

# **INDOOR AIR QUALITY ASSESSMENT**

**Lunenburg Town Hall  
17 Main Street  
Lunenburg, Massachusetts**



Prepared by:  
Massachusetts Department of Public Health  
Bureau of Environmental Health  
Indoor Air Quality Program  
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## Background

<b>Building:</b>	Lunenburg Town Hall (LTH)
<b>Address:</b>	17 Main Street, Lunenburg, MA
<b>Assessment Requested by:</b>	Jack Rodriquez, Director of Operations Lunenburg Department of Public Works
<b>Reason for Request:</b>	General indoor air quality (IAQ) assessment and employee concerns
<b>Date of Assessment:</b>	December 29, 2016
<b>Massachusetts Department of Public Health/Bureau of Environmental Health (MDPH/BEH) Staff Conducting Assessment:</b>	Michael Feeney, Director, IAQ Program
<b>Date of Building Construction:</b>	1867
<b>Building Description:</b>	Two-story wooden building
<b>Windows:</b>	Openable

The LTH was previously assessed by the IAQ Program on September 4, 2002. A report that detailed LTH conditions and made recommendations was released and provided to Lunenburg town officials on January 9, 2003 (MDPH, 2003). The January 2003 IAQ report is included as [Appendix A](#).

Observations made during the December 2016 visit indicate that many of the recommendations made in the 2003 assessment were not implemented, specifically the removal of bird waste from the attic and the removal of water-damaged paper records stored in the basement. Conditions in both the attic and basement have deteriorated in the intervening 15 years since the prior assessment of the LTH. The IAQ Program strongly recommends that employee access to both the attic and the basement be restricted until the January 2003 recommendations related to bird waste and mold remediation have been addressed. This current assessment details new conditions noted during the December 29, 2016 visit.

## Methods

Please refer to the IAQ Manual and appendices for methods, sampling procedures, and interpretation of results (MDPH, 2015).

## Results and Discussion

The following is a summary of indoor air testing results (Table 1).

- **Carbon dioxide** measurements were below the MDPH recommended level of 800 parts per million (ppm) in all areas surveyed.
- **Temperature** was below the MDPH recommended range of 70°F to 78°F at the time of assessment in roughly half the areas in the LTH.
- **Relative humidity** was below the MDPH recommended range of 40 to 60% in all areas tested.
- **Carbon monoxide** levels were non-detectable (ND) in all areas tested.
- **Particulate matter (PM<sub>2.5</sub>)** concentrations measured were below the National Ambient Air Quality (NAAQS) level of 35 µg/m<sup>3</sup> in all areas tested.

### Ventilation

A heating, ventilating, and air conditioning (HVAC) system has several functions. First it provides heating and, if equipped, cooling. Second, it is a source of fresh air. Finally, an HVAC system will dilute and remove normally occurring indoor environmental pollutants by not only introducing fresh air, but also filtering the airstream and ejecting stale air to the outdoors via exhaust ventilation. The HVAC system consists of air handling units (AHUs) that mix supply and return air from the room, filter, heat/cool (as needed) and deliver back to the room via ductwork.

Air is supplied to the second floor by an air handling unit (AHU) located in the attic. The attic AHU provides conditioned air to offices and the auditorium by a combination of ceiling and wall-mounted air diffusers connected via ductwork (see Appendix A, Picture 2). Air returns to the AHU through wall-mounted exhaust grills via ductwork. The first floor is provided with ventilation from an AHU located in the basement. This AHU was replaced at some time since the January 2003 report.

The attic AHU does not appear to be designed to exhaust air from the second floor but appears to only recirculate air within the LTH second floor. Without exhaust ventilation, pollutants that exist in the interior space will not be diluted and will build up and remain inside the office. Restroom fans are activated by the light switch; it is preferable that these fans should

operate continuously during business hours to remove water vapor and odors, and to provide some exhaust ventilation to the space.

To maximize air exchange, the BEH IAQ program recommends that both supply and exhaust ventilation operate continuously during periods of occupancy. In order to have proper ventilation with a mechanical supply and exhaust system, the systems must be balanced to provide an adequate amount of fresh air to the interior of a room while removing stale air from the room. The date of the last servicing and balancing of the systems in the LTH was not available at the time of the assessment. It is recommended that existing ventilation systems be re-balanced every five years to ensure adequate air systems function (SMACNA, 1994). Please note that in its current condition the LTH ventilation system can likely not be balanced.

