Police Department

Year Constructed:	1940's	
Construction Type:	II B	
Building Area per Floor:	Third Floor:	950 SF
	Second Floor:	2128 SF
	First Floor:	2128 SF
	Basement:	2223 SF
	Total Area:	7429 SF

Documents Used in Study:

Renovation Floor Plans dated 1988 (not constructed)
Assessor's Map and Aerial Photograph

General:

The building is not handicapped accessible:

3 There is no accessible entrance for the building. Add new entrance on side of building that encloses a stair and handicapped lift. (17)

3 There is no elevator. Add elevator. (34)

3 Typical doors are 32" wide and need to be replaced with 36" wide doors. Maneuvering clearance at most doors is inadequate requiring closets to be removed. (28)

3 Door hardware is primarily knob sets and should be replaced with lever sets. (27)

3 Toilet and shower rooms are non accessible. (30)

2 All stairs have projecting nosings that need correction. Vinyl nosings have deteriorated and need to be replaced. Handrails are too thick and are without extensions. Guardrails are too low. (20)

2 The stair from the day room to the basement has winders and we recommend its removal. (22)

2 The main stair should be extended to the lower level to create a fire rated egress stair. (3)

2 Add accessible parking and expand parking lot. (18)

Interior Finishes:

1 8x8 vinyl asbestos tiles (VAT) need to be abated and replaced. Carpeting is well worn and needs replacement. It is likely that the VAT exists under the carpet. (126)

4 Most office spaces have Tectum ceiling that should be replaced. (92)

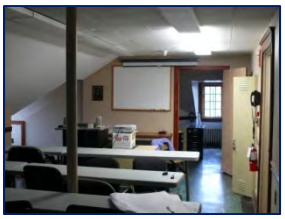
2 Ceilings in corridors are too low at 6'-10" above the floor and need to be 7'-6" minimum. Changing this will require a different mechanical system. (93)

3 Concrete slab in boiler room has deteriorated and needs replacement where damaged. (94)

2 Integrity of boiler room enclosure is compromised by piping, Piping needs to be moved out of wall and rated CMU wall repaired. (4)

Egress:

2 The upper level of the building should be provided with a second means of egress. Currently there are fire escape ladders accessed through windows at either end of the building; one does not extend to grade and the other does not provide an exit path away from the building. Both should be removed and a second stair added. The second stair should be handicapped accessible. (34 incl. elevator)



2 There is no egress door from the garage space on the lower level. Add egress door. (10)

Third Floor:

2 Minimum headroom required is 7'-6" but sloped ceilings are much lower than required by code. A guardrail could be added to separate the low ceiling areas but would significantly reduce the useable area of the spaces. Roof should be reconstructed to eliminate sloped ceilings and provide entire space with appropriate headroom. (95)

Exterior:

2 There are a number of loose, broken or missing slates on the roof that need replacement. (62)

3 Exterior painted trim generally is good except for dormers that have peeling paint. These should be scraped and repainted. (74)

4 Main entrance door surround needs to be stripped and painted. (75)

3 There are low spots in the rear parking area which appears to have been patched many times. This area should removed and repaved. (46)

4 Install programmable thermostatic controls for spaces without continuous occupancy to reduce energy consumption. For the radiators, the programmable controls would consist of replacing the manual pipe mounted thermostatic controllers with motor operated pipe mounted control valves with remote wall mounted programmable thermostats. For the air conditioning systems, the programmable controls would consist of replacing the non-programmable thermostats with a programmable thermostats. (109)

4 Minor re-pointing of exterior brick. (73)

2 Repair crack in entry slab. (54)

4 Install changeover/bypass temperature control systems. (110)

☐ In lieu of a changeover/bypass temperature controls system install a multi-zone variable refrigerant volume (VRV) split type system for all spaces.

4 Install either an outside air louver or a roof mounted outside air hood for each of the air handling systems, sized for minimum outside air ventilation in accordance with the mechanical code, with ductwork connected to the return air side of the air handling systems. (111)

3 The condensing unit for the first floor air conditioning system should be replaced. (112)

2 The cell exhaust ventilation system should be replaced with an exhaust system which exhausts the air outside the building. Optionally, the exhaust system serving the corridor adjacent to the holding cells could be adapted such that it exhausts air directly from each cell to outside the building. (119)

4 It is recommended that more distance be provided between the exhaust air and outside air terminations for the generator in order to insure that the generator cooling system will operate properly under all operating conditions. Providing ductwork outside the building - on the exhaust air louver, is one method. (120)

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

4 Upgrade existing 30kw emergency standby generator to feed the whole police station. (104)

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

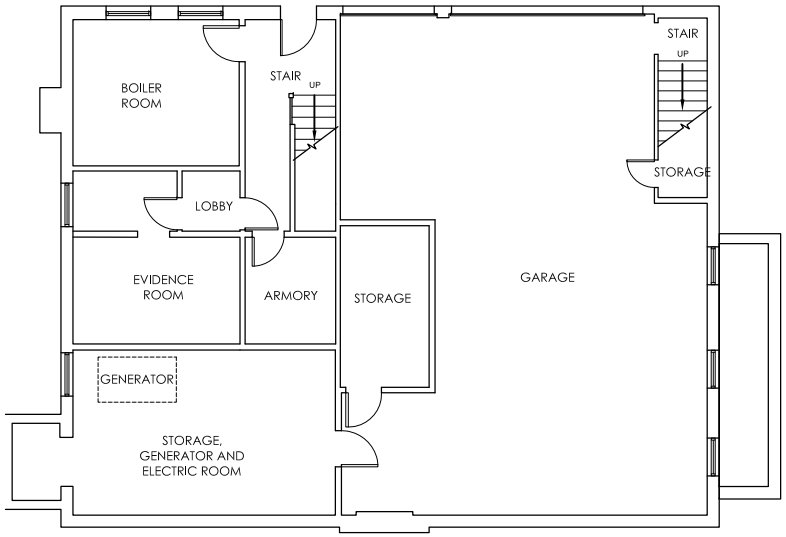
Operational factors:

A new 911 facility is nearing completion and will reduce the space currently needed for this function.

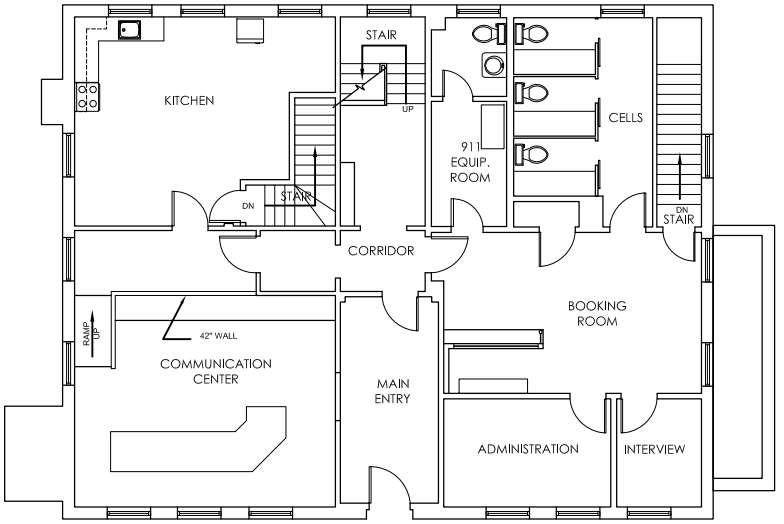
2 Current cells can only be accessed by using the narrow and steep stair on the east end of the building. It is recommended that these be relocated to the lower level where stairs will not be required. To replace the garage a sally port addition should be constructed. Proposed Juvenile and Women's cells will be available in Middleton although construction has not yet started. In conversations with them it was recommended that some cell space still be provided in Topsfield to cover those times when space in Middleton is unavailable.

