



## **Asbestos & Lead Based Paint Assessment**

City of Spartanburg  
458 Zephyr Street  
Spartanburg, South Carolina

### ***Prepared for:***

The City of Spartanburg  
440 South Church St., Suite B  
Spartanburg, SC 29306

### ***Prepared by:***

Apex Environmental Management, Inc.  
7 Winchester Court  
Mauldin, South Carolina 29662

Project Number: 0417-66

May 31, 2017





Apex Project Number 0417-66

May 31, 2017

7 Winchester Court  
Mauldin, SC 29662  
864.404.3210 office  
864.404.3213 fax  
[www.apex-ehs.com](http://www.apex-ehs.com)

Mr. Martin Livingston  
City of Spartanburg  
440 South Church Street, Suite B  
Spartanburg, SC 29306

Reference: Asbestos and Lead-Based Paint Assessment Services  
458 Zephyr Street  
Spartanburg, South Carolina

### SERVICES

- Indoor Air Quality
- Mold Remediation
- Asbestos & Lead
- Industrial Hygiene
- Worker Health & Safety
- Mold Consulting
- Moisture Management Plans
- Safety Assessment
- Environmental Site Assessments
- Hazard Communication

Dear Mr. Livingston:

Apex Environmental Management, Inc. (Apex) is pleased to provide the results of our assessment services for the referenced property.

This report and the associated attachments summarize our evaluation of the conditions observed at the project site. The findings presented by Apex are based upon sampling performed in the subject building. There is a chance that undetected ACM may exist in the building between walls or in other areas that would only be exposed during demolition or structural renovations. Should material be discovered that could potentially contain asbestos during the demolition process, additional samples of the material should be collected by a licensed asbestos inspector and submitted to an accredited laboratory for analytical interpretation. Our recommendations are based on the guidelines presented in EPA and/or OSHA regulations.

Please note that this document is not a specification for asbestos removal. It does not contain means and methods for abatement. Quantities are estimates and contractors must verify amounts prior to bidding or removal. If you are planning an abatement project, please contact Apex to discuss the requirements. Use of this document without the express written consent of Apex is at the sole risk of the user and or/abatement contractor.

The conclusions and/or recommendations contained in this report are based on our understanding of the applicable standards at the time this report was prepared. No warranty, expressed or implied, is made. If you have any questions please feel free to contact us at (864) 404-3210.

Respectfully submitted,  
**APEX ENVIRONMENTAL MANAGEMENT, INC.**

A handwritten signature in blue ink, appearing to read 'Tom Oliver', is written over a horizontal line.

Tom Oliver  
Director of Operations

Appendices

**ASBESTOS AND LEAD BASED PAINT ASSESSMENT**

**CITY OF SPARTANBURG  
458 ZEPHYR STREET  
SPARTANBURG, SOUTH CAROLINA**

**APEX PROJECT NO. 0417-66**

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**SECTION I**

**Asbestos & Lead Evaluation Report**

**ASBESTOS/LEAD EVALUATION REPORT**  
**APEX PROJECT NUMBER: 0417-66**

Date:	5/31/2017	Page Number:	1 of 4
Client:	City of Spartanburg	Client Contact:	Mr. Martin Livingston
Client Address:	440 South Church Street Suite B Spartanburg, SC 29306	Client Phone Number:	(864) 580-5323
Project:	Asbestos and Lead Evaluation		
Property Address:	458 Zephyr Street Spartanburg, SC		
Assessor:	Tom Oliver	Date of Assessment:	4/18/17
Company:	Apex Environmental Management 7 Winchester Court Mauldin, SC 29662	Phone Number:	(864) 404-3210
Purpose of Assessment:	Demolition	Age of Structure:	Approximately 65 years
Building Type:	Residential	Number of Stories:	1
Foundation:	Crawlspace	Approximate Square Footage	1,475 SF

**EXTERIOR BUILDING MATERIALS**

- Pitched wooden roof with shingles and no felt.
- Concrete exterior walls.
- Wooden windows with caulks and glazing.
- Wooden doors with caulk.
- Mastic on HVAC insulation in crawlspace.
- 3 chimney's with mastic/tar assumed positive.

**INTERIOR BUILDING MATERIALS**

- Texture over plaster with finish throughout walls and ceilings. Overspray exists.
- Drywall with joint compound and tape in the bathroom and rear entry.
- 2' x 2' fissure ceiling tiles in the kitchen.
- Wooden floors with no felt beneath.
- Multiple types and layers of vinyl floors and mastics.

## **SCOPE OF THE SURVEY**

The objectives of the asbestos and lead assessment included the following:

- Identification of suspect asbestos-containing material (ACM) and lead based paints (LBP) in readily observable locations. Limited demolition of building finishes was conducted.
- Asbestos survey with sample collection by a South Carolina accredited inspector.
- Suspect ACM analysis by polarized light microscopy (PLM) utilizing CEI Labs (CEI) as an NVLAP certified laboratory, their accreditation number is 101768-0.
- Transmission electron microscopy (TEM) analysis of non-friable organically bound materials suspected to contain asbestos and testing negatively by PLM analysis.
- Lead inspection by a lead inspector certified by the Environmental Protection Agency and licensed to conduct LBP surveys in South Carolina.
- In situ analysis of suspected lead based paints by X-ray fluorescence (XRF).
- Presenting the results in a report identifying confirmed ACMs and LBPs.

## **METHODS**

### **Asbestos Containing Materials**

In order to determine if the suspect materials observed during the visual survey contained asbestos, representative bulk samples were collected and placed in sealed packages. Thirty-five (35) bulk samples were collected during the survey and submitted to CEI Labs (CEI) in Cary, North Carolina for analysis using the EPA recommended method of Polarized Light Microscopy (PLM) coupled with dispersion staining (Method No. EPA 600/M4-82-020, Dec. 1982). CEI participates in the National Voluntary Laboratory Accreditation Program (NVLAP). Their NVLAP accreditation number is 101768-0. EPA regulations require that multiple samples of each homogeneous material be collected for laboratory analysis. In accordance with South Carolina Regulation 61-86.1, non-friable organically bound materials that are reported to be non-asbestos containing by PLM analysis must also be analyzed by Transmission Electron Microscopy (TEM). Sixteen (16) samples were analyzed using TEM.

### **Lead-Based Paint**

Lead painted surfaces were analyzed in place using X-ray fluorescence. Painted surfaces were selected based on color of topcoat, underlying layers and substrate on which it was painted.

## **RESULTS**

### **Asbestos Results**

The EPA defines an asbestos-containing material (ACM) as a material containing more than 1% asbestos. OSHA defines ACM as a material containing detectable amounts of asbestos. Materials were analyzed to contain less than 1% asbestos and it should be noted that OSHA asbestos regulations will apply. A specific *PLM* and *TEM* table is located in Appendix II of this report and identifies positive materials and designates approximate quantities.

Suspect asbestos containing materials that were identified to be asbestos containing include:

- Approximately 13 exterior windows with outer caulk on the frames.
- Approximately 3,800 SF of texture over plaster with finish walls and ceilings.
- Approximately 18 LF of mastic/tar on 3 chimneys – assumed positive.

#### Lead Based Paint

OSHA does not recognize a threshold level of lead for definition purposes, only the presence or absence of lead. The current OSHA regulations recognize an airborne action level of thirty micrograms per cubic meter ( $30 \mu\text{g}/\text{m}^3$ ) during an eight-hour workday and a permissible exposure level of fifty micrograms per cubic meter ( $50 \mu\text{g}/\text{m}^3$ ) for employees.

Currently, the EPA defines LBP as paint containing in excess of, or equal to,  $1.0 \text{ mg}/\text{cm}^2$ . The XRF analytical results and approximate locations of the paint samples collected are included in the Lead Analysis Report in Appendix II.

Several surfaces in the building tested positive for lead in excess of the regulatory definition:

- Exterior white concrete walls/siding.
- Interior cream plaster walls and ceilings.

### **RECOMMENDATIONS AND DISCUSSION**

#### Asbestos Containing Materials

If the above referenced asbestos materials are to be disturbed by renovations or demolition, the asbestos must be removed in accordance with EPA, State of South Carolina and OSHA asbestos regulations. The State of South Carolina, Department of Health and Environmental Control (DHEC) has specific regulations that must be adhered to during asbestos removal/abatement projects.

