UNIFORM INDOOR AIR QUALITY ASSESSMENT AND EVALUATION REPORT

for

MacDonough Elementary School
66 Spring Street
Middletown, Connecticut 06457

Prepared for:

Mr. Marco Gaylord
Executive Director of Operations
Middletown Public Schools
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Middletown, CT 06457

Prepared By:

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29 December 2024
140305401

LANGAN

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1.0 INTRODUCTION AND BACKGROUND

Middletown Public Schools (Middletown) engaged Langan CT, Inc. (Langan) to conduct a limited indoor air quality (IAQ) document review and visual assessment throughout MacDonough Elementary School (the School) at 66 Spring Street, Middletown, CT. The document review and visual assessment were conducted to address the State of Connecticut's recent revisions to IAQ inspection and evaluation requirements for Connecticut public schools in Connecticut General Statutes § 10-220(d) (the IAQ Statute) and the 14 categories of IAQ considerations set forth therein.

Documents reviewed included Middletown's completed "Tools for Schools" (TFS) checklists, which are forms published by the U.S. Environmental Protection Agency (EPA) as guidance for conducting IAQ assessments, as TFS is now mandated by the IAQ Statute.

The following sections include a summary of Langan's visual assessment and document review.

PROJECT INFORMATION

Client Name:	Middletown Public Schools	Property Visit Date:	23 November 2024
Professional's project #:	140305401	Construction Dates:	1925 Renovation/ Addition 1988
Consultant's Project Manager:	Matthew A. Myers	No. Buildings:	One
Phone No.:	203-562-5771	No. of Stories:	Three (Approximately 42,000 Square Feet)
Email:	mmyers@langan.com		
Property Address:	66 Spring Street		
Property Town, State:	Middletown, Connecticut	Property Use:	Public Elementary School

2.0 SUMMARY OF VISUAL ASSESSMENT (CATEGORY L OF IAQ STATUTE)

Langan inspectors, Matthew A. Myers (M.Sc. in Industrial Hygiene), Andy Rolinger, Jared Gorborino and Jeffrey Glass visually assessed representative interior and exterior locations of the School on 23 November 2024. The following items were noted on the day of the visual assessment:

Interior Areas

As part of its assessment, Langan reviewed Middletown's TFS General Walkthrough Inspection and Building and Grounds Checklists.

- Ceiling tiles/sheetrock ceilings exhibited evidence of dried, historic water staining at approximately fifty (50) locations in thirty-five (35) rooms throughout the School. Water was observed inside a fluorescent light fixture in the cafeteria. Surface rust on I beams was observed above the suspended ceilings in the kitchen and in the ground floor family resource room (Room 6).
- Plaster and sheetrock walls and ceilings exhibited water damage in locations adjacent to windows throughout the second floor and the first-floor library above the suspended ceiling tiles, in limited stairwells and restrooms and corridors near restrooms (appeared to be old (dry) damage/staining and were not currently wet).
- Two areas of suspect active water infiltration were observed in the cafeteria and in the first floor corridor adjacent to stairwell A.
- Four areas of possible mold growth on ceiling tiles were observed in the cafeteria, the family resource room (room 6), the art room (room 7), and a toilet room adjacent to stairwell C.
- "Dirty" ceiling air diffusers (some are dusty or stained) were observed in the library, the nurse's toilet room, elevator room, art room, and room 211. Visible dust was observed throughout the cafeteria HVAC mechanical closet.
- An odor was observed in the first-floor custodial closet.
- The ground floor YMCA room (room 9) has four wall mounted fans in use due. The room was warmer than most of the other rooms.
- The School has six "stacked" toilet rooms on the east (Pease Avenue) side of the School adjacent to stairwell C (two side-by-side toilet rooms on each floor). Floor drains in these toilet rooms were reported to be possibly improperly sealed to the floor, which occasionally causes water to leak around edges. John Giuliano, the School's Custodial Lead, reported this information.
- The gymnasium ceiling was slightly discolored and overhead pipe insulation on gymnasium rain leaders exhibited evidence of water staining.

Exterior Areas

As part of its assessment, Langan reviewed Middletown's TFS General Walkthrough Inspection and Building and Grounds Checklists.

- Brick and mortar on exterior walls were partially deteriorated in several locations;
- Window systems were partially deteriorated (rotted, cracked, water damage) around the window casings/trim.
- John Giuliano reported that several roof leaks have occurred at the School and that roof repair/patching has been performed.
- Solid waste containers (e.g., dumpsters) were observed in a fenced area to the northeast of the School. Solid waste containers were not observed near the School heating, ventilation and air conditioning (HVAC) air intake systems.

3.0 MECHANICAL/HVAC SYSTEMS (CATEGORIES A AND H OF IAQ STATUTE)

As part of its assessment, Langan reviewed Middletown's TFS General Walkthrough Inspection and Ventilation Checklists.

The original portion of the School is heated with two fuel-oil fired boilers located in a ground floor boiler room which feeds radiators throughout and unit ventilators are also located throughout. Fuel oil is stored in an underground storge tank (UST) located to the west of the School. An emergency electrical generator is located in the main boiler room. The emergency generator exhaust is located adjacent the first floor main office windows. Ground floor addition areas (cafeteria, kitchen, gymnasium/all-purpose room and associated rooms) are heated with a forced hot air HVAC system located in a ground floor mechanical room in the cafeteria.

Air-conditioning units are located above the suspended ceilings of the family resource room (room 6), the first floor library and main office, and room 212.

Two areas consisting of rooms converted to smaller offices (an area between room 217 and 212 on the second floor and an area adjacent to the gymnasium on the first floor) were observed to have been designed with proper ventilation (i.e., ventilation supply and return diffusers in each space).

4.0 CHEMICAL STORAGE (CATEGORIES D AND G OF IAQ STATUTE)

As part of its assessment, Langan reviewed Middletown's TFS General Walkthrough Inspection and Building and Grounds Checklists.

Various custodial cleaning chemicals were observed in custodial closets and storage areas of the School. Storage areas in the main ground floor boiler room included a flammable cabinet (containing commercial sized containers of paint), boxes of hand sanitizer, alcohol wipes, hand soap, and floor finish. A plastic container of spent fluorescent tubes was observed in the main boiler room. A smaller boiler room (located between the main boiler room and art room (room 7)) contains a domestic hot water heater, an air compressor and a kiln. Various ceramic glazes are stored on shelves in this area. Craft paints were observed in art room (room 7)) and the YMCA room (room 9). A rear garage storage area on the back of the gymnasium/all purpose room contains gasoline containers and bags of ice melt.

Langan did not identify the presence of substances/products containing significant quantities of volatile organic compounds (VOCs), that are commonly attributed to adverse IAQ in schools. Langan also did not identify any substances considered "extremely hazardous substances" referenced in Section 302 of the federal Emergency Planning and Community Right-to-Know Act, 42 USC § 9601 et seq.

5.0 RADON (CATEGORY B OF IAQ STATUTE)

Langan reviewed the State of Connecticut Department of Public Health (DPH) Radon Program "School Radon Re-Evaluation Report Form" for the School that was provided to Langan by Middletown.

The re-evaluation form indicates that radon measurement activities were conducted at the School in accordance with EPA protocols and the Connecticut DPH Radon Program's *School Radon Testing Guidance.* The testing was performed by Environmental Transactions, Inc. of River's Edge, New Jersey (Radon Measurement Professional Louis Esposito (NRSB# 5SS0001)). Five locations (rooms) within the School were tested over a 48-hour period (March 12 – 14, 2024). None of the rooms tested exhibited indoor radon concentrations exceeding the EPA action level of 4.0 picocuries per liter (pCi/L).

6.0 INTEGRATED PEST MANAGEMENT AND DEGREE OF PESTICIDE USAGE (CATEGORIES E AND F OF IAQ STATUTE)

As part of its assessment, Langan reviewed Middletown's TFS General Walkthrough Inspection, Waste Management, Food Service and Integrated Pest Management Checklists.

EPA recommends that schools use Integrated Pest Management (IPM), which is an effective and environmentally sensitive approach to pest management that uses a combination of common-sense practices. IPM can reduce the use of chemicals and provide economical and effective pest suppression. Middletown utilizes and adheres to an IPM policy pursuant to EPA's recommendation and in compliance with Connecticut General Statutes §§ 10-231a-10-231d and § 22a-66l. Middletown reported that they employ J.P. Bellamo & Sons Pest Controls Inc., Cromwell CT to perform their pest management and pesticide applications and that pesticides are used minimally and avoided where possible.

No evidence of building-wide widespread pest infestation (rodent/bird droppings, dead animals, bird/insect nests, etc.) were observed during the visual survey.

Notable excerpts from Middletown's IPM policy statement are as follows:

- *It is the policy of the Middletown Board of Education to implement an integrated pest management plan to reduce the amount of pesticides applied in any building, or on the grounds of any Middletown public school, by using available pest control techniques including judicious use of pesticides, when warranted, to maintain a pest population at or below an acceptable level, while decreasing the use of pesticides.*

- *The decision to apply pesticide in any building, or the grounds of any Middletown public school is dependent on results of periodic monitoring for pest populations to determine if a pest problem exists that exceeds acceptable threshold levels.*

- *No application of pesticide shall be made in any building, or on the grounds of any Middletown public school during regular school hours or during planned activities at any school, except as provided by Connecticut statute or regulation.*

- *Parents or guardians of children in any school may register for prior notice of pesticide application at their school.*

- *The Superintendent may direct that an emergency application of a pesticide be made during regular school hours or during planned activities at school without prior notice to parents or guardians of children in any school in the event of an immediate threat to human health, subject to applicable Connecticut statutory and regulatory provisions.*

- *There shall be no application of any lawn pesticide on the grounds of any school with students in Grade 8 or lower, except on an emergency basis, subject to applicable Connecticut statutory and regulatory provisions.*

- *The Middletown Board of Education's entire policy governing pesticide application is Policy No. 3524.1.*

7.0 POTENTIAL FOR EXPOSURE TO MICROBIOLOGICAL AIRBORNE PARTICLES, INCLUDING, BUT NOT LIMITED TO, FUNGI, MOLD AND BACTERIA (CATEGORY C OF IAQ STATUTE)

As part of its assessment, Langan reviewed Middletown's TFS General Walkthrough Inspection, Food Service and Building and Grounds Checklists.

Please see Section 2.0 Summary of Visual Assessment and Section 13.0 Conclusions and Recommendations for additional information.

8.0 PLUMBING, INCLUDING WATER DISTRIBUTION SYSTEMS, DRAINAGE SYSTEMS AND FIXTURES (CATEGORY I OF IAQ STATUTE)

As part of its assessment, Langan reviewed Middletown's TFS General Walkthrough Inspection, Food Service and Building and Grounds Checklists.

The visible plumbing and drainage systems appeared to be in working order. The gymnasium overhead pipe insulation on the rain leaders exhibited evidence of water staining.

9.0 MOISTURE INCURSION (CATEGORY J OF IAQ STATUTE)

As part of its assessment, Langan reviewed Middletown's TFS General Walkthrough Inspection, Food Service and Building and Grounds Checklists.

Please see Section 2.0 Summary of Visual Assessment and Section 13.0 Conclusions and Recommendations for additional information.

