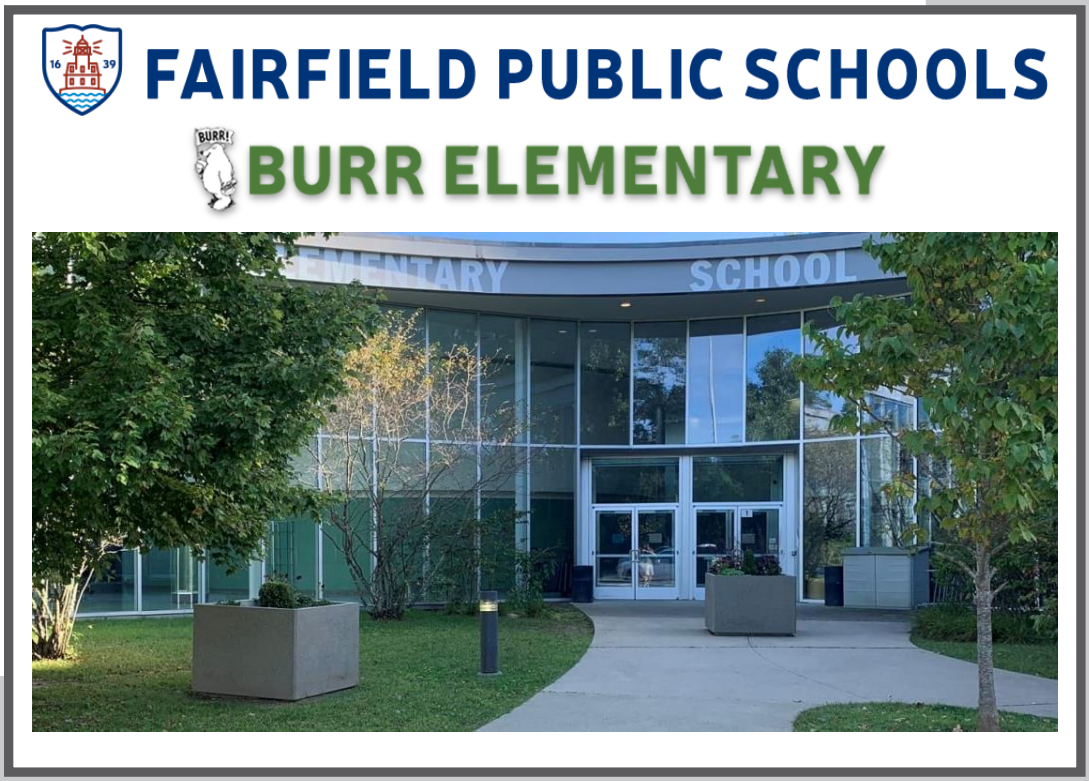
VAN ZELM ENGINEERS

Burr Elementary School

1960 Burr Street
Fairfield, CT 06824



Fairfield Public Schools Recommissioning (RCx) and Testing, Adjusting, & Balancing (TAB) Study

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FAIRFIELD PUBLIC SCHOOLS RECOMMISSIONING (RCX) AND TESTING, ADJUSTING, & BALANCING (TAB) STUDY

EXECUTIVE SUMMARY

Burr Elementary School was deemed to be school priority number eight by Fairfield Public Schools. The following report will indicate the compliance or non-compliance of this school with current International Mechanical Code (2015 IMC) regarding Ventilation for Acceptable Indoor Air Quality.

Burr Elementary School is located at 1960 Burr Street in Fairfield, CT and serves as an educational facility for approximately 338 students as of the May 2022 census and up to 110 faculty and staff. The school is one of the newer buildings, designed in 2003 and having finished its new construction by 2005. It has not seen any major studies or renovations since that time, particularly since the district wide IAQ and envelope study performed on other schools was done around 2003. The building wraps a series of courtyards, creating outdoor learning spaces and ushering in natural light and air. Kindergarten through fifth grade classrooms are located on the school's east and west edges, with shared elements including a cafeteria, a gymnasium, art and music rooms, and a library/media center. A recent boiler replacement project is underway at this school, though this does not have a direct impact on ventilation.

The school ventilation systems comprise 7 Roof mounted Trane Intellipak units which are also called AC units (AC-1 – 7, referred to as RTU-1 – 7 in the TAB documentation). These systems are in a lower section on the roof, all with hot water heating coils and packaged DX cooling and energy recovery wheels. Unit control operations remain largely unknown as the Building Automation network communication is compromised or non-functional to the Trane units. There are also direct-coupled ERUs with horizontal energy wheels associated with the rooftop units, but these systems did not appear to be operating properly, or at all. Aside from those units, the building ventilation system has in place exhaust fans for various purposes including, but not limited to, toilet exhaust, kitchen exhaust, mechanical/electrical space ventilation, etc. The Building Automation (BAS) control system consists of an Metasys Legacy control system through Johnson Controls, though monitoring and control of HVAC systems is limited. Within the past 4-years, Johnson Controls updated the NCU gateway controller serving the RTU's with an NEA, however we were unable to communicate and manipulate the units for our TAB services. As noted in the TAB data report component, the control contractor was unable to make changes to some of the tested units, so only the unit status could be seen. Discovering the cause of this issues would require further investigation through controls upgrade, systems evaluation and repair, and then have the systems re-commissioned.

We performed our on-site RCx inspection starting on April 2022, and TAB review starting in August 2022. The goal of this study is primarily focused towards addressing the outside air and outside air change rates of the occupied spaces. Although there are code exhaust air requirements for spaces like storage rooms, electrical rooms, mechanical rooms, etc., these spaces are often not directly ventilated with outside air, nor are they required to be since they typically have occupancy totals of zero (actual or expected). These spaces typically do not affect building occupants since they are typically provided with some form of exhaust which drives these spaces negative to the surrounding area. At worst, improper levels of exhaust would drive a negative building further negative, but it does not introduce air from these locations to classroom or office spaces. Should the district pursue additional work for the building including recommissioning, balancing, and controls upgrades, these spaces would be addressed as a component of that process.

Overall, the performance of the building with regard to ventilation was found to be poor and uncontrollable with units running 24/7, but this school was found to have good potential for being one of the best ventilated buildings in the district if the controls sequences and end devices were functioning properly. Preliminary findings from the Retro-Commissioning (RCx) and air-side Testing Adjusting and Balancing (TAB) process found significant issues that should be addressed immediately to improve building environmental control, reduce energy usage, and improve building ventilation compliance with the 2015 version of the International Mechanical Code (2015 IMC). Although there are additional guidelines and recommendations put forward by organizations dedicated to the research and implementation of healthy buildings that have plenty of overlap with IMC 2015, these were not the driving factors for this assessment. Please be aware that many of these changes on their own will not reduce energy consumption, but rather will increase it; in some cases, this increase could be significant. Measures should be considered that offset this additional energy use with control upgrades that adjust ventilation systems based on use and measured values. The remainder of this report will address these concerns directly and provide a path forward for Fairfield Public Schools.

EVALUATION

For the purposes of this study, the Fairfield Public Schools district had five primary questions about the capability and performance of each of the school buildings. Based on our findings, we have some insight into each of these below.

2015 International Mechanical Code (IMC) Compliance

As the accompanying spreadsheet indicates, many of the individual occupied spaces at this school do not fully comply with the applicable building codes or guidelines regarding indoor air quality and outdoor ventilation. The measured ventilation air being delivered into each occupied space would be considered a worst-case scenario only, and even at such, there are some areas within the building that do meet and exceed these ventilation requirements by a significant amount.

The supply of outside air to interior occupied spaces is governed by the 2018 Connecticut Building Code, which is based on the 2015 International Mechanical Code. This code prescribes the flow rate of outside air that must be supplied mechanically to occupied areas based on occupancy classifications. Depending on the type of use of a space, outdoor air flow rates in cubic feet per minute (CFM) per person are defined when the number of occupants within a space is known. When total occupants per space are unknown, the code defines occupant density for each classification type in number of occupants per space floor area. The final flow rate in CFM for every occupied space can thus be calculated. Please note that, although this is a school, some spaces like an office will not be indicated as being part of an “education” occupancy classification because the IMC does not distinguish between an office in an office building, a school, or anywhere else. This applies to nearly every space that is not considered a space for traditional classroom activities including, but not limited to, nurse and healthcare offices, gymnasium, assembly halls, etc.

As an alternative to providing outside air mechanically to occupied spaces, the building code also allows for outside air to enter occupied areas naturally through operable windows. If the area of operable windows for an occupied space is at least 4% of the space’s floor area, mechanical ventilation for that space is not required by code. However, although spaces with sufficient operable window area may satisfy code requirements, this is not a realistic way of providing adequate ventilation during periods of cold or hot weather, and this often adversely affects the temperature and humidity levels within the building. In any case, some sort of equipment is provided in every occupied space here, but whether it was supplying ventilation is a different question.

The amount of outside air supplied to occupied spaces is important for occupant comfort and health because contaminants generated by people and materials in the space must be removed or they will build

up to unhealthy levels. Diluting interior air with outside air reduces the concentration of various airborne contaminants, including viral particles that carry the COVID-19 virus and other viral and bacterial contaminants.

Outside Air Flow and Air Change Rate Findings

The "Ventilation Data Calculations" Appendix contains the data from all RCx findings and TAB measurements regarding ventilation within occupied spaces. This data conforms to the requirements within IMC 2015 and the results are calculated based on individual space classification and category. Additionally, these readings rely on the "worst case" scenario, whereby each space is considered fully occupied and the associated air handling units are operating with minimum outside air to satisfy the controlled parameters. The reason for using this method is to ensure that if a building is capable of maintaining required outside air flow in this minimum ventilation mode, it will definitely maintain them when more outside air is introduced. It does not necessarily mean that the units will handle thermal or humidity regulation in maximum ventilation modes. As a caveat, it is important to understand that forcing the worst case is not necessarily typical building operation but is necessary to discover root issues behind the ventilation control of the building. It is possible that correcting certain issues regarding outside airflow will cause different issues to be revealed, which in turn would need to be addressed.

Normally, the data in this spreadsheet would lead to quantitative conclusions about how well the building performs regarding ventilation, but the numerous issues with failed communication to the units and inaccessibility for TAB to take measurements results in an incomplete data set. The analysis for this school will necessarily be qualitative instead, since there is a general idea for performance based on the discovered issues. The results have been broken out into the "Primary" spreadsheet (Appendix 2A) and the "Best Case" spreadsheet (Appendix 2B), the latter of which is used for the calculations below.

For the occupied zones within this building, the total minimum required ventilation airflow came out to **15,943 CFM**. The TAB process was limited and could not reveal total delivered outside air, but numerous units had closed dampers and some spaces that were being fed by only recirculated air measured no flow or negligible flow, indicating closed terminal equipment. If we take the best possible case by operating the units in 100% outside air mode, we can take the flow totals we do have and translate them to what the outside airflow *would* be if the system were functioning properly. Using this method revealed that **36,397 CFM** of outside air is delivered to the spaces, resulting in a **20,454 CFM** surplus or 228.3% of the required minimum flow. However, these ventilation calculations reveal that only 58.3% of the occupied zones would actually met the requirements (35 out of 60). This means there is plenty of potential for full-building ventilation, but some spaces receive little to no ventilation due to closed terminal equipment, non-functional controls, or some other obstruction.

A common calculation used for measuring the amount of air flushed through the space every hour is the Air Change Rate (ACH), and for this analysis specifically we are concerned with the Outside Air Change Rate (OACH). At its core, this is a ratio of the volume of air that can theoretically completely fill the volume of each space and how many times it can do that every hour. For example, a 1000 ft^2 room with 10 ft ceilings will have a volume of 10,000 ft^3. If 250 CFM is delivered to this space, that results in 15,000 ft^3 of air. Every hour, the space will be flushed with that much air, resulting in an ACH of 1.5. This number on its own will not determine if a space satisfies code requirements and it does not mean that every molecule of the air in that space has been replaced after the hour, but it helps to give an idea into the type of performance that could be expected and there are guidelines for many space regarding the OACH. While general spaces like classrooms and offices are among the space categories that do not have outside air ACH requirements, these rates help to give some insight into overall performance. Current recommendations prescribe a total ACH of at least 3 throughout the building, without falling below the minimum outside air CFM.

Taking the entire building volume and air delivered cycled through the building, which includes outside air and filtered, return air, this building was capable of achieving 4.448 ACH. This is well beyond the recommended 3 ACH, and it could indicate that there is potential for the building to increase outside air where there is too little in order to meet the code requirements, but then reduce total unit airflow to save on energy lost on the added outside air. This can be further broken out by spaces that meet or fail to meet code. Among the spaces that would fail to meet code in the best case, the outside air ACH was 0.575; for spaces that would at least meet or exceeded code, the outside air ACH would be 7.300; the combined outside air ACH for the entire building would be 4.391. Special rooms such as a nurse's suite do require an outside air ACH of at least 2 and total ACH of 6, which was not met in this building. This is in addition to other recommendations or requirements such as negative pressure relative to adjacent spaces, extra filtration requirements for recirculated air, space pressure profiles for nurse suite spaces, etc.. The 7.300 ACH result for rooms that passed shows the excess air that could be provided, which would work heavily in favor of a well-performing building once the control and maintenance items are corrected.

Total ACH (RA + OA)	**Total OACH (OA/EA)**	**OACH for zones that do <u>not</u> meet code**	**OACH for zones that meet code**
4.448	4.391*	0.575*	7.300*

*The values represented here are only the best possible case since the building does not operate like this right now, nor should it operate like this during typical shoulder season occupancy. Units that are not operating in economizer or energy recovery modes will typically have reduced outside airflow quantities to save energy, but these units have the potential to achieve the above values and minimum outside airflow setpoints can be adjusted to meet requirements.

<u>Outside Air Flow Improvement Recommendations</u>

Immediate action should be taken to repair Energy Recovery components, nonoperational outside air dampers in all rooftop units as well as a deep dive into the control system to recommission with optimized and secure sequences of operations. This alone will bring a large quantity of outside air to spaces that currently have little or none and will necessarily improve building performance as a result. The HVAC systems should holistically be rebalanced to current design requirements and the BAS control system should generally be reviewed for improvements. This building has not seen any major overhauls since construction concluded in 2005, so a full recommissioning effort would uncover even more than just ventilation concerns.

Aside from the above, since the emergence of the COVID-19 virus in December 2019, the specific requirements and precautions taken regarding outside air have become more stringent. For example, ASHRAE has been continuously investigating the transmission of COVID-19 through HVAC systems and has made recommendations on how to adapt existing HVAC systems to minimize transmission of COVID-19. Changes to building systems to address the virus also positively improve the performance of the ventilation systems with handling the filtration of other particulate that directly impacts building air quality. On April 14, 2020, ASHRAE released a document "ASHRAE Position Document on Infectious Aerosols". This report was provided in an Appendix to the FPS high school ventilation summary reports. ASHRAE also gave a presentation on June 16, 2020, regarding Recommendations and Activities for re-opening schools for the fall 2020 academic semester. These recommendations remain relevant as COVID and other contaminants that impact indoor air quality continue to remain a concern. Although this report is primarily concerned with meeting 2015 IMC for compliance, ASHRAE's insight into addressing the code is invaluable. Their recommendations for reducing the transmission of infectious aerosols through HVAC systems as they apply to schools are as follows:

- Increase outdoor ventilation rates (Dilution) for all zones with deficit minimum outside air by adjusting the outside air damper minimum position of the associated air handling equipment. Generally, more is better, but any changes should follow ASHRAE Standard 62.1 as a minimum and should not overpower the capability of the heating or cooling equipment so as to maintain temperature and humidity requirements in the occupied spaces.
- Filter changes should become more frequent. Current policy indicates a twice-annual filter change at all schools. The filters had been scheduled to be changed at the time of inspection as the last change recorded was October 2021, and almost all of them were very dirty, which decreases the filter's efficiency and forces the unit fans to run at higher speeds (more energy consumption) or to deliver less outdoor ventilation air to the space.
- Increase total air change rates to between 3 and 6 ACH where possible while still satisfying minimum OA ventilation.
- Flush or purge building before and after occupancy for at least two (2) hours, if possible.
- Consider installation of UV-C or bi-polar ionization to recirculating air systems where installation of these systems do not interfere with the unit construction or operation.
- Supplement poorly or un-ventilated areas with portable HEPA filtration units in classrooms until such time as proper ventilation can be delivered to the space.
- Increase restroom exhaust where possible while maintaining a positive building pressurization to the exterior. This should not be performed while the outside air dampers are in need of repair.
- Perform duct cleaning for existing systems.

Control Sequence Update Recommendations

Without undertaking needed repairs or upgrade to the control system, retro-commissioning of the BAS control system itself is not suggested. While it is not possible to tell exactly what systems and components of the BAS needs repair or upgrade, our cursory review of what was available indicates great need to:

- Re-establish a secure and robust BAS communication network to all gateway's, controllers, and third-party systems such as Trane Intellipak.
- Consider an upgrade of older legacy NCU gateway's, zone and equipment controllers that will allow advanced control routines to be implemented, thereby improving environmental control, indoor air quality, while optimizing energy utilization.
- Have equipment manufacture inspect Rooftop and ERV unit controller functions and ensure control routines are in place and operational with end devices performing as expected. Ensure Intellipak operation
- Immediately address the communication issues that prevents manipulating the controls as needed. This made testing the building difficult but it also means that the building is not well controlled, nor is it flexible in case adjustments do need to be made.
- If not upgraded, repair or replace any faulty equipment controllers and end Input/Output devices.
- Look to program units to provide a pre and post occupancy purge for all occupied spaces.

- Generally, increase airflow to each space or decrease if the supplied air is significantly beyond necessary levels. Decreasing air to some locations might seem counterintuitive but some zones are being supplied with significantly more than 100% of what is required, so backing these down will help move air to where it needs to go. This item should not be addressed without a certified TAB contractor to verify flow adjustments are correct.

- Increase the minimum OA damper position for each unit once damper control has been regained, where possible.

- Confirm that trending and alarms have been set up for all units and establish alarm points for units operating below required minimum ventilation levels during occupied modes

- Implement CO_2 and Demand Control Ventilation (DCV) sequences for units to adjust ventilation air being delivered automatically and efficiently based on actual individual space occupancy. Not only will these sequences save a substantial amount of money in energy costs, but they remove the guesswork for facilities and control personnel for how much air each space needs, and code/guidelines incorporate these capabilities into exceptions for blanket minimum outside air flow rates. The implementation of this control strategy is especially vital since increased ventilation to the building will increase all energy costs as it has a direct impact on the heating and cooling systems as well.

Equipment Upgrade or Replacement Recommendations

Generally, the more outside air that can be supplied to occupied areas, the better. Each existing air handler should have outside air flow rates increased above current setpoints if they can be obtained. Even units that currently meet code requirements for ventilation flow rates could be increased, but should not be increased beyond the capacity of the unit to heat or cool the air. Total space air change rates should also be increased to the extent possible along with increases in outside air flow to better remove contaminants from the air. If a unit at maximum fan speeds is still incapable of providing at least the minimum ventilation or ACH required, then the system should be evaluated further to determine the best solution such a total system modification, or the installation of a self-contained HEPA filtration unit in areas where increasing fresh air is limited.

Supplemental air cleaning technology, such as ultraviolet-C (UV-C) light or bi-polar ionization, is available could be considered if additional disinfection measures are desired. UV-C is short wavelength ultraviolet light that has been found to effectively kill COVID-19 particles. UV-C systems are already used in other HVAC systems where they are installed in air streams to kill bacteria and other harmful living organisms. These systems can be installed relatively easily in already constructed system ductwork or air handlers without major modifications. Bi-polar ionization systems are also installed in ductwork or air handlers and use an electric charge to create a concentration of positively and negatively charged particles in an airstream. These particles cause pathogens to stick to each other and become larger, thus increasing the probability of them being captured by air filters. The charged particles created also leave the ductwork and remain charged when they enter occupied spaces. If the particles come in contact with pathogens in the occupied space, the charge removes hydrogen from the pathogen so that it is no longer able to sustain itself. For this reason, bi-polar ionization is preferred to UV-C air cleaning because bi-polar ionization has the ability to decontaminate pathogens outside of the ductwork whereas UV-C only decontaminates pathogens that enter the ducts.

