

**East Longmeadow  
Town Hall Feasibility Study**

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**September 2000**

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### **East Longmeadow Town Hall Feasibility Study September 2000**

#### Scope:

The scope of this study is to determine the long term office needs of the East Longmeadow Town Hall and to propose locations to house those needs.

#### Survey:

Department heads were surveyed in July 1998 with regard to their office current and prospective needs, inter department workings, and opinions. Questionnaires were sent out to all departments and returned. The building inspector took another survey a year later. This office did a follow-up last month.

#### Current Space Allocation:

Appendix A lists the current uses of the Town Hall. In summary there are 8798 net usable square feet of area, all either well used or jammed tight, save 252 SF of possible basement storage. (This unconditioned space is less than desirable because of high seasonal humidity.) The gross building area is 14,644 S.F. Hence, 60% of the gross is used.

#### Required Space Allocation:

Appendix B lists the prospective ten year additional needs which are net 6760 SF. To this we must add handicap toilets, elevator, janitor's closet, central receiving, etc. = net 7520 which on a 60% net-to-gross basis means adding a gross of 12,530 SF.

#### Where to find space:

There are several possibilities for finding the space that the town offices need in order to properly and efficiently serve their functions:

1. Create an annex for some offices and leave some in the current town hall.
2. Build a new town hall elsewhere and leave the present town hall for some other function.
3. Occupy and modify or expand another building either presently owned by the town or owned by a private party.
4. Add to and renovate the town hall.

#### 1. Town Hall Annex:

In the 7/6/98 questionnaires, several items relating to efficiency of services were made clear. The questionnaires asked departments what their specific functions were, how they related to other departments and about their storage needs. There were some discussions about the possibility of some offices being relocated elsewhere, for example, DPW along with the town engineer and

assistant engineer. There were also questions geared to relocating storage for some departments either remote in the same building or in some other building.

In this town hall, like any other town hall, residents or clientele often conduct business which requires interaction with more than one department or they come for service to one department but may not realize that in fact the service they need is provided by another department. Separating some departments into other buildings would cause some inefficiency if not hardship to the residents or clientele.

When departments need to interact with each other and a phone call will not suffice, being in separate buildings causes inefficiency, wastes time and can be a hardship to the employees.

When storage of books, records or drawings are remote from the department that needs them for frequent reference, it causes inefficiency. For some older records seldom referred to, remote storage is satisfactory and possibly preferable. But in general proximate records and rapid retrieval are required for all but the oldest records.

In the very long term computer diskette or CD storage or micro-fiche may lessen the need for volume storage. However, in the short term and near term alternative means of storage are not likely to appreciably reduce storage volume requirements. Drawings and maps, for example, must be stored by the Building Department, the Department of Public Works, the Planning board, the Conservation Commission, the Zoning Board of Appeals, and the Assessors and new records continue to be created, expanding the need for storage.

Also, the planning of a building or subdivision, for example, may involve all of the same departments which makes a one source building easiest for owner, engineer, architect and contractor as well as for all those departments.

Creation of an annex while possibly cheaper in the short run or while possibly a stop-gap, is ultimately not in the best interest of the town.

## 2. A New Town Hall:

The existing town hall has been shown to be inadequate to meet the town's needs. The existing building with one or more annexes has been shown to be less than desirable from an efficiency standpoint.

The original building is certainly historic and a prominent landmark at the busiest intersection in the town. The brownstone is an East Longmeadow icon. The one story brick and bar joist addition is non-descript but functional. Handicap accessibility is limited. The second floor and basement storage areas are not handicap accessible. Parking is limited. Land area is limited.

A new building could be state of the art in terms of lighting, wiring, HVAC, computer data cable, etc. A new building would mean a new site. If it were a privately owned parcel it would be taken off the tax roles. Required would be a 27,000 SF building with parking for 162 cars.

The zoning ordinance requires maximum site coverage of 25%, which means a site minimum size of 108,000 or about 2 -1/2 acres. Of this about half would be covered by parking.

The cost would probably be:

1.	Site acquisition cost	500,000 +/-
2.	Site development cost	100,000 +/-
3.	27,000 x \$150	4,050,000
4.	Design, engineering, advertising & printing	<u>350,000</u>
		5,000,000 +/-

The town also owns land at Heritage Park, the transfer station, Vineland Avenue and Hamlet Street which could potentially serve as a site for a new town hall. A new building on any of these sites would cost the same as above less site acquisition cost. Note that building a new town hall leaves the existing building vacant and available for adaptive reuse.

