4221 Forbes Boulevard · Suite 250
Lanham, Maryland 20706
T: 202.558.7487 | http://atiinc.com/

June 3, 2019

Prince George's County Public Schools
13300 Old Marlboro Pike
Upper Marlboro, Maryland 20772
Attention: Mr. Alex Baylor

RE: Indoor Air Quality Screening, Glenarden Woods Elementary School
IFB: 022-19
ATI Project Number: ATI19-671

Dear Mr. Baylor:

Prince George's County Public Schools requested that ATI, Inc., conduct a proactive indoor air quality (IAQ) screening at Glenarden Woods Elementary School. The IAQ screening was conducted on May 21, 2019. Its key findings are enclosed in the Executive Summary on page three, and the official laboratory report for total fungal spore trap sampling is enclosed in Appendix A.

Thank you for the opportunity to provide Industrial Hygiene services for Prince George's County Public Schools. If you have any questions regarding this report, please contact us at (202) 643-4283.

Sincerely,
ATI, INC.

Courtney E. McCall
Project Manager

Sarath Seneviratne
CIH, CSP, CHMM

Indoor Air Quality Screening Report

Prince George's County Public Schools
Glenarden Woods Elementary School
7801 Glenarden Parkway
Glenarden, Maryland 20706

Prepared for:

Prince George's County Public Schools
13300 Old Marlboro Pike
Upper Marlboro, Maryland 20772

June 3, 2019

Submitted by:

ati

ATI Job # 19-671

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Table of Contents

Abbreviations and Acronyms

AHU	Air-Handling Unit
AIHA	American Industrial Hygiene Association
ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers
ASTM	American Society for Testing and Materials
CO	Carbon Monoxide
CO_2	Carbon Dioxide
EMLAP	Environmental Microbiology Laboratory Accreditation Program
HVAC	Heating, Ventilating, And Air-Conditioning
IAQ	Indoor Air Quality
NIST	National Institute for Standards and Technology
NVLAP	National Voluntary Laboratory Accreditation Program
RH	Relative Humidity

Abbreviations involving scientific volume and measurements involving media or water sampling

Counts/m^3	Mold spores per cubic meter of air
LPM	Liters Per Minute
NTE	Not to exceed
°F	degree Fahrenheit
PPM	Parts Per Million

1. Executive Summary and Key Findings

ATI conducted a proactive Indoor Air Quality (IAQ) screening on May 21, 2019, at Glenarden Woods Elementary School, located at 7801 Glenarden Parkway, Glenarden, MD 20706.

The screening included a visual assessment of randomly selected classrooms and other frequently occupied spaces, such as the cafeteria, the main office, and classrooms, for potential IAQ contributors and pathways. As part of the screening, ATI collected direct reading measurements for comfort parameters, including temperature, relative humidity, carbon dioxide, and carbon monoxide. Also, ATI collected total fungal air samples on spore trap cassettes for microbiological analysis.

The following is a summary of the key findings from this screening:

1. Temperature measurements were within ASHRAE guidelines for summer temperatures, 73°F and 79°F.
2. Relative humidity measurements were within ASHRAE guidelines, <65%.
3. All tested spaces fell below recommended ASHRAE limit for carbon dioxide, which was 1,098 parts per million (PPM).
4. Carbon monoxide was not detected throughout the tested spaces.
5. The total concentration of spores in tested spaces compared favorably to outdoor results. There is no indication of indoor spore amplification.

2. Assessment Methods

Mr. Brian Chapman of ATI, Inc., conducted a visual assessment and air sampling on May 21, 2019. Sampled rooms were randomly selected and accounted for approximately 10% of classrooms or a minimum of five samples. Visual observations were made at the time the samples were collected. ATI references the American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE) *Standard 62.1 – 2016* and ASHRAE *Standard 55 – 2017* when providing IAQ services to clients. ASHRAE is an industry leader on energy efficiency and indoor air quality.

All measurements and air samples were collected between three-six feet from floor elevation, which represents the breathing zone, and away from air-supply and return diffusers. Real-time direct readings for temperature, relative humidity, carbon dioxide (CO_2), and carbon monoxide (CO), were obtained with a calibrated TSI Q-Trak 7575-X Meter and attached 982 Probe.

Total fungal air samples were collected with a Buck BioAire High-Volume Sampling Pump on Zefon Air-O-Cell spore-trap cassettes at a flow rate of 15 liters per minute for five minutes, for a sample volume of 75 liters. The samples were analyzed by direct microscopic examination (identifies and counts both viable and non-viable spores, which is then considered "total fungal"), via the American Society for Testing and Materials (ASTM) Standard D7391-09 by EMSL Analytical, Inc., (EMSL) located in Beltsville, MD.

EMSL participates in the National Institute of Standards and Technology's (NIST's) National Voluntary Laboratory Accreditation Program (NVLAP) for general laboratory performance and management and the

American Industrial Hygiene Association (AIHA) Environmental Microbial Laboratory Accreditation Program (EMLAP, Certificate Number 102891).

Instrument calibration records are included in Appendix B of this report.