Building Recommendations:

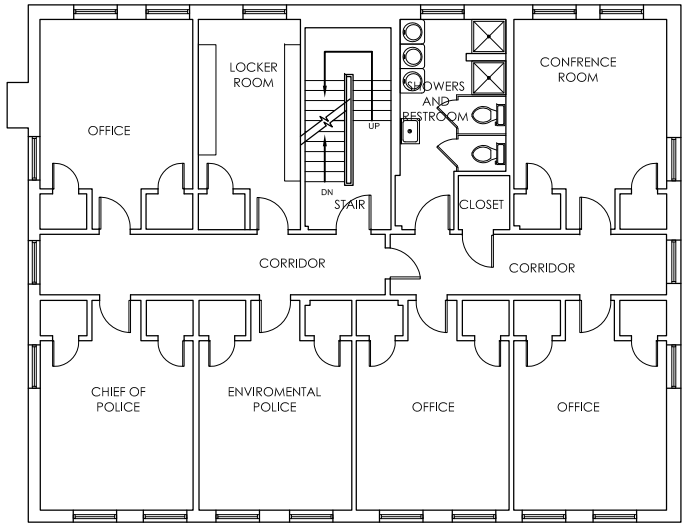
Many repairs and modifications are required for this building as noted above but there are also changes that are necessary to overcome operational problems and to satisfy basic needs of the police force.
These recommendations are represented in the program chart for the facility.



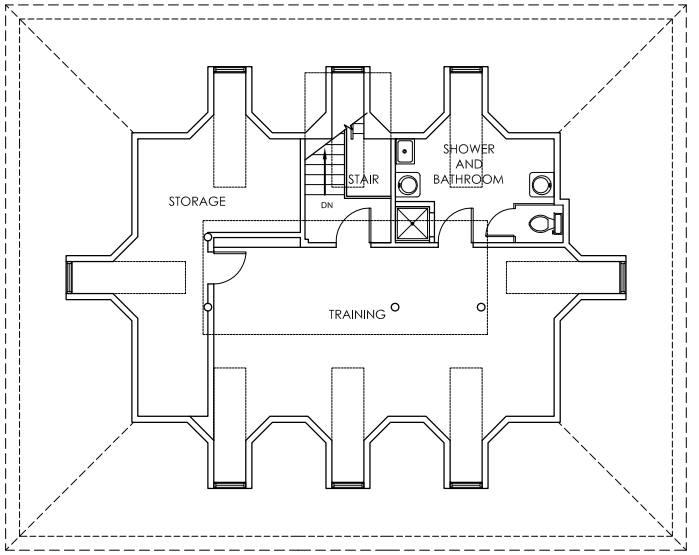
BASEMENT
SCALE 3/16"=1'-0"



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



SECOND FLOOR
SCALE 3/16"=1'-0"



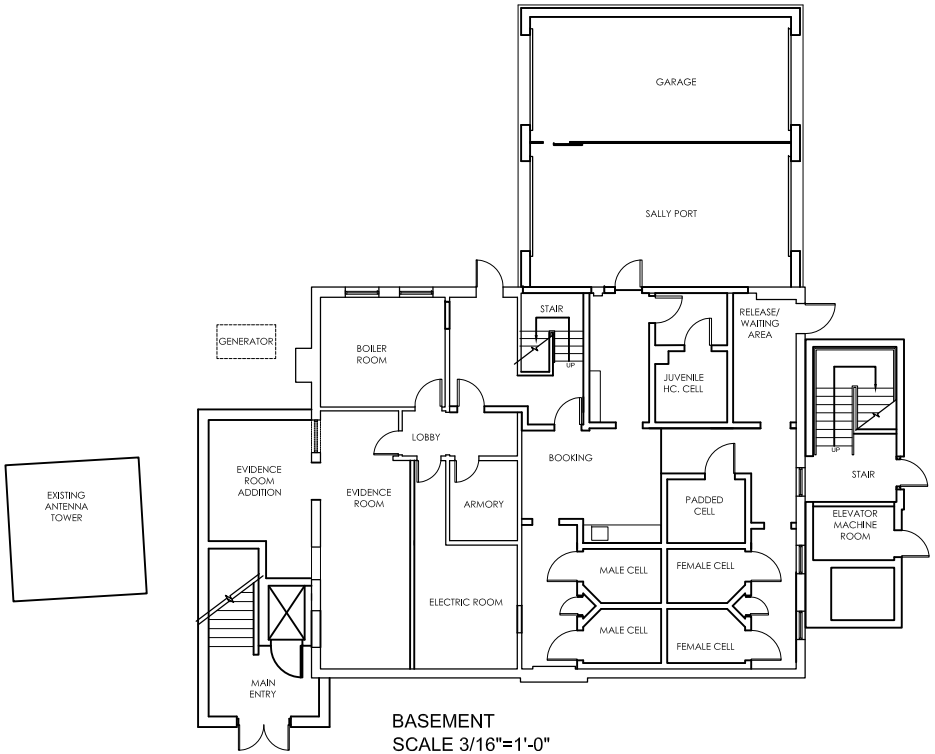
THIRD FLOOR
SCALE 3/16"=1'-0"

D·R·A Drummey Rosane Anderson Inc.