3. Addition and Renovation to Another Building:

The former Shawmut Bank building (SBB) has been mentioned in this regard and studied by others. In the May 1998 study by Galliher, Baier & Best Architects it was noted that the SBB had 8800 SF on each of two floors. This would require a 9400 SF addition plus renovation of the existing SBB. There are 50,825 SF on the site that leaves 37,325 for 115 parking spaces which is slightly short of the 162 needed. Presumably another 20 could be obtained from the town.

The total cost is likely to be:

a.	Purchase of SBB	700,000. +/-
b.	Renovation of SBB: 17600 x \$80 =	1,405,000.
c.	Site development costs	40,000. +/-
d.	Addition cost 9400 SF x \$150 =	1,410,000.
e.	Design, engineering, advertising & printing	<u>243,000</u>
		3,798,000.

Note that this cost is only \$ 500,000 less than the cost of a new building on town property.

4. Addition and Renovation to the Town Hall:

Location and sentiment both factor into this as a preferred solution if the cost is favorable or comparable.

Addition can be accomplished in several ways. The southeast side along Maple Street and the rotary would not be favorable because of the setting and the potential to obstruct traffic visibility. The rear toward the west would be possible if a second floor were added on top of the first and some of the library were annexed, or if all of the existing library were annexed. The second floor alone above the existing town hall addition would be only 5220 SF. However, it must be noted that adding another floor also means restructuring the existing roof. The existing library alone is about 14,000 SF.

However, the library has already done a study, had preliminary plans drawn up, applied for and received a grant, had a fund-raiser, and solicited for architects for a construction project. The construction project does not include annexing space to the town hall. It seems to be almost a foregone conclusion that the library project will proceed with an addition to the west, that the

former fire station will be razed for parking and the town hall will be required to seek another space.

It has always seemed to this writer that the best overall plan for the town hall / library, both of which are overcrowded, would be for either one to take over the entire complex and to relocate the other. If the town hall moved into the library, the library could possible move to:

- a. An addition to and renovation of the former fire station
- b. Inside the circular drive at the high school or at the location of several houses in front of the high school
- c. In conjunction with the new Birchland park Middle School or out in front of it along Hanward Hill Road.
- d. Vineland Avenue, Hamlet Street, Heritage Park or the transfer station

Assuming this line of reasoning is moot, the remaining option is an addition on the right side of the town hall along North Main Street and/or into the rear parking lot. This would require the acquisition of already improved land along North Main Street by negotiation or by eminent domain. This could include the flower shop and/or the travel agency and/or vacant land to the north of the travel agency owned by Pride Convenience Stores. This would add about 36,000 SF total and the possibility of adding about 100 parking spaces

Parking on the town hall/ library site is currently a problem. There are only 86 marked spaces (92 if six unmarked ones behind the fire station are counted.) Ignoring the fire station, the ordinance requires 6 spaces per 1000 SF. The town hall/library complex currently contains 28,000 SF gross, which means 168 spaces or nearly twice what are available.

The preliminary addition site plan for the library 1/28/97 shows only 78 spaces to serve the town hall/library complex with a library addiiton of about 9000 SF and the old fire station demolished. Required would be 222 spaces. Therefore, approval of this plan alone would require a variance.

However, if the town hall were to put an addiiton of 12,500 SF on its north side to come up to 27,000 SF gross, the total required parking space count would be 300 spaces and the total possible would be about 150 if the town acquired all three parcels. Furthermore the lot coverage would be 31% or 6% above the allowable 25%.

Therefore, this plan or even the town hall addition alone would require a variance

The cost of this plan would be approximately as follows:

a.	Purchase and demolition of the flower shop	157,000 *
b.	Purchase and demotion of the travel agency	216,000 *
c.	Purchase of the Pride Convenience Store's property	94,000 *
d.	Addition to the town hall 12530 SF @ \$150	1,880,000
e.	Renovation of 14,640 SF existing @ \$80/ SF	1,171,000
f.	Design, advertising, printing	<u>260,000</u>

Total \$3,778,000

These figures ar established by adding 15% onto the assessed values, which should be reasonably close according to the assessor's office. However, a local business owner and abutter has stated that he already has a purchase and sale option on the Pride Convenience Property for

upwards of \$300,000, not \$94,000. And if the other two businesses were required to relocate the town could face costly legal challenges

In this scheme a two story addition with an elevator could be constructed in the location of the flower shop with an elevator also serving the original town hall. The remaining two parcels would become parking.

