



## LOWELL JUSTICE CENTER HVAC SYSTEM EVALUATION SUMMARY

Visited the Lowell Justice Center on November 5, 2020. 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 architectural plans. The Lowell Justice Center is a new facility, constructed in 2020, and is approximately 265,000 square feet in size. Seven custom Multi-stack air handling units (AHU) supply air to the building. The seven air handlers are new and in excellent condition.

### 1.0 Airflow Rate Per Person (Reduced Occupancy)

Courtroom	Total People	Total Air		Outdoor Air	
		Supply Airflow (CFM)	Airflow Rate (CFM/Person)	Outside Airflow (CFM)	Airflow Rate (CFM/Person)
Jury Pool Waiting 1077	37	600	16	600	16
DC Courtroom 01 2017	38	3,105	82	1,375	36
DC Courtroom 02 2175	32	1,725	54	850	27
DC Courtroom 03 3020	38	3,105	82	1,375	36
DC Courtroom 04 3041	33	1,710	52	750	23
DC Courtroom 05 3083	32	1,725	54	850	27
DC Courtroom 06 3115	32	1,800	56	900	28
JC Courtroom 07 4019	26	1,575	61	700	27
JC Courtroom 08 4129	26	1,575	61	800	30
JC Courtroom 09 4148	38	2,505	66	1,250	33
PF Courtroom 10 5021	26	1,650	63	725	28
PF Courtroom 11 5145	26	1,650	63	825	32
HC Courtroom 12 6018	40	3,000	75	1,325	33
PF Courtroom 13 6112	26	1,575	61	800	30
PF Courtroom 14 6132	26	1,650	63	825	32
SC Courtroom 15 7019	41	3,000	73	1,325	32
SC Civil Courtroom 16 7128	38	2,625	69	1,3625	35
SC Courtroom 17 7145	39	2,460	63	1,225	32

### 2.0 Recommendations

Section	Recommendation/Finding	Action
<b>2.1</b>	<b>Filtration Efficiency</b>	
RF-1	Replace return air filters with a MERV-13 filter in AHU-5, AHU-6, and AHU-7	Complete
<b>2.2</b>	<b>Testing and Balancing</b>	
RTB-3	Increase outside air flow rate beyond minimum under non-peak conditions for AHU-5, AHU-6, and AHU-7	Complete

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## Lowell Justice Center HVAC System Evaluation Continued

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### 2.3 Equipment Maintenance and Upgrades

RE-3	Replace air handler motor	Complete
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### 2.4 Control System

RC-1	Implement a pre and post-occupancy flush sequence	Complete
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RC-3	Install controls required to introduce outside air beyond the minimum requirements in a stepped approach.	Complete
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RC-5	Disable demand control ventilation sequences.	Complete
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### 2.5 Additional Filtration and Air Cleaning

RFC-1	Install portable HEPA filters in high traffic areas – <i>if courthouse is to operate at a high occupancy (i.e. 50-75% or greater), install portable HEPA filters in high traffic areas.</i>	Complete
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### 2.6 Humidity Control

	No actionable items listed – continuous monitoring for seasonal changes	On-going
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**Lowell Justice Center  
Lowell, MA**

**HVAC SYSTEM  
EVALUATION  
COVID-19**

Office of Court Management

December 4, 2020

**Tighe&Bond**

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## Section 1

# Existing Conditions & Site Observations

Tighe & Bond visited the Lowell Justice Center on November 5, 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 architectural plans.

### Site Visit Attendees:

- *Office of Court Management:*
  - Michael Angluin, Lowell Justice Center Facilities System Supervisor
- *Tighe & Bond*
  - Jason R. Urso, PE, Mechanical Engineer

## 1.1 Existing Ventilation System

The Lowell Justice Center is a new facility, constructed in 2020, and is approximately 265,000 square feet in size. Seven custom Multi-stack air handling units (AHU) supply air to the building. AHU-2 through AHU-4 are 100% outdoor air units, and AHU-5 through AHU-7 are recirculating type units. It is uncertain if AHU-1 is a 100% outdoor air or recirculating type unit. The "AHU Schedule" on the design drawing contains conflicting language on what type of unit it is. Every unit contains an enthalpy wheel, supply fans, return fans, chilled water cooling coils, hot water heating coils, MERV 8 pre-filters and MERV 8 return air filters. The design drawings indicate all units were designed to have a MERV 13 final filter, however MERV 14 filters were observed in all units during our site visit. AHU-3 and AHU-4 have an additional desiccant wheel for advanced dehumidification purposes.

Air is distributed through several different system types. AHU-1 and AHU-5 are VAV systems distributing air to the building via variable air volume (VAV) boxes, and then to supply diffusers. AHU-2 is a constant volume air handling system serving the detainee area. AHU-3 and AHU-4 supply air to chilled beams and AHU-6 and AHU-7 supply air to Courtrooms via an underfloor, variable air volume air distribution ventilation system.

The seven air handlers are new and in excellent condition. All dampers and actuators are in excellent condition and all coils are clean. Return air from AHU-5, AHU-6, and AHU-7 pass through a MERV 8 filter before mixing with supply air. There are no downstream supply air filters after this mixing takes place. The MERV 14 supply air filters are located upstream of this mixing section.

During our site visit, we observed the return fan in AHU-2 was operating at 72 hertz (Hz) as indicated on the fan variable frequency drive (VFD). A motor running beyond 60 Hz may be subject to premature failure.

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)	Supply Pre/Final Filters	Return Pre/Final Filters	Condition
AHU-1	4,900	3,000	2" MERV 8/ 12" MERV 14	2" MERV 8	Excellent
AHU-2	4,000	4,000	2" MERV 8/ 12" MERV 14	2" MERV 8	Excellent
AHU-3	17,500	17,500	2" MERV 8/ 12" MERV 14	2" MERV 8	Excellent
AHU-4	17,500	17,500	2" MERV 8/ 12" MERV 14	2" MERV 8	Excellent
AHU-5	5,500	2,500	2" MERV 8/ 12" MERV 14	2" MERV 8	Excellent
AHU-6	17,500	7,570	2" MERV 8/ 12" MERV 14	2" MERV 8	Excellent
AHU-7	19,000	9,490	2" MERV 8/ 12" MERV 14	2" MERV 8	Excellent



Photo 1 – Representative Air Handler

## 1.2 Existing Control System

The Lowell Justice Center has an extensive Automated Building Systems (ABS) building management system (BMS) that controls all HVAC equipment throughout the Courthouse. The system monitors carbon dioxide (CO<sub>2</sub>) levels in the Courtrooms and some common areas, and the outdoor air flow rate for AHU-5, AHU-6, and AHU-7 is modulated based on CO<sub>2</sub> levels.

## Section 2

# Recommendations

Below is a list of recommendations that we propose for the Lowell Justice Center. 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 for the existing air handling units:

**RF-1:** *Replace return air filters with a MERV-13 filter in AHU-5, AHU-6, and AHU-7.*

AHU-5, AHU-6, and AHU-7 have the ability to mix return air back in with supply air without being filtered. This may present a risk of recirculating infectious aerosols back into the supply air stream. We recommend replacing the MERV 8 return air filters in AHU-5, AHU-6, and AHU-7 with MERV 13 filters. This will allow the return air to be filtered with the ASHRAE recommended filtration prior to recirculating it back into the building. The TAB Contractor and Engineer shall verify that the air handlers can accommodate a MERV-13 filter in the return air stream.

We do not recommend filtration upgrades to the supply air stream in the air handling units. The units contain MERV 14 final filters, which ASHRAE is recommending be installed during the COVID-19 pandemic.

### 2.2 Testing & Balancing Recommendations

The air handling units were installed this year and recently tested and balanced. We presume any discrepancies between the specified and the balanced outdoor air flow rates were identified by the engineer of record and corrected.

Table 2 notes the code required outdoor air flow rates, based on our calculations.

**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)
AHU-1	4,900	3,000	2,500	<b>3,000</b>
AHU-2	4,000	4,000	2,950	<b>4,000</b>
AHU-3	17,500	17,500	9,800	<b>17,500</b>
AHU-4	17,500	17,500	6,400	<b>17,500</b>
AHU-5	5,500	2,500	2,500	<b>2,500</b>
AHU-6	17,500	7,570	7,700	<b>7,700</b>
AHU-7	19,000	9,490	8,650	<b>9,490</b>

The significant discrepancy between the code minimum and the designed outdoor airflow rates for AHU-3 and AHU-4 is because these systems distribute air to chilled beams. Typically, chilled beam systems are used in conjunction with 100% outdoor air systems and more outdoor air is required to meet the space latent cooling loads compared to code required air.

The average airflow rate per person throughout the building 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 above. 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

	<i>All spaces</i>	<i>Courtrooms</i>	<i>Non-Courtroom Spaces</i>
Total Occupancy (People)	3,042	2,405	1,941
Total Supply Air (CFM/Person)	28	22	36
Outdoor Air (CFM/Person)	20	10	33

The airflow rate per person for each Courtroom and the Jury Pool Room is shown in Table 4. These values are based on full occupancy, the original design supply airflow rate, and the recommended outdoor airflow rate, without taking diversity into account. 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 4**  
Airflow Rate per Person – (Full Occupancy)

<i>Courtroom</i>	<i>Total People</i>	<i>Total Air</i>		<i>Outdoor Air</i>	
		<i>Supply Airflow (CFM)</i>	<i>Airflow Rate (CFM/Person)</i>	<i>Outside Airflow (CFM)</i>	<i>Airflow Rate (CFM/Person)</i>
Jury Pool Waiting 1077	117	600	5	600	5
DC Courtroom 01 2017	169	3,105	18	1,375	8
DC Courtroom 02 2175	126	1,725	14	850	7
DC Courtroom 03 3020	167	3,105	19	1,375	8
DC Courtroom 04 3041	127	1,710	13	750	6
DC Courtroom 05 3083	126	1,725	14	850	7
DC Courtroom 06 3115	129	1,800	14	900	7
JC Courtroom 07 4019	140	1,575	11	700	5
JC Courtroom 08 4129	124	1,575	13	800	6
JC Courtroom 09 4148	149	2,505	17	1,250	8
PF Courtroom 10 5021	143	1,650	12	725	5
PF Courtroom 11 5145	125	1,650	13	825	7
HC Courtroom 12 6018	157	3,000	19	1,325	8
PF Courtroom 13 6112	126	1,575	13	800	6
PF Courtroom 14 6132	127	1,650	13	825	6
SC Courtroom 15 7019	165	3,000	18	1,325	8
SC Civil Courtroom 16 7128	156	2,625	17	1,3625	8
SC Courtroom 17 7145	149	2,460	17	1,225	8

Note: Courtroom occupant 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)

<b>Courtroom</b>	<b>Total People</b>	<b>Total Air</b>		<b>Outdoor Air</b>	
		<b>Supply Airflow (CFM)</b>	<b>Airflow Rate (CFM/Person)</b>	<b>Outside Airflow (CFM)</b>	<b>Airflow Rate (CFM/Person)</b>
Jury Pool Waiting 1077	37	600	16	600	16
DC Courtroom 01 2017	38	3,105	82	1,375	36
DC Courtroom 02 2175	32	1,725	54	850	27
DC Courtroom 03 3020	38	3,105	82	1,375	36
DC Courtroom 04 3041	33	1,710	52	750	23
DC Courtroom 05 3083	32	1,725	54	850	27
DC Courtroom 06 3115	32	1,800	56	900	28
JC Courtroom 07 4019	26	1,575	61	700	27
JC Courtroom 08 4129	26	1,575	61	800	30
JC Courtroom 09 4148	38	2,505	66	1,250	33
PF Courtroom 10 5021	26	1,650	63	725	28
PF Courtroom 11 5145	26	1,650	63	825	32
HC Courtroom 12 6018	40	3,000	75	1,325	33
PF Courtroom 13 6112	26	1,575	61	800	30
PF Courtroom 14 6132	26	1,650	63	825	32
SC Courtroom 15 7019	41	3,000	73	1,325	32
SC Civil Courtroom 16 7128	38	2,625	69	1,3625	35
SC Courtroom 17 7145	39	2,460	63	1,225	32

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

We recommend temporarily increasing the maximum outdoor air flow rate for AHU-5, AHU-6, and AHU-7 under non-peak conditions to the airflow rates noted below.

**TABLE 5**

Temporary O.A. Flowrate Recommendations

<b>Air Handler</b>	<b>Designed</b>		<b>Recommended</b>	
	<b>Outdoor Airflow (CFM)</b>	<b>Intake Air Louver Velocity (FPM)</b>	<b>Outside Airflow (CFM)</b>	<b>Intake Air Louver Velocity (FPM)</b>
AHU-5	2,500	394	3,500	436
AHU-6	7,570	394	9,500	436
AHU-7	9,490	431	10,000	439

One aspect of determining the outdoor airflow capacity of a system is the outdoor air intake louver airflow capacity. The higher the airflow rate through an intake air louver, Lowell Justice Center HVAC System Evaluation - COVID 19

the higher the velocity. If the velocity is too high, there is a risk of drawing in rain or snow into the ductwork. The design drawings for this building indicate the minimum free area of the intake air louvers. Assuming the louvers that were installed match the free area performance noted on the design drawings, the airflow rates noted in Table 5 would result in the free area air velocities also noted in the table. Generally, we do not recommend exceeding a free area velocity of 450 feet per minute (FPM). We recommend that the free area of the installed louvers be confirmed with the approved louver submittals in order to confirm the louver velocities noted in Table 5 are accurate. We also recommend confirming with the design engineer that the recommended outdoor air flowrates and intake air louver velocities noted in Table 5 are acceptable.

If this measure is implemented, we recommend the intake air louver plenum be inspected during inclement weather to confirm that rain or snow is not entering the system. If there is evidence of rain or snow entering the system, the maximum outdoor airflow should be reduced.

## 2.3 Equipment Maintenance & Upgrades

We recommend the following equipment upgrades:

**RE-3:** *Replace air handler motor.*

The return fan in AHU-2 is operating beyond 60 Hz and may be subject to premature failure. We recommend discussing this concern with the air handler manufacturer to determine if replacing the motor with a larger size is necessary.

## 2.4 Control System Recommendations

We recommend the following for the control system:

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

**RC-3:** *Install controls required to introduce outside air beyond the minimum requirements in a stepped approach.*

The existing BMS appears sophisticated enough to implement this type of sequence with the existing equipment. We recommend increasing outside air to the values listed in Table 5, in lieu of 35% as noted in Appendix A, Master Recommendations List.

**RC-5:** *Disable demand control ventilation sequences.*

## 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% 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**

Installing duct mounted or portable humidifiers can help maintain the relative humidity levels recommended by ASHRAE. The feasibility of using duct mounted humidification or portable humidifiers is determined by the building envelope. Buildings that were not designed to operate with active humidification can potentially be damaged due to a lack of a vapor barrier, adequate insulation, and air tightness. We are not aware of whether this building was constructed to accommodate a humidification system.

Duct mounted humidifiers must be engineered, integrated into the building control system, tested, and commissioned. They are available in many configurations but require substantial maintenance and additional controls. They also run the risk of adversely affecting IAQ from growing microorganisms, or leaking water through poorly sealed ductwork damaging insulation and ceilings. Portable humidifiers are easier to install and require less maintenance, but still have the potential to damage the building envelope.

While active humidification is not recommended as a whole building solution due to high installation costs, operational costs, potential to damage the building envelope and adversely affect IAQ, it may be warranted as a temporary solution or could be considered in select areas.

## **2.7 Other Recommendations**

We do not have any other recommendations at this time.

## Section 3

# Testing & Balancing Results

Milharmer Associates, Inc. tested and balanced the Lowell Justice Center HVAC equipment in July 2020 as part of the original construction of the building. A summary of the tested airflow rates versus the design airflow rates for the air handlers and holding cell exhaust fans are shown below in Tables 6 and 7. Their full testing and balancing report is attached.

**TABLE 6**  
Air Handler Testing & Balancing Results

Unit	Design			Actual		
	Total Supply Fan Airflow (CFM)	Recommended Outdoor Airflow (CFM)	Return Fan Airflow (CFM)	Supply Fan Airflow (CFM)	Outdoor Airflow (CFM)	Return Fan Airflow (CFM)
AHU-1	4,900	3,000	1,900	5,191	5,191	0
AHU-2	4,000	4,000	0	3,540	3,540	0
AHU-3	17,500	17,500	0	20,500	20,500	0
AHU-4	17,500	17,500	0	20,147	20,147	0
AHU-5	5,500	2,500	3,000	5,101	2,691	2,410*
AHU-6	17,500	7,570	9,930	18,529	7,652	10,877*
AHU-7	19,000	9,490	9,510	20,683	9,294	11,389*

\*This value is an assumption based on the difference between the tested supply and outdoor air flow rate. The TAB report did not list the actual quantity of air returned to the unit.

**TABLE 7**  
Exhaust Fan Testing & Balancing Results

Unit	Serving	Design Exhaust Fan Airflow	Actual Exhaust Fan Airflow
EF-A01	East Cells	900	731
EF-C01	West Cells	1,285	1,355

In reviewing the airflow report data, the following should be noted:

1. According to the TAB report, AHU-1 is a 100% outdoor air unit.
2. AHU-2 is supply 460 CFM (over 10%) less than design. We recommend investigating if this unit can be balanced to the full design airflow rate.
3. AHU-5 is supplying 399 CFM (7%) less than design, however is providing more than the designed outdoor air flow rate. We recommend no action.

4. The remaining air handlers are performing within acceptable airflow range of design.
5. Exhaust fan EF-A01 is exhausting 169 CFM (over 18%) less than design. We recommend investigating if this fan can be balanced to the full design airflow rate.
6. Exhaust fan EF-C01 is performing within acceptable airflow range of design.

We did not review the comments noted in this balance report. We presume any outstanding issues were resolved during construction.

## **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.

J:\M\M1671 Comm. of MA Court System\011 - COVID-19 Courthouse Evaluations\Report\_Evaluation\Draft Reports\Lowell Justice Center\Lowell Justice Center Report - Draft.docx



# Submittal #230593-007.2 230593 - Testing Adjusting and Balancing for HVAC

Dimeo Construction Company  
75 Chapman Street  
Providence, Rhode Island 02905  
Phone: (401) 781-9800

Project: 800-15 - Lowell Justice Center  
370 Jackson Street  
Lowell, Massachusetts 01854

## Final Air Balancing Report Rev. 1

<b>REVISION:</b>	2	<b>SUBMITTAL MANAGER:</b>	Emma Kellar (Dimeo Construction Company)
<b>STATUS:</b>	Open	<b>DATE CREATED:</b>	07/14/2020
<b>ISSUE DATE:</b>	07/14/2020	<b>SPEC SECTION:</b>	230593 - Testing Adjusting and Balancing for HVAC
<b>RESPONSIBLE CONTRACTOR:</b>	Patrick J. Kennedy & Sons, Inc.	<b>RECEIVED FROM:</b>	
<b>RECEIVED DATE:</b>		<b>SUBMIT BY:</b>	
<b>FINAL DUE DATE:</b>	07/28/2020	<b>LOCATION:</b>	
		<b>COST CODE:</b>	
		<b>TYPE:</b>	Closeout
<b>APPROVERS:</b>	Leah Fishback (ARUP), Finegold Alexander (Finegold Alexander Architects)		
<b>BALL IN COURT:</b>	Emma Kellar (Dimeo Construction Company)		
<b>DISTRIBUTION:</b>	Julie Rogers (Sebesta), Peter Malloy (NV5 - Mass)		
<b>DESCRIPTION:</b>			

### SUBMITTAL WORKFLOW

NAME	SENT DATE	DUE DATE	RETURNED DATE	RESPONSE	ATTACHMENTS	COMMENTS
General Information Attachments					<a href="#">230593-007.2 Final Air Balancing Report Rev. 1 DCC SUB.pdf</a>	
Leah Fishback	07/14/2020	07/21/2020	07/28/2020	Revise And Resubmit	<a href="#">230593-007-2 Final Air Balancing Report Rev. 1 DCC SUB.pdf</a>	ARUP Response attached
Finegold Alexander	07/28/2020	07/28/2020	08/03/2020	Revise And Resubmit	<a href="#">230593-007-2 Final Air Balancing Report Rev. 1 DCC SUB.pdf</a>	See attached PDF for Engineer's comments. -Leah Wolkovich-Quartey

BY \_\_\_\_\_ DATE \_\_\_\_\_ COPIES TO \_\_\_\_\_

60 State Street  
Boston, MA 02109  
t +617 864 2987

### LOWELL JUDICIAL CENTER

Received: 7/14/2020

Returned: 7/27/2020

Project #: 242633-00

Storage Marker:

Attention: Leah Fishback

Arup  
60 State Street  
Boston, MA 02109

Submittal Package No.	Description	Stamps
230593-007-2	Final Air Balancing Report Rev. 1 DCC	
See comments on attachment. Hilary Williams - Mechanical		[X] REVISE AND RESUBMIT, NOT ACCEPTED FOR REASONS GIVEN

Review is only for general conformance with the design concept of the project and general compliance with the information given in the contract documents. Contractor is responsible for quantities and dimensions which shall be confirmed and correlated at the job site; checking for deviations between the field, submittal and the contract documents alerting Arup of same; fabrication processes and techniques; the means and methods of construction; coordination of its work with that of all other trades; and performing all work in a safe and satisfactory manner. This review does not modify Contractor's duty to comply with the contract documents and any action shown is subject to requirements of plans and specifications. This review does not increase Arup's standard of care or scope of services and Contractor shall immediately notify Arup of any intent to make a claim based on this submittal.



# Submittal #230593-007.2 230593 - Testing Adjusting and Balancing for HVAC

Dimeo Construction Company  
75 Chapman Street  
Providence, Rhode Island 02905  
Phone: (401) 781-9800

Project: 800-15 - Lowell Justice Center  
370 Jackson Street  
Lowell, Massachusetts 01854

## Final Air Balancing Report Rev. 1

<b>REVISION:</b>	2	<b>SUBMITTAL MANAGER:</b>	Emma Kellar (Dimeo Construction Company)
<b>STATUS:</b>	Open	<b>DATE CREATED:</b>	07/14/2020
<b>ISSUE DATE:</b>	07/14/2020	<b>SPEC SECTION:</b>	230593 - Testing Adjusting and Balancing for HVAC
<b>RESPONSIBLE CONTRACTOR:</b>	Patrick J. Kennedy & Sons, Inc.	<b>RECEIVED FROM:</b>	
<b>RECEIVED DATE:</b>		<b>SUBMIT BY:</b>	
<b>FINAL DUE DATE:</b>	07/28/2020	<b>LOCATION:</b>	
<b>SUB JOB:</b>		<b>COST CODE:</b>	
		<b>TYPE:</b>	Closeout
<b>APPROVERS:</b>	Leah Fishback (ARUP), Finegold Alexander (Finegold Alexander Architects)		
<b>BALL IN COURT:</b>	Leah Fishback (ARUP)		
<b>DISTRIBUTION:</b>	Julie Rogers (Sebesta) , Peter Malloy (NV5 - Mass)		
<b>DESCRIPTION:</b>			

### SUBMITTAL WORKFLOW

NAME	SENT DATE	DUE DATE	RETURNED DATE	RESPONSE	ATTACHMENTS	COMMENTS
General Information Attachments					<a href="#">230593-007.2 Final Air Balancing Report Rev. 1 DCC SUB.pdf</a>	
Leah Fishback	07/14/2020	07/21/2020		Pending		
Finegold Alexander		07/28/2020		Pending		

BY \_\_\_\_\_ DATE \_\_\_\_\_ COPIES TO \_\_\_\_\_



# Submittal Cover Page

Job: Lowell Justice Center  
Lowell, Ma  
DCC Job #800-15

Submittal No: 230593-007.2

Submittal Title: Final Air Balancing Report Rev. 1

Sent Date: 7/14/20

Due Date: 7/28/20

Contractor Comments:

Contractors Stamp

Lowell Justice Center  
800-15

ekellar 12:07 pm, Jul 14, 2020  
230593-007.2

Architect Comments:

Architects Stamp

**Finegold Alexander Architects**

SUBMITTAL REVIEW	
ARCHITECT'S REVIEW	RESPONSE REQUIRED
<input type="checkbox"/> No Exceptions Taken <input checked="" type="checkbox"/> Note Markings <input type="checkbox"/> Rejected <input type="checkbox"/> Not Reviewed	<input checked="" type="checkbox"/> Revise & Resubmit <input type="checkbox"/> Resubmit For Record <input type="checkbox"/> Resubmit Not Required
Architect's review is for general conformance with the design concept and contract documents. Markings or comments shall not be construed as relieving the contractor from compliance with the project plans and specifications, nor departures therefrom. The contractor remains responsible for details and accuracy, for confirming and correlating all quantities and dimensions, for selecting fabrication processes, for techniques of assembly, and for performing his work in a safe manner.	
BY: <u>Leah Wolkovich-Quartey</u>	DATE: <u>08/03/2020</u>

ARUP (AS DEFINED IN CONTRACT) SUBMITTAL REVIEW

NO EXCEPTION TAKEN

MAKE CORRECTIONS NOTED, RESUBMITTAL NOT REQUIRED

REVISE AND RESUBMIT, NOT ACCEPTED FOR REASONS GIVEN

SUBMITTAL NOT REVIEWED, REASONS MAY BE GIVEN AS NOTED

- FOR INFORMATIONAL PURPOSES ONLY
- NOT REQUESTED

REVIEWED FOR LOADS ONLY

- ON STRUCTURES
- BUILDING SYSTEMS
- HVAC
- ELECTRICAL
- PLUMBING
- FIRE PROTECTION

REJECTED

Review is only for general conformance with the design concept of the project and general compliance with the information given in the contract documents. Contractor is responsible for quantities and dimensions which shall be confirmed and correlated at the job site; checking for deviations between the field, submittal and the contract documents alerting Arup of same; fabrication processes and techniques; the means and methods of construction; coordination of its work with that of all other trades; and performing all work in a safe and satisfactory manner. This review does not modify Contractor's duty to comply with the contract documents and any action shown is subject to requirements of plans and specifications. This review does not increase Arup's standard of care or scope of services and Contractor shall immediately notify Arup of any intent to make a claim based on this submittal.

BY: H Williams DATE: 7/27/20

Engineer Comments:

Engineers Stamp

ARUP (AS DEFINED IN CONTRACT) SUBMITTAL REVIEW

NO EXCEPTION TAKEN

MAKE CORRECTIONS NOTED, RESUBMITTAL NOT REQUIRED

REVISE AND RESUBMIT, NOT ACCEPTED FOR REASONS GIVEN

SUBMITTAL NOT REVIEWED, REASONS MAY BE GIVEN AS NOTED

- FOR INFORMATIONAL PURPOSES ONLY
- NOT REQUESTED

REVIEWED FOR LOADS ONLY

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BY: H Williams DATE: 7/27/20

July 6<sup>th</sup>, 2020

RE: LJC Final TAB Report: Revision 02

In regards to ARUP review comments made to submittal 230593-007.1 (Final Air Balancing Report: Revision #1), please review following comment:

1. Issue closed. See ARUP & FAA emails dated 4/13/20 & 4/14/20, respectively. VAVs serving courtroom(s) meet design CFM and is distributed throughout via available floor outlets.
2. Items >10% range due to following:
  - a. RFI 1150 (AHU-3 & 4): EA and RA value tolerance increased to 25%
  - b. ~~Low design CFMs difficult to measure (instrumentation tolerance)~~
  - c. CAR (Constant Airflow Regulators) provided as HP model (0.6"wc – 2.4"wc per review comments in submittal 233300-004.0; however, noted RA duct system statics are <0.6"wc at PH level and riser. See traverse information within TAB Report. Field adjustment of CARs not specified.
3. Confirmed. This was a typo and has been corrected.
4. Corrected.
5. Per conversations with ARUP on 5/27/20, all VAV AHU return/exhaust fan speed logic adjusted to track as 90% of respective unit OA value. CAV unit (AHU-2) set to connected load setpoints.
6. Adjusted. See new data.
7. See unit data. EA design CFM is achieved
8. Adjusted. See new data.
9. Unit is commanding to supply setpoint connected load
10. Corrected. See new data.
11. See comment #2c.
12. See new data per RFI 1150.
13. See new data.
14. See new data per RFI 1150.
15. See new data.
16. See new data.
17. See new data.
18. See new data.
19. See new data.
20. Current measured value with

*(Red cloud-shaped callout box containing items 2b and 2c)*

*(Red rectangular callout box)*  
 The comment reference requested confirmation that the substitution was available in all pressure ranges specified. It did NOT request that ALL CAR valves be the HP model. See snip below

**AIR DISTRIBUTION CORPORATION**

353 Howard Street Brockton, MA 02302  
 781-828-9595 FAX 781-828-9656

Project:	<i>LOWELL JUSTICE CENTER</i>	Location:	<i>LOWELL, MA</i>
Contractor:	<i>WORCESTER AIR CONDITIONING</i>	Engineer:	<i>ARUP</i>
ADC Salesman:	<i>Paul O'Connell</i>	Date:	<i>August 28, 2017</i>

ADC offers the following in response to the ARUP comments on the Constant Airflow Regulator submittal:

**1. Submitted product quantity and size shall match to latest issued drawing.**

ADC Response: Quantities and sizes to be verified prior to release.

**2. Provide minimum operating temperature range.**

ADC Response: Operating range is -25 degrees F to 140 degrees F.

**3. Confirm that submitted product has high-pressure model can accommodate the 0.6 to 2.4 inch w.g. for use where the device is close to the fan and subject to higher pressures.**

ADC Response: Please see the attached submittal for the CR-HP for pressure ranges 0.6 to 2.4 inch w.g.

21. See new data.
22. See new data.
23. Not required by project per conversations between FAA & ARUP.
24. See new data.
25. See new data.
26. See new data.

**Response to 2,c:**

In follow up to comment on preceding page, our design spec calls for 3 pressure ranges of valve, low pressure, standard pressure and high pressure. The AHU return pd was 1" w.c. or more and therefore it the HP valve may have been need for branches close to the fan (such as level 7). Our comment requested confirmation that the HP option was available. It did not provide direction to use this model only. The intent was to select the model most appropriate for each location.

The contractor to investigate options to resolve pressure issue, or replacement of CAR's with correct pressure rates model.

Current performance is not meeting code min exhaust rates for toilets in most cases. see note s on following pages for details.

**Additional comments:**

- 1) Review individual comments on following pages.
- 2) Mechanical contractor to confirm locations of all VD in court room detainee areas and provide access for TAB.
- 3) Where VD is noted as closed, but air flow is still above design, confirm that VD is correctly installed and seated in duct.
- 4) Confirm why detention area VD are closed and values blank for AHU-6

**MILHARMER ASSOCIATES, INC.**

534 New State Highway, Route 44, Suite 3

Raynham, MA 02767

Tel.: (508)-823-8500; Facsimile: (508) 823-8600

## **TEST AND BALANCE REPORT**

**Project Name:** Lowell Justice Center

**Project Address:** 370 Jackson Street, Lowell, MA

**Project No.:** 17-219

**Project Date:** 7/6/2020

### **MECHANICAL CONTRACTOR**

3384

*A N.E.B.B. Certified Company*

**Project:** Lowell Justice Center

**Address:** 370 Jackson Street, Lowell, MA

**Date:** 7/6/2020

**Project No.**

## CERTIFICATION

*Submitted & Certified by:*  
**Milharmer Associates, Inc.**

Certification No **3384**

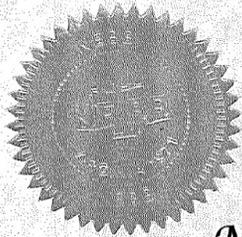
Certification Expiration Date: **3/31/2021**

The data presented in this Report is a record of systems measurements and final adjustments that have been obtained in accordance with the current edition of the **N.E.B.B. Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems**. Any variances from design quantities which exceed N.E.B.B. tolerances, are noted in the Test-Adjust\_Balance Report Project Summary.



N.E.B.B. Qualified TAB Supervisor Name: **Scott F. Miller**

N.E.B.B. Qualified TAB Supervisor Signature: *Scott F. Miller*



# Certification

THIS IS TO CERTIFY THAT

*Milharmer Associates, Inc.*

HAS MET ALL REQUIREMENTS FOR NEBB  
CERTIFICATION IN THE FOLLOWING DISCIPLINE

*Testing, Adjusting and Balancing of Environmental Systems*

FOR THE NEBB BOARD OF DIRECTORS

NEBB President

NEBB President-Elect

*March 31, 2021*

Expiration Date

*3384*

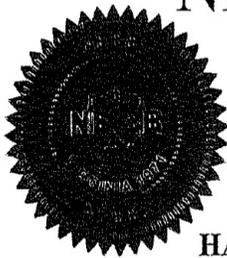
NEBB Certification Number



# NEBB Certification Board

NEBB Certified Professional

*Scott F. Miller*



**HAS MET ALL THE NEBB REQUIREMENTS FOR  
NEBB CERTIFIED PROFESSIONAL STATUS IN**

*Testing, Adjusting and Balancing of Environmental Systems*

This Certificate, as well as individual affiliation with a NEBB Certified Firm and associated NEBB Certification Stamp are **REQUIRED** to provide a NEBB Certified Report. Participation in the NEBB Quality Assurance Program requires the Certificant be affiliated with a NEBB Certified Firm.

*March 31, 2021*

Expiration Date

*23541*

NEBB Certificant Number

*Richard Farnoff*

NEBB Certification Board Chairman

*Cynthia Hestek*

NEBB Certification Director

The NEBB Certification Board retains sole ownership of all certificates. The NEBB Certification Board Policy Manual governs use of this certificate.

**Project:** Lowell Justice Center  
**Address:** 370 Jackson Street, Lowell, MA  
**Date:** 7/6/2020

**Project No.** 7/6/2020

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### **SECTION 1**

#### **TAB Qualifications**

- A. N.E.B.B. Certification
- B. N.E.B.B. Company Certificate
- C. N.E.B.B. Supervisor Certificate
- D. Instrument Sheet
- E. Symbol Sheet

### **SECTION 2**

#### **TAB Building Systems**

**Project:** Lowell Justice Center  
**Address:** 370 Jackson Street, Lowell, MA  
**Date:** 7/6/2020

**Project No.** 17-219

### INSTRUMENT SHEET

The following is a list of Instruments owned and operated by Milharmer Associates, Inc. and used on this project.

<b>Instrument ID Number</b>	<b>Instrument</b>	<b>Calibration Date</b>	<b>Calibration Due Date</b>
1	ADM-870 Digital Multimeter	8-20-19	8-20-20
2	Shortridge Flow Hood	8-20-19	8-20-20
3	Ampmeter	8-20-19	8-20-20
4	Tachometer	8-20-19	8-20-20
5	Airflow Anemometer	8-20-19	8-20-20
6	Digital Thermometers	8-20-19	8-20-20
7	Shortridge Water Meter	8-20-19	8-20-20
8	Sound Meter	8-20-19	8-20-20
9	Vibration Meter	8-20-19	8-20-20

Please Note: Instruments are tested annually at the M.A.I. Lab. and sent back to the factory if deviation exceeds manufacturing tolerance.

Technician:



**Project:** Lowell Justice Center

**Address:** 370 Jackson Street, Lowell, MA

**Date:** 7/6/2020

**Project No.** 17-219

**AIRFLOW MEASURING STATIONS CORRECTION FACTORS.**

AHU UNIT TAG	SYSTEM CALIBRATION	FAN A FLOW CORR.	FAN B FLOW CORR.	EBTRON A FLOW CORR.	EBTRON B FLOW CORR.
1	SUPPLY	3960	N / A	0.90	N / A
	RET. / EXH	5097	N / A	N / A	N / A
2	SUPPLY	9249	N / A	1.147	N / A
	RET. / EXH	4658	N / A	N / A	N / A
3	SUPPLY	8110	8110	1.27	
	RET. / EXH	9132	9132	N / A	N / A
4	SUPPLY	7962	7962	1.38	
	RET. / EXH	10959	10959	N / A	N / A
5	SUPPLY	6807	N / A	0.76	
	RET. / EXH	4055	N / A	N / A	N / A
6	SUPPLY	12421	12421	1.12	
	RET. / EXH	10132	10132	N / A	N / A
7	SUPPLY	11319	11319	1.08	N / A
	RET. / EXH	19300	19300	N / A	N / A

**Comments:** Screen shots are available of all AHU's for calibration and static profile modes.

**Project:** Lowell Justice Center

**Address:** 370 Jackson Street, Lowell, MA

**Date:** 7/6/2020

**Project No.** 17-219

**FAN DATA SHEET**

UNIT	FAN NO. AHU-1 SUPPLY		FAN NO. AHU-1 EXHAUST	
Serves / Location:	Basement VAV	BASEMENT MECH RM	Basement RGD's	BASEMENT MECH RM
Manufacturer:	MULTISTACK			
Model Number:	AGV-5-43-CW -HW -EW			
Size:				
Serial Number:	AH04-045			
MOTOR	DESIGN	TESTED	DESIGN	TESTED
Manufacturer:	BALDOR	BALDOR	BALDOR	BALDOR
Frame Number:	213T	213 T	182 T	182 T
Horsepower:	7.5	7.5	3	3
Brake Horsepower:	5.67	6.38	1.51	1.77
Safety Factor:	1.15	1.15	1.15	1.15
Volts / Phase:	460   3	469   3	460   3	356   3
Motor Amperage:	9.50	8.00	4.20	3.20
Motor RPM:	1,770	1,897	1,760	1,364
Speeds:	68 HERTZ	68 HERTZ	46 HERTZ	46.5 HERTZ
Efficiency:	91.70%	91.70%	89.50%	89.50%
Power Factor:	N.L.	80.00%	N.L.	75.00%
FAN	DESIGN	TESTED	DESIGN	TESTED
Supply Air CFM:	4,900	5,191		
Return Air CFM:				
Exhaust Air CFM:			2,750	2,836
Outside Air CFM:	DOA	SEE SA		
Suction Pressure:		-2.18		-1.37
Discharge Pressure:		2.34		0.15
Fan Static Pressure:	5.13	4.52	2.44	1.52
External Pressure:	1.85	2.20	1.10	1.09
RPM	DESIGN	TESTED	DESIGN	TESTED
Fan RPM:	2,006	2,006	1,372	1,364
Motor Drive:	DIRECT DRIVE	DIRECT DRIVE	DIRECT DRIVE	DIRECT DRIVE
Motor Size / Bore:	N.L.	"Ø"	N.L.	"Ø"
Fan Drive:	N.L.		N.L.	
Fan Size / Shaft:	N.L.	"Ø"	N.L.	"Ø"
Belt Size / Number:	N.L.		N.L.	
Shafts C-C:	N.L.		N.L.	
Turns Open:	N.L.		N.L.	

**Comments:** All SA & RA / EA design air volumes are based upon M003 schedule.

See unit profile sheet for pressure details.

\* Dedicated Outside Air

S.P. Setpoint: MIN: .5" / MAX: 1.75"

Connected loads per floor plans: SA=5,100 CFM EA= 2,885 CFM

**Project:** Lowell Justice Center

**Address:** 370 Jackson Street, Lowell, MA

**Date:** 7/6/2020

**Project No.** 0

**FAN DATA SHEET**

UNIT	FAN NO. AHU-2 SUPPLY		FAN NO. AHU-2 EXHAUST	
Serves / Location:	Prison Cells Basement	BASEMENT MECH RM		
Manufacturer:	MULTISTACK			
Model Number:	AGV-4-43-CW -HW -EW			
Size:				
Serial Number:	AHO4-046			
MOTOR	DESIGN	TESTED	DESIGN	TESTED
Manufacturer:	BALDOR	BALDOR	BALDOR	BALDOR
Frame Number:	184 T	184 T	184 T	184 T
Horsepower:	5	5	5	5
Brake Horsepower:	4.20	2.11	2.75	1.61
Safety Factor:	1.15	1.15	1.15	1.15
Volts / Phase:	460   3	318   3	460   3	356   3
Motor Amperage:	6.70	4.10	6.70	2.80
Motor RPM:	1,750	1,225	1,750	1,779
Speeds:	65 HERTZ	.45 HERTZ	72 HERTZ	72 HERTZ
Efficiency:	89.50%	89.50%	89.50%	89.50%
Power Factor:	N.L.	78.00%	N.L.	78.00%
FAN	DESIGN	TESTED	DESIGN	TESTED
Supply Air CFM:	4,000	3,540		
Return Air CFM:			4,000	3,063
Exhaust Air CFM:				
Outside Air CFM:	DOA	SEE SA		
Suction Pressure:		-1.30		-0.95
Discharge Pressure:		0.49		0.23
Fan Static Pressure:	4.61	1.79	2.73	1.18
External Pressure:	1.40	0.61	1.15	0.81
RPM	DESIGN	TESTED	DESIGN	TESTED
Fan RPM:	1,921	1,345	2,137	2,173
Motor Drive:	DIRECT DRIVE	DIRECT DRIVE	DIRECT DRIVE	DIRECT DRIVE
Motor Size / Bore:	N.L.	"Ø"	N.L.	"Ø"
Fan Drive:	N.L.		N.L.	
Fan Size / Shaft:	N.L.	"Ø"	N.L.	"Ø"
Belt Size / Number:	N.L.		N.L.	
Shafts C-C:	N.L.		N.L.	
Turns Open:	N.L.		N.L.	

**Comments:** All SA & RA / EA design air volumes are based upon M003 schedule.

See unit profile sheet for pressure details.

\* Dedicated Outside Air

S.P. Set Point: CAV-3,420 CFM

Connected loads per floor plans: SA= 3,420 CFM EA= 3,150 CFM

**Project:** Lowell Justice Center

**Address:** 370 Jackson Street, Lowell, MA

**Date:** 7/6/2020

**Project No.** 0

**FAN DATA SHEET**

UNIT	FAN NO. AHU-3 SUPPLY		FAN NO. AHU-3 EXHAUST	
Serves / Location:	CHILLED BEAMS	PENTHOUSE	AHU-3 SUPPLY	
Manufacturer:	MULTISTACK			
Model Number:	AGV-18-43-CW -HW -EW			
Size:				
Serial Number:	AH-05-206			
MOTOR	DESIGN	TESTED	DESIGN	TESTED
Manufacturer:	BALDOR (2 OF)	BALDOR (2 OF)	BALDOR (2 OF)	BALDOR (2 OF)
Frame Number:	254 T	254 T	256 T	256 T
Horsepower:	15	15	10	10
Brake Horsepower:	12.40	12.68	7.19	4.74
Safety Factor:	1.15	1.15	1.15	1.15
Volts / Phase:	460   3	466   3	460   3	332   3
Motor Amperage:	18.10	15.30	14.60	9.40
Motor RPM:	1,765	1,794	1,180	1,003
Speeds:	60 HERTZ	61 HERTZ	62 HERTZ	51 HERTZ
Efficiency:	92.40%	92.40%	91.00%	91.00%
Power Factor:	N.L.	83.00%	N.L.	72.00%
FAN	DESIGN	TESTED	DESIGN	TESTED
Supply Air CFM:	17,500	20,500		
Return Air CFM:			17,500	16,625
Exhaust Air CFM:				
Outside Air CFM:	DOA	SEE SA		
Suction Pressure:		-2.70		-1.61
Discharge Pressure:		1.75		0.56
Fan Static Pressure:	6.57	4.45	3.80	2.17
External Pressure:	2.10	1.98	1.00	
RPM	DESIGN	TESTED	DESIGN	TESTED
Fan RPM:	1,794	1,794	1,215	1,003
Motor Drive:	DIRECT DRIVE	DIRECT DRIVE	DIRECT DRIVE	DIRECT DRIVE
Motor Size / Bore:	N.L.	"Ø"	N.L.	"Ø"
Fan Drive:	N.L.		N.L.	
Fan Size / Shaft:	N.L.	"Ø"	N.L.	"Ø"
Belt Size / Number:	N.L.		N.L.	
Shafts C-C:	N.L.		N.L.	
Turns Open:	N.L.		N.L.	

**Comments:** All SA & RA / EA design air volumes are based upon M003 schedule.

See unit profile sheet for pressure details.

\* Dedicated Outside Air

S.P. Setpoint: MIN: .5" / MAX: 2.00"

Connected loads per floor plans: SA= 20,315 CFM RA= 21,045 CFM

**Project:** Lowell Justice Center

**Address:** 370 Jackson Street, Lowell, MA

**Date:** 7/6/2020

**Project No.** 0

**FAN DATA SHEET**

UNIT	FAN NO. AHU-4 SUPPLY		FAN NO. AHU-4 EXHAUST	
Serves / Location:	CHILLED BEAMS	PENTHOUSE	AHU-4 SUPPLY	
Manufacturer:	MULTISTACK			
Model Number:	AGV-18-43-CW -HW -EW			
Size:				
Serial Number:	AH-05-231			
MOTOR	DESIGN	TESTED	DESIGN	TESTED
Manufacturer:	BALDOR (2 OF)	BALDOR (2 OF)	BALDOR (2 OF)	BALDOR (2 OF)
Frame Number:	245 T	254 T	256 T	256 T
Horsepower:	15	15	10	10
Brake Horsepower:	12.40	12.85	7.19	4.78
Safety Factor:	1.15	1.15	1.15	1.15
Volts / Phase:	460   3	466   3	460   3	335   3
Motor Amperage:	18.00	15.50	14.60	9.40
Motor RPM:	1,765	1,794	1,180	1,003
Speeds:	<b>60 HERTZ</b>	61 HERTZ	<b>62 HERTZ</b>	51 HERTZ
Efficiency:	92.40%	92.40%	91.00%	91.00%
Power Factor:	N.L.	83.00%	N.L.	72.00%
FAN	DESIGN	TESTED	DESIGN	TESTED
Supply Air CFM:	17,500	20,147		
Return Air CFM:			17,500	18,352
Exhaust Air CFM:				
Outside Air CFM:	DOA	SEE SA		
Suction Pressure:		-2.66		-1.79
Discharge Pressure:		1.42		0.02
Fan Static Pressure:	6.57	4.08	3.80	1.81
External Pressure:	2.10	1.91	1.00	
RPM	DESIGN	TESTED	DESIGN	TESTED
Fan RPM:	1,794	1,794	1,215	1,003
Motor Drive:	DIRECT DRIVE	DIRECT DRIVE	DIRECT DRIVE	DIRECT DRIVE
Motor Size / Bore:	N.L.	"Ø"	N.L.	"Ø"
Fan Drive:	N.L.		N.L.	
Fan Size / Shaft:	N.L.	"Ø"	N.L.	"Ø"
Belt Size / Number:	N.L.		N.L.	
Shafts C-C:	N.L.		N.L.	
Turns Open:	N.L.		N.L.	

**Comments:** All SA & RA / EA design air volumes are based upon M003 schedule.

See unit profile sheet for pressure details.

\* Dedicated Outside Air

S.P. Setpoint: MIN: .4" / MAX: 2.50"

Connected loads per floor plans: SA= 20,220 CFM RA= 21,085 CFM

**Project:** Lowell Justice Center

**Address:** 370 Jackson Street, Lowell, MA

**Date:** 7/6/2020

**Project No.** 0

**FAN DATA SHEET**

UNIT	FAN NO. AHU-5 SUPPLY				FAN NO. AHU-5 EXHAUST			
Serves / Location:	FIRST FLLOOR VAV		PENTHOUSE		AHU-5 SUPPLY			
Manufacturer:	MULTISTACK							
Model Number:	AGV-6-43-CW -HW -EW							
Size:								
Serial Number:	AH-05-079							
MOTOR	DESIGN		TESTED		DESIGN		TESTED	
Manufacturer:	BALDOR		BALDOR		BALDOR		BALDOR	
Frame Number:	213 T		213 T		184 T		184 T	
Horsepower:	7.5		7.5		5		5	
Brake Horsepower:	5.26		4.11		3.42		0.34	
Safety Factor:	1.15		1.15		1.15		1.15	
Volts / Phase:	460	3	345	3	460	3	112	3
Motor Amperage:	9.50		7.00		6.70		1.90	
Motor RPM:	1,770		1,386		1,750		846	
Speeds:	<b>50 HERTZ</b>		44.3 HERTZ		<b>63 HERTZ</b>		29.10 HERTZ	
Efficiency:	91.70%		91.70%		89.50%		89.50%	
Power Factor:	N.L.		80.00%		N.L.		78.00%	
FAN	DESIGN		TESTED		DESIGN		TESTED	
Supply Air CFM:	5,000		5,101					
Return Air CFM:					5,500		4,821	
Exhaust Air CFM:					5,500			
Outside Air CFM:	2,500		2,691					
Suction Pressure:			-1.50				-1.03	
Discharge Pressure:			1.47				0.13	
Fan Static Pressure:	4.40		2.97		2.33		1.16	
External Pressure:	1.40		1.61		0.65			
RPM	DESIGN		TESTED		DESIGN		TESTED	
Fan RPM:	1,472		1,386		1,849		846	
Motor Drive:	DIRECT DRIVE		DIRECT DRIVE		DIRECT DRIVE		DIRECT DRIVE	
Motor Size / Bore:	N.L.		"Ø"		N.L.		"Ø"	
Fan Drive:	N.L.				N.L.			
Fan Size / Shaft:	N.L.		"Ø"		N.L.		"Ø"	
Belt Size / Number:	N.L.				N.L.			
Shafts C-C:	N.L.				N.L.			
Turns Open:	N.L.				N.L.			