10.0 OVERALL CLEANLINESS OF THE FACILITIES (CATEGORY K OF IAQ STATUTE)

As part of its assessment, Langan reviewed Middletown's TFS General Walkthrough Inspection, Waste Management, Food Service and Integrated Pest Management Checklists.

The overall cleanliness of the School generally appeared to be relatively good and typical of school buildings in the State of Connecticut.

11.0 USE OF SPACE (CATEGORY M OF IAQ STATUTE)

Spaces for occupied and unoccupied areas of the School are being used as constructed and intended. Two areas consisting of rooms converted to smaller offices (an area between room 217 and 212 on the second floor and an area adjacent to the gymnasium on the first floor) were observed to have been designed with proper ventilation (i.e., ventilation supply and return diffusers in each space).

12.0 TRAINING (CATEGORY N OF IAQ STATUTE)

Middletown has informed Langan that their custodial leads and custodial managers have received training for IAQ and have the TFS checklists at the School. They also have internal work orders that can be completed for IAQ concerns that may occur and require corrective action. An IAQ training class for all custodial staff is to be scheduled for 2025.

13.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the annual IAQ assessment and evaluation of the School, the following was noted and recommended:

- Middletown should assess and eliminate possible sources of water infiltration. This includes, but may not be limited to, replacing/repairing roofing materials, window systems, deteriorated exterior brick walls and sealing toilet room floor drains.
- "Dirty" ceiling air diffusers in the library, the nurse's toilet room, elevator room, art room, and room 211 should be cleaned. The cafeteria HVAC mechanical closet should be cleaned.
- The odor in the first floor custodial closet should be investigated. Consider installing/improving a dedicated air exhaust in this closet.

- The visual survey noted water impacted ceiling tiles/sheetrock throughout (dried, historic water staining). These should be removed and replaced under controlled conditions (to avoid spreading possible dust/possible mold). Investigate above impacted ceiling tiles/sheetrock to see if localized water infiltration is on-going and take corrective measures to stop any on-going water infiltration.
- Middletown is in the process of planning a School renovation/demolition project. Consider removing water damaged plaster and sheetrock as part of the project.
- Reconfigure and extend the emergency generator exhaust piping to be compliant with the building code.

14.0 LIMITATIONS

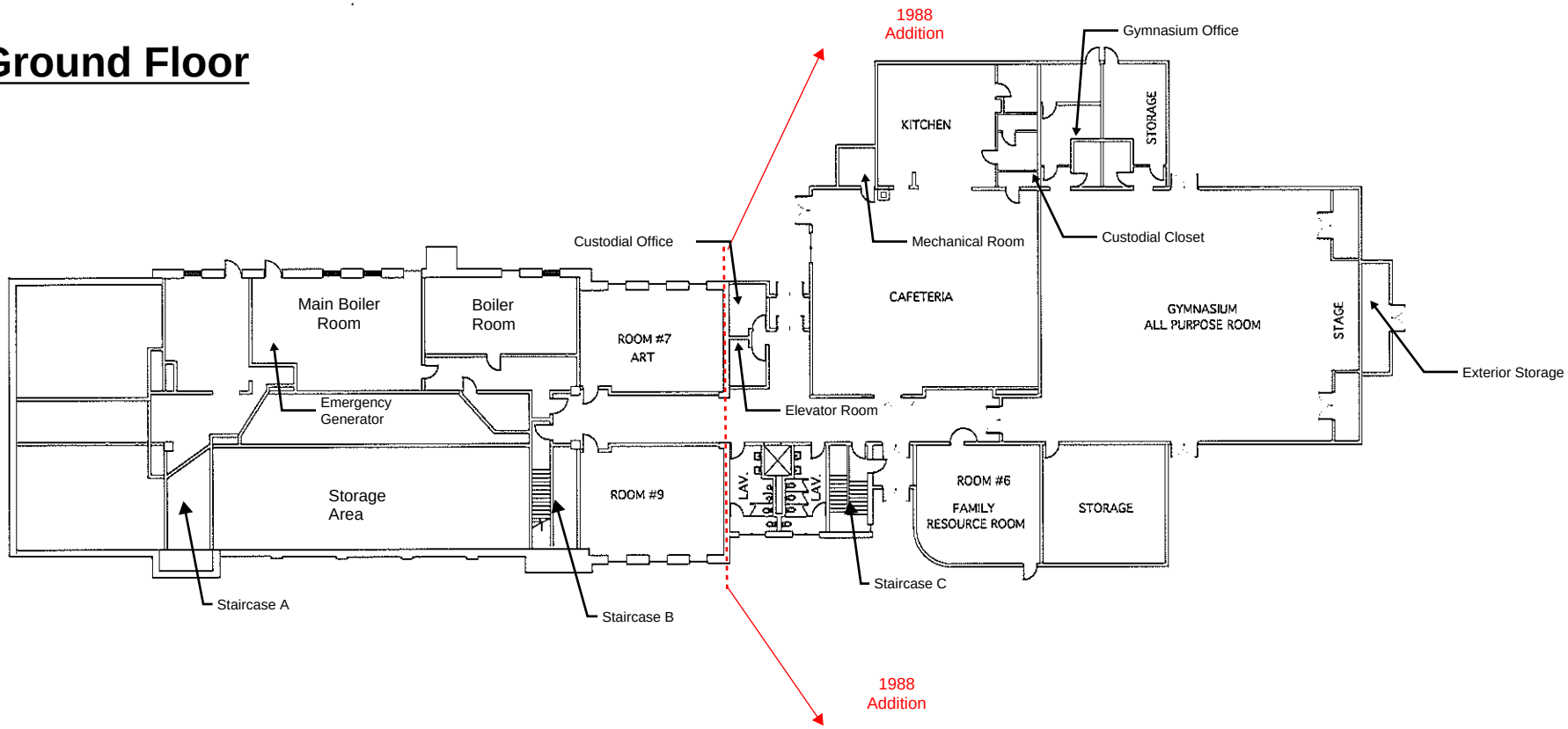
The conclusions and recommendations presented in this report are professional opinions based solely upon Langan's visual observations, document review and current legal/regulatory requirements. These conclusions and recommendations are intended exclusively for the purpose stated herein, at the site indicated, and for the project indicated.

