

FISHERIES AND OCEANS CANADA

PRE-RENOVATION HAZARDOUS MATERIALS BUILDING SURVEY - REVISED TECHNICAL SERVICES BUILDING

OCTOBER 4, 2018





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TECHNICAL SERVICES BUILDING

FISHERIES AND OCEANS CANADA

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TABLE OF CONTENTS

1	INTRODUCTION	1
2	SITE DESCRIPTION.....	2
3	LIMITATIONS.....	3
4	SCOPE OF WORK.....	4
5	METHODOLOGY	5
5.1	Asbestos Containing Materials (ACM)	5
5.2	Lead Based Paints (LBP).....	6
5.3	Lead Products.....	6
5.4	Mould and Other Microbial Contaminants.....	6
5.5	Crystalline Silica.....	6
5.6	Other Hazardous Materials	6
6	REGULATORY FRAMEWORK.....	7
7	HAZARDOUS MATERIALS RESULTS.....	7
7.1	Asbestos Containing Materials (ACM)	7
7.2	Lead Based Paints (LBP).....	10
7.3	TCLP results for Lead.....	11
7.4	Lead Products.....	13
7.5	Mould and Other Microbial Contaminants.....	13
7.6	Polychlorinated Biphenyls (PCB)	13
7.7	Mercury.....	13
7.8	Ozone Depleting Substances (ODS).....	14
7.9	Radioactive Materials (RAM)	14
7.10	Crystalline Substances.....	14
7.11	Flammable, Explosive, or Potentially Toxic/Hazardous Materials	14
8	RECOMMENDATIONS.....	14
9	CLOSURE	16



Tables

TABLE 1 ASBESTOS CONTENT RESULTS.....7
TABLE 2 LEAD BASED PAINT RESULTS..... 10
TABLE 3 SUSPECT LEAD BASED PAINT TCLP RESULTS.....12

APPENDICES

I FIGURES
II PHOTOGRAPHS
III CHAIN OF CUSTODIES AND LABORATORY RESULTS
IV REGULATORY FRAMEWORK
V STANDARD LIMITATIONS

1 INTRODUCTION

WSP Consultants Inc. (WSP) was retained by Fisheries and Oceans Canada (the Client) for the provision of an updated Pre-Renovation Hazardous Materials Building Survey - Revised (PHMS-R) of the Technical Services Building, south attached canopy covered staircase, east attached open ended canopy, and detached storage shed (Subject Site) associated with the Pacific Biological Station located at 3190 Hammond Bay Road, Nanaimo, BC (refer to the Site Location Map - Figure 1 included in the attached Appendix I).

WSP understands that this survey is required for regulatory compliance and due diligence purposes prior to potential renovation repairs to the Subject Site.

The objective of a PHMS-R is to establish the presence / absence, location, and type of hazardous building materials utilized in the construction of the facility by means of sample collection and subsequent laboratory analysis. Section 20.112 of the BC Occupational Health and Safety Regulation requires that a hazardous materials survey be conducted by a qualified person prior to any demolition or renovation activity which might disturb hazardous materials. The Canadian Occupational Health and Safety Regulations and Canada Labour Code, Part II, which applies to all areas under federal jurisdiction, stipulates the requirements for protection of employees.

For the purposes of this survey, hazardous building materials will be defined as:

- Asbestos-containing building materials (ACM);
- Lead materials and lead-based paints (LBP);
- Mercury;
- Polychlorinated biphenyls (PCB);
- Crystalline silica;
- Ozone depleting substances (ODS);
- Radioactive materials;
- Mould and/or microbial growth; and
- Flammable, Explosive, or Potentially Toxic/Hazardous Materials.

The survey and review was conducted in general accordance with WorkSafeBC Occupational Health and Safety Regulations Part 20, Construction, Excavation and Demolition, Section 20.112 Hazardous Materials.

The Hazardous Building Material Survey was conducted by identifying the above defined hazardous materials including suspect ACM and LBP through on-site bulk sampling and subsequent laboratory analysis, review for visual / olfactory presence of suspected mould growth, and review of elements or components which may contain lead products, mercury, PCB, ODS, and RAM.

The samples were analyzed by International Asbestos Testing Laboratories (IATL), following methods that comply with the WorkSafeBC Occupational Health and Safety Regulations and Hazardous Waste Regulation as defined by the BC Ministry of Environment.

This report documents the initial on-site field review of hazardous building materials completed by WSP on January 17 and 18, 2018 and the supplementary September 19, 2018 on-site sampling of client selected non-metallic substrate materials with applied lead paint in excess of 600mg/kg (600ppm). The selected non-metallic substrate material samples were sent for Toxicity Characteristic Leaching Procedure (TCLP) characterization.

2 SITE DESCRIPTION

The Technical Services Building was described to be of early 1960s period construction and underwent subsequent 1984 minor building renovations. The Technical Services Building is approximately 4 m in height, 30 m long (north-south) and 13 m wide (east-west) totalling approximately 390 m² /4,200 sq. ft. During the January 17 and 18, 2018 site visits, the Subject Site was observed to comprise of the following features.

The concrete base cement floor slab appeared to be largely on grade with some visible short height concrete footings in the southeast corner. The interior wood frame, columns and beams, were observed to be clad on the walls with vertical tongue and groove wooden planks and similarly clad across the ceiling. The tongue and groove vertical wall planking is visible on the exterior in areas about the sliding doors. Newer metal cladding is present covering the balance of the original wood plank cladding. A concrete masonry unit (CMU) wall was observed along the south wall of the metal storage room #10. Exploration of a void channel within the CMU wall of the metal storage room #10 found no indication of potential vermiculite insulation within. The flat top roof has two central drains and is covered with torch on bitumen based roll out roofing over multiple layers of rigid foam insulation and building paper.

Around the exterior of the concrete floor slab there is an approximately 2 cm thick application of fiberglass insulation covered with an outer cover of largely sub-grade asbestos-containing (10% chrysotile) hard fireproof composite fibre cement board panelling. Based on observations at the southeast perimeter corner, it is anticipated that the outer slab perimeter covering of hard fireproof composite fibre cement board panelling extends downward from the top side of the base sill plate approximately 18" into the ground. Approximately, the top 10 - 15 cm / 4 - 6 inches of the perimeter hard fireproof composite fibre cement board panelling is visible above-grade along the east elevation.

The north, west, and south elevations were not examined during the January 17 and 18, 2018 investigation due to the limited clearance between the base of the metal cladding and ground / asphalt surface however the hard fireproof composite fibre cement board panelling was suspected to also be present along all elevations totaling approximately 43 m² /465 sq. ft. of asbestos-containing sub-grade panelling about the floor slab perimeter. During the September 19, 2018 site works, further examination was undertaken in a limited test pit excavated in proximity to the northwest corner of the building whereupon the extent/presence of the sub-grade asbestos-containing (10 % chrysotile) hard fireproof composite fibre cement board panelling was confirmed to be present as suspected.

The southeast corner portion of the Technical Services Building is occupied by four offices (Rooms 1 through 4) and an adjoining common room (Room 5) with southern and eastern building entrances. Rooms 1 through 5 collectively occupy an area of approximately 10 m (north-south) by 8 m wide (east-west). Building material finishes within the office area include: modern vinyl sheet flooring (non-suspect for asbestos) over plywood over wood blocking set into concrete floor slab; white painted drywall walls; suspended T-bar grid ceiling with acoustic ceiling tiles; and open ceiling with exposed tongue and groove wooden planking.

Immediately west adjacent of the northwest office (Room 4) and common room (Room 5) is the southwest corner portion of the Technical Services Building occupied by the former metal storage room (Room 10). The metal storage room is approximately 10 m (north-south) by 5 m wide (east-west).

