A redevelopment feasibility study for

Upton Town Center

June 2025

BSC GROUP

PREPARED FOR

The Town of Upton, Massachusetts

Photo: Holy Angels Church – October 2024

Acknowledgments

This project was funded by the Commonwealth's Housing Choice Grant Program.

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Contents

Section 1. Introduction

Through a FY2024 One Stop for Growth, Housing Choice Grant Program award, the Town of Upton, Massachusetts received a $50,000 grant to hire a consultant, to complete a building rehabilitation feasibility and pre-permitting study for the redevelopment of 3 Milford Street, the former Holy Angels Church. The purpose of the study is to identify environmental resources, conceptual redevelopment layouts, potential permitting requirements, and an opinion of probable costs, as well as grants and other funding sources for redevelopment options.

Project Overview and Scope

This redevelopment feasibility study includes four properties in Upton Town Center – 1 & 3 Milford Street and 0 & 2 Grove Street. Of these, 3 Milford Street (Holy Angels) and 0 Grove Street and 2 Grove Street (vacant lots used for parking) are Town owned parcels while 1 Milford Street (also known as the Arcade block) is a privately owned parcel. The project scope includes the following elements:

- Field Visit/Resource Delineation
- Existing Conditions Review
- Proposed Conceptual Redevelopment Scenarios
- Permitting & Environmental Analysis
- Final Redevelopment Design Scenario

Purpose

A key element of this study is to explore redevelopment options, including housing, for the former "Holy Angels Church" and the adjacent properties. This effort builds upon the 2019 Upton Center Visioning Project and includes consideration of the upcoming MassDOT roadway improvements.

Because of the limited opportunity for housing within the existing church structure, this study explores different options for providing additional new housing units within Upton Center. The preferred concept plan developed through this effort would allow for the construction of two new mixed-use buildings yielding approximately nine (9) new housing units and a net gain of five (5) new units.

Review Process

The Town's Economic Development Committee served as the sounding board for this project, reviewing concept plans and recommendations and offering critical feedback. Meetings with the committee occurred on December 23, 2024, January 30, 2025, and March 27, 2025.

In addition, in March 2025, the Town's Planning Department submitted a request to the Conservation Commission for an Abbreviated Notice of Resource Area Delineation (ANRAD) for the study area and confirmation of the resource areas.

The Select Board received a presentation with the opportunity to comment on the draft conceptual analysis at the April 15, 2025, meeting.

On May 12, 2025, Town Meeting voters approved an appropriation of $35,000 for the continued evaluation of the Holy Angels Church building.

FOCUS AREA

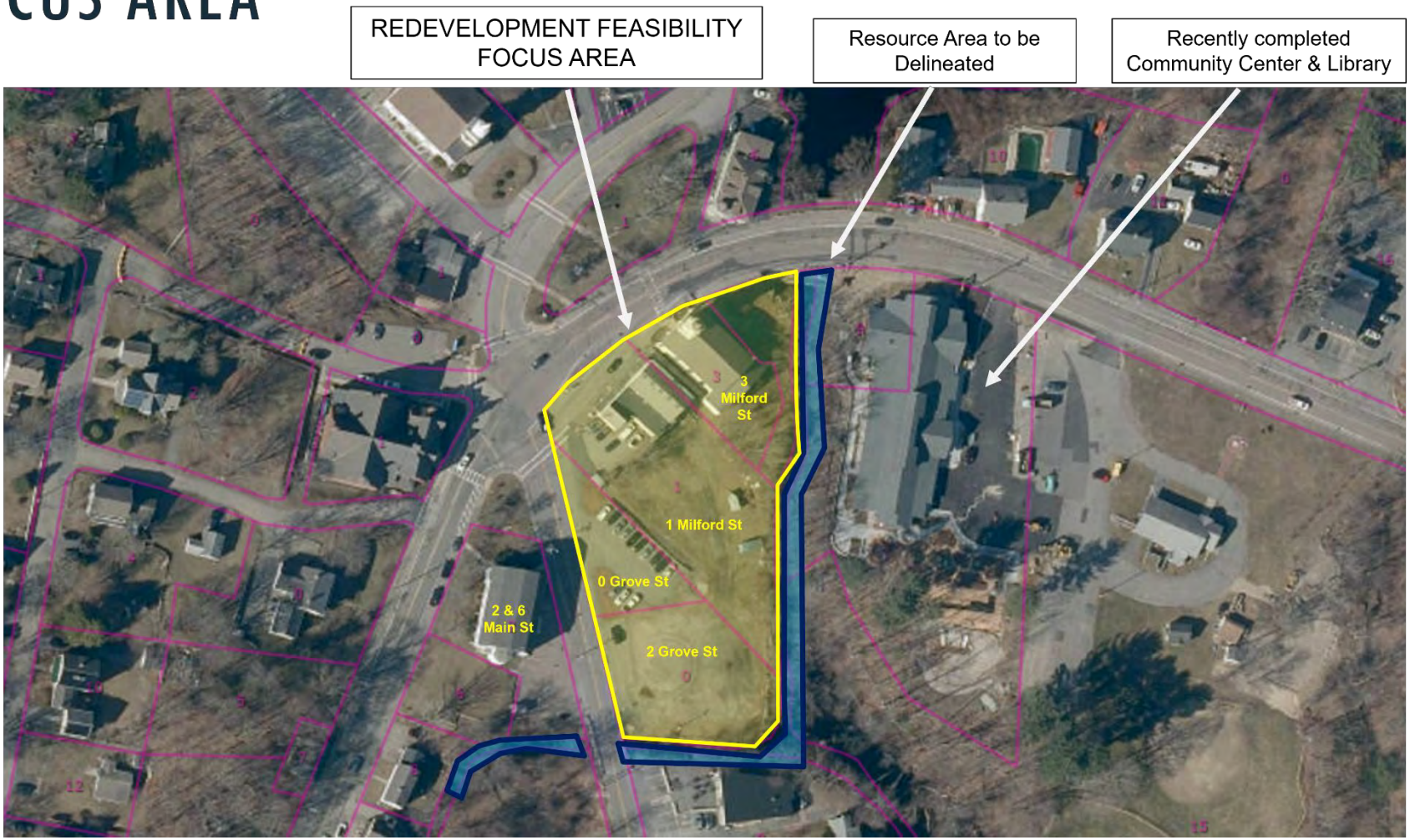


Figure 1 - Upton Town Center Project Focus Area

2019 Upton Center Visioning Project

The Town's 2019 Vision Plan is an important foundation for considering redevelopment options for the properties in the study area. While there have been several significant changes in Upton Center since 2019, the vision provides a baseline to build upon.

The Vision Plan laid the groundwork for locating the library/community center (which is now complete), the MassDOT roadway project (which is now beyond the 25% design phase), included a visual preference survey, and explored possible scenarios for Holy Angels and adjacent properties.

The Vision Plan included high level conceptual designs for the redevelopment of numerous parcels in Upton Center.

Figure 2 - Cover of the Upton Center Vision plan

Figure 3 - Portion of the 2019 Vision Plan with the 2025 study area outlined in red

This image shows the existing conditions from the 2019 Vision Plan with the current study area for this project outlined in red.

The Vision Plan showed the relocation of Grove Street to the south of the Knowlton Risteen Building. See Figure 4. While interesting, the scenario is incompatible with the current MassDOT TIP project design. As shown in Figure 5, the relocation of Grove Street significantly changed the parcel boundaries and resulted in a conceptual design with new buildings located between the Holy Angels Church and the Knowlton/Risteen building and a large parking area.

However, with the advancement of the MassDOT TIP project beyond the 25% design phase, the concept is no longer feasible.

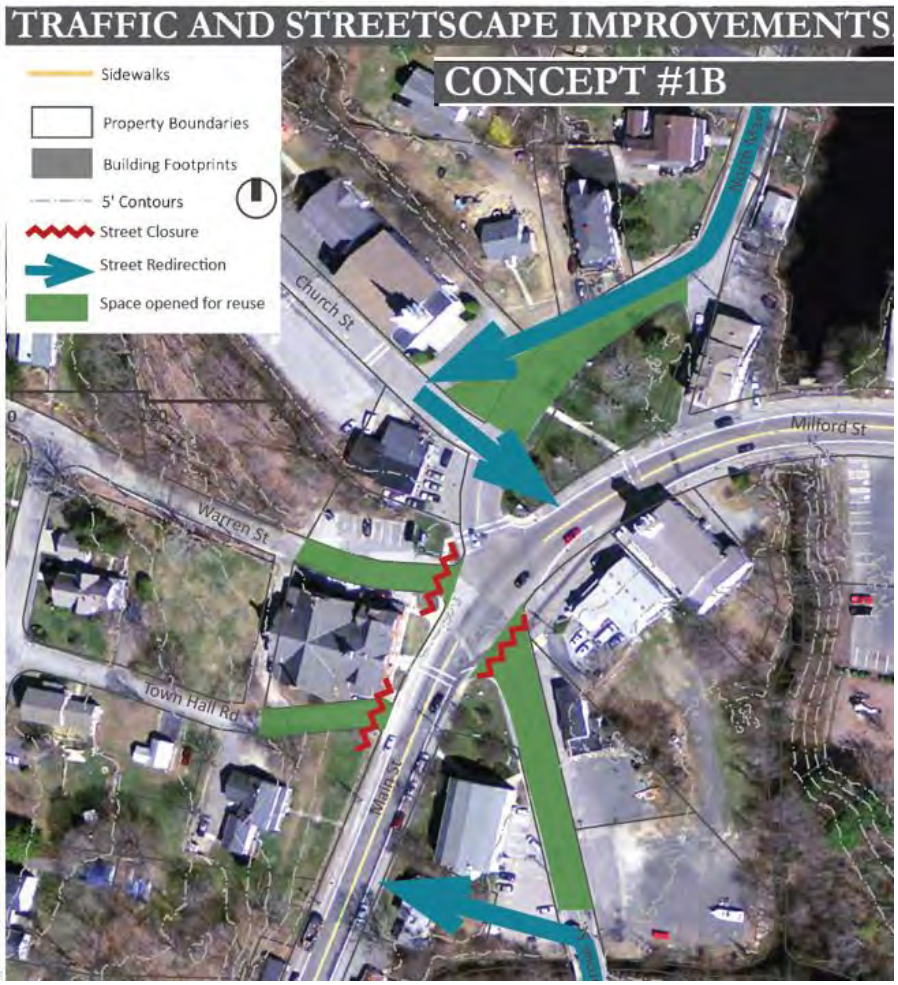


Figure 4 – Shows relocation of Grove Street

Figure 5 – Shows a conceptual design with the relocation of Grove Street

Important Changes Since 2019

There have been several changes since the 2019 Vision Plan which have important implications on the redevelopment feasibility study. These include:

1. *The Upton Community Center & Library has been built.*

    - The dual use building was constructed at 0 Milford Street. During the 2019 Visioning Project, the location for the new building was not known and still under consideration.

        - This $12 million dollar project was approved by Town Meeting in May 2021. The building opened to the public in May 2023.

2. *The Upton Center Business District (UCBD) Zoning Bylaw was implemented.*

    - The amendment was based on the 2019 Vision Plan with the purpose of encouraging the creation of a more vibrant town center. It included the following changes:

        - Allows for increased height (up to 3.5 stories), reduced setbacks, and increased lot coverage with a Special Permit.

        - Consolidates the Special Permit Granting Authority to prevent applicants from going to both the ZBA and Planning Board.

        - Allows a "mixed use facility" in the district with principal uses allowed in the Table of Uses.

3. *Re-design of roadway through the MassDOT TIP Project - Route 140 (Main Street/Milford Street).*

- The project includes roadway improvements, pedestrian safety improvements, and a roundabout at the intersection of Route 140 and Grove Street.
    - A 25% design hearing was held on January 23, 2023.
    - The estimated construction cost is $7.7 million with planned funding in the 2029 TIP.

4. *Two Requests for Proposals (RFPs) have been released for the subject properties.*

- Both RFPs identified the Town's desire to increase the vibrancy of and daily visits to the town center through redevelopment of the site with new service-based businesses, such as offices, shops, or restaurants, and with market rate housing options on the upper floors.
    - The Town released an initial RFP in February 2020 for a mixed-use development project of retail and residential units within a four-parcel area located in the center of town. The RFP required a developer to acquire two privately owned parcels (1 Milford Street containing the Arcade Building and 0 Grove Street containing a gravel parking lot) with a listed asking price of $400,000 and $150,000. The Town received no responses.
    - The Town released a second RFP in October 2022 for a mixed-use development. This RFP required a developer to acquire the last remaining private parcel (1 Milford Street containing the Arcade building) with a listed asking price of $700,000. The Town received no responses.

5. *The Town acquired the gravel lot at 0 Grove Street.*

- On November 10, 2020, residents at a Town Meeting authorized the acquisition of 0 Grove Street for $150,000 with an additional $60,000 to conduct environmental remediation.

Photos - Upton Community Center, October 2024.

Section 2. Existing Conditions Analysis

This redevelopment study includes four parcels, three of which are owned by the Town of Upton, and one that is held in private ownership.

For the purposes of this project, the properties have been evaluated based on the assumption they would be developed together as one project. Each property is discussed in more detail in this section.

Figure 6 – Basemap showing the study area.

3 Milford Street

Known as the Holy Angels Church, the property is a 10,937 square foot (0.25 acre) site on the south side of Route 140. The property contains an existing vacant building formerly used as a church. The Holy Angels Church was built in 1848. In 2011, the Roman Catholic Diocese of Worcester ceased use of the property as a church and later sold it to Upton Crossings LLC in 2015. The Town of Upton purchased the property from Upton Crossings LLC in 2017 for $187,000 (WDRD, Book 58158, Page 365).

The Holy Angels Church was a main discussion point during the 2019 Town Center Vision process. The report identifies that the participants had "*mixed opinions about the Holy Angels Church. Most people like the way it looks and value it. Some people are willing to replace it if it doesn't have a viable use, while others want to maintain it at any cost*." The plan identifies a series of actions to support the town's strong preference for rehabilitating and reusing the building, including continued evaluation of costs associated with reuse.

Photos – Holy Angels Church, October 2024.

An Approval Not Required (ANR) plan was endorsed by the Planning Board on May 26, 2022 (Plan Book 964, Page 68) to separate 3 Milford Street from the parcel to the east shown as Parcel A which is a small, 4,694 square foot parcel owned by the Town.