APEX recommends the following:

1. Abate the asbestos containing materials in the structure prior to renovation or demolition.
2. Follow applicable asbestos regulations during renovation or demolition of the structure. You should be aware that stringent requirements are imposed upon anyone renovating or demolishing a structure in which ACM will be disturbed. This work must be performed in accordance with OSHA asbestos regulations, 29 CFR 1910 & 1926, and NESHAP asbestos regulations 40 CFR 61, subpart M. South Carolina regulations require the accreditation of personnel who work in the asbestos field and notification and permitting fees for asbestos removal projects. There is a 10 working day notification period required prior to abatement of asbestos in a facility. Failure to take proper precautions and actions to protect human health and the environment can result in penalties, danger to personnel, and construction delays.

Lead-Based Paint

Currently the South Carolina Department of Health and Environmental Control (SCDHEC) define LBP as paint containing greater than 1.0 milligrams per square centimeter (mg/cm<sup>2</sup>) lead or in excess of, or equal to, 0.5 percent lead. Building materials identified as being painted with LBP should be segregated from the other building materials and recycled or disposed of in a municipal lined landfill. The removed wastes would need to be containerized and further tested by Toxic Characteristic Leaching procedures (TCLP) to determine if the waste is classified as hazardous. The remaining building materials that are not painted with LBP may be disposed of in a construction and demolition landfill. However, the landfills should be contacted to determine their specific disposal requirements.

Occupational Safety and Health Administration Lead Regulations apply to actions initiated on lead containing materials. This regulation applies to lead concentrations greater than the analytical limit of detection. This regulation sets exposure levels on airborne lead and does not reference the percent lead in paint. Therefore, initial personal air monitoring should be conducted on workers performing work on surfaces which have a lead concentration of 0.1 mg/cm<sup>2</sup> or above to satisfy the OSHA requirements. If a baseline exposure lower than the OSHA Action Level of 30 micrograms per cubic meter (µg/m<sup>3</sup>) is established, personal air monitoring may be terminated. The full OSHA lead standard should be referenced for compliance.

**A copy of this report must be submitted to SCDHEC at least ten (10) working days prior to demolition when applying for a demolition permit.**



**SECTION II**

**Asbestos & LBP Data Tables**

# ASBESTOS SURVEY FIELD DATA SHEET

Project Name: COS 458 Zephyr Street ACM/LBP

Sampled By: Tom Oliver

Project Location: 458 Zephyr Street, Spartanburg, SC

Project Manager: Ben Oliver

Project Number: 0417-66

Date: 4/18/2017

Sample No.	Location	Sample Description	Analytical Results	Friable/Non Friable	Condition	Quantity
1	Roof	Roof shingles (6 layers) and no felt	PLM - NAD	Non-Friable	Good	1,770 SF
2			TEM - <1% Chrysotile			
3						
4	Crawlspace	HVAC mastic	PLM - NAD	Non-Friable	Good	75 SF
5			TEM - NAD			
6						
7	Exterior windows	Outer caulk on window frames	3% Chrysotile	Non-Friable	Good	13 EA
8						
9						
10	Exterior windows	Inner caulk on window panes	PLM - NAD	Non-Friable	Good	13 EA
11			TEM - NAD			
12						
13	Exterior windows	Window glazing	PLM - NAD	Non-Friable	Good	13 EA
14			TEM - NAD			
15						
16	Exterior doors	Door caulk	PLM - NAD	Non-Friable	Good	2 EA
17			TEM - NAD			
18						
19	Kitchen ceiling	2' x 2' fissure ceiling tile	PLM - NAD	Friable	Good	195 SF
20						
21						
22	Rear entry & bathroom	Drywall with joint compound and tape	PLM - NAD	Friable	Good	380 SF
23						
24						

# ASBESTOS SURVEY FIELD DATA SHEET

Project Name: COS 458 Zephyr Street ACM/LBP

Sampled By: Tom Oliver

Project Location: 458 Zephyr Street, Spartanburg, SC

Project Manager: Ben Oliver

Project Number: 0417-66

Date: 4/18/2017

Sample No.	Location	Sample Description	Analytical Results	Friable/Non Friable	Condition	Quantity
25	<b>Throughout walls &amp; ceilings</b>	<b>Texture over plaster with finish</b>	<b>PLM - 2% Chrysotile</b>	<b>Friable</b>	<b>Good</b>	<b>3,800 SF</b>
26						
27						
28						
29						
30	Kitchen (2 layers) & front right bedroom closet (1 layer)	Stone pattern vinyl floor with no mastic over cream square pattern vinyl floor with mastic	PLM - NAD	Non-Friable	Good	155 SF
31			TEM - NAD			
32						
33	Bathroom (2 layers)	Beige square pattern vinyl floor with no mastic over wooden pattern vinyl floor with mastic	PLM - NAD	Non-Friable	Good	50 SF
34			TEM - NAD			
35						
<b>Assumed</b>	<b>Chimney's</b>	<b>Chimney mastic/tar</b>	<b>Assumed</b>	<b>Non-Friable</b>	<b>Good</b>	<b>18 LF</b>

NAD = No Asbestos Detected

LF = Linear Feet

EA = Each

**Bold = Positive For Asbestos**

SF = Square Feet

Chry = Chrysotile

**FIELD DATA SHEET  
LBP ANALYSIS**

Project Name: COS 458 Zephyr Street ACM/LBP

Sampled By: Ben Oliver

Project Location: 458 Zephyr Street, Spartanburg SC

Project Manager: Ben Oliver

Project Number: 0417-66

Date: 4/21/2017

Sample No.	Sample Location	Component	Color	Substrate	Analytical Result (mg/m <sup>3</sup> )
71	Exterior	Porch column	Green	Wood	0.14
<b>72</b>	<b>Exterior</b>	<b>Siding</b>	<b>White</b>	<b>Concrete</b>	<b>3.36</b>
73	Exterior	Porch floor	Green	Concrete	0.01
74	Exterior	Porch rail	Green	Wood	0.02
75	Exterior	Window sill	Green	Wood	0.19
76	Exterior	Siding	Green	Wood	0.76
<b>77</b>	<b>Interior</b>	<b>Wall</b>	<b>Cream</b>	<b>Plaster</b>	<b>1.00</b>
78	Interior	Window sill	Cream	Wood	0.10
79	Interior	Window	Cream	Wood	0.06
80	Interior	Door	Cream	Wood	0.11
81	Interior	Door frame	Cream	Wood	0.09
82	Interior	Fireplace	Cream	Concrete	0.00
83	Interior	Base board	Cream	Wood	0.05
84	Interior	Fireplace mantle	Cream	Wood	0.71
85	Interior	Wall	Cream	Drywall	0.48
86	Interior	Chair rail	Cream	Wood	0.13
87	Interior	Cabinets	Cream	Wood	0.00

**Bold = LBP**

**SECTION III**

**Laboratory Analytical Results**



April 26, 2017

Apex Environmental Management  
7 Winchester Court  
Mauldin, SC 29662

**CLIENT PROJECT:** COS 458 Zephyr St. ACM & LBP; 0417-66  
**CEI LAB CODE:** B17-0573

Dear Customer:

Enclosed are asbestos analysis results for PLM Bulk samples received at our laboratory on April 20, 2017. The samples were analyzed for asbestos using polarizing light microscopy (PLM) per the EPA 600 Method.

Sample results containing >1% asbestos are considered asbestos-containing materials (ACMs) per EPA regulatory requirements. The detection limit for the EPA 600 Method is <1% asbestos by weight as determined by visual estimation.

Thank you for your business and we look forward to continuing good relations. If you have any questions, please feel free to call our office at 919-481-1413.

Kind Regards,

A handwritten signature in black ink, appearing to read "Tianbao Bai".

