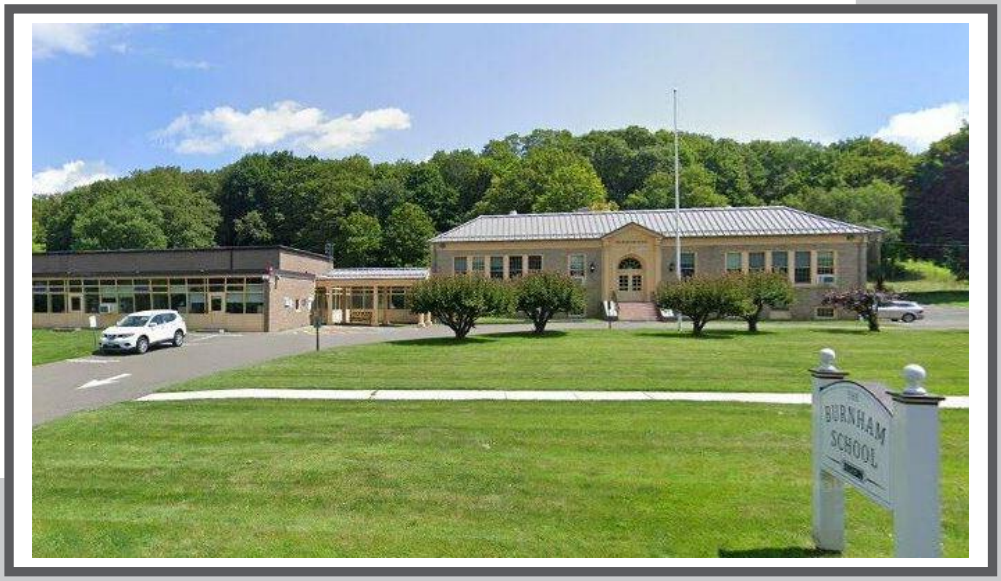
The Burnham School

80 Main Street
Bridgewater, CT 06752



Indoor Air Quality (IAQ) Evaluation and HVAC Systems Assessment

van Zelm Project # 2024005.00
September 5, 2024

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The Burnham 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 has an impact on building ventilation and indoor air quality to support a healthy learning environment in your school. The report's 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 Burnham School, a public school located in Bridgewater, CT, serves grade(s) K-5 in Regional School District 12. It serves approximately 72 Students.

HVAC System Overview

The building HVAC systems that were evaluated for operational performance, determination of overall condition, and included in our ventilation Testing Adjusting and Balancing (TAB) services are referenced within the attached Appendices.

Additional Information Related to HVAC Systems

The available equipment data and visual inspections indicate that all of the Air Handling Heating, Cooling, Ventilation Units and distribution equipment are in poor condition due to age.

van Zelm along with Wings Testing and Balancing performed the on-site inspections during the month of April 2024. 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.

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 The Burnham School.

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:

AHSRAE-62.1, (2010) Compliance

Our field observations indicate, most if not all of the individual occupied spaces at this school do not 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 does not currently utilize automatic space Carbon Dioxide (CO2) Demand Controlled Ventilation (DCV) to increase or decrease outdoor ventilation air into areas based upon CO2 levels within the spaces. There is an absolute correlation between CO2 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 CO2 level in ppm, Measured Indoor CO2 level in ppm, and CO2 Generation Rates (CFM) for different metabolic rates by age and activity level i.e., CO2 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. Note: In the case of this particular School, the current systems do not allow for this since the spaces only have exhaust systems and operable windows.

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^2 room with 10 ft ceilings will have a volume of 10,000 ft^3. If 250 CFM is delivered to this space, that results in 15,000 ft^3 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 Improvements

It is possible that based upon study findings some remedial action could be suggested to improve the HVAC systems' operation and overall environmental control. These measures alone may 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 redesign may be in order.

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 ASHRAE recommendations remain relevant as COVID and other contaminants that impact indoor air quality continue to remain a concern.

General Recommendations to Improve Schools Performance

Full Retro-commissioning of the building mechanical and control systems is usually recommended for energy savings and improved efficiency. Given the age of the equipment, this money would be better spent on HVAC upgrades.

Typical Equipment Upgrades

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 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 but may not be viable for the existing HVAC system.

General Air Handling Unit Upgrade or Replacement

Most of the major HVAC systems in the School are beyond their useful life. HVAC Systems typically have a lifespan of 20-25 years so the Facility Staff should be applauded for their diligence in keeping these units operating for all these years.

It would be an acceptable and beneficial consideration that a complete HVAC equipment evaluation be performed to consider upgrades and replacements to improve school ventilation and 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.
- Unit filters should be replaced with MERV 11 or higher and changed at intervals determined by area served and equipment operation.

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

CONCLUSIONS

The School District clearly has taken measures to maintain the aging equipment and should be commended for keeping these systems operating and maintained. Region 12 School District may want to consider unit replacement budgeting, including measures for indoor air quality (IAQ) improvements such as adding CO2 DCV.

As the accompanying compliance spreadsheet results show, this ventilation study found that The Burham School does not meet the current minimum ventilation requirements per ASHRAE-62.1, (2010) in all areas.

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Appendix 1

Ventilation Data Calculations

Project Name:	**Region 12-Burnham Elementary School**
Project Number:	**2024005.00**
Scope	**Ventilation Calculation by Building**
Date	**August 23, 2024**

