

HVAC ASSESSMENT

Sylvester Elementary School

BOILER ROOM:

- ?? The boiler room is provided with two cast iron sectional boilers. Boiler #1 is a cast iron sectional water tube boiler that appears to be approximately 80 years old. Visual observations of the boiler do not indicate a nameplate nor does it indicate a manufacturer. The boiler is covered with what appears to be asbestos insulation with a canvas jacket however, before an exact determination can be made samples of the material should be tested for the presents of asbestos. This boiler is provided with dual low water cut offs and all operating is safety controls. This boiler appears to be a converted coal boiler presently operating on natural gas. The gas regulators are vented to the exterior per code requirements. At the time of our visit a pit which this boiler sits within contained approximately 6" of standing water that the boiler was resting in. As we understand it this boiler was provided, after its coal conversion, with a fuel oil burner however, in recent years it has been completely taken from service. As it presently exists this boiler is fired only with natural gas. It was noted that the safety valve on the top of the boiler does not contain a discharge line and the discharge is approximately 8 ft above the floor which is non-code compliant. As we understand it from maintenance personnel this boiler is used primarily as a standby as it does operate however, it is noted to be in extremely poor condition and in need of replacement. The second boiler is an H. B. Smith cast iron sectional 450 mils boiler. This boiler appears to be approximately 50 years old and is provided with dual water cut offs and all operating and safety controls. Each boiler generates approximately eight pounds of steam pressure, which distributes to a common overhead header, which various sub-zones feed off this header to individual points within the building. Boiler #2 was noted to have sever staining on the mud drums along the cast iron section nipples which are potential leaking points. The exterior shell of boiler #2 was severely contaminated and rusted along the base of the shell. The safety valves on boiler #2 also did not contain a discharge line to the floor and this condition is also non-code compliant. The clearances adjacent to each boiler and adjacent structure do not meet minimum code requirements, which is a code violation. Considering the extreme antiquated nature of both boilers, the less than compliant clearances, the very poor piping of the safety valves and overall condition of the boilers, themselves consideration should be given to an overall upgrade at this time.
- ?? At one time fuel oil was supplied to each boiler through a recirculating schedule 40 black steel piping system. This entire piping system has been completely abandoned in place and considering it's lack of use should be removed. As it presently exists this piping system could not be reused and consideration should be given to a complete removal.
- ?? The breeching is of the welded black steel type and is insulated with what appears to be either calcium silicate or asbestos insulation with a canvas jacket. Before an exact

- determination can be made samples of the material should be tested for the presence of asbestos. It was noted that many sections of the insulation were damaged and falling free of the breeching system. Neither boiler was provided with a barometric damper. It was noted that there were no clean out doors in the breeching system. As it presently exists an atmospheric domestic water heater ties into this breeching. This breeching is of the single wall galvanized design and is not insulated. Adjacent to this section is a section of breeching also single wall galvanized metal, which connects to the main breeching however it is capped and disconnected from service. This breeching should be removed and capped at the main breeching line. Considering the extreme antiquated nature and very poor condition of all breeching consideration should be given to a complete replacement.
- ?? The chimney is of the masonry type and appears to be of adequate height and size for the power plant capacity. The chimney was provided with a cleanout door at the base of the chimney. It was noted that there was slight water stains on and around the cleanout door and where the breeching connects to the masonry chimney and it was noted to have slight cracking. The chimney should be inspected further by a structural engineer.
- ?? The combustion air system for the boiler room is through a single individual wall mounted louver located approximately 10 ft above the floor. This louver was not provided with any means of automatic shutoff and does free flow into the space at all times. The present code does require two individual openings of equal size and must be provided with one discharging high and one discharging low each provided with motor operated dampers and interlock with the firing circuit of the burners. Since this condition does not exist the entire installation is considered non-code compliant and must be improved upon.
- ?? Low-pressure steam piping appears to be schedule 40 black steel and was insulated with what appears to be calcium silicate or asbestos insulation with a canvas jacket. Samples of this insulation material should be tested for the presence of asbestos. It was not possible to evaluate the piping internal condition however considering its age it would appear that the steam piping has received its maximum serviceable life and consideration should be given to an overall upgrade. Many of the valves located throughout the boiler room were noted to have extensive surface contamination which could be due to bonnet leaking. Due to the extensive surface contamination it does suggest that the piping system is nearing it's maximum serviceable life.
- ?? Condensate piping throughout the entire building is through generally an un-insulated schedule 80 black steel condensate return system. Condensate is returned to the boiler room to a single floor mounted cast iron condensate receiver. It was noted that this condensate receiver does have extensive surface contamination and appears to be extremely old. The condensate receiver is provided with primary and standby boiler feed water pumps both of which were noted to have extensive surface contamination. Each boiler feed pump combines to a common distribution pipe to provide feedwater to each boiler. This pipe is not insulated and it was noted that many sections of this

pipng had been replaced. This does indicate that the former piping was leaking, further suggesting that the overall pipe condition is very poor and nearing its maximum serviceable life. Considering the extreme antiquated nature and indications of near failure consideration should be given to an overall upgrade at this time.

