

December 13, 2019

Dan Chaplik  
Superintendent  
Sultan School District  
514 4<sup>th</sup> Street  
Sultan, Washington 98294

Regarding: Sultan Middle School  
Fungal Air and Surface Testing  
301 High Avenue  
Sultan, WA  
PBS Project 41610.000

Dear Mr. Chaplik:

The purpose of this letter is to summarize the testing activities performed at Sultan Middle School following the limited fungal assessment/water intrusion investigation at two roof drains. That investigation found water damage and fungal growth inside wall cavities in the Library and Room 208. To help evaluate if those impacts have the potential to expose occupants to fungal particulate the District has requested PBS to conduct air and surface sampling for fungal particulate in Room 208 and the Library. Additionally, as a precautionary measure the District has requested PBS to perform air and surface sampling for fungal particulate throughout the campus.

In summary our findings revealed that no excessive fungal particulate was found in the air or settled dust in the occupied portions of the campus buildings tested. The following will provide details of our field activities, findings, conclusions and recommendations.

### **Field Activities**

PBS industrial hygienists conducted air and surface dust testing activities throughout Sultan Middle School on December 3, 2019.

#### Airborne Particulate

PBS collected and analyzed airborne particulate samples from representative locations throughout Sultan Middle School. The samples were collected to characterize the composition of airborne fungal particulates in representative areas throughout campus.

PBS collected samples of airborne particulate using the spore trap method. This method uses a high-volume vacuum pump fitted with an Allergenco-D™ cassette. The air pump draws a measured volume of air through the cassette, which impacts airborne particulates onto a specially treated slide mounted inside the cassette. Characteristic morphologies were observed by optical microscopy at a magnification of 600x. For each particle type observed, data was reported in particle counts per cubic meter (m<sup>3</sup>) or counts/m<sup>3</sup> of air. The high-volume air pump is calibrated before and after testing with a pre-calibrated rotameter. The rotameter is calibrated annually with a primary standard.

PBS collected nineteen (19) indoor samples and two (2) outdoor samples during this monitoring event. The outdoor samples were taken as a control to compare the composition of indoor air particulates to

that of the outdoors. Each sample was collected at a flow rate of 15 liters per minute for 10 minutes (150 liters per sample) from approximately four feet above floor level (i.e. in the breathing zone) within approximately 45 minutes of the space being occupied. The samples were labeled with unique identification numbers, packaged, and delivered with chain-of-custody documentation to Lab/Cor, Inc. of Seattle, Washington. Air samples follow preparation and analysis techniques outlines in Method 5 of the laboratory standard operating procedures (SOP). This method is based on guidelines from the Pan-American Aerobiology Association Standardized Protocol and ASTM Method 7391-09.

Laboratory Results

The following table provides a list of sample locations and the corresponding summary test data:

**Table 1. Airborne Fungal Particulate Sampling Locations and Corresponding Lab Results**

Sample ID	Location Description	Total Fungal (counts/m <sup>3</sup> )
41610.000-A1	Room 200 Library	267
41610.000-A2	Room 208/209 near divider	1,066
41610.000-A3	Hallway near 202	300
41610.000-A4	Room 101	267
41610.000-A5	Room 204	301
41610.000-A6	Room 206	700
41610.000-A7	Commons	500
41610.000-A8	Gym	400
41610.000-A9	Room 601	333
41610.000-A10	Break room	234
41610.000-A11	Kitchen	499
41610.000-A12	Room 501	1,301
41610.000-A13	Room 403	700
41610.000-A14	Room 402	2,166
41610.000-A15	Room 401	3,967
41610.000-A16	Room 304	600
41610.000-A17	Room 302	200
41610.000-A18	Room 305	300
41610.000-A19	Room 306	467
41610.000-A20	Exterior west of Room 304	19,434
41610.000-A21	Exterior East Courtyard	17,099

Based on the analytical results, the airborne fungal particulate concentration in the indoor samples were significantly lower when compared to the outdoor control samples. Additionally, the predominant types of fungal particulate identified in the indoor samples were also identified in the outdoor samples.

- Based on this testing, PBS does not consider airborne fungal particulate to be a concern during the test period.

Accumulated Surface Dust

PBS collected accumulated surface dust samples for fungal and non-fungal particulate throughout Sultan Middle School. A description of the sampling and interpretation of the results are included below.

PBS collected surface dust samples from nineteen (19) locations throughout Sultan Middle School. These samples were analyzed for fungal particulate to characterize the composition of accumulated surface dust (particulates) at the test site. While air sampling characterizes airborne particulate from a current snapshot in time, surface dust tends to provide a historical view of settled particulate.

PBS collected samples of surface dust in the building using the tape lift method. This method uses a pre-manufactured plastic microscope slide that contains a sticky substance on the surface to adhere particulates to the slide. The slide is manufactured by Environmental Monitoring Systems. The slide is gently pressed against a surface and accumulated particulate adhere to the slide. The samples were labeled with unique identification numbers, packaged, and delivered with chain-of-custody documentation to Lab/Cor, Inc. of Seattle, Washington.