3. Visual Observations

Table 1: Visual Observations and Sampling Locations

Sample Location	Observations
Outside	• Partly cloudy skies with N winds averaging 4 mph.
Main Office	• Large occupied area. • Office space branches off into various additional offices.
Room 405	• Two air returns, three air diffusers. • One occupant in area during sampling. • Perimeter windows along wall. • Sufficient lighting and air supply • Space approximately 832 ft.^{2}
Room 207	• Two air returns, one air diffuser. • Two perimeter windows sealed. • Sugar, bagels, and dip were left out. Food products should be stored away properly to help control pests. • Recent roof leak in hallway outside of room 208. No ceiling tiles appear to be stained. • Spaces approximately 270 ft.^{2}
Room 408	• Large occupied area. • Diffusers and air returns running along perimeter wall. • High ceilings lead to roof deck. • No ceiling tiles or ceiling plenum.
Room 502	• No concerns. • Two air returns, three air diffusers. • Space is approximately 896 ft.^{2}

4. Thermal Environmental Conditions for Human Occupancy

ASHRAE *Standard 55-2017, Thermal Environmental Conditions for Human Occupancy*, addresses thermal comfort in an office environment, which means that an employee wearing a normal amount of clothing feels neither too cold nor too warm. This standard discusses thermal comfort within the context of air temperature, humidity, and air movement and provides recommended ranges for temperature and humidity that are intended to satisfy most building occupants. The recommended ASHRAE ranges are referenced below by each comfort parameter.

4.1 Temperature

The ASHRAE standard establishes a winter comfort range of between 68°F and 75°F and a summer range of between 73°F and 79°F. The temperature measurements obtained during the May 21, 2019 screening is summarized in Table 2. As indicated by the data in the table, temperatures in the school averaged between 73.95 – 77.2°F, within the ASHRAE summer comfort range.

Table 2: Temperature Measurements

Sample Location	May 21, 2019 °F			ASHRAE Standard °F
	Min	Max	Average	
Outside	69.0	69.0	69.0	N/A
Indoors				
Main Office	78.9	79.2	73.95	73 – 79
Room 405	76.4	78.0	77.2	73 – 79
Room 207	76.6	76.8	76.7	73 – 79
Room 408	75.0	75.2	75.1	73 – 79
Room 502	73.6	74.7	74.15	73 – 79

4.2 Relative Humidity

Relative humidity is a key factor for mold growth. Mold has the potential of growing on suitable surfaces with humidity levels above 65%. ASHRAE *Standard 62.1-2016*, *Ventilation for Acceptable Indoor Air Quality,* recommends a maximum indoor relative humidity of 65% to prevent condensation of moisture on surfaces. Relative humidity below 30% may result in drying of the mucous membranes and skin. Relative humidity measurements are summarized in Table 3. As indicated by the data in the table, relative humidity measurements averaged between 31.9 and 35.0%, below the ASHRAE maximum recommendation of 65% relative humidity.

Table 3: Relative Humidity Measurements

Sample Location	May 21, 2019 (%)			ASHRAE Standard (% RH)
	Min	Max	Average	
Outside	30.2	33.1	31.65	N/A
Inside				
Main Office	34.5	34.5	34.5	< 65
Room 405	31.2	32.6	31.9	< 65
Room 207	34.9	35.1	35.0	< 65
Room 408	34.4	34.6	34.5	< 65
Room 502	34.5	35.5	35.0	< 65

4.3 Carbon Dioxide

Carbon dioxide measurements within an occupied building are a standard method used to gauge the efficiency of ventilation systems. Carbon dioxide is a by-product of human respiration and does not pose an acute health hazard alone. Elevated concentrations may suggest that insufficient fresh air is being supplied to an occupied space and/or that the ventilation system does not provide a sufficient rate of air exchange.

Research has indicated that buildings with adequately operating ventilation systems are able to remove odors generated by activities in an indoor office environment efficiently. ASHRAE *Standard 62.1-2016* states that comfort (odor) criteria with respect to human bioeffluents are likely to be satisfied if the ventilation results indoor carbon dioxide concentrations are less than 700 parts per million (ppm) above the outdoor air concentration.

Carbon dioxide measurements are summarized in Table 4. On the day of the screening, the average outdoor carbon dioxide concentration obtained was 389 ppm, which calculates to a maximum indoor concentration of 1,089 ppm (700 + 389). The carbon dioxide levels inside the suite ranged from the minimum average detected, 415 ppm to 627.5 ppm, the maximum average detected, under the ASHRAE maximum recommended concentration of 1,089 ppm.

Table 4: Carbon Dioxide Measurements

Sample Location	May 21, 2019 Concentration (parts per million)			ASHRAE Standard (ppm) NTE
	Min	Max	Average	
Outside	387	391	389	N/A
Inside				
Main Office	624	631	627.5	1,089
Room 405	465	476	470.5	1,089
Room 207	443	458	450.5	1,089
Room 408	413	417	415	1,089
Room 502	443	480	461.5	1,089

4.4 Carbon Monoxide

Carbon monoxide is a colorless and odorless gas produced by the incomplete combustion of carbon containing fuels. Oil, gasoline, diesel fuels, wood, coke, and coal are the major sources of carbon monoxide. ASHRAE recommends that carbon monoxide not exceed nine ppm indoors. As indicated by the data in Table 5, carbon monoxide was not detected throughout the suite.

Table 5: Carbon Monoxide Measurements

Sample Location	May 21, 2019 Concentration (parts per million)			ASHRAE Standard (ppm)
	Min	Max	Average	
Outside	0	0	0	N/A
Inside				
Main Office	0	0	0	< 9
Room 405	0	0	0	< 9
Room 207	0	0	0	< 9
Room 408	0	0	0	< 9
Room 502	0	0	0	< 9

5. Total Fungal Air Sampling Results

Mold needs a food source, moisture, proper temperature and humidity, and at times, a source of light, to grow in an environment. Air infiltration through building entrances and exits, open windows and loading docks, and foot traffic into buildings, including the HVAC system all serve as primary pathways that can carry fungi indoors. Water leaks and humid conditions inside of buildings provide the moisture that fosters mold growth.