**Comments:** All SA & RA / EA design air volumes are based upon M003 schedule.

See unit profile sheet for pressure details.

S.P. Setpoint: MIN: .10" / MAX: 2.00"

Connected loads per floor plans: SA= 5,000 CFM RA= 5,000 CFM

**Project:** Lowell Justice Center

**Address:** 370 Jackson Street, Lowell, MA

**Date:** 7/6/2020

**Project No.** 0

**FAN DATA SHEET**

UNIT	FAN NO. AHU-6 SUPPLY				FAN NO. AHU-6 EXHAUST			
Serves / Location:	COURTROOMS		PENTHOUSE		AHU-6 SUPPLY			
Manufacturer:	MULTISTACK							
Model Number:	AGV-6-43-CW -HW -EW							
Size:								
Serial Number:	AH-05-109							
MOTOR	DESIGN		TESTED		DESIGN		TESTED	
Manufacturer:	BALDOR (2 OF)		BALDOR (2 OF)		BALDOR (2 OF)		BALDOR (2 OF)	
Frame Number:	254 T		254 T		213 T		254 T	
Horsepower:	15 (2)		15 (2)		7.5 (2)		7.5 (2)	
Brake Horsepower:	9.35				5.28			
Safety Factor:	1.15		1.15		1.15		1.15	
Volts / Phase:	460	3	480	3	460	3	480	3
Motor Amperage:	18.10				11.00			
Motor RPM:	1,765				1,180			
Speeds:	47 HERTZ		47 HERTZ		66 HERTZ		50 HERTZ	
Efficiency:	92.40%		92.40%		91.00%		91.00%	
Power Factor:	N.L.		83.00%		N.L.		70.00%	
FAN	DESIGN		TESTED		DESIGN		TESTED	
Supply Air CFM:	17,500		18,529					
Return Air CFM:					17,500		17,153	
Exhaust Air CFM:								
Outside Air CFM:	7,570		7,652					
Suction Pressure:			-1.81				-0.88	
Discharge Pressure:			1.53				0.16	
Fan Static Pressure:	4.93		3.34		2.79		1.04	
External Pressure:	1.35		1.85		1.05			
RPM	DESIGN		TESTED		DESIGN		TESTED	
Fan RPM:	1,387		1,377		723			
Motor Drive:	N.L.		DIRECT DRIVE		N.L.			
Motor Size / Bore:	N.L.		"Ø"		N.L.		"Ø"	
Fan Drive:	N.L.				N.L.			
Fan Size / Shaft:	N.L.		"Ø"		N.L.		"Ø"	
Belt Size / Number:	N.L.				N.L.			
Shafts C-C:	N.L.				N.L.			
Turns Open:	N.L.				N.L.			

**Comments:** All SA & RA / EA design air volumes are based upon M003 schedule.

See unit profile sheet for pressure details.

S.P. Setpoint: MIN: .5" / MAX: 1.75"

Connected loads per floor plans: SA= 18,537 CFM RA= 17,070 CFM

**Project:** Lowell Justice Center

**Address:** 370 Jackson Street, Lowell, MA

**Date:** 7/6/2020

**Project No.** 0

**FAN DATA SHEET**

UNIT	FAN NO. AHU-7 SUPPLY		FAN NO. AHU-7 EXHAUST	
Serves / Location:	COURTROOMS	PENTHOUSE	AHU-7 SUPPLY	
Manufacturer:	MULTISTACK			
Model Number:	AGV-19-43-CW -HW -EW			
Size:				
Serial Number:	AH 05-192			
MOTOR	DESIGN	TESTED	DESIGN	TESTED
Manufacturer:	BALDOR	BALDOR	BALDOR	BALDOR
Frame Number:	254 T	284 T	256 T	284 T
Horsepower:	15	15	10	10
Brake Horsepower:	9.80	7.49	5.20	0.32
Safety Factor:	1.15	1.15	1.15	1.15
Volts / Phase:	460   3	380   3	460   3	58   3
Motor Amperage:	21.00	12.70	14.60	3.80
Motor RPM:	1,765	1,912	880	
Speeds:	65 HERTZ	65 HERTZ	49 HERTZ	15 HERTZ
Efficiency:	N.L.	91.70%	N.L.	89.50%
Power Factor:	N.L.	73.00%	N.L.	71.00%
FAN	DESIGN	TESTED	DESIGN	TESTED
Supply Air CFM:	19,000	20,683		
Return Air CFM:		19,219	19,000	19,219
Exhaust Air CFM:				
Outside Air CFM:	9,490	9,294		
Suction Pressure:		-1.87		-1.05
Discharge Pressure:		1.23		-0.66
Fan Static Pressure:	4.73	3.10	2.56	0.39
External Pressure:		1.27		
RPM	DESIGN	TESTED	DESIGN	TESTED
Fan RPM:	1,275	1,912	710	220
Motor Drive:	N.L.	DIRECT DRIVE	N.L.	DIRECT DRIVE
Motor Size / Bore:	N.L.	"Ø	N.L.	"Ø
Fan Drive:	N.L.		N.L.	
Fan Size / Shaft:	N.L.	"Ø	N.L.	"Ø
Belt Size / Number:	N.L.		N.L.	
Shafts C-C:	N.L.		N.L.	
Turns Open:	N.L.		N.L.	

**Comments:** All SA & RA / EA design air volumes are based upon M003 schedule.

See unit profile sheet for pressure details.

S.P. Setpoint: MIN: .3" / MAX: 1.80"

Connected loads per floor plans: SA= 20,265 CFM RA= 19,325 CFM

**Project:** Lowell Justice Center

**Address:** 370 Jackson Street, Lowell, MA

**Date:** 7/6/2020

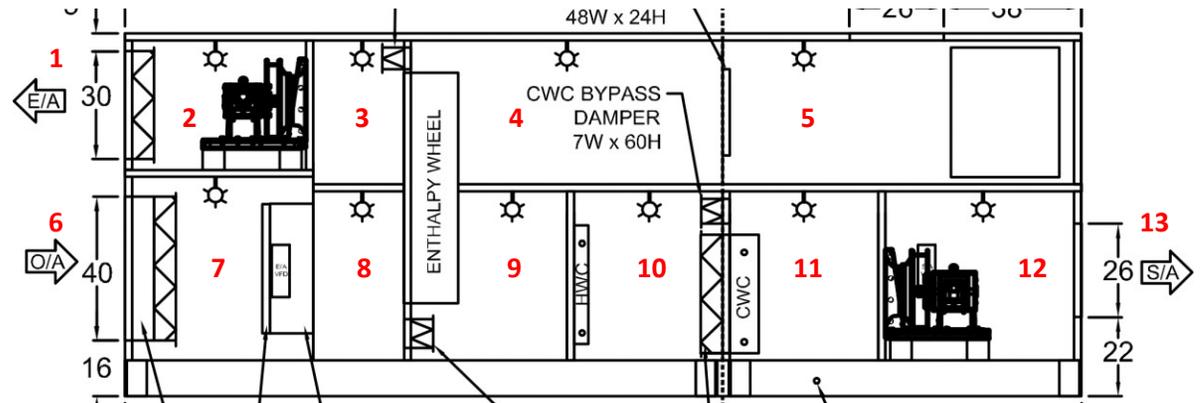
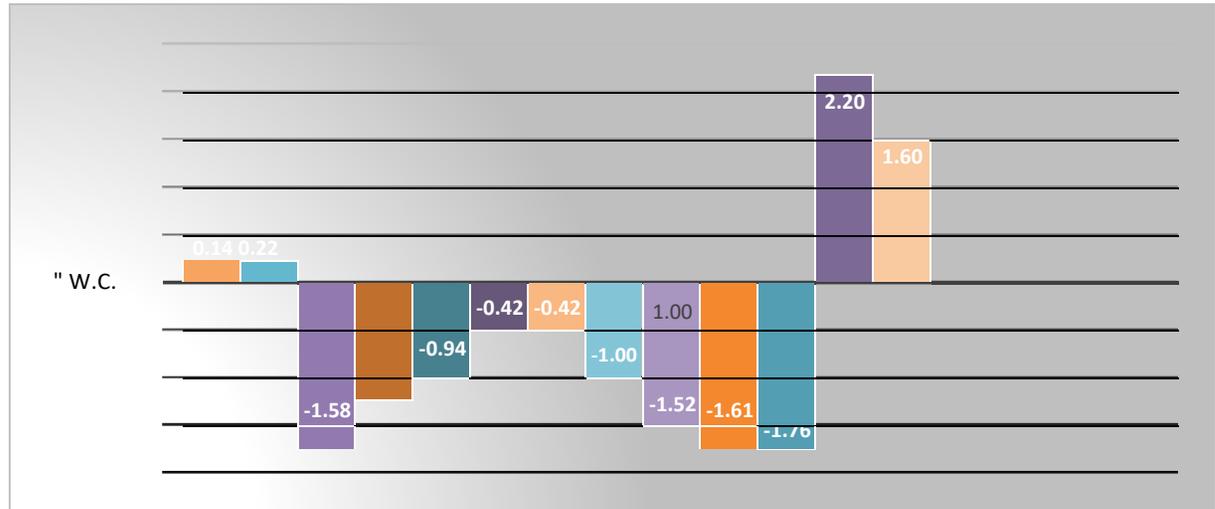
**Project No.** 17-219

### AIR HANDLER UNIT PROFILE

**UNIT NO.** AHU- 1

**PROFILE :** S.P.

FAN	TEST#	" W.C.
EA DUCT OUT	1	0.14
EA FAN OUT	2	0.22
EA FAN IN	3	-1.58
ENTHY W HL IN	4	-1.23
FILTERS IN	5	-0.94
OA DUCT IN	6	-0.42
FILTERS IN	7	-0.42
FILTERS OUT	8	-1.00
HTG COIL IN	9	-1.52
CLG COIL IN	10	-1.61
SA FAN IN	11	-1.76
SA FAN OUT	12	2.20
SA DUCT OUT	13	1.60



**Comments:**

**Technician:** Eric Szeto

**Project:** Lowell Justice Center

**Address:** 370 Jackson Street, Lowell, MA

**Date:** 7/6/2020

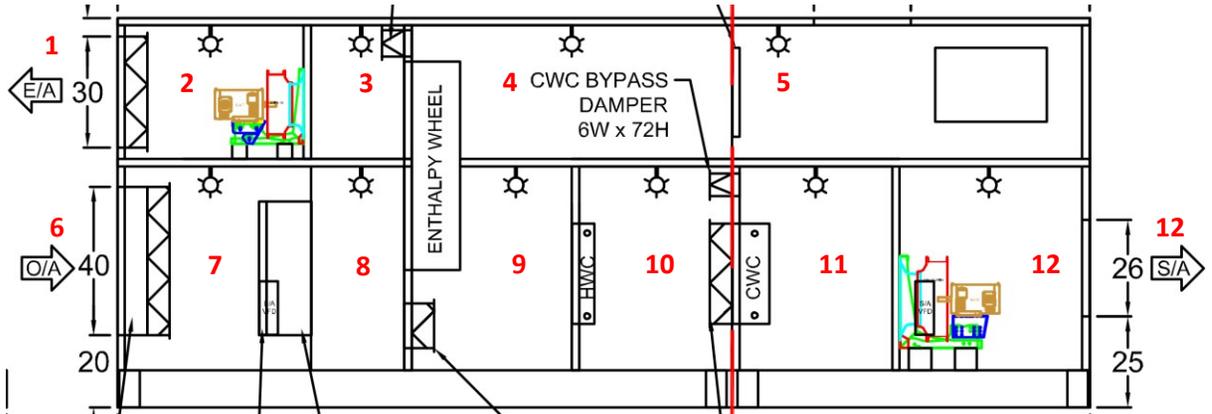
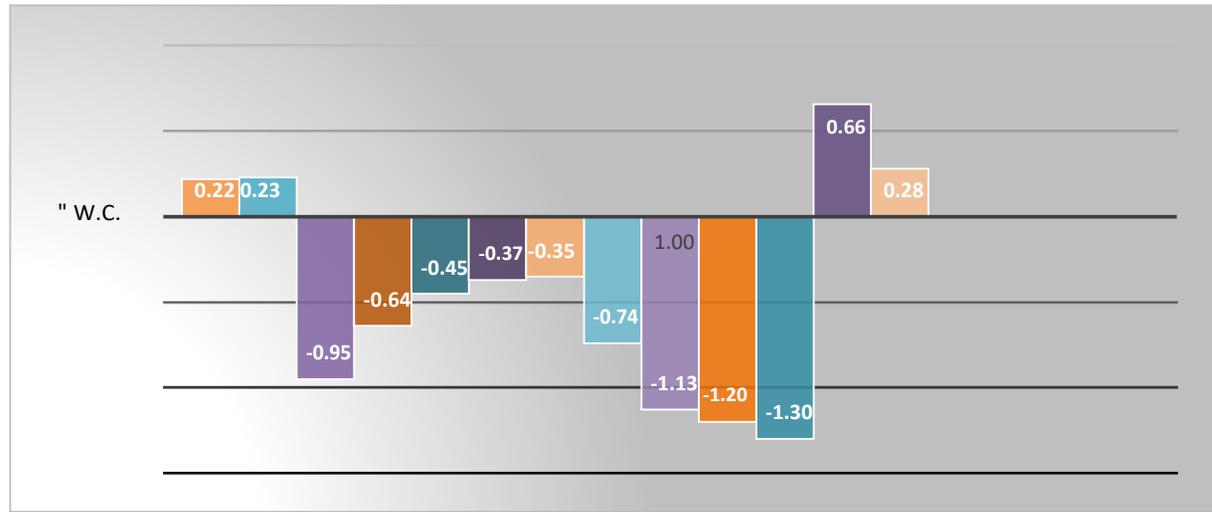
**Project No.** 17-219

### AIR HANDLER UNIT PROFILE

**UNIT NO.** AHU- 2

**PROFILE :** S.P.

FAN	TEST#	" W.C.
E.A. DUCT OUT	1	0.22
E.A. FAN OUT	2	0.23
E.A. FAN IN	3	-0.95
ENTHY W HL IN	4	-0.64
RA FILTERS IN	5	-0.45
OA DUCT IN	6	-0.37
FILTERS IN	7	-0.35
ENTHY W HL IN	8	-0.74
HTG COIL IN	9	-1.13
CLG COIL IN SA	10	-1.20
FAN IN	11	-1.30
SA FAN OUT	12	0.66
SA DUCT OUT	13	0.28



**Comments:**

**Technician:** *Eric Szeto*

**Project:** Lowell Justice Center

**Address:** 370 Jackson Street, Lowell, MA

**Date:** 7/6/2020

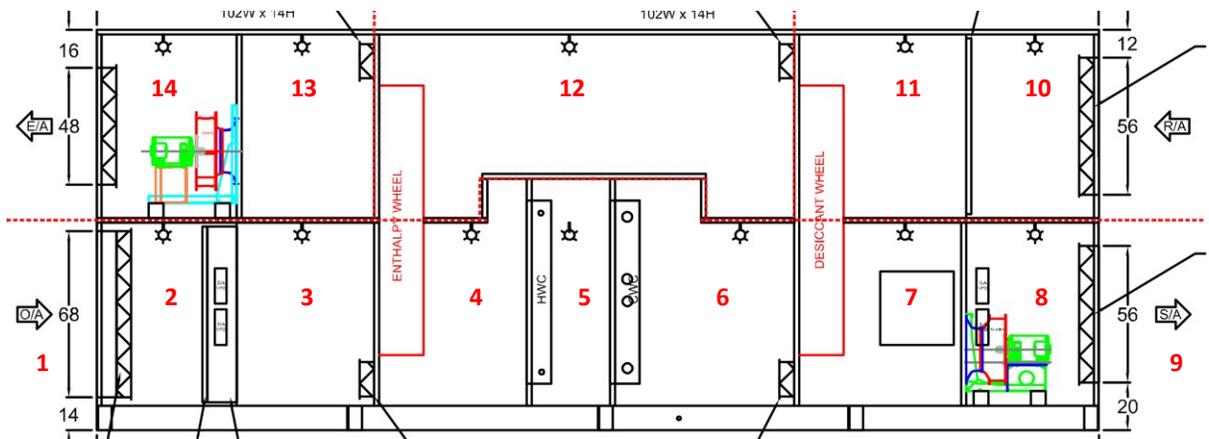
**Project No.** 17-219

### AIR HANDLER UNIT PROFILE

**UNIT NO.** AHU- 3

**PROFILE :** S.P.

FAN	TEST#	" W.C.
F.A.I. IN	1	-0.15
FILTERS IN	2	-0.97
ENTHL. WHL IN	3	-1.78
RH COIL IN	4	-1.83
CLG COIL IN	5	-2.16
DESINT W HL IN	6	-2.09
SA FAN IN	7	-2.70
SA FAN OUT	8	1.75
DA DUCT OUT	9	1.83
RA DUCT IN	10	-0.66
DESINT W HL IN	11	-0.88
ENTHL. WHL IN	12	-1.16
RA FAN IN	13	-1.61
RA FAN OUT	14	0.56



**Comments:**

**Technician:** Joe Lennon

**Project:** Lowell Justice Center

**Address:** 370 Jackson Street, Lowell, MA

**Date:** 7/6/2020

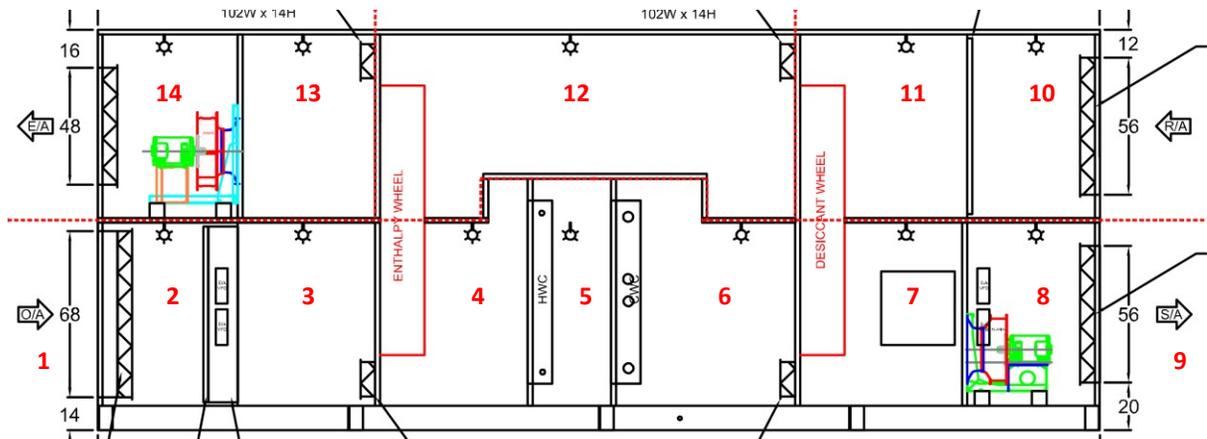
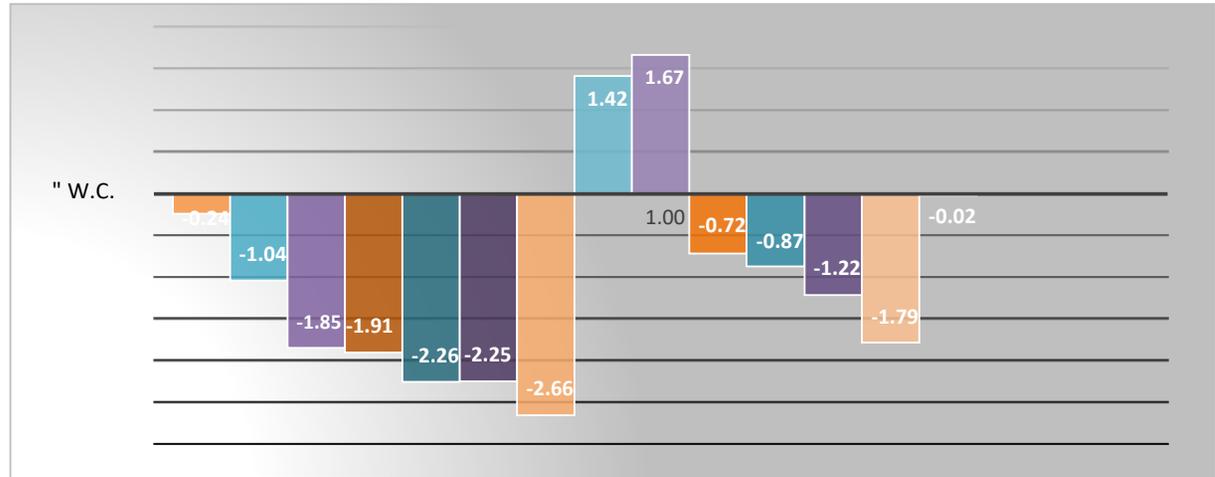
**Project No.** 17-219

### AIR HANDLER UNIT PROFILE

**UNIT NO.** AHU- 4

**PROFILE :** S.P.

FAN	TEST#	" W.C.
F.A.I. IN	1	-0.24
FILTERS IN	2	-1.04
ENTHL. W HL IN	3	-1.85
RH COIL IN	4	-1.91
CLG COIL IN	5	-2.26
DESINT W HL IN	6	-2.25
SA FAN IN	7	-2.66
SA FAN OUT	8	1.42
DA DUCT OUT	9	1.67
RA DUCT IN	10	-0.72
DESINT W HL IN	11	-0.87
ENTHL. W HL IN	12	-1.22
RA FAN IN	13	-1.79
RA FAN OUT	14	-0.02



**Comments:**

**Technician:** Joe Lennon

**Project:** Lowell Justice Center

**Address:** 370 Jackson Street, Lowell, MA

**Date:** 7/6/2020

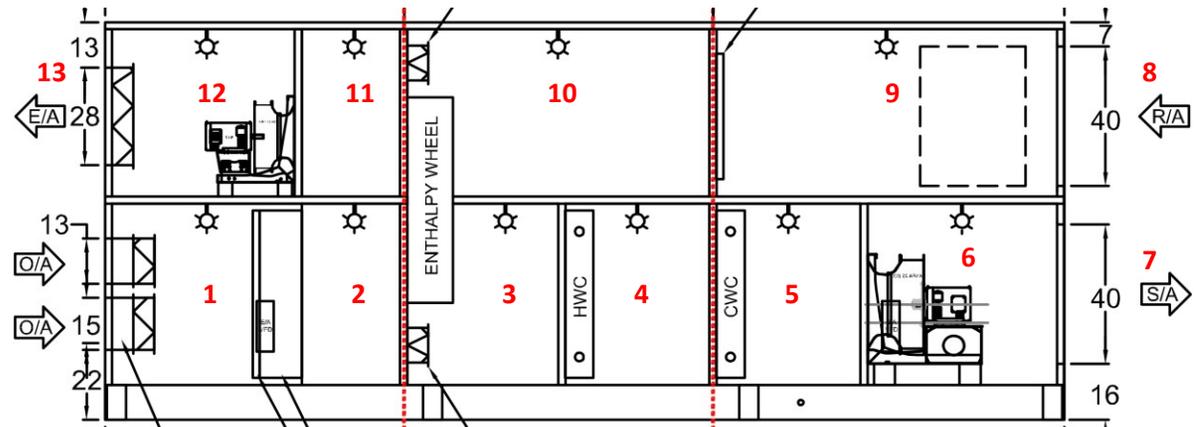
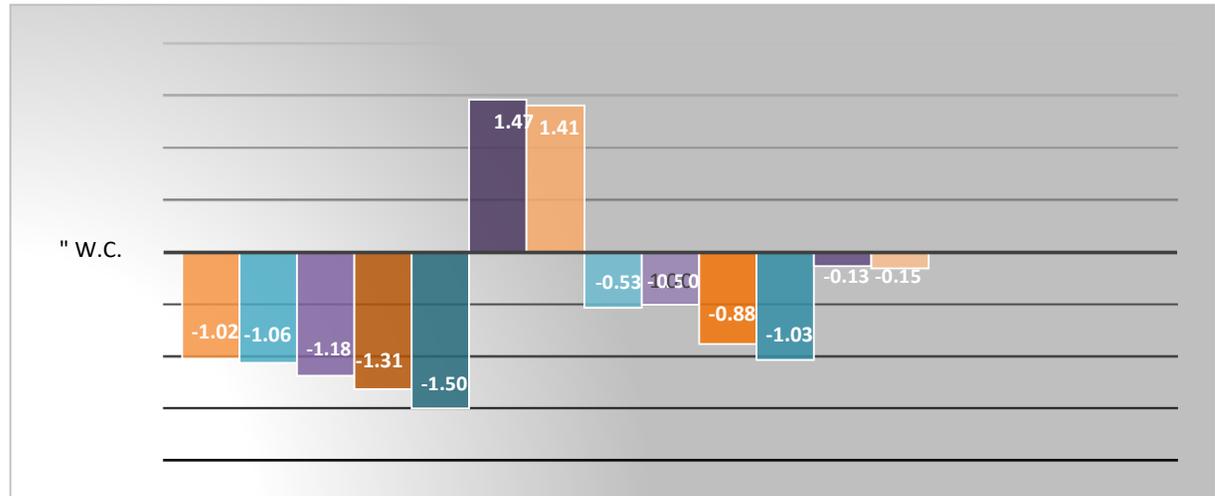
**Project No.** 17-219

### AIR HANDLER UNIT PROFILE

**UNIT NO.** AHU- 5

**PROFILE :** S.P.

FAN	TEST#	" W.C.
FILTERS IN	1	-1.02
ENTHY W HL IN	2	-1.06
RH COIL IN	3	-1.18
CLG COIL IN	4	-1.31
SA FAN IN	5	-1.50
SA FAN OUT	6	1.47
DA DUCT IN	7	1.41
RA DUCT IN	8	-0.53
FILTERS IN	9	-0.50
ENTHY W HL IN	10	-0.88
EA FAN IN	11	-1.03
EA FAN OUT	12	-0.13
EA DUCT OUT	13	-0.15



**Comments:**

**Technician:** Joe Lennon

**Project:** Lowell Justice Center

**Address:** 370 Jackson Street, Lowell, MA

**Date:** 7/6/2020

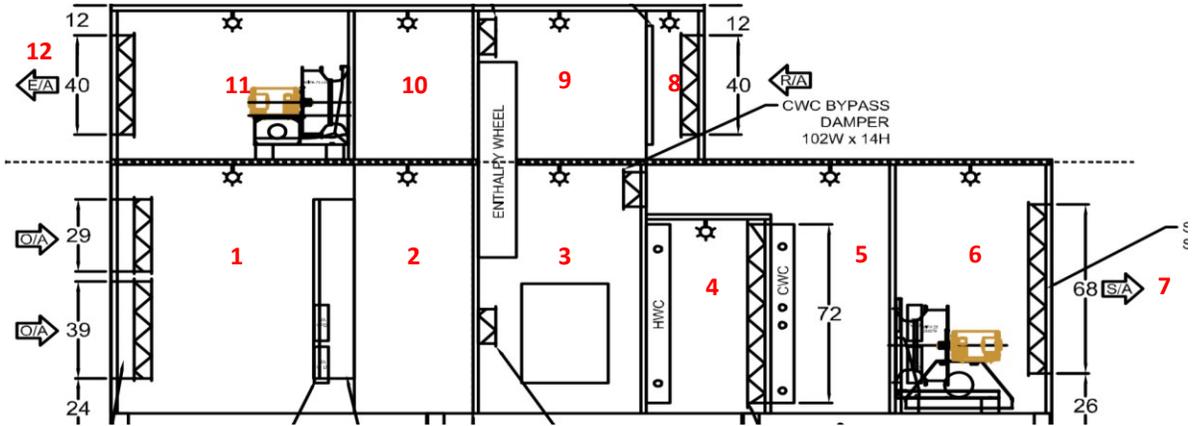
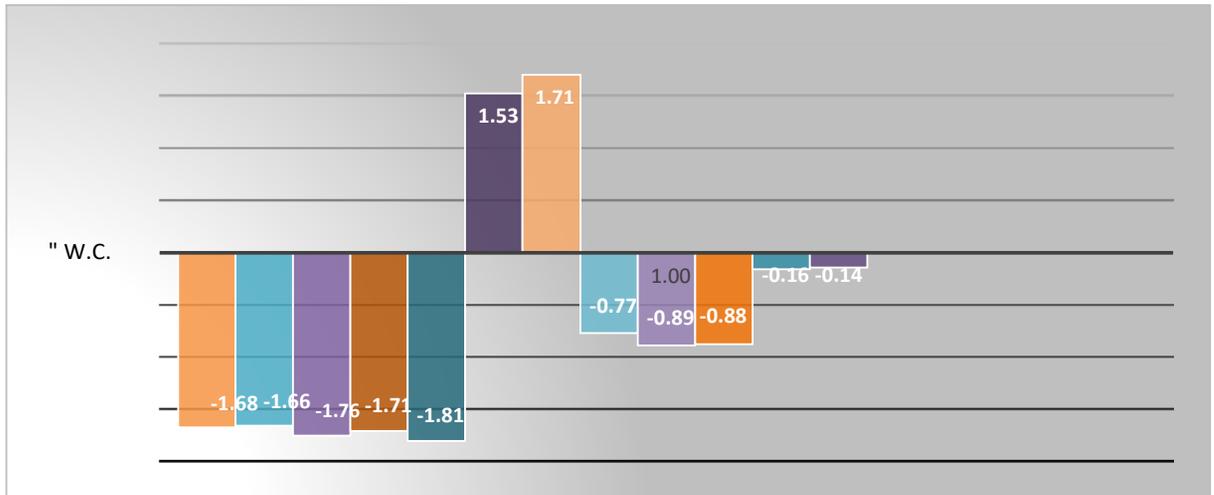
**Project No.** 17-219

### AIR HANDLER UNIT PROFILE

**UNIT NO.** AHU- 6

**PROFILE :** S.P.

FAN	TEST#	" W.C.
FILTERS IN	1	-1.68
ENTHY W HL IN	2	-1.66
RH COIL IN	3	-1.76
CLG COIL IN	4	-1.71
SA FAN IN	5	-1.81
SA FAN OUT	6	1.53
DA DUCT OUT	7	1.71
FILTERS IN	8	-0.77
ENTHY W HL IN	9	-0.89
EA FAN IN	10	-0.88
EA FAN OUT	11	-0.16
EA DUCT OUT	12	-0.14



**Comments:**

Technician: Joe Lennon

**Project:** Lowell Justice Center

**Address:** 370 Jackson Street, Lowell, MA

**Date:** 7/6/2020

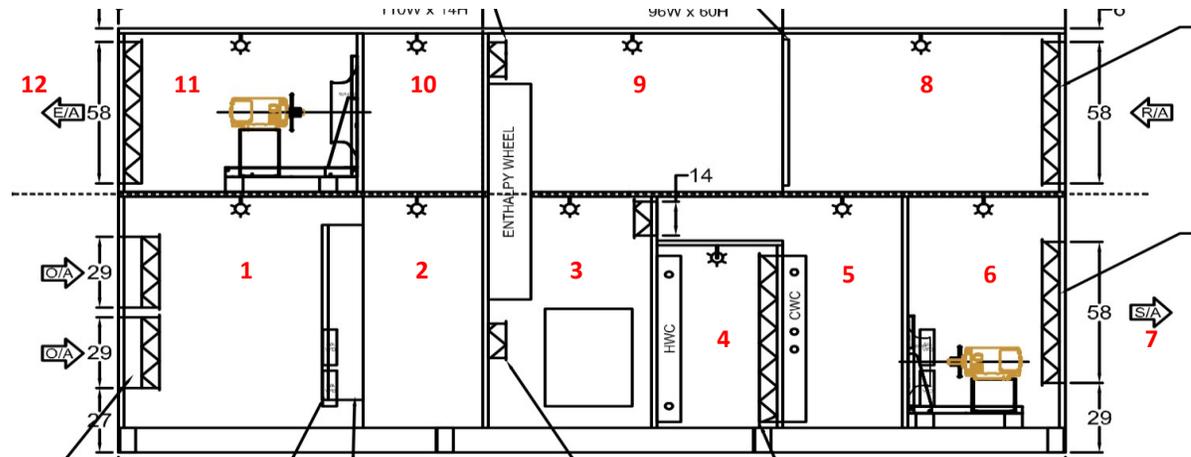
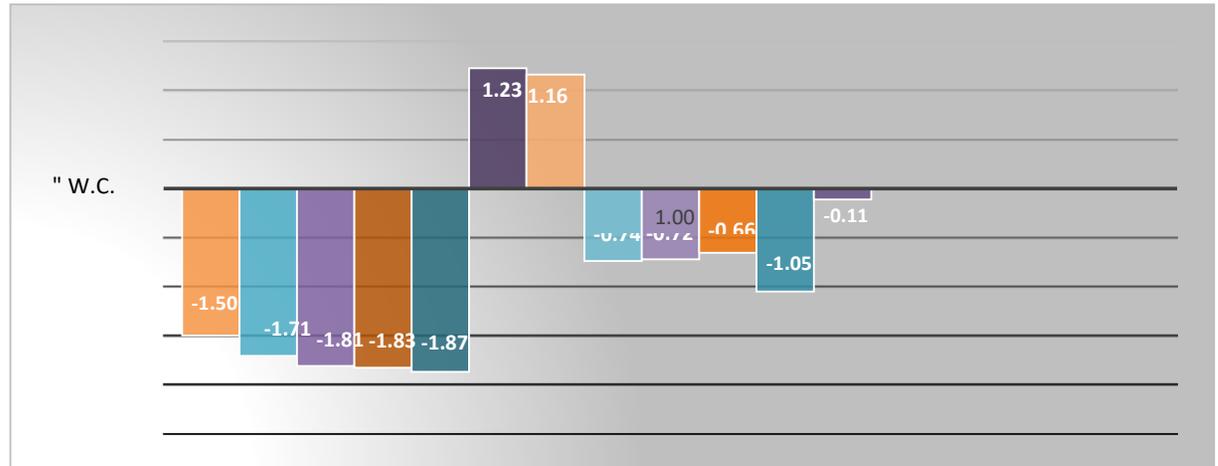
**Project No.** 17-219

### AIR HANDLER UNIT PROFILE

**UNIT NO.** AHU- 7

**PROFILE :** S.P.

FAN	TEST#	" W.C.
FILTERS IN	1	-1.50
ENTHY W HL IN	2	-1.71
RH COIL IN	3	-1.81
CLG COIL IN	4	-1.83
SA FAN IN	5	-1.87
SA FAN OUT	6	1.23
DA DUCT OUT	7	1.16
FILTERS IN	8	-0.74
ENTHY W HL IN	9	-0.72
EA FAN IN	10	-0.66
EA FAN OUT	11	-1.05
EA DUCT OUT	12	-0.11



**Comments:**

**Technician:** Joe Lennon

**Project:** Lowell Justice Center  
**Address:** 370 Jackson Street, Lowell, MA  
**Date:** 7/6/2020

**Project No.** 17-219

**TRAVERSE DATA**

**SYSTEM:** AHU- 1 SUPPLY

**TRAVERSE NUMBER:** T-1

**TRAVERSE LOCATION:** BASEMENT

**DUCT SIZE (ROUND)** " **DIAMETER** Sq Ft = 0.00  
**DUCT SIZE (RECT.)** 25 " **WIDTH** x 25 " **DEPTH** Sq Ft = 4.34

**AIR DENSITY DATA**

**STATIC PRESS @ CL:** 1.85 InWg. 68 HERTZ **DESIGN CFM =** 5,090  
**DUCT AIR TEMP:** 65 Deg F 8.0 AMPS **ACTUAL CFM =** 5,110  
**BAROMETRIC PRESS:** 29.92 In Hg. **SCFM=** 5,185

**AIR DENSITY RATIO CORRECTION**

**SCFM CORRECTION FACTOR:** 1.01  
**ACTUAL DENSITY:** 0.076

TEST HOLE	1	2	3	4	5	6	7	8
A	1,303	1,302	1,111	1,665	1,492			
B	1,305	606	348	980	1,342			
C	1,276	901	355	353	1,351			
D	1,194	1,248	1,080	1,110	1,601			
E	1,239	1,364	1,645	1,560	1,702			
F								
G								
H								
I								

**NO. OF READINGS =** 25 **AVERAGE FPM =** 1,177

TEST HOLE	9	10	11	12	13	14	15	16
J								
K								
L								
M								
N								
O								
P								
Q								
R								

**Comments:**

**Technician:** Eric Szeto

**Project:** Lowell Justice Center  
**Address:** 370 Jackson Street, Lowell, MA  
**Date:** 7/6/2020

**Project No.** 17-219

**TRAVERSE DATA**

**SYSTEM:** AHU- 1 EXHAUST

**TRAVERSE NUMBER:** T-2

**TRAVERSE LOCATION:** BASEMENT

**DUCT SIZE (ROUND)** " **DIAMETER** Sq Ft = 0.00  
**DUCT SIZE (RECT.)** 14 " **WIDTH** x 14 " **DEPTH** Sq Ft = 1.36

**AIR DENSITY DATA**  
**STATIC PRESS @ CL:** -0.33 InWg. **DESIGN CFM =**  
**DUCT AIR TEMP:** 70 Deg F **ACTUAL CFM =** 1,762  
**BAROMETRIC PRESS:** 29.92 In Hg. **SCFM=** 1,761

**AIR DENSITY RATIO CORRECTION**  
**SCFM CORRECTION FACTOR:** 1.00  
**ACTUAL DENSITY:** 0.075

TEST HOLE	1	2	3	4	5	6	7	8
A	1,448	1,215	1,214					
B	1,360	1,193	1,225					
C	1,405	1,244	1,346					
D								
E								
F								
G								
H								
I								

**NO. OF READINGS =** 9 **AVERAGE FPM =** 1,294

TEST HOLE	9	10	11	12	13	14	15	16
J								
K								
L								
M								
N								
O								
P								
Q								
R								

**Comments:**

**Technician:** Eric Szeto

**Project:** Lowell Justice Center  
**Address:** 370 Jackson Street, Lowell, MA  
**Date:** 7/6/2020

**Project No.** 17-219

**TRAVERSE DATA**

**SYSTEM:** AHU- 1 RETURN

**TRAVERSE NUMBER:** T-3

**TRAVERSE LOCATION:** BASEMENT

**DUCT SIZE (ROUND)** \_\_\_\_\_ **" DIAMETER** **Sq Ft =** 0.00  
**DUCT SIZE (RECT.)** 14 **" WIDTH x** 14 **" DEPTH** **Sq Ft =** 1.36

**AIR DENSITY DATA**

**STATIC PRESS @ CL:** -0.33 **InWg.** **DESIGN CFM =**    
**DUCT AIR TEMP:** 70 **Deg F** **ACTUAL CFM =** 1,058  
**BAROMETRIC PRESS:** 29.92 **In Hg.** **SCFM=** 1,057

**AIR DENSITY RATIO CORRECTION**

**SCFM CORRECTION FACTOR:** 1.00  
**ACTUAL DENSITY:** 0.075

TEST HOLE	1	2	3	4	5	6	7	8
A	936	864	789					
B	929	537	572					
C	926	769	671					
D								
E								
F								
G								
H								
I								

**NO. OF READINGS =** 9 **AVERAGE FPM =** 777

TEST HOLE	9	10	11	12	13	14	15	16
J								
K								
L								
M								
N								
O								
P								
Q								
R								

**Comments:**

**Technician:** Eric Szeto

**Project:** Lowell Justice Center  
**Address:** 370 Jackson Street, Lowell, MA  
**Date:** 7/6/2020

**Project No.** 17-219

**TRAVERSE DATA**

**SYSTEM:** AHU- 1 EXHAUST

**TRAVERSE NUMBER:** T-4

**TRAVERSE LOCATION:** BASEMENT

**DUCT SIZE (ROUND)** \_\_\_\_\_ **" DIAMETER** **Sq Ft =** 0.00  
**DUCT SIZE (RECT.)** 10 **" WIDTH x** 10 **" DEPTH** **Sq Ft =** 0.69

**AIR DENSITY DATA**

**STATIC PRESS @ CL:** -0.35 **InWg.** **DESIGN CFM =**    
**DUCT AIR TEMP:** 70 **Deg F** **ACTUAL CFM =** 593  
**BAROMETRIC PRESS:** 29.92 **In Hg.** **SCFM=** 593

**AIR DENSITY RATIO CORRECTION**

**SCFM CORRECTION FACTOR:** 1.00  
**ACTUAL DENSITY:** 0.075

TEST HOLE	1	2	3	4	5	6	7	8
A	991	938	810					
B	985	600	679					
C	996	877	811					
D								
E								
F								
G								
H								
I								

**NO. OF READINGS =** 9 **AVERAGE FPM =** 854

TEST HOLE	9	10	11	12	13	14	15	16
J								
K								
L								
M								
N								
O								
P								
Q								
R								

**Comments:** Unit RA/EA total is sum of T-2 + T-3 + t-4

**Technician:** Eric Szeto

**Project:** Lowell Justice Center  
**Address:** 370 Jackson Street, Lowell, MA  
**Date:** 7/6/2020

**Project No.** 17-219

**TRAVERSE DATA**

**SYSTEM:** AHU- 2 SUPPLY BRANCH A

**TRAVERSE NUMBER:** T-5

**TRAVERSE LOCATION:** BASEMENT

**DUCT SIZE (ROUND)** " **DIAMETER** Sq Ft = 0.00  
**DUCT SIZE (RECT.)** 20 " **WIDTH** x 14 " **DEPTH** Sq Ft = 1.94

**AIR DENSITY DATA**  
**STATIC PRESS @ CL:** 0.16 InWg. **DESIGN CFM =**  
**DUCT AIR TEMP:** 70 Deg F **ACTUAL CFM =** 1,553  
**BAROMETRIC PRESS:** 29.92 In Hg. **SCFM=** 1,555

**AIR DENSITY RATIO CORRECTION**  
**SCFM CORRECTION FACTOR:** 1.00  
**ACTUAL DENSITY:** 0.075

TEST HOLE	1	2	3	4	5	6	7	8
A	773	820	754	764				
B	813	832	777	870				
C	737	842	790	815				
D								
E								
F								
G								
H								
I								

**NO. OF READINGS =** 12 **AVERAGE FPM =** 799

TEST HOLE	9	10	11	12	13	14	15	16
J								
K								
L								
M								
N								
O								
P								
Q								
R								

**Comments:**

**Technician:** Eric Szeto

**Project:** Lowell Justice Center  
**Address:** 370 Jackson Street, Lowell, MA  
**Date:** 7/6/2020

**Project No.** 17-219

**TRAVERSE DATA**

**SYSTEM:** AHU- 2 SUPPLY BRANCH B

**TRAVERSE NUMBER:** T-6

**TRAVERSE LOCATION:** BASEMENT

**DUCT SIZE (ROUND)** " **DIAMETER** Sq Ft = 0.00  
**DUCT SIZE (RECT.)** 18 " **WIDTH** x 14 " **DEPTH** Sq Ft = 1.75

**AIR DENSITY DATA**

**STATIC PRESS @ CL:** 0.15 InWg. **DESIGN CFM =**  
**DUCT AIR TEMP:** 70 Deg F **ACTUAL CFM =** 1,872  
**BAROMETRIC PRESS:** 29.92 In Hg. **SCFM=** 1,873

**AIR DENSITY RATIO CORRECTION**

**SCFM CORRECTION FACTOR:** 1.00  
**ACTUAL DENSITY:** 0.075

TEST HOLE	1	2	3	4	5	6	7	8
A	909	1,164	1,213					
B	980	1,048	1,138					
C	901	1,121	1,151					
D								
E								
F								
G								
H								
I								

**NO. OF READINGS =** 9 **AVERAGE FPM =** 1,069

TEST HOLE	9	10	11	12	13	14	15	16
J								
K								
L								
M								
N								
O								
P								
Q								
R								

**Comments:** Unit total is T-2 + T-3 = 3,425

**Technician:** Eric Szeto

Project: Lowell Justice Center  
 Address: 370 Jackson Street, Lowell, MA  
 Date: 7/6/2020

Project No. 17-219

**TRAVERSE DATA**

SYSTEM: AHU- 2 RETURN A

TRAVERSE NUMBER: T-7

TRAVERSE LOCATION: BASEMENT

DUCT SIZE (ROUND) " DIAMETER Sq Ft = 0.00  
 DUCT SIZE (RECT.) 20 " WIDTH x 14 " DEPTH Sq Ft = 1.94

**AIR DENSITY DATA**  
 STATIC PRESS @ CL: -0.2 InWg. DESIGN CFM =  
 DUCT AIR TEMP: 70 Deg F ACTUAL CFM = 1,405  
 BAROMETRIC PRESS: 29.92 In Hg. SCFM= 1,405

**AIR DENSITY RATIO CORRECTION**  
 SCFM CORRECTION FACTOR: 1.00  
 ACTUAL DENSITY: 0.075

TEST HOLE	1	2	3	4	5	6	7	8
A	687	648	747	630				
B	788	790	811	695				
C	640	782	746	709				
D								
E								
F								
G								
H								
I								

NO. OF READINGS = 12 AVERAGE FPM = 723

TEST HOLE	9	10	11	12	13	14	15	16
J								
K								
L								
M								
N								
O								
P								
Q								
R								

Comments:

Technician: Eric Szeto

**Project:** Lowell Justice Center  
**Address:** 370 Jackson Street, Lowell, MA  
**Date:** 7/6/2020

**Project No.** 17-219

**TRAVERSE DATA**

**SYSTEM:** AHU- 2 RETURN B

**TRAVERSE NUMBER:** T-8

**TRAVERSE LOCATION:** BASEMENT

**DUCT SIZE (ROUND)** " **DIAMETER** Sq Ft = 0.00  
**DUCT SIZE (RECT.)** 18 " **WIDTH** x 14 " **DEPTH** Sq Ft = 1.75

**AIR DENSITY DATA**  
**STATIC PRESS @ CL:** -0.17 InWg. **DESIGN CFM =**             
**DUCT AIR TEMP:** 70 Deg F **72 HZ** **ACTUAL CFM =** 1,408  
**BAROMETRIC PRESS:** 29.92 In Hg. **2.7 AMP** **SCFM=** 1,408

**AIR DENSITY RATIO CORRECTION**  
**SCFM CORRECTION FACTOR:** 1.00  
**ACTUAL DENSITY:** 0.075

TEST HOLE	1	2	3	4	5	6	7	8
A	826	866	880					
B	811	764	861					
C	742	736	755					
D								
E								
F								
G								
H								
I								

**NO. OF READINGS =** 9 **AVERAGE FPM =** 805

TEST HOLE	9	10	11	12	13	14	15	16
J								
K								
L								
M								
N								
O								
P								
Q								
R								

**Comments:** T1 + T2 = 2812 CFM

**Technician:** Eric Szeto

**Project:** Lowell Justice Center  
**Address:** 370 Jackson Street, Lowell, MA  
**Date:** 7/6/2020

**Project No.** 17-219

**TRAVERSE DATA**

**SYSTEM:** AHU- 3 SUPPLY BRANCH A

**TRAVERSE NUMBER:** T-9

**TRAVERSE LOCATION:** PENTHOUSE

**DUCT SIZE (ROUND)** " **DIAMETER** Sq Ft = 0.00  
**DUCT SIZE (RECT.)** 56 " **WIDTH** x 50 " **DEPTH** Sq Ft = 19.44

**AIR DENSITY DATA**

**STATIC PRESS @ CL:** 1.64 InWg. **DESIGN CFM =**             
**DUCT AIR TEMP:** 60 Deg F **ACTUAL CFM =** 14,179  
**BAROMETRIC PRESS:** 29.92 In Hg. **SCFM=** 14,519

