



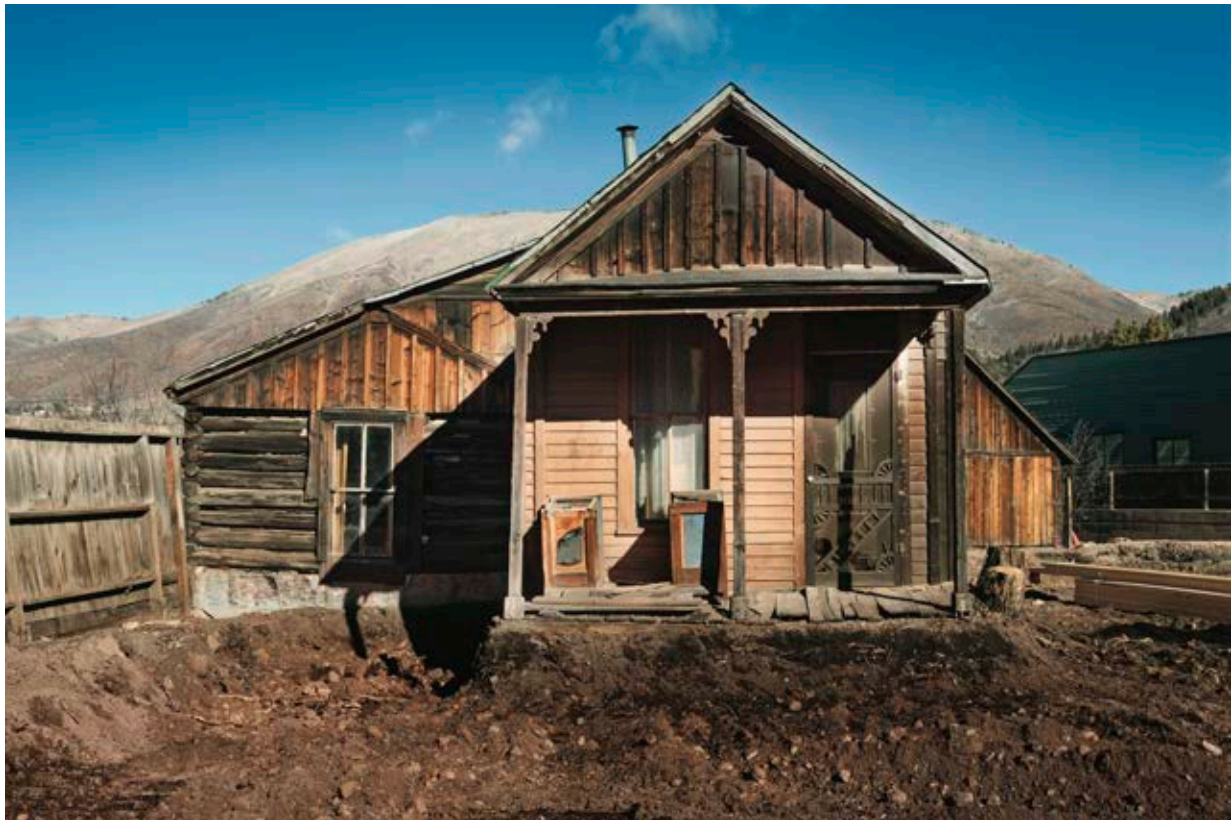
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PRESERVING THE PAST TRANSFORMING TOMORROW

# ZUPANCIS HOUSE INTERIOR MATERIALS STUDY

APRIL 25, 2017

Updated

May 12, 2017



PRODUCED  
FOR  
CHARLES CUNNIFFE ARCHITECTS

BY  
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## STRUCTURAL OVERVIEW

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The Zupancis House was moved from the original site to the new site on open space just outside the Town of Aspen. The new use will be as a house museum to be operated by the Aspen Historical Society. At the time of the site visit, the house was in three separate sections: the original log cabin, the two rooms of a Victorian era addition, and a later, simpler addition of three rooms. Please see the Key Index Project Plan for the original configuration of the house, and how it will be reconstructed (p. 13).

### Cabin Room 1

This portion of the structure is the oldest part of the house. Log construction showed some missing chinking and daubing, but appears to be in good condition. Signs of water infiltration and staining were present, but did not appear to be a current issue, indicating the roofing is intact. Previous reports indicated that the cabin was originally constructed without a foundation. This may or may not have led to additional moisture penetration from grade level, with possible capillary action wicking moisture vertically through the wall structure, causing unseen deterioration. Although none was detected during the site visit, this should be investigated and documented before the conservation of all interior elements. The interior surfaces showed deterioration of the materials due to moisture infiltration, with large areas of staining present. There were significant areas of loss of original materials, specifically of the wallpapers and linen wall covering. There was additional loss of the bead board used as ceiling fabric. The painted wood elements were sampled for paint analysis, and appeared to be in good condition. The original doors and windows had been removed for restoration off site. The floor may have had additional elements such as carpeting or linoleum, but none was present at the time of the site visit.

### Victorian Room 2 and 3

This portion of the structure appears to be the first addition to the house. Stud construction with interior and exterior sheathing was reported as the construction method in previous reports. Also noted was that this section of the house did not have a foundation, and wood elements were in contact with moisture found at grade. Signs of water infiltration and staining were present, but to a lesser degree than was found in the cabin portion of the house. Water



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infiltration did not appear to be a current issue, indicating the roofing is intact. Possible capillary action, wicking moisture vertically through the wall structure and causing unseen deterioration, should be part of the examination of the deterioration of this portion of the structure before the crawl space is closed and the construction phase is finalized. Although no deterioration of wood elements was detected during the site visit, it should be investigated and documented before the conservation of all interior elements. The interior surfaces showed little deterioration of the materials due to moisture infiltration, with little staining present. There were no significant areas of loss of original materials, except for carpeting. The painted wood elements were sampled for paint analysis, and appeared to be in good condition. The original doors and windows had been removed for restoration off site.

#### Addition Room 4, 5, 6, and 7

This portion of the structure appears to be the second addition to the house. Stud construction with interior and exterior sheathing was reported as the construction method in previous reports, and interior wood sheathing was found to be present during sampling procedures. Also noted in previous reports was this section of the house did not have a foundation, and wood elements were in contact with moisture found at grade. Signs of water infiltration and staining were present, but to a lesser degree than was found in the cabin portion of the house. It appeared that staining came from the roof and a previous vent for a wood stove or similar. Water infiltration did not appear to be a current issue, indicating the roofing is intact. Possible capillary action may have wicked moisture vertically through the wall structure, causing unseen deterioration. This should be part of the examination of the deterioration of this portion of the structure before the crawl space is closed and the construction phase is finalized. Although no deterioration of wood elements was detected during the site visit, it should be investigated and documented before the conservation of all interior elements. The interior surfaces showed little deterioration of the materials due to moisture infiltration, with some staining and deterioration present. There are some areas of loss of original materials. The painted wood elements were sampled for paint analysis, and appeared to be in good condition. The original doors and windows had been removed for restoration off site. Remnants of linoleum were present in this portion of the house, although they were in poor condition with large areas of loss. Samples were taken for XRF testing and cross section microscopy. A very small area of carpet was found and sampled, but all other areas of the carpet had been discarded prior to the move.





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Evidence of significant infiltration of rodents and insects was present in all spaces of the Zupancis House. Often these hazards were mixed with the dust and dirt on all surfaces, and between the layers of interior materials. This hazard must be considered when the interior materials are conserved, whether the materials are removed or if they remain in situ. Protective clothing and masks are recommended in the event that Hantavirus may be present. Conservation of materials may be completed after the hazardous materials are cleaned up.



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## REPORTS

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KEY INDEX PROJECT PLAN

PAINT REPORT

WALLPAPER

LINOLEUM

CARPET



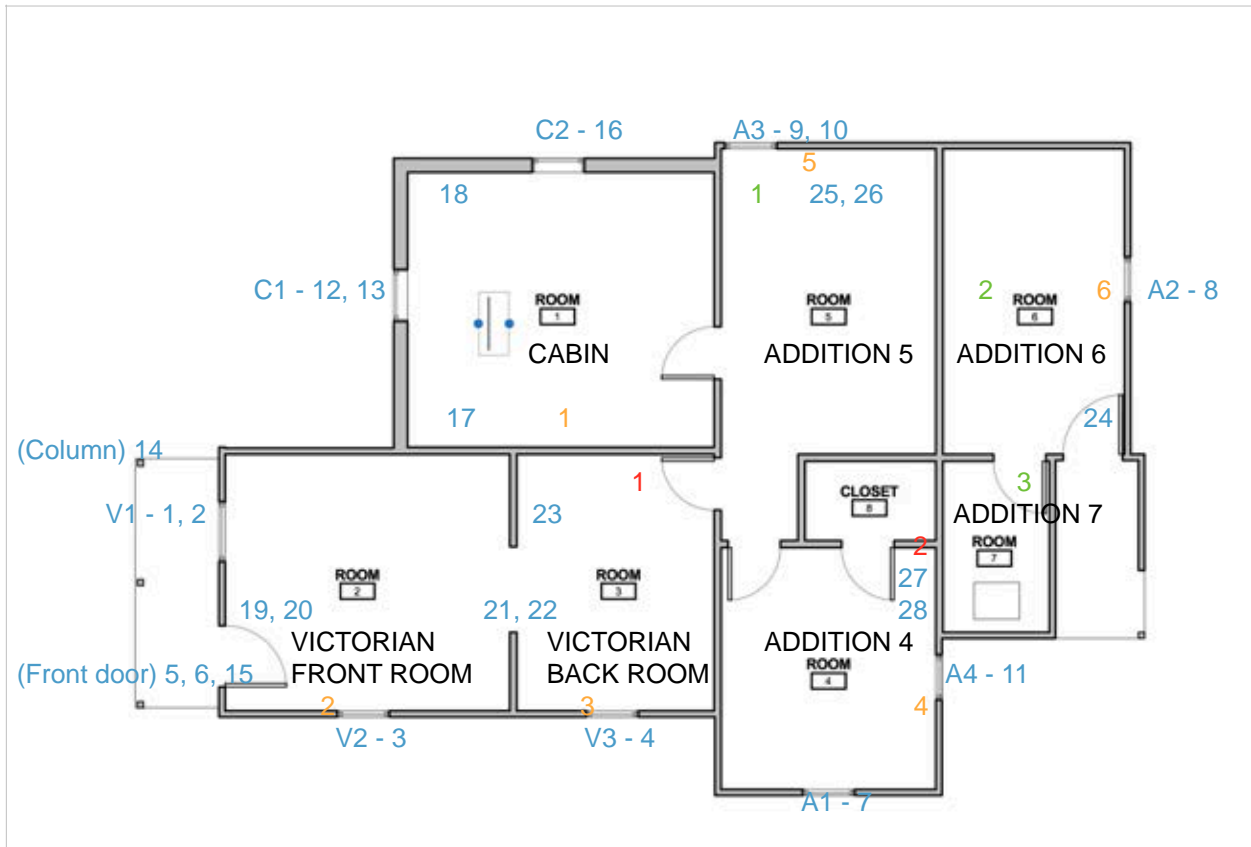
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## KEY INDEX PROJECT PLAN



**KEY:**

**PAINT SAMPLES**

- A1-4 - Addition Windows (Off Site for restoration)
- C1-2 - Cabin Windows (Off Site for restoration)
- V1-3 - Victorian Windows (Off Site for restoration)

**WALLPAPER SAMPLES**

**LINOLEUM SAMPLES**

**CARPET SAMPLES**



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## PAINT REPORT

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### INTRODUCTION

Paint has been used for millennia to beautify and protect both the interior and exterior surfaces of structures. The mixes, binders, pigments, solvents and techniques have evolved. Knowledge of these changes over time informs the investigation process when analyzing a structure, and when analyzing paint.

### COMMON TERMS AND DEFINITIONS

- Oil – binds the pigment together, affects gloss, and dry time. Common oils used in structural coatings include linseed oil, Tung oil, in some areas fish oil, etc.
- Distemper – pigment, casein or animal glue, water.
- Milk Paint – milk (casein binder), lime, pigment.
- Calcimine – pigment, lime, water, animal glue or casein.
- Lime wash, Color wash – water and lime, with pigment added for colors.
- Encaustic – hot wax painting.
- Tempera – water and pigment, egg yolk can be added.
- Turpentine, - originally distilled from the resin of the terebinth or turpentine tree, found in the Mediterranean. Later distilled from various pines.
- Mineral spirits – distilled from petroleum.
- Varnish – Dammar Varnish from Dammar gum.
- Metal coatings – such as alkyd enamels, exposure to oxygen polymerizes the binder.
- Modern Paints
  - Latex – water-borne sub-micrometer polymer particles (rubber latex is not a component)
  - Epoxies and Polyurethanes – cures via catalyzed polymerization forming a hard plastic surface
  - Powder coatings – little or no solvent used, applied to a surface that has been treated with an electrostatic application of dry powder and heated.
  - May contain additives – can affect surface tension, improve flow, control skinning, fight bacterial growth, etc.



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## PERFORMANCE

Paint has been used to protect both interior and exterior surfaces, and to express the style of the time and the tastes of the owner. Using paint as a protective coating can help prevent moisture penetration of the substrate, prevent deterioration of the substrate from ultra violet light, and can also prevent scuffs and abrasive damage. It is easy to maintain paint coatings and cheap to use for this purpose. Color has been part of paint from the earliest signs of its use. Used to express the style of the period, paint has been used to decorate for millennia. Often it is used as an indication of important space, a public space, or a sacred space. Expense of the paint treatment is related to the pigments included in the paint, and the techniques employed.

## A BRIEF HISTORY OF PAINT

As paint has developed over time, so have the formulas. The search for pigments that have lasting color continues today. Some of the first pigments were earth, clay, and plant products. The Egyptians were the first recorded to use ground glass as pigments. White lead and red lead have been used for over four thousand years. Distant travel to the Far East and the Americas yielded new pigments made from items such as semi-precious gemstones, and insects. The industrial revolution yielded new colors and pigments, but the most radical changes came during and after WWII as the world embraced chemistry and changed paint formulas and pigments. With the knowledge of paint history, it can be possible to identify the time of the paint application from the pigments used, the binders, and the color.

## PAINT ANALYSIS AND USES

Paint Analysis can allow a conservator to understand the original paint scheme, identify newer materials and/or additions to a structure, and the correct identification of the various layers can tell the history and care of the space. Once the paint has been sampled it is viewed through the microscope, and the original treatment of the substrate becomes clear. Sampling of the structure is critical to correctly identify the paint scheme. Sampling in areas with the least exposure to causes of deterioration, such as sunlight, the elements, smoke, and abrasions, yields the most intact and informative samples. Knowledge of the style of the period informs the sampling process, instructing the conservator as to where it is most likely to find color changes or decorative painting. Items that seem out of place can be sampled to see where the paint layers match or diverge. The number of paint layers can indicate an element's approximate





age, and show where new materials have been introduced. The layers of paint can also show periods of neglect and deterioration, fading or darkening due to UV or smoke, and it can show a change in what type of paint was used.

#### PROJECT SPECIFICS AND RESULTS

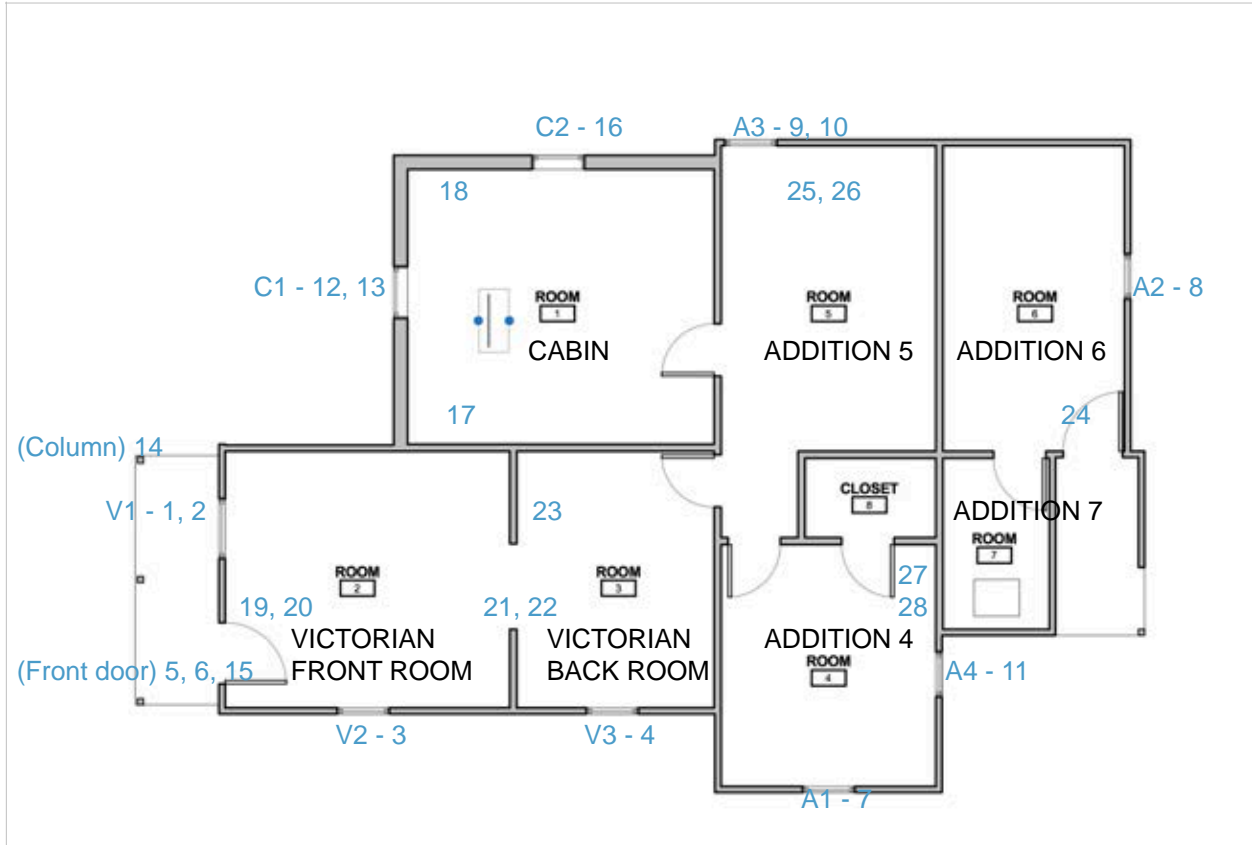
28 paint samples were taken at the Zupancis House in Aspen, Colorado, for analysis by cross section microscopy. The first three paint layers found were matched to the Munsell Color System. Wood was the substrate for all the areas sampled. All samples showed little deterioration, indicating a history of attention to maintenance, despite the period of time when the building stood empty. Several of the exterior elements sampled showed no paint under the microscope, although there appeared to be stain on several areas of the exterior. If remnants of paint are to be found on the exterior, it is recommended that a portable XRF spectrometer be utilized for assessment. Windows and doors were sampled by Chris Thompson, as they had all been removed from the site and stored for the winter in his studio for restoration work. All other samples of the interior elements were taken by BEE, on site.

Earliest paint campaigns appeared to be relatively simple, with no signs of decorative paint, with greens, reds, and whites dominating. Colors of paint matched throughout the house, including the earliest layers. This is unusual for a house that has had three phases of construction. The earliest paint layer in the section first constructed should not match any paint on the other two later additions. The earliest paint colors on the additions should match a second and third layer of paint on the original house. However the Zupancis house appears to have an off-white color in common on all the window sashes. It is possible that the whole house may have received new windows, once all areas of the house were constructed. In addition, there were not as many layers of paint as expected. In a house as old as the cabin section, it is normal to find 12-15 layers of paint. Five layers is unusual. This suggests that interior elements were either stripped of paint, never painted, or what is most likely, that the trim that was sampled was put in at a date later than the period of construction.



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## KEY INDEX: PAINT SAMPLE LOCATION PLAN



### KEY:

#### PAINT SAMPLES

- A1-4 - Addition Windows (Off Site for restoration)
- C1-2 - Cabin Windows (Off Site for restoration)
- V1-3 - Victorian Windows (Off Site for restoration)



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## CHART OF PAINT COLORS FOUND

The colors below are the paint colors found from the paint analysis. The first column shows the Munsell color chart number system, as required by ASTM standards and the GSA/NPS for color analysis. A descriptive name for the color has been added by BEE. The second column shows the Benjamin Moore commercial paints matched to the same paint colors, using the B.Moore numbering system and names.

Color swatches may be ordered from either company, but the Benjamin Moore website has swatches online that can be copied and downloaded without charge, while the Munsell colors charge a fee. A small sample of each of the BEE Lab Munsell color chips has been added to the chart in the third column. Certain colors are difficult to match to commercial paints. These colors may be called out below with the recommendation to purchase the Munsell color chip to order a custom paint color from a commercial paint company specified to the project. Colors below may appear differently depending upon computer monitor versus printer calibration.

PAINT COLOR - MUNSELL NUMBER		PAINT COLOR - MATCHED TO B. MOORE	B.MOORE COLOR SWATCH
Almost Cream	5Y 9/2	BM CC Morning Light 183	
Deep Yellow	2.5Y 6/6	BM CC El Sereno Gold 223	
Dark Red Purple	5R 2/4	BM CC 1267 Ruby Dusk - <a href="#">off, rec custom color</a>	
Medium Spring Green	2.5GY 5/4	BM CC 483 Home on the Range	
Medium Tan Gray	5Y 7/1	BM CC Paris Rain 1501	
Black Orange Red	2.5YR 2/2	BM Ext RM Tudor Brown	
Peach	2.5YR 7/6	BM CP 2175-50 Peach Blossom	
Bright Orange Brown	10YR 7/6	BM HC 8 Dorsett Gold	



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Yellow Olive	7.5Y 7/6	BM CC 377 Mustard Field	
Medium Gray Emerald Green	10GY 7/1	BM CC 460 Herb Bouquet	
Chartreuse Black	10Y 3/1	BM CC 1582 Deep River	
Gray Chartreuse	10Y 8.5/1	BM CC 971 Olympic Mountains	
Light Yellow Olive	7.5Y 8/2	BM CC 1516 Moon Shadow	
Dark Red	7.5R 2/6	BM EXT RM Cottage Redwood <a href="#">off, rec custom color</a>	
Medium Pea Green	5Y 5/4	BM CC 525 Savannah Shade	



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## CHART OF PAINT LAYER SEQUENCING

Below is a chart of the first three paint colors found for each sample, the Munsell number the color was matched to, the BMoore color the paint was matched to, and the number of layers found in the sample.