Tianbao Bai, Ph.D., CIH  
Laboratory Director





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**ASBESTOS ANALYTICAL REPORT**  
**By: Polarized Light Microscopy**

Prepared for

**Apex Environmental Management**

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CLIENT PROJECT: COS 458 Zephyr St. ACM & LBP; 0417-66

CEI LAB CODE: B17-0573

TEST METHOD: EPA 600 / R93 / 116 and EPA 600 / M4-82 / 020

REPORT DATE: 04/26/17

TOTAL SAMPLES ANALYZED: 23

# SAMPLES >1% ASBESTOS: 2

**TEL: 866-481-1412**

*[www.ceilabs.com](http://www.ceilabs.com)*



# Asbestos Report Summary

By: POLARIZING LIGHT MICROSCOPY

PROJECT: COS 458 Zephyr St. ACM & LBP; 0417-66 CEI LAB CODE: B17-0573

METHOD: EPA 600 / R93 / 116 and EPA 600 / M4-82 / 020

Client ID	Layer	Lab ID	Color	Sample Description	ASBESTOS %
1	Layer 1	B237711A	Green,Gray	Roof Shingle	None Detected
	Layer 2	B237711A	Black,Green	Roof Shingle	None Detected
		B237711B	Green	Roof Shingle	None Detected
		B237711C	Green,Black	Roof Shingle	None Detected
		B237711D	Red	Roof Shingle	None Detected
		B237711E	Red,Black	Roof Shingle	None Detected
2	Layer 1	B237712A	Green,Gray	Roof Shingle	None Detected
	Layer 2	B237712A	Black,Green	Roof Shingle	None Detected
		B237712B	Green	Roof Shingle	None Detected
		B237712C	Green,Black	Roof Shingle	None Detected
		B237712D	Red	Roof Shingle	None Detected
		B237712E	Red,Black	Roof Shingle	None Detected
3		B237713		Sample Submitted for TEM Analysis	
4	Layer 1	B237714	White	HVAC Mastic	None Detected
	Layer 2	B237714	Yellow	Insulation	None Detected
5	Layer 1	B237715	White	HVAC Mastic	None Detected
	Layer 2	B237715	Yellow	Insulation	None Detected
6	Layer 1	B237716	White	HVAC Mastic	None Detected
	Layer 2	B237716	Yellow	Insulation	None Detected
7	Layer 1	B237717	White,Tan	Outer Caulk	<b>Chrysotile 3%</b>
	Layer 2	B237717	Beige	Cementitious Material	None Detected
8		B237718		Sample Not Analyzed per COC	
9		B237719		Sample Not Analyzed per COC	
10		B237720	White	Inner Caulk	None Detected
11		B237721	White	Inner Caulk	None Detected
12		B237722		Sample Submitted for TEM Analysis	
13		B237723	Gray,Tan	Window Glazing	None Detected
14		B237724	Gray,Tan	Window Glazing	None Detected
15		B237725		Sample Submitted for TEM Analysis	





# Asbestos Report Summary

By: POLARIZING LIGHT MICROSCOPY

PROJECT: COS 458 Zephyr St. ACM & LBP; 0417-66 CEI LAB CODE: B17-0573

METHOD: EPA 600 / R93 / 116 and EPA 600 / M4-82 / 020

Client ID	Layer	Lab ID	Color	Sample Description	ASBESTOS %
16		B237726	White	Door Caulk	None Detected
17		B237727	White	Door Caulk	None Detected
18		B237728		Sample Submitted for TEM Analysis	
19		B237729	Beige	Ceiling Tile	None Detected
20		B237730	Beige	Ceiling Tile	None Detected
21		B237731	Beige	Ceiling Tile	None Detected
22	Layer 1	B237732	White	Joint Compound	None Detected
	Layer 2	B237732	Cream	Tape	None Detected
	Layer 3	B237732	White	Drywall	None Detected
23	Layer 1	B237733	White	Joint Compound	None Detected
	Layer 2	B237733	Cream	Tape	None Detected
	Layer 3	B237733	White	Drywall	None Detected
24	Layer 1	B237734	White	Joint Compound	None Detected
	Layer 2	B237734	Cream	Tape	None Detected
	Layer 3	B237734	White	Drywall	None Detected
25	Layer 1	B237735	White	Texture	None Detected
	Layer 2	B237735	Beige	Texture	<b>Chrysotile 2%</b>
	Layer 3	B237735	Gray	Finish	None Detected
	Layer 4	B237735	Tan	Plaster	None Detected
26		B237736		Sample Not Analyzed per COC	
27		B237737		Sample Not Analyzed per COC	
28		B237738		Sample Not Analyzed per COC	
29		B237739		Sample Not Analyzed per COC	
30		B237740A	Stone,Square Pattern	Vinyl Flooring	None Detected
	Layer 1	B237740B	Cream,Square Pattern	Vinyl Flooring	None Detected
	Layer 2	B237740B	Yellow	Mastic	None Detected
31		B237741A	Stone,Square Pattern	Vinyl Flooring	None Detected



# Asbestos Report Summary

By: POLARIZING LIGHT MICROSCOPY

**PROJECT:** COS 458 Zephyr St. ACM & LBP; 0417-66 **CEI LAB CODE:** B17-0573

**METHOD:** EPA 600 / R93 / 116 and EPA 600 / M4-82 / 020

Client ID	Layer	Lab ID	Color	Sample Description	ASBESTOS %
	Layer 1	B237741B	Cream,Square Pattern	Vinyl Flooring	None Detected
	Layer 2	B237741B	Yellow	Mastic	None Detected
32		B237742		Sample Submitted for TEM Analysis	
33		B237743A	Beige,Square Pattern	Vinyl Flooring	None Detected
	Layer 1	B237743B	Wood Pattern	Vinyl Flooring	None Detected
	Layer 2	B237743B	Yellow	Mastic	None Detected
34		B237744A	Beige,Square Pattern	Vinyl Flooring	None Detected
	Layer 1	B237744B	Wood Pattern	Vinyl Flooring	None Detected
	Layer 2	B237744B	Yellow	Mastic	None Detected
35		B237745		Sample Submitted for TEM Analysis	



# ASBESTOS BULK ANALYSIS

By: POLARIZING LIGHT MICROSCOPY

**Client:** Apex Environmental Management  
 7 Winchester Court  
 Mauldin, SC 29662

**CEI Lab Code:** B17-0573  
**Date Received:** 04-20-17  
**Date Analyzed:** 04-26-17  
**Date Reported:** 04-26-17

**Project:** COS 458 Zephyr St. ACM & LBP; 0417-66

## ASBESTOS BULK PLM, EPA 600 METHOD

Client ID Lab ID	Lab Description	Lab Attributes	NON-ASBESTOS COMPONENTS				ASBESTOS %
			Fibrous		Non-Fibrous		
1 Layer 1 B237711A	Roof Shingle	Heterogeneous Green,Gray Fibrous Bound	20%	Fiberglass	55%	Tar	None Detected
					25%	Gravel	
Layer 2 B237711A	Roof Shingle	Heterogeneous Black,Green Fibrous Bound	20%	Fiberglass	55%	Tar	None Detected
					25%	Gravel	
B237711B	Roof Shingle	Heterogeneous Green Fibrous Bound	30%	Cellulose	45%	Tar	None Detected
				25%	Gravel		
B237711C	Roof Shingle	Heterogeneous Green,Black Fibrous Bound	30%	Cellulose	45%	Tar	None Detected
				25%	Gravel		
B237711D	Roof Shingle	Heterogeneous Red Fibrous Bound	30%	Cellulose	45%	Tar	None Detected
				25%	Gravel		
B237711E	Roof Shingle	Heterogeneous Red,Black Fibrous Bound	30%	Cellulose	45%	Tar	None Detected
				25%	Gravel		
2 Layer 1 B237712A	Roof Shingle	Heterogeneous Green,Gray Fibrous Bound	20%	Fiberglass	55%	Tar	None Detected
					25%	Gravel	



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## ASBESTOS BULK PLM, EPA 600 METHOD

Client ID Lab ID	Lab Description	Lab Attributes	NON-ASBESTOS COMPONENTS				ASBESTOS %
			Fibrous		Non-Fibrous		
Layer 2 B237712A	Roof Shingle	Heterogeneous Black,Green Fibrous Bound	20%	Fiberglass	55%	Tar	None Detected
					25%	Gravel	
B237712B	Roof Shingle	Heterogeneous Green Fibrous Bound	30%	Cellulose	45%	Tar	None Detected
					25%	Gravel	
B237712C	Roof Shingle	Heterogeneous Green,Black Fibrous Bound	30%	Cellulose	45%	Tar	None Detected
					25%	Gravel	
B237712D	Roof Shingle	Heterogeneous Red Fibrous Bound	30%	Cellulose	45%	Tar	None Detected
					25%	Gravel	
B237712E	Roof Shingle	Heterogeneous Red,Black Fibrous Bound	30%	Cellulose	45%	Tar	None Detected
					25%	Gravel	
<b>3</b> B237713	Sample Submitted for TEM Analysis						
<b>4</b> Layer 1 B237714	HVAC Mastic	Homogeneous White Non-fibrous Bound			75%	Calc Carb	None Detected
					25%	Binder	
Lab Notes: Sample appears to be a Mud/Joint Compound-like material, no mastic present; Not an NOB material.							
Layer 2 B237714	Insulation	Heterogeneous Yellow Fibrous Loosely Bound	80%	Fiberglass	5%	Metal Foil	None Detected
			5%	Cellulose	10%	Binder	



# ASBESTOS BULK ANALYSIS

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 Mauldin, SC 29662

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**Date Received:** 04-20-17  
**Date Analyzed:** 04-26-17  
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**Project:** COS 458 Zephyr St. ACM & LBP; 0417-66

