

## **Agenda**

**I. Call to Order / WebEx Log-in / Motions**

**<https://woodbridgeps.webex.com/woodbridgeps/j.php?MTID=m6c10c38c80c053a7c599254c668f7aa3>**

**Meeting Number: 2486 711 4179**

**Meeting Password: mqMbMw2pW47**

*This meeting is being conducted as a hybrid meeting consistent with Connecticut Public Act 22-3. The public may attend in person at the location indicated above or electronically via WebEx with the link provided above.*

**II. Public Comment - *The Board welcomes public participation. We ask that speakers please limit their comments to three minutes. Please be aware that the Board will not respond to any comments made during the public comment period, except to clarify issues, but we will take into consideration your comments, and when appropriate, district administration will follow-up with you at a later point in time. Public Comments may be submitted electronically to [mdegennaro@woodbridgeps.org](mailto:mdegennaro@woodbridgeps.org)***

**III. Items for Discussion**

- A. Monthly Facilities Update
- B. Facilities and Grounds Update
- C. Indoor Air Quality Report

**IV. Public Comment - *The Board welcomes public participation. We ask that speakers please limit their comments to three minutes. Please be aware that the Board will not respond to any comments made during the public comment period, except to clarify issues, but we will take into consideration your comments, and when appropriate, district administration will follow-up with you at a later point in time.***

May 2024

# Beecher Road School

## Facilities Department Monthly Report

CLEAN  
SAFE  
HEALTHY  
SCHOOLS

Vito Esparo

Facilities Manager

Beecher Road School

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### Completed Projects:

- On the morning of 3/20 classroom D-5 (nurse) was exhibiting a slightly low space temperature. Upon investigation the motor was going in and out of alarm. We had a spare motor in stock and the repair was completed that evening.
- During March, classroom E2 (science) was exhibiting a high air discharge temperature. After testing the unit, both the valve actuator and outdoor air damper actuator were not responding correctly. Both parts were in stock and both were replaced that afternoon.
- During April all aged swing seats on the South playground were replaced.
- On the Friday 4/19 a power outage was reported after school dismissal. Our micro-turbine functioned as designed providing ample hallway lighting and the back-up batteries for our radios and other equipment worked as planned. Overall it was a successful outage from a planning and preparation standpoint.
- Over spring break the entrance doors to the South Assembly room were upgraded. They now feature windows and a center mullion for increased security.
- On 4/23 a high space temperature was recorded in the band room which is supplied by AHU\_1. After testing the unit a faulty valve actuator was identified to be causing the issue. We had the part in stock. Due to the location of the actuator our controls company arrived the following day to replace the item and test the unit.
- During April we received our final IAQ report via Van Zelm Engineering. The results were presented at a recent staff meeting and the entire report will be uploaded to the Beecher website. Results were positive, no major mechanical upgrades were recommended.
- In April the Regional Water Authority toured our building to test our backflow preventers. All of our equipment passed.
- During the months of March and April over 70 "fix-it" tickets were closed. This number is not inclusive of time-sensitive maintenance issues reported outside of fix-it. This number is also non-inclusive of the majority of HVAC repairs.

### Projects in process

- Due to several projects on site this summer we are making preparations to relocate several summer programs to the Amity Middle School-Bethany Campus. This includes moving supplies and furniture to the new location.
- Once school is out a roofing project on the K-Wing, Library, and D-wing roofs will begin.
- Preparations for several exterior site improvements are underway. Further details should be available in the coming weeks.
- On 4/25 a slightly high CO2 level was recorded in the classroom B5. Upon investigation the outdoor air damper actuator was not responding correctly. A quote for several replacement actuators has been received, they are in stock in the warehouse. Once they arrive replaced will be completed ASAP.
- Our PA system upgrade is nearly complete. The final speaker additions are being wired in the South School.
- An upgrade from our copper phone lines to digital (SIP) phone lines is imminent. We have tentatively scheduled the changeover for summer break.
- The faucet in the A-Wing custodial closet needs to be replaced. The work has been approved the repair is imminent.
- March test results from our water treatment program for our HVAC loops show both loops were below PH and high range molybdate benchmarks. A different treatment has been recommended which would require a least a week of chemical circulation and system flush. We are planning to complete this treatment after next winter changeover. We are awaiting a quote.

### Outstanding issues to be addressed:

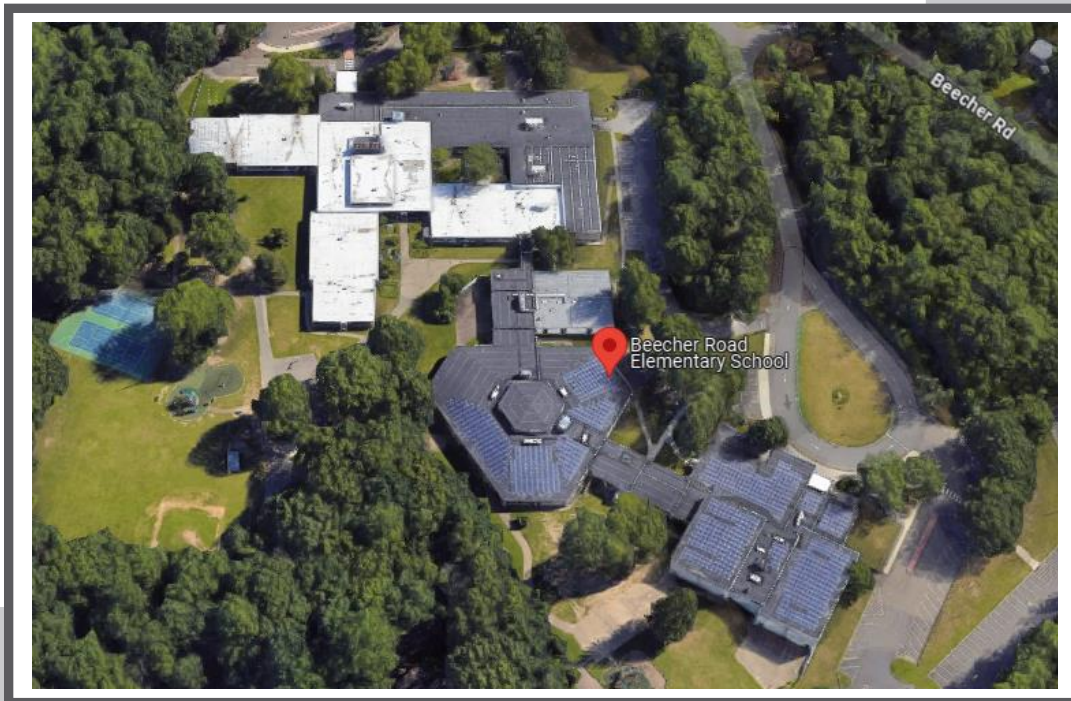
- Issues with the domestic cold water pressure in the North School have returned. Large pressure fluctuations are once again visible during occupied hours.

| Category   | Work Description   | Old Cost Estimates | Complete       | FY25          | FY26           | FY27           | FY28          | FY29          | FY30          | Not Scheduled |
|------------|--|--------------------|----------------|---------------|----------------|----------------|---------------|---------------|---------------|---------------|
| ROOFING    | NEW OF ROOF (K-Wing/D-Wing/Library) (2023 Updated Estimate)                                      | \$1,428,000        |                | 1,428,000     |                |                |               |               |               | -             |
| PAVING     | ASPHALT REPLACEMENT - DAMAGED SIDEWALK AND PLAYGROUND AREAS PLACEMENT                            | \$93,500           |                | 93,500        |                |                |               |               |               | -             |
| PAVING     | ASPHALT REPLACEMENT - NORTH & LIBRARY PARKING LOTS @ 171,000 SQ. FT. PLACEHOLDER                 | \$500,000          |                | 500,000       |                |                |               |               |               | -             |
| GROUND     | FUSS & O'NEILL SITE NEEDS ASSESSMENT (BASED ON 2011 SITE NEEDS ASSMT PHASES) PLACEHOLDER         | \$600,000          | 24,000         | 576,000       |                |                |               |               |               | -             |
| FIRE PANEL | FIRE PANEL UPGRADE   | \$33,000           |                | 33,000        |                |                |               |               |               | -             |
| FLOORING   | ASBESTOS ABATEMENT - SOUTH AREA PROJECTS   | \$90,024           |                | 90,024        |                |                |               |               |               | -             |
| CASEWORK   | SOUTH ART ROOM - REPLACE CASE WORK   | \$10,000           |                | 10,000        |                |                |               |               |               | -             |
| FLOORING   | REPLACE FLOORING - SPED CLASSROOM (Merriam)  | \$7,800            |                | 7,800         |                |                |               |               |               | -             |
| FLOORING   | REPLACE FLOORING - SOUTH ART ROOM  | \$10,000           |                | 10,000        |                |                |               |               |               | -             |
| FLOORING   | REPLACE FLOORING - CORRIDOR / RAMP LEADING TO BAND ROOM  | \$5,300            |                | 5,300         |                |                |               |               |               | -             |
| FLOORING   | REPLACE FLOORING - BAND ROOM CARPET  | \$15,000           |                | 15,000        |                |                |               |               |               | -             |
| PAINT      | PAINT - NORTH GYM  | \$6,300            |                |               | 6,300          |                |               |               |               | -             |
| PAINT      | PAINT - COMMONS ROOM   | \$7,500            |                |               | 7,500          |                |               |               |               | -             |
| GROUND     | REPLENISH POURED RUBBER PLAYGROUND SURFACES (N & S)  | \$35,100           |                |               |                | 35,100         |               |               |               | -             |
| ELEVATOR   | ELEVATOR REFURBISHMENT   | \$160,000          |                |               |                |                |               |               |               | 160,000       |
| CASEWORK   | REPLACE CASEWORK IN (10) CLASSROOMS (PHASE 2 of 2)   | \$60,000           |                | 10,000        | 10,000         | 10,000         | 10,000        | 10,000        | 10,000        | \$0           |
| FLOORING   | REPLACE FLOORING - NORTH OFFICE  | \$14,200           |                | 14,200        |                |                |               |               |               | -             |
| FLOORING   | REPLACE FLOORING - A1, A4, A8 CLASSROOM  | \$46,000           |                | 14,000        |                |                |               |               |               | 32,000        |
| FLOORING   | REPLACE FLOORING - SOUTH MAIN ENTRY OUTSIDE SUPERINTENDENT OFFICE                                | \$5,000            |                | 5,000         |                |                |               |               |               | -             |
| FLOORING   | REPLACE FLOORING - D WING CORRIDOR   | \$16,675           |                |               | 16,675         |                |               |               |               | -             |
| HVAC       | (16) UNIT VENTILATORS - CORRIDORS & SUPERINTENDENT OFFICES; & REPLACE VARIOUS DRINKING FOUNTAINS | \$257,000          | 37,347         |               |                |                |               |               |               | \$219,653     |
| PAINT      | PAINT - EXTERIOR AREAS (D, S, SOUTH) Updated 2/24  | \$150,000          |                |               |                | 75,000         | \$75,000      |               |               | -             |
| DOORS      | (34) EXTERIOR CLASSROOM DOORS REPLACEMENT - FIBERGLASS   | \$96,000           | 2,217          |               | 80,000         |                |               |               |               | 13,783        |
| GROUND     | REMOVAL OF WELL HEAD   | \$35,000           |                |               |                |                |               |               |               | 35,000        |
| CAMERAS    | INTERIOR/EXTERIOR CAMERA UPGRADES  | \$9,575            | 9,575          |               |                |                |               |               |               | -             |
| HVAC       | UPGRADES PER VANZELM ASSESSMENT  | \$139,110          | 139,110        |               |                |                |               |               |               | -             |
| DOORS      | CAFETERIA ENTRANCE DOORS ACCESS CONTROL UPGRADE  | \$11,115           | 11,115         |               |                |                |               |               |               | -             |
| DOORS      | NORTH GYM DOOR REPLACEMENT & ACCESS CONTROL UPGRADE  | \$11,933           | 11,933         |               |                |                |               |               |               | -             |
| DOORS      | INTERIOR DOOR UPGRADE (SOUTH ASSEMBLY)(AWAITING INSTALLATION)                                    | \$9,508            | 9,508          |               |                |                |               |               |               | -             |
| DOORS      | STAGE DOORS WINDOW INSTALLATION AND ACCESS CONTROL UPGRADE                                       | \$5,206            | 9,506          |               |                |                |               |               |               | -             |
| DOORS      | EXTERIOR DOOR ACCESS CONTROL UPGRADE (B4)  | \$3,269            | 3,269          |               |                |                |               |               |               | -             |
|            |  |                    |                |               |                |                |               |               |               |               |
|            | <b>Total</b>   | <b>\$3,871,114</b> | <b>233,580</b> | <b>91,300</b> | <b>120,475</b> | <b>120,100</b> | <b>85,000</b> | <b>10,000</b> | <b>10,000</b> | <b>#REF!</b>  |

# Beecher Road Elementary School

40 Beecher Rd.

Woodbridge, CT 06525



## **Indoor Air Quality (IAQ) Evaluation and HVAC Systems Assessment** van Zelm Project # 2022231.00 March 28, 2024

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# Beecher Road Elementary School

## INDOOR AIR QUALITY (IAQ) EVALUATION AND HVAC SYSTEMS ASSESSMENTS

### EXECUTIVE SUMMARY

The following Findings Report is an overview of the heating, ventilation, and air conditioning (HVAC) systems and operations that impacts overall ventilation and indoor air quality to support a healthy learning environment in your school. The report’s main focus, however, relates to occupied areas indoor ventilation and the compliance or non-compliance of this school with current ASHRAE-62.1, (2010) guidelines regarding Ventilation for Acceptable Indoor Air Quality for Schools.

#### **Building Overview**

The school is a single-story building with rising elevations from South to North. The extreme South end of the building houses the District Office and a public pool. These are technically separate from the Beecher Road School. Adjacent to this is the South Gym, Boy’s Locker Room, Lower-Level Girl’s Locker Room, Assembly Room/Auditorium, Music, and an office area that had been used by the Town Recreation Department but is now used for SPED. A corridor of classrooms (E Wing) joins this area to the central Rotunda (S Wing) which has a Multipurpose Room surrounded by 5<sup>th</sup> and 6<sup>th</sup> grade classrooms. Another corridor (D Wing) of 4<sup>th</sup> grade classrooms joins to the North section of the building. This is where the Media and Tech Centers are located, adjacent to the Cafeteria and Kitchen. The 3<sup>rd</sup> grade C Wing and Kindergarten K Wing corridors lead to the Administration area and main entrance to the school. The main corridor leads to the 2 grade and MAG classrooms in B Wing and the 1<sup>st</sup> grade classroom in A Wing.

#### **HVAC System Overview**

The building and HVAC control system utilizes a Honeywell Direct Digital (DDC) Control system integrated into a Honeywell Building Automation System (BAS). Carbon Dioxide (CO<sub>2</sub>) based Demand Controlled Ventilation (DCV) is incorporated into most of the HVAC equipment to optimize the required ventilation rate. The CO<sub>2</sub> sensor calibration was verified by Wings Testing and Balancing.

The school ventilation is provided by 16-HVAC units consisting of 6-AHU’s, 4- ERV’s feeding fresh air to 42-Fan Coil units in E, S, D, and K classrooms, 5-RTU’s and 1-Dectron pool dehumidification unit. There are also 24 classroom Unit Ventilators in the A, B and C Wing classrooms.

- AHU-1 located in Mechanical room serves Music area. This unit is an older Trane UCCAG10COAORDN12 with an apparent design CFM of 2,215 and OA 1,000. The cooling and heating coils are connected to the central plant 2-pipe system. The HVAC units are functional. Dampers and actuators appear to be functional although the dampers show signs of corrosion and should be cleaned and lubricated to ensure smooth operation and proper functionality.
- AHU-2 & 3 are located in the Gym space suspended from the ceiling. They serve the North Gym and the common space. As these units are up high, there is no accessibility without a high lift. These units are the newer Trane UCCAG12COAORDN12 with an apparent design CFM of 5,200 and OA 1,700. The configuration includes a heating and cooling unit with a rear sectional mixing box with bottom return and fresh air. Damper conditions unknown. Systems were operating and space was adequate conditioned.

- AHU-4 located in the mezzanine MER serves the assembly area. This unit is Trane Climate Changer model UCCAG14C0A0RDN12000000FC872, serial number K15G54994 with an apparent design CFM of 6,700. The outside air CFM is listed as 3,300 CFM. Cooling and heating coils are served from a central plant 2-pipe system. The unit is in good condition.
- AHU-5 located in the MER serves the South Gym and Locker Rooms. This is a three zone unit. This unit is a newer Trane Climate Changer model UCCAG21COA with an apparent design CFM of 9,700 and OA intake set for 4,300. Cooling and heating coils are served from a central plant 2-pipe system. There are associated reheat zone coils that serve the south Gym, Boys locker, and Girls Locker areas. The unit is in good condition.
- AHU-6 serves the Multipurpose and Language classrooms. This unit is a Trane Climate Changer model UCCAG08C0AEN-12 with an apparent design CFM of 3,500 and OA intake of 775. Access to this unit is limited. Cooling and heating coils are served from a central plant 2-pipe system. The unit is in good condition.
- ERV-1 located on building roof serves Fan Coil Units in the S Wing classrooms. This unit is a Xetex heat recovery unit with Cube heat recovery only supply and return air model IAQ-4000-RT-BT-SP. The unit has an apparent design supply air CFM of 2800, and a return air CFM of 2,225. The unit appears to be in good condition.
- ERV-2 located on building roof serves Fan Coil Units in the E and S Wing classrooms. This unit is a Xetex heat recovery unit with Cube heat recovery only supply and return air model IAQ-10000-RT-BT-SP. The unit has an apparent design supply air CFM of 6,275, and a return air CFM of 4,900. The unit appears to be in good condition.
- ERV-3 located on building roof serves Coil Units in the D Wing classrooms. This unit is a Xetex heat recovery unit with Cube heat recovery only model IAQ-4000-RT-BN-SP. The unit has an apparent design supply air CFM of 2,900, and a return air CFM of 2100. The unit appears to be in good condition.
- ERV-4 located on the building roof serves Fan Coil Units in the K Wing classrooms. This unit is a Xetex heat recovery unit with Cube heat recovery only model IAQ-3000-BP-PHW-HW. The unit has an apparent design supply air CFM of 4,500 and a return air CFM of 4,500. The unit appears to be in good condition.
- RTU-1 is located on the building roof dunnage. The unit serves the District Office Area, specifically the Conference Room and Rec Office. The unit is a Trane model CSAA003UBL00 with an apparent design CFM of 800 and OA 200. This unit is a Trane Climate Changer constant volume unit with cooling and heating water coils served from a central plant 2-pipe system. The unit is in good condition. Piping serving RTU's are within hinged door access house which give good control valve accessibility.
- RTU-2 is located on the building roof dunnage. The unit is a variable volume unit serving the main office. The unit is a Trane model CSAA006UBL00 with serial number K15G57531 and has an apparent design CFM of 3,000 and OA 600. This unit is a Trane Climate Changer with Cooling and Heating water coils served from a central plant 2-pipe system. There are associated VAV Terminal Boxes with hot water reheat coils serving, Waiting, Conference, Main Office, Principals Office, Vice Principals Office and PPT area. The unit is in good condition. Piping serving RTU's are within hinged door access house which give good control valve accessibility.
- RTU-3 is located on the building roof dunnage. Unit serves the cafeteria. The unit is a Trane model CSAA021UBL00 with serial number K15G55690 with an apparent design CFM of 10,560 and OA of 5,800. This unit is a Trane Climate Changer with Cooling and Heating water coils are served from a central plant 2-pipe system. The unit is in good condition. Piping serving RTU's are within hinged door access house which give good control valve accessibility.

- RTU-4 is located on the building roof dunnage. Unit serves the Library-Media. The unit is a Trane model CSAA017UBL00 with an apparent Design CFM of 7,400 and OA 2,100. This unit is a Trane Climate Changer with Cooling and Heating water coils are served from a central plant 2-pipe system. The unit is in good condition. Piping serving RTU's are within hinged door access house which give good control valve accessibility.
- RTU-5 is located on the building roof dunnage. Unit serves the Tech Center. The unit is a Trane Variable Volume Unit model CSAA008UBL00 with serial number K15G57541 with an apparent design CFM of 3,600 and OA of 700. This unit is a Trane Climate Changer with Cooling and Heating water coils are served from a central plant 2-pipe system. There are associated VAV Terminal Boxes serving Tech Center Office, Tech Center, and Tech Center Server area. Unit is in good condition.
- DH-1 is a dedicated heating, cooling, and dehumidification unit serving the Pool and surrounding areas. The unit is a Dectron model DSH-1532-7 with an apparent design CFM of 13,500 supply and exhaust of 3,100. This unit includes mechanical cooling compressors with gas reheat and operates similar to typical heat pump principal by recirculation pool air and removing the excess moisture content delivering warm, dry air to the pool area.
- Piping serving RTU's are within hinged door access house which give good control valve accessibility.

