Mechanical and Electrical Systems
Existing Conditions Narrative

J.M. Jeffrey Elementary School
Madison, Connecticut

3/11/10

Prepared By
Consulting Engineering Services, Inc.
811 Middle Street, Middletown, Connecticut 06457
CES Project No. 29066.00

A. ***PLUMBING NARRATIVE***

APPLICABLE CODES AND STANDARDS

The plumbing systems will be reviewed in conformance with the requirements of the following codes and regulations and all applicable local authority requirements, including the Bureau of School Facilities.

1. 2005 Connecticut State Building Code
2. 2005 Connecticut State Fire Safety Code
3. 2003 International Building Code(IBC)
4. 2003 International Plumbing Code
5. 2003 International Energy Conservation Code
6. NFPA, Latest Version
7. ASHRAE 90.1
8. State Department of Education School Construction Program

PLUMBING UTILITIES

1. Domestic Water:
   a. Existing Domestic Water Service: The building is currently served by a 2" domestic water main fed from Connecticut Water Company. This water service currently serves all of the school's domestic water needs including the portable classrooms. The water distribution system is original to the building.
2. Natural Gas:
   a. Existing Natural Gas Service: There is only natural gas service to the portable classrooms.
3. Sanitary:
   a. Existing Sanitary Service: The School's sanitary sewer system provides sanitary waste drainage for plumbing fixtures located throughout the School. The sanitary waste piping discharges to a septic tank and leaching field.
4. Storm:
   a. Existing Storm System: Building is served primarily by gutters.

PLUMBING FIXTURES AND SPECIALTIES

1. Existing plumbing fixtures are as follows:
   a. At the original 1957 section of the building, the water closets are floor mounted; tank type, vitreous china; original to the building. Portable classrooms are newer fixtures.

b. Lavatories at main building are wall hung vitreous china. Faucets are installed with two lever handle faucets.

c. Urinals at the main building are floor mounted with flush valves. Under new construction these are not allowed to be installed by the State of CT Department of Public Health. They are grandfathered in and are allowed to remain.

DOMESTIC HOT WATER SYSTEMS

1. Existing Domestic Hot Water System: The domestic hot water is generated by multiple electric water heaters with varying capacity and storage. In the boiler room there is an abandoned storage tank. The water heaters are fairly new and in good condition.

B. ***FIRE PROTECTION NARRATIVE***

FIRE PROTECTION SERVICE

1. There is no central fire protection system (sprinklers) currently at the facility.

C. ***MECHANICAL NARRATIVE***

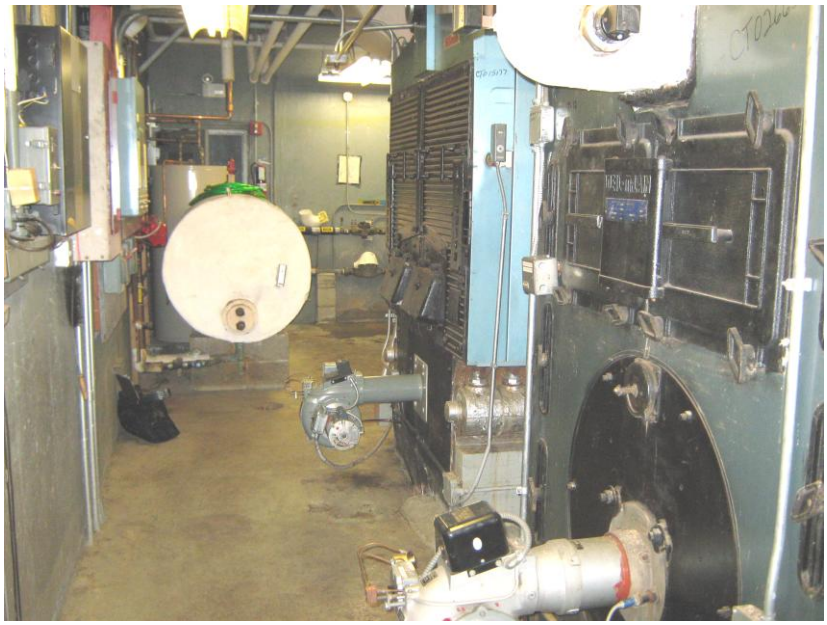
APPLICABLE CODES AND STANDARDS

The mechanical systems will be reviewed in conformance with the requirements of the following codes and regulations and all applicable local authority requirements, including the Bureau of School Facilities.

1. 2005 Connecticut State Building Code
2. 2005 Connecticut State Fire Safety Code
3. 2003 International Building Code(IBC)
4. 2003 International Mechanical Code
5. 2003 International Energy Conservation Code
6. NFPA, Latest Version
7. ASHRAE 90.1
8. State Department of Education School Construction Program

EXISTING SYSTEMS

1. Boiler Plant: The building is heated by (2) fuel-oil fired, hot water boilers. One boiler is original to the building (1957) with a new burner (2007) and one boiler is a replacement boiler (1988); respectively H.B. Smith 450 Mills, 12 section and Weil Mclain; each with nominal capacity of 3,000 Mbh output. There are four hot pump zones.