VANZELM ENGINEERS

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 Current required airflow?**	**Ventilation ACH**	**DCV?**
					(cfm)	(%)	(%)		(sq.ft)	(ft)	(cu.ft)	Adult	(cfm/ person)	(cfm/sf)	(#/1000sf)	(cfm)	(cfm)	Yes/No/N/A	(AC/hr)	Yes/No
1	100	GENERAL OFFICE	Offices	Office spaces	420 | 257	---	Set Manually - 20%	F-1	278	7.8	2168.4	3	5.0	0.06	5	32	114	**Yes**	**3.154**	No
1	LL-2	PRINCIPLE	Offices	Office spaces	225 | 175	---	Set Manually - 20%	F-1	120	10.6	1272	4	5.0	0.06	5	27	78	**Yes**	**3.679**	No
1	101	NURSE	Education	Conference rooms	130 | 75	---	Set Manually - 20%	F-1	106	7.8	826.8	2	5.0	0.06	50	16	33	**Yes**	**2.395**	No
1	LL-2	CONFERENCE	Offices	Conference rooms	225 | 256	---	Set Manually - 20%	F-1	162	7.8	1263.6	7	5.0	0.06	50	45	114	**Yes**	**5.413**	No
1	104	FIRST GRADE	Education	Classroom (ages 5-8)	N/D | 480	---	Set Manually - 20%	F-1	832	9	7488	24	10.0	0.12	25	340	214	**No**	**1.715**	No
1	105	KINDERGARTEN	Education	Classroom (ages 5-8)	N/D | 739	---	Set Manually - 20%	F-1	810	9	7290	31	10.0	0.12	25	407	329	**No**	**2.708**	No
1	106A	STAGE	Education	Music/theater/dance	N/D | 106	---	Set Manually - 20%	F-1	512	15	7680	12	10.0	0.06	35	151	47	**No**	**0.367**	No
1	106	GYM	Education	Music/theater/dance	N/D | 2750	---	Set Manually - 20%	F-1	2706	18	48708	76	10.0	0.06	35	922	1224	**Yes**	**1.508**	No
1		CORRIDOR	Public Spaces	Corridors	700 | 463	---	Set Manually - 20%	F-1	679	9.8	6654.2	10	0.0	0.06	0	41	206	**Yes**	**1.857**	No
1	107	SMALL GROUP	Education	Classroom (ages 5-8)	300 | 59	---	Set Manually - 20%	F-1	151	8.6	1298.6	7	10.0	0.12	25	88	26	**No**	**1.201**	No
1	LL-9	CUSTODIAN	Storage	Warehouses	N/D | 38	---	---	F-2			0	1	0.0	0.06	0	0	0	N/A		No
1	108	Ms. GRANITTTO SPEECH	Education	Classroom (ages 5-8)	N/D | 34	---	---	F-2	143	8.6	1229.8	4	10.0	0.12	25	57	0	**No**	**0.000**	No
1		OLD ENTRANCE OFFICE	Public Spaces	Corridors	---	---	---	---	208	11.5	2392	12	0.0	0.06	0	12	0	**No**	**0.000**	No
ML	203	SECOND GRADE	Education	Classroom (ages 5-8)	160 | 392	---	---	REF-2	653	12	7836	21	10.0	0.12	25	288	0	**No**	**0.000**	No
ML	204	FOURTH GRADE	Education	Classroom (ages 5-8)	260 | 54	---	---	REF-1	591	12	7092	21	10.0	0.12	25	281	0	**No**	**0.000**	No
ML	205	FIFTH GRADE	Education	Classroom (ages 5-8)	100 | 25	---	---	REF-1	619	12	7428	18	10.0	0.12	25	254	0	**No**	**0.000**	No
ML	201	TEAM ROOM SPECIAL ED.	Education	Classroom (ages 5-8)	170 | 33	---	---	REF-1	416	12	4992	10	10.0	0.12	25	150	0	**No**	**0.000**	No
ML	ML-5	CUSTODIAN	Storage	Warehouses	100 | 96	---	---	REF-3			0	1	0.0	0.06	0	0	0	N/A		No
ML	202	THIRD GRADE	Education	Classroom (ages 5-8)	300 | 74	---	---	REF-2	791	12	9492	14	10.0	0.12	25	235	0	**No**	**0.000**	No
ML	303	MUSIC	Education	Music/theater/dance	---	---	---	---	303	12	3636	3	10.0	0.06	35	48	0	**No**	**0.000**	No
		SPARE	None	None		---					0									
B	304	ART	Education	Art Classroom	N/D | 300	---	No access to determine	Unit Ventilator	653	7.9	5158.7	24	10.0	0.18	20	358	156	**No**	**1.814**	No
B	305	LIBRARY	Public Spaces	Libraries	350 | 494	---	---	FCU-1	571	7.9	4510.9	14	5.0	0.12	10	139	0	**No**	**0.000**	No
B	306	OLD COMPUTER LAB??	Education	Classroom (ages 5-8)	N/D | 316	---	No access to determine	Unit Ventilator	572	7.9	4518.8	8	10.0	0.12	25	149	124	**No**	**1.646**	No
B	B-4	BOILER ROOM	None	None	---	---	---	---			0	2	0.0	0.00	0	0	0	N/A		No
B	B-5	CUSTODIAN	Storage	Warehouses	---	---	---	---	111	7.6	843.6	2	0.0	0.06	0	7	0	**No**	**0.000**	No
B	302	TEACHERS ROOM-KITCHEN	Food and beverage service	Kitchens (cooking)	N/D | 553	---	---	Unit Ventilator	392	7.9	3096.8	11	0.0	0.00	0	0	0	N/A	**0.000**	No
B	B-9	ENTRANCE STORAGE	Storage	Warehouses	---	---	---	---	183	7.9	1445.7	1	0.0	0.06	0	11	0	**No**	**0.000**	No
B	B-10	KITCHEN	Food and beverage service	Kitchens (cooking)	N/D | 80	---	---	EF (No #)	81	7.9	639.9	1	0.0	0.00	0	0	0	N/A	**0.000**	No
			None	None		---														

Appendix 2

TAB Airflow Survey Data

WING'S TESTING & BALANCING CO., INC.

Burnham Elementary School

Ventilation Verification Survey

* * * *

Van Zelm Heywood & Shadford, Inc.
Attn: Bill Donald
10 Talcott Notch Road
Farmington, CT 06032-1800

April 17, 2024

94 North Branford Road • Suite One • Branford, CT 06405
(203) 481-4988 • Fax (203) 488-5634 • wings@wingstesting.com
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WING'S TESTING & BALANCING CO., INC.

April 17, 2024

Van Zelm Heywood & Shadford, Inc.
Attn: Bill Donald
10 Talcott Notch Road
Farmington, CT 06032-1800

RE: Burnham Elementary School Ventilation Verification Survey

Dear Bill,

The ventilation verification survey of the above referenced location has been completed, as noted on the attached data sheets. The following are our results:

- We measured all supply, return and exhaust distribution in school, we also measured outside air rates for air handler F-1, as well as unit ventilators in Art Room and Old Computer Lab as noted on our VPT sheet.
- We calculated O.A. rates for each space served by AHU-F1.
- We also updated the mechanical drawings by marking distribution and ductwork that was not shown for exhaust fan F2 on first floor.

The following pages are your record of current operating conditions. If you have any questions, or 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

Marek Sadowski
CT SM-2 License #7078
MA SM-2 License #4508
TABB Technician- BB1083468T
Indoor Air Quality Technician- IAQ1083468T
Fire and Smoke Damper Technician- FLS11083468T

VELOCITY PRESSURE READINGS

PROJECT:	Burnham Elementary School	**DATE:**	4/17/2024
AREA SERVED:	Building	**TECH:**	MS

TRAVERSE LOCATIONS	DUCT SIZE "	AREA SQ.FT.	DESIGN		CENT. STAT. PRESS."	TEST		NOTES
			FPM	CFM		FPM	CFM	
F-1								
Total	72" x 60"	30	---	N/D	w/ Velgrid	181	5430	
O.A.	61" x 46"	19.5	---	N/D	w/ Velgrid	124	2418	
UV Art Class								
O.A.	40" x 7"	2.0	---	N/D	w/ Velgrid	78	156	
UV Old Computer								
O.A.	40" x 7"	2.0	---	N/D	w/ Velgrid	62	124	

