

INDOOR AIR QUALITY ASSESSMENT

**Department of Revenue
333 East Street
Pittsfield, MA**



Prepared by:
Massachusetts Department of Public Health
Bureau of Environmental Health
Indoor Air Quality Program
October 2016

Background

Building:	Department of Revenue (DOR)
Address:	333 East Street Pittsfield, MA
Assessment Requested by:	Joshua Martin, Deputy Director, Office of Facilities Management, Massachusetts DOR
Reason for Request:	Lease renewal IAQ status report
Date of Assessment:	September 20, 2016
Massachusetts Department of Public Health/Bureau of Environmental Health (MDPH/BEH) Staff Conducting Assessment:	Ruth Alfasso, Environmental Engineer/Inspector, IAQ Program
Building Description:	Multi-story building with a flat roof and brick exterior. Building contains several other state offices, including the Registry of Motor Vehicles
Building Population:	Approximately 12 employees
Windows:	Not openable

Methods

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

IAQ Testing Results

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

- **Carbon dioxide levels** were below 800 parts per million (ppm) in all but one area assessed, indicating mostly adequate fresh air in the space.
- **Temperature** was within the recommended range of 70°F to 78°F in all areas assessed.
- **Relative humidity** was within the recommended range of 40% to 60% in all areas assessed except the annex area which is currently unoccupied.
- **Carbon monoxide** levels were non-detectable in all indoor areas assessed.

- *Fine particulate matter (PM2.5)* concentrations measured were below the National Ambient Air Quality Standard (NAAQS) level of 35 µg/m³ in all areas assessed.

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. Even if an HVAC system is operating as designed, point sources of respiratory irritation may exist and affect symptoms in sensitive individuals. The following analysis examines and identifies components of the HVAC system and likely sources of respiratory irritant/allergen exposure due to water damage, aerosolized dust, and/or chemicals found in the indoor environment.

The DOR office suite does not have a built-in source of mechanical ventilation. Heating is provided by baseboard radiators. Cooling is provided by window-mounted air conditioners (WAC) installed in many of the suite's windows (Picture 1). During the non-cooling season, these units are reportedly used to provide some fresh air in the "fan only" mode. Opening some windows during the non-cooling season can also assist with air exchange. At the time of the visit, renovation work on the building envelope, including brick repointing, was occurring. Windows should be kept closed when this work is impacting the side of the building where this office suite is located to prevent exposure to construction-related pollutants and noise.

Microbial/Moisture Concerns

Water dispensers were observed in carpeted areas (Picture 2). These appliances may spill or leak and lead to carpet damage and microbial growth. It is recommended that these appliances be located in areas without carpeting or on waterproof mats. The kitchen sink cabinet had water stains, which suggests that leaks or condensation is occurring. The area underneath sinks tends to be a moist environment, so storage of porous items or large amounts of items should be avoided. These areas should be checked periodically for leaks and dampness.

A plant was observed on a towel, which is a porous material (Picture 3). Plants should be placed on non-porous drip pans, well maintained and not overwatered. Picture 4 shows staining

of the cloth workstation covering below the plant shown in Picture 3, indicating that excess water was used on this plant in the past.

Room 106, also known as “the annex” is currently unused space accessed through a separate hallway door. A slight musty odor was observed in this room. The relative humidity in there was measured at 67 percent. Chronic elevated relative humidity, especially if it is above 70%, can be enough of a source of moisture to lead to water damage and microbial growth on porous materials such as carpeting and cloth-covered workstation dividers. There is a window air conditioning unit in this room, and it may be useful to run it during the most humid days to reduce the chance of damage to stored materials. The room will also need to be thoroughly ventilated and cleaned before any intended occupancy.

Other IAQ Evaluations

The BEH/IAQ program recently visited the offices of the Massachusetts Department of Developmental Services (DDS) at this building due to complaints about odors and particulates relating to the renovation activities. The exterior renovations did not appear to be impacting the DOR offices at the time of the visit, however good work practices should be followed, including keeping the windows and hallway doors closed until the renovations are complete. In general, the guidelines in the MDPH document “Methods Used to Reduce/Prevent Exposure to Construction/Renovation Generated Pollutants in Occupied Buildings” which is included as Appendix A, should be used during any renovation activities.