### **Additional Information Related to HVAC Systems**

Classrooms that are served by the UV's have an exhaust grill that is used to prevent over-pressurization of the space. The original design documents for the renovation project indicate that most of the classrooms are designed to exhaust 350 CFM through the exhaust grill in the room. These airflow quantities change based on the size of the rooms that are served by the UV's.

Classrooms served by the UV's control the ventilation air based upon CO2 levels (DCV) by modulating the UV's outside air dampers open to response to rising CO2 levels in the space.

Classrooms served by the ERU/FCU arrangement control the ventilation air based upon CO2 levels (DCV) by modulating the FCU outside air damper, which is ducted from the ERV to the FCU. There are 4 small PTAC units serving the Superintendent, Secretary, Business Manager and Kitchenette. These units have very small two position outside air dampers for ventilation. The outside air flow was not able to be measured.

Aside from above mentioned HVAC units, the building ventilation system has in place exhaust fans for various purposes including, but not limited to, toilet exhaust, kitchen exhaust, mechanical / electrical space ventilation, etc.

**It is our opinion that all the Air Handling Heating, Cooling and Ventilation Units are in good shape for their age and should continue to be maintained at regular intervals.**

van Zelm along with Wings Testing and Balancing performed the on-site inspections during the month of June 2023. The goal of this study is primarily focused towards addressing the operational conditions and outside air and outside air change rates of the occupied spaces. Although there are code exhaust air requirements for spaces like storage rooms, electrical rooms, mechanical rooms, etc., these spaces are often not directly ventilated with outside air, nor are they required to be since they typically have no occupancy. These non-occupied spaces typically do not affect building occupied areas as they are typically provided with some form of exhaust creating a negative pressure on the surrounding area. Unoccupied space exhaust may impact outside air infiltration into occupied areas; however, this would typically be limited and is not included in occupied spaces ventilation calculations. Should the School District pursue any Phase II activities for the building including recommissioning, balancing, and controls upgrades, these spaces could then be addressed as a component of that process.

Overall, the performance of the building with regard to ventilation was found to be addressed with added CO<sub>2</sub> control of ventilation incorporated into older HVAC equipment and local controls. Preliminary findings from the IAQ inspections and air-side Testing Adjusting and Balancing (TAB) to date found and documented issues that could be addressed immediately to improve building environmental control, reduce energy usage, and improve building ventilation compliance with the 2010 version of the ASHRAE-62.1, (2010) guidelines. Although there are very similar guidelines and regulations put forward by publications such as the International Mechanical Code that focuses on guidelines and directives to help achieve healthy well-ventilated buildings, the State program requires that ASHRAE-62.1, (2010) ventilation guidelines be used in this study calculations. It should be noted that often suggested changes to HVAC systems to improve ventilation could increase energy costs; in some cases, this increase could be significant. Measures should be considered that offset this additional energy use with control upgrades that adjust ventilation systems based on use and measured values. The remainder of this report will address these concerns directly and provide a path forward for Beecher Public Schools.

## **EVALUATION**

For the purposes of this study, our findings address identified deficiencies or concerns related to overall school building ventilation, inherent capability of systems to achieve needed ventilation and operational performance of the site HVAC systems. Based on our findings, we offer some beneficial insight and recommendations as follows:

### **ASHRAE-62.1, (2010) Compliance**

Our field observations indicate, most if not all of the individual occupied spaces at this school seem to comply with the applicable building codes or guidelines regarding indoor air quality and outdoor ventilation.

The ideal supply of outside air to interior occupied spaces should be based upon the 2018 Connecticut Building Code, which is based on the most currently adopted 2015 International Mechanical Code and coincides with ASHRAE-62.1, (2010) guidelines. These codes and guidelines prescribe the flow rate of outside air that must be supplied mechanically to occupied areas based on occupancy classifications. Depending on the type of use of a space, outdoor air flow rates in cubic feet per minute (CFM) per person are defined when the number of occupants within a space is known. When total occupants per space are unknown, the code defines occupant density for each classification type in number of occupants per space floor area. The final flow rate in CFM for every occupied space can thus be calculated. Please note that, although this is a school, the (CFM) per person requirements for some spaces such as an office may utilize the same occupancy classification ventilation rate of a commercial office space, as the rates are the same regardless on type of building. This applies to nearly every space that is not considered a space for traditional classroom activities including, but not limited to, nurse and healthcare offices, gymnasium, assembly halls, etc.

It shall be noted that this school utilizes automatic space Carbon Dioxide (CO<sub>2</sub>) Demand Controlled Ventilation (DCV) as a means to increase or decrease outdoor ventilation air into areas based upon CO<sub>2</sub> levels within the spaces. There is an absolute correlation between CO<sub>2</sub> levels and cubic feet per minute (CFM) of ventilation air per person that could be controlled by the Building Automation System (BAS) to meet ASHRAE 62.1 (2016) indoor ventilation requirements for schools that should be understood. The accepted formula to calculate CFM/Person utilizes: Outdoor CO<sub>2</sub> level in ppm, Measured Indoor CO<sub>2</sub> level in ppm, and CO<sub>2</sub> Generation Rates (CFM) for different metabolic rates by age and activity level i.e., CO<sub>2</sub> generation by an individual for a classroom would be lower than within an art room. Active DCV control is an acceptable alternate method to determine if ventilation requirements are met and could supersede rooms that may fail otherwise using traditional measured data collection procedures prescribed by established ASHRAE guidelines!

As an alternative to providing outside air mechanically to occupied spaces, the code and guidelines also allows for outside air to enter occupied areas naturally through operable windows. If the area of operable windows for an occupied space is at least 4% of the space’s floor area, mechanical ventilation for that space is not required by code. However, although spaces with sufficient operable window area may satisfy code requirements, this is not a realistic way of providing adequate ventilation during periods of cold or hot weather, and this often adversely affects the temperature and humidity levels within the building.

The amount of outside air supplied to occupied spaces is important for occupant comfort and health because contaminants generated by people and materials in the space must be removed or they will build up to undesirable or unhealthy levels. It should be noted that diluting interior air with outside air reduces the concentration of various airborne contaminants, including viral particles that carry the COVID-19 virus and other viral and bacterial contaminants.

**Outside Air Flow and Air Change Rate Findings**

By individual space area/volume measurements and ventilation air being delivered, it could then be determined if spaces conform to the requirements within codes / guidelines and the results are calculated based on individual space classification and category. Additionally, these readings should be based upon “worst case” scenario, whereby each space is considered fully occupied and the associated air handling units are operating with minimum outside air to satisfy the controlled parameters. The reason for using this method is to ensure that if a building can maintain required outside air flow in this minimum ventilation mode, it will maintain them when more outside air is introduced. It does not necessarily mean that the units will handle thermal or humidity regulation in maximum ventilation modes, which should be considered prior to any system modifications. As a caveat, it is important to understand that forcing the worst case is not necessarily typical building operation but is necessary to discover root issues behind the ventilation control of the building. It is possible that making changes regarding outside airflow may cause other issues to be revealed, which in turn may require additional analysis.

The data collected in this study will provide a quantitative conclusion about how well the building performs regarding ventilation if not using CO2-based demand-controlled ventilation. For the occupied zones within this building, the total minimum required ventilation airflow will be calculated. The planned continuation TAB activity will attempt to determine the total delivered outside air for the best possible case by operating the units in 100% outside air mode to simulate the systems had the ability to function in this mode. Using this method along with room volumes and occupancy will reveal the potential amount of outside air is delivered to the spaces, and if it meets current ventilation codes.

A common calculation used for measuring the amount of air that is exchanged through space every hour is the Air Change Rate (ACH), and for this analysis specifically we are concerned with the Outside Air Change Rate (OACH). At its core, this is a ratio of the volume of air that can theoretically completely fill the volume of each space and how many times it can do that every hour. For example, a 1000 ft<sup>2</sup> room with 10 ft ceilings will have a volume of 10,000 ft<sup>3</sup>. If 250 CFM is delivered to this space, that results in 15,000 ft<sup>3</sup> of air. Every hour, the space will be flushed with that much air, resulting in an ACH of 1.5. This number on its own will not determine if a space satisfies code requirements and it does not mean that every molecule of the air in that space has been replaced after the hour, but it helps to give an idea into the type of performance that could be expected and there are guidelines for many spaces regarding the OACH. While general spaces like classrooms and offices are among the space categories that do not have outside air ACH requirements, these rates help to give some insight into overall performance. Current recommendations prescribe a total ACH of at least 3 throughout the building, without falling below the minimum outside air CFM.

## **Outside Air Flow Improvement Recommendations**

It is possible that based upon study findings some remedial action will be suggested to improve the HVAC systems' operation and overall environmental control. These measures alone will help to ensure required outside ventilation air will be delivered to spaces that currently have a deficit and could improve overall building ventilation performance as a result. Due to the age of the building and changes over the years in occupancy, systems and codes, considerations for HVAC rebalancing and systems recommissioning to current design requirements will provide added benefits to building performance and operations.

Aside from the above, since the emergence of the COVID-19 virus in December 2019, the specific requirements and precautions taken regarding outside air have become more stringent. For example, ASHRAE has been continuously investigating the transmission of COVID-19 through HVAC systems and has made recommendations on how to adapt existing HVAC systems to minimize transmission of COVID-19. Changes to building systems to address the virus also positively improve the performance of the ventilation systems with handling the filtration of other particulate that directly impacts building air quality. On April 14, 2020, ASHRAE released a document "ASHRAE Position Document on Infectious Aerosols". ASHRAE also gave a presentation on June 16, 2020, regarding Recommendations and Activities for re-opening schools for the fall 2020 academic semester. These recommendations remain relevant as COVID and other contaminants that impact indoor air quality continue to remain a concern. Although this report is primarily concerned with meeting ASHRAE-62.1 (2010) ventilation guidelines, the complementing Technical Committee 9.7 publication provides for an informative prioritizing school checklist addressing advanced indoor air quality in schools that could also be utilized. ASHRAE's recommendations for reducing the transmission of infectious aerosols through HVAC systems as they apply to schools are as follows:

- Increase outdoor ventilation rates (Dilution) for all zones with deficit minimum outside air by adjusting the outside air damper minimum position of the associated air handling equipment. Generally, more is better, but any changes should follow ASHRAE Standard 62.1 as a minimum and should not overpower the capability of the heating or cooling equipment to maintain temperature and humidity requirements in the occupied spaces.
- HVAC unit filter changes should be scheduled with intervals as needed based on manufactures suggested pressure drop across filter media. Filters efficiencies should meet a MERV-11 rating with the exception of 100% outdoor air units or prefilters, where MERV-8 would be acceptable.
- Increase total air change rates to between 3 and 6 ACH where possible while still satisfying minimum OA ventilation.
- Flush or purge the building before and after occupancy for at least two (2) hours, if possible.
- Consider installation of UV-C or bi-polar ionization to systems with return air where installation of these systems does not interfere with the unit construction or operation.
- Supplement poorly or un-ventilated areas with portable HEPA filtration units in classrooms until such time as proper ventilation can be delivered to the space.
- Increase restroom exhaust where possible while maintaining a positive building pressurization to the exterior.
- Perform ductwork inspection and cleaning if needed for existing systems.

## **General Recommendations to Improve Schools Performance**

Full Retro-commissioning of the building mechanical and control systems is strongly recommended at this time. Retro-commissioning offers the opportunity for energy savings and improved efficiency. For optimal benefits, conduct retro-commissioning every 3-5 years for each building. Without Retro-commissioning, it would be difficult to determine the extent of additional services or modifications needed with the existing control system, however our cursory review and evaluation determined the following services should be considered as high priority considerations:

- Generally, increase airflow to each space or decrease if the supplied air is significantly beyond necessary levels. Decreasing air to some locations might seem counterintuitive but if some zones are being supplied with significantly more than 100% of what is required, backing these down will help move air to where it may be deficient. This item should not be addressed without a certified TAB contractor to verify flow adjustments are correct.
- Increase the minimum OA damper position for each unit under control to the heating cooling and dehumidification capacity of each unit. Seasonal limits should be taken into consideration.
- Confirm that trending and alarms have been set up in the BAS for all units and establish alarm points for units operating below required minimum ventilation levels during occupied modes.

## **Equipment Upgrade Recommendations**

Generally, the more outside air that can be supplied to occupied areas, the better. Existing HVAC systems where practical should have outside air flow rates increased above current setpoints if determined required and have the ability. Even units that currently meet code requirements for ventilation flow rates could be increased if there is not a negative energy impact but should not be increased beyond the capacity of the unit to heat or cool the air. Total space air change rates (ACH) should also be increased to the extent possible along with increases in outside air flow to better remove contaminants from the air. If a unit at maximum fan speeds is still incapable of providing at least the minimum ventilation or ACH required, then the system should be evaluated further to determine the best solution such as a total system modification, or the installation of a self-contained HEPA filtration unit in areas where increasing fresh air is limited.

Supplemental air cleaning technology, such as ultraviolet-C (UV-C) light or bi-polar ionization, is available and could be considered if additional disinfection measures are desired. UV-C is short wavelength ultraviolet light that has been found to effectively kill COVID-19 particles. UV-C systems are already used in other HVAC systems where they are installed in air streams to kill bacteria and other harmful living organisms. These systems can be installed relatively easily in already constructed system ductwork or air handlers without major modifications. Bi-polar ionization systems are also installed in ductwork or air handlers and use an electric charge to create a concentration of positively and negatively charged particles in an airstream. These particles cause pathogens to stick to each other and become larger, thus increasing the probability of them being captured by air filters. The charged particles created also leave the ductwork and remain charged when they enter occupied spaces. If the particles encounter pathogens in the occupied space, the charge removes hydrogen from the pathogen so that it is no longer able to sustain itself. For this reason, bi-polar ionization is preferred to UV-C air cleaning because bi-polar ionization could decontaminate pathogens outside of the ductwork whereas UV-C only decontaminates pathogens that enter the ducts.

ASHRAE recommends relative humidity values between 40 and 65% as these values have been shown to hamper the ability of COVID-19 and other pathogens to travel and thrive. Retrofitting these systems into existing units is difficult but if there are complaints about building humidity then it is worth considering,

albeit costly. When cooling systems are in operation, ensure dehumidification is adequate to keep relative humidity below 65%. During heating system operation, relative humidity values are typically less than 40%. Adding humidification to the existing HVAC systems is often exceedingly difficult and costly; additionally, humidification for HVAC systems can be problematic if not well maintained and adds to operating costs. For this reason, the recommendations discussed above should be enacted before humidification is considered.

To best confirm optimum performance once the implementation of the above recommendations is met as well as other improvements, we again recommend performing Recommissioning of this school. This is an extensive procedure that will help with fully documenting the building systems, their capabilities, and optimizes the control system to maintain the best performance while conserving the most energy. In general, Recommissioning should be performed approximately once every five years to keep the buildings operating smoothly.

For the Beecher Road Elementary School HVAC units with recirculation air, it could be suggested that the following recommendations would be beneficial with improving indoor air quality throughout the school if implemented:

- For units that may have, or planned to have dual series filter racks where the first has room for 2” filters and the second has room for 4” or greater filters, the 2” filters should be MERV 8 for pre-filtering, but the larger filters should remain MERV 11+.
- Utilizing a low differential pressure gauge or transmitter through the BAS would be suggested to determine filter loading and optimum replacement intervals.
- Consider adding Bi-polar ionization or another means of air disinfection wherever possible.
- Consider in-room HEPA filtration units to improve and control air quality in underperforming rooms.
- Consider investigating the potential of increasing the ventilation air flow rate wherever possible without impacting energy usage greatly.
- The following bullet items may be performed in-house or through outside service providers that could improve indoor air quality and energy consumption. Some typical issues include, but are not limited to:
  - Cleaning all unit coils on a yearly basis: Cleaning the coils will improve airflow patterns through the coil, increasing coil effectiveness and preventing deterioration due to rust or corrosion.
  - Damper cleaning, lubrication, and adjusting: All unit dampers should be cleaned and lubricated and tested throughout their movement range from the localized controller. As dampers age, lubrication and dirt builds up on linkages, blades and pivot points causing the actuator to need to push harder to move the damper into the required position. Too much build-up can result in control actuators failures or broken damper hardware, which would need to be replaced. Missing or worn blade-to blade or damper end seals could impact ventilation control and energy use, and therefore inspection of such should be provided on a regular basis.
  - General Unit Cleanliness: All unit’s internals, ductwork, and grills should be cleaned to remove any dirt or debris that has accumulated. Systems that are not maintained and cleaned frequently can become a breeding ground for bacteria and molds should those materials absorb moisture.

- **Fan Belt Tension:** All fan pulleys and belts should be reviewed for fit. Some motors might need to be repositioned in the unit to fix the tension or adjust for alignment. Consider installing belt tensioners where possible, to extend intervals between belt changes without compromising unit efficiency as the belt wears out.

**General Air Handling Unit Upgrade or Replacement Recommendations**

In review of the aged constant volume Air Handling units serving Music area and Common occupied areas, we have identified that for their age they appear to have been maintained very well but need replacement to help ensure reliable and efficient operation for years to come.

**Field Study Findings & General Comments**

General Comments:

- All dampers and linkages should be cleaned and lubricated to allow free movement and reduce potential damage to actuators or linkages. Replace damper and damper seals where necessary.
- Check heating and cooling coils for cleanliness and integrity. Clean coils as required to increase heat transfer performance.
- Calibrate as required all CO2 sensors used for space demand control ventilation and ensure controller operates to maintain a maximum CO2 ppm reading of no more than 1,000 ppm yearly.

Detailed in the attached appendix are our high-level observations of identified equipment unit information and overall operational notations.

**CONCLUSIONS**

The Woodbridge Public Schools clearly has taken measures in the past to address identified deficiencies with aging equipment including proper maintenance and filtration upgrades for indoor air quality (IAQ) improvements.

**The School had also previously installed CO2 Sensors in the classrooms which are helpful to control the volume of outside ventilation air, which in turn helps reduce the humidity levels in the spaces (DCV increases or decreases outdoor ventilation air into areas based upon CO2 levels within the spaces).**

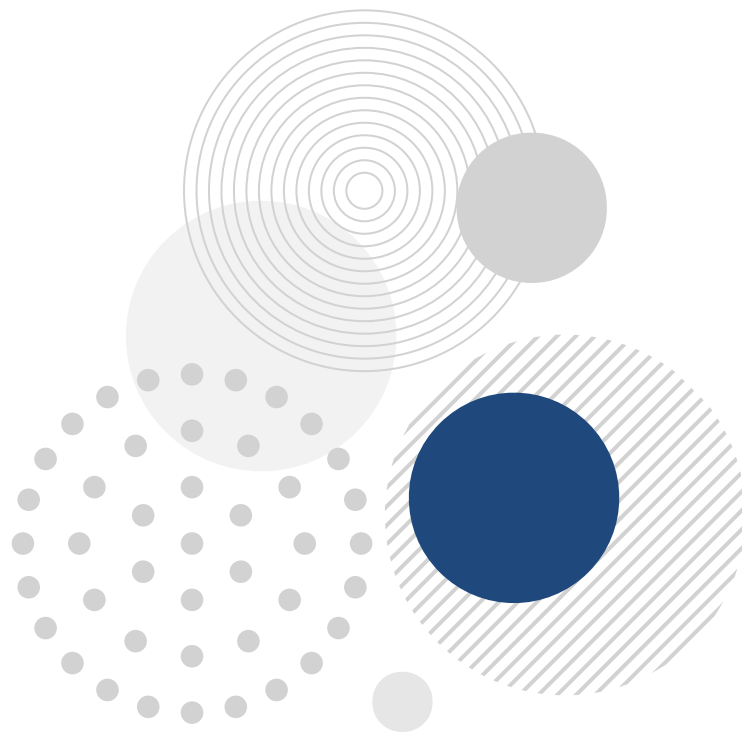
**As stated above, this evaluation found that the Beecher Road Elementary School seems to be meeting the current minimum ventilation requirements per ASHRAE-62.1, (2010) guidelines with CO2-based Demand Control Ventilation strategies.**

Given the results of this survey, we highly recommend further evaluation to be performed with whole-building Recommissioning, which would entail further testing and verification to confirm proper equipment and BAS operation.