- ?? The automatic temperature control system does not appear to function. The automatic temperature controls throughout the building appear to be as simple as starting and stopping the boilers manually when heat is required outside of the boiler room. The controls that were noted throughout the building are extremely antiquated and did not appear to operate. At the time of our visit it was not possible to locate the automatic temperature control compressor, which leads us to believe that the system has been completely abandoned in place. Consideration should be given to providing a complete new automatic temperature control system of the direct digital type.

CENTRAL VENTILATION:

- ?? When the building was originally constructed a central ventilation distribution system was provided in the basement which consists of a masonry room which houses two blast steam heating units which free-blow heated outside air into the masonry chamber where a floor mounted centrifugal distribution fan distributes the 100 % heated outside air throughout a series of duct shafts throughout the building. Exhaust air in the individual spaces flows by gravity through secondary shafts and discharges through roof-mounted chimneys. Over the years the entire ventilation system has been completely abandoned in place and our observations indicate that the fans are not capable of operating at this time. It appears that the exhaust ventilation openings on the roof had been blanked off and the room, which was utilized as the main distribution plenum in the basement is presently being used as a storage room. The entire ventilation system throughout the building is non-code compliant and should be improved upon.

KITCHEN:

- ?? The kitchen area is provided with a single wall stainless steel exhaust hood located over the entire cooking area. The exhaust appears to be of adequate size and mounting height for the area served and it was noted that the hood was clean. The hood was not provided with filters, vapor tight incandescent lighting, nor was it provided with fire protection. The hood communicates directly through a rear duct connection to a wall mounted exhaust fan located on the vertical surface of the wall directly adjacent to the hood. Because this hood discharges within 10 ft of openings in the wall, the exhaust condition is non-code compliant. Considering the lack of filters, fire protection, lighting, and the poor arrangement of the exhaust consideration should be given to an overall replacement of the entire hood and exhaust system at this time.
- ?? The kitchen area is heated with individual cast iron radiation located approximately 6 ft above the floor. The cast iron radiation was provided with hand valves and

thermostatic traps for the control of heat. The radiation was noted to be slightly dirty and antiquated and appears to be original condition to the building. Considering the antiquated nature and general poor condition consideration should be given to a complete upgrade at this time.

- ?? It was noted that there was no mechanical ventilation make-up air provided for the kitchen exhaust hood. This condition is non-code compliant and should be improved upon.

CAFETERIA:

- ?? The cafeteria is provided with two individual ceiling mounted classroom unit ventilators which free-blow into the cafeteria area adjacent to the kitchen. Each unit ventilator appears to be original condition to the building and is provided with a steam coil with control valve, filters, supply fan, and a source of outside ventilation air. At the time of our visit the units were not operating and based on comments from maintenance personnel it does not appear that ventilators are capable of operating. The units were noted to be dirty and extremely antiquated and generally in need of replacement at this time.

- ?? In addition to the unit ventilators at the ceiling, heating of the cafeteria is also through the use of cast iron radiation located along the perimeter walls. All radiation was located approximately 6 ft above the floor and was provided with hand valves and thermostatic traps for the control of heat. All radiation was noted to be extremely antiquated, dirty, and maintaining generally poor temperature control. Considering the extreme antiquated nature and condition of all equipment consideration should be given to a complete replacement at this time.

- ?? The dishwashing area was not provided with any means of mechanical supply ventilation air. Located at the ceiling of the dishwasher area was a centrifugal exhaust fan with a small length of galvanized exhaust ductwork which communicates between the fan and central exhaust shaft running vertically through the building. It was noted that this exhaust fan is extremely antiquated and dirty but as we understand it does operate. Make-up air for this exhaust system appears to flow through openings in the wall between the corridor and the cafeteria to the dishwashing room itself. Consideration should be given to an overall upgrade at this time.

LOWER LEVEL OCCUPIED AREAS:

- ?? These areas are generally provided with cast iron radiation located at approximately 6 ft above the floor for the general control of space heating. The cast iron radiation was provided with hand valves and thermostatic traps for the control of heat. All radiation was noted to be extremely antiquated, slightly dirty, and also appear to be original condition to the building. Based purely on age and general condition consideration should be given to upgrading at this time.

- ?? Ventilation of these spaces at one time was through the central ventilation shafts within the building. It appears that these ventilation shafts have been taken out of service and as it presently exists, ventilation does not exist with the exception of operable windows. Consideration should be given to a complete upgrade at this time.

VESTIBULES AND ENTRANCEWAYS:

- ?? The vestibules and entranceways of the original building and the classroom addition are provided with a combination of wall-mounted convectors and fin tube radiation operating within the low-pressure steam distribution system. Each heating element is provided with a hand valve and thermostatic trap for the control of heat however control is extremely poor throughout. All heating appliances were noted to be extremely antiquated and dirty and were also noted to be damaged in many instances. Based on the age and general poor condition of all heating equipment and the very poor control being maintained, consideration should be given to upgrading all systems at this time.

