



MOULD ASSESSMENT—SITE REVIEW REPORT

Project Name:	Pre-Construction Mould Investigation for RCMP Valemount Residence		
Client:	Public Services and Procurement Canada	Date of Site Visit:	June 9, 2021
Stantec Site Assessor:	Lovy Mangat, B.Sc.	Issue Date:	July 29, 2021
Location:	Residential House, 1296 7 th Avenue, Valemount, BC	Stantec Project #:	123221873

BACKGROUND

Stantec was retained by Public Services and Procurement Canada (PSPC) on behalf of the Royal Canadian Mounted Police (RCMP) to provide a pre-construction assessment for mould and/or moisture impacted building materials within the RCMP residential house located at 1296 7th Avenue, Valemount, British Columbia (subject building).

Stantec understands that air sampling for mould conducted previously by others indicated elevated spore concentrations relative to outdoor concentrations, and indicated the potential amplification of mould within the subject building.

The purpose of the site review was to assess for the presence and approximate extent of mould and/or moisture impacted building materials within the subject building, and to provide recommendations for remediation, if necessary.

SCOPE AND METHODOLOGY

A visual assessment was conducted pertaining to exposed and accessible building materials within the subject building to identify areas where suspect mould was most likely to proliferate (i.e., areas where moisture damage/staining was visible on building material surfaces).

The visual assessment was supplemented through the use of a surface moisture meter (Electrophysics Model CT808). The instrument was used in a non-quantitative manner, comparing moisture readings from areas where impacts were visible and/or presumed to those of similar materials that were known to be dry.

Destructive investigation (e.g., creating test cuts into wall cavities to check for concealed conditions) was also conducted. Holes created were repaired/covered by temporary means only.

The presence of suspect visible mould was assessed through visual observations and sampling. Material observed with dark-coloured staining and/or a textured and discoloured appearance is described as "suspected mould". Mould identified visually is defined as "suspected mould" unless it is confirmed as mould by laboratory analysis.

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To determine whether selected surfaces within the building were growth sites for fungi, samples were collected from surfaces that were visibly or potentially impacted, using tape-lift sampling techniques. Samples were submitted under proper chain-of-custody protocols, to Sporometrics Inc. in Toronto, Ontario for laboratory examination (direct microscopic analysis) of the mould forms present. Sporometrics' analytical laboratory is accredited for microbiological analysis (Direct Exam) by the American Industrial Hygiene Association Laboratory Accreditation Program (AIHA LAP) and participate in the AIHA Environmental Microbiology Proficiency Analytical Testing (EMPAT) for Fungi.

STANDARDS AND REFERENCE GUIDELINES

Stantec's site assessment work was completed in general accordance with the current industry standards of practice for professionals in the environmental and occupational hygiene fields, as well as the requirements of the Canada Labour Code, Part II Canada Occupational Health and Safety Regulations (COHSR), British Columbia's Occupational Health and Safety Regulation (BC Reg. 296/97) and Stantec's Safe Work Practices.

The scope of work and assessment procedures utilized were based on the recommendations provided in the documents listed below.

- *Mould Guidelines for the Canadian Construction Industry*, Canadian Construction Association – 82, 2004 (referred to as CCA 82)
- *Bioaerosols: Assessment and Control*, American Conference of Governmental Industrial Hygienists (ACGIH), 1999
- *Fungal Contamination in Public Buildings: Health Effects and Investigation Methods*, Federal- Provincial Committee on Environmental and Occupational Health, 2004
- *Indoor Air Quality in Office Buildings: A Technical Guide*, Report of the Federal-Provincial Advisory Committee on Environmental and Occupational Health, 1995
- *Field Guide for the Determination of Biological Contaminants in Environmental Samples*, American Industrial Hygiene Association (AIHA), 1996
- *Best Practices – Mould at the Worksite*, Government of Alberta Employment and Immigration, 2009

SITE REVIEW LIMITATIONS

In preparation of this report, Stantec used professional judgment based on experience. The work was conducted in accordance with generally accepted professional standards. Stantec relied on information gathered during the site review and laboratory analytical reports.

This report reflects the observations made within accessible and accessed portions of the subject building and the analytical results of the samples collected at specific times/locations during the assessment.

Visual assessment for the presence of suspected visible mould and/or suitable conditions for mould growth (e.g., moist and/or moisture-stained building materials) was conducted pertaining to interior building materials in accessed portions of the subject building only.