For quick reference:

Paint Samples from the **Cabin are in Orange**

Paint Samples from the **Victorian are in Blue**

Paint Samples from the **Addition are in Red**

Sample #	Location	1 <sup>st</sup> layer (Original)	2 <sup>nd</sup> layer	3rd	Total # of Layers
1	Victorian Window 1 Interior	Almost Cream, 5Y 9/2	Thin Coat, varnish Yellowing, unstable linseed oil	Deep Yellow 2.5Y 6/6	6
2	Victorian Window 1 Exterior	Almost Cream 5Y 9/2	Thin Coat, varnish	Deteriorated Paint, cannot match color	3
3	Victorian Window 2 Interior	Almost Cream, 5Y 9/2	Thin Coat, varnish	Deep Yellow 2.5Y 6/6	6
4	Victorian Window 3 Interior	Deep Yellow 2.5Y 6/6	Dark Red Purple 5R 2/4	Medium Spring Green 2.5GY 5/4	5
5	Victorian Front Door Interior	Dark Red Purple 5R 2/4	Medium Spring Green 2.5GY 5/4	Medium Tan Gray 5Y 7/1	4
6	Victorian Front Door Exterior	Varnish w Red Stain			1
7	Addition Window 1 Interior	Black Orange Red 2.5YR 2/2	Almost Cream 5Y 9/2	Peach 2.5YR 7/6	5
8	Addition Window 2 Interior	Black Orange Red 2.5YR 2/2	Almost Cream 5Y 9/2	Peach 2.5YR 7/6	5



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9	Addition Window 3 Interior	Bright Orange Brown 10YR 7/6	Yellow Olive 7.5Y 7/6	Medium Gray Emerald Green 10GY 7/1	5
10	Addition Window 3 Exterior	no signs of paint in sample provided			0
11	Addition Window 4 Interior	Chartreuse Black 7.5GY 3/1	Dark Red Purple 5R 2/4	Gray Chartreuse 10Y 8.5/1	4
12	Cabin Window 1 Interior	Almost Cream 5Y 9/2	Dark Red Purple 5R 2/4	Chartreuse Black 10Y 3/1	3
13	Cabin Window 1 Exterior	Stain - deteriorated Red/Brown			1
14	Front Porch Column Exterior	Almost Cream 5Y 9/2	Medium Tan Gray 5Y 7/1		2
15	Screen Door Exterior	Stain, Red Brown	Stain Dark Brown/Black		2
16	Log Cabin Window Frame - interior	Almost Cream 5Y 9/2	Dark Red Purple 5R 2/4	Chartreuse Black 10Y 3/1	3
17	Log Cabin Baseboard	Almost Cream 5Y 9/2	Dark Red Purple 5R 2/4	Chartreuse Black 10Y 3/1	3
18	Log Cabin Bead Board	Medium Gray Emerald Green 10GY 7/1	Medium Tan Gray 5Y 7/1		2
19	Victorian Parlor Baseboard	Almost Cream 5Y 9/2	Dark Red Purple 5R 2/4	Medium Spring Green 2.5GY 5/4	5
20	Victorian Parlor Door Frame	Medium Spring Green 2.5GY 5/4	Medium Tan Gray 5Y 7/1		
21	Victorian Parlor Frame @ Center Doorway	Dark Red Purple 5R 2/4	Medium Spring Green 2.5GY 5/4	Medium Tan Gray 5Y 7/1	4
22	Victorian Back Room Door Frame @ Center	Dark Red Purple 5R 2/4	Medium Spring Green 2.5GY 5/4	Medium Tan Gray 5Y 7/1	4



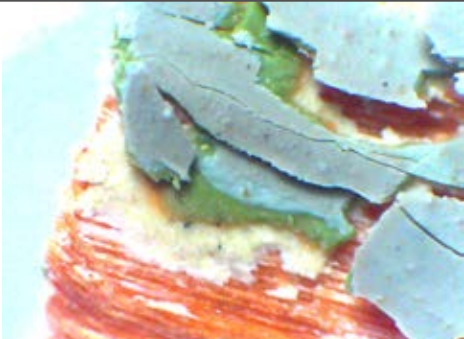
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23	Victorian Back Room Baseboard	Dark Red Purple 5R 2/4	Medium Spring Green 2.5GY 5/4	Medium Tan Gray 5Y 7/1	4
24	Addition Green Room Wall	Bright Orange Brown 10YR 7/6	Yellow Olive 7.5Y 7/6	Medium Gray Emerald Green 10GY 7/1	5
25	Addition, Back Door Frame	Dark Red Purple 5R 2/4	Medium Pea Green 5Y 5/4	Dark Red 7.5R 2/6	3
26	Addition, Back Baseboard	White 5Y 9/1	Black Orange Red 2.5YR 2/2	Dark Red Purple 5R 2/4	5
27	Addition North Room Closet Door Frame	Almost Cream 5Y 9/2	Peach 2.5YR 7/6	Light Yellow Olive 7.5Y 8/2	4
28	Addition North Room Baseboard	Almost Cream 5Y 9/2	Black Orange Red 2.5YR 2/2	Almost White 5Y 9/1	4



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## PAINT ANALYSIS FORMS - SAMPLES 1-28

PAINT ANALYSIS FORM			
Project Name:	Zupancis House McMurphy/Zupancis Relocation		
Project Location:	Aspen, Colorado		
Sampled by:	Chris Thompson		
Analyzed by:	BEE		
Sample Description: 1			
Victorian Window 1			
Interior			
Substrate:	Wood	Top Color:	Gray
LAYER #	COLOR DESCRIPTION	MUNSELL #	NOTES
1	Almost Cream	5Y 9/2	BM CC Albescent OC-40
2	Thin Coat, varnish		Yellowing, unstable linseed oil
3	Deep Yellow	2.5Y 6/6	BM CC El Sereno Gold 223
4	Medium Spring Green	2.5GY 5/4	
5	Medium Tan Gray	5Y 7/1	
6	Gray		
7			
8			
			






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PAINT ANALYSIS FORM			
Project Name:	Zupancis House McMurchy/Zupancis Relocation		
Project Location:	Aspen, Colorado		
Sampled by:	Chris Thompson		
Analyzed by:	BEE		
Sample Description: 2			
Victorian Window 1			
Exterior			
Substrate:	Wood	Top Color:	Unknown
LAYER #	COLOR DESCRIPTION	MUNSEL L #	NOTES
1	Almost Cream	5Y 9/2	BM CC Albescent OC-40
2	Thin Coat, varnish		Yellowing, unstable linseed oil
3	Deteriorated Paint, cannot match color		
4			
5			
6			
7			
8			
			

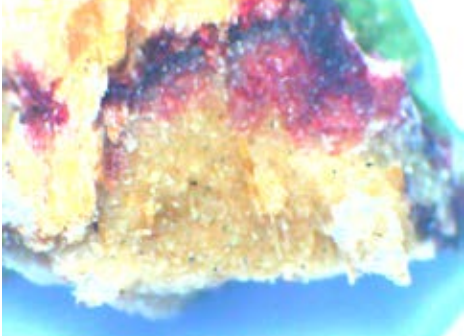


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PAINT ANALYSIS FORM			
Project Name:	Zupancis House McMurchy/Zupancis Relocation		
Project Location:	Aspen, Colorado		
Sampled by:	Chris Thompson		
Analyzed by:	BEE		
Sample Description: 3			
Victorian Window 2			
Interior			
Substrate:	Wood	Top Color:	Gray
LAYER #	COLOR DESCRIPTION	MUNSELL #	NOTES
1	Almost Cream	5Y 9/2	BM CC Albescent OC-40
2	Thin Coat, varnish		Yellowing, unstable linseed oil
3	Deep Yellow	2.5Y 6/6	BM CC El Sereno Gold 223
4	Medium Spring Green	2.5GY 5/4	
5	Medium Tan Gray	5Y 7/1	
6	Gray		
7			
8			
			

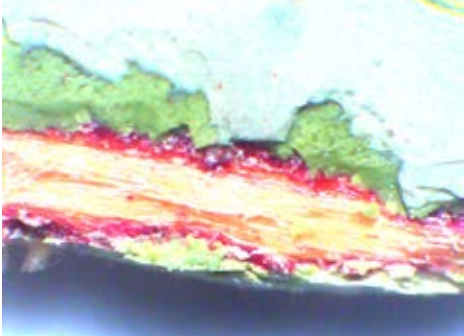


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PAINT ANALYSIS FORM			
Project Name:	Zupancis House McMurchy/Zupancis Relocation		
Project Location:	Aspen, Colorado		
Sampled by:	Chris Thompson		
Analyzed by:	BEE		
Sample Description: 4			
Victorian Window 3			
Interior			
Substrate:	Wood	Top Color:	Gray
LAYER #	COLOR DESCRIPTION	MUNSELL #	NOTES
1	Deep Yellow	2.5Y 6/6	BM CC El Sereno Gold 223
2	Dark Red Purple	5R 2/4	
3	Medium Spring Green	2.5GY 5/4	
4	Medium Tan Gray	5Y 7/1	
5	Gray		
6			
7			
8			
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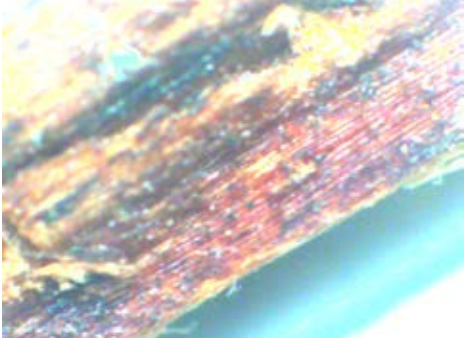


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PAINT ANALYSIS FORM			
Project Name:	Zupancis House McMurchy/Zupancis Relocation		
Project Location:	Aspen, Colorado		
Sampled by:	Chris Thompson		
Analyzed by:	BEE		
Sample Description: 5			
Victorian Front Door			
Interior			
Substrate:	Wood	Top Color:	White
LAYER #	COLOR DESCRIPTION	MUNSELL #	NOTES
1	Dark Red Purple	5R 2/4	
2	Medium Spring Green	2.5GY 5/4	
3	Medium Tan Gray	5Y 7/1	
4	Gray		
5			
6			
7			
8			
			




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PAINT ANALYSIS FORM			
Project Name:	Zupancis House McMurchy/Zupancis Relocation		
Project Location:	Aspen, Colorado		
Sampled by:	Chris Thompson		
Analyzed by:	BEE		
Sample Description: 6			
Victorian Front Door			
Exterior			
Substrate:	Wood	Top Color:	Stain
LAYER #	COLOR DESCRIPTION	MUNSELL #	NOTES
1	Varnish w Red Stain		
2			
3			
4			
5			
6			
7			
8			
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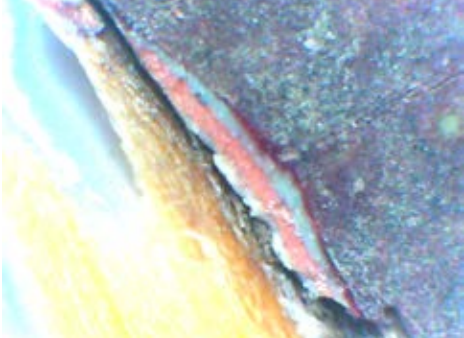


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PAINT ANALYSIS FORM			
Project Name:	Zupancis House McMurchy/Zupancis Relocation		
Project Location:	Aspen, Colorado		
Sampled by:	Chris Thompson		
Analyzed by:	BEE		
Sample Description: 7			
Addition Window 1			
Interior			
Substrate:	Wood	Top Color:	Red Brown
LAYER #	COLOR DESCRIPTION	MUNSELL #	NOTES
1	Black Orange Red	2.5YR 2/2	
2	Almost Cream	5Y 9/2	BM CC Albescent OC-40
3	Peach	2.5YR 7/6	
4	Medium Tan Gray	5Y 7/1	
5	Red Brown		
6			
7			
8			
<div style="display: flex; align-items: center;">  <div style="flex-grow: 1; border: 1px solid black;"></div> </div>			




BUILT ENVIRONMENT EVOLUTION  
PRESERVING THE PAST TRANSFORMING TOMORROW

PAINT ANALYSIS FORM			
Project Name:	Zupancis House McMurchy/Zupancis Relocation		
Project Location:	Aspen, Colorado		
Sampled by:	Chris Thompson		
Analyzed by:	BEE		
Sample Description: 8			
Addition Window 4			
Interior			
Substrate:	Wood	Top Color:	Red Brown
LAYER #	COLOR DESCRIPTION	MUNSELL #	NOTES
1	Black Orange Red	2.5YR 2/2	
2	Almost Cream	5Y 9/2	BM CC Albescent OC-40
3	Peach	2.5YR 7/6	
4	Medium Tan Gray	5Y 7/1	
5	Red Brown		
6			
7			
8			
			



BUILT ENVIRONMENT EVOLUTION  
PRESERVING THE PAST TRANSFORMING TOMORROW

PAINT ANALYSIS FORM			
Project Name:	Zupancis House McMurchy/Zupancis Relocation		
Project Location:	Aspen, Colorado		
Sampled by:	Chris Thompson		
Analyzed by:	BEE		
Sample Description: 9			
Addition Window 3			
Interior			
Substrate:	Wood	Top Color:	Green
LAYER #	COLOR DESCRIPTION	MUNSELL #	NOTES
1	Bright Orange Brown	10YR 7/6	BC HC 8 Dorsett Gold
2	Yellow Olive	7.5Y 7/6	
3	Medium Gray Emerald Green	10GY 7/1	
4	Medium Pea Green	5Y 5/4	
5	Green		
6			
7			
8			
			



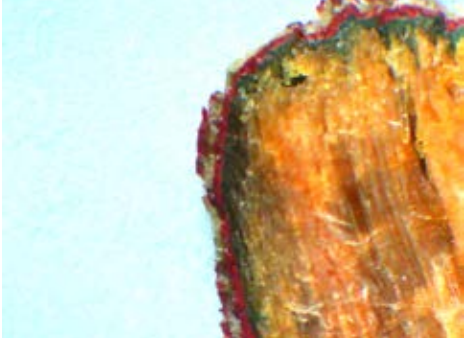


BUILT ENVIRONMENT EVOLUTION  
PRESERVING THE PAST TRANSFORMING TOMORROW

PAINT ANALYSIS FORM			
Project Name:	Zupancis House McMurchy/Zupancis Relocation		
Project Location:	Aspen, Colorado		
Sampled by:	Chris Thompson		
Analyzed by:	BEE		
Sample Description: 10			
Addition Window 3			
Exterior			
Substrate:	Wood	Top Color:	
LAYER #	COLOR DESCRIPTION	MUNSELL #	NOTES
1	no signs of paint in sample provided		
2			
3			
4			
5			
6			
7			
8			
			




BUILT ENVIRONMENT EVOLUTION  
PRESERVING THE PAST TRANSFORMING TOMORROW

PAINT ANALYSIS FORM			
Project Name:	Zupancis House McMurchy/Zupancis Relocation		
Project Location:	Aspen, Colorado		
Sampled by:	Chris Thompson		
Analyzed by:	BEE		
Sample Description: 11			
Addition Window 2			
Interior			
Substrate:	Wood	Top Color:	Brown
LAYER #	COLOR DESCRIPTION	MUNSELL #	NOTES
1	Chartreuse Black	7.5GY 3/1	
2	Dark Red Purple	5R 2/4	
3	Gray Chartreuse	10Y 8.5/1	
4	Brown		
5			
6			
7			
8			
			




BUILT ENVIRONMENT EVOLUTION  
PRESERVING THE PAST TRANSFORMING TOMORROW

PAINT ANALYSIS FORM			
Project Name:	Zupancis House McMurphy/Zupancis Relocation		
Project Location:	Aspen, Colorado		
Sampled by:	Chris Thompson		
Analyzed by:	BEE		
Sample Description: 12			
Cabin Window 1			
Interior			
Substrate:	Wood	Top Color:	Chartreuse Black
LAYER #	COLOR DESCRIPTION	MUNSELL #	NOTES
1	Almost Cream	5Y 9/2	Albescent OC-40
2	Dark Red Purple	5R 2/4	
3	Chartreuse Black	10Y 3/1	**might be 7.5GY 3/2
4			
5			
6			
7			
8			
			




BUILT ENVIRONMENT EVOLUTION  
PRESERVING THE PAST TRANSFORMING TOMORROW

PAINT ANALYSIS FORM			
Project Name:	Zupancis House McMurphy/Zupancis Relocation		
Project Location:	Aspen, Colorado		
Sampled by:	Chris Thompson		
Analyzed by:	BEE		
Sample Description: 13			
Cabin Window 1			
Exterior			
Substrate:	Wood	Top Color:	Brown Stain
LAYER #	COLOR DESCRIPTION	MUNSELL #	NOTES
1	Stain - deteriorated		dark brown over red brown
2			original??
3			
4			
5			
6			
7			
8			
			




BUILT ENVIRONMENT EVOLUTION  
PRESERVING THE PAST TRANSFORMING TOMORROW

PAINT ANALYSIS FORM			
Project Name:	Zupancis House McMurchy/Zupancis Relocation		
Project Location:	Aspen, Colorado		
Sampled by:	Chris Thompson		
Analyzed by:	BEE		
Sample Description: 14			
Front Porch Column			
Exterior			
Substrate:	Wood	Top Color:	Gray
LAYER #	COLOR DESCRIPTION	MUNSELL #	NOTES
1	Almost Cream	5Y 9/2 (?)	***Deteriorated
2	Medium Tan Gray	5Y 7/1 (?)	***Deteriorated
3			
4			
5			
6			
7			
8			
<div style="display: flex; border: 1px solid black; height: 150px;"> <div style="width: 30%; border-right: 1px solid black; border-bottom: 1px solid black;">  </div> <div style="width: 70%; border-bottom: 1px solid black;"></div> </div>			




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 PRESERVING THE PAST TRANSFORMING TOMORROW

PAINT ANALYSIS FORM			
Project Name:	Zupancis House McMurchy/Zupancis Relocation		
Project Location:	Aspen, Colorado		
Sampled by:	Chris Thompson		
Analyzed by:	BEE		
Sample Description: 15			
Screen Door			
Exterior			
Substrate:	Wood	Top Color:	White
LAYER #	COLOR DESCRIPTION	MUNSELL #	NOTES
1	Stain, Red Brown		
2	Stain Dark Brown/Black		
3			
4			
5			
6			
7			
8			
			




BUILT ENVIRONMENT EVOLUTION  
PRESERVING THE PAST TRANSFORMING TOMORROW

PAINT ANALYSIS FORM			
Project Name:	Zupancis House McMurphy/Zupancis Relocation		
Project Location:	Aspen, Colorado		
Sampled by:	BEE		
Analyzed by:	BEE		
Sample Description: 16			
Log Cabin, Room 1			
Window Frame - interior			
Substrate:	Wood	Top Color:	Chartreuse Black
LAYER #	COLOR DESCRIPTION	MUNSELL #	NOTES
1	Almost Cream	5Y 9/2	Albescent OC-40
2	Dark Red Purple	5R 2/4	
3	Chartreuse Black	10Y 3/1	**might be 7.5GY 3/2
4			
5			
6			
7			
8			
			




BUILT ENVIRONMENT EVOLUTION  
PRESERVING THE PAST TRANSFORMING TOMORROW

PAINT ANALYSIS FORM			
Project Name:	Zupancis House McMurphy/Zupancis Relocation		
Project Location:	Aspen, Colorado		
Sampled by:	BEE		
Analyzed by:	BEE		
Sample Description: 17			
Log Cabin, Room 1			
Baseboard			
Substrate:	Wood	Top Color:	Gray
LAYER #	COLOR DESCRIPTION	MUNSELL #	NOTES
1	Almost Cream	5Y 9/2	Albescent OC-40
2	Dark Red Purple	5R 2/4	
3	Chartreuse Black	10Y 3/1	**might be 7.5GY 3/2
4			
5			
6			
7			
8			
<div style="display: flex; align-items: center;">  <div style="flex-grow: 1;"></div> </div>			



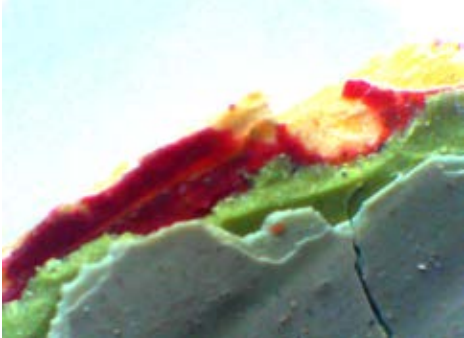


BUILT ENVIRONMENT EVOLUTION  
PRESERVING THE PAST TRANSFORMING TOMORROW

PAINT ANALYSIS FORM			
Project Name:	Zupancis House McMurphy/Zupancis Relocation		
Project Location:	Aspen, Colorado		
Sampled by:	BEE		
Analyzed by:	BEE		
Sample Description: 18			
Log Cabin, Room 1			
Bead Board			
Substrate:	Wood	Top Color:	Gray
LAYER #	COLOR DESCRIPTION	MUNSELL #	NOTES
1	Medium Gray Emerald Green	10GY 7/1	
2	Medium Tan Gray	5Y 7/1	
3			
4			
5			
6			
7			
8			
		Not original treatment	




