	AMENDED Long Range Planning Committee **Monday, March 13, 2023 – 6:00 pm** **Conference Call 312.626.6799** **Meeting ID: 818 4233 4115** **Zoom Meeting Link:** https://us02web.zoom.us/j/81842334115 **Health & Human Services Center – Community Room** **303 W. Chapel Street** **Dodgeville, Wisconsin**	**Iowa County Wisconsin**

For information regarding access for the disabled please call 935-0399.

Any subject on this agenda may become an action item.

1	Call to order.
2	Roll Call.
3	Consent Calendar A. Approve March 6, 2023 Agenda B. Approve January 3, 2023 Minutes
4	Report from committee members and an opportunity for members of the audience to address the committee. No action will be taken.
5	HHS HVAC Report from Kraus-Anderson
6	Environmental Services & Storage Garage
7	Facility Planning - Countywide
8	2023 Budget Amendment Proposal (plow trucks, HHS Heating system)
9	Set Next Meeting Date and Agenda Items
10	Adjournment.

Posting verified by the County Clerk's Office: Megan Currie Date: 02/24/2023 Initials: MC

	Draft Minutes of Long Range Planning Committee **Tuesday, January 3, 2023 – 7:00 pm** **Health & Human Services Center – Community Room** **303 W. Chapel Street** **Dodgeville, Wisconsin**	**Iowa County Wisconsin**

1	Call to order. The January 3, 2023 Long Range Planning Committee meeting was called to order by Chairman Dave Gollon at 7:00 p.m.
2	Roll Call. Present at roll call: Supervisors: Dave Gollon, Don Gander, Mike Peterson, Kim Alan, and Steve Deal. Others Present: Supervisor John Meyers, Larry Bierke, Jamie Gould, Craig Hardy, and Jake Tarrell.
3	Consent Calendar A. Approve January 3, 2023 Agenda B. Approve July 22, 2022 Minutes Motion by Sup. Deal seconded by Sup. Alan to approve consent calendar for the January 3, 2023 agenda and approve the July 22, 2022 minutes. Motion carried.
4	Report from committee members and an opportunity for members of the audience to address the committee. No action will be taken. No reports.
5	Capital Fund Balance Update Finance Director Gould provided the committee with an update of the Capital Fund Balance.
6	Set Goal for Broadband Access & Availability Motion by Sup. M. Peterson seconded by Sup. Alan to Set Goal for High Speed Internet Access and Availability at 100%. Motion carried.
7	Courthouse Landscaping and Memorial Improvements Environmental Service Director Tarrell presented the committee with ideas on improving Courthouse landscaping and memorial improvements.
8	Dam Repair and Replacement Fund No action taken.
9	Review 2023-2024 Highway Transfer Program Policy Motion by Sup. M. Peterson seconded by Sup. Gander to amend 3c. to include payments above $30,000 per mile will need to be approved by Long Range Planning Committee. Motion carried.

10	Discuss Environmental Services & Storage Garage The committee has requested staff assess their storage needs and report back to the committee.
11	2023 Capital Budget Review and Potential Changes No action taken.
12	Set Next Meeting Date and Agenda Items The next meeting date and time will be determined.
13	Adjournment. Motion by Sup. Deal seconded by Sup. Alan to adjourn at 9:00 p.m. Motion carried.
Prepare by Jamie Gould	

Send Result Report

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	Long Range Planning Committee **Monday, March 6, 2023 – 6:30 pm** **Conference Call 312.626.6799** **Meeting ID: 818 4233 4115** **Zoom Meeting Link:** https://us02web.zoom.us/j/81842334115 **Health & Human Services Center – Community Room** **303 W. Chapel Street** **Dodgeville, Wisconsin**	**Iowa County Wisconsin**

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No.	Date/Time	Destination	Times	Type	Result	Resolution/ECM
001	02/15/23 11:45	Dodge Chronicle	0°00'25"	FAX	OK	200x100 Normal/On
002	02/15/23 11:46	WDMP	0°00'42"	FAX	OK	200x100 Normal/Off