The May 21, 2019 mold screening sampled air using spore trap cassettes in randomly selected classrooms and other areas throughout the facility. These cassettes collect both viable spores, those capable of producing more fungal colonies, and non-viable spores, which cannot reproduce. Based upon recognized industry practices, indoor mold concentrations are compared with those detected outdoors, which are also known as ambient or baseline samples.

In normal circumstances, the diversity of spores identified indoors and outdoors should be similar with some exceptions. The high concentration of one or two species of fungal spores identified indoors and the absence of the same species outdoors can indicate a moisture problem with the potential to degrade the air quality. Fungi species present indoors are typically found at levels ranging from approximately 10-50% of their levels in the outdoor air, reflecting the filtering by the building's HVAC system.

The official laboratory report with spore trap samples collected on May 21, 2019, is presented in Appendix A. The findings indicated that the indoor concentrations were favorable compared to the outdoor concentrations, and indoor amplification was not present.

Basidiospores and Cladosporium had the highest concentrations, although they did not exceed those detected outdoors. Basidiospores are common outdoor fungi with the potential to enter building spaces though main entrances, opened windows, or via building envelopes. They may pose allergy-like symptoms but are not a fungus to be associated with water damaged building materials within the Mid-Atlantic region.

Aspergillus/Penicillium was detected indoors in one location at the same concentration as found outdoors. Low concentrations of other spores, such as Myxomycetes and Nigrospora, were detected and do not pose a concern.

6. Summary of Findings

Temperature measurements were within ASHRAE guidelines for summer temperatures, 73°F and 79°F. Relative humidity measurements were within ASHRAE guidelines, <65%. All tested locations fell below the ASHRAE limit for carbon dioxide, which was 1,089 parts per million (PPM). Carbon monoxide was not detected throughout the tested spaces.

The indoor mold spore concentrations were favorable compared to the outdoor concentrations, and indoor amplification was not present.

We appreciate the opportunity to provide these IAQ testing services for you. If you have any questions, please contact us at (202) 643-4283.

Sincerely,
ATI, INC.

Courtney E. McCall
Project Manager

Sarath Seneviratne
CIH, CSP, CHMM

Appendix A:
Laboratory Report and Chain of Custody

EMSL Analytical, Inc.

10768 Baltimore Avenue Beltsville, MD 20705

Tel/Fax: (301) 937-5700 / (301) 937-5701

http://www.EMSL.com / beltsvillelab@emsl.com

EMSL Order: 191905836
Customer ID: ATII25A
Customer PO:
Project ID:

Attn: Brian Chapman
ATI
4221 Forbes Blvd
Suite 250
Lanham, MD 20706
Project: 19-671-Glenarden Woods ES

Phone: (202) 368-1376
Fax:
Collected: 05/21/2019
Received: 05/21/2019
Analyzed: 05/23/2019 - 05/24/2019

Test Report: Air-O-Cell(™) Analysis of Fungal Spores & Particulates by Optical Microscopy (Methods MICRO-SOP-201, ASTM D7391)

Lab Sample Number:	191905836-0001			191905836-0002			191905836-0003		
Client Sample ID:	19-671-01			19-671-02			19-671-03		
Volume (L):	75						75		
Sample Location	Outside			Blank			Main Office		
Spore Types	**Raw Count**	**Count/m³**	**% of Total**	**Raw Count**	**Count/m³**	**% of Total**	**Raw Count**	**Count/m³**	**% of Total**
Alternaria (Ulocladium)	1	40	0.6	-	-	-	-	-	-
Ascospores	57	2300	34.7	-	-	-	1	40	23.5
Aspergillus/Penicillium	6	200	3	-	-	-	-	-	-
Basidiospores	85	3500	52.9	-	-	-	1	40	23.5
Bipolaris++	-	-	-	-	-	-	-	-	-
Chaetomium	-	-	-	-	-	-	-	-	-
Cladosporium	12	490	7.4	-	-	-	2	80	47.1
Curvularia	-	-	-	-	-	-	-	-	-
Epicoccum	-	-	-	-	-	-	-	-	-
Fusarium	-	-	-	-	-	-	-	-	-
Ganoderma	1	40	0.6	-	-	-	-	-	-
Myxomycetes++	-	-	-	-	-	-	1*	10*	5.9
Pithomyces++	-	-	-	-	-	-	-	-	-
Rust	-	-	-	-	-	-	-	-	-
Scopulariopsis/Microascus	-	-	-	-	-	-	-	-	-
Stachybotrys/Memnoniella	-	-	-	-	-	-	-	-	-
Unidentifiable Spores	-	-	-	-	-	-	-	-	-
Zygomycetes	-	-	-	-	-	-	-	-	-
Gonatobotryum	1	40	0.6	-	-	-	-	-	-
Nigrospora	-	-	-	-	-	-	-	-	-
Polythrincium	1*	10*	0.2	-	-	-	-	-	-
Total Fungi	**164**	**6620**	**100**	**-**	**No Trace**	**-**	**5**	**170**	**100**
Hyphal Fragment	1	40	-	-	-	-	1	40	-
Insect Fragment	1	40	-	-	-	-	1*	10*	-
Pollen	8	300	-	-	-	-	1*	10*	-
Analyt. Sensitivity 600x	-	41	-	-	0	-	-	41	-
Analyt. Sensitivity 300x	-	13*	-	-	0*	-	-	13*	-
Skin Fragments (1-4)	-	1	-	-	-	-	-	3	-
Fibrous Particulate (1-4)	-	1	-	-	-	-	-	1	-
Background (1-5)	-	1	-	-	-	-	-	2	-

++ Includes other spores with similar morphology; see EMSL's fungal glossary for each specific category.