Immediately north and adjacent to the northeast office (Room 3), is the former paint shop (Room 6) with a paint booth on the south side of the room and paint storage on the north side of the room. The paint shop is approximately 9.6 m (north-south) by 5 m wide (east-west) and has approximately 244 m² /2,640 sq. ft. of asbestos-containing (25% chrysotile) wall and ceiling hard fireproof composite fibre cement board panelling throughout. Immediately west, adjacent to the paint shop (Room 6), is the former machine shop (Room 9). The machine shop

is approximately 9.6 m (north-south) by 7.4 m wide (east-west) and has similar asbestos-containing (25% chrysotile) wall and ceiling hard fireproof composite fibre cement board panelling totaling approximately 223 m² / 2,400 sq. ft. The majority of the interior asbestos-containing wall and ceiling panelling in the paint shop and machine shop was in good condition with asbestos labelling applied to the walls.

Immediately north and adjacent to the paint shop (Room 6) and machine shop (Room 9), is the former carpenter shop (Room 7) and former lumber storage (room 8). The carpenter shop is located in the northeast corner portion of the building and is approximately 10 m (north-south) by 7.5 m wide (east-west). The lumber storage is located in the northwest corner portion of the building and is approximately 10 m (north-south) by 5.2 m wide (east-west). Refer to the building room layout configuration in the Site Plan - Figure 2 included in the attached Appendix I.

Heating supply is via a hot water return piping system that runs to ceiling mounted radiators. The associated thermal pipe insulation is comprised of straight run fiberglass ('None-Detected' for asbestos) and some original construction asbestos-containing (25% & 65% chrysotile) hard mud elbows. The majority of the elbows outside of the office area appear to have been previously abated however one remaining T-fitting (65% chrysotile) and trace residual asbestos on the previously abated pipe threads (0.5% chrysotile) were found.

Leading south from the common room south entrance is a staircase leading downward under a post supported wood framed canopy roof covered with torch on, bitumen based, roll out roofing material.

Attached to the north portion of the east elevation of the Technical Services Building is an open ended metal roof clad canopy. The east side of the metal canopy is wood framed with a plywood sheathed side wall. The canopy is approximately 4.7 m (north-south) by 3.8 m wide (east-west).

Approximately 1.5 m east of the canopy is a detached wood framed storage shed with a low pitch flat top roof covered with a torch on bitumen based roll out roofing over plywood. The shed is clad inside and out with plywood paneling. The shed is approximately 3.1 m (north-south) by 4.9 m wide (east-west).

The above-noted building materials include hazardous building materials that may be altered during renovations.

3 LIMITATIONS

The PHMS-R included construction materials and components only. As it is neither practical nor feasible to sample materials on a foot by foot basis, visually similar materials' analysis results were extrapolated throughout the Subject Site and / or based on estimated phases of construction, where that information was made available.

Energised electrical and mechanical equipment or systems were not opened for safety reasons. This survey excluded owner or occupant articles such as furniture or stored items. Concealed or inaccessible materials within the building structure, fire doors, and below ground materials including tanks and pipes were specifically excluded from our scope of work.

No below-grade water, drainage or plumbing systems or sub surface investigation of materials were included in the scope of this PHMS-R.

To the east of the south canopy covered staircase and south of the southeast portion of the Technical Services Building is a Furnace Breaker Building which was not included in the scope of this PHMS-R.

A paint sample (18L-TSB-13) was collected from a deteriorating area on the east side of the Furnace Breaker Building which was considered the same and representative of the paint on the underside of the canopy over the south staircase.

Paint samples were not collected from the metal soffit painted white and above metal decorative trim painted dark brown as to do so would have left noticeable scarring on the building and if demolished, these metal materials should be sent for metal recycling. However, the paint will need to be sampled prior to demolition in order for a proper risk assessment to be conducted.

4 SCOPE OF WORK

The scope of PHMS-R was limited to determining the potential hazardous building materials associated with the Technical Services Building, south attached canopy covered staircase, east attached open ended canopy, and detached storage shed (Subject Site).

The PHMS-R was performed by a qualified and experienced Environmental Technologist with AHERA Building Inspector Certification. The following tasks were performed as part of this survey:

- On site review of Subject Site building materials, collection and laboratory analysis of bulk samples suspected to contain asbestos;
- On site review of Subject Site building surface coatings, collection and laboratory analysis of bulk samples (paints) suspected to contain elevated concentrations of lead;
- Collection and laboratory analysis for toxicity characteristic leaching procedure (TCLP) of non-metallic base substrates suspected to potentially exceed the BC Ministry of Environment Hazardous Waste Criteria of 5.0 mg/L for Lead). The selected non-metallic bulk substrate materials were those previously identified with lead containing paint concentrations in excess of the 0.06% criteria (excess 600 mg/kg) and anticipated by DFO to potentially be transferred for disposal as part of the planned renovation works for the site.
- Visual identification of Subject Site building materials which may contain mercury;
- Visual identification of Subject Site building equipment which may contain PCB;
- Visual identification of Subject Site building materials which may contain silica such as concrete and drywall joint compounds;
- Visual identification of Subject Site building materials which may contain ODS;
- Visual identification of Subject Site building materials which may contain RAM;
- Review and reporting on areas of identified Subject Site building materials exhibiting signs of suspect mould growth,
- Visual identification of stored materials which may be flammable or explosive. and
- Preparation of this report summarizing the specific hazardous building materials identified through review and analysis.

The Sampling Plan - Figure 3 shows bulk material sampling locations (see Appendix I). Photographs of suspect hazardous building materials and associated areas were taken and are presented in Appendix II of this report.

5 METHODOLOGY

On January 17 and 18, 2018, Mr. Gordon Philippe, B. Tech. AHERA certified Environmental Technologist of WSP conducted the initial PHMS site work according to the following protocol. Visual review was conducted for suspect hazardous materials likely to be impacted by planned renovation activities. Subject Site building materials typically containing suspect hazardous materials were reviewed from the accessible areas.

On September 19, 2018, Mr. Gordon Philippe of WSP conducted the balance of the PHMS-R site work including TCLP substrate sample collection, observations of the northwest corner exterior test pit, and underlying flooring layers within the southwest corner of the office.

Site visit photographs taken of the in-situ suspect materials are presented in Appendix II.

The bulk sample collection frequency for suspect asbestos materials and suspect elevated lead content surface coatings (paints) was consistent with recognized industry standards and principles of good occupational hygiene practice. The number of samples collected was based on experienced professional judgment in consideration of, but not necessarily limited to, the era of construction, and uniformity of materials, and size of area of homogeneous materials.

Collected samples were placed in plastic bags appropriate for the proposed analysis. The sample material descriptions, sample locations, and associated sample numbers were indicated on sample bags and the Chain-of-Custody (COC) forms. Chain-of-custody protocol was observed during handling and transportation of the bulk samples.

The bagged samples and COC forms were sent to International Asbestos Testing Laboratories (iATL) in Mount Laurel, New Jersey, USA for analyses. iATL is an accredited laboratory that participates in the American Industrial Hygiene Association's (AIHA) Bulk Asbestos Proficiency Analytical Testing (BAPAT) Program.

The completed Chain-of-Custodies (COCs) and the Laboratory Reports of analytical results are presented in Appendix III.

5.1 ASBESTOS CONTAINING MATERIALS (ACM)

Twenty-eight (28) representative bulk samples were collected of Subject Site building materials that could potentially contain asbestos.

Suspect asbestos samples were analyzed by iATL in accordance with the following protocol: PLM: Bulk Asbestos Building Materials EPA 600 R 93 / 116. 1993.

