



BOULDER VALLEY SCHOOL DISTRICT

Dear Families and Staff,

Recently I reached out to let you know that, to provide extra assurance to our community regarding the effectiveness of our Marshall Fire remediation activities, BVSD conducted screening testing for char, soot, and ash on surfaces throughout Fireside Elementary on April 21. Fireside was chosen as the screening site because of its location and because a deposit of char was recently reported in one of the classrooms.

A total of 73 samples were collected via tape-lift and micro-vacuuming from non-porous and soft surfaces. Combustion products were not detected in 61 of the 73 samples. The remaining twelve samples had less than 1% char, which is considered a typical background concentration, according to consulting experts and analytical laboratories. The full report is available [here](#).

As we have throughout this experience, we are relying on the guidance of national industrial hygiene experts. Based on the most recent testing, these certified professionals conclude that the actions taken by BVSD during, and in response to, the Marshall fire have been successful at preventing and removing wildfire residues from surfaces in the school. We have also been advised that no further remedial action or testing is necessary. The interpretation of the test results, as well as the sample collection and testing protocol were provided by Ramboll US Consulting, Inc. (Ramboll). Ramboll was not involved in the original post-fire remediation plan, but has extensive experience in a range of industrial hygiene and environmental health topics.

As a reminder, BVSD conducted deep cleaning immediately after the fire, and we continue to clean buildings daily to address any reintroduction of fire-related residue and to remove the dirt and grime that are created in the daily operation of an elementary school. Custodians are provided HEPA filter-equipped vacuums and EPA approved products for effective cleaning and disinfecting. Additional cleaning such as carpet shampooing and floor waxing happens during periods when schools are unoccupied such as Winter and Spring Breaks. All schools in Louisville and Superior were deep-cleaned in the summer of 2022 and will be again this summer. Room-size air purifiers with HEPA filters have been provided to all schools for use in classrooms and other spaces to remove airborne particulates. These purifiers will remain at schools. In addition to the room-sized air purifiers, building HVAC filters are replaced on a regular schedule which helps improve the indoor air quality. All of these efforts contribute to maintaining a clean environment and preventing the spread of respiratory illness.

The health and safety of our students is a top priority for BVSD. We are pleased with the reassurance of these results and hope this information provides you additional peace of mind regarding the post-fire cleanliness of your student's school.

Sincerely,

Rob Price
Assistant Superintendent of Operational Services

Intended for
Boulder Valley School District

Date
May 2023

Project Number
1690030208

TESTS FOR WILDFIRE RESIDUE ON SURFACES

FIRESIDE ELEMENTARY SCHOOL

845 W. DAHLIA STREET

LOUISVILLE, COLORADO

Ramboll
1999 Broadway, Suite 2225
Denver, Colorado 80202
USA

www.ramboll.com

RAMBOLL

Bright ideas. Sustainable change.

TESTS FOR WILDFIRE RESIDUE ON SURFACES
Fireside Elementary School

CONTENTS

	SUMMARY	II
1.	INTRODUCTION	1
2.	TESTING STRATEGY	2
3.	METHODOLOGY	2
4.	RESULTS	3
5.	CONCLUSIONS	4

APPENDICES

Appendix A:	Results Table
Appendix B:	Laboratory Reports
Appendix C:	Photographs

TESTS FOR WILDFIRE RESIDUE ON SURFACES

Fireside Elementary School

SUMMARY

At the request of Boulder Valley School District (BVSD), surfacing testing for wildfire residues was performed by Ramboll US Consulting, Inc. (Ramboll) on April 21, 2023, at Fireside Elementary School (the school) located at 845 W. Dahlia Street, Louisville, Colorado. A table that summarizes the results is provided in Appendix A, laboratory reports are included in Appendix B and representative photographs are in Appendix C.

Background

The assessment was performed in accordance with the testing protocol (the protocol) prepared by Ramboll, dated April 18, 2023. Testing included collection and analysis of 73 surface samples including 54 tape lift samples from non-porous surfaces and 19 micro vacuum (micro-vac) samples collected from porous materials including carpeting and furnishings. Samples were submitted to Mr. Lawrence Wayne with Liberty EnviroLab in San Marcos, California. Mr. Wayne is a leading expert in trace evidence examination, including analysis for combustion product residues.

Analysis was performed for combustion products (char, ash, and soot) as well as identification of other particulates in the sample. The sum of char, ash, and soot as a percentage of the total particulate in a sample was reported and categorized as follows:

<1%	Typical
1-3%	Upper Background
4-9%	Atypical
10% or greater	Elevated

Sample locations were distributed throughout the school to be representative of different ventilation zones and room types. Surfaces were selected to include those that would be expected to undergo routine cleaning and those that could be overlooked or not included in cleaning procedures. Surfaces that would be routinely cleaned included desktops, countertops, windowsills, and other locations that would be frequently touched by students and staff. Tested surfaces that may not be routinely cleaned included tops of clocks, on top of rafters, ceiling tiles, in and behind storage bins, etc. Carpet samples included micro-vacuuming two square feet per sample, one square foot in a location with heavy foot traffic and the other in an area that may not be vacuumed regularly, such as between or behind furnishings.

Findings

Combustion products were not detected in 61 of the 73 samples. The remaining twelve samples had less than 1% char, which is considered a typical background concentration.

Based on these findings, the actions taken by BVSD during, and in response to, the Marshall fire were successful at preventing and removing wildfire residues from surfaces in the school. No further action is necessary.

TESTS FOR WILDFIRE RESIDUE ON SURFACES

Fireside Elementary School

1. INTRODUCTION

At the request of Boulder Valley School District (BVSD) surfacing testing for wildfire residues was performed by Ramboll US Consulting, Inc. (Ramboll) on April 21, 2023, at Fireside Elementary School (the school) located at 845 W. Dahlia Street, Louisville, Colorado. Sample collection was performed by Robert Rottersman, MS, CIH, Principal with Ramboll and Sam Reynolds, Consultant with Ramboll. A table that summarizes the results is provided in Appendix A, laboratory reports are included in Appendix B and photographs are in Appendix C.

BVSD contacted Ramboll and indicated that there have been concerns raised by community members regarding the possibility of wildfire residue from the Marshall Fire remaining on surfaces in Fireside Elementary School. BVSD asked Ramboll to develop and implement a testing protocol to screen for char, ash, and soot residue that may have originated from the Marshall Fire, on surfaces within the school.

The Marshall Fire began on December 30, 2021. It did extensive damage to the Superior and Louisville, Colorado area, including near Fireside Elementary School.

BVSD prepared for the fire by closing doors, windows, and outdoor air dampers for the school's ventilation systems. After the fire, BVSD performed restoration including air scrubbing using commercial and room size air filtration devices, professional cleaning of surfaces, and cleaning of internal components of the school's ventilation systems. Post remediation verification was performed by olfactory assessment supplemented by testing for airborne particulates and volatile organic compounds (VOCs) within the building,^{1,2}.

The actions taken by BVSD were reviewed by Clark Seif Clark (CSC), a firm with credentialed professionals and fire response experience. The specific actions performed by BVSD are outlined in CSC's report dated February 4, 2022³. CSC's report states *"Based on CSC's site visit and review of the Marshall Fire response activities by BVSD, the District has completed and continues to complete tasks to provide students and staff with an environment free from hazards at concentrations of concern, comfortable, better than outdoors and compliant with local, state and federal laws."*

In March 2022, BVSD performed testing of soil for metals outside Fireside Elementary School⁴. Results exhibited concentrations below United States Environmental Protection Agency (EPA) Regional Screening Levels (RSLs) for a residential scenario, Colorado Department of Public Health and Environment's (CDPHE) background threshold values or median concentrations for Colorado soils as determined by the state specific US Geological Survey (USGS). Additionally, BVSD provided Ramboll with results from samples for metals that were collected from surfaces inside two nearby homes. The data included in these reports showed that indoor surface contamination with metals was not a concern.

There are currently no regulatory requirements or methods for testing surfaces after fires. This protocol is based, in general, on information contained in the American Industrial Hygiene

¹ Quest Environmental Memorandum, Indoor Air Quality Assessment & Particulate Monitoring Related to Marshall Fire Fireside Elementary School – 845 W. Dahlia St., Louisville, CO 80027, January 11, 2021

² Quest Environmental Memorandum, Follow-Up Indoor Air Quality Assessment & Particulate Monitoring Related to Marshall Fire Fireside Elementary School – 845 W. Dahlia St., Louisville, CO 80027, January 25, 2021

³ CSC Preliminary Indoor Environmental Quality (IEQ) Opinions for Boulder Valley School District (BVSD) Related to the Marshall Fire Response at Eight District Schools, February 4, 2022

⁴ SGS North America, Inc. Report of Analysis, Boulder County – Marshall Fire Sampling, pages 15-17

TESTS FOR WILDFIRE RESIDUE ON SURFACES

Fireside Elementary School

Association's (AIHA) guideline for wildfire assessments⁵. While AIHA's guideline provides information on sampling strategy and techniques, it is not prescriptive.

The Marshall Fire occurred over one year prior to this assessment and the school has been under normal use and occupancy since that time. Dust accumulation on surfaces over time is normal and this dust would be expected to contain trace amounts of products from combustion unrelated to the Marshall Fire. Sources may include nearby fireplaces, cooking, grills, campfires, etc.

2. TESTING STRATEGY

Fireside Elementary School includes rooms with exterior walls, many with doors to the outside, as well as interior rooms that are contained within the building and do not share a wall with the outdoors. In general, exterior rooms with outside doors would be more likely to be affected by combustion products than interior rooms.

Ventilation for the school is provided by a series of air handling units (AHUs). Outdoor air intakes for these units are located on the roof. Some AHUs provide ventilation to both interior and exterior rooms. There are also AHUs that provide ventilation only to interior spaces including AHU 3 and AHU 7 that serve the library and gym, respectively.

The testing strategy was designed to collect samples from representative ventilation zones as well as a combination of rooms that have exterior walls and are interior only. This was done as an attempt to discern patterns. For example, if residue from the Marshall Fire is present in exterior rooms, but not interior room, that are served by the same AHU, then we may be able to conclude that combustion products entered through the exterior of the building, not ventilation systems, and recommend follow-up action accordingly.

Specific surfaces included in the testing were selected by Ramboll at the time of the assessment. These included a combination of frequently touched surfaces and surfaces that may not be routinely cleaned. Frequently touched surfaces included desks, shelves, windowsills, tables, etc. These are surfaces that children would likely contact daily. Surfaces that may not be routinely cleaned included shelves behind books/papers, ceiling tiles, tops of tall cabinets, tops of clocks, etc. Students would not be expected to touch these surfaces, but they also may have been overlooked during cleaning.

3. METHODOLOGY

Surface samples were collected using two methods including tape lifts from non-porous surfaces and micro-vac from carpeting and porous furnishings. An advantage of tape lift sampling is the method preserves the relative position of particulates as they are found on the surface. This is particularly important for this assessment as it may allow the analyst the ability to discern a pattern based on deposition of particles from a wildfire versus other combustion products that settled on the surface over time. Tape lifts are inefficient at removing particles from porous material, so the micro-vac technique was used to extract material that may be entrained in the carpet pile or fabric of the furnishing.

Tape lift samples were collected using ¾ inch Scotchtm transparent tape. The portion of tape exposed to the air was removed and discarded. A fresh, unexposed, portion of tape approximately 2 to 3 inches in length was applied, adhesive side down, to the surface to be tested. Light pressure was applied to the tape, which was then removed from the surface then placed, adhesive side down,

⁵ Technical Guide for Wildfire Impact Assessments for the OES Professional, AIHA, 2018

TESTS FOR WILDFIRE RESIDUE ON SURFACES

Fireside Elementary School

to a new glass microscope slide. The slide with the tape was labeled with a sample number and was inserted into a slide case.

Micro-vac samples were collected using 25-millimeter, two-piece cassettes containing a mixed cellulose ester (MCE) filter. The cassettes were equipped with a nozzle with a 45-degree inlet. The cassette was attached with tubing to a high-volume air pump that was calibrated to a flow rate of 20 liters of air per minute (lpm). For each sample location a 1 square foot template was placed on the surface. The cassette was opened, and pump was turned on. The nozzle of the cassette was passed over the surface in a zig-zag pattern 3 times, horizontally, vertically and at an angle. The pump was then turned off and inside of the cassette was viewed to ensure a sufficient amount of dust was captured. The cassette was then re-capped, labeled, and placed in a Ziplock plastic bag.

Carpet samples were collected as composite samples in each room. Each sample combined micro-vacuuming areas that would be expected to have normal foot traffic as well as areas that may not be routinely vacuumed, such as between furnishings and walls.

For quality control purposes, three blank samples, one of each brand of microscope slide and one micro-vac cassette were included with the samples that were collected.

Tape lift and micro-vac samples were shipped under chain of custody to Mr. Lawrence (Larry) Wayne with Liberty EnviroLab in San Marcos, California for analysis. Mr. Wayne is a leading expert in particle analysis, including trace evidence examination. He has personally analyzed over 200,000 samples for combustion product residues and was a technical peer reviewer of AIHA's guide for wildfire impact assessments.

Analysis was performed for combustion products (char, ash, and soot) as well as characterization of other particulates in the sample. The sum of char, ash, and soot as a percentage of the total particulate in a sample will be reported and categorized as follows:

<1%	Typical
1-3%	Upper Background
4-9%	Atypical
10% or greater	Elevated

4. RESULTS

A total of 73 samples were collected throughout the school including 54 tape-lifts and 19 micro-vacs.