Further complicating the town's and the library's need for space is the desire of some surrounding businesses to expand. There are preliminary plans for expansion of the health clubs by 8000 SF and for demolition of the SBB in order to build a one story retail building. The same principal is a partner in owning the health club, the SBB, the hardware store complex and most of the land between Crane Avenue and North Main Street. Exceptions are the historic house, the former fire station, the library-town hall complex, the flower shop and the travel agency. The same principal has stated that he holds the option on the Pride Convenience Property.

The principal has proposed the possibility of shared parking whereby the back property between Crane Avenue, Maple Street and North Main Street would contain about 435 spaces which would serve the library with addition, the town hall with addition, the health club with addition, and the retail space replacing the SBB. The historic house would be relocated onto other town property and the former fire station demolished according to the library plan.

Even though the zoning ordinance doesn't recognize shared parking, there is some merit to the concept. The health club has daily peak use in the morning before 8:00 a.m. and in the afternoon after 4:00 p.m.. The town hall has fairly steady traffic between 8 and 4 but some evening meetings after 7:00 p.m. The library has light traffic except from after school into the evening hours and some special programs, usually evenings. Retail space depending on its character has a variation in its heavy traffic. It's normally light during the morning commute hours, light during the day and heavier during the evening commute. Video stores and restaurants are busier evenings, and especially weekends.

Paving many acres simply to comply with the letter of the ordinance doesn't serve the best interest of all parties if the parking spaces are vacant much of the time. However, if peak parking demands were frequently at the same time leaving patrons with insufficient parking and tying up traffic around a busy rotary there would be hardship to all including hazardous driving conditions. The solution to this problem is somewhat beyond the scope of this study and somewhat ahead of this possible proposal which hasn't been formally advanced. Nevertheless it makes sense to this writer to consider the idea because if the town were to eventually approve it there would be a net dollar saving, because the town would purchase less property and gain in tax revenue.

## East Longmeadow Town Hall

<u>Current Net S.F. Areas</u>	<u>Totals</u>	<u>Long term Additional Needs</u>
Selectmen	503	
Admin. Asst.	238	1069
Meeting Room	328	
Accountants		
Acct.	85	
Office	245	330
Assessors:		
Office	490	
Meeting Room	245	735
Town Clerk:		
Clerk	125	
Office	1177	
Aux. Office	150	1803
Vault	127	
Satellite vault	202	
Closets	22	
Building Inspector	143	
Basement storage	36	179
Planning Board		
Planner	126	
Conservation Comm.	188	
Meeting Room	620 + 80	1067
Closets	53	
Computer Networking	238	238
Public Works Dept:		
Engineer	221	
Asst. Engineer	154	
Office	543	1487
Plan Room	569	
Lunch Room	150	
incl. storage	75	225

Janitor's Room	248	248
Meeting Rooms storage	200 + 400	
Planning and Town Clerk Basement Archives storage	300	300
Basement empty storage	252	252
Basement Mechanical Boiler Room	200	
Oil tank	192	392
Toilet rooms	221	
Janitor's closets	252	473

Total Gross Area = 14,644 SF  
(Remainder is stairs, halls, vestibules, lobbies, ramps, wall thickness)

% usable area is:  $\frac{8798}{14,644} = 60\%$

It is recognized that the existing percent of usable area is somewhat (though not exceedingly) low because of two factors:

1. The building is an original 3 floor basement, first, and second with a one story addition
2. The original building is brownstone with thick walls.

Mitigating square foot factors are:

1. All spaces are well used except some of the basement
2. There is no elevator or elevator lobby.

**ADDITIONS AND RENOVATIONS TO  
THE EAST LONGMEADOW TOWN HALL  
EAST LONGMEADOW, MASSACHUSETTS**

**MECHANICAL/ELECTRICAL SYSTEM ANALYSIS**

MECHANICAL BY: MARVIN BLAKLEY  
ELECTRICAL BY: MAURICE L. CAMPBELL

**MECHANICAL**

**A. GENERAL**

This report describes the observed conditions of the existing heating ventilating, and air conditioning systems in place at the East Longmeadow Town Hall, East Longmeadow, Massachusetts. It also proposes corrective action to meet the current building and mechanical codes, provide adequate ventilation and thermal comfort and to improve the reliability and dependability of the system.

