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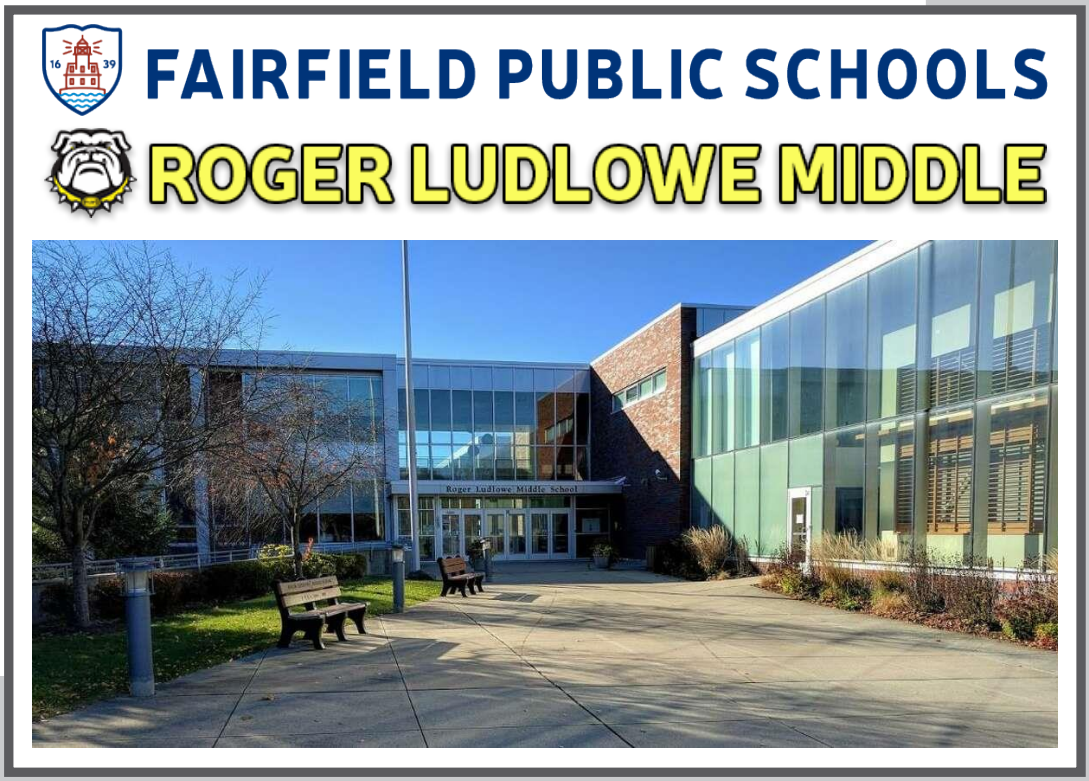

Fairfield Public Schools Recommissioning (RCx) and Testing, Adjusting, & Balancing (TAB) Study

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ROGER LUDLOWE MIDDLE SCHOOL

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

EXECUTIVE SUMMARY

The Roger Ludlowe Middle School was deemed to be school priority number two by Fairfield Public Schools just behind the nearby Fairfield Ludlowe High School. 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.

Roger Ludlowe Middle School is located at 689 Unquowa Rd., Fairfield and serves as an educational facility for around 850 students and around 100 faculty and staff. In the late 1990s, Fairfield's existing middle schools, Tomlinson and Fairfield Woods, suffered from overcrowding due to the town's increasing student population. Following a public referendum, the town elected to open a third middle school. Roger Ludlowe Middle School opened in September 1998 at 785 Unquowa Road. This was the former home to Roger Ludlowe High School, which closed in 1987 to be consolidated with Andrew Warde High School, forming Fairfield High School.

As the student population increased and moved up through the Fairfield Public Schools, overcrowding in Fairfield High School necessitated the re-opening of Fairfield's second high school. The problem arose of where the new high school would be located. The Board of Education voted that the new Fairfield Ludlowe High School (FLHS) would re-occupy the Roger Ludlowe building, and a brand-new RLMS building would be erected adjacent. The new building opened in August 2003, complete with a new athletic field complex to be shared with the high school.

Since the 2003 construction, the building has only undergone minor improvements or regular maintenance. The school ventilation systems comprise six (6) interior Air Handling Units (AHU-1 – 6), sixteen (16) Rooftop Air Handling Units (RTU-1 – 16), and exhaust fans for various purposes including, but not limited to, toilet exhaust, kitchen exhaust, mechanical/electrical space ventilation, etc. Some spaces have operable windows, which might vary in use depending on the particular occupant or environmental conditions, but these are not directly tied into any monitoring system nor are expected to be used for the purposes of providing fresh outside air as a component of the building ventilation. The Building Automation (BAS) control system consist of the original legacy Johnson Controls (JCI) Metasys with an overlay Automated Logic (ALC) system installed in 2020-2021. The ALC Direct Digital Control (DDC) system and communication gateway allows for seamless interoperability and user experience through an intuitive ALC City-Wide graphical user interface.. However due to some of the legacy controllers' limitations and communication network issues, monitoring and control of HVAC systems is limited.

We performed our on-site RCx inspection starting on March 14, 2022, and TAB review starting on March 21, 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 all provided with some form of exhaust which drives these spaces negative. 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, in some cases, entire sections of the building were not satisfied with any outside air. 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 the Roger Ludlowe Middle School does 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. With so few spaces supplying design or code-required ventilation many areas also might have a challenging time maintaining thermal comfort for occupants and wasting energy.

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.

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.

For the occupied zones within this building, the total minimum required ventilation airflow came out to 43,746 CFM. The TAB process revealed that only 35,340 CFM of outside air is delivered to the spaces, resulting in a 7,478 CFM deficit or 80.8% of the required minimum flow. This isn't the whole story, however, since the ventilation calculations reveal that only 22.2% of the occupied zones actually met the requirements. This means there is a huge disparity in zones either receiving far too little ventilation or far too much. A significant quantity of spaces received no ventilation at all, either because the associate unit is nonfunctional (e.g., RTU-3) or because the outside air dampers could not open manually or through the controls (AHU-3, 6, RTU-15, 16, etc.). An analysis of the rooms based on the associated air handling unit reveals additional reasons why clusters of rooms might have failed to meet code. A summary of those findings can be found below and outlines as issues for correction in the appendices:

- AHU-1 serves the music area and was providing 32% of its total capacity as outside air but all rooms with OA requirements were short on air, in some cases significantly. 1/3 of a unit's capacity is typical for non-dedicated outside air unit minimum ventilation flows but in order to meet most of the space minimum ventilation requirements the unit would need to be at or above 100% of its fan capacity. While this unit cannot reasonably maintain these flows if all rooms are fully occupied, there are a number of rooms that are not occupied except for specific times of day i.e., the Choral, Band, and Orchestra rooms, which typically only see use for 1-2 hours at a time and sometimes not simultaneously.

- AHU-2 serves art, textiles, and health. All spaces all satisfied minimum requirements but often provided about double the minimum OA. Either the fan speed or the minimum position can safely be reduced, which will save energy.

- AHU-3, which serves mostly classrooms and as mentioned above, did not have a functioning OA damper. The BAS was commanding the damper to 35% open but it remained closed. It is not clear at this time if that damper position will supply the necessary quantity of outside air. This will need to be assessed later after repairs or adjustments have been made.

- AHU-4 also serves mostly classrooms and was providing only 16.3% of its total capacity as outside air. All associated rooms failed but some were less than 10 CFM from the minimum required and the worst case was off by about 150 CFM. A handful of spaces had no air delivered, which would require further investigation. This unit's OA damper could reasonably be opened up at minimum and would clear up most of the issues here, but there is likely a controllability issue as the damper command might not be driving the damper.

- AHU-5 is similar to AHU-4, providing only 15% of its capacity as OA, and adjusting the minimum OA damper setpoint might resolve issues here. One distinct difference, however, is that the unit's mixed air plenum is positively pressurized to the mechanical equipment room, so return air was observed exhausting through the outside air intake section. This unit serves the administrative area, nurse, and three nearby classrooms. Special conditions regarding ideal nurse office recommendations and requirements might be needed in that space even if the adjacent spaces are satisfied with the adjustments. Due to the current operation of the unit, these adjustment might be more involved than simply opening the damper more during minimum.

- AHU-6 serves mostly classrooms and had a non-functioning, closed OA damper like AHU-3. It did not deliver any OA to these spaces.

- RTU-1 serves the auditorium lobby exclusively. At only 11% OA of unit capacity, the unit was short of the 1327 CFM min OA requirement by 475 CFM. Adjusting the minimum OA damper position higher could fix this issue.

- RTU-2, which serves the Auditorium and associated nearby spaces, significantly over-ventilated the space and was a major reason for the skewed CFM totals. Set to 52% damper position, the space only requires 3538 CFM OA but was being delivered 9530 CFM, more than two and a half times the requirement. Reducing fan speed, reducing damper minimum position, and ensuring the unit only operates at full during high occupancy would greatly reduce energy costs associated with this unit without sacrificing IAQ. Additionally, this unit is located on a low roof section adjacent to the Auditorium but there is not adequate or safe access to the unit. An aluminum extension ladder is located in the low roof area for service but it is not reliable and only provides sufficient access to the north side of the unit. The district has also indicated that the roof work for this school will result in the unit being lifted two feet higher, which will result in worse access and the necessary relocation of associated unit controls. The ductwork rests almost directly on the roof here and would also need to be raised, or flashed in, both of which are not ideal given the nearby penetrations into the duct chase/corridor. This is an older unit in poor condition and could probably be replaced instead of trying to fit this unit back onto the roof after completion of the roof work. The district should consider this course of action for this unit, and the replacement should include full integration with the BAS, TAB procedures, and commissioning.

- RTU-3 serves the kitchen as a makeup air unit. The unit was found off and did not run in either hand or auto. The filter media was pristine, indicating it had not run at least since the previous filter change. While kitchens do not directly have outside air requirements for ventilation, they do have exhaust requirements and the kitchen exhaust fans can drive a building negative, at least locally. A non-functioning makeup air unit also provides no thermal load and could adversely affect the users.

- RTU-4 serves some classrooms and provided only 14% capacity of outside air. Only one space met the requirements but the associated VAV had a bad controller so it is possible if it were functional this space would also fail based on command. Two other VAVs here had bad controllers as well. The OA damper could be increased but this area might also need to be rebalanced.

- RTU-5 serves the cafeteria area and did not supply the required air with the unit OA flow at 17% capacity. The cafeteria VAV had a failed controller as well, so that would need to be repaired. The damper was only commanded to 10% open, but these spaces are also highly dependent on time-of-day occupancy and do not always need such high flows. CO_2 DCV would greatly benefit this space, among others, if it were implemented.

- RTU-6 serving upper level classrooms was a mixed bag. What failed or passed was mostly only determined by a relatively low CFM, so this unit damper minimum and VAVs just need to be tweaked.

- RTU-7 serves a variety of spaces, most of which were not satisfied. With some exceptions, most of these were close to meeting requirements but the unit OA damper was at 80% open already. Opening the remaining 20% might not accomplish the required numbers, and it would mean the unit could not provide any more flow unless the fan speeds were increased, if that is also possible.

- RTU-8 serves more upper floor classrooms but all spaces failed except for the computer lab. This unit needs rebalancing and an OA damper minimum position adjustment.

- RTU-9 serves mid-level classrooms and none of them were close to meeting requirements. The unit was also at 41% OA capacity and 73% damper position. It is highly unlikely that this unit can meet the demands here but additional investigation would be required.

- RTU-10 serves the Media Center and these spaces passed. The library itself was significantly overventilated, and the unit was operating with the OA damper at 82% open. The library is another high efficiency space for CO_2 DCV due to fluctuating occupancy.

- RTU-11 serves more upper level classrooms and all spaces failed. For whatever reason, the unit OA damper command from the BAS was 0% but the damper was not fully closed, providing 27.5% OA as unit capacity. The VAVs for these spaces vary in how far off the spaces were from meeting requirements, so aside from investigating the OA damper command, the minimum OA needs to be adjusted and rebalancing must occur.

- RTU-12, 13, and 14 serve the Auxiliary Gym, Fitness Center, and Project Adventure, respectively. Each of these spaces met the minimum requirements, though RTU-13 and 14 overventilated some. All of these spaces would greatly benefit from unoccupied airflow reduction and CO_2 DCV.

- RTU-15 and 16 serve the locker rooms and main gym, respectively. Despite receiving OA damper position commands from the BAS, neither of these units' OA dampers moved in a way that allowed for outside air to be introduced to these spaces, rather what little could be opened was resulting in air exhausting through outside air intake sections. The units did exhaust air normally as well, which caused these areas to produce a strong negative pressure area. This caused doors in the gym corridor and in the core stairwell to be pulled open. This effect was observed on every level of the stairwell. RTU-15 does not have a strict OA flow requirement but RTU-16 does, and a majority of this pressure issue is caused by that unit. The dampers on both units should be repaired immediately and adjusted to meet space OA and pressure demand.

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 4.264 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 and reduce total airflow to save on energy. This can be further broken out by spaces that meet or fail to meet code. Among the spaces that failed to meet code, the *outside air* ACH was 0.609;for spaces that at least met or exceeded code, the *outside air* ACH was 2.025; the combined *outside air* ACH for the entire building was 0.973. 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. Only the nurse exam room satisfied the minimum outside air ACH with a value of 2.857. However, the room was so small and has a relatively large occupancy so it did not meet minimum outside air CFM requirements.

Outside Air Flow Improvement Recommendations

Immediate action should be taken regarding the units delivering 0 CFM outside air. The six units that are either not running or have malfunctioning outside air dampers (AHU-3, 4, 6, RTU-3, 15, and 16) should be repaired with the assistance of a control technician and TAB Contractor to confirm proper control operation and positioning of the unit dampers. This alone will bring some quantity of outside air to spaces that currently have none and will necessarily improve building performance as a result . The HVAC systems should holistically be rebalanced to current design requirements after the BAS control system has been upgraded with new end devices where needed.

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.
- While all units appear to have MERV 13 filters now installed, units that have both final and pre-filters have MERV 13 filters in both positions. Having two of the same efficiency filters in series does not significantly improve the filtration efficiency and mostly just reduces total airflow. MERV 8 pre-filters can be used in double bank racks to act as an inexpensive shield for the more expensive MERV 13 or 14 filters.
- 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.
- Provide humidification to maintain 40% RH during the heating seasons, if possible.
- Provide dehumidification in the summer to maintain room RH below 60%.
- 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.
- Add low return / high supply airflow paths or utilize displacement ventilation where possible.

- Increase restroom exhaust where possible while maintaining a positive building pressurization to the exterior.
- Perform duct cleaning for existing systems.

Control Sequence Update Recommendations

Without a specific retro-commissioning of the BAS control system itself, it is not possible to tell exactly what systems and components of the BAS needs repair or upgrade, but a cursory review of what was available indicates great need to :

- Address the issue where the building control system loses communication and cannot be accessed without a system reset. We are aware that this has been looked into already but it is not normal and should not keep happening. Typically, units that lose communication to a system will either remain in their last operating state or will revert to a "safe" operational mode. In both cases, they cannot respond to changes in the environment and can lead to adverse conditions like overheating/cooling or no ventilation.
- Repair or replace all 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, 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

Where any building areas are not meeting ventilation requirements due to a lack of mechanical ventilation, undersized units or those that are otherwise are in a state of disrepair, or for any units that need to be replaced, we recommend considering Energy Recovery Ventilators (ERV). Energy Recovery Ventilators are packaged heat recovery units that mostly utilize an air to air heat exchanger to recover waste heat from the exhaust air and transfer it to the outside air, powered by supply and exhaust air fans. ERVs require ducted outside and exhaust air to the outside of the building; the inlet and exhaust air

openings should be at least 10 feet apart to comply with the Building Code. Depending on the location, general exhaust fan ductwork could be repurposed for these units. There are two main types of air-to-air energy recovery units: energy wheel and cross-flow heat exchangers. Energy wheel units tend to be more expensive and have some additional operating costs due to the wheel motor, but they have higher heat transfer efficiency than cross-flow units. Both styles of units require filters to protect the heat exchanger media and operate best during peak load conditions. Sometimes an existing unit can be retro-fit with some form of heat recovery system, but it is highly dependent on the unit configuration and requires engineering calculations to determine sizing, including if the current unit fans can accommodate the increased static pressure losses that would be incurred.

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 in 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. 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 each high 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 cross-flow 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 only has a 4" filter, upgrade the air filters to 4" MERV 13 and add in a 2" pre-filter rack with MERV 8 pre-filters.
- 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.
- All existing filters should be replaced with the new filters of the same style. None of the currently installed filters were identified in acceptable condition during the time of the evaluation.
- 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.
- For any defunct units or disabled units needing serious repair or replacement, consider replacing with a unit that has energy recovery (either a wheel or cross-flow heat exchanger). This might require changes to the ductwork or balance of the air system since replacing a mixed air unit with a 100% OA unit might result in less total airflow required.
- 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.
- Fan Belt Tension and Wheel Alignment: All fan motor pulley's, sheaves and belts should be reviewed for proper alignment and tension. Some motors might need to be repositioned in the unit to fix the tension or adjust for alignment. Some fan wheels also wobble or pulleys could be misaligned. Consider adjust motor positions if out of alignment and installing belt tensioners where possible to extend intervals between belt changes without compromising unit efficiency as the belt wears.

CONCLUSIONS

While 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 the Roger Ludlowe Middle School is challenged to fully meet the current minimum ventilation requirements per 2015 IMC. 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 and generally increasing outside airflow throughout the building.

It has come to our attention that the entire roof of this school may need replacement during the summer of 2022, which will necessitate the temporary removal of many or all of the air handling units during the process. This time could be utilized to make repairs to internal components of the units that would otherwise be difficult while the units are needed for operation, but it comes with the caveat that units can become damaged during reinstallation or otherwise improperly adjusted during this time. In any case, while this process is ongoing, extra care should be given to the air handling equipment to maintain cleanliness and operability for reinstallation.

Following the roof work, and given the results of this survey, we highly recommend further evaluation to be performed including whole-building Recommissioning, BAS controls upgrade and rebalancing, possibly including engineered ventilation calculations/modifications aid in code compliance and generally better working order.

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 March 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. Some specific issues that were expected to have been addressed include filters within the air handling equipment were anticipated to be changed within a few weeks of the initial inspections. 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.

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 (92)
	Open	General	Ventilation Summary	Our study identified many individual areas that failed to meet the required outdoor air ventilation requirements. Some areas had no ventilation delivered while others were short on expected airflow. Details on this can be found within the report and on the 2015 IMC ventilation calculation spreadsheet.
	Open	General	Duct/Unit Cleanliness	Since numerous coils were observed as needing cleaning, this indicates that over the years excessive dust and dirt is getting through the filters. One cause is that, as filters load up, they start to buckle and force air through remaining openings at higher velocities, which allows for this dirt to bypass the filters in small quantities that add up over time. If unit, coil, and duct cleaning has not been performed recently or at all, it could be beneficial for the occupants to reproduce a baseline of air cleanliness.
	Open	Room 231A	Copier	There is no direct ventilation in this space
	Open	Room 314	Copier	There is no direct ventilation in this space
	Open	Room 335	Computer Lab	A window was left open in this computer lab. Without appropriate window opening protocol this could lead to excess temperature or humidity conditions unfavorable for occupant comfort or health of the electronic devices located here. Some details about how to implement these procedures can be found within the report.
	Open	AHU-1	Band, Kitchen, Office	Heating and cooling coils should be cleaned

Action Taken	Status	Unit/Zone	Serving/Room Name	Indoor Air Quality And Ventilation Issue (92)
	Open	AHU-1	Band, Kitchen, Office	Pre-filters are particularly dirty and need to be changed.
	Open	AHU-1	Band, Kitchen, Office	All rooms with OA requirements were short on air, in some cases significantly.
	Open	AHU-1	Band, Kitchen, Office	Generally, about 1/3 of a unit's capacity is typical for non-dedicated outside air unit minimum ventilation flows but based on the current ratio of available air and in order to meet most of the space minimum ventilation requirements, the unit would need to be at or above 100% of its fan capacity.
	Open	AHU-2	Art, Health	The heating coil is dirty
	Open	AHU-2	Art, Health	Pre-filters are particularly dirty and need to be changed.
	Open	AHU-3	Classrooms 221-237	The heating coil is dirty
	Open	AHU-3	Classrooms 221-237	The Outside air damper was non-operational; missing the linkage; the BAS was commanding the damper to 35% open but it remained closed.
	Open	AHU-3	Classrooms 221-237	The pre-filter is dirty and needs to be changed.
	Open	AHU-3	Classrooms 221-237	Dampers need to be cleaned and lubricated
	Open	AHU-3	Classrooms 221-237	It is not clear at this time if the 35% open damper position will supply the necessary quantity of outside air and this will need to be assessed later after repairs or adjustments have been made.
	Open	AHU-4	Classrooms 301-319	The heating and cooling coils are dirty
	Open	AHU-4	Classrooms 301-319	Dampers need to be cleaned and lubricated
	Open	AHU-4	Classrooms 301-319	Was providing only 16.3% of its total capacity as outside air. All associated rooms failed but some were less than 10 CFM from the minimum required and the worst case was off by about 150 CFM. This unit's OA damper could reasonably be opened up at minimum.

Action Taken	Status	Unit/Zone	Serving/Room Name	Indoor Air Quality And Ventilation Issue (92)
	Open	AHU-4	Classrooms 301-319	A handful of spaces had little-to-no conditioned air supplied, which requires further investigation.
	Open	AHU-5	Admin, Nurse, Team	Pre-filters are dirty and need to be changed
	Open	AHU-5	Admin, Nurse, Team	Dampers need to be cleaned and lubricated
	Open	AHU-5	Admin, Nurse, Team	The mixed air plenum is positively pressurized to MER so RA is exhausting through O.A. intake, reducing or completely limiting the amount of outside air delivered to the space.
	Open	AHU-5	Admin, Nurse, Team	Was providing only 15% of its capacity as OA, and adjusting the minimum OA damper setpoint might improve ventilation here.
	Open	AHU-5	Admin, Nurse, Team	The unit's mixed air plenum is positively pressurized to the mechanical equipment room, so return air was observed exhausting through the outside air intake section.
	Open	AHU-5	Admin, Nurse, Team	This unit serves the administrative area, nurse, and three nearby classrooms. Special conditions regarding ideal nurse office recommendations and requirements might be needed in that space even if the adjacent spaces are satisfied with any adjustments or corrections. Due to the current operation of the unit, these adjustment might be more involved than other units.
	Open	AHU-6	Classrooms 352-372	The heating coil is dirty
	Open	AHU-6	Classrooms 352-372	See picture in TAB report summary of damper command at 25% but 0 cfm airflow due to missing OA damper linkage; Does not have a functioning OA damper; the BAS was commanding the damper open but it remained closed.
	Open	AHU-6	Classrooms 352-372	Pre-filters are dirty and need to be changed
	Open	AHU-6	Classrooms 352-372	Dampers need to be cleaned, adjusted, and lubricated

Action Taken	Status	Unit/Zone	Serving/Room Name	Indoor Air Quality And Ventilation Issue (92)
	Open	RTU-1	Auditorium, Stage, Lobby	Dampers are dirty and should be cleaned
	Open	RTU-1	Auditorium, Stage, Lobby	At only 11% OA of unit capacity, the unit was short of the 1327 CFM min OA requirement by 475 CFM. Adjusting the minimum OA damper position higher could fix this issue.
	Open	RTU-2	Auditorium, Stage, Lobby	The heating and cooling coils need to be cleaned
	Open	RTU-2	Auditorium, Stage, Lobby	Supply fan wheel needs to be cleaned
	Open	RTU-2	Auditorium, Stage, Lobby	Pre-filters are dirty and need to be changed
	Open	RTU-2	Auditorium, Stage, Lobby	Dampers need to be cleaned, adjusted, and lubricated
	Open	RTU-3	Kitchen Makeup	The unit does not operate in either hand or auto modes, and seemingly has not run since at least the previous filter change in September 2021.
	Open	RTU-3	Kitchen Makeup	Filter media is pristine but the casings are covered with either moisture or colorful, dried growth
	Open	RTU-4	Classrooms 241-247	Some filters are dirtier than others. The blank-off plate for the 2” rack closest to the door is missing, likely allowing easier airflow on this side explaining the much dirtier filter here
	Open	RTU-4	Classrooms 241-247	Dampers need cleaning and lubrication.
	Open	RTU-4	Classrooms 241-247	At only 14% capacity of outside air, only one space met the requirements. The OA damper could be increased but this area might also need to be rebalanced.
	Open	RTU-5	Faculty dining, café	The heating and cooling coils need to be cleaned
	Open	RTU-5	Faculty dining, café	Supply fan wheel is dirty and the bearings are over greased; likely related.
	Open	RTU-5	Faculty dining, café	Pre-filters are dirty and need to be changed

Action Taken	Status	Unit/Zone	Serving/Room Name	Indoor Air Quality And Ventilation Issue (92)
	Open	RTU-5	Faculty dining, café	OA damper is not moving freely and it seems the actuator gear might have stripped, which means it might not open when commanded especially when fighting against internal unit pressures.
	Open	RTU-5	Faculty dining, café	Dampers are dirty and need cleaning and lubrication
	Open	RTU-5	Faculty dining, café	The cafeteria area was not supplied with the required air with the unit OA flow at 17% capacity. The damper was only commanded to 10% open.
	Open	RTU-6	Classrooms 320-328	Pre-filters are dirty and need to be changed
	Open	RTU-6	Classrooms 320-328	Dampers are dirty and need cleaning and lubrication
	Open	RTU-6	Classrooms 320-328	The heating and cooling coils need to be cleaned
	Open	RTU-6	Classrooms 320-328	Most of the associated spaces for this unit either failed or passed by a relatively low CFM, so this unit damper minimum and VAVs should be adjusted to meet requirements.
	Open	RTU-7	Technology	Pre-filters are dirty and need to be changed
	Open	RTU-7	Technology	Dampers are dirty and need cleaning and lubrication
	Open	RTU-7	Technology	The drain pan needs to be cleaned, indications of some signs of external rust / corrosion and algae growth
	Open	RTU-7	Technology	The heating and cooling coils need to be cleaned
	Open	RTU-7	Technology	Most of the associated spaces did not satisfy minimum requirements, but some were close. The unit OA damper needed to be at 80% open to do this. Opening the remaining 20% might not accomplish the required numbers, and it would mean the unit could not provide any more flow unless the fan speeds were increased, if that is even possible.

Action Taken	Status	Unit/Zone	Serving/Room Name	Indoor Air Quality And Ventilation Issue (92)
	Open	RTU-8	Classrooms 322-335	Pre-filters are dirty and need to be changed
	Open	RTU-8	Classrooms 322-335	Dampers are dirty and need cleaning and lubrication
	Open	RTU-8	Classrooms 322-335	The heating and cooling coils need to be cleaned
	Open	RTU-8	Classrooms 322-335	All spaces failed to meet minimum requirements except for the computer lab. This unit needs rebalancing and an OA damper minimum position adjustment at least.
	Open	RTU-9	Classrooms 248-260, Lobby	Pre-filters are dirty and need to be changed
	Open	RTU-9	Classrooms 248-260, Lobby	Dampers are dirty and need cleaning and lubrication
	Open	RTU-9	Classrooms 248-260, Lobby	None of the associated zones were close to meeting minimum requirements. The unit was also at 41% OA capacity and 73% damper position. This unit might not be able to meet the demands of these spaces but additional investigation would be required.
	Open	RTU-10	Library	Filters are dirty and need to be changed
	Open	RTU-10	Library	Outside air dampers are dirty and all dampers need to be lubricated
	Open	RTU-11	Classrooms 339-351	Pre-filters are very dirty and need to be changed
	Open	RTU-11	Classrooms 339-351	Dampers are dirty and need cleaning and lubrication
	Open	RTU-11	Classrooms 339-351	The heating coil needs to be cleaned
	Open	RTU-11	Classrooms 339-351	All associated spaces failed to meet minimum requirements. The VAVs for these spaces vary in how far off the spaces were from meeting requirements, so the minimum OA needs to be adjusted and rebalancing must occur.
	Open	RTU-12	Basement Locker Room	Filters are dirty and need to be changed

Action Taken	Status	Unit/Zone	Serving/Room Name	Indoor Air Quality And Ventilation Issue (92)
	Open	RTU-12	Basement Locker Room	Dampers are dirty and need cleaning and lubrication
	Open	RTU-13	Fitness Center	Filters are dirty and need to be changed
	Open	RTU-13	Fitness Center	Dampers are dirty and need cleaning and lubrication
	Open	RTU-13	Fitness Center	The heating and cooling coils need to be cleaned
	Open	RTU-14	Project Room	Filters are dirty and need to be changed
	Open	RTU-14	Project Room	Dampers are dirty and need cleaning and lubrication
	Open	RTU-14	Project Room	The heating and cooling coils need to be cleaned
	Open	RTU-15	Basement Locker Room	The locker area was noticeably negatively pressurized.
	Open	RTU-15	Basement Locker Room	Filters are dirty and need to be changed
	Open	RTU-15	Basement Locker Room	Dampers are dirty and need cleaning and lubrication
	Open	RTU-15	Basement Locker Room	The heating and cooling coils need to be cleaned
	Open	RTU-15	Basement Locker Room	Air was observed exhausting through the outside air intake section, reducing or completely limiting the amount of outside air delivered to the space.
	Open	RTU-15	Basement Locker Room	Despite receiving OA damper position commands from the BAS, the OA dampers did not move in a way that allowed for outside air to be introduced to these spaces, rather what little could be opened was resulting in air exhausting through outside air intake sections.
	Open	RTU-15	Basement Locker Room	In addition to providing no outside air, the unit exhausts air normally, which caused these areas to produce a strong negative pressure area. This leads to doors in the gym corridor and in the core stairwell to be pulled open. This effect was

Action Taken	Status	Unit/Zone	Serving/Room Name	Indoor Air Quality And Ventilation Issue (92)
				observed on every level of the stairwell. The dampers should be repaired immediately and adjusted to meet space OA and pressure demand.
	Open	RTU-16	Gym	The gym area was noticeably extremely negatively pressurized.
	Open	RTU-16	Gym	Min OA damper linkage missing so the damper cannot open.
	Open	RTU-16	Gym	Filters are dirty and need to be changed
	Open	RTU-16	Gym	Dampers are dirty and need cleaning and lubrication
	Open	RTU-16	Gym	The heating and cooling coils need to be cleaned
	Open	RTU-16	Gym	Air was observed exhausting through the outside air intake section, reducing or completely limiting the amount of outside air delivered to the space.
	Open	RTU-16	Gym	Despite receiving OA damper position commands from the BAS, the OA dampers did not move in a way that allowed for outside air to be introduced to these spaces, rather what little could be opened was resulting in air exhausting through outside air intake sections.
	Open	RTU-16	Gym	In addition to providing no outside air, the unit exhausts air normally, which caused these areas to produce a strong negative pressure area. This leads to doors in the gym corridor and in the core stairwell to be pulled open. This effect was observed on every level of the stairwell. The dampers should be repaired immediately and adjusted to meet space OA and pressure demand.