Iowa County- Health and Human Services Building

Facilities Condition Review
January 16th, 2023

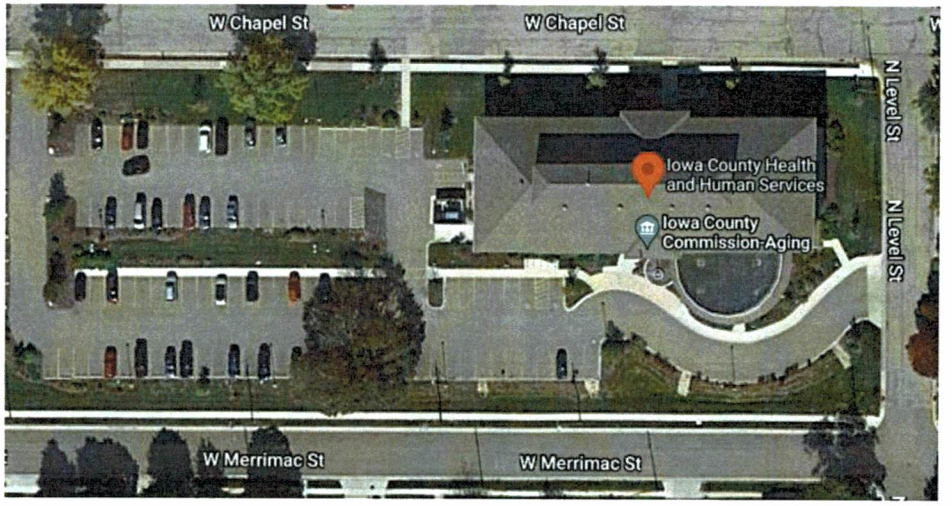
KRAUS-ANDERSON®

Executive Summary

- Kraus-Anderson completed a Facility Condition Review on the exterior enclosure and HVAC system
- Issue is stemming from a uncontrolled penthouse environment during low ambient conditions (20 Degrees F and lower)
- VRV (variable refrigerant volume) system operation is **highly dependent** on ambient conditions of 20 degrees or higher
- Current penthouse configuration is not able to be controlled or modulated to maintain temperature
- Provided recommendations to improve penthouse configuration as well configuration of ducting for VRV system
- Next steps require engineering and construction (Capital project required)

Facility Condition Review

- Visited the site on December 21st, 2022
- Outside Ambient Temperature at the time of the visit was 3 Degrees F
- Reviewed the VRV configuration, the penthouse configuration and the exterior enclosure
- Temperatures in the facility ranged from 59 degrees F to 75 degrees F
- Set point for HVAC system was 72-75 F



Penthouse configuration

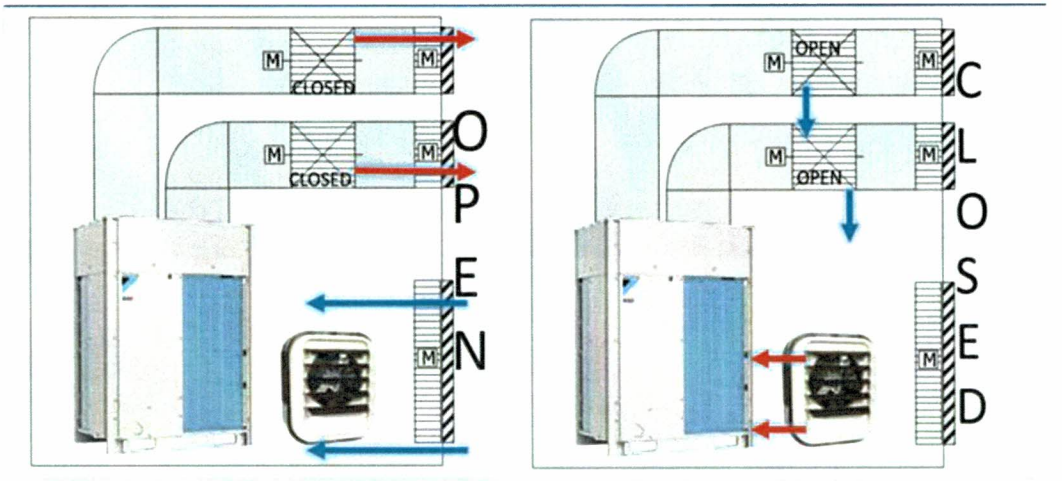
- Open louvered penthouse- no mechanical dampers
- Staff has blocked off louvers with insulated panels to try to maintain temperature
- VRV's reside in penthouse- ducted exhaust from VRV's to outside
- Large gas-fired unit heaters placed in ceiling
  - *Two (2) unit heaters directed at VRV's*
  - *Other unit heaters are more separated from VRV's*

Thermal images

- Image is of VRV system, unit heater and duct work in penthouse
- Temperature scale: -0.9 degrees F to 167 Degrees F
- Unit heater directed at VRV, blowing hot air onto unit
- Temperature across the coil was measured
  - *Range from 11 degrees F to 91 degrees F*
- This range across the coil is not recommended
- Not conducive to good operational control

Recommendations

- Improve exhaust ductwork configuration
- Install motorized dampers to control outside air
- Discharge of unit heaters should not be directly onto VRV
  - *False load*
  - *Compressor failure*



Recommendations: Costs

- Breakdown of cost included in report
- Motorized Dampers: ~ $282 K
- Modify discharge of VRV's: ~ $83K
- Modify Unit Heaters ducting: ~ $62K
- Alternative four (4) pipe system: $2.3M

Next Steps

- Key Recommendations:
  - *Reconfigure penthouse configuration*
    - Motorized damper control
    - Reconfigure exhaust system
    - Placement of unit heaters
- Require engineering/design
- Requires construction project
- Recommissioning of the building

QUESTIONS?

