

7.0 RECOMMENDATIONS

Based on our site assessment results, Tetra Tech formulated the following recommendations for each of the three hazardous materials in our scope: ACM, LBP and Crystalline Silica.

7.1 ASBESTOS-CONTAINING MATERIALS

ACMs were identified within the subject buildings. During demolition/renovation activities, ensure these materials are removed and disposed of in accordance with the requirements of the Alberta Asbestos Abatement Manual, August 2011. Identified ACMs should be managed, removed and disposed of in accordance with the requirements of the Transportation of Dangerous Goods Act. Specifically, Tetra Tech recommends that the identified ACMs should be managed, removed and disposed of in accordance with the following requirements:

- λ Government of Alberta document "Alberta Asbestos Abatement Manual" specifically Section 5.4; procedures for high risk abatement activities; for the removal of the asbestos-containing ceiling texture coat and concrete parging, mudded pipe insulation and drywall joint compound where identified within the subject buildings;
- λ Government of Alberta document "Alberta Asbestos Abatement Manual" specifically Section 5.3; procedures for moderate risk abatement activities; for the removal of the asbestos-containing 12"x12" dark beige vinyl floor tile, 6"x6" brown vinyl floor tile, 4"x4" black vinyl floor tile and exterior mastic where identified within the subject buildings;
- λ PWGSC Departmental Policy 057 – Asbestos Management; and,
- λ The Transportation of Dangerous Goods Act.

Tetra Tech did not assess roofing systems for the presence of asbestos-containing materials. If the roofing system is to be renovated or the subject building demolished Tetra Tech recommends that the roofing system and associated mastics are sampled down to substrate and analyzed for asbestos content.

7.2 LEAD-BASED SURFACE COATINGS

Lead-based surface coatings were identified within the subject buildings. Identified lead-based surface coatings should be managed, removed, and disposed of in accordance with the requirements of the Government of Alberta and the Alberta Environmental Protection and Enhancement Act, Subsection 191.

Prior to removal of these lead-based surface coatings, adequate safe work procedures must be developed to ensure workers are protected from lead exposure if lead surface coatings are to be removed from the substrate or if work activities potentially could generate finely divided airborne lead particles. During demolition/renovation of the subject buildings, if lead-based surface coatings are to be demolished in place, the contractor must implement an exposure control plan to meet the requirements of Alberta Occupational Health and Safety Regulations.

Under the Hazardous Products Act, identified LBP must undergo Toxicity Characteristic Leachate Properties (TCLP) to determine disposal procedures. The acceptable TCLP limit for disposal of LBP is less than 5 mg/L (5 ppm). If an identified LBP exhibits a TCLP result of less than 5 ppm, the paint is not considered a hazardous material and may be disposed of as general construction waste.

7.3 CRYSTALLINE SILICA

Based on the findings and limitations of our visual assessment, suspected products containing crystalline silica were identified within the subject buildings. During Tetra Tech's assessment, the subject buildings were visually assessed for products suspect of containing crystalline silica. Based on the visual assessment masonry products suspect of containing crystalline silica were visually identified within each of the subject buildings.

Tetra Tech recommends that during renovation or demolition work where disturbance of the masonry products may occur, air monitoring is conducted to determine if crystalline silica is present within the identified masonry products within the subject buildings. If present, then an exposure control plan must be implemented to meet the requirements of Alberta Occupational Health and Safety Regulations.

- λ Asbestos-containing ceiling texture coat (Tetra Tech sample No. FOB-008) located in the second floor hallway. The ACM was deemed to be in good condition at the time of assessment as depicted in photograph number 12.
- λ Asbestos-containing ceiling texture coat (Tetra Tech sample No. FOB-010) located in the stairwell leading to the second floor. The ACM was deemed to be in good condition at the time of assessment as depicted in photograph number 12.
- λ Asbestos-containing texture coat applied to fiber board (Tetra Tech sample No. FOB-023) located in the basement office. The ACM was deemed to be in good condition at the time of assessment as depicted in photograph number 13.
- λ Rated fire doors suspect of containing asbestos matting were located in multiple areas of the Friends of Banff Building.