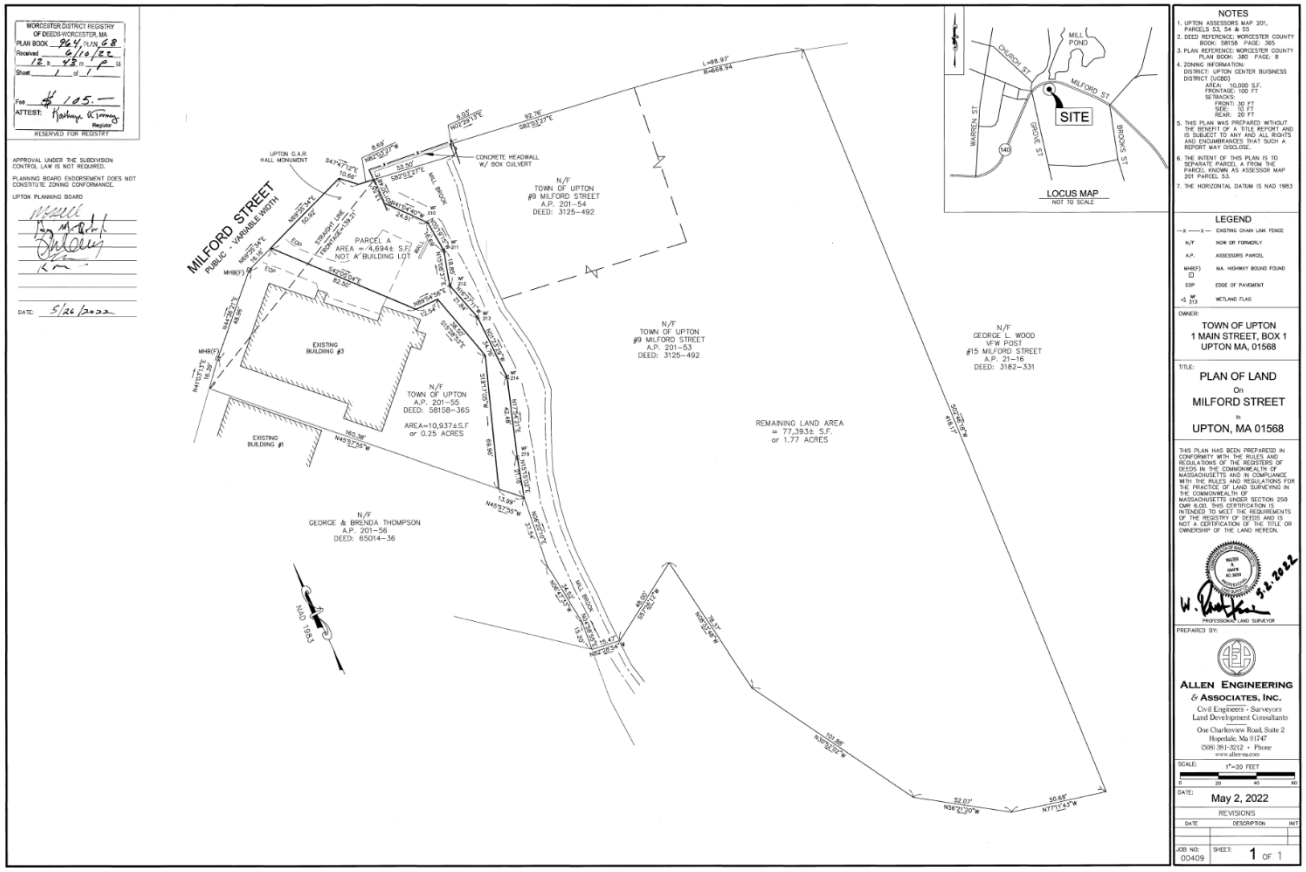
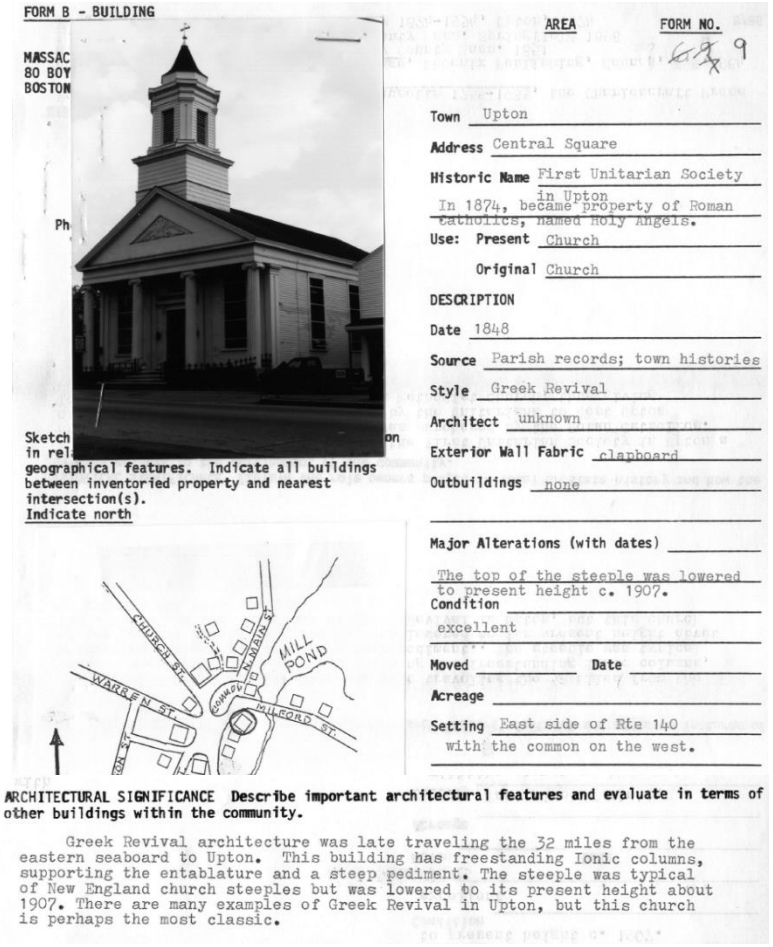


Figure 7 – ANR Plan endorsed in 2022

The building at 3 Milford Street was built in 1848 and is a historic landmark located in the Upton Center Historic District. The structure has been inventoried under the Massachusetts Cultural Resource Information System (MACRIS) and is identified as a valuable historic resource. The completed MHC Inventory Form recommends the building for listing in the National Register of Historic Places but has not been designated as such. The church is described as "perhaps the most classic" example of Greek Revival architecture in Upton.

The existing iron fence at the front of the property is an inventoried item (MARCIS ID # UPT.917) as a significant landscape architecture and religious feature associated with the Upton First Unitarian Church Decorative Iron Fence.

The adjacent property contains the Grand Army of the Republic Hall Marker (MACRIS ID # UPT.900) AR Hall monument.



FORM B - BUILDING

AREA FORM NO. 9

MASSAC
80 BOY
BOSTON

Ph

Sketch
in rel. on
geographical features. Indicate all buildings between inventoried property and nearest intersection(s).
Indicate north

Town Upton
Address Central Square
Historic Name First Unitarian Society in Upton
In 1874, became property of Roman Catholics, named Holy Angels.
Use: Present Church
Original Church

DESCRIPTION

Date 1848
Source Parish records; town histories
Style Greek Revival
Architect unknown
Exterior Wall Fabric clapboard
Outbuildings none

Major Alterations (with dates)
The top of the steeple was lowered to present height c. 1907.
Condition
excellent
Moved Date
Acreage
Setting East side of Rte 140 with the common on the west.

ARCHITECTURAL SIGNIFICANCE Describe important architectural features and evaluate in terms of other buildings within the community.

Greek Revival architecture was late traveling the 32 miles from the eastern seaboard to Upton. This building has freestanding Ionic columns, supporting the entablature and a steep pediment. The steeple was typical of New England church steeples but was lowered to its present height about 1907. There are many examples of Greek Revival in Upton, but this church is perhaps the most classic.

Figure 8 – Excerpt from MHC Inventory Form

In 2015, the Planning Board approved a Site Plan Review application to convert the existing church building into 3 dwelling units with enclosed parking spaces in the basement. The permit approval contained several conditions including approval of a fire suppression plan, no left turn onto Milford Street, and provisions for a 16-foot-wide driveway. The site plan showed a driveway width of 12 feet and given the steep slope and proximity to Main Street; it is unclear if the required width is achievable. The project was never initiated beyond the Planning Board permit phase.

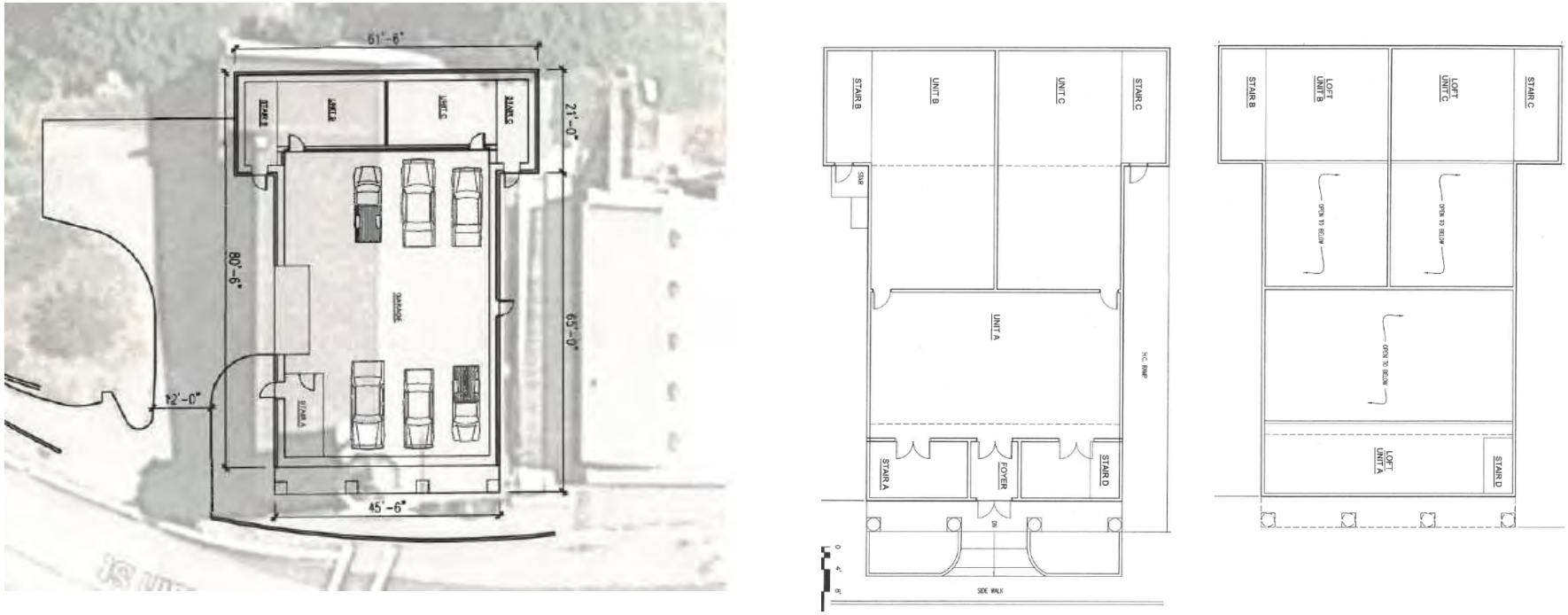


Figure 9 - Excerpt from approved plans showing three units and basement parking

A structural evaluation was completed for the Town in April 2019. The report found that the building was structurally sound. The scope of the evaluation was narrow and while it identifies several areas of concern, it outlined two options relative to the building's structural integrity:

1. To stabilize the building so that none of the existing conditions become significantly worse. This included: exterior painting, weather proofing of the bell tower, securing the exterior ramp, and basement water control. In 2019, this was estimated to be $78,000.

2. To renovate the structure and enhance the condition of the building (excluding upgrades associated with improvements required for a new use to meet building code). The improvements included stabilization of the bell tower, asbestos and lead paint mitigation, framing upgrades, and simple interior finishing. In 2019, these improvements were estimated to be $552,000.

The report identifies that the costs listed do not include electrical upgrades, lighting, plumbing, HVAC, sprinklers, or alarms. In 2019, the all-system renovation cost was estimated at an additional $1,500,000.

Finally, none of the costs listed above include accessibility improvements to the site such as ADA parking, ADA access (i.e. exterior ramp), interior ADA access, accessible restrooms, etc., which would be required for any public community space.

1 Milford Street

Commonly referred to as the Thompson Block and/or the Arcade Block, the property at 1 Milford Street is a privately owned parcel containing an existing building with a mix of uses. The existing building contains three leased retail spaces on the first floor and four leased apartments on the second floor. Each of those housing units consists of two bedrooms. The building includes a basement storage area.

Access to the property is via a curb cut situated on Grove Street close to the intersection with Main Street with an unmarked area for parking. As part of the Town's 2022 Request for Proposals associated with the properties in the study area, this property was included with an asking price of $700,000.

Photos - Thompson Block, October 2024.

The building at 1 Milford Street was once used as the Town's post office in 1921. As described in the MHC inventory form, in 1907 the building consisted of three-stories with a one-story building to the right and a shed roof connecting the two. That form is likely what gave rise to the site being called the "Arcade Block."

The MHC inventory form indicates that the top floor was removed between 1980-1981, reducing the historical integrity of the building's architecture.

Photo - Thompson Block, October 2024

ORM B - BUILDING

ASSACHUSETTS HISTORICAL COMMISSION
) BOYLSTON STREET
OSTON, MA 02116

AREA A

FORM NO. 10

Upton

ess Central Square

oric Name Arcade Block

Present Florist, Costume Shop, Automotive Supplies

Original store

RIPTION

1836

ce Deeds, assessors' records

e Vernacular Commercial

Architect unknown

Exterior Wall Fabric clapboards

Outbuildings

Major Alterations (with dates) 1980/81
Top floor removed making it 2-story.

Condition good

Moved Date

Acreage 41.04 rods

ketch Map: Draw map showing property's location
relation to nearest cross streets and/or
ographical features. Indicate all buildings
etween inventoried property and nearest
ntersection(s).
ndicate north

CHURCH ST.
MAIN ST.
MILL POND
WARREN ST.
COMMON
MILFORD ST.

ARCHITECTURAL SIGNIFICANCE Describe important architectural features and evaluate in terms other buildings within the community.

A 1907 photograph of this block shows a three-story building. A small one-story building is to the right with a shed type roof connecting the two. This arrangement probably is what gave rise to its being called the Arcade Block. There is a door on the north which leads to the apartments above. There are five windows evenly spaced on the two top floors, and two display windows on either side of a center door. There is a shed roof across the front of the main building.

The top floor has been removed and there are now only four windows across the front. The two buildings have been merged and the shed roof extends the whole length. The first floor of the main building remains as it was.

Figure 10 – Excerpt from MHC Inventory Form

0 Grove Street

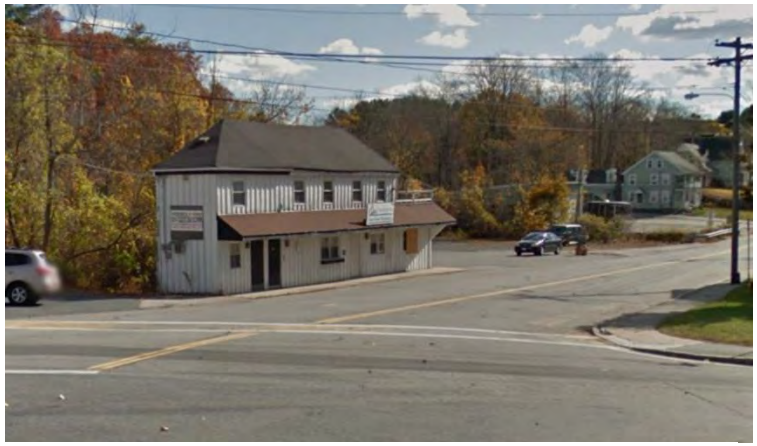
Known as the “town parking lot”, the property is a 0.25-acre site on the east side of Grove Street near Route 140.

The Town acquired the site in 2016, and the existing vacant building was demolished. In 2017, the Town designed, permitted, and built a 23-space municipal parking lot.

This lot serves as an important asset for the town center and provides parking for existing businesses, town hall, and community events. However, there was a clear indication from the 2019 Vision Plan that the area could be enhanced.

In addition, the Town’s Economic Development Committee recently urged that if the redevelopment of the other parcels could not be advanced quickly, the lot should be expanded and enhanced to support the existing businesses and civic uses in the Town Center.

It is important to note that the entrance to this parcel will be impacted by the MassDOT TIP project.



Photos – Top: Town Parking Lot, October 2024. Bottom: Google Street View, October 2013.

Policy Documents and Plans

2023 Upton Housing Production Plan

The Town of Upton completed its Housing Production Plan (HPP) in 2023. The purpose of the plan is to provide the Town with a roadmap for creating affordable housing that aligns with local goals and state requirements. The Plan represents the culmination of baseline demographic and housing research, community outreach, zoning and regulatory review, plus an implementation plan for goals and objectives.

The concepts outlined in this study (which highlight mixed use options) are consistent with Goal 2 of the Upton Housing Production Plan:

> *Goal 2: Make zoning and planning reforms*
>
> - *Promote greater diversity and density of permitted housing types.*
> - *Continue to promote mixed-use development.*

The Plan identifies that the Town Center is appropriate for multi-family housing because major transportation routes intersect it and there are nearby businesses and services. The HPP finds that the Route 140 corridor is an ideal location for new businesses while also supporting additional housing units.

Specifically, the HPP identifies a typical mixed-use scenario with two or three-story buildings with first floor commercial and multiple units of rental housing on the upper floors. This type of development would increase the opportunity and supply for rental housing and units with fewer than 2 bedrooms that are needed for young professionals, small families, or seniors.

Existing Zoning Regulations

In 2019, following the Town Center visioning process, residents at Town Meeting adopted a zoning change to create the Upton Center Business District (UCBD), modifying the Table of Allowed Uses.

The UCBD Zoning Bylaw allows for increased building heights, reduced setbacks, and increased coverage with a Special Permit. It also consolidates the Special Permit Granting Authority to prevent applicants from going to both the ZBA and Planning Board.

The UCBD allows a mixed-use facility but prohibits the use of property solely for multi-family residential. The bylaw includes several provisions related to shared parking.

Upton Center Business District Zoning Table	
Dimensional Requirements	**Upton Center Business District**
Minimum Frontage	100 feet
Minimum Lot Area	10,000 sq. ft.
Minimum Front Yard	30 feet (Reduced to 0 feet with a Special Permit)
Minimum Side Yard	10 feet
Minimum Rear Yard	20 feet
Maximum Lot Coverage	40% (Up to 80% with a Special Permit)
Height	25 feet (Up to 50 feet with a Special Permit)
Number of Stories	2 (Up to 3.5 stories with a Special Permit)
Use Regulations	
Townhouses and Garden Apartments	N (Prohibited)
Mixed Use Facilities	PB (Special Permit)
Retail (See Note 9)	YES (Permitted as of right)
Banks, Offices, Dine-in Restaurants	YES
Drive-through Establishments	PB
Note 9 - Only the following retail businesses are allowed by right: book, stationery or news store, cigar store, drug store, delicatessen, dry goods or variety store, florist or gift shop, fruit or grocery store, hardware store, jewelry store, meat market, music store, wearing apparel store, art galleries, and other similar retail businesses. In addition, the following retail business establishments are allowed in the UCBD by special permit: liquor store, artist live/work spaces.	

The use of shared off-street parking is encouraged and desirable wherever feasible within the UCBD and the Planning Board may consider requests for shared parking as part of the permitting process.

The shared parking provision establishes several requirements and criteria:

- The minimum number of parking spaces for a mixed-use development or where shared parking is proposed shall be determined using the Urban Land Institute Shared Parking Report or ITE Shared Parking Guidelines.
- For non-competing uses up to 75% of the predominant land use may be waived.
- For competing uses, up to 30% of the predominant land use may be waived.