Stefanie Schneider

Stefanie Schneider, Microbiology Laboratory Manager
or other approved signatory

High levels of background particulate can obscure spores and other particulates leading to underestimation. Background levels of 5 indicate an overloading of background particulates, prohibiting accurate detection and quantification. Present = Spores detected on overloaded samples. Results are not blank corrected unless otherwise noted. The detection limit is equal to one fungal spore, structure, pollen, fiber particle or insect fragment. "*" Denotes particles found at 300X. "-" Denotes not detected. Due to method stopping rules, raw counts in excess of 100 are extrapolated based on the percentage analyzed. EMSL maintains liability limited to cost of analysis. This report relates only to the samples reported above and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. Interpretation and use of test results are the responsibility of the client. Samples received in good condition unless otherwise noted.

Samples analyzed by EMSL Analytical, Inc. Beltsville, MD AIHA-LAP, LLC --EMLAP Accredted #102891

Initial report from: 05/24/2019 11:54:17

For information on the fungi listed in this report, please visit the Resources section at www.emsl.com

EMSL Analytical, Inc.

10768 Baltimore Avenue Beltsville, MD 20705

Tel/Fax: (301) 937-5700 / (301) 937-5701

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EMSL Order: 191905836
Customer ID: ATII25A
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Attn: Brian Chapman
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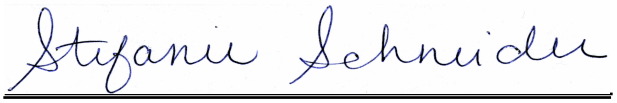
Project: 19-671-Glenarden Woods ES

Phone: (202) 368-1376
Fax:
Collected: 05/21/2019
Received: 05/21/2019
Analyzed: 05/23/2019 - 05/24/2019

Test Report: Air-O-Cell(™) Analysis of Fungal Spores & Particulates by Optical Microscopy (Methods MICRO-SOP-201, ASTM D7391)

Lab Sample Number:	191905836-0004			191905836-0005			191905836-0006		
Client Sample ID:	19-671-04			19-671-05			19-671-06		
Volume (L):	75			75			75		
Sample Location	Rm-405			Rm 207			408		
Spore Types	**Raw Count**	**Count/m³**	**% of Total**	**Raw Count**	**Count/m³**	**% of Total**	**Raw Count**	**Count/m³**	**% of Total**
Alternaria (Ulocladium)	-	-	-	-	-	-	-	-	-
Ascospores	-	-	-	-	-	-	1	40	13.8
Aspergillus/Penicillium	-	-	-	-	-	-	4	200	69
Basidiospores	-	-	-	-	-	-	1	40	13.8
Bipolaris++	-	-	-	-	-	-	-	-	-
Chaetomium	-	-	-	-	-	-	-	-	-
Cladosporium	2	80	100	1	40	100	-	-	-
Curvularia	-	-	-	-	-	-	-	-	-
Epicoccum	-	-	-	-	-	-	-	-	-
Fusarium	-	-	-	-	-	-	-	-	-
Ganoderma	-	-	-	-	-	-	-	-	-
Myxomycetes++	-	-	-	-	-	-	-	-	-
Pithomyces++	-	-	-	-	-	-	-	-	-
Rust	-	-	-	-	-	-	-	-	-
Scopulariopsis/Microascus	-	-	-	-	-	-	-	-	-
Stachybotrys/Memnoniella	-	-	-	-	-	-	-	-	-
Unidentifiable Spores	-	-	-	-	-	-	-	-	-
Zygomycetes	-	-	-	-	-	-	-	-	-
Gonatobotryum	-	-	-	-	-	-	-	-	-
Nigrospora	-	-	-	-	-	-	1*	10*	3.4
Polythrincium	-	-	-	-	-	-	-	-	-
Total Fungi	**2**	**80**	**100**	**1**	**40**	**100**	**7**	**290**	**100**
Hyphal Fragment	1	40	-	-	-	-	1	40	-
Insect Fragment	1	40	-	2	80	-	1	40	-
Pollen	-	-	-	-	-	-	1	40	-
Analyt. Sensitivity 600x	-	41	-	-	41	-	-	41	-
Analyt. Sensitivity 300x	-	13*	-	-	13*	-	-	13*	-
Skin Fragments (1-4)	-	2	-	-	2	-	-	1	-
Fibrous Particulate (1-4)	-	1	-	-	1	-	-	1	-
Background (1-5)	-	1	-	-	1	-	-	1	-

++ Includes other spores with similar morphology; see EMSL's fungal glossary for each specific category.



Stefanie Schneider, Microbiology Laboratory Manager
or other approved signatory

High levels of background particulate can obscure spores and other particulates leading to underestimation. Background levels of 5 indicate an overloading of background particulates, prohibiting accurate detection and quantification. Present = Spores detected on overloaded samples. Results are not blank corrected unless otherwise noted. The detection limit is equal to one fungal spore, structure, pollen, fiber particle or insect fragment. "*" Denotes particles found at 300X. "-" Denotes not detected. Due to method stopping rules, raw counts in excess of 100 are extrapolated based on the percentage analyzed. EMSL maintains liability limited to cost of analysis. This report relates only to the samples reported above and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. Interpretation and use of test results are the responsibility of the client. Samples received in good condition unless otherwise noted.