2. Buried Fuel Tanks: Refer to 2004 Underground Storage Tank Report done by Flagship Environmental LLC, 2004.
3. Heating and Ventilating (H&V) systems:
   a. At original 1957 section of the building, classrooms are served by finned tube radiation for heat. Ventilation at classrooms is accomplished by operable windows (natural ventilation) and a nominal amount of exhaust through a ducted exhaust system.
   b. At the 1988 building addition, classrooms are served by unit ventilators for heat and mechanical ventilation.
   c. “Cafetorium” and gymnasium are served by H&V units and exhaust fans.
   d. Temperature controls throughout the building are pneumatic controls served by an air compressor and air dryer located in the boiler room.
4. Air conditioning is provided at specific areas such as administrative areas, library, nurse’s offices and computer lab with combination of window air conditioners and ductless split units. Four classrooms at the original 1957 section of the building are served by air conditioning units also.
5. Portable classrooms are air conditioned and are served by Trane packaged roof top units (RTU’s) which are gas heat and electric cooling. The RTU’s are original equipment when the classrooms were constructed in 2000.

D. ***ELECTRICAL NARRATIVE***

APPLICABLE CODES AND STANDARDS

The electrical power, interior lighting, and fire alarm systems will be reviewed in conformance with the requirements of the following codes and regulations and all applicable local authority requirements, including the Bureau of School Facilities.

1. 2005 Connecticut State Building Code
2. 2005 Connecticut State Fire Safety Code
3. 2003 International Building Code(IBC)
4. 2003 International Energy Conservation Code
5. 2005 National Electrical Code, NFPA 70 (NEC)
6. Illuminating Engineering Society Lighting Handbook (IESNA), 9th Edition
7. ASHRAE 90.1
8. State Department of Education School Construction Program

EXISTING SYSTEMS

1. The main building (areas except portable classrooms) is served by upgraded General Electric gear; rated at 600 amperes, 208Y/120volts, 3-phase. This service equipment consists of a 600 amp main disconnect switch, distribution section and metering per utility company requirements. The newer equipment, circa 1990, feeds distribution panels original to the building including a main panel rated at 400 amperes. The service equipment is good condition; the distribution panels are in fair condition.

2. The portable classrooms are served by a separate electrical service rated at 400 amperes, 208Y/120volts, 3-phase.
3. There are a number of electrical panels located throughout the facility. These panelboards are original to the facility. The condition of these panelboards is good to poor. The majority of the panelboards do not have spare circuit breakers available for new circuits to be added, or have space to add new circuit breakers.
4. Lighting at classrooms, corridors and administrative areas consists primarily of fixtures with acrylic lenses and T8 fluorescent lamps. The Cafetorium and gymnasium are served by T5 fluorescent.
5. Site lighting has fair good coverage with pole mounted fixtures and building mounted fixtures.
6. The fire alarm system is a Notifier system with a Fire Lite dialer. There are manual fire alarm pullstations throughout the building and smoke detectors within the corridors.
7. Emergency lighting is handled by 2-head emergency lighting fixtures with integral battery packs.

E. ***MEP SYSTEMS CONCLUSION***

In general, the systems at the 1957 section of the building are original to the building and are 50+ years old, thus have met their useful life expectancy. The building's temperature controls system is all pneumatic and conversion to a DDC system is recommended. Ventilation is not a mechanical ventilation system in all areas of the building, which is typically preferred. The following capital needs survey form highlights the major systems in need of replacement and their respective capital costs to implement.

Town of Madison								
Capital Needs Survey Form						Orig Building	Portables	Total Floor Area (sf):
JM Jeffrey Elementary School						45,749	6,650	52,399

Note: The "System Priority Rating" (1 to 4 rating) and "Condition of the Existing System Rating" (1 to 5 rating) are to be reviewed together to assist in prioritizing replacement and/or upgrades. As an example, we recommend line items with a System Priority rating of 1 and Existing Conditions rating of 1 be prioritized for replacement and/or upgrades.

SYSTEM	System Priority 1 to 4 (1-Highest Priority, 4-Lowest Priority)	Condition of the Existing System 1 to 5 (1 Poor, 5 Excellent)	Last Major Reconstruction (Year)	Projected Replacement (Year)	Quantity	Unit Price	Current Replacement Cost	REMARKS
Division 2 - Site Construction								
Site - Electrical								
Site - Lighting								
Site - General								N/A
Division 15 -Plumbing								
Water Main								
Overall Plumbing Renovations - includes:	3	3	1950	2010	45,749	$12	$548,988	
Water Distribution System								
Plumbing Fixtures								
Water Heater			varies				$0	
Division 15 - HVAC								
Overall HVAC Renovations - includes:	3	3	1950	2010	45,749	$30	$1,372,470	
Hot Water Boilers								
Ventilation Systems								
Air Handling Systems								
Exhaust Systems								
Temperature Control Systems								
Air Conditioning Systems - added cost	4	3		2010	45,749	$12	$548,988	
Division 16 - Electrical								
Overall Electrical Renovations - includes:	2	3	1950	2010	45,749	$15	$686,235	
Electrical Service								
Distribution and Local Panels								
Lighting								
Emergency Lighting								
Misc Low Voltage Systems								
Fire Alarm System								
Added Elec Cost for A/C Systems	4	3		2010	45,749	$5	$228,745	Upgrade to 1000A - 480Y/277V
							$3,385,426	
							$ 65	per sf