HVAC Verification and Evaluation

Bethlehem Elementary School

Regional School District 14
Bethlehem, CT

9/1/2026

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1 Executive Summary

Regional School District 14 has requested a detailed assessment of the mechanical system's ventilation performance in accordance with new regulations set forth by the State of Connecticut. In 2025, the state of Connecticut codified ventilation assessment at each school building under jurisdiction of local and regional boards of education. Per substitute Senate Bill 287, "each local and regional board of education shall ensure that its heating, ventilation and air conditioning (HVAC) system is maintained and operated in accordance with the prevailing maintenance standards, such as ASHRAE Standard 62 at the time of installation or renovation of such system". These assessments must be completed by June 30, 2030, and every five years thereafter.

This report is an overview of findings from the HVAC systems evaluation performed at Bethlehem Elementary School (the "school"). The focus of this report is twofold: First, to identify to what extent the school's current ventilation system components are operational. Second, to evaluate if the system components are operating in such a manner as to provide adequate ventilation to the spaces within the building in accordance with the most recent indoor ventilation standards.

Our analysis shows most equipment at the school provides ventilation air below the calculated requirements based on ASHRAE 62.1 standard, as referenced in the state's building code. Additionally, the building has many spaces not served by any ventilating equipment. As a result, most spaces do not meet the outdoor air requirements.

Most of the equipment does not provide ventilation during all operating conditions. Rather, handwritten notes on unit control panels indicate that the equipment, some of which are manually adjusted, is only intended to provide outdoor air in "mild weather" even while noting that its operation is required for ventilation. It is recommended that this equipment is replaced or supplemented to provide ventilation during all weather conditions.

Further investigation into the HVAC equipment should be conducted to determine if the current mechanical equipment is capable of providing adequate mechanical ventilation for the school. Spaces not currently served by mechanical equipment or where existing equipment is not capable of providing required ventilation, engineered HVAC improvements should be developed to achieve compliance with current ventilation standards.

The school is actively working to remedy issues identified in this report. The school has installed a BAS which now serves the GYM AHU. The appropriate control components, such as an outdoor air damper and actuator, have been added to the air handler.

1.1 Building Overview

Bethlehem Elementary School is located at 92 East Street, Bethlehem, CT 06751. The school is approximately 45,808 square feet of floor area. The HVAC equipment providing outdoor air consists of two (2) air handling units (AHU), two (2) fan coil units (FCU), and (2) makeup air units (MAU). See Appendix C for school floor plans.

The MAUs serve boiler rooms exclusively and only run while the boilers are operating. The boiler room, classified as a utility room under the 2021 International Mechanical Code (IMC), does not have an outdoor air requirement; Therefore, the MAUs were excluded from this analysis. One MAU labeled Kiln Unit serves the kiln room, which no longer exists. This MAU has been decommissioned, and its outdoor air intake capped. This unit has been excluded from this analysis.

The building is further conditioned by variable refrigerant flow (VRF) split systems, hydronic unit heaters (UH), and additional FCUs with no ducted outdoor air. Boilers serve hydronic equipment. Any equipment that does not provide outdoor air has been excluded from the school's ventilation analysis.

Exhaust fans are located throughout the building to provide general exhaust for occupied spaces, including corridors, offices, classrooms, restrooms, and custodial closets. A dedicated exhaust fan serves the kitchen.

Digital controls were not observed for the systems that provide outdoor air. Ventilation equipment runs on packaged local controls and hardwired sensors.

1.2 HVAC System Overview

Excluding the MAUs, four (4) units are equipped to supply outdoor air. The Gym AHU is equipped to provide hydronic heating and no cooling. The AHU serving the office (AHU Off.) Is equipped with direct expansion cooling and hydronic heating. The FCUs provide direct expansion cooling and electric heating. Design data for these units was not available from the school district or respective manufacturers. Model numbers were used to determine nominal cooling capacities. Serial numbers were not available to determine equipment age. Equipment details are shown in Table 1 below.

Table 1: Equipment Data

EQUIPMENT LABEL	MAKE	MODEL	AGE (YRS)	COOLING CAPACITY (TONS)	HEATING CAPACITY (MBH)	AREA SERVED
Gym AHU	Trane	Torridor 212CB	N/D[1]	0	N/D[1]	Gym
AHU-1 Off.	Trane	TWE090A300BA	32	7.5	N/D[1]	Offices
FCU Media North	Lennox	CBX26UH-036-1	N/D[1]	3	N/D[1]	Media
FCU Media South	Trane	TWE048C140B2	N/D[1]	4	N/D[1]	Media

[1] No design data available

2 Evaluation

2.1 Code Compliance

The school was built in 1926 and has been renovated four times. The most recent renovation was in 1992. Building standards and requirements have changed since the renovations. In 2024, Senate Bill 287 codified ventilation assessments at each school building under jurisdiction of local and regional boards of education. These assessments must be completed during the period commencing July 1, 2025, and ending June 30, 2030. Each school shall be evaluated every five years thereafter. Per the requirements of sSB 278, the assessment included the following inspections and evaluations:

(A) Documenting maximum filter efficiency (MERV rating)
(B) Physical measurements of outside air delivery rate at the minimum damper position
(C) Verification of the appropriate condition and operation of ventilation components
(D) Measurement of air distribution through all system inlets and outlets,
(E) Verification of unit operation and that required maintenance has been performed in accordance with the most recent indoor ventilation standards promulgated by the American Society of Heating, Refrigerating and Air-Conditioning Engineers

(F) Verification of control sequences of damper operations
(G) Verification of carbon dioxide sensors does not apply.
(H) Identification of to what extent each school's current ventilation system components, including any existing central or noncentral mechanical ventilation system, are operating in such a manner as to provide appropriate ventilation to the school building in accordance with most recent indoor ventilation standards promulgated by the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE).

The required supply of outside air into interior occupied spaces is governed by the 2022 Connecticut State Building Code, which adopts the 2021 International Mechanical Code (IMC), and ASHRAE Standard 62.1. ASHRAE Standard 62.1 prescribes the flow rate of outdoor air required for occupied areas based on occupancy classification. Depending on the room classification and occupant density, the outdoor airflow rates in cubic feet per minute (CFM) per person are defined. When occupancy density is unknown, these documents define occupant density for each room classification in number of occupants per space floor area. The required airflow rate in CFM for every occupied space is then calculated based on this value. It shall be noted that although the occupancy classification is education, the IMC does not distinguish between an office within an office building, a school, or any other building classification. This applies to all rooms that are not considered traditional educational rooms such as healthcare offices, gymnasiums, theaters, and assembly halls. Table 2 below, from the 2021 IMC, indicates population density and required ventilation rates for each room classification.

Table 2
Room Type & Occupancy Summary

Room Types	Quantity[1]	Total	Occupancy Rate[2]	Occupancy	Area	Exhaust
Art Classroom	1	852	20	10	0.18	0.7
Auditorium	0	0	150	5	0.06	-
Cafeteria	1	2156	100	7.5	0.18	-
Classroom	23	16165	35	10	0.12	-
Computer Lab	0	0	25	10	0.12	-
Conference Room	1	223	50	5	0.06	-
Corridor	8	6452	-	-	0.06	-
Custodial	3	174	-	-	-	-
Gymnasium	1	2498	7	20	0.18	-
Kitchen	1	646	70	10	0.06	-
Multiuse Assembly	0	0	10	5	0.12	-
Library	0	0	10	5	0.06	-
Lobby	1	564	-	-	-	0.25
Locker Room	0	0	100	7.5	0.06	-
Music/Theater/Dance	2	2757	35	10	0.06	1.0
Nurse	1	188	5	5	0.06	-
Office	10	2582	5	5	0.06	-
Restroom	10	1368	-	-	-	50/70*
Stairs	0	0	-	-	-	-
Storage	9	1153	-	-	0.12	-
Stage/ Studio	0	0	70	10	0.06	-
Utility	2	871	-	-	-	-
Vestibule	2	312	10	5	0.06	-

Waiting Room	0	0	30	5	0.06	-
Science Laboratories	1	852	10	5	0.18	1
Wood/metal shop	0	0	10	5	0.18	0.5

[1] Based on as-built drawings

[2] Based on 2021 International Mechanical Code

Some room types do not have an outside air requirement, as can be seen in Table 2 above. Alternatively, these rooms have exhaust rates that must be met and are evaluated separately in this report. Refer to the exhaust rate evaluation tables in Appendix B for individual room exhaust rate evaluations.