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 (55)
	Open	Room 131	Tele/Data	EF-17 not running.
	Open	Room 158B	Office	The air in this space was noted as being stuffy/stale
	Open	Room 228	Elec	Associated exhaust fan was not running.
	Open	Room 270	Exam	The air in this space was noted as being warm and stuffy/stale
	Open	Room 272	Nurse	The air in this space was noted as being warm and stuffy/stale
	Open	Room 288	Classroom	The air in this space was noted as being stuffy/stale
	Open	Room 303A	Elec	Associated exhaust fan was not running.
	Open	Room 307	Classroom	The air in this space was noted as being stuffy/stale
	Open	Room 310	Science Classroom	The air in this space was noted as being stuffy/stale
	Open	Room 326	Tele/Data	The air in this space was noted as being warm and stuffy/stale
	Open	Room 330	Classroom	The air in this space was noted as being stuffy/stale
	Open	Room 332	Classroom	Some of the ceiling tiles in this space have water stains
	Open	AHU-2	Art, Health	The drain pan needs to be cleaned

Action Taken	Status	Unit/Zone	Serving/Room Name	Maintenance Issue (55)
	Open	AHU-3	Classrooms 221-237	Return fan belts are mismatched
	Open	AHU-3	Classrooms 221-237	The drain pan needs to be cleaned
	Open	AHU-4	Classrooms 301-319	Flex duct connection torn on fan section
	Open	AHU-4	Classrooms 301-319	Supply fan belts are mis-matched
	Open	RTU-1	Auditorium, Stage, Lobby	Both supply fan belts are loose
	Open	RTU-1	Auditorium, Stage, Lobby	One of the return fan belts are loose
	Open	RTU-2	Auditorium, Stage, Lobby	The outside air damper does not fully close
	Open	RTU-2	Auditorium, Stage, Lobby	The piping insulation in the pipe cabinet is deteriorating and should be replaced
	Open	RTU-2	Auditorium, Stage, Lobby	The drain pan needs to be cleaned
	Open	RTU-3	Kitchen Makeup	Supply Fan motor is covered in grease
	Open	RTU-4	Classrooms 241-247	The dampers, particularly the EA/OA dampers, do not close fully
	Open	RTU-4	Classrooms 241-247	The pipe cabinet door handle does not seal the door properly
	Open	RTU-4	Classrooms 241-247	There is significant rust located in the pan between the HW and CHW coils
	Open	RTU-4	Classrooms 241-247	The filter gauges cannot be read
	Open	RTU-5	Faculty dining, café	The drain pan needs to be cleaned
	Open	RTU-6	Classrooms 320-328	The drain pan needs to be cleaned
	Open	RTU-8	Classrooms 322-335	The drain pan needs to be cleaned
	Open	RTU-9	Classrooms 248-260, Lobby	Supply fan section door does not have any hinges

Action Taken	Status	Unit/Zone	Serving/Room Name	Maintenance Issue (55)
	Open	RTU-9	Classrooms 248-260, Lobby	The cooling coil has minor corrosion on the header
	Open	RTU-9	Classrooms 248-260, Lobby	The drain pan has minor rusting
	Open	RTU-10	Library	Supply fan base squeaks and should be adjusted to prevent unnecessary wear or noise.
	Open	RTU-10	Library	There is noticeable air trapped in the hot water coil, which could lead to reduced heat transfer performance
	Open	RTU-10	Library	The cooling coil has corrosion on the header
	Open	RTU-10	Library	The drain pan has debris in it but it was not blocking the drain
	Open	RTU-11	Classrooms 339-351	Belt guards are removed from the fans and there is heavy grease on the pillow blocks
	Open	RTU-12	Basement Locker Room	Notable rusting occurring in the drain pan and fan inlets
	Open	RTU-12	Basement Locker Room	Belt guards removed
	Open	RTU-12	Basement Locker Room	Dampers do not form a tight seal
	Open	RTU-13	Fitness Center	Belts are mismatched
	Open	RTU-13	Fitness Center	Belt guards removed
	Open	RTU-13	Fitness Center	The rusted areas on unit exterior need to be reprimed.
	Open	RTU-13	Fitness Center	Exposed insulation on exterior ductwork has failed and needs to be repaired.
	Open	RTU-14	Project Room	Belt guards removed
	Open	RTU-14	Project Room	The drain pan needs to be cleaned

Action Taken	Status	Unit/Zone	Serving/Room Name	Maintenance Issue (55)
	Open	RTU-14	Project Room	Return and supply fan motor bearings over-greased
	Open	RTU-14	Project Room	Return fan wheel needs to be cleaned
	Open	RTU-14	Project Room	Manual isolation valves turned closed on the HW side of the piping
	Open	RTU-14	Project Room	Excess rust observed on metal surfaces of fan rotor supports.
	Open	RTU-15	Basement Locker Room	Fan belts are mismatched
	Open	RTU-15	Basement Locker Room	The rusted areas on unit exterior need to be reprimed.
	Open	RTU-15	Basement Locker Room	Exposed insulation on exterior ductwork has failed and needs to be repaired.
	Open	RTU-16	Gym	The drain pan needs to be cleaned

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 (17)
	Open	General	BAS Graphics	It was observed that many of the ALC WebCTRL Equipment Graphics were not fully accurate in layout and component style. This does not have a direct impact on control but it does lead to some confusion with misrepresentation of presented data. Controllability of systems and areas is somewhat limited due primarily to age and abilities of the original Johnson Controls Metasys hardware and software that should be replaced in its entirety with new single vendor BMS..
	Open	Room 140	Cafeteria	This zone (N2-106) has failed controller.
	Open	Room 239	Classroom	This zone has a bad controller
	Open	Room 241	Classroom	This zone has a bad controller
	Open	Room 245	Science Classroom	This zone has a bad controller
	Open	Room 247	Classroom	This zone has a bad controller
	Open	AHU-2	Art, Health	This unit was unable to communicate with the associated VAVs
	Open	AHU-3	Classrooms 221-237	This unit needed to be operated at maximum fan frequency of 60 Hz for testing
	Open	AHU-4	Classrooms 301-319	This unit needed to be operated at maximum fan frequency of 60 Hz for testing

Action Taken	Status	Unit/Zone	Serving/Room Name	Control Issue (17)
	Open	AHU-4	Classrooms 301-319	There is possibly a controllability issue as the damper command might not be driving the damper.
	Open	AHU-5	Admin, Nurse, Team	The mixed air plenum is positively pressurized to MER so RA is exhausting through O.A. intake, which could be a result of improper fan or damper control
	Open	RTU-3	Kitchen Makeup	Unit was found with exterior HOA switch turned to “OFF”
	Open	RTU-9	Classrooms 248-260, Lobby	The heating coils temperature sensor has poor coverage over the coil face
	Open	RTU-11	Classrooms 339-351	The unit OA damper command from the BAS was 0% but the damper was not fully closed, providing 27.5% OA as unit capacity.
	Open	RTU-13	Fitness Center	AFMS probe locations are covered in grease and need to be cleaned. Calibration should be performed afterward
	Open	RTU-14	Project Room	Chilled water control valve actuator cover is missing, exposing the circuitry
	Open	RTU-15	Basement Locker Room	Air was observed exhausting through the outside air intake section, which could be a result of improper fan or damper control
	Open	RTU-16	Gym	Air was observed exhausting through the outside air intake section, which could be a result of improper fan or damper control

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 (12)
	Info Only	Room 119	Mechanical	There is no air provided to this space
	Info Only	Room 220	Mechanical	There is no air directly supplied to this space
	Info Only	Room 253	Library	Calculated airflow based on unit total since distribution is not accessible. The associated unit only serves this area
	Info Only	Room 259	Storage	There is no air directly supplied to this space
	Info Only	Room 334	Tele/Data	No air is shown on the drawings being delivered to this space.
	Info Only	Room 336	Tele/Data	There is no air directly supplied to this space
	Energy Savings	AHU-2	Art, Health	Since all rooms were satisfied at minimum flow, the fan speed or the minimum OA damper position could potentially be reduced, which will save energy. Exact reduction to be determined at a later date.
	Info Only	AHU-5	Admin, Nurse, Team	System simulation was capable through Metasys only. No ALC or HVACAO access
	Energy Savings	RTU-2	Auditorium, Stage, Lobby	The Auditorium and associated spaces were significantly over-ventilated and this was a major reason for the skewed building CFM totals. The damper command was set to 52% and the space only requires 3538 CFM OA but was being delivered 9530 CFM, more than two and a half times the requirement. Reducing fan speed, reducing damper minimum position, and ensuring the unit only operates at full during high occupancy would greatly reduce energy costs associated with this unit without sacrificing IAQ. Exact reduction to be determined at a later date.

Action Taken	Status	Unit/Zone	Serving/Room Name	Information Only Findings (12)
	Energy Savings	RTU-10	Library	The library (but not ancillary media center zones) was significantly overventilated, and the unit was operating with the OA damper at 82% open. Since all rooms were satisfied at minimum flow, the fan speed or the minimum OA damper position could potentially be reduced, which will save energy. Exact reduction to be determined at a later date.
	Energy Savings	RTU-13	Fitness Center	Since all rooms were satisfied at minimum flow, the fan speed or the minimum OA damper position could potentially be reduced, which will save energy. Exact reduction to be determined at a later date.
	Energy Savings	RTU-14	Project Room	Since all rooms were satisfied at minimum flow, the fan speed or the minimum OA damper position could potentially be reduced, which will save energy. Exact reduction to be determined at a later date.

APPENDIX 2 – Ventilation Data Calculations

Project Name:	**Fairfield Public Schools RCx & TAB Study**
Project Number:	**2020102.00.02**
Scope	**Ventilation Calculation by Building**
Date	**April 25, 2022**

Roger Ludlowe Middle School

VANZELM ENGINEERS

Zone Identification												IMC 2015 Ventilation Calculations									
Floor	**Room#**	**Room Name**	**Occupancy Classification**	**Category**	**Total Airflow**	**Unit Actual OA %**	**BAS OA Damper Cond**	**Served By**	**Zone Area, Az, per space**	**Ceiling Height**	**Volume, per space**	**Zone Population, Pz, per space**	**People OA Rate in Breathing Zone, Rp**	**Area OA Rate in Breathing Zone, Ra**	**Default Occupant Density**	**Min. Required Ventilation Airflow**	**ACTUAL MEASURED VENTILATION AIR FLOW**	**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)
0	002	Mechanical	None	None	---	---	---	EF-8	1611	10	16110	0	0.0	0.00	0	0	---	N/A		N/A	
0	003	Mechanical	None	None	---	---	---	EF-6,7,9	3548	10	35480	0	0.0	0.00	0	0	---	N/A		N/A	
0	005	Elev Mech	None	None	---	---	---	EF-NL	92	10	920	0	0.0	0.00	0	0	---	N/A		N/A	
0	008	Storage	Storage	Warehouses	648	---	---	TX-7A	250	125	31250	0	0.0	0.06	0	15	---	N/A		N/A	
0	009	Gym Lobby	Public Spaces	Corridors	613	0%	15%	RTU-15 N2-121	1418	24	34032	10	0.0	0.06	0	85	**0**	-85	-100.0%	**Fails**	**0.000**
0	010	Auxiliary Gymnasium	Sports and amusement	Gym, stadium, arena (play area)	2244	44%	75%	RTU-12	2812	26.7	75080	30	0.0	0.30	0	844	**987**	143	17.0%	**Meets**	**0.789**
0	011	Girls Locker Room	Education	Locker/dressing room	361	0%	15%	RTU-15 N2-123	836	9	7524	30	0.0	0.00	0	0	**0**	0		N/A	**0.000**
0	014	Office	Offices	Office spaces	78	0%	15%	RTU-15 N2-124	241	9	2169	4	5.0	0.06	5	34	**0**	-34	-100.0%	**Fails**	**0.000**
0	016	Office	Offices	Office spaces	87	0%	15%	RTU-15 N2-124	231	9	2079	4	5.0	0.06	5	34	**0**	-34	-100.0%	**Fails**	**0.000**
0	018	Boys Locker Room	Education	Locker/dressing room	295	0%	15%	RTU-15 N2-123	795	9	7155	30	0.0	0.00	0	0	**0**	0		N/A	**0.000**
0	019	Storage	Storage	Warehouses	---	---	---	EF-10	412	9	3708	0	0.0	0.06	0	25	---	N/A		N/A	
0	021	Elev Mech	None	None	---	---	---	EF-4	89	12.5	1113	0	0.0	0.00	0	0	---	N/A		N/A	
0	022	Gymnasium	Sports and amusement	Gym, stadium, arena (play area)	18,148	0%	30%	RTU-16	9900	35	346500	50	0.0	0.30	0	2970	**0**	-2970	-100.0%	**Fails**	**0.000**
1	102	Auditorium Lobby	Education	Auditoriums	7669	11%	50%	RTU-1	5445	*	78887	200	5.0	0.06	150	1327	**852**	-475	-35.8%	**Fails**	**0.648**
1	111	Auditorium, Stage, Elec, Cont., Balcony	Education	Auditoriums	18,327	52%	70%	RTU-2	8128	40	325120	610	5.0	0.06	150	3538	**9706**	6168	174.4%	**Meets**	**1.791**
1	112	Stage	Education	Music/theater/dance	---	52%	70%	RTU-2	2660	40	106400	30	10.0	0.06	35	460	---	N/A		N/A	
1	112A	Storage	Storage	Warehouses	---	---	---	EF-19	134	40	5360	0	0.0	0.06	0	8	---	N/A		N/A	
1	117	Elec	None	None	---	---	---	EF-18	70	10	700	0	0.0	0.00	0	0	---	N/A		N/A	
1	119	Mechanical	None	None	---	---	---	---	385	10	3850	0	0.0	0.00	0	0	---	N/A		N/A	
1	120	Choral Room	Education	Music/theater/dance	585	32%	35%	AHU-1 N2-102	1256	13.5	16956	69	10.0	0.06	35	765	**187**	-578	-75.6%	**Fails**	**0.662**
1	121	Office	Offices	Office spaces	0	32%	35%	AHU-1 N2-102	123	9.5	1169	3	5.0	0.06	5	22	**0**	-22	-100.0%	**Fails**	**0.000**

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VANZELM ENGINEERS

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					(cfm)	(%)	(%)		(sq.ft)	(ft)	(cu.ft)	Adult	(cfm/ person)	(cfm/sf)	(#/1000sf)	(cfm)	(cfm)	(cfm)	(%)		(AC/hr)
1	122	Storage	Storage	Warehouses	29	32%	35%	AHU-1 N2-102	87	9.5	827	0	0.0	0.06	0	5	**9**	4	72.4%	**Meets**	**0.653**
1	124	Orchestra Room	Education	Music/theater/dance	441	32%	35%	AHU-1 N2-103	1190	13.5	16065	48	10.0	0.06	35	551	**141**	-410	-74.4%	**Fails**	**0.527**
1	125	Office	Offices	Office spaces	---	---	---	---	174	9.5	1653	1	5.0	0.06	5	15	**0**	-15	-100.0%	**Fails**	**0.000**
1	126	Storage	Storage	Warehouses	---	32%	35%	EF-15	79	9.5	751	0	0.0	0.06	0	5	**---**	N/A		N/A	
1	127	Band Room	Education	Music/theater/dance	463	32%	35%	AHU-1 N2-102	1588	13.5	21438	40	10.0	0.06	35	495	**148**	-347	-70.1%	**Fails**	**0.414**
1	129	Storage	Storage	Warehouses	0	32%	35%	AHU-1 N2-103	142	13.5	1917	1	0.0	0.06	0	9	**0**	-9	-100.0%	**Fails**	**0.000**
1	130	Storage	Storage	Warehouses	26	32%	35%	AHU-1 N2-103	127	13.5	1715	1	0.0	0.06	0	8	**8**	0	5.0%	**Meets**	**0.280**
1	131	Tele/Data	None	None	0	---	---	EF-17	60	8	480	0	0.0	0.00	0	0	**---**	N/A		N/A	
1	132	Small Band	Education	Classroom (ages 9+)	530	32%	35%	AHU-1 N2-103	754	13.5	10179	20	10.0	0.12	35	290	**170**	-120	-41.5%	**Fails**	**1.002**
1	133	Keyboard	Education	Music/theater/dance	225	32%	35%	AHU-1 N2-101	691	13.5	9329	25	10.0	0.06	35	291	**72**	-219	-75.3%	**Fails**	**0.463**
1	134	Practice	Education	Music/theater/dance	84	32%	35%	AHU-1 N2-101	194	9.5	1843	4	10.0	0.06	35	52	**27**	-25	-47.7%	**Fails**	**0.879**
1	134A	Storage Acid Neut.	None	None	---	---	---	EF-20	70	17.5	1225	0	0.0	0.00	0	0	**---**	N/A		N/A	
1	135	Practice	Education	Music/theater/dance	44	32%	35%	AHU-1 N2-101	145	9.5	1378	2	10.0	0.06	35	29	**14**	-15	-51.2%	**Fails**	**0.610**
1	136	Practice	Education	Music/theater/dance	45	32%	35%	AHU-1 N2-102	134	9.5	1273	3	10.0	0.06	35	38	**14**	-24	-63.2%	**Fails**	**0.660**
1	137	Dressing	Education	Locker/dressing room	46	32%	35%	AHU-1 N2-103	195	9.5	1853	8	0.0	0.00	0	0	**15**	15		N/A	**0.486**
1	140	Cafeteria	Food and beverage service	Dining Rooms	8532	17%	10%	RTU-5 N2-106,107	4599	9.5	43691	348	7.5	0.18	70	3438	**1450**	-1988	-57.8%	**Fails**	**1.991**
1	141	Servery	Food and beverage service	Cafeteria, fast food	514	17%	10%	RTU-5 N2-104	808	9.5	7676	20	7.5	0.18	100	295	**87**	-208	-70.6%	**Fails**	**0.680**
1	142	Servery	Food and beverage service	Cafeteria, fast food	247	17%	10%	RTU-5 N2-104	462	9.5	4389	20	7.5	0.18	100	233	**42**	-191	-82.0%	**Fails**	**0.574**
1	143	Kitchen	Food and beverage service	Kitchens (cooking)	---	---	---	RTU-3 / FCU-2	1212	9.5	11514	8	0.0	0.00	0	0	**---**	N/A		N/A	
1	144	Office	Offices	Office spaces	34	32%	35%	AHU-1 N2-101	85	9.5	808	2	5.0	0.06	5	15	**11**	-4	-27.2%	**Fails**	**0.817**
1	146	Storage	Storage	Warehouses	---	---	---	Exhaust	194	9.5	1843	0	0.0	0.06	0	12	**---**	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	152	Faculty Dining	Food and beverage service	Dining Rooms	750	17%	10%	RTU-5 N2-105	397	9.5	3772	15	7.5	0.18	70	184	**128**	-56	-30.4%	**Fails**	**2.036**
1	156	Custodial Lounge	Offices	Office spaces	47	38%	80%	RTU-7 N2-112	340	9.5	3230	8	5.0	0.06	5	60	**18**	-42	-70.2%	**Fails**	**0.334**
1	156A	Tool Room	Storage	Warehouses	28	38%	80%	RTU-7 N2-112	13	9.5	124	0	0.0	0.06	0	1	**11**	10	1310.3%	**Meets**	**5.344**
1	156C	Head Custodian	Offices	Office spaces	47	38%	80%	RTU-7 N2-112	220	9.5	2090	2	5.0	0.06	5	23	**18**	-5	-22.4%	**Fails**	**0.517**
1	158	Reception	Offices	Reception Areas	95	38%	80%	RTU-7 N2-113	373	9.5	3544	5	5.0	0.06	30	47	**36**	-11	-24.0%	**Fails**	**0.610**
1	158A	Internal Suspension	Education	Classroom (ages 9+)	0	38%	80%	RTU-7 N2-112	224	9.5	2128	4	10.0	0.12	35	67	**0**	-67	-100.0%	**Fails**	**0.000**
1	158B	Office	Offices	Office spaces	---	---	---	Exhaust	110	9.5	1045	3	5.0	0.06	5	22	**0**	-22	-100.0%	**Fails**	**0.000**
1	158C	Tutor	Offices	Office spaces	130	38%	80%	RTU-7 N2-113	232	9.5	2204	5	5.0	0.06	5	39	**49**	10	25.9%	**Meets**	**1.334**
1	158D	Tutor	Offices	Office spaces	119	38%	80%	RTU-7 N2-113	222	9.5	2109	3	5.0	0.06	5	28	**45**	17	58.9%	**Meets**	**1.280**
1	158E	Tutor	Offices	Office spaces	83	38%	80%	RTU-7 N2-113	186	9.5	1767	7	5.0	0.06	5	46	**32**	-14	-30.7%	**Fails**	**1.087**
1	161	Classroom	Education	Classroom (ages 9+)	321	38%	80%	RTU-7 N2-114	897	9.5	8522	22	10.0	0.12	35	328	**122**	-206	-62.8%	**Fails**	**0.859**
1	164	Storage	Storage	Warehouses	---	---	---	EF-15	138	9.5	1311	0	0.0	0.06	0	8	**---**	N/A		**N/A**	
1	165	Office	Offices	Office spaces	42	38%	80%	RTU-7 N2-114	342	9.5	3249	3	5.0	0.06	5	36	**16**	-20	-55.0%	**Fails**	**0.295**
1	166	Book Storage	Storage	Warehouses	43	38%	80%	RTU-7 N2-114	506	9.5	4807	0	0.0	0.06	0	30	**16**	-14	-47.3%	**Fails**	**0.200**
1	167	OT/PT	Hospitals, nursing and convalescent homes	Physical Therapy	38	38%	80%	RTU-7 N2-114	468	9.5	4446	6	15.0	0.00	20	90	**14**	-76	-84.4%	**Fails**	**0.189**
1	168	Storage	Storage	Warehouses	373	38%	80%	RTU-7 N2-111	682	9.5	6479	2	0.0	0.06	0	41	**142**	101	247.0%	**Meets**	**1.315**
1	169	Storage	Storage	Warehouses	---	---	---	Exhaust	248	9.5	2356	0	0.0	0.06	0	15	**---**	N/A		**N/A**	
1	170	Tele/Data	None	None	---	---	---	Exhaust	115	8	920	0	0.0	0.00	0	0	**---**	N/A		**N/A**	
1	171	Applied Technology	Education	Classroom (ages 9+)	1018	38%	80%	RTU-7 N2-111	1671	13.5	22559	20	10.0	0.12	35	401	**387**	-14	-3.4%	**Fails**	**1.029**
1	171A	Storage	Storage	Warehouses	---	---	---	Exhaust	280	13.5	3780	0	0.0	0.06	0	17	**---**	N/A		**N/A**	
1	172	Elev Mech	None	None	---	---	---	EF-5	91	12	1092	0	0.0	0.00	0	0	**---**	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	175	Applied Technology	Education	Classroom (ages 9+)	839	38%	80%	RTU-7 N2-111	1180	13.5	15930	25	10.0	0.12	35	392	**319**	-73	-18.5%	**Fails**	**1.202**
1	175A	Computer Lab	Education	Computer lab	371	38%	80%	RTU-7 N2-111	339	9.5	3221	21	10.0	0.12	25	251	**141**	-110	-43.8%	**Fails**	**2.627**
1	177	Art Lab	Education	Art Classroom	1454	47%	30%	AHU-2 N2-116	997	9.5	9472	26	10.0	0.18	20	439	**683**	244	55.4%	**Meets**	**4.327**
1	177A	Art Storage	Storage	Warehouses	92	47%	30%	AHU-2 N2-116	225	9.5	2138	2	0.0	0.06	0	14	**43**	30	218.5%	**Meets**	**1.207**
1	177B	Kiln	Storage	Warehouses	---	---	---	Exhaust	106	13.5	1431	0	0.0	0.06	0	6	**---**	N/A		**N/A**	
1	178	Art Storage	Storage	Warehouses	102	47%	30%	AHU-2 N2-116	254	9.5	2413	6	0.0	0.06	0	15	**78**	63	411.8%	**Meets**	**1.939**
1	179	Elec	None	None	---	---	---	TX-4	50	13.5	675	0	0.0	0.00	0	0	**---**	N/A		**N/A**	
1	180	Tele/Data	None	None	30	---	---	TX-6	45	8	360	0	0.0	0.00	0	0	**---**	N/A		**N/A**	
1	181	Art Lab	Education	Art Classroom	1463	47%	30%	AHU-2 N2-116	1151	9.5	10935	18	10.0	0.18	20	387	**688**	301	77.7%	**Meets**	**3.775**
1	181A	Art Storage	Storage	Warehouses	383	47%	30%	AHU-2 N2-116	238	9.5	2261	4	0.0	0.06	0	14	**180**	166	1160.5%	**Meets**	**4.777**
1	181B	Kiln	Storage	Warehouses	---	---	---	---	57	13.5	770	2	0.0	0.06	0	3	**---**	N/A		**N/A**	
1	182	Food Lab	Education	Classroom (ages 9+)	1208	47%	30%	AHU-2 N2-117	1214	9.5	11533	16	10.0	0.12	35	306	**568**	262	85.8%	**Meets**	**2.955**
1	182A	Storage	Storage	Warehouses	123	47%	30%	AHU-2 N2-117	196	9.5	1862	3	0.0	0.06	0	12	**58**	46	393.2%	**Meets**	**1.869**
1	183A	Storage	Storage	Warehouses	115	47%	30%	AHU-2 N2-117	196	9.5	1862	2	0.0	0.06	0	12	**54**	42	359.2%	**Meets**	**1.740**
1	183	Textiles Lab	Education	Classroom (ages 9+)	1505	47%	30%	AHU-2 N2-117	951	9.5	9035	23	10.0	0.12	35	344	**707**	363	105.5%	**Meets**	**4.695**
1	188	Fitness Center	Sports and amusement	Gym, stadium, arena (play area)	3276	22%	50%	RTU-13	1458	23.5	34263	20	0.0	0.30	0	437	**714**	277	63.2%	**Meets**	**1.250**
1	189	Health Classroom	Education	Classroom (ages 9+)	1137	47%	30%	AHU-2 N2-118	688	9.5	6536	25	10.0	0.12	35	333	**534**	201	60.6%	**Meets**	**4.902**
1	190	Health Classroom	Education	Classroom (ages 9+)	1266	47%	30%	AHU-2 N2-118	726	9.5	6897	26	10.0	0.12	35	347	**595**	248	71.4%	**Meets**	**5.176**
1	191	Project Adventure	Education	Classroom (ages 9+)	3273	21%	6%	RTU-14	1351	27.5	37153	15	10.0	0.12	35	312	**703**	391	125.2%	**Meets**	**1.135**
1	192	Storage	Storage	Warehouses	255	47%	30%	AHU-2 N2-119	196	13.5	2646	2	0.0	0.06	0	12	**120**	108	920.4%	**Meets**	**2.721**
1	193	Mechanical	None	None	---	---	---	EF-14	400	13.5	5400	0	0.0	0.00	0	0	**---**	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	194	Mechanical	None	None	---	---	---	---	603	10	6030	0	0.0	0.00	0	0	---	N/A		N/A	
1	195	Data	None	None	---	---	---	EF-10	100	8	800	0	0.0	0.00	0	0	---	N/A		N/A	
2	213	Upper Lobby	Education	Auditoriums	---	11%	50%	RTU-1	*	*	*	*	5.0	0.06	150	0	---	N/A		N/A	
2	213	Elec	None	None	768	52%	70%	RTU-2	47	10	470	0	0.0	0.00	0	0	**110**	110		N/A	**14.043**
2	214	Control Room	Education	Auditoriums	---	52%	70%	RTU-2	180	9	1620	1	5.0	0.06	150	16	**66**	50	317.7%	**Meets**	**2.444**
2	217	Balcony	Education	Auditoriums	---	52%	70%	RTU-2	*	*	*	*	5.0	0.06	150	0	---	N/A		N/A	
2	220	Mechanical	None	None	---	---	---	---	1230	10	12300	0	0.0	0.00	0	0	---	N/A		N/A	
2	221	Prep	Education	Classroom (ages 9+)	143	0%	35%	AHU-3 N2-101	181	10.6	1919	2	10.0	0.12	35	42	**0**	-42	-100.0%	**Fails**	**0.000**
2	222	Classroom	Education	Classroom (ages 9+)	2143	0%	35%	AHU-3 N2-101	1180	10.6	12508	26	10.0	0.12	35	402	**0**	-402	-100.0%	**Fails**	**0.000**
2	223	Classroom	Education	Classroom (ages 9+)	1716	0%	35%	AHU-3 N2-102	724	9.5	6878	16	10.0	0.12	35	247	**0**	-247	-100.0%	**Fails**	**0.000**
2	224	Classroom	Education	Classroom (ages 9+)	1916	0%	35%	AHU-3 N2-101	705	9.5	6698	26	10.0	0.12	35	345	**0**	-345	-100.0%	**Fails**	**0.000**
2	225	Classroom	Education	Classroom (ages 9+)	1585	0%	35%	AHU-3 N2-102	730	9.5	6935	23	10.0	0.12	35	318	**0**	-318	-100.0%	**Fails**	**0.000**
2	226	Classroom	Education	Classroom (ages 9+)	746	0%	35%	AHU-3 N2-103	761	9.5	7230	26	10.0	0.12	35	351	**0**	-351	-100.0%	**Fails**	**0.000**
2	227	Classroom	Education	Classroom (ages 9+)	1894	0%	35%	AHU-3 N2-102	750	9.5	7125	15	10.0	0.12	35	240	**0**	-240	-100.0%	**Fails**	**0.000**
2	228	Elec	None	None	0	---	---	EF-17	57	13	741	0	0.0	0.00	0	0	---	N/A		N/A	
2	229	Prep	Education	Classroom (ages 9+)	107	0%	35%	AHU-3 N2-103	237	9.5	2252	2	10.0	0.12	35	48	**0**	-48	-100.0%	**Fails**	**0.000**
2	230	Science Classroom	Education	Classroom (ages 9+)	1019	0%	35%	AHU-3 N2-103	1154	9.5	10963	25	10.0	0.12	35	388	**0**	-388	-100.0%	**Fails**	**0.000**
2	231	Lounge	Offices	Office spaces	1170	0%	35%	AHU-3 N2-104	527	9	4743	9	5.0	0.06	5	77	**0**	-77	-100.0%	**Fails**	**0.000**
2	231A	Copier	Workrooms	Copy, printing rooms	---	0%	35%	AHU-3 N2-104	33	8	264	1	5.0	0.06	4	7	**0**	-7	-100.0%	**Fails**	**0.000**
2	237	Faculty	Offices	Office spaces	981	0%	35%	AHU-3 N2-104	227	9.5	2157	4	5.0	0.06	5	34	**0**	-34	-100.0%	**Fails**	**0.000**
2	237A	Telephone	Offices	Telephone/data entry	99	0%	35%	AHU-3 N2-104	66	9.5	627	2	5.0	0.06	60	14	**0**	-14	-100.0%	**Fails**	**0.000**

Project Name:	**Fairfield Public Schools RCx & TAB Study**
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Roger Ludlowe Middle School

VANZELM ENGINEERS

Zone Identification											IMC 2015 Ventilation Calculations									
Floor	**Room#**	**Room Name**	**Occupancy Classification**	**Category**	**Total Airflow**	**Unit Actual OA %**	**BAS OA Damper Cond**	**Served By**	**Zone Area, Az, per space**	**Ceiling Height**	**Volume, per space**	**Zone Population, Pz, per space**	**People OA Rate in Breathing Zone, Rp**	**Area OA Rate in Breathing Zone, Ra**	**Default Occupant Density**	**Min. Required Ventilation Airflow**	**ACTUAL MEASURED VENTILATION AIR FLOW**	**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	239	Classroom	Education	Classroom (ages 9+)	2118	14%	25%	AHU-4 N2-105	718	9.5	6821	26	10.0	0.12	35	346	**297**	-49	-14.2%	**Fails**	**2.613**
2	240	Classroom	Education	Classroom (ages 9+)	641	14%	25%	RTU-4 N2-106	753	9.5	7154	25	10.0	0.12	35	340	**90**	-250	-73.6%	**Fails**	**0.755**
2	241	Classroom	Education	Classroom (ages 9+)	3957	14%	25%	RTU-4 N2-105	734	9.5	6973	26	10.0	0.12	35	348	**554**	206	59.2%	**Meets**	**4.767**
2	242	Classroom	Education	Classroom (ages 9+)	551	14%	25%	RTU-4 N2-106	750	9.5	7125	23	10.0	0.12	35	320	**77**	-243	-75.9%	**Fails**	**0.648**
2	244	Prep	Education	Classroom (ages 9+)	837	14%	25%	RTU-4 N2-105	245	9.5	2328	2	10.0	0.12	35	49	**117**	68	136.8%	**Meets**	**3.016**
2	245	Science Classroom	Education	Classroom (ages 9+)	973	14%	25%	RTU-4 N2-108	1166	9.5	11077	26	10.0	0.12	35	400	**136**	-264	-66.0%	**Fails**	**0.737**
2	245A	Prep Room	Education	Classroom (ages 9+)	---	14%	25%	RTU-4 N2-108	237	9.5	2252	2	10.0	0.12	35	48	**0**	-48	-100.0%	**Fails**	**0.000**
2	246	Classroom	Education	Classroom (ages 9+)	690	14%	25%	RTU-4 N2-106	750	9.5	7125	28	10.0	0.12	35	370	**97**	-273	-73.8%	**Fails**	**0.817**
2	247	Classroom	Education	Classroom (ages 9+)	1981	14%	25%	RTU-4 N2-107	735	9.5	6983	25	10.0	0.12	35	338	**277**	-61	-18.1%	**Fails**	**2.380**
2	248	Classroom	Education	Classroom (ages 9+)	227	41%	73%	RTU-9 N2-110	696	9.5	6612	14	10.0	0.12	35	224	**93**	-131	-58.4%	**Fails**	**0.844**
2	249	Classroom	Education	Classroom (ages 9+)	208	41%	73%	RTU-9 N2-110	755	9.5	7173	22	10.0	0.12	35	311	**85**	-226	-72.6%	**Fails**	**0.711**
2	250	Classroom	Education	Classroom (ages 9+)	239	41%	73%	RTU-9 N2-110	733	9.5	6964	26	10.0	0.12	35	348	**98**	-250	-71.8%	**Fails**	**0.844**
2	251	Classroom	Education	Classroom (ages 9+)	---	41%	73%	RTU-9 N2-111	614	9.5	5833	24	10.0	0.12	35	314	**0**	-314	-100.0%	**Fails**	**0.000**
2	252	Computer Lab	Education	Computer lab	824	41%	73%	RTU-9 N2-112	982	9.5	9329	27	10.0	0.12	25	388	**338**	-50	-12.9%	**Fails**	**2.174**
2	253	Library	Public Spaces	Libraries	4842	69%	82%	RTU-10 N2-113-116	4301	9, 20, 17	73935	54	5.0	0.12	10	786	**3341**	2555	325.0%	**Meets**	**2.711**
2	254	Media Room	Public Spaces	Libraries	---	69%	82%	RTU-10 N2-113-116	640	17	10880	40	5.0	0.12	10	277	**---**	N/A		**N/A**	
2	257	Office	Offices	Office spaces	---	69%	82%	RTU-10 N2-113-116	312	20	6240	5	5.0	0.06	5	44	**---**	N/A		**N/A**	
2	258	Work Room	Workrooms	Copy, printing rooms	155	69%	82%	RTU-10	337	9.5	3202	5	5.0	0.06	4	45	**107**	62	136.6%	**Meets**	**2.005**
2	259	Storage	Storage	Warehouses	---	---	---	---	100	9.5	950	0	0.0	0.06	0	6	**---**	N/A		**N/A**	
2	260	Project Room	Workrooms	Copy, printing rooms	315	69%	82%	RTU-10	587	9.5	5577	32	5.0	0.06	4	195	**217**	22	11.2%	**Meets**	**2.335**
2	261B	Tele/Data	None	None	53	41%	73%	RTU-9 N2-111	165	8	1320	0	0.0	0.00	0	0	**22**	22		**N/A**	**1.000**

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Roger Ludlowe Middle School

VANZELM ENGINEERS

Zone Identification												IMC 2015 Ventilation Calculations									
Floor	**Room#**	**Room Name**	**Occupancy Classification**	**Category**	**Total Airflow**	**Unit Actual OA %**	**BAS OA Damper Cond**	**Served By**	**Zone Area, Az, per space**	**Ceiling Height**	**Volume, per space**	**Zone Population, Pz, per space**	**People OA Rate in Breathing Zone, Rp**	**Area OA Rate in Breathing Zone, Ra**	**Default Occupant Density**	**Min. Required Ventilation Airflow**	**ACTUAL MEASURED VENTILATION AIR FLOW**	**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	262	Office	Offices	Office spaces	36	15%	20%	AHU-5 2N-122	166	9.5	1577	4	5.0	0.06	5	30	**5**	-25	-83.3%	**Fails**	**0.190**
2	263	Office	Offices	Office spaces	29	15%	20%	AHU-5 2N-122	182	9.5	1729	5	5.0	0.06	5	36	**4**	-32	-88.9%	**Fails**	**0.139**
2	264	Conference	Offices	Conference rooms	126	15%	20%	AHU-5 N2-124	250	9.5	2375	8	5.0	0.06	50	55	**19**	-36	-65.5%	**Fails**	**0.480**
2	265	Office	Offices	Office spaces	38	15%	20%	AHU-5 2N-122	182	9.5	1729	7	5.0	0.06	5	46	**6**	-40	-86.9%	**Fails**	**0.208**
2	266	Guidance	Offices	Office spaces	152	15%	20%	AHU-5 2N-123	512	9.5	4864	7	5.0	0.06	5	66	**22**	-44	-66.5%	**Fails**	**0.271**
2	267	Office	Offices	Office spaces	33	15%	20%	AHU-5 2N-122	162	9.5	1539	4	5.0	0.06	5	30	**5**	-25	-83.2%	**Fails**	**0.195**
2	268	Office	Offices	Office spaces	39	15%	20%	AHU-5 2N-122	168	9.5	1596	5	5.0	0.06	5	35	**6**	-29	-82.9%	**Fails**	**0.226**
2	269	Elec	None	None	176	---	---	EF-12	48	13.7	658	0	0.0	0.00	0	0	**---**	N/A		N/A	
2	270	Exam	Hospitals, nursing and convalescent homes	Patient rooms	257	15%	20%	AHU-5 2N-117	84	9.5	798	2	25.0	0.00	10	50	**38**	-12	-24.0%	**Fails**	**2.857**
2	271	Infirmary	Hospitals, nursing and convalescent homes	Patient rooms	127	15%	20%	AHU-5 2N-119	542	9.5	5149	12	25.0	0.00	10	300	**19**	-281	-93.7%	**Fails**	**0.221**
2	272	Nurse	Hospitals, nursing and convalescent homes	Patient rooms	133	15%	20%	AHU-5 2N-119	162	9.5	1539	2	25.0	0.00	10	50	**20**	-30	-60.0%	**Fails**	**0.780**
2	273	Isolation Room	Hospitals, nursing and convalescent homes	Patient rooms	---	15%	20%	AHU-5 2N-119	64	9.5	608	1	25.0	0.00	10	25	**0**	-25	-100.0%	**Fails**	**0.000**
2	276	Administration	Offices	Office spaces	1155	15%	20%	AHU-5 N2-125	718	9.5	6821	8	5.0	0.06	5	83	**170**	87	104.6%	**Meets**	**1.495**
2	277	Mail	Workrooms	Copy, printing rooms	---	15%	20%	AHU-5 N2-125	111	9.5	1055	2	5.0	0.06	4	17	**0**	-17	-100.0%	**Fails**	**0.000**
2	278	Dean	Offices	Office spaces	194	15%	20%	AHU-5 2N-121	191	9.5	1815	2	5.0	0.06	5	21	**29**	8	35.1%	**Meets**	**0.959**
2	279	Dean	Offices	Office spaces	180	15%	20%	AHU-5 2N-121	206	9.5	1957	5	5.0	0.06	5	37	**26**	-11	-30.4%	**Fails**	**0.797**
2	281	Assistant Principal	Offices	Office spaces	109	15%	20%	AHU-5 2N-120	251	9.5	2385	5	5.0	0.06	5	40	**16**	-24	-60.1%	**Fails**	**0.403**
2	282	Principal	Offices	Office spaces	182	15%	20%	AHU-5 N2-118	331	9.5	3145	7	5.0	0.06	5	55	**27**	-28	-50.8%	**Fails**	**0.515**
2	283	Kitchenette	Offices	Office spaces	---	15%	20%	AHU-5 N2-118	130	9.5	1235	3	5.0	0.06	5	23	**0**	-23	-100.0%	**Fails**	**0.000**
2	284	Conference	Offices	Conference rooms	259	15%	20%	AHU-5 N2-116	367	9.5	3487	11	5.0	0.06	50	77	**38**	-39	-50.7%	**Fails**	**0.654**
2	285J	Cust	Storage	Warehouses	0	---	---	TX-5	33	9.5	314	0	0.0	0.06	0	2	**0**	-2	-100.0%	**Fails**	**0.000**