Appendix A

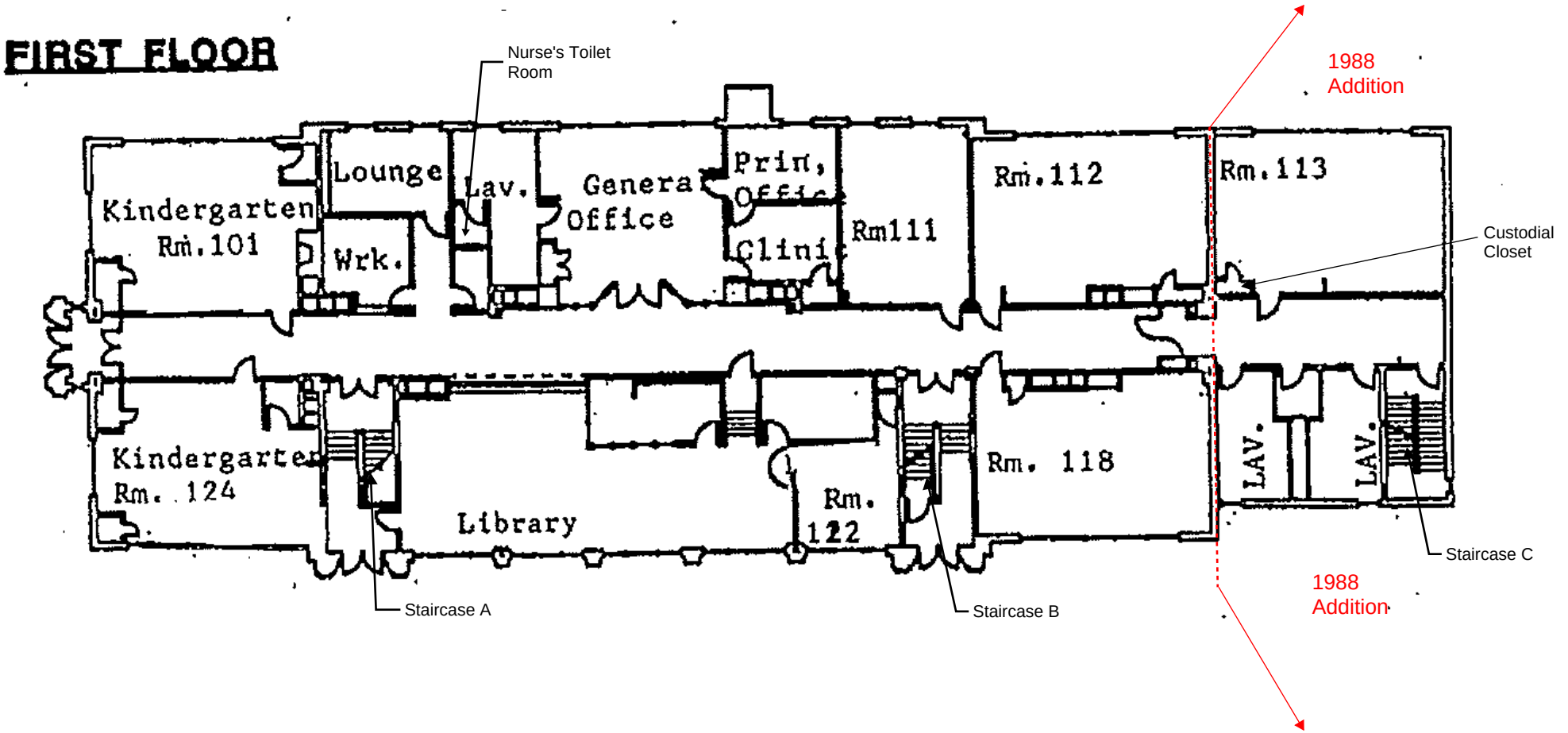
School Diagrams

MACDONOUGH SCHOOL FLOOR PLAN

Ground Floor

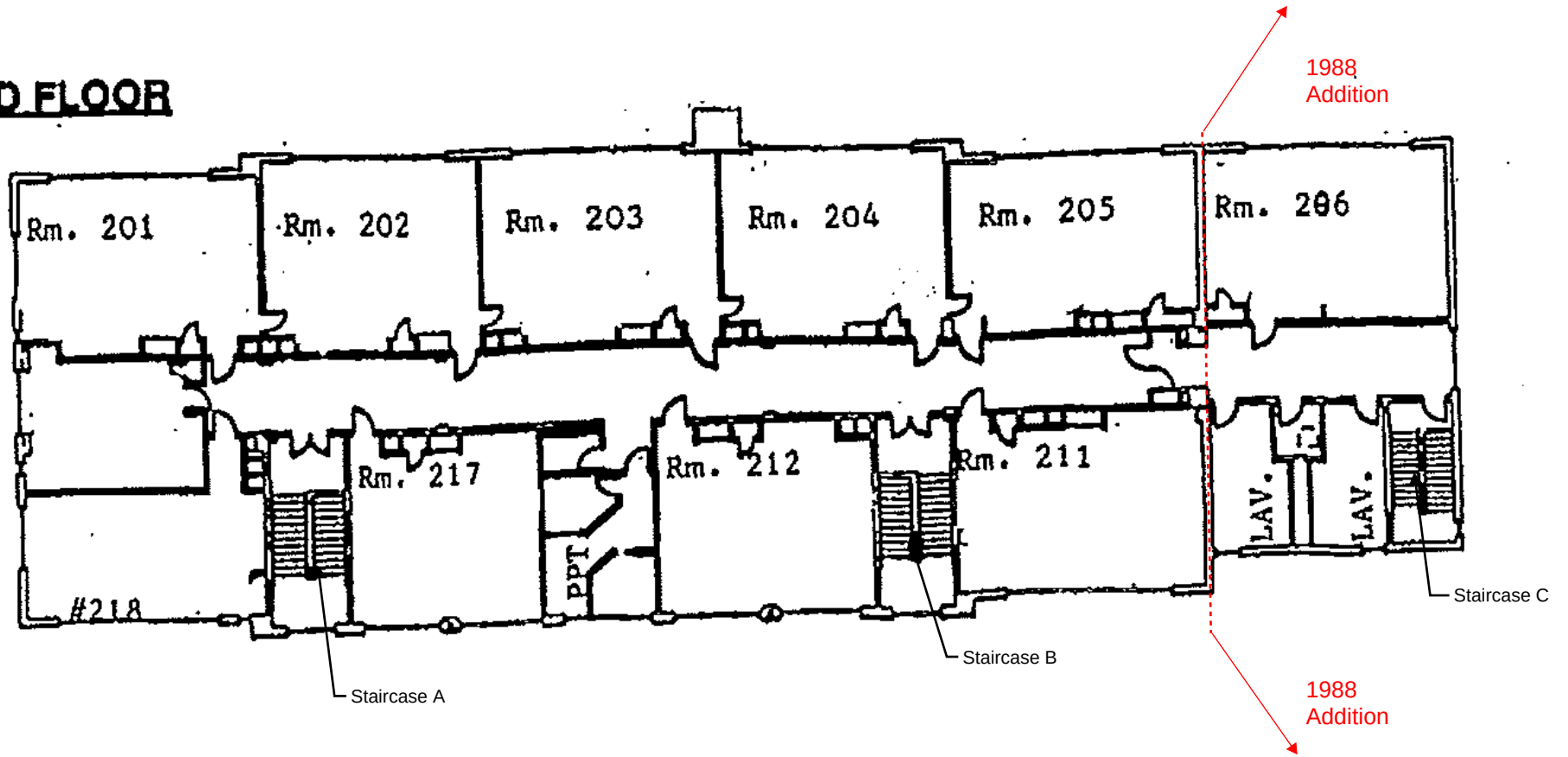


MACDONOUGH SCHOOL FLOOR PLAN



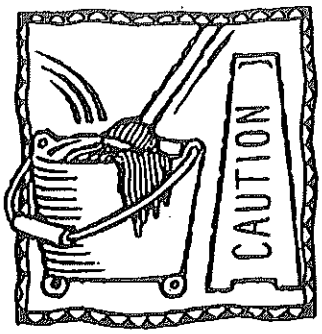
MACDONOUGH SCHOOL FLOOR PLAN

SECOND FLOOR



Appendix B

Tools for Schools Checklists



Building and Grounds Maintenance Checklist

Name: _____

School: MacDonough Elementary

Room or Area: _____ Date Completed: 11-22-2024

Signature: _____

Instructions

1. Read the *IAQ Backgrounder* and the Background Information for this checklist.
2. Keep the Background Information and make a copy of the checklist for future reference.
3. Complete the Checklist.
   - Check the "yes," "no," or "not applicable" box beside each item. (A "no" response requires further attention.)
   - Make comments in the "Notes" section as necessary.
4. Return the checklist portion of this document to the IAQ Coordinator.

1. BUILDING MAINTENANCE SUPPLIES

		Yes	No	N/A
1a.	Developed appropriate procedures and stocked supplies for spill control	☑	☐	☐
1b.	Reviewed supply labels	☑	☐	☐
1c.	Ensured that air from chemical and trash storage areas vents to the outdoors	☑	☐	☐
1d.	Stored chemical products and supplies in sealed, clearly labeled containers	☑	☐	☐
1e.	Researched and selected the safest products available	☑	☐	☐
1f.	Ensured that supplies are being used according to manufacturers' instructions	☑	☐	☐
1g.	Ensured that chemicals, chemical-containing wastes, and containers are disposed of according to manufacturers' instructions	☑	☐	☐
1h.	Substituted less- or non-hazardous materials (where possible)	☑	☐	☐
1i.	Scheduled work involving odorous or hazardous chemicals for periods when the school is unoccupied	☑	☐	☐
1j.	Ventilated affected areas during and after the use of odorous or hazardous chemicals	☑	☐	☐

2. GROUNDS MAINTENANCE SUPPLIES

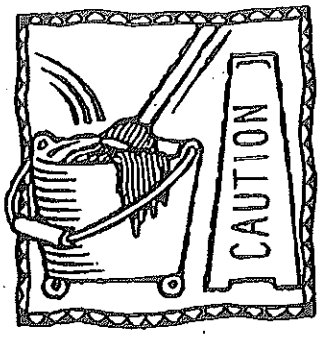
2a.	Stored grounds maintenance supplies in appropriate area(s)	☑	☐	☐
2b.	Ensured that supplies are used and stored according to manufacturers' instructions	☑	☐	☐
2c.	Established and followed procedures to minimize exposure to fumes from supplies	☑	☐	☐
2d.	Reviewed and followed manufacturers' guidelines for maintenance	☑	☐	☐
2e.	Replaced portable gas cans with low-emission cans	☑	☐	☐
2f.	Stored chemical products and supplies in sealed, clearly-labeled containers	☑	☐	☐
2g.	Ensured that chemicals, chemical-containing wastes, and containers are disposed of according to manufacturers' instructions	☑	☐	☐

3. DUST CONTROL

3a.	Installed and maintained barrier mats for entrances	☑	☐	☐
3b.	Used high efficiency vacuum bags	☑	☐	☐
3c.	Used proper dusting techniques	☑	☐	☐
3d.	Wrapped feather dusters with a dust cloth	☐	☐	☑
3e.	Cleaned air return grilles and air supply vents	☑	☐	☐

4. FLOOR CLEANING

	Yes	No	N/A
4a. Established and followed schedule for vacuuming and mopping floors	☑	☐	☐
4b. Cleaned spills on floors promptly (as necessary)	☑	☐	☐
4c. Performed restorative maintenance (as necessary)	☑	☐	☐



5. DRAIN TRAPS

5a. Poured water down floor drains once per week (about 1 quart of water)	☑	☐	☐
5b. Ran water in sinks at least once per week (about 2 cups of water)	☑	☐	☐
5c. Flushed toilets once each week (if not used regularly)	☑	☐	☐

6. MOISTURE, LEAKS, AND SPILLS

6a. Checked for moldy odors	☑	☐	☐
6b. Inspected ceiling tiles, floors, and walls for leaks or discoloration (may indicate periodic leaks)	☑	☐	☐
6c. Checked areas where moisture is commonly generated (e.g., kitchens, locker rooms, and bathrooms)	☑	☐	☐
6d. Checked that windows, windowsills, and window frames are free of condensate	☑	☐	☐
6e. Checked that indoor surfaces of exterior walls and cold water pipes are free of condensate	☑	☐	☐
6f. Ensured the following areas are free from signs of leaks and water damage:			
Indoor areas near known roof or wall leaks	☑	☐	☐
Walls around leaky or broken windows	☑	☐	☐
Floors and ceilings under plumbing	☑	☐	☐
Duct interiors near humidifiers, cooling coils, and outdoor air intakes	☑	☐	☐

7. COMBUSTION APPLIANCES

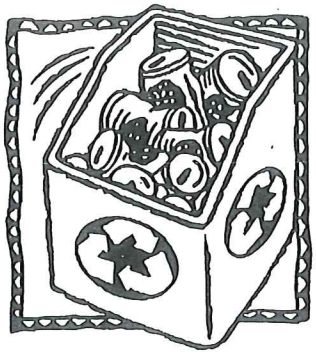
7a. Checked for odors from combustion appliances	☑	☐	☐
7b. Checked appliances for backdrafting (using chemical smoke)	☑	☐	☐
7c. Inspected exhaust components for leaks, disconnections, or deterioration	☑	☐	☐
7d. Inspected flue components for corrosion and soot	☑	☐	☐

8. PEST CONTROL

8a. Completed the *Integrated Pest Management Checklist*	☑	☐	☐

NOTES

we do not use dust feather dusters.



Waste Management Checklist

Name: _____

School: MacDonough Elementary

Room or Area: _____ Date Completed: _____

Signature: _____

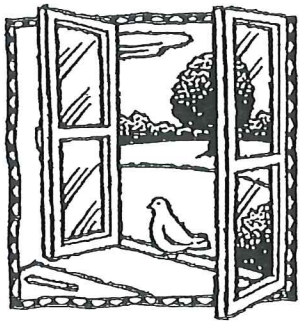
Instructions

1. Read the *IAQ Backgrounder* and the Background Information for this checklist.
2. Keep the Background Information and make a copy of the checklist for future reference.
3. Complete the Checklist.
   - Check the "yes," "no," or "not applicable" box beside each item. (A "no" response requires further attention.)
   - Make comments in the "Notes" section as necessary.
4. Return the checklist portion of this document to the IAQ Coordinator.

1. WASTE MANAGEMENT

	Yes	No	N/A
1a. Ensured that waste containers are appropriate for use (for example, food waste containers should have lids)	☑	☐	☐
1b. Ensured that waste containers are lined	☑	☐	☐
1c. Ensured that waste from art, science, vocational classes, etc., are handled separately	☐	☑	☐
1d. Labeled recycling bins clearly	☑	☐	☐
1e. Ensured number of bins and dumpsters is adequate	☑	☐	☐
1f. Ensured appropriate location of dumpsters (i.e., away from air intakes, doors, and operable windows in relation to prevailing winds)	☑	☐	☐
1g. Ensured waste containers are emptied regularly	☑	☐	☐
1h. Ensured appropriate waste removal schedule	☑	☐	☐
1i. Ensured waste is stored in a well-ventilated room	☑	☐	☐
1j. Ensured any exhaust fans in the room are operating properly	☑	☐	☐
1k. Checked waste storage areas for odors, contaminants, or signs of vermin	☑	☐	☐

NOTES



Ventilation Checklist

Name: _____

School: MacDonovan Elementary School

Unit Ventilator/AHU No: AHU 1

Room or Area: Gym Date Completed: _____

Signature: _____

Instructions

1. Read the *IAQ Backgrounder* and the Background Information for this checklist.
2. Keep the Background Information and make a copy of this checklist for **each** ventilation unit in your school, as well as a copy for future reference.
3. Complete the Checklist.
   - Check the "yes," "no," or "not applicable" box beside each item. (A "no" response requires further attention.)
   - Make comments in the "Notes" section as necessary.
4. Return the checklist portion of this document to the IAQ Coordinator.

