

IEA, INC.

## 2023 - 2024 Ventilation Assessment



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## Saint Paul Public Schools Horace Mann School

Assessment Date:  
Monday, April 24, 2023

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## Project Description

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IEA conducted a ventilation inspection in Horace Mann School by IEA representative, Eddie Anderson, with the intent of gathering visual observations and overall ventilation information which will assist the District in making informed and proactive decisions to improve and maintain acceptable air quality in the building. This inspection is based upon the Environmental Protection Agency's (EPA's) Tools for Schools IAQ guidelines and the recommended Minnesota Department of Education (MDE) portion of a school district's IAQ management plan. Ventilation verification is also recommended by American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE).

Some observations gathered during the inspection may identify issues which may require additional testing, evaluation, further investigation, or maintenance on the ventilation systems.

The findings, conclusions and recommendations presented herein are believed to be accurate and representative of the building on the date and time of the inspection.

### **GENERAL COMMENTS**

The analysis and opinions expressed in this report are based upon data obtained from Saint Paul Public Schools at the indicated locations. This report does not reflect variations in conditions that may occur across the site, property, or facility. Actual conditions may vary and may not become evident without further assessment.

The report is prepared for the exclusive use of our client for specific application to the project discussed and has been prepared in accordance with generally accepted indoor air quality practices. Other than as provided in the preceding sentence, no warranties are extended or made.

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## Building Information

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General information regarding the building was collected by IEA during an interview with building maintenance staff. The information gathered during this process is a vital component, as it is helpful in determining how these items may play a role in possible IAQ related issues.

**Below is a summary of the information gathered during the interview:**

- Automation controls are managed internally.
- A Building Automation System is present. The automation control software program is Tridium and controls can not be accessed remotely.
- Schedules:

Ventilation operation:

| Day:          | Occupied? | Start Time: | End Time: |
|---------------|-----------|-------------|-----------|
| Monday-Friday | Yes       | 5:00 AM     | 8:00 PM   |
| Monday-Friday | Yes       | 5:00 AM     | 7:00 PM   |

Typical occupancy:

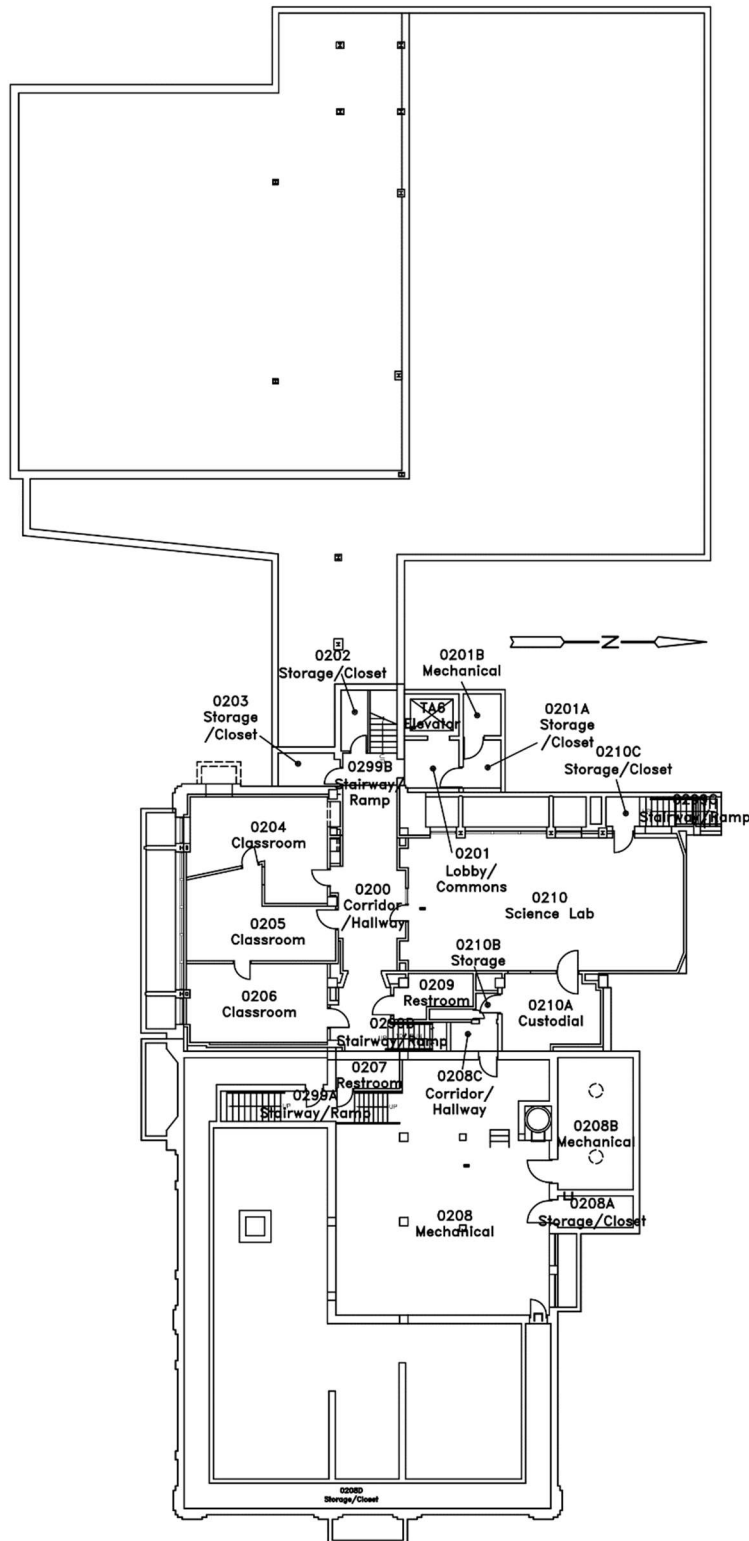
| Day:          | Occupied? | Start Time: | End Time: |
|---------------|-----------|-------------|-----------|
| Monday-Friday | Yes       | 7:15 AM     | 2:00 AM   |
| Saturday      | No        |             |           |
| Sunday        | No        |             |           |
| Holiday       | No        |             |           |