The existing building encompasses a gross area of 14,500 square feet on three levels. The Town Hall offices are located on the first and second floors of the original building with a basement level which houses the boiler room, oil storage tanks, and general storage. The "Annex" building is an addition to the first floor level of the Town Hall.

The building envelope is stone and masonry construction with a moderate wall-to-glass ratio. The building has minimal insulation, single glazed windows, and in consideration of its age and usage, appears to be in generally fair condition.

Although the Town Library is connected to this facility this report does not address those conditions as they are independent systems and do not interconnect with this project..

**B. HEATING, VENTILATING, AND AIR CONDITIONING**

**Existing Conditions**

The Town Hall Annex is a single story addition built in 1967, which is served by a gas-fired rooftop heating and air conditioning unit installed in 1995. The duct distribution system provides outside air ventilation and is controlled with variable air volume diffusers.

The Town Hall building is heated from a single oil-fired Weil-McLain BL-6768W, 3.8GPH steam boiler with a capacity of 350,000 Btuh and is 23 years old. The No2 fuel oil storage is also in the basement and houses four (4) 330gallon fuel oil tanks installed 3 to 4 years ago.

The heat is distributed throughout the Town Hall by individual terminal units, i.e., convectors, radiators via a 2-pipe steam distribution system. It appears that asbestos pipe insulation may be present and should be tested for verification.

The first and second floors of the Town Hall are presently air conditioned with a four (4) ton split a/c system for the 1<sup>st</sup> floor and a 7 ½ ton split a/c system serving the second floor. The units introduce outside fresh air ventilation when in operation during the summer. These systems were installed in 1995 and appear to be in good condition.

### Deficiencies

The existing steam boiler was manufactured in 1977, and it appears to be in fair condition. The system is controlled by a single thermostat, which makes it difficult to control temperature and provide functional zone control. The existing steam system is inadequate to properly control the temperature in individual spaces. The steam and condensate piping is in poor condition and its longevity is impossible to determine.

During the heating season, there are no provisions for the introduction of mechanical ventilation air to individual spaces however; the operable windows can be used for natural ventilation.

It is the opinion of this office that the existing boiler does not have the capacity to provide heating for any future additions or expansions of this facility.

### Corrective Action

The recommendations in this section are directed to the corrections required to provide proper heating ventilating and air conditioning of the existing facility and to provide the services for the proposed addition of this complex. Since ventilation and indoor air quality have a major effect on the proper environmental control, this office has included options to improve these components.

The following options are the recommended corrective action with option I addressing only the existing building since the heating system is in poor condition and by today's standards does not distribute heat evenly and does not have provisions for mechanical ventilation. Options II and III address the entire facility, which includes the existing building and proposed new addition.

### **Option I- New Heating System – Existing Building**

Replace the existing steam boiler with a new oil or gas fired hot water boiler of adequate size to serve the existing Town Hall complex. Install new boiler controls to reset water temperature based on outside air temperature. The hot water system will be zoned with circulating pumps and be complete with a new hydronic piping system including piping and controls. Provide duct-mounted hot water heating coils in the existing first and second floor air conditioning units to allow their operation during the winter to supply ventilation air throughout the existing duct distribution system.

Replace and/or convert existing terminal heating units and connect with new piping and individual controls. The existing air conditioning system will remain in operation.

### **Option II- New HVAC System – Hot Water Heating**

Similar to option I except the new boiler would be sized for both the existing and new building to distribute hot water heating throughout the complex. Provide additional zoned circulating pumps for distribution to the new addition equipment.

The hot water system in the addition will provide individual space control utilizing perimeter hot water baseboard heat and will supply new central packaged/or split system hot water heating and electric air conditioning units.

This option will provide a central mechanical system with “State of the Art” equipment and temperatures control.

### **Option III- New HVAC – Gas Heating**

Same as option I except the new addition would be served by separate gas-fired rooftop packaged heating and air conditioning units. Heating and air conditioning will be distributed through central duct distribution systems with zoning accomplished with multiple units or variable air volume controls.

## **C. PLUMBING**

### **Existing Conditions**

The existing plumbing system i.e. piping, fixtures and equipment are in fair condition with the age of the fixtures unknown. The majority of the sanitary and vent piping is cast iron or galvanized pipe and all water piping is copper and brass.

The building is served by an existing 1 1/2" domestic water service, which is located in the basement level of the Town Hall.