**AIR DENSITY RATIO CORRECTION**

**SCFM CORRECTION FACTOR:** 1.02  
**ACTUAL DENSITY:** 0.077

TEST HOLE	1	2	3	4	5	6	7	8
A	391	646	747	872	1,006	1,176	1,246	1,479
B	327	587	547	678	846	1,180	1,170	1,459
C	331	380	417	777	720	1,130	1,096	1,248
D	0	237	313	628	947	1,094	1,238	1,321
E	0	0	121	708	0	1,234	1,450	1,418
F	0	0	0	436	862	1,065	1,344	1,353
G	0	0	0	661	809	1,264	1,307	1,393
H	0	0	180	385	882	1,275	1,355	1,438
I	0	0	0	360	965	1,197	1,401	1,407

**NO. OF READINGS =** 72 **AVERAGE FPM =** 729

TEST HOLE	9	10	11	12	13	14	15	16
J								
K								
L								
M								
N								
O								
P								
Q								
R								

**Comments:** For calibration, see screen shot for details.

**Technician:** Joe Lennon

**Project:** Lowell Justice Center  
**Address:** 370 Jackson Street, Lowell, MA  
**Date:** 7/6/2020

**Project No.** 17-219

**TRAVERSE DATA**

**SYSTEM:** AHU- 3 SUPPLY BRANCH B

**TRAVERSE NUMBER:** T-10

**TRAVERSE LOCATION:** PENTHOUSE

**DUCT SIZE (ROUND)** " **DIAMETER** Sq Ft = 0.00  
**DUCT SIZE (RECT.)** 30 " **WIDTH** x 24 " **DEPTH** Sq Ft = 5.00

**AIR DENSITY DATA**

**STATIC PRESS @ CL:** 1.51 InWg. **DESIGN CFM =**             
**DUCT AIR TEMP:** 60 Deg F **ACTUAL CFM =** 5,473  
**BAROMETRIC PRESS:** 29.92 In Hg. **SCFM=** 5,602

**AIR DENSITY RATIO CORRECTION**

**SCFM CORRECTION FACTOR:** 1.02  
**ACTUAL DENSITY:** 0.077

TEST HOLE	1	2	3	4	5	6	7	8
A	1,100	1,074	1,073	1,171	1,211			
B	1,053	1,092	1,120	1,076	1,138			
C	923	1,008	1,022	1,140	1,230			
D	953	991	1,062	1,197	1,256			
E								
F								
G								
H								
I								

**NO. OF READINGS =** 20 **AVERAGE FPM =** 1,095

TEST HOLE	9	10	11	12	13	14	15	16
J								
K								
L								
M								
N								
O								
P								
Q								
R								

**Comments:** For calibration, see screen shot for details.

**Technician:** Joe Lennon

**Project:** Lowell Justice Center  
**Address:** 370 Jackson Street, Lowell, MA  
**Date:** 7/6/2020

**Project No.** 17-219

**TRAVERSE DATA**

**SYSTEM:** AHU- 3 EXHAUST

**TRAVERSE NUMBER:** T-11

**TRAVERSE LOCATION:** PENTHOUSE

**DUCT SIZE (ROUND)** " **DIAMETER** Sq Ft = 0.00  
**DUCT SIZE (RECT.)** 70 " **WIDTH** x 40 " **DEPTH** Sq Ft = 19.44

**AIR DENSITY DATA**

<b>STATIC PRESS @ CL:</b>	0.36	InWg.	<b>DESIGN CFM =</b>	17,500
<b>DUCT AIR TEMP:</b>	68	Deg F	<b>ACTUAL CFM =</b>	23,210
<b>BAROMETRIC PRESS:</b>	29.92	In Hg.	<b>SCFM=</b>	23,332

**AIR DENSITY RATIO CORRECTION**  
**SCFM CORRECTION FACTOR:** 1.01  
**ACTUAL DENSITY:** 0.075

TEST HOLE	1	2	3	4	5	6	7	8
A	1,907	1,928	1,824	1,450	1,497	1,384	1,132	613
B	1,880	1,764	1,604	1,602	1,605	1,586	946	785
C	1,263	1,592	1,533	1,498	1,475	1,576	1,380	823
D	1,856	1,594	1,570	1,481	1,486	1,373	1,379	752
E	1,770	1,685	1,572	1,479	1,456	1,253	1,263	1,113
F	1,799	1,587	1,544	1,541	1,432	1,108	1,065	1,171
G								
H								
I								

**NO. OF READINGS =** 66      **AVERAGE FPM =** 1,194

TEST HOLE	9	10	11	12	13	14	15	16
J	515	0	0					
K	533	0	0					
L	419	231	0					
M	970	764	0					
N	1,168	924	822					
O	1,394	1,322	745					
P								
Q								
R								

**Comments:** For calibration, see screen shot for details.

**Technician:** Joe Lennon

**Project:** Lowell Justice Center  
**Address:** 370 Jackson Street, Lowell, MA  
**Date:** 7/6/2020

**Project No.** 17-219

**TRAVERSE DATA**

**SYSTEM:** AHU- 3 FRESH AIR INTAKE

**TRAVERSE NUMBER:** T-12

**TRAVERSE LOCATION:** PENTHOUSE

**DUCT SIZE (ROUND)** " **DIAMETER** Sq Ft = 0.00  
**DUCT SIZE (RECT.)** 68 " **WIDTH** x 68 " **DEPTH** Sq Ft = 32.11

**AIR DENSITY DATA**

**STATIC PRESS @ CL:** -0.15 InWg. **DESIGN CFM =** 17,500  
**DUCT AIR TEMP:** 36 Deg F **ACTUAL CFM =** 21,718  
**BAROMETRIC PRESS:** 29.92 In Hg. **SCFM=** 23,212

**AIR DENSITY RATIO CORRECTION**

**SCFM CORRECTION FACTOR:** 1.07  
**ACTUAL DENSITY:** 0.080

TEST HOLE	1	2	3	4	5	6	7	8
A	256	731	721	709	673	597	781	835
B	823	834		573	539	730	671	670
C	591	693	740	804	873		450	702
D	603	685	666	597	674	708	701	788
E	577	667	673	648	665	550	646	669
F	696	771		559	595	565	618	620
G	576	651	667	719	779		562	722
H	725	647	685	576	566	682	553	746
I	599	667	696	689	707	607	674	712

**NO. OF READINGS =** 110 **AVERAGE FPM =** 676

TEST HOLE	9	10	11	12	13	14	15	16
J	748	793		571	768	770	714	702
K	576	707	708	748	778		313	606
L	718	737	741	605	719	721	785	809
M	343	600	670	705	736	617	720	767
N	797	816		340	694	780	786	695
O	651	753	802	836	808			
P								
Q								
R								

**Comments:** For calibration, see screen shot for details.  
 Spaces within traverse represent test rows.

**Technician:** Joe Lennon

**Project:** Lowell Justice Center  
**Address:** 370 Jackson Street, Lowell, MA  
**Date:** 7/6/2020

**Project No.** 17-219

**TRAVERSE DATA**

**SYSTEM:** AHU- 4 SUPPLY

**TRAVERSE NUMBER:** T-13

**TRAVERSE LOCATION:** PENTHOUSE

**DUCT SIZE (ROUND)** " **DIAMETER** Sq Ft = 0.00  
**DUCT SIZE (RECT.)** 56 " **WIDTH** x 56 " **DEPTH** Sq Ft = 21.78

**AIR DENSITY DATA**

**STATIC PRESS @ CL:** 1.63 InWg. **DESIGN CFM =** 17,500  
**DUCT AIR TEMP:** 60 Deg F **ACTUAL CFM =** 20,907  
**BAROMETRIC PRESS:** 29.92 In Hg. **SCFM=** 21,406

**AIR DENSITY RATIO CORRECTION**

**SCFM CORRECTION FACTOR:** 1.02  
**ACTUAL DENSITY:** 0.077

TEST HOLE	1	2	3	4	5	6	7	8
A	1,260	1,426	1,219	964	863	973	1,058	966
B	1,279		1,381	1,191	1,126	799	742	721
C	924	800	794		1,343	1,317	1,001	815
D	647	805	665	992	654		1,344	1,401
E	1,112	758	894	917	779	869	334	
F	1,020	1,098	887	676	756	834	903	919
G	0		1,271	1,384	1,169	885	982	878
H	1,059	962	405		1,297	1,339	1,198	930
I	902	859	922	1,062	0		1,359	1,365

**NO. OF READINGS =** 81 **AVERAGE FPM =** 960

TEST HOLE	9	10	11	12	13	14	15	16
J	1,179	898	910	1,061	847	994	420	
K	1,311	1,292	1,201	1,025	878	965	937	856
L	532							
M								
N								
O								
P								
Q								
R								

**Comments:** For calibration, see screen shot for details.

Spaces within traverse represent test rows.

**Technician:** Joe Lennon

**Project:** Lowell Justice Center  
**Address:** 370 Jackson Street, Lowell, MA  
**Date:** 7/6/2020

**Project No.** 17-219

**TRAVERSE DATA**

**SYSTEM:** AHU- 4 EXHAUST

**TRAVERSE NUMBER:** T-14

**TRAVERSE LOCATION:** PENTHOUSE

**DUCT SIZE (ROUND)** " **DIAMETER** Sq Ft = 0.00  
**DUCT SIZE (RECT.)** 48 " **WIDTH** x 48 " **DEPTH** Sq Ft = 16.00

**AIR DENSITY DATA**

**STATIC PRESS @ CL:** -0.34 InWg. **DESIGN CFM =** 17,500  
**DUCT AIR TEMP:** 68 Deg F **ACTUAL CFM =** 22,938  
**BAROMETRIC PRESS:** 29.92 In Hg. **SCFM=** 23,019

**AIR DENSITY RATIO CORRECTION**

**SCFM CORRECTION FACTOR:** 1.00  
**ACTUAL DENSITY:** 0.075

TEST HOLE	1	2	3	4	5	6	7	8
A	1,859	1,720	1,359	0	0	0	331	756
B	2,215	1,777	1,506	330	978	627	1,118	1,165
C	2,065	1,738	1,575	929	1,185	1,205	1,442	1,488
D	2,387	1,816	1,809	960	1,077	1,084	1,316	1,491
E	1,794	1,487	1,181	1,034	1,385	1,516	1,659	1,902
F	1,915	1,408	1,075	968	1,563	1,871	1,982	2,253
G	1,682	1,373	1,293	1594	1,792	1876	1,991	2128
H	1,113	998	1,232	1613	1,966	2208	2381	2212
I								

**NO. OF READINGS =** 64 **AVERAGE FPM =** 1,434

TEST HOLE	9	10	11	12	13	14	15	16
J								
K								
L								
M								
N								
O								
P								
Q								
R								

**Comments:** For calibration, see screen shot for details.

**Technician:** Joe Lennon

**Project:** Lowell Justice Center  
**Address:** 370 Jackson Street, Lowell, MA  
**Date:** 7/6/2020

**Project No.** 17-219

**TRAVERSE DATA**

**SYSTEM:** AHU- 4 FRESH AIR INTAKE

**TRAVERSE NUMBER:** T-15

**TRAVERSE LOCATION:** PENTHOUSE

**DUCT SIZE (ROUND)** " **DIAMETER** Sq Ft = 0.00  
**DUCT SIZE (RECT.)** 68 " **WIDTH** x 68 " **DEPTH** Sq Ft = 32.11

**AIR DENSITY DATA**  
**STATIC PRESS @ CL:** -0.19 InWg. **DESIGN CFM =** 17,500  
**DUCT AIR TEMP:** 35 Deg F **ACTUAL CFM =** 26,913  
**BAROMETRIC PRESS:** 29.92 In Hg. **SCFM=** 28,820

**AIR DENSITY RATIO CORRECTION**  
**SCFM CORRECTION FACTOR:** 1.07  
**ACTUAL DENSITY:** 0.080

TEST HOLE	1	2	3	4	5	6	7	8
A	917	998	1,004	863	988	1,005	833	760
B	799	711		877	992	1,019	938	954
C	813	988	934	1,048	577		696	978
D	1,033	1,046	933	1,073	993	1,222	385	0
E		966	981	930	1,046	997	1,033	1,083
F	1,115	237	140		780	950	865	893
G	1,032	1,007	1,059	1,015	245	0		367
H	810	928	1,005	860	933	971	917	333
I	0		893	980	1,028	1,016	925	1,025

**NO. OF READINGS =** 110 **AVERAGE FPM =** 838

TEST HOLE	9	10	11	12	13	14	15	16
J	981	850	199	102		890	983	1,022
K	1,002	969	1,046	995	988	0	0	
L	1,024	1,035	1,014	986	996	1,059	1,129	816
M	840	158		982	960	775	813	1,028
N	936	1,127	1,106	920	0		1,016	986
O	913	999	1,066	1,008	1,067	1,072	361	234
P								
Q								
R								

**Comments:** For calibration, see screen shot for details.  
 Spaces within traverse represent test rows.

**Technician:** Joe Lennon

**Project:** Lowell Justice Center  
**Address:** 370 Jackson Street, Lowell, MA  
**Date:** 7/6/2020

**Project No.** 17-219

**TRAVERSE DATA**

**SYSTEM:** AHU- 5 SUPPLY

**TRAVERSE NUMBER:** T-16

**TRAVERSE LOCATION:** PENTHOUSE

**DUCT SIZE (ROUND)** " **DIAMETER** Sq Ft = 0.00  
**DUCT SIZE (RECT.)** 40 " **WIDTH** x 50 " **DEPTH** Sq Ft = 13.89

**AIR DENSITY DATA**  
**STATIC PRESS @ CL:** 0.97 InWg. **DESIGN CFM =** 5,500  
**DUCT AIR TEMP:** 60 Deg F **ACTUAL CFM =** 3,560  
**BAROMETRIC PRESS:** 29.92 In Hg. **SCFM=** 3,640

**AIR DENSITY RATIO CORRECTION**  
**SCFM CORRECTION FACTOR:** 1.02  
**ACTUAL DENSITY:** 0.077

TEST HOLE	1	2	3	4	5	6	7	8
A	0	0	0	327	191	531	713	653
B	0	0	0	0	69	356	566	542
C	0	0	0	0	0	0	584	355
D	0	0	0	0	0	182	502	807
E	262	0	0	0	246	431	598	819
F	580	446	324	0	440	406	587	788
G								
H								
I								

**NO. OF READINGS =** 48 **AVERAGE FPM =** 256

TEST HOLE	9	10	11	12	13	14	15	16
J								
K								
L								
M								
N								
O								
P								
Q								
R								

**Comments:** For calibration, see screen shot for details.

**Technician:** Joe Lennon

**Project:** Lowell Justice Center  
**Address:** 370 Jackson Street, Lowell, MA  
**Date:** 7/6/2020

**Project No.** 17-219

**TRAVERSE DATA**

**SYSTEM:** AHU- 5 EXHAUST

**TRAVERSE NUMBER:** T-17

**TRAVERSE LOCATION:** PENTHOUSE

**DUCT SIZE (ROUND)** " **DIAMETER** Sq Ft = 0.00  
**DUCT SIZE (RECT.)** 30 " **WIDTH** x 30 " **DEPTH** Sq Ft = 6.25

**AIR DENSITY DATA**

<b>STATIC PRESS @ CL:</b>	<u>0.09</u>	InWg.	<b>DESIGN CFM =</b>	<u>5,500</u>
<b>DUCT AIR TEMP:</b>	<u>68</u>	Deg F	<b>ACTUAL CFM =</b>	<u>4,572</u>
<b>BAROMETRIC PRESS:</b>	<u>29.92</u>	In Hg.	<b>SCFM=</b>	<u>4,592</u>

**AIR DENSITY RATIO CORRECTION**  
**SCFM CORRECTION FACTOR:** 1.00  
**ACTUAL DENSITY:** 0.075

TEST HOLE	1	2	3	4	5	6	7	8
A	1,111	1,007	1,135	989	1,057			
B	1,028	1,148	998	690	498			
C	998	1,058	924	530	0			
D	839	830	849	342	0			
E	685	591	612	367	0			
F								
G								
H								
I								

**NO. OF READINGS =** 25      **AVERAGE FPM =** 731

TEST HOLE	9	10	11	12	13	14	15	16
J								
K								
L								
M								
N								
O								
P								
Q								
R								

**Comments:** For calibration, see screen shot for details.

**Technician:** Joe Lennon

**Project:** Lowell Justice Center  
**Address:** 370 Jackson Street, Lowell, MA  
**Date:** 7/6/2020

**Project No.** 17-219

**TRAVERSE DATA**

**SYSTEM:** AHU- 5 FRESH AIR INTAKE

**TRAVERSE NUMBER:** T-18

**TRAVERSE LOCATION:** PENTHOUSE

**DUCT SIZE (ROUND)** " **DIAMETER** Sq Ft = 0.00  
**DUCT SIZE (RECT.)** 28 " **WIDTH** x 28 " **DEPTH** Sq Ft = 5.44

**AIR DENSITY DATA**

**STATIC PRESS @ CL:** -0.24 InWg. **DESIGN CFM =** 5,500  
**DUCT AIR TEMP:** 18 Deg F **ACTUAL CFM =** 5,765  
**BAROMETRIC PRESS:** 29.92 In Hg. **SCFM=** 6,393

**AIR DENSITY RATIO CORRECTION**

**SCFM CORRECTION FACTOR:** 1.11  
**ACTUAL DENSITY:** 0.083

TEST HOLE	1	2	3	4	5	6	7	8
A	1,377	1,245	970	1,331	529			
B	1,497	1,337	1,499	1,366	814			
C	1,261	1,357	1,541	1,474	1,107			
D	879	1,542	1,616	1,567	337			
E	0	341	325	1,162	0			
F								
G								
H								
I								

**NO. OF READINGS =** 25 **AVERAGE FPM =** 1,059

TEST HOLE	9	10	11	12	13	14	15	16
J								
K								
L								
M								
N								
O								
P								
Q								
R								

**Comments:** For calibration, see screen shot for details.

**Technician:** Joe Lennon

**Project:** Lowell Justice Center  
**Address:** 370 Jackson Street, Lowell, MA  
**Date:** 7/6/2020

**Project No.** 17-219

**TRAVERSE DATA**

**SYSTEM:** AHU- 6 SUPPLY

**TRAVERSE NUMBER:** T-19

**TRAVERSE LOCATION:** PENTHOUSE

**DUCT SIZE (ROUND)** " **DIAMETER** Sq Ft = 0.00  
**DUCT SIZE (RECT.)** 42 " **WIDTH** x 52 " **DEPTH** Sq Ft = 15.17

**AIR DENSITY DATA**

**STATIC PRESS @ CL:** 1.5 InWg. **DESIGN CFM =** 17,500  
**DUCT AIR TEMP:** 60 Deg F **ACTUAL CFM =** 21,983  
**BAROMETRIC PRESS:** 29.92 In Hg. **SCFM=** 22,501

**AIR DENSITY RATIO CORRECTION**

**SCFM CORRECTION FACTOR:** 1.02  
**ACTUAL DENSITY:** 0.077

TEST HOLE	1	2	3	4	5	6	7	8
A	689	0	2,435	1,591	0	1,951	2,188	616
B	235	2,189	2,423	1,300	0	2,226	2,000	870
C	220	1,796	2,500	2,111	0	2,250	2,175	1,069
D	0	1,905	2,501	2,074	0	2,055	1,861	818
E	436	2,355	2,426	2,321	0	2,309	2,503	1,579
F								
G								
H								
I								

**NO. OF READINGS =** 40 **AVERAGE FPM =** 1,449

TEST HOLE	9	10	11	12	13	14	15	16
J								
K								
L								
M								
N								
O								
P								
Q								
R								

**Comments:** For calibration, see screen shot for details.

**Technician:** Jope Lenna

**Project:** Lowell Justice Center  
**Address:** 370 Jackson Street, Lowell, MA  
**Date:** 7/6/2020

**Project No.** 17-219

**TRAVERSE DATA**

**SYSTEM:** AHU- 6 RETURN

**TRAVERSE NUMBER:** T-20

**TRAVERSE LOCATION:** PENTHOUSE

**DUCT SIZE (ROUND)** " **DIAMETER** Sq Ft = 0.00  
**DUCT SIZE (RECT.)** 50 " **WIDTH** x 36 " **DEPTH** Sq Ft = 12.50

**AIR DENSITY DATA**

**STATIC PRESS @ CL:** -0.56 InWg. **DESIGN CFM =** 17,500  
**DUCT AIR TEMP:** 68 Deg F **ACTUAL CFM =** 13,527  
**BAROMETRIC PRESS:** 29.92 In Hg. **SCFM=** 13,567

**AIR DENSITY RATIO CORRECTION**

**SCFM CORRECTION FACTOR:** 1.00  
**ACTUAL DENSITY:** 0.075

TEST HOLE	1	2	3	4	5	6	7	8
A	0	533	951	1,165	1,185	1,293	1,297	1,284
B	389	619	1,092	1,268	1,341	1,277	1,290	1,076
C	913	924	1,302	1,246	1,328	1,312	1,288	813
D	1,039	1,086	1,296	1,236	1,344	1,275	1,198	715
E	992	1,062	1,038	1,270	1,370	1,210	1,235	792
F	895	905	1,074	1,197	1,313	1,276	1,172	767
G								
H								
I								

**NO. OF READINGS =** 48 **AVERAGE FPM =** 1,082

TEST HOLE	9	10	11	12	13	14	15	16
J								
K								
L								
M								
N								
O								
P								
Q								
R								

**Comments:** For calibration, see screen shot for details.

**Technician:** Joe Lennon

**Project:** Lowell Justice Center  
**Address:** 370 Jackson Street, Lowell, MA  
**Date:** 7/6/2020

**Project No.** 17-219

**TRAVERSE DATA**

**SYSTEM:** AHU- 6 FRESH AIR INTAKE

**TRAVERSE NUMBER:** T-21

**TRAVERSE LOCATION:** PENTHOUSE

**DUCT SIZE (ROUND)** " **DIAMETER** Sq Ft = 0.00  
**DUCT SIZE (RECT.)** 68 " **WIDTH x** 68 " **DEPTH** Sq Ft = 32.11

**AIR DENSITY DATA**

**STATIC PRESS @ CL:** -0.15 InWg. **DESIGN CFM =** 17,500  
**DUCT AIR TEMP:** 29 Deg F **ACTUAL CFM =** 18,050  
**BAROMETRIC PRESS:** 29.92 In Hg. **SCFM=** 19,568

**AIR DENSITY RATIO CORRECTION**

**SCFM CORRECTION FACTOR:** 1.08  
**ACTUAL DENSITY:** 0.081

TEST HOLE	1	2	3	4	5	6	7	8
A	919	988	961	905	838	544	254	197
B	74	0		1,015	1,056	930	895	669
C	403	285	223	0	0		1,086	963
D	749	560	237	124	28	0	0	0
E		1,190	1,059	755	514	207	89	0
F	0	44	0		1,006	1,144	983	641
G	372	0	0	0	0	0		876
H	936	855	632	327	395	0	0	0
I	0		936	998	1,015	985	751	459

**NO. OF READINGS =** 110 **AVERAGE FPM =** 562

TEST HOLE	9	10	11	12	13	14	15	16
J	366	0	0	0		986	950	963
K	1,015	948	683	342	323	0	0	
L	1,043	1,049	949	1,026	1,038	758	605	211
M	0	607		1,114	1,092	1,038	1,045	1,040
N	806	572	621	646	641		1,087	1,056
O	803	983	643	186	412	847	757	508
P								
Q								
R								

**Comments:** Top section 29" x 68", Bottom section 39" x 68". Spaces within traverse represent test rows.  
 For calibration, see screen shot for details.

**Technician:** Joe Lennon

**Project:** Lowell Justice Center  
**Address:** 370 Jackson Street, Lowell, MA  
**Date:** 7/6/2020

**Project No.** 17-219

**TRAVERSE DATA**

**SYSTEM:** AHU- 7 SUPPLY

**TRAVERSE NUMBER:** T-22

**TRAVERSE LOCATION:** PENTHOUSE

**DUCT SIZE (ROUND)** " **DIAMETER** Sq Ft = 0.00  
**DUCT SIZE (RECT.)** 60 " **WIDTH** x 36 " **DEPTH** Sq Ft = 15.00

**AIR DENSITY DATA**  
**STATIC PRESS @ CL:** 0.7 InWg. **DESIGN CFM =** 19,000  
**DUCT AIR TEMP:** 60 Deg F **ACTUAL CFM =** 18,136  
**BAROMETRIC PRESS:** 29.92 In Hg. **SCFM=** 18,527

**AIR DENSITY RATIO CORRECTION**  
**SCFM CORRECTION FACTOR:** 1.02  
**ACTUAL DENSITY:** 0.077

TEST HOLE	1	2	3	4	5	6	7	8
A	1,654	1,712	1,836	1,844	1,594	1,594	1,548	1,575
B	1,470	1,381	1,446	1,465	1,640	1,462	1,356	1,340
C	1,189	1,268	1,280	1,290	1,383	1,290	1,435	1,305
D	948	1,151	1,147	1,260	1,198	1,299	1,133	1,187
E	416	1,013	908	1,052	1,037	1,072	975	981
F	372	766	626	631	937	691	845	832
G								
H								
I								

**NO. OF READINGS =** 60 **AVERAGE FPM =** 1,209

TEST HOLE	9	10	11	12	13	14	15	16
J	1,717	1,304						
K	1,302	1,283						
L	1,337	1,234						
M	1,206	1,254						
N	1,158	1,173						
O	754	988						
P								
Q								
R								

**Comments:** For calibration, see screen shot for details.

**Technician:** Joe Lennon

**Project:** Lowell Justice Center  
**Address:** 370 Jackson Street, Lowell, MA  
**Date:** 7/6/2020

**Project No.** 17-219

**TRAVERSE DATA**

**SYSTEM:** AHU- 7 RETURN

**TRAVERSE NUMBER:** T-23

**TRAVERSE LOCATION:** PENTHOUSE

**DUCT SIZE (ROUND)** " **DIAMETER** Sq Ft = 0.00  
**DUCT SIZE (RECT.)** 60 " **WIDTH** x 36 " **DEPTH** Sq Ft = 15.00

**AIR DENSITY DATA**

**STATIC PRESS @ CL:** -0.73 InWg. **DESIGN CFM =** 19,000  
**DUCT AIR TEMP:** 68 Deg F **ACTUAL CFM =** 19,812  
**BAROMETRIC PRESS:** 29.92 In Hg. **SCFM=** 19,863

**AIR DENSITY RATIO CORRECTION**

**SCFM CORRECTION FACTOR:** 1.00  
**ACTUAL DENSITY:** 0.075

TEST HOLE	1	2	3	4	5	6	7	8
A	1,665	1,616	1,629	1,532	1,485	1,609	1,579	1,154
B	1,624	1,473	1,440	1,495	1,548	1,594	1,614	969
C	1,682	1,516	1,475	1,417	1,500	1,617	1,652	887
D	1,708	1,541	1,499	1,400	1,497	1,521	1,601	1,044
E	1,716	1,582	1,489	1,277	1,336	1,522	1,614	1,215
F	1,739	1,701	1,538	1,453	0	1,534	1,677	1,459
G								
H								
I								

**NO. OF READINGS =** 54 **AVERAGE FPM =** 1,321

TEST HOLE	9	10	11	12	13	14	15	16
J	576							
K	0							
L	69							
M	0							
N	0							
O	244							
P								
Q								
R								

**Comments:** For calibration, see screen shot for details.

**Technician:** Joe Lennon

**Project:** Lowell Justice Center  
**Address:** 370 Jackson Street, Lowell, MA  
**Date:** 7/6/2020

**Project No.** 17-219

**TRAVERSE DATA**

**SYSTEM:** AHU- 7 FRESH AIR INTAKE

**TRAVERSE NUMBER:** T-24

**TRAVERSE LOCATION:** PENTHOUSE

**DUCT SIZE (ROUND)** " **DIAMETER** Sq Ft = 0.00  
**DUCT SIZE (RECT.)** 58 " **WIDTH** x 58 " **DEPTH** Sq Ft = 23.36

**AIR DENSITY DATA**

**STATIC PRESS @ CL:** -0.15 InWg. **DESIGN CFM =** 19,000  
**DUCT AIR TEMP:** 28 Deg F **ACTUAL CFM =** 16,974  
**BAROMETRIC PRESS:** 29.92 In Hg. **SCFM=** 18,440

**AIR DENSITY RATIO CORRECTION**

**SCFM CORRECTION FACTOR:** 1.09  
**ACTUAL DENSITY:** 0.081

TEST HOLE	1	2	3	4	5	6	7	8
A	717	700	669	778	675	778	718	734
B	694	672	701	723	328	706	723	756
C	711	765	719	767	599	721	787	778
D	716	777	779	754	537	784	768	727
E	638	713	725	677	639	726	598	744
F	826	800	675	715	671	792	728	884
G	723	736	695	686	645	707	779	823
H	797	754	756	738	861	882	829	808
I	812	844	857	871	0	886	789	760

**NO. OF READINGS =** 81 **AVERAGE FPM =** 727

TEST HOLE	9	10	11	12	13	14	15	16
J	680							
K	776							
L	757							
M	642							
N	716							
O	895							
P	900							
Q	723							
R	416							

**Comments:** For calibration, see screen shot for details.

**Technician:** Joe Lennon

**Project:** Lowell Justice Center  
**Address:** 370 Jackson Street, Lowell, MA  
**Date:** 7/6/2020

**Project No.** 17-219

**TRAVERSE DATA**

**SYSTEM:** EF-A01

**TRAVERSE NUMBER:** T-25  
**TRAVERSE LOCATION:** BASEMENT

**DUCT SIZE (ROUND)** " **DIAMETER** Sq Ft = 0.00  
**DUCT SIZE (RECT.)** 16 " **WIDTH** x 14 " **DEPTH** Sq Ft = 1.56

**AIR DENSITY DATA**  
**STATIC PRESS @ CL:** -0.28 InWg. **DESIGN CFM =** 840  
**DUCT AIR TEMP:** 65 Deg F **ACTUAL CFM =** 731  
**BAROMETRIC PRESS:** 29.92 In Hg. **SCFM =** 738

**AIR DENSITY RATIO CORRECTION**  
**SCFM CORRECTION FACTOR:** 1.01  
**ACTUAL DENSITY:** 0.076

TEST HOLE	1	2	3	4	5	6	7	8
A	471	463	497	499				
B	383	450	502	542				
C	434	405	505	481				
D								
E								
F								
G								
H								
I								

**NO. OF READINGS =** 12 **AVERAGE FPM =** 469

TEST HOLE	9	10	11	12	13	14	15	16
J								
K								
L								
M								
N								
O								
P								
Q								
R								

**Comments:**

**Technician:** Joe Lennon

**Project:** Lowell Justice Center  
**Address:** 370 Jackson Street, Lowell, MA  
**Date:** 7/6/2020

**Project No.** 17-219

**TRAVERSE DATA**

**SYSTEM:** AHU- 3 EXHAUST RISER.

**TRAVERSE NUMBER:** T-26

**TRAVERSE LOCATION:** PENTHOUSE

**DUCT SIZE (ROUND)** " **DIAMETER** Sq Ft = 0.00  
**DUCT SIZE (RECT.)** 32 " **WIDTH** x 30 " **DEPTH** Sq Ft = 6.67

**AIR DENSITY DATA**

**STATIC PRESS @ CL:** -0.3 InWg. **DESIGN CFM =** 4,900  
**DUCT AIR TEMP:** 68 Deg F **ACTUAL CFM =** 2,790  
**BAROMETRIC PRESS:** 29.92 In Hg. **SCFM=** 2,800

**AIR DENSITY RATIO CORRECTION**

**SCFM CORRECTION FACTOR:** 1.00  
**ACTUAL DENSITY:** 0.075

TEST HOLE	1	2	3	4	5	6	7	8
A	487	503	316	465	348			
B	545	508	417	504	342			
C	542	555	455	420	301			
D	446	478	438	374	262			
E	374	467	405	303	207			
F								
G								
H								
I								

**NO. OF READINGS =** 25 **AVERAGE FPM =** 418

TEST HOLE	9	10	11	12	13	14	15	16
J								
K								
L								
M								
N								
O								
P								
Q								
R								

**Comments:**

**Technician:** Joe Lennon

**Project:** Lowell Justice Center  
**Address:** 370 Jackson Street, Lowell, MA  
**Date:** 7/6/2020

**Project No.** 17-219

**TRAVERSE DATA**

**SYSTEM:** EF-SO1

**TRAVERSE NUMBER:** T-27  
**TRAVERSE LOCATION:** PENTHOUSE

**DUCT SIZE (ROUND)** " **DIAMETER** Sq Ft = 0.00  
**DUCT SIZE (RECT.)** 30 " **WIDTH** x 30 " **DEPTH** Sq Ft = 6.25

**AIR DENSITY DATA**  
**STATIC PRESS @ CL:** 0.23 InWg. **DESIGN CFM =** 12,000  
**DUCT AIR TEMP:** 68 Deg F **ACTUAL CFM =** 11,889  
**BAROMETRIC PRESS:** 29.92 In Hg. **SCFM=** 11,948

**AIR DENSITY RATIO CORRECTION**  
**SCFM CORRECTION FACTOR:** 1.00  
**ACTUAL DENSITY:** 0.075

TEST HOLE	1	2	3	4	5	6	7	8
A	1,698	1,956	2,251	2,351	2,405			
B	1,426	1,497	1,857	2,098	2,320			
C	1,549	1,627	2,047	1,995	2,035			
D	1,736	1,754	2,121	2,129	1,844			
E	1,412	1,960	1,924	1,912	1,652			
F								
G								
H								
I								

**NO. OF READINGS =** 25 **AVERAGE FPM =** 1,902

TEST HOLE	9	10	11	12	13	14	15	16
J								
K								
L								
M								
N								
O								
P								
Q								
R								

**Comments:** **Technician:** Joe Lennon

**Project:** Lowell Justice Center

**Address:** 370 Jackson Street, Lowell, MA

**Date:** 7/6/2020

**Project No.** 17-219

**VAV BOX AIR DISTRIBUTION**

**SYSTEM:** AHU-1

**TITUS**

ROOM OR LOCATION	BOX & OUTLET NUMBER	BOX & OUTLET SIZE	BOX INLET SP OR HOOD	DESIGN CFM AT MINIMUM	TESTED CFM AT MINIMUM	DESIGN CFM AT MAXIMUM	TESTED CFM AT MAXIMUM
U0002	1	12 "∅	0.785	50	52	410	440
Address:	1001	FC	1.59	VP	0.14	VP	0.14
	VAV-0-1- 01	4 "∅					
0001	1	CD-2	F.H.	50	54	50	54
	2	CD-2	F.H.	50	49	50	49
			Total	100	103	100	103
Address:	1002	FC	1.13	VP	0.48	VP	0.48
	VAV-0-1- 02	6 "∅					
0007	1	CD-2	F.H.	120	129	120	129
D0055	2	SCD-1	F.H.	20	22	20	22
0050	3	SCD-1	F.H.	50	53	50	53
0063	4	SCD-1	F.H.	105	107	105	107
		....	Total	295	311	295	311
Address:	1003	FC	1.03	VP	0.29	VP	0.90
	VAV-0-1- 03	6 "∅					
0005	1	CD-7	F.H.	117	120	205	210
	2	CD-7	F.H.	117	123	205	216
			Total	234	243	410	426
Address:	1004	FC	1.45	VP	0.07	VP	0.30
	VAV-0-1- 04	8 "∅					
0016	1	CD-7	F.H.	123	113	250	230
	2	CD-7	F.H.	123	130	250	265
			Total	245	243	500	495

F.H. INDICATES TESTED CFM USING FLOW HOOD.

**Comments:**

**Project:** Lowell Justice Center

**Address:** 370 Jackson Street, Lowell, MA

**Date:** 7/6/2020

**Project No.** 1-1-2019

**VAV BOX AIR DISTRIBUTION**

**SYSTEM:** AHU-1

ROOM OR LOCATION	BOX & OUTLET NUMBER	BOX & OUTLET SIZE	BOX INLET SP OR HOOD	DESIGN CFM AT MINIMUM	TESTED CFM AT MINIMUM	DESIGN CFM AT MAXIMUM	TESTED CFM AT MAXIMUM	
Address:	1005	FC	1.63		VP	0.03	VP	0.06
	VAV-0-1- 05	4 "∅						
1008	1	CD-2	F.H.	45	46	65	66	
Address:	1006	FC	1.40		VP	0.46	VP	0.46
	VAV-0-1- 06	4 "∅						
0004	1	CD-1	F.H.	20	20	20	20	
	2	CD-1	F.H.	45	43	45	43	
0009	3	CD-1	F.H.	20	20	20	20	
0003	4	CD-1	F.H.	55	52	55	52	
0052	5	CD-1	F.H.	45	50	45	50	
			<b>Total</b>	185	185	185	185	
Address:	1007	FC	1.47		VP	0.07	VP	0.07
	VAV-0-1- 07	4 "∅						
D0058	1	CD-1	F.H.	35	36	35	36	
	2	CD-1	F.H.	35	35	35	35	
			<b>Total</b>	70	71	70	71	
Address:	1008	FC	1.50		VP	0.25	VP	0.33
	VAV-0-1- 08	5 "∅						
0048	1	CD-2	F.H.	90	91	105	106	
	2	CD-2	F.H.	90	89	105	100	
			<b>Total</b>	181	180	210	206	

F.H. INDICATES TESTED CFM USING FLOW HOOD.

**Comments:**

**Project:** Lowell Justice Center

**Address:** 370 Jackson Street, Lowell, MA

**Date:** 7/6/2020

**Project No.** 1-1-2019

**VAV BOX AIR DISTRIBUTION**

**SYSTEM:** AHU-1

ROOM OR LOCATION	BOX & OUTLET NUMBER	BOX & OUTLET SIZE	BOX INLET SP OR HOOD	DESIGN CFM AT MINIMUM	TESTED CFM AT MINIMUM	DESIGN CFM AT MAXIMUM	TESTED CFM AT MAXIMUM
Address:	1009	FC	1.57		VP	0.28	VP
	VAV-0-1- 09	10 "Ø					0.45
Bsmt. Corridor	1	CD-1	F.H.	186	194	235	245
	2	CD-1	F.H.	186	193	235	244
	3	CD-1	F.H.	186	188	235	238
	4	CD-1	F.H.	186	187	235	237
			Total	743	762	940	964
Address:	1010	FC	1.20		VP	0.03	VP
	VAV-0-1- 10	4 "Ø					0.05
1005	1	CD-2	F.H.	45	47	60	62
Address:	1011	FC	1.60		VP	0.54	VP
	VAV-0-1- 11	5 "Ø					0.54
0019	1	CD-1	F.H.	90	93	90	93
	2	CD-1	F.H.	90	86	90	86
0023	3	CD-1	F.H.	30	30	30	30
CORRIDOR	4	CD-1	F.H.	30	28	30	28
	5	CD-1	F.H.	25	27	25	27
			Total	265	264	265	264

F.H. INDICATES TESTED CFM USING FLOW HOOD.

**Comments:**

**Project:** Lowell Justice Center

**Address:** 370 Jackson Street, Lowell, MA

**Date:** 7/6/2020

**Project No.** 1-1-2019

**VAV BOX AIR DISTRIBUTION**

**SYSTEM:** AHU-1

ROOM OR LOCATION	BOX & OUTLET NUMBER	BOX & OUTLET SIZE	BOX INLET SP OR HOOD	DESIGN CFM AT MINIMUM	TESTED CFM AT MINIMUM	DESIGN CFM AT MAXIMUM	TESTED CFM AT MAXIMUM
Address:	1012	FC	1.95		VP 0.50		VP 0.50
	VAV-0-1- 12	4 "Ø					
U0036	1	CD-1	F.H.	25	26	25	26
U0029	2	CD-1	F.H.	30	32	30	32
U0025	3	CD-1	F.H.	20	20	20	20
U0028	4	CD-1	F.H.	20	21	20	21
U0029	5	CD-2	F.H.	90	94	90	94
			Total	185	193	185	193
Address:	1013	FC	1.50		VP 0.09		VP 0.32
	VAV-0-1- 13	4 "Ø					
0033	1	CD-1	F.H.	20	20	35	35
0038	2	CD-1	F.H.	23	24	40	42
0035	3	CD-1	F.H.	12	13	20	22
0034	4	CD-1	F.H.	29	32	50	55
			Total	84	89	145	154
Address:	1014	FC	1.70		VP 0.35		VP 0.35
	VAV-0-1- 14	5 "Ø					
0039	1	CD-1	F.H.	40	44	40	44
0096	2	CD-1	F.H.	55	57	55	57
0097	3	CD-1	F.H.	55	59	55	59
CORRIDOR	4	CD-1	F.H.	50	53	50	53
			Total	200	213	200	213

F.H. INDICATES TESTED CFM USING FLOW HOOD.

**Comments:**

**Project:** Lowell Justice Center

**Address:** 370 Jackson Street, Lowell, MA

**Date:** 7/6/2020

**Project No.** 1-1-2019

**VAV BOX AIR DISTRIBUTION**

**SYSTEM:** AHU-1

ROOM OR LOCATION	BOX & OUTLET NUMBER	BOX & OUTLET SIZE	BOX INLET SP OR HOOD	DESIGN CFM AT MINIMUM	TESTED CFM AT MINIMUM	DESIGN CFM AT MAXIMUM	TESTED CFM AT MAXIMUM
Address: 1015 FC 1.48 VP 0.04 VP 0.52							
VAV-0-1- 15 10 "Ø							
0049	1	CD-3	F.H.	74	70	265	250
	2	CD-3	F.H.	74	72	265	256
	3	CD-3	F.H.	74	75	265	269
	4	CD-3	F.H.	74	74	265	263
			Total	297	291	1,060	1,038

F.H. INDICATES TESTED CFM USING FLOW HOOD.

**Comments:**

**Project:** Lowell Justice Center

**Address:** 370 Jackson Street, Lowell, MA

**Date:** 7/6/2020

**Project No.** 17-219

**AIR DISTRIBUTION**

**SYSTEM:** AHU-1

SUPPLY

RETURN

EXHAUST

ROOM OR LOCATION	UNIT NUMBER	UNIT SIZE	AREA xK FACTOR	DESIGN FT / MIN	TEST FT / MIN	DESIGN CFM	TEST CFM
0005	1	EG-4	FH	N / A	N / A	100	106
	2	EG-4	FH	N / A	N / A	100	108
	3	EG-4	FH	N / A	N / A	125	135
0014	4	EG-4	FH	N / A	N / A	70	70
0015	5	EG-4	FH	N / A	N / A	105	113
	6	EG-4	FH	N / A	N / A	105	102
0017	7	EG-4	FH	N / A	N / A	70	75
0018	8	EG-4	FH	N / A	N / A	105	111
	9	EG-4	FH	N / A	N / A	105	97
0016	10	EG-4	FH	N / A	N / A	100	103
	11	EG-4	FH	N / A	N / A	100	103
	12	EG-4	FH	N / A	N / A	105	97
T0051	13	EG-2	FH	N / A	N / A	70	64
D0063	14	EG-2	FH	N / A	N / A	105	100
T0059	15	EG-1	FH	N / A	N / A	70	71
D0062	16	SCG-1	FH	N / A	N / A	80	73
1056	17	EG-1	FH	N / A	N / A	100	97
U0108	18	EG-1	FH	N / A	N / A	45	49
0007	19	EG-2	FH	N / A	N / A	120	121
0050	20	EG-2	FH	N / A	N / A	50	53
D0055	21	SCG-1	FH	N / A	N / A	75	69
0048	22	EG-2	FH	N / A	N / A	105	100
	23	EG-2	FH	N / A	N / A	105	102
U0093	24	EG-1	FH	N / A	N / A	20	20
U0046	25	EG-1	FH	N / A	N / A	25	25
U0041	26	EG-1	FH	N / A	N / A	40	37
0032	27	EG-1	FH	N / A	N / A	80	73
CORRIDOR	28	EG-1	FH	N / A	N / A	80	75
	29	EG-1	FH	N / A	N / A	80	72
	30	EG-1	FH	N / A	N / A	50	46
<b>TOTAL</b>						2,490	2,467

F.H. INDICATES TESTED CFM USING FLOW HOOD

**Comments:**

**Project:** Lowell Justice Center

**Address:** 370 Jackson Street, Lowell, MA

**Date:** 7/6/2020

**Project No.** 17-219

### AIR DISTRIBUTION

**SYSTEM:** AHU-1

SUPPLY

RETURN

EXHAUST

ROOM OR LOCATION	UNIT NUMBER	UNIT SIZE	AREA xK FACTOR	DESIGN FT / MIN	TEST FT / MIN	DESIGN CFM	TEST CFM
U0030	31	EG-1	FH	N/A	N/A	25	25
U0029	32	EG-1	FH	N/A	N/A	30	27
U0028	33	EG-1	FH	N/A	N/A	20	20
0025	34	EG-1	FH	N/A	N/A	20	20
0019	35	EG-1	FH	N/A	N/A	90	83
	36	EG-1	FH	N/A	N/A	90	82
0023	37	EG-1	FH	N/A	N/A	25	25
0022	38	RG-1	FH	N/A	N/A	95	87
<b>TOTAL</b>						395	369

F.H. INDICATES TESTED CFM USING FLOW HOOD

Comments:

**Project:** Lowell Justice Center

**Address:** 370 Jackson Street, Lowell, MA

**Date:** 7/6/2020

**Project No.** 17-219

**AIR DISTRIBUTION**

**SYSTEM:** AHU-2

SUPPLY

RETURN

EXHAUST

ROOM OR LOCATION	UNIT NUMBER	UNIT SIZE	AREA xK FACTOR	DESIGN FT / MIN	TEST FT / MIN	DESIGN CFM	TEST CFM	
D0056	1	SCD-1	FH	N / A	N / A	20	29 *1	
D0213	2	SCD-2	FH	N / A	N / A	75	80	
D0057	3	CD-1	FH	N / A	N / A	100	106	
D0105	4	SCD-1	FH	N / A	N / A	20	31 *1	
D0105	5	SCD-2	FH	N / A	N / A	20	27 *1	
D0053	6	SCD-2	FH	N / A	N / A	20	32 *1	
	7	SCD-1	FH	N / A	N / A	20	21	
D0054	8	SCD-2	FH	N / A	N / A	30	30	
DO140	9	SCD-2	FH	N / A	N / A	20	25 *1	
D0062	10	SCD-2	FH	N / A	N / A	70	74	
D0060	11	SCD-2	FH	N / A	N / A	20	20	
D0061	12	SCD-2	FH	N / A	N / A	20	24 *1	
D0079	13	SCD-2	FH	N / A	N / A	70	76	
D0080	14	SCD-2	FH	N / A	N / A	65	64	
CELL VEST.	15	SCD-2	FH	N / A	N / A	55	51	
D0081	16	SCD-2	FH	N / A	N / A	65	63	
D0082	17	SCD-2	FH	N / A	N / A	165	167	
D0086	18	SCD-2	FH	N / A	N / A	155	158	
CELL VEST.	19	SCD-1	FH	N / A	N / A	65	69	
D0084	20	SCD-2	FH	N / A	N / A	105	110	
D0083	21	SCD-2	FH	N / A	N / A	165	155	
D0078	22	SCD-1	FH	N / A	N / A	20	22	
D0088	23	SCD-2	FH	N / A	N / A	90	95	
CELL VEST.	24	SCD-2	FH	N / A	N / A	40	42	
D0085	25	SCD-2	FH	N / A	N / A	105	110	
D0068	26	SCD-2	FH	N / A	N / A	95	98	
D0066	27	SCD-2	FH	N / A	N / A	65	70	
D0067	28	SCD-2	FH	N / A	N / A	65	65	
CELL VEST.	29	SCD-2	FH	N / A	N / A	65	67	
D0069	30	SCD-2	FH	N / A	N / A	170	173	
<b>F.H. INDICATES TESTED CFM USING FLOW HOOD</b>						<b>TOTAL</b>	2,060	2,154

**Comments:** \*1 Volume damper is closed.

**Project:** Lowell Justice Center  
**Address:** 370 Jackson Street, Lowell, MA  
**Date:** 7/6/2020

**Project No.** 17-219

**AIR DISTRIBUTION**

**SYSTEM:** AHU-2

SUPPLY       RETURN       EXHAUST

ROOM OR LOCATION	UNIT NUMBER	UNIT SIZE	AREA xK FACTOR	DESIGN FT / MIN	TEST FT / MIN	DESIGN CFM	TEST CFM
CORR CELLS 2-5	31	SCD-1	FH	N / A	N / A	20	22
D0064	32	SCD-2	FH	N / A	N / A	65	65
CELL VEST.	33	SCD-1	FH	N / A	N / A	40	41
D0065	34	SCD-2	FH	N / A	N / A	65	67
D0070	35	SCD-2	FH	N / A	N / A	65	65
CELL VEST.	36	SCD-2	FH	N / A	N / A	55	58
D0071	37	SCD-2	FH	N / A	N / A	65	70
D0075	38	SCD-2	FH	N / A	N / A	65	69
CELL VEST.	39	SCD-2	FH	N / A	N / A	55	57
D0073	40	SCD-2	FH	N / A	N / A	165	165
D0074	41	SCD-2	FH	N / A	N / A	65	66
D0072	42	SCD-2	FH	N / A	N / A	165	167
D0106	43	SCD-1	FH	N / A	N / A	20	22
CELL VEST.	44	SCD-1	FH	N / A	N / A	45	47
D0077	45	SCD-2	FH	N / A	N / A	110	104
D0106	46	SCD-1	FH	N / A	N / A	20	22
D0076	47	SCD-2	FH	N / A	N / A	165	161
D0106	48	SCD-1	FH	N / A	N / A	20	21
D0090	49	SCD-1	FH	N / A	N / A	70	70
D0110	50	SCD-1	FH	N / A	N / A	20	27 *1
<b>TOTAL</b>						1,360	1,386

F.H. INDICATES TESTED CFM USING FLOW HOOD

**Comments:** \*1 Volume damper is closed.

Project: Lowell Justice Center

Address: 370 Jackson Street, Lowell, MA

Date: 7/6/2020

Project No. 17-219

AIR DISTRIBUTION

SYSTEM: AHU-2

START THIS PAGE

SUPPLY

RETURN

EXHAUST

ROOM OR LOCATION	UNIT NUMBER	UNIT SIZE	AREA xK FACTOR	DESIGN FT / MIN	TEST FT / MIN	DESIGN CFM	TEST CFM
D0056	1	SCG-1	FH	N/A	N/A	20	31 *1
D0213	2	SCG-1	FH	N/A	N/A	75	81
D0056A	3	SCG-1	FH	N/A	N/A	20	29 *1
D0057	4	SCG-1	FH	N/A	N/A	100	92
D0053	5	SCG-1	FH	N/A	N/A	75	79
D0054	6	SCG-1	FH	N/A	N/A	20	21
	7	SCG-1	FH	N/A	N/A	20	20
D0060	8	SCG-1	FH	N/A	N/A	20	22
D0061	9	SCG-1	FH	N/A	N/A	20	26 *1
D0079	10	SCG-1	FH	N/A	N/A	80	74
CELL VEST.	11	SCG-1	FH	N/A	N/A	20	20
D0080	12	SCG-1	FH	N/A	N/A	75	69
D0081	13	SCG-1	FH	N/A	N/A	75	70
D0082	14	SCG-1	FH	N/A	N/A	180	165
D0078	15	SCG-1	FH	N/A	N/A	20	22
CELL VEST.	16	SCG-1	FH	N/A	N/A	20	19
D0083	17	SCG-1	FH	N/A	N/A	180	163
D0086	18	SCG-1	FH	N/A	N/A	170	155
D0084	19	SCG-1	FH	N/A	N/A	115	106
D0088	20	SCG-1	FH	N/A	N/A	100	92
D0085	21	SCG-1	FH	N/A	N/A	115	106
CELL VEST.	22	SCG-1	FH	N/A	N/A	20	20
CORR. CELLS 2-5	23	SCG-1	FH	N/A	N/A	20	20
D0072	24	SCG-1	FH	N/A	N/A	180	163
D0070	25	SCG-1	FH	N/A	N/A	75	68
CELL VEST.	26	SCG-1	FH	N/A	N/A	20	19
D0071	27	SCG-1	FH	N/A	N/A	75	71
CELL VEST.	28	SCG-1	FH	N/A	N/A	20	20
D0066	29	SCG-1	FH	N/A	N/A	75	75
D0068	30	SCG-1	FH	N/A	N/A	105	98

F.H. INDICATES TESTED CFM USING FLOW HOOD

TOTAL

2,110

2,016

Comments: \*1 Volume damper is closed.

