PHASE II ENVIRONMENTAL SITE ASSESSMENT

625 DOUGLAS STREET
WOODBURY COUNTY
SIOUX CITY, IOWA

HR GREEN, INC. PROJECT NO. 210667

APRIL 6, 2023

PREPARED FOR:
CITY OF SIOUX CITY

PREPARED BY:

HRGreen

PHASE II ENVIRONMENTAL SITE ASSESSMENT
US EPA BROWNFIELDS
HAZARDOUS SUBSTANCES AND PETROLEUM ASSESSMENT GRANT:
EPA COOPERATIVE AGREEMENT NO. 97787201

625 Douglas Street
Woodbury County
Sioux City, Iowa

April 6, 2023

HR GREEN, INC. PROJECT NO. 210667

Prepared for:

CITY OF SIOUX CITY
405 6th Street
Sioux City, IA 51102

HRGreen

TABLE OF CONTENTS

LIST OF TABLES

APPENDICES

GLOSSARY OF TERMS

BGS - Below Ground Surface

Calculator – IDNR Cumulative Risk Calculator

CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act

CFR – Code of Federal Regulations

EPA – Environmental Protection Agency

ESA – Environmental Site Assessment

IAC - Iowa Administrative Code

IDNR - Iowa Department of Natural Resources

LBP – Lead-Based Paint

LCS – Laboratory Control Sample

LCSD - LCS Duplicate

LRP - Land Recycling Program

LUST – Leaking Underground Storage Tank

MDL – Method Detection Limit

NFA – No Further Action

PAH – Polycyclic Aromatic Hydrocarbon

PID – Photoionization Detector

QA/QC – Quality Assurance / Quality Control

Range 1 – 0-2' bgs – Shallow Soils

Range 2 – >2' bgs – Deep Soils

RCRA Metals – Resource Conservation and Recovery Act metals

REC(s) – Recognized Environmental Condition(s) as used by ASTM Standard E 1527-13 is defined as the presence or likely presence of any hazardous substances or petroleum products in, on, or at a property: (1) due to release to the environment; (2) under conditions indicative of a release to the environment; or (3) under conditions that pose a material threat of a future release to the environment. De minimis conditions are not recognized environmental conditions.

ROW – Public Right-of-Way

RPD - Relative Percent Difference

SU – Standard Unit

SWS(s) – Statewide Standard(s)

SVOC – Semi-Volatile Organic Compounds

TEH – Total Extractable Hydrocarbon

UST - Underground Storage Tank

VOC - Volatile Organic Compounds

1.0 EXECUTIVE SUMMARY

The City of Sioux City (City) has retained HR Green, Inc. (HR Green) to conduct a Phase II ESA on the property owned by Lamb Art LTD. This property is 0.34 acres in size and is located at 625 Douglas Street in Sioux City, Woodbury County, Iowa (Figure 1, Appendix B). This report hereinafter refers to the property as the "subject property."

A Phase II Sampling Plan for Phase II ESA activities was prepared and submitted to the EPA Project Manager for approval. The findings and conclusions of this Phase II ESA are summarized as follows:

- **Indoor Air:** Fourteen (14) VOCs were detected and did not exceed applicable RSLs. Three of the fourteen compounds were detected in the ambient air sample and not detected in the three indoor air samples.

  Using IDNR's Risk Calculator, the cancer and non-cancer risk for of these findings was calculated for a site worker and construction worker. The calculated risks were acceptable for site occupant.

- **Building Material Survey:** An Iowa-licensed asbestos inspector and Iowa-licensed lead-based paint inspector with GeoTek Engineering & Testing Services, Inc completed building material surveys for an asbestos and lead-based paint, respectively. Asbestos and lead-based paint were identified withing the structure on the subject property. During the asbestos survey, roofing material was not sampled. These surveys are included in Appendix E.

- **Mold:** Elevated relative humidity was identified within the structure as well as the following in airborne and/or tape samples: total mold, *Penicillium/Aspergillus*, *Aspergillus, Stachybotrys, Acremonium*, and *Cladosporium*.

Currently the subject property is vacant and it is HR Green's understanding that this property is planned to be redeveloped back into a theater. The results of this study identify *acceptable* cancer and non-cancer risks based on the indoor air sample collection and did not identify elevated indoor air concentrations in the collected samples.

Additionally, asbestos containing material, lead-based paint, and mold were identified in the structure on the subject property. Asbestos abatement and disposal should be completed by a licensed professional prior to demolition or renovation of a structure. Additional lead-based paint recommendations are provided within the attached survey report. The mold survey states that while "there is no official PEL for mold, it is recommended that demolition workers wear respiratory protection."

Should the owner desire to have a radon survey and/or lead in drinking water survey, this can be completed at a later date and when conditions permit for this type of sample collection.

2.0 INTRODUCTION

The City is currently participating in the U.S. EPA Brownfields Assessment Grant program. The goal of this economic redevelopment initiative is to facilitate community revitalization and promote sustainable economic conditions by addressing real or perceived contamination concerns associated with abandoned and underused properties in Sioux City's targeted brownfields areas.

2.1 Purpose

The major objective of the Brownfields Program is to eliminate concerns regarding perceived or actual contamination on properties so redevelopment can occur. The objective of this assessment was to evaluate any environmental impairment to the property resulting from the RECs identified during the Phase I ESA process. The data gathered during this assessment will assist the City in evaluating the feasibility of redevelopment by comparing constituent concentrations on the property to the risk-based standards outlined in IAC 567 *Chapter 137: Iowa Land Recycling Program and Response Action Standards.*

2.2 Problem Statement

The City is evaluating abandoned, idle, and underused properties with the intent of encouraging redevelopment. The goal of this economic redevelopment initiative is to facilitate community revitalization and to promote sustainable economic conditions by addressing real or perceived contamination concerns associated with abandoned and underused properties in Sioux City's targeted brownfields areas.

The EPA Brownfields Cooperative Agreement requires that environmental data collected are of the appropriate type, quantity, and quality to support project decisions. Project data quality objectives were identified in the *Phase II ESA Data Quality Objectives and Generic Quality Assurance Project Plan, December 2021*. Project specific data quality objectives were identified and documented in the Phase II Sampling Plan.

Evaluation of environmental impairment is conducted using the regulatory programs outlined in IAC. Evaluation of environmental impairment not associated with USTs involves risk-based evaluation and response action through the voluntary LRP as set forth in IAC 567-137(457B) *Chapter 137: Iowa Land Recycling Program and Statewide Response Action Standards* (IAC 137). In the event that contamination is associated with USTs, IAC 137 defers to the evaluation criteria outlined in IAC 567-135(455B) *Chapter 135: Technical Standards and Corrective Action Requirements for Owners and Operators of Underground Storage Tanks* (IAC 135). For this Project, soil and groundwater evaluations for public risk were conducted according to IAC 137.

2.3 Limitations and Exceptions of Assessments

This report has been prepared in accordance with generally accepted environmental methodologies referred to in ASTM 1903-19, and contains all the limitations inherent in these methodologies. No other warranties, expressed or implied, are made as to the professional services provided under the terms of our contract and included in this report.

This report has been prepared on behalf of and for the exclusive use of the City and EPA solely for use in evaluating the recognized environmental conditions and is not intended for any other purpose nor the benefit or use of any other person. This report and the findings contained herein shall not in whole or in part, be disseminated or conveyed to any other party, nor used by any other person, in whole or in part, without the prior written consent of HR Green, except the

report may be conveyed to persons or groups of persons within the governmental offices of the City or EPA or specified by the City or EPA.

2.4 Limiting Conditions and Methodologies Used

No ESA can eliminate all uncertainty. Furthermore, any sample, either surface or subsurface, taken for chemical analysis may or may not be representative of a larger population. Professional judgment and interpretation are inherent in the process and uncertainty is inevitable. Additional assessment may be able to reduce the uncertainty.

Even when Phase II ESA work is executed with an appropriate site-specific standard of care, certain conditions present especially difficult detection problems. Such conditions may include, but are not limited to, complex geological settings, the fate and transport characteristics of certain hazardous substances and petroleum products, the distribution of existing contamination, physical limitations imposed by the location of utilities and other man-made objects, and the limitations of assessment technologies.

Phase II ESAs do not generally require an exhaustive assessment of environmental conditions on a property. There is a point at which the cost of information obtained and the time required to obtain it outweigh the usefulness of the information and, in fact, may be a material detriment to the orderly completion of transactions. If hazardous substance or petroleum releases are confirmed on a parcel of property, the extent of further assessment is related to the degree of uncertainty that is acceptable to the user with respect to the real estate transaction.

Measurements and sampling data only represent the site conditions at the time of data collection. Therefore, the usability of data collected as part of this Phase II ESA may have a finite lifetime depending on the application and use being made of the data. An environmental professional should evaluate whether the generated data are appropriate for any subsequent use beyond the original purpose for which it was collected.

3.0 BACKGROUND

3.1 Site Characteristics

The subject property is owned by Lamb Art LTD located at 625 Douglas Street, Sioux City, Woodbury County, Iowa (Figure 1, Appendix B). The subject property is located within the NE ¼ of the SW ¼ of Section 28, Township 89 North, Range 47 West in Woodbury County, Iowa, and the approximate center of the subject property is further located by the latitude 42.4971° North and longitude -96.4068° West.

The subject property and adjoining parcels to the north and south are zoned Downtown Commercial (DC) while adjacent parcels to the northeast, east-southeast, and west-southwest are zoned Public and Institutional (PI). The adjoining parcel to the northwest is zoned General Commercial (GC). See Appendix G for a copy of the City's Zoning Map. A NRCS Soil Survey of the property identifies the soil as Rawles-Urban land complex found on 0-2 percent slopes.

3.2 Phase I Environmental Site Assessment

HR Green completed the Phase I ESA of the subject property on August 12, 2022. The Phase I ESA revealed the presence of seven (7) RECs in connection with the subject property. The following summarizes the RECs:

On-Site REC:

1. HRG observed boilers and electrical machinery having substantial rust and corrosion during site reconnaissance. In these conditions, PCB contamination is possible to occur.

Off-Stie RECs:

2. The historical use of a portion of a parcel located adjacent to the northeast of the subject property at 401 7th Street. This facility appears to also be associated with LUST 9LTJ60 that has a status of High Risk. Available historical documents list a portion of the parcel as a gas station in 1924, 1933, 1943, 1948, 1949, 1953, 1959, 1964, 1968, 1973, 1979, and 1984. Historical Sanborn maps dated 1924 and 1949 depict two (2) gasoline tanks associated with the operation.
3. The historical use of a parcel located adjacent to the south of the subject property at 615 Douglas Street. Available historical documents list the parcel as an automotive company in 1918 and 1923; automotive company and tractor manufacturer in 1928; and automotive company in 1933. A historical Sanborn map dated 1924 depicts the subject property as an auto service station with repair activities on the 2nd and 3rd floors and auto painting on the 2nd floor.
4. The historical use of a parcel located adjacent to the northwest of the subject property at 301/305 7th Street. Available historical documents list the parcel as a gas station in 1924, 1928, and 1933; used car dealership in 1938; gas station in 1949; used car dealership in 1953 and 1959. Historical Sanborn maps dated 1924 and 1949 depict two (2) and one (1) associated gasoline tank on the parcel, respectively. The latter Sanborn map also depicted a greasing building associated with the operation.
5. The historical use of parcel located approximately 70 feet to the south of the subject property at 607/607-611 Douglas Street. Available documents list it as an auto company in 1918; auto accessories company in 1923; auto service station in 1924; and auto repair in 1953 and 1959. Historical Sanborn maps dated 1924 and 1949 depict three (3) associated USTs located immediately west of the building in a north-south alleyway.
6. The historical use of a portion of a parcel located 100 feet to the southwest of the subject property at 610 Pearl Street. Available historical documents list it as an auto repair shop in the rear of the lot in 1924, 1933, 1948, 1949, 1953, 1959, and 1968. The IDNR's UST indicates the facility currently has eleven (11) 50-gallon hoist oil tanks with active statuses. This location underwent subtantion renovation to a public park, with no found documentation of removal or potential releases during the process.
7. The American Cleaners/Pierce Street Dry Cleaner facility is located 0.134 miles northeast of the subject property. A Phase II ESA completed at the facility in 2014 identified elevated levels of VOCs in off-site groundwater samples. IDNR issued a letter on March 14, 2014 indicating the agency determined "…the extent of contamination of soil and groundwater on the property (817 Pierce Street) has not been adequately demonstrated." IDNR sent a follow-up email to Woodbury County officials on February 5, 2016 indicating no further investigation has been

completed at the site. HR Green was unable to locate any other information related to the facility.

4.0 PHASE II ACTIVITIES

A Phase II Sampling Plan was completed to evaluate potential impact to the subject property from RECs identified in the Phase I ESA. The sampling plan included the collection of lead in drinking water samples, indoor sample collection and analysis for VOCs, building material testing for asbestos and lead-based paint, and indoor testing for mold and radon.

Phase II field investigation activities were conducted in accordance with the Phase II Sampling Plan with the follow caveats:

- Lead in drinking water samples were not collected as utilities are not on at this time and water has been shut off to the structure. The owner stated that it is their intent to replace fixtures and plumbing within the structure as part of the renovation and does not desire to have this testing completed.
- Radon testing was not completed due to the lack of heating or temperature control in the structure. Equipment to collect radon samples requires that temperatures within the area being tested remain around 70 degrees or warmer and that is not possible in this structure at this time.

4.1 Indoor and Ambient Air Assessment

Four air samples were collected on the subject property on February 7, 2023. Three of these samples were indoor air samples, including one duplicate sample, and one sample was an ambient air sample. Samples were collected over an 8-hour period on the subject property into 6-liter SUMMA canisters using a laboratory-provided flow control valve. Canisters were closed within approximately -2 inches (Hg) in the field or at the 8-hour sample collection window. Samples were then shipped to Eurofins TestAmerica Knoxville for TO-15 analysis.

Two sample locations were selected in the basement of the structure and a duplicate sample was collected at one of these locations. Prior to starting the sample collection, the pressure of each canister was recorded and then the canister was opened to start the sample collection.

The indoor air results were compared to EPA RSLs for residential and industrial air thresholds using the THQ of 0.1. The detected analytical results for indoor and ambient air results are summarized below in Table 1.

Table 1
Indoor Air and Ambient Air VOC Analytical Results (ug/m^3)

Parameter	EPA RSL Residential Air (TR = 1E-06 or THQ-0.1)	EPA RSL Industrial Air (TR = 1E-06 or THQ-0.1)	IA1 (IA1-625)	IA2 (IA2-625)	Duplicate @ IA1 (IADUP-625)	Ambient (IA-625)
1,1,2-Trichloro-1,2,2-trifluoroethane	520	2200	0.37 J	0.37 J	0.69 J	0.42 J
2-Butanone (MEK)	520	2200	2.9 U	2.9 U	2.9 U	0.55 J
Acetone	NL	NL	18 U	18 U	18 U	7.5 J
Benzene	0.36	1.6	0.33 J	0.33 J	0.32 J	0.36 J
Carbon tetrachloride	0.47	2.0	0.32 J	0.32 J	0.32 J	0.32 J
Chloromethane	9.4	39	0.98 J	0.49 J	0.98 J	1.3 J
Dichlorodifluoromethane	10	44	1.4 J	1.6 J	1.6 J	1.4 J
Ethylbenzene	1.1	4.9	0.31 J	0.22 J	0.31 J	0.23 J
Hexane	73	310	0.41 J	0.32 J	0.3 J	0.37 J
Isopropyl alcohol	21	88	12 U	12 U	12 U	0.66 J
m-Xylene & p-Xylene	10*	44*	0.97 J	0.66 J	0.93 J	0.73 J
o-Xylene	10	44	0.24 J	0.24 J	0.21 J	0.26 J
Toluene	520	2200	1.2 J	1.1 J	1.1 J	1.1 J
Trichlorofluoromethane	NL	NL	0.94 J	0.91 J	0.94 J	0.89 J

* Listed RSL is for m-xylene and p-xylene individually, not jointly; NL: Not Listed; U: Not detected at the laboratory RL; J: Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value. **Bold** indicates concentration reported above the EPA RSL for residential air; *Italic* text indicates a concentration reported above the EPA RSL for industrial air.

Fourteen (14) VOCs were detected and did not exceed applicable RSLs. However, three of the fourteen compounds were detected in the ambient sample and not detected in the three indoor air samples. The laboratory analytical reports can be found in Appendix C.

4.2 Building Material Surveys

The structure on the subject property is planned to be renovated prior to reuse of the property. As such, a lead-based paint survey was conducted by an Iowa-licensed lead-based paint inspector with GeoTek Engineering & Testing Services, Inc. Lead-based paint was identified in the following items on the second floor: window sash on exterior wall and interior wall plaster on exterior wall. Additional findings and recommendations can be found in the Lead Based Paint Survey report in Appendix E.

An Iowa-licensed asbestos inspector with GeoTek Engineering & Testing Services, Inc. completed an asbestos survey for the structure located on the subject property. This survey was completed to augment a previously complete asbestos survey of the structure, completed by Terracon Consultants, Inc. on May 31, 2019. Both asbestos survey reports are included in Appendix E. Field investigations were completed on February 8, 2023. A total of six (6) bulk asbestos samples were collected. The previously completed survey identified thirteen building materials that contain >1% asbestos and this survey identified two additional building materials that contain >1% asbestos: pipe insulation and pipe fitting insultation. Material in the roof that was repair in 2022 was not sampled during this survey to prevent causing leaks to the structure. Roofing material was not sampled during this assessment and as such is assumed to contain asbestos. The Asbestos Survey can be found in Appendix E.

4.3 Mold Survey

GeoTek Engineering & Testing Services, Inc. completed an Indoor Air Quality Limited Mold Testing assessment on the interior of the subject property on February 8, 2023. This assessment identified elevated relative humidity levels inside the structure (78% where guidelines are 20-30% during winter months), elevated *Penicillium/Aspergillus* and total mold levels. Observations included visible mold within the structure and collected microscopic samples identified *Aspergillus, Stachybotrys, Acremonium*, and *Cladosporium* growth within the structure. This report can be found in Appendix F.

4.4 Risk Evaluations

Iowa Administrative Code 137.10(7), Sub rule 567 specifies cumulative risk criteria that must be complied with in order to acquire a NFA certificate under the Iowa LRP. Cumulative risk is the summation of cancer and non-cancer risks, determined separately, based on exposure to multiple contaminants from the same medium and exposure of the same individual to contaminants in multiple media. Evaluation of cumulative risk is conducted using the Calculator on the IDNR Contaminated Sites Section website.

This Calculator assesses risk to potentially exposed parties, based on three standard exposure scenarios: site resident, site worker, and construction worker. The potential pathways for exposure under each of these scenarios are groundwater, soil, and air.

To evaluate compliance with the cumulative risk criteria, the results from the Calculator must not show increased cancer and non-cancer health risks. The cumulative risk criteria are as follows:

- Cumulative cancer risk summation of multiple media shall not exceed 1 in 10,000.
- Non-cancer health risk summation of multiple media to the same target organ shall not exceed a cumulative Hazard Quotient of 1.

The values for input into the Calculator are chosen using one of the following representations of the dataset:

- The maximum value for each contaminant in each medium from multiple samples of each medium of concern; or,
- The 95% Upper Confidence Limit of the mean contaminant concentration in each medium. This method requires a minimum of six samples.

For the purposes of risk calculations the highest detection, for vapor is entered into the risk calculator. Tables 2 and 3 summarize the cancer and non-cancer risk calculations for vapor exposure. The straight sum for each media and exposure scenario (site worker and construction worker) is calculated. Site resident was not included for this assessment as the subject property is to be developed for commercial purposes and is not planned to contain residential development.

Final risk calculation findings are determined after removal of values which are not considered to be complete exposure pathways. The Final Sum row of Tables 2 and 3 represents the actual applicable risk assessment results based on concentrations observed during the completion of this report.

Vapor

Fourteen (14) VOCs were detected in the collected air samples. However three compounds were detected in the ambient sample and were not detected in the indoor air samples. As such, these samples were not included in the vapor risk calculation as they did not appear to be present at detectable concentrations in the indoor samples. The xylene concentrations were combined to and then included as one result in the Calculator as xylene, mixture. The highest detected concentrations for indoor air samples were included in the IDNR Cumulative Risk Calculator.

Risk calculations are summarized below in Tables 2 and 3 and Calculator results can be viewed in Appendix D.

Table 2
IDNR Risk Calculator Cancer Summations

Media	Site Worker	Construction Worker
Indoor Air	0	0
***Sum**	0	0
****Final Sum**	**0**	**0**

*Sum equals total calculated risk BEFORE excluding "severed" exposure pathways. Severed exposure pathways are greyed out. **Final Sum represents the actual applicable risk assessment results of all remaining human health risk exposure pathways.
A Final Sum of <1 represents acceptable cancer risk
A Final Sum of >1 represents unacceptable cancer risk

Table 3
IDNR Risk Calculator Non-Cancer Summations

Site Worker														
Media	**Heart**	**Liver**	**Blood**	**Kidney**	**Skin**	**Endoc**	**Eye**	**Immu**	**Nerve**	**GenUr**	**Respi**	**Other**	**Devel**	**Gastro**
Indoor Air	0	0	0	0	0	0	0	0	0	0	0	0	0	0
***Sum**	0	0	0	0	0	0	0	0	0	0	0	0	0	0
****Final Sum**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Construction Worker														
Media	**Heart**	**Liver**	**Blood**	**Kidney**	**Skin**	**Endoc**	**Eye**	**Immu**	**Nerve**	**GenUr**	**Respi**	**Other**	**Devel**	**Gastro**
Indoor Air	0	0	0	0	0	0	0	0	0	0	0	0	0	0
***Sum**	0	0	0	0	0	0	0	0	0	0	0	0	0	0
****Final Sum**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Endoc–endocrine system, Immu–immune system, GenUr-genitourinary system, Respi-respiratory system, Devel-developmental
*Sum equals total calculated risk BEFORE excluding "severed" exposure pathways. Severed exposure pathways are greyed out.
**Final Sum represents the actual applicable risk assessment results of all remaining human health risk exposure pathways.
A Final Sum of <1 represents acceptable non-cancer risk.
A Final Sum of >1 represents unacceptable non-cancer risk

5.0 FINDINGS

The findings and conclusions are summarized as follows:

- **Indoor Air:** Fourteen (14) VOCs were detected and did not exceed applicable RSLs. Three of the fourteen compounds were detected in the ambient air sample and not detected in the three indoor air samples.

  Using IDNR's Risk Calculator, the cancer and non-cancer risk for of these findings was calculated for a site worker and construction worker. The calculated risks were acceptable for site occupant.

- **Building Material Survey:** An Iowa-licensed asbestos inspector and Iowa-licensed lead-based paint inspector with GeoTek Engineering & Testing Services, Inc completed building material surveys for an asbestos and lead-based paint, respectively. Asbestos and lead-based paint were identified withing the structure on the subject property. During the asbestos survey, roofing material was not sampled. These surveys are included in Appendix E.

- **Mold:** Elevated relative humidity was identified within the structure as well as the following in airborne and/or tape samples: total mold, *Penicillium/Aspergillus*, *Aspergillus, Stachybotrys, Acremonium*, and *Cladosporium*.

6.0 DISCUSSION AND RECOMMENDATIONS

Currently the subject property is vacant and it is HR Green's understanding that this property is planned to be redeveloped back into a theater. The results of this study identify *acceptable* cancer and non-cancer risks based on the indoor air sample collection and did not identify elevated indoor air concentrations in the collected samples.

Additionally, asbestos containing material, lead-based paint, and mold were identified in the structure on the subject property. Asbestos abatement and disposal should be completed by a licensed professional prior to demolition or renovation of a structure. Additional lead-based paint recommendations are provided within the attached survey report. The mold survey states that while "there is no official PEL for mold, it is recommended that demolition workers wear respiratory protection."

Should the owner desire to have a radon survey and/or lead in drinking water survey, this can be completed at a later date and when conditions permit for this type of sample collection.

7.0 DATA VALIDATION AND USABILITY

Validation of the data collected during Phase II ESA of the subject property is included below.

7.1 Representativeness

Samples were collected in the manner and at locations specified in the Phase II Sampling Plan to accurately reflect the constituent concentrations in the media from which they were taken at

the time of sampling, except where noted in Section 4.0. Sample locations were biased to focus efforts on areas of the property with the greatest potential to impact adjacent properties.

Representativeness of the data was partially ensured by avoiding cross-contamination, adhering to standard sample handling and analytical procedures, and use of proper chain-of-custody documentation procedures.

7.2 Comparability

In order that one set of data may be compared with another, all analyses were performed by accepted EPA or state methods, and all analytical results were reported in similar concentration units and format.

7.3 Completeness

In order for a set of data to be used with confidence to make a decision, the data must be complete. The sampling design included the collection of samples from the area of the property most likely to impact adjacent properties. The samples recommended in the approved Phase II Sampling Plan were collected where possible and the data set is complete.

7.4 Sensitivity

Detection and quantification limits were compared to EPA RSLs. The laboratory reporting limits were all below applicable RSLs with the exception of the following VOCs:

- 1,1,2,2, Tetrachloroethane, 1,1,2-trichloroethane, benzyl chloride, 1,2-dibromoethane, hexachlorobutadiene, and naphthalene for both residential and industrial
- 1,2,4-Trichlorobenzne, 1,2-dichloroethane, chloroform, bromodichloromethane, and vinyl bromide for residential.

7.5 Precision

Precision is a measure of the variability of a measurement system. Precision was assessed through the collection and evaluation of field quality control samples. Precision is typically an estimate by means of duplicate measurements and is expressed in terms of RPD. The goal for precision of field duplicate results is ±50 percent RPD for soil samples and ±35 percent RPD for water samples.

The RPD between the primary and corresponding duplicate sample will be calculated using the below formula.

$$RPD = \left[\frac{2\ x\ (C_1 - C_2)}{(C_1 + C_2)} \right] \times 100$$

where: RPD = Relative percent difference
C_1 = Larger of the two observed measurement values
C_2 = Smaller of the two observed measurement values

An indoor air duplicate sample was collected for VOC analysis. RPD values were not calculated for results where both the sample and duplicate were reported as non-detect values because of this, RPD values were calculated for three VOCs. Calculated RPD values for indoor air are provided for information purposes and are shown in Table 4.

Table 4
Relative Percent Difference

Media	Location	Parameter	Sample Concentration	Duplicate Concentration	RPD
Indoor Air	**VOCs (ug/m3)**				
	IA1 (IA1-625)	1,1,2-Trichloro-1,2,2-trifluoroethane	0.37 J	0.69 J	60.38
		Benzene	0.33 J	0.32 J	3.08
		Carbon tetrachloride	0.32 J	0.32 J	0.00
		Chloromethane	0.98 J	0.98 J	0.00
		Dichlorodifluoromethane	1.4 J	1.6 J	13.33
		Ethylbenzene	0.31 J	0.31 J	0.00
		Hexane	0.41 J	0.3 J	30.99
		m-Xylene & p-Xylene	0.97 J	0.93 J	4.21
		o-Xylene	0.24 J	0.21 J	13.33
		Toluene	1.2 J	1.1 J	8.70
		Trichlorofluoromethane	0.94 J	0.94 J	0.00

7.6 Accuracy

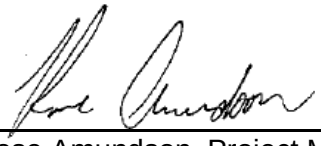
Trip blanks were not analyzed as groundwater samples were not collected during the completion of this assessment.

Sampling and analytical activities were conducted in accordance with EPA approved methods or industry standard practices.

8.0 SIGNATURES OF ENVIRONMENTAL PROFESSIONALS

We declare, to the best of our professional knowledge and belief, we meet the definition of *Environmental Professional* as defined in §312.10 of 40 CFR 312 and we have the specific qualifications based on education, training, and experience to assess a *property* of the nature, history, and setting of the *subject site*. We have developed and performed all appropriate inquiries in conformance with the standards and practices set forth in 40 CFR Part 312.

Signatures of the environmental professionals responsible for this report:



Rose Amundson, Project Manager, Technical Review

Stacy E. Woodson, P.E., Senior Project Manager, Quality Control and Assurance

APPENDIX A

QUALIFICATIONS

HR GREEN COMPANY PROFILE

HR Green, Inc. is a professional engineering and technical consulting firm serving clients in the public and private sectors. We are a privately held, employee-owned company, and fully committed to the success of our clients and the well-being of our over 500 employees.

HR Green builds **business accountability into every task we perform for our clients**. This means we partner with our clients to create viable facilities and healthy enterprises that are truly sustainable **for the client**.

We have been in business without interruption since 1913. We carefully target our technical services to address the most timely needs of society, and thus to succeed as sustainable businesses.

QUALIFICATIONS OF INDIVIDUALS PREPARING THIS REPORT

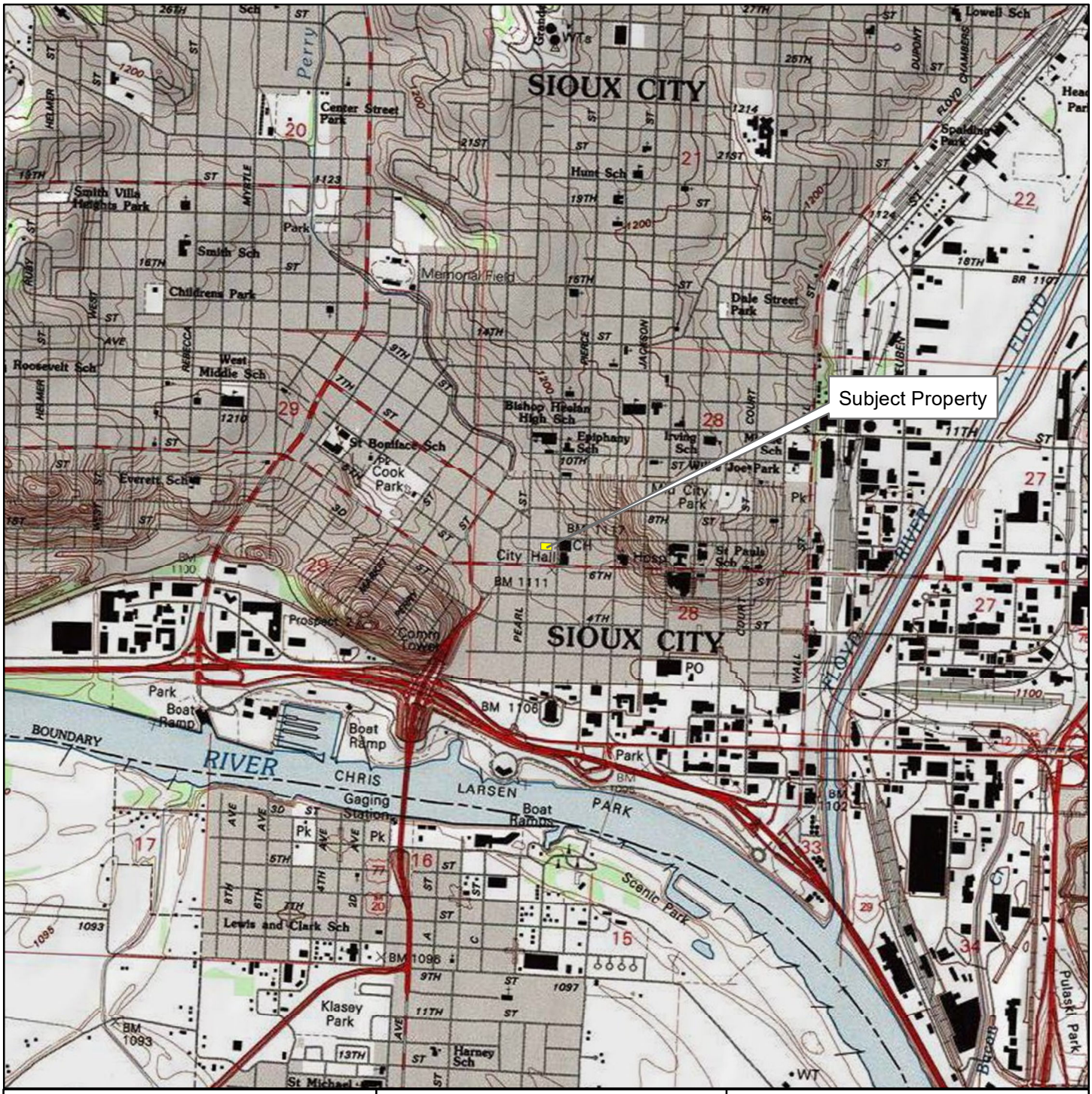
Ms. Rose Amundson is a Lead Scientist with fourteen years of experience working in the environmental field. Rose has completed work on Federal and State regulatory compliance reporting, Phase I and Phase II Environmental Site Assessments, site remediation planning and implementation, geographic information systems (GIS) projects, and surface water and groundwater modeling. Rose holds a Master's Degree in Hydrology from the University of Arizona and is 40-hour Hazardous Waste Operations and Emergency Response (HAZWOPER) certified. Rose is also an Iowa Certified Groundwater Professional (#2103).

Ms. Stacy Woodson, P.E. is a Senior Project Manager with twenty years of experience working as an environmental consultant. Stacy's experience includes completing numerous National Environmental Policy Act (NEPA) Environmental Assessments projects involving impact analysis, agency coordination, and public involvement. Her background includes noise studies, air quality permits, Phase I Environmental Site Assessments, traffic and corridor studies, feasibility studies, and environmental compliance. Stacy is a licensed engineer in the States of Iowa (#17389) and Minnesota (#50739) and holds a Bachelor's of Science Degree in Civil Engineering from Iowa State University.

APPENDIX B

FIGURES

Figure 1 – Site Vicinity Map
Figure 2 – Sample Location Map



Legend

Subject Property

FIGURE 1

Site Vicinity Map

625 Douglas Street

City of Sioux City
Woodbury County, Iowa

N
W E
S

0 2,000 Feet

1 inch = 2,000 feet

HRGreen

Legend

- Indoor Air Sample Locations
- Subject Property

The ambient outdoor air sample was collected from small door in the exterior wall facing to the east on the first floor of the structure.

Figure 2

Sample Location Map

625 Douglas Street

City of Sioux City
Woodbury County, Iowa

N
W E
S

0 50 Feet

1 inch = 50 feet

HRGreen

APPENDIX C

LABORATORY REPORTS/CHAIN OF CUSTODY DOCUMENTATION

eurofins | Environment Testing

ANALYTICAL REPORT

PREPARED FOR

Attn: Rose Amundson
HR Green, Inc
PO BOX 9009
Cedar Rapids, Iowa 52409

Generated 2/21/2023 2:04:24 PM

JOB DESCRIPTION

625 Douglas

JOB NUMBER

140-30561-1

Eurofins Knoxville
5815 Middlebrook Pike
Knoxville TN 37921

See page two for job notes and contact information.

myEOL

Job Notes

This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

The test results in this report relate only to the samples as received by the laboratory and will meet all requirements of the methodology, with any exceptions noted. This report shall not be reproduced except in full, without the express written approval of the laboratory. All questions should be directed to the Eurofins TestAmerica Project Manager.

Authorization

Generated
2/21/2023 2:04:24 PM

Authorized for release by
Diana Lange, Project Management Assistant II
Diane.Lange@et.eurofinsus.com
Designee for
Jamie McKinney, Senior Project Manager
Jamie.McKinney@et.eurofinsus.com
(865)291-3000

Table of Contents

Definitions/Glossary

Client: HR Green, Inc
Project/Site: 625 Douglas

Job ID: 140-30561-1

Qualifiers

Air - GC/MS VOA

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Case Narrative

Client: HR Green, Inc
Project/Site: 625 Douglas

Job ID: 140-30561-1

Job ID: 140-30561-1

Laboratory: Eurofins Knoxville

Narrative

Job Narrative
140-30561-1

Comments
No additional comments.

Receipt
The samples were received on 2/14/2023 11:30 AM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice.

Receipt Exceptions
The Field Sampler was not listed on the Chain of Custody.

Air - GC/MS VOA
Methods TO 15 LL, TO-14A, TO-15: EPA methods TO-14A and TO-15 specify the use of humidified "zero air" as the blank reagent for canister cleaning, instrument calibration and sample analysis. Ultra-high purity humidified nitrogen from a cryogenic reservoir is used in place of "zero air" by Eurofins TestAmerica Knoxville.