- It is not known whether or not CO2 sensors are associated with the ventilation system.
- VAVs are not present.
- Building has variable frequency drives (VFD).
- The heating system is a hot water boiler.
- A cooling system is present and is a Dx type system.
- Filters used are:

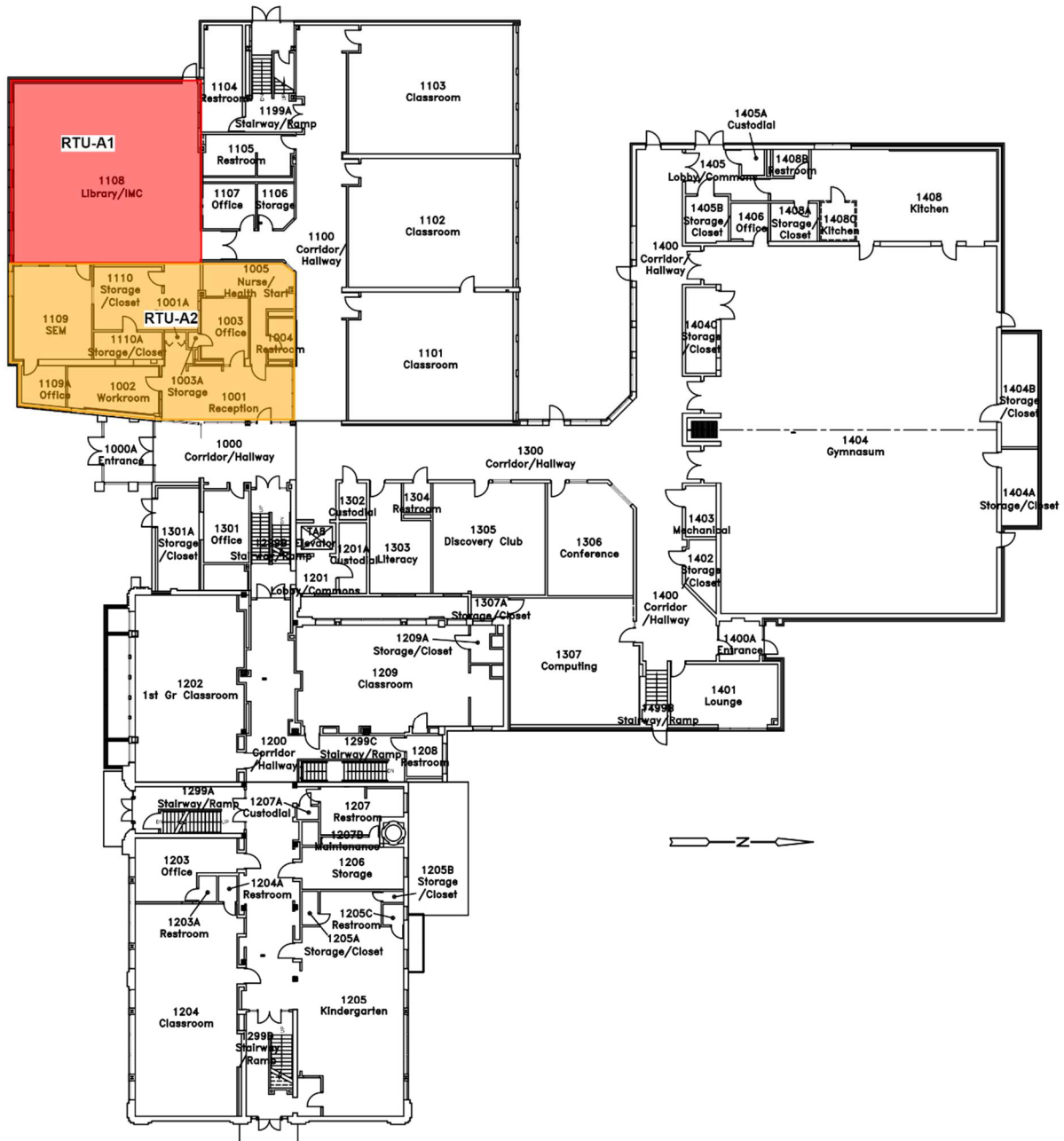
| Filter Type | MERV Rating |
|-------------|-------------|
| Pleated     | MERV 11     |
| Pleated     | MERV 13     |

- Filters are changed 4 months a year.
- Energy Recovery Units are present.
- Units do not contain system Enhancements.
- Personal air purifiers are supplied for individual rooms. They are 3M/Winix.
  - Location: Various classrooms
- It is not known whether or not the building was commissioned during the original construction.