Combustion products were not detected in 61 of the 73 samples. The remaining twelve samples had less than 1% char, which is considered a typical background concentration.

A variety of other particulate matter was present on the surfaces or in carpet and furnishings. The most identified particles included epithelial cells, which would be expected in an occupied building. Other material frequently identified included cellulose fibers, which are often from paper products, and soil minerals which can be blown or tracked in from outdoors.

TESTS FOR WILDFIRE RESIDUE ON SURFACES

Fireside Elementary School

5. CONCLUSIONS

Results of the sampling did not identify combustion products in most of the samples. Trace amounts of char were identified in a few samples, and these were all detected at less than 1% of the particles present on a surface which is consistent with typical background levels that would be expected in most buildings.

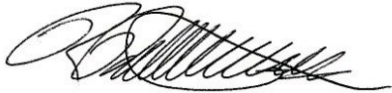
Based on these findings, the actions taken by BVSD during, and in response to, the Marshall Fire were successful at preventing and removing wildfire residues from surfaces in the school. No further action is necessary.

Test results are based on conditions present on the day of the survey.

Please contact our office if you have any questions regarding the above report. Ramboll thanks you for the opportunity to be of service.

Sincerely,

Ramboll US Consulting, Inc.



Robert B. Rottersman, MS, CIH

Principal

D 312.288.3857

rrottersman@ramboll.com

APPENDIX A
RESULTS TABLES

Surface Sampling Results
Boulder Valley School District - Fireside Elementary School - Louisville, Colorado

Sample ID	Room	Location	Sample Type	Combustion Products (% of Total Particulate)			Top 3 Particulates Types	
				Char (pyrolyzed plant material)	Plant Ash	Soot	Particulate Type	% of Total
MV-1	131	Floor carpet (Two 1 ft ² locations)	Micro-vac	ND	ND	ND	Epithelial cells (33 %) Cellulose fibers (30 %) Soil minerals (20 %)	
MV-2	131	Chair fabric (Two chairs, 1 ft ² each)	Micro-vac	< 1	ND	ND	Epithelial cells (40 %) Cellulose fibers (21 %) Soil minerals (16 %)	
MV-3	114	Floor carpet (Two 1 ft ² locations)	Micro-vac	ND	ND	ND	Epithelial cells (33 %) Cellulose fibers (31 %) Soil minerals (14 %)	
MV-4	117	Floor carpet (Two 1 ft ² locations)	Micro-vac	ND	ND	ND	Epithelial cells (30 %) Soil minerals (26 %) Cellulose fibers (23 %)	
MV-5	138	Floor carpet (Two 1 ft ² locations)	Micro-vac	ND	ND	ND	Cellulose fibers (29 %) Epithelial cells (24 %) Soil minerals (20 %)	
MV-6	151	Floor carpet (Two 1 ft ² locations)	Micro-vac	ND	ND	ND	Cellulose fibers (44 %) Epithelial cells (20 %) Soil minerals (17 %)	
MV-7	148	Floor carpet (Two 1 ft ² locations)	Micro-vac	< 1	ND	ND	Cellulose fibers (50 %) Epithelial cells (16 %) Soil minerals (14 %)	
MV-8	143 (Library)	Floor carpet (Two 1 ft ² locations)	Micro-vac	ND	ND	ND	Cellulose fibers (34 %) Soil minerals (24 %) Epithelial cells (19 %)	
MV-9	155	Floor carpet (Two 1 ft ² locations)	Micro-vac	< 1	ND	ND	Cellulose fibers (35 %) Soil minerals (30 %) Epithelial cells (15 %)	
MV-10	167	Floor carpet (Two 1 ft ² locations)	Micro-vac	ND	ND	ND	Cellulose fibers (31 %) Soil minerals (26 %) Epithelial cells (21 %)	
MV-11	Main Office (Front Desk Area)	Floor carpet (Two 1 ft ² locations)	Micro-vac	ND	ND	ND	Soil minerals (30 %) Cellulose fibers (28 %) Epithelial cells (18 %)	
MV-12	Main Office (Conference Room)	Floor carpet (Two 1 ft ² locations)	Micro-vac	ND	ND	ND	Cellulose fibers (37 %) Soil minerals (20 %) Epithelial cells (17 %)	

Surface Sampling Results
Boulder Valley School District - Fireside Elementary School - Louisville, Colorado

Sample ID	Room	Location	Sample Type	Combustion Products (% of Total Particulate)			Top 3 Particulates Types		
				Char (pyrolyzed plant material)	Plant Ash	Soot	Particulate Type	% of Total	
MV-13	195	Floor carpet (Two 1 ft ² locations)	Micro-vac	ND	ND	ND	Cellulose fibers (42 %)	Epithelial cells (17 %)	Soil minerals (17 %)
MV-14	188 (Art Room)	Floor carpet (Two 1 ft ² locations)	Micro-vac	ND	ND	ND	Cellulose fibers (41 %)	Epithelial cells (24 %)	Soil minerals (15 %)
MV-15	185	Floor carpet (Two 1 ft ² locations)	Micro-vac	ND	ND	ND	Cellulose fibers (46 %)	Soil minerals (19 %)	Epithelial cells (14 %)
MV-16	102 (Amphitheatre)	Floor carpet (Two 1 ft ² locations)	Micro-vac	ND	ND	ND	Cellulose fibers (41 %)	Soil minerals (20 %)	Epithelial cells (16 %)
MV-17	172 (Teacher's Lounge)	Floor carpet (Two 1 ft ² locations)	Micro-vac	< 1	ND	ND	Cellulose fibers (46 %)	Epithelial cells (16 %)	Soil minerals (12 %)
MV-18	139	Floor carpet (Two 1 ft ² locations)	Micro-vac	ND	ND	ND	Cellulose fibers (50 %)	Soil minerals (15 %)	Epithelial cells (12 %)
MV-19	139	Chair fabric (One chair, 1 ft ²)	Micro-vac	ND	ND	ND	Cellulose fibers (29 %)	Soil minerals (28 %)	Epithelial cells (20 %)
MV-20	Blank	Blank	Micro-vac	ND	ND	ND	No particulates detected		
T-1	131	Shelf by window	Tape lift	ND	ND	ND	No particulates detected		
T-2	131	Top of rafter	Tape lift	ND	ND	ND	Epithelial cells (51 %)	Cellulose fibers (21 %)	Soil minerals (8 %)
T-3	131	Ceiling tile	Tape lift	ND	ND	ND	Gypsum (26 %)	Paint (21 %)	Carbonate minerals (20 %)
T-4	114	Top of junction box	Tape lift	< 1	ND	ND	Epithelial cells (41 %)	Cellulose fibers (24 %)	Soil minerals (17 %)

Surface Sampling Results
Boulder Valley School District - Fireside Elementary School - Louisville, Colorado

Sample ID	Room	Location	Sample Type	Combustion Products (% of Total Particulate)			Top 3 Particulates Types		
				Char (pyrolyzed plant material)	Plant Ash	Soot	Particulate Type	% of Total	
T-5	114	Top of children's cabinet	Tape lift	ND	ND	ND	No particulates detected		
T-6	114	Inside child's storage cubby	Tape lift	ND	ND	ND	Cellulose fibers (41 %)	Epithelial cells (24 %)	Soil minerals (17 %)
T-7	117	Top of cabinets	Tape lift	< 1	ND	ND	Epithelial cells (47 %)	Cellulose fibers (18 %)	Soil minerals (15 %)
T-8	117	Teacher's desk	Tape lift	ND	ND	ND	No particulates detected		
T-9	138	Between bins in shelving unit	Tape lift	< 1	ND	ND	Paint (33 %)	Epithelial cells (31 %)	Soil minerals (12 %)
T-10	138	Top of light fixture	Tape lift	< 1	ND	ND	Epithelial cells (35 %)	Carbonate minerals (19 %)	Cellulose fibers (17 %)
T-11	138	Counter near sink	Tape lift	ND	ND	ND	No particulates detected		
T-12	151	Windowsill	Tape lift	ND	ND	ND	Epithelial cells (41 %)	Cellulose fibers (26 %)	Organic debris (12 %)
T-13	151	Top of clock	Tape lift	ND	ND	ND	Cellulose fibers (26 %)	Epithelial cells (22 %)	Soil minerals (21 %)
T-14	151	Inside pink cubby tote with books	Tape lift	ND	ND	ND	Epithelial cells (66 %)	Cellulose fibers (12 %)	Soil minerals (7 %)
T-15	148	Top of dry erase board	Tape lift	ND	ND	ND	No particulates detected		
T-16	148	Top of book shelf	Tape lift	ND	ND	ND	Epithelial cells (61 %)	Cellulose fibers (20 %)	Soil minerals (6 %)

Surface Sampling Results
Boulder Valley School District - Fireside Elementary School - Louisville, Colorado

Sample ID	Room	Location	Sample Type	Combustion Products (% of Total Particulate)			Top 3 Particulates Types	
				Char (pyrolyzed plant material)	Plant Ash	Soot	Particulate Type	% of Total
T-17	148	Ceiling tile at supply air diffuser	Tape lift	ND	ND	ND	Epithelial cells Cellulose fibers Paint	(36 %) (21 %) (11 %)
T-18	143 (Library)	Bookshelf (white)	Tape lift	ND	ND	ND	Cellulose fibers Epithelial cells	(95 %) (5 %)
T-19	143 (Library)	Bookshelf (brown)	Tape lift	ND	ND	ND	Cellulose fibers Epithelial cells	(92 %) (8 %)
T-20	143 (Library)	Top of skylight	Tape lift	ND	ND	ND	Epithelial cells Cellulose fibers Soil minerals	(39 %) (24 %) (15 %)
T-21	155	Desktop, center of room	Tape lift	ND	ND	ND	No particulates detected	
T-22	155	Supply air diffuser	Tape lift	ND	ND	ND	No particulates detected	
T-23	155	Inside bin on window ledge	Tape lift	ND	ND	ND	Epithelial cells Cellulose fibers Organic debris	(62 %) (12 %) (8 %)
T-24	167	Shelf by door	Tape lift	ND	ND	ND	Epithelial cells Cellulose fibers Paint	(56 %) (21 %) (12 %)
T-25	167	Teacher's desk	Tape lift	ND	ND	ND	Cellulose fibers Epithelial cells Organic debris	(54 %) (24 %) (7 %)
T-26	167	Rafter	Tape lift	< 1	ND	ND	Epithelial cells Cellulose fibers Organic debris	(43 %) (21 %) (7 %)
T-27	Main Office (Front Desk Area)	Top of cabinets	Tape lift	ND	ND	ND	Epithelial cells Cellulose fibers Organic debris	(70 %) (12 %) (5 %)
T-28	Main Office (Front Desk Area)	Behind computer monitors	Tape lift	ND	ND	ND	Epithelial cells Cellulose fibers Soil minerals	(73 %) (21 %) (3 %)

Surface Sampling Results
Boulder Valley School District - Fireside Elementary School - Louisville, Colorado

Sample ID	Room	Location	Sample Type	Combustion Products (% of Total Particulate)			Top 3 Particulates Types	
				Char (pyrolyzed plant material)	Plant Ash	Soot	Particulate Type	% of Total
T-29	Main Office (Work Room)	Top of mail shelf	Tape lift	< 1	ND	< 1	Epithelial cells Cellulose fibers Opaque (non-CP)	(51 %) (28 %) (6 %)
T-30	Main Office (Health Room)	Top of fridge	Tape lift	ND	ND	ND	Epithelial cells Cellulose fibers Soil minerals	(52 %) (17 %) (11 %)
T-31	212 (Cafeteria)	Cafeteria table	Tape lift	ND	ND	ND	No particulates detected	
T-32	212 (Cafeteria)	Cafeteria windowsill	Tape lift	ND	ND	ND	Epithelial cells Soil minerals Organic debris	(51 %) (17 %) (11 %)
T-33	215	Kitchen top of serving counter	Tape lift	ND	ND	ND	No particulates detected	
T-34	215	Kitchen top of oven	Tape lift	ND	ND	ND	Epithelial cells Cellulose fibers Organic debris	(55 %) (19 %) (8 %)
T-35	209 (Gym)	Stage floor	Tape lift	ND	ND	ND	Epithelial cells Cellulose fibers	(55 %) (45 %)
T-36	209 (Gym)	Top of "Bill the Box"	Tape lift	ND	ND	ND	Cellulose fibers Epithelial cells Organic debris	(38 %) (37 %) (7 %)
T-37	209 (Gym)	Office windowsill	Tape lift	ND	ND	ND	Epithelial cells Cellulose fibers Soil minerals	(49 %) (26 %) (7 %)
T-38	195	Top of dry erase board	Tape lift	ND	ND	ND	Epithelial cells Cellulose fibers Soil minerals	(74 %) (12 %) (4 %)
T-39	195	Desk top	Tape lift	ND	ND	ND	No particulates detected	
T-40	195	Inside bin	Tape lift	ND	ND	ND	Cellulose fibers Epithelial cells Soil minerals	(56 %) (37 %) (4 %)

Surface Sampling Results
Boulder Valley School District - Fireside Elementary School - Louisville, Colorado

