Park & Cemetery

Pine Grove Cemetery, Haverhill Road.

Year Constructed:

Building 1:	1970's
Building 2:	1970's
Building 3:	1895

Construction Types:

Building 1:	Type IIB (Non-combustible)
Building 2:	Type IIB & Type V
Building 3:	Type V (Wood Framed)

Building Areas:

Building 1:	1,539 SF
Building 2:	1,190 SF
Building 3:	490 SF
Total Area:	3,219 SF

Documents Used in Study:

Assessor's Map and Aerial Photograph

Building 1

Building 2

General Description:

Building 3

Currently there are the three buildings on the site plus two fabric garages, and a large container. Equipment is stored on the ground around the site and includes such items as snow plow blades, tractor mount post hole drills and four town vehicles.

Building 2 has two wood framed wings, without floors, that are constructed on concrete piers. These spaces are damp and not appropriate for the storage of equipment.
Building 1 is the main building and includes the office areas, restrooms and garage space. This is the building that families need to visit to purchase cemetery lots and is not appropriate for this function.

Building 3 is used as a garage, but architecturally it is the most significant structure on the site.

Architectural Assessment Building 1:

2 Office walls have exposed studs on garage side. All wood framing should be finished with gypsum wallboard. (13)

3 Toilet rooms are not of the correct dimensions for handicapped accessibility and finishes are not appropriate for client use. Grab bars are missing in women's room Toilet rooms should be reconstructed to the correct dimensions and have new durable finishes such as porcelain tile floors, ceramic tile walls and new ceilings. (30)

Architectural Assessment Building 2:

4 Wood framed wings are built on pier foundations and are without a floor slab. Wood doors are warping. Any equipment stored in these wings is exposed to rodent damage and moisture damage. The two wood framed wings should be removed but if retained should be provided with a concrete slab and doors replaced on the smaller building. (47)

Architectural Assessment Building 3:

2 Windows should be restored and interior storm panels added (including attic windows). (116)

2 Exterior should be scraped and painted. Any severely water damaged shingles or siding should be replaced. (79)

General Site Assessment:

3 Paving is deteriorated and cracked. Replace all paving back to gates leading to buildings. (46)

3 Provide handicapped parking adjacent to Building 1. (18)

4 Miscellaneous storage of loose equipment and materials occurs along the edge of the cemetery. Adjacent areas to cemetery to be cleaned and simple landscaping provided along backs of buildings. (48)

4 Replace the non-programmable thermostat for the unit heaters with a programmable thermostat, to reduce energy consumption. (106)

3 Replace existing zoned fire alarm system with new addressable fire alarm system to meet the latest codes. (8)

4 Upgrade existing interior and exterior lighting and controls to new more energy efficient lighting and controls. (113)

2 Provide additional exit signs to meet the requirements of the latest codes. (5)

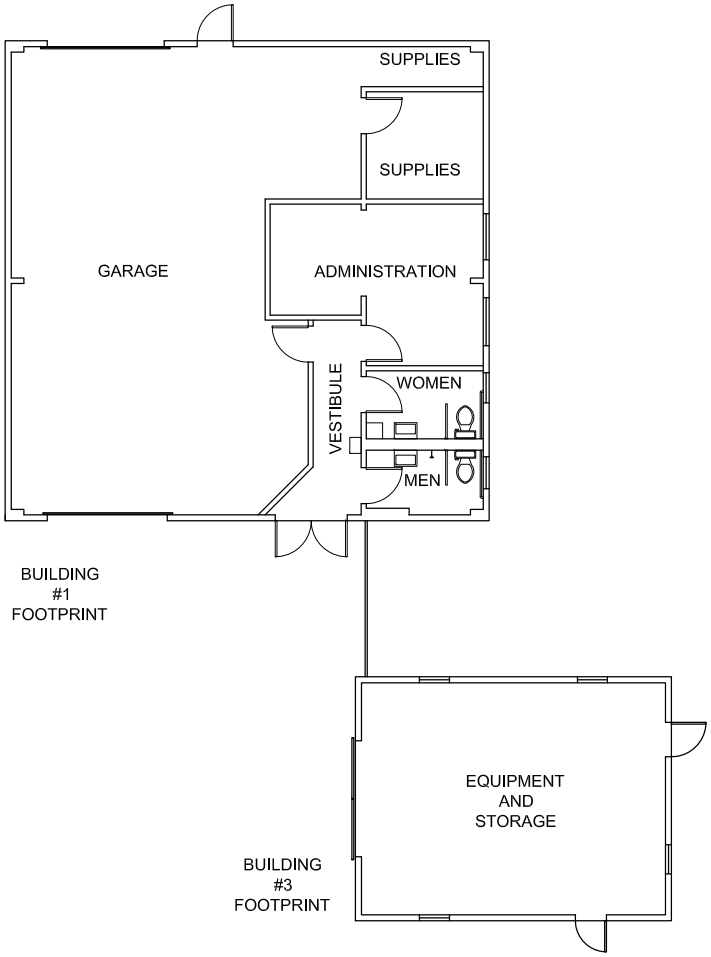
Building Recommendations:

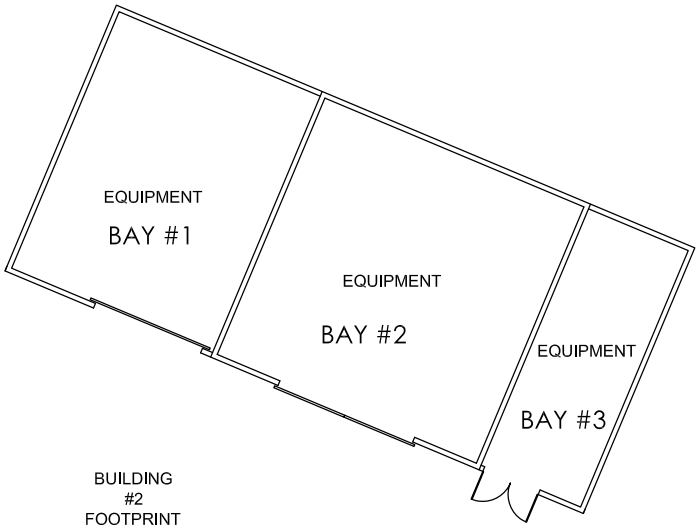
Office areas together with a small conference room should be relocated to Building 3. A link should be constructed to connect Building 3 to Building 1 for access to the restroom. The link could also be used as a waiting area. Steps should be provided at rear door of building 3 and a handicapped ramp with railings added to the side door. Building 3 should be insulated and a hatch created to separate the attic from the main space. Soffit and ridge vents should be added. Perimeter if building 3 is un-insulated; excavate block foundation and install 2 inch thick rigid insulation board to 3 feet below grade.

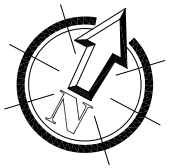
The space currently occupied by the offices will revert to being part of the garage and will be used to house the two tractors and equipment.

A new eight bay garage should be constructed to house the four trucks and small equipment, including plows, currently stored in the container and in the wood wings of Building 2.

All temporary buildings to be removed from site.

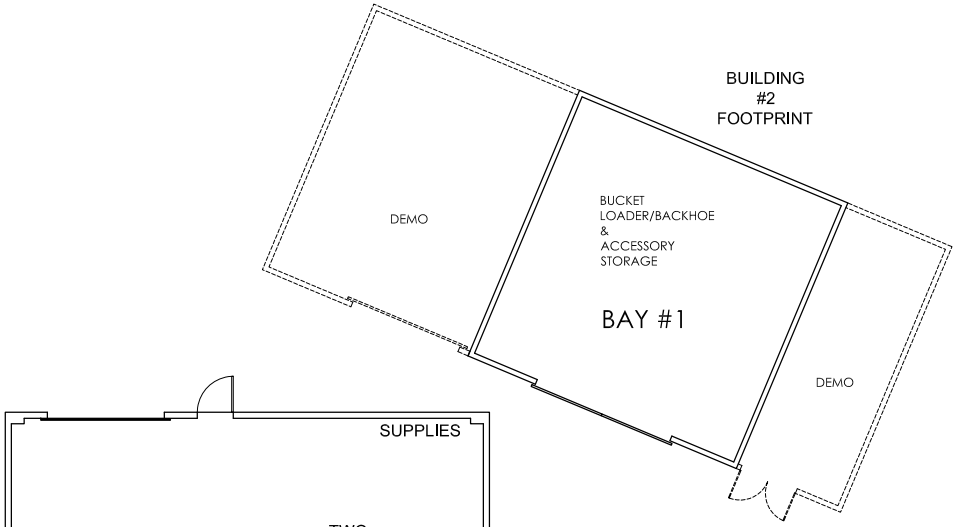


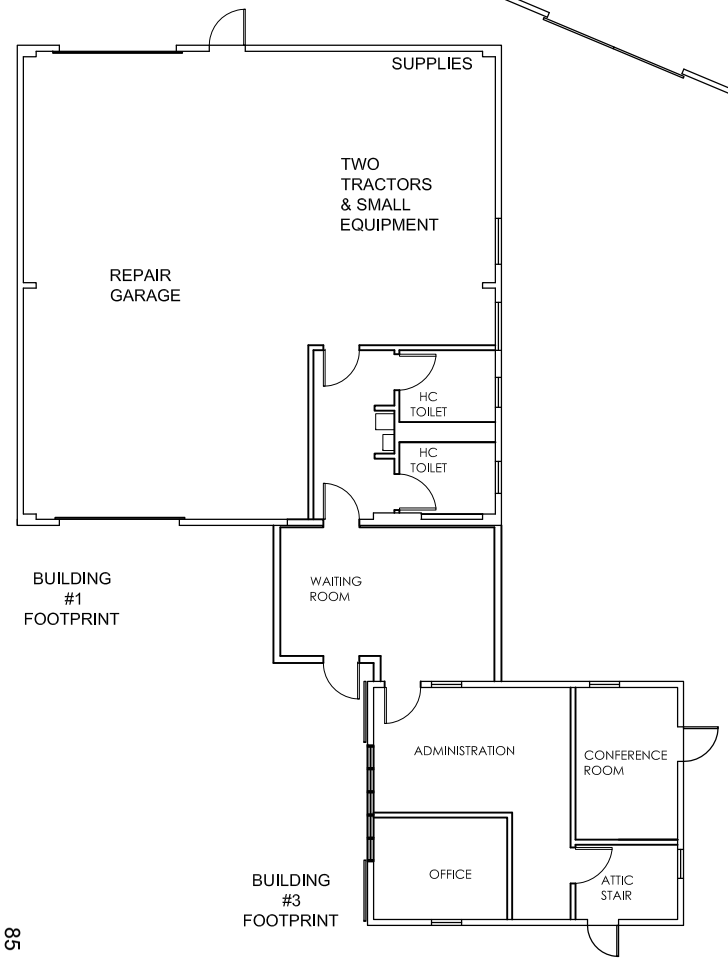




D·R·A Drummey Rosane Anderson Inc.

PARK CEMETERY BUILDINGS EXISTING Topsfield, Massachusetts





D·R·A Drummey Rosane Anderson Inc.

PARK CEMETERY BUILDINGS PROPOSED Topsfield, Massachusetts

Topsfield Public Building Study 1/10/2013

PARK CEMETERY BUILDINGS

Program Statement

Spaces:	Existing Spaces				Renovations / Additions & New Building				
	ROOMS	FIRST	TOTAL	TOTAL BUILDING AREA	ROOMS	FIRST	TOTAL	TOTAL BUILDING AREA	Comments
Building #1:				**1,532**				**1,754**	Area
Garage	1	975	975		1	1,306	1,306		
Supplies	1	121	121						
Administration	1	204	204						
Women's Toilet	1	55	55		1	48	48		
Men's Toilet	1	50	50		1	48	48		
Toilet Vestibule					1	92	92		
Vestibule	1	72	72						
Waiting Room					1	211	211		
Building #2:				**1,191**				**542**	Area
Bay #1	1	420	420		1	542	542		
Bay #2	1	542	542						
Bay #3	1	210	210						
Building #3:				**490**				**490**	Area
Equipment and Storage Bay	1	490	490						
Administration					1	215	215		
Conference Room					1	108	108		
Office					1	95	95		
Attic Stairs					1	53	53		
New Building :								**2,304**	Area
Bay #1					1	864	864		
Bay #2					1	288	288		
Bay #3					1	288	288		
Bay #4					1	288	288		
Bay #5					1	576	576		
Subtotal of net spaces:	**10**	**3,139**	**3,139**		**15**	**5,022**	**5,022**		
Unasigned area (structure)			74				68		
TOTAL Area of all Buildings :			**3,213**				**5,090**		
% Circulation and Structure			2%				1%		

TOWN BUILDING ASSESSMENT STUDY AND CAPITAL MASTER PLAN
Town of Topsfield, Massachusetts

Parks & Cemetery Garage

Mechanical, Electrical, Plumbing, And Fire Protection Systems

Prepared By:
Consulting Engineering Services
510 Chapman Street, Suite 201
Canton, MA 02021

January 14, 2012

General

The mechanical, electrical, plumbing, and fire protection systems were reviewed in conformance with the requirements of the following State and National codes and regulations, as applicable:

- Massachusetts State Building Code 8th Edition
- Massachusetts State Fire Prevention Regulations
- NFPA Latest Editions
- Massachusetts Plumbing Code
- Massachusetts Mechanical Code
- Massachusetts Electrical code (NEC 2011 Edition)
- Illuminating Engineering Society of North America (IESNA) Lighting Handbook
- ASHRAE 90.1 Latest Edition

The scope of this study does not include operational assessment of the fixtures and equipment reviewed; it includes only a brief visual review of the fixtures and equipment. Therefore notes regarding the condition of the fixtures and equipment may or may not be indicative of the actual condition of the systems and equipment and/or the expected life of the fixtures and equipment. Therefore it is recommended that services of a qualified technician be retained to evaluate the actual condition of fixtures and equipment prior to replacement.

Mechanical

EXISTING SYSTEMS

Two ceiling mounted gas fired unit heaters, controlled by a non-programmable thermostat, provide heat for the maintenance/service area of the building. The unit heaters appear to be in fair to good condition.

The other spaces are provided with electric baseboard heaters. The heaters appear to be in fair condition.

The building does not have any general ventilation systems.

The separate garage/storage facility does not have any mechanical systems.