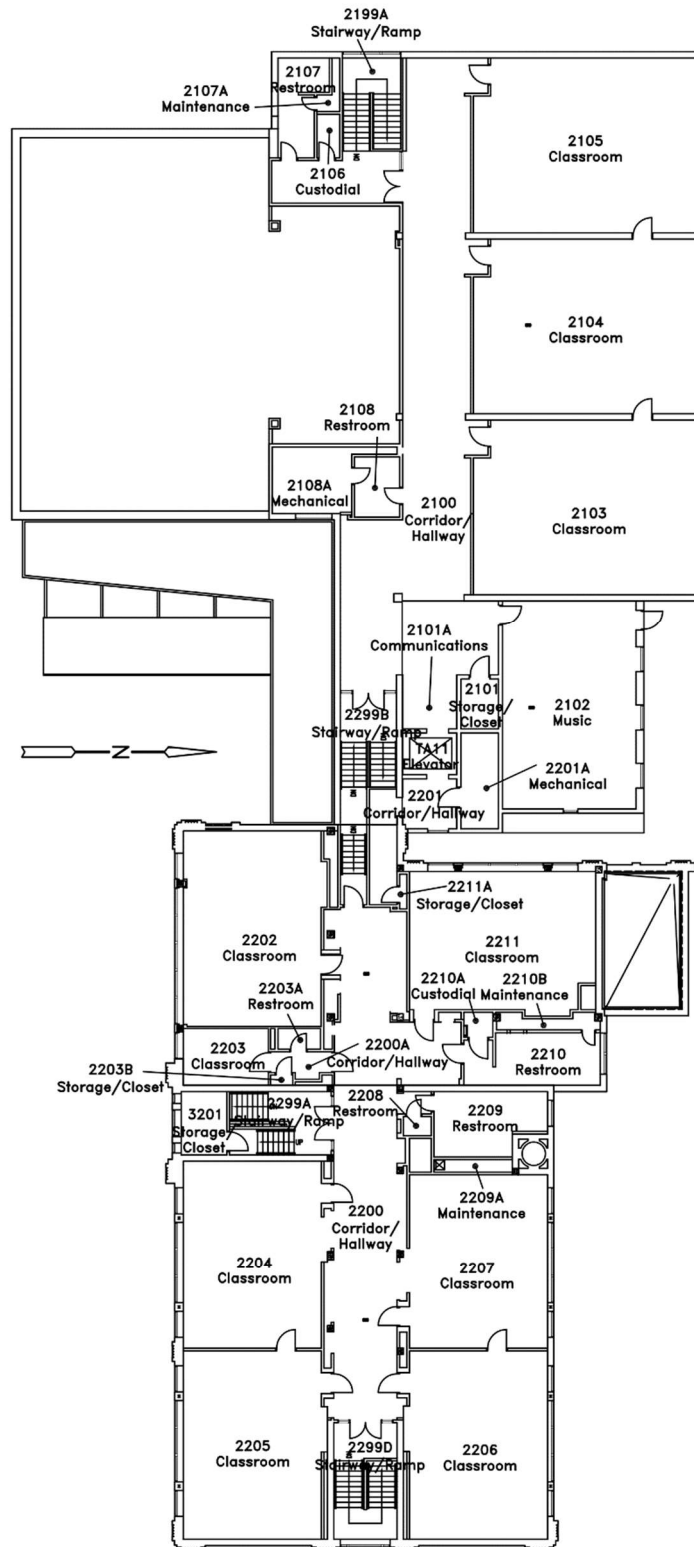
## Air Handling Unit Designations & Service Zones: 1st Floor



## Air Handling Unit Designations & Service Zones: 2nd Floor



## Air Handling Unit Designations & Service Zones: 3rd Floor



## Assessment

### Ventilation System

The following information was gathered by IEA on Monday, April 24, 2023 with support from the district building representative during the on-site interview. The type of heating, ventilating and air-conditioning (HVAC) system and its assessment is included for each unit below:

|                                                                                                                                                                                               |                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
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| <b>Unit Designation:</b>                                                                                                                                                                      | AHU-B1                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Location of Unit:</b>                                                                                                                                                                      | Gym Storage Room 1404A                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Areas Served:</b>                                                                                                                                                                          | Dock & Receiving<br>See attached map                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>System Enhancements:</b>                                                                                                                                                                   | None                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Supply System</b>                                                                                                                                                                          | <b>Outdoor Air</b>                                                                                                                                                                                 | <b>Cleanliness and Observations</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Type</b> <ul style="list-style-type: none"> <li>Supply System - Constant Volume</li> <li>Heating - Hot Water</li> <li>Cooling - None</li> <li>Energy Recovery Unit (ERU) - None</li> </ul> | Outdoor air intake is inaccessible<br><br>Outdoor air intake is located on the roof.<br><br>It is not known if there are nearby pollution sources.<br><br>Outdoor air intake is in good condition. | Outdoor air filters are not present.<br><br>Return air filters are not present.<br><br>Mixed air pre-filters are not present. Mixed air main filters are somewhat dirty and on the border of needing replacement (scoring 3 out of 5) and fit well. Mixed air main filters are installed correctly.<br><br>Drain pans are not applicable or not present. Drain pan condition is not known.<br><br>Heating coils are clean.<br><br>Heat wheels are not present.<br><br>Exterior ducting is visible. Exterior ducting insulation is in good condition.<br><br>Interior ducting is not visible. Interior ducting insulation is in an unknown condition. Interior ducting is of unknown cleanliness.<br><br>Air handling room is free of trash/chemicals.<br><br>Outside damper is inaccessible, and its condition is not known.<br><br>Return damper is inaccessible, and its condition is not known.<br><br>The general condition of the unit is good. |
| <b>Filter Type - Mixed</b> <ul style="list-style-type: none"> <li>Pre-filter: None</li> <li>Main filter: Pleated, MERV 11</li> </ul>                                                          |                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

