NEW BEDFORD DISTRICT COURT
HVAC SYSTEM EVALUATION SUMMARY

Visited August 20, 2020. While on site, inspected the air handling equipment located in the mechanical rooms and toured the facility to determine if the spaces generally matched usages noted on the 2014 architectural plans. The New Bedford District Courthouse was constructed in 1984 and is approximately 47,000 square feet in size.

1.0 Airflow Rate per Person (Reduced Occupancy)

		Total Air		*Outdoor Air*	
Courtroom	*Total People*	*Supply Airflow (CFM)*	*Airflow Rate (CFM/Person)*	*Outside Airflow (CFM)*	*Airflow Rate (CFM/Person)*
Jury Pool Room	5	470	97	73	15
Courtroom C-119	26	3,680	142	1,025	39
Courtroom C-128	12	1,720	143	424	35
Courtroom C-111	12	1,750	146	424	35
Juvenile Courtroom	12	1,010	84	497	41
Courtroom 4	15	Unknown	-	Unknown	-
Courtroom 5	12	Unknown	-	Unknown	-

2.0 Recommendations

Section	Recommendation/Finding	Action
2.1	**Filtration Efficiency**	
RF-1	Replace filters with a MERV-13 filter.	Complete
RE-3	Install a differential pressure sensor across the filter bank.	Deferred
2.2	**Testing and Balancing**	
RTB-1	Test and rebalance air handling unit supply air and minimum outside air flow rates	Complete
RTB-2	Rebalance system return and exhaust air flow rate	Complete
RTB-3	Increase outside air flow rate beyond minimum under non-peak conditions.	Complete
RTB-5	Test and balance all air inlets and outlets.	Complete
RTB-6	Test and balance hot water and chilled water control valves.	N/A
2.3	**Equipment Maintenance and Upgrades**	
RE-1	Test existing air handling system dampers and actuators for proper operation	Complete
RE-2	Clean air handler coils.	Complete
RE-5 & 5a	Install freeze stat on the hot water coil and provide a local alarm.	Deferred
RE-7	Test the existing control valves and actuators for proper operation.	Complete

2.4	Control System	
RC-1	Implement a pre and post-occupancy flush sequence	Complete
RC-2	Install controls required to introduce outside air beyond the minimum requirements.	Deferred
RC-4	Confirm the economizer control sequence is operational.	Complete
2.5	Additional Filtration and Air Cleaning	
RFC-1	Install portable HEPA filters.	Complete
2.6	Humidity Control	
	Installing humidifiers need further assessment by an architect	On-going
2.7	Other Recommendations	
2.7.1	Relocate Return Fan Exhaust Discharge	Deferred
2.7.2	Replace Air Handling Units & Return Fans	Deferred
2.7.3	Replacement of HV-1	Deferred
2.7.4	Install a Building Management System	Deferred
2.7.5	Replace Fan Coil Units	Deferred
2.7.6	Convert Hydronic Systems to Variable Flow	Deferred

New Bedford District Court
New Bedford, MA

HVAC SYSTEM EVALUATIONS COVID-19

Office of Court Management

April 6, 2021

Tighe&Bond

Section 1
Existing Conditions & Site Observations

Tighe & Bond visited the New Bedford District Courthouse on August 20, 2020. While on site we inspected the air handling equipment located in the mechanical rooms and toured the facility to determine if the spaces generally matched usages noted on the 2014 architectural plans.

Site Visit Attendees:

- *Office of Court Management:*
  - Ronald De Pesa, Manager of Court Facilities – Region 4
  - Courthouse Facilities Staff
- Tighe & Bond
  - Jason Urso, PE, Senior Mechanical Engineer
  - Sean Pringle, PE, Project Mechanical Engineer

1.1 Existing Ventilation System

The New Bedford District Courthouse was constructed in 1984 and is approximately 47,000 square feet in size. The building is served by nine, constant volume Trane Climate Changer air handling units, of which eight (AC-1 through AC-8) providing heating and cooling and one (HV-1) provides only heating. A dedicated return fan (REF-1 through REF-8) serves each AC unit, which is also ducted to an exhaust air louver, indicating the systems may operate on economizers. Some return fan exhaust ducts are connected to the louver used by the air handler for outdoor air. Current code requirements state intake air louvers are required to be at least ten feet away from exhaust air louvers. HV-1 is a heating only unit and primarily serves perimeter offices that also contain a fan coil unit that provides heating and cooling. Several exhaust fans serve toilet rooms throughout the Courthouse.