The domestic water is heated with two (2) electric water heaters located in the basement and have a hot water re-circulation line.

- a. Sepco 40-gallon heater (2) 4,500-watt electric elements.
- b. A.O. Smith 50-gallon heater (2) 4,500-watt electric elements.

Both heaters appear to have been recently replaced and are in good condition although the existing plumbing fixtures presently serving this facility are old; they appear to be in good operating condition. One existing toilet room on the first floor is handicap accessible.

### Deficiencies

The domestic water mains and branches are predominately original brass and are in poor condition. All sanitary piping is original and has exceeded its life expectancy.

The present plumbing code requires all lavatory faucets in public buildings to be equipped with metering faucets.

### Corrective Action

Provide new metering faucets on all lavatory faucets. Replace all water piping in the basement with copper tubing and shut-off valves. Re-insulate all domestic water piping.

## **D. FIRE PROTECTION**

### Existing Conditions

There is not presently a fire suppression system or standpipes installed in this facility.

### Deficiencies

The present building Code requires all business occupancies 12,000 square feet and over to have a fire sprinkler system installed during any renovations, which are valued at more than one third, the assessed value of the building.

New building construction greater than 12,000 square feet will be required to have a fire sprinkler protection system. Since a new service is required for the proposed addition, it would be recommended to extend the sprinkler system to the existing building to provide life safety protection.

**Corrective Action**

Install a new fire sprinkler system throughout the new and existing building. The new water service will be provided with backflow protection. New piping can be installed exposed or concealed in new soffits.

**E. Cost Estimate**

**HVAC**

Option I	Existing.....	\$145,000
Option II	New & Existing.....	\$295,000
Option III	New & Existing.....	\$265,000

**Plumbing**

12,500 Square Feet New Addition.....	\$62,500
14,500 Square Feet Existing Building.....	<u>\$25,000</u>
	\$87,500

**Fire Protection**

12,500 Square Feet New Addition.....	\$28,125
14,500 Square Feet Existing Building.....	<u>\$32,625</u>
	\$60,750

## ELECTRICAL

### A. GENERAL

This report describes the observed conditions of the existing electrical building systems at the East Longmeadow Town Hall, East Longmeadow, MA. It also proposes methodology to correct any noted deficiencies and to improve the integrity, reliability and dependability of these systems

It should be noted that the Town Hall and the Library share common electric utility services. Hence both buildings will be discussed in this report.

### B. DESCRIPTION

The East Longmeadow Town Hall is located in a Municipal Complex that is comprised of the Town Hall and a Library. The original structure is approximately 100 years old. The indications are that there has been two additions made to the original building.

The complex is currently occupied as follows:

- |    |           |                     |
|----|-----------|---------------------|
| a. | Town Hall | 14,500 square feet. |
| b. | Library   | 11,000 square feet. |

Total size of the Municipal Complex is 25,500 square feet.

### C. CODE REVIEW

Whereas the electrical building systems in this facility are approximately (33) thirty-three years old and whereas casual field observation indicates that they were in code compliance at the time of installation, any major renovation/addition to the building requires upgrading the electrical building systems to meet current requirements of the applicable Local, State and Federal codes.

### D. PHYSICAL CONDITIONS

#### 1. Primary Electrical Service:

The primary electrical service is an underground service lateral from the Massachusetts Electric Co. (MECO) underground distribution system on Maple Street. To a MECO pad mounted transformer located at the south side of the building.

#### 2. Secondary Electrical Distribution:

The main distribution panelboard (MDP) serving the complex is located in the Annex and has the following rating:

1200A, 120/208V, three phase, 4 wire.

3. The library is currently fed by a 200A, 120/208 three phase service, from the MDP.
4. Based on casual field observations the electrical distribution system appears to be in fair condition.
5. Federal Pacific Equipment Co. (FPE) which is no longer in business manufactured the MDP. Spare parts for FPE switchgear are costly and difficult to obtain.

6. System Ground:

The electrical distribution system is a four-wire system. There is no segregation between the equipment grounding conductor and the neutral conductor.

7. Wiring Method:

- a. The wiring for this building is comprised primarily of conduits. Some modernization work was done on the first and second floors. There were also some circuits extended with the use of wiremold surface raceways.