Method TO-15: The continuing calibration verification (CCV) associated with batch 140-70376 exhibited % difference of > 30% for the following analyte(s) 1,2-Dichloro-1,1,2,2-tetrafluoroethane; however, the results were within the LCS acceptance limits. The EPA method requires that all target analytes in the continuing calibration verification standard be within 30% difference from the initial calibration. According to the laboratory standard operating procedure, the continuing calibration is acceptable if it meets the laboratory control sample acceptance criteria.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Detection Summary

Client: HR Green, Inc
Project/Site: 625 Douglas

Job ID: 140-30561-1

Client Sample ID: IA1-625 — Lab Sample ID: 140-30561-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,2-Trichloro-1,2,2-trifluoroethane	0.048	J	0.20	0.024	ppb v/v	1		TO-15	Total/NA
Benzene	0.10	J	0.20	0.033	ppb v/v	1		TO-15	Total/NA
Carbon tetrachloride	0.051	J	0.20	0.032	ppb v/v	1		TO-15	Total/NA
Chloromethane	0.48	J	1.0	0.16	ppb v/v	1		TO-15	Total/NA
Dichlorodifluoromethane	0.28	J	0.50	0.035	ppb v/v	1		TO-15	Total/NA
Ethylbenzene	0.072	J	0.20	0.033	ppb v/v	1		TO-15	Total/NA
Hexane	0.12	J	0.80	0.063	ppb v/v	1		TO-15	Total/NA
m-Xylene & p-Xylene	0.22	J	0.80	0.073	ppb v/v	1		TO-15	Total/NA
o-Xylene	0.056	J	0.20	0.038	ppb v/v	1		TO-15	Total/NA
Toluene	0.33	J	1.0	0.057	ppb v/v	1		TO-15	Total/NA
Trichlorofluoromethane	0.17	J	0.20	0.028	ppb v/v	1		TO-15	Total/NA

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,2-Trichloro-1,2,2-trifluoroethane	0.37	J	1.5	0.18	ug/m3	1		TO-15	Total/NA
Benzene	0.33	J	0.64	0.11	ug/m3	1		TO-15	Total/NA
Carbon tetrachloride	0.32	J	1.3	0.20	ug/m3	1		TO-15	Total/NA
Chloromethane	0.98	J	2.1	0.33	ug/m3	1		TO-15	Total/NA
Dichlorodifluoromethane	1.4	J	2.5	0.17	ug/m3	1		TO-15	Total/NA
Ethylbenzene	0.31	J	0.87	0.14	ug/m3	1		TO-15	Total/NA
Hexane	0.41	J	2.8	0.22	ug/m3	1		TO-15	Total/NA
m-Xylene & p-Xylene	0.97	J	3.5	0.32	ug/m3	1		TO-15	Total/NA
o-Xylene	0.24	J	0.87	0.17	ug/m3	1		TO-15	Total/NA
Toluene	1.2	J	3.8	0.21	ug/m3	1		TO-15	Total/NA
Trichlorofluoromethane	0.94	J	1.1	0.16	ug/m3	1		TO-15	Total/NA

Client Sample ID: IA2-625 — Lab Sample ID: 140-30561-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,2-Trichloro-1,2,2-trifluoroethane	0.048	J	0.20	0.024	ppb v/v	1		TO-15	Total/NA
Benzene	0.10	J	0.20	0.033	ppb v/v	1		TO-15	Total/NA
Carbon tetrachloride	0.051	J	0.20	0.032	ppb v/v	1		TO-15	Total/NA
Chloromethane	0.24	J	1.0	0.16	ppb v/v	1		TO-15	Total/NA
Dichlorodifluoromethane	0.32	J	0.50	0.035	ppb v/v	1		TO-15	Total/NA
Ethylbenzene	0.051	J	0.20	0.033	ppb v/v	1		TO-15	Total/NA
Hexane	0.091	J	0.80	0.063	ppb v/v	1		TO-15	Total/NA
m-Xylene & p-Xylene	0.15	J	0.80	0.073	ppb v/v	1		TO-15	Total/NA
o-Xylene	0.054	J	0.20	0.038	ppb v/v	1		TO-15	Total/NA
Toluene	0.30	J	1.0	0.057	ppb v/v	1		TO-15	Total/NA
Trichlorofluoromethane	0.16	J	0.20	0.028	ppb v/v	1		TO-15	Total/NA

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,2-Trichloro-1,2,2-trifluoroethane	0.37	J	1.5	0.18	ug/m3	1		TO-15	Total/NA
Benzene	0.33	J	0.64	0.11	ug/m3	1		TO-15	Total/NA
Carbon tetrachloride	0.32	J	1.3	0.20	ug/m3	1		TO-15	Total/NA
Chloromethane	0.49	J	2.1	0.33	ug/m3	1		TO-15	Total/NA
Dichlorodifluoromethane	1.6	J	2.5	0.17	ug/m3	1		TO-15	Total/NA
Ethylbenzene	0.22	J	0.87	0.14	ug/m3	1		TO-15	Total/NA
Hexane	0.32	J	2.8	0.22	ug/m3	1		TO-15	Total/NA
m-Xylene & p-Xylene	0.66	J	3.5	0.32	ug/m3	1		TO-15	Total/NA
o-Xylene	0.24	J	0.87	0.17	ug/m3	1		TO-15	Total/NA
Toluene	1.1	J	3.8	0.21	ug/m3	1		TO-15	Total/NA
Trichlorofluoromethane	0.91	J	1.1	0.16	ug/m3	1		TO-15	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins Knoxville

Detection Summary

Client: HR Green, Inc
Project/Site: 625 Douglas

Job ID: 140-30561-1

Client Sample ID: IADUP-625 — Lab Sample ID: 140-30561-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,2-Trichloro-1,2,2-trifluoroethane	0.090	J	0.20	0.024	ppb v/v	1		TO-15	Total/NA
Benzene	0.10	J	0.20	0.033	ppb v/v	1		TO-15	Total/NA
Carbon tetrachloride	0.051	J	0.20	0.032	ppb v/v	1		TO-15	Total/NA
Chloromethane	0.48	J	1.0	0.16	ppb v/v	1		TO-15	Total/NA
Dichlorodifluoromethane	0.32	J	0.50	0.035	ppb v/v	1		TO-15	Total/NA
Ethylbenzene	0.071	J	0.20	0.033	ppb v/v	1		TO-15	Total/NA
Hexane	0.085	J	0.80	0.063	ppb v/v	1		TO-15	Total/NA
m-Xylene & p-Xylene	0.21	J	0.80	0.073	ppb v/v	1		TO-15	Total/NA
o-Xylene	0.049	J	0.20	0.038	ppb v/v	1		TO-15	Total/NA
Toluene	0.29	J	1.0	0.057	ppb v/v	1		TO-15	Total/NA
Trichlorofluoromethane	0.17	J	0.20	0.028	ppb v/v	1		TO-15	Total/NA

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,2-Trichloro-1,2,2-trifluoroethane	0.69	J	1.5	0.18	ug/m3	1		TO-15	Total/NA
Benzene	0.32	J	0.64	0.11	ug/m3	1		TO-15	Total/NA
Carbon tetrachloride	0.32	J	1.3	0.20	ug/m3	1		TO-15	Total/NA
Chloromethane	0.98	J	2.1	0.33	ug/m3	1		TO-15	Total/NA
Dichlorodifluoromethane	1.6	J	2.5	0.17	ug/m3	1		TO-15	Total/NA
Ethylbenzene	0.31	J	0.87	0.14	ug/m3	1		TO-15	Total/NA
Hexane	0.30	J	2.8	0.22	ug/m3	1		TO-15	Total/NA
m-Xylene & p-Xylene	0.93	J	3.5	0.32	ug/m3	1		TO-15	Total/NA
o-Xylene	0.21	J	0.87	0.17	ug/m3	1		TO-15	Total/NA
Toluene	1.1	J	3.8	0.21	ug/m3	1		TO-15	Total/NA
Trichlorofluoromethane	0.94	J	1.1	0.16	ug/m3	1		TO-15	Total/NA

Client Sample ID: IA-625 — Lab Sample ID: 140-30561-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,2-Trichloro-1,2,2-trifluoroethane	0.055	J	0.20	0.024	ppb v/v	1		TO-15	Total/NA
2-Butanone (MEK)	0.19	J	1.0	0.18	ppb v/v	1		TO-15	Total/NA
Acetone	3.1	J	7.5	1.4	ppb v/v	1		TO-15	Total/NA
Benzene	0.11	J	0.20	0.033	ppb v/v	1		TO-15	Total/NA
Carbon tetrachloride	0.052	J	0.20	0.032	ppb v/v	1		TO-15	Total/NA
Chloromethane	0.61	J	1.0	0.16	ppb v/v	1		TO-15	Total/NA
Dichlorodifluoromethane	0.28	J	0.50	0.035	ppb v/v	1		TO-15	Total/NA
Ethylbenzene	0.053	J	0.20	0.033	ppb v/v	1		TO-15	Total/NA
Hexane	0.11	J	0.80	0.063	ppb v/v	1		TO-15	Total/NA
Isopropyl alcohol	0.27	J	5.0	0.24	ppb v/v	1		TO-15	Total/NA
m-Xylene & p-Xylene	0.17	J	0.80	0.073	ppb v/v	1		TO-15	Total/NA
o-Xylene	0.061	J	0.20	0.038	ppb v/v	1		TO-15	Total/NA
Toluene	0.30	J	1.0	0.057	ppb v/v	1		TO-15	Total/NA
Trichlorofluoromethane	0.16	J	0.20	0.028	ppb v/v	1		TO-15	Total/NA

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,2-Trichloro-1,2,2-trifluoroethane	0.42	J	1.5	0.18	ug/m3	1		TO-15	Total/NA
2-Butanone (MEK)	0.55	J	2.9	0.53	ug/m3	1		TO-15	Total/NA
Acetone	7.5	J	18	3.3	ug/m3	1		TO-15	Total/NA
Benzene	0.36	J	0.64	0.11	ug/m3	1		TO-15	Total/NA
Carbon tetrachloride	0.32	J	1.3	0.20	ug/m3	1		TO-15	Total/NA
Chloromethane	1.3	J	2.1	0.33	ug/m3	1		TO-15	Total/NA
Dichlorodifluoromethane	1.4	J	2.5	0.17	ug/m3	1		TO-15	Total/NA
Ethylbenzene	0.23	J	0.87	0.14	ug/m3	1		TO-15	Total/NA
Hexane	0.37	J	2.8	0.22	ug/m3	1		TO-15	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: IA-625 (Continued)

Lab Sample ID: 140-30561-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Isopropyl alcohol	0.66	J	12	0.59	ug/m3	1		TO-15	Total/NA
m-Xylene & p-Xylene	0.73	J	3.5	0.32	ug/m3	1		TO-15	Total/NA
o-Xylene	0.26	J	0.87	0.17	ug/m3	1		TO-15	Total/NA
Toluene	1.1	J	3.8	0.21	ug/m3	1		TO-15	Total/NA
Trichlorofluoromethane	0.89	J	1.1	0.16	ug/m3	1		TO-15	Total/NA

This Detection Summary does not include radiochemical test results.

Client: HR Green, Inc
Project/Site: 625 Douglas

Job ID: 140-30561-1

Client Sample ID: IA1-625
Date Collected: 02/07/23 16:11
Date Received: 02/14/23 11:30
Sample Container: Summa Canister 6L

Lab Sample ID: 140-30561-1
Matrix: Air

Method: EPA TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		0.20	0.072	ppb v/v			02/16/23 17:49	1
1,1,2,2-Tetrachloroethane	ND		0.20	0.035	ppb v/v			02/16/23 17:49	1
1,1,2-Trichloro-1,2,2-trifluoroethane	**0.048**	**J**	0.20	0.024	ppb v/v			02/16/23 17:49	1
1,1,2-Trichloroethane	ND		0.20	0.038	ppb v/v			02/16/23 17:49	1
1,1-Dichloroethane	ND		0.20	0.027	ppb v/v			02/16/23 17:49	1
1,1-Dichloroethene	ND		0.20	0.032	ppb v/v			02/16/23 17:49	1
1,2,4-Trichlorobenzene	ND		2.0	0.089	ppb v/v			02/16/23 17:49	1
1,2,4-Trimethylbenzene	ND		0.20	0.050	ppb v/v			02/16/23 17:49	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.20	0.030	ppb v/v			02/16/23 17:49	1
1,2-Dichlorobenzene	ND		0.40	0.078	ppb v/v			02/16/23 17:49	1
1,2-Dichloroethane	ND		0.20	0.025	ppb v/v			02/16/23 17:49	1
1,2-Dichloropropane	ND		0.20	0.025	ppb v/v			02/16/23 17:49	1
1,3,5-Trimethylbenzene	ND		0.40	0.16	ppb v/v			02/16/23 17:49	1
1,3-Dichlorobenzene	ND		0.20	0.040	ppb v/v			02/16/23 17:49	1
1,4-Dichlorobenzene	ND		0.20	0.040	ppb v/v			02/16/23 17:49	1
1,4-Dioxane	ND		5.0	0.075	ppb v/v			02/16/23 17:49	1
2-Butanone (MEK)	ND		1.0	0.18	ppb v/v			02/16/23 17:49	1
4-Methyl-2-pentanone (MIBK)	ND		1.0	0.14	ppb v/v			02/16/23 17:49	1
Acetone	ND		7.5	1.4	ppb v/v			02/16/23 17:49	1
Benzene	**0.10**	**J**	0.20	0.033	ppb v/v			02/16/23 17:49	1
Benzyl chloride	ND		0.80	0.095	ppb v/v			02/16/23 17:49	1
Bromoform	ND		0.20	0.066	ppb v/v			02/16/23 17:49	1
Bromomethane	ND		0.20	0.055	ppb v/v			02/16/23 17:49	1
Carbon disulfide	ND		0.50	0.087	ppb v/v			02/16/23 17:49	1
Carbon tetrachloride	**0.051**	**J**	0.20	0.032	ppb v/v			02/16/23 17:49	1
Chlorobenzene	ND		0.20	0.056	ppb v/v			02/16/23 17:49	1
Dibromochloromethane	ND		0.20	0.034	ppb v/v			02/16/23 17:49	1
Chloroethane	ND		0.80	0.079	ppb v/v			02/16/23 17:49	1
Chloroform	ND		0.20	0.036	ppb v/v			02/16/23 17:49	1
Chloromethane	**0.48**	**J**	1.0	0.16	ppb v/v			02/16/23 17:49	1
cis-1,2-Dichloroethene	ND		0.20	0.025	ppb v/v			02/16/23 17:49	1
cis-1,3-Dichloropropene	ND		0.40	0.048	ppb v/v			02/16/23 17:49	1
Cyclohexane	ND		0.50	0.093	ppb v/v			02/16/23 17:49	1
Bromodichloromethane	ND		0.20	0.044	ppb v/v			02/16/23 17:49	1
Dichlorodifluoromethane	**0.28**	**J**	0.50	0.035	ppb v/v			02/16/23 17:49	1
Ethylbenzene	**0.072**	**J**	0.20	0.033	ppb v/v			02/16/23 17:49	1
1,2-Dibromoethane (EDB)	ND		0.20	0.031	ppb v/v			02/16/23 17:49	1
Hexachlorobutadiene	ND		1.0	0.080	ppb v/v			02/16/23 17:49	1
Hexane	**0.12**	**J**	0.80	0.063	ppb v/v			02/16/23 17:49	1
Isopropyl alcohol	ND		5.0	0.24	ppb v/v			02/16/23 17:49	1
Isopropylbenzene	ND		0.80	0.043	ppb v/v			02/16/23 17:49	1
m-Xylene & p-Xylene	**0.22**	**J**	0.80	0.073	ppb v/v			02/16/23 17:49	1
Methyl tert-butyl ether	ND		1.0	0.13	ppb v/v			02/16/23 17:49	1
Methylene Chloride	ND		1.0	0.34	ppb v/v			02/16/23 17:49	1
Naphthalene	ND		0.50	0.10	ppb v/v			02/16/23 17:49	1
o-Xylene	**0.056**	**J**	0.20	0.038	ppb v/v			02/16/23 17:49	1
Styrene	ND		0.20	0.060	ppb v/v			02/16/23 17:49	1
Tetrachloroethene	ND		0.20	0.029	ppb v/v			02/16/23 17:49	1

Client Sample ID: IA1-625
Date Collected: 02/07/23 16:11
Date Received: 02/14/23 11:30
Sample Container: Summa Canister 6L

Lab Sample ID: 140-30561-1
Matrix: Air

Method: EPA TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tetrahydrofuran	ND		5.0	0.18	ppb v/v			02/16/23 17:49	1
Toluene	**0.33**	**J**	1.0	0.057	ppb v/v			02/16/23 17:49	1
trans-1,2-Dichloroethene	ND		0.20	0.033	ppb v/v			02/16/23 17:49	1
trans-1,3-Dichloropropene	ND		0.20	0.049	ppb v/v			02/16/23 17:49	1
Trichloroethene	ND		0.20	0.033	ppb v/v			02/16/23 17:49	1
Trichlorofluoromethane	**0.17**	**J**	0.20	0.028	ppb v/v			02/16/23 17:49	1
Vinyl acetate	ND		5.0	0.070	ppb v/v			02/16/23 17:49	1
Vinyl bromide	ND		0.20	0.050	ppb v/v			02/16/23 17:49	1
Vinyl chloride	ND		0.40	0.065	ppb v/v			02/16/23 17:49	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		1.1	0.39	ug/m3			02/16/23 17:49	1
1,1,2,2-Tetrachloroethane	ND		1.4	0.24	ug/m3			02/16/23 17:49	1
1,1,2-Trichloro-1,2,2-trifluoroethane	**0.37**	**J**	1.5	0.18	ug/m3			02/16/23 17:49	1
1,1,2-Trichloroethane	ND		1.1	0.21	ug/m3			02/16/23 17:49	1
1,1-Dichloroethane	ND		0.81	0.11	ug/m3			02/16/23 17:49	1
1,1-Dichloroethene	ND		0.79	0.13	ug/m3			02/16/23 17:49	1
1,2,4-Trichlorobenzene	ND		15	0.66	ug/m3			02/16/23 17:49	1
1,2,4-Trimethylbenzene	ND		0.98	0.25	ug/m3			02/16/23 17:49	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		1.4	0.21	ug/m3			02/16/23 17:49	1
1,2-Dichlorobenzene	ND		2.4	0.47	ug/m3			02/16/23 17:49	1
1,2-Dichloroethane	ND		0.81	0.10	ug/m3			02/16/23 17:49	1
1,2-Dichloropropane	ND		0.92	0.12	ug/m3			02/16/23 17:49	1
1,3,5-Trimethylbenzene	ND		2.0	0.79	ug/m3			02/16/23 17:49	1
1,3-Dichlorobenzene	ND		1.2	0.24	ug/m3			02/16/23 17:49	1
1,4-Dichlorobenzene	ND		1.2	0.24	ug/m3			02/16/23 17:49	1
1,4-Dioxane	ND		18	0.27	ug/m3			02/16/23 17:49	1
2-Butanone (MEK)	ND		2.9	0.53	ug/m3			02/16/23 17:49	1
4-Methyl-2-pentanone (MIBK)	ND		4.1	0.57	ug/m3			02/16/23 17:49	1
Acetone	ND		18	3.3	ug/m3			02/16/23 17:49	1
Benzene	**0.33**	**J**	0.64	0.11	ug/m3			02/16/23 17:49	1
Benzyl chloride	ND		4.1	0.49	ug/m3			02/16/23 17:49	1
Bromoform	ND		2.1	0.68	ug/m3			02/16/23 17:49	1
Bromomethane	ND		0.78	0.21	ug/m3			02/16/23 17:49	1
Carbon disulfide	ND		1.6	0.27	ug/m3			02/16/23 17:49	1
Carbon tetrachloride	**0.32**	**J**	1.3	0.20	ug/m3			02/16/23 17:49	1
Chlorobenzene	ND		0.92	0.26	ug/m3			02/16/23 17:49	1
Dibromochloromethane	ND		1.7	0.29	ug/m3			02/16/23 17:49	1
Chloroethane	ND		2.1	0.21	ug/m3			02/16/23 17:49	1
Chloroform	ND		0.98	0.18	ug/m3			02/16/23 17:49	1
Chloromethane	**0.98**	**J**	2.1	0.33	ug/m3			02/16/23 17:49	1
cis-1,2-Dichloroethene	ND		0.79	0.099	ug/m3			02/16/23 17:49	1
cis-1,3-Dichloropropene	ND		1.8	0.22	ug/m3			02/16/23 17:49	1
Cyclohexane	ND		1.7	0.32	ug/m3			02/16/23 17:49	1
Bromodichloromethane	ND		1.3	0.29	ug/m3			02/16/23 17:49	1
Dichlorodifluoromethane	**1.4**	**J**	2.5	0.17	ug/m3			02/16/23 17:49	1
Ethylbenzene	**0.31**	**J**	0.87	0.14	ug/m3			02/16/23 17:49	1
1,2-Dibromoethane (EDB)	ND		1.5	0.24	ug/m3			02/16/23 17:49	1

Client Sample ID: IA1-625

Lab Sample ID: 140-30561-1

Date Collected: 02/07/23 16:11
Matrix: Air
Date Received: 02/14/23 11:30
Sample Container: Summa Canister 6L

Method: EPA TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hexachlorobutadiene	ND		11	0.85	ug/m3			02/16/23 17:49	1
Hexane	**0.41**	**J**	2.8	0.22	ug/m3			02/16/23 17:49	1
Isopropyl alcohol	ND		12	0.59	ug/m3			02/16/23 17:49	1
Isopropylbenzene	ND		3.9	0.21	ug/m3			02/16/23 17:49	1
m-Xylene & p-Xylene	**0.97**	**J**	3.5	0.32	ug/m3			02/16/23 17:49	1
Methyl tert-butyl ether	ND		3.6	0.47	ug/m3			02/16/23 17:49	1
Methylene Chloride	ND		3.5	1.2	ug/m3			02/16/23 17:49	1
Naphthalene	ND		2.6	0.52	ug/m3			02/16/23 17:49	1
o-Xylene	**0.24**	**J**	0.87	0.17	ug/m3			02/16/23 17:49	1
Styrene	ND		0.85	0.26	ug/m3			02/16/23 17:49	1
Tetrachloroethene	ND		1.4	0.20	ug/m3			02/16/23 17:49	1
Tetrahydrofuran	ND		15	0.53	ug/m3			02/16/23 17:49	1
Toluene	**1.2**	**J**	3.8	0.21	ug/m3			02/16/23 17:49	1
trans-1,2-Dichloroethene	ND		0.79	0.13	ug/m3			02/16/23 17:49	1
trans-1,3-Dichloropropene	ND		0.91	0.22	ug/m3			02/16/23 17:49	1
Trichloroethene	ND		1.1	0.18	ug/m3			02/16/23 17:49	1
Trichlorofluoromethane	**0.94**	**J**	1.1	0.16	ug/m3			02/16/23 17:49	1
Vinyl acetate	ND		18	0.25	ug/m3			02/16/23 17:49	1
Vinyl bromide	ND		0.87	0.22	ug/m3			02/16/23 17:49	1
Vinyl chloride	ND		1.0	0.17	ug/m3			02/16/23 17:49	1

Client Sample ID: IA2-625

Lab Sample ID: 140-30561-2

Date Collected: 02/07/23 16:45
Matrix: Air
Date Received: 02/14/23 11:30
Sample Container: Summa Canister 6L

Method: EPA TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		0.20	0.072	ppb v/v			02/16/23 18:38	1
1,1,2,2-Tetrachloroethane	ND		0.20	0.035	ppb v/v			02/16/23 18:38	1
1,1,2-Trichloro-1,2,2-trifluoroethane	**0.048**	**J**	0.20	0.024	ppb v/v			02/16/23 18:38	1
1,1,2-Trichloroethane	ND		0.20	0.038	ppb v/v			02/16/23 18:38	1
1,1-Dichloroethane	ND		0.20	0.027	ppb v/v			02/16/23 18:38	1
1,1-Dichloroethene	ND		0.20	0.032	ppb v/v			02/16/23 18:38	1
1,2,4-Trichlorobenzene	ND		2.0	0.089	ppb v/v			02/16/23 18:38	1
1,2,4-Trimethylbenzene	ND		0.20	0.050	ppb v/v			02/16/23 18:38	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.20	0.030	ppb v/v			02/16/23 18:38	1
1,2-Dichlorobenzene	ND		0.40	0.078	ppb v/v			02/16/23 18:38	1
1,2-Dichloroethane	ND		0.20	0.025	ppb v/v			02/16/23 18:38	1
1,2-Dichloropropane	ND		0.20	0.025	ppb v/v			02/16/23 18:38	1
1,3,5-Trimethylbenzene	ND		0.40	0.16	ppb v/v			02/16/23 18:38	1
1,3-Dichlorobenzene	ND		0.20	0.040	ppb v/v			02/16/23 18:38	1
1,4-Dichlorobenzene	ND		0.20	0.040	ppb v/v			02/16/23 18:38	1
1,4-Dioxane	ND		5.0	0.075	ppb v/v			02/16/23 18:38	1
2-Butanone (MEK)	ND		1.0	0.18	ppb v/v			02/16/23 18:38	1
4-Methyl-2-pentanone (MIBK)	ND		1.0	0.14	ppb v/v			02/16/23 18:38	1
Acetone	ND		7.5	1.4	ppb v/v			02/16/23 18:38	1
Benzene	**0.10**	**J**	0.20	0.033	ppb v/v			02/16/23 18:38	1

Client: HR Green, Inc
Project/Site: 625 Douglas

Job ID: 140-30561-1

Client Sample ID: IA2-625
Date Collected: 02/07/23 16:45
Date Received: 02/14/23 11:30
Sample Container: Summa Canister 6L

Lab Sample ID: 140-30561-2
Matrix: Air

Method: EPA TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzyl chloride	ND		0.80	0.095	ppb v/v			02/16/23 18:38	1
Bromoform	ND		0.20	0.066	ppb v/v			02/16/23 18:38	1
Bromomethane	ND		0.20	0.055	ppb v/v			02/16/23 18:38	1
Carbon disulfide	ND		0.50	0.087	ppb v/v			02/16/23 18:38	1
Carbon tetrachloride	**0.051**	**J**	0.20	0.032	ppb v/v			02/16/23 18:38	1
Chlorobenzene	ND		0.20	0.056	ppb v/v			02/16/23 18:38	1
Dibromochloromethane	ND		0.20	0.034	ppb v/v			02/16/23 18:38	1
Chloroethane	ND		0.80	0.079	ppb v/v			02/16/23 18:38	1
Chloroform	ND		0.20	0.036	ppb v/v			02/16/23 18:38	1
Chloromethane	**0.24**	**J**	1.0	0.16	ppb v/v			02/16/23 18:38	1
cis-1,2-Dichloroethene	ND		0.20	0.025	ppb v/v			02/16/23 18:38	1
cis-1,3-Dichloropropene	ND		0.40	0.048	ppb v/v			02/16/23 18:38	1
Cyclohexane	ND		0.50	0.093	ppb v/v			02/16/23 18:38	1
Bromodichloromethane	ND		0.20	0.044	ppb v/v			02/16/23 18:38	1
Dichlorodifluoromethane	**0.32**	**J**	0.50	0.035	ppb v/v			02/16/23 18:38	1
Ethylbenzene	**0.051**	**J**	0.20	0.033	ppb v/v			02/16/23 18:38	1
1,2-Dibromoethane (EDB)	ND		0.20	0.031	ppb v/v			02/16/23 18:38	1
Hexachlorobutadiene	ND		1.0	0.080	ppb v/v			02/16/23 18:38	1
Hexane	**0.091**	**J**	0.80	0.063	ppb v/v			02/16/23 18:38	1
Isopropyl alcohol	ND		5.0	0.24	ppb v/v			02/16/23 18:38	1
Isopropylbenzene	ND		0.80	0.043	ppb v/v			02/16/23 18:38	1
m-Xylene & p-Xylene	**0.15**	**J**	0.80	0.073	ppb v/v			02/16/23 18:38	1
Methyl tert-butyl ether	ND		1.0	0.13	ppb v/v			02/16/23 18:38	1
Methylene Chloride	ND		1.0	0.34	ppb v/v			02/16/23 18:38	1
Naphthalene	ND		0.50	0.10	ppb v/v			02/16/23 18:38	1
o-Xylene	**0.054**	**J**	0.20	0.038	ppb v/v			02/16/23 18:38	1
Styrene	ND		0.20	0.060	ppb v/v			02/16/23 18:38	1
Tetrachloroethene	ND		0.20	0.029	ppb v/v			02/16/23 18:38	1
Tetrahydrofuran	ND		5.0	0.18	ppb v/v			02/16/23 18:38	1
Toluene	**0.30**	**J**	1.0	0.057	ppb v/v			02/16/23 18:38	1
trans-1,2-Dichloroethene	ND		0.20	0.033	ppb v/v			02/16/23 18:38	1
trans-1,3-Dichloropropene	ND		0.20	0.049	ppb v/v			02/16/23 18:38	1
Trichloroethene	ND		0.20	0.033	ppb v/v			02/16/23 18:38	1
Trichlorofluoromethane	**0.16**	**J**	0.20	0.028	ppb v/v			02/16/23 18:38	1
Vinyl acetate	ND		5.0	0.070	ppb v/v			02/16/23 18:38	1
Vinyl bromide	ND		0.20	0.050	ppb v/v			02/16/23 18:38	1
Vinyl chloride	ND		0.40	0.065	ppb v/v			02/16/23 18:38	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		1.1	0.39	ug/m3			02/16/23 18:38	1
1,1,2,2-Tetrachloroethane	ND		1.4	0.24	ug/m3			02/16/23 18:38	1
1,1,2-Trichloro-1,2,2-trifluoroethane	**0.37**	**J**	1.5	0.18	ug/m3			02/16/23 18:38	1
1,1,2-Trichloroethane	ND		1.1	0.21	ug/m3			02/16/23 18:38	1
1,1-Dichloroethane	ND		0.81	0.11	ug/m3			02/16/23 18:38	1
1,1-Dichloroethene	ND		0.79	0.13	ug/m3			02/16/23 18:38	1
1,2,4-Trichlorobenzene	ND		15	0.66	ug/m3			02/16/23 18:38	1
1,2,4-Trimethylbenzene	ND		0.98	0.25	ug/m3			02/16/23 18:38	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		1.4	0.21	ug/m3			02/16/23 18:38	1

Client: HR Green, Inc
Project/Site: 625 Douglas

Job ID: 140-30561-1

Client Sample ID: IA2-625
Date Collected: 02/07/23 16:45
Date Received: 02/14/23 11:30
Sample Container: Summa Canister 6L

Lab Sample ID: 140-30561-2
Matrix: Air

Method: EPA TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2-Dichlorobenzene	ND		2.4	0.47	ug/m3			02/16/23 18:38	1
1,2-Dichloroethane	ND		0.81	0.10	ug/m3			02/16/23 18:38	1
1,2-Dichloropropane	ND		0.92	0.12	ug/m3			02/16/23 18:38	1
1,3,5-Trimethylbenzene	ND		2.0	0.79	ug/m3			02/16/23 18:38	1
1,3-Dichlorobenzene	ND		1.2	0.24	ug/m3			02/16/23 18:38	1
1,4-Dichlorobenzene	ND		1.2	0.24	ug/m3			02/16/23 18:38	1
1,4-Dioxane	ND		18	0.27	ug/m3			02/16/23 18:38	1
2-Butanone (MEK)	ND		2.9	0.53	ug/m3			02/16/23 18:38	1
4-Methyl-2-pentanone (MIBK)	ND		4.1	0.57	ug/m3			02/16/23 18:38	1
Acetone	ND		18	3.3	ug/m3			02/16/23 18:38	1
Benzene	**0.33**	**J**	0.64	0.11	ug/m3			02/16/23 18:38	1
Benzyl chloride	ND		4.1	0.49	ug/m3			02/16/23 18:38	1
Bromoform	ND		2.1	0.68	ug/m3			02/16/23 18:38	1
Bromomethane	ND		0.78	0.21	ug/m3			02/16/23 18:38	1
Carbon disulfide	ND		1.6	0.27	ug/m3			02/16/23 18:38	1
Carbon tetrachloride	**0.32**	**J**	1.3	0.20	ug/m3			02/16/23 18:38	1
Chlorobenzene	ND		0.92	0.26	ug/m3			02/16/23 18:38	1
Dibromochloromethane	ND		1.7	0.29	ug/m3			02/16/23 18:38	1
Chloroethane	ND		2.1	0.21	ug/m3			02/16/23 18:38	1
Chloroform	ND		0.98	0.18	ug/m3			02/16/23 18:38	1
Chloromethane	**0.49**	**J**	2.1	0.33	ug/m3			02/16/23 18:38	1
cis-1,2-Dichloroethene	ND		0.79	0.099	ug/m3			02/16/23 18:38	1
cis-1,3-Dichloropropene	ND		1.8	0.22	ug/m3			02/16/23 18:38	1
Cyclohexane	ND		1.7	0.32	ug/m3			02/16/23 18:38	1
Bromodichloromethane	ND		1.3	0.29	ug/m3			02/16/23 18:38	1
Dichlorodifluoromethane	**1.6**	**J**	2.5	0.17	ug/m3			02/16/23 18:38	1
Ethylbenzene	**0.22**	**J**	0.87	0.14	ug/m3			02/16/23 18:38	1
1,2-Dibromoethane (EDB)	ND		1.5	0.24	ug/m3			02/16/23 18:38	1
Hexachlorobutadiene	ND		11	0.85	ug/m3			02/16/23 18:38	1
Hexane	**0.32**	**J**	2.8	0.22	ug/m3			02/16/23 18:38	1
Isopropyl alcohol	ND		12	0.59	ug/m3			02/16/23 18:38	1
Isopropylbenzene	ND		3.9	0.21	ug/m3			02/16/23 18:38	1
m-Xylene & p-Xylene	**0.66**	**J**	3.5	0.32	ug/m3			02/16/23 18:38	1
Methyl tert-butyl ether	ND		3.6	0.47	ug/m3			02/16/23 18:38	1
Methylene Chloride	ND		3.5	1.2	ug/m3			02/16/23 18:38	1
Naphthalene	ND		2.6	0.52	ug/m3			02/16/23 18:38	1
o-Xylene	**0.24**	**J**	0.87	0.17	ug/m3			02/16/23 18:38	1
Styrene	ND		0.85	0.26	ug/m3			02/16/23 18:38	1
Tetrachloroethene	ND		1.4	0.20	ug/m3			02/16/23 18:38	1
Tetrahydrofuran	ND		15	0.53	ug/m3			02/16/23 18:38	1
Toluene	**1.1**	**J**	3.8	0.21	ug/m3			02/16/23 18:38	1
trans-1,2-Dichloroethene	ND		0.79	0.13	ug/m3			02/16/23 18:38	1
trans-1,3-Dichloropropene	ND		0.91	0.22	ug/m3			02/16/23 18:38	1
Trichloroethene	ND		1.1	0.18	ug/m3			02/16/23 18:38	1
Trichlorofluoromethane	**0.91**	**J**	1.1	0.16	ug/m3			02/16/23 18:38	1
Vinyl acetate	ND		18	0.25	ug/m3			02/16/23 18:38	1
Vinyl bromide	ND		0.87	0.22	ug/m3			02/16/23 18:38	1
Vinyl chloride	ND		1.0	0.17	ug/m3			02/16/23 18:38	1

Client Sample ID: IADUP-625

Lab Sample ID: 140-30561-3

Date Collected: 02/07/23 00:00
Matrix: Air
Date Received: 02/14/23 11:30
Sample Container: Summa Canister 6L