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| <b>Unit Designation:</b>                                                                                                                                                                           | DOAS_A1                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Location of Unit:</b>                                                                                                                                                                           | Mechanical Room Library Roof Middle                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Areas Served:</b>                                                                                                                                                                               | 1954 Building Classrooms<br>See attached map                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>System Enhancements:</b>                                                                                                                                                                        | None                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Supply System</b>                                                                                                                                                                               | <b>Outdoor Air</b>                                                                                                                | <b>Cleanliness and Observations</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Type</b> <ul style="list-style-type: none"> <li>Supply System - Constant Volume</li> <li>Heating - Hot Water</li> <li>Cooling - Dx</li> <li>Energy Recovery Unit (ERU) - Fixed Plate</li> </ul> | Outdoor air intake is accessible<br><br>Outdoor air intake is located on the roof.<br><br>No nearby pollution sources were found. | Outdoor air filters are not present.<br><br>Return air pre-filters are not present. Return air main filters are clean and not in need of replacement (scoring 2 out of 5) and fit well. Return air main filters are installed correctly.<br><br>Mixed air pre-filters are not present. Mixed air main filters are clean and not in need of replacement (scoring 2 out of 5) and fit well. Mixed air main filters are installed correctly.<br><br>Drain pans are not plugged. Drain pan condition is good. |
| <b>Filter Type - Return</b> <ul style="list-style-type: none"> <li>Pre-filter: None</li> <li>Main filter: Pleated, MERV 11</li> </ul>                                                              | Outdoor air intake is in good condition.                                                                                          | Heating coils are clean and cooling coils are clean.<br><br>Heat wheels are clean.                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Filter Type - Mixed</b> <ul style="list-style-type: none"> <li>Pre-filter: None</li> <li>Main filter: Pleated, MERV 13</li> </ul>                                                               |                                                                                                                                   | Exterior ducting is not visible. Exterior ducting insulation is in an unknown condition.<br><br>Interior ducting is not visible. Interior ducting insulation is in an unknown condition. Interior ducting is of unknown cleanliness.<br><br>Air handling room is free of trash/chemicals.<br><br>Outside damper is open, and its condition is good.<br><br>Return damper is open, and its condition is good.<br><br>The general condition of the unit is good.                                            |

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| <b>Unit Designation:</b>                                                                                                                                                                           | DOAS_B1                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Location of Unit:</b>                                                                                                                                                                           | Mechanical room Upper Roof closer to gym side                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Areas Served:</b>                                                                                                                                                                               | Classrooms - 2 Level<br>See attached map                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>System Enhancements:</b>                                                                                                                                                                        | None                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Supply System</b>                                                                                                                                                                               | <b>Outdoor Air</b>                                                                                                                | <b>Cleanliness and Observations</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Type</b> <ul style="list-style-type: none"> <li>Supply System - Constant Volume</li> <li>Heating - Hot Water</li> <li>Cooling - Dx</li> <li>Energy Recovery Unit (ERU) - Fixed Plate</li> </ul> | Outdoor air intake is accessible<br><br>Outdoor air intake is located on the roof.<br><br>No nearby pollution sources were found. | Outdoor air filters are not present.<br><br>Return air filters are not present.<br><br>Mixed air pre-filters are not present. Mixed air main filters are clean and not in need of replacement (scoring 2 out of 5) and fit well. Mixed air main filters are installed correctly.<br><br>Drain pans are not plugged. Drain pan condition is poor.<br><br>Heating coils are clean and cooling coils are clean.<br><br>Heat wheels are clean.<br><br>Exterior ducting is not visible. Exterior ducting insulation is in an unknown condition.<br><br>Interior ducting is not visible. Interior ducting insulation is in an unknown condition. Interior ducting is of unknown cleanliness.<br><br>Air handling room is free of trash/chemicals.<br><br>Outside damper is open, and its condition is good.<br><br>Return damper is open, and its condition is good.<br><br>The general condition of the unit is good. |
| <b>Filter Type - Mixed</b> <ul style="list-style-type: none"> <li>Pre-filter: None</li> <li>Main filter: Pleated, MERV 11</li> </ul>                                                               | Outdoor air intake is in good condition.                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