THANK YOU!

KRAUS-ANDERSON®

Kraus-Anderson Construction Company
151 E Wilson Street, Suite 100, Madison, WI 53703

Iowa County- Health and Human Services Facility

Facility Condition Review

DRAFT Report January 16, 2023

Office 608-838-5444 | www.krausanderson.com | Fax 608-838-5445

Building enduring relationships and strong communities

EXECUTIVE SUMMARY

Kraus-Anderson was hired by Health and Human Services of Iowa County, WI to provide a facility review regarding HVAC issues they have been experiencing in their Health and Human Services Building located in Dodgeville, WI. Based upon our site visit and observations of the system operations, the recommendation is to improve the overall penthouse ambient conditions. The existing HVAC system, which is a Variable Refrigerant Volume (VRV) system, is highly dependent on more steady-state ambient conditions that exceed 20 degrees Fahrenheit in order to maintain the interior office environment temperatures.

The current configuration of the penthouse does not allow the primary system components (VRV condensers) to reside in a homogeneous, balanced, steady-state ambient conditions, with temperatures ranging in the penthouse from 0 Degrees F to 160 Degrees F. This system configuration is most likely the cause of VRV compressor failure, as well as causing the building to operate inefficiently during winter operation. Due to these conditions, this leads to a highly unstable operation of the HVAC system for the building. The building was observed to have variation of temperature of 16 degrees in various areas of the building (59 degrees F to 75 Degrees F). Based upon our review, the envelope of the main building does not appear to be the major issue of the facility, with exception of the louver/penthouse configuration.

Kraus-Anderson has provided various options from modification of the penthouse louver configuration, modification of the VRV Duct exhaust system to a full-replacement of the VRV system for a new boiler-chiller four (4) pipe system. All options have been priced accordingly. Any given revision will need to be completed by a licensed professional engineering/design firm and will require construction services to implement the suggested recommendations. Modification of the VRV systems themselves will not remediate the current condition and/or operation of this system.

OBJECTIVE

Kraus-Anderson was hired by Health and Human Services of Iowa County, WI to provide a facility review regarding HVAC issues they have been experiencing in their Health and Human Services Building (HHS) located in Dodgeville, WI.

In regards to some of the noted concerns of the building, prior to the review were as follows:

- The facility has issues with proprietary HVAC systems that cause issues with finding replacement parts and components
- Increase electrical bills in winter (possibly due to supplementary electric heat)
- Zoning issues with thermostat placement, covering multiple spaces
- Issues with building control once the temperature drops below 20 Degrees F

Kraus-Anderson visited the site on the 21st of December to observe the situation. The temperature at the time of the visit was approximately 3 Degrees F. Kraus-Anderson's Facility Assessment team provided a preliminary review of the systems to confirm initial findings and ideas.

The facility is located at 303 W Chapel St, Dodgeville, WI 53533 and is approximately 30,000 SF. The facility condition review was limited in scope and help review the systems and its current configuration and operation. This review was not inclusive of a building load analysis nor an engineering review of the system.

The review documented the existing facility systems and identified its current condition. The review included review of the exterior enclosure condition and louvered penthouse section to the building.

BACKGROUND

The HHS building was built and commissioned on October of 2010. The mechanical system installed in the building is a variable refrigerant volume (VRV) system manufactured by Daikin.

Daikin as the system manufacturer was responsible for all of the sizing and routing of refrigerant piping to terminal devices and equipment in the system. (This is typical of all VRV type systems). All of the temperature controls for the VRV system are by Daikin and are local to the building. In 2020 some Johnson Controls (JCI) monitoring only points were installed for remote monitoring of the building. Occupied spaces in the building are heated and cooled by Daikin cassettes or Daikin fan coil units connected to the refrigerant piping and Daikin building selector units. Multiple rooms share Daikin thermostats and generally up to 4 to 6 rooms are on a common thermostat. (T-Stat configuration is typical per most building configurations).

There are four separate VRV condensers and piping systems in operation in the building. There are two penthouses in the building and the VRV condensers are located inside in the penthouses. The penthouses are configured with an open intake louver with no dampers located on one side of the penthouse and an enclosure exhaust louver and plenum located on the opposite side of the penthouse. Discharge air from the top of the VRV condensers is hard-ducted to the exhaust plenum. Each penthouse has two large gas fired unit heaters installed with discharge air from the unit heaters directed down toward VRV condensers.

No modifications or renovations to the mechanical systems or the building have been made since the building was completed and occupied in 2010.