Samples analyzed by EMSL Analytical, Inc. Beltsville, MD AIHA-LAP, LLC --EMLAP Accredted #102891

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EMSL Order: 191905836
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Attn: Brian Chapman
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4221 Forbes Blvd
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Project: 19-671-Glenarden Woods ES

Phone: (202) 368-1376
Fax:
Collected: 05/21/2019
Received: 05/21/2019
Analyzed: 05/23/2019 - 05/24/2019

Test Report: Air-O-Cell(™) Analysis of Fungal Spores & Particulates by Optical Microscopy (Methods MICRO-SOP-201, ASTM D7391)

Lab Sample Number:	**191905836-0007**								
Client Sample ID:	**19-671-07**								
Volume (L):	**75**								
Sample Location	**502**								
Spore Types	**Raw Count**	**Count/m³**	**% of Total**						
Alternaria (Ulocladium)	-	-	-						
Ascospores	1	40	22.2						
Aspergillus/Penicillium	-	-	-						
Basidiospores	3	100	55.6						
Bipolaris++	-	-	-						
Chaetomium	-	-	-						
Cladosporium	1	40	22.2						
Curvularia	-	-	-						
Epicoccum	-	-	-						
Fusarium	-	-	-						
Ganoderma	-	-	-						
Myxomycetes++	-	-	-						
Pithomyces++	-	-	-						
Rust	-	-	-						
Scopulariopsis/Microascus	-	-	-						
Stachybotrys/Memnoniella	-	-	-						
Unidentifiable Spores	-	-	-						
Zygomycetes	-	-	-						
Gonatobotryum	-	-	-						
Nigrospora	-	-	-						
Polythrincium	-	-	-						
Total Fungi	**5**	**180**	**100**						
Hyphal Fragment	-	-	-						
Insect Fragment	-	-	-						
Pollen	-	-	-						
Analyt. Sensitivity 600x	-	41	-						
Analyt. Sensitivity 300x	-	13*	-						
Skin Fragments (1-4)	-	2	-						
Fibrous Particulate (1-4)	-	1	-						
Background (1-5)	-	1	-						

++ Includes other spores with similar morphology; see EMSL's fungal glossary for each specific category.

Stefanie Schneider

Stefanie Schneider, Microbiology Laboratory Manager
or other approved signatory

High levels of background particulate can obscure spores and other particulates leading to underestimation. Background levels of 5 indicate an overloading of background particulates, prohibiting accurate detection and quantification. Present = Spores detected on overloaded samples. Results are not blank corrected unless otherwise noted. The detection limit is equal to one fungal spore, structure, pollen, fiber particle or insect fragment. "*" Denotes particles found at 300X. "-" Denotes not detected. Due to method stopping rules, raw counts in excess of 100 are extrapolated based on the percentage analyzed. EMSL maintains liability limited to cost of analysis. This report relates only to the samples reported above and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. Interpretation and use of test results are the responsibility of the client. Samples received in good condition unless otherwise noted.

Samples analyzed by EMSL Analytical, Inc. Beltsville, MD AIHA-LAP, LLC --EMLAP Accredted #102891

Initial report from: 05/24/2019 11:54:17

For information on the fungi listed in this report, please visit the Resources section at www.emsl.com

OrderID: 191905836

EMSL ANALYTICAL, INC
LABORATORY · PRODUCTS · TRAINING

Microbiology Chain of Custody

EMSL Order Number *(Lab Use Only)*:

EMSL ANALYTICAL, INC.
200 ROUTE 130 NORTH
CINNAMINSON, NJ 08077
PHONE: (800) 220-3675
FAX:(856) 786-0262

Company Name: ATI, Inc.	**EMSL-Bill to:** ☐ Same ☐ Different If Bill to is Different note instructions in Comments
Street: 4221 Rumsey Road Suite 250	*Third Party Billing requires written authorization from third party*
City: Lanham **State/Province:** MD	**Zip/Postal Code:** 20706 **Country:**
Report To (Name): Courtney and Brian	**Telephone #:**
Email Address: Brian@atiinc.com / Courtney@atiinc.com	**Fax #:** **Purchase Order:**
Project Name/Number: 19-671 - Glenarden Woods ES	**Please Provide Results:** ☐ Fax ■ Email
U.S. State Samples Taken: MD **Project Zip Code:**	**Connecticut Samples:** ■ Commercial ☐ Residential

Sterile, Sodium Thiosulfate Preserved Bottle Used: ☐ **Biocide Used in Source (specify):** ☐

Public Water Supply Samples: ☐ **Note: All results may automatically be reported to DOH if required by state.**

Turnaround Time (TAT) Options - Please Check

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

Microbiology Test Codes

M001 *Air-O-Cell* | **M174** MoldSnap
M030 Micro 5 | **M032** Allergenco-D

M041 Fungal Direct Examination
M169 Pollen ID & Enumeration
M280 Dust Characterization Level-1
M281 Dust Characterization Level-2
M005 Viable Fungi- Air Samples (Genus ID & Count)
M006 Viable Fungi- Air Samples (Includes *Penicillium, Aspergillus, Cladosporium, Stachybotrys* Species ID & Count)
M007 Culturable fungi - Surface Samples (Genus ID & Count)
M008 Culturable fungi - Surface Samples (Includes *Penicillium, Aspergillus, Cladosporium, Stachybotrys* Species ID & Count)
M009 Bacteria Culture Gram Stain & Count
M010 Bacteria Count & ID - 3 Most Prominent
M011 Bacteria Count & ID - 5 Most Prominent

