

Suter ENGINEERING, PC

205 Dry River Road
Bridgewater, VA 22812
PH(540)810-3239 Landline(540)828-0508
eldie@suterengineering.com
www.suterengineering.com

July 8, 2016

Harman Construction Inc.
1024 Pleasant Valley Road
Harrisonburg, VA 22801
Attn: Travis Layman

Re: Site visit and survey of Mechanical Systems
Shenandoah Valley Electric Co-op, Mt Crawford, Virginia

The Shenandoah Valley Electric Co-op building in Mt. Crawford appears to have been built in 1989, 27 years old. The building envelope appears to be built very solid and the building appears to be very comfortable in all spaces. Many spaces and most offices have their own thermostat control and I heard no complaints about temperature control.

Hvac System Summary

The Hvac system is all electric, both A.C. and heating. The systems consist of Roof Top Units (RTUs) with variable air volume (VAV) control boxes with electric re-heat and split systems with electric heat. Additionally, there are electric baseboard convector heaters in most offices and other perimeter rooms for additional heating of the perimeter of the building.

This all electric building, while very comfortable, is somewhat expensive to operate. The electric usage for the Co-op in 2015 ranged from 66,320 kWh in February to 38,240 kWh in September 2015. The average electric bill, as computed by SVEC, would be about \$11,550 per month with the existing demand charge. While most new owners would use less power, maybe far less than the co-op, it is still an expensive building to heat.

The Hvac system consists of 5 Roof top units (RTUs), 3 split systems and 2 ductless split systems.



The two large and main RTUs are set up for variable air volume (VAV) with approximately 17 VAV boxes and 11 fan powered boxes that serve the engineering wing and the accounting wing. All of the VAVs are equipped with electric re-heat. The three smaller RTUs serve the front office & waiting area, the conference rooms, server room and corridors. All five RTUs are straight AC with electric heat. The RTUs range in capacity from 5 tons to 25 tons with a total capacity of approx. 89 tons of cooling for this building including all the split systems. The three split systems serve the operations room, the utility room and possibly the kitchen. The ductless split systems serve a large office and the other ductless unit serves as back-up to the server room RTU. Also included in the existing Hvac system are 13 exhaust fans, 50 convection heaters and approx. 6 other misc heaters serving utility type rooms.

In about 2005 or 2006 the 5 RTUs were replaced. The Trane RTUs were replaced with Carrier brand. At the time of the RTU replacement, the thermostats and control system were replaced with a lite-commercial control system. All the 17 VAV boxes, 11 fan powered boxes stayed as-is and are original and 27 years old now. Of the three split systems, only one looks original, but they all look like 1988 – early 90s vintage. The main RTU thermostats and most of the control system were replaced recently. The new thermostats are high quality Honeywell commercial thermostats. The individual office thermostats were not replaced but seem to be working fine.



The ductwork is commercial grade and installed in a professional manner. The ductwork and VAVs look good. I understand that the lite commercial controllers on the VAVs were recently replaced when the thermostats/controls were replaced.

So the five main RTUs are only 10 years old and one of them is only 1-2 years old (Server Room). The controls are only a few years old and good quality. The ductless systems appear to be in good shape and not very old. The three split systems look to be 25-27 years old and past their life expectancy. I recommend that if any of this equipment fails before the new owner takes over, that the Hvac equipment is replaced with like kind and like quality.

Plumbing System

The existing plumbing looked to be of a high commercial standard. The existing piping and fixtures are all excellent quality. The existing domestic water main appears to be a 3" supply line that enters the building and then reduces to a 2 ½" CW supply. This 3" to 2 ½" supply is sufficient for some additional bathrooms or fixtures if desired.

Additionally the county water system provides good pressure to this building as it is being reduced to 70 psi operating pressure. The existing 80 gallon hot water heater with recirc loop and recirc pump provides good hot water service to all parts of the building.



There seems to be two existing problems with the plumbing. First, the four small restrooms do not provide a lot of facilities for the approx 54 employees now at this building. Additionally, there is an existing chronic problem with the sanitary main under the building. I am told that camera work has shown that there is a dip and rise in the sanitary line. Because there is not a good constant grade leaving the building, there are somewhat frequent clogs and service calls are required on a too frequent basis. Good planning should be taken to replace, abandon, or not add any additional load to this section of sanitary if renovations are made.

The building sprinkler main enters the building next to the domestic water service. It appears to be a quality commercial installation.

Moving forward and additional thoughts

The Hvac system is all electric. The electric resistance heat is an expensive way to heat a large building. Some thought might be given to doing some heat with a more economical electric method or possibly using gas for warm up purposes or temperature reset on the VAV systems. It might be possible to use gas to heat one or more of the wings.

From a mechanical perspective, the systems are high grade, good quality commercial systems. I think the short comings from a long term point of view are the 27 year old VAV boxes and fan powered boxes. But more concerning are the three (3) residential grade split systems. They are running on borrowed time with an ASHARE life

expectancy of 15-20 years. Since the existing RTUs are only 10 years old they have another 10 years of life in them. But the electric heat in those RTUs does give me some concern for an operating cost point of view.

Lastly, there are two humidifiers that are part of the systems serving the operations and communications rooms. Humidifiers are high maintenance items and work longer and better if the water is without minerals. If kept, a RO water system might be considered. But these may not be necessary for new owners.

I believe the five (5) main RTU systems can serve a new owner well. Careful planning should be done to minimize renovation costs. If that is done, I think all the RTU systems can be reworked to serve the new owner well. The split systems, electric baseboard and ductless systems might be eliminated, re-located or replaced or re-configured to serve the new usage and new layout. Almost certainly, some amount of re-ducting and re-configuring will be required of the ductwork systems.

This is only a brief summary. Please be in contact if further questions or discussions are required.

Sincerely,

Eldie Suter

Suter ENGINEERING, PC

Eldon (Eldie) Suter II, PE