### **Microbial/Moisture Concerns**

The LTH has significant water damage to stored materials in the basement. Any water-damaged porous materials (e.g., GW, carpeting, ceiling tiles) not dried within 48 hours should be discarded and replaced to avoid microbial colonization. Due to the potential for becoming moistened and mold-colonized, carpeting is not recommended in below grade space. It is also important to note that the basement has numerous signs of squirrel and/or chipmunk infestation. Squirrels/chipmunks can damage building components, furnishings, and stored items and can be a source of waste.

Plants were observed in several areas, including on porous surfaces (e.g., carpet). Plants can be a source of pollen and mold, which are respiratory irritants to some individuals. Plants should be properly maintained and equipped with drip pans to prevent water damage to porous materials. Plants should also be located away from air diffusers to prevent the aerosolization of dirt, pollen, and mold.

### **Other Conditions**

Other conditions that can affect IAQ were observed during the assessment. A number of occupied offices contain wall-to-wall carpeting which is likely to be nearly 30 years old. It was unclear if the building has a regular carpet cleaning program. The Institute of Inspection, Cleaning and Restoration Certification (IICRC), recommends that carpeting be cleaned annually, or semi-annually in soiled high traffic areas (IICRC, 2012). Regular vacuuming with a high

efficiency particulate air (HEPA) filtered vacuum in combination with an annual cleaning will help to reduce accumulation and potential aerosolization of materials from carpeting. Since the average lifespan of carpeting is approximately eleven years (Bishop, 2002), consideration should be given to the installation of new flooring.

## **Conclusions and Recommendations**

In view of the findings at the time of the visit, the following recommendations are made:

1. Fully implement recommendations made in the MDPH January 2003 assessment regarding bird waste in the attic and mold in the basement. Restrict access by employees to these spaces until the remediation has been completed.
2. Have rodents removed from the basement and seal all holes in the exterior walls, doors and windows to prevent, squirrel and/or chipmunk access.
3. Consider re-wiring bathroom exhaust fans to operate continuously during occupied hours.
4. Plants should be properly maintained and equipped with drip pans to prevent water damage to porous materials. Plants should also be located away from air diffusers to prevent the aerosolization of dirt, pollen, and mold.
5. Clean carpeting annually or semi-annually in soiled high traffic areas as per the recommendations of the Institute of Inspection, Cleaning and Restoration Certification (IICRC, 2012).
6. Consider replacing any carpets that are over 11 years old.
7. For buildings in New England, periods of low relative humidity during the winter are often unavoidable. Therefore, scrupulous cleaning practices should be adopted to minimize common indoor air contaminants whose irritant effects can be enhanced when the relative humidity is low. To control for dusts, a high efficiency particulate arrestance (HEPA) filter equipped vacuum cleaner in conjunction with wet wiping of all surfaces is recommended. Avoid the use of feather dusters. Drinking water during the day can help ease some symptoms associated with a dry environment (throat and sinus irritation).
8. Refer to resource manual and other related indoor air quality documents located on the MDPH's website for further building-wide evaluations and advice on maintaining public buildings. These documents are available at <http://mass.gov/dph/iaq>.

## REFERENCES

Bishop. 2002. Bishop, J. & Institute of Inspection, Cleaning and Restoration Certification. A Life Cycle Cost Analysis for Floor Coverings in School Facilities.

Institute of Inspection, Cleaning and Restoration Certification (IICRC). 2012. Carpet Cleaning: FAQ. Retrieved from <http://www.iicrc.org/consumers/care/carpet-cleaning>.

Massachusetts Department of Public Health (MDPH). 2015. Indoor Air Quality Manual: Chapters I-III. Available at: <http://www.mass.gov/eohhs/gov/departments/dph/programs/environmental-health/exposure-topics/iaq/iaq-manual/>.

SMACNA. 1994. HVAC Systems Commissioning Manual. 1<sup>st</sup> ed. Sheet Metal and Air Conditioning Contractors' National Association, Inc., Chantilly, VA.