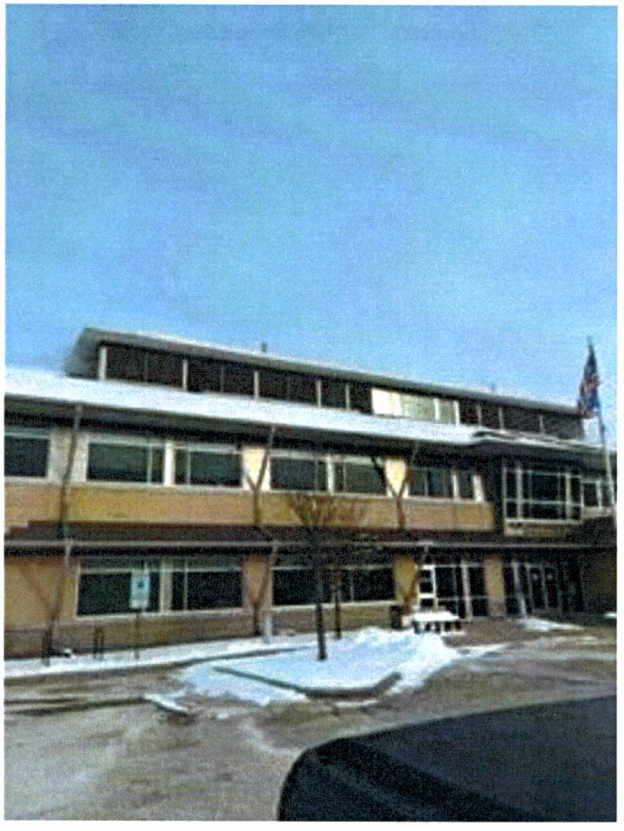


Figure 1. Exterior photo showing penthouses and intake louvers.

Figure 2. Intake louver in the penthouse. Note that portions of the intake louver have rigid insulation blocking sections of louver off.

Figure 3. Discharge air from VRV condensers ducted to exhaust plenum and louver.

Figure 4. VRV condensers discharge is located in a common exhaust plenum.

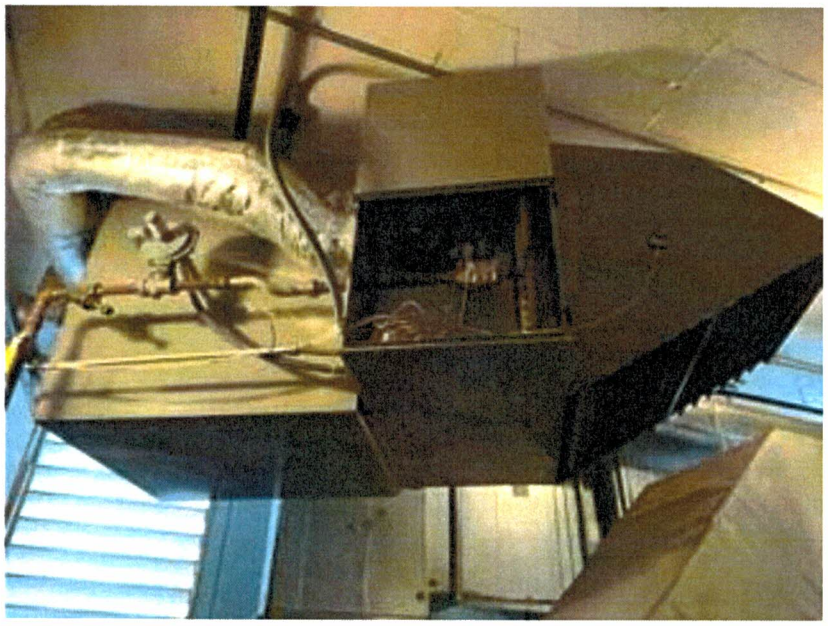


Figure 5. Gas fired unit heater installed near top of penthouse with discharge air directed down toward VRV condensers. (On the day of our visit, the shown Unit Heater was not operational).

Figure 6. Typical building selector unit for distribution of refrigerant piping to terminal units.

ANALYSIS

KA visited the site on December 21, 2022 to verify existing conditions and discuss operation of the mechanical system with Iowa County maintenance staff. Outside air temperature was 3 degrees F during the site visit. From the discussion with maintenance staff the following main points were discussed:

1. The building is adequately cooled in the summer time with little or no complaints from building occupants on temperature.
2. When outside air temperature falls below 20 degrees F, then the building starts to have heating issues. Building occupants will let maintenance know that space temperatures are too cold. Space temperatures have been reported to be as low as in the 40 degree range during extremely cold weather.
3. Compressors in the VRV condensers have been replaced on multiple occasions since original installation. Coincidentally on the day of our site visit, a compressor was in the process of being replaced in one of the VRV condensers.
4. Because of the proprietary nature of the Daikin system and controls, maintenance staff has very limited ability to trouble shoot the system and make repairs. This is frustrating to the maintenance team.
5. The maintenance team has added some local temperature sensors in each penthouse in a central location in the penthouse. If the temperature sensor in the center of the penthouse stays at approximately 30 degrees F or above, then maintenance staff report that the building seems to be heated adequately.