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| <b>Unit Designation:</b>                                                                                                                                                                           | DOAS_B2                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Location of Unit:</b>                                                                                                                                                                           | Mechanical room Upper Roof closer to library side                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Areas Served:</b>                                                                                                                                                                               | 1938 Building Classrooms<br>See attached map                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>System Enhancements:</b>                                                                                                                                                                        | None                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Supply System</b>                                                                                                                                                                               | <b>Outdoor Air</b>                                                                                                                | <b>Cleanliness and Observations</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Type</b> <ul style="list-style-type: none"> <li>Supply System - Constant Volume</li> <li>Heating - Hot Water</li> <li>Cooling - Dx</li> <li>Energy Recovery Unit (ERU) - Fixed Plate</li> </ul> | Outdoor air intake is accessible<br><br>Outdoor air intake is located on the roof.<br><br>No nearby pollution sources were found. | Outdoor air filters are not present.<br><br>Return air filters are not present.<br><br>Mixed air pre-filters are not present. Mixed air main filters are clean and not in need of replacement (scoring 2 out of 5) and fit well. Mixed air main filters are installed correctly.<br><br>Drain pans are not plugged. Drain pan condition is poor.<br><br>Heating coils are clean and cooling coils are clean.                                                                                 |
| <b>Filter Type - Mixed</b> <ul style="list-style-type: none"> <li>Pre-filter: None</li> <li>Main filter: Pleated, MERV 11</li> </ul>                                                               | Outdoor air intake is in poor condition.                                                                                          | Heat wheels are clean.<br><br>Exterior ducting is not visible. Exterior ducting insulation is in an unknown condition.<br><br>Interior ducting is not visible. Interior ducting insulation is in an unknown condition. Interior ducting is of unknown cleanliness.<br><br>Air handling room is free of trash/chemicals.<br><br>Outside damper is open, and its condition is good.<br><br>Return damper is open, and its condition is good.<br><br>The general condition of the unit is good. |

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| <b>Unit Designation:</b>                                                                                                                                                                           | DOAS_C1                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Location of Unit:</b>                                                                                                                                                                           | Gym Room Far Right                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Areas Served:</b>                                                                                                                                                                               | Cafe<br>See attached map.                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>System Enhancements:</b>                                                                                                                                                                        | None                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Supply System</b>                                                                                                                                                                               | <b>Outdoor Air</b>                                                                                                                | <b>Cleanliness and Observations</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Type</b> <ul style="list-style-type: none"> <li>Supply System - Constant Volume</li> <li>Heating - Hot Water</li> <li>Cooling - Dx</li> <li>Energy Recovery Unit (ERU) - Fixed Plate</li> </ul> | Outdoor air intake is accessible<br><br>Outdoor air intake is located on the roof.<br><br>No nearby pollution sources were found. | Outdoor air filters are not present.<br><br>Return air filters are not present.<br><br>Mixed air pre-filters are not present. Mixed air main filters are clean and not in need of replacement (scoring 2 out of 5) and fit well. Mixed air main filters are installed correctly.<br><br>Drain pans are not plugged. Drain pan condition is poor.<br><br>Heating coils are clean and cooling coils are clean.<br><br>Heat wheels are clean.<br><br>Exterior ducting is not visible. Exterior ducting insulation is in an unknown condition.<br><br>Interior ducting is not visible. Interior ducting insulation is in an unknown condition. Interior ducting is of unknown cleanliness.<br><br>Air handling room is free of trash/chemicals.<br><br>Outside damper is closed, and its condition is good.<br><br>Return damper is open, and its condition is good.<br><br>The general condition of the unit is good. |
| <b>Filter Type - Mixed</b> <ul style="list-style-type: none"> <li>Pre-filter: None</li> <li>Main filter: Pleated, MERV 13</li> </ul>                                                               | Outdoor air intake is in good condition.                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

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| <b>Unit Designation:</b>                                                                                                                                                                       | ERU_B1 (ERV-1)                             |                                                                                                                                                                                                                                                                                                                                                |
| <b>Location of Unit:</b>                                                                                                                                                                       | Mechanical room 1995 Roof                  |                                                                                                                                                                                                                                                                                                                                                |
| <b>Areas Served:</b>                                                                                                                                                                           | 1996 Low Roof<br>See attached map          |                                                                                                                                                                                                                                                                                                                                                |
| <b>System Enhancements:</b>                                                                                                                                                                    | None                                       |                                                                                                                                                                                                                                                                                                                                                |
| <b>Supply System</b>                                                                                                                                                                           | <b>Outdoor Air</b>                         | <b>Cleanliness and Observations</b>                                                                                                                                                                                                                                                                                                            |
| <b>Type</b> <ul style="list-style-type: none"> <li>Supply System - Constant Volume</li> <li>Heating - Hot Water</li> <li>Cooling - None</li> <li>Energy Recovery Unit (ERU) - Wheel</li> </ul> | Outdoor air intake is accessible           | Outdoor air pre-filters are not present. Outdoor air main filters are somewhat dirty and on the border of needing replacement (scoring 4 out of 5) and fit well. Outdoor air main filters are installed correctly.                                                                                                                             |
|                                                                                                                                                                                                | Outdoor air intake is located on the roof. | Return air pre-filters are not present. Return air main filters are clean and not in need of replacement (scoring 2 out of 5) and fit well. Return air main filters are installed correctly.                                                                                                                                                   |
|                                                                                                                                                                                                | No nearby pollution sources were found.    | Drain pans are not applicable or not present. Drain pan condition is good.                                                                                                                                                                                                                                                                     |
| <b>Filter Type - Outdoor</b>                                                                                                                                                                   |                                            |                                                                                                                                                                                                                                                                                                                                                |
| <ul style="list-style-type: none"> <li>Pre-filter: None</li> <li>Main filter: Pleated, MERV 11</li> </ul>                                                                                      | Outdoor air intake is in poor condition.   | Heating coils are clean.<br>Heat wheels are clean.<br>Exterior ducting is not visible. Exterior ducting insulation is in an unknown condition.                                                                                                                                                                                                 |
| <b>Filter Type - Return</b>                                                                                                                                                                    |                                            |                                                                                                                                                                                                                                                                                                                                                |
| <ul style="list-style-type: none"> <li>Pre-filter: None</li> <li>Main filter: Pleated, MERV 11</li> </ul>                                                                                      |                                            | Interior ducting is not visible. Interior ducting insulation is in an unknown condition. Interior ducting is of unknown cleanliness.<br>Air handling room is free of trash/chemicals.<br>Outside damper is open, and its condition is good.<br>Return damper is open, and its condition is good.<br>The general condition of the unit is good. |