Method: EPA TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		0.20	0.072	ppb v/v			02/16/23 19:26	1
1,1,2,2-Tetrachloroethane	ND		0.20	0.035	ppb v/v			02/16/23 19:26	1
1,1,2-Trichloro-1,2,2-trifluoroethane	**0.090**	**J**	0.20	0.024	ppb v/v			02/16/23 19:26	1
1,1,2-Trichloroethane	ND		0.20	0.038	ppb v/v			02/16/23 19:26	1
1,1-Dichloroethane	ND		0.20	0.027	ppb v/v			02/16/23 19:26	1
1,1-Dichloroethene	ND		0.20	0.032	ppb v/v			02/16/23 19:26	1
1,2,4-Trichlorobenzene	ND		2.0	0.089	ppb v/v			02/16/23 19:26	1
1,2,4-Trimethylbenzene	ND		0.20	0.050	ppb v/v			02/16/23 19:26	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.20	0.030	ppb v/v			02/16/23 19:26	1
1,2-Dichlorobenzene	ND		0.40	0.078	ppb v/v			02/16/23 19:26	1
1,2-Dichloroethane	ND		0.20	0.025	ppb v/v			02/16/23 19:26	1
1,2-Dichloropropane	ND		0.20	0.025	ppb v/v			02/16/23 19:26	1
1,3,5-Trimethylbenzene	ND		0.40	0.16	ppb v/v			02/16/23 19:26	1
1,3-Dichlorobenzene	ND		0.20	0.040	ppb v/v			02/16/23 19:26	1
1,4-Dichlorobenzene	ND		0.20	0.040	ppb v/v			02/16/23 19:26	1
1,4-Dioxane	ND		5.0	0.075	ppb v/v			02/16/23 19:26	1
2-Butanone (MEK)	ND		1.0	0.18	ppb v/v			02/16/23 19:26	1
4-Methyl-2-pentanone (MIBK)	ND		1.0	0.14	ppb v/v			02/16/23 19:26	1
Acetone	ND		7.5	1.4	ppb v/v			02/16/23 19:26	1
Benzene	**0.10**	**J**	0.20	0.033	ppb v/v			02/16/23 19:26	1
Benzyl chloride	ND		0.80	0.095	ppb v/v			02/16/23 19:26	1
Bromoform	ND		0.20	0.066	ppb v/v			02/16/23 19:26	1
Bromomethane	ND		0.20	0.055	ppb v/v			02/16/23 19:26	1
Carbon disulfide	ND		0.50	0.087	ppb v/v			02/16/23 19:26	1
Carbon tetrachloride	**0.051**	**J**	0.20	0.032	ppb v/v			02/16/23 19:26	1
Chlorobenzene	ND		0.20	0.056	ppb v/v			02/16/23 19:26	1
Dibromochloromethane	ND		0.20	0.034	ppb v/v			02/16/23 19:26	1
Chloroethane	ND		0.80	0.079	ppb v/v			02/16/23 19:26	1
Chloroform	ND		0.20	0.036	ppb v/v			02/16/23 19:26	1
Chloromethane	**0.48**	**J**	1.0	0.16	ppb v/v			02/16/23 19:26	1
cis-1,2-Dichloroethene	ND		0.20	0.025	ppb v/v			02/16/23 19:26	1
cis-1,3-Dichloropropene	ND		0.40	0.048	ppb v/v			02/16/23 19:26	1
Cyclohexane	ND		0.50	0.093	ppb v/v			02/16/23 19:26	1
Bromodichloromethane	ND		0.20	0.044	ppb v/v			02/16/23 19:26	1
Dichlorodifluoromethane	**0.32**	**J**	0.50	0.035	ppb v/v			02/16/23 19:26	1
Ethylbenzene	**0.071**	**J**	0.20	0.033	ppb v/v			02/16/23 19:26	1
1,2-Dibromoethane (EDB)	ND		0.20	0.031	ppb v/v			02/16/23 19:26	1
Hexachlorobutadiene	ND		1.0	0.080	ppb v/v			02/16/23 19:26	1
Hexane	**0.085**	**J**	0.80	0.063	ppb v/v			02/16/23 19:26	1
Isopropyl alcohol	ND		5.0	0.24	ppb v/v			02/16/23 19:26	1
Isopropylbenzene	ND		0.80	0.043	ppb v/v			02/16/23 19:26	1
m-Xylene & p-Xylene	**0.21**	**J**	0.80	0.073	ppb v/v			02/16/23 19:26	1
Methyl tert-butyl ether	ND		1.0	0.13	ppb v/v			02/16/23 19:26	1
Methylene Chloride	ND		1.0	0.34	ppb v/v			02/16/23 19:26	1
Naphthalene	ND		0.50	0.10	ppb v/v			02/16/23 19:26	1
o-Xylene	**0.049**	**J**	0.20	0.038	ppb v/v			02/16/23 19:26	1
Styrene	ND		0.20	0.060	ppb v/v			02/16/23 19:26	1
Tetrachloroethene	ND		0.20	0.029	ppb v/v			02/16/23 19:26	1

Client: HR Green, Inc
Project/Site: 625 Douglas

Job ID: 140-30561-1

Client Sample ID: IADUP-625
Date Collected: 02/07/23 00:00
Date Received: 02/14/23 11:30
Sample Container: Summa Canister 6L

Lab Sample ID: 140-30561-3
Matrix: Air

Method: EPA TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tetrahydrofuran	ND		5.0	0.18	ppb v/v			02/16/23 19:26	1
Toluene	**0.29**	**J**	1.0	0.057	ppb v/v			02/16/23 19:26	1
trans-1,2-Dichloroethene	ND		0.20	0.033	ppb v/v			02/16/23 19:26	1
trans-1,3-Dichloropropene	ND		0.20	0.049	ppb v/v			02/16/23 19:26	1
Trichloroethene	ND		0.20	0.033	ppb v/v			02/16/23 19:26	1
Trichlorofluoromethane	**0.17**	**J**	0.20	0.028	ppb v/v			02/16/23 19:26	1
Vinyl acetate	ND		5.0	0.070	ppb v/v			02/16/23 19:26	1
Vinyl bromide	ND		0.20	0.050	ppb v/v			02/16/23 19:26	1
Vinyl chloride	ND		0.40	0.065	ppb v/v			02/16/23 19:26	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		1.1	0.39	ug/m3			02/16/23 19:26	1
1,1,2,2-Tetrachloroethane	ND		1.4	0.24	ug/m3			02/16/23 19:26	1
1,1,2-Trichloro-1,2,2-trifluoroethane	**0.69**	**J**	1.5	0.18	ug/m3			02/16/23 19:26	1
1,1,2-Trichloroethane	ND		1.1	0.21	ug/m3			02/16/23 19:26	1
1,1-Dichloroethane	ND		0.81	0.11	ug/m3			02/16/23 19:26	1
1,1-Dichloroethene	ND		0.79	0.13	ug/m3			02/16/23 19:26	1
1,2,4-Trichlorobenzene	ND		15	0.66	ug/m3			02/16/23 19:26	1
1,2,4-Trimethylbenzene	ND		0.98	0.25	ug/m3			02/16/23 19:26	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		1.4	0.21	ug/m3			02/16/23 19:26	1
1,2-Dichlorobenzene	ND		2.4	0.47	ug/m3			02/16/23 19:26	1
1,2-Dichloroethane	ND		0.81	0.10	ug/m3			02/16/23 19:26	1
1,2-Dichloropropane	ND		0.92	0.12	ug/m3			02/16/23 19:26	1
1,3,5-Trimethylbenzene	ND		2.0	0.79	ug/m3			02/16/23 19:26	1
1,3-Dichlorobenzene	ND		1.2	0.24	ug/m3			02/16/23 19:26	1
1,4-Dichlorobenzene	ND		1.2	0.24	ug/m3			02/16/23 19:26	1
1,4-Dioxane	ND		18	0.27	ug/m3			02/16/23 19:26	1
2-Butanone (MEK)	ND		2.9	0.53	ug/m3			02/16/23 19:26	1
4-Methyl-2-pentanone (MIBK)	ND		4.1	0.57	ug/m3			02/16/23 19:26	1
Acetone	ND		18	3.3	ug/m3			02/16/23 19:26	1
Benzene	**0.32**	**J**	0.64	0.11	ug/m3			02/16/23 19:26	1
Benzyl chloride	ND		4.1	0.49	ug/m3			02/16/23 19:26	1
Bromoform	ND		2.1	0.68	ug/m3			02/16/23 19:26	1
Bromomethane	ND		0.78	0.21	ug/m3			02/16/23 19:26	1
Carbon disulfide	ND		1.6	0.27	ug/m3			02/16/23 19:26	1
Carbon tetrachloride	**0.32**	**J**	1.3	0.20	ug/m3			02/16/23 19:26	1
Chlorobenzene	ND		0.92	0.26	ug/m3			02/16/23 19:26	1
Dibromochloromethane	ND		1.7	0.29	ug/m3			02/16/23 19:26	1
Chloroethane	ND		2.1	0.21	ug/m3			02/16/23 19:26	1
Chloroform	ND		0.98	0.18	ug/m3			02/16/23 19:26	1
Chloromethane	**0.98**	**J**	2.1	0.33	ug/m3			02/16/23 19:26	1
cis-1,2-Dichloroethene	ND		0.79	0.099	ug/m3			02/16/23 19:26	1
cis-1,3-Dichloropropene	ND		1.8	0.22	ug/m3			02/16/23 19:26	1
Cyclohexane	ND		1.7	0.32	ug/m3			02/16/23 19:26	1
Bromodichloromethane	ND		1.3	0.29	ug/m3			02/16/23 19:26	1
Dichlorodifluoromethane	**1.6**	**J**	2.5	0.17	ug/m3			02/16/23 19:26	1
Ethylbenzene	**0.31**	**J**	0.87	0.14	ug/m3			02/16/23 19:26	1
1,2-Dibromoethane (EDB)	ND		1.5	0.24	ug/m3			02/16/23 19:26	1

Client Sample ID: IADUP-625

Lab Sample ID: 140-30561-3

Date Collected: 02/07/23 00:00
Matrix: Air
Date Received: 02/14/23 11:30
Sample Container: Summa Canister 6L

Method: EPA TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hexachlorobutadiene	ND		11	0.85	ug/m3			02/16/23 19:26	1
Hexane	**0.30**	**J**	2.8	0.22	ug/m3			02/16/23 19:26	1
Isopropyl alcohol	ND		12	0.59	ug/m3			02/16/23 19:26	1
Isopropylbenzene	ND		3.9	0.21	ug/m3			02/16/23 19:26	1
m-Xylene & p-Xylene	**0.93**	**J**	3.5	0.32	ug/m3			02/16/23 19:26	1
Methyl tert-butyl ether	ND		3.6	0.47	ug/m3			02/16/23 19:26	1
Methylene Chloride	ND		3.5	1.2	ug/m3			02/16/23 19:26	1
Naphthalene	ND		2.6	0.52	ug/m3			02/16/23 19:26	1
o-Xylene	**0.21**	**J**	0.87	0.17	ug/m3			02/16/23 19:26	1
Styrene	ND		0.85	0.26	ug/m3			02/16/23 19:26	1
Tetrachloroethene	ND		1.4	0.20	ug/m3			02/16/23 19:26	1
Tetrahydrofuran	ND		15	0.53	ug/m3			02/16/23 19:26	1
Toluene	**1.1**	**J**	3.8	0.21	ug/m3			02/16/23 19:26	1
trans-1,2-Dichloroethene	ND		0.79	0.13	ug/m3			02/16/23 19:26	1
trans-1,3-Dichloropropene	ND		0.91	0.22	ug/m3			02/16/23 19:26	1
Trichloroethene	ND		1.1	0.18	ug/m3			02/16/23 19:26	1
Trichlorofluoromethane	**0.94**	**J**	1.1	0.16	ug/m3			02/16/23 19:26	1
Vinyl acetate	ND		18	0.25	ug/m3			02/16/23 19:26	1
Vinyl bromide	ND		0.87	0.22	ug/m3			02/16/23 19:26	1
Vinyl chloride	ND		1.0	0.17	ug/m3			02/16/23 19:26	1

Client Sample ID: IA-625

Lab Sample ID: 140-30561-4

Date Collected: 02/07/23 16:47
Matrix: Air
Date Received: 02/14/23 11:30
Sample Container: Summa Canister 6L

Method: EPA TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		0.20	0.072	ppb v/v			02/16/23 20:16	1
1,1,2,2-Tetrachloroethane	ND		0.20	0.035	ppb v/v			02/16/23 20:16	1
1,1,2-Trichloro-1,2,2-trifluoroethane	**0.055**	**J**	0.20	0.024	ppb v/v			02/16/23 20:16	1
1,1,2-Trichloroethane	ND		0.20	0.038	ppb v/v			02/16/23 20:16	1
1,1-Dichloroethane	ND		0.20	0.027	ppb v/v			02/16/23 20:16	1
1,1-Dichloroethene	ND		0.20	0.032	ppb v/v			02/16/23 20:16	1
1,2,4-Trichlorobenzene	ND		2.0	0.089	ppb v/v			02/16/23 20:16	1
1,2,4-Trimethylbenzene	ND		0.20	0.050	ppb v/v			02/16/23 20:16	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.20	0.030	ppb v/v			02/16/23 20:16	1
1,2-Dichlorobenzene	ND		0.40	0.078	ppb v/v			02/16/23 20:16	1
1,2-Dichloroethane	ND		0.20	0.025	ppb v/v			02/16/23 20:16	1
1,2-Dichloropropane	ND		0.20	0.025	ppb v/v			02/16/23 20:16	1
1,3,5-Trimethylbenzene	ND		0.40	0.16	ppb v/v			02/16/23 20:16	1
1,3-Dichlorobenzene	ND		0.20	0.040	ppb v/v			02/16/23 20:16	1
1,4-Dichlorobenzene	ND		0.20	0.040	ppb v/v			02/16/23 20:16	1
1,4-Dioxane	ND		5.0	0.075	ppb v/v			02/16/23 20:16	1
2-Butanone (MEK)	**0.19**	**J**	1.0	0.18	ppb v/v			02/16/23 20:16	1
4-Methyl-2-pentanone (MIBK)	ND		1.0	0.14	ppb v/v			02/16/23 20:16	1
Acetone	**3.1**	**J**	7.5	1.4	ppb v/v			02/16/23 20:16	1
Benzene	**0.11**	**J**	0.20	0.033	ppb v/v			02/16/23 20:16	1

Client Sample ID: IA-625
Date Collected: 02/07/23 16:47
Date Received: 02/14/23 11:30
Sample Container: Summa Canister 6L

Lab Sample ID: 140-30561-4
Matrix: Air

Method: EPA TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzyl chloride	ND		0.80	0.095	ppb v/v			02/16/23 20:16	1
Bromoform	ND		0.20	0.066	ppb v/v			02/16/23 20:16	1
Bromomethane	ND		0.20	0.055	ppb v/v			02/16/23 20:16	1
Carbon disulfide	ND		0.50	0.087	ppb v/v			02/16/23 20:16	1
Carbon tetrachloride	**0.052**	**J**	0.20	0.032	ppb v/v			02/16/23 20:16	1
Chlorobenzene	ND		0.20	0.056	ppb v/v			02/16/23 20:16	1
Dibromochloromethane	ND		0.20	0.034	ppb v/v			02/16/23 20:16	1
Chloroethane	ND		0.80	0.079	ppb v/v			02/16/23 20:16	1
Chloroform	ND		0.20	0.036	ppb v/v			02/16/23 20:16	1
Chloromethane	**0.61**	**J**	1.0	0.16	ppb v/v			02/16/23 20:16	1
cis-1,2-Dichloroethene	ND		0.20	0.025	ppb v/v			02/16/23 20:16	1
cis-1,3-Dichloropropene	ND		0.40	0.048	ppb v/v			02/16/23 20:16	1
Cyclohexane	ND		0.50	0.093	ppb v/v			02/16/23 20:16	1
Bromodichloromethane	ND		0.20	0.044	ppb v/v			02/16/23 20:16	1
Dichlorodifluoromethane	**0.28**	**J**	0.50	0.035	ppb v/v			02/16/23 20:16	1
Ethylbenzene	**0.053**	**J**	0.20	0.033	ppb v/v			02/16/23 20:16	1
1,2-Dibromoethane (EDB)	ND		0.20	0.031	ppb v/v			02/16/23 20:16	1
Hexachlorobutadiene	ND		1.0	0.080	ppb v/v			02/16/23 20:16	1
Hexane	**0.11**	**J**	0.80	0.063	ppb v/v			02/16/23 20:16	1
Isopropyl alcohol	**0.27**	**J**	5.0	0.24	ppb v/v			02/16/23 20:16	1
Isopropylbenzene	ND		0.80	0.043	ppb v/v			02/16/23 20:16	1
m-Xylene & p-Xylene	**0.17**	**J**	0.80	0.073	ppb v/v			02/16/23 20:16	1
Methyl tert-butyl ether	ND		1.0	0.13	ppb v/v			02/16/23 20:16	1
Methylene Chloride	ND		1.0	0.34	ppb v/v			02/16/23 20:16	1
Naphthalene	ND		0.50	0.10	ppb v/v			02/16/23 20:16	1
o-Xylene	**0.061**	**J**	0.20	0.038	ppb v/v			02/16/23 20:16	1
Styrene	ND		0.20	0.060	ppb v/v			02/16/23 20:16	1
Tetrachloroethene	ND		0.20	0.029	ppb v/v			02/16/23 20:16	1
Tetrahydrofuran	ND		5.0	0.18	ppb v/v			02/16/23 20:16	1
Toluene	**0.30**	**J**	1.0	0.057	ppb v/v			02/16/23 20:16	1
trans-1,2-Dichloroethene	ND		0.20	0.033	ppb v/v			02/16/23 20:16	1
trans-1,3-Dichloropropene	ND		0.20	0.049	ppb v/v			02/16/23 20:16	1
Trichloroethene	ND		0.20	0.033	ppb v/v			02/16/23 20:16	1
Trichlorofluoromethane	**0.16**	**J**	0.20	0.028	ppb v/v			02/16/23 20:16	1
Vinyl acetate	ND		5.0	0.070	ppb v/v			02/16/23 20:16	1
Vinyl bromide	ND		0.20	0.050	ppb v/v			02/16/23 20:16	1
Vinyl chloride	ND		0.40	0.065	ppb v/v			02/16/23 20:16	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		1.1	0.39	ug/m3			02/16/23 20:16	1
1,1,2,2-Tetrachloroethane	ND		1.4	0.24	ug/m3			02/16/23 20:16	1
1,1,2-Trichloro-1,2,2-trifluoroethane	**0.42**	**J**	1.5	0.18	ug/m3			02/16/23 20:16	1
1,1,2-Trichloroethane	ND		1.1	0.21	ug/m3			02/16/23 20:16	1
1,1-Dichloroethane	ND		0.81	0.11	ug/m3			02/16/23 20:16	1
1,1-Dichloroethene	ND		0.79	0.13	ug/m3			02/16/23 20:16	1
1,2,4-Trichlorobenzene	ND		15	0.66	ug/m3			02/16/23 20:16	1
1,2,4-Trimethylbenzene	ND		0.98	0.25	ug/m3			02/16/23 20:16	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		1.4	0.21	ug/m3			02/16/23 20:16	1

Client: HR Green, Inc
Project/Site: 625 Douglas

Job ID: 140-30561-1

Client Sample ID: IA-625
Date Collected: 02/07/23 16:47
Date Received: 02/14/23 11:30
Sample Container: Summa Canister 6L

Lab Sample ID: 140-30561-4
Matrix: Air

Method: EPA TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2-Dichlorobenzene	ND		2.4	0.47	ug/m3			02/16/23 20:16	1
1,2-Dichloroethane	ND		0.81	0.10	ug/m3			02/16/23 20:16	1
1,2-Dichloropropane	ND		0.92	0.12	ug/m3			02/16/23 20:16	1
1,3,5-Trimethylbenzene	ND		2.0	0.79	ug/m3			02/16/23 20:16	1
1,3-Dichlorobenzene	ND		1.2	0.24	ug/m3			02/16/23 20:16	1
1,4-Dichlorobenzene	ND		1.2	0.24	ug/m3			02/16/23 20:16	1
1,4-Dioxane	ND		18	0.27	ug/m3			02/16/23 20:16	1
2-Butanone (MEK)	**0.55**	**J**	2.9	0.53	ug/m3			02/16/23 20:16	1
4-Methyl-2-pentanone (MIBK)	ND		4.1	0.57	ug/m3			02/16/23 20:16	1
Acetone	**7.5**	**J**	18	3.3	ug/m3			02/16/23 20:16	1
Benzene	**0.36**	**J**	0.64	0.11	ug/m3			02/16/23 20:16	1
Benzyl chloride	ND		4.1	0.49	ug/m3			02/16/23 20:16	1
Bromoform	ND		2.1	0.68	ug/m3			02/16/23 20:16	1
Bromomethane	ND		0.78	0.21	ug/m3			02/16/23 20:16	1
Carbon disulfide	ND		1.6	0.27	ug/m3			02/16/23 20:16	1
Carbon tetrachloride	**0.32**	**J**	1.3	0.20	ug/m3			02/16/23 20:16	1
Chlorobenzene	ND		0.92	0.26	ug/m3			02/16/23 20:16	1
Dibromochloromethane	ND		1.7	0.29	ug/m3			02/16/23 20:16	1
Chloroethane	ND		2.1	0.21	ug/m3			02/16/23 20:16	1
Chloroform	ND		0.98	0.18	ug/m3			02/16/23 20:16	1
Chloromethane	**1.3**	**J**	2.1	0.33	ug/m3			02/16/23 20:16	1
cis-1,2-Dichloroethene	ND		0.79	0.099	ug/m3			02/16/23 20:16	1
cis-1,3-Dichloropropene	ND		1.8	0.22	ug/m3			02/16/23 20:16	1
Cyclohexane	ND		1.7	0.32	ug/m3			02/16/23 20:16	1
Bromodichloromethane	ND		1.3	0.29	ug/m3			02/16/23 20:16	1
Dichlorodifluoromethane	**1.4**	**J**	2.5	0.17	ug/m3			02/16/23 20:16	1
Ethylbenzene	**0.23**	**J**	0.87	0.14	ug/m3			02/16/23 20:16	1
1,2-Dibromoethane (EDB)	ND		1.5	0.24	ug/m3			02/16/23 20:16	1
Hexachlorobutadiene	ND		11	0.85	ug/m3			02/16/23 20:16	1
Hexane	**0.37**	**J**	2.8	0.22	ug/m3			02/16/23 20:16	1
Isopropyl alcohol	**0.66**	**J**	12	0.59	ug/m3			02/16/23 20:16	1
Isopropylbenzene	ND		3.9	0.21	ug/m3			02/16/23 20:16	1
m-Xylene & p-Xylene	**0.73**	**J**	3.5	0.32	ug/m3			02/16/23 20:16	1
Methyl tert-butyl ether	ND		3.6	0.47	ug/m3			02/16/23 20:16	1
Methylene Chloride	ND		3.5	1.2	ug/m3			02/16/23 20:16	1
Naphthalene	ND		2.6	0.52	ug/m3			02/16/23 20:16	1
o-Xylene	**0.26**	**J**	0.87	0.17	ug/m3			02/16/23 20:16	1
Styrene	ND		0.85	0.26	ug/m3			02/16/23 20:16	1
Tetrachloroethene	ND		1.4	0.20	ug/m3			02/16/23 20:16	1
Tetrahydrofuran	ND		15	0.53	ug/m3			02/16/23 20:16	1
Toluene	**1.1**	**J**	3.8	0.21	ug/m3			02/16/23 20:16	1
trans-1,2-Dichloroethene	ND		0.79	0.13	ug/m3			02/16/23 20:16	1
trans-1,3-Dichloropropene	ND		0.91	0.22	ug/m3			02/16/23 20:16	1
Trichloroethene	ND		1.1	0.18	ug/m3			02/16/23 20:16	1
Trichlorofluoromethane	**0.89**	**J**	1.1	0.16	ug/m3			02/16/23 20:16	1
Vinyl acetate	ND		18	0.25	ug/m3			02/16/23 20:16	1
Vinyl bromide	ND		0.87	0.22	ug/m3			02/16/23 20:16	1
Vinyl chloride	ND		1.0	0.17	ug/m3			02/16/23 20:16	1

Default Detection Limits

Client: HR Green, Inc
Project/Site: 625 Douglas

Job ID: 140-30561-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	RL	MDL	Units
1,1,1-Trichloroethane	0.20	0.072	ppb v/v
1,1,1-Trichloroethane	1.1	0.39	ug/m3
1,1,2,2-Tetrachloroethane	0.20	0.035	ppb v/v
1,1,2,2-Tetrachloroethane	1.4	0.24	ug/m3
1,1,2-Trichloro-1,2,2-trifluoroethane	0.20	0.024	ppb v/v
1,1,2-Trichloro-1,2,2-trifluoroethane	1.5	0.18	ug/m3
1,1,2-Trichloroethane	0.20	0.038	ppb v/v
1,1,2-Trichloroethane	1.1	0.21	ug/m3
1,1-Dichloroethane	0.20	0.027	ppb v/v
1,1-Dichloroethane	0.81	0.11	ug/m3
1,1-Dichloroethene	0.20	0.032	ppb v/v
1,1-Dichloroethene	0.79	0.13	ug/m3
1,2,4-Trichlorobenzene	2.0	0.089	ppb v/v
1,2,4-Trichlorobenzene	15	0.66	ug/m3
1,2,4-Trimethylbenzene	0.20	0.050	ppb v/v
1,2,4-Trimethylbenzene	0.98	0.25	ug/m3
1,2-Dibromoethane (EDB)	0.20	0.031	ppb v/v
1,2-Dibromoethane (EDB)	1.5	0.24	ug/m3
1,2-Dichloro-1,1,2,2-tetrafluoroethane	0.20	0.030	ppb v/v
1,2-Dichloro-1,1,2,2-tetrafluoroethane	1.4	0.21	ug/m3
1,2-Dichlorobenzene	0.40	0.078	ppb v/v
1,2-Dichlorobenzene	2.4	0.47	ug/m3
1,2-Dichloroethane	0.20	0.025	ppb v/v
1,2-Dichloroethane	0.81	0.10	ug/m3
1,2-Dichloropropane	0.20	0.025	ppb v/v
1,2-Dichloropropane	0.92	0.12	ug/m3
1,3,5-Trimethylbenzene	0.40	0.16	ppb v/v
1,3,5-Trimethylbenzene	2.0	0.79	ug/m3
1,3-Dichlorobenzene	0.20	0.040	ppb v/v
1,3-Dichlorobenzene	1.2	0.24	ug/m3
1,4-Dichlorobenzene	0.20	0.040	ppb v/v
1,4-Dichlorobenzene	1.2	0.24	ug/m3
1,4-Dioxane	5.0	0.075	ppb v/v
1,4-Dioxane	18	0.27	ug/m3
2-Butanone (MEK)	1.0	0.18	ppb v/v
2-Butanone (MEK)	2.9	0.53	ug/m3
4-Methyl-2-pentanone (MIBK)	1.0	0.14	ppb v/v
4-Methyl-2-pentanone (MIBK)	4.1	0.57	ug/m3
Acetone	7.5	1.4	ppb v/v
Acetone	18	3.3	ug/m3
Benzene	0.20	0.033	ppb v/v
Benzene	0.64	0.11	ug/m3
Benzyl chloride	0.80	0.095	ppb v/v
Benzyl chloride	4.1	0.49	ug/m3
Bromodichloromethane	0.20	0.044	ppb v/v
Bromodichloromethane	1.3	0.29	ug/m3
Bromoform	0.20	0.066	ppb v/v
Bromoform	2.1	0.68	ug/m3
Bromomethane	0.20	0.055	ppb v/v
Bromomethane	0.78	0.21	ug/m3
Carbon disulfide	0.50	0.087	ppb v/v
Carbon disulfide	1.6	0.27	ug/m3
Carbon tetrachloride	0.20	0.032	ppb v/v

Default Detection Limits

Client: HR Green, Inc
Project/Site: 625 Douglas

Job ID: 140-30561-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	RL	MDL	Units
Carbon tetrachloride	1.3	0.20	ug/m3
Chlorobenzene	0.20	0.056	ppb v/v
Chlorobenzene	0.92	0.26	ug/m3
Chloroethane	0.80	0.079	ppb v/v
Chloroethane	2.1	0.21	ug/m3
Chloroform	0.20	0.036	ppb v/v
Chloroform	0.98	0.18	ug/m3
Chloromethane	1.0	0.16	ppb v/v
Chloromethane	2.1	0.33	ug/m3
cis-1,2-Dichloroethene	0.20	0.025	ppb v/v
cis-1,2-Dichloroethene	0.79	0.099	ug/m3
cis-1,3-Dichloropropene	0.40	0.048	ppb v/v
cis-1,3-Dichloropropene	1.8	0.22	ug/m3
Cyclohexane	0.50	0.093	ppb v/v
Cyclohexane	1.7	0.32	ug/m3
Dibromochloromethane	0.20	0.034	ppb v/v
Dibromochloromethane	1.7	0.29	ug/m3
Dichlorodifluoromethane	0.50	0.035	ppb v/v
Dichlorodifluoromethane	2.5	0.17	ug/m3
Ethylbenzene	0.20	0.033	ppb v/v
Ethylbenzene	0.87	0.14	ug/m3
Hexachlorobutadiene	1.0	0.080	ppb v/v
Hexachlorobutadiene	11	0.85	ug/m3
Hexane	0.80	0.063	ppb v/v
Hexane	2.8	0.22	ug/m3
Isopropyl alcohol	5.0	0.24	ppb v/v
Isopropyl alcohol	12	0.59	ug/m3
Isopropylbenzene	0.80	0.043	ppb v/v
Isopropylbenzene	3.9	0.21	ug/m3
Methyl tert-butyl ether	1.0	0.13	ppb v/v
Methyl tert-butyl ether	3.6	0.47	ug/m3
Methylene Chloride	1.0	0.34	ppb v/v
Methylene Chloride	3.5	1.2	ug/m3
m-Xylene & p-Xylene	0.80	0.073	ppb v/v
m-Xylene & p-Xylene	3.5	0.32	ug/m3
Naphthalene	0.50	0.10	ppb v/v
Naphthalene	2.6	0.52	ug/m3
o-Xylene	0.20	0.038	ppb v/v
o-Xylene	0.87	0.17	ug/m3
Styrene	0.20	0.060	ppb v/v
Styrene	0.85	0.26	ug/m3
Tetrachloroethene	0.20	0.029	ppb v/v
Tetrachloroethene	1.4	0.20	ug/m3
Tetrahydrofuran	5.0	0.18	ppb v/v
Tetrahydrofuran	15	0.53	ug/m3
Toluene	1.0	0.057	ppb v/v
Toluene	3.8	0.21	ug/m3
trans-1,2-Dichloroethene	0.20	0.033	ppb v/v
trans-1,2-Dichloroethene	0.79	0.13	ug/m3
trans-1,3-Dichloropropene	0.20	0.049	ppb v/v
trans-1,3-Dichloropropene	0.91	0.22	ug/m3
Trichloroethene	0.20	0.033	ppb v/v
Trichloroethene	1.1	0.18	ug/m3

Default Detection Limits

Client: HR Green, Inc
Project/Site: 625 Douglas

Job ID: 140-30561-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	RL	MDL	Units
Trichlorofluoromethane	0.20	0.028	ppb v/v
Trichlorofluoromethane	1.1	0.16	ug/m3
Vinyl acetate	5.0	0.070	ppb v/v
Vinyl acetate	18	0.25	ug/m3
Vinyl bromide	0.20	0.050	ppb v/v
Vinyl bromide	0.87	0.22	ug/m3
Vinyl chloride	0.40	0.065	ppb v/v
Vinyl chloride	1.0	0.17	ug/m3

Client: HR Green, Inc
Project/Site: 625 Douglas

Job ID: 140-30561-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Lab Sample ID: MB 140-70376/5
Matrix: Air
Analysis Batch: 70376

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		0.20	0.072	ppb v/v			02/16/23 11:34	1
1,1,2,2-Tetrachloroethane	ND		0.20	0.035	ppb v/v			02/16/23 11:34	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.20	0.024	ppb v/v			02/16/23 11:34	1
1,1,2-Trichloroethane	ND		0.20	0.038	ppb v/v			02/16/23 11:34	1
1,1-Dichloroethane	ND		0.20	0.027	ppb v/v			02/16/23 11:34	1
1,1-Dichloroethene	ND		0.20	0.032	ppb v/v			02/16/23 11:34	1
1,2,4-Trichlorobenzene	ND		2.0	0.089	ppb v/v			02/16/23 11:34	1
1,2,4-Trimethylbenzene	ND		0.20	0.050	ppb v/v			02/16/23 11:34	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.20	0.030	ppb v/v			02/16/23 11:34	1
1,2-Dichlorobenzene	ND		0.40	0.078	ppb v/v			02/16/23 11:34	1
1,2-Dichloroethane	ND		0.20	0.025	ppb v/v			02/16/23 11:34	1
1,2-Dichloropropane	ND		0.20	0.025	ppb v/v			02/16/23 11:34	1
1,3,5-Trimethylbenzene	ND		0.40	0.16	ppb v/v			02/16/23 11:34	1
1,3-Dichlorobenzene	ND		0.20	0.040	ppb v/v			02/16/23 11:34	1
1,4-Dichlorobenzene	ND		0.20	0.040	ppb v/v			02/16/23 11:34	1
1,4-Dioxane	ND		5.0	0.075	ppb v/v			02/16/23 11:34	1
2-Butanone (MEK)	ND		1.0	0.18	ppb v/v			02/16/23 11:34	1
4-Methyl-2-pentanone (MIBK)	ND		1.0	0.14	ppb v/v			02/16/23 11:34	1
Acetone	ND		7.5	1.4	ppb v/v			02/16/23 11:34	1
Benzene	ND		0.20	0.033	ppb v/v			02/16/23 11:34	1
Benzyl chloride	ND		0.80	0.095	ppb v/v			02/16/23 11:34	1
Bromoform	ND		0.20	0.066	ppb v/v			02/16/23 11:34	1
Bromomethane	ND		0.20	0.055	ppb v/v			02/16/23 11:34	1
Carbon disulfide	ND		0.50	0.087	ppb v/v			02/16/23 11:34	1
Carbon tetrachloride	ND		0.20	0.032	ppb v/v			02/16/23 11:34	1
Chlorobenzene	ND		0.20	0.056	ppb v/v			02/16/23 11:34	1
Dibromochloromethane	ND		0.20	0.034	ppb v/v			02/16/23 11:34	1
Chloroethane	ND		0.80	0.079	ppb v/v			02/16/23 11:34	1
Chloroform	ND		0.20	0.036	ppb v/v			02/16/23 11:34	1
Chloromethane	ND		1.0	0.16	ppb v/v			02/16/23 11:34	1
cis-1,2-Dichloroethene	ND		0.20	0.025	ppb v/v			02/16/23 11:34	1
cis-1,3-Dichloropropene	ND		0.40	0.048	ppb v/v			02/16/23 11:34	1
Cyclohexane	ND		0.50	0.093	ppb v/v			02/16/23 11:34	1
Bromodichloromethane	ND		0.20	0.044	ppb v/v			02/16/23 11:34	1
Dichlorodifluoromethane	ND		0.50	0.035	ppb v/v			02/16/23 11:34	1
Ethylbenzene	ND		0.20	0.033	ppb v/v			02/16/23 11:34	1
1,2-Dibromoethane (EDB)	ND		0.20	0.031	ppb v/v			02/16/23 11:34	1
Hexachlorobutadiene	ND		1.0	0.080	ppb v/v			02/16/23 11:34	1
Hexane	ND		0.80	0.063	ppb v/v			02/16/23 11:34	1
Isopropyl alcohol	ND		5.0	0.24	ppb v/v			02/16/23 11:34	1
Isopropylbenzene	ND		0.80	0.043	ppb v/v			02/16/23 11:34	1
m-Xylene & p-Xylene	ND		0.80	0.073	ppb v/v			02/16/23 11:34	1
Methyl tert-butyl ether	ND		1.0	0.13	ppb v/v			02/16/23 11:34	1
Methylene Chloride	ND		1.0	0.34	ppb v/v			02/16/23 11:34	1
Naphthalene	ND		0.50	0.10	ppb v/v			02/16/23 11:34	1
o-Xylene	ND		0.20	0.038	ppb v/v			02/16/23 11:34	1
Styrene	ND		0.20	0.060	ppb v/v			02/16/23 11:34	1
Tetrachloroethene	ND		0.20	0.029	ppb v/v			02/16/23 11:34	1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: MB 140-70376/5
Matrix: Air
Analysis Batch: 70376

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tetrahydrofuran	ND		5.0	0.18	ppb v/v			02/16/23 11:34	1
Toluene	ND		1.0	0.057	ppb v/v			02/16/23 11:34	1
trans-1,2-Dichloroethene	ND		0.20	0.033	ppb v/v			02/16/23 11:34	1
trans-1,3-Dichloropropene	ND		0.20	0.049	ppb v/v			02/16/23 11:34	1
Trichloroethene	ND		0.20	0.033	ppb v/v			02/16/23 11:34	1
Trichlorofluoromethane	ND		0.20	0.028	ppb v/v			02/16/23 11:34	1
Vinyl acetate	ND		5.0	0.070	ppb v/v			02/16/23 11:34	1
Vinyl bromide	ND		0.20	0.050	ppb v/v			02/16/23 11:34	1
Vinyl chloride	ND		0.40	0.065	ppb v/v			02/16/23 11:34	1