1. OUTDOOR AIR INTAKES

	Yes	No	N/A
1a. Marked locations of all outdoor air intakes on a small floor plan (for example, a fire escape floor plan)	☐	☐	☑
1b. Ensured that the ventilation system was on and operating in "occupied" mode	☑	☐	☐

ACTIVITY 1: OBSTRUCTIONS

1c. Ensured that outdoor air intakes are clear of obstructions, debris, clogs, or covers	☑	☐	☐
1d. Installed corrective devices as necessary (e.g., if snowdrifts or leaves frequently block an intake)	☐	☐	☑

ACTIVITY 2: POLLUTANT SOURCES

1e. Checked ground-level intakes for pollutant sources (dumpsters, loading docks, and bus-idling areas)	☑	☐	☐
1f. Checked rooftop intakes for pollutant sources (plumbing vents; kitchen, toilet, or laboratory exhaust fans; puddles; and mist from air-conditioning cooling towers)	☑	☐	☐
1g. Resolved any problems with pollutant sources located near outdoor air intakes (e.g., relocated dumpster or extended exhaust pipe)	☑	☐	☐

ACTIVITY 3: AIRFLOW

1h. Obtained chemical smoke (or a small piece of tissue paper or light plastic)	☑	☐	☐
1i. Confirmed that outdoor air is entering the intake appropriately	☑	☐	☐

2. SYSTEM CLEANLINESS

ACTIVITY 4: AIR FILTERS

2a. Replaced filters per maintenance schedule	☑	☐	☐
2b. Shut off ventilation system fans while replacing filters (prevents dirt from blowing downstream)	☑	☐	☐
2c. Vacuumed filter areas before installing new filters	☑	☐	☐
2d. Confirmed proper fit of filters to prevent air from bypassing (flowing around) the air filter	☑	☐	☐
2e. Confirmed proper installation of filters (correct direction for airflow)	☑	☐	☐

2. SYSTEM CLEANLINESS (continued)

ACTIVITY 5: DRAIN PANS

	Yes	No	N/A
2f. Ensured that drain pans slant toward the drain (to prevent water from accumulating)	☑	☐	☐
2g. Cleaned drain pans	☑	☐	☐
2h. Checked drain pans for mold and mildew	☑	☐	☐

ACTIVITY 6: COILS

2i. Ensured that heating and cooling coils are clean	☑	☐	☐

ACTIVITY 7: AIR-HANDLING UNITS, UNIT VENTILATORS

2j. Ensured that the interior of air-handling unit(s) or unit ventilator (air-mixing chamber and fan blades) is clean	☑	☐	☐
2k. Ensured that ducts are clean	☑	☐	☐

ACTIVITY 8: MECHANICAL ROOMS

2l. Checked mechanical room for unsanitary conditions, leaks, and spills	☑	☐	☐
2m. Ensured that mechanical rooms and air-mixing chambers are free of trash, chemical products, and supplies	☑	☐	☐

3. CONTROLS FOR OUTDOOR AIR SUPPLY

3a. Ensured that air dampers are at least partially open (minimum position)	☑	☐	☐
3b. Ensured that minimum position provides adequate outdoor air for occupants	☑	☐	☐

ACTIVITY 9: CONTROLS INFORMATION

3c. Obtained and reviewed all design inside/outside temperature and humidity requirements, controls specifications, as-built mechanical drawings, and controls operations manuals (often uniquely designed)	☑	☐	☐

ACTIVITY 10: CLOCKS, TIMERS, SWITCHES

3d. Turned summer-winter switches to the correct position	☐	☐	☑
3e. Set time clocks appropriately	☐	☐	☑
3f. Ensured that settings fit the actual schedule of building use (including night/weekend use)	☑	☐	☐

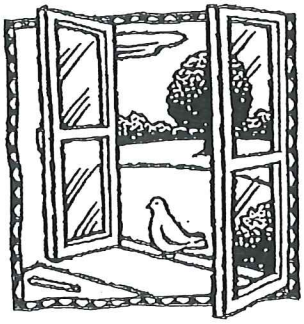
ACTIVITY 11: CONTROL COMPONENTS

3g. Ensured appropriate system pressure by testing line pressure at both the occupied (day) setting and the unoccupied (night) setting	☐	☐	☑
3h. Checked that the line dryer prevents moisture buildup	☐	☐	☑
3i. Replaced control system filters at the compressor inlet based on the compressor manufacturer's recommendation (for example, when you blow down the tank)	☑	☐	☐
3j. Set the line pressure at each thermostat and damper actuator at the proper level (no leakage or obstructions)	☑	☐	☐

ACTIVITY 12: OUTDOOR AIR DAMPERS

3k. Ensured that the outdoor air damper is visible for inspection	☑	☐	☐
3l. Ensured that the recirculating relief and/or exhaust dampers are visible for inspection	☐	☐	☑
3m. Ensured that air temperature in the indoor area(s) served by each outdoor air damper is within the normal operating range	☑	☐	☐

NOTE: It is necessary to ensure that the damper is operating properly and within the normal range to continue.



3. CONTROLS FOR OUTDOOR AIR SUPPLY (continued)

	Yes	No	N/A
3n. Checked that the outdoor air damper fully closes within a few minutes of shutting off appropriate air handler	☑	☐	☐
3o. Checked that the outdoor air damper opens (at least partially with no delay) when the air handler is turned on	☑	☐	☐
3p. If in heating mode, checked that the outdoor air damper goes to its minimum position (without completely closing) when the room thermostat is set to 85°F	☑	☐	☐
3q. If in cooling mode, checked that the outdoor air damper goes to its minimum position (without completely closing) when the room thermostat is set to 60°F and mixed air thermostat is set to 45°F	☑	☐	☐
3r. If the outdoor air damper does not move, confirmed the following items:			
▪ The damper actuator links to the damper shaft, and any linkage set screws or bolts are tight	☑	☐	☐
▪ Moving parts are free of impediments (e.g., rust, corrosion)	☑	☐	☐
▪ Electrical wire or pneumatic tubing connects to the damper actuator	☑	☐	☐
▪ The outside air thermostat(s) is functioning properly (e.g., in the right location, calibrated correctly)	☐	☐	☑

Proceed to Activities 13–16 if the damper seems to be operating properly.

ACTIVITY 13: FREEZE STATS

3s. Disconnected power to controls (for automatic reset only) to test continuity across terminals	☑	☐	☐
OR			
3t. Confirmed (if applicable) that depressing the manual reset button (usually red) trips the freeze stat (clicking sound indicates freeze stat was tripped)	☑	☐	☐
3u. Assessed the feasibility of replacing all manual reset freeze-stats with automatic reset freeze-stats	☑	☐	☐

NOTE: HVAC systems with water coils need protection from the cold. The freeze-stat may close the outdoor air damper and disconnect the supply air when tripped. The typical trip range is 35°F to 42°F.

ACTIVITY 14: MIXED AIR THERMOSTATS

3v. Ensured that the mixed air stat for heating mode is set no higher than 65°F	☐	☐	☑
3w. Ensured that the mixed air stat for cooling mode is set no lower than the room thermostat setting	☑	☐	☐

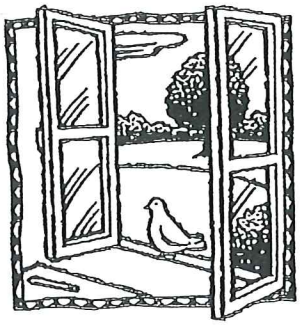
ACTIVITY 15: ECONOMIZERS

3x. Confirmed proper economizer settings based on design specifications or local practices	☐	☐	☑

NOTE: The dry-bulb is typically set at 65°F or lower.

3y. Checked that sensor on the economizer is shielded from direct sunlight	☐	☐	☑
3z. Ensured that dampers operate properly (for outside air, return air, exhaust/relief air, and recirculated air), per the design specifications	☐	☐	☑

NOTE: Economizers use varying amounts of cool outdoor air to assist with the cooling load of the room or rooms. There are two types of economizers, dry-bulb and enthalpy. Dry-bulb economizers vary the amount of outdoor air based on outdoor temperature, and enthalpy economizers vary the amount of outdoor air based on outdoor temperature and humidity level.



3. CONTROLS FOR OUTDOOR AIR SUPPLY (continued)

ACTIVITY 16: FANS

	Yes	No	N/A
3aa. Ensured that all fans (supply fans and associated return or relief fans) that move outside air indoors continuously operate during occupied hours (even when room thermostat is satisfied)	☑	☐	☐

NOTE: If fan shuts off when the thermostat is satisfied, adjust control cycle as necessary to ensure sufficient outdoor air supply.

4. AIR DISTRIBUTION

ACTIVITY 17: AIR DISTRIBUTION

4a. Ensured that supply and return air pathways in the existing ventilation system perform as required	☑	☐	☐
4b. Ensured that passive gravity relief ventilation systems and transfer grilles between rooms and corridors are functioning	☐	☐	☑

NOTE: If ventilation system is closed or blocked to meet current fire codes, consult with a professional engineer for remedies.

4c. Made sure every occupied space has supply of outdoor air (mechanical system or operable windows)	☑	☐	☐
4d. Ensured that supply and return vents are open and unblocked	☑	☐	☐

NOTE: If outlets have been blocked intentionally to correct drafts or discomfort, investigate and correct the cause of the discomfort and reopen the vents.

4e. Modified the HVAC system to supply outside air to areas without an outdoor air supply	☐	☐	☑
4f. Modified existing HVAC systems to incorporate any room or zone layout and population changes	☑	☐	☐
4g. Moved all barriers (for example, room dividers, large free-standing blackboards or displays, bookshelves) that could block movement of air in the room, especially those blocking air vents	☐	☐	☑
4h. Ensured that unit ventilators are quiet enough to accommodate classroom activities	☑	☐	☐
4i. Ensured that classrooms are free of uncomfortable drafts produced by air from supply terminals	☑	☐	☐

ACTIVITY 18: PRESSURIZATION IN BUILDINGS

NOTE: To prevent infiltration of outdoor pollutants, the ventilation system is designed to maintain positive pressurization in the building. Therefore, ensure that the system, including any exhaust fans, is operating on the "occupied" cycle when doing this activity.

4j. Ensured that air flows out of the building (using chemical smoke) through windows, doors, or other cracks and holes in exterior wall (for example, floor joints, pipe openings)	☐	☐	☑

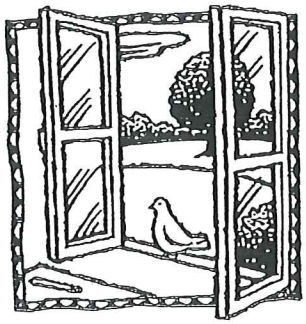
5. EXHAUST SYSTEMS

ACTIVITY 19: EXHAUST FAN OPERATION

5a. Checked (using chemical smoke) that air flows into exhaust fan grille(s)	☐	☐	☑

If fans are running but air is not flowing toward the exhaust intake, check for the following:

- *Inoperable dampers*
- *Obstructed, leaky, or disconnected ductwork*
- *Undersized or improperly installed fan*
- *Broken fan belt*



5. EXHAUST SYSTEMS (continued)

ACTIVITY 20: EXHAUST AIRFLOW

NOTE: Prevent migration of indoor contaminants from areas such as bathrooms, kitchens, and labs by keeping them under negative pressure (as compared to surrounding spaces).

	Yes	No	N/A
5b. Checked (using chemical smoke) that air is drawn into the room from adjacent spaces	☐	☐	☑

Stand outside the room with the door slightly open while checking airflow high and low in the door opening (see "How to Measure Airflow").

5c. Ensured that air is flowing toward the exhaust intake	☐	☐	☑

ACTIVITY 21: EXHAUST DUCTWORK

5d. Checked that the exhaust ductwork downstream of the exhaust fan (which is under positive pressure) is sealed and in good condition	☐	☐	☑

6. QUANTITY OF OUTDOOR AIR

ACTIVITY 22: OUTDOOR AIR MEASUREMENTS AND CALCULATIONS

NOTE: Refer to "How to Measure Airflow" for techniques.