REMARKS

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

AIR DEVICE REPORT

PROJECT: Burnham Elementary School | **DATE:** 4/16/2024

SYSTEM / AREA: Existing Floor/ 1st Floor | **TECH:** MS

LOCATION	NO.	SIZE	A K	DESIGN		TEST		FINAL		NOTES
				FPM	CFM	FPM	CFM	FPM	CFM	
F-1/ Supply										
Gym	1	48" x 18"	Velg	---	N/D	---	2750			(1)
Corridor	2	12" x 12"	FH	---	400	---	223			
Small Group	3	9" x 9"	FH	---	150	---	33			
Small Group	4	9" x 9"	FH	---	300	---	26			
Corridor	5	12" x 12"	FH	---	150	---	240			
Main Office	6	12" x 12"	FH	---	210	---	120			
Main Office	7	12" x 12"	FH	---	210	---	137			
Principal	8	14" x 6"	FH	---	225	---	175			
Conference	9	14" x 6"	FH	---	225	---	256			
Health	10	9" x 9"	FH	---	130	---	75			
1st Grade	11	36" x 8"	1.4	---	N/D	342	480			(1)
Kindergarten	12	36" x 8"	1.4	---	N/D	528	739			(1)
Stage	13	36" x 8"	1.4	---	N/D	76	106			(1)
				Total	N/D		5360			
F-1/ Return										
Gym	R1	48" x 18"		---	N/D	---	1401			(1)
Corridor	R2	26" x 10"	FH	---	N/D	---	169			(1)
Main Office	R3	18" x 18"	FH	---	850	---	413			
					N/D		1983			(2)
Basement										
Old Comp. Lab										
UV	S1	50" x 5"	1.4	---	N/D	226	316			
Library										
FCU-1	S1	44" x 5"	1.2	---	350	412	494			
Art Room										
UV	S1	50" x 5"	1.4	---	N/D	214	300			

REMARKS

(1) Not listed on drawings

(2) Also ceiling plenum next to unit is part of return

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

AIR DEVICE REPORT

PROJECT: Burnham Elementary School | **DATE:** 4/17/2024

SYSTEM / AREA: Existing Exhaust/ Building - Various | **TECH:** MS

LOCATION	NO.	SIZE	A K	DESIGN		TEST		FINAL		NOTES
				FPM	CFM	FPM	CFM	FPM	CFM	
REF-1/ Main Level										
Special Ed 201	E1	8" x 8"	FH	---	170	---	33			
4th Grade 204	E2	10" x 10"	FH	---	260	---	54			
5th Grade 205	E3	30" x 20"	FH	---	160	---	338			
5th Grade 205	E4	10" x 8"	FH	---	100	---	25			
					690		450			
REF-2/ Main Level										
3rd Grade 202	E1	12" x 10"	FH	---	300	---	74			
2nd Grade 203	E2	30" x 20"	FH	---	160	---	392			
2nd Grade 203	E3	10" x 8"	FH	---	100	---	31			
Basement										
TLT #4	E4	6" x 6"	0.2	---	75	120	24			
TLT #3	E5	6" x 6"	0.2	---	75	140	28			
					710		549			
REF-3/ Main Level										
Boys	E1	14" x 10"	FH	---	400	---	429			
Restroom	E2		FH	---	75	---	100			
Custodian	E2A	8" x 8"	FH	---	100	---	96			
Basement										
TLT #1	E3	6" x 6"	0.2	---	75	340	68			
TLT #2	E4	6" x 6"	0.2	---	75	300	60			
					725		753			
REF-4/ Main Level										
Girls	E1	---	---	---	300	---	---			(1)
F-2										
Nurse 101	E1	6" x 6"	FH	---	75	---	19			
1st Grade 104	E2	8" x 6"	FH	---	75	---	18			
Kindergarten 105	E3	8" x 6"	FH	---	75	---	16			
Custodian	E4	8" x 8"	FH	---	N/D	---	38			
Womens	E5	8" x 8"	FH	---	N/D	---	33			
Room 108	E6	8" x 8"	FH	---	N/D	---	34			
					N/D		158			

REMARKS

(1) Changed to Music Room; diffuser removed.

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

Project Name:	**Region 12 School District**	**Burnham Elementary**
Project Number:	*2024005.00*	
Scope	**TAB Data**	
Date	**HV**	

Zone Identification

Floor	Room#	Room Name	Design | Measured CFM	Measured Min OA Flow (cfm)	OA Damper Position	Associated Equipment	Notes
1	100	GENERAL OFFICE	420 | 257	114	Set Manually - 20%	F-1	Contant Volume, HV-1 Zone 3
1	LL-2	PRINCIPLE	225 | 175	78	Set Manually - 20%	F-1	Constant Volume
1	101	NURSE	130 | 75	33	Set Manually - 20%	F-1	Constant Volume
1	LL-2	CONFERENCE	225 | 256	114	Set Manually - 20%	F-1	Constant Volume
1	104	FIRST GRADE	N/D | 480	214	Set Manually - 20%	F-1	Constant Volume, HV-1 Zone 4
1	105	KINDERGARTEN	N/D | 739	329	Set Manually - 20%	F-1	Constant Volume, HV-1 Zone 5
1	106A	STAGE	N/D | 106	47	Set Manually - 20%	F-1	Constant Volume, OBD Closed
1	106	GYM	N/D | 2750	1224	Set Manually - 20%	F-1	Constant Volume, HV-1 Zone 1
1		CORRIDOR	700 | 463	206	Set Manually - 20%	F-1	Constant Volume, HV-1 Zone 2
1	107	SMALL GROUP	300 | 59	26	Set Manually - 20%	F-1	Constant Volume
1	LL-9	CUSTODIAN	N/D | 38	0	---	F-2	Exhaust Only, not shown on drawings
1	108	Ms. GRANITTTO SPEECH	N/D | 34	0	---	F-2	Exhaust Only. Fan in attic next to F-1's OA intake.
1		OLD ENTRANCE OFFICE	---	0	---	---	No Ventilation
ML	203	SECOND GRADE	160 | 392	0	---	REF-2	Exhaust Only
ML	204	FOURTH GRADE	260 | 54	0	---	REF-1	Exhaust Only
ML	205	FIFTH GRADE	100 | 25	0	---	REF-1	Exhaust Only
ML	201	TEAM ROOM SPECIAL ED.	170 | 33	0	---	REF-1	Exhaust Only
ML	ML-5	CUSTODIAN	100 | 96	0	---	REF-3	Exhaust Only
ML	202	THIRD GRADE	300 | 74	0	---	REF-2	Exhaust Only
ML	303	MUSIC	---	0	---	---	No Ventilation or Exhaust. Converted from old toilet room.
		SPARE					
B	304	ART	N/D | 300	156	No access to determine	Unit Ventilator	Measured OA intake outside
B	305	LIBRARY	350 | 494	0	---	FCU-1	Fan coil has no OA (not as shown on drawing)
B	306	OLD COMPUTER LAB??	N/D | 316	124	No access to determine	Unit Ventilator	Measured OA intake outside
B	B-4	BOILER ROOM	---	0	---	---	No Ventilation
B	B-5	CUSTODIAN	---	0	---	---	No Ventilation

Project Name:	**Region 12 School District**	**Burnham Elementary**
Project Number:	*2024005.00*	
Scope	**TAB Data**	
Date	**HV**	