The analytical results for asbestos content of the bulk material samples are presented in the Laboratory Reports, included in Appendix III.

Based on WSP's professional opinion, the following materials were assumed not to contain asbestos during this survey and were classified as non-asbestos materials:

- Dimensional lumber, plywood, laminated particle pressed board for cabinetry, metal cladding, metal racking, metal T-Bar tracking of the suspended ceiling, and modern pliable baseboard moulding and associated mastics.

5.2 LEAD BASED PAINTS (LBP)

Fifteen (15) representative bulk surface coating samples suspected to contain elevated lead were collected from Subject Site building materials.

The office area white paint on drywall was not collected due to its very thin application. Collection attempts from the drywall resulted in damaging removal of the drywall paper along with the white paint which is known to cause bias and unreliability for the analytical process.

Suspect elevated lead content surface coating samples (paints) were analyzed by iATL in accordance with ASTM D3335-85A "Standard Method to Test for Low Concentrations of Lead in Paint by Atomic Absorption Spectrophotometry".

Seven (7) of the LBP samples on non-metallic substrates with lead containing paint concentrations in excess of the 0.06% criteria (excess 600 mg/kg) and that were anticipated by DFO to potentially be transferred for disposal as part of the planned renovation works were further analysed using the Toxicity Characteristic Leaching Procedure (TCLP) to test for the leachability of lead from the base materials. The analysis was conducted in accordance with EPA Method 6020A Metals by TCLP.

The analytical results for lead content of the bulk surface coating samples and TCLP results of the bulk substrate materials are presented in the Laboratory Reports, included in Appendix III.

5.3 LEAD PRODUCTS

The Subject Site building materials were visually inspected for the presence of lead-containing building products. No samples were collected of these materials.

5.4 MOULD AND OTHER MICROBIAL CONTAMINANTS

The accessible Subject Site building materials were visually reviewed for the presence of water damage and suspected mould growth. They were also visually reviewed for other microbial contaminants including animal wastes. No samples were collected.

5.5 CRYSTALLINE SILICA

The accessible Subject Site building materials were visually reviewed for the presence of concrete or mineral-composite building materials which may contain crystalline silica. No samples were collected for analysis of silica content.

5.6 OTHER HAZARDOUS MATERIALS

The accessible Subject Site building materials were visually assessed for the presence of fluorescent light ballasts and tubes which could contain mercury or PCBs; equipment which might contain ODS-containing halons or refrigerants; smoke detectors and exit signs which may contain RAM; mould or animal feces; and any stored flammable or explosive materials. No additional samples were collected.

6 REGULATORY FRAMEWORK

The details of the regulatory frameworks for ACM, LBP, PCB, mercury, RAM, and ODS are found in Appendix IV.

7 HAZARDOUS MATERIALS RESULTS

The results of the PHMS-R are summarized below. The Sampling Plan (Figure 3) showing bulk material sampling locations, is attached in Appendix I. Photographs taken during the site visit are presented in Appendix II. The completed Chain-of-Custodies (COCs) and the Laboratory Reports of analytical results are presented in Appendix III.

7.1 ASBESTOS CONTAINING MATERIALS (ACM)

Table 1 Asbestos Content Results

SAMPLE LOCATION	MATERIAL SAMPLED	SAMPLE ID	CONTENT/TYPE
Carpenter Shop Floor	Concrete	17A-TSB-00	None Detected
Carpenter Shop Floor	Cork Like Filler	17A-TSB-01	None Detected
Carpenter Shop Floor Block Perimeter	Grey Level Compound	17A-TSB-02	None Detected
Carpenter Shop Floor Under Wood Blocking	Black Mastic	17A-TSB-03	None Detected
Carpenter Shop	Thermal Pipe Insulation Straight Run Canvas Over Fiberglass	17A-TSB-04	None Detected
Carpenter Shop	Thermal Pipe Insulation T-Junction Hard Mud Under Canvas	17A-TSB-05	Hard Mud '65 % Chrysotile' Canvas Cover 'None Detected'
Carpenter Shop	Thermal Pipe Insulation Residual Hard Mud From Pipe Threads	17A-TSB-06	White Insulation 'None Detected' Brown Insulation 'PC 0.5 % Chrysotile'
Paint Shop - Storage	Thermal Pipe Insulation Straight Run Large Diameter Canvas Over Fiberglass	17A-TSB-07	None Detected
Paint Shop - Storage	Thermal Pipe Insulation Straight Run Small Diameter Canvas Over Fiberglass	17A-TSB-08	None Detected

SAMPLE LOCATION	MATERIAL SAMPLED	SAMPLE ID	CONTENT/TYPE
Paint Shop - Storage Interior Sliding Door Frame	Hard Fireproof Composite Fibre Cement Board Panelling (Transite Panel)	17A-TSB-09	'25 % Chrysotile'
Paint Shop - Storage Exterior Sliding Door Frame	Hard Fireproof Composite Fibre Cement Board Panelling (Transite Panel)	17A-TSB-10	'25 % Chrysotile'
Machine Shop Interior Roll-Up Door Frame	Hard Fireproof Composite Fibre Cement Board Panelling (Transite Panel)	17A-TSB-11	'25 % Chrysotile'
Machine Shop	Thermal Pipe Insulation Residual Hard Mud From Pipe Threads	17A-TSB-12	None Detected
Office Common Room South Wall	Thermal Pipe Insulation Large Diameter Hard Mud From Lower East Elbow	17A-TSB-13	'65 % Chrysotile'
Office Common Room South Wall	Thermal Pipe Insulation Large Diameter Hard Mud From Lower West Elbow	17A-TSB-14	Laboratory Reported Portion of Total Sample '25 % Chrysotile' <i>(Suspect Portion of Sample is the Same as 17A-TSB-05 & 13 or 65 % Chrysotile -see notation from laboratory*)</i>
Office Common Room South Wall	Thermal Pipe Insulation Large Diameter Straight Run From Lower East Pipe Section	17A-TSB-15	None Detected
Office Common Room South Wall	Thermal Pipe Insulation Large Diameter Straight Run From Lower West Pipe Section	17A-TSB-16	None Detected
Office Room #1 Wall at Door Frame	Drywall Joint Compound	17A-TSB-17	None Detected
Office Room #2 Wall at Door Frame	Drywall Joint Compound	17A-TSB-18	None Detected
Office Room #3 Wall at Door Frame	Drywall Joint Compound	17A-TSB-19	None Detected
Office Room #4 Wall at Door Frame	Drywall Joint Compound	17A-TSB-20	None Detected
Office Room #4 Suspended Ceiling	Suspended Ceiling Tile	17A-TSB-21	None Detected

SAMPLE LOCATION	MATERIAL SAMPLED	SAMPLE ID	CONTENT/TYPE
Main Roof Northeast Portion	Roofing Layers	17A-TSB-22	None Detected
Main Roof Southwest Portion	Roofing Layers	17A-TSB-23	None Detected
South Staircase Canopy Roof	Roofing Layers	17A-TSB-24	None Detected
Northeast Shed Roof	Roofing Layers	17A-TSB-25	None Detected
Exterior Perimeter of Foundation Slab At Carpenter Shop Exit	Hard Fireproof Composite Fibre Cement Board Panelling (Transite Panel)	17A-TSB-26	'10 % Chrysotile'
Exterior Perimeter of Foundation Slab At Carpenter Shop Exit	Fibreglass Insulation With Backing Paper and Black Mastic	17A-TSB-27	None Detected

Notes: **Bold indicates asbestos detected above 0.5% criteria**

** Review of the laboratory analysis for the below referenced samples, you will notice the percentage of the non-suspect portion of the following Thermal Pipe Insulation samples varies wherein:*

6430699 Client No.: 17A-TSB-05 – 65% Chrysotile contains only 5% Fiberglass - Grey

6430707 Client No.: 17A-TSB-13 – 65% Chrysotile Contains NO Fiberglass - Grey

6430708 Client No.: 17A-TSB-14 – 25% Chrysotile Contains 65% Fiberglass - Grey/Tan

The discrepancy in coloration is an indication that the samples were composed of different types of fiber. The overall composition of fibers determines what percentage of the sample is asbestos. Since there was a significant amount of Fiberglass insulation it is reasonable that the percentage of asbestos fibers is less in sample 6430708 than the other two referenced samples.