## ASBESTOS BULK PLM, EPA 600 METHOD

Client ID Lab ID	Lab Description	Lab Attributes	NON-ASBESTOS COMPONENTS			ASBESTOS %	
			Fibrous	Non-Fibrous			
<b>5</b> Layer 1 B237715	HVAC Mastic	Homogeneous	75%	Calc Carb	None Detected		
		White Non-fibrous Bound	25%	Binder			
Lab Notes: Sample appears to be a Mud/Joint Compound-like material, no mastic present; Not an NOB material.							
Layer 2 B237715	Insulation	Heterogeneous	80%	Fiberglass	5%	Metal Foil	None Detected
		Yellow Fibrous Loosely Bound	5%	Cellulose	10%	Binder	
<b>6</b> Layer 1 B237716	HVAC Mastic	Homogeneous	75%	Calc Carb	None Detected		
		White Non-fibrous Bound	25%	Binder			
Lab Notes: Sample appears to be a Mud/Joint Compound-like material, no mastic present; Not an NOB material.							
Layer 2 B237716	Insulation	Heterogeneous	80%	Fiberglass	5%	Metal Foil	None Detected
		Yellow Fibrous Loosely Bound	5%	Cellulose	10%	Binder	
<b>7</b> Layer 1 B237717	Outer Caulk	Heterogeneous	5%	Paint	<b>3% Chrysotile</b>		
		White, Tan Non-fibrous Bound	50%	Calc Carb	42%	Binder	
Layer 2 B237717	Cementitious Material	Heterogeneous	<1%	Hair	65%	Silicates	None Detected
		Beige Non-fibrous Bound			35%	Binder	
<b>8</b> B237718	Sample Not Analyzed per COC						
<b>9</b> B237719	Sample Not Analyzed per COC						



# ASBESTOS BULK ANALYSIS

By: POLARIZING LIGHT MICROSCOPY

**Client:** Apex Environmental Management  
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**Date Analyzed:** 04-26-17  
**Date Reported:** 04-26-17

**Project:** COS 458 Zephyr St. ACM & LBP; 0417-66

## ASBESTOS BULK PLM, EPA 600 METHOD

Client ID Lab ID	Lab Description	Lab Attributes	NON-ASBESTOS COMPONENTS		ASBESTOS %
			Fibrous	Non-Fibrous	
<b>10</b> B237720	Inner Caulk	Heterogeneous White Non-fibrous Bound	5% 85% 10%	Paint Caulk Binder	None Detected
<b>11</b> B237721	Inner Caulk	Heterogeneous White Non-fibrous Bound	5% 85% 10%	Paint Caulk Binder	None Detected
<b>12</b> B237722	Sample Submitted for TEM Analysis				
<b>13</b> B237723	Window Glazing	Heterogeneous Gray,Tan Non-fibrous Bound	5% 50% 45%	Paint Calc Carb Binder	None Detected
<b>14</b> B237724	Window Glazing	Heterogeneous Gray,Tan Non-fibrous Bound	5% 50% 45%	Paint Calc Carb Binder	None Detected
<b>15</b> B237725	Sample Submitted for TEM Analysis				
<b>16</b> B237726	Door Caulk	Heterogeneous White Non-fibrous Bound	5% 90% 5%	Paint Caulk Binder	None Detected
<b>17</b> B237727	Door Caulk	Heterogeneous White Non-fibrous Bound	5% 90% 5%	Paint Caulk Binder	None Detected
<b>18</b> B237728	Sample Submitted for TEM Analysis				



# ASBESTOS BULK ANALYSIS

By: POLARIZING LIGHT MICROSCOPY

**Client:** Apex Environmental Management  
 7 Winchester Court  
 Mauldin, SC 29662

**CEI Lab Code:** B17-0573  
**Date Received:** 04-20-17  
**Date Analyzed:** 04-26-17  
**Date Reported:** 04-26-17

**Project:** COS 458 Zephyr St. ACM & LBP; 0417-66

## ASBESTOS BULK PLM, EPA 600 METHOD

Client ID Lab ID	Lab Description	Lab Attributes	NON-ASBESTOS COMPONENTS				ASBESTOS %
			Fibrous		Non-Fibrous		
<b>19</b> B237729	Ceiling Tile	Heterogeneous	60%	Cellulose	5%	Paint	None Detected
		Beige	20%	Fiberglass	15%	Perlite	
		Fibrous					
		Bound					
<b>20</b> B237730	Ceiling Tile	Heterogeneous	60%	Cellulose	5%	Paint	None Detected
		Beige	20%	Fiberglass	15%	Perlite	
		Fibrous					
		Bound					
<b>21</b> B237731	Ceiling Tile	Heterogeneous	60%	Cellulose	5%	Paint	None Detected
		Beige	20%	Fiberglass	15%	Perlite	
		Fibrous					
		Bound					
<b>22</b> Layer 1 B237732	Joint Compound	Heterogeneous			5%	Paint	None Detected
		White			70%	Calc Carb	
		Non-fibrous			25%	Binder	
		Bound					
Layer 2 B237732	Tape	Homogeneous	100%	Cellulose			None Detected
		Cream					
		Fibrous Bound					
Layer 3 B237732	Drywall	Homogeneous	10%	Cellulose	90%	Gypsum	None Detected
		White					
		Fibrous					
		Bound					
<b>23</b> Layer 1 B237733	Joint Compound	Heterogeneous			5%	Paint	None Detected
		White			70%	Calc Carb	
		Non-fibrous			25%	Binder	
		Bound					



# ASBESTOS BULK ANALYSIS

By: POLARIZING LIGHT MICROSCOPY

**Client:** Apex Environmental Management  
 7 Winchester Court  
 Mauldin, SC 29662

**CEI Lab Code:** B17-0573  
**Date Received:** 04-20-17  
**Date Analyzed:** 04-26-17  
**Date Reported:** 04-26-17

**Project:** COS 458 Zephyr St. ACM & LBP; 0417-66

## ASBESTOS BULK PLM, EPA 600 METHOD

Client ID Lab ID	Lab Description	Lab Attributes	NON-ASBESTOS COMPONENTS			ASBESTOS %
			Fibrous	Non-Fibrous		
Layer 2 B237733	Tape	Homogeneous Cream Fibrous Bound	100%	Cellulose		None Detected
Layer 3 B237733	Drywall	Homogeneous White Fibrous Bound	10%	Cellulose	90% Gypsum	None Detected
<b>24</b> Layer 1 B237734	Joint Compound	Heterogeneous White Non-fibrous Bound			5% Paint 70% Calc Carb 25% Binder	None Detected
Layer 2 B237734	Tape	Homogeneous Cream Fibrous Bound	100%	Cellulose		None Detected
Layer 3 B237734	Drywall	Homogeneous White Fibrous Bound	10%	Cellulose	90% Gypsum	None Detected
<b>25</b> Layer 1 B237735	Texture	Heterogeneous White Non-fibrous Bound	2%	Cellulose	5% Paint 60% Calc Carb 33% Binder	None Detected
Layer 2 B237735	Texture	Heterogeneous Beige Non-fibrous Bound	<1%	Cellulose	65% Calc Carb 33% Binder	<b>2% Chrysotile</b>





# ASBESTOS BULK ANALYSIS

By: POLARIZING LIGHT MICROSCOPY

**Client:** Apex Environmental Management  
 7 Winchester Court  
 Mauldin, SC 29662

**CEI Lab Code:** B17-0573  
**Date Received:** 04-20-17  
**Date Analyzed:** 04-26-17  
**Date Reported:** 04-26-17

**Project:** COS 458 Zephyr St. ACM & LBP; 0417-66

## ASBESTOS BULK PLM, EPA 600 METHOD

Client ID Lab ID	Lab Description	Lab Attributes	NON-ASBESTOS COMPONENTS			ASBESTOS %
			Fibrous		Non-Fibrous	
Layer 3 B237735	Finish	Heterogeneous	30%	Silicates	None Detected	
		Gray	20%	Calc Carb		
		Non-fibrous	50%	Binder		
		Bound				
Layer 4 B237735	Plaster	Heterogeneous	<1%	Hair	None Detected	
		Tan	65%	Silicates		
		Non-fibrous	35%	Binder		
		Bound				
<b>26</b> B237736	Sample Not Analyzed per COC					
<b>27</b> B237737	Sample Not Analyzed per COC					
<b>28</b> B237738	Sample Not Analyzed per COC					
<b>29</b> B237739	Sample Not Analyzed per COC					
<b>30</b> B237740A	Vinyl Flooring	Heterogeneous	40%	Cellulose	None Detected	
		Stone, Square	10%	Fiberglass		
		Pattern				
		Fibrous				
Layer 1 B237740B	Vinyl Flooring	Heterogeneous	40%	Cellulose	None Detected	
		Cream, Square	10%	Fiberglass		
		Pattern				
		Fibrous				
Layer 2 B237740B	Mastic	Heterogeneous	100%	Mastic	None Detected	
		Yellow				
		Non-fibrous				
		Bound				