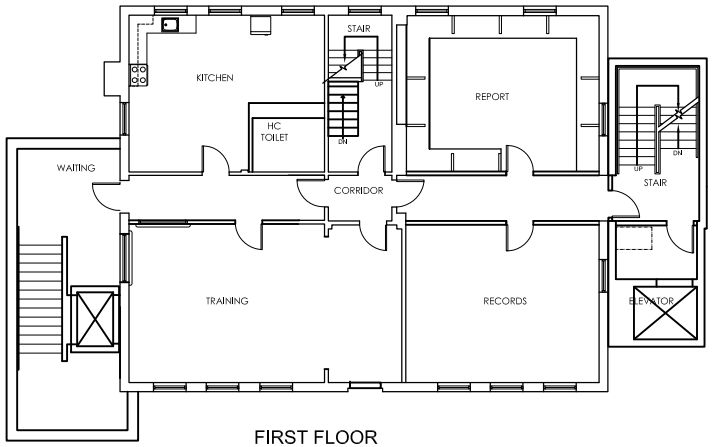
POLICE STATION

EXISTING

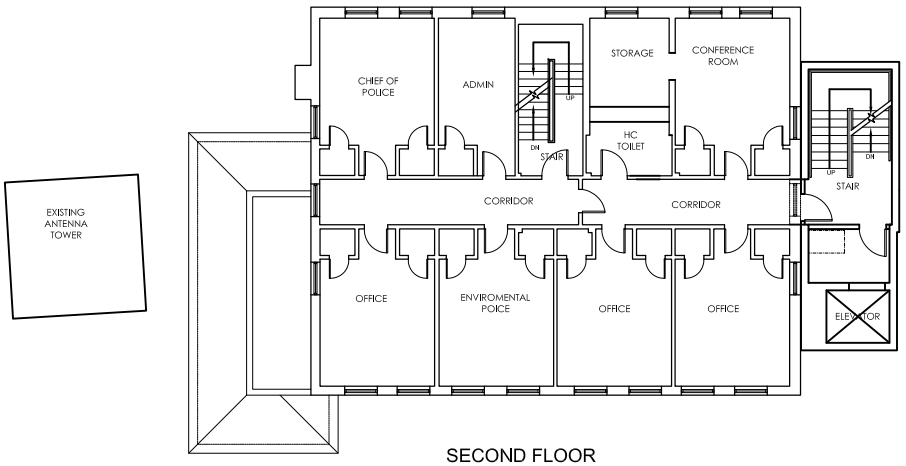
Topsfield, Massachusetts



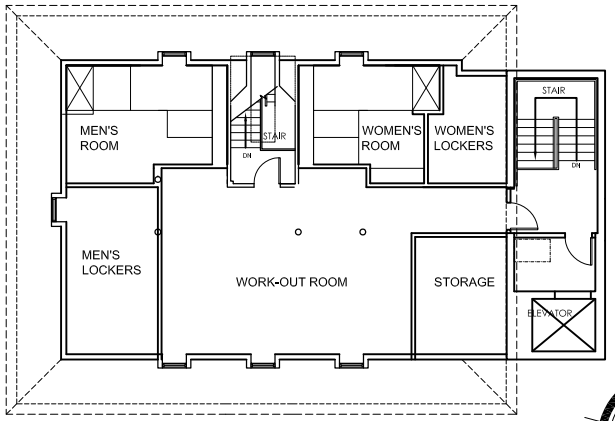
BASEMENT
SCALE 3/16"=1'-0"



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



SECOND FLOOR
SCALE 3/16"=1'-0"

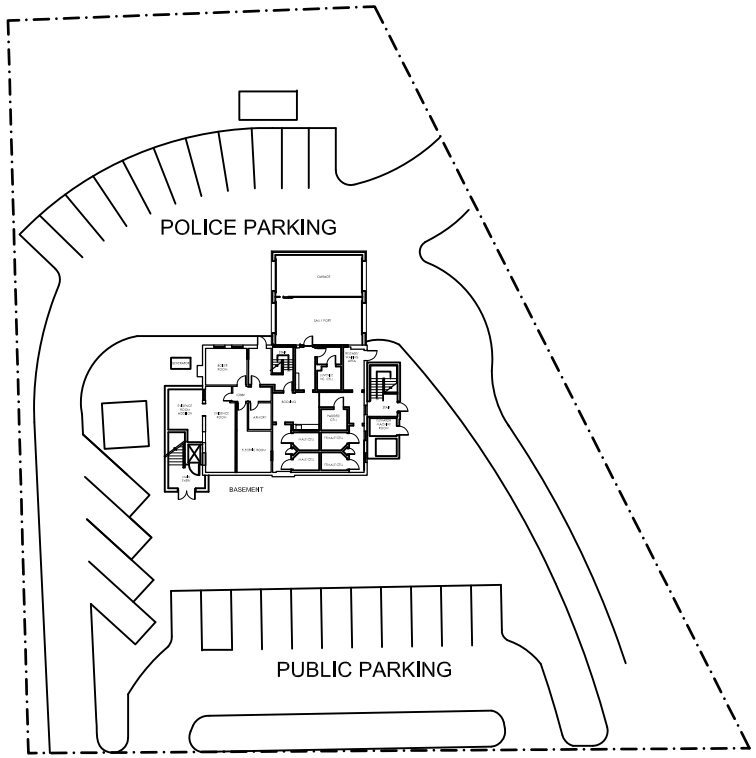


THIRD FLOOR
SCALE 3/16"=1'-0"

D·R·A Drummey Rosane Anderson Inc.

POLICE STATION PROPOSED

Topsfield, Massachusetts



SCALE 1/16"=1'-0"

D·R·A Drummey Rosane Anderson Inc.

POLICE STATION PROPOSED SITE

Topsfield, Massachusetts

POLICE STATION

Program Statement

Spaces:	Existing Spaces					Renovations / Additions					*New Building				Comment
	BASEMENT	FIRST	SECOND	THIRD	TOTAL	BASEMENT	FIRST	SECOND	THIRD	TOTAL	FIRST	SECOND	THIRD	TOTAL	
Boiler Room	170				170	170				170					
Lobby	24				24	64				64					
Evidence Room	170				170	457				457	300				
Armory	67				67	67				67	100				
Generator and Electrical Room	331				331										
Electrical Room						190				190					Generator moved to exterior
Storage	100			233	333						100				
Garage	1090				1,090										
Sally Port/ Garage					0	870				870	900				
Kitchen		320			320		314			314		300			
Communication Center		465			465										911 function, no longer required
Main Entry		140			140										
Booking Room		292			292	274				274	250				
Administration		125			125			146		146		140			
Interview		64			64						65				
Cells		182			182	616				616	600				
Release/ Waiting Area						98				98	100				
Rest Room		40			40										
911 Equipment Room		65			65										No longer required
Chief of Police			218		218			218		218		200			
Enviromental Police			218		218			218		218		200			
Offices (3 @ 218 sf each)			654		654			654		654		600			
Locker Room			146		146										
Showers and Restroom			135	135	270										
Showers and Lockers:															
Women's									277	277			275		
Men's									412	412			400		
Conference Room			218		218			218		218			200		
Training Room				478	478		534			534		500			Includes reduced Communications
Elevator Machine Room						54				54					
H.C. Toilet							48	56		104					
Report							382			382		300			
Records							377			377		300			
Storage								87	133	220		200			
Work-Out Room									608	608			450		
Subtotal of net spaces:	**1,952**	**1,693**	**1,589**	**846**	**6,080**	**2,860**	**1,655**	**1,597**	**1,430**	**7,542**	**2,415**	**2,740**	**1,325**	**6,480**	*New building does not include any work in the existing police Department building. The 35% is the the unassigned area including public restrooms, MEP rooms, structure and circulation
Unassigned area (Partitions & Circulation)	271	435	539	104	1,349	968	1,196	872	456	3,492	1,050	725	500	2,275	
TOTAL Building Area Per Code SF:	**2,223**	**2,128**	**2,128**	**950**	**7,429**	**3,828**	**2,851**	**2,469**	**1,886**	**11,034**	**3,465**	**3,465**	**1,825**	**8,755**	
% Circulation and Structure					18%					32%				35%	

Police Department

Structural

Structural Description:

The Police Department facility is a three-story, concrete and steel framed building with perimeter, masonry bearing walls (brick and terra cotta). The building is rectangular in plan, with a (dormered) hipped roof (slate). The main entrance to the building is at the First Floor level on the east (front) side. The site is relatively level (approximately matching the Basement Floor elevation); however, a berm was created on the front (east) side, to create the Main Entrance at the First Floor. The date of construction is unknown; however, it appears that the building may have been constructed in the 1930's or 1940's. No original construction drawings were available. The building is not sprinklered. The total are of the facility is approximately 7,430 square feet.