A central chiller located in the ground floor mechanical room provides chilled water to all AC air handlers. A gas fired boiler plant, located in the same room, provides hot water to all air handling units as well as terminal units in the Courthouse. All chilled and hot water coils are served by 3-way control valves. All air handling units and appear to be original from the 1984 installation and are in fair to poor condition. The return fans also appear to be original and are in fair condition. Most air handler outdoor air dampers are rusted and some may be seized closed. The hot and chilled water coils are considerably dirty. The 3-way hot and chilled water control valves and actuators also appear to be original and are in fair to poor condition.

Table 1 summarizes the air handling units' designed airflow rates, the MERV rating of the installed filters, and the condition.

TABLE 1
Existing Air Handling Units

Unit	Original Design Airflow (CFM)	Original Design Min. O.A. (CFM)	Filters	Condition
AC-1	3,680	600	2", MERV 8	Fair/Poor
AC-2	1,720	270	2", MERV 8	Fair/Poor
AC-3	1,750	270	2", MERV 8	Fair/Poor
AC-4	12,930	1,040	2", MERV 8	Fair/Poor
AC-5	1,920	90	2", MERV 8	Fair/Poor
AC-6	1,010	270	2", MERV 8	Fair/Poor
AC-7	6,120	330	2", MERV 8	Fair/Poor
AC-8	1,000	30	2", MERV 8	Fair/Poor
HV-1	1,415	1,415	2", MERV unknown	Fair/Poor

Photo 1 - Representative Air Handler

1.2 Existing Control System

A pneumatic, Barber Coleman system controls the existing HVAC air handling equipment. It is an old, obsolete system and appears to be original. We did not see any evidence or components of a Building Management System (BMS) during our site visit. We are not aware of any demand control ventilation sequences in use at this courthouse.

Section 2
Recommendations

Below is a list of recommendations that we propose for the New Bedford Courthouse. Please refer to the "Master Recommendation List" for further explanation and requirements of the stated recommendations.

2.1 Filtration Efficiency Recommendations

We recommend the following measures be implemented the existing air handling units:

RF-1: *Replace filters with a MERV-13 filter.*

TAB Contractor and/or Engineer shall verify that the air handlers can accommodate a MERV-13 filter.

RF-3: *Install a differential pressure sensor across the filter bank.*

2.2 Testing & Balancing Recommendations

All air handling units are approximately 35 years old and it is unknown to Tighe & Bond when the last time the units were tested and balanced. Also, the code required outside air flow rates that were used to design the system in 1981 are different than the 2015 International Mechanical Code (IMC) and ASHRAE Standard 62.1.

The ASHRAE climatic data for outdoor air conditions in New Bedford states a summer design condition of 88.2°F/73.4°F DB/WB and a winter condition of 8.6°F. In reviewing the originally designed entering mixed air temperatures for the chilled water and hot water coils in the air handling units, 83.5°F/67.8°F DB/WB (approximate) and 60°F DB, respectively, we've determined the air handlers AC-1 through AC-6 cannot accommodate the 2015 code required ventilation air under peak conditions. AC-7 can accommodate more than code minimum and AC-8 can accommodate the minimum. HV-1 is a 100% outdoor air unit. Prior to rebalancing efforts, dampers and actuators should be tested to ensure they are operating correctly. We recommend the following measures be implemented:

RTB-1: *Test and rebalance air handling unit supply, return, and minimum outside air flow rates.*

We recommend rebalancing the air handler outside airflow rates to the recommended O.A. rates listed in Table 2. The cooling and heating coils should be able to provide leaving air conditions similar to the original design under peak outdoor air conditions, assuming the coils are clean and their performance has not degraded significantly over time.

TABLE 2
Recommended Air Handler O.A. Flow Rates

Unit	Original Supply Airflow (CFM)	Original Design Min. O.A. (CFM)	Current Code Min. O.A. Requirements (CFM)	Recommended Minimum O.A. (CFM)
AC-1	3,680	600	1,025	600
AC-2	1,720	270	425	300
AC-3	1,750	270	425	300
AC-4	12,930	1,040	4,500	2,000
AC-5	1,920	90	525	300
AC-6	1,010	270	500	100/270*
AC-7	6,120	330	240	900
AC-8	1,000	30	110	150
HV-1	1,415	1,415	1,975	1,415

Note: Although the ASHRAE Position Document on Infectious Aerosols recommends using the latest published standards and codes as a baseline for minimum ventilation, the mechanical code in effect at the time the HVAC systems were designed and constructed is what governs the required outdoor air flowrate for the HVAC equipment, if there have been no additions, renovations, alterations or changes in occupancy to the building. The 2015 International Mechanical Code does not prevent the continued use of existing systems.

