Indoor Air Quality Report

Performed at:

Somerset Middle School
1141 Brayton Avenue
Somerset, MA 02726

Prepared for:

Somerset School Department
580 Whetstone Hill Road
Somerset, MA 02726
Attention: Carlos Campos

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1.0 INTRODUCTION

As requested by the Town of Somerset School Department, MAC Services, LLC (MAC) completed an Indoor Air Quality (IAQ) evaluation of the Somerset Middle School located at 1141 Brayton Avenue in Somerset, MA. This was a follow up inspection from the initial inspection completed in August of 2020 and the most recent inspection completed in January of 2021.

Mr. Joseph Cooney, representing MAC Services, LLC, performed the evaluation on August 4th, 2021. Mr. Cooney is a Senior Environmental Technician with over 15 years of experience in the Environmental Consulting Industry and has completed dozens of Indoor Air Quality assessments in a diverse range of environments including Child Care Facilities, manufacturing facilities, and large retail buildings, as well as residential buildings. Mr. Cooney was assisted by Field Technician's Brendon Cooney and Brent Rezendes. In conducting this evaluation, MAC performed the following tasks:

- Conducted interview with facility personnel.
- Conducted a visual inspection of interior areas to detect any suspect discoloration of building materials.
- Conducted a visual inspection of the Heating and Ventilation air filtration system and well as maintenance records.
- Measured Relative Humidity and Temperature.
- Utilized instantaneous reading equipment to obtain data measuring oxygen levels (O), carbon monoxide (CO), hydrogen sulfide (H2S), Lower Explosive Limit (LEL- methane gases) and over 170 Volatile Organic Compounds (VOC) including but not limited to Formaldehyde, Ethyl Benzene, Tetrachloroethylene, Trichloroethylene, Vinyl Chloride, Carbon Dioxide (CO2) and Naphthalene (smells like mothballs). Appendix A presents these Direct Reading Environmental Measurements.
- Conducted a Mold Determination Survey.

2.0 FACILITY DESCRIPTION

The space subject to the IAQ evaluation at 1141 Brayton Avenue in Somerset, MA is made up of Two separate sections that were constructed at different times. One section is approximately 60 years old while the second section (Grade 6) is slightly newer. The Somerset Middle School consists of a one-story building that is approximately 132,000 square feet in total area. The facility is used to educate students in grades 6 through 8.

The building construction is made up of walls that are a combination of gypsum board with skim coat plaster as well as hard plaster walls in the original section. Some walls are made of CU block as well. Ceilings are a combination of suspended 2' x 2' ceiling tile and hard plaster in some areas. The floors are mostly VCT with some areas having carpet cover such as the Library. Many materials appear to be homogenous throughout. Ceramic tile is used in the bathrooms.

The Heating and ventilation system is made up of Uni-vent units, roof top units over the Gym, pull down units in the hallways and an Air Handler unit in the boiler room. There is no Air Conditioning.

3.0 OBSERVATIONS AND DISCUSSION

During the survey the individual rooms were kept isolated by closing the doors. The ventilation system continued to function.

There was no obvious building exterior integrity breakdown observed. There were no obvious odors detected. Although there is a reported history of 'sweaty' floors in some sections during an extended period of high humidity, there was none detected and the air did not feel humid. There were multiple industrial sized dehumidifiers and air purifiers in place and running throughout the school. Cabinet doors were observed to be open in many of the classrooms in particular the open area classrooms.

Visual inspection of the Heating and ventilation units resulted with the following observations:

- Filter changes were reportedly just completed. Inspection of the Uni-vent systems detected new filters in place.

- Digital record keeping of all filter changes was started since the last inspection in January, 2021.

The weather outdoors was mostly sunny with the temperature approximately 72 Degrees (F) and Humidity level at 70% at the time of Survey activity on 8/2/21.

3.1 Occupied space

All areas subject to sampling were unoccupied at the time of sampling.

4.0 DIRECT READING ENVIRONMENTAL MEASUREMENTS

MAC performed direct-reading environmental measurements, utilizing a Multi-Rae Five Gas Meter. Measurements were taken outdoors and at numerous indoor locations. MAC measured oxygen levels as well as H2S (hydrogen sulfide), LEL (methane gases), CO (carbon monoxide) and multiple VOC's (volatile organic compounds). Measurements were collected during the regular daytime school hours and obtained in three (3) separate rounds of collection taken from the same locations each round. Data was collected randomly throughout all areas of the building as well as outdoors. Sample locations were determined with an approach of every other room in general, with consideration given to what rooms weren't sampled in January of 2021. There were a total of One-Hundred and Twenty (123) samples obtained from Forty (41) collection stations throughout the interior.