8. Lighting:

a. Interior Lighting

Light fixtures in this facility are primarily surface mount fluorescent fixtures with T12 lamps and wraparound acrylic lenses. Based on our observations all fixtures appear to be in fair condition.

b. Emergency Lighting

The emergency light system is comprised of wall packs augmented by power packs with remote heads. Casual field observation indicated that these were in fair condition.

c. Exterior Lighting

The exterior light fixtures are primarily HID fixtures. A number of the fixtures were in poor condition. It was also noted that there was a wall wash light fixture on the south side of the building that was defective.

9. Emergency Generation System:

- a. There is no emergency generator currently at the East Longmeadow Town Hall.

10. Fire Alarm System:

- a. The Fire Alarm Control Panel is comprised of four zone conventional panel located in the basement and a remote annunciator located in the Annex. The system is zoned as follows:

1. Library
2. Annex
3. Town Hall
4. Town Hall

11. Telephone System:

a. The telephone backboard, punch down blocks and switch are located in the basement. There are a number of abandoned telephone cables, which should be removed.

E. **ADDITION/RENOVATION:**

The following are proposed addition to the complex.

- a. Town Hall - 12,500 square feet resulting in a total of 27,000 square feet.
- b. Library - 9,300 square feet resulting in a total of 20,300 square feet.

With the proposed addition the resulting size of the Municipal complex will be 47,300 square feet.

- 1 With the proposed additions to the Municipal Complex the Town of East Longmeadow should review the relationship between the two buildings in the Complex and determine whether or not they will continue to share there electric utility service.

F **REMEDIAL:**

- a. Replace Main Distribution Panel with new equipment.
- b. Upgrade secondary electrical distribution system.
- c. Upgrade fire alarm system
- d. Install computer Grade power distribution system.
- e. Install Security System.

**G. COST ESTIMATE (RENOVATION/ADDITION)**

**1. Alternate No.1**

Single Electrical Service for Municipal Complex (Town Hall & Library):

<u>Description</u>	<u>Approx. Cost</u>
1. Electrical Service /Distribution System Upgrade .....	\$40,000.00
Including but not limited to the following:	
a.    New electrical service to the building Including pad-mount transformer installation.	
b.    New Main Distribution Panel.	
c.    New secondary distribution system including Wiring to Sub-panels.	
2. Fire Alarm System.....	\$12,000.00
3. Security System (Town Hall).....	\$5,000.00
4. Lighting Upgrade(Town Hall).....	\$8,000.00
5. Computer Grade Power Distribution (Town Hall).....	\$15,000.00
6. New Addition (Town Hall)	<u>\$80,000.00</u>
Total Electrical Modernization Costs	<u>\$160,000</u>

**2. Alternate No.2**

Separate Electrical Service for the Town Hall

<u>Description</u>	<u>Approx. Cost</u>
1. Electrical Service /Distribution System Upgrade.....	\$27,000.00
Including but not limited to the following:	
a.    New electrical service to the building Including pad-mount transformer.	
b.    New Main Distribution Panel.	
c.    New secondary distribution system including Wiring to Sub-panels.	
2. New Fire Alarm.....	\$8,000.00
3. Security System (Town Hall).....	\$5,000.00
4. Lighting Upgrade(Town Hall).....	\$8,000.00
5. Electrical Distribution System (Town Hall).....	\$15,000.00
6. New Town Hall Addition.....	<u>\$80,000.00</u>
Total Electrical Modernization Costs:	<u>\$143,000</u>

**H. Recommendations:**

a. This office recommends the modernization of the electrical power system and signal systems in the existing Town Hall to facilitate the new technology equipment and be compatible new addition. Estimated Costs are as follows

1.	Renovation	<b>\$80,000.00</b>
2.	Addition	<b>\$80,000.00</b>

b. That the Town of East Longmeadow resolves the issues with the utility services.



East Longmeadow Town Hall  
Structural Evaluation

Scope of Report

This report reviews the present edition (6th edition) of the Commonwealth of Massachusetts Building Code (780 CMR) and provides a synopsis of the structural analyses and evaluations required by code for renovations of existing buildings. In addition, this report provides an opinion relative to the existing condition of the building.

Existing drawings were not available to indicate the details of the original construction. Testing services (non-destructive or destructive) were beyond the scope of this report. This report's purpose is to evaluate visible conditions where possible. This should aid in the decisions needed leading to the preparation of construction documents.