6a. Measured the quantity of outdoor air supplied (22a) to each ventilation unit	☐	☐	☑
6b. Calculated the number of occupants served (22b) by the ventilation unit under consideration	☐	☐	☑
6c. Divided outdoor air supply (22a) by the number of occupants (22b) to determine the existing quantity of outdoor air supply per person (22c)	☐	☐	☑

ACTIVITY 23: ACCEPTABLE LEVELS OF OUTDOOR AIR QUANTITIES

6d. Compared the existing outdoor air per person (22c) to the recommended levels in Table 1	☑	☐	☐
6e. Corrected problems with ventilation units that supplied inadequate quantities of outdoor air to ensure that outdoor air quantities (22c) meet the recommended levels in Table 1	☑	☐	☐

NOTES

Ventilation Checklist

Name: _____

School: MacDonald Elementary School

Unit Ventilator/AHU No: AHU 4

Room or Area: Office Date Completed: _____

Signature: _____

Instructions

1. Read the *IAQ Backgrounder* and the Background Information for this checklist.
2. Keep the Background Information and make a copy of this checklist for **each** ventilation unit in your school, as well as a copy for future reference.
3. Complete the Checklist.
   - Check the "yes," "no," or "not applicable" box beside each item. (A "no" response requires further attention.)
   - Make comments in the "Notes" section as necessary.
4. Return the checklist portion of this document to the IAQ Coordinator.

1. OUTDOOR AIR INTAKES

	Yes	No	N/A
1a. Marked locations of all outdoor air intakes on a small floor plan (for example, a fire escape floor plan)	☐	☐	☑
1b. Ensured that the ventilation system was on and operating in "occupied" mode	☑	☐	☐

ACTIVITY 1: OBSTRUCTIONS

1c. Ensured that outdoor air intakes are clear of obstructions, debris, clogs, or covers	☑	☐	☐
1d. Installed corrective devices as necessary (e.g., if snowdrifts or leaves frequently block an intake)	☐	☐	☑

ACTIVITY 2: POLLUTANT SOURCES

1e. Checked ground-level intakes for pollutant sources (dumpsters, loading docks, and bus-idling areas)	☑	☐	☐
1f. Checked rooftop intakes for pollutant sources (plumbing vents; kitchen, toilet, or laboratory exhaust fans; puddles; and mist from air-conditioning cooling towers)	☑	☐	☐
1g. Resolved any problems with pollutant sources located near outdoor air intakes (e.g., relocated dumpster or extended exhaust pipe)	☑	☐	☐

ACTIVITY 3: AIRFLOW

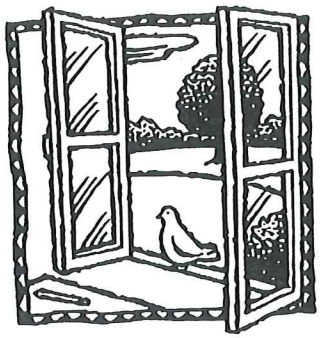
1h. Obtained chemical smoke (or a small piece of tissue paper or light plastic)	☑	☐	☐
1i. Confirmed that outdoor air is entering the intake appropriately	☑	☐	☐

2. SYSTEM CLEANLINESS

ACTIVITY 4: AIR FILTERS

2a. Replaced filters per maintenance schedule	☑	☐	☐
2b. Shut off ventilation system fans while replacing filters (prevents dirt from blowing downstream)	☑	☐	☐
2c. Vacuumed filter areas before installing new filters	☑	☐	☐
2d. Confirmed proper fit of filters to prevent air from bypassing (flowing around) the air filter	☑	☐	☐
2e. Confirmed proper installation of filters (correct direction for airflow)	☑	☐	☐

2. SYSTEM CLEANLINESS (continued)



ACTIVITY 5: DRAIN PANS

	Yes	No	N/A
2f. Ensured that drain pans slant toward the drain (to prevent water from accumulating)	☑	☐	☐
2g. Cleaned drain pans	☑	☐	☐
2h. Checked drain pans for mold and mildew	☑	☐	☐

ACTIVITY 6: COILS

2i. Ensured that heating and cooling coils are clean	☑	☐	☐

ACTIVITY 7: AIR-HANDLING UNITS, UNIT VENTILATORS

2j. Ensured that the interior of air-handling unit(s) or unit ventilator (air-mixing chamber and fan blades) is clean	☑	☐	☐
2k. Ensured that ducts are clean	☑	☐	☐

ACTIVITY 8: MECHANICAL ROOMS

2l. Checked mechanical room for unsanitary conditions, leaks, and spills	☑	☐	☐
2m. Ensured that mechanical rooms and air-mixing chambers are free of trash, chemical products, and supplies	☑	☐	☐

3. CONTROLS FOR OUTDOOR AIR SUPPLY

3a. Ensured that air dampers are at least partially open (minimum position)	☑	☐	☐
3b. Ensured that minimum position provides adequate outdoor air for occupants	☑	☐	☐

ACTIVITY 9: CONTROLS INFORMATION

3c. Obtained and reviewed all design inside/outside temperature and humidity requirements, controls specifications, as-built mechanical drawings, and controls operations manuals (often uniquely designed)	☑	☐	☐

ACTIVITY 10: CLOCKS, TIMERS, SWITCHES

3d. Turned summer-winter switches to the correct position	☐	☐	☑
3e. Set time clocks appropriately	☐	☐	☑
3f. Ensured that settings fit the actual schedule of building use (including night/weekend use)	☑	☐	☐

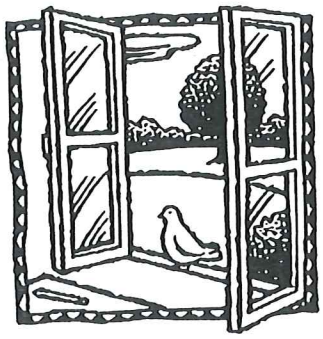
ACTIVITY 11: CONTROL COMPONENTS

3g. Ensured appropriate system pressure by testing line pressure at both the occupied (day) setting and the unoccupied (night) setting	☐	☐	☑
3h. Checked that the line dryer prevents moisture buildup	☐	☐	☑
3i. Replaced control system filters at the compressor inlet based on the compressor manufacturer's recommendation (for example, when you blow down the tank)	☑	☐	☐
3j. Set the line pressure at each thermostat and damper actuator at the proper level (no leakage or obstructions)	☑	☐	☐

ACTIVITY 12: OUTDOOR AIR DAMPERS

3k. Ensured that the outdoor air damper is visible for inspection	☑	☐	☐
3l. Ensured that the recirculating relief and/or exhaust dampers are visible for inspection	☐	☐	☑
3m. Ensured that air temperature in the indoor area(s) served by each outdoor air damper is within the normal operating range	☑	☐	☐

NOTE: It is necessary to ensure that the damper is operating properly and within the normal



3. CONTROLS FOR OUTDOOR AIR SUPPLY (continued)

	Yes	No	N/A
3n. Checked that the outdoor air damper fully closes within a few minutes of shutting off appropriate air handler	☑	☐	☐
3o. Checked that the outdoor air damper opens (at least partially with no delay) when the air handler is turned on	☑	☐	☐
3p. If in heating mode, checked that the outdoor air damper goes to its minimum position (without completely closing) when the room thermostat is set to 85°F	☑	☐	☐
3q. If in cooling mode, checked that the outdoor air damper goes to its minimum position (without completely closing) when the room thermostat is set to 60°F and mixed air thermostat is set to 45°F	☑	☐	☐
3r. If the outdoor air damper does not move, confirmed the following items:			
• The damper actuator links to the damper shaft, and any linkage set screws or bolts are tight	☑	☐	☐
• Moving parts are free of impediments (e.g., rust, corrosion)	☑	☐	☐
• Electrical wire or pneumatic tubing connects to the damper actuator	☑	☐	☐
• The outside air thermostat(s) is functioning properly (e.g., in the right location, calibrated correctly)	☐	☐	☑

Proceed to Activities 13–16 if the damper seems to be operating properly.

ACTIVITY 13: FREEZE STATS

3s. Disconnected power to controls (for automatic reset only) to test continuity across terminals	☑	☐	☐
OR			
3t. Confirmed (if applicable) that depressing the manual reset button (usually red) trips the freeze stat (clicking sound indicates freeze stat was tripped)	☑	☐	☐
3u. Assessed the feasibility of replacing all manual reset freeze-stats with automatic reset freeze-stats	☑	☐	☐

NOTE: HVAC systems with water coils need protection from the cold. The freeze-stat may close the outdoor air damper and disconnect the supply air when tripped. The typical trip range is 35°F to 42°F.

ACTIVITY 14: MIXED AIR THERMOSTATS

3v. Ensured that the mixed air stat for heating mode is set no higher than 65°F	☐	☐	☑
3w. Ensured that the mixed air stat for cooling mode is set no lower than the room thermostat setting	☑	☐	☐

ACTIVITY 15: ECONOMIZERS

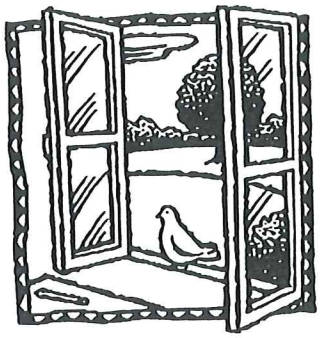
3x. Confirmed proper economizer settings based on design specifications or local practices	☑	☐	☐

NOTE: The dry-bulb is typically set at 65°F or lower.

3y. Checked that sensor on the economizer is shielded from direct sunlight	☑	☐	☐
3z. Ensured that dampers operate properly (for outside air, return air, exhaust/relief air, and recirculated air), per the design specifications	☑	☐	☐

NOTE: Economizers use varying amounts of cool outdoor air to assist with the cooling load of the room or rooms. There are two types of economizers, dry-bulb and enthalpy. Dry-bulb economizers vary the amount of outdoor air based on outdoor temperature, and enthalpy economizers vary the amount of outdoor air based on outdoor temperature and humidity level.

3. CONTROLS FOR OUTDOOR AIR SUPPLY (continued)



ACTIVITY 16: FANS

	Yes	No	N/A
3aa. Ensured that all fans (supply fans and associated return or relief fans) that move outside air indoors continuously operate during occupied hours (even when room thermostat is satisfied)	☑	☐	☐

NOTE: If fan shuts off when the thermostat is satisfied, adjust control cycle as necessary to ensure sufficient outdoor air supply.

4. AIR DISTRIBUTION

ACTIVITY 17: AIR DISTRIBUTION

4a. Ensured that supply and return air pathways in the existing ventilation system perform as required	☑	☐	☐
4b. Ensured that passive gravity relief ventilation systems and transfer grilles between rooms and corridors are functioning	☐	☐	☑

NOTE: If ventilation system is closed or blocked to meet current fire codes, consult with a professional engineer for remedies.

4c. Made sure every occupied space has supply of outdoor air (mechanical system or operable windows)	☑	☐	☐
4d. Ensured that supply and return vents are open and unblocked	☑	☐	☐

NOTE: If outlets have been blocked intentionally to correct drafts or discomfort, investigate and correct the cause of the discomfort and reopen the vents.