Appendix 'A' presents direct reading environmental measurements obtained during data collection survey on 8/4/21 in the specified areas.

4.1 Oxygen

NIOSH (National Institute for Occupational Safety and Health) defines an oxygen deficient atmosphere containing oxygen levels less than 19.5% and an oxygen-enriched atmosphere as containing more than 23.5%.

Individuals exposed to an atmosphere of less than 19.5% oxygen would exhibit decreased ability to work strenuously, impair coordination and may induce symptoms in persons with coronary, pulmonary, or circulatory problems.

MAC measured the Oxygen levels to be consistently at 20.9%.

4.2 Carbon Monoxide (CO)

Carbon monoxide is an odorless, colorless toxic gas produced by the incomplete combustion of solid, liquid and gaseous fuels. Elevated indoor carbon monoxide concentrations may be a result of combustion sources indoors or the introduction of combustion products from outdoors into the indoor air. In the absence of indoor sources, indoor carbon monoxide concentrations are usually less than, or equal to outdoor concentrations. ASHRAE Standard 62-1999 recommends an upper limit for carbon monoxide of 9 ppm as a 24-hour average, and 35 ppm as a 1-hour average.

MAC measured the concentrations of all samples obtained of CO to be none detected (ND).

4.3 Hydrogen Sulfide (H2S)

Hydrogen sulfide is the chemical compound H2S. This colorless, toxic and flammable gas is responsible for the foul odor of rotten eggs and flatulence. It often results from the bacterial breakdown of sulfates in organic matter in the absence of oxygen, such as in swamps and sewers (anaerobic digestion). Hydrogen Sulfide is a highly toxic and flammable gas. Being heavier than air, it tends to accumulate at the bottom of poorly ventilated spaces. Although very pungent at first, it quickly deadens the sense of smell. The OSHA recommended permissible exposure limit (PEL) for hydrogen sulfide is 20 ppm.

MAC measured the concentrations of all H2S samples obtained to be none detected (ND).

4.4 Lower Explosive Limit (LEL)

The Lower Explosive Limit of a gas or vapor, is the limiting concentration (in air) that is needed for the gas to ignite and explode. There are two explosive limits for any gas or vapor, the lower explosive limit and the upper explosive limit (UEL). At concentrations in air below the LEL there is not enough fuel to continue an explosion; at concentrations above the UEL the fuel (gas or vapor) has displaced so much air that there is not enough oxygen to begin a reaction. Concentrations of explosive gases are often reported in terms of percent of lower explosive limit (% LEL). The EPA recommends the action level to be greater than 10%.

MAC measured the LEL % concentrations to be none detected (ND).

4.5 Volatile Organic Compounds (VOC)

MAC measured for multiple VOC's. There were minimal concentrations of any listed VOC's. The list is extensive and can be furnished upon request. Included in this list is Carbon Dioxide (CO2). VOC's are components which, at room temperature, may be released from materials or products in the form of gases. The EPA calls for concentrations of less than 100 PPM (parts per million) for the Criteria Air Pollutants as a guidance.

MAC measured the VOC concentrations to be none detected (ND). Included in the VOC measurements was Carbon Dioxide (CO2).

4.6 Relative Humidity (RH)

MAC measured for RH in all the targeted areas.

ASHRAE Standard 62.1-2016 recommends that RH levels be maintained to be less than 60% to lessen the likelihood of mold growth while ASHRAE Standard 55-2013 recommends that RH in a occupied space be generally maintained to be less than 80% as it corresponds with acceptable T levels.

MAC measured the indoor RH to be consistently between 55% and 60%.

4.7 Temperature (T)

MAC measured for T in all the targeted areas over a time period of approximately 2 hours and 26 minutes.

ASHRAE Standard 55-2013 recommends that for Thermal Environmental conditions for human occupancy comfort purposes, temperature could be from 67 to 82 degrees (F). This range depends on a number of variables including the occupant's age, clothing worn and activity level.

MAC measured the indoor Temperatures to be consistently between 73 and 75 degrees (F).

5.0 MOLD ASSESSMENT

5.1 Scope of Work

MAC conducted a mold determination survey including a visual inspection of all rooms and representative air sampling for the purpose of determining if elevated levels of mold spore activity exist.