**Project:** Lowell Justice Center

**Address:** 370 Jackson Street, Lowell, MA

**Date:** 7/6/2020

**Project No.** 17-219

**AIR DISTRIBUTION**

**SYSTEM:** AHU-2

**SUPPLY**

**RETURN**

**EXHAUST**

ROOM OR LOCATION	UNIT NUMBER	UNIT SIZE	AREA xK FACTOR	DESIGN FT / MIN	TEST FT / MIN	DESIGN CFM	TEST CFM
D0067	31	SCG-1	FH	N / A	N / A	75	73
D0069	32	SCG-1	FH	N / A	N / A	185	170
D0064	33	SCG-1	FH	N / A	N / A	75	69
CELL VEST.	34	SCG-1	FH	N / A	N / A	20	20
D0065	35	SCG-1	FH	N / A	N / A	75	71
CELL VEST.	36	SCG-1	FH	N / A	N / A	20	21
D0073	37	SCG-1	FH	N / A	N / A	180	177
D0075	38	SCG-1	FH	N / A	N / A	75	75
D0074	39	SCG-1	FH	N / A	N / A	75	77
CELL VEST.	40	SCG-1	FH	N / A	N / A	20	21
D0076	41	SCG-1	FH	N / A	N / A	180	163
D0077	42	SCG-1	FH	N / A	N / A	120	110
<b>TOTAL</b>						1,100	1,047

F.H. INDICATES TESTED CFM USING FLOW HOOD

**Comments:** Security ceiling installed. No access to volume dampers

**Project:** Lowell Justice Center

**Address:** 370 Jackson Street, Lowell, MA

**Date:** 7/6/2020

**Project No.** 17-219

**VAV BOX AIR DISTRIBUTION**

**SYSTEM:** AHU-3

ROOM OR LOCATION	BOX & OUTLET NUMBER	BOX & OUTLET SIZE	BOX INLET SP OR HOOD	DESIGN CFM AT MINIMUM	TESTED CFM AT MINIMUM	DESIGN CFM AT MAXIMUM	TESTED CFM AT MAXIMUM
Address:	11002	FC:	1.52	MIN VP:	0.05	MAX VP:	0.45
	VAV-7-3- 01	5 "Ø					
7020	1	ACB- 10	82-MN	39	36	150	140
	2	ACB- 10	82-MN	39	37	150	142
			<b>Total</b>	78	73	300	282
Address:	11003	FC:	2.24	MIN VP:	0.07	MAX VP:	0.14
	VAV-7-3- 02	4 "Ø					
7026	1	AC 371		70	71	100	102
Address:	11004	FC:	2.93	MIN VP:	0.11	MAX VP:	0.26
	VAV-7-3- 03	4 "Ø					
7044	1	ACB- 04	34-MN	70	74	70	74
7041	2	ACB- 01	24-UN	15	16	15	16
7039	3	ACB- 01	24-UN	15	16	15	16
7038	4	ACB- 02	24-SN	30	32	30	32
			<b>Total</b>	130	138	130	138
Address:	11005	FC:	1.39	MIN VP:	0.12	MAX VP:	0.65
	VAV-7-3- 04	6 "Ø					
7068	1	ACB- 13	148-SN	90	82	200	183
	2	ACB- 13	148-SN	90	80	200	178
			<b>Total</b>	180	162	400	361

F.H. INDICATES TESTED CFM USING FLOW HOOD.

**Comments:**

**Project:** Lowell Justice Center

**Address:** 370 Jackson Street, Lowell, MA

**Date:** 7/6/2020

**Project No.** 17-219

**VAV BOX AIR DISTRIBUTION**

**SYSTEM:** AHU-3

ROOM OR LOCATION	BOX & OUTLET NUMBER	BOX & OUTLET SIZE	BOX INLET SP OR HOOD	DESIGN CFM AT MINIMUM	TESTED CFM AT MINIMUM	DESIGN CFM AT MAXIMUM	TESTED CFM AT MAXIMUM
Address:	11006	FC:	1.51	MIN VP:	0.42	MAX VP:	1.00
	VAV-7-3- 05	6 "Ø					
7067	1	ACB- 08	88-SN	59	61	90	94
	2	ACB- 08	88-SN	59	60	90	93
	3	ACB- 08	88-SN	59	60	90	92
7035	4	ACB- 08	88-SN	59	62	90	95
	5	ACB- 04	34-MN	46	48	70	74
			<b>Total</b>	280	291	430	448
Address:	11007	FC:	1.47	MIN VP:	0.04	MAX VP:	0.25
	VAV-7-3- 06	8 "Ø					
7001	1	ACB- 15	58-SN	29	27	95	86
	2	ACB- 15	58-SN	29	27	95	87
	3	ACB- 15	58-SN	29	27	95	86
	4	ACB- 15	58-SN	29	27	95	88
	5	ACB- 15	58-SN	29	27	95	86
	6	ACB- 15	58-SN	29	28	95	91
			<b>Total</b>	177	162	570	524
Address:	11008	FC:	2.03	MIN VP:	0.10	MAX VP:	0.24
	VAV-7-3- 07	4 "Ø					
7147	1	ACB- 05	58-SN	42	43	65	66
7148	2	ACB- 05	58-SN	42	44	65	67
			<b>Total</b>	85	86	130	133

F.H. INDICATES TESTED CFM USING FLOW HOOD.

**Comments:**

**Project:** Lowell Justice Center

**Address:** 370 Jackson Street, Lowell, MA

**Date:** 7/6/2020

**Project No.** 17-219

**VAV BOX AIR DISTRIBUTION**

**SYSTEM:** AHU-3

ROOM OR LOCATION	BOX & OUTLET NUMBER	BOX & OUTLET SIZE	BOX INLET SP OR HOOD	DESIGN CFM AT MINIMUM	TESTED CFM AT MINIMUM	DESIGN CFM AT MAXIMUM	TESTED CFM AT MAXIMUM
Address:	1109	FC:	2.74	MIN VP:	0.11	MAX VP:	0.26
	VAV-7-3- 08	4 "Ø					
7016	1	ACB- 05	58-SN	42	43	65	66
7018	2	ACB- 04	34-MN	46	47	70	73
			<b>Total</b>	88	90	135	139
Address:	11010	FC:	2.29	MIN VP:	0.04	MAX VP:	0.29
	VAV-7-3- 09	8 "Ø					
7001	1	ACB- 15	58-SN	29	29	95	94
	2	ACB- 15	58-SN	29	29	95	95
	3	ACB- 15	58-SN	29	29	95	92
	4	ACB- 15	58-SN	29	29	95	93
	5	ACB- 15	58-SN	29	30	95	96
	6	ACB- 15	58-SN	29	29	95	95
			<b>Total</b>	177	175	570	565
<b>SIXTH FLOOR</b>							
Address:	12002	FC:	1.24	MIN VP:	0.26	MAX VP:	0.59
	VAV-6-3- 01	7 "Ø					
6019	1	ACB- 14	200-SN	161	168	240	250
	2	ACB- 14	200-SN	161	165	240	246
6024	3	ACB- 01	24-UN	10	11	15	16
			<b>Total</b>	332	343	495	512

F.H. INDICATES TESTED CFM USING FLOW HOOD.

**Comments:**

**Project:** Lowell Justice Center

**Address:** 370 Jackson Street, Lowell, MA

**Date:** 7/6/2020

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**VAV BOX AIR DISTRIBUTION**

**SYSTEM:** AHU-3

ROOM OR LOCATION	BOX & OUTLET NUMBER	BOX & OUTLET SIZE	BOX INLET SP OR HOOD	DESIGN CFM AT MINIMUM	TESTED CFM AT MINIMUM	DESIGN CFM AT MAXIMUM	TESTED CFM AT MAXIMUM
Address:	12003	FC:	1.19	MIN VP:	0.22	MAX VP:	0.74
	VAV-6-3- 02	6 "Ø					
6028	1	ACB- 10	82-MN	83	86	150	156
	2	ACB- 10	82-MN	83	86	150	156
	3	CD-2	FH	39	41	70	74
			<b>Total</b>	205	214	370	386
Address:	12004	FC:	2.35	MIN VP:	0.12	MAX VP:	0.12
	VAV-6-3- 03	4 "Ø					
6044	1	ACB- 01	24-UN	15	16	15	16
6041	2	ACB- 01	24-UN	15	15	15	15
6039	3	ACB- 01	24-UN	15	16	15	16
6038	4	ACB- 01	24-UN	15	16	15	16
6037	5	ACB- 02	24-SN	30	32	30	32
			<b>Total</b>	90	95	90	95
Address:	12005	FC:	1.86	MIN VP:	0.04	MAX VP:	0.47
	VAV-6-3- 04	5 "Ø					
6055	1	ACB- 09	88-SN	35	35	120	122
	2	ACB- 09	88-SN	35	36	120	125
			<b>Total</b>	70	72	240	247
Address:	12006	FC:	1.43	MIN VP:	0.04	MAX VP:	0.60
	VAV-6-3- 05	5 "Ø					
6055	1	ACB- 02	24-SN	8	8	30	32
	2	ACB- 09	88-SN	31	32	120	122
	3	ACB- 09	88-SN	31	33	120	125
			<b>Total</b>	70	73	270	279

F.H. INDICATES TESTED CFM USING FLOW HOOD.

**Comments:**

**Project:** Lowell Justice Center

**Address:** 370 Jackson Street, Lowell, MA

**Date:** 7/6/2020

**Project No.** 17-219

**VAV BOX AIR DISTRIBUTION**

**SYSTEM:** AHU-3

ROOM OR LOCATION	BOX & OUTLET NUMBER	BOX & OUTLET SIZE	BOX INLET SP OR HOOD	DESIGN CFM AT MINIMUM	TESTED CFM AT MINIMUM	DESIGN CFM AT MAXIMUM	TESTED CFM AT MAXIMUM
Address:	12007	FC:	2.23	MIN VP:	0.23	MAX VP:	0.37
	VAV-6-3- 06	5 "Ø					
6058	1	ACB- 09	88-SN	94	98	120	125
6059	2	ACB- 02	24-SN	23	25	30	32
6060	3	ACB- 02	24-SN	23	24	30	31
6064	4	ACB- 02	24-SN	23	25	30	32
			<b>Total</b>	164	172	210	220
Address:	12008	FC:	2.26	MIN VP:	0.38	MAX VP:	0.53
	VAV-6-3- 07	5 "Ø					
	1	ACB- 05	58-SN	55	56	65	66
	2	ACB- 05	58-SN	55	55	65	65
	3	ACB- 05	58-SN	55	57	65	67
	4	ACB- 05	58-SN	55	54	65	64
			<b>Total</b>	221	223	260	262
Address:	12009	FC:	3.20	MIN VP:	0.21	MAX VP:	0.33
	VAV-6-3- 08	4 "Ø					
6079	1	ACB- 02	24-SN	24	26	30	32
6078	2	ACB- 01	24-UN	12	12	15	15
6077	3	ACB- 01	24-UN	12	13	15	16
6076	4	ACB- 01	24-UN	12	13	15	16
6075	5	ACB- 01	24-UN	12	12	15	15
6065	6	CD- 2	FH	48	50	60	62
			<b>Total</b>	120	125	150	156

F.H. INDICATES TESTED CFM USING FLOW HOOD.

**Comments:**

**Project:** Lowell Justice Center

**Address:** 370 Jackson Street, Lowell, MA

**Date:** 7/6/2020

**Project No.** 17-219

**VAV BOX AIR DISTRIBUTION**

**SYSTEM:** AHU-3

ROOM OR LOCATION	BOX & OUTLET NUMBER	BOX & OUTLET SIZE	BOX INLET SP OR HOOD	DESIGN CFM AT MINIMUM	TESTED CFM AT MINIMUM	DESIGN CFM AT MAXIMUM	TESTED CFM AT MAXIMUM
Address:	12010	FC:	2.03	MIN VP:	0.15	MAX VP:	0.27
	VAV-6-3- 09	4 "Ø					
6115	1	ACB- 05	58-SN	48	50	65	68
6116	2	ACB- 04	34-MN	52	55	70	74
			<b>Total</b>	100	105	135	142
Address:	12011	FC:	0.98	MIN VP:	0.34	MAX VP:	1.28
	VAV-6-3- 10	6 "Ø					
6001	1	ACB- 15	58-SN	41	36	95	84
	2	ACB- 15	58-SN	41	36	95	83
	3	ACB- 15	58-SN	41	37	95	86
	4	ACB- 15	58-SN	41	38	95	88
	5	ACB- 15	58-SN	41	35	95	82
	6	ACB- 15	58-SN	41	36	95	84
			<b>Total</b>	245	218	570	507
Address:	12012	FC:	2.17	MIN VP:	0.11	MAX VP:	0.26
	VAV-6-3- 11	4 "Ø					
6134	1	ACB- 04	34-MN	46	47	70	72
6135	2	ACB- 05	58-SN	42	44	65	67
			<b>Total</b>	88	90	135	139
Address:	12013	FC:	2.13	MIN VP:	0.07	MAX VP:	0.29
	VAV-6-3- 12	4 "Ø					
6016	1	ACB- 04	34-MN	34	36	70	74
6017	2	ACB- 04	34-MN	34	38	70	78
			<b>Total</b>	69	74	140	152

F.H. INDICATES TESTED CFM USING FLOW HOOD.

**Comments:**

**Project:** Lowell Justice Center

**Address:** 370 Jackson Street, Lowell, MA

**Date:** 7/6/2020

**Project No.** 17-219

**VAV BOX AIR DISTRIBUTION**

**SYSTEM:** AHU-3

ROOM OR LOCATION	BOX & OUTLET NUMBER	BOX & OUTLET SIZE	BOX INLET SP OR HOOD	DESIGN CFM AT MINIMUM	TESTED CFM AT MINIMUM	DESIGN CFM AT MAXIMUM	TESTED CFM AT MAXIMUM
Address:	12014	FC:	0.91	MIN VP:	0.31	MAX VP:	0.98
	VAV-6-3- 13	6 "Ø					
6001	1	ACB- 15	58-SN	41	31	95	73
	2	ACB- 15	58-SN	41	33	95	76
	3	ACB- 15	58-SN	41	32	95	75
	4	ACB- 15	58-SN	41	32	95	74
	5	ACB- 15	58-SN	41	33	95	77
	6	ACB- 15	58-SN	41	30	95	69
			<b>Total</b>	245	191	570	444
<b>FIFTH FLOOR</b>							
Address:	13002	FC:	2.72	MIN VP:	0.03	MAX VP:	0.47
	VAV-5-3- 01	4 "Ø					
5024	1	ACB- 08	88-SN	23	24	90	95
	2	ACB- 08	88-SN	23	23	90	93
			<b>Total</b>	45	47	180	188
Address:	13003	FC:	1.38	MIN VP:	0.07	MAX VP:	0.29
	VAV-5-3- 02	8 "Ø					
5028	1	ACB- 02	24-SN	15	16	30	32
	2	ACB- 10	82-MN	75	76	150	152
	3	ACB- 10	82-MN	75	78	150	155
5030	4	CD-2	FH	70	73	140	145
			<b>Total</b>	235	242	470	484

F.H. INDICATES TESTED CFM USING FLOW HOOD.

**Comments:**

**Project:** Lowell Justice Center

**Address:** 370 Jackson Street, Lowell, MA

**Date:** 7/6/2020

**Project No.** 17-219

**VAV BOX AIR DISTRIBUTION**

**SYSTEM:** AHU-3

ROOM OR LOCATION	BOX & OUTLET NUMBER	BOX & OUTLET SIZE	BOX INLET SP OR HOOD	DESIGN CFM AT MINIMUM	TESTED CFM AT MINIMUM	DESIGN CFM AT MAXIMUM	TESTED CFM AT MAXIMUM
Address:	13004	FC:	1.65	MIN VP:	0.08	MAX VP:	0.49
	VAV-5-3- 03	5 "∅					
5037	1	ACB- 09	88-SN	49	51	120	125
	2	ACB- 09	88-SN	49	52	120	126
			<b>Total</b>	98	103	240	251
Address:	13005	FC:	1.83	MIN VP:	0.08	MAX VP:	0.47
	VAV-5-3- 04	5 "∅					
5037	1	ACB- 09	88-SN	49	50	120	122
	2	ACB- 09	88-SN	49	51	120	125
			<b>Total</b>	98	101	240	247
Address:	13006	FC:	1.46	MIN VP:	0.49	MAX VP:	0.60
	VAV-5-3- 05	6 "∅					
5074	1	ACB- 03	30-MN	46	48	50	53
5071	2	ACB- 01	24-UN	14	15	15	16
5068	3	ACB- 01	24-UN	14	15	15	16
5070	4	ACB- 01	24-UN	14	15	15	16
5072	5	CD- 4	FH	218	223	240	245
			<b>Total</b>	305	315	335	346
Address:	13007	FC:	2.34	MIN VP:	0.08	MAX VP:	0.30
	VAV-5-3- 06	4 "∅					
5116	1	ACB- 04	34-MN	36	38	70	75
5117	2	ACB- 04	34-MN	36	38	70	74
			<b>Total</b>	71	76	140	149

F.H. INDICATES TESTED CFM USING FLOW HOOD.

**Comments:**

**Project:** Lowell Justice Center

**Address:** 370 Jackson Street, Lowell, MA

**Date:** 7/6/2020

**Project No.** 17-219

**VAV BOX AIR DISTRIBUTION**

**SYSTEM:** AHU-3

ROOM OR LOCATION	BOX & OUTLET NUMBER	BOX & OUTLET SIZE	BOX INLET SP OR HOOD	DESIGN CFM AT MINIMUM	TESTED CFM AT MINIMUM	DESIGN CFM AT MAXIMUM	TESTED CFM AT MAXIMUM
Address:	13008	FC:	1.66	MIN VP:	0.03	MAX VP:	0.40
	VAV-5-3- 07	8 "Ø					
5001	1	ACB- 15	58-SN	28	28	95	95
	2	ACB- 15	58-SN	28	28	95	96
	3	ACB- 15	58-SN	28	27	95	92
	4	ACB- 15	58-SN	28	28	95	97
	5	ACB- 15	58-SN	28	28	95	98
	6	ACB- 15	58-SN	28	28	95	96
			<b>Total</b>	165	166	570	574
Address:	13009	FC:	2.06	MIN VP:	0.13	MAX VP:	0.36
	VAV-5-3- 08	5 "Ø					
5151	1	ACB- 04	34-MN	43	45	70	74
5147	2	ACB- 04	34-MN	43	46	70	76
5148	3	ACB- 05	58-SN	40	41	65	67
			<b>Total</b>	125	132	205	217
Address:	13010	FC:	1.77	MIN VP:	0.25	MAX VP:	0.60
	VAV-5-3- 09	5 "Ø					
5016	1	ACB- 05	58-SN	42	43	65	67
5018	2	ACB- 04	34-MN	45	47	70	74
5019	3	ACB- 05	58-SN	42	42	65	66
5020	4	ACB- 04	34-MN	45	47	70	73
			<b>Total</b>	173	179	270	280

F.H. INDICATES TESTED CFM USING FLOW HOOD.

**Comments:**

**Project:** Lowell Justice Center

**Address:** 370 Jackson Street, Lowell, MA

**Date:** 7/6/2020

**Project No.** 17-219

**VAV BOX AIR DISTRIBUTION**

**SYSTEM:** AHU-3

ROOM OR LOCATION	BOX & OUTLET NUMBER	BOX & OUTLET SIZE	BOX INLET SP OR HOOD	DESIGN CFM AT MINIMUM	TESTED CFM AT MINIMUM	DESIGN CFM AT MAXIMUM	TESTED CFM AT MAXIMUM
Address:	13011	FC:	1.59	MIN VP:	0.03	MAX VP:	0.41
	VAV-5-3- 10	8 "Ø					
5001	1	ACB- 15	58-SN	28	28	95	96
	2	ACB- 15	58-SN	28	28	95	95
	3	ACB- 15	58-SN	28	28	95	98
	4	ACB- 15	58-SN	28	27	95	94
	5	ACB- 15	58-SN	28	28	95	96
	6	ACB- 15	58-SN	28	28	95	97
			<b>Total</b>	165	167	570	576
<b>FOURTH FLOOR</b>							
Address:	14002	FC:	1.95	MIN VP:	0.04	MAX VP:	0.43
	VAV-4-3- 01	5 "Ø					
4023	1	ACB- 14	200-SN	70	69	240	236
Address:	14003	FC:	1.37	MIN VP:	0.12	MAX VP:	0.37
	VAV-4-3- 02	8 "Ø					
4030	1	ACB- 10	82-MN	84	87	150	156
	2	ACB- 10	82-MN	84	87	150	155
4027	3	CD-4	FH	129	134	230	240
			<b>Total</b>	297	309	530	551

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**Comments:**

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**VAV BOX AIR DISTRIBUTION**

**SYSTEM:** AHU-3

ROOM OR LOCATION	BOX & OUTLET NUMBER	BOX & OUTLET SIZE	BOX INLET SP OR HOOD	DESIGN CFM AT MINIMUM	TESTED CFM AT MINIMUM	DESIGN CFM AT MAXIMUM	TESTED CFM AT MAXIMUM
Address:	14004	FC:	2.03	MIN VP:	0.07	MAX VP:	0.15
	VAV-4-3- 03	4 "Ø					
4048	1	ACB- 04	34-MN	48	51	70	74
4047	2	ACB- 01	24-UN	10	11	15	16
4046	3	ACB- 01	24-UN	10	11	15	16
			<b>Total</b>	69	73	100	106
Address:	14005	FC:	1.70	MIN VP:	0.07	MAX VP:	0.57
	VAV-4-3- 04	5 "Ø					
4041	1	ACB- 11	116-SN	47	49	130	135
	2	ACB- 11	116-SN	47	49	130	136
			<b>Total</b>	94	98	260	271
Address:	14006	FC:	1.50	MIN VP:	0.07	MAX VP:	0.55
	VAV-4-3- 05	5 "Ø					
4041	1	ACB- 11	116-SN	47	48	130	134
	2	ACB- 11	116-SN	47	48	130	132
			<b>Total</b>	94	96	260	266
Address:	14007	FC:	4.39	MIN VP:	0.39	MAX VP:	0.47
	VAV-4-3- 06	5 "Ø					
4071	1	ACB- 07	56-MN	101	109	110	118
4072	2	CD- 2	FH	60	61	65	66
4073	3	CD- 2	FH	55	57	60	62
			<b>Total</b>	216	226	235	246

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**VAV BOX AIR DISTRIBUTION**

**SYSTEM:** AHU-3

ROOM OR LOCATION	BOX & OUTLET NUMBER	BOX & OUTLET SIZE	BOX INLET SP OR HOOD	DESIGN CFM AT MINIMUM	TESTED CFM AT MINIMUM	DESIGN CFM AT MAXIMUM	TESTED CFM AT MAXIMUM
Address:	14008	FC:	2.18	MIN VP:	0.04	MAX VP:	0.09
	VAV-4-3- 07	4 "Ø					
4112	1	ACB- 01	24-UN	10	10	15	16
4113	2	ACB- 01	24-UN	10	10	15	16
4114	3	ACB- 01	24-UN	10	10	15	16
4115	4	ACB- 02	24-SN	20	21	30	32
			<b>Total</b>	49	52	75	80
Address:	14009	FC:	1.97	MIN VP:	0.03	MAX VP:	0.08
	VAV-4-3- 08	4 "Ø					
4105	1	ACB- 01	24-UN	10	10	15	16
4106	2	ACB- 01	24-UN	10	10	15	16
4107	3	ACB- 01	24-UN	10	10	15	15
4109	4	ACB- 01	24-UN	10	10	15	16
4110	5	ACB- 01	24-UN	10	10	15	16
			<b>Total</b>	49	51	75	79
Address:	14010	FC:	1.84	MIN VP:	0.19	MAX VP:	0.34
	VAV-4-3- 09	4 "Ø					
4127	1	ACB- 06	58-SN	59	64	80	86
4128	2	ACB- 04	34-MN	52	55	70	74
			<b>Total</b>	111	118	150	160

F.H. INDICATES TESTED CFM USING FLOW HOOD.

**Comments:**

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**VAV BOX AIR DISTRIBUTION**

**SYSTEM:** AHU-3

ROOM OR LOCATION	BOX & OUTLET NUMBER	BOX & OUTLET SIZE	BOX INLET SP OR HOOD	DESIGN CFM AT MINIMUM	TESTED CFM AT MINIMUM	DESIGN CFM AT MAXIMUM	TESTED CFM AT MAXIMUM
Address:	14011	FC:	1.83	MIN VP:	0.03	MAX VP:	0.41
	VAV-4-3- 10	8 "∅					
4001	1	ACB- 15	58-SN	28	28	95	96
	2	ACB- 15	58-SN	28	28	95	97
	3	ACB- 15	58-SN	28	28	95	95
	4	ACB- 15	58-SN	28	27	95	94
	5	ACB- 15	58-SN	28	28	95	98
	6	ACB- 15	58-SN	28	28	95	97
			<b>Total</b>	165	167	570	577
Address:	14012	FC:	2.08	MIN VP:	0.11	MAX VP:	0.24
	VAV-4-3- 11	4 "∅					
4150	1	ACB- 05	58-SN	44	45	65	66
4151	2	ACB- 05	58-SN	44	46	65	68
			<b>Total</b>	88	91	130	134
Address:	14013	FC:	2.25	MIN VP:	0.11	MAX VP:	0.26
	VAV-4-3- 12	4 "∅					
4017	1	ACB- 05	58-SN	42	44	65	67
4018	2	ACB- 04	34-MN	46	47	70	72
			<b>Total</b>	88	90	135	139

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### VAV BOX AIR DISTRIBUTION

**SYSTEM:** AHU-3

ROOM OR LOCATION	BOX & OUTLET NUMBER	BOX & OUTLET SIZE	BOX INLET SP OR HOOD	DESIGN CFM AT MINIMUM	TESTED CFM AT MINIMUM	DESIGN CFM AT MAXIMUM	TESTED CFM AT MAXIMUM
Address:	14014	FC:	1.83	MIN VP:	0.03	MAX VP:	0.41
	VAV-4-3- 13	8 "∅					
4001	1	ACB- 15	58-SN	28	28	95	96
	2	ACB- 15	58-SN	28	28	95	98
	3	ACB- 15	58-SN	28	28	95	95
	4	ACB- 15	58-SN	28	27	95	94
	5	ACB- 15	58-SN	28	28	95	97
	6	ACB- 15	58-SN	28	28	95	97
			<b>Total</b>	165	167	570	577
<b>THIRD FLOOR</b>							
Address:	15002	FC:	2.07	MIN VP:	0.03	MAX VP:	0.53
	VAV-3-3- 01	6 "∅					
3021	1	ACB- 10	82-MN	38	41	150	162
	2	ACB- 10	82-MN	38	41	150	164
			<b>Total</b>	75	82	300	326
Address:	15003	FC:	2.11	MIN VP:	0.04	MAX VP:	0.51
	VAV-3-3- 02	5 "∅					
3027	1	ACB- 09	88-SN	35	38	120	131
	2	ACB- 09	88-SN	35	37	120	126
			<b>Total</b>	70	75	240	257

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**VAV BOX AIR DISTRIBUTION**

**SYSTEM:** AHU-3

ROOM OR LOCATION	BOX & OUTLET NUMBER	BOX & OUTLET SIZE	BOX INLET SP OR HOOD	DESIGN CFM AT MINIMUM	TESTED CFM AT MINIMUM	DESIGN CFM AT MAXIMUM	TESTED CFM AT MAXIMUM
Address:	15004	FC:	0.93	MIN VP:	0.05	MAX VP:	0.78
	VAV-3-3- 03	6 "Ø					
3028	1	ACB- 13	148-SN	50	49	200	196
	2	ACB- 13	148-SN	50	50	200	199
			<b>Total</b>	100	99	400	395
Address:	15005	FC:	1.77	MIN VP:	0.10	MAX VP:	0.23
	VAV-3-3- 04	4 "Ø					
3017	1	ACB- 05	58-SN	42	41	65	63
3018	2	ACB- 04	34-MN	46	44	70	67
			<b>Total</b>	88	85	135	130
Address:	15006	FC:	1.34	MIN VP:	0.03	MAX VP:	0.41
	VAV-3-3- 05	8 "Ø					
3001	1	ACB- 15	58-SN	28	28	95	98
	2	ACB- 15	58-SN	28	27	95	94
	3	ACB- 15	58-SN	28	28	95	97
	4	ACB- 15	58-SN	28	28	95	95
	5	ACB- 15	58-SN	28	28	95	97
	6	ACB- 15	58-SN	28	29	95	99
			<b>Total</b>	165	168	570	580
Address:	15007	FC:	1.60	MIN VP:	0.13	MAX VP:	0.21
	VAV-3-3- 06	4 "Ø					
3037	1	ACB- 05	58-SN	50	49	65	63
3039	2	ACB- 05	58-SN	50	48	65	62
			<b>Total</b>	100	96	130	125

F.H. INDICATES TESTED CFM USING FLOW HOOD.

**Comments:**

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**VAV BOX AIR DISTRIBUTION**

**SYSTEM:** AHU-3

ROOM OR LOCATION	BOX & OUTLET NUMBER	BOX & OUTLET SIZE	BOX INLET SP OR HOOD	DESIGN CFM AT MINIMUM	TESTED CFM AT MINIMUM	DESIGN CFM AT MAXIMUM	TESTED CFM AT MAXIMUM
Address:	15008	FC:	1.90	MIN VP:	0.11	MAX VP:	0.17
	VAV-3-3- 07	4 "Ø					
3082	1	ACB- 05	58-SN	51	50	65	64
3081	2	ACB- 03	30-MN	39	38	50	49
			<b>Total</b>	90	88	115	113
Address:	15009	FC:	1.33	MIN VP:	0.03	MAX VP:	0.41
	VAV-3-3- 08	8 "Ø					
3001	1	ACB- 15	58-SN	28	29	95	99
	2	ACB- 15	58-SN	28	28	95	95
	3	ACB- 15	58-SN	28	28	95	95
	4	ACB- 15	58-SN	28	28	95	98
	5	ACB- 15	58-SN	28	27	95	93
	6	ACB- 15	58-SN	28	28	95	95
			<b>Total</b>	165	167	570	575
Address:	15010	FC:	1.55	MIN VP:	0.10	MAX VP:	0.26
	VAV-3-3- 09	4 "Ø					
3118	1	ACB- 04	34-MN	44	45	70	72
3119	2	ACB- 04	34-MN	44	44	70	70
			<b>Total</b>	88	89	140	142

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**VAV BOX AIR DISTRIBUTION**

**SYSTEM:** AHU-3

ROOM OR LOCATION	BOX & OUTLET NUMBER	BOX & OUTLET SIZE	BOX INLET SP OR HOOD	DESIGN CFM AT MINIMUM	TESTED CFM AT MINIMUM	DESIGN CFM AT MAXIMUM	TESTED CFM AT MAXIMUM
<b>SECOND FLOOR</b>							
Address:	4003	FC:	2.38	MIN VP:	0.04	MAX VP:	0.45
	VAV-2-3- 01	4 "∅					
2018	1	ACB- 08	88-SN	26	27	90	93
	2	ACB- 08	88-SN	26	26	90	90
			<b>Total</b>	52	53	180	183
Address:	4004	FC:	1.88	MIN VP:	0.09	MAX VP:	0.44
	VAV-2-3- 02	7 "∅					
2023	1	ACB- 10	82-MN	68	63	150	140
	2	ACB- 10	82-MN	68	64	150	143
2024	3	CD- 2	FH	63	69	140	153
			<b>Total</b>	198	196	440	436
Address:	4005	FC:	1.45	MIN VP:	0.10	MAX VP:	0.53
	VAV-2-3- 03	6 "∅					
2070	1	ACB- 12	116-SN	70	73	160	166
	2	ACB- 12	116-SN	70	70	160	160
			<b>Total</b>	141	143	320	326

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**VAV BOX AIR DISTRIBUTION**

**SYSTEM:** AHU-3

ROOM OR LOCATION	BOX & OUTLET NUMBER	BOX & OUTLET SIZE	BOX INLET SP OR HOOD	DESIGN CFM AT MINIMUM	TESTED CFM AT MINIMUM	DESIGN CFM AT MAXIMUM	TESTED CFM AT MAXIMUM
Address:	4006	FC: 2.62		MIN VP:	0.14	MAX VP:	0.67
	VAV-2-3- 04	6 "Ø					
2071	1	ACB- 02	24-SN	14	14	30	32
2070	2	ACB- 06	58-SN	36	38	80	85
	3	ACB- 06	58-SN	36	37	80	83
	4	ACB- 06	58-SN	36	35	80	78
	5	ACB- 06	58-SN	36	36	80	81
2083	6	ACB- 01	24-UN	7	7	15	15
			<b>Total</b>	164	168	365	374
Address:	4007	FC: 2.52		MIN VP:	0.28	MAX VP:	0.48
	VAV-2-3- 05	4 "Ø					
2072	1	ACB- 04	34-MN	53	55	70	73
2124	2	ACB- 04	34-MN	53	52	70	68
2159	3	ACB- 03	30-MN	38	36	50	48
			<b>Total</b>	144	144	190	189
Address:	4008	FC: 1.23		MIN VP:	0.18	MAX VP:	0.51
	VAV-2-3- 06	6 "Ø					
2001	1	ACB- 06	58-SN	47	49	80	83
	2	ACB- 06	58-SN	47	50	80	85
	3	ACB- 06	58-SN	47	47	80	80
	4	ACB- 06	58-SN	47	49	80	83
			<b>Total</b>	189	195	320	331

F.H. INDICATES TESTED CFM USING FLOW HOOD.

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**VAV BOX AIR DISTRIBUTION**

**SYSTEM:** AHU-3

ROOM OR LOCATION	BOX & OUTLET NUMBER	BOX & OUTLET SIZE	BOX INLET SP OR HOOD	DESIGN CFM AT MINIMUM	TESTED CFM AT MINIMUM	DESIGN CFM AT MAXIMUM	TESTED CFM AT MAXIMUM
Address:	4009	FC:	2.00	MIN VP:	0.11	MAX VP:	0.24
	VAV-2-3- 07	4 "∅					
2177	1	ACB- 04	34-MN	46	47	70	72
2178	2	ACB- 05	58-SN	42	42	65	65
			<b>Total</b>	88	89	135	137
Address:	4010	FC:	1.53	MIN VP:	0.11	MAX VP:	0.24
	VAV-2-3- 08	4 "∅					
2014	1	ACB- 04	34-MN	46	50	70	75
2016	2	ACB- 05	58-SN	43	45	65	68
			<b>Total</b>	89	94	135	143
Address:	4011	FC:	1.55	MIN VP:	0.17	MAX VP:	0.51
	VAV-2-3- 09	6 "∅					
2001	1	ACB- 06	58-SN	47	49	80	83
	2	ACB- 06	58-SN	47	50	80	85
	3	ACB- 06	58-SN	47	47	80	80
	4	ACB- 06	58-SN	47	48	80	82
			<b>Total</b>	189	195	320	330

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### VAV BOX AIR DISTRIBUTION

**SYSTEM:** AHU-3

ROOM OR LOCATION	BOX & OUTLET NUMBER	BOX & OUTLET SIZE	BOX INLET SP OR HOOD	DESIGN CFM AT MINIMUM	TESTED CFM AT MINIMUM	DESIGN CFM AT MAXIMUM	TESTED CFM AT MAXIMUM
<b>FIRST FLOOR</b>							
Address:	2002	FC:	1.13	MIN VP:	0.09	MAX VP:	0.53
	VAV-1-3- 01	6 "Ø					
1033	1	ACB- 12	58-SN	64	65	160	162
	2	ACB- 12	58-SN	64	66	160	165
			<b>Total</b>	128	131	320	327
Address:	2003	FC:	1.37	MIN VP:	0.03	MAX VP:	0.49
	VAV-1-3- 02	4 "Ø					
1038	1	ACB- 12	58-SN	40	43	160	170
CORRIDOR	2	CD- 1	FH	5	6	20	22
			<b>Total</b>	45	48	180	192
Address:	2004	FC:	1.37	MIN VP:	0.34	MAX VP:	0.67
	VAV-1-3- 03	6 "Ø					
1031	1	ACB- 09	88-SN	85	87	120	123
	2	ACB- 09	88-SN	85	89	120	125
	3	ACB- 09	88-SN	85	84	120	119
			<b>Total</b>	256	261	360	367
Address:	2005	FC:	1.38	MIN VP:	0.17	MAX VP:	0.38
	VAV-1-3- 04	5 "Ø					
1031	1	ACB- 04	34-MN	47	48	70	72
	2	ACB- 04	34-MN	47	49	70	73
	3	ACB- 04	34-MN	47	51	70	76
			<b>Total</b>	141	148	210	221

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**VAV BOX AIR DISTRIBUTION**

**SYSTEM:** AHU-3

ROOM OR LOCATION	BOX & OUTLET NUMBER	BOX & OUTLET SIZE	BOX INLET SP OR HOOD	DESIGN CFM AT MINIMUM	TESTED CFM AT MINIMUM	DESIGN CFM AT MAXIMUM	TESTED CFM AT MAXIMUM
Address:	2006	FC:	1.14	MIN VP:	0.08	MAX VP:	0.20
	VAV-1-3- 05	4 "Ø					
1025	1	ACB- 01	24-UN	9	10	15	16
1024	2	ACB- 03	30-MN	31	33	50	54
1023	3	ACB- 03	30-MN	31	33	50	53
			<b>Total</b>	71	76	115	123
Address:	2007	FC:	1.20	MIN VP:	0.18	MAX VP:	0.20
	VAV-1-3- 06	4 "Ø					
1044	1	ACB- 09	88-SN	115	117	120	122
Address:	2008	FC:	1.03	VP:	0.03	VP:	0.03
	VAV-1-3- 07	4 "Ø					
1020	1	ACB- 01	24-UN	15	16	15	16
1019	2	ACB- 02	24-SN	30	32	30	32
			<b>Total</b>	45	48	45	48
Address:	2009	FC:	0.81	MIN VP:	0.05	MAX VP:	0.55
	VAV-1-3- 08	6 "Ø					
1037	1	ACB- 06	58-SN	25	26	80	85
	2	ACB- 06	58-SN	25	26	80	84
	3	ACB- 06	58-SN	25	25	80	82
	4	ACB- 06	58-SN	25	25	80	81
			<b>Total</b>	99	103	320	332

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### VAV BOX AIR DISTRIBUTION

**SYSTEM:** AHU-3

ROOM OR LOCATION	BOX & OUTLET NUMBER	BOX & OUTLET SIZE	BOX INLET SP OR HOOD	DESIGN CFM AT MINIMUM	TESTED CFM AT MINIMUM	DESIGN CFM AT MAXIMUM	TESTED CFM AT MAXIMUM
Address:	2010	FC:	1.09	MIN VP:	0.43	MAX VP:	0.43
	VAV-1-3- 09	6 "Ø					
1060	1	CD- 4	FH	214	209	235	230
1058	2	ACB- 02	24-SN	27	29	30	32
1059	3	ACB- 02	24-SN	27	30	30	33
			<b>Total</b>	268	268	295	295
Address:	2011	FC:	1.29	MIN VP:	0.34	MAX VP:	0.48
	VAV-1-3- 10	5 "Ø					
1050	1	ACB- 06	58-SN	67	68	80	81
	2	ACB- 06	58-SN	67	71	80	84
	3	ACB- 06	58-SN	67	71	80	85
			<b>Total</b>	202	210	240	250
Address:	2012	FC:	1.37	MIN VP:	0.13	MAX VP:	0.18
	VAV-1-3- 11	4 "Ø					
1053	1	ACB- 06	58-SN	68	72	80	85
1055	2	ACB- 01	24-UN	13	14	15	16
1057	3	ACB- 01	24-UN	13	14	15	16
			<b>Total</b>	94	99	110	117

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**VAV BOX AIR DISTRIBUTION**

**SYSTEM:** AHU-3

ROOM OR LOCATION	BOX & OUTLET NUMBER	BOX & OUTLET SIZE	BOX INLET SP OR HOOD	DESIGN CFM AT MINIMUM	TESTED CFM AT MINIMUM	DESIGN CFM AT MAXIMUM	TESTED CFM AT MAXIMUM
Address:	2013	FC:	1.44	MIN VP:	0.57	MAX VP:	1.10
	VAV-1-3- 12	6 "Ø					
1077	1	ACB- 07	56-MN	79	81	110	112
	2	ACB- 07	56-MN	79	82	110	114
	3	ACB- 07	56-MN	79	79	110	110
	4	ACB- 07	56-MN	79	85	110	118
1084	5	ACB- 01	24-UN	11	12	15	16
			<b>Total</b>	328	338	455	470
Address:	2014	FC:	1.31	MIN VP:	0.21	MAX VP:	0.40
1077	VAV-1-3- 13	5 "Ø					
	1	ACB- 07	56-MN	79	83	110	115
	2	ACB- 07	56-MN	79	81	110	113
			<b>Total</b>	158	164	220	228

F.H. INDICATES TESTED CFM USING FLOW HOOD.

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**Address:** 370 Jackson Street, Lowell, MA

**Date:** 7/6/2020

**Project No.** 17-219

**AIR DISTRIBUTION**

**SYSTEM:** AHU-3

**SUPPLY**

**RETURN**

**EXHAUST**

ROOM OR LOCATION	UNIT NUMBER	UNIT SIZE	AREA xK FACTOR			DESIGN CFM	TEST CFM	
7020	1	RG-3	FH			120	113	
7026	2	RG-2	FH			100	95	
T7023	3	EG-1	FH	N/A	N/A	70	33 *1	
T7024	4	EG-1	FH	N/A	N/A	70	26 *1	
7044	5	RG-2	FH	N/A	N/A	70	66	
7041	6	RG-2	FH	N/A	N/A	15	14	
7039	7	RG-2	FH	N/A	N/A	15	14	
7038	8	RG-2	FH	N/A	N/A	30	28	
CORR. 7058	9	RG-4	FH	N/A	N/A	285	271	
7009	10	RG-5	FH	N/A	N/A	295	280	
7018	11	RG-2	FH	N/A	N/A	70	66	
7016	12	RG-2	FH	N/A	N/A	85	79	
7058	13	RG-4	FH			285	260	
7068	14	RG-2	FH			70	64	
7001	15	RG-5	FH			295	277	
7147	16	RG-2	FH	N/A	N/A	70	65	
7148	17	RG-2	FH	N/A	N/A	65	60	
T6021	18	EG-1	FH	N/A	N/A	70	26 *1	
T6022	19	EG-1	FH	N/A	N/A	70	81 *1	
T6026	20	EG-1	FH	N/A	N/A	70	9 *1	
6028	21	RG-4	FH			350	333	
6024	22	RG-2	FH			15	14	
6019	23	RG-3	FH			180	169	
6056	24	RG-2	FH			50	47	
6009	25	RG-5	FH	N/A	N/A	295	269	
6017	26	RG-2	FH	N/A	N/A	70	66	
6016	27	RG-2	FH	N/A	N/A	70	63	
6044	28	RG-2	FH	N/A	N/A	15	14	
6041	29	RG-2	FH	N/A	N/A	15	14	
6039	30	RG-2	FH	N/A	N/A	15	14	
<b>F.H. INDICATES TESTED CFM USING FLOW HOOD</b>						<b>TOTAL</b>	3,295	2,930

Min 50cfm is required by code for toilets w th low expected usage.

Min 50cfm is required by code for toilets with low expected usage.

Min 50cfm is required by code for toilets with low expected usage.

ok

**Comments:** \*1 CAR DAMPER

The readings are the result of the directions found in RFI # 1150. Typical for all AHU-3 RA /EA air volumes.

**Project:** Lowell Justice Center

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**AIR DISTRIBUTION**

**SYSTEM:** AHU-3

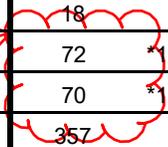
SUPPLY

RETURN

EXHAUST

ROOM OR LOCATION	UNIT NUMBER	UNIT SIZE	AREA xK FACTOR	DESIGN FT / MIN	TEST FT / MIN	DESIGN CFM	TEST CFM
6038	31	RG-2	FH	N/A	N/A	15	14
6037	32	RG-2	FH	N/A	N/A	30	28
CORR. 6035	33	RG-3	FH	N/A	N/A	190	176
6055	34	RG-3	FH	N/A	N/A	190	179
6001	35	RG-5	FH	N/A	N/A	295	270
6115	36	RG-2	FH	N/A	N/A	65	61
6116	37	RG-2	FH	N/A	N/A	70	66
6134	38	RG-2	FH	N/A	N/A	70	63
6135	39	RG-2	FH	N/A	N/A	65	60
6058	40	RG-2	FH	N/A	N/A	120	112
6059	41	RG-2	FH	N/A	N/A	30	28
6060	42	RG-2	FH	N/A	N/A	30	28
6064	43	RG-2	FH	N/A	N/A	30	27
6107	44	RG-2	FH	N/A	N/A	65	60
6108	45	RG-2	FH	N/A	N/A	65	62
6109	46	RG-2	FH	N/A	N/A	65	63
6110	47	RG-2	FH	N/A	N/A	65	61
6065	48	RG-2	FH	N/A	N/A	60	12 *1
6079	49	RG-2	FH	N/A	N/A	30	28
6078	50	RG-2	FH	N/A	N/A	15	14
6077	51	RG-2	FH	N/A	N/A	15	14
6076	52	RG-2	FH	N/A	N/A	15	14
6075	53	RG-2	FH	N/A	N/A	15	14
6074	54	RG-2	FH	N/A	N/A	20	18
T5025	55	EG-1	FH	N/A	N/A	70	72 *
T5026	56	EG-1	FH	N/A	N/A	70	70 *
5028	57	RG-4	FH	N/A	N/A	380	357
5022	58	RG-4	FH	N/A	N/A	240	222
5009	59	RG-5	FH	N/A	N/A	295	270
5018	60	RG-2	FH	N/A	N/A	70	65

Ok however it these CAR meet design with HP valve, those on floor above should too. please investigate cause of low flow on floor 7.