M012 *Pseudomonas aeruginosa* (P/A***)
M024 *Pseudomonas aeruginosa* (MFT*)
M015 Heterotrophic Plate Count
M017 Total Coliform & *E. coli* (Colilert P/A***)
M018 Total Coliform & *E coli* (MFT*)
M114 Total Coliform & *E. coli* Enumeration (Colilert MPN**)
M019 Fecal Coliform (MFT*)
M020 Fecal *Streptococcus* (MFT*)
M029 *Enterococci* (MFT*)
M129 *Enterococci* (Enterolert P/A***)
M180 Real Time qPCR-ERMI 36 Panel
M025 Sewage Screen –Water (MFT*)

M115 Sewage Screen - Water (P/A***)
M116 Sewage Screen - Water (MPN**)
M117 Sewage Screen - Swab (P/A***)
M013 Sewage Screen - Swab (MFT*)
M133 *Methicillin-resistant Staph aureus* (MRSA)
M031 Rapid-growing non-TB *Mycobacteria* Detection & Enumeration
M014 Endotoxin Analysis
M044 Group Allergen (Cat, Dog, Cockroach, Dust Mite)
Other See Analytical Price Guide
***Legionella* Analysis** Please use EMSL *Legionella* COC

*MFT= Membrane Filtration Technique
**MPN= Most Probable Number
***P/A= Presence/Absence

Name of Sampler: Brian Chapman **Signature of Sampler:**

Sample #	Sample Location/Description	Sample Type	Potable/ NonPotable (Only for Waters)	Test Code	Volume/ Area	Date/Time Collected	Temperature (°C) (Lab Use Only)
Example A1	Kitchen Sink/Tap	Water	☒ P ☐ NP	M017	100 mL	9/1/13 4:00 PM	
19-671-01	Outside	Air	☐ P ☐ NP	M001	75L	05-21-19	1:00pm
19-671-02	Blank	Air	☐ P ☐ NP	M001	75L	05-21-19	
19-671-03	Main Office	Air	☐ P ☐ NP	M001	75L	05-21-19	
19-671-04	Rm -405	Air	☐ P ☐ NP	M001	75L	05-21-19	
19-671-05	Rm 207	Air	☐ P ☐ NP	M001	75L	05-21-19	

Client Sample # (s): -7 **Total # of Samples:** 7 **Samples Received Chilled?** Yes / No (Lab Use Only)

Relinquished (Client): **Date:** 5/21/19 **Time:**

Received (Lab): **Date:** 5/21/19 **Time:** 4:30 AM

Comments/Special Instructions:

Controlled Document – COC-34 Micro R8 11/14/2017

EMSL ANALYTICAL, INC.
LABORATORY•PRODUCTS•TRAINING

Microbiology Chain of Custody
EMSL Order Number *(Lab Use Only)*:

EMSL ANALYTICAL, INC.
200 ROUTE 130 NORTH
CINNAMINSON, NJ 08077
PHONE: (800) 220-3675
FAX.(856) 786-0262

Additional pages of the chain of custody are only necessary if needed for additional sample information

Sample #	Sample Location/Description	Sample Type	Potable/ NonPotable (Only for Waters)	Test Code	Volume/ Area	Date/Time Collected	Temperature (°C) (Lab Use Only)
19-671-06	408	Air	☐ P ☐ NP	M001	75L	05-21-19	
19-671-07	502	✓	☐ P ☐ NP	"	"	"	
			☐ P ☐ NP				
			☐ P ☐ NP				
			☐ P ☐ NP				
			☐ P ☐ NP				
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			☐ P ☐ NP				
			☐ P ☐ NP				

Comments/Special Instructions:

Page 2 of 2

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Appendix B:
Instrument Calibration Records

Certificate of Calibration

(✓) ~~Buck™~~ BioAire Pump Calibration Rotameter

( ) Buck™ BioSlide Pump Calibration Rotameter

Serial number: R14057

Date Calibrated: 1/22/19 **Calibration Due Date:** 1/22/20

Flow Calibration

This is to certify that the rotameter listed above has been calibrated using a Buck Primary calibrator listed below which is calibrated according to A.P. Buck, Inc. calibration procedure APB-1, Ver. 6.2 and is traceable to the National Institute of Standards & Technology (N.I.S.T). A.P. Buck guarantees the accuracy of the rotameter to be within ± 5% of the actual flow rate.

AMBIENT CONDITIONS: Temperature 74±3° F Relative Humidity 50±10%

Description	MFR.	Model	Serial #
Primary Calibrator	A.P. Buck Inc.	M30B	☐ A40020 ☑ ~~A40021~~

QA Approval By:

A.P. BUCK, INC.
7101 Presidents Drive, Suite 110
Orlando, FL 32809
Phone: 407-851-8602
Fax: 407-851-8910

BUCK
A.P. BUCK, INC.

