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Requisition No. EZ108-152040/A

MERX I.D. No.

SPECIFICATIONS
For
Asbestos Abatement Project at CFB Esquimalt
Naden Property – Base Library and NIS Building
CFB Esquimalt (Naden), Victoria, BC
Project No. R.017157.009 January 2015

APPROVED BY:

Regional Manager, A&E Services — Date: 2015-01-20

Construction Safety Coordinator — Date: 2015-01-19

Tender Submission:

Project Manager — Date: 2015-01-19

END OF SECTION

PROFESSIONAL ENGINEER PROVINCE OF BRITISH COLUMBIA J. C. ANDERSON # 40557

Jan 20/2015
Division 23 only

PROFESSIONAL ENGINEER PROVINCE OF BRITISH COLUMBIA A. J. CHANAM

Jan. 20/15
Divisions only

Part 1 General

1.1 REFERENCES

.1 Appendix A: "Hazardous Building Materials Assessment – Esquimalt Graving Dock – DND Buildings", prepared by North West Environmental Group Ltd. (NWEG) for Public Service Commission of Canada Environmental Services, dated December, 2011, NWEG Project: 15609.

1.2 WORK COVERED BY CONTRACT DOCUMENTS

.1 National Investigative Service Building (NIS) (Naden 64) Building N4:

.1 Removal and disposal of asbestos-containing insulation debris from the top-side of the drywall ceiling of the washrooms (appears to be debris from removal of insulation from 1 – 2 mechanical pipe fittings).

.2 Cleaning of the top-side of the drywall ceiling of the washroom and adjacent surfaces, subsequent to removal of debris (two washroom ceilings, each approximately 6 square meters (2mx3m) of area)

.3 Patching and repairing (re-wrapping) asbestos-containing insulation on approximately three (3) mechanical pipe fittings in the ceiling space above the front Commissionaire's Security Desk

.1 Insulation is in good condition. Areas around fittings have had wrap removed. Wrap requires replacement

.2 Base Library (N12) crawlspace:

.1 Conducting the following work under Asbestos Abatement - Maximum Precautions (High Risk) procedures within the crawlspace, which comprises the approximately 450 m^2 footprint of the building (approximately 30m x 15m) and is approximately 1 m or less in height throughout.

.1 Removing asbestos-containing insulation from mechanical pipes throughout (approximately 107 lineal metres of insulation on mechanical pipe straights).

.2 Removing asbestos-containing insulation debris from crawlspace floors and other horizontal surfaces throughout.

.3 Installing 10mil vapour barrier and approximately 50mm thick concrete slurry ground-seal on the soil floor of the crawlspace

.2 Re-installing insulation on approximately 107 lineal metres of mechanical pipe straights within the crawlspace.

1.3 CONTRACT METHOD

.1 Construct Work under stipulated price contract.

.2 The Departmental Representative will be the Contract Administrator for this project.

1.4 WORK SEQUENCE

.1 Construct Work in stages to accommodate occupants continued use of the premises during construction.

.2 Where possible coordinate work with least disruption to DND base personnel and library workers during construction.

.3 Maintain fire access/control at all times.

1.5 CONTRACTOR USE OF PREMISES

.1 Co-ordinate use of premises under direction of Departmental Representative.

.2 Obtain and pay for use of additional storage or work areas needed for operations under this Contract with the Departmental Representative.

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

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

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

1.6 OWNER OCCUPANCY

.1 DND workers will occupy Base Library premises during entire construction period for execution of normal operations. DND workers within the NIS building may be relocated in stages to an alternate location to accommodate work for a maximum of three days.

.2 Co-operate with Departmental Representative in scheduling operations to minimize conflict and to facilitate DND and Departmental Representative usage.

1.7 ALTERATIONS, ADDITIONS OR REPAIRS TO EXISTING BUILDING

.1 Execute work with least possible interference or disturbance to local traffic, and normal use of premises. Arrange with Departmental Representative to facilitate execution of work.

.2 Use only existing walkways and doorways in building for moving workers and material.

.1 Accept liability for damage, safety of equipment and overloading of existing equipment.

1.8 EXISTING SERVICES

.1 Notify Departmental Representative and utility companies of intended interruption of services and obtain required permission.

.2 Submit schedule to and obtain approval from the Departmental Representative for any shut-down or closure of active service or facility including power and communication services. Adhere to approved schedule. Where unknown services are encountered, immediately contact the Departmental Representative and confirm findings in writing.

Keep duration of interruptions to a minimum. Where possible, carry out interruptions after normal working hours of occupants.

.3 Provide alternative routes for personnel and vehicular traffic as required.

.4 Establish location and extent of service lines in area of work before starting Work. Notify Departmental Representative of findings.

.5 Submit schedule to and obtain approval from Departmental Representative for any shut-down or closure of active service or facility including power and communications services. Adhere to approved schedule and provide notice to affected parties.

.6 Provide temporary services to maintain critical building and tenant systems.

.7 Where unknown services are encountered, immediately advise Departmental Representative and confirm findings in writing.

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

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

1.9 DOCUMENTS REQUIRED

.1 Maintain at job site, one copy each document as follows:

- .1 Contract Drawings.
- .2 Specifications.
- .3 Addenda.
- .4 Change Orders.
- .5 Permits and Licences
- .6 Field Test Reports.
- .7 Copy of Approved Work Schedule.
- .8 Health and Safety Plan and Other Safety Related Documents.
- .9 Other documents as specified.

END OF SECTION

Part 1 General

1.1 ACCESS AND EGRESS

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

1.2 USE OF SITE AND FACILITIES

.1 Execute work with least possible interference or disturbance to local traffic and normal use of premises. Make arrangements with Departmental Representative to facilitate work.

.2 Maintain existing services to building and provide for personnel and vehicle access.

.3 Use areas as designated by the Departmental Representative, on site for work and storage. All other areas are off limits to the Contractor except as approved by the Departmental Representative.

.4 Departmental Representative will assign sanitary facilities for use by Contractor's personnel. Keep facilities clean.

.5 Use only hallways, entrances, and access panels existing in building for moving workers and material.

.1 Accept liability for damage, safety of equipment and overloading of existing equipment.

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

1.3 ALTERATIONS, ADDITIONS OR REPAIRS TO EXISTING BUILDING

.1 Execute work with least possible interference or disturbance to building operations, occupants, and normal use of premises. Arrange with Departmental Representative to facilitate execution of work.

1.4 EXISTING SERVICES

.1 Notify Departmental Representative and utility companies of intended interruption of services and obtain required permission.

.2 Where Work involves breaking into or connecting to existing services, provide Departmental Representative with a schedule and obtain approval for any necessary interruption of communication, mechanical or electrical service throughout course of work. Adhere to provided schedule and keep duration of interruptions minimum. Where possible carry out interruptions after normal working hours of occupants, preferably on weekends.

.3 Provide for personnel, pedestrian and vehicular traffic as required.

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

1.5 SPECIAL REQUIREMENTS

.1 Site PWGSC safety orientation is required for all workers prior to commencing any work onsite.

.2 Within 10 working days of Contract award Contractor must provide a schedule for approval by Departmental Representative showing project milestones, anticipated progress stages and final completion of work within the time period specified in the contract documents.

.3 All work must be completed by March 31st, 2015

.4 Hours of work are 8am to 4pm Monday to Friday. Any work outside of these hours is not permitted unless approved by the Departmental Representative.

.5 Ensure Contractor's personnel employed on site become familiar with and obey regulations including DND safety, fire, traffic and security regulations.

.6 Keep within limits of work and avenues of ingress and egress.

.7 Contractors work area to be confirmed with the departmental representative prior to accessing the site.

.8 Deliver materials outside of peak traffic hours 7:00 to 9:00 and 13:00 to 15:00 unless otherwise approved by Departmental Representative.

1.6 ASBESTOS DISCOVERY

.1 Demolition or disturbance of asbestos containing materials can be hazardous to your health. Should the contractor or his/her workers encounter any materials resembling asbestos containing materials or other designated substances not identified in the Hazardous Materials Assessment in Appendix A in the course of the work that are to be disturbed, stop work and notify the Departmental Representative immediately. Do not proceed until written direction is provided by the Departmental Representative.

1.7 DUST AND PARTICULATE CONTROL

.1 Implement and maintain dust and particulate control measures immediately during construction and in accordance with Federal, Provincial and all other applicable regulations.

.2 Departmental Representative may stop work at any time when Contractor's control of dust and particulate is inadequate for wind conditions present at site, or when air quality monitoring indicates that release of fugitive dusts and particulate into atmosphere equals or exceeds specified levels by British Columbia Workers Compensation Board. Cost of such work stoppage shall be borne by the Contractor.

.3 If Contractor's dust and particulate control is not sufficient for controlling dust and particulate into atmosphere, stop work. Contractor must prepare and discuss procedures to resolve the problem. Make all necessary changes to operations prior to resuming any excavation, handling, processing, or any other work that may cause release of dusts or particulate.

.4 Recover and treat any runoff from water applied to the roads. Prevent any water applied to the roads or excavation from discharging directly to the storm sewer or offsite.

1.8 SECURITY

.1 Where security has been reduced by Work of Contract, provide temporary means to maintain security.

.2 Security clearances:

.1 Personnel employed on this project will be subject to security check. Obtain clearance, as instructed, for each individual who will require to enter premises.

1.9 BUILDING SMOKING ENVIRONMENT

.1 Comply with applicable PWGSC and DND smoking restrictions. Smoke only in designated smoking areas. Smoking is not permitted within any buildings.

1.10 MEDIA AND INTERVIEWS

.1 The Contractor must ensure that no workers, subcontractors, specialists or others on their team provides information or grants interviews to the media or others regarding this project. Videotaping for any purpose on the DND site is strictly prohibited unless coordinated in advance with the Departmental representative.

END OF SECTION

Part 1 General

1.1 ADMINISTRATIVE

.1 Schedule and administer project meetings throughout the progress of the work at the call of the Departmental Representative.

.2 Prepare agenda for meetings.

.3 Distribute written notice of each meeting four days in advance of meeting date to Departmental Representative.

.4 Provide physical space and make arrangements for meetings.

.5 Preside at meetings.

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

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

.8 Representative of 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 10 days after award of Contract, request a meeting of parties in contract to discuss and resolve administrative procedures and responsibilities.

.2 Representatives from DND, PWGSC, Consultant, Contractor, major Subcontractors, 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 in the Work.

.2 Schedule of Work.

.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 Take-over procedures, acceptance, warranties in accordance with Section 01 77 00 - Closeout Procedures.

.6 Appointment of inspection and testing agencies or firms.

.7 Insurances, transcript of policies.

1.3 PROGRESS MEETINGS

.1 During course of Work schedule progress meetings weekly.

.2 Contractor, Departmental Representative and Consultant are to be in attendance.

.3 Notify parties minimum 2 days prior to meetings.

.4 Record minutes of meetings and circulate to attending parties and affected parties not in attendance within 2 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 Corrective measures and procedures to regain projected schedule if required.

.6 Revision to construction schedule.

.7 Progress schedule, during succeeding work period.

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

.9 Other business.

END OF SECTION

Part 1 General

1.1 ADMINISTRATIVE

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

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

.3 Present shop drawings, product data, and samples SI Metric units.

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

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

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

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

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

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

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

1.2 SHOP DRAWINGS AND PRODUCT DATA

.1 The term "shop drawings" means drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are to be provided by Contractor to illustrate details of a portion of Work.

.2 Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of Work.

.3 Allow 7 days for Departmental Representative's review of each submission.

.4 Adjustments made on shop drawings by Departmental Representative, and/or Consultant 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 shop drawings as Departmental Representative and/or Consultant may require, consistent with Contract Documents. When resubmitting, notify Departmental Representative and/or Consultant in writing of revisions other than those requested.

.6 Accompany submissions with transmittal letter, in duplicate, containing:

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

.7 Submissions include:

- .1 Date and revision dates.
- .2 Project title and number.
- .3 Name and address of:
  - .1 Subcontractor.
  - .2 Supplier.
  - .3 Manufacturer.
- .4 Contractor's stamp, signed by Contractor's authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents.
- .5 Details of appropriate portions of Work as applicable:
  - .1 Capacities.
  - .2 Performance characteristics.
  - .3 Standards.

.8 After Departmental Representative's and/or Consultant review, distribute copies.

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

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

.11 The review of shop drawings by Public Works and Government Services Canada (PWGSC) is for sole purpose of ascertaining conformance with general concept.

- .1 This review shall not mean that PWGSC approves detail design inherent in shop drawings, responsibility for which shall remain with Contractor submitting same, and such review shall not relieve Contractor of responsibility for errors or omissions in shop drawings or of responsibility for meeting requirements of construction and Contract Documents.
- .2 Without restricting generality of foregoing, Contractor is responsible for dimensions to be confirmed and correlated at job site, for information that pertains solely to fabrication processes or to techniques of construction and installation and for co-ordination of Work of sub-trades.

1.3 PHOTOGRAPHIC DOCUMENTATION

.1 Submit electronic copy of colour digital photography in jpg format, standard resolution as directed by Departmental Representative and/or Consultant.

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

.3 Number of viewpoints: 2 locations.

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

1.4 CERTIFICATES AND TRANSCRIPTS

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

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

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 Government of Canada.

- .1 Canada Labour Code - Part II
- .2 Canada Occupational Health and Safety Regulations.

.2 National Building Code of Canada (NBC):

- .1 Part 8, Safety Measures at Construction and Demolition Sites.

.3 Canadian Standards Association (CSA) as amended:

- .1 CSA Z797-2009 Code of Practice for Access Scaffold
- .2 CSA S269.1-1975 (R2003) Falsework for Construction Purposes
- .3 CSA S350-M1980 (R2003) Code of Practice for Safety in Demolition of Structures

.4 Fire Protection Engineering Services, HRSDC:

- .1 FCC No. 301, Standard for Construction Operations.
- .2 FCC No. 302, Standard for Welding and Cutting.

.5 American National Standards Institute (ANSI):

- .1 ANSI A10.3, Operations – Safety Requirements for Powder-Actuated Fastening Systems.

.6 Province of British Columbia:

- .1 Workers Compensation Act Part 3-Occupational Health and Safety.
- .2 Occupational Health and Safety Regulation

.7 Yukon Territory

- .1 Occupational Health and Safety Act, R.S.Y.

1.2 RELATED SECTIONS

.1 Refer to the following current NMS sections as required:

.1	Submittals procedures:	Section 01 33 00
.2	Temporary utilities:	Section 01 51 00
.3	Construction facilities:	Section 01 52 00
.4	Temporary barriers and enclosures:	Section 01 56 00
.5	Structure demolition:	Section 02 41 16
.6	Asbestos abatement:	Section 02 82 00.02
.7	Asbestos abatement:	Section 02 82 00.03

1.3 WORKERS' COMPENSATION BOARD COVERAGE

.1 Comply fully with the Workers' Compensation Act, regulations and orders made pursuant thereto, and any amendments up to the completion of the work.

.2 Maintain Workers' Compensation Board coverage during the term of the Contract, until and including the date that the Certificate of Final Completion is issued.

1.4 COMPLIANCE WITH REGULATIONS

.1 PWGSC may terminate the Contract without liability to PWGSC where the Contractor, in the opinion of PWGSC, refuses to comply with a requirement of the Workers' Compensation Act or the Occupational Health and Safety Regulations.

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

1.5 SUBMITTALS

.1 Submit to Departmental Representative submittals listed for review in accordance with Section 01 33 00

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

.3 Submit the following:

- .1 Health and Safety Plan.
- .2 Copies of reports or directions issued by Federal and Provincial health and safety inspectors.
- .3 Copies of incident and accident reports.
- .4 Complete set of Material Safety Data Sheets (MSDS), and all other documentation required by Workplace Hazardous Materials Information System (WHMIS) requirements.
- .5 Emergency Procedures.

.4 The Departmental Representative will review the Contractor's site-specific project Health and Safety Plan and emergency procedures, and provide comments to the Contractor within 7 days after receipt of the plan. Revise the plan as appropriate and resubmit to Departmental Representative.

.5 Medical surveillance: where prescribed by legislation, regulation or safety program, submit certification of medical surveillance for site personnel prior to commencement of work, and submit additional certifications for any new site personnel to Departmental Representative.

.6 Submission of the Health and Safety Plan, and any revised version, to the Departmental Representative is for information and reference purposes only. It shall not:

- .1 Be construed to imply approval by the Departmental Representative.
- .2 Be interpreted as a warranty of being complete, accurate and legislatively compliant.
- .3 Relieve the Contractor of his legal obligations for the provision of health and safety on the project.

1.6 RESPONSIBILITY

.1 Assume responsibility as the Prime Contractor for work under this contract.

.2 Be responsible for health and safety of persons on site, safety of property on site and for protection of persons adjacent to site and environment to extent that they may be affected by conduct of Work.

.3 Comply with and enforce compliance by employees with safety requirements of Contract documents, applicable Federal, Provincial, Territorial and local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan.

1.7 HEALTH AND SAFETY COORDINATOR

.1 The Health and Safety Coordinator must:

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

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

.3 Be on site during execution of work.

1.8 GENERAL CONDITIONS

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

.2 Ensure that non-authorized persons are not allowed to circulate in designated construction areas of the work site.

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

.2 Secure site at night time as deemed necessary to protect site against entry.

1.9 PROJECT/SITE CONDITIONS

.1 Work at site will involve contact with:

.1 Asbestos-containing materials

.2 Lead-containing paints

1.10 REGULATORY REQUIREMENTS

.1 Comply with specified codes, acts, bylaws, standards and regulations to ensure safe operations at site.

.2 In event of conflict between any provision of the above authorities, the most stringent provision will apply. Should a dispute arise in determining the most stringent requirement, the Departmental Representative will advise on the course of action to be followed.

1.11 WORK PERMITS

.1 Obtain speciality permits related to project before start of work.

1.12 FILING OF NOTICE

.1 The General Contractor is to complete and submit a Notice of Project as required by Provincial authorities.

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

1.13 HEALTH AND SAFETY PLAN

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

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

.1 Primary requirements:

.1 Contractor's safety policy.

.2 Identification of applicable compliance obligations.

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

.4 General safety rules for project.

.5 Job-specific safe work, procedures.

.6 Inspection policy and procedures.

.7 Incident reporting and investigation policy and procedures.

.8 Occupational Health and Safety Committee/Representative procedures.

.9 Occupational Health and Safety meetings.

.10 Occupational Health and Safety communications and record keeping procedures.

.2 Summary of health risks and safety hazards resulting from analysis of hazard assessment, with respect to site tasks and operations which must be performed as part of the work.

.3 List hazardous materials to be brought on site as required by work.

.4 Indicate Engineering and administrative control measures to be implemented at the site for managing identified risks and hazards.

.5 Identify personal protective equipment (PPE) to be used by workers.

.6 Identify personnel and alternates responsible for site safety and health.

.7 Identify personnel training requirements and training plan, including site orientation for new workers.

.3 Develop the plan in collaboration with all subcontractors. Ensure that work/activities of subcontractors are included in the hazard assessment and are reflected in the plan.

.4 Revise and update Health and Safety Plan as required, and re-submit to the Departmental Representative.

.5 Departmental Representative's review: the review of Health and Safety Plan by Public Works and Government Services Canada (PWGSC) shall not relieve the Contractor of responsibility for errors or omissions in final Health and Safety Plan or of responsibility for meeting all requirements of construction and Contract documents.

1.14 EMERGENCY PROCEDURES

.1 List standard operating procedures and measures to be taken in emergency situations. Include an evacuation plan and emergency contacts (i.e. names/telephone numbers) of:

- .1 Designated personnel from own company.
- .2 Regulatory agencies applicable to work and as per legislated regulations.
- .3 Local emergency resources.
- .4 Departmental Representative.

.2 Include the following provisions in the emergency procedures:

- .1 Notify workers and the first-aid attendant, of the nature and location of the emergency.
- .2 Evacuate all workers safely.
- .3 Check and confirm the safe evacuation of all workers.
- .4 Notify the fire department or other emergency responders.
- .5 Notify adjacent workplaces or residences which may be affected if the risk extends beyond the workplace.
- .6 Notify Departmental Representative.

.3 Provide written rescue/evacuation procedures as required for, but not limited to:

- .1 Work at high angles.
- .2 Work in confined spaces or where there is a risk of entrapment.
- .3 Work with hazardous substances.
- .4 Underground work.
- .5 Work on, over, under and adjacent to water.
- .6 Workplaces where there are persons who require physical assistance to be moved.

.4 Design and mark emergency exit routes to provide quick and unimpeded exit.

.5 At least once each year, emergency drills must be held to ensure awareness and effectiveness of emergency exit routes and procedures, and a record of the drills must be kept.

.6 Revise and update emergency procedures as required, and re-submit to the Departmental Representative.

1.15 HAZARDOUS PRODUCTS

.1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage and disposal of hazardous materials, and regarding labelling and provision of Material Safety Data Sheets (MSDS) acceptable to the Departmental Representative and in accordance with the Canada Labour Code.

.2 Where use of hazardous and toxic products cannot be avoided:

- .1 Advise Departmental Representative beforehand of the product(s) intended for use. Submit applicable MSDS and WHMIS documents as per Section 01 33 00.
- .2 In conjunction with Departmental Representative, schedule to carry out work during "off hours" when tenants have left the building.
- .3 Provide adequate means of ventilation in accordance with Section 01 51 00.

1.16 ASBESTOS HAZARD

.1 Modifications to spray- or trowel-applied asbestos surfaces can be hazardous to health.

.2 Removal and handling of asbestos will be performed as indicated in Sections 02 82 00.02 and 02 82 00.03

1.17 REMOVAL OF LEAD- CONTAINING PAINTS

.1 All paints containing TCLP lead concentrations above 5 ppm are classified as hazardous.

.2 Carry out demolition activities involving lead-containing paints in accordance with applicable regulations.

1.18 AMMONIA GAS HAZARD

.1 Excavation activities in areas adjacent to aprons and taxiways of certain airports have resulted in encounters with ammonia gas.

.1 Ammonia gas results from decomposition of urea, used for de-icing purposes, which seeps through surface pavement joints and cracks to become trapped in sometimes heavily concentrated pockets in underlying and adjacent soil.

.2 Advise all workers, before any such excavation work, that should the smell of ammonia be detected at any time when working in excavations, then the workers must immediately leave the excavation area until such time as the volume of ammonia can be measured and appropriate safety measures are taken.

.3 Ensure that all workers are aware that, at certain levels of concentration, unprotected exposure to ammonia can result in nose and throat irritation, breathing difficulty, and eye and skin irritation. Prolonged exposure without adequate protection could result in serious and permanent damage to personal health.

.4 Notify Departmental Representative immediately upon detection of ammonia.

.5 The Departmental Representative will act to have the ammonia gas concentration measured immediately and, depending upon the results, will direct procedures to be adopted for the safety of all personnel in adjacent areas.

1.19 ELECTRICAL SAFETY REQUIREMENTS

.1 Comply with authorities and ensure that, when installing new facilities or modifying existing facilities, all electrical personnel are completely familiar with existing and new electrical circuits and equipment and their operation.

.1 Before undertaking any work, coordinate required energizing and de-energizing of new and existing circuits with Departmental Representative.

.2 Maintain electrical safety procedures and take necessary precautions to ensure safety of all personnel working under this Contract, as well as safety of other personnel on site.

1.20 ELECTRICAL LOCKOUT

.1 Develop, implement and enforce use of established procedures to provide electrical lockout and to ensure the health and safety of workers for every event where work must be done on any electrical circuit or facility.

.2 Prepare the lockout procedures in writing, listing step-by-step processes to be followed by workers, including how to prepare and issue the request/authorization form. Have procedures available for review upon request by the Departmental Representative.

.3 Keep the documents and lockout tags at the site and list in a log book for the full duration of the Contract. Upon request, make such data available for viewing by Departmental Representative or by any authorized safety representative.

1.21 OVERLOADING

.1 Ensure no part of work is subjected to a load which will endanger its safety or will cause permanent deformation.

1.22 FALSEWORK

.1 Design and construct falsework in accordance with CSA S269.1-1975 (R2003).

1.23 SCAFFOLDING

.1 Design, construct and maintain scaffolding in a rigid, secure and safe manner, in accordance with CSA Z797-2009 and B.C. Occupational Health and Safety Regulations.

1.24 Confined Spaces

.1 Carry out work in confined spaces in compliance with all Federal and Provincial regulations whichever is more stringent.