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# Appendix 1

## Ventilation Data Calculations



|                 |                                     |
|-----------------|-------------------------------------|
| Project Name:   | Beecher Road School RCx & TAB Study |
| Project Number: | 2022231.00                          |
| Scope           | Ventilation Calculation by Building |
| Date            | March 28, 2024                      |



| Zone Identification |         |                  |                           |                      |               |                  |                    |              |                          |                |                   | ASHRAE-62.1, (2010) Ventilation Calculations |                                      |                                    |                          |                                   |                                      |                   |      |
|---------------------|---------|------------------|---------------------------|----------------------|---------------|------------------|--------------------|--------------|--------------------------|----------------|-------------------|--|--------------------------------------|------------------------------------|--------------------------|-----------------------------------|--------------------------------------|-------------------|------|
| Floor               | Room#   | Room Name        | Occupancy Classification  | Category             | Total Airflow | Unit Actual OA % | BAS OA Damper Cond | Served By    | Zone Area, Az, per space | Ceiling Height | Volume, per space | Zone Population, Pz, per space               | People OA Rate in Breathing Zone, Rp | Area OA Rate in Breathing Zone, Ra | Default Occupant Density | Min. Required Ventilation Airflow | ACTUAL MEASURED VENTILATION AIR FLOW | Meets Ashrae 62.1 | DCV? |
|                     |         |                  |                           |                      | (cfm)         | (%)              | (%)                |              | (sq.ft)                  | (ft)           | (cu.ft)           | Adult  | (cfm/ person)                        | (cfm/sf)                           | (#/1000sf)               | (cfm)                             | (cfm)                                |                   | YES  |
| 1                   | A1      | Classroom        | Education                 | Classroom (ages 9+)  | N/A           |                  | 30%                | UV           | 822                      | 10             | 8220              | 20   | 10.0                                 | 0.12                               | 35                       | 299                               | 242                                  | Meets             | YES  |
| 1                   | A2      | Classroom        | Education                 | Classroom (ages 9+)  | N/A           |                  | 30%                | UV           | 825                      | 10             | 8250              | 20   | 10.0                                 | 0.12                               | 35                       | 299                               | 208                                  | Meets             | YES  |
| 1                   | A3      | Classroom        | Education                 | Classroom (ages 9+)  | N/A           |                  | 30%                | UV           | 826                      | 10             | 8260              | 20   | 10.0                                 | 0.12                               | 35                       | 299                               | 198                                  | Meets             | YES  |
| 1                   | A4      | Classroom        | Education                 | Classroom (ages 9+)  | N/A           |                  | 30%                | UV           | 820                      | 10             | 8200              | 20   | 10.0                                 | 0.12                               | 35                       | 298                               | 256                                  | Meets             | YES  |
| 1                   | A5      | Classroom        | Education                 | Classroom (ages 9+)  | N/A           |                  | 30%                | UV           | 829                      | 10             | 8290              | 20   | 10.0                                 | 0.12                               | 35                       | 299                               | 189                                  | Meets             | YES  |
| 1                   | A6      | Classroom        | Education                 | Classroom (ages 9+)  | N/A           |                  | 30%                | UV           | 818                      | 10             | 8180              | 20   | 10.0                                 | 0.12                               | 35                       | 298                               | 218                                  | Meets             | YES  |
| 1                   | A7      | Art              | Education                 | Art Classroom        | N/A           |                  | 30%                | UV           | 1137                     | 10             | 11370             | 20   | 10.0                                 | 0.18                               | 20                       | 405                               | 144                                  | Meets             | YES  |
| 1                   | A8      | Classroom        | Public Spaces             | Classroom (ages 9+)  | N/A           |                  | 30%                | UV           | 1188                     | 10             | 11880             | 20   | 10.0                                 | 0.12                               | 35                       | 343                               | 170                                  | Meets             | YES  |
| 1                   | A9      | Speech           | Offices                   | Office spaces        | N/A           |                  | 30%                | UV           | 334                      | 10             | 3340              | 10   | 5.0                                  | 0.06                               | 5                        | 70                                | 191                                  | Meets             | YES  |
| 1                   | ---     | CONFERENCE       | Offices                   | Conference rooms     | N/A           |                  | 10%                | E(VAV) RTU-2 | 248                      | 9              | 2232              | 10   | 5.0                                  | 0.06                               | 50                       | 65                                | 54                                   | Meets             | YES  |
| 1                   | ---     | WAIT/MAIN OFFICE | Education                 | Classroom (ages 5-8) | N/A           |                  | 10%                | E(VAV) RTU-2 | 723                      | 9.5            | 6869              | 6  | 10.0                                 | 0.12                               | 25                       | 147                               | 226                                  | Meets             | YES  |
| 1                   | ---     | VICE PRINCIPLE   | Offices                   | Office spaces        | N/A           |                  | 10%                | E(VAV) RTU-2 | 153                      | 9.5            | 1454              | 2  | 5.0                                  | 0.06                               | 5                        | 19                                | 44                                   | Meets             | YES  |
| 1                   | ---     | PRINCIPLE        | Offices                   | Office spaces        | N/A           |                  | 10%                | E(VAV) RTU-2 | 150                      | 9.5            | 1425              | 2  | 5.0                                  | 0.06                               | 5                        | 19                                | 34                                   | Meets             | YES  |
| 1                   | ---     | KITCHEN          | Food and beverage service | Kitchens (cooking)   | N/A           |                  | 10%                | E(VAV) RTU-2 | 91                       | 9.5            | 865               | 6  | 0.0                                  | 0.00                               | 0                        | 0                                 | 20                                   | N/A               | YES  |
| 1                   | B13     | STOR. SALLY PORT | Education                 | Multiuse assembly    | N/A           |                  | 10%                | E(VAV) RTU-2 | 200                      | 9.5            | 1900              | 6  | 7.5                                  | 0.06                               | 100                      | 57                                | 72                                   | Meets             | YES  |
| 1                   | B14     | STAFF ROOM       | Education                 | Multiuse assembly    | N/A           |                  | 10%                | FCU          | 780                      | 9              | 7020              | 14   | 7.5                                  | 0.06                               | 100                      | 152                               | 166                                  | Meets             | YES  |
| 1                   | B12     | STORAGE          | Storage                   | Warehouses           | N/A           |                  | ---                | EF           | 288                      | 8.9            | 2563              | 0  | 0.0                                  | 0.06                               | 0                        | 17                                | ---                                  | N/A               | ---  |
| 1                   | B11     | NURSE            | Education                 | Multiuse assembly    | N/A           |                  | 30%                | FCU          | 590                      | 8.9            | 5251              | 6  | 7.5                                  | 0.06                               | 100                      | 80                                | 59                                   | Meets             | YES  |
| 1                   | B10     | CLASSROOM        | Education                 | Classroom (ages 9+)  | N/A           |                  | 30%                | FCU (x2)     | 823                      | 8.9            | 7325              | 20   | 10.0                                 | 0.12                               | 35                       | 299                               | 316                                  | Meets             | YES  |
| 1                   | B1      | CLASSROOM        | Education                 | Classroom (ages 9+)  | N/A           |                  | 30%                | UV           | 827                      | 10             | 8270              | 20   | 10.0                                 | 0.12                               | 35                       | 299                               | 227                                  | Meets             | YES  |
| 1                   | B2      | CLASSROOM        | Education                 | Classroom (ages 9+)  | N/A           |                  | 30%                | UV           | 819                      | 10             | 8190              | 20   | 10.0                                 | 0.12                               | 35                       | 298                               | 253                                  | Meets             | YES  |
| 1                   | B3      | CLASSROOM        | Education                 | Classroom (ages 5-8) | N/A           |                  | 30%                | UV           | 823                      | 10             | 8230              | 20   | 10.0                                 | 0.12                               | 25                       | 299                               | 230                                  | Meets             | YES  |
| 1                   | B4      | CLASSROOM        | Education                 | Classroom (ages 9+)  | N/A           |                  | 30%                | UV           | 822                      | 10             | 8220              | 20   | 10.0                                 | 0.12                               | 35                       | 299                               | 166                                  | Meets             | YES  |
| 1                   | B5      | CLASSROOM        | Education                 | Classroom (ages 9+)  | N/A           |                  | 30%                | UV           | 820                      | 10             | 8200              | 20   | 10.0                                 | 0.12                               | 35                       | 298                               | 176                                  | Meets             | YES  |
| 1                   | B6      | CLASSROOM        | Education                 | Classroom (ages 9+)  | N/A           |                  | 30%                | UV           | 824                      | 10             | 8240              | 20   | 10.0                                 | 0.12                               | 35                       | 299                               | 259                                  | Meets             | YES  |
| 1                   | B9      | CLASSROOM        | Education                 | Classroom (ages 9+)  | N/A           |                  | 30%                | UV           | 331                      | 10             | 3310              | 20   | 10.0                                 | 0.12                               | 35                       | 240                               | 355                                  | Meets             | YES  |
| 1                   | B7      | CLASSROOM        | Education                 | Classroom (ages 5-8) | N/A           |                  | 30%                | UV           | 1194                     | 10             | 11940             | 20   | 10.0                                 | 0.12                               | 25                       | 343                               | 282                                  | Meets             | YES  |
| 1                   | B8      | CLASSROOM        | Education                 | Classroom (ages 5-8) | N/A           |                  | 30%                | UV           | 1190                     | 10             | 11900             | 20   | 10.0                                 | 0.12                               | 25                       | 343                               | 234                                  | Meets             | YES  |
| 1                   | NORTH   | GYMNASIUM        | Education                 | Multiuse assembly    | N/A           |                  | 30%                | AHU-2, AHU-3 | 2910                     | 17             | 49470             | 50   | 7.5                                  | 0.06                               | 100                      | 550                               | 1650                                 | Meets             | YES  |
| 1                   | FITNESS | COMMONS          | Education                 | Multiuse assembly    | N/A           |                  | 30%                | AHU-2, AHU-3 | 2648                     | 10.2           | 27010             | 40   | 7.5                                  | 0.06                               | 100                      | 459                               | 1719                                 | Meets             | YES  |

|                 |                                     |
|-----------------|-------------------------------------|
| Project Name:   | Beecher Road School RCx & TAB Study |
| Project Number: | 2022231.00                          |
| Scope           | Ventilation Calculation by Building |
| Date            | March 28, 2024                      |



| Zone Identification |       |                      |                           |                      |               |                  |                    |                  |                          |                |                   | ASHRAE-62.1, (2010) Ventilation Calculations |                                      |                                    |                          |                                   |                                      |                   |      |  |
|---------------------|-------|----------------------|---------------------------|----------------------|---------------|------------------|--------------------|------------------|--------------------------|----------------|-------------------|--|--------------------------------------|------------------------------------|--------------------------|-----------------------------------|--------------------------------------|-------------------|------|--|
| Floor               | Room# | Room Name            | Occupancy Classification  | Category             | Total Airflow | Unit Actual OA % | BAS OA Damper Cond | Served By        | Zone Area, Az, per space | Ceiling Height | Volume, per space | Zone Population, Pz, per space               | People OA Rate in Breathing Zone, Rp | Area OA Rate in Breathing Zone, Ra | Default Occupant Density | Min. Required Ventilation Airflow | ACTUAL MEASURED VENTILATION AIR FLOW | Meets Ashrae 62.1 | DCV? |  |
|                     |       |                      |                           |                      | (cfm)         | (%)              | (%)                |                  | (sq.ft)                  | (ft)           | (cu.ft)           | Adult  | (cfm/ person)                        | (cfm/sf)                           | (#/1000sf)               | (cfm)                             | (cfm)                                |                   | YES  |  |
| 1                   | K9    | CLASSROOM            | Education                 | Classroom (ages 5-8) | N/A           |                  | 30%                | FCU              | 840                      | 9              | 7560              | 20   | 10.0                                 | 0.12                               | 25                       | 301                               | 190                                  | Meets             | YES  |  |
| 1                   | K7    | CLASSROOM            | Education                 | Classroom (ages 5-8) | N/A           |                  | 30%                | FCU              | 511                      | 9              | 4599              | 8  | 10.0                                 | 0.12                               | 25                       | 141                               | 102                                  | Meets             | YES  |  |
| 1                   | KP    | CLASSROOM            | Education                 | Classroom (ages 9+)  | N/A           |                  | 30%                | FCU              | 997                      | 9.4            | 9372              | 20   | 10.0                                 | 0.12                               | 35                       | 320                               | 190                                  | Meets             | YES  |  |
| 1                   | K1    | CLASSROOM            | Education                 | Classroom (ages 9+)  | N/A           |                  | 30%                | FCU              | 1008                     | 9.6            | 9677              | 20   | 10.0                                 | 0.12                               | 35                       | 321                               | 314                                  | Meets             | YES  |  |
| 1                   | K2    | CLASSROOM            | Education                 | Classroom (ages 9+)  | N/A           |                  | 30%                | FCU              | 1037                     | 9.5            | 9852              | 20   | 10.0                                 | 0.12                               | 35                       | 324                               | 184                                  | Meets             | YES  |  |
| 1                   | K8    | CLASSROOM            | Education                 | Classroom (ages 9+)  | N/A           |                  | 30%                | FCU              | 776                      | 9.5            | 7372              | 20   | 10.0                                 | 0.12                               | 35                       | 293                               | 146                                  | Meets             | YES  |  |
| 1                   | K3    | CLASSROOM            | Education                 | Classroom (ages 9+)  | N/A           |                  | 30%                | FCU              | 1005                     | 9.6            | 9648              | 20   | 10.0                                 | 0.12                               | 35                       | 321                               | 214                                  | Meets             | YES  |  |
| 1                   | ADD   | Gym Teacher office   | Offices                   | Office spaces        | N/A           |                  | 30%                | FCU              | 72                       | 8              | 576               | 1  | 5.0                                  | 0.06                               | 5                        | 9                                 | 10                                   | Meets             | NO   |  |
| 1                   | K4    | CLASSROOM            | Education                 | Classroom (ages 5-8) | N/A           |                  | 30%                | FCU              | 1000                     | 9.5            | 9500              | 20   | 10.0                                 | 0.12                               | 25                       | 320                               | 187                                  | Meets             | YES  |  |
| 1                   | K6    | CLASSROOM            | Education                 | Classroom (ages 9+)  | N/A           |                  | 30%                | FCU              | 1041                     | 9.7            | 10098             | 20   | 10.0                                 | 0.12                               | 35                       | 325                               | 159                                  | Meets             | YES  |  |
| 1                   | K5    | CLASSROOM            | Education                 | Classroom (ages 9+)  | N/A           |                  | 30%                | FCU              | 1036                     | 9.6            | 9946              | 20   | 10.0                                 | 0.12                               | 35                       | 324                               | 114                                  | Meets             | YES  |  |
| 1                   | ---   | Kitchen              | Food and beverage service | Kitchens (cooking)   | N/A           |                  | 25%                | RTU-3            | 1444                     | 8.9            | 12852             | 6  | 0.0                                  | 0.00                               | 0                        | 0                                 | 309                                  | N/A               | YES  |  |
| 1                   | ---   | Cafeteria            | Food and beverage service | Dining Rooms         | N/A           |                  | 25%                | RTU-3            | 3777                     | 10.5           | 39659             | 125  | 7.5                                  | 0.18                               | 70                       | 1617                              | 2608                                 | Meets             | YES  |  |
| 1                   | ---   | Library              | Education                 | Multiuse assembly    | N/A           |                  | 10%                | RTU-4            | 5500                     | 10.9           | 59950             | 80   | 7.5                                  | 0.06                               | 100                      | 930                               | 482                                  | Meets             | YES  |  |
| 1                   | ---   | Tech Center          | Education                 | Classroom (ages 9+)  | N/A           |                  | 25%                | VAV 5-2,3, RTU-5 | 1299                     | 7.7            | 10002             | 40   | 10.0                                 | 0.12                               | 35                       | 556                               | 713                                  | Meets             | YES  |  |
| 1                   | ---   | Media Center Storage | Storage                   | Warehouses           | N/A           |                  | 10%                | RTU-4            | 646                      | 10.9           | 7041              | 0  | 0.0                                  | 0.06                               | 0                        | 39                                | 94                                   | Meets             | YES  |  |
| 1                   | ---   | Break Rm. Office     | Offices                   | Office spaces        | N/A           |                  | 25%                | VAV-1, RTU-5     | 287                      | 8              | 2296              | 5  | 5.0                                  | 0.06                               | 5                        | 42                                | 10                                   | Meets             | YES  |  |
| 1                   | ---   | Green Screen         | Education                 | Multiuse assembly    | N/A           |                  | 25%                | VAV-1, RTU-5     | 197                      | 7.6            | 1497              | 2  | 7.5                                  | 0.06                               | 100                      | 27                                | 81                                   | Meets             | YES  |  |
| 1                   | ---   | Tech Office          | Offices                   | Office spaces        | N/A           |                  | 25%                | VAV-1, RTU-5     | 156                      | 8              | 1248              | 1  | 5.0                                  | 0.06                               | 5                        | 14                                | 21                                   | Meets             | YES  |  |
| 1                   | ---   | Reading Room         | Education                 | Classroom (ages 9+)  | N/A           |                  | 10%                | RTU-4            | 161                      | 7.9            | 1272              | 2  | 10.0                                 | 0.12                               | 35                       | 39                                | 9                                    | Meets             | YES  |  |
| 1                   | C6    | Hutchinson           | Education                 | Classroom (ages 9+)  | N/A           |                  | N/A / 30%          | UV               | 828                      | 10             | 8280              | 20   | 10.0                                 | 0.12                               | 35                       | 299                               | 227                                  | Meets             | YES  |  |
| 1                   | C5    | Meacham              | Education                 | Classroom (ages 9+)  | N/A           |                  | 30%                | UV               | 808                      | 10             | 8080              | 20   | 10.0                                 | 0.12                               | 35                       | 297                               | 269                                  | Meets             | YES  |  |
| 1                   | C4    | CLASSROOM            | Education                 | Classroom (ages 9+)  | N/A           |                  | 30%                | UV               | 817                      | 10             | 8170              | 20   | 10.0                                 | 0.12                               | 35                       | 298                               | 243                                  | Meets             | YES  |  |
| 1                   | C3    | Classroom            | Education                 | Classroom (ages 9+)  | N/A           |                  | 30%                | UV               | 823                      | 10             | 8230              | 20   | 10.0                                 | 0.12                               | 35                       | 299                               | 269                                  | Meets             | YES  |  |
| 1                   | C2    | Triplet              | Education                 | Classroom (ages 9+)  | N/A           |                  | 30%                | UV               | 827                      | 10             | 8270              | 20   | 10.0                                 | 0.12                               | 35                       | 299                               | 227                                  | Meets             | YES  |  |
| 1                   | C1    | Ngov                 | Education                 | Classroom (ages 9+)  | N/A           |                  | 30%                | UV               | 814                      | 10             | 8140              | 20   | 10.0                                 | 0.12                               | 35                       | 298                               | 278                                  | Meets             | YES  |  |
| 1                   | D5/D6 | Office               | Offices                   | Office spaces        | N/A           |                  | 30%                | FCU              | 129                      | 8              | 1032              | 1  | 5.0                                  | 0.06                               | 5                        | 13                                | 15                                   | Meets             | NO   |  |
| 1                   | D5    | Nurse                | Education                 | Multiuse assembly    | N/A           |                  | 30%                | FCU              | 1009                     | 9              | 9081              | 6  | 7.5                                  | 0.06                               | 100                      | 106                               | 166                                  | Meets             | YES  |  |
| 1                   | D6    | Nolan                | Education                 | Classroom (ages 9+)  | N/A           |                  | 30%                | FCU              | 10098                    | 9              | 90882             | 21   | 10.0                                 | 0.12                               | 35                       | 1422                              | 317                                  | Meets             | YES  |  |
| 1                   | D4    | Marcellino           | Education                 | Classroom (ages 9+)  | N/A           |                  | 30%                | FCU              | 855                      | 10             | 8550              | 21   | 10.0                                 | 0.12                               | 35                       | 313                               | 54                                   | Meets             | YES  |  |

|                 |                                     |
|-----------------|-------------------------------------|
| Project Name:   | Beecher Road School RCx & TAB Study |
| Project Number: | 2022231.00                          |
| Scope           | Ventilation Calculation by Building |
| Date            | March 28, 2024                      |