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		1.1	0.39	ug/m3			02/16/23 11:34	1
1,1,2,2-Tetrachloroethane	ND		1.4	0.24	ug/m3			02/16/23 11:34	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		1.5	0.18	ug/m3			02/16/23 11:34	1
1,1,2-Trichloroethane	ND		1.1	0.21	ug/m3			02/16/23 11:34	1
1,1-Dichloroethane	ND		0.81	0.11	ug/m3			02/16/23 11:34	1
1,1-Dichloroethene	ND		0.79	0.13	ug/m3			02/16/23 11:34	1
1,2,4-Trichlorobenzene	ND		15	0.66	ug/m3			02/16/23 11:34	1
1,2,4-Trimethylbenzene	ND		0.98	0.25	ug/m3			02/16/23 11:34	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		1.4	0.21	ug/m3			02/16/23 11:34	1
1,2-Dichlorobenzene	ND		2.4	0.47	ug/m3			02/16/23 11:34	1
1,2-Dichloroethane	ND		0.81	0.10	ug/m3			02/16/23 11:34	1
1,2-Dichloropropane	ND		0.92	0.12	ug/m3			02/16/23 11:34	1
1,3,5-Trimethylbenzene	ND		2.0	0.79	ug/m3			02/16/23 11:34	1
1,3-Dichlorobenzene	ND		1.2	0.24	ug/m3			02/16/23 11:34	1
1,4-Dichlorobenzene	ND		1.2	0.24	ug/m3			02/16/23 11:34	1
1,4-Dioxane	ND		18	0.27	ug/m3			02/16/23 11:34	1
2-Butanone (MEK)	ND		2.9	0.53	ug/m3			02/16/23 11:34	1
4-Methyl-2-pentanone (MIBK)	ND		4.1	0.57	ug/m3			02/16/23 11:34	1
Acetone	ND		18	3.3	ug/m3			02/16/23 11:34	1
Benzene	ND		0.64	0.11	ug/m3			02/16/23 11:34	1
Benzyl chloride	ND		4.1	0.49	ug/m3			02/16/23 11:34	1
Bromoform	ND		2.1	0.68	ug/m3			02/16/23 11:34	1
Bromomethane	ND		0.78	0.21	ug/m3			02/16/23 11:34	1
Carbon disulfide	ND		1.6	0.27	ug/m3			02/16/23 11:34	1
Carbon tetrachloride	ND		1.3	0.20	ug/m3			02/16/23 11:34	1
Chlorobenzene	ND		0.92	0.26	ug/m3			02/16/23 11:34	1
Dibromochloromethane	ND		1.7	0.29	ug/m3			02/16/23 11:34	1
Chloroethane	ND		2.1	0.21	ug/m3			02/16/23 11:34	1
Chloroform	ND		0.98	0.18	ug/m3			02/16/23 11:34	1
Chloromethane	ND		2.1	0.33	ug/m3			02/16/23 11:34	1
cis-1,2-Dichloroethene	ND		0.79	0.099	ug/m3			02/16/23 11:34	1
cis-1,3-Dichloropropene	ND		1.8	0.22	ug/m3			02/16/23 11:34	1
Cyclohexane	ND		1.7	0.32	ug/m3			02/16/23 11:34	1
Bromodichloromethane	ND		1.3	0.29	ug/m3			02/16/23 11:34	1
Dichlorodifluoromethane	ND		2.5	0.17	ug/m3			02/16/23 11:34	1
Ethylbenzene	ND		0.87	0.14	ug/m3			02/16/23 11:34	1
1,2-Dibromoethane (EDB)	ND		1.5	0.24	ug/m3			02/16/23 11:34	1
Hexachlorobutadiene	ND		11	0.85	ug/m3			02/16/23 11:34	1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: MB 140-70376/5
Matrix: Air
Analysis Batch: 70376

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hexane	ND		2.8	0.22	ug/m3			02/16/23 11:34	1
Isopropyl alcohol	ND		12	0.59	ug/m3			02/16/23 11:34	1
Isopropylbenzene	ND		3.9	0.21	ug/m3			02/16/23 11:34	1
m-Xylene & p-Xylene	ND		3.5	0.32	ug/m3			02/16/23 11:34	1
Methyl tert-butyl ether	ND		3.6	0.47	ug/m3			02/16/23 11:34	1
Methylene Chloride	ND		3.5	1.2	ug/m3			02/16/23 11:34	1
Naphthalene	ND		2.6	0.52	ug/m3			02/16/23 11:34	1
o-Xylene	ND		0.87	0.17	ug/m3			02/16/23 11:34	1
Styrene	ND		0.85	0.26	ug/m3			02/16/23 11:34	1
Tetrachloroethene	ND		1.4	0.20	ug/m3			02/16/23 11:34	1
Tetrahydrofuran	ND		15	0.53	ug/m3			02/16/23 11:34	1
Toluene	ND		3.8	0.21	ug/m3			02/16/23 11:34	1
trans-1,2-Dichloroethene	ND		0.79	0.13	ug/m3			02/16/23 11:34	1
trans-1,3-Dichloropropene	ND		0.91	0.22	ug/m3			02/16/23 11:34	1
Trichloroethene	ND		1.1	0.18	ug/m3			02/16/23 11:34	1
Trichlorofluoromethane	ND		1.1	0.16	ug/m3			02/16/23 11:34	1
Vinyl acetate	ND		18	0.25	ug/m3			02/16/23 11:34	1
Vinyl bromide	ND		0.87	0.22	ug/m3			02/16/23 11:34	1
Vinyl chloride	ND		1.0	0.17	ug/m3			02/16/23 11:34	1

Lab Sample ID: LCS 140-70376/1002
Matrix: Air
Analysis Batch: 70376

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
1,1,1-Trichloroethane	2.00	1.88		ppb v/v		94	70 - 130
1,1,2,2-Tetrachloroethane	2.00	2.05		ppb v/v		102	70 - 130
1,1,2-Trichloro-1,2,2-trifluoroethane	2.00	1.94		ppb v/v		97	70 - 130
1,1,2-Trichloroethane	2.00	2.06		ppb v/v		103	70 - 130
1,1-Dichloroethane	2.00	2.00		ppb v/v		100	70 - 130
1,1-Dichloroethene	2.00	1.87		ppb v/v		93	70 - 130
1,2,4-Trichlorobenzene	2.00	2.10		ppb v/v		105	60 - 140
1,2,4-Trimethylbenzene	2.00	2.11		ppb v/v		106	70 - 130
1,2-Dichloro-1,1,2,2-tetrafluoroethane	2.00	2.64		ppb v/v		132	60 - 140
1,2-Dichlorobenzene	2.00	2.15		ppb v/v		108	70 - 130
1,2-Dichloroethane	2.00	1.95		ppb v/v		97	70 - 130
1,2-Dichloropropane	2.00	2.01		ppb v/v		101	70 - 130
1,3,5-Trimethylbenzene	2.00	2.19		ppb v/v		109	70 - 130
1,3-Dichlorobenzene	2.00	2.14		ppb v/v		107	70 - 130
1,4-Dichlorobenzene	2.00	2.12		ppb v/v		106	70 - 130
1,4-Dioxane	2.00	1.94	J	ppb v/v		97	60 - 140
2-Butanone (MEK)	2.00	1.93		ppb v/v		96	60 - 140
4-Methyl-2-pentanone (MIBK)	2.00	2.09		ppb v/v		105	60 - 140
Acetone	2.00	1.86	J	ppb v/v		93	60 - 140
Benzene	2.00	2.04		ppb v/v		102	70 - 130
Benzyl chloride	2.00	2.23		ppb v/v		111	70 - 130
Bromoform	2.00	2.25		ppb v/v		113	60 - 140

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: LCS 140-70376/1002
Matrix: Air
Analysis Batch: 70376

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Bromomethane	2.00	2.41		ppb v/v		120	70 - 130
Carbon disulfide	2.00	1.84		ppb v/v		92	70 - 130
Carbon tetrachloride	2.00	1.94		ppb v/v		97	70 - 130
Chlorobenzene	2.00	2.09		ppb v/v		104	70 - 130
Dibromochloromethane	2.00	2.11		ppb v/v		105	70 - 130
Chloroethane	2.00	2.40		ppb v/v		120	70 - 130
Chloroform	2.00	1.96		ppb v/v		98	70 - 130
Chloromethane	2.00	2.53		ppb v/v		127	60 - 140
cis-1,2-Dichloroethene	2.00	1.93		ppb v/v		97	70 - 130
cis-1,3-Dichloropropene	2.00	2.07		ppb v/v		103	70 - 130
Cyclohexane	2.00	1.95		ppb v/v		98	70 - 130
Bromodichloromethane	2.00	2.05		ppb v/v		103	70 - 130
Dichlorodifluoromethane	2.00	2.30		ppb v/v		115	60 - 140
Ethylbenzene	2.00	2.03		ppb v/v		101	70 - 130
1,2-Dibromoethane (EDB)	2.00	2.09		ppb v/v		105	70 - 130
Hexachlorobutadiene	2.00	1.68		ppb v/v		84	60 - 140
Hexane	2.00	1.97		ppb v/v		99	70 - 130
Isopropyl alcohol	2.00	2.40		ppb v/v		120	60 - 140
Isopropylbenzene	2.00	2.01		ppb v/v		101	70 - 130
m-Xylene & p-Xylene	4.00	4.18		ppb v/v		105	70 - 130
Methyl tert-butyl ether	2.00	1.90		ppb v/v		95	60 - 140
Methylene Chloride	2.00	1.91		ppb v/v		96	70 - 130
Naphthalene	2.00	2.04		ppb v/v		102	60 - 140
o-Xylene	2.00	1.97		ppb v/v		99	70 - 130
Styrene	2.00	2.11		ppb v/v		106	70 - 130
Tetrachloroethene	2.00	2.02		ppb v/v		101	70 - 130
Tetrahydrofuran	2.00	2.01		ppb v/v		101	60 - 140
Toluene	2.00	1.97		ppb v/v		98	70 - 130
trans-1,2-Dichloroethene	2.00	1.92		ppb v/v		96	70 - 130
trans-1,3-Dichloropropene	2.00	2.08		ppb v/v		104	70 - 130
Trichloroethene	2.00	1.96		ppb v/v		98	70 - 130
Trichlorofluoromethane	2.00	1.91		ppb v/v		95	60 - 140
Vinyl acetate	2.00	2.20		ppb v/v		110	60 - 140
Vinyl bromide	2.00	2.14		ppb v/v		107	60 - 140
Vinyl chloride	2.00	2.44		ppb v/v		122	70 - 130

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
1,1,1-Trichloroethane	11	10.2		ug/m3		94	70 - 130
1,1,2,2-Tetrachloroethane	14	14.0		ug/m3		102	70 - 130
1,1,2-Trichloro-1,2,2-trifluoroethane	15	14.9		ug/m3		97	70 - 130
1,1,2-Trichloroethane	11	11.3		ug/m3		103	70 - 130
1,1-Dichloroethane	8.1	8.08		ug/m3		100	70 - 130
1,1-Dichloroethene	7.9	7.41		ug/m3		93	70 - 130
1,2,4-Trichlorobenzene	15	15.6		ug/m3		105	60 - 140
1,2,4-Trimethylbenzene	9.8	10.4		ug/m3		106	70 - 130
1,2-Dichloro-1,1,2,2-tetrafluoroethane	14	18.5		ug/m3		132	60 - 140
1,2-Dichlorobenzene	12	12.9		ug/m3		108	70 - 130

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: LCS 140-70376/1002
Matrix: Air
Analysis Batch: 70376

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
1,2-Dichloroethane	8.1	7.88		ug/m3		97	70 - 130
1,2-Dichloropropane	9.2	9.30		ug/m3		101	70 - 130
1,3,5-Trimethylbenzene	9.8	10.8		ug/m3		109	70 - 130
1,3-Dichlorobenzene	12	12.9		ug/m3		107	70 - 130
1,4-Dichlorobenzene	12	12.8		ug/m3		106	70 - 130
1,4-Dioxane	7.2	6.97	J	ug/m3		97	60 - 140
2-Butanone (MEK)	5.9	5.69		ug/m3		96	60 - 140
4-Methyl-2-pentanone (MIBK)	8.2	8.58		ug/m3		105	60 - 140
Acetone	4.8	4.42	J	ug/m3		93	60 - 140
Benzene	6.4	6.52		ug/m3		102	70 - 130
Benzyl chloride	10	11.5		ug/m3		111	70 - 130
Bromoform	21	23.3		ug/m3		113	60 - 140
Bromomethane	7.8	9.34		ug/m3		120	70 - 130
Carbon disulfide	6.2	5.72		ug/m3		92	70 - 130
Carbon tetrachloride	13	12.2		ug/m3		97	70 - 130
Chlorobenzene	9.2	9.60		ug/m3		104	70 - 130
Dibromochloromethane	17	18.0		ug/m3		105	70 - 130
Chloroethane	5.3	6.34		ug/m3		120	70 - 130
Chloroform	9.8	9.56		ug/m3		98	70 - 130
Chloromethane	4.1	5.23		ug/m3		127	60 - 140
cis-1,2-Dichloroethene	7.9	7.66		ug/m3		97	70 - 130
cis-1,3-Dichloropropene	9.1	9.38		ug/m3		103	70 - 130
Cyclohexane	6.9	6.73		ug/m3		98	70 - 130
Bromodichloromethane	13	13.7		ug/m3		103	70 - 130
Dichlorodifluoromethane	9.9	11.4		ug/m3		115	60 - 140
Ethylbenzene	8.7	8.81		ug/m3		101	70 - 130
1,2-Dibromoethane (EDB)	15	16.1		ug/m3		105	70 - 130
Hexachlorobutadiene	21	17.9		ug/m3		84	60 - 140
Hexane	7.0	6.96		ug/m3		99	70 - 130
Isopropyl alcohol	4.9	5.89		ug/m3		120	60 - 140
Isopropylbenzene	9.8	9.90		ug/m3		101	70 - 130
m-Xylene & p-Xylene	17	18.2		ug/m3		105	70 - 130
Methyl tert-butyl ether	7.2	6.85		ug/m3		95	60 - 140
Methylene Chloride	6.9	6.65		ug/m3		96	70 - 130
Naphthalene	10	10.7		ug/m3		102	60 - 140
o-Xylene	8.7	8.57		ug/m3		99	70 - 130
Styrene	8.5	8.99		ug/m3		106	70 - 130
Tetrachloroethene	14	13.7		ug/m3		101	70 - 130
Tetrahydrofuran	5.9	5.93		ug/m3		101	60 - 140
Toluene	7.5	7.42		ug/m3		98	70 - 130
trans-1,2-Dichloroethene	7.9	7.62		ug/m3		96	70 - 130
trans-1,3-Dichloropropene	9.1	9.43		ug/m3		104	70 - 130
Trichloroethene	11	10.5		ug/m3		98	70 - 130
Trichlorofluoromethane	11	10.7		ug/m3		95	60 - 140
Vinyl acetate	7.0	7.75		ug/m3		110	60 - 140
Vinyl bromide	8.7	9.34		ug/m3		107	60 - 140
Vinyl chloride	5.1	6.23		ug/m3		122	70 - 130

QC Association Summary

Client: HR Green, Inc
Project/Site: 625 Douglas

Job ID: 140-30561-1

Air - GC/MS VOA

Analysis Batch: 70376

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-30561-1	IA1-625	Total/NA	Air	TO-15	
140-30561-2	IA2-625	Total/NA	Air	TO-15	
140-30561-3	IADUP-625	Total/NA	Air	TO-15	
140-30561-4	IA-625	Total/NA	Air	TO-15	
MB 140-70376/5	Method Blank	Total/NA	Air	TO-15	
LCS 140-70376/1002	Lab Control Sample	Total/NA	Air	TO-15	

Lab Chronicle

Client: HR Green, Inc
Project/Site: 625 Douglas

Job ID: 140-30561-1

Client Sample ID: IA1-625
Date Collected: 02/07/23 16:11
Date Received: 02/14/23 11:30

Lab Sample ID: 140-30561-1
Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1	200 mL	500 mL	70376	02/16/23 17:49	S1K	EET KNX
	Instrument ID: MS									

Client Sample ID: IA2-625
Date Collected: 02/07/23 16:45
Date Received: 02/14/23 11:30

Lab Sample ID: 140-30561-2
Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1	200 mL	500 mL	70376	02/16/23 18:38	S1K	EET KNX
	Instrument ID: MS									

Client Sample ID: IADUP-625
Date Collected: 02/07/23 00:00
Date Received: 02/14/23 11:30

Lab Sample ID: 140-30561-3
Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1	200 mL	500 mL	70376	02/16/23 19:26	S1K	EET KNX
	Instrument ID: MS									

Client Sample ID: IA-625
Date Collected: 02/07/23 16:47
Date Received: 02/14/23 11:30

Lab Sample ID: 140-30561-4
Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1	200 mL	500 mL	70376	02/16/23 20:16	S1K	EET KNX
	Instrument ID: MS									

Client Sample ID: Method Blank
Date Collected: N/A
Date Received: N/A

Lab Sample ID: MB 140-70376/5
Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1	200 mL	500 mL	70376	02/16/23 11:34	S1K	EET KNX
	Instrument ID: MS									

Client Sample ID: Lab Control Sample
Date Collected: N/A
Date Received: N/A

Lab Sample ID: LCS 140-70376/1002
Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1	500 mL	500 mL	70376	02/16/23 09:23	S1K	EET KNX
	Instrument ID: MS									

Laboratory References:
EET KNX = Eurofins Knoxville, 5815 Middlebrook Pike, Knoxville, TN 37921, TEL (865)291-3000

Method Summary

Client: HR Green, Inc
Project/Site: 625 Douglas

Job ID: 140-30561-1

Method	Method Description	Protocol	Laboratory
TO-15	Volatile Organic Compounds in Ambient Air	EPA	EET KNX

Protocol References:

EPA = US Environmental Protection Agency

Laboratory References:

EET KNX = Eurofins Knoxville, 5815 Middlebrook Pike, Knoxville, TN 37921, TEL (865)291-3000

Sample Summary

Client: HR Green, Inc
Project/Site: 625 Douglas

Job ID: 140-30561-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
140-30561-1	IA1-625	Air	02/07/23 16:11	02/14/23 11:30	Air Canister (6-Liter) #34002100
140-30561-2	IA2-625	Air	02/07/23 16:45	02/14/23 11:30	Air Canister (6-Liter) #12121
140-30561-3	IADUP-625	Air	02/07/23 00:00	02/14/23 11:30	Air Canister (6-Liter) #34002111
140-30561-4	IA-625	Air	02/07/23 16:47	02/14/23 11:30	Air Canister (6-Liter) #12023

TestAmerica Sacramento
880 Riverside Parkway
West Sacramento, CA 95605
phone 916.374.4378 fax 916.372.1059

Canister Samples Chain of Custody Record

TestAmerica Laboratories, Inc. assumes no liability with respect to the collection and shipment of these samples.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Laboratories, Inc.

Client Contact Information	Project Manager: Rose Amundson	Samples Collected By:	COC No:
Company Name: HR Green	Phone: 319 841 4000		1 of 1 COCs
Address: 8710 Earhart Lane	Email: ramundson@hrgreen.com		
City/State/Zip: Cedar Rapids IA 52404	Site Contact:		For Lab Use Only:
Phone: 319 841 4000	TA Contact:		Walk-in Client:
FAX: —	Anaylsis Turnaround Time		Lab Sampling:
Project Name: I-625 Douglas	Standard (Specific): 2 week		Job / SDG No.:
Site/Location: Sioux City	Rush (Specifiy):		(See below for Add'l Items)
P O #			

Sample Identification	Sample Date(s)	Time Start	Time Stop	Canister Vacuum in Field, 'Hg (Start)'	Canister Vacuum in Field, 'Hg (Stop)'	Flow Controller ID	Canister ID	TO-15 (Med / Std / Low / SIM)	MA-APH	EPA 3C	EPA 25C / 25.3	ASTM D-1946 / 1945 / 3588	EPA 15/16	TO-3	Other (Please specify in notes section)	Sample Type: Indoor Air	Ambient Air	Soil Gas	Landfill Gas	Other (Please specify in notes section)	Sample Specific Notes:
IA1-625	2/7/23	843	1611	-29	-5	9714	3400 2100	✓								✓					
IA2-625	↓	848	1645	-29	-4	11730	12121	✓								✓					
IADup-625		—	—	-30	-2	8921	3400 2111	✓								✓					
AA-625		850	1647	-29	-3	9654	12023	✓									✓				

No Custody Seals

Received Ambient
DH 2/14/23
1 Box UPS 1Z 534 630 03 6222 6888

Temperature (Fahrenheit)	Interior	Ambient	
Start			28
Stop			39

4 Cans / 4 Flows G

Temperature (Fahrenheit)	Interior	Ambient	
Start			30.10
Stop			30.18

140-30561 Chain of Custody

Special Instructions/QC Requirements & Comments:

Samples Shipped by:	Date / Time: 2/10 1300	Samples Received by: Dean Hickson ETAKNX 2/14/23 11:30 ~~08:45~~ DH 2/14/23	
Samples Relinquished by:	Date / Time:	Received by:	
Relinquished by:	Date / Time:	Received by:	
Lab Use Only: Shipper Name:	Opened by:	Condition:	

Form No. CA-C-WI-003, Rev. 1, dated 05/10/2013

Loc: 140
30561

EUROFINS/TESTAMERICA KNOXVILLE SAMPLE RECEIPT/CONDITION UPON RECEIPT ANOMALY CHECKLIST **Log In Number:**

Review Items	Yes	No	NA	If No, what was the problem?
1. Are the shipping containers intact?	✓			☐ **Containers, Broken**
2. Were ambient air containers received intact?			✓	☑ Checked in lab
3. The coolers/containers custody seal if present, is it intact?			✓	☐ Yes ☐ NA
4. Is the cooler temperature within limits? (> freezing temp. of water to 6 °C, VOST: 10°C) Thermometer ID :_____ Correction factor: _____			✓	☐ **Cooler Out of Temp, Client Contacted, Proceed/Cancel** ☐ **Cooler Out of Temp, Same Day Receipt**
5. Were all of the sample containers received intact?	✓			☐ **Containers, Broken**
6. Were samples received in appropriate containers?	✓			☐ **Containers, Improper; Client Contacted; Proceed/Cancel**
7. Do sample container labels match COC? (IDs, Dates, Times)	✓			☐ **COC & Samples Do Not Match** ☐ **COC Incorrect/Incomplete** ☐ **COC Not Received**
8. Were all of the samples listed on the COC received?	✓			☐ **Sample Received, Not on COC** ☐ **Sample on COC, Not Received**
9. Is the date/time of sample collection noted?	✓			☐ **COC; No Date/Time; Client Contacted**
10. Was the sampler identified on the COC?		✓		☑ **Sampler Not Listed on COC**
11. Is the client and project name/# identified?	✓			☐ **COC Incorrect/Incomplete**
12. Are tests/parameters listed for each sample?	✓			☐ **COC No tests on COC**
13. Is the matrix of the samples noted?	✓			☐ **COC Incorrect/Incomplete**
14. Was COC relinquished? (Signed/Dated/Timed)	✓			☐ **COC Incorrect/Incomplete**
15. Were samples received within holding time?	✓			☐ **Holding Time - Receipt**
16. Were samples received with correct chemical preservative (excluding Encore)?			✓	☐ **pH Adjusted, pH Included (See box 16A)** ☐ **Incorrect Preservative**
17. Were VOA samples received without headspace?			✓	☐ **Headspace (VOA only)**
18. Did you check for residual chlorine, if necessary? (e.g. 1613B, 1668) Chlorine test strip lot number:_____			✓	☐ **Residual Chlorine**
19. For 1613B water samples is pH<9?			✓	☐ If no, notify lab to adjust
20. For rad samples was sample activity info. Provided?			✓	☐ Project missing info

Comments/Actions Taken

10, COC does not list Sampler

Labeling Verified by: **Date:**

pH test strip lot number:

Box 16A: pH Preservation	Box 18A: Residual Chlorine
Preservative:	
Lot Number:	
Exp Date:	
Analyst:	
Date:	
Time:	

Project #: 14005249 PM Instructions: _____

Sample Receiving Associate: Deann Hickson Date: 2/14/23

QA026R32.doc, 062719

Eurofins Knoxville - Air Canister Initial Pressure Check

Gauge ID: G5
Date/Time: 2/15/23 900

Analyst	Sample ID	Pressure @ Receipt (-in Hg or +psig)/initial pressurisation (if applicable)	Asset #	Cleaning Job	Cert Type	Size (L)	Comments
BRS	140-30561-a-1	-3.0	34002100	140-30143-a-2	B	6	
BRS	140-30561-a-2	-2.9	12121	140-30143-a-3	B	6	
BRS	140-30561-a-3	1.1	34002111	140-30143-a-4	B	6	
BRS	140-30561-a-4	-2.7	12023	140-30143-a-12	B	6	

APPENDIX D

CUMULATIVE RISK CALCULATIONS

Indoor Air - Site Worker

PREPARER INPUT

Chemical	CASRN	Exposure P	Site-Specific Background Air Level* (mg/m3)
Benzene	000071-43-2	0.00033	
Carbon Tetrachloride	000056-23-5	0.00032	
Chloromethane (air)	000074-87-3	0.00098	
Dichlorodifluoromethane	000075-71-8	0.0016	
Ethylbenzene	000100-41-4	0.00031	
Hexane, N-	000110-54-3	0.00041	
Toluene	000108-88-3	0.0012	
Trichloro-1,2,2-trifluoroethane, 1,1,2-	000076-13-1	0.00094	
Trichlorofluoromethane	000075-69-4	0.00069	
Xylene, Mixture	001330-20-7	0.00121	

CANCER OUTPUT		
Chemical	CASRN	Site Worker Air
Benzene	000071-43-2	0
Carbon Tetrachloride	000056-23-5	0
	TOTALS:	**0**

Cumulative Cancer Risk Site Worker: 0
All cancer risk values are x 10^-4

SITE WORKER - NON CANCER OUTPUT BY TARGET ORGAN

Chemical Name	CASRN	Media	Heart	Liver	Blood	Kidney	Skin	Endoc	Eye	Immu	Nerve	GenUr	Respi	Other	Devel	Gastro
Benzene	000071-43-2															
		Air			0					0						
Carbon Tetrachloride	000056-23-5															
		Air		0												
Chloromethane (air)	000074-87-3															
		Air		0							0					
Dichlorodifluoromethane	000075-71-8															
		Air		0												
Ethylbenzene	000100-41-4															
		Air				0					0				0	
Hexane, N-	000110-54-3															
		Air									0					
Toluene	000108-88-3															
		Air									0					
Trichloro-1,2,2-trifluoroethane, 1,1,2-	000076-13-1															
		Air												0		
Trichlorofluoromethane	000075-69-4															
		Air				0							0			
Xylene, Mixture	001330-20-7															
		Air									0					
		Sum:	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Indoor Air - Construction

PREPARER INPUT

Chemical	CASRN	Exposure P	Site-Specific Background Air Level* (mg/m3)
Benzene	000071-43-2	0.00033	
Carbon Tetrachloride	000056-23-5	0.00032	
Chloromethane (air)	000074-87-3	0.00098	
Dichlorodifluoromethane	000075-71-8	0.0016	
Ethylbenzene	000100-41-4	0.00031	
Hexane, N-	000110-54-3	0.00041	
Toluene	000108-88-3	0.0012	
Trichloro-1,2,2-trifluoroethane, 1,1,2-	000076-13-1	0.00094	
Trichlorofluoromethane	000075-69-4	0.00069	
Xylene, Mixture	001330-20-7	0.00121	

CANCER OUTPUT

Chemical	CASRN	Construction Worker Air
Benzene	000071-43-2	0
Carbon Tetrachloride	000056-23-5	0
	TOTALS:	**0**

Cumulative Cancer Risk Construction Worker: 0
All cancer risk values are x 10^-4

CONSTRUCTION WORKER - NON CANCER OUTPUT BY TARGET ORGAN

Chemical Name	CASRN	Media	Heart	Liver	Blood	Kidney	Skin	Endoc	Eye	Immu	Nerve	GenUr	Respi	Other	Devel	Gastro
Benzene	000071-43-2															
		Air			0					0						
Carbon Tetrachloride	000056-23-5															
		Air		0												
Chloromethane (air)	000074-87-3															
		Air		0							0					
Dichlorodifluoromethane	000075-71-8															
		Air		0												
Ethylbenzene	000100-41-4															
		Air				0					0				0	
Hexane, N-	000110-54-3															
		Air									0					
Toluene	000108-88-3															
		Air									0					
Trichloro-1,2,2-trifluoroethane,	000076-13-1															
		Air												0		
Trichlorofluoromethane	000075-69-4															
		Air				0							0			
Xylene, Mixture	001330-20-7															
		Air									0					
		Sum:	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

APPENDIX E

LEAD-BASED PAINT SURVEY &
ASBESTOS CONTAINING MATERIAL SURVEY

GEOTEK ENGINEERING
& TESTING SERVICES, INC.
909 East 50th Street North
Sioux Falls, South Dakota 57104
605-335-5512 Fax 605-335-0773

February 15, 2023

HR Green, Inc.
8710 Earhart Lane SW
Cedar Rapids, IA 52404

Attn: Ms. Rose Amundson

Subj: Limited Lead Based Paint Survey
Lamb Theater
625 Douglas St.
Sioux City, IA
GeoTek #23-0119

Dear Ms. Amundson;

GeoTek performed a Lead Survey at the referenced location on February 8, 2023. Lead testing was requested to assess the potential exposure levels prior to remodeling or demolition activities in the building.

GeoTek Engineering and Testing Services, Inc. appreciates the opportunity to have been of service on this project. Please contact us if you have questions or if we can be of further assistance.

Respectfully submitted,

GEOTEK ENGINEERING & TESTING SERVICES, INC.

Katherine Howard
Staff Scientist
IDPH Lead Inspector/Risk Assessor
Certification No.: LEAD-INSP10182

INTRODUCTION

Lead-based paint (LBP) testing was conducted at the referenced site on February 8, 2023. Testing was performed to identify possible LBP at the building prior to renovation or demolition. Access was provided by the owners. The building was reportedly constructed in 1909. The interior has been extensively reconstructed over the years.

Testing was completed for HR Green Inc. Lead-based paint testing was conducted by Ms. Katherine Howard, IDPH Lead Inspector/Risk Assessor, Certification License #LEAD-INSP10182. The IDPH has certified that GeoTek Engineering & Testing Services, Inc. of Sioux Falls, SD, has fulfilled the requirements to conduct lead-based paint activities in the State of Iowa. GeoTek's firm Certification No. is LEAD-FIRM12577. The LBP inspector's certifications and the performance characteristic sheet (PCS) of the Niton X-ray Fluorescence (XRF) analyzer are included as Appendices A and B, respectively.

LBP SAMPLING METHODS AND ANALYTICAL PROCEDURE

Survey sampling was conducted in accordance with the Iowa Administrative Code 641-CH 70.6(2), revised 7/14/21. Iowa Administrative Code 641-Chapeter 70 defines the paint action level as lead concentrations above the level of 1.0 mg/cm^2 when measured with a portable XRF instrument or greater than 0.5% by weight.

The results of portable x-ray fluorescence (XRF) analysis of representative building components are shown in Table 1. All tests were done using a Niton XLp 303a X-Ray Fluorescence Spectrum Analyzer (Serial # 25581, 109 Cadmium Source #1191.20 40miC installed on 12/21/20) to measure the lead content of surface coatings on representative homogenous building components.

XRF results are classified as positive, negative, or inconclusive. A positive classification indicates that lead is present on the testing combination at or above standard of 1.0 mg/cm^2. An inconclusive classification indicates that the XRF test result cannot determine, with reasonable certainty, whether lead is present on the testing combination at or above the standard. It is important to note that positive, negative, and inconclusive results apply not only to the actual testing combination, but also to any repetitions of the testing combination in the room or area that were not tested. Inconclusive testing combinations were not encountered on this project.

Any paint found to contain lead levels below the IDPH/EPA standard is considered to be non-hazardous, regardless of condition.

In the attached XRF Testing Table, each side of the building was given a corresponding letter of A, B, C, or D. A= east, B= south, C= west and D= north.

DISCUSSION OF TEST RESULTS

Based on the sampling and XRF results, which are tabulated in Table 1, the components listed below tested positive for LBP:

Location	Component	Color
2nd Floor Rm A2	**Window Sash, on Exterior Wall**	**Beige**
2nd Floor Rm A2	**Wall Plaster, Exterior Wall**	**Beige**
2nd Floor Rm B1	**Wall Plaster, Exterior Wall**	**Beige**

Excluding the windows, the exterior of the building was not found to be positive for lead paint. Inside the building exterior walls are furred out for the most part so original wall plaster is not exposed. Where internal plaster on exterior walls was exposed the lead levels were not consistently above 1.0 mg/cm^2, however, internal plaster on exterior walls should be assumed to be positive for lead-based paint.

Windows on exterior walls are not exposed on the first floor. Exterior window sashes on the 2nd floor tested positive for lead-based paint. Exterior window sashes exposed during demolition should be assumed to be positive for lead-based paint.

Workers should use appropriate work practices, and personal protective equipment (PPE) should be used to prevent exposure to lead dust/fumes or conveying lead contamination from the work site. It is noted that personnel working with lead-based paint are subject to OSHA Construction Standards for Lead and associated monitoring requirements.

Clearance dust testing is only a requirement for child occupied facilities. Public buildings do not usually fit this definition; however, clearance testing is recommended as a best practice.

XRF sampling LBP test results are tabulated in Table 1. A rough, current floor plan is provided in the Maps Appendix.

RECOMMENDATIONS

The EPA Renovation, Repair, and Painting (RRP) regulations may apply to this facility. We recommend following the RRP regulations (i.e. ground containment, following lead-safe work practices, etc.) as a best management practice regardless of the definition of a child-occupied facility.

We recommend that the lead in construction standards (29 CFR 1926.62 & Iowa Administrative Code 641-ch 69) be reviewed prior to commencing work at the facility. Workers should be aware of the appropriate work practices and PPE used to prevent exposure to lead dust/fumes or conveying lead contamination from the work site.

Should additional painted surfaces (not identified by this report) be encountered, we recommend disturbance of that surface be avoided until the lead content of the surface in question is determined. Additional precautions would be necessary if lead-based coatings are disturbed.

Prior to reoccupation of the facility, it is recommended that clearance testing be conducted by an IDPH certified risk assessor, paint inspector or other professionally certified combination acceptable under Iowa Administrative Code 641-ch 70 upon completion of renovation and cleaning. Depending upon the final use of the facility IDPH clearance standards may apply.

STANDARD OF CARE

Information contained in this report was obtained by means of on-site observations and analytical data. Suggestions contained in this report represent our professional opinions. These opinions are based on information currently available and derived in accordance with accepted practices and industry guidelines. However, this is not to suggest that the information obtained is a complete compilation of all existing information, which may be pertinent to this site.

This survey is not intended to represent exhaustive research of all potential hazards or conditions, which may exist. Other than this, no warranty is implied or intended.

The services performed by GeoTek Engineering & Testing Services, Inc. (GeoTek) on this project have been conducted with that level of care and skill ordinarily exercised by reputable members of the profession, practicing in the same locality under similar budget and time constraints. No other warranty is expressed or implied.

REMARKS

We appreciate the opportunity to be of service to you on this project. Please let us know if you have any questions or if we may be of further assistance.

Respectfully submitted,

GEOTEK ENGINEERING & TESTING SERVICES, INC.