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The conclusions provided herein will not necessarily identify all sources of moisture leading to suitable conditions for mould growth within the subject building. This assessment does not constitute a building envelope/building systems assessment, which would include an intrusive investigation to assess the internal condition, potential moisture sources, and expected remaining service life of the various components and systems comprising the envelope of a building (or area).

This report has been prepared for the exclusive use of the Client for the purpose of assessing general conditions pertaining to mould in the subject building as outlined herein. Any use that a third party makes of this report, or reliance on, or decisions to be made on it, are the responsibility of such third parties. Stantec accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

SITE REVIEW RESULTS

Visual and Moisture Meter Assessment


The following general observations were made pertaining to mould and/or moisture within the subject building:

- Moisture meter readings taken from surfaces throughout the subject building did not indicate building materials with elevated moisture content or active areas of moisture.
- Dried moisture stains were observed on the concrete floor of the carport and the workshop at the three bay doors and the three man-doors leading to the exterior.
- Gaps in the weatherstripping around the man-doors in the carport and workshop were observed and evidence of rodent infestation (e.g., droppings and evidence of burrowing) could be observed at the man-doors (likely point of access for rodents/pests).
- Visible moisture staining/suspect mould was observed in the following locations:
 - In the den, on the brick façade behind the fireplace, in the area of the fresh air intake.
 - In the carport and workshop, on the lower portions of the wood/drywall sheathing and wood wall framing members on either side of the two man-doors located on the east wall.
 - In the carport, on the lower portion of the wood sheathing and wood wall framing members at the northeast wall corner.
- Test cuts into representative perimeter drywall walls within the lower level of the subject building did not identify moisture impacts or suspect mould within the concealed locations. Locations of intrusive test cuts are indicated on the floor plan attached to this document.
- No musty odours were detected by Stantec at the time of the assessment.

The table below provides more detailed findings of the visual assessment and relative moisture meter readings, including general recommendations pertaining to each observation, where deemed necessary.

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Table 1 **Mould and/or Moisture Visual Assessment Summary—June 9, 2021**
Residence at 1296 7th Avenue, Valemount, BC

Area Assessed	Observations and Results	Suspected Source of Moisture	Photo	Recommendation
Lower Level Den	Visible moisture-staining on brick façade behind fireplace, in the area of the fresh air intake. Moisture meter reading similar to background readings. No active moisture observed.	Condensation from intake opening.		Clean and disinfect stained surfaces. Monitor areas and materials where moisture-staining was observed. If staining re-appears or active moisture is observed, the source of the moisture should be identified and corrected.

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Area Assessed	Observations and Results	Suspected Source of Moisture	Photo	Recommendation
Carport	Visible rodent droppings and other evidence of rodent infestation; moisture-stained wood sheathing and wall framing members around man-door. Moisture meter reading similar to background readings. No active moisture observed.	Inadequate weatherstripping and gaps around doors allowing rodents/pests and moisture intrusion into carport.		Remove lower 2'x 2' section of interior wood wall sheathing on either side of doors. Clean and disinfect stained wood framing surfaces. Seal/weatherstripping around doors should be assessed and repaired/corrected prior to re-instatement of new building materials.

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Area Assessed	Observations and Results	Suspected Source of Moisture	Photo	Recommendation
Carport	Visible moisture staining on the lower portion of the wood sheathing and wood wall framing members at the northeast wall corner. Moisture meter reading similar to background readings. No active moisture observed.	Pooling water in corner from moisture (e.g., rain and snow) brought into carport by vehicles, footwear, etc.		Remove lower 2' x 2' section of interior wood wall sheathing on either side from corner. Clean and disinfect stained wood framing surfaces. Consideration should be given to applying a sealant at bottom of wall perimeter to prevent moisture getting into the wall cavity.

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Area Assessed	Observations and Results	Suspected Source of Moisture	Photo	Recommendation
Workshop	Visible rodent droppings and other evidence of rodent infestation; moisture-stained wood sheathing and wall framing members around man-door. Moisture meter reading similar to background readings. No active moisture observed.	Poor weatherstripping and gaps around doors allowing rodents/pests and moisture intrusion into workshop.		Remove lower 2' x 2' section of interior drywall sheathing on either side of doors. Clean and disinfect stained wood framing surfaces. Seal/weatherstripping around doors should be assessed and repaired/corrected prior to re-instatement of new building materials.
Lower Level Bathroom	Test cut into east perimeter drywall wall did not identify moisture or suspect mould within the wall cavity.	N/A		Repair wall assembly, including insulation, vapour barrier and drywall.