F.H. INDICATES TESTED CFM USING FLOW HOOD

**TOTAL**

2,755

2,528

**Comments:** \*1 CAR DAMPER

Project: Lowell Justice Center

Address: 370 Jackson Street, Lowell, MA

Date: 7/6/2020

Project No. 17-219

### AIR DISTRIBUTION

SYSTEM: AHU-3

SUPPLY

RETURN

EXHAUST

ROOM OR LOCATION	UNIT NUMBER	UNIT SIZE	AREA xK FACTOR	DESIGN FT / MIN	TEST FT / MIN	DESIGN CFM	TEST CFM	
5016	61	RG-2	FH	N / A	N / A	65	60	
5020	62	RG-2	FH	N / A	N / A	65	61	
5019	63	RG-2	FH	N / A	N / A	70	65	
5037	64	RG-3	FH	N / A	N / A	140	129	
	65	RG-3	FH	N / A	N / A	140	130	
5067	66	RG-2	FH	N / A	N / A	70	64	
5072	67	RG-3	FH	N / A	N / A	240	225	
5071	68	RG-2	FH	N / A	N / A	15	14	
5083	69	RG-2	FH	N / A	N / A	50	46	
5085	70	RG-2	FH	N / A	N / A	50	45	
5090	71	RG-2	FH	N / A	N / A	50	47	
5068	72	RG-2	FH	N / A	N / A	15	14	
5070	73	RG-2	FH	N / A	N / A	15	14	
5001	74	RG-5	FH	N / A	N / A	295	277	
5117	75	RG-2	FH			70	64	
5151	76	RG-2	FH			70	65	
5147	77	RG-2	FH				63	
5150	78	RG-2	FH			70 65	60	
T4025	79	EG-1	FH	N / A	N / A	70	25 *1	
T4026	80	EG-1	FH	N / A	N / A	70	26 *1	
U4028	81	EG-1	FH	N / A	N / A	50	45	
4030	82	RG-4	FH	N / A	N / A	350	330	
4020	83	RG-2	FH	N / A	N / A	20	50 *1	
4021	84	EG-1	FH	N / A	N / A	50	34 *1	
4022	85	RG-2	FH	N / A	N / A	20	18	
4023	86				N / A	240	227	
4048	87				N / A	70	66	
4047	88	RG-2	FH	N / A	N / A	15	14	
4046	89	RG-2	FH	N / A	N / A	15	14	
4044	90	EG-1	FH	N / A	N / A	50	25 *1	
F.H. INDICATES TESTED CFM USING FLOW HOOD						<b>TOTAL</b>	2,575	2,317

Min 50cfm is required by code for toilets with low expected usage.

These value are reversed, were they installed correctly?

Not within the design tolerance, adjust valve or replace with correct pressure range

Comments: \*1 CAR DAMPER

**Project:** Lowell Justice Center

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**Date:** 7/6/2020

**Project No.** 17-219

**AIR DISTRIBUTION**

**SYSTEM:** AHU-3

SUPPLY

RETURN

EXHAUST

ROOM OR LOCATION	UNIT NUMBER	UNIT SIZE	AREA xK FACTOR	DESIGN FT / MIN	TEST FT / MIN	DESIGN CFM	TEST CFM	
4041	91	RG-3	FH	N/A	N/A	160	151	
4009	92	RG-5	FH	N/A	N/A	295	270	
4018	93	RG-2	FH	N/A	N/A	70	66	
4017	94	RG-2	FH	N/A	N/A	65	60	
4049	95	RG-3	FH	N/A	N/A	160	147	
4041	96	RG-3	FH	N/A	N/A	160	150	
4071	97	RG-3	FH	N/A	N/A	100	92	
4112	98	RG-2	FH	N/A	N/A	15	14	
4113	99	RG-2	FH	N/A	N/A	15	14	
4114	100	RG-2	FH	N/A	N/A	15	14	
4115	101	RG-2	FH	N/A	N/A	30	27	
4105	102	RG-2	FH	N/A	N/A	15	14	
4110	103	RG-2	FH	N/A	N/A	15	14	
4109	104	RG-2	FH	N/A	N/A	15	14	
4106	105	RG-2	FH	N/A	N/A	15	14	
4107	106	RG-2	FH	N/A	N/A	15	14	
4108	107	RG-2	FH	N/A	N/A	65	59	
4001	108	RG-5	FH	N/A	N/A	295	277	
4127	109	RG-2	FH	N/A	N/A	80	76	
4128	110	RG-2	FH	N/A	N/A	70	63	
4150	111	RG-2	FH	N/A	N/A	65	60	
4151	112	RG-2	FH	N/A	N/A	65	62	
T3023	113	EG-1	FH	N/A	N/A	70	31 *1	
T3024	114	EG-1	FH	N/A	N/A	70	32 *1	
3022	115	RG-5	FH	N/A	N/A	400	366	
3027	116	RG-3	FH	N/A	N/A	240	225	
3021	117	RG-3	FH	N/A	N/A	160	149	
3009	118	RG-4	FH	N/A	N/A	295	270	
3017	119	RG-2	FH	N/A	N/A	65	61	
3018	120	RG-2	FH	N/A	N/A	70	63	
<b>F.H. INDICATES TESTED CFM USING FLOW HOOD</b>						<b>TOTAL</b>	3,170	2,869

Min 50cfm is required by code for toilets with low expected usage.

**Comments:** \*1 CAR DAMPER

**Project:** Lowell Justice Center

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**Date:** 7/6/2020

**Project No.** 17-219

**AIR DISTRIBUTION**

**SYSTEM:** AHU-3

**SUPPLY**

**RETURN**

**EXHAUST**

ROOM OR LOCATION	UNIT NUMBER	UNIT SIZE	AREA xK FACTOR	DESIGN FT / MIN	TEST FT / MIN	DESIGN CFM	TEST CFM	
3037	121	RG-2	FH	N/A	N/A	65	60	
3039	122	RG-2	FH	N/A	N/A	65	62	
3001	123	RG-4	FH	N/A	N/A	295	279	
3082	124	RG-2	FH			65	59	
3081	125	RG-2	FH			50	47	
3118	126	RG-2	FH			70	65	
3119	127	RG-2	FH			70	64	
T2020	128	EG-1	FH	N/A	N/A	70	27 *1	
T2021	129	EG-1	FH	N/A	N/A	70	37 *1	
2018	130	RG-3	FH	N/A	N/A	180	170	
2023	131	RG-4	FH	N/A	N/A	350	326	
2014	132	RG-2	FH	N/A	N/A	70	66	
2016	133	RG-2	FH	N/A	N/A	70	63	
2072	134	RG-2	FH	N/A	N/A	50	47	
2071	135	RG-2	FH	N/A	N/A	30	30	
2070	136	RG-4	FH	N/A	N/A	235	212	
	137	RG-4	FH	N/A	N/A	235	223	
2001	138	RG-2	FH	N/A	N/A	30	29	
2159	139	RG-2	FH	N/A	N/A	50	46	
2177	140	RG-2	FH	N/A	N/A	70	66	
2178	141	RG-2	FH	N/A	N/A	65	61	
1038	142	RG-3	FH	N/A	N/A	160	145	
1033	143	RG-4	FH	N/A	N/A	320	288	
1025	144	RG-2	FH	N/A	N/A	15	14	
1024	145	RG-2	FH	N/A	N/A	50	46	
1023	146	RG-2	FH	N/A	N/A	50	45	
1044	147	RG-2	FH	N/A	N/A	50	45	
1022	148	RG-4	FH	N/A	N/A	240	228	
1020	149	RG-2	FH	N/A	N/A	15	14	
1018	150	RG-4	FH	N/A	N/A	30	28	
<b>F.H. INDICATES TESTED CFM USING FLOW HOOD</b>						<b>TOTAL</b>	3,185	2,892

Min 50cfm is required by code for toilets with low expected usage.

64  
27  
37  
170

**Comments:** \*1 CAR DAMPER

**Project:** Lowell Justice Center

**Address:** 370 Jackson Street, Lowell, MA

**Date:** 7/6/2020

**Project No.** 17-219

**AIR DISTRIBUTION**

**SYSTEM:** AHU-3

**SUPPLY**

**RETURN**

**EXHAUST**

ROOM OR LOCATION	UNIT NUMBER	UNIT SIZE	AREA xK FACTOR	DESIGN FT / MIN	TEST FT / MIN	DESIGN CFM	TEST CFM	
1016	151	RG-4	FH	N / A	N / A	240	227	
1037	152	RG-2	FH	N / A	N / A	160	145	
	153	RG-2	FH	N / A	N / A	160	153	
1050	154	RG-2	FH	N / A	N / A	100	94	
1053	155	RG-2	FH	N / A	N / A	80	73	
1055	156	RG-2	FH	N / A	N / A	15	14	
1057	157	RG-2	FH			15	14	
1058	158	RG-2	FH			30	27	
1059	159	RG-2	FH			30	27	
1060	160	RG-3	FH			235	224	
1037	161	RG-3	FH	N / A	N / A	100	92	
T7124	162	EG-1	FH	N / A	N / A	70	45 *1	
T7098	163	EG-1	FH	N / A	N / A	140	41 *1	
	164	EG-1	FH	N / A	N / A	140	46 *1	
T7099	165	EG-1	FH	N / A	N / A	140	47 *1	
	166	EG-1	FH	N / A	N / A	140	37 *1	
T6098	167	EG-1	FH	N / A	N / A	140	48 *1	
	168	EG-1	FH	N / A	N / A	140	44 *1	
T6099	169	EG-1	FH	N / A	N / A	140	45 *1	
	170	EG-1	FH			140	44 *1	
T5115	171	EG-1	FH			70	26 *1	
T5098	172	EG-1	FH			140	130 *1	
	173	EG-1	FH	N / A	N / A	140	105 *1	
T5099	174	EG-1	FH	N / A	N / A	140	47 *1	
	175	EG-1	FH	N / A	N / A	140	48 *1	
T4111	176	EG-1	FH	N / A	N / A	70	40 *1	
T4098	177	EG-1	FH	N / A	N / A	140	35 *1	
	178	EG-1	FH	N / A	N / A	140	47 *1	
T4099	179	EG-1	FH	N / A	N / A	140	41 *1	
	180	EG-1	FH	N / A	N / A	140	46 *1	
<b>F.H. INDICATES TESTED CFM USING FLOW HOOD</b>						<b>TOTAL</b>	3,615	2,052

**Comments:** \*1 CAR DAMPER

Min 50cfm per toilet stall is required by code for toilets with low expected usage.

These two meet code min rate but not design rate,

Min 50cfm per toilet stall is required by code for toilets with low expected usage.

**Project:** Lowell Justice Center  
**Address:** 370 Jackson Street, Lowell, MA  
**Date:** 7/6/2020

**Project No.** 17-219

**AIR DISTRIBUTION**

**SYSTEM:** AHU-3

**SUPPLY**

**RETURN**

**EXHAUST**

ROOM OR LOCATION	UNIT NUMBER	UNIT SIZE	AREA xK FACTOR	DESIGN FT / MIN	TEST FT / MIN	DESIGN CFM	TEST CFM
T3098	181	EG-1	FH	N / A	N / A	140	48 *1
	182	EG-1	FH	N / A	N / A	140	49 *1
T3099	183	EG-1	FH	N / A	N / A	140	48 *1
	184	EG-1	FH	N / A	N / A	140	44 *1
T2094	185	EG-1	FH	N / A	N / A	70	38 *1
T2098	186	EG-1	FH	N / A	N / A	140	42 *1
	187	EG-1	FH	N / A	N / A	140	35 *1
T2099	188	EG-1	FH	N / A	N / A	140	57 *1
	189	EG-1	FH	N / A	N / A	140	49 *1
1070	190	EG-1	FH	N / A	N / A	70	43 *1
1071	191	EG-1	FH	N / A	N / A	70	43 *1
T1080	192	EG-1	FH	N / A	N / A	140	80 *1
	193	EG-1	FH	N / A	N / A	140	67 *1
T1081	194	EG-1	FH	N / A	N / A	140	69 *1
	195	EG-1	FH	N / A	N / A	140	72 *1
T1098	196	EG-1	FH	N / A	N / A	140	65 *1
	197	EG-1	FH	N / A	N / A	140	68 *1
T1099	198	EG-1	FH	N / A	N / A	140	62 *1
	199	EG-1	FH	N / A	N / A	140	58 *1

Min 50cfm per toilet stall is required by code for toilets with low expected usage. replace 1# CAR with standard pressure model.

Does not meet design

F.H. INDICATES TESTED CFM USING FLOW HOOD

**TOTAL**

2,450

1,037

**Comments:** \*1 CAR DAMPER

**Project:** Lowell Justice Center

**Address:** 370 Jackson Street, Lowell, MA

**Date:** 7/6/2020

**Project No.** 17-219

### VAV BOX AIR DISTRIBUTION

**SYSTEM:** AHU-4

ROOM OR LOCATION	BOX & OUTLET NUMBER	BOX & OUTLET SIZE	BOX INLET SP OR HOOD	DESIGN CFM AT MINIMUM	TESTED CFM AT MINIMUM	DESIGN CFM AT MAXIMUM	TESTED CFM AT MAXIMUM
Address:	21002	FC:	1.60	MIN VP:	0.04	MAX VP:	0.47
	VAV-7-4- 01	5 "Ø					
7129	1	ACB- 09	88-SN	35	35	120	122
	2	ACB- 09	88-SN	35	36	120	125
			Total	70	72	240	247
Address:	21003	FC:	1.12	MIN VP:	0.06	MAX VP:	0.56
	VAV-7-4- 02	6 "Ø					
7136	1	ACB- 12	116-SN	50	51	160	165
	2	ACB- 12	116-SN	50	51	160	166
			Total	99	103	320	331
Address:	21004	FC:	1.19	MIN VP:	0.12	MAX VP:	0.55
	VAV-7-4- 03	5 "Ø					
7144	1	ACB- 11	116-SN	60	62	130	135
	2	ACB- 11	116-SN	60	61	130	133
			Total	120	123	260	268
Address:	21005	FC:	0.57	MIN VP:	0.07	MAX VP:	0.75
	VAV-7-4- 04	6 "Ø					
7081	1	ACB- 10	82-MN	47	48	150	155
7080	2	ACB- 12	116-SN	50	51	160	165
7078	3	ACB- 05	58-SN	20	21	65	67
			Total	116	120	375	387

F.H. INDICATES TESTED CFM USING FLOW HOOD.

**Comments:**

**Project:** Lowell Justice Center

**Address:** 370 Jackson Street, Lowell, MA

**Date:** 7/6/2020

**Project No.** 17-219

### VAV BOX AIR DISTRIBUTION

**SYSTEM:** AHU-4

ROOM OR LOCATION	BOX & OUTLET NUMBER	BOX & OUTLET SIZE	BOX INLET SP OR HOOD	DESIGN CFM AT MINIMUM	TESTED CFM AT MINIMUM	DESIGN CFM AT MAXIMUM	TESTED CFM AT MAXIMUM
Address:	21006	FC:	1.05	MIN VP:	0.12	MAX VP:	0.54
	VAV-7-4- 05	6 "Ø					
7083	1	ACB- 12	116-SN	75	78	160	166
7082	2	ACB- 12	116-SN	75	77	160	164
			Total	150	155	320	330
Address:	21007	FC:	2.23	MIN VP:	0.24	MAX VP:	0.24
	VAV-7-4- 06	4 "Ø					
7079	1	CD- 2	FH	65	67	65	67
7077	2	CD- 2	FH	20	22	20	22
7075	3	CD- 2	FH	45	46	45	46
			Total	130	135	130	135
Address:	21008	FC:	1.17	MIN VP:	0.09	MAX VP:	1.63
	VAV-7-4- 07	6 "Ø					
7087	1	ACB 08	88-SN	21	22	90	96
7090	2	ACB 08	88-SN	21	22	90	94
7093	3	ACB 11	116-SN	30	31	130	135
7104	4	ACB 09	88-SN	28	28	120	122
	5	CD-2	FH	28	29	120	125
			Total	106	109	550	572
Address:	21009	FC:	1.17	MIN VP:	0.04	MAX VP:	0.30
	VAV-7-4- 08	8 "Ø					
7110	1	ACB 09	88-SN	43	44	120	122
7109	2	ACB 09	88-SN	43	45	120	124
7108	3	ACB 09	88-SN	43	44	120	121
7107	4	ACB 09	88-SN	43	45	120	125
			Total	173	177	480	492

F.H. INDICATES TESTED CFM USING FLOW HOOD.

**Comments:**

**Project:** Lowell Justice Center

**Address:** 370 Jackson Street, Lowell, MA

**Date:** 7/6/2020

**Project No.** 17-219

### VAV BOX AIR DISTRIBUTION

**SYSTEM:** AHU-4

ROOM OR LOCATION	BOX & OUTLET NUMBER	BOX & OUTLET SIZE	BOX INLET SP OR HOOD	DESIGN CFM AT MINIMUM	TESTED CFM AT MINIMUM	DESIGN CFM AT MAXIMUM	TESTED CFM AT MAXIMUM
Address:	21010	FC:	2.07	MIN VP:	0.08	MAX VP:	0.31
	VAV-7-4- 09	4 "∅					
7119	1	ACB 01	24-UN	8	8	15	16
7120	2	ACB 01	24-UN	8	8	15	15
7121	3	ACB 01	24-UN	8	8	15	15
7122	4	ACB 01	24-UN	8	8	15	16
7123	5	ACB 01	24-UN	8	8	15	16
7125	6	CD- 2	FH	36	38	70	74
			Total	74	78	145	152
Address:	21011	FC:	1.21	MIN VP:	0.03	MAX VP:	0.10
	VAV-7-4- 10	"∅					
7112	1	ACB- 06	58-SN		0	80	85
<b>SIXTH FLOOR</b>							
Address:	22003	FC:	1.75	MIN VP:	0.04	MAX VP:	0.55
	VAV-6-4- 01	5 "∅					
6124	1	ACB- 11	116-SN	35	36	130	133
	2	ACB- 11	116-SN	35	36	130	135
			Total	70	72	260	268

F.H. INDICATES TESTED CFM USING FLOW HOOD.

**Comments:**

**Project:** Lowell Justice Center

**Address:** 370 Jackson Street, Lowell, MA

**Date:** 7/6/2020

**Project No.** 17-219

**VAV BOX AIR DISTRIBUTION**

**SYSTEM:** AHU-4

ROOM OR LOCATION	BOX & OUTLET NUMBER	BOX & OUTLET SIZE	BOX INLET SP OR HOOD	DESIGN CFM AT MINIMUM	TESTED CFM AT MINIMUM	DESIGN CFM AT MAXIMUM	TESTED CFM AT MAXIMUM
Address:	22004	FC:	1.37	MIN VP:	0.09	MAX VP:	0.52
	VAV-6-4- 02	8 "Ø					
6130	1	ACB- 12	116-SN	66	66	160	161
	2	ACB- 12	116-SN	66	68	160	166
	3	ACB- 12	116-SN	66	68	160	165
	4	ACB- 12	116-SN	66	67	160	163
			Total	262	269	640	655
Address:	22005	FC:	1.15	MIN VP:	0.05	MAX VP:	0.54
	VAV-6-4- 03	6 "Ø					
6126	1	ACB- 12	116-SN	50	51	160	165
	2	ACB- 12	116-SN	50	51	160	163
			Total	99	102	320	328
Address:	22006	FC:	1.98	MIN VP:	0.11	MAX VP:	0.47
	VAV-6-4- 04	5 "Ø					
6071	1	ACB- 09	88-SN	59	60	120	122
	2	ACB- 09	88-SN	59	62	120	126
			Total	118	122	240	248
Address:	22007	FC:	1.74	MIN VP:	0.04	MAX VP:	0.55
	VAV-6-4- 05	5 "Ø					
6066	1	ACB- 11	116-SN	35	36	130	133
6068	2	ACB- 11	116-SN	35	36	130	135
			Total	70	72	260	268

F.H. INDICATES TESTED CFM USING FLOW HOOD.

**Comments:**

**Project:** Lowell Justice Center

**Address:** 370 Jackson Street, Lowell, MA

**Date:** 7/6/2020

**Project No.** 17-219

### VAV BOX AIR DISTRIBUTION

**SYSTEM:** AHU-4

ROOM OR LOCATION	BOX & OUTLET NUMBER	BOX & OUTLET SIZE	BOX INLET SP OR HOOD	DESIGN CFM AT MINIMUM	TESTED CFM AT MINIMUM	DESIGN CFM AT MAXIMUM	TESTED CFM AT MAXIMUM
Address:	22008	FC:	1.57	MIN VP:	0.08	MAX VP:	0.52
	VAV-6-4- 06	8 "∅					
6072	1	ACB- 12	116-SN	64	66	160	166
	2	ACB- 12	116-SN	64	66	160	164
	3	ACB- 12	116-SN	64	64	160	160
	4	ACB- 12	116-SN	64	66	160	165
			Total	256	262	640	655
Address:	22009	FC:	1.42	MIN VP:	0.12	MAX VP:	0.71
	VAV-6-4- 07	6 "∅					
6072	1	ACB- 08	88-SN	37	39	90	94
	2	ACB- 08	88-SN	37	39	90	95
	3	ACB- 08	88-SN	37	39	90	96
	4	ACB- 08	88-SN	37	38	90	92
			Total	148	155	360	377
Address:	22010	FC:	1.63	MIN VP:	0.04	MAX VP:	0.36
	VAV-6-4- 08	8 "∅					
6102	1	ACB- 03	30-MN	16	17	50	54
6070	2	ACB- 12	116-SN	51	52	160	162
6069	3	ACB- 12	116-SN	51	52	160	163
6067	4	ACB- 12	116-SN	51	53	160	165
			Total	170	174	530	544
Address:	22011	FC:	1.79	MIN VP:	0.03	MAX VP:	0.09
	VAV-6-4- 09	"∅					
6103	1	ACB- 06	58-SN		0	80	84

F.H. INDICATES TESTED CFM USING FLOW HOOD.

**Comments:**

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**Date:** 7/6/2020

**Project No.** 17-219

### VAV BOX AIR DISTRIBUTION

**SYSTEM:** AHU-4

ROOM OR LOCATION	BOX & OUTLET NUMBER	BOX & OUTLET SIZE	BOX INLET SP OR HOOD	DESIGN CFM AT MINIMUM	TESTED CFM AT MINIMUM	DESIGN CFM AT MAXIMUM	TESTED CFM AT MAXIMUM
<b>FIFTH FLOOR</b>							
Address:	23003	FC:	1.22	MIN VP:	0.05	MAX VP:	0.51
	VAV-5-4- 01	6 "Ø					
5138	1	ACB- 12	116-SN	50	51	160	163
	2	ACB- 12	116-SN	50	50	160	161
			Total	99	100	320	324
Address:	23004	FC:	1.31	MIN VP:	0.30	MAX VP:	0.51
	VAV-5-4- 02	6 "Ø					
5136	1	CD- 4	FH	187	172	240	220
5141	2	ACB- 03	30-MN	39	39	50	50
5143	3	ACB- 03	30-MN	39	41	50	52
			Total	265	251	340	322
Address:	23005	FC:	1.39	MIN VP:	0.04	MAX VP:	0.28
	VAV-5-4- 03	5 "Ø					
5142	1	ACB- 13	148-SN	70	67	200	190
Address:	23006	FC:	1.39	MIN VP:	0.03	MAX VP:	0.06
	VAV-5-4- 04	4 "Ø					
5075	1	ACB- 05	58-SN	45	46	65	67
Address:	23007	FC:	1.32	MIN VP:	0.05	MAX VP:	0.55
	VAV-5-4- 05	6 "Ø					
5037	1	ACB- 12	116-SN	50	51	160	165
	2	ACB- 12	116-SN	50	51	160	166
			Total	100	103	320	331

F.H. INDICATES TESTED CFM USING FLOW HOOD.

**Comments:**

**Project:** Lowell Justice Center

**Address:** 370 Jackson Street, Lowell, MA

**Date:** 7/6/2020

**Project No.** 17-219

**VAV BOX AIR DISTRIBUTION**

**SYSTEM:** AHU-4

ROOM OR LOCATION	BOX & OUTLET NUMBER	BOX & OUTLET SIZE	BOX INLET SP OR HOOD	DESIGN CFM AT MINIMUM	TESTED CFM AT MINIMUM	DESIGN CFM AT MAXIMUM	TESTED CFM AT MAXIMUM
Address:	23008	FC:	1.38	MIN VP:	0.05	MAX VP:	0.58
	VAV-5-4- 06	6 "∅					
5096	1	ACB- 09	88-SN	34	35	120	124
5094	2	ACB- 09	88-SN	34	34	120	122
5093	3	ACB- 09	88-SN	34	34	120	123
			Total	101	103	360	369
Address:	23009	FC:	1.14	MIN VP:	0.04	MAX VP:	0.30
	VAV-5-4- 07	8 "∅					
5100	1	ACB- 12	116-SN	58	60	160	166
	2	ACB- 12	116-SN	58	59	160	163
	3	ACB- 12	116-SN	58	59	160	164
			Total	173	177	480	493
Address:	23010	FC:	3.60	MIN VP:	1.30	MAX VP:	1.90 *1
	VAV-5-4- 08	5 "∅					
5101	1	ACB- 09	88-SN	80	66	120	99
5102	2	ACB- 09	88-SN	80	67	120	100
5103	3	ACB- 09	88-SN	80	64	120	95
5104	4	ACB- 09	88-SN	80	62	120	93
5105	5	ACB- 09	88-SN	80	73	120	109
			Total	402	332	600	496 *2

F.H. INDICATES TESTED CFM USING FLOW HOOD.

**Comments:** \*1 VP to high to operate this VAV per design

\*2 VAV box is to small for this air volume.

**Project:** Lowell Justice Center

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**Project No.** 17-219

**VAV BOX AIR DISTRIBUTION**

**SYSTEM:** AHU-4

ROOM OR LOCATION	BOX & OUTLET NUMBER	BOX & OUTLET SIZE	BOX INLET SP OR HOOD	DESIGN CFM AT MINIMUM	TESTED CFM AT MINIMUM	DESIGN CFM AT MAXIMUM	TESTED CFM AT MAXIMUM
Address:	23011	FC:	1.75	MIN VP:	0.11	MAX VP:	0.24
	VAV-5-4- 09	4 "Ø					
5109	1	ACB 01	24-UN	8	8	15	16
5112	2	ACB 01	24-UN	8	8	15	15
5113	3	ACB 01	24-UN	8	8	15	16
5114	4	ACB 01	24-UN	8	8	15	16
CORRIDOR	5	CD- 2	FH	57	59	70	72
			Total	88	91	130	135
Address:	23012	FC:	1.61	MIN VP:	0.28	MAX VP:	0.67
	VAV-5-4- 10	5 "Ø					
5106	1	ACB- 07	56-MN	70	73	110	114
	2	ACB- 07	56-MN	70	74	110	115
5129	3	ACB- 05	56-SN	42	42	65	66
			Total	182	189	285	295
Address:	23013	FC:	1.50	MIN VP:	0.03	MAX VP:	0.48
	VAV-5-4- 11	4 "Ø					
5116	1	ACB- 08	88-SN	23	24	90	95
	2	ACB- 08	88-SN	23	24	90	94
			Total	45	47	180	189

F.H. INDICATES TESTED CFM USING FLOW HOOD.

**Comments:**

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**Date:** 7/6/2020

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**VAV BOX AIR DISTRIBUTION**

**SYSTEM:** AHU-4

ROOM OR LOCATION	BOX & OUTLET NUMBER	BOX & OUTLET SIZE	BOX INLET SP OR HOOD	DESIGN CFM AT MINIMUM	TESTED CFM AT MINIMUM	DESIGN CFM AT MAXIMUM	TESTED CFM AT MAXIMUM
<b>FOURTH FLOOR</b>							
Address:	24002	FC:	1.50	MIN VP:	0.03	MAX VP:	0.48
	VAV-4-4- 01	4 "Ø					
4130	1	ACB- 08	88-SN	23	24	90	95
	2	ACB- 08	88-SN	23	24	90	94
			Total	45	47	180	189
Address:	24003	FC:	1.23	MIN VP:	0.06	MAX VP:	0.55
	VAV-4-4- 02	6 "Ø					
4139	1	ACB- 12	116-SN	51	53	160	165
	2	ACB- 12	116-SN	51	53	160	166
			Total	102	106	320	331
Address:	24004	FC:	1.20	MIN VP:	0.06	MAX VP:	0.37
	VAV-4-4- 03	6 "Ø					
4145	1	ACB- 11	116-SN	52	54	130	135
	2	ACB- 11	116-SN	52	54	130	136
4143		CD- 2	FH	56	58	140	144
			Total	160	166	400	415
Address:	24005	FC:	1.38	MIN VP:	0.06	MAX VP:	0.82
	VAV-4-4- 04	6 "Ø					
4077	1	ACB- 08	88-SN	23	25	90	95
4076	2	ACB- 08	88-SN	23	24	90	92
4075	3	ACB- 08	88-SN	23	24	90	93
4074	4	ACB- 09	88-SN	31	33	120	126
			Total	101	106	390	406

F.H. INDICATES TESTED CFM USING FLOW HOOD.

**Comments:**

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**Project No.** 17-219

### VAV BOX AIR DISTRIBUTION

**SYSTEM:** AHU-4

ROOM OR LOCATION	BOX & OUTLET NUMBER	BOX & OUTLET SIZE	BOX INLET SP OR HOOD	DESIGN CFM AT MINIMUM	TESTED CFM AT MINIMUM	DESIGN CFM AT MAXIMUM	TESTED CFM AT MAXIMUM
Address:	24006	FC:	1.57	MIN VP:	0.04	MAX VP:	0.74
	VAV-4-4- 05	5 "∅					
4070	1	ACB- 10	82-MN	35	36	150	155
	2	ACB- 10	82-MN	35	35	150	154
			Total	69	71	300	309
Address:	24007	FC:	1.55	MIN VP:	0.03	MAX VP:	0.40
	VAV-4-4- 06	8 "∅					
4070	1	ACB- 10	82-MN	44	42	150	146
	2	ACB- 10	82-MN	44	41	150	143
	3	ACB- 10	82-MN	44	42	150	144
	4	ACB- 10	82-MN	44	41	150	142
			Total	174	167	600	575
Address:	24008	FC:	1.39	MIN VP:	0.06	MAX VP:	0.63
	VAV-4-4- 07	6 "∅					
4122	1	ACB- 07	56-MN	34	36	110	115
4121	2	ACB- 07	56-MN	34	36	110	116
4120	3	ACB- 09	88-SN	37	39	120	125
			Total	105	110	340	356
Address:	24009	FC:	1.24	MIN VP:	0.06	MAX VP:	0.55
	VAV-4-4- 08	6 "∅					
4123	1	ACB- 12	116-SN	51	53	160	166
	2	ACB- 12	116-SN	51	53	160	165
			Total	102	106	320	331

F.H. INDICATES TESTED CFM USING FLOW HOOD.

**Comments:**

**Project:** Lowell Justice Center

**Address:** 370 Jackson Street, Lowell, MA

**Date:** 7/6/2020

**Project No.** 17-219

### VAV BOX AIR DISTRIBUTION

**SYSTEM:** AHU-4

ROOM OR LOCATION	BOX & OUTLET NUMBER	BOX & OUTLET SIZE	BOX INLET SP OR HOOD	DESIGN CFM AT MINIMUM	TESTED CFM AT MINIMUM	DESIGN CFM AT MAXIMUM	TESTED CFM AT MAXIMUM
Address:	24010	FC:	2.50	MIN VP:	0.12	MAX VP:	0.21
	VAV-4-4- 09	4 "∅					
4116	1	ACB- 02	24-SN	23	24	30	32
4117	2	ACB- 02	24-SN	23	23	30	31
4118	3	ACB- 02	24-SN	23	24	30	32
4119	4	ACB- 02	24-SN	23	23	30	30
			Total	90	94	120	125
<b>THIRD FLOOR</b>							
Address:	25003	FC:	1.70	MIN VP:	0.04	MAX VP:	0.44
	VAV-3-4- 01	5 "∅					
3096	1	ACB- 09	88-SN	35	35	120	120
	2	ACB- 09	88-SN	35	36	120	123
			Total	70	70	240	243
Address:	25004	FC:	1.07	MIN VP:	0.05	MAX VP:	0.51
	VAV-3-4- 02	6 "∅					
3106	1	ACB- 12	116-SN	50	50	160	160
	2	ACB- 12	116-SN	50	50	160	161
			Total	99	100	320	321

F.H. INDICATES TESTED CFM USING FLOW HOOD.

**Comments:**

**Project:** Lowell Justice Center

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**Date:** 7/6/2020

**Project No.** 17-219

**VAV BOX AIR DISTRIBUTION**

**SYSTEM:** AHU-4

ROOM OR LOCATION	BOX & OUTLET NUMBER	BOX & OUTLET SIZE	BOX INLET SP OR HOOD	DESIGN CFM AT MINIMUM	TESTED CFM AT MINIMUM	DESIGN CFM AT MAXIMUM	TESTED CFM AT MAXIMUM
Address:	25005	FC:	1.28	MIN VP:	0.17	MAX VP:	1.51
	VAV-3-4- 03	6 "Ø					
3112	1	ACB- 13	148-SN	66	66	200	199
	2	ACB- 13	148-SN	66	65	200	197
3110	3	CD- 2	FH	46	50	140	152
3113	4	ACB- 1	24-UN	5	5	15	15
			Total	183	186	555	563
Address:	25006	FC:	1.85	MIN VP:	0.07	MAX VP:	0.63
	VAV-3-4- 04	5 "Ø					
3050	1	ACB- 10	82-MN	51	54	150	160
3049	2	ACB- 09	88-SN	41	43	120	126
			Total	92	97	270	286
Address:	25007	FC:	2.00	MIN VP:	0.00	MAX VP:	0.49
	VAV-3-4- 05	7 "Ø					
3053	1	ACB- 10	82-MN	59	60	150	153
3052	2	ACB- 10	82-MN	59	61	150	157
3051	3	ACB- 10	82-MN	59	59	150	151
			Total	176	180	450	461
Address:	25008	FC:	1.70	MIN VP:	0.07	MAX VP:	0.54
	VAV-3-4- 06	7 "Ø					
3055	1	ACB- 12	116-SN	58	59	160	163
	2	ACB- 12	116-SN	58	58	160	161
	3	ACB- 12	116-SN	58	58	160	161
			Total	173	175	480	485

F.H. INDICATES TESTED CFM USING FLOW HOOD.

**Comments:**

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**Project No.** 17-219

### VAV BOX AIR DISTRIBUTION

**SYSTEM:** AHU-4

ROOM OR LOCATION	BOX & OUTLET NUMBER	BOX & OUTLET SIZE	BOX INLET SP OR HOOD	DESIGN CFM AT MINIMUM	TESTED CFM AT MINIMUM	DESIGN CFM AT MAXIMUM	TESTED CFM AT MAXIMUM
Address:	25009	FC:	1.47	MIN VP:	0.13	MAX VP:	0.35
	VAV-3-4- 07	5 "Ø					
3064	1	ACB- 03	30-MN	29	29	50	51
	2	ACB- 03	30-MN	29	27	50	48
	3	ACB- 03	30-MN	29	29	50	50
	4	ACB- 03	30-MN	29	27	50	47
3060	5	ACB- 01	24-UN	9	9	15	15
3061	6	ACB- 01	24-UN	9	9	15	15
			Total	131	129	230	226
Address:	25010	FC:	1.39	MIN VP:	0.05	MAX VP:	0.63
	VAV-3-4- 08	6 "Ø					
3054	1	ACB- 09	88-SN	34	33	120	118
3056	2	ACB- 09	88-SN	34	33	120	117
3057	3	ACB- 09	88-SN	34	33	120	119
			Total	101	99	360	354
Address:	25011	FC:	1.89	MIN VP:	0.12	MAX VP:	0.19
	VAV-3-4- 09	4 "Ø					
3047	1	ACB- 09	88-SN	94	93	120	119
Address:	25012	FC:	1.65	MIN VP:	0.13	MAX VP:	0.21
	VAV-3-4- 10	4 "Ø					
3048	1	ACB- 09	88-SN	94	98	120	125

F.H. INDICATES TESTED CFM USING FLOW HOOD.

**Comments:**

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**Date:** 7/6/2020

**Project No.** 17-219

**VAV BOX AIR DISTRIBUTION**

**SYSTEM:** AHU-4

ROOM OR LOCATION	BOX & OUTLET NUMBER	BOX & OUTLET SIZE	BOX INLET SP OR HOOD	DESIGN CFM AT MINIMUM	TESTED CFM AT MINIMUM	DESIGN CFM AT MAXIMUM	TESTED CFM AT MAXIMUM
Address:	25013	FC:	1.66	MIN VP:	0.04	MAX VP:	0.48
	VAV-3-4- 11	5 "Ø					
3058	1	ACB- 09	88-SN	35	36	120	125
3059	2	ACB- 09	88-SN	35	36	120	124
			Total	70	72	240	249
Address:	25014	FC:	1.81	MIN VP:	0.26	MAX VP:	0.26
	VAV-3-4- 12	4 "Ø					
3065	1	ACB- 03	30-MN	50	51	50	51
3046	2	ACB- 08	88-SN	90	93	90	93
			Total	140	144	140	144
<b>SECOND FLOOR</b>							
Address:	5003	FC:	0.80	MIN VP:	0.03	MAX VP:	0.03
	VAV-2-4- 01	4 "Ø					
2151	1	ACB- 01	24-UN	15	15	15	15
2152	2	ACB- 01	24-UN	15	15	15	15
2153	3	ACB- 01	24-UN	15	15	15	15
			Total	45	45	45	45
Address:	5004	FC:	1.09	MIN VP:	0.05	MAX VP:	0.51
	VAV-2-4- 02	6 "Ø					
2164	1	ACB- 12	116-SN	50	48	160	155
	2	ACB- 12	116-SN	50	51	160	163
			Total	99	99	320	318

F.H. INDICATES TESTED CFM USING FLOW HOOD.

**Comments:**

**Project:** Lowell Justice Center

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**Project No.** 17-219

### VAV BOX AIR DISTRIBUTION

**SYSTEM:** AHU-4

ROOM OR LOCATION	BOX & OUTLET NUMBER	BOX & OUTLET SIZE	BOX INLET SP OR HOOD	DESIGN CFM AT MINIMUM	TESTED CFM AT MINIMUM	DESIGN CFM AT MAXIMUM	TESTED CFM AT MAXIMUM
Address:	5005	FC:	1.20	MIN VP:	0.04	MAX VP:	0.45
	VAV-2-4- 03	5 "∅					
2170	1	ACB- 09	88-SN	36	38	120	126
	2	ACB- 12	88-SN	36	37	120	124
			Total	72	75	240	250
Address:	5006	FC:	1.68	MIN VP:	0.04	MAX VP:	0.41
	VAV-2-4- 04	5 "∅					
2084	1	ACB- 12	116-SN	50	52	160	169
2111	2	ACB- 05	58-SN	20	22	65	71
			Total	70	74	225	240
Address:	5007	FC:	1.73	MIN VP:	0.20	MAX VP:	1.51
	VAV-2-4- 05	6 "∅					
2104	1	ACB- 07	56-MN	39	40	110	113
2103	2	ACB- 07	56-MN	39	38	110	108
2102	3	ACB- 07	56-MN	39	39	110	111
2096	4	ACB- 07	56-MN	39	37	110	107
2085	5	ACB- 07	56-MN	39	39	110	112
			Total	193	193	550	551
Address:	5008	FC:	1.70	MIN VP:	0.05	MAX VP:	0.52
	VAV-2-4- 06	5 "∅					
2109	1	ACB- 11	116-SN	39	38	130	127
	2	ACB- 11	116-SN	39	41	130	136
			Total	78	79	260	263

F.H. INDICATES TESTED CFM USING FLOW HOOD.

**Comments:**

**Project:** Lowell Justice Center

**Address:** 370 Jackson Street, Lowell, MA

**Date:** 7/6/2020

**Project No.** 17-219

### VAV BOX AIR DISTRIBUTION

**SYSTEM:** AHU-4

ROOM OR LOCATION	BOX & OUTLET NUMBER	BOX & OUTLET SIZE	BOX INLET SP OR HOOD	DESIGN CFM AT MINIMUM	TESTED CFM AT MINIMUM	DESIGN CFM AT MAXIMUM	TESTED CFM AT MAXIMUM
Address:	5009	FC:	2.24	MIN VP:	0.07	MAX VP:	0.84
	VAV-2-4- 07	5 "Ø					
2113	1	ACB- 07	56-MN	32	32	110	111
2112	2	ACB- 07	56-MN	32	32	110	109
2110	3	ACB- 07	56-MN	32	32	110	110
			Total	96	96	330	330
Address:	5010	FC:	1.80	MIN VP:	0.11	MAX VP:	0.80
	VAV-2-4- 08	5 "Ø					
2114	1	ACB- 07	56-MN	40	37	110	104
2107	2	ACB- 07	56-MN	40	39	110	107
2115	3	ACB- 09	88-SN	43	42	120	117
			Total	122	118	340	328
Address:	5011	FC:	2.21	MIN VP:	0.37	MAX VP:	0.37
	VAV-2-4- 09	5 "Ø					
2108	1	CD- 2	FH	40	38	40	38
2087	2	CD- 4	FH	180	183	180	183
			Total	220	221	220	221
Address:	5012	FC:	1.17	MIN VP:	0.14	MAX VP:	0.56
	VAV-2-4- 10	6 "Ø					
2116	1	ACB- 05	58-SN	33	36	65	70
	2	ACB- 05	58-SN	33	34	65	67
	3	ACB- 05	58-SN	33	33	65	65
	4	ACB- 05	58-SN	33	34	65	66
	5	ACB- 05	58-SN	33	34	65	67
			Total	166	171	325	335

F.H. INDICATES TESTED CFM USING FLOW HOOD.

**Comments:**

**Project:** Lowell Justice Center

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**VAV BOX AIR DISTRIBUTION**

**SYSTEM:** AHU-4

ROOM OR LOCATION	BOX & OUTLET NUMBER	BOX & OUTLET SIZE	BOX INLET SP OR HOOD	DESIGN CFM AT MINIMUM	TESTED CFM AT MINIMUM	DESIGN CFM AT MAXIMUM	TESTED CFM AT MAXIMUM
Address:	5013	FC:	1.56	MIN VP:	0.24	MAX VP:	0.58
	VAV-2-4- 11	5 "Ø					
2116	1	ACB- 11	116-SN	83	88	130	138
	2	ACB- 11	116-SN	83	90	130	140
			Total	166	178	260	278
Address:	5014	FC:	1.67	MIN VP:	0.10	MAX VP:	0.48
	VAV-2-4- 12	7 "Ø					
2169	1	CD- 2	FH	63	65	140	144
2172	1	ACB- 03	30-MN	23	24	50	53
2174	2	ACB- 01	24-UN	7	7	15	15
2163	3	CD- 4	FH	108	112	240	249
			Total	200	207	445	461
<b>FIRST FLOOR</b>							
Address:	3002	FC:	0.87	MIN VP:	0.04	MAX VP:	0.46
	VAV-1-4- 01	6 "Ø					
1126	1	ACB- 05	58-SN	20	20	65	67
1128	2	ACB- 02	24-SN	9	10	30	33
1127	3	ACB- 13	148-SN	60	62	200	205
			Total	89	92	295	305
Address:	3003	FC:	1.06	MIN VP:	0.04	MAX VP:	0.38
	VAV-1-4- 02	5 "Ø					
1109	1	ACB- 04	34-MN	23	24	70	74
	2	ACB- 04	34-MN	23	24	70	72
	3	ACB- 04	34-MN	23	25	70	75
			Total	69	73	210	221

F.H. INDICATES TESTED CFM USING FLOW HOOD.

**Comments:**

**Project:** Lowell Justice Center

**Address:** 370 Jackson Street, Lowell, MA

**Date:** 7/6/2020

**Project No.** 17-219

**VAV BOX AIR DISTRIBUTION**

**SYSTEM:** AHU-4

ROOM OR LOCATION	BOX & OUTLET NUMBER	BOX & OUTLET SIZE	BOX INLET SP OR HOOD	DESIGN CFM AT MINIMUM	TESTED CFM AT MINIMUM	DESIGN CFM AT MAXIMUM	TESTED CFM AT MAXIMUM
Address:	3004	FC:	1.20	MIN VP:	0.05	MAX VP:	0.63
	VAV-1-4- 03	5 "∅					
1109	1	ACB- 08	88-SN	26	28	90	95
	2	ACB- 08	88-SN	26	28	90	96
	3	ACB- 08	88-SN	26	27	90	94
			Total	78	83	270	285
Address:	3005	FC:	1.04	MIN VP:	0.07	MAX VP:	0.60
	VAV-1-4- 04	5 "∅					
1104	1	ACB- 09	88-SN	42	43	120	123
1103	2	ACB- 10	82-MN	53	54	150	155
			Total	95	97	270	278
Address:	3006	FC:	1.17	MIN VP:	0.04	MAX VP:	0.24
	VAV-1-4- 05	4 "∅					
1123	1	ACB- 01	24-UN	6	6	15	16
1101	2	ACB- 03	30-MN	20	20	50	52
1102	3	ACB- 05	58-SN	25	26	65	67
			Total	51	53	130	135

F.H. INDICATES TESTED CFM USING FLOW HOOD.

**Comments:**

**Project:** Lowell Justice Center

**Address:** 370 Jackson Street, Lowell, MA

**Date:** 7/6/2020

**Project No.** 17-219

### VAV BOX AIR DISTRIBUTION

**SYSTEM:** AHU-4

ROOM OR LOCATION	BOX & OUTLET NUMBER	BOX & OUTLET SIZE	BOX INLET SP OR HOOD	DESIGN CFM AT MINIMUM	TESTED CFM AT MINIMUM	DESIGN CFM AT MAXIMUM	TESTED CFM AT MAXIMUM
Address:	3007	FC:	0.90	MIN VP:	0.09	MAX VP:	0.40
	VAV-1-4- 06	5 "Ø					
1076	1	ACB- 02	24-UN	14	15	30	32
1067	2	CD- 2	FH	12	12	25	26
	3	CD- 2	FH	9	10	20	21
1107	4	CD- 2	FH	9	10	20	22
1075	5	ACB- 02	24-UN	14	15	30	32
C1073	6	CD- 2	FH	9	10	20	21
1072	7	ACB- 04	34-MN	32	34	70	74
			Total	99	105	215	228
Address:	3008	FC:	1.16	MIN VP:	0.07	MAX VP:	0.10
	VAV-1-4- 07	4 "Ø					
1065	1	ACB- 01	24-UN	13	14	15	16
1068	2	ACB- 03	30-MN	43	46	50	54
1069	3	ACB- 01	24-UN	13	14	15	16
			Total	68	73	80	86
Address:	3009	FC:	1.24	MIN VP:	0.09	MAX VP:	0.14
	VAV-1-4- 08	4 "Ø					
1064	1	ACB- 01	24-UN	12	13	15	16
1063	2	ACB- 01	24-UN	12	13	15	16
1100	3	ACB- 03	30-MN	41	44	50	54
1062	4	ACB- 01	24-UN	12	12	15	15
			Total	78	83	95	101

F.H. INDICATES TESTED CFM USING FLOW HOOD.

**Comments:**

**Project:** Lowell Justice Center

**Address:** 370 Jackson Street, Lowell, MA

**Date:** 7/6/2020

**Project No.** 17-219

Min 50cfm per toilet stall is required by code for toilets with low expected usage.