*AC-6 was originally designed with an O.A. flow rate of 270 CFM. This results in a winter mixed air dry bulb temperature of 53.4°F, 6.6 degrees below the entering air temperature the heating coil was designed for per the unit schedule. This indicates that under a peak design condition of 8°F, the hot water coil may not be maintaining the designed leaving air temperature of 60°F. If the Courthouse is currently not experiencing any heating issues with this unit, then we recommend maintaining an O.A. flow rate of 270 CFM. Otherwise, in order to obtain a supply air temperature of 60°F, the outdoor air should be balanced to 100 CFM.

According to the current ventilation air requirements, HV-1 requires an additional 560 CFM in order to provide the code minimum outside air to each space it serves. We do not believe this unit can handle this additional airflow rate and recommend to maintain the current airflow rate of 1,415 CFM.

The average airflow rate per person is shown below in Table 3. These values are based on the original design supply airflow rate and the recommended outdoor air flow rates shown in Table 2. The airflow rate per person assumes a diversity factor of 70%, meaning the maximum number of occupants assumed to be in all zones at all times equates to 70% of the code required occupancy.

TABLE 3
Average Airflow Rate per Person

	All spaces	*Courtrooms*	*Non-Courtroom Spaces*
Total Occupancy (People)	502	227	275
Total Supply Air (CFM/Person)	64	36	87
Outdoor Air (CFM/Person)	12	6	17

The airflow rate per person for each Courtroom and Jury Pool Room is shown below in Table 4. These values are based on full occupancy without taking diversity into account, the original design supply airflow rate, and the recommended outdoor airflow rate. The 1981 design plans do not show any supply air for Courtroom 4 on the Ground floor.

TABLE 4
Airflow Rate per Person - Courtrooms

		Total Air		*Outdoor Air*	
Courtroom	*Total People*	*Supply Airflow (CFM)*	*Airflow Rate (CFM/Person)*	*Outside Airflow (CFM)*	*Airflow Rate (CFM/Person)*
Jury Pool Room	20	470	22	73	3
Courtroom C-119	140	3,680	26	1,025	7
Courtroom C-128	58	1,720	30	424	7
Courtroom C-111	58	1,750	30	424	7
Juvenile Courtroom	68	1,010	15	497	7
Courtroom 4	88	Unknown	-	Unknown	-
Courtroom 5	56	Unknown	-	Unknown	-

Note: Courtroom occupancy density is based on 70 people/1,000 square feet, per the 2015 International Mechanical Code

The airflow rate per person for each Courtroom and the Jury Pool Room, based on a reduced occupancy schedule determined by the Office of Court Management, is shown below in Table 4a. The airflow rate per person assumes the full supply airflow is being delivered to the room. At times when the supply airflow is reduced due to the space temperature being satisfied, the airflow rate per person will also be reduced.

TABLE 4a
Airflow Rate per Person (Reduced Occupancy)

		Total Air		*Outdoor Air*	
Courtroom	***Total People***	***Supply Airflow (CFM)***	***Airflow Rate (CFM/Person)***	***Outside Airflow (CFM)***	***Airflow Rate (CFM/Person)***
Jury Pool Room	5	470	94	73	15
Courtroom C-119	26	3,680	142	1,025	39
Courtroom C-128	12	1,720	143	424	35
Courtroom C-111	12	1,750	146	424	35
Juvenile Courtroom	12	1,010	84	497	41
Courtroom 4	15	Unknown	-	Unknown	-
Courtroom 5	12	Unknown	-	Unknown	-

RTB-2: *Rebalance system return and exhaust air flow rate*

To accommodate the revised outdoor air flow rates and to help provide a positive building pressure, the return fans will have to be rebalanced.

RTB-3: *Increase outside air flow rate beyond minimum under non-peak conditions.*

Due to the age of the units, the ability for the coils to maintain the supply air temperature is uncertain. We recommend increasing the outdoor air flow rate by only 10% beyond the recommended outdoor air flow rates. We do not believe this would cause a threat of a potential coil to freeze given the amount of outside air as a percentage of total supply air, however cold spots on the coil may develop due to poor mixing. This may cause nuisance freeze stat trips via the existing freeze stat.

RTB-5: *Test and balance all air inlets and outlets.*

If the Courthouse experiences regular cooling and heating comfort complaints, we recommend rebalancing all air inlets and outlets throughout the building. Prior to rebalancing the building, we recommend verifying the chiller and boiler plants are maintaining the correct supply water temperatures. Incorrect supply water temperatures may be contributing to the temperature control complaints instead of a lack of airflow.

RTB-6: *Test and balance all air handler chilled and hot water coils.*

Testing and balancing the air handler hot and chilled water coils will help ensure the coils are receiving the proper water flow rates. Due to the age of the coils, the coils may not perform as required to properly temper the supply air. Coils become fouled over time, which degrades the performance.