BSC Group evaluated the ITE Shared Parking Guidelines relative to the potential redevelopment of the site for mixed-use development and activation of the Holy Angels Church. Based on the ITE parking generation, the peak demand for 9 residential units would be 15 parking spaces.

The peak demand for 6,500 square feet of retail would be 19 parking spaces. Therefore, without reductions, the ITE parking generation for the two mixed-use buildings would be 34 parking spaces. Activation of the Holy Angels Church building with assembly use (designated as a church under ITE) would have a peak demand of 47 parking spaces.

Upton Center Design Standards

The Upton Center Design Standards were completed in February 2020 for use by the Town's Planning Board. They are meant to govern the "look and feel" of new construction within the UCBD. The Design Guidelines include a range of considerations for new development, including but not limited to:

- Site Design – New development along the street frontage to reinforce the pedestrian realm and natural space and pedestrian paths to knit the UCBD together.
- Driveways & Parking – Parking is a necessity, but it cannot be the dominant feature of mixed-use development.
- Styles & Materials – Historic building forms, consistent with New England village architecture, are preferred.
- Bulk Massing & Scale – Designs employ a variety of techniques throughout the UCBD that avoid monotonous building facades and produce a distinct "sense of place."

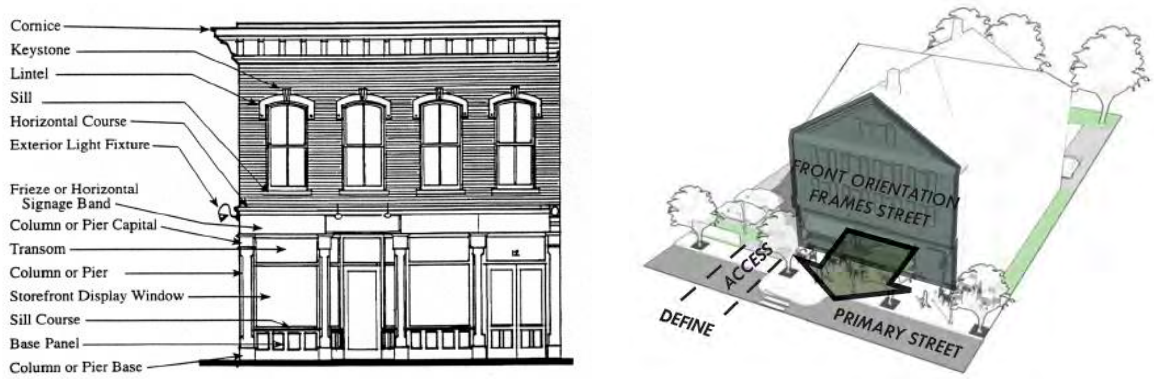


Figure 11 – Left: Excerpt from Spencer Town Center Design Guidelines
Right: Excerpt from East Dedham Square Design Guidelines

Section 3. Resource Area Delineation

BSC staff conducted a resource delineation of Center Brook and surrounding areas on October 31, 2024. The purpose of the delineation was to establish the resource area boundaries and provide a map showing regulated areas. The wetland resource identified on site is the Inland Bank associated with Central Brook, a jurisdictional resource area under the Massachusetts Wetlands Protection Act. At the bottom of the bank is the wetland resource area, Land Under Water and Waterways (LUWW), and this is represented by the area of the stream that is inundated by flowing water.

Delineation flags were hung along the top of the bank. Given the relatively steep slope of the bank, in terms of horizontal distance, the top of bank is within a couple of feet of the Ordinary High Water (OHW) elevation, which is the upper limit of the waterway resource of the Central Brook, and which represents the boundary of Waters of the U.S. (WOTUS) which is a resource area under the U.S. Army Corps of Engineers jurisdiction. The OHW line was not field delineated.

No Bordering Vegetated Wetlands (BVW) were identified on site. Other wetland resources include Bordering Lands Subject to Flooding (BLSF) and a 200-ft Riverfront Area, along with a 100-ft buffer zone to the Inland Bank. The Riverfront Area and 100-ft Buffer Zone boundaries are determined in GIS as 200-ft and 100-ft offsets from the Inland Bank boundary line.

The resulting plan is suitable for the Town to use as an Abbreviated Notice of Resource Area Delineation (ANRAD) filing with the Conservation Commission. See Figure 12. Once the ANRAD is approved, it will provide an agreed upon baseline from which any future development project would utilize for permitting with the Conservation Commission.

Figure 12 – Abbreviated Notice of Resource Area Delineation (ANRAD) plan

As discussed in the Permitting Analysis, historical imagery was used to provide a preliminary calculation of areas defined under the Riverfront Regulations 310 CMR 10.58 as previously disturbed.

For conceptual planning purposes, the resource area delineation was used to determine a preliminary calculation for disturbed areas.

As shown on the map, approximately 1.46 acres are within previously disturbed riverfront area (RFA). This preliminary calculation is important for future redevelopment as it provides an estimate for land that can be eligible for redevelopment.

A more detailed discussion of RFA permitting requirements is included in this report. Any future redevelopment project will have to seek confirmation of the existing disturbed area from the Conservation Commission.

Figure 13 – Approximate area of RFA disturbance

Section 4. Mixed Use Building Design Considerations

Based on feedback from the Economic Development Committee, the Select Board, and the 2019 Visioning Report, the study area is an important visual focal point in Upton. Any future redevelopment in this area must carefully reflect and enhance the historic building architecture, patterns, and surrounding neighborhood.

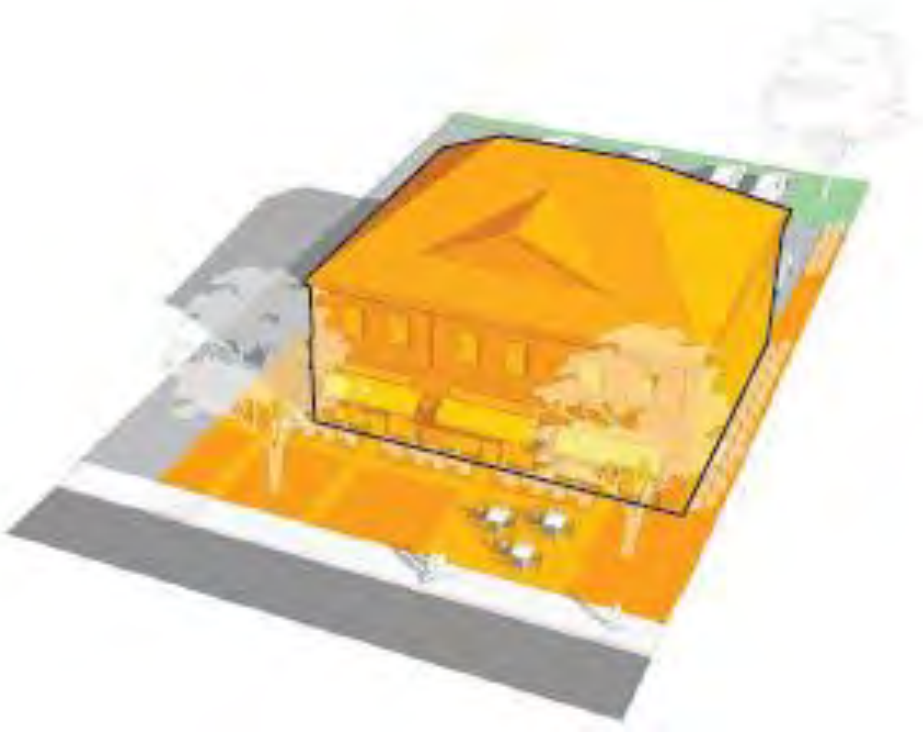


Figure 14 – Left: Existing buildings in Upton Town Center Right: Excerpt from East Dedham Square Design Guidelines

The size and height of one or more mixed-use buildings in the Town Center will need to be compatible with the surrounding buildings and historic character. For the purposes of this study, a new mixed-use building was anticipated to be 2 stories in accordance with the dimensional regulations. The UCBD zoning does allow for building heights to increase to 50 feet and 3.5 stories, but with taller buildings, more onsite parking will be required.

The images below depict a building in Hyannis containing 10 units on a small 0.38-acre parcel and a building in Clinton, CT containing 12 units with 4,300 square feet of commercial space on a 0.49-acre parcel.

Figure 15 - Left: Excerpt from Cape Cod Commission Mixed Use Model Bylaw and Accompanying Guide
Right: Mixed-use building at 57 West Main Street in Clinton, CT (Google Streetview)

Creating an active first floor area in a mixed-use building is essential to creating a walkable Town Center. This active space is traditionally occupied by shops, service businesses, restaurants, cafes, or art galleries. The least active uses should be oriented towards the back of the building and can include residential entrances and in some cases, can provide accessible units.

Figure 16 - Left: Excerpt from East Dedham Square Design Guidelines. Right: Proposed Concept Plan A.

Section 5. Parking Lot Design Considerations

`The study area is in a highly visible section of the Town Center. The existing Town owned parking lot provides important parking for visitors. The expansion of the municipal parking lot, or creation of parking as part of a new mixed-use development, should incorporate low impact design standards and attractive landscaping that enhances the visual appearance and function within the Town Center. The following figures are intended to illustrate important parking lot design considerations that have been incorporated in the conceptual designs.

*Figure 17 – Photo – Left: Existing town parking lot on Grove Street. Right: Parking lot runoff directed into a bioswale**

Figure 18 – Left: A municipal parking lot in Easthampton's Green Infrastructure Master Plan.
Right: Excerpt from proposed Concept Plan D showing the expansion of Upton's municipal parking lot on Grove Street.

Figure 19 - Rendering of the municipal parking lot in Easthampton's Green Infrastructure Master Plan.

Section 6. ADA/All Persons Trail Design Considerations

The Center Brook runs through the rear of the study area and has been identified as an important asset within the Town Center. During the conceptual design development, providing pedestrian access to the Center Brook was a high priority.

The 2019 Vision Plan included a streamside path and a bridge to connect to the VFW and playing fields.

With the completion of the of the community center construction, the Town has an opportunity to incorporate public access as part of a redevelopment project. The precedent examples in this section illustrate the opportunity for the Town to create an accessible trail in the heart of the town's center.

Figure 20 – Photo: Accessible trail from Mass Audubon All Persons Trail guide.

The two projects identified below, are prime examples of accessible trails adjacent to resource areas. Each provides accessible pedestrian access using a stone dust surface and meet the U.S. Forest Service standards for accessibility. Park projects that incorporate U.S. Forest Service standards into their design and construction are eligible for funding through state programs such as MassTrails and the Parkland Acquisitions and Renovations for Communities (PARC) program.

Figure 21 – Photo – Top: Swift River Universal Access Trail Loop in Palmer MA (Marcy Marchello)
Bottom: Lake Wallace Sensory Trail in Belchertown MA (New England Outdoor Project)

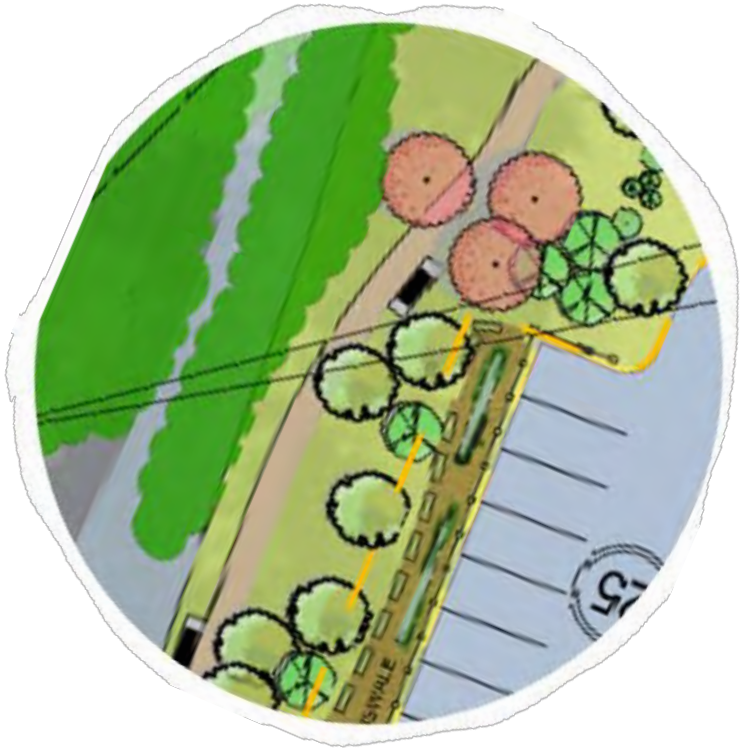


Figure 22 – Excerpt showing an accessible path from the proposed Concept Plans.

Section 7. Concept Plans

Four concept plans were developed with input from the Economic Development Committee and Planning Department staff between December 2024 - May 2025. These concept plans serve as a guide to show arrangements that represent the community's vision for redevelopment within the Town Center. They suggest ways that the Town can support new commercial space and housing units in the Town Center. Future variables may result in the mixing and matching of the components presented in these concept plans. Key factors that were considered during the design development process include:

- All four concept plans were designed to incorporate and show the forthcoming MassDOT TIP project roadway layout which includes the construction of a roundabout in the heart of the town center, adjacent to the study area.
- Three out of four concepts incorporate the Holy Angels Church building as an integral component of the design.
- One scenario depicts the replacement of the church and Thompson Block. It was important for the community to have an illustration of how a new building might be incorporated into the site if the building is deemed not feasible for reuse.
- A central theme of the 2019 Town Center Study was to focus on a mixed-use building development pattern to create a new sense of vibrancy within the town center. Any future development within the study area will need to carefully respect, complement, and relate to the historic structures within the town center.

- The concept plans depict a possible pedestrian bridge over Center Brook. The location of the bridge has shifted to the south to account for significant grade changes. Additional in-depth study is required to determine the financial and permitting feasibility of a pedestrian bridge.
- The plans attempt to provide a balanced approach to parking, recognizing parking relief may need to be granted or shared parking arrangements made with others.
- The concept plans include an option for the Town to enhance and expand the existing Town-owned parking lot if redevelopment does not occur in the near term. There was discussion of certain changes to the parking areas that could be accomplished through negotiations with the owners of the Thompson Block.

Existing Conditions

- Holy Angels Church (town-owned)
- Thompson Block (privately owned)
- Grove Street parking (town-owned)
- Vacant gravel lot (town-owned)

14 public parking spaces

BASE MAP - FOCUS AREA

UPTON, MASSACHUSETTS

MARCH 24,2025

BSC GROUP
BUILD | SUPPORT | CONNECT

Concept A

Holy Angels building preserved

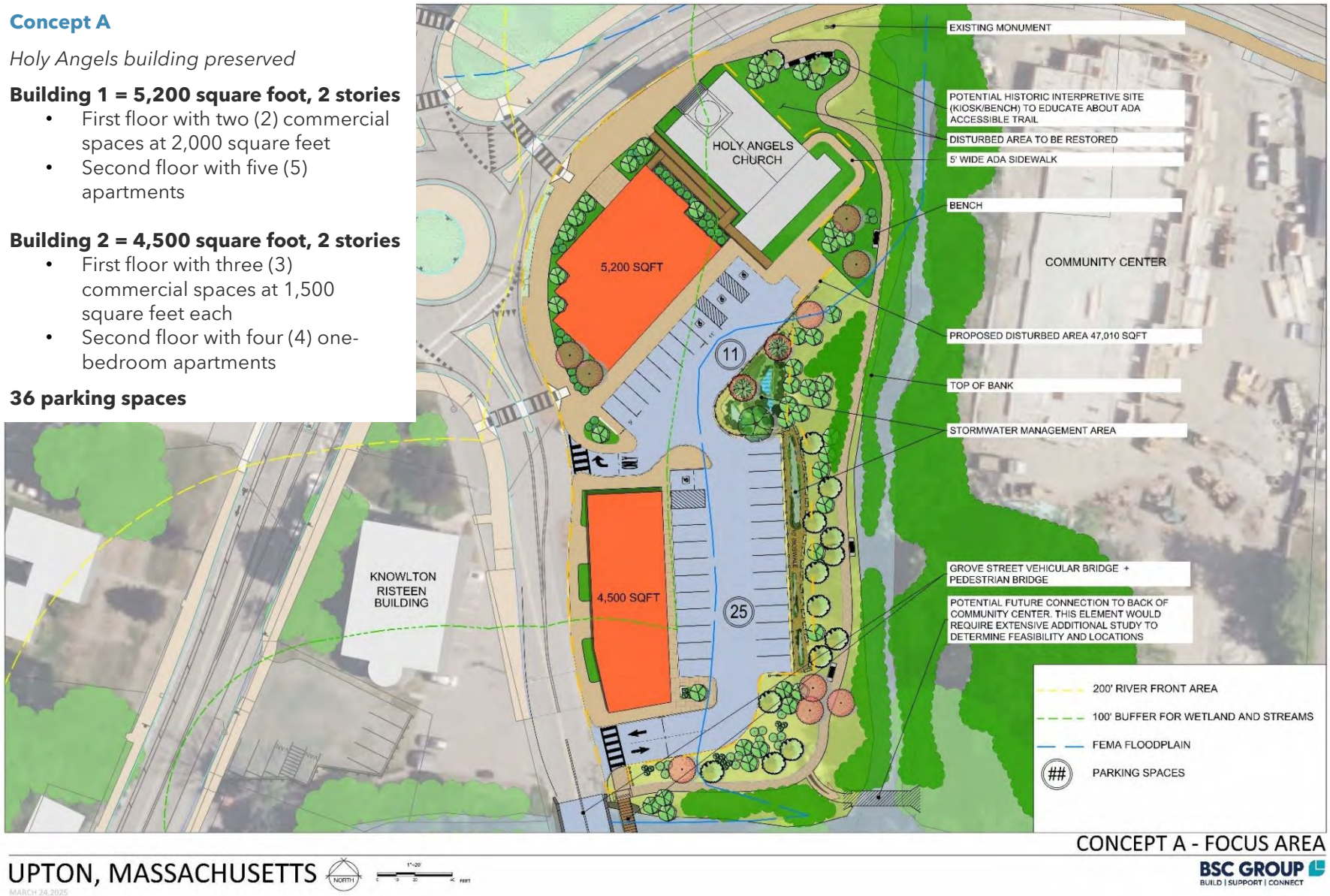
Building 1 = 5,200 square foot, 2 stories