ASHRAE recommends relative humidity values between 40 and 65% as these values have been shown to hamper the ability of COVID-19 and other pathogens to travel and thrive. Retrofitting these systems into existing units is difficult but if there are complaints about building humidity then it is worth considering. When cooling systems are in operation, ensure dehumidification is adequate to keep relative humidity

below 65%. During heating system operation, relative humidity values are typically less than 40%. Adding humidification to the existing HVAC systems is often exceedingly difficult and costly; additionally, humidification for HVAC systems can be problematic if not well maintained and adds to operating costs. For this reason, recommendations discussed above should be enacted before humidification is considered.

In order to best confirm that the implementation of the above recommendations is met as well as other improvements, we recommend performing Recommissioning of this school. This is an extensive procedure that will help with fully documenting the building systems, their capabilities, and optimizes the control system to maintain the best performance while conserving the most energy. In general, Recommissioning should be performed approximately once every five years to keep the buildings operating smoothly.

For any unit that operates *only* with 100% outside air (e.g., makeup air units, dedicated outside air units, etc.) MERV 8 filters can be used instead of MERV 13s. This will allow for fan energy savings and increased ventilation without sacrificing indoor air quality. Where any of these units need to be replaced, we recommend considering a unit with some form of energy recovery (either a wheel or crossflow heat exchanger). This will conserve additional energy and will still allow for systems to operate with more outside air.

Most units allow for some amount of recirculation, so the following are recommendations for upgrading the air handling units:

- Where any unit has a two filter racks where the first has room for 2" filters and the second has room for 4" or greater filters, the 2" filters can be MERV 8 for pre-filtering, but the larger filters should remain MERV 13.
- Based upon our observations HVAC unit filter changes should be performed more frequently. The party responsible for changing the filters should note which unit filters become dirty quicker and should further increase the frequency of changes to those units.
- Consider adding Bi-polar ionization or another means of air disinfection wherever possible.
- Consider investigating the potential of increasing the ventilation air flow rate wherever possible.
- All of the items noted within the RCx and TAB field finding appendices should be addressed by the facilities personnel. These items are separated by category: IAQ/Ventilation items, Maintenance items, Control items, and Information Only. While these lists are not a substitute for a full-building commissioning service, these corrections contain many of the significant issues that will quickly improve indoor air quality and energy consumption rates. Some typical issues include, but are not limited to:
    - Cleaning all unit coils: Some are in worse shape than others. Cleaning the coils will improve airflow patterns through the coil, increasing coil effectiveness and preventing deterioration due to rust or corrosion.
    - Damper cleaning and lubrication: All unit dampers should be cleaned and lubricated and tested throughout their movement range from the BAS. As dampers age, lubrication fails and dirt builds up causing the actuator to need to push harder to move the damper. Too much build-up can result in control actuators failures or broken damper hardware, which would need to be replaced.

- Exterior Insulation: ductwork and piping insulation should have UV-resistant coating or shields. Typically, foil-faced aluminum insulation or banded aluminum jacketing works for this. For exposed refrigerant piping, these should be reinsulated with elastomeric insulation and coated with a UV-resistant paint. This will prevent deterioration from the sun and avoid costly repairs since almost all air handling and refrigerant equipment is located on the roof.
- General Unit Cleanliness: All units should be cleaned to remove any dirt or debris that has accumulated. Some units were observed with loose paper, cardboard, and other materials within the units that can become a breeding ground for bacteria and molds should those materials absorb moisture. Sections of units that have developed rust or corrosion should be kept dry and cleaned with appropriate chemicals for removing the build-up before repainting or repairs tasks.

CONCLUSIONS

Fairfield Public Schools has taken measures in the past to address identified deficiencies regarding the recommended proper filtration upgrades for indoor air quality (IAQ) improvements, this study found that while the Burr Elementary School has good potential for being a well-ventilated building, it does not meet the current minimum ventilation requirements per 2015 IMC mainly due to the lack of automated control of dampers and HVAC systems. The van Zelm, Wings, and Fairfield Public Schools team will collectively discuss options and estimate costs for correcting issues and code deficiencies discovered as part of this study. The cost analysis portion will be a continual process.

While some recommendations will help improve performance, there are a number of key recommendations that should be implemented immediately since the school is currently occupied. These include bringing into proper operation the outside air dampers for all units, providing better means of access to ductwork and accessories for a rebalancing effort leading to redistributing outside airflow throughout the building, and providing additional calibration or flow control devices for better monitoring and maintenance procedures. Given the results of this survey, we highly recommend further evaluation to be performed with whole-building Recommissioning, which would entail BAS controls recommissioning and rebalancing, as well as any engineered ventilation calculations/modifications required to aid in code compliance.

APPENDICES

APPENDIX 1 – Issues List

ISSUES LIST

Issue List General Discussion

The following sections within this appendix include observations we made as a part of the study. Some of these items directly impact Indoor Air Quality (IAQ) or Ventilation and, since this is the primary concern of the study, are recommended to be addressed immediately. Other items are overdue/improper maintenance, control system issues, or general observations. Just because an issue is not included in the IAQ/Ventilation sections does not necessarily mean that it will have no effect on improving the building environment, but it is more likely that the effects are minimal or would only indirectly address a concern. In some cases, these could potentially *reduce* overall building outside airflow, even if in such instances it would keep the associated spaces within code compliance. While this might seem counterintuitive, given the concerns, it is a way to manage a healthy, code-compliant building environment while also saving energy.

The nature of this process being one that affects almost the entire building means that a response to this issue list should be through a holistic approach. Any one issue correction on its own might locally improve the condition of the served areas, but if an adjacent, non-functioning unit is also not corrected then the positive effects will be diminished. The interconnectivity of the issues cannot be easily indicated due to the complexity of the built environment, but a thorough review of all issues and an implementation plan will provide better results overall for the building and its stakeholders.

It should be noted that the inspections we performed as part of this study were undertaken during the month of April 2022 , so it is possible that some noted concerns, particularly maintenance items or issues already known about could have been addressed prior to the distribution of this report. Ongoing discussions with Fairfield Public Schools will allow us to update these items as we continue through other schools and into the implementation phase later in the year.

To aid in the process of addressing and tracking these issues, we have included a column indicating when action has been taken by Fairfield Public Schools or a hired contractor to address any individual issues, and will allow the district to document and timestamp issues that have been corrected since the initial inspection.

Please note: The terms “AC” and “RTU” are used interchangeably, e.g., AC-1 and RTU-1 refer to the same unit.

Indoor Air Quality And Ventilation Issue Findings

Below is a compilation of findings from our commissioning indoor space evaluation, TAB verification effort, and the air handling equipment analysis that relate to indoor air quality or ventilation status of the building. These findings should be considered as a high priority for budgeting and action steps. Many of the listed issues might lend clarity as to why the ventilation findings of throughout were found to be deficient. Addressing these issues individually will not correct any systemic, unit, or building-wide issues related to the IAQ or ventilation of the building..

Action Taken	Status	Unit/Zone	Serving/Room Name	Indoor Air Quality And Ventilation Issue (50)
	Open	103 Storage	Airflow	No ventilation
	Open	108 Storage	Airflow	No ventilation
	Open	113 Storage	Airflow	No ventilation
	Open	118 Storage	Airflow	No ventilation
	Open	130 Storage	Airflow	No Ventilation
	Open	131 Platform	Airflow	No Ventilation
	Open	133 Dry Storage	Airflow	No Ventilation
	Open	156A Storage	Airflow	No ventilation
	Open	164A Storage	Airflow	No ventilation
	Open	178A Library Storage	Airflow	No Ventilation
	Open	181 MDF	Airflow	No Ventilation
	Open	181 MDF	Airflow	AC-12 FCU has no grilles

Action Taken	Status	Unit/Zone	Serving/Room Name	Indoor Air Quality And Ventilation Issue (50)
	Open	203 Storage	Airflow	No Ventilation
	Open	208 Storage	Airflow	No Ventilation
	Open	213 Storage	Airflow	No Ventilation
	Open	218 Storage	Airflow	No Ventilation
	Open	223 Boiler Room	Airflow	No Ventilation
	Open	224 IDF	Airflow	No Ventilation
	Open	224A Storage	Airflow	No Ventilation
	Open	226 Storage	Airflow	No Ventilation
	Open	231 Storage	Airflow	No Ventilation
	Open	234 Storage	Airflow	No Ventilation
	Open	237 Storage	Airflow	No Ventilation
	Open	240 Storage	Airflow	No Ventilation
	Open	245 Storage	Airflow	No Ventilation
	Open	247 Storage	Airflow	No Ventilation
	Open	AC-1	Coils	Coils should be cleaned
	Open	AC-1	Dampers	Clean and adjust damper including lubrication

Action Taken	Status	Unit/Zone	Serving/Room Name	Indoor Air Quality And Ventilation Issue (50)
	Open	AC-1	ERW	Energy recovery wheel filters need to be changed
	Open	AC-2	Coils	Coils should be cleaned
	Open	AC-2	Dampers	Clean and adjust damper including lubrication
	Open	AC-2	ERW	Energy recovery wheel filters need to be changed
	Open	AC-3	Coils	Coils should be cleaned
	Open	AC-3	Dampers	Clean and adjust damper including lubrication
	Open	AC-3	ERW	Energy recovery wheel filters need to be changed
	Open	AC-4	Coils	Coils should be cleaned
	Open	AC-4	Dampers	Clean and adjust damper including lubrication
	Open	AC-4	Filters	Filters are dirty and need to be changed
	Open	AC-5	Coils	Coils should be cleaned
	Open	AC-5	Dampers	Clean and adjust damper including lubrication
	Open	AC-5	Filters	Filters are dirty and need to be changed
	Open	AC-6	Coils	Coils should be cleaned
	Open	AC-6	Dampers	Outside air damper linkage is broken
	Open	AC-6	Dampers	Clean and adjust damper including lubrication
	Open	AC-6	Filters	Filters are dirty and need to be changed
	Open	AC-7	Coils	Coils should be cleaned
	Open	AC-7	Dampers	Clean and adjust damper including lubrication

Action Taken	Status	Unit/Zone	Serving/Room Name	Indoor Air Quality And Ventilation Issue (50)
	Open	AC-7	ERW	Energy recovery wheel filters need to be changed
	Open	ACs	Filters	While filters are new, the associated coils are dirty and should be washed. Belts are OK. Damper seals have failed in several units. Metal pre-filters are very dirty and should be power washed or replaced.
	Open	RTUs	Dampers	All outside air dampers were closed during occupied mode and did not open when commanded

Maintenance Issue Findings

Below is a compilation of findings from our commissioning indoor space evaluation, TAB verification effort, and the air handling equipment analysis that relate to indoor air quality or ventilation status of the building. The priority level of these findings will vary, and correcting any of them could improve the associated unit's performance, which might have an incidental effect on the indoor air quality or ventilation in the spaces. These issues do not necessarily explain reasons why the ventilation findings of the associated spaces were found to be deficient but should be corrected, nonetheless.

Action Taken	Status	Unit/Zone	Serving/Room Name	Maintenance Issue (35)
	Open	169 Work Room	Access	High Ceiling, No Access to Diffusers
	Open	170 Art	Access	High Ceiling, No Access to Diffusers
	Open	173 Music 1	Access	High Ceiling, No Access to Diffusers
	Open	175 Storage and 176 Office	Access	High Ceiling, No Access to Diffusers
	Open	178 Library	Access	High Ceiling, No Access to Diffusers
	Open	186 Science	Access	High Ceiling, No Access to Diffusers
	Open	AC-1	Access	Unit door hardware is rusted, needs adjustment and lubrication
	Open	AC-1	Cleaning	VFDs, fans, and electronics are dirty and need to be cleaned
	Open	AC-1	Dampers	Damper Seals falling off
	Open	AC-2	Access	Unit door hardware is rusted, needs adjustment and lubrication
	Open	AC-2	Cleaning	VFDs, fans, and electronics are dirty and need to be cleaned
	Open	AC-2	Dampers	Damper Seals falling off

Action Taken	Status	Unit/Zone	Serving/Room Name	Maintenance Issue (35)
	Open	AC-3	Access	Unit door hardware is rusted, needs adjustment and lubrication
	Open	AC-3	Dampers	Damper Seals falling off
	Open	AC-4	Access	Unit door hardware is rusted, needs adjustment and lubrication
	Open	AC-4	Cleaning	Supply fan belt section is very dirty
	Open	AC-4	ERW	Unclear if ERW was operable, we could not get it to run
	Open	AC-5	Access	Unit door hardware is rusted, needs adjustment and lubrication
	Open	AC-5	Belt	Supply fan belt is loose
	Open	AC-5	ERW	Unclear if ERW was operable, we could not get it to run
	Open	AC-6	Access	Unit door hardware is rusted, needs adjustment and lubrication
	Open	AC-6	ERW	Unclear if ERW was operable, we could not get it to run
	Open	AC-7	Access	Unit door hardware is rusted, needs adjustment and lubrication
	Open	AC-7	Dampers	Damper Seals falling off
	Open	AC-7	Dampers	Damper Linkage off
	Open	AC-7	ERW	Energy recovery wheel not running
	Open	AC-7	Safety	Electrical Code clearances are not met
	Open	ACs	Rust	Unit Exteriors are rusted, latches are difficult to operate
	Open	RTU-2	Dampers	This unit's outside air damper was damaged and in need of repair

Action Taken	Status	Unit/Zone	Serving/Room Name	Maintenance Issue (35)
	Open	RTU-2	Operation	The unit exhaust was not operational
	Open	RTU-3	Dampers	This unit's outside air damper was damaged and in need of repair
	Open	RTU-5	Access	There was no reasonable means of access for measuring airflow totals at this unit
	Open	RTU-6	Access	There was no reasonable means of access for measuring airflow totals at this unit
	Open	RTU-6	Dampers	The outside air damper actuator is disconnected
	Open	RTUs	Dampers	There is leakage at the outside air dampers generally when they are fully closed

Control Issue Findings

Below is a compilation of findings from our commissioning indoor space evaluation, TAB verification effort, and the air handling equipment analysis that relate to the status of the control system within the building. The priority level of these findings will vary, and correcting any of them could improve the associated unit's performance, which might have an incidental effect on the indoor air quality or ventilation in the spaces. Some control issues do affect whether or not facilities or maintenance personnel are informed of issues at systems or equipment, which can result in delays to maintenance or repairs that would otherwise have been quick to correct. These issues do not necessarily explain reasons why the ventilation findings of the associated spaces were found to be deficient but should be corrected, nonetheless.

Action Taken	Status	Unit/Zone	Serving/Room Name	Control Issue (16)
	Open	129 Multi-Purpose Room	Dampers	OAD 100% open on BMS. Actual position 0% open.
	Open	220 Classroom	Controller	Bad VAV Controller
	Open	230 Classroom	Controller	Bad VAV Controller, won't modulate to min.
	Open	AC-1	Operation	Unit operation is not clearly discernable through the controls
	Open	AC-2	Operation	Unit operation is not clearly discernable through the controls
	Open	AC-3	Operation	Unit operation is not clearly discernable through the controls
	Open	AC-4	Operation	Unit operation is not clearly discernable through the controls
	Open	AC-5	Operation	Unit operation is not clearly discernable through the controls
	Open	AC-6	Operation	Unit operation is not clearly discernable through the controls
	Open	AC-7	Operation	Unit operation is not clearly discernable through the controls
	Open	ACs	Operation	AC units were generally not operating properly or their actual operation was unknown

Action Taken	Status	Unit/Zone	Serving/Room Name	Control Issue (16)
	Open	MAU-1	Operation	Unit operation is not clearly discernable through the controls
	Open	RTU-2	Ductwork	Fire/Smoke Dampers associated with the supply/return for this unit tripped multiple times during the investigation, forcing a unit reset. While this occurred, classrooms 211-220 were cut off from all airflow. Custodians informed us that this happens often
	Open	RTU-7	Operation	The economizer mode was disabled, resulting in 0% outside air and full recirculation
	Open	RTUs	Dampers	Per the TAB findings, the BAS showed a command to all outside air dampers of 100% open, however it was discovered at the time of measurement that all outside air dampers were fully closed instead and commands from the control contractor resulted in no change of damper position
	Open	VAVs	Airflow	Many VAVs did not respond to commands from the control system

Information Only Findings

Below is a list of the general "information only" findings from the room take-off measurements, TAB verification effort, and the air handling equipment analysis. If a correction can be made to these items, it will not affect improving the indoor air quality or ventilation for occupied spaces. Some of these items might actually speak to *reducing* outside airflow, particularly if a space is significantly overventilated or has inconsistent/large swings in occupancy, in which case their status has been indicated as "Energy Savings".

Action Taken	Status	Unit/Zone	Serving/Room Name	Information Only Findings (9)
	Info Only	122A Multi-Purpose Storage	Name Change	Room Number is 124, not 122A
	Open	133 Dry Storage	Airflow	No Air
	Info Only	139 Cafeteria	Capacity	200 Maximum Seating Capacity
	Info Only	169 Work Room	Conjoined	Open to Art
	Info Only	175 Storage and 176 Office	Conjoined	175/176 same area, same room
	Info Only	244 IDF	Airflow	Ventilation through transfer grill from storage 245
	Open	General	Operation	Full building retro-commissioning should be performed due to the limited availability of information and control on all of the air handling units.
	Open	RTUs	Ductwork	TAB was unable to reach or measure airflow at return air ductwork given the height of installation and obstructions on the ground.
	Open	RTUs	Ductwork	TAB was unable to reach or measure airflow at many supply air diffuser locations given the height of installation and obstructions on the ground. Some of these might be accessible with a lift, which was unavailable at the time, but not all

APPENDIX 2 – Ventilation Data Calculations

Project Name:	Fairfield Public Schools RCx & TAB Study
Project Number:	2020102.00.08
Scope	Ventilation Calculation by Building
Date	November 20, 2022