Sample ID	Room	Location	Sample Type	Combustion Products (% of Total Particulate)			Top 3 Particulates Types	
				Char (pyrolyzed plant material)	Plant Ash	Soot	Particulate Type	% of Total
T-41	188 (Art Room)	Top of fire alarm	Tape lift	ND	ND	ND	Epithelial cells (43 %) Cellulose fibers (23 %) Soil minerals (7 %)	
T-42	188 (Art Room)	Top of cabinets	Tape lift	ND	ND	ND	Epithelial cells (44 %) Cellulose fibers (26 %) Soil minerals (9 %)	
T-43	188 (Art Room)	Counter top	Tape lift	ND	ND	ND	Paint (62 %) Carbonate minerals (19 %) Epithelial cells (11 %)	
T-44	185	Ceiling tile	Tape lift	ND	ND	ND	Paint (68 %) Soil minerals (17 %) Fibrous glass (15 %)	
T-45	185	Top of fridge	Tape lift	ND	ND	ND	Epithelial cells (55 %) Cellulose fibers (31 %) Soil minerals (10 %)	
T-46	185	Teacher's desk	Tape lift	ND	ND	ND	Epithelial cells (89 %) Cellulose fibers (8 %) Soil minerals (3 %)	
T-47	102 (Amphitheatre)	Top of cabinets	Tape lift	ND	ND	ND	Epithelial cells (36 %) Cellulose fibers (17 %) Soil minerals (16 %)	
T-48	102 (Amphitheatre)	Top of wall	Tape lift	< 1	ND	ND	Epithelial cells (59 %) Cellulose fibers (20 %) Soil minerals (6 %)	
T-49	102 (Amphitheatre)	Music stand	Tape lift	ND	ND	ND	No particulates detected	
T-50	172 (Teacher's Lounge)	Windowsill	Tape lift	ND	ND	ND	Epithelial cells (81 %) Organic debris (6 %) Cellulose fibers (5 %)	
T-51	172 (Teacher's Lounge)	Top of clock	Tape lift	< 1	ND	ND	Epithelial cells (33 %) Cellulose fibers (27 %) Soil minerals (24 %)	
T-52	139	Top of shelf	Tape lift	ND	ND	ND	Cellulose fibers (69 %) Epithelial cells (12 %) Carbonate minerals (7 %)	

Surface Sampling Results
Boulder Valley School District - Fireside Elementary School - Louisville, Colorado

Sample ID	Room	Location	Sample Type	Combustion Products (% of Total Particulate)			Top 3 Particulates Types	
				Char (pyrolyzed plant material)	Plant Ash	Soot	Particulate Type	% of Total
T-53	139	Inside bin	Tape lift	ND	ND	ND	Carbonate minerals (45 %) Epithelial cells (16 %) Cellulose fibers (15 %)	
T-54	139	Top of desk	Tape lift	ND	ND	ND	No particulates detected	
T-55	Blank	Non-frosted side of tape	Tape lift	ND	ND	ND	No particulates detected	
T-56	Blank	Frosted side of tape	Tape lift	ND	ND	ND	No particulates detected	

Notes:

Samples were analyzed by Liberty EnviroLab (San Marcos, CA).

All samples were collected on April 21, 2023 at Fireside Elementary School in Louisville, CO.

Combustion products (char, plant ash, and soot) are consistent with origination in wildfires.

ND = Not Detected

APPENDIX B
LABORATORY REPORTS

Laboratory Report
Wildfire Residue Analysis (Particulate)
by Polarized Light Microscopy (PLM)
 Settled Dust Analysis - Visual Area Estimation by %

Client Contact: Rob Rottersman
Company: Ramboll
Address: 1999 Broadway, Suite 2225
 Denver, CO 80202

Project #: BVSD - Fireside #1690030208
Project Site:

Date Received: 4/24/2023
Analyst: LW

Combustion Product Summary

Sample #	Lab #	Description	Char	Ash	Soot	Total %
T-1	109854	Room 131 - shelf by window	ND	ND	ND	ND
T-2	109855	Room 131 - top of rafter	ND	ND	ND	ND
T-3	109856	Room 131 - ceiling tile	ND	ND	ND	ND
T-4	109857	Room 114 - top of junction box	<1	ND	ND	<1
T-5	109858	Room 114 - top of children's cabinet	ND	ND	ND	ND
T-6	109859	Room 114 - inside child's storage cubby	ND	ND	ND	ND
T-7	109860	Room 117 - top of cabinets	<1	ND	ND	<1
T-8	109861	Room 117 - teacher's desk	ND	ND	ND	ND
T-9	109862	Room 138 - between bins in shelving unit	<1	ND	ND	<1
T-10	109863	Room 138 - top of light fixture	<1	ND	ND	<1

Level Concentrations:	<1%	Typical
	1 - 3%	Upper Background
	4 - 9%	Atypical
	10% or greater	Elevated

Total combustion product is the sum of the char, ash and soot percentages per sample.
 NOTE: Combustion products are consistent with origin in wildfires unless otherwise noted

Laboratory Report
Wildfire Residue Analysis (Particulate)
by Polarized Light Microscopy (PLM)
 Settled Dust Analysis - Visual Area Estimation by %

Client Contact: Rob Rottersman
Company: Ramboll
Address: 1999 Broadway, Suite 2225
 Denver, CO 80202

Project #: BVSD - Fireside #1690030208
Project Site:

Date Received: 4/24/2023
Analyst: LW

Combustion Product Summary

Sample #	Lab #	Description	Char	Ash	Soot	Total %
T-11	109864	Room 138 - counter near sink	ND	ND	ND	ND
T-12	109865	Room 151 - windowsill	ND	ND	ND	ND
T-13	109866	Room 151 - top of clock	ND	ND	ND	ND
T-14	109867	Room 151 - inside pink cubby tote with books	ND	ND	ND	ND
T-15	109868	Room 148 - top of dry erase board	ND	ND	ND	ND
T-16	109869	Room 148 - top of book shelf	ND	ND	ND	ND
T-17	109870	Room 148 - ceiling tile at supply air diffuser	ND	ND	ND	ND
T-18	109871	Room 143 - library bookshelf (white)	ND	ND	ND	ND
T-19	109872	Room 143 - library bookshelf (brown)	ND	ND	ND	ND
T-20	109873	Room 143 - library, top of skylight	ND	ND	ND	ND

Level Concentrations:	<1%	Typical
	1 - 3%	Upper Background
	4 - 9%	Atypical
	10% or greater	Elevated

Total combustion product is the sum of the char, ash and soot percentages per sample.
 NOTE: Combustion products are consistent with origin in wildfires unless otherwise noted

Laboratory Report
Wildfire Residue Analysis (Particulate)
by Polarized Light Microscopy (PLM)
 Settled Dust Analysis - Visual Area Estimation by %

Client Contact: Rob Rottersman
Company: Ramboll
Address: 1999 Broadway, Suite 2225
 Denver, CO 80202

Project #: BVSD - Fireside #1690030208
Project Site:

Date Received: 4/24/2023
Analyst: LW

Combustion Product Summary

Sample #	Lab #	Description	Char	Ash	Soot	Total %
T-21	109874	Room 155 - desktop center of room	ND	ND	ND	ND
T-22	109875	Room 155 - supply air diffuser	ND	ND	ND	ND
T-23	109876	Room 155 - inside bin on window ledge	ND	ND	ND	ND
T-24	109877	Room 167 - shelf by door	ND	ND	ND	ND
T-25	109878	Room 167 - teacher's desk	ND	ND	ND	ND
T-26	109879	Room 167 - rafter	<1	ND	ND	<1
T-27	109880	Main Office - front desk top of cabinets	ND	ND	ND	ND
T-28	109881	Main Office - behind comp monitors front desk	ND	ND	ND	ND
T-29	109882	Main Office - work room top of mail shelf	<1	ND	<1	<1
T-30	109883	Main Office - health room top of fridge	ND	ND	ND	ND

Level Concentrations:	<1%	Typical
	1 - 3%	Upper Background
	4 - 9%	Atypical
	10% or greater	Elevated

Total combustion product is the sum of the char, ash and soot percentages per sample.
 NOTE: Combustion products are consistent with origin in wildfires unless otherwise noted

Laboratory Report
Wildfire Residue Analysis (Particulate)
by Polarized Light Microscopy (PLM)
 Settled Dust Analysis - Visual Area Estimation by %

Client Contact: Rob Rottersman
Company: Ramboll
Address: 1999 Broadway, Suite 2225
 Denver, CO 80202

Project #: BVSD - Fireside #1690030208
Project Site:

Date Received: 4/24/2023
Analyst: LW

Combustion Product Summary

Sample #	Lab #	Description	Char	Ash	Soot	Total %
T-31	109884	Room 212 - cafeteria table	ND	ND	ND	ND
T-32	109885	Room 212 - cafeteria windowsill	ND	ND	ND	ND
T-33	109886	Room 215 - kitchen top of serving counter	ND	ND	ND	ND
T-34	109887	Room 215 - kitchen top of oven	ND	ND	ND	ND
T-35	109888	Gym - stage floor	ND	ND	ND	ND
T-36	109889	Gym - top of "Bill the Box"	ND	ND	ND	ND
T-37	109890	Gym - office windowsill	ND	ND	ND	ND
T-38	109891	Room 195 - top of dry erase board	ND	ND	ND	ND
T-39	109892	Room 195 - desk top	ND	ND	ND	ND
T-40	109893	Room 195 - inside bin	ND	ND	ND	ND

Level Concentrations:	<1%	Typical
	1 - 3%	Upper Background
	4 - 9%	Atypical
	10% or greater	Elevated

Total combustion product is the sum of the char, ash and soot percentages per sample.
 NOTE: Combustion products are consistent with origin in wildfires unless otherwise noted

Laboratory Report
Wildfire Residue Analysis (Particulate)
by Polarized Light Microscopy (PLM)
 Settled Dust Analysis - Visual Area Estimation by %

Client Contact: Rob Rottersman
Company: Ramboll
Address: 1999 Broadway, Suite 2225
 Denver, CO 80202

Project #: BVSD - Fireside #1690030208
Project Site:

Date Received: 4/24/2023
Analyst: LW

Combustion Product Summary

Sample #	Lab #	Description	Char	Ash	Soot	Total %
T-41	109894	Art Room - top of fire alarm	ND	ND	ND	ND
T-42	109895	Art Room - top of cabinets	ND	ND	ND	ND
T-43	109896	Art Room - counter top	ND	ND	ND	ND
T-44	109897	Room 185 - ceiling tile	ND	ND	ND	ND
T-45	109898	Room 185 - top of fridge	ND	ND	ND	ND
T-46	109899	Room 185 - teacher's desk	ND	ND	ND	ND
T-47	109900	Amphitheater - top of cabinets	ND	ND	ND	ND
T-48	109901	Amphitheater - top of wall	<1	ND	ND	<1
T-49	109902	Amphitheater - music stand	ND	ND	ND	ND
T-50	109903	Room 172 - windowsill	ND	ND	ND	ND

Level Concentrations:	<1%	Typical
	1 - 3%	Upper Background
	4 - 9%	Atypical
	10% or greater	Elevated

Total combustion product is the sum of the char, ash and soot percentages per sample.
 NOTE: Combustion products are consistent with origin in wildfires unless otherwise noted

Laboratory Report
Wildfire Residue Analysis (Particulate)
by Polarized Light Microscopy (PLM)
 Settled Dust Analysis - Visual Area Estimation by %

Client Contact: Rob Rottersman
Company: Ramboll
Address: 1999 Broadway, Suite 2225
 Denver, CO 80202

Project #: BVSD - Fireside #1690030208
Project Site:

Date Received: 4/24/2023
Analyst: LW

Combustion Product Summary

Sample #	Lab #	Description	Char	Ash	Soot	Total %
T-51	109904	Room 172 - top of clock	<1	ND	ND	<1
T-52	109905	Room 139 - top of shelf	ND	ND	ND	ND
T-53	109906	Room 139 - inside bin	ND	ND	ND	ND
T-54	109907	Room 139 - desk top	ND	ND	ND	ND
T-55	109908	Blank - non-frosted slide	ND	ND	ND	ND
T-56	109909	Blank - frosted slide	ND	ND	ND	ND

Level Concentrations:	<1%	Typical
	1 - 3%	Upper Background
	4 - 9%	Atypical
	10% or greater	Elevated

Total combustion product is the sum of the char, ash and soot percentages per sample.
 NOTE: Combustion products are consistent with origin in wildfires unless otherwise noted

Laboratory Report
Wildfire Residue Analysis (Particulate)
by Polarized Light Microscopy (PLM)

Detail Page

Client Contact: Rob Rottersman
Company: Ramboll
Address: 1999 Broadway, Suite 2225
 Denver, CO 80202

Project #: BVSD - Fireside #1690030208
Project Site:

Date Received: 4/24/2023
Analyst: LW

Sample #	Lab #	Description	Loading
T-1	109854	Room 131 - shelf by window	Blank

Char (pyrolyzed plant material)	ND
Plant ash	ND
Soot	ND

Total combustion product consistent with origination in wildfire ND

Sample #	Lab #	Description	Loading
T-2	109855	Room 131 - top of rafter	Light

Epithelial cells	51
Cellulose fibers	21
Soil minerals	8
Organic debris	6
Paint	5
Other	5
Opaque (non-CP)	4

Char (pyrolyzed plant material)	ND
Plant ash	ND
Soot	ND

Total combustion product consistent with origination in wildfire ND

Laboratory Report
Wildfire Residue Analysis (Particulate)
by Polarized Light Microscopy (PLM)

Detail Page

Client Contact: Rob Rottersman
Company: Ramboll
Address: 1999 Broadway, Suite 2225
 Denver, CO 80202

Project #: BVSD - Fireside #1690030208
Project Site:

Date Received: 4/24/2023
Analyst: LW

Sample #	Lab #	Description	Loading
T-3	109856	Room 131 - ceiling tile	Light
		Gypsum	26
		Paint	21
		Carbonate minerals	20
		Soil minerals	15
		Fibrous glass	13
		Other	5