**SYSTEM:** AHU-4

SUPPLY

RETURN

EXHAUST

ROOM OR LOCATION	UNIT NUMBER	UNIT SIZE	AREA x K FACTOR	DESIGN FT / MIN	TEST FT / MIN	DESIGN CFM	TEST CFM
7144	1	RG-4	FH	N/A	N/A	260	235
7136	2	RG-3	FH	N/A	N/A	180	168
T7143	3	EG-1	FH	N/A	N/A	70	35 *1
T7140	4	EG-1	FH	N/A	N/A	70	31 *1
T7141	5	EG-1	FH	N/A	N/A	70	33 *1
T7138	6	EG-1	FH	N/A	N/A	70	32 *1
U7092	7	EG-1	FH	N/A	N/A	50	45
T7115	8	EG-1	FH	N/A	N/A	70	36 *1
T7114	9	EG-1	FH	N/A	N/A	70	39 *1
7112	10	EG-1	FH	N/A	N/A	30	27
7116	11	EG-1	FH	N/A	N/A	60	45 *1
7117	12	EG-1	FH	N/A	N/A	20	35 *1
7103	13	EG-1	FH	N/A	N/A	50	25 *1
7096	14	EG-1	FH	N/A	N/A	50	63 *1
T7085	15	EG-1	FH	N/A	N/A	70	39 *1
T7084	16	EG-1	FH	N/A	N/A	70	36 *1
7119	17	RG-1	FH	N/A	N/A	15	14
7120	18	RG-1	FH	N/A	N/A	15	14
7121	19	RG-1	FH	N/A	N/A	15	14
7122	20	RG-1	FH	N/A	N/A	15	14
7123	21	RG-1	FH	N/A	N/A	15	14
7075	22	RG-1	FH	N/A	N/A	45	41
7110	23	RG-2	FH	N/A	N/A	120	111
7109	24	RG-2	FH	N/A	N/A	120	110
7108	25	RG-2	FH	N/A	N/A	120	108
7107	26	RG-2	FH	N/A	N/A	120	112
7087	27	RG-2	FH	N/A	N/A	90	81
7090	28	RG-2	FH	N/A	N/A	90	85
7093	29	RG-2	FH	N/A	N/A	130	121
7083	30	RG-3	FH	N/A	N/A	160	148

Not mee ing design air flow

Min 50cfm per toilet stall is required by code for toilets with low expected usage.

F.H. INDICATES TESTED CFM USING FLOW HOOD

**TOTAL**

2,000

1,011

**Comments:** \*1 CAR DAMPER

The readings are the result of the directions found in RFI # 1150. Typical for all AHU-4 RA /EA air volume

**Project:** Lowell Justice Center

**Address:** 370 Jackson Street, Lowell, MA

**Date:** 7/6/2020

**Project No.** 17-219

**AIR DISTRIBUTION**

**SYSTEM:** AHU-4

SUPPLY

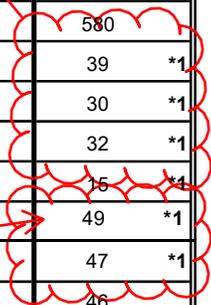
RETURN

EXHAUST

ROOM OR LOCATION	UNIT NUMBER	UNIT SIZE	RETURN		TEST FT / MIN	DESIGN CFM	TEST CFM	
7079	31	RG-2			N / A	65	60	
	32	RG-2			N / A	20	18	
7082	33	RG-2			N / A	160	148	
7081	34	RG-3			N / A	150	135	
7080	35	RG-3	FH	N / A	N / A	160	150	
7078	36	RG-2	FH	N / A	N / A	65	59	
6126	37	RG-3	FH	N / A	N / A	320	290	
6130	38	RG-5	FH	N / A	N / A	640	580	
T6127	39	EG-1	FH	N / A	N / A	70	39 *1	
T6128	40	EG-1	FH	N / A	N / A	70	30 *1	
6129	41	EG-1	FH	N / A	N / A	70	32 *1	
U6092	42	EG-1	FH	N / A	N / A	50	15 *1	
T6104	43	EG-1				75	49 *1	
T6105	44	EG-1				75	47 *1	
6101	45	EG-1	FH	N / A	N / A	50	46	
6062	46	EG-1	FH	N / A	N / A	100	90	
6103	47	EG-1	FH	N / A	N / A	50	153 *1	
CORR. 6124	48	RG-5	FH	N / A	N / A	360	330	
6070	49	RG-2	FH	N / A	N / A	160	145	
6069	50	RG-2	FH	N / A	N / A	160	148	
6067	51	RG-2	FH	N / A	N / A	160	144	
6068	52	RG-3	FH	N / A	N / A	130	121	
6066	53	RG-3	FH	N / A	N / A	130	122	
6071	54	RG-4	FH	N / A	N / A	240	225	
CORR. 6071	55	RG-5	FH	N / A	N / A	360	325	
5141	56	RG-2	FH	N / A	N / A	50	46	
5142	57	RG-3	FH	N / A	N / A	200	182	
5143	58	RG-2	FH	N / A	N / A	50	46	
5138	59	RG-4	FH	N / A	N / A	370	333	
T5139	60	EG-1	FH	N / A	N / A	70	30 *1	
F.H. INDICATES TESTED CFM USING FLOW HOOD						<b>TOTAL</b>	4,630	4,138

Min 50cfm per toilet stall is required by code for toilets with low expected usage. replace 1# CAR with standard pressure model.

Not meeting design air flow



**Comments:** \*1 CAR DAMPER

**Project:** Lowell Justice Center

**Address:** 370 Jackson Street, Lowell, MA

**Date:** 7/6/2020

**Project No.** 17-219

**AIR DISTRIBUTION**

**SYSTEM:** AHU-4

SUPPLY

RETURN

EXHAUST

ROOM OR LOCATION	UNIT NUMBER	UNIT SIZE	AREA x K FACTOR	DESIGN FT / MIN	TEST FT / MIN	DESIGN CFM	TEST CFM
T5140	61	EG-1	FH	N / A	N / A	70	43 *1
U5092	62	EG-1	FH	N / A	N / A	100	53 *1
5105	63	RG-2	FH	N / A	N / A	90	81
5104	64	RG-2	FH	N / A	N / A	90	85
5103	65	RG-2	FH	N / A	N / A	90	83
5102	66	RG-2	FH	N / A	N / A	90	85
5101	67	RG-2	FH	N / A	N / A	90	82
5100	68	RG-5	FH	N / A	N / A	480	450
5096	69	RG-2	FH	N / A	N / A	120	110
5094	70	RG-2	FH	N / A	N / A	120	112
5093	71	RG-2	FH	N / A	N / A	120	108
5075	72	RG-2	FH	N / A	N / A	65	60
5037	73	RG-4	FH	N / A	N / A	320	290
5087	74	EG-1	FH	N / A	N / A	50	36 *1
5082	75	EG-1	FH	N / A	N / A	50	22 *1
5109	76	RG-2	FH	N / A	N / A	15	14
5112	77	RG-2	FH	N / A	N / A	15	14
5113	78	RG-2	FH	N / A	N / A	15	14
5114	79	RG-2	FH	N / A	N / A	15	14
5129	80	RG-2	FH	N / A	N / A	65	60
5106	81	RG-4	FH	N / A	N / A	380	345
T4140	82	EG-1	FH	N / A	N / A	70	29 *1
T4141	83	EG-1	FH	N / A	N / A	70	29 *1
T4142	84	EG-1	FH	N / A	N / A	70	30 *1
T4144	85	EG-1	FH	N / A	N / A	70	28 *1
4145	86	RG-2	FH	N / A	N / A	260	235
4130	87	RG-2	FH	N / A	N / A	100	92
4139	88	RG-2	FH	N / A	N / A	320	290
4116	89	RG-2	FH	N / A	N / A	30	28
4130	90	RG-2	FH	N / A	N / A	415	375
<b>TOTAL</b>						<b>3,855</b>	<b>3,297</b>

Min 50cfm per toilet stall is required by code for toilets with low expected usage. replace 1# CAR with standard pressure model.

Does not meet design

Min 50cfm per toilet stall is required by code for toilets with low expected usage. replace 1# CAR with standard pressure model.

F.H. INDICATES TESTED CFM USING F.H.

**Comments:** \*1 CAR DAMPER

**Project:** Lowell Justice Center

**Address:** 370 Jackson Street, Lowell, MA

**Date:** 7/6/2020

**Project No.** 17-219

**AIR DISTRIBUTION**

**SYSTEM:** AHU-4

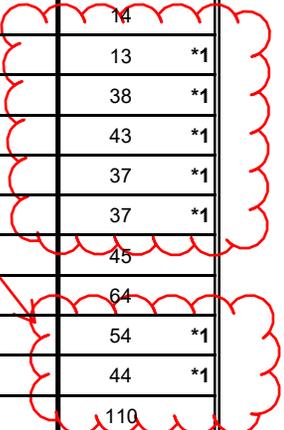
SUPPLY

RETURN

EXHAUST

ROOM OR LOCATION	UNIT NUMBER	UNIT SIZE	AREA x K FACTOR	DESIGN FT / MIN	TEST FT / MIN	DESIGN CFM	TEST CFM	
4117	91	RG-2	FH	N / A	N / A	30	27	
4123	92	RG-4	FH	N / A	N / A	320	290	
4118	93	RG-2	FH	N / A	N / A	30	28	
4122	94	RG-2	FH	N / A	N / A	80	75	
4119	95	RG-2	FH	N / A	N / A	30	25	
4121	96	RG-2	FH	N / A	N / A	100	92	
4120	97	RG-2	FH	N / A	N / A	120	111	
4077	98	RG-2	FH	N / A	N / A	90	84	
4073	99			N / A	N / A	60	54	
4076	100			N / A	N / A	90	85	
4075	101			N / A	N / A	90	81	
4074	102			N / A	N / A	100	90	
4070	103			N / A	N / A	415	375	
3106	104			N / A	N / A	180	165	
3112	105			N / A	N / A	400	375	
3113	106	RG-2	FH	N / A	N / A	15	14	
U3092	107	EG-1	FH	N / A	N / A	50	13 *1	
T3107	108	EG-1	FH	N / A	N / A	70	38 *1	
T3108	109	EG-1	FH	N / A	N / A	70	43 *1	
T3109	110	EG-1	FH	N / A	N / A	50	37 *1	
T3111	111	EG-1	FH	N / A	N / A	70	37 *1	
3067	112	EG-1	FH	N / A	N / A	50	45	
3062	113	EG-1	FH	N / A	N / A	70	64	
T3078	114	EG-1	FH	N / A	N / A	70	54 *1	
T3077	115	EG-1	FH	N / A	N / A	70	44 *1	
3059	116	RG-2	FH	N / A	N / A	120	110	
3066	117	RG-2	FH	N / A	N / A	20	18	
3061	118	RG-2	FH	N / A	N / A	15	14	
3060	119	RG-2	FH	N / A	N / A	15	14	
3065	120	RG-2	FH	N / A	N / A	50	46	
<b>F.H. INDICATES TESTED CFM USING FLOW HOOD</b>						<b>TOTAL</b>	2,940	2,548

Min 50cfm per toilet stall is required by code for toilets with low expected usage. replace 1# CAR with standard pressure model.



**Comments:** \*1 CAR DAMPER

**Project:** Lowell Justice Center

**Address:** 370 Jackson Street, Lowell, MA

**Date:** 7/6/2020

**Project No.** 17-219

**AIR DISTRIBUTION**

**SYSTEM:** AHU-4

SUPPLY

RETURN

EXHAUST

ROOM OR LOCATION	UNIT NUMBER	UNIT SIZE	AREA xK FACTOR	DESIGN FT / MIN	TEST FT / MIN	DESIGN CFM	TEST CFM	
3046	121	RG-2	FH	N / A	N / A	90	84	
3047	122	RG-2	FH	N / A	N / A	120	113	
3048	123	RG-2	FH	N / A	N / A	120	110	
3058	124	RG-2	FH	N / A	N / A	120	112	
3057	125	RG-2	FH	N / A	N / A	120	110	
3056	126	RG-2	FH	N / A	N / A	120	110	
3054	127	RG-2	FH	N / A	N / A	120	112	
3055	128	RG-4	FH	N / A	N / A	400	375	
3053	129	RG-2	FH			120	110	
3052	130	RG-2	FH			120	111	
3051	131	RG-2	FH			120	110	
3050	132	RG-2	FH			120	112	
CORRIDOR	133	RG-2	FH			140	131	
3049	134	RG-2	FH			120	110	
2164	135	RG-4	FH	N / A	N / A	370	333	
2170	136	RG-3	FH	N / A	N / A	240	227	
2174	137	RG-2	FH	N / A	N / A	15	14	
2172	138	RG-2	FH	N / A	N / A	50	45	
2151	139	RG-2	FH	N / A	N / A	15	14	
2152	140	RG-2	FH	N / A	N / A	15	14	
2153	141	RG-2	FH	N / A	N / A	15	14	
T2165	142	EG-1	FH	N / A	N / A	70	32 *1	
T2166	143	EG-1	FH	N / A	N / A	70	32 *1	
T2168	144	EG-1	FH	N / A	N / A	70	28 *1	
T2167	145	EG-1	FH	N / A	N / A	70	33 *1	
U2092	146	EG-1	FH	N / A	N / A	100	72 *1	
2115	147	RG-2	FH	N / A	N / A	120	110	
2107	148	RG-2	FH	N / A	N / A	100	92	
2114	149	RG-2	FH	N / A	N / A	100	90	
2113	150	RG-2	FH	N / A	N / A	100	94	
<b>F.H. INDICATES TESTED CFM USING FLOW HOOD</b>						<b>TOTAL</b>	<b>3,470</b>	<b>3,054</b>

Min 50cfm per toilet stall is required by code for toilets with low expected usage. replace 1# CAR with standard pressure model.

**Comments:** \*1 CAR DAMPER

**Project:** Lowell Justice Center

**Address:** 370 Jackson Street, Lowell, MA

**Date:** 7/6/2020

**Project No.** 17-219

**AIR DISTRIBUTION**

**SYSTEM:** AHU-4

SUPPLY

RETURN

EXHAUST

ROOM OR LOCATION	UNIT NUMBER	UNIT SIZE	AREA xK FACTOR	DESIGN FT / MIN	TEST FT / MIN	DESIGN CFM	TEST CFM	
2112	151	RG-2	FH	N / A	N / A	100	92	
2110	152	RG-2	FH	N / A	N / A	100	92	
2109	153	RG-4	FH	N / A	N / A	260	235	
2104	154	RG-2	FH	N / A	N / A	100	93	
2103	155	RG-2	FH	N / A	N / A	100	90	
2102	156	RG-2	FH	N / A	N / A	100	92	
2096	157	RG-2	FH	N / A	N / A	100	90	
2085	158	RG-2	FH	N / A	N / A	100	93	
2084	159	RG-2	FH	N / A	N / A	160	147	
2111	160	RG-2	FH	N / A	N / A	65	60	
DCP Open Area	161	RG-4	FH	N / A	N / A	260	236	
	162	RG-4	FH	N / A	N / A	260	240	
2108	163	RG-2	FH	N	Does not meet design		35	
2100	164	RG-2	FH	N / A	N / A	20	18	
2087	165	RG-3	FH	N / A	N / A	160	145	
2105	166	EG-1	FH	N / A	N / A	50	30 *1	
2090	167	EG-1	FH	N / A	N / A	70	37 *1	
1126	168	RG-2	FH	N / A	N / A	65	58	
1127	169	RG-3	FH	N / A	N / A	200	180	
1128	170	RG-2	FH	N / A	N / A	30	27	
CORR. 1087	171	RG-2	FH	N / A	N / A	20	18	
1076	172	RG-2	FH	N / A	N / A	30	27	
1075	173	RG-2	FH	N / A	N / A	30	25	
1068	174	RG-2	FH	N / A	N / A	15	14	
1069	175	RG-2	FH	N / A	N / A	15	14	
1064	176	EG-1	FH	N / A	N / A	15	14	
1063	177	RG-2	FH	N / A	N / A	15	14	
1065	178	RG-3	FH	N / A	N / A	50	45	
1062	179	RG-2	FH	N / A	N / A	15	14	
1067	180	RG-2	FH	N / A	N / A	25	23	
<b>F.H. INDICATES TESTED CFM USING FLOW HOOD</b>						<b>TOTAL</b>	<b>2,570</b>	<b>2,298</b>

**Comments:** \*1 CAR DAMPER

**Project:** Lowell Justice Center

**Address:** 370 Jackson Street, Lowell, MA

**Date:** 7/6/2020

**Project No.** 17-219

**AIR DISTRIBUTION**

**SYSTEM:** AHU-4

**SUPPLY**

**RETURN**  X

**EXHAUST**  X

ROOM OR LOCATION	UNIT NUMBER	UNIT SIZE	AREA xK FACTOR	DESIGN FT / MIN	TEST FT / MIN	DESIGN CFM	TEST CFM
1100	181	RG-2	FH	N/A	N/A	50	46
1110	182	RG-2	FH	N/A	N/A	50	47
1109	183	RG-2	FH	N/A	N/A	110	99
1106	184	RG-2	FH	N/A	N/A	50	43
1104	185	RG-2	FH	N/A	N/A	120	109
1103	186	RG-2	FH	N/A	N/A	120	110
1101	187	RG-2	FH	N/A	N/A	50	47
1102	188	RG-2	FH	N/A	N/A	65	60
T1094	189	EG-1	FH	N/A	N/A	70	33 *1
T1096	190	EG-1	FH	N/A	N/A	70	33 *1
U1092	191	EG-1	FH	N/A	N/A	50	32 *1
1093	192	EG-1	FH	N/A	N/A	80	84 *1
1211	193	EG-3	FH	N/A	N/A	220	203
T0021	194	EG-1	FH	N/A	N/A	100	62 *1
D0090	195	SCG-1	FH	N/A	N/A	70	56 *1
D0087	196	EG-1	FH	N/A	N/A	45	42 *1
<b>TOTAL</b>						1,320	1,106

Min 50cfm per toilet stall is required by code for toilets with low expected usage. replace 1# CAR with standard pressure model.

F.H. INDICATES TESTED CFM USING FLOW HOOD

Comments: \*1 CAR DAMPER

**Project:** Lowell Justice Center

**Address:** 370 Jackson Street, Lowell, MA

**Date:** 7/6/2020

**Project No.** 17-219

### VAV BOX AIR DISTRIBUTION

**SYSTEM:** AHU-5

ROOM OR LOCATION	BOX & OUTLET NUMBER	BOX & OUTLET SIZE	BOX INLET SP OR HOOD	DESIGN CFM AT MINIMUM	TESTED CFM AT MINIMUM	DESIGN CFM AT MAXIMUM	TESTED CFM AT MAXIMUM
Address:	1009	FC	0.95		VP: 0.01		VP: 0.33
	VAV-1-5- 01	10 "∅					
1002	1	CD- 5	FH	64	67	400	417
	2	CD- 5	FH	64	66	400	410
			Total	128	132	800	827
Address:	1004	FC	0.94		VP: 0.29		VP: 0.74
	VAV-1-5- 02	12 "∅					
1002	1	JD- 1	FH	126	128	200	203
	2	JD- 1	FH	126	129	200	205
	3	JD- 1	FH	126	129	200	205
	4	JD- 1	FH	126	130	200	206
	5	JD- 1	FH	126	132	200	210
	6	JD- 1	FH	126	128	200	203
	7	JD- 1	FH	126	123	200	195
	8	JD- 1	FH	126	126	200	200
			Total	1,008	1,025	1,600	1,627

F.H. INDICATES TESTED CFM USING FLOW HOOD.

**Comments:**

**Project:** Lowell Justice Center

**Address:** 370 Jackson Street, Lowell, MA

**Date:** 7/6/2020

**Project No.** 17-219

**VAV BOX AIR DISTRIBUTION**

**SYSTEM:** AHU-5

ROOM OR LOCATION	BOX & OUTLET NUMBER	BOX & OUTLET SIZE	BOX INLET SP OR HOOD	DESIGN CFM AT MINIMUM	TESTED CFM AT MINIMUM	DESIGN CFM AT MAXIMUM	TESTED CFM AT MAXIMUM
Address:	1003	FC	0.96	VP	0.30	VP:	0.75
	VAV-1-5- 03	12 "∅					
1002	1	JD- 1	FH	126	133	200	211
	2	JD- 1	FH	126	132	200	209
	3	JD- 1	FH	126	125	200	198
	4	JD- 1	FH	126	130	200	206
	5	JD- 1	FH	126	132	200	210
	6	JD- 1	FH	126	129	200	204
	7	JD- 1	FH	126	125	200	199
	8	JD- 1	FH	126	126	200	200
			Total	1,008	1,031	1,600	1,637
Address:	1000	FC	1.05	VP	0.01	VP:	0.31
	VAV-1-5- 04	10 "∅					
1002	1	CD- 5	FH	64	65	400	409
	2	CD- 5	FH	64	64	400	399
			Total	128	129	800	808
Address:	1211	FC	0.84	VP	0.05	VP:	0.31
	VAV-1-5- 05	5 "∅					
1211	1	CD- 4	FH	80	81	200	202

F.H. INDICATES TESTED CFM USING FLOW HOOD.

**Comments:**

**Project:** Lowell Justice Center

**Address:** 370 Jackson Street, Lowell, MA

**Date:** 7/6/2020

**Project No.** 17-219

### AIR DISTRIBUTION

**SYSTEM:** AHU-5

**SUPPLY**

**RETURN**

**EXHAUST**

ROOM OR LOCATION	UNIT NUMBER	UNIT SIZE	AREA xK FACTOR	DESIGN FT / MIN	TEST FT / MIN	DESIGN CFM	TEST CFM
1002 HIGH	1	RG-6	FH	N / A	N / A	500	465
	2	RG-6	FH	N / A	N / A	500	465
	3	RG-6	FH	N / A	N / A	500	460
	4	RG-6	FH	N / A	N / A	500	468
	5	RG-6	FH	N / A	N / A	500	480
	6	RG-6	FH	N / A	N / A	500	467
	7	RG-6	FH	N / A	N / A	500	456
	8	RG-6	FH	N / A	N / A	500	479
1002 LOW	9	RG-6	FH	N / A	N / A	500	533
	10	RG-6	FH	N / A	N / A	500	548
<b>TOTAL</b>						5,000	4,821

F.H. INDICATES TESTED CFM USING FLOW HOOD

**Comments:**

**Project:** Lowell Justice Center

**Address:** 370 Jackson Street, Lowell, MA

**Date:** 7/6/2020

**Project No.** 17-219

**VAV BOX AIR DISTRIBUTION**

**SYSTEM:** AHU-6

ROOM OR LOCATION	BOX & OUTLET NUMBER	BOX & OUTLET SIZE	BOX INLET SP OR HOOD	DESIGN CFM AT MINIMUM	TESTED CFM AT MINIMUM	DESIGN CFM AT MAXIMUM	TESTED CFM AT MAXIMUM
Address:	11001	FC	1.56	MIN VP:	0.00	MAX VP:	0.60
Courtroom Cells	VAV-8-6- 01	12 "Ø					
D7030	1	CD-1	F.H.	7	0	15	*1
D7031	2	SCD-1	F.H.	9	0	20	*1
D7032	3	CD-1	F.H.	9	0	20	*1
D7033	4	SCG-1	F.H.	32	32	70	71
D7034	5	SCD-2	F.H.	59	62	130	138
D6033	6	SCD-2	F.H.	32	32	70	72
D6031	7	CD-1	F.H.	9	0	20	*1
D6034	8	SCD-2	F.H.	59	64	130	143
D5034	9	SCD-2	F.H.	32	0	70	
D5032	10	SCD-1	F.H.			20	*1
D5035	11	SCD-2	F.H.			130	127
D4035	12	SCD-2	F.H.			70	75
D4033	13	SCD-1	F.H.			20	*1
D4037	14	SCD-2	F.H.			130	135
D3029	15	CD-1	F.H.			20	*1
D3031	16	CD-1	F.H.			20	*1
D3032	17	SCD-2	F.H.			70	76
D3030	18	SCD-1	F.H.			20	*1
D3033	19	SCD-2	F.H.			130	128
D2041	20	CD-1	F.H.			20	*1
D2047	21	SCD-2	F.H.			110	120
D2044	22	SCD-1	F.H.			20	*1
D2048	23	SCD-2	F.H.			130	129
			Total	130	128	1,455	1,214

F.H. INDICATES TESTED CFM USING FLOW HOOD.

**Comments:** \*1 Volume damper is closed.

15	34	*1
20	45	*1
20	41	*1
70	71	
130	138	
70	72	
20	41	*1
130	143	
70	67	
20	59	
130	127	
70	75	
20	49	*1
130	135	
20	75	*1
20	96	*1
70	78	*1
20	102	*1
20	88	*1
110	120	
20	89	*1
130	129	
1,455	1,398	

Values previously submitted, why are these all blank now?

**Project:** Lowell Justice Center

**Address:** 370 Jackson Street, Lowell, MA

**Date:** 7/6/2020

**Project No.** 17-219

**VAV BOX AIR DISTRIBUTION**

**SYSTEM:** AHU-6

ROOM OR LOCATION	BOX & OUTLET NUMBER	BOX & OUTLET SIZE	BOX INLET SP OR HOOD	DESIGN CFM AT MINIMUM	TESTED CFM AT MINIMUM	DESIGN CFM AT MAXIMUM	TESTED CFM AT MAXIMUM
Address:	12001	FC	1.81	MIN VP	0.03	MAX VP	0.61
	VAV-6-6- 01	16 "Ø					
7019	1	22" x 20"	3.06	240	246	1,000	1,023
	2	22" x 20"	3.06	240	253	1,000	1,053
	3	22" x 20"	3.06	240	240	1,000	1,000
			Total	720	738	3,000	3,076
Address:	13001	FC	1.46	MIN VP	0.03	MAX VP	0.59
	VAV-5-6- 01	16 "Ø					
6018	1	22" x 20"	3.06	235	238	980	990
	2	22" x 20"	3.06	235	236	980	985
	3	22" x 20"	3.06	235	234	980	974
			Total	706	708	2,940	2,949
Address:	14001	FC	1.18	MIN VP	0.05	MAX VP	0.74
	VAV-4-6- 01	12 "Ø					
5021	1	14" x 20"	1.94	140	141	537	544
	2	14" x 20"	1.94	140	143	537	551
	3	14" x 20"	1.94	140	141	537	541
			Total	419	425	1,611	1,636
Address:	15001	FC	1.38	MIN VP	0.05	MAX VP	0.69
	VAV-3-6- 01	12 "Ø					
4019	1	14" x 20"	1.94	140	141	537	541
	2	14" x 20"	1.94	140	137	537	527
	3	14" x 20"	1.94	140	136	537	522
			Total	419	413	1,611	1,590

F.H. INDICATES TESTED CFM USING FLOW HOOD.

**Comments:**

**Project:** Lowell Justice Center

**Address:** 370 Jackson Street, Lowell, MA

**Date:** 7/6/2020

**Project No.** 17-219

**VAV BOX AIR DISTRIBUTION**

**SYSTEM:** AHU-6

ROOM OR LOCATION	BOX & OUTLET NUMBER	BOX & OUTLET SIZE	BOX INLET SP OR HOOD	DESIGN CFM AT MINIMUM	TESTED CFM AT MINIMUM	DESIGN CFM AT MAXIMUM	TESTED CFM AT MAXIMUM
Address:	4001	FC	1.67	MIN VP	0.04	MAX VP	0.67
	VAV-2-6- 01	16 "Ø					
3020	1	14" x 20"	1.94	248	254	1,035	1,057
	2	14" x 20"	1.94	248	250	1,035	1,040
	3	14" x 20"	1.94	248	252	1,035	1,049
			Total	745	755	3,105	3,146
Address:	4002	FC	1.65	MIN VP	0.05	MAX VP	0.82
	VAV-2-6- 02	12 "Ø					
3041	1	14" x 20"	1.94	143	143	570	573
	2	14" x 20"	1.94	143	140	570	561
	3	14" x 20"	1.94	143	145	570	579
			Total	428	428	1,710	1,713
Address:	2001	FC	1.18	MIN VP	0.00	MAX VP	0.66
	VAV-1-6- 01	16 "Ø					
DC COURT 2017	1	22" x 20"	3.06	248	253	1,035	1,055
	2	22" x 20"	3.06	248	256	1,035	1,067
	3	22" x 20"	3.06	248	260	1,035	1,083
			Total	745	769	3,105	3,205

F.H. INDICATES TESTED CFM USING FLOW HOOD.

**Comments:**

**Project:** Lowell Justice Center

**Address:** 370 Jackson Street, Lowell, MA

**Date:** 7/6/2020

**Project No.** 17-219

**AIR DISTRIBUTION**

**SYSTEM:** AHU-6

SUPPLY

RETURN

EXHAUST

ROOM OR LOCATION	UNIT NUMBER	UNIT SIZE	AREA xK FACTOR	DESIGN FT / MIN	TEST FT / MIN	DESIGN CFM	TEST CFM
7019	1	RL-1	0.83	596	600	495	498
	2	RL-1	0.83	596	612	495	508
	3	RL-1	0.83	596	636	495	528
	4	RL-1	0.83	596	627	495	520
	5	RL-1	0.83	596	641	495	532
	6	RL-1	0.83	596	653	495	542
6018	7	RL-1	0.83	590	644	490	535
	8	RL-1	0.83	590	636	490	528
	9	RL-1	0.83	590	618	490	513
	10	RL-1	0.83	590	600	490	498
	11	RL-1	0.83	590	609	490	505
	12	RL-1	0.83	590	619	490	514
5021	13	RL-1	0.83	651	667	540	554
	14	RL-1	0.83	651	646	540	536
	15	RL-1	0.83	651	661	540	549
4019	16	RL-1	0.83	633	600	525	498
	17	RL-1	0.83	633	620	525	515
	18	RL-1	0.83	633	640	525	531
3020	19	RL-1	0.83	627	617	520	512
	20	RL-1	0.83	627	627	520	520
	21	RL-1	0.83	627	631	520	524
	22	RL-1	0.83	627	615	520	510
	23	RL-1	0.83	627	600	520	498
	24	RL-1	0.83	627	631	520	524
3041	25	RL-1	0.83	693	681	575	565
	26	RL-1	0.83	693	674	575	559
	27	RL-1	0.83	693	638	575	530
2017	28	RL-1	0.83	627	642	520	533
	29	RL-1	0.83	627	607	520	504
	30	RL-1	0.83	627	600	520	498

F.H. INDICATES TESTED CFM USING FLOW HOOD

**TOTAL**

15,510

15,680

**Comments:**

**Project:** Lowell Justice Center

**Address:** 370 Jackson Street, Lowell, MA

**Date:** 7/6/2020

**Project No.** 17-219

**AIR DISTRIBUTION**

**SYSTEM:** AHU-6

SUPPLY

RETURN

EXHAUST

ROOM OR LOCATION	UNIT NUMBER	UNIT SIZE	AREA xK FACTOR	DESIGN FT / MIN	TEST FT / MIN	DESIGN CFM	TEST CFM
2017	31	RL-1	0.83	627	601	520	499
	32	RL-1	0.83	627	598	520	496
	33	RL-1	0.83	627	575	520	477
<b>TOTAL</b>						1,560	1,472

F.H. INDICATES TESTED CFM USING FLOW HOOD

**Comments:**

Project: Lowell Justice Center

Address: 370 Jackson Street, Lowell, MA

Date: 7/6/2020

Project No. 17-219

### VAV BOX AIR DISTRIBUTION

SYSTEM: AHU-7

ROOM OR LOCATION	BOX & OUTLET NUMBER	BOX & OUTLET SIZE	BOX INLET SP OR HOOD	DESIGN CFM AT MINIMUM	TESTED CFM AT MINIMUM	DESIGN CFM AT MAXIMUM	TESTED CFM AT MAXIMUM
Address:	21001	FC	1.22	MIN VP:	0.00	MAX VP:	0.48
	VAV-8-7- 01	10 "Ø					
D7139	1	SCD-2	F.H.	32	28	70	62
D7131	2	SCD-1	F.H.	9	28	20	62 *1
D7130	3	SCD-2	F.H.	32	33	70	73
D6118	4	SCD-2	F.H.	32	33	70	73
D6120	5	SCD-1	F.H.	9	18	20	39 *1
D6119	6	SCD-2	F.H.	32	80	70	178 *2
D5130	7	SCD-2	F.H.	32	67	70	149 *3
D5132	8	SCD-1	F.H.	9	16	20	36 *1
D5131	9	SCD-2	F.H.	32	33	70	74
D4132	10	SCD-2	F.H.	32	30	70	67
D4134	11	SCD-1	F.H.	9	23	20	50 *1
D4133	12	SCD-2	F.H.	32	34	70	76
D4136	13	SCD-1	F.H.	7	16	15	35 *1
D3084	14	SCD-2	F.H.	32	34	70	75
D3087	15	SCD-1	F.H.	9	20	20	45 *1
D3085	16	SCD-2	F.H.	32	32	70	72
D2155	17	SCD-2	F.H.	32	34	70	76
D2157	18	SCD-1	F.H.	9	24	20	54 *1
D2156	19	SCD-2	F.H.	32	34	70	75

Contractor to confirm VD is installed and seated correctly

VD for this diffuser is shown in corridor outside, contractor to confirm location for balancing.

F.H. INDICATES TESTED CFM USING FLOW HOOD.

**Comments:** \*1 Volume damper is closed.

\*2 Could not locate the volume damper.

\*3 No access to the volume damper.

Contractor to provide access to VD in corridor, confirm that all VD have been installed.

**Project:** Lowell Justice Center

**Address:** 370 Jackson Street, Lowell, MA

**Date:** 7/6/2020

**Project No.** 17-219

**VAV BOX AIR DISTRIBUTION**

**SYSTEM:** AHU-7

ROOM OR LOCATION	BOX & OUTLET NUMBER	BOX & OUTLET SIZE	BOX INLET SP OR HOOD	DESIGN CFM AT MINIMUM	TESTED CFM AT MINIMUM	DESIGN CFM AT MAXIMUM	TESTED CFM AT MAXIMUM
Address:	22001	FC	1.71	MIN VP	0.04	MAX VP	0.47
	VAV-6-7- 01	16 "Ø					
7128	1	14" x 20"	1.94	236	239	875	885
	2	14" x 20"	1.94	236	238	875	880
	3	14" x 20"	1.94	236	238	875	882
			Total	709	715	2,625	2,647
Address:	22002	FC	1.75	MIN VP	0.03	MAX VP	0.41
	VAV-6-7- 02	16 "Ø					
7145	1	14" x 20"	1.94	230	228	820	815
	2	14" x 20"	1.94	230	230	820	823
	3	14" x 20"	1.94	230	233	820	833
			Total	689	692	2,460	2,471
Address:	23001	FC	1.35	MIN VP	0.05	MAX VP	0.70
	VAV-5-7- 01	12 "Ø					
6112	1	14" x 20"	1.94	137	139	525	535
	2	14" x 20"	1.94	137	135	525	519
	3	14" x 20"	1.94	137	139	525	533
			Total	410	413	1,575	1,587
Address:	23002	FC	1.58	MIN VP	0.05	MAX VP	0.78
	VAV-5-7- 02	12 "Ø					
6132	1	14" x 20"		138	140	550	560
	2	14" x 20"		138	141	550	563
	3	14" x 20"		138	145	550	578
			Total	413	425	1,650	1,701

F.H. INDICATES TESTED CFM USING FLOW HOOD.

**Comments:**

**Project:** Lowell Justice Center

**Address:** 370 Jackson Street, Lowell, MA

**Date:** 7/6/2020

**Project No.** 17-219

**VAV BOX AIR DISTRIBUTION**

**SYSTEM:** AHU-7

ROOM OR LOCATION	BOX & OUTLET NUMBER	BOX & OUTLET SIZE	BOX INLET SP OR HOOD	DESIGN CFM AT MINIMUM	TESTED CFM AT MINIMUM	DESIGN CFM AT MAXIMUM	TESTED CFM AT MAXIMUM
Address:	24001	FC	1.55	MIN VP	0.05	MAX VP	0.80
	VAV-4-7- 01	12 "Ø					
5145	1	14" x 20"	1.94	138	141	550	565
	2	14" x 20"	1.94	138	140	550	560
	3	14" x 20"	1.94	138	142	550	567
			Total	413	423	1,650	1,692
Address:	25001	FC	0.99	MIN VP	0.00	MAX VP	0.00
	VAV-3-7- 01	12 "Ø					
4129	1	14" x 20"	1.94	147	137	525	489
	2	14" x 20"	1.94	147	134	525	480
	3	14" x 20"	1.94	147	140	525	500
			Total	441	411	1,575	1,469
Address:	25002	FC	1.54	VP	0.00	VP	0.90
	VAV-3-7- 02	16 "Ø					
4148	1	14" x 20"	1.94	217	208	835	800
	2	14" x 20"	1.94	217	220	835	846
	3	14" x 20"	1.94	217	223	835	856
			Total	651	651	2,505	2,502
Address:	5001	FC	1.40	MIN VP	0.03	MAX VP	0.36
	VAV-2-7- 01	14 "Ø					
3083	1	14" x 20"	1.94	173	175	575	583
	2	14" x 20"	1.94	173	168	575	560
	3	14" x 20"	1.94	173	176	575	587
			Total	518	519	1,725	1,730

F.H. INDICATES TESTED CFM USING FLOW HOOD.

**Comments:**

Project: Lowell Justice Center

Address: 370 Jackson Street, Lowell, MA

Date: 7/6/2020

Project No. 17-219

VAV BOX AIR DISTRIBUTION

SYSTEM: AHU-7

ROOM OR LOCATION	BOX & OUTLET NUMBER	BOX & OUTLET SIZE	BOX INLET SP OR HOOD	DESIGN CFM AT MINIMUM	TESTED CFM AT MINIMUM	DESIGN CFM AT MAXIMUM	TESTED CFM AT MAXIMUM
Address:	5002	FC	1.80	MIN VP	0.06	MAX VP	0.91
	VAV-2-7- 02	12 "ø					
3115	1	14" x 20"	1.94	156	150	600	575
	2	14" x 20"	1.94	156	158	600	609
	3	14" x 20"	1.94	156	156	600	600
			Total	468	464	1,800	1,784
Address:	3001	FC	1.78	MIN VP	0.05	MAX VP	0.85
	VAV-1-7- 01	12 "ø					
2175	1	14" x 20"	1.94	144	145	575	580
	2	14" x 20"	1.94	144	143	575	570
	3	14" x 20"	1.94	144	145	575	579
			Total	431	432	1,725	1,729

F.H. INDICATES TESTED CFM USING FLOW HOOD.

Comments:

Project: Lowell Justice Center

Address: 370 Jackson Street, Lowell, MA

Date: 7/6/2020

Project No. 17-219

### AIR DISTRIBUTION

SYSTEM: AHU-7

SUPPLY

RETURN

EXHAUST

ROOM OR LOCATION	UNIT NUMBER	UNIT SIZE	AREA xK FACTOR	DESIGN FT / MIN	TEST FT / MIN	DESIGN CFM	TEST CFM
7145	1	RL-1	0.83	602	655	500	544
	2	RL-1	0.83	602	645	500	535
	3	RL-1	0.83	602	640	500	531
	4	RL-1	0.83	602	612	500	508
	5	RL-1	0.83	602	615	500	510
7128	6	RL-1	0.83	633	669	525	555
	7	RL-1	0.83	633	657	525	545
	8	RL-1	0.83	633	650	525	540
	9	RL-1	0.83	633	633	525	525
	10	RL-1	0.83	633	641	525	532
6112	11	RL-1	0.83	633	623	525	517
	12	RL-1	0.83	633	615	525	510
	13	RL-1	0.83	633	630	525	523
6132	14	RL-1	0.83	663	660	550	548
	15	RL-1	0.83	663	645	550	535
	16	RL-1	0.83	663	631	550	524
5145	17	RL-1	0.83	663	640	550	531
	18	RL-1	0.83	663	625	550	519
	19	RL-1	0.83	663	660	550	548
4129	20	RL-1	0.83	633	616	525	511
	21	RL-1	0.83	633	627	525	520
	22	RL-1	0.83	633	600	525	498
4148	23	RL-1	0.83	602	600	500	498
	24	RL-1	0.83	602	610	500	506
	25	RL-1	0.83	602	602	500	500
	26	RL-1	0.83	602	615	500	510
	27	RL-1	0.83	602	600	500	498
3083	28	RL-1	0.83	693	735	575	610
	29	RL-1	0.83	693	700	575	581
	30	RL-1	0.83	693	627	575	520
<b>TOTAL</b>						15,800	15,835

F.H. INDICATES TESTED CFM USING FLOW HOOD

Comments:

Project: Lowell Justice Center

Address: 370 Jackson Street, Lowell, MA

Date: 7/6/2020

Project No. 17-219

AIR DISTRIBUTION

SYSTEM: AHU-7

SUPPLY

RETURN

EXHAUST

ROOM OR LOCATION	UNIT NUMBER	UNIT SIZE	AREA xK FACTOR	DESIGN FT / MIN	TEST FT / MIN	DESIGN CFM	TEST CFM
3115	31	RL-1	0.83	723	713	600	592
	32	RL-1	0.83	723	700	600	581
	33	RL-1	0.83	723	687	600	570
2175	34	RL-1	0.83	693	675	575	560
	35	RL-1	0.83	693	653	575	542
	36	RL-1	0.83	693	650	575	540
<b>TOTAL</b>						3,525	3,385

F.H. INDICATES TESTED CFM USING FLOW HOOD

Comments:

**Project:** Lowell Justice Center

**Address:** 370 Jackson Street, Lowell, MA

**Date:** 7/6/2020

**Project No.** 17-219

**AIR DISTRIBUTION**

**SYSTEM:** FC UNITS

SUPPLY

RETURN

EXHAUST

ROOM OR LOCATION	UNIT NUMBER	UNIT SIZE	AREA xK FACTOR	DESIGN FT / MIN	TEST FT / MIN	DESIGN CFM	TEST CFM
	FCU-1					FAN SPEED:	<b>HIGH</b>
S3-06	1	SSG-2	FH	NA	NA	520	523
	FCU-1					FAN SPEED:	<b>HIGH</b>
S3-04	1	SSG-2	FH	NA	NA	520	513
	FCU-1					FAN SPEED:	<b>HIGH</b>
S3-02	1	SSG-2	FH	NA	NA	520	520
	FCU-2					FAN SPEED:	<b>MED HIGH</b>
S4-06	1	SSG-2	FH	NA	NA	1,200	1,071
	FCU-2					FAN SPEED:	<b>MED HIGH</b>
S4-04	1	SSG-2	FH	NA	NA	1,200	980
	FCU-2					FAN SPEED:	<b>MED HIGH</b>
S4-02	1	SSG-2	FH	NA	NA	1,200	918
						<b>TOTAL</b>	5,160
							4,525

F.H. INDICATES TESTED CFM USING FLOW HOOD

**Comments:**

**Project:** Lowell Justice Center  
**Address:** 370 Jackson Street, Lowell, MA  
**Date:** 7/6/2020

**Project No.** 17-219

**COURTROOM FLOOR REGISTERS**

**SYSTEM:** AHU- 6

**TERMINAL UNIT:** VAV-1-6-01

**COURTROOM:** 1

ROOM OR LOCATION	UNIT NUMBER	DESIGN S.P.	TESTED S.P.	UNIT NUMBER	DESIGN S.P.	TESTED S.P.	UNIT NUMBER	DESIGN S.P.	TESTED S.P.
2017	1	0.04	0.038	34	0.04	0.043	66	0.04	0.041
	2	0.04	0.039	35	0.04	0.042	67	0.04	0.04
	3	0.04	0.04	36	0.04	0.041	68	0.04	0.042
	4	0.04	0.041	37	0.04	0.041	69	0.04	0.041
	5	0.04	0.041	38	0.04	0.042	70	0.04	0.041
	6	0.04	0.04	39	0.04	0.043	71	0.04	N.I.
	7	0.04	0.043	40	0.04	0.041	72	0.04	N.I.
	8	0.04	0.041	41	0.04	0.041	73	0.04	N.I.
	9	0.04	0.041	42	0.04	0.044	74	0.04	N.I.
	10	0.04	0.041	43	0.04	0.041	75	0.04	N.I.
	11	0.04	0.044	44	0.04	0.04	76	0.04	N.I.
	12	0.04	0.04	45	0.04	0.042	77	0.04	N.I.
	13	0.04	0.041	46	0.04	0.041	78	0.04	N.I.
	14	0.04	0.043	47	0.04	0.043	79	0.04	N.I.
	15	0.04	0.041	48	0.04	0.043	80	0.04	N.I.
	16	0.04	0.041	49	0.04	0.041	81	0.04	N.I.
	17	0.04	0.043	50	0.04	0.04	82	0.04	N.I.
	18	0.04	0.041	51	0.04	0.04	83	0.04	N.I.
	19	0.04	0.041	52	0.04	0.041	84	0.04	N.I.
	20	0.04	0.04	53	0.04	0.043	85	0.04	N.I.
	21	0.04	0.039	54	0.04	0.041	86	0.04	N.I.
	22	0.04	0.041	55	0.04	0.043	87	0.04	N.I.
	23	0.04	0.041	56	0.04	0.044	88	0.04	N.I.
	24	0.04	0.039	57	0.04	0.04	89	0.04	N.I.
	25	0.04	0.038	58	0.04	0.041	90	0.04	N.I.
	26	0.04	0.041	59	0.04	0.038			
	28	0.04	0.044	60	0.04	0.041			
	29	0.04	0.043	61	0.04	0.041			
	30	0.04	0.041	62	0.04	0.043			
	31	0.04	0.041	63	0.04	0.042			
	32	0.04	0.042	64	0.04	0.041			
	33	0.04	0.041	65	0.04	0.042			

**COMMENTS:** N.L. Not Installed

**Project:** Lowell Justice Center  
**Address:** 370 Jackson Street, Lowell, MA  
**Date:** 7/6/2020

**Project No.** 17-219

**COURTROOM FLOOR REGISTERS**

**SYSTEM:** AHU- 7

**TERMINAL UNIT:** VAV-1-7-01

**COURTROOM:** 2

ROOM OR LOCATION	UNIT NUMBER	DESIGN S.P.	TESTED S.P.	UNIT NUMBER	DESIGN S.P.	TESTED S.P.	UNIT NUMBER	DESIGN S.P.	TESTED S.P.
2175	1	0.04	0.022	33	0.04	0.02			
	2	0.04	0.023	34	0.04	0.022			
	3	0.04	0.022	35	0.04	0.023			
	4	0.04	0.022	36	0.04	0.021			
	5	0.04	0.021	37	0.04	0.023			
	6	0.04	0.022	38	0.04	0.021			
	7	0.04	0.023	39	0.04	0.02			
	8	0.04	0.022	40	0.04	0.021			
	9	0.04	0.022	41	0.04	0.021			
	10	0.04	0.021	42	0.04	0.022			
	11	0.04	0.021	43	0.04	0.023			
	12	0.04	0.021	44	0.04	0.022			
	13	0.04	0.023	45	0.04	0.021			
	14	0.04	0.021	46	0.04	0.021			
	15	0.04	0.023	47	0.04	0.021			
	16	0.04	0.021	48	0.04	0.021			
	17	0.04	0.022	49	0.04	0.021			
	18	0.04	0.022						
	19	0.04	0.023						
	20	0.04	0.023						
	21	0.04	0.023						
	22	0.04	0.022						
	23	0.04	0.021						
	24	0.04	0.021						
	25	0.04	0.02						
	26	0.04	0.021						
	27	0.04	0.023						
	28	0.04	0.021						
	29	0.04	0.022						
	30	0.04	0.021						
	31	0.04	0.021						
	32	0.04	0.023						