Katherine Howard
Project Manager
EPA Certified Lead Inspector/Risk Assessor
Certification No.: LEAD-INSP10182

Reviewed by:

Jerald K. Zutz
Senior Project Manager
PE/Remediator #5083

TABLE 1

XRF Lead-Based Paint Inspection Test Results

Reading No	Time	Duration	Units	Component	Substrate	Side	Condition	Color	Floor	Room	Results	Depth Index	Action Level	PbC	PbC Error
1	2/8/2023 10:24	101.97	cps											3.01	0
2	2/8/2023 10:27	13.25	mg / cm ^2			CALIBRATE					Positive	1.11	1	1.1	0.1
3	2/8/2023 10:27	7.06	mg / cm ^2			CALIBRATE					Positive	1.14	1	1.1	0.1
4	2/8/2023 10:28	8.94	mg / cm ^2			CALIBRATE					Null	1.06	1	1	0.1
5	2/8/2023 10:29	1.21	mg / cm ^2			CALIBRATE					Null	1.01	1	0.9	0.3
6	2/8/2023 10:31	20.97	mg / cm ^2			CALIBRATE					Positive	1.11	1	1	0.1
7	2/8/2023 10:32	4.81	mg / cm ^2	WALL	CONCRETE	D	POOR	YELLOW	FIRST	OUTSIDE	Negative	1	1	< LOD	0.03
8	2/8/2023 10:33	4.3	mg / cm ^2	WALL	SIDING EIFS	D	POOR	BROWN	FIRST	OUTSIDE	Negative	1	1	< LOD	0.03
9	2/8/2023 10:33	3.8	mg / cm ^2	WALL	SIDING EIFS	D	POOR	YELLOW	FIRST	OUTSIDE	Negative	1	1	< LOD	0.03
10	2/8/2023 10:34	3.43	mg / cm ^2	WALL	CONCRETE	D	POOR	TAN	FIRST	OUTSIDE	Negative	2.48	1	< LOD	0.04
11	2/8/2023 10:36	4.45	mg / cm ^2	DOOR	METAL	A	INTACT	BROWN	FIRST	OUTSIDE	Negative	1	1	< LOD	0.03
12	2/8/2023 11:10	4.3	mg / cm ^2	DOOR	METAL	A	INTACT	BROWN	FIRST	ENTRY	Negative	1	1	< LOD	0.03
13	2/8/2023 11:11	3.94	mg / cm ^2	DOOR FR	METAL	A	INTACT	BROWN	FIRST	ENTRY	Negative	1	1	< LOD	0.03
14	2/8/2023 11:12	3.09	mg / cm ^2	WINDOW	METAL	A	INTACT	BROWN	FIRST	ENTRY	Negative	1	1	< LOD	0.03
15	2/8/2023 11:13	2.42	mg / cm ^2	TRIM	WOOD	A	INTACT	BROWN	FIRST	HALL A	Negative	7.43	1	< LOD	0.25
16	2/8/2023 11:15	10.84	mg / cm ^2	WALL	DRYWALL	A	POOR	BEIGE	FIRST	HALL A	Negative	5.56	1	0.4	0.1
17	2/8/2023 11:15	3.27	mg / cm ^2	WALL	DRYWALL	C	POOR	BEIGE	FIRST	HALL A	Negative	4.63	1	< LOD	0.11
18	2/8/2023 11:16	3.96	mg / cm ^2	COLUMN	DRYWALL	B	POOR	BEIGE	FIRST	HALL A	Negative	5.32	1	< LOD	0.09
19	2/8/2023 11:18	7.41	mg / cm ^2	DOOR FR A4	WOOD	B	POOR	BEIGE	FIRST	HALL A	Negative	3.67	1	0.5	0.1
20	2/8/2023 11:19	2.75	mg / cm ^2	WALL	DRYWALL	C	POOR	BEIGE	FIRST	A4	Negative	1	1	< LOD	0.03
21	2/8/2023 11:20	2.75	mg / cm ^2	WALL	DRYWALL	D	POOR	BEIGE	FIRST	A4	Negative	1	1	< LOD	0.03
22	2/8/2023 11:20	4.66	mg / cm ^2	WALL	DRYWALL	A	POOR	BEIGE	FIRST	A4	Negative	5.49	1	< LOD	0.1
23	2/8/2023 11:20	2.93	mg / cm ^2	WALL	DRYWALL	B	POOR	BEIGE	FIRST	A4	Negative	1	1	< LOD	0.03
24	2/8/2023 11:21	2.42	mg / cm ^2	DOOR	WOOD	C	POOR	BROWN	FIRST	A4	Negative	1	1	< LOD	0.03
25	2/8/2023 11:21	2.59	mg / cm ^2	DOOR	WOOD	C	POOR	BROWN	FIRST	A4	Negative	1	1	< LOD	0.03
26	2/8/2023 11:22	0.17	mg / cm ^2	DOOR FR	WOOD	C	POOR	BEIGE	FIRST	A4	Null	1	1	< LOD	0.07
27	2/8/2023 11:22	3.63	mg / cm ^2	DOOR FR	WOOD	C	POOR	BEIGE	FIRST	A4	Negative	1	1	< LOD	0.03
28	2/8/2023 11:23	2.58	mg / cm ^2	DOOR FR	WOOD	C	POOR	GRAY	FIRST	A4	Negative	2.89	1	< LOD	0.2
29	2/8/2023 11:24	2.42	mg / cm ^2	DOOR FR	WOOD	D	POOR	GRAY	FIRST	B2	Negative	1	1	< LOD	0.03
30	2/8/2023 11:25	2.4	mg / cm ^2	DOOR	WOOD	D	POOR	BEIGE	FIRST	B2	Negative	1	1	< LOD	0.03
31	2/8/2023 11:25	3.28	mg / cm ^2	WALL	DRYWALL	A	POOR	BEIGE	FIRST	B2	Negative	1	1	< LOD	0.03
32	2/8/2023 11:26	4.14	mg / cm ^2	WALL	DRYWALL	B	POOR	BEIGE	FIRST	B2	Negative	1	1	< LOD	0.03
33	2/8/2023 11:26	3.09	mg / cm ^2	WALL	DRYWALL	C	POOR	BEIGE	FIRST	B2	Negative	1	1	< LOD	0.03
34	2/8/2023 11:27	5.17	mg / cm ^2	WALL	DRYWALL	D	POOR	BEIGE	FIRST	HALL B	Negative	2.51	1	0.1	0.05
35	2/8/2023 11:28	4.47	mg / cm ^2	WALL	DRYWALL	B	POOR	BEIGE	FIRST	HALL B	Negative	1.93	1	< LOD	0.03
36	2/8/2023 11:29	2.43	mg / cm ^2	DOOR FR B5	WOOD	B	POOR	BROWN	FIRST	HALL B	Negative	1	1	< LOD	0.03
37	2/8/2023 11:32	3.62	mg / cm ^2	WALL	DRYWALL	A	POOR	BEIGE	FIRST	B5	Negative	1	1	< LOD	0.03
38	2/8/2023 11:32	0.86	mg / cm ^2	WALL	DRYWALL	B	POOR	BEIGE	FIRST	B5	Null	1	1	< LOD	0.03
39	2/8/2023 11:33	4.48	mg / cm ^2	WALL	DRYWALL	B	POOR	BEIGE	FIRST	B5	Negative	1	1	< LOD	0.03
40	2/8/2023 11:33	1.38	mg / cm ^2	WALL	DRYWALL	C	POOR	BEIGE	FIRST	B5	Null	1	1	< LOD	0.03
41	2/8/2023 11:34	3.63	mg / cm ^2	WALL	DRYWALL	C	POOR	BEIGE	FIRST	B5	Negative	1	1	< LOD	0.03
42	2/8/2023 11:34	2.92	mg / cm ^2	WALL	DRYWALL	D	POOR	BEIGE	FIRST	B5	Negative	4.08	1	< LOD	0.06
43	2/8/2023 11:35	3.63	mg / cm ^2	DOOR	WOOD	D	POOR	BEIGE	FIRST	B5	Negative	7.18	1	< LOD	0.17
44	2/8/2023 11:38	2.59	mg / cm ^2	COLUMN 1	WOOD	D	POOR	BEIGE	FIRST	STAGE AREA	Negative	1	1	< LOD	0.03
45	2/8/2023 11:38	2.93	mg / cm ^2	WALL	DRYWALL	A	POOR	BEIGE	FIRST	STAGE AREA	Negative	1	1	< LOD	0.03

Reading No	Time	Duration	Units	Component	Substrate	Side	Condition	Color	Floor	Room	Results	Depth Index	Action Level	PbC	PbC Error
46	2/8/2023 11:39	2.42	mg / cm ^2	WINDOW	WOOD	A	POOR	BROWN	FIRST	STAGE AREA	Negative	1	1	< LOD	0.03
47	2/8/2023 11:40	3.79	mg / cm ^2	WALL	DRYWALL	B	POOR	BEIGE	FIRST	STAGE AREA	Negative	1	1	< LOD	0.03
48	2/8/2023 11:41	5.01	mg / cm ^2	WALL	PLASTER	D	POOR	BEIGE	FIRST	STAGE AREA	Negative	2	1	0.29	0.07
49	2/8/2023 11:42	2.58	mg / cm ^2	DOOR	WOOD	A	POOR	BEIGE	FIRST	STAGE AREA	Negative	1	1	< LOD	0.03
50	2/8/2023 11:43	3.8	mg / cm ^2	WALL	DRYWALL	D	POOR	BEIGE	FIRST	HALL D	Negative	1	1	< LOD	0.03
51	2/8/2023 11:43	2.77	mg / cm ^2	WALL	DRYWALL	B	POOR	BEIGE	FIRST	HALL D	Negative	1	1	< LOD	0.03
52	2/8/2023 11:47	3.78	mg / cm ^2	WALL	PLASTER	D	POOR	BLUE	FIRST	D7	Negative	1	1	< LOD	0.03
53	2/8/2023 11:48	5.01	mg / cm ^2	WALL	DRYWALL	A	POOR	BEIGE	FIRST	D7	Negative	1	1	< LOD	0.03
54	2/8/2023 11:49	2.41	mg / cm ^2	WALL	DRYWALL	B	POOR	BEIGE	FIRST	D7	Negative	1	1	< LOD	0.03
55	2/8/2023 11:49	2.57	mg / cm ^2	DOOR	WOOD	B	POOR	BROWN	FIRST	D7	Negative	1	1	< LOD	0.03
56	2/8/2023 11:52	3.8	mg / cm ^2	WALL	DRYWALL	C	POOR	BEIGE	SECOND	HALL A	Negative	2.47	1	< LOD	0.04
57	2/8/2023 11:52	2.4	mg / cm ^2	WALL	DRYWALL	A	POOR	BEIGE	SECOND	HALL A	Negative	1	1	< LOD	0.03
58	2/8/2023 11:56	38.9	mg / cm ^2	WALL	PLASTER	A	POOR	BEIGE	SECOND	A2	Null	10	1	1	0.3
59	2/8/2023 11:58	15.51	mg / cm ^2			CALIBRATE					Null	1.06	1	1	0.1
60	2/8/2023 11:58	2.92	mg / cm ^2			CALIBRATE					Null	1.12	1	1.1	0.2
61	2/8/2023 12:02	103.91	cps											2.85	0
62	2/8/2023 12:05	20.3	mg / cm ^2			CALIBRATE					Positive	1.08	1	1	0.1
63	2/8/2023 12:06	4.49	mg / cm ^2			CALIBRATE					Null	1.12	1	1.1	0.1
64	2/8/2023 12:07	8.45	mg / cm ^2			CALIBRATE					Positive	1.12	1	1.1	0.1
65	2/8/2023 12:07	4.83	mg / cm ^2			CALIBRATE					Positive	1.18	1	1.2	0.1
75	2/8/2023 12:16	2.08	mg / cm ^2	SASH	WOOD	A	POOR	BEIGE	SECOND	A2	Positive	10	1	12	3.7
66	2/8/2023 12:09	2.94	mg / cm ^2	WALL	PLASTER	A	POOR	BEIGE	SECOND	A2	Null	10	1	< LOD	0.38
67	2/8/2023 12:10	13.13	mg / cm ^2	WALL	PLASTER	A	POOR	BEIGE	SECOND	A2	Null	10	1	1.1	0.5
68	2/8/2023 12:11	3.44	mg / cm ^2	WALL	DRYWALL	B	POOR	BEIGE	SECOND	A2	Negative	3.7	1	< LOD	0.1
69	2/8/2023 12:11	5.69	mg / cm ^2	WALL	DRYWALL	C	POOR	BEIGE	SECOND	A2	Null	2.6	1	0.07	0.04
70	2/8/2023 12:12	3.28	mg / cm ^2	WALL	DRYWALL	D	POOR	BEIGE	SECOND	A2	Negative	3.89	1	< LOD	1.25
71	2/8/2023 12:14	38.94	mg / cm ^2	WALL	PLASTER	A	POOR	BEIGE	SECOND	A2	Null	10	1	0.9	0.3
84	2/8/2023 12:29	6.71	mg / cm ^2	WALL	PLASTER	A	POOR	BEIGE	SECOND	A2	Positive	9.4	1	1.9	0.7
72	2/8/2023 12:15	2.41	mg / cm ^2	WINDOW	WOOD	A	POOR	BEIGE	SECOND	A2	Negative	1.67	1	0.4	0.2
73	2/8/2023 12:16	2.92	mg / cm ^2	WINDOW SL	WOOD	A	POOR	BEIGE	SECOND	A2	Null	8.67	1	< LOD	0.37
74	2/8/2023 12:16	3.61	mg / cm ^2	WINDOW SL	WOOD	A	POOR	BEIGE	SECOND	A2	Negative	2.75	1	< LOD	0.04
83	2/8/2023 12:27	2.6	mg / cm ^2	WALL	DRYWALL	A	POOR	BEIGE	SECOND	A4	Negative	1.53	1	< LOD	0.05
76	2/8/2023 12:19	4.65	mg / cm ^2	WALL	PLASTER	B	POOR	BEIGE	SECOND	B1	Positive	3.21	1	2.2	0.9
77	2/8/2023 12:20	2.93	mg / cm ^2	WALL	DRYWALL	A	POOR	BEIGE	SECOND	B1	Negative	1	1	< LOD	0.03
78	2/8/2023 12:21	3.95	mg / cm ^2	WALL	DRYWALL	D	POOR	BEIGE	SECOND	B1	Negative	1	1	< LOD	0.03
79	2/8/2023 12:22	4.65	mg / cm ^2	WALL	DRYWALL	C	POOR	BEIGE	SECOND	B1	Negative	1	1	< LOD	0.03
80	2/8/2023 12:22	1.72	mg / cm ^2	WALL	PLASTER	B	POOR	BEIGE	SECOND	B1	Null	2.81	1	< LOD	0.45
81	2/8/2023 12:22	5.84	mg / cm ^2	WALL	PLASTER	B	POOR	BEIGE	SECOND	B1	Negative	2.3	1	0.3	0.07
82	2/8/2023 12:24	24.9	mg / cm ^2	WALL	PLASTER	B	POOR	BEIGE	SECOND	B1	Null	2.44	1	0.6	0.1
85	2/8/2023 12:30	6.88	mg / cm ^2			CALIBRATE					Positive	1.17	1	1.1	0.1
86	2/8/2023 12:31	9.35	mg / cm ^2			CALIBRATE					Null	1.1	1	1	0.1
87	2/8/2023 12:32	20.21	mg / cm ^2			CALIBRATE					Positive	1.1	1	1	0.1
88	2/8/2023 12:33	19.18	mg / cm ^2			CALIBRATE					Positive	1.1	1	1	0.1

APPENDIX A

IDPH Certifications

IDPH
IOWA Department of PUBLIC HEALTH

Protecting and Improving the Health of Iowans

Kim Reynolds, Governor | Adam Gregg, Lt. Governor | Kelly Garcia, Interim Director

April 13, 2022

Katherine Howard
909 50th St N Street E
Sioux Falls, SD 57104

Dear Katherine Howard

The department has reviewed the information you submitted and determined that you have met the requirements for certification in the state of Iowa as a Lead Inspector/Risk Assessor. Your certification number is: LEAD-INSP10182.

Your certification will expire on April 12, 2025. By that date, you must renew your certification in order to perform any lead professional certification activities. To renew your certification, you will need to have completed the appropriate refresher course. Refresher courses are valid if taken within 3-years from the date that you renew.

Please keep a copy of your certification on your person or in an easily retrievable area at the work site. If you submitted your application online or with a valid email address, the certification is being provided to you electronically. You may choose to either print these documents or have them available on your phone or other electronic device for display if requested.

You can find the certification requirements and work practice standards for all lead professionals in Iowa Administrative Code 641 - Chapter 70, which is at: http://www.idph.iowa.gov/LPP under "Resources". You **must** be currently certified to perform work that requires certification.

Bureau of Environmental Health Services
Lead Professional Certification
Phone: 800-972-2026
E-mail: Lead.Bureau@idph.iowa.gov

IOWA DEPARTMENT OF PUBLIC HEALTH

Katherine Howard

Lead Inspector/Risk Assessor

Certification Number: LEAD-INSP10182

Expiration Date: April 12, 2025

Iowa Department of Public Health

Bureau of Environmental Health Services

Lead Professional Certification

GEOTEK ENGINEERING & TESTING, INC.

909 50TH ST N STREET E
SIOUX FALLS, SD 57104

is certified as a lead professional firm under Iowa Administrative Code 641 - Chapter 70

Certification No: **LEAD-FIRM12577**

Issued: **April 13, 2022**

Expires: **April 12, 2025**

APPENDIX B

Performance Characteristics Sheets (Niton XRF)

Performance Characteristic Sheet

EFFECTIVE DATE: **September 24, 2004** **EDITION NO.: 1**

MANUFACTURER AND MODEL:

Make: *Niton LLC*
Tested Model: *XLp 300*
Source: ^{109}Cd
Note: This PCS is also applicable to the equivalent model variations indicated below, for the Lead-in-Paint K+L variable reading time mode, in the XLi and XLp series:

XLi 300A, XLi 301A, XLi 302A and XLi 303A.
XLp 300A, XLp 301A, XLp 302A and XLp 303A.
XLi 700A, XLi 701A, XLi 702A and XLi 703A.
XLp 700A, XLp 701A, XLp 702A, and XLp 703A.

Note: The XLi and XLp versions refer to the shape of the handle part of the instrument. The differences in the model numbers reflect other modes available, in addition to Lead-in-Paint modes. The manufacturer states that specifications for these instruments are identical for the source, detector, and detector electronics relative to the Lead-in-Paint mode.

FIELD OPERATION GUIDANCE

OPERATING PARAMETERS:

Lead-in-Paint K+L variable reading time mode.

XRF CALIBRATION CHECK LIMITS:

0.8 to 1.2 mg/cm^2 (inclusive)

The calibration of the XRF instrument should be checked using the paint film nearest 1.0 mg/cm^2 in the NIST Standard Reference Material (SRM) used (e.g., for NIST SRM 2579, use the 1.02 mg/cm^2 film).

If readings are outside the acceptable calibration check range, follow the manufacturer's instructions to bring the instruments into control before XRF testing proceeds.

SUBSTRATE CORRECTION:

For XRF results using Lead-in-Paint K+L variable reading time mode, substrate correction is <u>not</u> needed for:

Brick, Concrete, Drywall, Metal, Plaster, and Wood

INCONCLUSIVE RANGE OR THRESHOLD:

K+L MODE READING DESCRIPTION	SUBSTRATE	THRESHOLD (mg/cm^2)
Results not corrected for substrate bias on any substrate	Brick	1.0
	Concrete	1.0
	Drywall	1.0
	Metal	1.0
	Plaster	1.0
	Wood	1.0

BACKGROUND INFORMATION

EVALUATION DATA SOURCE AND DATE:

This sheet is supplemental information to be used in conjunction with Chapter 7 of the HUD *Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing* ("HUD Guidelines"). Performance parameters shown on this sheet are calculated from the EPA/HUD evaluation using archived building components. Testing was conducted in August 2004 on 133 testing combinations. The instruments that were used to perform the testing had new sources; one instrument's was installed in November 2003 with 40 mCi initial strength, and the other's was installed June 2004 with 40 mCi initial strength.

OPERATING PARAMETERS:

Performance parameters shown in this sheet are applicable only when properly operating the instrument using the manufacturer's instructions and procedures described in Chapter 7 of the HUD Guidelines.

SUBSTRATE CORRECTION VALUE COMPUTATION:

Substrate correction is not needed for brick, concrete, drywall, metal, plaster or wood when using Lead-in-Paint K+L variable reading time mode, the normal operating mode for these instruments. If substrate correction is desired, refer to Chapter 7 of the HUD Guidelines for guidance on correcting XRF results for substrate bias.

EVALUATING THE QUALITY OF XRF TESTING:

Randomly select ten testing combinations for retesting from each house or from two randomly selected units in multifamily housing. Use the K+L variable time mode readings.

Conduct XRF retesting at the ten testing combinations selected for retesting.

Determine if the XRF testing in the units or house passed or failed the test by applying the steps below.

Compute the Retest Tolerance Limit by the following steps:

Determine XRF results for the original and retest XRF readings. Do not correct the original or retest results for substrate bias. In single-family housing a result is defined as the average of three readings. In multifamily housing, a result is a single reading. Therefore, there will be ten original and ten retest XRF results for each house or for the two selected units.

Calculate the average of the original XRF result and retest XRF result for each testing combination.

Square the average for each testing combination.

Add the ten squared averages together. Call this quantity C.

Multiply the number C by 0.0072. Call this quantity D.

Add the number 0.032 to D. Call this quantity E.

Take the square root of E. Call this quantity F.

Multiply F by 1.645. The result is the Retest Tolerance Limit.

Compute the average of all ten original XRF results.

Compute the average of all ten re-test XRF results.

Find the absolute difference of the two averages.

If the difference is less than the Retest Tolerance Limit, the inspection has passed the retest. If the difference of the overall averages equals or exceeds the Retest Tolerance Limit, this procedure should be repeated with ten new testing combinations. If the difference of the overall averages is equal to or greater than the Retest Tolerance Limit a second time, then the inspection should be considered deficient.

Use of this procedure is estimated to produce a spurious result approximately 1% of the time. That is, results of this procedure will call for further examination when no examination is warranted in approximately 1 out of 100 dwelling units tested.

TESTING TIMES:

For the Lead-in-Paint K+L variable reading time mode, the instrument continues to read until it is moved away from the testing surface, terminated by the user, or the instrument software indicates the reading is complete. The following table provides testing time information for this testing mode. The times have been adjusted for source decay, normalized to the initial source strengths as noted above. Source strength and type of substrate will affect actual testing times. At the time of testing, the instruments had source strengths of 26.6 and 36.6 mCi.

Testing Times Using K+L Reading Mode (Seconds)						
	All Data			Median for laboratory-measured lead levels (mg/cm^2)		
Substrate	25^{th} Percentile	Median	75^{th} Percentile	Pb < 0.25	0.25 ≤ Pb<1.0	1.0 ≤ Pb
Wood Drywall	4	11	19	11	15	11
Metal	4	12	18	9	12	14
Brick Concrete Plaster	8	16	22	15	18	16

CLASSIFICATION RESULTS:

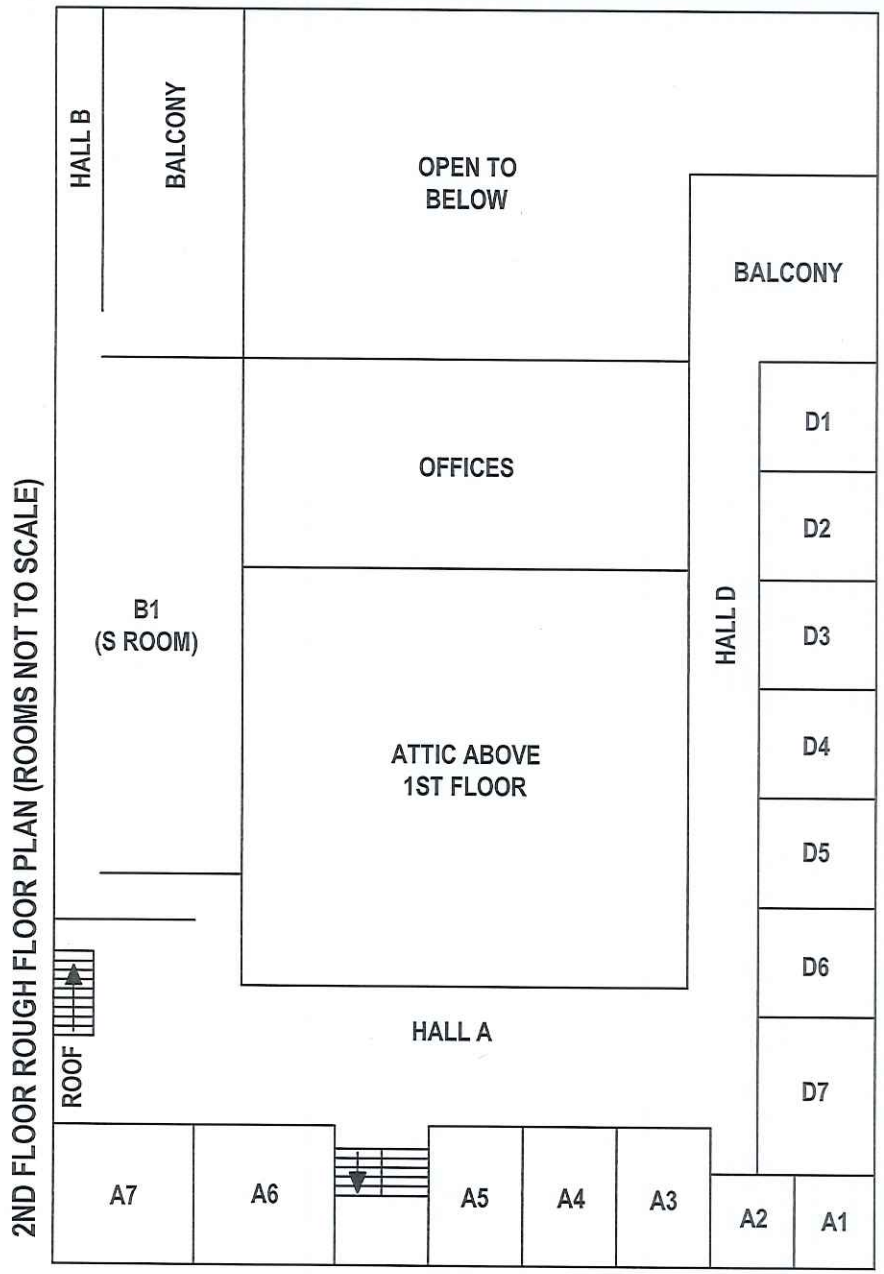
XRF results are classified as positive if they are greater than or equal to the threshold, and negative if they are less than the threshold.

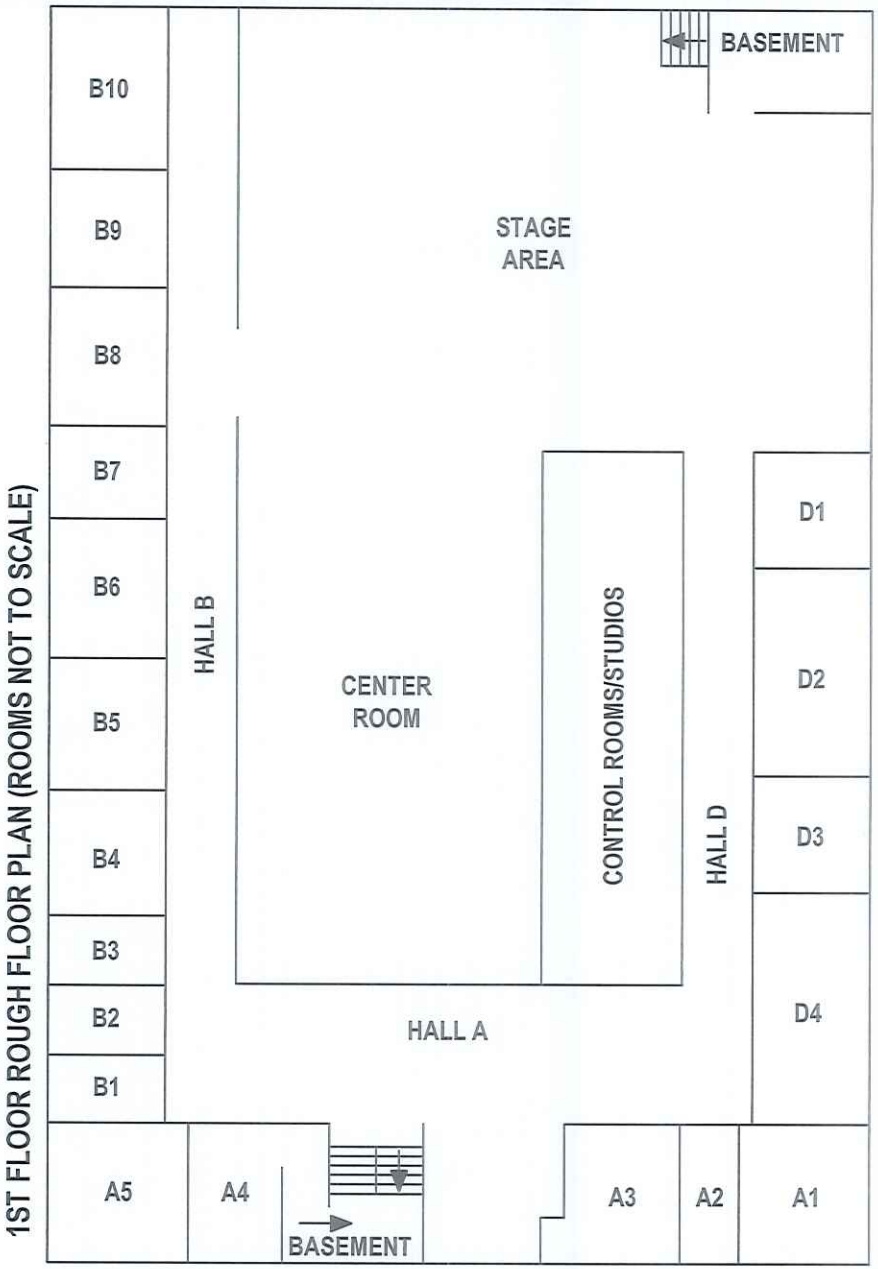
DOCUMENTATION:

A document titled *Methodology for XRF Performance Characteristic Sheets* provides an explanation of the statistical methodology used to construct the data in the sheets, and provides empirical results from using the recommended inconclusive ranges or thresholds for specific XRF instruments. For a copy of this document call the National Lead Information Center Clearinghouse at 1-800-424-LEAD.

This XRF Performance Characteristic Sheet was developed by the Midwest Research Institute (MRI) and QuanTech, Inc., under a contract between MRI and the XRF manufacturer. HUD has determined that the information provided here is acceptable when used as guidance in conjunction with Chapter 7, Lead-Based Paint Inspection, of HUD's *Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing*.

MAPS





NORTH

FIGURE 1
SITE MAP
LAMB THEATER
625 DOUGLAS STREET
SIOUX CITY, IA

ACAD/GEOTEK/KATHERINE/23-0119

PROJECT#: 23-0119

DRAWN BY: DHP

GEOTEK ENGINEERING & TESTING SERVICES, INC.
909 East 50th Street North
Sioux Falls, South Dakota 57104
605-335-5512 Fax 605-335-0773

GEOTEK ENGINEERING
& TESTING SERVICES, INC.
909 East 50th Street North
Sioux Falls, South Dakota 57104
605-335-5512 Fax 605-335-0773

March 20, 2023

HR Green
8710 Earhart Lane SW
Cedar Rapids, IA 52404

Attn: Mrs. Rose Amundson

Subj: Asbestos Survey
Targeted Brownfield Assessment
Lamb Theatre
625 Douglas Street
Latitude 42°29'49"N, Longitude 96°24'25"W
Sioux City, IA
GeoTek #23-0124

Dear Mrs. Amundson,

Introduction

This report presents the asbestos survey recently conducted at the subject property. The purpose of this work was to identify asbestos containing materials (if present) in the building prior to renovation activities. This report augments a previous survey conducted by Terracon (Project #05197420, May 31, 2019).

The Environmental Protection Agencies (EPA) National Emission Standard for Hazardous Air Pollutants (NESHAP), (40 CFR Part 61, Subpart M) requires building owners to inspect for asbestos containing materials (ACM) in areas of a building where renovation projects, demolitions, and training fires will take place. A material is considered asbestos containing if it contains more than 1% asbestos. For samples with asbestos **detected** by PLM (Polarized Light Microscopy) analysis up to 10%, the material can either be presumed to contain >1% asbestos and treated accordingly, or verified to be less than 1% by point counting analysis. EPA also requires the removal of certain regulated friable ACM and non-friable ACM that may become friable during renovations. Prior to demolition of a building, certain regulated friable ACM must be removed from the affected area. In addition, non-friable materials which are in a damaged or significantly damaged condition or are likely to become friable during the process of demolition also must be removed.

Background Information

The subject site consists of an approximate 22,126 square foot two-story, masonry former event center located in central Sioux City, IA. The structure was reportedly built in 1909. The structure is currently unoccupied and has been vacant for some time. The approximate legal description is Lots 1&2, Block 5, Sioux City East Addition, Sioux City, Woodbury County, Iowa. According to the Woodbury County Assessor's Office, the current owner is Lamb Arts Ltd.

We understand that the current property owner has applied to the Targeted Brownfield Financial Assistance Program for assessment of the project site. They are seeking to renovate the site structure. A previous asbestos survey was conducted of the property (Terracon - Project #05197420, May 31, 2019). The only reported renovation of the structure to have taken place is a partial roof repair completed in 2022.

Attached Figure 2 is a diagram which shows sample locations for samples collected during this survey.

Asbestos Survey

On February 8, 2023 the subject property was surveyed for obvious suspected asbestos containing building materials. The asbestos survey was conducted in accordance with 29 CFR 1926.1101, 40 CFR Part 61, and applicable federal, state, or local requirements. The survey was conducted by accredited Iowa asbestos building inspector Mr. Jason Cook. The asbestos survey included verifying the presence/absence of asbestos containing materials previously identified within the building and identifying new friable (dust producing under hand pressure) and non-friable asbestos-containing building materials (ACBM) and assessment of types of material on an area-by-area basis that were not previously identified. Suspect materials (if present) were identified and categorized into three groups: 1) thermal system insulation (T) including pipe, HVAC insulation and fitting insulation; 2) sprayed-on or trowelled-on surfacing material (S) including acoustical plaster, soundproofing, fireproofing, and decorative materials; and 3) miscellaneous materials (M) including ceiling tiles and floor tiles.

The materials were categorized as friable or non-friable. Both suspect friable and non-friable materials were sampled. Destructive sample methods (making holes to check in enclosed areas for concealed materials) were utilized, but only in some areas. Therefore, there is potential that additional suspect materials could be present within concealed locations such as within walls or floors, above ceilings, etc. Examples of possible suspect materials that could be encountered include, but are not limited to: insulation of fire doors, interior insulation of flue pipes or chimneys, transite piping, interior insulation of concrete block walls, interior duct insulation, etc.

Approximately six bulk samples of suspect materials were collected on February 8, 2023 and submitted for analysis by polarized light microscopy (PLM) on November 23, 2022. Samples were analyzed by EMC Laboratories, Inc., a National Voluntary Laboratory Accreditation Program (NVLAP) and American Industrial Hygiene Association (AIHA) accredited laboratory.

The materials sampled, as well as sample locations, are listed on the attached Tables. The laboratory analysis report is attached in Appendix A. Attached Figure 2 show sample locations. Photos of the building and asbestos materials are attached in Appendix B.

Asbestos Containing Materials

Material	Location	Friable	Estimated Quantity	Comments
Ceiling Tile Mastic	1&2nd Floors	N	≈11,130 ft²	
Glue (brown-behind baseboard)	1st floor front hall, 1st floor men's restroom, Rooms off N Hall, 2nd floor central hall, 2nd floor rooms off N. Hall	N	≈700 ln ft	
Thermal system insulation	1st floor NE Room	Y	≈20 ln ft	
Vermiculite Skim Coat on Plaster	Old Balcony	Y	≈6,500 ft²	
Joint Compound	2nd floor stage – north & south stairwells	Y	≈1,800 ft²	
Vibration Isolator (gasket)	2nd floor – NW Air Handler	N	6 units (approx. 3 ft² each)	
Roof Flashing (black)	Roof – north & south parapets	N	≈190 ln ft	
Roof Sealant (black)	Roof – around AC units	N	≈10 ln ft	
12x12" Floor tile (red) & mastic (black)	2nd Floor – Rm 29	N	≈90 ft²	
Window Glazing (gray)	Exterior – between window glass & wood	N	10 windows	
Window Caulking (gray/black)	Exterior – between window frame & window	N	10 windows	
Window Glazing (gray)	Exterior – 2nd floor windows	N	12 windows	
Transite Panels	Front Entry	N	≈60 ft²	Not attached to building
Pipe Insulation	SE Basement Stairwell & 1st floor SE (above ceiling)	Y	≈55 ln ft	
Pipe Fitting Insulation	SE Basement Stairwell & 1st floor SE (above ceiling)	Y	≈8 fittings	

Note: Items in red were sampled and found to contain >1% asbestos as a part of this survey. Items listed in black print were identified in the initial Terracon asbestos survey dated May 31, 2019.

Note: Quantities listed are an estimate, not actual measurements or guaranteed amounts. Quantities are based on observable areas. Concealed, inaccessible and covered areas are not included. If applicable, future asbestos abatement should include contractor quantification with opening of concealed areas to observe hidden materials.

Conclusions

Two surveys for asbestos containing building materials have been conducted for this property. The Terracon survey (Project #05197420, May 31, 2019) and this report. Fifteen building materials have been identified as containing >1% asbestos.

Roofing materials from a recent (2022) roof repair were not sampled to avoid causing damage and roof leaks (at the request of the building owner). These materials must be assumed to contain asbestos unless tested and proven otherwise. Roofing materials (if asbestos containing) are often classified as Category I Non-friable materials by the US EPA.

Recommendations

If the identified asbestos containing materials will be removed/disturbed as part of the building renovation process, they should be abated prior to renovation by a licensed Iowa asbestos abatement contractor.

We understand a whole roof replacement is being considered for the structure. Prior to roof replacement, we recommend a limited asbestos survey be conducted to test the recent roof repair materials. We recommend this survey be completed close to the date of planned roof replacement to minimize the risk of the sampling causing leaks/damage to building components.

The roofing materials identified in the previous asbestos survey are classified as Category I Non-friable roofing materials. These materials (provided they are in good condition and still non-friable) may be removed and disposed of by non-asbestos abatement personnel. Disposal regulations regarding disposal of unsegregated non-friable asbestos waste should still be observed (check with local landfill prior to disposal).

The IDNR must be notified 10 working days prior to removal of regulated quantities of asbestos materials and prior to all demolitions (regardless of the presence of asbestos). Rules, regulations, guidelines, and forms can be viewed and downloaded from the Iowa DNR web page at https://www.iowadnr.gov/Portals/idnr/uploads/waste/wholebuildingdemolition.pdf.

We recommend that this asbestos survey data be provided to future contractors or employees working in the buildings (Note that if known or suspected asbestos building materials remain in a structure, OSHA rules apply to contractors and employees working with asbestos containing materials. Notification of the existence of suspected and confirmed asbestos building materials is required. For employees such as custodial and maintenance workers, an asbestos awareness course is required in buildings with confirmed or presumed asbestos containing materials). Such persons should take appropriate precautions when disturbing or working with the materials.

Should additional suspect materials (not identified by this survey) be encountered, we recommend that either the material be segregated, abated, or demolition in that area cease until the asbestos content of the new material is determined and appropriate measures taken.

The building is in generally poor condition with multiple roof leaks and damaged building

materials including damaged floors and ceilings. At the time of our survey significant mold growth was observed throughout the building and ice/water was present in several locations. Mold and lead-based paint testing was completed separately and will be described in detail in other reports.