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VANZELM ENGINEERS

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Floor	**Room#**	**Room Name**	**Occupancy Classification**	**Category**	**Total Airflow**	**Unit Actual OA %**	**BAS OA Damper Cond**	**Served By**	**Zone Area, Az, per space**	**Ceiling Height**	**Volume, per space**	**Zone Population, Pz, per space**	**People OA Rate in Breathing Zone, Rp**	**Area OA Rate in Breathing Zone, Ra**	**Default Occupant Density**	**Min. Required Ventilation Airflow**	**ACTUAL MEASURED VENTILATION AIR FLOW**	**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	288	Classroom	Education	Classroom (ages 9+)	450	15%	20%	AHU-5 N2-114	441	9.5	4190	13	10.0	0.12	35	183	**66**	-117	-63.9%	**Fails**	**0.945**
2	289	Classroom	Education	Classroom (ages 9+)	1092	15%	20%	AHU-5 N2-114	593	9.5	5634	10	10.0	0.12	35	171	**161**	-10	-5.9%	**Fails**	**1.715**
2	291	Classroom	Education	Classroom (ages 9+)	729	15%	20%	AHU-5 N2-115	718	9.5	6821	13	10.0	0.12	35	216	**107**	-109	-50.5%	**Fails**	**0.941**
2	292	Team Assembly	Offices	Conference rooms	761	15%	20%	AHU-5 N2-126	1464	9.5	13908	37	5.0	0.06	50	273	**112**	-161	-59.0%	**Fails**	**0.483**
2	293	Mechanical	None	None	---	---	---	---	1040	10	10400	0	0.0	0.00	0	0	**---**	N/A		N/A	
1	294	Mechanical/Storage	Storage	Warehouses	---	---	---	---	316	9.5	3002	0	0.0	0.06	0	19	**---**	N/A		N/A	
3	301	Prep	Education	Classroom (ages 9+)	223	16.3%	35%	AHU-4 N2101	288	9.5	2736	2	10.0	0.12	35	55	**36**	-19	-34.0%	**Fails**	**0.789**
3	302	Science Classroom	Education	Classroom (ages 9+)	2214	16.3%	35%	AHU-4 N2101	1103	9.5	10479	26	10.0	0.12	35	392	**362**	-30	-7.7%	**Fails**	**2.073**
3	303A	Elec	None	None	---	---	---	EF-17	44	12	528	0	0.0	0.00	0	0	**---**	N/A		N/A	
3	304	Classroom	Education	Classroom (ages 9+)	1231	16.3%	35%	AHU-4 N2-102	724	9.5	6878	26	10.0	0.12	35	347	**201**	-146	-42.1%	**Fails**	**1.753**
3	305	Classroom	Education	Classroom (ages 9+)	1711	16.3%	35%	AHU-4 N2-101	718	9.5	6821	26	10.0	0.12	35	346	**280**	-66	-19.1%	**Fails**	**2.463**
3	306	Classroom	Education	Classroom (ages 9+)	1208	16.3%	35%	AHU-4 N2-102	736	9.5	6992	26	10.0	0.12	35	348	**197**	-151	-43.4%	**Fails**	**1.691**
3	307	Classroom	Education	Classroom (ages 9+)	1630	16.3%	35%	AHU-4 N2-103	738	9.5	7011	28	10.0	0.12	35	369	**266**	-103	-27.8%	**Fails**	**2.276**
3	308	Classroom	Education	Classroom (ages 9+)	1218	16.3%	35%	AHU-4 N2-102	756	9.5	7182	23	10.0	0.12	35	321	**199**	-122	-38.0%	**Fails**	**1.662**
3	309	Prep	Education	Classroom (ages 9+)	184	16.3%	35%	AHU-4 N2-103	235	9.5	2233	2	10.0	0.12	35	48	**30**	-18	-37.8%	**Fails**	**0.806**
3	310	Science Classroom	Education	Classroom (ages 9+)	2387	16.3%	35%	AHU-4 N2-103	1148	9.5	10906	26	10.0	0.12	35	398	**390**	-8	-2.0%	**Fails**	**2.146**
3	312	Lounge	Offices	Office spaces	0	16.3%	35%	AHU-4 N2-104	527	9	4743	9	5.0	0.06	5	77	**0**	-77	-100.0%	**Fails**	**0.000**
3	314	Copier	Workrooms	Copy, printing rooms	---	---	---	---	33	8	264	1	5.0	0.06	4	7	**---**	N/A		N/A	
3	314A (358)	Copier	Workrooms	Copy, printing rooms	---	---	---	---	25	8	200	0	5.0	0.06	4	2	**---**	N/A		N/A	
3	319	Faculty	Offices	Office spaces	0	16.3%	35%	AHU-4 N2-104	227	9.5	2157	4	5.0	0.06	5	34	**0**	-34	-100.0%	**Fails**	**0.000**
3	319A	Telephone	Offices	Telephone/data entry	0	16.3%	35%	AHU-4 N2-104	66	9.5	627	2	5.0	0.06	60	14	**0**	-14	-100.0%	**Fails**	**0.000**

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Floor	**Room#**	**Room Name**	**Occupancy Classification**	**Category**	**Total Airflow**	**Unit Actual OA %**	**BAS OA Damper Cond**	**Served By**	**Zone Area, Az, per space**	**Ceiling Height**	**Volume, per space**	**Zone Population, Pz, per space**	**People OA Rate in Breathing Zone, Rp**	**Area OA Rate in Breathing Zone, Ra**	**Default Occupant Density**	**Min. Required Ventilation Airflow**	**ACTUAL MEASURED VENTILATION AIR FLOW**	**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)
3	320	Classroom	Education	Classroom (ages 9+)	978	34%	45%	RTU-6 N2-106	717	9.5	6812	26	10.0	0.12	35	346	**333**	-13	-3.8%	Fails	**2.933**
3	321	Classroom	Education	Classroom (ages 9+)	1075	34%	45%	RTU-6 N2-105	755	9.5	7173	25	10.0	0.12	35	341	**366**	25	7.5%	Meets	**3.062**
3	322	Classroom	Education	Classroom (ages 9+)	1018	34%	45%	RTU-6 N2-107	756	9.5	7182	14	10.0	0.12	35	231	**346**	115	50.0%	Meets	**2.891**
3	323	Classroom	Education	Classroom (ages 9+)	695	34%	45%	RTU-6 N2-106	754	9.5	7163	26	10.0	0.12	35	350	**236**	-114	-32.7%	Fails	**1.977**
3	324	Prep	Education	Classroom (ages 9+)	334	34%	45%	RTU-6 N2-107	232	9.5	2204	2	10.0	0.12	35	48	**114**	66	138.3%	Meets	**3.103**
3	325	Science Classroom	Education	Classroom (ages 9+)	1569	34%	45%	RTU-6 N2-107	1160	9.5	11020	28	10.0	0.12	35	419	**533**	114	27.1%	Meets	**2.902**
3	326	Tele/Data	None	None	---	---	---	EF-16	53	13	689	0	0.0	0.00	0	0	**---**	N/A		N/A	
3	327	Classroom	Education	Classroom (ages 9+)	649	34%	45%	RTU-6 N2-106	754	9.5	7163	13	10.0	0.12	35	220	**221**	1	0.2%	Meets	**1.851**
3	328	Classroom	Education	Classroom (ages 9+)	677	34%	45%	RTU-6 N2-106	734	9.5	6973	28	10.0	0.12	35	368	**230**	-138	-37.5%	Fails	**1.979**
3	329	Classroom	Education	Classroom (ages 9+)	687	23%	35%	RTU-8 N2-108	696	9.5	6612	25	10.0	0.12	35	334	**158**	-176	-52.6%	Fails	**1.434**
3	330	Classroom	Education	Classroom (ages 9+)	675	23%	35%	RTU-8 N2-108	754	9.5	7163	26	10.0	0.12	35	350	**155**	-195	-55.8%	Fails	**1.298**
3	331	Classroom	Education	Classroom (ages 9+)	697	23%	35%	RTU-8 N2-108	739	9.5	7021	26	10.0	0.12	35	349	**160**	-189	-54.1%	Fails	**1.367**
3	332	Classroom	Education	Classroom (ages 9+)	1025	23%	35%	RTU-8 N2-111	614	9.5	5833	26	10.0	0.12	35	334	**236**	-98	-29.3%	Fails	**2.428**
3	333	Computer Lab	Education	Computer lab	3151	23%	35%	RTU-8 N2-111	984	9.5	9348	29	10.0	0.12	25	408	**725**	317	77.7%	Meets	**4.653**
3	333A	Office	Offices	Office spaces	---	23%	35%	RTU-8 N2-111	132	9.5	1254	1	5.0	0.06	5	13	**0**	-13	-100.0%	Fails	**0.000**
3	334	Tele/Data	None	None	---	---	---	---	132	13.5	1782	0	0.0	0.00	0	0	**---**	N/A		N/A	
3	335	Computer Lab	Education	Computer lab	852	23%	35%	RTU-8 N2-112	746	9.5	7087	25	10.0	0.12	25	340	**196**	-144	-42.3%	Fails	**1.659**
3	336	Tele/Data	None	None	---	---	---	---	53	13.5	716	0	0.0	0.00	0	0	**---**	N/A		N/A	
3	339	Classroom	Education	Classroom (ages 9+)	315	27.5%	0%	RTU-11 N2-118	718	9.5	6821	24	10.0	0.12	35	326	**87**	-239	-73.3%	Fails	**0.765**
3	340	Classroom	Education	Classroom (ages 9+)	108	27.5%	0%	RTU-11 N2-117	730	9.5	6935	15	10.0	0.12	35	238	**30**	-208	-87.4%	Fails	**0.260**
3	341	Classroom	Education	Classroom (ages 9+)	281	27.5%	0%	RTU-11 N2-118	733	9.5	6964	28	10.0	0.12	35	368	**77**	-291	-79.1%	Fails	**0.663**

Project Name:	**Fairfield Public Schools RCx & TAB Study**
Project Number:	**2020102.00.02**
Scope	**Ventilation Calculation by Building**
Date	**April 25, 2022**

Roger Ludlowe Middle School

VANZELM ENGINEERS

Zone Identification											IMC 2015 Ventilation Calculations									
Floor	**Room#**	**Room Name**	**Occupancy Classification**	**Category**	**Total Airflow**	**Unit Actual OA %**	**BAS OA Damper Cond**	**Served By**	**Zone Area, Az, per space**	**Ceiling Height**	**Volume, per space**	**Zone Population , Pz, per space**	**People OA Rate in Breathing Zone, Rp**	**Area OA Rate in Breathing Zone, Ra**	**Default Occupant Density**	**Min. Required Ventilation Airflow**	**ACTUAL MEASURED VENTILATION AIR FLOW**	**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)
3	342	Prep	Education	Classroom (ages 9+)	123	27.5%	0%	RTU-11 N2-118	226	9.5	2147	2	10.0	0.12	35	47	**34**	-13	-27.8%	**Fails**	**0.950**
3	343	Elec	None	None	---	---	---	TF-12	67	12	804	0	0.0	0.00	0	0	**---**	N/A		**N/A**	
3	344	Classroom	Education	Classroom (ages 9+)	137	27.5%	0%	RTU-11 N2-117	746	9.5	7087	23	10.0	0.12	35	320	**38**	-282	-88.1%	**Fails**	**0.322**
3	345	Tele/Data	None	None	---	---	---	TF-11	63	13.5	851	0	0.0	0.00	0	0	**---**	N/A		**N/A**	
3	346	Prep	Education	Classroom (ages 9+)	35	27.5%	0%	RTU-11 N2-117	226	9.5	2147	2	10.0	0.12	35	47	**10**	-37	-78.8%	**Fails**	**0.279**
3	347	Classroom	Education	Classroom (ages 9+)	129	27.5%	0%	RTU-11 N2-119	724	9.5	6878	23	10.0	0.12	35	317	**35**	-282	-89.0%	**Fails**	**0.305**
3	348	Classroom	Education	Classroom (ages 9+)	969	27.5%	0%	RTU-11 N2-120	744	9.5	7068	25	10.0	0.12	35	339	**266**	-73	-21.6%	**Fails**	**2.258**
3	349	Classroom	Education	Classroom (ages 9+)	1045	27.5%	0%	RTU-11 N2-120	732	9.5	6954	25	10.0	0.12	35	338	**287**	-51	-15.0%	**Fails**	**2.476**
3	350	Classroom	Education	Classroom (ages 9+)	131	27.5%	0%	RTU-11 N2-119	730	9.5	6935	12	10.0	0.12	35	208	**36**	-172	-82.7%	**Fails**	**0.311**
3	351	Classroom	Education	Classroom (ages 9+)	1066	27.5%	0%	RTU-11 N2-120	726	9.5	6897	25	10.0	0.12	35	337	**293**	-44	-13.1%	**Fails**	**2.549**
3	352	Classroom	Education	Classroom (ages 9+)	486	0%	25%	AHU-6 N2-124	718	9.5	6821	12	10.0	0.12	35	206	**0**	-206	-100.0%	**Fails**	**0.000**
3	355	Faculty	Offices	Office spaces	416	0%	25%	AHU-6 N2-121	240	9.5	2280	1	5.0	0.06	5	19	**0**	-19	-100.0%	**Fails**	**0.000**
3	355A	Telephone	Offices	Telephone/data entry	77	0%	25%	AHU-6 N2-121	66	9.5	627	1	5.0	0.06	60	9	**0**	-9	-100.0%	**Fails**	**0.000**
3	360	Lounge	Education	Classroom (ages 9+)	272	0%	25%	AHU-6 N2-121	382	9	3438	10	10.0	0.12	35	146	**0**	-146	-100.0%	**Fails**	**0.000**
3	361	Classroom	Education	Classroom (ages 9+)	558	0%	25%	AHU-6 N2-124	753	9.5	7154	28	10.0	0.12	35	370	**0**	-370	-100.0%	**Fails**	**0.000**
3	362	Classroom	Education	Classroom (ages 9+)	329	0%	25%	AHU-6 N2-123	720	9.5	6840	22	10.0	0.12	35	306	**0**	-306	-100.0%	**Fails**	**0.000**
3	363	Classroom	Education	Classroom (ages 9+)	688	0%	25%	AHU-6 N2-124	771	9.5	7325	28	10.0	0.12	35	373	**0**	-373	-100.0%	**Fails**	**0.000**
3	364	Prep	Education	Classroom (ages 9+)	187	0%	25%	AHU-6 N2-122	212	9.5	2014	2	10.0	0.12	35	45	**0**	-45	-100.0%	**Fails**	**0.000**
3	365	Elec	None	None	---	---	---	---	62	14	868	0	0.0	0.00	0	0	**---**	N/A		**N/A**	
3	366	Classroom	Education	Classroom (ages 9+)	329	0%	25%	AHU-6 N2-123	768	9.8	7526	11	10.0	0.12	35	202	**0**	-202	-100.0%	**Fails**	**0.000**
3	367	Tele/Data	None	None	---	---	---	Exhaust	60	13.5	810	0	0.0	0.00	0	0	**---**	N/A		**N/A**	

Project Name:	Fairfield Public Schools RCx & TAB Study
Project Number:	2020102.00.02
Scope	Ventilation Calculation by Building
Date	April 25, 2022

Roger Ludlowe Middle School

VANZELM ENGINEERS

Zone Identification												IMC 2015 Ventilation Calculations									
Floor	Room#	Room Name	Occupancy Classification	Category	Total Airflow	Unit Actual OA %	BAS OA Damper Cond	Served By	Zone Area, Az, per space	Ceiling Height	Volume, per space	Zone Population, Pz, per space	People OA Rate in Breathing Zone, Rp	Area OA Rate in Breathing Zone, Ra	Default Occupant Density	Min. Required Ventilation Airflow	ACTUAL MEASURED VENTILATION AIR FLOW	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)
3	368	Prep	Education	Classroom (ages 9+)	77	0%	25%	AHU-6 N2-125	204	9.5	1938	1	10.0	0.12	35	34	0	-34	-100.0%	Fails	0.000
3	369	Classroom	Education	Classroom (ages 9+)	357	0%	25%	AHU-6 N2-125	704	9.5	6688	24	10.0	0.12	35	324	0	-324	-100.0%	Fails	0.000
3	370	Classroom	Education	Classroom (ages 9+)	573	0%	25%	AHU-6 N2-122	737	9.5	7002	23	10.0	0.12	35	318	0	-318	-100.0%	Fails	0.000
3	371	Classroom	Education	Classroom (ages 9+)	636	0%	25%	AHU-6 N2-122	741	9.5	7040	22	10.0	0.12	35	309	0	-309	-100.0%	Fails	0.000

APPENDIX 3 – Roof Map


RTU-10
RTU-9
RTU-7
RTU-8
RTU-11
AHU-2 (Inside, Ground Floor)
AHU-5 (Inside, Second Floor
AHU-6 (Inside, Second Floor
RTU-6
RTU-14
RTU-13
RTU-16
RTU-4
RTU-5
RTU-12
RTU-15
RTU-3
AHU-1 (Inside, Ground Floor)
AHU-4 (Inside, 2nd Floor)
AHU-3 (Inside, 2nd Floor)
RTU-1
RTU-2
3D

APPENDIX 4 – TAB Airflow Survey Data

Fairfield Public Schools

Roger Ludlow Middle School

Ventilation Survey

* * * *

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

April 10th, 2022

April 10th, 2022

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

Re: Fairfield Public Schools – Roger Ludlow Middle School / HVAC Retro Commissioning

Dear Bill,

Wing's has completed the testing of ventilation rates at the above referenced location. The results are as follows:

- Air handler totals and O.A. readings for all systems as well as distribution readings for the requested areas has been completed.
- All readings were taken as noted on attached data sheets.
- Systems were very slow in responding to fan speed adjustments.
- Systems were unable to be manipulated through the ALC or Metasys system. All overrides were through the J.C.I. B.A.S.
- Numerous VAV controllers were found to be bad.
- O.A. damper positions did not watch the head and on numerous systems.

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

John Flanagan
Certified TABB Supervisor TB950107S
CT SM-2 License #771
TABB Sound & Vibration Supervisor SV060109S
Indoor Air Quality Technician IAQ950107T

Pictures:

AHU-3 Min. O.A.

AHU-6 Min O.A. “as found”

AHU-3 “as found”

AHU-4 Min. O.A.

RTU-16 Min. O.A.

VELOCITY PRESSURE READINGS

PROJECT: Fairfield Public Schools - Roger Ludlowe Middle School **DATE:** 3/25/22

AREA SERVED: Various **TECH:** JF

TRAVERSE LOCATIONS	DUCT SIZE "	AREA SQ.FT.	DESIGN FPM	DESIGN CFM	CENT. STAT. PRESS.''	TEST FPM	TEST CFM	NOTES
RTU-1								
Max Flow	46 1/4'' x 38 1/2''	12.37	501	6200	w/ Velgrid	620	7669	
Min. O.A.	36 3/4'' x 33 3/4''	8.61	235	2025	w/ Velgrid	99	852	
RTU-2								
Max Flow	2 (69 1/4'' x 32 1/2'')	30.35	527	16,000	w/ Velgrid	608	18,453	
Min. O.A.	49 1/2'' x 63 3/4''	21.9	415	9090	w/ Velgrid	436	9548	
RTU-3 MUA								(1)
Max Flow	(1)	(1)	(1)	4800	(1)	(1)	(1)	
Min. O.A.	(1)	(1)	(1)	4800	(1)	(1)	(1)	
RTU-4								
Min Flow	98 1/2'' x 35 1/2''	24.28	---	ND	w/ Velgrid	496	12,043	
Min. O.A.	2 (32 3/4'' x 26 3/4'')	12.17	227	2760	w/ Velgrid	143	1740	
Max Flow	98 1/2'' x 35 1/2''	24.28	511	12,400	w/ Velgrid	522	12,674	
Min. O.A.	2 (32 3/4'' x 26 3/4'')	12.17	227	2760	w/ Velgrid	196	2385	
RTU-5								
Min Flow	98 1/2'' x 35 1/2''	24.28	---	ND	w/ Velgrid	476	11,557	
Min. O.A.	2 (32 3/4'' x 26 3/4'')	12.17	439	5340	w/ Velgrid	161	1959	
Max Flow	98 1/2'' x 35 1/2''	24.28	502	12,180	w/ Velgrid	535	12,990	
Min. O.A.	2 (32 3/4'' x 26 3/4'')	12.17	439	5340	w/ Velgrid	248	3018	
RTU-6								
Min Flow	101 1/4'' x 35 1/2''	24.96	---	ND	w/ Velgrid	337	8412	
Min. O.A.	2 (32 3/4'' x 26 3/4'')	12.17	217	2640	w/ Velgrid	233	2836	
Max Flow	101 1/4'' x 35 1/2''	24.96	509	12,700	w/ Velgrid	370	9235	
Min. O.A.	2 (32 3/4'' x 26 3/4'')	12.17	217	2640	w/ Velgrid	235	2860	

REMARKS

General Note: All Min/Max Flow readings measured by coil scan unless otherwise noted. All O.A. readings measured at intake.

(1) Unit doesn't run.

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

VELOCITY PRESSURE READINGS

PROJECT: Fairfield Public Schools - Roger Ludlowe Middle School **DATE:** 3/28/22

AREA SERVED: Various **TECH:** JF

TRAVERSE LOCATIONS	DUCT SIZE "	AREA SQ.FT.	DESIGN FPM	DESIGN CFM	CENT. STAT. PRESS."	TEST FPM	TEST CFM	NOTES
RTU-7								
Min Flow	108" x 35 1/2"	26.625	---	ND	w/ Velgrid	360	9585	
Min. O.A.	2 (32 3/4" x 30 3/4")	6.99	303	2115	w/ Velgrid	518	3621	
Max Flow	108" x 35 1/2"	26.625	518	13,800	w/ Velgrid	375	9984	
Min. O.A.	2 (32 3/4" x 30 3/4")	6.99	303	2115	w/ Velgrid	555	3879	
RTU-8								
Min Flow	103" x 35 1/2"	25.39	---	ND	w/ Velgrid	331	8404	
Min. O.A.	2 (32 3/4" x 30 3/4")	13.99	170	2385	w/ Velgrid	141	1973	
Max Flow	103" x 35 1/2"	25.39	516	13,100	w/ Velgrid	345	8760	
Min. O.A.	2 (32 3/4" x 30 3/4")	13.99	170	2385	w/ Velgrid	155	2168	
RTU-9								
Min Flow	117 1/2" x 38 1/2"	31.41	---	ND	w/ Velgrid	231	7256	
Min. O.A.	2 (40 1/4" x 30 3/4")	17.19	132	2265	w/ Velgrid	172	2957	
Max Flow	117 1/2" x 38 1/2"	31.41	509	16,000	w/ Velgrid	408	12,815	
Min. O.A.	2 (40 1/4" x 30 3/4")	17.19	132	2265	w/ Velgrid	169	2905	
RTU-10								
Min Flow	47" x 38 1/2"	12.56	---	ND	w/ Velgrid	423	5313	
Min. O.A.	35 3/4" x 32 3/4"	8.13	237	1925	w/ Velgrid	452	3675	
Max Flow	47" x 38 1/2"	12.56	454	5700	w/ Velgrid	508	6380	
Min. O.A.	35 3/4" x 32 3/4"	8.13	237	1925	w/ Velgrid	526	4276	

REMARKS

General Note: All Min/Max Flow readings measured by coil scan unless otherwise noted. All O.A. readings measured at intake.

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

VELOCITY PRESSURE READINGS

PROJECT: Fairfield Public Schools - Roger Ludlowe Middle School **DATE:** 3/28/22

AREA SERVED: Various **TECH:** JF

TRAVERSE LOCATIONS	DUCT SIZE "	AREA SQ.FT.	DESIGN FPM	DESIGN CFM	CENT. STAT. PRESS."	TEST FPM	TEST CFM	NOTES
RTU-11								
Min Flow	98 3/4'' x 35 1/2''	24.3	---	ND	w/ Velgrid	274	6658	
Min. O.A.	2 (32 3/4'' x 28 3/4'')	13.08	295	3855	w/ Velgrid	140	1831	
Max Flow	98 3/4'' x 35 1/2''	24.3	514	12,500	w/ Velgrid	275	6683	
Min. O.A.	2 (32 3/4'' x 28 3/4'')	13.08	295	3855	w/ Velgrid	142	1857	
RTU-12								
Max Flow	29 5/8'' x 14 5/8''	3.0	883	2650	w/ Velgrid	748	2244	(1)
Min. O.A.	29 5/8'' x 14 5/8''	3.0	500	1500	w/ Velgrid	329	987	
RTU-13								
Max Flow	29 5/8'' x 14 5/8''	3.0	883	2650	w/ Velgrid	1092	3276	(1)
Min. O.A.	29 5/8'' x 14 5/8''	3.0	145	435	w/ Velgrid	238	714	
RTU-14								
Max Flow	29 5/8'' x 14 5/8''	3.0	883	2650	w/ Velgrid	1091	3273	(3)
Min. O.A.	29 5/8'' x 14 5/8''	3.0	140	420	w/ Velgrid	234	702	
RTU-15								
Min Flow	46 1/4'' x 38 1/4''	12.29	---	ND	w/ Velgrid	347	4265	
Min. O.A.	35 3/4'' x 32 3/4''	8.13	89	720	w/ Velgrid	0	0	(2)
Max Flow	46 1/4'' x 38 1/4''	12.29	509	6250	w/ Velgrid	545	6698	
Min. O.A.	35 3/4'' x 32 3/4''	8.13	89	720	w/ Velgrid	135	1098	
RTU-16								
Max Flow	2 (85 1/2'' x 38 1/2'')	44.92	534	24,000	w/ Velgrid	404	18,148	
Min. O.A.	2 (32 5/8'' x 71 1/2'')	32.40	436	14,130	w/ Velgrid	0	0	(2)

REMARKS

General Note: All Min/Max Flow readings measured by coil scan unless otherwise noted. All O.A. readings measured at intake.

(1) Tested under 100% O.A. Coil scan not possible.

(2) Air exhausting through O.A. intake.

(3) Tested under 100% O.A. as no suitable location for coil scan or duct traverse.

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

VELOCITY PRESSURE READINGS

PROJECT: Fairfield Public Schools - Roger Ludlowe Middle School **DATE:** 3/22/22

AREA SERVED: Various **TECH:** JF

TRAVERSE LOCATIONS	DUCT SIZE "	AREA SQ.FT.	DESIGN FPM	DESIGN CFM	CENT. STAT. PRESS."	TEST FPM	TEST CFM	NOTES
AHU-1								
Min Total	59 1/2" x 35 1/2"	14.67	---	ND	w/ Velgrid	268	3932	
Min O.A.	70" x 14"	6.80	311	2115	-0.007"	186	1265	
Max Total	59 1/2" x 35 1/2"	14.67	502	7370	w/ Velgrid	534	7834	
Min O.A.	70" x 14"	6.80	311	2115	-0.014"	253	1720	
AHU-2								
Min Total	67 1/2" x 44 1/2"	20.86	---	ND	w/ Velgrid	512	10,680	(4)
Return	32" x 32"	7.11	---	ND	-0.16"	796	5660	
Min O.A.	---	---	---	2340	---	---	5020	
Max Total	67 1/2" x 44 1/2"	20.86	---	8960	---	---	---	(4)
Return	32" x 32"	7.11	---	ND	---	---	---	
Min O.A.	---	---	---	2340	---	---	---	
AHU-3								
Min Total	2 (93 1/2" x 26 1/2")	32.94	---	ND	w/ Velgrid	486	16,009	(3)
Min O.A.	2 (44" x 22")	13.44	209	2805	RVA	0	0	(1,2)
Max Total	2 (93 1/2" x 26 1/2")	32.94	441	14,520	w/ Velgrid	488	16,075	
Min O.A.	2 (44" x 22")	13.44	209	2805	RVA	0	0	(1,2)
AHU-4								
Min Total	2 (77 1/2" x 29 1/2")	30.93	---	ND	w/ Velgrid	465	14,382	(3)
Min O.A.	94" x 24"	15.67	187	2925	-0.01"	150	2351	
Max Total	2 (77 1/2" x 29 1/2")	30.93	487	15,070	w/ Velgrid	470	14,537	
Min O.A.	94" x 24"	15.67	187	2925	-0.01"	153	2398	

REMARKS

(1) No suitable location for VPT on R.A. or O.A. Reading is across damper.

(2) Damper did not open. See picture.

(3) Fan at 60 Hz.

(4) System unable to communicate with VAVs.

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

VELOCITY PRESSURE READINGS

PROJECT: Fairfield Public Schools - Roger Ludlowe Middle School **DATE:** 3/24/22

AREA SERVED: Various **TECH:** JF

TRAVERSE LOCATIONS	DUCT SIZE "	AREA SQ.FT.	DESIGN FPM	DESIGN CFM	CENT. STAT. PRESS.''	TEST FPM	TEST CFM	NOTES
AHU-5								
Min Total	2 (77 1/2'' x 26 1/2'')	27.78	---	ND	w/ Velgrid	305	8473	(2)
Min O.A.	86'' x 24''	14.33	200	2865	-0.02''	0	0	(1,2)
Max Total	2 (77 1/2'' x 26 1/2'')	27.78	520	14,455	w/ Velgrid	444	12,334	(2)
Min O.A.	86'' x 24''	14.33	200	2865	-0.006''	173	2479	(2)
AHU-6								
Min Total	71 1/2'' x 50 1/2''	25.07	---	ND	w/ Velgrid	266	6669	
Min O.A.	80'' x 24''	13.33	239	3180	+0.009''	0	0	(4)
Max Total	71 1/2'' x 50 1/2''	25.07	502	12,585	w/ Velgrid	390	9777	
Min O.A.	80'' x 24''	13.33	239	3180	+0.005''	0	0	

REMARKS

(1) Mixed air plenum is positively pressurized to MER. RA is exhausting through O.A. intake.

(2) System simulation through Metasys only. No ALC or HVACAO.