RECOMMENDATIONS

Replace the non-programmable thermostat for the unit heaters with a programmable thermostat, to reduce energy consumption.

Electrical

EXISTING SYSTEMS

The building is served by a single electrical service rated 200amperes, 240/120 volts, 1-phase, 3-wire. The service equipment consists of utility metering equipment, 200amp main circuit breaker in panelboard. The predominance of the main distribution equipment is older but in fair condition.

There is a one panelboard. The predominance of this panelboard is G.E. The G.E. panelboard is older and is in good condition and has space available for additional circuit breakers for new circuits to be added.

The lighting throughout the facility consists of recessed 2x4, and 2x2 lensed troffers, 1x8 industrial fixtures. The fixtures appear to be in good condition. The lighting in all spaces are controlled by light switches. The light levels appear to be within the recommended levels.

The fire alarm system is a Fire Lite zoned system. There are manual fire alarm pull stations, horn/strobes located through the facility. Heat and smoke detectors are present in select areas. Sprinkler flow and tamper switches are present as well as monitoring of mechanical equipment. The fire alarm devices are in good condition.

Exterior lighting is accomplished via building mounted wall packs, HID flood lights. The lighting appears is in good condition.

Life safety emergency lighting is provided by fixtures in the path of egress.

Exit signage is not installed throughout the building. The exit signage does not comply with today code requirements.

RECOMMENDATIONS

Replace existing zoned fire alarm system with new addressable fire alarm system to meet the latest codes.

Upgrade existing interior and exterior lighting and controls to new more energy efficient lighting and controls.

Provide additional exit signs to meet the requirements of the latest codes.

Plumbing

The water closets are wall mount low flow tank type vitreous china fixtures that appears to be in good condition.

The urinal is a wall mount flush valve vitreous china fixture that appears to be in good condition.

The lavatories are wall mount vitreous china fixtures with a manual faucet that appears to be in good condition.

There is water cooler in the corridor that appears to be in good condition.

There is an emergency shower in one of the restrooms that appears to be in good condition.

There is a tank type electric water heater in one of the restrooms, enclosed by casework without access, condition not reviewed.

The separate garage/storage facility does not have any plumbing systems.

Fire Protection

Neither building has a sprinkler system.

END OF MEP REPORT

Highway Department

279 Boston Street

Year Constructed:	1999
Construction Type:	II B
Building Area per Floor:	Mezzanine: 756
	First Floor: 10,070
	Total Area: 11,582

Documents Used in Study:

Floor Plans dated 1999
Assessor's Map and Aerial Photograph

General:

Architecturally the building is in very good condition reflective of its young age.

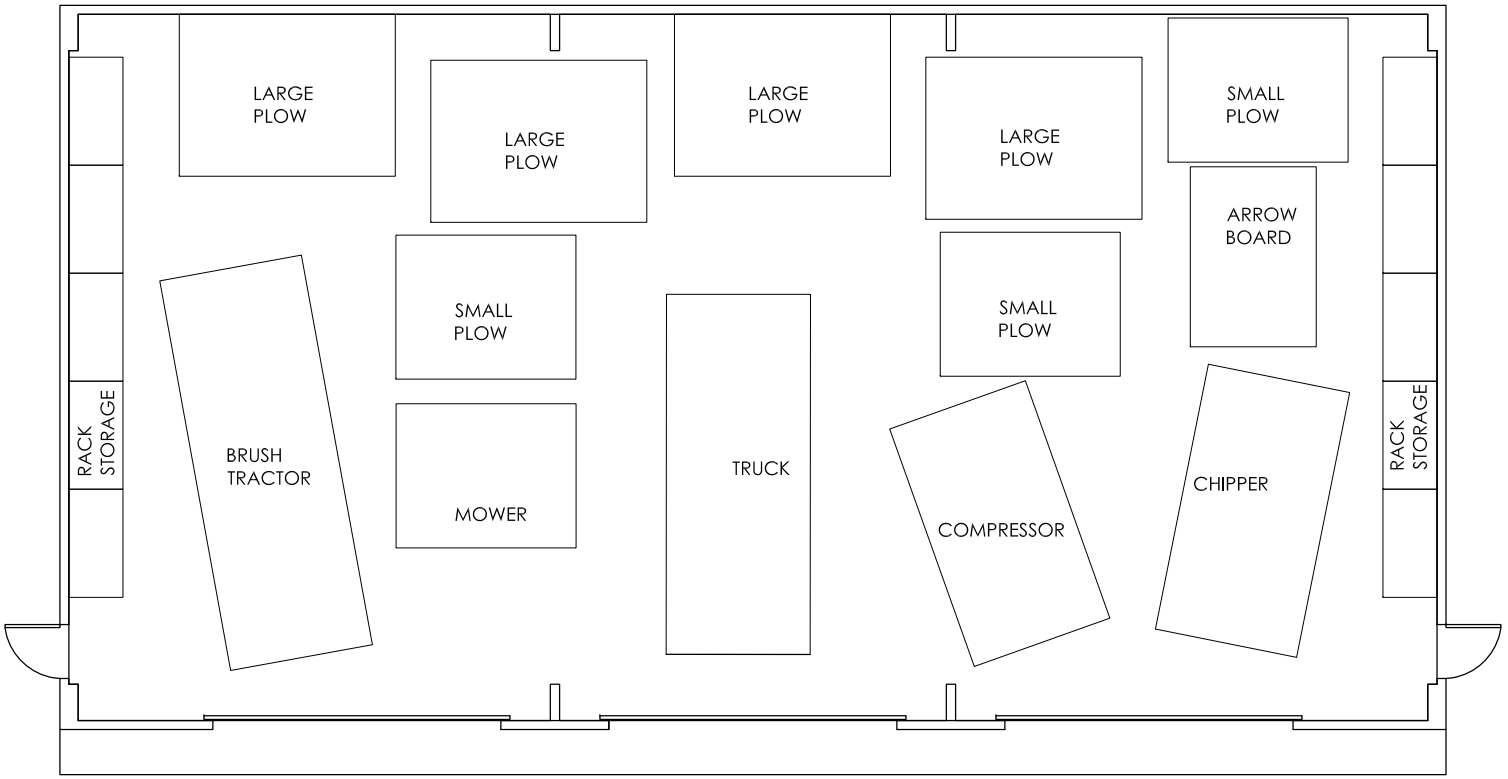
Mechanical:

3 Provide a changeover/bypass temperature control system for the office areas. (110)

3 Provide an outside air louver or a roof mounted outside air hood, sized for minimum outside air ventilation in accordance with the mechanical code, with ductwork connected to the return air side of the furnace/DX air handling system. (111)

Recommendations:

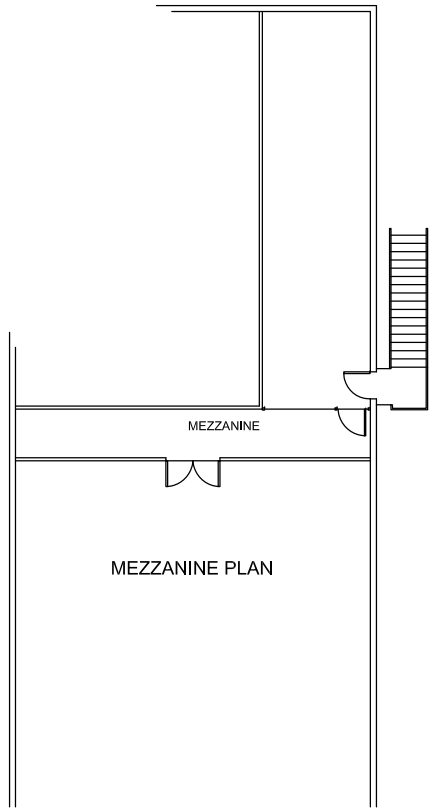
The building does not have sufficient space for all pieces of equipment which have to be left outside. Equipment needs to be stored under cover to protect the Town's investment. After review it is recommended that a new metal building be constructed to house the equipment. (136)



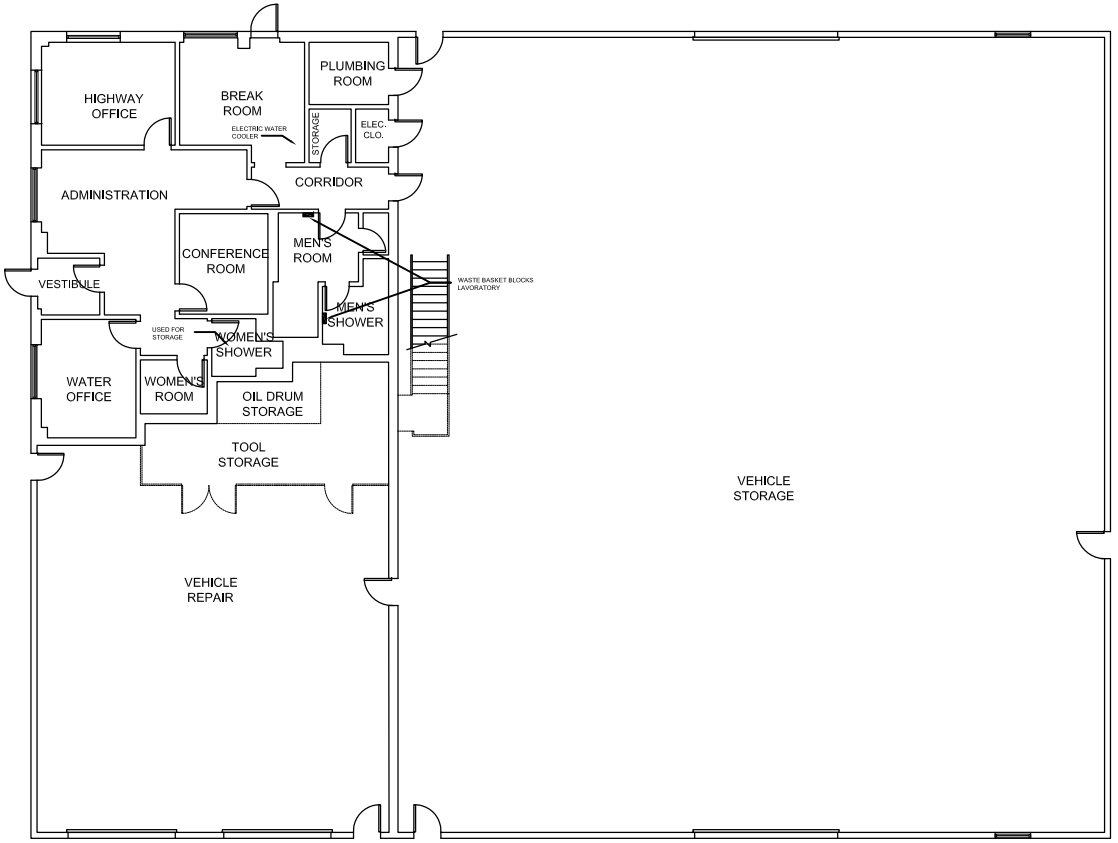
PROPOSED NEW DPW GARAGE

SCALE: 3/8" = 1'-0"

D·R·A Drummey Rosane Anderson Inc. HIGHWAY DEPARTMENT PROPOSED NEW Topsfield, Massachusetts



MEZZANINE PLAN



FIRST FLOOR
Scale 3/16"=1'-0"

D·R·A Drummey Rosane Anderson Inc.

HIGHWAY DEPARTMENT EXISTING

Topsfield, Massachusetts

Topsfield Public Building Study

HIGHWAY DEPARTMENT BUILDING

Program Statement

Spaces:	Existing Spaces					New Building				
	ROOMS	FIRST	MEZZANINE	TOTAL	TOTAL BUILDING AREA	ROOMS	FIRST	TOTAL	TOTAL BUILDING AREA	Comments
Existing Building :										
Highway Office	1	169		169						
Break Room	1	174		174						
Plumbing Room	1	62		62						
Electrical Closet	1	22		22						
Storage	1	28	756	28						
Administration	1	310		310						
Conference Room	1	110		110						
Men's Restroom & Shower	1	176		176						
Women's Restroom & Shower	1	87		87						
Water Office	1	140		140						
Tool Storage	1	295		295						
Vehicle Repair Bay	1	1563		1,563						
Vehicle Storage Bay	1	6934		6,934						
Total Area		**10,070**	**756**		**10,826**					
New Garage Building										
Bay #1						1	1057	1057		
Bay #2						1	864	864		
Bay #3						1	1057	1057		
Total Area									**2,978**	
Subtotal of net spaces:	**13**	**10,070**	**756**		**10,826**	**3**	**2,978**		**2,978**	
Unasigned area (structure)					756				0	
TOTAL Area of all Buildings :					**11,582**				**2,978**	
% Circulation and Structure					7%				0%	

TOWN BUILDING ASSESSMENT STUDY AND CAPITAL MASTER PLAN
Town of Topsfield, Massachusetts

Highway Department

Mechanical, Electrical, Plumbing, And Fire Protection Systems

Prepared By:
Consulting Engineering Services
510 Chapman Street, Suite 201
Canton, MA 02021

January 14, 2012

General

The mechanical, electrical, plumbing, and fire protection systems were reviewed in conformance with the requirements of the following State and National codes and regulations, as applicable:

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- Massachusetts State Fire Prevention Regulations
- NFPA Latest Editions
- Massachusetts Plumbing Code
- Massachusetts Mechanical Code
- Massachusetts Electrical code (NEC 2011 Edition)
- Illuminating Engineering Society of North America (IESNA) Lighting Handbook
- ASHRAE 90.1 Latest Edition

The scope of this study does not include operational assessment of the fixtures and equipment reviewed; it includes only a brief visual review of the fixtures and equipment. Therefore notes regarding the condition of the fixtures and equipment may or may not be indicative of the actual condition of the systems and equipment and/or the expected life of the fixtures and equipment. Therefore it is recommended that services of a qualified technician be retained to evaluate the actual condition of fixtures and equipment prior to replacement.

Mechanical

VEHICLE PARKING AREA

The heating system consists of four ceiling mounted natural gas fired units heaters controlled by a programmable thermostat. The units appear to be in fair to good condition. There is a fifth unit heater, but it has been taken out of service.

The ventilation system consists of two roof mounted exhaust fans with manual on/off switches. When the fans are operating, make-up air is introduced into the space via two wall mounted louvers. There also are three ceiling mounted paddle fans with manual switches for destratification.

There is no air conditioning system.