- First floor with two (2) commercial spaces at 2,000 square feet
- Second floor with five (5) apartments

Building 2 = 4,500 square foot, 2 stories

- First floor with three (3) commercial spaces at 1,500 square feet each
- Second floor with four (4) one-bedroom apartments

36 parking spaces



Concept B

Demolition of Holy Angels & Thompson Block

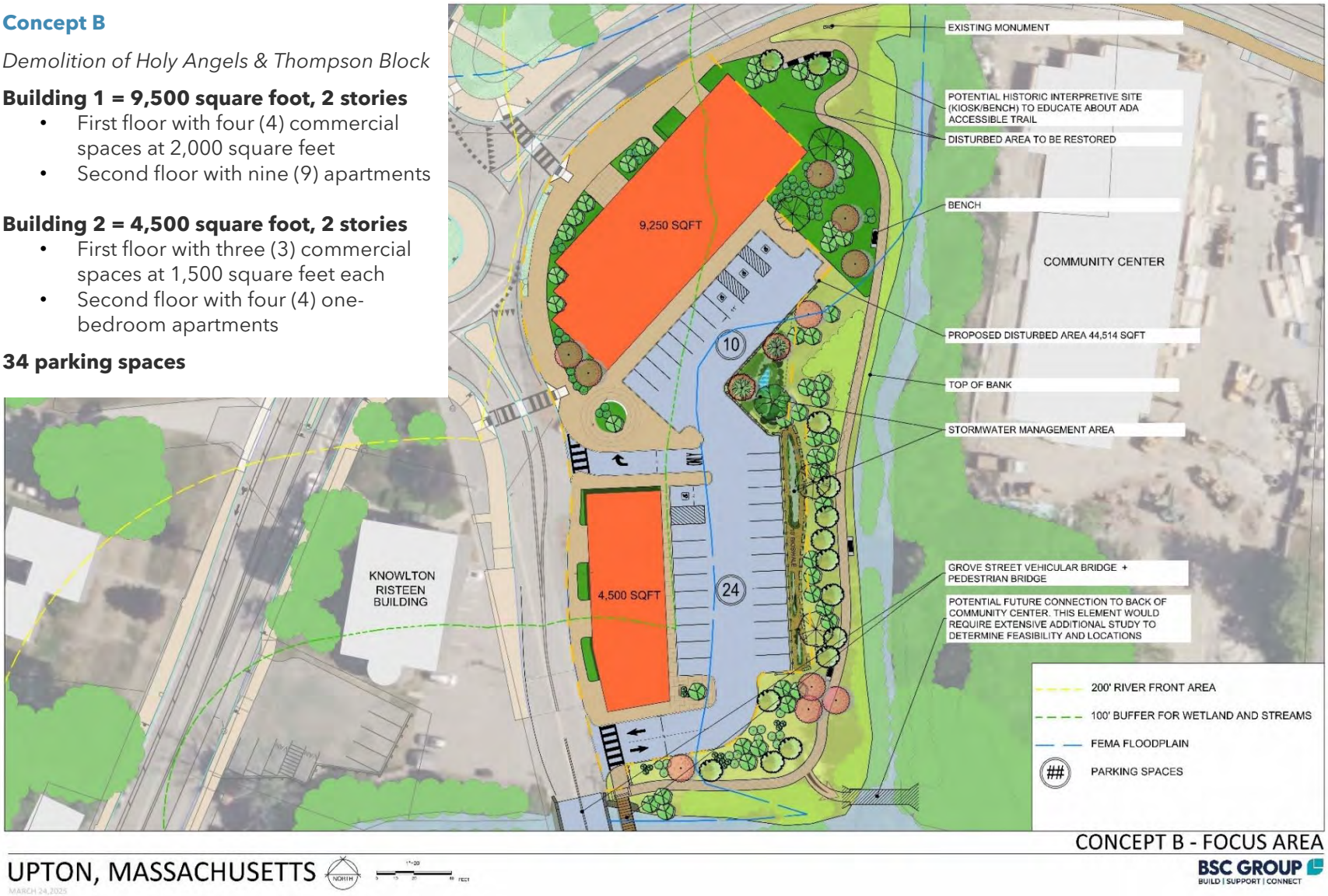
Building 1 = 9,500 square foot, 2 stories

- First floor with four (4) commercial spaces at 2,000 square feet
- Second floor with nine (9) apartments

Building 2 = 4,500 square foot, 2 stories

- First floor with three (3) commercial spaces at 1,500 square feet each
- Second floor with four (4) one-bedroom apartments

34 parking spaces



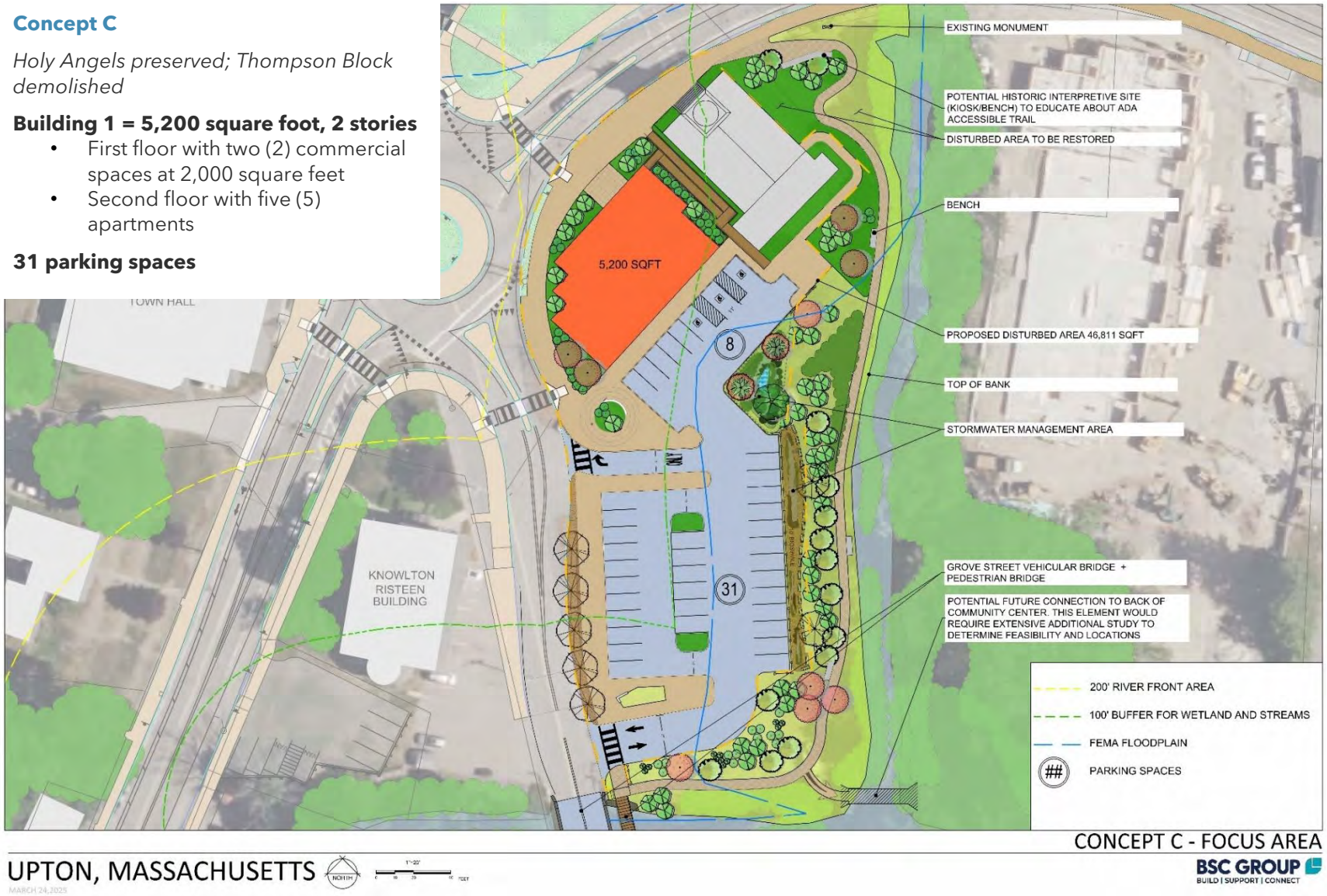
Concept C

Holy Angels preserved; Thompson Block demolished

Building 1 = 5,200 square foot, 2 stories

- First floor with two (2) commercial spaces at 2,000 square feet
- Second floor with five (5) apartments

31 parking spaces

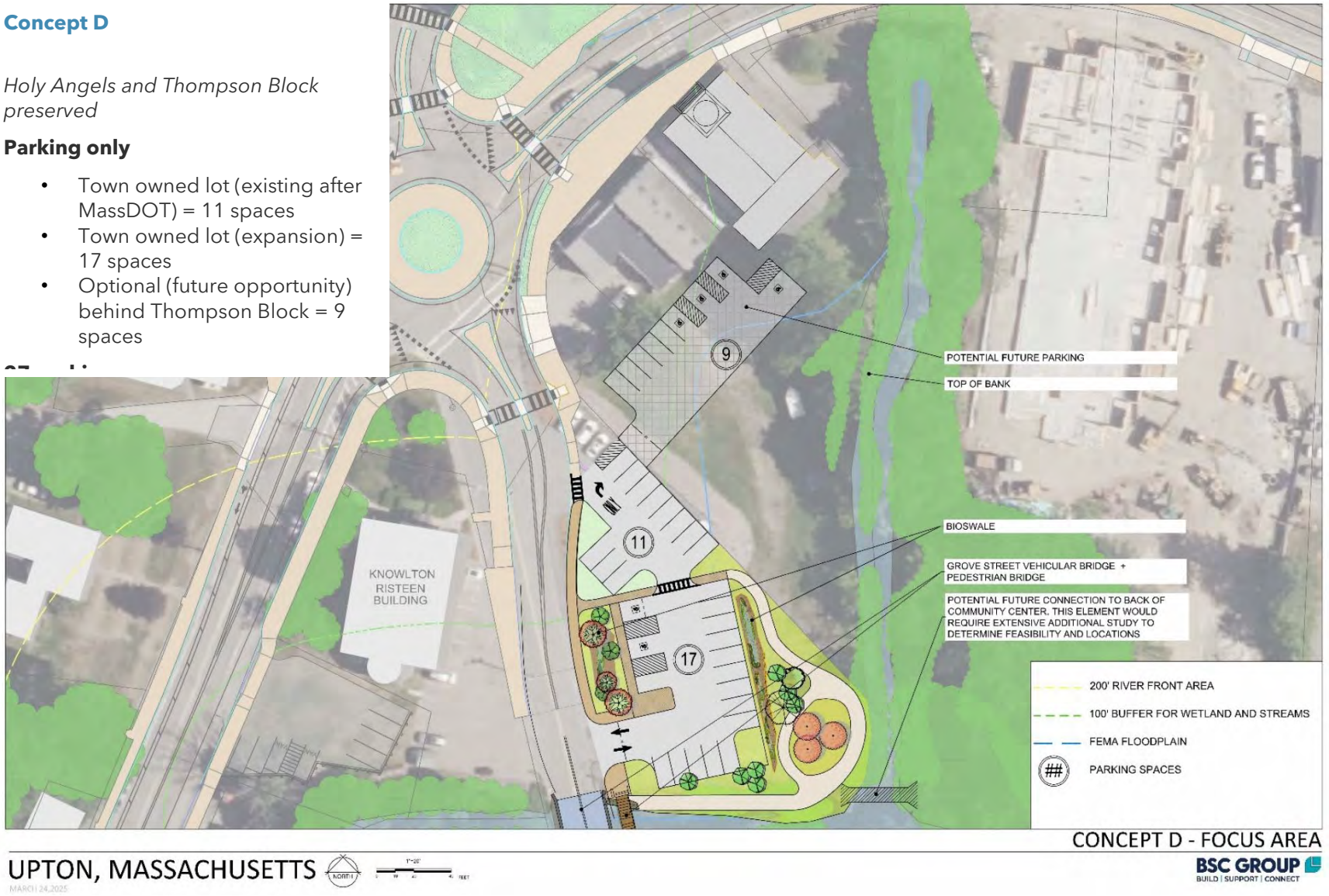


Concept D

Holy Angels and Thompson Block preserved

Parking only

- Town owned lot (existing after MassDOT) = 11 spaces
- Town owned lot (expansion) = 17 spaces
- Optional (future opportunity) behind Thompson Block = 9 spaces



Section 8. Order of Magnitude Costs

The estimated order of magnitude construction cost for a mixed-use building in 2025 could range between $200-$350 per square foot inclusive of both hard and soft costs. Therefore, the building costs below are based on the range of these figures. Several factors may influence actual costs, including:

- Design complexity – e.g., architectural features or designs that are compatible with adjacent historic buildings.
- Material choices – e.g., premium siding, window style and finishes.
- Site conditions – e.g., remediation of contaminated soil and/or soil quality related to stormwater infiltration.
- Regulatory requirements – e.g., permitting from the Conservation Commission and/or Planning Board.

The costs associated with reuse of the Holy Angels Church building are pending. In May 2024, voters at Town Meeting authorized funds to examine the costs associated with bringing the building up to current building codes for an assembly space. The following is an approximate order of magnitude cost estimate for the preferred concept plan (Concept A):

Holy Angels Church:	TBD
Building 1 (19,000 GFA mixed use building at $200-$350/sq. ft.):	$3,800,000-$6,650,000
Building 2 (9,000 GFA mixed use building at $200-$350/sq. ft.):	$1,800,000-$3,150,000
Site construction (grading, parking, stormwater, ADA trail, etc.):	$675,000
Acquisition of 1 Milford Street (Thompson Block):	TBD

Section 9. Permitting Analysis

The following Permitting Assessment Summary includes ecological and environmental permitting requirements anticipated for the redevelopment of the subject properties. It is based on Concept A, as the preferred concept plan, and includes the following:

Demolition and New Construction:

- Demolish 1 Milford Street (Thompson Block building)
- Construct a new 5,200 square foot building in its place
- Remove 2 Grove Street parking lot
- Construct a new 4,500 square foot building on both 2 Grove and 0 Grove Street

Parking and Pathways:

- Create a new parking lot behind and between the two new buildings
- Install an ADA-compliant, stabilized stone dust path behind the church, parking lots, and along Center Brook

Landscaping and Stormwater Improvements:

- Enhance the riverfront area with stormwater management features
- Install bioswales between the parking lot and Center Brook
- Incorporate native plantings and maintain existing vegetation near wetland resource areas

The Permitting Table below outlines the anticipated permits necessary for redevelopment of the properties. A brief discussion related to permitting follows:

Permitting Table		
Permitting Authority	**Required Permit**	**Estimated Timeline**
Upton Planning Board	Mixed Use Buildings: Special Permit for mixed use facility and shared parking Holy Angels Church: Special Permit for shared parking (use is allowed by right)	4 months
Upton Zoning Board of Appeals	Holy Angels Church – ZBA Special Permit for alterations, extension, or changes to non-conforming structure (setbacks)	4 months
Upton Conservation Commission	• Permit - Upton Wetlands Protection Bylaw • Notice of Intent - Wetlands Protection Act • Permit - Land Disturbance (Stormwater)	4-8 months
Upton Historical Commission	Demolition Delay possible for demolition of Thompson Block Demolition Delay possible for demolition of Holy Angels Church	3 months
MADEP	Stormwater Report	4-8 months
USEPA	National Pollution Discharge Elimination System General Permit	4 months
MEPA, Natural Heritage & Endangered Species (NHESP), and Massachusetts Historic Commission permitting are not applicable.		

The following is a description of anticipated permitting requirements for redevelopment of the subject property based on the concept plans:

Planning Board

The redevelopment of the site for construction of a new mixed-use building(s) and reuse of the Holy Angels church building will require approval from the Upton Planning Board.

Within the Upton Center Business District, the use of a "mixed use facility" is regulated by a Special Permit from the Planning Board. Certain commercial uses that could occupy the first floor of a mixed-use building such retail uses, dine-in restaurants, and service uses are allowed by right. A mixed-use facility will likely require approval for shared parking, which is reviewed and approved by the Planning Board as part of the application for the mixed-use facility.

