

Fenton Judicial Center Lawrence, MA

HVAC SYSTEM EVALUATIONS COVID-19

Office of Court Management Septmber 18, 2024



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Section 1 Existing Conditions & Site Observations

Tighe & Bond visited the Fenton Judicial Center in Lawrence, MA on February 4, 2021. 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:
 - Greg McMahan, Regional Facilities Manager
 - o Rick Croswell, Courthouse Facilities Staff
 - Jose Ayalan, Courthouse Facilities Staff
- Tighe & Bond:
 - Sean Pringle, PE, Mechanical Engineer
 - Tim Bill, Staff Mechanical Engineer

1.1 Existing Ventilation System

The Fenton Judicial Center was constructed in 1998 and is approximately 156,000 square feet in size. Six variable air volume (VAV) air handling units (AHU) provide ventilation air to the building. Each unit contains a supply fan, chilled water cooling coils, hot water heating coils, and a single stage 12" MERV 14 filter. Five dedicated return fans serve AHU's 1-5. All six units serve the building through a common supply and return duct system. AHU's 1-5 operate with variable airflow and approximately 25% outdoor air. AHU-6 operates with constant airflow and is a 100 percent outdoor air unit. Supply air is distributed to each zone via VAV boxes. The AHU's are from the original building construction in 1997 and are generally in good condition.

According to staff, AHU-1 cannot be shut off when the other units are running, or the fan will spin backwards, and air will enter the unit from the supply duct. This may indicate a stuck smoke damper in the supply ductwork, allowing airflow back through the unit while the unit. Half of the outdoor air damper on AHU-2 was closed at the time of the visit. The pneumatic actuator pressure was significantly lower than the other actuators, possibly indicating a leak or control issue. In all of the units, it appeared that the original filter differential pressure transducers had been removed and left on the floor of the unit to accommodate the 12" filters. The AHU's were originally designed to use a 2" prefilter and 10" final filter.

Approximately 10,000 CFM of the AHU-6 supply air is sent to the common supply air system. The remaining 15,000 CFM is routed through a booster fan (BF-1) with a hot water and electric reheat coil. The supply air from this is distributed throughout the building as "enrichment air" through pneumatically operated dampers. According to staff, the electric reheat coil is disconnected and no longer operates.

The main AHU supply air system serves a combination of traditional VAV boxes as well as fan powered VAV boxes. Many of the traditional VAV boxes have a minimum airflow of 0 CFM per the design drawings. While some have enrichment air circuits that provide the minimum required outdoor air to each zone, many do not. Code requires that ventilation

be continuous during occupied periods. In these spaces, the code required ventilation is not being provided when the airflow is zero or very low.

Of the ten toilet and holding cell exhaust fans, six were not operating at the time of the visit (EF's-8, 9, 12, 13, 14, and 16). In most of these, the motors were spinning but the belts had failed. According to staff, these are checked twice a year and were all repaired in the fall. Given the number that had failed, this may indicate that belt tensioning and alignment procedures are not adequate, or the that bearings are worn and impeding proper tensioning and alignment.

In the lock-up area, supply air from the AHU's is delivered to the corridors and into each cell. Air is exhausted from each cell via several exhaust fans.

An eight million BTU/h hot water boiler plant provides hot water to air handlers, radiation, and VAV reheat coils. A pair of 250 ton, water cooled chiller located in the mechanical room provides chilled water to all air handlers.

While onsite, we observed a basement storage room that had been converted to a break room. This area did not have any means of ventilation.

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

| | Original Design Airflow | Original Design Min. O.A. | | |
|-------|----------------------------|------------------------------|-------------|-----------|
| Unit | (CFM) | (CFM) | Filters | Condition |
| AHU-1 | 28,120 | 7,500 | 12" MERV 14 | Good |
| AHU-2 | 28,120 | 7,500 | 12" MERV 14 | Good |
| AHU-3 | 28,120 | 7,500 | 12" MERV 14 | Good |
| AHU-4 | 28,120 | 7,500 | 12" MERV 14 | Good |
| AHU-5 | 28,120 | 7,500 | 12" MERV 14 | Good |
| AHU-6 | 25,000 | 25,000 | 12" MERV 14 | Good |

| TABLE 1 | |
|-----------------------|---|
| Existing Air Handling | ι |



Photo 1 – Representative Air Handler

1.2 Existing Control System

The existing control system is a relatively sophisticated electronic BMS system with electronic sensors in AHU's and other major equipment, and pneumatic actuators. The fan powered VAV boxes utilize pneumatic actuators with electronic controls and are visible from the BMS central controller. The traditional VAV boxes and associated thermostats and perimeter heating devices are fully pneumatic, with no electronic controls or visibility from the BMS. While fairly sophisticated and capable, both the BMS system and the pneumatic controls are obsolete. There is currently a project in the design phase to replace all pneumatic systems with electronic controls and update the BMS system.

The existing pneumatic controls for the "enrichment air" dampers attached to the VAV systems function as a rudimentary occupancy detection / demand controlled ventilation (DCV) system and prevent overcooling. The enrichment air dampers will close if the space temperature falls more than three degrees below the setpoint, which will generally happen when the space is unoccupied or very lightly occupied. At all other times, the enrichment air dampers are open.

Section 2 Recommendations

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

As noted in section 1, the basement break room is unventilated. Building areas without adequate ventilation and filtration significantly increase the risk of spreading viruses like COVID-19, especially areas with high occupant density and where people occupy the same space for relatively long periods of time. Consider significantly reducing occupancy or relocating occupants to other areas with adequate ventilation.

2.1 Filtration Efficiency Recommendations

The filters in the AHU's were recently upgraded with single stage 12" MERV 14 filters. It is likely that the existing equipment can accommodate the static pressure drop of the new filters. The use of MERV 14 filtration meets the ASHRAE recommendations for filtration during the pandemic. We recommend maintaining the current level of filtration. However, we recommend that a testing and balancing Contractor test and document the airflow and static pressure profile of all RTU's, as outlined in recommendation RF-1 in the Overview of Recommendations document.

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

The existing differential pressure sensors that have been disconnected should be reinstalled. If they no longer fit the new 12" deep filters, they should be modified to fit if possible, or replaced.

2.2 Testing & Balancing Recommendations

The air handling units are approximately 23 years old and it is unknown to Tighe & Bond when the last time the units were tested and balanced. Also, the code requirements to determine the outside air flow rates that were used to design the original system may be different than the 2015 International Mechanical Code (IMC) and current ASHRAE Standard 62.1 requirements.

We recommend the following testing and balancing measures be implemented:

RTB-1: Test and balance air handling unit supply air and minimum outside air flow rates.

We recommend testing and balancing the outdoor air flow rates for all air handling units to the recommended minimum O.A. rates listed in Table 2.

| 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 | 28,120 | 7,500 | 1,300 | 7,500 |
| AHU-2 | 28,120 | 7,500 | 1,300 | 7,500 |
| AHU-3 | 28,120 | 7,500 | 1,300 | 7,500 |
| AHU-4 | 28,120 | 7,500 | 1,300 | 7,500 |
| AHU-5 | 28,120 | 7,500 | 1,300 | 7,500 |
| AHU-6 | 25,000 | 25,000 | 25,000 | 25,000 |

TABLE 2

Recommended Air Handler O.A. Flow Rates

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

The calculated outdoor air requirements below assume AHU's 1-6 are all operating simultaneously. Assuming AHU-6 operates continuously at full airflow as designed, the code required combined minimum outdoor provided by AHU's 1-5 airflow is 7,000 CFM across all operating units.

In the original design drawings, many VAV boxes indicated a minimum outdoor airflow of 0 CFM and did not have any enrichment air. To be able to calculate the O.A. requirements for each space and the system overall, the minimum ventilation rate cannot be zero. For the purposes of this calculation, where the minimum ventilation requirements were not being met with enrichment air, we assumed that VAV minimum airflows were set to 30% of the maximum airflow for most spaces and 40% for VAV's serving break rooms.

During the pandemic, we recommend maintaining the outdoor airflows at the original designed values where they exceed the code minimums calculated by Tighe & Bond. Supplying more outdoor than required by code will provide better indoor air quality.

Our ventilation air analysis discovered that while the exhaust airflow in the lockup areas appears adequate as a whole, the supply and ventilation airflow rates are inconsistent from cell to cell. We recommend reviewing and adjusting the supply air and enrichment air flows in the lockup area as part of the planned controls upgrade.

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

| | All spaces | Courtrooms | Non-Courtroom Spaces |
|----------------------------------|------------|------------|-------------------------|
| Total Occupancy (People) | 1,520 | 1,100 | 420 |
| Total Supply Air (CFM/Person) | 110 | 31 | 320 |
| Outdoor Air (CFM/Person) | 41 | 17 | 110 |

TABLE 3

Average Airflow Rate per Person

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

| | | T | otal Air | Out | door Air |
|----------------|-----------------|----------------------------|------------------------------|-----------------------------|------------------------------|
| Courtroom | Total People | Supply Airflow (CFM) | Airflow Rate (CFM/Person) | Outside Airflow (CFM) | Airflow Rate (CFM/Person) |
| Jury Pool Room | 33 | 2,000 | 61 | 802 | 24 |
| Courtroom 1 | 184 | 6,200 | 34 | 2,777 | 15 |
| Courtroom 2 | 86 | 3,040 | 35 | 1,151 | 13 |
| Courtroom 3 | 124 | 5,760 | 46 | 2,741 | 22 |
| Courtroom 4 | 159 | 7,070 | 44 | 3,102 | 20 |
| Courtroom 5 | 104 | 3,360 | 32 | 1,436 | 14 |
| Courtroom 6 | 70 | 2,680 | 38 | 1,222 | 17 |
| Courtroom 7 | 71 | 2,680 | 38 | 1,222 | 17 |
| Courtroom 8 | 103 | 3,240 | 31 | 1,398 | 14 |
| Courtroom 9 | 103 | 3,240 | 31 | 1,398 | 14 |
| Courtroom 10 | 108 | 4,920 | 46 | 2,271 | 21 |

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)

| Ainow Rate per reison | | Total Air | | Out | door Air |
|-----------------------|-----------------|----------------------------|------------------------------|-----------------------------|------------------------------|
| Courtroom | Total People | Supply Airflow (CFM) | Airflow Rate (CFM/Person) | Outside Airflow (CFM) | Airflow Rate (CFM/Person) |
| Jury Pool Room | 10 | 2,000 | 200 | 802 | 80 |
| Courtroom 1 | 23 | 6,200 | 270 | 2,777 | 121 |
| Courtroom 2 | 17 | 3,040 | 180 | 1,151 | 68 |
| Courtroom 3 | 20 | 5,760 | 288 | 2,741 | 137 |
| Courtroom 4 | 28 | 7,070 | 253 | 3,102 | 111 |
| Courtroom 5 | 19 | 3,360 | 177 | 1,436 | 76 |
| Courtroom 6 | 14 | 2,680 | 191 | 1,222 | 87 |
| Courtroom 7 | 14 | 2,680 | 191 | 1,222 | 87 |
| Courtroom 8 | 20 | 3,240 | 162 | 1,398 | 70 |
| Courtroom 9 | 17 | 3,240 | 191 | 1,398 | 82 |
| Courtroom 10 | 20 | 4,920 | 246 | 2,271 | 114 |

Note: If occupancy is further reduced, the airflow rate per person will increase, assuming full airflow is being delivered to the space.

RTB-4: Test and balance VAV box flow rates.

We recommend testing and balancing the existing VAV boxes to ensure each space is being supplied the proper quantity of air. As the pneumatic controls will be replaced soon, this may not be practical. However, this should be included in the commissioning of the planned control upgrades.

Note that the minimum VAV airflow for many areas was identified as zero on the design documents. As part of the controls upgrade project, non-zero minimum VAV airflows should be established. These should be established by an engineer to maintain the code required ventilation rates to all areas at the minimum VAV airflow.

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

Spaces with airflow/temperature issues

If specific areas within the Courthouse experiences regular cooling and heating comfort complaints this may be an indication of a lack of airflow to the space. We recommend testing and balancing the air inlets and outlets serving those spaces to the designed values. Prior to rebalancing, we recommend verifying the boiler and chilled water plants are maintaining the correct supply water temperature. Incorrect supply water temperature may be contributing to the temperature control complaints instead of a lack of airflow.

Whole building

As part of the planned control systems upgrade, we recommend testing and balancing all inlets and outlets, in addition to the VAV boxes, to ensure each space is being supplied the proper quantity of air.

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

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

2.3 Equipment Maintenance & Upgrades

We recommend the following equipment maintenance and upgrades:

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

Replace dampers and actuators that are not functioning properly. A portion of the outdoor air damper on AHU-2 was closed at the time of the visit.

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

RE-4: Inspect VAV boxes and controllers.

VAV boxes regulate the supply air delivered to each space. At a minimum, we recommend adjusting the thermostat to cycle the damper positions and confirming the airflow varies in response to the thermostat. Consider cleaning the boxes and reheat coils and changing dirty filters in the fan powered VAV boxes. Any boxes not responding the thermostat changes should be rebalanced or replaced.

As the pneumatic controls operating the VAV's will be replaced soon, this may not be cost effective. However, this should be included in the commissioning of the planned control upgrades.

RE-5: Confirm the existing freeze stat is working correctly on each air handling unit.

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

2.4 Control System Recommendations

We recommend the following for the control system:

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

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

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

Consider manually disabling the enrichment damper actuators and setting the dampers to be fully open. This will allow outdoor air to flow continuously through this system during occupied periods. This is a fairly involved task and may not be practical as there are approximately 200 enrichment dampers throughout the building. While this will increase ventilation airflow to spaces, this measure will also increase the risk of overcooling, potentially causing comfort issues.

As part of the controls upgrade, we recommend adding a control feature to allow the enrichment dampers to be overridden open through the BMS.

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 adding active humidification 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.

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 poor IAQ, it may be warranted as a temporary solution in some areas.

2.7 Other Recommendations

2.7.1 Repair or Replace Holding Cell and Toilet Exhaust Fans

We recommend repairing or replacing the holding cell and toilet exhaust fans that are not working or are not exhausting the proper airflow rate. It appears that many of the fans are relatively small and according to staff they have had chronic issues with belt failures. For larger fans, consider having the motors professionally aligned and bearings checked. For smaller belt driven fans, consider replacing these with equivalent direct drive ECM fans to reduce maintenance requirements.

2.7.2 Add Ventilation to Employee Break Area

Staff were using an unventilated storage area as a break room at the time of the visit. If this area will continue to be used as a break room, we recommend adding ventilation to this space. This could likely be accomplished by adding ductwork from the existing supply air distribution.

2.7.3 Fix Air Handler Smoke Damper

The staff mentioned that AHU-1 could not be turned off while the system was operating, or the fans would begin to rotate backwards. This is most likely due to the smoke damper not closing properly. The damper should be repaired to allow for this unit to be cycled off when not needed or for service. This recommendation is primarily a maintenance measure and does not directly increase the indoor air quality of the building.

2.7.4 Improve Enrichment Air Control Logic

As noted in Section 1.1, the existing pneumatic controls for the "enrichment air" dampers provide rudimentary occupancy detection / DCV system and prevent overcooling. Because this system relies on low temperature as an indirect indicator of occupancy, there is some risk that enrichment air dampers will shut off during occupied periods, and there will be no ventilation air provided to the zone. We recommend installing CO2 sensors in the occupied spaces that use enrichment air and modulating the enrichment dampers and the VAV's in response to CO2 concentrations. This should be incorporated into the planned controls upgrade and in conjunction with establishing new VAV minimum airflows.

Section 3 **Testing & Balancing Results**

Wings Testing and Balancing visited the Fenton Center Courthouse on May 20, 2021 to test the airflow rates of the air handling units and the exhaust fans. A summary of the tested airflow rates versus the design airflow rates are shown below in Tables 5,6,7 and 8. The full testing and balancing report is attached. Wings Testing and Balancing returned to the site on June 1, 2022 to retest the systems. Wings returned to the court on December 13, 2023 to change the sheaves on EF-8 and 13 and rebalance the fans. The tables below reflect the updated testing results.