Burr Elementary School

Primary Sheet

VANZELM ENGINEERS

Zone Identification													IMC 2015 Ventilation Calculations							
Floor	Room#	Room Name	Occupancy Classification	Category	Total Airflow	Unit Actual OA %	BAS OA Damper Cmnd	Served By	Zone Area, Az, per space	Ceiling Height	Volume, per space	Zone Population, Pz, per space	People OA Rate in Breathing Zone, Rp	Area OA Rate in Breathing Zone, Ra	Default Occupant Density	Min. Required Ventilation Airflow	ACTUAL MEASURED VENTILATION AIR FLOW	Excess Ventilation Air (negative indicates deficit)	Excess Ventilation Air Percentage	PASS/FAIL	Ventilation ACH
					(cfm)	(%)	(%)		(sq.ft)	(ft)	(cu.ft)	Adult	(cfm/ person)	(cfm/sf)	(#/1000sf)	(cfm)	(cfm)	(cfm)	(%)		(AC/hr)
1	101	Classroom	Education	Classroom (ages 5-8)	**1063**	N/A	100% Open	RTU-2 / VAV-101	834	8.9	7423	18	10.0	0.12	25	280	**N/A**	N/A		N/A	
1	101A	Toilet	Public Spaces	Toilet rooms - public	**0**	N/A	N/A	EF	35	8.9	312	1	0.0	0.00	0	0	**N/A**	N/A	0.0%	N/A	
1	103	Storage	None	None	**0**	N/A	N/A	N/A	88	8.9	783	0	0.0	0.00	0	0	**0**	0	0.0%	N/A	**0.000**
1	105	Classroom	Education	Classroom (ages 5-8)	**520**	N/A	100% Open	RTU-2 / VAV-105	835	8.9	7432	16	10.0	0.12	25	260	**N/A**	N/A		N/A	
1	105A	Toilet	Public Spaces	Toilet rooms - public	**0**	N/A	N/A	EF	35	8.9	312	1	0.0	0.00	0	0	**N/A**	N/A	0.0%	N/A	
1	106	Classroom	Education	Classroom (ages 5-8)	**171**	N/A	100% Open	RTU-2 / VAV-106	834	8.9	7423	18	10.0	0.12	25	280	**N/A**	N/A		N/A	
1	106A	Toilet	Public Spaces	Toilet rooms - public	**-31**	N/A	N/A	EF	35	8.9	312	1	0.0	0.00	0	0	**N/A**	N/A	0.0%	N/A	
1	108	Storage	None	None	**0**	N/A	N/A	N/A	88	8.9	783	0	0.0	0.00	0	0	**0**	0	0.0%	N/A	**0.000**
1	110	Classroom	Education	Classroom (ages 5-8)	**170**	N/A	100% Open	RTU-2 / VAV-110	835	8.8	7348	12	10.0	0.12	25	220	**N/A**	N/A		N/A	
1	110A	Toilet	Public Spaces	Toilet rooms - public	**0**	N/A	N/A	EF	35	8.9	312	1	0.0	0.00	0	0	**N/A**	N/A	0.0%	N/A	
1	111	Classroom	Education	Classroom (ages 5-8)	**1612**	N/A	100% Open	RTU-2 / VAV-111	700	8.9	6230	3	10.0	0.12	25	114	**N/A**	N/A		N/A	
1	111A	Toilet	Public Spaces	Toilet rooms - public	**-26**	N/A	N/A	EF	35	8.9	312	1	0.0	0.00	0	0	**N/A**	N/A	0.0%	N/A	
1	113	Storage	None	None	**0**	N/A	N/A	N/A	51	8.9	454	0	0.0	0.00	0	0	**0**	0	0.0%	N/A	**0.000**
1	115	Classroom	Education	Classroom (ages 5-8)	**302**	N/A	100% Open	RTU-2 / VAV-115	712	9	6408	18	10.0	0.12	25	265	**N/A**	N/A		N/A	
1	115A	Toilet	Public Spaces	Toilet rooms - public	**0**	N/A	N/A	EF	35	8.9	312	1	0.0	0.00	0	0	**N/A**	N/A	0.0%	N/A	
1	116	Classroom	Education	Classroom (ages 5-8)	**238**	N/A	100% Open	RTU-2 / VAV-116	697	8.9	6203	16	10.0	0.12	25	244	**N/A**	N/A		N/A	
1	116A	Toilet	Public Spaces	Toilet rooms - public	**0**	N/A	N/A	EF	35	8.9	312	1	0.0	0.00	0	0	**N/A**	N/A	0.0%	N/A	
1	118	Storage	None	None	**0**	N/A	N/A	N/A	51	8.9	454	0	0.0	0.00	0	0	**0**	0	0.0%	N/A	**0.000**
1	120	Classroom	Education	Classroom (ages 5-8)	**253**	N/A	100% Open	RTU-2 / VAV	713	8.8	6274	18	10.0	0.12	25	266	**N/A**	N/A		N/A	
1	120A	Toilet	Public Spaces	Toilet rooms - public	**0**	N/A	N/A	EF	35	8.9	312	1	0.0	0.00	0	0	**N/A**	N/A	0.0%	N/A	
1	122	Cust	Storage	Warehouses	**0**	N/A	N/A	EF	50	7	350	1	0.0	0.06	0	3	**N/A**	N/A		N/A	
1	122B	Women	Public Spaces	Toilet rooms - public	**0**	N/A	N/A	EF	36	8.9	320	1	0.0	0.00	0	0	**N/A**	N/A	0.0%	N/A	
1	122A	Multi-Purpose Storage	None	None	**20**	N/A	100% Open	RTU-2	546	7.5	4095	0	0.0	0.00	0	0	**N/A**	N/A	0.0%	N/A	
1	123	Office	Offices	Office spaces	**38**	N/A	100% Open	RTU-2	77	7.1	547	2	5.0	0.06	5	15	**N/A**	N/A		N/A	
1	129	Multi-Purpose Room	Education	Multiuse assembly	**12051**	N/A	100% Open	RTU-3	4366	23.4	102164	563	7.5	0.06	100	4484	**N/A**	N/A		N/A	
1	131	Platform	Education	Music/theater/dance	**0**	N/A	N/A	N/A	993	14.5	14399	55	10.0	0.06	35	610	**0**	-610	-100.0%	**Fails**	**0.000**
1	129A	Women	Public Spaces	Toilet rooms - public	**-59**	N/A	N/A	EF	200	8.9	1780	3	0.0	0.00	0	0	**N/A**	N/A	0.0%	N/A	

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Project Number:	**2020102.00.08**
Scope	**Ventilation Calculation by Building**
Date	**November 20, 2022**

Burr Elementary School

Primary Sheet

VANZELM ENGINEERS

Zone Identification													IMC 2015 Ventilation Calculations								
Floor	**Room#**	**Room Name**	**Occupancy Classification**	**Category**	**Total Airflow**	**Unit Actual OA %**	**BAS OA Damper Cmnd**	**Served By**	**Zone Area, Az, per space**	**Ceiling Height**	**Volume, per space**	**Zone Population, Pz, per space**	**People OA Rate in Breathing Zone, Rp**	**Area OA Rate in Breathing Zone, Ra**	**Default Occupant Density**	**Min. Required Ventilation Airflow**	**ACTUAL MEASURED VENTILATION AIR FLOW**	**Excess Ventilation Air (negative indicates deficit)**	**Excess Ventilation Air Percentage**	**PASS/FAIL**	**Ventilation ACH**
					(cfm)	(%)	(%)		(sq.ft)	(ft)	(cu.ft)	Adult	(cfm/ person)	(cfm/sf)	(#/1000sf)	(cfm)	(cfm)	(cfm)	(%)		(AC/hr)
1	129B	Men	Public Spaces	Toilet rooms - public	**-88**	N/A	N/A	EF	128	8.9	1139	2	0.0	0.00	0	0	**N/A**	N/A	0.0%	N/A	
1	130	Storage	None	None	**0**	N/A	N/A	N/A	114	14.8	1687	0	0.0	0.00	0	0	**0**	0	0.0%	N/A	**0.000**
1	129C	One-Person Women	Public Spaces	Toilet rooms - public	**-27**	N/A	N/A	EF	36	8.9	320	1	0.0	0.00	0	0	**N/A**	N/A	0.0%	N/A	
1	129D	One-Person Men	Public Spaces	Toilet rooms - public	**-20**	N/A	N/A	EF	36	8.9	320	1	0.0	0.00	0	0	**N/A**	N/A	0.0%	N/A	
1	139	Cafeteria	Food and beverage service	Cafeteria, fast food	**7989**	N/A	100% Open	RTU-4	2941	12	35292	386	7.5	0.18	100	3424	**N/A**	N/A		N/A	
1	138	Kitchen/Dishwash	Food and beverage service	Kitchens (cooking)	**4214**	100%	No set point on RM6	MAU-1	683	11.5	7855	10	0.0	0.00	0	0	**4241**	4241	0.0%	N/A	**32.397**
1	138A	Kitchen Toilet	Public Spaces	Toilet rooms - public	**-127**	N/A	N/A	EF	36	8.9	320	1	0.0	0.00	0	0	**N/A**	N/A	0.0%	N/A	
1	136	Kitchen Office	Offices	Office spaces	**100**	100%	No set point on RM6	MAU-1	51	8.9	454	1	5.0	0.06	5	8	**100**	92	1140.7%	**Meets**	**13.219**
1	133	Dry Storage	None	None	**0**	N/A	N/A	N/A	89	8.5	757	0	0.0	0.00	0	0	**0**	0	0.0%	N/A	**0.000**
1	140	Faculty Lounge	Food and beverage service	Dining Rooms	**627**	N/A	100% open	RTU-1	488	8.5	4148	20	7.5	0.18	70	238	**N/A**	N/A		N/A	
1	140.1	Women	Public Spaces	Toilet rooms - public	**-66**	N/A	N/A	EF	36	8.9	320	1	0.0	0.00	0	0	**N/A**	N/A	0.0%	N/A	
1	141	Office	Offices	Office spaces	**48**	N/A	100% open	RTU-1	105	8.8	924	1	5.0	0.06	5	11	**N/A**	N/A		N/A	
1	143	Fire Pump	None	None	**0**	N/A	100% open	RTU-1	130	9	1170	0	0.0	0.00	0	0	**N/A**	N/A	0.0%	N/A	
1	144	Office	Offices	Office spaces	**105**	N/A	100% open	RTU-1	179	8.9	1593	6	5.0	0.06	5	41	**N/A**	N/A		N/A	
1	145	Switch Gear	None	None	**0**	N/A	100% open	RTU-1	167	9	1503	0	0.0	0.00	0	0	**N/A**	N/A	0.0%	N/A	
1	146	Office	Offices	Office spaces	**57**	N/A	100% open	RTU-1	215	8.7	1871	6	5.0	0.06	5	43	**N/A**	N/A		N/A	
1	147	Emer. Elec	None	None	**0**	N/A	100% open	RTU-1	51	9	459	0	0.0	0.00	0	0	**N/A**	N/A	0.0%	N/A	
1	148	Phone	Offices	Office spaces	**0**	N/A	100% open	RTU-1	46	9	414	0	5.0	0.06	5	4	**N/A**	N/A		N/A	
1	149	Office	Offices	Office spaces	**46**	N/A	100% open	RTU-1	178	8.9	1584	4	5.0	0.06	5	31	**N/A**	N/A		N/A	
1	150	Office	Offices	Office spaces	**60**	N/A	100% open	RTU-1	148	8.9	1317	2	5.0	0.06	5	19	**N/A**	N/A		N/A	
1	151	Office	Offices	Office spaces	**0**	N/A	100% open	RTU-1	80	8.9	712	4	5.0	0.06	5	25	**N/A**	N/A		N/A	
1	152	Office	Offices	Office spaces	**27**	N/A	100% open	RTU-1	141	8.9	1255	4	5.0	0.06	5	28	**N/A**	N/A		N/A	
1	153	Office	Offices	Office spaces	**258**	N/A	100% open	RTU-1	220	8.9	1958	3	5.0	0.06	5	28	**N/A**	N/A		N/A	
1	154	Office	Offices	Office spaces	**465**	N/A	100% open	RTU-1	274	8.9	2439	6	5.0	0.06	5	46	**N/A**	N/A		N/A	
1	156.1	Toilet	Public Spaces	Toilet rooms - public	**0**	N/A	N/A	EF	36	8.9	320	1	0.0	0.00	0	0	**N/A**	N/A	0.0%	N/A	
1	156	Principal	Offices	Office spaces	**50**	N/A	100% open	RTU-1	233	8.8	2050	6	5.0	0.06	5	44	**N/A**	N/A		N/A	
1	156A	Storage	None	None	**0**	N/A	N/A	N/A	21	8.8	185	0	0.0	0.00	0	0	**0**	0	0.0%	N/A	**0.000**

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Zone Identification													IMC 2015 Ventilation Calculations							
Floor	Room#	Room Name	Occupancy Classification	Category	Total Airflow	Unit Actual OA %	BAS OA Damper Cmnd	Served By	Zone Area, Az, per space	Ceiling Height	Volume, per space	Zone Population, Pz, per space	People OA Rate in Breathing Zone, Rp	Area OA Rate in Breathing Zone, Ra	Default Occupant Density	Min. Required Ventilation Airflow	ACTUAL MEASURED VENTILATION AIR FLOW	Excess Ventilation Air (negative indicates deficit)	Excess Ventilation Air Percentage	PASS/FAIL	Ventilation ACH
					(cfm)	(%)	(%)		(sq.ft)	(ft)	(cu.ft)	Adult	(cfm/ person)	(cfm/sf)	(#/1000sf)	(cfm)	(cfm)	(cfm)	(%)		(AC/hr)
1	157	Conference	Offices	Conference rooms	127	N/A	100% open	RTU-1	184	8.8	1619	8	5.0	0.06	50	51	N/A	N/A		N/A	
1	158	Files	Storage	Warehouses	0	N/A	100% open	RTU-1	46	8.8	405	0	0.0	0.06	0	3	N/A	N/A		N/A	
1	159	Conference	Offices	Conference rooms	603	N/A	100% open	RTU-1	387	8.9	3444	16	5.0	0.06	50	103	N/A	N/A		N/A	
1	160	Reception	Offices	Reception Areas	76	N/A	100% open	RTU-1	569	8.9	5064	3	5.0	0.06	30	49	N/A	N/A		N/A	
1	161	Office	Offices	Office spaces	38	N/A	100% open	RTU-1	140	8.9	1246	2	5.0	0.06	5	18	N/A	N/A		N/A	
1	162	Files	Storage	Warehouses	0	N/A	100%	RTU-1	37	7.9	292	0	0.0	0.06	0	2	N/A	N/A		N/A	
1	164	Exam	Hospitals nursing and convalescent homes	Patient rooms	40	N/A	100%	RTU-1 / EF	206	8.8	1813	2	25.0	0.00	10	50	N/A	N/A		N/A	
1	164A	Storage	None	None	0	N/A	N/A	N/A	55	8.4	462	0	0.0	0.00	0	0	0	0	0.0%	N/A	0.000
1	165	Nurse	Hospitals nursing and convalescent homes	Patient rooms	95	N/A	100%	RTU-1	423	8.8	3722	4	25.0	0.00	10	100	N/A	N/A		N/A	
1	165A	Toilet	Public Spaces	Toilet rooms - public	0	N/A	N/A	EF	36	8.9	320	1	0.0	0.00	0	0	N/A	N/A	0.0%	N/A	
1	166	Speech and Language	Offices	Office spaces	289	N/A	100%	RTU-1	238	8.8	2094	8	5.0	0.06	5	54	N/A	N/A		N/A	
1	167	Social Worker	Offices	Office spaces	442	N/A	100%	RTU-1	332	8.9	2955	8	5.0	0.06	5	60	N/A	N/A		N/A	
1	168	Kiln	Storage	Warehouses	50	N/A	100%	RTU-1 / EF-1	71	8	568	1	0.0	0.06	0	4	N/A	N/A		N/A	
1	169	Work Room	Workrooms	Copy, printing rooms	?	N/A	N/A	RTU-1	79	8	632	1	5.0	0.06	4	10	N/A	N/A		N/A	
1	170	Art	Education	Art Classroom	?	N/A	N/A	RTU-1	729	20	14580	25	10.0	0.18	20	381	N/A	N/A		N/A	
1	173	Music 1	Education	Music/theater/dance	?	N/A	N/A	RTU-6 / VAV	945	20	18620	15	10.0	0.06	35	207	N/A	N/A		N/A	
1	174	Music 2	Education	Music/theater/dance	202	N/A	N/A	RTU-6 /	760	24	17088	15	10.0	0.06	35	196	N/A	N/A		N/A	
1	175	Storage and 176 Office	Offices	Office spaces	?	N/A	N/A	RTU-6 /	213	18.4	3919	0	5.0	0.06	5	18	N/A	N/A		N/A	
1	178	Library	Education	Media Center	?	N/A	N/A	RTU-5 /	3713	20.4	75745	50	10.0	0.12	25	946	N/A	N/A		N/A	
1	179	Seminar	Education	Lecture Classroom	375	N/A	N/A	RTU-5 /	335	8	2464	6	7.5	0.06	65	65	N/A	N/A		N/A	
1	180	Office	Offices	Office spaces	127	N/A	N/A	RTU-5 /	127	8.8	1118	1	5.0	0.06	5	13	N/A	N/A		N/A	
1	181	MDF	None	None	0	N/A	N/A	N/A	72	8.8	634	0	0.0	0.00	0	0	0	0	0.0%	N/A	0.000
1	183	Work Room	Workrooms	Copy, printing rooms	72	N/A	N/A	RTU-5 /	155	8.8	1364	1	5.0	0.06	4	14	N/A	N/A		N/A	
1	184	Office	Offices	Office spaces	89	N/A	N/A	RTU-5 /	143	8.2	1173	1	5.0	0.06	5	14	N/A	N/A		N/A	
1	178A	Library Storage	None	None	0	N/A	N/A	RTU-5 /	9	8	72	0	0.0	0.00	0	0	0	0	0.0%	N/A	0.000
1	185	Resource Collection	Offices	Office spaces	54	N/A	N/A	RTU-5 /	220	8.9	1842	2	5.0	0.06	5	23	N/A	N/A		N/A	
1	186	Science	Education	Science Laboratories	?	N/A	N/A	RTU-2 /	626	20	10620	20	10.0	0.18	25	313	N/A	N/A		N/A	

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Primary Sheet

VANZELM ENGINEERS

Zone Identification													IMC 2015 Ventilation Calculations								
Floor	Room#	Room Name	Occupancy Classification	Category	Total Airflow	Unit Actual OA %	BAS OA Damper Cmnd	Served By	Zone Area, Az, per space	Ceiling Height	Volume, per space	Zone Population, Pz, per space	People OA Rate in Breathing Zone, Rp	Area OA Rate in Breathing Zone, Ra	Default Occupant Density	Min. Required Ventilation Airflow	ACTUAL MEASURED VENTILATION AIR FLOW	Excess Ventilation Air (negative indicates deficit)	Excess Ventilation Air Percentage	PASS/FAIL	Ventilation ACH
					(cfm)	(%)	(%)		(sq.ft)	(ft)	(cu.ft)	Adult	(cfm/ person)	(cfm/sf)	(#/1000sf)	(cfm)	(cfm)	(cfm)	(%)		(AC/hr)
1	187	Prep	Education	Science Laboratories	170	N/A	N/A	RTU-2 / EF-3	124	8	992	1	10.0	0.18	25	32	N/A	N/A		N/A	
1	192	Elevator Machine Room	None	None	0	N/A	N/A	Split Only	58	7.3	423	0	0.0	0.00	0	0	N/A	N/A	0.0%	N/A	
2	201	Classroom	Education	Classroom (ages 5-8)	1200	N/A	100%	RTU-1	715	9	6435	20	10.0	0.12	25	286	N/A	N/A		N/A	
2	201A	Toilet	Public Spaces	Toilet rooms - public	-32	N/A	N/A	EF	35	8.9	312	1	0.0	0.00	0	0	N/A	N/A	0.0%	N/A	
2	247	Storage	None	None	0	N/A	N/A	N/A	92	8.9	819	0	0.0	0.00	0	0	0	0	0.0%	N/A	0.000
2	203	Storage	None	None	0	N/A	N/A	N/A	67	8.9	596	0	0.0	0.00	0	0	0	0	0.0%	N/A	0.000
2	205	Classroom	Education	Classroom (ages 5-8)	432	N/A	100%	RTU-1	712	9	6408	20	10.0	0.12	25	285	N/A	N/A		N/A	
2	205A	Toilet	Public Spaces	Toilet rooms - public	-34	N/A	N/A	EF	35	8.9	312	1	0.0	0.00	0	0	N/A	N/A	0.0%	N/A	
2	206	Classroom	Education	Classroom (ages 5-8)	245	N/A	100%	RTU-2	712	9	6408	10	10.0	0.12	25	185	N/A	N/A		N/A	
2	206A	Toilet	Public Spaces	Toilet rooms - public	0	N/A	N/A	EF	35	8.9	312	1	0.0	0.00	0	0	N/A	N/A	0.0%	N/A	
2	208	Storage	None	None	0	N/A	N/A	N/A	67	8.9	596	0	0.0	0.00	0	0	0	0	0.0%	N/A	0.000
2	210	Classroom	Education	Classroom (ages 5-8)	164	N/A	100%	RTU-2	715	9	6435	20	10.0	0.12	25	286	N/A	N/A		N/A	
2	210A	Toilet	Public Spaces	Toilet rooms - public	0	N/A	N/A	EF	35	8.9	312	1	0.0	0.00	0	0	N/A	N/A	0.0%	N/A	
2	211	Classroom	Education	Classroom (ages 5-8)	202	N/A	100%	RTU-2	715	9	6435	20	10.0	0.12	25	286	N/A	N/A		N/A	
2	211A	Toilet	Public Spaces	Toilet rooms - public	-74	N/A	N/A	EF	35	8.9	312	1	0.0	0.00	0	0	N/A	N/A	0.0%	N/A	
2	213	Storage	None	None	0	N/A	N/A	N/A	63	8.9	561	0	0.0	0.00	0	0	0	0	0.0%	N/A	0.000
2	215	Classroom	Education	Classroom (ages 5-8)	186	N/A	100%	RTU-2	715	9	6435	20	10.0	0.12	25	286	N/A	N/A		N/A	
2	215A	Toilet	Public Spaces	Toilet rooms - public	-56	N/A	N/A	EF	35	8.9	312	1	0.0	0.00	0	0	N/A	N/A	0.0%	Meets	
2	216	Classroom	Education	Classroom (ages 5-8)	238	N/A	100%	RTU-2	699	9	6291	20	10.0	0.12	25	284	N/A	N/A		N/A	
2	216A	Toilet	Public Spaces	Toilet rooms - public	-46	N/A	N/A	EF	35	8.9	312	1	0.0	0.00	0	0	N/A	N/A	0.0%	N/A	
2	218	Storage	None	None	0	N/A	100%	N/A	63	8.9	561	0	0.0	0.00	0	0	0	0	0.0%	N/A	0.000
2	220	Classroom	Education	Classroom (ages 5-8)	200	N/A	N/A	RTU-2	700	9	6300	20	10.0	0.12	25	284	N/A	N/A		N/A	
2	220A	Toilet	Public Spaces	Toilet rooms - public	-60	N/A	N/A	EF	35	8.9	312	1	0.0	0.00	0	0	N/A	N/A	0.0%	N/A	
2	222	Cust	Storage	Warehouses	-25	N/A	N/A	EF	59	8.9	525	1	0.0	0.06	0	4	N/A	N/A		N/A	
2	222A	Women	Public Spaces	Toilet rooms - public	-34	N/A	N/A	EF	35	8.9	312	1	0.0	0.00	0	0	N/A	N/A	0.0%	N/A	
2	223	Boiler Room	None	None	0	N/A	N/A	N/A	510	11.8	6018	0	0.0	0.00	0	0	0	0	0.0%	N/A	0.000
2	226	Storage	None	None	0	N/A	N/A	N/A	136	8	1088	0	0.0	0.00	0	0	0	0	0.0%	N/A	0.000