In addition to providing mechanical ventilation to the space, an alternative method approved by the building code allows for air to enter the occupied space naturally through operable windows. Most spaces in the school are equipped with operable windows. The code states that the minimum openable area to the outdoors shall be 4% of the floor area being ventilated. Although this is an acceptable means of providing outdoor air by code, it is not a realistic option during cold weather or hot weather months, as windows will typically be closed. Operable windows are not considered sources of ventilation in this analysis.

2.1.1 Airflow Design vs. Measurements

Table 3 below displays the measured equipment supply and outside airflows. Airflow measurements were performed by Wing's Testing and Balancing (TAB). Using ASHRAE Standard 62.1, outside air flow rates were calculated. The required airflow column in Table 3 is the combined outdoor air required for each unit's associated spaces. Appendix A contains the full report provided by Wing's TAB, and Appendix B Tables 1 & 2 contain the calculated required airflow rate for each space performed by F&O.

Based on the testing and balancing results, most of the outdoor air equipment is underserving its associated spaces. Although AHU-1 OFF. provides sufficient outdoor air to satisfy the combined ventilation requirement, the outdoor air distribution system is not balanced appropriately to meet the minimum ventilation requirements of individual spaces. As a result, some spaces receive less outdoor air than required, while others receive more than required.

The row titled "Not Served" represents the spaces in the building that require outdoor air but are not served by any equipment. The combined required outdoor air flowrate for these spaces is 13,346 CFM.

Table 3
Design vs. Measured Airflow

AHU	Measured Airflow			Required Airflow	
	SUPPLY CFM	OA CFM	% OA	OA CFM	% OA
Gym AHU	2,523	513	20%	873	35%
AHU-1 OFF.	2,080	249	12%	224	11%
FCU Media North	917	37	4%	392	43%
FCU Media South	1,103	44	4%	392	36%
Not Served	-	-	-	13,346	-

2.1.2 Individual Room Ventilation

Ventilation rates for each room with the outdoor air damper at the minimum position are itemized in Appendix B. At this position, most rooms do not receive appropriate ventilation based on ASHRAE population densities described in Section 2.1. The ASHRAE population densities are conservative, and the ventilation rates can be adjusted based on actual space uses. See Appendix A for TAB ventilation testing data and see Section 3 for recommended adjustments.

2.2 Field Study Findings and General Observations

F&O performed a walk-down of the school prior to the TAB testing activities and noted room measurements, observable maintenance concerns, and general equipment condition. Below is a summary of TAB and F&O observations. See Section 3 for recommendations.

2.2.1 General Observations

F&O observed visible staining on the plaster ceiling. This may indicate active leaks from piping above or compromised duct or pipe insulation resulting in condensation. Furthermore, it was noted that the equipment serving the building relies primarily on manual and electromechanical controls rather than networked direct digital controls.

2.2.2 Air Handling Units

Outdoor air is provided to the AHUs through ducted exterior wall louvers or remote rooftop outdoor air intakes connected to the unit's outdoor air intake section. Return air is mixed with the outdoor air and circulated through the units. The dampers for the air handlers are adjusted manually. AHU-1 OFF.'s sequence of operation has a handwritten note to turn off the unit on cold days and states that the unit is primarily for ventilation and cooling. The hot water piping serving the Gym AHU was not insulated.

2.2.3 Fan Coil Units

Outdoor air is provided to the FCUs through ducted exterior wall louvers. Return air is mixed with the outdoor air and circulated through the units. Return air is mixed with the outdoor air and circulated through the units. The outdoor air dampers are controlled by an on/off switch which actuates the dampers to either the 4% open position or fully closed. Similar to the AHUs, there is a handwritten note to turn off outdoor air on the cold days. The majority of the FCU Media South's supply and return ductwork is flexible duct, which has a much higher pressure drop than metal duct, and can restrict airflow.

2.2.4 Exhaust Fans

The Southeast classroom exhaust fan (Ea. So. EF) was noted to operate with excessive noise. Most spaces in the building are exhausted but are not provided with makeup air, relying on building leaks and air from other spaces. The kitchen hood exhaust may be provided with makeup air integral to the exhaust hood, but operation was not observed.

The TAB report noted that many of the exhaust fan speed control potentiometers were set to their maximum position, indicating that they are running at their maximum operating setpoint. The inline exhaust fan serving Restroom 200 was running but did not draw any air during testing.

Exhaust fan flowrates can be found in Appendix B Table 2.

3 Discussion and Recommendations

3.1 Code Compliance Review

As discussed, many spaces which require ventilation are not served by any ventilating equipment. Of the spaces that are served by ventilating equipment, most do not meet the ventilation requirement. While most of the school is served by exhaust equipment, many of the spaces that require exhaust do not meet ASHRAE requirements. See Appendix B for each room's compliance. The remainder of this section provides recommendations for the school to meet the ASHRAE standard.

3.2 Recommendations to Improve Ventilation Performance

3.2.1 General Observations

To preserve the condition and capability of the HVAC equipment serving the building, it is recommended that a maintenance program following ASHRAE 180-2018: *Standard Practice for Inspection and Maintenance of Commercial Building HVAC Systems* be implemented. This standard provides a comprehensive guide, that when followed, can increase the HVAC system's ability to achieve acceptable thermal comfort, energy efficiency and indoor air quality within the building.

The ceiling discoloration may indicate water intrusion resulting from active pipe leaks or condensation on inadequately insulated piping or ductwork within the plenum space.

None of the equipment is equipped with digital controls. Direct digital controls should be incorporated in future improvements to improve ventilation control, energy efficiency, system monitoring and maintenance.

Most spaces in the building are not served by mechanical ventilating equipment. It is recommended that an engineered design is implemented to provide outdoor air to the spaces not currently served.

3.2.2 Air Handling Units

AHU-1 OFF provides the outdoor air required for the combination of the spaces it serves yet still serves spaces that do not meet the requirement. Depending on the ductwork configuration, the requirement may be met by balancing the ductwork. The outdoor air percentage at AHU-1 OFF may need to be increased to provide outdoor air for the most demanding space. The AHU needs to be evaluated to determine whether it can accommodate these system changes.

The note on the control's sequences for AHU-1 OFF. indicates that this unit cannot properly condition outdoor air during cold weather, and that no outdoor air is to be provided during cold weather. It is recommended that this

equipment is either supplemented or replaced with equipment that can provide outdoor air during all design conditions.

The Gym AHU does not provide the required outdoor air for the space it serves. The AHU should be investigated to determine whether it is capable of providing the required outdoor air. If the unit cannot provide the outdoor air required, it should be replaced or supplemented.