| Zone Identification |       |                   |                          |                      |               |                  |                    |           |                          |                |                   | ASHRAE-62.1, (2010) Ventilation Calculations |                                      |                                    |                          |                                   |                                      |                   |      |  |
|---------------------|-------|-------------------|--------------------------|----------------------|---------------|------------------|--------------------|-----------|--------------------------|----------------|-------------------|--|--------------------------------------|------------------------------------|--------------------------|-----------------------------------|--------------------------------------|-------------------|------|--|
| Floor               | Room# | Room Name         | Occupancy Classification | Category             | Total Airflow | Unit Actual OA % | BAS OA Damper Cond | Served By | Zone Area, Az, per space | Ceiling Height | Volume, per space | Zone Population, Pz, per space               | People OA Rate in Breathing Zone, Rp | Area OA Rate in Breathing Zone, Ra | Default Occupant Density | Min. Required Ventilation Airflow | ACTUAL MEASURED VENTILATION AIR FLOW | Meets Ashrae 62.1 | DCV? |  |
|                     |       |                   |                          |                      | (cfm)         | (%)              | (%)                |           | (sq.ft)                  | (ft)           | (cu.ft)           | Adult  | (cfm/ person)                        | (cfm/sf)                           | (#/1000sf)               | (cfm)                             | (cfm)                                |                   | YES  |  |
| 1                   | D3    | Shepard           | Education                | Classroom (ages 9+)  | N/A           |                  | 30%                | FCU       | 1349                     | 10             | 13490             | 22   | 10.0                                 | 0.12                               | 35                       | 382                               | 352                                  | Meets             | YES  |  |
| 1                   | D2    | Mumford           | Education                | Classroom (ages 5-8) | N/A           |                  | 30%                | FCU       | 919                      | 10             | 9190              | 22   | 10.0                                 | 0.12                               | 25                       | 330                               | 65                                   | Meets             | YES  |  |
| 1                   | D1    | Lavigne           | Education                | Classroom (ages 9+)  | N/A           |                  | 30%                | FCU       | 1270                     | 10             | 12700             | 21   | 10.0                                 | 0.12                               | 35                       | 362                               | 185                                  | Meets             | YES  |  |
| 1                   | D7    | Reading           | Education                | Classroom (ages 9+)  | N/A           |                  | 30%                | FCU       | 433                      | 9              | 3897              | 5  | 10.0                                 | 0.12                               | 35                       | 102                               | 90                                   | Meets             | YES  |  |
| 1                   | D7-1  | W/in Reading      | Education                | Classroom (ages 9+)  | N/A           |                  | 30%                | FCU       | 116                      | 8              | 928               | 1  | 10.0                                 | 0.12                               | 35                       | 24                                | 29                                   | Meets             | NO   |  |
| 1                   | D7-2  | W/in Reading      | Education                | Classroom (ages 9+)  | N/A           |                  | 30%                | FCU       | 132                      | 8              | 1056              | 1  | 10.0                                 | 0.12                               | 35                       | 26                                | 34                                   | Meets             | NO   |  |
| 1                   | D7-3  | W/in Reading      | Education                | Classroom (ages 9+)  | N/A           |                  | 30%                | FCU       | 110                      | 8              | 880               | 1  | 10.0                                 | 0.12                               | 35                       | 23                                | 22                                   | Meets             | NO   |  |
| 1                   | S1    | Rogers            | Education                | Classroom (ages 5-8) | N/A           |                  | 30%                | FCU       | 1021                     | 9              | 9189              | 20   | 10.0                                 | 0.12                               | 25                       | 323                               | 172                                  | Meets             | YES  |  |
| 1                   | S2    | Glennon           | Education                | Classroom (ages 9+)  | N/A           |                  | 30%                | FCU       | 1256                     | 9              | 11304             | 20   | 10.0                                 | 0.12                               | 35                       | 351                               | 290                                  | Meets             | YES  |  |
| 1                   | S16   | Resources         | Education                | Classroom (ages 5-8) | N/A           |                  | 30%                | FCU       | 382                      | 9              | 3438              | 6  | 10.0                                 | 0.12                               | 25                       | 106                               | 131                                  | Meets             | YES  |  |
| 1                   | S3    | Irfran            | Education                | Classroom (ages 5-8) | N/A           |                  | 30%                | FCU       | 1256                     | 9              | 11304             | 21   | 10.0                                 | 0.12                               | 25                       | 361                               | 178                                  | Meets             | YES  |  |
| 1                   | S4    | Chase             | Education                | Classroom (ages 5-8) | N/A           |                  | 30%                | FCU       | 1021                     | 9              | 9189              | 21   | 10.0                                 | 0.12                               | 25                       | 333                               | 172                                  | Meets             | YES  |  |
| 1                   | S17   | Greene            | Education                | Classroom (ages 9+)  | N/A           |                  | 30%                | FCU       | 561                      | 9.6            | 5386              | 4  | 10.0                                 | 0.12                               | 35                       | 107                               | 346                                  | Meets             | YES  |  |
| 1                   | S5    | Horvath           | Education                | Classroom (ages 9+)  | N/A           |                  | 30%                | FCU       | 1024                     | 9              | 9216              | 20   | 10.0                                 | 0.12                               | 35                       | 323                               | 181                                  | Meets             | YES  |  |
| 1                   | S6    | Campbell          | Education                | Classroom (ages 9+)  | N/A           |                  | 30%                | FCU       | 1256                     | 9              | 11304             | 20   | 10.0                                 | 0.12                               | 35                       | 351                               | 185                                  | Meets             | YES  |  |
| 1                   | S7    | Guerra            | Education                | Classroom (ages 9+)  | N/A           |                  | 30%                | FCU       | 1256                     | 8.9            | 11178             | 20   | 10.0                                 | 0.12                               | 35                       | 351                               | 196                                  | Meets             | YES  |  |
| 1                   | S8    | Conroy            | Education                | Classroom (ages 9+)  | N/A           |                  | 30%                | FCU       | 1024                     | 8.9            | 9114              | 20   | 10.0                                 | 0.12                               | 35                       | 323                               | 199                                  | Meets             | YES  |  |
| 1                   | S9    | Mulligan          | Education                | Classroom (ages 5-8) | N/A           |                  | 30%                | FCU       | 1021                     | 8.9            | 9087              | 20   | 10.0                                 | 0.12                               | 25                       | 323                               | 301                                  | Meets             | YES  |  |
| 1                   | S10   | McHugh            | Education                | Classroom (ages 5-8) | N/A           |                  | 30%                | FCU       | 1256                     | 8.9            | 11178             | 20   | 10.0                                 | 0.12                               | 25                       | 351                               | 210                                  | Meets             | YES  |  |
| 1                   | S13   | Resources         | Education                | Classroom (ages 5-8) | N/A           |                  | 30%                | FCU       | 380                      | 8.9            | 3382              | 20   | 10.0                                 | 0.12                               | 25                       | 246                               | 120                                  | Meets             | YES  |  |
| 1                   | S11   | Rourke            | Education                | Classroom (ages 9+)  | N/A           |                  | 30%                | FCU       | 1256                     | 8.9            | 11178             | 20   | 10.0                                 | 0.12                               | 35                       | 351                               | 168                                  | Meets             | YES  |  |
| 1                   | S12   | Antonelles        | Education                | Classroom (ages 9+)  | N/A           |                  | 30%                | FCU       | 1021                     | 8.9            | 9087              | 20   | 10.0                                 | 0.12                               | 35                       | 323                               | 203                                  | Meets             | YES  |  |
| 1                   | ---   | FAC Director Vito | Education                | Classroom (ages 9+)  | N/A           |                  | 25%                | AHU-6     | 144                      | 7.2            | 1037              | 1  | 10.0                                 | 0.12                               | 35                       | 27                                | 18                                   | Not Meets         | NO   |  |
| 1                   | S19   | Computer          | Education                | Computer lab         | N/A           |                  | 30%                | FCU       | 830                      | 9              | 7470              | 4  | 10.0                                 | 0.12                               | 25                       | 140                               | 91                                   | Meets             | YES  |  |
| 1                   | S15   | Taylor            | Education                | Classroom (ages 9+)  | N/A           |                  | 25%                | AHU-6     | 178                      | 9              | 1602              | 4  | 10.0                                 | 0.12                               | 35                       | 61                                | 16                                   | Not Meets         | NO   |  |
| 1                   | S18   | Criscuola         | Education                | Classroom (ages 9+)  | N/A           |                  | 25%                | AHU-6     | 458                      | 7.8            | 3572              | 10   | 10.0                                 | 0.12                               | 35                       | 155                               | 28                                   | Not Meets         | NO   |  |
| 1                   | S14   | Krawel            | Education                | Classroom (ages 9+)  | N/A           |                  | 30%                | FCU       | 830                      | 9              | 7470              | 10   | 10.0                                 | 0.12                               | 35                       | 200                               | 146                                  | Meets             | YES  |  |
| 1                   | S22   | Simoniello        | Education                | Classroom (ages 9+)  | N/A           |                  | 30%                | FCU       | 830                      | 9              | 7470              | 10   | 10.0                                 | 0.12                               | 35                       | 200                               | 110                                  | Meets             | YES  |  |
| 1                   | S21   | Teach lounge      | Education                | Multiuse assembly    | N/A           |                  | 25%                | AHU-6     | 521                      | 9              | 4689              | 6  | 7.5                                  | 0.06                               | 100                      | 76                                | 32                                   | Not Meets         | NO   |  |
| 1                   | S20   | Mallor            | Education                | Classroom (ages 9+)  | N/A           |                  | 25%                | AHU-6     | 178                      | 9              | 1602              | 2  | 10.0                                 | 0.12                               | 35                       | 41                                | 14                                   | Not Meets         | NO   |  |

|                 |                                     |
|-----------------|-------------------------------------|
| Project Name:   | Beecher Road School RCx & TAB Study |
| Project Number: | 2022231.00                          |
| Scope           | Ventilation Calculation by Building |
| Date            | March 28, 2024                      |



| Zone Identification |            |                      |                           |                                     |               |                  |                    |           |                          |                |                   | AHSRAE-62.1, (2010) Ventilation Calculations |                                      |                                    |                          |                                   |                                      |                    |      |
|---------------------|------------|----------------------|---------------------------|-------------------------------------|---------------|------------------|--------------------|-----------|--------------------------|----------------|-------------------|--|--------------------------------------|------------------------------------|--------------------------|-----------------------------------|--------------------------------------|--------------------|------|
| Floor               | Room#      | Room Name            | Occupancy Classification  | Category                            | Total Airflow | Unit Actual OA % | BAS OA Damper Cond | Served By | Zone Area, Az, per space | Ceiling Height | Volume, per space | Zone Population, Pz, per space               | People OA Rate in Breathing Zone, Rp | Area OA Rate in Breathing Zone, Ra | Default Occupant Density | Min. Required Ventilation Airflow | ACTUAL MEASURED VENTILATION AIR FLOW | Meets Ashraae 62.1 | DCV? |
|                     |            |                      |                           |                                     | (cfm)         | (%)              | (%)                |           | (sq.ft)                  | (ft)           | (cu.ft)           | Adult  | (cfm/ person)                        | (cfm/sf)                           | (#/1000sf)               | (cfm)                             | (cfm)                                |                    | YES  |
| 1                   | ---        | ROTUNDA              | Education                 | Classroom (ages 9+)                 | N/A           |                  | 25%                | AHU-6     | 1665                     | 22             | 36630             | 30   | 10.0                                 | 0.12                               | 35                       | 500                               | 170                                  | Meets              | YES  |
| 1                   | ADD        | Music Office         | Education                 | Music/theater/dance                 | N/A           |                  | 25%                | AHU-6     | 65                       | 8              | 520               | 2  | 10.0                                 | 0.06                               | 35                       | 24                                | 18                                   | Not Meets          | NO   |
| 1                   | E1         | Acheson (Art)        | Education                 | Art Classroom                       | N/A           |                  | 30%                | FCU       | 1128                     | 9              | 10152             | 22   | 10.0                                 | 0.18                               | 20                       | 423                               | 44                                   | Meets              | YES  |
| 1                   | E2         | Trofimclik (Science) | Education                 | Science Laboratories                | N/A           |                  | 30%                | FCU       | 905                      | 8.6            | 7783              | 21   | 10.0                                 | 0.18                               | 25                       | 373                               | 205                                  | Meets              | YES  |
| 1                   | E3         | Saunders             | Education                 | Classroom (ages 9+)                 | N/A           |                  | 30%                | FCU       | 922                      | 9              | 8298              | 25   | 10.0                                 | 0.12                               | 35                       | 361                               | 352                                  | Meets              | YES  |
| 1                   | E4         | Summer Camp Office   | Offices                   | Office spaces                       | N/A           |                  | 30%                | FCU       | 529                      | 9              | 4761              | 2  | 5.0                                  | 0.06                               | 5                        | 42                                | 118                                  | Meets              | YES  |
| 1                   | E5         | Recreation Office    | Education                 | Classroom (ages 5-8)                | N/A           |                  | 30%                | FCU       | 113                      | 8              | 904               | 1  | 10.0                                 | 0.12                               | 25                       | 24                                | 112                                  | Meets              | No   |
| 1                   | E6         | Special Ed           | Education                 | Classroom (ages 5-8)                | N/A           |                  | 30%                | FCU       | 795                      | 8              | 6360              | 2  | 10.0                                 | 0.12                               | 25                       | 115                               | 307                                  | Meets              | YES  |
| 1                   | NEW Office | Special Ed Office    | Offices                   | Office spaces                       | N/A           |                  | 30%                | FCU       | 105                      | 8              | 840               | 2  | 5.0                                  | 0.06                               | 5                        | 16                                | 114                                  | Meets              | YES  |
| 1                   | E7         | MUSIC                | Education                 | Music/theater/dance                 | N/A           |                  | 20%                | AHU-1     | 1698                     | 9.1            | 15452             | 20   | 10.0                                 | 0.06                               | 35                       | 302                               | 551                                  | Meets              | YES  |
| 1                   | AUD        | ASSEMBLY ROOM        | Education                 | Multiuse assembly                   | N/A           |                  | 20%                | AHU-4     | 3160                     | 12.1           | 38236             | 120  | 7.5                                  | 0.06                               | 100                      | 1090                              | 921                                  | Meets              | YES  |
| 1                   | ---        | SUPERINDENDANT       | Offices                   | Office spaces                       | N/A           |                  | 30%                | UV        | 375                      | 8.5            | 3188              | 7  | 5.0                                  | 0.06                               | 5                        | 58                                | 101                                  | Meets              | NO   |
| 1                   | RECEPT.    | RECEPTION            | Offices                   | Office spaces                       | N/A           |                  | 30%                | UV        | 386                      | 8.5            | 3277              | 2  | 5.0                                  | 0.06                               | 5                        | 33                                | 36                                   | Meets              | NO   |
| 1                   | KITCHEN    | KITCHEN              | Food and beverage service | Kitchens (cooking)                  | N/A           |                  | 30%                | UV        | 100                      | 8.5            | 850               | 2  | 0.0                                  | 0.00                               | 0                        | 0                                 | 64                                   | N/A                | NO   |
| 1                   | CONF       | CONFERENCE           | Offices                   | Conference rooms                    | N/A           |                  | 5%                 | RTU-1     | 192                      | 8              | 1536              | 6  | 5.0                                  | 0.06                               | 50                       | 42                                | ---                                  | Meets              | YES  |
| 1                   | B. MANAGER | B. MANAGER           | Education                 | Classroom (ages 5-8)                | N/A           |                  | N/A / 5%           | RTU-1     | 123                      | 8.5            | 1046              | 3  | 10.0                                 | 0.12                               | 25                       | 45                                | ---                                  | N/A                | NO   |
| 1                   | POOL       | POOL                 | Sports and amusement      | Swimming pools (pool and deck area) | N/A           |                  |                    | DH-1      | 4328                     | 26             | 112528            | 125  | 0.0                                  | 0.48                               | 0                        | 2077                              | 365                                  | Not Meets          | NO   |
| 1                   | OFFICE     | Jimencz (Payroll)    | Offices                   | Office spaces                       | N/A           |                  | 5%                 | RTU-1     | 355                      | 8              | 2840              | 3  | 5.0                                  | 0.06                               | 5                        | 36                                | ---                                  | Meets              | YES  |
| 1                   | Office     | Office               | Offices                   | Office spaces                       | N/A           |                  | 30%                | UV        | 46                       | 8              | 368               | 1  | 5.0                                  | 0.06                               | 5                        | 8                                 | 42                                   | Meets              | NO   |
| 1                   | Boy        | (1ST.) BOYS LOCKER   | Education                 | Locker/dressing room                | N/A           |                  | 20%                | AHU-5     | 931                      | 7.8            | 7262              | 40   | 0.0                                  | 0.00                               | 0                        | 0                                 | 68                                   | Meets              | YES  |
| 1                   | Girl       | (LL) GIRLS LOCKER    | Education                 | Locker/dressing room                | N/A           |                  | 20%                | AHU-5     | 1144                     | 7.7            | 8809              | 40   | 0.0                                  | 0.00                               | 0                        | 0                                 | 46                                   | Meets              | YES  |
| 1                   | OFFICE     | OFFICE- Off Gym      | Offices                   | Office spaces                       | N/A           |                  | 20%                | AHU-5     | 212                      | 7.9            | 1675              | 2  | 5.0                                  | 0.06                               | 5                        | 23                                | 26                                   | Meets              | YES  |
| 1                   | SOUTH      | GYMNASIUM            | Sports and amusement      | Gym, stadium, arena (play area)     | N/A           |                  | 20%                | AHU-5     | 4982                     | 22.5           | 112095            | 100  | 0.0                                  | 0.30                               | 0                        | 1495                              | 196                                  | Meets              | YES  |
| 1                   | Office     | Pool Life Guard      | Offices                   | Office spaces                       | N/A           |                  | 20%                | AHU-5     | 165                      | 7              | 1155              | 2  | 5.0                                  | 0.06                               | 5                        | 20                                | 0                                    | Meets              | YES  |

# Appendix 2

## TAB Airflow Survey Data





**WING'S** TESTING & BALANCING CO., INC.

---

# **Woodbridge Public Schools**

## **Beecher Road School**

### **Ventilation Verification**

\* \* \* \*

VanZelm Engineers  
Attn: Bill Donald  
10 Talcott Notch Road  
Farmington, CT. 06032

**August 16, 2023**

94 North Branford Road • Suite One • Branford, CT 06405  
(203) 481-4988 • wings@wingstesting.com



# WING'S TESTING & BALANCING CO., INC.

August 16, 2023

VanZelm Engineers  
Attn: Bill Donald  
10 Talcott Notch Road  
Farmington, CT. 06032

Re: Woodbridge Public Schools - Beecher Road School Ventilation Survey

Dear Bill,

The Ventilation Verification survey of the above referenced location has been completed. Readings at all spaces were documented on the tables provided. Fresh air at each unit was also tested and documented on our data sheets.

CO<sub>2</sub> sensors were checked for calibration and operation. We have included a CO<sub>2</sub> testing table which shows the location of all sensors, actual readings, BMS readings, and verification that the CO<sub>2</sub> sensor operates as designed, and opens on a call for increased ventilation. All CO<sub>2</sub> sensors are functioning properly except for RTU-1, which needs replacing.

We noted that all AHU and RTU OA dampers are functioning and responding to commands. Please be advised that the outside air intakes are plugged on RTU-2 and RTU-4, and that the OA grilles on AHU-2, AHU-3, and RTU-5 are dirty and should be cleaned to ensure proper fresh air delivery.

The following pages are your record of the tested conditions. If you have any questions, or if we can be of further service please do not hesitate to call.