This report does not discuss the condition of non-structural items. Based on the work done and the Code review, the following observations and comments are offered:

Field Survey

Section 3408.0 of Article 34 of 780 CMR, "Repair, Alteration, Addition, and Change of Use of Existing Buildings", governs the structural assessment of existing buildings. Based on this section of the Code, it is my opinion that a full investigation of the existing structure affected by renovation is required and warranted. Since drawings of the building are not available, a field investigation of areas to be renovated or affected by renovations will be necessary to determine the actual layout and size of the existing structural elements (beams, columns, slabs, and walls). If original drawings were available, it is my opinion that these could be used as a basis for the required evaluations (See Section 3408.3.2.1). Additions and alterations which are not affected by renovation would not require these evaluations.

Code Review of Structural Assessment Requirements  
Applicable Code Requirements

The following sections of the Code are cited as a basis for the general comments above:

Section 3408.2 - requires the structural evaluation of the existing building to determine the adequacy of all structural elements that are affected by alteration, change of use or damage to be repaired.

Section 3408.2.1 - requires a field investigation sufficient to determine the location, size, details, and conditions of existing structural elements.

Section 3408.2.2 - indicates that a structural analysis adequate to demonstrate the ability of new and existing systems to support required loads must be made.

Section 3408.3.2.1 - the strength of existing materials shall be determined by tests or from generally accepted historical records.

Section 3408.3.8 - existing damaged structural members with capacity less than 85% of the required capacity shall be repaired, replaced or reinforced.

Section 3408.5.1 - indicates that the load capacity of all floors shall be sufficient to support Code required loads except as provided in Section 3408.5.2. This section allows posting of originally approved live loads provided use is controlled except in use groups F, I, or S (factory, institutional, or storage respectively).

Section 3408.5.4.1 - indicates the Seismic Hazard Category which a renovation will fall under. This number determines the scope of the seismic analysis which must be made.

Seismic Hazard Category 1 - Renovation must cost less than 50% of the assessed value of the building. This category may be applicable.

Seismic Hazard Category 3 - If the renovation cost is more than 50% of the assessed value of the building and a change in use to Seismic Hazard Exposure Group III (Table 1612.1.5) is planned, the renovation would be assigned a seismic hazard category of 3 and compliance with the Code for new construction would be required. Uses in Exposure Group III include fire or police stations; institutional use I2; emergency preparedness centers; post earthquake recovery vehicle garages; power generating stations; primary communications facilities; and high toxic material facilities. This category is not applicable.

Section 3408.6.4 - Where compliance with the code for new construction is required, masonry walls must: 1.) be adequately tied to the structural elements; 2.) have an unbraced length or width less than an allowable level and 3.) be of sufficient strength to resist required earthquake forces from article 1612.7.

Seismic Hazard Category 2 - for all other changes in use or no change in use the renovation would be assigned a seismic hazard category of 2. If the cost of the renovation is more than 50% of the assessed value of the property or if the occupancy is raised by more than 25% to 100 or more, this category would be applicable.

Section 3408.5.4.4 - For seismic hazard category 2 renovations, the earthquake resistance needs to comply with section 3408.3.5 and 3408.6.3.

Section 3408.3.5 - Alterations shall not be made to elements contributing to the lateral load resistance of a building which would reduce their capacity to resist lateral loads unless an analysis as required shows that 1.) the lateral

load resisting system of the building as altered conforms to the code for new construction or 2.) the lateral load resisting system as altered conforms to minimum load requirements of Article 3408 and that there is no reduction in the lateral load capacity of the building as a whole. Existing elements may be reinforced or replaced with new elements of equivalent strength and stiffness to meet these requirements.

Section 3408.6.3 - Special earthquake hazards (parapets, masonry walls, and precast concrete) shall be evaluated and reinforced or repaired. Parapets shall be removed, braced or reinforced. Masonry walls shall be tied at the tops to the floor or roof structures above to resist 100 pounds per lineal foot. Interconnections of precast concrete structural elements shall be investigated and reinforced if necessary.

Section 3408.7 - Renovations assigned a Seismic Hazard Category of 2 are required to have the existing foundations and subsoils evaluated to determine that the existing foundations are not subject to failure from liquefaction of the sub-soils in accordance with 780CMR 1805.3. Borings will have to be taken to determine the liquefaction potential of existing soils. If liquefaction is a problem, the existing foundations will have to be reinforced to limit the effects of the liquefaction.

#### Vertical Load Evaluations

The projected future use of the building will govern the loads required to be carried by the floor framing. Under the present Code, offices are required to carry live loads of 50 pounds per square foot (psf); open and assembly areas are required to support 100 psf; corridors above the first floor need to support 80 psf. No upper floors are presently anticipated as storage areas. Existing members can be deemed sufficient if they are capable of carrying 85% of the required loadings if no changes in use or loads are imposed.

