INDOOR AIR QUALITY ASSESSMENT

Proposed Food Bank
Cowell Gymnasium
51 Maple Street
Shelburne, Massachusetts

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

At the request of Mr. Joseph J. Judd, Selectman for the Town of Shelburne, the Massachusetts Department of Public Health (MDPH), Bureau of Environmental Health (BEH) provided assistance and consultation regarding the Cowell Gymnasium (CG), 51 Maple Street, Shelburne, MA. The request was prompted to assess whether basement space could be utilized as a food bank and inspect mold/water damage remediation work conducted in the basement. On March 14, 2014, a visit to conduct an indoor air quality (IAQ) assessment was made to the CG by Michael Feeney, Director of BEH's IAQ Program and Kathleen Gilmore, Environmental Analyst/Regional Inspector for the BEH/IAQ Program.

The building is a one-story brick structure constructed in 1936 as part of Arms Academy School. The main floor gymnasium is currently used as sports/recreation space for town programs. The unoccupied basement previously housed an automotive garage, wood and metal shops and shower/locker rooms. Windows in the basement are openable.

The BEH/IAQ program previously visited CG on July 28, 2010 to perform an IAQ assessment specifically to identify sources of water damage and mold colonization/growth in the basement. As mentioned, at that time the space was proposed to serve as the new Shelburne Police Department. A report was generated based on observations made during the July 28, 2010 visit. Recommendations were made following the 2010 assessment to reduce/eliminate sources of moisture/mold growth in the basement and improve IAQ conditions in the building if it were to be used as a police station. Appendix A contains a summary of those recommendations and the actions that have been taken at the CG to meet them.

Mr. Judd reported that the town had contracted with a professional mold remediation firm which completed remedial work in the basement prior to the March 14, 2014 visit.

Methods

BEH/IAQ staff performed a visual inspection of interior and exterior building materials to identify possible sources of water damage and/or microbial growth. The building was vacant on the day of the assessment.

Results/Discussion

Proposed Food Bank

The space consists of two rooms adjacent to the side entrance of the building which would be used as the entrance/exit for the food bank. The rooms are to be used to store canned items and equipped with a refrigerator for storage of perishable food. The food bank space would primarily be used to prepare meals from nonperishable items but also include fresh fruits and vegetables when available. Demonstrations on healthy meal preparation are also planned.

The basement of the CG where the proposed food bank would be located does not have a mechanical ventilation system. The sole means for introducing fresh air into the building is through openable windows. It was reported that the space designated for use by the food bank would be renovated for use (i.e. heating/air-conditioning, electrical, plumbing, refrigeration) prior to occupancy.

Peeling paint and damaged wall plaster was observed on walls, floors and windows (Picture 1). The window frames were found to be deteriorated and screened with an open wire mesh of insufficient tightness to deter many pests (Picture 2). In addition, grass/debris had accumulated between the windows and the wire mesh screen, and a beehive was noted in one

window (Picture 3). These windows should be replaced and enclosed with appropriate window screens to prevent insects and other pests from entering the building when the windows are open.

Food is an attractant to pests. Proper food storage is an integral component in maintaining optimal indoor environmental conditions. Food should be properly stored and clearly labeled. Food storage and preparation equipment should be regularly cleaned and maintained to reduce the presence of pests.

BEH/IAQ staff detected an odor of hydraulic fuel in the hallway outside the elevator shaft. Hydraulic fluid has a distinct odor and contains volatile organic compounds (VOCs), which can be irritating to the eyes, nose and throat. Odors can be distributed to surrounding areas if the elevator does not have an operable exhaust fan. Both food bank rooms contain ductwork that formerly served as an exhaust vent system (Picture 4). The ductwork vents should sealed to prevent hydraulic fuel odors from migrating into the food bank space.

Propane/gas-like odors were noted in the food bank space which is adjacent to the boiler room and garage space. BEH/IAQ staff observed holes and gaps surrounding utility pipes that penetrate the common wall of the boiler room and the food bank space (Picture 5). Since these breaches can serve as pathways for air, moisture, odors and particulates to migrate from the boiler room into surrounding spaces, all gaps and holes in this area should be sealed with appropriate fire-resistant materials.

The food bank room has a door that opens into the garage space. It was reported that the door would be used only as a designated emergency exit for the food bank. A fire-rated door should be installed and kept closed to prevent the migration of odors, moisture and particulates from the garage area into the food bank space.

With implementation of remedial actions described above, the basement area described could be used for the proposed use as a food bank, contingent upon inspection by the Shelburne Board of Health.

Moisture/Microbial Concerns

Mold Remediation

Areas outside the proposed food bank had undergone extensive mold remediation. BEH/IAQ staff observed several improvements in the basement associated with the reported mold remediation work including:

- No visible signs of water damage or mold growth were observed in the basement space.
- All porous materials had been removed and mold-colonized non-porous surfaces had been cleaned/disinfected.
- Damaged tiles, carpeting, and raised plywood floors had been removed.
- Two new windows had been installed in the garage area of the basement.