SERVICE GARAGE

The heating system consists of two ceiling mounted natural gas fired units heaters controlled by a programmable thermostat. The units appear to be in fair to good condition.

There is a roof mounted exhaust fan for general ventilation. When the fan is operating, make-up air is introduced into the space via a wall mounted louver.

There is local vehicle exhaust system generally consisting of a single exhaust fan exhausting up thru the roof, serving two wall/rail mounted hose reels. This system appears to be in fair condition. There also are two ceiling mounted paddle fans with manual switches for destratification.

There is no air conditioning system.

OFFICE AREA

The office area is heated and air conditioned by a single zone gas fired furnace with a direct expansion (DX) cooling coil connected to a grade mounted condensing unit.

The controls for the heating and air conditioning system consist of a programmable thermostat located in the Director's office.

The ventilation system consists of a roof mounted exhaust fan which serves the restrooms. There is no outside air ventilation system; the furnace/DX system is a return air only system.

RECOMMENDATIONS

A single zone heating and air conditioning system typically provides good temperature control in the space where the thermostat is located and in spaces with both similar exposure and similar use. For the office area of this building, there are no spaces with both similar exposures and uses to that of the Director's office; all of the spaces have either/or both dissimilar exposures or dissimilar uses. Therefore it would be expected that the temperature control in the spaces other than the Director's office might at times have less than ideal temperature control. Per conversations with the occupants (during the site visit), that is the case.

Short of replacing the existing single zone temperature control system with a true multiple zone temperature control system, recommended is the installation of what is known as a changeover/bypass temperature control system. This system generally consists of variable volume zone control dampers installed on the existing ductwork that allow the air handling system to provide varying amounts of heated and cooled air to the various spaces served by the system. Such an installation will provide for better temperature control of the various spaces served. However, as it is not a true multiple zone temperature control system, it should not be expected that all of the zones served will be comfortable all of the time; it should only be expected that all of the zones served will be comfortable more of the time than they are presently.

Also, the furnace/DX system air handling system does not have outside air ventilation, and per code all occupied spaces must have either operable exterior openings (minimum 4% of the floor area) or mechanical outside air ventilation. The conference/meeting room has neither, and therefore is not in accordance to the mechanical code. Therefore recommended also is the installation of either an outside air louver or a roof mounted outside air hood, sized for minimum outside air ventilation in accordance with the mechanical code, with ductwork connected to the return air side of the furnace/DX air handling system.

Electrical

EXISTING SYSTEMS

The building is served by a single electrical service rated 400amperes, 208Y/120 volts, 3-phase, 4-wire and is located in the main electric room. The service equipment consists of utility metering equipment, 400amp main circuit breaker and distribution panelboard located in the main electrical room. The predominance of the main distribution equipment is newer and in good condition.

There are a number of electrical panels located throughout the Facility. The predominance of these panelboards are Siemens and G.E. The Siemens panelboards are in good condition with the some of the panelboards having spare circuit breakers

available for new circuits to be added. The G.E. panelboards are older and in poor condition and do not have any spare circuit breakers available.

The lighting throughout the facility consists of recessed 2x4, and 2x2 parabolic and 2x4 lensed troffers, 2x4 high-bay fluorescent fixtures. The fixtures appear to be in good to very good condition. The lighting in all offices and other spaces are controlled by light switches. The light levels appear to be within the recommended levels.

The fire alarm system is an Edwards EST2 addressable system. There are manual fire alarm pull stations, horn/strobes located through the facility. Heat and smoke detectors are present in select areas. Sprinkler flow and tamper switches are present as well as monitoring of mechanical equipment. The fire alarm devices are in good condition.

Exterior lighting is accomplished via building mounted wall packs, HID flood lights and a number of pole mounted HID cut-off type luminaries. The lighting appears is in good condition.

There is currently a natural gas fired Kohler 60kw emergency standby generator. This unit is older and appears to be in fair condition. The generator provides power to the whole building.

Life safety emergency lighting is provided by fixtures throughout the Facility being feed from the emergency standby generator, supplemented by central battery unit with remote heads in the parking and service bays.

Exit signage is installed throughout the facility. The exit sign are being powered from the emergency standby generator. The exit signage does comply with today code requirements.

There is currently a security system including magnetic contacts at all doors and motion sensor detection devices throughout the library. This system was noted during the walk through as operating without problem.

Plumbing

Water is provided to the building via wells and a storage tank outside of the building. The condition of these system was not reviewed. A dual water pump set inside the building delivers water from the storage tank to the building. This pump set appears to be in fair to good condition.

A tank type gas fired water heater provides hot water for the building. This unit appears to be in fair to good condition.

The water closets and the urinal are flush valve operated low flow vitreous china fixtures, and they appear to be in good condition.

The lavatories are wall mount vitreous china fixtures with manual faucets, and they appear to be in good condition.

The stainless steel sink in the lunch room appears to be in fair to good condition.

There is a hand held shower in the shower room that appears to be in condition, however the shower room does not appear to be used; supplies are stored in the room such that taking a shower would be impractical.

The service garage has both a compressed air system and a lube oil system that appear to be in fair to good condition.

Fire Protection

The building is provided with sprinkler piping and sprinkler heads throughout, however there is no sprinkler water supply to the building; there is only a fire department connection which allows for connecting a fire department pumping type vehicle with integral storage tank.

Library

1 South Common Street

Year Constructed: Major Renovations 1999
Construction Type: III B
Building Area per Floor: Second Floor:
First Floor:
Basement:
Total Area:

Documents Used in Study:
Floor Plans dated 1999
Assessor's Map and Aerial Photograph

Basement

1

At times when the stream behind the library floods the basement has flooded. When this last occurred power was also lost and the added sump pumps became non-functioning result in a couple of feet of standing water. GWB was not replaced until a solution can be found. There are no perimeter drains around the original building.

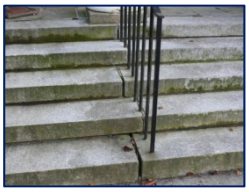
As a first step it is recommended that the sump pumps be provided with an automatic generator back-up. Following that a perforated pipe surrounded by filter fabric and gravel should be installed beneath the floor slab and extend from sump to sump. This will have the effect of lowering the water level below the floor. It will be a challenging installation in a finished space and will be very disruptive so we suggest this would be the second step to resolving the problem.(104)

Entrance Portico

3

Bases on wood columns and pilasters are rotting. Bad wood should be cut out or consolidated. Dutchmen inserted and bedded in epoxy patching material and shaped to match profile. Sand, prime and repaint bases pilasters and columns. As an option bases can be replaced with aluminum bases to prevent future deterioration. (80)

3 Stone steps and landing stones have shifted and mortar is missing. Remove mortar and re-point. (84)



3 Metal railings are badly rusted. Remove rust and prime and paint railings. (86)

Miscellaneous

3 Fan detailing over windows is peeling. There a lot of paint build up on these so they should be stripped, cracks patched, sanded primed and painted. (85)

3 Column by new entrance has a vertical split. Add vents at bottom of column. Scrape out open joint, fill and re-paint column. (88)

3 Cornice trim (gutter?) is deteriorating at corners. If these are gutters they should be lined at corners to prevent water from entering the end grain. Exterior to be scraped, wood dried, filled sanded primed and painted. (74)

Mechanical

3 The outside air intake of the roof mounted make-up air ventilation system should be ducted away from the boiler flue, such that the make-up air system can operate throughout the year, as likely was the design intent. (122)

3 Check/repair/replace the control valves through-out the facility. (108)

TOWN BUILDING ASSESSMENT STUDY AND CAPITAL MASTER PLAN
Town of Topsfield, Massachusetts

Town Library

Mechanical, Electrical, Plumbing, And Fire Protection Systems

Prepared By:
Consulting Engineering Services
510 Chapman Street, Suite 201
Canton, MA 02021

January 14, 2013

General:

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Mechanical

CENTRAL PLANT

The building is served by a two pipe switchover heating and cooling plant which generally consists of a hot water boiler, a chiller, and a pumping plant. The system operated either in heating mode, where the circulated water is heated by the boiler, or in cooling mode, where the circulated water is cooled by the chiller; the central plant system cannot provide both heating and cooling simultaneously. The boiler, the pumps, and the plant piping accessories are located in the basement mechanical room.

The boiler is the non-condensing natural gas fired type, and it appears to be in fair to poor condition.

The chiller is the packaged air cooled type mounted on the roof, nominal 50 tons, refrigerant R-22. It appears to be in good condition.

Two base mounted end suction type pumps circulate heating/cooling water throughout the building. They appear to be in good condition.

HEATING & AIR CONDITIONING

The terminal heating and air conditioning systems generally consist of many low tonnage vertical cabinet type fan coil units at the perimeter of the building, but there also are a couple of horizontal units mounted above the ceiling serving the ground floor meeting space. They appear to be in good condition.

VENTILATION

Ventilation is provided by an outside air make-up unit mounted on the roof adjacent to the chiller. The unit generally consists of a supply fan, a natural gas fired furnace, a direct expansion (DX) cooling coil, and filters, and it appears to be in good condition. Refrigerant (R-410a) is routed via refrigerant piping between the cooling coil and a grade mounted condensing unit.

This unit appears to have been designed to allow not only for tempering to room temperature the outside air provided in the winter and the summer, but also possibly to allow for morning warm-up during the milder seasons when the chiller plant was operating (and the boiler plant was not). The outside air intake is however very close to the boiler flue and therefore not in accordance to Mechanical Code (minimum 10 feet), and per the Library Director (during one of our walk-throughs) there are times when both the boiler and the make-up air unit operates that products of combustion are introduced to the building via this unit, and therefore this unit has been disabled during the heating season. The simplest fix to this issue appears to be to duct the outside air intake away from the boiler flue; there is room on the flat roof for this ductwork.

Roof mounted exhaust fans provide exhaust ventilation for the restrooms.

TEMPERATURE CONTROLS

The temperature controls generally consist of non-programmable thermostats controlling the fan coil units. These thermostats are the type that have dip switch selected setback temperatures, where the setback period is determined by a central occupied/unoccupied programmable time clock, and therefore should provide for a good measure of energy savings. Because a central time clock controls the occupied/unoccupied cycles, these thermostats cannot be programmed for separate use of the spaces.

Per the Library Director (during one of our walk-thrus) about a third (12 of 36) of the control valves are not working properly.

RECOMMENDATIONS

The outside air intake of the roof mounted make-up air ventilation system should be ducted away from the boiler flue, such that the make-up air system can operate throughout the year, as likely was the design intent.

Check/repair/replace the control valves through-out the facility.

Electrical

EXISTING SYSTEMS

The building is served by a single electrical service rated 800amperes, 208Y/120 volts, 3-phase, 4-wire and is located in the main electric room. The service equipment consists of utility metering equipment an 800amp main circuit breaker and distribution panelboard located in the main electrical room. The predominance of the main distribution equipment, service equipment is newer (1999) and in very good condition.

There are a number of electrical panels located throughout the Library. The predominance of these panelboards are G.E. panels that were installed during the 1999 addition and renovation. The condition of these panelboards is very good with the majority of the panelboards having spare circuit breakers available for new circuits to be added.

The lighting throughout the library consists of pendent indirect fluorescent luminaires, recessed compact fluorescent downlights, decorative pendent luminaires, recessed 2x4 and 2x2 troffers. The lighting throughout the library was installed during the 1999 addition and renovation and is in very good condition. The lighting control for the library is through a lighting control relay panel located in a storage room in the basement with

low voltage switches throughout the library. The controls were installed during the 1999 addition and renovation. The light levels appear to be within the recommended levels.

The fire alarm system is a Simplex 4020 addressable system. There are manual fire alarm pull stations, horn/strobes located through the building. Heat and smoke detectors are present in select areas of the library. Sprinkler flow and tamper switches are present as well as monitoring of mechanical equipment. The equipment was installed during the 1999 addition and renovation.

Exterior lighting is accomplished via building mounted wall packs. The lighting was recently upgraded and appear is in very good condition.

Life safety emergency lighting is provided by emergency battery packs with remote heads throughout the library. The equipment was installed during the 1999 addition and renovation and in very good condition.

Exit signage is installed throughout the library. The exit sign are AC type with emergency batteries.

There is currently a security system including magnetic contacts at all doors and motion sensor detection devices throughout the library. This system was noted during the walk through as operating without problem.

Plumbing

The water closets are the low flow flush valve vitreous china type, and they appear to be in good condition.

The lavatories are the wall mount vitreous china type with metering faucets, and they appear to be in good condition.

There are two open pit sump pumps in the basement, for de-watering the basement. The pumps appear to be in good condition.

The sewage is pumped out of the building by a sewage pump set in the basement. The pumps are located in a basin that is recessed into the floor of the basement. The cover of the basin was not removed during the site visit, therefore the condition of the pumps was not reviewed.

The storm/rain water is pumped out of the building by a sewage pump set in the basement. The pumps are located in a basin that is recessed into the floor of the basement. The cover of the basin was not removed during the site visit, therefore the condition of the pumps was not reviewed.

Fire Protection

The building has a sprinkler system throughout. The fire entrance in the mechanical room appears to be in good condition.

Steward School

261 Perkins Row

Years Constructed: 1963 (+/-) .
Last addition 1999

Construction Type: II B

Building Areas per Floor:

First Floor:	57,642 SF
Total Area:	57,642 SF

Documents Used in Study:
- Floor Plans (undated)
- Egress Plans
- Assessor's Map and Aerial Photograph

Architectural Assessment:

General:

The building is generally handicapped accessible except for:

3 With the exception of the 300 classroom wing classroom restrooms are not accessible and are too small. Construct an accessible unisex restroom in the preschool classrooms. (30)

3 Dual electric water coolers need side protection in all but the 300 wing. (26)

3 Classroom sinks/bubblers are not handicapped accessible throughout the school. Modify/replace cabinetry and sinks to meet the correct heights, depth and knee space requirements. (25)

3 Stage is 24 inches high and is not accessible. Provide lift. (35)

3 Main Office desk does not have an accessible section. Add fold-up counter. (35)

3 Older playground is not handicapped accessible. Re-grade around perimeter wood curbing for wheelchair access. (41)

Roofs:

3 Zig-zag EPDM cafeteria roof has ponded water in flat valleys. Add crickets to prevent ponding. Water drips from ends of valleys. Scuppers should be added at each end to prevent moisture damage to fascia. Above the metal roof at the front of the cafeterial metal roof is rusting due to water run-off. Add rainleader and downspout and repaint area of metal roof. (64)

3 Roof over rear wing (above classrooms 211 to 215) does not have uniform slope resulting in ponded water. Some fasteners (in Tectum deck) are not properly seated. Loose fasteners should be replaced with fasteners into sound deck. Resolution of ponding water will be challenging due to the shape of the roof. Our recommendation is to wait until roof replacement is required and design the roof with tapered insulation for a positive slope to drains but, prior to that shape insulation at drains to prevent any dams. (89)

3 Roof over classrooms 201 to 210 includes a double layer of EPDM. There is some ponding of water. Seams are bubbled. Roof membrane appears to be acceptable but the bubbles in the seams may grow and potentially cause leaks. It is recommended that these seams be cut out, membrane installed and new seams formed. (66)

☐ There were very few markings on the roof as most of the membrane appears to be Firestone. Where Carlisle membrane was used the membrane markings indicated a manufacturing date of August 1986 making the membrane 27 years old. Unfortunately, these markings were not consistent throughout the roof and may only reflect a small portion of the roof. The last addition to the building was constructed in 1998 and some reroofing was done at that time. If well maintained a 60

mil EPDM should last thirty years before membrane performance is noticeably diminished.