According to WorkSafeBC, the definition of an asbestos-containing material is 0.5% by weight.

Based on the representative sampling, corresponding IATL results of asbestos content, WorkSafeBC criteria, and site review assessment of visually similar materials, the following materials are herein extrapolated to be asbestos-containing:

- The thermal pipe insulation Hard Mud at Elbows and T-Junctions on the hot water heating lines as sampled from the carpenter shop and office common room (25 % and 65 % Chrysotile).
- The thermal pipe insulation Residual Hard Mud on Pipe Treads at Elbow and T-Junction Fittings on the hot water heating lines as sampled from the carpenter shop (PC 0.5% Chrysotile).
- The Hard Fireproof Composite Fibre Cement Board Panelling (Transite Panel) lining the walls and ceilings of the paint shop and machine shop (25 % Chrysotile).
- The Hard-Fireproof Composite Fibre Cement Board Panelling (Transite Panel) lining the exterior sub-grade perimeter of the foundation floor slab (10 % Chrysotile).

Based on the representative sampling, corresponding IATL results of 'None Detected' for asbestos content, WorkSafeBC criteria, and site review assessment, the remaining building materials as sampled are not considered to be asbestos-containing.

An Asbestos-Containing Composite Fibre Cement Board Paneling Plan (Figure 4) showing the extent of ACM Cement Board is attached in Appendix I. Photographs of the aforementioned sampled materials are presented in

Appendix II. The completed Chain-of-Custody (COCs) forms and the Laboratory Reports of analytical results are presented in Appendix III.

7.2 LEAD BASED PAINTS (LBP)

WSP collected bulk material surface coating (paint) samples. The corresponding IATL laboratory results for lead content are as follows:

Table 2 Lead Based Paint Results

SAMPLE LOCATION	MATERIAL SAMPLED	SAMPLE ID	CONTENT/TYPE
Interior Side of Wooden Window Frame in Carpenters Shop	White Paint	18L-TSB-00	4.3 % by Weight 43,000 ppm
Interior Plywood Floor in Carpenters Shop	Grey Paint	18L-TSB-01	0.19 % by Weight 1,900 ppm
Interior Door Carpenters Shop	Green-Grey Paint	18L-TSB-02	6.9 % by Weight 89,000 ppm
Wooden Work Bench Carpenters Shop	Light Blue Paint	18L-TSB-03	0.17 % by Weight 1,700 ppm
Exterior Door Paint Shop	Brown-Grey Paint on Orange Paint on White Paint	18L-TSB-04	2.4 % by Weight 24,000 ppm
Lumber Storage Interior Built-In Wooden Lockers	Light Grey-Green Paint	18L-TSB-05	0.16 % by Weight 1,600 ppm
Exterior Side of Wood Siding (Original Cladding)	Tan Paint	18L-TSB-06	0.063 % by Weight 630 ppm
Exterior Metal Siding (Newer Cladding)	Tan Paint	18L-TSB-07	0.012 % by Weight 120 ppm
Attached Canopy East Wood Wall	Tan Paint	18L-TSB-08	<0.0064 % by Weight <64 ppm
Storage Shed Wood Exterior Siding	White Paint	18L-TSB-11	0.14 % by Weight 1,400 ppm
Exterior Side of Wooden Window Frame at Paint Shop and Office #3	Dark Brown Paint	18L-TSB-12	1.4 % by Weight 14,000 ppm
Representative of the South Staircase Underside of Canopy (sample was collected from the east side of the Furnace breaker building)	Dark Brown Paint	18L-TSB-13	0.95 % by Weight 9,500 ppm
Machine Shop Benches and Interior Side of Exit Door	Medium Green Paint	18L-TSB-14	0.21 % by Weight 2,100 ppm

SAMPLE LOCATION	MATERIAL SAMPLED	SAMPLE ID	CONTENT/TYPE
Machine Shop Interior Walls	Mint Green Paint	18L-TSB-15	0.0096 % by Weight 96 ppm
Machine Shop Interior Plywood Floor	Grey Paint	18L-TSB-16	0.0096 % by Weight 96 ppm

Note: BOLD indicates lead concentrations detected above 0.06% criteria.

Lead based paints are not specifically defined in the WorkSafeBC regulations.

BC Environmental Regulations¹ and WorkSafeBC Guidelines² require leachate testing prior disposal of lead waste.

Health Canada and the US Consumer Product Safety Improvement Act both consider a lead-containing surface coating as a paint that contains over 0.009% (90 mg/kg) dry weight of lead. This corresponds to the concentration of lead in paint that may present risk to pregnant women and children.

To comply with WorkSafeBC regulations, if lead materials are identified at a site (this includes lead in paint), the employer must, before any renovation/demolition, have a qualified professional conduct a risk assessment and develop an exposure control plan, that contains safe work procedures, to protect workers that may be exposed to lead. When evaluating risk, the concentration of lead in paint and the activity must be considered together. In general, if aggressive techniques (i.e. cutting torch, abrasive blasting, and power grinders/sanders) are not used and if the lead concentration in paint is below 600 mg/kg³, renovation/demolition workers are unlikely to be exposed to lead concentrations in air exceeding the 0.05 mg/m² TWA limit.

- A risk assessment and an exposure control plan will be required prior to scheduling work involving alteration (i.e., sanding, cutting, grinding, or welding) to the numerous paints found to have lead content in excess 600 mg/kg.

All the paint sampled except for the Attached Canopy East Wood Wall was found to be lead containing (over 90 mg lead/kg sample).

The completed Chain-of-Custody (COCs) forms and the Laboratory Reports of analytical results are presented in Appendix III.

7.3 TCLP RESULTS FOR LEAD

WSP collected bulk samples of non-metallic base substrates suspected to potentially exceed the BC Ministry of Environment Hazardous Waste Criteria of 5.0 mg/L for Lead.

The selected non-metallic bulk substrate materials were those previously identified with lead containing paint concentrations in excess of the 0.06% criteria (excess 600 mg/kg) and anticipated by DFO to potentially be transferred for disposal as part of the planned renovation works for the site. (See Table 2 Lead Based Paint Results in Section 7.2 above for the base substrate associated lead in surface coating (paint) results.)

¹ Hazardous Waste Regulation

² Lead-Containing Coats and Paintings - Preventing Exposure in the Construction Industry

³ California division of Occupational Safety and Health requires an exposure control plan for concentrations above 600 mg/kg.

For identification purposes the last two (2) digits in the sample identification numbers of the base substrates with paint were kept the same as the last two (2) digits in the associated surface coating (paint) identification numbers (i.e., sample ID # 18TCLP-TSB-01 is the same paint as 18L-TSB-01 as are those ending in -02, -03, -04, -05, -11, & -14).

The results of the TCLP analysis for lead, by iATL, are tabulated below.