CLASSROOMS:

- ?? The addition building classrooms are provided with wall-mounted classroom unit ventilators with adjacent draft barrier on each side of the unit ventilator located along the exterior wall. The unit ventilators are of the low-pressure steam design and are provided with two position automatic control valves. The unit ventilators are provided with an outside air intake louver as well as filters, a supply fan, and mixing dampers which distributes heated and ventilated air to the occupied space. In each case the units were extremely antiquated many of which were slightly damaged on the surface and all were generally in need of cleaning. The spaces were also provided with individual exhaust registers located at the ceiling within the closet areas within the classrooms. These exhaust registers were noted to be slightly dirty and antiquated however they do operate. Located above the ceiling was a series of galvanized exhaust ductwork which communicates each register to roof-mounted exhaust fans. The fans were running at the time of our visit and the systems were noted to be extremely noisy. At the time of our visit the unit ventilators did not appear to be operating however, they were maintaining space temperature control through the convected amount of heat coming through the heating coil. It does not appear that the amount of code required ventilation air is being provided. Considering the extreme antiquated nature and poor condition of all mechanical systems the systems should be considered for replacement at this time.
- ?? The original building classrooms are provided with a series of cast iron radiators located along the exterior wall of the building. All radiators was noted to be slightly soiled and extremely antiquated; however they do appear to operate. The radiators were provided with a combination hand valves and automatic control valves as well as thermostatic traps. It did not appear that the automatic control valves operate. Located on the opposite wall is an extremely antiquated line voltage electric thermostat, which appears to control the automatic valves however the entire control

- system has completely failed in place. Consideration should be given to an overall upgrade of all heating systems within the classrooms at this time.
- ?? Located within the closet area of each classroom was a ceiling mounted exhaust register was extremely antiquated, dirty, and generally in need of replacement. Also located in each classroom was an opening located at the floor line in the wall which is also designed to remove, through convective flow currents, exhaust air which is drawn in to the central ventilation system. These wall openings have been completely taken out of service and generally speaking the exhaust systems which flow vertically through the roof line have been taken out of service; consequently, the code required amounts of ventilation area are not provided.
- ?? Also located within each classroom is a grille located approximately 8 ft above the floor, which is designed to distribute ventilation air that is heated through the central ventilation system, described earlier. This entire ventilation system has been completely removed from service and generally speaking no ventilation is provided. Considering the extreme antiquated nature and very poor nature of all installed systems consideration should be given to a complete replacement at this time.

AUDITORIUM:

- ?? This area was also originally intended to communicate with the central ventilation system which has been completely removed from service. The decorative grilles located at the entrance to the auditorium are located high on the wall over the entrance door, generally are inoperative, and have been completely taken out of service at this time. The grilles were noted to be extremely dirty and generally in need of replacement.
- ?? The auditorium area is also provided with a series of cast iron radiators located along the perimeter of the space. Each cast iron radiator is provided with a decorative grille which allows air to flow into the face of the radiator; however, no discharge grille was provided to allow heat to efficiently flow from the radiation unit. All units were noted to be extremely antiquated and dirty; however, they do appear to function. The radiators were provided with a hand valve and thermostatic trap for the general control of heating however, as we understand it, very poor temperature control is being maintained throughout. Considering the extremely antiquated nature, consideration should be given to an overall upgrade at this time.

ADMINISTRATION AREA:

- ?? This area is provided with a series of cast iron radiators located along the exterior wall of each space. The radiation was covered with decorative grilles and was also provided with hand valves and thermostatic traps for the control of heat. All radiation was noted to be extremely antiquated however it was not dirty. As we understand it the radiation does maintain reasonable space temperature control, although it overheats from time to time. Without the provision for automatic control the spaces

- will overheat. Based purely on age consideration should be given to an overall upgrade at this time.
- ?? The areas were also provided with window air conditioning units. The units were noted to be slightly dirty however, as we understand, they do operate and maintain reasonable space temperature control. The units were noted to be noisy when they do operate.
- ?? The entire administration area is not provided with any means of mechanical ventilation. Although spaces with an outside wall have operable windows, which presently meet the current building code requirements for ventilation air, the interior administrative spaces are not provided with any means of ventilation. This condition is non-code compliant and should be improved upon.

TOILET AREA:

- ?? The public toilet areas within the building were generally provided with sidewall type exhaust registers directly connected to galvanized sheet metal exhaust systems located at the ceiling. It was noted that the exhaust registers were dirty and very antiquated and contaminated however they were operating at the time of our visit. These exhaust registers communicate to roof mounted exhaust fans through a galvanized sheet metal exhaust system. The systems were maintaining very poor ventilation control and it was noted that all exhaust fans were very noisy when they do operate. Consideration should be given to an overall upgrade at this time.
- ?? Make-up air for the toilet exhaust systems is through the use of door-mounted louvers. These louvers appear to be undersized for the volume of air being removed and it was noted that the louvers were slightly dirty. Consideration should be given to increasing the size of the louvers in the doors to improve make-up ventilation.
- ?? Located within each toilet space was a cast iron radiator for general space heating. The radiators were provided with a hand valve and thermostatic trap for general control and it was noted that the radiation was slightly dirty, antiquated, and generally in poor condition. Based on the very poor condition, antiquated nature, and very poor temperature control consideration should be given to an overall upgrade at this time.