1.25 POWDER-ACTUATED DEVICES

.1 Use powder-actuated devices in accordance with ANSI A10.3 only after receipt of written permission from the Departmental Representative.

1.26 FIRE SAFETY AND HOT WORK

.1 Obtain Departmental Representative's authorization before any welding, cutting or any other hot work operations can be carried out on site.

.2 Hot work includes cutting/melting with use of torch, flame heating roofing kettles, or other open flame devices and grinding with equipment which produces sparks.

1.27 FIRE SAFETY REQUIREMENTS

.1 Store oily/paint-soaked rags, waste products, empty containers and materials subject to spontaneous combustion in ULC approved, sealed containers and remove from site on a daily basis.

.2 Handle, store, use and dispose of flammable and combustible materials in accordance with the National Fire Code of Canada.

1.28 FIRE PROTECTION AND ALARM SYSTEM

.1 Fire protection and alarm systems shall not be:

.1 Obstructed.

.2 Shut off.

.3 Left inactive at the end of a working day or shift.

.2 Do not use fire hydrants, standpipes and hose systems for purposes other than firefighting.

.3 Be responsible/liable for costs incurred from the fire department, the building owner and the tenants, resulting from false alarms.

1.29 UNFORESEEN HAZARDS

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

1.30 Posted Documents

.1 Post legible versions of the following documents on site:

.1 Health and Safety Plan.

.2 Sequence of work.

.3 Emergency procedures.

.4 Site drawing showing project layout, locations of the first-aid station, evacuation route and marshalling station, and the emergency transportation provisions.

.5 Notice of Project.

.6 Floor plans or site plans.

.7 Notice as to where a copy of the Workers' Compensation Act and Regulations are available on the work site for review by employees and workers.

.8 Workplace Hazardous Materials Information System (WHMIS) documents.

.9 Material Safety Data Sheets (MSDS).

.10 List of names of Joint Health and Safety Committee members, or Health and Safety Representative, as applicable.

.2 Post all Material Safety Data Sheets (MSDS) on site, in a common area, visible to all workers and in locations accessible to tenants when work of this Contract includes construction activities adjacent to occupied areas.

.3 Postings should be protected from the weather, and visible from the street or the exterior of the principal construction site shelter provided for workers and equipment, or as approved by the Departmental Representative.

1.31 MEETINGS

.1 Attend health and safety pre-construction meeting and all subsequent meetings called by the Departmental Representative.

1.32 CORRECTION OF NON-COMPLIANCE

.1 Immediately address health and safety non-compliance issues identified by the Departmental Representative.

.2 Provide Departmental Representative with written report of action taken to correct non-compliance with health and safety issues identified.

.3 The Departmental Representative may issue a "stop work order" if non-compliance of health and safety regulations is not corrected immediately or within posted time. The General Contractor/subcontractors will be responsible for any costs arising from such a "stop work order".

END OF SECTION

Part 1 General

1.1 FIRE DEPARTMENT BRIEFING

.1 Departmental Representative will co-ordinate arrangements for contractor for briefing on Fire Safety at pre-work conference by Fire Chief before work is commenced.

1.2 REPORTING FIRES

.1 Know location of nearest fire alarm box and telephone, including emergency phone number.

.2 Report immediately fire incidents to Fire Department as follows:

- .1 Activate nearest fire alarm box; or
- .2 Telephone 9-1-1

.3 When reporting fire by telephone, give location of fire, name or number of building and be prepared to verify location.

1.3 INTERIOR AND EXTERIOR FIRE PROTECTION AND ALARM SYSTEMS

.1 Fire protection and alarm system will not be:

- .1 Obstructed;
- .2 Shut-off; and
- .3 Left inactive at end of working day or shift without authorization from Fire Chief.

.2 Fire hydrants, standpipes and hose systems will not be used for other than fire-fighting purposes unless authorized by Fire Chief.

1.4 FIRE EXTINGUISHERS

.1 Supply fire extinguishers, as scaled by Fire Chief, necessary to protect work in progress and contractor's physical plant on site.

1.5 BLOCKAGE OF ROADWAYS

.1 Advise Fire Chief of work that would impede fire apparatus response. This includes violation of minimum overhead clearance, as prescribed by Fire Chief, erecting of barricades and digging of trenches.

1.6 SMOKING PRECAUTIONS

.1 Observe smoking regulations.

Comply with applicable PWGSC and DND smoking restrictions. Smoke only in designated smoking areas. Smoking is not permitted within any buildings.

1.7 RUBBISH AND WASTE MATERIALS

.1 Keep rubbish and waste materials at minimum quantities.

.2 Burning of rubbish is prohibited.

.3 Removal:

.1 Remove rubbish from work site at end of work day or shift or as directed.

.4 Storage:

.1 Store oily waste in approved receptacles to ensure maximum cleanliness and safety.

.2 Deposit greasy or oily rags and materials subject to spontaneous combustion in approved receptacles and remove specified.

1.8 FLAMMABLE AND COMBUSTIBLE LIQUIDS

.1 Handling, storage and use of flammable and combustible liquids governed by current National Fire Code of Canada.

.2 Keep flammable and combustible liquids such as gasoline, kerosene and naphtha for ready use in quantities not exceeding 45 litres provided they are stored in approved safety cans bearing Underwriters' Laboratory of Canada or Factory Mutual seal of approval. Storage of quantities of flammable and combustible liquids exceeding 45 litres for work purposes requires permission of Fire Chief.

.3 Transfer of flammable and combustible liquids is prohibited within buildings or jetties.

.4 Transfer of flammable and combustible liquids will not be carried out in vicinity of open flames or any type of heat-producing devices.

.5 Do not use flammable liquids having flash point below 38 degrees C such as naphtha or gasoline as solvents or cleaning agents.

.6 Store flammable and combustible waste liquids, for disposal, in approved containers located in safe ventilated area. Keep quantities minimum and Fire Department is to be notified when disposal is required.

1.9 HAZARDOUS SUBSTANCES

.1 Work entailing use of toxic or hazardous materials, chemicals and/or explosives, or otherwise creating hazard to life, safety or health, in accordance with National Fire Code of Canada.

.2 Obtain from Fire Chief a "Hot Work" permit for work involving welding, burning or use of blowtorches and salamanders, in buildings or facilities.

.3 When Work is carried out in dangerous or hazardous areas involving use of heat, provide fire watchers equipped with sufficient fire extinguishers. Determination of dangerous or hazardous areas along with level of protection necessary for Fire Watch is at discretion of Fire Chief. Contractors are responsible for providing fire watch service for work on scale established and in conjunction with Fire Chief at pre-work conference.

.4 Provide ventilation where flammable liquids, such as lacquers or urethanes are used, eliminate sources of ignition. Inform Fire Chief prior to and at cessation of such work.

1.10 QUESTIONS AND/OR CLARIFICATION

.1 Direct questions or clarification on Fire Safety in addition to above requirements to Fire Chief.

1.11 FIRE INSPECTION

.1 Co-ordinate site inspections by Fire Chief through Departmental Representative.

.2 Allow Fire Chief unrestricted access to work site.

.3 Co-operate with Fire Chief during routine fire safety inspection of work site.

.4 Immediately remedy unsafe fire situations observed by Fire Chief.

END OF SECTION

Part 1 General

1.1 REFERENCES AND CODES

.1 Perform Work in accordance with National Building Code of Canada (NBC) including amendments up to tender closing date and other codes of provincial or local application provided that in case of conflict or discrepancy, more stringent requirements apply.

.2 Comply with the current version of British Columbia's Occupational Health and Safety Regulation (BC Reg 296/97)

.3 Comply with Canada Labour Code, Canada Occupational Safety and Health Regulations.

.4 Meet or exceed requirements of:

.1 Contract documents.

.2 Specified standards, codes and referenced documents.

.5 Comply with all Permits and approvals that apply to the Work.

.6 All Federal, Provincial and Local laws and Regulations shall apply as appropriate to the Contractor and the Work.

.7 Contractor shall on its part and on the part of all of their Subcontractors ensure compliance with the requirements specified in these specifications and contract documents.

.8 Codes, Standards and Regulations are specified in other sections of the specifications and the Work shall be done in accordance with those Codes, Standards and Regulations where applicable.

1.2 HAZARDOUS MATERIAL DISCOVERY

.1 Asbestos: Removal of asbestos containing materials (ACM) is hazardous to health and is one of the primary purposes of this contract. Notify the Departmental Representative immediately when additional materials resembling ACM's that have not been previously identified are observed. Refer to Section 02 82 00.01 - Asbestos Abatement - Minimum Precautions, 02 82 00.02 - Asbestos Abatement - Intermediate Precautions, 02 82 00.03 - Asbestos Abatement - Maximum Precautions.

1.3 BUILDING SMOKING ENVIRONMENT

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

.2 Comply with applicable PWGSC and DND smoking restrictions. Smoke only in designated smoking areas. Smoking is not permitted within any buildings.

END OF SECTION

Part 1 General

1.1 ACTION AND INFORMATIONAL SUBMITTALS

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

1.2 INSTALLATION AND REMOVAL

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

.2 Remove from site all such work after use.

1.3 DEWATERING

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

1.4 WATER SUPPLY

.1 Departmental Representative will provide continuous supply of potable water for construction use. Contractor will be responsible to pay for water usage at standard DND CFB Esquimalt rates.

.2 Arrange for connection location with Departmental Representative and pay costs for installation, maintenance and removal.

1.5 TEMPORARY HEATING AND VENTILATION

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

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

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

- .1 Facilitate progress of Work.
- .2 Protect Work and products against dampness and cold.
- .3 Prevent moisture condensation on surfaces.
- .4 Provide ambient temperatures and humidity levels for storage, installation and curing of materials.
- .5 Provide adequate ventilation to meet health regulations for safe working environment.

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

.5 Ventilating:

- .1 Prevent accumulations of dust, fumes, mists, vapours or gases in areas occupied during construction.
- .2 Provide local exhaust ventilation to prevent harmful accumulation of hazardous substances into atmosphere of occupied areas.

.3 Dispose of exhaust materials in manner that will not result in harmful exposure to persons.

.4 Ventilate storage spaces containing hazardous or volatile materials.

.5 Ventilate temporary sanitary facilities.

.6 Continue operation of ventilation and exhaust system for time after cessation of work process to assure removal of harmful contaminants.

.6 Maintain strict supervision of operation of temporary heating and ventilating equipment to:

.1 Conform with applicable codes and standards.

.2 Enforce safe practices.

.3 Prevent abuse of services.

.4 Prevent damage to finishes.

.5 Vent direct-fired combustion units to outside.

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

.8 Departmental representative will advise if acceptable for the permanent heating system of building, to be used when available. Be responsible for damage to heating system if use is permitted.

1.6 TEMPORARY POWER AND LIGHT

.1 Provide and pay Departmental Representative for temporary power during construction for temporary lighting and operating of power tools, to a maximum supply of 230 volts 30 amps.

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

.3 Provide and maintain temporary lighting throughout project. Ensure level of illumination on all floors and stairs is not less than 162 lx.

1.7 TEMPORARY COMMUNICATION FACILITIES

.1 Provide and pay for temporary telephone, fax, data hook up, necessary for own use.

1.8 FIRE PROTECTION

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

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

Part 2 Execution

2.1 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 that complies with EPA 832/R-92-005 or requirements of authorities having jurisdiction, whichever is more stringent.

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

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

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 01 51 00 Temporary Utilities.

1.2 REFERENCES

.1 Canadian Standards Association (CSA International)

- .1 CSA-A23.1/A23.2-(2014), Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
- .2 CSA-0121-M1978(R2003), Douglas Fir Plywood.
- .3 CAN/CSA-S269.2-M1987(R2003), Access Scaffolding for Construction Purposes.
- .4 CAN/CSA-Z321-96(R2001), Signs and Symbols for the Occupational Environment.

.2 Public Works Government Services Canada (PWGSC) Standard Acquisition Clauses and Conditions (SACC)-ID: R0202D, Title: General Conditions 'C', In Effect as of: March 6th, 2012.

.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.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

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

1.4 INSTALLATION AND REMOVAL

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

.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.

1.5 SCAFFOLDING

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

.2 Provide and maintain scaffolding, ladders, platforms, or temporary stairs as required.

1.6 HOISTING

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

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

1.7 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.

1.8 CONSTRUCTION PARKING

.1 Parking will be permitted on site provided it does not disrupt performance of Work or impede the flow of DND Vehicular traffic. Contractor to request parking locations from the Departmental Representative and only allow parking in locations designated by the Departmental Representative.

.2 Provide and maintain adequate access to project site and DND buildings and roadways.

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

1.9 OFFICES

.1 The Contractors Superintendents vehicle may be considered as the Contractors site office.

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

.3 Subcontractors to provide their own offices as necessary but only in locations previously approved by the Departmental Representative.

1.10 EQUIPMENT, TOOL AND MATERIALS STORAGE

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

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

1.11 SANITARY FACILITIES

.1 Permanent facilities may be used on approval of Departmental Representative.

.2 Keep area and premises in sanitary condition.

1.12 CONSTRUCTION SIGNAGE

.1 Maintain approved signs and notices approved by the Departmental Representative and in accordance with the construction documents in good condition for duration of project, and dispose of off-site on completion of project or earlier if directed by Departmental Representative.

1.13 PROTECTION AND MAINTENANCE OF TRAFFIC

.1 Provide access 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 Lighting: to assure full and clear visibility for full width of road and work areas during night work operations.

1.14 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.

Part 2 Execution

2.1 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 sediment and erosion control plan, specific to site, that complies with EPA 832/R-92-005 or requirements of authorities having jurisdiction, whichever is more stringent.

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

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

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 Canadian Standards Association (CSA International)

.1 CSA-O121-08(R2013), 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 HOARDING

.1 If required to facilitate work erect temporary site enclosures using 38 x 89 mm construction grade lumber framing at 600 mm centres and 1200 x 2400 x 13 mm exterior grade fir plywood to CSA O121.

.2 Erect and maintain pedestrian walkways including roof and side covers, complete with signs and electrical lighting as required by law.

1.4 GUARD RAILS AND BARRICADES

.1 Provide secure, rigid guard rails and barricades around deep excavations, open shafts, open stair wells, open edges of floors and roofs, crawlspace entries and any other location that may be dangerous to works or the public.

.2 Provide as required by:

.1 WorkSafeBC and all governing authorities.

.2 Canada Labour Code - Part II

.3 Government of Canada Occupational Health and Safety Regulations.

1.5

In the case of multiple applicable regulations the more stringent will apply.

1.6 DUST TIGHT SCREENS

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

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

1.7 ACCESS TO SITE

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

1.8 TRAFFIC FLOW

.1 Provide and maintain competent signal flag operators, traffic signals, barricades and flares, lights, or lanterns as required to perform Work and protect public if vehicle or pedestrian access is impacted by Work activities.

1.9 FIRE ROUTES

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

1.10 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.

1.11 PROTECTION OF BUILDING FINISHES

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

.2 Provide necessary screens, covers, and hoardings.

.3 Confirm with Departmental Representative locations and installation schedule 7 days prior to installation.

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

1.12 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste for recycling and dispose of off-site in accordance with all Federal, Provincial and Local laws and regulations.

END OF SECTION

Part 1 General

1.1 PROJECT CLEANLINESS

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

.2 Remove waste materials from site at daily regularly scheduled times or dispose of as directed by Departmental Representative. Do not burn waste materials on site.

.3 Clear snow and ice from access to buildings as directed by the Departmental Representative.

.4 Make arrangements with and obtain permits from authorities 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.

.7 Dispose of waste materials and debris off site.

.8 Clean interior areas on an ongoing basis, and maintain areas free of dust and other contaminants during all operations.

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

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

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

.12 Schedule cleaning operations so that resulting dust, debris and other contaminants will not fall on wet, newly painted surfaces nor contaminate building systems.

1.2 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 other than that caused by Departmental Representative or other Contractors.

.5 Remove waste materials from site at regularly scheduled times or dispose of as directed by Departmental Representative. Do not burn waste materials on site

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

.7 Remove stains, spots, marks and dirt from decorative work, electrical and mechanical fixtures, furniture fitments, walls, and floors.

.8 Clean lighting reflectors, lenses, and other lighting surfaces affected by the Work.

.9 Vacuum clean and dust building interiors, behind grilles, louvres and screens affected by the Work.

.10 Broom clean and wash exterior walks, steps and surfaces; rake clean other surfaces of grounds affected by the Work.

.11 Remove dirt and other disfiguration from exterior surfaces caused by the work.

.12 Clean and sweep areaways, and sunken wells or crawlspace entrances affected by the Work.

.13 Sweep and wash clean paved areas affected by the Work.

.14 Remove debris and surplus materials from crawl areas and other accessible concealed spaces.

1.3 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for recycling in accordance with all applicable Federal, Provincial or Local laws and regulations.

.2 Dispose of all waste off site.

END OF SECTION

Part 1 General

1.1 ADMINISTRATIVE REQUIREMENTS

.1 Acceptance of Work Procedures:

- .1 Contractor's Inspection: Contractor 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 submit verification that corrections have been made.
  - .2 Request Departmental Representative inspection.
- .2 Departmental Representative Inspection:
  - .1 Departmental Representative and Contractor to inspect Work and identify defects and deficiencies.
  - .2 Contractor to correct Work as directed.
- .3 Completion Tasks: submit written certificates in English that tasks have been performed as follows:
  - .1 Work: completed and inspected for compliance with Contract Documents.
  - .2 Defects: corrected and deficiencies completed.
  - .3 Work: complete and ready for final inspection.
- .4 Final Inspection:
  - .1 When completion tasks are done, request final inspection of Work by Departmental Representative and Contractor.
  - .2 When Work incomplete according to Departmental Representative, complete outstanding items and request re-inspection.
- .5 Declaration of Substantial Performance: when Departmental Representative considers deficiencies and defects corrected and requirements of Contract substantially performed, make application for Certificate of Substantial Performance.
- .6 Commencement of Lien and Warranty Periods: date of Departmental Representatives acceptance of submitted declaration of Substantial Performance to be date for commencement for warranty period and commencement of lien period unless required otherwise by lien statute of Place of Work.
- .7 Final Payment:
  - .1 When Departmental Representative considers final deficiencies and defects corrected and requirements of Contract met, make application for final payment.
- .8 Payment of Holdback: after issuance of Certificate of Substantial Performance of Work, submit application for payment of holdback amount in accordance with contractual agreement.

1.2 FINAL CLEANING

.1 Clean in accordance with Section 01 74 11 - Cleaning.

.1 Remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 02 81 01 – Hazardous Materials

.2 Section 02 82 00.02 – Asbestos Abatement – Intermediate Precautions

.3 Section 02 82 00.03 – Asbestos Abatement – Maximum Precautions

1.2 REFERENCES

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

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

.1 Material Safety Data Sheets (MSDS).

.3 National Fire Code of Canada (current version).

.4 Transportation of Dangerous Goods Act (TDGA – current version).

.5 Transportation of Dangerous Goods Regulations (current version).

1.3 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.

1.4 ACTION AND INFORMATIONAL 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 Consultant when shipping toxic wastes off site.

.3 Maintain 1 copy of product data in readily accessible file on site.

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

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

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

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

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

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

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

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 02 50 13 – Management of Toxic Waste

.2 Section 02 82 00.02 – Asbestos Abatement – Intermediate Precautions

.3 Section 02 82 00.03 – Asbestos Abatement – Maximum Precautions

1.2 REFERENCES

.1 Definitions:

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

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

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

.2 Reference Standards:

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

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

.2 Department of Justice Canada (Jus)

.1 Transportation of Dangerous Goods Act, (TDGA – current version).

.2 Transportation of Dangerous Goods Regulations (current version).

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

.1 Material Safety Data Sheets (MSDS).

.4 National Research Council Canada Institute for Research in Construction (NRC-IRC)

.1 National Fire Code of Canada (current version).

1.3 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 digital copies of WHMIS MSDS in accordance with Section 01 35 33 - Health and Safety Requirements to Consultant for each hazardous material required prior to bringing hazardous material on site.

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

1.4 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with manufacturer's written instructions.

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

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

.1 When exporting hazardous waste to another country, ensure compliance with Export and Import of Hazardous Waste and Hazardous Recyclable Materials 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.

.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 quantities of hazardous materials and wastes in excess of 5 kg for solids, and 5 litres for liquids:

.1 Store hazardous materials and wastes in closed and sealed containers.

.2 Label containers of hazardous materials and wastes in accordance with WHMIS.

.3 Store hazardous materials and wastes in containers compatible with that material or waste.

.4 Segregate incompatible materials and wastes.

.5 Ensure that different hazardous materials or hazardous wastes are 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 Comply with applicable federal, provincial and municipal laws and regulations for generators of hazardous waste.

.2 Use licensed carrier authorized by provincial authorities to accept subject material.

.3 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.

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

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

.6 Provide photocopy or digital scan of shipping documents and waste manifests to Consultant.

.7 Track receipt of completed manifest from consignee after shipping dangerous goods. Provide photocopy or digital scan of completed manifest to Consultant.

.8 Report discharge, emission, or escape of hazardous materials immediately to Departmental Representative, Consultant 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 and Consultant. Submit a written spill report to Departmental Representative and Consultant 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 recycling, where applicable.

.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 SUMMARY

.1 Unless otherwise determined through risk assessment conducted by a qualified person in accordance with authorities having jurisdiction, comply with requirements of this Section when performing following Work:

- .1 NIS (Naden 64) Building N4.
  - .1 Removal and disposal of asbestos-containing insulation debris from the top-side of the drywall ceiling of the washrooms.
  - .2 Cleaning of the top-side of the drywall ceiling of the washroom and adjacent surfaces, subsequent to removal of debris
  - .3 Patching and repairing (re-wrapping) asbestos-containing insulation on mechanical pipe fittings in the ceiling space above the front Commissionaire's Security Desk
    - .1 Insulation is in good condition. Areas around fittings have had wrap removed. Wrap requires replacement
- .2 Base Library (N12) Crawlspace.
  - .1 Installing and removing enclosures and work area containment materials and structures in preparation for "high risk" (see Section 02 82 00.03 – Asbestos Abatement – Maximum Precautions) work within the crawlspace.

1.2 RELATED REQUIREMENTS

.1 Section 02 50 13 – Management of Toxic Waste

.2 Section 02 81 01 – Hazardous Materials

.3 Section 02 82 00.03 – Asbestos Abatement – Maximum Precautions

1.3 REFERENCES

.1 Canadian General Standards Board (CGSB)

- .1 CAN/CGSB-1.205-(2003), Sealer for Application of Asbestos Fibre Releasing Materials.

.2 Department of Justice Canada (Jus)

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

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

- .1 Material Safety Data Sheets (MSDS).

.4 Transport Canada (TC)

- .1 Transportation of Dangerous Goods Act (TDGA – current version).

.5 Underwriters' Laboratories of Canada (ULC)

.6 WorkSafeBC

.1 British Columbia's Occupational Health and Safety Regulation (BC Reg. 296/97, including amendments to date of work)

.2 "Safe Work Practices for Handling Asbestos" (2012 Edition)

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 (or vermiculite insulation with any concentration of asbestos) 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: Engineers, or designated representatives, and representatives of regulatory agencies.

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

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

.2 Is familiar with the provincial 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 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Submit proof satisfactory to Consultant that suitable arrangements have been made to dispose of asbestos containing waste in accordance with requirements of authority having jurisdiction.

.3 Submit according to Provincial requirements for Notice of Project Form.

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

.5 Submit to Consultant 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 Consultant 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 Consultant. 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 Consultant that employees have respirator fitting and testing. Workers must be fit tested (irritant smoke test or equivalent qualitative fit test; or quantitative fit test) with respirator that is personally issued.

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 Do construction occupational health and safety in accordance with Section 01 35 33 - Health and Safety Requirements.
- .2 Safety Requirements: worker and visitor protection.
  - .1 Protective equipment and clothing to be worn by workers while in Asbestos Work Area include:
    - .1 Air purifying half-mask respirator with N-100, R-100 or P-100 particulate filter (Powered, Air Purifying Respirator (PAPR)

with N-100, R-100 or P-100 particulate filter for work that is required WITHIN the crawlspace of the Base Library (N12)) , personally issued to worker and marked as to efficiency and purpose, suitable for protection against asbestos and acceptable to Provincial Authority having jurisdiction. The respirator to be fitted so that there is an effective seal between the respirator and the worker's face, unless the respirator is equipped with a hood or helmet. The respirator to be cleaned, disinfected and inspected after use on each shift, or more often if necessary, when issued for the exclusive use of one worker, or after each use when used by more than one worker. The respirator to have damaged or deteriorated parts replaced prior to being used by a worker; and, when not in use, to be stored in a convenient, clean and sanitary location. The employer to establish written procedures regarding the selection, use and care of respirators, and a copy of the procedures to be provided to and reviewed with each worker who is required to wear a respirator. A worker not to be assigned to an operation requiring the use of a respirator unless he or she is physically able to perform the operation while using the respirator.