After the meeting with the maintenance team, KA toured the building and verified some existing conditions. The following thermal images were taken in the penthouses. Note that in the West penthouse one of the two gas fired unit heaters was not operable. In the East penthouse both gas fired unit heaters were operating.

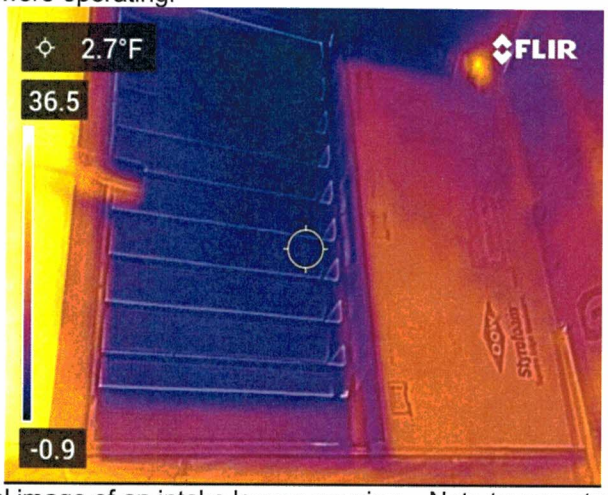


Figure 7. Thermal image of an intake louver opening. Note temperature at open louver. Warmer temperature on rigid insulation that is blanking off louver.

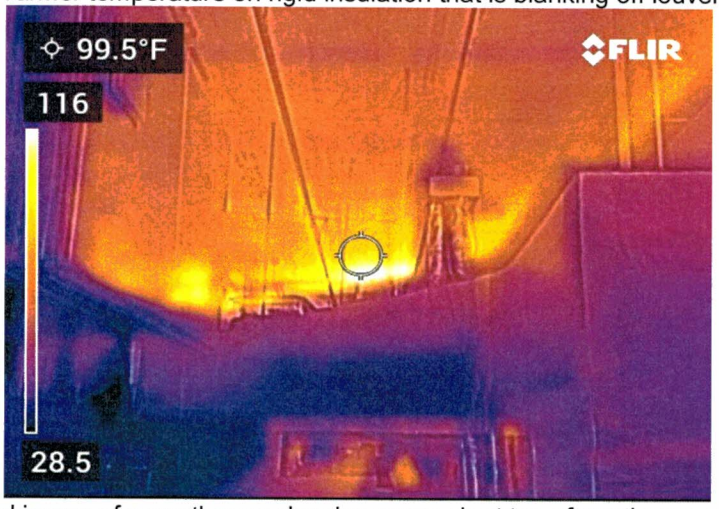


Figure 8. Thermal image of a penthouse showing warm air at top of penthouse and cold air down toward the floor of the penthouse

Figure 9. Thermal image showing hot air discharging from unit heater and cold temperatures in the penthouse further away from unit heater discharge.

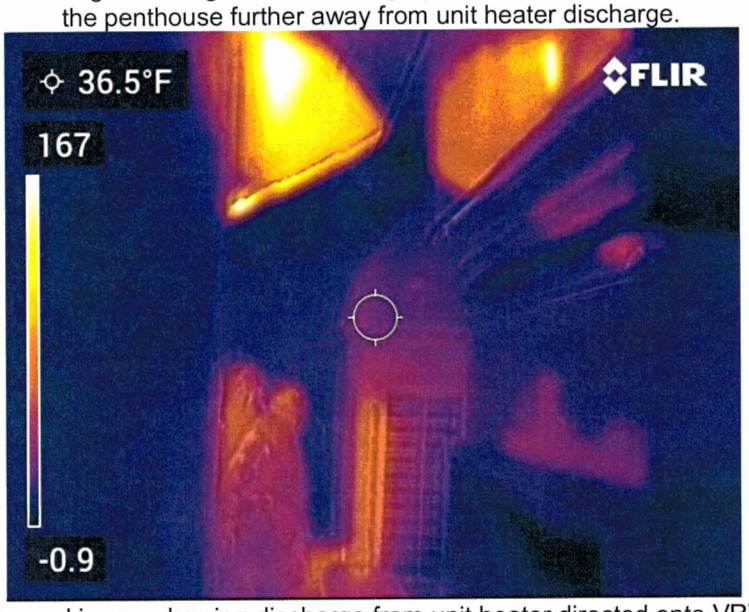


Figure 10. Thermal image showing discharge from unit heater directed onto VRV condenser. Note that edge of VRV condenser is warm and is much cooler farther from unit heater discharge.

Figure 11. Thermal image of VRV condensers. Note warmer temperatures at top of condenser and cooler temperatures toward bottom of condensers.