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Zone Identification													IMC 2015 Ventilation Calculations								
Floor	Room#	Room Name	Occupancy Classification	Category	Total Airflow	Unit Actual OA %	BAS OA Damper Cmnd	Served By	Zone Area, Az, per space	Ceiling Height	Volume, per space	Zone Population, Pz, per space	People OA Rate in Breathing Zone, Rp	Area OA Rate in Breathing Zone, Ra	Default Occupant Density	Min. Required Ventilation Airflow	ACTUAL MEASURED VENTILATION AIR FLOW	Excess Ventilation Air (negative indicates deficit)	Excess Ventilation Air Percentage	PASS/FAIL	Ventilation ACH
					(cfm)	(%)	(%)		(sq.ft)	(ft)	(cu.ft)	Adult	(cfm/ person)	(cfm/sf)	(#/1000sf)	(cfm)	(cfm)	(cfm)	(%)		(AC/hr)
2	226A	Women	Public Spaces	Toilet rooms - public	**170**	N/A	100%	RTU-1 / EF	144	8.9	1282	3	0.0	0.00	0	0	**N/A**	N/A	0.0%	N/A	
2	226B	Women	Public Spaces	Toilet rooms - public	**-25**	N/A	N/A	EF	37	8.9	329	1	0.0	0.00	0	0	**N/A**	N/A	0.0%	N/A	
2	224A	Storage	None	None	**0**	N/A	N/A	N/A	33	8.3	274	0	0.0	0.00	0	0	**0**	0	0.0%	N/A	**0.000**
2	224B	Men	Public Spaces	Toilet rooms - public	**160**	N/A	100%	RTU-1 /EF	133	8.9	1184	3	0.0	0.00	0	0	**N/A**	N/A	0.0%	N/A	
2	224	IDF	None	None	**0**	N/A	N/A	N/A	89	11.8	1050	0	0.0	0.00	0	0	**0**	0	0.0%	N/A	**0.000**
2	230	Classroom	Education	Classroom (ages 5-8)	**1019**	N/A	100%	RTU-1	930	8.9	8277	20	10.0	0.12	25	312	**N/A**	N/A		N/A	
2	231	Storage	None	None	**0**	N/A	N/A	N/A	50	8.9	445	0	0.0	0.00	0	0	**0**	0	0.0%	N/A	**0.000**
2	232	Classroom	Education	Classroom (ages 5-8)	**98**	N/A	100%	RTU-1	775	9	6975	20	10.0	0.12	25	293	**N/A**	N/A		N/A	
2	233	Classroom	Education	Classroom (ages 5-8)	**118**	N/A	100%	RTU-1	736	9	6624	18	10.0	0.12	25	268	**N/A**	N/A		N/A	
2	234	Storage	None	None	**0**	N/A	N/A	N/A	50	8.9	445	0	0.0	0.00	0	0	**0**	0	0.0%	N/A	**0.000**
2	235	Classroom	Education	Classroom (ages 5-8)	**117**	N/A	100%	RTU-1	756	9	6804	8	10.0	0.12	25	171	**N/A**	N/A		N/A	
2	236	Classroom	Education	Classroom (ages 5-8)	**114**	N/A	100%	RTU-1	745	9	6705	20	10.0	0.12	25	289	**N/A**	N/A		N/A	
2	237	Storage	None	None	**0**	N/A	N/A	N/A	67	8.9	596	0	0.0	0.00	0	0	**0**	0	0.0%	N/A	**0.000**
2	238	Classroom	Education	Classroom (ages 5-8)	**131**	N/A	100%	RTU-1	755	9	6795	20	10.0	0.12	25	291	**N/A**	N/A		N/A	
2	239	Classroom	Education	Classroom (ages 5-8)	**127**	N/A	100%	RTU-1	746	9	6714	16	10.0	0.12	25	250	**N/A**	N/A		N/A	
2	240	Storage	None	None	**0**	N/A	N/A	N/A	67	8.9	596	0	0.0	0.00	0	0	**0**	0	0.0%	N/A	**0.000**
2	241	Classroom	Education	Classroom (ages 5-8)	**1252**	N/A	100%	RTU-1	763	9	6867	10	10.0	0.12	25	192	**N/A**	N/A		N/A	
2	229	Special Ed./Psychologist	Education	Classroom (ages 5-8)	**256**	N/A	N/A	RTU-6	415	9	3735	6	10.0	0.12	25	110	**N/A**	N/A		N/A	
2	242	Gifted Language Arts	Education	Classroom (ages 5-8)	**380**	N/A	N/A	RTU-5	368	8.6	3165	6	10.0	0.12	25	104	**N/A**	N/A		N/A	
2	243	Gifted Math	Education	Classroom (ages 5-8)	**180**	N/A	N/A	RTU-5	200	8.6	1720	6	10.0	0.12	25	84	**N/A**	N/A		N/A	
2	244	IDF	None	None	**0**	N/A	N/A	N/A	87	9	783	0	0.0	0.00	0	0	**N/A**	N/A	0.0%	N/A	
2	245	Storage	None	None	**40**	N/A	N/A	RTU-5	211	8.6	1815	0	0.0	0.00	0	0	**0**	0	0.0%	N/A	**0.000**
2	246	Occupational Therapy	Hospitals nursing and convalescent homes	Physical Therapy	**114**	N/A	N/A	RTU-5	278	9	2502	2	15.0	0.00	20	30	**N/A**	N/A		N/A	

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					(cfm)	(%)	(%)		(sq.ft)	(ft)	(cu.ft)	Adult	(cfm/ person)	(cfm/sf)	(#/1000sf)	(cfm)	(cfm)	(cfm)	(%)		(AC/hr)
1	101	Classroom	Education	Classroom (ages 5-8)	1063	N/A	100% Open	RTU-2 / VAV-101	834	8.9	7423	18	10.0	0.12	25	280	1063	783	279.5%	Meets	8.593
1	101A	Toilet	Public Spaces	Toilet rooms - public	0	N/A	N/A	EF	35	8.9	312	1	0.0	0.00	0	0	0	0	0.0%	N/A	0.000
1	103	Storage	None	None	0	N/A	N/A	N/A	88	8.9	783	0	0.0	0.00	0	0	0	0	0.0%	N/A	0.000
1	105	Classroom	Education	Classroom (ages 5-8)	520	N/A	100% Open	RTU-2 / VAV-105	835	8.9	7432	16	10.0	0.12	25	260	520	260	99.8%	Meets	4.198
1	105A	Toilet	Public Spaces	Toilet rooms - public	0	N/A	N/A	EF	35	8.9	312	1	0.0	0.00	0	0	0	0	0.0%	N/A	0.000
1	106	Classroom	Education	Classroom (ages 5-8)	171	N/A	100% Open	RTU-2 / VAV-106	834	8.9	7423	18	10.0	0.12	25	280	171	-109	-38.9%	Fails	1.382
1	106A	Toilet	Public Spaces	Toilet rooms - public	-31	N/A	N/A	EF	35	8.9	312	1	0.0	0.00	0	0	0	0	0.0%	N/A	0.000
1	108	Storage	None	None	0	N/A	N/A	N/A	88	8.9	783	0	0.0	0.00	0	0	0	0	0.0%	N/A	0.000
1	110	Classroom	Education	Classroom (ages 5-8)	170	N/A	100% Open	RTU-2 / VAV-110	835	8.8	7348	12	10.0	0.12	25	220	170	-50	-22.8%	Fails	1.388
1	110A	Toilet	Public Spaces	Toilet rooms - public	0	N/A	N/A	EF	35	8.9	312	1	0.0	0.00	0	0	0	0	0.0%	N/A	0.000
1	111	Classroom	Education	Classroom (ages 5-8)	1612	N/A	100% Open	RTU-2 / VAV-111	700	8.9	6230	3	10.0	0.12	25	114	1612	1498	1314.0%	Meets	15.525
1	111A	Toilet	Public Spaces	Toilet rooms - public	-26	N/A	N/A	EF	35	8.9	312	1	0.0	0.00	0	0	0	0	0.0%	N/A	0.000
1	113	Storage	None	None	0	N/A	N/A	N/A	51	8.9	454	0	0.0	0.00	0	0	0	0	0.0%	N/A	0.000
1	115	Classroom	Education	Classroom (ages 5-8)	302	N/A	100% Open	RTU-2 / VAV-115	712	9	6408	18	10.0	0.12	25	265	302	37	13.8%	Meets	2.828
1	115A	Toilet	Public Spaces	Toilet rooms - public	0	N/A	N/A	EF	35	8.9	312	1	0.0	0.00	0	0	0	0	0.0%	N/A	0.000
1	116	Classroom	Education	Classroom (ages 5-8)	238	N/A	100% Open	RTU-2 / VAV-116	697	8.9	6203	16	10.0	0.12	25	244	238	-6	-2.3%	Fails	2.302
1	116A	Toilet	Public Spaces	Toilet rooms - public	0	N/A	N/A	EF	35	8.9	312	1	0.0	0.00	0	0	0	0	0.0%	N/A	0.000
1	118	Storage	None	None	0	N/A	N/A	N/A	51	8.9	454	0	0.0	0.00	0	0	0	0	0.0%	N/A	0.000
1	120	Classroom	Education	Classroom (ages 5-8)	253	N/A	100% Open	RTU-2 / VAV	713	8.8	6274	18	10.0	0.12	25	266	253	-13	-4.7%	Fails	2.419
1	120A	Toilet	Public Spaces	Toilet rooms - public	0	N/A	N/A	EF	35	8.9	312	1	0.0	0.00	0	0	0	0	0.0%	N/A	0.000
1	122	Cust	Storage	Warehouses	0	N/A	N/A	EF	50	7	350	1	0.0	0.06	0	3	0	-3	-100.0%	Fails	0.000
1	122B	Women	Public Spaces	Toilet rooms - public	0	N/A	N/A	EF	36	8.9	320	1	0.0	0.00	0	0	0	0	0.0%	N/A	0.000
1	122A	Multi-Purpose Storage	None	None	20	N/A	100% Open	RTU-2	546	7.5	4095	0	0.0	0.00	0	0	20	20	0.0%	N/A	0.293
1	123	Office	Offices	Office spaces	38	N/A	100% Open	RTU-2	77	7.1	547	2	5.0	0.06	5	15	38	23	159.9%	Meets	4.170
1	129	Multi-Purpose Room	Education	Multiuse assembly	12051	N/A	100% Open	RTU-3	4366	23.4	102164	563	7.5	0.06	100	4484	12051	7567	168.7%	Meets	7.077
1	131	Platform	Education	Music/theater/dance	0	N/A	N/A	N/A	993	14.5	14399	55	10.0	0.06	35	610	0	-610	-100.0%	Fails	0.000
1	129A	Women	Public Spaces	Toilet rooms - public	-59	N/A	N/A	EF	200	8.9	1780	3	0.0	0.00	0	0	0	0	0.0%	N/A	0.000

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Floor	**Room#**	**Room Name**	**Occupancy Classification**	**Category**	**Total Airflow**	**Unit Actual OA %**	**BAS OA Damper Cmnd**	**Served By**	**Zone Area, Az, per space**	**Ceiling Height**	**Volume, per space**	**Zone Population, Pz, per space**	**People OA Rate in Breathing Zone, Rp**	**Area OA Rate in Breathing Zone, Ra**	**Default Occupant Density**	**Min. Required Ventilation Airflow**	**ACTUAL MEASURED VENTILATION AIR FLOW**	**Excess Ventilation Air (negative indicates deficit)**	**Excess Ventilation Air Percentage**	**PASS/FAIL**	**Ventilation ACH**
					(cfm)	(%)	(%)		(sq.ft)	(ft)	(cu.ft)	Adult	(cfm/ person)	(cfm/sf)	(#/1000sf)	(cfm)	(cfm)	(cfm)	(%)		(AC/hr)
1	129B	Men	Public Spaces	Toilet rooms - public	**-88**	N/A	N/A	EF	128	8.9	1139	2	0.0	0.00	0	0	**0**	0	0.0%	N/A	**0.000**
1	130	Storage	None	None	**0**	N/A	N/A	N/A	114	14.8	1687	0	0.0	0.00	0	0	**0**	0	0.0%	N/A	**0.000**
1	129C	One-Person Women	Public Spaces	Toilet rooms - public	**-27**	N/A	N/A	EF	36	8.9	320	1	0.0	0.00	0	0	**0**	0	0.0%	N/A	**0.000**
1	129D	One-Person Men	Public Spaces	Toilet rooms - public	**-20**	N/A	N/A	EF	36	8.9	320	1	0.0	0.00	0	0	**0**	0	0.0%	N/A	**0.000**
1	139	Cafeteria	Food and beverage service	Cafeteria, fast food	**7989**	N/A	100% Open	RTU-4	2941	12	35292	386	7.5	0.18	100	3424	**7989**	4565	133.3%	**Meets**	**13.582**
1	138	Kitchen/Dishwash	Food and beverage service	Kitchens (cooking)	**4214**	100%	No set point on RM6	MAU-1	683	11.5	7855	10	0.0	0.00	0	0	**4241**	4241	0.0%	N/A	**32.397**
1	138A	Kitchen Toilet	Public Spaces	Toilet rooms - public	**-127**	N/A	N/A	EF	36	8.9	320	1	0.0	0.00	0	0	**0**	0	0.0%	N/A	**0.000**
1	136	Kitchen Office	Offices	Office spaces	**100**	100%	No set point on RM6	MAU-1	51	8.9	454	1	5.0	0.06	5	8	**100**	92	1140.7%	**Meets**	**13.219**
1	133	Dry Storage	None	None	**0**	N/A	N/A	N/A	89	8.5	757	0	0.0	0.00	0	0	**0**	0	0.0%	N/A	**0.000**
1	140	Faculty Lounge	Food and beverage service	Dining Rooms	**627**	N/A	100% open	RTU-1	488	8.5	4148	20	7.5	0.18	70	238	**627**	389	163.6%	**Meets**	**9.069**
1	140.1	Women	Public Spaces	Toilet rooms - public	**-66**	N/A	N/A	EF	36	8.9	320	1	0.0	0.00	0	0	**0**	0	0.0%	N/A	**0.000**
1	141	Office	Offices	Office spaces	**48**	N/A	100% open	RTU-1	105	8.8	924	1	5.0	0.06	5	11	**48**	37	324.8%	**Meets**	**3.117**
1	143	Fire Pump	None	None	**0**	N/A	100% open	RTU-1	130	9	1170	0	0.0	0.00	0	0	**0**	0	0.0%	N/A	**0.000**
1	144	Office	Offices	Office spaces	**105**	N/A	100% open	RTU-1	179	8.9	1593	6	5.0	0.06	5	41	**105**	64	157.7%	**Meets**	**3.955**
1	145	Switch Gear	None	None	**0**	N/A	100% open	RTU-1	167	9	1503	0	0.0	0.00	0	0	**0**	0	0.0%	N/A	**0.000**
1	146	Office	Offices	Office spaces	**57**	N/A	100% open	RTU-1	215	8.7	1871	6	5.0	0.06	5	43	**57**	14	32.9%	**Meets**	**1.828**
1	147	Emer. Elec	None	None	**0**	N/A	100% open	RTU-1	51	9	459	0	0.0	0.00	0	0	**0**	0	0.0%	N/A	**0.000**
1	148	Phone	Offices	Office spaces	**0**	N/A	100% open	RTU-1	46	9	414	0	5.0	0.06	5	4	**0**	-4	-100.0%	**Fails**	**0.000**
1	149	Office	Offices	Office spaces	**46**	N/A	100% open	RTU-1	178	8.9	1584	4	5.0	0.06	5	31	**46**	15	49.9%	**Meets**	**1.742**
1	150	Office	Offices	Office spaces	**60**	N/A	100% open	RTU-1	148	8.9	1317	2	5.0	0.06	5	19	**60**	41	217.8%	**Meets**	**2.733**
1	151	Office	Offices	Office spaces	**0**	N/A	100% open	RTU-1	80	8.9	712	4	5.0	0.06	5	25	**0**	-25	-100.0%	**Fails**	**0.000**
1	152	Office	Offices	Office spaces	**27**	N/A	100% open	RTU-1	141	8.9	1255	4	5.0	0.06	5	28	**27**	-1	-5.1%	**Fails**	**1.291**
1	153	Office	Offices	Office spaces	**258**	N/A	100% open	RTU-1	220	8.9	1958	3	5.0	0.06	5	28	**258**	230	814.9%	**Meets**	**7.906**
1	154	Office	Offices	Office spaces	**465**	N/A	100% open	RTU-1	274	8.9	2439	6	5.0	0.06	5	46	**465**	419	901.3%	**Meets**	**11.441**
1	156.1	Toilet	Public Spaces	Toilet rooms - public	**0**	N/A	N/A	EF	36	8.9	320	1	0.0	0.00	0	0	**0**	0	0.0%	N/A	**0.000**
1	156	Principal	Offices	Office spaces	**50**	N/A	100% open	RTU-1	233	8.8	2050	6	5.0	0.06	5	44	**50**	6	13.7%	**Meets**	**1.463**
1	156A	Storage	None	None	**0**	N/A	N/A	N/A	21	8.8	185	0	0.0	0.00	0	0	**0**	0	0.0%	N/A	**0.000**

