ESI Environmental Solutions, Inc.

www.esi4u.com (410)-867-6262

Discovery Environmental Inspection Report

Project Contact Information

Alex Baylor Environmental Specialists Environmental Safety Office 13306 Old Marlboro Pike Upper Marlboro, MD 20772 301-952-6760 alex.baylor@pgcps.org	Phyllis E. Williams Elementary School 64,451 square feet	Bryan Harrington Certified Indoor Environmentalist Environmental Solutions, Inc. 6114 Drum Point Rd Deale, MD 20751 410-867-6262 Bryan@esi4u.com

Property Location

9601 Prince Place, Upper Marlboro, MD 20774

Date of Inspection 4/30/2019

Prepared By: Bryan Harrington

Certified Indoor Environmentalist (CIE)

Dear Mr. Baylor,

The results of the inspection and testing performed Phyllis E. Williams Elementary School, which is located at 9601 Prince Place, Upper Marlboro, MD 20774, are concluded and the findings are enclosed. I want to thank you for allowing ESI the opportunity to service your indoor environmental needs. Included in this report are the observations, lab results, and recommendation from ESI's 4/30/2019 inspection and testing.

Background Information

The Prince George's County Public School Environmental Team has taken a proactive approach in cleaning the above-mentioned school to ensure there are no health or environmental risks related to microbial hazards. Historically elevated levels of humidity, condensation from pipes, periodic steam leaks, and outdated HVAC systems may have contributed to water damage ceiling tiles and colonization of mold spores in various areas of the school.

Purpose

ESI was engaged to inspect the school in a random sufficient manner. Classrooms, administration offices and common area building materials and contents, will be visual inspected for water damage and microbial growth.

In each location inspected, the indoor air quality will be tested for elevated levels of carbon monoxide and carbon dioxide, in addition to measuring the relative humidity and temperature. Microbial hazards within the breathable airspace will also be tested.

Based upon the visual assessment, instrument readings and lab results, ESI will determine if additional remediation in required.

Observations and instrument readings

The following table is designed for this project. Some of the fields may not be filled in due to not being applicable during the time of the inspection. You will notice either a '**YES**' or 'NO' in the table. '**YES**' indicates that mold and/or water damage was detected and 'NO' indicates it was not. If '**YES**' is noted, remediation recommendation will be included for the area inspected.

Location	IAQ Sample #	Swab	R/H	Temp	CO2	CO	Cubic feet of air.	
A101	2441724	**YES**	46.0	76.8	976	000	6,660	
Inspected								
Ceiling Tiles	Walls	Teacher Desks	Student Desks	Tables	Cabinets Shelving	Convector	HVAC Diffusors	Sinks
2x4	CMU and drywall	1	0	17	3	0	4	0
NO	NO	NO	NO	**YES**	NO	NO	NO	NO

Observation Notes

- Suspected mold growth was discovered on the underside of trapezoidal table across from door. A surface swab sample was collected and "Rare" Cladosporium species was identified on the underside of the table.
- Ceiling tiles are sagging.
- The indoor air quality should not pose environmental or exposure risks at these levels. The total spore count was 320 Count/M^3 and no elevated levels of Carbon monoxide (976 ppm) or Carbon dioxide (000) were detected.

Recommendations

- HEPA vacuum the underside of the trapezoidal table(s) to remove surface mold growth. Then damp-wipe underside of the trapezoidal table(s) with ShockWave or equivalent.
- Monitor relative and maintain between 30-50 percent, particularly during warm and humid summer months.

Location	IAQ Sample #	Swab	R/H	Temp	CO2	CO	Cubic feet of air.	
B104	2441722	NO	51.0	74.4	**1097**	000	6,535	
Inspected								
Ceiling Tiles	Walls	Teacher Desks	Student Desks	Tables	Cabinets Shelving	Convector	HVAC Diffusors	Sinks
2x4	CMU and drywall	1	20	3	3	0	4	0
NO	NO	NO	NO	**YES**	NO	NO	NO	NO

Observation Notes

- Suspected mold growth was discovered on the underside of rectangular tables along the wall adjoining the Pod B hallway.
- Ceiling tiles are sagging.
- Amplified levels of Carbon dioxide (1,097 ppm) were detected.
- The total spore count (240 Count/M^3) and Carbon monoxide (000) levels should not pose exposure risks.