The results of Fungal air samples are determined by utilizing a comparative analysis with current conditions outdoors at the time of indoor sampling using Industry Standard guidelines for acceptable levels of mold spore activity. In addition to the outdoor sample, additional samples were collected in the following locations:

- Room 58
- Room 55
- Room 51
- Room 46

- Room 44
- Room 62
- Room 16
- Room 32
- Room 35
- Room 37
- Outdoor at the side entrance next to Maintenance office
- Room 14
- Room 11
- Room 7
- Room 5
- Room 43- Computer Lab
- Nurse's Office
- Teachers' Lounge
- Guidance Main Office

5.2 Discussion

Fungal bio-aerosol monitoring is the sampling of spores from the air onto a media slide. Utilizing a microscope, the spores are then identified at least to genus and counted. Comparisons with outside levels and types indicate whether pathogenic species have been or have become predominate and at what concentration in a particular area.

All mold samples were analyzed by H2O EnviroComp, an EMPAT (Environmental Microbiology Proficiency Analytical Testing) proficient Laboratory located in West Dennis, MA. This evaluation is limited in scope and reflects the levels of fungal contaminants on the day of sampling. Airborne levels of fungal spores will vary naturally, and conditions may change in the future which could promote the growth of mold or create other air quality concerns in the interior environment. The industry standard acceptable level of spore counts for most species of mold is generally (1,000 s/cu m). The acceptable level is more stringent for some species of more harmful species such as Chaetomium, (600 s/ cu m) and Stachybotrys (400 s/cu m).

In addition to the threat mold poses against the structural integrity and value of a property, bacterial / fungal magnification or enhancement within a building can lead to a number of health issues. Associated health risks can include respiratory as well as pulmonary symptoms. Some molds produce mycotoxins which can lead to effects on the neurological system. All types of mold are harmful to health to some degree so deciding on action to be taken should not depend on the type of mold rather the overall concentration level of specific mold spores.

The absence of spores and visible colonies does not always insure that no microbiological colonies exist. Colonies may be hidden and spores released sporadically based on environmental conditions, in particular, humidity levels.

The effects of mold spores depend on a number of variables including the pre-existing health of the occupants, the sensitivity level and age of the inhabitants of the space, as well as the type of mold contaminants and concentration levels of mold spore counts. MAC services utilizes several sources of Industry guidelines when interpreting air sample analytical data, including the EPA (Environmental Protection Agency) and IICRC (Institute of Inspections Cleaning and Restoration Certification) organizations.

5.3 Conclusion

The visual inspection was not able to detect any areas of mold growth.

The analytical results appeared to be within the Industry Standard acceptable levels for all samples obtained. The results of air sampling and the visual inspection compared to approximately one year ago were remarkably improved.

Note: Please see the attached Laboratory Analytical Report in Appendix B

5.4 Recommendation

To avoid mold growth in the future, any water intrusion must be remedied by repairing immediately and drying out any resulting affected areas within 48 hours. Maintaining humidity levels below 60% is a must in controlling mold spore activity. Continue to run dehumidifiers in place and monitor humidity levels diligently, especially during the high humidity weather season (April to September). Add additional dehumidifiers as necessary to maintain the RH level below 60%. If the noise of the units is obtrusive to some then move the unit to a less obtrusive location but they must continue to run in order to combat potential mold growth. Maintenance personnel need to continue to monitor areas susceptible to mold growth such as closed cabinets, under desks, inside any small, closed spaces with little air circulation. Whenever possible, leave cabinet doors open to help facilitate air circulation inside of them.

6.0 OVERALL CONCLUSIONS AND RECOMMENDATIONS

MAC's conclusions and recommendations are based on visual inspections as well as scientific data obtained and presented in this report.

With regards to all non-mold assessment measurements, there is no scientific evidence apparent that would indicate an unhealthy work environment exists as it relates to Indoor Air Quality (IAQ) in the areas referenced in this document at the time sampling was conducted. All measurements acquired were well within acceptable limits of guideline levels provided by OSHA, NIOSH and ASHRAE. In fact, the levels for the measurables were not even detectable.

All HVAC filters were reportedly recently changed. The visual inspection of the filters did reflect the recent change out. The changes are now being recorded digitally by the Head Custodian of each school and kept in a master spreadsheet for all schools with the Director of Facilities. Continue to maintain the building HVAC filtration system and document the maintenance activities as they take place. All filters should be checked approximately every Three months, depending on the visual inspection, the filters should be changed out as needed. All filter changes should be recorded and kept on file digitally.

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