The Gym AHU hot water supply piping should be properly insulated. Insulating the hot water supply piping will reduce heat loss from the piping prior to reaching the AHU, improving energy efficiency and allowing the hot water to reach the heating coils at the intended temperature. Providing hot water to the coils lower than the intended temperature can reduce the heating capacity of the air handler and increase boiler run times.

3.2.3 Fan Coil Units

The FCUs are not providing the required outdoor air for the spaces they serve. The FCUs should be investigated to determine whether they can provide the required outdoor air. If the unit cannot provide the outdoor air required, it should be replaced or supplemented.

The note on the control panel indicates that this unit cannot properly condition outdoor air during cold weather, and that no outdoor air is provided during cold weather. It is recommended that this equipment is either supplemented or replaced with equipment that can provide outdoor air during all design conditions.

The flexible ductwork serving FCU Media South may be limiting the equipment's performance. The flexible ductwork should be inspected and all kinks, compression, and sagging should be eliminated. If found that static pressure is limiting the unit's performance, then the ductwork should be replaced with rigid sheet metal ductwork.

3.2.4 Exhaust Fans

The southeast exhaust fan (Ea. So. EF) should be investigated to determine the cause of excessive operating noise. Corrective actions may include repairing or replacing worn bearings, belts, or other mechanical components, and verifying proper fan alignment and mounting.

The school should be evaluated for issues associated with excessive negative building pressurization. Indicators such as difficulty opening doors, whistling at exterior openings, and noticeable drafts may indicate excessive differential pressure between the outdoors and indoors. Where necessary, conditioned makeup air should be provided to maintain proper building pressurization and exhaust system performance.

Several exhaust systems did not meet the required exhaust airflow for the spaces they serve while at the maximum speed setting. These fans should be evaluated to determine whether airflow is being limited by system static pressure, duct restrictions, or fan capacity. Necessary repairs or replacements should be carried out to meet the exhaust airflow requirements.

The inline exhaust fan serving Restroom 200 was operating but not drawing any air. The fan and associated ductwork should be inspected for disconnected or blocked ductwork, closed dampers, missing belts, or other conditions that may be preventing airflow.

Appendix A

Testing and Balancing Report

WING'S TESTING & BALANCING CO., INC.

Bethlehem Elementary School

Ventilation Verification

* * * *

Fuss & O'Neill
Attn: Josh Boudreau
One Financial Plaza, 15th Floor
Hartford, CT 06103

June 25, 2026

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

SM-1 License #6803

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WING'S TESTING & BALANCING CO., INC.

June 25, 2026

Fuss & O'Neill
Attn: Josh Boudreau
One Financial Plaza, 15th Floor
Hartford, CT 06103

Re: Bethlehem Elementary School – Ventilation Verification

Dear Josh,

The ventilation verification for Bethlehem Elementary School has been completed. Following are our findings:

- Majority of the school is served by exhaust fans. All classrooms, from the oldest to the most recent section are served by exhaust fans and have openable windows.
- The Multipurpose Room, Cafeteria, and part of the Media Lab/ Library are served by 100% return air FCUs for the purpose of cooling.
- Storage 141 originally was a kiln room with a unit in it which served the space. The unit is decommissioned and has its outside air inlet capped as it normally isn't used. The unit does have the ability to run if necessary.
- Only four systems have outside air: North Media FCU, South Media FCU, AHU-1 which serves the Front Office and Nurses Office, and the Gym AHU, which serves the Gym and stage.
- None of these units have any digital controls other than on/off status. These four units have their outside air set manually or controlled by a switch if they need ventilation.
- Units were set to their minimal outside air status for testing and that is how we calculated outside air distributed to each rooms.
- The percentage of outside air for each is 4% for Media units, 12% for AHU-1, and 20% for the Gym.
- Units not functioning at the time of testing were the FCU which serve corridor 8 (100% return air and only run when boilers are on due to Accutemp controller for devices), the boiler rooms units which only run when boilers are on, the Gym exhaust fans, and an in-line exhaust fan in Restroom 200.

The following pages are your record of current operating 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:
TAB—Cx—Indoor Air Quality—Sound & Vibration
Fire & Smoke Damper—Smoke Control Systems

Dominic DiLeonardo
TAB Technician



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VELOCITY PRESSURE READINGS

PROJECT: Bethlehem Elementary School - Ventilation Verification **DATE:** 6/25/2026

AREA SERVED: Assorted Units Totals/ Outside Air **TECH:** DD

TRAVERSE LOCATIONS	DUCT SIZE "	AREA SQ.FT.	DESIGN FPM	DESIGN CFM	CENT. STAT. PRESS.''	TEST FPM	TEST CFM	NOTES
No. Media FCU O.A	10"Ø	0.55	---	N/D	-0.015"	68	37	(1)
So. Media FCU O.A.	10"Ø	0.55	---	N/D	-0.024"	79	43	(1)
AHU-1								
Supply	32" x 14"	3.11	---	N/D	+0.08"	472	1468	
Return								
Branch #1	18" x 10"	1.25	---	N/D	-0.15"	543	679	
Branch #2	12" x 10"	0.83	---	N/D	-0.17"	416	345	
Branch #3	12" x 6"	0.5	---	N/D	-0.16"	528	264	
Total							1288	
O.A. Calc.	---	---	---	---	---	---	180	(2)
Gym AHU								
Return								
Branch #1	24" x 18"	3.0	---	N/D	-0.06"	354	1062	
Branch #2	24" x 18"	3.0	---	N/D	-0.05"	316	948	
							2010	
O.A.	56" x 20"	7.78	---	N/D	w/ Velgrid	66	513	(2, 4)
Supply Calc.	---	---	---	---	---	---	2523	(3)

REMARKS

(1) O.A. dampers closed 100%, doors open with switch flipped
(2) Damper 100% closed
(3) Supply diffusers too high to reach & duct is suspected asbestos wrapped
(4) Not possible to traverse accuratley; needs to be measured at inlet

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

AIR DEVICE REPORT

PROJECT: Bethlehem Elementary School - Ventilation Verification | **DATE:** 6/25/2026

SYSTEM / AREA: Various/ FCU-AHU's | **TECH:** DD

LOCATION	NO.	SIZE	A K	DESIGN		TEST		FINAL		NOTES
				FPM	CFM	FPM	CFM	FPM	CFM	
141 Unit										(1)
Supply	S1	6"Ø	0.2	---	N/D	600	120			
Return	R1	14" x 10"	0.7	---	N/D	237	166			
FCU Multipur. 103										
Supply	S1	16" x 16"	FH	---	N/D	---	256			(2)
Supply	S2	16" x 16"	FH	---	N/D	---	431			
Supply	S3	16" x 16"	FH	---	N/D	---	449			
Supply	S4	16" x 16"	FH	---	N/D	---	211			
							1347			
Return	R1	22" x 22"	FH	---	N/D	---	621			
Return	R2	22" x 22"	FH	---	N/D	---	635			
							1256			
AHU-1										
Supply										
Nurses Office	S1	9" x 9"	FH	---	N/D	---	137			
Nurses Office	S2	9" x 9"	FH	---	N/D	---	138			
Exam Rm	S3	9" x 9"	FH	---	N/D	---	111			
Office	S4	6" x 6"	FH	---	N/D	---	55			
Office	S5	9" x 9"	FH	---	N/D	---	117			
Office	S6	9" x 9"	FH	---	N/D	---	173			
Office	S7	9" x 9"	FH	---	N/D	---	93			
Office Hall	S8	6" x 6"	FH	---	N/D	---	58			
Office Workroom	S9	6" x 6"	FH	---	N/D	---	105			
Conference	S10	9" x 9"	FH	---	N/D	---	125			
Conference	S11	9" x 9"	FH	---	N/D	---	140			
Principal	S12	9" x 9"	FH	---	N/D	---	128			
Principal	S13	9" x 9"	FH	---	N/D	---	99			
							1479			
Return										
Exam	R1	10" x 10"	FH	---	N/D	---	87			
Nurses Office	R2	10" x 10"	FH	---	N/D	---	188			
Office	R3	14" x 14"	FH	---	N/D	---	421			
Conference	R4	10" x 10"	FH	---	N/D	---	172			
Principal	R5	10" x 10"	FH	---	N/D	---	232			
							1111			