Recommendations

- HEPA vacuum the underside of the rectangular tables to remove suspected mold growth. Then damp-wipe underside of the rectangular tables with ShockWave or equivalent.
- Increase air movement and/or ventilation to reduce Carbon dioxide levels.
- Monitor relative and maintain between 30-50 percent, particularly during warm and humid summer months.

Location	IAQ Sample #	Swab	R/H	Temp	CO2	CO	Cubic feet of air.	
C101	2441723	NO	52.6	75.2	1054	000	6,975	
Inspected								
Ceiling Tiles	Walls	Teacher Desks	Student Desks	Tables	Cabinets Shelving	Convector	HVAC Diffusors	Sinks
2x4	CMU and drywall	0	20	5	7	0	4	0
NO	NO	NO	NO	YES	NO	NO	NO	NO

Observation Notes

- Suspected mold growth was discovered on the underside of trapezoidal table underneath the TV.
- Amplified levels of Carbon dioxide (1,054 ppm) were detected.
- The total spore count (920 Count/M^3) and Carbon monoxide (000) levels should not pose exposure risks.

Recommendations

- HEPA vacuum the underside of the trapezoidal table to remove suspected mold growth. Then damp-wipe underside of the trapezoidal table with ShockWave or equivalent.
- Increase air movement and/or ventilation to reduce Carbon dioxide levels.

Location	IAQ Sample #	Swab	R/H	Temp	CO2	CO	Cubic feet of air.	
NW104	2441714	N/A	54.4	75.9	1215	000	6,452	
Inspected								
Ceiling Tiles	Walls	Teacher Desks	Student Desks	Tables	Cabinets Shelving	Convector	HVAC Diffusors	Windows
2x4	CMU	1	0	2	6	0	4	6
YES	NO	NO	NO	NO	NO	NO	NO	NO

Observation Notes

- There were no signs of suspected mold growth in this location.
- There were 5 water damaged ceiling tiles.
- Amplified levels of Carbon dioxide (1,215 ppm) were detected.
- The total spore count (440 Count/M^3) and Carbon monoxide (000) levels should not pose exposure risks.

Recommendations

- Remove the water damaged ceiling tiles and place in contractor's bag for proper disposal. Replace as needed.
- Increase air movement and/or ventilation to reduce Carbon dioxide levels.

Location	IAQ Sample #	Swab	R/H	Temp	CO2	CO	Cubic feet of air.	
D103	2441719	N/A	51.5	75.5	926	000	6,535	
Inspected								
Ceiling Tiles	Walls	Teacher Desks	Student Desks	Tables	Cabinets Shelving	Convector	HVAC Diffusors	Sinks
2x4	CMU and drywall	1	26	6	6	0	4	0
NO	NO	NO	NO	NO	NO	NO	NO	NO
Observation Notes								
• There were no signs of visible mold growth in this location. • The indoor air quality should not pose environmental or exposure risks at these levels. The total spore count was 80 Count/M^3 and no elevated levels of Carbon dioxide (926 ppm) or Carbon monoxide (000 ppm) were detected.								
Recommendations								
NONE								

Location	IAQ Sample #	Swab	R/H	Temp	CO2	CO	Cubic feet of air.	
E102	2441713	N/A	50.9	76.6	936	000	7,006	
Inspected								
Ceiling Tiles	Walls	Teacher Desks	Student Desks	Tables	Cabinets Shelving	Convector	HVAC Diffusors	Sinks
2x4	CMU and drywall	1	0	4	3	0	4	0
NO	NO	NO	NO	NO	NO	NO	NO	NO
Observation Notes								
• There were no signs of visible mold growth in this location. • The indoor air quality should not pose environmental or exposure risks at these levels. The total spore count was 240 Count/M^3 and no elevated levels of Carbon dioxide (936 ppm) or Carbon monoxide (000 ppm) were detected.								
Recommendations								
NONE								

Location	IAQ Sample #	Swab	R/H	Temp	CO2	CO	Cubic feet of air.
Outdoors	2441718	N/A	35.9	83.6	726	000	N/A
Observation Notes							
• The total spore count was 3,000 Count/M^3 and the prominent genera were Basidiospores (1,760 Count/M^3), Ascospores (520 Count/M^3), Cladosporium (440 Count/M^3), and Smuts/Myxomycetes (200 Count/M^3).							

