AAA ENERGY SERVICE CO.
4 Commercial Road • P.O. Box 908 • Scarborough, ME 04070-0908 • (207) 883-1473 FAX (207) 883-8371

Edward Henningsen
Eliot Energy Committee
Eliot, Maine 03903

January 14, 2011

Re.: **Energy Inspection and Survey**

Ed,

AAA Energy Service Co. is pleased to provide the initial findings from our site visit on December 22, 2010.

OVERALL

The building is heated and air conditioned with an air handler utilizing a remote condensing unit, direct expansion air conditioning coil and a hot water coil connected to a central boiler. In some areas there are smaller convector units with individual thermostats that supply additional heat from the boiler loop. There is an exhaust fan in the Sally Port that is activated by the closing of the door and runs for a preset time period, and then shuts off. In an adjacent unheated building is the backup generator for the electrical service. All of the equipment appears to be approximately 9 years old.

Central Air Handling Unit

Make:	Magic Aire
Model #	90/120BMW/BMX
Serial #	WD11011047
Fan motor	¾HP 208VAC 3PH
RLA	2.8 amps
SFA	3.4 amps
Supply SP	+28 in.
Return SP	-.75 in.
ESP	1.03 in.

The air handling unit is located in one of the garage bays under the middle building. During inspection of the drive belt and pulley for the blower it was discovered that the belt was loose. We did tighten the belt but found this made the motor draw high amperage. This usually indicates the motor is under a high load, or is failing. Static pressure readings indicate high return and low supply air static. This will contribute to a motor drawing higher than normal amperage, but also indicates that there may be a problem with return duct sizing or construction.

This unit has outside air ducted through the Sally Port that is outside of the booking room and exits the building on the right side wall. This duct has been closed off to the outside and has had 2 filter grilles added to the bottom of the duct within the Sally Port.

The access panel on the side of the air handler has a large hole cut in the lower right hand corner where the refrigerant piping enters the unit. The area of this panel that was cut out is

much larger than necessary, and is allowing a large quantity of air to remain untreated by the cooling or heating coils before being returned to the space.

Where the supply duct system connects to the main air handler there are transitions and fittings that have not been constructed and installed using methods considered industry standard that may have a negative impact on the airflow.

The duct branches off to feed some diffusers on the lower level, and runs up through the building into the attic space and feeds the upper floor with ceiling diffusers. The branch ducts in the attic space have no volume dampers where they are connected to the trunk duct, making balancing the system virtually impossible. The duct insulation is falling off two of the branch ducts and one of the branch ducts had pulled off completely allowing a quantity of air to be discharged in the attic (we did close off this duct to minimize the loss of conditioned air. Remaining pieces were not long enough to reconnect).

The insulation used on the duct in the attic appears to be 1" or 1 ½" at best. Insulation used on duct that passes through unheated spaces such as attics requires a minimum of 2" and 3" is recommended. Inadequate insulation allows large losses of heat during the heating season and additional cooling load gain during the summer months.

There are three immediate concerns that we would like to make note of following our inspection of the duct system which should be addressed.

There is a smoke detector in the supply duct and the cover has been removed. This type detector will not function properly in the event of a fire as it requires air circulation through the detector for activation.

The two grilles in the Sally Port are returning air to the central air handler. During our visit there were two cruisers either started up and driven out or started and driven in. The smoke detector is inoperable and we did not see a CO detector in the space.

The exhaust fan in the Sally Port is supposed to be controlled by the door switch and a time delay relay to turn the fan off after the preset time. This fan is running all of the time and the timer that is supposed to turn it off is failed in the closed position. The door switch was found to be full of water and has burnt connections inside.

Hot Water Heating Coil

Make: Unknown (there was not a clearly legible tag)
The hot water to this coil is controlled by a Honeywell ML7984 actuator. There is one failed actuator in the pan under the unit already, and the current actuator is missing the setscrew that locks the adjustment of the actuator to the stroke of the valve (we did attempt to locate and install the setscrew but could not find it). We did adjust the actuator to the valve but if a setscrew is not installed it will back off the stem again after a period of time.