REMARKS

(1) O.A. plugged; unit also not used since kiln was removed

(2) No O.A. ducted to unit

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

AIR DEVICE REPORT

PROJECT: Bethlehem Elementary School - Ventilation Verification | **DATE:** 6/25/2026

SYSTEM / AREA: Various/ FCU | **TECH:** DD

LOCATION	NO.	SIZE	A K	DESIGN		TEST		FINAL		NOTES
				FPM	CFM	FPM	CFM	FPM	CFM	
FCU North Media										
Supply	S1	9" x 9"	FH	---	N/D	---	39			
Supply	S2	9" x 9"	FH	---	N/D	---	32			
Supply	S3	16" x 16"	FH	---	N/D	---	817			
Supply	S4	9" x 9"	FH	---	N/D	---	29			
							917			
Return	R1	22" x 10"	1.53	---	N/D	590	903			(1)
FCU South Media										
Library Office	S1	9" x 9"	FH	---	N/D	---	106			
Media	S2	9" x 9"	FH	---	N/D	---	100			
Media	S3	16" x 16"	FH	---	N/D	---	784			
Media	S4	9" x 9"	FH	---	N/D	---	113			
							1103			
Return	R1	22" x 10"	1.53	---	N/D	686	1050			(1)
Attic FCU Unit										
Media Supply	S1	12" x 12"	FH	---	N/D	---	171			
Media Supply	S2	12" x 12"	FH	---	N/D	---	155			
Media Supply	S3	12" x 12"	FH	---	N/D	---	220			
Media Supply	S4	12" x 12"	FH	---	N/D	---	189			
							735			
Media Return	R1	22" x 22"	FH	---	N/D	---	699			
Café Wall FCU-1										(2)
Supply	S1	28" x 9"	1.26	---	N/D	648	816			
Return	R1	44" x 5"	1.1	---	N/D	316	348			(3)
Café Wall FCU-2										(2)
Supply	S1	28" x 9"	1.26	---	N/D	526	663			
Return	R1	44" x 5"	1.1	---	N/D	244	268			(3)

REMARKS

(1) Side of FCU in ceiling

(2) No O.A. ducted to unit

(3) Leakage at edge of box and walls allows more air in

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

AIR DEVICE REPORT

PROJECT: Bethlehem Elementary School - Ventilation Verification | **DATE:** 6/22-6/26/26

SYSTEM / AREA: Various/ Exhausts | **TECH:** DD

LOCATION	NO.	SIZE	A K	DESIGN		TEST		FINAL		NOTES
				FPM	CFM	FPM	CFM	FPM	CFM	
Exhast Fan 114										
Room 114	E1	14" x 14"	FH	---	N/D	---	582			(1)
RR Cor 5 EF										
Girls RR 99	E1	10" x 10"	0.5	---	N/D	640	320			(1)
Boys RR 98	E2	10" x 10"	FH	---	N/D	---	279			(1)
Custodial	E3	8" x 6"	0.24	---	N/D	190	46			(1)
Staff RR	E4	8" x 4"	FH	---	N/D	---	60			(1)
Handicap RR	E5	8" x 4"	FH	---	N/D	---	71			(1)
							776			
EF 111 & 112										
SE 111	E1	12" x 12"	FH	---	N/D	---	542			(1)
Grade 1 Class 112	E2	12" x 12"	FH	---	N/D	---	550			(1)
							1092			
ED 109 & 110										
Grade 2 Class 109	E1	12" x 12"	FH	---	N/D	---	532			(1)
Grade 2 Class 110	E2	12" x 12"	FH	---	N/D	---	559			(1)
							1091			
EF 107 & 108										
Grade 2 Class 107	E1	12" x 12"	FH	---	N/D	---	397			(1)
Grade 4 Class 108	E2	12" x 12"	FH	---	N/D	---	410			(1)
							807			
East South Class EF										
Grade 5 Class 106	E1	16" x 16"	FH	---	N/D	---	546			
Grade 5 Class 105	E2	16" x 16"	FH	---	N/D	---	600			
Storage	E3	8" x 8"	FH	---	N/D	---	83			
Grade 4 Class 104	E4	16" x 16"	FH	---	N/D	---	618			
							1847			
East North Class EF										
Multipurpose 103	E1	16" x 16"	FH	---	N/D	---	638			
Grade 3 Class 102	E2	16" x 16"	FH	---	N/D	---	707			
Grade 3 Class 101	E3	16" x 16"	FH	---	N/D	---	603			
							1948			

REMARKS

(1) Unit at max @ potentiometer

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

AIR DEVICE REPORT

PROJECT: Bethlehem Elementary School - Ventilation Verification | **DATE:** 6/25/2026

SYSTEM / AREA: Various/ Exhausts | **TECH:** DD

LOCATION	NO.	SIZE	A K	DESIGN		TEST		FINAL		NOTES
				FPM	CFM	FPM	CFM	FPM	CFM	
East RR EF										
Boys RR 129	E1	16" x 8"	0.89	---	N/D	561	499			
Staff RR 131	E2	16" x 3"	0.33	---	N/D	213	70			
Grils RR 130	E3	14" x 6"	0.58	---	N/D	287	166			
Custodial RR	E4	6" x 6"	0.18	---	N/D	220	40			
							775			
Office EF										
Nurses RR 137	E1	12" x 4"	0.33	---	N/D	500	165			
Office RR 140	E2	12" x 4"	0.33	---	N/D	505	167			
Work Rm 136	E3	8" x 8"	FH	---	N/D	---	93			
							425			
Cafeteria EF										
Cafeteria	E1	48" x 16"	3.84	---	N/D	692	2657			
Cafeteria	E2	48" x 16"	3.84	---	N/D	691	2653			
							5310			
Kitchen Hoof EF										
Exhaust	E1	144" x 4"	4.0	---	N/D	982	3928			
EF 118 & 117										
Kindergarten 118	E1	24" x 8"	FH	---	N/D	---	223			
Kindergarten 118	E2	24" x 8"	FH	---	N/D	---	144			
Art Class 117	E3	24" x 8"	FH	---	N/D	---	139			
Art Class 117	E4	24" x 8"	FH	---	N/D	---	144			
							650			
EF 119 & 121										
Kindergarten 119	E1	24" x 8"	FH	---	N/D	---	138			
Kindergarten 119	E2	24" x 8"	FH	---	N/D	---	165			
Work Rm 208	E3	6" x 6"	FH	---	N/D	---	0			
							303			
EF 120 & 122										
Kindergarten 120	E1	24" x 8"	FH	---	N/D	---	119			
Kindergarten 120	E2	24" x 8"	FH	---	N/D	---	278			
OT/FT/SA 122	E3	24" x 8"	FH	---	N/D	---	174			
OT/FT/SA 122	E4	36" x 8"	FH	---	N/D	---	313			
							776			

REMARKS

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

AIR DEVICE REPORT

PROJECT: Bethlehem Elementary School - Ventilation Verification | **DATE:** 6/25/2026