Interpretation of Lab Results

In the enclosed Air Cassette Analysis report, you will notice Fungal Identification, which is the genera detected in the breathable airspace, both indoors and/or outdoors (control sample). The Raw Count is the actual number of spores counted on the slide, and the Count/M^3 are the spores per cubic meter of air. The Other particles are non-living particles such as dander, mycelial fragments, pollens, etc…

In order for humans to be exposed indoors, fungal spores, fragments, or metabolites must be released into the air and inhaled, physically contacted (dermal exposure), or ingested. Whether symptoms develop in people exposed to fungi depends on the nature of the fungal material (e.g., allergenic, toxic, or infectious), the amount of exposure, and the susceptibility of exposed persons.

Susceptibility varies with genetic predisposition (e.g., allergic reactions do not always occur in all individuals), age, state of health, and concurrent exposures.

Air Sampling Lab Results

SanAir Technologies Laboratory

Name: Environmental Solutions, Inc
Address: 534-A Deale Road
Deale, MD 20751
Phone: 410-867-6262

Project Number: 9601 Prince Place
P.O. Number:
Project Name: Phyllis E. Williams E.S.
Collected Date: 4/30/2019
Received Date: 5/1/2019 10:40:00 AM

SanAir ID Number
19020665
FINAL REPORT
5/3/2019 12:24:55 PM

Analyst: Smith, Kiersten

Air Cassette Analysis

ND = None Detected. Blank spaces indicate no spores detected.

SanAir ID Number	19020665-001			19020665-002			19020665-003			19020665-004		
Analysis Using STL	107C			107C			107C			107C		
Sample Number	2441724			2441722			2441723			2441714		
Sample Identification	Room A 101			Room B 104			Room C 101			Room NW 104		
Sample Type	Air Cassette - Micro-5			Air Cassette - Micro-5			Air Cassette - Micro-5			Air Cassette - Micro-5		
Volume	25 Liters			25 Liters			25 Liters			25 Liters		
Analytical Sensitivity	40 Count/M^3			40 Count/M^3			40 Count/M^3			40 Count/M^3		
Background Density	1+			2			2			2		
Other	**Raw Count**	**Count/M^3**	**%**	**Raw Count**	**Count/M^3**	**%**	**Raw Count**	**Count/M^3**	**%**	**Raw Count**	**Count/M^3**	**%**
Dander	5	200	n/a	59	2360	n/a	72	2880	n/a	73	2920	n/a
Fibers	2	80	n/a	4	160	n/a	8	320	n/a	4	160	n/a
Pollen												
Fungal Identification	**Raw Count**	**Count/M^3**	**%**	**Raw Count**	**Count/M^3**	**%**	**Raw Count**	**Count/M^3**	**%**	**Raw Count**	**Count/M^3**	**%**
Alternaria species												
Ascospores												
Aspergillus/Penicillium	2	80	25	3	120	50	11	440	48			
Basidiospores				1	40	17	5	200	22	2	80	18
Cladosporium species	3	120	38	1	40	17	5	200	22	7	280	64
Oidium species												
Rusts										1	40	9
Smuts/Myxomycetes	3	120	38	1	40	17	2	80	9	1	40	9
TOTAL	**8**	**320**		**6**	**240**		**23**	**920**		**11**	**440**	

Signature: K. Smith Date: 5/3/2019 Reviewed: Johnston Wilson Date: 5/3/2019

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Analyst: Smith, Kiersten

Air Cassette Analysis

ND = None Detected. Blank spaces indicate no spores detected.