The reuse of the Holy Angels Church for a hub related to arts and culture or similar gathering space would likely be considered either a "nonprofit museum, art gallery or community center" or a "performing arts/concert venue" or "place of amusement or assembly" all of which are allowed by right in the UCBD.

However, due to the limited availability of parking, a Special Permit from the Planning Board would be required for shared parking associated with the reuse of the church building.

Zoning Board of Appeals

Regarding Holy Angels Church, a Special Permit from the ZBA will be required since the building is non-conforming to required setbacks. Significant alterations, such as new accessible ramps or an addition to incorporate an elevator, will require a Special Permit from the Zoning Board of Appeals.

Conservation Commission

The entire site is located within 200 feet of the Center Brook – a perennial stream. Therefore, any proposed improvements will require review and approval by the Conservation Commission through a Notice of Intent (NOI). The NOI will address 310 CMR 10.58 (8) which is required for redevelopment within previously developed Riverfront Areas (RFA). The concept plan demonstrates improvements to the RFA through landscape design, stormwater management, and accessible pathways.

Based on a desktop review, the study area contains Bordering Land Subject to Flooding (BLSF), primarily on 0 Grove and 2 Grove Street. Development in a BLSF will require the creation of flood compensatory storage at a ratio of 2:1. This could have a significant impact on a developer's ability to provide the required compensatory storage at the site. As outlined in the recommendations, it appears that the Base Flood Elevation as shown on the FEMA maps may be inaccurate.

MassDEP and Upton Stormwater Management

The proposed project will disturb more than 20,000 square feet of land and therefore a Land Disturbance Permit is required. Pursuant to Chapter 325 of Upton's Stormwater Regulations, the Conservation Commission is Upton's Stormwater Authority, and any application must include a Stormwater Management Plan, Erosion and Sedimentation Control Plan, and Operation and Maintenance Plan. The project will also require a stormwater report pursuant to MassDEP guidelines.

Massachusetts Environmental Policy Act (MEPA)

The redevelopment of the site for construction of new mixed-use buildings and associated parking does not appear to trigger any of the thresholds of 301 CMR 11.03 under MEPA.

Section 10. Next Steps & Recommendations

The following is a preliminary list of the next steps associated with the potential redevelopment of the study area:

1. Existing Conditions Land Survey

It is recommended the Town complete an existing conditions land survey for 0 Grove Street. If possible, the Town should seek approval from the owners of 1 Milford Street and include that property in the land survey. The survey should include the resource area delineation mapped by BSC Group, topography in 1-foot intervals, and existing trees larger than 3" caliper. The survey will provide critical information for a developer if the property is released for disposition via a new Request for Proposals process.

2. FEMA Letter of Map Revision (LOMR)

A small portion of the study area was surveyed during the design of the adjacent Grove Street Bridge Replacement project. However, the survey did not include enough data on the subject properties to determine the topography. Upon completion of the existing conditions land survey, BSC recommends the Town seek a Letter of Map Revision (LOMR) from FEMA regarding the location BLSF land. The primary issue is that in Zone AE, the BLSF and Building Code requirements are based on the actual grades and elevations on the property, not what is shown on FEMA FIRM maps. Based on available survey information and the Base Flood Elevation, it appears that the BLSF is closer to the stream bank than the center of the property at 0 Grove Street. Any effort to clarify the location and extent of the BLSF prior to releasing an RFP will provide clarity for a developer considering redeveloping the property.

3. Geotechnical Exploration/Test Pits

To better understand the proximity of groundwater and soil conditions in the study area, test pits are recommended at key locations to support stormwater design, on-site hydrology analysis, hydraulic calculations, and preparation of a stormwater report. This information will provide clarity for a developer considering redeveloping the property.

4. Thompson Block Appraisal

The Town should explore ways to work cooperatively with the property owner to secure an updated appraisal for the value of the property. The estimated cost for acquisition included in the 2022 RFP was $700,000. The cost of the acquisition, if unknown, may be a barrier to enticing a private developer to prepare a proforma for a development proposal via response to an RFP process.

5. MassDOT

The conceptual design plans include the current designs for the MassDOT project. As noted, the MassDOT project will have an impact on the existing town-owned parking lot on Grove Street. Based on the review of available information, it appears that the MassDOT project will realign a portion of Grove Street at the existing entrance to the parking lot and eliminate three parking spaces. The Town should discuss this element of the project design with MassDOT to ensure that the design has the most minimal impact on the existing parking area.

6. Holy Angels

If the Holy Angels building is considered for renovation as a stand alone project, a conceptual design/fit test for the existing driveway on the church property should be evaluated for compliance with ADA requirements, including but not limited to, vehicle turning movements, ADA discharge

aisles, slope, line of sight, and driveway width. Although the MassDOT TIP project maintains the curb cut, the viability of that space for providing ADA parking is not clear. If activation of the church occurs without any involvement of the owners of the Thompson Block, or if the curb cut was deemed to not provide ADA parking and access, a waiver from the AAB requirements should be explored.

7. Structural Analysis Update

In 2025, the Town appropriated funds for the continued exploration of the Holy Angels Church building for reuse as a gathering space. This evaluation should provide the Town with enough information to know if the condition of the building will allow renovation and identify the current order of magnitude cost associated with modernizing the building.

8. Upton Cultural Council/Mass Cultural Council

If the Holy Angels Church building is suitable for renovation, the Town's Cultural Council could begin to support the creation of an organization dedicated to developing the space as an activity hub in the town center. The Massachusetts Cultural Council also provides significant grants to organizations that facilitate upgrades and enhancements to creative spaces and places through the Cultural Facilities Fund.

Appendices

A. Concept Plans
B. Presentation to the Upton Select Board, April 15, 2025
C. EDC memo dated December 16, 2024
D. Holy Angels Church Structural Evaluation dated April 26, 2019
E. Site Plan Approval dated February 15, 2015

Appendix A – Concept Plans

CONCEPT A - FOCUS AREA

UPTON, MASSACHUSETTS

NORTH

1"=20'

0 10 20 40 FEET

MARCH 24,2025

BSC GROUP
BUILD | SUPPORT | CONNECT

CONCEPT B - FOCUS AREA

UPTON, MASSACHUSETTS

NORTH

1"=20'

0 10 20 40 FEET

MARCH 24,2025

BSC GROUP
BUILD | SUPPORT | CONNECT

EXISTING MONUMENT

POTENTIAL HISTORIC INTERPRETIVE SITE (KIOSK/BENCH) TO EDUCATE ABOUT ADA ACCESSIBLE TRAIL

DISTURBED AREA TO BE RESTORED

BENCH

PROPOSED DISTURBED AREA 46,811 SQFT

TOP OF BANK

STORMWATER MANAGEMENT AREA

GROVE STREET VEHICULAR BRIDGE + PEDESTRIAN BRIDGE

POTENTIAL FUTURE CONNECTION TO BACK OF COMMUNITY CENTER. THIS ELEMENT WOULD REQUIRE EXTENSIVE ADDITIONAL STUDY TO DETERMINE FEASIBILITY AND LOCATIONS

UPTON
TOWN HALL

KNOWLTON
RISTEEN
BUILDING

5,200 SQFT

8

31

ONLY

10' BIOSWALE

VAN

VAN

200' RIVER FRONT AREA

100' BUFFER FOR WETLAND AND STREAMS

FEMA FLOODPLAIN

PARKING SPACES

CONCEPT C - FOCUS AREA

UPTON, MASSACHUSETTS

NORTH

1"=20'

0 10 20 40 FEET

MARCH 24,2025

BSC GROUP
BUILD | SUPPORT | CONNECT

UPTON
TOWN HALL

KNOWLTON
RISTEEN
BUILDING

9

11

17

POTENTIAL FUTURE PARKING

TOP OF BANK

BIOSWALE

GROVE STREET VEHICULAR BRIDGE +
PEDESTRIAN BRIDGE

POTENTIAL FUTURE CONNECTION TO BACK OF COMMUNITY CENTER. THIS ELEMENT WOULD REQUIRE EXTENSIVE ADDITIONAL STUDY TO DETERMINE FEASIBILITY AND LOCATIONS

200' RIVER FRONT AREA

100' BUFFER FOR WETLAND AND STREAMS

FEMA FLOODPLAIN

PARKING SPACES

CONCEPT D - FOCUS AREA

UPTON, MASSACHUSETTS

NORTH

1"=20'

0 10 20 40 FEET

MARCH 24,2025

BSC GROUP
BUILD | SUPPORT | CONNECT

Appendix B – Presentation to Select Board, April 15, 2025

BSC GROUP

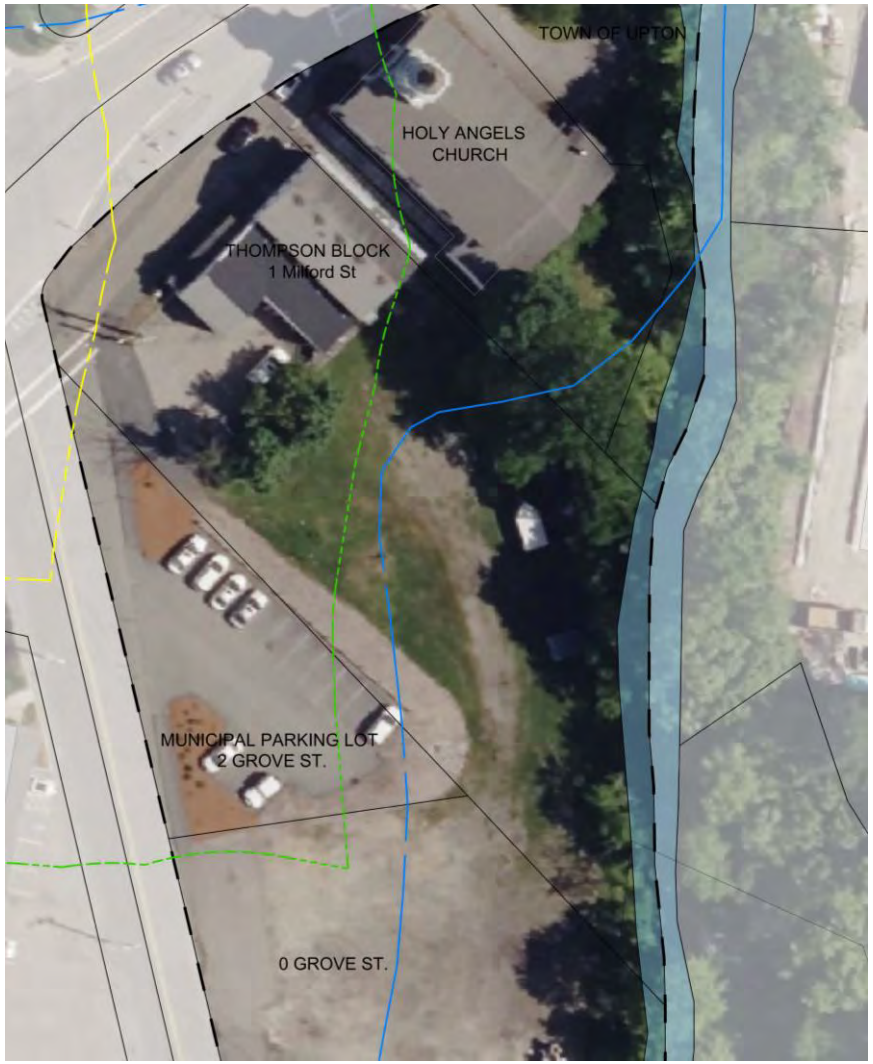
Upton Town Center

Redevelopment Feasibility Study

Select Board presentation April 15, 2025

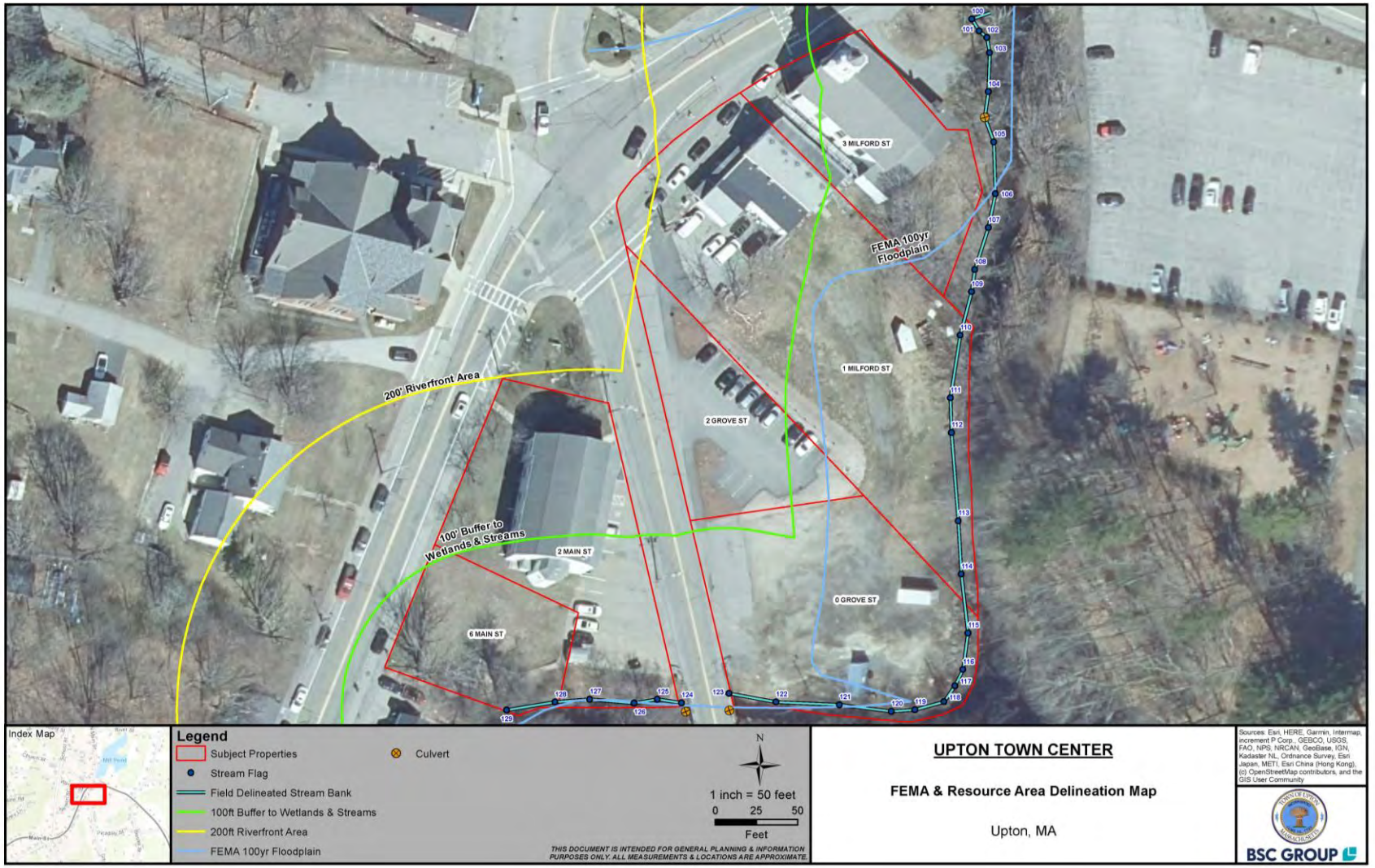
Introduction

- Funded by a Housing Choice Grant
- Economic Development Committee
- Builds off prior efforts:
  - 2019 Town Center Vision
  - Mass DOT TIP
  - Grove St Bridge
  - Two RFP's for redevelopment
  - Upton Design Standards
  - Upton Housing Production Plan
- Scope includes:
  - Resource Delineation
  - Existing Conditions Review
  - Conceptual Redevelopment Scenarios
  - Permitting Analysis



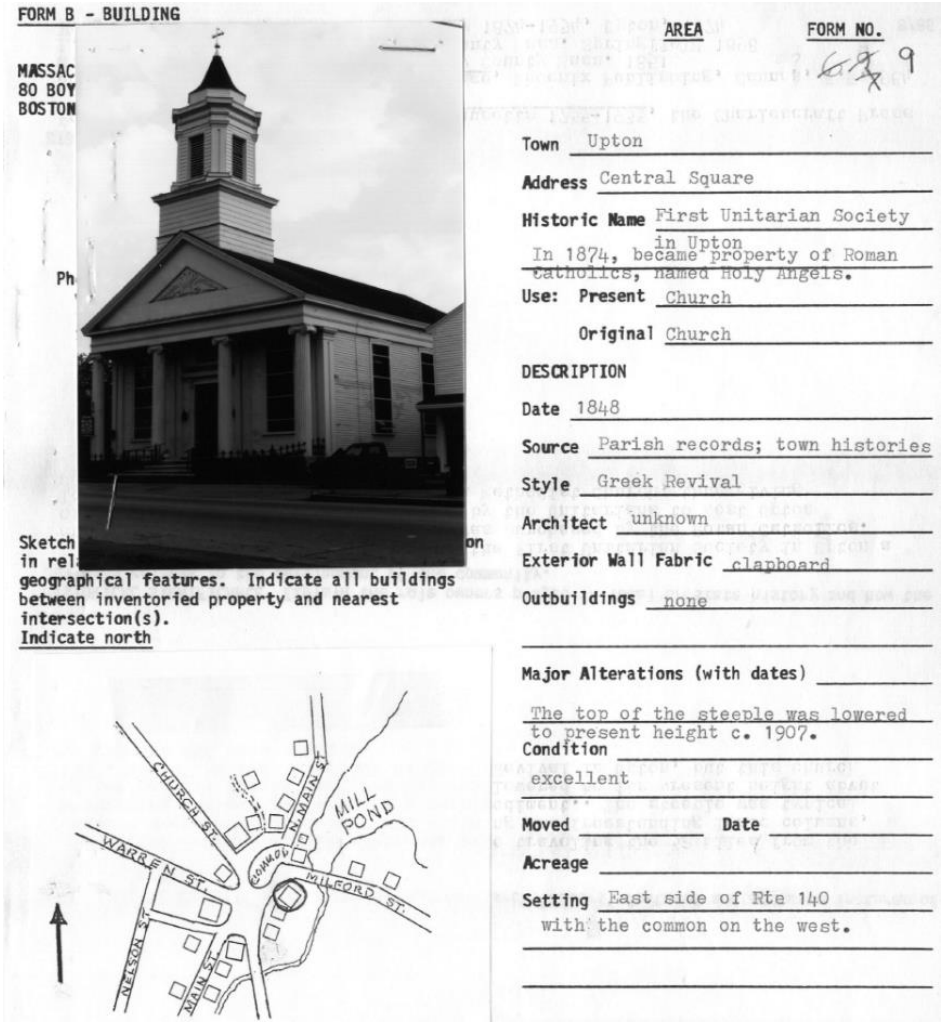
Resource Area Delineation

- Center Brook runs along site study area
- BSC ecologists delineated the top of bank
- Creates baseline data to make the permitting more predictable



Existing Conditions

- Zoning – The UCBD creates flexibility for height (up to 3 stories, setbacks, and shared parking). Allows for mixed use buildings.
- Historic – Preserving as much historic character as possible.
  - The Holy Angels Church is an important element of the town center.
  - The Thompson Block was significantly modified (3rd floor removed).
- Parking –Flexibility with parking requirements for new construction will be critical.