3 For other roof areas there is some minor ponding that can be addressed with adding crickets. At equipment curbs sealant needs to be applied around edges of top sheet. (67)

1 Roof hatches require guardrail protection on all sides. (62)

Exteriors:

2 Paint on cafeteria wood soffits and fascia is badly peeling. Repair any damaged wood, scrape, sand and repaint. (74)

2 Clerestory windows to Cafeteria are single glazed and wood frames are peeling. Replace windows with new frames with insulated low-e glazing. (57)

2 Cupola needs to be scraped, sanded and repainted. (65)

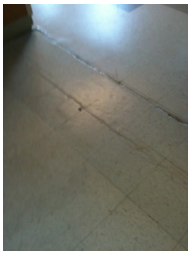
4 Exterior hollow metal frames in corridor opposite gymnasium are single glazed. Replace frames with insulted glass in thermally broken frames. (60)

Interior Finishes:

2 Gymnasium plywood wall panels need to be covered with wall padding. (97)

3 Media Center Carpeting needs to be replaced. (98)

3 Floor tile at building expansion joints needs to be replaced with an expansion joint cover. (99)



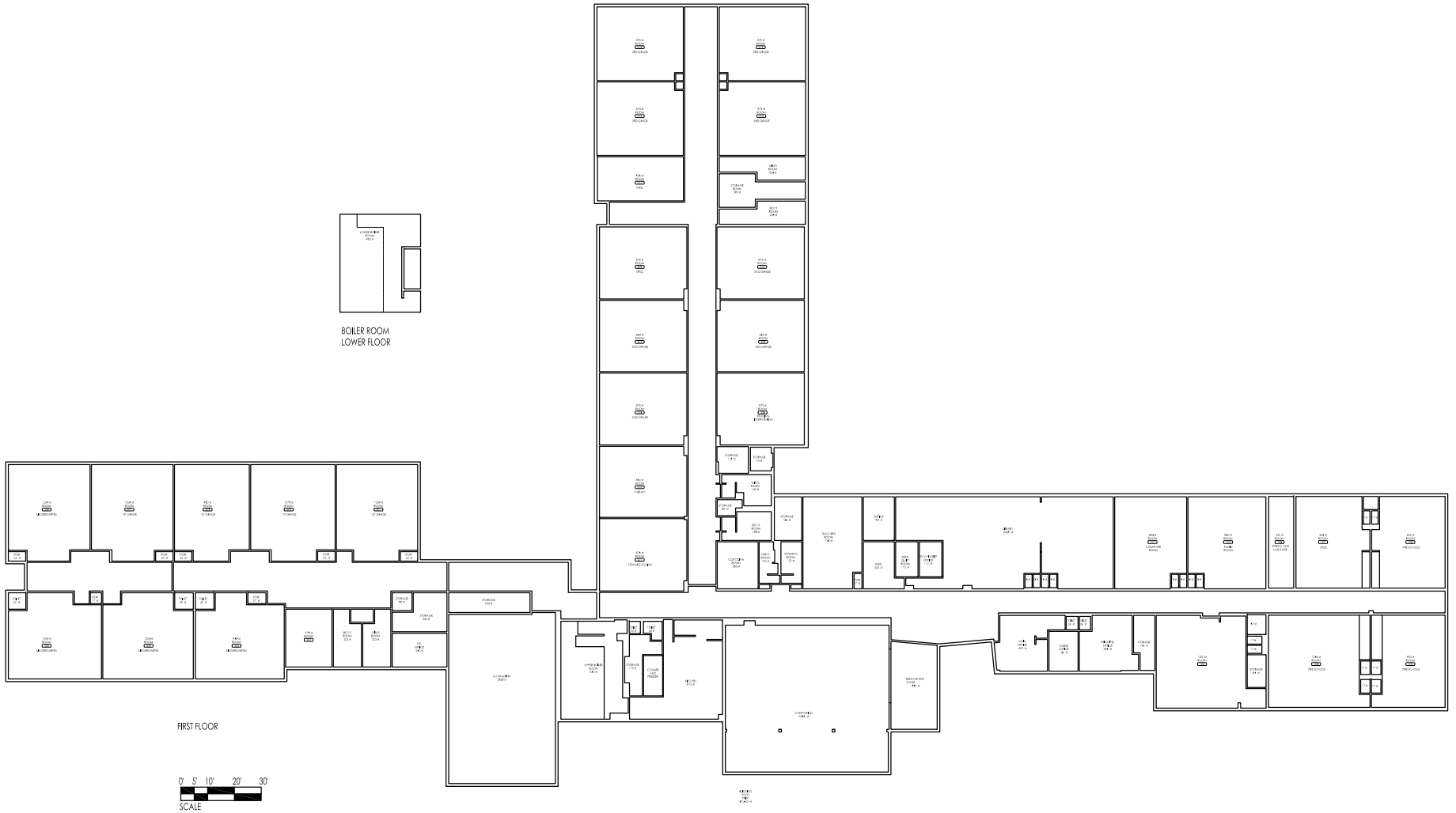
Mechanical & Electrical (See Mechanical, Electrical, Plumbing, And Fire Protection Systems Report).

4 Replace the existing pneumatic control system with a direct digital control system. There are two variations of this replacement that would generally provide similar functionality - a complete replacement of all the pneumatic controls - including control damper and control valve operators, and a replacement of all of the pneumatic controls except for the control damper and control valve actuators, where the first cost of the latter is less that of the former. Both of these options would provide the building operator with numerous tools for increasing the functionality and programming of the building, for reducing energy consumption, for monitoring and trending, both of which are very useful for troubleshooting problems and optimizing the system, and for alarms (such as frozen coil and pump failure alarms) that the existing control system does not have. (105)

3 Repair/replace the split air conditioning system serving the computer room that is not operating properly. (124)

3 Provide new HVAC systems to serve the space where the added partition has separated a formerly exterior space into an interior space and an exterior space. (121)

3 Replace existing zoned fire alarm system with new addressable fire alarm system to meet the latest codes. (8)

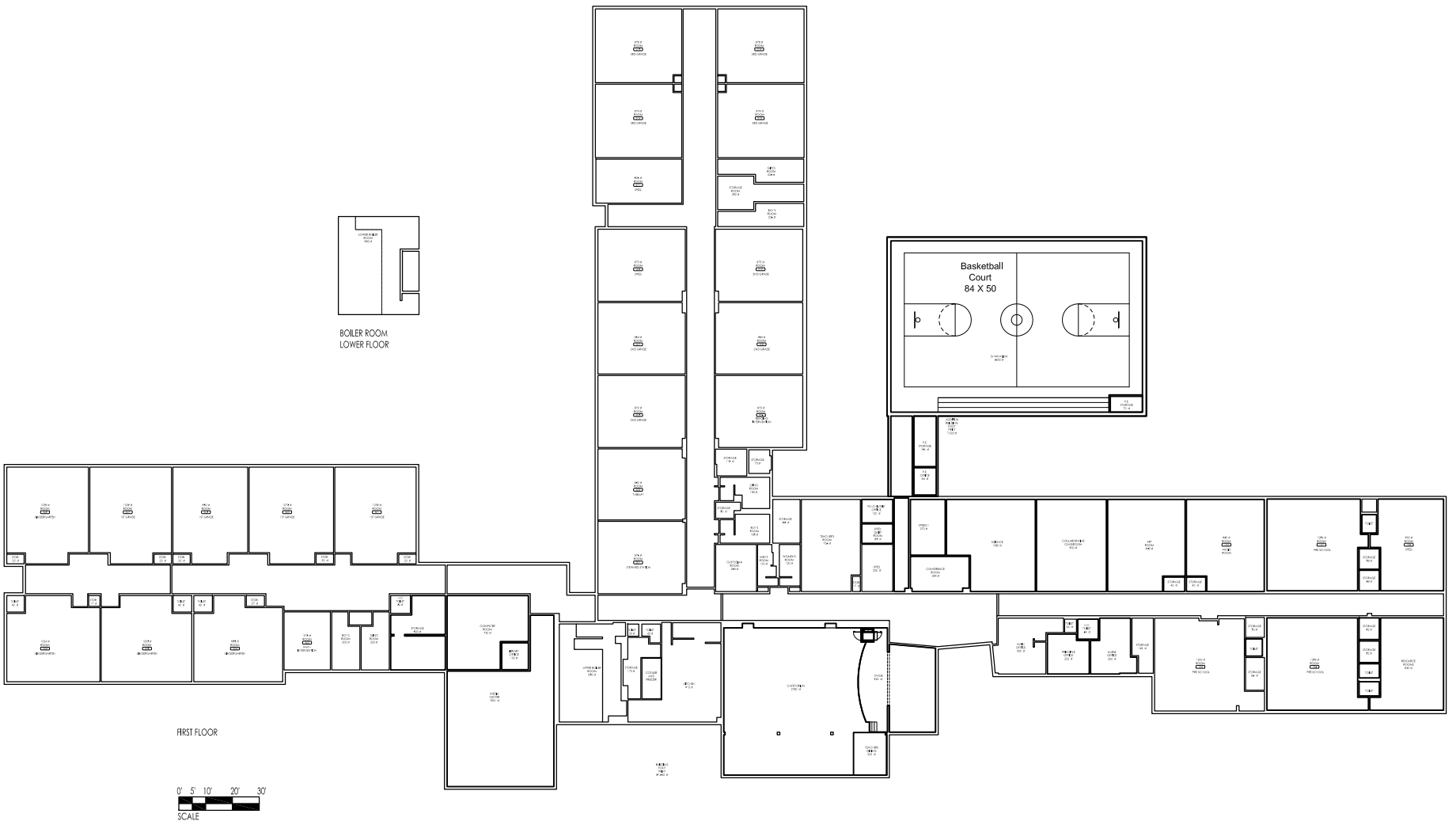


D·R·A Drummey Rosane Anderson Inc.

STEWARD SCHOOL

EXISTING

Topsfield, Massachusetts



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STEWARD SCHOOL PROPOSED RENOVATIONS Topsfield, Massachusetts

TOWN BUILDING ASSESSMENT STUDY AND CAPITAL MASTER PLAN, TOPSFIELD, MA

STEWARD SCHOOL

Program Statement

Classrooms:	Number	Size Each	MSBA Recommends	Existing Areas	Student Capacity	Renovated Areas	Student Capacity	Renovation & Addition	Student Capacity
Pre School	1	1288	1100-1300 SF	1,288	15	1,288	15	1,254	15
Pre School	2	900	1100-1300 SF	1,800	30	1,800	30	2,454	30
Kindergarten	3	1070	1100-1300 SF	3,210	54	3,210	54	3,210	54
Kindergarten	1	1060	1100-1300 SF	1,060	18	1,060	18	1,060	18
General Classrooms				0		0			
Grades 1-3	12	923	900-1000 SF	11,080	264	11,080	264	11,080	264
Science	0	1100		0		0		1,080	
TOTALS:	**19**			**18,438**		**18,438**		**20,138**	**381**
Specialized Spaces:	**Number**	**Size Each**		**Existing Areas**	**Student Capacity**	**Renovated Areas**	**Student Capacity**	**Renovation & Addition**	**Student Capacity**
Art	1	1200		1,200		1,200		960	
Art Storage	1	86		86		86		40	
Computer Lab	1	916		916		916		730	
Music	1	960		960		960		960	
Music Storage	2	15		30		30		40	
Reading	1	872		872		872		872	
Cafeteria	1	3356		3,356	672	3,156	630	2,780	555
Cafeteria Platform	1	550		550		550		943	
Kitchen and Serving	1	1253		1,253		1,253		1,253	
Gym	1	2525		2,525		2,525		6,000	
Gym Office and Storage	1	260		260		260		308	
Media Center	1	2435		2,435		2,435		1,900	
Media Center Support Rooms	1	190		190		190		100	
Special Education Classroom	1	526		526		526		526	
Special Education Classroom	1	900		900		900		900	
Special Education Classroom	1	873		873		873		873	
Collaborative Classroom	0	900		0		0		900	
SPED Office	1	220		220		220		220	
Resource Rooms	2	450		900		900		840	
Psychologist / Social Worker Office	1	110		110		110		100	
Speech	1	320		320		320		270	
Testing / Meditation Room	1	110		110		110		85	
OT/PT	1	860		860		860		860	
Health Suite	1	162		162		300		300	
Nurse Toilet	1	24		24		58		58	
Steward Station (before/after school)	1	876		876		876		876	
Main Office	1	420		420		420		420	
Principal's Office	1	400		400		246		246	
Conference	0	300		0		0		284	
Teachers' Planning	1	736		736		736		736	
Teachers' Dining	0	200		0		200		200	
General Storage	6	varies		966		966		1,002	
Custodial Office & Storage	4	varies		658		658		658	
Subtotal of net spaces:	**40**			**42,132**	**73%**	**42,150**	**73%**	**47,378**	**73%**
Mech., toil., circul., structure				15,510	27%	15,492	27%	17,286	27%
TOTAL Gross Square Feet:				**57,642**		**57,642**		**64,664**	**100%**

Steward School Educational Space Needs

The Steward School houses grades Pre-Kindergarten (PK) through 3, with a current enrollment of approximately 350 students. Enrollment projections show a continuing drop in enrollments.