2.3 Equipment Maintenance & Upgrades

We recommend the following equipment maintenance and upgrades:

RE-1: *Test existing air handling system dampers and actuators for proper operation*.

Replace dampers and actuators that are not functioning.

RE-2: *Clean air handler coils and drain pans.*

RE-5 & 5a: *Install freeze stat on the hot water coil and provide a local alarm.*

Since we recommend increasing the outside air flow rate, as an extra precaution we recommend installing a freeze stat to help prevent the hot water coil from freezing.

RE-7: Test the existing control valves and actuators for proper operation.

2.4 Control System

The New Bedford Courthouse has a pneumatic control system with limited functionality. We recommend the following control system strategies be implemented into the existing control system:

RC-1: *Implement a pre and post-occupancy flush sequence.*

RC-2: *Install controls required to introduce outside air beyond the minimum requirements.*

Considering that the existing system is pneumatic, a considerable amount of control equipment and programming would be required for this recommendation. Further discussion with a control system supplier is warranted to determine the most cost-effective solution.

RC-4: *Confirm the economizer control sequence is operational.*

2.5 Additional Filtration and Air Cleaning

We recommend the installation of the following air cleaning devices:

RFC-1: *Install portable HEPA filters.*

If the Courthouse is to operate at a high capacity (i.e. 50%-75% occupancy or greater), we recommend installing portable HEPA filters in high traffic areas, such as entrance lobbies. They should also be considered for Courtrooms, depending on the occupancy of the room and how much noise is generated from the filters. The noise levels will vary depending on the manufacturer.

2.6 Humidity Control

The installation of humidifiers should be further assessed by an architect who can review the construction of the building envelope. Adding humidity to a building that is not properly designed can present indoor air quality issues if not implemented correctly.

Installing space mounted humidifiers are not recommended at this point unless there are high risk employees who are required to be in the Courthouse who cannot work remotely.

2.7 Other Recommendations

2.7.1 Relocate Return Fan Exhaust Discharge

To comply with current code requirements, we recommend the location of the exhaust air discharge of the return fans be relocated a minimum of ten feet away from the air handling unit outside air intake louvers. The current location presents a risk of recirculating building air back into the intake air louvers. If this is occurring, the air handlers are bringing in less outside air and recirculating more. This is a concern, especially during the COVID-19 pandemic, despite the installation of MERV 13 filters.

If the original design intent was to open the exhaust dampers during economizer mode only vs. exhausting a portion of return air at all times, then the frequency of this issue occurring is less.

2.7.2 Replace Air Handling Units & Return Fans

Replacing the air handling units should be considered within the next five years. Indoor air handling units have a life expectancy of 35-40 years. The units in the New Bedford Courthouse are approximately 35 years old and are in poor condition. Replacing the return fans should also occur in conjunction with the replacement of the air handling units and should be sized correctly to provide an overall positive building pressure to reduce infiltration.

2.7.3 Replace HV-1

HV-1 is a 100% outdoor air unit that appears to provide code minimum ventilation air to several perimeter offices. This unit has only a heating coil, therefore, ventilation air is not cooled during the summer. A fan coil unit located in each space provides additional heating and cooling. If this unit is operational during the summer, it is providing warm, humid air into the spaces. If this unit is not run during the summer, then ventilation air is not being provided to these spaces unless the windows are open. We recommend this unit be replaced with an Energy Recovery Unit (ERU) that can heat and cool the ventilation air. Toilet exhaust can be ducted to the ERU and some exhaust fans may be able to be eliminated. The use of an ERU would have to be explored further to determine its viability.

2.7.4 Install a Building Management System

When the air handling units are replaced, we recommend installing a BMS to control and monitor equipment. Pneumatic air systems are antiquated and do not offer the same benefits as a BMS. This recommendation is an energy saving and maintenance measure and does not affect the indoor air quality of the building.

2.7.5 Replace Fan Coil Units

We recommend replacing the fan coil units within the next five years. The average life of a fan coil unit is approximately 35 years. The fan coil units appear to be original and are approximately 36 years old, exceeding their expected useful life.

2.7.6 Convert Hydronic Systems to Variable Flow

As an energy saving measure, converting the chilled and hot water systems from constant volume to variable flow should be considered when the air handling units are replaced.

This would include replacing three-way control valves with two-way valves, installing variable frequency drives (VFD) on the pumps, and may require pump replacements. Other ancillary devices and would also be required. This recommendation is an energy saving measure and does not affect the indoor air quality of the building.