There are two, north-south interior bearing lines, located on either side of the central corridor. Hipped roof construction consists of precast (gypsum) concrete plank spanning to structural steel rafters. Roof construction is supported by the perimeter bearing walls and by interior steel pipe columns located on the aforementioned bearing lines. Floor construction in the corridor is a concrete slab (on paper/steel mesh forms; thickness unknown), spanning 2.5+/- feet in the north-south direction to 6" deep steel channels. Elsewhere, floor construction is assumed to be similar, with a concrete slab supported by steel beams/steel joists spanning from the east and west exterior walls to the interior corridor bearing lines. Foundations are assumed to be conventional spread footings with a concrete slab on grade at the Basement. Foundation walls are concrete; approximately 14" thick.

Structural Conditions:

Structural conditions at the Police Department facility were observed during a brief tour of the building 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. The Basement spaces appear to be dry (with respect to groundwater infiltration).

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

- The condition of the exterior brick is generally satisfactory, given the age of the building. Repointing is required in some areas. There is a crack in the veneer at one of the overhead doors on the back (west) side which should be repaired; this condition is not a structural concern.

- There is a crack in the entry stair slab where it meets the east foundation wall of the building. This condition is likely due to the settlement of the stair over time and is not a structural concern. The crack should be repaired/sealed to prohibit water infiltration and freeze/thaw damage.

- Downspouts should be inspected and repaired and/or modified to ensure that rainwater from the roof is not deposited adjacent to the foundation walls.

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

Comments/Recommendations:

Massachusetts State Building Code Requirements – General Comments:

Proposed renovations, alterations, repairs and additions to the Police Department facility 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 (depends on the extent of the renovation/alteration work and/or proposed change(s) in use). In addition, Section 101.5.4.0 of the Massachusetts Amendments (Chapter 34) requires that the existing building be investigated in sufficient detail to ascertain the effects of the 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 will 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 this case) 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.).

Proposed Additions and Renovations - Anticipated Scope of Structural Work:

- Masonry and envelope repairs as noted above and in the Architectural Report.

- Remove the existing fire escape on the north side of the building and construct a new Elevator/Stair core, extending from the Basement to the Third Floor of the building. The new addition will be constructed with 8" thick, 100% solid grouted, reinforced masonry bearing walls with a brick veneer and will be structurally connected to the existing building. Floor construction will be a concrete slab on steel deck supported by steel beams. Roof construction will be steel deck supported by steel beams. The new stairs will be concrete filled, steel pan construction. Foundations will be conventional spread footing construction with a 5" thick concrete slab on grade at the Basement level. Local underpinning of the existing, north foundation wall will be required to construct the new elevator pit.

- Remove the existing fire escape on the south side of the building and construct a new, two-story entry, extending from the Basement to the First Floor of the building. The new addition will be constructed with 8" thick, 100% solid grouted, reinforced masonry bearing walls with a brick veneer and will be structurally connected to the existing building. Floor construction will be a concrete slab on deck supported by steel beams. Roof construction will be steel deck supported by steel beams. The new stairs will be concrete filled, steel pan construction. Foundations will be conventional spread footing construction with a 5" thick concrete slab on grade at the Basement level. Minimal underpinning of the existing, south foundation wall may be required to construct the pit for the new lift.

- A new, one-story Sally Port and Garage addition will be constructed on the back (west) side of the building. Roof framing will consist of steel deck supported by steel beams, which span to perimeter, reinforced/grouted perimeter masonry bearing walls. Foundations will be conventional spread footing construction with a 5" thick concrete slab on grade (pitched for drainage).

- The existing Third Floor volume will be expanded, by removing the existing, steel framed roof construction and constructing new, full-height exterior walls that align with the present dormer face walls. The new roof will be framed with steel deck and steel beams. Additional steel beams will need to be installed at the Third Floor level to carry new roof loads to the interior and perimeter bearing lines.

- The current, central stair at the back of the building (presently serving the First through the Third Floors) will be extended to the Basement Level. Additional steel framing at the First Floor and new foundations at the Basement level will be required to facilitate this extension.

End of Structural Report

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

Police Station

210 Boston Street

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 for the building is a natural gas fired steam boiler located in the basement which appears to be in fair condition. The condensate return system is a gravity return system; there are no condensate pumps.

The terminal heating system for the basement consists of ceiling mounted steam unit heaters.

The terminal heating units for the floors other than the basement consist of floor mounted steam radiators which appear to be in fair condition. Controls for the radiators consist of pipe mounted manually operated thermostatic control valves.

There is a abandoned buried oil tank in the basement, with one end extending into the electrical room.

AIR CONDITIONING

The air conditioning systems consist of two split single zone direct expansion (DX) air conditioning systems - one serving the first floor and one serving the second floor. Neither the attic nor the basement are air conditioned.

The air handler for the air conditioning system serving the first floor is located in the basement, with supply ductwork at the ceiling of the basement and floor registers throughout the first floor. The unit appears to be in fair condition. The condensing unit for this system is grade mounted, and it appears to be in poor condition. This system provided with a single non-programmable thermostat.

The air handler for the air conditioning system serving the second floor is located in a closet off the second floor corridor, with supply ductwork at the ceiling of the second floor, and supply registers above the doors to each of the perimeter spaces. The unit appears to be in good condition. The condensing unit for this system is grade mounted, and it appears to be in good condition. This system is also provided with a single non-programmable thermostat.

VENTILATION

There are no mechanical outside air ventilation systems.

The exhaust system serving the holding cells consists of manually operated transfer fans for each of the three cells which transfer air from each of the holding cells to the adjacent corridor, and the adjacent corridor has a dedicated exhaust fan which exhausts air from the corridor to outside the building. As each holding cell is provided with a water closet, the ventilation system serving the holding cells is not in accordance to

code; code requires the air to be exhausted from each holding cell to outside the building (via a continuous exhaust ductwork system).

The outside air intake and the exhaust air louver for the generator are adjacent to each other and on walls that are 90° to each other. Such a configuration could, under stagnant wind conditions, cause recirculation of the exhaust air to the extent that the operation of the unit is compromised.