Very truly yours,

**Wing's Testing & Balancing Co., Inc.**

*ICB Certified Contractor for:*

TABB—Commissioning—Fire/Life Safety L1&L2—Sound & Vibration

**Barry Stratos**  
Certified TABB Technician  
CT SM-2 License 6386  
MA SM-2 13595



94 North Branford Road • Suite One • Branford, CT 06405  
(203) 481-4988 • wings@wingstesting.com

| VELOCITY PRESSURE READINGS  |             |             |        |      |                     |                      |      |       |
|---|-------------|-------------|--------|------|---------------------|----------------------|------|-------|
| <b>PROJECT:</b> Woodbridge Public Schools - Beecher Road School                                       |             |             |        |      |                     | <b>DATE:</b> 8/10/23 |      |       |
| <b>AREA SERVED:</b> Building - 1st Floor  |             |             |        |      |                     | <b>TECH:</b> BS, MS  |      |       |
| TRAVERSE LOCATIONS  | DUCT SIZE " | AREA SQ.FT. | DESIGN |      | CENT. STAT. PRESS." | TEST                 |      | NOTES |
|   |             |             | FPM    | CFM  |                     | FPM                  | CFM  |       |
| <b>AHU-2</b>  |             |             |        |      |                     |                      |      |       |
| Return  | 48" x 12"   | 4           |        | 3600 | w/Velgrid           | 1486                 | 5944 | (1)   |
| OA  | 40" x 19"   | 5.28        |        | 1700 | w/Velgrid           | 0                    | 0    |       |
| <b>AHU-3</b>  |             |             |        |      |                     |                      |      |       |
| Return  | 48" x 12"   | 4           |        | 3600 | w/Velgrid           | 1073                 | 4292 | (1)   |
| OA  | 40" x 19"   | 5.28        |        | 1700 | w/Velgrid           | 0                    | 0    |       |
| <b>RTU-1</b>  |             |             |        |      |                     |                      |      |       |
| OA  | 20" x 14"   | 1.94        |        | 200  | w/Velgrid           | 50                   | 97   |       |
| <b>RTU-2</b>  |             |             |        |      |                     |                      |      |       |
| OA  | 31" x 12"   | 2.58        |        | 600  | w/Velgrid           | 0                    | 0    | (2)   |
| <b>RTU-3</b>  |             |             |        |      |                     |                      |      |       |
| OA  | 44" x 44"   | 13.44       |        | 6320 | w/Velgrid           | 217                  | 2917 |       |
| <b>RTU-4</b>  |             |             |        |      |                     |                      |      |       |
| OA  | 45" x 36"   | 11.25       |        | 2100 | w/Velgrid           | 52                   | 585  | (2)   |
| <b>RTU-5</b>  |             |             |        |      |                     |                      |      |       |
| OA  | 30" x 24"   | 5.          |        | 700  | w/Velgrid           | 165                  | 825  | (1)   |
| <b>ERV-1</b>  |             |             |        |      |                     |                      |      |       |
| Supply  | 56" x 26"   | 10.1        |        | 2800 | w/Velgrid           | 124                  | 1252 |       |
| Exhaust   | 35" x 24"   | 5.83        |        | 2225 | w/Velgrid           | 325                  | 1895 |       |
| <b>ERV-2</b>  |             |             |        |      |                     |                      |      |       |
| Supply  | 72" x 38"   | 19.         |        | 6275 | w/Velgrid           | 292                  | 5548 |       |
| Exhaust   | 34" x 34"   | 8.03        |        | 4900 | w/Velgrid           | 1038                 | 8335 |       |
| <b>ERV-3</b>  |             |             |        |      |                     |                      |      |       |
| Supply  | 56" x 26"   | 10.1        |        | 2900 | w/Velgrid           | 214                  | 2161 |       |
| Exhaust   | 35" x 24"   | 5.83        |        | 2100 | w/Velgrid           | 521                  | 3037 |       |
| <b>ERV-4</b>  |             |             |        |      |                     |                      |      |       |
| Supply  | 56" x 36"   | 14.         |        | 4500 | w/Velgrid           | 198                  | 2772 |       |
| Exhaust   | 35" x 24"   | 5.83        |        | 4500 | w/Velgrid           | 713                  | 4157 |       |
| <b>REMARKS</b>  |             |             |        |      |                     |                      |      |       |
| (1) Dirty Grille.<br>(2) Intake Plugged.  |             |             |        |      |                     |                      |      |       |
| <b>N/A</b> Not Available   <b>N/D</b> No Design   <b>D/D</b> Direct Drive   <b>N/R</b> No Requirement |             |             |        |      |                     |                      |      |       |





**WING'S** TESTING & BALANCING CO., INC.

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# **Woodbridge Public Schools**

## **Beecher Road School**

### **Retesting**

\* \* \* \*

**VanZelm Engineers**  
**Attn: Bill Donald**  
**10 Talcott Notch Road**  
**Farmington, CT 06032**

**February 20, 2024**

94 North Branford Road • Suite One • Branford, CT 06405  
(203) 481-4988 • Fax (203) 488-5634 • [wings@wingstesting.com](mailto:wings@wingstesting.com)



# WING'S TESTING & BALANCING CO., INC.

February 20, 2024

VanZelm Engineers  
Attn: Bill Donald  
10 Talcott Notch Road  
Farmington, CT 06032

Re: Woodbridge Public Schools – Beecher Road School Retesting

Dear Bill,

We have completed our retesting of Beecher Road School. Included in this update are the outside air readings for UV's A-4, A-6, and A-7. Also included are the grille reading and outside air readings for the two gym units AHU-2 and AHU-3. It was noticed upon testing that AHU-3 goes to 78 Hz on a 100% command from the computer, whereas AHU-2 goes to 68 Hz on a 100% command from the computer. These setpoints are programmed into the VFDs and were left as-is.

Very truly yours,

**Wing's Testing & Balancing Co., Inc.**

*ICB Certified Contractor for:*

TABB—Commissioning—Indoor Air Quality  
Fire & Smoke Damper—Smoke Control Systems  
Sound & Vibration

**Barry Stratos**  
CT SM-2 License 6386  
MA Sheetmetal Journeyperson License #13595  
TABB Technician-BB996928T  
Indoor Air Quality Technician- IAQ996928T  
Indoor Air Quality Supervisor- IAQ996928S



94 North Branford Road • Suite One • Branford, CT 06405  
(203) 481-4988 • Fax (203) 488-5634 • wings@wingstesting.com

| AIR DEVICE REPORT  |     |             |      |        |     |      |             |                 |     |       |
|--|-----|-------------|------|--------|-----|------|-------------|-----------------|-----|-------|
| PROJECT: Woodbridge Public Schools - Beecher Road School |     |             |      |        |     |      |             | DATE: 2/20/2024 |     |       |
| SYSTEM / AREA: Beecher Road School                       |     |             |      |        |     |      |             | TECH: BS        |     |       |
| LOCATION   | NO. | SIZE        | A K  | DESIGN |     | TEST |             | FINAL           |     | NOTES |
|  |     |             |      | FPM    | CFM | FPM  | CFM         | FPM             | CFM |       |
| <b>AHU-2 (@ 68 Hz)</b>                                   |     |             |      |        |     |      |             |                 |     |       |
| North Gym  | 1   | 27" x 11.5" | 1.55 | ---    | N/D | 498  | 772         |                 |     |       |
| North Gym  | 2   | 27" x 11.5" | 1.55 | ---    | N/D | 982  | 1522        |                 |     |       |
| Commons  | 3   | 30" x 20"   | 4.17 | ---    | N/D | 547  | <u>2281</u> |                 |     |       |
|  |     |             |      |        |     |      | 4575        |                 |     |       |
| <b>AHU-3 (@ 78 Hz)</b>                                   |     |             |      |        |     |      |             |                 |     |       |
| North Gym  | 1   | 27" x 11.5" | 1.55 | ---    | N/D | 1414 | 2192        |                 |     |       |
| North Gym  | 2   | 27" x 11.5" | 1.55 | ---    | N/D | 372  | 577         |                 |     |       |
| Commons  | 3   | 30" x 20"   | 4.17 | ---    | N/D | 715  | <u>2982</u> |                 |     |       |
|  |     |             |      |        |     |      | 5751        |                 |     |       |
| <b>REMARKS</b>   |     |             |      |        |     |      |             |                 |     |       |
|  |     |             |      |        |     |      |             |                 |     |       |

N/A Not Available | N/D No Design | D/D Direct Drive | N/R No Requirement





|                        |  |
|------------------------|--|
| <b>Project Name:</b>   | <b>Woodbridge Public Schools R Beecher Road School</b> |
| <b>Project Number:</b> | 2022231.00   |
| <b>Scope</b>           | <b>TAB Data</b>  |
| <b>Date</b>            | <b>August 2, 2023</b>                                  |

| Zone Identification |       |                  |                    |                            |                                  |                               |                        |
|---------------------|-------|------------------|--------------------|----------------------------|----------------------------------|-------------------------------|------------------------|
| Floor               | Room# | Room Name        | Design Min/Max CFM | Measured Min OA Flow (cfm) | BAS Min OA Flow (cfm) / Pos. (%) | Associated VAV & RTU/AHU Unit | Notes                  |
| 1                   | A1    | Classroom        | 936                | 242                        | N/A / 30%                        | UV                            |                        |
| 1                   | A2    | Classroom        | 890                | 208                        | N/A / 30%                        | UV                            |                        |
| 1                   | A3    | Classroom        | 783                | 198                        | N/A / 30%                        | UV                            |                        |
| 1                   | A4    | Classroom        | 673                | 0                          | N/A / 30%                        | UV                            |                        |
| 1                   | A5    | Classroom        | 687                | 189                        | N/A / 30%                        | UV                            |                        |
| 1                   | A6    | Classroom        | 886                | 0                          | N/A / 30%                        | UV                            |                        |
| 1                   | A7    | Art              | 550                | 0                          | N/A / 30%                        | UV                            |                        |
| 1                   | A8    | Classroom        | 494                | 170                        | N/A / 30%                        | UV                            |                        |
| 1                   | A9    | Speech           | 635                | 191                        | N/A / 30%                        | UV                            |                        |
| 1                   |       | CONFERENCE       | 132                | 54                         | N/A / 10%                        | E(VAV) RTU-2                  | Retested 02/20/24      |
| 1                   |       | WAIT/MAIN OFFICE | 555                | 226                        | N/A / 10%                        | E(VAV) RTU-2                  | Retested 02/20/24      |
| 1                   |       | VICE PRINCIPLE   | 108                | 44                         | N/A / 10%                        | E(VAV) RTU-2                  | Retested 02/20/24      |
| 1                   |       | PRINCIPLE        | 83                 | 34                         | N/A / 10%                        | E(VAV) RTU-2                  | Retested 02/20/24      |
| 1                   |       | KITCHEN          | 48                 | 20                         | N/A / 10%                        | E(VAV) RTU-2                  | Retested 02/20/24      |
| 1                   | B13   | STOR. SALLY PORT | 176                | 72                         | N/A / 10%                        | E(VAV) RTU-2                  | Retested 02/20/24      |
| 1                   | B14   | STAFF ROOM       | 479                | 166                        | 0 / 30%                          | FCU                           |                        |
| 1                   | B12   | STORAGE          | -395               | ---                        | ---                              | EF                            | Space has Exhaust Only |
| 1                   | B11   | NURSE            | 474                | 59                         | N/A / 30%                        | FCU                           |                        |
| 1                   | B10   | CLASSROOM        | 1604               | 316                        | N/A / 30%                        | FCU (x2)                      |                        |
| 1                   | B1    | CLASSROOM        | 659                | 227                        | N/A / 30%                        | UV                            |                        |
| 1                   | B2    | CLASSROOM        | 788                | 253                        | N/A / 30%                        | UV                            |                        |
| 1                   | B3    | CLASSROOM        | 681                | 230                        | N/A / 30%                        | UV                            |                        |
| 1                   | B4    | CLASSROOM        | 796                | 166                        | N/A / 30%                        | UV                            |                        |
| 1                   | B5    | CLASSROOM        | 909                | 176                        | N/A / 30%                        | UV                            |                        |

|                        |  |
|------------------------|--|
| <b>Project Name:</b>   | <b>Woodbridge Public Schools R Beecher Road School</b> |
| <b>Project Number:</b> | 2022231.00   |
| <b>Scope</b>           | <b>TAB Data</b>  |
| <b>Date</b>            | <b>August 2, 2023</b>                                  |

| Zone Identification |         |                      |                    |                            |                                  |                               |                      |
|---------------------|---------|----------------------|--------------------|----------------------------|----------------------------------|-------------------------------|----------------------|
| Floor               | Room#   | Room Name            | Design Min/Max CFM | Measured Min OA Flow (cfm) | BAS Min OA Flow (cfm) / Pos. (%) | Associated VAV & RTU/AHU Unit | Notes                |
| 1                   | B6      | CLASSROOM            | 921                | 259                        | N/A / 30%                        | UV                            |                      |
| 1                   | B9      | CLASSROOM            | 702                | 355                        | N/A / 30%                        | UV                            |                      |
| 1                   | B7      | CLASSROOM            | 869                | 282                        | N/A / 30%                        | UV                            |                      |
| 1                   | B8      | CLASSROOM            | 798                | 234                        | N/A / 30%                        | UV                            |                      |
| 1                   | NORTH   | GYMNASIUM            | 6808               | 0                          | N/A / 20%                        | AHU-2, AHU-3                  |                      |
| 1                   | FITNESS | COMMONS              | 3428               | 0                          | N/A / 20%                        | AHU-2, AHU-3                  |                      |
| 1                   | K9      | CLASSROOM            | 712                | 190                        | N/A / 30%                        | FCU                           |                      |
| 1                   | K7      | CLASSROOM            | 390                | 102                        | N/A / 30%                        | FCU                           |                      |
| 1                   | KP      | CLASSROOM            | 755                | 190                        | N/A / 30%                        | FCU                           |                      |
| 1                   | K1      | CLASSROOM            | 749                | 314                        | N/A / 30%                        | FCU                           | OA 100% Open         |
| 1                   | K2      | CLASSROOM            | 380                | 184                        | N/A / 30%                        | FCU                           |                      |
| 1                   | K8      | CLASSROOM            | 701                | 146                        | N/A / 30%                        | FCU                           |                      |
| 1                   | K3      | CLASSROOM            | 890                | 214                        | N/A / 30%                        | FCU                           |                      |
| 1                   | ADD     | Gym Teacher office   | 30                 | 8                          | N/A / 30%                        | FCU                           |                      |
| 1                   | K4      | CLASSROOM            | 714                | 187                        | N/A / 30%                        | FCU                           |                      |
| 1                   | K6      | CLASSROOM            | 754                | 159                        | N/A / 30%                        | FCU                           |                      |
| 1                   | K5      | CLASSROOM            | 700                | 114                        | N/A / 30%                        | FCU                           |                      |
| 1                   |         | Kitchen              | 1015               | 309                        | N/A / 25%                        | RTU-3                         |                      |
| 1                   |         | Cafeteria            | 8580               | 2608                       | N/A / 25%                        | RTU-3                         |                      |
| 1                   |         | Library              | 4750               | 482                        | N/A / 10%                        | RTU-4                         |                      |
| 1                   |         | Tech Center          | 1731               | 713                        | N/A / 25%                        | VAV 5-2,3, RTU-5              | VAVs Constant Volume |
| 1                   |         | Media Center Storage | 930                | 94                         | N/A / 10%                        | RTU-4                         |                      |
| 1                   |         | Break Rm. Office     | 24                 | 10                         | N/A / 25%                        | VAV-1, RTU-5                  |                      |
| 1                   |         | Green Screen         | 197                | 81                         | N/A / 25%                        | VAV-1, RTU-5                  |                      |

|                        |  |
|------------------------|--|
| <b>Project Name:</b>   | <b>Woodbridge Public Schools R Beecher Road School</b> |
| <b>Project Number:</b> | 2022231.00   |
| <b>Scope</b>           | <b>TAB Data</b>  |
| <b>Date</b>            | <b>August 2, 2023</b>                                  |

| Zone Identification |       |              |                    |                            |                                  |                               |       |
|---------------------|-------|--------------|--------------------|----------------------------|----------------------------------|-------------------------------|-------|
| Floor               | Room# | Room Name    | Design Min/Max CFM | Measured Min OA Flow (cfm) | BAS Min OA Flow (cfm) / Pos. (%) | Associated VAV & RTU/AHU Unit | Notes |
| 1                   |       | Tech Office  | 51                 | 21                         | N/A / 25%                        | VAV-1, RTU-5                  |       |
| 1                   |       | Reading Room | 90                 | 9                          | N/A / 10%                        | RTU-4                         |       |
| 1                   | C6    | Hutchinson   | 831                | 227                        | N/A / 30%                        | UV                            |       |
| 1                   | C5    | Meacham      | 854                | 269                        | N/A / 30%                        | UV                            |       |
| 1                   | C4    | CLASSROOM    | 618                | 243                        | N/A / 30%                        | UV                            |       |
| 1                   | C3    | Classroom    | 746                | 269                        | N/A / 30%                        | UV                            |       |
| 1                   | C2    | Triplett     | 880                | 227                        | N/A / 30%                        | UV                            |       |
| 1                   | C1    | Ngov         | 762                | 278                        | N/A / 30%                        | UV                            |       |
| 1                   | D5/D6 | Office       | 37                 | 15                         | N/A / 30%                        | FCU                           |       |
| 1                   | D5    | Nurse        | 493                | 166                        | N/A / 30%                        | FCU                           |       |
| 1                   | D6    | Nolan        | 800                | 317                        | N/A / 30%                        | FCU                           |       |
| 1                   | D4    | Marcellino   | 430                | 54                         | N/A / 30%                        | FCU                           |       |
| 1                   | D3    | Shepard      | 779                | 352                        | N/A / 30%                        | FCU                           |       |
| 1                   | D2    | Mumford      | 510                | 65                         | N/A / 30%                        | FCU                           |       |
| 1                   | D1    | Lavigne      | 596                | 185                        | N/A / 30%                        | FCU                           |       |
| 1                   | D7    | Reading      | 159                | 90                         | N/A / 30%                        | FCU                           |       |
| 1                   | D7-1  | W/in Reading | 52                 | 29                         | N/A / 30%                        | FCU                           |       |
| 1                   | D7-2  | W/in Reading | 60                 | 34                         | N/A / 30%                        | FCU                           |       |
| 1                   | D7-3  | W/in Reading | 38                 | 22                         | N/A / 30%                        | FCU                           |       |
| 1                   | S1    | Rogers       | 614                | 172                        | N/A / 30%                        | FCU                           |       |
| 1                   | S2    | Glennon      | 614                | 290                        | N/A / 30%                        | FCU                           |       |
| 1                   | S16   | Resources    | 333                | 131                        | N/A / 30%                        | FCU                           |       |
| 1                   | S3    | Irfran       | 762                | 178                        | N/A / 30%                        | FCU                           |       |
| 1                   | S4    | Chase        | 689                | 172                        | N/A / 30%                        | FCU                           |       |

|                        |  |
|------------------------|--|
| <b>Project Name:</b>   | <b>Woodbridge Public Schools R Beecher Road School</b> |
| <b>Project Number:</b> | 2022231.00   |
| <b>Scope</b>           | <b>TAB Data</b>  |
| <b>Date</b>            | <b>August 2, 2023</b>                                  |

| Zone Identification |       |                      |                    |                            |                                  |                               |       |
|---------------------|-------|----------------------|--------------------|----------------------------|----------------------------------|-------------------------------|-------|
| Floor               | Room# | Room Name            | Design Min/Max CFM | Measured Min OA Flow (cfm) | BAS Min OA Flow (cfm) / Pos. (%) | Associated VAV & RTU/AHU Unit | Notes |
| 1                   | S17   | Greene               | 417                | 346                        | N/A / 30%                        | FCU                           |       |
| 1                   | S5    | Horvath              | 833                | 181                        | N/A / 30%                        | FCU                           |       |
| 1                   | S6    | Campbell             | 902                | 185                        | N/A / 30%                        | FCU                           |       |
| 1                   | S7    | Guerra               | 898                | 196                        | N/A / 30%                        | FCU                           |       |
| 1                   | S8    | Conroy               | 854                | 199                        | N/A / 30%                        | FCU                           |       |
| 1                   | S9    | Mulligan             | 660                | 301                        | N/A / 30%                        | FCU                           |       |
| 1                   | S10   | McHugh               | 739                | 210                        | N/A / 30%                        | FCU                           |       |
| 1                   | S13   | Resources            | 580                | 120                        | N/A / 30%                        | FCU                           |       |
| 1                   | S11   | Rourke               | 600                | 168                        | N/A / 30%                        | FCU                           |       |
| 1                   | S12   | Antonelles           | 419                | 203                        | N/A / 30%                        | FCU                           |       |
| 1                   |       | FAC Director Vito    | 145                | 18                         | N/A / 25%                        | AHU-6                         |       |
| 1                   | S19   | Computer             | 492                | 91                         | N/A / 30%                        | FCU                           |       |
| 1                   | S15   | Taylor               | 143                | 16                         | N/A / 25%                        | AHU-6                         |       |
| 1                   | S18   | Criscuola            | 246                | 28                         | N/A / 25%                        | AHU-6                         |       |
| 1                   | S14   | Krawel               | 555                | 146                        | N/A / 30%                        | FCU                           |       |
| 1                   | S22   | Simoniello           | 532                | 110                        | N/A / 30%                        | FCU                           |       |
| 1                   | S21   | Teach lounge         | 283                | 32                         | N/A / 25%                        | AHU-6                         |       |
| 1                   | S20   | Mallor               | 127                | 14                         | N/A / 25%                        | AHU-6                         |       |
| 1                   |       | ROTUNDA              | 1490               | 170                        | N/A / 25%                        | AHU-6                         |       |
| 1                   | ADD   | Music Office         | 165                | 18                         | N/A / 25%                        | AHU-6                         |       |
| 1                   | E1    | Acheson (Art)        | 804                | 44                         | N/A / 30%                        | FCU                           |       |
| 1                   | E2    | Trofimclik (Science) | 822                | 205                        | N/A / 30%                        | FCU                           |       |
| 1                   | E3    | Saunders             | 1083               | 352                        | N/A / 30%                        | FCU                           |       |
| 1                   | E4    | Summer Camp Office   | 481                | 118                        | N/A / 30%                        | FCU                           |       |