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Burr Elementary School

Best Case Scenario

VANZELM ENGINEERS

Zone Identification													IMC 2015 Ventilation Calculations								
Floor	Room#	Room Name	Occupancy Classification	Category	Total Airflow	Unit Actual OA %	BAS OA Damper Cmnd	Served By	Zone Area, Az, per space	Ceiling Height	Volume, per space	Zone Population, Pz, per space	People OA Rate in Breathing Zone, Rp	Area OA Rate in Breathing Zone, Ra	Default Occupant Density	Min. Required Ventilation Airflow	ACTUAL MEASURED VENTILATION AIR FLOW	Excess Ventilation Air (negative indicates deficit)	Excess Ventilation Air Percentage	PASS/FAIL	Ventilation ACH
					(cfm)	(%)	(%)		(sq.ft)	(ft)	(cu.ft)	Adult	(cfm/ person)	(cfm/sf)	(#/1000sf)	(cfm)	(cfm)	(cfm)	(%)		(AC/hr)
1	157	Conference	Offices	Conference rooms	127	N/A	100% open	RTU-1	184	8.8	1619	8	5.0	0.06	50	51	127	76	148.8%	Meets	4.706
1	158	Files	Storage	Warehouses	0	N/A	100% open	RTU-1	46	8.8	405	0	0.0	0.06	0	3	0	-3	-100.0%	Fails	0.000
1	159	Conference	Offices	Conference rooms	603	N/A	100% open	RTU-1	387	8.9	3444	16	5.0	0.06	50	103	603	500	484.2%	Meets	10.504
1	160	Reception	Offices	Reception Areas	76	N/A	100% open	RTU-1	569	8.9	5064	3	5.0	0.06	30	49	76	27	54.7%	Meets	0.900
1	161	Office	Offices	Office spaces	38	N/A	100% open	RTU-1	140	8.9	1246	2	5.0	0.06	5	18	38	20	106.5%	Meets	1.830
1	162	Files	Storage	Warehouses	0	N/A	100%	RTU-1	37	7.9	292	0	0.0	0.06	0	2	0	-2	-100.0%	Fails	0.000
1	164	Exam	Hospitals nursing and convalescent homes	Patient rooms	40	N/A	100%	RTU-1 / EF	206	8.8	1813	2	25.0	0.00	10	50	40	-10	-20.0%	Fails	1.324
1	164A	Storage	None	None	0	N/A	N/A	N/A	55	8.4	462	0	0.0	0.00	0	0	0	0	0.0%	N/A	0.000
1	165	Nurse	Hospitals nursing and convalescent homes	Patient rooms	95	N/A	100%	RTU-1	423	8.8	3722	4	25.0	0.00	10	100	95	-5	-5.0%	Fails	1.531
1	165A	Toilet	Public Spaces	Toilet rooms - public	0	N/A	N/A	EF	36	8.9	320	1	0.0	0.00	0	0	0	0	0.0%	N/A	0.000
1	166	Speech and Language	Offices	Office spaces	289	N/A	100%	RTU-1	238	8.8	2094	8	5.0	0.06	5	54	289	235	432.4%	Meets	8.279
1	167	Social Worker	Offices	Office spaces	442	N/A	100%	RTU-1	332	8.9	2955	8	5.0	0.06	5	60	442	382	637.7%	Meets	8.975
1	168	Kiln	Storage	Warehouses	50	N/A	100%	RTU-1 / EF-1	71	8	568	1	0.0	0.06	0	4	50	46	1073.7%	Meets	5.282
1	169	Work Room	Workrooms	Copy, printing rooms	?	N/A	N/A	RTU-1	79	8	632	1	5.0	0.06	4	10	0	-10	-100.0%	Fails	0.000
1	170	Art	Education	Art Classroom	?	N/A	N/A	RTU-1	729	20	14580	25	10.0	0.18	20	381	0	-381	-100.0%	Fails	0.000
1	173	Music 1	Education	Music/theater/dance	?	N/A	N/A	RTU-6 / VAV	945	20	18620	15	10.0	0.06	35	207	0	-207	-100.0%	Fails	0.000
1	174	Music 2	Education	Music/theater/dance	202	N/A	N/A	RTU-6 /	760	24	17088	15	10.0	0.06	35	196	202	6	3.3%	Meets	0.709
1	175	Storage and 176 Office	Offices	Office spaces	?	N/A	N/A	RTU-6 /	213	18.4	3919	0	5.0	0.06	5	18	0	-18	-100.0%	Fails	0.000
1	178	Library	Education	Media Center	?	N/A	N/A	RTU-5 /	3713	20.4	75745	50	10.0	0.12	25	946	0	-946	-100.0%	Fails	0.000
1	179	Seminar	Education	Lecture Classroom	375	N/A	N/A	RTU-5 /	335	8	2464	6	7.5	0.06	65	65	375	310	476.0%	Meets	9.131
1	180	Office	Offices	Office spaces	127	N/A	N/A	RTU-5 /	127	8.8	1118	1	5.0	0.06	5	13	127	114	906.3%	Meets	6.818
1	181	MDF	None	None	0	N/A	N/A	N/A	72	8.8	634	0	0.0	0.00	0	0	0	0	0.0%	N/A	0.000
1	183	Work Room	Workrooms	Copy, printing rooms	72	N/A	N/A	RTU-5 /	155	8.8	1364	1	5.0	0.06	4	14	72	58	403.5%	Meets	3.167
1	184	Office	Offices	Office spaces	89	N/A	N/A	RTU-5 /	143	8.2	1173	1	5.0	0.06	5	14	89	75	555.4%	Meets	4.554
1	178A	Library Storage	None	None	0	N/A	N/A	RTU-5 /	9	8	72	0	0.0	0.00	0	0	0	0	0.0%	N/A	0.000
1	185	Resource Collection	Offices	Office spaces	54	N/A	N/A	RTU-5 /	220	8.9	1842	2	5.0	0.06	5	23	54	31	132.8%	Meets	1.759
1	186	Science	Education	Science Laboratories	?	N/A	N/A	RTU-2 /	626	20	10620	20	10.0	0.18	25	313	0	-313	-100.0%	Fails	0.000

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Zone Identification													IMC 2015 Ventilation Calculations								
Floor	Room#	Room Name	Occupancy Classification	Category	Total Airflow	Unit Actual OA %	BAS OA Damper Cmnd	Served By	Zone Area, Az, per space	Ceiling Height	Volume, per space	Zone Population, Pz, per space	People OA Rate in Breathing Zone, Rp	Area OA Rate in Breathing Zone, Ra	Default Occupant Density	Min. Required Ventilation Airflow	ACTUAL MEASURED VENTILATION AIR FLOW	Excess Ventilation Air (negative indicates deficit)	Excess Ventilation Air Percentage	PASS/FAIL	Ventilation ACH
					(cfm)	(%)	(%)		(sq.ft)	(ft)	(cu.ft)	Adult	(cfm/ person)	(cfm/sf)	(#/1000sf)	(cfm)	(cfm)	(cfm)	(%)		(AC/hr)
1	187	Prep	Education	Science Laboratories	170	N/A	N/A	RTU-2 / EF-3	124	8	992	1	10.0	0.18	25	32	170	138	426.0%	Meets	10.282
1	192	Elevator Machine Room	None	None	0	N/A	N/A	Split Only	58	7.3	423	0	0.0	0.00	0	0	0	0	0.0%	N/A	0.000
2	201	Classroom	Education	Classroom (ages 5-8)	1200	N/A	100%	RTU-1	715	9	6435	20	10.0	0.12	25	286	1200	914	319.9%	Meets	11.189
2	201A	Toilet	Public Spaces	Toilet rooms - public	-32	N/A	N/A	EF	35	8.9	312	1	0.0	0.00	0	0	0	0	0.0%	N/A	0.000
2	247	Storage	None	None	0	N/A	N/A	N/A	92	8.9	819	0	0.0	0.00	0	0	0	0	0.0%	N/A	0.000
2	203	Storage	None	None	0	N/A	N/A	N/A	67	8.9	596	0	0.0	0.00	0	0	0	0	0.0%	N/A	0.000
2	205	Classroom	Education	Classroom (ages 5-8)	432	N/A	100%	RTU-1	712	9	6408	20	10.0	0.12	25	285	432	147	51.3%	Meets	4.045
2	205A	Toilet	Public Spaces	Toilet rooms - public	-34	N/A	N/A	EF	35	8.9	312	1	0.0	0.00	0	0	0	0	0.0%	N/A	0.000
2	206	Classroom	Education	Classroom (ages 5-8)	245	N/A	100%	RTU-2	712	9	6408	10	10.0	0.12	25	185	245	60	32.1%	Meets	2.294
2	206A	Toilet	Public Spaces	Toilet rooms - public	0	N/A	N/A	EF	35	8.9	312	1	0.0	0.00	0	0	0	0	0.0%	N/A	0.000
2	208	Storage	None	None	0	N/A	N/A	N/A	67	8.9	596	0	0.0	0.00	0	0	0	0	0.0%	N/A	0.000
2	210	Classroom	Education	Classroom (ages 5-8)	164	N/A	100%	RTU-2	715	9	6435	20	10.0	0.12	25	286	164	-122	-42.6%	Fails	1.529
2	210A	Toilet	Public Spaces	Toilet rooms - public	0	N/A	N/A	EF	35	8.9	312	1	0.0	0.00	0	0	0	0	0.0%	N/A	0.000
2	211	Classroom	Education	Classroom (ages 5-8)	202	N/A	100%	RTU-2	715	9	6435	20	10.0	0.12	25	286	202	-84	-29.3%	Fails	1.883
2	211A	Toilet	Public Spaces	Toilet rooms - public	-74	N/A	N/A	EF	35	8.9	312	1	0.0	0.00	0	0	0	0	0.0%	N/A	0.000
2	213	Storage	None	None	0	N/A	N/A	N/A	63	8.9	561	0	0.0	0.00	0	0	0	0	0.0%	N/A	0.000
2	215	Classroom	Education	Classroom (ages 5-8)	186	N/A	100%	RTU-2	715	9	6435	20	10.0	0.12	25	286	186	-100	-34.9%	Fails	1.734
2	215A	Toilet	Public Spaces	Toilet rooms - public	-56	N/A	N/A	EF	35	8.9	312	1	0.0	0.00	0	0	0	0	0.0%	Meets	0.000
2	216	Classroom	Education	Classroom (ages 5-8)	238	N/A	100%	RTU-2	699	9	6291	20	10.0	0.12	25	284	238	-46	-16.2%	Fails	2.270
2	216A	Toilet	Public Spaces	Toilet rooms - public	-46	N/A	N/A	EF	35	8.9	312	1	0.0	0.00	0	0	0	0	0.0%	N/A	0.000
2	218	Storage	None	None	0	N/A	100%	N/A	63	8.9	561	0	0.0	0.00	0	0	0	0	0.0%	N/A	0.000
2	220	Classroom	Education	Classroom (ages 5-8)	200	N/A	N/A	RTU-2	700	9	6300	20	10.0	0.12	25	284	200	-84	-29.6%	Fails	1.905
2	220A	Toilet	Public Spaces	Toilet rooms - public	-60	N/A	N/A	EF	35	8.9	312	1	0.0	0.00	0	0	0	0	0.0%	N/A	0.000
2	222	Cust	Storage	Warehouses	-25	N/A	N/A	EF	59	8.9	525	1	0.0	0.06	0	4	0	-4	-100.0%	Fails	0.000
2	222A	Women	Public Spaces	Toilet rooms - public	-34	N/A	N/A	EF	35	8.9	312	1	0.0	0.00	0	0	0	0	0.0%	N/A	0.000
2	223	Boiler Room	None	None	0	N/A	N/A	N/A	510	11.8	6018	0	0.0	0.00	0	0	0	0	0.0%	N/A	0.000
2	226	Storage	None	None	0	N/A	N/A	N/A	136	8	1088	0	0.0	0.00	0	0	0	0	0.0%	N/A	0.000

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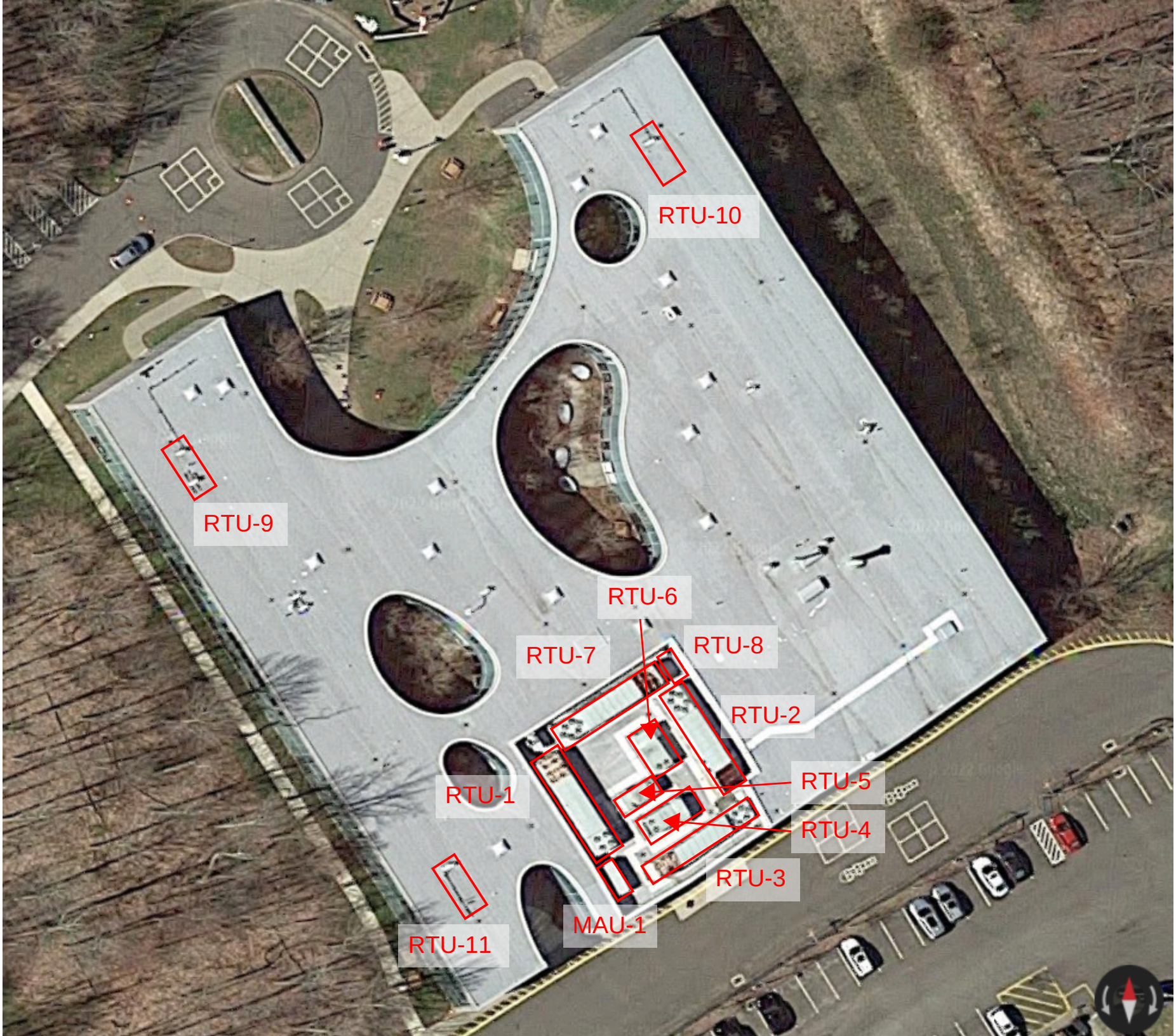
					(cfm)	(%)	(%)		(sq.ft)	(ft)	(cu.ft)	Adult	(cfm/ person)	(cfm/sf)	(#/1000sf)	(cfm)	(cfm)	(cfm)	(%)		(AC/hr)
2	226A	Women	Public Spaces	Toilet rooms - public	**170**	N/A	100%	RTU-1 / EF	144	8.9	1282	3	0.0	0.00	0	0	**170**	170	0.0%	N/A	**7.959**
2	226B	Women	Public Spaces	Toilet rooms - public	**-25**	N/A	N/A	EF	37	8.9	329	1	0.0	0.00	0	0	**0**	0	0.0%	N/A	**0.000**
2	224A	Storage	None	None	**0**	N/A	N/A	N/A	33	8.3	274	0	0.0	0.00	0	0	**0**	0	0.0%	N/A	**0.000**
2	224B	Men	Public Spaces	Toilet rooms - public	**160**	N/A	100%	RTU-1 /EF	133	8.9	1184	3	0.0	0.00	0	0	**160**	160	0.0%	N/A	**8.110**
2	224	IDF	None	None	**0**	N/A	N/A	N/A	89	11.8	1050	0	0.0	0.00	0	0	**0**	0	0.0%	N/A	**0.000**
2	230	Classroom	Education	Classroom (ages 5-8)	**1019**	N/A	100%	RTU-1	930	8.9	8277	20	10.0	0.12	25	312	**1019**	707	227.0%	**Meets**	**7.387**
2	231	Storage	None	None	**0**	N/A	N/A	N/A	50	8.9	445	0	0.0	0.00	0	0	**0**	0	0.0%	N/A	**0.000**
2	232	Classroom	Education	Classroom (ages 5-8)	**98**	N/A	100%	RTU-1	775	9	6975	20	10.0	0.12	25	293	**98**	-195	-66.6%	**Fails**	**0.843**
2	233	Classroom	Education	Classroom (ages 5-8)	**118**	N/A	100%	RTU-1	736	9	6624	18	10.0	0.12	25	268	**118**	-150	-56.0%	**Fails**	**1.069**
2	234	Storage	None	None	**0**	N/A	N/A	N/A	50	8.9	445	0	0.0	0.00	0	0	**0**	0	0.0%	N/A	**0.000**
2	235	Classroom	Education	Classroom (ages 5-8)	**117**	N/A	100%	RTU-1	756	9	6804	8	10.0	0.12	25	171	**117**	-54	-31.5%	**Fails**	**1.032**
2	236	Classroom	Education	Classroom (ages 5-8)	**114**	N/A	100%	RTU-1	745	9	6705	20	10.0	0.12	25	289	**114**	-175	-60.6%	**Fails**	**1.020**
2	237	Storage	None	None	**0**	N/A	N/A	N/A	67	8.9	596	0	0.0	0.00	0	0	**0**	0	0.0%	N/A	**0.000**
2	238	Classroom	Education	Classroom (ages 5-8)	**131**	N/A	100%	RTU-1	755	9	6795	20	10.0	0.12	25	291	**131**	-160	-54.9%	**Fails**	**1.157**
2	239	Classroom	Education	Classroom (ages 5-8)	**127**	N/A	100%	RTU-1	746	9	6714	16	10.0	0.12	25	250	**127**	-123	-49.1%	**Fails**	**1.135**
2	240	Storage	None	None	**0**	N/A	N/A	N/A	67	8.9	596	0	0.0	0.00	0	0	**0**	0	0.0%	N/A	**0.000**
2	241	Classroom	Education	Classroom (ages 5-8)	**1252**	N/A	100%	RTU-1	763	9	6867	10	10.0	0.12	25	192	**1252**	1060	553.6%	**Meets**	**10.939**
2	229	Special Ed./Psychologist	Education	Classroom (ages 5-8)	**256**	N/A	N/A	RTU-6	415	9	3735	6	10.0	0.12	25	110	**256**	146	133.2%	**Meets**	**4.112**
2	242	Gifted Language Arts	Education	Classroom (ages 5-8)	**380**	N/A	N/A	RTU-5	368	8.6	3165	6	10.0	0.12	25	104	**380**	276	264.8%	**Meets**	**7.204**
2	243	Gifted Math	Education	Classroom (ages 5-8)	**180**	N/A	N/A	RTU-5	200	8.6	1720	6	10.0	0.12	25	84	**180**	96	114.3%	**Meets**	**6.279**
2	244	IDF	None	None	**0**	N/A	N/A	N/A	87	9	783	0	0.0	0.00	0	0	**0**	0	0.0%	N/A	**0.000**
2	245	Storage	None	None	**40**	N/A	N/A	RTU-5	211	8.6	1815	0	0.0	0.00	0	0	**40**	40	0.0%	N/A	**1.323**
2	246	Occupational Therapy	Hospitals nursing and convalescent homes	Physical Therapy	**114**	N/A	N/A	RTU-5	278	9	2502	2	15.0	0.00	20	30	**114**	84	280.0%	**Meets**	**2.734**

APPENDIX 3 – Roof Map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RTU-9
RTU-6
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RTU-8
RTU-2
RTU-5
RTU-1
RTU-4
RTU-3
MAU-1
RTU-11

APPENDIX 4 – TAB Airflow Survey Data

WING'S TESTING & BALANCING CO., INC.

Fairfield Public Schools
Burr Elementary

Ventilation Survey

* * * *

vanZelm Engineers
Attn: Bill Donald
10 Talcott Notch Road
Farmington, CT 06032

August 12, 2022

94 North Branford Road • Suite One • Branford, CT 06405
(203) 481-4988 • Fax (203) 488-5634 • wings@wingstesting.com
SM-1 License #6803
www.wingstesting.com

WING'S TESTING & BALANCING CO., INC.

August 12, 2022

vanZelm Engineers
Attn: Bill Donald
10 Talcott Notch Road
Farmington, CT 06032

Re: Fairfield Public Schools- Burr Elementary- HVAC Survey

Dear Bill,

The airflow testing at the above-referenced location has been completed as noted on our attached data sheets. The following are our results:

- We are unable to calculate fresh air percentages on the units
  - BMS showed outside air damper positions on all RTUs set for 100% open.
  - All OADs were closed and did not respond to commands from control contractor.
    - There is some leakage at OA intakes, but the amount cannot be quantified.
    - Return ductwork is located high in the air with no access for testing.
  - OA dampers on RTU-2 and RTU-3 are damaged. See attached photos.
- High ceilings in some areas did not allow for testing of airflow.
  - A lift would be needed to access diffusers.
- There was no access to measure unit totals on RTU-5 & RTU-6.
- Fire/ smoke dampers on RTU-2 Supply & Return ducts tripped multiple times and unit had to be reset. Airflow to Classrooms 211 through 220 is cut off when this happens.
  - Custodians informed us this happens often.
- Many VAV boxes did not respond to commands from the control contractor

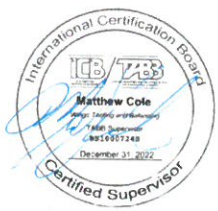
The following pages are your record of current operating conditions. If you have any questions, or if we can be of further service, please do not hesitate to call.