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Area Assessed	Observations and Results	Suspected Source of Moisture	Photo	Recommendation
Lower Level Bedroom	Test cut into west perimeter drywall wall did not identify moisture or suspect mould within the wall cavity.	N/A		Repair wall assembly, including insulation, vapour barrier and drywall.
Carport/ Workshop	Moisture staining on concrete floor at bay doors.	Pooling of water that has infiltrated through bay doors.		Clean and disinfect stained surfaces. Consideration should be given to improving weatherstripping on the bottom of the garage door.

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TAPE LIFT SAMPLE RESULTS

Table 2, below, summarizes the locations and analytical results of the tape lift samples collected within the subject building on June 9, 2021. A floor plan indicating sample locations is attached to this document, for reference.

Table 2 Surface Sample Collection and Analysis Summary—June 9, 2021 Residence at 1296 7th Avenue, Valemount, BC

Sample No.	Sample Location	Microscopic Observation	Mould Growth Indicated?
TL-01	Carport – staining on wood wall framing in NE corner	Low counts of <i>Cladosporium</i> spores. Medium counts of <i>Chaetomium</i> mycelia and spores.	Yes
TL-02	Lower Level Den – staining on brick façade at fresh air intake	Low counts of <i>Alternaria</i> spores, <i>Chaetomium</i> spores, <i>Cladosporium</i> mycelia, and ascospores. Medium counts of <i>Cladosporium</i> spores.	Yes
TL-03	Workshop – staining on wood frame on east man-door	Low counts of <i>Taeniolella</i> spores. Medium counts of <i>Cladosporium</i> mycelia and spores.	Yes

As indicated above, mould growth was confirmed on building materials in the following locations:

- On the wood wall framing in the NE corner within the Carport.
- On the brick façade at the fresh air intake in the Lower Level Den.
- On the wood framing of the east man-door in the Workshop.

The certificate of analysis for the samples submitted, as provided by Sporometrics, is attached to this document, for reference.

RECOMMENDATIONS

Documents published by Health Canada, Ontario Ministry of Health, AIHA, ACGIH and others, provide guidance for interpreting the results of mould investigations. The Health Canada Guide states that:

...current knowledge supports the need to prevent damp conditions and mould growth and to remediate any fungal contamination in buildings.

To this end, Stantec recommends the course of action within the subject building as outlined in Table 1 is completed.

This work should be conducted by competent personnel, who are knowledgeable of potential hazards of mould exposure, using personal protective equipment and procedures in accordance with industry accepted practices for mould abatement (e.g., CCA 82).

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ASBESTOS CONSIDERATIONS

Assessment for asbestos and other hazardous building materials was conducted concurrently within the subject building, and reported under separate cover. Sampling from that assessment indicated the presence of asbestos in joint compound on drywall walls throughout the building. As such, joint compound on drywall within the Lower Level bedroom and bathroom in the area of wall assembly test cut locations is considered ACM.

Remediation activities associated with the above should be conducted by appropriately trained personnel (e.g., asbestos abatement contractor personnel) in accordance with the requirements of British Columbia's Occupational Health and Safety Regulation and the WorkSafeBC publication *Safe Work Practices for Handling Asbestos*.

CLOSING

If any conditions become apparent that differ significantly from our understanding of conditions as presented in this document, we request that we be notified immediately to reassess the information provided herein.

We trust that the document meets your current requirements. Should you have any questions or concerns regarding the above, please do not hesitate to contact the undersigned.

Stantec Consulting Ltd.