6.1.4 **PARK ADMINISTRATION BUILDING**

- λ Asbestos-containing 12"x12" dark beige vinyl floor tile (Tetra Tech sample No. Admin-001), located in the basement records room. The ACM was deemed to be in good condition at the time of assessment as depicted in photograph number 15.
- λ Asbestos-containing 6"x6" brown vinyl floor tile (Tetra Tech sample No. Admin-004) sampled from a stock pile of floor tiles located within the Boiler room as shown in photograph number 16 and 17. The floor tile was visually confirmed in multiple areas of the subject building.
- λ Asbestos-containing 4"x4" black vinyl floor tile (Tetra Tech sample No. Admin-010) sampled from a stock pile of floor tiles located within the Boiler room as shown in photograph number 16 and 17. The floor tile was visually confirmed in multiple areas of the subject building.
- λ Asbestos-containing texture coating (Tetra Tech sample No. Admin-012) located on the wall of the main floor photocopy room. The ACM was deemed to be in good condition at the time of assessment as depicted in photograph number 18.
- λ Rated fire doors suspect of containing asbestos matting were located in multiple areas of the Park Administration Building.

6.2 ASBESTOS SAMPLE QA/QC

Tetra Tech submitted duplicate samples totalling 10% of the total samples submitted for quality assurance/ quality control to the laboratory. The samples were labelled in such a way that the lab did not know the samples were field duplicates. Duplicate samples are labelled within Table 1- 4.

6.3 LEAD-BASED SURFACE COATINGS

Tetra Tech collected and submitted six LBP samples for laboratory analysis. Based on the findings of our assessment, LBPs were identified within some of the samples submitted for the subject buildings.

- λ Analytical results, sample point locations and descriptions of all materials assessed for lead content are summarized in Table 5. Paint coverings confirmed to be lead-based are outlined in RED bold within Table 5.
- λ Based on the findings of our assessment, the following LBPs were identified within the following subject buildings at the time of Tetra Tech's assessment.

6.3.1 OPERATIONS BUILDING

- λ White interior lead-based paint (Tetra Tech sample No. OPS-L001) applied to the wall at the roof exit within the Operations Building. The paint was deemed to be in poor condition at the time of assessment as seen in photograph number 19.
- λ Brown exterior lead-based paint (Tetra Tech sample No. OPS-L002) applied to the exterior metal staircases of the Operations Building. The paint was deemed to be in good to poor condition dependent on location at the time of assessment as seen in photograph number 7.

6.3.2 INFORMATION BUILDING

- λ At the time of assessment Tetra Tech did not identify a suitable location for the sampling of painted surface coatings due to murals being present on the walls of the subject building.

6.3.3 FRIENDS OF BANFF BUILDING

- λ Grey exterior lead-based paint (Tetra Tech sample No. FOB-L002) applied to the exterior window frames of the Friends of Banff Building. The paint was deemed to be in poor condition at the time of assessment as seen in photograph number 20.

6.3.4 **PARK ADMINISTRATION BUILDING**

- λ Egg shell interior lead-based paint (Tetra Tech sample No. Admin-L001), applied to the wall within the boiler room. The paint was deemed to be in poor condition at the time of assessment as seen in photograph number 21.
- λ Green interior lead-based paint (Tetra Tech sample No. Admin-L002) applied to the floor of the boiler room. The paint was deemed to be in fair condition at the time of assessment as seen in photograph number 21.

6.4 CRYSTALLINE SILICA

Based on the findings and limitations of our visual assessment, the following products area suspected to contain crystalline silica were identified within the subject buildings.

6.4.1 ~~OPERATIONS BUILDING~~

~~Crystalline silica is suspect to be present within the concrete slab foundation, concrete vertical support columns and the interior and exterior brick walls.~~

6.4.2 ~~INFORMATION BUILDING~~

~~Crystalline silica is suspect to be present within the concrete slab foundation, concrete vertical support columns and interior parging covering the interior concrete formed slabs located within the basement.~~

6.4.3 ~~FRIENDS OF BANFF BUILDING~~

~~Crystalline silica is suspect to be present within the concrete slab foundation, concrete vertical support columns and interior and exterior parging associated with the concrete formed slabs.~~

6.4.4 **PARK ADMINISTRATION BUILDING**

Crystalline silica is suspect to be present within the concrete slab foundation, concrete vertical support columns, exterior masonry façade and interior parging associated with the concrete formed slabs.