CERTIFICATE OF CALIBRATION AND TESTING

TSI Incorporated, 500 Cardigan Road, Shoreview, MN 55126 USA
Tel: 1-800-874-2811 1-651-490-2811 Fax: 1-651-490-3824 http://www.tsi.com

ENVIRONMENT CONDITIONS		
TEMPERATURE	75.3 (24.1)	°F (°C)
RELATIVE HUMIDITY	46	%RH
BAROMETRIC PRESSURE	28.84 (976.6)	inHg (hPa)

MODEL	7575-X
SERIAL NUMBER	7575X1711004

☐ AS LEFT
☒ AS FOUND
☒ IN TOLERANCE
☐ OUT OF TOLERANCE

– CALIBRATION VERIFICATION RESULTS –

THERMO COUPLE — SYSTEM PRESSURE01-02 — *Unit: °F (°C)*

#	STANDARD	MEASURED	ALLOWABLE RANGE	#	STANDARD	MEASURED	ALLOWABLE RANGE
1	71.5 (21.9)	71.1 (21.7)	69.5~73.5 (20.8~23.1)				

BAROMETRIC PRESSURE — SYSTEM PRESSURE01-02 — *Unit: inHg (hPa)*

#	STANDARD	MEASURED	ALLOWABLE RANGE	#	STANDARD	MEASURED	ALLOWABLE RANGE
1	28.89 (978.3)	28.80 (975.3)	28.31~29.47 (958.7~998.0)				

TSI does hereby certify that the above described instrument conforms to the original manufacturer's specification (not applicable to As Found data) and has been calibrated using standards whose accuracies are traceable to the United States National Institute of Standards and Technology (NIST) or has been verified with respect to instrumentation whose accuracy is traceable to NIST, or is derived from accepted values of physical constants. TSI's calibration system is registered to ISO-9001:2015.

Measurement Variable	System ID	Last Cal.	Cal. Due
Temperature	E002827	03-14-18	03-31-19
Pressure	E003982	02-07-18	08-31-18

Measurement Variable	System ID	Last Cal.	Cal. Due
Pressure	E005254	10-06-17	10-31-18
DC Voltage	E003493	09-21-17	09-30-18

K. Davey
VERIFIED

May 25, 2018
DATE

Doc ID: CERT_GEN_ACC

TSI P/N 2300157

CERTIFICATE OF CALIBRATION AND TESTING

TSI Incorporated, 500 Cardigan Road, Shoreview, MN 55126 USA
Tel: 1-800-874-2811 1-651-490-2811 Fax: 1-651-490-3824 http://www.tsi.com

ENVIRONMENT CONDITIONS		
TEMPERATURE	75.2 (24.0)	°F (°C)
RELATIVE HUMIDITY	45	%RH
BAROMETRIC PRESSURE	28.81 (975.6)	inHg (hPa)

MODEL	7575-X
SERIAL NUMBER	7575X1711004

☒ AS LEFT ☐ AS FOUND

☒ IN TOLERANCE ☐ OUT OF TOLERANCE

– CALIBRATION VERIFICATION RESULTS –

THERMO COUPLE — SYSTEM PRESSURE01-02 — *Unit: °F (°C)*

#	STANDARD	MEASURED	ALLOWABLE RANGE	#	STANDARD	MEASURED	ALLOWABLE RANGE
1	71.6 (22.0)	71.6 (22.0)	69.6~73.6 (20.9~23.1)				

BAROMETRIC PRESSURE — SYSTEM PRESSURE01-02 — *Unit: inHg (hPa)*

#	STANDARD	MEASURED	ALLOWABLE RANGE	#	STANDARD	MEASURED	ALLOWABLE RANGE
1	28.89 (978.3)	28.91 (979.0)	28.31~29.47 (958.7~998.0)				

TSI does hereby certify that the above described instrument conforms to the original manufacturer's specification (not applicable to As Found data) and has been calibrated using standards whose accuracies are traceable to the United States National Institute of Standards and Technology (NIST) or has been verified with respect to instrumentation whose accuracy is traceable to NIST, or is derived from accepted values of physical constants. TSI's calibration system is registered to ISO-9001:2015.

Measurement Variable	System ID	Last Cal.	Cal. Due
Temperature	E002827	03-14-18	03-31-19
Pressure	E003982	02-07-18	08-31-18

Measurement Variable	System ID	Last Cal.	Cal. Due
Pressure	E005254	10-06-17	10-31-18
DC Voltage	E003493	09-21-17	09-30-18

Ken Davey
CALIBRATED

May 25, 2018
DATE

Doc. ID: CERT_GEN_WCC

TSI P/N 2300157

CERTIFICATE OF CALIBRATION AND TESTING

TSI Incorporated, 500 Cardigan Road, Shoreview, MN 55126 USA
Tel: 1-800-874-2811 1-651-490-2811 Fax: 1-651-490-3824 http://www.tsi.com

ENVIRONMENT CONDITIONS		
TEMPERATURE	75.0 (23.9)	°F (°C)
RELATIVE HUMIDITY	45	%RH
BAROMETRIC PRESSURE	28.83 (976.3)	inHg (hPa)

MODEL	982
SERIAL NUMBER	P17100006

☐ AS LEFT ☐ IN TOLERANCE
☒ AS FOUND ☒ OUT OF TOLERANCE

– CALIBRATION VERIFICATION RESULTS –

GAS CO_2 AS FOUND — SYSTEM G-101 — *Unit: ppm*

#	STANDARD	MEASURED	ALLOWABLE RANGE	#	STANDARD	MEASURED	ALLOWABLE RANGE
1	0	0	0~50	4	3033.5	* 2860.4	2942.5~3124.5
2	523.8	* 470.7	473.8~573.8	5	5060	* 4739.5	4908.2~5211.8
3	1025	* 960.5	975~1075				