**COMMENTS:**

**Project:** Lowell Justice Center  
**Address:** 370 Jackson Street, Lowell, MA  
**Date:** 7/6/2020

**Project No.** 17-219

**COURTROOM FLOOR REGISTERS**

**SYSTEM:** AHU- 6

**TERMINAL UNIT:** VAV-2-6-01

**COURTROOM:** 3

ROOM OR LOCATION	UNIT NUMBER	DESIGN S.P.	TESTED S.P.	UNIT NUMBER	DESIGN S.P.	TESTED S.P.	UNIT NUMBER	DESIGN S.P.	TESTED S.P.
3020	1	0.04	0.044	33	0.04	0.038	65	0.04	0.041
	2	0.04	0.044	34	0.04	0.044	66	0.04	0.043
	3	0.04	0.046	35	0.04	0.041	67	0.04	0.042
	4	0.04	0.045	36	0.04	0.044	68	0.04	0.041
	5	0.04	0.035	37	0.04	0.04	69	0.04	0.041
	6	0.04	0.041	38	0.04	0.039	70	0.04	N.I.
	7	0.04	0.041	39	0.04	0.041	71	0.04	N.I.
	8	0.04	0.043	40	0.04	0.044	72	0.04	N.I.
	9	0.04	0.043	41	0.04	0.043	73	0.04	N.I.
	10	0.04	0.043	42	0.04	0.041	74	0.04	N.I.
	11	0.04	0.044	43	0.04	0.04	75	0.04	N.I.
	12	0.04	0.042	44	0.04	0.04	76	0.04	N.I.
	13	0.04	0.038	45	0.04	0.044	77	0.04	N.I.
	14	0.04	0.04	46	0.04	0.043	78	0.04	N.I.
	15	0.04	0.038	47	0.04	0.038	79	0.04	N.I.
	16	0.04	0.043	48	0.04	0.041	80	0.04	N.I.
	17	0.04	0.041	49	0.04	0.044	81	0.04	N.I.
	18	0.04	0.044	50	0.04	0.043	82	0.04	N.I.
	19	0.04	0.042	51	0.04	0.041	83	0.04	N.I.
	20	0.04	0.044	52	0.04	0.044	84	0.04	N.I.
	21	0.04	0.042	53	0.04	0.04	85	0.04	N.I.
	22	0.04	0.042	54	0.04	0.042	86	0.04	N.I.
	23	0.04	0.04	55	0.04	0.042	87	0.04	N.I.
	24	0.04	0.043	56	0.04	0.044	88	0.04	N.I.
	25	0.04	0.042	57	0.04	0.041	89	0.04	N.I.
	26	0.04	0.043	58	0.04	0.039			
	27	0.04	0.043	59	0.04	0.038			
	28	0.04	0.044	60	0.04	0.041			
	29	0.04	0.043	61	0.04	0.041			
	30	0.04	0.041	62	0.04	0.043			
	31	0.04	0.041	63	0.04	0.042			
	32	0.04	0.042	64	0.04	0.041			

**COMMENTS:** N.I. Not Installed

**Project:** Lowell Justice Center  
**Address:** 370 Jackson Street, Lowell, MA  
**Date:** 7/6/2020

**Project No.** 17-219

**COURTROOM FLOOR REGISTERS**

**SYSTEM:** AHU- 6

**TERMINAL UNIT:** VAV-2-6-02

**COURTROOM:** 4

ROOM OR LOCATION	UNIT NUMBER	DESIGN S.P.	TESTED S.P.	UNIT NUMBER	DESIGN S.P.	TESTED S.P.	UNIT NUMBER	DESIGN S.P.	TESTED S.P.
3041	1	0.04	0.023	33	0.04	0.022			
	2	0.04	0.023	34	0.04	0.02			
	3	0.04	0.023	35	0.04	0.021			
	4	0.04	0.021	36	0.04	0.023			
	5	0.04	0.022	37	0.04	0.021			
	6	0.04	0.023	38	0.04	0.021			
	7	0.04	0.022	39	0.04	0.024			
	8	0.04	0.022	40	0.04	0.023			
	9	0.04	0.021	41	0.04	0.023			
	10	0.04	0.2	42	0.04	0.021			
	11	0.04	0.022	43	0.04	0.023			
	12	0.04	0.022	44	0.04	0.021			
	13	0.04	0.2	45	0.04	0.02			
	14	0.04	0.022	46	0.04	0.023			
	15	0.04	0.021	47	0.04	0.024			
	16	0.04	0.021	48	0.04	0.021			
	17	0.04	0.02	49	0.04	0.021			
	18	0.04	0.022						
	19	0.04	0.022						
	20	0.04	0.022						
	21	0.04	0.021						
	22	0.04	0.021						
	23	0.04	0.023						
	24	0.04	0.021						
	25	0.04	0.021						
	26	0.04	0.02						
	27	0.04	0.022						
	28	0.04	0.022						
	29	0.04	0.021						
	30	0.04	0.022						
	31	0.04	0.021						
	32	0.04	0.023						

**COMMENTS:**

**Project:** Lowell Justice Center  
**Address:** 370 Jackson Street, Lowell, MA  
**Date:** 7/6/2020

**Project No.** 17-219

**COURTROOM FLOOR REGISTERS**

**SYSTEM:** AHU-

**TERMINAL UNIT:** VAV-2-7-01

**COURTROOM:** 5

ROOM OR LOCATION	UNIT NUMBER	DESIGN S.P.	TESTED S.P.	UNIT NUMBER	DESIGN S.P.	TESTED S.P.	UNIT NUMBER	DESIGN S.P.	TESTED S.P.
3083	1	0.04	0.015	33	0.04	0.015			
	2	0.04	0.016	34	0.04	0.016			
	3	0.04	0.016	35	0.04	0.016			
	4	0.04	0.016	36	0.04	0.015			
	5	0.04	0.014	37	0.04	0.013			
	6	0.04	0.015	38	0.04	0.016			
	7	0.04	0.016	39	0.04	0.016			
	8	0.04	0.017	40	0.04	0.013			
	9	0.04	0.015	41	0.04	0.016			
	10	0.04	0.015	42	0.04	0.016			
	11	0.04	0.016	43	0.04	0.015			
	12	0.04	0.014	44	0.04	0.013			
	13	0.04	0.013	45	0.04	0.015			
	14	0.04	0.014	46	0.04	0.016			
	15	0.04	0.016	47	0.04	0.017			
	16	0.04	0.014	48	0.04	0.016			
	17	0.04	0.016	49	0.04	0.015			
	18	0.04	0.014						
	19	0.04	0.016						
	20	0.04	0.016						
	21	0.04	0.015						
	22	0.04	0.015						
	23	0.04	0.016						
	24	0.04	0.015						
	25	0.04	0.014						
	26	0.04	0.013						
	27	0.04	0.015						
	28	0.04	0.016						
	29	0.04	0.015						
	30	0.04	0.016						
	31	0.04	0.013						
	32	0.04	0.016						

**COMMENTS:**

**Project:** Lowell Justice Center  
**Address:** 370 Jackson Street, Lowell, MA  
**Date:** 7/6/2020

**Project No.** 17-219

**COURTROOM FLOOR REGISTERS**

**SYSTEM:** AHU- 7

**TERMINAL UNIT:** VAV-2-7-02

**COURTROOM:** 6

ROOM OR LOCATION	UNIT NUMBER	DESIGN S.P.	TESTED S.P.	UNIT NUMBER	DESIGN S.P.	TESTED S.P.	UNIT NUMBER	DESIGN S.P.	TESTED S.P.
3115	1	0.04	0.028	33	0.04	0.027			
	2	0.04	0.027	34	0.04	0.026			
	3	0.04	0.028	35	0.04	0.028			
	4	0.04	0.027	36	0.04	0.028			
	5	0.04	0.027	37	0.04	0.026			
	6	0.04	0.028	38	0.04	0.026			
	7	0.04	0.029	39	0.04	0.027			
	8	0.04	0.027	40	0.04	0.028			
	9	0.04	0.028	41	0.04	0.028			
	10	0.04	0.027	42	0.04	0.026			
	11	0.04	0.027	43	0.04	0.025			
	12	0.04	0.028	44	0.04	0.026			
	13	0.04	0.028	45	0.04	0.026			
	14	0.04	0.027	46	0.04	0.027			
	15	0.04	0.028	47	0.04	0.026			
	16	0.04	0.027	48	0.04	0.028			
	17	0.04	0.026	49	0.04	N.I.			
	18	0.04	0.027	50	0.04	N.I.			
	19	0.04	0.028						
	20	0.04	0.027						
	21	0.04	0.027						
	22	0.04	0.028						
	23	0.04	0.027						
	24	0.04	0.027						
	25	0.04	0.025						
	26	0.04	0.026						
	27	0.04	0.027						
	28	0.04	0.027						
	29	0.04	0.028						
	30	0.04	0.025						
	31	0.04	0.026						
	32	0.04	0.026						

**COMMENTS:** N.I. Not Installed

**Project:** Lowell Justice Center  
**Address:** 370 Jackson Street, Lowell, MA  
**Date:** 7/6/2020

**Project No.** 17-219

**COURTROOM FLOOR REGISTERS**

**SYSTEM:** AHU- 6

**TERMINAL UNIT:** VAV-3-6-01

**COURTROOM:** 7

ROOM OR LOCATION	UNIT NUMBER	DESIGN S.P.	TESTED S.P.	UNIT NUMBER	DESIGN S.P.	TESTED S.P.	UNIT NUMBER	DESIGN S.P.	TESTED S.P.
4019	1	0.04	0.03	33	0.04	0.028			
	2	0.04	0.031	34	0.04	0.027			
	3	0.04	0.031	35	0.04	0.028			
	4	0.04	0.035	36	0.04	0.028			
	5	0.04	0.035	37	0.04	0.028			
	6	0.04	0.035	38	0.04	0.027			
	7	0.04	0.031	39	0.04	0.027			
	8	0.04	0.031	40	0.04	0.028			
	9	0.04	0.029	41	0.04	0.027			
	10	0.04	0.029	42	0.04	0.027			
	11	0.04	0.031	43	0.04	0.028			
	12	0.04	0.029	44	0.04	0.029			
	13	0.04	0.031	45	0.04	N.I.			
	14	0.04	0.032	46	0.04	N.I.			
	15	0.04	0.031						
	16	0.04	0.03						
	17	0.04	0.029						
	18	0.04	0.03						
	19	0.04	0.03						
	20	0.04	0.03						
	21	0.04	0.03						
	22	0.04	0.03						
	23	0.04	0.028						
	24	0.04	0.028						
	25	0.04	0.026						
	26	0.04	0.026						
	27	0.04	0.026						
	28	0.04	0.028						
	29	0.04	0.027						
	30	0.04	0.027						
	31	0.04	0.026						
	32	0.04	0.028						

**COMMENTS:** N.I. Not Installed

**Project:** Lowell Justice Center  
**Address:** 370 Jackson Street, Lowell, MA  
**Date:** 7/6/2020

**Project No.** 17-219

**COURTROOM FLOOR REGISTERS**

**SYSTEM:** AHU- 7

**TERMINAL UNIT:** VAV-3-7-01

**COURTROOM:** 8

ROOM OR LOCATION	UNIT NUMBER	DESIGN S.P.	TESTED S.P.	UNIT NUMBER	DESIGN S.P.	TESTED S.P.	UNIT NUMBER	DESIGN S.P.	TESTED S.P.
4129	1	0.04	0.021	33	0.04	0.018			
	2	0.04	0.021	34	0.04	0.019			
	3	0.04	0.021	35	0.04	0.019			
	4	0.04	0.02	36	0.04	0.02			
	5	0.04	0.02	37	0.04	0.02			
	6	0.04	0.021	38	0.04	0.021			
	7	0.04	0.02	39	0.04	0.02			
	8	0.04	0.02	40	0.04	0.019			
	9	0.04	0.019	41	0.04	0.019			
	10	0.04	0.02	42	0.04	0.019			
	11	0.04	0.021	43	0.04	0.02			
	12	0.04	0.02	44	0.04	N.I.			
	13	0.04	0.021						
	14	0.04	0.02						
	15	0.04	0.02						
	16	0.04	0.019						
	17	0.04	0.019						
	18	0.04	0.019						
	19	0.04	0.02						
	20	0.04	0.02						
	21	0.04	0.018						
	22	0.04	0.019						
	23	0.04	0.018						
	24	0.04	0.021						
	25	0.04	0.019						
	26	0.04	0.019						
	27	0.04	0.02						
	28	0.04	0.02						
	29	0.04	0.021						
	30	0.04	0.019						
	31	0.04	0.02						
	32	0.04	0.021						

**COMMENTS:** N.I. Not Installed

Project: Lowell Justice Center  
 Address: 370 Jackson Street, Lowell, MA  
 Date: 7/6/2020

Project No. 17-219

**COURTROOM FLOOR REGISTERS**

SYSTEM: AHU- 7

TERMINAL UNIT: VAV-3-7-01

COURTROOM: 9

ROOM OR LOCATION	UNIT NUMBER	DESIGN S.P.	TESTED S.P.	UNIT NUMBER	DESIGN S.P.	TESTED S.P.	UNIT NUMBER	DESIGN S.P.	TESTED S.P.
4148	1	0.04	0.018	33	0.04	0.018	65	0.04	N.I.
	2	0.04	0.018	34	0.04	0.018	66	0.04	N.I.
	3	0.04	0.018	35	0.04	0.016	67	0.04	N.I.
	4	0.04	0.015	36	0.04	0.018	68	0.04	N.I.
	5	0.04	0.018	37	0.04	0.017	69	0.04	N.I.
	6	0.04	0.018	38	0.04	0.017	70	0.04	N.I.
	7	0.04	0.017	39	0.04	0.017			
	8	0.04	0.019	40	0.04	0.017			
	9	0.04	0.018	41	0.04	0.017			
	10	0.04	0.018	42	0.04	0.017			
	11	0.04	0.017	43	0.04	0.017			
	12	0.04	0.018	44	0.04	0.017			
	13	0.04	0.018	45	0.04	0.017			
	14	0.04	0.018	46	0.04	0.018			
	15	0.04	0.017	47	0.04	0.018			
	16	0.04	0.017	48	0.04	0.016			
	17	0.04	0.017	49	0.04	0.017			
	18	0.04	0.017	50	0.04	0.016			
	19	0.04	0.017	51	0.04	0.018			
	20	0.04	0.017	52	0.04	0.017			
	21	0.04	0.017	53	0.04	0.017			
	22	0.04	0.017	54	0.04	0.017			
	23	0.04	0.017	55	0.04	0.018			
	24	0.04	0.018	56	0.04	0.016			
	25	0.04	0.017	57	0.04	0.016			
	26	0.04	0.017	58	0.04	0.017			
	27	0.04	0.016	59	0.04	0.016			
	28	0.04	0.019	60	0.04	0.016			
	29	0.04	0.017	61	0.04	0.017			
	30	0.04	0.018	62	0.04	0.016			
	31	0.04	0.017	63	0.04	0.016			
	32	0.04	0.018	64	0.04	0.017			

COMMENTS: N.I. NOT INSTALLED

**Project:** Lowell Justice Center  
**Address:** 370 Jackson Street, Lowell, MA  
**Date:** 7/6/2020

**Project No.** 17-219

**COURTROOM FLOOR REGISTERS**

**SYSTEM:** AHU- 6

**TERMINAL UNIT:** VAV-4-6-01

**COURTROOM:** 10

ROOM OR LOCATION	UNIT NUMBER	DESIGN S.P.	TESTED S.P.	UNIT NUMBER	DESIGN S.P.	TESTED S.P.	UNIT NUMBER	DESIGN S.P.	TESTED S.P.
5021	1	0.04	0.022	33	0.04	0.021			
	2	0.04	0.021	34	0.04	0.021			
	3	0.04	0.021	35	0.04	0.022			
	4	0.04	0.022	36	0.04	0.021			
	5	0.04	0.022	37	0.04	0.021			
	6	0.04	0.023	38	0.04	0.021			
	7	0.04	0.021	39	0.04	0.021			
	8	0.04	0.022	40	0.04	0.02			
	9	0.04	0.02	41	0.04	0.021			
	10	0.04	0.021	42	0.04	0.02			
	11	0.04	0.02	43	0.04	0.022			
	12	0.04	0.021	44	0.04	N.I.			
	13	0.04	0.021	45	0.04	N.I.			
	14	0.04	0.022						
	15	0.04	0.021						
	16	0.04	0.022						
	17	0.04	0.021						
	18	0.04	0.022						
	19	0.04	0.022						
	20	0.04	0.022						
	21	0.04	0.021						
	22	0.04	0.021						
	23	0.04	0.021						
	24	0.04	0.021						
	25	0.04	0.019						
	26	0.04	0.021						
	27	0.04	0.021						
	28	0.04	0.021						
	29	0.04	0.021						
	30	0.04	0.016						
	31	0.04	0.021						
	32	0.04	0.021						

**COMMENTS:** N.I. Not Installed

**Project:** Lowell Justice Center  
**Address:** 370 Jackson Street, Lowell, MA  
**Date:** 7/6/2020

**Project No.** 17-219

**COURTROOM FLOOR REGISTERS**

**SYSTEM:** AHU- 7

**TERMINAL UNIT:** VAV-4-7-01

**COURTROOM:** 11

ROOM OR LOCATION	UNIT NUMBER	DESIGN S.P.	TESTED S.P.	UNIT NUMBER	DESIGN S.P.	TESTED S.P.	UNIT NUMBER	DESIGN S.P.	TESTED S.P.
5145	1	0.04	0.022	33	0.04	0.016			
	2	0.04	0.022	34	0.04	0.021			
	3	0.04	0.022	35	0.04	0.02			
	4	0.04	0.022	36	0.04	0.02			
	5	0.04	0.021	37	0.04	0.019			
	6	0.04	0.021	38	0.04	0.021			
	7	0.04	0.022	39	0.04	0.021			
	8	0.04	0.022	40	0.04	0.02			
	9	0.04	0.02	41	0.04	0.02			
	10	0.04	0.021	42	0.04	0.019			
	11	0.04	0.021	43	0.04	0.02			
	12	0.04	0.021	44	0.04	N.I.			
	13	0.04	0.02	45	0.04	N.I.			
	14	0.04	0.021	46	0.04	N.I.			
	15	0.04	0.021						
	16	0.04	0.022						
	17	0.04	0.02						
	18	0.04	0.02						
	19	0.04	0.019						
	20	0.04	0.021						
	21	0.04	0.02						
	22	0.04	0.021						
	23	0.04	0.02						
	24	0.04	0.021						
	25	0.04	0.021						
	26	0.04	0.022						
	27	0.04	0.021						
	28	0.04	0.021						
	29	0.04	0.019						
	30	0.04	0.021						
	31	0.04	0.02						
	32	0.04	0.021						

**COMMENTS:** N.I. Not Installed

**Project:** Lowell Justice Center  
**Address:** 370 Jackson Street, Lowell, MA  
**Date:** 7/6/2020

**Project No.** 17-219

**COURTROOM FLOOR REGISTERS**

**SYSTEM:** AHU-6                      **TERMINAL UNIT:** VAV-5-6-01                      **COURTROOM:** 12

ROOM OR LOCATION	UNIT NUMBER	DESIGN S.P.	TESTED S.P.	UNIT NUMBER	DESIGN S.P.	TESTED S.P.	UNIT NUMBER	DESIGN S.P.	TESTED S.P.
6018	1	0.04	0.05	33	0.04	0.05	65	0.04	N.I.
	2	0.04	0.05	34	0.04	0.05	66	0.04	N.I.
	3	0.04	0.05	35	0.04	0.05	67	0.04	N.I.
	4	0.04	0.05	36	0.04	0.03	68	0.04	N.I.
	5	0.04	0.05	37	0.04	0.05	69	0.04	N.I.
	6	0.04	0.05	38	0.04	0.05	70	0.04	N.I.
	7	0.04	0.05	39	0.04	0.05	71	0.04	N.I.
	8	0.04	0.05	40	0.04	0.05	72	0.04	N.I.
	9	0.04	0.05	41	0.04	0.05	73	0.04	N.I.
	10	0.04	0.05	42	0.04	0.05	74	0.04	N.I.
	11	0.04	0.05	43	0.04	0.05	75	0.04	N.I.
	12	0.04	0.05	44	0.04	0.05	76	0.04	N.I.
	13	0.04	0.05	45	0.04	0.05	77	0.04	N.I.
	14	0.04	0.05	46	0.04	0.05	78	0.04	N.I.
	15	0.04	0.05	47	0.04	0.05	79	0.04	N.I.
	16	0.04	0.05	48	0.04	0.05	80	0.04	N.I.
	17	0.04	0.05	49	0.04	0.05	81	0.04	N.I.
	18	0.04	0.05	50	0.04	0.05	82	0.04	N.I.
	19	0.04	0.05	51	0.04	0.05	83	0.04	N.I.
	20	0.04	0.05	52	0.04	0.05	84	0.04	N.I.
	21	0.04	0.05	53	0.04	0.05			
	22	0.04	0.05	54	0.04	0.04			
	23	0.04	0.05	55	0.04	0.05			
	24	0.04	0.05	56	0.04	0.05			
	25	0.04	0.05	57	0.04	0.05			
	26	0.04	0.05	58	0.04	0.05			
	27	0.04	0.06	59	0.04	0.04			
	28	0.04	0.05	60	0.04	0.04			
	29	0.04	0.03	61	0.04	0.04			
	30	0.04	0.05	62	0.04	0.05			
	31	0.04	0.05	63	0.04	0.05			
	32	0.04	0.05	64	0.04	0.05			

**COMMENTS:** N.I. Not Installed

**Project:** Lowell Justice Center  
**Address:** 370 Jackson Street, Lowell, MA  
**Date:** 7/6/2020

**Project No.** 17-219

**COURTROOM FLOOR REGISTERS**

**SYSTEM:** AHU-7

**TERMINAL UNIT:** VAV-5-7-01

**COURTROOM:** 13

ROOM OR LOCATION	UNIT NUMBER	DESIGN S.P.	TESTED S.P.	UNIT NUMBER	DESIGN S.P.	TESTED S.P.	UNIT NUMBER	DESIGN S.P.	TESTED S.P.
6112	1	0.04	0.02	33	0.04	0.02			
	2	0.04	0.02	34	0.04	0.02			
	3	0.04	0.02	35	0.04	0.02			
	4	0.04	0.02	36	0.04	0.02			
	5	0.04	0.02	37	0.04	0.02			
	6	0.04	0.02	38	0.04	0.02			
	7	0.04	0.02	39	0.04	0.02			
	8	0.04	0.02	40	0.04	0.02			
	9	0.04	0.02	41	0.04	0.02			
	10	0.04	0.02	42	0.04	0.02			
	11	0.04	0.02	43	0.00	N.I.			
	12	0.04	0.02	44	0.00	N.I.			
	13	0.04	0.02	45	0.00	N.I.			
	14	0.04	0.02						
	15	0.04	0.02						
	16	0.04	0.02						
	17	0.04	0.02						
	18	0.04	0.02						
	19	0.04	0.02						
	20	0.04	0.02						
	21	0.04	0.02						
	22	0.04	0.02						
	23	0.04	0.02						
	24	0.04	0.02						
	25	0.04	0.02						
	26	0.04	0.02						
	27	0.04	0.02						
	28	0.04	0.02						
	29	0.04	0.02						
	30	0.04	0.02						
	31	0.04	0.02						
	32	0.04	0.02						

**COMMENTS:** N.I. Not Installed

**Project:** Lowell Justice Center  
**Address:** 370 Jackson Street, Lowell, MA  
**Date:** 7/6/2020

**Project No.** 17-219

**COURTROOM FLOOR REGISTERS**

**SYSTEM:** AHU-7

**TERMINAL UNIT:** VAV-5-7-02

**COURTROOM:** 14

ROOM OR LOCATION	UNIT NUMBER	DESIGN S.P.	TESTED S.P.	UNIT NUMBER	DESIGN S.P.	TESTED S.P.	UNIT NUMBER	DESIGN S.P.	TESTED S.P.
6132	1	0.04	0.026	33	0.04	0.025			
	2	0.04	0.025	34	0.04	0.026			
	3	0.04	0.025	35	0.04	0.024			
	4	0.04	0.019	36	0.04	,024			
	5	0.04	0.025	37	0.04	0.024			
	6	0.04	0.025	38	0.04	0.025			
	7	0.04	0.026	39	0.04	0.025			
	8	0.04	0.026	40	0.04	0.025			
	9	0.04	0.026	41	0.04	0.024			
	10	0.04	0.026	42	0.04	0.025			
	11	0.04	0.026	43	0.04	0.025			
	12	0.04	0.023	44	0.04	N.I.			
	13	0.04	0.027	45	0.04	N.I.			
	14	0.04	0.026	46	0.04	N.I.			
	15	0.04	0.025						
	16	0.04	0.036						
	17	0.04	0.026						
	18	0.04	0.026						
	19	0.04	0.022						
	20	0.04	0.025						
	21	0.04	0.024						
	22	0.04	0.025						
	23	0.04	0.028						
	24	0.04	0.027						
	25	0.04	0.026						
	26	0.04	0.026						
	27	0.04	0.025						
	28	0.04	0.025						
	29	0.04	0.024						
	30	0.04	0.027						
	31	0.04	0.027						
	32	0.04	0.026						

**COMMENTS:** N.I. Not Installed

**Project:** Lowell Justice Center  
**Address:** 370 Jackson Street, Lowell, MA  
**Date:** 7/6/2020

**Project No.** 17-219

**COURTROOM FLOOR REGISTERS**

**SYSTEM:** AHU-6

**TERMINAL UNIT:** VAV-6-6-01

**COURTROOM:** 15

ROOM OR LOCATION	UNIT NUMBER	DESIGN S.P.	TESTED S.P.	UNIT NUMBER	DESIGN S.P.	TESTED S.P.	UNIT NUMBER	DESIGN S.P.	TESTED S.P.
7019	1	0.04	0.034	33	0.04	0.032	65	0.04	0.031
	2	0.04	0.033	34	0.04	0.033	66	0.04	0.028
	3	0.04	0.033	35	0.04	0.031	67	0.04	0.031
	4	0.04	0.033	36	0.04	0.031	68	0.04	N.I.
	5	0.04	0.033	37	0.04	0.031	69	0.04	N.I.
	6	0.04	0.034	38	0.04	0.031	70	0.04	N.I.
	7	0.04	0.032	39	0.04	0.032	71	0.04	N.I.
	8	0.04	0.033	40	0.04	0.031	72	0.04	N.I.
	9	0.04	0.032	41	0.04	0.032	73	0.04	N.I.
	10	0.04	0.03	42	0.04	0.032	74	0.04	N.I.
	11	0.04	0.034	43	0.04	0.031	75	0.04	N.I.
	12	0.04	0.032	44	0.04	0.0312	76	0.04	N.I.
	13	0.04	0.031	45	0.04	0.033	77	0.04	N.I.
	14	0.04	0.032	46	0.04	0.031	78	0.04	N.I.
	15	0.04	0.032	47	0.04	0.032	79	0.04	N.I.
	16	0.04	0.032	48	0.04	0.031	80	0.04	N.I.
	17	0.04	0.033	49	0.04	0.031	81	0.04	N.I.
	18	0.04	0.034	50	0.04	0.031	82	0.04	N.I.
	19	0.04	0.033	51	0.04	0.031	83	0.04	N.I.
	20	0.04	0.03	52	0.04	0.03	84	0.04	N.I.
	21	0.04	0.031	53	0.04	0.03	85	0.04	N.I.
	22	0.04	0.031	54	0.04	0.031			
	23	0.04	0.032	55	0.04	0.031			
	24	0.04	0.032	56	0.04	0.032			
	25	0.04	0.031	57	0.04	0.031			
	26	0.04	0.031	58	0.04	0.032			
	27	0.04	0.032	59	0.04	0.032			
	28	0.04	0.032	60	0.04	0.031			
	29	0.04	0.033	61	0.04	0.031			
	30	0.04	0.033	62	0.04	0.031			
	31	0.04	0.032	63	0.04	0.032			
	32	0.04	0.032	64	0.04	0.032			

**COMMENTS:** N.I. Not Installed

**Project:** Lowell Justice Center  
**Address:** 370 Jackson Street, Lowell, MA  
**Date:** 7/6/2020

**Project No.** 17-219

**COURTROOM FLOOR REGISTERS**

**SYSTEM:** AHU-7

**TERMINAL UNIT:** VAV-6-7-01

**COURTROOM:** 16

ROOM OR LOCATION	UNIT NUMBER	DESIGN S.P.	TESTED S.P.	UNIT NUMBER	DESIGN S.P.	TESTED S.P.	UNIT NUMBER	DESIGN S.P.	TESTED S.P.
7128	1	0.04	0.033	33	0.04	0.033	65	0.04	0.032
	2	0.04	0.033	34	0.04	0.032	66	0.04	0.032
	3	0.04	0.033	35	0.04	0.032	67	0.04	0.031
	4	0.04	0.033	36	0.04	0.032	68	0.04	N.I.
	5	0.04	0.033	37	0.04	0.033	69	0.04	N.I.
	6	0.04	0.033	38	0.04	0.033	70	0.04	N.I.
	7	0.04	0.032	39	0.04	0.033	71	0.04	N.I.
	8	0.04	0.032	40	0.04	0.031	72	0.04	N.I.
	9	0.04	0.032	41	0.04	0.032	73	0.04	N.I.
	10	0.04	0.031	42	0.04	0.032	74	0.04	N.I.
	11	0.04	0.033	43	0.04	0.032			
	12	0.04	0.033	44	0.04	0.033			
	13	0.04	0.032	45	0.04	0.034			
	14	0.04	0.033	46	0.04	0.033			
	15	0.04	0.031	47	0.04	0.031			
	16	0.04	0.033	48	0.04	0.033			
	17	0.04	0.033	49	0.04	0.035			
	18	0.04	0.033	50	0.04	0.033			
	19	0.04	0.033	51	0.04	0.033			
	20	0.04	0.031	52	0.04	0.03			
	21	0.04	0.033	53	0.04	0.033			
	22	0.04	0.033	54	0.04	0.032			
	23	0.04	0.034	55	0.04	0.033			
	24	0.04	0.033	56	0.04	0.033			
	25	0.04	0.032	57	0.04	0.032			
	26	0.04	0.032	58	0.04	0.033			
	27	0.04	0.033	59	0.04	0.033			
	28	0.04	0.033	60	0.04	0.032			
	29	0.04	0.033	61	0.04	0.033			
	30	0.04	0.033	62	0.04	0.033			
	31	0.04	0.032	63	0.04	0.033			
	32	0.04	0.032	64	0.04	0.032			

**COMMENTS:** N.I. Not Installed

**Project:** Lowell Justice Center  
**Address:** 370 Jackson Street, Lowell, MA  
**Date:** 7/6/2020

**Project No.** 17-219

**COURTROOM FLOOR REGISTERS**

**SYSTEM:** AHU-7

**TERMINAL UNIT:** VAV-6-7-02

**COURTROOM:** 17

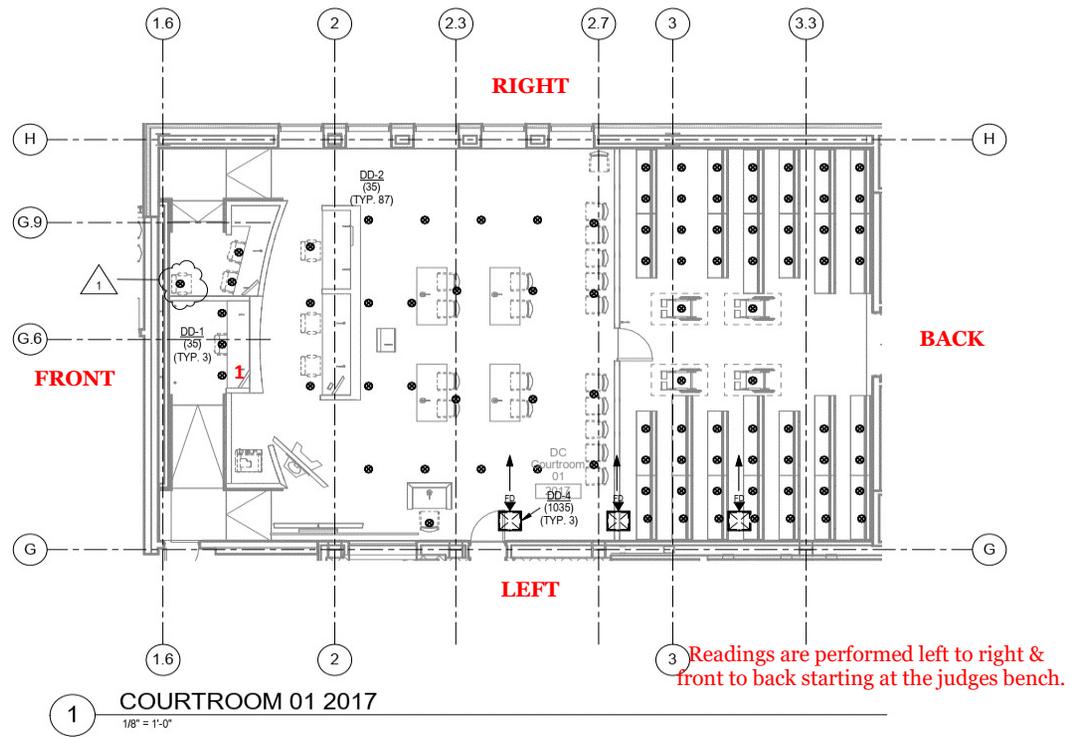
ROOM OR LOCATION	UNIT NUMBER	DESIGN S.P.	TESTED S.P.	UNIT NUMBER	DESIGN S.P.	TESTED S.P.	UNIT NUMBER	DESIGN S.P.	TESTED S.P.
7145	1	0.04	0.027	33	0.04	0.026	65	0.04	N.I.
	2	0.04	0.027	34	0.04	0.027	66	0.04	N.I.
	3	0.04	0.023	35	0.04	0.026	67	0.04	N.I.
	4	0.04	0.027	36	0.04	0.023	68	0.04	N.I.
	5	0.04	0.028	37	0.04	0.026	69	0.04	N.I.
	6	0.04	0.028	38	0.04	0.026	70	0.04	N.I.
	7	0.04	0.027	39	0.04	0.027			
	8	0.04	0.027	40	0.04	0.025			
	9	0.04	0.027	41	0.04	0.025			
	10	0.04	0.026	42	0.04	0.026			
	11	0.04	0.025	43	0.04	0.026			
	12	0.04	0.026	44	0.04	0.027			
	13	0.04	0.027	45	0.04	0.026			
	14	0.04	0.027	46	0.04	0.026			
	15	0.04	0.027	47	0.04	0.026			
	16	0.04	0.027	48	0.04	0.025			
	17	0.04	0.026	49	0.04	0.025			
	18	0.04	0.026	50	0.04	0.026			
	19	0.04	0.026	51	0.04	0.027			
	20	0.04	0.02	52	0.04	0.026			
	21	0.04	0.025	53	0.04	0.026			
	22	0.04	0.027	54	0.04	0.026			
	23	0.04	0.027	55	0.04	0.028			
	24	0.04	0.026	56	0.04	0.026			
	25	0.04	0.027	57	0.04	0.027			
	26	0.04	0.027	58	0.04	0.026			
	27	0.04	0.027	59	0.04	0.026			
	28	0.04	0.027	60	0.04	0.026			
	29	0.04	0.027	61	0.04	0.027			
	30	0.04	0.027	62	0.04	0.026			
	31	0.04	0.026	63	0.04	0.026			
	32	0.04	0.026	64	0.04	N.I.			

**COMMENTS:** N.I. Not Installed

**Project:** Lowell Justice Center **Address:**  
370 Jackson Street, Lowell, MA  
**Date:** 7/6/2020

**Project No.** 17-219

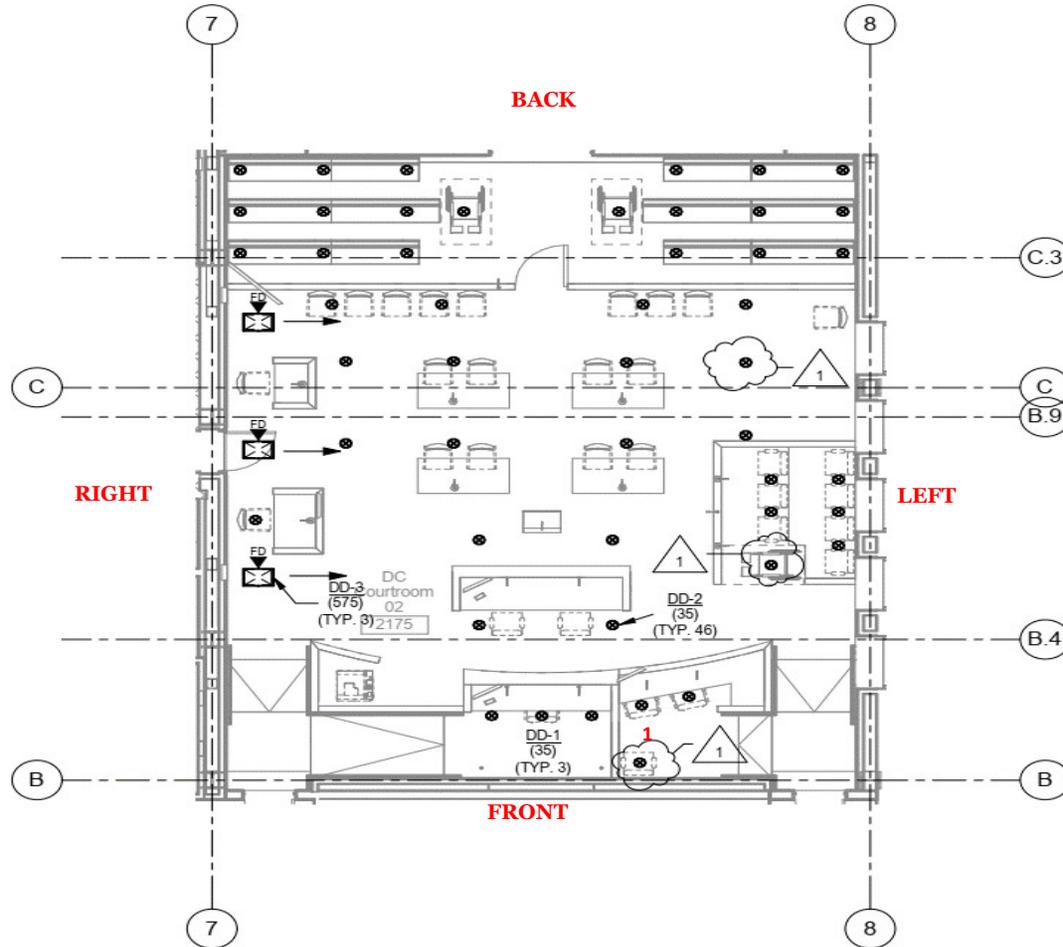
### COURTROOM DIFFUSERS LAYOUT



**Project:** Lowell Justice Center **Address:**  
370 Jackson Street, Lowell, MA  
**Date:** 7/6/2020

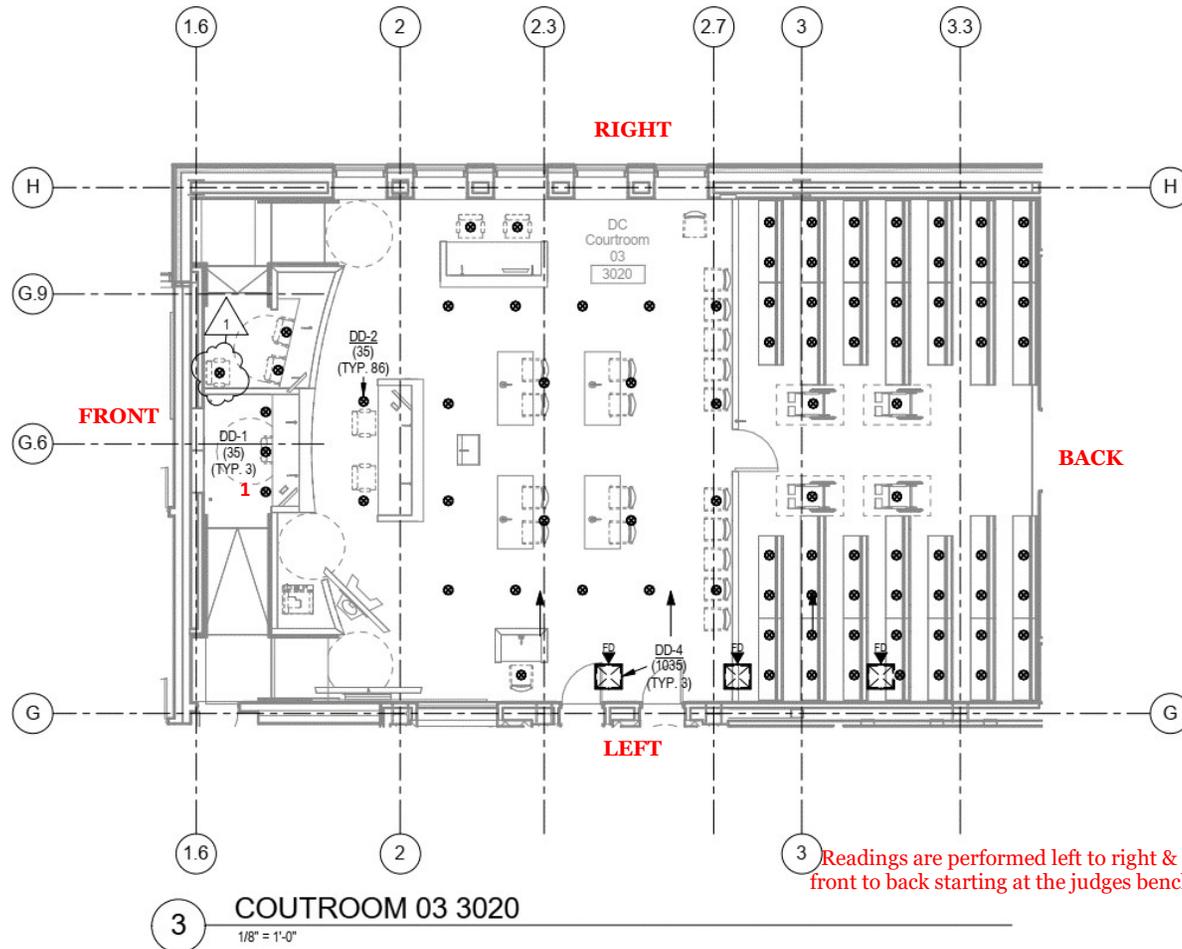
**Project No.** 17-219

### COURTROOM DIFFUSERS LAYOUT



**2** COURTROOM 02 2175  
1/8" = 1'-0"

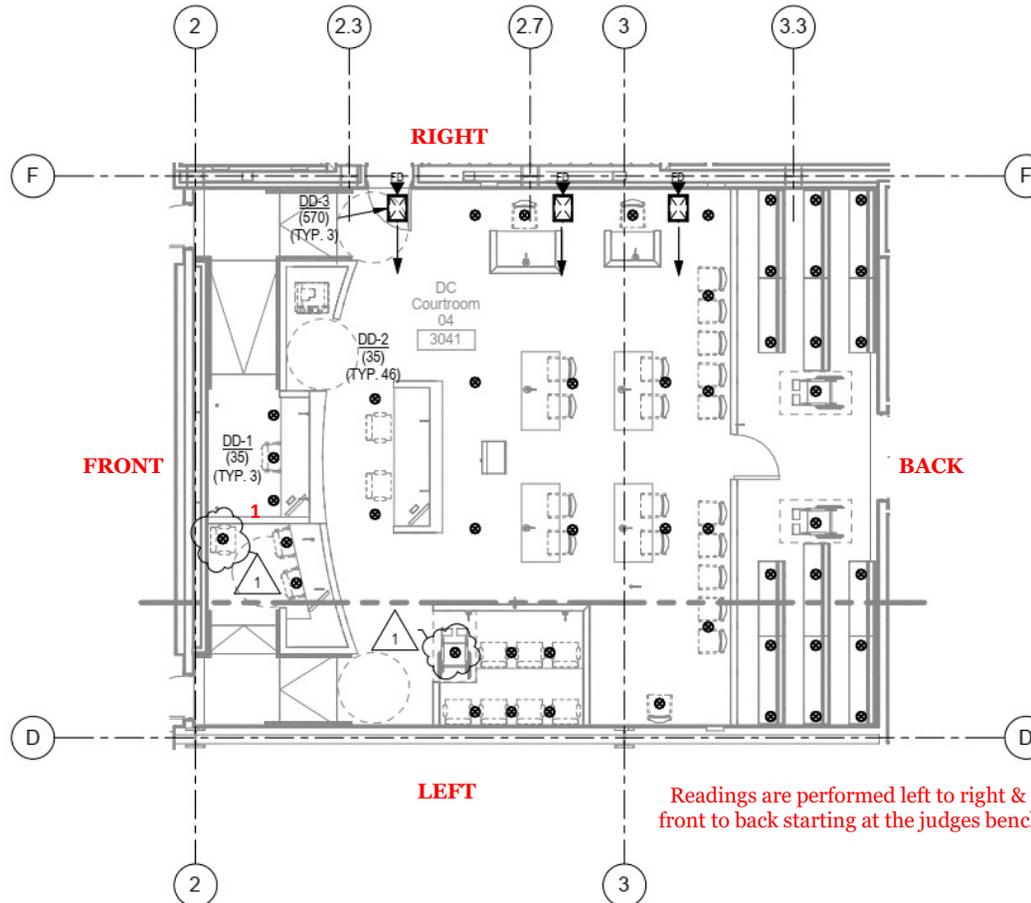
**COURTROOM DIFFUSERS LAYOUT**



**Project:** Lowell Justice Center **Address:**  
370 Jackson Street, Lowell, MA  
**Date:** 7/6/2020

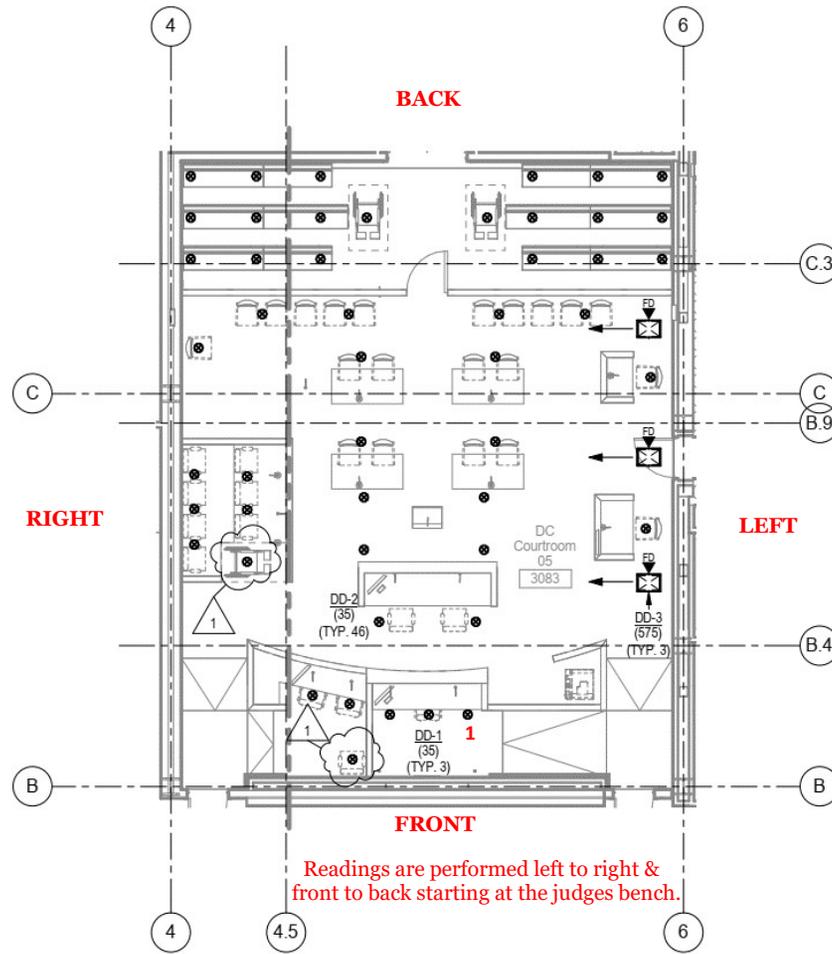
**Project No.** 17-219

### COURTROOM DIFFUSERS LAYOUT



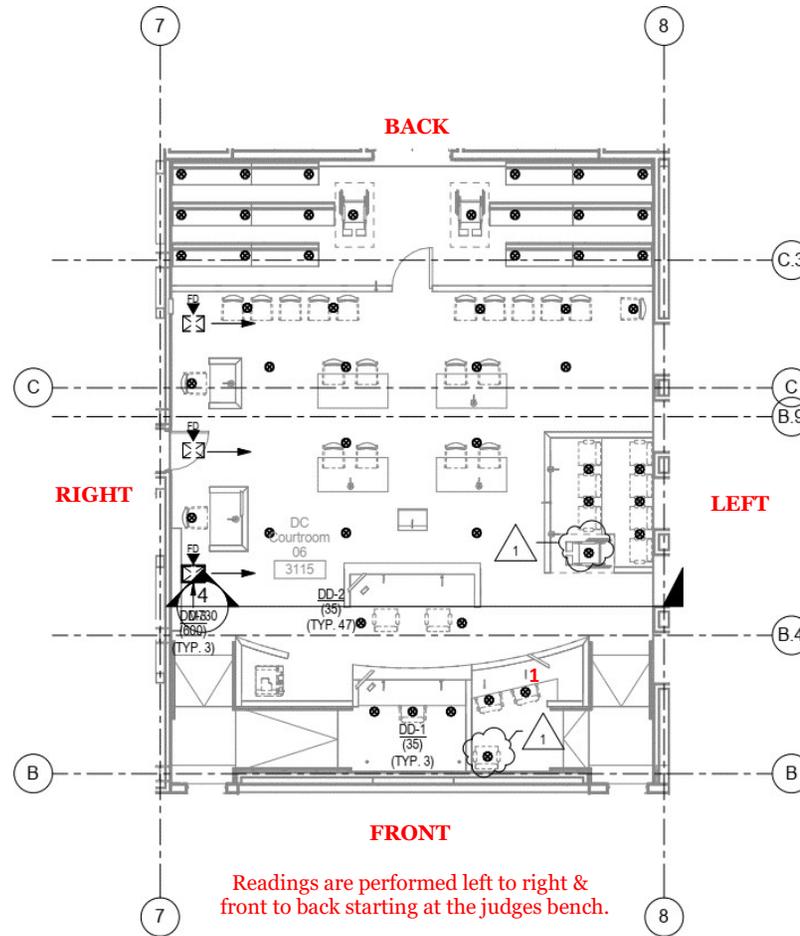
4 COURTROOM 04 3041  
1/8" = 1'-0"