|                        |  |
|------------------------|--|
| <b>Project Name:</b>   | <b>Woodbridge Public Schools R Beecher Road School</b> |
| <b>Project Number:</b> | 2022231.00   |
| <b>Scope</b>           | <b>TAB Data</b>  |
| <b>Date</b>            | <b>August 2, 2023</b>                                  |

| Zone Identification |            |                    |                    |                            |                                  |                               |       |
|---------------------|------------|--------------------|--------------------|----------------------------|----------------------------------|-------------------------------|-------|
| Floor               | Room#      | Room Name          | Design Min/Max CFM | Measured Min OA Flow (cfm) | BAS Min OA Flow (cfm) / Pos. (%) | Associated VAV & RTU/AHU Unit | Notes |
| 1                   | E5         | Recreation Office  | 241                | 112                        | N/A / 30%                        | FCU                           |       |
| 1                   | E6         | Special Ed         | 657                | 307                        | N/A / 30%                        | FCU                           |       |
| 1                   | NEW Office | Special Ed Office  | 243                | 114                        | N/A / 30%                        | FCU                           |       |
| 1                   | E7         | MUSIC              | 1731               | 551                        | N/A / 20%                        | AHU-1                         |       |
| 1                   | AUD        | ASSEMBLY ROOM      | 2975               | 921                        | N/A / 20%                        | AHU-4                         |       |
| 1                   |            | SUPERINDENDANT     | 536                | 101                        | N/A / 30%                        | UV                            |       |
| 1                   | RECEPT.    | RECEPTION          | 267                | 36                         | N/A / 30%                        | UV                            |       |
| 1                   | KITCHEN    | KITCHEN            | 363                | 64                         | N/A / 30%                        | UV                            |       |
| 1                   | CONF       | CONFERENCE         | 134                | ---                        | N/A / 5%                         | RTU-1                         |       |
| 1                   | B. MANAGER | B. MANAGER         | 193                | ---                        | N/A / 5%                         | RTU-1                         |       |
| 1                   | POOL       | POOL               | 14,266             | 365                        | N/A /                            | DH-1                          |       |
| 1                   | OFFICE     | Jimencz (Payroll)  | 193                | ---                        | N/A / 5%                         | RTU-1                         |       |
| 1                   | Office     | Office             | 312                | 42                         | N/A / 30%                        | UV                            |       |
| 1                   | Boy        | (1ST.) BOYS LOCKER | 1000               | 68                         | N/A / 20%                        | AHU-5                         |       |
| 1                   | Girl       | (LL) GIRLS LOCKER  | 680                | 46                         | N/A / 20%                        | AHU-5                         |       |
| 1                   | OFFICE     | OFFICE- Off Gym    | 391                | 26                         | N/A / 20%                        | AHU-5                         |       |
| 1                   | SOUTH      | GYMNASIUM          | 2896               | 196                        | N/A / 20%                        | AHU-5                         |       |
| 1                   | Office     | Pool Life Guard    | 0                  | 0                          | N/A / 20%                        | AHU-5                         |       |
|                     |            |                    |                    |                            |                                  |                               |       |

# Appendix 3

## CO<sub>2</sub>-DCV Testing



| <b>Project Name:</b>   |       | <b>Woodbridge Public Schools</b> |                   |                             |                              |                       |                       |                        |
|------------------------|-------|----------------------------------|-------------------|-----------------------------|------------------------------|-----------------------|-----------------------|------------------------|
| <b>Project Number:</b> |       | 2022231.00                       |                   |                             |                              |                       |                       |                        |
| <b>Scope</b>           |       | CO2/ DCV TESTING                 |                   |                             |                              |                       |                       |                        |
| <b>Date</b>            |       |                                  |                   |                             |                              |                       |                       |                        |
| Floor                  | Room# | Room Name                        | SERVED BY SYSTEM? | RESPOND TO SETPOINT YES/ NO | CO2 SENSOR INSTALLED YES/ NO | BAS CO2 READING (PPM) | WTB CO2 READING (PPM) | Notes                  |
| 1                      | A1    | CLASSROOM                        | UV                | YES                         | YES                          | 570                   | 519                   |                        |
| 1                      | A2    | CLASSROOM                        | UV                | YES                         | YES                          | 459                   | 429                   |                        |
| 1                      | A3    | CLASSROOM                        | UV                | YES                         | YES                          | 481                   | 428                   |                        |
| 1                      | A4    | CLASSROOM                        | UV                | YES                         | YES                          | 658                   | 590                   |                        |
| 1                      | A5    | CLASSROOM                        | UV                | YES                         | YES                          | 435                   | 422                   |                        |
| 1                      | A6    | CLASSROOM                        | UV                | YES                         | YES                          | 445                   | 402                   |                        |
| 1                      | A7    | Art                              | UV                | YES                         | YES                          | 437                   | 434                   |                        |
| 1                      | A8    | CLASSROOM                        | UV                | YES                         | YES                          | 440                   | 419                   |                        |
| 1                      | A9    | Speech                           | UV                | YES                         | YES                          | 429                   | 403                   |                        |
| 1                      |       | CONFERENCE                       | RTU-2             | YES                         | YES                          | 497                   | 446                   |                        |
| 1                      |       | WAIT/MAIN OFFICE                 | RTU-2             | YES                         | YES                          | 481                   | 410                   |                        |
| 1                      |       | VICE PRINCIPLE                   | RTU-2             | YES                         | YES                          | 460                   | 439                   |                        |
| 1                      |       | PRINCIPLE                        | RTU-2             | YES                         | YES                          | 444                   | 426                   |                        |
| 1                      |       | KITCHEN                          | RTU-2             | YES                         | YES                          | 482                   | 441                   |                        |
| 1                      | B13   | STOR. SALLY PORT                 | RTU-2             | YES                         | YES                          | 480                   | 436                   |                        |
| 1                      | B14   | STAFF ROOM                       | FCU               | YES                         | YES                          | 499                   | 450                   |                        |
| 1                      | B12   | STORAGE                          | EF                | ---                         | ---                          | ---                   | ---                   | Space Only Has Exhaust |
| 1                      | B11   | NURSE                            | FCU               | YES                         | YES                          | 437                   | 434                   |                        |
| 1                      | B10   | CLASSROOM                        | FCU (x2)          | YES / YES                   | YES / YES                    | 437 / 442             | 415 / 415             |                        |
| 1                      | B1    | CLASSROOM                        | UV                | YES                         | YES                          | 515                   | 458                   |                        |
| 1                      | B2    | CLASSROOM                        | UV                | YES                         | YES                          | 523                   | 527                   |                        |
| 1                      | B3    | CLASSROOM                        | UV                | YES                         | YES                          | 443                   | 423                   |                        |
| 1                      | B4    | CLASSROOM                        | UV                | YES                         | YES                          | 474                   | 444                   |                        |
| 1                      | B5    | CLASSROOM                        | UV                | YES                         | YES                          | 448                   | 416                   |                        |
| 1                      | B6    | CLASSROOM                        | UV                | YES                         | YES                          | 455                   | 442                   |                        |
| 1                      | B9    | CLASSROOM                        | UV                | YES                         | YES                          | 440                   | 421                   |                        |
| 1                      | B7    | CLASSROOM                        | UV                | YES                         | YES                          | 432                   | 420                   |                        |
| 1                      | B8    | CLASSROOM                        | UV                | YES                         | YES                          | 430                   | 418                   |                        |
| 1                      | NORTH | GYMNASIUM                        | AHU-2, AHU-3      | YES                         | YES                          | 476                   | 455                   |                        |
| 1                      |       | COMMONS                          | AHU-2, AHU-3      | YES                         | YES                          | 476                   | 455                   |                        |
| 1                      | K9    | CLASSROOM                        | FCU               | YES                         | YES                          | 504                   | 410                   |                        |
| 1                      | K7    | CLASSROOM                        | FCU               | YES                         | YES                          | 467                   | 440                   |                        |
| 1                      | KP    | CLASSROOM                        | FCU               | YES                         | YES                          | 434                   | 411                   |                        |
| 1                      | K1    | CLASSROOM                        | FCU               | YES                         | YES                          | 454                   | 415                   |                        |
| 1                      | K2    | CLASSROOM                        | FCU               | YES                         | YES                          | 439                   | 420                   |                        |
| 1                      | K8    | CLASSROOM                        | FCU               | YES                         | YES                          | 437                   | 402                   |                        |
| 1                      | K3    | CLASSROOM                        | FCU               | YES                         | YES                          | 447                   | 420                   |                        |
| 1                      | ADD   | Gym Teacher office               | FCU               | NO                          | NO                           | ---                   | ---                   |                        |
| 1                      | K4    | CLASSROOM                        | FCU               | YES                         | YES                          | 510                   | 485                   |                        |
| 1                      | K6    | CLASSROOM                        | FCU               | YES                         | YES                          | 510                   | 467                   |                        |

| <b>Project Name:</b>   |       | <b>Woodbridge Public Schools</b> |                   |                             |                              |                       |                       |       |
|------------------------|-------|----------------------------------|-------------------|-----------------------------|------------------------------|-----------------------|-----------------------|-------|
| <b>Project Number:</b> |       | 2022231.00                       |                   |                             |                              |                       |                       |       |
| <b>Scope</b>           |       | CO2/ DCV TESTING                 |                   |                             |                              |                       |                       |       |
| <b>Date</b>            |       |                                  |                   |                             |                              |                       |                       |       |
| Floor                  | Room# | Room Name                        | SERVED BY SYSTEM? | RESPOND TO SETPOINT YES/ NO | CO2 SENSOR INSTALLED YES/ NO | BAS CO2 READING (PPM) | WTB CO2 READING (PPM) | Notes |
| 1                      | K5    | CLASSROOM                        | FCU               | YES                         | YES                          | 438                   | 413                   |       |
| 1                      |       | Kitchen                          | RTU-3             | YES                         | YES In Cafeteria             | 429                   | 413                   |       |
| 1                      |       | Cafeteria                        | RTU-3             | YES                         | YES                          | 429                   | 408                   |       |
| 1                      |       | Library                          | RTU-4             | YES                         | YES                          | 480                   | 461                   |       |
| 1                      |       | Tech Center                      | RTU-5             | YES                         | YES in Unit                  | 434                   | 458                   |       |
| 1                      |       | Media Storage                    | RTU-4             | ---                         | Yes in Library               | 466                   | 444                   |       |
| 1                      |       | Break Rm. Office                 | RTU-5             | YES                         | YES in Unit                  | 444                   | 440                   |       |
| 1                      |       | Green Screen                     | RTU-5             | YES                         | YES in Unit                  | 436                   | 428                   |       |
| 1                      |       | Tech Office                      | RTU-5             | YES                         | YES in Unit                  | 450                   | 431                   |       |
| 1                      |       | Reading Room                     | RTU-4             | ---                         | Yes in Library               | 471                   | 446                   |       |
| 1                      | C6    | Hutchinson                       | UV                | YES                         | YES                          | 427                   | 421                   |       |
| 1                      | C5    | Meacham                          | UV                | YES                         | YES                          | 479                   | 433                   |       |
| 1                      | C4    | CLASSROOM                        | UV                | YES                         | YES                          | 528                   | 502                   |       |
| 1                      | C3    | ?                                | UV                | YES                         | YES                          | 444                   | 449                   |       |
| 1                      | C2    | Triplett                         | UV                | YES                         | YES                          | 445                   | 425                   |       |
| 1                      | C1    | Ngov                             | UV                | YES                         | YES                          | 464                   | 424                   |       |
| 1                      | D5/D6 | Office                           | FCU               | NO                          | NO                           | ---                   | ---                   |       |
| 1                      | D5    | Nurse                            | FCU               | YES                         | YES                          | 433                   | 417                   |       |
| 1                      | D6    | Nolan                            | FCU               | YES                         | YES                          | 437                   | 413                   |       |
| 1                      | D4    | Marcellino                       | FCU               | YES                         | YES                          | 443                   | 408                   |       |
| 1                      | D3    | Shepard                          | FCU               | YES                         | YES                          | 431                   | 411                   |       |
| 1                      | D2    | Mumford                          | FCU               | YES                         | YES                          | 420                   | 408                   |       |
| 1                      | D1    | Lavigne                          | FCU               | YES                         | YES                          | 343                   | 427                   |       |
| 1                      | D7    | Reading                          | FCU               | YES                         | YES                          | 434                   | 406                   |       |
| 1                      | D7-1  | W/in Reading                     | FCU               | NO                          | NO                           | ---                   | ---                   |       |
| 1                      | D7-2  | W/in Reading                     | FCU               | NO                          | NO                           | ---                   | ---                   |       |
| 1                      | D7-3  | W/in Reading                     | FCU               | NO                          | NO                           | ---                   | ---                   |       |
| 1                      | S1    | Rogers                           | FCU               | YES                         | YES                          | 431                   | 411                   |       |
| 1                      | S2    | Glennon                          | FCU               | YES                         | YES                          | 459                   | 430                   |       |
| 1                      | S16   | Resources                        | FCU               | YES                         | YES                          | 418                   | 420                   |       |
| 1                      | S3    | Irfan                            | FCU               | YES                         | YES                          | 459                   | 434                   |       |
| 1                      | S4    | Chase                            | FCU               | YES                         | YES                          | 435                   | 416                   |       |
| 1                      | S17   | Greene                           | FCU               | YES                         | YES                          | 461                   | 402                   |       |
| 1                      | S5    | Horvath                          | FCU               | YES                         | YES                          | 430                   | 417                   |       |
| 1                      | S6    | Campbell                         | FCU               | YES                         | YES                          | 435                   | 413                   |       |
| 1                      | S7    | Guerra                           | FCU               | YES                         | YES                          | 445                   | 416                   |       |
| 1                      | S8    | Conroy                           | FCU               | YES                         | YES                          | 443                   | 432                   |       |
| 1                      | S9    | Mulligan                         | FCU               | YES                         | YES                          | 484                   | 470                   |       |
| 1                      | S10   | McHugh                           | FCU               | YES                         | YES                          | 444                   | 426                   |       |
| 1                      | S13   | Resources                        | FCU               | YES                         | YES                          | 430                   | 427                   |       |

| <b>Project Name:</b>   |            | <b>Woodbridge Public Schools</b> |                   |                             |                              |                       |                       |       |
|------------------------|------------|----------------------------------|-------------------|-----------------------------|------------------------------|-----------------------|-----------------------|-------|
| <b>Project Number:</b> |            | 2022231.00                       |                   |                             |                              |                       |                       |       |
| <b>Scope</b>           |            | <b>CO2/ DCV TESTING</b>          |                   |                             |                              |                       |                       |       |
| <b>Date</b>            |            |                                  |                   |                             |                              |                       |                       |       |
| Floor                  | Room#      | Room Name                        | SERVED BY SYSTEM? | RESPOND TO SETPOINT YES/ NO | CO2 SENSOR INSTALLED YES/ NO | BAS CO2 READING (PPM) | WTB CO2 READING (PPM) | Notes |
| 1                      | S11        | Rourke                           | FCU               | YES                         | YES                          | 430                   | 412                   |       |
| 1                      | S12        | Antonelles                       | FCU               | YES                         | YES                          | 444                   | 421                   |       |
| 1                      |            | Copy Center                      | FCU               | NO                          | NO                           | ---                   | ---                   |       |
| 1                      | S19        | Computer                         | FCU               | YES                         | YES                          | 440                   | 452                   |       |
| 1                      | S15        | Taylor                           | AHU-6             | NO                          | NO                           | ---                   | ---                   |       |
| 1                      | S18        | Criscuola                        | AHU-6             | NO                          | NO                           | ---                   | ---                   |       |
| 1                      | S14        | Krawel                           | FCU               | YES                         | YES                          | 424                   | 419                   |       |
| 1                      | S22        | Simoniello                       | FCU               | YES                         | YES                          | 439                   | 404                   |       |
| 1                      | S21        | Teach lounge                     | AHU-6             | NO                          | NO                           | ---                   | ---                   |       |
| 1                      | S20        | Mallor                           | AHU-6             | NO                          | NO                           | ---                   | ---                   |       |
| 1                      |            | ROTUNDA                          | AHU-6             | YES                         | YES                          | 428                   | 422                   |       |
| 1                      | ADD        | Music Office                     | AHU-1             | NO                          | NO                           | ---                   | ---                   |       |
| 1                      | E1         | Acheson (Art)                    | FCU               | YES                         | YES                          | 427                   | 424                   |       |
| 1                      | E2         | Trofimklik (Science)             | FCU               | YES                         | YES                          | 437                   | 426                   |       |
| 1                      | E3         | Saunders                         | FCU               | YES                         | YES                          | 433                   | 430                   |       |
| 1                      | E4         | Music                            | FCU               | YES                         | YES                          | 441                   | 428                   |       |
| 1                      | E5         | Recreation Office                | FCU               | No                          | No                           | ---                   | ---                   |       |
| 1                      | E6         | Special Ed                       | FCU               | YES                         | YES                          | 437                   | 418                   |       |
| 1                      | NEW Office | Special Ed Office                | FCU               | YES                         | YES                          | 440                   | 438                   |       |
| 1                      | E7         | MUSIC                            | AHU-1             | YES                         | YES                          | 426                   | 430                   |       |
| 1                      | AUD        | ASSEMBLY ROOM                    | AHU-4             | YES                         | YES                          | 414                   | 437                   |       |
| 1                      |            | SUPERINDENDANT                   | UV                | NO                          | NO                           | ---                   | ---                   |       |
| 1                      | RECEPT.    | M. DeGennro                      | UV                | NO                          | NO                           | ---                   | ---                   |       |
| 1                      | KITCHEN    | Kitchette                        | UV                | NO                          | NO                           | ---                   | ---                   |       |
| 1                      | CONF       | Conference                       | RTU-1             | YES                         | YES                          | 441                   | 209                   |       |
| 1                      | B. MANAGER | D. Coonan                        | UV                | NO                          | NO                           | ---                   | ---                   |       |
| 1                      | POOL       | Pool Life Guard                  | Dektron           | NO                          | NO                           | ---                   | ---                   |       |
| 1                      | OFFICE     | Jimencz (Payroll)                | RTU-1             | YES                         | YES                          | 429                   | 209                   |       |
| 1                      | Office     | Office                           | UV                | NO                          | NO                           | ---                   | ---                   |       |
| 1                      | Boy        | (1ST.) BOYS LOCKER               | AHU-5             | YES                         | YES                          | 416                   | 431                   |       |
| 1                      | Girl       | (LL) GIRLS LOCKER                | AHU-5             | YES                         | YES                          | 429                   | 431                   |       |
| 1                      | OFFICE     | OFFICE- Off Gym                  | AHU-5             | YES                         | YES                          | 433                   | 431                   |       |
| 1                      | SOUTH      | GYMNASIUM                        | AHU-5             | YES                         | YES                          | 440                   | 431                   |       |
| 1                      | Office     | Pool Life Guard                  | AHU-5             | YES                         | YES                          | 432                   | 431                   |       |