.2 Disposable type protective clothing that does not readily retain or permit penetration of asbestos fibres. Protective clothing to be provided by the employer and worn by every worker who enters the work area, and the protective clothing to consist of a head covering and full body covering that fits snugly at the ankles, wrists and neck, in order to prevent asbestos fibres from reaching the garments and skin under the protective clothing. It includes suitable footwear, and it to be repaired or replaced if torn.

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

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

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

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

.7 Visitor Protection:

.1 Provide protective clothing and approved respirators (and means to conduct fit tests) 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 recycling, where applicable.

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

.3 Collect and separate paper and corrugated cardboard packaging material in appropriate on-site bins for recycling.

.4 Separate for recycling and place in designated containers steel, metal and plastic waste.

.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/Territorial and Municipal regulations. Dispose of asbestos waste in sealed double thickness 6 mil bags (minimum) 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 ACMs to be handled, removed, or otherwise disturbed and disposed of during this Project are bound to this specification in Appendix A

.2 Notify Consultant of suspected ACM discovered during Work and not apparent from drawings, specifications, or reports pertaining to Work. Do not disturb such material until instructed by Consultant.

1.9 SCHEDULING

.1 Hours of work are 8am to 4pm Monday to Friday. Any work outside of these hours is not permitted unless approved by the Departmental Representative.

1.10 PERSONNEL TRAINING

.1 Before beginning Work, provide Consultant 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.

.7 Sealer: flame spread and smoke developed rating less than 50.

.8 Encapsulant: surface film forming penetrating type conforming to CAN/CGSB-1.205 ULC listed.

Part 3 Execution

3.1 SUPERVISION

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

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

3.2 PROCEDURES

.1 Do construction occupational health and safety in accordance with Section 01 35 33 - Health and Safety Requirements.

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

.3 Before beginning Work remove visible dust from surfaces in work area where dust is likely to be disturbed during course of work.

.1 Use HEPA vacuum or damp cloths where damp cleaning does not create hazard and is otherwise appropriate.

.2 Do not use compressed air to clean up or remove dust from any surface.

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

.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 Shut off mechanical ventilation system serving work area and seal ventilation ducts to and from work area.

.5 Where removal of ceiling tiles is required to access areas to complete patch/repair of mechanical insulation and/or cleaning of asbestos-containing debris, 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.

.2 Clean "T" grid suspension system.

.6 For patch/repair of mechanical fittings with exposed (good condition) asbestos-containing insulation, use canvas wrap as specified in section 23 07 19 HVAC Piping

Insulation Clause 2.3.5 treated with adhesive to manufacturers specifications to cover exposed insulation.

.1 Adhesive type to conform to 23 07 19 HVAC Piping Insulation and manufacturer's requirements. 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.

.2 Use garden reservoir type low - velocity sprayer or airless spray equipment capable of producing mist or fine spray, where practical.

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

.7 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, where practical.

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

.8 Pipe Insulation Removal Using Glove Bag:

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

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

.1 The condition of the insulation.

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

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

.1 The type of jacketing.

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

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

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

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

.5 Insert nozzle of garden reservoir type sprayer into bag through valve and wash down pipe and interior of bag thoroughly. Wet surface of insulation in lower section of bag.

.6 To remove bag after completion of stripping, wash top section and tools thoroughly. Remove air from top section through elasticized valve using a HEPA vacuum. Pull polyethylene waste container over glove bag before removing from

pipe. Release one strap and remove freshly washed tools. Place tools in water. Remove second strap and zipper. Fold over into waste container and seal.

.7 After removal of bag ensure that pipe is free of residue. Remove residue using HEPA vacuum or wet cloths. Ensure that surfaces are free of sludge which after drying could release asbestos dust into atmosphere. Seal exposed surfaces of pipe and ends of insulation with slow drying sealer to seal in any residual fibres.

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

.9 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.

.10 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 authorities 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, Consultant to take air samples on daily basis inside and outside of Asbestos Work Area enclosures in accordance with Provincial Occupational Health and Safety Regulations.

.2 If air monitoring shows that areas outside Asbestos Work Area enclosures 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, Consultant 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.

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 Unless otherwise determined through risk assessment conducted by a qualified person in accordance with authorities having jurisdiction, comply with requirements of this Section when performing following Work:

- .1 Base Library (N12) Crawlspace.
  - .1 Removing asbestos-containing insulation from mechanical pipes (including in areas where Glove Bag procedures may be used).
  - .2 Removing asbestos-containing insulation debris from floors and horizontal surfaces throughout
  - .3 Installing concrete slurry ground-seal on the soil floor of the crawlspace

1.2 RELATED REQUIREMENTS

.1 Section 02 50 13 – Management of Toxic Waste

.2 Section 02 81 01 – Hazardous Materials

.3 Section 02 82 00.02 – Asbestos Abatement – Intermediate Precautions

1.3 REFERENCES

.1 Canadian General Standards Board (CGSB)

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

.2 Department of Justice Canada (Jus)

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

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

- .1 Material Safety Data Sheets (MSDS).

.4 Transport Canada (TC)

- .1 Transportation of Dangerous Goods Act (TDGA – current version).

.5 Underwriters' Laboratories of Canada (ULC)

.6 WorkSafeBC

- .1 British Columbia's Occupational Health and Safety Regulation (BC Reg. 296/97, including amendments to date of work)
- .2 "Safe Work Practices for Handling Asbestos" (2012 Edition)

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 (or vermiculite insulation with any concentration of asbestos) 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: Engineers, or designated representatives, and representatives of regulatory agencies.

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

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

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

.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.

.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 ACTION AND INFORMATIONAL 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 Consultant that suitable arrangements have been made to receive and properly dispose of asbestos waste.

.2 Submit proof satisfactory to Consultant 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 Consultant. 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 Consultant for review.

.5 Submit documentation including test results for sealer proposed for use, if applicable.

.6 Submit according to Provincial requirements for Notice of Project form.

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

.8 Submit proof satisfactory to Consultant that employees have respirator fitting and testing. Workers must be fit tested (irritant smoke test or equivalent qualitative fit test; or quantitative fit 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.

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 Do construction occupational health and safety in accordance with Section 01 35 33 - Health and Safety Requirements.

.2 Safety Requirements: worker and visitor protection.

.1 Protective equipment and clothing to be worn by workers while in Asbestos Work Area 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 (and means to conduct fit tests) 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 recycling, where applicable.

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

.3 Collect and separate paper and corrugated cardboard packaging material in appropriate on-site bins for recycling.

.4 Separate for recycling and place in designated containers steel, metal and plastic waste.

.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, Territorial and Municipal regulations. Dispose of asbestos waste in sealed double thickness 6 ml bags or leak proof drums. Label containers with appropriate warning labels.

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

1.8 EXISTING CONDITIONS

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

.2 Notify Consultant of suspected ACM discovered during Work and not apparent from drawings, specifications, or reports pertaining to Work. Do not disturb such material until instructed by Consultant.

1.9 SCHEDULING

.1 Not later than ten (10) days before beginning Work on this Project notify following in writing:

.1 Appropriate Regional or Zone Director of Medical Services Branch, Health Canada.

.2 Regional Office of Labour Canada.

.3 Provincial Occupational Health and Safety Department (WorkSafeBC).

.4 Disposal Authority.

.2 Inform sub-trades of presence of asbestos containing materials identified in Existing Conditions.

.3 Submit to Consultant copy of notifications prior to start of Work.

.4 Hours of Work: perform work involving asbestos abatement outlined herein during normal working hours 8am to 4pm Monday to Friday. Any work outside of these hours is not permitted unless approved by the Departmental Representative.

1.10 PERSONNEL TRAINING

.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.

.10 Encapsulants: Type 1 penetrating type Class A water based conforming to CAN/CGSB-1.205 and approved by the Fire Commissioner of Canada.

Part 3 Execution

3.1 PREPARATION

.1 Do construction occupational health and safety in accordance with Section 01 35 33 - Health and Safety Requirements.

.2 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 Pre-clean fixed casework, plant, and equipment within proposed work areas, using HEPA vacuum and cover with polyethylene sheeting sealed with tape.

.3 Clean proposed work areas 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.

.4 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.

.5 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. 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.

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

.7 Cover floor and wall surfaces, where appropriate based on the work to be conducted, with polyethylene sheeting sealed with tape. If floors are to be covered, cover floors first so that polyethylene extends at least 300 mm up walls then cover walls to overlap floor sheeting.

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

.9 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)".

.10 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. Use localized water spraying during fixture removal to reduce fibre dispersal.

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

.12 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.

.13 After preparation of work areas and Decontamination Enclosure Systems, remove asbestos containing materials 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.

.3 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 areas, with two curtained doorways, one to Shower Room and one to work areas. Install portable toilet (if necessary), waste receptor, and storage facilities for workers' shoes and protective clothing to be reworn in work areas. Build Equipment and Access Room large enough to accommodate specified facilities, other equipment needed, and at least one worker allowing him /her sufficient space to undress comfortably.

.2 Shower Room: build Shower Room between Clean Room and Equipment and Access Room, with two 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. Departmental Representative will provide continuous supply of potable water for construction use. Contractor to coordinate location of water connection with Departmental Representative and will be responsible to pay for water usage at standard DND CFB Esquimalt rates. Drains to common sewers are available and can be coordinated with the Departmental representative. Contractor to provide piping and connect to water sources and drains. Pump waste water through 5 micrometre filter system acceptable to Consultant 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.

.4 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.

.5 Construction of Decontamination Enclosures:

.1 Build suitable framing for enclosures or use existing rooms where convenient, and line with polyethylene sheeting sealed with tape.

.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.

.6 Separation of Work Areas from Occupied Areas:

.1 Separate parts of building required to remain in use from 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.

.7 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 Consultant.

.8 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, decontamination enclosures and parts of building required to remain in use 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.

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 Where Consultant decides complete removal of asbestos containing material is impossible due to obstructions such as structural members or major service elements, and provides written direction, encapsulate material as follows:

.1 Apply penetrating type sealer to penetrate existing asbestos surfaces uniformly to substrate.

.6 After wire brushing and wet sponging surfaces (as applicable – i.e. mechanical pipes) to remove visible asbestos, after encapsulating asbestos containing material impossible to remove and after Installing 10mil vapour barrier and concrete slurry ground seal over floor surface throughout crawlspace, wet clean entire work area including Equipment and Access Room, and equipment used in process. After inspection by Consultant 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.

.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/Territorial and Federal authority having jurisdiction. Supervise dumping and ensure that dump operator is fully aware of hazardous nature of material to be dumped and that guidelines and regulations for asbestos disposal are followed.

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

3.4 FINAL CLEANUP

.1 Following cleaning specified above, and when air sampling shows that asbestos levels on both sides of seals do not exceed 0.01 fibres/cc as determined through air sampling conducted by Consultant, 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 0.01 fibres/cc. 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 to 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 RE-ESTABLISHMENT OF OBJECTS AND SYSTEMS

.1 When cleanup is complete:

.1 Re-establish objects moved to temporary locations in course of Work, in their proper positions.

.2 Re-secure mounted objects removed in course of Work in their former positions.

.3 Re-establish mechanical and electrical systems in proper working order. Install new filters.

.4 Repair or replace objects damaged in the course of Work, as directed by Departmental Representative and Consultant.

3.6 AIR MONITORING

.1 From beginning of Work until completion of cleaning operations, Consultant to take air samples on daily basis inside and outside of work area enclosure in accordance with applicable Provincial regulations.

.2 Use results of air monitoring inside work area to establish type of respirators to be used. Workers may be required to wear sample pumps for up to full-shift periods.

.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, Consultant 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, Consultant will perform air monitoring within Asbestos Work Area.

.1 Final air monitoring results must show fibre levels of less than 0.01 f/cc.

.2 If air monitoring results show fibre levels in excess of 0.01 f/cc, 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 0.01 f/cc, at no additional cost to Owner.

3.7 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 Consultant may result in Work stoppage, at no cost to Owner.

.2 Consultant will inspect Work for:

.1 Adherence to specific procedures and materials.

.2 Final cleanliness and completion.

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

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

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.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 SECTION INCLUDES

.1 Cast-in-place concrete for crawlspace ground seal application in Base Library (N12) crawlspace.

1.2 REFERENCES

.1 ASTM International

- .1 ASTM C260/C260M-10a - Standard Specification for Air-Entraining Admixtures for Concrete.
- .2 ASTM C494/C494M-12 - Standard Specification for Chemical Admixtures for Concrete.
- .3 ASTM C1017/C 1017M-07 - Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete.

.2 Canadian General Standards Board (CGSB)

- .1 CAN/CGSB 51.34 M86(R1988), Vapour Barrier, Polyethylene Sheet for Use in Building Construction.

.3 CSA International

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

1.3 SUBMITTALS FOR REVIEW

.1 Contractor to submit concrete mix design to Departmental Representative 7 days prior to scheduled placing of concrete onsite in accordance with Section 01 33 00: Submission procedures.

1.4 SUBMITTALS FOR INFORMATION

.1 Section 01 33 00: Submission procedures.

.2 Test Data: Minimum 1 week prior to starting concrete work, submit manufacturer's test data and certification by qualified independent inspection and testing laboratory that following materials will meet specified requirements:

- .1 Portland cement.
- .2 Admixtures.
- .3 Aggregates.
- .4 Water.

.3 Certification: Provide certification that mix proportions selected will produce concrete of quality, yield and strength as specified in concrete mixes, and will comply with the construction documents.

1.5 QUALITY ASSURANCE

.1 Independent Inspection/Testing Agency will be organized and engaged by the Contractor for purpose of inspecting and/or testing all concrete used in the execution of the Work. Contractor to provide all testing and inspection results and reports for review by Departmental Representative and shall not proceed without written approval when deviations from mix design or parameters are found.

.2 Acquire cement and aggregate from same source for all work.

.3 Conform to CSA-A23.1 when concreting during hot weather.

.4 Conform to CSA-A23.1 when concreting during cold weather.

Part 2 Products

2.1 CONCRETE MATERIALS

.1 Cement: CSA-A3001, Type GU

.2 Blended Hydraulic Cement: CSA-A3001, Type GUb; Grey colour.

.3 Fine and Coarse Aggregates: CSA-A23.1. Maximum aggregate size <20 mm Itemize the gradation if special aggregates are required.

.4 Water: CSA-A23.1, clean and not detrimental to concrete.

2.2 CONCRETE MIX

.1 Mix and deliver normal density concrete in accordance with CSA-A23.1, to the following criteria:

- .1 Cement Type: Hydraulic
- .2 Class of exposure: GU
- .3 Compressive Strength (28 day): 25MPa
- .4 Nominal size of coarse aggregate: < 9 mm
- .5 Air Entrainment: min 1%

.2 Use accelerating admixtures in cold weather only when approved by Consultant. Use of admixtures will not relax cold weather placement requirements.

.3 Use calcium chloride only when approved by Departmental Representative

.4 Add air entraining agent to normal weight concrete mix for work exposed to exterior.

Part 3 Execution

3.1 EXAMINATION

.1 Verify all dimensions and locations required on drawings.

.2 Verify requirements for concrete cover over vapour barrier

.3 Verify that items to be cast into concrete are accurately placed, positioned securely, and will not impede concrete placement.

.4 Verify locations of all openings and embedments required for existing electrical, structural, mechanical work.

3.2 PREPARATION

.1 Clean crawl space of all loose and deleterious materials prior to spreading vapour barrier.

.2 Rough level the crawlspace floor to eliminate thin spots from occurring in the placed concrete and ensure a 50mm minimum concrete slab thickness

3.3 PLACING CONCRETE

.1 Place concrete in accordance with CSA-A23.1.

.2 Notify Departmental representative minimum 2 days prior to commencement of operations.

.3 Install vapour barrier under interior slabs on grade. Lap joints minimum 300 mm and seal watertight by taping sealant applied between overlapping edges and ends.

.4 Repair vapour barrier damaged during placement of concrete reinforcing. Repair with vapour barrier material; lap over damaged areas minimum 150 mm and seal watertight.

.5 Maintain records of concrete placement. Record date, location, quantity, air temperature, and test samples taken.

.6 Do not interrupt successive placement; do not permit cold joints to occur.

3.4 TOLERANCES

.1 Minimum slab thickness 50mm

.2 Maximum slab thickness 75mm

3.5 CONCRETE FINISHING

.1 Rough screed concrete to produce a generally smooth surface for Owner's future access to mechanical systems in the crawl space.

.2 Rough raked concrete finish will not be accepted

3.6 CURING AND PROTECTION

.1 Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical damage.

.2 Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.

3.7 FIELD QUALITY CONTROL

.1 Provide free access to Work and cooperate with appointed firm.

.2 Submit proposed mix design to Inspection/testing agency for review prior to commencement of Work.

.3 Three (3) concrete test cylinders will be taken and tested for every concrete pour, and class of concrete placed.

.1 Minimum one (1) test per day when concrete is poured.

.4 One additional test cylinder will be taken during cold weather concreting, cured on job site under same conditions as concrete it represents.

.5 One slump or flow test and one air test will be taken for each set of test cylinders.

3.8 PATCHING

.1 Allow Consultant to inspect concrete surfaces immediately upon removal of forms.

.2 Excessive honeycomb or embedded debris in concrete is not acceptable. Notify Consultant upon discovery.

.3 Patch imperfections as directed by the Departmental Representative.

3.9 DEFECTIVE CONCRETE

.1 Defective Concrete: Concrete not conforming to required lines, details, dimensions, tolerances or specified requirements.

.2 Repair or replacement of defective concrete will be determined by the Departmental Representative.

.3 Do not patch, fill, touch-up, repair, or replace exposed concrete except upon express direction of Consultant for each individual area.

END OF SECTION

Part 1 General

1.1 RELATED WORK

.1 This Section of the Specification forms part of the Contract Documents and is to be read, interpreted and coordinated with all other parts.

1.2 GENERAL

.1 Provide thermal insulation on all piping, valves, fittings and radiant ceiling panels, as called for and as scheduled. Note items listed that do not require insulation.

.2 Journeyman insulation applicators, skilled in this trade, shall perform the work.

.3 Be responsible for ensuring that sufficient space is always provided to allow proper installation of insulation materials.

.4 As applicable, use the latest edition of the "B.C. Insulation Contractors Association (BCICA) Quality Standards Manual", as a reference standard if sufficient detail/information is not contained herein.

1.3 REGULATORY REQUIREMENTS

.1 Flame spread ratings and smoke developed classifications shall be as required by the 2012 B.C. Building Code and NFPA 90A. Generally, the flame spread rating throughout the material shall not exceed 25 and the smoke developed classification shall not exceed 50.

.2 Insulation thickness and insulating values shall be in accordance with NRC Model National Energy Code of Canada for Buildings (MNECB).

1.4 QUALIFICATIONS AND SAMPLES

.1 Submit, for approval, substantiating manufacturer's documentation (and samples when requested) for all materials, applications and finishing methods to establish that all will satisfy this specification and meet all applicable code requirements, before commencing work.

.2 Submit, for approval, samples of each type of firestopping, smoke seal and accessory.

1.5 DEFINITIONS

.1 "CONCEALED" insulated mechanical services in trenches, chases, furred spaces, shafts and hung ceilings.

.2 "EXPOSED" will mean not concealed.

.3 Removal of all asbestos products shall be carried out in accordance with Section 35 of the Industrial Compensation Board of B.C. by a contractor experienced in this specialty.

1.6 CONNECTIONS TO EXISTING PIPING

.1 Make good all existing insulation disturbed or removed to facilitate alterations and additions to existing piping.

Part 2 Products

2.1 PREFORMED PIPE COVERING

.1 Mineral Fibre - Low and Medium Temperature:

.1 With integral vapour barrier jacket and longitudinal lap.

.2 Thermal conductivity at 24°C - 0.033 W/m/deg.C.

.2 Phenolic closed cell – rigid:

.1 With integral vapour barrier jacket and longitudinal lap.

.2 Thermal conductivity @ 24°C - 0.019 W/m/deg.C.

2.2 FIRE STOPPING AND SMOKE SEAL MATERIALS

.1 References:

.1 CAN4-S115-M, Standard Method of Fire Tests of Firestop Systems.

.2 ASTM E814 Standard Method of Fire Tests and Through-Penetration Firestops.

.3 1997 Certifications Listings Intertek Testing Services N.A. Ltd. (Warnock Hersey).

.4 Underwriters Laboratories of Canada. Listing of Equipment and Materials Vol. 3 Fire Resistance Ratings -Revision 4/95.

.2 Work Included:

.1 Furnish all labour, material, equipment and services necessary to supply and install firestopping and smoke seals around mechanical service piping and duct penetrations through fire rated wall and floor assemblies, as indicated and as specified.

.3 Quality Assurance:

.1 The work of this section shall be carried out only by an approved specialist firm, employing skilled tradesmen experienced in firestopping and smoke seal application and approved, licensed and supervised by the manufacturer of fire stopping materials.

.2 All work to be of the highest quality according to best trade practice and in strict accordance with manufacturer's printed specifications.

.4 Submittals:

.1 Submit shop drawings to show proposed material, reinforcement, anchorage, fastenings and method of installation.

.2 Submit manufacturers' product data for materials and prefabricated devices. Include assembly/location design system number references with copies of test information. Construction details should accurately reflect actual job conditions.

.3 For building assemblies which do not correspond to any previously tested and rated assemblies, submit proposals based on related designs using accepted fireproofing design criteria.

.5 Materials:

.1 Asbestos-free materials and systems capable of maintaining an effective barrier against flame, smoke and gases in compliance with requirements of ULC CAN4-S115 and not to exceed opening sizes for which they are intended.

.2 Service penetration assemblies and design numbers: Certified by ULC in accordance with CAN4-S115 and listed in ULC Guide No. 40 U19. 1997 Certification Listings Intertek Testing Services N.A. Ltd. (Warnock Hersey).

.3 Service penetration firestop components: Certified by ULC in accordance with CAN4-S115 and listed in ULC Guide No. 40 U19.13 and ULC Guide No. 40 U19.15 under the Label Service of ULC or equivalent approved tests by Warnock Hersey.

.4 Fire resistance rating of installed fire stopping assembly shall be not less than the fire resistance rating of surrounding floor and wall assembly.

2.3 ACCESSORIES

.1 Insulation Fastenings:

.1 1.6 mm [16 ga.] galvanized wire or 1.6 mm thick copper wire as commercially available.

.2 Jacket Fastenings:

.1 Thermocanvas and All Service:

.1 Staples (flare type), compatible jacket finishing tape, contact adhesives recommended by the jacket manufacturer.

.2 Metal Jackets:

.1 Sheet metal screws, pop rivets, bands.

.3 PVC Jacket and Fitting Covers:

.1 PVC self-adhesive tape, plastic pop rivets, bonding cement.

.3 Adhesives:

.1 Flexible elastomeric and flexible closed cell insulation adhesive:

.2 Vapour barrier jacket adhesive:

.3 Fabric adhesive, to insulation pipe covering:

.4 Coatings:

.1 Vapour barrier coating on reinforcing membrane or on insulating cement:

.2 Flexible elastomeric and flexible closed cell insulation finish coating:

.1 Armstrong, Bakelite 120-13, Rubatex, Zipcoat.

.5 Finish Jackets:

.1 Thermocanvas Jacket:

.2 All Service Jacket (with 0.03 mm [0.0019"] minimum thick foil:

.6 Reinforcing Membrane:

.1 Glass reinforcing membrane as commercially available.

.7 Insulating Cement:

.1 High temperature.

.8 Finishing Cement:

.9 Flexible Insulation:

.10 Preformed Fitting Covers:

.1 Aluminum Fitting Covers:

.1 0.51 mm [22 ga.] thick, die shaped components with factory applied protective liner on interior surface.

.2 PVC Fitting Covers:

.1 0.50 mm [0.020"] thick pre-moulded one piece covers.