Surface samples follow preparation and analysis techniques outlined in Method 7 and Method 9 of the laboratory standard operating procedures (SOP). These methods are based on guidelines from the Pan-American Aerobiology Association Standardized Protocol and ASTM Method 7391-09. The particles on the slide are then stained with lactocotton blue and characteristic morphologies were observed using optical microscopy at a magnification of 600x. Fungal counts are reported in relative abundance (high, moderate, low, and trace).

### Results

The following table provides a list of all sampling locations:

**Table 2. Accumulated Surface Dust Sampling Locations**

<b>Sample ID</b>	<b>Location Description</b>
41610.000-T01	Bookshelf behind return desk- Library
41610.000-T02	Top of bookshelf SE corner of 208
41610.000-T03	Top of upper wood trim. Corridor S of 202
41610.000-T04	Top of Equip. Shelf NW in Conf. Room 110
41610.000-T05	Teacher's Desk between Monitors. SW in 204
41610.000-T06	Teacher's Desk near Monitor. NE in 206
41610.000-T07	Top of Trophy Case. SW in Commons
41610.000-T08	Top of White Board. SE Gym by Girl's Locker Room
41610.000-T09	Top of Bookshelf. SE in Music Room 601
41610.000-T10	Top of Fridge. NW in Break Room 110
41610.000-T11	Top of Food Warmer. W Side of Kitchen
41610.000-T12	Top of Desk. SW in Auxiliary Gym
41610.000-T13	Top of Paper Towel Holder SW in 403
41610.000-T14	Top of Student Desk. W in 402
41610.000-T15	Top of Heater. West in Art Room 401
41610.000-T16	Teacher's Desk near Monitor. SW in 302
41610.000-T17	Counter-top Ledge. E in Computer Lab 304
41610.000-T18	Top of Bookshelf. E Side of 305
41610.000-T19	Top of Teacher's Desk. SW in 306

- Based on the analytical results, accumulated fungal particulate in surface dust generally was found to be at trace to low levels at the test areas. This is typical of indoor environments and is not considered a concern. The predominant types of fungal particulate identified in the surface dust samples were all identified in the outdoor air samples. No fungal indicator species were identified. Fungal indicator species are known to be linked to long term water intrusion.

### **Conclusions and Recommendations**

Based on our testing activities PBS concludes and recommends the following;

- Airborne concentrations of indoor fungal particulate should be similar to or lower than that of outdoors. The outdoor concentration of air fungal particulate is the standard for comparison to the indoor concentrations of fungal particulate and is considered the "clean" air. Laboratory analysis results at Sultan Middle School clearly revealed that indoor airborne fungal particulate (which ranged from 200 to 3,967 cts/m<sup>3</sup>) was substantially lower than the outdoors concentration which ranged from 17,099 to 19,434 cts/m<sup>3</sup>. Additionally, no fungal indicator species were found. Fungal indicator species are those that are typically found in locations where long-term water intrusion is occurring. It is PBS' opinion that the fungal growth found in the wall cavities of Room 208 and the Library has not become airborne in the occupied spaces. Furthermore, testing of the other locations on campus revealed a similar unremarkable condition.
- While air sampling characterizes airborne particulate from a current snapshot in time, surface dust tends to provide a historical view of settled fungal particulate from previous events. All laboratory analysis revealed trace to low levels of fungal particulate in the settled dust. This is a typical finding in "clean" buildings. It is PBS' opinion that past events have not contaminated the resident dust in the test areas.
- While testing did not reveal excessive fungal particulate in the occupied areas PBS has been requested by the District to perform additional exploratory assessments in other areas of the campus to help determine if water damage and associated fungal growth is present. PBS has scheduled to perform this work on December 19 and 20<sup>th</sup>.
- Once the full extent of water damage has been determined, the District has requested PBS to work with a professional remediation contractor and building envelope specialist to remediate all known issues, determine the specific cause of the water intrusion and recommend repairs.
- PBS recommends that the known water damage in Room 208 and the Library not be disturbed to prevent subsequent contaminant migration.

### **Project Limitations**

This study was limited to the tests and locations, as indicated, to determine the absence or presence of certain contaminants. The site may have other concerns that were not characterized by this study; therefore, further study may be warranted. It is important to understand that statistically valid data come only from the collection of numerous samples in the study areas. The findings and conclusions of this investigation are not scientific certainties, but rather probabilities based on professional judgement concerning the significance of the data gathered during the course of this activity.

Sultan Middle School  
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Please do not hesitate to contact us if you have any questions regarding this report or require additional information.

Respectfully,  
PBS Engineering and Environmental, Inc.

A handwritten signature in black ink, appearing to read "G. Middaugh", with a large, sweeping flourish at the end.

Gregg Middaugh  
Senior Project Manager  
Industrial Hygiene Group