BUILT ENVIRONMENT EVOLUTION  
 PRESERVING THE PAST TRANSFORMING TOMORROW

PAINT ANALYSIS FORM			
Project Name:	Zupancis House McMurchy/Zupancis Relocation		
Project Location:	Aspen, Colorado		
Sampled by:	BEE		
Analyzed by:	BEE		
Sample Description: 19			
Victorian Parlor, Rm 2			
Baseboard			
Substrate:	Wood	Top Color:	White
LAYER #	COLOR DESCRIPTION	MUNSELL #	NOTES
1	Almost Cream	5Y 9/2	
2	Dark Red Purple	5R 2/4	
3	Medium Spring Green	2.5GY 5/4	
4	Medium Tan Gray	5Y 7/1	
5	Gray		
6			
7			
8			
			




BUILT ENVIRONMENT EVOLUTION  
PRESERVING THE PAST TRANSFORMING TOMORROW

PAINT ANALYSIS FORM			
Project Name:	Zupancis House McMurphy/Zupancis Relocation		
Project Location:	Aspen, Colorado		
Sampled by:	BEE		
Analyzed by:	BEE		
Sample Description: 20			
Victorian Parlor, Rm 2			
Door Frame			
Substrate:	Wood	Top Color:	Gray
LAYER #	COLOR DESCRIPTION	MUNSELL #	NOTES
1	Medium Spring Green	2.5GY 5/4	deteriorated
2	Medium Tan Gray	5Y 7/1	
3			
4			
5			
6			
7			
8			
<div style="display: flex; align-items: center;">  <div style="flex-grow: 1; border-left: 1px solid black; border-right: 1px solid black; height: 150px;"></div> </div>			




BUILT ENVIRONMENT EVOLUTION  
PRESERVING THE PAST TRANSFORMING TOMORROW

PAINT ANALYSIS FORM			
Project Name:	Zupancis House McMurphy/Zupancis Relocation		
Project Location:	Aspen, Colorado		
Sampled by:	BEE		
Analyzed by:	BEE		
Sample Description: 21			
Victorian Parlor, Rm 2			
Frame @ Center Doorway			
Substrate:	Wood	Top Color:	Gray
LAYER #	COLOR DESCRIPTION	MUNSELL #	NOTES
1	Dark Red Purple	5R 2/4	
2	Medium Spring Green	2.5GY 5/4	
3	Medium Tan Gray	5Y 7/1	
4	Gray		
5			
6			
7			
8			
			




BUILT ENVIRONMENT EVOLUTION  
 PRESERVING THE PAST TRANSFORMING TOMORROW

PAINT ANALYSIS FORM			
Project Name:	Zupancis House McMurchy/Zupancis Relocation		
Project Location:	Aspen, Colorado		
Sampled by:	BEE		
Analyzed by:	BEE		
Sample Description: 22			
Victorian Back Room, Rm 3			
Door Frame @ Center			
Substrate:	Wood	Top Color:	Gray
LAYER #	COLOR DESCRIPTION	MUNSELL #	NOTES
1	Dark Red Purple	5R 2/4	
2	Medium Spring Green	2.5GY 5/4	
3	Medium Tan Gray	5Y 7/1	
4	Gray		
5			
6			
7			
8			
			




BUILT ENVIRONMENT EVOLUTION  
PRESERVING THE PAST TRANSFORMING TOMORROW

PAINT ANALYSIS FORM			
Project Name:	Zupancis House McMurchy/Zupancis Relocation		
Project Location:	Aspen, Colorado		
Sampled by:	BEE		
Analyzed by:	BEE		
Sample Description: 23			
Victorian Back Room, Rm 3			
Baseboard			
Substrate:	Wood	Top Color:	White
LAYER #	COLOR DESCRIPTION	MUNSELL #	NOTES
1	Dark Red Purple	5R 2/4	
2	Medium Spring Green	2.5GY 5/4	
3	Medium Tan Gray	5Y 7/1	
4	Gray		
5			
6			
7			
8			
			

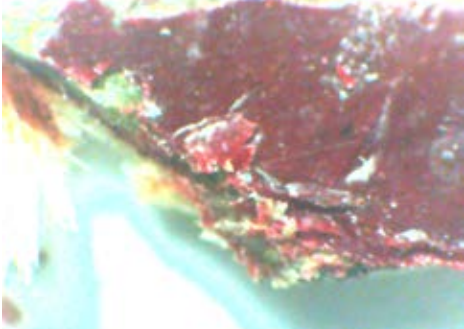


BUILT ENVIRONMENT EVOLUTION  
PRESERVING THE PAST TRANSFORMING TOMORROW

PAINT ANALYSIS FORM			
Project Name:	Zupancis House McMurchy/Zupancis Relocation		
Project Location:	Aspen, Colorado		
Sampled by:	BEE		
Analyzed by:	BEE		
Sample Description: 24			
Addition, Rm 6			
Green Room Wall			
Substrate:	Wood	Top Color:	Green
LAYER #	COLOR DESCRIPTION	MUNSELL #	NOTES
1	Bright Orange Brown	10YR 7/6	
2	Yellow Olive	7.5Y 7/6	
3	Medium Gray Emerald Green	10GY 7/1	
4	Medium Pea Green	5Y 5/4	
5	Green		
6			
7			
8			
			




BUILT ENVIRONMENT EVOLUTION  
PRESERVING THE PAST TRANSFORMING TOMORROW

PAINT ANALYSIS FORM			
Project Name:	Zupancis House McMurchy/Zupancis Relocation		
Project Location:	Aspen, Colorado		
Sampled by:	BEE		
Analyzed by:	BEE		
Sample Description: 25			
Addition, Back, Rm 5			
Door Frame			
Substrate:	Wood	Top Color:	Red
LAYER #	COLOR DESCRIPTION	MUNSELL #	NOTES
1	Dark Red Purple	5R 2/4	
2	Medium Pea Green	5Y 5/4	
3	Dark Red	7.5R 2/6	High gloss
4			
5			
6			
7			
8			
<div style="display: flex; align-items: center;">  <div style="border: 1px solid black; width: 400px; height: 150px;"></div> </div>			



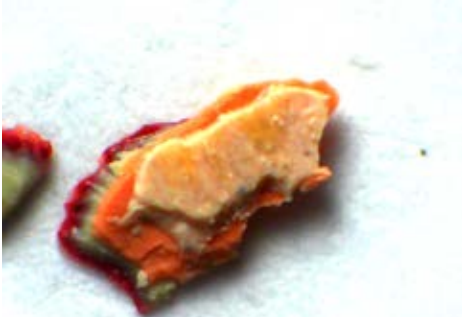


BUILT ENVIRONMENT EVOLUTION  
PRESERVING THE PAST TRANSFORMING TOMORROW

PAINT ANALYSIS FORM			
Project Name:	Zupancis House McMurchy/Zupancis Relocation		
Project Location:	Aspen, Colorado		
Sampled by:	BEE		
Analyzed by:	BEE		
Sample Description: 26			
Addition, Back Rm 5			
Baseboard			
Substrate:	Wood	Top Color:	Red
LAYER #	COLOR DESCRIPTION	MUNSELL #	NOTES
1	White	5Y 9/1	
2	Black Orange Red	2.5YR 2/2	
3	Dark Red Purple	5R 2/4	
4	Medium Pea Green	5Y 5/4	
5	Red		
6			
7			
8			
		Signs of Deco Paint	




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PAINT ANALYSIS FORM			
Project Name:	Zupancis House McMurchy/Zupancis Relocation		
Project Location:	Aspen, Colorado		
Sampled by:	BEE		
Analyzed by:	BEE		
Sample Description: 27			
Addition North Rm 4			
Closet Door Frame			
Substrate:	Wood	Top Color:	Red
LAYER #	COLOR DESCRIPTION	MUNSELL #	NOTES
1	Almost Cream	5Y 9/2	
2	Peach	2.5YR 7/6	
3	Light Yellow Olive	7.5Y 8/2	
4	Red		
5			
6			
7			
8			
			



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PRESERVING THE PAST TRANSFORMING TOMORROW

PAINT ANALYSIS FORM			
Project Name:	Zupancis House McMurchy/Zupancis Relocation		
Project Location:	Aspen, Colorado		
Sampled by:	BEE		
Analyzed by:	BEE		
Sample Description: 28			
Addition North Rm 4			
Baseboard			
Substrate:	Wood	Top Color:	White
LAYER #	COLOR DESCRIPTION	MUNSELL #	NOTES
1	Almost Cream	5Y 9/2	
2	Black Orange Red	2.5YR 2/2	
3	Almost White	5Y 9/1	
4	Peach	2.5YR 7/6	
5		7.5Y 8/2	
6			
7			
8			
<div style="display: flex; align-items: center;">  <div style="flex-grow: 1; border-left: 1px solid black; border-right: 1px solid black; height: 160px;"></div> </div>			



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## WALLPAPER REPORT

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### INTRODUCTION

Wall coverings have been used for hundreds of years as a material to decorate interiors. Various materials have been used, such as silk, linen, various qualities of papers, and during the later half of the twentieth century, vinyl and other synthetic materials. Wall coverings were often chosen to beautify an interior, depict the latest fashion, to complement the architecture, and tie together the interior furnishings with the surrounding walls. Early wall coverings were created by hand, often with incredible detail. The printing press allowed for more economical options, so homeowners of various classes could upgrade their interiors with wallpapers to imitate more opulent interiors of the wealthy homeowner. One characteristic of wall coverings is that they are applied directly to the wall surface, with adhesion techniques that typically keep the wall covering from ever being reused. Once applied it could be considered part of the structure, seldom removed or incorporated into another decorative scheme.

Wallpaper in the United States was manufactured using various techniques, inks, dyes, and pigments, on various qualities of papers, allowing for a range in quality and price. Some of the most common wallpapers were the least expensive, often using wood pulp, coated with distemper paints and dyes. Metallics were popular during the Victorian era, and could be found both on very expensive papers and more economical imitations. Understanding the components of a wallpaper sample can assist the conservator in understanding the time and place of the interior spaces it covers. Materials, patterns and different printing methods, can provide information about the functions of rooms, preferences of previous inhabitants, their social status, financial situation and prevailing fashions. It is most informative to view the sample wallpaper within the original environment, ideally with all interior features intact.



Conservation of wallpapers often is separated into two methodologies, such as the conservation of individual wallpaper samples (fragments of an original paper) and conservation of wallpapers in-situ, preserved intact in the original interiors. There are benefits and difficulties with both methods. Individual wallpaper samples can be moved from the original site, put into storage if needed, and used for displays, as a curator requires. The drawback to this technique is that once an object has been removed from the original context, it has lost the integrity that lends to the overall value both of the sample and of the original interior space. Once lost, this is difficult to reestablish. The second method, conservation in-situ, allows for the integrity of the space and the wallpaper samples to remain intact. Preserving historic wallpaper in its original location is ideal, but not always possible. The condition of the wallpaper and changes in the surrounding environment may require the removal of the papers in order to save them. The substrate must be examined, the space must be secure from infiltration of water, insects, fungus, etc., and the final use of the space must be considered. The recommended conservation treatment should stabilize the wallpaper, stop further decay, and allow for the preservation of all elements of the materials.

#### PROJECT SPECIFICS AND RESULTS:

The Zupancis House interiors have multiple layers of wallpaper in most rooms of the house. Each room that was investigated showed the first layer of paper was applied to a linen backing. Some of these backings showed signs that the fabric was repurposed, perhaps from use as flour sacks or something similar. Addition Room 5 had a fabric backing that appeared to be similar to mattress ticking. Water infiltration had damaged both the linen backings and the layers of wallpapers, causing staining and the transfer of pigments and dyes between layers and to the fabric backing. The number of years that the house stood empty allowed dust and dirt to penetrate various layers, causing further deterioration. Insects had also penetrated the layers, and although there was



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no damage found from insects eating the wallpapers, it seems they found the substrate/linen/wallpaper layers the ideal living situation. Separating the paper layers in order to identify the specific patterns from various periods, showed many identifying characteristics as well as additional information for the conservation process.

1. The substrate was often a wood sheathing with a linen backing nailed to it, often with small upholstery nails or similar being used. The linen was sewn together, with what appears to be a standardized stitch of a sewing machine.
2. It appears that many of the layers were partially removed, or had begun to deteriorate when the next layer was applied. The next layer was applied directly on top of the incomplete first layer.
3. Often the number of layers of wallpaper indicate the age of the space. However the oldest area of the house, the original cabin structure, had the fewest layers, with only two layers of wallpaper. The newer space, in Addition Room 4, had the most layers of wallpaper. This creates a challenge to identifying a specific paper to a specific time period of the interior decor. Research to identify the manufacturers of the various wallpapers layers continues, so that if a match in patterns may be found, that a date can be applied to the specific paper.
4. Cross section microscopy showed wallpaper to be made of wood pulp fibers, aligned in one direction, indicating production was mechanized on rollers, verses a hand made paper. Of the available wallpapers, these samples all appear to be of a less expensive variety, although there are signs that the original layers in the Victorian Room 2 and Room 3 have better inks and pigments than the other layers on top.
5. Water staining varied on the layers, perhaps due to multiple leaks in the space that were repaired, and new paper covering the original staining. In addition, it appears there was water infiltration during the time the



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building was unoccupied. This appears to have caused staining, decay, mold, and the transfer of pigments to the adjacent wallpaper layers.

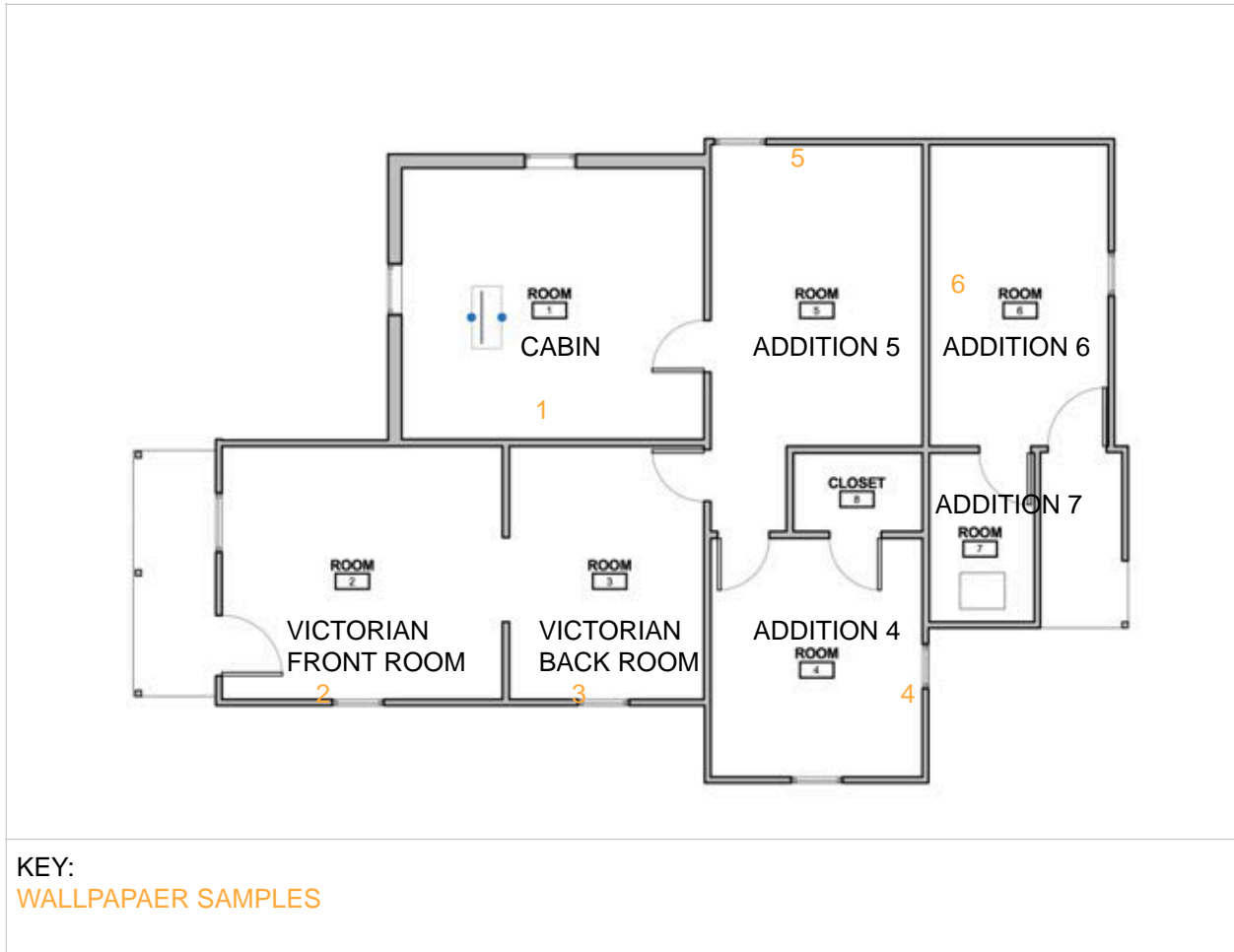
6. The wallpaper samples were in remarkably good condition for the length of time the house stood without maintenance. However all samples were brittle, and prone to breaking into small pieces. Removal of any papers for conservation will require care and attention.

The above issues are taken into consideration when deciding the best and most practical options for conservation. These recommendations can be found on page 123.



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## KEY INDEX: WALLPAPER SAMPLE LOCATION PLAN







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## WALLPAPER SAMPLE PHOTOS

CABIN - ROOM 1



1. Top Layer of Wallpaper, currently visible on the walls of the interior of the Log Cabin.



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2. Second Layer of wallpaper in the Log Cabin.



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3. Linen backing, surface wallpaper is attached to.



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VICTORIAN FRONT ROOM - ROOM 2



1. Top Layer of Wallpaper, currently visible on the walls of the interior of the Victorian Parlor.



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2. Second Layer of wallpaper in the Victorian Parlot.



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3. Third layer of wallpaper in the Victorian Parlor.



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4. The forth and oldest (possibly original) wallpaper in the Victorian Parlor.



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5. Linen back to Wallpaper from Victorian Parlor.





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VICTORIAN BACK ROOM - ROOM 3



1. Top Layer of Wallpaper, currently visible on the walls of the interior of the Victorian Back Room.



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2. Second Layer of wallpaper in the Victorian Back Room.



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3. Third layer of wallpaper in the Victorian Back Room.



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4. Forth layer of wallpaper in the Victorian Back Room.



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5. Fifth (oldest) layer of wallpaper in the Victorian Back Room.



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6. Linen layer, base for the wallpaper in the Victorian Back Room.



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ADDITION - ROOM 4



1. Top Layer of Wallpaper, currently visible on the walls of the interior of Addition Room 4.



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2. Second Layer of wallpaper in Addition Room 4.





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3. Third layer of wallpaper in Addition Room 4.



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4. Forth layer of wallpaper in Addition Room 4.



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5. Fifth layer of wallpaper in Addition Room 4.



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6. Sixth layer of wallpaper in Addition Room 4.



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7. Seventh layer of wallpaper in Addition Room 4.



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8. Eighth layer - Linen backing in Addition Room 4. Note: Image appears to be from a flour sack.



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ADDITION - ROOM 5



1. Top Layer of Wallpaper, currently visible on the walls of the interior of Addition Room 5.



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2. Second Layer of wallpaper in Addition Room 5





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3. Third layer of wallpaper in Addition Room 5.



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4. Forth layer of wallpaper in Addition Room 5.



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5. Fifth layer of wallpaper in Addition Room 5.



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6. Sixth layer of wallpaper in Addition Room 5.



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7. Seventh layer of wallpaper in Addition Room 5.



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8. Eighth layer of wallpaper in Addition Room 5.



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9. Ninth layer of wallpaper in Addition Room 5.



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10. Tenth layer of wallpaper in Addition Room 5.





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11. Eleventh layer of wallpaper found behind sample of Linen Backing found in Addition Room 5.



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ADDITION ROOM 6 - Green Paint, no wallpaper or wall coverings

ADDITION ROOM 7 - Green Paint, no wallpaper or wall coverings



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## LINOLEUM REPORT

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### INTRODUCTION

Linoleum has been used over the past century and a half as a durable and affordable floor covering. The process for the flooring was patented in 1860, and has continued to evolve with changes in the formulas to allow a greater resistance to abrasion, as well as more vibrant colors. Often seen as a cheap, disposable material, it is increasingly rare to find the oldest, historic linoleum intact. Identifying characteristics include burlap or jute backing, linseed oil, various resins (often pine), ground limestone, wood powder and drying agents. Early patterns began as simple, one-color sheets, or “marble” swirls of color. Patterns may have been painted on the surface. Later patterns included faux patterns of brick, ceramic tiles, wood, paint spatters, geometrics, florals, Persian rugs, etc. By the 1930s there were many options to cut the linoleum and create inlays such as Greek key borders, leaves and ribbons. Linoleums are often revealed under later floor treatments, and can at times occur in multiple layers. BEE uses XRF analysis to identify the constituents of the flooring to interpret the time period of the flooring sample.

### COMMON TERMS AND DEFINITIONS

- Linoleum - a combination of linseed oil, gums, resins, cork and/or wood flour and pigments, with a backing, often burlap.
  - Plain - one color throughout the depth of the floor covering. The surface may or may not have a painted surface.
  - Inlaid - a pattern is produced with pigment that colors the depth of the specific area, similar to tiles melted together into one uniformed surface.
- Printed Felt Base - A felt base saturated by asphalt both top and bottom, and a surface application of paint.
- Asphalt Tile - asphalts or synthetic resins, asbestos fibers, pigments, and mineral fillers. Tiles evolved to have better color with the addition of plasticized resins.
- Vinyl Floor Covering - Vinyl asbestos, developed from asphalt tiles. Asbestos fibers, mineral fillers, and pigments bonded with copolymers of vinyl chloride, or vinyl acetate. Embossing and clear layers can produce inlaid and three-dimensional effects.