4e. Modified the HVAC system to supply outside air to areas without an outdoor air supply	☐	☐	☑
4f. Modified existing HVAC systems to incorporate any room or zone layout and population changes	☑	☐	☐
4g. Moved all barriers (for example, room dividers, large free-standing blackboards or displays, bookshelves) that could block movement of air in the room, especially those blocking air vents	☐	☐	☑
4h. Ensured that unit ventilators are quiet enough to accommodate classroom activities	☑	☐	☐
4i. Ensured that classrooms are free of uncomfortable drafts produced by air from supply terminals	☑	☐	☐

ACTIVITY 18: PRESSURIZATION IN BUILDINGS

NOTE: To prevent infiltration of outdoor pollutants, the ventilation system is designed to maintain positive pressurization in the building. Therefore, ensure that the system, including any exhaust fans, is operating on the "occupied" cycle when doing this activity.

4j. Ensured that air flows out of the building (using chemical smoke) through windows, doors, or other cracks and holes in exterior wall (for example, floor joints, pipe openings)	☐	☐	☑

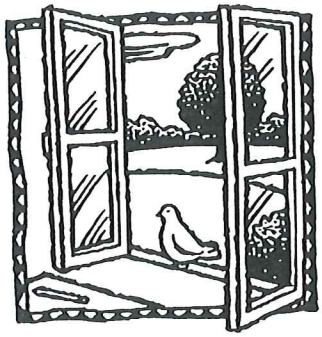
5. EXHAUST SYSTEMS

ACTIVITY 19: EXHAUST FAN OPERATION

5a. Checked (using chemical smoke) that air flows into exhaust fan grille(s)	☐	☐	☑

If fans are running but air is not flowing toward the exhaust intake, check for the following:

- *Inoperable dampers*
- *Obstructed, leaky, or disconnected ductwork*
- *Undersized or improperly installed fan*
- *Broken fan belt*



5. EXHAUST SYSTEMS (continued)

ACTIVITY 20: EXHAUST AIRFLOW

NOTE: Prevent migration of indoor contaminants from areas such as bathrooms, kitchens, and labs by keeping them under negative pressure (as compared to surrounding spaces).

	Yes	No	N/A
5b. Checked (using chemical smoke) that air is drawn into the room from adjacent spaces	☐	☐	☑

Stand outside the room with the door slightly open while checking airflow high and low in the door opening (see "How to Measure Airflow").

5c. Ensured that air is flowing toward the exhaust intake	☐	☐	☑

ACTIVITY 21: EXHAUST DUCTWORK

5d. Checked that the exhaust ductwork downstream of the exhaust fan (which is under positive pressure) is sealed and in good condition	☐	☐	☑

6. QUANTITY OF OUTDOOR AIR

ACTIVITY 22: OUTDOOR AIR MEASUREMENTS AND CALCULATIONS

NOTE: Refer to "How to Measure Airflow" for techniques.

6a. Measured the quantity of outdoor air supplied (22a) to each ventilation unit	☐	☐	☑
6b. Calculated the number of occupants served (22b) by the ventilation unit under consideration	☐	☐	☑
6c. Divided outdoor air supply (22a) by the number of occupants (22b) to determine the existing quantity of outdoor air supply per person (22c)	☐	☐	☑

ACTIVITY 23: ACCEPTABLE LEVELS OF OUTDOOR AIR QUANTITIES

6d. Compared the existing outdoor air per person (22c) to the recommended levels in Table 1	☑	☐	☐
6e. Corrected problems with ventilation units that supplied inadequate quantities of outdoor air to ensure that outdoor air quantities (22c) meet the recommended levels in Table 1	☑	☐	☐

NOTES

Ventilation Checklist

Name: _____

School: MacDonough Elementry School

Unit Ventilator/AHU No: Unit Ventilators

Room or Area: Classrooms Date Completed: _____

Signature: _____

Instructions

1. Read the *IAQ Backgrounder* and the Background Information for this checklist.
2. Keep the Background Information and make a copy of this checklist for **each** ventilation unit in your school, as well as a copy for future reference.
3. Complete the Checklist.
   - Check the "yes," "no," or "not applicable" box beside each item. (A "no" response requires further attention.)
   - Make comments in the "Notes" section as necessary.
4. Return the checklist portion of this document to the IAQ Coordinator.

1. OUTDOOR AIR INTAKES

	Yes	No	N/A
1a. Marked locations of all outdoor air intakes on a small floor plan (for example, a fire escape floor plan)	☐	☐	☑
1b. Ensured that the ventilation system was on and operating in "occupied" mode	☑	☐	☐

ACTIVITY 1: OBSTRUCTIONS

1c. Ensured that outdoor air intakes are clear of obstructions, debris, clogs, or covers	☑	☐	☐
1d. Installed corrective devices as necessary (e.g., if snowdrifts or leaves frequently block an intake)	☐	☐	☑

ACTIVITY 2: POLLUTANT SOURCES

1e. Checked ground-level intakes for pollutant sources (dumpsters, loading docks, and bus-idling areas)	☑	☐	☐
1f. Checked rooftop intakes for pollutant sources (plumbing vents; kitchen, toilet, or laboratory exhaust fans; puddles; and mist from air-conditioning cooling towers)	☐	☐	☑
1g. Resolved any problems with pollutant sources located near outdoor air intakes (e.g., relocated dumpster or extended exhaust pipe)	☐	☐	☑

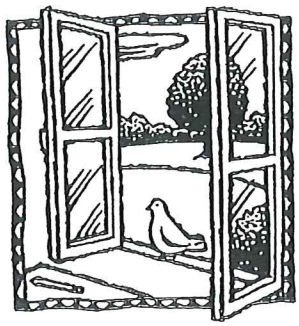
ACTIVITY 3: AIRFLOW

1h. Obtained chemical smoke (or a small piece of tissue paper or light plastic)	☐	☐	☑
1i. Confirmed that outdoor air is entering the intake appropriately	☑	☐	☐

2. SYSTEM CLEANLINESS

ACTIVITY 4: AIR FILTERS

2a. Replaced filters per maintenance schedule	☑	☐	☐
2b. Shut off ventilation system fans while replacing filters (prevents dirt from blowing downstream)	☑	☐	☐
2c. Vacuumed filter areas before installing new filters	☑	☐	☐
2d. Confirmed proper fit of filters to prevent air from bypassing (flowing around) the air filter	☑	☐	☐
2e. Confirmed proper installation of filters (correct direction for airflow)	☑	☐	☐



2. SYSTEM CLEANLINESS (continued)

ACTIVITY 5: DRAIN PANS

	Yes	No	N/A
2f. Ensured that drain pans slant toward the drain (to prevent water from accumulating)	☐	☐	☑
2g. Cleaned drain pans	☐	☐	☑
2h. Checked drain pans for mold and mildew	☐	☐	☑

ACTIVITY 6: COILS

2i. Ensured that heating and cooling coils are clean	☑	☐	☐

ACTIVITY 7: AIR-HANDLING UNITS, UNIT VENTILATORS

2j. Ensured that the interior of air-handling unit(s) or unit ventilator (air-mixing chamber and fan blades) is clean	☑	☐	☐
2k. Ensured that ducts are clean	☐	☐	☑

ACTIVITY 8: MECHANICAL ROOMS

2l. Checked mechanical room for unsanitary conditions, leaks, and spills	☐	☐	☑
2m. Ensured that mechanical rooms and air-mixing chambers are free of trash, chemical products, and supplies	☐	☐	☑

3. CONTROLS FOR OUTDOOR AIR SUPPLY

3a. Ensured that air dampers are at least partially open (minimum position)	☑	☐	☐
3b. Ensured that minimum position provides adequate outdoor air for occupants	☑	☐	☐

ACTIVITY 9: CONTROLS INFORMATION

3c. Obtained and reviewed all design inside/outside temperature and humidity requirements, controls specifications, as-built mechanical drawings, and controls operations manuals (often uniquely designed)	☐	☐	☑

ACTIVITY 10: CLOCKS, TIMERS, SWITCHES

3d. Turned summer-winter switches to the correct position	☐	☐	☑
3e. Set time clocks appropriately	☐	☐	☑
3f. Ensured that settings fit the actual schedule of building use (including night/weekend use)	☐	☐	☑

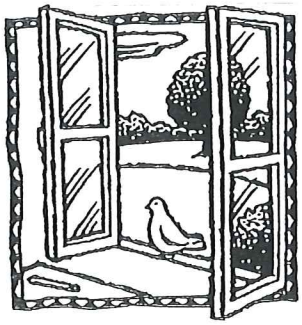
ACTIVITY 11: CONTROL COMPONENTS

3g. Ensured appropriate system pressure by testing line pressure at both the occupied (day) setting and the unoccupied (night) setting	☐	☐	☑
3h. Checked that the line dryer prevents moisture buildup	☐	☐	☑
3i. Replaced control system filters at the compressor inlet based on the compressor manufacturer's recommendation (for example, when you blow down the tank)	☐	☐	☑
3j. Set the line pressure at each thermostat and damper actuator at the proper level (no leakage or obstructions)	☐	☐	☑

ACTIVITY 12: OUTDOOR AIR DAMPERS

3k. Ensured that the outdoor air damper is visible for inspection	☑	☐	☐
3l. Ensured that the recirculating relief and/or exhaust dampers are visible for inspection	☐	☐	☑
3m. Ensured that air temperature in the indoor area(s) served by each outdoor air damper is within the normal operating range	☑	☐	☐

NOTE: It is necessary to ensure that the damper is operating properly and within the normal range to continue.



3. CONTROLS FOR OUTDOOR AIR SUPPLY (continued)

	Yes	No	N/A
3n. Checked that the outdoor air damper fully closes within a few minutes of shutting off appropriate air handler	☑	☐	☐
3o. Checked that the outdoor air damper opens (at least partially with no delay) when the air handler is turned on	☑	☐	☐
3p. If in heating mode, checked that the outdoor air damper goes to its minimum position (without completely closing) when the room thermostat is set to 85°F	☑	☐	☐
3q. If in cooling mode, checked that the outdoor air damper goes to its minimum position (without completely closing) when the room thermostat is set to 60°F and mixed air thermostat is set to 45°F	☑	☐	☑
3r. If the outdoor air damper does not move, confirmed the following items:			
◦ The damper actuator links to the damper shaft, and any linkage set screws or bolts are tight	☑	☐	☐
◦ Moving parts are free of impediments (e.g., rust, corrosion)	☑	☐	☐
◦ Electrical wire or pneumatic tubing connects to the damper actuator	☑	☐	☐
◦ The outside air thermostat(s) is functioning properly (e.g., in the right location, calibrated correctly)	☑	☐	☐

Proceed to Activities 13–16 if the damper seems to be operating properly.

ACTIVITY 13: FREEZE STATS

3s. Disconnected power to controls (for automatic reset only) to test continuity across terminals	☑	☐	☐
OR			
3t. Confirmed (if applicable) that depressing the manual reset button (usually red) trips the freeze stat (clicking sound indicates freeze stat was tripped)	☑	☐	☐
3u. Assessed the feasibility of replacing all manual reset freeze-stats with automatic reset freeze-stats	☑	☐	☐

NOTE: HVAC systems with water coils need protection from the cold. The freeze-stat may close the outdoor air damper and disconnect the supply air when tripped. The typical trip range is 35°F to 42°F.