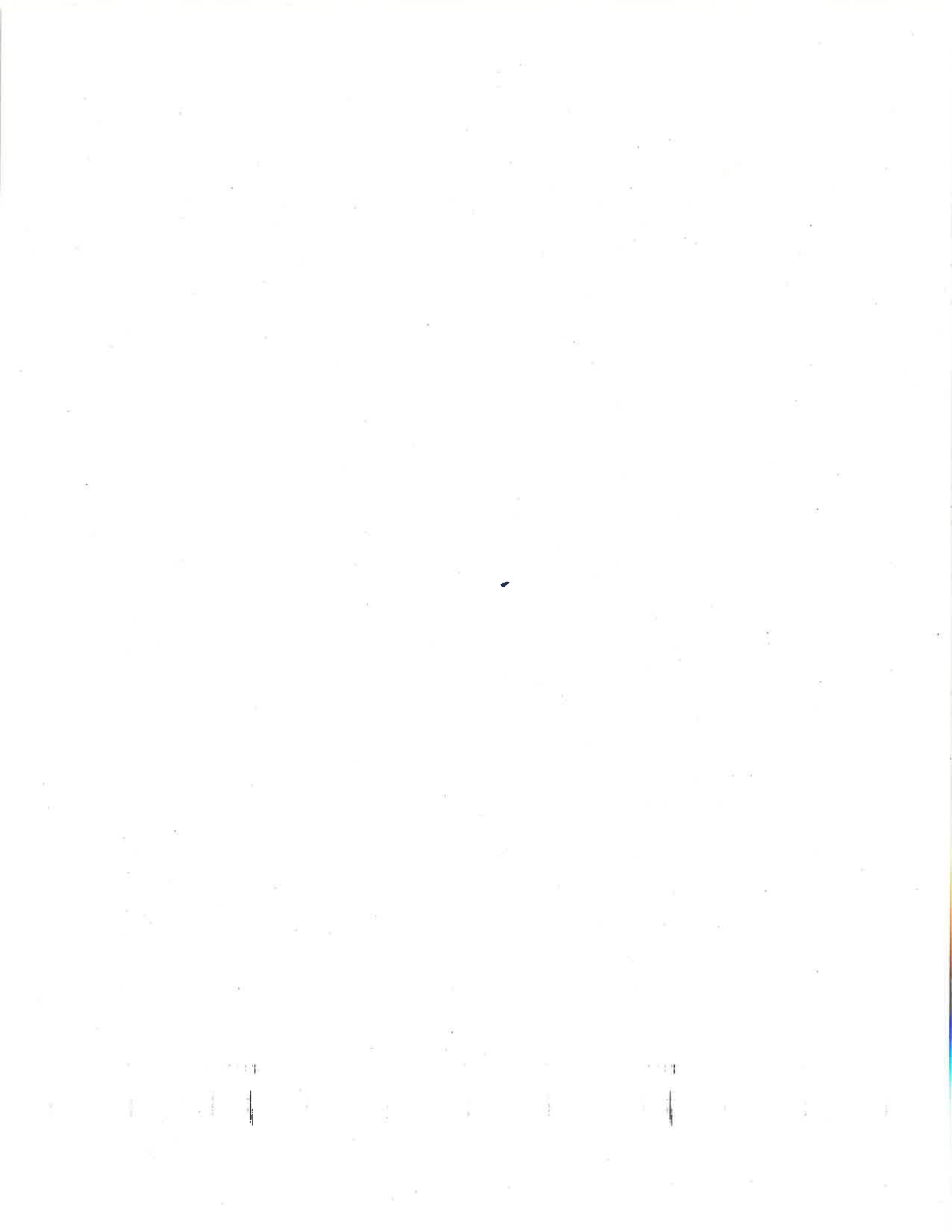




Photo 15: Asbestos containing 12"x12" dark beige vinyl floor tile located in the basement records room. EBA sample No.Admin-001.



Photo 16: Asbestos containing 6"x6" brown vinyl floor tiles and 4"x4" black vinyl floor tiles. EBA sample No.Admin-004 and Admin-010. These floor tiles were visually identified on the first floor.



Photo 17: Asbestos containing 6"x6" brown vinyl floor tiles and 4"x4" black vinyl floor tiles as seen on the first floor. EBA sample No.Admin-004 and Admin-010.



Photo 18: Asbestos containing texture coat on the wall of the Photocopy room on the main floor. EBA sample No.Admin-012.