(3) Tested "as found" MER = -0.003'' / Dmp = 20%

(4) See picture: Dmp = 25%

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

AIR DEVICE REPORT

PROJECT: Fairfield Public Schools - Roger Ludlowe Middle School **DATE:** 3/28/22

SYSTEM / AREA: Toilet Exhaust / Various **TECH:** JF

LOCATION	NO.	SIZE	A K	DESIGN		TEST		FINAL		NOTES
				FPM	CFM	FPM	CFM	FPM	CFM	
TX-1										
Women's Rm 114	1	24'' x 12''	FH	---	120	---	93			
Women's Rm 114	2	24'' x 12''	FH	---	120	---	120			
Men's Rm 113	3	24'' x 12''	FH	---	120	---	100			
Men's Rm 113	4	24'' x 12''	FH	---	120	---	111			
Janitor's Clst 138A	5	24'' x 12''	1.6	50	80	35	56			
W.C. 218	6	24'' x 12''	FH	---	160	---	154			
					720		634			
TX-2										
Handicap 313	1	24'' x 12''	FH	---	80	---	41			
Faculty 319	2	24'' x 12''	FH	---	80	---	38			
Janitor's Clst 315	3	24'' x 12''	1.6	50	80	40	64			
Women's Rm 317	4	24'' x 12''	FH	---	120	---	57			
Women's Rm 317	5	24'' x 12''	FH	---	120	---	108			
Men's Rm 318	6	24'' x 12''	FH	---	120	---	89			
Men's Rm 318	7	24'' x 12''	FH	---	120	---	94			
Janitor's Clst 233	8	24'' x 12''	1.6	50	80	20	32			
Faculty 232	9	24'' x 12''	FH	---	80	---	43			
Lounge Toilet 234	10	24'' x 12''	FH	---	80	---	33			
Women's Rm 235	11	24'' x 12''	FH	---	120	---	61			
Women's Rm 235	12	24'' x 12''	FH	---	120	---	41			
Men's Rm 236	13	24'' x 12''	FH	---	120	---	39			
Men's Rm 236	14	24'' x 12''	FH	---	120	---	43			
					1440		783			
TX-3										
W.C. 148	1	24'' x 12''	FH	---	80	---	36			
Men's Rm 150	2	24'' x 12''	FH	---	120	---	52			
Men's Rm 150	3	24'' x 12''	FH	---	120	---	19			
Women's Rm 151	4	24'' x 12''	FH	---	120	---	59			
Women's Rm 151	5	24'' x 12''	FH	---	120	---	21			
Locker W.C. 156A	6	24'' x 12''	FH	---	80	---	32			
Women's Rm 173	7	24'' x 12''	FH	---	120	---	23			
Women's Rm 173	8	24'' x 12''	FH	---	120	---	13			
Men's Rm 174	9	24'' x 12''	FH	---	120	---	41			
Men's Rm 174	10	24'' x 12''	FH	---	120	---	15			
Men's Rm 164	11	24'' x 12''	FH	---	150	---	34			
Women's Rm 163	12	24'' x 12''	FH	---	150	---	14			
					1420		359			

REMARKS

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

AIR DEVICE REPORT

PROJECT: Fairfield Public Schools - Roger Ludlowe Middle School **DATE:** 3/28/22

SYSTEM / AREA: Toilet Exhaust / Various **TECH:** JF

LOCATION	NO.	SIZE	A K	DESIGN		TEST		FINAL		NOTES
				FPM	CFM	FPM	CFM	FPM	CFM	
TX-5										
W.C. 357	1	24'' x 12''	FH	---	80	---	69			
Janitor's Cl 356	2	24'' x 12''	1.6	50	80	75	120			
Copy 358	3	24'' x 12''	FH	---	80	---	115			
Copy 359	4	24'' x 12''	FH	---	80	---	77			
Women's Rm 354	5	24'' x 12''	FH	---	120	---	128			
Women's Rm 354	6	24'' x 12''	FH	---	120	---	136			
Men's Rm 353	7	24'' x 12''	FH	---	120	---	108			
Men's Rm 353	8	24'' x 12''	FH	---	120	---	106			
					800		859			
TX-6										
W.C. 290	1	24'' x 12''	FH	---	80	---	108			
Men's Rm 287	2	24'' x 12''	FH	---	160	---	117			
Women's Rm 286	3	24'' x 12''	FH	---	160	---	163			
Storage 274	4	24'' x 12''	FH	---	80	---	121			
W.C. 273	5	24'' x 12''	FH	---	80	---	103			
W.C. 273	6	24'' x 12''	FH	---	80	---	109			
Admin's Tlt 283A	7	24'' x 12''	FH	---	80	---	85			
Janitor's Cl 285A	8	24'' x 12''	1.6	50	80	0	0			
Men's Rm 185	9	24'' x 12''	FH	---	160	---	45			
Men's Rm 185	10	24'' x 12''	FH	---	160	---	14			
Women's Rm 184	11	24'' x 12''	FH	---	160	---	36			
Women's Rm 184	12	24'' x 12''	FH	---	160	---	32			
Janitor's Cl 180	13	24'' x 12''	FH	---	80	---	30			
					1520		963			
TX-7A										
008	1	24'' x 12''	FH	---	205	---	328			
008	2	24'' x 12''	FH	---	200	---	320			
					405		648			
TX-7										
006	1	24'' x 12''	FH	---	200	---	193			
006	2	24'' x 12''	FH	---	200	---	225			
007	3	24'' x 12''	FH	---	200	---	202			
007	4	24'' x 12''	FH	---	200	---	152			
					800		772			

REMARKS

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

Project Name:	**Fairfield Public Schools RCx: Roger Ludlowe Middle School**
Project Number:	*2020102.00.02*
Scope	**TAB Data**
Date	**03/28/2022**

Zone Identification								
Floor	Room#	Room Name	Design Min CFM	Actual OA at Min	Unit Actual OA %	BAS OA Damper Cond	Space Served By	Notes
0	002	Mechanical	NA	---	---	---	EF-8	
0	003	Mechanical	---	---	---	---	EF-6,7,9	
0	005	Elev Mech	---	---	---	---	EF-NL	
0	008	Storage	648	---	---	---	TX-7A	
0	009	Gym Lobby	613	0	0%	15%	RTU-15 N2-121	
0	010	Auxiliary Gymnasium	2244	987	44%	75%	RTU-12	
0	011	Girls Locker Room	138 S | 223 E	0	0%	15%	RTU-15 N2-123	TX-6
0	014	Office	78	0	0%	15%	RTU-15 N2-124	
0	016	Office	87	0	0%	15%	RTU-15 N2-124	
0	018	Boys Locker Room	115 S | 180 E	0	0%	15%	RTU-15 N2-123	
0	019	Storage	---	---	---	---	EF-10	
0	021	Elev Mech	---	---	---	---	EF-4	
0	022	Gymnasium	18,148	0	0%	30%	RTU-16	
1		Gym Hall						
1	102	Auditorium Lobby	7669	852	11%	50%	RTU-1	
1	111	Auditorium	18,327	9530	52%	70%	RTU-2	
1	112	Stage	---	---	52%	70%	RTU-2	Open to 111
1	112A	Storage	---	---	---	---	EF-19	
1	117	Elec	---	---	---	---	EF-18	
1	119	Mechanical	---	---	---	---	---	No Ventilation
1	120	Choral Room	585	187	32%	35%	AHU-1 N2-102	
1	121	Office	0	0	32%	35%	AHU-1 N2-102	
1	122	Storage	29	9	32%	35%	AHU-1 N2-102	
1	124	Orchestra Room	441	141	32%	35%	AHU-1 N2-103	
1	125	Office						
1	126	Storage			32%	35%	EF-15	
1	127	Band Room	463	148	32%	35%	AHU-1 N2-102	
1	129	Storage	0	0	32%	35%	AHU-1 N2-103	
1	130	Storage	26	8	32%	35%	AHU-1 N2-103	
1	131	Tele/Data	0	---	---	---	EF-17	EF-17 not running.
1	132	Small Band	530	170	32%	35%	AHU-1 N2-103	
1	133	Keyboard	225	72	32%	35%	AHU-1 N2-101	
1	134	Practice	84	27	32%	35%	AHU-1 N2-101	
1	134A	Storage Acid Neut.	---	---	---	---	EF-20	
1	135	Practice	44	14	32%	35%	AHU-1 N2-101	
1	136	Practice	45	14	32%	35%	AHU-1 N2-102	
1	137	Dressing	46	15	32%	35%	AHU-1 N2-103	
1		Café Hall						
1	140	Cafeteria	8532	1450	17%	10%	RTU-5 N2-106,107	N2-106 Has failed controller.
1	141	Servery	514	87	17%	10%	RTU-5 N2-104	
1	142	Servery	247	42	17%	10%	RTU-5 N2-104	
1	143	Kitchen	---	---	---	---	RTU-3 / FCU-2	RTU-3 not running in hand or auto.
1	144	Office	34	11	32%	35%	AHU-1 N2-101	
1	146	Storage	---	---	---	---	Exhaust	
1		Storage						
1	152	Faculty Dining	750	128	17%	10%	RTU-5 N2-105	
1		Hall outside Fac D,						
1	156	Custodial Lounge	47	18	38%	80%	RTU-7 N2-112	

Project Name:	**Fairfield Public Schools RCx: Roger Ludlowe Middle School**
Project Number:	*2020102.00.02*
Scope	**TAB Data**
Date	**03/28/2022**

Zone Identification								
Floor	Room#	Room Name	Design Min CFM	Actual OA at Min	Unit Actual OA %	BAS OA Damper Cond	Space Served By	Notes
1	156A	Tool Room	28	11	38%	80%	RTU-7 N2-112	
1	156C	Head Custodian	47	18	38%	80%	RTU-7 N2-112	
1		Entrance Lobby						
1	158	Reception	95	36	38%	80%	RTU-7 N2-113	
1	158A	Internal Suspension	0	0	38%	80%	RTU-7 N2-112	
1	158B	Office	---	---	---	---	Exhaust	
1	158C	Tutor	130	49	38%	80%	RTU-7 N2-113	
1	158D	Tutor	119	45	38%	80%	RTU-7 N2-113	
1	158E	Tutor	83	32	38%	80%	RTU-7 N2-113	
1	161	Classroom	321	122	38%	80%	RTU-7 N2-114	
1		Hall 161						
1	164	Storage	---	---	---	---	EF-15	
1	165	Office	42	16	38%	80%	RTU-7 N2-114	
1	166	Book Storage	43	16	38%	80%	RTU-7 N2-114	
1	167	OT/PT	38	14	38%	80%	RTU-7 N2-114	
1	168	Storage	373	142	38%	80%	RTU-7 N2-111	
1		Hallway 168	---	---	---	---	Exhaust	Exhaust
1	169	Storage	---	---	---	---	Exhaust	Exhaust
1	170	Tele/Data	---	---	---	---	Exhaust	Exhaust
1	171	Applied Technology	1018	387	38%	80%	RTU-7 N2-111	
1	171A	Storage	---	---	---	---	Exhaust	
1	172	Elev Mech	---	---	---	---	EF-5	
1	175	Applied Technology	839	319	38%	80%	RTU-7 N2-111	
1	175A	Computer Lab	371	141	38%	80%	RTU-7 N2-111	
1	177	Art Lab	1454	683	47%	30%	AHU-2 N2-116	
1	177A	Art Storage	92	43	47%	30%	AHU-2 N2-116	
1	177B	Kiln	---	---	---	---	Exhaust	
1	178	Art Storage	102	78	47%	30%	AHU-2 N2-116	
1	179	Elec	---	---	---	---	TX-4	
1	180	Tele/Data	30	---	---	---	TX-6	
1	181	Art Lab	1463	688	47%	30%	AHU-2 N2-116	
1	181A	Art Storage	383	180	47%	30%	AHU-2 N2-116	
1	181B	Kiln	---	---	---	---	---	
1	182	Food Lab	1208	568	47%	30%	AHU-2 N2-117	
1	182A	Storage	123	58	47%	30%	AHU-2 N2-117	
1	183	Textiles Lab	1505	707	47%	30%	AHU-2 N2-117	
1	183A	Storage	115	54	47%	30%	AHU-2 N2-117	
1	188	Fitness Center	3276	714	22%	50%	RTU-13	
1	189	Health Classroom	1137	534	47%	30%	AHU-2 N2-118	
1	190	Health Classroom	1266	595	47%	30%	AHU-2 N2-118	
1	191	Project Adventure	3273	703	21%	6%	RTU-14	
1	192	Storage	255	120	47%	30%	AHU-2 N2-119	
1	193	Mechanical	---	---	---	---	EF-14	
1	194	Mechanical	---	---	---	---	---	
1	195	Data	---	---	---	---	EF-10	
2	213	Upper Lobby	---	---	11%	50%	RTU-1	Open to 102
2	213	Elec	211 | 557	110	52%	70%	RTU-2	
2	214	Control Room		66	52%	70%	RTU-2	12 x 6 = 0.36 x 350 = 126

Project Name:	**Fairfield Public Schools RCx: Roger Ludlowe Middle School**
Project Number:	*2020102.00.02*
Scope	**TAB Data**
Date	**03/28/2022**

Zone Identification								
Floor	Room#	Room Name	Design Min CFM	Actual OA at Min	Unit Actual OA %	BAS OA Damper Cond	Space Served By	Notes
2	217	Balcony	---	---	---	---	RTU-2	Open to auditorium 111
2	220	Mechanical	---	---	---	---	---	No mechanical ventilation
2	221	Prep	143	0	0%	35%	AHU-3 N2-101	
2	222	Classroom	2143	0	0%	35%	AHU-3 N2-101	
2	223	Classroom	1716	0	0%	35%	AHU-3 N2-102	
2	224	Classroom	1916	0	0%	35%	AHU-3 N2-101	
2	225	Classroom	1585	0	0%	35%	AHU-3 N2-102	
2	226	Classroom	746	0	0%	35%	AHU-3 N2-103	
2	227	Classroom	1894	0	0%	35%	AHU-3 N2-102	
2	228	Elec	0	---	---	---	EF-17	Fan not running.
2	229	Prep	107	0	0%	35%	AHU-3 N2-103	
2	230	Science Classroom	1019	0	0%	35%	AHU-3 N2-103	
2	231	Lounge	1170	0	0%	35%	AHU-3 N2-104	
2	231A	Copier	---	---	---	---	---	No mechanical ventilation.
2	237	Faculty	981	0	0%	35%	AHU-3 N2-104	
2	237A	Telephone	99	0	0%	35%	AHU-3 N2-104	
2	239	Classroom	2118	297	14%	25%	AHU-4 N2-105	Bad controller.
2	240	Classroom	641	90	14%	25%	RTU-4 N2-106	
2	241	Classroom	3957	554	14%	25%	RTU-4 N2-105	Bad controller.
2	242	Classroom	551	77	14%	25%	RTU-4 N2-106	
2	244	Classroom	837	117	14%	25%	RTU-4 N2-105	
2	245	Science Classroom	973	136	14%	25%	RTU-4 N2-108	Bad controller.
2	245A	Prep Room						
2	246	Classroom	690	97	14%	25%	RTU-4 N2-106	
2	247	Classroom	1981	277	14%	25%	RTU-4 N2-107	Bad controller.
2	248	Classroom	227	93	41%	73%	RTU-9 N2-110	
2	249	Classroom	208	85	41%	73%	RTU-9 N2-110	
2	250	Classroom	239	98	41%	73%	RTU-9 N2-110	
2	251	Classroom	0	0	41%	73%	RTU-9 N2-111	
2	252	Computer Lab	824	338	41%	73%	RTU-9 N2-112	
2	253	Library	4842	3341	69%	82%	RTU-10 N2-113-116	Calc. based on unit total. Dist not accessible.
2	254	Media Room	---	---	---	---	---	Open to 253
2	257	Office	---	---	---	---	---	Open to 253
2	258	Work Room	155	107	69%	82%	RTU-10	
2	259	Storage	---	---	---	---	---	No ventilation shown.
2	260	Project Room	315	217	69%	82%	RTU-10	
2	261B	Tele/Data	53	22	41%	73%	RTU-9 N2-111	
2	262	Office	36	5	15%	20%	AHU-5 2N-122	
2	263	Office	29	4	15%	20%	AHU-5 2N-122	
2	264	Conference	126	19	15%	20%	AHU-5 N2-124	
2	265	Office	38	6	15%	20%	AHU-5 2N-122	
2	266	Guidance	152	22	15%	20%	AHU-5 2N-123	
2	267	Office	33	5	15%	20%	AHU-5 2N-122	
2	268	Office	39	6	15%	20%	AHU-5 2N-122	
2	269	Elec	176	---	---	---	EF-12	
2	270	Exam	257	38	15%	20%	AHU-5 2N-117	
2	271	Infirmary	127	19	15%	20%	AHU-5 2N-119	
2	272	Nurse	133	20	15%	20%	AHU-5 2N-119	

Project Name:	**Fairfield Public Schools RCx: Roger Ludlowe Middle School**
Project Number:	*2020102.00.02*
Scope	**TAB Data**
Date	**03/28/2022**

Zone Identification								
Floor	Room#	Room Name	Design Min CFM	Actual OA at Min	Unit Actual OA %	BAS OA Damper Cond	Space Served By	Notes
2		Isolation Room						
2	276	Administration	1155	170	15%	20%	AHU-5 N2-125	
2	278	Dean	194	29	15%	20%	AHU-5 2N-121	
2	279	Dean	180	26	15%	20%	AHU-5 2N-121	
2	281	Assistant Principal	109	16	15%	20%	AHU-5 2N-120	
2	282	Principal	182	27	15%	20%	AHU-5 N2-118	
2	284	Conference	259	38	15%	20%	AHU-5 N2-116	
2		Kitchen						
2		Mail						
2		Office Hallway						
2	285J	Cust	0	---	---	---	TX-5	
2	288	Classroom	450	66	15%	20%	AHU-5 N2-114	
2	289	Classroom	1092	161	15%	20%	AHU-5 N2-114	
2	291	Classroom	729	107	15%	20%	AHU-5 N2-115	
2	292	Team Assembly	761	112	15%	20%	AHU-5 N2-126	
2	293	Mechanical	---	---	---	---	---	
3	301	Prep	223	36	16.3%	35%	AHU-4 N2101	
3	302	Science Classroom	2214	362	16.3%	35%	AHU-4 N2101	
3	303A	Elec	0	---	---	---	EF-17	Fan not running.
3	304	Classroom	1231	201	16.3%	35%	AHU-4 N2-102	
3	305	Classroom	1711	280	16.3%	35%	AHU-4 N2-101	
3	306	Classroom	1208	197	16.3%	35%	AHU-4 N2-102	
3	307	Classroom	1630	266	16.3%	35%	AHU-4 N2-103	
3	308	Classroom	1218	199	16.3%	35%	AHU-4 N2-102	
3	309	Prep	184	30	16.3%	35%	AHU-4 N2-103	
3	310	Science Classroom	2387	390	16.3%	35%	AHU-4 N2-103	
3	312	Lounge	0	0	16.3%	35%	AHU-4 N2-104	
3	314	Copier	---	---	---	---	---	No ventilation.
3	319	Faculty	0	0	16.3%	35%	AHU-4 N2-104	
3	319A	Not Labeled	0	0	16.3%	35%	AHU-4 N2-104	
3	320	Classroom	978	333	34%	45%	RTU-6 N2-106	
3	321	Classroom	1075	366	34%	45%	RTU-6 N2-105	
3	322	Classroom	1018	346	34%	45%	RTU-6 N2-107	
3	323	Classroom	695	236	34%	45%	RTU-6 N2-106	
3	324	Prep	334	114	34%	45%	RTU-6 N2-107	
3	325	Science Classroom	1569	533	34%	45%	RTU-6 N2-107	
3	326	Tele/Data	---	---	---	---	EF-16	
3	327	Classroom	649	221	34%	45%	RTU-6 N2-106	
3	328	Classroom	677	230	34%	45%	RTU-6 N2-106	
3	329	Classroom	687	158	23%	35%	RTU-8 N2-108	
3	330	Classroom	675	155	23%	35%	RTU-8 N2-108	
3	331	Classroom	697	160	23%	35%	RTU-8 N2-108	
3	332	Classroom	1025	236	23%	35%	RTU-8 N2-111	
3	333	Computer Lab	3151	725	23%	35%	RTU-8 N2-111	
3	333A	Office						
3	334	Tele/Data	---	---	---	---	---	No ventilation shown.
3	335	Computer Lab	852	196	23%	35%	RTU-8 N2-112	
3	336	Tele/Data	---	---	---	---	---	No ventilation shown.

Project Name:	**Fairfield Public Schools RCx: Roger Ludlowe Middle School**
Project Number:	*2020102.00.02*
Scope	**TAB Data**
Date	**03/28/2022**

Zone Identification								
Floor	Room#	Room Name	Design Min CFM	Actual OA at Min	Unit Actual OA %	BAS OA Damper Cond	Space Served By	Notes
3	339	Classroom	315	87	27.5%	0%	RTU-11 N2-118	
3	340	Classroom	108	30	27.5%	0%	RTU-11 N2-117	
3	341	Classroom	281	77	27.5%	0%	RTU-11 N2-118	
3	342	Prep	123	34	27.5%	0%	RTU-11 N2-118	
3	343	Elec	---	---	---	---	TF-12	
3	344	Classroom	137	38	27.5%	0%	RTU-11 N2-117	
3	345	Tele/Data	---	---	---	---	TF-11	
3	346	Prep	35	10	27.5%	0%	RTU-11 N2-117	
3	347	Classroom	129	35	27.5%	0%	RTU-11 N2-119	
3	348	Classroom	969	266	27.5%	0%	RTU-11 N2-120	
3	349	Classroom	1045	287	27.5%	0%	RTU-11 N2-120	
3	350	Classroom	131	36	27.5%	0%	RTU-11 N2-119	
3	351	Classroom	1066	293	27.5%	0%	RTU-11 N2-120	
3	352	Classroom	486	0	0%	25%	AHU-6 N2-124	
3	355	Faculty	416	0	0%	25%	AHU-6 N2-121	
3	355A	Telephone	77	0	0%	25%	AHU-6 N2-121	
3	314A (358)	Copier	---	---	---	---	---	No ventilation shown.
3	360	Lounge	272	0	0%	25%	AHU-6 N2-121	
3	361	Classroom	558	0	0%	25%	AHU-6 N2-124	
3	362	Classroom	329	0	0%	25%	AHU-6 N2-123	
3	363	Classroom	688	0	0%	25%	AHU-6 N2-124	
3	364	Prep	187	0	0%	25%	AHU-6 N2-122	
3	365	Elec	---	---	---	---	---	
3	366	Classroom	329	0	0%	25%	AHU-6 N2-123	
3	367	Tele/Data	---	---	---	---	Exhaust	
3	368	Prep	77	0	0%	25%	AHU-6 N2-125	
3	369	Classroom	357	0	0%	25%	AHU-6 N2-125	
3	370	Classroom	573	0	0%	25%	AHU-6 N2-122	
3	371	Classroom	636	0	0%	25%	AHU-6 N2-122	

District Name:	FAIRFIELD PUBLIC SCHOOLS
Building Name:	Roger Ludlowe Middle School
Address:	689 Unquowa Road Fairfield, CT 06824

Side D

Basement

Access Controlled Doors are displayed in ORANGE

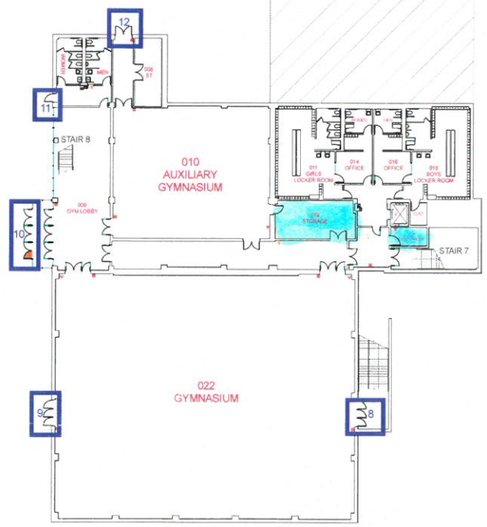
Side C

Basement Floor Plan

Side A

Legend

- Chair Lift
- MWWT — Bathrooms: Mens, Womens, Unisex
- ST — Storage
- OHD — Overhead Door
- E — Elevator
- Emergency Phone
- KNOX — Knox Box
- W — Water Shutoff
- S — Sprinkler Shutoff
- E — Electrical Shutoff
- GAS — Gas Shutoff
- R — Ramp
- GEN — Emergency Generator
- FACP — Fire Alarm Control Panel
- FDC — Fire Dept. Connection
- FX — Fire Extinguisher



Side B

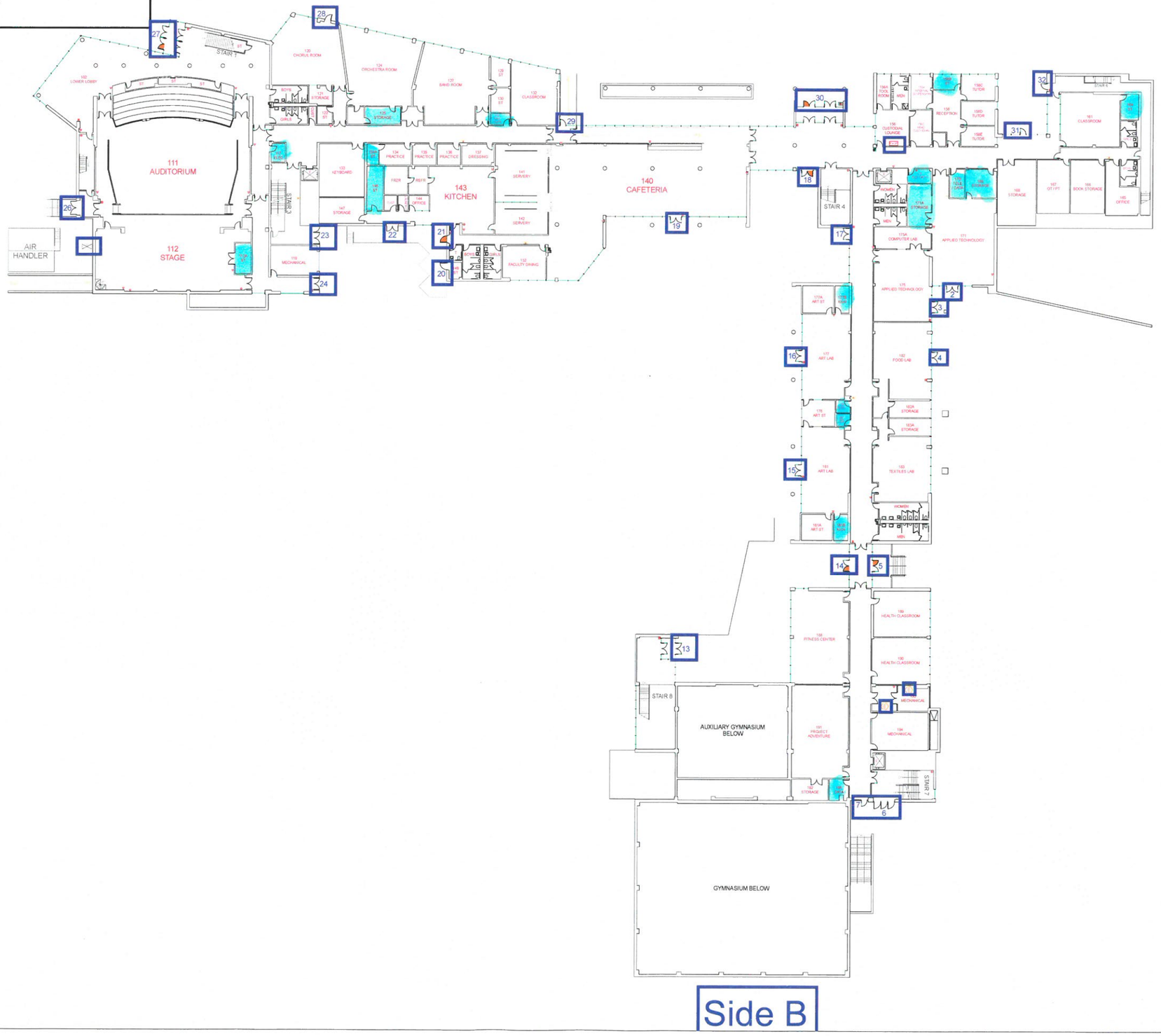
District Name:	FAIRFIELD PUBLIC SCHOOLS
Building Name:	Roger Ludlowe Middle School
Address:	689 Unquowa Road Fairfield, CT 06824

1st Floor

Access Controlled Doors are displayed in ORANGE

Side C

Side D



Side A

Side B

1st Floor Plan

Legend

- Chair Lift
- MWT — Bathrooms: Mens, Womens, Unisex
- ST — Storage
- OHD — Overhead Door
- E — Elevator
- Emergency Phone
- KNOX — Knox Box
- W — Water Shutoff
- S — Sprinkler Shutoff
- E — Electrical Shutoff
- GAS — Gas Shutoff
- R — Ramp
- GEN — Emergency Generator
- FACP — Fire Alarm Control Panel
- FDC — Fire Dept. Connection
- FX — Fire Extinguisher

BE SAFE TECHNOLOGIES INC

District Name:	FAIRFIELD PUBLIC SCHOOLS
Building Name:	Roger Ludlowe Middle School
Address:	689 Unquowa Road Fairfield, CT 06824

Side D

2nd Floor

Access Controlled Doors are displayed in ORANGE

Side C

2nd Floor Plan

Side A

Legend

- Chair Lift
- MWT — Bathrooms: Mens, Womens, Unisex
- ST — Storage
- OHD — Overhead Door
- E — Elevator
- Emergency Phone
- KNOX — Knox Box
- W — Water Shutoff
- S — Sprinkler Shutoff
- E — Electrical Shutoff
- GAS — Gas Shutoff
- R — Ramp
- GEN — Emergency Generator
- FACP — Fire Alarm Control Panel
- FDC — Fire Dept. Connection
- FX — Fire Extinguisher

BE SAFE TECHNOLOGIES INC

Side B

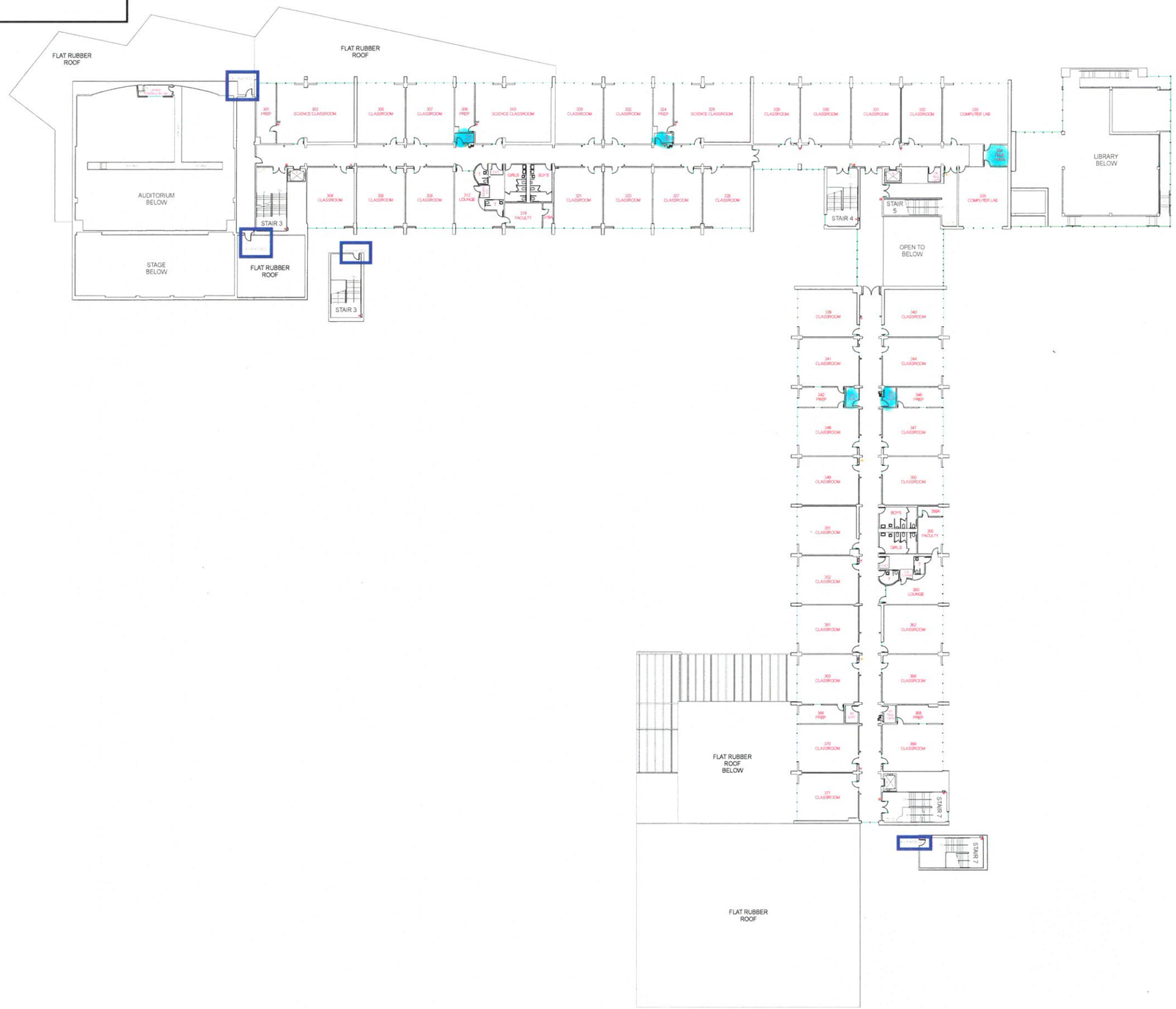
District Name:	FAIRFIELD PUBLIC SCHOOLS
Building Name:	Roger Ludlowe Middle School
Address:	689 Unquowa Road Fairfield, CT 06824

Side D

3rd Floor

Access Controlled Doors are displayed in ORANGE

Side C



Side A

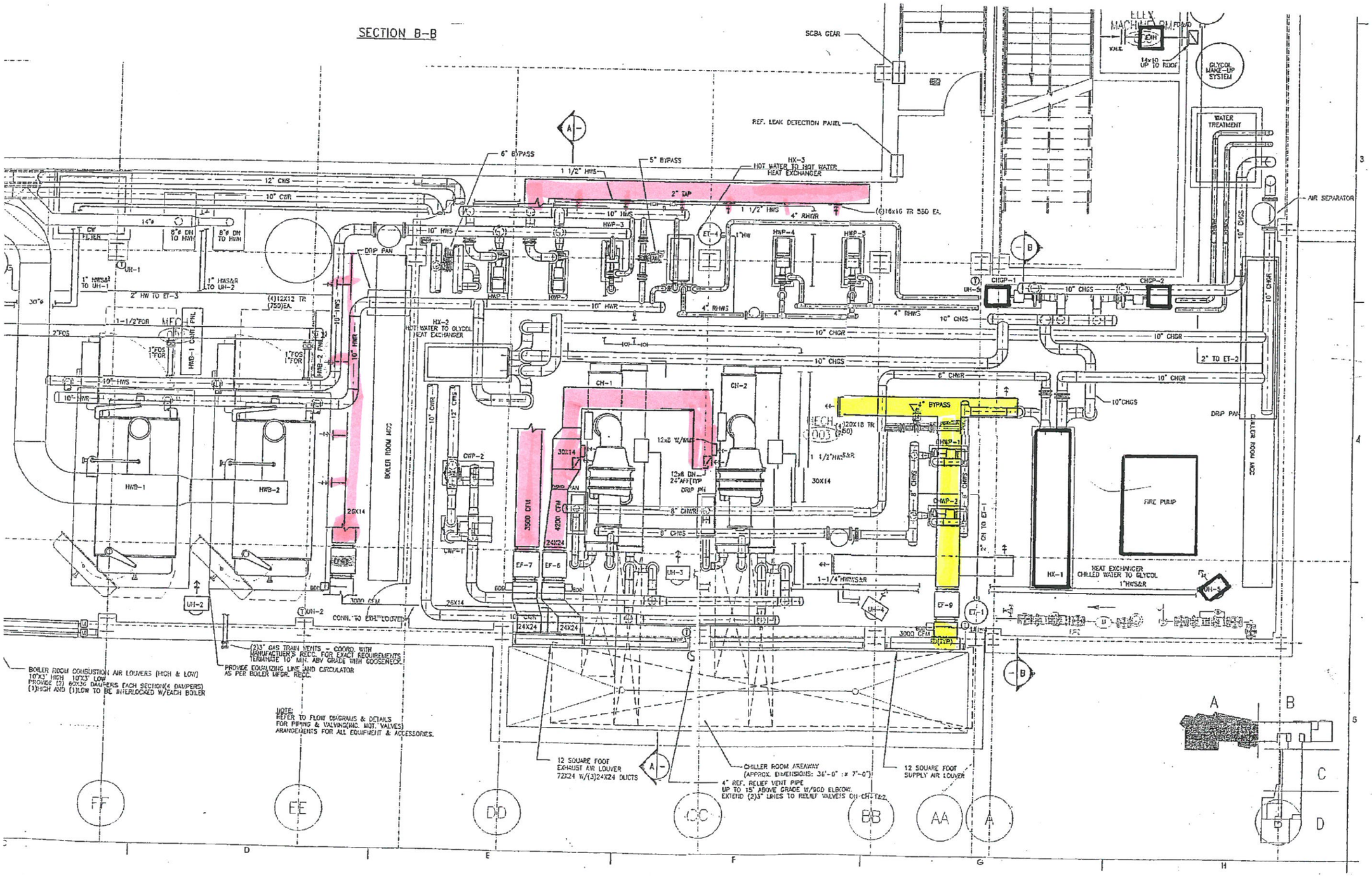
Side B

Legend

- Chair Lift
- MWT — Bathrooms: Mens, Womens, Unisex
- ST — Storage
- OHD — Overhead Door
- E — Elevator
- Emergency Phone
- KNOX — Knox Box
- W — Water Shutoff
- S — Sprinkler Shutoff
- E — Electrical Shutoff
- GAS — Gas Shutoff
- R — Ramp
- GEN — Emergency Generator
- FACP — Fire Alarm Control Panel
- FDC — Fire Dept. Connection
- FX — Fire Extinguisher