# Appendix 4

## Unit and Room Take-Off Data



|                            |                                      |                |
|----------------------------|--------------------------------------|----------------|
| <b>Project Name:</b>       | <b>Woodbridge Public Schools RCx</b> | <i>JM / RA</i> |
| <b>Project Number:</b>     | 2022231.00                           |                |
| <b>Scope</b>               | <b>Room Take-Off Data</b>            |                |
| <b>Date</b>                | <b>June 27, 2023</b>                 |                |
| <b>Beecher Road School</b> |                                      |                |

| Zone Identification |       |                  |           |                     |        |        |                                       |                          |          |
|---------------------|-------|------------------|-----------|---------------------|--------|--------|---------------------------------------|--------------------------|----------|
| Floor               | Room# | Room Name        | Area (SF) | Ceiling Height (FT) | Volume | People | Notes                                 | Identified Deficiencies  | Pictures |
|                     |       |                  |           |                     |        |        |                                       |                          | Y / N    |
| 1                   | A1    |                  | 822       | 10                  | 8,220  | 20     | Unit Ventilator, Honeywell CO2 Cntrl, | Room dehumidifier        |          |
| 1                   | A2    |                  | 825       | 10                  | 8,250  | 20     | Unit Ventilator, Honeywell CO2 Cntrl, |                          |          |
| 1                   | A3    |                  | 826       | 10                  | 8,260  | 20     | Unit Ventilator, Honeywell CO2 Cntrl, |                          |          |
| 1                   | A4    |                  | 820       | 10                  | 8,200  | 20     | Unit Ventilator, Honeywell CO2 Cntrl, |                          |          |
| 1                   | A5    |                  | 829       | 10                  | 8,290  | 20     | Unit Ventilator, Honeywell CO2 Cntrl, |                          |          |
| 1                   | A6    |                  | 818       | 10                  | 8,180  | 20     | Unit Ventilator, Honeywell CO2 Cntrl, |                          |          |
| 1                   | A7    | Art              | 1137      | 10                  | 11,370 | 20     | Unit Ventilator, Honeywell CO2 Cntrl, |                          |          |
| 1                   | A8    |                  | 1188      | 10                  | 11,880 |        |                                       |                          |          |
| 1                   | A9    | Speech           | 334       | 10                  | 3,340  |        |                                       |                          |          |
| 1                   |       | CONFERENCE       | 248       | 9                   | 2,232  |        |                                       |                          |          |
| 1                   |       | WAIT/MAIN OFFICE | 723       | 9.5                 | 6,869  | 6      |                                       |                          |          |
| 1                   |       | VICE PRINCIPLE   | 153       | 9.5                 | 1,454  |        |                                       |                          |          |
| 1                   |       | PRINCIPLE        | 150       | 9.5                 | 1,425  |        |                                       |                          |          |
| 1                   |       | KITCHEN          | 91        | 9.5                 | 865    |        |                                       |                          |          |
| 1                   | B13   | STOR. SALLY PORT | 200       | 9.5                 | 1,900  |        |                                       |                          |          |
| 1                   | B14   | STAFF ROOM       | 780       | 9                   | 7,020  |        |                                       |                          |          |
| 1                   | B12   | STORAGE          | 288       | 8.9                 | 2,563  |        |                                       |                          |          |
| 1                   | B11   | NURSE            | 590       | 8.9                 | 5,251  | 6      |                                       | TEACHERS ROOM/HEALTH 113 |          |
| 1                   | B10   | CLASSROOM        | 823       | 8.9                 | 7,325  | 20     |                                       | LANGUAGE                 |          |
| 1                   | B1    | CLASSROOM        | 827       | 10                  | 8,270  | 20     |                                       |                          |          |
| 1                   | B2    | CLASSROOM        | 819       | 10                  | 8,190  | 20     |                                       |                          |          |

|                        |                                      |                |
|------------------------|--------------------------------------|----------------|
| <b>Project Name:</b>   | <b>Woodbridge Public Schools RCx</b> | <i>JM / RA</i> |
| <b>Project Number:</b> | 2022231.00                           |                |
| <b>Scope</b>           | <b>Room Take-Off Data</b>            |                |
| <b>Date</b>            | <b>June 27, 2023</b>                 |                |

**Beecher Road School**

**Zone Identification**

| Floor | Room# | Room Name          | Area (SF) | Ceiling Height (FT) | Volume | People | Notes | Identified Deficiencies | Pictures |
|-------|-------|--------------------|-----------|---------------------|--------|--------|-------|-------------------------|----------|
|       |       |                    |           |                     |        |        |       |                         | Y / N    |
| 1     | B3    | CLASSROOM          | 823       | 10                  | 8,230  | 20     |       |                         |          |
| 1     | B4    | CLASSROOM          | 822       | 10                  | 8,220  | 20     |       |                         |          |
| 1     | B5    | CLASSROOM          | 820       | 10                  | 8,200  | 20     |       |                         |          |
| 1     | B6    | CLASSROOM          | 824       | 10                  | 8,240  | 20     |       |                         |          |
| 1     | B9    | CLASSROOM          | 331       | 10                  | 3,310  | 20     |       |                         |          |
| 1     | B7    | CLASSROOM          | 1194      | 10                  | 11,940 | 20     |       | (Folding partition)     |          |
| 1     | B8    | CLASSROOM          | 1190      | 10                  | 11,900 | 20     |       | (Folding partition)     |          |
| 1     | NORTH | GYMNASIUM          | 2910      | 17                  | 49,470 |        |       |                         |          |
| 1     |       | COMMONS            | 2648      | 10.2                | 27,010 |        |       | served by gym units     |          |
| 1     | K9    | CLASSROOM          | 840       | 9                   | 7,560  | 20     |       |                         |          |
| 1     | K7    | CLASSROOM          | 511       | 9                   | 4,599  |        |       | RESOURCE ROOM           |          |
| 1     | KP    | CLASSROOM          | 997       | 9.4                 | 9,372  | 20     |       |                         |          |
| 1     | K1    | CLASSROOM          | 1008      | 9.6                 | 9,677  | 20     |       |                         |          |
| 1     | K2    | CLASSROOM          | 1037      | 9.5                 | 9,852  | 20     |       |                         |          |
| 1     | K8    | CLASSROOM          | 776       | 9.5                 | 7,372  | 20     |       |                         |          |
| 1     | K3    | CLASSROOM          | 1005      | 9.6                 | 9,648  | 20     |       |                         |          |
| 1     | ADD   | Gym Teacher office | 72        | 8                   | 576    | 1      |       |                         |          |

|                            |                                      |                |
|----------------------------|--------------------------------------|----------------|
| <b>Project Name:</b>       | <b>Woodbridge Public Schools RCx</b> | <i>JM / RA</i> |
| <b>Project Number:</b>     | 2022231.00                           |                |
| <b>Scope</b>               | <b>Room Take-Off Data</b>            |                |
| <b>Date</b>                | <b>June 27, 2023</b>                 |                |
| <b>Beecher Road School</b> |                                      |                |

| Zone Identification |       |                  |           |                     |        |        |       |                         |          |
|---------------------|-------|------------------|-----------|---------------------|--------|--------|-------|-------------------------|----------|
| Floor               | Room# | Room Name        | Area (SF) | Ceiling Height (FT) | Volume | People | Notes | Identified Deficiencies | Pictures |
|                     |       |                  |           |                     |        |        |       |                         | Y / N    |
| 1                   | K4    | CLASSROOM        | 1000      | 9.5                 | 9,500  |        |       |                         |          |
| 1                   | K6    | CLASSROOM        | 1041      | 9.7                 | 10,098 |        |       |                         |          |
| 1                   | K5    | CLASSROOM        | 1036      | 9.6                 | 9,946  |        |       |                         |          |
| 1                   |       | Kitchen          | 1444      | 8.9                 | 12,852 |        |       |                         |          |
| 1                   |       | Cafeteria        | 3777      | 10.5                | 39,659 |        |       |                         |          |
| 1                   |       | Library          | 5500      | 10.9                | 59,950 |        |       |                         |          |
| 1                   |       | Tech Center      | 1299      | 7.7                 | 10,002 |        |       |                         |          |
| 1                   |       | Media Center     | 646       | 10.9                | 7,041  |        |       |                         |          |
| 1                   |       | Break Rm. Office | 287       | 8                   | 2,296  |        |       |                         |          |
| 1                   |       | Green Screen     | 197       | 7.6                 | 1,497  |        |       |                         |          |
| 1                   |       | Tech Office      | 156       | 8                   | 1,248  |        |       |                         |          |
| 1                   |       | Reading Room     | 161       | 7.9                 | 1,272  |        |       |                         |          |
| 1                   | C6    | Hutchinson       | 828       | 10                  | 8,280  | 20     |       |                         |          |
| 1                   | C5    | Meacham          | 808       | 10                  | 8,080  | 20     |       |                         |          |
| 1                   | C4    | CLASSROOM        | 817       | 10                  | 8,170  | 20     |       |                         |          |
| 1                   | C3    | ?                | 823       | 10                  | 8,230  | 20     |       |                         |          |
| 1                   | C2    | Triplett         | 827       | 10                  | 8,270  | 20     |       |                         |          |
| 1                   | C1    | Ngov             | 814       | 10                  | 8,140  | 20     |       |                         |          |
| 1                   | D5/D6 | Office           | 129       | 8                   | 1,032  | 1      |       |                         |          |
| 1                   | D5    | Nurse            | 1009      | 9                   | 9,081  | 6      |       |                         |          |
| 1                   | D6    | Nolan            | 10098     | 9                   | 90,882 |        |       |                         |          |

|                        |                               |         |
|------------------------|-------------------------------|---------|
| <b>Project Name:</b>   | Woodbridge Public Schools RCx |         |
| <b>Project Number:</b> | 2022231.00                    | JM / RA |
| <b>Scope</b>           | Room Take-Off Data            |         |
| <b>Date</b>            | June 27, 2023                 |         |
|                        | Beecher Road School           |         |

| Zone Identification |       |              |           |                     |        |        |       |                         |          |
|---------------------|-------|--------------|-----------|---------------------|--------|--------|-------|-------------------------|----------|
| Floor               | Room# | Room Name    | Area (SF) | Ceiling Height (FT) | Volume | People | Notes | Identified Deficiencies | Pictures |
|                     |       |              |           |                     |        |        |       |                         | Y / N    |
| 1                   | D4    | Marcellino   | 855       | 10                  | 8,550  |        |       |                         |          |
| 1                   | D3    | Shepard      | 1349      | 10                  | 13,490 |        |       |                         |          |
| 1                   | D2    | Mumford      | 919       | 10                  | 9,190  |        |       |                         |          |
| 1                   | D1    | Lavigne      | 1270      | 10                  | 12,700 |        |       |                         |          |
| 1                   | D7    | Reading      | 433       | 9                   | 3,897  |        |       | Dwg. Altered            |          |
| 1                   | D7-1  | W/in Reading | 116       | 8                   | 928    | 1      |       | Dwg. Altered            |          |
| 1                   | D7-2  | W/in Reading | 132       | 8                   | 1,056  | 1      |       | Dwg. Altered            |          |
| 1                   | D7-3  | W/in Reading | 110       | 8                   | 880    | 1      |       | Dwg. Altered            |          |
| 1                   | S1    | Rogers       | 1021      | 9                   | 9,189  |        |       |                         |          |
| 1                   | S2    | Glennon      | 1256      | 9                   | 11,304 |        |       |                         |          |
| 1                   | S16   | Resources    | 382       | 9                   | 3,438  |        |       |                         |          |
| 1                   | S3    | Irfran       | 1256      | 9                   | 11,304 |        |       |                         |          |
| 1                   | S4    | Chase        | 1021      | 9                   | 9,189  |        |       |                         |          |
| 1                   | S17   | Greene       | 561       | 9.6                 | 5,386  |        |       |                         |          |
| 1                   | S5    | Horvath      | 1024      | 9                   | 9,216  |        |       |                         |          |
| 1                   | S6    | Campbell     | 1256      | 9                   | 11,304 |        |       |                         |          |
| 1                   | S7    | Guerra       | 1256      | 8.9                 | 11,178 |        |       |                         |          |
| 1                   | S8    | Conroy       | 1024      | 8.9                 | 9,114  |        |       |                         |          |
| 1                   | S9    | Mulligan     | 1021      | 8.9                 | 9,087  |        |       |                         |          |
| 1                   | S10   | McHugh       | 1256      | 8.9                 | 11,178 |        |       |                         |          |
| 1                   | S13   | Resources    | 380       | 8.9                 | 3,382  |        |       |                         |          |

|                            |                                      |                |
|----------------------------|--------------------------------------|----------------|
| <b>Project Name:</b>       | <b>Woodbridge Public Schools RCx</b> | <i>JM / RA</i> |
| <b>Project Number:</b>     | 2022231.00                           |                |
| <b>Scope</b>               | <b>Room Take-Off Data</b>            |                |
| <b>Date</b>                | <b>June 27, 2023</b>                 |                |
| <b>Beecher Road School</b> |                                      |                |

| Zone Identification |            |                      |           |                     |        |        |                                |                         |          |
|---------------------|------------|----------------------|-----------|---------------------|--------|--------|--------------------------------|-------------------------|----------|
| Floor               | Room#      | Room Name            | Area (SF) | Ceiling Height (FT) | Volume | People | Notes                          | Identified Deficiencies | Pictures |
|                     |            |                      |           |                     |        |        |                                |                         | Y / N    |
| 1                   | S11        | Rourke               | 1256      | 8.9                 | 11,178 |        |                                |                         |          |
| 1                   | S12        | Antonelles           | 1021      | 8.9                 | 9,087  |        |                                |                         |          |
| 1                   |            | FAC Director Vito    | 144       | 7.2                 | 1,037  | 1      |                                |                         |          |
| 1                   | S19        | Computer             | 830       | 9                   | 7,470  |        |                                |                         |          |
| 1                   | S15        | Taylor               | 178       | 9                   | 1,602  |        |                                |                         |          |
| 1                   | S18        | Criscuola            | 458       | 7.8                 | 3,572  |        |                                |                         |          |
| 1                   | S14        | Krawel               | 830       | 9                   | 7,470  |        |                                |                         |          |
| 1                   | S22        | Simoniello           | 830       | 9                   | 7,470  |        | Copy Room                      |                         |          |
| 1                   | S21        | Teach lounge         | 521       | 9                   | 4,689  |        |                                |                         |          |
| 1                   | S20        | Mallor               | 178       | 9                   | 1,602  |        |                                |                         |          |
| 1                   |            | ROTUNDA              | 1665      | 22                  | 36,630 |        | Odd Shape                      |                         |          |
| 1                   | ADD        | Music Office         | 65        | 8                   | 520    | 1      | Room off music room within E-7 |                         |          |
| 1                   | E1         | Acheson (Art)        | 1128      | 9                   | 10,152 | 22     |                                |                         |          |
| 1                   | E2         | Trofimclik (Science) | 905       | 8.6                 | 7,783  | 21     |                                |                         |          |
| 1                   | E3         | Saunders             | 922       | 9                   | 8,298  |        |                                |                         |          |
| 1                   | E4         | Summer Camp Office   | 529       | 9                   | 4,761  | 17     |                                |                         |          |
| 1                   | E5         | Recreation Office    | 113       | 8                   | 904    | 1      |                                |                         |          |
| 1                   | E6         | Special Ed           | 795       | 8                   | 6,360  |        |                                |                         |          |
| 1                   | NEW Office | Special Ed Office    | 105       | 8                   | 840    | 1      | Within E-6                     |                         |          |
| 1                   | E7         | MUSIC                | 1698      | 9.1                 | 15,452 |        |                                |                         |          |
| 1                   | AUD        | ASSEMBLY ROOM        | 3160      | 12.1                | 38,236 |        | Stage area and Assembly area   |                         |          |

|                            |                                      |                |
|----------------------------|--------------------------------------|----------------|
| <b>Project Name:</b>       | <b>Woodbridge Public Schools RCx</b> | <i>JM / RA</i> |
| <b>Project Number:</b>     | 2022231.00                           |                |
| <b>Scope</b>               | <b>Room Take-Off Data</b>            |                |
| <b>Date</b>                | <b>June 27, 2023</b>                 |                |
| <b>Beecher Road School</b> |                                      |                |

| Zone Identification |            |                    |           |                     |         |        |            |                         |          |
|---------------------|------------|--------------------|-----------|---------------------|---------|--------|------------|-------------------------|----------|
| Floor               | Room#      | Room Name          | Area (SF) | Ceiling Height (FT) | Volume  | People | Notes      | Identified Deficiencies | Pictures |
|                     |            |                    |           |                     |         |        |            |                         | Y / N    |
| 1                   |            | SUPERINDENDANT     | 375       | 8.5                 | 3,188   | 7      |            |                         |          |
| 1                   | RECEPT.    |                    | 385.5     | 8.5                 | 3,277   |        |            |                         |          |
| 1                   | KITCHEN    |                    | 100       | 8.5                 | 850     |        |            |                         |          |
| 1                   | CONF       |                    | 192       | 8                   | 1,536   |        |            |                         |          |
| 1                   | B. MANAGER |                    | 123       | 8.5                 | 1,046   | 1      |            |                         |          |
| 1                   | POOL       |                    | 4328      | 26                  | 112,528 |        |            |                         |          |
| 1                   | OFFICE     | Jimencz (Payroll)  | 355       | 8                   | 2,840   | 3      |            |                         |          |
| 1                   | Office     | Office             | 46        | 8                   | 368     |        | Within E-8 |                         |          |
| 1                   | Boy        | (1ST.) BOYS LOCKER | 931       | 7.8                 | 7,262   |        |            |                         |          |
| 1                   | Girl       | (LL) GIRLS LOCKER  | 1144      | 7.7                 | 8,809   |        |            |                         |          |
| 1                   | OFFICE     | OFFICE- Off Gym    | 212       | 7.9                 | 1,675   |        |            |                         |          |
| 1                   | SOUTH      | GYMNASIUM          | 4982      | 22.5                | 112,095 |        |            |                         |          |
| 1                   | Office     | Pool Life Guard    | 165       | 7                   | 1,155   |        |            |                         |          |

WOODBIDGE PUBLIC SCHOOLS – BEECHER ROAD SCHOOL EQUIPMENT DATA SHEET

|                                     |  |   |
|-------------------------------------|--|---|
| <b>Unit Tag</b>                     | <b>AHU-1</b>   | <b>Addition comments descriptions</b>               |
| Location:                           | MER  |   |
| Serving:                            | Music  |   |
| Mfr.                                | Trane  |   |
| Model #                             | -  |   |
| Serial #                            | K15G54994?????   |   |
| Manufacture Date                    |  |   |
| System CFM                          |  | By TAB  |
| Min OA CFM                          |  |   |
| Filter Data<br>(Size, Qty)          |  |   |
| Filter Condition                    | Changed 4/23 Filters are dirty, should be clean prior to balancing | Note: Filters were changed after our initial visit. |
| Utilize CO <sub>2</sub> and/or DCV? | Yes  |   |
| Heating Type                        | Hot water  |   |
| Heating Coil Condition              | OK   |   |
| Cooling Type                        | Chilled water  |   |
| Cooling Coil Condition              | OK   |   |
| Drain Pan Status                    | OK   |   |
| Notes:                              |  |   |
|                                     |  |   |
| <b>Description</b>                  | <b>Photos Taken (Check All That Applies)</b>                       |   |
| Unit Tag Info                       |  |   |
| Heating Coil                        |  |   |
| Cooling Coil                        |  |   |
| Filters                             |  |   |
|                                     |  |   |

WOODBIDGE PUBLIC SCHOOLS – BEECHER ROAD SCHOOL EQUIPMENT DATA SHEET

|   |  |   |
|---|--|---|
| <b>Unit Tag</b>                           | <b>AHU-2</b> No access available                                   | <b>Addition comments descriptions</b>               |
| Location:                                 | Gym  |   |
| Serving:                                  | North Gym & Common room  |   |
| Mfr.                                      | Trane  |   |
| Model #                                   | xxx  |   |
| Serial #                                  | K15G54xxx  |   |
| Manufacture Date                          |  |   |
| System CFM                                |  | By TAB  |
| Min OA CFM                                |  |   |
| Filter Data<br>(Size, Qty)                | xxx  |   |
| Filter Condition                          | Changed 4/23 Filters are dirty, should be clean prior to balancing | Note: Filters were changed after our initial visit. |
| Utilize CO <sub>2</sub> and/or DCV?       | xx   |   |
| Heating Type                              | Hot water  |   |
| Heating Coil Condition                    | xx   |   |
| Cooling Type                              | Chilled water  |   |
| Cooling Coil Condition                    | xx   |   |
| Drain Pan Status                          | xx   |   |
| Notes: High in space, no access available |  |   |
|   |  |   |
| <b>Description</b>                        | <b>Photos Taken (Check All That Applies)</b>                       |   |
| Unit Tag Info                             |  |   |
| Heating Coil                              |  |   |
| Cooling Coil                              |  |   |
| Filters                                   |  |   |
|   |  |   |