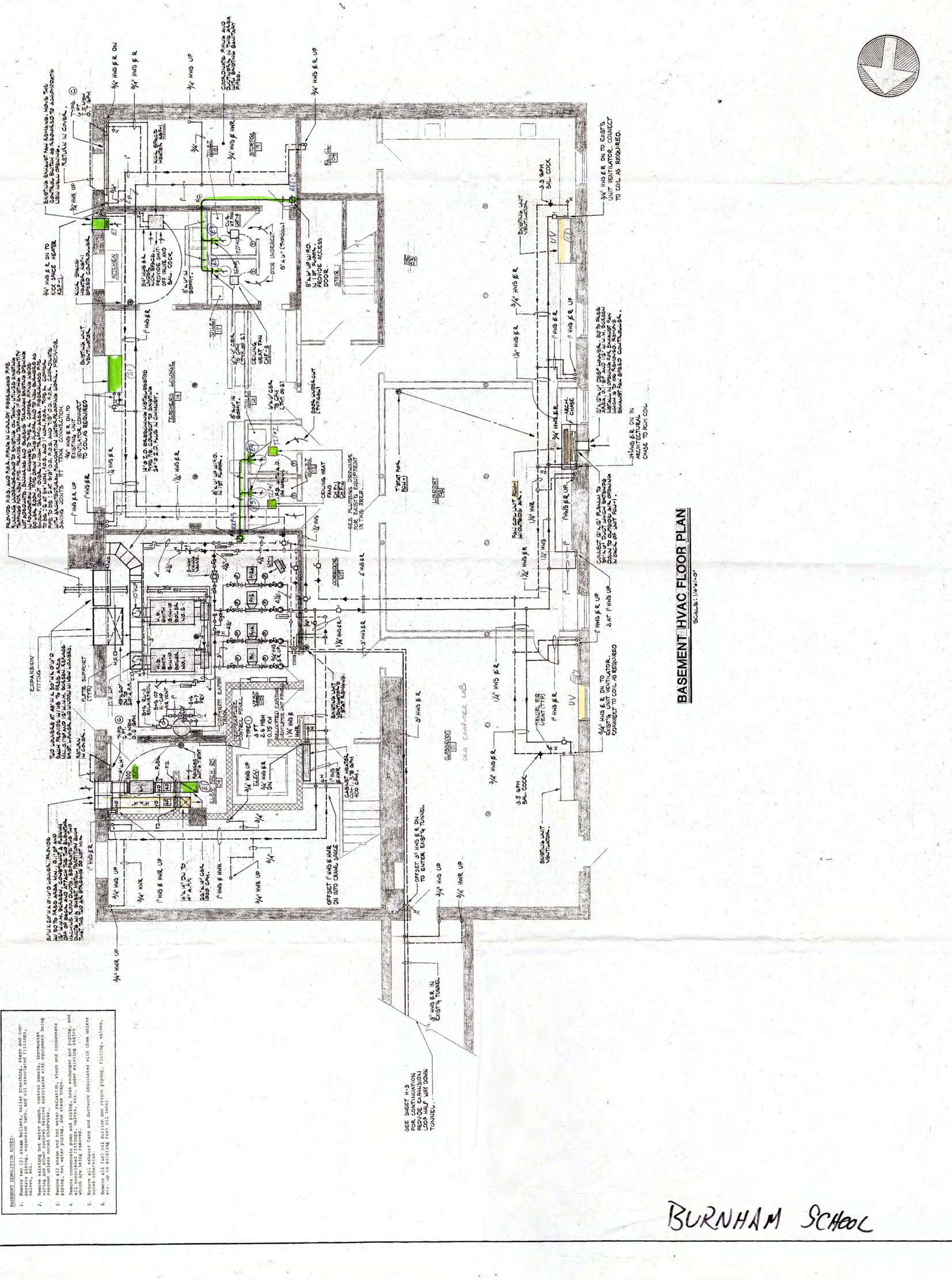
Zone Identification

Floor	Room#	Room Name	Design | Measured CFM	Measured Min OA Flow (cfm)	OA Damper Position	Associated Equipment	Notes
B	302	TEACHERS ROOM-KITCHEN	N/D | 553	0	---	Unit Ventilator	No O.A. Intake
B	B-9	ENTRANCE STORAGE	---	0	---	---	No Ventilation
B	B-10	KITCHEN	N/D | 80	0	---	EF (No #)	Wall Mounted
B	B-6	ELEVATOR ROOM	1000 | 0	0	---	EF-1	Fan not running, bad motor
B	See A101b	TLT #1	75 | 68	0	---	REF-3	Exhaust Only
B	See A101b	TLT #2	75 | 60	0	---	REF-3	Exhaust Only
B	See A101b	TLT #3	75 | 28	0	---	REF-2	Exhaust Only
B	See A101b	TLT #4	75 | 24	0	---	REF-2	Exhaust Only
1	104T	FIRST GRADE TLT	75 | 18	0	---	F-2	Exhaust Only
1	105T	KINDERGARTEN TLT	75 | 16	0	---	F-2	Exhaust Only
1	101T	NURSE TLT	75 | 19	0	---	F-2	Exhaust Only
1	See H-3	WOMEN	N/D | 33	0	---	F-2	Exhaust Only
1	See H-2	BOYS	400 | 429	0	---	REF-3	Exhaust Only
ML	See H-2	RESTROOM	75 | 100	0	---	REF-3	Exhaust Only

BURNHAM SCHOOL BRIDGEWATER

H-1	BASEMENT HVAC FLOOR PLAN	CONSULTANTS:
	SCALE AS NOTED DRAWN BY J.R.B.	MECHANICAL & ELECTRICAL: BURTON & VANHOUTEN ENGINEERS INC. 10 NORTH MAIN STREET WEST HARTFORD, CT. 06107 (203) 236-2266
	DATE 2-1-83 REVISED	STRUCTURAL: GIHARD & CO. ENGINEERS 40 WETHERSFIELD AVENUE HARTFORD, CT. 06114 (203) 524-1564
		C. J. LAWLER ASSOCIATES ARCHITECTS & PLANNERS 7 SOUTH MAIN STREET WEST HARTFORD, CT. 06107 (203) 233-8626

#67280



BASEMENT DEMOLITION NOTES:

1. Remove two (2) steam boilers, boiler breeching, steam and condensate piping, expansion tank, and all associated fittings, valves, etc.
2. Remove existing hot water pumps, control panels, thermostat wiring, and other control devices associated with equipment being removed unless noted otherwise.
3. Remove all steam and hot water radiation, steam and condensate piping, hot water piping, and steam traps.
4. Remove condensate pump and piping, heat exchanger and piping, and all associated fittings, valves, etc., under existing stairs which are being removed.
5. Remove all exhaust fans and ductwork associated with them unless noted otherwise.
6. Remove all fuel oil suction and return piping, fittings, valves, etc. up to existing fuel oil tanks.