# ASBESTOS BULK ANALYSIS

By: POLARIZING LIGHT MICROSCOPY

**Client:** Apex Environmental Management  
 7 Winchester Court  
 Mauldin, SC 29662

**CEI Lab Code:** B17-0573  
**Date Received:** 04-20-17  
**Date Analyzed:** 04-26-17  
**Date Reported:** 04-26-17

**Project:** COS 458 Zephyr St. ACM & LBP; 0417-66

## ASBESTOS BULK PLM, EPA 600 METHOD

Client ID Lab ID	Lab Description	Lab Attributes	NON-ASBESTOS COMPONENTS				ASBESTOS %
			Fibrous		Non-Fibrous		
<b>31</b> B237741A	Vinyl Flooring	Heterogeneous	40%	Cellulose	50%	Vinyl	None Detected
		Stone, Square Pattern Fibrous Bound	10%	Fiberglass			
Layer 1 B237741B	Vinyl Flooring	Heterogeneous	40%	Cellulose	50%	Vinyl	None Detected
		Cream, Square Pattern Fibrous Bound	10%	Fiberglass			
Layer 2 B237741B	Mastic	Heterogeneous Yellow Non-fibrous Bound			100%	Mastic	None Detected
<b>32</b> B237742	Sample Submitted for TEM Analysis						
<b>33</b> B237743A	Vinyl Flooring	Heterogeneous	40%	Cellulose	50%	Vinyl	None Detected
		Beige, Square Pattern Fibrous Bound	10%	Fiberglass			
Layer 1 B237743B	Vinyl Flooring	Heterogeneous	25%	Cellulose	50%	Vinyl	None Detected
		Wood Pattern Fibrous Bound	10%	Fiberglass	15%	Binder	
Layer 2 B237743B	Mastic	Heterogeneous Yellow Non-fibrous Bound			100%	Mastic	None Detected



# ASBESTOS BULK ANALYSIS

By: POLARIZING LIGHT MICROSCOPY

**Client:** Apex Environmental Management  
 7 Winchester Court  
 Mauldin, SC 29662

**CEI Lab Code:** B17-0573  
**Date Received:** 04-20-17  
**Date Analyzed:** 04-26-17  
**Date Reported:** 04-26-17

**Project:** COS 458 Zephyr St. ACM & LBP; 0417-66

## ASBESTOS BULK PLM, EPA 600 METHOD

Client ID Lab ID	Lab Description	Lab Attributes	NON-ASBESTOS COMPONENTS				ASBESTOS %
			Fibrous		Non-Fibrous		
<b>34</b> B237744A	Vinyl Flooring	Heterogeneous	40%	Cellulose	50%	Vinyl	None Detected
		Beige, Square Pattern Fibrous Bound	10%	Fiberglass			
Layer 1 B237744B	Vinyl Flooring	Heterogeneous	25%	Cellulose	50%	Vinyl	None Detected
		Wood Pattern Fibrous Bound	10%	Fiberglass	15%	Binder	
Layer 2 B237744B	Mastic	Heterogeneous Yellow Non-fibrous Bound			100%	Mastic	None Detected
<b>35</b> B237745	Sample Submitted for TEM Analysis						



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**LEGEND:**    Non-Anth        = Non-Asbestiform Anthophyllite  
                 Non-Trem        = Non-Asbestiform Tremolite  
                 Calc Carb        = Calcium Carbonate

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**METHOD:** EPA 600 / R93 / 116 and EPA 600 / M4-82 / 020

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**REPORTING LIMIT:** <1% by visual estimation

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**REGULATORY LIMIT:** >1% by weight

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Due to the limitations of the EPA 600 method, nonfriable organically bound materials (NOBs) such as vinyl floor tiles can be difficult to analyze via polarized light microscopy (PLM). EPA recommends that all NOBs analyzed by PLM, and found not to contain asbestos, be further analyzed by Transmission Electron Microscopy (TEM). Please note that PLM analysis of dust and soil samples for asbestos is not covered under NVLAP accreditation. Estimated measurement of uncertainty is available on request.

This report relates only to the samples tested or analyzed and may not be reproduced, except in full, without written approval by CEI Labs, Inc. CEI Labs makes no warranty representation regarding the accuracy of client submitted information in preparing and presenting analytical results. Interpretation of the analytical results is the sole responsibility of the client. Samples were received in acceptable condition unless otherwise noted. This report may not be used by the client to claim product endorsement by NVLAP or any other agency of the U.S. Government.

**ANALYST:** *Samantha Card*  
Samantha Card

**APPROVED BY:** *Tianbao Bai*  
Tianbao Bai, Ph.D., CIH  
Laboratory Director





107 New Edition Court, Cary, NC 27511  
 Tel: 866-481-1412; Fax: 919-481-1442

# ASBESTOS CHAIN OF CUSTODY

B17-0573  
 (35) B237711-  
 B237745

LAB USE ONLY:
CEI Lab Code:
CEI Lab I.D. Range:

COMPANY INFORMATION	PROJECT INFORMATION
CEI CLIENT #:	Job Contact: Ben Oliver
Company: Apex Environmental Management, Inc.	Email / Tel: boliver@apex-ehs.com
Address: 7 Winchester Court	Project Name: COS 458 Zephyr St. ACM & LBP
Mauldin, South Carolina 29662	Project ID# 0417-66
Email: boliver@apex-ehs.com	PO #:
Tel: 864-404-3210 Fax: 864-404-3213	STATE SAMPLES COLLECTED IN: South Carolina

GENERAL INSTRUCTIONS		
POSITIVE STOP ANALYSIS	<input checked="" type="checkbox"/>	PLM DUE DATE: / /
ANALYZE NOB'S BY TEM	<input checked="" type="checkbox"/>	TEM DUE DATE: / /

IF TAT IS NOT MARKED STANDARD 3 DAY TAT APPLIES.

ASBESTOS	METHOD	TURN AROUND TIME					
		4 HR	8 HR	24 HR	2 DAY	3 DAY	5 DAY
PLM BULK	EPA 600	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
PLM POINT COUNT (400)	EPA 600	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PLM POINT COUNT (1000)	EPA 600	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PLM GRAV w POINT COUNT	EPA 600	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PCM AIR	NIOSH 7400	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TEM AIR AHERA	EPA AHERA	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TEM AIR NIOSH	NIOSH 7402	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TEM BULK	CHATFIELD	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
TEM DUST WIPE	ASTM D6480-05	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TEM DUST MICROVAC	ASTM D5755-09	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TEM SOIL	ASTM D7521-13	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TEM VERMICULITE	CINCINNATI METHOD	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
OTHER:		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

REMARKS: Utilize Positive Stop During Analysis		<input checked="" type="checkbox"/> Accept Samples <input type="checkbox"/> Reject Samples	
Relinquished By:	Date/Time	Received By:	Date/Time
<i>[Signature]</i>	4-19-17	<i>[Signature]</i>	4-20-17 9:10

Samples will be disposed of 30 days after analysis

# ASBESTOS SAMPLING FORM



COMPANY CONTACT INFORMATION	
Company: Apex Environmental Management, Inc.	Job Contact: Ben Oliver
Project Name: COS 458 Zephyr St. ACM/LBP	
Project ID #: 0417-66	Tel: 864-640-1147