WOODBIDGE PUBLIC SCHOOLS – BEECHER ROAD SCHOOL EQUIPMENT DATA SHEET

|   |  |   |
|---|--|---|
| <b>Unit Tag</b>                           | <b>AHU-3</b> No access available                                   | <b>Addition comments descriptions</b>               |
| Location:                                 | Gym  |   |
| Serving:                                  | North Gym & Common room  |   |
| Mfr.                                      | Trane  |   |
| Model #                                   | xxx  |   |
| Serial #                                  | K15G54xxx  |   |
| Manufacture Date                          |  |   |
| System CFM                                |  | By TAB  |
| Min OA CFM                                |  |   |
| Filter Data<br>(Size, Qty)                | xxx  |   |
| Filter Condition                          | Changed 4/23 Filters are dirty, should be clean prior to balancing | Note: Filters were changed after our initial visit. |
| Utilize CO <sub>2</sub><br>and/or DCV?    | xx   |   |
| Heating Type                              | Hot water  |   |
| Heating Coil Condition                    | xx   |   |
| Cooling Type                              | Chilled water  |   |
| Cooling Coil Condition                    | xx   |   |
| Drain Pan Status                          | xx   |   |
| Notes: High in space, no access available |  |   |
|   |  |   |
| <b>Description</b>                        | <b>Photos Taken (Check All That Applies)</b>                       |   |
| Unit Tag Info                             |  |   |
| Heating Coil                              |  |   |
| Cooling Coil                              |  |   |
| Filters                                   |  |   |
|   |  |   |

WOODBIDGE PUBLIC SCHOOLS – BEECHER ROAD SCHOOL EQUIPMENT DATA SHEET

|   |  |   |
|---|--|---|
| <b>Unit Tag</b>   | <b>AHU-4</b>   | <b>Addition comments descriptions</b>               |
| Location:   | MER  |   |
| Serving:  | ASSEMBLY   |   |
| Mfr.  | Trane  |   |
| Model #   | UCCAG14C0A0RDN12000000FC872  |   |
| Serial #  | K15G54994  |   |
| Manufacture Date  |  |   |
| System CFM  |  | By TAB  |
| Min OA CFM  |  |   |
| Filter Data<br>(Size, Qty)                                | (2) 16x20x2 (1) 16x25x2 (2) 20x20x2 (1) 20x25x2<br>(2) 16x20x4 (1) 16x25x4 (2) 20x20x4 (1) 20x25x4 |   |
| Filter Condition  | Changed 4/23 Filters are dirty, should be clean prior to balancing                                 | Note: Filters were changed after our initial visit. |
| Utilize CO <sub>2</sub> and/or DCV?                       | Yes  |   |
| Heating Type  | Hot water  |   |
| Heating Coil Condition                                    | OK   |   |
| Cooling Type  | Chilled water  |   |
| Cooling Coil Condition                                    | OK   |   |
| Drain Pan Status  | OK   |   |
| Notes: Newer installation, originally maintained by Emcor |  |   |
|   |  |   |
| <b>Description</b>  | <b>Photos Taken (Check All That Applies)</b>   |   |
| Unit Tag Info   |  |   |
| Heating Coil  |  |   |
| Cooling Coil  |  |   |
| Filters   |  |   |
|   |  |   |

WOODBIDGE PUBLIC SCHOOLS – BEECHER ROAD SCHOOL EQUIPMENT DATA SHEET

|                                     |  |   |
|-------------------------------------|--|---|
| <b>Unit Tag</b>                     | <b>AHU-5</b>   | <b>Addition comments descriptions</b>               |
| Location:                           | MER  |   |
| Serving:                            | South Gym  |   |
| Mfr.                                | Trane  |   |
| Model #                             |  |   |
| Serial #                            |  |   |
| Manufacture Date                    |  |   |
| System CFM                          |  | By TAB  |
| Min OA CFM                          |  |   |
| Filter Data<br>(Size, Qty)          | (2) 16x20x2 (2) 16x25x2<br>(2) 20x20x2 (2) 20x25x2<br>(2) 16x20x4 (2) 16x25x4<br>(2) 20x20x4 (2) 20x25x4 |   |
| Filter Condition                    | Changed 4/23 Filters are dirty, should be clean prior to balancing                                       | Note: Filters were changed after our initial visit. |
| Utilize CO <sub>2</sub> and/or DCV? | Yes  |   |
| Heating Type                        | Hot water  |   |
| Heating Coil Condition              | OK   |   |
| Cooling Type                        | Chilled water  |   |
| Cooling Coil Condition              | OK   |   |
| Drain Pan Status                    | OK   |   |
| Notes:                              |  |   |
|                                     |  |   |
| <b>Description</b>                  | <b>Photos Taken (Check All That Applies)</b>   |   |
| Unit Tag Info                       |  |   |
| Heating Coil                        |  |   |
| Cooling Coil                        |  |   |
| Filters                             |  |   |
|                                     |  |   |

WOODBIDGE PUBLIC SCHOOLS – BEECHER ROAD SCHOOL EQUIPMENT DATA SHEET

| <u>Unit Tag</u>                     | <u>ERV-1</u>   | <u>Addition comments descriptions</u>              |
|-------------------------------------|--|--|
| Location:                           | Roof   |  |
| Serving:                            |  |  |
| Mfr.                                | XeteX  |  |
| Model #                             | IAQ-4000-RT-BP-SP  |  |
| Serial #                            | 129521015-1/4  |  |
| Manufacture Date                    |  |  |
| System CFM                          |  | By TAB   |
| Min OA CFM                          |  |  |
| Filter Data<br>(Size, Qty)          | (8) 16x24x2  |  |
| Filter Condition                    | Changed 4/23 Filters are dirty, should be clean prior to balancing | Note: Filters were changed after our initial visit |
| Utilize CO <sub>2</sub> and/or DCV? | Yes  |  |
| Heating Type                        | N/A  |  |
| Heating Coil Condition              | N/A  |  |
| Cooling Type                        | N/A  |  |
| Cooling Coil Condition              | N/A  |  |
| Drain Pan Status                    | OK   |  |
| Notes: CUBE HEAT RECOVERY ONLY      |  |  |
|                                     |  |  |
| <u>Description</u>                  | <u>Photos Taken (Check All That Applies)</u>                       |  |
| Unit Tag Info                       |  |  |
| Heating Coil                        |  |  |
| Cooling Coil                        |  |  |
| Filters                             |  |  |
|                                     |  |  |

WOODBIDGE PUBLIC SCHOOLS – BEECHER ROAD SCHOOL EQUIPMENT DATA SHEET

|                                     |  |   |
|-------------------------------------|--|---|
| <b>Unit Tag</b>                     | <b>ERV-2</b>   | <b>Addition comments descriptions</b>               |
| Location:                           | Roof   |   |
| Serving:                            |  |   |
| Mfr.                                | XeteX  |   |
| Model #                             | IAQ-1000-RT-BP-SP  |   |
| Serial #                            | 129521015-12/4   |   |
| Manufacture Date                    |  |   |
| System CFM                          |  | By TAB  |
| Min OA CFM                          |  |   |
| Filter Data<br>(Size, Qty)          |  |   |
| Filter Condition                    | Changed 4/23 Filters are dirty, should be clean prior to balancing | Note: Filters were changed after our initial visit. |
| Utilize CO <sub>2</sub> and/or DCV? | Yes  |   |
| Heating Type                        | N/A  |   |
| Heating Coil Condition              | N/A  |   |
| Cooling Type                        | N/A  |   |
| Cooling Coil Condition              | N/A  |   |
| Drain Pan Status                    | OK   |   |
| Notes: CUBE HEAT RECOVERY ONLY      |  |   |
|                                     |  |   |
| <b>Description</b>                  | <b>Photos Taken (Check All That Applies)</b>                       |   |
| Unit Tag Info                       |  |   |
| Heating Coil                        |  |   |
| Cooling Coil                        |  |   |
| Filters                             |  |   |
|                                     |  |   |

**WOODBIDGE PUBLIC SCHOOLS – BEECHER ROAD SCHOOL EQUIPMENT DATA SHEET**

|                                     |  |   |
|-------------------------------------|--|---|
| <b>Unit Tag</b>                     | <b>ERV-3</b>   | <b>Addition comments descriptions</b>               |
| Location:                           | Roof   |   |
| Serving:                            | Rotunda (Area - S wing)  |   |
| Mfr.                                | XeteX  |   |
| Model #                             | IAQ-4000-RT-BN-SP  |   |
| Serial #                            | 129521015-3/4  |   |
| Manufacture Date                    |  |   |
| System CFM                          |  | By TAB  |
| Min OA CFM                          |  |   |
| Filter Data<br>(Size, Qty)          | (8) 16x24x2  |   |
| Filter Condition                    | Changed 4/23 Filters are dirty, should be clean prior to balancing | Note: Filters were changed after our initial visit. |
| Utilize CO <sub>2</sub> and/or DCV? | Yes  |   |
| Heating Type                        | N/A  |   |
| Heating Coil Condition              | N/A  |   |
| Cooling Type                        | N/A  |   |
| Cooling Coil Condition              | N/A  |   |
| Drain Pan Status                    | OK   |   |
| Notes: CUBE HEAT RECOVERY ONLY      |  |   |
|                                     |  |   |
| <b>Description</b>                  | <b>Photos Taken (Check All That Applies)</b>                       |   |
| Unit Tag Info                       |  |   |
| Heating Coil                        |  |   |
| Cooling Coil                        |  |   |
| Filters                             |  |   |
|                                     |  |   |

WOODBIDGE PUBLIC SCHOOLS – BEECHER ROAD SCHOOL EQUIPMENT DATA SHEET

|                                     |  |   |
|-------------------------------------|--|---|
| <b>Unit Tag</b>                     | <b>ERV-4</b>   | <b>Addition comments descriptions</b>               |
| Location:                           | Roof   |   |
| Serving:                            | Rotunda (Area - S wing)  |   |
| Mfr.                                | XeteX  |   |
| Model #                             | IAQ-3000-BP-PHW-HW   |   |
| Serial #                            | 129521015-4/4  |   |
| Manufacture Date                    |  |   |
| System CFM                          |  | By TAB  |
| Min OA CFM                          |  |   |
| Filter Data<br>(Size, Qty)          | (8) 20x24x2  |   |
| Filter Condition                    | Changed 4/23 Filters are dirty, should be clean prior to balancing | Note: Filters were changed after our initial visit. |
| Utilize CO <sub>2</sub> and/or DCV? | Yes  |   |
| Heating Type                        | N/A  |   |
| Heating Coil Condition              | N/A  |   |
| Cooling Type                        | N/A  |   |
| Cooling Coil Condition              | N/A  |   |
| Drain Pan Status                    | OK   |   |
| Notes: CUBE HEAT RECOVERY ONLY      |  |   |
|                                     |  |   |
| <b>Description</b>                  | <b>Photos Taken (Check All That Applies)</b>                       |   |
| Unit Tag Info                       |  |   |
| Heating Coil                        |  |   |
| Cooling Coil                        |  |   |
| Filters                             |  |   |
|                                     |  |   |

WOODBIDGE PUBLIC SCHOOLS – BEECHER ROAD SCHOOL EQUIPMENT DATA SHEET

| <u>Unit Tag</u>                     | <u>RTU-1</u>   | <u>Addition comments descriptions</u>               |
|-------------------------------------|--|---|
| Location:                           | Roof   |   |
| Serving:                            | Main Office  |   |
| Mfr.                                | Trane  |   |
| Model #                             | CSAA006UBL00   |   |
| Serial #                            | K15G57521  |   |
| Manufacture Date                    |  |   |
| System CFM                          |  | By TAB  |
| Min OA CFM                          |  |   |
| Filter Data<br>(Size, Qty)          | (2) 20x25x2 (2) 20x25x4  |   |
| Filter Condition                    | Changed 4/23 Filters are dirty, should be clean prior to balancing | Note: Filters were changed after our initial visit. |
| Utilize CO <sub>2</sub> and/or DCV? | Yes  |   |
| Heating Type                        | Hot water  |   |
| Heating Coil Condition              | OK   |   |
| Cooling Type                        | Chilled water  |   |
| Cooling Coil Condition              | OK   |   |
| Drain Pan Status                    | OK   |   |
| Notes:                              |  |   |
|                                     |  |   |
|                                     |  |   |
| <u>Description</u>                  | <u>Photos Taken (Check All That Applies)</u>                       |   |
| Unit Tag Info                       |  |   |
| Heating Coil                        |  |   |
| Cooling Coil                        |  |   |
| Filters                             |  |   |
|                                     |  |   |

WOODBIDGE PUBLIC SCHOOLS – BEECHER ROAD SCHOOL EQUIPMENT DATA SHEET

| <u>Unit Tag</u>                     | <u>RTU-2</u>   | <u>Addition comments descriptions</u>               |
|-------------------------------------|--|---|
| Location:                           | Roof   |   |
| Serving:                            | Main Office  |   |
| Mfr.                                | Trane  |   |
| Model #                             | CSAA006UBL00   |   |
| Serial #                            | K15G57531  |   |
| Manufacture Date                    |  |   |
| System CFM                          |  | By TAB  |
| Min OA CFM                          |  |   |
| Filter Data<br>(Size, Qty)          | (2) 20x25x2 (2) 20x25x4  |   |
| Filter Condition                    | Changed 4/23 Filters are dirty, should be clean prior to balancing | Note: Filters were changed after our initial visit. |
| Utilize CO <sub>2</sub> and/or DCV? | Yes  |   |
| Heating Type                        | Hot water  |   |
| Heating Coil Condition              | OK   |   |
| Cooling Type                        | Chilled water  |   |
| Cooling Coil Condition              | OK   |   |
| Drain Pan Status                    | OK   |   |
| Notes:                              |  |   |
|                                     |  |   |
|                                     |  |   |
| <u>Description</u>                  | <u>Photos Taken (Check All That Applies)</u>                       |   |
| Unit Tag Info                       |  |   |
| Heating Coil                        |  |   |
| Cooling Coil                        |  |   |
| Filters                             |  |   |
|                                     |  |   |

WOODBIDGE PUBLIC SCHOOLS – BEECHER ROAD SCHOOL EQUIPMENT DATA SHEET

| <u>Unit Tag</u>                     | <u>RTU-3</u>   | <u>Addition comments descriptions</u>               |
|-------------------------------------|--|---|
| Location:                           | Roof   |   |
| Serving:                            | Cafeteria  |   |
| Mfr.                                | Trane  |   |
| Model #                             | CSAA012UBL00   |   |
| Serial #                            | K15G55679  |   |
| Manufacture Date                    |  |   |
| System CFM                          |  | By TAB  |
| Min OA CFM                          |  |   |
| Filter Data<br>(Size, Qty)          | (4) 16x25x2 (3) 20x25x2<br>(4) 16x25x4 (3) 20x25x4                 |   |
| Filter Condition                    | Changed 4/23 Filters are dirty, should be clean prior to balancing | Note: Filters were changed after our initial visit. |
| Utilize CO <sub>2</sub> and/or DCV? | Yes  |   |
| Heating Type                        | Hot water  |   |
| Heating Coil Condition              | OK   |   |
| Cooling Type                        | Chilled water  |   |
| Cooling Coil Condition              | OK   |   |
| Drain Pan Status                    | OK   |   |
| Notes:                              |  |   |
|                                     |  |   |
|                                     |  |   |
| <u>Description</u>                  | <u>Photos Taken (Check All That Applies)</u>                       |   |
| Unit Tag Info                       |  |   |
| Heating Coil                        |  |   |
| Cooling Coil                        |  |   |
| Filters                             |  |   |
|                                     |  |   |

WOODBIDGE PUBLIC SCHOOLS – BEECHER ROAD SCHOOL EQUIPMENT DATA SHEET

| <u>Unit Tag</u>                     | <u>RTU-4</u>   | <u>Addition comments descriptions</u>               |
|-------------------------------------|--|---|
| Location:                           | Roof   |   |
| Serving:                            | Library/Media  |   |
| Mfr.                                | Trane  |   |
| Model #                             | CSAA012UBL00   |   |
| Serial #                            | K15G55690  |   |
| Manufacture Date                    |  |   |
| System CFM                          |  | By TAB  |
| Min OA CFM                          |  |   |
| Filter Data<br>(Size, Qty)          | (2) 20x20x2 (4) 20x24x2<br>(2) 20x20x4 (4) 20x24x4                 |   |
| Filter Condition                    | Changed 4/23 Filters are dirty, should be clean prior to balancing | Note: Filters were changed after our initial visit. |
| Utilize CO <sub>2</sub> and/or DCV? | Yes  |   |
| Heating Type                        | Hot water  |   |
| Heating Coil Condition              | OK   |   |
| Cooling Type                        | Chilled water  |   |
| Cooling Coil Condition              | OK   |   |
| Drain Pan Status                    | OK   |   |
| Notes:                              |  |   |
|                                     |  |   |
|                                     |  |   |
| <u>Description</u>                  | <u>Photos Taken (Check All That Applies)</u>                       |   |
| Unit Tag Info                       |  |   |
| Heating Coil                        |  |   |
| Cooling Coil                        |  |   |
| Filters                             |  |   |
|                                     |  |   |

WOODBIDGE PUBLIC SCHOOLS – BEECHER ROAD SCHOOL EQUIPMENT DATA SHEET

| <u>Unit Tag</u>                     | <u>RTU-5</u>   | <u>Addition comments descriptions</u>               |
|-------------------------------------|--|---|
| Location:                           | Roof   |   |
| Serving:                            | Tech Center  |   |
| Mfr.                                | Trane  |   |
| Model #                             | CSAA008UBL00   |   |
| Serial #                            | K15G57541  |   |
| Manufacture Date                    |  |   |
| System CFM                          |  | By TAB  |
| Min OA CFM                          |  |   |
| Filter Data<br>(Size, Qty)          | (1) 20x24x2 (1) 24x24x2<br>(1) 20x24x4 (1) 24x24x4                 |   |
| Filter Condition                    | Changed 4/23 Filters are dirty, should be clean prior to balancing | Note: Filters were changed after our initial visit. |
| Utilize CO <sub>2</sub> and/or DCV? | Yes  |   |
| Heating Type                        | Hot water  |   |
| Heating Coil Condition              | OK   |   |
| Cooling Type                        | Chilled water  |   |
| Cooling Coil Condition              | OK   |   |
| Drain Pan Status                    | OK   |   |
| Notes:                              |  |   |
|                                     |  |   |
|                                     |  |   |
| <u>Description</u>                  | <u>Photos Taken (Check All That Applies)</u>                       |   |
| Unit Tag Info                       |  |   |
| Heating Coil                        |  |   |
| Cooling Coil                        |  |   |
| Filters                             |  |   |
|                                     |  |   |

WOODBIDGE PUBLIC SCHOOLS – BEECHER ROAD SCHOOL EQUIPMENT DATA SHEET

| <u>Unit Tag</u>                          | <u>DECTRON</u>                               | <u>Addition comments descriptions</u> |
|--|--|---------------------------------------|
| Location:                                | MER  |                                       |
| Serving:                                 | POOL   |                                       |
| Mfr.                                     | Dectron                                      |                                       |
| Model #                                  |  |                                       |
| Serial #                                 |  |                                       |
| Manufacture Date                         |  |                                       |
| System CFM                               |  | By TAB                                |
| Min OA CFM                               |  |                                       |
| Filter Data<br>(Size, Qty)               |  |                                       |
| Filter Condition                         |  |                                       |
| Utilize CO <sub>2</sub><br>and/or DCV?   |  |                                       |
| Heating Type                             |  |                                       |
| Heating Coil Condition                   |  |                                       |
| Cooling Type                             |  |                                       |
| Cooling Coil Condition                   |  |                                       |
| Drain Pan Status                         |  |                                       |
| Notes: Pool empty, Dectron still running |  |                                       |
|  |  |                                       |
| <u>Description</u>                       | <u>Photos Taken (Check All That Applies)</u> |                                       |
| Unit Tag Info                            |  |                                       |
| Heating Coil                             |  |                                       |
| Cooling Coil                             |  |                                       |
| Filters                                  |  |                                       |
|  |  |                                       |

# Appendix 5

## Floor Plans





# Appendix 6

## Photos