BE SAFE TECHNOLOGIES INC

SECTION B-B



HVAC- BASEMEN
MER PART PLAN

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

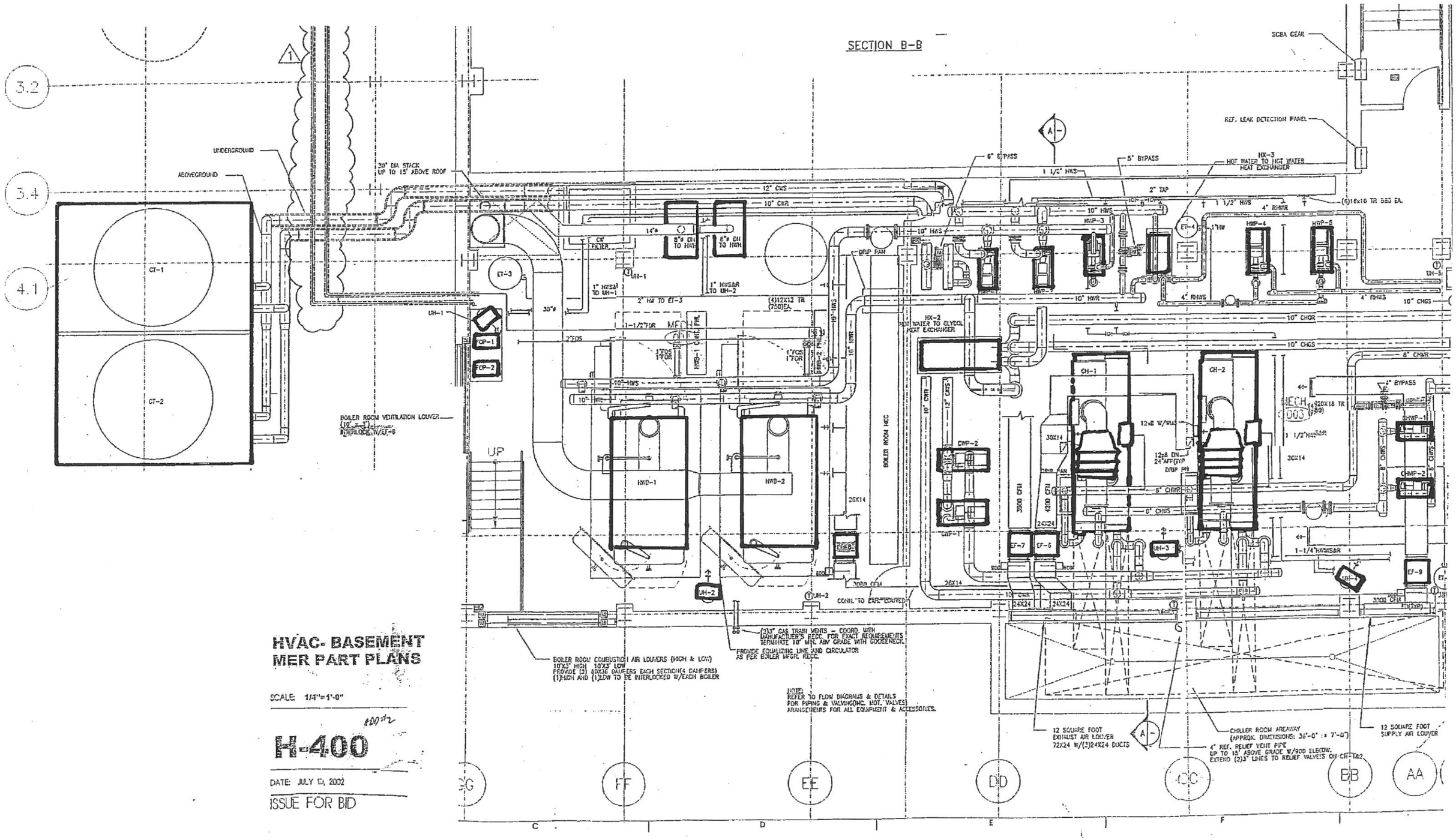
H-400

DATE: JULY 10, 2002

ISSUE FOR BID

Roger Ludlowe Middle School

SECTION B-B



HVAC- BASEMENT MER PART PLANS

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

H-400

DATE: JULY 10, 2002

ISSUE FOR BID

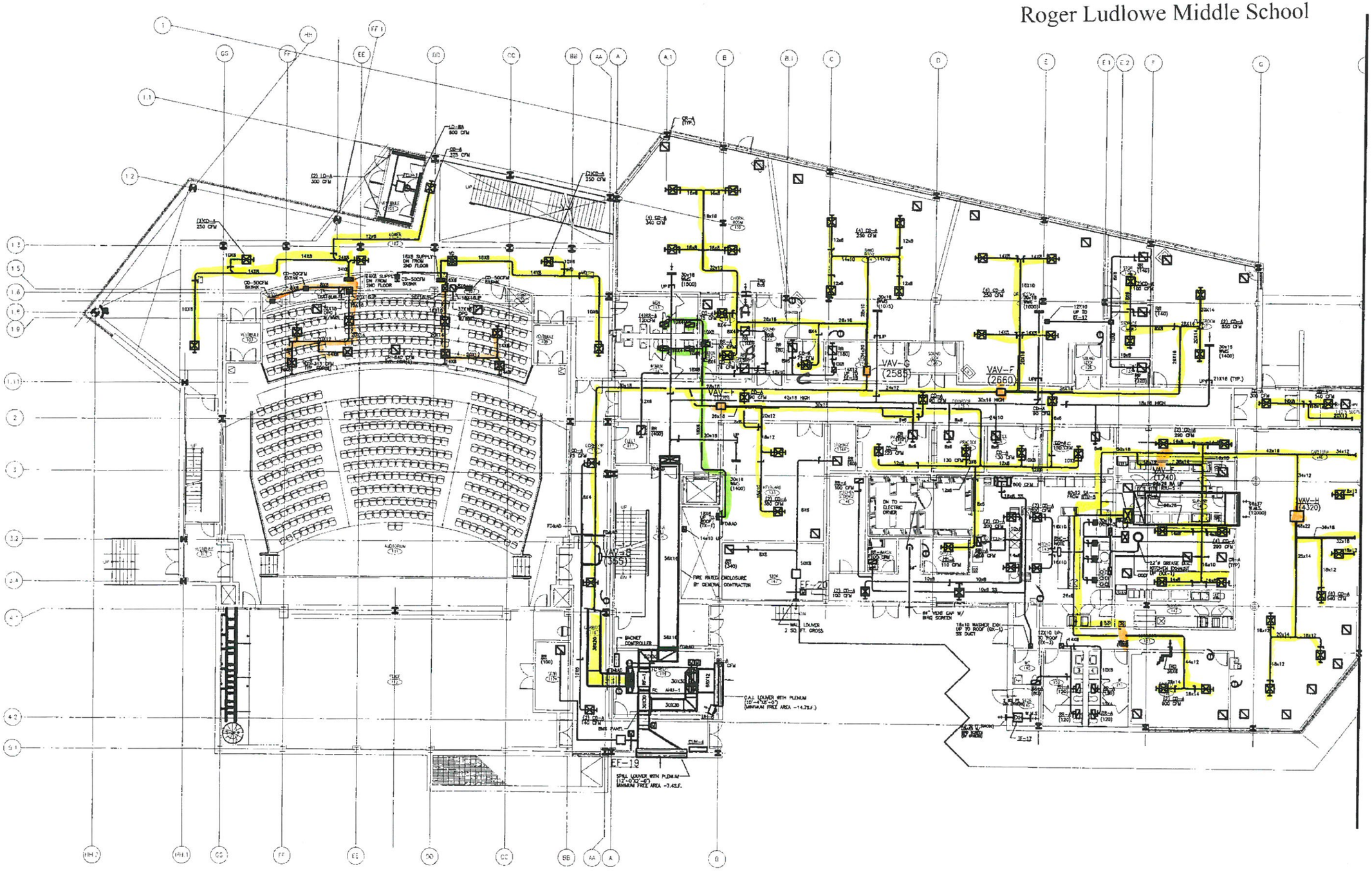
Roger Ludlowe Middle School

HVAC -BASEMEN
PLAN D
DUCTWORK

1/8"=1'-0"

H-200D

Roger Ludlowe Middle School

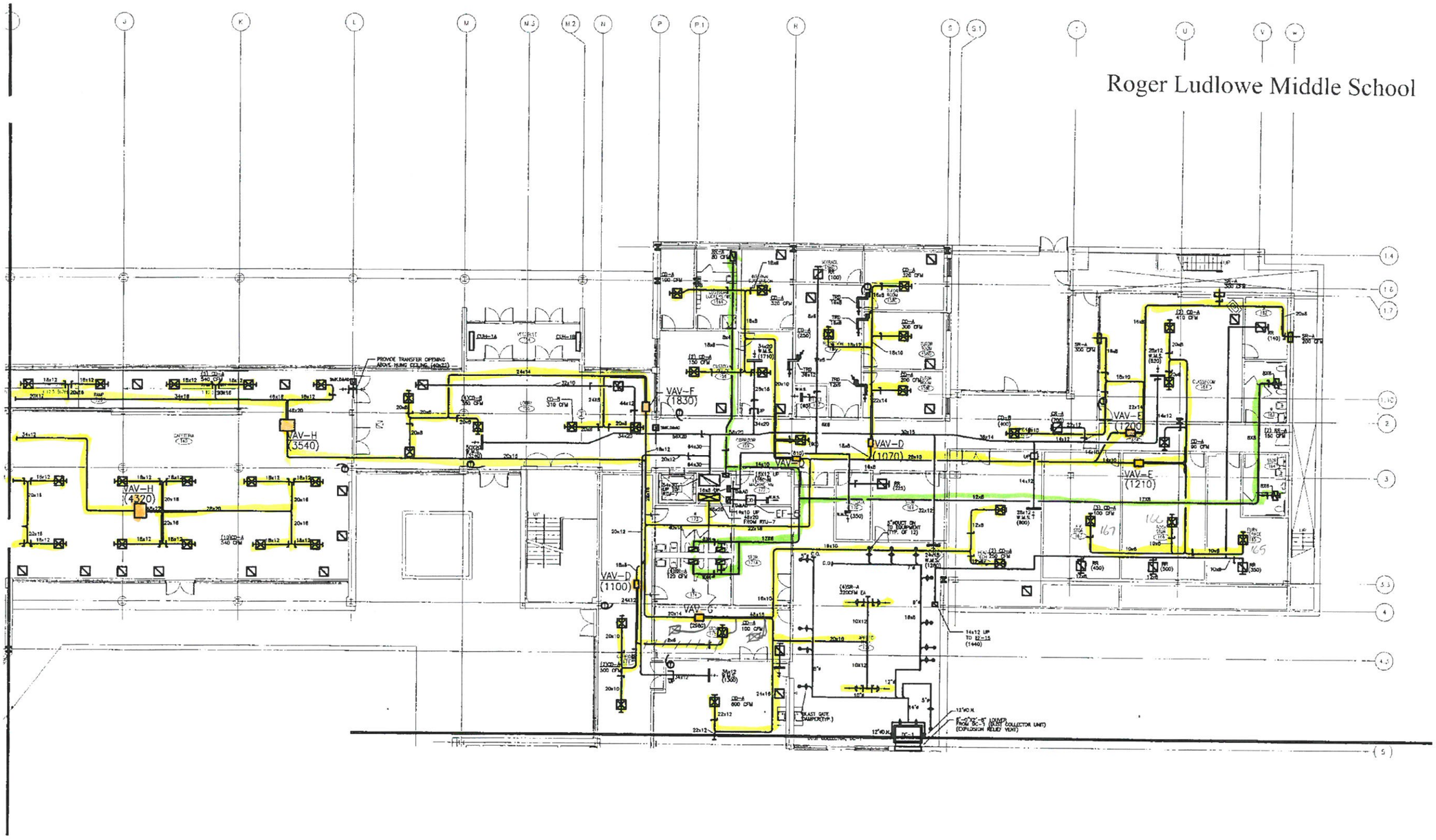


HVAC - FIRST FLOOR PLAN DUCTWORK

1/8"=1'-0"

H-201A

Roger Ludlowe Middle School

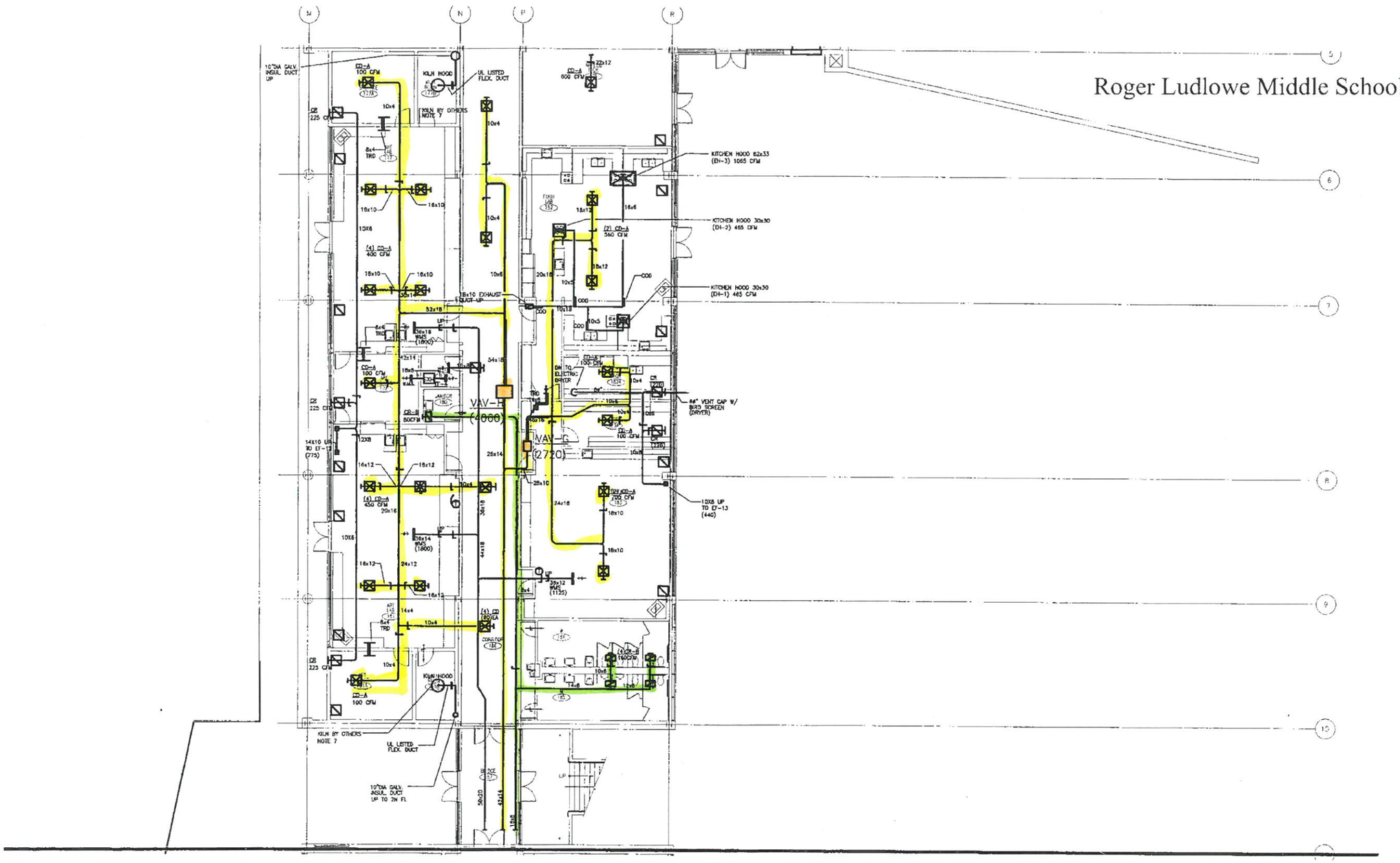


HVAC - FIRST FLOOR PLAN DUCTWORK

1/8"=1'-0"

H-201B

Roger Ludlowe Middle School

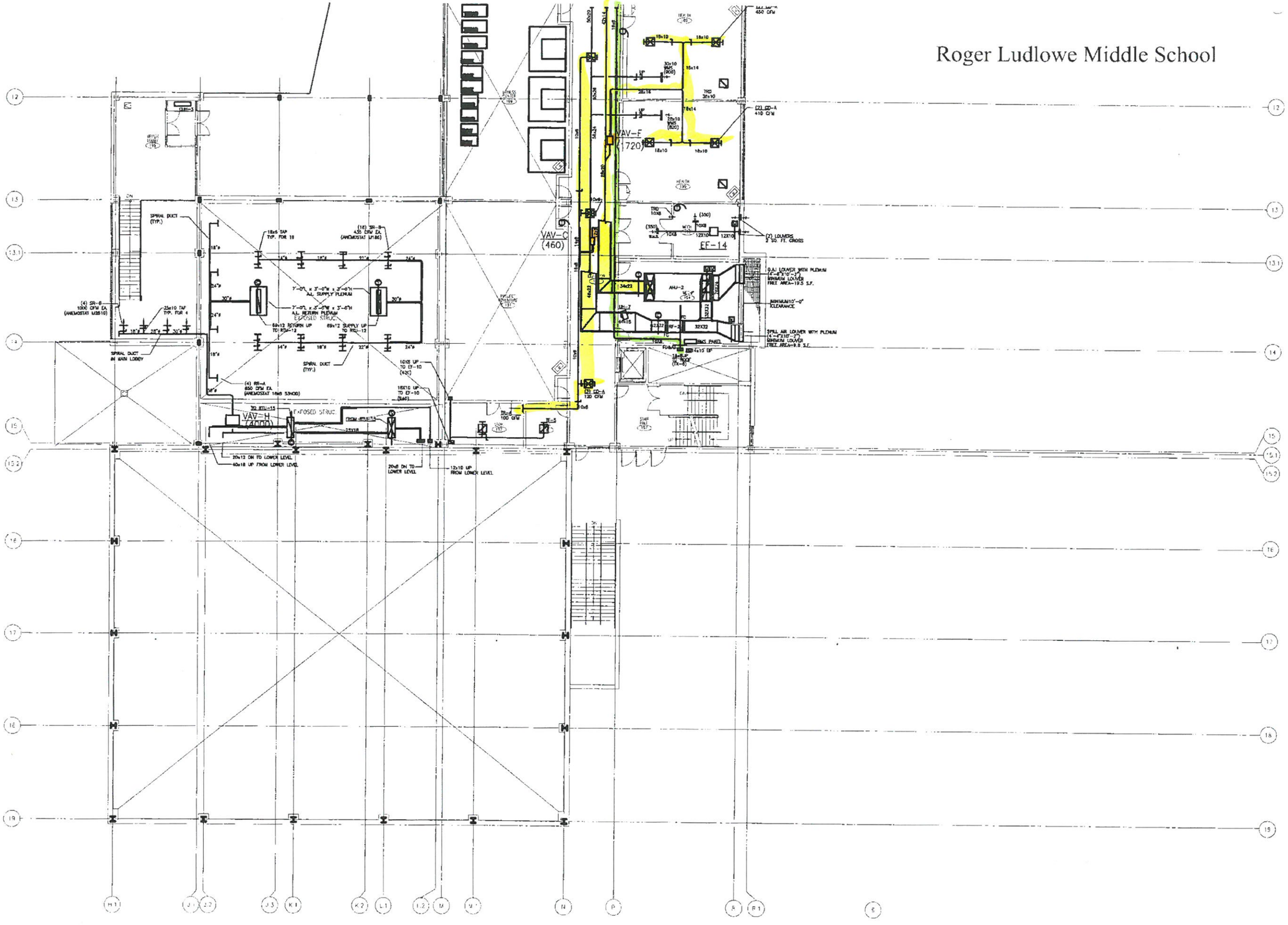


HVAC - FIRST FLOOR PLAN C DUCTWORK

1/8"=1'-0"

H-201C

Roger Ludlowe Middle School

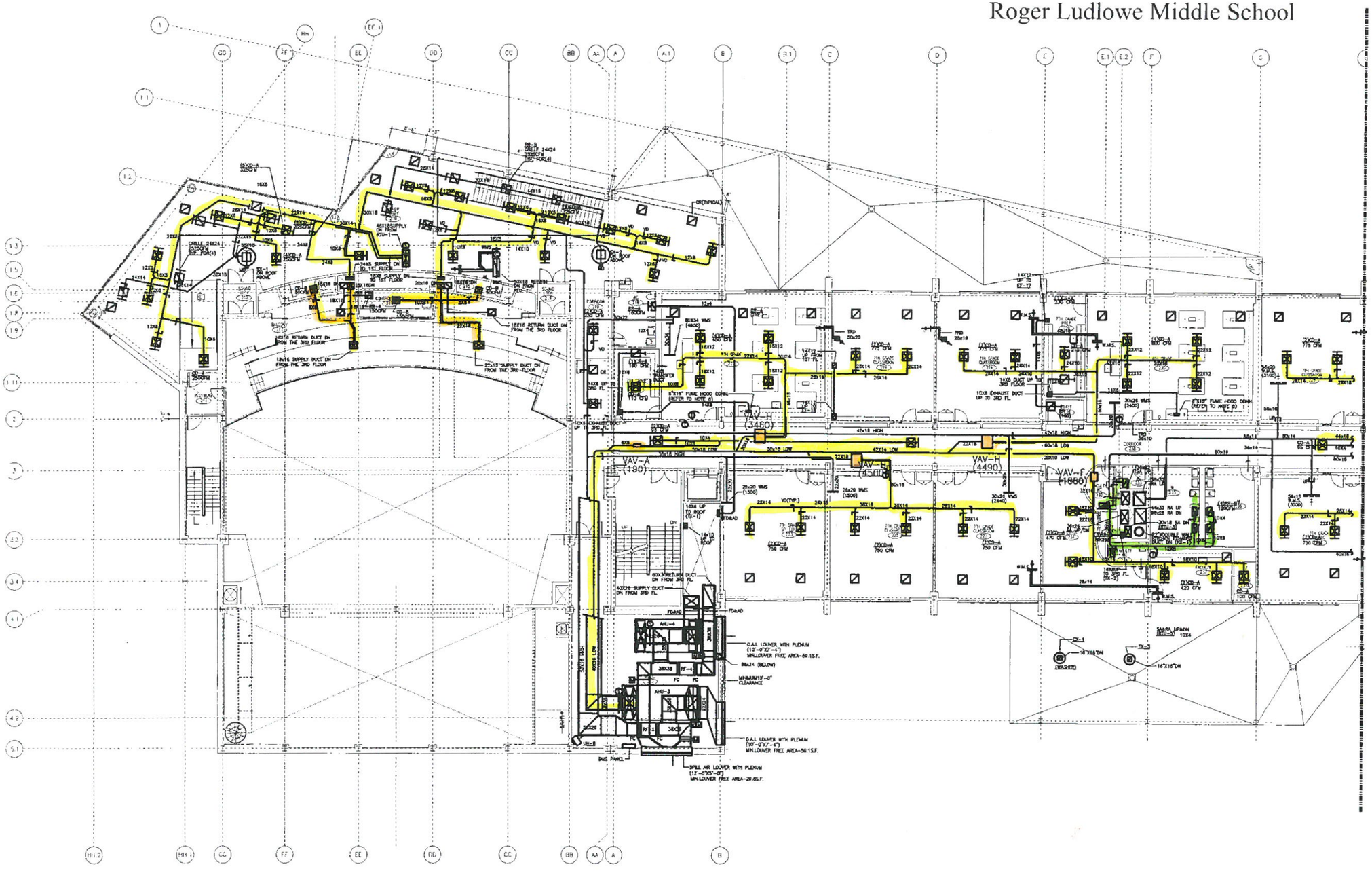


HVAC - FIRST FLOOR PLAN D DUCTWORK

1/8"=1'-0"

H-201D

Roger Ludlowe Middle School



HVAC - SECOND FLOOR PLAN A DUCTWORK

1/8"=1'-0"

H-202A

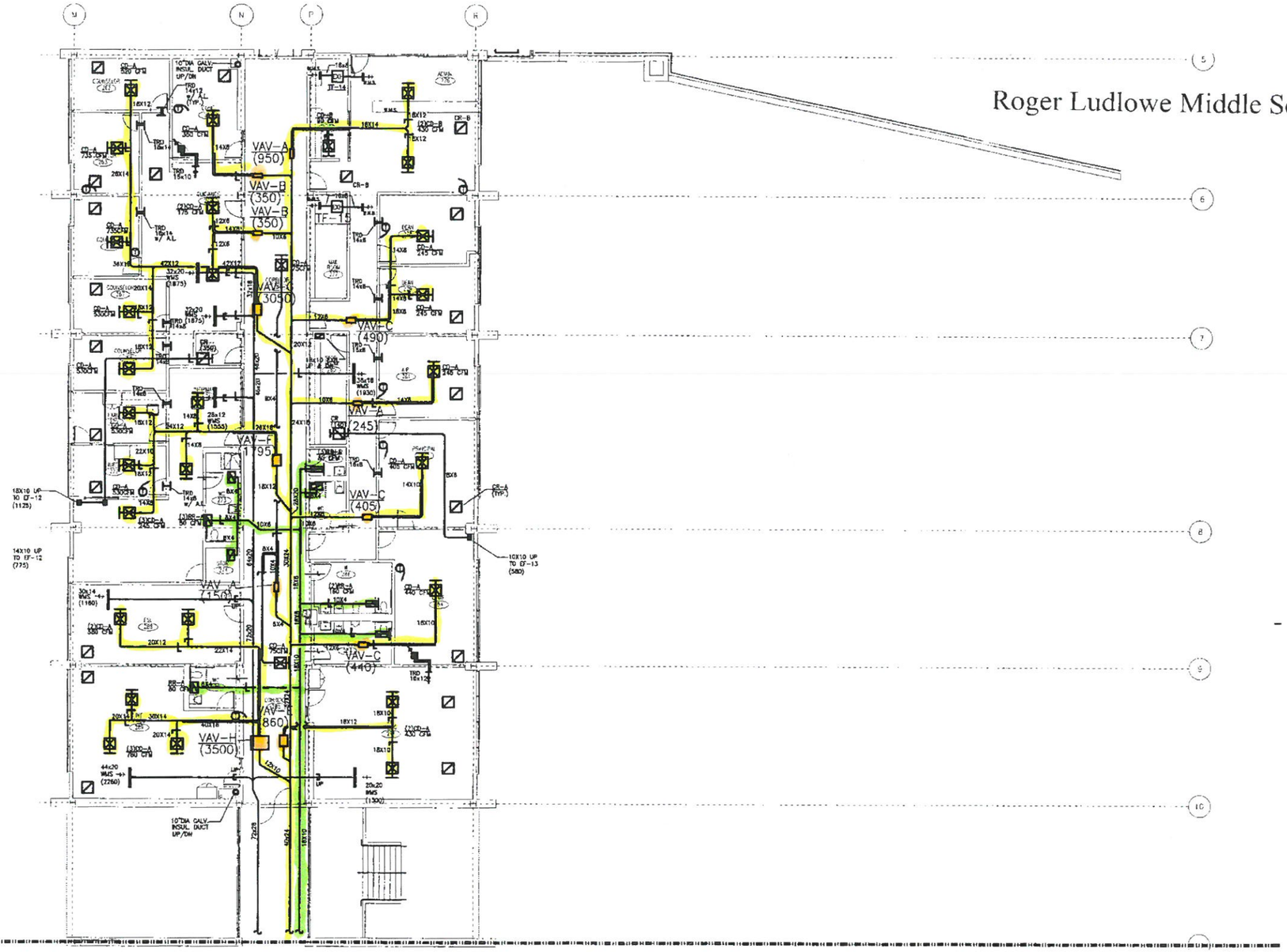
Roger Ludlowe Middle School

HVAC - SECONI
FLOOR PLAN B
DUCTWORK

1/8"= 1'-0"

H-202B

Roger Ludlowe Middle School

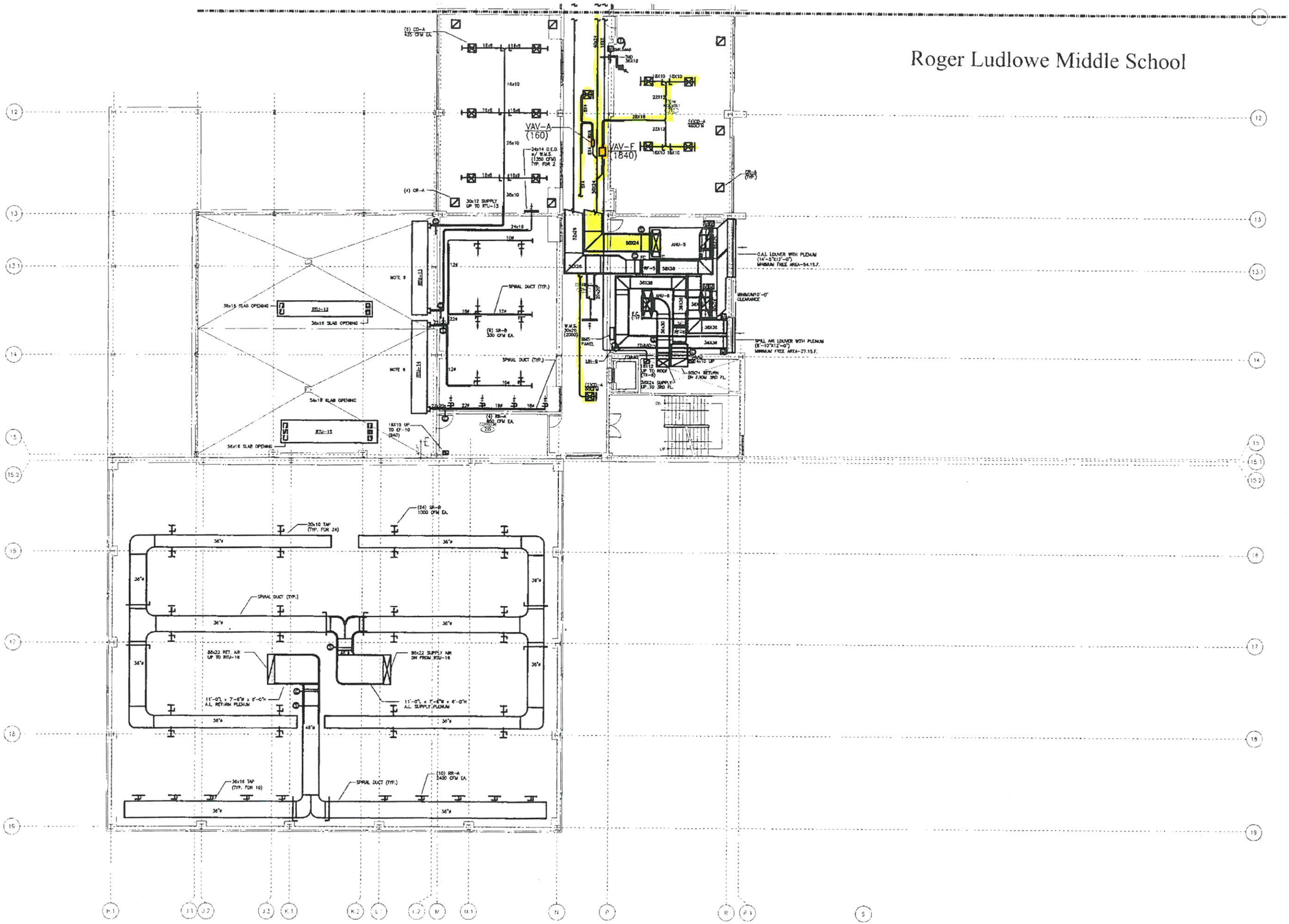


HVAC - SECOND FLOOR PLAN C DUCTWORK

1/8"=1'-0"

H-202C

Roger Ludlowe Middle School



HVAC - SECOND FLOOR PLAN D DUCTWORK

1/8"=1'-0"

H-202D

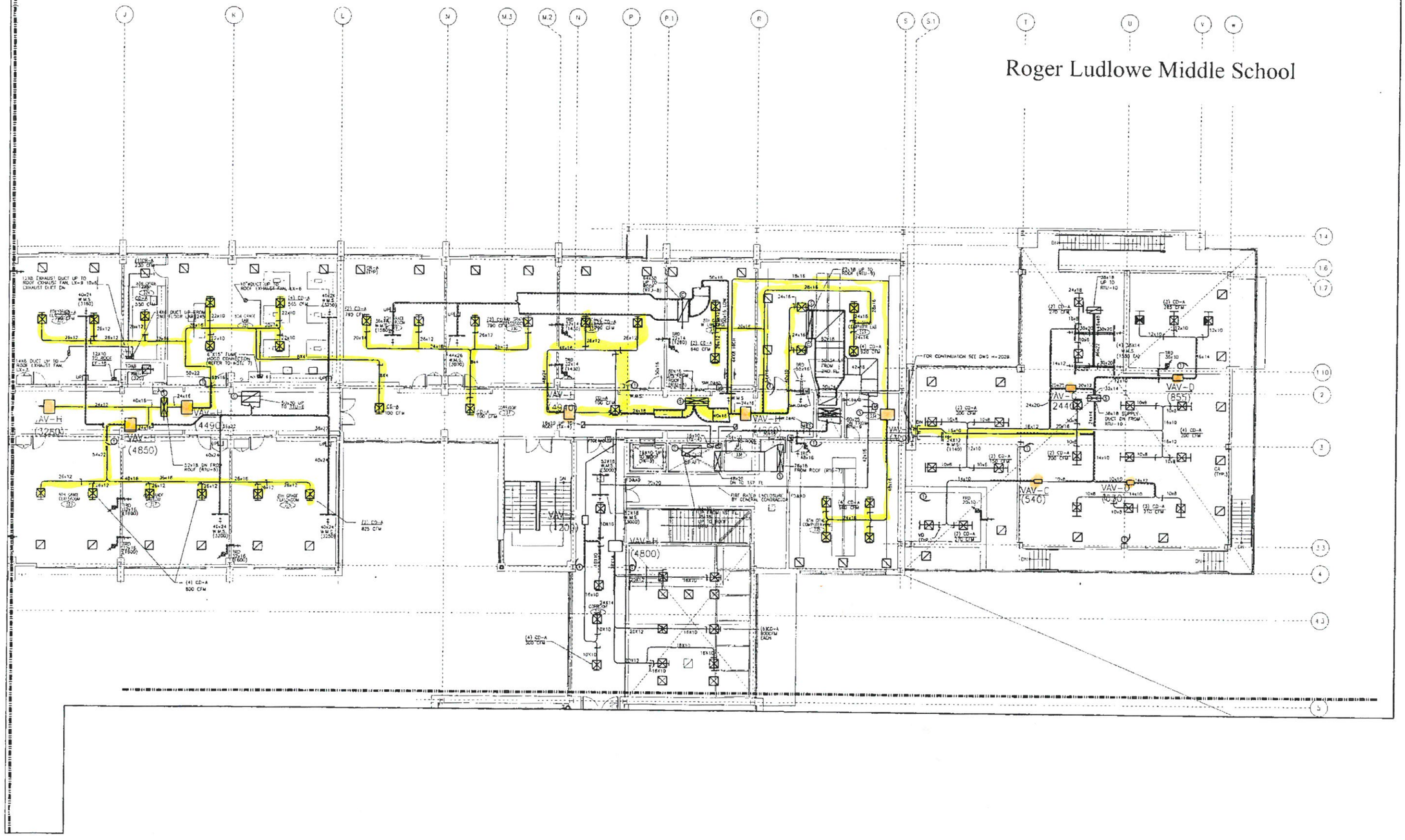
Roger Ludlowe Middle School

HVAC - THIRD FLOOR PLAN A DUCTWORK

1/8"=1'-0"