RECOMMENDATIONS

The temperature controls, both for the heating terminal units and the air conditioning systems, consist of non-programmable controls. Though this facility is likely occupied 24/7/365, if there are times when many of the spaces are not in use, recommended is the installation of programmable thermostatic controls for those spaces to reduce energy consumption. For the radiators, the programmable controls would consist of replacing the manual pipe mounted thermostatic controllers with motor operated pipe mounted control valves with remote wall mounted programmable thermostats. For the air conditioning systems, the programmable controls would consist of replacing the non-programmable thermostats with a programmable thermostats.

Single zone air conditioning systems typically provide good temperature control in all of the spaces served when all of the spaces served have both similar exposures and similar uses. For the air conditioned areas of this building (the first and second floors) such is not the case; the spaces served have either or both dissimilar exposures or dissimilar uses. Therefore it would be expected that the temperature control in the spaces other than the spaces where the thermostats are located might at times have less than ideal cooling temperature control.

Short of replacing the two existing single zone air conditioning temperature control systems with true multiple zone temperature control systems, recommended is the installation of what is known as changeover/bypass temperature control systems. These systems generally consists of variable volume zone control dampers installed on the existing ductwork that allow the air handling systems to provide varying amounts of cooled air to the various spaces served by the systems. Such an installation will provide for better cooling 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 air handling systems do not have outside air ventilation, and per code all occupied spaces must have either operable exterior openings (minimum 4% of the floor area) to be considered naturally ventilated, or mechanical outside air ventilation. Though all the various spaces in this building may meet the natural ventilation requirement (not verified in this study), nonetheless recommended also is the installation of either an outside air louver or a roof mounted outside air hood for each

of the air handling systems, sized for minimum outside air ventilation in accordance with the mechanical code, with ductwork connected to the return air side of the air handling systems.

The condensing unit for the first floor air conditioning system should be replaced.

The cell exhaust ventilation system should be replaced with an exhaust system which exhausts the air outside the building. Optionally, the exhaust system serving the corridor adjacent to the holding cells could be adapted such that it exhausts air directly from each cell to outside the building.

It is recommended that more distance be provided between the exhaust air and outside air terminations for the generator in order to insure that the generator cooling system will operate properly under all operating conditions. Providing ductwork outside the building - on the exhaust air louver, is one method.

Electrical

EXISTING SYSTEMS

The building is served by a single electrical service rated 600amperes, 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 in good condition.

There are a number of electrical panels located throughout the Facility. The predominance of these panelboards are G.E. The G.E. panelboards are combination of older and newer and some are in fair and some are in poor condition and do not have any spare circuit breakers available.

The lighting throughout the facility consists of recessed 2x4, and 2x2 lensed troffers, incandescent track, incandescent and fluorescent security fixtures, surface mounted 1x4 fluorescent wraparound 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 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.

There is currently a natural gas fired Generac 30kw emergency standby generator. This unit is older and appears to be in fair condition. The generator provides power to basement, first floor, and some of the second floor.

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.

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.

Upgrade existing 30kw emergency standby generator to feed the whole police station.

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

Plumbing

The water closets in the holding cells are the vitreous china and are flush valve operated. They appear to be in fair condition.

The other water closets are vitreous china tank type fixtures that appear to be in fair to good condition.

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

The hot water heater for the building is a natural gas fired tank type unit located in the boiler room. It appears to be in good condition.

The stainless steel sink in the staff room appears to be in fair to good condition, and the double bowl stainless steel utility sink in the garage in the basement appears to be in good condition.

There is a sump pump in the boiler room, condition not reviewed.

Fire Protection

This building does not have a sprinkler system.

END OF MEP REPORT

Fire Department

27 High Street

Year Constructed:	1969	
Construction Type:	III B	
Fire Sprinklers:	No	
Building Area per Floor:	Second Floor:	1727 SF
	First Floor:	4139 SF
	Total Area:	5866 SF

Documents Used in Study:

- Floor Plans dated
- Possible Expansion Plans dated 12-4-00
- Assessor's Map and Aerial Photograph
- Septic System Plan

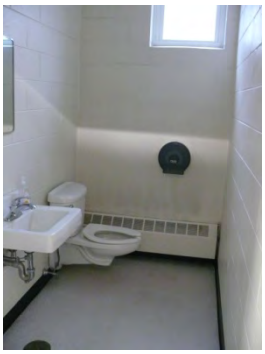
General:

The building is not handicapped accessible:

3 Entrance does not have sufficient clearance at door for wheelchair access. Vestibule needs to be made wider.

3 Handicapped access is not provided to the second floor. Provide Elevator.

3 Doors at north corner exit (vestibule at bottom of stair) are too close together and a step up is required to exit. Change door swing.



2 Stair risers are too high (7.5") and treads too narrow (10") and stair has nosings. Handrails also do not comply. Replace stair and redesign to eliminate vestibule at bottom.

3 Restrooms (3) and shower are not accessible . Reconstruct to proper dimensions.

3 Kitchen and lunchroom counters are not accessible. Reconstruct with appropriate knee space.

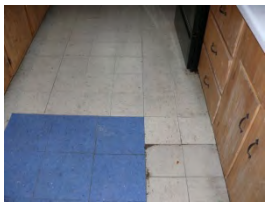
3 A number of doors are smaller than 3'-0" wide and need to be changed. This includes toilet room doors (3) and Watch Room door.

3 Doors have knob-sets that need to be changed to lever hardware.

3 Side entrance door is not accessible. Remove interior steps and create exterior ramp/walk with small retaining wall and railings.

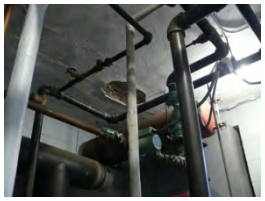
Interior Finishes

1 8x8 vinyl asbestos tiles (VAT) throughout the second floor need to be abated and replaced. On second floor include a plywood sub-floor.



☐ Sheet vinyl has been used to replace the VAT on the first floor but it is unknown whether or not the VAT was first removed.

2 Boiler Room ceiling may possibly contain asbestos. It is damage and should be replaced with a 1 hour fire rated assembly.



3 Kitchen cabinets need to be re-finished (also see accessibility items).

1 Ladder in hose tower does not have protective cage (required by OSHA). Add cage.

Egress

2 The upper level of the building should be provided with a second means of egress.

Attic

☐ The attic space is currently used for storage but does not have a fire rating. The egress stair does not connect to the exit stair from the second floor. (Also see structural report). Storage needs to be moved out of the attic.

3 The attic has been insulated but there does not appear to be adequate ventilation above the insulation. Insulation should be moved to the floor or ventilation baffles added behind the insulation and a ridge vent added.

Roof

2 The roof is used for cooking with a gas grill. A guardrail should be added around this area.

	The gas grille sits on walkway pads but it should be noted that grease will cause premature deterioration of the EPDM membrane.
3	Missing downspouts on rear wing and at front of building should be replaced.

Exterior

2	Exterior Trim, siding and shutters need to be scraped, sanded primed and painted.
3	Block chimney needs re-painting.

Building Envelope:

3	Exterior walls are un-insulated. At second floor add perimeter metal stud wall and fill with insulation to achieve a minimum R-value of 18. Finish interior with a vapor barrier covered by 5/8" painted GWB. Add vinyl base. At first floor repeat approach but with a ceramic tile 30" high wainscot on cement board with painted GWB above.