TABLE 5

Air Handler Testing & Balancing Results

| | Design | | | | Actual | |
|-------|--------------------------------------|---|----------------------------|--------------------------------|-----------------------------|----------------------------|
| Unit | Total Supply Fan Airflow (CFM) | Recommended Outdoor Airflow (CFM) | Return Airflow (CFM) | Supply Fan Airflow (CFM) | Outdoor Airflow (CFM) | Return Airflow (CFM) |
| AHU-1 | 28,120 | 7,500 | 20,620 | 36,411 | 9,695 | 26,715 |
| AHU-2 | 28,120 | 7,500 | 20,620 | 35,903 | 9,214 | 26,689 |
| AHU-3 | 28,120 | 7,500 | 20,620 | 37,347 | 11,070 | 26,677 |
| AHU-4 | 28,120 | 7,500 | 20,620 | 39,981 | 10,727 | 29,254 |
| AHU-5 | 28,120 | 7,500 | 20,620 | 39,350 | 9,833 | 29,517 |
| AHU-6 | 25,000 | 25,000 | - | 26,691 | 26,691 | - |

| TABLE 6 Return and Bo | oster Fan Testing | & Balancing Results | |
|--------------------------|-------------------|--------------------------|--------------------------|
| | | Design Return Airflow | Actual Return Airflow |
| Unit | Serving | (CFM) | (CFM) |
| RAF-1 | AHU-1 | 20,620 | 27,180 |
| RAF-2 | AHU-2 | 20,620 | 27,120 |
| RAF-3 | AHU-3 | 20,620 | 28,884 |
| RAF-4 | AHU-4 | 20,620 | 29,256 |
| RAF-5 | AHU-5 | 20,620 | 27,096 |
| BF-1 | AHU-6 | 15,600 | 16,995 |

| | Desi | ign | Actu | Actual | | |
|-------|---|---|---|---|--|--|
| Unit | Chilled Water Design Flow Rate (GPM) | Hot Water Design Flow Rate (GPM) | Chilled Water Actual Flow Rate (GPM) | Hot Water Actual Flow Rate (GPM) | | |
| AHU-1 | 217 | 30 | 230 | 33 | | |
| AHU-2 | 217 | 30 | 230 | 22 | | |
| AHU-3 | 217 | 30 | 230 | 33 | | |
| AHU-4 | 217 | 30 | 230 | 33 | | |
| AHU-5 | 217 | 30 | 230 | 30 | | |
| AHU-6 | 200 | 32 | Not Tested | 35 | | |

TABLE 7

TABLE 8

| Exhaust Fa | an Testino | & Balancir | na Results |
|------------|-------------|-------------|-------------|
| EXHAUSTIC | an resening | or Danament | ig itebaite |

| | | Design Exhaust Airflow | Actual Exhaust Airflow |
|-------|-----------------|---------------------------|---------------------------|
| Unit | Serving | (CFM) | (CFM) |
| EF-8 | Toilets | 850 | 824 |
| EF-9 | Toilets | 5,175 | 5,596 |
| EF-10 | Toilets | 850 | 923 |
| EF-11 | Toilets/Holding | 425 | 419 |
| EF-12 | Toilets | 700 | 716 |
| EF-13 | Toilets | 750 | 714 |
| EF-14 | Toilets | 3,325 | 3,141 |
| EF-15 | Holding | 925 | 944 |
| EF-16 | Toilets/Holding | 425 | 444 |
| EF-17 | Holding | 6,170 | 6,478 |

Typical balancing tolerances for air systems is $\pm 10\%$ of the design airflow. In VAV systems, airflow issues may reside in downstream VAV boxes resulting in a total supply airflow reading at the air handler less than the designed value. Further investigation is required to determine the cause of a low airflow reading at the air handling unit.

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

- 1. AHU-1 through AHU-5 and the associated return air fans are performing at approximately 130% to 140% of design airflow. These AHU's were tested with three set to a low speed (30 Hz), allowing the remaining two to operate at maximum speed (60 Hz). The airflows shown in Tables 5 and 6 are the recorded airflows of each AHU at maximum speed. Note that this test does not guarantee that the system as a whole will be able the attain the design airflow of approximately 150,000 CFM, only that the AHU's can operate at the airflow shown under the test conditions indicated, and that the system can operate at least 90,000 CFM total airflow. Since the VAV's are locally controlled with pneumatic systems, the design airflow of the entire system cannot be tested. The control system appears to be maintaining a 9,000 to 10,000 offset between the supply and return fan airflow for each AHU. The existing 12" MERV 14 filters do not appear to be impacting airflow.
- 2. AHU-6 and the associated BF-1 booster fan are performing within the acceptable range. The existing 12" MERV 14 filters do not appear to be impacting airflow.
- 3. All toilet and holding area exhaust fans are working and operating within the acceptable range.
- 4. The circuit setter on the bottom of the hot water coil on AHU-2 is broken and needs to be replaced. The Court is replacing this circuit setter as part of an upcoming energy conservation project.
- 5. AHU-6 does not have a circuit setter on the chilled water coil so the actual flow rate could not be measured.

Disclaimer

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

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Tighe&Bond

Wings Testing and Balancing Co., Inc. TAB Report May 26, 2021



Fenton Judicial Center HVAC/Ventilation Survey

* * * *

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

May 26, 2021



May 26, 2021

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

Re: Fenton Judicial Center/HVAC Ventilation Survey

Dear Jason,

We have completed our HVAC/Fresh-Air survey for the above-mentioned project. Through our testing we found:

- EF-8 has a cracked fan sheave that needs replacing.
- EF-13 has controls issues and does not run.
- AHU-6 has no circuit setter on the chilled water and there is no room to test with an ultrasound.
- AHU-2 the bottom of circuit setter for the hot water is broken and needs to be replaced.
- AHU-4 half of the mixed air dampers were broken but they have been fixed by the controls contractor.
 - During our testing we replaced all the belts on all exhaust fans and realigned several sheaves.
 - All flow stations have been calibrated with controls.

This report includes Brake Horsepower (BHP) calculations. When a motor has a VFD, we take the amperage measurements from there. When we calculate from volts and amps, it means there has to be a nameplate on the motor. Many times, these are missing or illegible. If BHP is not listed for an individual motor, this is because we do not have enough information to calculate it. It should be noted that that the older a motor is, the less likely it is to follow the affinity laws for BHP- since the efficiency degrades over time. We have used accepted constants for efficiency and the power factor, which should result in fairly close calculations, but are not as accurate for older motors. Fenton Judicial Center May 26, 2021

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

Very truly yours, Wing's Testing & Balancing Co., Inc. ICB Certified Contractor for: TABB—Commissioning—Fire/Life Safety L1&L2—Sound & Vibration

May Stat

Barry Stratos Certified TABB Technician BB996928T



| | Center | | | DATE: 5/20/2 | 21 | |
|----------------------|------------|------------|---|--------------|------------|------------|
| AREA SERVED: Various | | | | TECH: BS | | |
| | | FAN D | ΑΤΑ | | | |
| FAN NUMBER | HVA | AC-1 | RA | F-1 | HVAC-2 | |
| LOCATION | Base | ment | Base | ment | Base | ment |
| AREA SERVED | All A | reas | All A | Areas | All A | reas |
| MANUFACTURER | Buffalo Ai | r Handlers | Wo | ods | Buffalo Ai | r Handlers |
| MODEL OR SIZE | 300 |)-BB | 36J 1 | 1/2-Е | 300 |)-BB |
| | DESIGN | ACTUAL | DESIGN | ACTUAL | DESIGN | ACTUAL |
| TOTAL CFM | 28,120 | 36,411 | 20,620 | 27,180 | 28,120 | 35,903 |
| RETURN AIR | 20,620 | 26,716 | | | 20,620 | 26,689 |
| OUTSIDE AIR | 7500 | 9695 | | | 7500 | 9214 |
| DISCH. STATIC | | 2.44 | | +0.64" | | 2.42" |
| SUCTION STATIC | | -1.58" | | -1.01" | | -1.69" |
| TOTAL STATIC | | 4.02 | | | | 4.11 |
| FAN RPM | | 1052 | NA | NA | | 1046 |
| PULLEY O.D. | 11" x 2 | 2 7/16" | N | IA | 11" x 2 | 2 7/16" |
| ESP | 3. | 01 | 3- | | 3. | 02 |
| VFD SPEED | 60 | Hz | 60 | Hz | 60 | Hz |
| O.A.D.MIN POS | 30 | 0% | - | | 30 | 0% |
| | | MOTOR | DATA | | | |
| MANUFACTURER | Bal | dor | Tos | hiba | Bal | dor |
| MODEL OR FR. | 324 T | | 254 TZ | | 32 | 4 T |
| HORSEPOWER | 40 | 40 | 15 | 15 | 40 | 40 |
| MOTOR RPM | 1775 | 1775 | 1775 | 1775 | 1775 | 1775 |
| VOLTAGE / PH. | 460/3 | 460/3 | 460/3 | 460/3 | 460/3 | 460/3 |
| LEG 1 | 48.0 | 39.9 | 18.5 | 11.8 | 48.0 | 36.7 |
| AMPS LEG 2 | | 39.8 | | 11.7 | | 37.2 |
| LEG 3 | | 39.7 | | 11.8 | | 36.8 |
| SHEAVE O.D. | 6 1/2" : | x 2 1/8" | N | IA | 6 1/2" | x 2 1/8" |
| BELTS - QTY / SIZE | | X930 | | IA | | 'X930 |
| SHEAVE POSITION | | ed | | IA | | ed |
| | | 3.2 | THE REAL PROPERTY OF THE PARTY | .6 | | L.O |
| внр | | | | | 0. | |

| | Center | | | DATE: 5/20/2 | 21 | |
|----------------------|--------|--------|------------|--------------|------------|------------|
| AREA SERVED: Various | | | | TECH: BS | | |
| | | FAN D | ATA | | | |
| FAN NUMBER | RA | F-2 | HVA | AC-3 | RA | F-3 |
| LOCATION | Base | ment | Base | ment | Basement | |
| AREA SERVED | All A | reas | All A | Areas | All A | reas |
| MANUFACTURER | Wo | ods | Buffalo Ai | r Handlers | Buffalo Ai | r Handlers |
| MODEL OR SIZE | 36J : | 1/2-Е | 300 |)-BB | 300 |)-BB |
| | DESIGN | ACTUAL | DESIGN | ACTUAL | DESIGN | ACTUAI |
| TOTAL CFM | 20,620 | 27,120 | 28,120 | 37,747 | 20,620 | 28,884 |
| RETURN AIR | | | 20,620 | 26,677 | | |
| OUTSIDE AIR | | | 7500 | 11,070 | | |
| DISCH. STATIC | | +0.62" | | +2.38" | | +0.64" |
| SUCTION STATIC | | -0.81" | | -1.78" | | -0.75" |
| TOTAL STATIC | | 1.43 | | 4.16 | | 1.39 |
| FAN RPM | NA | NA | | 1044 | NA | NA |
| PULLEY O.D. | N | A | 11" x 2 | 2 7/16" | N | IA |
| ESP | - | | 3. | 01 | - | |
| VFD SPEED | 60 | Hz | 60 | Hz | 60 | Hz |
| O.A.D.MIN POS | - | | 30 | 0% | - | |
| | | MOTOR | DATA | | | |
| MANUFACTURER | Tos | hiba | Bal | ldor | Tos | hiba |
| MODEL OR FR. | 254 T | | 324 T | | 25 | 4 T |
| HORSEPOWER | 15 | 15 | 40 | 40 | 15 | 15 |
| MOTOR RPM | 1775 | 1775 | 1775 | 1775 | 1775 | 1775 |
| VOLTAGE / PH. | 460/3 | 460/3 | 460/3 | 460/3 | 460/3 | 460/3 |
| LEG 1 | 18.5 | 10.6 | 48.0 | 36.2 | 18.5 | 11.2 |
| AMPS LEG 2 | | 10.8 | | 35.8 | | 11.1 |
| LEG 3 | | 10.9 | | 36.1 | | 10.9 |
| SHEAVE O.D. | N | IA | 6 1/2" | x 2 1/8" | N | IA |
| BELTS - QTY / SIZE | N | IA | | x 930 | | IA |
| SHEAVE POSITION | N | IA | | ked | | IA |
| | | .8 | | | | |
| BHP | | | 30.2 9.1 | | | |

| PROJECT: Fenton Judicial C | enter | | | DATE: 5/20/2 | 21 | |
|----------------------------|------------|------------|--------|--------------|------------|------------|
| AREA SERVED: Various | | | | TECH: BS | | |
| | | FAN D | ATA | | | |
| FAN NUMBER | HVA | AC-4 | RA | F-4 | HVA | AC-5 |
| LOCATION | Base | ment | Base | ment | Base | ment |
| AREA SERVED | All A | reas | All A | reas | All A | reas |
| MANUFACTURER | Buffalo Ai | r Handlers | Wo | ods | Buffalo Ai | r Handlers |
| MODEL OR SIZE | 300-BB | | 36J 1 | L/2-E | 300 |)-BB |
| | DESIGN | ACTUAL | DESIGN | ACTUAL | DESIGN | ACTUAL |
| TOTAL CFM | 28,120 | 39,981 | 20,620 | 29,256 | 28,120 | 39,350 |
| RETURN AIR | 20,620 | 29,254 | | | 20,620 | 29,517 |
| OUTSIDE AIR | 7500 | 10,727 | | | 7500 | 9833 |
| DISCH. STATIC | | +2.44" | | +0.74" | | +2.31" |
| SUCTION STATIC | | -1.89" | | -1.01" | | -1.83" |
| TOTAL STATIC | | 4.33 | | | | 4.14 |
| FAN RPM | | 1055 | NA | NA | | 1059 |
| PULLEY O.D. | 11" x 2 | 2 7/16" | N | IA | 11" x 2 | 2 7/16" |
| ESP | 2. | 99 | - | | 3. | 08 |
| VFD SPEED | 60 | Hz | 60 | Hz | 60 | Hz |
| O.A.D.MIN POS | 30 |)% | - | | 30 | 0% |
| | | MOTOR | DATA | | | |
| MANUFACTURER | Bal | dor | Tos | hiba | Bal | dor |
| MODEL OR FR. | 324 T | | 25 | 4 T | 32 | 4 T |
| HORSEPOWER | 40 | 40 | 15 | 15 | 40 | 40 |
| MOTOR RPM | 1775 | 1775 | 1775 | 1775 | 1775 | 1775 |
| VOLTAGE / PH. | 460/3 | 460/3 | 460/3 | 460/3 | 460/3 | 460/3 |
| LEG 1 | 48.0 | 36.2 | 18.5 | 11.5 | 48.0 | 37.2 |
| AMPS LEG 2 | | 35.7 | | 11.6 | | 37.0 |
| LEG 3 | | 36.7 | | 12.0 | | 36.6 |
| SHEAVE O.D. | 6 1/2" | x 2 1/8" | N | IA | 6 1/2" | x 2 1/8" |
| BELTS - QTY / SIZE | 315V | 'X930 | N | IA | | x 930 |
| | | ed | | IA | | ked |
| SHEAVE POSITION | |).2 | | .7 | | L.O |
| SHEAVE POSITION | J 50 | | | | | |

| PROJECT: Fe | nton Judicial Ce | enter | | | DATE: 5/20/2 | 21 | 101 |
|---------------|------------------|--------|----------|------------|--------------|--------|-------|
| AREA SERVE | D: Various | | | | TECH: BS | | |
| | | | FAN D | ΑΤΑ | | | |
| FAN NUMBE | R | RA | F-5 | HVA | AC-6 | | |
| LOCATION | | Base | ment | Base | ment | | |
| AREA SERVED |) | All A | Areas | All A | Areas | | |
| MANUFACTL | JRER | Wo | ods | Buffalo Ai | r Handlers | | |
| MODEL OR S | IZE | 36J : | 1/2-Е | 300 |)-BB | | |
| | | DESIGN | ACTUAL | DESIGN | ACTUAL | DESIGN | ACTUA |
| TOTAL CFM | | 20,620 | 27,096 | 25,000 | 26,691 | | |
| RETURN AIR | | | | 0 | 0 | | |
| OUTSIDE AIR | | | | 25,000 | 26,691 | | |
| DISCH. STATI | C | | +0.71" | | +1.10" | | |
| SUCTION STA | ATIC | | -0.93" | | -1.30" | | |
| TOTAL STATI | С | | 1.64 | | 2.40 | | |
| FAN RPM | | NA | NA | NA | 1044 | | |
| PULLEY O.D. | | N | IA | 12" x 2 | 2 3/16" | | |
| ESP | | - | | - | | | |
| VFD SPEED | | 60 | Hz | 56 | Hz | | |
| O.A.D.MIN POS | | | | 10 | 0% | | |
| | | | MOTOR | DATA | | | |
| MANUFACTU | JRER | Tos | Toshiba | | maker | | |
| MODEL OR F | R. | 254 T | | 32 | 4 T | | |
| HORSEPOWE | R | 15 | 15 | 40 | 40 | | |
| MOTOR RPM | 1 | 1775 | 1775 | 1780 | 1780 | | |
| VOLTAGE / P | н. | 460/3 | 460/3 | 460/3 | 460/3 | | |
| | LEG 1 | 18.5 | 11.5 | 47.5 | 31.1 | | |
| AMPS | LEG 2 | | 11.6 | | 30.8 | | |
| | LEG 3 | | 11.5 | | 30.9 | | |
| SHEAVE | 0.D. | Ν | IA IA | 7" x 2 | 2 3/8" | | |
| BELTS - QTY | / SIZE | N | IA | | /X960 | | |
| SHEAVE POS | ITION | N | IA | Fix | ked | | |
| BHP | | 9 | .4 | 26 | 5.2 | | |
| | | | REMA | | | | |