Char (pyrolyzed plant material)	ND
Plant ash	ND
Soot	ND

Total combustion product consistent with origination in wildfire ND

Sample #	Lab #	Description	Loading
T-4	109857	Room 114 - top of junction box	Moderate
		Epithelial cells	41
		Cellulose fibers	24
		Soil minerals	17
		Organic debris	6
		Other	5
		Opaque (non-CP)	4
		Paint	3

Char (pyrolyzed plant material)	<1
Plant ash	ND
Soot	ND

Total combustion product consistent with origination in wildfire <1

Laboratory Report
Wildfire Residue Analysis (Particulate)
by Polarized Light Microscopy (PLM)

Detail Page

Client Contact: Rob Rottersman
Company: Ramboll
Address: 1999 Broadway, Suite 2225
 Denver, CO 80202

Project #: BVSD - Fireside #1690030208
Project Site:

Date Received: 4/24/2023
Analyst: LW

Sample #	Lab #	Description	Loading
T-5	109858	Room 114 - top of children's cabinet	Blank

Char (pyrolyzed plant material)	ND
Plant ash	ND
Soot	ND

Total combustion product consistent with origination in wildfire ND

Sample #	Lab #	Description	Loading
T-6	109859	Room 114 - inside child's storage cubby	Light

Cellulose fibers	41
Epithelial cells	24
Soil minerals	17
Organic debris	8
Other	4
Opaque (non-CP)	3
Paint	3

Char (pyrolyzed plant material)	ND
Plant ash	ND
Soot	ND

Total combustion product consistent with origination in wildfire ND

Laboratory Report
Wildfire Residue Analysis (Particulate)
by Polarized Light Microscopy (PLM)

Detail Page

Client Contact: Rob Rottersman
Company: Ramboll
Address: 1999 Broadway, Suite 2225
 Denver, CO 80202

Project #: BVSD - Fireside #1690030208
Project Site:

Date Received: 4/24/2023
Analyst: LW

Sample #	Lab #	Description	Loading
T-7	109860	Room 117 - top of cabinets	Light
		Epithelial cells	47
		Cellulose fibers	18
		Soil minerals	15
		Organic debris	6
		Paint	5
		Other	5
		Opaque (non-CP)	4

Char (pyrolyzed plant material)	<1
Plant ash	ND
Soot	ND

Total combustion product consistent with origination in wildfire <1

Sample #	Lab #	Description	Loading
T-8	109861	Room 117 - teacher's desk	Blank

Char (pyrolyzed plant material)	ND
Plant ash	ND
Soot	ND

Total combustion product consistent with origination in wildfire ND

Laboratory Report
Wildfire Residue Analysis (Particulate)
by Polarized Light Microscopy (PLM)

Detail Page

Client Contact: Rob Rottersman
Company: Ramboll
Address: 1999 Broadway, Suite 2225
 Denver, CO 80202

Project #: BVSD - Fireside #1690030208
Project Site:

Date Received: 4/24/2023
Analyst: LW

Sample #	Lab #	Description	Loading
T-9	109862	Room 138 - between bins in shelving unit	Light
		Paint	33
		Epithelial cells	31
		Soil minerals	12
		Cellulose fibers	10
		Organic debris	8
		Other	4
		Opaque (non-CP)	2

Char (pyrolyzed plant material)	<1
Plant ash	ND
Soot	ND

Total combustion product consistent with origination in wildfire <1

Sample #	Lab #	Description	Loading
T-10	109863	Room 138 - top of light fixture	Moderate
		Epithelial cells	35
		Carbonate minerals	19
		Cellulose fibers	17
		Paint	12
		Soil minerals	8
		Other	5
		Opaque (non-CP)	4

Char (pyrolyzed plant material)	<1
Plant ash	ND
Soot	ND

Total combustion product consistent with origination in wildfire <1

Laboratory Report
Wildfire Residue Analysis (Particulate)
by Polarized Light Microscopy (PLM)

Detail Page

Client Contact: Rob Rottersman
Company: Ramboll
Address: 1999 Broadway, Suite 2225
 Denver, CO 80202

Project #: BVSD - Fireside #1690030208
Project Site:

Date Received: 4/24/2023
Analyst: LW

Sample #	Lab #	Description	Loading
T-11	109864	Room 138 - counter near sink	Blank

Char (pyrolyzed plant material)	ND
Plant ash	ND
Soot	ND

Total combustion product consistent with origination in wildfire ND

Sample #	Lab #	Description	Loading
T-12	109865	Room 151 - windowsill	Very Light

Epithelial cells	41
Cellulose fibers	26
Organic debris	12
Opaque (non-CP)	8
Soil minerals	8
Other	5

Char (pyrolyzed plant material)	ND
Plant ash	ND
Soot	ND

Total combustion product consistent with origination in wildfire ND

Laboratory Report
Wildfire Residue Analysis (Particulate)
by Polarized Light Microscopy (PLM)

Detail Page

Client Contact: Rob Rottersman
Company: Ramboll
Address: 1999 Broadway, Suite 2225
Denver, CO 80202

Project #: BVSD - Fireside #1690030208
Project Site:

Date Received: 4/24/2023
Analyst: LW

Sample #	Lab #	Description	Loading
T-13	109866	Room 151 - top of clock	Moderate
		Cellulose fibers	26
		Epithelial cells	22
		Soil minerals	21
		Carbonate minerals	14
		Organic debris	8
		Other	5
		Opaque (non-CP)	4

Char (pyrolyzed plant material)	ND
Plant ash	ND
Soot	ND

Total combustion product consistent with origination in wildfire ND

Sample #	Lab #	Description	Loading
T-14	109867	Room 151 - inside pink cubby tote with books	Light
		Epithelial cells	66
		Cellulose fibers	12
		Soil minerals	7
		Organic debris	6
		Other	5
		Opaque (non-CP)	4

Char (pyrolyzed plant material)	ND
Plant ash	ND
Soot	ND

Total combustion product consistent with origination in wildfire ND

Laboratory Report
Wildfire Residue Analysis (Particulate)
by Polarized Light Microscopy (PLM)

Detail Page

Client Contact: Rob Rottersman
Company: Ramboll
Address: 1999 Broadway, Suite 2225
 Denver, CO 80202

Project #: BVSD - Fireside #1690030208
Project Site:

Date Received: 4/24/2023
Analyst: LW

Sample #	Lab #	Description	Loading
T-15	109868	Room 148 - top of dry erase board	Blank

Char (pyrolyzed plant material)	ND
Plant ash	ND
Soot	ND

Total combustion product consistent with origination in wildfire ND

Sample #	Lab #	Description	Loading
T-16	109869	Room 148 - top of book shelf	Moderate

Epithelial cells	61
Cellulose fibers	20
Soil minerals	6
Organic debris	5
Other	5
Opaque (non-CP)	3

Char (pyrolyzed plant material)	ND
Plant ash	ND
Soot	ND

Total combustion product consistent with origination in wildfire ND

Laboratory Report
Wildfire Residue Analysis (Particulate)
by Polarized Light Microscopy (PLM)

Detail Page

Client Contact: Rob Rottersman
Company: Ramboll
Address: 1999 Broadway, Suite 2225
 Denver, CO 80202

Project #: BVSD - Fireside #1690030208
Project Site:

Date Received: 4/24/2023
Analyst: LW

Sample #	Lab #	Description	Loading
T-17	109870	Room 148 - ceiling tile at supply air diffuser	Moderate
		Epithelial cells	36
		Cellulose fibers	21
		Paint	11
		Soil minerals	10
		Organic debris	7
		Carbonate minerals	6
		Other	5
		Opaque (non-CP)	4
		Char (pyrolyzed plant material)	ND
		Plant ash	ND
		Soot	ND

Total combustion product consistent with origination in wildfire ND

Sample #	Lab #	Description	Loading
T-18	109871	Room 143 - library bookshelf (white)	Ext. Light
		Cellulose fibers	95
		Epithelial cells	5

		Char (pyrolyzed plant material)	ND
		Plant ash	ND
		Soot	ND

Total combustion product consistent with origination in wildfire ND

Laboratory Report
Wildfire Residue Analysis (Particulate)
by Polarized Light Microscopy (PLM)

Detail Page

Client Contact: Rob Rottersman
Company: Ramboll
Address: 1999 Broadway, Suite 2225
Denver, CO 80202

Project #: BVSD - Fireside #1690030208
Project Site:

Date Received: 4/24/2023
Analyst: LW

Sample #	Lab #	Description	Loading
T-19	109872	Room 143 - library bookshelf (brown)	Ext. Light
		Cellulose fibers	92
		Epithelial cells	8

Char (pyrolyzed plant material)	ND
Plant ash	ND
Soot	ND

Total combustion product consistent with origination in wildfire ND

Sample #	Lab #	Description	Loading
T-20	109873	Room 143 - library, top of skylight	Moderate
		Epithelial cells	39
		Cellulose fibers	24
		Soil minerals	15
		Organic debris	8
		Opaque (non-CP)	6
		Other	5
		Carbonate minerals	3

Char (pyrolyzed plant material)	ND
Plant ash	ND
Soot	ND

Total combustion product consistent with origination in wildfire ND

Laboratory Report
Wildfire Residue Analysis (Particulate)
by Polarized Light Microscopy (PLM)

Detail Page

Client Contact: Rob Rottersman
Company: Ramboll
Address: 1999 Broadway, Suite 2225
 Denver, CO 80202

Project #: BVSD - Fireside #1690030208
Project Site:

Date Received: 4/24/2023
Analyst: LW

Sample #	Lab #	Description	Loading
T-21	109874	Room 155 - desktop center of room	Blank

Char (pyrolyzed plant material)	ND
Plant ash	ND
Soot	ND

Total combustion product consistent with origination in wildfire ND

Sample #	Lab #	Description	Loading
T-22	109875	Room 155 - supply air diffuser	Blank

Char (pyrolyzed plant material)	ND
Plant ash	ND
Soot	ND

Total combustion product consistent with origination in wildfire ND

Laboratory Report
Wildfire Residue Analysis (Particulate)
by Polarized Light Microscopy (PLM)

Detail Page

Client Contact: Rob Rottersman
Company: Ramboll
Address: 1999 Broadway, Suite 2225
Denver, CO 80202

Project #: BVSD - Fireside #1690030208
Project Site:

Date Received: 4/24/2023
Analyst: LW

Sample #	Lab #	Description	Loading
T-23	109876	Room 155 - inside bin on window ledge	Light
		Epithelial cells	62
		Cellulose fibers	12
		Organic debris	8
		Soil minerals	8
		Opaque (non-CP)	6
		Other	4

Char (pyrolyzed plant material)	ND
Plant ash	ND
Soot	ND

Total combustion product consistent with origination in wildfire ND

Sample #	Lab #	Description	Loading
T-24	109877	Room 167 - shelf by door	Light
		Epithelial cells	56
		Cellulose fibers	21
		Paint	12
		Other	5
		Opaque (non-CP)	3
		Soil minerals	3

Char (pyrolyzed plant material)	ND
Plant ash	ND
Soot	ND

Total combustion product consistent with origination in wildfire ND

Laboratory Report
Wildfire Residue Analysis (Particulate)
by Polarized Light Microscopy (PLM)

Detail Page

Client Contact: Rob Rottersman
Company: Ramboll
Address: 1999 Broadway, Suite 2225
 Denver, CO 80202

Project #: BVSD - Fireside #1690030208
Project Site:

Date Received: 4/24/2023
Analyst: LW

Sample #	Lab #	Description	Loading
T-25	109878	Room 167 - teacher's desk	Moderate
		Cellulose fibers	54
		Epithelial cells	24
		Organic debris	7
		Soil minerals	6
		Opaque (non-CP)	5
		Other	4

Char (pyrolyzed plant material)	ND
Plant ash	ND
Soot	ND

Total combustion product consistent with origination in wildfire ND

Sample #	Lab #	Description	Loading
T-26	109879	Room 167 - rafter	Moderate
		Epithelial cells	43
		Cellulose fibers	21
		Organic debris	7
		Paint	6
		Pollen	6
		Soil minerals	5
		Other	5
		Opaque (non-CP)	4
		Carbonate minerals	3

Char (pyrolyzed plant material)	<1
Plant ash	ND
Soot	ND

Total combustion product consistent with origination in wildfire <1

Laboratory Report
Wildfire Residue Analysis (Particulate)
by Polarized Light Microscopy (PLM)

Detail Page

Client Contact: Rob Rottersman
Company: Ramboll
Address: 1999 Broadway, Suite 2225
Denver, CO 80202

Project #: BVSD - Fireside #1690030208
Project Site:

Date Received: 4/24/2023
Analyst: LW

Sample #	Lab #	Description	Loading
T-27	109880	Main Office - front desk top of cabinets	Moderate
		Epithelial cells	70
		Cellulose fibers	12
		Organic debris	5
		Soil minerals	5
		Other	5
		Opaque (non-CP)	3

Char (pyrolyzed plant material)	ND
Plant ash	ND
Soot	ND

Total combustion product consistent with origination in wildfire ND

Sample #	Lab #	Description	Loading
T-28	109881	Main Office - behind comp monitors front desk	Light
		Epithelial cells	73
		Cellulose fibers	21
		Soil minerals	3
		Other	3

Char (pyrolyzed plant material)	ND
Plant ash	ND
Soot	ND

Total combustion product consistent with origination in wildfire ND

Laboratory Report
Wildfire Residue Analysis (Particulate)
by Polarized Light Microscopy (PLM)

Detail Page

Client Contact: Rob Rottersman
Company: Ramboll
Address: 1999 Broadway, Suite 2225
 Denver, CO 80202