SanAir ID Number	19020665-005			19020665-006			19020665-007			
Analysis Using STL	107C			107C			107C			
Sample Number	2441719			2441713			2441718			
Sample Identification	Room D 103			Room E 102			Outdoor (Control)			
Sample Type	Air Cassette - Micro-5			Air Cassette - Micro-5			Air Cassette - Micro-5			
Volume	25 Liters			25 Liters			25 Liters			
Analytical Sensitivity	40 Count/M³			40 Count/M³			40 Count/M³			
Background Density	1+			2			2+			
Other	**Raw Count**	**Count/M³**	**%**	**Raw Count**	**Count/M³**	**%**	**Raw Count**	**Count/M³**	**%**	
Dander	15	600	n/a	63	2520	n/a	4	160	n/a	
Fibers	4	160	n/a	7	280	n/a	4	160	n/a	
Pollen							11	440	n/a	
Fungal Identification	**Raw Count**	**Count/M³**	**%**	**Raw Count**	**Count/M³**	**%**	**Raw Count**	**Count/M³**	**%**	
Alternaria species				1	40	17				
Ascospores				1	40	17	13	520	17	
Aspergillus/Penicillium										
Basidiospores	2	80	>99				44	1760	59	
Cladosporium species				2	80	33	11	440	15	
Oidium species							2	80	3	
Rusts										
Smuts/Myxomycetes				2	80	33	5	200	7	
TOTAL	**2**	**80**		**6**	**240**		**75**	**3000**		

Signature: K. Smith Date: 5/3/2019 Reviewed: Johnathan Wilson Date: 5/3/2019

Direct ID Lab Results

SanAir Technologies Laboratory

SanAir ID Number
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Project Number: 9601 Prince Place
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Collected Date: 4/30/2019
Received Date: 5/1/2019 10:40:00 AM

Analyst: Smith, Kiersten

Direct Identification Analysis

SanAir ID: 19020665-008 Sample #:Swab Room A 101 Trapezoidal Table

D1 - Direct Identification Analysis on Surface Swab using STL 104

Direct ID of Mold

Fungi	Estimated Amount
Cladosporium species	Rare

Estimated Amount	Indication of Growth	Evidence of Mycelial Fragments/Conidiophores
Rare	Not Likely	None
Light	Possible	Some, 10 to 25% of Tape Covered
Moderate	Probable	Abundant, 25 to 50% of Tape Covered
Heavy	Significant	Throughout, 50 to 100% of Tape Covered

*Refer to additional information page for further details

Signature: K. Smith
Date: 5/3/2019

Reviewed: Johnathan Wilson
Date: 5/3/2019

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Organism Descriptions

The descriptions of the organisms presented are derived from various reference materials. The laboratory report is based on the data derived from the samples submitted and no interpretation of the data, as to potential, or actual, health effects resulting from exposure to the numbers of organisms found, can be made by laboratory personnel. Any interpretation of the potential health effects of the presence of this organism must be made by qualified professional personnel with first hand knowledge of the sample site, and the problems associated with that site.

Dander - Comprised of human and/or animal skin cells. Counts may be higher in carpeted rooms and in rooms with more traffic.
Health Effects: May cause allergies.

Fibers - This category can include clothing, carpet, and insulation fibers.

Pollen - Produced by trees, flowers, weeds and grasses. The level of pollen production can depend on water availability, precipitation, temperature, and light. Pollen is usually dispersed by either insects or the wind.
Health Effects: Mostly effects the respiratory tract with hay fever symptoms but has also been shown to trigger asthma in some people.

Alternaria species - This genus compromises a large number of saprobes and plant pathogens. It is one of the predominate airborne fungal spores indoor and outdoor. Outdoors it may be isolated from samples of soil, seeds, and plants. It is one of the more common fungi found in nature, extremely widespread and ubiquitous. Conidia are easily carried by the wind, with peak concentrations in the summer and early fall. It is commonly found in outdoor samples. It is often found in indoor environments, on drywall, ceiling tiles, in house dust, carpets, textiles, and on horizontal surfaces in building interiors. Often found on window frames.
Health Effects: In humans, it is recognized to cause type I and III allergic responses. Because of the large size of the spores, it can be deposited in the nose, mouth and upper respiratory tract, causing nasal septum infections. It has been known to cause Baker's asthma, farmer's lung, and hay fever. It has been associated with hypersensitivity pneumoniti, sinusitis, deratomycosis, onychomycosis, subcutaneous phaeohyphomycosis, and invasive infection. Common cause of extrinsic asthma (immediate-type hypersensitivity: type I). Acute symptoms include edema and bronchiospasms, chronic cases may develop pulmonary emphysema.
References: Flannigan, Brian, Robert A. Samson, and J. David Miller, eds. Microorganisms in Home and Indoor Work Environments: Diversity, Health Impacts, Investigation, and Control. London and New York: Taylor & Francis, 2001.