Section 3
Testing & Balancing Results

Wing's Testing & Balancing Co., Inc. visited the Bedford District Courthouse on December 23, 2020 to test the airflow rates of the air handling units and the exhaust fans. A summary of the tested airflow rates versus the design airflow rates are shown below in Tables 5 and 6. The full testing and balancing report is attached.

TABLE 5
Air Handler Testing & Balancing Results

	Design			Actual		
Unit	Total Supply Fan Airflow (CFM)	Recommended Outdoor Airflow (CFM)	Return Fan Airflow (CFM)	Supply Fan Airflow (CFM)	Outdoor Airflow (CFM)	Return Fan Airflow (CFM)
AC-1	3,680	600	3,050	2,718	1,287	1,431
AC-2	1,720	300	1,450	965	162	803
AC-3	1,750	300	1,450	1,632	638	994
AC-4	12,930	1,040	11,890	11,848	1,934	9,914
AC-5	1,920	300	1,620	2,641	1,028	1,613
AC-6	1,010	270	740	1,099	710	389
AC-7	6,120	900	5,220	6,452	5,244	1,208
AC-8	1,000	150	850	Unit is not operating		
HV-1	1,415	1,415	0	1,004	1,004	0

TABLE 6
Exhaust Fan Testing & Balancing Results

Unit	Serving	Design Return/Exhaust Airflow (CFM)	Actual Return/Exhaust Airflow (CFM)
EF-5	Toilet	975	1,048
EF-9	General	200	400
EF-12	Kitchen	105	274

Typical balancing tolerances for air systems is ±10% of the design airflow. In reviewing the airflow report data, the following should be noted:

1. AC-8 (serving records storage) no longer operates and therefore does not have any test data.
2. The outside air actuator for AC-6 is not functional and should be replaced.

3. AC-1 (serving Courtroom C-119), AC-2 (serving Courtroom C-128), and HV-1 are operating below the ±10% recommended total supply airflow tolerance. AC-1 is delivering double the outside air and AC-2 is delivering 50% of the recommended outside air. Further investigation is required to determine if these units can be rebalanced with a sheave change or if a new motor is required.
4. AC-5 serves the cell area and is delivering 37% more total air and 342% more outside air than recommended. The TAB Contractor noted this unit was not rebalanced to the recommended flow rates because this is an existing condition, will provide better air change rates, and was reported that there have been no alarms or units tripping due to this excess outdoor air. We recommend confirming that the existing freeze stats are in working condition. We also recommend monitoring the space temperature. If there are heating or cooling complaints, we recommend balancing this unit to the recommended values.
5. AC-4, AC-6, and AC-7 are delivering much more outside airflow over the recommended airflows. The TAB Contractor left the existing airflows as is since this was how the existing units were operating and were providing excess outdoor air with no temperature complaints, to our knowledge. Once the pandemic is over, the outdoor airflows can be rebalanced to the recommend values to reduce energy costs.
6. Exhaust fan EX-9 is operating approximately 100 percent over design airflow.
7. Exhaust fan EX-12 is operating approximately 260 percent over design airflow.
8. The remaining toilet exhaust fans were not tested due to a lack of time.

Disclaimer

Tighe and Bond cannot in anyway guarantee the effectiveness of the proposed recommendations to reduce the presence or transmission of viral infection. Our scope of work is intended to inform the Office of Court Management on recommendations for best practices based on the guidelines published by ASHRAE and the CDC. Please note that these recommendations are measures that may help reduce the risk of airborne exposure to COVID-19 but cannot eliminate the exposure or the threat of the virus. Implementing the proposed recommendations will not guarantee the safety of building occupants. Tighe & Bond will not be held responsible should building occupants contract the virus. The Office of Court Management should refer to other guidelines, published by the CDC and other governing entities, such as social distancing, wearing face masks, cleaning and disinfecting surfaces, etc. to help reduce the risk of exposure of COVID-19 to building occupants.

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WING'S TESTING & BALANCING CO., INC.

New Bedford District Courthouse
HVAC/Ventilation Survey

* * * *

Tighe & Bond
Attn: Jason Urso
53 Southampton Road
Westfield, MA 01085

December 23, 2020

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WING'S TESTING & BALANCING CO., INC.

Tighe & Bond
Attn: Jason Urso
53 Southampton Road
Westfield, MA 01085

December 23, 2020

Re: New Bedford District Courthouse/HVAC Ventilation Survey

Dear Jason,

Our HVAC ventilation survey has been completed. Through our testing we have found the following.

- AC-8 is not operational.
- The outside air actuator for AC-6 is not functional.
- AC-2 has loose belts that are slipping.