Project #: BVSD - Fireside #1690030208
Project Site:

Date Received: 4/24/2023
Analyst: LW

Sample #	Lab #	Description	Loading
T-29	109882	Main Office - work room top of mail shelf	Light
		Epithelial cells	51
		Cellulose fibers	28
		Opaque (non-CP)	6
		Soil minerals	6
		Other	5
		Organic debris	4

Char (pyrolyzed plant material)	<1
Plant ash	ND
Soot	<1

Total combustion product consistent with origination in wildfire <1

Sample #	Lab #	Description	Loading
T-30	109883	Main Office - health room top of fridge	Light
		Epithelial cells	52
		Cellulose fibers	17
		Soil minerals	11
		Organic debris	7
		Opaque (non-CP)	5
		Other	5
		Paint	3

Char (pyrolyzed plant material)	ND
Plant ash	ND
Soot	ND

Total combustion product consistent with origination in wildfire ND

Laboratory Report
Wildfire Residue Analysis (Particulate)
by Polarized Light Microscopy (PLM)

Detail Page

Client Contact: Rob Rottersman
Company: Ramboll
Address: 1999 Broadway, Suite 2225
 Denver, CO 80202

Project #: BVSD - Fireside #1690030208
Project Site:

Date Received: 4/24/2023
Analyst: LW

Sample #	Lab #	Description	Loading
T-31	109884	Room 212 - cafeteria table	Blank

Char (pyrolyzed plant material)	ND
Plant ash	ND
Soot	ND

Total combustion product consistent with origination in wildfire ND

Sample #	Lab #	Description	Loading
T-32	109885	Room 212 - cafeteria windowsill	Light

Epithelial cells	51
Soil minerals	17
Organic debris	11
Opaque (non-CP)	6
Paint	6
Other	5
Cellulose fibers	4

Char (pyrolyzed plant material)	ND
Plant ash	ND
Soot	ND

Total combustion product consistent with origination in wildfire ND

Laboratory Report
Wildfire Residue Analysis (Particulate)
by Polarized Light Microscopy (PLM)

Detail Page

Client Contact: Rob Rottersman
Company: Ramboll
Address: 1999 Broadway, Suite 2225
 Denver, CO 80202

Project #: BVSD - Fireside #1690030208
Project Site:

Date Received: 4/24/2023
Analyst: LW

Sample #	Lab #	Description	Loading
T-33	109886	Room 215 - kitchen top of serving counter	Blank

Char (pyrolyzed plant material)	ND
Plant ash	ND
Soot	ND

Total combustion product consistent with origination in wildfire ND

Sample #	Lab #	Description	Loading
T-34	109887	Room 215 - kitchen top of oven	Light

Epithelial cells	55
Cellulose fibers	19
Organic debris	8
Soil minerals	7
Opaque (non-CP)	6
Other	5

Char (pyrolyzed plant material)	ND
Plant ash	ND
Soot	ND

Total combustion product consistent with origination in wildfire ND

Laboratory Report
Wildfire Residue Analysis (Particulate)
by Polarized Light Microscopy (PLM)

Detail Page

Client Contact: Rob Rottersman
Company: Ramboll
Address: 1999 Broadway, Suite 2225
Denver, CO 80202

Project #: BVSD - Fireside #1690030208
Project Site:

Date Received: 4/24/2023
Analyst: LW

Sample #	Lab #	Description	Loading
T-35	109888	Gym - stage floor	Ext. Light
		Epithelial cells	55
		Cellulose fibers	45

Char (pyrolyzed plant material)	ND
Plant ash	ND
Soot	ND

Total combustion product consistent with origination in wildfire ND

Sample #	Lab #	Description	Loading
T-36	109889	Gym - top of "Bill the Box"	Light
		Cellulose fibers	38
		Epithelial cells	37
		Organic debris	7
		Carbonate minerals	5
		Soil minerals	5
		Opaque (non-CP)	4
		Other	4

Char (pyrolyzed plant material)	ND
Plant ash	ND
Soot	ND

Total combustion product consistent with origination in wildfire ND

Laboratory Report
Wildfire Residue Analysis (Particulate)
by Polarized Light Microscopy (PLM)

Detail Page

Client Contact: Rob Rottersman
Company: Ramboll
Address: 1999 Broadway, Suite 2225
 Denver, CO 80202

Project #: BVSD - Fireside #1690030208
Project Site:

Date Received: 4/24/2023
Analyst: LW

Sample #	Lab #	Description	Loading
T-37	109890	Gym - office windowsill	Light
		Epithelial cells	49
		Cellulose fibers	26
		Soil minerals	7
		Organic debris	5
		Carbonate minerals	5
		Other	5
		Opaque (non-CP)	3

Char (pyrolyzed plant material)	ND
Plant ash	ND
Soot	ND

Total combustion product consistent with origination in wildfire ND

Sample #	Lab #	Description	Loading
T-38	109891	Room 195 - top of dry erase board	Light
		Epithelial cells	74
		Cellulose fibers	12
		Soil minerals	4
		Other	4
		Opaque (non-CP)	3
		Organic debris	3

Char (pyrolyzed plant material)	ND
Plant ash	ND
Soot	ND

Total combustion product consistent with origination in wildfire ND

Laboratory Report
Wildfire Residue Analysis (Particulate)
by Polarized Light Microscopy (PLM)

Detail Page

Client Contact: Rob Rottersman
Company: Ramboll
Address: 1999 Broadway, Suite 2225
 Denver, CO 80202

Project #: BVSD - Fireside #1690030208
Project Site:

Date Received: 4/24/2023
Analyst: LW

Sample #	Lab #	Description	Loading
T-39	109892	Room 195 - desk top	Blank

Char (pyrolyzed plant material)	ND
Plant ash	ND
Soot	ND

Total combustion product consistent with origination in wildfire ND

Sample #	Lab #	Description	Loading
T-40	109893	Room 195 - inside bin	Ext. Light

Cellulose fibers	56
Epithelial cells	37
Soil minerals	4
Other	3

Char (pyrolyzed plant material)	ND
Plant ash	ND
Soot	ND

Total combustion product consistent with origination in wildfire ND

Laboratory Report
Wildfire Residue Analysis (Particulate)
by Polarized Light Microscopy (PLM)

Detail Page

Client Contact: Rob Rottersman
Company: Ramboll
Address: 1999 Broadway, Suite 2225
 Denver, CO 80202

Project #: BVSD - Fireside #1690030208
Project Site:

Date Received: 4/24/2023
Analyst: LW

Sample #	Lab #	Description	Loading
T-41	109894	Art Room - top of fire alarm	Moderate
Epithelial cells			43
Cellulose fibers			23
Soil minerals			7
Organic debris			6
Carbonate minerals			5
Other			5
Opaque (non-CP)			4
Paint			4
Fibrous glass			3

Char (pyrolyzed plant material)	ND
Plant ash	ND
Soot	ND

Total combustion product consistent with origination in wildfire ND

Sample #	Lab #	Description	Loading
T-42	109895	Art Room - top of cabinets	Moderate
Epithelial cells			44
Cellulose fibers			26
Soil minerals			9
Organic debris			6
Opaque (non-CP)			5
Carbonate minerals			5
Other			5

Char (pyrolyzed plant material)	ND
Plant ash	ND
Soot	ND

Total combustion product consistent with origination in wildfire ND

Laboratory Report
Wildfire Residue Analysis (Particulate)
by Polarized Light Microscopy (PLM)

Detail Page

Client Contact: Rob Rottersman
Company: Ramboll
Address: 1999 Broadway, Suite 2225
 Denver, CO 80202

Project #: BVSD - Fireside #1690030208
Project Site:

Date Received: 4/24/2023
Analyst: LW

Sample #	Lab #	Description	Loading
T-43	109896	Art Room - counter top	Very Light
		Paint	62
		Carbonate minerals	19
		Epithelial cells	11
		Organic debris	5
		Opaque (non-CP)	3

Char (pyrolyzed plant material)	ND
Plant ash	ND
Soot	ND

Total combustion product consistent with origination in wildfire ND

Sample #	Lab #	Description	Loading
T-44	109897	Room 185 - ceiling tile	Ext. Light
		Paint	68
		Soil minerals	17
		Fibrous glass	15

Char (pyrolyzed plant material)	ND
Plant ash	ND
Soot	ND

Total combustion product consistent with origination in wildfire ND

Laboratory Report
Wildfire Residue Analysis (Particulate)
by Polarized Light Microscopy (PLM)

Detail Page

Client Contact: Rob Rottersman
Company: Ramboll
Address: 1999 Broadway, Suite 2225
 Denver, CO 80202

Project #: BVSD - Fireside #1690030208
Project Site:

Date Received: 4/24/2023
Analyst: LW

Sample #	Lab #	Description	Loading
T-45	109898	Room 185 - top of fridge	Ext. Light
		Epithelial cells	55
		Cellulose fibers	31
		Soil minerals	10
		Opaque (non-CP)	4

Char (pyrolyzed plant material)	ND
Plant ash	ND
Soot	ND

Total combustion product consistent with origination in wildfire ND

Sample #	Lab #	Description	Loading
T-46	109899	Room 185 - teacher's desk	Ext. Light
		Epithelial cells	89
		Cellulose fibers	8
		Soil minerals	3

Char (pyrolyzed plant material)	ND
Plant ash	ND
Soot	ND

Total combustion product consistent with origination in wildfire ND

Laboratory Report
Wildfire Residue Analysis (Particulate)
by Polarized Light Microscopy (PLM)

Detail Page

Client Contact: Rob Rottersman
Company: Ramboll
Address: 1999 Broadway, Suite 2225
 Denver, CO 80202

Project #: BVSD - Fireside #1690030208
Project Site:

Date Received: 4/24/2023
Analyst: LW

Sample #	Lab #	Description	Loading
T-47	109900	Amphitheater - top of cabinets	Moderate
		Epithelial cells	36
		Cellulose fibers	17
		Soil minerals	16
		Carbonate minerals	9
		Organic debris	6
		Other	5
		Opaque (non-CP)	4
		Paint	4
		Pollen	3

Char (pyrolyzed plant material)	ND
Plant ash	ND
Soot	ND

Total combustion product consistent with origination in wildfire ND

Sample #	Lab #	Description	Loading
T-48	109901	Amphitheater - top of wall	Moderate
		Epithelial cells	59
		Cellulose fibers	20
		Soil minerals	6
		Organic debris	5
		Other	5
		Opaque (non-CP)	3
		Carbonate minerals	2

Char (pyrolyzed plant material)	<1
Plant ash	ND
Soot	ND

Total combustion product consistent with origination in wildfire <1

Laboratory Report
Wildfire Residue Analysis (Particulate)
by Polarized Light Microscopy (PLM)

Detail Page

Client Contact: Rob Rottersman
Company: Ramboll
Address: 1999 Broadway, Suite 2225
 Denver, CO 80202

Project #: BVSD - Fireside #1690030208
Project Site:

Date Received: 4/24/2023
Analyst: LW

Sample #	Lab #	Description	Loading
T-49	109902	Amphitheater - music stand	Blank

Char (pyrolyzed plant material)	ND
Plant ash	ND
Soot	ND

Total combustion product consistent with origination in wildfire ND

Sample #	Lab #	Description	Loading
T-50	109903	Room 172 - windowsill	Ext. Light

Epithelial cells	81
Organic debris	6
Cellulose fibers	5
Soil minerals	3
Other	3
Opaque (non-CP)	2

Char (pyrolyzed plant material)	ND
Plant ash	ND
Soot	ND

Total combustion product consistent with origination in wildfire ND

Laboratory Report
Wildfire Residue Analysis (Particulate)
by Polarized Light Microscopy (PLM)

Detail Page

Client Contact: Rob Rottersman
Company: Ramboll
Address: 1999 Broadway, Suite 2225
 Denver, CO 80202

Project #: BVSD - Fireside #1690030208
Project Site:

Date Received: 4/24/2023
Analyst: LW

Sample #	Lab #	Description	Loading
T-51	109904	Room 172 - top of clock	Moderate

Epithelial cells	33
Cellulose fibers	27
Soil minerals	24
Opaque (non-CP)	6
Organic debris	5
Other	5

Char (pyrolyzed plant material)	<1
Plant ash	ND
Soot	ND

Total combustion product consistent with origination in wildfire <1

Sample #	Lab #	Description	Loading
T-52	109905	Room 139 - top of shelf	Moderate

Cellulose fibers	69
Epithelial cells	12
Carbonate minerals	7
Soil minerals	4
Organic debris	3
Other	3
Opaque (non-CP)	2

Char (pyrolyzed plant material)	ND
Plant ash	ND
Soot	ND

Total combustion product consistent with origination in wildfire ND

Laboratory Report
Wildfire Residue Analysis (Particulate)
by Polarized Light Microscopy (PLM)

Detail Page

Client Contact: Rob Rottersman
Company: Ramboll
Address: 1999 Broadway, Suite 2225
 Denver, CO 80202

Project #: BVSD - Fireside #1690030208
Project Site:

Date Received: 4/24/2023
Analyst: LW

Sample #	Lab #	Description	Loading
T-53	109906	Room 139 - inside bin	Very Light
		Carbonate minerals	45
		Epithelial cells	16
		Cellulose fibers	15
		Soil minerals	10
		Organic debris	8
		Other	4
		Opaque (non-CP)	2

Char (pyrolyzed plant material)	ND
Plant ash	ND
Soot	ND

Total combustion product consistent with origination in wildfire ND

Sample #	Lab #	Description	Loading
T-54	109907	Room 139 - desk top	Blank

Char (pyrolyzed plant material)	ND
Plant ash	ND
Soot	ND

Total combustion product consistent with origination in wildfire ND

Laboratory Report
Wildfire Residue Analysis (Particulate)
by Polarized Light Microscopy (PLM)

Detail Page

Client Contact: Rob Rottersman
Company: Ramboll
Address: 1999 Broadway, Suite 2225
 Denver, CO 80202

Project #: BVSD - Fireside #1690030208
Project Site:

Date Received: 4/24/2023
Analyst: LW

Sample #	Lab #	Description	Loading
T-55	109908	Blank - non-frosted slide	Blank

Char (pyrolyzed plant material)	ND
Plant ash	ND
Soot	ND
Total combustion product consistent with origination in wildfire	ND

Laboratory Report
Wildfire Residue Analysis (Particulate)
by Polarized Light Microscopy (PLM)

Detail Page

Client Contact: Rob Rottersman
Company: Ramboll
Address: 1999 Broadway, Suite 2225
 Denver, CO 80202

Project #: BVSD - Fireside #1690030208
Project Site:

Date Received: 4/24/2023
Analyst: LW

Sample #	Lab #	Description	Loading
T-56	109909	Blank - frosted slide	Blank

Char (pyrolyzed plant material)	ND
Plant ash	ND
Soot	ND

Total combustion product consistent with origination in wildfire ND



 Lawrence Wayne, Laboratory Director

Analytical results and associated reports are generated by Liberty EnviroLab, LLC at the request of and for the exclusive use of the client named in the report. Release of results to other persons or entities requires written permission from the originating client. The client is solely responsible for use and interpretation of results. Liberty EnviroLab, LLC reserves the right to dispose of samples after 30 days. This report shall not be reproduced except in full without written permission from Liberty EnviroLab LLC.