SYSTEM / AREA: Various/ Exhausts | **TECH:** DD

LOCATION	NO.	SIZE	A K	DESIGN		TEST		FINAL		NOTES
				FPM	CFM	FPM	CFM	FPM	CFM	
North RR EF										
Student RR 126	E1	6" x 4"	0.14	---	N/D	141	20			
Student RR 127	E2	6" x 4"	0.14	---	N/D	149	21			
Staff RR 210	E3	8" x 8"	FH	---	N/D	---	72			
Girls RR 123	E4	16" x 6"	0.54	---	N/D	203	110			
Custodial 125	E5	12" x 10"	0.6	---	N/D	352	211			
Boys RR 124	E6	16" x 6"	0.54	---	N/D	206	111			
Vestibule 121	E7	6" x 4"	FH	---	N/D	---	32			
							577			
Attic EF										
LIT Class 202	E1	12" x 12"	FH	---	N/D	---	388			
LIT Class 204	E2	12" x 12"	FH	---	N/D	---	318			
Learning Center	E3	12" x 12"	FH	---	N/D	---	399			
Book Rm 203	E4	12" x 12"	FH	---	N/D	---	433			
Music Rm L-2	E5	16" x 8"	FH	---	N/D	---	292			
Science Lab L-1	E6	10" x 10"	FH	---	N/D	---	201			
RR 200	E7	6" x 6"	FH	---	N/D	---	36			
							2067			
RR 200 In-line										
RR 200	E1	14" x 4"	FH	---	N/D	---	0			(1)
RR 200	E2	14" x 4"	FH	---	N/D	---	0			(1)
							0			

REMARKS

(1) Unit has power and runs but no air draw

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

Project: Bethlehem Elementary

TECH: DD

Field Notes					Served By			TAB MEASUREMENTS						
Location	Given Room Name/Number from Room Names PDF	Room Type	Drawing Room #	Drawing Room Name	Terminal Equipment	AHU/RTU	EXHAUST FAN	TAB Measured SA	TAB MEASURED RETURN	TAB MEASURED EXHAUST	Calc. OA CFM @ Min.	Meas. unit OA %	BAS Damper Command	Notes
					VAV/FCU/UV			(cfm)	(cfm)	(cfm)	(OA cfm)	(OA cfm)	(pos. %)	
Main Floor	1	Corridor	1	Corr-1	---	---	---	---	---	---	---	---	---	No Ventilation
Main Floor	2	Corridor	2	Corr-2	---	---	---	---	---	---	---	---	---	No Ventilation
Main Floor	3	Corridor	3	Corr-3	---	---	---	---	---	---	---	---	---	No Ventilation
Main Floor	4	Corridor	4	Corr-4	---	---	---	---	---	---	---	---	---	No Ventilation; openable windows
Main Floor	5	Corridor	5	Corr-5	---	---	---	---	---	---	---	---	---	No Ventilation
Main Floor	6	Corridor	6	Corr-6	---	---	---	---	---	---	---	---	---	No Ventilation; openable windows
Main Floor	7	Corridor	7	Corr-7	---	---	---	---	---	---	---	---	---	No Ventilation; openable windows
Main Floor	8	Corridor	8	Corr-8	FCU 1, 2, 3	---	---	---	---	---	0%	0%	---	FCUs, All return, No O.A., seasonal w/ boiler
Main Floor	93	Vestibule	93	Vestibule	---	---	---	---	---	---	---	---	---	No Ventilation
Main Floor	94	Storage	94	Stor	---	---	---	---	---	---	---	---	---	No Ventilation
Main Floor	95	Utility	95	Boiler-Room	---	MAU-A	---	---	---	---	---	---	N/A	N/R - Unoccupied/Seasonal
Main Floor	96	Office	96	Stor/Office	---	---	---	---	---	---	---	---	---	No Ventilation
Main Floor	97	Storage	97	Stor	---	---	---	---	---	---	---	---	---	No Ventilation
Main Floor	98	Restroom	98	Boys-RR	---	---	Cors RR EF	---	---	279	---	---	---	Openable Windows
Main Floor	99	Restroom	99	Girls-RR	---	---	Cors RR EF	---	---	320	---	---	---	Openable Windows
Main Floor	101	Classroom	101	Grade3-Classroom	---	---	Ea. No. Class EF	---	---	603	---	---	---	Openable Windows
Main Floor	102	Classroom	102	Grade3-Classroom	---	---	Ea. No. Class EF	---	---	707	---	---	---	Openable Windows
Main Floor	103	Classroom	103	Multipurpose-Classroom	---	Multi. FCU	Ea. No. Class EF	1347	1131	638	---	---	---	Openable Windows
Main Floor	104	Classroom	104	Grade4-Classroom	---	---	Ea. So. Class EF	---	---	618	---	---	---	Openable Windows
Main Floor	105	Classroom	105	Grade5-Classroom	---	---	Ea. So. Class EF	---	---	600	---	---	---	Openable Windows
Main Floor	106	Classroom	106	Grade5-Classroom	---	---	Ea. So. Class EF	---	---	546	---	---	---	Openable Windows
Main Floor	107	Classroom	107	Grade2-Classroom	---	---	EF 107, 108	---	---	397	---	---	---	Openable Windows
Main Floor	108	Classroom	108	Grade4-Classroom	---	---	EF 107, 108	---	---	410	---	---	---	Openable Windows
Main Floor	109	Classroom	109	Grade2-Classroom	---	---	EF 109, 110	---	---	532	---	---	---	Openable Windows
Main Floor	110	Classroom	110	Grade1-Classroom	---	---	EF 109, 110	---	---	559	---	---	---	Openable Windows
Main Floor	111	Classroom	111	Special-Education	---	---	EF 111, 112	---	---	542	---	---	---	Openable Windows
Main Floor	112	Classroom	112	Grade1-Classroom	---	---	EF 111, 112	---	---	550	---	---	---	Openable Windows
Main Floor	113	Classroom	113	SRO-CLASSROOM	---	---	---	---	---	---	---	---	---	No Ventilation; openable windows
Main Floor	114	Office	114	PSYCH	---	---	EF-114	---	---	582	---	---	---	Openable Windows
Main Floor	115	Cafeteria	115	Cafeteria	FCU 1 & 2	---	Café EF	1478	616	5310	---	---	N/A	Openable Windows
Main Floor	116	Kitchen	116	Kitchen	---	---	Kitchen Hd	---	---	3928	---	---	---	Openable Windows
Main Floor	117	Art Classroom	117	Art-Classroom	---	---	EF 117, 118	---	---	283	---	---	N/A	Openable Windows
Main Floor	118	Classroom	118	Kindergarten-Classroom	---	---	EF 117, 118	---	---	367	---	---	N/A	Openable Windows
Main Floor	119	Classroom	119	Kindergarten-Classroom	---	---	EF 119-121	---	---	303	---	---	N/A	Openable Windows
Main Floor	120	Classroom	120	Kindergartern-Classroom	---	---	EF 120-122	---	---	397	---	---	N/A	Openable Windows
Main Floor	121	Vestibule	121	Vestibule	---	---	---	---	---	---	---	---	N/A	No Ventilation; openable windows