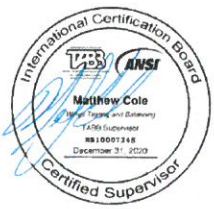
Several of the units were left over design on the outside air because these were already existing conditions and there have been no alarms or units tripping. This allows for better air changes for the public spaces.

This report includes Brake Horsepower (BHP) calculations. When a motor has a VFD, we take the amperage measurements from there. When we calculate from volts and amps, it means there has to be a nameplate on the motor. Many times, these are missing or illegible. If BHP is not listed for an individual motor, this is because we do not have enough information to calculate it. It should be noted that that the older a motor is, the less likely it is to follow the affinity laws for BHP- since the efficiency degrades over time. We have used accepted constants for efficiency and the power factor, which should result in fairly close calculations, but are not as accurate for older motors.

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

Barry Stratos
Certified TABB Technician BB996928T



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EXHAUST FAN REPORT

PROJECT: New Bedford Districct Courthouse | **DATE:** 12/23/20

AREA SERVED: Various | **TECH:** BS

FAN DATA

FAN NUMBER		EF-5	EF-12	EF-9		
LOCATION		Roof	Roof	Roof		
AREA SERVED		Toilets	Kitchen			
MANUFACTURER		Central Fan Co	Central Fan Co	Central Fan Co		
MODEL OR SIZE		D11ESCW	D9CSCW	D9CSCW		
TOTAL CFM	DESIGN	975	105	200		
	ACTUAL	1048	274	400		
FAN RPM	DESIGN	DD	DD	DD		
	ACTUAL	DD	DD	DD		
PULLEY	O.D.	DD	DD	DD		
SERVICE						

MOTOR DATA

MANUFACTURER		Century	Century	Century		
MODEL NUMBER		J562	J56	J56		
MOTOR HP	DESIGN	.50	.50	.25		
	ACTUAL	.50	.25	.25		
MOTOR RPM		1100	1140	1140		
VOLTAGE/PHASE		115/1	115/1	115/1		
MOTOR AMPS	DESIGN	6.4	5.0	5.0		
	ACT. LEG 1	---	---	---		
	ACT. LEG 2	5.1	3.4	4.5		
	ACT. LEG 3	---	---	---		
SHEAVE		DD	DD	DD		
BELTS-QTY/SIZE		DD	DD	DD		
SHEAVE POSITION		NA	NA	DD		
BHP		0.4	0.2	0.2		

REMARKS

SUPPLY FAN REPORT

PROJECT: New Bedford District Courthouse	**DATE:** 12/23/20
AREA SERVED: Various	**TECH:** BS

FAN DATA

	AC-8		AC-6		AC-5	
FAN NUMBER						
LOCATION	Basement		Basement		Penthouse	
AREA SERVED	Vaults		Court Room 4		Lock Up	
MANUFACTURER	Trane		Trane		Trane	
MODEL OR SIZE	CCDB03AHWC		CCDB03AHNC		CCDB06AHNC	
	DESIGN	**ACTUAL**	**DESIGN**	**ACTUAL**	**DESIGN**	**ACTUAL**
TOTAL CFM	1000	(2)	1010	1099	1920	2641
RETURN AIR	850	(2)	740	389	1620	1613
OUTSIDE AIR	150	(2)	270	710 (1)	300	1028
DISCH. STATIC	---	---	---	+0.52"	---	+0.77"
SUCTION STATIC	---	---	---	-0.86"	---	-0.81"
TOTAL STATIC	---	---	NA	1.38	NA	1.38
FAN RPM	---	---	NA	1428	NA	1444
PULLEY O.D.	4" x 7/8"		4" x 7/8"		6 1/2" x 7/8"	
ESP	---		0.82"		1.10"	
VFD SPEED	No VFD		No VFD		No VFD	
O.A.D. MIN POS	NA		NA		40%	

MOTOR DATA

MANUFACTURER	GE		GE		Baldor	
MODEL OR FR.	562		NA		145T	
HORSEPOWER	.75	.75	.75	.75	1.5	1.5
MOTOR RPM	1725	1725	1725	1725	1725	1725
VOLTAGE / PH.	208/3	208/3	208/3	208/3	208/3	208/3
AMPS LEG 1	2.6	---	2.6	2.2	5.0	4.8
AMPS LEG 2	---	---	---	2.3	---	4.8
AMPS LEG 3	---	---	---	2.3	---	4.8
SHEAVE O.D.	3 3/4" x 5/8"		3 3/4" x 5/8"		5" x 7/8"	
BELTS - QTY / SIZE	1/4L350		1/A38		1/B45	
SHEAVE POSITION	50% Open		50% Open		100% Closed	
BHP	---		0.7		1.4	