.11 Preformed Insulation fittings:

2.4 SCOPE OF INSULATION

.1 Heating Pipe, Fittings and Valves:

.1 Insulate the following systems, unless otherwise noted:

.1 Heating Piping where asbestos insulation has been removed

.2 DO NOT insulate the following, unless otherwise noted:

.1 Piping where asbestos has NOT been removed

.2 Previously uninsulated piping.

.3 Insulate the following valves and fittings if the pipe was insulated:

.1 Elbows, tees, reducers.

.2 Valve bodies on valves and check valves, over NPS 2-1/2".

.3 Flanges.

.4 Strainers.

.4 The following hot pipe fittings that operate at 60° C [140° F] shall be coated to prevent skin burns:

.1 Valves, NPS 2-1/2" and smaller.

.2 Valve bonnets.

.3 Unions.

.4 Drip legs.

.5 Flexible connections.

.6 Expansion joints.

.7 Check valve covers.

.2 Pipe penetrations through walls and floors:

.1 All material for the stuffing, sealing and caulking of the pipe penetration shall be supplied and installed under this section.

2.5 PIPE INSULATION THICKNESS TABLE - MM [INS]

	NOMINAL PIPE SIZE (NPS)					
Service	**Design Operating Temperature**	**Runouts 2 and less (note 1)**	**1 and less**	**$1^1/_4$ to 2**	**$2^1/_2$ to 4**	**5 and larger**
Hot Water Heating	50-90°C [120-200°F]	25 [1]	25 [1]	25 [1]	40 [1.5]	40 [1.5]
Hot Water Heating	96-120°C [205-250°F]	25 [1]	40 [1.5]	40 [1.5]	50 [2]	50 [2]
Steam	334 kPa & greater [121 psig & greater}	40 [1.5]	65 [2.5]	65 [2.5]	75 [3.0]	90 [3.5]

Note 2: All piping forming part of the HVAC system and located outside the building envelope shall be insulated for the level specified in the Table for steam piping at pressures 334 kPa [121 psig] and greater.

Part 3 Execution

3.1 APPLICATION

.1 Apply insulation to piping only after all tests have been made and systems accepted by Consultant as tight.

.2 Apply insulation and insulation finish in a workmanlike manner so that the finished product is uniform in diameter, smooth in finish, pleasing to the eye and with the longitudinal seams positioned to be concealed from view. Apply piping insulation materials, accessories and finishes in accordance with manufacturer's recommendations.

.3 On piping NPS 2-1/2 and larger with insulation and vapour barrier, install high density insulation above hanger shield. Insert to be slightly longer than the length of shield. Maintain integrity of vapour barrier over full length of pipe without interruption at sleeves, fittings and supports.

.4 Insulation and vapour barrier shall be continuous through all non-rated separations.

3.2 INSULATION TERMINATION POINTS

.1 Terminate insulation 75 mm [3"] back from all uninsulated fittings to provide working clearance and terminate insulation at 90° and finish with reinforced scrim cloth and vapour barrier mastic system. Cover onto pipe and over the insulation vapour barrier. On concealed hot services terminate insulation 75mm [3"] back from all uninsulated fittings, cut off at 90° and apply reinforced scrim cloth and breather mastic system.

.2 Cut back insulation at 45° and finish with a silicone caulking sealant around the base of thermometer wells, pressure gauges, flow switches and pressure and control sensors.

3.3 VERTICAL RISERS

.1 On vertical pipe over 75 mm [3"] provide insulation supports welded or bolted to pipe, directly above lowest pipe fitting. Thereafter, locate on 4.5 m [15 ft.] centres.

3.4 HOT APPLICATION 26.7°C [80°F] AND OVER

.1 Piping:

.1 Install medium temperature pipe insulation with integral jacket to pipe and hold in place by stapling the flap, with spreading staples at 75 mm [3"] centres. Pipe insulation with integral self-sealing jacket will not require additional fastening.

.2 Install strips of vapour barrier jacket over butt joints and secure with spreading staples.

.2 Fittings:

.1 Insulate fittings, to thickness of adjacent pipe insulation, with sections of the pipe insulation mitred to fit tightly, or with preformed insulation fittings or from insulation fabricator.

.3 Valves, Strainers:

.1 Insulate valve bodies and strainers with fitted pipe insulation, or mitred blocks all to thickness of adjacent pipe insulation or insulate with preformed insulation fittings or from insulation fabricator. Drains, blowoff plugs and caps shall be left uncovered.

.4 Flanges and Victaulic Fittings:

.1 Insulate flanges with oversized pipe insulation or mitred blocks to the thickness of the adjacent pipe insulation. Insulation to overlap adjoining insulation at least 75 mm [3"].

3.5 ANTI-SWEAT COATING

.1 Coat with an anti-sweat coating - "No Sweat" the following uninsulated cold surfaces:

.1 Connecting surfaces of thermometers, pressure gauges, flow switches, controllers, etc.

.2 The coating thickness shall be as recommended by the coating manufacturer for the system operation conditions.

3.6 PIPE INSULATION FINISHES

.1 "Concealed" insulation in horizontal and vertical service spaces will require no further finish.

.2 "Concealed" pipe insulation in damp locations, e.g. pipe trenches shall have a vapour barrier jacket, vapour sealed.

.3 "Exposed" flexible insulation shall be painted with a heavy brush coating of foam plastic white insulation coating.

.4 "Exposed" insulation inside the building shall be finished as follows:

.1 Premium Finish:

.1 Over a factory applied integral all-service type jacket on the pipe insulation, apply PVC jacket.

.2 Over insulated fittings apply PVC fitting covers. Over insulated valve bodies, valve bonnets, strainers and flanges apply purchased PVC covers or field fabricate from PVC sheeting secured with solvent bonding cement.

.3 Finish fabric with one (1) coat of fabric coating.

.2 "Exposed" outdoor insulation shall be finished as follows:

.1 Insulation shall have a vapour sealed vapour barrier jacket.

.2 Over the pipe insulation jacket apply aluminum weather protecting jacket. The longitudinal seam shall be located to shed water. Secure the jacket using necessary metal banding on approximately 250 mm (10") centres and at the overlaps. Screws are not permitted on cold operating systems, since they will penetrate the vapour barrier.

.3 Over insulated fittings, valve bodies, valve bonnets, strainers and flanges apply metal jacket or preformed metal fittings to provide a complete jacket system. Secure with necessary fastenings.

.4 Seal all outdoor jacketing watertight.

3.7 FIRE STOPPING AND SMOKE SEALS

.1 Install fire stopping and smoke seal material and components in accordance with ULC certification and manufacturer's instructions.

.2 Maintain insulation around pipes penetrating fire separation only as permitted by Firestop Assembly Listing.

.3 Submit Certificate of Inspection (Form MF173) that all work is complete and in accordance with the specified requirements before Substantial Completion.

3.8 INSULATION PACKING OF PIPE SLEEVES

.1 Tightly pack the space between all pipe sleeves and pipe or between pipe sleeve and pipe insulation with mineral wool insulation - Thermal Ceramics "Cerafiber" or Carborundum "Fiberfax" to full depth of sleeve to prevent transmission of sound and/or passage of smoke.

END OF SECTION

Appendix A
HazMat Report EGD-DND Buildings December 2011

Hazardous Building Material Assessment

Esquimalt Graving Dock – DND Buildings

Prepared for:

Public Service Commission of Canada | Commission de la fonction publique du Canada

Environmental Services

Prepared by

North West Environmental Group Ltd.

NWEG Project: 15609

EXECUTIVE SUMMARY

Introduction

North West Environmental Group Ltd. was retained by Public Works and Government Services Canada (PWGSC) Environmental Services to conduct a Hazardous Materials Assessment on the DND owned buildings located at the Esquimalt Graving Dock (EGD), Esquimalt BC.

The surveys were conducted at the Esquimalt Graving Dock on various dates between October 24th - December 13th 2011.

Previous Hazardous Building Materials Assessment reports and documentation were reviewed and additional non-destructive floor-by-floor, room-by-room assessments of all building areas were conducted in order to identify hazardous materials and their condition.
Identification of all sampling locations were made on detailed floor plans, and a summary of remedial recommendations made by priority.

FINDINGS AND RECOMMENDATIONS

Asbestos

Asbestos-containing materials were found in various locations within the building fabric and mechanical systems of the DND buildings.

Asbestos was identified in the following materials:

- Floor tiles (exposed and concealed)
- Sheet flooring (exposed and concealed)
- Roof Tar
- Fire stopping
- Pipe Insulation
- Cementitious Parging
- Transite Board

Table 1: Asbestos Containing Materials Summary-Current Survey

Asbestos containing materials were identified to be in the following materials/locations:			
Sample ID	**Building**	**Material**	**Recommendation**
15609-01	Bldg 4 - DND Property - EDC Office - Bathroom	Sheet Flooring – 20% Chrysotile Asbestos Content	Routine Surveillance: Institute routine surveillance of the ACM.
15609-04	Bldg 4 - DND Property - EDC Office	Floor Tile - 12"x12" White –	Routine Surveillance: Institute routine surveillance of the ACM.

Warning: in the event any additional suspect materials are encountered during renovation/repair activities, work on those materials should stop immediately and remain undisturbed until testing confirms the presence or absence of asbestos or other hazardous material

Asbestos containing materials were identified to be in the following materials/locations:			
		<1% Chrysotile Asbestos Content	
15609-08	Bldg 8 - DND Property - Kiln Building - Electrical - Kiln Bay #6	Roof-Tar – 10% Chrysotile Asbestos Content	Routine Surveillance: Institute routine surveillance of the ACM.
15609-10	Bldg 8 - DND Property - Kiln Building - Steel Shop - Kiln Bay #8	Firestopping 10% Chrysotile Asbestos Content	Proactive removal or patch and repair of ACM.
15609-12	Bldg 5 - DND Property - Jenkins Marine - Office	Sheet Flooring - Orange/Brown Mosaic 15% Chrysotile Asbestos Content	Proactive Removal or Routine Surveillance: Institute routine surveillance
15609-14	Bldg 5 - DND Property - Jenkins Marine - Office	Sheet Flooring (Bottom Layer) – 25% Chrysotile Asbestos Content	Proactive Removal or Routine Surveillance: Institute routine surveillance
15609-20	DND Property - N4 - NIS - Commissionaire Front Security Desk	Parged Pipe Insulation (T-Section above Ceiling) 50% Chrysotile Asbestos Content	Routine Surveillance: Institute routine surveillance of the ACM.
15609-24	DND Property - N4 - NIS - Entrance	Floor Tile - Greyish Green 12"x12" – <1% Chrysotile Asbestos Content	Routine Surveillance: Institute routine surveillance of the ACM.
15609-26	D N D Property - N4 - NIS - Room 112	Parged Piping (Elbow above Ceiling) – 50% Chrysotile Asbestos Content	Immediate clean up of debris. Repair ACM and institute routine surveillance of the ACM.
15609-43	DND Property - N12 - Library - Crawl Space	Mechanical Piping Insulation (Aircell on Straights) – 60% Chrysotile Asbestos Content	Immediate clean up of debris. Repair ACM and institute routine surveillance of the ACM.

Lead

Table 3: Paint Chip Sampling Results

Sample	Description	Lead (%)	Condition
15609-05	DND Property – EDC Office Exterior – Blue	0.017	Fair
15609-06	DND Property – EDC Office Exterior – Cream	3.100	Poor
15609-11	DND Property – Kiln Building – Exterior - White	0.110	Good
15609-15	DND Property – Jenkins Marine - Exterior	5.300	Fair

Paint

Analysis of paint samples indicated that lead is present in concentrations ranging from 5.3% to a low of 0.017%. Samples were found to have lead concentrations in excess

Warning: in the event any additional suspect materials are encountered during renovation/repair activities, work on those materials should stop immediately and remain undisturbed until testing confirms the presence or absence of asbestos or other hazardous material

of the threshold specified in the federal *Surface Coatings Material Regulation SCMR* of 90 mg/kg for new paint acceptable for use in residential applications.

Overall, paint coatings were found to be in fair to good condition. Parts of the exterior of Building 4 - EDC office is in poor condition and should be removed. Where damaged and deteriorating, paint should be removed following procedures designed to protect the workers from heavy metal exposure and to avoid the spread of contamination. Lead content of painted materials should not increase their disposal costs however; concentrated paint chips would need to be disposed as hazardous waste. Routine removal of lead paint is not recommended; rather it should be managed in place and removed on an "as needed" basis.

Polychlorinated Biphenyls (PCB) in Electrical Equipment

Fluorescent light fixtures were observed and appeared to be of a vintage often found to contain ballasts which Environment Canada (EC) has developed a guideline called - *Identification of Lamp Ballasts Containing PCBs –Environment Canada 1991*.

Manufacturers of ballasts and capacitors use distinct catalogue and date codes to identify their product, its date of manufacture, and, for some capacitors, its dielectric fluid. Fluorescent lamp ballasts are usually mounted between the fluorescent tubes on the light fixture and are shielded with a metal protective device which reduces heat radiation. Due to the fact the covers are easily broken and the risk of electrical shock when accessing the ballast, it is standard practice to make the observation that there is a potential for PCBs to be present and have the ballasts inspected prior to disposal.

The hazardous building material materials assessment report from NWEG in 2000 mentioned that many of these ballasts have already been removed.

Inspect all light ballasts for the presence of PCB prior to disposal. PCB containing ballasts must be disposed as hazardous waste.

Mould

No mould or significant moisture issues were observed during the survey.

Hantavirus-Animal Droppings

Materials suspected of containing Hantavirus were not observed during the survey.

Workers accessing areas where rodent or other animal droppings are present must be informed of the potential risk of Hantavirus exposure and employ suitable precautions for personal protection and control of the spread of contamination.

Ozone Depleting Substances

Several pieces of equipment including refrigerators and air conditioners containing ozone depleting substances (ODS) were observed during this investigation. PWGSC maintains an active halocarbon inventory.

Crystalline Silica

Testing for crystalline silica in dust was not completed/conducted as part of this survey however it is known to be a component of concrete dust. All concrete, plaster and stucco is suspected of containing silica in crystalline and non-crystalline forms. Many of the removal techniques (grinding, cutting, chipping etc) for these materials can generate high levels of crystalline silica in the air.

Use wetting techniques and/or HEPA equipped extraction systems attached to drills and other power equipment where possible in order to decrease dust levels.

As per the clients request, non-invasive investigative techniques were used. Even with the most invasive survey techniques, however, it should be noted that the possibility remains for other concealed materials to be found during a renovation or demolition.

Warning: in the event any additional suspect materials are encountered during demolition or renovation activities, work on those materials must stop immediately and remain undisturbed until testing confirms the presence or absence of asbestos or other hazardous material. If this any materials suspected of containing asbestos or another hazardous material are disturbed during the work, all work shall stop until the area is contained, the hazard evaluated by a qualified professional and the hazardous materials, if indeed present, is safely managed by a qualified contractor.

TABLE OF CONTENTS

Warning: in the event any additional suspect materials are encountered during renovation/repair activities, work on those materials should stop immediately and remain undisturbed until testing confirms the presence or absence of asbestos or other hazardous material

LIST OF ACRONYMS

ACM ..... asbestos-containing materials
ALARA ..... As Low As Reasonably Achievable
AMP ..... Asbestos Management Program
CFCs ..... chlorofluorocarbons
EC ..... Environment Canada
EGD ..... Esquimalt Graving Dock
EMA ..... Environmental Management Act
HCFCs ..... hydrochlorofluorocarbons
HFCs ..... hydrofluorocarbons
HPA ..... Hazardous Products Act
HWR ..... Hazardous Waste Regulation
NWEG ..... North West Environmental Group
ODS ..... ozone-depleting substances
PCBs ..... Polychlorinated biphenyls (PCBs
PWGSC ..... Public Works and Government Services Canada
SCMR ..... Surface Coating Materials Regulation
SOW ..... Statement of Work
WMO ..... United Nations World Meteorological Organization

Warning: in the event any additional suspect materials are encountered during renovation/repair activities, work on those materials should stop immediately and remain undisturbed until testing confirms the presence or absence of asbestos or other hazardous material

1.0 INTRODUCTION

North West Environmental Group Ltd. was retained by Public Works and Government Services Canada (PWGSC) Environmental Services to conduct a Hazardous Materials Assessment Survey on the DND owned Buildings administered by PWGSC located at the Esquimalt Graving Dock, Esquimalt BC. The facility is referred to as the "subject site" or "site" throughout this document. The site location is shown on Drawing 1.

The surveys were conducted between October 24th and December 13th 2011 by Julie Scott-Moncrieff, Jason Smit and Kris White, Industrial Hygienists from North West Environmental Group.

Note: this document is detailed review of hazardous materials found within the building fabric of the site; however, it cannot be considered an absolute listing of all hazardous materials present within the structure. Occupant supplies and processes were not generally considered except where they may have contaminated the building fabric and some materials may have been concealed within enclosed areas of the building structure and not visible to the inspectors at the time of the survey. In the event that materials suspected of containing asbestos, heavy metals or other hazardous components are uncovered or impacted during operations, maintenance, renovation, construction or demolition activities, all work must stop until such time as the materials can be evaluated by a qualified person and appropriate precautions are employed to protect workers and building occupants.

2.0 SCOPE OF WORK

The scope of work for this hazardous material assessment survey was based on the *Scope of Work* (SOW) outlined by PWGSC-Environmental Services and included the following tasks:

- Previous Hazardous Building Materials Assessment reports and documentation were reviewed, incorporating the pertinent and confirmed information into the current assessment. These included:
    - Hazardous Materials Report: Esquimalt Graving Dock: Rob Christie, NWEG (March 2000)
- Non-destructive floor-by-floor, room-by-room assessment of all building areas, identifying the location, accessibility to personnel, type of material (e.g. vinyl floor tiles, wall paint, thermostat) and condition of all asbestos-containing materials (including vermiculite insulation), lead materials, mercury containing equipment, ozone depleting substances and PCBs.

  The following buildings were assessed:
    - Building 4 EDC Office Building
    - Building 3 Back Gate Guard House
    - Building 8 Kiln Building
    - Building 5 Jenkins Marine
    - Naden 66 N12 Base Library
    - Naden 64 N4 National Investigative Services (NIS)
- Sampling and subsequent analysis to ascertain the amount of hazardous materials within the buildings using a laboratory accredited by the National Voluntary Laboratory Accreditation Program (NVLAP), as per PWGSC Departmental Directive 057.
- Identification of all sampling locations on detailed floor plans, distinguishing between those that are confirmed to be hazardous and those that are not.
- A summary of remedial recommendations sorted by priority. Preparation of a separate summary of costs for repair, encapsulation or removal of the asbestos containing materials and other hazardous materials, presented as remedial options and report detailing the results, conclusions and recommendations as well as an abatement cost estimate, if necessary.

3.0 SITE DESCRIPTION

3.1 Site Location

The Esquimalt Graving Dock (EGD) is located in Esquimalt, BC, near the city of Victoria, on the southern tip of Vancouver Island. The site is located as shown in Appendix A. EGD is owned by PWGSC and private shipyard companies lease space at the EGD for ship maintenance and buildings operations. This survey assessed buildings on site owned by DND.

See Appendix A for map of Site Location and Plan.

4.0 REGULATORY FRAMEWORK, GUIDELINES AND CODES

4.1 Federal Occupational Health and Safety

In Federal jurisdictions, asbestos-containing materials (ACM) are regulated 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 competent persons;
- 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.

4.2 BC Occupational Health and Safety Regulation

Most of the employees working in the PWGSC buildings are Federal employees and are subject to the federal OHSA. However the majority of contractors and some site tenants Workplace health and safety is regulated in British Columbia by WorkSafeBC under the *Workers' Compensation Act* (effective April 15, 1998), as amended by *Workers' Compensation (Occupational Health and Safety) Amendment Act* (effective October 1, 1999). The Act defines the general duties and obligations of the employer, employees and others at the work site.

Under this regulation, employers are required to:

- Maintain a record of all hazardous materials;
- Undertake a hazard investigation by competent persons;
- 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

WorkSafeBC Regulations apply to the handling of materials containing designated substances and the prevention of possible worker exposures. Permissible exposure limits to these designated substances, which include asbestos, lead, mercury and arsenic, are established by the American Conference of Governmental Industrial Hygienists (ACGIH) and adopted by WorkSafeBC.

4.3 Environmental Management Act

The *Environmental Management Act* (EMA), brought into force in July 2004, is the principle environmental statute in British Columbia. The EMA prohibits the introduction of waste into the environment in such a manner or quantity as to cause pollution, except in accordance with a regulation, permit, approval or code of practice issued under the Act. The Hazardous Waste Regulation (HWR) addresses the proper handling, transport and disposal of hazardous wastes, under provisions of the EMA. While the Provincial Regulations do not apply directly to the sites operated by the Federal Government, they do apply when the materials are removed from the site for disposal.

4.4 BC Occupational Health and Safety Regulation

WorkSafeBC Regulations apply to the handling of materials containing designated substances and the prevention of possible worker exposures. These designated substances, which include lead, mercury and arsenic, are established by the American Conference of Governmental Industrial Hygienists (ACGIH) and adopted by WorkSafeBC.

Where worker exposure to a designated substance may exceed 50% of the threshold limit value for a substance, WorkSafeBC requires that the employer establish an exposure control plan. All routes of entry must be considered when establishing the extent of worker exposure. Exposure limits are summarized in Table 4.4.1.

Table 4.4.1: ACGIH / WorkSafeBC Exposure Limits

Substance [CAS No.]	*Time Weighted Average (TWA)*
Asbestos - All forms [1332-21-4]	0.1 f/cc (F)
Lead - elemental and inorganic compounds, as Pb [7439-92-1]	0.05 mg/m3
Silica, Crystalline - alpha quartz [14808-60-7; 1317-95-9] and Cristobalite, Respirable [14464-46-1] Revised 2006	0.025 mg/m3

4.5 Hazardous Products Act, Surface Coating Materials Regulation

The *Hazardous Products Act (HPA), Surface Coating Materials Regulation (SOR/2005-109) (SCMR)* permits the advertising, sale and labeling of surface coatings (including paint) that meet the following criteria set out below. Quantities of lead and mercury are specifically limited. Other heavy metals are not addressed in this regulation.

There has been confusion in the past regarding the limits for lead and mercury in paint and how that relates to worker safety and disposal. An explanation of the SCMR limits for paint and mercury are included in this report to help alleviate this confusion. Although a given paint sample may have concentrations of lead and mercury lower than the limits specified within the SCMR, worker exposure may still occur if sufficient quantities of lead and/or mercury are inhaled, ingested or absorbed through the skin. The risk to workers posed by heavy metal containing coatings is proportional to the

work undertaken. Heavy metal laden coatings that are not disturbed pose little risk to non-pre-school aged building occupants.

Lead

Paints containing lead may be advertised, sold or imported into Canada when under standardized testing conducted on a dried sample of the coating indicates that lead concentrations do not exceed 600 mg/kg.

In 2005 the *Federal Surface Coating Materials Regulation* was amended to reduce this threshold from 5,000 mg/kg to 600 mg/kg. As paints under this concentration of lead are acceptable for use in residential settings today, such coatings do not pose a significant hazardous material issue unless rendered airborne within a worker's breathing zone by fine dust generating processes.

Paints that exceed this concentration threshold are prohibited to be advertised, sold or imported into Canada unless they meet certain conditions of use and labeling. Permitted uses include:

- as an anti-corrosive or an anti-weathering coating applied on the interior or exterior surface of any building or equipment that is used for an agricultural or industrial purpose;
- as an anti-corrosive or an anti-weathering coating applied on any structure, other than a building, that is used for an agricultural, industrial or public purpose;
- as a touch-up coating for metal surfaces;
- on traffic signs;
- for graphic art on billboards or similar displays;
- for identification marks in industrial buildings; or
- as material for the purposes of arts, crafts or hobbies, other than material for use by children.

Polychlorinated Biphenyls

Polychlorinated biphenyls (PCBs) are regulated under both Federal (*Canadian Environmental Protection Act*) and Provincial (*BC Hazardous Waste Regulation*) legislation and must be treated as PCB waste and be stored and disposed of accordingly.

Each fluorescent light fixture removed during facility renovation or demolition should have the ballast checked to determine if it contains PCBs. Ballasts containing PCBs must be removed, sorted and transported to a licensed facility. Although rare, paints have been known to contain PCBs.