Table 3 Suspect Lead Based Paint TCLP Results

SAMPLE LOCATION	MATERIAL SAMPLED	SAMPLE ID	LEACHATE RESULT [PB (MG/L)]
Interior Plywood Floor in Carpenters Shop	Grey Paint on Plywood	18TCLP-TSB-01	<0.20
Interior Side of Door to Paint Shop (Same as Interior Door Carpenters Shop)	Green-Grey Paint on Plywood	18TCLP-TSB-02	1.5
Wooden Work Bench Carpenters Shop	Light Blue Paint on Plywood	18TCLP-TSB-03	<0.20
Exterior Side of Door to Paint Shop	Brown-Grey Paint on Orange Paint on White Paint on Plywood	18TCLPL-TSB-04	4.2
Lumber Storage Interior Built-In Wooden Lockers	Light Grey-Green Paint on Plywood	18TCLP-TSB-05	3.0
Storage Shed Wood Exterior Siding	White Paint on Plywood	18TCLP-TSB-11	0.20
Machine Shop Benches and Interior Side of Exit Door	Medium Green Paint on Entry Doorway Wood Trim	18TCLP-TSB-14	7.1

Notes: NA - Samples containing less than (<) 100 mg/kg Total Lead do not require TCLP analysis (Ref. 1311 Sec 1.2). **BOLD indicates total allowable concentration in waste extract for lead above 5mg/L criteria.**

The TCLP samples were analyzed by International Asbestos Testing Laboratories (iATL) following the Toxicity Characteristic Leaching Procedure (TCLP). The samples were analyzed in accordance with EPA Method 6020A Metals by TCLP.

This method complies with the Hazardous Waste Regulation as defined by the BC Ministry of Environment. The total allowable concentration in waste extract for lead as defined in the Hazardous Waste Regulation is <5mg/L.

- The TCLP analytical sample lead results for the medium green coloured paint on the Machine Shop east wood bench, northwest cabinet, southeast false double doors, south-central door, and interior side of sliding access exit door as represented by Sample ID 18TCLP-TSB-14 are in excess of the BC Ministry of Environment Special Waste criteria of 5mg/L (refer to Figure 5 in Appendix I). Therefore, if these wood items or the associated surface coating paint are to be disposed of they would be considered a lead-containing waste shown to be a “leachable toxic waste” and are to be characterized and disposed of as a regulated hazardous waste.

With the exception the medium green coloured paint on the Machine Shop wood benches and interior side of the exit door, the sample results for the remaining selected paint samples analyzed (tabulated above) are below the

BC Ministry of Environment Special Waste criteria of 5mg/L and therefore may be disposed of as non-hazardous waste.

Photographs of the aforementioned sampled materials are presented in Appendix II. The completed Chain-of-Custody (COCs) forms and the Laboratory Reports of analytical results are presented in Appendix III.

7.4 LEAD PRODUCTS

An Emergency light was observed in the office common Room 5. The potentially associated battery may be lead containing. Lead may be a component of the solder on wire connections of electric components and on sweated joints between copper pipes and fittings in the building.

7.5 MOULD AND OTHER MICROBIAL CONTAMINANTS

Suspect visible mould and/or animal feces were not readily apparent in the Subject Site.

7.6 POLYCHLORINATED BIPHENYLS (PCB)

Numerous functionally active tube fluorescent light fixtures were suspended from the ceiling.

Dismantlement of the elevated light fixtures for inspection of ballasts was not possible due to safety limitations for use of available ladders which do not permit laborious hands free extension activities while on ladders (minimum three points of contact while on ladders).

PCBs are not anticipated to be associated with the active light fixtures due to the associated contemporary date of manufacture and/or routine replacement of potential older period PCB associated ballasts commonly undertaken in order to maintain functionality.

7.7 MERCURY

Numerous functionally active tube fluorescent light fixtures were suspended from the ceiling.

The light fixtures were observed to contain linear tube fluorescent lights.

Mercury vapour in the range of approximately 10 to 50 mg is commonly present in fluorescent light tubes ranging in length from 0.61 to 2.44 m (2 to 8 ft).

The thermostat control identified during the site visit did not appear to contain a mercury containing glass activator bulb of the older style thermostats. Should a mercury thermostat be subsequently identified it may be accepted through a province-wide program called "Switch the 'stat". Recycling instructions can be found at <http://www.switchthestat.ca/eng/index.php>.

A wide variety of thermostatic controls from original install to modern replacements were observed throughout the Subject Site. Newer non-suspect thermostats were observed in the offices and detached shed. Attempts to open the active older style thermostats present in the carpenter shop and lumber storage were halted due to encountered difficulties and potential risk for damage. The older thermostatic controls in the Technical Services Building may have mercury bulb activator switches.

7.8 OZONE DEPLETING SUBSTANCES (ODS)

A domestic style air conditioner was observed to be mounted within the south wall window opening of the office common Room # 5. A domestic freezer was observed in the lumber storage Room # 8. Domestic style air conditioner units and domestic freezers are typically charged with ozone depleting substances (ODS).

Two Heating, ventilation and air conditioning (HVAC) units that are commonly charged with ODS are mounted on the roof top of the south adjacent Furnace Breaker Building however assessment of the Furnace Breaker Building was beyond the scope of this investigation.

7.9 RADIOACTIVE MATERIALS (RAM)

Radioactive materials are potentially present within building ionization type smoke and/or heat detectors.

Emergency exit signage at the south and east exits of the common room (Room 5) were electrically powered and not suspected to have RAMs as can be associated with unpowered emergency exit signage.

7.10 CRYSTALLINE SUBSTANCES

It is anticipated Crystalline Silica is present within the concrete cement floor slab, concrete footings, and drywall walls.

7.11 FLAMMABLE, EXPLOSIVE, OR POTENTIALLY TOXIC/HAZARDOUS MATERIALS

The Subject Site was visually assessed for the presence of flammable, explosive, or potentially toxic/hazardous materials. None were observed during the site visit.

8 RECOMMENDATIONS

Based on our review of building materials, and the laboratory results, WSP has the following recommendations;

- Asbestos-containing materials must be isolated, handled, or removed using safe work practices and procedures before renovation occurs. The WorkSafeBC publication "Safe Work Practices for Handling Asbestos" and the Occupational Health and Safety (OHS) Regulation Guideline G6.8 describe acceptable practices.
- A risk assessment for asbestos materials must be performed before renovation work begins to determine the exposure risk to workers and other persons as per OHS Regulation Guideline G20.112 Risk Assessment for Identified Asbestos.
- Ensure that any Contractors hired to work on or near asbestos-containing materials have reviewed available surveyed material results, have all documents, procedures, training and other responsibilities completed and in place prior to commencement of work.

