

Indoor Air Quality Report

Performed at:

**Somerset Berkley High School
625 County Street
Somerset, MA 02726**

Prepared for:

**Somerset Berkley School Department
625 County Street
Somerset, MA 02726
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1.0 INTRODUCTION

As requested by the Town of Somerset / Berkely School Department, MAC Services, LLC (MAC) completed an Indoor Air Quality (IAQ) evaluation of the Somerset Berkley High School located at 625 County Street in Somerset, MA. This was a Six-month follow up inspection from the original inspection completed in August of 2020 and the last inspection completed in January of 2021.

Mr. Joseph Cooney, representing MAC Services, LLC, performed the evaluation on August 5th, 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. In conducting this evaluation, MAC performed the following tasks:

- Conducted interview with facility personnel to discuss changes made or any incidents since the last inspection completed this past January.
- Conducted a visual inspection of the interior areas to detect any suspect discoloration of building materials.
- 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). Data was collected from areas throughout the interior areas of the building as well as outdoors. The sampling locations represented approximately one third of the rooms and were chosen to represent a different third than was sampled during the August inspection. Appendix A presents these Direct Reading Environmental Measurements.
- Conducted a Mold Determination Survey.

2.0 FACILITY DESCRIPTION

The building subject to the IAQ evaluation at 625 County Street in Somerset, MA appears to be in excellent condition and recently constructed. The Somerset Berkley High School campus consists of a three-story building along with various sprawling outdoor areas for athletic and recreational purposes. The building is approximately 225,000 square feet in total area. The facility is used to educate students in grades 9 through 12.

The building construction is made up of gypsum board walls with skim coat plaster. Some walls are made up of CMU block. Ceilings are a combination of suspended 2' x 2' ceiling tile and gypsum board with plaster on some areas. The floors are mostly VCT with some areas having carpet cover. All materials appear to be homogenous throughout. Ceramic tile is used in the bathrooms. A rubber flooring material is used in the stairwells. Mostly non-porous materials used throughout the building.

3.0 OBSERVATIONS AND DISCUSSION

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

There was no building exterior integrity breakdown observed. No visible signs of mold were noted in any of the areas where sampling took place. There were no obvious odors detected. There were no areas of plumbing breakdown observed.

The weather outdoors was mostly sunny with the temperature approximately 73 Degrees (F) and Humidity level at 86% at the time of Survey activity on 8/5/21.

3.1 Occupied space

The building was generally unoccupied during all sampling with the exception of some teachers working in classrooms as well as some maintenance personnel within some areas of the building.

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 throughout all Three levels of the building. MAC measured oxygen levels as well as hydrogen sulfide, LEL (methane gases), carbon monoxide and multiple volatile organic compounds. Measurements were collected over a period of over Two plus hours during the regular school time and obtained in three, (3), separate rounds of collection taken from the same locations each round. There were a total of Forty-eight (48) sample collection stations throughout the interior and a total of 144 data measurements obtained.

Appendix A presents direct reading environmental measurements obtained during data collection surveys on 8/5/21 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 Non-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 Non-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 Non-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 Non-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 65% 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 interior RH to be generally between 56% and 62%.

4.7 Temperature (T)

MAC measured for T throughout the building over a time period of approximately 2 hour and 45 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 occupants age, clothing worn and activity level.

MAC measured the indoor Temperatures to be consistently between 70 and 74 degrees (F).

5.0 MOLD ASSESSMENT

5.1 Scope of Work

MAC conducted a mold determination survey including a visual inspection and air sampling for the purpose of determining if elevated levels of mold spore activity exist within the specific areas sampled. 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 331
- Room 336
- Room 340
- Room 304F
- Room 309
- Room 314
- Room 326
- Room 233
- Room 237
- Staff Lunchroom (Room 238)
- Room 208

- Room 206
- Room 221
- Room 141
- Room 138B
- Library- North end
- Library- South end
- Guidance – Main Area
- Nurse office
- Main office
- Room 109
- Room 118
- Outdoor at the Courtyard
- Room 134
- Girls PE Locker
- Boys PE Locker
- Cafeteria- Northeast corner
- Cafeteria- Southwest corner

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 did not detect any evidence of mold growth. The analytical results appeared to be well within the Industry Standard acceptable levels for all samples obtained.

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% will also assist in controlling mold spore activity.

Replace all ceiling tiles with water stains as they develop. If a leaking roof is the cause them it must be repaired immediately. If condensation is the cause, then insulation will need to be adjusted.

6.0 OVERALL CONCLUSIONS AND RECOMMENDATIONS

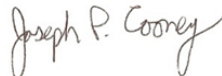
MAC's conclusions and recommendations are based on visual inspections and scientific data obtained and presented in this report.

With regards to all non-mold assessment measurements, there is no scientific evidence apparent that would indicate an unhealthy 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 including OSHA, NIOSH and ASHRAE.

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.

During the last three inspections all areas have now been included within the IAQ measurements. MAC will continue obtaining data from the next group of rooms tested in August of 2020 during the next IAQ survey planned for February of 2022.

This report submitted by:



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