| JECT: Fenton Judio A SERVED: Various | | | | | | DATE: 5/20/ | 21 | |
|---|----------------|--------|-------------|--------|-------------------|-------------|----------------|------|
| TRAVERSE | DUCT | AREA | DE | SIGN | CENTERLINE | TECH: BS | EST | NOTE |
| LOCATIONS | SIZE " | SQ.FT. | FPM | CFM | STATIC PRES." | FPM | CFM | NOTE |
| | | | | | | | | |
| AHU-1 Total | 107" x 70 1/2" | 57.39 | | 28,120 | w/velgrid | 695 | 36,411 | |
| AHU-1 OA | 110" x 30" | 22.92 | | 7500 | w/velgrid | 423 | 9695 | |
| AHU-1 Return | | | | 20,620 | Calc | | 26,716 | |
| AHU-2 Total | 106" x 66" | 48.58 | | 28,120 | w/velgrid | 739 | 35,903 | |
| AHU-2 OA | 110" x 30" | 22.92 | | 7500 | w/velgrid | 402 | 9214 | |
| AHU-2 Return | | | | 20,620 | Calc | | 26,716 | |
| AHU-3 Total | 106" x 66" | 48.58 | | 28,120 | w/velgrid | 777 | 37,747 | |
| AHU-3 OA | 110" x 30" | 22.92 | and the sec | 7500 | w/velgrid | 483 | 11,070 | |
| AHU-3 Return | | | | 20,620 | Calc | | 26,677 | |
| AHU-4 Total | 106" x 66" | 48.58 | | 28,120 | w/velgrid | 823 | 39,981 | |
| AHU-4 OA | 110" x 30" | 22.92 | | 7500 | w/velgrid | 463 | 10,727 | |
| AHU-4 Return | | | | 20,620 | Calc | | 29,254 | |
| AHU-5 Total | 106" x 66" | 48.58 | | 28,120 | w/volgrid | 810 | 20.250 | |
| AHU-5 OA | 110" x 30" | 22.92 | | 7500 | w/velgrid | 810 | 39,350 | |
| AHU-5 Return | | | | 20,620 | w/velgrid Calc | 429 | 9833 29,517 | |
| | | | | | | | | |
| AHU-6 Total | 98" x 74" | 50.36 | | 25,000 | w/velgrid | 530 | 26,691 | |
| RAF-1 | 72" x 24" | 12.0 | | 20,620 | -1.02" | 2265 | 27,180 | |
| RAF-2 | 72" x 24" | 12.0 | | 20,620 | -0.80" | 2260 | 27,120 | |
| RAF-3 | 72" x 24" | 12.0 | | 20,620 | -0.75" | 2407 | 28,884 | |
| RAF-4 | 72" x 24" | 12.0 | | 20,620 | -1.01" | 2458 | 29,256 | |
| | | | R | EMARKS | | | | |

| | DUCT SIZE " 72" x 24" | AREA SQ.FT. | DES FPM | SIGN CFM | CENTERLINE | | ST | NOTES |
|----------|-----------------------------|----------------|------------|-------------|---------------|------|--------|--------|
| RAF-5 | SIZE " | | | | | | :51 | I NOIE |
| RAF-5 | | | | | STATIC PRES." | FPM | CFM | |
| | 72" x 24" | | | Crim | JIANC PRES. | | Crivi | |
| EF-8 | | 12.0 | | 20,620 | -0.93" | 2258 | 27,696 | |
| | 12" x 12" | 1.0 | | 850 | -0.44" | 831 | 831 | |
| EF-9 | 24" x 24" | 4.0 | | 5175 | -0.80" | 1399 | 5596 | |
| EF-10 | 12" x 12" | 1.0 | | 850 | -0.56" | 923 | 923 | |
| EF-11 | 12" x 12" | 1.0 | | 425 | -0.71" | 419 | 419 | |
| EF-12 13 | 5" x 13.5" | 1.27 | | 700 | -0.49" | 564 | 716 | |
| EF-14 : | 26" x 26" | 4.69 | | 3325 | -0.63" | 669 | 3141 | |
| EF-15 13 | .5" x 13.5" | 1.27 | | 925 | -0.91" | 743 | 944 | |
| EF-16 13 | .5" x 13.5" | 1.27 | | 425 | -0.19" | 351 | 444 | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | I | RE | EMARKS | | | | |

| I NOJECI. | Fenton Judicial Ce | nter | | | DATE: 5/20/21 | |
|-----------|---|---------------|---------------|---------------|---------------|---|
| AREA SERV | ED: Various | | | Marcan 191 | TECH: BS | 1997 - 1997 - 1998 - 1998 - 1998 - 1998 - 1998 - 1998 - 1998 - 1998 - 1998 - 1998 - 1998 - 1998 - 1998 - 1998 - |
| | | | FAN DATA | | d | |
| FAN NUME | BER | EF-8 | EF-9 | EF-10 | EF-11 | EF-12 |
| LOCATION | | Roof | Roof | Roof | Roof | Roof |
| AREA SERV | ED | Toilets | Toilets | Toilets | Toilets | Toilets |
| MANUFAC | TURER | Cook | Cook | Cook | Cook | Cook |
| MODEL OR | SIZE | 120R3B | 245R3B | 100R2B | 100R2B | 100R2B |
| TOTAL | DESIGN | 850 | 5175 | 850 | 425 | 700 |
| CFM | ACTUAL | 831 | 5596 | 923 | 419 | 716 |
| FAN | DESIGN | | | | | |
| RPM | ACTUAL | 1745 | 1047 | 1574 | 1347 | 1968 |
| PULLEY | O.D. | 3" x 3/4" (1) | 6" x 1" | 3" x 3/4" | 3" x 3/4" | 2 1/2" x 3/4 |
| SERVICE | - | 1.25 | 1.15 | 1.35 | 1.35 | 1.35 |
| | | | | | | |
| | | | MOTOR DATA | | | |
| MANUFAC | | Marathon | Baldor | Marathon | Marathon | Marathon |
| MODEL NU | T | 48YZ | 145T | 482 | 482 | 48YZ |
| MOTOR | DESIGN | 1/4 | 2 | 1/6 | 1/6 | 1/4 |
| HP | ACTUAL | 1/4 | 2 | 1/6 | 1/6 | 1/4 |
| MOTOR RP | and the second se | 1725 | 1750 | 1725 | 1725 | 1725 |
| VOLTAGE/I | PHASE | 120/1 | 460/3 | 120/1 | 120/1 | 120/1 |
| | DESIGN | 5.0 | 2.9 | 3.6 | 3.6 | 5.0 |
| MOTOR | ACT. LEG 1 | | | | | |
| AMPS | ACT. LEG 2 | 4.1 | 2.6 | 3.6 | 2.9 | 4.6 |
| | ACT. LEG 3 | | | | | |
| SHEAVE | | 3" x 1/2" | 3 1/2" x 3/4" | 2 1/4" x 1/2" | 3" x 1/2" | 3 1/4" x 1/2" |
| BELTS-QTY | /SIZE | 1/4L200 | 1/AX28 | 1/4L470H | 1/4L180 | 1/4470 |
| SHEAVE PC | SITION | 75% Closed | 50% Open | Fixed | 100% Closed | 75% Closed |
| 3HP | | 0.21 | 1.8 | 0.17 | 0.13 | 0.23 |
| | | | | | 1 | 1 |

(1) Sheave cracked and needs replacing

| PROJECT: | Fenton Judicial Cer | nter | | | DATE: 5/20/21 | |
|-----------|---------------------|---------------|---|---------------|---------------|----------------|
| AREA SERV | /ED: Various | | 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - | | TECH: BS | |
| | | | FAN DATA | | 1 | |
| FAN NUME | BER | EF-13 | EF-14 | EF-15 | EF-16 | EF-17 |
| LOCATION | | Roof | Roof | Roof | Roof | Roof |
| AREA SERV | /ED | Toilets | Toilets | Holding Cells | Toilets | Holding Cells |
| MANUFAC | TURER | Cook | Cook | Cook | Cook | Cook |
| MODEL OF | | 120R3B | 180R3B | 120R3B | 100R2B | 255LPB |
| TOTAL | DESIGN | 750 | 3325 | 925 | 425 | 6170 |
| CFM | ACTUAL | (1) | 3141 | 944 | 444 | 6478 |
| FAN | DESIGN | | | | | |
| RPM | ACTUAL | | 1636 | 1626 | 1714 | |
| PULLEY | 0.D. | 2 3/4" x 3/4" | 5" x 3/4" | 3" x 3/4" | 3" x 3/4" | 6 1/2" x 1" |
| SERVICE | | 1.15 | 1.15 | 1.15 | 1.35 | 1.15 |
| | | | | | | |
| MANUFAC | TURER | Marathon | MOTOR DATA Magnetek | Marathon | Marathon | Baldor |
| MODEL NU | JMBER | 48YZ | P145T | 482 | 48Y | 182T |
| MOTOR | DESIGN | 1/4 | 1 1/2 | 1/4 | 1/6 | 3 |
| HP | ACTUAL | 1/4 | 1 1/2 | 1/4 | 1/6 | 3 |
| MOTOR RF | PM | 1725 | 1745 | 1725 | 1725 | 1760 |
| VOLTAGE/ | PHASE | 120/1 | 460/3 | 120/1 | 120/1 | 460/3 |
| | DESIGN | 5.0 | 1.95 | 5.0 | 3.6 | 4.1 |
| MOTOR | ACT. LEG 1 | | 1.7 | | | |
| AMPS | ACT. LEG 2 | | 1.6 | 4.4 | 3.1 | 3.6 |
| | ACT. LEG 3 | | 1.7 | | | |
| SHEAVE | | 3" x 1/2" | 3 3/4" x 7/8" | 3" x 1/2" | 3" x 1/2" | 4 3/4" x 1 1/8 |
| BELTS-QTY | /SIZE | 1/4L200 | 1/4L270 | 1/4L200 | 1/4L190 | 1/A62 |
| SHEAVE PC | DSITION | 50% Open | 50% Open | 50% Open | 100% Closed | 75% Closed |
| внр | | | 1.3 | 0.2 | 0.1 | 2.6 |
| | | | | | | |
| | | | | | | |

| ROJECT: Fenton. | ludicial | Center | | | | | | | DATE: | 5/20/21 | | |
|-----------------|----------|----------|----------|-------|--------|------|--------|------|----------|---------|------|----------|
| AREA SERVED: Va | rious | | | | | | | | TECH: BS | | | |
| | 1 | | | | DESIGN | | TEST I | | | FINAL | | |
| LOCATION | NO. | ELEMENT | MFG. | SIZE | GPM | POS. | PR.DIF | GPM | POS. | PR.DIF | GPM | NOTES |
| Hot Water | | | | | | | | | | | | |
| AHU-1 Top | 1 | CS | B&G | 1 1/2 | 10 | 30 | 20.8 | 25.0 | 40 | 8.8 | 11 | (2) |
| AHU-1 Middle | 2 | CS | B&G | 1 1/2 | 10 | 30 | 21.0 | 25.0 | 40 | 8.9 | 11 | |
| AHU-1 Bottom | 3 | CS | B&G | 1 1/2 | 10 | 30 | 19.4 | 25.0 | 40 | 8.1 | 11 | |
| AHU-2 Top | 4 | CS | B&G | 1 1/2 | 10 | 20 | 23.2 | 37.0 | 40 | 8.2 | 11 | |
| AHU-2 Middle | 5 | CS | B&G | 1 1/2 | 10 | 20 | 24.1 | 37.0 | 40 | 8.8 | 11 | |
| AHU-2 Bottom | 6 | CS | B&G | 1 1/2 | 10 | | | | | | | (4) |
| AHU-3 Top | 7 | CS | B&G | 1 1/2 | 10 | 20 | 24.9 | 40.0 | 40 | 8.2 | 11 | |
| AHU-3 Middle | 8 | CS | B&G | 1 1/2 | 10 | 20 | 22.6 | 35.0 | 40 | 8.1 | 11 | |
| AHU-3 Bottom | 9 | CS | B&G | 1 1/2 | 10 | 20 | 23.1 | 35.0 | 40 | 8.0 | 11 | |
| AHU-4 Top | 10 | CS | B&G | 1 1/2 | 10 | 30 | 20.6 | 25.0 | 40 | 9.1 | 11 | |
| AHU-4 Middle | 11 | CS | B&G | 1 1/2 | 10 | 30 | 20.1 | 25.0 | 40 | 9.4 | 11 | |
| AHU-4 Bottom | 12 | CS | B&G | 1 1/2 | 10 | 30 | | 25.0 | 40 | 8.8 | 11 | |
| AHU-5 Top | 13 | CS | B&G | 1 1/2 | 10 | 30 | 15.7 | 22.0 | 40 | 7.7 | 10 | |
| AHU-5 Middle | 14 | CS | B&G | 1 1/2 | 10 | 30 | 15.2 | 22.0 | 40 | 7.9 | 10 | <u> </u> |
| AHU-5 Bottom | 15 | CS | B&G | 1 1/2 | 10 | 30 | 15.1 | 22.0 | 40 | 7.6 | 10 | |
| AHU-6 | 16 | CS | Wheaton | 4" | 32 | open | 17.0 | 200 | 20 | 1.1 | 35.0 | |
| Chilled Water | - | | | | | | | | | | | (1) |
| AHU-1 | 1 | CS | Wheatley | 4" | 228 | 100 | 14.3 | 255 | 80 | 10.9 | 230 | |
| AHU-2 | 2 | CS | Wheatley | 4" | 228 | 100 | 13.6 | 245 | 90 | 10.3 | 230 | |
| AHU-3 | 3 | CS | Wheatley | 4" | 228 | 100 | 13.8 | 245 | 90 | 10.2 | 230 | |
| AHU-4 | 4 | CS | Wheatley | 4" | 228 | 100 | 12.9 | 240 | 90 | 10.0 | 230 | |
| AHU-5 | 5 | CS | Wheatley | 4" | 228 | 100 | 10.1 | 230 | 100 | 10.0 | 230 | |
| AHU-6 | 6 | CS | Wheatley | 4" | 217 | | | | | | | (3) |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | I | <u> </u> | | | REMAR | KS | | L | <u> </u> | | | I |

(1) Chilled water DP is set at 10.0 psi

(2) Hot water DP is set at 15.0 psi

(3) AHU-6 has no curcuit setter for the chilled water and there is no place to ultrasound it.

(4) This curcuit setter is broken and needs replacing

Tighe&Bond

Wings Testing and Balancing Co., Inc. TAB Report June 1, 2022



Fenton Judicial Center HVAC/ Ventilation Survey Revisit

* * * *

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

June 01, 2022

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



June 01, 2022

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

Re: Revisit to Fenton Judicial Center

Dear Jason,

We have completed our revisit testing for the above-mentioned site. Following are our findings:

- **BF-1** was functional and retested.
- **EF-13** has a motor sheave that is tightened down to the very tip of the motor shaft. This is causing high amperage draw.
 - While attempting to adjust the sheaves with the in-house technicians, we partially chipped the fan sheave. It still works but should be replaced.
 - The fan sheave is seized in place but needs to be adjusted to the point that it is level with the end of the shaft.
 - Then the sheaves need to be realigned.
- The hot water circuit setter for ATTU-2 is still broken.
- The chilled water circuit setter for AHU-6 has not been installed.
- All updated readings in the report are listed in BOLD

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

Very truly yours,

Wing's Testing & Balancing Co., Inc.

ICB Certified Contractor for: TABB—Commissioning—Fire/Life Safety L1&L2—Sound & Vibration

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





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

www.wingstesting.com



May 26, 2021

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

Re: Fenton Judicial Center/HVAC Ventilation Survey

Dear Jason,

We have completed our HVAC/Fresh-Air survey for the above-mentioned project. Through our testing we found:

- EF-8 has a cracked fan sheave that needs replacing.
- EF-13 has controls issues and does not run.
- AHU-6 has no circuit setter on the chilled water and there is no room to test with an ultrasound.
- AHU-2 the bottom of circuit setter for the hot water is broken and needs to be replaced.
- AHU-4 half of the mixed air dampers were broken but they have been fixed by the controls contractor.
 - During our testing we replaced all the belts on all exhaust fans and realigned several sheaves.
 - All flow stations have been calibrated with controls.