Laboratory Report
Wildfire Residue Analysis (Particulate)
by Polarized Light Microscopy (PLM)
 Settled Dust Analysis - Visual Area Estimation by %

Client Contact: Rob Rottersman
Company: Ramboll
Address: 1999 Broadway, Suite 2225
 Denver, CO 80202

Project #: BVSD - Fireside #1690030208
Project Site:

Date Received: 4/24/2023
Analyst: LW

Combustion Product Summary

Sample #	Lab #	Description		Char	Ash	Soot	Total %
MV-1	109910	Room 131	2ft ²	ND	ND	ND	ND
MV-2	109911	Room 131 chair fabric (2 chairs)	2ft ²	<1	ND	ND	<1
MV-3	109912	Room 114	2ft ²	ND	ND	ND	ND
MV-4	109913	Room 117	2ft ²	ND	ND	ND	ND
MV-5	109914	Room 138	2ft ²	ND	ND	ND	ND
MV-6	109915	Room 151	2ft ²	ND	ND	ND	ND
MV-7	109916	Room 148	2ft ²	<1	ND	ND	<1
MV-8	109917	Room 143	2ft ²	ND	ND	ND	ND
MV-9	109918	Room 155	2ft ²	<1	ND	ND	<1
MV-10	109919	Room 167	2ft ²	ND	ND	ND	ND

Level Concentrations:	<1%	Typical
	1 - 3%	Upper Background
	4 - 9%	Atypical
	10% or greater	Elevated

Total combustion product is the sum of the char, ash and soot percentages per sample.
 NOTE: Combustion products are consistent with origin in wildfires unless otherwise noted

Laboratory Report
Wildfire Residue Analysis (Particulate)
by Polarized Light Microscopy (PLM)
 Settled Dust Analysis - Visual Area Estimation by %

Client Contact: Rob Rottersman
Company: Ramboll
Address: 1999 Broadway, Suite 2225
 Denver, CO 80202

Project #: BVSD - Fireside #1690030208
Project Site:

Date Received: 4/24/2023
Analyst: LW

Combustion Product Summary

Sample #	Lab #	Description		Char	Ash	Soot	Total %
MV-11	109920	Main Office front desk	2ft ²	ND	ND	ND	ND
MV-12	109921	Main Office conference room	2ft ²	ND	ND	ND	ND
MV-13	109922	Room 195	2ft ²	ND	ND	ND	ND
MV-14	109923	Room 188	2ft ²	ND	ND	ND	ND
MV-15	109924	Room 185	2ft ²	ND	ND	ND	ND
MV-16	109925	Room 102 amphitheater	2ft ²	ND	ND	ND	ND
MV-17	109926	Room 172 teachers' lounge	2ft ²	<1	ND	ND	<1
MV-18	109927	Room 139	2ft ²	ND	ND	ND	ND
MV-19	109928	Room 139 chair fabric (1 chair)	1ft ²	ND	ND	ND	ND
MV-20	109929	Blank	Blank	ND	ND	ND	ND

Level Concentrations:	<1%	Typical
	1 - 3%	Upper Background
	4 - 9%	Atypical
	10% or greater	Elevated

Total combustion product is the sum of the char, ash and soot percentages per sample.
 NOTE: Combustion products are consistent with origin in wildfires unless otherwise noted

Laboratory Report
Wildfire Residue Analysis (Particulate)
by Polarized Light Microscopy (PLM)

Detail Page

Client Contact: Rob Rottersman
Company: Ramboll
Address: 1999 Broadway, Suite 2225
 Denver, CO 80202

Project #: BVSD - Fireside #1690030208
Project Site:

Date Received: 4/24/2023
Analyst: LW

Sample #	Lab #	Description	Area	Loading
MV-1	109910	Room 131	(2ft ²)	Moderate
Epithelial cells				33
Cellulose fibers				30
Soil minerals				20
Organic debris				5
Other				5
Opaque (non-CP)				4
Carbonate minerals				3

Char (pyrolyzed plant material)	ND
Plant ash	ND
Soot	ND

Total combustion product consistent with origination in wildfire ND

Sample #	Lab #	Description	Area	Loading
MV-2	109911	Room 131 chair fabric (2 chairs)	(2ft ²)	Moderate
Epithelial cells				40
Cellulose fibers				21
Soil minerals				16
Organic debris				8
Opaque (non-CP)				5
Other				5
Carbonate minerals				3
Synthetic fibers				2

Char (pyrolyzed plant material)	<1
Plant ash	ND
Soot	ND

Total combustion product consistent with origination in wildfire <1

Laboratory Report
Wildfire Residue Analysis (Particulate)
by Polarized Light Microscopy (PLM)

Detail Page

Client Contact: Rob Rottersman
Company: Ramboll
Address: 1999 Broadway, Suite 2225
 Denver, CO 80202

Project #: BVSD - Fireside #1690030208
Project Site:

Date Received: 4/24/2023
Analyst: LW

Sample #	Lab #	Description	Loading
MV-3	109912	Room 114 (2ft ²)	Moderate
Epithelial cells			33
Cellulose fibers			31
Soil minerals			14
Organic debris			7
Other			5
Opaque (non-CP)			4
Synthetic fibers			4
Paint			2
Char (pyrolyzed plant material)			ND
Plant ash			ND
Soot			ND

Total combustion product consistent with origination in wildfire ND

Sample #	Lab #	Description	Loading
MV-4	109913	Room 117 (2ft ²)	Moderate
Epithelial cells			30
Soil minerals			26
Cellulose fibers			23
Organic debris			8
Other			5
Opaque (non-CP)			3
Synthetic fibers			3
Paint			2

Char (pyrolyzed plant material)			ND
Plant ash			ND
Soot			ND

Total combustion product consistent with origination in wildfire ND

Laboratory Report
Wildfire Residue Analysis (Particulate)
by Polarized Light Microscopy (PLM)

Detail Page

Client Contact: Rob Rottersman
Company: Ramboll
Address: 1999 Broadway, Suite 2225
 Denver, CO 80202

Project #: BVSD - Fireside #1690030208
Project Site:

Date Received: 4/24/2023
Analyst: LW

Sample #	Lab #	Description	Area	Loading
MV-5	109914	Room 138	(2ft ²)	Moderate
Cellulose fibers				29
Epithelial cells				24
Soil minerals				20
Organic debris				7
Synthetic fibers				6
Opaque (non-CP)				5
Other				5
Carbonate minerals				2
Paint				2
Char (pyrolyzed plant material)				ND
Plant ash				ND
Soot				ND
Total combustion product consistent with origination in wildfire				ND

Sample #	Lab #	Description	Area	Loading
MV-6	109915	Room 151	(2ft ²)	Moderate
Cellulose fibers				44
Epithelial cells				20
Soil minerals				17
Organic debris				7
Other				5
Synthetic fibers				4
Opaque (non-CP)				3
Char (pyrolyzed plant material)				ND
Plant ash				ND
Soot				ND
Total combustion product consistent with origination in wildfire				ND

Laboratory Report
Wildfire Residue Analysis (Particulate)
by Polarized Light Microscopy (PLM)

Detail Page

Client Contact: Rob Rottersman
Company: Ramboll
Address: 1999 Broadway, Suite 2225
 Denver, CO 80202

Project #: BVSD - Fireside #1690030208
Project Site:

Date Received: 4/24/2023
Analyst: LW

Sample #	Lab #	Description	Loading
MV-7	109916	Room 148 (2ft ²)	Moderate
		Cellulose fibers	50
		Epithelial cells	16
		Soil minerals	14
		Organic debris	5
		Other	5
		Opaque (non-CP)	4
		Carbonate minerals	2
		Paint	2
		Synthetic fibers	2
		Char (pyrolyzed plant material)	<1
		Plant ash	ND
		Soot	ND
Total combustion product consistent with origination in wildfire			<1

Sample #	Lab #	Description	Loading
MV-8	109917	Room 143 (2ft ²)	Moderate
		Cellulose fibers	34
		Soil minerals	24
		Epithelial cells	19
		Opaque (non-CP)	6
		Other	5
		Carbonate minerals	4
		Organic debris	3
		Synthetic fibers	3
		Char (pyrolyzed plant material)	ND
		Plant ash	ND
		Soot	ND
Total combustion product consistent with origination in wildfire			ND

Laboratory Report
Wildfire Residue Analysis (Particulate)
by Polarized Light Microscopy (PLM)

Detail Page

Client Contact: Rob Rottersman
Company: Ramboll
Address: 1999 Broadway, Suite 2225
 Denver, CO 80202

Project #: BVSD - Fireside #1690030208
Project Site:

Date Received: 4/24/2023
Analyst: LW

Sample #	Lab #	Description	Loading
MV-9	109918	Room 155 (2ft ²)	Moderate
Cellulose fibers			35
Soil minerals			30
Epithelial cells			15
Organic debris			6
Other			5
Opaque (non-CP)			3
Carbonate minerals			2
Paint			2
Synthetic fibers			2
Char (pyrolyzed plant material)			<1
Plant ash			ND
Soot			ND

Total combustion product consistent with origination in wildfire <1

Sample #	Lab #	Description	Loading
MV-10	109919	Room 167 (2ft ²)	Moderate
Cellulose fibers			31
Soil minerals			26
Epithelial cells			21
Other			5
Opaque (non-CP)			4
Organic debris			4
Synthetic fibers			4
Paint			3
Carbonate minerals			2
Char (pyrolyzed plant material)			ND
Plant ash			ND
Soot			ND

Total combustion product consistent with origination in wildfire ND

Laboratory Report
Wildfire Residue Analysis (Particulate)
by Polarized Light Microscopy (PLM)

Detail Page

Client Contact: Rob Rottersman
Company: Ramboll
Address: 1999 Broadway, Suite 2225
 Denver, CO 80202

Project #: BVSD - Fireside #1690030208
Project Site:

Date Received: 4/24/2023
Analyst: LW

Sample #	Lab #	Description	Loading
MV-11	109920	Main Office front desk (2ft ²)	Moderate
		Soil minerals	30
		Cellulose fibers	28
		Epithelial cells	18
		Organic debris	7
		Other	5
		Opaque (non-CP)	4
		Paint	4
		Carbonate minerals	2
		Synthetic fibers	2
		Char (pyrolyzed plant material)	ND
		Plant ash	ND
		Soot	ND
Total combustion product consistent with origination in wildfire			ND

Sample #	Lab #	Description	Loading
MV-12	109921	Main Office conference room (2ft ²)	Moderate
		Cellulose fibers	37
		Soil minerals	20
		Epithelial cells	17
		Organic debris	7
		Other	5
		Carbonate minerals	4
		Paint	4
		Opaque (non-CP)	3
		Synthetic fibers	3
		Char (pyrolyzed plant material)	ND
		Plant ash	ND
		Soot	ND
Total combustion product consistent with origination in wildfire			ND

Laboratory Report
Wildfire Residue Analysis (Particulate)
by Polarized Light Microscopy (PLM)

Detail Page

Client Contact: Rob Rottersman
Company: Ramboll
Address: 1999 Broadway, Suite 2225
 Denver, CO 80202

Project #: BVSD - Fireside #1690030208
Project Site:

Date Received: 4/24/2023
Analyst: LW

Sample #	Lab #	Description	Area	Loading
MV-13	109922	Room 195	(2ft ²)	Moderate
Cellulose fibers				42
Epithelial cells				17
Soil minerals				17
Organic debris				8
Other				5
Synthetic fibers				4
Opaque (non-CP)				3
Carbonate minerals				2
Paint				2
Char (pyrolyzed plant material)				ND
Plant ash				ND
Soot				ND
Total combustion product consistent with origination in wildfire				ND

Sample #	Lab #	Description	Area	Loading
MV-14	109923	Room 188	(2ft ²)	Moderate
Cellulose fibers				41
Epithelial cells				24
Soil minerals				15
Organic debris				6
Other				5
Paint				4
Opaque (non-CP)				3
Synthetic fibers				2
Char (pyrolyzed plant material)				ND
Plant ash				ND
Soot				ND
Total combustion product consistent with origination in wildfire				ND