Existing classroom sizes in square feet (s.f.) are listed below:

PK:	900 s.f.	900 s.f.	1200 s.f.	
K:	955 s.f.	1000 s.f.	1000 s.f.	1000 s.f.
Grade 1:		1000 s.f.	1000 s.f.	1000 s.f.
Grade 2:		870 s.f.	870 s.f.	870 s.f.
Grade 3:		870 s.f.	870 s.f.	870 s.f.

Two of the PK classrooms are only 900 s.f. in size, which is small for PK rooms. The larger one at 1200 s.f. is a better size for PK. However, the toilet rooms in all the PK rooms are too small for handicapped access.

Three of the Kindergarten rooms also have toilets in them, but the fourth one does not. Students in that K room have to cross the hallway to use the toilet in another classroom. Every classroom in the school has a sink in it.

In addition to the classrooms, Steward School has 8 classroom-sized rooms that contain Art, Music, Computer Lab, Reading, Special Ed rooms, and Steward Station (before and after school program). In determining the capacity of the school, these spaces are not counted as contributing seats to the total. However, when schools are pressed for space, as during times of rising enrollments, some of these rooms could be used as regular classrooms, allowing the school to exceed its current capacity. The ability to re-assign up to 8 rooms is a measure of the flexibility of the building to adjust to enrollment variations.

School Capacity

The number of classrooms in the Steward School determines its capacity. Normally, the number of students per classroom (which may vary by grade) times the number of regular classrooms available for each grade equals the school capacity. Before doing the calculation, however, the Kindergarten classroom usage pattern needs to be described.

Kindergarten in Topsfield is full-day, but a mixture of full-week and part-week students. The full-week K option is supported by tuition fees. Currently two of

the four K classrooms house full-week classes, and the other two rooms are in session only on Tuesdays, Wednesdays, and Fridays. The current enrollment is 15 students per classroom, with a maximum of 18 students one day a week when every student comes. Therefore, we will count the K classrooms as being able to seat a maximum of 18 students each. The administration said, however, that if full-time Kindergarten was made available without tuition, the school would add one more Kindergarten room to satisfy the need.

The theoretical capacity of the school, based on classrooms, is tabulated below:

PK:	3 classrooms X 15 students =	45 total
K:	4 classrooms X 18 students =	72 total
Gr 1:	4 classrooms X 20 students =	80 total
Gr 2:	4 classrooms X 22 students =	88 total
Gr 3:	4 classrooms X 24 students =	96 total
	TOTAL	381 seats

Next, we will look at the core or shared spaces of the school to determine how well they support the classroom capacity, starting with the largest spaces.

Cafeteria and Stage

The cafeteria is 3356 square feet in size, including a lower-ceiling extension on one side. This is enough space for up to 220 seats, more than sufficient for the current enrollment of 350, which eats lunch in four seatings. The extra space is currently used as small group workspace.

The cafeteria can also serve as a performance space, having a raised platform of 550 square feet at one end. However, when a whole grade is performing there would be about 80 students on the platform at the same time, making it too small. The cafeteria as seating space can accommodate up to 280 seats in the high-ceiling portion of the floor, about 80% of the school enrollment. If one class (about 80 students) were on the platform, the rest of the school could be seated in the audience.

Gymnasium

The existing Gym is 2525 square feet in size, large enough for one section of Physical Education at a time. Each grade K-3 has 4 classrooms, and PK has 3 classrooms, so a total of 19 sections of P. E. are needed to offer one section to every student every week, about 4 each day of the week. The gym is sufficient for the educational needs of the school, but the walls need padding for better safety.

However, school gyms are also part of the town's resources, and they host after-school functions such as basketball and volleyball. This gym is recognized as

being too small to offer an adult sized basketball court, and there is no space for seating parents during a youth basketball event. This limits the usefulness of the gym to the community in general. For comparison, the Massachusetts School Building Authority (MSBA) space summary template lists 6000 sq.ft. as the minimum size of an elementary school gym, more than twice the size of the existing gym.

The P.E. office also contains P.E. storage and the sprinkler entrance pipes and valves. This is a crowded space because of the multiple functions.

Media Center and Computer Lab

A modern school has a media center rather than a library, because it offers much more than books. Whole classes come to use the media center at a time, with small groups of students doing research around computers, or moving back and forth between tables and shelves. The computer lab at Steward School is not connected to the media center directly, although they share a common wall. A new door and windows between these two spaces would enhance the functionality of the media center, and allow supervision in both directions.

Special Ed (SPED) Spaces

The school offers a good variety of SPED spaces, dispersed around the plan. However, the school does not offer a Collaborative classroom. The administration said they would like to be able to add that function to this school in the future, if the enrollments continue to drop, making space available. Since a Collaborative classroom is meant to house SPED students requiring more intensive support, a handicapped accessible toilet room would have to be included in such a room.

A reflection room should be created, a quiet room for a student to regain his or her composure. The room needs a minimum of furniture, no sharp corners, and windows for supervision purposes.

Main Office, Principal, and Nurse

The Main Office is located at the main entrance to the school, in a good location to control the entrance. Adjacent to the main office is the nurse's office, at 162 s.f. it is seriously undersized. On the other side of the nurse is the principal's office (395 s.f.), but not connected to the main office, except by walking through the nurse's office. The principal would like to improve the adjacencies and allow a larger nurse's office by exchanging her office with the nurse, but the toilet connected to her office is only 24 s.f. in size, too small for a handicapped toilet.

Pre-School Playground

The main playground has a nice play structure, newly built, but the pre-school playground is showing its age and is not handicapped accessible.

Steward School Program Statement

Chart

The areas of the existing and suggested spaces are listed in the program chart.

Steward Elementary School

Structural

Structural Description:

The Steward Elementary School is a one-story (plus partial Basement) building that is T-shaped in plan. The roof of the building is typically flat (pitched to internal drains), except a "sawtooth" roof was constructed over the Cafetorium. The original building was L-shaped in plan, composed of a Gymnasium, a Cafetorium, a Library, Administrative offices and classrooms to south and east. A one-story classroom wing was subsequently added to the north of the Gymnasium; smaller, one-story classroom additions were constructed at the ends of the original south and east wings at that time as well. The site is relatively level. Roof construction of the original building and the additions is typically steel framed, with a cementitious fiber (e.g. Tectum) deck. Foundations are assumed to be conventional spread footings with a concrete slab on grade First Floor. Original construction documents were not available. The date of construction (original building and the additions) is unknown.

Bearing lines for the (north, south and east) classroom sections are arranged in a double loaded corridor fashion, with closely spaced (7+/- feet) steel tube columns along each side of the corridor. Stack bond concrete masonry (CMU) walls infill the space between columns and provide a degree of lateral stability for the wings. The Gymnasium and Cafetorium spaces are clear spanned with steel framing. The perimeter walls of these spaces are concrete masonry (CMU) construction.

Structural Conditions:

Structural conditions at the Steward Elementary School were observed during a brief tour of the facility on January 3, 2013. Generally speaking, floor and roof construction appears to be performing satisfactorily; there is no evidence of structural distress that would indicate significantly overstressed, deteriorated or failed structural members. Foundations appear to be performing adequately; there are no signs of significant, total or differential settlements.

Structural/structurally related conditions observed during site visit are noted below:

- The condition of the exterior brick veneer was not reviewed in detail; however, it generally appears to be in satisfactory condition.

- Wood trim generally appears to be in satisfactory condition (sanding/painting required).

- Reportedly, there were roof leaks in the sawtooth Cafetorium roof. These leaks have been addressed and it does not appear that the structural steel or the cementitious fiber roof decking has been compromised.

- Flooring at the juncture of the original building and the subsequent (north, south and east) classroom additions is distressed. These conditions are likely due to improper surface preparation at the top of the original foundation walls at the corridor joint (not a structural concern).

Additional Comments:

Massachusetts State Building Code Requirements – General Comments:

Proposed renovations, alterations, repairs and additions to the Steward Elementary School would be governed by the provisions of the Massachusetts State Building Code (MSBC – 780 CMR 8th Edition) and the Massachusetts Existing Building Code (MEBC). These documents are based on amended versions of the 2009 International Building Code (IBC) and the 2009 International Existing Building Code (IEBC), respectively.

The MEBC allows the Design Team to choose one of three (3) compliance methods. Structurally, the Prescriptive Compliance Method is preferred. Regardless of the compliance method chosen, the MEBC may require that the unreinforced masonry walls of the building (perimeter walls and interior masonry partitions) be evaluated with respect to the provisions of Appendix A1 of the IEBC. This provision would be applicable to the Steward School, only in the event of a significant renovation (not currently proposed). Section 101.5.4.0 of the Massachusetts Amendments (Chapter 34) would require that the existing building be investigated in sufficient detail to ascertain the effects of any proposed work on the area under consideration and, the entire building or structure and its foundations if impacted by the proposed work.

Additions – General Comments:

The design and construction of proposed additions would be conducted in accordance with the Code for new construction. Significant additions should be structurally separated from the existing building by an expansion (seismic) joint to avoid an increase in gravity loads and/or lateral loads to existing structural elements. Smaller additions can be structurally attached to the existing building, provided they do not increase the demand - capacity ratio of the existing lateral force resisting elements in the building by more than 10%.

Renovations/Alterations – General Comments:

Where proposed alterations to existing structural elements carrying gravity loads results in a stress increase of over 5%, the affected element would need to be reinforced or replaced to comply with the Code for new construction. Proposed alterations to existing structural elements carrying lateral load (e.g. perimeter and corridor masonry walls in this building) which result in an increase in the demand - capacity ratio of over 10% should be avoided, if possible. Essentially, this means that removal of, or major alterations to the existing, unreinforced masonry walls in the building should be minimized. If this is not avoidable, more significant seismic upgrades/reinforcing will be required, potentially including the addition of lateral force resisting elements (braces, shear walls, etc.).

New Gymnasium:

The existing Gymnasium is undersized and the construction of a new Gymnasium is currently under consideration. The new Gymnasium would likely be constructed in the open area to the southeast of the building and would be structurally separated from the existing school building. Roof construction would be steel framed, with clear spanning longspan steel joists or (alternately) steel beams supported by clear spanning steel trusses. Cellular acoustic steel roof deck would span between the joists or beams. Tubular steel columns would be uniformly spaced around the perimeter of the building (25+/- feet on centers) and lateral stability (wind and seismic loads) would be provided by steel bracing in each direction. Foundations would be conventional spread footings. The floor of the Gymnasium would be a 5" thick concrete slab on grade, reinforced with welded wire fabric and underlain by a heavy duty vapor barrier and 6" of compacted gravel. Exterior walls would be brick veneer with a concrete masonry (CMU) or steel stud backup.

Cafetorium Stage Extension:

The width of the existing stage in the Cafetorium is inadequate. The expansion of the stage is currently under consideration. The existing stage and proscenium would remain as it currently exists; however, the stage would be extended outwards. The extension would be constructed wider, continuing beyond each side of the proscenium, to extent possible. New stage construction would either be wood or cold-formed steel framed, depending on fire related considerations. The new stage extension would be supported on the existing concrete slab on grade and be anchored to the existing construction; no new foundation work would be required.

End of Structural Report

TOWN BUILDING ASSESSMENT STUDY AND CAPITAL MASTER PLAN
Town of Topsfield, Massachusetts

Steward Elementary School

261 Perkins Row

Mechanical, Electrical, Plumbing, And Fire Protection Systems

Prepared By:
Consulting Engineering Services
510 Chapman Street, Suite 201
Canton, MA 02021

January 14, 2012

General

The mechanical, electrical, plumbing, and fire protection systems were reviewed in conformance with the requirements of the following State and National codes and regulations, as applicable:

- Massachusetts State Building Code 8th Edition
- Massachusetts State Fire Prevention Regulations
- NFPA Latest Editions
- Massachusetts Plumbing Code
- Massachusetts Mechanical Code
- Massachusetts Electrical code (NEC 2011 Edition)
- Illuminating Engineering Society of North America (IESNA) Lighting Handbook
- ASHRAE 90.1 Latest Edition

The scope of this study does not include operational assessment of the fixtures and equipment reviewed; it includes only a brief visual review of the fixtures and equipment. Therefore notes regarding the condition of the fixtures and equipment may or may not be indicative of the actual condition of the systems and equipment and/or the expected life of the fixtures and equipment. Therefore it is recommended that services of a qualified technician be retained to evaluate the actual condition of fixtures and equipment prior to replacement.

Mechanical

HEATING PLANT

The heating plant generally consists of two non-condensing natural gas fired boilers and a pumps to circulate the heating water throughout the building. The boilers appear to be in fair to good condition.

One set of three lead/lead/lag primary pumps circulates the hot water within the mechanical room. The pumps appear to be in fair condition.

Two sets of secondary pumps circulate heating hot water throughout the building. Each set consists of a lead and lag pump. The pumps appear to be in fair condition. The hot water delivered to the building is reset via two pairs of modulating control valves, presumably in reverse proportion to the outside air temperature, to provide hot water during the colder season and warm water during the milder seasons, thereby decreasing heat loss via the piping system while also increasing controllability and comfort.

HEATING AND VENTILATION

Heating and ventilating for all of the spaces other than the kitchen and the gymnasium is provided via unit ventilators at the perimeter of the spaces. Through the wall louvers are provided for make-up air. There are no provisions for relief air from the classrooms.

Heating and ventilating for the gymnasium and the kitchen is provided by single zone constant volume air handling units within the building. The air handling units generally consist of supply fans, hot water coils, and filter sections, and they appear to be in fair to good condition. Both outside air and relief air are provided by either roof hoods or louvers.

EXHAUST VENTILATION

Exhaust ventilation for the restrooms is provided by rood mounted exhaust fans.

AIR CONDITIONING

The unit ventilators serving the office spaces are provided with direct expansion (DX) cooling coils connected via refrigerant piping to small tonnage condensing units mounted on the roof.

Air conditioning is also provided at the library and the computer room via ductless split air conditioning systems, via either floor mounted console type or flush mounted ceiling type indoor air handling units.

Per the building operator (during our site visit) the equipment is serviced regularly, and all of it operates satisfactorily except for one of the two systems serving the computer room.

TEMPERATURE CONTROLS

The temperature control system is a pneumatic system. The building operator is able to program the occupied and unoccupied cycles of the building (as a whole - not individual spaces) via a digital interface that has been provided, but that is essentially the extent of the abilities of that interface. As such there is little in the way of programming that the building operator can do to reduce energy consumption, and the interface does not offer anything in the way of monitoring, trending, alarms, etc.