Ascospores - From the fungal Subphylum Ascomycotina. Ascospores are ubiquitous in nature and are commonly found in the outdoor environment. This class contains the "sac fungi" and yeasts. Some ascospores can be identified by spore morphology, however; some care should be excercised with regard to specific identification. They are identified on tape lifts and non-viable analysis by the fact that they have no attachment scars and are sometimes enclosed in sheaths with or without sacs. Ascomycetes may develop both sexual and asexual stages. Rain and high humidity may help asci to release, and dispurse ascospores, which is why during these weather conditions there is a great increase in counts.
Health Effects: This group contains possible allergens.

Aspergillus/Penicillium - These spores are easily aerosolized. Only through the visualization of reproductive structures can the genera be distinguished. Also included in this group are the spores of the genera Acremonium, Phialophora, Verticillium, Paecilomyces, etc. Small, round spores of this group lack the necessary distinguishing characteristics when seen on non-viable examination.
Health Effects: Can cause a variety of symptoms including allergic reactions. Most symptoms occur if the individual is immunocompromised in some way (HIV, cancer, etc). Both Penicillium and Aspergillus spores share similar morphology on non-viable analysis and therefore are lumped together into the same group.

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Organism Descriptions

The descriptions of the organisms presented are derived from various reference materials. The laboratory report is based on the data derived from the samples submitted and no interpretation of the data, as to potential, or actual, health effects resulting from exposure to the numbers of organisms found, can be made by laboratory personnel. Any interpretation of the potential health effects of the presence of this organism must be made by qualified professional personnel with first hand knowledge of the sample site, and the problems associated with that site.

Basidiospores - From the Subphylum Basidiomycotina which contains the mushrooms, shelf fungi, and a variety of other macrofungi. They are saprophytes, ectomycorrhizal fungi or agents of wood rot, which may destroy the structure wood of buildings. It is extremely difficult to identify a specific genera of mushrooms by using standard culture plate techniques. Some basidiomycete spores can be identified by spore morphology; however, some care should be exercised with regard to specific identification. The release of basidiospores is dependant upon moisture, and they are dispersed by wind.
Health Effects: Many have the potential to produce a variety of toxins. Members of this group may trigger Type I and III fungal hypersensitivity reactions. Rarely reported as opportunistic pathogens.

Cladosporium species - The most commonly identified outdoor fungus. The outdoor numbers are reduced in the winter and are often high in the summer. Often found indoors in numbers less than outdoor numbers. It is commonly found on the surface of fiberglass duct liner in the interior of supply ducts. A wide variety of plants are food sources for this fungus. It is found on dead plants, woody plants, food, straw, soil, paint and textiles. Often found in dirty refrigerators and especially in reservoirs where condensation is collected, on moist window frames it can easily be seen covering the whole painted area with a velvety olive green layer.
Health Effects: It is a common allergen. It can cause mycosis. Common cause of extrinsic asthma (immediate-type hypersensitivity: type I). Acute symptoms include edema and bronchiospasms, chronic cases may develop pulmonary emphysema. Illnesses caused by this genus can include phaeohyphomycosis, chromoblastomycosis, hay fever and common allergies.
References: Flannigan, Brian, Robert A. Samson, and J. David Miller, eds. Microorganisms in Home and Indoor Work Environments: Diversity, Health Impacts, Investigation, and Control. London and New York: Taylor & Francis, 2001.

Oidium species - This is an obligate plant pathogen causing a disease known as "powdery mildew." It is an anamorph of Erysiphe.
References: Kendrick, Bryce. The Fifth Kingdom, 3rd Edition. Newburyport, MA: Focus Publishing, 2000.