Other conditions related to water penetration noted in the previous report were made in light of plans to use part of the basement area as the Shelburne Police Department. According to Mr. Judd, the basement is no longer planned for such use and instead would be used for storage. BEH/IAQ staff would recommend using the basement area for storage in its current configuration, as long as steps are taken to prevent moistening of stored materials from high relative humidity prevalent during hot, humid weather as well as water penetration though the foundation.

Other Conditions

The floor surrounding the boiler was noted to have efflorescence[1] (Picture 6). This condition is likely due to a leak from the boiler. In addition, BEH/IAQ staff observed that hoses designed to drain condensation from the boiler into the existing floor drains, terminated on the floor of the boiler room floor (Picture 7) which can result in moisture/water accumulation in the space. During the heating season, if floor drains are not used or filled with water on a regular basis, the drain traps can dry out, which will allow sewer gas/odors and additional moisture to enter other parts of the building. In order to maintain the watertight seal, water should be poured down the drain routinely during the heating season or the drains should be capped to prevent the back up of gas/odors.

Floor drains were also observed in the former shower rooms in the basement (Picture 8). Consideration should be given to permanently capping/sealing these as they are no longer needed.

Exterior doors had gaps and were ill-fitting; in some cases the weather-stripping had become worn or the door did not seal tightly allowing light to be seen through the gaps. These gaps can allow water, drafts, particulates and pests into the building. All exterior doors should be checked for light penetration, and damaged/missing weather-stripping should be repaired/ replaced. In particular, the exterior doors of the garage were found deteriorated and one unable to be closed tightly (Picture 9). These doors are located in the rear of the building and, as mentioned in the 2010 report, exist below the sloped driveway (Picture 10) and are subject to water runoff and penetration. These doors should be replaced with metal/steel doors if they are going to be used a means of egress from the building or removed and sealed over if they are no longer needed.

[1] Efflorescence is a characteristic sign of water damage to building materials, but it is not mold growth. As moisture penetrates and works its way through building materials, water-soluble compounds dissolve, creating a solution. As this solution moves to the surface, the water evaporates, leaving behind white, powdery mineral deposits.

Conclusions/Recommendations

All mold-contaminated materials appear to have been removed from the basement of the CG as recommended in the 2010 MDPH/BEH report. The basement area could be used for the proposed food bank as long as the Shelburne Board of Health inspects its proposed location in the two rooms described in this report. Other locations in the basement can be used as storage space for nonporous materials in its current configuration, as long as steps are taken to prevent moistening of these materials resulting from high relative humidity during hot, humid weather and from water penetration through the foundation.

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

1. Continue implementing recommendations from the July 2010 MDPH report; refer to Appendix A.
2. Consult with an HVAC engineering firm to ensure the mechanical room has adequate make-up air for appliances.
3. 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 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).
4. Use the openable windows for ventilation as needed.
5. Repair damaged wall plaster.

6. Paint the walls with an appropriate paint.
7. Install new windows in food bank rooms that are equipped with tight insect-proof window screens. Discontinue use of wire mesh on all exterior windows.
8. Consider installing nonporous tile in the food bank spaces.
9. Avoid storage of porous materials in all basement areas that may be prone to condensation in hot, humid weather, and ensure that air can flow around non-porous items in these areas to facilitate drying.
10. Ensure food is properly stored and clearly labeled. Food storage and preparation equipment should be regularly cleaned and maintained or kept in a centralized location.
11. Seal former exhaust vents in the food bank rooms to prevent odor migration from the elevator and other locations in the basement.
12. Seal gaps and spaces around plumbing/utility pipes with a fire-rated expandable foam to prevent odor migration from the boiler room into the food bank space.
13. Install a fire-rated emergency door between the food bank and garage space.
14. Ensure that the food bank space is inspected by the Shelburne Board of Health prior to occupancy.
15. Consult with an HVAC professional to repair or replace boiler as necessary. Ensure drainage hoses terminate over floor drains.
16. Ensure floor drains that are not used regularly are wetted down to prevent dry traps and the infiltration of sewer odors into occupied areas. Regularly pour water into drains to maintain the trap seal, and consider permanently capping/removing those that are no longer needed.

17. Replace exterior access doors to the garage. Remove and seal over with wood/siding if not needed as an access door from the building.

18. Refer to resource manuals and other related indoor air quality documents for further building-wide evaluations and advice on maintaining public buildings. These materials are located on the MDPH's website: http://mass.gov/dph/iaq.