Mechanical (Please see Mechanical, Electrical, Plumbing and Fire Protection Report) **:**

3	The non-programmable thermostats should be replaced with either stand-alone or better communicating programmable thermostats. Communicating programmable thermostats (similar to Honeywell T7300 series) would allow for programming from a central location. Optionally, a system of programmable thermostats located in a central location with remote sensors would allow for similar programming. Programmable thermostats would provide for fuel reduction by automatically setting back the heating temperature set points during unoccupied hours.
3	A new return duct mounted modulating control damper should be provided for the fan coil system in the attic, and the actuator for the existing outside air control damper should be replaced with a modulating type actuator. In addition to programmable thermostat, supplemental controls generally consisting of an occupancy sensor, a CO_2 sensor, and economizer controls are recommended. As the use of this space is likely sporadic (not scheduled), switching automatically from unoccupied to occupied and vice versa by an occupancy sensor would reduce both fuel and electrical (fan) energy consumption. In the occupied mode, the CO_2 sensor would provide only the amount of outside air required, thereby reducing energy consumption. The economizer controls would allow the introduction of up to 100% outside air when cooling is required,

thereby effectively allowing the system to cool or partially cool the meeting space when the outside air temperature is less than 70°F or so.

Electrical (Please see Mechanical, Electrical, Plumbing and Fire Protection Report**:**

2 Provide exit signs with emergency battery back- up in the path of egress.

3 Update electrical distribution equipment.

3 Update emergency standby generator to handle whole fire station.

3 Upgrade existing lighting and lighting controls to be more energy efficient.

Plumbing (Please see Mechanical, Electrical, Plumbing and Fire Protection Report **:**

No recommendations

Fire Protection (Please see Mechanical, Electrical, Plumbing and Fire Protection Report

No recommendations.

Structural (Please see Structural Report)

Building Recommendations:

Many repairs and modifications are required for this building as noted above but there are also changes that are necessary to overcome operational problems and to satisfy basic needs of the Fire Department.

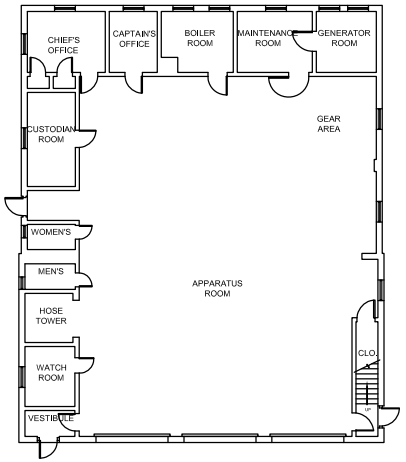
The building has not been up-graded over time and is now suffering from inadequate space and poor working conditions. The above assessment describes the major issues that will need to be addressed to overcome the building problems, but they do not address space needs.

An expansion study was performed in 2000 to meet the requirements of a modern fire department that could serve the town for well over twenty years. We have taken a similar approach but have made some significant changes to accommodate specific requirements of the department.
The department is in need of a new ladder truck but the current bay doors to not provide sufficient height. We have shown a single story addition on the south side of the building that will provide adequate headroom. This addition will constructed in the location of the current septic system. The top of the hill behind the fire department has been percolation tested and will become the new location for the system.

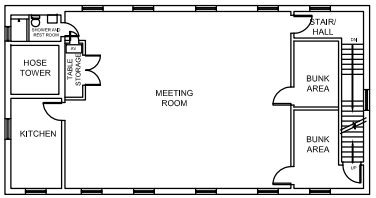
The second floor was reduced in area but the spaces meet normal standards for fire department room sizes. Dead end corridors were eliminated.
A new parking area is proposed behind the building with a new accessible entrance mid way between the two floor. This will be the primary public entrance.
It is mentioned in the assessment that the exit stair on the north side of the building needs to be replaced. It is unlikely that there is adequate space to replace the stair in its current location. If this approach is taken then a more detailed planning process will need to occur to find a better location for the stair (locations include the area of the current watch room with kitchen above; the north west corner or along the north side).

The analysis chart also provides an option for new building on a site to be determined.

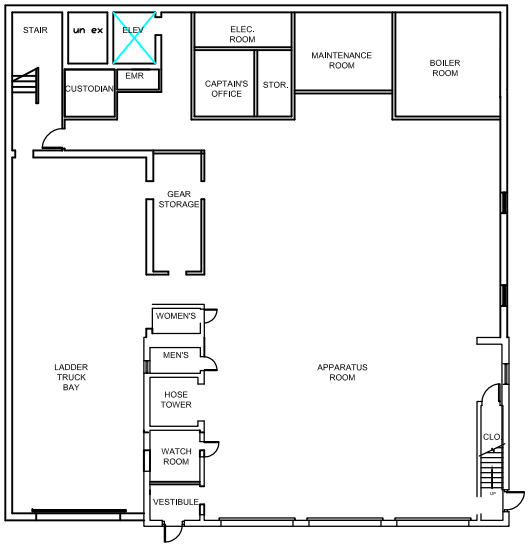
These recommendations are represented in the program chart for the facility and the attached drawings.



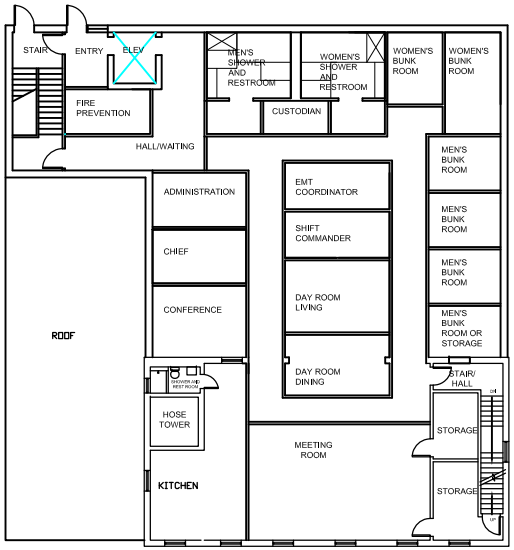
EXISTING FIRST FLOOR
Scale 1/8"=1'-0"



EXISTING SECOND FLOOR
Scale 1/8"=1'-0"