Project: Bethlehem Elementary

TECH: DD

Field Notes					Served By			TAB MEASUREMENTS						
Location	Given Room Name/Number from Room Names PDF	Room Type	Drawing Room #	Drawing Room Name	Terminal Equipment	AHU/RTU	EXHAUST FAN	TAB Measured SA	TAB MEASURED RETURN	TAB MEASURED EXHAUST	Calc. OA CFM @ Min.	Meas. unit OA %	BAS Damper Command	Notes
					VAV/FCU/UV			(cfm)	(cfm)	(cfm)	(OA cfm)	(OA cfm)	(pos. %)	
Main Floor	122	Classroom	122	OT/PT/SPL-Classroom	---	---	EF 120-122	---	---	487	---	---	N/A	
Main Floor	123	Restroom	123	Girls-RR	---	---	No. RR EF	---	---	110	---	---	---	No Ventilation; openable windows
Main Floor	124	Restroom	124	Boys-RR	---	---	No. RR EF	---	---	111	---	---	---	No Ventilation; openable windows
Main Floor	125	Custodial	125	Jan.Closet	---	---	No. RR EF	---	---	211	---	---	---	No Ventilation; openable windows
Main Floor	126	Storage	126	Stor	---	---	No. RR EF	---	---	20	---	---	N/A	
Main Floor	127	Storage	127	Stor	---	---	No. RR EF	---	---	21	---	---	N/A	
Main Floor	128	Music/Theater/Dance	128	Media-Center	FCU No., So., Attic	---	---	2755	2652	---	80	3%	N/A	
Main Floor	129	Restroom	129	Boys-RR	---	---	Ea. RR EF	---	---	499	---	---	---	
Main Floor	130	Restroom	130	Girls-RR	---	---	Ea. RR EF	---	---	166	---	---	---	
Main Floor	131	Restroom	131	Lav	---	---	Ea. RR EF	---	---	70	---	---	---	
Main Floor	132	Office	132	Main Office	---	AHU-1 Off.	---	601	421	---	72	12%	N/A	
Main Floor	133	Conference Room	133	Conference-Room	---	AHU-1 Off.	---	265	172	---	32	12%	N/A	
Main Floor	134	Office	134	Principal	---	AHU-1 Off.	---	227	232	---	27	12%	N/A	
Main Floor	135	Nurse	135	Nurse	---	AHU-1 Off.	---	275	188	---	33	12%	N/A	
Main Floor	136	Office	136	Workroom	---	AHU-1 Off.	Office EF	601	421	93	72	12%	N/A	Same as office
Main Floor	137	Restroom	137	Lav	---	---	Office EF	---	---	165	---	---	---	
Main Floor	138	Storage	138	Stor	---	---	---	---	---	---	---	---	---	No Ventilation
Main Floor	139	Classroom	139	Exam	---	AHU-1 Off.	---	111	87	---	13	12%	N/A	
Main Floor	140	Custodial	140	Custodial-Closet	---	---	Ea. RR EF	---	---	40	---	---	---	
Main Floor	140	Custodial	140	Custodial-Closet	---	---	Office EF	---	---	167	---	---	---	
Main Floor	141	Storage	141	Storage	---	Kiln Unit	---	120	166	---	---	---	N/A	Decommissioned unit, O.A. plugged
Main Floor	200	Restroom	200	Restroom	---	---	Attic EF Inline EF	---	---	36	---	---	---	Inline turns on, doesn't move air
Main Floor	201	Office	201	Psych	---	---	---	---	---	---	---	---	---	No Ventilation; openable windows
Main Floor	202	Classroom	202	Lit-Classroom	---	---	Attic EF	---	---	388	---	---	N/A	Openable Windows
Main Floor	203	Classroom	203	Book-Room	---	---	Attic EF	---	---	433	---	---	N/A	Openable Windows
Main Floor	204	Classroom	204	Lit-Classroom	---	---	Attic EF	---	---	318	---	---	N/A	Openable Windows
Main Floor	205	Classroom	205	Learning-Center	---	---	Attic EF	---	---	399	---	---	N/A	Openable Windows
Main Floor	206	Office	206	Zenden	---	---	---	---	---	---	---	---	---	No Ventilation; openable windows
Main Floor	207	Lobby	207	Faculty-Room	---	Gym AHU	Gym EF 1, 2	2523	2010	0	513	20%	N/A	EFs not running w/ unit
Main Floor	208	Office	208	Work-Room	---	---	EF 119-121	---	---	0	---	---	N/A	Openable Windows
Main Floor	209	Storage	209	Server	---	---	---	---	---	---	---	---	N/A	No Ventilation
Main Floor	210	Restroom	210	Restroom	---	---	No. RR EF	---	---	72	---	---	N/A	Openable Windows
Main Floor	211	Storage	211	Storage	---	---	---	---	---	---	---	---	N/A	No Ventilation
Main Floor	212	Kitchen	212	Gymnasium	---	Gym AHU	EF 1, 2	2523	2010	0	513	20%	N/A	Same as 207
Main Floor	213	Office	213	Counselor	---	---	---	---	---	---	---	---	---	No Ventilation
Main Floor	214	Office	214	PE-Office	---	---	---	---	---	---	---	---	---	No Ventilation

Project: Bethlehem Elementary TECH: DD

Field Notes					Served By			TAB MEASUREMENTS						
Location	Given Room Name/Number from Room Names PDF	Room Type	Drawing Room #	Drawing Room Name	Terminal Equipment	AHU/RTU	EXHAUST FAN	TAB Measured SA	TAB MEASURED RETURN	TAB MEASURED EXHAUST	Calc. OA CFM @ Min.	Meas. unit OA %	BAS Damper Command	Notes
					VAV/FCU/UV			(cfm)	(cfm)	(cfm)	(OA cfm)	(OA cfm)	(pos. %)	
Main Floor	215	Storage	215	Stor	---	---	---	---	---	---	---	---	N/A	No Ventilation
Lower Level	L-1	Classroom	L-1	Science Lab	---	---	Attic EF	---	---	201	---	---	N/A	Openable Windows
Lower Level	L-2	Music/Theater/Dance	L-2	Music Classroom	---	---	Attic EF	---	---	292	---	---	N/A	Openable Windows
Lower Level	L-3	Utility	L-3	Boiler Room	---	MUA-B	---	---	---	---	---	---	N/A	N/R - Unoccupied/Seasonal

Appendix B

Ventilation Data Calculations

Project Name: 5-Year HVAC Evaluation
School Name: RSD 14 Bethlehem Elementary School
Project Numbe P20230560.A10
Scope: HVAC Verification and Evaluation
Data Collection TAB Data F&O Data
Date: 6/25/2026 4/15/2026
Outside Air Verification Calculation