Rusts - From the group Uredinales, called Rusts due to the color of the spores, which are known for causing disease in plants.

Smuts/Myxomycetes - Smuts and Myxomycetes are parasitic plant pathogens. They are typically grouped together due to their association with plants, the outdoors and because they share similar microscopic morphology.
Health Effects: Can produce type I fungal hypersensitivity reactions.
References: Martin, G.W., C.J. Alexopoulos, and M.L. Farr. The Genera of Myxomycetes. Iowa City, Iowa: University of Iowa Press, 1983.

Conclusions/Recommendations

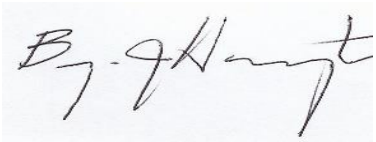
Suspected mold growth was discovered on the underside of the trapezoidal or rectangular table(s) in Rooms A101, B104, and C101. The tables should be properly HEPA vacuumed to remove three-dimensional growth. After which, the underside of the tables should be sanitized with ShockWave or an equivalent.

The water damaged ceiling tiles in NW104 should be removed and replaced as needed. ESI recommends placing the water damaged tiles in contractor's bag for proper disposal.

The amplified levels of Carbon dioxide should be reduced by increasing air movement and ventilation.

I hope you found our service beneficial. If you have any questions or concerns, please feel free to contact me at 410-867-6262.

Respectfully,



Bryan Harrington (CIE)
Environmental Solutions, Inc.

Industry References

Since the 1993 New York City Department of Health (NYCDOH) document (Assessment and remediation of *Stachybotrys Atra* in Indoor Environments) was produced, several other guidance documents have been written. This report was developed in accordance with and including:

- *Fungal Contamination in Buildings: A Guide to Recognition and Management* (Health Canada, 1995).
- *Control of Moisture Problems Affecting Biological Indoor Air Quality* (Flannigan and Morey, 1996).
- *Bioaerosols: Assessment and Control* (American Conference of Government Industrial Hygienists [ACGIH], 1999).
- *Guidelines on Assessment and Remediation of Fungi in Indoor Environments* (NYCDOH, 2000). [external link]
- *Mold Remediation in Schools and Commercial Buildings* (U.S. EPA, 2001).
- *Report of the Microbial Growth Task Force* (The American Industrial Hygiene Association, 2001).
- *Fungal Contamination: A manual for investigation, remediation and control (BECi) 2005*.
- *29 CFR 1910, Occupational Safety and Health Standards for General Industry, U.S. Department of Labor*
- Institute of Inspection, Cleaning and Restoration Certification Standard IICRC S520 *29 CFR 1926, Occupational Safety and Health Standards for the Construction Industry*, U.S. Department of Labor
- *40 CFR 61, National Emission Standards for Hazardous Air Pollutants (NESHAP), U.S. Environmental Protection Agency*
- *ACR 2006, Assessment, Cleaning and Restoration of HVAC Systems, National Air Duct Cleaners Association, 2006**
- *ASHRAE Standards 62.1 or 62.2*
- *ASTM D-1653, Standard Test Methods for Water Vapor Transmission of Organic Coating Films*
- *Bioaerosols: Assessment and Control,* American Conference of Governmental Industrial Hygienists, 1999
- *Field Guide for Determination of Biological Contaminants in Environmental Samples, American Industrial Hygiene Association, 2005*
- *A Guide for Mold Remediation in Schools and Commercial Buildings, US Environmental Protection Agency, 2001 Protecting the Built Environment: Cleaning for Health, Michael A. Berry Ph.D., 1993*
- *IICRC S100 Standard and Reference Guide for Professional Carpet Cleaning, Fourth Edition, Institute of Inspection, Cleaning and Restoration Certification, (S100)**
- *IICRC S300 Standard and Reference Guide for Professional Upholstery Cleaning, First Edition, Institute of Inspection, Cleaning and Restoration Certification, (S300)**
- *ANSI/IICRC S500 Standard and Reference Guide for Professional Water Damage Restoration, Third Edition, Institute of Inspection, Cleaning and Restoration Certification, (S500)**