Very truly yours,

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

Nick Carrano

Nicholas Carrano
Certified TABB Technician #BB1160780T
CT SM-2 License 7484



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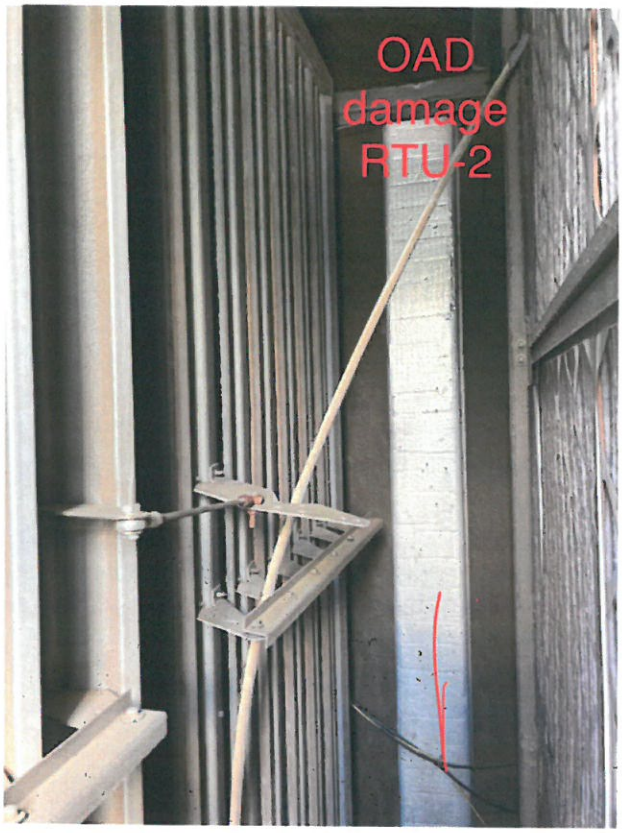
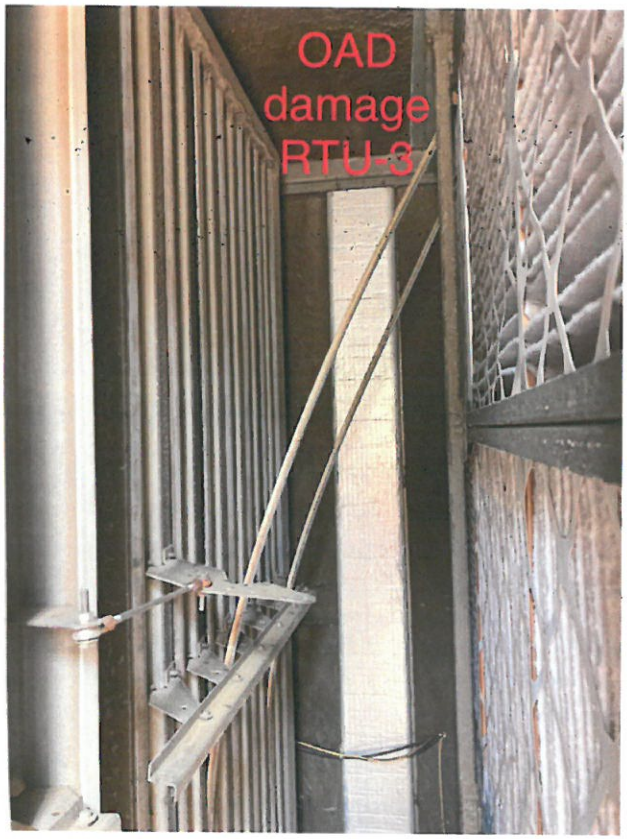

OAD
damage
RTU-2


OAD
damage
RTU-3

VELOCITY PRESSURE READINGS

PROJECT:	FPS - Burr Elementary School					**DATE:**	8/8/2022	
AREA SERVED:	Various					**TECH:**	NC	
TRAVERSE LOCATIONS	**DUCT SIZE "**	**AREA SQ.FT.**	**DESIGN**		**CENT. STAT. PRESS."**	**TEST**		**NOTES**
			FPM	**CFM**		**FPM**	**CFM**	
RTU-1								
Supply	78" x 62"	33.58	ND	ND	Velgrid	289	9705	(2)
Exhaust	18.5" x 18"	2.31	ND	ND	Airfoil	1848	4269	
RTU-2								
Supply	78" x 72"	39.0	ND	ND	Velgrid	476	18,564	(2)
Exhaust	18.5" x 18"	2.31	ND	ND	Airfoil	---	---	(6)
RTU-3								
Supply	78" x 72"	39.0	ND	ND	Velgrid	309	12,051	(2)
Exhaust	18.5" x 18"	2.31	ND	ND	Airfoil	3820	8824	
RTU-7								
Supply	78" x 72"	39.0	ND	ND	Velgrid	540	21,060	(1)
Exhaust	18.5" x 18"	2.31	ND	ND	Airfoil	5000	11,550	
RTU-4								
Total	---	---	ND	ND	---	---	7989	(7)
OA	47" x 29"	9.47	ND	ND	Velgrid	75	710	(3)
RTU-5								
Total	---		ND	ND	---			(8)
OA	47" x 29"	9.47	ND	ND	Velgrid	---	---	(4)
						93	881	
RTU-6								
Total	---		ND	ND	---	---	---	(8)
OA	37" x 18.5"	4.75	ND	ND	Velgrid	116	551	(3), (5)
Kitchen Hood Exh	178" x 3.75"	4.635	ND	ND	Airfoil	823	3815	

REMARKS

(1) Economizer disabled, OAD 0%, RAD 100% open, Fan speed 77%.
(2) BMS shows OAD 100% open, but is is 0% open / Return damper 100% open.
(3) OA damper 100% open.
(4) OA damper 100% closed.
(5) OA damper actuator is disconnected.
(6) Exhaust not rrunning.
(7) Total of supply distribution taken with flow hood.
(8) No way to measure unit total.

NA Not Available | **ND** No Design | **DD** Direct Drive | **N/R** No Requirement

Project Name:	**Fairfield Public Schools RCx: Burr Elementary School**
Project Number:	*2020102.00.08*
Scope	**TAB Data**
Date	**[DATE]**

Zone Identification								
Floor	Room#	Room Name	TAB Measured (cfm)	Calc. OA CFM @ Min. (OA cfm)	Meas. unit OA % (OA cfm)	BAS Damper Command (pos. %)	Associated VAV & RTU/AHU Unit	Notes
1	101	Classroom	1063	NA	NA	100% Open	RTU-2 / VAV-101	
1	101A	Toilet	0	NA	NA	NA	EF	
1	103	Storage	NA	NA	NA	NA	NA	No ventilation
1	105	Classroom	520	NA	NA	100% Open	RTU-2 / VAV-105	
1	105A	Toilet	0	NA	NA	NA	EF	
1	106	Classroom	171	NA	NA	100% Open	RTU-2 / VAV-106	
1	106A	Toilet	-31	NA	NA	NA	EF	
1	108	Storage	NA	NA	NA	NA	NA	No ventilation
1	110	Classroom	170	NA	NA	100% Open	RTU-2 / VAV-110	
1	110A	Toilet	0	NA	NA	NA	EF	
1	111	Classroom	1612	NA	NA	100% Open	RTU-2 / VAV-111	
1	111A	Toilet	-26	NA	NA	NA	EF	
1	113	Storage	NA	NA	NA	NA	NA	No ventilation
1	115	Classroom	302	NA	NA	100% Open	RTU-2 / VAV-115	
1	115A	Toilet	0	NA	NA	NA	EF	
1	116	Classroom	238	NA	NA	100% Open	RTU-2 / VAV-116	
1	116A	Toilet	0	NA	NA	NA	EF	
1	118	Storage	NA	NA	NA	NA	NA	No ventilation
1	120	Classroom	253	NA	NA	100% Open	RTU-2 / VAV	
1	120A	Toilet	0	NA	NA	NA	EF	
1	122	Cust	0	NA	NA	NA	EF	
1	122B	Women	0	NA	NA	NA	EF	
1	122A	Multi-Purpose Storage	20	NA	NA	100% Open	RTU-2	Room Number is 124, not 122A
1	123	Office	38	NA	NA	100% Open	RTU-2	
1	129	Multi-Purpose Room	12,051	NA	NA	100% Open	RTU-3	OAD 100% open on BMS. Actual position 0% open.
1	131	Platform	NA	NA	NA	NA	NA	No Ventilation

Project Name:	**Fairfield Public Schools RCx: Burr Elementary School**
Project Number:	*2020102.00.08*
Scope	**TAB Data**
Date	**[DATE]**

Zone Identification								
Floor	Room#	Room Name	TAB Measured (cfm)	Calc. OA CFM @ Min. (OA cfm)	Meas. unit OA % (OA cfm)	BAS Damper Command (pos. %)	Associated VAV & RTU/AHU Unit	Notes
1	129A	Women	-59	NA	NA	NA	EF	
1	129B	Men	-88	NA	NA	NA	EF	
1	130	Storage	NA	NA	NA	NA	NA	No Ventilation

Project Name:	**Fairfield Public Schools RCx: Burr Elementary School**
Project Number:	*2020102.00.08*
Scope	**TAB Data**
Date	**[DATE]**

Zone Identification								
Floor	Room#	Room Name	TAB Measured (cfm)	Calc. OA CFM @ Min. (OA cfm)	Meas. unit OA % (OA cfm)	BAS Damper Command (pos. %)	Associated VAV & RTU/AHU Unit	Notes
1	129C	One-Person Women	-27	NA	NA	NA	EF	
1	129D	One-Person Men	-20	NA	NA	NA	EF	
1	139	Cafeteria	7989	NA	NA	100% Open	RTU-4	
1	138	Kitchen/Dishwash	4214	4241	100%	No set point on BMS. 100% open	MAU-1	
1	138A	Kitchen Toilet	-127	NA	NA	NA	EF	
1	136	Kitchen Office	100	100	100%	No set point on BMS. 100% open	MAU-1	
1	133	Dry Storage	NA	NA	NA	NA	NA	No Ventilation
1	140	Faculty Lounge	627	NA	NA	100% open	RTU-1	
1	140.1	Women	-66	NA	NA	NA	EF	
1	141	Office	48	NA	NA	100% open	RTU-1	
1	143	Fire Pump	0	NA	NA	100% open	RTU-1	
1	144	Office	105	NA	NA	100% open	RTU-1	
1	145	Switch Gear	0	NA	NA	100% open	RTU-1	
1	146	Office	57	NA	NA	100% open	RTU-1	
1	147	Emer. Elec	0	NA	NA	100% open	RTU-1	
1	148	Phone	0	NA	NA	100% open	RTU-1	
1	149	Office	46	NA	NA	100% open	RTU-1	
1	150	Office	60	NA	NA	100% open	RTU-1	
1	151	Office	0	NA	NA	100% open	RTU-1	
1	152	Office	27	NA	NA	100% open	RTU-1	
1	153	Office	258	NA	NA	100% open	RTU-1	
1	154	Office	465	NA	NA	100% open	RTU-1	
1	156.1	Toilet	0	NA	NA	NA	EF	
1	156	Principal	50	NA	NA	100% open	RTU-1	
1	156A	Storage	NA	NA	NA	NA	NA	No ventilation
1	157	Conference	127	NA	NA	100% open	RTU-1	

Project Name:	**Fairfield Public Schools RCx: Burr Elementary School**
Project Number:	*2020102.00.08*
Scope	**TAB Data**
Date	**[DATE]**

Zone Identification								
Floor	Room#	Room Name	TAB Measured (cfm)	Calc. OA CFM @ Min. (OA cfm)	Meas. unit OA % (OA cfm)	BAS Damper Command (pos. %)	Associated VAV & RTU/AHU Unit	Notes
1	158	Files	0	NA	NA	100% open	RTU-1	
1	159	Conference	603	NA	NA	100% open	RTU-1	
1	160	Reception	76	NA	NA	100% open	RTU-1	
1	161	Office	38	NA	NA	100% open	RTU-1	
1	162	Files	0	NA	NA	100%	RTU-1	
1	164	Exam	+40 / -211	NA	NA	100%	RTU-1 / EF	
1	164A	Storage	NA	NA	NA	NA	NA	No ventilation
1	165	Nurse	95	NA	NA	100%	RTU-1	
1	165A	Toilet	0	NA	NA	NA	EF	
1	166	Speech and Language	289	NA	NA	100%	RTU-1	
1	167	Social Worker	442	NA	NA	100%	RTU-1	
1	168	Kiln	+50 / -265	NA	NA	100%	RTU-1 / EF-1	
1	169	Work Room	Open ceiling to 170	NA	NA	NA	RTU-1	High Ceiling, No Access to Diffusers
1	170	Art	No Access	NA	NA	NA	RTU-1	High Ceiling, No Access to Diffusers
1	173	Music 1	No Access	NA	NA	NA	RTU-6 / VAV	High Ceiling, No Access to Diffusers
1	174	Music 2	202	NA	NA	NA	RTU-6 /	
1	175	Storage and 176 Office	No Access	NA	NA	NA	RTU-6 /	High Ceiling, No Access to Diffusers
1	178	Library	No Access	NA	NA	NA	RTU-5 /	High Ceiling, No Access to Diffusers
1	179	Seminar	375	NA	NA	NA	RTU-5 /	
1	180	Office	127	NA	NA	NA	RTU-5 /	
1	181	MDF	NA	NA	NA	NA	NA	No Ventilation
1	183	Work Room	72	NA	NA	NA	RTU-5 /	
1	184	Office	89	NA	NA	NA	RTU-5 /	
1	178A	Library Storage	NA	NA	NA	NA	RTU-5 /	No Ventilation
1	185	Resource Collection	54	NA	NA	NA	RTU-5 /	
1	186	Science	No Access	NA	NA	NA	RTU-2 /	High Ceiling, No Access to Diffusers

Project Name:	**Fairfield Public Schools RCx: Burr Elementary School**
Project Number:	*2020102.00.08*
Scope	**TAB Data**
Date	**[DATE]**

Zone Identification								
Floor	Room#	Room Name	TAB Measured (cfm)	Calc. OA CFM @ Min. (OA cfm)	Meas. unit OA % (OA cfm)	BAS Damper Command (pos. %)	Associated VAV & RTU/AHU Unit	Notes
1	187	Prep	170 / -60	NA	NA	NA	RTU-2 / EF-3	
1	192	Elevator Machine Room	NA	NA	NA	NA	Split Only	
2	201	Classroom	1200	NA	NA	100%	RTU-1	
2	201A	Toilet	-32	NA	NA	NA	EF	
2	247	Storage	NA	NA	NA	NA	NA	No Ventilation
2	203	Storage	NA	NA	NA	NA	NA	No Ventilation
2	205	Classroom	432	NA	NA	100%	RTU-1	
2	205A	Toilet	-34	NA	NA	NA	EF	
2	206	Classroom	245	NA	NA	100%	RTU-2	
2	206A	Toilet	N/A	NA	NA	NA	EF	
2	208	Storage	NA	NA	NA	NA	NA	No Ventilation
2	210	Classroom	164	NA	NA	100%	RTU-2	
2	210A	Toilet	NA	NA	NA	NA	EF	
2	211	Classroom	202	NA	NA	100%	RTU-2	
2	211A	Toilet	-74	NA	NA	NA	EF	
2	213	Storage	NA	NA	NA	NA	NA	No Ventilation
2	215	Classroom	186	NA	NA	100%	RTU-2	
2	215A	Toilet	-56	NA	NA	NA	EF	
2	216	Classroom	238	NA	NA	100%	RTU-2	
2	216A	Toilet	-46	NA	NA	NA	EF	
2	218	Storage	NA	NA	NA	100%	NA	No Ventilation
2	220	Classroom	200	NA	NA	NA	RTU-2	Bad VAV Controller
2	220A	Toilet	-60	NA	NA	NA	EF	
2	222	Cust	-25	NA	NA	NA	EF	
2	222A	Women	-34	NA	NA	NA	EF	
2	223	Boiler Room	NA	NA	NA	NA	NA	No Ventilation

Project Name:	**Fairfield Public Schools RCx: Burr Elementary School**
Project Number:	*2020102.00.08*
Scope	**TAB Data**
Date	**[DATE]**

Zone Identification								
Floor	Room#	Room Name	TAB Measured (cfm)	Calc. OA CFM @ Min. (OA cfm)	Meas. unit OA % (OA cfm)	BAS Damper Command (pos. %)	Associated VAV & RTU/AHU Unit	Notes
2	226	Storage	NA	NA	NA	NA	NA	No Ventilation
2	226A	Women	170 / -76	NA	NA	100%	RTU-1 / EF	
2	226B	Women	-25	NA	NA	NA	EF	
2	224A	Storage	NA	NA	NA	NA	NA	No Ventilation
2	224B	Men	160 / -77	NA	NA	100%	RTU-1 /EF	
2	224	IDF	NA	NA	NA	NA	NA	No Ventilation
2	230	Classroom	1019	NA	NA	100%	RTU-1	Bad VAV Controller, won't modulate to min.
2	231	Storage	NA	NA	NA	NA	NA	No Ventilation
2	232	Classroom	98	NA	NA	100%	RTU-1	
2	233	Classroom	118	NA	NA	100%	RTU-1	
2	234	Storage	NA	NA	NA	NA	NA	No Ventilation
2	235	Classroom	117	NA	NA	100%	RTU-1	
2	236	Classroom	114	NA	NA	100%	RTU-1	
2	237	Storage	NA	NA	NA	NA	NA	No Ventilation
2	238	Classroom	131	NA	NA	100%	RTU-1	
2	239	Classroom	127	NA	NA	100%	RTU-1	
2	240	Storage	NA	NA	NA	NA	NA	No Ventilation
2	241	Classroom	1252	NA	NA	100%	RTU-1	
2	229	Special Ed./Psychologist	256	NA	NA	NA	RTU-6	
2	242	GIfted Language Arts	380	NA	NA	NA	RTU-5	
2	243	Gifted Math	180	NA	NA	NA	RTU-5	
2	244	IDF	NA	NA	NA	NA	NA	Ventilation through transfer grill from storage 245
2	245	Storage	40	NA	NA	NA	RTU-5	No Ventilation
2	246	Occupational Therapy	114	NA	NA	NA	RTU-5	

APPENDIX 5 – RCx Unit and Room Take-Off Data

Project Name:	**Fairfield Public Schools RCx**
Project Number:	*2020102.00.08*
Scope	**Room Take-Off Data**
Date	**April 21, 2022**
	Burr Elementary School

RCM, RA, JRK

Zone Identification

Floor	Room#	Room Name	Area (SF)	Ceiling Height	Volume	People	Notes	Identified Defficiencies	Pictures Y /N
1	101	Classroom	834	8.9	7423	18	6-Grilles, Radiant Panel		
1	101A	Toilet	35	8.9	312	1			
1	103	Storage	88	8.9	783	0			
1	105	Classroom	835	8.9	7432	16	6-Grilles, Radiant Panel		
1	105A	Toilet	35	8.9	312	1			
1	106	Classroom	834	8.9	7423	18	6-Grilles, Radiant Panel		
1	106A	Toilet	35	8.9	312	1			
1	108	Storage	88	8.9	783	0			
1	110	Classroom	835	8.8	7348	12	6-Grilles, Radiant Panel		
1	110A	Toilet	35	8.9	312	1			
1	111	Classroom	700	8.9	6230	3	6-Grilles, Radiant Panel	Special Needs	
1	111A	Toilet	35	8.9	312	1			
1	113	Storage	51	8.9	454	0			
1	115	Classroom	712	9	6408	18	6-Grilles, Radiant Panel		
1	115A	Toilet	35	8.9	312	1			
1	116	Classroom	697	8.9	6203	16	6-Grilles, Radiant Panel		
1	116A	Toilet	35	8.9	312	1			
1	118	Storage	51	8.9	454	0			
1	120	Classroom	713	8.8	6274	18	6-Grilles, Radiant Panel		
1	120A	Toilet	35	8.9	312	1			