Laboratory Report
Wildfire Residue Analysis (Particulate)
by Polarized Light Microscopy (PLM)

Detail Page

Client Contact: Rob Rottersman
Company: Ramboll
Address: 1999 Broadway, Suite 2225
 Denver, CO 80202

Project #: BVSD - Fireside #1690030208
Project Site:

Date Received: 4/24/2023
Analyst: LW

Sample #	Lab #	Description	Loading
MV-15	109924	Room 185 (2ft ²)	Moderate
		Cellulose fibers	46
		Soil minerals	19
		Epithelial cells	14
		Paint	6
		Other	5
		Organic debris	4
		Opaque (non-CP)	3
		Synthetic fibers	3
		Char (pyrolyzed plant material)	ND
		Plant ash	ND
		Soot	ND
Total combustion product consistent with origination in wildfire			ND

Sample #	Lab #	Description	Loading
MV-16	109925	Room 102 amphitheater (2ft ²)	Moderate
		Cellulose fibers	41
		Soil minerals	20
		Epithelial cells	16
		Organic debris	5
		Paint	5
		Other	5
		Synthetic fibers	4
		Opaque (non-CP)	2
		Carbonate minerals	2
		Char (pyrolyzed plant material)	ND
		Plant ash	ND
		Soot	ND
Total combustion product consistent with origination in wildfire			ND

Laboratory Report
Wildfire Residue Analysis (Particulate)
by Polarized Light Microscopy (PLM)

Detail Page

Client Contact: Rob Rottersman
Company: Ramboll
Address: 1999 Broadway, Suite 2225
 Denver, CO 80202

Project #: BVSD - Fireside #1690030208
Project Site:

Date Received: 4/24/2023
Analyst: LW

Sample #	Lab #	Description	Loading
MV-17	109926	Room 172 teachers' lounge (2ft ²)	Moderate
		Cellulose fibers	46
		Epithelial cells	16
		Soil minerals	12
		Organic debris	6
		Synthetic fibers	6
		Paint	5
		Other	5
		Opaque (non-CP)	2
		Carbonate minerals	2
		Char (pyrolyzed plant material)	<1
		Plant ash	ND
		Soot	ND
Total combustion product consistent with origination in wildfire			<1

Sample #	Lab #	Description	Loading
MV-18	109927	Room 139 (2ft ²)	Moderate
		Cellulose fibers	50
		Soil minerals	15
		Epithelial cells	12
		Synthetic fibers	6
		Other	5
		Organic debris	4
		Opaque (non-CP)	3
		Paint	3
		Carbonate minerals	2
		Char (pyrolyzed plant material)	ND
		Plant ash	ND
		Soot	ND
Total combustion product consistent with origination in wildfire			ND

Laboratory Report
Wildfire Residue Analysis (Particulate)
by Polarized Light Microscopy (PLM)

Detail Page

Client Contact: Rob Rottersman
Company: Ramboll
Address: 1999 Broadway, Suite 2225
 Denver, CO 80202

Project #: BVSD - Fireside #1690030208
Project Site:

Date Received: 4/24/2023
Analyst: LW

Sample #	Lab #	Description	Loading
MV-19	109928	Room 139 chair fabric (1 chair) (1ft ²)	Moderate
		Cellulose fibers	29
		Soil minerals	28
		Epithelial cells	20
		Organic debris	6
		Other	5
		Opaque (non-CP)	4
		Synthetic fibers	4
		Carbonate minerals	2
		Paint	2
		Char (pyrolyzed plant material)	ND
		Plant ash	ND
		Soot	ND
		Total combustion product consistent with origination in wildfire	ND

Laboratory Report
Wildfire Residue Analysis (Particulate)
by Polarized Light Microscopy (PLM)

Detail Page

Client Contact: Rob Rottersman
Company: Ramboll
Address: 1999 Broadway, Suite 2225
 Denver, CO 80202

Project #: BVSD - Fireside #1690030208
Project Site:

Date Received: 4/24/2023
Analyst: LW

Sample #	Lab #	Description	Loading
MV-20	109929	Blank	Blank

- Epithelial cells
- Opaque (non-CP)
- Organic debris
- Carbonate minerals
- Soil minerals
- Paint
- Cellulose fibers
- Other
- Synthetic fibers

Char (pyrolyzed plant material)	ND
Plant ash	ND
Soot	ND

Total combustion product consistent with origination in wildfire ND



 Lawrence Wayne, Laboratory Director

Analytical results and associated reports are generated by Liberty EnviroLab, LLC at the request of and for the exclusive use of the client named in the report. Release of results to other persons or entities requires written permission from the originating client. The client is solely responsible for use and interpretation of results. Liberty EnviroLab, LLC reserves the right to dispose of samples after 30 days. This report shall not be reproduced except in full without written permission from Liberty EnviroLab LLC.



CHAIN OF CUSTODY

1645 Capalina Rd., Suite 800
San Marcos, CA 92069

(760) 539-7024 Fax: (760) 560-4582 clientservices@libertyenvirolab.com

CONTACT INFORMATION		PROJECT INFORMATION		TURN AROUND TIME	
Company: Ramboll		Contact: Rob Rottersman		Invoice to: apumw@ramboll.com Reference project: 1690030208	
Address: 1999 Broadway, Suite 2225		Phone: 312-622-0255			
City, state, ZIP: Denver, CO 80202		Email: rrottersman@ramboll.com			
Project Name/#: BVSD - Fireside # 1690030208		Project Site: Fireside Elementary		Please note: Turnaround time for this project is	
Sampling Date: 4/21/23		PROJECT TYPE: Wildfire Combustion Analysis / Particle ID		5 DAYS	
Sample ID	DESCRIPTION	NOTES			
T-01	Room 131 - shelf by window				
T-02	Room 131 - top of rafter				
T-03	Room 131 - ceiling tile				
T-04	Room 114 - Top of Junction box				
T-05	Room 114 - Top of childrens cabinet				
T-06	Room 114 - inside child storage cubby				
T-07	Room 117 - Teachers desk top of cabinets				
T-08	Room 117 - Teachers desk				
T-09	Room 138 - between bins in shelving unit				
T-10	Room 138 - top of light fixture				
T-11	Room 138 - counter near sink				
T-12	Room 151 - window sill				
T-13	Room 151 - top of clock				
T-14	Room 151 - inside pink cubby tote w/ books				
T-15	Room 148 - Top of dry erase board				
T-16	Room 148 - top of book shelf				
T-17	Room 148 - ceiling tile at supply air diffuser				
SAMPLE TYPE CODES		RELINQUISHED BY	DATE	RECEIVED BY	DATE
MV - Microvac	CP - Contact Plate		4/21/23		4-24-2023
Z - Zefon Air-O-Cell	T - Tape				
S - Swab	BL - Bulk				
ALL - Allergenco D	W - Alcohol Wipe				

CHAIN OF CUSTODY



CHAIN OF CUSTODY

1645 Capalina Rd., Suite 800
San Marcos, CA 92069

(760) 539-7024 Fax: (760) 560-4582 clientservices@libertyenvirolab.com

CONTACT INFORMATION		PROJECT INFORMATION		TURN AROUND TIME	
Company: Ramboll		Contact: Rob Rottersman		Invoice to: apumw@ramboll.com Reference project: 1690030208	
Address: 1999 Broadway, Suite 2225		Phone: 312-622-0255			
City, state, ZIP: Denver, CO 80202		Email: rrottersman@ramboll.com			
Project Name/#: BVSD - Fireside # 1690030208		Project Site: Fireside Elementary		Please note: Turnaround time for this project is	
Sampling Date: 4/21/23		PROJECT TYPE: Wildfire Combustion Analysis / Particle ID		5 DAYS	
Sample ID	DESCRIPTION	NOTES			
T-18	Room 143 - library book shelf (white)				
T-19	Room 143 - library book shelf (brown)				
T-20	Room 143 - library, top of skylight				
T-21	Room 155 - Desktop center of room				
T-22	Room 155 - supply air diffuser				
T-23	Room 155 - inside bin on window ledge				
T-24	Room 167 - shelf by door				
T-25	Room 167 - teacher's desk				
T-26	Room 167 - rafter				
T-27	Main office - behind computer monitor front desk top of cabinets				
T-28	Main office - work room top of mail shelf behind comp monitors front desk				
T-29	Main office - health room top of fridge work room top of mail shelf				
T-30	Main office - health room top of fridge				
T-31	Room 212 - cafeteria table				
T-32	Room 212 - cafeteria window sill				
T-33	Room 215 - Kitchen top of serving counter				
T-34	Room 215 - Kitchen top of oven				
SAMPLE TYPE CODES		RELINQUISHED BY	DATE	RECEIVED BY	DATE
MV - Microvac	CP - Contact Plate		4/21/23		4-24-2023
Z - Zefon Air-O-Cell	T - Tape				
S - Swab	BL - Bulk				
ALL - Allergenco D	W - Alcohol Wipe				

CHAIN OF CUSTODY



CHAIN OF CUSTODY

1645 Capalina Rd., Suite 800
San Marcos, CA 92069

(760) 539-7024 Fax: (760) 560-4582 clientservices@libertyenvirolab.com

CONTACT INFORMATION		PROJECT INFORMATION		TURN AROUND TIME	
Company: Ramboll		Contact: Rob Rottersman		Invoice to: apumw@ramboll.com Reference project: 1690030208	
Address: 1999 Broadway, Suite 2225		Phone: 312-622-0255			
City, state, ZIP: Denver, CO 80202		Email: rrottersman@ramboll.com			
Project Name/#: BVSD - Fireside # 1690030208		Project Site: Fireside Elementary		Please note: Turnaround time for this project is	
Sampling Date: 4/21/23		PROJECT TYPE: Wildfire Combustion Analysis / Particle ID		5 DAYS	
Sample ID	DESCRIPTION	NOTES			
T-35	Gym - stage floor				
T-36	Gym - top of Bill the Box				
T-37	Gym - office window sill				
T-38	Room 195 - Top of dry erase board				
T-39	Room 195 - Desk top				
T-40	Room 195 - Inside bin				
T-41	Art Room - top of fire alarm				
T-42	Art Room - top of cabinets				
T-43	Art Room - Counter top				
T-44	Room 185 - Ceiling tile				
T-45	Room 185 - Top of fridge				
T-46	Room 185 - Teacher's Desk				
T-47	Amphitheater - top of cabinets				
T-48	Amphitheater - top of wall				
T-49	Amphitheater - music stand				
T-50	Room 172 - Window sill				
T-51	Room 172 - Top of clock				
SAMPLE TYPE CODES		RELINQUISHED BY	DATE	RECEIVED BY	DATE
MV - Microvac	CP - Contact Plate		4/21/23		4-21-2023
Z - Zefon Air-O-Cell	T - Tape				
S - Swab	BL - Bulk				
ALL - Allergenco D	W - Alcohol Wipe				

CHAIN OF CUSTODY



CHAIN OF CUSTODY

1645 Capalina Rd., Suite 800
San Marcos, CA 92069

(760) 539-7024 Fax: (760) 560-4582 clientservices@libertyenvirolab.com

CONTACT INFORMATION		PROJECT INFORMATION		TURN AROUND TIME	
Company: Ramboll		Contact: Rob Rottersman		Invoice to: apumw@ramboll.com Reference project: 1690030208	
Address: 1999 Broadway, Suite 2225		Phone: 312-622-0255			
City, state, ZIP: Denver, CO 80202		Email: rrottersman@ramboll.com			
Project Name/#: BVSD - Fireside # 1690030208		Project Site: Fireside Elementary		Please note: Turnaround time for this project is	
Sampling Date: 4/21/23		PROJECT TYPE: Wildfire Combustion Analysis / Particle ID		5 DAYS	
Sample ID	DESCRIPTION	NOTES			
T-52	Room 139 - top of shelf				
T-53	Room 139 - inside bin				
T-54	Room 139 - Desk top				
T-55	Blank - non frosted slide				
T-56	Blank - frosted slide				
SAMPLE TYPE CODES		RELINQUISHED BY	DATE	RECEIVED BY	DATE
MV - Microvac	CP - Contact Plate		4/21/23		4-21-2023
Z - Zefon Air-O-Cell	T - Tape				
S - Swab	BL - Bulk				
ALL - Allergenco D	W - Alcohol Wipe				

CHAIN OF CUSTODY



CHAIN OF CUSTODY

1645 Capalina Rd., Suite 800
San Marcos, CA 92069

(760) 539-7024 Fax: (760) 560-4582 clientservices@libertyenvirolab.com

CONTACT INFORMATION		PROJECT INFORMATION		TURN AROUND TIME		Invoice to: apumw@ramboll.com Reference project: 1690030208
Company: Ramboll		Contact: Rob Rottersman		Please note: Turnaround time for this project is		
Address: 1999 Broadway, Suite 2225		Phone: 312-622-0255		5 DAYS		
City, state, ZIP: Denver, CO 80202		Email: rrottersman@ramboll.com				
Project Name/#: BVSD - Fireside # 1690030208		Project Site: Fireside Elementary				
Sampling Date: 4/21/23		PROJECT TYPE: Wildfire Combustion Analysis / Particle ID				
Sample ID	DESCRIPTION					NOTES
MV-01	Room 131					2 ft ²
MV-02	Room 131 chair fabric (2 chairs)					2 ft ²
MV-03	Room 114					2 ft ²
MV-04	Room 117					2 ft ²
MV-05	Room 138					2 ft ²
MV-06	Room 151					2 ft ²
MV-07	Room 148					2 ft ²
MV-08	Room 143					2 ft ²
MV-09	Room 155					2 ft ²
MV-10	Room 167					2 ft ²
MV-11	Room Main Office front desk					2 ft ²
MV-12	Room Main office conference room					2 ft ²
MV-13	Room 195					2 ft ²
MV-14	Room 188					2 ft ²
MV-15	Room 195					2 ft ²
MV-16	Room 102 amphitheater					2 ft ²
MV-17	Room 172 teachers lounge					2 ft ²
SAMPLE TYPE CODES		RELINQUISHED BY	DATE	RECEIVED BY	DATE	
MV - Microvac	CP - Contact Plate		4/21/23		4-24-2023	
Z - Zefon Air-O-Cell	T - Tape					
S - Swab	BL - Bulk					
ALL - Allergenco D	W - Alcohol Wipe					