FORM B - BUILDING

AREA FORM NO. 9

MASSAC
80 BOY
BOSTON

Ph

Sketch
in rel on
geographical features. Indicate all buildings between inventoried property and nearest intersection(s).
Indicate north

CHURCH ST.
N. MAIN ST.
MILL POND
WARREN ST.
COMMON
MILFORD ST.
NELSON ST.
MAIN ST.

Town Upton
Address Central Square
Historic Name First Unitarian Society in Upton
In 1874, became property of Roman Catholics, named Holy Angels.
Use: Present Church
Original Church
DESCRIPTION
Date 1848
Source Parish records; town histories
Style Greek Revival
Architect unknown
Exterior Wall Fabric clapboard
Outbuildings none

Major Alterations (with dates)
The top of the steeple was lowered to present height c. 1907.
Condition
excellent
Moved Date
Acreage
Setting East side of Rte 140 with the common on the west.

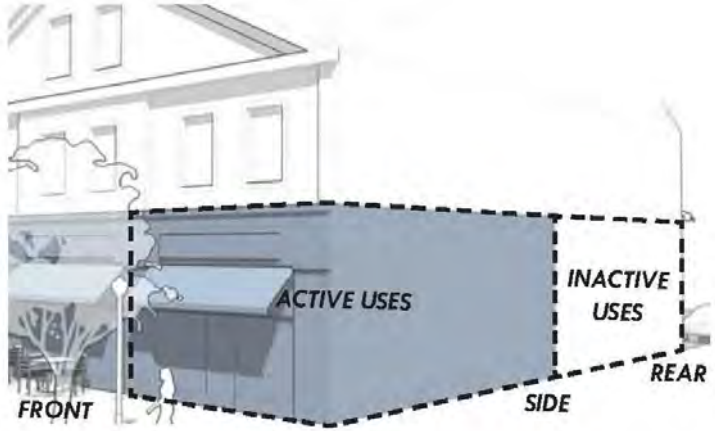
Town Center Vision

- 2019 Vision Plan
  - Collected significant community input
  - Laid groundwork for library/community center
  - Explored possible scenarios for Holy Angels and adjacent parcels
  - Included a visual preference survey
- Acknowledged goals of historic preservation and outlined need to investigate options and costs associated with Holy Angels.

Town Center Vision

- 2019 Vision Plan
  - Created an ambitious and ultimately infeasible concept for the town center by relocating Grove Street.
  - This concept plan became infeasible as the MassDOT TIP project advanced.

Precedent Examples – Mixed Use



Precedent Examples - Parking

Precedent Examples – Low Impact/ADA Trail

Study Area

BASE MAP - FOCUS AREA

UPTON, MASSACHUSETTS

NORTH

1"=20'
0 10 20 40 FEET

MARCH 24,2025

BSC GROUP
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Redevelopment Concepts

Concept A

Holy Angels preserved; Thompson Block demolished

Building 1 – 5,200 square feet, 2 story
- First floor with two (2) commercial spaces at 2,000 square feet
- Second floor with five (5) apartments

Building 2 = 4,500 square feet, 2 story
- First floor with three (3) commercial spaces at 1,500 square feet each
- Second floor with four (4) one-bedroom apartments

36 parking spaces

Concept B

Demolition of Holy Angels and Thompson Block

Building 1 = 9,500 square foot, 2 story
- First floor with four (4) commercial spaces at 2,000 square feet
- Second floor with nine (9) apartments

Building 2 = 4,500 square foot, 2 story
- First floor with three (3) commercial spaces at 1,500 square feet each
- Second floor with four (4) one-bedroom apartments

34 parking spaces

Concept C

Holy Angels preserved; Thompson Block demolished

Building 1 = 5,200 square foot, 2 story
- First floor with two (2) commercial spaces at 2,000 square feet
- Second floor with five (5) apartments

31 parking spaces

Concept D

Holy Angels preserved; Thompson Block remains

Existing municipal lot
- Current= 14 spaces
- After MassDOT = 11 spaces

Expanded municipal lot
- Existing municipal lot = 11 spaces
- Expanded municipal lot = 17 spaces

Expanded Total = 28 parking spaces

Concept A

CONCEPT A - FOCUS AREA

UPTON, MASSACHUSETTS

NORTH

1"=20'
0 10 20 40 FEET

MARCH 24,2025

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Concept B

CONCEPT B - FOCUS AREA

UPTON, MASSACHUSETTS

MARCH 24,2025

NORTH

1"=20'

0 10 20 40 FEET

BSC GROUP
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Concept C

CONCEPT C - FOCUS AREA

UPTON, MASSACHUSETTS

NORTH

1"=20'

0 10 20 40 FEET

MARCH 24,2025

BSC GROUP
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Concept D

CONCEPT D - FOCUS AREA

UPTON, MASSACHUSETTS

NORTH

1"=20'
0 10 20 40 FEET

MARCH 24,2025

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Permitting Analysis Summary

Permitting Authority	Required Permit
Upton Planning Board	• Site Plan Approval
Upton Conservation Commission	• Upton Wetlands Protection Bylaw permit • Wetland Protection Act – Notice of Intent (including performance standards for RFA, 310 CMR 10.58(5) • Land Disturbance Permit (Stormwater)
Upton Historical Commission	• Demolition Delay
MEPA	• N/A
MADEP	• Stormwater Report
Natural Heritage & Endangered Species (NHESP)	• N/A
Massachusetts Historic Commission	• Optional: National Historic Register Designation (tax credits)
USEPA	• National Pollution Discharge Elimination System (NPDES) Construction General Permit
FEMA	• Bordering Land Subject to Flooding (BLSF) Letter of Map Revision completed by the Town to make private development

Appendix C – EDC memorandum dated December 16, 2024

BSC GROUP
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Engineers
Environmental Scientists
Software Developers
Landscape Architects
Planners
Surveyors

www.bscgroup.com

MEMORANDUM

TO: Michael Antonellis, Town Planner
FROM: Jeff Bagg, Senior Planner, BSC Group
DATE: December 16, 2024
RE: Upton Center Conceptual Designs

BSC Group's role in this project is to help the Town explore options for the reuse of the properties in Upton Center at 1 Milford Street, 3 Milford Street, 0 Grove Street, and 2 Grove Street ("the Site"). To that end, we conducted a site visit of the properties and completed a resource area delineation in October 2024. We have also reviewed the 2019 Upton Vision Plan and the 2019 Structural Evaluation of the building known as the Holy Angels Church.

Based on this information and our initial consultation with Town officials, our team has prepared three preliminary concepts for the redevelopment of the properties for review and comment. We are prepared to attend the next meeting of the Town's Economic Development Committee (EDC) to review the baseline information collected to date and to discuss the three concepts. Based on feedback received from the EDC meeting, our team will continue to refine the proposed options and prepare a comparison of existing vs. conceptual conditions associated with building sizes, uses, and parking.

Upon receiving feedback, BSC will finalize the concepts and complete our analysis.

The following is a brief overview of the preliminary concepts which should be considered ***DRAFT FOR DISCUSSION:***

Option A illustrates the potential for the following:

a. Retention of the church building along with ADA parking nearby.
b. The existing ADA ramp is extended down to the parking area and would provide ADA access to both levels of the church building without the need for an elevator.
c. Demolition of the Arcade block to be replaced with a 5,200 square foot building.
d. A new 4,500 square foot building along Grove Street with associated parking and stormwater detention.
e. A conceptual "trail" at the back of the property along Center Brook.

Option B illustrates the potential for the following:

a. Demolition of the church building and the Arcade block and construction of a new 9,250 square foot building.
b. A new 4,500 square foot building along Grove Street with associated parking.
c. A conceptual "trail" at the back of the property along Center Brook.

Option C illustrates the potential for the following:

a. Retention of the church along with ADA parking nearby.
b. The existing ADA ramp is extended down to the parking area and would provide ADA access to both levels of the church building without the need for an elevator.
c. Demolition of the Arcade block to be replaced with a 5,200 square foot building.
d. Construction of a larger municipal parking lot to serve the town center and potential community uses in the area.

Resource Area Delineation & Riverfront Disturbed Areas.

The Resource Area Delineation map shows a 100-foot and 200-foot riverfront buffer area as well as FEMA flood zones. The Riverfront Disturbed Area map shows an initial calculation of existing disturbed areas. Together, these maps begin to dictate the potential redevelopment opportunities with some additional allowance potentially available under the Wetlands Protection Act.

Next Steps

With input from Town officials and the EDC, the three proposed concepts will be refined, with the goal of identifying one preferred conceptual plan. Additional information related to the potential number of units, number of required parking spaces, and other calculations will be provided for the Town. This project also includes a review of potential permitting requirements for the redevelopment of these properties and the preparation of a plan suitable for an Abbreviated Notice of Resource Area Delineation (ANRAD). Finally, BSC will provide an estimate of probable costs for the finalized concept plan.

Please note that the project scope does not include a detailed evaluation of improvements to the Holy Angels Church. A future phase is anticipated to be necessary with the support of an architect to provide the Town with more detailed information regarding the reuse of that building.

Sincerely,

Jeff Bagg
Senior Planner

EXISTING MONUMENT

POTENTIAL HISTORIC INTERPRETIVE SITE (KIOSK/BENCH) TO EDUCATE ABOUT ADA ACCESSIBLE TRAIL

DISTURBED AREA TO BE RESTORED

5' WIDE ADA SIDEWALK

BENCH

200' RIVER FRONT AREA

100' BUFFER FOR WETLAND AND STREAMS

PROPOSED DISTURBED AREA 46,908 SQFT

ADA PARKING

9 PARKING SPACES (9x18)

TOP OF BANK

FEMA FLOODPLAIN

NATURAL FLOOD BUFFER ZONE

24 PARKING SPACES (9x18)

GROVE STREET VEHICULAR BRIDGE + PEDESTRIAN BRIDGE

POTENTIAL FUTURE CONNECTION TO BACK OF COMMUNITY CENTER. THIS ELEMENT WOULD REQUIRE EXTENSIVE ADDITIONAL STUDY TO DETERMINE FEASIBILITY AND LOCATIONS

HOLY ANGELS CHURCH

5,200 SQFT

KNOWLTON RISTEEN BUILDING

4,500 SQFT

ONLY

VAN

VAN

NORTH

1"=20'

0 10 20 40 FEET

CONCEPT A - FOCUS AREA

UPTON, MASSACHUSETTS

DECEMBER 13,2024

BSC GROUP
BUILD | SUPPORT | CONNECT

NORTH

1"=20'

0 10 20 40 FEET

CONCEPT B - FOCUS AREA

UPTON, MASSACHUSETTS

DECEMBER 06,2024

BSC GROUP
BUILD | SUPPORT | CONNECT

NORTH

1"=20'

0 10 20 40 FEET

CONCEPT C - FOCUS AREA

UPTON, MASSACHUSETTS

DECEMBER 13,2024

BSC GROUP
BUILD | SUPPORT | CONNECT

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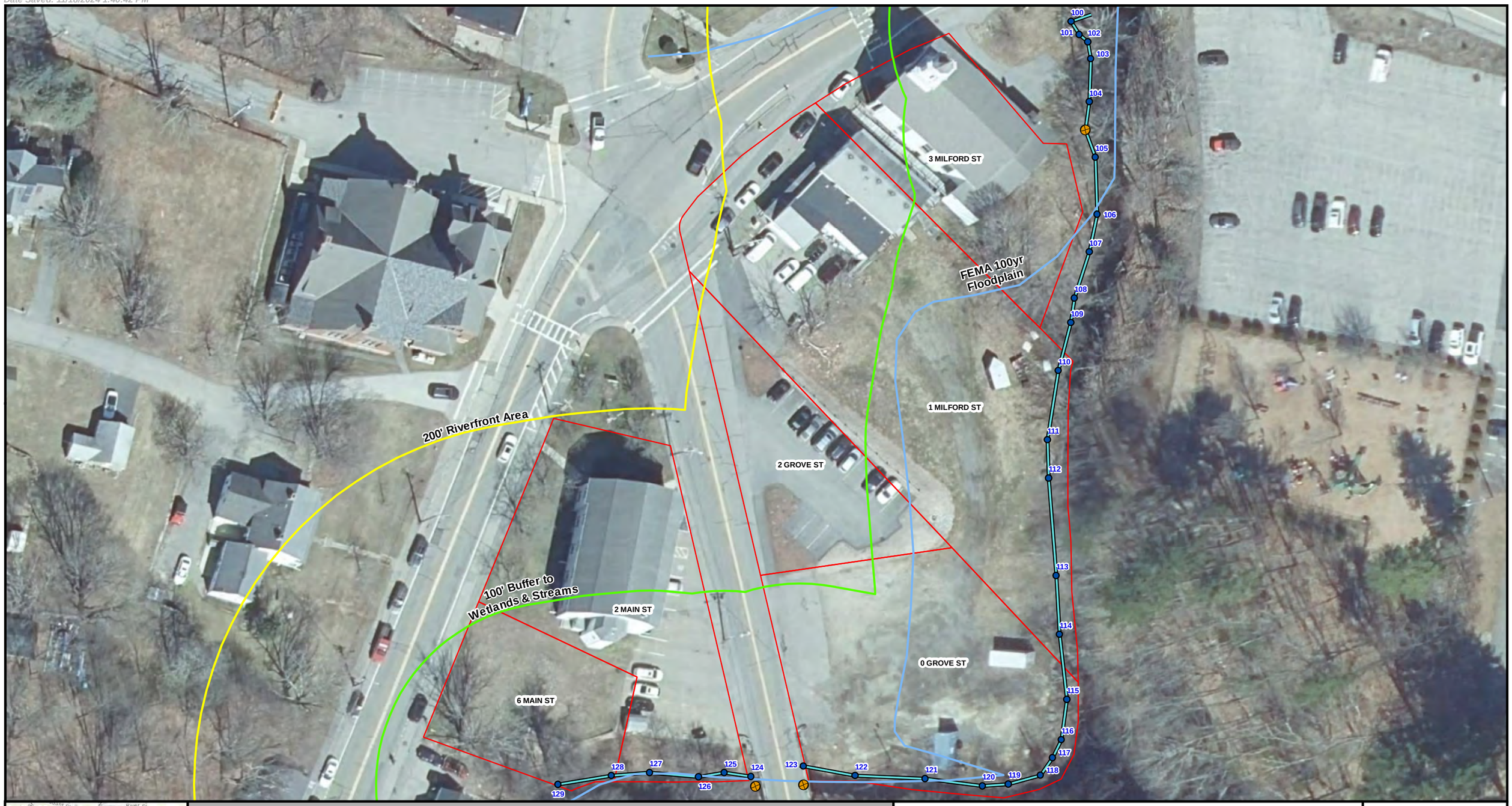
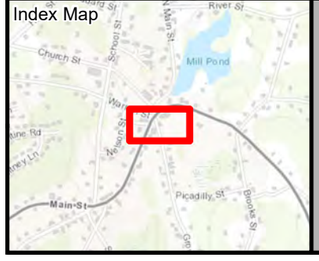


Index Map



Legend

- Subject Properties
- Stream Flag
- Field Delineated Stream Bank
- 100ft Buffer to Wetlands & Streams
- 200ft Riverfront Area
- FEMA 100yr Floodplain
- Culvert

N

1 inch = 50 feet

0 25 50

Feet

THIS DOCUMENT IS INTENDED FOR GENERAL PLANNING & INFORMATION PURPOSES ONLY. ALL MEASUREMENTS & LOCATIONS ARE APPROXIMATE.