Project Name:	**Fairfield Public Schools RCx**
Project Number:	*2020102.00.08*
Scope	**Room Take-Off Data**
Date	**April 21, 2022**
	Burr Elementary School

RCM, RA, JRK

Zone Identification

Floor	Room#	Room Name	Area (SF)	Ceiling Height	Volume	People	Notes	Identified Defficiencies	Pictures Y /N
1	122	Cust	50	7	350	1	1-Exhaust		
1	122B	Women	36	8.9	320	1			
1	122A	Multi-Purpose Storage	546	7.5	4095	0	1-Supply, Full of stuff		
1	123	Office	77	7.1	547	2	1-Supply		
1	129	Multi-Purpose Room	4366	23.4	102164	563	Dedicated RTU, standing 287 seated		
1	131	Platform	993	14.5	14399	55			
1	129A	Women	200	8.9	1780	3			
1	129B	Men	128	8.9	1139	2			
1	130	Storage	114	14.8	1687	0			
1	129C	One-Person Women	36	8.9	320	1			
1	129D	One-Person Men	36	8.9	320	1			
1	139	Cafeteria	2941	12	35292	386	Standing, 200 seated	200 Maximum Seating Capacity	
1	138	Kitchen/Dishwash	683	11.5	7855	10	4- Supplies Hood exhaust, different ceiling heights, eff. 11.5ft	Wide Open	
1	138A	Kitchen Toilet	36	8.9	320	1			
1	136	Kitchen Office	51	8.9	454	1	1-Supply, 1-Return		
1	133	Dry Storage	89	8.5	757	0	No Air		
1	140	Faculty Lounge	488	8.5	4148	20	4-Supplies, 1- Return, Radiant Panel	Refrigerators, Vending	
1	140.1	Women	36	8.9	320	1			
1	141	Office	105	8.8	924	1	2- Returns, Radiant Panel	Faculty	
1	143	Fire Pump	130	9	1170	0			

Project Name:	**Fairfield Public Schools RCx**
Project Number:	*2020102.00.08*
Scope	**Room Take-Off Data**
Date	**April 21, 2022**
	Burr Elementary School

RCM, RA, JRK

Zone Identification

Floor	Room#	Room Name	Area (SF)	Ceiling Height	Volume	People	Notes	Identified Defficiencies	Pictures Y /N
1	144	Office	179	8.9	1593	6	2- Supplies, 1-Return, Radiant Panel	Math Resource	
1	145	Switch Gear	167	9	1503	0			
1	146	Office	215	8.7	1871	6	2- Supplies, 1-Return, Radiant Panel	Language Arts	
1	147	Emer. Elec	51	9	459	0			
1	148	Phone	46	9	414	0			
1	149	Office	178	8.9	1584	4	1- Supplies, 1-Return, Radiant Panel	Instrument Support	
1	150	Office	148	8.9	1317	2	1- Supplies, 1-Return,	Interior Social Worker	
1	151	Office	80	8.9	712	4	1- Supplies, 1-Return,		
1	152	Office	141	8.9	1255	4	1- Supplies, 1-Return, Radiant Panel	Language Arts	
1	153	Office	220	8.9	1958	3	2- Supplies, 1-Return,		
1	154	Office	274	8.9	2439	6	2- Supplies, 1-Return, Radiant Panel		
1	156.1	Toilet	36	8.9	320	1			
1	156	Principal	233	8.8	2050	6	2- Supplies, 1-Return, Radiant Panel	DX Samsung	
1	156A	Storage	21	8.8	185	0			
1	157	Conference	184	8.8	1619	8	2- Supplies, 1-Return, Radiant Panel	DX Samsung	
1	158	Files	46	8.8	405	0	1-Supply		
1	159	Conference	387	8.9	3444	16	2- Supplies, 1-Return, 018 DX Mr. Slim		
1	160	Reception	569	8.9	5064	3	3- Supplies		
1	161	Office	140	8.9	1246	2	1- Supplies, 1-Return, Radiant Panel		
1	162	Files	37	7.9	292	0	1 Supply		

Project Name:	**Fairfield Public Schools RCx**
Project Number:	*2020102.00.08*
Scope	**Room Take-Off Data**
Date	**April 21, 2022**
	Burr Elementary School

RCM, RA, JRK

Zone Identification

Floor	Room#	Room Name	Area (SF)	Ceiling Height	Volume	People	Notes	Identified Defficiencies	Pictures Y /N
1	164	Exam	206	8.8	1813	2	1- Supplies, 1-Return, Radiant Panel		
1	164A	Storage	55	8.4	462	0			
1	165	Nurse	423	8.8	3722	4	3- Supplies, 1-Return,		
1	165A	Toilet	36	8.9	320	1			
1	166	Speech and Language	238	8.8	2094	8	1- Supplies, 1-Return, Radiant Panel	World Language	
1	167	Social Worker	332	8.9	2955	8	2- Supplies, 1-Return, Radiant Panel	Special Ed	
1	168	Kiln	71	8	568	1	1- Supplu, 1-Return		
1	169	Work Room	79	8	632	1		Open to Art	
1	170	Art	729	20	14580	25	6 2x4 supplies, 6 2x4 Return Fujitsu DX		
1	173	Music 1	945	20	18620	15	5 2x4 supplies, 10 2x4 Returns?	Odd shape	
1	174	Music 2	760	24	17088	15	3 Low supplies 12x12, 6 24x48 R high	Odd shape	
1	175	Storage and 176 Office	213	18.4	3919	0	2- Supplies, 1-Return, Radiant Panel	175/176 same area, same room	
1	178	Library	3713	20.4	75745	50?		Odd shape	
1	179	Seminar	335	8	2464	6	4- Supplies, 1-Return	Odd shape	
1	180	Office	127	8.8	1118	1	1-Supply, 1-Return		
1	181	MDF	72	8.8	634	0	AC-12 FCU NO GRILLES		
1	183	Work Room	155	8.8	1364	1	1-Supply, 1-Return		
1	184	Office	143	8.2	1173	1	1-Supply, 1-Return		
1	178A	Library Storage	9	8	72	0			
1	185	Resource Collection	220	8.9	1842	2	2-Supply, 1-Return	Odd shape	

Project Name:	**Fairfield Public Schools RCx**
Project Number:	*2020102.00.08*
Scope	**Room Take-Off Data**
Date	**April 21, 2022**
	Burr Elementary School

RCM, RA, JRK

Zone Identification

Floor	Room#	Room Name	Area (SF)	Ceiling Height	Volume	People	Notes	Identified Defficiencies	Pictures Y /N
1	186	Science	626	20	10620	20	6 sup, 6 ret, 024 DX AC-10	Odd shape	
1	187	Prep	124	8	992	1	1-Supply, 1-Return		
1	192	Elevator Machine Room	58	7.3	423	0			
2	201	Classroom	715	9	6435	20	6 Grilles	Class	
2	201A	Toilet	35	8.9	312	1			
2	247	Storage	92	8.9	819	0			
2	203	Storage	67	8.9	596	0			
2	205	Classroom	712	9	6408	20	6 Grilles	Class	
2	205A	Toilet	35	8.9	312	1			
2	206	Classroom	712	9	6408	10	6 Grilles	Spec ed.	
2	206A	Toilet	35	8.9	312	1			
2	208	Storage	67	8.9	596	0			
2	210	Classroom	715	9	6435	20	6 Grilles		
2	210A	Toilet	35	8.9	312	1			
2	211	Classroom	715	9	6435	20	6 Grilles, 024 DX	Laptop Computers	
2	211A	Toilet	35	8.9	312	1			
2	213	Storage	63	8.9	561	0			
2	215	Classroom	715	9	6435	20	6 Grilles		
2	215A	Toilet	35	8.9	312	1			
2	216	Classroom	699	9	6291	20	6 Grilles	Class	

Project Name:	**Fairfield Public Schools RCx**
Project Number:	*2020102.00.08*
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	Burr Elementary School

RCM, RA, JRK

Zone Identification

Floor	Room#	Room Name	Area (SF)	Ceiling Height	Volume	People	Notes	Identified Defficiencies	Pictures Y /N
2	216A	Toilet	35	8.9	312	1			
2	218	Storage	63	8.9	561	0			
2	220	Classroom	700	9	6300	20	6 Grilles	Class	
2	220A	Toilet	35	8.9	312	1			
2	222	Cust	59	8.9	525	1			
2	222A	Women	35	8.9	312	1			
2	223	Boiler Room	510	11.8	6018	0			
2	226	Storage	136	8	1088	0			
2	226A	Women	144	8.9	1282	3			
2	226B	Women	37	8.9	329	1			
2	224A	Storage	33	8.3	274	0			
2	224B	Men	133	8.9	1184	3			
2	224	IDF	89	11.8	1050	0	true height, ceiling tiles removed		
2	230	Classroom	930	8.9	8277	20	6-Grilles, AC-11 Carrier	Class	
2	231	Storage	50	8.9	445	0			
2	232	Classroom	775	9	6975	20	6-Grilles	Class	
2	233	Classroom	736	9	6624	18	6-Grilles		
2	234	Storage	50	8.9	445	0			
2	235	Classroom	756	9	6804	8	6-Grilles		
2	236	Classroom	745	9	6705	20	6-Grilles		

Project Name:	**Fairfield Public Schools RCx**
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	Burr Elementary School

RCM, RA, JRK

Zone Identification

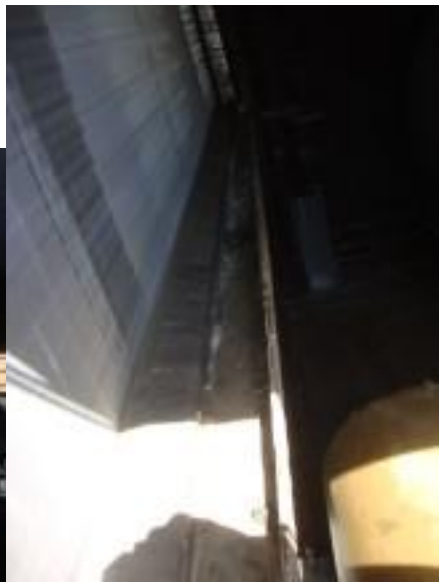
Floor	Room#	Room Name	Area (SF)	Ceiling Height	Volume	People	Notes	Identified Defficiencies	Pictures Y /N
2	237	Storage	67	8.9	596	0			
2	238	Classroom	755	9	6795	20	6-Grilles		
2	239	Classroom	746	9	6714	16	6-Grilles		
2	240	Storage	67	8.9	596	0			
2	241	Classroom	763	9	6867	10	6-Grilles		
2	229	Special Ed./Psychologist	415	9	3735	6	018 DX	Psychiatrist	
2	242	GIfted Language Arts	368	8.6	3165	6		Gifted Language	
2	243	Gifted Math	200	8.6	1720	6		Gifted Math	
2	244	IDF	87	9	783	0	024 DX		
2	245	Storage	211	8.6	1815	0			
2	246	Occupational Therapy	278	9	2502	2	2-Supply, 1-Return		

PROJECT: 2020102.08 FAIRFIELD PUBLIC SCHOOLS – BURR ELEMENTARY SCHOOL EQUIPMENT DATA SHEET

Unit Tag	**AC-1**	**Addition comments descriptions**
Location	Roof Pit	
Serving	Southwest Classrooms (Per JCI Docs)	
Config/Style	Packaged RTU, DX Cooling ERW, HW Heating	
Mfr.	Trane Intellipak	
Model #	SLHFC40ED567S8BD9000	
Serial #	C03J08035	
Age (years)	2003	
System CFM		
Max OA CFM		
V/Hz/Ph	200/60/3	
SF Qty/HP	(1) 25.0 (2) 5VX930 Belts	
SF VFD Data	VFD, Fans and electronics dirty	
EF Qty/HP	(1) 10.0 (1) BX-87 Belts	
EF VFD Data	VFD, Fans and electronics dirty	
Filter Data (Size Quantity)	(5) 12x24x2, (6) 24x24x2 (5) 12x24x4 (6) 24x24x4	
Filter Status	Filters are clean, proper spacer	4-5-22 Change date
Controls Type	Electronic DDC, Packaged BAS, Trane Package	
Controls Mfr.	Factory	
Economizer	Packaged economizer	
CO_2 DCV	-	
Damper Styles	Factory parallel,	
Damper Status	Seals falling off, Clean adjust and Lubricate.	
Heating Type	Hot Water	
Heating Coil Condition	Unknown, no access doors for inspection, assumed dirty coils	
Cooling Type	DX Package	
Cooling Coil Condition	Dirty, Needs cleaning	
ERW	Wheel, Airxchange Ser. 064248/0339, ¼ HP. Filters, (3) 24x24x2, (3) 12x24x2 Aluminum	Filters Dirty and rusted, replace.
Wheel Exhaust	5.0 HP, Twin City Size - Type BAB-DW, Belt BX-65	

Controls	Functionally it is unclear as to what mode system is in, Retro Cx recommended	
Drain Pan Status	OK, Flush after coil cleaning,	
Notes:	Door Hardware, rusted, adjust, and lubricate	

Photos



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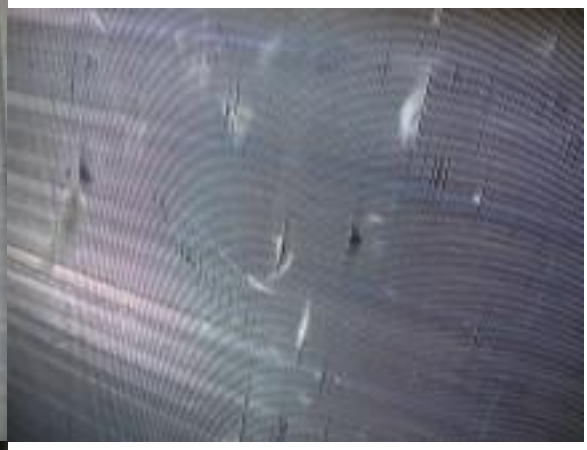

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PROJECT: 2020102.08 FAIRFIELD PUBLIC SCHOOLS – BURR ELEMENTARY SCHOOL EQUIPMENT DATA SHEET

Unit Tag	**AC-2**	**Addition comments descriptions**
Location	Roof Pit	
Serving	Northwest Classrooms (Per JCI Docs)	
Config/Style	Packaged RTU, DX Cooling ERW, HW Heating	
Mfr.	Trane Intellipak	
Model #	SLHFC50ED577S8BD9000	
Serial #	C03J0842	
Age (years)	2003	
System CFM		
Max OA CFM		
V/Hz/Ph	200/60/3	
SF Qty/HP	(1) 30.0 (2) 5VX930 Belts	
SF VFD Data	VFD, Fans and electronics dirty	
EF Qty/HP	(1) 15.0 (1) BX-81 Belts	
EF VFD Data	VFD, Fans and electronics dirty	
Filter Data (Size Quantity)	(3) 12x24x2, (3) 12x12x4 (9) 24x24x2 (9) 24x24x4	
Filter Status	Filters are clean, proper spacer	4-5-22 Change date
Controls Type	Electronic DDC, Packaged BAS, Trane Package	
Controls Mfr.	Factory	
Economizer	Packaged economizer, found damper actuator missing bolt, fixed temporarily.	
CO_2 DCV	-	
Damper Styles	Factory parallel,	
Damper Status	Seals falling off, Clean adjust and Lubricate.	
Heating Type	Hot Water	
Heating Coil Condition	Unknown, no access doors for inspection, assumed dirty coils	
Cooling Type	DX Package	
Cooling Coil Condition	Dirty, Needs cleaning	
ERW	Wheel, Airxchange Ser. 064245/0339, ¼ HP. Filters, (3) 24x24x2, (3) 12x24x2 Aluminum	Filters Dirty and rusted, replace.

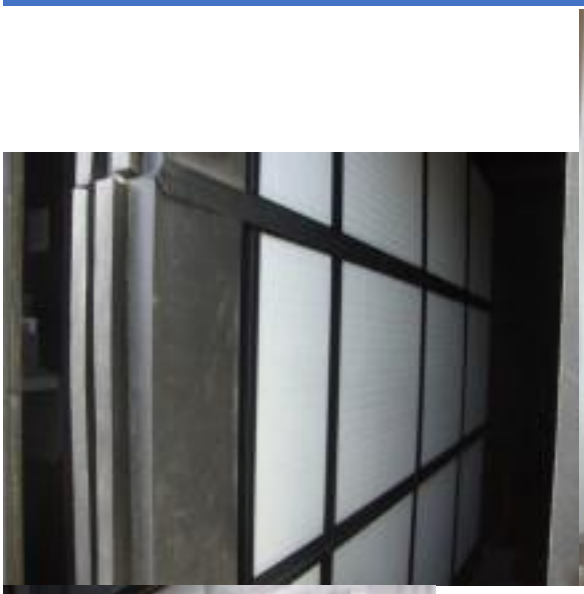
Wheel Exhaust	5.0 HP, Twin City Size 81 - Type BAB-DW, Belt BX-65	
Controls	Functionally it is unclear as to what mode system is in, Retro Cx recommended	
Drain Pan Status	OK, Flush after coil cleaning,	
Notes:	Door Hardware, rusted, adjust, and lubricate	

Photos

PROJECT: 2020102.08 FAIRFIELD PUBLIC SCHOOLS – BURR ELEMENTARY SCHOOL EQUIPMENT DATA SHEET




PROJECT: 2020102.08 FAIRFIELD PUBLIC SCHOOLS – BURR ELEMENTARY SCHOOL EQUIPMENT DATA SHEET



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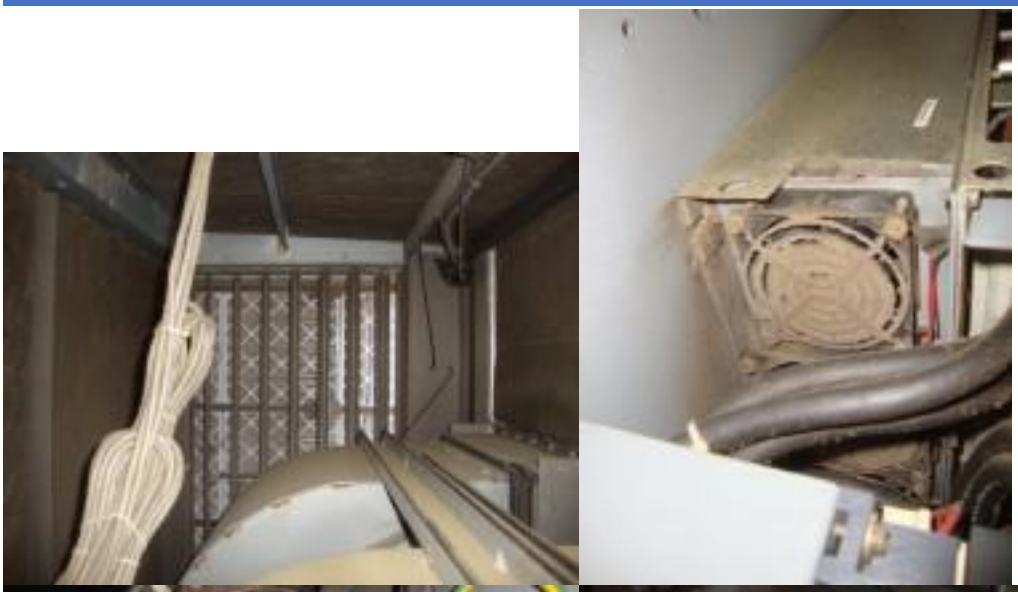

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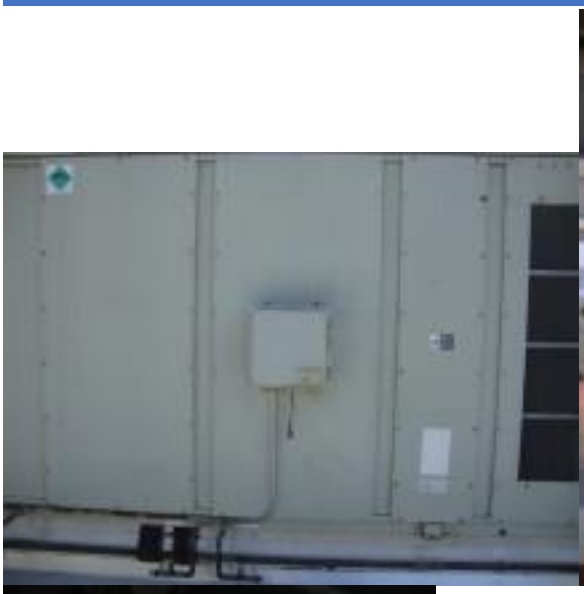