H-203A

Roger Ludlowe Middle School

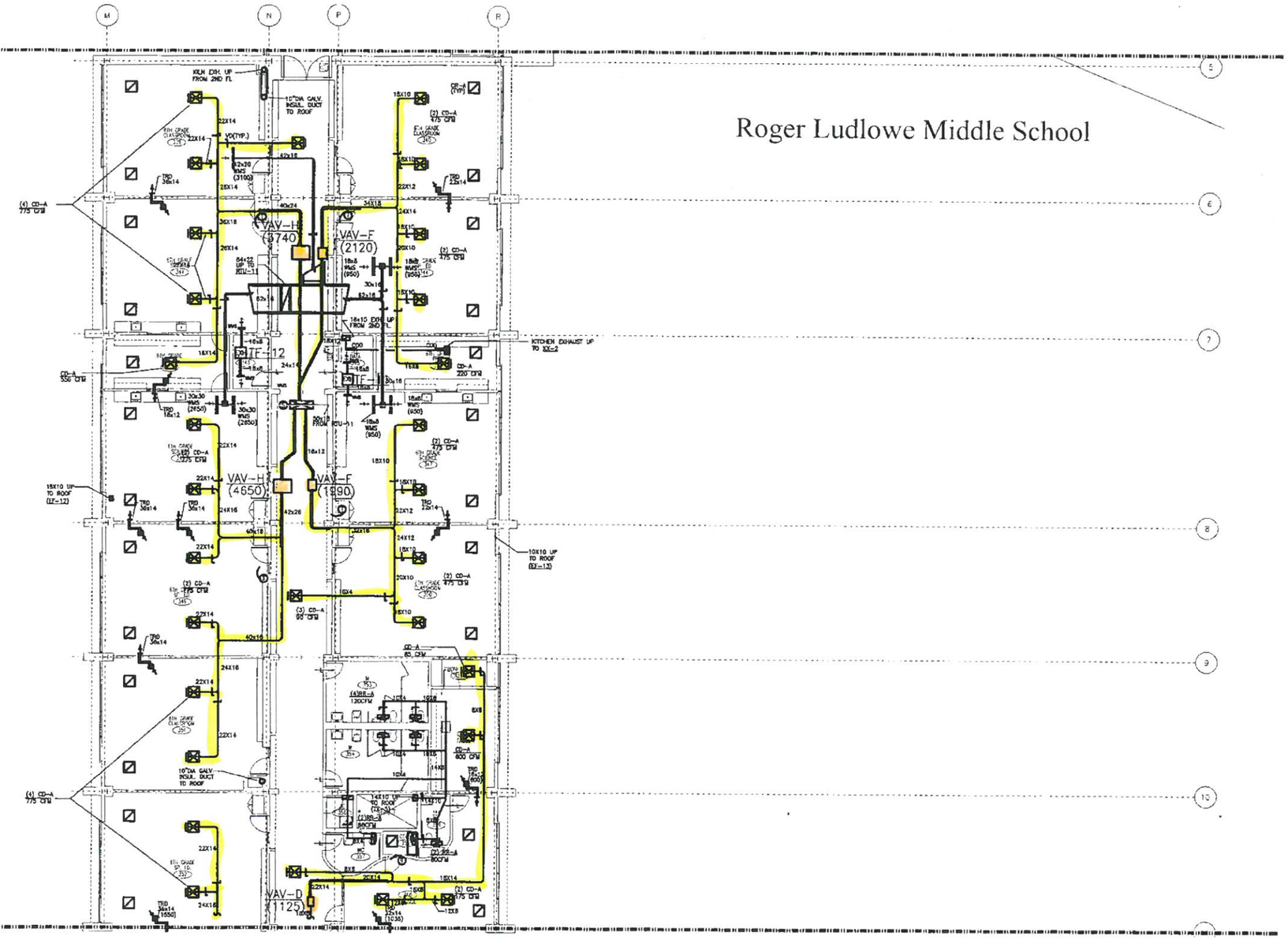


HVAC - THIRD FLOOR PLAN DUCTWORK

1/8"=1'-0"

H-203B

Roger Ludlowe Middle School

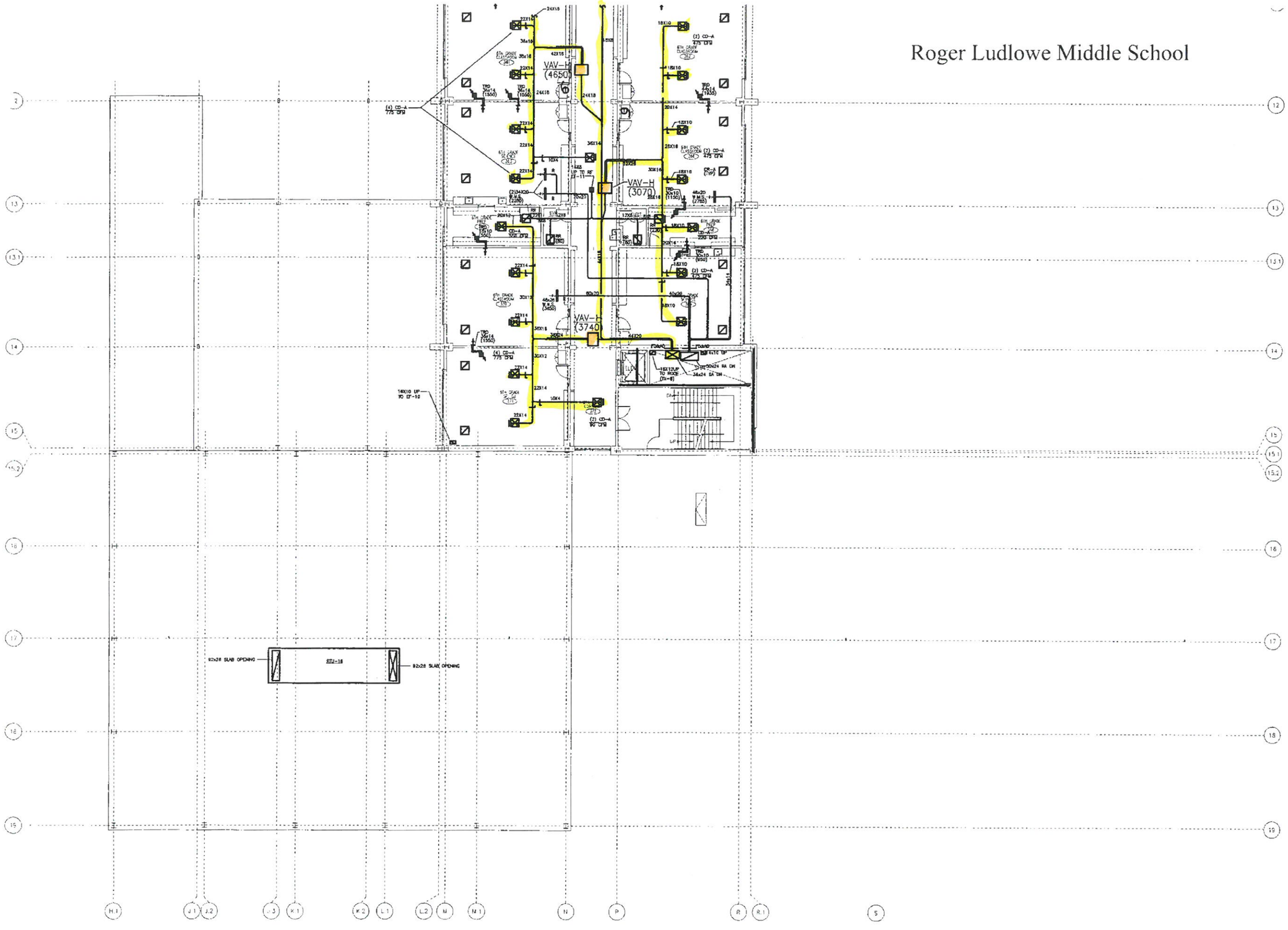


HVAC - THIRD FLOOR PLAN C DUCTWORK

1/8"=1'-0"

H-203C

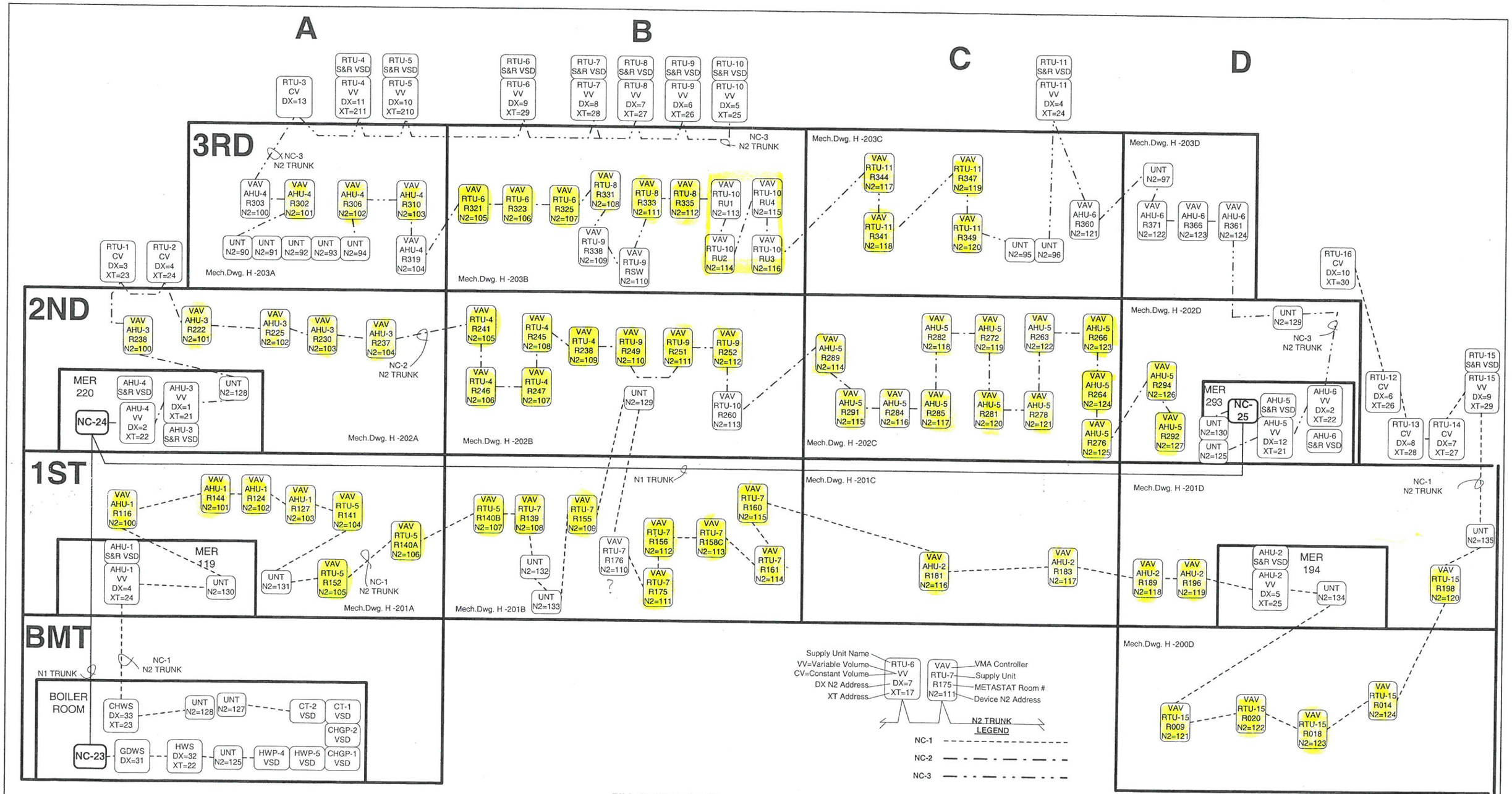
Roger Ludlowe Middle School



HVAC - THIRD FLOOR PLAN D DUCTWORK

1/8"=1'-0"

H-203D



BILL OF MATERIALS

Designation	Qty	Part Number	Description
Field Devices:			
OWS-1	1	GX260	DELL OPTIPLEX GX260 P4/2.4GHZ, 40GB/512MB/
	2	KX-P3123	PRINTER--DOT MATRIX 24 PIN
	1	M992	DELL 19" CRT MONITOR
	1	MW-M5WHCI-0	M5 WORKSTATION HCI
	1	MW-MGRAPH-0	M-GRAPHICS, NEW PROJ CD-ROM
	1	WS-SWOPMI-0C	WORKSTATION PMI, NEW ON CD
Panel Devices:			
NC-1,2,3	3	EN-EWC22-0	DUAL ENCLOSURE WITH POWER ENTRY BOX
	3	NU-NCM350-8	NETWORK CNTRL MOD 350,8MB,ARC/ETHERNET
	3	NU-NET301-0	NCU,N1 CARD F/ NCM350,ETHERNET,PRECONFIG

REVISION INFORMATION					
NUMBER	OWS-1		CLARIFICATION	6.2.3	EDM
DATE 10/06/03	CHANGE NC-1,2,3			5.19.03	EDM
TIME 11:14 AM	ADD FC-1,2,3			4.25.3	EDM

Drawing Title: **Area N1& N2 Network Riser**

Project Title: **Fairfield Schools - New Middle School**

Sales Engineer	Project Manager	Application Engineer	DRAWN BY	DRAWN DATE	APPROVED BY	APPROVED DATE
C. Schoonerman	A. Koehnke	E. Monaco		0		0

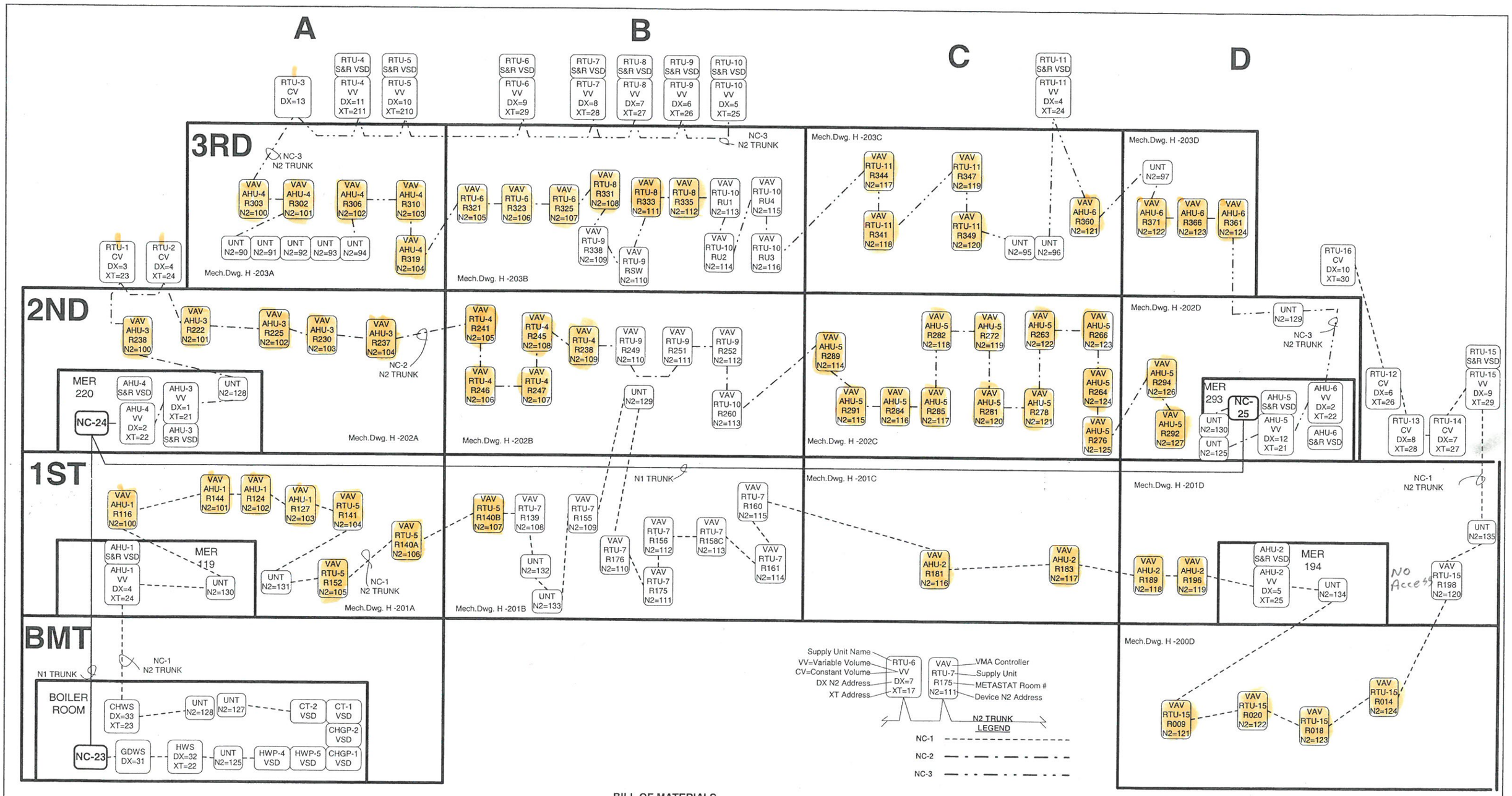
JOHNSON CONTROLS
Systems & Services Division

Branch Information
Johnson Controls, Inc.
605 Franklin Avenue
Hartford
CT 06114-3026
Phone: 860-520-6200
Fax: 860-247-3644

CONTRACT NUMBER **2058-0067**

DRAWING NUMBER **ANR-1-1**

FILENAME: lchva017.vsd



BILL OF MATERIALS

Designation	Qty	Part Number	Description
Field Devices:			
OWS-1	1	GX260	DELL OPTIPLEX GX260 P4/2.4GHZ, 40GB/512MB/
	2	KX-P3123	PRINTER--DOT MATRIX 24 PIN
	1	M992	DELL 19" CRT MONITOR
	1	MW-M5WHCI-0	M5 WORKSTATION HCI
	1	MW-MGRAPH-0	M-GRAPHICS, NEW PROJ CD-ROM
	1	WS-SWOPMI-0C	WORKSTATION PMI, NEW ON CD
Panel Devices:			
NC-1,2,3	3	EN-EWC22-0	DUAL ENCLOSURE WITH POWER ENTRY BOX
	3	NU-NCM350-8	NETWORK CNTRL MOD 350,8MB,ARC/ETHERNET
	3	NU-NET301-0	NCU,N1 CARD F/ NCM350,ETHERNET,PRECONFIG

REVISION INFORMATION					
NUMBER	OWS-1		CLARIFICATION	6.2.3	EDM
DATE 10/06/03	CHANGE NC-1,2,3			5.19.03	EDM
TIME 11:14 AM	ADD FC-1,2,3			4.25.3	EDM
	REFERENCE DRAWING	NO.	REVISION-LOCATION	ECN	DATE / BY

Drawing Title: **Area N1& N2 Network Riser**

Project Title: **Fairfield Schools - New Middle School**

Sales Engineer	Project Manager	Application Engineer	DRAWN BY	DRAWN DATE	APPROVED BY	APPROVED DATE
C. Schoonerman	A. Koehnke	E. Monaco		0		0

JOHNSON CONTROLS
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CONTRACT NUMBER **2058-0067**

DRAWING NUMBER **ANR-1-1**

FILENAME: lchva017.vsd

LAB Exh - LX

Kitchen Exh - KX

Gen Exh - EF

TLT Exh - TX

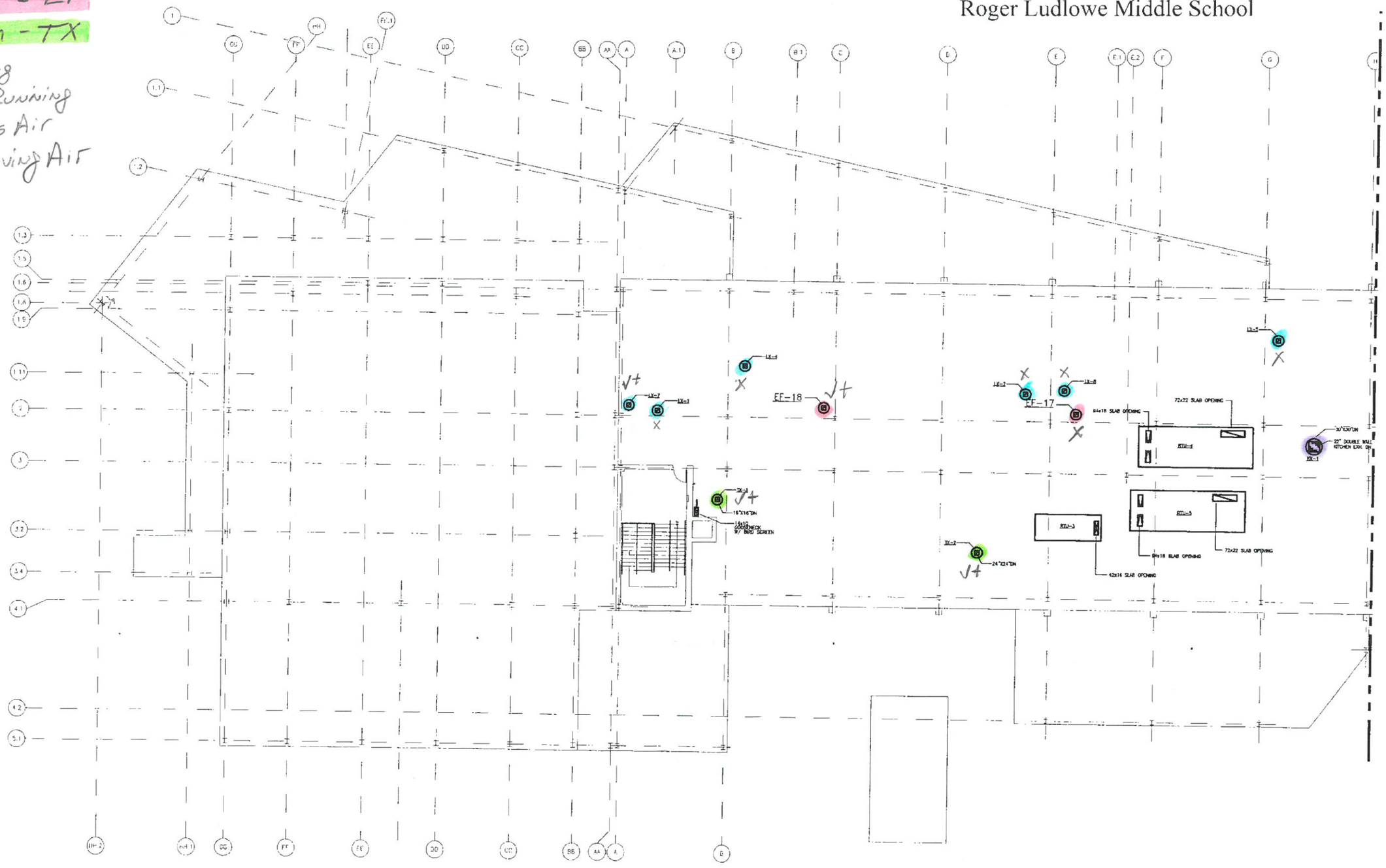
✓ Running

X Not Running

+ Moves Air

- Not Moving Air

Roger Ludlowe Middle School

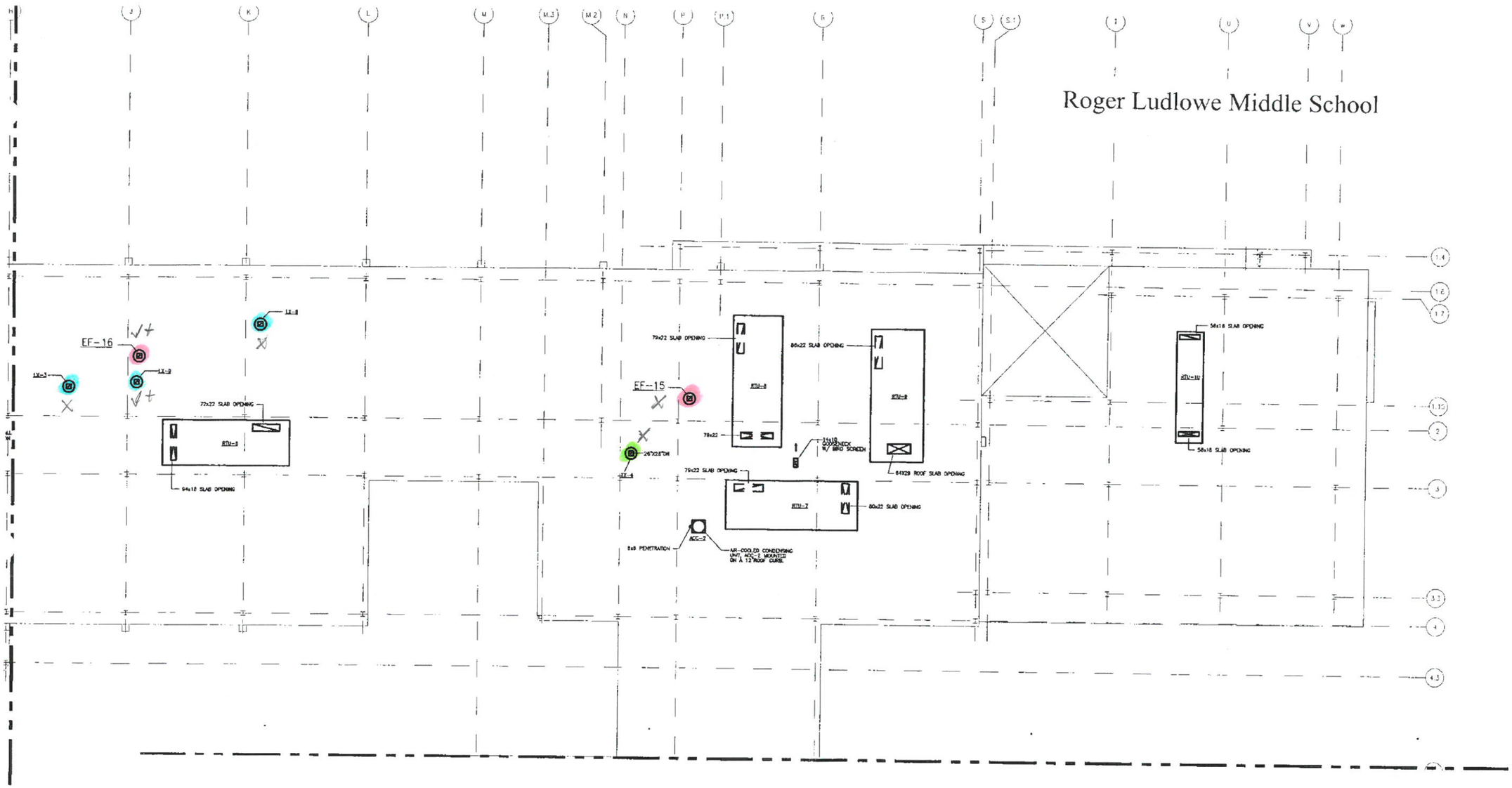


HVAC - ROOF PLAN A

1/8"=1'-0"

H-204

Roger Ludlowe Middle School

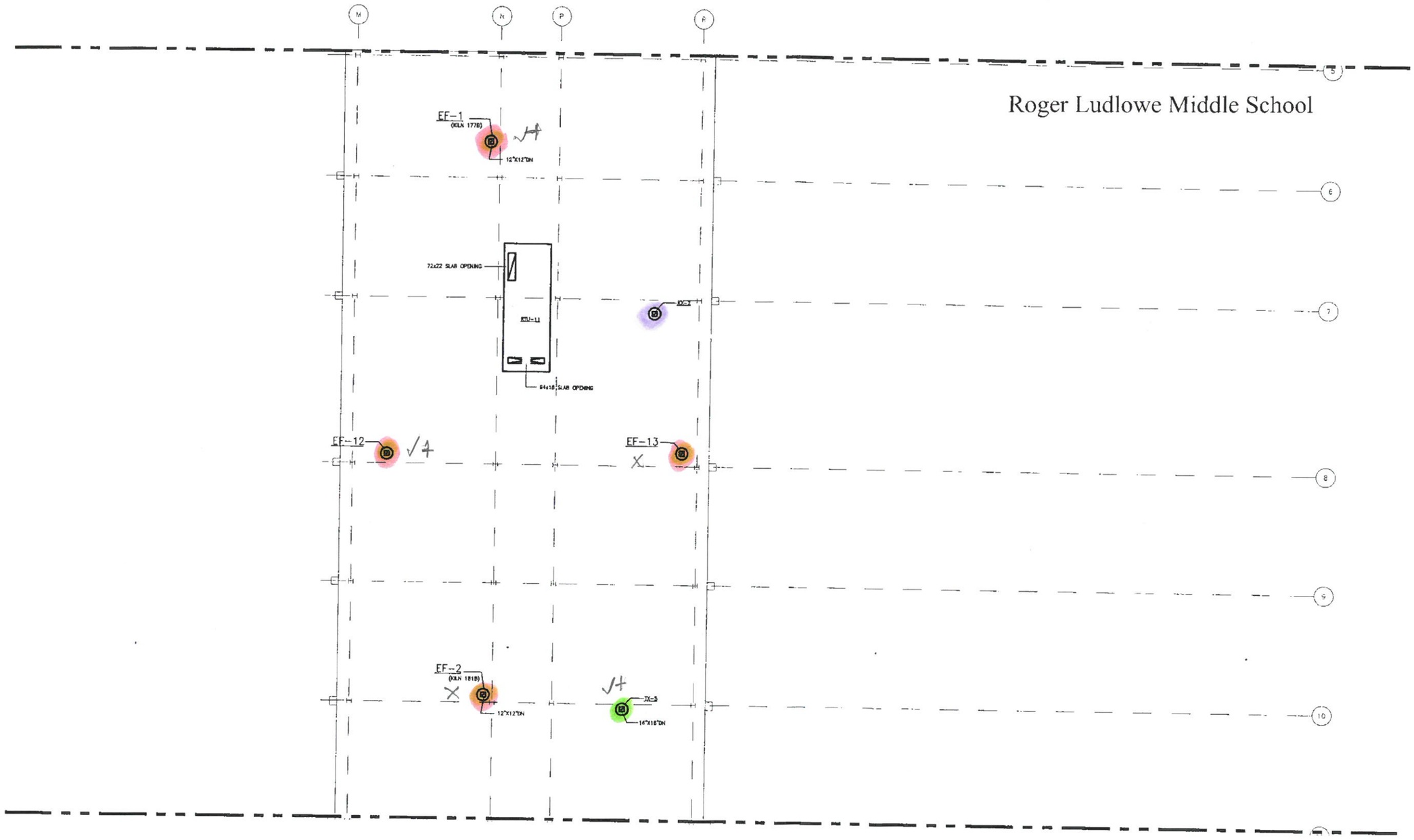


HVAC - ROOF PLAN B

1/8"=1'-0"

H-204B

Roger Ludlowe Middle School

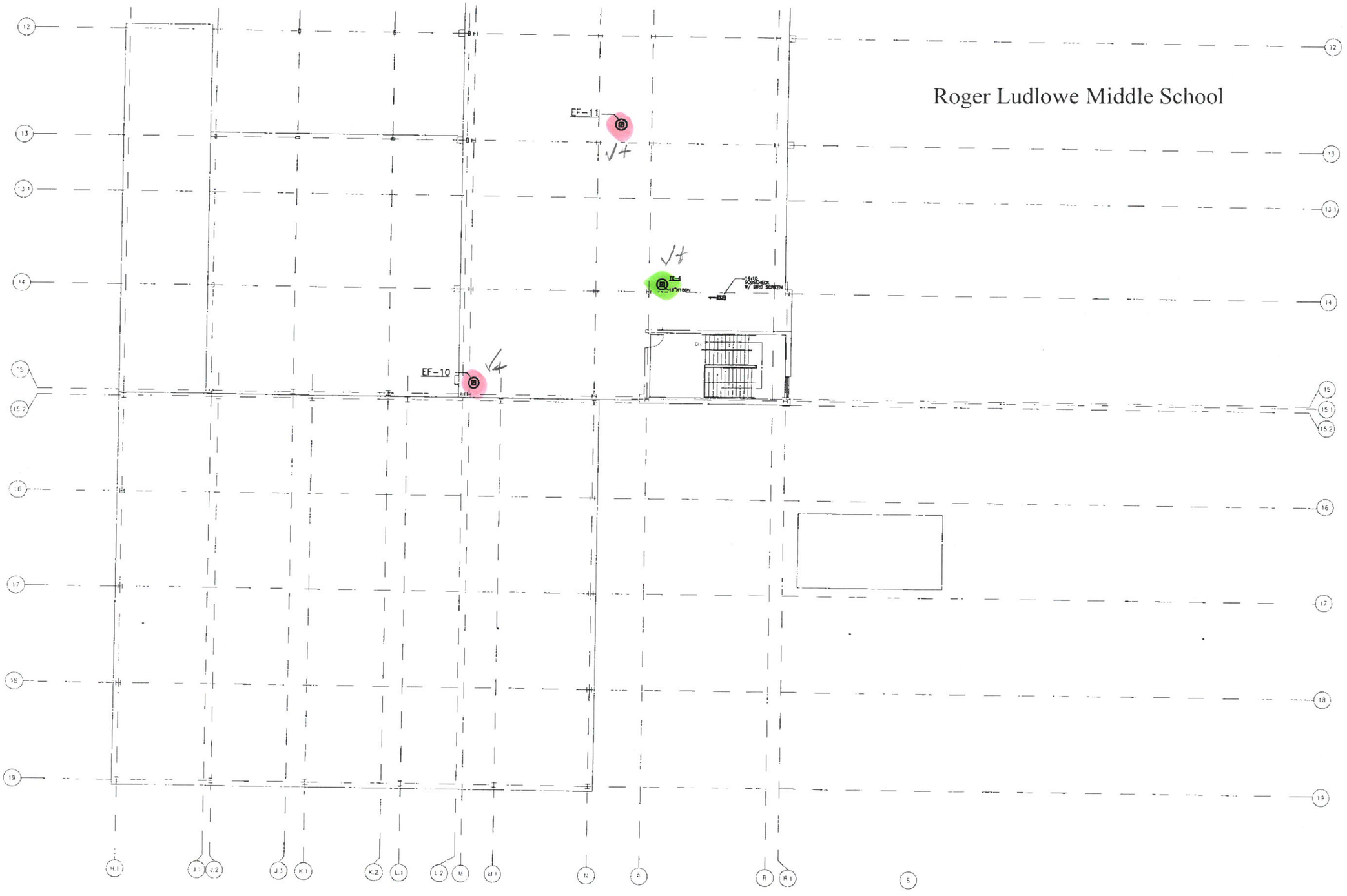


HVAC - ROOF PLAN C

1/8"=1'-0"