Ozone-depleting Substances (CFCs/ODS)

Chlorofluorocarbons (CFCs) are ozone-depleting substances (ODS) and a type of halocarbon. ODS are regulated by the *Canadian Environmental Protection Act* under the *Ozone-Depleting Substances Regulations 1998 SOR/99-7* and the *Federal*

Halocarbon Regulations (FHR) SOR/99-225. Compounds that contain only chlorine, fluorine and carbon are called CFCs. These materials are used in refrigeration systems and in fire suppression systems. The other main refrigerants are hydrochlorofluorocarbons (HCFCs), hydrofluorocarbons (HFCs) and blends of fluorocarbons (designated by "R").

In BC these substances are regulated under the BC Ozone Depleting Substances and Other Halocarbons Regulation.

While the regulations allow the continued use of halocarbon refrigerants, they strictly prohibit any person from releasing any halocarbons into the environment.

In the case of demolition, ODS will require proper recovery and disposal. The BC Ozone-Depleting Substances Regulations would also apply to any CFC/ODS abatement procedures. These regulations require that all ODS be collected, stored and recycled, or collected and disposed of accordingly.

Crystalline Silica

Crystalline silica is a substance which is considered hazardous by inhalation and can result in serious and sometimes fatal lung disease. The ACGIH and WorkSafeBC, under the Occupational Health and Safety Regulation and the Canada Labour Code specify an exposure limit of 0.025 mg/m^3.

Paint

Paints often contain heavy metals as pigments and/or preservatives. Common heavy metal additives to paints are lead, mercury, and arsenic. Under specific circumstances, persons may be exposed to these metals by ingestion, skin absorption and/or inhalation.

Other than during the application process, the primary mechanism of exposure for workers would be the inhalation of dusts through activities such as sanding, scraping, drilling, crushing, heating, burning or other processes likely to damage the coatings themselves. Paints containing heavy metals pose little risk to workers when in good condition and when undisturbed.

Although limits are currently imposed in the quantities of lead permitted in paints intended for specific uses, lead content below these limits may still pose a health hazard if rendered airborne and inhaled, ingested or absorbed through the skin. The same applies to mercury. The Hazardous Products Act, Surface Coating Materials Regulation (SOR/2005-109) (SCMR) permits the advertising, sale and labeling of surface coatings (including paint) that meet the following criteria set out below. Quantities of lead and mercury are specifically limited. Other heavy metals are not addressed in this regulation.

In 1976, the amount of lead that could be added to interior paints was limited by law, but exterior paints could still contain higher amounts of lead, provided they carried a warning label. Under the Surface Coating Materials Regulations, which came into effect in 2005, the lead limit was further reduced (from Health Canada). The 600 mg/kg

maximum total lead standard is the same as that proposed for paints and other liquid coating materials used for furniture, household products, children's products, and exterior and interior surfaces of any building frequented by children, under the recent amendment to the Hazardous Products Act Liquid Coating Materials Regulations. It is also the same standard prescribed by the U.S. Consumer Product Safety Commission Regulation 16 CFR Part 1303, for paint and other liquid coatings for residential use, toys and furniture (97). This limit was determined by a risk assessment which calculated that 600 mg/kg of lead in paint was the threshold level, at or below which there would be no significant lead exposure if a child consumed a one square inch paint chip each day.

When lead is present in paint, there is a potential for airborne exposure of lead to workers. Airborne exposure can occur if the material is disturbed (especially if the lead containing materials are hand sanded); hand demolished and/or any other disturbances are made to the coating. An exposure control plan is necessary if workers are, or may be, exposed to lead in excess of 50 % of the exposure limit established by the Workers' Compensation Board (WorkSafeBC) for an 8 hours total weighted average exposure, or if exposure through any route of entry could cause elevated levels of lead in the blood. Lead precautions during demolition or renovation may be required, including the use of personal protective equipment for workers and/or dust suppression methods.

5.0 METHODOLOGY

The methodology of the survey is summarized in the following sections. Prior to all site work, a *Site Specific Health and Safety Plan* was developed and forwarded to PWGSC Environmental Services.

Asbestos

The asbestos survey methodology and sampling procedure are outlined in the following sections.

Survey Methodology

The survey was designed to determine the type and extent of asbestos containing material (ACM) presence within the subject site. The survey was non-destructive and therefore did not include areas that were inaccessible at the time of the survey. Where practicable, sample volumes were minimized to avoid unnecessary damage to building systems. Specific building material components were examined within the building and include, where applicable:

- Structural – all visible structural components including walls, roofs and supporting members
- Mechanical systems - insulation, domestic hot and cold water, and caulks.
- Architectural – systems including: texture coats, sheet flooring, vinyl floor tile, ceiling tile, wall board, drywall joint compound, asbestos sheet products.

Where materials were observed that were suspected of containing asbestos, representative samples were collected. Fifty one (51) samples of materials suspected of containing asbestos were collected and submitted with a chain of custody to the contract laboratory.

A complete listing of all materials suspected of containing asbestos that were sampled, including the results of analysis is found in Section 6 of this report.

Sampling Procedures

Bulk Samples

Sampling procedures for various building materials vary somewhat depending on the exact conditions at each site. In all cases standardized protocols are used for collecting samples for asbestos analysis. All accessible suspect materials that were visually unique were sampled. Visually similar materials were only sampled once unless known to be heterogeneous such as drywall joint compound.

Sampled materials were cut down to the base substrate to ensure that a representative sample was collected.

Paint

Painted surfaces were scraped down to the base substrate to ensure that all layers of paint were included. Paint samples were tested using the following analytical method:

- Lead: EMSL (SW 846 3050B*/7000B) Lead in Paint Chips by Flame Atomic Absorption Spectrophotometer

A total of five paint chips were submitted to EMSL Analytical for analysis. The sample locations are shown on the floor plans

Polychlorinated Biphenyls (PCB)

The Site was surveyed for the presence of PCBs in electrical equipment. The primary source of PCBs was identified in fluorescent light ballasts which were evaluated according to the guideline developed by Environment Canada (EC) - *Identification of Lamp Ballasts Containing PCBs –Environment Canada 1991*.

Manufacturers of ballasts and capacitors use distinct catalogue and date codes to identify their product, its date of manufacture, and, for some capacitors, its dielectric fluid. Fluorescent lamp ballasts are usually mounted between the fluorescent tubes on the light fixture and are shielded with a metal protective device which reduces heat radiation. In order to determine if fluorescent light ballasts contain PCB's the metal protective cover is removed while the power is off to the fixture. With the ballast exposed the date code is visible and can be referenced in the EC guideline.

For ballasts not stamped "no PCB", in most cases, fluorescent light ballasts need to be removed from the fixture before the date of manufacture can be determined. The date of manufacture is critical in establishing whether PCB may be present in the ballast capacitor.

Ozone Depleting Substances (ODS) and Other Halocarbons

The subject building was inspected for the presence of devices that are known or suspected of containing to contain ODS or other halocarbons. Devices suspected of containing these materials were documented so that any hazardous materials can be removed prior to demolition or disposal of the equipment. These devices typically include refrigeration and air conditioning equipment.

Crystalline Silica

Testing for crystalline silica in dust was not completed/conducted as part of this survey however it is known to be a component of concrete dust. All concrete, plaster and stucco is suspected of containing silica in crystalline and non-crystalline forms. Many of the removal techniques (grinding, cutting, chipping etc) for these materials can generate high levels of crystalline silica in the air.

Mould

Within the BC Occupational Health and Safety Regulations, there are no established permissible exposure levels for mould spores in air. This means that there are no published concentrations above which worker exposure is deemed to be hazardous

and under which workers would not need respiratory protection. WorkSafeBC does, however, provide guidance on protocols for protecting workers from the hazards of airborne mould and bacteria within the section(s) of the Regulation guidelines addressing Indoor Air Quality.

Various other guidelines are provided for addressing mould in Canada including:

- The Institute of Inspection, Cleaning and Restoration and Certification (IICRC) standard S500 governing both water damage restoration and entitled: Standard for Professional Water Damage Restoration – S500. This document is approved by the American National Standards Institute (ANSI)
- Health Canada: Fungal contamination in public buildings: A guide to recognition and management, 1995
- Health Canada. Fungal Contamination in Public Buildings: Health Effects and Investigation Methods, 2004

These guidelines also state that any non-porous (metal, glass and hard plastics) and semi-porous (wood and concrete) materials that are structurally sound and visibly mouldy can be cleaned and re-used. However, porous materials such as ceiling tiles, wallpaper, insulation, drywall, and sometimes carpets with more than a small area of contamination should be removed and discarded.

6.0 FINDINGS AND RISK ASSESSMENT

The findings of the survey are discussed in the following sections. Photographs of sample locations are provided in Section 7.0. The asbestos risk assessment and indicative cost estimates are provided in this section. The analytical reports are provided in Appendix A.

6.1 Asbestos in Bulk Building Material Samples

A total of fifty one (51) samples of suspected asbestos containing materials were collected and submitted for analysis to the contract laboratory. The analytical results are provided both as an Excel Spreadsheet provided to the PWGSC-Environmental Services and attached as a pdf report in Appendix A.

Asbestos-containing materials were found in various locations within the building fabric and mechanical systems of the DND buildings.

Asbestos was identified in the following materials:

- Floor tiles (exposed and concealed)
- Sheet flooring (exposed and concealed)
- Roof Tar
- Fire stopping
- Pipe Insulation
- Cementitious Parging
- Transite Board

The roof structures, in most buildings, were not tested for the presence of asbestos so as not to disrupt the building envelope. Sampling will need to be undertaken prior to the commencement of any work and may require the presence of a qualified roofer to make good any damage to the roof membrane.

Recommendations are based on Public Works and Government Services Canada Departmental Policy 057 – Asbestos Management (DP 057).

Asbestos Containing Materials must be managed under the PWGSC Asbestos Management Plan (AMP). The AMP should conform to PWGSC Departmental Policy 057. The purpose of the AMP is to assist the organization in managing ACM in a systematic fashion to ensure identified ACM are managed in a safe manner which complies with the Canada Labour Code and WorkSafeBC guidelines.

ACM in good condition may be managed in place in accordance with the implementation of the Asbestos Management Plan (AMP). Institute routine surveillance of the ACM. Trained workers or contractors must use appropriate asbestos precautions (Type 1, Type 2 or Type 3) during disturbance of the remaining ACM.

Inspect all identified asbestos containing materials annually to identify any damage and ensure proper labeling is present.

Any damaged ACM found during future inspections, as well as ACM that could be impacted by any demolition or renovation activity, should be removed following procedures outlined in the AMP.

Throughout any abatement activities, appropriate air monitoring and inspection should be conducted by qualified personnel to ensure all contamination is contained and ACM are disposed of appropriately. It is recommended that a proper scope of work and asbestos removal specifications be written to ensure the complete and proper removal of all ACM.

Table 1: Asbestos Containing Materials Summary-Current Survey

Asbestos containing materials were identified to be in the following materials/locations:

Sample ID	Building	Material	Access-ibility	Friability (F or N)	Condition (G/F/P)	Action Code
15609-01	Bldg 4 - DND Property - EDC Office - Bathroom	Sheet Flooring – 20% Chrysotile Asbestos Content	A	N	G	ACTION 7
15609-04	Bldg 4 - DND Property - EDC Office	Floor Tile - 12"x12" White – <1% Chrysotile Asbestos Content	A	N	G	ACTION 7
15609-08	Bldg 8 - DND Property - Kiln Building - Electrical - Kiln Bay #6	Roof-Tar – 10% Chrysotile Asbestos Content	B	N	G	ACTION 7
15609-10	Bldg 8 - DND Property - Kiln Building - Steel Shop - Kiln Bay #8	Firestopping 10% Chrysotile Asbestos Content	A	F	F	ACTION 5/6
15609-12	Bldg 5 - DND Property - Jenkins Marine - Office	Sheet Flooring - Orange/Brown Mosaic 15% Chrysotile Asbestos Content	A	F	G	ACTION 5/7
15609-14	Bldg 5 - DND Property - Jenkins Marine - Office	Sheet Flooring (Bottom Layer) – 25% Chrysotile Asbestos Content	A	F	G	ACTION 5/7
15609-20	DND Property - N4 - NIS - Commissionaire Front Security Desk	Parged Pipe Insulation (T-Section above Ceiling) 50% Chrysotile Asbestos Content	B	F	G	ACTION 7
15609-24	DND Property - N4 - NIS - Entrance	Floor Tile - Greyish Green 12"x12" – <1% Chrysotile Asbestos Content	A	N	F	ACTION 5/7
15609-26	D N D Property - N4 - NIS - Room 112	Parged Piping (Elbow above Ceiling) – 50% Chrysotile Asbestos Content	B	F	P-Debris G-Main	ACTION 1 ACTION 6/7

Warning: in the event any additional suspect materials are encountered during renovation/repair activities, work on those materials should stop immediately and remain undisturbed until testing confirms the presence or absence of asbestos or other hazardous material

Asbestos containing materials were identified to be in the following materials/locations:						
Previously identified	DND Property- N$ -NIS Boiler Room	Mechanical Pipe and Boiler Insulation	B	F	G	ACTION 7
15609-43	DND Property - N12 - Library - Crawl Space	Mechanical Piping Insulation (Aircell on Straights) – 60% Chrysotile Asbestos Content	B	F	P-Debris G-Main	ACTION 1 ACTION 7

Evaluation of asbestos containing materials is based on the condition of the material and its accessibility. Following are the guidelines used to evaluate ACMs and the action, if any, required to safely manage them.

Figure 1: Action Matrix from DP 057

	CONDITION			
ACCESS	GOOD	FAIR	POOR	DEBRIS
(A)	ACTION 5/7	ACTION 5/6	ACTION 3	ACTION 1
(B)	ACTION 7	ACTION 6/5	ACTION 3	ACTION 1
(C) exposed	ACTION 7	ACTION 6	ACTION 4	ACTION 2
(C) concealed	ACTION 7	ACTION 7	ACTION 4	ACTION 2
(D)	ACTION 7	ACTION 7	ACTION 7	ACTION 7

The following is excerpted from Public Works and Government Services Canada Departmental Policy 057 – Asbestos Management (DP 057).

Condition

Spray Applied Fireproofing, Insulation and Texture Finishes

In evaluating the condition of ACM spray applied as fireproofing, thermal insulation or texture, decorative or acoustic finishes, the following criteria apply;

GOOD	Surface of material shows no significant signs of damage, deterioration or delamination. Up to one percent visible damage to surface is allowed within range of GOOD. Evaluation of sprayed fireproofing requires the surveyor to be familiar with the irregular surface texture typical of sprayed asbestos products. GOOD condition includes unencapsulated or unpainted fireproofing or texture finishes, where no delamination or damage is observed, and encapsulated fireproofing or texture finishes where the encapsulation has been applied after the damage or fallout occurred.
POOR	Sprayed materials show signs of damage, delamination or deterioration. More than one percent damage to surface of ACM spray.

Mechanical Insulation

In evaluating the condition of mechanical insulation (on boilers, breeching, ductwork, piping, tanks, equipment etc.) the following criteria are used:

GOOD	Insulation is completely covered in jacketing and exhibits no evidence of damage or deterioration. No insulation is exposed. Includes conditions where the jacketing has minor surface damage (i.e., scuffs or stains), but the jacketing is not penetrated.
FAIR	Minor penetration damage to jacketed insulation (cuts, tears, nicks, deterioration or delamination) or undamaged insulation that has never been jacketed. Insulation is

	exposed but not showing surface disintegration. The extent of missing insulation ranges should be minor to none.
POOR	Original insulation jacket is missing, damaged, deteriorated or delaminated. Insulation is exposed and significant areas have been dislodged. Damage cannot be readily repaired.

Non-Friable and Potentially Friable Materials

Non-friable materials generally have little potential to release airborne fibres, even when damaged by mechanical breakage. However, some non-friable materials, i.e., exterior asbestos Concrete products, may have deteriorated so that the binder no longer effectively contains the asbestos fibres. In such cases of significantly deteriorated non-friable material, the material will be treated as a friable product.

Accessibility

The accessibility of building materials known or suspected of being ACM is rated according to the following criteria:

Access (A)	Areas of the building within reach (from floor level) of all building users. Includes areas such as gymnasiums, workshops, and storage areas where activities of the building users may results in disturbance of ACM not normally within reach from floor level.
Access (B)	Frequently entered maintenance areas within reach of maintenance staff, without need for a ladder. Includes: frequently entered pipe chases, tunnels and service areas or areas within reach from a fixed ladder or catwalk, i.e., tops of equipment, mezzanines.
Access (C) Exposed	Areas of the building above 8'0" where use of a ladder is required to reach the ACM. Only refers to ACM materials that are exposed to view, from the floor or ladder, without removing or opening other building components such as ceiling tiles, or service access doors or hatches. Does not include infrequently accessed service areas of the building.
Access (C) Concealed	Areas of the building which require removal of a building component including lay-in ceilings and access panels into solid ceiling systems. Includes rarely entered crawl spaces, attic spaces etc. Observations are limited to the extent visible from the access points.
Access (D)	Areas of the building behind inaccessible solid ceiling systems, walls, or mechanical equipment, etc., where demolition or the ceiling, wall or equipment etc., is required to reach the ACM. Evaluation of condition and extent of ACM is limited or impossible, depending on the surveyor's ability to visually examine the materials in Access D.

Warning: in the event any additional suspect materials are encountered during renovation/repair activities, work on those materials should stop immediately and remain undisturbed until testing confirms the presence or absence of asbestos or other hazardous material

Figure 2: Action Key

Action 1	**Immediate Clean Up of Debris That is Likely to be Disturbed** Restrict access that is likely to cause a disturbance of the ACM DEBRIS and clean up ACM DEBRIS immediately. Utilize correct asbestos procedures. This action is required for compliance with regulatory requirements.
Action 2	**Entry Into Areas with ACM Debris** At locations where ACM DEBRIS can be isolated in lieu of removal or clean up, use appropriate means to limit entry to the area. Restrict access to the area to persons utilizing Type 2 asbestos-work precautions. The precautions will be required until the ACM DEBRIS has been cleaned up, and the source of the DEBRIS has been stabilized or removed.
Action 3	**ACM Removal Required for Compliance** Remove ACM for compliance with regulatory requirements. Utilize asbestos procedures appropriate to the scope of the removal work.
Action 4	**Access into Areas Where ACM is Present and Likely to be Disturbed by Access** Use asbestos precautions when entry or access into an area likely to disturb the ACM. ACTION 4 must be used until the ACM is removed (Use ACTION 1 or 2 if DEBRIS is present).
Action 5	**Proactive ACM Removal** Remove ACM in lieu of repair, or at locations where the presence of asbestos in GOOD condition is not desirable.
Action 6	**ACM Repair** Repair ACM found in FAIR condition, and not likely to be damaged again or disturbed by normal use of the area or room. Upon completion of the repair work, treat ACM as material in GOOD condition and implement ACTION 7. If ACM is likely to be damaged or disturbed during normal use of the area or room, implement ACTION 5.
Action 7	**Routine Surveillance** Institute routine surveillance of the ACM. Trained workers or contractors must use appropriate asbestos precaution during disturbance of the remaining ACM.

Note: any additional suspect materials encountered during renovation or demolitions activities must be left undisturbed until testing determines the presence or absence of asbestos or other hazardous material. In the event they are damaged or otherwise impacted, all work shall stop until appropriate control can be put in place to protect workers and the public.

6.2 Lead

Lead Paint

Analysis of paint samples indicated that lead is present in concentrations ranging from 5.3% to a low of 0.017%. All samples were confirmed to exceed the concentration of lead permissible in new paint (0.009% - SCMR) threshold to be sold without notifying the consumer of its lead content.

Table 3: Paint Chip Sampling Results

Sample	Description	Lead (%)	Condition
15609-05	DND Property – EDC Office Exterior – Blue	0.017	Fair
15609-06	DND Property – EDC Office Exterior – Cream	3.100	Poor
15609-11	DND Property – Kiln Building – Exterior - White	0.110	Good
15609-15	DND Property – Jenkins Marine - Exterior	5.300	Fair

Overall, paint coatings were found to be in fair to good condition. Parts of the exterior of Building 4 - EDC office is in poor condition and should be removed. Where damaged and deteriorating, paint should be removed following procedures designed to protect the workers from heavy metal exposure and to avoid the spread of contamination. Lead content of painted materials should not increase their disposal costs however; concentrated paint chips would need to be disposed as hazardous waste. Routine removal of lead paint is not recommended, rather it should be managed in place and removed on an "as needed" basis.

Elemental Lead

Lead within the copper water pipes/fittings was not tested for lead content however lead content in solder, especially from buildings of this vintage, is known to reach levels up to 98% lead.

If lead materials are found they are typically recognized as having significant salvage value, disposal therefore should not be a major concern. Workers should exercise caution if heat is to be used to melt any lead found as means of facilitating its extraction. Molten lead can produce significant quantities of inhalable lead fume which can pose a severe health hazard. The BC Occupational Health and Safety Regulation requires that worker exposure to airborne lead be kept below 0.05 mg/m^3.

Polychlorinated Biphenyls (PCB) in Electrical Equipment

Fluorescent light fixtures were observed and appeared to be of a vintage often found to contain ballasts which Environment Canada (EC) has developed a guideline called - *Identification of Lamp Ballasts Containing PCBs –Environment Canada 1991*.

Manufacturers of ballasts and capacitors use distinct catalogue and date codes to identify their product, its date of manufacture, and, for some capacitors, its dielectric fluid. Fluorescent lamp ballasts are usually mounted between the fluorescent tubes on the light fixture and are shielded with a metal protective device which reduces heat radiation. Due to the fact the covers are easily broken and the risk of electrical shock when accessing the ballast, it is standard practice to make the observation that there is a potential for PCBs to be present and have the ballasts inspected prior to disposal.

The Hazardous materials report from NWEG in 2000 mentioned that many of these ballasts have already been removed.

Inspect all light ballasts for the presence of PCB prior to disposal. PCB containing ballasts must be disposed of as hazardous waste.

6.3 Mould

No mould or significant moisture issues were observed during the survey.

6.4 Hantavirus-Animal Droppings

Materials suspected of containing Hantavirus were not observed during the survey.

Workers accessing areas where rodent or other animal droppings are present must be informed of the potential risk of Hantavirus exposure and employ suitable precautions for personal protection and control of the spread of contamination.

6.5 Ozone Depleting Substances

Several pieces of equipment containing ozone depleting substances (ODS) were observed during this investigation. PWGSC maintains an active halocarbon inventory.

6.6 Crystalline Silica

Testing for crystalline silica in dust was not completed/conducted as part of this survey however it is known to be a component of concrete dust. All concrete, plaster and stucco is suspected of containing silica in crystalline and non-crystalline forms. Many of the removal techniques (grinding, cutting, chipping etc) for these materials can generate high levels of crystalline silica in the air.

Use wetting techniques and/or HEPA equipped extraction systems attached to drills and other power equipment where possible in order to decrease dust levels.

As per the clients request, non-invasive investigative techniques were used. Even with the most invasive survey techniques, however, it should be noted that the possibility remains for other concealed materials to be found during a renovation or demolition.

Warning: in the event any additional suspect materials are encountered during demolition or renovation activities, work on those materials must stop immediately and remain undisturbed until testing confirms the presence or absence of asbestos or other hazardous material. If this any materials suspected of containing asbestos or another hazardous material are disturbed during the work, all work shall stop until the area is contained, the hazard evaluated by a qualified professional and the hazardous materials, if indeed present, is safely managed by a qualified contractor.

7.0 ABATEMENT COST ESTIMATE

1) Clean up debris above Building N4 - NIS - Room 112 using Type 2 (moderate risk procedures). Note: More debris may be present in other locations-recommend inspection above t-bar ceiling by trained personnel.

   Cost for the removal of this debris (approximately 2 m^2):
   (including labor, materials, air sampling and inspection) is estimated at
   $ 2,000.00

2) Clean up debris and ACM pipe repair in crawl space N12 - Library using Type 2 (moderate risk procedures).

   Cost for the removal of this debris (approximately 2 m^2) plus HEPA vacuuming and repair:
   (including labor, materials, air sampling and inspection) is estimated at
   $ 3,000.00

3) Patching and repair to ACM firestopping in Kiln Bay #8 using Type 2 (moderate risk procedures).

   Cost for the repair of this ACM (approximately 2 m^2) plus HEPA vacuuming and repair:
   (including labor, materials, air sampling and inspection) is estimated at
   $ 3,000.00

4) Sheet flooring as identified in the office and reception areas of building 7 (Jenkins Marine) may be managed in place or be proactively removed using Type 3 (high risk procedures).