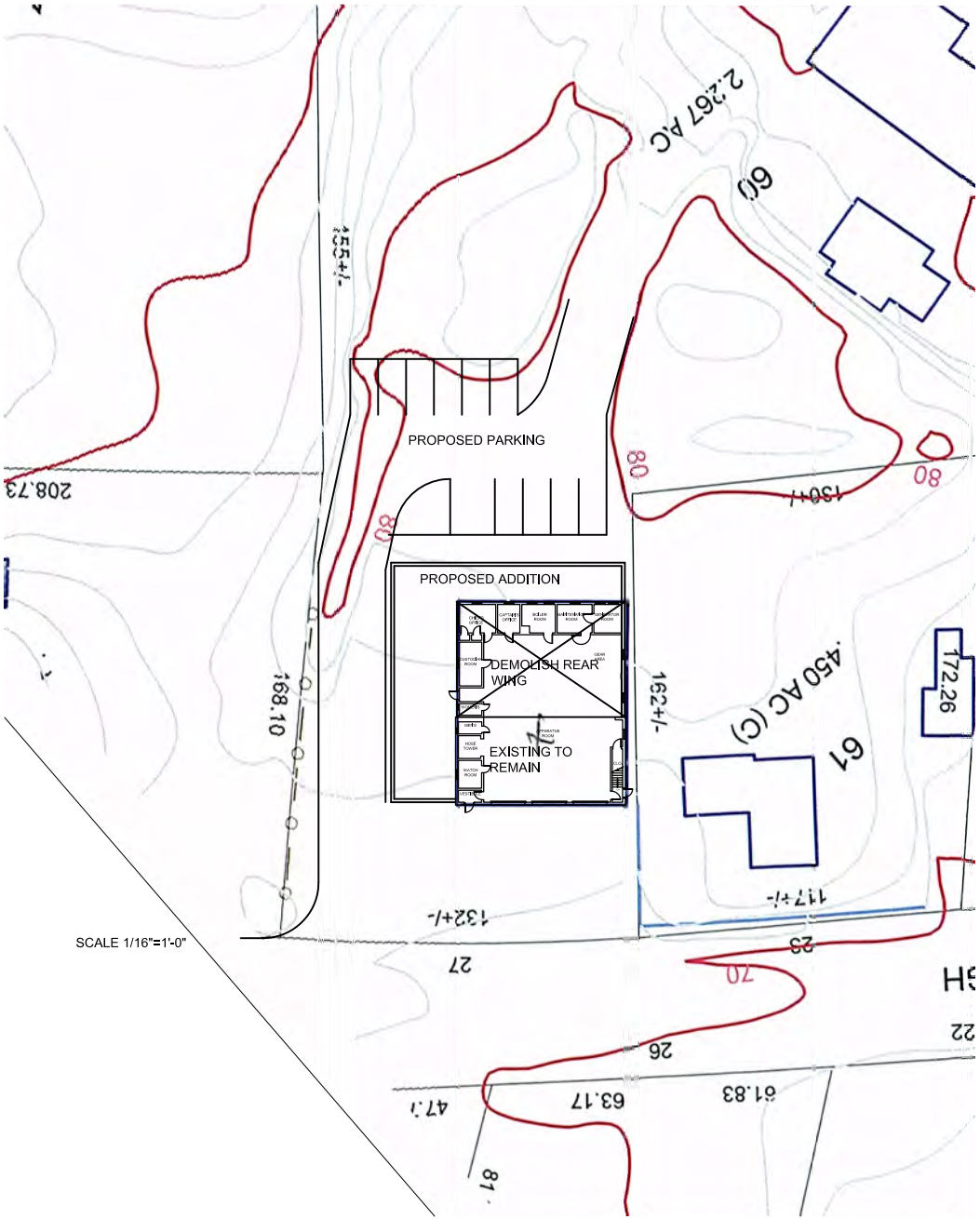
PROPOSED FIRST FLOOR
Scale 1/8"=1'-0"



PROPOSED SECOND FLOOR
Scale 1/8"=1'-0"

D·R·A Drummey Rosane Anderson Inc.

FIRE STATION EXISTING & PROPOSED Topsfield, Massachusetts



D·R·A Drummey Rosane Anderson Inc.

FIRE STATION PROPOSED SITE

Topsfield, Massachusetts

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

FIRE DEPARTMENT

Program Statement

Spaces:	Existing Spaces			Renovations / Additions			*New Building			Comment
	FIRST	SECOND	TOTAL	FIRST	SECOND	TOTAL	FIRST	SECOND	TOTAL	
Chief's Office	146		146		140	140		140		
Captain's Office	81		81	110		110	110			
Administration					140	140		140		
Boiler Room	115		115	304		304				
Maintenance Room	127		127	212		212		200		
Generator Room	102		102			0				
Custodian Room	125		125	66	60	126				
Women's Room	34		34	34		34				
Men's Room	36		36	36		36				
Hose Tower	65		65	65		65	65			
Watch Room	84		84	72		72	75			
Vestibule	36		36	50	65	115				
Apparatus Room	2933		2,933	3,340		3,340	3,000			
Ladder Truck Bay				1,302		1,302	1,300			
Closet/ Stair	70		70	70		70				
Stair				192	192	384				
Elevator Machine Room				24		24	24			
Electric Room				94		94				
Gear Storage				158		158	200			
Shower and Restroom		37	37		37	37				
Mens					205	205				
Womens					205	205				
Bunk Area		196	196							2 Rooms
Mens					426	426		426		4 Rooms
Womens					269	269		270		2 Rooms
Kitchen		127	127		340	340		250		
Day Room Dining					175	175		200		
Day Room					210	210		200		
Table Storage		27	27			0		100		
Meeting Room		1076	1,076		585	585		600		
Stair / Hall		127	127		127	127				
Storage Rooms				64	196	260	150	150		3 Rooms
Fire Prevention					105	105		150		
Conference Room					186	186		200		
EMT Coordinator					134	134		150		
Shift Commander					134	134		150		
Subtotal of net spaces:	**3,954**	**1,590**	**5,544**	**6,193**	**3,931**	**10,124**	**4,924**	**3,326**	**8,250**	*New building does not include any work in the existing fire department building. The 35% is the the unassigned area including public restrooms, MEP rooms, structure and circulation
Circulation and Structure			772			2,969	1,725	1,165	2,890	
TOTAL Gross Square Feet:	**4,403**	**1,913**	**6,316**	**7,250**	**5,843**	**13,093**	**6,649**	**4,491**	**11,140**	
% Circulation and Structure			12%			23%			35%	

Fire Department

Structural

Structural Description:

The Fire Department facility is a two-story (with Attic), wood and steel framed building with perimeter, masonry bearing walls. The two-story main building is rectangular in plan, with a gable roof. The entrance to the building is at the First Floor level on the south (front) side. A one-story annex with a flat roof (pitched east-west for drainage) was constructed on the back (north) side of the main building, housing the back section of the Apparatus Room as well as various support spaces. The site slopes upwards to the north, approximately ½ story. The facility was constructed in the 1970's. No original construction drawings were available.

There are two lines of two interior columns in the Apparatus Room. The northernmost column line supports the northern edge of the Second Floor, along with the northern exterior wall and roof of the main building. The southernmost column line supports the Second Floor only. Gable roof construction in the main building consists of 2x10 (nominal) rafters @20"+/- o.c. clear spanning the Second Floor. Attic Floor joists are 2x8 @20" o.c. and are suspended from the rafters with 2x6 hangers. Main roof construction is supported by the perimeter masonry bearing walls (4" brick veneer and 8" CMU block – 12" total thickness - no cavity). Roof construction at the one-story annex is unknown, but is likely wood framed. Second Floor construction in the main building appears to be wood framed, supported by steel beams over the Apparatus Room. Foundations are assumed to be conventional spread footings with a concrete slab on grade at the First Floor (pitched for drainage in the Apparatus Room).