H-204(

Roger Ludlowe Middle School



HVAC - ROOF PLAN D

1/8"=1'-0"

H-204D

APPENDIX 5 – RCx Unit and Room Take-Off Data

Project Name:	**Fairfield Public Schools RCx**
Project Number:	*2020102.00.02*
Scope	**Room Take-Off Data**
Date	**March 16, 2022**
	Roger Ludlowe Middle School

RCM, RA, JRK

Zone Identification

Floor	Room#	Room Name	Area (SF)	Ceiling Height	Volume	People	Notes	Identified Deficiencies	Pictures Y /N
0	002	Mechanical			0				
0	003	Mechanical			0				
0	005	Elev Mech			0				
0	008	Storage	250	125	31250	0			
0	009	Gym Lobby	1418	24	34032	10			
0	010	Auxiliary Gymnasium	2812	26.7	75080.4	30			
0	011	Girls Locker Room	836	9	7524	30	2 SA Bay 2 Exh.		
0	014	Office	241	9	2169		2 SA		
0	016	Office	231	9	2079	4	2 SA		
0	018	Boys Locker Room	795	9	7155	30	2 SA Bay 2 Exh.	Cust Room 112 sf w/ 13' Height	
0	019	Storage	412	9	3708	0			
0	021	Elev Mech	89	12.5	1112.5	0	Exhaust fan located here		
0	022	Gymnasium	9900	35	346500	50	bleachers open could be ~200 people		
1		Gym Hall	913	9	8217		2 SA	New Named	
1	102	Auditorium Lobby	*	*	78886.9	200	Served RTU-1 CV	FloorSectionArea (ft^2)Height (ft)Volume (ft^3) 2Ramp bot35.8810.5376.74 2Ramp Sl142.629.751390.545 2Main1211.88910906.92 2Vest Up4388.53723 2Landing461.338.53921.305 1Stair48026.512720 1Windows820.0826.521732.12 1Main1855.11324116.3 78886.93	
1	111	Auditorium	5468	40	218720	580	Served RTU-2 CV	200 back, 216 sides, 164 middle	
1	112	Stage	2660	40	106400	30			
1	112A	Storage			0				
1	117	Elec			0				
1	119	Mechanical			0				
1	120	Choral Room	1256	13.5	16956	69	4 SA with FTR		
1	121	Office	123	9.5	1168.5	3	1 SA		
1	122	Storage	87	9.5	826.5				
1	124	Orchestra Room	1190	13.5	16065	48			
1	125	Office	174	9.5	1653	1	No SA only Exhaust		
1	126	Storage	79	9.5	750.5		1 SA	ADDED ROOM	
1	127	Band Room	1588	13.5	21438	40	4 SA		
1	129	Storage	142	13.5	1917	1	1 SA		
1	130	Storage	127	13.5	1714.5	1	1 SA		
1	131	Tele/Data			0				
1	132	Small Band	754	13.5	10179	20	2 SA		
1	133	Keyboard	691	13.5	9328.5	25	2 SA		
1	134	Practice	194	9.5	1843	4	1 SA		
1	134A	Storage Acid Neut.	70	17.5	1225				
1	135	Practice	145	9.5	1377.5	2	1 SA		
1	136	Practice	134	9.5	1273	3	1 SA		

Project Name:	**Fairfield Public Schools RCx**
Project Number:	*2020102.00.02*
Scope	**Room Take-Off Data**
Date	**March 16, 2022**
	Roger Ludlowe Middle School

RCM, RA, JRK

Zone Identification

Floor	Room#	Room Name	Area (SF)	Ceiling Height	Volume	People	Notes	Identified Deficiencies	Pictures Y /N
1	137	Dressing	195	9.5	1852.5	8	1 SA and Exh		
1		Café Hall	769	12	9228			ADDED AREA	
1	140	Cafeteria	4599	9.5	43690.5	348	16 SA with FTR		
1	141	Servery	808	9.5	7676	20	2 SA		
1	142	Servery	462	9.5	4389	20	1 SA with 2 Exh		
1	143	Kitchen	1212	9.5	11514	8	6 SA with 2 Hoods		
1	144	Office	85	9.5	807.5	2	1 SA		
1	146	Storage	194	9.5	1843				
1		Storage	316	9.5			Exh	ADDED ROOM	
1	152	Faculty Dining	397	9.5	3771.5	15	2 SA		
1		Hall outside Fac D,	260	9.5	2470			ADDED AREA	
1	156	Custodial Lounge	340	9.5	3230	8	1 SA		
1	156A	Tool Room	13	9.5	123.5		1 SA		
1	156C	Head Custodian	220	9.5	2090	2	1 SA		
1		Entrance Lobby	2094	9.5	19893		5 SA	ADDED AREA	
1	158	Reception	373	9.5	3543.5	5	1 SA		
1	158A	Internal Suspension	224	9.5	2128	4	1 SA with FTR		
1	158B	Office	110	9.5	1045	3	FTR	No Air / Stuffy	
1	158C	Tutor	232	9.5	2204	5	1 SA with FTR		
1	158D	Tutor	222	9.5	2109	3	1 SA		
1	158E	Tutor	186	9.5	1767	7	1 SA		
1	161	Classroom	897	9.5	8521.5	22	1 SA		
1		Hall 161	254	9.5	2413		1 SA	New AREA	
1	164	Storage	138	9.5	1311		1 Exh		
1	165	Office	342	9.5	3249	3	1 SA		
1	166	Book Storage	506	9.5	4807		1 SA with Exh		
1	167	OT/PT	468	9.5	4446	6	1 SA		
1	168	Storage	682	9.5	6479	2	2 SA		
1		Hallway 168	503	9.5			2 SA	NEW AREA	
1	169	Storage	248	9.5	2356		Exh		
1	170	Tele/Data			0				
1	171	Applied Technology	1671	13.5	22558.5	20	AHU /Exh/ Dust Collector	Wood Shop	
1	171A	Storage	280	13.5	3780		Exh		
1	172	Elev Mech			0				
1	175	Applied Technology	1180	13.5	15930	25	2 A with FTR		
1	175A	Computer Lab	339	9.5	3220.5	21	2 SA		
1	177	Art Lab	997	9.5	9471.5	26	4 SA with FTR		
1	177A	Art Storage	225	9.5	2137.5	2	1 SA		
1	177B	Kiln	106	13.5	1431		Kiln Exh		
1	178	Art Storage	254	9.5	2413	6	1 SA with FTR		
1	179	Elec			0				

Project Name:	**Fairfield Public Schools RCx**
Project Number:	*2020102.00.02*
Scope	**Room Take-Off Data**
Date	**March 16, 2022**
	Roger Ludlowe Middle School

RCM, RA, JRK

Zone Identification

Floor	Room#	Room Name	Area (SF)	Ceiling Height	Volume	People	Notes	Identified Deficiencies	Pictures
									Y /N
1	180	Tele/Data			0				
1	181	Art Lab	1151	9.5	10934.5	18	4 SA with FTR		
1	181A	Art Storage	238	9.5	2261	4	1 SA	Air King filtration/ 7-17 filters	Y
1	181B	Kiln	57	13.5	769.5	2	Exh		
1	182	Food Lab	1214	9.5	11533	16	2 SA with FTR and 3 Hoods		
1	182A	Storage	196	9.5	1862	3	1 SA with FTR	Washer/Drier. Refrg	
1	183	Textiles Lab	951	9.5	9034.5	23	2 SA with FTR		
1	183A	Storage	196	9.5	1862	2	1 SA with FTR		
1	188	Fitness Center	1458	23.5	34263	20	6 SA with FTR		
1	189	Health Classroom	688	9.5	6536	25	2 SA with FTR		
1	190	Health Classroom	726	9.5	6897	26	2 SA with FTR		
1	191	Project Adventure	1351	27.5	37152.5	15	8 SA Ducted		
1	192	Storage	196	13.5	2646	2			
1	193	Mechanical	400	13.5	5400		Switchgear/Gen ATS	Exh Fan	
1	194	Mechanical			0				
1	195	Data			0				
2	213	Upper Lobby			0				
2	213	Elec			0				
2	214	Control Room			0				
2	217	Balcony			0				
2	220	Mechanical			0				
2	221	Prep	181	10.6	1918.6	2	1 SA with Exh		
2	222	Classroom	1180	10.6	12508	26	4 SA with FTR		
2	223	Classroom	724	9.5	6878	16	2 SA with FTR		
2	224	Classroom	705	9.5	6697.5	26	2 SA with FTR		
2	225	Classroom	730	9.5	6935	23	2 SA with FTR		
2	226	Classroom	761	9.5	7229.5	26	2 SA with FTR		
2	227	Classroom	750	9.5	7125	15	2 SA with FTR		
2	228	Elec	57	13	741	0			
2	229	Prep	237	9.5	2251.5	2	1 SA		
2	230	Science Classroom	1154	9.5	10963	25	4 SA with FTR		
2	231	Lounge	527	9	4743	9	2 SA with FTR		
2	231A	Copier	33	8	264	1			
2	237	Faculty	227	9.5	2156.5	4	2 SA with FTR		
2	237A	Telephone	66	9.5	627	2	1 SA		
2	239	Classroom	718	9.5	6821	26	2 SA with FTR		
2	240	Classroom	753	9.5	7153.5	25	2 SA with FTR		
2	241	Classroom	734	9.5	6973	26	2 SA with FTR		
2	242	Classroom	750	9.5	7125	23	2 SA with FTR		
2	244	Classroom			0				
2	245	Science Classroom	1166	9.5	11077	26	4 SA with FTR		

Project Name:	**Fairfield Public Schools RCx**
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RCM, RA, JRK

Zone Identification

Floor	Room#	Room Name	Area (SF)	Ceiling Height	Volume	People	Notes	Identified Deficiencies	Pictures Y /N
2	245A	Prep Room	237	9.5	2251.5	2	1 SA	ADDED ROOM	
2	246	Classroom	750	9.5	7125	28	2 SA with FTR		
2	247	Classroom	735	9.5	6982.5	25	2 SA with FTR		
2	248	Classroom	696	9.5	6612	14	2 SA with FTR		
2	249	Classroom	755	9.5	7172.5	22	2 SA with FTR		
2	250	Classroom	733	9.5	6963.5	26	2 SA with FTR		
2	251	Classroom	614	9.5	5833	24	2 SA with FTR		
2	252	Computer Lab	982	9.5	9329	27	6 SA with FTR		
2	253	Library	230 886 3185	9 20 17	73935	54	14 SA with FTR		
2	254	Media Room	640	17	10880	40	2 SA, shares an open ceiling with Library		
2	257	Office	312	20	6240	5	2 SA, shares an open ceiling with Library		
2	258	Work Room	337	9.5	3201.5	5	2 SA		
2	259	Storage	100	9.5	950	0			
2	260	Project Room	587	9.5	5576.5	32	3 SA		
2	261B	Tele/Data			0				
2	262	Office	166	9.5	1577	4	1 A with FTR		
2	263	Office	182	9.5	1729	5	1 SA with FTR		
2	264	Conference	250	9.5	2375	8	1 SA		
2	265	Office	182	9.5	1729	7	1 SA		
2	266	Guidance	512	9.5	4864	7	2 SA		
2	267	Office	162	9.5	1539	4	1 SA with FTR		
2	268	Office	168	9.5	1596	5	1 SA with FTR		
2	269	Elec	48	13.7	657.6		Exh		
2	270	Exam	84	9.5	798	2	1 Sa with FTR	Warm and Stuffy	
2	271	Infirmary	542	9.5	5149	12	2 SA		
2	272	Nurse	162	9.5	1539	2	1 SA with Exh	Very Warm and Stuffy	
2		Isolation Room	64	9.5	608	1	FTR no SA	ADDED ROOM	
2	276	Administration	718	9.5	6821	8	3 SA with FTR		
2	278	Dean	191	9.5	1814.5	2	1 SA with FTR		
2	279	Dean	206	9.5	1957	5	1 A with FTR		
2	281	Assistant Principal	251	9.5	2384.5	5	1 SA with FTR		
2	282	Principal	331	9.5	3144.5	7	1 SA with FTR		
2	284	Conference	367	9.5	3486.5	11	2 SA with FTR		
2		Kitchen	130	9.5	1235	3		ADDED ROOM	
2		Mail	111	9.5	1054.5	2		ADDED ROOM	
2		Office Hallway	407	9.5	3866.5			ADDED ROOM	
2	285J	Cust			0				
2	288	Classroom	441	9.5	4189.5	13	2 SA with FTR	Stuffy	
2	289	Classroom	593	9.5	5633.5	10	3 SA with FTR and 2 Exh		
2	291	Classroom	718	9.5	6821	13	2 SA with FTR		
2	292	Team Assembly	1464	9.5	13908	37	2 A with FTR		

Project Name:	**Fairfield Public Schools RCx**
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Zone Identification

Floor	Room#	Room Name	Area (SF)	Ceiling Height	Volume	People	Notes	Identified Deficiencies	Pictures Y /N
2	293	Mechanical			0				
3	301	Prep	288	9.5	2736	2	1 SA with Exh		
3	302	Science Classroom	1103	9.5	10478.5	26	4 SA with FTR		
3	303A	Elec			0				
3	304	Classroom	724	9.5	6878	26	2 SA with FTR		
3	305	Classroom	718	9.5	6821	26	2 SA with FTR		
3	306	Classroom	736	9.5	6992	26	2 SA with FTR		
3	307	Classroom	738	9.5	7011	28	2 SA with FTR	Stuffy	
3	308	Classroom	756	9.5	7182	23	2 SA with FTR		
3	309	Prep	235	9.5	2232.5	2	1 SA with Exh		
3	310	Science Classroom	1148	9.5	10906	26	4 SA with FTR	Stuffy	
3	312	Lounge	527	9	4743	9	2 SA with FTR		
3	314	Copier	33	8	264	1			
3	319	Faculty	227	9.5	2156.5	4	2 SA with FTR		
3	319A	Not Labeled	66	9.5	627	2	1 SA		
3	320	Classroom	717	9.5	6811.5	26	2 SA with FTR		
3	321	Classroom	755	9.5	7172.5	25	2 SA with FTR		
3	322	Classroom	756	9.5	7182	14	2 A with FTR		
3	323	Classroom	754	9.5	7163	26	2 SA with FTR		
3	324	Prep	232	9.5	2204	2	1 SA with Exh		
3	325	Science Classroom	1160	9.5	11020	28	4 SA with FTR		
3	326	Tele/Data	53	13	689	0	Ceiling Stained outside Door	Very Warm and Stuffy	y
3	327	Classroom	754	9.5	7163	13	2 SA with FTR		
3	328	Classroom	734	9.5	6973	28	2 SA with FTR		
3	329	Classroom	696	9.5	6612	25	2 SA with FTR		
3	330	Classroom	754	9.5	7163	26	2 SA with FTR	Stuffy	
3	331	Classroom	739	9.5	7020.5	26	2 SA with FTR		
3	332	Classroom	614	9.5	5833	26	2 SA with FTR	Stained Tiles	Y
3	333	Computer Lab	984	9.5	9348	29	4 SA with FTR		
3	333A	Office	132	9.5	1254	1	No Air Stuffy	ADDED ROOM	
3	334	Tele/Data			0				
3	335	Computer Lab	746	9.5	7087	25	4 SA with FTR	Window Open	
3	336	Tele/Data	53	13.5	715.5				
3	339	Classroom	718	9.5	6821	24	2 SA and FTR		
3	340	Classroom	730	9.5	6935	15	2 SA 2-R and FTR		
3	341	Classroom	733	9.5	6963.5	28	2 SA and FTR		
3	342	Prep	226	9.5	2147	2	1 SA with FTR		
3	343	Elec	67	12	804				
3	344	Classroom	746	9.5	7087	23	2 SA 2-R and FTR		
3	345	Tele/Data			0				
3	346	Prep	226	9.5	2147	2	1 SA 1-R with FTR		

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Zone Identification

Floor	Room#	Room Name	Area (SF)	Ceiling Height	Volume	People	Notes	Identified Deficiencies	Pictures Y /N
3	347	Classroom	724	9.5	6878	23	2 SA 2-R and FTR		
3	348	Classroom	744	9.5	7068	25	2 SA and FTR		
3	349	Classroom	732	9.5	6954	25	2 SA and FTR		
3	350	Classroom	730	9.5	6935	12	2 SA with FTR		
3	351	Classroom	726	9.5	6897	25	2 SA and FTR		
3	352	Classroom	718	9.5	6821	12	2 SA and FTR		
3	355	Faculty	240	9.5	2280	1	1 SA 1-R and FTR		
3	355A	Telephone	66	9.5	627	1	1 SA 1-R and FTR		
3	314A (358)	Copier	25	8	200	0	2 RETURNS	1 COPIER	
3	360	Lounge	382	9	3438	10	2 SA 2-R and FTR		
3	361	Classroom	753	9.5	7153.5	28	2 SA and FTR		
3	362	Classroom	720	9.5	6840	22	2 SA 2-R and FTR		
3	363	Classroom	771	9.5	7324.5	28	2 SA and FTR		
3	364	Prep	212	9.5	2014	2	1 SA with FTR		
3	365	Elec	62	14	868			2-PANELS 4 HOA STARTERS	
3	366	Classroom	768	9.8	7526.4	11	2 SA 2-R and FTR		
3	367	Tele/Data			0				
3	368	Prep	204	9.5	1938	1	2 SA and FTR		
3	369	Classroom	704	9.5	6688	24	2 SA 2-R and FTR		
3	370	Classroom	737	9.5	7001.5	23	2 SA 2-R and FTR		
3	371	Classroom	741	9.5	7039.5	22	2 SA 2-R and FTR		

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Unit Tag	RLMS AHU-1	Addition comments descriptions
Location	MER 119	
Serving	Band, Kitchen Office, Corridor	
Config/Style	VAV Dual Temperature Heating and Cooling	
Mfr.	Ventrol	
Model #		
Serial #		
Age (years)		
System CFM	7370 RF 7370	
Max OA CFM		
V/Hz/Ph	230/460 -Phase	
SF Qty/HP	15 HP	(3) BX66
SF VFD Data		
RF Qty/HP	5 HP	Greenheck TCB-1-24-50-XSN 03A21016
RF VFD Data		
Filter Data (Size Quantity)	Need to gather	
Filter Status	Dirty Pre-Filter	Last Changed 9-21
Controls Type		
Controls Mfr.	JCI	
Economizer	Yes	
CO_2 DCV		
Damper Styles		
Damper Status	Damper blades dirty and should be cleaned and lubricated	
Heating Type		
Heating Coil Condition	Moderate	Should be cleaned
Cooling Type		
Cooling Coil Condition	Moderate	Should be cleaned
CU Mfr.		
CU Model		
CU Serial		
Drain Pan Status	Not bad	

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Notes:	Mechanical Space should be cleaned of stored equipment for safety purposes	

Description	**Photos**
Unit from afar	

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Unit SF Tag Info	

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Unit RF/EF Tag Info	   

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Heating Coil	
Cooling Coil	

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Condensate Pan	
Control Dampers	 

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Filters	   

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

	
Controls	 

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

	
Electrical / Misc.	 

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Unit Tag	RLMS AHU-2	Addition comments descriptions
Location	MER 194	
Serving	Art, Health	
Config/Style		
Mfr.	Ventrol	
Model #		
Serial #		
Age (years)	2003	
System CFM	9570@5.1" 1,612 RPM	
Max OA CFM		
V/Hz/Ph		
SF Qty/HP	(1) 15.0	
SF VFD Data	ABB	
RF Qty/HP	(1) 7.5	Greenheck TCB-1-30
RF VFD Data	ABB	
Filter Data (Size Quantity)	(6) 24X24X12 (6) 24X24X2	9/29/21 CHANGE OUT
Filter Status	Pre-filters dirty	Missing safing
Controls Type		
Controls Mfr.		
Economizer	Yes	
CO_2 DCV		
Damper Styles	OBD	
Damper Status	TAMCO	
Heating Type	GLYCOL HOT WATER	
Heating Coil Condition	DIRTY	
Cooling Type	GLYCOL CHILLED WATER	
Cooling Coil Condition	OK	
CU Mfr.	N/A	
CU Model	N/A	
CU Serial	N/A	
Drain Pan Status	S.S SHOULD BE CLEANED	
Notes:	FREEZE STAT SET @35, VORTEX AIR FLOW MEASURING	

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Description	**Photos**
Unit from afar	

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Unit SF Tag Info	

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Unit RF/EF Tag Info	   

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Heating Coil	
Cooling Coil	

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Condensate Pan	 
Control Dampers	  

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Filters	  

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Controls	   

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Electrical / Misc.	   

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Unit Tag	RLMS AHU-3	Addition comments descriptions
Location	MER 220	
Serving	Classrooms 221-237	
Config/Style		
Mfr.	Ventrol	
Model #		
Serial #		
Age (years)	2003	
System CFM	14520@5.3” 1,315 RPM	
Max OA CFM		
V/Hz/Ph		
SF Qty/HP	(1) 25.0	
SF VFD Data	ABB	
RF Qty/HP	(1) 10.0 BELTS MIS-MATCHED	Greenheck TCB-2-36-100X
RF VFD Data	ABB	
Filter Data (Size Quantity)	(6) 24X24-12 (6) 12X24X2	
Filter Status	PRE-FILTER DIRTY	
Controls Type		
Controls Mfr.		
Economizer	YES	
CO_2 DCV		
Damper Styles	OBD TAMCO	
Damper Status	Ok CLEAN LUBRICATE AND ADJUST	Min OA Damper linkage missing
Heating Type	Glycol hot water	
Heating Coil Condition	dirty	
Cooling Type	Glycol chilled water	
Cooling Coil Condition	ok	
CU Mfr.	N/A	
CU Model	N/A	
CU Serial	N/A	
Drain Pan Status	S.S. SHOULD BE CLEANED	
Notes:		

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Description	**Photos**
Unit from afar	
Unit RF/EF Tag Info	  

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Controls	    

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Unit Tag	RLMS AHU-4	Addition comments descriptions
Location	MER 220	
Serving		
Config/Style		
Mfr.	Ventrol	
Model #		
Serial #		
Age (years)	2003	
System CFM	15070@5.28” 1,329 RPM	(3) BX93
Max OA CFM		
V/Hz/Ph		
SF Qty/HP	25.0	
SF VFD Data	ABB	
RF Qty/HP	10.0	Greenheck TCB-2-36
RF VFD Data	ABB	(2) BX105
Filter Data (Size Quantity)		
Filter Status		
Controls Type		
Controls Mfr.		
Economizer	YES	
CO_2 DCV		
Damper Styles	Tamco OBD	
Damper Status	Clean adjust and lubricate	Dampers need adjustments Min OA damper linkage missing
Heating Type	Glycol hot water	
Heating Coil Condition	dirty	
Cooling Type	Glycol chilled water	
Cooling Coil Condition	dirty	
CU Mfr.	n/a	
CU Model	n/a	
CU Serial	n/a	
Drain Pan Status	S.S.	
Notes:	Flex connection torn on fan section, sup belts mis-matched	

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Description	**Photos**
Unit Tag Info	

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Unit SF Tag Info	    

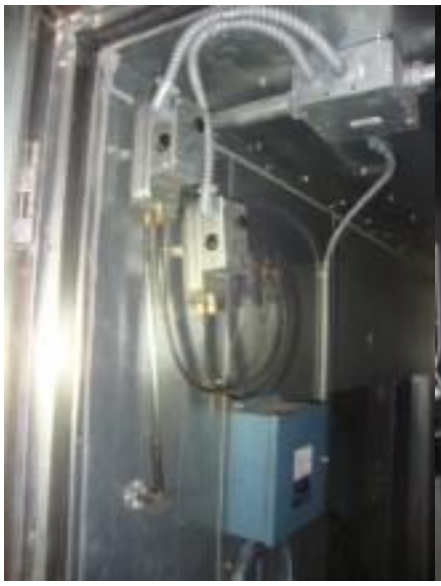
PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Unit RF/EF Tag Info	 
Heating Coil	

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Cooling Coil	
Control Dampers	

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Filters	 
Controls	 
Electrical / Misc.	

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Unit Tag	AHU-5	Addition comments descriptions
Location	MER 293	
Serving	Administration, Nurse, Team	
Config/Style		
Mfr.	Ventrol	
Model #		
Serial #		
Age (years)	2003	
System CFM	14450@5.11" 1,299 RPM	
Max OA CFM		
V/Hz/Ph		
SF Qty/HP	25.0	
SF VFD Data	ABB	
RF Qty/HP	10	Greenheck TCB-2-36-100x
RF VFD Data	ABB	
Filter Data (Size Quantity)	(6) 24X24X12 (5) 12X24X2	9-21-21
Filter Status	Pre dirty	
Controls Type		
Controls Mfr.		
Economizer	yes	
CO_2 DCV		
Damper Styles	Tamco OBD	
Damper Status	Clean lubricate and adjust	
Heating Type	Glycol Hot Water	
Heating Coil Condition	ok	
Cooling Type	Glycol Chilled Water	
Cooling Coil Condition	ok	
CU Mfr.	n/a	
CU Model	n/a	
CU Serial	n/a	
Drain Pan Status	S.S.	
Notes:	Freeze stat set @38 Vortex Airflow	

Description	**Photos**

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Unit Tag Info	
Unit from afar	

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Unit SF Tag Info	     

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Unit RF/EF Tag Info	     

Heating Coil	  

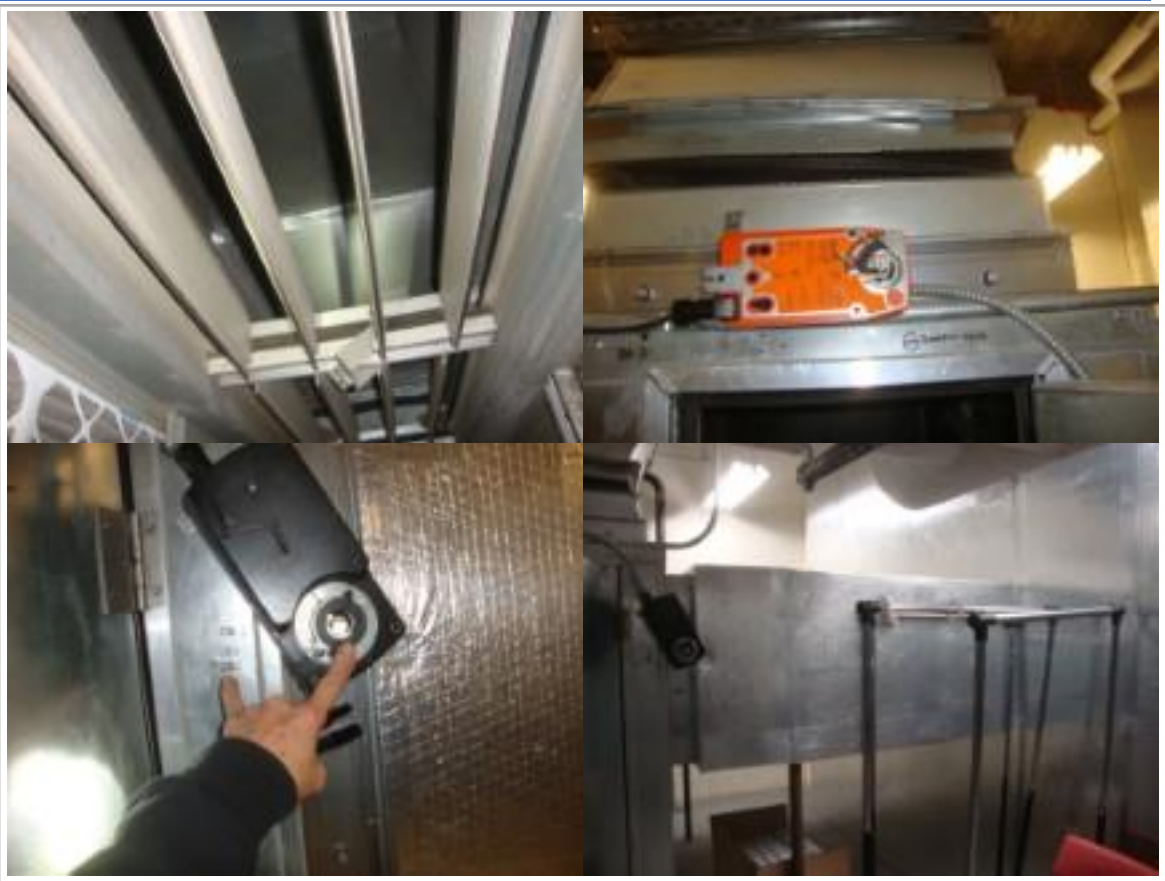
PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Cooling Coil	

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Control Dampers	

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET



PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Filters	

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Controls	
Electrical / Misc.	

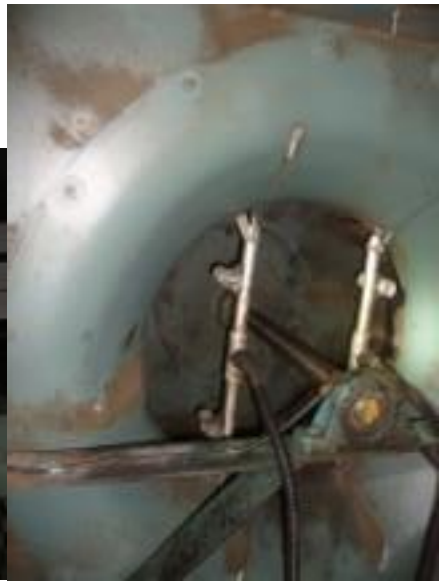
PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Unit Tag	RLMS AHU-6	Addition comments descriptions
Location	MER 293	
Serving	Classrooms 352-372	
Config/Style		
Mfr.	Ventrol	
Model #		
Serial #		
Age (years)	2003	
System CFM	12585@	
Max OA CFM		
V/Hz/Ph		
SF Qty/HP	20	
SF VFD Data	ABB	
RF Qty/HP	7.5	Greenheck TCB-1-36-75X
RF VFD Data	ABB	
Filter Data (Size Quantity)	(6) 24x24x12 (6) 12x24x2	
Filter Status	Pre-dirty	
Controls Type		
Controls Mfr.		
Economizer	Yes	
CO_2 DCV		
Damper Styles	Tamco OBD	
Damper Status	Clean adjust and lubricate	Min OA Damper linkage missing
Heating Type	Glycol Hot water	
Heating Coil Condition	Dirty	
Cooling Type	Glycol Chilled water	
Cooling Coil Condition	okay	
CU Mfr.	n/a	
CU Model	n/a	
CU Serial	n/a	
Drain Pan Status	S.S.	
Notes:		

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Description	**Photos**
Unit SF Tag Info	  

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Unit RF/EF Tag Info	    

Heating Coil	  

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Cooling Coil	
Condensate Pan	
Control Dampers	

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Filters	 
Controls	
Electrical / Misc.	 

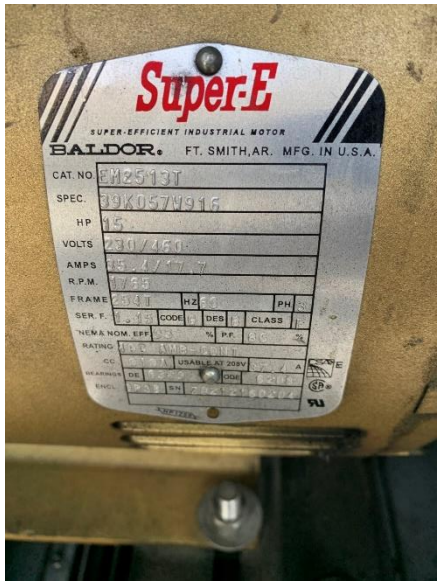
PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Unit Tag	RTU-1	Addition comments descriptions
Location	Auditorium Lobby Roof	
Serving	Auditorium, Stage. Lobby	
Config/Style	S/R with economizer control and DT H/CHW	
Mfr.	Ventrol	
Model #	unknown	
Serial #	unknown	
Age (years)	20	
System CFM	6200	
Max OA CFM	6200	
V/Hz/Ph		
SF Qty/HP	1, 15, 230V/460V, 35.4A/17.7A, 1765 rpm	Both fan belts are loose
SF VFD Data		
RF Qty/HP	1, 3, 230V/460V, 8.2/4.1A, 1760 rpm	One fan belt is loose
RF VFD Data		
Filter Data (Size Quantity)	2” MERV 13, 12” MERV 13	
Filter Status	Dirty	
Controls Type		
Controls Mfr.		
Economizer	Yes	
CO_2 DCV	Unknown	
Damper Styles	Tamco parallel blade	
Damper Status	Dampers are dirty but they modulate	
Heating Type	Dual-temperature Hot Water	
Heating Coil Condition	Ok	
Cooling Type	Dual-temperature Chilled Water	
Cooling Coil Condition	Ok	
CU Mfr.	N/A	
CU Model	N/A	
CU Serial	N/A	
Drain Pan Status	Ok	
Notes:		

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Description	**Photos**
Unit Tag Info	
Unit from afar	   

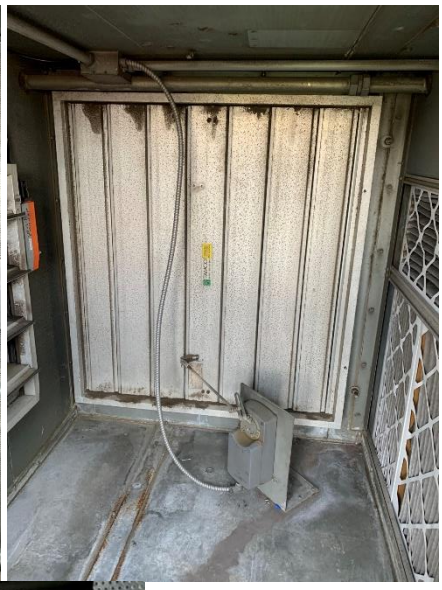
PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Unit SF Tag Info	
Unit RF/EF Tag Info	

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Heating Coil	
Cooling Coil	

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Condensate Pan	
Control Dampers	  

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Filters	  
Controls	 

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Electrical / Misc.	   