REMARKS

(1) Outsisde air actuator is not functional
(2) AC-8 does not run
NA-Not Available
ND-No Design DD-Direct Drive

SUPPLY FAN REPORT

PROJECT: New Bedford District Courthouse	**DATE:** 12/23/20
AREA SERVED: Various	**TECH:** BS

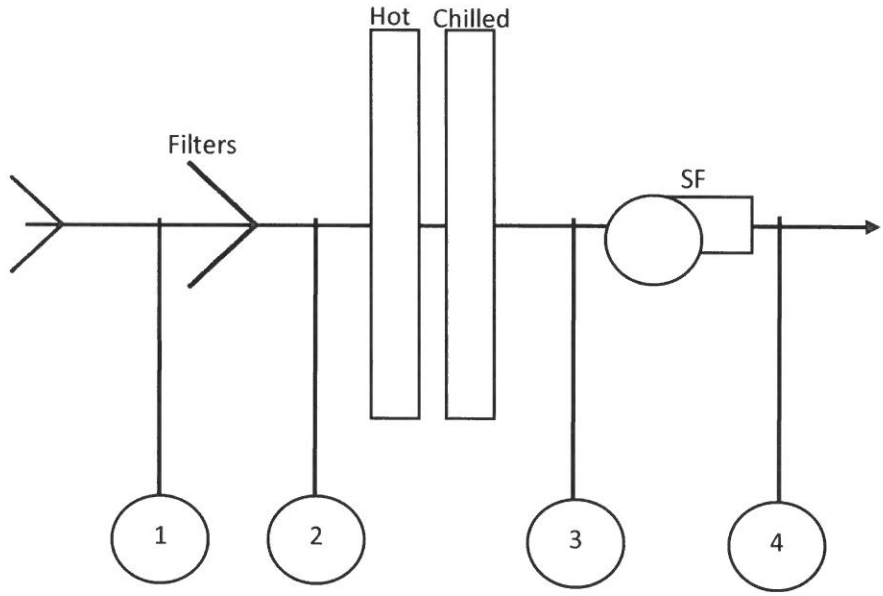
FAN DATA						
FAN NUMBER	AC-4		AC-2		HV-1	
LOCATION	Penthouse		Penthouse		Penthouse	
AREA SERVED	Probation		Court #3			
MANUFACTURER	Trane		Trane		Trane	
MODEL OR SIZE	CCDB250HNC		CCDB038HNC		TVDB03AE0C	
	DESIGN	**ACTUAL**	**DESIGN**	**ACTUAL**	**DESIGN**	**ACTUAL**
TOTAL CFM	12930	11848	1720	965	1415	1004
RETURN AIR	10930	9914	1420	803	0	0
OUTSIDE AIR	2000	1934	300	162	1415	1004
DISCH. STATIC	---	+0.84"	---	+0.29"	---	---
SUCTION STATIC	---	-1.22"	---	-0.09"	---	---
TOTAL STATIC	---	2.06	---	0.38	---	---
FAN RPM	---	606	---	1248	---	1633
PULLEY O.D.	16" x 2 1/8"		7" x 1 3/8"		4 3/4" x 7/8"	
ESP	1.15"		0.31"		---	
VFD SPEED	No VFD		No VFD		No VFD	
O.A.D. MIN POS	15%		20%		100%	
MOTOR DATA						
MANUFACTURER	US Motors		Gould		Lincoln	
MODEL OR FR.	254T		M145T		143T	
HORSEPOWER	15	15	1.5	1.5	1	1
MOTOR RPM	1755	1755	1745	1745	1750	1750
VOLTAGE / PH.	208/3	208/3	208/3	208/3	208/3	208/3
AMPS LEG 1	49.0	31.7	5.5	4.1	3.4	2.9
AMPS LEG 2	---	32.5	---	4.2	---	2.9
AMPS LEG 3	---	21.6	---	4.2	---	2.9
SHEAVE O.D.	6" x 1 5/8"		5 1/2" x 7/8"		4 1/4" x 7/8"	
BELTS - QTY / SIZE	2/B90		1/A40		1/4L420	
SHEAVE POSITION	50% Open		100% Open		100% Open	
BHP	9.7		1.2		0.9	

REMARKS

NA-Not Available
ND-No Design DD-Direct Drive

SYSTEM STATIC PRESSURE PROFILE

PROJECT: New Bedford District Courthouse	**DATE:** 12/23/20
SYSTEM/AREA SERV: Various	**TECH:** BS