CHAIN OF CUSTODY



CHAIN OF CUSTODY

1645 Capalina Rd., Suite 800
San Marcos, CA 92069

(760) 539-7024 Fax: (760) 560-4582 clientservices@libertyenvirolab.com

CONTACT INFORMATION		PROJECT INFORMATION		TURN AROUND TIME		Invoice to: apumw@ramboll.com Reference project: 1690030208
Company: Ramboll		Contact: Rob Rottersman		Please note: Turnaround time for this project is		
Address: 1999 Broadway, Suite 2225		Phone: 312-622-0255		5 DAYS		
City, state, ZIP: Denver, CO 80202		Email: rrottersman@ramboll.com				
Project Name/#: BVSD - Fireside # 1690030208		Project Site: Fireside Elementary				
Sampling Date: 4/21/23		PROJECT TYPE: Wildfire Combustion Analysis / Particle ID				
Sample ID	DESCRIPTION					NOTES
MV-18	Room 139					2 ft ²
MV-19	Room 139 chair fabric (1 chair)					1 ft ²
MV-20	Blank					Blank
SAMPLE TYPE CODES		RELINQUISHED BY	DATE	RECEIVED BY	DATE	
MV - Microvac	CP - Contact Plate		4/21/23		4-24-2023	
Z - Zefon Air-O-Cell	T - Tape					
S - Swab	BL - Bulk					
ALL - Allergenco D	W - Alcohol Wipe					

CHAIN OF CUSTODY

APPENDIX C
PHOTOGRAPHS

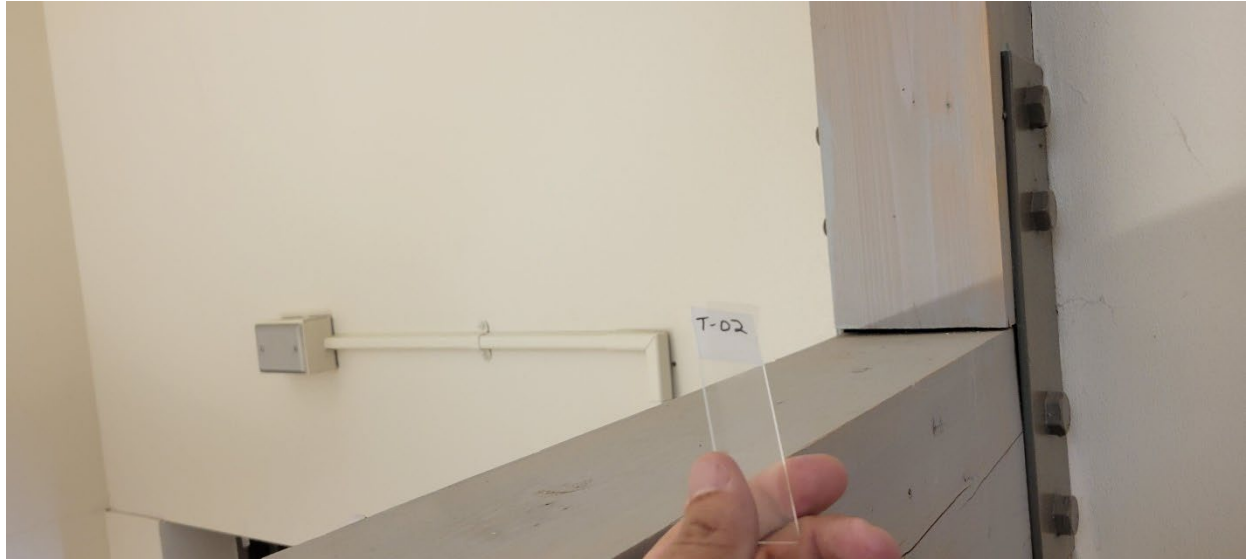


Photo 1: Example of tape lift sample collected from the top surface of a rafter in a classroom.

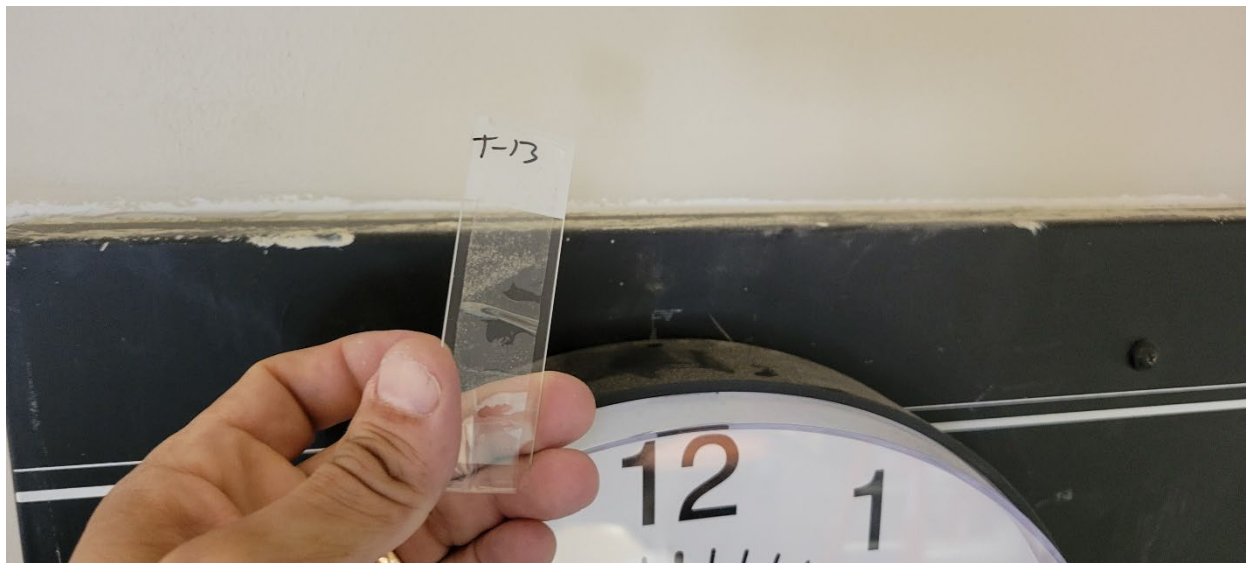


Photo 2: Example of a tape lift sample collected from the top of a clock in a classroom.

Title: Representative Photographs
Site: Fireside Elementary School, Louisville, Colorado

Date: April 21, 2023
Project# 1690030208



Photo 3: Surface sample collected from on top of "Bill the Box" located in the gymnasium.



Photo 4: Example of a surface sample collected from inside a bin.

Title: Representative Photographs
Site: Fireside Elementary School, Louisville, Colorado

Date: April 21, 2023
Project# 1690030208

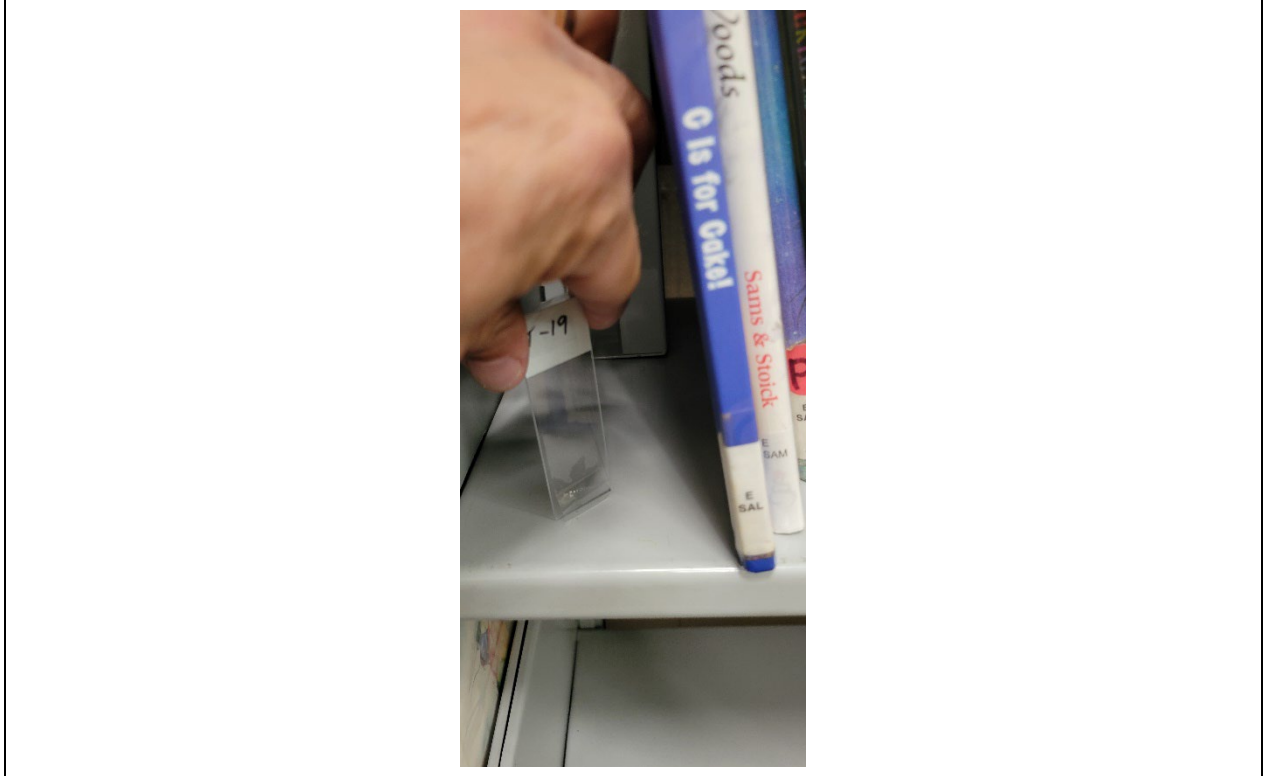


Photo 5: Example of a sample collected from a shelf in the library.



Photo 6: Example of a sample collected from a ceiling tile.

Title: Representative Photographs
Site: Fireside Elementary School, Louisville, Colorado

Date: April 21, 2023
Project# 1690030208

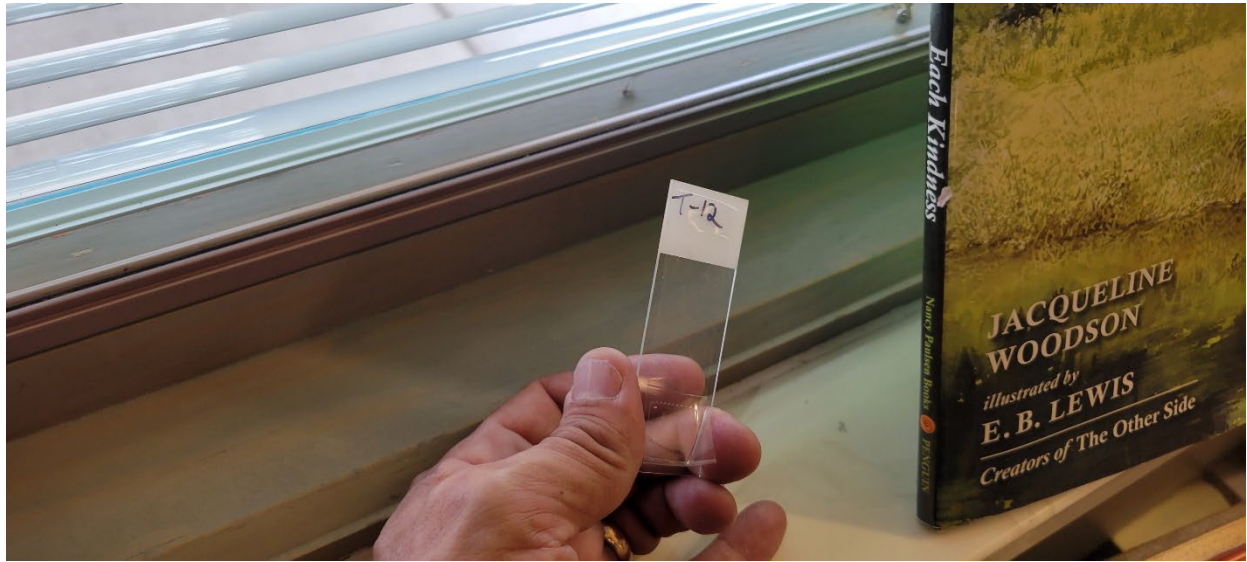


Photo 7: Example of a sample collected from a classroom windowsill.



Photo 8: Microvac setup including cassette attached to a vacuum air pump, 1 square foot template and previously collected samples in bags.

Title: Representative Photographs
Site: Fireside Elementary School, Louisville, Colorado

Date: April 21, 2023
Project# 1690030208