   Cost for the removal of approximately 15 m^2 of flooring:
   (including labor, materials, air sampling and inspection) is estimated at
   $ 20,000.00

8.0 BULK SAMPLES

The following photoplate is a summary of the room by room assessment including samples collected.

Building: 4 DND Property – EDC Office

Area: EDC Office

Details:

- Construction Date: 1970
- Ceiling: Drywall and wood panels
- Walls: Drywall and wood panels
- Flooring: Floor tiles and sheet flooring on wood substrate
- Roof: Asphalt shingles

Area: Office and Bathroom

Hazardous Materials Observed:

- Lead: Lead based paint on walls and trim
- Mercury containing equipment:
- Fluorescent light fixtures present
- Mercury containing Thermostat present
- Ozone depleting substances: Fridge present
- PCB's: [potential] Fluorescent light ballasts present
- Mould: None observed

Samples:

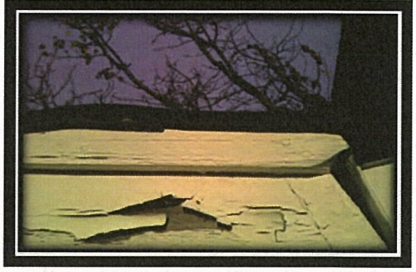
15609-01: Sheet Flooring (Lt. Grey Mosaic)
Bathroom
20% Chrysotile Asbestos Content

15609-02: Insulation (Window Frame)
Exterior
No Asbestos Detected

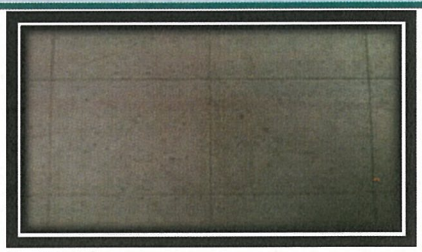
15609-03: Roofing Material (3 Layers)
Roof
No Asbestos Detected

15609-04 : Floor Tile (White 12"x12")
Office Area
<1% Chrysotile Asbestos Content

No access to attic space.



Building: 4 DND Property – EDC Office



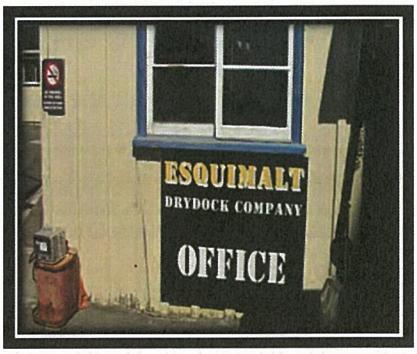
Area: Exterior and Office

Samples:

15609-05: Blue Paint
Exterior Door & Window Trim
Lead Concentration 0.017 % w.t.

15609-06: Cream Paint
Exterior Wall Paint
Lead Concentration 5.3% w.t.

Asbestos-containing wall panel was identified by an asbestos warning sign and was not sampled.



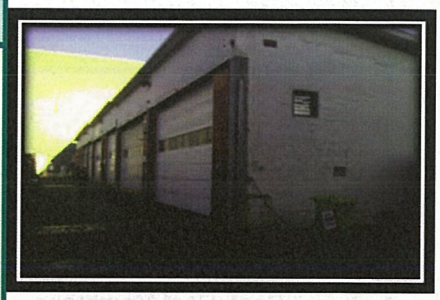
Warning: in the event any additional suspect materials are encountered during renovation/repair activities, work on those materials should stop immediately and remain undisturbed until testing confirms the presence or absence of asbestos or other hazardous material

Building: 8 DND Property – Kiln Building

Area: Kiln Building

Details:

- Construction Date: Unknown
- Ceiling: Wood
- Walls: Brick, Mortar & Concrete
- Flooring: Concrete
- Roof: Metal Sheeting



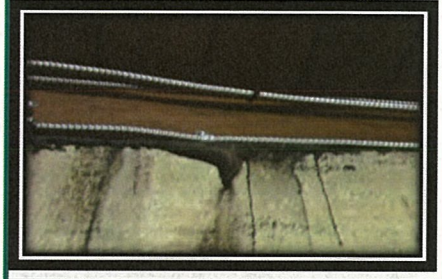
Area: Kiln Bays and Shops

Hazardous Materials Observed:

- Lead: Lead based paint on walls and trim
- Mercury containing equipment: Fluorescent light fixtures present
- Ozone depleting substances: Fridge(s) present
- PCB's: [potential] Fluorescent ballasts present
- Mould: None Observed

Samples:

15609-07: Mastic (Exhaust Duct Joint)
Pipe Shop - Kiln Bay #1
No Asbestos Detected



15609-08: Tar – Roof
Electrical – Kiln Bay #6
10% Chrysotile Asbestos Content

15609-09: Mortar (Brick Wall)
Steel Shop – Kiln Bay #7
No Asbestos Detected

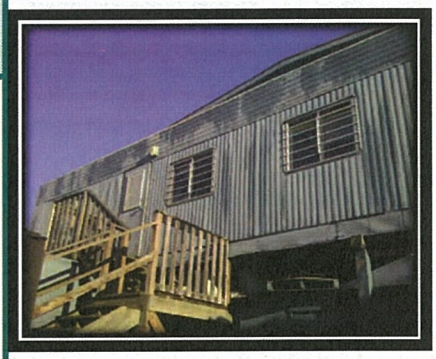
15609-10: Firestopping
Steel Shop – Kiln Bay #8
10% Chrysotile Asbestos Content

15609-11: White Paint
Exterior Walls
Lead Concentration 0.11% w.t.

Warning: in the event any additional suspect materials are encountered during renovation/repair activities, work on those materials should stop immediately and remain undisturbed until testing confirms the presence or absence of asbestos or other hazardous material

Building: 5 DND Property – Jenkins Marine

Area: Office Trailer and Warehouse



Details:

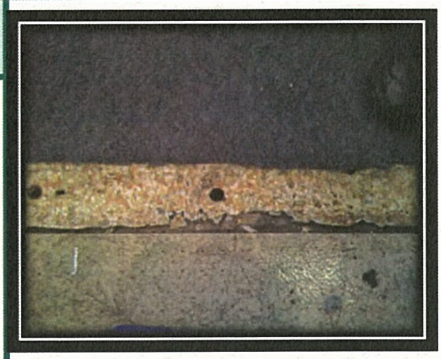
Office Trailer:

- Construction Date: Unknown
- Ceiling: Wood Fiber Ceiling Tiles
- Walls: Wall Panels
- Flooring: Sheet Flooring
- Roof: Roof Membrane

Warehouse:

- Construction Date: 1940
- Ceiling: Wood Structure
- Walls: Wood Paneling
- Flooring: Concrete
- Roof: Not Accessible

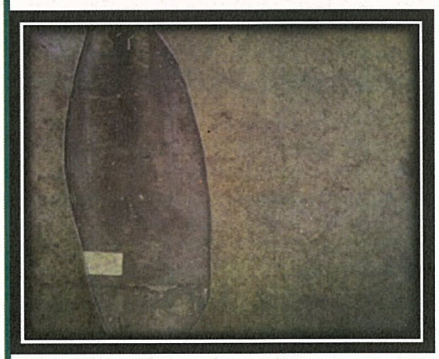
Area: Office Trailer and Warehouse



Hazardous Materials Observed:

- Lead: Lead based paint on walls and trim
- Mercury containing equipment: Fluorescent light fixtures present
- Ozone depleting substances: Fridge(s) present
- PCB's: [potential] Fluorescent light ballasts present
- Mould: None Observed

Samples:



15609-12: Sheet Flooring (Orange/Brown Mosaic)
Office Area
15% Chrysotile Asbestos Content

15609-13: Sheet Flooring (Beige – Top Layer)
Office Area
No Asbestos Detected

15609-14: Sheet Flooring (Bottom Layer)
Office Area
25% Chrysotile Asbestos Content

Warning: in the event any additional suspect materials are encountered during renovation/repair activities, work on those materials should stop immediately and remain undisturbed until testing confirms the presence or absence of asbestos or other hazardous material

Building: 5 DND Property – Jenkins Marine

15609-15: Blue Paint
Exterior of Jenkins Marine Warehouse
Lead Concentration 5.3% w.t.

Warning: in the event any additional suspect materials are encountered during renovation/repair activities, work on those materials should stop immediately and remain undisturbed until testing confirms the presence or absence of asbestos or other hazardous material

Building: 3 DND Property – PWGSC Guard House (Back Gate)

Area: Guard House

Details:

- Construction Date: 1940
- Ceiling: Drywall
- Walls: Drywall & Wood Panel
- Flooring: Floor Tiles on Concrete Substrate
- Roof: Roofing Materials

Area: Guard House

Hazardous Materials Observed:

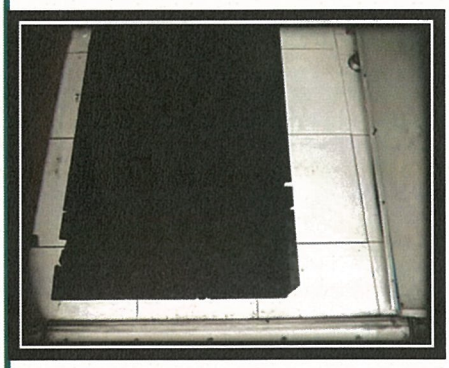
- Lead: [potential] Lead based paint on walls and trim
- Mercury containing equipment: Fluorescent light fixtures present
- Ozone depleting substances: Fridge present
- PCB's: [potential] Fluorescent light ballasts present
- Mould: None Observed

Samples:

15609-16: Drywall Joint Compound
Interior Office Wall
No Asbestos Detected

15609-17: Floor Tile – White 12"x12"
Office Flooring
No Asbestos Detected

15609-18: Floor Mastic
Mastic beneath Floor Tile on Concrete Substrate
No Asbestos Detected



Window and door trim paint (blue) and exterior wall paint (cream) visually similar as Building 4 DND Property – EDC Office.

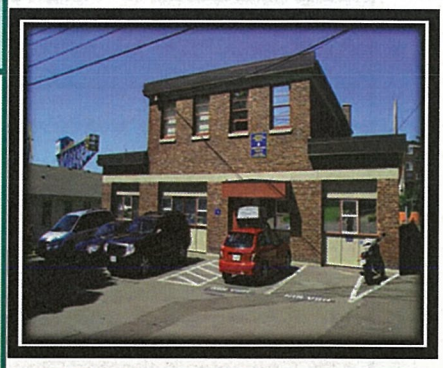
Warning: in the event any additional suspect materials are encountered during renovation/repair activities, work on those materials should stop immediately and remain undisturbed until testing confirms the presence or absence of asbestos or other hazardous material

Building: N4 DND Property – National Investigation Services

Area: NIS Building

Details:

Construction Date: 1943
Ceiling: Wood Planks
Walls: Brick, Mortar & Drywall
Flooring: Floor Tiles, Sheet Flooring on Concrete Substrate
Roof: Roof Membrane (Not Accessible)



Area: Office Areas

Hazardous Materials Observed:

- Lead: [potential] Lead based paint on walls and equipment
- Mercury containing equipment: Fluorescent light fixtures present
- Ozone depleting substances: Fridge(s) present
- PCB's: [potential] Fluorescent light ballasts present
- Mould: None Observed

Samples:

15609-19: Acoustic Ceiling Tile
Random Small Fissure & Small Pinhole (2'x4')
Commissionaire Front Security Desk
No Asbestos Detected

15609-20: Parged Pipe Insulation
T-Section Above Ceiling Tiles
Commissionaire Front Security Desk
50% Chrysotile Asbestos Content

15609-21: Drywall Joint Compound
Commissionaire Front Security Desk
No Asbestos Detected

15609-22: Acoustic Ceiling Tile
Long Horizontal Fissure & Random Pinhole (2'x4')
Room 101
No Asbestos Detected

Warning: in the event any additional suspect materials are encountered during renovation/repair activities, work on those materials should stop immediately and remain undisturbed until testing confirms the presence or absence of asbestos or other hazardous material

Building: N4 DND Property – National Investigation Services

Area: Main Floor - Office Areas

Samples:

15609-23: Drywall Joint Compound
Room 102
No Asbestos Detected

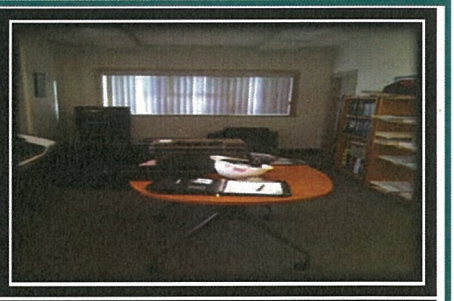
15609-24: Floor Tile – Greyish Green 12"x12"
Entrance
<1% Chrysotile Asbestos Content

15609-25: Drywall Joint Compound
Room 112
No Asbestos Detected

15609-26: Parged Piping
Elbow above Ceiling Tiles
Room 112
50% Chrysotile Asbestos Content

15609-27: Drywall Joint Compound
Room 110
No Asbestos Detected

Sample 15609-26 was observed to be damaged in very poor condition. A moderate risk clean-up of this damaged asbestos material by a qualified contractor is required.



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Area: Main Floor - Office Areas

Samples:

15609-28: Floor Tile – Lt. Grey 12"x12"
Room 109 (Layer 1)
No Asbestos Detected

15609-28: Mastic
Room 109 (Layer 2)
No Asbestos Detected

15609-29: Floor Tile – Dark Grey 12"x12"
Entrance (Layer 1)
No Asbestos Detected

15609-29: Mastic
Entrance (Layer 2)
No Asbestos Detected

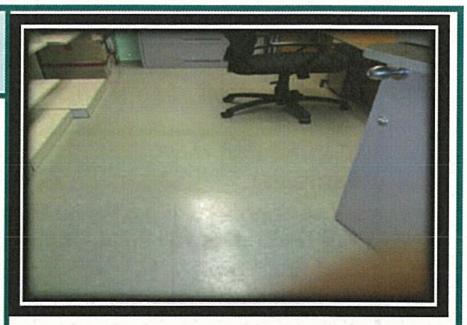
15609-30: Plaster (Layer 1)
Room 105 – Electrical Room
No Asbestos Detected

15609-30: Plaster (Layer 2)
Room 105 – Electrical Room
No Asbestos Detected

15609-31: Brick Mortar
Room 105 – Electrical Room
No Asbestos Detected

15609-32: Sheet Flooring – Lt Grey/White (Layer 1)
Room 107 – Washroom
No Asbestos Detected

15609-32: Mastic (Layer 2)
Room 107 – Washroom
No Asbestos Detected



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Area: 2nd Floor – Office Areas

Samples:

15609-33: Drywall Joint Compound
2nd Floor Lobby
No Asbestos Detected

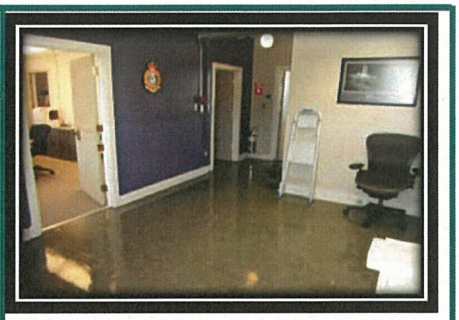
15609-34: Drywall Joint Compound
Room 200 – Boardroom
No Asbestos Detected

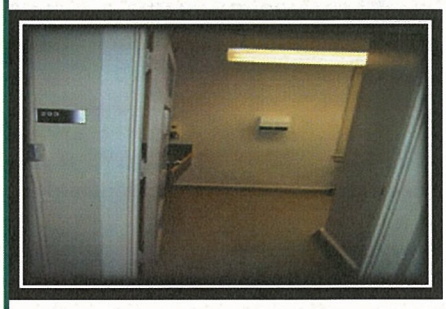
15609-35: Carpet Mastic
Room 200 – Boardroom
No Asbestos Detected

15609-36: Sheet Flooring – Lt. Grey (Layer 1)
Room 203 – 2nd Floor Washroom
No Asbestos Detected

15609-36: Mastic (Layer 2)
Room 203 – 2nd Floor Washroom
No Asbestos Detected

15609-37: Drywall Joint Compound
Room 203 – 2nd Floor Washroom
No Asbestos Detected





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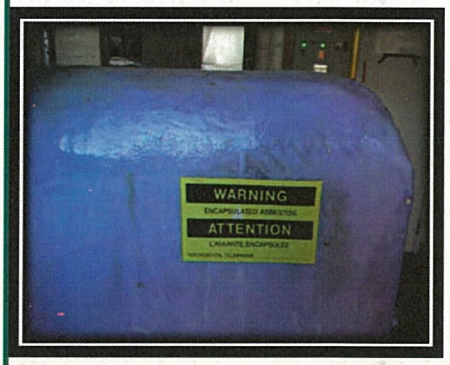
Area: Boiler Room

- Boiler Room mechanical piping insulation identified as asbestos containing by warning sign and was not sampled.
- Boiler mechanical insulation identified as asbestos-containing by warning sign and was not sampled.
- Black duct expansion material was not sampled and suspected of containing asbestos.



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Building: N12 DND Property – Base Library

Area: Base Library

Details:

- Construction Date: 1940
- Ceiling: Wood Panel
- Walls: Wood Panel/Drywall
- Flooring: Sheet Flooring on Wood Substrate
- Roof: Wood Frame & Roofing Materials

Area: Building: N12 DND Property – Base Library

Hazardous Materials Observed:

- Lead: [potential] Lead based paint on walls and equipment
- Mercury containing equipment: Fluorescent light fixtures present
- Ozone depleting substances: Fridge observed.
- PCB's: [potential] Fluorescent light ballasts present
- Mould: None Observed

Samples:

15609-38: Tar Paper
Boiler Room
No Asbestos Detected

15609-39: Brick Mortar
Boiler Room – Chimney
No Asbestos Detected

15609-40: Acoustic Ceiling Tile
Large Horizontal Fissure & Random Pinhole (2'x4')
No Asbestos Detected

15609-41: Drywall Joint Compound
Library North Wall
No Asbestos Detected

Warning: in the event any additional suspect materials are encountered during renovation/repair activities, work on those materials should stop immediately and remain undisturbed until testing confirms the presence or absence of asbestos or other hazardous material

Area: Base Library

Samples:

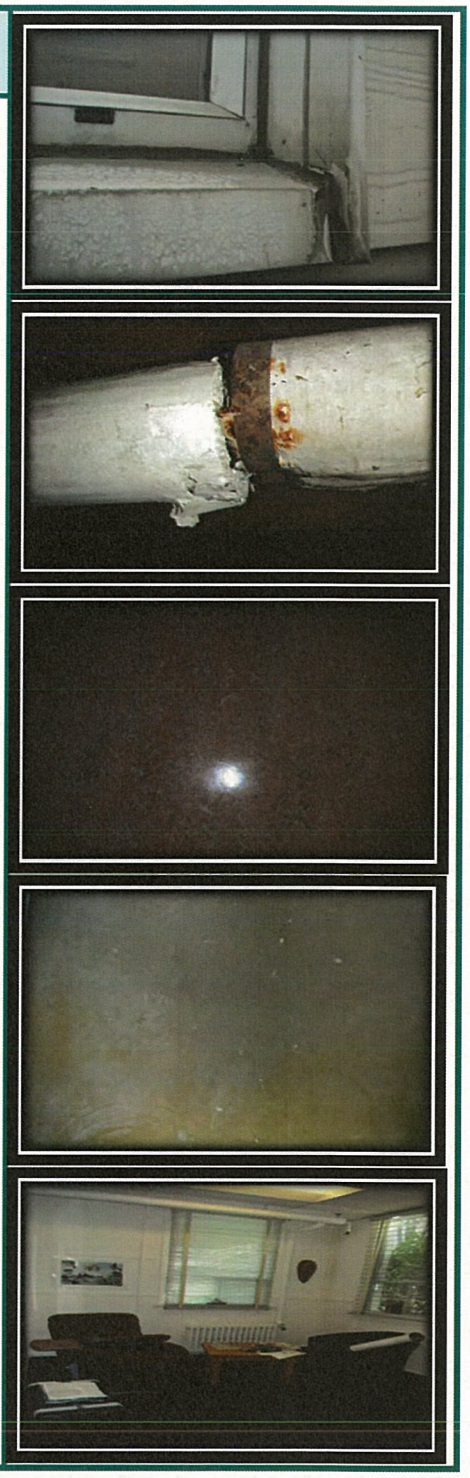
15609-42: Caulking
Exterior Window
No Asbestos Detected

15609-43: Mechanical Piping Insulation
Crawl Space
60% Chrysotile Asbestos Content

15609-44: Sheet Flooring – Lt. Orange
Library Staff Room
Non Asbestos Detected

15609-45: Sheet Flooring – Brown
Hot Water Tank Room
No Asbestos Detected

15609-46: Carpet Mastic
Library
No Asbestos Detected



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Area: Base Library

Samples:

15609-47: Sheet Flooring – Red
Library Floor under Carpet
No Asbestos Detected

15609-48: Acoustic Ceiling Tile
Large Horizontal Fissure & Random Pinhole (2'x4')
No Asbestos Detected

15609-49: Duct Mastic
Attic
Non Asbestos Detected

15609-50: Drywall Joint Compound
Library South Wall
No Asbestos Detected

15609-51: Sheet Flooring
Entrance
No Asbestos Detected

Warning: in the event any additional suspect materials are encountered during renovation/repair activities, work on those materials should stop immediately and remain undisturbed until testing confirms the presence or absence of asbestos or other hazardous material

9.0 Limitation of Survey

This document details the methodology, findings and conclusions of this survey and assessment conducted on the subject site in October – December 2011.

Analytical results included in the report reflect the sampled materials at the specific sample locations. Visually similar materials were referenced to specific analyzed samples.

The survey of the building did not include destructive sampling which would permit an intrusive investigation of inaccessible wall and ceiling cavities. Limited access into interior and perimeter walls, voids, crawlspaces, and mechanical shafts was obtained for the investigation of insulation materials. It is possible that hazardous materials are present in these areas but were not identified. If materials suspected of containing asbestos or other hazardous materials are encountered during future renovations or demolition, they should be treated as hazardous proven otherwise. Locations and building materials that have not been surveyed should be considered potentially hazardous materials-containing until such time as they can be evaluated by a qualified person. Until such time as the material can be appropriately evaluated, all work that could impact the suspect materials shall cease in the affected areas until such time as appropriate precautions can be implemented to protect workers and others at the subject site.

Roofing materials may contain asbestos, however, due to the potential for damage to the building and its contents, full depth roofing core samples were not obtained from the roofing systems. Roofing materials should be sampled and analyzed for asbestos prior to disturbance in the event that roof repairs or replacement is required.

All vermiculite insulation should be considered as asbestos containing until such time as a comprehensive destructive testing sampling program is carried out within the building or structure. Asbestos containing vermiculite should be considered present within all concrete block walls, voids, and spaces including attics, walls, ceiling and floor voids.

Some materials cannot be reasonably surveyed without causing significant damage to the building structure or envelope systems. These materials should be assessed for risk specific to any planned renovations or demolition activities. Materials suspected of containing asbestos may be located in concealed locations on this site include:

- Materials inside double wall metal chimney sections,
- Fire doors and frames,
- Concealed roofing, caulk and felts,
- Internal parts of appliances and white goods,
- Vermiculite in walls that do not have existing penetrations,
- Buried cement pipes, and
- Gaskets in pipe flanges and valves.

Other materials were not sampled for fear of causing damage to building systems including vibration dampeners and electrical wiring.

An asbestos risk assessment must be completed prior to any removal and/or alteration work in or on a building. Removal and/or alteration work requires control measures to be implemented in accordance with WorkSafeBC. Regulations. Protective personal equipment is required during any work or major alteration that may disturb synthetic or asbestos insulation and/or dust that may be present.

Yours very truly,

North West Environmental Group Ltd.