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- Rubber Flooring - early forms are made with natural rubber, with later forms made of synthetic rubber, pigments, fillers, resins, and curing materials. The floor covering is often sold as tiles or in rolls.
- Epoxy Resin - an epoxy resin with two parts that are mixed together before creating a seamless, poured surface that begins curing at the time of mixing, with pigments and fillers added during the liquid state.

## PERFORMANCE

Linoleum flooring is a resilient, hard surface that resists wear, indentation, alkalis, and organic solvents. Certain tires, rubber casters and rubber wheels can cause discoloration from extended contact. The material warms quickly to be comfortable under foot, resists combustion, fungal attack, mild acids and alkalis, oils and grease. Linoleum is best maintained with regular sweeping, warm water with soap or detergent, with wax, resin or emulsion polishes to improve shine and prolong life.

## A BRIEF HISTORY

Linoleum type products appear to have been used during the early seventeenth century, but the patent for processing Linoleum was granted in 1860 to Frederick Walton of Great Britain. Plain Linoleum was popular, and was often used until approximately the mid 1930s. Decorative Linoleum was designed at this time, and began to replace the plainer predecessor in floor coverings. In the 1920s, sheet and tile materials were developed with a base of asphalt mixed with asbestos fibers and mineral fillers, often with the characteristics of dark-colored base. Light-colored resins became available within the next 10 years, and although these newer products did not contain asphalt, the name persisted. The Chicago World's Fair in 1933 introduced vinyl asbestos tiles, but shortages in resin impeded large-scale production until 1948. The introductory vinyl was a composite of polyvinyl chloride resins. Many types of this floor covering became available after World War II, as the production of plastics increased. Traditional Linoleum remained in use, but other were gaining popularity as affordable choices in flooring, including materials as asphalt, cork, rubber, vinyl asbestos, and the various types of vinyl. By the late 1950s, vinyl flooring was becoming the popular material of choice. The 1960s brought a new era of flooring, with epoxy resins that could be poured directly on the floor base, and allowed to harden into a durable, seamless surface. Today's flooring allows many choices in composite flooring materials. Companies that currently manufacture linoleum advertise a "natural" flooring material, made of



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renewables, that combine to make a low-maintenance, environmental product of choice.

#### ANALYSIS AND USES

Linoleum was a common flooring found in many residential and commercial application. It provides a resilient surface with little reaction to acids or alkaloids. Linoleum is made of linseed oil, pigments, pine rosin and pine flour. It is manufactured by oxidizing linseed oil and adding the other ingredients to form a thick mixture called linoleum cement. According to the Columbia University Press, "linseed oil is exposed to the air in a succession of thin films until it is of a rubbery consistency, or it is thickened by heating until it becomes a spongy mass, after which it is ground, mixed with pulverized wood and other ingredients, and then applied to the foundation and rolled smooth." Additional items may be used, such as ground limestone or granite. The final process is a thorough seasoning in drying rooms or draped over ovens. The final product can be prepared as a sheet or as individual tiles.

#### PROJECT SPECIFICS AND RESULTS

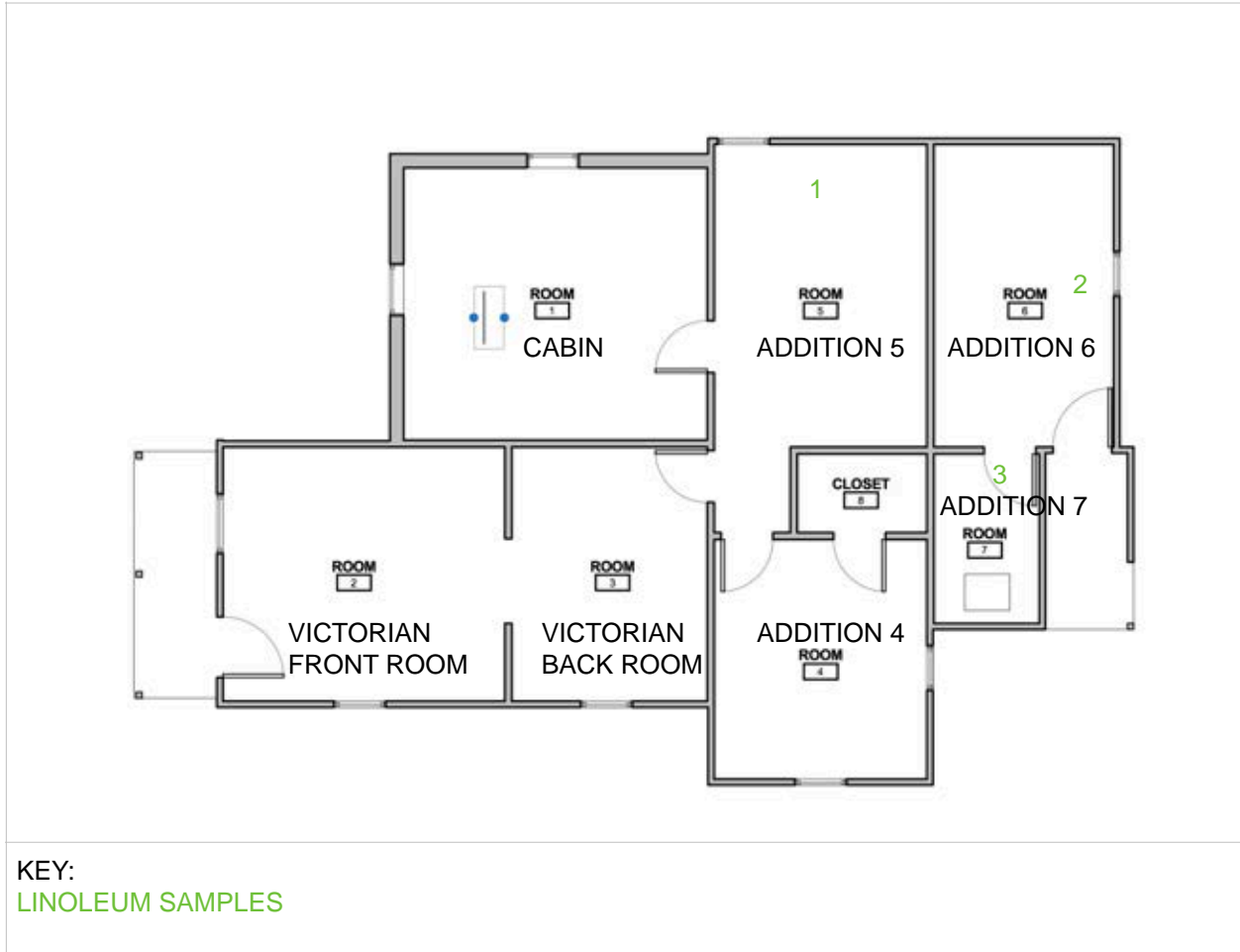
Samples of linoleum flooring found at the Zupancic house were collected from the site and brought to the BEE laboratory for analysis using X-ray fluorescence. Pigments were identified, showing the earliest date of the linoleum had to be after 1921 due to the presence of titanium as a pigment in the white portions of the product. Zinc was also found, and is the main pigment for the white portions of the flooring. Several unusual heavy metals were identified, used for drying and hardening the materials. Notes have been provided with each image of the spectra created by the XRF analysis. A chart with the specific numbers (photon counts) for each element found is located on page 185.

Recommendations for linoleum can be found on page 150.



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## KEY INDEX: LINOLEUM SAMPLE LOCATION PLAN





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## LINOLEUM SAMPLE PHOTOS



ADDITION ROOM 5 - SAMPLE FROM FIRST LAYER OF LINOLEUM, BEE LAB PHOTO  
Note: The colors of this sample are inherent from surface to base, and have been melted together to form the sheet.



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ADDITION ROOM 6 - SAMPLE FROM SECOND LAYER OF LINOLEUM, BEE LAB PHOTO

Note: This pattern was applied with paint, and is significantly worn. Areas of intact linoleum that remain on site should be cleaned with warm soapy water, and re-photographed if the pattern is to be used for a digital vinyl reproduction.



ADDITION ROOM 7 - BEE LAB PHOTO

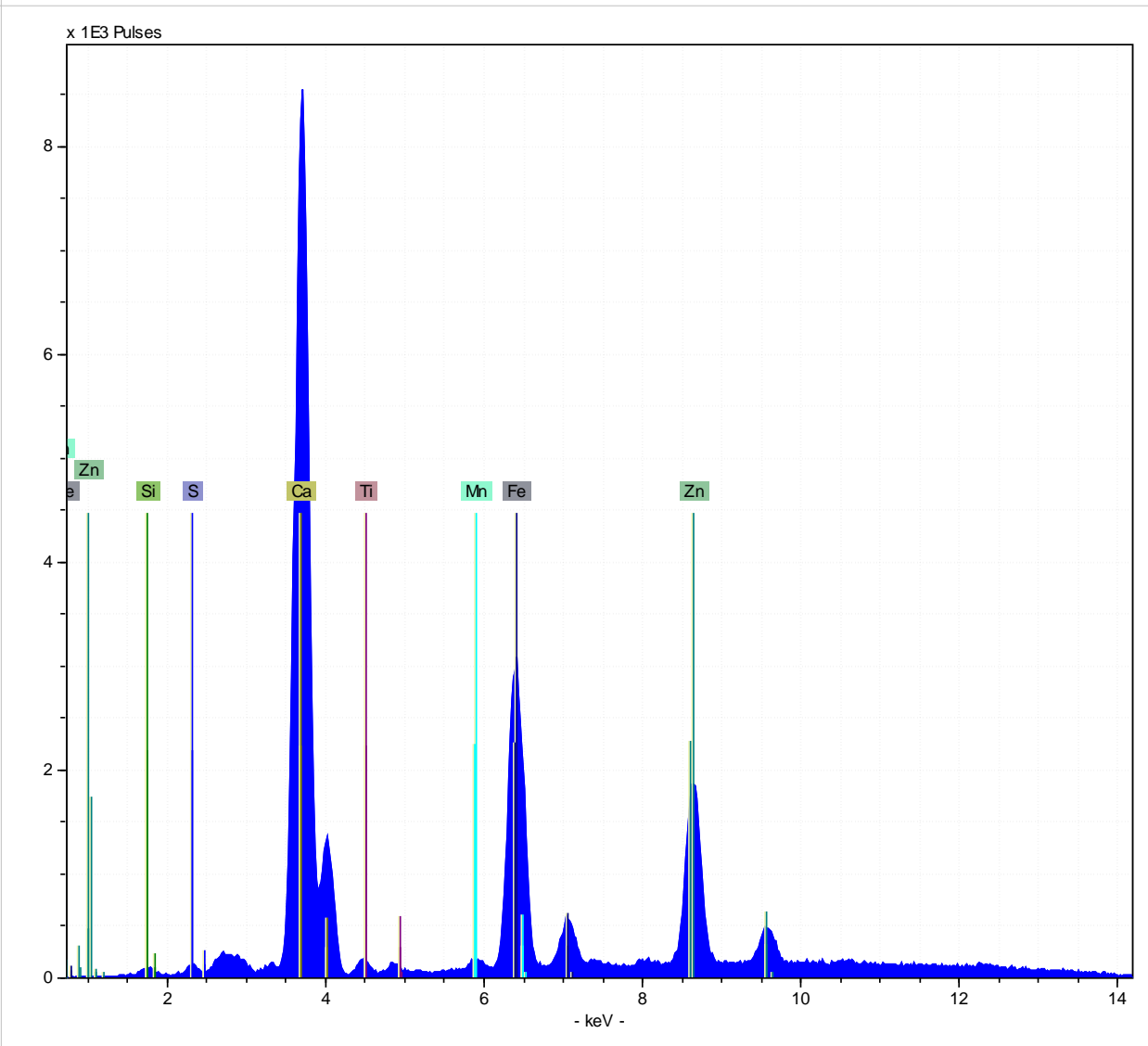




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## XRF LINOLEUM SAMPLE RESULTS

SAMPLE 5: ROOM 5, GREEN WHITE SPECKLE LINOLEUM - UNDERSIDE

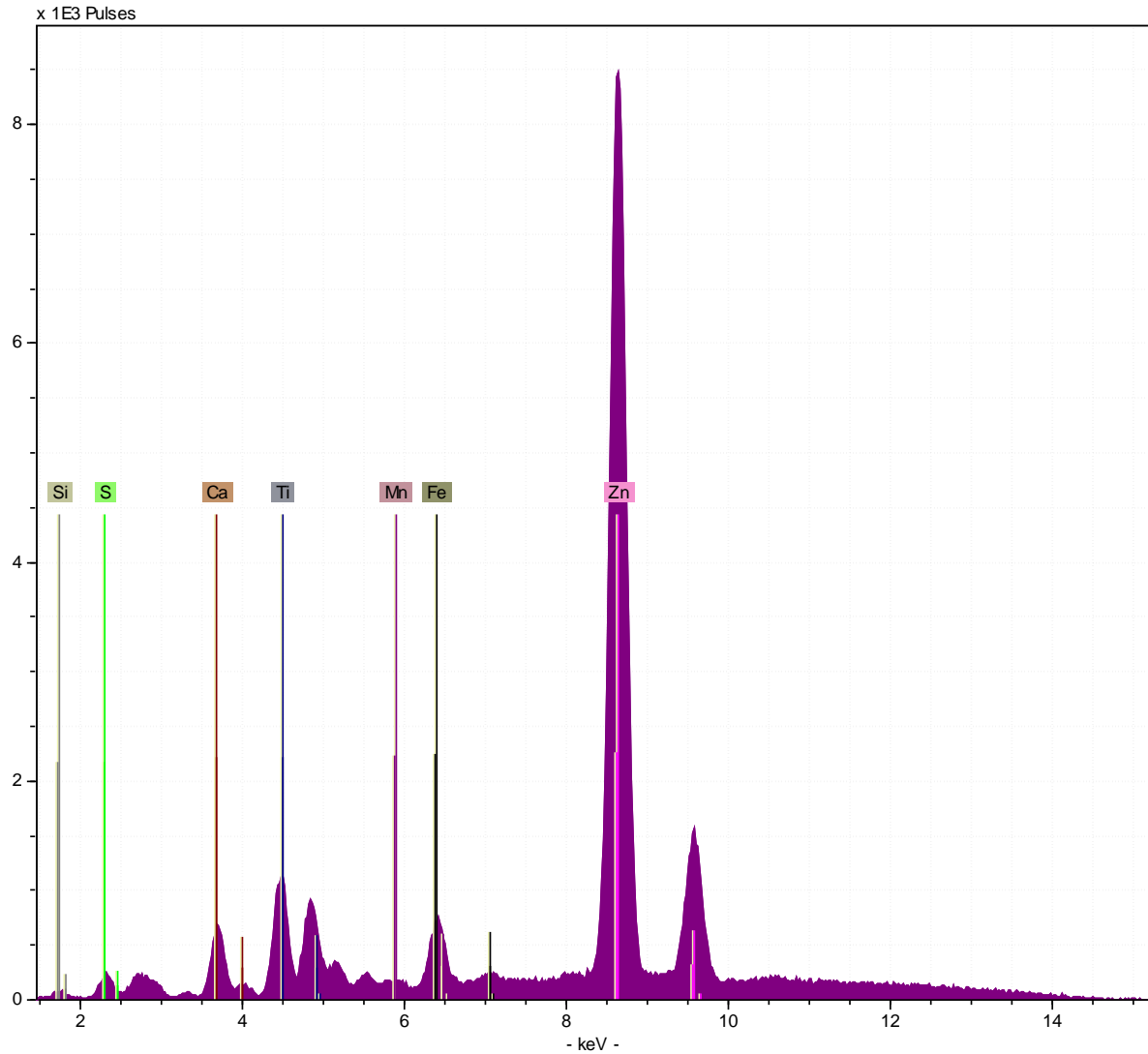


There is a large amount of calcium (Ca) in this sample from the underside, or base of the sample. This could be from a ground limestone, although with the iron (Fe) it could also be feldspar from granite. There is some zinc and titanium pigments present, but not in large quantities.



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### SAMPLE 6: ROOM 5, GREEN WHITE SPECKLE LINOLEUM - TOP

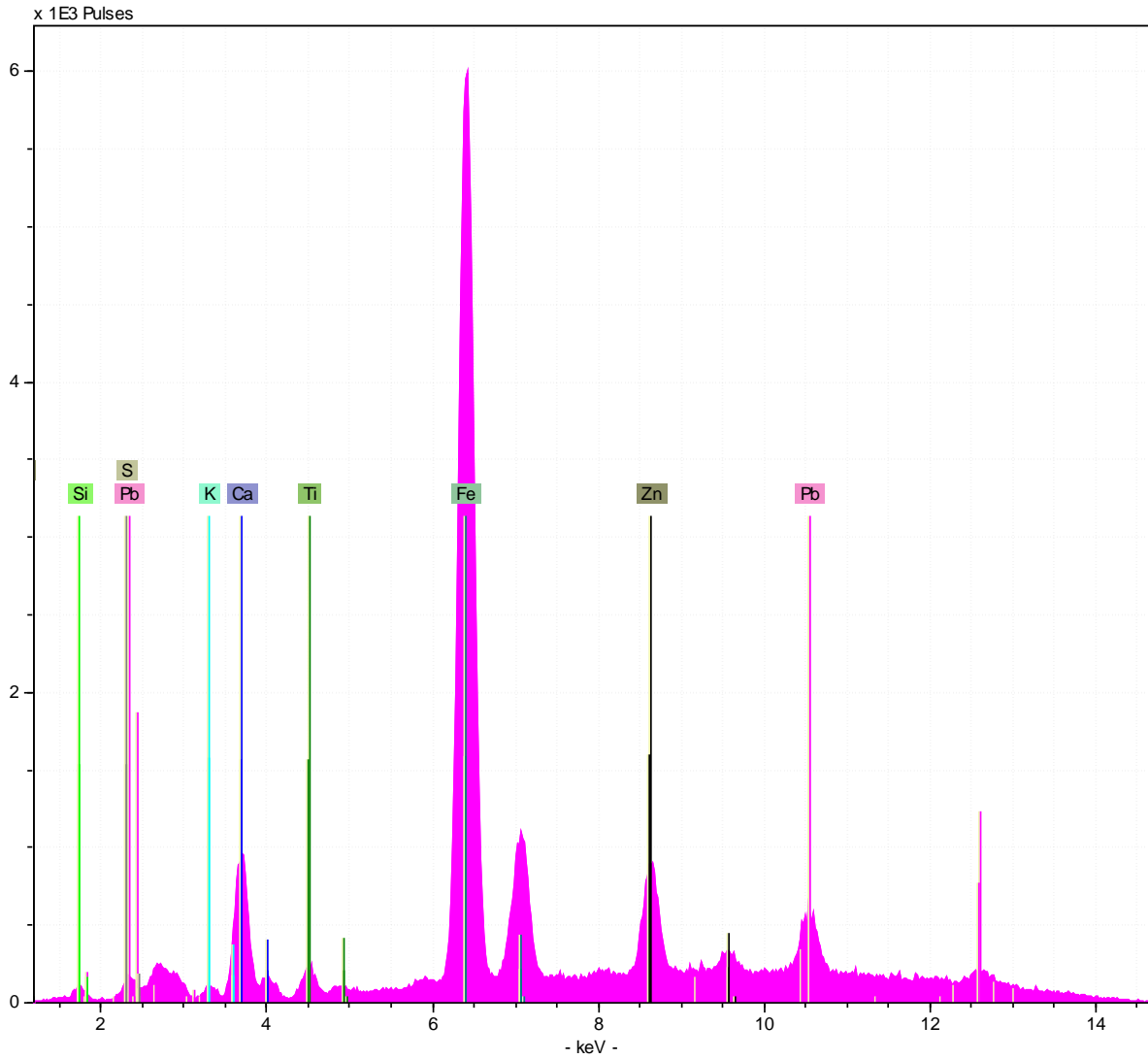


The top side of the linoleum shows the strong peak at zinc, with a smaller peak at titanium (Ti). Titanium began being used as a pigment in 1921, dating this linoleum sample to have a post 1921 manufacturing date.