The temperature control zoning is generally acceptable, except for one location in a staff work area where a partition was added which split a perimeter space into an interior and an exterior space. As such the unit ventilator is now heating and ventilating the perimeter space, but not heating and ventilating the interior space.

RECOMMENDATIONS

Replace the existing pneumatic control system with a direct digital control system. There are two variations of this replacement that would generally provide similar functionality - a complete replacement of all the pneumatic controls - including control damper and control valve operators, and a replacement of all of the pneumatic controls except for the control damper and control valve actuators, where the first cost of the latter is less that of the former. Both of these options would provide the building operator with numerous tools for increasing the functionality and programming of the building, for reducing energy consumption, for monitoring and trending, both of which are very useful for troubleshooting problems and optimizing the system, and for alarms (such as frozen coil and pump failure alarms) that the existing control system does not have.

Repair/replace the split air conditioning system serving the computer room that is not operating properly.

Provide new HVAC systems to serve the space where the added partition has separated a formerly exterior space into an interior space and an exterior space.

Electrical

EXISTING SYSTEMS

The building is served by a single electrical service rated 400amperes, 208Y/120 volts, 3-phase, 4-wire and is located in the main electric room. The service equipment consists of utility metering equipment an 400amp main circuit breaker and distribution

panelboard located in the main electrical room. The predominance of the main distribution equipment is newer and in good condition.

There are a number of electrical panels located throughout the School. The predominance of these panelboards are G.E. panels. The panelboards are in good condition with the some of the panelboards having spare circuit breakers available for new circuits to be added. The mechanical equipment in the mechanical room is feed from a motor control center located in the mechanical room. The equipment is newer and in very good condition.

The lighting throughout the school consists of recessed 2x4 and 2x2 lensed troffers. The lighting throughout the school was recently upgraded and is in very good condition. The lighting in classrooms and other spaces are controlled by occupancy sensor and light switches. The gymnasium lighting is 2x4 fluorescent high-bay fixtures with integral occupancy sensors. The library lighting is direct/indirect pendent fluorescent luminaries and controlled by occupancy sensor and local switches. The Mechanical room lighting is a combination of fluorescent industrial fixtures and HID low-bay fixtures controlled by a light switch. The light levels appear to be within the recommended levels.

The fire alarm system is a Simplex 4002 zoned system with graphic annunciator located on building exterior next to the main entry. There are manual fire alarm pull stations, horn/strobes located through the building. Heat and smoke detectors are present in select areas of the library. Sprinkler flow and tamper switches are present as well as monitoring of mechanical equipment. The fire alarm devices are in good condition.

Exterior lighting is accomplished via building mounted wall packs, HID flood lights and a number of pole mounted LED cut-off type luminaries. The lighting was recently upgraded and appear is in very good condition.

There is currently a diesel fired 150kw Caterpillar emergency standby generator. This unit appears to be in very good condition and recently had routine maintenance performed and was noted by school personal was functioning without any issues. The generator is sized to provide power to the whole school.

Life safety emergency lighting is provided by fixtures throughout the school being feed from the emergency standby generator.

Exit signage is installed throughout the school. The exit sign are being powered from the emergency standby generator.

The existing Clock/ Paging system is a Simplex 6400 that’s rack mounted with paging/speaker system. The systems appear to be in good condition and functioning without any problems.

There is currently a security system including magnetic contacts at all doors and motion sensor detection devices throughout the library. This system was noted during the walk through as operating without problem.

RECOMMENDATIONS

Replace existing zoned fire alarm system with new addressable fire alarm system to meet the latest codes.

Plumbing

The hot water plant consists of a natural gas fired tank type water heater in the boiler room which appears to be in fair condition. However, though it appears to be in fair condition, it probably should be scheduled to be replaced within at most the next ten years, ideally the next five years, as potable water heaters tend to have relatively short life spans. The replacement water heater may not need to be of the same capacity as the existing; the existing water heater appears to be oversized.

The water heater is provided with mixing valves which temper the hot water before supplying it to the building.

All of the plumbing fixtures except for several in the computer lab, the art classroom, and the library have been upgraded to low flow fixtures, and they are in good condition.

The water closets in the computer lab, the art classroom, and the library are in fair to poor condition, and should be scheduled to be replaced with low flow fixtures in the near future.

A sewage pump set was provided with the 1999 addition, to serve the 1999 addition. The condition of the pumps was not reviewed.

Fire Protection

The building is fully sprinklered, and the sprinkler entrance equipment appears to be in good condition.

Proctor School

60 Main Street

Years Constructed: 1932
Last renovated late 1990's

Construction Type: III B Sprinklered

Building Areas per Floor:

Third Floor:	6,141 SF
Second Floor:	6,441 SF
First Floor:	40,973 SF
Basement:	2,037 SF
Total Area:	55,592 SF

Documents Used in Study:

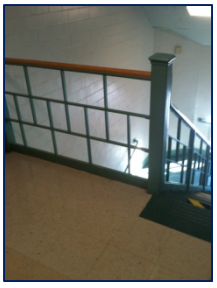
Floor Plans dated: 1932, 1998
Egress Plans
Assessor's Map and Aerial Photograph

General:

The building is handicapped accessible except as noted below:

3 Curb cut for wheelchair access at main entrance is uneven and needs to be replaced. (52)

3 Exterior ramp at Cafeteria requires a toe kick on both sides.(37)



3 Classroom, teachers and library sinks are not accessible (total of 22). Modify/replace cabinetry and sinks to meet the correct heights, depth and knee space requirements. (25)

3 Stairs at each end of the original building do not have handrail extensions and handrail cross section is too large and does not provide continuity around newel posts. Add separate handrail on brackets for full height of stairs and on both sides with

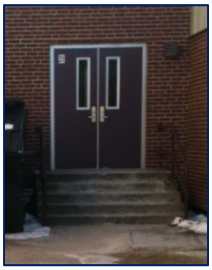
extensions at top and bottom. (see also "Miscellaneous" below). (part of 21)

3 Electric water coolers in original building are higher than 27" and project more than 4". They require side protection that can be formed with metal side panels or by metal stud and GWB low wall each side. The unit is only 26" above the floor and needs to be raised to 27". (26)

3 Stoops from classrooms (4 locations) do not have accessible railings and there is a step at the door. Top landing needs to be raised to be flush with floor and steps re-worked from 2 to 3 risers. New compliant railings with extensions to be provided. (Part of 36)

4 Exterior stoop from gymnasium is flush with the floor but does not provide sufficient clearance on the side of the door. The one handrail does not have the correct extension. Widen stoop and replace handrail with two railings with extensions. (Part of 36)

2 In the third floor music room (304) a guardrail or other barrier is required to separate the low ceiling area from the rest of the room. Provide a guard rail where ceiling height is lower than 6'-8" above the floor. (24)



3 Exit doors to east of cafeteria are too narrow. replace doors with a 3' wide door and a narrower leaf to fit the opening. (28)

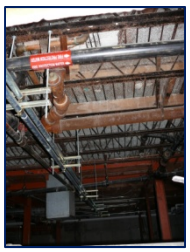
3 Handrails on steps from exit doors east of cafeteria do not have extensions and do not meet the requirements for guardrails. Provide guardrails with handrails with extensions to replace existing handrails. (Part of 21)

3 In 4th grade classrooms toilet rooms are not accessible. Reconstruct one toilet room in each classroom to correct dimensions and to meet accessibility standards for fixtures and accessories. (30)

3 No lift is provide to stage in gymnasium. Add a LULA lift for access to the stage. (35)

3 Serving line in kitchen has a clear width to the columns of only 27". Minimum clear width needs to be 36" at the narrowest point. (40)

Basement:



Basement crawl space is ventilated with a limited number of brick vents and despite the minimal amount of ventilation and the dirt floor there was no evidence of moisture damage.

3 The first floor slab over the crawl space should be insulated at both the wood floor and the concrete floor. A non-combustible sprayed insulation should be used. (103)

Miscellaneous

2 Stairs at each end of the original building have guardrails that are too low and the style of the railings allows for climbing and the openings in the railing will allow the passage of a 4" diameter ball through them. Although grandfathered, this is a dangerous situation for a school facility and should be replaced with a code compliant 42" high guardrail. (Part of 21)

3 Gymnasium windows on all sides are single glazed in original frames. Replace windows and frames a Kalwall type insulated, translucent system. (58)

3 Cafeteria windows are single glazed in original frames. Replace windows with low-E glass in thermally broken frames. (57)

3 Double hung windows in original building were installed 1992 to 1993 and have a number of problems. A number of windows cannot close. This item has been addressed on the front of the building by screwing the upper sash into the frame effectively creating a single hung window. Defects are particularly bad on the west exposure where muntins are separating from the sash frames and the sash are not straight. Manufacturer's non-glass warrantee expired after ten years. Replacement sash was sought from the manufacturer but the cost was excessive as the window type is no longer manufactured. The life cycle for a window should far exceed 20 years, although glass seals could fail sooner. It is recommended that these windows be replaced but the type of window will need to be reviewed with the Historic Commission. (59)

1 Ladder to third floor roof is narrow and located in a narrow shaft. This does not appear to comply with OSHA (other than this item the building has not been reviewed for OSHA compliance). There is no grandfathering for this requirement. Provide a wider shaft (30"

clear) with the ladder centered. The roof hatch should also be provided with a guard rail. (9)

1 Roof hatch to first floor roof requires guardrail protection around opening. (7)

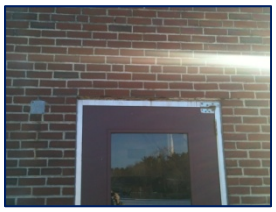
3 Flashing at window sill of east windows in library has been damaged by lawn mowing equipment. Flashing should be repaired and an aluminum extrusion applied over flashing as a rub strip for lawn mowers. (69)

3 Panel 15 installation on exterior of 4th grade wing is separating from corners and at base of piers. This is not a durable system (aluminum on 1/8" plywood) and we recommend that it be replaced with painted cement siding and trim. (70)

Exterior

4 Concrete paving used for parking of town vehicles, on the south side of the building, requires driving over the granite curb. The concrete paving at the curb has become chipped. If this area is to continue to be used for parking the curb should be lowered to be flush with the driveway and the concrete paving replaced with a ramped section. (49)

2 At the same location is a oil fill pipe that projects above the grade. This is a tripping hazard and should be marked with a higher rod or pipe. (50)



3 Delivery stoop from kitchen is high without side protection. There is insufficient clearance from door jamb to edge of stoop. Increase width of stoop at door by constructing new concrete steps with a top landing with a clear space of 24"x48"minimum at door jamb. There are no handrails on steps. Provide a railing on back and end of stoop with handrails on steps with extensions. (51)

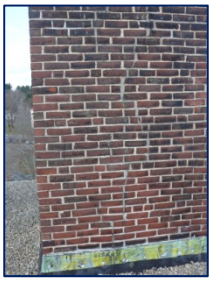
3 Lintel above door from gymnasium is severely rusted causing the brick to crack. Lintel needs to be replaced with a galvanized lintel and brick above reconstructed. Flashing needs to be added above lintel and provided with weep hole. (76)

3 Wood fascias on the link between the fifth and forth grade wings are deteriorating and paint is peeling. Strip all paint and sand. Repair or replace missing portions of wood. (Part of 74)

3 Paint on soffits of 5th grade wing is peeling. It was not possible to determine if the soffits are constructed with transite panels. If they are, they are hazardous materials containing asbestos and need to be appropriately removed and disposed. If they are not hazardous loose paint should be scraped and re-primed and painted. If they are transite replacement panels are required. (132)

3 Wood soffits on 4th grade wing are to repaired to replace any deteriorated wood. Facias and soffits to be scraped, sanded and painted. (Part of 74)

Roof



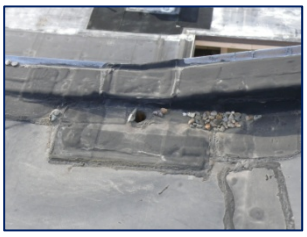
3 Chimney has a crack extending from the flashing to the chimney cap. The crack has been patched with mortar. (see structural report). (87)

4 The balustrade around the lantern has been boxed in to prevent deterioration. These should be exposed and preserved to prevent accelerated deterioration. (81)

3 Wood facing of lantern and exposed balustrade is crazed and peeling. Strip paint, sand, prime and paint wood facing and trim. (82)

3 Painted finish of window sash at lantern is peeling. Paint needs to be stripped and re-painted extending paint slightly onto glass to seal edges. (83)

3 It was reported that the roof of the original building leaks at times when snow is melting or during high winds. It was not obvious what causes these leaks but the description would be consistent with water getting behind low flashings. It is likely the flashing on the lantern or its base needs to be repaired. (Part of 62)



3 Drains on rear section of roof over original building are very small. Gravel that is collecting in these areas could easily cause a blockage. This size drain has been used to avoid any impact to the cornice line but it is likely spill over the roof edge and cause premature deterioration of the

cornice. Ideally the drain should be replaced with a overflow scupper into a leader-head with a rain-leader and downspout. (Part of 62)

3 Bell and frame is deteriorating on roof. Measures should be taken to prevent further deterioration of the metal work associated with the bell including removal of rust and re-painting. Wood frame is fully rotted and should be replaced with durable wood or with modified wood to prevent future rot. (56)

3 Stepped flashings are lifting and separating from the masonry. Replace flashings with new 16 oz copper. Saw-cut joints and wedge flashing into joints a minimum of three inches with up-turned back edge. Bottom edge should have an inside hook to connect to lower flashing to prevent lifting. Masonry joint should sealed. (Part of 62)

3 Bottom of valley appears to have a wrong way lap in cap flashing that could allow water to enter the building. Remove shingles at bottom of valley and replace cap flashing with new copper flashing that extends across valley with no open seams. Seal top edge of flashing with ice and water shield and re-shingle over area. (Part of 62)

3 The first floor roof was reviewed and in some areas a Carlisle label was present that indicated a membrane age of 1987. As the markings were in only limited locations we believe that they reflect patches only and not necessary the actual age of the roof. The roof appears to have been previously painted white in areas. There were many ponded areas. We recommend that test cuts be taken of the roof to determine the make-up including insulation value. It is recommended that the roof be replaced over the next ten years. (63)