Standard of Care

Information contained in this report was obtained by means of on-site observations and analytical data. Recommendations contained in this report represent our professional opinions. These opinions are based on information currently available and derived in accordance with accepted practices and industry guidelines. However, this is not to suggest that the information obtained is a complete compilation of all existing information, which may be pertinent to this site.

The services performed by GeoTek Engineering & Testing Services, Inc. (GeoTek) on this project have been conducted with that level of care and skill ordinarily exercised by reputable members of the profession, practicing in the same locality under similar budget and time constraints. No other warranty is expressed or implied.

Remarks

We appreciate the opportunity to be of service to you on this project. Please let us know if you have any questions or if we may be of further assistance.

GEOTEK ENGINEERING & TESTING SERVICES, INC.

Jason P. Cook
Sr. Project Manager
IA Asbestos Inspector #23-9347

This report was reviewed by:

Jerald K. Zutz
Senior Project Manager
IA Asbestos Inspector #23-9265

Table 1
Bulk Asbestos Samples
Sampled (2/8/2023)

SAMPLE #	MATERIAL	SAMPLE LOCATION
***1**	**Pipe Insulation**	**SE Basement stairwell & above ceilings in SE 1st floor offices**
2	Paper flooring underlayment	Lobby areas – 1st & 2nd floors
3	Loose Insulation (gray)	Attic spaces
***4**	**Pipe Fitting Insulation**	**SE Basement stairwell & above ceilings in SE 1st floor offices**
5	Stucco	Exterior (west)
6	EIFS siding	Exterior (east)

* = Samples/Materials in **bold** print and with an asterisk (*****) contain asbestos >1%.

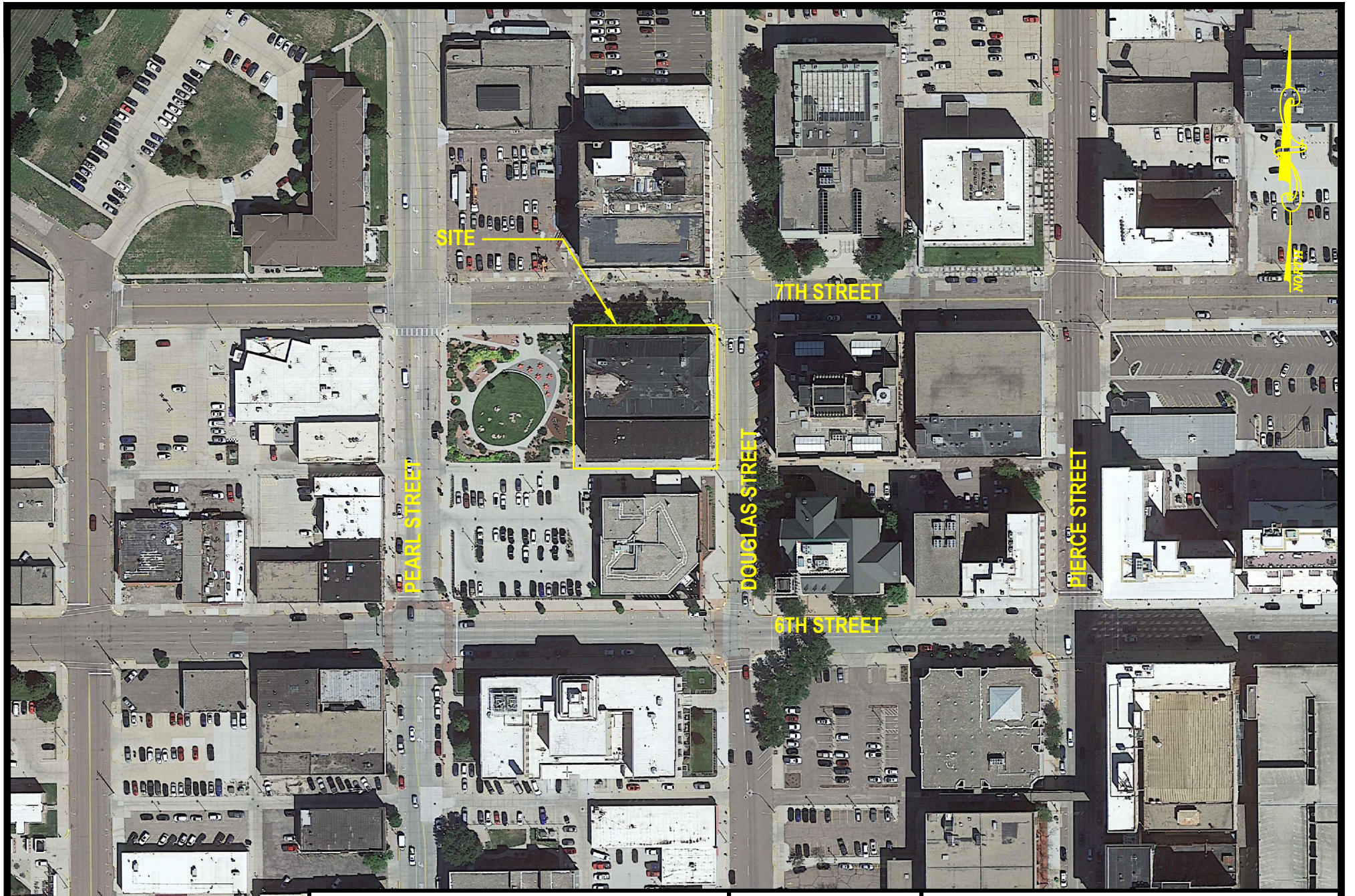


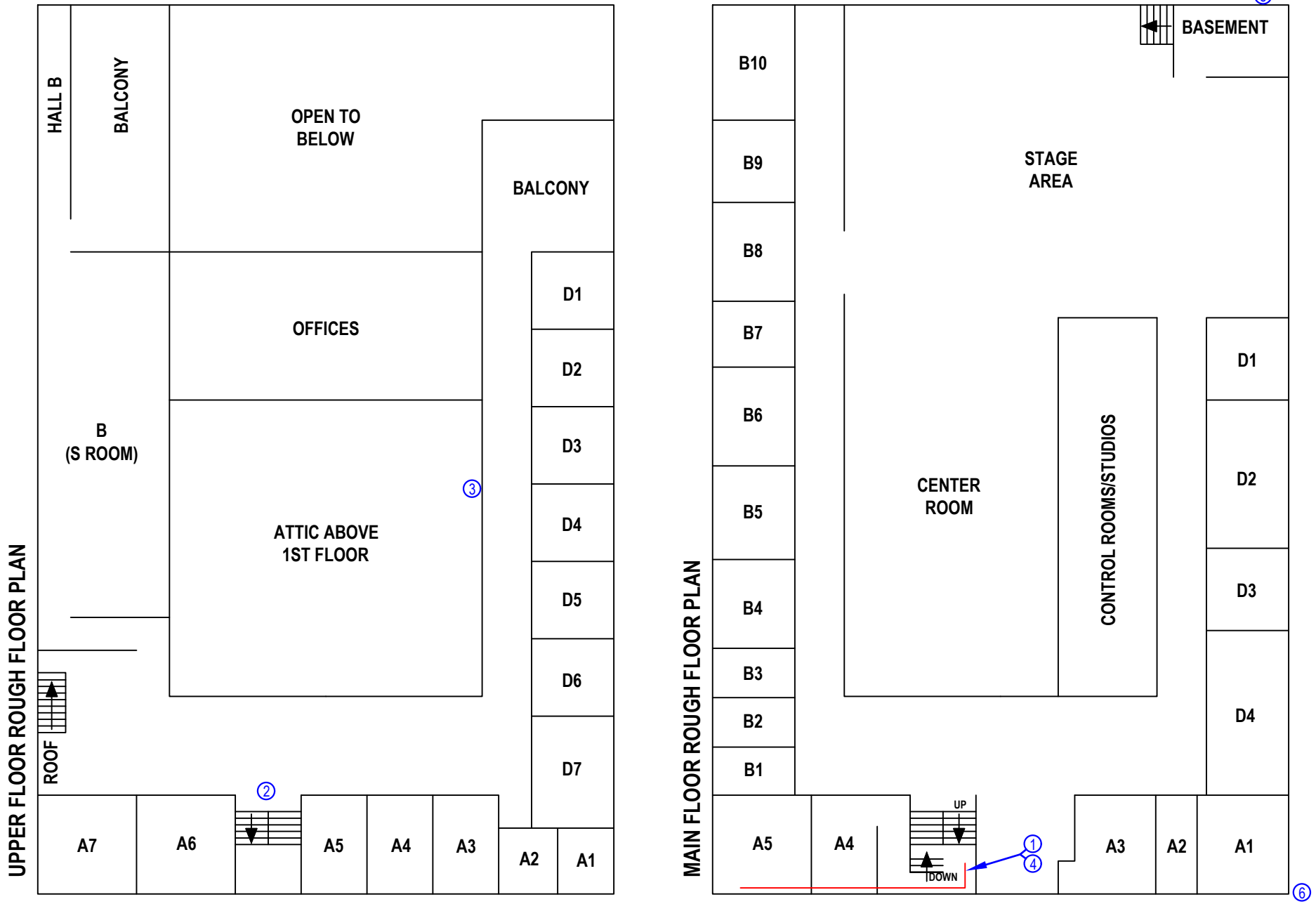
FIGURE 1
AERIAL PHOTA
LAMB THEATRE
625 DOUGLAS STREET
SIOUX CITY, IA

ACAD/GEOTEK/JASON/23-0124

PROJECT#: 23-0124

DRAWN BY: BDD

GEOTEK ENGINEERING & TESTING SERVICES, INC.
909 East 50th Street North
Sioux Falls, South Dakota 57104
605-335-5512 Fax 605-335-0773



NORTH

FIGURE 2
SAMPLE LOCATION MAP
LAMB THEATER
625 DOUGLAS STREET
SIOUX CITY, IA

ACAD/GEOTEK/KATHERINE/23-0124

PROJECT#: 23-0124

DRAWN BY: DHP

GEOTEK ENGINEERING & TESTING SERVICES, INC.
909 East 50th Street North
Sioux Falls, South Dakota 57104
605-335-5512 Fax 605-335-0773

APPENDIX A

EMC Laboratories
Report #0286858

EMC LABS, INC.

9830 S. 51st Street, Suite B109, Phoenix, AZ 85044
Phone: 800-362-3373 or 480-940-5294 - Fax: (480) 893-1726

Laboratory Report
0286858

Bulk Asbestos Analysis by Polarized Light Microscopy

NVLAP#101926-0

Client:	GEOTEK ENGINEERING	Job# / P.O. #:	23-0124
Address:	909 E. 50TH STREET NORTH	Date Received:	02/10/2023
	SIOUX FALLS, SD 57104	Date Analyzed:	02/15/2023
Collected:	02/08/2023	Date Reported:	02/15/2023
Project Name:	LAMB THEATRE-SIOUX CITY	EPA Method:	EPA 600/R-93/116
Address:		Submitted By:	JASON COOK
		Collected By:	

Lab ID Client ID	Sample Location	Layer Name / Sample Description	Asbestos Detected	Asbestos Type	(%)	Non-Asbestos Constituents	
0286858-001 1	SE BSMT STAIRWELL	LAYER 1 Pipe Insulation, Gray	Yes	Chrysotile	75%	Cellulose Fiber	5%
						Carbonates Gypsum	
						Binder/Filler	20%
		LAYER 2 Wrap, White Note: Difficult to separate adjacent layer	Yes	Chrysotile	2%	Cellulose Fiber	98%
0286858-002 2	THROUGHOUT	Paper Underlayment, Black	No	None Detected		Cellulose Fiber Synthetic Fiber	40% 15%
						Carbonates Gypsum	
						Binder/Filler	45%
0286858-003 3	ATTIC SPACE	Loose Insulation, Gray	No	None Detected		Mineral Wool	95%
						Carbonates Quartz	
						Binder/Filler	5%
0286858-004 4	SE BSMT STAIRWELL	Pipe Fitting Insulation, Gray	Yes	Chrysotile	5%	Mineral Wool	35%
						Gypsum Quartz Carbonates	
						Binder/Filler	60%
0286858-005 5	WEST EXTERIOR	Stucco, Off White	No	None Detected			
						Quartz Gypsum Mica Carbonates	
						Binder/Filler	100%

EMC LABS, INC.

9830 S. 51st Street, Suite B109, Phoenix, AZ 85044
Phone: 800-362-3373 or 480-940-5294 - Fax: (480) 893-1726

Laboratory Report
0286858

Bulk Asbestos Analysis by Polarized Light Microscopy

NVLAP#101926-0

Client:	GEOTEK ENGINEERING	Job# / P.O. #:	23-0124
Address:	909 E. 50TH STREET NORTH	Date Received:	02/10/2023
	SIOUX FALLS, SD 57104	Date Analyzed:	02/15/2023
Collected:	02/08/2023	Date Reported:	02/15/2023
Project Name:	LAMB THEATRE-SIOUX CITY	EPA Method:	EPA 600/R-93/116
Address:		Submitted By:	JASON COOK
		Collected By:	

Lab ID / Client ID	Sample Location	Layer Name / Sample Description	Asbestos Detected	Asbestos Type	(%)	Non-Asbestos Constituents	
0286858-0066	EAST EXTERIOR	LAYER 1 EIFS, Gray	No	None Detected			
						Quartz	
						Gypsum	
						Carbonates	
						Mica	
						Binder/Filler	100%
		LAYER 2 Mesh, White	No	None Detected		Fibrous Glass	100%
		LAYER 3 EIFS, Tan	No	None Detected			
						Perlite	
						Gypsum	
						Binder/Filler	100%

Analyst - Mark Steiner

Signatory - Lab Director - Kurt Kettler

CHAIN OF CUSTODY

EMC Laboratories
9830 S. 51ST St., Ste B-109
Phoenix, AZ 85044
(800) 362-3373 Fax (480) 893-1726

LAB#: 286858
TAT: 3 Days
Rec'd: FEB 10 P.M.
EMC USE ONLY

COMPANY NAME:	GeoTek Engineering & Testing Services, Inc	**BILL TO:**	**(If Different Location)**
	909 East 50th Street North	(SAME)	
	Sioux Falls, SD 57104		
CONTACT:	Jason P. Cook		
Phone/Fax:	(605)335-5512 Fax (605)335-0773		
Email:	jcook@geotekeng.com		

Now Accepting: VISA – MASTERCARD **Price Quoted: $_____ / Sample $____ / Layers**

COMPLETE ITEMS 1-4: (Failure to complete any items may cause a delay in processing or analyzing your samples)

1. TURNAROUND TIME: [4hr rush] [8hr rush] [1-Day] [2-Day] (3-Day) [5-Day] [6-10 Day]

****Prior confirmation of turnaround time is required**
****Additional charges for rush analysis (please call marketing department for pricing details)**
****Laboratory analysis may be subject to delay if credit terms are not met**

2. TYPE OF ANALYSIS: (Bulk-PLM) [Air-PCM] [Lead] [Point Count] [Fungi: AOC, W-C, Bulk, Swab, Tape]

3. DISPOSAL INSTRUCTIONS: (Dispose of samples at EMC] / [Return samples to me at my expense]

(If you do not indicate preference, EMC will dispose of samples 60 days from analysis.)

4. Project Name: Lamb Theatre - Sioux City

P.O. Number: ✓ **Project Number:** 23-0124

EMC SAMPLE #	CLIENT SAMPLE #	DATE & TIME SAMPLED	LOCATION/MATERIAL TYPE	Samples Accepted Yes / No	AIR SAMPLE INFO / COMMENTS ON	OFF	FLOW RATE
1	1	2/8/2023	SE Bsmt Stairwell - pipe insulation	(Y) N			
2	2		throughout - paper underlayment	Y N			
3	3		Attic space - loose insulation	Y N			
4	4		SE Bsmt Stairwell - pipe fitting insul	Y N			
5	5		West exterior - stucco	Y N			
6	6		East exterior - Eifs	(Y) N			
				Y N			
				Y N			
				Y N			
				Y N			
				Y N			
				Y N			
				Y N			
				Y N			
				Y N			

SPECIAL INSTRUCTIONS: Email Results

Sample Collector: (Print) Jason Cook (Signature) [signature] 9USXM

Relinquished by: [signature] Date/Time: 2/9/2023 16:30 Received by: Diana Federico Date/Time: 2/10/23

Relinquished by: Diana Federico Date/Time: 2/10/23 Received by: [signature] Date/Time: 2-10-23 340

Relinquished by: _____ Date/Time _____ Received by: _____ Date/Time: 1540

** In the event of any dispute between the above parties for these services or otherwise, parties agree that jurisdiction and venue will be in Phoenix, Arizona and prevailing party will be entitled to attorney's fees and court costs.

Rev. 09/01/08

APPENDIX B

Site & Sample Photographs

625 Douglas Street, Sioux City, IA

Sample #1 – Pipe Insulation (SE Basement Stairwell)

Sample #4 – Pipe Fitting (SE Basement Stairwell)

APPENDIX C

Iowa Asbestos Inspectors License

JASON COOK

DOB: 01-11-1968

Issued: 01-23-2023

This person is licensed to perform asbestos work in the State of Iowa. ID card is intended for official use only and must be present on jobsite.

Asbestos Survey Report

Lamb Theatre
625 Douglas Street
Sioux City, Iowa

May 31, 2019

Terracon Project No. 05197420

Prepared for:

J Development Company
2430 South 73rd Street
Omaha, Nebraska

Prepared by:

Terracon Consultants, Inc.
Omaha, Nebraska

May 31, 2019

Mr. Nick Ramage
J Development Company
2430 South 73rd Street
Omaha, NE 68124

Re: Asbestos Survey Report
Lamb Theatre
625 Douglas Street
Sioux City, Iowa
Terracon Project No. 05197420

Dear Mr. Ramage:

The purpose of this report is to present the results of an asbestos survey at the Lamb Theatre, 625 Douglas Street, located in Sioux City, Iowa. The survey was conducted on May 20 and May 21, 2019 in general accordance with Terracon's Proposal P05197420 dated May 10, 2019. We understand the survey was requested to assess the building for asbestos-containing materials (ACMs) prior to proposed renovation activities. The following table summarizes the asbestos findings:

Asbestos-Containing Materials (ACM)

Building	Friable ACM(s)	Non-Friable ACM(s)
Lamb Theatre	3	10

Please refer to the attached report for details. Identified ACMs are listed in Section 4.0 of the attached report.

Terracon Consultants, Inc. (Terracon) appreciates the opportunity to provide these services to J Development Company. Please call us at (402) 330-2202 if you have questions regarding this report.

Sincerely,

Terracon Consultants, Inc.

Phillip Thomas, OHST, CHMM
Sr. Industrial Hygiene Specialist

Jon Fannon
Environmental Group Manager

Distribution: Addressee (pdf via e-mail

TABLE OF CONTENTS

ASBESTOS SURVEY REPORT

LAMB THEATRE
625 DOUGLAS STREET
SIOUX CITY, IOWA

Terracon Project No. 05197420

May 31, 2019

1.0 INTRODUCTION

The purpose of this asbestos survey that was conducted at the Lamb Theatre located at 625 Douglas Street, Sioux City, Iowa was to:

- Locate, sample (if accessible), quantify and assess suspect building materials for the presence of asbestos.

The site services were conducted by Mr. Aaron Girard of Terracon, a State of Nebraska-licensed asbestos inspector in general accordance with Terracon's proposal P05197420 dated May 10, 2019.

Homogeneous areas with suspect asbestos-containing materials (ACMs) were visually characterized and documented. Although reasonable effort was made to survey accessible suspect materials, additional suspect but unsampled materials could be located in walls, voids or in other concealed areas. Suspect ACM samples were collected in accordance with the sampling protocols outlined in Environmental Protection Agency (EPA) regulation 40 Code of Federal Regulations Part 763-Asbestos, Subpart E-Asbestos-Containing Materials in Schools (40 CFR 763; known as the Asbestos Hazard Emergency Response Act [AHERA]). Suspect ACM samples were submitted to a laboratory accredited under the National Voluntary Laboratory Accreditation Program (NVLAP) for analysis by polarized light microscopy.

1.1 Project Objective

We understand that the project services were requested in anticipation of planned renovation of the building. EPA regulation 40 CFR 61, Subpart M, National Emission Standards for Hazardous Air Pollutants (NESHAP), prohibits the release of asbestos fibers to the atmosphere during renovation and demolition activities. The asbestos NESHAP also requires that potentially regulated ACMs must be identified, classified and quantified prior to activities that will disturb these materials.

2.0 ASBESTOS FIELD ACTIVITIES

As previously mentioned, the asbestos survey was conducted by Mr. Aaron Girard, a State of Iowa-licensed asbestos inspector. A copy of Mr. Girard's asbestos inspector license is included in Appendix C. The survey was conducted in general accordance with the sample collection protocols established by EPA regulation 40 CFR 763-Asbestos. A summary of the survey activities is provided in the following subsections.

2.1 Visual Assessment

Our survey activities began with a visual assessment of interior and exterior areas of the building to establish homogeneous areas with suspect ACM. A homogeneous area consists of building materials that appear similar throughout in terms of color, texture and date of application. The assessment was limited to visually accessible areas.

2.2 Physical Assessment

A physical assessment of each homogeneous area with suspect ACM was conducted to assess the friability and condition of the materials. A friable material is defined by the EPA as a material that can be crumbled, pulverized or reduced to powder by hand pressure when dry. Friability was assessed by physically touching suspect materials.

2.3 Sample Collection

Based on the findings of the visual assessment, bulk samples of suspect ACM were collected in general accordance with EPA sampling protocols. Random samples of suspect materials were collected in each homogeneous area. Samples were placed in sealable containers and labeled with unique sample numbers using an indelible marker.

Terracon collected 55 bulk samples from the buildings. The laboratory separated multi-layered materials into individual layers and analyzed a total of 62 samples. Due to the safety issues, electrical and mechanical components were not sampled as part of this survey. Building materials identified as concrete, glass, wood, masonry, metal or rubber are not considered suspect ACM and therefore, were not sampled. The suspect building materials collected during the survey and submitted for analysis are listed in Table 1 of Appendix A. The analytical report and chain of custody for the samples collected are located in Appendix B.

2.4 Sample Analysis

Bulk samples were submitted under chain of custody to EMSL Analytical, Inc. (EMSL) of Cinnaminson, New Jersey, for analysis by polarized light microscopy with dispersion staining techniques per EPA's *Method for the Determination of Asbestos in Bulk Building Materials* (600/R-93-116). The percentage of asbestos, if present, was established by microscopic visual estimation. EMSL is accredited under the National Voluntary Laboratory Accreditation Program (NVLAP; lab code 101048-0).

2.5 Regulatory Overview

The asbestos NESHAP (40 CFR Part 61, Subpart M) regulates asbestos fiber emissions and asbestos waste disposal practices. It also requires the identification and classification of existing building materials prior to demolition or renovation activities. Under NESHAP, ACMs are classified as friable or Category I or Category II nonfriable ACM. Friable materials are those that, when dry, may be crumbled, pulverized or reduced to powder by hand pressure. Category I nonfriable ACM includes packings, gaskets, resilient floor coverings and asphalt roofing products containing more than 1% asbestos. Category II nonfriable ACMs are any materials other than Category I materials that contain >1% asbestos.

Friable ACMs and Category I and Category II nonfriable ACMs that are in poor condition and have become friable; will be subjected to drilling, sanding, grinding, cutting or abrading; or could be crushed or pulverized during anticipated renovation activities are considered regulated ACM (RACM).

RACM must be removed prior to renovation activities that will disturb the materials. If the amount of RACM exceeds 260 linear feet of pipe insulation or 160 square feet for other building components or will generate more than one cubic meter of waste, the owner or operator must provide the State of Iowa with written notification of planned removal activities at least 10 working days prior to the commencement of asbestos abatement activities. Removal of RACM must be conducted by an appropriately accredited and Iowa-certified asbestos abatement contractor. A third party visual clearance is required following abatement activities. For friable abatement projects that are equal to or greater than (≥) 260 linear feet or any combination that is ≥160 square feet and linear feet, third party final clearance air sampling is required following abatement. In addition, the landfill receiving the ACM materials must be notified of the asbestos content.

The Occupational Safety and Health Administration (OSHA) asbestos standards for general industry and construction (29 CFR 1910.1001 and 1926.1101) regulate workplace exposure to asbestos. The OSHA standards require that employee exposures to airborne asbestos fibers be maintained below the permissible exposure limits (PELs) of 0.1 asbestos fiber per cubic

centimeter of air (0.1 f/cc) as an 8-hour time-weighted average (TWA) or 1.0 f/cc as a 30-minute excursion limit. The OSHA standards classify specific work practices and precautions and require building owners to maintain records and inform employees who will conduct housekeeping activities of the presence and location of ACM.

The Occupational Safety and Health Administration (OSHA) Asbestos standards for general industry and construction (29 CFR 1910.1001 and 1926.1101) regulate workplace exposure to asbestos. The OSHA standards require that employee exposures to airborne asbestos fibers must be maintained below 0.1 asbestos fiber per cubic centimeter of air (0.1 f/cc) as an 8-hour time-weighted average (TWA) and 1 f/cc for a 30-minute period referred to as the excursion limit (EL). The OSHA standards classify specific work practices and precautions, require building owners to maintain records of the presence and location of ACM and inform employees who might disturb these materials.

3.0 FINDINGS AND RECOMMENDATIONS

Laboratory analysis of the bulk samples collected for asbestos identified the following building materials as asbestos-containing:

Main Office – Building #1

Sample Number	Material Description	Material Location	Estimated Quantity*	Asbestos Content
CP-20, 21, 22	Ceiling Tile Mastic Pucks (brown)	1st and 2nd Floors – Throughout Rooms (under 1' x 1' ceiling tiles)	11,130 SF	4 – 5% Chrysotile
B-26-Glue	Glue (brown) Behind Brown Baseboard	1st Floor – Front Hallway, Front Men's Restroom, Room #2, Room #1, North Hallway and Room #3 2nd Floor – Central Hallway, Rooms #24-#28, North Hallway, Room #17B, South Hallway	700 LF	3% Chrysotile
TSI-28-Black Felt	Felt Layer of Thermal Systems Insulation	1st Floor, North Hallway – Room #4	20 LF	15% Chrysotile
V-30, 34, 47, 48, 49	Vermiculite Skim Coat on Plaster (brown/gold)	Old Balcony – Skim Coat on Plaster	6,500 SF	8 – 15% Chrysotile
JC-43, 44	Joint Compound	2nd Floor, Stage – South and North Stairwells	1,800 SF	2 – 3% Chrysotile
VG-45	Vibration Gasket (grey)	2nd Floor – NW Air Handler Attic – North and South Sides	6 joints (~3 SF each)	25% Chrysotile

Sample Number	Material Description	Material Location	Estimated Quantity*	Asbestos Content
RF-50	Roof Flashing (black)	Exterior, Roof – North and Southeast Parapets	190 LF	8% Chrysotile
S-56	Roof Sealant (black)	Exterior, Roof – around AC Units	10 LF	10% Chrysotile
FT-57	12" x 12" Floor Tile (red) and Black Mastic	2nd Floor – Room 29	90 SF	5% Tile 4% Mastic Chrysotile
WG-59	Window Glazing (grey)	Exterior – Between Glass and Wood	10 windows	2% Chrysotile
WC-60	Window Caulking (grey/black)	Exterior – Between Window Frame and Window	10 windows	3% Chrysotile
WG-61	Window Glazing (grey)	2nd Floor, Exterior	12 windows	2% Chrysotile
Not Sampled	Transite Panels	1st Floor – Sitting in the Front Entry	60 SF	NA

SF=Square Feet; LF=Linear Feet; MF=Mechanical Fitting
*Quantities are approximate and should be field verified.

EPA does not regulate materials containing 1% or less asbestos; however, the OSHA regulations for asbestos apply when materials containing 1% asbestos or less are disturbed during renovations or demolitions. Materials that contain 1% asbestos or less are identified in Table 2 to enable the demolition contractor to make appropriate decisions concerning compliance issues with applicable OSHA regulations.

It should be reemphasized that although reasonable efforts were made to survey accessible suspect materials, additional suspect but unsampled materials could be located under existing building materials, in isolated areas or in other concealed areas. Therefore, if suspicious materials are encountered during demolition activities that do not appear to have been characterized as non-ACM, samples should be collected and analyzed prior to disturbing these materials or the materials can be assumed to be ACM and abated accordingly.

4.0 GENERAL COMMENTS

The asbestos survey was conducted in a manner consistent with the level of care and skill ordinarily exercised by members of the profession currently practicing under similar conditions in the same locale. The results, findings, conclusions and recommendations expressed in this report are based on conditions observed during our survey of the building. The information contained in this report is relevant to the date on which this survey was conducted and should not be relied upon to represent conditions at a later date. This report has been prepared on behalf of and exclusively for use by J Development Company for specific application to the

project as discussed. Contractors or consultants reviewing this report must draw their own conclusions regarding further investigation or remediation deemed necessary. Terracon does not warrant the work of regulatory agencies, laboratories or other third parties supplying information which may have been used in the preparation of this report. No warranty, expressed or implied, is made.

APPENDIX A

Table 1.0
ASBESTOS SURVEY SAMPLE SUMMARY
Lamb Theatre
625 Douglas Street
Sioux City, Iowa

SAMPLE NO.	DESCRIPTION	MATERIAL LOCATION	LAB RESULT	FRIABLE / NON-FRIABLE	CONDITION	ESTIMATED QUANTITY
DW-1, 2, 3	Drywall	Basement - Boiler Room and Electrical Room	None Detected	Non-Friable	Good	NA
JC-4, 5, 6	Joint Compound	Basement - Boiler Room and Electrical Room	None Detected	Non-Friable	Good	NA
M-10, 11	Black Mastic	1st Floor - North Hallway	None Detected	Non-Friable	Good	NA
F-15	Black Felt Paper	2nd Floor - North Hallway	None Detected	Non-Friable	Good	NA
FT-16	12" x 12" Floor Tile (off-white) and Yellow Mastic	1st Floor, North Hallway - Room #1 and #16	None Detected	Non-Friable	Good	NA
CT-17, 18, 19	12" x 12" Ceiling Tile (large fissure)	1st Floor - North Hallway, South Hallway at Room #8, 2nd Floor - Room #25	None Detected	Friable	Good	NA
CP-20, 21, 22	Mastic Pucks (brown) under 1' x 1' Ceiling Tiles	1st and 2nd Floor - Throughout Rooms	4 - 5% Chrysotile	Non-Friable	Good	11,130 SF
DW-23, 24	Drywall	1st Floor, North Hallway - Room #2 2nd Floor, South Hallway - Room #6	None Detected	Non-Friable	Good	NA
JC-25, 32	Joint Compound	1st Floor, North Hallway - Room #2 2nd Floor, South Hallway - Room #6	None Detected	Non-Friable	Good	NA
B-26	Brown Vinyl Baseboard with Tan Mastic and Brown Glue	1st Floor, North Hallway - Room #2	Baseboard - ND Mastic - ND Glue - 3% Chrysotile	Non-Friable	Good	700 LF
CT-27	2' x 4' Ceiling Tile (pin-hole)	1st Floor, North Hallway - Rooms #1-4	None Detected	Friable	Good	NA

Table 1.0
ASBESTOS SURVEY SAMPLE SUMMARY
Lamb Theatre
625 Douglas Street
Sioux City, Iowa

SAMPLE NO.	DESCRIPTION	MATERIAL LOCATION	LAB RESULT	FRIABLE / NON-FRIABLE	CONDITION	ESTIMATED QUANTITY
TSI-28	Thermal Systems Insulation (straight pipe) w/Black Felt Layer	1st Floor, North Hallway - Room #4	15% Chrysotile	Friable	Damaged	20 LF
P-29	Plaster	1st Floor, North Hallway - Room #4	None Detected	Non-Friable	Good	NA
V-30	Vermiculite Texture	1st Floor, North Hallway - Room #4	15% Chrysotile	Friable	Good	6,500 SF combined with V-34, 47, 48, 49
CT-31	12" x 12" Ceiling Tile (rough)	1st Floor - Front Office and Front Entry	None Detected	Friable	Good	NA
CT-33	2' x 2' Ceiling Tile (pin-hole)	1st Floor, South Hallway - Room #7	None Detected	Friable	Good	NA
V-34	Vermiculite Texture	1st Floor, South Hallway - Room #8	15%Chrysotile	Friable	Good	6,500 SF combined with V-30, 47, 48, 49
P-35	Plaster	1st Floor, South Hallway - Room #8	None Detected	Non-Friable	Good	NA
B-36	Black Baseboard and Beige Mastic	1st Floor, South Hallway - Room #16	None Detected	Non-Friable	Good	NA
SU-37	Sink Undercoating (black)	1st Floor, South Hallway - Room #16	None Detected	Non-Friable	Good	NA
P-38	Plaster	Garage Stage	None Detected	Non-Friable	Good	NA
A-39	Ceiling Tile Adhesive	Garage Stage	None Detected	Non-Friable	Good	NA

Table 1.0
ASBESTOS SURVEY SAMPLE SUMMARY
Lamb Theatre
625 Douglas Street
Sioux City, Iowa

SAMPLE NO.	DESCRIPTION	MATERIAL LOCATION	LAB RESULT	FRIABLE / NON-FRIABLE	CONDITION	ESTIMATED QUANTITY
SF-40	Sheet Flooring	2nd Floor - Room #17	None Detected	Non-Friable	Damaged	NA
DW-41, 42	Drywall	2nd Floor - NW Air Handler Room and South Hallway	None Detected	Non-Friable	Good	NA
JC-43, 44	Joint Compound	2nd Floor - NW Air Handler Room and South Hallway	2 - 3% Chrysotile	Non-Friable	Good	1,800 SF
VG-45	Vibration Gasket/Joint	2nd Floor - NW Air Handler Room Attic - North and South Sides	25% Chrysotile	Friable	Good	6 joints ~ 3 SF each
A-46	Ceiling Tile Adhesive	2nd Floor, West Power Room above 2' x 4' Ceiling Tile	None Detected	Non-Friable	Good	NA
V-47, 48, 49	Vermiculite Texture	Garage 2nd Floor - NW Stairwell 1st Floor - Room #16	8 - 10% Chrysotile	Friable	Good	6,500 SF combined with V-30 & V-34
RF-50	Roof Flashing (black)	Exterior, Roof - North and Southeast Parapets	8% Chrysotile	Non-Friable	Good	190 LF
RF-51	Roof Flashing (black)	Exterior, Roof - South Parapets	None Detected	Non-Friable	Good	NA
T-52	Tar (black)	Exterior, Flat Roof - under Rubber Roofing	None Detected	Non-Friable	Good	NA
RF-53	Roof Flashing (black)	Exterior, Roof - around All Parapets under Rubber Roofing	None Detected	Non-Friable	Good	NA
C-54	Caulking (grey)	Exterior, Roof, West and East Sides - Caulking Between Parapet an Rubber Roofing	None Detected	Non-Friable	Good	NA

Table 1.0
ASBESTOS SURVEY SAMPLE SUMMARY
Lamb Theatre
625 Douglas Street
Sioux City, Iowa

SAMPLE NO.	DESCRIPTION	MATERIAL LOCATION	LAB RESULT	FRIABLE / NON-FRIABLE	CONDITION	ESTIMATED QUANTITY
S-55	Sealant (black)	Exterior, Roof - around Roof Vents	None Detected	Non-Friable	Good	NA
S-56	Sealant (black)	Exterior, Roof - around AC Units	10% Chrysotile	Non-Friable	Good	10 LF
FT-57	12" x 12" Floor Tile (red) and Black Mastic	2nd Floor - Room #29	5% Tile 4% Mastic Chrysotile	Non-Friable	Good	90 SF
ST-58	Stucco	Exterior - North and East Sides	None Detected	Non-Friable	Good	NA
WG-59	Window Glazing	Exterior - Between Glass and Wood	2% Chrysotile	Non-Friable	Damaged	10 windows
WC-60	Caulking (grey-black)	Exterior - Between Window Frame and Window	3% Chrysotile	Non-Friable	Damaged	10 windows
WG-61	Window Glazing	Exterior - 2nd Floor	2% Chrysotile	Non-Friable	Damaged	12 windows
Not Sampled	Transite Panels	1st Floor - Sitting in the Front Entry	NA	Non-Friable	Good	60 SF

Point Counting (PC): A method of analyzing where the sample is homogenized, placed on microscope slides, and examined under a polarized light microscope. A minimum of 400 counts are made for each slide.
" = inches ' = feet PC = point counting SF = square feet LF = linear feet NA = Not Applicable
ACMs are highlighted in yellow.
Materials highlighted in green contain <1.5% asbestos and are not classified as ACM based on the EPA's round up/round down rule (i.e. EPA clarification letter dated January 31, 2007). Although they do not need to be abated prior to renovation or demolition of the building, the renovation/demolition contractor should be notified that these materials could generate airborne concentrations of asbestos greater than the OSHA PEL. Therefore, the contractor must take the necessary precautions to protect his/her personnel from potential exposures during work-related activities as per the OSHA standard.

APPENDIX B

EMSL Analytical, Inc.

