

HALDANE CENTRAL SCHOOL DISTRICT
PRE-BOND BUILDING EVALUATION
HEATING, VENTILATING AND AIR CONDITIONING

Observations:

The building is heated by two sectional cast iron steam boilers that were reportedly installed in 1973. The burners are of the same vintage. They are both fired on #2 oil with gas ignition. The boilers have almost outlived their life expectancy (35 years per ASHRAE 2005 Handbook). Boiler Number 1 is leaking at the rear near the steam drum. Due to asbestos encasement and the cost associated with its removal the exact location and nature of the leak is undetermined. The boilers are reportedly a continuing maintenance burden. They have become unreliable and are in need of replacement.

Fuel oil is stored in a 5000 gallon double wall fiberglass underground fuel oil tank with monitoring system that was installed in 1997. The tank monitoring system is reportedly in disrepair and in need of replacement.

The boiler room has an occupied space above and there is no powered ventilation as required by NYSED.

The duplex boiler feed pump was reportedly installed at the same time as the boilers and has outlived its life expectancy (15 years per ASHRAE 2005 Handbook).

The building is of three main vintages (ie.1934, 1964 and 1979). The classrooms in the original building (1934) are heated with steam radiators. Steam unit ventilators were recently added in 2003; however, many were not sealed properly to the wall which allows cold air to infiltrate into the building. Most were installed without face and bypass damper actuators, which eliminate the ability to provide a constant mixed air temperature to the classroom. Some teachers complain of excessive noise from the units. Unfortunately, whenever a piece of equipment is installed inside the space that it is serving, machine noise is to be expected. Other design approaches can avoid noise problems.

At the time the unit ventilators were installed, original gravity exhaust was eliminated and new ducted powered exhaust was added.

There have reportedly been steam piping leaks in the original building and in the 1979 wing due to deterioration in certain locations.

Many of the steam traps were reportedly replaced during the 2003 renovation.

The Library is heated and ventilated by three unit ventilators, radiators and ducted exhaust. Air conditioning is provided by three ductless split systems and one window air conditioner. The computer section of the library is reportedly uncomfortable on warmer days. The cooling load in this portion of the library is higher than the rest of the space and the air conditioning equipment is apparently undersized for the current use.

The Gymnasium in the original building has perimeter radiators for heat and there are reports of overheating. The steam air handling unit in the rooftop mechanical room has been disconnected and abandoned in place. Windows provide the only source of ventilation during the heating season. This arrangement does not comply with current SED Standards. In 2003, five roof mounted air conditioners were added. However, they are not capable of providing tempered ventilation air in the cooler months. Gravity exhaust shafts behind the balcony area relieve the outdoor air introduced by the rooftop units.

The administration / nurses areas in the front of the building have perimeter radiators, ducted exhaust, operable windows and window air conditioners.

During the 2003 renovation, the gang toilets in the original building were renovated. New ceilings were installed, but no exhaust outlets are visible and the air is noticeably stagnant.

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There are reports of uncontrolled radiators in the corridors and stairwells of the 1934 wing which cause spaces to overheat.

The 1964 wing has two (2) steam-to-hot water heat exchangers and hot water pumps in a mechanical room to heat this portion of the building. Two of the original base mounted standby pumps have failed and been abandoned in place. Two (2) additional zones were added to one of the heat exchangers with a recent renovation. Those zones are equipped with in-line pumps which appear to be in good condition. The heat exchangers have outlived their life expectancy (24 years per ASHRAE 2005 Handbook). The controls in this room are a mixture of digital and pneumatic.

Also contained in this room is a steam condensate pump which serves the heat exchangers. This unit pumps condensate back to the boiler feed pumps in the boiler room. It was installed at the same time as the in-line hot water pumps. The room is very cramped with severely limited service access. It is below grade with limited drainage and contains electrical panels. There is evidence of prior flooding.

The Cafeteria is heated by perimeter hot water finned tube radiation. Fresh air is introduced to the space through two built-in air handlers in the ceiling of the corridor at the rear of the Cafeteria. These units are reported to have control problems and have both outlived their useful life (20 years per ASHRAE 2005 Handbook).

Outdoor air is relieved from the Cafeteria in two ways. When the Kitchen is not in use, a roof mounted exhaust fan over the Cafeteria relieves the air. When the Kitchen is in use, the downblast hood fan (non-conforming) and dishwasher fan relieve the air. All three of these fans have outlived their useful life and the Cafeteria system reportedly no longer operates the way it was originally designed.

The Gymnasium in the 1964 wing has two air handlers hung from the ceiling in the space. One had the roof mounted intake hood blown off in a wind storm, and its hot water coil burst on a different occasion. This unit is no longer used and the other unit has outlived its useful life (20 years per ASHRAE 2005 Handbook). Each unit has an associated roof mounted relief air fan that has also outlived its useful life. Heat in the Gym is provided by perimeter cabinet heaters.

The Locker rooms have roof mounted air handlers that provide ventilation air. They were installed in 1990. They are approaching the end of their useful life (20 years per ASHRAE 2005 Handbook) and are reportedly in disrepair.

The Home Economics room has a ceiling mounted air conditioning type unit ventilator and associated exhaust hood that was installed in 2003 and is reportedly functioning properly.

The Music Room (1964) has a floor mounted unit ventilator with perimeter radiation. The unit has reportedly failed.

The elementary portion of the building (1979) is heated by perimeter steam finned tube radiation. Ducted exhaust is relieved from the building through roof mounted exhaust fans. Ventilation air is introduced through operable windows which do not conform to current NYSED ventilation standards.

There is an existing digital temperature control system that controls only select equipment in the building. Much of the equipment is controlled by antiquated pneumatics or is not controlled at all.

Recommendations:

1. Replace steam boilers, boiler feed pump and 1964 wing converters and pumps.
2. Replace fuel oil tank monitoring system.
3. Add a boiler room supply fan.
4. Test steam piping.
5. Replace all steam traps.
6. Seal all unit ventilators to walls in the 1934 wing and provide upgrades to controls and actuators.
7. Provide roof mounted energy recovery units in the 1934 wing with steam coils (remove UV's).
8. Convert entire building to hot water heat. Provide roof mounted energy recovery units in the 1934 wing with hot water coils (remove UV's) and provide full perimeter hot water radiation.
9. Add roof mounted recovery units in the 1979 wing with steam coils.
10. Add roof mounted energy recovery units in the 1979 wing with hot water coils and provide full perimeter hot water radiation.
11. Add ductless split system air conditioner to computer portion of Library.
12. Replace heating and ventilating unit in roof Mechanical Room of Gynatorium.
13. Add powered ventilation ductless split system heat pumps to administration / nurses area.
14. Add exhaust to toilet rooms.
15. Replace two Cafeteria heating and ventilating units, exhaust fans, and hood exhaust fan.
16. Replace two Gym heating and ventilating units and exhaust fan.
17. Replace two Locker Room heating and ventilating units and exhaust fans.
18. Remove unit ventilator from Music Room and add a roof mounted energy recovery unit.
19. Add controls to the radiators in corridors and Gynatorium.
20. Replace all pneumatic controls with digital type controls.