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SAMPLE 7: ROOM 7, LINOLEUM LARGE STAR, BROWN AREA - UNDERSIDE

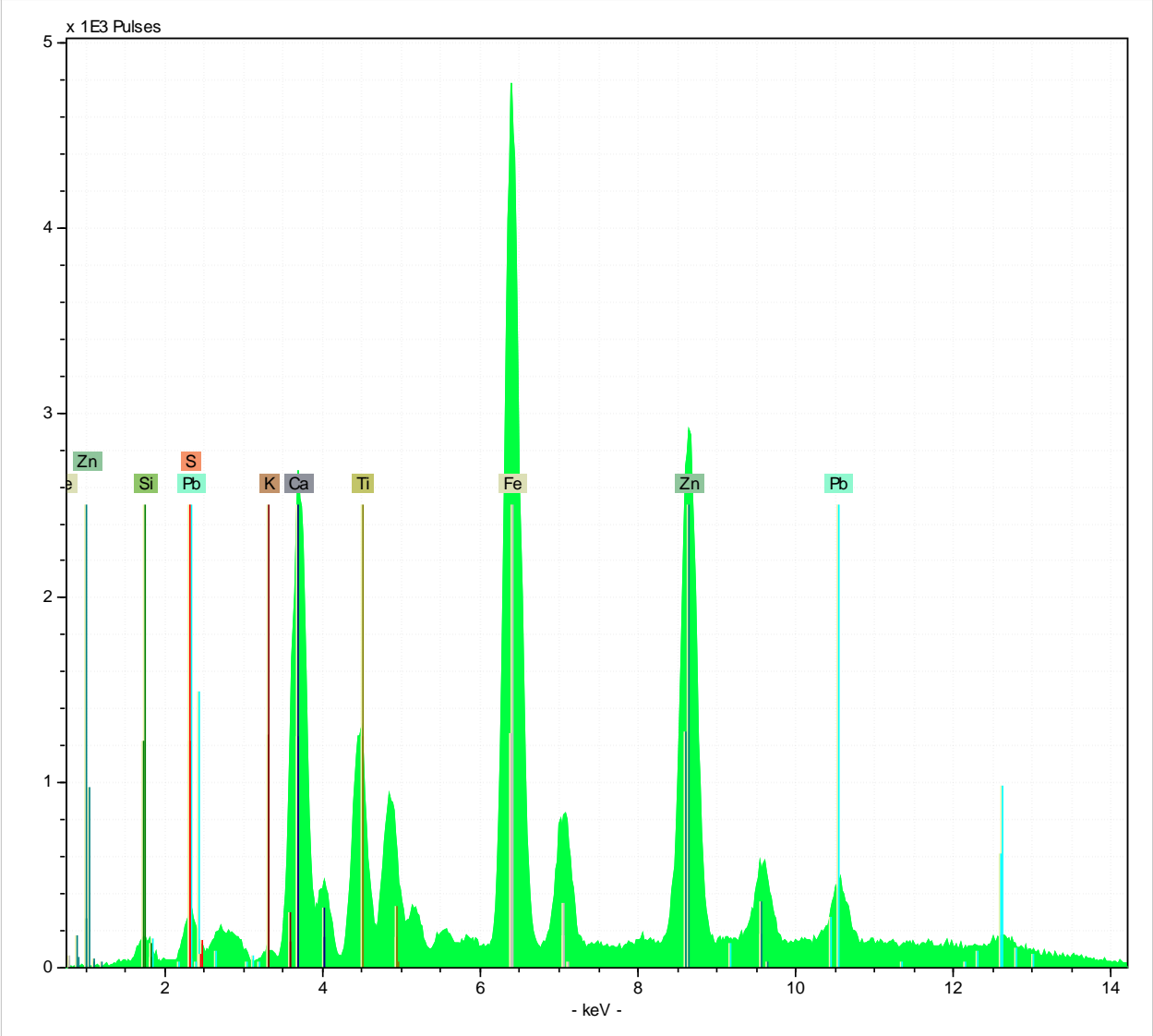


This side of the sample shows a large peak at iron (Fe). Often iron is used as a pigment for reds and browns, but it can also be used as a drying agent or desiccant. Note the lead present. There is lead found in the carpet samples too. Neither the linoleum or the carpet require lead for dyes or pigments. It seems to be a part of the dust of the house. Many odd metals appear to be part of the dust in the house, including gold and silver.



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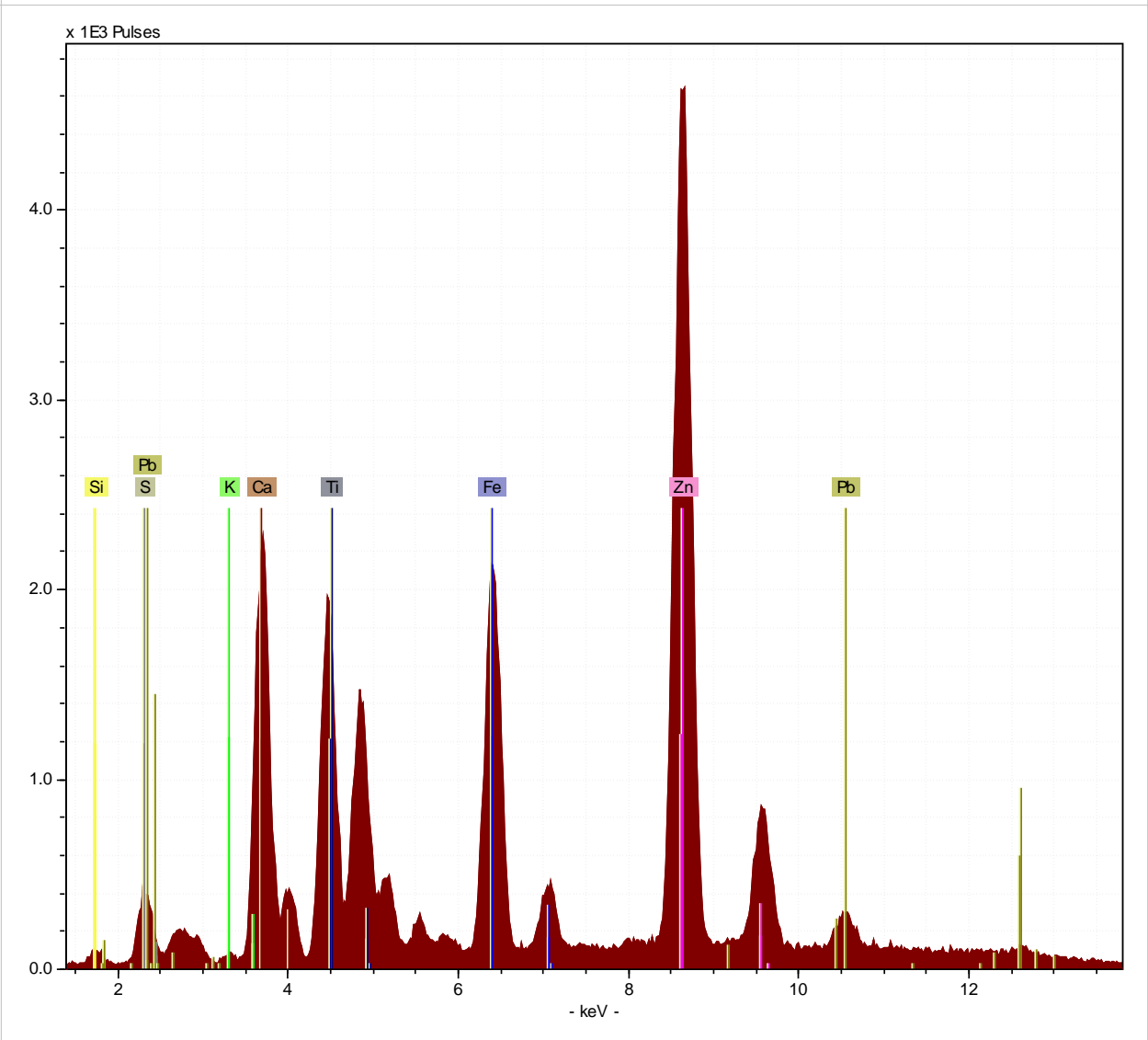
SAMPLE 8: ROOM 7, LINOLEUM LARGE STAR, BROWN AREA - TOP





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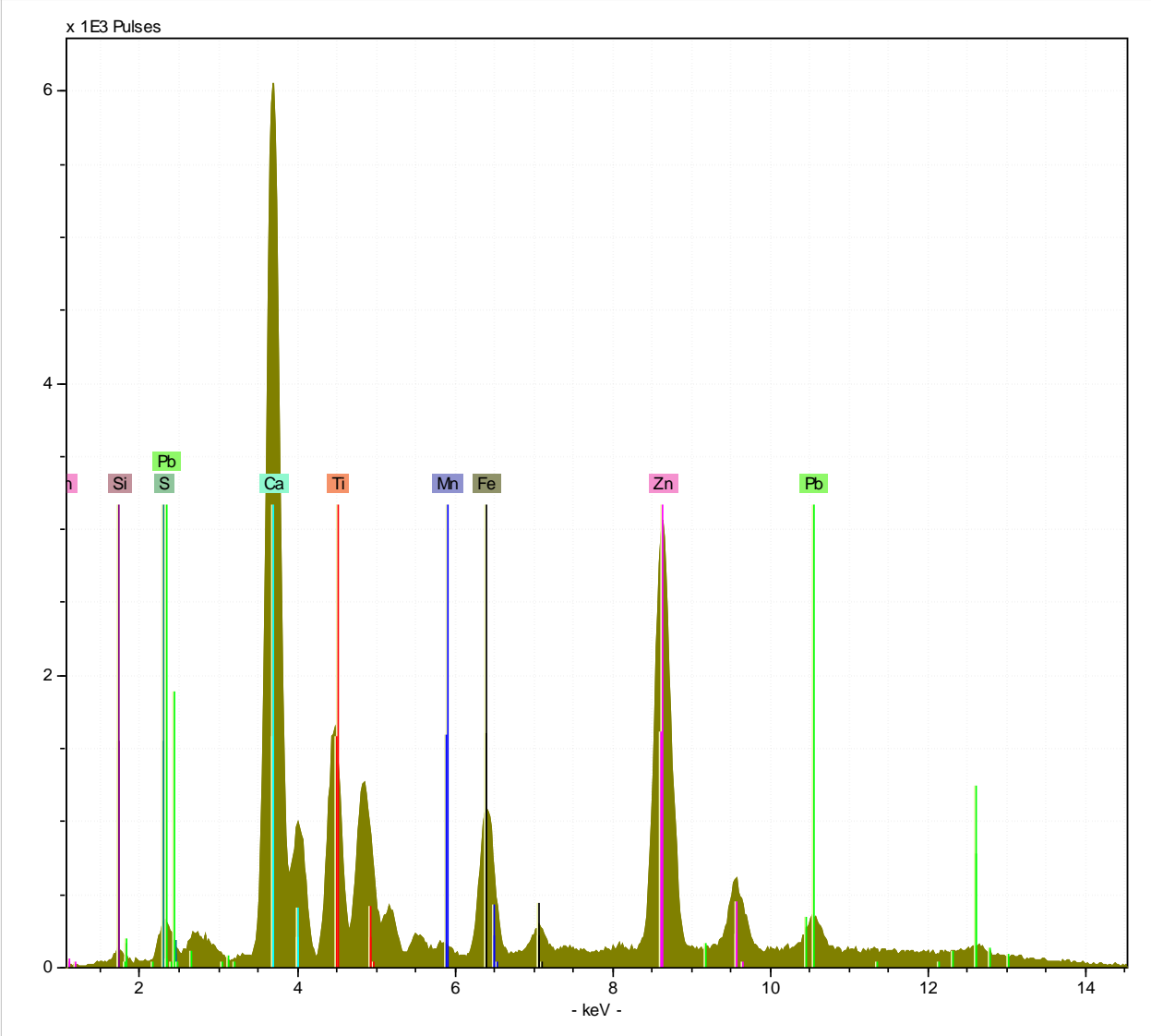
SAMPLE 9: ROOM 7, LINOLEUM LARGE STAR, CREAM AREA





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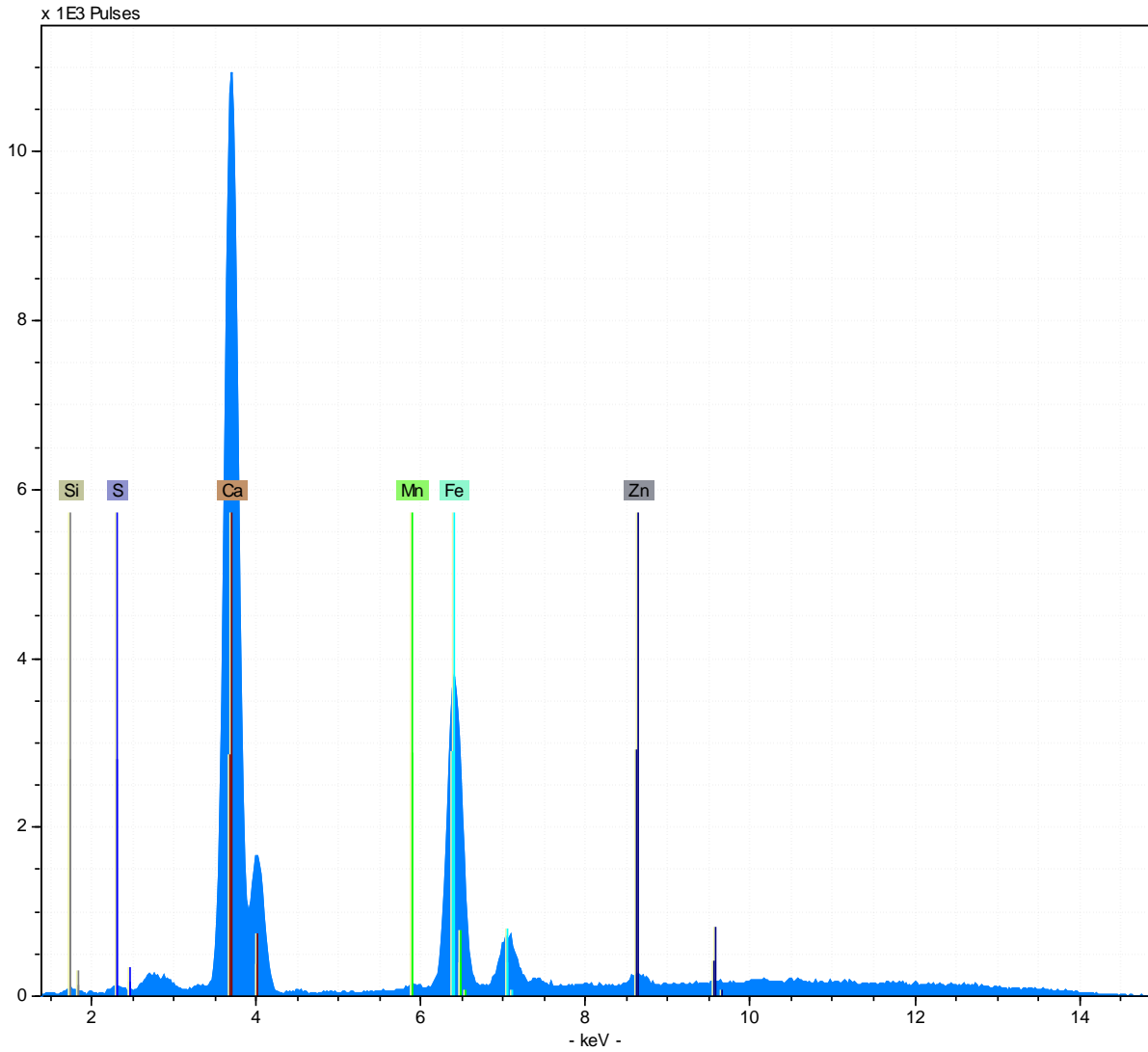
SAMPLE 10: ROOM 7, LINOLEUM LARGE STAR, MAROON AREA





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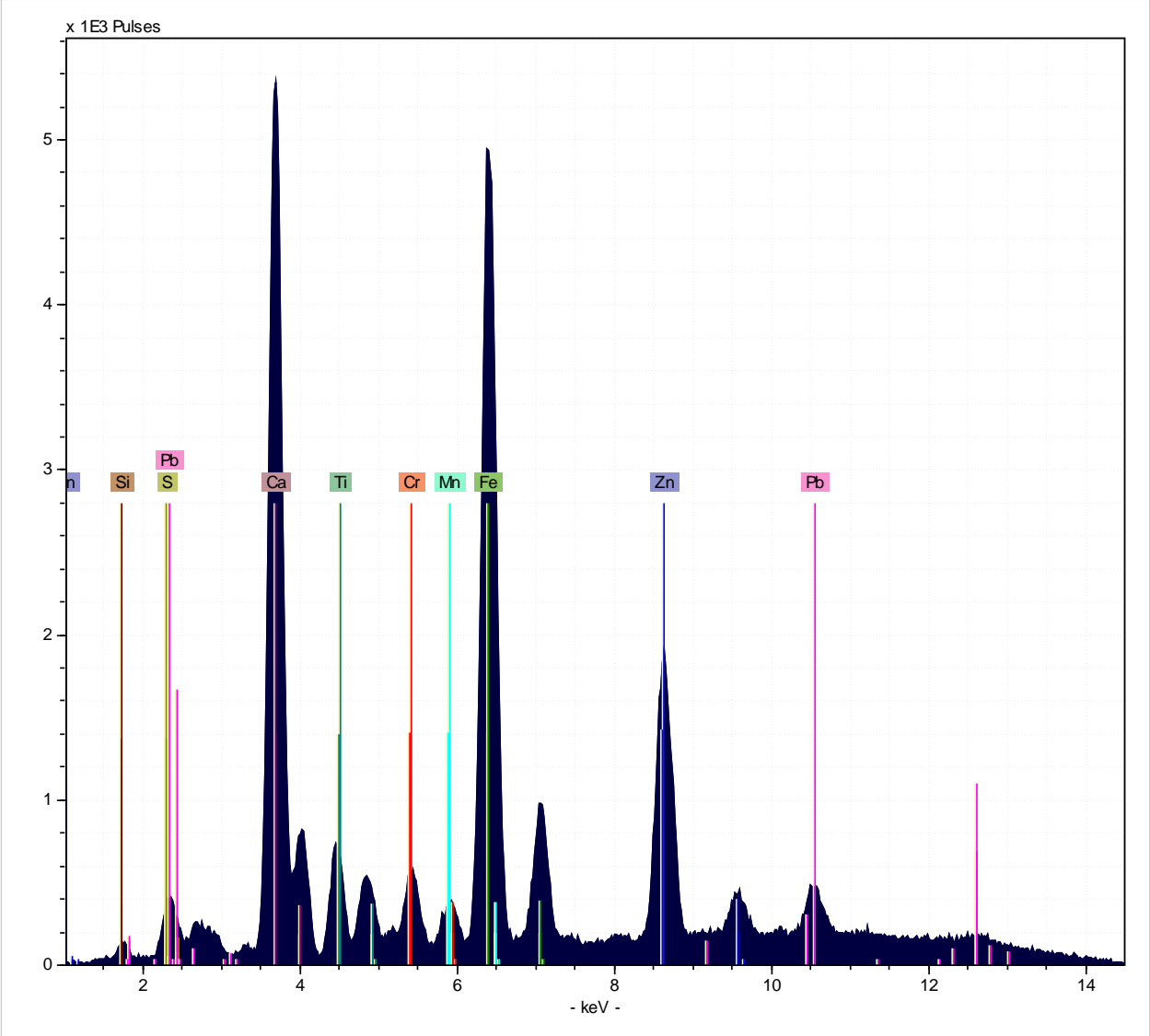
SAMPLE 11: ROOM 6, LINOLEUM SMALL STAR - BACK