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



Fenton Judicial Center May 26, 2021

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

Very truly yours, Wing's Testing & Balancing Co., Inc. ICB Certified Contractor for: TABB—Commissioning—Fire/Life Safety L1&L2—Sound & Vibration

Stat

Barry Stratos Certified TABB Technician BB996928T



| | al Center | | | DATE: 5/20/2 | 21 | | | |
|----------------------|------------|--------------|----------|--------------|------------|------------|--|--|
| AREA SERVED: Various | | | TECH: BS | | | | | |
| | | FAN D | ATA | • | | | | |
| FAN NUMBER | HV | AC-1 | RA | F-1 | HVA | AC-2 | | |
| LOCATION | Base | ment | Base | ment | Base | ment | | |
| AREA SERVED | All A | Areas | All A | Areas | All A | Areas | | |
| MANUFACTURER | Buffalo Ai | r Handlers | Wo | ods | Buffalo Ai | r Handlers | | |
| MODEL OR SIZE | 300 | 300-BB | | 1/2-Е | 300 |)-BB | | |
| | DESIGN | ACTUAL | DESIGN | ACTUAL | DESIGN | ACTUAL | | |
| TOTAL CFM | 28,120 | 36,411 | 20,620 | 27,180 | 28,120 | 35,903 | | |
| RETURN AIR | 20,620 | 26,716 | | | 20,620 | 26,689 | | |
| OUTSIDE AIR | 7500 | 9695 | | | 7500 | 9214 | | |
| DISCH. STATIC | | 2.44 | | +0.64" | | 2.42" | | |
| SUCTION STATIC | | -1.58" | | -1.01" | | -1.69" | | |
| TOTAL STATIC | | 4.02 | | | | 4.11 | | |
| FAN RPM | | 1052 | NA | NA | | 1046 | | |
| PULLEY O.D. | 11" x 2 | 2 7/16" | N | IA | 11" x 2 | 2 7/16" | | |
| ESP | 3. | 01 | - | | 3. | 02 | | |
| VFD SPEED | 60 | Hz | 60 | Hz | 60 | Hz | | |
| O.A.D.MIN POS | 30 | 0% | - | | 30 | 0% | | |
| | | MOTOR | DATA | | | | | |
| MANUFACTURER | Bal | dor | Tos | hiba | Bal | dor | | |
| MODEL OR FR. | 32 | 324 T | | 4 TZ | 32 | 4 T | | |
| HORSEPOWER | 40 | 40 | 15 | 15 | 40 | 40 | | |
| MOTOR RPM | 1775 | 1775 | 1775 | 1775 | 1775 | 1775 | | |
| VOLTAGE / PH. | 460/3 | 460/3 | 460/3 | 460/3 | 460/3 | 460/3 | | |
| LEG 1 | | 39.9 | 18.5 | 11.8 | 48.0 | 36.7 | | |
| AMPS LEG 2 | | 39.8 | | 11.7 | | 37.2 | | |
| LEG 3 | | 39.7 | | 11.8 | | 36.8 | | |
| SHEAVE O.D. | 6 1/2" | x 2 1/8" | N | IA | 6 1/2" : | x 2 1/8" | | |
| BELTS - QTY / SIZE | | /X930 | | IA | | /X930 | | |
| SHEAVE POSITION | | (ed | | IA | | ed | | |
| | | | | | | | | |
| ВНР | | 33.2 REMARKS | | | 9.6 31.0 | | | |

| AREA SERVED: Various FAN NUMBER LOCATION AREA SERVED MANUFACTURER MODEL OR SIZE | Base | FAN DA | ATA | TECH: BS | | |
|--|---------|--------|--|------------|------------|------------|
| LOCATION AREA SERVED MANUFACTURER | Base | | ATA | | | |
| LOCATION AREA SERVED MANUFACTURER | Base | F-2 | | | | |
| AREA SERVED MANUFACTURER | | | HVA | AC-3 | RA | F-3 |
| MANUFACTURER | | ment | Base | ment | Base | ment |
| and the second | L All A | reas | All A | reas | All A | reas |
| MODEL OR SIZE | Wo | ods | Buffalo Ai | r Handlers | Buffalo Ai | r Handlers |
| | 36J 1 | 1/2-Е | 300 |)-BB | 300 |)-BB |
| | DESIGN | ACTUAL | DESIGN | ACTUAL | DESIGN | ACTUAL |
| TOTAL CFM | 20,620 | 27,120 | 28,120 | 37,747 | 20,620 | 28,884 |
| RETURN AIR | | | 20,620 | 26,677 | | |
| OUTSIDE AIR | | | 7500 | 11,070 | | |
| DISCH. STATIC | | +0.62" | | +2.38" | | +0.64" |
| SUCTION STATIC | | -0.81" | | -1.78" | | -0.75" |
| TOTAL STATIC | | 1.43 | | 4.16 | | 1.39 |
| FAN RPM | NA | NA | | 1044 | NA | NA |
| PULLEY O.D. | N | IA | 11" x 2 | 2 7/16" | N | IA |
| ESP | - | | 3.0 | 01 | - | |
| VFD SPEED | 60 | Hz | 60 | Hz | 60 | Hz |
| O.A.D.MIN POS | - | | 30 | 0% | - | |
| | | MOTOR | DATA | | | |
| MANUFACTURER | Tosl | hiba | Bal | dor | Tosl | hiba |
| MODEL OR FR. | 254 T | | 32 | 4 T | 25 | 4 T |
| HORSEPOWER | 15 | 15 | 40 | 40 | 15 | 15 |
| MOTOR RPM | 1775 | 1775 | 1775 | 1775 | 1775 | 1775 |
| VOLTAGE / PH. | 460/3 | 460/3 | 460/3 | 460/3 | 460/3 | 460/3 |
| LEG 1 | 18.5 | 10.6 | 48.0 | 36.2 | 18.5 | 11.2 |
| AMPS LEG 2 | | 10.8 | | 35.8 | | 11.1 |
| LEG 3 | | 10.9 | | 36.1 | | 10.9 |
| SHEAVE O.D. | N | A | 6 1/2" > | x 2 1/8" | N | |
| BELTS - QTY / SIZE | N | A | | x 930 | N | |
| SHEAVE POSITION | N | A | | ed | N | |
| ЗНР | 8. | .8 | |).2 | 9. | |
| | ••••••• | REMA | the second s | I | | _ |

| THOSE OF THE | on Judicial C | enter | | | DATE: 5/20/2 | 21 | | |
|-----------------|---------------------|--------------|------------|--------|--------------|---|------------|--|
| AREA SERVED: | Various | | | | TECH: BS | 12 12 16 16 16 16 16 16 16 16 16 16 16 16 16 | | |
| | | | FAN D | ΑΤΑ | | | | |
| FAN NUMBER | | HV | AC-4 | RA | F-4 | HVA | AC-5 | |
| LOCATION | | Base | ment | Base | ment | Base | ment | |
| AREA SERVED | | All A | Areas | All A | Areas | A I A | reas | |
| MANUFACTUR | ER | Buffalo Ai | r Handlers | Woods | | Buffalo Ai | r Handlers | |
| MODEL OR SIZE | | 300 |)-BB | 36J : | 1/2-Е | 300 |)-BB | |
| | | DESIGN | ACTUAL | DESIGN | ACTUAL | DESIGN | ACTUA | |
| TOTAL CFM | | 28,120 | 39,981 | 20,620 | 29,256 | 28,120 | 39,350 | |
| RETURN AIR | | 20,620 | 29,254 | | | 20,620 | 29,517 | |
| OUTSIDE AIR | | 7500 | 10,727 | | | 7500 | 9833 | |
| DISCH. STATIC | | | +2.44" | | +0.74" | | +2.31" | |
| SUCTION STATI | С | | -1.89" | | -1.01" | | -1.83" | |
| TOTAL STATIC | | | 4.33 | | | | 4.14 | |
| FAN RPM | | | 1055 | NA | NA | | 1059 | |
| PULLEY O.D. | | 11" x 2 | 2 7/16" | N | IA · | 11" x 2 | 2 7/16" | |
| ESP | | 2. | 99 | - | | 3. | 08 | |
| VFD SPEED | | 60 | Hz | 60 | Hz | 60 | Hz | |
| O.A.D.MIN POS | | 30 | 0% | - | | 30 |)% | |
| | | | MOTOR | DATA | | | | |
| MANUFACTUR | R | Bal | dor | Tos | hiba | Bal | dor | |
| MODEL OR FR. | Kaling and a second | 324 T | | 254 T | | 324 T | | |
| HORSEPOWER | | 40 | 40 | 15 | 15 | 40 | 40 | |
| MOTOR RPM | | 1775 | 1775 | 1775 | 1775 | 1775 | 1775 | |
| VOLTAGE / PH. | | 460/3 | 460/3 | 460/3 | 460/3 | 460/3 | 460/3 | |
| | LEG 1 | 48.0 | 36.2 | 18.5 | 11.5 | 48.0 | 37.2 | |
| AMPS | LEG 2 | | 35.7 | | 11.6 | | 37.0 | |
| | LEG 3 | | 36.7 | | 12.0 | | 36.6 | |
| SHEAVE O. | D. | 6 1/2" : | x 2 1/8" | N | A | 6 1/2" > | (2 1/8" | |
| BELTS - QTY / S | ZE | 315V | X930 | N | A | - | x 930 | |
| SHEAVE POSITI | NC | Fix | ed | N | A | and the second | ed | |
| ВНР | | 30 |).2 | 9 | .7 | and the second se | | |
| ВНР | | 30.2 REMARKS | | | 9.7 31.0 | | | |
| PROJECT: Fe | nton Judicial C | enter | | | DATE: 05/20 | /21 6/01/22 | |
|---------------|-----------------|--------|--------|------------|-------------|-------------|--------|
| AREA SERVED | D: Various | | | | TECH: BS | | |
| | | | FAN D | ATA | • | | |
| FAN NUMBER | { | RA | F-5 | HVA | AC-6 | BI | -1 |
| LOCATION | | Base | ment | Base | ment | Base | ment |
| AREA SERVED |) | All A | reas | All A | Areas | All A | reas |
| MANUFACTU | RER | Wo | ods | Buffalo Ai | r Handlers | Wa | ods |
| MODEL OR SI | ZE | 36J 1 | 1/2-Е | 300 | D-BB | 30dG | 24P/A |
| | | DESIGN | ACTUAL | DESIGN | ACTUAL | DESIGN | ACTUAI |
| TOTAL CFM | | 20,620 | 27,096 | 25,000 | 26,691 | ND | 16995 |
| RETURN AIR | | | | 0 | 0 | | |
| OUTSIDE AIR | | | | 25,000 | 26,691 | | |
| DISCH. STATI | С | | +0.71" | | +1.10" | | +5.17" |
| SUCTION STA | TIC | | -0.93" | | -1.30" | | +1.98" |
| TOTAL STATIO | C | | 1.64 | | 2.40 | | 7.15 |
| FAN RPM | | NA | NA | NA | 1044 | DD | DD |
| PULLEY O.D. | | N | IA | 12" x 2 | 2 3/16" | D | D |
| ESP | | - | | - | | - | |
| VFD SPEED | | 60 | Hz | 56 | Hz | 57 | Hz |
| O.A.D.MIN PO | DS | - | | 10 | 0% | - | |
| | | | MOTOR | DATA | | | |
| MANUFACTU | RER | Tos | hiba | Peace | maker | N | A |
| MODEL OR F | ۲. | 25 | 4 T | 32 | 4 T | N | A |
| HORSEPOWE | R | 15 | 15 | 40 | 40 | 15 | 15 |
| MOTOR RPM | | 1775 | 1775 | 1780 | 1780 | 1775 | 1775 |
| VOLTAGE / PI | Η. | 460/3 | 460/3 | 460/3 | 460/3 | 460/3 | 460/3 |
| | LEG 1 | 18.5 | 11.5 | 47.5 | 31.1 | 34.0 | 32.1 |
| AMPS | LEG 2 | | 11.6 | | 30.8 | | 31.6 |
| | LEG 3 | | 11.5 | | 30.9 | | 31.7 |
| SHEAVE | 0.D. | N | A | 7" x 2 | 2 3/8" | D | D |
| BELTS - QTY / | SIZE | N | A | | /X960 | | D |
| SHEAVE POSI | TION | N | A | Fix | (ed | | D |
| внр | | 9 | .4 | 26 | 5.2 | | |
| | | | REMA | | | | |



| ROJECT: Fenton Judio | | | | | | DATE: 5/20/2 | 21 | |
|---------------------------------|----------------|----------------|------------------|--------|-----------------------------|--------------|------------|-------|
| REA SERVED: Various TRAVERSE | | ADEA | | | | TECH: BS | | 1 |
| LOCATIONS | DUCT SIZE " | AREA SQ.FT. | FPM | SIGN | CENTERLINE STATIC PRES." | FPM | EST CFM | NOTES |
| | | | | | | | | |
| AHU-1 Total | 107" x 70 1/2" | 57.39 | | 28,120 | w/velgrid | 695 | 36,411 | |
| AHU-1 OA | 110" x 30" | 22.92 | | 7500 | w/velgrid | 423 | 9695 | |
| AHU-1 Return | | | | 20,620 | Calc | | 26,716 | |
| AHU-2 Total | 106" x 66" | 48.58 | | 28,120 | w/velgrid | 739 | 35,903 | |
| AHU-2 OA | 110" x 30" | 22.92 | | 7500 | w/velgrid | 402 | 9214 | |
| AHU-2 Return | | | | 20,620 | Calc | | 26,716 | |
| AHU-3 Total | 106" x 66" | 48.58 | | 28,120 | w/velgrid | 777 | 37,747 | |
| AHU-3 OA | 110" x 30" | 22.92 | | 7500 | w/velgrid | 483 | 11,070 | |
| AHU-3 Return | | | Allen Anno Allen | 20,620 | Calc | | 26,677 | |
| AHU-4 Total | 106" x 66" | 48.58 | | 28,120 | w/velgrid | 823 | 39,981 | |
| AHU-4 OA | 110" x 30" | 22.92 | | 7500 | w/velgrid | 463 | 10,727 | |
| AHU-4 Return | | | | 20,620 | Calc | | 29,254 | |
| AHU-5 Total | 106" x 66" | 48.58 | | 28,120 | w/velgrid | 810 | 39,350 | |
| AHU-5 OA | 110" × 30" | 22.92 | | 7500 | w/velgrid | 429 | 9833 | |
| AHU-5 Return | | | | 20,620 | Calc | | 29,517 | |
| AHU-6 Total | 98" x 74" | 50.36 | | 25,000 | w/velgrid | 530 | 26,691 | |
| RAF-1 | 72" x 24" | 12.0 | | 20,620 | -1.02" | 2265 | 27,180 | |
| RAF-2 | 72" x 24" | 12.0 | | 20,620 | -0.80" | 2260 | 27,120 | |
| RAF-3 | 72" x 24" | 12.0 | | 20,620 | -0.75" | 2407 | 28,884 | |
| RAF-4 | 72" x 24" | 12.0 | | 20,620 | -1.01" | 2458 | 29,256 | |

| EA SERVED: Various TRAVERSE LOCATIONS RAF-5 | DUCT SIZE " | AREA | DES | | | TECH: BS | | |
|--|----------------|--------|-----|---|---------------|----------|--------|------|
| LOCATIONS | | | DES | | | | | 1 |
| | SIZE | SOFT | | and the second se | CENTERLINE | | ST | NOTE |
| RAF-5 | | SQ.FT. | FPM | CFM | STATIC PRES." | FPM | CFM | |
| | 72" x 24" | 12.0 | | 20,620 | -0.93" | 2258 | 27,696 | |
| EF-8 | 12" x 12" | 1.0 | | 850 | -0.44" | 831 | 831 | |
| EF-9 | 24" x 24" | 4.0 | | 5175 | -0.80" | 1399 | 5596 | |
| EF-10 | 12" x 12" | 1.0 | | 850 | -0.56" | 923 | 923 | |
| EF-11 | 12" x 12" | 1.0 | | 425 | -0.71" | 419 | 419 | |
| EF-12 | 13.5" x 13.5" | 1.27 | | 700 | -0.49" | 564 | 716 | |
| EF-14 | 26" x 26" | 4.69 | | 3325 | -0.63" | 669 | 3141 | |
| EF-15 | 13.5" x 13.5" | 1.27 | | 925 | -0.91" | 743 | 944 | |
| EF-16 | 13.5" x 13.5" | 1.27 | | 425 | -0.19" | 351 | 444 | |
| EF-13 | 14" x 14" | 1.36 | | 750 | -0.38" | 516 | 707 | |
| BF-1 | 30"Ø | 4.91" | | ND | +5.17" | 3464 | 16995 | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | RI | EMARKS | | | | |