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Bulk Asbestos Fiber Analysis
 (EPA 600/R-93/116)



NVLAP LAB CODE 200613-0

EBA Engineering Consultants, LTD (a Tetra Tech co)
 Project Location: Banff Townsite, Banff National Park
 Alberta

RGA Batch Number: **12-0674**
 Client Job Number: **W23101553**
 Number of Samples: **25**

Report Key				
Client Sample ID RGA Lab ID	Layer ID (if applicable) Layer Description Layer Comments (if applicable)	Asbestos Components	Non-Asbestos Fibrous Components	Non-Fibrous Components
Admin-001 12007031	L-1 Gray vinyl tile w/ brown streaks	2% Chrysotile		65% Calcite Filler and Binder 25% Vinyl Filler and Binder 8% Mineral Particles
	L-2 Black asphaltic material	5% Chrysotile		90% Asphalt Filler and Binder 5% Mineral Particles
Admin-002 12007032	L-1 Gray vinyl tile	No Asbestos Detected		65% Calcite Filler and Binder 25% Vinyl Filler and Binder 10% Mineral Particles
	L-2 Yellow adhesive	No Asbestos Detected		90% Resin and Binder 10% Mineral Particles
Admin-003 12007033	Gray vinyl tile	No Asbestos Detected		65% Calcite Filler and Binder 25% Vinyl Filler and Binder 10% Mineral Particles
Admin-004 12007034	L-1 Red vinyl tile w/ gray streaks	7% Chrysotile		65% Calcite Filler and Binder 25% Vinyl Filler and Binder 3% Mineral Particles
	L-2 Black shiny asphaltic material	No Asbestos Detected		90% Asphalt Filler and Binder 10% Mineral Particles
Admin-005 12007035	White crystalline material	No Asbestos Detected		85% Calcite Filler and Binder 15% Mineral Particles

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 Reviewed By: Aruna Turaga

3/22/2012
 3/27/2012

Analyzed By: Minh Huynh

3/27/2012



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Report Key				
Client Sample ID RGA Lab ID	Layer ID (if applicable) Layer Description Layer Comments (if applicable)	Asbestos Components	Non-Asbestos Fibrous Components	Non-Fibrous Components
Admin-006 12007036	L-1 White paint	No Asbestos Detected		90% Paint 10% Mineral Particles
	L-2 White crystalline material	No Asbestos Detected		85% Calcite Filler and Binder 15% Mineral Particles
Admin-007 12007037	L-1 Layered paint	No Asbestos Detected		90% Paint 10% Mineral Particles
	L-2 White hard granular material	No Asbestos Detected		85% Filler and Binder 15% Mineral Particles
	L-3 White granular sandy material	No Asbestos Detected		65% Filler and Binder 25% Sand 10% Mineral Particles
Admin-008 12007038	L-1 Beige paint	No Asbestos Detected		90% Paint 10% Mineral Particles
	L-2 Gray granular sandy material	No Asbestos Detected		65% Filler and Binder 25% Sand 10% Mineral Particles
Admin-009 12007039	L-1 Tan paint	No Asbestos Detected		90% Paint 10% Mineral Particles
	L-2 White crystalline material	No Asbestos Detected	10% Cellulose	85% Calcite Filler and Binder 5% Mineral Particles

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 Number of Samples: **25**

Report Key				
Client Sample ID RGA Lab ID	Layer ID (if applicable) Layer Description Layer Comments (if applicable)	Asbestos Components	Non-Asbestos Fibrous Components	Non-Fibrous Components
Admin-010 12007040	L-1 Black vinyl tile	3% Chrysotile		65% Calcite Filler and Binder 25% Vinyl Filler and Binder 7% Mineral Particles
	L-2 Black shiny asphaltic material	No Asbestos Detected		90% Asphalt Filler and Binder 10% Mineral Particles
Admin-011 12007041	L-1 Tan paint	No Asbestos Detected		90% Paint 10% Mineral Particles
	L-2 White crystalline material	No Asbestos Detected	5% Cellulose	85% Calcite Filler and Binder 10% Mineral Particles
Admin-012 12007042	L-1 Tan paint	No Asbestos Detected		90% Paint 10% Mineral Particles
	L-2 White crystalline material	5% Chrysotile		85% Calcite Filler and Binder 10% Mineral Particles
Admin-013 12007043	L-1 Layered paint	No Asbestos Detected		90% Paint 10% Mineral Particles
	L-2 White hard granular material	No Asbestos Detected		85% Filler and Binder 15% Mineral Particles
	L-3 Gray granular sandy material	No Asbestos Detected		65% Filler and Binder 25% Sand 10% Mineral Particles