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| <b>Unit Designation:</b>                                                                                                                                                                      | RTU_A1                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Location of Unit:</b>                                                                                                                                                                      | Mechanical room Library Roof farthest from Roof Access                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Areas Served:</b>                                                                                                                                                                          | Library<br>See attached map                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>System Enhancements:</b>                                                                                                                                                                   | None                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Supply System</b>                                                                                                                                                                          | <b>Outdoor Air</b>                                                                                                                | <b>Cleanliness and Observations</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Type</b> <ul style="list-style-type: none"> <li>Supply System - Constant Volume</li> <li>Heating - Hot Water</li> <li>Cooling - None</li> <li>Energy Recovery Unit (ERU) - None</li> </ul> | Outdoor air intake is accessible<br><br>Outdoor air intake is located on the roof.<br><br>No nearby pollution sources were found. | Outdoor air filters are not present.<br><br>Return air filters are not present.<br><br>Mixed air pre-filters are not present. Mixed air main filters are somewhat dirty and on the border of needing replacement (scoring 3 out of 5) and fit well. Mixed air main filters are installed correctly.<br><br>Drain pans are not plugged. Drain pan condition is good.<br><br>Heating coils are dirty.                                                                                                |
| <b>Filter Type - Mixed</b> <ul style="list-style-type: none"> <li>Pre-filter: None</li> <li>Main filter: Pleated, MERV 11</li> </ul>                                                          | Outdoor air intake is in good condition.                                                                                          | Heat wheels are not present.<br><br>Exterior ducting is not visible. Exterior ducting insulation is in an unknown condition.<br><br>Interior ducting is not visible. Interior ducting insulation is in an unknown condition. Interior ducting is of unknown cleanliness.<br><br>Air handling room is free of trash/chemicals.<br><br>Outside damper is open, and its condition is good.<br><br>Return damper is open, and its condition is good.<br><br>The general condition of the unit is good. |

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| <b>Unit Designation:</b>                                                                                                                                                                           | RTU_A2                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Location of Unit:</b>                                                                                                                                                                           | Mechanical room Library Roof closest to aroof access                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Areas Served:</b>                                                                                                                                                                               | Offices<br>See attached map                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>System Enhancements:</b>                                                                                                                                                                        | None                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Supply System</b>                                                                                                                                                                               | <b>Outdoor Air</b>                                                                                                                | <b>Cleanliness and Observations</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Type</b> <ul style="list-style-type: none"> <li>Supply System - Constant Volume</li> <li>Heating - Hot Water</li> <li>Cooling - Dx</li> <li>Energy Recovery Unit (ERU) - Fixed Plate</li> </ul> | Outdoor air intake is accessible<br><br>Outdoor air intake is located on the roof.<br><br>No nearby pollution sources were found. | Outdoor air filters are not present.<br><br>Return air filters are not present.<br><br>Mixed air pre-filters are not present. Mixed air main filters are clean and not in need of replacement (scoring 2 out of 5) and fit well. Mixed air main filters are installed correctly.<br><br>Drain pans are not plugged. Drain pan condition is poor.<br><br>Heating coils are clean and cooling coils are clean.                                                                                 |
| <b>Filter Type - Mixed</b> <ul style="list-style-type: none"> <li>Pre-filter: None</li> <li>Main filter: Pleated, MERV 13</li> </ul>                                                               | Outdoor air intake is in good condition.                                                                                          | Heat wheels are clean.<br><br>Exterior ducting is not visible. Exterior ducting insulation is in an unknown condition.<br><br>Interior ducting is not visible. Interior ducting insulation is in an unknown condition. Interior ducting is of unknown cleanliness.<br><br>Air handling room is free of trash/chemicals.<br><br>Outside damper is open, and its condition is good.<br><br>Return damper is open, and its condition is good.<br><br>The general condition of the unit is good. |