Reviewed by:

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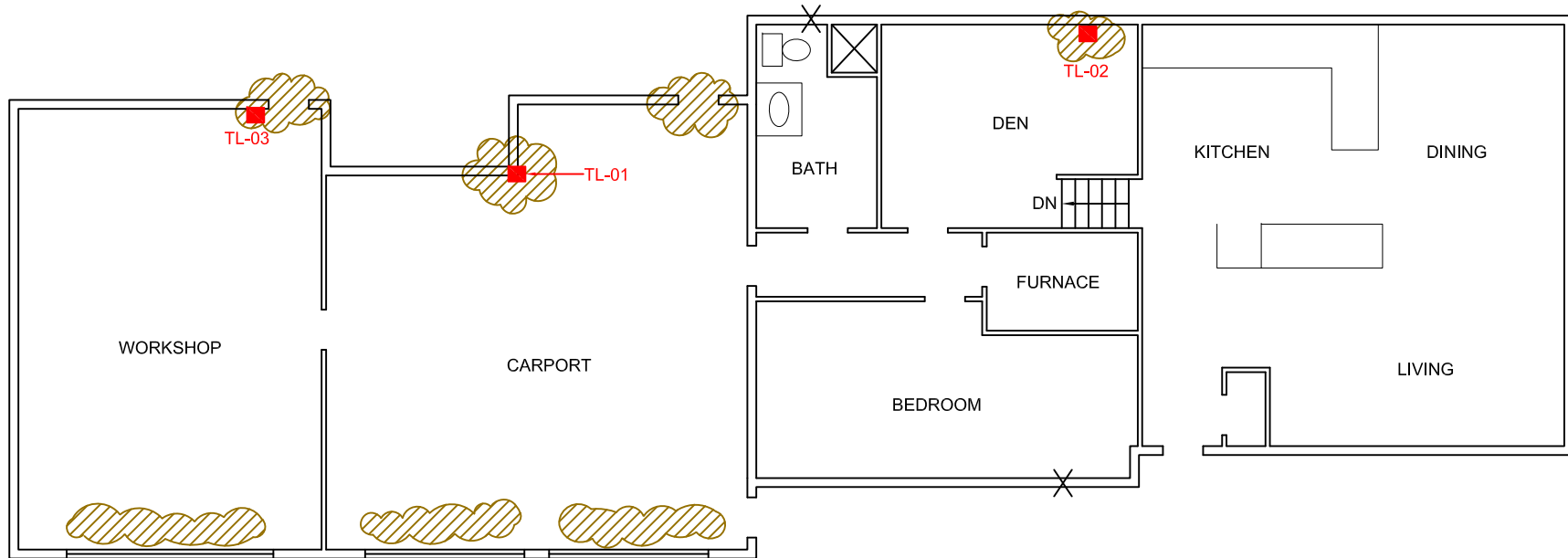


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Attachments: Floor Plan – 1 page
Mould Surface Samples - Analytical Record (Sporometrics) – 3 pages

ATTACHMENT 1

Floor Plan



MAIN FLOOR AND LOWER LEVEL

LEGEND

- TAPE LIFT SAMPLE LOCATION FOR MOULD
- LOCATION OF MOULD AND/OR MOISTURE IMPACTED BUILDING MATERIALS
- X LOCATION OF INTRUSIVE TEST CUTS INTO WALL ASSEMBLY

NOTES: 1. DRYWALL JOINT COMPOUND THROUGHOUT IS ASBESTOS-CONTAINING (EXCLUDING WORKSHOP).

2. THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC CONSULTING LTD. REPORT AND MUST NOT BE USED FOR OTHER PURPOSES.

PRE-CONSTRUCTION MOULD INVESTIGATION

RCMP VALEMOUNT RESIDENCE, 1296 7TH AVENUE, VALEMOUNT, BC

Client: PUBLIC SERVICES AND PROCUREMENT CANADA

Project No.: 123221873

Scale: N.T.S.

Date: 21/07/07

Dwn. By: CD CS SL2021070020

App'd By: LM

Dwg. No.:

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ATTACHMENT 2

Mould Surface Samples - Analytical Record (Sporometrics)



RESULTS OF LABORATORY ANALYSES:

JOB NO. 36473.00

To:	Lovy Mangat	Date of report:	2021/06/21
Company:	Stantec Consulting Ltd. - Calgary, AB	Date of sampling:	2021/06/09
Client Project:	123221873	Analyst:	Yaima Arocha-Rosete
Client Address:	200 - 325 - 25 Street SE, Calgary, AB T2A 7H8	Date Received:	2021/06/14