☐ The gymnasium roof is an older style asphalt shingle roof without tabs. It appears to be in good condition

Mechanical

3 Replace the existing pneumatic control system with a direct digital control system. There are two variations of this replacement that would generally provide similar functionality - a complete replacement of all the pneumatic controls - including control

damper and control valve operators, and a replacement of all of the pneumatic controls except for the control damper and control valve actuators, where the first cost of the latter is less that of the former. Both of these options would provide the building operator with numerous tools for increasing the functionality and programming of the building, for reducing energy consumption, for monitoring and trending, both of which are very useful for troubleshooting problems and optimizing the system, and for alarms (such as frozen coil and pump failure alarms) that the existing control system does not have. (105)

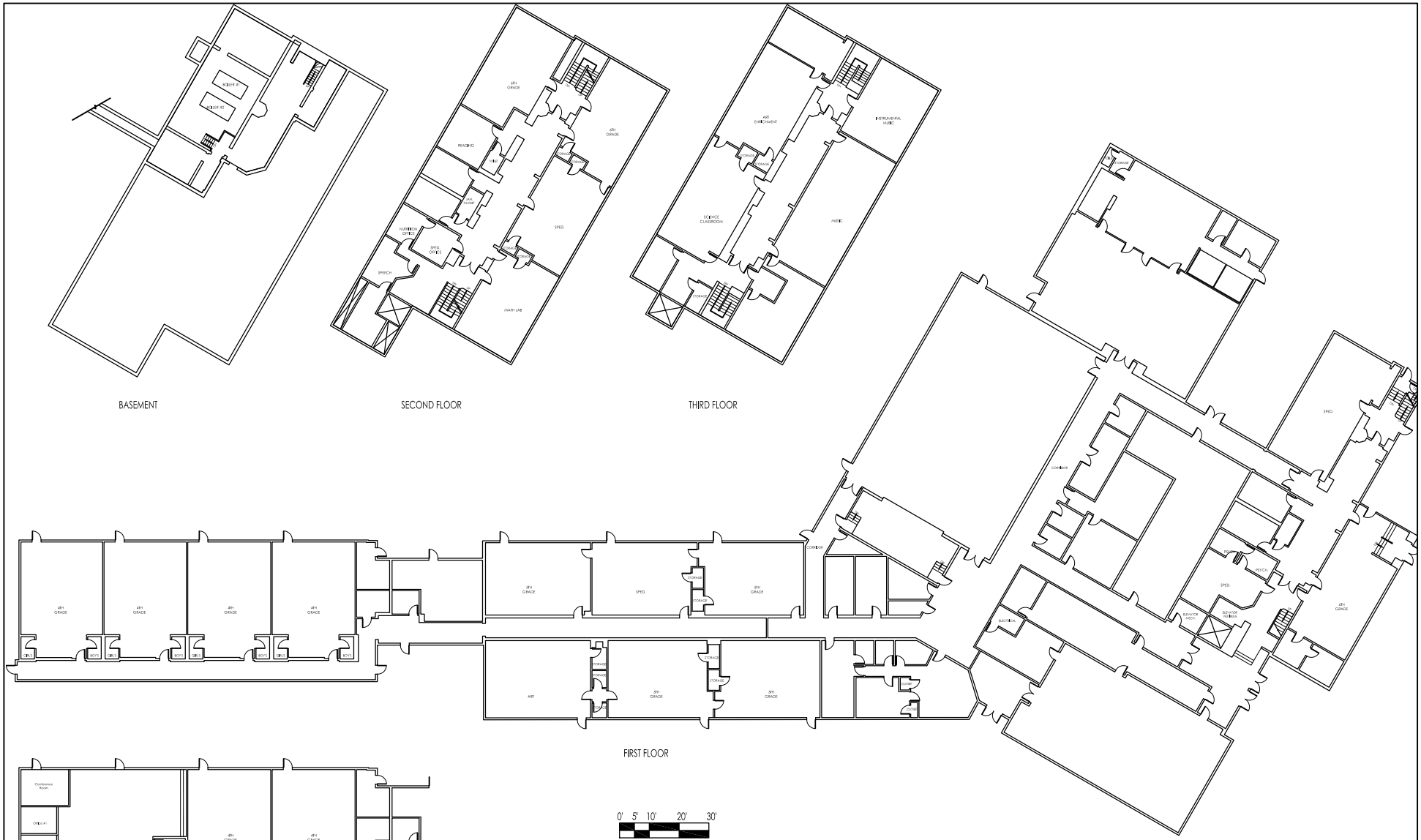
3 The two supply grilles at the gymnasium should be removed and either replaced with silencers, or supply ducts, likely the length of the gymnasium, should be provided to reduce the noise, thereby allowing this space to be used for other than gymasium purposes. If required - if the supply fans do not have the additional power to overcome the additional static pressure of the duct silencers and/or additional ductwork, the air handling unit fan motors should be upsized accordingly. (118)

3 The temperature controls for the spaces which are served by both rooftop air conditioning units and unit ventilators should be replaced with controls which control both of the systems together. The replacement of the pneumatic system, as recommended above, would accomplish this. (Part of 105)

3 The rooftop unit serving the computer room and the staff work spaces should be replaced with two rooftop units (or some other type of air conditioning system, such as ductless split systems) - one unit which serves only the computer room and another unit which serves the staff work spaces. (123)

Electrical

3 Replace existing zoned fire alarm system with new addressable fire alarm system to meet the latest codes. (8)



FIRST FLOOR
PROPOSED RENOVATIONS

147

D·R·A Drummey Rosane Anderson Inc.

PROCTOR SCHOOL EXISTING & PROPOSED

Topsfield, Massachusetts

TOWN BUILDING ASSESSMENT STUDY AND CAPITAL MASTER PLAN, TOPSFIEI

PROCTOR SCHOOL

Program Statement

	EXISTING SCHOOL				REVISIONS TO SCHOOL (2017)				
Classrooms:	**Number**	**Size Each**	**Total Area**	**Capacity (Students)**	**Number**	**Size Each**	**Total Area**	**Capacity (Students)**	**Comment**
General Classrooms									
Grades 4-6	*12*	*934*	*11,213*	*264*	*10*	*917*	*9,166*	*264*	Average size of existing classrooms is 917 s.f. Range is 765 to 1069 s.f.
Science	1	814	814	24	1	814	814	24	Includes storage.
TOTALS:	**13**		**12,027**	**288**	**11**		**9,980**	**288**	
Specialized Spaces:	**Number**	**Size Each**	**Total Area**	**Capacity (Students)**	**Number**	**Size Each**	**Total Area**	**Capacity (Students)**	**Comment**
Art	1	915	915		1	915	915		
Art Storage	2	34	68		2	34	68		
Art Enrichment	1	750	750		1	750	750		
Art Enrichment Storage	1	337	337		1	337	337		
Computer Lab	1	918	918		1	918	918		Includes storage.
Music	1	1043	1,043		1	1043	1,043		
Music Storage	1	542	542		1	542	542		
Instrumental Music	1	613	613		1	613	613		
Instrumental Music	1	104	104		1	104	104		
Reading	1	254	254		1	254	254		
Math Lab	1	700	700		1	700	700		
Cafeteria	1	2200	2,200	441	1	2200	2,200	441	15 s.f. per seat; 3 seatings.
Kitchen and Serving	1	1532	1,532		1	1532	1,532		
Gym	1	4366	4,366		1	4366	4,366		No bleachers. Community uses and town meetings.
Gym Platform	1	578	578		1	578	578		
Gym Storage	1	170	170		1	170	170		
Media Center	1	2420	2,420		1	2420	2,420		
AV Storage	1	334	334		1	334	334		
Special Education Classroom 20	1	730	730		1	730	730		
Special Education Classroom 12	1	1038	1,038		1	1038	1,038		
Special Education Classroom 12	1	340	340		1	340	340		
Special Education Classroom	1	347	347		1	347	347		
Special Education Classroom 10	1	823	823		1	823	823		
SPED Office	1	142	142		1	142	142		
Speech	1	170	170		1	170	170		
Health Suite	1	293	293		1	293	293		
Nurse Toilet	1	50	50		1	50	50		
Main Office	1	425	425		1	425	425		
Principal's Office	1	236	236		1	236	236		
Psychologist Office	1	72	72		1	72	72		
Psychologist Office	1	85	85		1	85	85		
Nutrition Office	1	110	110		1	110	110		
Teachers' Room	1	488	488		1	488	488		
Workroom	1	146	146		1	146	146		
General Storage	4	varies	533		4	varies	533		
Custodial Office & Storage	4	varies	676		4	varies	676		
Council on Aging:									
Open Floor Area					1	1935	1,935		
Conference Room					1	192	192		
Offices					2	108	216		
H.C. Women's Toilet					1	80	80		
H.C. Men's Toilet					1	80	80		
Subtotal of net spaces:	**56**		**36,575**	**70%**	**60**		**37,031**	**71%**	
Mech., toil., circul., structure			15,720	30%			15,264	29%	
TOTAL Gross Square Feet:			**52,295**	**100%**			**52,295**	**100%**	Existing total: 52,295 s.f.*

Proctor School Educational Space Needs

The Proctor School houses grades 4 through 6, with a current enrollment of approximately 250 students. At one time, this building served as the Topsfield High School, with the oldest portion built in 1933. Enrollment projections show a continuing drop in enrollments, until in 2022 they predict the following:

Grade 4: 66
Grade 5: 66
Grade 6: 67
Total: 199

With a classroom loading of 22 students, this would require a minimum of 9 classrooms, 3 classrooms per grade. For flexibility, it would be best to have 10 classrooms to house the occasional large grade as they pass through the school. At present, the school has 12 classrooms or 4 per grade, excluding the special classrooms (art, music, math lab, and special education) and the science room. Therefore, two classrooms could be made available for other use.

Existing classroom sizes in square feet (s.f.) are listed below:

Grade 4:	1050 s.f.	1120 s.f.	1120 s.f.	1120 s.f.
Grade 5:	860 s.f.	850 s.f.	910 s.f.	910 s.f.
Grade 6:	1030 s.f.	1010 s.f.	800 s.f.	760 s.f.

The "Hotel" wing, containing the 4th grade classrooms, is furthest from the core of the school, and if two classrooms were to be retired from use it would make sense to use the ones most isolated from the rest of the school, at the end of the corridor. The Program Statement in the next section assumes these two classrooms have been removed from the school total, and the square footage has been suitably reduced.

Three of the Kindergarten rooms also have toilets in them, but the fourth one does not. Students in that K room have to cross the hallway to use the toilet in another classroom. Every classroom in the school has a sink in it.

In addition to the classrooms, Proctor School has 9 classroom-sized rooms that contain Art, Music, Math Lab, Art Enrichment, and Special Ed rooms. In determining the capacity of the school, these spaces are not counted as contributing seats to the total. However, when schools are pressed for space, as

during times of rising enrollments, some of these rooms could be used as regular classrooms, allowing the school to exceed its current capacity. The ability to re-assign up to 9 rooms is a measure of the flexibility of the building to adjust to enrollment variations.

School Capacity

The number of classrooms in the Proctor School determines its capacity. For this purpose, the Science Room may be counted as a classroom. The number of students per classroom (which may vary by grade) times the number of regular classrooms available for each grade equals the school capacity.

The theoretical capacity of the school, based on classrooms, is tabulated below:

Gr 4:	4 classrooms X 22 students =	88 total
Gr 5:	4 classrooms X 22 students =	88 total
Gr 6:	4 classrooms X 22 students =	88 total
	Subtotal of classrooms	264 seats
Science classroom X 24 students =		24
	TOTAL	288 seats

Next, we will look at the core or shared spaces of the school to determine how well they support the classroom capacity, starting with the largest spaces.

Cafeteria

The cafeteria is 2200 square feet in size. This is enough space for up to 146 seats, more than sufficient for the current enrollment of 250, which eats lunch in three seatings.

Gymnasium

The existing Gym is 4360 square feet in size, large enough for one section of Physical Education at a time. Each grade 4-6 has 4 classrooms, so a total of 12 sections of P. E. are needed to offer one section to every student every week, between 2 and 3 each day of the week. The gym is sufficient for the educational needs of the school.

However, school gyms are also part of the town's resources, and they host after-school functions such as basketball and volleyball. This gym is large enough to offer a basketball court, but there is no space for seating parents during a youth basketball event. If bleachers were added to the room, there wouldn't be enough floor space for the basketball court.

The gym can also serve as a performance space as well as hosting the Town Meeting, having a raised platform of 578 square feet at one end. However, the

platform is not handicapped accessible, being about three feet above the first floor of the school, with only stairs giving access, no ramp or lift.

There is a long hallway connecting to one set of doors next to the platform. If a ramp were built in this space, it could provide access to the platform, but it would not satisfy the intent of accessible design, in which the person needs access to the raised platform without the need to pass through the hallways outside the room. A lift needs to be added to the platform, accessible from within the gym.

Media Center and Computer Lab

A modern school has a media center rather than a library, because it offers much more than books. Whole classes come to use the media center at a time, with small groups of students doing research around computers, or moving back and forth between tables and shelves. The media center is large enough for the school, and has good access to natural light. The computer lab at Proctor School is connected to the media center. The space is long and narrow, a difficult shape for a classroom.

Special Ed (SPED) Spaces

The school offers a good variety of SPED spaces, dispersed around the plan. The three-story portion of the building (the Georgian building) is handicapped accessible using a ramp near the cafeteria and an elevator serving all three classroom floors.

Student Entrance

The side of the school facing the bus drive is the service court, containing the emergency generator, the dumpster, and the truck unloading area. This is also the entrance for students coming from the buses.

To improve the student entrance and keep students out of the service court, it would be necessary to make the entrance at the end of the Georgian wing handicapped accessible by building an exterior ramp and moving the exterior door up to align with the floor level of the wing.

Proctor School Program Statement

Chart

The areas of the existing spaces are listed in the program chart.

Proctor Elementary School

Structural

Structural Description:

The original Proctor Elementary School is a three-story (plus Basement) building that is rectangular in plan with a (dormered) gable roof. Two, one-story additions were subsequently constructed to the west of the original school building, providing a Gymnasium, a Cafeteria and additional classrooms. The site is relatively level. The original building is wood and steel framed, with interior and perimeter (brick) masonry bearing walls. Roofs of the additions are wood and steel framed. Foundations are assumed to be conventional spread footings with a concrete slab on grade at the lowest floor level. Original construction documents were not available. The date of construction of the original building is 1932 but that of the additions is unknown; however the facility was renovated in 1999. The most recent (classroom) addition at the west end of the facility is believed to have been constructed in the 1970's. The school is fully sprinklered.