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|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Unit Designation:</b>                                                                                                                                                                      | RTU_B1                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Location of Unit:</b>                                                                                                                                                                      | Mechanical room GYM Roof toward building                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Areas Served:</b>                                                                                                                                                                          | Gym<br>See attached map                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>System Enhancements:</b>                                                                                                                                                                   | None                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Supply System</b>                                                                                                                                                                          | <b>Outdoor Air</b>                                                                                                                | <b>Cleanliness and Observations</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Type</b> <ul style="list-style-type: none"> <li>Supply System - Constant Volume</li> <li>Heating - Hot Water</li> <li>Cooling - None</li> <li>Energy Recovery Unit (ERU) - None</li> </ul> | Outdoor air intake is accessible<br><br>Outdoor air intake is located on the roof.<br><br>No nearby pollution sources were found. | Outdoor air filters are not present.<br><br>Return air filters are not present.<br><br>Mixed air pre-filters are not present. Mixed air main filters are clean and not in need of replacement (scoring 2 out of 5) and fit well. Mixed air main filters are installed correctly.<br><br>Drain pans are not plugged. Drain pan condition is good.<br><br>Heating coils are inaccessible.                                                                                                            |
| <b>Filter Type - Mixed</b> <ul style="list-style-type: none"> <li>Pre-filter: None</li> <li>Main filter: Pleated, MERV 11</li> </ul>                                                          | Outdoor air intake is in good condition.                                                                                          | Heat wheels are not present.<br><br>Exterior ducting is not visible. Exterior ducting insulation is in an unknown condition.<br><br>Interior ducting is not visible. Interior ducting insulation is in an unknown condition. Interior ducting is of unknown cleanliness.<br><br>Air handling room is free of trash/chemicals.<br><br>Outside damper is open, and its condition is good.<br><br>Return damper is open, and its condition is good.<br><br>The general condition of the unit is poor. |

|                                                                                                                                                                                               |                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Unit Designation:</b>                                                                                                                                                                      | RTU_B2                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Location of Unit:</b>                                                                                                                                                                      | Mechanical room GYM Roof towards roor edge                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Areas Served:</b>                                                                                                                                                                          | Gym<br>See attached map                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>System Enhancements:</b>                                                                                                                                                                   | None                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Supply System</b>                                                                                                                                                                          | <b>Outdoor Air</b>                                                                                                                                                                                  | <b>Cleanliness and Observations</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Type</b> <ul style="list-style-type: none"> <li>Supply System - Constant Volume</li> <li>Heating - Hot Water</li> <li>Cooling - None</li> <li>Energy Recovery Unit (ERU) - None</li> </ul> | <p>Outdoor air intake is accessible</p> <p>Outdoor air intake is located in an unknown location.</p> <p>No nearby pollution sources were found.</p> <p>Outdoor air intake is in good condition.</p> | <p>Outdoor air filters are not present.</p> <p>Return air filters are not present.</p> <p>Mixed air pre-filters are not present. Mixed air main filters are clean and not in need of replacement (scoring 2 out of 5) and fit well. Mixed air main filters are installed correctly.</p> <p>Drain pans are not plugged. Drain pan condition is good.</p> <p>Heating coils are clean.</p> <p>Heat wheels are not present.</p> <p>Exterior ducting is not visible. Exterior ducting insulation is in an unknown condition.</p> <p>Interior ducting is not visible. Interior ducting insulation is in an unknown condition. Interior ducting is of unknown cleanliness.</p> <p>Air handling room is free of trash/chemicals.</p> <p>Outside damper is open, and its condition is good.</p> <p>Return damper is open, and its condition is good.</p> <p>The general condition of the unit is good.</p> |
| <b>Filter Type - Mixed</b> <ul style="list-style-type: none"> <li>Pre-filter: None</li> <li>Main filter: Pleated, MERV 11</li> </ul>                                                          |                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

|                                                                                                                                                                                               |                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Unit Designation:</b>                                                                                                                                                                      | RTU_B3                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Location of Unit:</b>                                                                                                                                                                      | Mechanical room 1995 Roof near ERU_B1                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Areas Served:</b>                                                                                                                                                                          | 1996 Low Roof<br>See attached map                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>System Enhancements:</b>                                                                                                                                                                   | None                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Supply System</b>                                                                                                                                                                          | <b>Outdoor Air</b>                                                                                                                | <b>Cleanliness and Observations</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Type</b> <ul style="list-style-type: none"> <li>Supply System - Constant Volume</li> <li>Heating - Hot Water</li> <li>Cooling - None</li> <li>Energy Recovery Unit (ERU) - None</li> </ul> | Outdoor air intake is accessible<br><br>Outdoor air intake is located on the roof.<br><br>No nearby pollution sources were found. | Outdoor air filters are not present.<br><br>Return air filters are not present.<br><br>Mixed air pre-filters are not present. Mixed air main filters are clean and not in need of replacement (scoring 2 out of 5) and fit poorly. Mixed air main filters are installed correctly.<br><br>Drain pans are not plugged. Drain pan condition is good.<br><br>Heating coils are clean.                                                                                                     |
| <b>Filter Type - Mixed</b> <ul style="list-style-type: none"> <li>Pre-filter: None</li> <li>Main filter: Pleated, MERV 11</li> </ul>                                                          | Outdoor air intake is in good condition.                                                                                          | Heat wheels are not present.<br><br>Exterior ducting is not visible. Exterior ducting insulation is in an unknown condition.<br><br>Interior ducting is not visible. Interior ducting insulation is not present. Interior ducting is of unknown cleanliness.<br><br>Air handling room is free of trash/chemicals.<br><br>Outside damper is open, and its condition is good.<br><br>Return damper is open, and its condition is good.<br><br>The general condition of the unit is good. |