- Maintain and update the asbestos labelling program to reflect material changes to ACMs managed in place, as per WorkSafeBC occupational health and safety regulation 6.5, identification. All ACM in the building should continue to be inspected annually for evidence of damage and the inventory updated.
- Safe work procedures must be followed when cutting or grinding the concrete cement floor slab or the concrete masonry unit (CMU) south wall of the metal storage room #10.
- If a paint coating is encountered during demolition activities that has not been discussed or analyzed it should be considered lead containing until sampling can demonstrate otherwise.
- A risk assessment and an exposure control plan must be undertaken by a qualified professional prior to renovation or demolition work beginning in areas with paints containing lead as per OHS Regulations 6.58.1 through 6.69
- Fluorescent light tubes containing mercury should be recycled when removed from service. The Light Recycle website provides a list of recycling facilities on their website, at <http://www.lightrecycle.ca/>.
- Prior to demolition, all electrical equipment and light ballasts should be checked for PCB content prior to disposal. The identified PCB containing ballasts and any potential PCB containing transformers if so encountered should be handled transferred, and disposed of appropriately as hazardous waste.
- If found, safe work procedures should be followed when working in proximity to or when removing mould-contaminated materials and animal waste (e.g. rodent droppings).
- If the south window mounted air conditioner units and/or lumber storage room freezer are to be disposed of they should be degassed by a certified refrigerant technician as required by British Columbia's Ozone Depleting Substances Regulation, prior to disposal.
- Smoke detectors or other equipment with RAM, if encountered, should be recycled when removed from service. AlarmRecycle is a recycling program for used or expired smoke and carbon monoxide (CO) alarms. Since October 1, 2011, BC residents have been able to drop off their smoke and CO alarms for recycling at AlarmRecycle drop-off locations across BC.
- The TCLP analytical sample lead results for the medium green coloured paint on the Machine Shop wood bench, cabinet, southeast false double doors, south-central door, and interior side of sliding access exit door as represented by Sample ID 18TCLP-TSB-14 are in excess of the BC Ministry of Environment Special Waste criteria of 5mg/L. Therefore, if these wood items or the associated surface coating paint are to be disposed of they would be considered a lead-containing waste shown to be a "leachable toxic waste" and are to be characterized and disposed of as a regulated hazardous waste.
- All hazardous wastes generated must be managed in a manner that complies with the requirements of the Hazardous Waste Regulation (HWR) and documented with the B.C. Generator (BCC) number for site of generation. The hazardous waste generated shall be properly stored while on site and manifested when transferred by a licenced transported to an appropriately licenced permitted hazardous waste management facility. Other provincial requirements may apply including, but not limited to, WorkSafeBC requirements for the work site and all personnel involved in the construction/demolition activity.
- WSP should be notified if any suspect asbestos-containing material or hazardous materials not identified in this report are exposed or encountered during renovation or demolition of the survey buildings. Suspect materials should be considered hazardous pending further review.
- Retain a copy of this report and provide it to any contractors who may be undertaking demolition work in the building as required by Section 20.112 of the WorkSafeBC regulations.

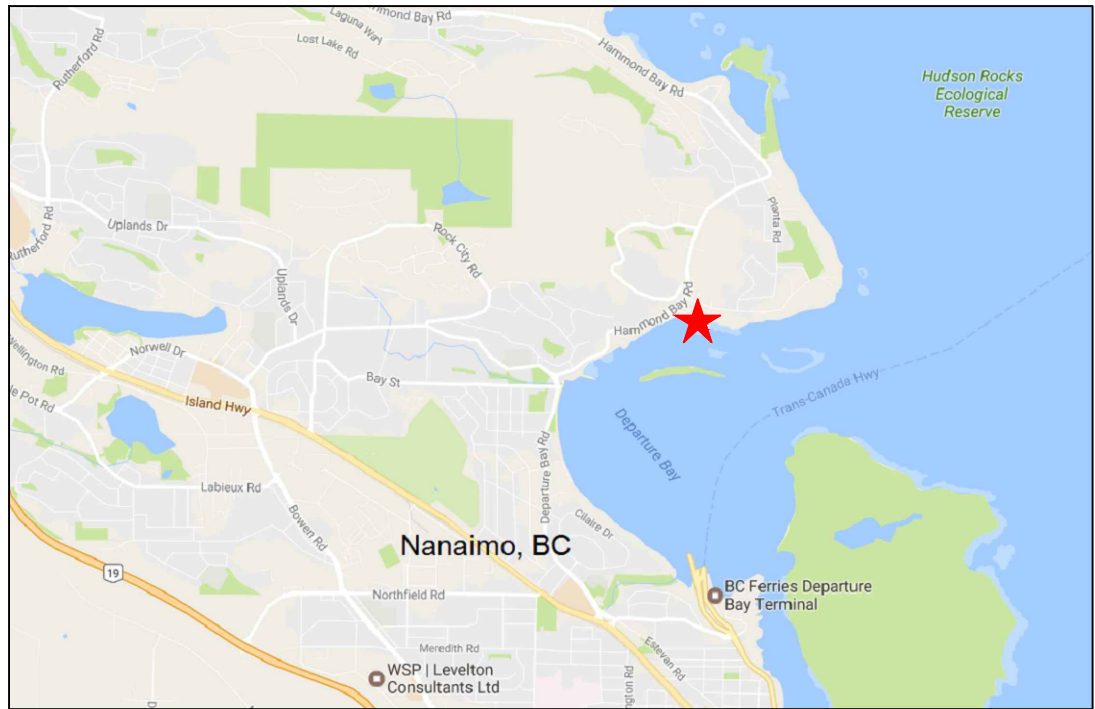
9 CLOSURE

No hazardous building materials survey can wholly eliminate uncertainty regarding the potential for recognized hazardous materials conditions at the site. Performance of a standardized hazardous material survey protocol is intended to reduce, but not eliminate uncertainty regarding the potential for recognized hazardous materials at the site, given reasonable limits of time and cost.


This report has been prepared by WSP exclusively for Fisheries and Oceans Canada and is intended to provide a survey of the potential for the presence of hazardous materials within the Technical Services Building, south attached canopy covered staircase, east attached open ended canopy, and detached storage shed (Subject Site) associated with the Pacific Biological Station located at 3190 Hammond Bay Road, Nanaimo, BC.

The conclusions made in this report reflect WSP's best judgment in light of the information available at the time of preparation. No other warranty, expressed or implied, is made. Any use which a third party makes of this report, or any reliance on or decisions to be made or actions based on it, are the responsibility of such third parties. WSP accepts no responsibility for damages, if any, suffered by a third party as a result of decisions made or actions based on this report. The standard limitations of this report are specified in Appendix V.

**APPENDIX
I
FIGURES**



LEGEND

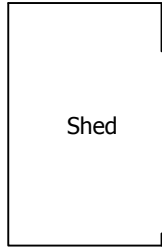
 - SUBJECT SITE

For General Reference Only
Drawing Is Approximate And Not To Scale

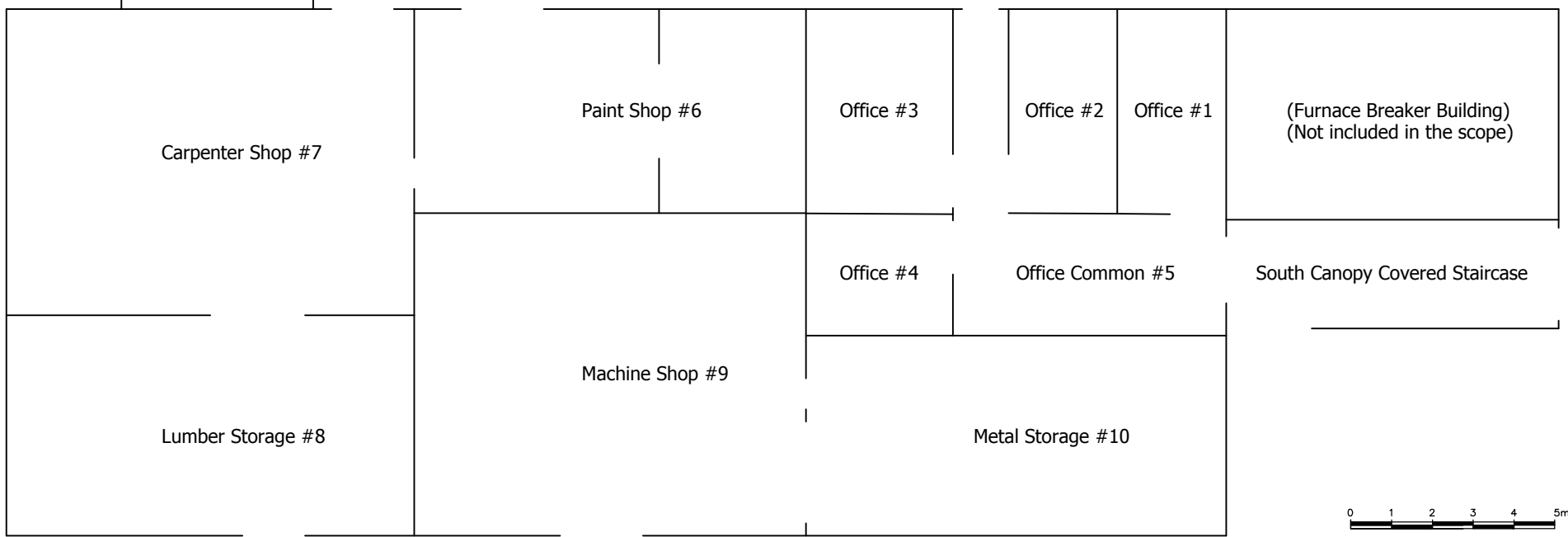


TITLE: Site Location Map
PROJECT: Pre Renovation Hazardous Building Materials Survey
Technical Services Building
3190 Hammond Bay Road, Nanaimo, BC
CLIENT: Fisheries and Oceans Canada