PROJECT: 2020102.08 FAIRFIELD PUBLIC SCHOOLS – BURR ELEMENTARY SCHOOL EQUIPMENT DATA SHEET

Unit Tag	**AC-3**	**Addition comments descriptions**
Location	Roof Pit	
Serving	Gymnasium (Per JCI Docs)	
Config/Style	Packaged RTU, DX Cooling ERW, HW Heating	
Mfr.	Trane Intellipak	
Model #	SLHFC50ED567S7B01000AOZ	
Serial #	C03J08046	
Age (years)	2003	
System CFM		
Max OA CFM		
V/Hz/Ph	200/60/3	
SF Qty/HP	(1) 25.0 (2) 5VX930 Belts	
SF VFD Data	N/A	
EF Qty/HP	(1) 10.0 (1) BX-87 Belts	
EF VFD Data	N/A	
Filter Data (Size Quantity)	(3) 12x24x2, (9) 24x24x2 (3) 12x24x4 (9) 24x24x4	
Filter Status	Filters are clean, proper spacer	4-5-22 Change date
Controls Type	Electronic DDC, Packaged BAS, Trane Package	
Controls Mfr.	Factory	
Economizer	Packaged economizer	
CO_2 DCV	-	
Damper Styles	Factory parallel,	
Damper Status	Seals falling off, Clean adjust and Lubricate.	
Heating Type	Hot Water	
Heating Coil Condition	Unknown, no access doors for inspection, assumed dirty coils	
Cooling Type	DX Package	
Cooling Coil Condition	Dirty, Needs cleaning	
ERW	Wheel, Airxchange Ser. -, ¼ HP. Filters, (3) 24x24x2, (3) 12x24x2 Aluminum	Filters Dirty and rusted, replace.
Wheel Exhaust	5.0 HP, Twin City Size - Type BAB-DW, Belt BX-65	

Controls	Functionally it is unclear as to what mode system is in, Retro Cx recommended	
Drain Pan Status	OK, Flush after coil cleaning,	
Notes:	Door Hardware, rusted, adjust, and lubricate	

Photos

PROJECT: 2020102.08 FAIRFIELD PUBLIC SCHOOLS – BURR ELEMENTARY SCHOOL EQUIPMENT DATA SHEET

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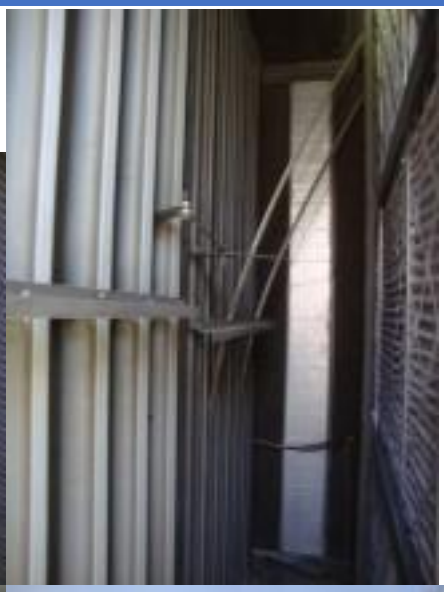

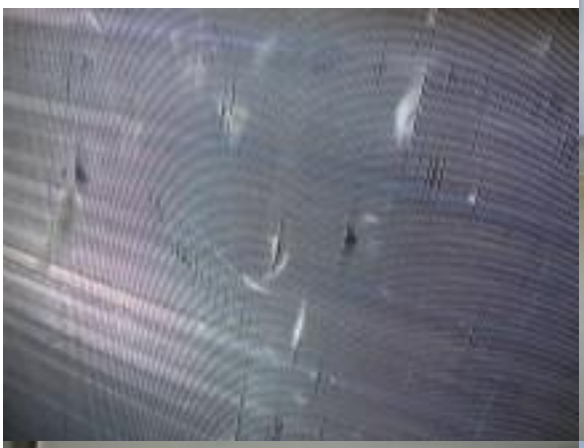

PROJECT: 2020102.08 FAIRFIELD PUBLIC SCHOOLS – BURR ELEMENTARY SCHOOL EQUIPMENT DATA SHEET

Unit Tag	**ERU-4**	**AC-4**
Location	Roof Pit	Roof Pit
Serving	Cafeteria (Per JCI Docs)	Cafeteria (Per JCI Docs)
Config/Style	ERW, Supply and Exhaust Fans	Packaged RTU, DX Cooling, HW Heating
Mfr.	Semco ERU	Trane Voyager
Model #	FV5000T-4RN4AB	TFD301C30GCA
Serial #	33266/M017531-01	343100396D
Age (years)	11/2003	10/2003
System CFM		
Max OA CFM		
V/Hz/Ph	200/60/3	200/60/3
SF Qty/HP	(1) 2.0 (1) Adj. Belt Fan section dirty	(1) 7.5 (1) BX-81 Belt
SF VFD Data	N/A	N/A
EF Qty/HP	(1) 3.0 (1) Belt	N/A
EF VFD Data	N/A	N/A
Filter Data (Size Quantity)	(3) 16x25x1 Aluminum dirty, Replace	(4) 20x20x2 (4) 20x25x2
Filter Status	Filters are dirty	Clean 4-5-22 Change date
Controls Type	Electronic DDC, Packaged BAS, Trane Package	JCI Metasys
Controls Mfr.	Factory	
Economizer	Packaged economizer, 100% O.A. If functional?	
CO_2 DCV	-	
Damper Styles	Factory Slide, O.A. Needs to be cleaned adjusted and lubricated	N/A
Damper Status	Sketchy, Clean adjust and lubricate.	N/A
Heating Type	N/A	Hot Water
Heating Coil Condition	Unknown, no access doors for inspection, assumed dirty coils	No access to inspect
Cooling Type	Wheel	DX Package, Twin Circuit
Cooling Coil Condition	Wheel looks OK, did not seem to operate	Dirty, Needs cleaning
ERW	Horizontal Wheel, 1/15 HP.	N/A

Controls	Functionally is unclear as to if it works and or what mode system is in, Retro Cx recommended	
Drain Pan Status		OK, Flush after coil cleaning,
Notes:	Door Hardware, rusted, adjust, and lubricate	

Photos

PROJECT: 2020102.08 FAIRFIELD PUBLIC SCHOOLS – BURR ELEMENTARY SCHOOL EQUIPMENT DATA SHEET

PROJECT: 2020102.08 FAIRFIELD PUBLIC SCHOOLS – BURR ELEMENTARY SCHOOL EQUIPMENT DATA SHEET

Unit Tag	**ERU-5**	**AC-5**
Location	Roof Pit	Roof Pit
Serving	Library (Per JCI Docs)	Library (Per JCI Docs)
Config/Style	ERW, Supply and Exhaust Fans	Packaged RTU, DX Cooling, HW Heating
Mfr.	Semco ERU	Trane Voyager
Model #	FV5000T-4RN4AB	TFD301C30GCA
Serial #	33266/M017532-01	343100435D
Age (years)	11/2003	10/2003
System CFM		
Max OA CFM		
V/Hz/Ph	200/60/3	200/60/3
SF Qty/HP	(1) 1.5 (1) AX-51Belt Loose	(1) 7.5 (1) BX-81 Belt
SF VFD Data	N/A	N/A
EF Qty/HP	(1) 1.5 (1) Belt AX-51	N/A
EF VFD Data	N/A	N/A
Filter Data (Size Quantity)	(3) 16x25x1 Aluminum dirty, Replace	(4) 20x20x2 (4) 20x25x2
Filter Status	Filters are dirty	Clean 4-5-22 Change date
Controls Type	Electronic DDC, Packaged BAS, Trane Package	JCI Metasys
Controls Mfr.	Factory	
Economizer	Packaged economizer, 100% O.A. If functional	
CO_2 DCV	-	
Damper Styles	Factory Slide, O.A. Needs to be cleaned adjusted and lubricated	N/A
Damper Status	Sketchy, Clean adjust and lubricate.	N/A
Heating Type	N/A	Hot Water
Heating Coil Condition	Unknown, no access doors for inspection, assumed dirty coils	No access to inspect
Cooling Type	Wheel	DX Package, Twin Circuit
Cooling Coil Condition	Wheel looks OK, did not seem to operate	Dirty, Needs cleaning
ERW	Horizontal Wheel, 1/15 HP.	N/A

Controls	Functionally is unclear as to if it works and or what mode system is in, Retro Cx recommended	
Drain Pan Status		OK, Flush after coil cleaning,
Notes:	Door Hardware, rusted, adjust, and lubricate	

Photos

PROJECT: 2020102.08 FAIRFIELD PUBLIC SCHOOLS – BURR ELEMENTARY SCHOOL EQUIPMENT DATA SHEET

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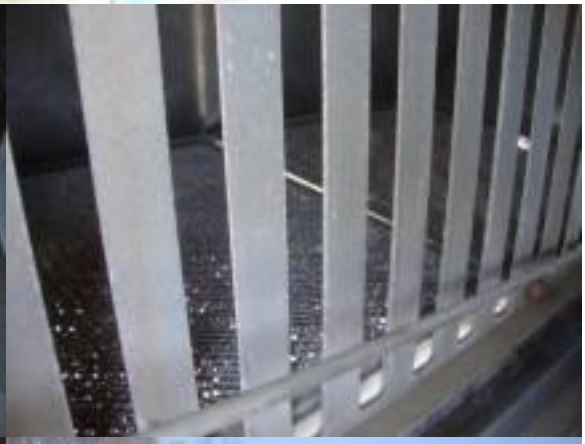
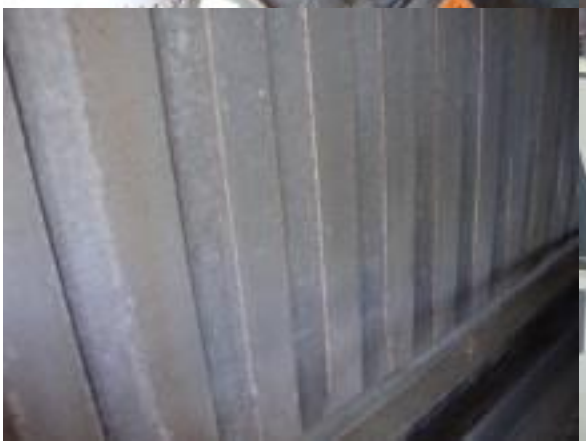
Unit Tag	**ERU-6**	**AC-6**
Location	Roof Pit	Roof Pit
Serving	Music (Per JCI Docs)	Music (Per JCI Docs)
Config/Style	ERW, Supply and Exhaust Fans	Packaged RTU, DX Cooling, HW Heating
Mfr.	Semco ERU	Trane Voyager
Model #	FV5000T-4RN4AB	TFD151C30GCA
Serial #	33266/M017533-01	343100374D
Age (years)	11/2003	10/2003
System CFM		
Max OA CFM		
V/Hz/Ph	200/60/3	200/60/3
SF Qty/HP	(1) 1.5 (1) AX-42	(1) 3.0 (1) BX-62 Belt
SF VFD Data	N/A	N/A
EF Qty/HP	(1) 1.5 (1) Belt 4L-490	N/A
EF VFD Data	N/A	N/A
20Filter Data (Size Quantity)	(2) 16x20x1 Aluminum dirty, Replace	(4) 20x20x2 (4) 20x25x2
Filter Status	Filters are dirty	Clean 4-5-22 Change date
Controls Type	Electronic DDC, Packaged BAS, Trane Package	JCI Metasys
Controls Mfr.	Factory	
Economizer	Packaged economizer, 100% O.A. If functional	
CO_2 DCV	-	
Damper Styles	Factory Slide, O.A. Linkage is broken, Needs to be fixed, cleaned adjusted and lubricated	N/A
Damper Status	Sketchy, Clean adjust and lubricate.	N/A
Heating Type	N/A	Hot Water
Heating Coil Condition	Unknown, no access doors for inspection, assumed dirty coils	No access to inspect
Cooling Type	Wheel	DX Package, Twin Circuit
Cooling Coil Condition	Wheel looks OK, did not seem to operate	Dirty, Needs cleaning
ERW	Horizontal Wheel, 1/15 HP.	N/A

Controls	Functionally is unclear as to if it works and or what mode system is in, Retro Cx recommended	
Drain Pan Status	N/A	OK, Flush after coil cleaning,
Notes:	Door Hardware, rusted, adjust, and lubricate, unit appears to be off	

Photos

PROJECT: 2020102.08 FAIRFIELD PUBLIC SCHOOLS – BURR ELEMENTARY SCHOOL EQUIPMENT DATA SHEET





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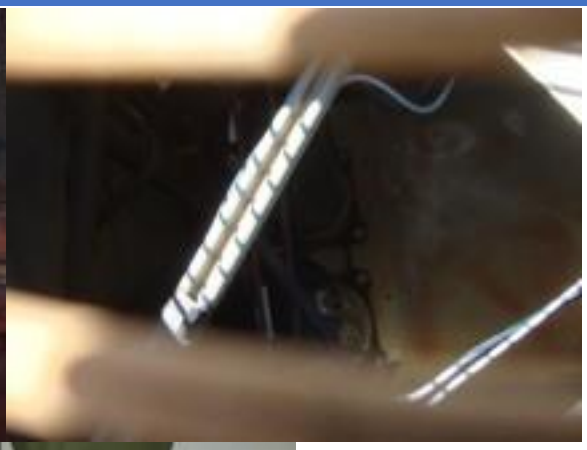

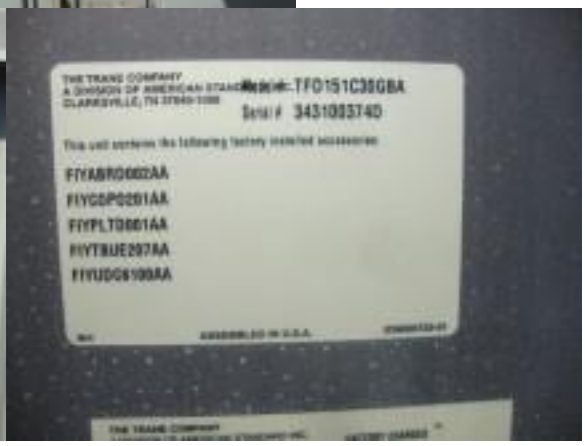

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Unit Tag	**AC-7**	**Addition comments descriptions**
Location	Roof Pit	
Serving	Lobby- (Per JCI Docs)	
Config/Style	Packaged RTU, DX Cooling ERW, HW Heating	
Mfr.	Trane Intellipak	
Model #	SLHFC50ED56858DB1000A	
Serial #	C03J08216	
Age (years)	2003	
System CFM		
Max OA CFM		
V/Hz/Ph	200/60/3	Electrical Code clearances are not met
SF Qty/HP	(1) 30.0	
SF VFD Data	N/A	
EF Qty/HP	(1) 15.0 (1) BX-82 Belts	
EF VFD Data	N/A	
Filter Data (Size Quantity)	(3) 12x24x2, (9) 24x24x2 (3) 12x24x4 (9) 24x24x4	
Filter Status	Filters are clean, proper spacer	4-5-22 Change date
Controls Type	Electronic DDC, Packaged BAS, Trane Package	
Controls Mfr.	Factory	
Economizer	Packaged economizer	
CO_2 DCV	-	
Damper Styles	Factory parallel,	
Damper Status	Seals falling off, Damper Linkage off. Clean adjust and Lubricate.	Found missing Bolt, reinstalled and corrected temporarily
Heating Type	Hot Water	
Heating Coil Condition	Unknown, no access doors for inspection, assumed dirty coils	
Cooling Type	DX Package	
Cooling Coil Condition	OK, could use a cleaning	
ERW	Wheel, Airxchange Ser. 064248/0339, ¼ HP. Filters, (3) 24x24x2, (3) 12x24x2 Aluminum	Filters Dirty and rusted, replace. Wheel pie piece replaced, Wheel not running.
Wheel Exhaust	5.0 HP, Twin City Size 61 Type BAB-DW, Belt BX-65	

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Controls	Functionally it is unclear as to what mode system is in, Retro Cx recommended	
Drain Pan Status	OK, Flush after coil cleaning,	
Notes:	Door Hardware, rusted, adjust, and lubricate	

Photos

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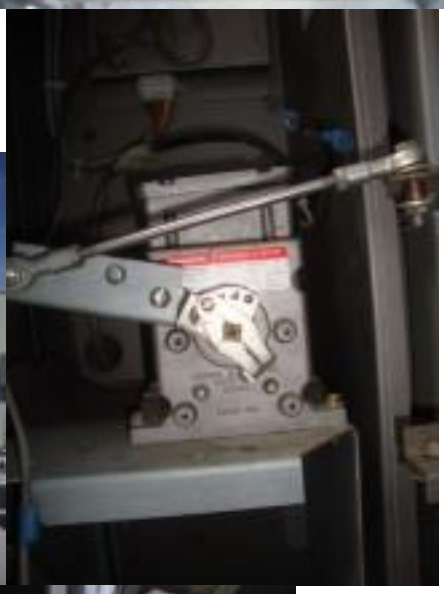

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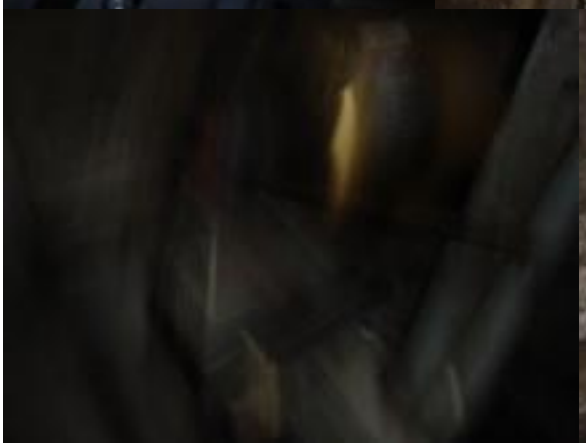

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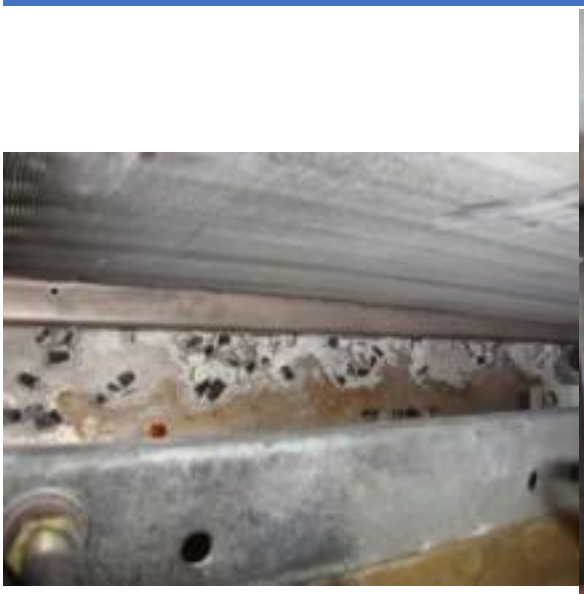

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Unit Tag	**MAU-1**	**Addition comments descriptions**
Location	Enclosed Rooftop Equipment Area, South	
Serving	Kitchen JCI Documents	Associated with EF-7
Config/Style	Makeup Air Unit	
Mfr.	Greenheck	
Model #	DGX-112HH22-DB	
Serial #	03J103383	
Age (years)		
System CFM		
Max OA CFM		
V/Hz/Ph	208/60/3	
SF Qty/HP	3.0 (1) Belt AX-52	
SF VFD Data	N/A	
RF Qty/HP	N/A	
RF VFD Data	N/A	
Filter Data (Size Quantity)	(6) 20x20x2 Aluminum	
Filter Status	Dirty	
Controls Type	Factory Dampers and controls	Damper tightly closed when unit was off
Controls Mfr.		
Economizer	100% O.A.	
CO_2 DCV	N/A	
Damper Styles	Opposed	
Damper Status	OK	
Heating Type	Gas	
Heating Coil Condition	Burner, OK	
Cooling Type	N/A	
Cooling Coil Condition	N/A	
Drain Pan Status	N/A	
Notes:	Operation Unknown,	

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Photos