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SAMPLE 12: ROOM 6, LINOLEUM SMALL STAR - BLACK STAR

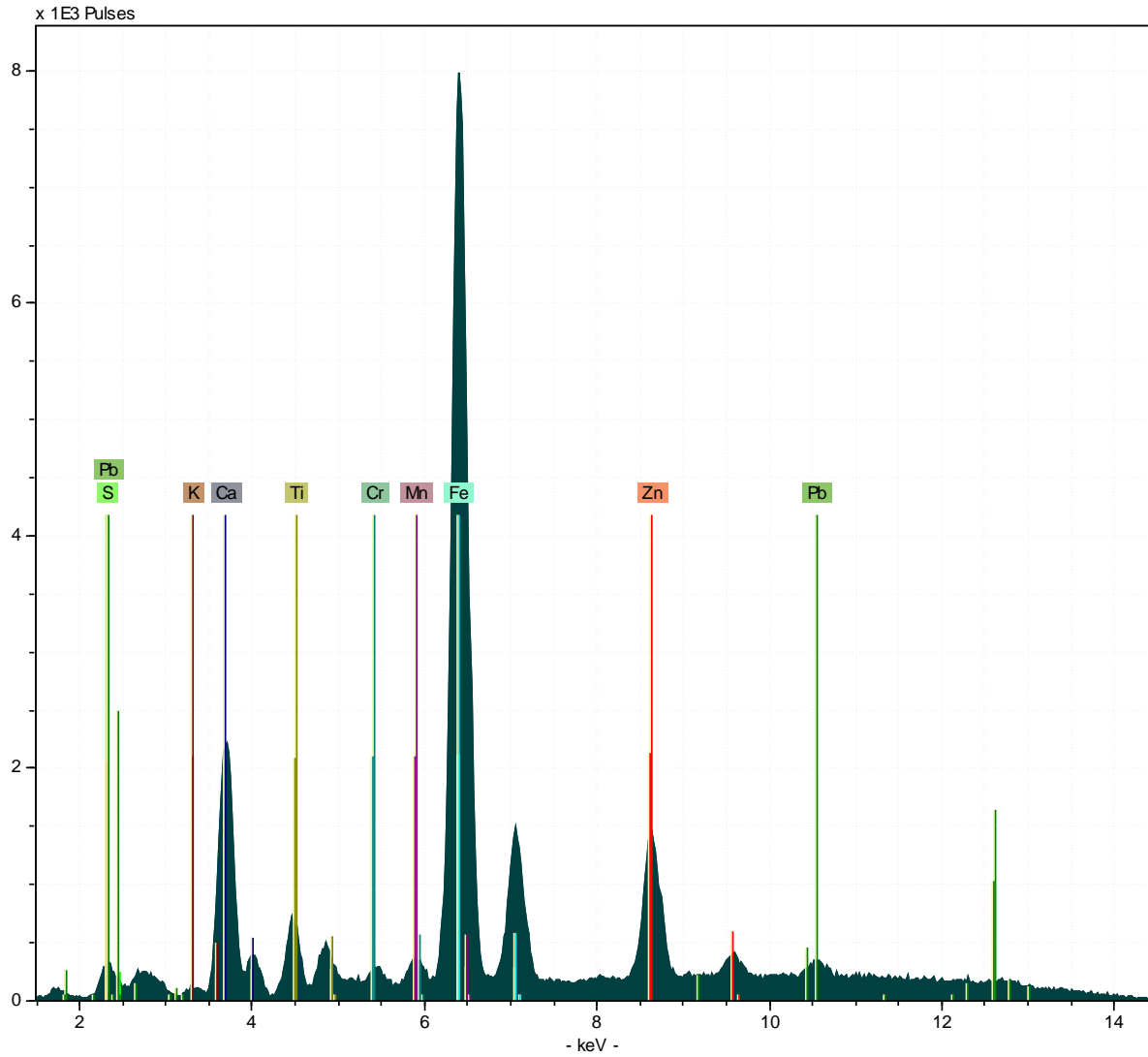






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SAMPLE 13: ROOM 6, LINOLEUM SMALL STAR - GREEN STAR

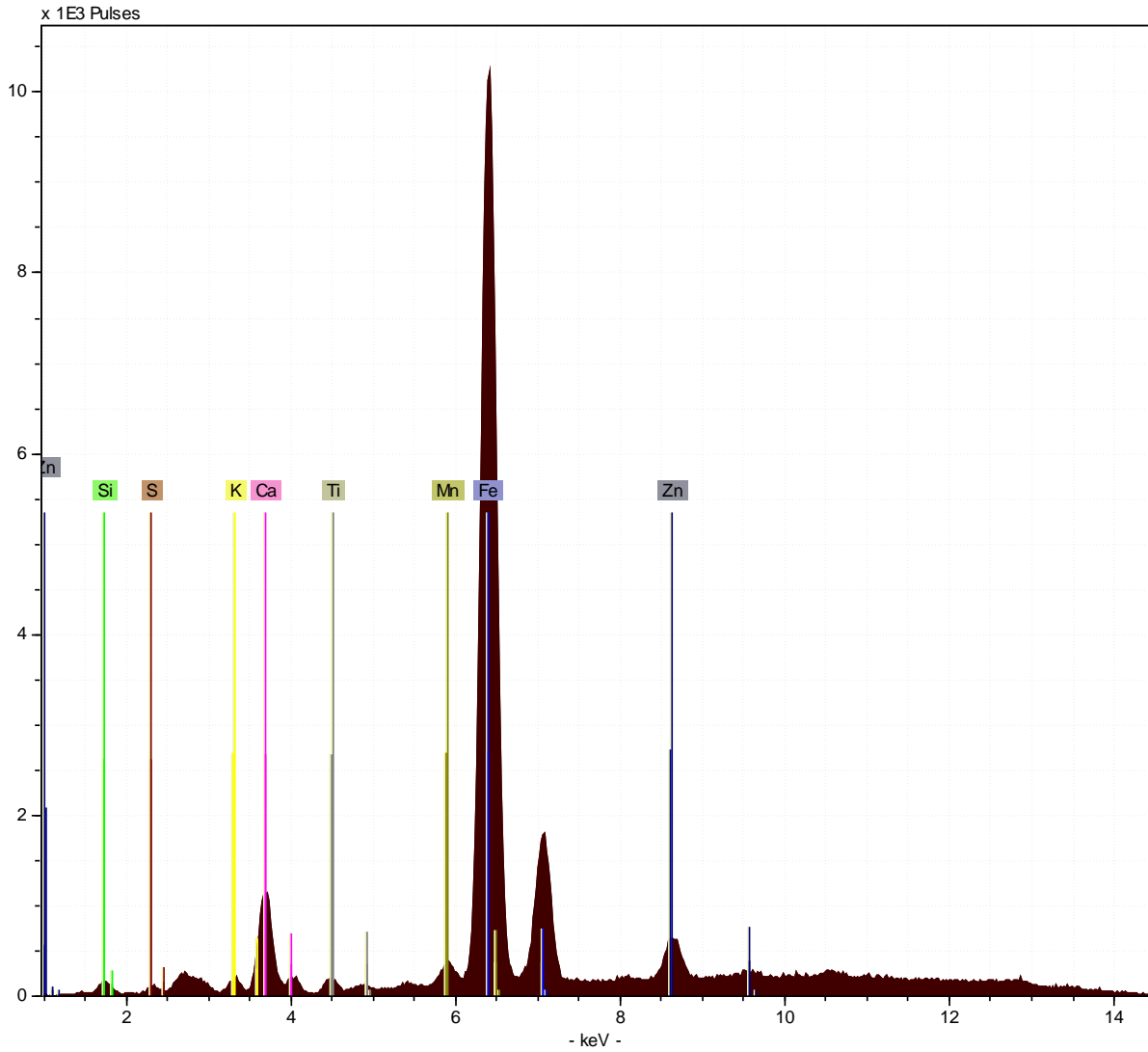


A small peak at Chromium (Cr) shows the pigment for the green paint.



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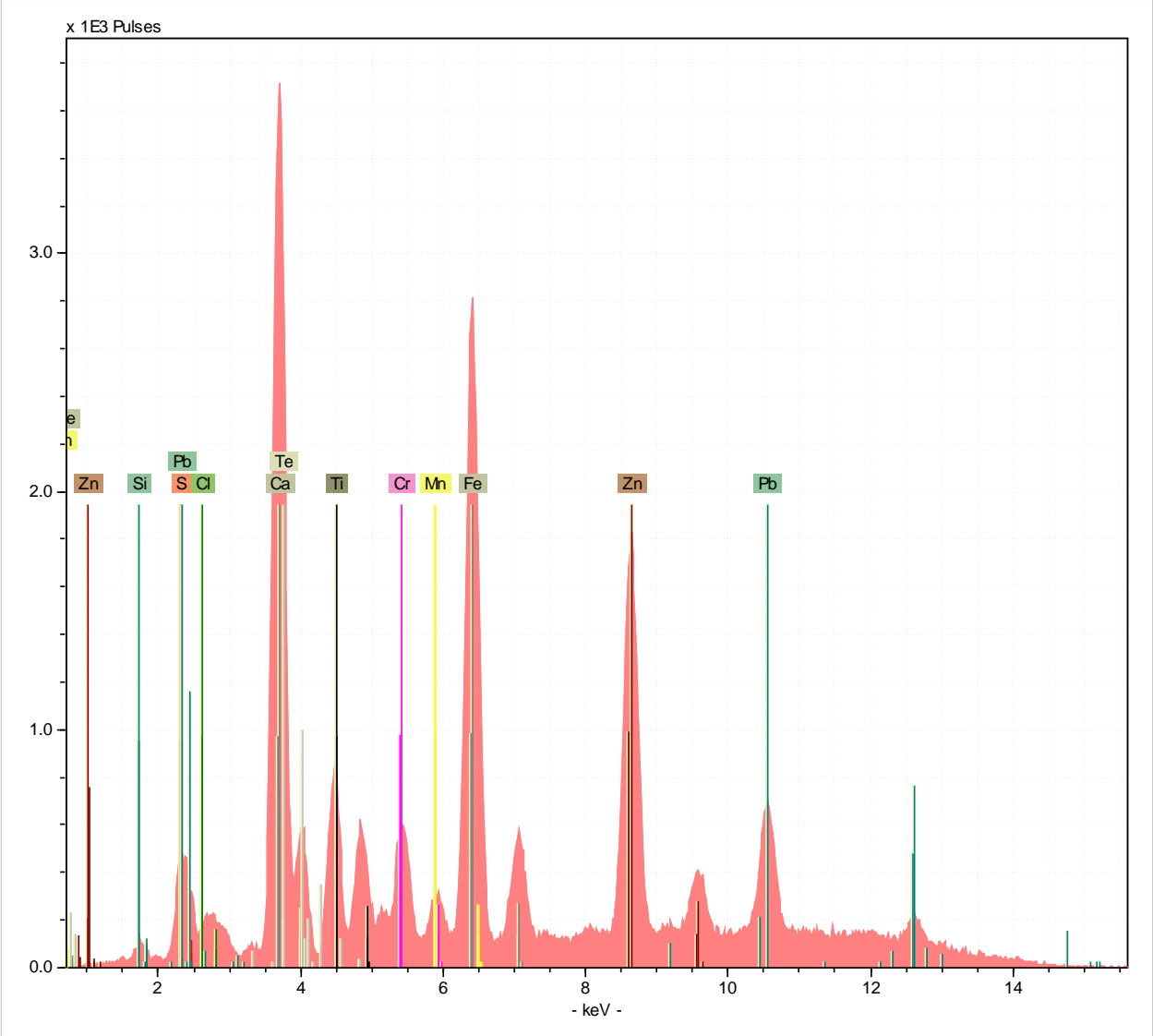
SAMPLE 14: ROOM 6, LINOLEUM SMALL STAR - PLAIN AREA BETWEEN IMAGES, BROWN





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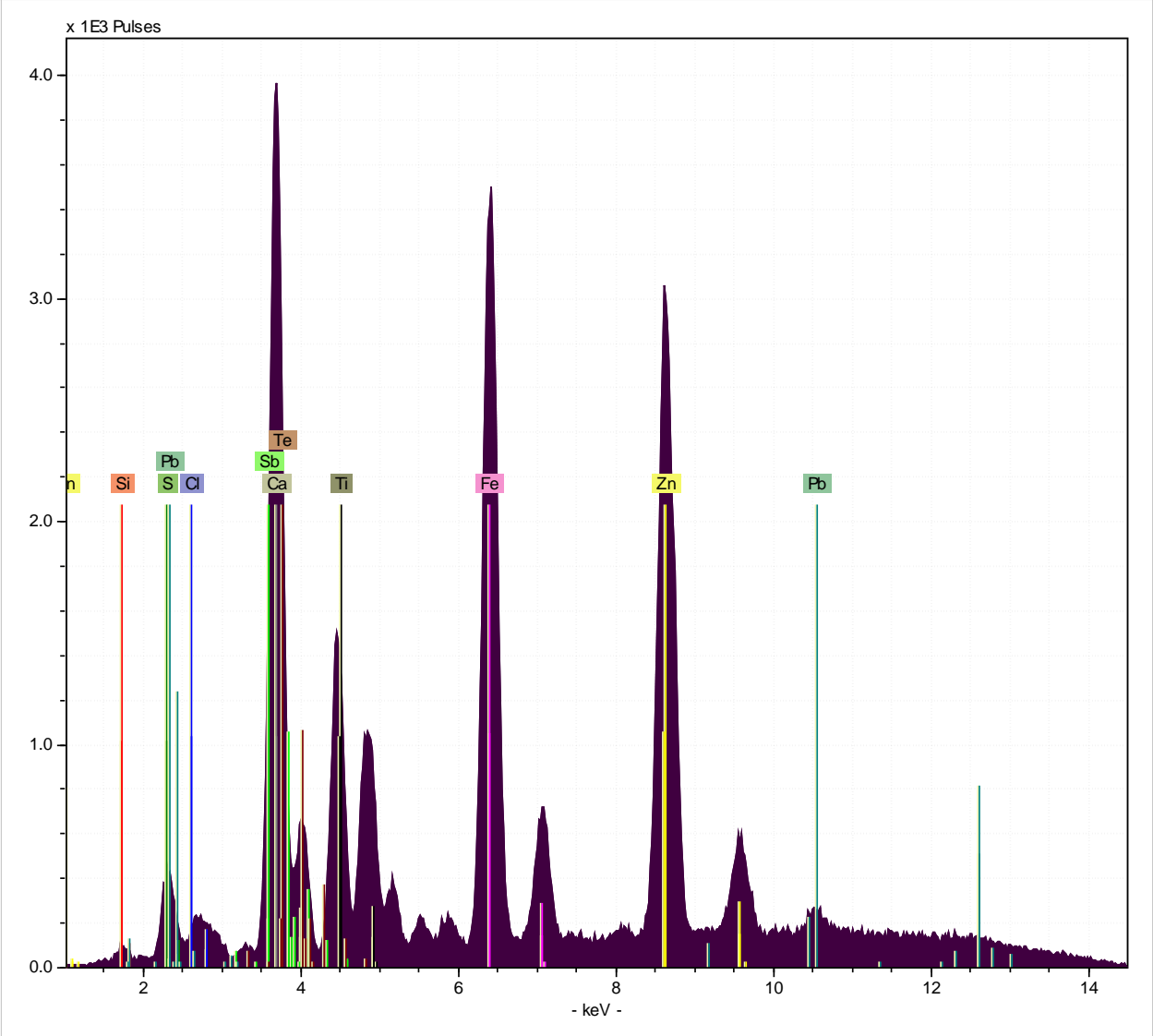
SAMPLE 15: ROOM 6, LINOLEUM SMALL STAR - RED STAR





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SAMPLE 16: ROOM 6, LINOLEUM SMALL STAR - WHITE STAR



## CARPET REPORT

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### INTRODUCTION

#### COMMON TERMS AND DEFINITIONS

- Ingrain/Kidderminster - 2-3 ply warp and weft yarns, dyed before weaving. Used from 1700-1900, but became unpopular due to issues with wear. The color of the weft is used to create the patterns in the carpet. 120 tufts / square inch.
- Wire-formed piles - uncut looped pile formed by round wires, first introduced about the mid-18th century, followed shortly after by bladed wires producing a cut pile. A Jacquard device was used with each type from about the 1820s. Typically 120 tufts / square inch.
- Tapestry - is a printed pile yarn carpet that may be cut or uncut but must, by its nature, normally be one pile thread per dent. In order to make a design by a method other than printing yarn, more than one pile yarn per dent (five or six usually) is used with a jacquard. Tapestry carpets were invented in Scotland in 1830 but are now virtually obsolete after World War II. Typically 50-80 tufts / square inch.
- Loom-formed pile -
  - Axminster carpets - Axminster loom was developed about 1890. All-wool pile is popular, although nylon-wool mixtures and various combinations of natural and man-made fibers are becoming common. Carpets made of 100 percent man-made fibers are increasing in popularity.
  - Spool - Spool looms were invented in the United States in 1876. Pile is drawn from an individual spool, and two blades cut away the tufts when woven. 40-50 tufts / square inch
  - Gripper - each tuft is held by its beak-like gripper and taken from its yarn carrier to the fell of the carpet, the point at which the warp and weft intersect, after being precisely cut away by a traversing knife blade. 40 - 50 tufts / square inch



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- Chenille - The chenille two-stage process was invented in Glasgow about 1830. Chenille pile is formed on the carpet loom by weaving the "fur," or pile yarn, as a weft.
- Jute weft and cotton warp - common materials for Axminster carpets.
- Unconventional carpets - Tufts are inserted by means of vertically reciprocating needles pushing through pre-woven backing and are held below the carpet backing by loopers. The loop pile slips off the loopers, or is severed when cut pile is desired. Designs including up to eight colors are possible, with quality almost as satisfactory as in traditional carpets having an equal number of colors.

## PERFORMANCE

### A BRIEF HISTORY

The Egyptians in 3000 bc are credited with the first carpets, made of linen with brightly colored pieces of wool and cloth. Woven flooring spread throughout the Middle East, Mongolia and China. Early Chinese carpets were made of knotted silk pile, with backings of wool or cotton. Later the pile was made from wool, which became common in China and in Central Asia by nomadic tribes. The Middle Ages introduced "Oriental" rugs to Europe by Italian traders. These rugs were usually hung on the walls while Europeans continued to cover their floors with rushes and straw. French carpet weavers formed a strong guild by the 1600s, with tapestries in production throughout Europe. New machinery was invented to radically improve textile manufacture in the late 1700s, and with the addition of the steam engine, the power loom was first applied to the manufacturing of carpets in 1839. Carpet production in the U.S. was largely a cottage industry. By 1830, the use of carpets had become popular throughout the eastern U.S., and factories were being established in New England, New York, and Pennsylvania. In 1876 an Axminster loom was invented, changing the carpet industry and allowing an unlimited range of color and design. The broadloom allowed carpets to change from production of a width of inches (18", 27", or 36") to feet (12', 15', or 18') resulting in cost reduction and larger areas without seams. A post - World War II era introduced needle tufting, beginning with a pre-woven backing and sewing tufts of yarn through the backings, allowing for more rapid production and greater design possibilities.



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## ANALYSIS AND USES

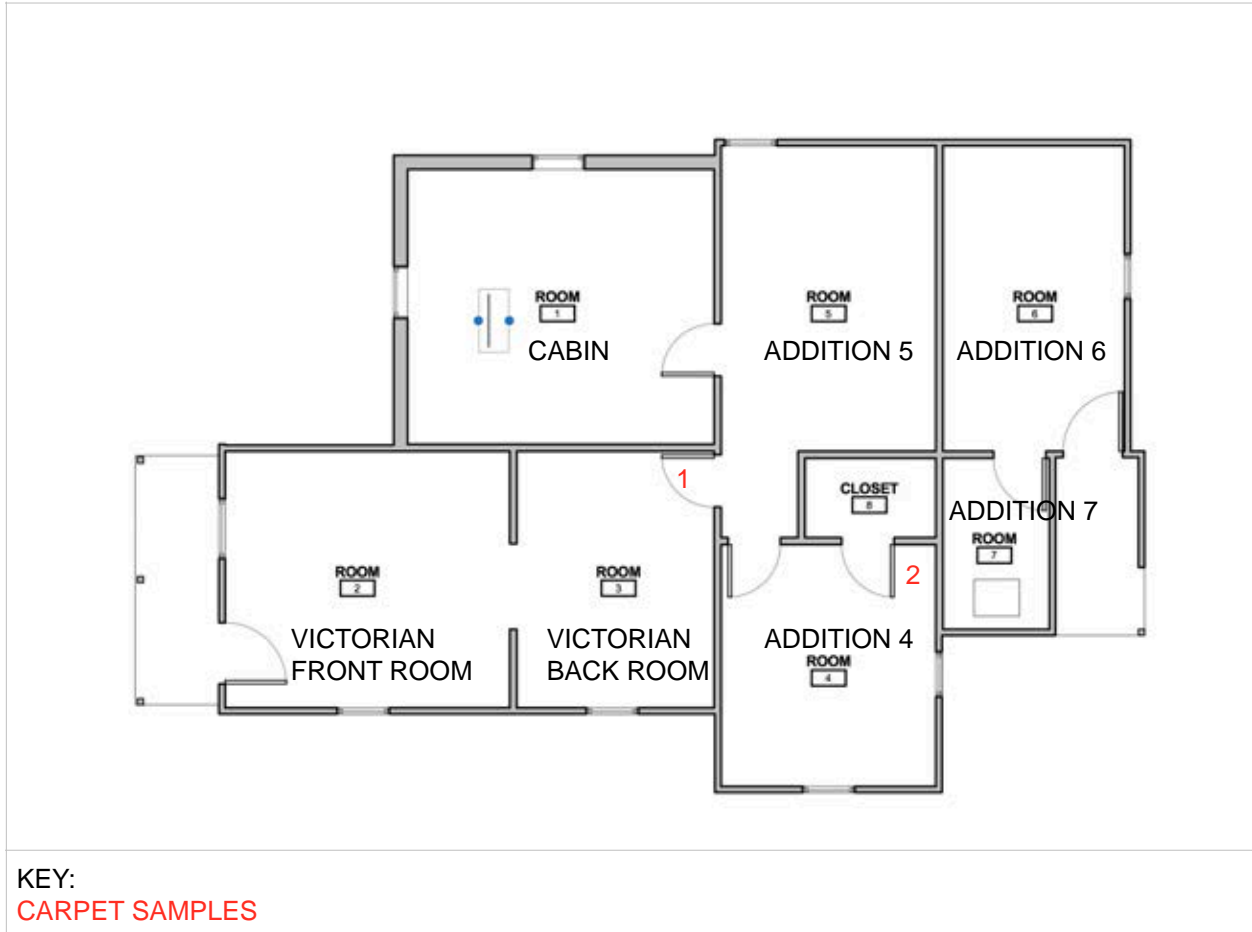
### PROJECT SPECIFICS AND RESULTS

The tested carpet samples showed a tufted carpet with a woven back of natural materials, with a warp and weft that appear to be jute. Each sample had a warp and weft thread count of 10 x 10 threads per square inch, and an approximate tuft count of 80-100 tufts per square inch. Each sample appears to have a pile made from wool, with a nylon yarn possibly interwoven. XRF testing shows evidence of petrochemicals, that could indicate a synthetic yarn is present or a treatment was added to the carpet at some point. Both possibilities point to a carpet that was installed in the period of WWII or after. The samples were very worn, with significant areas of pile loss. Restoration of the carpets would be both difficult and costly, and the results would show the new areas of the carpet aging differently than the original sections. See the list of recommendations on page 126.