BULK / TAPELIFT / BIOTAPE SAMPLE NO.:		TL-01	TL-02	TL-03	-	-	-
Location:		Staining on wood wall framing in garage	Staining on wall at fresh air intake in lower level den	Staining on wood door frame in garage / workshop			
Serial #:		N/A	N/A	N/A			
Expiry date:		N/A	N/A	N/A			
FUNGAL IDENTIFICATION: ^a ELEMENTS:		MICROSCOPIC OBSERVATIONS ^b (RATING ^c):					
<i>Alternaria</i> NOS	mycelia	-	-	-			
	spores	-	tr	-			
<i>Chaetomium</i> NOS	mycelia	1+	-	-			
	spores	1+	tr	-			
<i>Cladosporium</i> NOS	mycelia	-	tr	1+			
	spores	tr	1+	1+			
<i>Epicoccum</i> NOS	mycelia	-	-	-			
	spores	-	tr	-			
<i>Taeniolella</i> NOS	mycelia	-	-	-			
	spores	-	-	tr			
ascospores NOS		-	tr	-			
OTHER OBSERVATIONS:							
background rating		3+	3+	3+			
insect parts		tr	-	-			
FUNGAL GROWTH INDICATED? ^d :		Y	Y	Y			

AIHA LAP, LLC LAB NO: 171117

Samples were received in satisfactory condition and tested in accordance with SOP 5.4.1.1.3. These results relate only to the samples tested.

^a NOS = not otherwise specified.

^b Mounted in lactofuchsin / lactic acid, or other medium as required, with 50-100 fields examined in bright field microscopy at 400x magnification.

^c - = not detected; tr = 10⁰ - 10¹ elements in total; 1+ = 10⁰ - 10¹ elements in each of ~25% fields; 2+ = 10¹ - 10² elements in each of ~50% fields; 3+ = 10² - 10³ elements in each of ~75% fields; 4+ => 75% fields obscured.

^d Possibility of fungal growth *in situ* based on microscopic observations; Y = yes; N = no; ? = ambiguous. For explanation please refer to the final page of this report.



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Client Address:	200 - 325 - 25 Street SE, Calgary, AB T2A 7H8	Date Received:	2021/06/14

END OF REPORT

Examined By

Released By



Yaima Arocha-Rosete, PhD
Analyst



Mike Saleh, MHSc
Analyst





RESULTS OF LABORATORY ANALYSES:

JOB NO. 36473.00

To:	Lovy Mangat	Date of report:	2021/06/21
Company:	Stantec Consulting Ltd. - Calgary, AB	Date of sampling:	2021/06/09
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Guidance on the interpretation of microscopic findings Samples of bulk materials as well as tape lift samples from potentially contaminated surfaces may be examined microscopically to assess the potential of these materials to be supporting fungal growth and serving as indoor fungal amplification sites. Guidelines on indoor microbial contamination proposed by Health Canada (HC. 1995. *Indoor air quality in office buildings: A technical guide*. Federal-Provincial Advisory Committee on Environmental and Occupational Health. Ottawa: Environmental Health Directorate 93-EHD-166 rev.) state unambiguously that indoor, active fungal growth sites are unacceptable regardless of the extent to which these amplifiers impact on the indoor airborne spore-load. Fungal spores are commonly borne on air currents and settle on flat surfaces as a matter of course. Thus, the observation of fungal spores alone is insufficient to characterize a specimen as a growth site. This judgment primarily requires the microscopic visualization of fungal filaments ("hyphae", or *en masse*, "mycelia"). Additionally, the identification of different kinds of fungi usually requires the observation of spores (e.g. conidia, ascospores, etc.) along with the organs responsible for their production (e.g. conidiophores, ascomata, etc.). However, the latter rarely persist long after the spores have been produced, making definitive identification difficult or impossible in aged specimens. The rating system used by Sporometrics to score the frequency of structures observed microscopically is based on a 5-point assessment of 50-100 microscopic fields, usually taken at 400 x magnification. This system uses the following rating criteria:

Descriptor	Criteria (based on 50-100 fields)	Interpretation of growth <i>in situ</i> according to observations:	
		Spores alone	Spores and spore-bearing structures or mycelia
tr	10 ⁰ -10 ¹ elements in total	growth not indicated	growth not indicated
1+	10 ⁰ -10 ¹ elements per ~25% fields	unclear	growth indicated
2+	10 ¹ -10 ² elements per ~50% fields	growth indicated	growth indicated
3+	10 ² -10 ³ elements per ~75% fields	growth indicated	growth indicated
4+	> 75% fields obscured by elements	growth indicated	growth indicated