ACTIVITY 14: MIXED AIR THERMOSTATS

3v. Ensured that the mixed air stat for heating mode is set no higher than 65°F	☐	☐	☑
3w. Ensured that the mixed air stat for cooling mode is set no lower than the room thermostat setting	☐	☐	☑

ACTIVITY 15: ECONOMIZERS

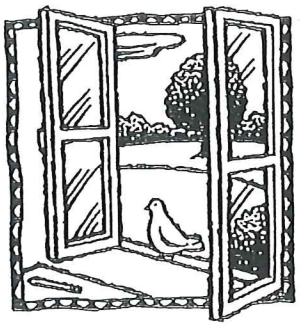
3x. Confirmed proper economizer settings based on design specifications or local practices	☐	☐	☑

NOTE: The dry-bulb is typically set at 65°F or lower.

3y. Checked that sensor on the economizer is shielded from direct sunlight	☐	☐	☑
3z. Ensured that dampers operate properly (for outside air, return air, exhaust/relief air, and recirculated air), per the design specifications	☐	☐	☑

NOTE: Economizers use varying amounts of cool outdoor air to assist with the cooling load of the room or rooms. There are two types of economizers, dry-bulb and enthalpy. Dry-bulb economizers vary the amount of outdoor air based on outdoor temperature, and enthalpy economizers vary the amount of outdoor air based on outdoor temperature and humidity level.

3. CONTROLS FOR OUTDOOR AIR SUPPLY (continued)



ACTIVITY 16: FANS

	Yes	No	N/A
3aa. Ensured that all fans (supply fans and associated return or relief fans) that move outside air indoors continuously operate during occupied hours (even when room thermostat is satisfied)	☑	☐	☐

NOTE: If fan shuts off when the thermostat is satisfied, adjust control cycle as necessary to ensure sufficient outdoor air supply.

4. AIR DISTRIBUTION

ACTIVITY 17: AIR DISTRIBUTION

4a. Ensured that supply and return air pathways in the existing ventilation system perform as required	☑	☐	☐
4b. Ensured that passive gravity relief ventilation systems and transfer grilles between rooms and corridors are functioning	☐	☐	☑

NOTE: If ventilation system is closed or blocked to meet current fire codes, consult with a professional engineer for remedies.

4c. Made sure every occupied space has supply of outdoor air (mechanical system or operable windows)	☑	☐	☐
4d. Ensured that supply and return vents are open and unblocked	☑	☐	☐

NOTE: If outlets have been blocked intentionally to correct drafts or discomfort, investigate and correct the cause of the discomfort and reopen the vents.

4e. Modified the HVAC system to supply outside air to areas without an outdoor air supply	☐	☐	☑
4f. Modified existing HVAC systems to incorporate any room or zone layout and population changes	☑	☐	☐
4g. Moved all barriers (for example, room dividers, large free-standing blackboards or displays, bookshelves) that could block movement of air in the room, especially those blocking air vents	☐	☐	☑
4h. Ensured that unit ventilators are quiet enough to accommodate classroom activities	☑	☐	☐
4i. Ensured that classrooms are free of uncomfortable drafts produced by air from supply terminals	☑	☐	☐

ACTIVITY 18: PRESSURIZATION IN BUILDINGS

NOTE: To prevent infiltration of outdoor pollutants, the ventilation system is designed to maintain positive pressurization in the building. Therefore, ensure that the system, including any exhaust fans, is operating on the "occupied" cycle when doing this activity.

4j. Ensured that air flows out of the building (using chemical smoke) through windows, doors, or other cracks and holes in exterior wall (for example, floor joints, pipe openings)	☐	☐	☑

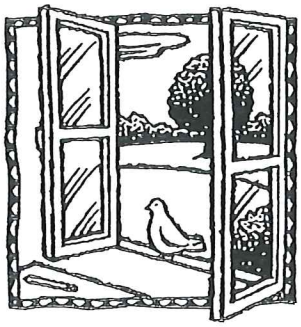
5. EXHAUST SYSTEMS

ACTIVITY 19: EXHAUST FAN OPERATION

5a. Checked (using chemical smoke) that air flows into exhaust fan grille(s)	☐	☐	☑

If fans are running but air is not flowing toward the exhaust intake, check for the following:

- *Inoperable dampers*
- *Obstructed, leaky, or disconnected ductwork*
- *Undersized or improperly installed fan*
- *Broken fan belt*



5. EXHAUST SYSTEMS (continued)

ACTIVITY 20: EXHAUST AIRFLOW

NOTE: Prevent migration of indoor contaminants from areas such as bathrooms, kitchens, and labs by keeping them under negative pressure (as compared to surrounding spaces).

	Yes	No	N/A
5b. Checked (using chemical smoke) that air is drawn into the room from adjacent spaces	☐	☐	☑

Stand outside the room with the door slightly open while checking airflow high and low in the door opening (see "How to Measure Airflow").

5c. Ensured that air is flowing toward the exhaust intake	☐	☐	☑

ACTIVITY 21: EXHAUST DUCTWORK

5d. Checked that the exhaust ductwork downstream of the exhaust fan (which is under positive pressure) is sealed and in good condition	☐	☐	☑

6. QUANTITY OF OUTDOOR AIR

ACTIVITY 22: OUTDOOR AIR MEASUREMENTS AND CALCULATIONS

NOTE: Refer to "How to Measure Airflow" for techniques.

6a. Measured the quantity of outdoor air supplied (22a) to each ventilation unit	☐	☐	☑
6b. Calculated the number of occupants served (22b) by the ventilation unit under consideration	☐	☐	☑
6c. Divided outdoor air supply (22a) by the number of occupants (22b) to determine the existing quantity of outdoor air supply per person (22c)	☐	☐	☑

ACTIVITY 23: ACCEPTABLE LEVELS OF OUTDOOR AIR QUANTITIES

6d. Compared the existing outdoor air per person (22c) to the recommended levels in Table 1	☐	☐	☑
6e. Corrected problems with ventilation units that supplied inadequate quantities of outdoor air to ensure that outdoor air quantities (22c) meet the recommended levels in Table 1	☐	☐	☑

NOTES

Walkthrough Inspection Checklist

Name: _____

School: MacDonald Elementary School

Room or Area: _____ Date Completed: _____

Signature: _____

Instructions

1. Read the *IAQ Backgrounder* and the Background Information for this checklist.
2. Keep the Background Information and make a copy of the checklist for future reference.
3. Complete the Checklist.
   - Check the "yes," "no," or "not applicable" box beside each item. (A "no" response requires further attention.)
   - Make comments in the "Notes" section as necessary.
4. Return the checklist portion of this document to the IAQ Coordinator.

1. GROUND LEVEL

		Yes	No	N/A
1a.	Ensured that ventilation units operate properly	☑	☐	☐
1b.	Ensured there are no obstructions blocking air intakes	☑	☐	☐
1c.	Checked for nests and droppings near outdoor air intakes	☑	☐	☐
1d.	Determined that dumpsters are located away from doors, windows, and outdoor air intakes	☑	☐	☐
1e.	Checked potential sources of air contaminants near the building (chimneys, stacks, industrial plants, exhaust from nearby buildings)	☑	☐	☐
1f.	Ensured that vehicles avoid idling near outdoor air intakes	☑	☐	☐
1g.	Minimized pesticide application	☑	☐	☐
1h.	Ensured that there is proper drainage away from the building (including roof downspouts)	☑	☐	☐
1i.	Ensured that sprinklers spray away from the building and outdoor air intakes	☑	☐	☐
1j.	Ensured that walk-off mats are used at exterior entrances and that they are cleaned regularly	☑	☐	☐

2. ROOF

While on the roof, consider inspecting the HVAC units (use the Ventilation Checklist*).*

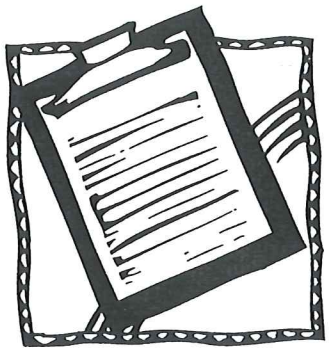
2a.	Ensured that the roof is in good condition	☐	☑	☐
2b.	Checked for evidence of water ponding	☑	☐	☐
2c.	Checked that ventilation units operate properly (air flows in)	☑	☐	☐
2d.	Ensured that exhaust fans operate properly (air flows out)	☑	☐	☐
2e.	Ensured that air intakes remain open, even at minimum setting	☑	☐	☐
2f.	Checked for nests and droppings near outdoor air intakes	☑	☐	☐
2g.	Ensured that air from plumbing stacks and exhaust outlets flows away from outdoor air intakes	☑	☐	☐

3. ATTIC

3a.	Checked for evidence of roof and plumbing leaks	☑	☐	☐
3b.	Checked for birds and animal nests	☑	☐	☐

4. GENERAL CONSIDERATIONS

4a.	Ensured that temperature and humidity are maintained within acceptable ranges	☑	☐	☐
4b.	Ensured that no obstructions exist in supply and exhaust vents	☑	☐	☐
4c.	Checked for odors	☑	☐	☐
4d.	Checked for signs of mold and mildew growth	☑	☐	☐



4. GENERAL CONSIDERATIONS (continued)

	Yes	No	N/A
4e. Checked for signs of water damage	☑	☐	☐
4f. Checked for evidence of pests and obvious food sources	☑	☐	☐
4g. Noted and reviewed all concerns from school occupants	☑	☐	☐

5. BATHROOMS AND GENERAL PLUMBING

5a. Ensured that bathrooms and restrooms have operating exhaust fans	☑	☐	☐
5b. Ensured proper drain trap maintenance:			
Water is poured down floor drains once per week (approx. 1 quart of water)	☑	☐	☐
Water is poured into sinks at least once per week (about 2 cups of water)	☑	☐	☐
Toilets are flushed at least once per week	☑	☐	☐

6. MAINTENANCE SUPPLIES

6a. Ensured that chemicals are used only with adequate ventilation and when building is unoccupied	☑	☐	☐
6b. Ensured that vents in chemical and trash storage areas are operating properly	☑	☐	☐
6c. Ensured that portable fuel containers are properly closed	☑	☐	☐
6d. Ensured that power equipment, like snowblowers and lawn mowers, have been serviced and maintained according to manufacturers' guidelines	☑	☐	☐

7. COMBUSTION APPLIANCES

7a. Checked for combustion gas and fuel odors	☑	☐	☐
7b. Ensured that combustion appliances have flues or exhaust hoods	☑	☐	☐
7c. Checked for leaks, disconnections, and deterioration	☑	☐	☐
7d. Ensured there is no soot on inside or outside of flue components	☑	☐	☐

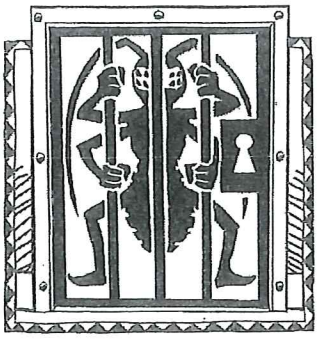
8. OTHER

8a. Checked for peeling and flaking paint (if the building was built before 1980, this could be a lead hazard)	☑	☐	☐
8b. Determined date of last radon test	☑	☐	☐

NOTES

2a. ROOF AGE 20+ YEARS

8b. TEST TO BE PERFORMED FEBRUARY 2024



Integrated Pest Management Checklist

Name: JP Bellamo and Sons Pest Control

School: MacDonough Elementary

Room or Area: _____ Date Completed: 12/18/24

Signature: J. P. Bellamo

Instructions

1. Read the *IAQ Backgrounder* and the Background Information for this checklist.
2. Keep the Background Information and make a copy of the checklist for future reference.
3. Complete the Checklist.
   - Check the "yes," "no," or "not applicable" box beside each item. (A "no" response requires further attention.)
   - Make comments in the "Notes" section as necessary.
4. Return the checklist portion of this document to the IAQ Coordinator.