| | Fenton Judicial Ce | nter | | | DATE: 5/20/21 | |
|--|--|--|--|---|--|---|
| AREA SERV | VED: Various | At the second seco | | | TECH: BS | |
| | 4.00 | | FAN DATA | | | |
| FAN NUM | BER | EF-8 | EF-9 | EF-10 | EF-11 | EF-12 |
| LOCATION | | Roof | Roof | Roof | Roof | Roof |
| AREA SERV | /ED | Toilets | Toilets | Toilets | Toilets | Toilets |
| MANUFAC | | Cook | Cook | Cook | Cook | Cook |
| MODEL OF | | 120R3B | 245R3B | 100R2B | 100R2B | 100R2B |
| TOTAL | DESIGN | 850 | 5175 | 850 | 425 | 700 |
| CFM | ACTUAL | 831 | 5596 | 923 | 419 | 716 |
| FAN | DESIGN | | | | | |
| RPM | ACTUAL | 1745 | 1047 | 1574 | 1347 | 1968 |
| PULLEY | 0.D. | 3" x 3/4" (1) | 6" x 1" | 3" x 3/4" | 3" x 3/4" | 2 1/2" x 3/4' |
| SERVICE | | 1.25 | 1.15 | 1.35 | 1.35 | 1.35 |
| | | | | | | |
| | TUDE0 | | MOTOR DATA | T | | I |
| MANUFAC | | Marathon | Baldor | Marathon | Marathon | Marathon |
| | JIVIBER | 48YZ 1/4 | 145T | 482 | 482 | 48YZ |
| MODEL NU | DECICN | 1/4 | 2 | 1/6 | 1/6 | 1/4 |
| MOTOR | DESIGN | | | | | the second se |
| MOTOR HP | ACTUAL | 1/4 | 2 | 1/6 | 1/6 | 1/4 |
| MOTOR HP MOTOR RF | ACTUAL | 1/4 1725 | 1750 | 1725 | 1725 | 1/4 1725 |
| MOTOR HP MOTOR RF | ACTUAL PM PHASE | 1/4 1725 120/1 | 1750 460/3 | 1725 120/1 | 1725 120/1 | 1/4 1725 120/1 |
| MOTOR HP MOTOR RF VOLTAGE/ | ACTUAL PM PHASE DESIGN | 1/4 1725 120/1 5.0 | 1750 460/3 2.9 | 1725 | 1725 120/1 3.6 | 1/4 1725 |
| MOTOR HP MOTOR RF VOLTAGE/ MOTOR | ACTUAL PM PHASE DESIGN ACT. LEG 1 | 1/4 1725 120/1 5.0 | 1750 460/3 2.9 | 1725 120/1 3.6 | 1725 120/1 3.6 | 1/4 1725 120/1 5.0 |
| MOTOR HP MOTOR RF VOLTAGE/ | ACTUAL PM PHASE DESIGN ACT. LEG 1 ACT. LEG 2 | 1/4 1725 120/1 5.0 4.1 | 1750 460/3 2.9 2.6 | 1725 120/1 3.6 3.6 | 1725 120/1 3.6 | 1/4 1725 120/1 5.0 |
| MOTOR HP MOTOR RF VOLTAGE/ MOTOR AMPS | ACTUAL PM PHASE DESIGN ACT. LEG 1 | 1/4 1725 120/1 5.0 4.1 | 1750 460/3 2.9 2.6 | 1725 120/1 3.6 3.6 | 1725 120/1 3.6 2.9 | 1/4 1725 120/1 5.0 4.6 |
| MOTOR HP MOTOR RF VOLTAGE/ MOTOR AMPS SHEAVE | ACTUAL PM PHASE DESIGN ACT. LEG 1 ACT. LEG 2 ACT. LEG 3 | 1/4 1725 120/1 5.0 4.1 3" x 1/2" | 1750 460/3 2.9 2.6 3 1/2" x 3/4" | 1725 120/1 3.6 3.6 2 1/4" x 1/2" | 1725 120/1 3.6 2.9 3" x 1/2" | 1/4 1725 120/1 5.0 4.6 3 1/4" x 1/2" |
| MOTOR HP MOTOR RF VOLTAGE/ MOTOR AMPS SHEAVE BELTS-QTY | ACTUAL PM PHASE DESIGN ACT. LEG 1 ACT. LEG 2 ACT. LEG 3 /SIZE | 1/4 1725 120/1 5.0 4.1 3" x 1/2" 1/4L200 | 1750 460/3 2.9 2.6 3 1/2" x 3/4" 1/AX28 | 1725 120/1 3.6 3.6 2 1/4" x 1/2" 1/4L470H | 1725 120/1 3.6 2.9 3" x 1/2" 1/4L180 | 1/4 1725 120/1 5.0 4.6 3 1/4" x 1/2" 1/4470 |
| MOTOR HP MOTOR RF VOLTAGE/ MOTOR AMPS SHEAVE BELTS-QTY SHEAVE PC | ACTUAL PM PHASE DESIGN ACT. LEG 1 ACT. LEG 2 ACT. LEG 3 /SIZE | 1/4 1725 120/1 5.0 4.1 3" x 1/2" 1/4L200 75% Closed | 1750 460/3 2.9 2.6 3 1/2" x 3/4" 1/AX28 50% Open | 1725 120/1 3.6 3.6 2 1/4" x 1/2" 1/4L470H Fixed | 1725 120/1 3.6 2.9 3" x 1/2" 1/4L180 100% Closed | 1/4 1725 120/1 5.0 4.6 3 1/4" x 1/2' 1/4470 75% Closed |
| MOTOR HP MOTOR RF VOLTAGE/ MOTOR AMPS SHEAVE BELTS-QTY SHEAVE PC | ACTUAL PM PHASE DESIGN ACT. LEG 1 ACT. LEG 2 ACT. LEG 3 /SIZE | 1/4 1725 120/1 5.0 4.1 3" x 1/2" 1/4L200 | 1750 460/3 2.9 2.6 3 1/2" x 3/4" 1/AX28 | 1725 120/1 3.6 3.6 2 1/4" x 1/2" 1/4L470H | 1725 120/1 3.6 2.9 3" x 1/2" 1/4L180 | 1/4 1725 120/1 5.0 4.6 3 1/4" x 1/2" 1/4470 |
| MOTOR HP MOTOR RF VOLTAGE/ MOTOR AMPS SHEAVE | ACTUAL PM PHASE DESIGN ACT. LEG 1 ACT. LEG 2 ACT. LEG 3 /SIZE | 1/4 1725 120/1 5.0 4.1 3" x 1/2" 1/4L200 75% Closed | 1750 460/3 2.9 2.6 3 1/2" x 3/4" 1/AX28 50% Open | 1725 120/1 3.6 3.6 2 1/4" x 1/2" 1/4L470H Fixed | 1725 120/1 3.6 2.9 3" x 1/2" 1/4L180 100% Closed | 1/4 1725 120/1 5.0 4.6 3 1/4" x 1/2 1/4470 75% Closed |

(1) Sheave cracked and needs replacing

| PROJECT: | Fenton Judicial Cer | nter | | | DATE: 05/20/2 | 1 6/01/22 |
|-----------|--|------------------|---------------|---|---------------|---------------------|
| AREA SERV | ED: Various | | | | TECH: BS | |
| | | | FAN DATA | | 4 | |
| FAN NUMB | ER | EF-13 (1) | EF-14 | EF-15 | EF-16 | EF-17 |
| LOCATION | | Roof | Roof | Roof | Roof | Roof |
| AREA SERV | ED | Toilets | Toilets | Holding Cells | Toilets | Holding Cells |
| MANUFAC | TURER | Cook | Cook | Cook | Cook | Cook |
| MODEL OR | SIZE | 120R3B | 180R3B | 120R3B | 100R2B | 255LPB |
| TOTAL | DESIGN | 750 | 3325 | 925 | 425 | 6170 |
| CFM | ACTUAL | 702 | 3141 | 944 | 444 | 6478 |
| FAN | DESIGN | | | | | |
| RPM | ACTUAL | 1304 | 1636 | 1626 | 1714 | |
| PULLEY | 0.D. | 2 3/4" x 3/4" | 5" x 3/4" | 3" x 3/4" | 3" x 3/4" | 6 1/2" x 1" |
| SERVICE | | 1.15 | 1.15 | 1.15 | 1.35 | 1.15 |
| | | | | | | |
| MANUFACT | | Manathan | MOTOR DATA | The second se | | 1 |
| MODEL NU | | Marathon 48YZ | Magnetek | Marathon | Marathon | Baldor |
| MOTOR | DESIGN | 1/4 | P145T | 482 | 48Y | 182T |
| HP | ACTUAL | 1/4 | 1 1/2 | 1/4 | 1/6 | 3 |
| MOTOR RP | | 174 | 1 1/2 1745 | 1/4 | 1/6 | 3 |
| VOLTAGE/F | the second se | 120/1 | | 1725 | 1725 | 1760 |
| VOLIAUL/I | DESIGN | 5.0 | 460/3 1.95 | 120/1 5.0 | 120/1 | 460/3 |
| MOTOR | ACT. LEG 1 | 5.0 | 1.95 | 5.0 | 3.6 | 4.1 |
| AMPS | ACT. LEG 2 | 14.2 | 1.6 | 4.4 | | |
| | ACT. LEG 3 | | 1.0 | 4.4 | 3.1 | 3.6 |
| SHEAVE | | 3" x 1/2" | 3 3/4" x 7/8" | 3" x 1/2" | 3" x 1/2" | 4 3/4" x 1 1/8' |
| BELTS-QTY | /SIZE | 1/4L200 | 1/4L270 | 1/4L200 | 1/4L190 | 1/A62 |
| SHEAVE PO | and the second | 50% Open | 50% Open | 50% Open | 100% Closed | 75% Closed |
| внр | | | 1.3 | 0.2 | 0.1 | 2.6 |
| | 1 | | | | | |
| | | | | | | |

(1) Fan sheave and motor sheaves both need to be lowered. Motor sheave is riding on the very tip of the motor shaft creating very high pumps. Fan sheave is cracked and should be replaced.

| ROJECT: Fenton | udicial | Center | | | | | | | DATE: | 5/20/21 | | |
|----------------|---------|---------|----------|-------|--------|------------|--------|------|-------|---------|--------------|----------|
| REA SERVED: Va | rious | | | | | | | | TECH: | BS | | |
| | | | | | DESIGN | | TEST I | | | FINAL | | |
| LOCATION | NO. | ELEMENT | MFG. | SIZE | GPM | POS. | PR.DIF | GPM | POS. | PR.DIF | GPM | NOTE |
| Hot Water | | | | | | - | | | | | <u>-8 6 </u> | |
| AHU-1 Top | 1 | CS | B&G | 1 1/2 | 10 | 30 | 20.8 | 25.0 | 40 | 8.8 | 11 | (2) |
| AHU-1 Middle | 2 | CS | B&G | 1 1/2 | 10 | 30 | 21.0 | 25.0 | 40 | 8.9 | 11 | |
| AHU-1 Bottom | 3 | CS | B&G | 1 1/2 | 10 | 30 | 19.4 | 25.0 | 40 | 8.1 | 11 | |
| AHU-2 Top | 4 | CS | B&G | 1 1/2 | 10 | 20 | 23.2 | 37.0 | 40 | 8.2 | 11 | |
| AHU-2 Middle | 5 | CS | B&G | 1 1/2 | 10 | 20 | 24.1 | 37.0 | 40 | 8.8 | 11 | <u> </u> |
| AHU-2 Bottom | 6 | CS | B&G | 1 1/2 | 10 | | | | | | | (4) |
| AHU-3 Top | 7 | CS | B&G | 1 1/2 | 10 | 20 | 24.9 | 40.0 | 40 | 8.2 | 11 | |
| AHU-3 Middle | 8 | CS | B&G | 1 1/2 | 10 | 20 | 22.6 | 35.0 | 40 | 8.1 | 11 | <u> </u> |
| AHU-3 Bottom | 9 | CS | B&G | 1 1/2 | 10 | 20 | 23.1 | 35.0 | 40 | 8.0 | 11 | |
| AHU-4 Top | 10 | CS | B&G | 1 1/2 | 10 | 30 | 20.6 | 25.0 | 40 | 9.1 | 11 | <u> </u> |
| AHU-4 Middle | 11 | CS | B&G | 1 1/2 | 10 | 30 | 20.1 | 25.0 | 40 | 9.4 | 11 | |
| AHU-4 Bottom | 12 | CS | B&G | 1 1/2 | 10 | 30 | | 25.0 | 40 | 8.8 | 11 | <u> </u> |
| AHU-5 Top | 13 | CS | B&G | 1 1/2 | 10 | 30 | 15.7 | 22.0 | 40 | 7.7 | 10 | |
| AHU-5 Middle | 14 | CS | B&G | 1 1/2 | 10 | 30 | 15.2 | 22.0 | 40 | 7.9 | 10 | <u> </u> |
| AHU-5 Bottom | 15 | CS | B&G | 1 1/2 | 10 | 30 | 15.1 | 22.0 | 40 | 7.6 | 10 | |
| AHU-6 | 16 | CS | Wheaton | 4" | 32 | open | 17.0 | 200 | 20 | 1.1 | 35.0 | |
| Chilled Water | | | | | | | | | | | - 11 M | (1) |
| AHU-1 | 1 | CS | Wheatley | 4" | 228 | 100 | 14.3 | 255 | 80 | 10.9 | 230 | (1) |
| AHU-2 | 2 | CS | Wheatley | 4" | 228 | 100 | 13.6 | 245 | 90 | 10.2 | 230 | |
| AHU-3 | 3 | CS | Wheatley | 4" | 228 | 100 | 13.8 | 245 | 90 | 11.1 | 230 | |
| AHU-4 | 4 | CS | Wheatley | 4" | 228 | 100 | 12.9 | 240 | 90 | 10.0 | 230 | |
| AHU-5 | 5 | CS | Wheatley | 4" | 228 | 100 | 10.1 | 230 | 100 | 10.2 | 230 | <u> </u> |
| AHU-6 | 6 | CS | Wheatley | 4" | 217 | | | | | | | (3) |
| | | | | | | | | | | | | |
| | | | | | REMAR | < <u>s</u> | | | | | | |

(2) Hot water DP is set at 15.0 psi

(3) AHU-6 has no curcuit setter for the chilled water and there is no place to ultrasound it.

(4) This curcuit setter is broken and needs replacing

Tighe&Bond

Wings Testing and Balancing Co., Inc. TAB Report December 23, 2023



Fenton Judicial Center Revisit 12.13.23- Sheave Change

* * * *

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

December 13, 2023



December 13, 2023

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

Re: Fenton Judicial Center Sheave Change

Dear Jason,

We have completed our revisit of the above-mentioned site. The cracked sheaves on EF-8 and EF-13 have been replaced. These fans were retested and set to design. All updated data from this revisit is in **BOLD** in the following data sheets.

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

Very truly yours,

Wing's Testing & Balancing Co., Inc.

ICB Certified Contractor for: TABB—Commissioning—Fire/Life Safety L1&L2—Sound & Vibration

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





www.wingstesting.com



June 01, 2022

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

Re: Revisit to Fenton Judicial Center

Dear Jason,

We have completed our revisit testing for the above-mentioned site. Following are our findings:

- **BF-1** was functional and retested.
- **EF-13** has a motor sheave that is tightened down to the very tip of the motor shaft. This is causing high amperage draw.
 - While attempting to adjust the sheaves with the in-house technicians, we partially chipped the fan sheave. It still works but should be replaced.
 - The fan sheave is seized in place but needs to be adjusted to the point that it is level with the end of the shaft.
 - Then the sheaves need to be realigned.
- The hot water circuit setter for ATTU-2 is still broken.
- The chilled water circuit setter for AHU-6 has not been installed.
- All updated readings in the report are listed in BOLD

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

Very truly yours,

Wing's Testing & Balancing Co., Inc.

ICB Certified Contractor for: TABB—Commissioning—Fire/Life Safety L1&L2—Sound & Vibration

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





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

www.wingstesting.com

| | SUP | PLY FA | N REPC | RT | | |
|-------------------------|-----------|-------------|--------|------------|-----------|-------------|
| PROJECT: Fenton Judicia | al Center | | | DATE: 5/20 |)/21 | |
| AREA SERVED: Various | | | | TECH: BS | | |
| | | | | | | |
| FAN NUMBER | HV | AC-1 | RA | \F-1 | HV | AC-2 |
| LOCATION | Base | ement | Base | ement | Base | ement |
| AREA SERVED | All A | Areas | All A | Areas | All A | Areas |
| MANUFACTURER | Buffalo A | ir Handlers | Wo | oods | Buffalo A | ir Handlers |
| MODEL OR SIZE | 300 | D-BB | 36J | 1/2-E | 300 | D-BB |
| | DESIGN | ACTUAL | DESIGN | ACTUAL | DESIGN | ACTUAL |
| TOTAL CFM | 28,120 | 36,411 | 20,620 | 27,180 | 28,120 | 35,903 |
| RETURN AIR | 20,620 | 26,716 | | | 20,620 | 26,689 |
| OUTSIDE AIR | 7500 | 9695 | | | 7500 | 9214 |
| DISCH. STATIC | | 2.44 | | +0.64" | | 2.42" |
| SUCTION STATIC | | -1.58" | | -1.01" | | -1.69" |
| TOTAL STATIC | | 4.02 | | | | 4.11 |
| FAN RPM | | 1052 | NA | NA | | 1046 |
| PULLEY O.D. | 11" x 2 | 2 7/16" | N | A | 11" x 2 | 2 7/16" |
| ESP | 3. | 01 | - | | 3. | 02 |
| VFD SPEED | 60 | Hz | 60 | Hz | 60 | Hz |
| O.A.D.MIN POS | 30 |)% | - | | 30 |)% |
| | | MOTOR | DATA | | | |
| MANUFACTURER | Bal | dor | Tos | hiba | Bal | dor |
| MODEL OR FR. | 32 | 4 T | 254 | TZ | 32 | 4 T |
| HORSEPOWER | 40 | 40 | 15 | 15 | 40 | 40 |
| MOTOR RPM | 1775 | 1775 | 1775 | 1775 | 1775 | 1775 |
| VOLTAGE / PH. | 460/3 | 460/3 | 460/3 | 460/3 | 460/3 | 460/3 |
| LEG 1 | 48.0 | 39.9 | 18.5 | 11.8 | 48.0 | 36.7 |
| AMPS LEG 2 | | 39.8 | | 11.7 | | 37.2 |
| LEG 3 | | 39.7 | | 11.8 | | 36.8 |
| SHEAVE O.D. | 6 1/2" > | (2 1/8" | Ν | A | 6 1/2" > | (2 1/8" |
| BELTS - QTY / SIZE | 315V | X930 | N | A | 315V | X930 |
| SHEAVE POSITION | Fix | ed | N | A | Fix | ed |
| BHP | 33 | .2 | 9. | 6 | 31 | .0 |
| | | REMA | RKS | | | |