Julie Scott-Moncrieff, B.Sc.,
Senior Occupational Hygienist

APPENDICES

APPENDIX A – SITE LOCATION AND SITE PLAN

Drawing 1: Site Location (Google maps)

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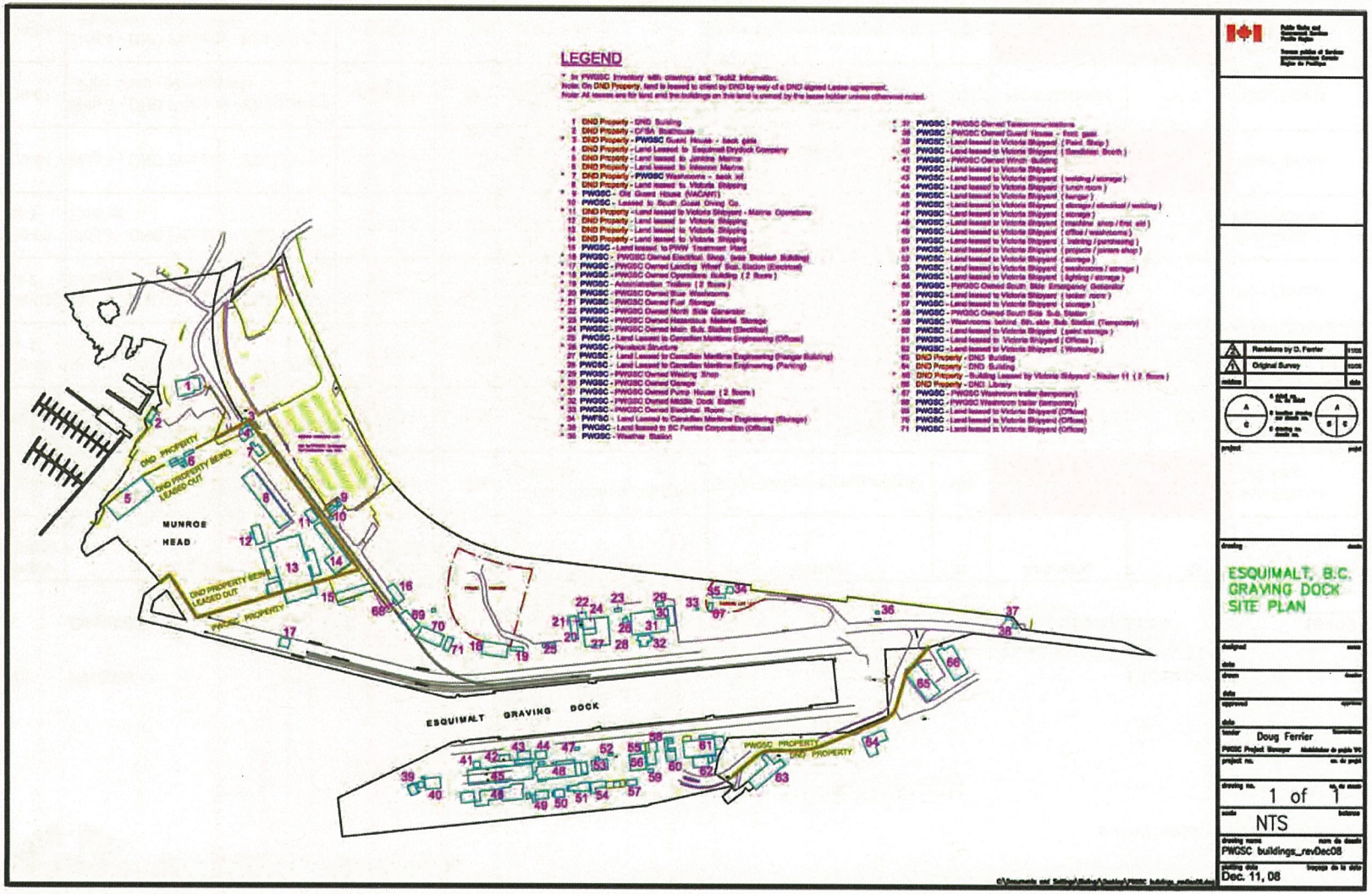
Drawing 2: Site Plan



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Asbestos Analysis of Bulk Materials using Polarized Light Microscopy

Client: **PWGSC**

Site: **Esquimalt Graving Dock Hazmat**

December 16, 2011

Sampled by:/Client Job or PO #	KW
Project Number	15609

Sample Number	Location	Date Analysed	Analyst	Description	Phase	%	Asbestos	%	Other Materials	%
15609-01	Bldg 4 - DND Property - EDC Office - Bathroom	12/05/11	EM	Sheet Flooring - Lt. Grey Mosaic	Grey Fibrous Heterogeneous	100	Chrysotile	20	Non-Fibrous Cellulose	50 30
15609-02	Bldg 4 - DND Property - EDC Office - Exterior	12/05/11	EM	Insulation - Window Frame	Brown/Blue Non-Fibrous Heterogeneous	100	None Detected	0	Non-Fibrous	100
15609-03 Layer 1	Bldg 4 - DND Property - EDC Office - Exterior	12/05/11	EM	Roofing Material - Shingle	Black Fibrous Heterogeneous	33	None Detected	0	Non-Fibrous Cellulose	80 20
15609-03 Layer 2	Bldg 4 - DND Property - EDC Office - Exterior	12/05/11	EM	Roofing Material - Roofing	Black Non-Fibrous Heterogeneous	33	None Detected	0	Non-Fibrous	100
15609-03 Layer 3	Bldg 4 - DND Property - EDC Office - Exterior	12/05/11	EM	Roofing Material - Felt	Black Fibrous Heterogeneous	34	None Detected	0	Cellulose Non-Fibrous	90 10
15609-04	Bldg 4 - DND Property - EDC Office	12/05/11	EM	Floor Tile - 12"x12" White	White Non-Fibrous Heterogeneous	100	Chrysotile	< 1	Non-Fibrous	100
15609-07	Bldg 8 - DND Property - Kiln Building - Pipe Shop - Kiln Bay #1	12/05/11	EM	Mastic - Exhuast Duct Joint	Grey Non-Fibrous Heterogeneous	100	None Detected	0	Non-Fibrous	100
15609-08	Bldg 8 - DND Property - Kiln Building - Electrical - Kiln Bay #6	12/05/11	EM	Tar - Ceiling	Black Fibrous Heterogeneous	100	Chrysotile	10	Non-Fibrous	90
15609-09	Bldg 8 - DND Property - Kiln Building - Steel Shop - Kiln Bay #7	12/05/11	EM	Mortar - Brick Wall	Grey Non-Fibrous Heterogeneous	100	None Detected	0	Non-Fibrous	100

AIHA Proficiency Analytical Testing Programs, LLC

Note: Samples were analyzed by method: EPA/600/R- 93/116 "Bulk Asbestos Analysis by Polarized Light Microscopy". For heterogeneous materials the concentrations may vary.

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15609-10	Bldg 8 - DND Property - Kiln Building - Steel Shop - Kiln Bay #8	12/05/11	EM	Firestopping	Grey/Black Non-Fibrous Heterogeneous	100	Chrysotile	10	Non-Fibrous	90
15609-12	Bldg 5 - DND Property - Jenkins Marine - Office	12/05/11	EM	Sheet Flooring - Orange/Brown Mosaic	Brown/Orange Fibrous Heterogeneous	100	Chrysotile	15	Non-Fibrous Cellulose	55 30
15609-13	Bldg 5 - DND Property - Jenkins Marine - Office	12/05/11	EM	Sheet Flooring - Beige (Top Layer)	Beige Fibrous Heterogeneous	100	None Detected	0	Non-Fibrous Glass	98 2
15609-14	Bldg 5 - DND Property - Jenkins Marine - Office	12/05/11	EM	Sheet Flooring (Bottom Layer)	Brown Fibrous Heterogeneous	100	Chrysotile	25	Non-Fibrous	75
15609-16	Bldg 3 - DND Property - PWGSC Guard House (Back Gate)	11/29/11	EM	Drywall Joint Compound	White Non-Fibrous Homogeneous	100	None Detected	0	Non-Fibrous	100
15609-17 Layer 1	Bldg 3 - DND Property - PWGSC Guard House (Back Gate)	11/29/11	EM	Floor Tile - White 12" x 12"	White Non-Fibrous Heterogeneous	50	None Detected	0	Non-Fibrous	100
15609-18 Layer 2	Bldg 3 - DND Property - PWGSC Guard House (Back Gate)	11/29/11	EM	Mastic	Black Non-Fibrous Heterogeneous	50	None Detected	0	Non-Fibrous	100
15609-19	DND Property - N4 - NIS - Commissionaire Front Security Desk	12/16/11	EM	Acoustic Ceiling Tile - Random Small Fissure/Pinhole (2'x4')	Grey/White Fibrous Heterogeneous	100	None Detected	0	Non-Fibrous Min. Wool Cellulose	25 30 45
15609-20	DND Property - N4 - NIS - Commissionaire Front Security Desk	12/16/11	EM	Parged Pipe Insulation (T-Section above Ceiling)	Grey Fibrous Heterogeneous	100	Chrysotile	50	Non-Fibrous	50

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15609-21	DND Property - N4 - NIS - Commissionaire Front Security Desk	12/16/11	EM	Drywall Joint Compound	White Non-Fibrous Heterogeneous	100	None Detected	0	Non-Fibrous	100
15609-22	DND Property - N4 - NIS - Room 101	12/16/11	EM	Acoustic Ceiling Tile - Long Horizontal Fissure	Grey/White Fibrous Heterogeneous	100	None Detected	0	Non-Fibrous Min. Wool Cellulose	25 30 45
15609-23	DND Property - N4 - NIS - Room 102	12/16/11	EM	Drywall Joint Compound	White Non-Fibrous Heterogeneous	100	None Detected	0	Non-Fibrous	100
15609-24	DND Property - N4 - NIS - Entrance	12/16/11	EM	Floor Tile - Greyish Green 12"x12"	Grey/Green Non-Fibrous Heterogeneous	100	**Chrysotile**	**< 1**	Non-Fibrous	100
15609-25	DND Property - N4 - NIS - Room 112	12/16/11	EM	Drywall Joint Compound	White Non-Fibrous Heterogeneous	100	None Detected	0	Non-Fibrous	100
15609-26	DND Property - N4 - NIS - Room 112	12/16/11	EM	Parged Piping (Elbow above Ceiling)	Grey Fibrous Heterogeneous	100	**Chrysotile**	**50**	Non-Fibrous	50
15609-27	DND Property - N4 - NIS - Room 110	12/16/11	EM	Drywall Joint Compound	White Non-Fibrous Heterogeneous	100	None Detected	0	Non-Fibrous	100
15609-28 Layer 1	DND Property - N4 - NIS - Room 109	12/16/11	EM	Floor Tile - Lt. Grey 12"x12"	Grey Non-Fibrous Heterogeneous	50	None Detected	0	Non-Fibrous	100
15609-28 Layer 2	DND Property - N4 - NIS - Room 109	12/16/11	EM	Floor Tile - Lt. Grey 12"x12"	Black Non-Fibrous Heterogeneous	50	None Detected	0	Non-Fibrous	100

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Sample Number	Location	Date Analysed	Analyst	Description	Phase	%	Asbestos	%	Other Materials	%
15609-29 Layer 1	DND Property - N4 - NIS - Entrance	12/16/11	EM	Floor Tile - Dark Grey 12"x12"	Grey Non-Fibrous Heterogeneous	50	None Detected	0	Non-Fibrous	100
15609-29 Layer 2	DND Property - N4 - NIS - Entrance	12/16/11	EM	Floor Tile - Dark Grey 12"x12"	Black/Yellow Non-Fibrous Heterogeneous	50	None Detected	0	Non-Fibrous	100
15609-30 Layer 1	DND Property - N4 - NIS - Room 105 (Electrical Room)	12/16/11	EM	Plaster - Skim Coat	White Non-Fibrous Heterogeneous	50	None Detected	0	Non-Fibrous	100
15609-30 Layer 2	DND Property - N4 - NIS - Room 105 (Electrical Room)	12/16/11	EM	Plaster - Base Coat	Grey Non-Fibrous Heterogeneous	50	None Detected	0	Non-Fibrous	100
15609-31	DND Property - N4 - NIS - Room 105 (Electrical Room)	12/16/11	EM	Brick Mortar	Grey/White Non-Fibrous Heterogeneous	100	None Detected	0	Non-Fibrous	100
15609-32 Layer 1	DND Property - N4 - NIS - Room 107 (Washroom)	12/16/11	EM	Sheet Flooring - Lt. Grey/White - Linoleum	Grey/Tan Fibrous Heterogeneous	50	None Detected	0	Synthetic Cellulose Non-Fibrous	10 25 65
15609-32 Layer 2	DND Property - N4 - NIS - Room 107 (Washroom)	12/16/11	EM	Sheet Flooring - Lt. Grey/White - Mastic	Yellow Non-Fibrous Heterogeneous	50	None Detected	0	Non-Fibrous	100
15609-33	DND Property - N4 - NIS - 2nd Floor Lobby	12/16/11	EM	Drywall Joint Compound	White Non-Fibrous Heterogeneous	100	None Detected	0	Non-Fibrous	100
15609-34	DND Property - N4 - NIS - Room 200 (Boardroom)	12/16/11	EM	Drywall Joint Compound	White Non-Fibrous Heterogeneous	100	None Detected	0	Non-Fibrous	100

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Sample Number	Location	Date Analysed	Analyst	Description	Phase	%	Asbestos	%	Other Materials	%
15609-35	DND Property - N4 - NIS - Room 200 (Boardroom)	12/16/11	EM	Carpety Mastic	Yellow Non-Fibrous Heterogeneous	100	None Detected	0	Non-Fibrous	100
15609-36 Layer 1	DND Property - N4 - NIS - Room 203 (2nd Floor Washroom)	12/16/11	EM	Sheet Flooring - Lt Grey	Grey/White Fibrous Heterogeneous	50	None Detected	0	Cellulose Non-Fibrous	30 70
15609-36 Layer 2	DND Property - N4 - NIS - Room 203 (2nd Floor Washroom)	12/16/11	EM	Sheet Flooring - Lt Grey	Yellow Non-Fibrous Heterogeneous	50	None Detected	0	Non-Fibrous	100
15609-37	DND Property - N4 - NIS - Room 203 (2nd Floor Washroom)	12/16/11	EM	Drywall Joint Compound	White Non-Fibrous Heterogeneous	100	None Detected	0	Non-Fibrous	100
15609-38	DND Property - N12 - Library - Boiler Room - Perimeter Wall	12/16/11	EM	Tar Paper	Black Fibrous Heterogeneous	100	None Detected	0	Non-Fibrous Cellulose	30 70
15609-39	DND Property - N12 - Library - Boiler Room - Chimney	12/16/11	EM	Brick Mortar	Brown/Grey Non-Fibrous Heterogeneous	100	None Detected	0	Non-Fibrous	100
15609-40	DND Property - N12 - Library	12/16/11	EM	Acoustic Ceiling Tile - Large Horizontal Fissure, Random Pinhole	Grey/White Fibrous Heterogeneous	100	None Detected	0	Non-Fibrous Cellulose Min. Wool	20 40 40
15609-41	DND Property - N12 - Library - North Wall	12/16/11	EM	Drywall Joint Compound	White Non-Fibrous Heterogeneous	100	None Detected	0	Non-Fibrous	100
15609-42	DND Property - N12 - Library - Window Exterior	12/16/11	EM	Caulking	White Non-Fibrous Heterogeneous	100	None Detected	0	Non-Fibrous	100

AIHA Proficiency Analytical Testing Programs, LLC

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Client: **PWGSC**

Site: **Esquimalt Graving Dock Hazmat**

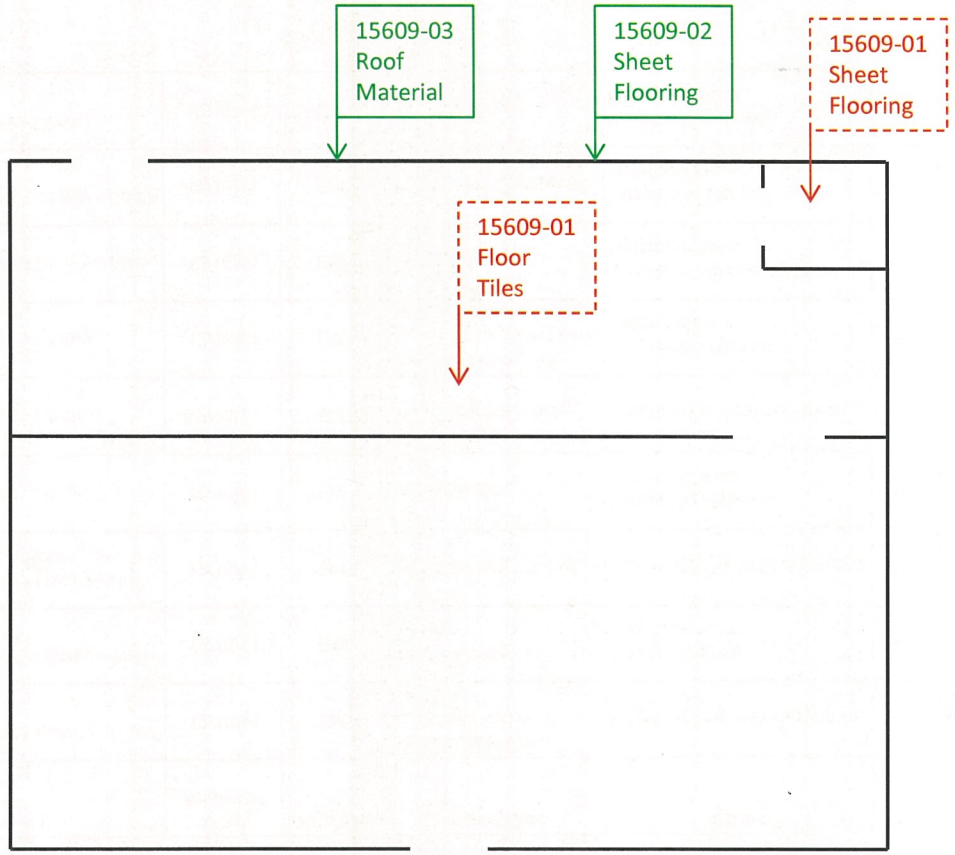
December 16, 2011

Sampled by:/Client Job or PO #	**KW**
Project Number	**15609**

Sample Number	Location	Date Analysed	Analyst	Description	Phase	%	Asbestos	%	Other Materials	%
15609-43	DND Property - N12 - Library - Crawl Space	12/16/11	EM	Mechanical Piping Insulation (Aircell on Straights)	White Fibrous Heterogeneous	100	**Chrysotile**	**60**	Cellulose Non-Fibrous	10 30
15609-44	DND Property - N12 - Library - Staff Room	12/16/11	EM	Sheet Flooring - Lt. Orange	Orange Fibrous Heterogeneous	100	None Detected	0	Cellulose Non-Fibrous	15 85
15609-45	DND Property - N12 - Library - Hot Water Tank/Storage Room	12/16/11	EM	Sheet Flooring - Brown	Brown Fibrous Heterogeneous	100	None Detected	0	Cellulose Non-Fibrous	25 75
15609-46	DND Property - N12 - Library	12/16/11	EM	Carpet Mastic	Yellow Non-Fibrous Heterogeneous	100	None Detected	0	Non-Fibrous	100
15609-47	DND Property - N12 - Library	12/16/11	EM	Sheet Flooring - Red	Red Fibrous Heterogeneous	100	None Detected	0	Cellulose Non-Fibrous	15 85
15609-48	DND Property - N12 - Library	12/16/11	EM	Acoustic Ceiling Tile - Large Horizontal Fissure, Random Pinhole (NEW)	Grey/White Fibrous Heterogeneous	100	None Detected	0	Non-Fibrous Cellulose Min. Wool	20 40 40
15609-49	DND Property - N12 - Library - Attic	12/16/11	EM	Duct Mastic	Grey Non-Fibrous Heterogeneous	100	None Detected	0	Non-Fibrous	100
15609-50	DND Property - N12 - Library - South Wall	12/16/11	EM	Drywall Joint Compound	White Non-Fibrous Heterogeneous	100	None Detected	0	Non-Fibrous	100
15609-51	DND Property - N12 - Library - Entrance	12/16/11	EM	Sheet Flooring	Grey/White Fibrous Heterogeneous	100	None Detected	0	Glass Cellulose Non-Fibrous	10 15 75

AIHA Proficiency Analytical Testing Programs, LLC

Note: Samples were analyzed by method: EPA/600/R- 93/116 "Bulk Asbestos Analysis by Polarized Light Microscopy". For heterogeneous materials the concentrations may vary.



LEGEND

DWJC = Drywall Joint Compound

DRAWING NOT TO SCALE

LEGEND **ASBESTOS**

123 None Detected

123 Material Contains Asbestos

ADDRESS/LOCATION:

Bldg 4 – DND Property – EDC Office

DRAWING TITLE: EDC Office

PROJECT NO.: 15609

DATE: 12/20/2011

SURVEYED BY: KW

DRAWING NO.: 001

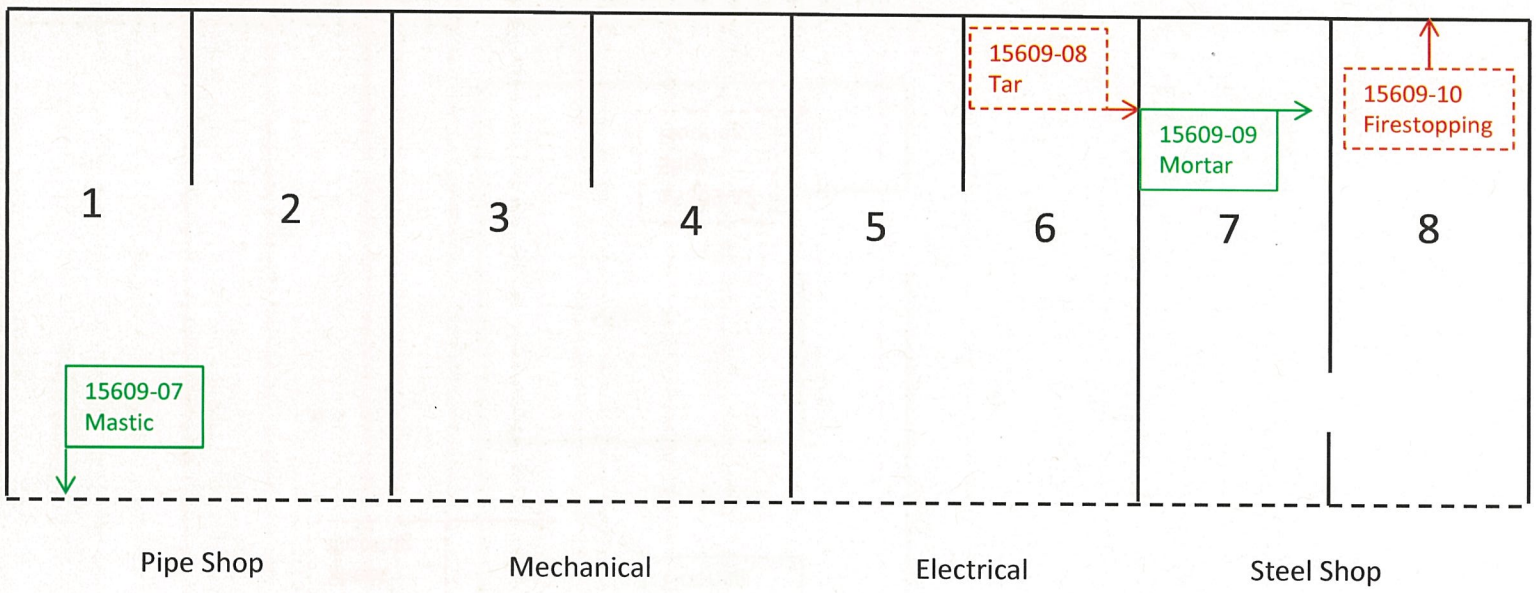
North West Environmental Group Ltd.

#210 – 2950 Douglas St.