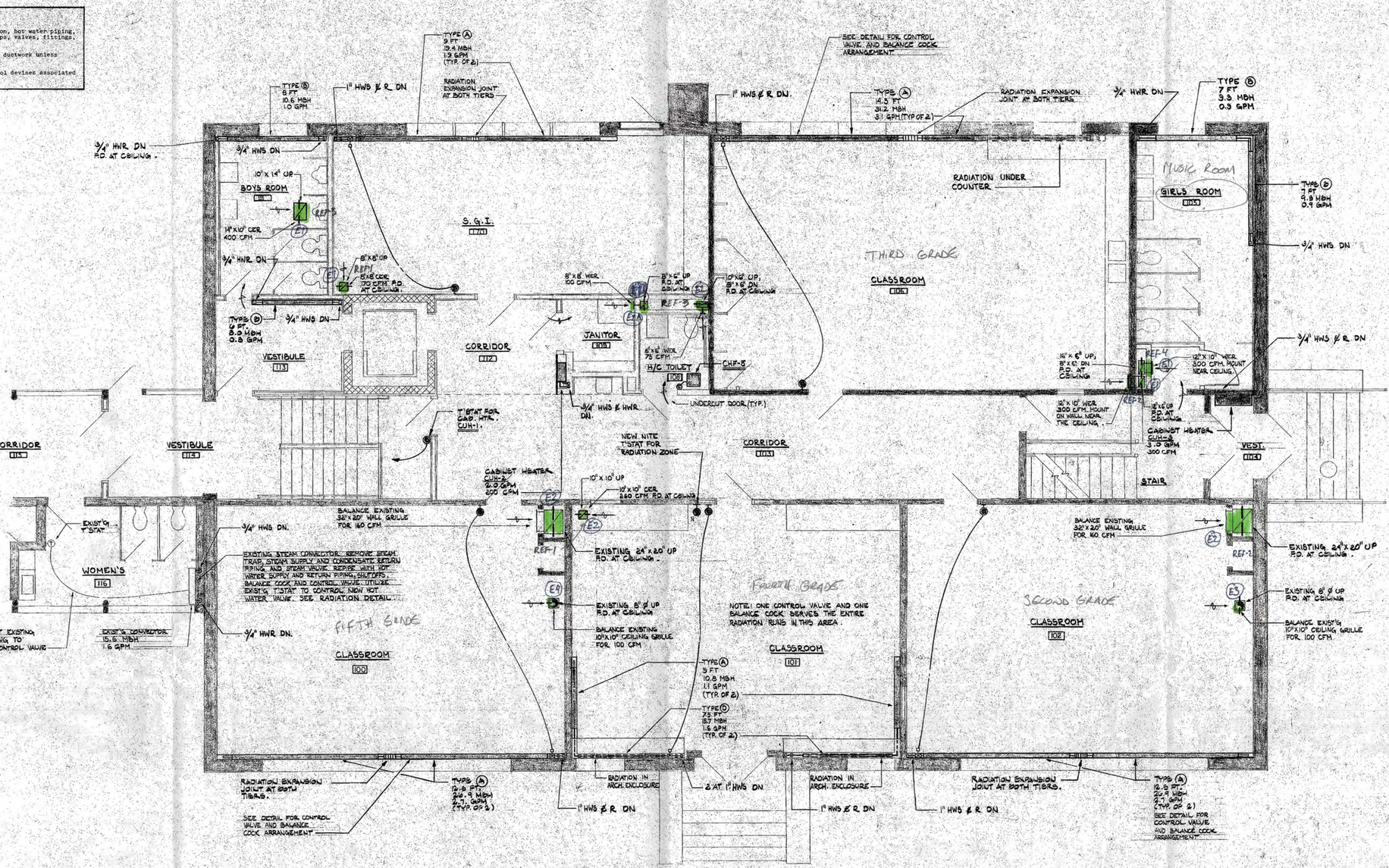
BURNHAM SCHOOL

A.S. 1-8-88

#67280

FIRST FLOOR DEMOLITION NOTES:

1. Remove all hot water and steam radiation, hot water piping, steam and condensate piping, steam traps, valves, fittings, etc. unless noted otherwise.
2. Remove all exhaust fans and associated ductwork unless noted otherwise.
3. Remove all thermostats and other control devices associated with equipment being removed.



FIRST FLOOR HVAC PLAN

SCALE: 1/4" = 1'-0"

C. J. LAWLER ASSOCIATES
ARCHITECTS & PLANNERS
7 SOUTH MAIN STREET WEST HARTFORD, CT. 06107 (203) 233-8526

CONSULTANTS:
MECHANICAL & ELECTRICAL: BURTON & VANHOUTEN ENGINEERS INC. 10 NORTH MAIN STREET WEST HARTFORD, CT. 06107 (203) 232-2586
STRUCTURAL: GIRARD & CO. ENGINEERS 40 WATERFIELD AVENUE HARTFORD, CT. 06114 (203) 524-1084