SAMPLE ID#	DESCRIPTION / LOCATION	VOLUME/ AREA	TEST	
			PLM <input type="checkbox"/>	TEM <input type="checkbox"/>
1	Roof shingles (6 layers) and no felt.		PLM <input checked="" type="checkbox"/>	TEM <input type="checkbox"/>
2			PLM <input checked="" type="checkbox"/>	TEM <input type="checkbox"/>
3			PLM <input type="checkbox"/>	TEM <input checked="" type="checkbox"/>
4	HVAC mastic		PLM <input checked="" type="checkbox"/>	TEM <input type="checkbox"/>
5			PLM <input checked="" type="checkbox"/>	TEM <input type="checkbox"/>
6	Outer caulk on window frames		PLM <input type="checkbox"/>	TEM <input checked="" type="checkbox"/>
7			PLM <input checked="" type="checkbox"/>	TEM <input type="checkbox"/>
8			PLM <input checked="" type="checkbox"/>	TEM <input type="checkbox"/>
9	Inner caulk on window panes		PLM <input type="checkbox"/>	TEM <input checked="" type="checkbox"/>
10			PLM <input checked="" type="checkbox"/>	TEM <input type="checkbox"/>
11	Window glazing		PLM <input checked="" type="checkbox"/>	TEM <input type="checkbox"/>
12			PLM <input type="checkbox"/>	TEM <input checked="" type="checkbox"/>
13			PLM <input checked="" type="checkbox"/>	TEM <input type="checkbox"/>
14	Door caulk		PLM <input type="checkbox"/>	TEM <input checked="" type="checkbox"/>
15			PLM <input checked="" type="checkbox"/>	TEM <input type="checkbox"/>
16	2'x2' fissure ceiling tile		PLM <input type="checkbox"/>	TEM <input checked="" type="checkbox"/>
17			PLM <input checked="" type="checkbox"/>	TEM <input type="checkbox"/>
18			PLM <input checked="" type="checkbox"/>	TEM <input type="checkbox"/>
19	Drywall with joint compound and tape		PLM <input checked="" type="checkbox"/>	TEM <input type="checkbox"/>
20			PLM <input checked="" type="checkbox"/>	TEM <input type="checkbox"/>
21	Texture over plaster with finish		PLM <input checked="" type="checkbox"/>	TEM <input type="checkbox"/>
22			PLM <input checked="" type="checkbox"/>	TEM <input type="checkbox"/>
23			PLM <input checked="" type="checkbox"/>	TEM <input type="checkbox"/>
24	Stone square pattern vinyl floor	↓	PLM <input checked="" type="checkbox"/>	TEM <input type="checkbox"/>
25			PLM <input checked="" type="checkbox"/>	TEM <input type="checkbox"/>





May 3, 2017

Apex Environmental Management  
7 Winchester Court  
Mauldin, SC 29662

**CLIENT PROJECT:** COS 458 Zephyr St. ACM & LBP; 0417-66  
**CEI LAB CODE:** T17-0784

Dear Customer:

Enclosed are asbestos analysis results for TEM bulk samples received at our laboratory on April 26, 2017. The samples were analyzed for asbestos using transmission electron microscopy (TEM) per Chatfield Method.

Sample results containing > 1% asbestos are considered asbestos-containing materials (ACMs) per the EPA regulatory requirements. The detection limit for the TEM Chatfield method is <1% depending on the processed weight and constituents of the sample.

Thank you for your business and we look forward to continuing good relations. If you have any questions, please feel free to call our office at 919-481-1413.

Kind Regards,

A handwritten signature in black ink, appearing to read "Tianbao Bai".

Tianbao Bai, Ph.D., CIH  
Laboratory Director





---

**ASBESTOS ANALYTICAL REPORT**  
**By: Transmission Electron Microscopy**

Prepared for

**Apex Environmental Management**

---

CLIENT PROJECT: COS 458 Zephyr St. ACM & LBP; 0417-66

CEI LAB CODE: T17-0784

TEST METHOD: Bulk Chatfield  
EPA 600 / R93 / 116

REPORT DATE: 05/03/17

**TEL: 866-481-1412**

*[www.ceilabs.com](http://www.ceilabs.com)*



# ASBESTOS BULK ANALYSIS

By: TRANSMISSION ELECTRON MICROSCOPY

**Client:** Apex Environmental Management  
 7 Winchester Court  
 Mauldin, SC 29662

**CEI Lab Code:** T17-0784  
**Date Received:** 04-26-17  
**Date Analyzed:** 04-27-17  
**Date Reported:** 05-03-17

**Project:** COS 458 Zephyr St. ACM & LBP; 0417-66

## TEM BULK CHATFIELD / EPA 600 / R93 / 116

Client ID Lab ID	Material Description	Sample Weight (g)	Organic Material %	Acid Soluble Material %	Acid Insoluble Material %	Asbestos %
3 T61668	Green, Gray Roof Shingle	0.394	22.1	44.7	33.2	None Detected
3 T61669	Black, Green Roof Shingle	0.646	22.1	42.4	35.5	None Detected
3 T61670	Green Roof Shingle	0.354	52	9.9	38.1	None Detected
3 T61671	Green, Black Roof Shingle	0.439	64	3.2	32.8	None Detected
3 T61672	Red Roof Shingle	0.269	75.1	4.5	20.4	None Detected
3 T61673	Red, Black Roof Shingle	0.347	92.2	3.5	4.3	<1% Chrysotile
12 T61674	White Inner Caulk	0.214	33.6	64.5	1.9	None Detected
15 T61675	Gray, Tan Window Glazing	0.214	21	74.3	4.7	None Detected
18 T61676	White Door Caulk	0.22	30.5	65	4.5	None Detected
32 T61677	Stone, Square Pattern Vinyl Flooring	0.45	45.8	52.4	1.8	None Detected
32 T61678	Cream, Square Pattern Vinyl Flooring	0.432	55.6	16.2	28.2	None Detected
32 T61679	Yellow Mastic	0.23	42.6	11.7	45.7	None Detected



# ASBESTOS BULK ANALYSIS

By: TRANSMISSION ELECTRON MICROSCOPY

**Client:** Apex Environmental Management  
7 Winchester Court  
Mauldin, SC 29662

**CEI Lab Code:** T17-0784  
**Date Received:** 04-26-17  
**Date Analyzed:** 04-27-17  
**Date Reported:** 05-03-17

**Project:** COS 458 Zephyr St. ACM & LBP; 0417-66

## TEM BULK CHATFIELD / EPA 600 / R93 / 116

Client ID Lab ID	Material Description	Sample Weight (g)	Organic Material %	Acid Soluble Material %	Acid Insoluble Material %	Asbestos %
35 T61680	Beige, Square Pattern Vinyl Flooring	0.246	52.8	46.7	.5	<b>None Detected</b>
35 T61681	Wood Pattern Vinyl Flooring	0.294	66.7	20.7	12.6	<b>None Detected</b>
35 T61682	Yellow Mastic	0.197	38.6	23.4	38	<b>None Detected</b>



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**LEGEND:** None

---

**METHOD:** CHATFIELD & EPA/600/R-93/116

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**LIMIT OF DETECTION:** Varies with the weight and constituents of the sample (<1%)

---

**REGULATORY LIMIT:** >1% by weight

---

This report relates only to the samples tested or analyzed and may not be reproduced, except in full, without written approval by CEI Labs, Inc. CEI Labs makes no warranty representation regarding the accuracy of client submitted information in preparing and presenting analytical results. Interpretation of the analytical results is the sole responsibility of the client. Estimated measurement of uncertainty is available on request. Samples were received in acceptable condition unless otherwise noted.

**ANALYST:**

  
Abigail Nails

**APPROVED BY:**

  
Tianbao Bai, Ph.D., CIH  
Laboratory Director

T17-0784  
T61668-682

B17-0573

(35) B237711-  
B237745



107 New Edition Court, Cary, NC 27511  
Tel: 866-481-1412; Fax: 919-481-1442

# ASBESTOS CHAIN OF CUSTODY

LAB USE ONLY:
CEI Lab Code:
CEI Lab I.D. Range:

COMPANY INFORMATION	PROJECT INFORMATION
CEI CLIENT #:	Job Contact: Ben Oliver
Company: Apex Environmental Management, Inc.	Email / Tel: boliver@apex-ehs.com
Address: 7 Winchester Court	Project Name: COS 458 Zephyr St. ACM & LBP
Mauldin, South Carolina 29662	Project ID# 0417-66
Email: boliver@apex-ehs.com	PO #:
Tel: 864-404-3210 Fax: 864-404-3213	STATE SAMPLES COLLECTED IN: South Carolina

GENERAL INSTRUCTIONS		
POSITIVE STOP ANALYSIS	<input checked="" type="checkbox"/>	PLM DUE DATE: / /
ANALYZE NOB'S BY TEM	<input checked="" type="checkbox"/>	TEM DUE DATE: / /

IF TAT IS NOT MARKED STANDARD 3 DAY TAT APPLIES.