The window air conditioners are equipped with filters (Picture 5) which should be cleaned regularly to ensure proper function and prevent them becoming a source of particulates and odors to the indoor environment. In one location, a pencil sharpener was located next to a window air conditioner which can distribute particulates.

Exposure to low levels of total volatile organic compounds (TVOCs) may produce eye, nose, throat, and/or respiratory irritation in some sensitive individuals. To determine if VOCs were present, BEH/IAQ staff examined rooms for products containing VOCs. BEH/IAQ staff noted dry erase materials in use within the building (Table 1). These products have the potential to be irritants to the eyes, nose, throat, and respiratory system of sensitive individuals.

The offices were mostly carpeted. Carpets should be cleaned annually (or semi-annually in soiled/high traffic areas) in accordance with Institute of Inspection, Cleaning and Restoration Certification (IICRC) recommendations, (IICRC, 2012).

In some areas, stored materials and accumulated items make it more difficult for custodial staff to clean. Items should be stored neatly and moved periodically to allow for wet wiping and HEPA vacuuming of surfaces.

Conclusions/Recommendations

Based on observations at the time of assessment, the following is recommended:

1. Use methods outlined in the MDPH document “Methods Used to Reduce/Prevent Exposure to Construction/Renovation Generated Pollutants in Occupied Buildings” (Appendix A).
2. Use openable windows and WACs in cooling or fan-only mode to provide fresh air. Avoid opening the windows while envelope renovations are occurring on the near side of the building.
3. Consider locating water dispensers in non-carpeted areas or place on a waterproof mat.
4. Maintain plants, place on waterproof drip pans and avoid overwatering.
5. Monitor area under sinks for any leaks and avoid storing porous materials in there.
6. 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 irritations).
7. During very hot weather, operate the WAC in the annex room (106) to prevent excess humidity. If this room is to be reoccupied, ensure it is well-ventilated and thoroughly cleaned to remove any musty odors.
8. Clean the filters on WACs periodically.
9. Avoid placing pencil sharpeners and other sources of odors and particulates next to window air conditioners.

10. Clean carpeting in accordance with IICRC recommendations (IICRC, 2012).
11. Reduce accumulated materials on flat surfaces and store in an organized manner to allow for thorough cleaning.
12. Reduce the use of materials containing TVOCs such as dry erase markers, strong cleaners, and fragrances/air deodorizers.
13. Refer to resource manual and other related IAQ 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

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

MDPH. 2015. Massachusetts Department of Public Health. 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/>.

Picture 1



Window air conditioner

Picture 2



Water dispenser on carpet

Picture 3



Plant on towel

Picture 4



Water stain on cloth divider from overwatering plant in Picture 3

Picture 5



Window air conditioner filter (in good condition)

Table 1

Location	Carbon Dioxide (ppm)	Carbon Monoxide (ppm)	Temp (°F)	Relative Humidity (%)	PM2.5 (µg/m ³)	Occupants in Room	Windows Openable	Ventilation		Remarks
								Supply	Exhaust	
Background	374	ND	75	61	16					Sunny
Reception	719	ND	76	44	8	0	Y	N	N	WAC
O'Neil (cube)	763	ND	76	45	9	0	Y	N	N	WAC, plants on porous materials
Spratlin (cube)	787	DN	75	47	8	1	Y	N	N	WAC
John Keenan	776	ND	74	46	9	1	Y	N	N	WAC
Russell (cube)	812	ND	74	47	7	1	Y	N	N	
Winslow (cube)	746	ND	74	45	9	0	Y	N	N	
Keegan	730	ND	73	45	9	0	Y	N	N	
106 (annex)	440	ND	74	67	10	0	Y	N	N	WAC (off), Musty odor

ppm = parts per million

µg/m³ = micrograms per cubic meter

WAC = window air conditioner

Comfort Guidelines

Carbon Dioxide: < 800 ppm = preferred
> 800 ppm = indicative of ventilation problems

Temperature: 70 - 78 °F
Relative Humidity: 40 - 60%