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## KEY INDEX: CARPET SAMPLE LOCATION PLAN







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## CARPET SAMPLE PHOTOS



VICTORIAN ROOM 2 - PHOTO FROM BEE SITE VISIT



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VICTORIAN ROOM 2 - PHOTO FROM BEE SITE VISIT



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VICTORIAN ROOM 3 - SAMPLE FOR ANALYSIS, BEE LAB PHOTO



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VICTORIAN ROOM 3 - SAMPLE FOR ANALYSIS, BEE LAB PHOTO



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## XRF CARPET SAMPLE RESULTS

CABIN - ROOM 1

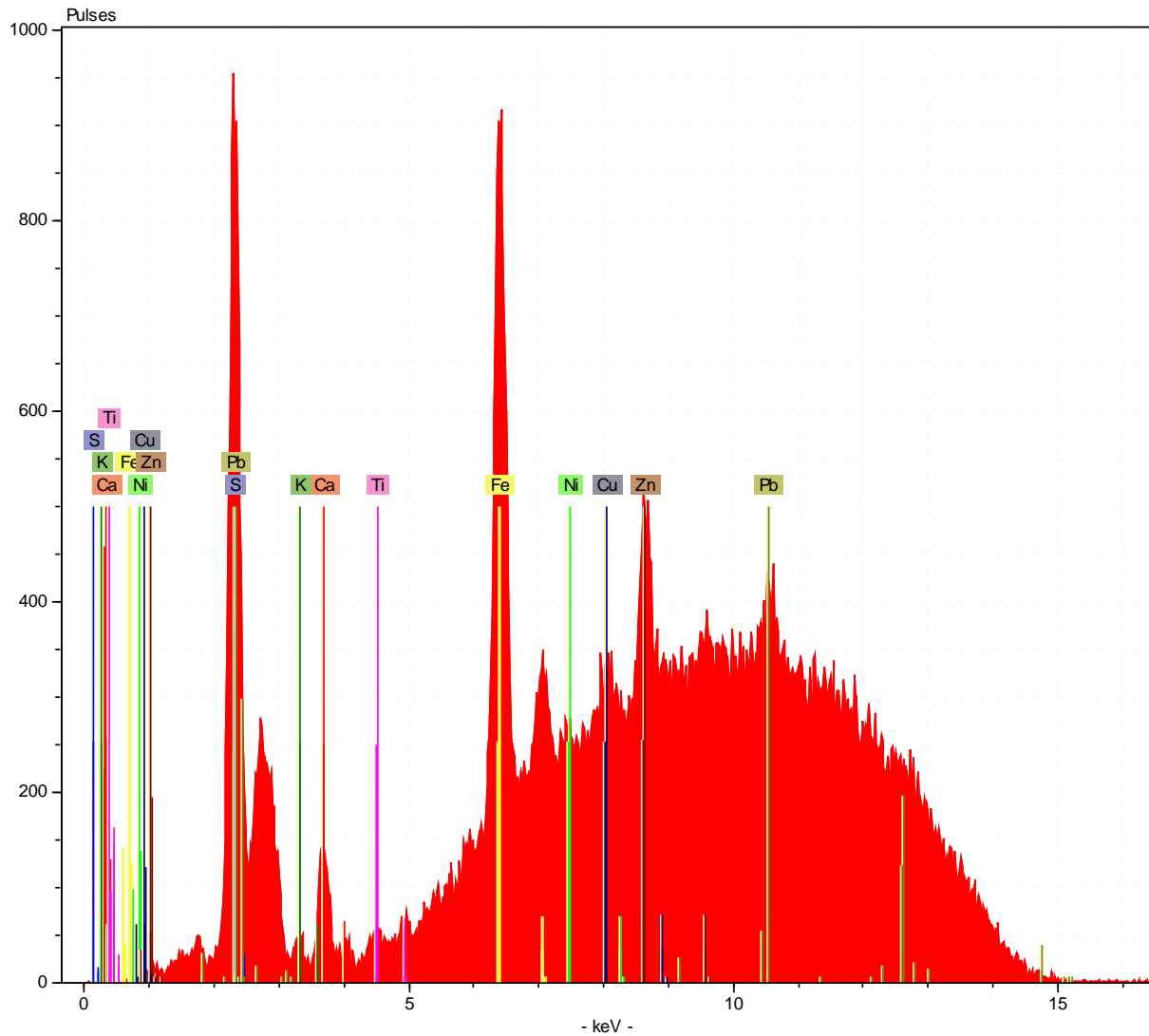
VICTORIAN - ROOM 2 and 3

ADDITION - ROOM 4, 5, 6, and 7



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### SAMPLE 1 - CARPET SAMPLE FROM VICTORIAN ROOM 3, LESS DETERIORATED GOLD AREA

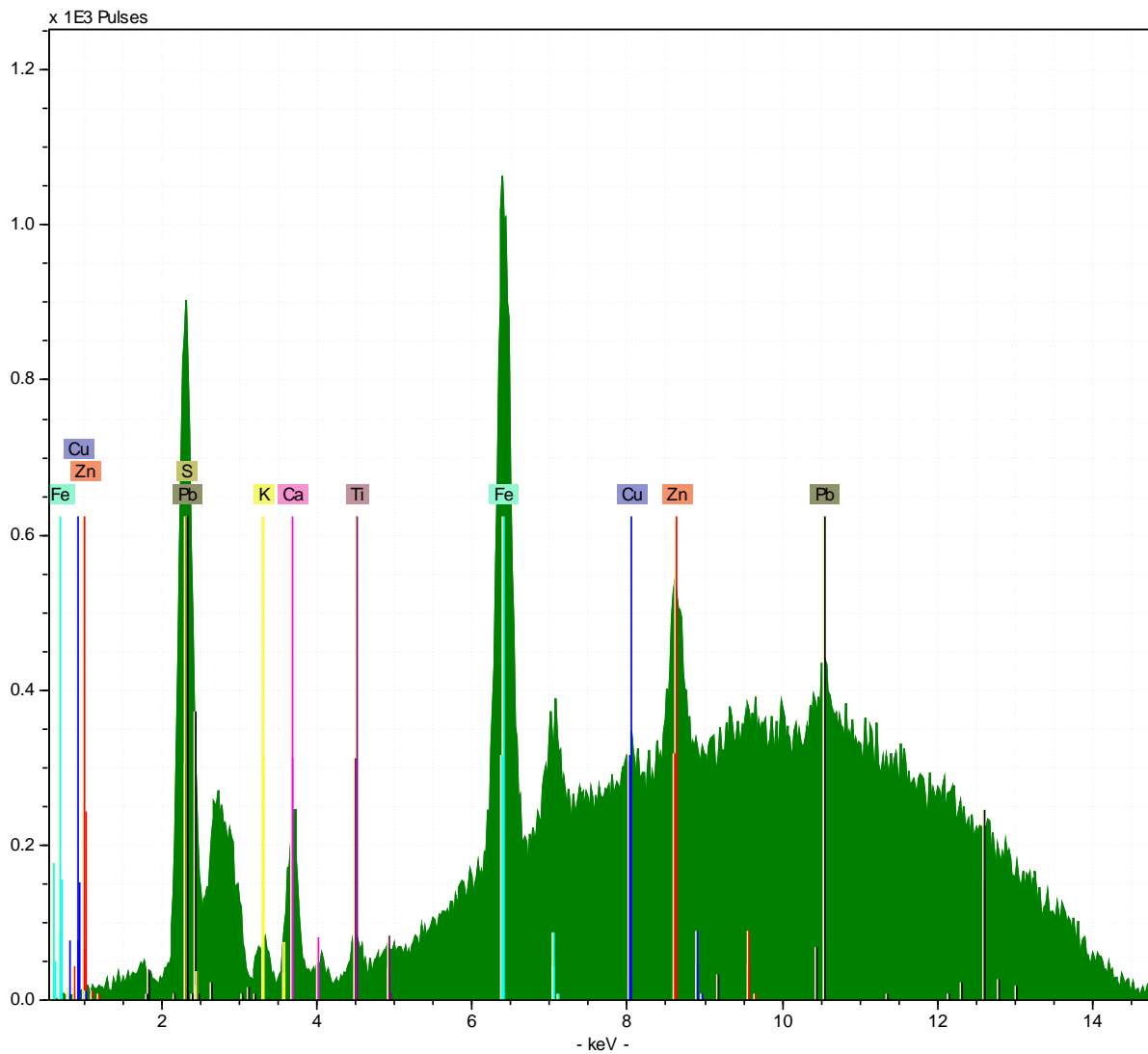


NOTE: The large arc in the reading is an indication of backscatter associated with a petroleum product - either a nylon thread added to the wool pile, or a coating on the carpet fibers. Visually there is a peak that appears to be both lead (Pb) and sulfur (S), but this peak represents a relatively large amount of sulfur. Sulfur can be used as a yellow dye, but the same peak appears in Sample 2 which is not from a gold portion of the carpet. A portion of the sulfur may be from dye, but it appears the sulfur was applied, perhaps for insect mitigation.



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### SAMPLE 2 - CARPET SAMPLE FROM VICTORIAN ROOM 3, LESS DETERIORATED GRAY AREA

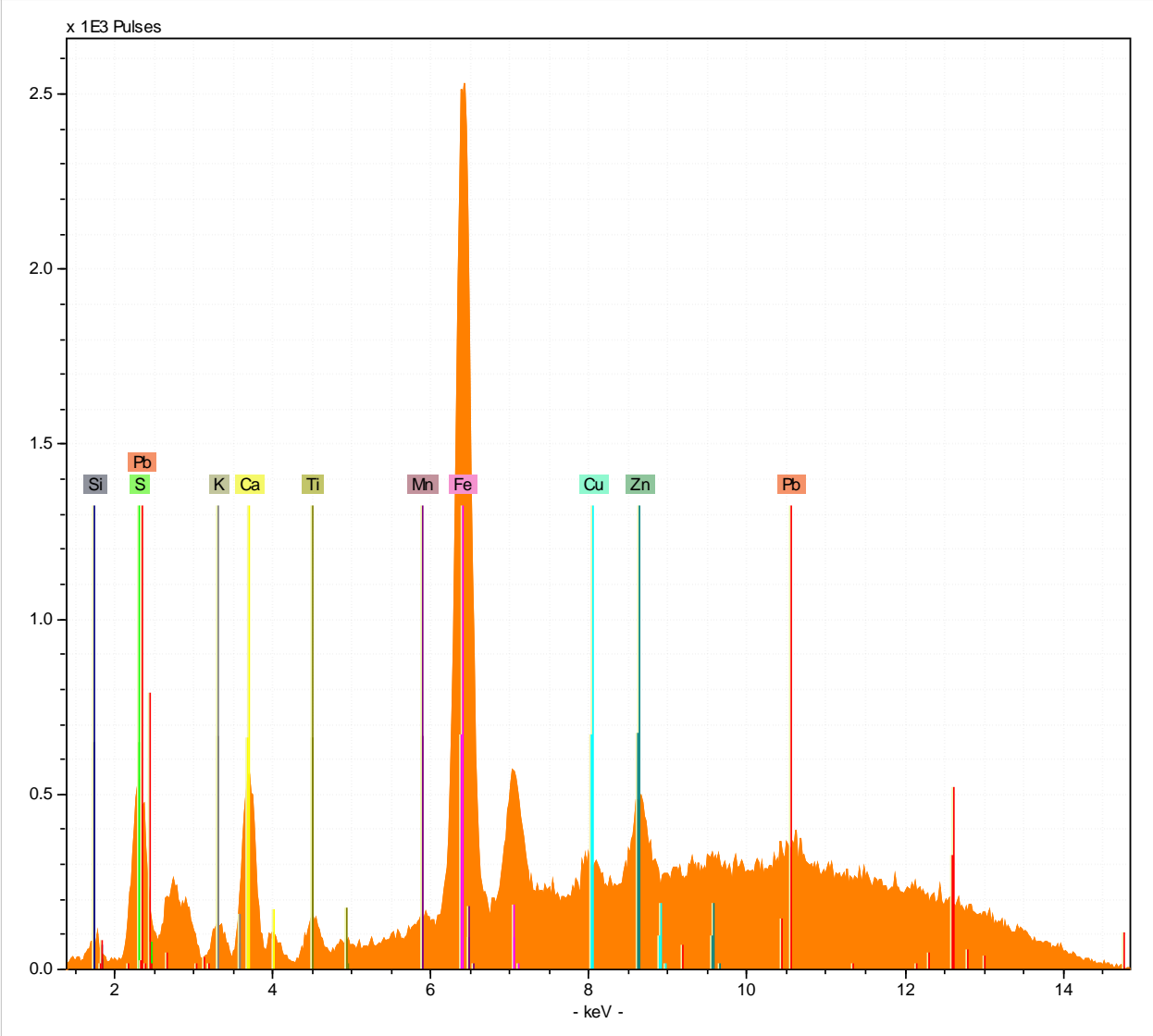


NOTE: The large arc in the reading is an indication of backscatter associated with a petroleum product - either a nylon thread added to the wool pile, or a coating on the carpet fibers. Visually there is a peak that appears to be both lead (Pb) and sulfur (S), but this peak represents a relatively large amount of sulfur. The peak also appears in Sample 1, but is slightly smaller. It appears the sulfur was applied, perhaps for insect mitigation.



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SAMPLE 3 - CARPET SAMPLE FROM VICTORIAN ROOM 3, MORE DETERIORATED GREEN AREA

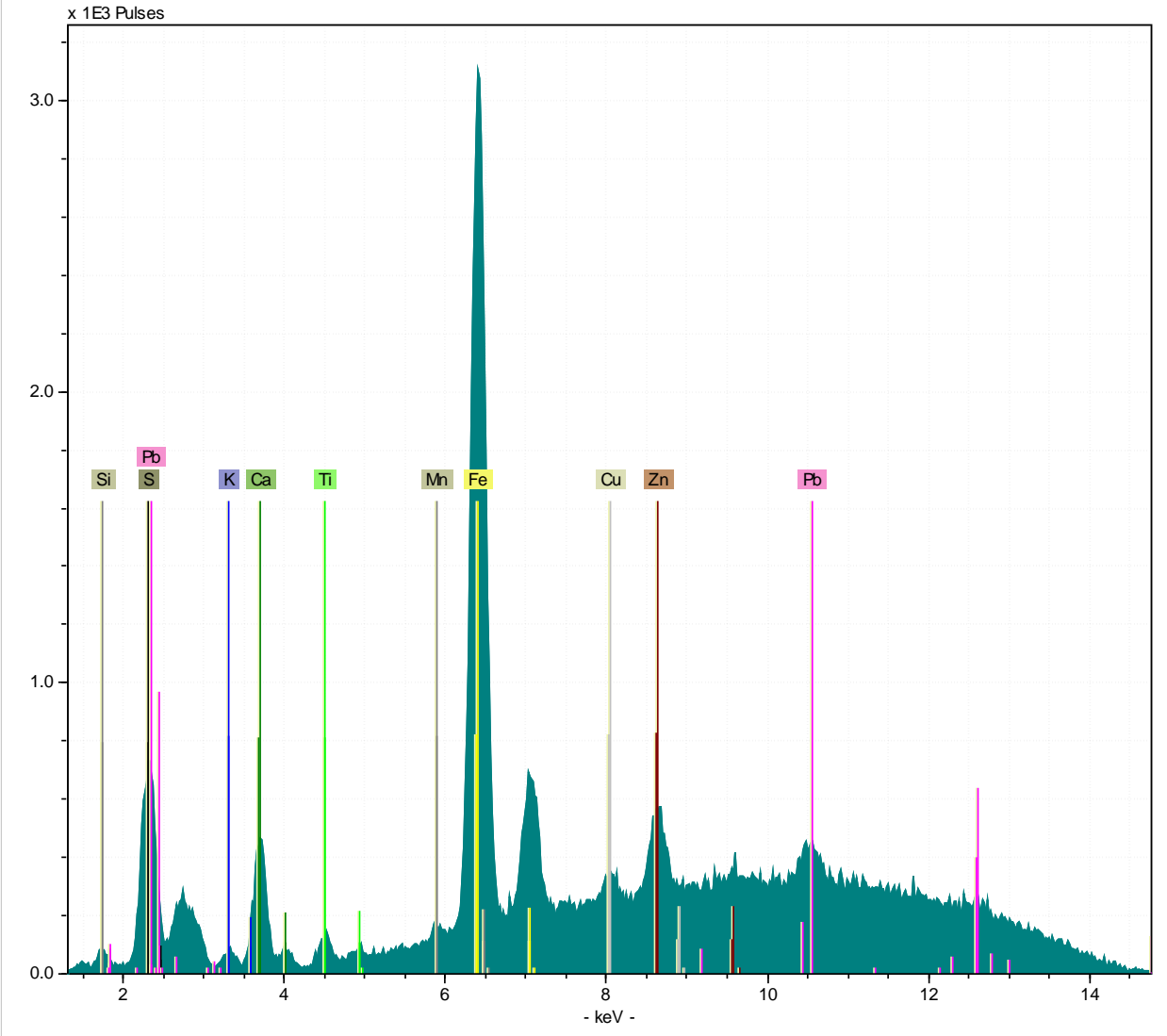






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SAMPLE 4 - CARPET SAMPLE FROM VICTORIAN ROOM 3, GOLD AREA





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## RECOMMENDATIONS

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PAINT

WALLPAPER

LINEN WALL COVERING

LINOLEUM

CARPET

WOOD SHEATHING



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## INTRODUCTION

The Historic Interiors Finishes Survey identified six different materials for analysis, seen below. The wood wall paneling was not sampled for testing, but is included in the recommendations below.

## PAINT

Paint Analysis forms can be found on page 128. These forms identify the layers of paint found, their conditions, and were matched to the Munsell Color system, as per the Secretary of Interior's Guidelines. In addition the colors found were matched to a corresponding Benjamin Moore color, should a modern paint product be required.

Treatment:

Interior original painted surfaces that are found in good condition are to be cleaned and painted with a barrier clear coat, and a new modern paint to be applied over the barrier coat. The modern paint will match the color from the paint analysis that is from the period of interpretation specified for the room. This method allows any modern paint to be reversible, without damaging the original paint layers.

**Alternative Options:**

1. Painted areas are to be left in their current condition, with no additional treatments.
2. Allow for a light sanding, with new paint applied to match the historic paint color for the period of significance/interpretation. If an adjacent surface requires new materials to match the existing paint, then it is recommended that both the original surface and the adjacent surface be painted.
3. Cover any original paint with a barrier clear coat, then place a new paint matching the historic paint formula over the original paint, thus allowing any new paint to be reversible, without damaging the original paint layers. Colors will match the original color, pigments and oils as found at the location, as determined by paint and XRF analysis.

## WALLPAPER

The interior of the structure has many areas of remaining wallpaper. Remnants of the original wall coverings were on site for testing. The wallpaper is wood pulp with various dyes and a cellulose paste adhesive. The wallpaper campaigns appear to span from the late 1880s to the 1950s. The remnants are in poor condition, with some areas of fair condition to nonexistent condition. Matches to the original samples are currently being researched. The significant areas of wallpaper loss will make it impossible for a replacement paper to match the original paper, since as the old and new papers continue to age over time, they will age differently and no longer match. There are areas of the original papers that can be saved with intervening conservation techniques, but many areas are so damaged that it will be impossible to restore the papers to their original appearance. The remaining wallpaper remnants may be



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conserved for the museum display purposes, but it is not recommended to conserve the wallpapers as they were found in the spaces. It is recommended that the various wall treatments be removed, and areas of deterioration in the wall substrate be repaired. Any mechanical and electrical needs would be addressed at this time, while all wall substrate is exposed.

#### Treatment:

A new hand-printed wallpaper matching the exact original colors and patterns will be attached to a new linen covering, which in turn will be stretched over a new substrate that will rest atop the original wall substrate. This may be designed to allow for access to the original wood substrate without the need to remove the decorative wall covering, as well as ease for the removal and replacement if any areas incur damage. An ideal substrate material would be as thin as possible to do little to change the dimensions of the original interiors, and would be vapor permeable to ensure there is no deterioration due to a moisture build up at the interface between the original walls, the new material, and the wallpapers. This option will allow for the best replication of the original wallpaper to be applied to the interior surfaces.

#### Alternative Options:

1. A new digitally printed wall covering will be attached to the existing walls. The wall covering will be produced from digital images of the original wallpaper samples from each specific space it was originally from. This method will be the fastest, and should be the most economically viable option.
2. A new wall covering that appears similar to (but not matching) the historic wallpaper in color and pattern from the period of significance of the space will be attached to the existing walls
3. A new hand-printed wallpaper will be attached to the existing walls. The wallpaper will approximately match the original colors and patterns of the original wallpaper.

## LINEN WALL COVERING

The linen wall covering appears to be different between various spaces. It appears to have been attached directly to the wall substrate in some areas, and over original wallpapers in other areas. Most samples appear to be plain, with no patterns, although it is possible that the patterns have faded over time. One area of linen or cotton did have a striped pattern, another area showed a portion of a what appeared to be a company logo, perhaps for flour.

#### Treatment:

It is recommended that the linen be replaced by new, plain linen cloth, to be used for the backing of the new wallpaper/wall coverings. All original linen backing would be



BUILT ENVIRONMENT EVOLUTION  
PRESERVING THE PAST TRANSFORMING TOMORROW

retained for research, as areas sampled showed commercial names, possibly of flour sacks. This information could inform the period the linen backing was put in place.

#### Alternative Options:

It may be possible to conserve and stabilize the original fabric, and reuse it in the original manner. Once the fabric is conserved, it could be put back in place as the original linen backing. Issues of concern with this treatment include the level of deterioration found throughout the interior, how this deterioration and insect infiltration has affected the fabric, and the expense for the conservation efforts for an element that will remain unseen. This treatment would allow for the retention of the integrity of the materials, and would allow future conservators to see how the original fabric was used.

## LINOLEUM

Remnants of the original linoleum were on site for testing. XRF analysis can be found on page 97. The linoleum appears to be from the early 1920s to late 1930s, and is an increasingly rare sample of this type of flooring. The remnants are in fair to poor condition. The remaining linoleum samples are small for the total space required to be covered. It is recommended that samples of each be cleaned and conserved for museum exhibits and displays. It is recommended that the linoleum remnants be removed, and areas of deterioration in the subfloor be repaired. Any mechanical and electrical needs would be addressed at this time, while all flooring substrate is exposed.

#### Treatment:

A new, custom linoleum floor will be made to match the original samples, using historic techniques with colors, patterns, and materials that match the originals. New linoleum will be attached to a new substrate that will rest atop the original flooring substrate. This may be designed to allow for access to the crawl spaces without the need to remove/damage the linoleum, as well as ease for the removal and replacement of areas of wear without additional damage to the original flooring materials. An ideal substrate material would be as thin as possible to do little to raise the original height of the floors and thresholds, and would be vapor permeable to ensure there is no deterioration due to a moisture build up at this interface.

#### Alternative Options:

1. A new, modern linoleum flooring will be attached to the existing floor system. New linoleum will match the colors of the original with a match in pattern that is close to the original.
2. A new, digitally printed, modern vinyl flooring will be attached to the existing floor system. Images from the original flooring samples will be used to match colors and patterns exactly.
3. A salvaged historic linoleum floor to be used (yet to be located).