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Unit Tag	RTU-2	Addition comments descriptions
Location	Auditorium Roof	
Serving	Auditorium	
Config/Style	CV SZ	
Mfr.	Ventrol	
Model #		
Serial #		
Age (years)	2003	
System CFM	16,000 CFM SA @ 6.22 SP 6.00 CFM RA @ 1.4 SP	
Max OA CFM		
V/Hz/Ph	230/460 3 Phase	
SF Qty/HP	25 HP 3-BX91 Belts	Fan Wheel needs cleaning
SF VFD Data	NA	
RF Qty/HP	7.5 HP 2-BX88 Belts	
RF VFD Data	NA	
Filter Data (Size Quantity)	6 - 24x24x2 M-136 - 24x24x12 M-13	
Filter Status	Pre filters dirty	
Controls Type	DDC	
Controls Mfr.	JCI	
Economizer		
CO_2 DCV		
Damper Styles	Opposed TAMCO	ODA Does not fully close
Damper Status	Need Clean, Lubricate and Adjust	
Heating Type	Dual Hot Water	
Heating Coil Condition	Moderate	Some insects on coil
Cooling Type	Dual Chilled Water	
Cooling Coil Condition	Should be cleaned	
CU Mfr.		
CU Model		
CU Serial		
Drain Pan Status	Needs cleaning	
Notes:	Mold in Pipe Chase	

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Description	**Photos**
Unit from afar	   

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Unit SF Tag Info	   

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

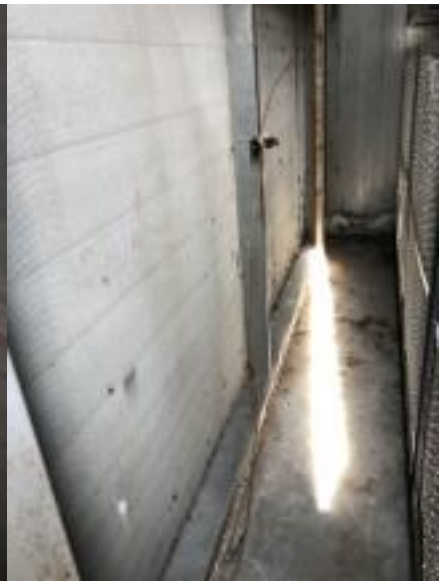
Unit RF/EF Tag Info	  

Heating Coil	

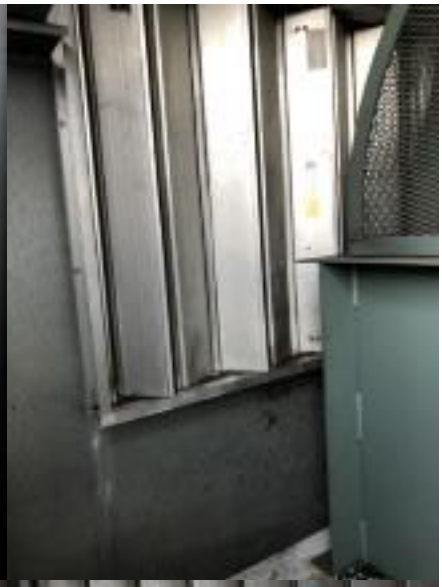
PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Cooling Coil	

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Condensate Pan	 

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Control Dampers	   

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET




PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Filters	   

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Controls	
Electrical / Misc.	

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Unit Tag	RLMS RTU-3	Addition comments descriptions
Location	A roof, west	
Serving	Kitchen Makeup	
Config/Style	MAU 100% OA with gas heat, heating only	
Mfr.	Ventrol	
Model #	unknown	
Serial #	unknown	
Age (years)	20	
System CFM	4800	
Max OA CFM	4800	
V/Hz/Ph		
SF Qty/HP	1, 7.5hp, 230V/460V, 20A/10A, 1760rpm	Unit appears to have not run for months, at least since the previous filter change in September 2021
SF VFD Data		Fan motor is covered in grease
RF Qty/HP	N/A	No Return/Exhaust in this unit
RF VFD Data	N/A	
Filter Data (Size Quantity)	2” MERV 13, 12” MERV 13	
Filter Status	Filter media is pristine but the casings are covered with either moisture or colorful, dried growth	
Controls Type		Unit was found with exterior HOA switch turned to “OFF”
Controls Mfr.		
Economizer	100% OA only, no recirc	
CO_2 DCV	No	
Damper Styles	Tamco parallel blade	
Damper Status	Ok	
Heating Type	Gas furnace (Reznor)	
Heating Coil Condition	Ok	
Cooling Type	No cooling	
Cooling Coil Condition	N/A	
CU Mfr.	N/A	
CU Model	N/A	
CU Serial	N/A	
Drain Pan Status	ok	
Notes:		

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

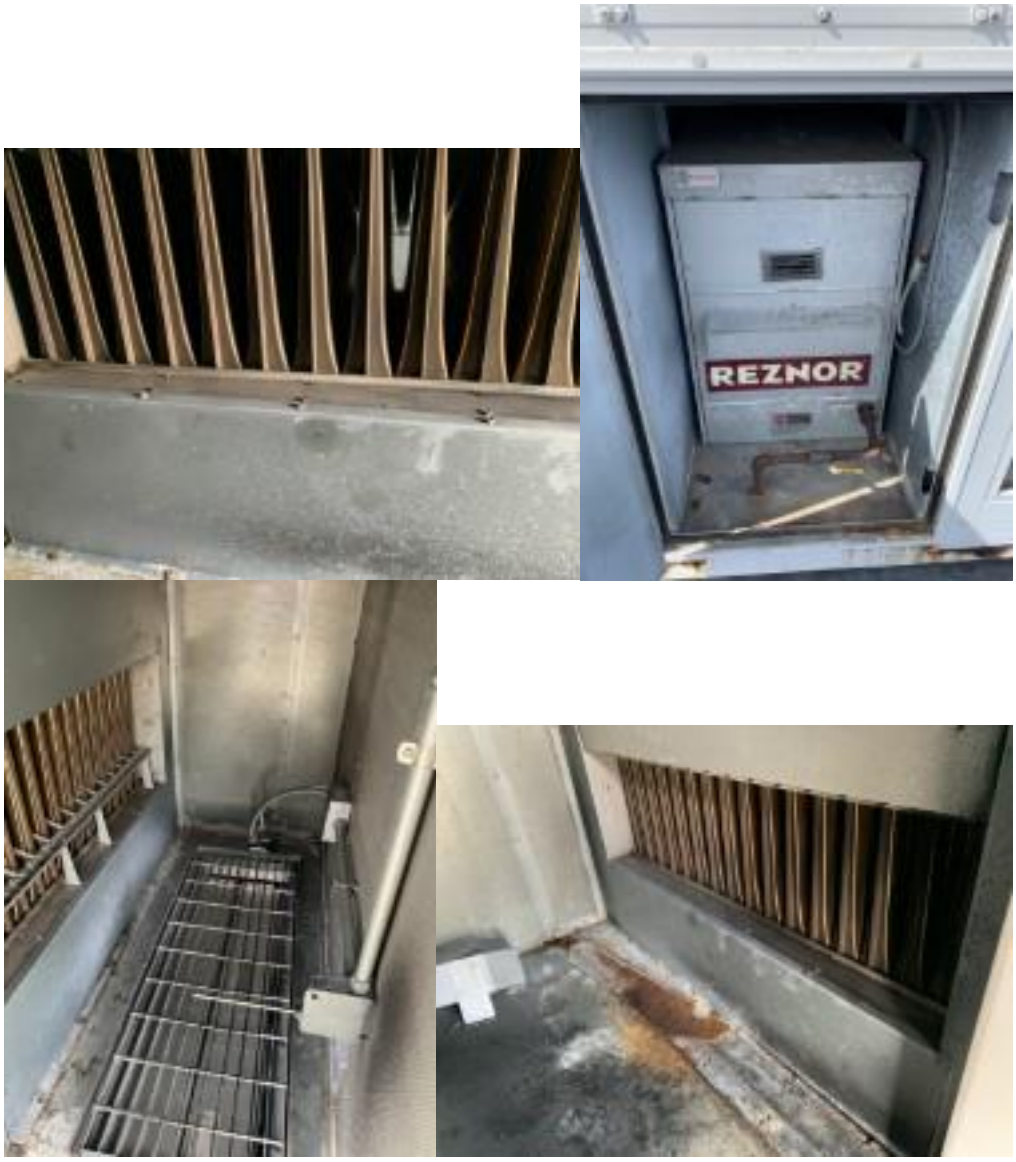
Description	**Photos**
Unit Tag Info	
Unit from afar	   

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Unit SF Tag Info	

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Heating Coil	
Control Dampers	

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Filters	

	   
Controls	

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Electrical / Misc.	

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Unit Tag	RTU-4	Addition comments descriptions
Location	Central Roof	
Serving	Classrooms 241-247	
Config/Style	S/R with economizer control and DT H/CHW	
Mfr.	Ventrol	
Model #	unknown	
Serial #	unknown	
Age (years)	20	
System CFM	12400	
Max OA CFM	12400	
V/Hz/Ph		
SF Qty/HP	1, 25hp, 230V/460V, 60A/30A, 1770rpm	
SF VFD Data	ABB M# ACH401C02032+10CF0000	480V, 35A
RF Qty/HP	2, 3hp, 230V/460V, 8.2A/4.1A, 1760rpm	
RF VFD Data	ABB M# ACH401C00632, C# 64371665, S# 2030200793	480V, 11.1A
Filter Data (Size Quantity)	2” MERV 13, 12” MERV 13	
Filter Status	Some dirtier than others	The blank-off plate for the 2” rack closest to the door is missing, likely allowing easier airflow on this side explaining the much dirtier filter here
Controls Type		
Controls Mfr.		
Economizer	Yes	
CO_2 DCV	Unknown	
Damper Styles	Tamco parallel blade	
Damper Status	Need cleaning. Most, including EA/OA do not close fully	
Heating Type	Dual-temperature Hot Water	Pipe cabinet door handle does not seal the door properly
Heating Coil Condition	Ok	
Cooling Type	Dual-temperature Chilled Water	
Cooling Coil Condition	Minor header corrosion	
CU Mfr.	N/A	

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

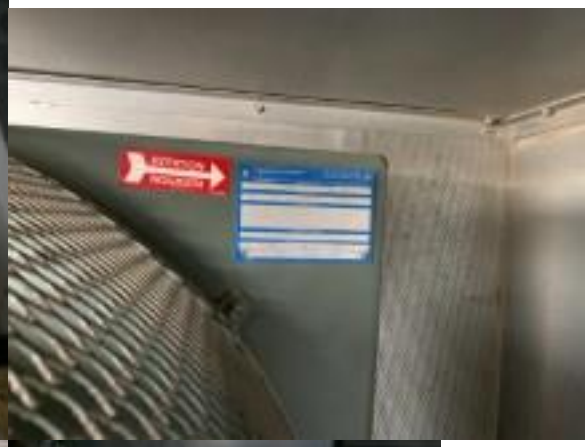
CU Model	N/A	
CU Serial	N/A	
Drain Pan Status	Significant rust located in the pan between the HW and CHW coils.	This section is not drained (typical)
Notes:		

Description	**Photos**
Unit Tag Info	
Unit from afar	   

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Unit SF Tag Info	

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Unit RF/EF Tag Info	    

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Heating Coil	 

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Cooling Coil	    

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Condensate Pan	 
Control Dampers	  

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Filters	

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Controls	

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Electrical / Misc.	   

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Unit Tag	RLMS RTU-5	Addition comments descriptions
Location	Cafe Roof	
Serving	Faculty Dining, Cafe	
Config/Style	VAV	
Mfr.	Ventrol	
Model #		
Serial #		
Age (years)	2003	
System CFM	12.180 SA CFM @ 6.19 SP6090 Each RA CFM @ 1.58 SP	
Max OA CFM		
V/Hz/Ph	230-460 3 Phase	
SF Qty/HP	25?	Fan Dirty, bearings over greased
SF VFD Data	ACH	
RF Qty/HP	3 HP (2 Fans)	2 BX44 Belts
RF VFD Data	ACH401C00632	
Filter Data (Size Quantity)	5 - 12x24x2, 5 - 24x24x25 - 12x24x12, 5 - 24x24x12	MERV 13 9-28-21 Changed
Filter Status	Pre Dirty	
Controls Type		
Controls Mfr.		
Economizer		
CO_2 DCV		
Damper Styles	Opposed	
Damper Status	Dirt needing Cleaning and Lubrication	OA Damper not moving freely, possible actuator gear stripped.
Heating Type	Dual Hot Water	
Heating Coil Condition	Needs Cleaning	
Cooling Type	Cool Chilled Water	
Cooling Coil Condition	Should be cleaned	
CU Mfr.		
CU Model		
CU Serial		
Drain Pan Status	Needs Cleaning	

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Notes:		

Description	**Photos**
Unit Tag Info	
Unit from afar	

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Unit SF Tag Info	   

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Unit RF/EF Tag Info	   

	
Heating Coil	

Cooling Coil	  

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Condensate Pan	
Control Dampers	

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Filters	

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Controls	

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Electrical / Misc.	   

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Unit Tag	RLMS RTU-6	Addition comments descriptions
Location	Central Roof	
Serving	Classrooms 320-328	
Config/Style		
Mfr.	Ventrol	
Model #		
Serial #		
Age (years)	2003	
System CFM	12,700 SF CFM @ 6.4 SP6350 RA CFM (2) @1.4 SP	
Max OA CFM		
V/Hz/Ph	230-460 3-Phase	
SF Qty/HP	25 HP	2 -5VX830 Belts
SF VFD Data	ACH	
RF Qty/HP	(2) 3 HP	2 - BX44 Belts each Fan
RF VFD Data	ACH401C00632	
Filter Data (Size Quantity)	5 - 12x24x2, 5 - 24x24x25 - 12x24x12, 5 - 24x24x12	MERV 13
Filter Status	Due to be changed	
Controls Type		
Controls Mfr.		
Economizer		
CO_2 DCV		
Damper Styles	TAMCO Opposed	
Damper Status	Need Cleaning and Lubrication	
Heating Type	Dual Hot Water	
Heating Coil Condition	Should be cleaned	
Cooling Type	Dual Chilled Water	
Cooling Coil Condition	Should be cleaned	
CU Mfr.		
CU Model		
CU Serial		
Drain Pan Status	Needs Cleaning	
Notes:		

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Description	**Photos**
Unit Tag Info	
Unit from afar	

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Unit SF Tag Info	   

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Unit RF/EF Tag Info	   

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Heating Coil	 

Cooling Coil	

Condensate Pan	

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Filters	   

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Controls	 

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Electrical / Misc.	   

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Unit Tag	RLMS RTU-7	Addition comments descriptions
Location	Central Roof	
Serving	Technologies	
Config/Style	VAV Dual Temp Htg, Clg.	
Mfr.	Ventrol	
Model #		
Serial #		
Age (years)	2003	
System CFM	13800	
Max OA CFM		
V/Hz/Ph	230/460 3 Phase	
SF Qty/HP	(1) 25 HP	(2) 5VX830 Belts
SF VFD Data	ABB ACH with Bypass	
RF Qty/HP	(2) 3 HP	(2) BX44 Belts each fan
RF VFD Data	ABB ACH401C00632With Bypass	
Filter Data (Size Quantity)		
Filter Status	Pre-filters could be changed	
Controls Type		
Controls Mfr.		
Economizer		
CO_2 DCV		
Damper Styles		
Damper Status	Not bad, could use lubrication	
Heating Type	Dual Temp Hot Water	
Heating Coil Condition	Somewhat dirty	
Cooling Type	Dual Temp Chilled Water	
Cooling Coil Condition	Somewhat Dirty	
CU Mfr.	N/A	
CU Model	N/A	
CU Serial	N/A	
Drain Pan Status	Moderate, cleaning in near future	
Notes:	Some signs of external rust and corrosion and algae growth	

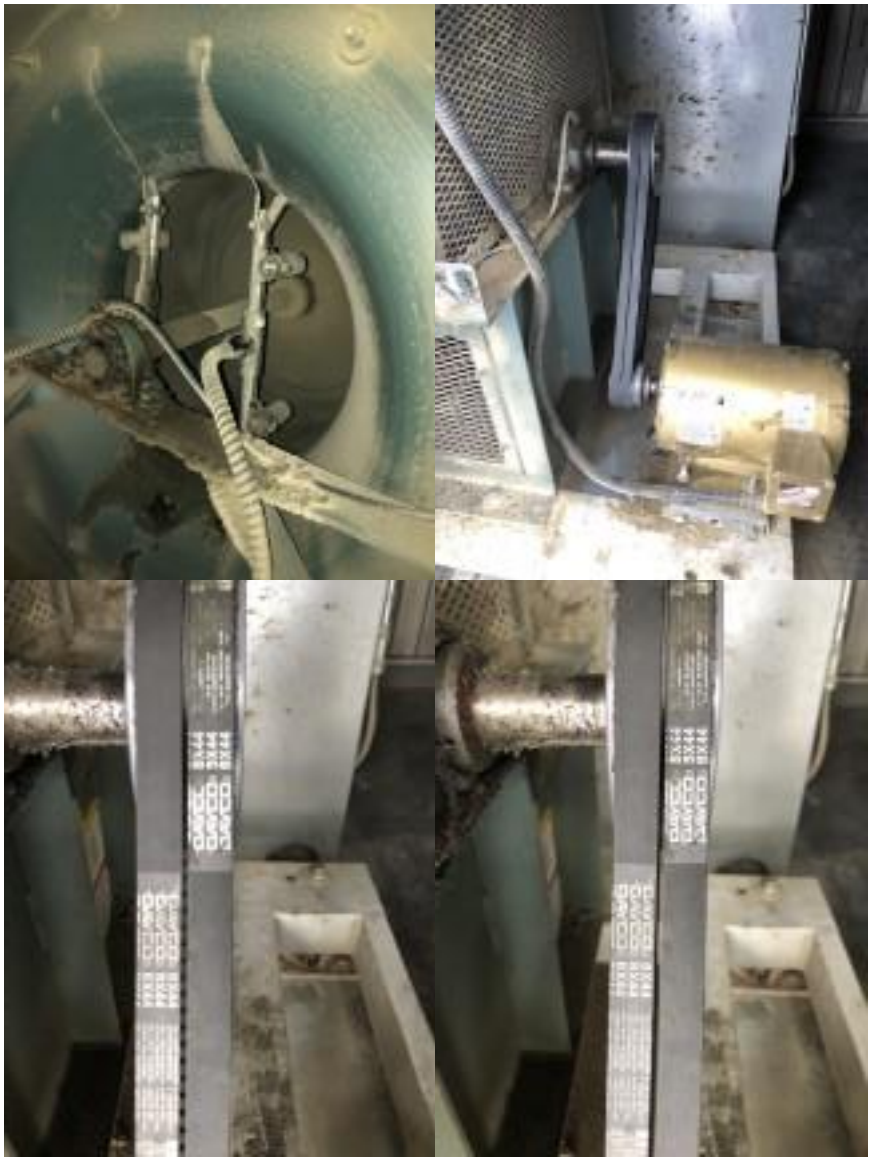
PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Description	**Photos**
Unit Tag Info	
Unit from afar	

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Unit SF Tag Info	   

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET



PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Unit RF/EF Tag Info	    

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Heating Coil	  

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Cooling Coil	  
Condensate Pan	 

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Control Dampers	 
Filters	 
Controls	 

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Electrical / Misc.	   

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Unit Tag	RLMS RTU-8	Addition comments descriptions
Location		
Serving	Classrooms 322-335	
Config/Style		
Mfr.	Ventrol	
Model #		
Serial #		
Age (years)	2003	
System CFM	13,800 SF CFM @5.91 SP6,900 RF (2) CFM@5.91 SP	
Max OA CFM		
V/Hz/Ph	230-460 3-Phase	
SF Qty/HP	25 HP	2 - 5VX830 Belts
SF VFD Data	ACH	
RF Qty/HP	(2) 3 HP	(2) BX45 Belts
RF VFD Data	ACH401C00632	
Filter Data (Size Quantity)	5 - 12x24x2, 5 - 24x24x25 - 12x24x12, 5 - 24x24x12	
Filter Status	Pre should be cleaned	Last Changed 9-28-22
Controls Type		
Controls Mfr.		
Economizer		
CO_2 DCV		
Damper Styles	Opposed TAMCO	
Damper Status	Should be Cleaned and Lubricated	
Heating Type	Dual HW	
Heating Coil Condition	Moderate	
Cooling Type	Dual CHW	
Cooling Coil Condition	Moderate	
CU Mfr.		
CU Model		
CU Serial		
Drain Pan Status	Cleaning needed	
Notes:		

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Description	**Photos**
Unit Tag Info	
Unit from afar	

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Unit SF Tag Info	   

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Unit RF/EF Tag Info	  

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Heating Coil	
Cooling Coil	 

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Condensate Pan	
Control Dampers	

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Filters	    

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Controls	  

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Electrical / Misc.	  

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Unit Tag	RLMS RTU-9	Addition comments descriptions
Location	Central Roof	
Serving	Classrooms 248-269, Lobby	
Config/Style	S/R with economizer control and DT H/CHW	
Mfr.	Ventrol	
Model #	unknown	
Serial #	unknown	
Age (years)	20	
System CFM	16000	
Max OA CFM	16000	
V/Hz/Ph		
SF Qty/HP	1, 30hp, 230V/460V, 72A/36A, 1775rpm	Supply fan section door has no hinges
SF VFD Data	ABB M# H550-VH-045A-4, S# 2121403079	
RF Qty/HP	2, 5hp, 230V/460V, 13A/6.5A, 1750rpm	
RF VFD Data	ABB M# ACH401C00932, C# 6431673	480V, 14.8A
Filter Data (Size Quantity)	2” MERV 13, 12” MERV 13	
Filter Status	Pre-filters Dirty, final filters clean	
Controls Type		
Controls Mfr.		
Economizer	Yes	
CO_2 DCV	Unknown	
Damper Styles	Tamco parallel blade	
Damper Status	Need to be cleaned	
Heating Type	Dual-temperature Hot Water	
Heating Coil Condition	Coil is ok, temperature sensor has poor coverage	
Cooling Type	Dual-temperature Chilled Water	
Cooling Coil Condition	Minor corrosion on the header	
CU Mfr.	N/A	
CU Model	N/A	
CU Serial	N/A	
Drain Pan Status	Minor rust in the pan	
Notes:		

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Description	**Photos**
Unit Tag Info	
Unit from afar	   

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Unit SF Tag Info	   

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Unit RF/EF Tag Info	   

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Heating Coil	    

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Cooling Coil	
Condensate Pan	

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Control Dampers	 
Filters	   

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Controls	

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Electrical / Misc.	   

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Unit Tag	RLMS RTU-10	Addition comments descriptions
Location	North Roof	
Serving	Library	
Config/Style	S/R with economizer control and DT H/CHW	
Mfr.	Ventrol	
Model #	unknown	
Serial #	unknown	
Age (years)	20	
System CFM	6200	
Max OA CFM	6200	
V/Hz/Ph		
SF Qty/HP	1, 15hp, 230V/460V, 35.4A/17.7A, 1765rpm	Fan base squeaks and could use an adjustment
SF VFD Data	ABB M# ACH401C00432+A0CE0000	480V, 6.6A
RF Qty/HP	1, 3hp, 230V/460V, 8.4A/4.2A, 1765rpm	
RF VFD Data		
Filter Data (Size Quantity)	2” MERV 13, 12” MERV 13	
Filter Status	Dirty	
Controls Type		
Controls Mfr.		
Economizer	Yes	
CO_2 DCV	Unknown	
Damper Styles	Tamco parallel blade	
Damper Status	OA dampers dirty, all need to be greased	
Heating Type	Dual-temperature Hot Water	
Heating Coil Condition	Noticeable air in the coil	
Cooling Type	Dual-temperature Chilled Water	
Cooling Coil Condition	Corrosion on the header	
CU Mfr.	N/A	
CU Model	N/A	
CU Serial	N/A	
Drain Pan Status	Debris found in drain pan, drain was not obstructed	

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

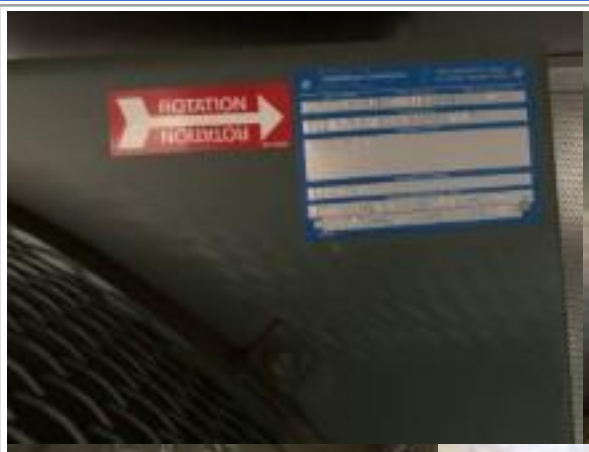
Notes:		

Description	**Photos**
Unit Tag Info	

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Unit from afar	

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Unit SF Tag Info	     

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Unit RF/EF Tag Info	   

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Heating Coil	   

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Cooling Coil	  
Condensate Pan	

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Control Dampers	   

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Filters	    

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Controls	  

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Electrical / Misc.	  

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Unit Tag	RLMS RTU-11	Addition comments descriptions
Location	Central Roof	
Serving	Classrooms 339-351	
Config/Style		
Mfr.	Ventrol	
Model #		
Serial #		
Age (years)	2003	
System CFM	12500@6.1: 1,887 RPM	(2) BX81
Max OA CFM		
V/Hz/Ph		
SF Qty/HP	20?	
SF VFD Data	ABB	
RF Qty/HP	(2) 3.0	(2) BX84 ea.
RF VFD Data	ABB	
Filter Data (Size Quantity)		
Filter Status	Prefilter very bad	9-27-21
Controls Type		
Controls Mfr.		
Economizer	Yes	
CO_2 DCV		
Damper Styles	Tamco OBD	
Damper Status	Clean Adjust and lubricate	
Heating Type	Glycol Hot water	
Heating Coil Condition	Dirty	
Cooling Type	Glycol Chilled water	
Cooling Coil Condition	OK	
CU Mfr.	n/a	
CU Model	n/a	
CU Serial	n/a	
Drain Pan Status	S.S	
Notes:	Belt guards removed, Freeze stats set @38	Heavy grease on pillow blocks

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Description	**Photos**
Unit Tag Info	
Unit from afar	  

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Unit SF Tag Info	

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Unit RF/EF Tag Info	    

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Heating Coil	 
Cooling Coil	 
Condensate Pan	

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Control Dampers	
Filters	

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Controls	  

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Electrical / Misc.	 

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Unit Tag	RLMS RTU-12	Addition comments descriptions
Location	Gym Roof	
Serving	Basement Locker Rooms	
Config/Style	CV Dual Temp Htg, Clg.	
Mfr.	Ventrol	
Model #	No Tag	
Serial #		
Age (years)	2003	
System CFM	2650	
Max OA CFM		
V/Hz/Ph	230/460 3 Phase	
SF Qty/HP	7 1/2 HP	
SF VFD Data	NA	
RF Qty/HP	1 1/2 HP	
RF VFD Data	NA	
Filter Data (Size Quantity)	1-24x24x2, 1-24x24x2,1-24x12x12, 1-24x24x12 Box	MERV 13 Both
Filter Status	Require Changing	
Controls Type	DDC	
Controls Mfr.	JCI	
Economizer	Yes	
CO_2 DCV	?	
Damper Styles	Opposed	
Damper Status	Need Cleaning & Lubrication	
Heating Type	Dual Temp Hot Water	
Heating Coil Condition	Looks Clean	
Cooling Type	Dual Temp Chilled Water	
Cooling Coil Condition	Looks Clean	
CU Mfr.		
CU Model		
CU Serial		
Drain Pan Status	OK	
Notes:		

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Description	**Photos**
Unit Tag Info	
Unit from afar	

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Unit SF Tag Info	

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Unit RF/EF Tag Info	   

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Heating Coil	

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Cooling Coil	
Condensate Pan	

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Control Dampers	   

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Filters	

	 
Electrical / Misc.	

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Unit Tag	RLMS RTU-13	Addition comments descriptions
Location	Gym Roof	
Serving	Fitness Center	
Config/Style	Custom	
Mfr.	Ventrol	
Model #		
Serial #		
Age (years)		
System CFM	2650	
Max OA CFM		
V/Hz/Ph	460/60/3	
SF Qty/HP	7-1/2 (2) BX-35 belts loose, guards removed	
SF VFD Data	N/A	
RF Qty/HP	1-1/2 (2) BX-32 belts mis-matched, guards removed	
RF VFD Data	N/A	
Filter Data (Size Quantity)	(1) 12x24x2 (1) 24x24x12 (1) 12x24x2 (1) 24x24x12	
Filter Status	Dirty 9/27/21	
Controls Type	Factory DDC	
Controls Mfr.	Metasys (ALC)	
Economizer	Available	
CO_2 DCV	unknown	
Damper Styles	Parallel Tamco	
Damper Status	Clean, Lubricate and adjust	Damper positions unknown
Heating Type	Hot Water	
Heating Coil Condition	Dirty	
Cooling Type	Chilled Water	
Cooling Coil Condition	Dirty	
Air flow probes	Grease covered, requires cleaning and calibration.	
Drain Pan Status	Stainless Steel, clean after coils are completed	
Notes:	Prime rusted areas on unit exterior. Exposed insulation on exterior ductwork has failed, repair.	

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Unit Tag	RLMS RTU-14	Addition comments descriptions
Location	Gym Roof	
Serving	Project Room	
Config/Style	CV Dual Temp Htg, Clg.	
Mfr.	Ventrol	
Model #	No Tag	
Serial #		
Age (years)	19 (2003)	
Supply CFM	2650@5,3 4,412 RPM	(2) BX35. Belt Guard removed
Max OA CFM		
V/Hz/Ph	230-460 3-Phase	
SF Qty/HP	7.5	
SF VFD Data	None	
RF Qty/HP	1 1/2 HP	(2) BX32 Belts. Belt Guard removed 2650 CFM
RF VFD Data	None	
Filter Data (Size Quantity)	1-24x24x2, 1-24x24x2, 1-24x12x12, 1-24x24x12 Box	Merv 13
Filter Status	Dirty Pre needs cleaning	Last changed 9-27-21
Controls Type		
Controls Mfr.		
Economizer	Yes	
CO_2 DCV		
Damper Styles	Tamco OBD	
Damper Status	Clean adjust and lubricate	
Heating Type	Duel Temp HW	
Heating Coil Condition	Should be cleaned	
Cooling Type	Dual Temp Chilled Water	
Cooling Coil Condition	Should be cleaned	
CU Mfr.	n/a	
CU Model	n/a	
CU Serial	n/a	
Drain Pan Status	Loose scale/dirt	
Notes:	Belt guards off side return and discharge Motor Bearings over-greased, RF fan wheel could be cleaned	Overall in good condition with a need for enhanced Maintenance

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Description	**Photos**
Unit Tag Info	

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Unit from afar	   

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Unit SF Tag Info	     

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Unit RF/EF Tag Info	   

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Heating Coil	
Cooling Coil	

Condensate Pan	

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Control Dampers	     

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Filters	   

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

	
Controls	

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Electrical / Misc.	

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Unit Tag	RLMS RTU-15	Addition comments descriptions
Location	Gym Roof	
Serving	Basement Locker Rooms	
Config/Style	VAV	
Mfr.	Ventrol	
Model #		
Serial #		
Age (years)		
System CFM	6250@5.99” 2,468 RPM	
Max OA CFM		
V/Hz/Ph	460/60/3	
SF Qty/HP	15.0 (2) BX-68 Belts mismatched	
SF VFD Data	VFD ABB 230/460V	
RF Qty/HP	5.0	
RF VFD Data	VFB ABB	
Filter Data (Size Quantity)	(3) 12x24x2 (3) 12x24x12 (2) 24x24x2 (2) 12x24x12	
Filter Status	Dirty 9/27/21	
Controls Type	Factory DDC	
Controls Mfr.	Metasys, ALC	
Economizer	Available	
CO_2 DCV	unknown	
Damper Styles	Parallel Tamco	
Damper Status	Clean, adj. and lubricate	Damper positions unknown
Heating Type	Hot water	
Heating Coil Condition	Dirty	
Cooling Type	Chilled Water	
Cooling Coil Condition	Dirty	
Air flow probes	Grease covered, requires cleaning and calibration.	
Drain Pan Status	Stainless Steel, clean after coils are completed	
Notes:	Prime rusted areas on unit exterior. Exposed insulation on exterior ductwork has failed, repair.	

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Notes:		
Description	**Photos**	
Unit Tag Info		
Unit from afar		

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Unit SF Tag Info	   
Unit RF/EF Tag Info	

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Heating Coil	 
Cooling Coil	  

Condensate Pan		

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Control Dampers	     

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Filters	     

Electrical / Misc.	

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Unit Tag	RLMS RTU-16	Addition comments descriptions
Location	Gym Roof	
Serving	Gym	
Config/Style	VAV	
Mfr.	Ventrol	
Model #		
Serial #		
Age (years)		
System CFM	24,000	
Max OA CFM		
V/Hz/Ph	460/60/3	
SF Qty/HP	50.0	
SF VFD Data	N/A	
RF Qty/HP	15.0	New, 10/27/14
RF VFD Data	N/A	
Filter Data (Size Quantity)	(12) 24x24x2 (12) 24x24x12	
Filter Status	Dirty	
Controls Type	Factory DDC	
Controls Mfr.	Metasys, ALC	
Economizer	Yes	
CO_2 DCV		
Damper Styles	Tamco OBD	
Damper Status	Clean, Lubricate and Adjust	Min OA damper linkage missing
Heating Type	Glycol Hot water	
Heating Coil Condition	Dirty	
Cooling Type	Glycol Chilled water	
Cooling Coil Condition	Dirty	
CU Mfr.	n/a	
CU Model	n/a	
CU Serial	n/a	
Drain Pan Status	OK, S.S. clean pan after coil is washed	
Notes:		

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Description	**Photos**
Unit from afar	
Unit SF Tag Info	   

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Unit RF/EF Tag Info	  

Heating Coil	  

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Cooling Coil	   

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Condensate Pan	
Control Dampers	  

PROJECT: 2020102.00.02 FAIRFIELD PUBLIC SCHOOLS – ROGER LUDLOWE MIDDLE SCHOOL
EQUIPMENT DATA SHEET

Filters	
Controls	 
Electrical / Misc.