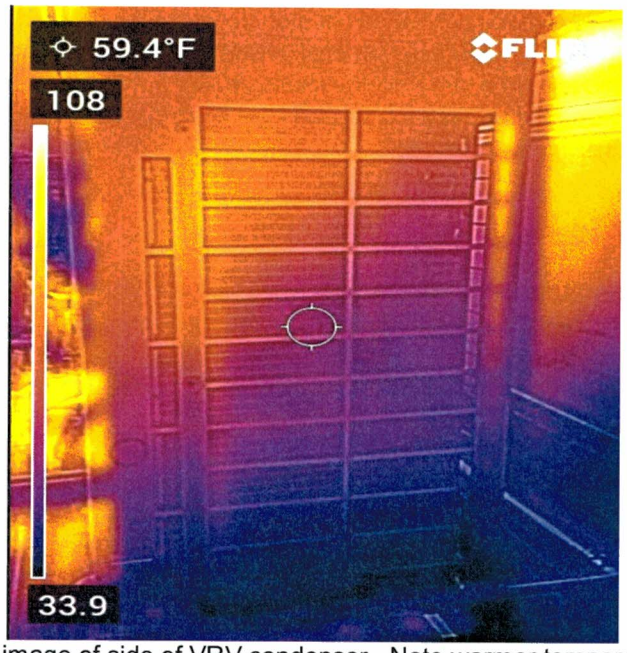


Figure 12. Thermal image of side of VRV condenser. Note warmer temperature on upper left of condenser and cooler to bottom right.

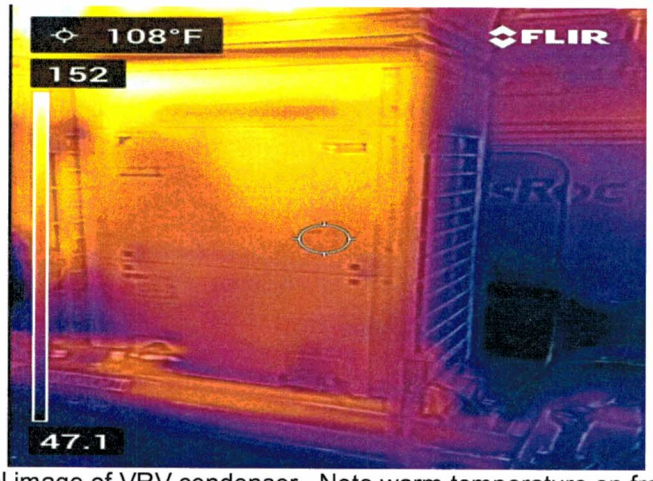


Figure 13. Thermal image of VRV condenser. Note warm temperature on front access panel of condenser which is directly under unit heater discharge. Temperature is much cooler on the right side of condenser where coil fins are located.

Information on the installation of the Daikin equipment and thermal images were shared with a Minneapolis based Daikin sales representative during this analysis. The sales representative responded with the following comments:

1. It is recommended that each VRV condenser be individually ducted all the way to the building exterior. If VRV condenser discharge is connected to a common plenum, then short cycling could occur which would impact performance of the condenser.
2. It is recommended to install motorized dampers on the outdoor air and two motorized dampers on the discharge from the VRV condensers. On the discharge duct, one damper should direct air to the exterior of the building and one should recirculate air back to the penthouse.

3. It is recommended to not have the unit heater discharge air directed down directly onto the VRV condensers. Potentially this configuration could "false load" the VRV condenser actual outdoor air sensor in the unit into staying in the cooling mode and locking out the heating mode. At 75 degrees F as sensed by this sensor heating mode is locked out and the unit stays in cooling mode.

EXTERIOR ENCLOSURE REVIEW

Per the proposal, it was requested to include a review of the exterior enclosure. Based upon our findings, the exterior enclosure is performing as expected for the majority of the facility interior spaces. Temperature gradients were as expected across the building wall cavity. Temperature was measured at insulated glass units (IGU's) and was observed to be within tolerance of expected performance.

The team also reviewed the insulation over the plenum spaces and appeared to be sufficient per building codes of 2010 standards. A wall cutout was reviewed and the temperature gradient for the exterior enclosure was within specification with no large temperature gradient.

The only issue regarding the exterior enclosure for moderation of temperature is stemmed by the design of the penthouse. It is recommended that modulated control of the louvers via mechanical dampers will better maintain the penthouse temperature, reduce the need for the unit heaters to operate, therefore will save energy for the facility. The mechanical damper control system is included in our estimates and recommendations.