FIRST FLOOR HVAC PLAN
SCALE: 1/8" = 1'-0" DRAWN BY: JAS
DATE: 2-1-85 REVISED

H-2

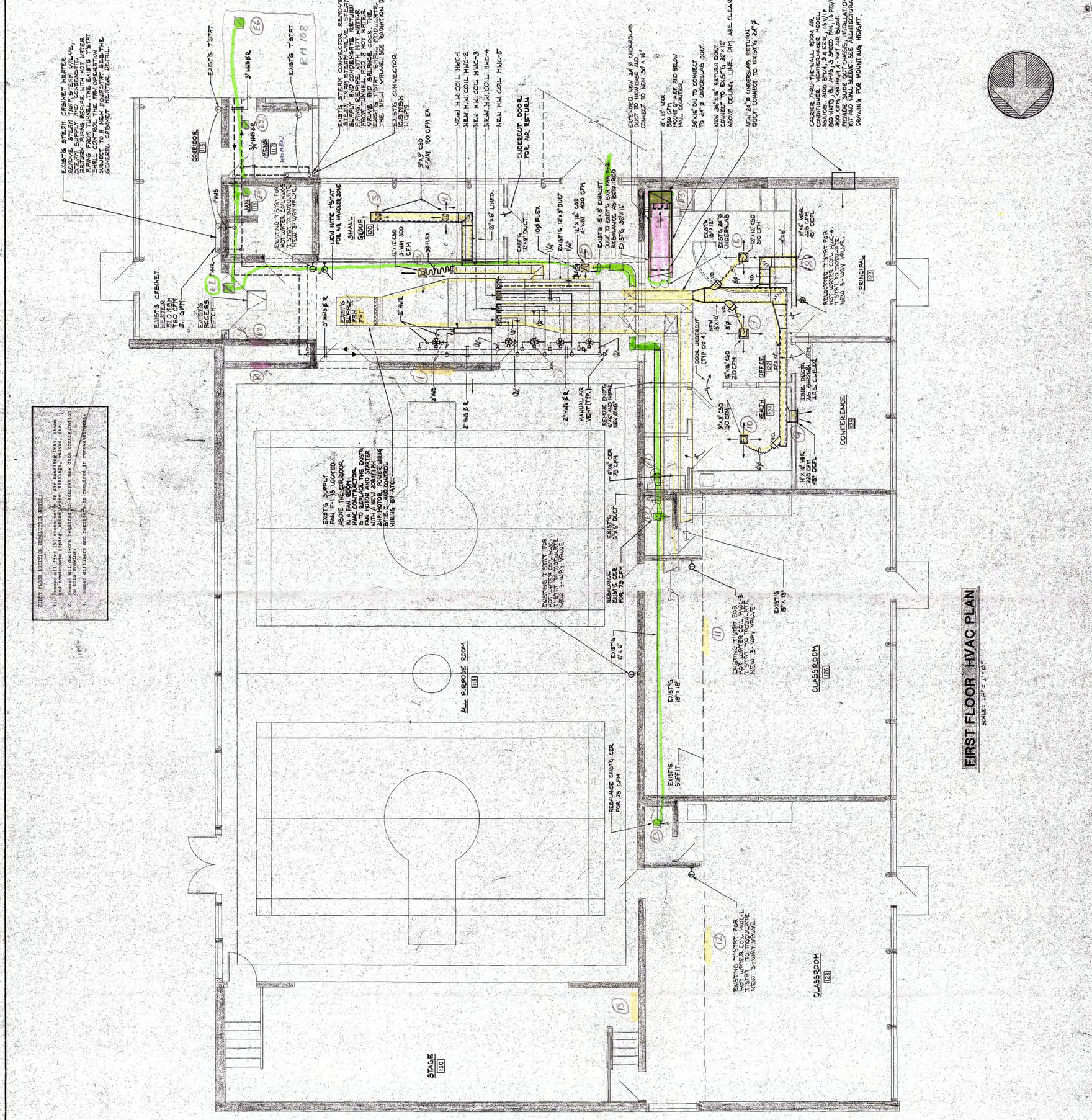
BURNHAM SCHOOL BRIDGEWATER

JOSEPH MERRITT & CO. Sepia 3CH

87256

BURNHAM SCHOOL BRIDGEWATER

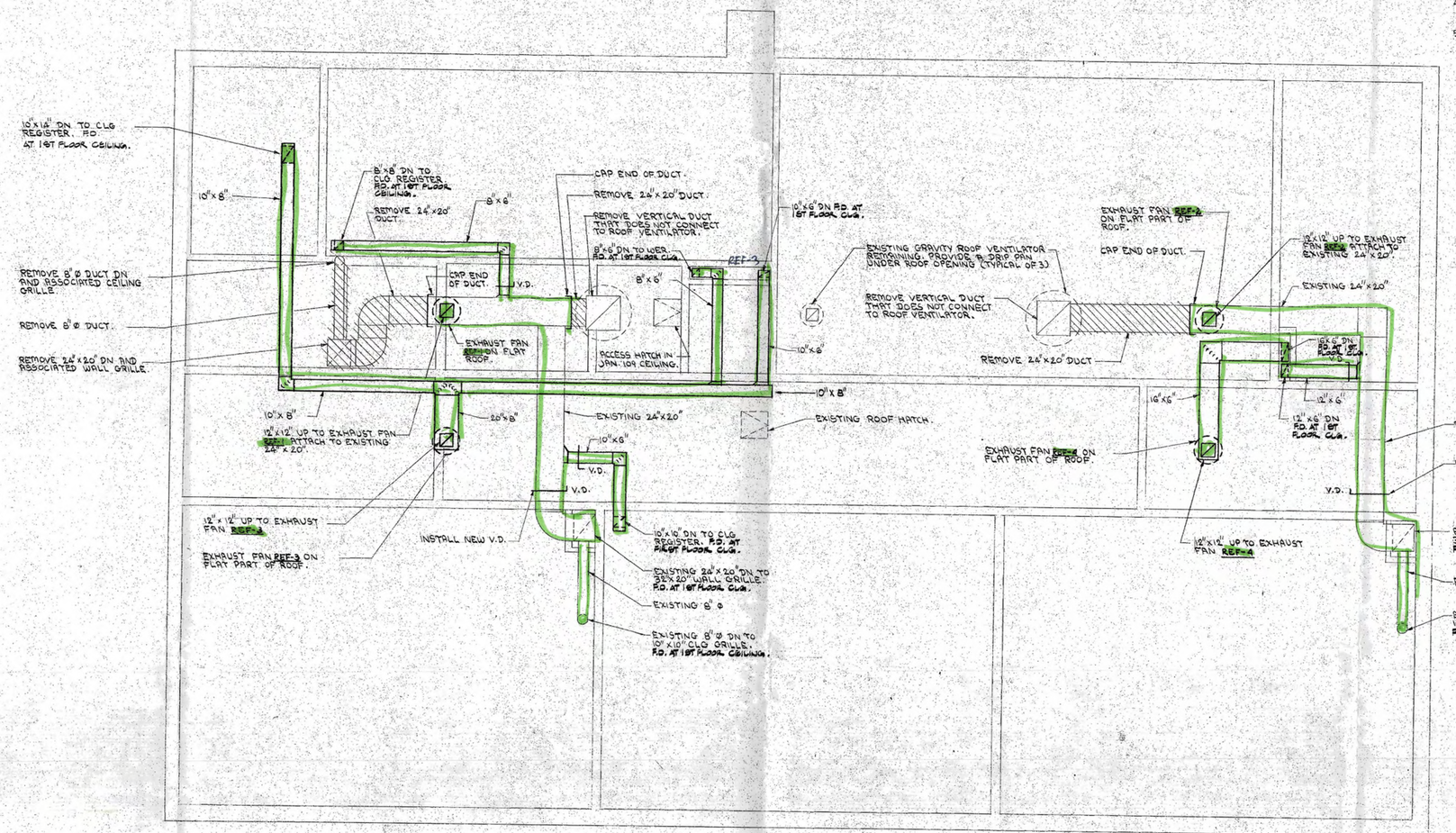
H-3	FIRST FLOOR HVAC PLAN SCALE: AS NOTED DRAWN BY J.B.D. DATE 2-1-83 REVISED	CONSULTANTS: MECHANICAL & ELECTRICAL: BUTTON & VANHOUTEN ENGINEERS INC. 10 NORTH MAIN STREET WEST HARTFORD, CT. 06107 (203) 236-2266 STRUCTURAL: GIRARD & CO. ENGINEERS 40 WETHERSFIELD AVENUE HARTFORD, CT. 06114 (203) 524-1564	C. J. LAWLER ASSOCIATES ARCHITECTS & PLANNERS 7 SOUTH MAIN STREET WEST HARTFORD, CT. 06107 (203) 232-8526



FIRST FLOOR HVAC PLAN
SCALE: 1/4" = 1'-0"

GENERAL NOTES:

1. THE WALLS SHOWN ON THIS PLAN ARE BELOW THE ATTIC FLOOR.
2. THE EXISTING DUCTWORK IN THE ATTIC RUNS ON THE FLOOR.
3. REMOVE ALL EXISTING ABANDONED SHEET METAL LYING ON ATTIC FLOOR.
4. THE NEW DUCT WORK FOR TOILET EXHAUST SYSTEMS REF-3 AND REF-4 SHALL BE KEPT OFF OF THE FLOOR.
5. PROVIDE NEW DRIP PAN FOR EXISTING GRAVITY ROOF VENTILATORS (TYP. OF 3) SEE DETAIL.