GAS CO AS FOUND — SYSTEM G-101 — *Unit: ppm*

#	STANDARD	MEASURED	ALLOWABLE RANGE	#	STANDARD	MEASURED	ALLOWABLE RANGE
1	36	* 0	33~39	2	101.3	* 0	98.2~104.3

TEMPERATURE AS FOUND — SYSTEM T-101 — *Unit: °F (°C)*

#	STANDARD	MEASURED	ALLOWABLE RANGE	#	STANDARD	MEASURED	ALLOWABLE RANGE
1	32.0 (0.0)	32.4 (0.2)	31.0~33.0 (−0.6~0.6)	2	140.0 (60.0)	140.8 (60.4)	139.0~141.0 (59.4~60.6)

HUMIDITY AS FOUND — SYSTEM H-102 — *Unit: %RH*

#	STANDARD	MEASURED	ALLOWABLE RANGE	#	STANDARD	MEASURED	ALLOWABLE RANGE
1	10.0	9.8	7.0~13.0	4	70.0	72.5	67.0~73.0
2	30.0	30.6	27.0~33.0	5	90.02	* 93.27	87.02~93.02
3	49.9	51.6	46.9~52.9				

**Indicates Out-of-Tolerance Condition*

TSI does hereby certify that the above described instrument conforms to the original manufacturer's specification (not applicable to As Found data) and has been calibrated using standards whose accuracies are traceable to the United States National Institute of Standards and Technology (NIST) or has been verified with respect to instrumentation whose accuracy is traceable to NIST, or is derived from accepted values of physical constants. TSI's calibration system is registered to ISO-9001:2015.

Measurement Variable	System ID	Last Cal.	Cal. Due
5000 CO_2	T-0926	02-15-18	12-18-20
N2	t78516	04-17-18	04-03-23
Flow	E003298	10-25-17	10-31-18
Flow	E003980	03-28-18	03-31-19
2000 C4H8	EB0053919	10-20-17	10-20-21
Temperature	E003986	02-14-18	08-31-18
Humidity	E003539	02-22-18	08-31-18

Measurement Variable	System ID	Last Cal.	Cal. Due
200 CO	CC506122	01-24-18	01-25-26
Air	108551y	04-23-18	03-09-20
Flow	E004631	10-25-17	10-31-18
Flow	E003525	01-10-18	01-31-19
100 C4H8	EB0078607	09-28-16	09-28-20
Temperature	E003987	02-14-18	08-31-18

K. Davey
VERIFIED

May 25, 2018
DATE

Doc ID: CERT_GEN_WCC

TSI P/N 2300157

TSI P/N 2300157

CERTIFICATE OF CALIBRATION AND TESTING

TSI Incorporated, 500 Cardigan Road, Shoreview, MN 55126 USA
Tel: 1-800-874-2811 1-651-490-2811 Fax: 1-651-490-3824 http://www.tsi.com

Environment Conditions		
Temperature	75.9 (24.4)	°F (°C)
Relative Humidity	46	%RH
Barometric Pressure	28.81 (975.6)	inHg (hPa)

Model	982
Serial Number	P17100006

☒ As Left ☐ As Found

☒ In Tolerance ☐ Out of Tolerance

– Calibration Verification Results –

Temperature Verification — System T-101 — *Unit: °F (°C)*

#	Standard	Measured	Allowable Range	#	Standard	Measured	Allowable Range
1	32.0 (0.0)	32.4 (0.2)	31.0~33.0 (−0.6~0.6)	2	140.0 (60.0)	140.8 (60.4)	139.0~141.0 (59.4~60.6)

Humidity Verification — System H-102 — *Unit: %RH*

#	Standard	Measured	Allowable Range	#	Standard	Measured	Allowable Range
1	10.0	9.6	7.8~12.2	4	70.0	69.7	67.8~72.2
2	30.0	29.7	27.8~32.2	5	90.0	89.3	87.8~92.2
3	50.0	49.9	47.8~52.2				

CO_2 Gas Verification — System G-101 — *Unit: ppm*

#	Standard	Measured	Allowable Range	#	Standard	Measured	Allowable Range
1	0	0	0~50	4	3031	3043	2940~3122
2	518	510	468~568	5	5000	4988	4850~5150
3	1020	1030	970~1070				

CO Gas Verification — System G-101 — *Unit: ppm*

#	Standard	Measured	Allowable Range	#	Standard	Measured	Allowable Range
1	36	36	33~39	2	101	100	98~104

TSI does hereby certify that the above described instrument conforms to the original manufacturer's specification (not applicable to As Found data) and has been calibrated using standards whose accuracies are traceable to the United States National Institute of Standards and Technology (NIST) or has been verified with respect to instrumentation whose accuracy is traceable to NIST, or is derived from accepted values of physical constants. TSI's calibration system is registered to ISO-9001:2015.

Measurement Variable	System ID	Last Cal.	Cal. Due
Temperature	E003986	02-14-18	08-31-18
Humidity	E003539	02-22-18	08-31-18
200 CO	CC506122	01-24-18	01-25-26
Air	108551y	04-23-18	03-09-20
Flow	E004631	10-25-17	10-31-18
Flow	E003525	01-10-18	01-31-19
100 C4H8	EB0078607	09-28-16	09-28-20

Measurement Variable	System ID	Last Cal.	Cal. Due
Temperature	E003987	02-14-18	08-31-18
5000 CO_2	c5732043	04-16-18	10-04-20
N_2	t78516	04-17-18	04-03-23
Flow	E003298	10-25-17	10-31-18
Flow	E003980	03-28-18	03-31-19
2000 C4H8	EB0053919	10-20-17	10-20-21

Calibrated

May 29, 2018
Date

Doc. ID: CERT_GEN_WCC