200 Route 130 North Cinnaminson, NJ 08077
Tel/Fax: (800) 220-3675 / (856) 786-5974
http://www.EMSL.com / cinnasblab@EMSL.com

EMSL Order:	041913822
Customer ID:	AQSI93A
Customer PO:	05197420
Project ID:	

Attention:	Aaron Girard	**Phone:**	(402) 670-2512
	Air Quality Services, Inc A Terracon Co	**Fax:**	
	3301 Northbrook Dr	**Received Date:**	05/22/2019 9:30 AM
	Suite A	**Analysis Date:**	05/23/2019 - 05/25/2019
	Sioux City, IA 51105	**Collected Date:**	05/20/2019
Project:	05197420 / 625 Douglass Street, Sioux City, IA		

Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

			Non-Asbestos		Asbestos
Sample	**Description**	**Appearance**	**% Fibrous**	**% Non-Fibrous**	**% Type**
DW-01 *041913822-0001*	Basement - Boiler Room - Drywall	White Fibrous Homogeneous	20% Cellulose 10% Glass	70% Non-fibrous (Other)	None Detected
DW-02 *041913822-0002*	Basement - Electrical Room - Drywall	White Fibrous Homogeneous	20% Cellulose 10% Glass	70% Non-fibrous (Other)	None Detected
DW-03 *041913822-0003*	Basement - Boiler Room - Drywall	White Fibrous Homogeneous	20% Cellulose 5% Glass	75% Non-fibrous (Other)	None Detected
JC-04 *041913822-0004*	Basement - Boiler Room - Joint Compound	Tan/White Non-Fibrous Homogeneous	5% Cellulose	95% Non-fibrous (Other)	None Detected
JC-05 *041913822-0005*	Basement - Electrical Room - Joint Compound	White Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
JC-06 *041913822-0006*	Basement - Boiler Room - Joint Compound	White Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
M-10 *041913822-0007*	1st Floor - North HVAC - Black Mastic	Black Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
M-11 *041913822-0008*	1st Floor - North HVAC - Black Mastic	Black Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
F-15 *041913822-0009*	2nd Floor - North Hall - Black Felt	Black Fibrous Homogeneous	60% Cellulose	40% Non-fibrous (Other)	None Detected
FT-16-Tile *041913822-0010*	1st Floor - North HVAC - Room #1 - Room #16 - 12x12 Floor Tile - Off White Confetti	White Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
FT-16-Mastic *041913822-0010A*	1st Floor - North HVAC - Room #1 - Room #16 - Yellow Mastic	Yellow Non-Fibrous Homogeneous	8% Cellulose	92% Non-fibrous (Other)	None Detected
CT-17 *041913822-0011*	1st Floor - North HVAC - 12x12 Ceiling Tile - Large Fissure	White Fibrous Homogeneous	60% Cellulose 30% Min. Wool	10% Non-fibrous (Other)	None Detected
CT-18 *041913822-0012*	1st Floor - South HVAC Room #8 - 12x12 Ceiling Tile - Large Fissure	White Fibrous Homogeneous	60% Cellulose 30% Min. Wool	10% Non-fibrous (Other)	None Detected
CT-19 *041913822-0013*	2nd Floor - Room #25 - 12x12 Ceiling Tile - Large Fissure	White Fibrous Homogeneous	60% Cellulose 30% Min. Wool	10% Non-fibrous (Other)	None Detected
CP-20 *041913822-0014*	1st Floor - North HVAC - Ceiling Pucks	Brown Non-Fibrous Homogeneous		96% Non-fibrous (Other)	4% Chrysotile

Initial report from: 05/23/2019 21:33:20

EMSL Analytical, Inc.
200 Route 130 North Cinnaminson, NJ 08077
Tel/Fax: (800) 220-3675 / (856) 786-5974
http://www.EMSL.com / cinnasblab@EMSL.com

EMSL Order: 041913822
Customer ID: AQSI93A
Customer PO: 05197420
Project ID:

Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

			Non-Asbestos		Asbestos
Sample	**Description**	**Appearance**	**% Fibrous**	**% Non-Fibrous**	**% Type**
CP-21 *041913822-0015*	1st Floor - South HVAC Room #2 - Ceiling Pucks	Brown Non-Fibrous Homogeneous		95% Non-fibrous (Other)	5% Chrysotile
CP-22 *041913822-0016*	2nd Floor - Room #25 - Ceiling Pucks	Brown Non-Fibrous Homogeneous		96% Non-fibrous (Other)	4% Chrysotile
DW-23 *041913822-0017*	1st Floor - North HVAC Room #2 - Drywall	White Non-Fibrous Homogeneous	20% Cellulose 10% Glass	70% Non-fibrous (Other)	None Detected
DW-24 *041913822-0018*	1st Floor - South HVAC Room #6 - Drywall	White Fibrous Homogeneous	20% Cellulose 5% Glass	75% Non-fibrous (Other)	None Detected
JC-25 *041913822-0019*	1st Floor - North HVAC Room #2 - Joint Compound	White Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
JC-32 *041913822-0020*	1st Floor - South HVAC Room #6 - Joint Compound	White Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
B-26-Baseboard *041913822-0021*	1st Floor - North HVAC Room #2 - Brown Baseboard	Brown Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
B-26-Mastic *041913822-0021A*	1st Floor - North HVAC Room #2 - Mastic	Tan Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
B-26-Glue *041913822-0021B*	1st Floor - North HVAC Room #2 - Glue	Brown Non-Fibrous Homogeneous		97% Non-fibrous (Other)	3% Chrysotile
CT-27 *041913822-0022*	1st Floor - North HVAC Room #3 - 2'x4' Ceiling tile - Pin Hole	White Fibrous Homogeneous	50% Cellulose 40% Min. Wool	10% Non-fibrous (Other)	None Detected
TSI-28-Black Felt *041913822-0023*	1st Floor - North HVAC Room #4 - Thermal System Pipe Insulation - Black Felt	Black Fibrous Homogeneous	15% Cellulose	70% Non-fibrous (Other)	15% Chrysotile
TSI-28-Insulation Wrap *041913822-0023A*	1st Floor - North HVAC Room #4 - Thermal System Pipe Insulation - Black Felt	Gray/Peach Fibrous Homogeneous	60% Cellulose 15% Synthetic	25% Non-fibrous (Other)	None Detected
P-29-Skim Coat *041913822-0024*	1st Floor - North HVAC Room #4 - Plaster	Tan Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
P-29-Base Coat *041913822-0024A*	1st Floor - North HVAC Room #4 - Plaster	Tan Fibrous Homogeneous	5% Hair	95% Non-fibrous (Other)	None Detected
V-30 *041913822-0025*	1st Floor - North HVAC Room #4 - Vermiculite Texture	Brown/Gold Fibrous Homogeneous		75% Vermiculite 10% Non-fibrous (Other)	15% Chrysotile
CT-31 *041913822-0026*	1st Floor - Front Office #5 - Front Entry - 12x12 Ceiling Tile - Rough	White Fibrous Homogeneous	80% Min. Wool	20% Non-fibrous (Other)	None Detected
CT-33 *041913822-0027*	1st Floor - South HVAC Room #7 - 2'x2' Pin Hole	Gray/White Fibrous Homogeneous	60% Cellulose 20% Min. Wool	20% Non-fibrous (Other)	None Detected
V-34 *041913822-0028*	1st Floor - South HVAC Room #8 - Vermiculite	Brown/Tan Fibrous Homogeneous		75% Vermiculite 10% Non-fibrous (Other)	15% Chrysotile

Initial report from: 05/23/2019 21:33:20

EMSL Analytical, Inc.
200 Route 130 North Cinnaminson, NJ 08077
Tel/Fax: (800) 220-3675 / (856) 786-5974
http://www.EMSL.com / cinnasblab@EMSL.com

EMSL Order: 041913822
Customer ID: AQSI93A
Customer PO: 05197420
Project ID:

Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

			Non-Asbestos		Asbestos
Sample	**Description**	**Appearance**	**% Fibrous**	**% Non-Fibrous**	**% Type**
P-35 *041913822-0029*	1st Floor - South HVAC Room #8 - Plaster	Tan Fibrous Homogeneous	5% Cellulose 5% Hair	90% Non-fibrous (Other)	None Detected
B-36-Baseboard *041913822-0030*	1st Floor - South HVAC Room #16 - Baseboard - Black	Black Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
B-36-Mastic *041913822-0030A*	1st Floor - South HVAC Room #16 - Mastic	Beige Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
SU-37 *041913822-0031*	1st Floor - South HVAC Room #16 - Sink Undercoating - Black	Black Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
P-38 *041913822-0032*	Garage Stage - Plaster	Gray/Tan Fibrous Homogeneous	5% Cellulose	95% Non-fibrous (Other)	None Detected
A-39 *041913822-0033*	Garage Stage - Adhesive	Brown Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
SF-40 *041913822-0034*	2nd Floor - Room #17 - Sheet Flooring	Brown/Tan Fibrous Homogeneous	35% Cellulose 5% Synthetic	60% Non-fibrous (Other)	None Detected
DW-41 *041913822-0035*	2nd Floor - Air Handler Room - Drywall	White Fibrous Homogeneous	20% Cellulose	80% Non-fibrous (Other)	None Detected
DW-42 *041913822-0036*	2nd Floor - South HVAC - Drywall	White Fibrous Homogeneous	15% Cellulose	85% Non-fibrous (Other)	None Detected
JC-43 *041913822-0037*	2nd Floor - Air Handler Room - Joint Compound	Tan Fibrous Homogeneous		97% Non-fibrous (Other)	3% Chrysotile
JC-44 *041913822-0038*	2nd Floor - South HVAC - Joint Compound	Tan Non-Fibrous Homogeneous		98% Non-fibrous (Other)	2% Chrysotile
VG-45 *041913822-0039*	2nd Floor - Air Handler Room - Attic Southside - Vibration Gasket	Gray Fibrous Homogeneous	20% Cellulose 10% Synthetic	45% Non-fibrous (Other)	25% Chrysotile
A-46 *041913822-0040*	2nd Floor - West Power Room - Ceiling Adhesive	Brown Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
V-47 *041913822-0041*	Garage - Vermiculite	Brown/Gold Non-Fibrous Homogeneous		80% Vermiculite 12% Non-fibrous (Other)	8% Chrysotile
V-48 *041913822-0042*	2nd Floor - Stairwell - Vermiculite	Brown/Gold Fibrous Homogeneous		80% Vermiculite 10% Non-fibrous (Other)	10% Chrysotile
V-49 *041913822-0043*	1st Floor - Room #16 - Vermiculite	Brown/Gold Fibrous Homogeneous		80% Vermiculite 10% Non-fibrous (Other)	10% Chrysotile
RF-50 *041913822-0044*	Exterior Rof North Parapit - Roof Flashing	Black Non-Fibrous Homogeneous		92% Non-fibrous (Other)	8% Chrysotile
RF-51 *041913822-0045*	South Parapit - Roof Flashing	Black Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected

Initial report from: 05/23/2019 21:33:20

EMSL Analytical, Inc.
200 Route 130 North Cinnaminson, NJ 08077
Tel/Fax: (800) 220-3675 / (856) 786-5974
http://www.EMSL.com / cinnasblab@EMSL.com

EMSL Order: 041913822
Customer ID: AQSI93A
Customer PO: 05197420
Project ID:

Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

			Non-Asbestos		Asbestos
Sample	**Description**	**Appearance**	**% Fibrous**	**% Non-Fibrous**	**% Type**
T-52 *041913822-0046*	Exterior Flat Roof - Rubber Roof - Tar	Black Fibrous Homogeneous	25% Cellulose	75% Non-fibrous (Other)	None Detected
RF-53 *041913822-0047*	Exterior Roof around All Parapits under Rubber - Black Roof Flashing	Black Fibrous Homogeneous	20% Cellulose	80% Non-fibrous (Other)	None Detected
C-54 *041913822-0048*	Between Parapit and Rubber West and East - Caulking	Gray Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
S-55 *041913822-0049*	Exterior Roof - Sealant	Black Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
S-56 *041913822-0050*	Exterior Roof - Sealant	Black Fibrous Homogeneous		90% Non-fibrous (Other)	10% Chrysotile
FT-57-Floor Tile *041913822-0051*	2nd Floor - Room #29 - 12x12 Red Floor Tile	Red Non-Fibrous Homogeneous		95% Non-fibrous (Other)	5% Chrysotile
FT-57-Mastic *041913822-0051A*	2nd Floor - Room #29 - Mastic	Black Fibrous Homogeneous		96% Non-fibrous (Other)	4% Chrysotile
FT-57-Mastic 2 *041913822-0051B*	2nd Floor - Room #29 - Mastic	Yellow Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
ST-58 *041913822-0052*	Exterior North and East Sides - Stucco	Gray/Tan Fibrous Homogeneous	10% Glass	90% Non-fibrous (Other)	None Detected
WG-59 *041913822-0053*	Exterior Window Glazing Between Glass and Wood - Window Glazing	Gray Fibrous Homogeneous		98% Non-fibrous (Other)	2% Chrysotile
WC-60 *041913822-0054*	Between Window Frame and Window - Caulking	Gray/Black Non-Fibrous Homogeneous		97% Non-fibrous (Other)	3% Chrysotile
WG-61 *041913822-0055*	Exterior East End - Window Glazing	Gray Non-Fibrous Homogeneous		98% Non-fibrous (Other)	2% Chrysotile

Analyst(s)

Andrew Coward (25)
Nancy Stalter (31)
Quynh Vu (7)

Benjamin Ellis, Laboratory Manager
or Other Approved Signatory

Initial report from: 05/23/2019 21:33:20

OrderID: 041913822

EMSL ANALYTICAL, INC.
LABORATORY • PRODUCTS • TRAINING

Asbestos Chain of Custody

EMSL Order Number (*Lab Use Only*): 041913822

RECEIVED EMSL CINNAMINSON, NJ 2019 MAY 22 A 10:24

PHONE:
FAX:

Company Name : Terracon		**EMSL Customer ID:**	
Street: 3301 Northbrook Drive Suite1		**City:** Sioux City	**State/Province:** Iowa
Zip/Postal Code: 51105	**Country:** United States	**Telephone #:** 402-670-2512	**Fax #:**
Report To (Name): Aaron Girard		**Please Provide Results:** ☐ Fax ☑ Email	
Email Address: aaron.girard@terracon.com		**Purchase Order:**	
Project Name/Number: 05197420 - 625 Douglas Street		**EMSL Project ID** (*Internal Use Only*):	
U.S. State Samples Taken: IA Sioux City		**CT Samples:** ☐ Commercial/Taxable ☐ Residential/Tax Exempt	

EMSL-Bill to: ☐ Same ☐ Different - If Bill to is Different note instructions in Comments**
Third Party Billing requires written authorization from third party

Turnaround Time (TAT) Options* – Please Check

☐ 3 Hour ☐ 6 Hour ☐ 24 Hour ☐ 48 Hour ☒ 72 Hour ☐ 96 Hour ☐ 1 Week ☐ 2 Week

**For TEM Air 3 hr through 6 hr, please call ahead to schedule.*There is a premium charge for 3 Hour TEM AHERA or EPA Level II TAT. You will be asked to sign an authorization form for this service. Analysis completed in accordance with EMSL's Terms and Conditions located in the Analytical Price Guide.*

PCM - Air ☐ Check if samples are from NY
☐ NIOSH 7400
☐ w/ OSHA 8hr. TWA

PLM - Bulk (reporting limit)
☒ PLM EPA 600/R-93/116 (<1%)
☐ PLM EPA NOB (<1%)
Point Count
☐ 400 (<0.25%) ☐ 1000 (<0.1%)
Point Count w/Gravimetric
☐ 400 (<0.25%) ☐ 1000 (<0.1%)
☐ NYS 198.1 (friable in NY)
☐ NYS 198.6 NOB (non-friable-NY)
☐ NYS 198.8 SOF-V
☐ NIOSH 9002 (<1%)

TEM – Air ☐ 4-4.5hr TAT (AHERA only)
☐ AHERA 40 CFR, Part 763
☐ NIOSH 7402
☐ EPA Level II
☐ ISO 10312

TEM - Bulk
☐ TEM EPA NOB
☐ NYS NOB 198.4 (non-friable-NY)
☐ Chatfield SOP
☐ TEM Mass Analysis-EPA 600 sec. 2.5

TEM – Water: EPA 100.2
Fibers >10µm ☐ Waste ☐ Drinking
All Fiber Sizes ☐ Waste ☐ Drinking

TEM- Dust
☐ Microvac - ASTM D 5755
☐ Wipe - ASTM D6480
☐ Carpet Sonication (EPA 600/J-93/167)

Soil/Rock/Vermiculite
☐ PLM EPA 600/R-93/116 with milling prep (<1%)
☐ PLM EPA 600/R-93/116 with milling prep (<0.25%)
☐ TEM EPA 600/R-93/116 with milling prep (<0.1%)
☐ TEM Qualitative via Filtration Prep
☐ TEM Qualitative via Drop Mount Prep
☐ Cincinnati Method EPA 600/R-04/004 – PLM/TEM (BC only)

Other:
☐

☐ Check For Positive Stop – Clearly Identify Homogenous Group

Filter Pore Size (Air Samples): ☐ 0.8µm ☐ 0.45µm

Samplers Name: Aaron Girard **Samplers Signature:**

Sample #	Sample Description	Volume/Area (Air) HA # (Bulk)	Date/Time Sampled
		55	

Client Sample # (s): 1 - ~~55~~ 61 **Total # of Samples:** 55

Relinquished (Client): **Date:** **Time:**

Received (Lab): CM **Date:** 5.22.19 **Time:** 9:24

Comments/Special Instructions:

Page 1 of _____ pages

Controlled Document – Asbestos COC – R10 – 05/09/2016

OrderID: 041913822

041913822

TERRACON
BULK SAMPLE LOG

Client: J Development Company
Building: 625 Douglas Street, Sioux City, IA
Inspector: Aaron Ward
Project #: 05197422
Date: 5/20/19
Homogeneous Area:

Sample #	Material Description	Sample Location	Condition	Friability	Contact	Quantity
DW-1	DRY WALL	BOILER BASEMENT - RM				
DW-2		ELECTRICAL RM				
DW-3		BOILER - RM				
JC-4	JOINT COMPOUND	BOILER - RM				
JC-5		ELECTRICAL - RM				
JC-6		BOILER - RM				
[redacted]	[redacted]	[redacted]				[redacted]
M-10	BLACK MASTIC	FIRST FLOOR NORTH HAUL				
M-11		~~FIRST FLOOR NORTH HAUL~~				
~~M-12~~		FIRST FLOOR NORTH HAUL				
~~M-13~~						
F-15	BLACK FELT	~~FIRST FLOOR SOUTH HAUL~~	2 SECOND FLOOR North Hall			
~~F-14~~		~~SECOND FLOOR~~				
	12X12 OFWHITE CONFETTY W/YELLOW MASTIC	NORTH HAUL RM-1 - FIRST FLOOR	RM#16			23X17 700SF - RM-16
FT-16						
CT-17	12X12 LARGE FEASURE	FIRST FLOOR NORTH HAUL				
CT-18	~~12X12 ROUND~~	FIRST FLOOR SOUTH HAUL RM#8				
CT-19		SECOND FLOOR RM # 25				

OrderID: 041913822

041913822

TERRACON
BULK SAMPLE LOG

Client: J Development Company
Building: 625 Douglas Street Sioux City, IA
Inspector: Aaron Gorrell
Project #: 05197421
Date: 5/20/19
Homogeneous Area:

Sample #	Material Description	Sample Location	Condition	Friability	Contact	Quantity
CP-20	CEILING PUCKS	NORTH FIRST FLOOR HALL				
CP-21		FIRST FLOOR SOUTH HALL RM #7				
CP-22		SECOND FLOOR RM # 25				
DW-23	DRYWALL	FIRST FL NORTH HALL RM #2				
DW-24		FIRST FLOOR SOUTH HALL RM #6				
JC-25	JOINT COMPOUND	NORTH HALL FIRST FLOOR RM #2				
JC-32		FIRST FLOOR SOUTH HALL #6				
B-26	BASE BOARD BROWN	NORTH HALL FIRST FLOOR RM #2				
CT-27	2'x4' CEILING TILE PIN HOLE ~~BOARD FELT~~	NORTH HALL FIRST FLOOR RM #3	RM #2 & RM #1 & RM #4			
TSI-28	THERMAL SYSTEM PIPE INSULATION "BLACK FELT"	NORTH HALL FIRST FLOOR RM #4				20 LF
P-29	PLASTER	NORTH HALL FIRST FLOOR RM #4				
V-30	VERMICULITE TEXTURE	NORTH HALL FIRST FLOOR RM #4				

041913822

TERRACON
BULK SAMPLE LOG

Client: J Development Company
Building: 625 Douglas Street, Sioux City, IA
Inspector: Aaron Grant
Project #: 05197420
Date: 5/20/19
Homogeneous Area:

Sample #	Material Description	Sample Location	Condition	Friability	Contact	Quantity
CT-31	12x12 ROOF TILE	FIRST FLOOR FRONT OFFICE #5 FRONT ENTRY				18x8 "15x19
~~TSI-32~~	~~THERMAL SYSTEMS INSULATION~~ PIPE	FRONT EAST LOBBY				20-LF
CT-33	2'x2' PIN HOLE	FIRST FLOOR SOUTH HAUL RM#7				250SF
V-34	VERMICULITE	FIRST FLOOR SOUTH HAUL RM#8				
P-35	PLASTER	FIRST FLOOR SOUTH HAUL RM#9				
B-36	BASE BOARD "BLACK"	FIRST FLOOR SOUTH HAUL RM#10				
SU-37	SINK UNDERCOATING "BLACK"	FIRST FLOOR SOUTH HAUL RM#16				
P-38	PLASTER	GARAGE STAGE				
A-39	ADHESIVE "CEILING TILE"	GARAGE STAGE				12x27

04191382 2

TERRACON
BULK SAMPLE LOG

Client: J Development Company
Building: 625 Douglas Street Sioux City, IA
Inspector: Aaron Lee

Project #: 05197420
Date: 5/20/19
Homogeneous Area:

Sample #	Material Description	Sample Location	Condition	Friability	Contact	Quantity
SF-40	SHEET FLOORING	SECOND FLOOR RM #17				75-LF
DW-41	DRYWALL	SECOND FLOOR NW AIR HANDLER RM				
DW-42		SECOND FLOOR S HALL				
JC-43	JOINT COMPOUND	SECOND FLOOR NW AIR HANDLER RM				
JC-44		SECOND FLOOR SOUTH HALL				
VG-45	VIBRATION GASTIC	SECOND FLOOR NW AIR HANDLER				2-EA
		↓ ATTIC SOUTH SIDE				2-EA
		NORTH SIDE				2-EA
A-46	CEILING ADHESIVE	SECOND FLOOR WEST POWER RM ABOVE 2X4 CEILING				~~FIRST~~ THROUGHOUT 3650 SF GARAGE 1700 SF
V-47	VERMICULITE	GARAGE				2900 SF 1200
V-48		SECOND FLOOR NW STAIRWELL				
V-49		FIRST FLOOR RM-16			3600	3600 SF - N & S HALLS & ROOMS
RF-50	ROOF FLASHING	EXTERIOR ROOF N PARAPET SE				190-LF
RF-51		SOUTH PARAPET				130-LF
T-52	TAR	EXTERIOR FLAT ROOF UNDER RUBBER ROOF				

OrderID: 041913822

041913822

TERRACON
BULK SAMPLE LOG

Client: J Development Company
Building: 625 Douglas Street, Sioux City, IA
Inspector: Aaron Linsrud
Project #: 05197420
Date: 5/20/19
Homogeneous Area:

Sample #	Material Description	Sample Location	Condition	Friability	Contact	Quantity
RF-53	BLACK ROOF FLASHING	EXTERIOR ROOF AROUND ALL PARAPITS UNDER RUBBER				
C-54	CAULKING	PARIPIT CAULKING BETWEEN PARAPIT & RUBBER WEST + EAST				
S-55	SEILENT AROUND ROOF VENTS	EXTERIOR ROOF				10 SF
S-56	SEILENT AROUND AC HOUSES	EXTERIOR ROOF				
FT-57	12X12 RED FLOOR TILE	2ND FLOOR RM-29				
ST-58	STUCO	EXTERIOR ~~NE~~ N AMP EAST SIDES				
WG-59	WINDOW GLAZING	EXTERIOR WINDOWS GLAZING BETWEEN GLASS AND WOOD				10 EA
WC-60	CAULKING	BETWEEN WINDOW FRAME & WINDOW				10 EA
WG-61	WINDOW GL	SEE COND FL EXTERIOR EOND				12 EA

APPENDIX C

AARON GIRARD

DOB: 08-03-1985

Issued: 02-27-2019

This person is licensed to perform asbestos work in the State of Iowa. ID card is intended for official use only and must be present on jobsite.

License Type	Number	Expires
INSPECTOR	19-1964	01-10-2020

Asbestos

Michael A. Mauro
Labor Commissioner

PHILLIP THOMAS

DOB: 05-26-1976

Issued: 08-06-2018

This person is licensed to perform asbestos work in the State of Iowa. ID card is intended for official use only and must be present on jobsite.

License Type	Number	Expires
INSPECTOR	18-0817	07-31-2019

DIVISION OF IOWA LABOR

Asbestos

Michael A. Mauro
Labor Commissioner

APPENDIX F

MOLD SURVEY

GEOTEK ENGINEERING
& TESTING SERVICES, INC.
909 East 50th Street North
Sioux Falls, South Dakota 57104
605-335-5512 Fax 605-335-0773

February 14, 2023

HR Green, Inc.
8710 Earhart Lane SW
Cedar Rapids, IA 52404

Subj: IAQ/Limited Mold Testing Report
Lamb Theater
625 Douglas St.
Sioux City, IA
GeoTek #23-0136

Ms. Rose Amundson;

GeoTek performed an indoor air quality (IAQ) site assessment for mold at the referenced location on February 8, 2023. Testing was requested as part of the Brownfield Evaluation of the building.

Thank you for contacting GeoTek regarding indoor air quality testing on this project, we appreciate your business. If you have any questions or if we may be of further assistance, please give us a call at 605/335-5512.

GEOTEK ENGINEERING & TESTING SERVICES, INC.

Katherine Howard
Project Manager

INDOOR AIR QUALITY
LIMITED MOLD TESTING

Site:

Lamb Theater
625 Douglas St.
Sioux City, IA

GeoTek #23-0136-4

Prepared by:

Katherine Howard – Project Manager/Staff Scientist
GeoTek Engineering & Testing Services, Inc.
909 East 50th Street North
Sioux Falls, SD 57104

Tested: February 8, 2023

TABLE OF CONTENTS

EXECUTIVE SUMMARY

GeoTek performed an indoor air quality (IAQ) site assessment and limited testing for mold at the referenced project site on February 8, 2023. Testing was requested as part of the Brownfield Evaluation of the building.

Airborne sampling results indicated elevated *Penicillium/Aspergillus* and total mold levels in the areas tested. Visible mold was observed throughout the structure. Representative areas were selected for tape testing. Microscopic examination of the samples showed *Aspergillus, Stachybotrys, Acremonium & Cladosporium* growth present in the building.

Relative humidity levels were above the ASHRAE (American Society of Heating, Refrigerating & Air Conditioning Engineers) guidelines in the areas tested.

The building is currently unheated. The following air quality parameters measured during our site visit (CO_2, CO) did not indicate levels outside of ASHRAE guidelines in the areas tested.

1.0 INTRODUCTION

1.1 Purpose of Work

The purpose of this work was to complete an indoor air quality (IAQ) site assessment and limited mold testing at the referenced project site. Testing was requested as part of the Brownfield Evaluation of the building.

2.0 BACKGROUND INFORMATION

2.1 Site Description/History

The structure is a two story, brick theater building with a dirt basement under the original foot print. The roof was recently patched but leaked extensively. Some dripping was still evident during the visit.

3.0 ASSESSMENT RESULTS

3.1 Observations

A GeoTek Staff Scientists, Katherine Howard & Jason Cook, arrived on site Wednesday, February 8, 2023 at approximately 9:00 am. Ice was present on the floors of the north hallways where water intrusion had frozen. Three airborne mold samples were collected on each level. Temperatures below freezing in the building would be expected to inhibit collection of spores on the spore traps, therefore, the airborne mold levels observed in the samples are likely to be lower than the actual levels present. Visible mold was observed throughout the structure. Four representative areas were selected for tape testing. Sampling was performed under freezing conditions. Layers of ice were present in the second floor halls.

3.2 QTRAK Instrument Readings

It is standard procedure for GeoTek to include QTRAK readings for IAQ assessments. The QTRAK meter (TSI, Inc.) records air measurements including carbon dioxide (CO_2), carbon monoxide (CO), relative humidity (%RH) and temperature (°F).

Locations	CO_2 (ppm)	Temperature (°F)	Relative Humidity (%)	CO (ppm)
2nd Floor Landing	550	**33.0**	**78.0**	0.0
Guidelines	***<1000***	***68-76 F ****	***30-50% 20-30%*****	***<9***

* = ASHRAE guideline based on body odors and comfort in offices.
** = To minimize moisture, keep %RH between 20-30% in winter and below 50% in summer.
*** = Spaces not meant for human occupation cannot be evaluated by these standards.

Carbon dioxide (CO_2) is produced as people breathe in oxygen and exhale CO_2. It is often used as a crude indicator of ventilation. Normal well-ventilated rooms usually have about 700-900 ppm CO_2 with people present while poorly ventilated rooms may exceed 1000-1500 ppm CO_2. Outside air is usually about 350-450 ppm. The American Society of Heating, Refrigeration, and Air conditioning Engineers (1997) recommends a maximum of 1000 ppm CO_2. Complaints may increase when concentrations exceed 1000-2000 ppm CO_2. High CO_2 levels sometimes suggest insufficient ventilation (lack of fresh, outside air). This may contribute to headaches, fatigue, and reduced productivity. However, severe health effects are not related to carbon dioxide below 5000 ppm (OSHA limit). **Carbon dioxide readings were within the recommended guidelines in areas tested, however, the building is unoccupied.**

Carbon monoxide (CO) is a gas given off due to incomplete combustion. Sources include furnaces, vehicles, kerosene, gas water heaters, etc. The current OSHA permissible exposure limit (PEL) is 50 ppm as an 8-hour exposure for industrial workers. Average levels in homes without gas stoves vary from 0.5 to 5 ppm. CO limits the absorption of oxygen into the bloodstream and can cause headaches and other symptoms. **Direct readings did not indicate the presence of CO at levels of concern in the areas tested.**

Temperature (°F) measures air temperature. For office workers, ASHRAE (1992) suggests 68-75 °F in winter and 73-76 °F in summer. **The structure is currently unheated.**

Relative humidity (%RH) is a measure of moisture in the air. Moisture levels in excess of 60-70% feel uncomfortable and may promote mold growth. To reduce microbiological growth, relative humidity should be kept below 50% during warm months and below 30% in colder months. Relative humidity usually should not be reduced below 20% in the winter. Health complaints occur much more frequently when below 30% RH and especially below 20% RH (Godish, 1995, p.56; ASHRAE, 1997, p.8.12). This can include static electricity problems to equipment, and eye and respiratory system irritations (ASHRAE, 2000, p. S20-2). **Relative humidity readings were above the recommended guidelines in areas tested.**

4.0 MOLD TEST RESULTS

Mold testing methods include: (1) visible mold, and (2) airborne mold. Both methods are useful and provide supporting information. Sampling results are attached in Appendix A with major genera summarized in Table 1. See Appendices B, C, D & E for mold testing options and methods, mold exposure guidelines, and general suggestions for reducing mold concerns.

4.1. Visible Mold

Tape lift samples were collected from four suspect mold contaminated surfaces. Locations for tape lift samples (T1, T2, T3 & T4) can be found on the map attached in Appendix A.

(Tape) Sample #1: This sample was collected from behind the wall paper on the south wall of the southeast room on the 1st Floor (A5). Microscopic examination of the sample revealed the presence of a few growths of *Aspergillus. Aspergillus* is a problem indicating mold.

(Tape) Sample #2: This sample was collected from the spots on the north wall of 1st Floor Room D2. Microscopic examination of the sample revealed the presence of numerous growths of *Stachybotrys* as well as many growths of *Acremonium*. *Stachybotrys & Acremonium* are problem indicating molds.

(Tape) Sample #3: This sample was collected from the 1st Floor north hall doors located on the east end of the hall. Microscopic examination of the sample revealed the presence of numerous growths of *Cladosporium*. In small amounts (10 sq. ft.) *Cladosporium* is usually a non-problem mold, however, the mold appeared to be present in large amounts.

(Tape) Sample #4: This sample was collected from the 1st Floor, east hall, east wall. Microscopic examination of the sample revealed the presence of numerous growths *Cladosporium*. In small amounts (10 sq. ft.) *Cladosporium* is usually a non-problem mold, however, the mold appeared to be present in large amounts. *Penicillium/Aspergillus & Alternaria* spores were also observed without growth.

Below is some general information about visible mold.

Some molds such as *Alternaria* and *Cladosporium* are often considered nonproblem indicating molds that can live in moist conditions and do not always indicate a concern. *Aspergillus, Penicillium* and *Scopulariopsis* can survive in dry to moist conditions and are very common, however, their presence at elevated airborne levels is often considered a problem indicator. They are allergen molds and are sometimes of concern. The presence of some molds such as *Bispora, Phialophora*, and *Taeniolella* are indicative of wood rot. Slight amounts of visible mold do not necessarily indicate a problem exists. However, large amounts of any visible mold may be cause for concern.

Common mycotoxin producing fungi that are present in water-damaged buildings and building systems include species of *Alternaria, Aspergillus, Chaetomium, Memnoniella, Paecilomyces,*

Penicillium, Phoma, Stachybotrys, and *Trichoderma*. Environmental conditions, such as temperature, humidity, climate, and growing substrate significantly influence whether mycotoxins are produced or not. Slight amounts of some of these molds are not uncommon (EML Laboratories, Shelton, et.al., 2002). Many visible molds are not a concern unless disturbed. Cleaning, remodeling, demolition, etc., may stir up visible molds and produce high airborne levels.

4.2 Airborne Testing

A total of 6 airborne samples for nonviable (not cultured) mold were collected. Non-viable mold includes both living and dead mold collected in a cassette and identified under a microscope (not cultured). Data is reported in spores per cubic meter of air (spores/m^3). Tests were taken using Allergenco cassettes at a calibrated flow rate of 15 liters/minute for 5 minutes each.

4.2.1 Non-Viable Mold – General

Non-viable mold data for major molds are shown in Table 1. (See also lab analyses in Appendix A.) Non-viable mold includes both living and dead mold collected in a cassette and identified under a microscope (not cultured). Non-viable tests provide less accurate identification of specific molds but often provide a good indication of total mold. Both living and dead molds can be allergens and produce mycotoxins.

Normal non-viable mold levels for non-problem buildings are typically in the range of 500 to 3000 spores/m^3. Higher levels may sometimes occur. This does not always indicate a problem exists, especially if airborne levels are higher outside. In non-problem buildings, mold levels are typically higher outside than inside (not always true in the winter months when temperature, weather, and ground cover can be a factor).

Indoor spore levels usually average 30-80% of the outdoor spore level at the time of sampling, with the same general distribution of spore types. Filtered air, air-conditioned air or air remote from outside sources may average 5-15% of the outside air at the time of sampling. (These percentages are guidelines only. A major factor is the accessibility of outdoor air. A residence with open doors and windows and heavy foot traffic may average 95% of the outdoor level while high rise office buildings with little air exchange may average 2%. Dusty interiors may exceed 100% of the outdoors to some degree, but will still mirror the outdoor distribution of spore types).

In warmer months, the moist mold *Cladosporium* (often considered a non-problem mold at low levels) is usually the most common mold both inside and outside in non-problem buildings. During winter months, the common molds, *Aspergillus* and *Penicillium*, may show increases. These molds tolerate drier conditions and may become more common in the winter months inside. They are considered problem indicators at higher levels (>1000-2000 spores/m^3) or where they are the dominant mold present. The tiny spores for these two molds look alike in non-viable tests and are typically reported together as *Pen/Asp* or *Asp/Pen*.

Some molds that grow in very moist to wet conditions are considered problem indicators even at low levels. This may include *Stachybotrys, Trichoderma, Memnoniella, Chaetomium* and others. These molds produce mycotoxins and may be harmful to sensitive individuals. They are often poorly detected in airborne samples unless active disturbance (remodeling, etc.) is occurring.

4.2.2 Non-Viable Mold – Test Results

A substantial increase of one or two spore types which are inconsistent with and non-reflective of the outside distribution of spore types is usually indicative of an indoor reservoir of mold growth. In Table 1 the key genera are used to evaluate mold levels.