#### Seismic and Wind Load Analysis

The Code requires that seismic evaluations of the existing structures be made. The extent of this analysis and the scope of the repairs required depends on the "Seismic Hazard Category" assigned as described in detail below.

For renovations with a "Seismic Hazard Category" number of 1 or 2, alterations to systems contributing to lateral load resistance may not be made without adding elements of equivalent stiffness unless the lateral load resisting system conforms to the code for new construction. Existing systems do not meet present Code requirements for new construction.

For projects with a Seismic Hazard Category of 2, an evaluation of the liquefaction potential of the existing soils must be made. If necessary, the subsoils and/or foundations must be improved to prevent failure in the event liquefaction occurs. In order to perform this analysis, soil boring information must be available to determine the

existing subsoil profile. If liquefaction is determined to be a problem, repair costs of the existing foundations would probably be prohibitive. In addition, special earthquake hazards from parapets, masonry walls and precast concrete structures must be evaluated and reinforced if necessary. Plans for new construction must be done in a manner which limits the removal of existing structural systems or structural repair costs could increase considerably.

Existing systems which contribute to the lateral stability of the building may be considered to participate in resisting lateral forces. Existing structural systems (steel, concrete, or masonry) do not need to conform to the requirements of Article 18 to 23. Existing unreinforced masonry may remain subject to the limitations of article 3408.6.4 of the Code. These walls must be adequately tied to the structure and have a limited unbraced height or length. In addition, these walls must be of sufficient strength to resist the required earthquake forces.

### Additions

An addition over the existing one story office area would require restructuring of the existing framing and investigation of the existing foundations which are not visible. While the existing roof structure at this area is not visible, it would have been designed to support on the order of 15 psf of dead load and 35 psf of snow load. A new second story would be required to carry dead loads of 20 psf if wood framed and 70 psf if framed with steel and concrete. In addition, live loads of 50 psf and partition loads of 20 psf would be required. The existing roof framing and columns are unlikely to be able to support this additional load. If a second floor is added over the one story area, it is my opinion that the increased area and load would be considered as an addition under Section 3408.3 - "Earthquake Loads" of the Mass. Code. Under Section 3408.4.3.2 - Additions Not Structurally Separated, "If both the area and weight of the building are increased by less than 10%, earthquake resistance of the existing portion of the building need only comply with the requirements of 780 CMR 3408.3.5." If either the area or weight is increased by more than 10%, reinforcement of the existing structure would be required. Costs to upgrade the existing structure to meet Code Seismic requirements in this case could be prohibitive. It is therefore my opinion that adding a floor over the existing one story section is not likely to be a cost effective solution.

### General Comments About Existing Building Conditions

#### Floor Framing

The original building is supported on exterior masonry walls and on interior wood girders supported on brick piers at the basement. Wood floor joists at the first floor frame to wood girders. Wood girders appear to have been added at the perimeter of the building in the basement to support the

first floor joists. These are supported on brick piers abutting the original stone foundation. It is my opinion that these were probably added after the original construction to support the first floor because of sill rot at the exterior sills. At the front of the building near the staircase, where the girder was not added (probably due to interference with piping in the basement) the floor has noticeably sagged at the exterior wall. Second floor framing is assumed to also be wood floor joists framing to wood girders. Roof framing is wood rafters spanning to interior wood trusses and exterior bearing walls. The sizes of the existing structural members were not visible. Based on the condition of the existing finishes, it is my opinion that they are probably capable of supporting Code required loads.

The roof structure at the one story section of the building is not visible. However, it is unlikely to be able to support floor loadings. Therefore an addition over this section of the building would require the restructuring of the existing framing.

#### Foundation

The existing foundation of the original building is a stone foundation at the full basement. This foundation is generally in fair condition. No major failures of this foundation were visible. Wood framing is supported on brick piers. Several of these piers are in poor condition and should be replaced. Water problems appear to have existed in several areas of the basement. It is unknown whether these problems have been solved.

#### Other Considerations

The amount of seismic reinforcement required will depend on the decisions made during design and development. Existing masonry shear and bearing walls should be left intact. The design phase will need to incorporate structural considerations carefully in order to minimize structural reinforcement costs. Should you have additional questions or need further information, please contact me.

  
William M. Barry, PE