1. OFFICIAL POLICY STATEMENT

		Yes	No	N/A
1a.	Developed or located the school's official policy statement for integrated pest management (IPM)	☐	☒	☐

2. DESIGNATING PEST MANAGEMENT ROLES

		Yes	No	N/A
2a.	Assigned and trained a qualified person to be the pest manager	☐	☒	☐
2b.	Involved decision makers in the IPM program	☒	☐	☐
2c.	Educated students and staff (the occupants of the building) about IPM and asked them to keep their areas clean and free of clutter	☐	☒	☐
2d.	Encouraged parents to learn about IPM practices and implement them at home	☐	☒	☐
2e.	Developed a program to educate and train all IPM participants	☐	☒	☐
2f.	Included language about IPM into contracts with pest management professionals	☒	☐	☐

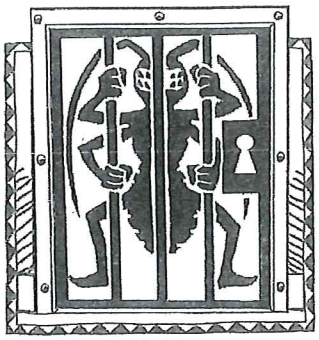
3. SETTING PEST MANAGEMENT OBJECTIVES

		Yes	No	N/A
3a.	Set appropriate pest management objectives for school buildings (such as preventing pests from interfering with students' learning environment and preserving the integrity of the building structure)	☐	☒	☐
3b.	Set appropriate pest management objectives for school grounds (such as providing safe playing areas and the best athletic surfaces possible)	☐	☒	☐

4. INSPECTING, IDENTIFYING, AND MONITORING

		Yes	No	N/A
4a.	Inspected all buildings and grounds for pest evidence, entry points, food, water, and harborage sites	☒	☐	☐
4b.	Identified potential pest habitats in buildings and grounds	☒	☐	☐
4c.	Pinpointed the source of any current pest problems	☒	☐	☐
4d.	Monitored to determine the extent of pest problems and to estimate pest populations	☒	☐	☐
4e.	Developed plans to modify habitat (for example, exclusion, repair, and sanitation efforts) to prevent or resolve any pest problems	☐	☒	☐
4f.	Established a monitoring program that consists of routine inspections to estimate pest population levels and identify evidence of pests and potential habitat	☒	☐	☐

5. SETTING ACTION THRESHOLDS



	Yes	No	N/A
5a. Evaluated all available data obtained through inspecting, identifying, and monitoring	☐	☒	☐
5b. Determined how many pests the school buildings, grounds, and occupants can tolerate	☐	☒	☐
5c. Set action thresholds	☐	☒	☐

6. PREVENTIVE STRATEGIES

INDOOR SITES

6a. Implemented appropriate strategies to prevent pests from inhabiting the following areas:

• Entryways	☒	☐	☐
• Classrooms	☒	☐	☐
• Gymnasiums	☒	☐	☐
• Locker rooms	☒	☐	☐
• Offices	☒	☐	☐
• Staff lounges	☒	☐	☐
• Bathrooms	☒	☐	☐
• Food preparation and serving areas	☒	☐	☐
• Rooms with extensive plumbing	☒	☐	☐
• Maintenance areas	☒	☐	☐
• Other	☒	☐	☐

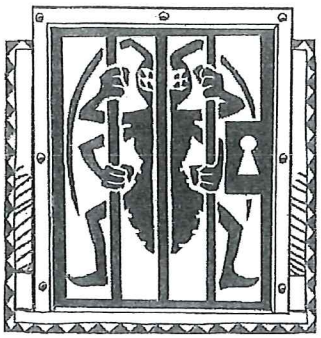
OUTDOOR SITES

6b. Implemented appropriate strategies to prevent pests from inhabiting the following areas:

• Playgrounds	☒	☐	☐
• Parking lots	☒	☐	☐
• Lawns and athletic fields	☒	☐	☐
• Teaching gardens or greenhouses	☐	☒	☐
• Loading docks	☒	☐	☐
• Dumpsters	☒	☐	☐
• Areas with ornamental shrubs and trees	☐	☒	☐
• Other	☐	☐	☒

7. PESTICIDE USE AND STORAGE

7a. Explored alternative pest management methods before concluding that pesticides were necessary	☒	☐	☐
7b. Ensured that pest management professionals integrate IPM into their pest management methods	☒	☐	☐
7c. Identified the least toxic, target-specific chemical (or pesticide formulation) that is the most effective to address the pest problem, preferably as baitsand granules	☒	☐	☐
7d. Reviewed and followed all label instructions on pesticides and learned how to properly apply and handle these chemicals	☒	☐	☐
7e. Used spot-treatment (or bait, crack, and crevice applications) to apply pesticides whenever possible and only treated the obviously infested plants in the area	☒	☐	☐
7f. Used protective clothing or equipment when applying pesticides	☒	☐	☐
7g. Placed all pesticides in tamper-resistant bait boxes or locations that are inaccessible to children and non-target species	☒	☐	☐



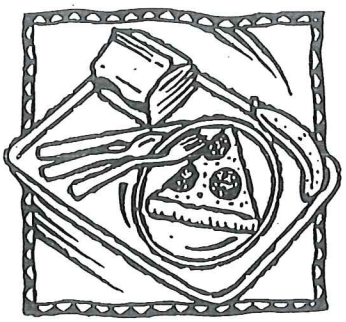
7. PESTICIDE USE AND STORAGE (cont.)

	Yes	No	N/A
7h. Locked or fastened lids of all bait boxes and placed bait away from the runway of the box	☒	☐	☐
7i. Applied pesticides when occupants were not present or in areas where they would not be exposed to the chemicals	☒	☐	☐
7j. Ensured that school occupants (students and staff) are notified of upcoming pesticide applications through posted notices and/or letters	☒	☐	☐
7k. Ensured that parents are notified of upcoming pesticide applications through letters	☒	☐	☐
7l. Kept copies of current pesticide labels and information on pesticides easily accessible	☒	☐	☐
7m. Stored pesticides off site or in areas that are locked and accessible only to designated personnel	☐	☐	☒
7n. Ensured that storage areas are adequately ventilated and are located away from areas prone to flooding or where spills or leaks may contaminate the environment	☐	☐	☒
7o. Ensured that flammable liquids are stored away from ignition sources	☐	☐	☒
7p. Ensured that pesticides are stored in their original containers and all lids are securely fastened	☐	☐	☒
7q. Ensured that air in the storage space cannot mix with the air in the central ventilation system	☐	☐	☒

8. EVALUATING RESULTS AND RECORD KEEPING

8a. Ensured that accurate, up-to-date records of IPM practices and a pest management log for each property are kept	☒	☐	☐
8b. Ensured that pesticide records necessary to meet all state, local, and school board requirements are maintained	☒	☐	☐
8c. Ensured that each log book contains the following items:			
• Copy of the pest management plan	☒	☐	☐
• Service schedules for maintenance of buildings and grounds	☒	☐	☐
• Current EPA-registered labels	☒	☐	☐
• Current Material Safety Data Sheets (MSDS) for each pesticide project	☒	☐	☐
• Pest surveillance data sheets	☒	☐	☐
• Diagram noting the location of pest activity, traps, and bait stations	☒	☐	☐

NOTES



Food Service Checklist

Name: Randall Mel

School: MacDonough Elementary

Room or Area: Cafe Date Completed: 11/14/24

Signature:

Instructions

1. Read the *IAQ Backgrounder* and the Background Information for this checklist.
2. Keep the Background Information and make a copy of the checklist for future reference.
3. Complete the Checklist.
   - Check the "yes," "no," or "not applicable" box beside each item. (A "no" response requires further attention.)
   - Make comments in the "Notes" section as necessary.
4. Return the checklist portion of this document to the IAQ Coordinator.

1. COOKING AREA

		Yes	No	N/A
1a.	Determined that local exhaust fans operate properly (note if fans are excessively noisy)	☑	☐	☐
1b.	Checked for odors near cooking, preparation, and eating areas	☑	☐	☐
1c.	Ensured that exhaust fans are used whenever cooking, washing dishes, and cleaning	☑	☐	☐
1d.	Determined that gas appliances function properly	☑	☐	☐
1e.	Verified that gas appliances are vented outdoors	☐	☐	☑
1f.	Ensured there are no combustion gas or natural gas odors, leaks, back-drafting, or headaches when gas appliances are used	☑	☐	☐
1g.	Ensured that kitchen is clean after use	☑	☐	☐
1h.	Checked for signs of microbiological growth in the kitchen, including the upper walls and ceiling (for example, mold, slime, and algae)	☑	☐	☐
1i.	Selected biocides registered by EPA (if required), followed the manufacturer's directions for use, and carefully reviewed the method of application	☑	☐	☐
1j.	Verified the kitchen is free of plumbing and ceiling leaks (signs include stains, discoloration, and damp areas)	☐	☐	☐

2. FOOD HANDLING AND STORAGE

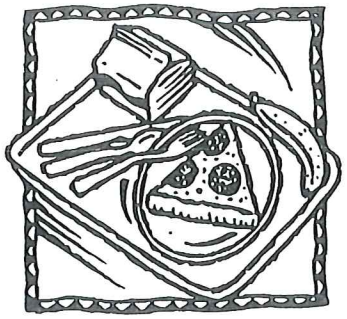
2a.	Checked food preparation, cooking, and storage areas for signs of insects and vermin (for example, feces or remains)	☑	☐	☐
2b.	Stored leftovers in well-sealed containers with no traces of food on outside surfaces	☑	☐	☐
2c.	Ensured that food preparation, cooking, and storage practices are sanitary	☑	☐	☐
2d.	Disposed of food scraps properly and removed crumbs	☑	☐	☐
2e.	Cleaned counters with soap and water or a disinfectant (according to school policy)	☑	☐	☐
2f.	Swept and wet mopped floors	☑	☐	☐

3. WASTE MANAGEMENT

3a.	Selected and placed waste in appropriate containers	☑	☐	☐
3b.	Ensured that containers' lids are securely closed	☑	☐	☐
3c.	Separated food waste and food-contaminated items from other wastes, if possible	☑	☐	☐
3d.	Stored waste containers in a well-ventilated area	☑	☐	☐
3e.	Ensured that dumpsters are properly located (away from air intake vents, operable windows, and food service doors in relation to prevailing winds)	☑	☐	☐

4. DELIVERIES

	Yes	No	N/A
4a. Instructed vendors to avoid idling their engines during deliveries	☑	☐	☐
4b. Posted a sign prohibiting vehicles from idling their engines in receiving areas	☑	☐	☐
4c. Ensured that doors or air barriers are closed between receiving area and kitchen	☑	☐	☐



NOTES