UPTON TOWN CENTER

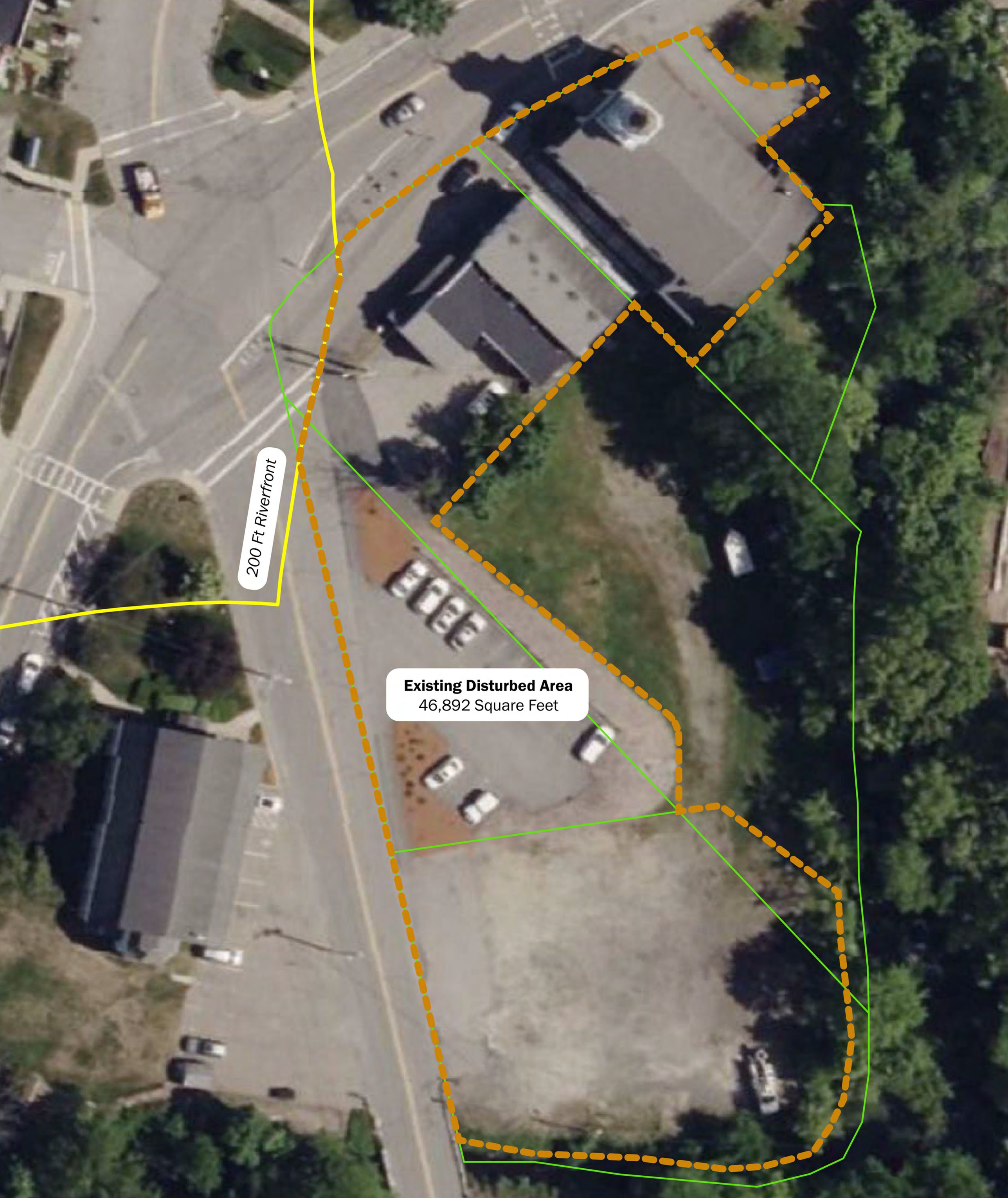
FEMA & Resource Area Delineation Map

Upton, MA

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

TOWN OF UPTON INCORPORATED JUNE 14, 1735 MASSACHUSETTS

BSC GROUP


200 Ft Riverfront
Existing Disturbed Area
46,892 Square Feet

Appendix D – Holy Angels Church Structural Evaluation dated April 26, 2019

CRITERIUM® ENGINEERS

STRUCTURAL EVALUATION

Holy Angels Church
3 Milford Street
Upton, MA

Prepared for:

Town of Upton
c/o Derek Brindisi - Town Manager
1 Main Street
Upton, MA 01568

Prepared by:

Criterium Engineers
5 Depot Street, Suite 23
Freeport, Maine 04032
(800) 242-1969
In association with
Criterium-Dudka Engineers
Hopkinton, Massachusetts

April 26, 2019

Project Number: 19-0104-MA
Date of Inspection: April 4, 2019
Engineers: H. Alan Mooney, P.E.
Nate Powelson, P.E.

Table of Contents

1.0 Introduction

At the request of the Economic Development Committee (the Committee) in Upton, Massachusetts we have performed a structural evaluation of the Holy Angels Church located at 3 Milford Street in Upton, MA. The report that follows, including the photos and other information in the appendices, is the result of our evaluation.

After you have had an opportunity to review this information, if you wish to discuss our observations and conclusions in more detail, we are available for a meeting.

2.0 Purpose

As we understand it, the committee is interested in obtaining a professional opinion on whether the building is structurally sound and what, if any, significant repairs or rehabilitation would be needed if it were to be actively occupied again, perhaps as a mixed-use building.

Further, if rehabilitation is feasible, the committee would also like to know the estimated cost for rehabilitation. Our ability to provide a cost estimate is limited to some assumptions we must make about reuse options as well as having only evaluated the structural condition.

Overall, our work was guided by our proposal for this project which is included in Appendix D.

3.0 Executive Summary

Overall, we consider this building to be structurally sound. We found some evidence of deterioration in parts of the framing in contact with the soil on the lower level; however, this is not significant and does not compromise the overall structural soundness at this time. Some repairs would be needed in these areas if an extensive renovation or conversion to a different use was undertaken.

The approximate live load capacity for the first floor is 65 pounds per square foot (PSF). That capacity is typical for a building of this age and construction type. However, if this building were renovated and used for assembly purposes (theater, restaurant, etc.) it is likely that the required first floor live load capacity would be 100 PSF. Therefore, some reinforcement would be needed. Also, if this type of use were anticipated, some reinforcement of the framing connections and details for the first floor would be recommended.

Of most concern in this building, although not specifically structural, is the evidence of widespread presence of asbestos containing materials. The mitigation of these materials, which includes some of the floor tiles (typically the 9" x 9" tiles) and some of the loose insulation, will be a complex and potentially expensive project. Also, considering the age of this building, it is likely that lead paint was used which also would require some mitigation depending on the anticipated use.

Finally, with regard to an overall summary, for future reuse, accessibility will be a concern. There is a ramp on the right side of the building which does provide access to the main level. However, this ramp is generally in poor condition at this time. Further, the details of this ramp

(slope, width, etc.) would need to be reviewed to be sure that it is compliant with current ADA standards. Further, there are other accessibility issues throughout this building including door widths, access to the stage, rest rooms, signage, etc. All of these would need to be addressed appropriately to secure proper permits for any planned renovation of this building.

Of immediate consideration is the safety of the ramp; use should be prohibited.

4.0 Description

This building, a former church now vacant, was reportedly built around 1800 and consists of approximately 7,600 SF of above grade space. Prior to our inspection, finishes had been removed on most of the lower level.

There are two sections: the original building and a smaller addition at the rear. The main building has wood siding and the addition has vinyl siding. The roofs on both buildings are composite shingles. There are several significant architectural features (columns, cornices, etc.) on the exterior of this building.

The primary structural system contains heavy timber elements typical for a building of this age. The newer addition is more conventional wood framing.

5.0 Methodology

The field inspection was conducted by H. Alan Mooney, P.E. (MA) and Nate Powelson, P.E. (ME). Resumes are provided in Appendix E. These two individuals spent approximately four hours at the property. At that time, all accessible parts of the building structure were examined. In addition, photos were taken (see Appendix B). Please be sure to review all of the photos since they supplement the report.

Our inspection team was assisted by Andrew Dudka, the principal of Criterium-Dudka Engineers in Hopkinton, MA.

Elevations were taken of the upper level and lower level floors. Also, a sampling of specific framing measurements were taken to provide basis for our subsequent analysis of the upper level floor capacity.

Various members of the Committee and Upton town officials were in attendance at the time of our inspection.

We also reviewed various plans made available to us, most of which relate to a proposed renovation prepared in 2015.

We also have reviewed an engineering report by Flood Consulting dated November 26, 2014. That report is included in Appendix C.

6.0 Standards and Limitations

Our inspection and report has been conducted consistent with that level of care and skill that is ordinarily exercised by members of the profession providing the same services under similar conditions at the time the services are performed.

We examined this building based on our extensive experience with other buildings of similar age and construction type. A standard of reference for new construction would not be appropriate for a building that is over 100 years old. We examined it for structural soundness and for reasonable structural integrity.

Our inspection report is limited to observations made from visual evidence. No destructive or invasive testing was performed. Our report is not to be considered a guarantee of condition and no warranty is implied.

For your reference while reading our report, the following definitions may be helpful:

Average - Component or system compares to what is typical for construction in the geographic area in which the inspection occurs. It also compares it to buildings of similar age and construction type. Since construction practices vary from region to region, average is intended to be region specific.

Excellent - Component or system is in "as new" condition, requiring no rehabilitation, and should perform as expected.

Good - Component or system is sound and performing its function, although it may show signs of normal wear and tear. Some normal maintenance work may be required.

Fair - Component or system falls into one or more of the following categories:

1. Evidence of previous repairs not in compliance with commonly accepted standards.
2. Workmanship not in compliance with commonly accepted standards.
3. Component or system is obsolete.
4. Component or system approaching end of expected performance. Repair or replacement is required to prevent further deterioration or to prolong expected life.

Poor - Component or system has either failed, or cannot be relied upon to continue performing its original function as a result of having exceeded its expected performance, excessive deferred maintenance, or state of disrepair. Present condition could contribute or cause the deterioration of other adjoining elements or systems. Repair or replacement is required.

All ratings are determined by comparison to other buildings of similar age and construction type.

We did not do a complete code evaluation of this building. This would be inappropriate for a building of this age unless proposed renovations would trigger a need for compliance with current building codes. The International Existing Building Codes (IEBC) do provide some

flexibility for reuse of existing buildings, however, there would still be some significant building code requirements if this building were to be renovated for a new use.

While some references to hazardous materials may be made, our report is not a complete investigation for toxic wastes in the building or adjacent soils, hazardous materials, or public records affecting this property. Such an investigation would be much more costly and is beyond the scope of this inspection.

Mold is a growing concern. For some individuals, the presence of mold may aggravate certain respiratory conditions, and, for still a smaller group, may actually be toxic. Organizations like the Environmental Protection Agency (EPA) and the Centers for Disease Control (CDC) have not established any levels considered to be safe or unsafe for mold. This is not for lack of trying; it is a matter of complexity. If you find mold, it often can be removed effectively using a chlorine solution (e.g. diluted Clorox) and then monitoring the area to determine if it returns. Mold is usually the result of moisture. Controlling moisture penetration will typically eliminate the opportunity for mold to survive. For more information about mold, you might want to consider visiting one or more of the following websites:

1. www.iaqa.com
2. www.epa.gov/iaw/molds/index.html
3. www.cdc.gov (search on mold)

While some references to handicap accessibility may be made, our report is not intended to be a complete investigation for conformance to the Americans with Disabilities Act (ADA) or any other state or Federal handicap accessibility standards. Such an investigation is beyond the scope of this inspection.

While we often comment on major code violations, as we mentioned, this report should not be construed as a specific code compliance investigation. Further, since this is a public, commercial building, it is subject to many local and state ordinances and codes which do change from time to time. Therefore, to avoid surprises later on that might affect your use of this building as well as your maintenance and renovation budgets, we suggest that you review this building with the local code enforcement and fire officials prior to making any final decisions about its future. Establishing a relationship with these officials and having them review your building at this stage would be appropriate.

The cost estimates we provided are presented to give you a range of magnitude understanding of the costs for the recommended repairs. While every effort has been made to be precise, the actual costs may vary from these estimates. Many different variables affect the final cost of any project. Consultation with the contractor who will actually be doing the work will give you a much more precise estimate.

7.0 Observations

7.1. Foundation

The foundation of the main building is primarily stone and brick. It reflects a high quality of workmanship as would be consistent for 19th century construction of a religious facility. We did not find any evidence of significant distress in the foundation of the main building.

The newer addition at the rear of the building has a cast in place concrete foundation. That also is in sound condition at this time. Nothing suggests that new work would be needed to the foundation other than some modest repointing of the stonework in a few areas.

Cost for general rehabilitation of the foundation would be minimal, perhaps $3,000 to $5,000. This work is not urgent.

7.2. Framing

This section will address the framing for the lower level, upper level and attic portions of this building.

The basement, otherwise referred to here as the lower level, is mostly above grade. The building was built into a slope such that the main level (the sanctuary level) is at street level at the front of the building. At the rear of the building, the lower level is at ground level.

The lower level floor is concrete. It is generally relatively level. Appendix A includes a basement plan where we have noted elevation differences throughout the lower level floor. The most significant difference is approximately 0.1 feet which is approximately one inch. This suggests that there has been minimal settlement in this foundation throughout its approximate 200 year life.

There are a few cracks in the lower level floor but none that are significant as it relates to evidence of any structural distress or settlement.

We also took elevations of the main floor. That plan with our elevations noted is included in Appendix A. We found as much as two to three inches of variation in parts of the floor. For the size of the space, this is not unusual, nor is it of concern structurally. Of course, if this building were to be renovated, it is likely that some leveling would be needed to serve the needs of some future space.

The upper level framing is visible from the lower level. Most of the interior finishes (ceiling, walls, etc.) have been removed. Generally, the main level framing is in good condition. There are a series of columns, beams and joists. The photos show the sizes measured of a sampling those members. The framing includes both saw cut and hand hewn members.

The joists are notched to rest on the beams. Many joists have been shimmed to level the floor above. Again, this is evidence of a high quality of workmanship typical for this type of building in the 19th century.

Our review of the capacity of this framing system indicates a live load capacity of approximately 65 pounds per square foot (PSF). As noted previously, this is less than would be expected for this building if it were built today and being used for assembly (church, restaurant, theater, etc.). It is also likely that a more detailed analysis of this framing would yield a somewhat higher capacity. We have used conservative allowable stresses that may not apply to lumber of this age since such lumber is generally more dense than dimension lumber available today. In any event, if a future use needed a higher capacity, given the openness of the lower level, it would be relatively straightforward to reinforce the main level to satisfy a higher load requirement.

The notched configuration of the joists as they are supported by the beams visible in the lower level is not ideal and does compromise the capacity of those joists. If this building were to be reused and if the required first floor live load capacity was 70 PSF or more, we recommend adding joist hangers to these joists so that the full bearing of the joist would be at the bottom of the joist, not at the notch.

In addition to the primary columns, there are a few steel lally columns noted in the basement. These were probably added to stiffen certain areas related to functions and/or equipment on the upper level. These did not appear to be structurally significant.

This, along with some other upgrading or refreshing of the general capacity of the main floor framing, would be a recommendation of the building at this time regardless of its future use.

The attic was accessed through a hatch from the balcony at the rear of the sanctuary. There are many pictures in Appendix B of the attic framing. It is well done, consistent with the workmanship that would be expected of a building of this type in the early19th century. It is likely that the bell tower was added somewhat after the original construction. A close examination of the various framing members reveals some members that are saw cut and others that are hewn, as is the case with some of the framing in the lower level.

As an aside, it is fascinating to think about how this building would have been built in the early 19th century. The requirement for hand labor and hand tools was enormous, to both create the framing members and to erect the structure. There are beams in the upper level floor framing that appear to be one solid piece the full width of the building.

We did not find any evidence of significant distress in the roof framing. There are many combinations of trusses, rafters and steel hangers effectively integrated to produce a roof framing system that has survived 200 years. The work is consistent with the capability of what was known as a Master Builder in the 19th century, someone who embodied the skills of what we think of today as an architect, an engineer and a builder. They were competent and capable of producing well-crafted, sound buildings, mostly relying on experience and good judgement.

The ceiling in the sanctuary has insulation installed above it. It is unclear when that ceiling was installed. It is not likely original to this building. Most likely, for this vintage, the original ceiling would have been plaster. Many plaster ceilings from 19th century churches have been removed or failed as the buildings age. I suspect the current ceiling is a later addition. The insulation above it adds some weight but not enough to be significant at this time. However, that insulation may contain some asbestos and mitigation may be required if that ceiling is to be removed and replaced as part of any renovation.

There is a rather challenging and somewhat awkward stair going up into the bell tower. If this building were to be fully rehabilitated, for safety purposes, some of the access throughout the attic and up into the bell tower should be upgraded.

For now, however, since access to the attic would be limited to those appropriately qualified, there is no need to do any repair work to the roof framing or attic access in this building.