**COURTROOM DIFFUSERS LAYOUT**



**5** COURTROOM 05 3083  
1/8" = 1'-0"

**COURTROOM DIFFUSERS LAYOUT**

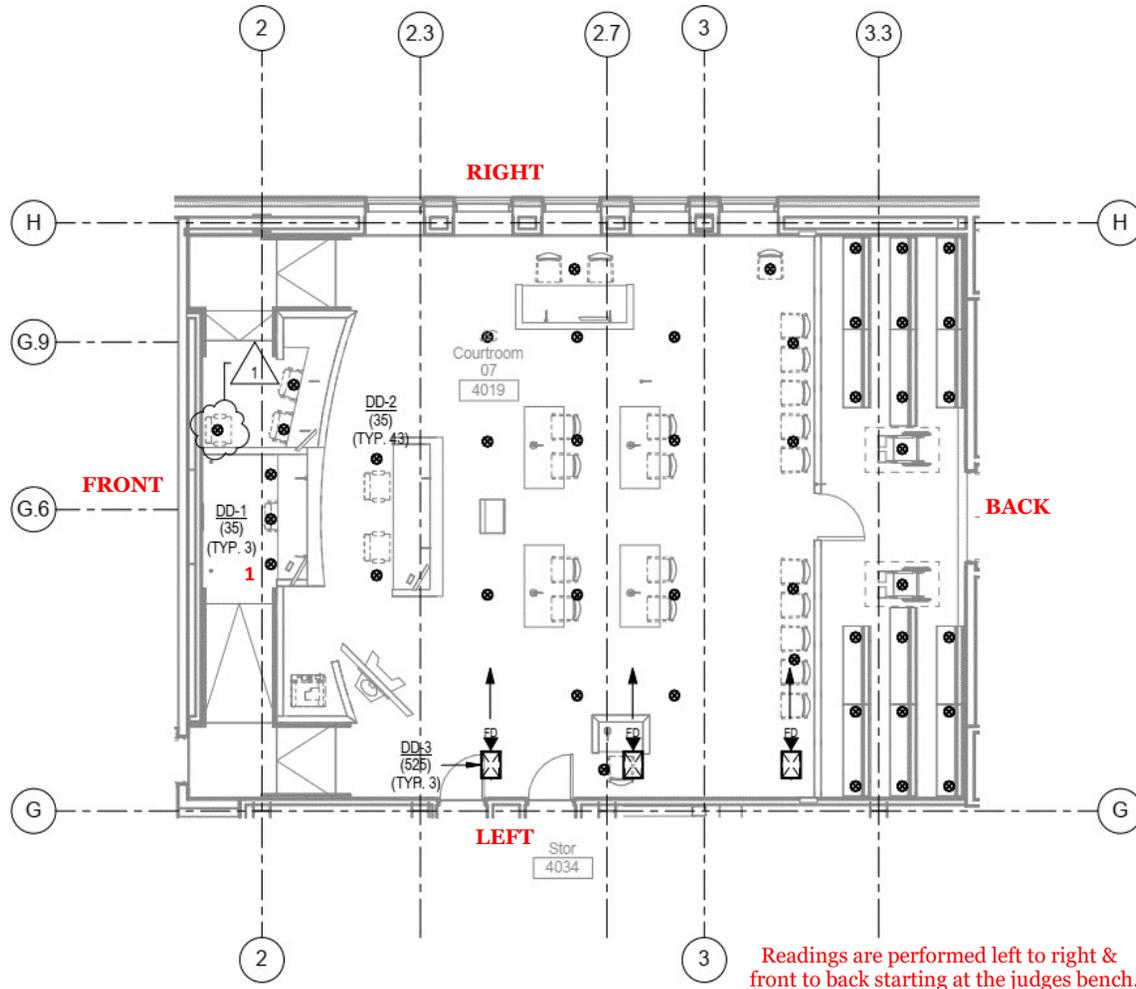


**6** COURTROOM 06 3115  
1/8" = 1'-0"

**Project:** Lowell Justice Center **Address:**  
370 Jackson Street, Lowell, MA  
**Date:** 7/6/2020

**Project No.** 17-219

### COURTROOM DIFFUSERS LAYOUT

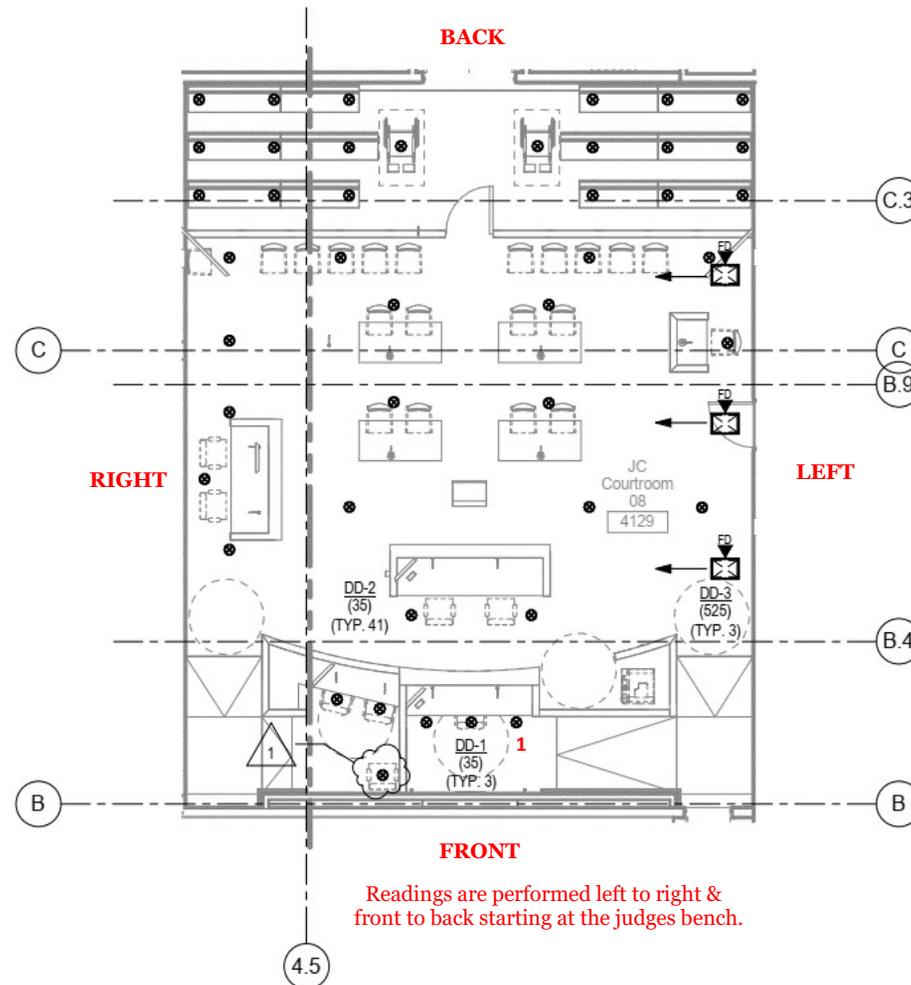


1 COURTROOM 07 4019  
1/8" = 1'-0"

**Project:** Lowell Justice Center **Address:**  
370 Jackson Street, Lowell, MA  
**Date:** 7/6/2020

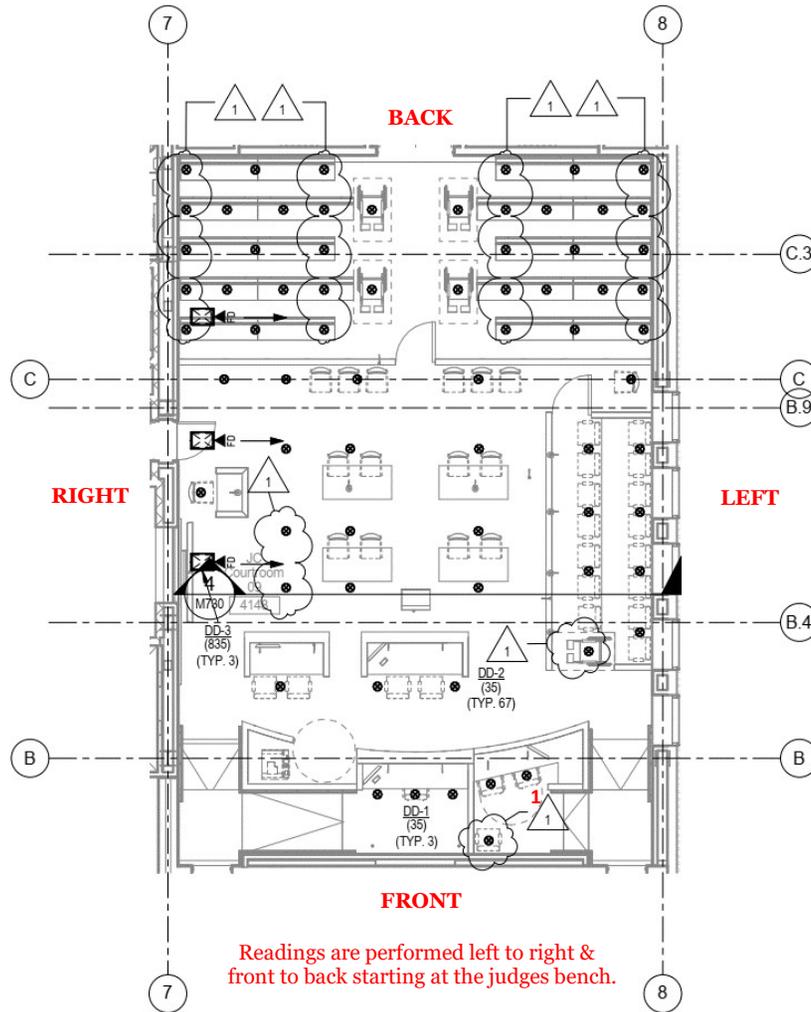
**Project No.** 17-219

### COURTROOM DIFFUSERS LAYOUT



**2** COURTROOM 08 4129  
1/8" = 1'-0"

### COURTROOM DIFFUSERS LAYOUT



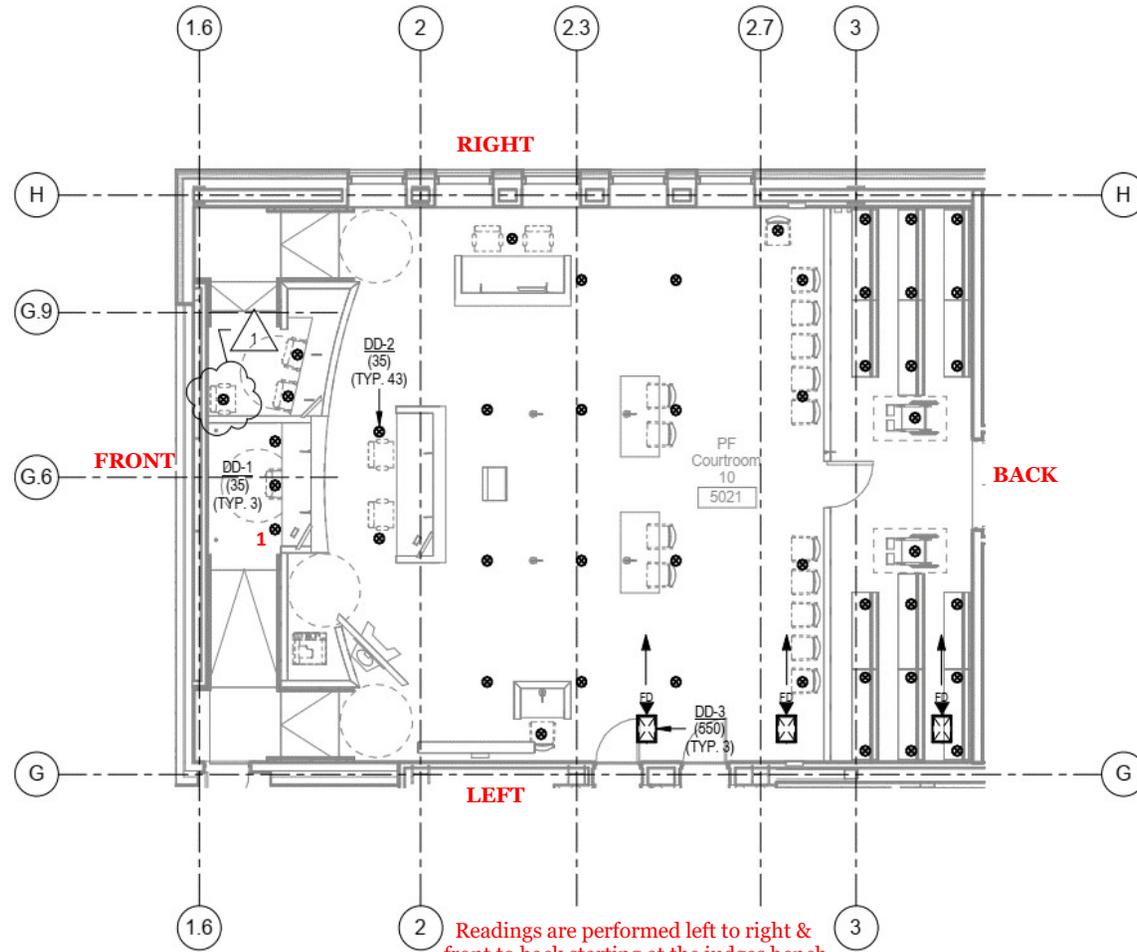
3 COURTROOM 09 4148

1/8" = 1'-0"

**Project:** Lowell Justice Center **Address:**  
370 Jackson Street, Lowell, MA  
**Date:** 7/6/2020

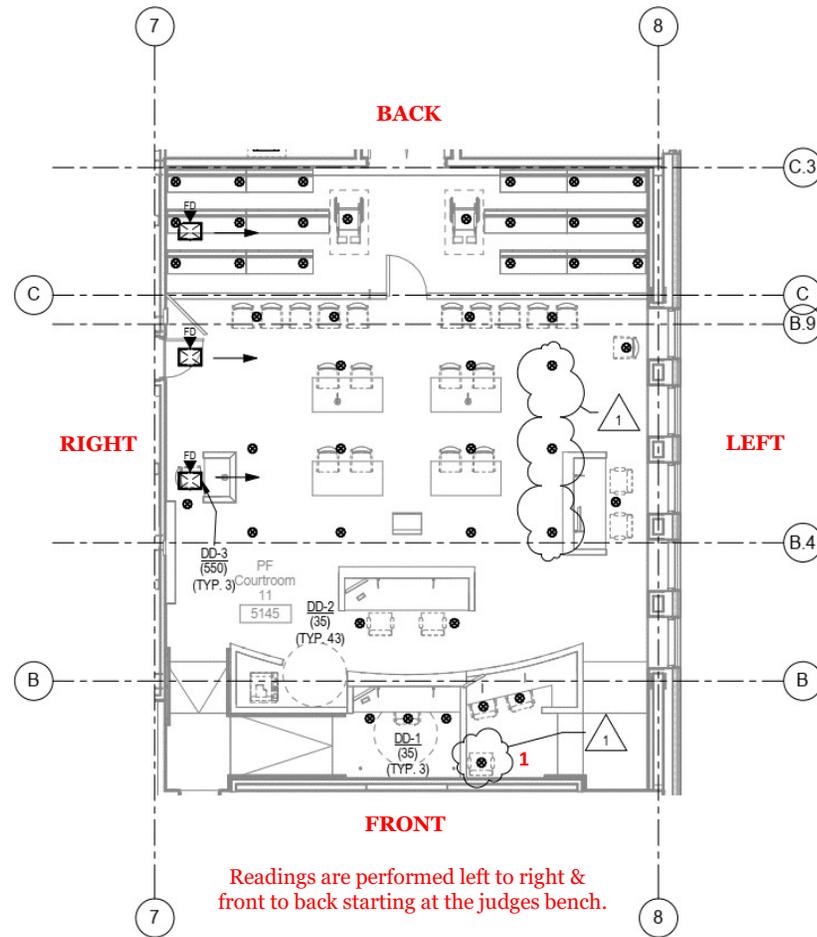
**Project No.** 17-219

### COURTROOM DIFFUSERS LAYOUT



4 **COURTROOM 10 5021**  
1/8" = 1'-0"

**COURTROOM DIFFUSERS LAYOUT**

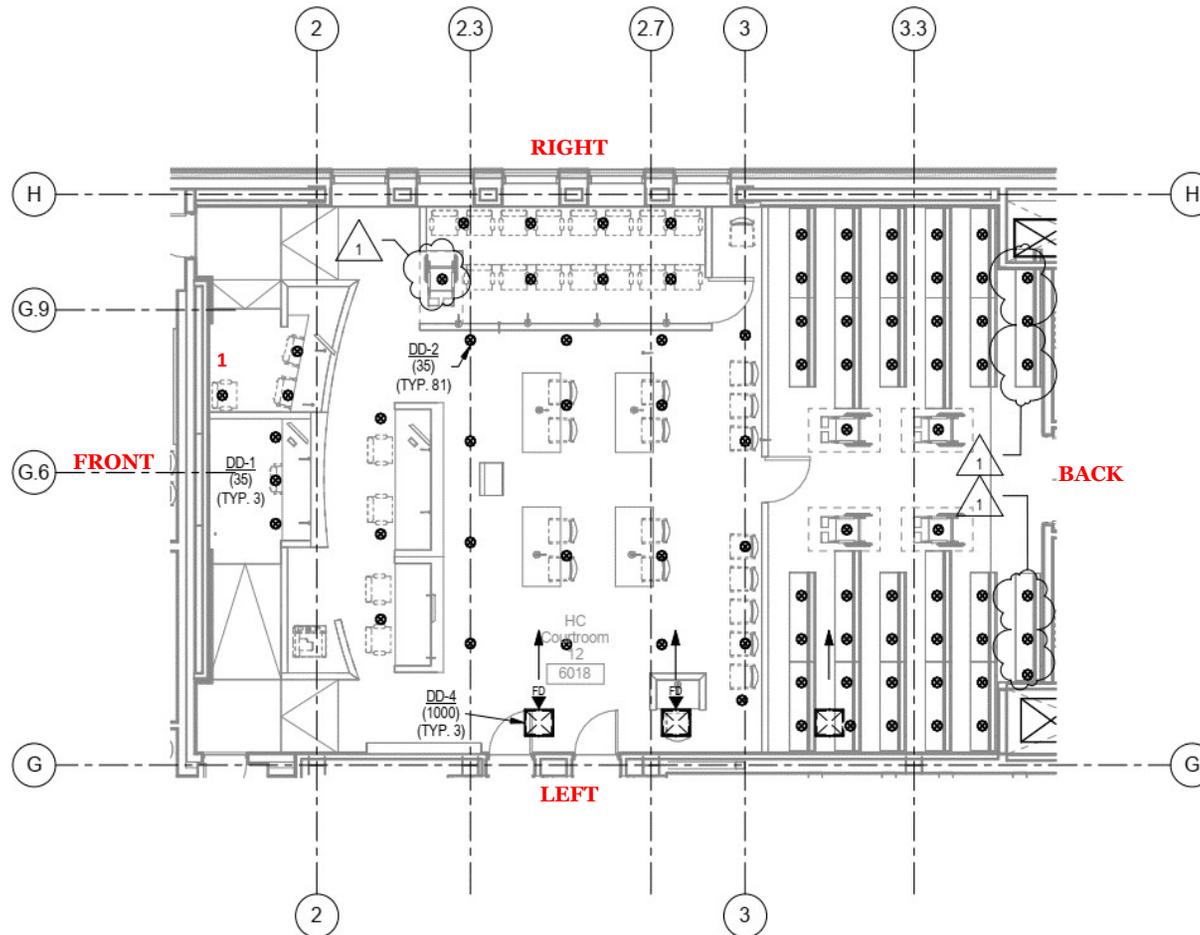


**5** COURTROOM 11 5145  
1/8" = 1'-0"

**Project:** Lowell Justice Center **Address:**  
370 Jackson Street, Lowell, MA  
**Date:** 7/6/2020

**Project No.** 17-219

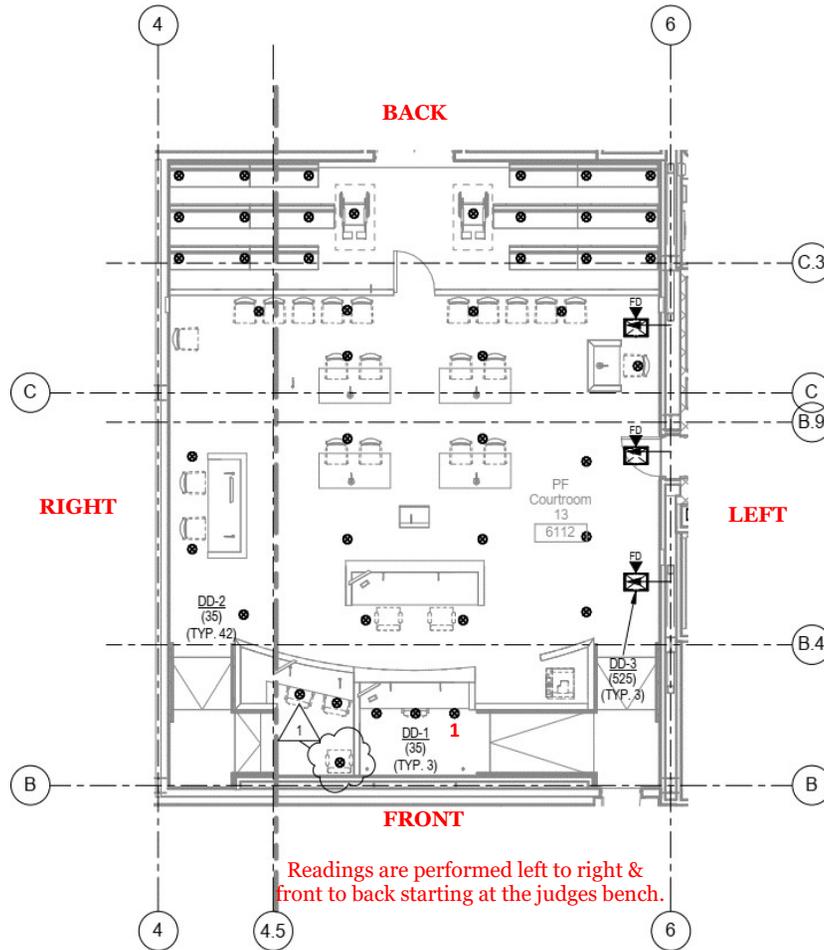
### COURTROOM DIFFUSERS LAYOUT



Readings are performed left to right & front to back starting at the judges bench.

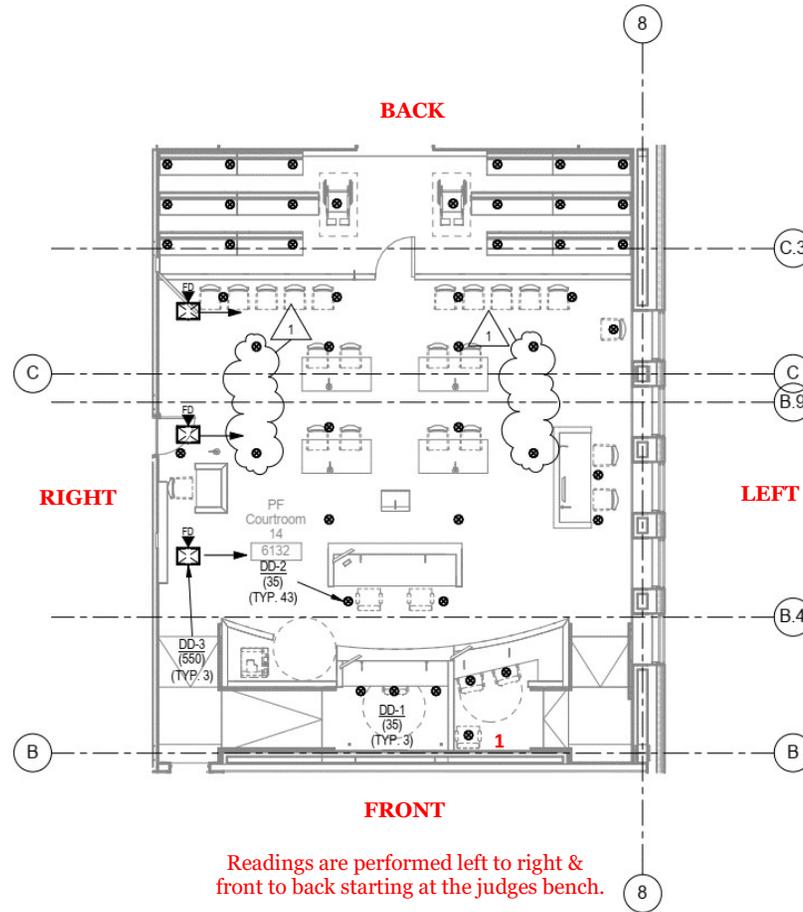
**1** COURTROOM 12 6018  
1/8" = 1'-0"

**COURTROOM DIFFUSERS LAYOUT**



**2** COURTROOM 13 6112  
1/8" = 1'-0"

**COURTROOM DIFFUSERS LAYOUT**

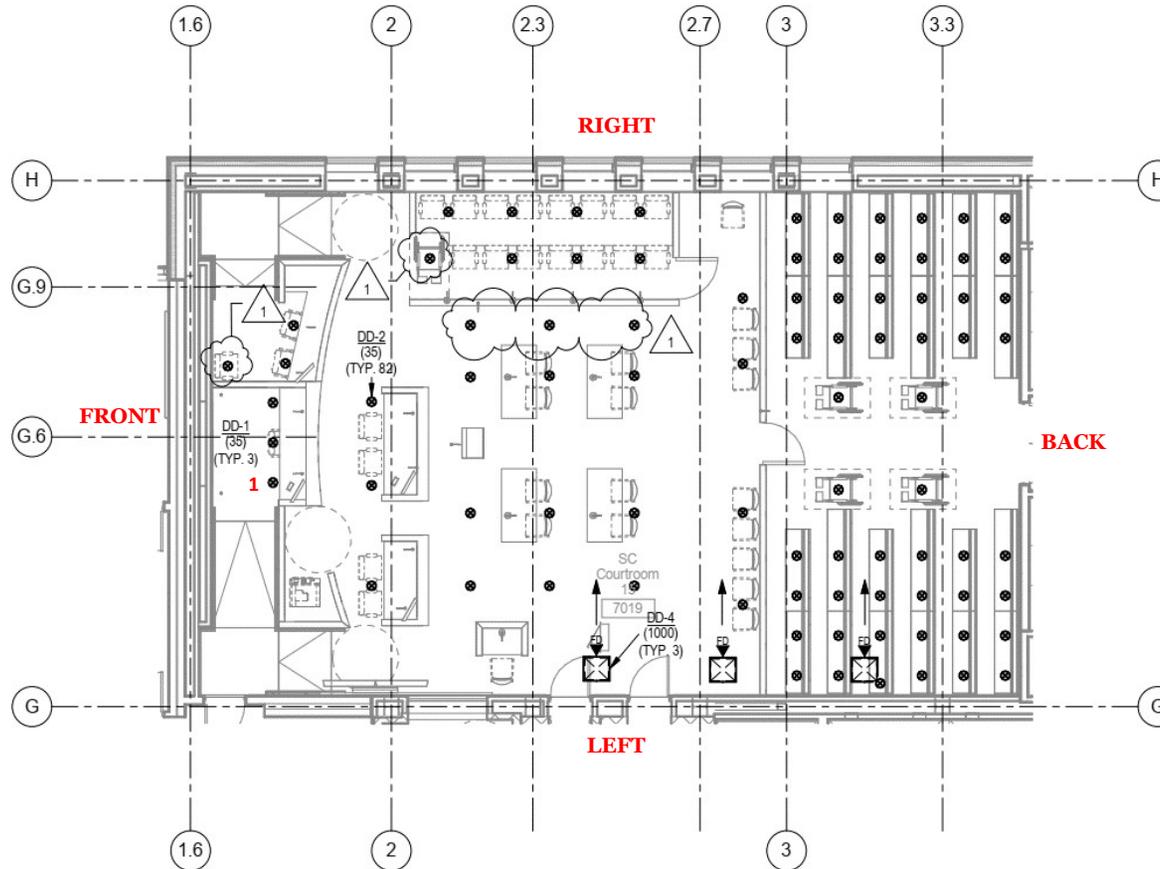


**3** COURTROOM 14 6132  
1/8" = 1'-0"

**Project:** Lowell Justice Center **Address:**  
370 Jackson Street, Lowell, MA  
**Date:** 7/6/2020

**Project No.** 17-219

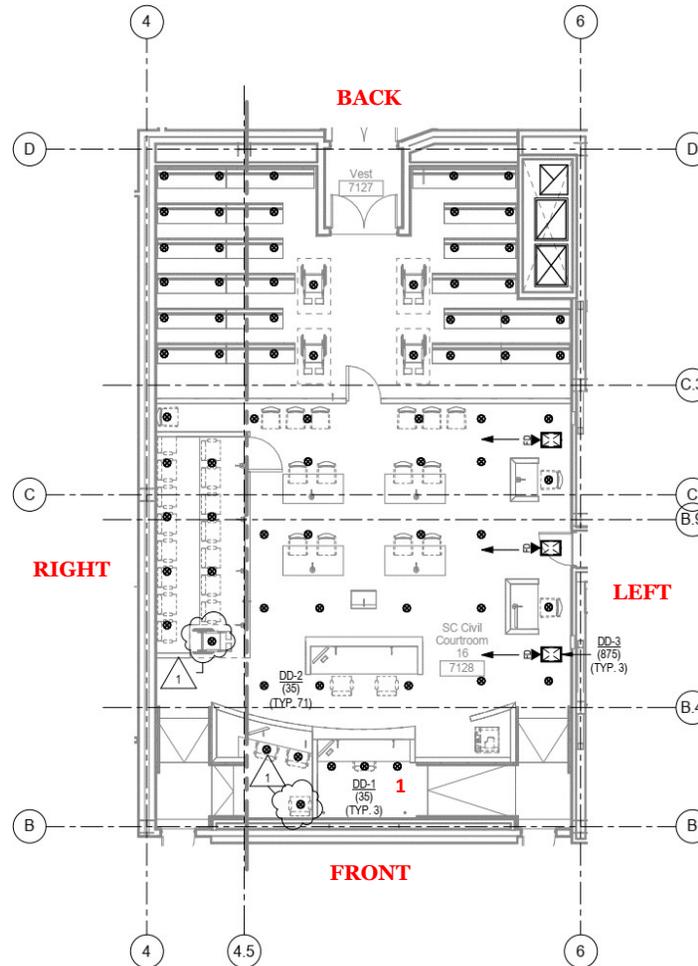
### COURTROOM DIFFUSERS LAYOUT



**4** COURTROOM 15 7019  
1/8" = 1'-0"

Readings are performed left to right & front to back starting at the judges bench.

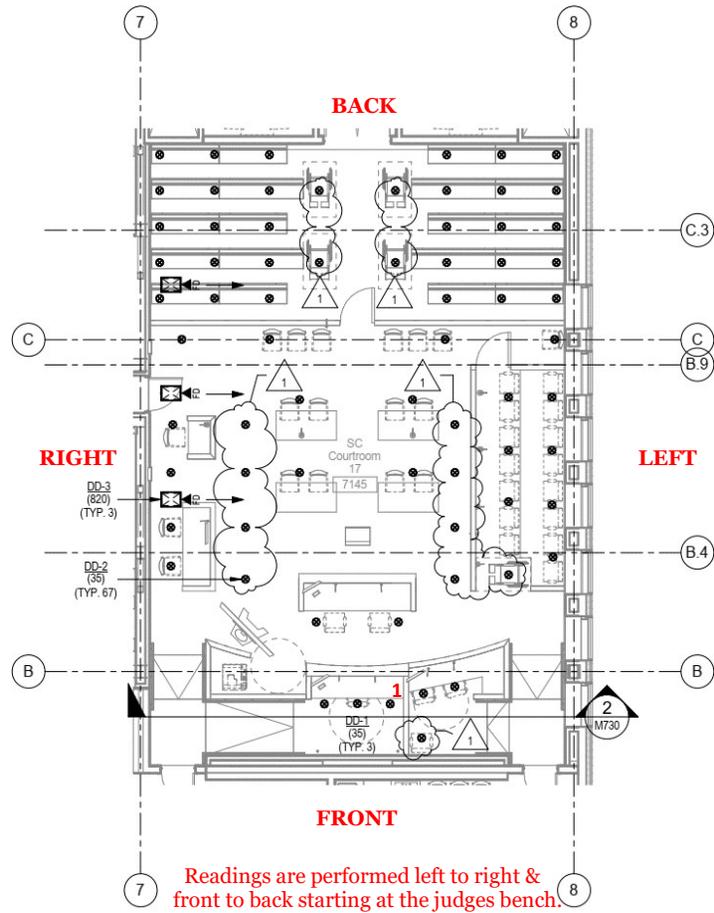
**COURTROOM DIFFUSERS LAYOUT**



Readings are performed left to right & front to back starting at the judges bench.

5 COURTROOM 16 7128  
1/8" = 1'-0"

**COURTROOM DIFFUSERS LAYOUT**



**6** COURTROOM 17 7145  
1/8" = 1'-0"

**Project:** Lowell Justice Center

**Address:** 370 Jackson Street, Lowell, MA

**Date:** 7/6/2020

**Project No.** 17-219

**FAN DATA SHEET**

UNIT	FAN NO. EF-1				FAN NO. EF-5			
Serves / Location:	CHILLER ROOM		CHILLER ROOM		SALLY PORT		BASEMENT	
Manufacturer:	COOK				COOK			
Model Number:	100 SQND				120 SQND			
Size:	N.L.				N.L.			
Serial Number:	010SH49798				N.A.			
MOTOR	DESIGN		TESTED		DESIGN		TESTED	
Manufacturer:	N.L.				N.L.			
Frame Number:	N.L.				N.L.			
Horsepower:	1/8		1/8		1/4		1/4	
Brake Horsepower:	0.42		0.35		0.64		0.58	
Safety Factor:	N.L.		1.15		N.L.		1.15	
Volts / Phase:	115	1	118	1	115	1	118	1
Motor Amperage:	3.80		3.04		5.80		5.07	
Motor RPM:	1,725				1,725			
Speeds:	VARIABLE		@80					
Efficiency:	N.L.				N.L.			
Power Factor:	N.L.				N.L.			
FAN	DESIGN		TESTED		DESIGN		TESTED	
Supply Air CFM:								
Return Air CFM:								
Exhaust Air CFM:	410		428		1,100		1,125	
Outside Air CFM:								
Suction Pressure:								
Discharge Pressure:								
Fan Static Pressure:	0.40				0.52			
External Pressure:								
RPM	DESIGN		TESTED		DESIGN		TESTED	
Fan RPM:	1,300		1,380		1,407		1,400	
Motor Drive:	N.L.		DIRECT DRIVE		N.L.		DIRECT DRIVE	
Motor Size / Bore:	N.L.		"Ø		N.L.		"Ø	
Fan Drive:	N.L.				N.L.			
Fan Size / Shaft:	N.L.		"Ø		N.L.		"Ø	
Belt Size / Number:	N.L.				N.L.			
Shafts C-C:	N.L.				N.L.			
Turns Open:	N.L.				N.L.			

**Comments:**

**Project:** Lowell Justice Center

**Address:** 370 Jackson Street, Lowell, MA

**Date:** 7/6/2020

**Project No.** 17-219

**FAN DATA SHEET**

UNIT	FAN NO. EF-6				FAN NO. EF-S01			
Serves / Location:	EQUIPMENT ROOMS		BASEMENT		LOBBY SMOKE EVAC		PENTHOUSE	
Manufacturer:	COOK				COOK			
Model Number:	120 SQND				245 QMX			
Size:	N.L.							
Serial Number:	N.A.				010SH49798-00/0000701			
MOTOR	DESIGN		TESTED		DESIGN		TESTED	
Manufacturer:	N.L.				N.L.		BALDOR	
Frame Number:	N.L.				N.L.			
Horsepower:	1/4				5		5	
Brake Horsepower:	0.64		0.61		4.82		3.73	
Safety Factor:	N.L.		1.15		N.L.		1.15	
Volts / Phase:	118	1	118	1	460	3	466	3
Motor Amperage:	5.80		5.37		6.00		4.80	
Motor RPM:	1,725				1,725		1,725	
Speeds:					VFD		60 HERTZ	
Efficiency:	N.L.				N.L.		N / A	
Power Factor:	N.L.				N.L.		N / A	
FAN	DESIGN		TESTED		DESIGN		TESTED	
Supply Air CFM:					1,215			
Return Air CFM:								
Exhaust Air CFM:	860		942		12,000		11,889	
Outside Air CFM:								
Suction Pressure:								
Discharge Pressure:								
Fan Static Pressure:	0.53				1.50			
External Pressure:								
RPM	DESIGN		TESTED		DESIGN		TESTED	
Fan RPM:	1,254		1,374		1,215		1,200	
Motor Drive:	N.L.		DIRECT DRIVE		N.L.		2 VP 42	
Motor Size / Bore:	N.L.		"Ø		N.L.		1-1/8 "Ø	
Fan Drive:	N.L.				N.L.		2 TB 50	
Fan Size / Shaft:	N.L.		"Ø		N.L.		1-11/16	"Ø
Belt Size / Number:	N.L.				N.L.		AX 66	2
Shafts C-C:	N.L.				N.L.		27.52"	
Turns Open:	N.L.				N.L.		2	

**Comments:**

**Project:** Lowell Justice Center

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**Date:** 7/6/2020

**Project No.** 17-219

**FAN DATA SHEET**

UNIT	FAN NO. EF-A01				FAN NO. EF-C01			
Serves / Location:	EAST COURT CELLS		ROOF		WEST COURT CELLS		ROOF	
Manufacturer:	COOK				COOK			
Model Number:	135 ACRUD				135 ACRUD			
Size:								
Serial Number:	010SH49798-01/0000701				010SH49798-01/0001801			
MOTOR	DESIGN		TESTED		DESIGN		TESTED	
Manufacturer:	N.L.		US MOTOR		N.L.		US MOTOR	
Frame Number:	N.L.		48Y		N.L.		48Y	
Horsepower:	0.5		0.5		0.5		0.5	
Brake Horsepower:	0.69		0.61		0.69		0.68	
Safety Factor:	N.L.		1.15		N.L.		1.15	
Volts / Phase:	115	1.00	118	1.00	115	1.00	118	1.00
Motor Amperage:	6.20		5.40		6.20		5.97	
Motor RPM:	1,725		1,229		1,725		1,543	
Speeds:	VARI.		MAX. SPEED		VARI		MAX SPEED	
Efficiency:	N.L.		CB		N.L.		CB	
Power Factor:	N.L.		CB		N.L.		CB	
FAN	DESIGN		TESTED		DESIGN		TESTED	
Supply Air CFM:								
Return Air CFM:								
Exhaust Air CFM:	840		731		1,330		1,355	
Outside Air CFM:								
Suction Pressure:								
Discharge Pressure:								
Fan Static Pressure:	0.40				0.60			
External Pressure:								
RPM	DESIGN		TESTED		DESIGN		TESTED	
Fan RPM:	908		1,176		1,544		1,402	
Motor Drive:	N.L.		DIRECT DRIVE		N.L.		DIRECT DRIVE	
Motor Size / Bore:	N.L.		"Ø		N.L.		"Ø	
Fan Drive:	N.L.				N.L.			
Fan Size / Shaft:	N.L.		"Ø		N.L.		"Ø	
Belt Size / Number:	N.L.				N.L.			
Shafts C-C:	N.L.				N.L.			
Turns Open:	N.L.				N.L.			

**Comments:**

**Project:** Lowell Justice Center

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**Date:** 7/6/2020

**Project No.** 17-219

**FAN DATA SHEET**

UNIT	FAN NO. EF-G01		FAN NO. EF-G02	
Serves / Location:	GARAGE EXHAUST	BASEMENT	GARAGE EXHAUST	BASEMENT
Manufacturer:	TEMTROL		TEMTROL	
Model Number:	FWR-22-40-40		FWR-22-40-40	
Size:	22		22	
Serial Number:	B001287-001		B001287-002	
MOTOR	DESIGN	TESTED	DESIGN	TESTED
Manufacturer:	Nortek Air Solutions	Nortek Air Solutions	Nortek Air Solutions	Nortek Air Solutions
Frame Number:	MK 152	MK 152	MK 152	MK 152
Horsepower:	N.L.	3	N.L.	3
Brake Horsepower:	N.L.	2.65	N.L.	2.69
Safety Factor:	1.15	1.15	1.15	1.15
Volts / Phase:	460   3	476   3	460   3	476   3
Motor Amperage:	4.70	3.33	4.70	3.39
Motor RPM:	1,550	1,800	1,550	1,800
Speeds:	VFD	60 HERTZ	VFD	60 HERTZ
Efficiency:	N.L.	N / A	N.L.	N / A
Power Factor:	N.L.	N / A	N.L.	N / A
FAN	DESIGN	TESTED	DESIGN	TESTED
Supply Air CFM:				
Return Air CFM:				
Exhaust Air CFM:	5,510	7,032	5,510	7,139
Outside Air CFM:				
Suction Pressure:				
Discharge Pressure:				
Fan Static Pressure:	1.00	N / A	1.00	N / A
External Pressure:				
RPM	DESIGN	TESTED	DESIGN	TESTED
Fan RPM:	1,550	1,800	1,550	1,800
Motor Drive:	N.L.	DIRECT DRIVE	N.L.	DIRECT DRIVE
Motor Size / Bore:	N.L.	"Ø"	N.L.	"Ø"
Fan Drive:	N.L.		N.L.	
Fan Size / Shaft:	N.L.	"Ø"	N.L.	"Ø"
Belt Size / Number:	N.L.		N.L.	
Shafts C-C:	N.L.		N.L.	
Turns Open:	N.L.		N.L.	

**Comments:** This is a fanwall system with 3 fans. Total CFM design is 16,525 or 5,510 each. Fans are tested by overriding to 100% and measuring W.M.S. with a Vel-Grid. Inlet W.M.S. is 28" x 28".

**Project:** Lowell Justice Center

**Address:** 370 Jackson Street, Lowell, MA

**Date:** 7/6/2020

**Project No.** 17-219

**FAN DATA SHEET**

UNIT	FAN NO. EF-G03		FAN NO.	
Serves / Location:	GARAGE EXHAUST	BASEMENT		
Manufacturer:	TEMTRON			
Model Number:	FWR-22-40-40			
Size:	22			
Serial Number:	B001287-003			
MOTOR	DESIGN	TESTED	DESIGN	TESTED
Manufacturer:	Nortek Air Solutions	Nortek Air Solutions		
Frame Number:	MK 152	MK 152	N.L.	
Horsepower:	N.L.	3		
Brake Horsepower:	N.L.	2.28		
Safety Factor:	1.15	1.15	N.L.	1.15
Volts / Phase:	460   3	476   3		
Motor Amperage:	4.70	2.87		
Motor RPM:	1,550	1,800		
Speeds:	VFD	60 HERTZ		
Efficiency:	N.L.	N / A	N.L.	
Power Factor:	N.L.	N / A	N.L.	
FAN	DESIGN	TESTED	DESIGN	TESTED
Supply Air CFM:				
Return Air CFM:				
Exhaust Air CFM:	5,510	5,190		
Outside Air CFM:				
Suction Pressure:				
Discharge Pressure:				
Fan Static Pressure:	1.00	N / A		
External Pressure:				
RPM	DESIGN	TESTED	DESIGN	TESTED
Fan RPM:	1,550	1,800		
Motor Drive:	N.L.	DIRECTDRIVE	N.L.	
Motor Size / Bore:	N.L.	"Ø	N.L.	"Ø
Fan Drive:	N.L.		N.L.	
Fan Size / Shaft:	N.L.	"Ø	N.L.	"Ø
Belt Size / Number:	N.L.		N.L.	
Shafts C-C:	N.L.		N.L.	
Turns Open:	N.L.		N.L.	

**Comments:** This is a fanwall system with 3 fans. Total CFM design is 16,525 or 5,510 each. Fans are tested by overriding to 100% and measuring W.M.S. with a Vel-Grid. Inlet W.M.S. is 28" x 28".



**Project:** Lowell Justice Center

**Address:** 370 Jackson Street, Lowell, MA

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**Project No.** 17-219

**AIR DISTRIBUTION**

**SYSTEM:** EXHAUST FANS

SUPPLY

RETURN

EXHAUST

ROOM OR LOCATION	UNIT NUMBER	UNIT SIZE	AREA xK FACTOR	DESIGN FT / MIN	TEST FT / MIN	DESIGN CFM	TEST CFM	
	EF-A01							
D7139	1	SCG-1	FH	N / A	N / A	70	48 *1	
D7130	2	SCG-1	FH	N / A	N / A	70	58 *1	
D6118	3	SCG-1	FH	N / A	N / A	70	39 *1	
D6119	4	SCG-1	FH	N / A	N / A	70	39 *1	
D5130	5	SCG-1	FH	N / A	N / A	70	48 *1	
D5131	6	SCG-1	FH	N / A	N / A	70	47 *1	
D4132	7	SCG-1	FH	N / A	N / A	70	35 *1	
D4133	8	SCG-1	FH	N / A	N / A	70	44 *1	
D3084	9	SCG-1	FH	N / A	N / A	70	106 *1	
D3085	10	SCG-1	FH	N / A	N / A	70	27 *1	
D2155	11	SCG-1	FH	N / A	N / A	70	26 *1	
D2155	Min 50cfm per toilet stall is required by code for toilets with low expected usage. replace 1# CAR with standard pressure model.					A	70	34 *1
	Doesnot meet design, Review CAR selection.					Total	840	551
D7033	1	SCG-1	FH	N / A	N / A	70	55 *1	
D7034	2	SCG-1	FH	N / A	N / A	130	222 *1	
D6033	3	SCG-1	FH	N / A	N / A	70	69 *1	
D6034	4	SCG-1	FH	N / A	N / A	130	104 *1	
D5034	5	SCG-1	FH	N / A	N / A	70	37 *1	
D5035	6	SCG-1	FH	N / A	N / A	130	230 *1	
D4035	7	SCG-1	FH	N / A	N / A	70	57 *1	
D4037	8	SCG-1	FH	N / A	N / A	130	111 *1	
D3032	9	SCG-1	FH	N / A	N / A	90	67 *1	
D3033	10	SCG-1	FH	N / A	N / A	130	106 *1	
D2047	11	SCG-1	FH	N / A	N / A	110	85 *1	
D2048	12	SCG-1	FH	N / A	N / A	130	112 *1	
T1046	13	SCG-1	FH	N / A	N / A	70	100 *1	
					Total	1,330	1,355 *2	

F.H. INDICATES TESTED CFM USING FLOW HOOD

**TOTAL**

**Comments:** \*1 CAR type balancing damper.

\*2 Readings are the result of lowering fan speed from 1,544 RPM down to 1,402 RPM per engineers comments.