STATIC PRESSURE READINGS "wc

POS. (+) / NEG.(-)	1	2	3	4	5	6	7	NOTES
AC-1	-0.62"	-0.99"	-1.47"	+0.88"				
AC-7	-0.41"	-0.67"	-1.01"	+0.81"				
AC-3	-0.26"	-0.58"	-0.88"	+0.24"				
HV-1	-0.36"	-0.50"	-0.95"	+0.56"				
AC-5	-0.33"	-0.50"	-0.81"	+0.77"				
AC-6	-0.30"	-0.44"	-0.86"	+0.52"				
AC-4	-0.31"	-0.54"	-1.22"	+0.84"				
AC-2	-0.02"	-0.04"	-0.09"	+0.29"				

REMARKS

VELOCITY PRESSURE READINGS

PROJECT: New Bedford District Courthouse | **DATE:** 12/23/20

AREA SERVED: Various | **TECH:** BS

TRAVERSE LOCATIONS	DUCT SIZE "	AREA SQ.FT.	DESIGN		CENTERLINE STATIC PRES."	TEST		NOTES
			FPM	CFM		FPM	CFM	
AC-1								
Total	18" x 18"	2.25	---	3680	+0.35	1208	2718	
Return	40" x 16"	4.44	---	3050	-0.03	322	1431	
OA Calc							1287	
AC-7								
Total	60" x 32"	13.33	---	6120	w/velgrid	484	6452	
Return	64" x 18"	8.0	---	900	-0.06	151	1208	
OA Calc							5244	
AC-3								
Total	18" x 16"	2.0	---	1750	+0.20	816	1632	
Return	18" x 16"	2.0	---	1450	-0.06	497	994	
OA Calc							638	
HV-1								
Total	16" x 18"	2.0	---	1415	-0.04	502	1004	
AC-5								
Total	26" x 12"	2.17	---	1920	+0.77	1219	2641	
OA	16" x 16"	1.77	---	300	-0.03	578	1028	
Return Calc							1613	
AC-6								
Total	24" x 8"	1.33	---	1010	+0.19	824	1099	
OA	24" x 8"	1.33	---	270	-0.06	534	710	
Return Calc							389	

REMARKS

VELOCITY PRESSURE READINGS

PROJECT: New Bedford District Courthouse | **DATE:** 12/23/20

AREA SERVED: Various | **TECH:** BS

TRAVERSE LOCATIONS	DUCT SIZE "	AREA SQ.FT.	DESIGN		CENTERLINE STATIC PRES."	TEST		NOTES
			FPM	CFM		FPM	CFM	
AC-4								
Total	42" x 30"	8.75	---	12230	+0.84	1354	11848	
OA	50" x 24"	8.33	---	2000	+0.02	323	1933	
Return Calc							9914	
AC-2								
Total	10 1/2" x 10 1/2"	0.77	---	1720	+0.29	1260	965	
OA	18" x 16"	2.0	---	300	-0.11	81	162	
Return Calc							803	
EF-5	10"Ø	0.55	---	975	+0.27	1906	1048	
EF-12	10"Ø	0.55	---	105	+0.02	499	274	
EF-9	10"Ø	0.55	---	200	+0.04	728	400	

REMARKS

EXHAUST FAN REPORT

PROJECT: New Bedford Districct Courthouse | **DATE:** 12/23/20

AREA SERVED: Various | **TECH:** BS

FAN DATA						
FAN NUMBER		EF-5	EF-12	EF-9		
LOCATION		Roof	Roof	Roof		
AREA SERVED		Toilets	Kitchen			
MANUFACTURER		Central Fan Co	Central Fan Co	Central Fan Co		
MODEL OR SIZE		D11ESCW	D9CSCW	D9CSCW		
TOTAL CFM	DESIGN	975	105	200		
	ACTUAL	1048	274	400		
FAN RPM	DESIGN	DD	DD	DD		
	ACTUAL	DD	DD	DD		
PULLEY	O.D.	DD	DD	DD		
SERVICE						
MOTOR DATA						
MANUFACTURER		Century	Century	Century		
MODEL NUMBER		J562	J56	J56		
MOTOR HP	DESIGN	.50	.50	.25		
	ACTUAL	.50	.25	.25		
MOTOR RPM		1100	1140	1140		
VOLTAGE/PHASE		115/1	115/1	115/1		
MOTOR AMPS	DESIGN	6.4	5.0	5.0		
	ACT. LEG 1	---	---	---		
	ACT. LEG 2	5.1	3.4	4.5		
	ACT. LEG 3	---	---	---		
SHEAVE		DD	DD	DD		
BELTS-QTY/SIZE		DD	DD	DD		
SHEAVE POSITION		NA	NA	DD		
BHP		0.4	0.2	0.2		

REMARKS