Picture 1

Peeling paint/damaged wall plaster in food bank room

Picture 2

Deteriorated window with wire mesh (note grass/debris)

Picture 3

Exterior window showing bee hive behind wire mesh

Picture 4

Former ductwork exhaust vent

Picture 5

Utility pipe leading from food bank to boiler room showing large gap around pipe

Picture 6

Efflorescence on floor surounding boiler (circle)

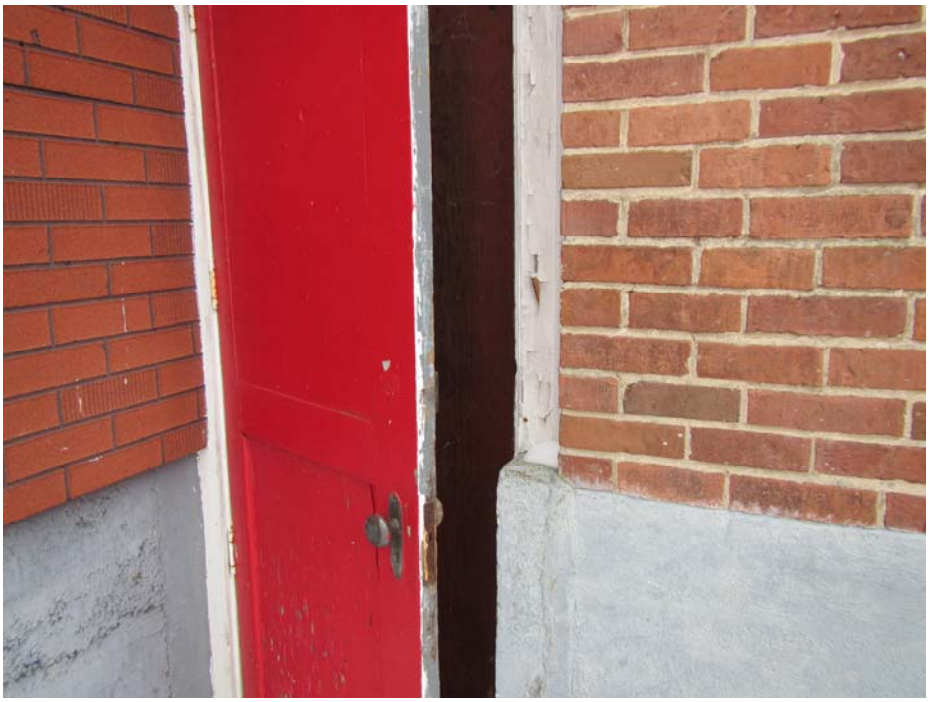
Picture 7

Boiler condensation hoses terminating on floor

Picture 8

Floor drain in former shower room

Picture 9



Exterior door to garage unable to close

Picture 10

Exterior doors at rear of building (note slope from driveway).

Actions on MDPH Recommendations
Cowell Gymnasium
14 West Street, Shelburne, MA

The following is a status report of action(s) taken on recommendations made in the July 28, 2010 MDPH IAQ r**e**port (**in bold**) based on documents, photographs and observations of the MDPH BEH/IAQ staff.

- **Consult with an engineering firm to develop a plan to address topography/drainage and to address building envelope concerns (e.g., cracked missing mortar, gaps beneath doors, permeable areas of foundation, deteriorated interior walls) in order to eliminate water infiltration into the building.**
- **Action**: Not completed.
- **Ensure all water-damaged porous materials are removed from the building and all mold colonized nonporous surfaces are cleaned in accordance with EPA Guidance for Mold Remediation in Schools and Commercial Buildings (US EPA, 2001).**
- **Action**: Water damaged materials were removed during the mold remediation work.
- **Consult with an HVAC engineering firm to develop an air handling unit that will provide adequate ventilation, heat, air conditioning and moisture control for the occupied space, and to ensure mechanical room has adequate make-up air for appliances**.
- **Action**: Not completed. Plan for use of space as the Shelburne Police Department was abandoned.
- **Consider replacing deteriorated windows. Remove ivy from exterior walls and clear plant material and soil from window wells.**

- **Action:** Two damaged windows in the garage space were replaced. Deteriorated windows exist in proposed food bank space. Ivy was removed from exterior walls.
- **Consider removing raised flooring to determine extent of moisture penetration below.**
- **Action**: Raised floors were removed.
- **Replace damaged exterior wall surfaces. If the surface is composed of asbestos-containing material, it must be removed in compliance with applicable state and federal regulations and hazardous waste disposal laws.**
- **Action**: It was unknown if this recommendation was addressed.
- **Eliminate peeling paint from interior surfaces. If the lead status of the paint is unknown, it must be assumed the paint contains lead and renovations must meet all applicable state and federal regulations.**
- **Action**: Some peeling paint removed.
- **If damaged floor tiles contain asbestos, remediate floor tiles in conformance with state and federal asbestos remediation and hazardous waste disposal laws.**
- **Action**: No loose floor tiles were observed.
- **Identify floor drains in the building and ensure compliance with state and federal environmental regulations.**
- **Action**: Not completed. Floor drains were found open and not sealed.
- **Discontinue use of porous materials (e.g., carpet) in below grade areas.**
- **Action**: Porous materials were removed.
- **Pour water into sink drain twice a week (or as needed) to maintain an airtight seal, or remove sink and properly cap plumbing.**
- **Action**: It could not be determined if the sink was capped.

- **Design and provide gutter/downspout system that deposits rainwater as far as practicable from the foundation.**
- **Action**: Gutters and downspouts were observed.