|                                                                                                                                                                                  |                                            |                                                                                                                                                                                                                    |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Unit Designation:</b>                                                                                                                                                         | MAU-1                                      |                                                                                                                                                                                                                    |
| <b>Location of Unit:</b>                                                                                                                                                         | Gym Roof near DOAS_C1                      |                                                                                                                                                                                                                    |
| <b>Areas Served:</b>                                                                                                                                                             | See attached map.                          |                                                                                                                                                                                                                    |
| <b>System Enhancements:</b>                                                                                                                                                      | None                                       |                                                                                                                                                                                                                    |
| <b>Supply System</b>                                                                                                                                                             | <b>Outdoor Air</b>                         | <b>Cleanliness and Observations</b>                                                                                                                                                                                |
| <b>Type</b> <ul style="list-style-type: none"> <li>Supply System - Unknown</li> <li>Heating - None</li> <li>Cooling - None</li> <li>Energy Recovery Unit (ERU) - None</li> </ul> | Outdoor air intake is accessible           | Outdoor air pre-filters are not present. Outdoor air main filters are somewhat dirty and on the border of needing replacement (scoring 3 out of 5) and fit well. Outdoor air main filters are installed correctly. |
| <b>Filter Type - Outdoor</b>                                                                                                                                                     | Outdoor air intake is located on the roof. | Return air filters are not present.                                                                                                                                                                                |
|                                                                                                                                                                                  | No nearby pollution sources were found.    | Drain pans are not applicable or not present. Drain pan condition is not known.                                                                                                                                    |
| <ul style="list-style-type: none"> <li>Pre-filter: None</li> <li>Main filter: Pleated, MERV 11</li> </ul>                                                                        | Outdoor air intake is in good condition.   | Heat wheels are not present.                                                                                                                                                                                       |
|                                                                                                                                                                                  |                                            | Exterior ducting is not visible. Exterior ducting insulation is in an unknown condition.                                                                                                                           |
|                                                                                                                                                                                  |                                            | Interior ducting is not visible. Interior ducting insulation is in an unknown condition. Interior ducting is of unknown cleanliness.                                                                               |
|                                                                                                                                                                                  |                                            | Air handling room is free of trash/chemicals.                                                                                                                                                                      |
|                                                                                                                                                                                  |                                            | Outside damper is open, and its condition is good.                                                                                                                                                                 |
|                                                                                                                                                                                  |                                            | Return damper is not present.                                                                                                                                                                                      |
|                                                                                                                                                                                  |                                            | The general condition of the unit is good.                                                                                                                                                                         |

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## Recommendations

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Dirty Coils were observed on unit RTU\_A1 during the ventilation inspection.

**Recommendation:** Impacted/dirty coils can result in poor ventilation air supply as well as be a source for mold and bacterial growth on the coils. Coils should be cleaned annually, or as needed, as identified in the operations and maintenance program.

The drain pan for units DOAS\_B1, DOAS\_B2, DOAS\_C1 and RTU\_A2 was plugged or damaged at the time of the site inspection.

**Recommendation:** Damage to the drain pan should be repaired, or the drain pan should be inspected more frequently to ensure that it does not become plugged.

The general condition of unit RTU\_B1 was poor.

**Recommendation:** The units should be repaired or cleaned as needed.

Dirty or poorly fitting filters were observed in unit RTU\_B3 during the ventilation inspection.

**Recommendation:** The operations and maintenance program for filter changes should be reviewed and revised to ensure proper filter changes to optimize filtration capacity.

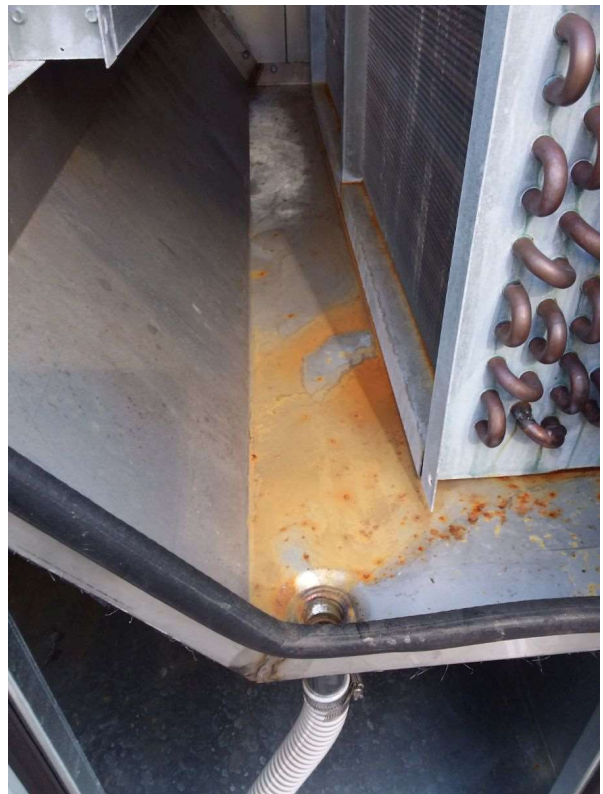
## **Appendix A**

### Photo Documentation



AHU-B1

Mixed Main Filter Cleanliness



DOAS\_B1

Drain Pans



DOAS\_B2

Drain Pans



DOAS\_B2

Outdoor Intake



DOAS\_C1  
Drain Pans



ERU\_B1 (ERV-1)  
Outdoor Main Filter Cleanliness



ERU\_B1 (ERV-1)  
Outdoor Intake



RTU\_A1  
Mixed Main Filter Cleanliness



RTU\_A1  
Heating Coils



RTU\_B1  
General Condition



RTU\_B3  
Mixed Main Filter Fit



MAU-1  
Outdoor Main Filter Cleanliness



MAU-1

Mixed Main Filter Cleanliness