ATTIC FLOOR HVAC PLAN

SCALE 1/4" = 1'-0"

LEGEND

- NEW OR RELOCATED
- EXISTING TO BE RELOCATED OR REMOVED
- EXISTING TO REMAIN

C. J. LAWLER ASSOCIATES
ARCHITECTS & PLANNERS
7 SOUTH MAIN STREET WEST HARTFORD, CT. 06107 (203) 233-8526

CONSULTANTS:
MECHANICAL & ELECTRICAL: BURTON & VANHOUTEN ENGINEERS INC. 10 NORTH MAIN STREET WEST HARTFORD, CT. 06107 (860) 236-4888
STRUCTURAL: GIRARD & CO. ENGINEERS 40 WATERSFIELD AVENUE HARTFORD, CT. 06114 (860) 296-1694

ATTIC FLOOR HVAC PLAN

SCALE: AS NOTED
DATE: 2-1-89
DRAWN BY: J.R.D.
REVISED:

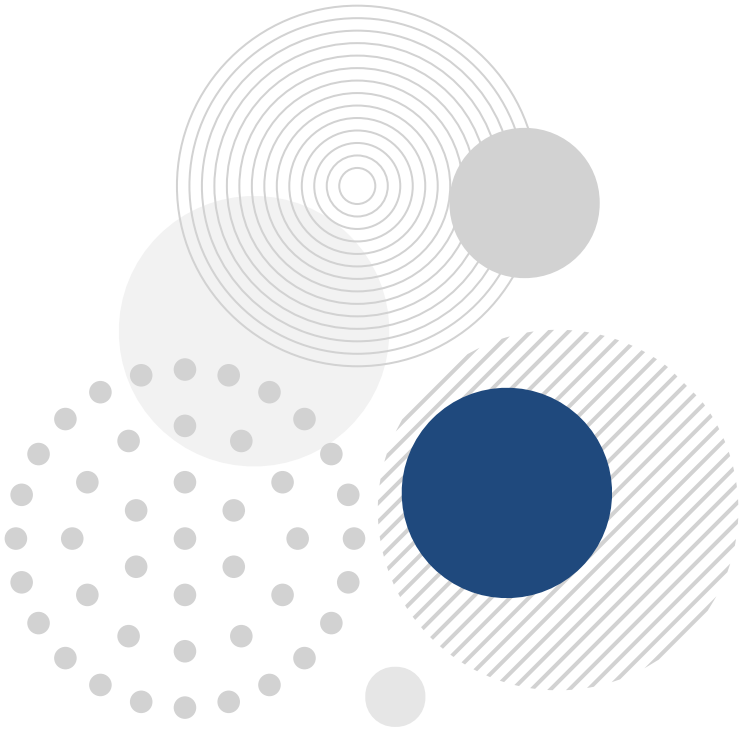
H-4

BURNHAM SCHOOL

JOSEPH MERRITT & CO.

Appendix 3

Room Data Take-Off Sheet



Project Name:	**Region 12-Burnham Elementary School**
Project Number:	*2024005.00*
Scope	**Room DataTake-Off**
Date	**April 4, 2024**

Auditor : RCM

Zone Identification									
Floor	Room#	Room Name	Area (SF)	Ceiling Height (FT)	Volume	People	Notes	Identified Deficiencies	Pictures Y /N
1	100	GENERAL OFFICE	278	7.8	2168.4	3	HV-1 Zone 3		
1	LL-2	PRINCIPLE	120	10.6	1272	4			
1	101	NURSE	106	7.8	826.8	2			
1	LL-2	CONFERENCE	162	7.8	1263.6	7			
1	104	FIRST GRADE	832	9	7488	24	HV-1 Zone 4		
1	105	KINDERGARTEN	810	9	7290	31	HV-1 Zone 5		
1	106A	STAGE	512	15	7680	12			
1	106	GYM	2706	18	48708	76	HV-1 Zone 1		
1		CORRIDOR	679	9.8	6654.2	10	HV-1 Zone 2		
1	107	SMALL GROUP	151	8.6	1298.6	7			
1	LL-9	CUSTODIAN			0	1			
1	108	Ms. GRANITTTO SPEECH	143	8.6	1229.8	4			
1		OLD ENTRANCE OFFICE	208	11.5	2392	1w			
ML	203	SECOND GRADE	653	12	7836	21			
ML	204	FOURTH GRADE	591	12	7092	21			
ML	205	FIFTH GRADE	619	12	7428	18			
ML	201	TEAM ROOM SPECIAL ED.	416	12	4992	10			
ML	ML-5	CUSTODIAN			0	1			
ML	202	THIRD GRADE	791	12	9492	14			
ML	303	MUSIC	303	12	3636	3			
		SPARE			0				

Project Name:	**Region 12-Burnham Elementary School**
Project Number:	*2024005.00*
Scope	**Room DataTake-Off**
Date	**April 4, 2024**

Auditor : RCM

Zone Identification									
Floor	Room#	Room Name	Area (SF)	Ceiling Height (FT)	Volume	People	Notes	Identified Deficiencies	Pictures Y /N
B	304	ART	653	7.9	5158.7	24	TTL UV VERY OLD		
B	305	LIBRARY	571	7.9	4510.9	14	NEWER TRANE UV		
B	306	OLD COMPUTER LAB??	572	7.9	4518.8	8	TTL UV VERY OLD		
B	B-4	BOILER ROOM			0	2			
B	B-5	CUSTODIAN	111	7.6	843.6	2	Back of Boiler Room		
B	302	TEACHERS ROOM-KITCHEN	392	7.9	3096.8	11			
B	B-9	ENTRANCE STORAGE	183	7.9	1445.7	1			
B	B-10	KITCHEN	81	7.9	639.9	1			

Appendix 4

Equipment Data Sheets

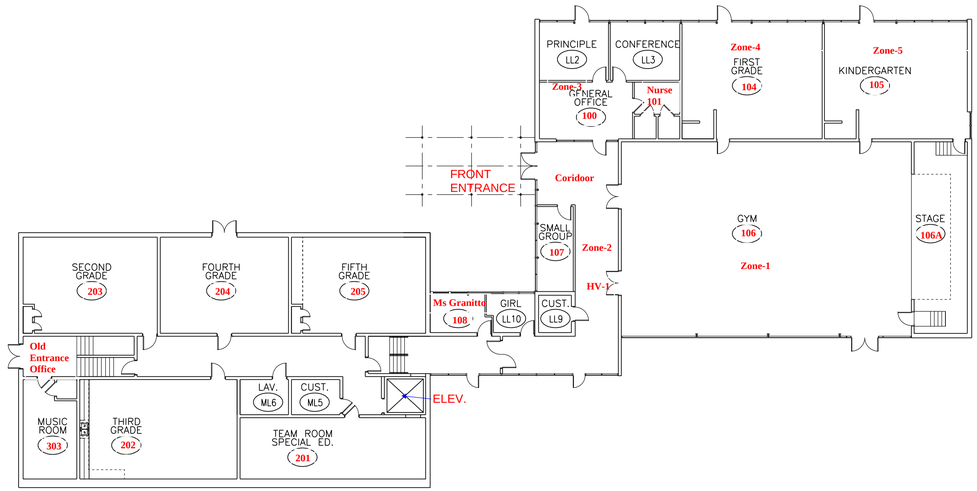
BURNHAM REGION 12 EQUIPMENT DATA SHEET

Auditor: RCM **Date: 4/4/24**	**Data Collected**	**Addition Details**
Unit ID:	HV-1	
Location:	Above Gym Corridor	
Serving:	Five Reheat Coil Zones	
Manufacture	Trane	
Model #	21	
Serial #	LL- 4945	
Manufacture Date	Unknown	
System CFM		
Min OA CFM		
Filter Data (Size, Qty)	(12) 20 x 20 x2	
Filter Condition	Clean	
Utilize CO_2 and/or DCV?:	No	
Heating Type	Hot Water Reheats	
Heating Coil Condition	Unknown	
Cooling Type	NA	
Cooling Coil Condition		
Drain Pan Status	NA	
Other Conditional Notes: New RH valves and coils replaced at some point. OAD damper has no minimum and Controlled by MA Local potentiometer control. Zones include: Gym, Gym Corridor, Admin, Classroom 104 & 105		