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Report Key				
Client Sample ID RGA Lab ID	Layer ID (if applicable) Layer Description Layer Comments (if applicable)	Asbestos Components	Non-Asbestos Fibrous Components	Non-Fibrous Components
Admin-014 12007044	L-1 Tan paint	No Asbestos Detected		90% Paint 10% Mineral Particles
	L-2 White crystalline material	No Asbestos Detected	5% Cellulose	85% Calcite Filler and Binder 10% Mineral Particles
Admin-015 12007045	L-1 Tan paint	No Asbestos Detected		90% Paint 10% Mineral Particles
	L-2 White crystalline material	No Asbestos Detected	5% Cellulose	85% Calcite Filler and Binder 10% Mineral Particles
Admin-016 12007046	L-1 Tan paint	No Asbestos Detected		90% Paint 10% Mineral Particles
	L-2 White crystalline material	No Asbestos Detected	5% Cellulose	85% Calcite Filler and Binder 10% Mineral Particles
Admin-017 12007047	L-1 Tan paint	No Asbestos Detected		90% Paint 10% Mineral Particles
	L-2 White crystalline material	No Asbestos Detected		85% Calcite Filler and Binder 15% Mineral Particles
	L-3 White fibrous papery material	No Asbestos Detected	75% Cellulose	15% Filler and Binder 10% Mineral Particles

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RGA Batch Number: **12-0674**
 Client Job Number: **W23101553**
 Number of Samples: **25**

Report Key				
Client Sample ID RGA Lab ID	Layer ID (if applicable) Layer Description Layer Comments (if applicable)	Asbestos Components	Non-Asbestos Fibrous Components	Non-Fibrous Components
Admin-018 12007048	L-1 Tan paint	No Asbestos Detected		90% Paint 10% Mineral Particles
	L-2 White crystalline material	No Asbestos Detected	5% Cellulose	85% Calcite Filler and Binder 10% Mineral Particles
Admin-019 12007049	L-1 Tan paint	No Asbestos Detected		90% Paint 10% Mineral Particles
	L-2 White crystalline material	No Asbestos Detected		85% Calcite Filler and Binder 15% Mineral Particles
	L-3 White fibrous papery material	No Asbestos Detected	75% Cellulose	15% Filler and Binder 10% Mineral Particles
	L-4 Tan fibrous papery material	No Asbestos Detected	75% Cellulose	15% Filler and Binder 10% Mineral Particles
	L-5 Gray powdery blocky material	No Asbestos Detected	15% Glass Fiber	65% Gypsum Filler and Binder 10% Calcite Filler and Binder 10% Mineral Particles

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Report Key				
Client Sample ID	Layer ID (if applicable)	Asbestos Components	Non-Asbestos Fibrous Components	Non-Fibrous Components
RGA Lab ID	Layer Description			
	Layer Comments (if applicable)			

Admin-020 12007050	L-1 Tan paint	No Asbestos Detected		90% Paint 10% Mineral Particles
	L-2 White crystalline material	No Asbestos Detected		85% Calcite Filler and Binder 15% Mineral Particles
	L-3 White fibrous papery material	No Asbestos Detected	75% Cellulose	15% Filler and Binder 10% Mineral Particles
	L-4 Tan fibrous papery material	No Asbestos Detected	75% Cellulose	15% Filler and Binder 10% Mineral Particles
	L-5 Gray powdery blocky material	No Asbestos Detected	15% Glass Fiber	65% Gypsum Filler and Binder 10% Calcite Filler and Binder 10% Mineral Particles

Admin-021 12007051	L-1 Green paint	No Asbestos Detected		90% Paint 10% Mineral Particles
	L-2 White crystalline material	No Asbestos Detected		85% Calcite Filler and Binder 15% Mineral Particles
	L-3 White fibrous papery material	No Asbestos Detected	75% Cellulose	15% Filler and Binder 10% Mineral Particles
	L-4 Tan fibrous papery material	No Asbestos Detected	75% Cellulose	15% Filler and Binder 10% Mineral Particles
	L-5 Gray powdery blocky material	No Asbestos Detected	15% Glass Fiber	65% Gypsum Filler and Binder 10% Calcite Filler and Binder 10% Mineral Particles

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Report Key				
Client Sample ID RGA Lab ID	Layer ID (if applicable) Layer Description Layer Comments (if applicable)	Asbestos Components	Non-Asbestos Fibrous Components	Non-Fibrous Components