| | | | PLY FA | N REPC | | | |
|------------|----------------|--------|----------|------------|------------|-----------|-------------|
| | Fenton Judicia | Center | | | DATE: 5/20 |)/21 | |
| AREA SER | VED: Various | ***** | | | TECH: BS | | |
| | | | FAND | 1 | | | |
| FAN NUM | | RA | \F-2 | | AC-3 | RA | \F-3 |
| LOCATION | | Base | ement | | ement | | ement |
| AREA SERV | VED | | Areas | All A | Areas | | Areas |
| MANUFAC | TURER | | ods | Buffalo Ai | r Handlers | Buffalo A | ir Handlers |
| MODEL OF | R SIZE | 36J | 1/2-Е | 300 |)-BB | 300 |)-BB |
| | | DESIGN | ACTUAL | DESIGN | ACTUAL | DESIGN | ACTUAL |
| TOTAL CF | M | 20,620 | 27,120 | 28,120 | 37,747 | 20,620 | 28,884 |
| RETURN A | AIR | | | 20,620 | 26,677 | | |
| OUTSIDE A | MR | | | 7500 | 11,070 | | |
| DISCH. STA | TIC | | +0.62" | | +2.38" | | +0.64" |
| SUCTION S | STATIC | | -0.81" | | -1.78" | | -0.75" |
| TOTAL STA | TIC | | 1.43 | | 4.16 | | 1.39 |
| FAN RPM | | NA | NA | | 1044 | NA | NA |
| PULLEY O. | D. | N | Α | 11" x 2 | 2 7/16" | N | A |
| ESP | | - | | 3.0 | 01 | - | |
| VFD SPEED |) | 60 | Hz | 60 | Hz | 60 | Hz |
| O.A.D.MIN | POS | - | | 30 | 1% | - | |
| | | | V(8)(8); | DATA | | | |
| MANUFAC | TURER | Tos | hiba | Bal | dor | Tos | hiba |
| MODEL OR | FR. | 25 | 4 T | 324 | 4 T | 254 | 4 T |
| HORSEPOV | VER | 15 | 15 | 40 | 40 | 15 | 15 |
| MOTOR RP | M | 1775 | 1775 | 1775 | 1775 | 1775 | 1775 |
| VOLTAGE / | ' PH. | 460/3 | 460/3 | 460/3 | 460/3 | 460/3 | 460/3 |
| | LEG 1 | 18.5 | 10.6 | 48.0 | 36.2 | 18.5 | 11.2 |
| AMPS | LEG 2 | | 10.8 | | 35.8 | | 11.1 |
| | LEG 3 | | 10.9 | | 36.1 | | 10.9 |
| SHEAVE | O.D. | N | A | 6 1/2" x | 2 1/8" | N. | A |
| BELTS - QT | Y / SIZE | N | A | 315V | x 930 | N | A |
| HEAVE PO | SITION | N | A | Fix | ed | N | Α |
| знр | | 8. | 8 | 30 | .2 | 9. | 1 |
| | | | REMA | | | | |

| MODEL OR SIZE | Base All A Buffalo Ai 300 DESIGN 28,120 20,620 7500 | FAN D AC-4 ment Areas r Handlers -BB ACTUAL 39,981 29,254 10,727 +2.44" -1.89" 4.33 1055 | RA Base All A Wo | TECH: BS | Base All A Buffalo Ai | AC-5 ement Areas r Handlers D-BB ACTUAL 39,350 29,517 9833 +2.31" -1.83" |
|--|--|---|--|--|--|--|
| LOCATION AREA SERVED MANUFACTURER MODEL OR SIZE I TOTAL CFM RETURN AIR OUTSIDE AIR DISCH. STATIC SUCTION STATIC TOTAL STATIC FAN RPM PULLEY O.D. | Base All A Buffalo Ai 300 DESIGN 28,120 20,620 7500 | AC-4 ment Areas r Handlers -BB ACTUAL 39,981 29,254 10,727 +2.44" -1.89" 4.33 | RA Base All A Wo 36J 3 DESIGN 20,620 | ement Areas ods 1/2-E ACTUAL 29,256 +0.74" -1.01" | Base All A Buffalo Ai 300 DESIGN 28,120 20,620 7500 | ement Areas ir Handlers D-BB ACTUAL 39,350 29,517 9833 +2.31" |
| LOCATION AREA SERVED MANUFACTURER MODEL OR SIZE I TOTAL CFM RETURN AIR OUTSIDE AIR DISCH. STATIC SUCTION STATIC TOTAL STATIC FAN RPM PULLEY O.D. | Base All A Buffalo Ai 300 DESIGN 28,120 20,620 7500 | ment reas r Handlers -BB ACTUAL 39,981 29,254 10,727 +2.44" -1.89" 4.33 | Base All A Wo 36J : DESIGN 20,620 | ement Areas ods 1/2-E ACTUAL 29,256 +0.74" -1.01" | Base All A Buffalo Ai 300 DESIGN 28,120 20,620 7500 | ement Areas ir Handlers D-BB ACTUAI 39,350 29,517 9833 +2.31" |
| AREA SERVED MANUFACTURER MODEL OR SIZE I TOTAL CFM RETURN AIR OUTSIDE AIR DISCH. STATIC SUCTION STATIC TOTAL STATIC FAN RPM PULLEY O.D. | All A Buffalo Ai 300 DESIGN 28,120 20,620 7500 | Areas r Handlers -BB ACTUAL 39,981 29,254 10,727 +2.44" -1.89" 4.33 | All A Wo 36J : DESIGN 20,620 | Areas bods 1/2-E ACTUAL 29,256 +0.74" -1.01" | All A Buffalo Ai 300 DESIGN 28,120 20,620 7500 | Areas ir Handlers D-BB ACTUAI 39,350 29,517 9833 +2.31" |
| MANUFACTURER E MODEL OR SIZE I TOTAL CFM RETURN AIR OUTSIDE AIR DISCH. STATIC SUCTION STATIC TOTAL STATIC FAN RPM PULLEY O.D. | Buffalo Ai 300 DESIGN 28,120 20,620 7500 | r Handlers -BB ACTUAL 39,981 29,254 10,727 +2.44" -1.89" 4.33 | Wo 36J : DESIGN 20,620 | bods 1/2-E ACTUAL 29,256 +0.74" -1.01" | Buffalo Ai 300 DESIGN 28,120 20,620 7500 | r Handlers -BB ACTUAI 39,350 29,517 9833 +2.31" |
| MODEL OR SIZE | 300 DESIGN 28,120 20,620 7500 | -BB ACTUAL 39,981 29,254 10,727 +2.44" -1.89" 4.33 | 36J : DESIGN 20,620 | 1/2-E ACTUAL 29,256 +0.74" -1.01" | 300 DESIGN 28,120 20,620 7500 | -BB ACTUAI 39,350 29,517 9833 +2.31" |
| TOTAL CFM RETURN AIR OUTSIDE AIR DISCH. STATIC SUCTION STATIC TOTAL STATIC FAN RPM PULLEY O.D. | DESIGN 28,120 20,620 7500 | ACTUAL 39,981 29,254 10,727 +2.44" -1.89" 4.33 | DESIGN 20,620 | ACTUAL 29,256 +0.74" -1.01" | DESIGN 28,120 20,620 7500 | ACTUA 39,350 29,517 9833 +2.31" |
| TOTAL CFM RETURN AIR OUTSIDE AIR DISCH. STATIC SUCTION STATIC TOTAL STATIC FAN RPM PULLEY O.D. | 28,120 20,620 7500 | 39,981 29,254 10,727 +2.44" -1.89" 4.33 | 20,620 | 29,256 +0.74" -1.01" | 28,120 20,620 7500 | 39,350 29,517 9833 +2.31" |
| RETURN AIR OUTSIDE AIR DISCH. STATIC SUCTION STATIC TOTAL STATIC FAN RPM PULLEY O.D. | 20,620 7500 | 29,254 10,727 +2.44" -1.89" 4.33 | | +0.74" -1.01" | 20,620 7500 | 29,517 9833 +2.31" |
| OUTSIDE AIR DISCH. STATIC SUCTION STATIC TOTAL STATIC FAN RPM PULLEY O.D. | 7500 | 10,727 +2.44" -1.89" 4.33 | | +0.74" -1.01" | 7500 | 9833 +2.31" |
| DISCH. STATIC SUCTION STATIC TOTAL STATIC FAN RPM PULLEY O.D. | | +2.44" -1.89" 4.33 | | +0.74" -1.01" | | +2.31" |
| SUCTION STATIC TOTAL STATIC FAN RPM PULLEY O.D. | | -1.89" 4.33 | | -1.01" | | |
| TOTAL STATIC FAN RPM PULLEY O.D. | | 4.33 | | | | -1.83" |
| FAN RPM PULLEY O.D. | | | | | | |
| PULLEY O.D. | | 1055 | | | | 4.14 |
| | | 1022 | NA | NA | | 1059 |
| | 11" x 2 | 7/16" | N | A | 11" x 2 | 2 7/16" |
| ESP | 2.9 | 99 | - | | 3.(| 08 |
| VFD SPEED | 60 | Hz | 60 | Hz | 60 | Hz |
| O.A.D.MIN POS | 30 | % | - | | 30 | 1% |
| | | V(0)(0); | DATA | | | |
| MANUFACTURER | Bal | dor | Tos | hiba | Bal | dor |
| MODEL OR FR. | 324 | 4 T | 254 | 4 T | 324 | 4 T |
| HORSEPOWER | 40 | 40 | 15 | 15 | 40 | 40 |
| MOTOR RPM | 1775 | 1775 | 1775 | 1775 | 1775 | 1775 |
| VOLTAGE / PH. | 460/3 | 460/3 | 460/3 | 460/3 | 460/3 | 460/3 |
| LEG 1 | 48.0 | 36.2 | 18.5 | 11.5 | 48.0 | 37.2 |
| AMPS LEG 2 | | 35.7 | | 11.6 | | 37.0 |
| LEG 3 | | 36.7 | | 12.0 | | 36.6 |
| SHEAVE O.D. | 6 1/2" x | 2 1/8" | N | A | 6 1/2" x | 2 1/8" |
| BELTS - QTY / SIZE | 315V) | X930 | N | A | 315V | x 930 |
| SHEAVE POSITION | Fix | ed | N | A | Fix | ed |
| 3HP | 30. | .2 | 9. | 7 | 31 | .0 |

| PROJECT: | Fenton Judicial | Center | | | DATE: 05/2 | 20/21 6/01/2 | 22 |
|-------------|-----------------|--------|---------|------------|-------------|--------------|--------|
| AREA SERV | ED: Various | | | | TECH: BS | | |
| | | | | | | | |
| FAN NUME | BER | RA | F-5 | HV | AC-6 | BI | F-1 |
| LOCATION | | Base | ement | Base | ement | Base | ement |
| AREA SERV | 'ED | All A | Areas | All A | \reas | All A | Areas |
| MANUFAC | FURER | Wo | oods | Buffalo Ai | ir Handlers | Wo | oods |
| MODEL OR | SIZE | 36J : | 1/2-Е | 300 |)-BB | 30dG | 24P/A |
| | | DESIGN | ACTUAL | DESIGN | ACTUAL | DESIGN | ACTUAL |
| TOTAL CFN | Λ | 20,620 | 27,096 | 25,000 | 26,691 | ND | 16995 |
| RETURN A | IR | | | 0 | 0 | | |
| OUTSIDE A | IR | | | 25,000 | 26,691 | | |
| DISCH. STA | TIC | | +0.71" | | +1.10" | | +5.17" |
| SUCTION S | TATIC | | -0.93" | | -1.30" | | +1.98" |
| TOTAL STA | TIC | | 1.64 | | 2.40 | | 7.15 |
| FAN RPM | | NA | NA | NA | 1044 | DD | DD |
| PULLEY O.I | Э. | N | Α | 12" x 2 | 2 3/16" | D | D |
| ESP | | - | | - | | | |
| VFD SPEED | | 60 | Hz | 56 | Hz | 57 | Hz |
| O.A.D.MIN | POS | - | | 10 | 0% | | |
| | | | N. OTO; | DATA | | | |
| MANUFACT | URER | Tosi | hiba | Peace | maker | N | A |
| MODEL OR | FR. | 254 | 4 T | 324 | 4 T | N | A |
| HORSEPOW | /ER | 15 | 15 | 40 | 40 | 15 | 15 |
| MOTOR RPI | Μ | 1775 | 1775 | 1780 | 1780 | 1775 | 1775 |
| VOLTAGE / | PH. | 460/3 | 460/3 | 460/3 | 460/3 | 460/3 | 460/3 |
| | LEG 1 | 18.5 | 11.5 | 47.5 | 31.1 | 34.0 | 32.1 |
| AMPS | LEG 2 | | 11.6 | | 30.8 | | 31.6 |
| | LEG 3 | | 11.5 | | 30.9 | | 31.7 |
| HEAVE | O.D. | N | A | 7" x 2 | 3/8" | D | D |
| BELTS - QTN | / / SIZE | N | A | 315V | X960 | D | D |
| HEAVE PO | SITION | N | A | Fix | ed | D | D |
| BHP | | 9. | 4 | 26 | 2 | | - |

| ROJECT: Fenton Judicial Cen | YSTEN | | | លែលវិចារាំមារពិសៅ | | DATE: 5/2 | 20/21 | |
|-----------------------------|---------|------------|--------|-------------------|---------|-----------|----------|----------|
| YSTEM/AREA SERV: AHU's | | | | | | TECH: BS | 20/21 | |
| | Filters | 2 | | | SF 3 | | | |
| POS. (+) / NEG.(-) | 1 | 2 | 3 | READINGS | 5 | 6 | 7 | NOTES |
| AHU-1 | -0.57" | -1.16" | -1.58" | +2.44" | | | | |
| AHU-2 | -0.54" | -1.20" | -1.69" | +2.42" | | | | |
| | -0.51" | -1.18" | -1.78" | +2.38" | | | | |
| AHU-3 | | 1 1 2 2 11 | -1.89" | +2.44" | | | | 1 |
| AHU-3 AHU-4 | -0.55" | -1.33" | | | | | | <u> </u> |
| AHU-3 AHU-4 AHU-5 | -0.77" | -1.33" | -1.83" | +2.31" | | | | |
| AHU-3 AHU-4 | | | | +2.31" +1.10" | | | | |

| JECT: Fenton Judi | | | | | | DATE: 5/20 |)/21 | |
|------------------------------|----------------|-------|-----------|-----------------|-------------|------------|--------|----|
| A SERVED: Variou TRAVERSE | s DUCT | AREA | 9999997°3 | ign | | TECH: BS | | NO |
| LOCATIONS | Size | | EPM | | STATEC PRES | EPM | CFM | |
| AHU-1 Totai | 107" x 70 1/2" | 57.39 | | 28,120 | w/velgrid | 695 | 36,411 | |
| AHU-1 OA | 110" x 30" | 22.92 | | 7500 | w/velgrid | 423 | 9695 | |
| AHU-1 Return | | | | 20,620 | Calc | | 26,716 | |
| AHU-2 Total | 106" x 66" | 48.58 | | 28,120 | w/velgrid | 739 | 35,903 | |
| AHU-2 OA | 110" x 30" | 22.92 | | 7500 | w/velgrid | 402 | 9214 | |
| AHU-2 Return | | | | 20,620 | Calc | | 26,716 | - |
| AHU-3 Total | 106" x 66" | 48.58 | | 28,120 | w/velgrid | 777 | 37,747 | |
| AHU-3 OA | 110" x 30" | 22.92 | | 7500 | w/velgrid | 483 | 11,070 | |
| AHU-3 Return | | | | 20,620 | Calc | | 26,677 | |
| AHU-4 Total | 106" x 66" | 48.58 | | 28,120 | w/velgrid | 823 | 39,981 | |
| AHU-4 OA | 110" x 30" | 22.92 | | 7500 | w/velgrid | 463 | 10,727 | |
| AHU-4 Return | | | | 20,620 | Calc | | 29,254 | |
| AHU-5 Total | 106" x 66" | 48.58 | | 28,120 | w/velgrid | 810 | 39,350 | |
| AHU-5 OA | 110" x 30" | 22.92 | | 7500 | w/velgrid | 429 | 9833 | |
| AHU-5 Return | | | | 20,620 | Calc | | 29,517 | |
| AHU-6 Total | 98" x 74" | 50.36 | | 25,000 | w/velgrid | 530 | 26,691 | |
| RAF-1 | 72" x 24" | 12.0 | | 20,620 | -1.02" | 2265 | 27,180 | |
| RAF-2 | 72" x 24" | 12.0 | | 20,620 | -0.80" | 2260 | 27,120 | |
| RAF-3 | 72" x 24" | 12.0 | | 20,620 | -0.75" | 2407 | 28,884 | |
| RAF-4 | 72" x 24" | 12.0 | | 20,620 MARK5 | -1.01" | 2458 | 29,256 | |

| EA SERVED: Variou | icial Center | | | | | DATE: 5/2 | 0/21 06/01/22 | |
|-------------------|---------------|---------------|---|------------|--------------------------|--|----------------------|-------|
| TRAVERSE | 512E | AR A SQ FT | er de la compañía de Compañía de la compañía | IGN CFW | GIATERLINE STATICPRES | Sector se | iest CfM | Neita |
| RAF-5 | 72" x 24" | 12.0 | | 20,620 | -0.93" | 2258 | 27,696 | |
| EF-8 | 12" x 12" | 1.0 | | 850 | -0.44" | 831 | 831 | |
| EF-9 | 24" x 24" | 4.0 | | 5175 | -0.80" | 1399 | 5596 | |
| EF-10 | 12" x 12" | 1.0 | | 850 | -0.56" | 923 | 923 | |
| EF-11 | 12" x 12" | 1.0 | | 425 | -0.71" | 419 | 419 | |
| EF-12 | 13.5" x 13.5" | 1.27 | | 700 | -0.49" | 564 | 716 | |
| EF-14 | 26" x 26" | 4.69 | | 3325 | -0.63" | 669 | 3141 | |
| EF-15 | 13.5" x 13.5" | 1.27 | | 925 | -0.91" | 743 | 944 | |
| EF-16 | 13.5" x 13.5" | 1.27 | | 425 | -0.19" | 351 | 444 | |
| EF-13 | 14" x 14" | 1.36 | | 750 | -0.38" | 516 | 707 | |
| BF-1 | 30"Ø | 4.91" | | ND | +5.17" | 3464 | 16995 | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | Marks | | | | |