TABLE 1 - Summary of Major Genera Non-Viable Airborne Mold Tests

Sampling Location	Date	Total Mold (T =100%)	Cladosporium (%T) **Common Dominant Mold**	Penicillium/Aspergillus (%T) **Moisture Indicator Mold**	Chaetomium & Stachybotrys (%T) **Wet Molds**
1st Floor – E Entry	02/08/2023	**11,945**	960 (8%)	**10,080** (84%)	*Not Detected*
1st Floor – N Hall	02/08/2023	**27,006**	53 (<1%)	**26,688** (99%)	159 (<1%)
1st Floor – Center Room	02/08/2023	1,918	213 (11%)	1,546 (81%)	53 (3%)
2nd Floor – Large S Room	02/08/2023	744	106 (14%)	426 (57%)	53 (7%)
2nd Floor – N Hall	02/08/2023	**3,253**	213 (7%)	**2,720** (84%)	*Not Detected*
2nd Floor – Top of E Stair	02/08/2023	**7,144**	213 (3%)	**5,760** (81%)	**533** (7%)
Informal Rule of Thumb Normal (Non-Problem) Mold Levels Inside Buildings					
Upper Range Most Buildings		<2000-4000	<2000-3000	<1000-2000	<50-250
Upper Range with good Filtration		<1000-3000	<1000-2000	<500-1000	Not Detected

Notes: Percent (%T) is percent mold type versus total mold. **Bold** = Possible Concern. Levels also depend on outside conditions. > - Indicates spores too numerous to count. Values given are estimates for quantitation purposes. The screening levels are based on GeoTek's experience and published literature of mold levels exceeding normal background levels. This is not a formal guideline. Most persons will not experience noticeable symptoms at these levels while sensitive persons may experience symptoms below these levels. Higher levels may be required to cause noticeable health symptoms, especially for only short-term exposure (hours).

* = Basements, attics, tunnels, crawlspaces, and wall cavity samples often have higher mold levels than ambient airborne samples.

** - Airborne sampling results showed spore types and levels consistent with outdoor air infiltration.

5.0 CONCLUSIONS/RECOMMENDATIONS

GeoTek performed Indoor Air Quality and Limited Mold Testing at the referenced project site on February 8, 2023.

Airborne sampling results indicated elevated *Penicillium/Aspergillus* and total mold levels in the areas tested. Current relative humidity was 78%. Visible mold was present on many surfaces. Several of the more toxic molds were found to be present. These mold often do not show up in airborne samples until disturbed. The airborne mold samples found currently can be expected to be minimum levels due to collection under freezing conditions. As the ice present in the halls melts, the air warms naturally due to spring weather conditions, and when disturbance takes place the airborne mold levels can be expected to rise. Although there is no official PEL for mold, it is recommended that demolition workers wear respiratory protection. Our preference would be to use half face respirators with N-99 cartridges, however, in lieu of a full respirator, disposable N-95 or N-99 face masks could be substituted.

Other indoor air quality parameters measured during our site visit (CO_2, CO, Temp.) did not indicate levels outside of ASHRAE guidelines in the areas tested.

6.0 STANDARD OF CARE

The services performed by GeoTek Engineering & Testing Services, Inc., (GeoTek) on this project have been conducted with that level of care and skill ordinarily exercised by reputable members of the profession, practicing in the same locality under similar budget and time constraints. No other warranty is expressed or implied.

We emphasize mold testing methods have many limitations, especially short-term testing based on limited sampling (Burge, 1995, 2000). The presence or absence of indoor air quality mold related hazards applies only to tested or assessed areas on the date of the field visit and that conditions may change due to deterioration or maintenance. Ongoing monitoring by the owner or facility is usually necessary. This survey is not intended to represent exhaustive research of all potential hazards or conditions, which may exist. Mold present in concealed areas of the building not exposed to the general ventilation, such as wall cavities, may not be detected by airborne testing.

7.0 REMARKS

We appreciate the opportunity to be of service to you on this project. Please let us know if you have any questions or if we may be of further assistance.

GEOTEK ENGINEERING & TESTING SERVICES, INC.

Katherine Howard
Project Manager
Staff Scientist

Report Reviewed by:

Jason Cook
Certified Industrial Hygienist
Senior Project Manager

GEOTEK APPENDIX A

MOLD – LABORATORY ANALYSES

MAP OF SAMPLE LOCATIONS

GEOTEK ENGINEERING
& TESTING SERVICES, INC.
909 EAST 50TH STREET NORTH
SIOUX FALLS, SD 57104
605-335-5512 FAX 605-335-0773

	FOG	RAIN	SNOW	WIND	CLOUDY
NONE					
LIGHT					
MODERATE					
HEAVY					

CONTACT INFORMATION

CLIENT: HR Green	CONTACT:
ADDRESS: 8710 Earhart Ln SW	PHONE NO.:
Cedar Rapids, IA 52404	E-MAIL.:

PROJECT INFORMATION

PROJECT: Lamb Theatre - Mold Assessment	
PROJECT ADDRESS: 625 Douglas St	
PROJECT CITY, STATE: Sioux City, IA	
SAMPLING DATE: 2/8/23	
PO NUMBER: 23-0136	

TURN AROUND TIME CODES

- STD – STANDARD (DEFAULT)
- SD – SAME BUSINESS DAY
- ND – NEXT BUSINESS DAY
- 2D – TWO BUSINESS DAY

REQUESTED SERVICES (√ BOXES)

NON-CULTURABLE: SPORE TRAP; TAPE SWAB BULK

MISC: OTHER

SAMPLE ID	CASSETTE ID	DESCRIPTION	SAMPLE TYPE (BELOW)	PUMP CAL (L/MIN)	SAMPLE TIME (MIN)	NOTES (TIME OF DAY, TEMP, RH, ETC.)	Fungi – Spore Trap Analysis	Fungi – Direct Microscopic Exam	Describe:
1	4920555	1st floor - E. Entry	ST			CO_2 - 550			
2	4704507	1st floor - N. Hall				CO - 0.0			
3	4920580	1st floor - center Rm				RH - 78%			
4	4704487	2nd floor - S. large Rm				Temp - 33°F			
5	4704791	2nd floor - N. Hall							
6	4920587	2nd floor - Top E. Stairwell							
7	T1	1st floor - SE Room, SW wall							
8	T2	" - Room D2 N wall							
9	T3	" - Hall D, Doors E End							
10	T2	" - Hall A, E wall							

SAMPLE TYPE CODES

ST – SPORE TRAP: ZEFON ALLERGENCO, BURKARD....	T – TAPE	D – DUST
	SW – SWAB	W – WATER
SAS – SURFACE AIR SYS	B – BULK	SO – SOIL
O – OTHER _____		

RELINQUISHED BY	DATE & TIME	RECEIVED BY	DATE & TIME
		[signature]	2-8-23

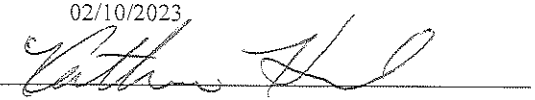
GeoTek Engineering Testing Services, Inc.
909 East 50th Street North, Sioux Falls, SD 57104
(605) 335-5512 Fax (605) 335-0773

Client: HR Green
8710 Earhart Ln. SW
Cedar Rapids, IA 52404

Site: Lamb Theater
625 Douglas St.
Sioux City, IA

Date of Sampling: 02/08/2023
Date of Received: 02/08/2023
Date of Analysis: 02/10/2023

GeoTek#: 23-0136-4
Analyst: Katherine Howard

Analyst Signature: 

SPORE TRAP REPORT: NON-VIABLE METHODOLOGY ASTM D7391

Location:	1st Floor - E Entry				1st Floor - N Hall				1st Floor - Large Center Room				2nd Floor - Large S Room			
Lab ID:	#1 23-0136-#4920555				#2 23-0136-#4704507				#3 23-0136-#4920580				#4 23-0136-#4704487			
Standard Slide Identification	1000x - 25%				1000x - 25%				1000x - 25%				1000x - 25%			
	Raw ct.	Spores/m^3	DL/ m^3	%	Raw ct.	Spores/m^3	DL/ m^3	%	Raw ct.	Spores/m^3	DL/ m^3	%	Raw ct.	Spores/m^3	DL/ m^3	%
Alternaria	1	53	53	<1	1	53	53	<1								
Ascospores*	14	746	53	6					1	53	53	3	2	106	53	14
Basidiospores*	2	106	53	1					1	53	53	3	1	53	53	7
Cercospora																
Chaetomium					2	106	53	<1								
Cladosporium	18	960	53	8	1	53	53	<1	4	213	53	11	2	106	53	14
Curvularia																
Drechslara/Bipolaris type																
Epicoccum																
Fusarium																
Nigrospora																
Oidium																
Penicillium/Aspergillus**	189	10,080	68	84	500	26,688	191	99	29	1,546	53	81	8	426	53	57
Pithomyces																
Rusts																
Smuts, Periconia, Myxomycetes					1	53	53	<1								
Stachybotrys/Memnoniella					1	53	53	<1	1	53	53	3	1	53	53	7
Taeniolella																
Ulocladium																
Unknown, Other																
Pollen																
Background debris (1-4+)	2+				2+				1+				2+			
Sample volume (liters)	75				75				75				75			
TOTAL SPORES/M3		11,945	53	100		27,006	53	100		1,918	53	100		744	53	100

* Most of these spore types are not seen with culturable methods. Most of the ascospores and basidiospores are "mushroom" spores while the rusts and smuts are plant pathogens.

**The spores of Aspergillus and Penicillium are small and round with very few distinguishing characteristics. They cannot be differentiated by non-viable sampling methods. Also, some species with very small spores are easily missed, and may be undercounted.

**Background debris (graded from 1+ to 4+, indicating the largest amounts) is an indication of the amount of non-biological particulate matter present on the slide (dust in the air).

The Limit of Detection is the product of a raw count of 1 and 100 divided by the percent read. The analytical sensitivity (DL/ m^3) is the product of the Limit of Detection and 1000 divided by the sample volume.

GeoTek Engineering Testing Services, Inc.
909 East 50th Street North, Sioux Falls, SD 57104
(605) 335-5512 Fax (605) 335-0773

Client: HR Green
8710 Earhart Ln. SW
Cedar Rapids, IA 52404

Site: Lamb Theater
625 Douglas St.
Sioux City, IA

Date of Sampling: 02/08/2023
Date of Received: 02/08/2023
Date of Analysis: 02/10/2023

GeoTek#: 23-0136-4
Analyst: Katherine Howard

Analyst Signature: _____

SPORE TRAP REPORT: NON-VIABLE METHODOLOGY ASTM D7391

Location:	2nd Floor - N Hall				2nd Floor - Top of E Stairwell											
Lab ID:	#5 23-0136-#4704791				#6 23-0136-#4920587											
Standard Slide Identification	1000x - 25%				1000x - 25%											
	Raw ct.	Spores/m^3	DL/ m^3	%	Raw ct.	Spores/m^3	DL/ m^3	%	Raw ct.	Spores/m^3	DL/ m^3	%	Raw ct.	Spores/m^3	DL/ m^3	%
Alternaria																
Ascospores*					2	106	53	1								
Basidiospores*	6	320	53	10	7	373	53	5								
Cercospora																
Chaetomium																
Cladosporium	4	213	53	7	4	213	53	3								
Curvularia																
Drechslara/Bipolaris type																
Epicoccum																
Fusarium																
Nigrospora																
Oidium																
Penicillium/Aspergillus**	51	2,720	53	84	108	5,760	53	81								
Pithomyces																
Rusts					1	53	53	1								
Smuts, Periconia, Myxomycetes					2	106	53	1								
Stachybotrys/Memnoniella					10	533	53	7								
Taeniolella																
Ulocladium																
Unknown, Other																
Pollen																
Background debris (1-4+)	2+				2+											
Sample volume (liters)	75				75											
TOTAL SPORES/M3		3,253	53	100		7,144	53	100								

* Most of these spore types are not seen with culturable methods. Most of the ascospores and basidiospores are "mushroom" spores while the rusts and smuts are plant pathogens.

**The spores of Aspergillus and Penicillium are small and round with very few distinguishing characteristics. They cannot be differentiated by non-viable sampling methods. Also, some species with very small spores are easily missed, and may be undercounted.

**Background debris (graded from 1+ to 4+, indicating the largest amounts) is an indication of the amount of non-biological particulate matter present on the slide (dust in the air).

The Limit of Detection is the product of a raw count of 1 and 100 divided by the percent read. The analytical sensitivity (DL/ m^3) is the product of the Limit of Detection and 1000 divided by the sample volume.

GeoTek Engineering Testing Services, Inc.
909 East 50th Street North, Sioux Falls, SD 57104
(605) 335-5512 Fax (605) 335-0773

TABLE I - Sample Evaluation

Summary of Major Genera Non-Viable Airborne Mold Tests
Lamb Theater
625 Douglas St.
Sioux City, IA

Units in Spores/m^3

Sampling Location	Date	Total Mold (T=100%)	Cladosporium (%T) Common Dominant Mold		Penicillium Aspergillus (%T) Moiture Indicator Mold		Chaetomium & Stachybotrys (%T) Wet Molds	
1st Floor - E Entry	02/08/2023	**11,945**	960	8 %	**10,080**	84 %	*Not Detected*	
1st Floor - N Hall	02/08/2023	**27,006**	53	<1 %	**26,688**	99 %	159	<1 %
1st Floor - Large Center Room	02/08/2023	1,918	213	11 %	1,546	81 %	53	3 %
2nd Floor - Large S Room	02/08/2023	744	106	14 %	426	57 %	53	7 %
2nd Floor - N Hall	02/08/2023	**3,253**	213	7 %	**2,720**	84 %	*Not Detected*	
2nd Floor - Top of E Stairwell	02/08/2023	**7,144**	213	3 %	**5,760**	81 %	**533**	7 %
Upper Range Most Building		<2000 - 4000	<2000 - 3000		<1000 - 2000		<50 - 250	
Upper Range with Good Filtration		<1000 - 3000	<1000 - 2000		<500 - 1000		Not Detected	

Notes: Percent (%T) is percent mold type versus total mold. **Bold** = Possible Concern. Levels also depend on outside conditions. Cladosporium is typically dominant in non-problem buildings. *Aspergillus/Penicillium* are often the dominant molds in problem buildings. *Chaetomium* or *Stachybotrys* are considered wet, problem mold indicators. The levels used above are a general screening indicator based on GeoTek's experience and published literature of mold levels exceeding normal background levels. This is not a formal guideline. Most persons will not experience noticeable symptoms at these levels while sensitive persons may experience symptoms below these levels. Higher levels may be required to cause noticeable health symptoms, especially for only short-term exposure.
* = Basements, tunnels, **crawlspaces**, and wall cavity samples often have higher mold levels than ambient airborne samples.
** = Spore types and levels are consistent with outdoor air infiltration.

NORMAL SPORE LEVELS: Indoor spore levels usually average 30-80% of the outdoor spore level at the time of sampling, with the same general distribution of spore types. Filtered air, air-conditioned air or air remote from outside sources may average 5-15% of the outside air at the time of sampling. (These percentages are guidelines only. A major factor is the accessibility of outdoor air. A residence with open doors and windows and heavy foot traffic may average 95% of the outdoor level while high rise office buildings with little air exchange may average 2%. Dusty interiors may exceed 100% of the outdoors to some degree, but will still mirror the outdoor distribution of spore types).
PROBLEM INTERIORS: A substantial increase of one or two spore types which are inconsistent with and non-reflective of the outside distribution of spore types is usually indicative of an indoor reservoir of mold growth.

GeoTek Engineering & Testing Services, Inc.
909 East 50th Street North, Sioux Falls, SD 57104
Phone: (605) 335-5512 Fax (605) 335-0773

Client: HR Green
8710 Earhart Ln. SW
Cedar Rapids, IA 52404

Date of Sampling: 02/08/23
Date of Receipt: 02/08/23
Date of Analysis: 02/10/23

Site: Lamb Theater
625 Douglas St.
Sioux City, IA

GeoTek# 23-0136-4

DIRECT MICROSCOPIC EXAMINATION REPORT
(Tape Lift Samples)

Sample ID	Background Debris & Common Background Spores Present Generally indicative of normal conditions, i.e. seen on surfaces in most environments. The distribution of spore types seen reflects what is seen outdoors. Includes, pollen, basidiospores (mushroom spores), myxomycetes (slime molds), ascospores, rusts, and smuts no spore type predominating	MOLD GROWTHS OBSERVED:	General Impression	Problem Mold/ Non-problem*
T1 – 1st Floor, SE Room, S Wall	Light - No miscellaneous spores observed.	*Aspergillus*	A few growths of *Aspergillus* were observed.	*Aspergillus* is a **Problem** indicating mold.
T2 – 1st Floor, Room D2, N Wall	Light - No miscellaneous spores observed.	*Stachybotrys, Acremonium*	Numerous growths of *Stachybotrys* were observed with many growths of *Acremonium*. Mite feces were present.	*Stachybotrys & Acremonium* are **Problem** indicating molds.
T3 – 1st Floor, N Hall, Doors on E End	Light - No miscellaneous spores observed.	*Cladosporium*	Numerous growths of *Cladosporium* were observed. Mite feces were present.	In small amounts *Cladosporium* is usually a **Non-problem** mold.*
T4 – 1st Floor, E Hall, E Wall	Light - No miscellaneous spores observed.	*Cladosporium*	Numerous growths of *Cladosporium* were observed. *Penicillium/Aspergillus & Alternaria* spores were observed without growth. Mites and mite feces were present.	In small amounts *Cladosporium* is usually a **Non-problem** mold.*

* Health risks can only truly be determined by air sampling. For visible mold - Small amounts of the common, often non-problem molds, *Alternaria* and *Cladosporium* are usually not considered a major concern although large amounts of any mold may be (over 10 sq.ft. is used as a cut off point for amounts of concern by the New York Dept. of Health).
Some visible molds are considered problem indicators. Mycotoxin producing molds include *Alternaria, Aspergillus, Chaetomium, Paecilomyces, Penicillium, Phoma, Stachybotrys, Memnoniella, Trichoderma* and others. Many factors affect the amount of mycotoxins that may be produced by these molds. That is, mycotoxin levels may vary from site to site.

Analyst:

Katherine Howard
Microscopist

FIGURE 1
SITE MAP
LAMB THEATER
625 DOUGLAS STREET
SIOUX CITY, IA

ACAD/GEOTEK/KATHERINE/23-0136

PROJECT#: 23-0136

DRAWN BY: DHP

GEOTEK ENGINEERING & TESTING SERVICES, INC.
909 East 50th Street North
Sioux Falls, South Dakota 57104
605-335-5512 Fax 605-335-0773

GEOTEK APPENDIX B
MOLD TESTING METHODS

This appendix addresses normal mold sampling methods used by GeoTek. Mold problems are not always obvious. The absence of visible mold does not mean a problem does not exist. Mold can grow out of sight behind walls and in ductwork. Airborne testing is often needed to identify if a problem exists. Airborne tests are also useful for before and after testing of clean-ups.

There are two common mold sample types, Tape/Bulk and Airborne.

Tape/Bulk Mold Tests

Samples of visible mold can be collected by lifting it from a surface with clear (not frosted) scotch tape. The exposed tape is then placed (sticky side down) onto a new glass microscope slide. The slide is labeled with location, date and other information. The tape sample is then observed with a microscope (400-1000x). Small bulk samples may also be collected in plastic bags for direct microscopic examination.

Airborne Mold Tests

There are two common types of airborne mold tests, Viable and Non-Viable mold.

Viable (culturable) methods collect air samples on culture plates. Samples are grown for 1-2 weeks on various types of growth media (petri plates). Samples are collected from individual growth colonies and placed under a microscope. This method provides more accurate identification of specific molds (growth structures). But, mold growth is dependent on the type of growth media and may molds do not grow on the media chosen. This method usually detects only a fraction of the total mold present and quickly becomes overloaded at higher levels. Note: home test kits based on settle (gravity) culture plates are not considered reliable. Both viable and non-viable tests are often preferred when legal concerns are involved.

Non-Viable tests collect both living and dead molds onto a sticky plate inside a plastic cartridge or cassette (Air-O-Cell). The sticky plate is observed with a microscope (400-1000x). This method allows for quicker analysis than viable tests (because there is no culture period) but is less effective at identifying specific mold species as only the spores (not growth structures) are usually detected. This method does not work as well in the cold (plate becomes less sticky). The non-viable method provides a good way to measure the total amount of airborne mold present. This method can detect some mold (such as Stachybotrys) better than the viable method and can detect much higher levels than the viable method. Non-viable tests are the predominate test method for airborne mold.

Standard non-viable airborne tests are collected as follows. An Air-O-Cell cassette is attached to a high volume air pump calibrated to a flow rate of 15 liters/minute. The typical sampling period is 5 minutes. For very moldy environments, this may be reduced to 1 or 2 minutes. The air sample is taken about 2-4 ft above the floor. Typically, a few samples are collected from the building interior and one outside air sample is collected. Emphasis is placed on problem areas, crawlspaces, and basements.

In-wall non-viable tests are collected as follows. Mold tests inside walls are typically taken by removing the faceplate off an electric outlet and placing a plastic cone over the outlet. Using an Air-O-Cell cassette and air pump, a sample is collected for 1 minute at a flow rate of 15 liters/minute. Another method used is to make a small (1/4 inch) hole in the wall and insert a plastic tube connected to an Air-O-Cell cassette and air pump. This is often done in the space behind the baseboard just above the sill plate.

GEOTEK APPENDIX C
MOLD EXPOSURE – RULES OF THUMB AND GUIDELINES

There are no well accepted numerical guidelines for mold exposure. Some individuals are much more sensitive than others. Exposure to high mold doses over a prolonged period may cause sensitization (allergic reactions) in some. There is disagreement among the scientific community over some symptoms but there is growing consensus that damp and moldy buildings are often associated with increased health problems. Molds can vary greatly in toxicity even in the same species. Those most vulnerable include infants and children <2 yrs old, elderly, persons with severe allergies or asthma and persons with weakened immune systems (due to sickness or medical treatments). **Airborne exposure** is the main concern from mold.

Visible Mold

Small amounts of visible mold (including problem molds) are not uncommon and do not necessarily indicate a problem exists. However, large amounts of visible mold are considered a potential health risk and unacceptable in occupied buildings (Samson, 1994). The New York City Health Dept (2000) considers <10 square ft to be a small amount. See US EPA and NYCHD web pages

Small amounts of the common, often non-problem molds, *Alternaria* and *Cladosporium* are usually not considered a major concern (although large amounts of any mold may be). Some visible molds are considered problem indicators. Mycotoxin producing molds include *Alternaria, Aspergillus, Chaetomium, Paecilomyces, Penicillium, Phoma, Stachybotrys, Memnoniella, Trichoderma* and others. Many factors affect the amount of mycotoxins that may be produced by these molds. That is, mycotoxin levels may vary from site to site.

Evaluating the Results of Tape or Bulk Samples (from Aerotech P&K, 2004 – see their web page)

1. Determine whether the fungi are colonizing, growing, and amplifying and identify the fungus.
2. The presence of a few loose spores are considered as background dust deposits.
3. The presence of growth structures suggests colonization and growth but not amplification if spores are not produced.
4. The presence of growth structures and spores suggests growth and amplification.
5. The presence of spores does not necessarily indicate amplification. An unusual number of spores of the same kind may suggest contamination from sources nearby.
6. The degree of growth is described as: (note: trace spores are common and may not indicate a concern)
   A. **Massive**: fungal structures cover the entire sample in more than one layer.
   B. **Numerous**: one layer of fungal structures covers the entire view area.
   C. **Many**: fungal structures cover 25% to near 90% of the viewing area.
   D. **A few**: fungal structures are consistently detectable and countable, and cover up to 25% of the view area.
   E. **A trace**: fungal structures are detectable when carefully examined by one analyst, but may be missed by another.
   F. **No obvious fungal growth.**

Airborne Mold

Airborne mold levels can vary greatly from place to place and seasonally. Mold levels are typically lower in offices than in houses and often highest in basements and crawlspaces. **Remodeling or cleaning water damaged or moldy rooms may disturb mold and temporarily cause high airborne levels.**

There are general guides but no national recognized acceptable numerical exposure guidelines for exposure. In GeoTek's experience, many non-problem mold levels often do not exceed 2000-4000 spores/m3. However, health symptoms and mold problems appear to occur more frequently when mold levels exceed 5,000-10,000 spores/m3.

Rules of Thumb – Airborne Tests - Non Problem Buildings: (1). Total mold levels <2000-5000 spores/m3; (2) Inside levels are lower than outside levels (not true in winter); (3) Approximately the same molds are inside as well as outside; (4) *Cladosporium* is often the most dominant mold.

Rules of Thumb – Airborne Tests - Problem Buildings: (1) Total mold levels >5000-10,000 spores/m3. May be higher inside than outside (not true in winter); (2) Types of mold are different inside than outside with *Aspergillus* and *Penicillium* often being dominant; (3) *Aspergillus* and/or *Penicillium* levels often >5,000-10,000 spores/m3; (4) Noticeable levels (especially >500-1000 spores/m3) of wet, (often toxic), molds including *Chaetomium, Fusarium, Stachybotrys, Memnoniella, and Trichoderma.*

Informal Rule of Thumb Normal (Non-Problem) Mold Levels Inside Buildings (spores/m3)				
Type of Mold	Total Mold	Cladosporium	Asp-Pen	Stachybotrys
Upper Range Most Buildings	<2000-4000	<2000-3000	<1000-2000	<50-250
Upper Range with good Filtration	<1000-3000	<1000-2000	<500-1000	Not Detected

GEOTEK APPENDIX D
REDUCING MOLD CONCERNS - GENERAL SUGGESTIONS

These are general suggestions intended for homeowners and small businesses. The keys to minimizing mold include moisture and dust control. **Remodeling may cause very high airborne mold levels.**

1. Remove Visible Mold. Any visible mold should be removed quickly. If large amounts of visible mold are present, appropriate safety precautions should be followed and care should be taken to isolate the area being cleaned. See NYCHD (2000) and Morey (1999). Isolate area and avoid spreading mold around during removal. Use cleaning firms for large problems.

2. Clean Up Water Leaks Within 48 Hours. Water damage can rapidly lead to severe microbiologic growth (bacteria, mold) within a few days. Moisture meters, thermal meters can locate damp spots. Note: Proper drying may take several days.

3. Reduce Excessive Moisture. Relative humidity should be kept below 50% in summer and 35% in winter. Inexpensive relative humidity meters are available. Dehumidifiers are available in many forms, often with automatic controls. Relative humidity should not be reduced below 20%, as this will cause health and static electric problems.

4. Provide Good Drainage. Rain gutters and downspouts with extensions should drain water at least 3' away from building foundations. This includes sump pumps and other water sources. Avoid excessive watering.

5. Check Roofs for Leaks. Roofs, especially flat roofs, are prone to leaks. Check roofs after heavy rain storms and during spring snow melt. Repair small leaks promptly.

6. Check Basement and Crawlspace. Basements and crawlspaces (including steam tunnels) are often major moisture sources. Good drainage, appropriate waterproofing and vapor barriers should be utilized. Ventilation and/or use of dehumidifiers, HUMIDEX-type systems, etc. may be useful. Use ½ inch gap (capillary break) between concrete floors and sheetrock walls to avoid moisture wicking up into the sheetrock and growing behind the walls. Stiff foam insulation often preferable to fiberglass in basements. Avoid vinyl wallpaper on basement exterior walls.

7. Use Good Building Practices. Consider appropriate insulation, ventilation, vapor barriers, etc. See Lstiburek and Carmody (1994), Beall (1999), Bynum (2001), Kuball (1999). Avoid use of vinyl wallpaper on exterior walls.

8. Check HVAC Ventilation & Insulation. Carbon dioxide levels should not exceed the ASHRAE (1997) guideline of 1000 ppm. Many buildings are tightly sealed and may not provide sufficient outside air. Ventilation systems are often poorly maintained. See HVAC contractors. Consider installing an outside air intake if needed. Attic insulation should be R38 (at least 1 ft of fiberglass or cellulose insulation. Colder air conditioned rooms allow warm humid outside air to condense in attic in summer and vice versa in winter

9. Check Attic Ventilation. Buildings with a lack of attic ventilation may trap moisture. Bath and kitchen fans should be exhausted to the outside and not into the attic. Soffit vents are often plugged up with loose insulation.

10. Optimize HVAC Filtration. Use the most efficient filters available for your system. This includes pleated filters. Note: The HVAC system must be designed to accept high efficiency filters. See HVAC contractors.

11. Have HVAC Ductwork Cleaned. Professional cleaning firms can clean out HVAC systems & duct work.

GEOTEK APPENDIX E
CLEANING UP MOLD

WATER CLEAN-UPS - DO IT QUICK BUT DO IT RIGHT!

Water leaks should be cleaned within 24-48 hours. Water wicks quickly into sheetrock and particleboard. Large amounts of mold growth usually take 1-2 weeks or more. Just removing standing water is not enough. Because of this, dehumidifiers are typically needed for several days. The baseboards should often be pulled back and small holes made in the walls to allow drying. Consider commercial cleaning firms for larger jobs.

LARGE MOLD CLEAN-UPS – DON'T STIR UP MOLD!

The main health concern is airborne exposure to high mold levels. **Mold is often not a concern until disturbed**. Remodeling and clean-ups involving opening up walls (especially in basements) often disturb large amounts of mold This can be a serious health concern. Use commercial cleaning firms for large jobs or rent their equipment and follow their advice.

The proposed area should be isolated from other rooms. Plastic sheeting can be placed over doors and HVAC registers. The room should be placed under negative air (blowing to the outside) or large air scrubbers (air filters) should be used. Respirators (N-95 dust masks or better) should be used.

Before starting clean-up, the cause of the moisture should be identified and corrected. Dehumidifiers should be used if needed to dry out the room. Remove porous moldy materials (sheetrock, particleboard) and bag immediately. Don't carry moldy materials through other rooms. Wipe off moldy non-porous materials (wood, plastic, metal, concrete). This should include the floor, walls and ceiling in the room. Disinfectants can be used but soapy water is often enough. Moldy wood can be sanded. Allow materials to dry. Antimicrobial paints or encapsulants (Bins, Kilz, Perma-White, polyurethane paint) can be used on some surfaces to reduce moisture and future mold growth.

For sheetrock in basements, cut a ½ inch gap (capillary break) between the bottom of the sheetrock and concrete floor to prevent future wicking. Or consider mold resistant materials (cement-fiber board, mold resistant sheetrock, etc). Foam insulation may be better in basements than fiberglass.

WHAT CAN BE CLEANED?

Porous items such as wet sheetrock or particleboard may need to be removed. Clothes and rugs can often be cleaned. However, musty porous furniture and mattresses may need to be discarded. Hard (non-porous) materials can often just be wiped off with a damp cloth. This includes plastic, glass, metal, and wood objects.

Small mold spots can often be wiped off and cleaned with soapy water mixed with a little bleach (one part bleach to 10 parts water). Avoid use of strong chemicals and pure bleach. Check with a commercial cleaning firm for advice (mm3/05).

GEOTEK APPENDIX F
MOLD & WATER CLEANUP FIRMS

BROOKINGS – **Total Maintenance** 708 Main St., Brookings, SD, Ph. 605-692-6425 Fax 605-697-7788 Cell 690-6425 Contact: Sean Lesnar. Services: Mold & water clean-up. Carpet and duct cleaning.

FAIRMONT, MINNESOTA – **Indoor Technologies** 10 Forgotten Lake Rd. Fairmont, MN 56301. Ph. 507-238-9927. Cell: 507-399-9173 Contacts: Craig Diegnau Services: Mold & water clean-up, duct & carpet cleaning, etc. MOLD TESTING

HARRISBURG, SIOUX FALLS – **Moxie Services** 710 Laura St., Harrisburg, SD 57032. Ph. 605-2016189 Contacts: Dan Grossman. Services: Mold remediation, water, clean-up, carpet/rug, duct cleaning; tile shower sealing cleaning. www.moxiesd.com

HARRISBURG, SIOUX FALLS – **Mustang Disaster Clean-Up** 27283 SD Hwy 115, Harrisburg, SD 57032. Ph. 605-370-1990, Services: Mold remediation, duct cleaning, fire, smoke water, flood restoration. www.mustangdisastercleanup.com

IOWA (Central) – **Mustang Disaster Clean-Up** 518 Broad St, Story City, IA 50248, Ph. 515-620-3772, Services: Mold remediation, duct cleaning, fire, smoke water, flood restoration. www.mustangdisastercleanup.com

MITCHELL – **Floor Tec Professional Cleaning Services** 119 Railroad Ave. W, Mitchell, SD 57301
Ph. 605-999-4055. Contact Thad Herman, mold & water clean-up, etc. MOLD TESTING

NORFOLK, NEBRASKA - **Service Master of Norfolk** 1118 Riverside Blvd., Norfolk, NE 68702. Ph. 402-379-0357. Services: Mold & water clean-up, duct & carpet cleaning, etc. MOLD TESTING

RAPID CITY, SIOUX FALLS, – **L&L Insulation** PO Box 1258, Rapid City, SD 57709, Ph 800-378-4012, Fax 605-343-0936, Contact: Steve VenTeicher Services: Mold remediation, Lead-based paint and asbestos abatement services.

RAPID CITY – **Mustang Disaster Clean-Up** 870 Seger Dr., Rapid City, SD, 57701. Ph. 605-858-2569 Services: Mold remediation, duct cleaning, fire, smoke water, flood restoration. www.mustangdisastercleanup.com

SIOUX CITY, IOWA - **Service Master of Sooland,** 1905 A St., S. Sioux City, NE 68776. Ph 402-494-3188. Fax 402-494-5035. Contact Milan Johnson. Services: Mold remediation, water clean-up, etc. E-mail: milan.johnson@smsooland.com

SIOUX FALLS - **InTek (Interior Technicians, Inc.)** 505 N. Harlem, PO Box 1670, Sioux Falls, SD 57101. Ph. 605-334-9716, 1-800-456-5004, fax 605-335-6786 Contacts: for mold - Gaylon Anderson or Chuck Schipper Services: Mold remediation, duct cleaning & inspections, water clean-up, infrared camera moisture scans

SIOUX FALLS – **Kelsey's Cleaning & Water Restoration** 1912 S Cardinal Dr., Sioux Falls, SD 57105, Ph. 605-360-1111, Mark Kelsey, Services: Mold remediation, water, flood restoration, cleaning services.

SIOUX FALLS – **Rainbow International**,., 4607 N 4th Ave. Ph 605-271-1111. Contact: Joe Schwebach. Services: water, fire & smoke restoration and cleaning. E-mail" joe.schwebach@mail.rainbowintl.com

SIOUX FALLS - **ServiceMaster of Sioux Falls** 1201 N Carla Ave., Tea SD 57064. Ph. 605-338-9615. Fax 605-368-9769 Contacts: Jim Slater, Tim Schavee Services: Mold & water clean-up, duct & carpet cleaning, etc. MOLD TESTING, e-mail: tim@svcmas.midconetwork.com, www.servicemastersf.com

SIOUX FALLS – **Servpro West Sioux Falls** 27063 Sunset Blvd., Ste. 105, Tea, SD 57064, Ph. 605-213-3303, Adam Birger, Services: Mold remediation, water, fire, storm restoration, duct cleaning, 24 hr cleaning services. e-mail: office@servprowestsiouxfalls.com, www.servprowestsiouxfalls.com

SIOUX FALLS - **Total Cleaning** 2305 W. 50th St., Suite A, Sioux Falls, SD 57105. Cell 728-6832 Contact: Colonel Echols, Dave Edler. Services: Mold & water clean-up, duct & carpet cleaning, etc.

SIOUX FALLS – **Tougas Restoration** 2215 North Dr., Sioux Falls, SD 57104. Cell 838-0791 Contact: Mat Tougas. Services: Mold & water clean-up, fire & smoke cleaning, storm & wind damage etc. MOLD TESTING

SIOUX FALLS – **Ductbusters** ph. 605-371-3030, www.ductbusters.com. Duct cleaning & other services.

SPIRIT LAKE, IOWA – **Steamway of Spirit Lake** 1509 Memphis Ave., Unit F, Spirit Lake, IA 51360. Ph. 712-336-2484 Contacts: Glenda Services: Mold & water clean-up, duct & carpet cleaning, etc. MOLD TESTING

VERMILLION – **Louie's Carpet Cleaning & Disaster Restoration** P.O. Box 461 Vermillion, SD 57069, ph. 605-624-2485. Services: Mold & water clean-up, duct & carpet cleaning, etc. MOLD TESTING

WATERTOWN – **Steam Brothers** PO Box 1941, Watertown, SD 57210. Ph. 800-657-5818. Fax 605-886-4210.
Contact: Dan Lindner. Services: Mold & water clean-up, duct clean, carpet clean

WATERTOWN – **Service Master** PO Box 331, Watertown, SD 57201. Ph 605-657-5818. Contact: April Prins. E-mail: april@smwatertown.com. Mold and water clean-up, duct clean, etc. MOLD TESTING

YANKTON, SD, NEBRASKA & IOWA – **Floor Tec Professional Cleaning Services** 186 Oak Hollow Lane, Yankton, SD 57078
Ph. 605-665-4839. Contact Tom Langdon, mold & water clean-up, etc. MOLD TESTING

YANKTON – **Intek** 827 Hemi Dr. #1, Yankton, SD 57078 Ph. 605-689-2220. Contact: Bruce Tirrell, mold & water clean-up, etc. MOLD TESTING