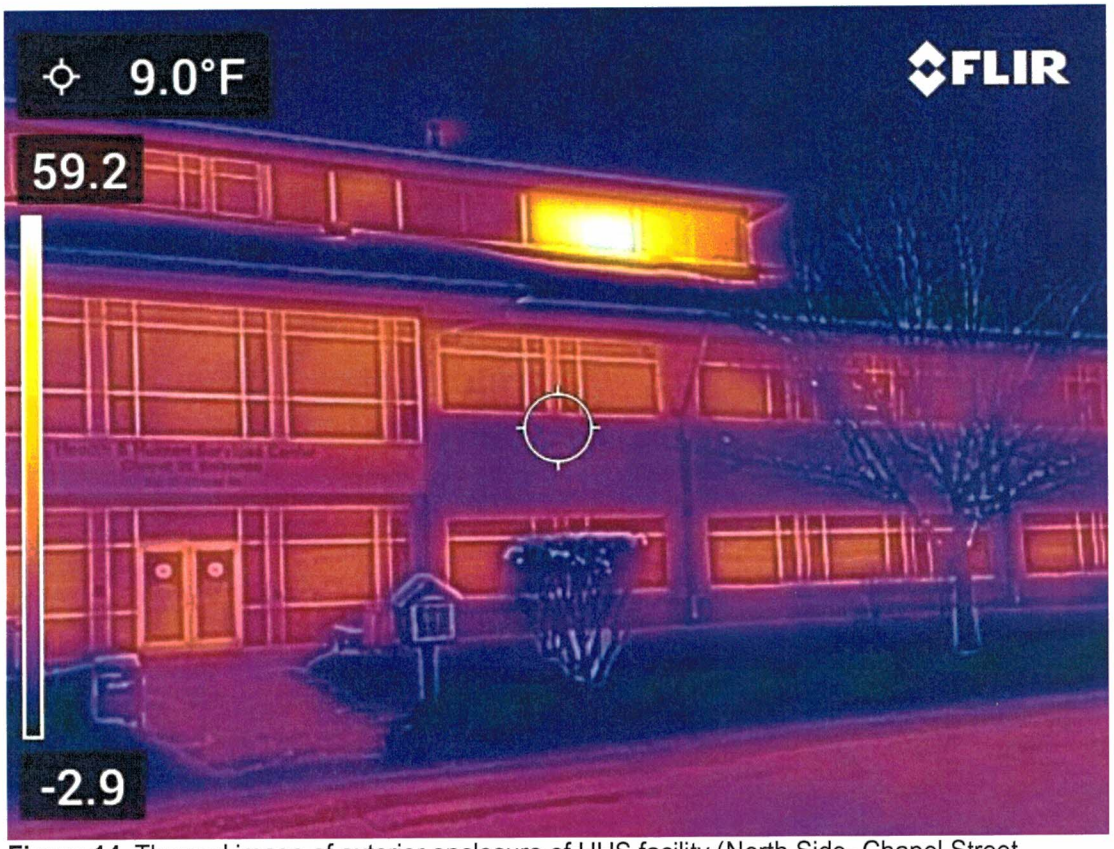


Figure 14. Thermal image of exterior enclosure of HHS facility (North Side- Chapel Street Entrance). Note the heat from the penthouse from the VRV Exhaust.

CONCLUSIONS AND RECOMMENDATIONS

From site observations and the thermal images in the preceding sections the following conclusions are made:

1. There is a non-uniform temperature profile across the penthouses. Warmer air is present at the top of the penthouse and much cooler air near the floor. Also colder temperatures are seen farther away from the heater.
2. The VRV condensers have non uniform air temperatures across their coils.
3. The combination of cold air and non-uniform temperature profiles on VRV condensers is impacting performance of the system in the heating mode.

Based on these conclusions the following recommendations are made:

1. In order to allow the VRV condensers to operate correctly, the penthouse temperature needs to be uniform and stable above at least 40 degrees F minimum. To accomplish uniform and stable temperature it is recommended to add motorized dampers to the outside air intake louver and two dampers in the discharge from the VRV condensers. One damper in the discharge would recirculate air back to the penthouse and the other damper would exhaust air to the outside. Below are two graphics for damper placement:

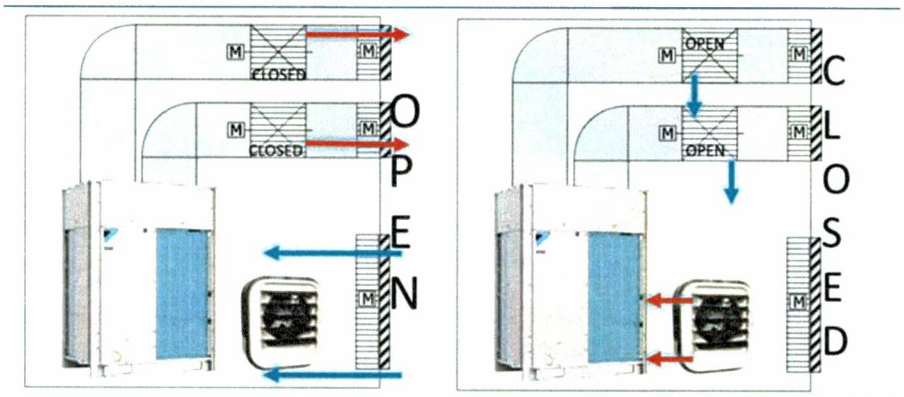


Figure 15. Graphic on recommended damper placement. The left graphic is for summer operation and the graphic on the right is for winter operation.