RSD 14 Bethlehem Elementary School Outside Air Verification Calculation											
ROOM IDENTIFICATION					AIR HAND. EQUIPMENT		CALCULATED VENTILATION REQUIREMENT				VENTILATION DELTA
DRAWING ROOM NUMBER	Actual Room Designation	ROOM TYPE	AREA	VOLUME	AHU	MEASURED OA AIRFLOW	OCCUPANCY DENSITY	PEOPLE BASED OA (RP)	AREA BASED OA (RA)	Vbz	
			(ft^2)	(ft^3)		(cfm)	(ppl/1000ft^2)	(CFM)	(CFM)	(CFM)	MEAS. - CALC.
1	Corr-1	Corridor	396	3564	---	0	-	0	24	24	-24
3	Corr-3	Corridor	1194	10748	---	0	-	0	72	72	-72
4	Corr-4	Corridor	825	7424	---	0	-	0	49	49	-49
5	Corr-5	Corridor	1025	9227	---	0	-	0	62	62	-62
6	Corr-6	Corridor	893	8041	---	0	-	0	54	54	-54
7	Corr-7	Corridor	938	8442	---	0	-	0	56	56	-56
8	Corr-8	Corridor	701	6311	---	0	-	0	42	42	-42
93	Vestibule	Vestibule	143	1290	---	0	0	10	9	19	-19
94	Stor	Storage	106	955	---	0	-	0	13	13	-13
95	Boiler-Room	Utility	360	3237	MAU-A	0	0	0	0	0	0
96	Stor/Office	Office	385	3461	---	0	2	10	23	33	-33
97	Stor	Storage	96	861	---	0	-	0	11	11	-11
98	Boys-RR	Restroom	221	1993	---	0	-	0	0	300	-300
99	Girls-RR	Restroom	245	2201	---	0	-	0	0	200	-200
101	Grade3-Classroom	Classroom	722	6499	---	0	25	260	87	347	-347
102	Grade3-Classroom	Classroom	720	6477	---	0	25	260	86	346	-346
103	Multipurpose-Classroom	Classroom	715	6432	---	0	25	260	86	346	-346
104	Grade4-Classroom	Classroom	778	6999	---	0	27	280	93	373	-373
105	Grade5-Classroom	Classroom	771	6936	---	0	27	270	92	362	-362
106	Grade5-Classroom	Classroom	767	6906	---	0	27	270	92	362	-362
107	Grade2-Classroom	Classroom	850	7654	---	0	30	300	102	402	-402
108	Grade4-Classroom	Classroom	857	7710	---	0	30	300	103	403	-403
109	Grade2-Classroom	Classroom	819	7375	---	0	29	290	98	388	-388
110	Grade1-Classroom	Classroom	814	7330	---	0	29	290	98	388	-388
111	Special-Education	Classroom	854	7689	---	0	30	300	103	403	-403
112	Grade1-Classroom	Classroom	834	7507	---	0	29	300	100	400	-400
113	SRO-CLASSROOM	Classroom	326	2935	---	0	11	120	39	159	-159
114	PSYCH	Office	339	3055	---	0	2	10	20	30	-30
115	Cafeteria	Cafeteria	2156	19403	---	0	216	1620	388	2008	-2,008
116	Kitchen	Kitchen	646	5816	---	0	13	98	78	175	-175
117	Art-Classroom	Art Classroom	852	7671	---	0	17	180	153	333	-333
118	Kindergarten-Classroom	Classroom	829	7460	---	0	29	300	99	399	-399
119	Kindergarten-Classroom	Classroom	806	7250	---	0	28	290	97	387	-387
120	Kindergartern-Classroom	Classroom	827	7439	---	0	29	290	99	389	-389
121	Vestibule	Vestibule	168	1515	---	0	0	10	10	20	-20

RSD 14 Bethlehem Elementary School Outside Air Verification Calculation											
ROOM IDENTIFICATION					AIR HAND. EQUIPMENT		CALCULATED VENTILATION REQUIREMENT				VENTILATION DELTA
DRAWING ROOM NUMBER	Actual Room Designation	ROOM TYPE	AREA	VOLUME	AHU	MEASURED OA AIRFLOW	OCCUPANCY DENSITY	PEOPLE BASED OA (RP)	AREA BASED OA (RA)	Vbz	
			(ft^2)	(ft^3)		(cfm)	(ppl/1000ft^2)	(CFM)	(CFM)	(CFM)	MEAS. - CALC.
122	OT/PT/SPL-Classroom	Classroom	836	7526	---	0	29	300	100	400	-400
123	Girls-RR	Restroom	181	1629	---	0	-	0	0	300	-300
124	Boys-RR	Restroom	211	1895	---	0	-	0	0	350	-350
125	Jan.Closet	Custodial	90	809	---	0	-	0	0	50	-50
126	Stor	Storage	40	361	---	0	-	0	5	5	-5
127	Stor	Storage	35	316	---	0	-	0	4	4	-4
128	Media-Center	Music/Theater/Dance	1898	17079	FCU No., So., Attic	80	66	670	114	784	-704
129	Boys-RR	Restroom	161	1453	---	0	-	0	0	350	-350
130	Girls-RR	Restroom	190	1714	---	0	-	0	0	300	-300
131	Lav	Restroom	42	377	---	0	-	0	0	50	-50
132	Main Office	Office	564	5080	AHU-1 Off.	72	3	15	34	49	23
133	Conference-Room	Conference Room	223	2009	AHU-1 Off.	32	11	60	13	73	-41
134	Principal	Office	214	1922	AHU-1 Off.	27	1	10	13	23	4
135	Nurse	Nurse	188	1694	AHU-1 Off.	33	1	5	11	16	17
136	Workroom	Office	76	687	AHU-1 Off.	72	0	5	5	10	62
137	Lav	Restroom	43	387	---	0	-	0	0	50	-50
138	Stor	Storage	42	382	---	0	-	0	5	5	-5
139	Exam	Classroom	106	952	AHU-1 Off.	13	4	40	13	53	-40
140	Custodial-Closet	Custodial	42	380	---	0	-	0	0	50	-50
140	Custodial-Closet	Custodial	42	380	---	0	-	0	0	50	-50
141	Storage	Storage	392	3529	Kiln Unit	0	-	0	47	47	-47
200	Restroom	Restroom	41	368	---	0	-	0	0	50	-50
201	Psych	Office	168	1511	---	0	1	5	10	15	-15
202	Lit-Classroom	Classroom	618	5565	---	0	22	220	74	294	-294
203	Book-Room	Classroom	596	5365	---	0	21	210	72	282	-282
204	Lit-Classroom	Classroom	571	5141	---	0	20	200	69	269	-269
205	Learning-Center	Classroom	611	5501	---	0	21	220	73	293	-293
206	Zenden	Office	187	1681	---	0	1	5	11	16	-16
207	Faculty-Room	Lobby	564	5080	Gym AHU	116	6	30	34	64	52
208	Work-Room	Office	177	1591	---	0	1	5	11	16	-16
209	Server	Storage	83	745	---	0	-	0	10	10	-10
210	Restroom	Restroom	32	292	---	0	-	0	0	50	-50
211	Storage	Storage	261	2353	---	0	-	0	31	31	-31
212	Gymnasium	Gymnasium	2498	22480	Gym AHU	397	17	360	450	810	-412
213	Counselor	Office	295	2655	---	0	1	10	18	28	-28
214	PE-Office	Office	177	1597	---	0	1	5	11	16	-16
215	Stor	Storage	97	877	---	0	-	0	12	12	-12
L-1	Science Lab	Classroom	537	4833	---	0	19	190	64	254	-254
L-2	Music Classroom	Music/Theater/Dance	859	7731	---	0	30	310	52	362	-362
L-3	Boiler Room	Utility	511	4599	MAU-B	0	0	0	0	0	0

Project Name: 5-Year HVAC Evaluation
Project Number: P20230560.A10
School Name RSD 14 Bethlehem Elementary School
Scope: HVAC Verification and Evaluation
Data Collection By: TAB Data F&O Data
Date: 6/25/2026 4/15/2026

RESTROOM EXHAUST FAN CALCULATION

RSD 14 Bethlehem Elementary School RESTROOM EXHAUST FAN CALCULATION

ROOM CHARACTERISTICS							TAB DATA	EXHAUST CALCULATIONS	
DRAWING ROOM NUMBER	DRAWING ROOM NAME	ROOM TYPE	AREA	VOLUME	PLUMBING FIXTURES	EXHAUST FAN	MEASURED EXHAUST	ASHRAE 62.1 REQUIRED EXHAUST	EXHAUST REQUIREMENT DELTA
			(ft^2)	(ft^3)	QTY.		(cfm)	(cfm)	MEAS. - CALC.
98	Boys-RR	Restroom	221	1993	6	Cors RR EF	279	300	-21
99	Girls-RR	Restroom	245	2201	4	Cors RR EF	320	200	120
123	Girls-RR	Restroom	181	1629	6	No. RR EF	110	300	-190
124	Boys-RR	Restroom	211	1895	7	No. RR EF	111	350	-239
129	Boys-RR	Restroom	161	1453	7	Ea. RR EF	499	350	149
130	Girls-RR	Restroom	190	1714	6	Ea. RR EF	166	300	-134
131	Lav	Restroom	42	377	1	Ea. RR EF	70	50	20
137	Lav	Restroom	43	387	1	Office EF	165	50	115
200	Restroom	Restroom	41	368	1	Attic EF Inline EF	36	50	-14
210	Restroom	Restroom	32	292	1	No. RR EF	72	50	22