Victoria, BC V8T 4N4

LEGEND

DWJC = Drywall Joint Compound



DRAWING NOT TO SCALE

LEGEND	ASBESTOS
123	None Detected
123	Material Contains Asbestos

ADDRESS/LOCATION:

Bldg 8 – DND Property – Kiln Building

DRAWING TITLE: Kiln Building

PROJECT NO.: 15609

DATE: 12/20/2011

SURVEYED BY: KW

DRAWING NO.: 002

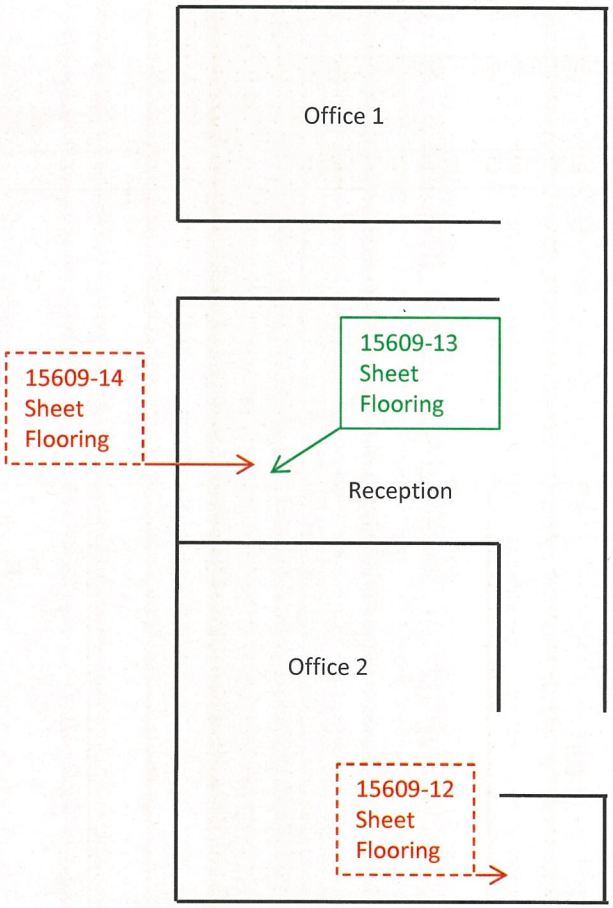
North West Environmental Group Ltd.

#210 – 2950 Douglas St.

Victoria, BC V8T 4N4

LEGEND

DWJC = Drywall Joint Compound

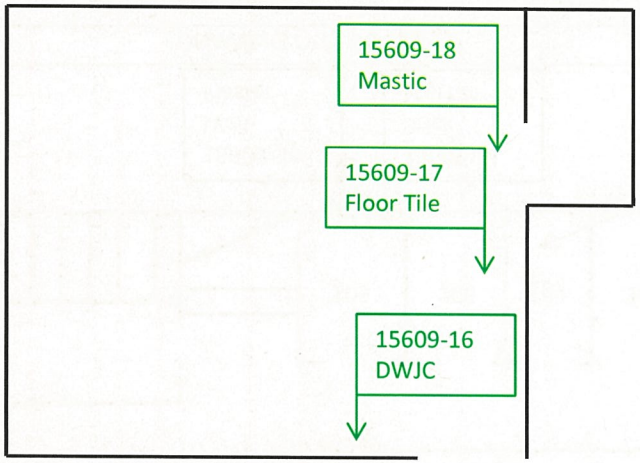


DRAWING NOT TO SCALE

LEGEND ASBESTOS				
123	None Detected	ADDRESS/LOCATION: Bldg 5 – DND Property – Jenkins	**PROJECT NO.: 15609**	North West Environmental Group Ltd.
123	Material Contains Asbestos	DRAWING TITLE: 2nd Floor Trailor	DATE: 12/20/2011	#210 – 2950 Douglas St.
			SURVEYED BY: KW	Victoria, BC V8T 4N4
			DRAWING NO.: 003	

LEGEND

DWJC = Drywall Joint Compound



DRAWING NOT TO SCALE

LEGEND **ASBESTOS**

123 None Detected

123 Material Contains Asbestos

ADDRESS/LOCATION:

Bldg 3 – DND Property – Guard House Back Gate

DRAWING TITLE: Old Guard House

PROJECT NO.: 15609

DATE: 12/20/2011

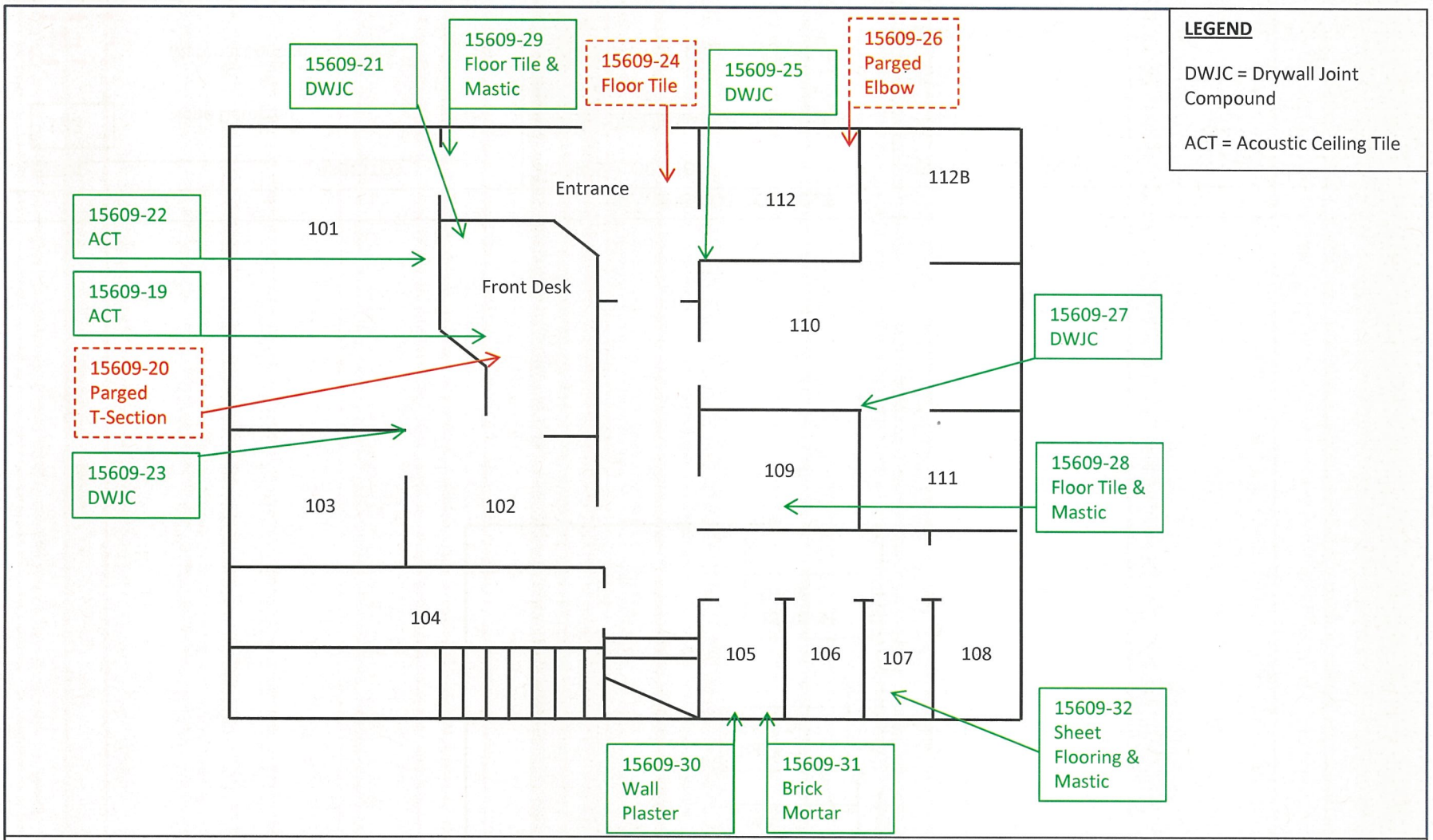
SURVEYED BY: KW

DRAWING NO.: 004

North West Environmental Group Ltd.

#210 – 2950 Douglas St.

Victoria, BC V8T 4N4



DRAWING NOT TO SCALE

LEGEND **ASBESTOS**

123 — None Detected

123 — Material Contains Asbestos

ADDRESS/LOCATION:

DND Property – N4 – National Investigation Service

DRAWING TITLE: Main Floor

PROJECT NO.: 15609

DATE: 12/20/2011

SURVEYED BY: KW

DRAWING NO.: 005

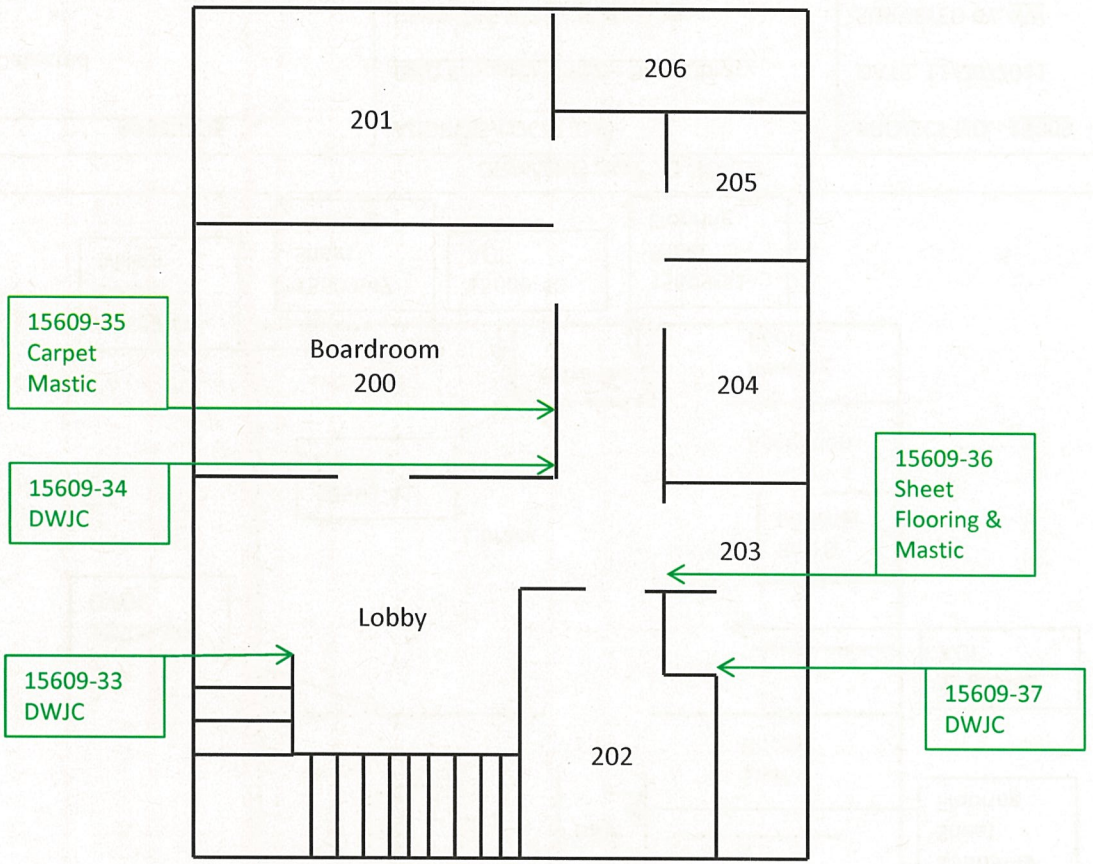
North West Environmental Group Ltd.

#210 – 2950 Douglas St.

Victoria, BC V8T 4N4

LEGEND

DWJC = Drywall Joint Compound



DRAWING NOT TO SCALE

LEGEND **ASBESTOS**

123 None Detected

123 Material Contains Asbestos

ADDRESS/LOCATION:

DND Property – N4 – National Investigation Service

DRAWING TITLE: 2nd Floor

PROJECT NO.: 15609

DATE: 12/20/2011

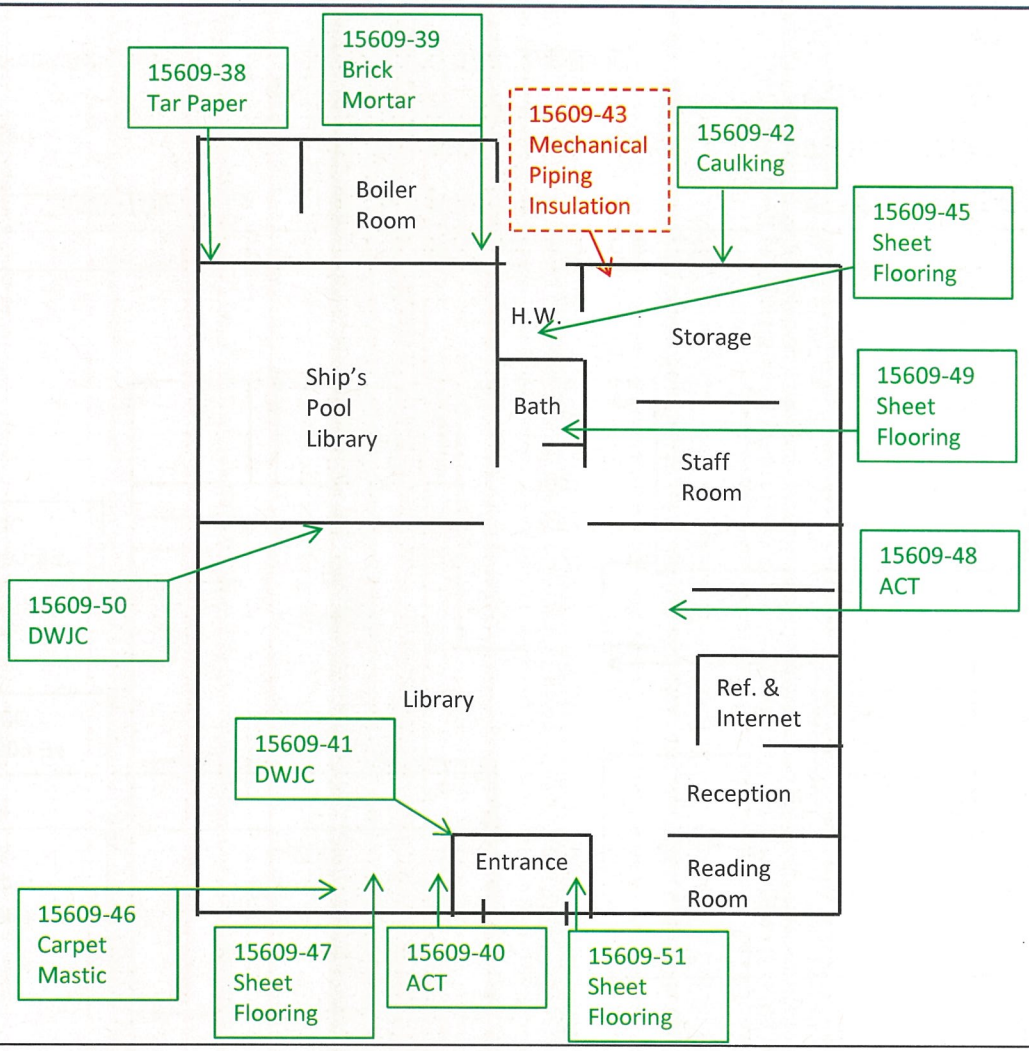
SURVEYED BY: KW

DRAWING NO.: 006

North West Environmental Group Ltd.

#210 – 2950 Douglas St.

Victoria, BC V8T 4N4



LEGEND

DWJC = Drywall Joint Compound

H.W. = Hot Water Tank

ACT = Acoustic Ceiling Tile

DRAWING NOT TO SCALE

LEGEND **ASBESTOS**

123 — None Detected

123 — Material Contains Asbestos

ADDRESS/LOCATION:

DND Property – N12 – Base Library

DRAWING TITLE: Main Floor

PROJECT NO.: 15609

DATE: 12/20/2011

SURVEYED BY: KW

DRAWING NO.: 007

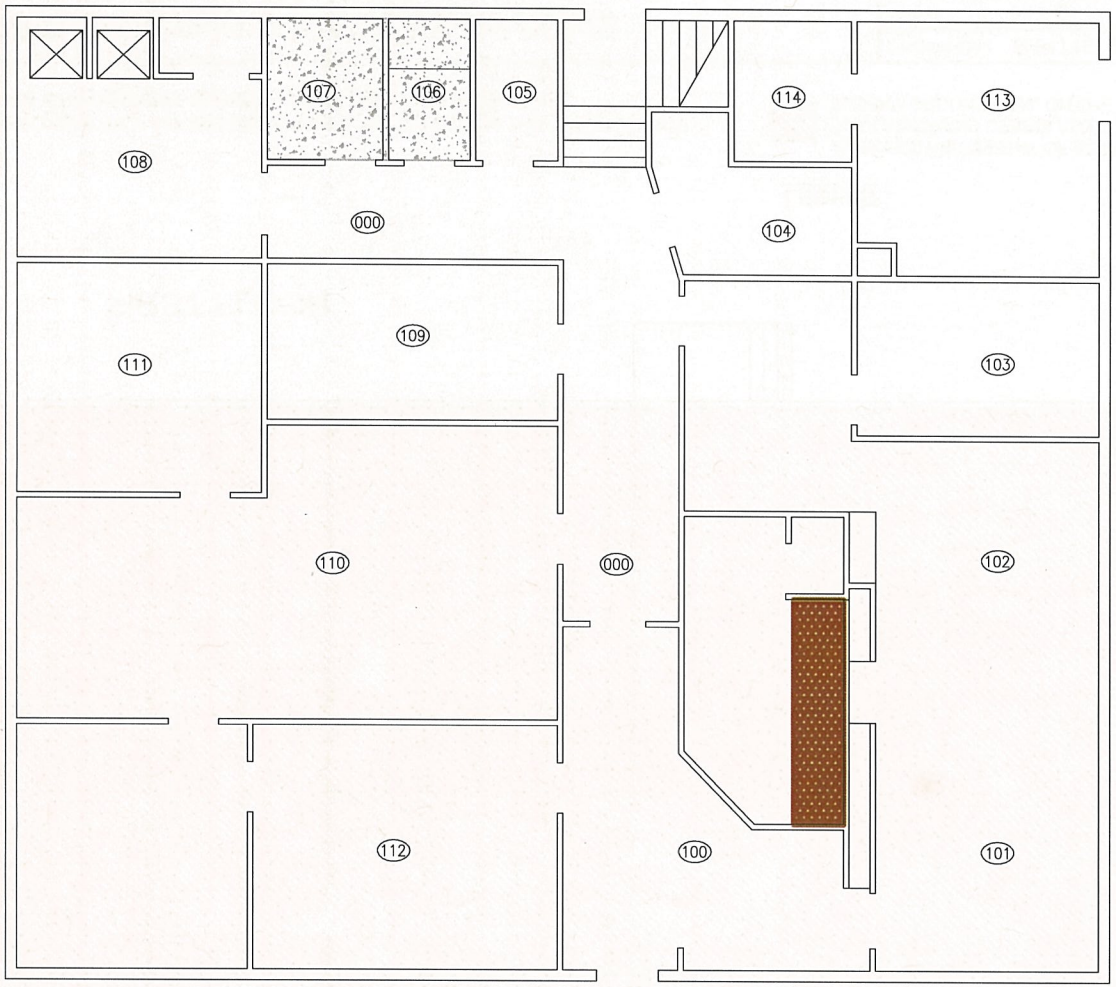
North West Environmental Group Ltd.

#210 – 2950 Douglas St.

Victoria, BC V8T 4N4

Drawings:

- **NIS Building (N64) Locations of Cleanup and Repair**
- **Base Library (N12) Locations of Cleanup and Repair**



FIRST FLOOR

LEGEND

LOCATION OF ASBESTOS-CONTAINING INSULATION DEBRIS ABOVE DRY WALL CEILING IN WASHROOMS

LOCATION OF EXPOSED ASBESTOS-CONTAINING MECHANICAL PIPE INSULATION WHERE REPLACEMENT OF WRAP IS REQUIRED

DRAWING SHOWING LOCATIONS OF ACMS FOR CLEANUP AND REPAIR - NIS (N64) BUILDING N4

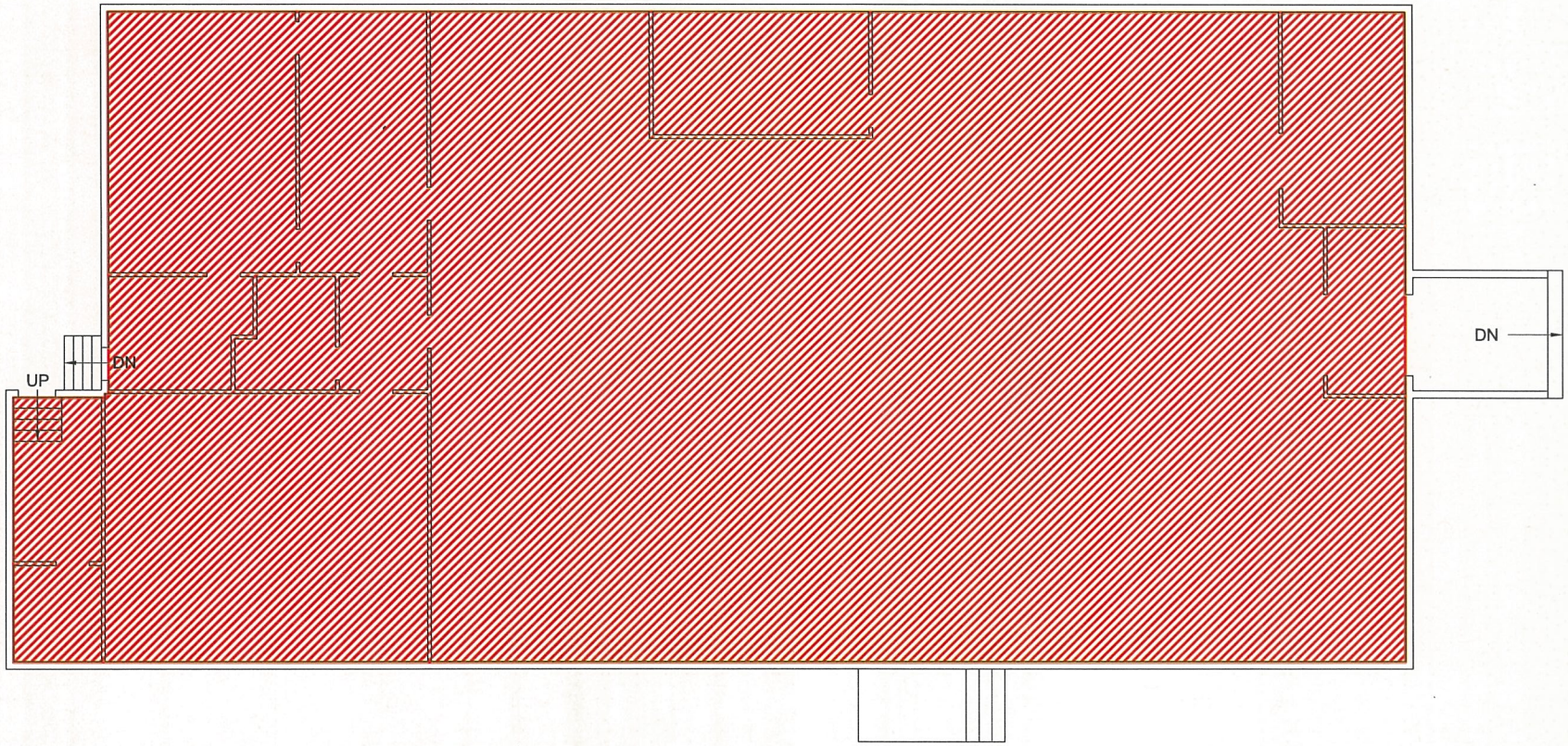
CFB ESQUIMALT, ESQUIMALT, BC

Client: PUBLIC WORKS GOVERNMENT SERVICES CANADA

Project No.:	R.017157.009
Scale:	N.T.S.
Date:	14/12/09
Dwn. By:	CD PK SL2014120069
App'd By:	SB

Dwg. No.: 1

Stantec



FIRST FLOOR

LEGEND

AREA FOR ABATEMENT OF ASBESTOS-CONTAINING INSULATION AND DEBRIS ALONG WITH INSTALLATION OF CONCRETE SLURRY GROUND-SEAL ON THE SOIL FLOOR OF THE CRAWLSPACE.

NOTES: **1. REMOVE AND REPLACE APPROXIMATELY 107 METERS OF PIPE INSULATION IN THE CRAWLSPACE.**
2. INSTALL 450 SQUARE METERS OF CONCRETE SLURRY AND 10 MIL VAPOUR BARRIER.

DRAWING SHOWING LOCATIONS OF ACMS FOR CLEANUP AND REPAIR - BASE LIBRARY (N12)

CFB ESQUIMALT, ESQUIMALT, BC

Client: PUBLIC WORKS GOVERNMENT SERVICES CANADA

Project No.:	R.017157.009
Scale:	N.T.S.
Date:	15/01/13
Dwn. By:	CD PK SL2015010022
App'd By:	SB

Dwg. No.: 2

Stantec