ASBESTOS	METHOD	TURN AROUND TIME					
		4 HR	8 HR	24 HR	2 DAY	3 DAY	5 DAY
PLM BULK	EPA 600	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
PLM POINT COUNT (400)	EPA 600	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PLM POINT COUNT (1000)	EPA 600	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PLM GRAV w POINT COUNT	EPA 600	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PCM AIR	NIOSH 7400	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TEM AIR AHERA	EPA AHERA	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TEM AIR NIOSH	NIOSH 7402	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TEM BULK	CHATFIELD	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
TEM DUST WIPE	ASTM D6480-05	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TEM DUST MICROVAC	ASTM D5755-09	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TEM SOIL	ASTM D7521-13	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TEM VERMICULITE	CINCINNATI METHOD	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
OTHER:		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

REMARKS: Utilize Positive Stop During Analysis		<input checked="" type="checkbox"/> Accept Samples <input type="checkbox"/> Reject Samples	
Relinquished By:	Date/Time	Received By:	Date/Time
<i>[Signature]</i>	4-19-17	<i>[Signature]</i>	4-20-17 9:10
<i>[Signature]</i>	4-26-17 11:15 am		

Samples will be disposed of 30 days after analysis



B17-0573

T17-0784

# ASBESTOS SAMPLING FORM



COMPANY CONTACT INFORMATION	
Company: Apex Environmental Management, Inc.	Job Contact: Ben Oliver
Project Name: <i>COS 458 Zephyr St. ACM/LRP</i>	
Project ID #: <i>0417-66</i>	Tel: 864-640-1147

SAMPLE ID#	DESCRIPTION / LOCATION	VOLUME/ AREA	TEST	
			PLM	TEM
1	<i>Roof shingles (6 layers) and no felt.</i>		PLM <input checked="" type="checkbox"/>	TEM <input type="checkbox"/>
2			PLM <input checked="" type="checkbox"/>	TEM <input type="checkbox"/>
3			PLM <input type="checkbox"/>	TEM <input checked="" type="checkbox"/>
4	<i>HVAC mastic</i>		PLM <input checked="" type="checkbox"/>	TEM <input type="checkbox"/>
5			PLM <input checked="" type="checkbox"/>	TEM <input type="checkbox"/>
6	<i>Outer caulk on window frames</i>		PLM <input type="checkbox"/>	TEM <input checked="" type="checkbox"/>
7			PLM <input checked="" type="checkbox"/>	TEM <input type="checkbox"/>
8			PLM <input checked="" type="checkbox"/>	TEM <input type="checkbox"/>
9	<i>Inner caulk on window panes</i>		PLM <input type="checkbox"/>	TEM <input checked="" type="checkbox"/>
10			PLM <input checked="" type="checkbox"/>	TEM <input type="checkbox"/>
11	<i>Window glazing</i>		PLM <input type="checkbox"/>	TEM <input checked="" type="checkbox"/>
12			PLM <input checked="" type="checkbox"/>	TEM <input type="checkbox"/>
13	<i>Door caulk</i>		PLM <input checked="" type="checkbox"/>	TEM <input type="checkbox"/>
14			PLM <input checked="" type="checkbox"/>	TEM <input type="checkbox"/>
15	<i>2'x2' fissure ceiling tile</i>		PLM <input type="checkbox"/>	TEM <input checked="" type="checkbox"/>
16			PLM <input checked="" type="checkbox"/>	TEM <input type="checkbox"/>
17	<i>Drywall with joint compound and tape</i>		PLM <input checked="" type="checkbox"/>	TEM <input type="checkbox"/>
18			PLM <input checked="" type="checkbox"/>	TEM <input type="checkbox"/>
19	<i>Texture over plaster with finish</i>		PLM <input checked="" type="checkbox"/>	TEM <input type="checkbox"/>
20			PLM <input checked="" type="checkbox"/>	TEM <input type="checkbox"/>
21			PLM <input checked="" type="checkbox"/>	TEM <input type="checkbox"/>
22			PLM <input checked="" type="checkbox"/>	TEM <input type="checkbox"/>
23	<i>Stone square pattern vinyl floor</i>		PLM <input checked="" type="checkbox"/>	TEM <input type="checkbox"/>
24			PLM <input checked="" type="checkbox"/>	TEM <input type="checkbox"/>
25			PLM <input checked="" type="checkbox"/>	TEM <input type="checkbox"/>
26			PLM <input checked="" type="checkbox"/>	TEM <input type="checkbox"/>
27			PLM <input checked="" type="checkbox"/>	TEM <input type="checkbox"/>
28			PLM <input checked="" type="checkbox"/>	TEM <input type="checkbox"/>
29			PLM <input checked="" type="checkbox"/>	TEM <input type="checkbox"/>
30			PLM <input checked="" type="checkbox"/>	TEM <input type="checkbox"/>

Page 2 of 3





May 31, 2017

Apex Environmental Management  
7 Winchester Court  
Mauldin, SC 29662

**CLIENT PROJECT:** COS 458 Zephyr St. ACM & LBP; 0417-66  
**CEI LAB CODE:** T17-0784.1

Dear Customer:

Enclosed are asbestos analysis results for TEM bulk samples received at our laboratory on May 31, 2017. The samples were analyzed for asbestos using transmission electron microscopy (TEM) per Chatfield Method.

Sample results containing > 1% asbestos are considered asbestos-containing materials (ACMs) per the EPA regulatory requirements. The detection limit for the TEM Chatfield method is <1% depending on the processed weight and constituents of the sample.

Thank you for your business and we look forward to continuing good relations. If you have any questions, please feel free to call our office at 919-481-1413.

Kind Regards,

A handwritten signature in black ink, appearing to read 'Tianbao Bai', is written in a cursive style.

Tianbao Bai, Ph.D., CIH  
Laboratory Director





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**ASBESTOS ANALYTICAL REPORT**  
**By: Transmission Electron Microscopy**

Prepared for

**Apex Environmental Management**

---

CLIENT PROJECT: COS 458 Zephyr St. ACM & LBP; 0417-66

CEI LAB CODE: T17-0784.1

TEST METHOD: Bulk Chatfield  
EPA 600 / R93 / 116

REPORT DATE: 05/31/17

**TEL: 866-481-1412**

*[www.ceilabs.com](http://www.ceilabs.com)*



# ASBESTOS BULK ANALYSIS

By: TRANSMISSION ELECTRON MICROSCOPY

**Client:** Apex Environmental Management  
7 Winchester Court  
Mauldin, SC 29662

**CEI Lab Code:** T17-0784.1  
**Date Received:** 05-31-17  
**Date Analyzed:** 05-31-17  
**Date Reported:** 05-31-17

**Project:** COS 458 Zephyr St. ACM & LBP; 0417-66

## TEM BULK CHATFIELD / EPA 600 / R93 / 116

Client ID Lab ID	Material Description	Sample Weight (g)	Organic Material %	Acid Soluble Material %	Acid Insoluble Material %	Asbestos %
6 T63258	White HVAC Mastic	0.302	7	85.8	7.2	None Detected



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**LEGEND:** None

---

**METHOD:** CHATFIELD & EPA/600/R-93/116

---

**LIMIT OF DETECTION:** Varies with the weight and constituents of the sample (<1%)

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**REGULATORY LIMIT:** >1% by weight


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This report relates only to the samples tested or analyzed and may not be reproduced, except in full, without written approval by CEI Labs, Inc. CEI Labs makes no warranty representation regarding the accuracy of client submitted information in preparing and presenting analytical results. Interpretation of the analytical results is the sole responsibility of the client. Estimated measurement of uncertainty is available on request. Samples were received in acceptable condition unless otherwise noted.

**ANALYST:**

  
Abigail Nails

**APPROVED BY:**

  
Tianbao Bai, Ph.D., CIH  
Laboratory Director

T17-0784  
T61668-682

B17-0573  
35 B237711-  
B237745



107 New Edition Court, Cary, NC 27511  
Tel: 866-481-1412; Fax: 919-481-1442

**ASBESTOS  
CHAIN OF CUSTODY**

<b>LAB USE ONLY:</b>
CEI Lab Code:
CEI Lab I.D. Range:

COMPANY INFORMATION	PROJECT INFORMATION
CEI CLIENT #:	Job Contact: Ben Oliver
Company: Apex Environmental Management, Inc.	Email / Tel: boliver@apex-ehs.com
Address: 7 Winchester Court Mauldin, South Carolina 29662	Project Name: COS 458 Zephyr St. ACM & LBP
Email: boliver@apex-ehs.com	Project ID#: 0417-66
Tel: 864-404-3210 Fax: 864-404-3213	PO #:
	STATE SAMPLES COLLECTED IN: South Carolina

GENERAL INSTRUCTIONS		
POSITIVE STOP ANALYSIS	<input checked="" type="checkbox"/>	PLM DUE DATE: / /
ANALYZE NOB'S BY TEM	<input checked="" type="checkbox"/>	TEM DUE DATE: / /

IF TAT IS NOT MARKED STANDARD 3 DAY TAT APPLIES.