Structural Conditions:

Structural conditions at the Fire Department facility were observed during a brief tour of the building 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 (refer to additional comments below). Foundations appear to be performing adequately; there are no signs of significant, total or differential settlements. Spaces at the back of the building (where exterior grades are high) appear to be dry.

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

- As noted above, the Attic Floor is suspended from the roof above with 2x hangers. It does not appear that roof rafters have sufficient capacity to support code required snow loads plus any significant storage loads. Further review is advisable In the interim, FBRA recommends that heavy storage loads (e.g. file cabinets, stacked bankers boxes, etc.) be removed from the Attic space.

- There is a potential for relatively significant drifting/sliding snow (from the main building on the southern portion of the one-story Annex roof. Further review is recommended. In the interim, removal of any deep snow accumulation on this roof (adjacent to the main building) is recommended.

- The condition of the exterior brick is generally satisfactory, given the age of the building. Repointing is required in some areas.

Comments/Recommendations:

Massachusetts State Building Code Requirements – General Comments:

Proposed renovations, alterations, repairs and additions to the Fire Department facility 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 (depends on the extent of the renovation/alteration work and/or proposed change(s) in use). In addition, Section 101.5.4.0 of the Massachusetts Amendments (Chapter 34) requires that the existing building be investigated in sufficient detail to ascertain the effects of the 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 will 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 this case) 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.).

Proposed Addition and Renovations - Anticipated Scope of Structural Work:

- Masonry and envelope repairs as noted above and in the Architectural Report.

- Review the roof and Attic structure at the main building and provide reinforcing as required to support storage loading.

- Demolish and remove the existing, one-story annex on the north side of the main building to accommodate the new addition.

- Construct a new, one-story addition that wraps around the existing, main building on the north (back) and west sides. The new addition will have a steel framed roof (steel deck and steel beams) supported by interior steel columns and 8" thick, 100% solid grouted, reinforced masonry perimeter bearing walls (with a brick veneer and cavity). The new addition will be structurally separated from the existing, main building by an expansion/seismic joint. The roof over the new Ladder Truck Bay (west side) will be raised, to provide adequate height clearance (the present Apparatus Room height is marginal). Foundations for the new addition will be conventional spread footing construction. New foundation walls along the most of the east and west sides and the entire north side of the addition will be cantilever retaining walls (16" thick), as exterior grades will be above the elevation of the First Floor. Provide perimeter foundation drainage behind the new foundation walls. Typical First Floor areas will be a 5" thick, concrete slab on grade. The slab on grade in the Ladder Truck Bay will be an 8" thick, reinforced concrete slab on grade.

End of Structural Report

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

Fire Station

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

The heating plant consists of a non-condensing natural gas fired hot water boiler which appears to be fair to good condition. Hot water is circulated throughout the facility via two inline circulators which appear to be in good condition. The configuration of the plant is to provide high temperature water only when the system is operating.

The heating terminal unit serving the apparatus bay is a ceiling mounted hot water unit heater that appears to be in good condition. The heating terminal units serving the ground floor spaces other than the apparatus bay consist of baseboard fin tube convectors and floor mounted cabinet unit heaters which appear to be in fair condition.

The heating system for the second floor generally consists of a fully fan coil unit and ductwork system located in the attic. The fan coil unit generally consists of a fan, a hot water coil, and filters, and it appears to be in fair condition. Supply ductwork distributes supply air throughout the second floor and return air is via a single return grille in the open area. Outside air and exhaust air ventilation is provided via two louvers in shed dormers. There is an automatic outside air control damper but there no return air control damper.

AIR CONDITIONING

The building has no built-in air conditioning systems.

VENTILATION

General ventilation for the apparatus bay is provided by a wall mounted propeller type exhaust fan operated by a manual wall mounted switch. The fan appears to be in good condition.

The apparatus bay is also provided with a local vehicle exhaust system which generally consists of a centrifugal exhaust fan which serves several flexible hose drops from the ceiling to the vehicles in each bay. This system appears to be in good condition.

The other spaces on the first floor are not provided with mechanical ventilation; ventilation is via operable windows.

See Heating for the ventilation system serving the second floor.

TEMPERATURE CONTROLS

The heating and ventilation systems are controlled by manual thermostats.

RECOMMENDATIONS

The non-programmable thermostats should be replaced with either stand-alone or better communicating programmable thermostats. Communicating programmable thermostats (similar to Honeywell T7300 series) would allow for programming from a central location. Optionally, a system of programmable thermostats located in a central location with remote sensors would allow for similar programming. Programmable thermostats would provide for fuel reduction by automatically setting back the heating temperature setpoints during unoccupied hours.

A new return duct mounted modulating control damper should be provided for the fan coil system in the attic, and the actuator for the existing outside air control damper should be replaced with a modulating type actuator. In addition to programmable thermostat, supplemental controls generally consisting of an occupancy sensor, a CO_2 sensor, and economizer controls are recommended. As the use of this space is likely sporadic (not scheduled), switching automatically from unoccupied to occupied and vice versa by an occupancy sensor would reduce both fuel and electrical (fan) energy consumption. In the occupied mode, the CO_2 sensor would provide only the amount of outside air required, thereby reducing energy consumption. The economizer controls would allow the introduction of up to 100% outside air when cooling is required, thereby effectively allowing the system to cool or partially cool the meeting space when the outside air temperature is less than 70°F or so.

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 lunchroom. The service equipment consists of utility metering equipment, 400amp main circuit breaker and distribution panelboard located in the lunch room. The predominance of the main distribution equipment is older but in good condition.

There are a number of electrical panels located throughout the Facility. The predominance of these panelboards are G.E. The G.E. panelboards are combination of older and newer and are in good condition and do not have any spare circuit breakers available.

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 MS-4 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.

There is currently a natural gas fired Onan 30kw emergency standby generator. This unit is older and appears to be in good condition. The generator provides power to most of the building.

Life safety emergency lighting is provided by fixtures in the path of egress and in the stair wells and is feed from the emergency standby generator.

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

RECOMMENDATIONS

Provide exit signs with emergency battery back- up in the path of egress.

Update electrical distribution equipment.

Update emergency standby generator to handle whole fire station.

Upgrade existing lighting and lighting controls to be more energy efficient.

Plumbing

The water closets and the urinal are the low flow tank type vitreous china type and they appear to be in fair to good condition. The lavatories are wall mount vitreous china and they also appear to be in fair to good condition.

A natural gas fired tank type water heater located in the boiler room provides hot water for the facility. It appears to be in fair to good condition.

There is a basin with a sump pump mounted on blocks in the boiler room which appears to be a storm water pump, but the function was not confirmed. It appears to be in good condition.

The water piping system provided in the apparatus bay to fill the vehicles is no longer in use.

Fire Protection

The facility does not have a sprinkler system.

END OF MEP REPORT