Admin-022 12007052	L-1 Tan paint	No Asbestos Detected		90% Paint 10% Mineral Particles
	L-2 White crystalline material	No Asbestos Detected		85% Calcite Filler and Binder 15% Mineral Particles
	L-3 White fibrous papery material	No Asbestos Detected	75% Cellulose	15% Filler and Binder 10% Mineral Particles
	L-4 Tan fibrous papery material	No Asbestos Detected	75% Cellulose	15% Filler and Binder 10% Mineral Particles
	L-5 Gray powdery blocky material	No Asbestos Detected	15% Glass Fiber	65% Gypsum Filler and Binder 10% Calcite Filler and Binder 10% Mineral Particles

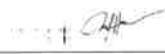
Admin-023 12007053	L-1 Tan paint	No Asbestos Detected		90% Paint 10% Mineral Particles
	L-2 White crystalline material	No Asbestos Detected		85% Calcite Filler and Binder 15% Mineral Particles
	L-3 Glass weave	No Asbestos Detected	90% Glass Fiber	10% Mineral Particles
	L-4 White fibrous papery material	No Asbestos Detected	75% Cellulose	15% Filler and Binder 10% Mineral Particles

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Project Location: Banff Townsite, Banff National Park
 Alberta

RGA Batch Number: 12-0674

Client Job Number: W23101553

Number of Samples: 25

Report Key				
Client Sample ID	Layer ID (if applicable)	Asbestos Components	Non-Asbestos Fibrous Components	Non-Fibrous Components
RGA Lab ID	Layer Description			
	Layer Comments (if applicable)			

Admin-024 12007054	L-1 Tan paint	No Asbestos Detected	90% Paint	10% Mineral Particles
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L-2 White crystalline material	No Asbestos Detected	85% Calcite Filler and Binder	15% Mineral Particles
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Admin-025 12007055	L-1 Layered paint	No Asbestos Detected	90% Paint	10% Mineral Particles
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L-2 White crystalline material	No Asbestos Detected	85% Calcite Filler and Binder	15% Mineral Particles
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Table 4: Suspect Asbestos Containing Material Summary - Administration Building

Sample Identification	Type	Condition	Location	% Asbestos
Admin-001	12"x12" dark beige VFT	Good	Basement, records room	2 - 5% Ch
Admin-002	12"x12" light beige VFT	Good	Basement, records room	Non-detect
Admin-003	12"x12" light beige VFT	Good	QA/QC duplicate of Admin-002	Non-detect
Admin-004	6"x6" brown VFT	Poor	Tupperware bin, basement	7% Ch
Admin-005	DWJC	Good	Rear wall, records room, basement	Non-detect
Admin-006	DWJC	Good	Bathroom wall, off of records room	Non-detect
Admin-007	Plaster	Good	Ceiling of bathroom, basement	Non-detect
Admin-008	Parging	Fair	Record storage room	Non-detect
Admin-009	Texture coat	Good	Ground floor lunch room	Non-detect
Admin-010	4"x4" black floor	Poor	Tupperware bin, basement (as seen on ground floor)	3% Ch
Admin-011	Texture coating	Good	Perimeter wall, realty immobile office area	Non-detect
Admin-012	Texture coating	Good	Photocopy room, main floor	5% Ch
Admin-013	Texture coating	Good	Perimeter wall, offices near reception	Non-detect
Admin-014	Texture coating	Good	Ceiling in stairwell	Non-detect
Admin-015	Texture coating	Good	Perimeter wall, office #208	Non-detect
Admin-016	Texture coating	Good	Communications office area	Non-detect
Admin-017	DWJC	Good	Bulkhead, stairwell to 3 rd floor	Non-detect
Admin-018	Plaster	Good	Stairwell to 3rd floor	Non-detect
Admin-019	DWJC	Good	Perimeter wall, 3 rd floor office area near bathroom	Non-detect
Admin-020	DWJC	Good	QA/QC duplicate of Admin-019	Non-detect
Admin-021	DWJC	Good	Perimeter wall, room 301B	Non-detect
Admin-022	DWJC	Good	Entrance to room 301E	Non-detect
Admin-023	DWJC	Good	Stairwell to 3 rd floor	Non-detect
Admin-024	DWJC	Good	Utility closet, 2 nd floor	Non-detect
Admin-025	DWJC	Good	QA/QC duplicate of Admin-024	Non-detect

Notes:

Non-detect: No asbestos content detected in sample
 % Ch: Percentage of chrysotile asbestos analytically detected
 VFT: Vinyl floor tile
 DWJC: Drywall joint compound