Air Conditioning Direct Expansion (DX) Coil

Make: Magic Aire
Model # 90BMX.3.A
Serial # WO11099702

Remote Condensing Unit

Make: Bryant
Model # 569CPX090000ABAA
Serial # 0601G00173
Voltage 208/230VAC 3PH
RLA 28 Amps
LRA 195 Amps

Condensing unit is equipped with a crank case heater and condenser fan cycling control for operation during lower temperatures. The crank case heater is operational and compressor does run, but without running the air conditioning for an extended period of time it is difficult to report on the overall condition of the compressor. The condensing unit does appear to have had the compressor replaced at some point.

Hot Water Boiler

Make: Peerless
Model # EC/ECT.05.175.W/S
Serial # 336726.200012
Input 214,000btu/hr
Output 186,000btu/hr
Burner Beckett 21805A
Nozzle 1.75gph

The boiler has combustion air supplied by a fan interlocked with the burner connected to an outside air hood. The breeching is connected to a dual wall metal chimney which terminates above the roof line on the left side of the building. The top cap on the chimney was missing and located outside the back door.

A combustion analysis on the boiler was done and the results show a combustion efficiency of 81.5%. The readings were:
Net stack temperature 400 degF
Carbon dioxide 9.5%
Trace amount of smoke

The boiler supplies heating water to the air handler and all of the individual convectors located throughout the building. The convectors have individual thermostats and all were cycled to confirm operation.

Airflow readings were taken at all outlets that were accessible without equipment. There were three diffusers in the lower level we could not read because of obstructions close to the outlets. These will need to be measured with an alternative method on a return trip.

Standby Generator

The generator is a 220 volt unit connected to a 150 Amp transfer switch and is located in an unheated outbuilding. The block heater is actually an external heater that is inline with a coolant

hose. It is a self contained unit with its own thermostat that circulates coolant through the block. The heater is rated at 1500 watts and maintains a temperature average of 100 degrees. The day we were there it was cold and this heater only cycled off for very short periods of time, however if it is set for the typical 100 degrees it will cycle all year long.

ENERGY STAR Portfolio Manager

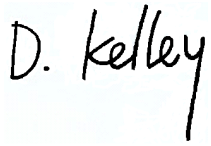
In order to compare the Police Station's energy use with similar facilities throughout the country, we entered the utility bills into a government sponsored program called Energy Star Portfolio Manager.

Portfolio Manager is an interactive energy management tool that allows you to track and assess energy and water consumption across your entire portfolio of buildings in a secure online environment. Portfolio Manager can help you set investment priorities, identify under-performing buildings, verify efficiency improvements, and receive EPA recognition for superior energy performance.

For many facilities, you can rate their energy performance on a scale of 1–100 relative to similar buildings nationwide. Your building is *not* compared to the other buildings entered into Portfolio Manager to determine your ENERGY STAR rating. Instead, statistically representative models are used to compare your building against similar buildings from a national survey conducted by the Department of Energy's Energy Information Administration. This national survey, known as the Commercial Building Energy Consumption Survey (CBECS), is conducted every four years, and gathers data on building characteristics and energy use from thousands of buildings across the United States. Your building's peer group of comparison is those buildings in the CBECS survey that have similar building and operating characteristics. A rating of 50 indicates that the building, from an energy consumption standpoint, performs better than 50% of all similar buildings nationwide, while a rating of 75 indicates that the building performs better than 75% of all similar buildings nationwide.

At this time, we have successfully entered your utility bills and have requested a Summary Energy Performance Report for the period ending 12/2010. The Energy Performance Report identification number for this report is 25086. Once we receive the report via email, I will forward it on to you for review and discussion. From there, we can discuss possible energy savings measures for the Police Department.

Respectfully Submitted,



David Kelley, PE, LEED AP

AAA Energy Service Co.
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