ASBESTOS	METHOD	TURN AROUND TIME					
		4 HR	8 HR	24 HR	2 DAY	3 DAY	5 DAY
PLM BULK	EPA 600	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
PLM POINT COUNT (400)	EPA 600	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PLM POINT COUNT (1000)	EPA 600	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PLM GRAV w POINT COUNT	EPA 600	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PCM AIR	NIOSH 7400	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TEM AIR AHERA	EPA AHERA	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TEM AIR NIOSH	NIOSH 7402	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TEM BULK	CHATFIELD	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
TEM DUST WIPE	ASTM D6480-05	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TEM DUST MICROVAC	ASTM D5755-09	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TEM SOIL	ASTM D7521-13	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TEM VERMICULITE	CINCINNATI METHOD	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
OTHER:		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

REMARKS: Utilize Positive Stop During Analysis		<input checked="" type="checkbox"/> Accept Samples <input type="checkbox"/> Reject Samples	
Relinquished By:	Date/Time	Received By:	Date/Time
<i>[Signature]</i>	4-19-17	DL	4-20-17 9:10
<i>[Signature]</i>	4-26-17 11:15 am		

Samples will be disposed of 30 days after analysis

B17-0573  
T17-0784

# ASBESTOS SAMPLING FORM



COMPANY CONTACT INFORMATION	
Company: Apex Environmental Management, Inc.	Job Contact: Ben Oliver
Project Name: COS 458 Zephyr St. ACM/LRP	
Project ID #: 0417-66	Tel: 864-640-1147

SAMPLE ID#	DESCRIPTION/LOCATION	VOLUME/ AREA	TEST	
			PLM	TEM
1	Roof shingles (6 layers)		<input checked="" type="checkbox"/>	<input type="checkbox"/>
2	and no felt.		<input checked="" type="checkbox"/>	<input type="checkbox"/>
3			<input type="checkbox"/>	<input checked="" type="checkbox"/>
4	HVAC mastic		<input checked="" type="checkbox"/>	<input type="checkbox"/>
5			<input checked="" type="checkbox"/>	<input type="checkbox"/>
6			<input type="checkbox"/>	<input checked="" type="checkbox"/>
7	Outer caulk on		<input checked="" type="checkbox"/>	<input type="checkbox"/>
8	Window frames		<input checked="" type="checkbox"/>	<input type="checkbox"/>
9			<input type="checkbox"/>	<input checked="" type="checkbox"/>
10	Inner caulk on		<input checked="" type="checkbox"/>	<input type="checkbox"/>
11	Window panes		<input checked="" type="checkbox"/>	<input type="checkbox"/>
12			<input type="checkbox"/>	<input checked="" type="checkbox"/>
13	Window glazing		<input checked="" type="checkbox"/>	<input type="checkbox"/>
14			<input checked="" type="checkbox"/>	<input type="checkbox"/>
15			<input type="checkbox"/>	<input checked="" type="checkbox"/>
16	Door caulk		<input checked="" type="checkbox"/>	<input type="checkbox"/>
17			<input checked="" type="checkbox"/>	<input type="checkbox"/>
18			<input type="checkbox"/>	<input checked="" type="checkbox"/>
19	2'x2' fissure		<input checked="" type="checkbox"/>	<input type="checkbox"/>
20	ceiling tile		<input checked="" type="checkbox"/>	<input type="checkbox"/>
21			<input checked="" type="checkbox"/>	<input type="checkbox"/>
22	Drywall with joint		<input checked="" type="checkbox"/>	<input type="checkbox"/>
23	compound and tape		<input checked="" type="checkbox"/>	<input type="checkbox"/>
24			<input checked="" type="checkbox"/>	<input type="checkbox"/>
25	Texture over plaster		<input checked="" type="checkbox"/>	<input type="checkbox"/>
26	with finish		<input checked="" type="checkbox"/>	<input type="checkbox"/>
27			<input checked="" type="checkbox"/>	<input type="checkbox"/>
28			<input checked="" type="checkbox"/>	<input type="checkbox"/>
29			<input checked="" type="checkbox"/>	<input type="checkbox"/>
30	Stone square pattern vinyl floor		<input checked="" type="checkbox"/>	<input type="checkbox"/>



RE: 458 Zephyr Street TEM

From: Tom Oliver

Sent: Wed, May 31, 2017 at 10:30 am

To: 'Laura Bostwick', Tianboa Bai

T17-0784.1

[image001.png](#) (29.5 KB)

Laura,

I need a TEM ran on sample #6 as per the COC. How soon should I expect to receive it?

Thanks,

Thomas H. Oliver

Director of Operations

Apex Environmental Management, Inc.

7 Winchester Court

Mauldin, SC 29662

Office (864) 404-3210 Ext: 5

Mobile (864) 640-5127

Fax (864) 404-3213

Email [toliver@apex-ehs.com](mailto:toliver@apex-ehs.com)

Website [www.apex-ehs.com](http://www.apex-ehs.com)



**From:** Laura Bostwick [mailto:[asbestos@ceilabs.com](mailto:asbestos@ceilabs.com)]

**Sent:** Wednesday, May 31, 2017 9:36 AM

**To:** Tom Oliver

**Subject:** RE: 458 Zephyr Street TEM

Tom,

I just spoke with the analyst to confirm and she said that it was not a true mastic, and was in fact more of a joint compound material and that is why we ran it as PLM instead of TEM.

Please let me know if you have further questions!

Laura Bostwick

CEI Labs, Inc.

730 SE Maynard Road

Cary, NC 27511

(919)481-1413

[asbestos@ceilabs.com](mailto:asbestos@ceilabs.com)

-----Original Message-----

From: "Tom Oliver" <[toliver@apex-ehs.com](mailto:toliver@apex-ehs.com)>

Sent: Wednesday, May 31, 2017 9:28am

To: "CEI Labs, Inc." <[asbestos@ceilabs.com](mailto:asbestos@ceilabs.com)>, "Tianboa Bai" <[bai@ceilabds.com](mailto:bai@ceilabds.com)>

Subject: 458 Zephyr Street TEM

A TEM was not ran for sample #6 as it is indicated on the COC. How soon can you get the TEM analysis results to me for sample #6.

Thomas H. Oliver  
Director of Operations  
Apex Environmental Management, Inc.  
7 Winchester Court  
Mauldin, SC 29662

Office (864) 404-3210 Ext: 5

Mobile (864) 640-5127

Fax (864) 404-3213

Email [toliver@apex-ehs.com](mailto:toliver@apex-ehs.com)

Website [www.apex-ehs.com](http://www.apex-ehs.com)





RE: 458 Zephyr Street TEM

From: Tom Oliver

Sent: Wed, May 31, 2017 at 11:37 am

To: jennifer@ceilabs.com, Tianboa Bai

---

I need the results today. I will pay the 5-day TAT as indicated on the COC.

Thomas H. Oliver  
Director of Operations  
Apex Environmental Management, Inc.  
7 Winchester Court  
Mauldin, SC 29662

Office (864) 404-3210 Ext: 5  
Mobile (864) 640-5127  
Fax (864) 404-3213  
Email [toliver@apex-ehs.com](mailto:toliver@apex-ehs.com)  
Website [www.apex-ehs.com](http://www.apex-ehs.com)

-----Original Message-----

From: jennifer@ceilabs.com [mailto:[jennifer@ceilabs.com](mailto:jennifer@ceilabs.com)]

Sent: Wednesday, May 31, 2017 11:00 AM

To: [Toliver@apex-ehs.com](mailto:Toliver@apex-ehs.com)

Subject: 458 Zephyr Street TEM

Good Morning Tom,

We just received the 458 Zephyr Street project for TEM, and wanted to reach out and see what TAT you would like for the project. If you could let me know as soon as possible so I can get it started for you that would be great!

Thanks,  
Jenn Turner  
TEM Analyst/Lab Tech  
919-481-1413

**SECTION IV**  
**Photographic Log**



Photo 1 -- 458 Zephyr Street in Spartanburg, SC.



Photo 2 – Roof shingles and no felt.



Photo 3 – Typical chimney with mastic assumed positive.



Photo 4 – HVAC mastic in the crawlspace.



Photo 5 – Outer caulk on exterior windows.



Photo 6 – Inner caulk on window panes.





Photo 7 -- Window glazing.



Photo 8 – Door caulk.



Photo 9 – 2' x 2' fissure ceiling tile in the kitchen.



Photo 10 – Drywall with joint compound & tape in the rear entry & bathroom.



Photo 11 – Texture over plaster with finish throughout the ceilings and walls.



Photo 12 – Stone square pattern vinyl floor with no mastic over cream vinyl floor with mastic.

*Asbestos & Lead Assessment  
City of Spartanburg  
458 Zephyr Street  
Spartanburg, South Carolina*



Photo 13 – Beige square pattern vinyl floor with no mastic over wooden pattern vinyl floor with mastic.

**SECTION V**

**SC DHEC Asbestos Inspector License**

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**SCDHEC ISSUED**  
Asbestos ID Card

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**Thomas H Oliver**



Expiration Date

**AIRSAMPLER AS-00202 03/17/18**  
**CONSULTBI BI-00680 01/18/18**