CUSTODIAL EXHAUST FAN CALCULATION

RSD 14 Bethlehem Elementary School CUSTODIAL EXHAUST FAN CALCULATION

ROOM CHARACTERISTICS							TAB DATA	EXHAUST CALCULATIONS	
DRAWING ROOM NUMBER	DRAWING ROOM NAME	ROOM TYPE	AREA	VOLUME	PLUMBING FIXTURES	EXHAUST FAN	MEASURED EXHAUST	ASHRAE 62.1 REQUIRED EXHAUST	EXHAUST REQUIREMENT DELTA
			(ft^2)	(ft^3)	QTY.		(cfm)	(cfm)	MEAS. - CALC.
125	Jan.Closet	Custodial	90	809	1	No. RR EF	211	50	161
140	Custodial-Closet	Custodial	42	380	1	Ea. RR EF	40	50	-10
140	Custodial-Closet	Custodial	42	380	1	Ea. RR EF	40	50	-10

MUSIC/THEATER/DANCE EXHAUST FAN CALCULATION

MUSIC/THEATER/DANCE EXHAUST FAN CALCULATION

ROOM CHARACTERISTICS						TAB DATA	EXHAUST CALCULATIONS	
DRAWING ROOM NUMBER	DRAWING ROOM NAME	ROOM TYPE	AREA	VOLUME	EXHAUST FAN	MEASURED EXHAUST	ASHRAE 62.1 REQUIRED EXHAUST	EXHAUST REQUIREMENT DELTA
			(ft^2)	(ft^3)		(cfm)	(cfm)	MEAS. - CALC.
128	Media-Center	Music/Theater/Dance	1898	17079	---	0	784	-784
L-2	Music Classroom	Music/Theater/Dance	859	7731	Attic EF	292	362	-70

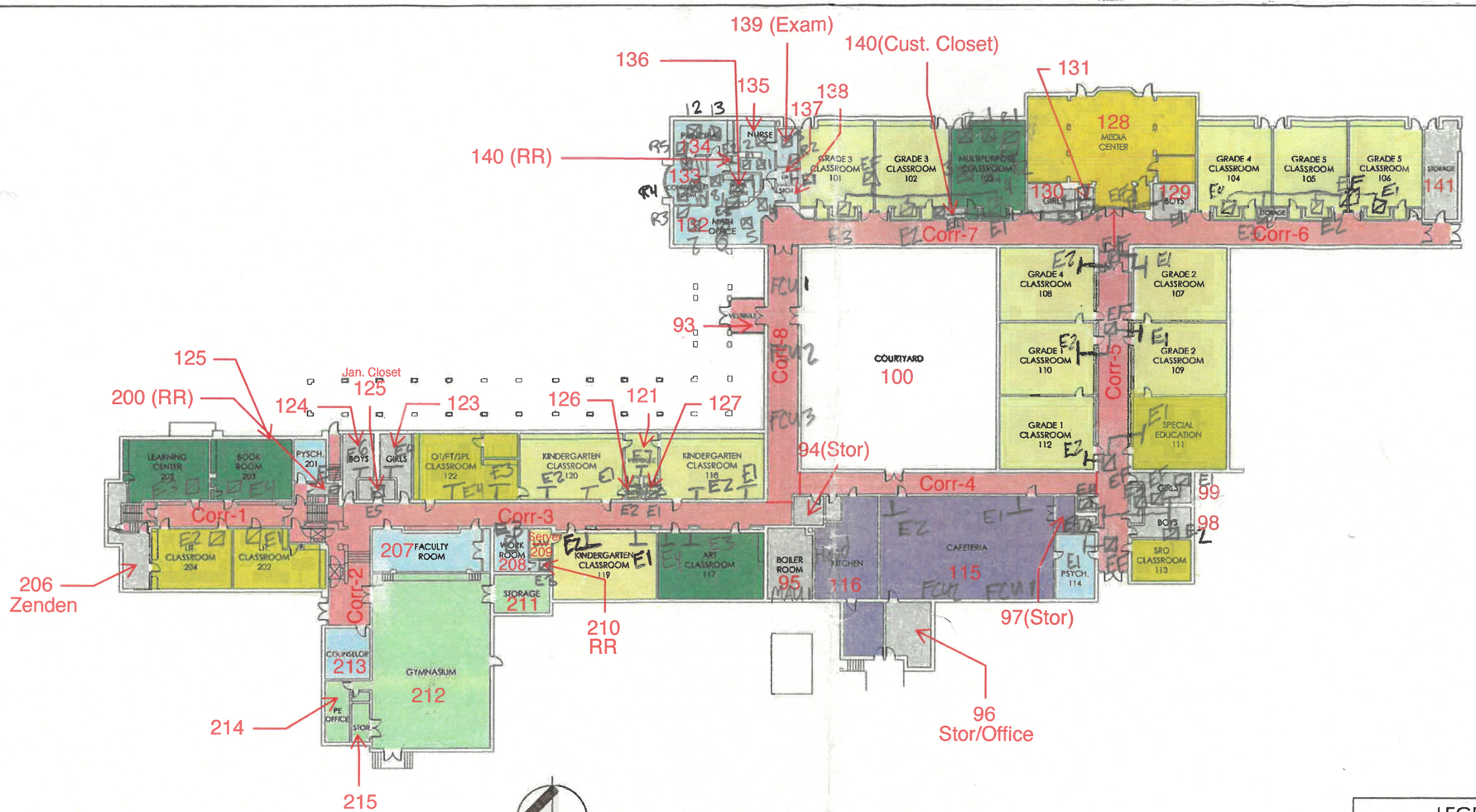
Art Classroom Exhaust Fan Calculation

RSD 14 Bethlehem

ROOM CHARACTERISTICS						TAB DATA	EXHAUST CALCULATIONS	
DRAWING ROOM NUMBER	DRAWING ROOM NAME	ROOM TYPE	AREA	VOLUME	EXHAUST FAN	MEASURED EXHAUST	ASHRAE 62.1 REQUIRED EXHAUST	EXHAUST REQUIREMENT DELTA
			(ft^2)	(ft^3)		(cfm)	(cfm)	MEAS. - CALC.
117	Art-Classroom	Art Classroom	852	7671	EF 117, 118	283	333	-50

Appendix C

Floor Plans



LEGEND		
	CLASSROOMS	11,535 NSF
	SPECIALS	3,644 NSF
	SPECIAL EDUCATION	3,101 NSF
	MEDIA CENTER	1,925 NSF
	PHYSICAL EDUCATION	3,050 NSF
	FOOD SERVICE	3,214 NSF
	AUDITORIUM	0 NSF
	ADMINISTRATION	3,108 NSF
	BUILDING INFRASTRUCTURE	4,554 NSF
	CIRCULATION	11,677 NSF
	SCHOOL TOTAL	45,808 NSF

Region 14 Schools
Facilities & Demographic Assessment

BETHLEHEM ELEMENTARY SCHOOL
PROGRAM CONDITIONS

SILVER/PETRUCELLI + ASSOCIATES