Figure 16. Graphic showing an actual installation of indoor condensers with closed outside air dampers and open recirculation dampers.

2. The existing gas fired unit heaters can be used to help maintain temperature in the penthouse after the new dampers are installed. Discharge from the unit heaters should be modified to prevent potential "false" readings of the outdoor sensor on the Daikin units. Adding some distribution ductwork would also be beneficial to distribute warm air more uniformly throughout the penthouses.
3. To prevent potential short cycling of discharge air from the VRV condensers, each condenser should be individually ducted to the building exterior per Daikin sales representative recommendation.

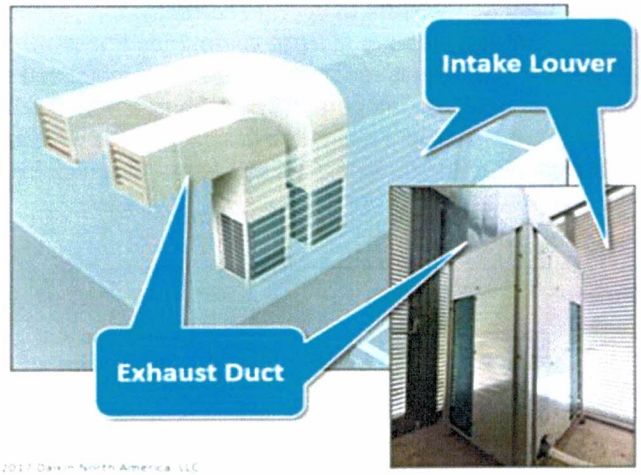


Figure 17. Graphic from Daikin sales representative showing recommended exhaust duct arrangement

Another way to approach the heating issues associated with the VRV system would be to replace the VRV system with a different mechanical system. We would recommend a four pipe fan coil system as the best option to replace the VRV system. The main components of the four pipe fan coil system would be:

- Gas Fired Heating water boilers
- Air cooled chiller
- Heating and cooling distribution pumps
- Heating and cooling distribution piping to new fan coil units
- Controls of system by JCI (or other)
- Complete removal of all piping and equipment associated with the VRV system

ESTIMATED COSTS

From the recommendations in the previous section of this report, following are estimated costs of each recommendation. Estimates include two (2) years of escalation assuming the work would be implemented within two years.

1. Addition of motorized dampers to the penthouses:

Material	$	54,000
Labor	$	62,000
Controls	$	35,000
Design	$	15,000

Permits, GC's, etc.	$	50,000
Contingency	$	22,000
Escalation	$	44,000
Total	$	282,000

2. Modify discharge conditions of existing unit heaters

Material	$	10,000
Labor	$	20,000
Controls	$	10,000
Design	$	7,000
Permits, GC's, etc.	$	15,000
Contingency	$	7,000
Escalation	$	14,000
Total	$	83,000

3. Modify discharge ductwork from VRV condensers to be independent to exterior

Material	$	10,000
Labor	$	21,000
Controls	$	-
Design	$	5,000
Permits, GC's, etc.	$	11,000
Contingency	$	5,000
Escalation	$	10,000
Total	$	62,000

4. Alternative Four pipe fan coil system to replace VRV system

Boilers	$	125,000
Chiller	$	115,000
Pumps	$	45,000
Piping system	$	170,000
Fan coil units	$	150,000
VRV system demo	$	35,000
Electrical	$	70,000
Labor	$	500,000
Controls	$	90,000
Design	$	55,000
Permits, GC's, etc	$	400,000
Contingency	$	175,000
Escalation	$	350,000
Total	$	2,280,000

CONCLUSION

The review of the system during the extreme winter conditions, allowed Kraus-Anderson to accurately troubleshoot the issues with the building and mechanical system configuration. The design of the VRV system is highly dependent on an ambient condition of 20 degrees F or higher (40 Degrees F is ideal). Based upon the conditions in the penthouse, this type of condition is not feasible once the outside temperatures are 20 degrees or lower.

The configuration of the Unit Heater pointed directly at the VRV system is not a recommended way to maintain temperature for the HVAC system for the facility. This type of configuration can lead to false load signals.

The variation of temperature in the penthouse and across the VRV coils is most likely impacting operation and possibly maintenance issues for the systems.

The ducting methodology for the VRV system in the penthouse needs to be reconfigured. Mechanical dampers should be added to maintain temperature in the penthouse.

Next steps would be to begin redesign of the penthouse with a licensed professional engineer. A construction project would then take place, following the proper bidding procedures set forth by the county.