The Boiler Room in the original building is located in a lowered Basement section at the northwest corner. A utility tunnel extends westward, below the corridor to the Gymnasium/Cafeteria. Elsewhere, the Basement is used for (limited) storage. A slab on grade is present in the northern section of the Basement; the southern section is a dirt floor (essentially a high crawl space). First Floor construction in the original building is wood framed (2x12 and 16" o.c. joists) with steel beam and column supports. The central and southern sections of the First Floor are steel framed, with a concrete slab on steel mesh/lath spanning to open web steel bar joists. The joists are supported by steel beams and columns. The First Floor of the original building is lower than the Gymnasium/Cafeteria addition; the aforementioned connecting corridor is sloped to transition between the levels. The upper floors of the original building appear to be wood framed, with supports arranged in a double loaded corridor fashion. Sloped roof construction in the original building is wood framed, supported by steel beams and masonry bearing walls. As noted above, roof construction at the one-story additions is primarily wood framed, with timber decking spanning to wood beams. Structural bearing lines in the earlier classroom addition are arranged in a double-loaded corridor fashion, with 8" concrete block (CMU) bearing walls on either side of the corridor. The 1970's classroom structure is arranged in a single loaded corridor fashion, with the corridor located on the south side of the building. The floor level of this addition is lower than that in the earlier classroom addition; an internal ramp transitions between levels. The Gymnasium roof (earlier addition) is framed with timber decking spanning to wood purlins, which are supported by clear spanning

glue-laminated wood arches. Roof construction at this addition is typically flat, except at the Gymnasium. The roof of the 1970's classroom addition has a shallow pitch, with an east-west ridge.

The exterior walls of the original building are solid brick masonry (12"+/- thick). Exterior walls of the first addition are brick veneer, with a CMU backup. The brick veneer at the Gymnasium and Cafeteria additions overhangs the foundation by approximately 4 inches and is supported by a continuous steel angle at the top of the foundation wall. Exterior components of the 1970's classroom addition (columns, walls, soffits, eaves, rakes, etc.) are clad in aluminum.

Structural Conditions – Comments and Recommendations:

Structural conditions at the Proctor Elementary School were observed during a brief tour of the facility on January 3, 2013. Generally speaking, floor and roof construction appears to be performing satisfactorily; there is no evidence of structural distress that would indicate significantly overstressed, deteriorated or failed structural members. Foundations appear to be performing adequately; there are no signs of significant, total or differential settlements.

Structural/structurally related conditions observed during site visit are noted below:

- The condition of the exterior brick (original building and earlier addition) is generally satisfactory. Repointing is required in some areas. Masonry walls in the stairwells appear to be in good condition. Masonry cracks at the southeast (interior) corner of the Gymnasium were observed, but do not appear to be structurally significant. Rust jacking at a steel loose lintel was observed at an opening at the northwest corner of the Gymnasium. Loose lintels at all locations conditions should be inspected and evaluated in conjunction with future renovations to the building.

- The chimney of the original building has cracked and appears to have been repaired in the past. The chimney at the 1970's classroom addition exhibits cracking as well. Further review/repair at each location is recommended, in conjunction with future renovations to the building.

- Minor spalling of concrete at the top of the earlier addition foundation walls was observed in several areas. These conditions are not structurally significant; however, the should be repaired in conjunction with future renovations to the building.

- The aluminum trim/cladding at the 1970's classroom addition has been damaged in numerous locations and needs to be replaced. Open joints in this system allow water infiltration, which could damage structural elements in the long term, if not addressed.

- Wood trim generally appears to be in satisfactory condition (sanding/painting required); however there are a number of areas in the original building and the additions, where repair is required (particularly soffit/fascia elements). The centrally located cupola on

the original building has open joints and has rotted in some areas; review/repair recommended. Roof leaks surrounding the cupola were recently repaired.

- Guard rails in the north and south stairwells of the original building do not meet current code requirements and will need to be replaced or augmented to be brought into compliance.

Additional Comments:

Massachusetts State Building Code Requirements – General Comments:

Proposed renovations, alterations, repairs and additions to the Proctor Elementary School would be governed by the provisions of the Massachusetts State Building Code (MSBC – 780 CMR 8th Edition) and the Massachusetts Existing Building Code (MEBC). These documents are based on amended versions of the 2009 International Building Code (IBC) and the 2009 International Existing Building Code (IEBC), respectively.

The MEBC allows the Design Team to choose one of three (3) compliance methods. Structurally, the Prescriptive Compliance Method is preferred. Regardless of the compliance method chosen, the MEBC may require that the unreinforced masonry walls of the building be evaluated with respect to the provisions of Appendix A1 of the IEBC. This provision would be applicable to the original building; however, as it was renovated in 1999, the extent of proposed renovations would not be of an extent that would trigger Appendix A1 requirements. Section 101.5.4.0 of the Massachusetts Amendments (Chapter 34) would require that the existing building be investigated in sufficient detail to ascertain the effects of any proposed work on the area under consideration and, the entire building or structure and its foundations if impacted by the proposed work.

Additions – General Comments:

The design and construction of any proposed additions would be conducted in accordance with the Code for new construction. Significant additions should be structurally separated from the existing building by an expansion (seismic) joint to avoid an increase in gravity loads and/or lateral loads to existing structural elements. Smaller additions can be structurally attached to the existing building, provided they do not increase the demand - capacity ratio of the existing lateral force resisting elements in the building by more than 10%. Presently, no additions to the Proctor Elementary School are proposed.

Renovations/Alterations – General Comments:

Where proposed alterations to existing structural elements carrying gravity loads results in a stress increase of over 5%, the affected element would need to be reinforced or replaced to comply with the Code for new construction. Proposed alterations to existing structural

elements carrying lateral load (masonry walls in the case of the original building and the earlier addition) which result in an increase in the demand - capacity ratio of over 10% should be avoided, if possible. Essentially, this means that removal of, or major alterations to the existing, unreinforced masonry walls in the building should be minimized. If this is not avoidable, more significant seismic upgrades/reinforcing will be required, potentially including the addition of lateral force resisting elements (braces, shear walls, etc.).

End of Structural Report

TOWN BUILDING ASSESSMENT STUDY AND CAPITAL MASTER PLAN
Town of Topsfield, Massachusetts

Proctor Elementary School

Mechanical, Electrical, Plumbing, And Fire Protection Systems

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January 14, 2012

General

The mechanical, electrical, plumbing, and fire protection systems were reviewed in conformance with the requirements of the following State and National codes and regulations, as applicable:

- Massachusetts State Building Code 8th Edition
- Massachusetts State Fire Prevention Regulations
- NFPA Latest Editions
- Massachusetts Plumbing Code
- Massachusetts Mechanical Code
- Massachusetts Electrical code (NEC 2011 Edition)
- Illuminating Engineering Society of North America (IESNA) Lighting Handbook
- ASHRAE 90.1 Latest Edition

The scope of this study does not include operational assessment of the fixtures and equipment reviewed; it includes only a brief visual review of the fixtures and equipment. Therefore notes regarding the condition of the fixtures and equipment may or may not be indicative of the actual condition of the systems and equipment and/or the expected life of the fixtures and equipment. Therefore it is recommended that services of a qualified technician be retained to evaluate the actual condition of fixtures and equipment prior to replacement.

Mechanical

HEATING PLANT

The heating plant generally consists of two non-condensing natural gas fired boilers and a pumps to circulate the heating water throughout the building. The boilers appear to be in fair to good condition.

One set of three lead/lead/lag primary pumps circulates the hot water within the mechanical room. The pumps appear to be in fair condition.

Two sets of secondary pumps circulate heating hot water throughout the building. Each set consists of a lead and lag pump. The pumps appear to be in fair condition. The hot water delivered to the building is reset via two pairs of modulating control valves, presumably in reverse proportion to the outside air temperature, to provide hot water during the colder season and warm water during the milder seasons, thereby decreasing heat loss via the piping system while also increasing controllability and comfort.

HEATING AND VENTILATION

Heating and ventilating for all of the spaces other than the kitchen and the gymnasium is provided via unit ventilators at the perimeter of the spaces. Through the wall louvers are provided for make-up air. There are no provisions for relief air from the classrooms.

Heating and ventilating for the gymnasium and the kitchen is provided by single zone constant volume air handling units within the building. The air handling units generally consist of supply fans, hot water coils, and filter sections, and they appear to be in fair to good condition. Both outside air and relief air are provided by either roof hoods or louvers.

The supply air grilles for the air handling unit serving the gymnasium are loud to the extent that the space is not suitable for any purposes other than gym use.

EXHAUST VENTILATION

Exhaust ventilation for the restrooms is provided by rood mounted exhaust fans.

AIR CONDITIONING

Air conditioning is provided at the library, the computer room, and several other staff spaces by roof mounted HVAC units. However there are couple of issues with these units. The first issue is the non-integration of the rooftop unit controls with the controls for the unit ventilators for spaces provided with unit ventilators, leading to operational problems and possibly unnecessary energy usage when the unit ventilators are trying to heat the space while the rooftop units are trying to cool the space. The second issue is that the rooftop unit serving the computer room also serves several staff work spaces,

leading to overcooling of the staff spaces because the thermostat is in the computer room, and the computer room is likely always calling for more cooling than is needed in the staff work spaces, thereby leading to overcooling the staff work spaces. The rooftop units are all more than 10 years old, therefore their replacement should be scheduled within the next 10 years.

TEMPERATURE CONTROLS

The temperature control system is a pneumatic system. The Director of Facilities is able to program the occupied and unoccupied cycles of the building (as a whole - not individual spaces) via a digital interface that has been provided, but that is essentially the extent of the abilities of that interface. As such there is little in the way of programming that the Director of Facilities can do to reduce energy consumption, and the interface does not offer anything in the way of monitoring, trending, alarms, etc.

RECOMMENDATIONS

Replace the existing pneumatic control system with a direct digital control system. There are two variations of this replacement that would generally provide similar functionality - a complete replacement of all the pneumatic controls - including control damper and control valve operators, and a replacement of all of the pneumatic controls except for the control damper and control valve actuators, where the first cost of the latter is less that of the former. Both of these options would provide the building operator with numerous tools for increasing the functionality and programming of the building, for reducing energy consumption, for monitoring and trending, both of which are very useful for troubleshooting problems and optimizing the system, and for alarms (such as frozen coil and pump failure alarms) that the existing control system does not have.

The two supply grilles at the gymnasium should be removed and either replaced with silencers, or supply ducts, likely the length of the gymnasium, should be provided to reduce the noise, thereby allowing this space to be used for other than gymasium purposes. If required - if the supply fans do not have the additional power to overcome the additional static pressure of the duct silencers and/or additional ductwork, the air handling unit fan motors should be upsized accordingly.

The temperature controls for the spaces which are served by both rooftop air conditioning units and unit ventilators should be replaced with controls which control both of the systems together. The replacement of the pneumatic system, as recommended above, would accomplish this.

The rooftop unit serving the computer room and the staff work spaces should be replaced with two rooftop units (or some other type of air conditioning system, such as ductless split systems) - one unit which serves only the computer room and another unit which serves the staff work spaces.

Electrical

EXISTING SYSTEMS

The building is served by a single electrical service rated 800amperes, 208Y/120 volts, 3-phase, 4-wire and is located in the main electric room. The service equipment consists of utility metering equipment, 400amp main circuit breaker and distribution panelboard located in the main electrical room. The predominance of the main distribution equipment is newer and in good condition.

There are a number of electrical panels located throughout the School. The predominance of these panelboards are Cutler Hammer and Federal Pacific. The Cutler Hammer panelboards are in good condition with the some of the panelboards having spare circuit breakers available for new circuits to be added. The Federal Pacific panelboards are in fair condition and do not have any spare circuit breakers available. The mechanical equipment in the mechanical room is feed from a motor control center located in the mechanical room. The equipment is newer and in very good condition.

The lighting throughout the school consists of recessed 2x4 and 2x2 lensed troffers. The lighting throughout the school was recently upgraded and is in very good condition. The lighting in classrooms and other spaces are controlled by occupancy sensor and light switches. The gymnasium lighting is 2x4 fluorescent high-bay fixtures with integral occupancy sensors. The light levels appear to be within the recommended levels.

The fire alarm system is a Simplex 4002 zoned system with graphic annunciator located in the entry corridor. There are manual fire alarm pull stations, horn/strobes located through the building. Heat and smoke detectors are present in select areas of the school. Sprinkler flow and tamper switches are present as well as monitoring of mechanical equipment. The fire alarm devices are in good condition.

Exterior has recently been upgraded to LED fixtures.

There is currently a diesel fired 300kw Caterpillar emergency standby generator. This unit appears to be in very good condition and recently had routine maintenance performed and was noted by school personal was functioning without any issues. The generator is sized to provide power to the whole school.

Life safety emergency lighting is provided by fixtures throughout the school and is being feed from the emergency standby generator.

Exit signage is installed throughout the school. The exit sign are being powered from the emergency standby generator.

The existing Clock/ Paging system is a Simplex 5105 wall mounted with paging/speaker system. The systems appear to be in good condition and functioning without any problems.

There is currently a security system including magnetic contacts at all doors and motion sensor detection devices throughout the library. This system was noted during the walk through as operating without problem.

RECOMMENDATIONS

Replace existing zoned fire alarm system with new addressable fire alarm system to meet the latest codes.

Plumbing

The hot water plant consists of a natural gas fired tank type water heater in the boiler room which appears to be in poor condition, and therefore it should be scheduled to be replaced. The replacement water heater may not need to be of the same capacity as the existing; the existing water heater appears to be oversized.

The water heater is provided with mixing valves which temper the hot water before supplying it to the building.

There are two electric water heaters in the room adjacent to the boiler room that have been abandoned.

All of the plumbing fixtures except for several in the fourth grade wing have been upgraded to low flow fixtures, and they are in good condition.

All of the water closets in the fourth grade wing are in poor condition, and should be scheduled to be replaced with low flow fixtures in the near future.

Fire Protection

The building is fully sprinklered, and the sprinkler entrance equipment appears to be in good condition.

The sprinkler system entrance is accessed off of a classroom, a location that is not typical for sprinkler system entrances.

END OF MEP REPORT