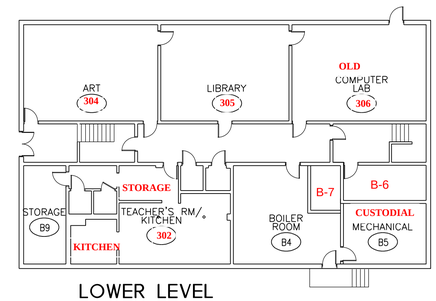
Description	**Supporting Photos Taken (Check All That Applies)**
Unit From Afar	
Unit Tag Info	
Heating Coil	
Cooling Coil	
Filters	
Additional	

Appendix 5

Floor Plans



MAIN LEVEL



LOWER LEVEL

1 BURNHAM ELEMENTARY SCHOOL KEY PLAN

SCALE: 1/16"=1'-0"

DOOR SURVEY

CLOHESSY HARRIS & KAISER, LLC

GREYSTONE COURT WEST
573 HOPMEADOW STREET
PO BOX 95
SIMSBURY, CT 06070-0095

860-651-3777
Fax 860-651-7316
chk@chkarch.com

ARCHITESTEURE • INTERIOR DESIGN • FABILITIES PLANNING

Consultants

RSD 12 Burnham Elementary School
Door Survey

80 Main Street South
Bridgewater, Connecticut

Revisions

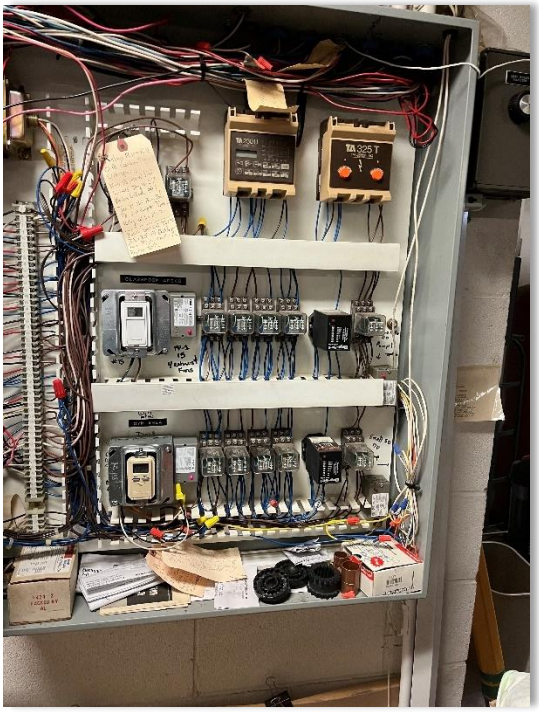
Date	1/11/2013
Scale	1/16"=1'-0"
Project Number	13005
Drawn By	DTP

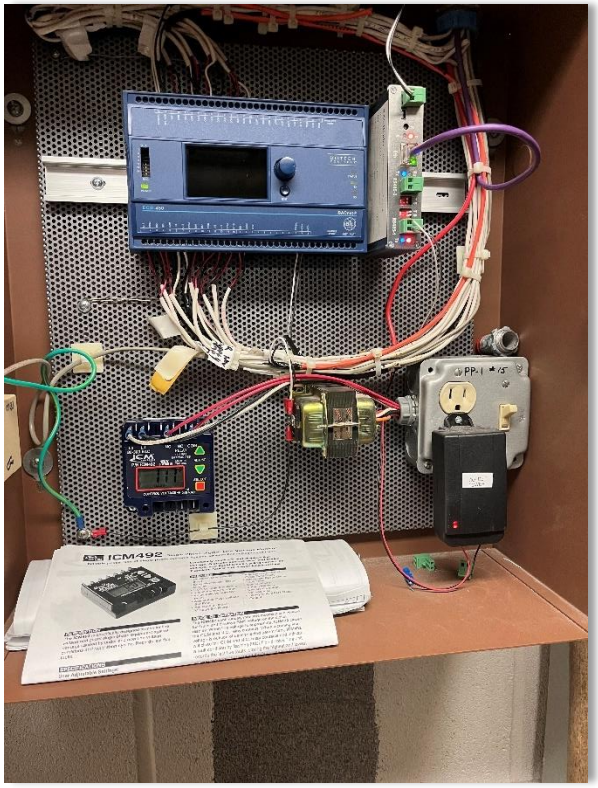
A101b

Appendix 6

Photos

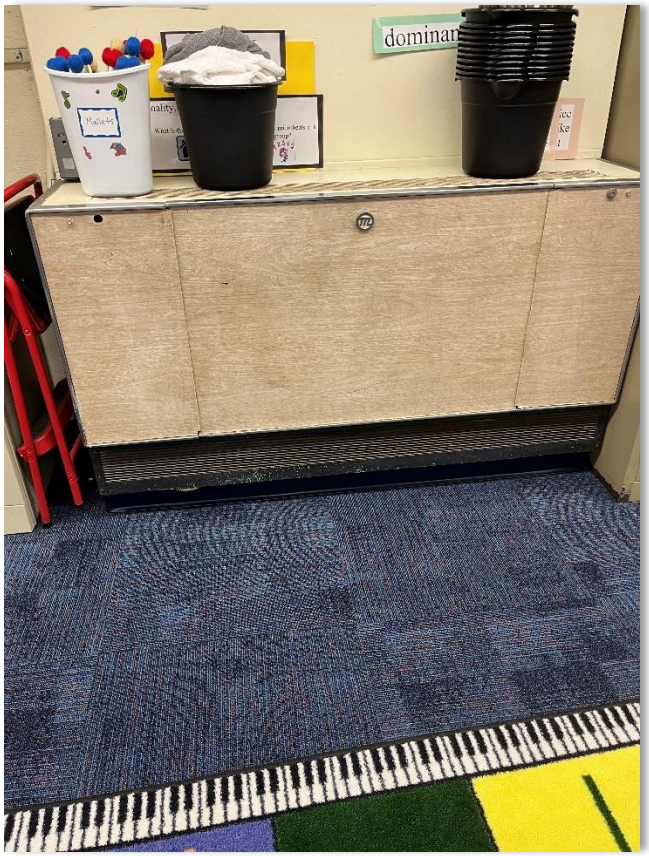
Air Handler




ICM492

HOT WATER
SUPPLY

HOT WATER
SUPPLY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The Burnham school