DES.	DR.	GP
CH.	SCALE	NTS
APP.	DATE	Sept 2018
FILE NO.	181-00998-00 & 181-13191-00	
DWG. NO.	FIGURE 1	

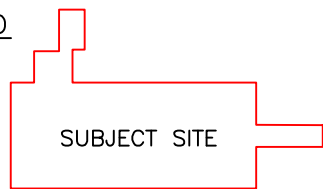


NE Canopy



ALL DIMENSIONS ARE APPROXIMATE.
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Drawing Is Approximate And Not To Scale

LEGEND



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TITLE:

Site Plan

PROJECT:

Pre Renovation Hazardous Building Materials Survey

Technical Services Building

3190 Hammond Bay Road, Nanaimo, BC

Fisheries and Oceans Canada

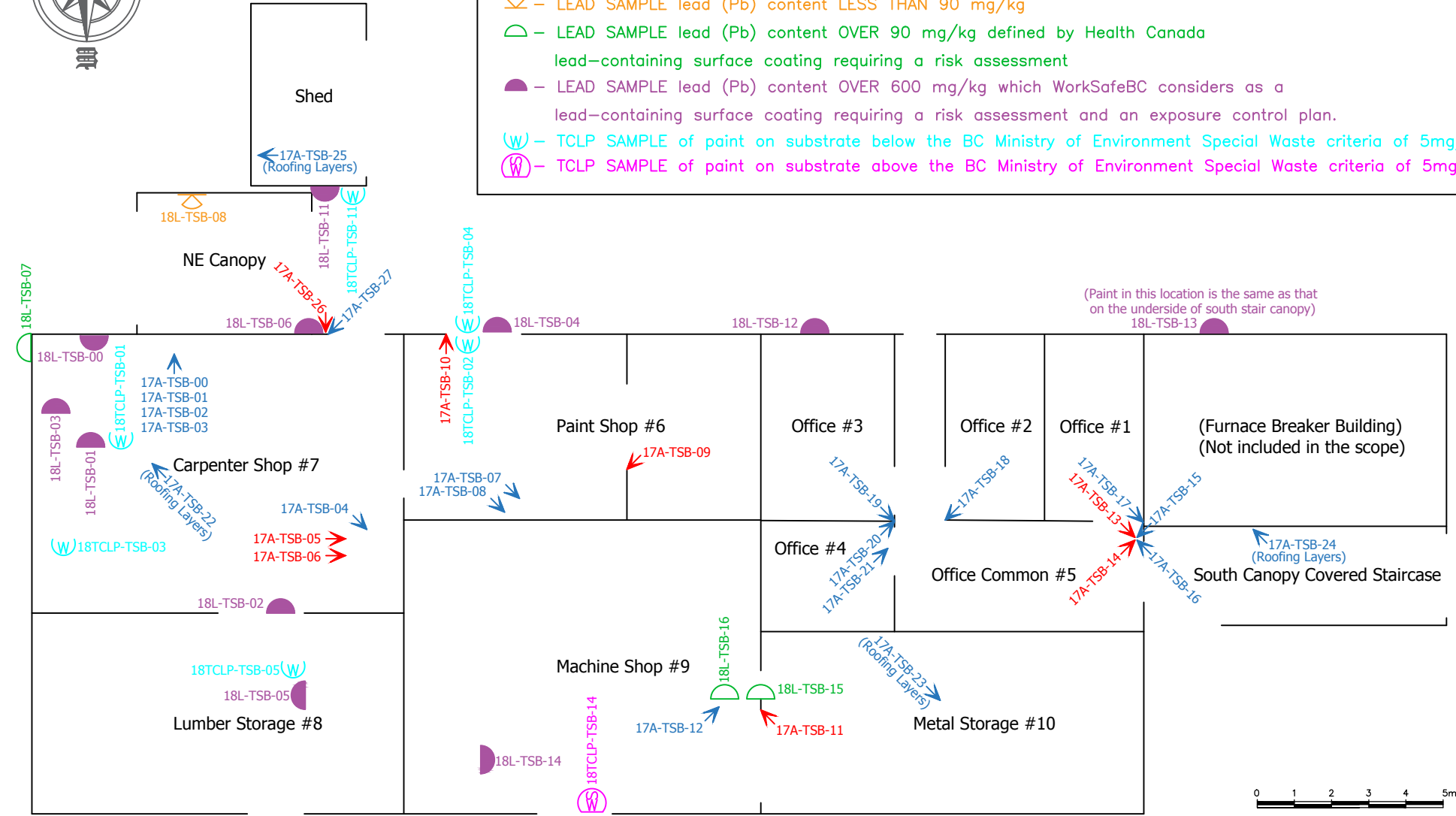
CLIENT:

DES.	DR.
	GP
CH.	SCALE
	NTS
APP.	DATE
	Sept 2018
FILE NO.	181-00998-00 & 181-13191-00
DWG. NO.	FIGURE 2



LEGEND

- ASBESTOS SAMPLE determined "NONE DETECTED"
- ASBESTOS SAMPLE determined to be ASBESTOS CONTAINING "CHRYSTOLITE"
- ◇ - LEAD SAMPLE lead (Pb) content LESS THAN 90 mg/kg
- ◒ - LEAD SAMPLE lead (Pb) content OVER 90 mg/kg defined by Health Canada lead-containing surface coating requiring a risk assessment
- ◐ - LEAD SAMPLE lead (Pb) content OVER 600 mg/kg which WorkSafeBC considers as a lead-containing surface coating requiring a risk assessment and an exposure control plan.
- Ⓜ - TCLP SAMPLE of paint on substrate below the BC Ministry of Environment Special Waste criteria of 5mg/L.
- Ⓢ - TCLP SAMPLE of paint on substrate above the BC Ministry of Environment Special Waste criteria of 5mg/L.