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## CARPET

Remnants of the original carpet were on site for testing. XRF analysis can be found on page 117. The carpet is wool with a burlap woven backing, and appears to be from the late 1920 to early 1940s, but the XRF findings show a possible nylon yarn or treatment to the carpet that would indicate a post WWII manufacturing date. The carpet remnants are in poor to nonexistent condition. An exact match to the original carpet is yet to be determined. The remaining carpets are not salvageable, but may be saved by the museum for display purposes. It is recommended that the carpets be removed, and areas of deterioration in the subfloor be repaired. Any mechanical and electrical needs would be addressed at this time, while all flooring substrate is exposed.

### Treatment:

A new wool carpet matching the exact original colors and patterns would replace the original damaged carpets, attached to a new substrate that will rest atop the original flooring substrate. This may be designed to allow for access to the crawl spaces without the need to remove the carpeting, as well as for the removal and replacement of worn carpets without additional damage to the original flooring materials. An ideal substrate material would be as thin as possible to do little to raise the original height of the floors and thresholds, and would be vapor permeable to ensure there is no deterioration due to a moisture build up at this interface.

### Alternative Options:

1. A new wool carpet matching the exact original colors and pattern will be tacked to the existing floors.
2. A new synthetic carpet will be tacked to the existing floors. The carpeting will match the colors and pattern of the original carpet.
3. A new synthetic carpet will be tacked to the existing floors. The carpeting will be a match the original colors and be a similar pattern of the original carpet.

## INTERIOR WOOD WALL SHEATHING

Wood sheathing was found in all the spaces sampled. Not all interior walls were examined as the linen wall coverings and wallpapers were attached to the sheathing. Sampling of these items exposed the wood sheathing, but not in large enough areas to assess the conditions. Wood sheathing on stud construction was common in Colorado mining towns, and is an important aspect of the original construction methods that should be preserved.

### Treatment:

All areas of the interior walls are to have the linen wall covering removed to expose the wood sheathing for proper inspection and documentation. Any areas of deterioration and/or insect infestation would need to be stabilized and repaired. Required replacement materials would match the original materials, using similar dimensions,



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wood species, graining, and production methods, i.e. rough sawn wood, etc. Best practices would encourage all possible original materials to remain in place.

**Alternative Options:**

Replace with modern materials that function best for the needs of the museum, including but not limited to modern dimension lumber, plywood, etc. Plastics and composite materials may not be used, as they will change the vapor permeability of the wall construction, and cause harm. Materials specified must be sourced for longevity and maintenance considerations. Once in place, it is expected there will be little to no disruption of the materials in the future.



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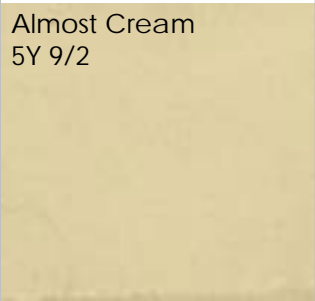




## INTERIOR MOCK UPS

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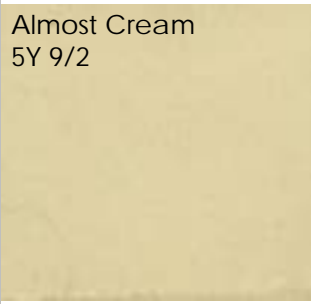






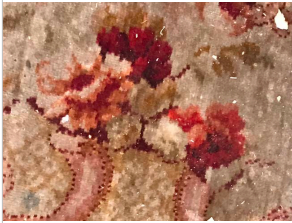
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The chart below represents the known aspects of the interiors of each room, as seen by paint, wallpaper, carpet and linoleum analysis. Not all features of all time periods are known entities, unknown aspects are represented by a "x". Some areas have more wallpaper than paint, or vice versa.

CABIN - ROOM 1				
	Paint	Wallpaper	Linoleum	Carpet
1	 Almost Cream 5Y 9/2	X	X	X
2	 Dark Red Purple 5R 2/4		X	X
	 Chartreuse Black 10Y 3/1		X	X







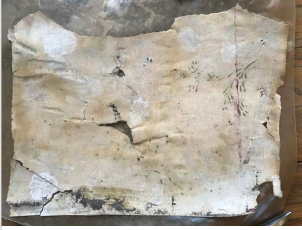




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VICTORIAN - ROOM 2				
Paint	Wallpaper	Carpet	Linoleum	
Almost Cream 5Y 9/2 	X	X	X	
Deep Yellow 2.5Y 6/6 		X	X	
Dark Red Purple 5R 2/4 		X	X	
Medium Spring Green 2.5GY 5/4 			X	










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<p>Medium Tan Gray 5Y 7/1</p> 			<p>X</p>
<p>VICTORIAN - ROOM 3</p>			
<p>Paint</p>	<p>Wallpaper</p>	<p>Carpet</p>	<p>Linoleum</p>
<p>Deep Yellow 2.5Y 6/6</p> 		<p>X</p>	<p>X</p>
<p>Dark Red Purple 5R 2/4</p> 		<p>X</p>	<p>X</p>
<p>Medium Spring Green 2.5GY 5/4</p> 		<p>X</p>	<p>X</p>






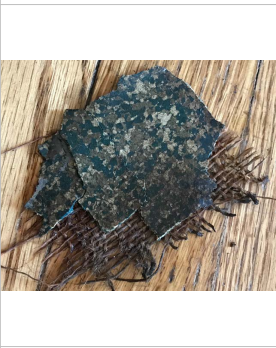



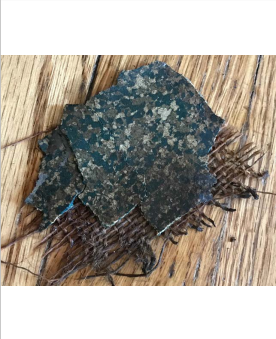
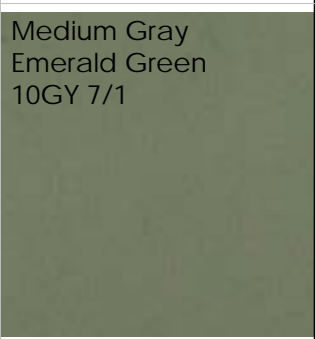


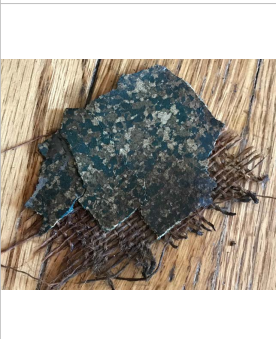


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<p>Medium Tan Gray 5Y 7/1</p>			<p>X</p>
<p>Gray</p>			<p>X</p>
<p>ADDITION - ROOM 4</p>			
<p>Paint</p>	<p>Wallpaper</p>	<p>Carpet</p>	<p>Linoleum</p>
<p>Black Orange Red 2.5YR 2/2</p>			<p>X</p>
<p>Almost Cream 5Y 9/2</p>			<p>X</p>




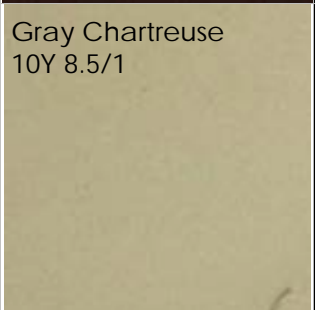



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<p>Peach 2.5YR 7/6</p> 			<p>X</p>
<p>ADDITION - ROOM 5</p>			
<p>Paint</p>	<p>Wallpaper</p>	<p>Carpet</p>	<p>Linoleum</p>
<p>Bright Orange Brown 10YR 7/6</p> 		<p>X</p>	
<p>Yellow Olive 7.5Y 7/6</p> 			
<p>Medium Gray Emerald Green 10GY 7/1</p> 			



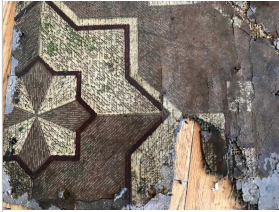
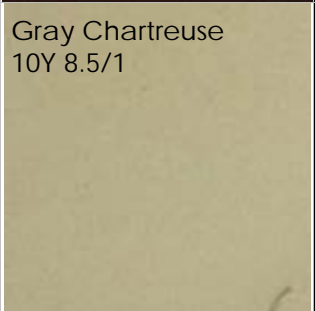
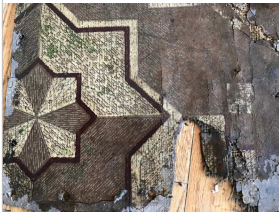


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ADDITION - ROOM 6				
	Paint Wall	Wallpaper	Carpet	Linoleum
	Chartreuse Black 7.5GY 3/1 	X	X	X
	Dark Red Purple 5R 2/4 	X	X	
	Gray Chartreuse 10Y 8.5/1 	X	X	



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ADDITION - ROOM 7			
Paint		Carpet	Linoleum
Chartreuse Black 7.5GY 3/1 	X	X	X
Dark Red Purple 5R 2/4 	X	X	
Gray Chartreuse 10Y 8.5/1 	X	X	





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## COST PROJECTIONS

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COST PROJECTIONS BY MATERIAL		TOTAL
<b>OPTION 1</b>		
<b>PAINT</b>		
<ul style="list-style-type: none"> <li>Interior Original Painted Surfaces Cleaned, Barrier Clear Coat Applied</li> </ul>	\$2-\$10/sf	\$2000
<ul style="list-style-type: none"> <li>New Modern Paint to be Applied               <ul style="list-style-type: none"> <li>Match the color from the paint analysis and specified period of interpretation for the specific space.</li> </ul> </li> </ul>	\$4-\$10/sf	\$4000 - \$10,000
<b>WALLPAPER</b>		
<ul style="list-style-type: none"> <li>Apply new hand-printed wallpaper to linen - Rom 1-5               <ul style="list-style-type: none"> <li>match the exact original colors and patterns</li> </ul> </li> </ul>	\$200-\$400/roll x 38	\$7600 - \$15,200
<ul style="list-style-type: none"> <li>Conserve Wallpapers in-situ - sf to be determined</li> </ul>	\$200-\$1000/sf	
<b>LINEN</b>		
<ul style="list-style-type: none"> <li>Apply new linen covering - Room 1- 5               <ul style="list-style-type: none"> <li>match to original linen, attach in same manner to original wooden substrate or similar</li> </ul> </li> </ul>	\$0.50/sf	\$1000
<ul style="list-style-type: none"> <li>Retain original linen backing for research, as areas sampled showed commercial names, possibly of flour sacks.</li> </ul>		\$0
<b>LINOLEUM</b>		
<ul style="list-style-type: none"> <li>New, custom linoleum floor - Match the original samples, Use historic techniques, Match original colors, patterns, and materials</li> </ul>	Under research, not immediately available	
<ul style="list-style-type: none"> <li>Attach to a new vapor permeable substrate that will rest atop the original flooring substrate</li> </ul>	To be determined by Architect	
<b>CARPET</b>		
<ul style="list-style-type: none"> <li>Attach new wool carpet to a New Substrate               <ul style="list-style-type: none"> <li>Match exact original colors and pattern</li> </ul> </li> </ul>	\$250/sf	\$14,500
<ul style="list-style-type: none"> <li>New Substrate will rest atop the original flooring</li> </ul>	To be determined by Architect	



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OPTION 2		
PAINT		
<ul style="list-style-type: none"> <li>Painted areas are to be left in their current condition, with no additional treatments.</li> </ul>		\$0.00
WALLPAPER		
<ul style="list-style-type: none"> <li>A New Digitally Printed Wall Covering - images of original papers</li> </ul>	\$6.30/sf	\$8,200 - \$11,000
<ul style="list-style-type: none"> <li>Attach to the Existing Walls.</li> </ul>		\$1,400
LINEN		
<ul style="list-style-type: none"> <li>Conserve and Stabilize the Original Fabric</li> </ul>	Unknown	\$2,000 - \$40,000
<ul style="list-style-type: none"> <li>Reuse in the Original Manner, Attached to the Existing Walls.</li> </ul>		\$1,400
LINOLEUM		
<ul style="list-style-type: none"> <li>Attach New, modern linoleum floor to the existing floor system               <ul style="list-style-type: none"> <li>Match the colors and pattern close to the original.</li> </ul> </li> </ul>	\$4-\$7/sf	\$1,500 - \$2,600
CARPET		
<ul style="list-style-type: none"> <li>Tack new wool carpet to the existing floors               <ul style="list-style-type: none"> <li>Match exact original colors and pattern</li> </ul> </li> </ul>	\$250/sf	\$14,500



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OPTION 3		
PAINT		
<ul style="list-style-type: none"> <li>• Light sanding</li> <li>• New paint applied</li> <li>• Match the historic paint color for the period of significance/ interpretation</li> </ul>	\$2 - \$4/sf	\$1000 - \$2000
WALLPAPER		
<ul style="list-style-type: none"> <li>• A new wall covering in colors and pattern from the period of significance of the space, attached to the existing walls</li> </ul>	\$2 - \$6.50	\$2600 - \$8400
LINOLEUM		
<ul style="list-style-type: none"> <li>• Attach new, digitally printed, modern vinyl floor to the existing floor system               <ul style="list-style-type: none"> <li>• Images from the original flooring samples will be used to match colors and patterns exactly</li> </ul> </li> </ul>	\$5 - \$10sf	\$1875 - \$3750
CARPET		
<ul style="list-style-type: none"> <li>• Tack new synthetic carpet to the existing floors               <ul style="list-style-type: none"> <li>• Match colors and pattern of original</li> </ul> </li> </ul>	small quantities unavailable (not found)	



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OPTION 4		
PAINT		
<ul style="list-style-type: none"> <li>Barrier clear coat applied</li> </ul>		
<ul style="list-style-type: none"> <li>New Paint matching the historic paint formula</li> </ul>	\$125/hr	\$10,000
<ul style="list-style-type: none"> <li>Match the original color, pigments and oils as determined by XRF analysis.</li> </ul>	\$300/sample x 10	\$3000
WALLPAPER		
<ul style="list-style-type: none"> <li>Attach new wallpaper to the existing walls</li> <li>Approximate match the historic colors and patterns</li> </ul>	\$3.10/sf	\$4000
LINOLEUM		
<ul style="list-style-type: none"> <li>Apply salvaged historic linoleum floor</li> </ul>	not immediately available, similar found \$16.50/sf	
CARPET		
<ul style="list-style-type: none"> <li>A new synthetic carpet will be tacked to the existing floors</li> <li>Match original colors, similar pattern to original</li> </ul>	\$2 - \$10/sf	\$120 - \$600

All the above options were researched at the time of the report and are intended to be used to assist in creating an informed Preservation Plan. Prices are estimates and may vary by distributor, contractor, and time of estimate.



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## PHOTO APPENDIX

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ZUPANSIS RESIDENCE IMAGING ::  
ORIGINAL ASPEN TOWNSITE - 2016



DEREK SKALKO 2016  
[www.derekskalko.com](http://www.derekskalko.com)



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## XRF FINDINGS - PHOTON COUNTS

<b>Project:</b>	Marolt House Interiors.rtx			
<b>Ser.No.:</b>				
<b>Method:</b>	Aspen Marolt House			
<b>Measurement</b>				
High voltage/kV:	15			
Current/μA:	38			
Time/s:	26			
Energy range/keV:	0.0			
Anode:				
Filter:				
Optic:	No optic			
Atmosphere:	Air			
<b>Evaluation</b>				
Corrections:	Escape Backgr.			
Stripping cycles:	9			
Elements:				
	Ag Al Au Ca Cd Cl Co Cr Cu Fe In Ir K Mg Mn Mo Ni P Pb Po Rb S Sb Si Sn Sr Te Ti Y Zn Zr			
Deconvolution method:	Bayes			
<b>Values:</b>	Net area			



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Sample Location	Ag K12	Ag L1	Al K12	Au L1	Au M1	Ca K12	Cd K12	Cd L1	Cl K12	Co K12	Cr K12	Cu K12	Fe K12	In K12	In L1	Ir M1	K K12	
Carpet - less deteriorated - dark gold section	18	277	109	448	222	938	9	0	1038	228	169	725	7691	13	1	56	0	127
Carpet - less deteriorated - gray section	49	376	75	320	192	1608	20	0	1017	131	1	262	9475	15	1	113	-2	295
Carpet - more deteriorated - green section	23	361	113	268	131	3877	19	0	821	0	81	953	25721	12	1	176	0	597
Carpet - more deteriorated - red section	17	273	110	332	170	3226	20	0	1012	519	14	841	31263	20	1	85	0	292
Linoleum green white speckle - bottom	17	467	85	318	29	61142	11	0	1042	176	119	488	31566	2	1	-5	1	1
Linoleum green white speckle - top	12	375	90	1106	41	3546	21	0	860	276	1499	300	6460	9	1	140	0	8
Linoleum large star back	16	529	176	178	16	6604	12	0	889	817	6	307	62887	13	5	116	0	54
Linoleum large star brown area	22	321	145	326	49	16356	7	0	738	518	1544	341	48607	8	1	67	0	1
Linoleum large star cream area	18	403	116	411	51	13182	9	0	812	-1	2115	224	21653	3	1	89	0	1
Linoleum large star maroon area	10	266	124	476	37	39639	10	0	959	119	2125	203	10495	6	0	34	0	1
Linoleum small star - back	15	358	93	335	23	81512	13	0	981	368	18	224	38541	8	0	-1	0	1
Linoleum small star - black star	17	201	108	189	21	36718	11	0	823	644	4765	401	51135	7	0	107	0	1
Linoleum small star - green star	28	342	137	223	44	14172	13	0	754	841	1577	323	82907	12	2	105	0	31
Linoleum small star - plain area between items, brown@240417_132119	28	390	208	182	28	7838	15	0	1047	1230	396	327	108474	10	1	116	0	711
Linoleum small star - red star	22	217	99	318	53	24274	11	0	550	252	5099	134	27755	6	0	122	0	1
Linoleum small star - white star	22	261	92	574	66	25226	9	0	1007	433	1754	362	35881	5	1	66	0	1

Mg K12	Mn K12	Mo K12	Ni K12	P K12	Pb L1	Pb M1	Po L1	Po M1	Rb K12	S K12	Sb K12	Sb L1	Si K12	Sn K12	Sn L1	Sr K12	Te K12	Te L1	Ti K12	Y K12	Zn K12	Zr K12
47	137	25	185	1	1166	0	119	0	1	6512	1	63	163	4	0	1	1	91	239	-1	2088	9
20	75	11	117	1	1091	0	196	18	1	6050	1	99	159	2	0	30	1	1	318	-3	2343	6
19	319	8	240	1	1075	0	77	37	1	3324	1	442	468	1	1	1	1	296	1020	-1	2546	4
23	178	8	99	1	1941	0	173	20	1	4939	2	365	383	1	0	1	1	206	801	-1	3327	3
21	884	32	436	14	410	0	3	0	50	344	0	10100	606	0	0	14	1	4909	826	10	19515	31
26	597	388	191	1	518	0	99	56	1	1152	0	716	463	1	0	33	1	1653	9966	26	95964	19
23	336	24	1	1	4795	0	72	244	1	720	1	1032	622	1	0	1	1	712	1614	15	7894	7
17	425	50	65	1	3871	0	70	103	1	1621	2	3201	1100	2	0	45	1	4403	10667	92	31619	44
15	577	124	159	1	2125	0	88	0	1	2504	1	2647	589	1	0	44	1	4533	16689	36	51948	12
26	647	72	337	12	2802	0	18	0	1	1758	1	6942	650	2	0	3	0	8435	13174	9	32919	15
54	447	31	704	31	657	0	228	0	1	225	1	12335	475	4	0	1	1	3305	62	3	1425	8
21	1881	25	301	1	3534	0	122	296	1	2377	2	5980	715	1	0	20	1	5824	5330	26	19340	28
11	1628	43	1	1	1602	0	123	267	1	1825	1	2232	648	1	0	1	1	3025	5223	49	14078	49
4	2024	48	1	2	961	0	242	87	1	340	1	1012	1133	1	0	1	1	1068	1189	19	4975	21
27	1176	14	166	17	6591	0	65	524	1	3153	1	4210	619	1	0	65	2	4394	6007	1	18993	5
26	960	65	132	31	1303	0	21	0	1	2678	1	4548	485	3	0	1	1	5985	11992	64	32432	41



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## PRODUCTS AND VENDORS

<b>WALLPAPER</b>
Custom Hand Printed Wallpapers <a href="http://www.adelphipaperhangings.com/">http://www.adelphipaperhangings.com/</a>
Hand Printed Wallpapers <a href="http://www.bradbury.com/index.html">http://www.bradbury.com/index.html</a>
Digital Printed Images Wall covering <a href="https://www.megaprint.com/wallpaper.php">https://www.megaprint.com/wallpaper.php</a>
<b>LINOLEUM AND SIMILAR</b>
Natural Linoleum <a href="http://www.forbo.com/flooring/en-us/">http://www.forbo.com/flooring/en-us/</a> Julie Jones - Rep. 801-209-8143
Natural Linoleum <a href="https://www.armstrongflooring.com/commercial/en-us/">https://www.armstrongflooring.com/commercial/en-us/</a> Carpet Exchange - 303-536-5756
Digital Printed Vinyl Flooring <a href="http://graphicimageflooring.com/">http://graphicimageflooring.com/</a> Tim Wirtz
Vinyl Carpet in Vintage Patterns <a href="http://cottagehomefurniture.com/?s=vinyl+floor+cloth&amp;submit=Search">http://cottagehomefurniture.com/?s=vinyl+floor+cloth&amp;submit=Search</a>
<b>CARPET</b>
Custom Made Carpet: <a href="http://www.langhornecarpets.com/custom-designs-manufacturing/">http://www.langhornecarpets.com/custom-designs-manufacturing/</a> Cory Brown - 801-580-2860