| PROIFCT | Fenton Judicial | | | | DATE: 6/1/20 |)22 12/13/202 |
|--|--|--|--|---|---|--|
| | VED: Various | Center | | | TECH: BS | |
| | | | FAN DATA | | | |
| FAN NUM | IBER | EF-8 | EF-9 | EF-10 | EF-11 | EF-12 |
| LOCATION | | Roof | Roof | Roof | Roof | Roof |
| AREA SER | VED | Toilets | Toilets | Toilets | Toilets | Toilets |
| MANUFAG | CTURER | Cook | Cook | Cook | Cook | Cook |
| MODEL OI | R SIZE | 120R3B | 245R3B | 100R2B | 100R2B | 100R2B |
| TOTAL | DESIGN | 850 | 5175 | 850 | 425 | 700 |
| CFM | ACTUAL | 824 | 5596 | 923 | 419 | 716 |
| FAN | DESIGN | | | | | |
| RPM | ACTUAL | 1731 | 1047 | 1574 | 1347 | 1968 |
| PULLEY | O.D. | 3" x 3/4" (1) | 6" x 1" | 3" x 3/4" | 3" x 3/4" | 2 1/2" x 3/4' |
| SERVICE | | 1.25 | 1.15 | 1.35 | 1.35 | 1.35 |
| | | | | | | |
| | | | | | | |
| | | | | | | 1 |
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| | TUDED | Marathan | MOTOR DAT | and the local data from the state of the local data and the local data in the local | Marathon | Marathon |
| | | Marathon | Baldor | Marathon | Marathon | Marathon |
| MODEL NU | JMBER | 48YZ | Baldor 145T | Marathon 482 | 482 | 48YZ |
| MODEL NU MOTOR | JMBER DESIGN | 48YZ 1/4 | Baldor 145T 2 | Marathon 482 1/6 | 482 1/6 | 48YZ 1/4 |
| MODEL NU MOTOR HP | JMBER DESIGN ACTUAL | 48YZ 1/4 1/4 | Baldor 145T 2 2 | Marathon 482 1/6 1/6 | 482 1/6 1/6 | 48YZ 1/4 1/4 |
| MODEL NU MOTOR HP MOTOR R | JMBER DESIGN ACTUAL PM | 48YZ 1/4 1/4 1725 | Baldor 145T 2 2 1750 | Marathon 482 1/6 1/6 1725 | 482 1/6 1/6 1725 | 48YZ 1/4 1/4 1725 |
| MODEL NU MOTOR HP MOTOR R | JMBER DESIGN ACTUAL PM PHASE | 48YZ 1/4 1/4 1725 120/1 | Baldor 145T 2 2 1750 460/3 | Marathon 482 1/6 1/6 1725 120/1 | 482 1/6 1/6 1725 120/1 | 48YZ 1/4 1/4 1725 120/1 |
| MODEL NI MOTOR HP MOTOR RI VOLTAGE/ | JMBER DESIGN ACTUAL PM PHASE DESIGN | 48YZ 1/4 1/4 1725 120/1 5.0 | Baldor 145T 2 2 1750 460/3 2.9 | Marathon 482 1/6 1/6 1725 120/1 3.6 | 482 1/6 1/6 1725 120/1 3.6 | 48YZ 1/4 1/4 1725 120/1 5.0 |
| MODEL NU MOTOR HP MOTOR RI VOLTAGE/ MOTOR | JMBER DESIGN ACTUAL PM PHASE DESIGN ACT. LEG 1 | 48YZ 1/4 1/4 1725 120/1 5.0 | Baldor 145T 2 2 1750 460/3 2.9 | Marathon 482 1/6 1/6 1725 120/1 3.6 | 482 1/6 1/6 1725 120/1 3.6 | 48YZ 1/4 1/4 1725 120/1 5.0 |
| MODEL NU MOTOR HP MOTOR RI VOLTAGE/ MOTOR | JMBER DESIGN ACTUAL PM PHASE DESIGN ACT. LEG 1 ACT. LEG 2 | 48YZ 1/4 1/4 1725 120/1 5.0 | Baldor 145T 2 2 1750 460/3 2.9 | Marathon 482 1/6 1/6 1725 120/1 3.6 | 482 1/6 1/6 1725 120/1 3.6 | 48YZ 1/4 1/4 1725 120/1 5.0 |
| MODEL NI MOTOR HP MOTOR RI VOLTAGE/ MOTOR AMPS | JMBER DESIGN ACTUAL PM PHASE DESIGN ACT. LEG 1 | 48YZ 1/4 1/4 1725 120/1 5.0 4.1 | Baldor 145T 2 2 1750 460/3 2.9 2.6 | Marathon 482 1/6 1/6 1725 120/1 3.6 3.6 | 482 1/6 1/6 1725 120/1 3.6 2.9 | 48YZ 1/4 1/4 1725 120/1 5.0 4.6 |
| MODEL NI MOTOR HP MOTOR RI VOLTAGE/ MOTOR AMPS SHEAVE | JMBER DESIGN ACTUAL PM PHASE DESIGN ACT. LEG 1 ACT. LEG 2 ACT. LEG 3 | 48YZ 1/4 1/4 1725 120/1 5.0 4.1 3" x 1/2" | Baldor 145T 2 2 1750 460/3 2.9 2.6 3 1/2" x 3/4" | Marathon 482 1/6 1/6 1725 120/1 3.6 3.6 2 1/4" x 1/2" | 482 1/6 1/6 1725 120/1 3.6 2.9 3" x 1/2" | 48YZ 1/4 1/4 1725 120/1 5.0 4.6 3 1/4" x 1/2" |
| MODEL NU MOTOR HP MOTOR R VOLTAGE/ MOTOR AMPS SHEAVE BELTS-QTY | JMBER DESIGN ACTUAL PM PHASE DESIGN ACT. LEG 1 ACT. LEG 2 ACT. LEG 3 | 48YZ 1/4 1/4 1725 120/1 5.0 4.1 3" x 1/2" 1/4L200 | Baldor 145T 2 2 1750 460/3 2.9 2.6 3 1/2" x 3/4" 1/AX28 | Marathon 482 1/6 1/6 1725 120/1 3.6 3.6 2 1/4" x 1/2" 1/4L470H | 482 1/6 1/6 1725 120/1 3.6 2.9 3" x 1/2" 1/4L180 | 48YZ 1/4 1/4 1725 120/1 5.0 4.6 3 1/4" x 1/2" 1/4470 |
| MODEL NU MOTOR HP MOTOR RI VOLTAGE/ MOTOR AMPS SHEAVE BELTS-QTY SHEAVE PC | JMBER DESIGN ACTUAL PM PHASE DESIGN ACT. LEG 1 ACT. LEG 2 ACT. LEG 3 | 48YZ 1/4 1/4 1725 120/1 5.0 4.1 3" x 1/2" 1/4L200 75% Closed | Baldor 145T 2 2 1750 460/3 2.9 2.6 3 1/2" x 3/4" 1/AX28 50% Open | Marathon 482 1/6 1/6 1725 120/1 3.6 3.6 2 1/4" x 1/2" 1/4L470H Fixed | 482 1/6 1/6 1725 120/1 3.6 2.9 3" x 1/2" 1/4L180 100% Closed | 48YZ 1/4 1/4 1725 120/1 5.0 4.6 3 1/4" x 1/2" 1/4470 75% Closed |
| MANUFAC MODEL NU MOTOR HP MOTOR RI VOLTAGE/ MOTOR AMPS SHEAVE BELTS-QTV SHEAVE PC BHP | JMBER DESIGN ACTUAL PM PHASE DESIGN ACT. LEG 1 ACT. LEG 2 ACT. LEG 3 | 48YZ 1/4 1/4 1725 120/1 5.0 4.1 3" x 1/2" 1/4L200 | Baldor 145T 2 2 1750 460/3 2.9 2.6 3 1/2" x 3/4" 1/AX28 | Marathon 482 1/6 1/6 1725 120/1 3.6 3.6 2 1/4" x 1/2" 1/4L470H | 482 1/6 1/6 1725 120/1 3.6 2.9 3" x 1/2" 1/4L180 | 48YZ 1/4 1/4 1725 120/1 5.0 4.6 3 1/4" x 1/2" 1/4470 |
| MODEL NU MOTOR HP MOTOR RI VOLTAGE/ MOTOR AMPS SHEAVE BELTS-QTY SHEAVE PC | JMBER DESIGN ACTUAL PM PHASE DESIGN ACT. LEG 1 ACT. LEG 2 ACT. LEG 3 | 48YZ 1/4 1/4 1725 120/1 5.0 4.1 3" x 1/2" 1/4L200 75% Closed | Baldor 145T 2 2 1750 460/3 2.9 2.6 3 1/2" x 3/4" 1/AX28 50% Open | Marathon 482 1/6 1/6 1725 120/1 3.6 3.6 2 1/4" x 1/2" 1/4L470H Fixed | 482 1/6 1/6 1725 120/1 3.6 2.9 3" x 1/2" 1/4L180 100% Closed | 48YZ 1/4 1/4 1725 120/1 5.0 4.6 3 1/4" x 1/2" 1/4470 75% Closed |

| FROJECT | Fenton Judicial | Center | | | DATE: 6/01/2 | 2 12/13/2023 |
|---|---|---|---|--|--|--|
| AREA SER | VED: Various | | | | TECH: BS | |
| | | | FAN DATA | | | |
| FAN NUM | 1BER | EF-13 | EF-14 | EF-15 | EF-16 | EF-17 |
| LOCATION | N | Roof | Roof | Roof | Roof | Roof |
| AREA SER | VED | Toilets | Toilets | Holding Cells | Toilets | Holding Cell |
| MANUFA | CTURER | Cook | Cook | Cook | Cook | Cook |
| MODEL O | R SIZE | 120R3B | 180R3B | 120R3B | 100R2B | 255LPB |
| TOTAL | DESIGN | 750 | 3325 | 925 | 425 | 6170 |
| CFM | ACTUAL | 714 | 3141 | 944 | 444 | 6478 |
| FAN | DESIGN | | | | | |
| RPM | ACTUAL | 1326 | 1636 | 1626 | 1714 | |
| PULLEY | O.D. | 2 3/4" x 3/4" | 5" x 3/4" | 3" x 3/4" | 3" x 3/4" | 6 1/2" x 1" |
| SERVICE | | 1.15 | 1.15 | 1.15 | 1.35 | 1.15 |
| | | | | | | |
| | | | | | | 1 |
| | | | | | | |
| MANIJEA | TURFR | Marathon | Metor DAT | 1 | Marathon | Baldor |
| | | Marathon 48Y7 | Magnetek | Marathon | Marathon 48Y | Baldor 182T |
| MODEL NU | UMBER | 48YZ | Magnetek P145T | Marathon 482 | 48Y | 182T |
| MODEL NU MOTOR | UMBER DESIGN | 48YZ 1/4 | Magnetek P145T 1 1/2 | Marathon 482 1/4 | 48Y 1/6 | 182T 3 |
| MODEL NU MOTOR HP | UMBER DESIGN ACTUAL | 48YZ 1/4 1/4 | Magnetek P145T 1 1/2 1 1/2 | Marathon 482 1/4 1/4 | 48Y 1/6 1/6 | 182T 3 3 |
| MODEL NU MOTOR HP MOTOR RI | UMBER DESIGN ACTUAL PM | 48YZ 1/4 1/4 1725 | Magnetek P145T 1 1/2 1 1/2 1745 | Marathon 482 1/4 1/4 1725 | 48Y 1/6 1/6 1725 | 182T 3 3 1760 |
| MODEL NU MOTOR HP MOTOR RI | UMBER DESIGN ACTUAL PM /PHASE | 48YZ 1/4 1/4 1725 120/1 | Magnetek P145T 1 1/2 1 1/2 1745 460/3 | Marathon 482 1/4 1/4 1725 120/1 | 48Y 1/6 1/6 1725 120/1 | 182T 3 3 1760 460/3 |
| CFM FAN RPM PULLEY SERVICE MOTOR MOTOR HP MOTOR RF /OLTAGE/ | UMBER DESIGN ACTUAL PM /PHASE DESIGN | 48YZ 1/4 1/4 1725 | Magnetek P145T 1 1/2 1 1/2 1745 460/3 1.95 | Marathon 482 1/4 1/4 1725 | 48Y 1/6 1/6 1725 | 182T 3 3 1760 |
| MODEL NU MOTOR HP MOTOR RI VOLTAGE/ | UMBER DESIGN ACTUAL PM /PHASE DESIGN ACT. LEG 1 | 48YZ 1/4 1/4 1725 120/1 5.0 | Magnetek P145T 1 1/2 1 1/2 1745 460/3 1.95 1.7 | Marathon 482 1/4 1/4 1725 120/1 5.0 | 48Y 1/6 1/6 1725 120/1 3.6 | 182T 3 3 1760 460/3 4.1 |
| MODEL NU MOTOR HP MOTOR R VOLTAGE/ | UMBER DESIGN ACTUAL PM /PHASE DESIGN ACT. LEG 1 ACT. LEG 2 | 48YZ 1/4 1/4 1725 120/1 | Magnetek P145T 1 1/2 1 1/2 1745 460/3 1.95 1.7 1.6 | Marathon 482 1/4 1/4 1725 120/1 | 48Y 1/6 1/6 1725 120/1 3.6 | 182T 3 3 1760 460/3 4.1 |
| MODEL NU MOTOR HP MOTOR RI VOLTAGE/ MOTOR AMPS | UMBER DESIGN ACTUAL PM /PHASE DESIGN ACT. LEG 1 | 48YZ 1/4 1/4 1725 120/1 5.0 4.9 | Magnetek P145T 1 1/2 1 1/2 1745 460/3 1.95 1.7 1.6 1.7 | Marathon 482 1/4 1/4 1725 120/1 5.0 4.4 | 48Y 1/6 1/6 1725 120/1 3.6 3.1 | 182T 3 3 1760 460/3 4.1 3.6 |
| MODEL NU MOTOR HP MOTOR RI VOLTAGE/ MOTOR AMPS SHEAVE | UMBER DESIGN ACTUAL PM /PHASE DESIGN ACT. LEG 1 ACT. LEG 2 ACT. LEG 3 | 48YZ 1/4 1/4 1725 120/1 5.0 4.9 3" x 1/2" | Magnetek P145T 1 1/2 1 1/2 1745 460/3 1.95 1.7 1.6 1.7 3 3/4" x 7/8" | Marathon 482 1/4 1/4 1725 120/1 5.0 4.4 3" x 1/2" | 48Y 1/6 1/6 1725 120/1 3.6 3.1 3" x 1/2" | 182T 3 3 1760 460/3 4.1 3.6 4 3/4" x 1 1/8 |
| MODEL NU MOTOR HP MOTOR RI /OLTAGE/ MOTOR AMPS SHEAVE BELTS-QTY | UMBER DESIGN ACTUAL PM /PHASE DESIGN ACT. LEG 1 ACT. LEG 2 ACT. LEG 3 | 48YZ 1/4 1/4 1725 120/1 5.0 4.9 3" x 1/2" 1/4L200 | Magnetek P145T 1 1/2 1 1/2 1745 460/3 1.95 1.7 1.6 1.7 3 3/4" x 7/8" 1/4L270 | Marathon 482 1/4 1/4 1725 120/1 5.0 4.4 3" x 1/2" 1/4L200 | 48Y 1/6 1/6 1725 120/1 3.6 3.1 3" x 1/2" 1/4L190 | 182T 3 3 1760 460/3 4.1 3.6 4 3/4" x 1 1/8 1/A62 |
| MODEL NU MOTOR HP MOTOR RI /OLTAGE/ MOTOR AMPS SHEAVE | UMBER DESIGN ACTUAL PM /PHASE DESIGN ACT. LEG 1 ACT. LEG 2 ACT. LEG 3 | 48YZ 1/4 1/4 1725 120/1 5.0 4.9 3" x 1/2" | Magnetek P145T 1 1/2 1 1/2 1745 460/3 1.95 1.7 1.6 1.7 3 3/4" x 7/8" | Marathon 482 1/4 1/4 1725 120/1 5.0 4.4 3" x 1/2" | 48Y 1/6 1/6 1725 120/1 3.6 3.1 3" x 1/2" | 182T 3 3 1760 460/3 4.1 3.6 4 3/4" x 1 1/8 |