0 1 2 3 4 5m
 ALL DIMENSIONS ARE APPROXIMATE.
 For General Reference Only
 Drawing Is Approximate And Not To Scale

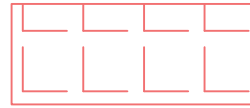


TITLE: Sample Plan
PROJECT: Pre Renovation Hazardous Building Materials Survey
 Technical Services Building
 3190 Hammond Bay Road, Nanaimo, BC
 Fisheries and Oceans Canada
CLIENT:

DES.	DR.
CH.	GP
APP.	SCALE NTS
	DATE Sept 2018
FILE NO.	181-00998-00 & 181-13191-00
DWG. NO.	FIGURE 3



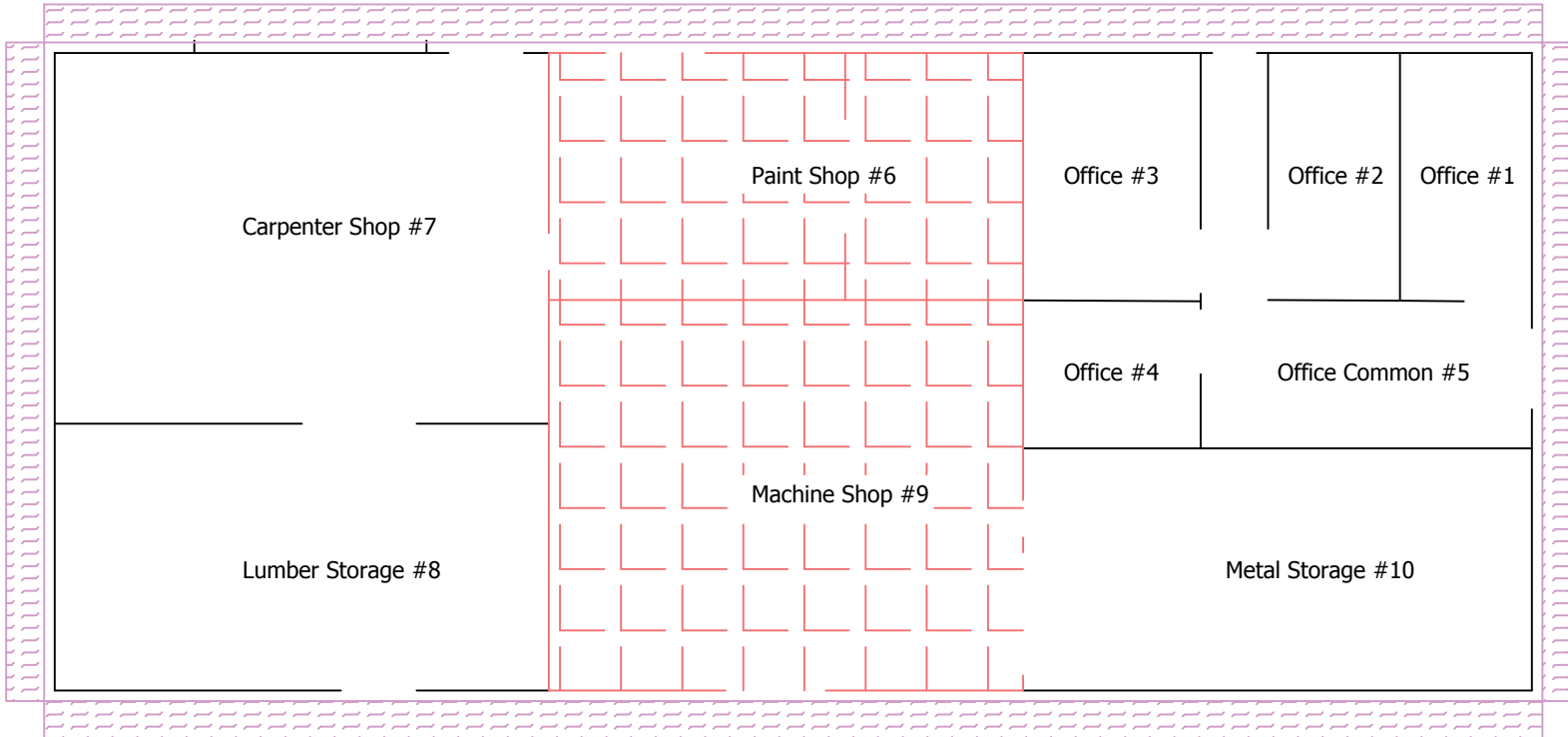
LEGEND



– Hard Fireproof Composite Fibre Cement Board Paneling (Transite Panel) lining the walls and ceilings of the paint shop and machine shop (25 % Chrysotile).



– Hard Fireproof Composite Fibre Cement Board Paneling (Transite Panel) lining the exterior sub-grade perimeter of the foundation floor slab (10 % Chrysotile). The outer slab perimeter covering of hard fireproof composite fibre cement board panelling extends in a vertical orientation downward from the top side of the base sill plate approximately 18” into the ground (not horizontally as indicated).



For General Reference Only
Drawing Is Approximate And Not To Scale



TITLE: Asbestos-Containing Composite Fibre Cement Board Paneling Plan
Pre Renovation Hazardous Building Materials Survey
Technical Services Building
3190 Hammond Bay Road, Nanaimo, BC
Fisheries and Oceans Canada

PROJECT:

CLIENT:

DES.	DR.
CH.	SCALE
APP.	DATE
FILE NO.	
DWG. NO.	

GP
NTS
Sept 2018
181-00998-00 & 181-13191-00
FIGURE 4



Carpenter Shop #7

Lumber Storage #8

Paint Shop #6

Office #3

Office #4

a.) east wood bench

c.) southeast false double doors

Machine Shop #9

– The preliminary TCLP analytical sample lead results for the medium green coloured paint on the Machine Shop: a.) east wood bench; b.) northwest cabinet; c.) southeast false double doors; d.) south-central door; and e.) interior side of sliding access exit door as represented by Sample ID 18TCLP-TSB-14 are in excess of the BC Ministry of Environment Special Waste criteria of 5mg/L. Therefore, if these painted wood items or the associated surface coating paint are to be disposed of they would be considered a lead-containing waste shown to be a "leachable toxic waste" and are to be characterized and disposed of as a regulated hazardous waste.

d.) south-central door

Metal Storage #10

b.) northwest cabinet

e.) interior side of sliding access exit door

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TITLE:

Medium Green Coloured Paint (TCLP Pb 7.1mg/L) Plan
Pre Renovation Hazardous Building Materials Survey

PROJECT:

Technical Services Building
3190 Hammond Bay Road, Nanaimo, BC

CLIENT:

Fisheries and Oceans Canada

DES.	DR.
CH.	SCALE
APP.	DATE
FILE NO.	
DWG. NO.	

GP
NTS
Sept 2018
181-00998-00 & 181-13191-00
FIGURE 5

APPENDIX
II
PHOTOGRAPHS



Technical Services Building west and south elevations with south staircase canopy (looking northeast).



Technical Services Building south and east elevations with east attached open ended canopy, and detached storage shed (looking north-northwest).
The Furnace Breaker Building (yellow outlined lower left) was not included in the scope of this PHMS.



Technical Services Building north elevation (looking westward).



The east attached open ended canopy and detached storage shed (looking north).



Looking southward from the roof of the Technical Services Building down onto the top of the south staircase canopy.



Looking eastward from the roof of the Technical Services Building onto the east attached open ended canopy (foreground) and detached storage shed (upper right).



Looking southward over the roof of the Technical Services Building.



Looking northward over the roof of the Technical Services Building.



Roofing materials core layer Sample 17A-TSB-22 collected from the northeast portion of the Technical Services Building.



Roofing materials core layer Sample 17A-TSB-23 collected from the southwest portion of the Technical Services Building.



Post-core-sampling temporary fill and patch with flashing cap on the northeast portion of the Technical Services Building (not warranted).



Post-core-sampling temporary fill and patch with flashing cap on the southwest portion of the Technical Services Building (not warranted).



Roofing materials core layer Sample 17A-TSB-24 collected from the east cant strip under the flashing of the south staircase canopy. Subsequently filled and patched with flashing cap (not warranted).



Post-core Sample 17A-TSB-25 temporary fill and patch with flashing cap on the detached storage shed (not warranted).



Common Room # 5, looking south (left), north (center pair), and east (right).



Offices # 1 through 4 (left to right)



Close-up of exploratory review of modern vinyl sheet flooring and underlying plywood and wood blocking within southwest corner of office area.