| AHU-4 Top 10 CS B&G 1 1/2 10 30 20.6 25.0 40 9.1 11 11 AHU-4 Middle 11 CS B&G 1 1/2 10 30 20.1 25.0 40 9.4 11 11 AHU-4 Middle 11 CS B&G 1 1/2 10 30 20.1 25.0 40 9.4 11 1 AHU-4 Bottom 12 CS B&G 1 1/2 10 30 15.7 22.0 40 7.7 10 10 AHU-5 Middle 14 CS B&G 1 1/2 10 30 15.1 22.0 40 7.7 10 10 AHU-5 Middle 14 CS B&G 1 1/2 10 30 15.1 22.0 40 7.6 10 10 AHU-5 Bottom 15 CS B&G 1 1/2 10 30 15.1 22.0 40 7.6 10 10 AHU-6 16 CS Wheator 4" 32 <td< th=""><th>PROJECT: Fento</th><th></th><th></th><th>r</th><th></th><th></th><th></th><th></th><th></th><th><u> </u></th><th>5/20/2</th><th>21</th><th></th></td<> | PROJECT: Fento | | | r | | | | | | <u> </u> | 5/20/2 | 21 | |
|--|----------------|---------|--------|----------|-------|-------|------|--------|------|----------|--------|------|----------|
| LOCATION NO. ELEVIEN MPG. SIZE GPM POS. PR.DIF GPM POS. PR.DIF GPM. POS. AHU-1 1 CS B&G 11/2 10 30 10.0 20.0 23.1 37.0 40 8.1 11 11 AHU-2 Model 8.8 11.1 11 11 11 11 <td< th=""><th>AREA SERVED: \</th><th>/arious</th><th>5</th><th></th><th></th><th></th><th></th><th></th><th></th><th>TECH:</th><th></th><th></th><th>10000000</th></td<> | AREA SERVED: \ | /arious | 5 | | | | | | | TECH: | | | 10000000 |
| IndIn | | | | | | | | | | | | | |
| AHU-1 Top 1 CS B&G 11/2 10 30 20.8 25.0 40 8.8 11 AHU-1 Middle 2 CS B&G 11/2 10 30 21.0 25.0 40 8.9 11 AHU-1 Bottom 3 CS B&G 11/2 10 30 19.4 25.0 40 8.1 11 AHU-2 Top 4 CS B&G 11/2 10 20 23.2 37.0 40 8.2 11 AHU-2 Middle 5 CS B&G 11/2 10 20 24.1 37.0 40 8.2 11 AHU-3 Top 7 CS B&G 11/2 10 20 24.9 40.0 40 8.2 11 AHU-3 Middle 8 CS B&G 11/2 10 20 23.1 35.0 40 8.1 11 AHU-3 Middle 11 CS B&G 11/2 | 108A116N | NO | ELEMEN | i Mfg | SIZE | GPM | POS. | PR DIE | GPM | POS. | PR DIF | GPM | NOTE |
| AHU-1 Midle 2 CS B&G 1 1/2 10 30 21.0 25.0 40 8.9 11 AHU-1 Bottom 3 CS B&G 1 1/2 10 30 19.4 25.0 40 8.1 11 AHU-2 Top 4 CS B&G 1 1/2 10 20 23.2 37.0 40 8.2 11 AHU-2 Middle 5 CS B&G 1 1/2 10 20 24.1 37.0 40 8.8 11 AHU-3 Middle 6 CS B&G 1 1/2 10 400 8.8 11 | Hot Water | | | | | | | | | | | | |
| AHU-1 Bottom 3 CS B&G 1 1/2 10 30 19.4 25.0 40 8.1 11 AHU-2 Top 4 CS B&G 1 1/2 10 20 23.2 37.0 40 8.2 11 AHU-2 Middle 5 CS B&G 1 1/2 10 20 24.1 37.0 40 8.8 11 AHU-2 Middle 5 CS B&G 1 1/2 10 <t< td=""><td>AHU-1 Top</td><td>1</td><td>CS</td><td>B&G</td><td>1 1/2</td><td>10</td><td>30</td><td>20.8</td><td>25.0</td><td>40</td><td>8.8</td><td>11</td><td>(2)</td></t<> | AHU-1 Top | 1 | CS | B&G | 1 1/2 | 10 | 30 | 20.8 | 25.0 | 40 | 8.8 | 11 | (2) |
| AHU-2 Top 4 CS B&G 1/2 10 20 23.2 37.0 40 8.2 11 AHU-2 Middle 5 CS B&G 11/2 10 20 24.1 37.0 40 8.8 11 AHU-2 Middle 6 CS B&G 11/2 10 < | AHU-1 Middle | 2 | CS | B&G | 1 1/2 | 10 | 30 | 21.0 | 25.0 | 40 | 8.9 | 11 | |
| AHU-2 Middle 5 CS B&G 11/2 10 20 24.1 37.0 40 8.8 11 1 AHU-2 Bottom 6 CS B&G 11/2 10 11 AHU-3 Mdu 8.2 111 1 2 10 30 10.5 20 40 8.0 111 1 AHU-4 40 9.4 11 1 2 10 30 15.7 20 40 7.0 10 10 10 10 10 < | AHU-1 Bottom | 3 | CS | B&G | 1 1/2 | 10 | 30 | 19.4 | 25.0 | 40 | 8.1 | 11 | |
| AHU-2 Bottom 6 CS B&G 1 1/2 10 A A A A A A A B G 11 I C B B G 11/2 10 30 20.1 25.0 40 8.8 11 A AHU-4 B CS B&G 11/2 | AHU-2 Top | 4 | CS | B&G | 1 1/2 | 10 | 20 | 23.2 | 37.0 | 40 | 8.2 | 11 | |
| AHU-3 Top 7 CS B&G 1 1/2 10 20 24.9 40.0 40 8.2 11 A AHU-3 Middle 8 CS B&G 1 1/2 10 20 22.6 35.0 40 8.1 11 A AHU-3 Bottom 9 CS B&G 1 1/2 10 20 23.1 35.0 40 8.0 11 A AHU-4 Top 10 CS B&G 1 1/2 10 30 20.6 25.0 40 9.1 11 A AHU-4 Middle 11 CS B&G 1 1/2 10 30 20.1 25.0 40 9.4 11 11 AHU-4 Middle 11 CS B&G 1 1/2 10 30 15.7 22.0 40 7.7 10 10 AHU-5 Middle 14 CS B&G 1 1/2 10 30 15.1 22.0 40 7.6 10 10 AHU-5 Middle 14 CS B&G 1 1/2 10 30 | AHU-2 Middle | 5 | CS | B&G | 1 1/2 | 10 | 20 | 24.1 | 37.0 | 40 | 8.8 | 11 | |
| AHU-3 Middle 8 CS B&G 1 1/2 10 20 22.6 35.0 40 8.1 11 AHU-3 Middle 9 CS B&G 1 1/2 10 20 23.1 35.0 40 8.0 11 AHU-3 Bottom 9 CS B&G 1 1/2 10 30 20.6 25.0 40 9.1 11 AHU-4 Top 10 CS B&G 1 1/2 10 30 20.6 25.0 40 9.4 11 AHU-4 Middle 11 CS B&G 1 1/2 10 30 20.1 25.0 40 9.4 11 AHU-4 Bottom 12 CS B&G 1 1/2 10 30 15.7 22.0 40 7.7 10 AHU-5 Middle 14 CS B&G 1 1/2 10 30 15.1 22.0 40 7.6 10 AHU-5 Middle 14 CS B&G 1 1/2 10 30 15.1 22.0 40 7.6 10 1 | AHU-2 Bottom | 6 | CS | B&G | 1 1/2 | 10 | | | | | | | (4) |
| AHU-3 Bottom 9 CS B&G 1 1/2 10 20 23.1 35.0 40 8.0 11 AHU-4 Top 10 CS B&G 1 1/2 10 30 20.6 25.0 40 9.1 11 AHU-4 Middle 11 CS B&G 1 1/2 10 30 20.1 25.0 40 9.4 11 1 AHU-4 Middle 11 CS B&G 1 1/2 10 30 20.1 25.0 40 9.4 11 1 AHU-4 Bottom 12 CS B&G 1 1/2 10 30 15.7 22.0 40 7.7 10 10 AHU-5 Middle 14 CS B&G 1 1/2 10 30 15.1 22.0 40 7.6 10 10 AHU-5 Middle 14 CS B&G 1 1/2 10 30 15.1 22.0 40 7.6 10 10 AHU-5 16 CS Wheator 4" 32 open 17.0 < | AHU-3 Top | 7 | CS | B&G | 1 1/2 | 10 | 20 | 24.9 | 40.0 | 40 | 8.2 | 11 | |
| AHU-4 Top 10 CS B&G 1 1/2 10 30 20.6 25.0 40 9.1 11 AHU-4 Middle 11 CS B&G 1 1/2 10 30 20.6 25.0 40 9.4 11 AHU-4 Middle 11 CS B&G 1 1/2 10 30 20.1 25.0 40 9.4 11 AHU-4 Bottom 12 CS B&G 1 1/2 10 30 15.7 22.0 40 7.7 10 AHU-5 Middle 14 CS B&G 1 1/2 10 30 15.7 22.0 40 7.7 10 AHU-5 Middle 14 CS B&G 1 1/2 10 30 15.1 22.0 40 7.6 10 AHU-5 Bottom 15 CS B&G 1 1/2 10 30 15.1 22.0 40 7.6 10 AHU-6 16 CS Wheaton 4" 32 open 17.0 200 20 1.1 35.0 1 | AHU-3 Middle | 8 | CS | B&G | 1 1/2 | 10 | 20 | 22.6 | 35.0 | 40 | 8.1 | 11 | |
| AHU-4 Middle 11 CS B&G 1 1/2 10 30 20.1 25.0 40 9.4 11 AHU-4 Bottom 12 CS B&G 1 1/2 10 30 20.1 25.0 40 8.8 11 AHU-4 Bottom 12 CS B&G 1 1/2 10 30 15.7 22.0 40 7.7 10 AHU-5 Top 13 CS B&G 1 1/2 10 30 15.7 22.0 40 7.7 10 AHU-5 Middle 14 CS B&G 1 1/2 10 30 15.1 22.0 40 7.6 10 10 AHU-5 Bottom 15 CS B&G 1 1/2 10 30 15.1 22.0 40 7.6 10 10 AHU-6 16 CS Wheaton 4" 32 open 17.0 200 20 1.1 35.0 10 AHU-6 16 CS Wheaton 4" 32 open 17.0 200 20 | AHU-3 Bottom | 9 | CS | B&G | 1 1/2 | 10 | 20 | 23.1 | 35.0 | 40 | 8.0 | 11 | |
| AHU-4 Bottom 12 CS B&G 1 1/2 10 30 25.0 40 8.8 11 AHU-5 Top 13 CS B&G 1 1/2 10 30 15.7 22.0 40 7.7 10 10 AHU-5 Middle 14 CS B&G 1 1/2 10 30 15.2 22.0 40 7.7 10 10 AHU-5 Middle 14 CS B&G 1 1/2 10 30 15.1 22.0 40 7.9 10 10 AHU-5 Bottom 15 CS B&G 1 1/2 10 30 15.1 22.0 40 7.6 10 10 AHU-6 16 CS Wheaton 4" 32 open 17.0 200 20 1.1 35.0 1 Chilled Water 16 CS Wheaton 4" 32 open 14.3 255 80 10.9 23.0 1 AHU-1 1 CS Wheatley 4" 228 100 13.6 | AHU-4 Top | 10 | CS | B&G | 1 1/2 | 10 | 30 | 20.6 | 25.0 | 40 | 9.1 | 11 | |
| AHU-5 Top 13 CS B&G 1 1/2 10 30 15.7 22.0 40 7.7 10 AHU-5 Middle 14 CS B&G 1 1/2 10 30 15.2 22.0 40 7.9 10 AHU-5 Middle 14 CS B&G 1 1/2 10 30 15.1 22.0 40 7.9 10 AHU-5 Bottom 15 CS B&G 1 1/2 10 30 15.1 22.0 40 7.6 10 10 AHU-6 16 CS Wheaton 4" 32 open 17.0 200 20 1.1 35.0 10 AHU-6 16 CS Wheaton 4" 32 open 17.0 200 20 1.1 35.0 10 AHU-6 16 CS Wheatley 4" 32 open 17.0 200 20 1.1 35.0 10 AHU-1 1 CS Wheatley 4" 228 100 14.3 255 8 | AHU-4 Middle | 11 | CS | B&G | 1 1/2 | 10 | 30 | 20.1 | 25.0 | 40 | 9.4 | 11 | |
| AHU-5 Middle 14 CS B&G 1 1/2 10 30 15.2 22.0 40 7.9 10 AHU-5 Bottom 15 CS B&G 1 1/2 10 30 15.1 22.0 40 7.6 10 AHU-6 16 CS Wheaton 4" 32 open 17.0 200 20 1.1 35.0 35.0 Chilled Water I Image: CS Wheaton 4" 32 open 17.0 200 20 1.1 35.0 35.0 Chilled Water Image: CS Wheaton 4" 32 open 17.0 200 20 1.1 35.0 35.0 AHU-1 I CS Wheatley 4" 228 100 14.3 255 80 10.9 230 30 AHU-2 2 CS Wheatley 4" 228 100 13.6 245 90 11.1 230 30 AHU-3 3 CS Wheatley 4" 228 100 13.8 <td>AHU-4 Bottom</td> <td>12</td> <td>CS</td> <td>B&G</td> <td>1 1/2</td> <td>10</td> <td>30</td> <td></td> <td>25.0</td> <td>40</td> <td>8.8</td> <td>11</td> <td></td> | AHU-4 Bottom | 12 | CS | B&G | 1 1/2 | 10 | 30 | | 25.0 | 40 | 8.8 | 11 | |
| AHU-5 Bottom 15 CS B&G 1 1/2 10 30 15.1 22.0 40 7.6 10 AHU-6 16 CS Wheaton 4" 32 open 17.0 200 20 1.1 35.0 Chilled Water Image: CS Wheaton 4" 32 open 17.0 200 20 1.1 35.0 100 Chilled Water Image: CS Wheatley 4" 228 100 14.3 255 80 10.9 230 100 AHU-1 1 CS Wheatley 4" 228 100 14.3 255 80 10.9 230 100 AHU-2 2 CS Wheatley 4" 228 100 13.6 245 90 10.2 230 100 AHU-3 3 CS Wheatley 4" 228 100 13.8 245 90 11.1 230 100 AHU-4 4 CS Wheatley 4" 228 100 10.1 2301 | AHU-5 Top | 13 | CS | B&G | 1 1/2 | 10 | 30 | 15.7 | 22.0 | 40 | 7.7 | 10 | |
| AHU-616CS $Wheaton$ $4"$ 32 $open$ 17.0 200 20 1.1 35.0 1.1 $Chilled Water$ I | AHU-5 Middle | 14 | CS | B&G | 1 1/2 | 10 | 30 | 15.2 | 22.0 | 40 | 7.9 | 10 | |
| Image: Marking | AHU-5 Bottom | 15 | CS | B&G | 1 1/2 | 10 | 30 | 15.1 | 22.0 | 40 | 7.6 | 10 | |
| AHU-1 1 CS Wheatley 4" 228 100 14.3 255 80 10.9 230 AHU-2 2 CS Wheatley 4" 228 100 13.6 245 90 10.2 230 AHU-3 3 CS Wheatley 4" 228 100 13.8 245 90 11.1 230 AHU-4 4 CS Wheatley 4" 228 100 12.9 240 90 10.0 230 AHU-5 5 CS Wheatley 4" 228 100 12.9 240 90 10.0 230 | AHU-6 | 16 | CS | Wheaton | 4" | 32 | open | 17.0 | 200 | 20 | 1.1 | 35.0 | |
| AHU-2 2 CS Wheatley 4" 228 100 13.6 245 90 10.2 230 AHU-3 3 CS Wheatley 4" 228 100 13.8 245 90 11.1 230 AHU-4 4 CS Wheatley 4" 228 100 12.9 240 90 10.0 230 AHU-5 5 CS Wheatley 4" 228 100 10.1 230 100 10.2 230 | Chilled Water | | | | | | | | | | | | (1) |
| AHU-3 3 CS Wheatley 4" 228 100 13.8 245 90 11.1 230 AHU-4 4 CS Wheatley 4" 228 100 12.9 240 90 10.0 230 AHU-5 5 CS Wheatley 4" 228 100 10.1 230 100 10.2 230 | AHU-1 | 1 | CS | Wheatley | 4" | 228 | 100 | 14.3 | 255 | 80 | 10.9 | 230 | |
| AHU-4 4 CS Wheatley 4" 228 100 12.9 240 90 10.0 230 AHU-5 5 CS Wheatley 4" 228 100 10.1 230 100 10.2 230 | AHU-2 | 2 | CS | Wheatley | 4" | 228 | 100 | 13.6 | 245 | 90 | 10.2 | 230 | |
| AHU-5 5 CS Wheatley 4" 228 100 10.1 230 100 10.2 230 | AHU-3 | 3 | CS | Wheatley | 4" | 228 | 100 | 13.8 | 245 | 90 | 11.1 | 230 | |
| | AHU-4 | 4 | CS | Wheatley | 4" | 228 | 100 | 12.9 | 240 | 90 | 10.0 | 230 | |
| AHU-6 6 CS Wheatley 4" 217 < | AHU-5 | 5 | CS | Wheatley | 4" | 228 | 100 | 10.1 | 230 | 100 | 10.2 | 230 | |
| | AHU-6 | 6 | CS | Wheatley | 4" | 217 | | | | | | | (3) |
| | | | | | | | | | | | | | |
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| | | | | | | | | | | | | | |
| REMARKS | | | | | | REMAR | S | | | | | | |

(3) AHU-6 has no curcuit setter for the chilled water and there is no place to ultrasound it.

(4) This curcuit setter is broken and needs replacing

Fenton Judicial Center Sheave Change 12.23.xlsx

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