While doing our field investigation, we also checked the plumbness of the walls at a sampling of locations, both at the lower level and the upper level (see photos). We generally found the plumbness to be within reasonable tolerances we would expect for a building of this age. They are not perfectly plumb, and in fact they may not have been perfectly plumb when this building was built. However, they are certainly within any tolerance that we would consider to be appropriate to conclude that this building is structurally sound and stable at this time.

7.3. Roof

The roof on the main building is composite shingles. They appear to be in good condition at this time, we would estimate they are not much more than 10-15 years old. Another 5-10 years is likely.

The roof on the new addition is also composite shingles and appears to be in good condition at this time and at least another 5-10 years can be expected. I suspect both roofs were reshingled at the same time.

From the attic, the roof framing and roof sheathing appear to be in good condition.

There is evidence of a few roof leaks which may be the result of ice dams and/or some flashing failure around the chimney, for example. These did not appear to be extensive, however.

The most significant area of water intrusion is around the bell tower. There are water stains on the ceiling of the balcony, most likely the result of wind-driven rain entering the bell tower. That structure is not weather tight. It would be necessary, if the building is to be renovated, to enclose that bell tower in some way to assure weather-tightness.

At this point, if the building is to remain unused for the foreseeable future, some effort to make the bell tower weather tight, at least temporarily, is recommended. Given the accessibility (height, steep roof, attic access), we suggest an allowance of $7,000 to do that, and that would only provide a temporary solution, not a permanent one.

7.4. Interior

The interior finishes are what would be expected of a building of this age and construction type, and they are generally in fair condition at this time. The lower level finishes have been removed almost entirely. The main level finishes are still in place, but would need to be renovated for any future use. As noted, as the main level finishes are removed, there appears to be loose insulation in the wall cavity which should be tested for asbestos.

Any significant renovation would require all new interior finishes. The choice of materials and quality for the interior finishes will affect the cost significantly.

7.5. Exterior

The exterior of the main building is primarily wood clapboard and wood panel siding. The rear newer addition is vinyl siding. There are a few areas (see photos) where there is some rot in the wood siding and wood trim. This is not extensive but would need attention. At a minimum, if this building is to remain unoccupied for some period of time, the exterior should be thoroughly prepared and painted. Those areas where there is evidence of rot should be addressed to remove and replace the rotted wood and apply an appropriate paint or wood preservative.

All of the exterior doors are in poor condition.

Since this is a large, tall, complex building, thoroughly repainting the exterior is likely to cost $50,000 or more.

7.6. Site Drainage

There are drainage channels that run down both sides of this building (see photos). Given the steepness of the slope and the way this building is built into the slope, during a heavy rain there would be quite a lot of water that would run down the sides of this building. That has caused some erosion toward the rear of the building and does expose some of the wood framing to moisture that has caused some rot. Also, particularly along the left side (facing from the street), there is water intrusion evident in the lower level as a result of that drainage. Some of the backup of water is based on the drainage channels not being kept clear so they flood or pond during heavy rains. This should be improved as part of the stabilization project.

7.7. General

The ramp on the right and the metal stair on the left are in fair to poor condition. Many of the connections in the ramp, as well as the attachment to the building, are substandard and at risk of failure. The ramp should not be used.

While our purpose is to evaluate the structural condition of the building at this time, we consider it relevant to note two other areas that will need consideration regardless of what future plans may be undertaken for this building.

The first involves hazardous materials. There is evidence of widespread presence of asbestos-containing materials (ACM) in this building. This includes the smaller floor tiles (9" square) and some of the loose insulation. Some other materials such as wall finishes may also contain asbestos. Asbestos in building materials was quite common in the 19th century as well as the early 20th century.

A comprehensive project for mitigating ACMs in this building is likely to cost several hundred thousand dollars. A more specific estimate would require more investigation and material testing.

It is also likely that there is lead paint in this building. The extent to which that would need to be mitigated would depend on the plans for the building. Generally speaking, dealing with lead paint is guided by "lead-safe" standards rather than "lead-free" standards. Lead-safe means, among other things, an effective lead paint management program. It does not mean removing all of the lead paint. However, even an effective lead paint management program to achieve a "lead safe" condition could cost $50,000 or more for a building of this size.

Another area of concern involves accessibility. To what extent this would impact the future use of this building would depend greatly on what that future use may be. If it is to remain some type of a theater, performance, meeting or religious facility, access to the stage/platform would be needed. Also, there are stairs in the building that are too steep to meet current standards. If the exterior ramp were to be rehabilitated, that could provide adequate access to both levels, but again it depends on the future use would be as to the extent that would be necessary to satisfy Americans with Disabilities Act (ADA) standards.

In addition, accessible restrooms will be needed on both levels if public access is anticipated for both levels.

Accessibility has been a high priority for quite some time and the standards are becoming more demanding as time passes.

8.0 Recommendations

There are essentially two options for going forward with this building. One is to simply take minimal action it so it can remain unoccupied and unused for some period of time while minimizing further deterioration. We call that stabilization. The second would be renovation for some new use. We can only offer a very rough estimate for that cost since it would be totally dependent on what that new use would be.

8.1. Stabilize

To stabilize, the following items will need to be addressed and we have provided rough estimates for each.

Repaint exterior	$50,000
Weatherproof bell tower	$8,000
Rehabilitate access ramp (or close it)	$10,000
Control water intrusion at the basement	$3,000
Subtotal	$71,000
Contingency (10%)	$7,000
TOTAL	**$78,000**

We have not included the rehabilitation of the main level framing in this stabilization project since that would only be required as part of a renovation project for this building.

8.2. Renovate

To renovate, the following items will need to be addressed. Many of these estimates are very approximate since further testing and investigation is needed before more firm estimates can be developed.

All of stabilization (except bell tower)	$74,000	
Asbestos mitigation	$150,000	
Lead paint mitigation	$50,000	
Upper level framing upgrades	$8,000	
Interior finishes/simple (7,600 SF)	$220,000	*Note 1*
Subtotal	$502,000	
Contingency	$50,000	
TOTAL	**$552,000**	

Note 1 – The cost of interior finishes will vary significantly depending on the quality and type of materials and fixtures chosen.

Since our work was structural, we have not addressed anything with regard to electrical, lighting, plumbing, HVAC, fire sprinklers, alarm systems, etc. All of those would need to be considered.

A very rough estimate for a major renovation of this building including all systems would be $1,500,000. And, again, that is very dependent on the quality of finishes and materials chosen.

9.0 Conclusion

We consider this building to be structurally sound at this time. If nothing were done to it, it is likely that it would continue to be structurally sound for many years.

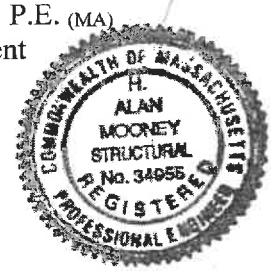
However, to minimize ongoing deterioration, a modest stabilization project as outlined here is recommended. Also, for public safety and to minimize liability, access to the ramp should be prohibited.

After that is complete, further work will be dependent on the planned use. Again, it is important to remember that any renovations of this building will require mitigation of the hazardous materials, at least the asbestos-containing material, and attention to accessibility.

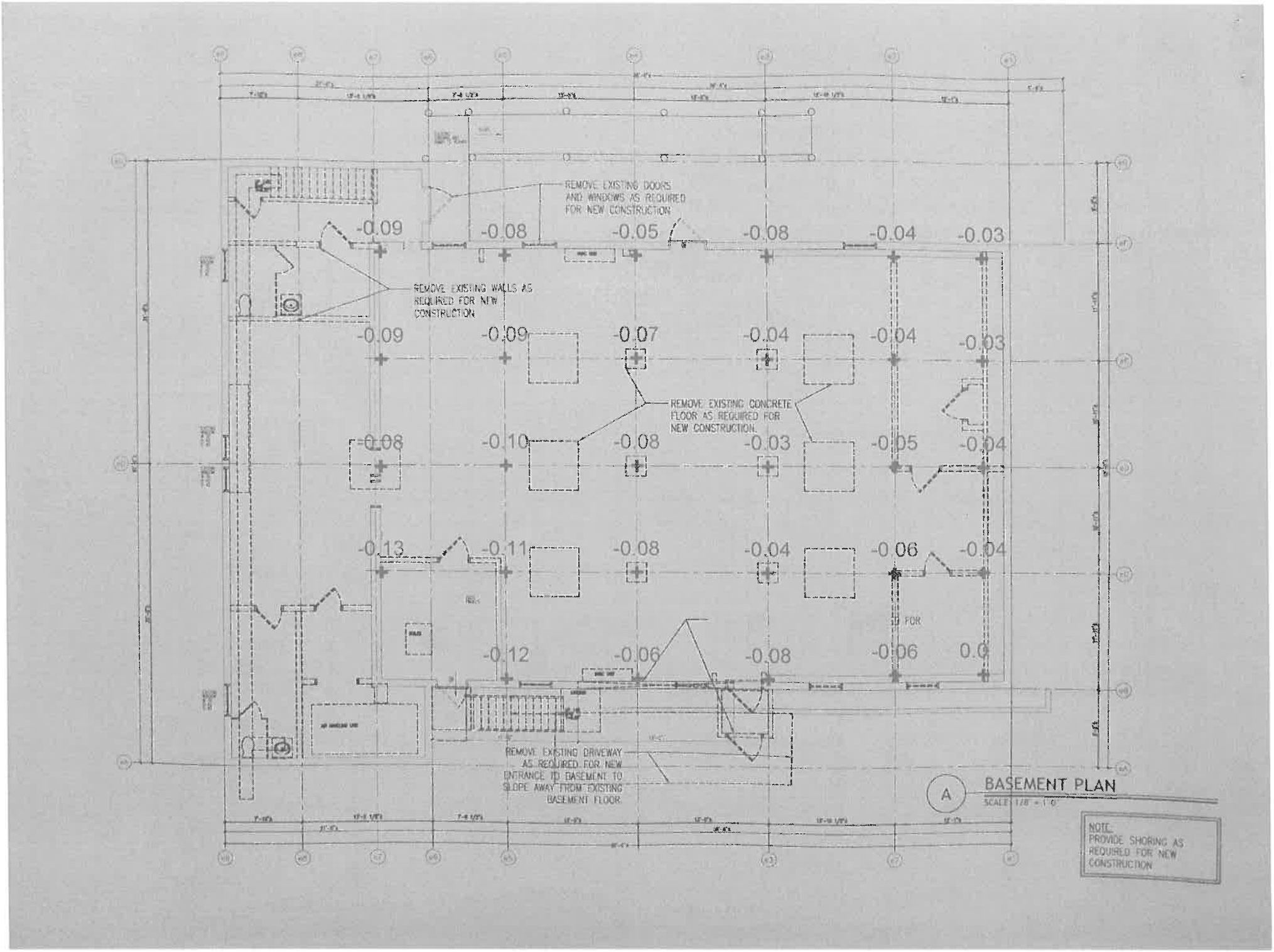
As you have any additional questions, please feel free to call. Thank you for the opportunity to work with you by evaluating this interesting and historically significant building.

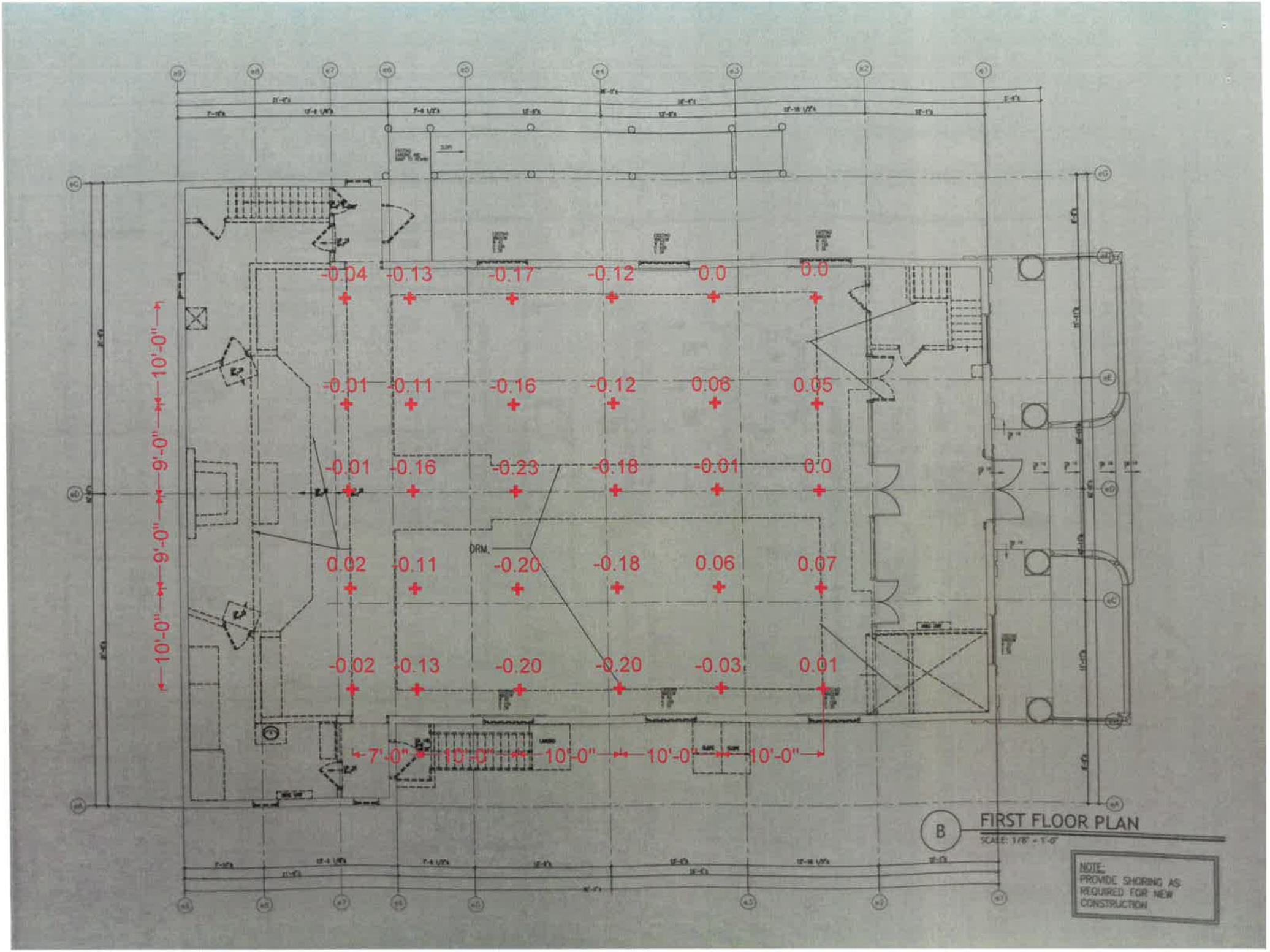
Respectfully submitted,

H. Alan Mooney, P.E. (MA)
Founding President



APPENDIX A
FLOOR ELEVATION PLANS


REMOVE EXISTING DOORS AND WINDOWS AS REQUIRED FOR NEW CONSTRUCTION
REMOVE EXISTING WALLS AS REQUIRED FOR NEW CONSTRUCTION
REMOVE EXISTING CONCRETE FLOOR AS REQUIRED FOR NEW CONSTRUCTION.
REMOVE EXISTING DRIVEWAY AS REQUIRED FOR NEW ENTRANCE TO BASEMENT TO SLOPE AWAY FROM EXISTING BASEMENT FLOOR.
-0.09 -0.08 -0.05 -0.08 -0.04 -0.03
-0.09 -0.09 -0.07 -0.04 -0.04 -0.03
-0.08 -0.10 -0.08 -0.03 -0.05 -0.04
-0.13 -0.11 -0.08 -0.04 -0.06 -0.04
-0.12 -0.06 -0.08 -0.06 0.0
A BASEMENT PLAN
SCALE 1/8" = 1'-0"
NOTE:
PROVIDE SHORING AS REQUIRED FOR NEW CONSTRUCTION



B FIRST FLOOR PLAN

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

NOTE:
PROVIDE SHORING AS REQUIRED FOR NEW CONSTRUCTION

APPENDIX C
FLOOD REPORT

FLOOD CONSULTING
Structural Engineering

Revised November 26, 2014

Mr. James Maloney
10 North Main Street
Upton, MA 01568

Re: **Holy Angels Catholic Church**
Structural Review
3 Milford Street
Upton, MA
FC Project No. 1494

Dear James:

Per your request, I visited the site of the above-referenced project in order to perform a structural review of the existing building. The structure was built in 1900 with a 4,000 square foot footprint. The structure consists of single floor level with a partial upper floor mezzanine and a full basement. The building is wood-framed with a heavy timber roof truss system bearing on perimeter columns down to the basement level. The first floor level appears to be wood framed with steel pipe column supports within the basement area. The structure is founded on a solid granite wall system.

Two additions were added to the southeast end of the building, appear to be wood-framed and are supported on concrete foundation walls. These additions were added to provide additional egress from the building. The north addition provides a stair access to the lower grade level on the north side of the building while the south addition provides a ramp from the main level to the street.

It is my understanding that modifications will be made to the structure for the conversion to a multi-family dwelling. The basement will be used for car parking with overhead door access provided through the existing exterior basement wall. The existing loft area will be expanded and a new stair will be added to the loft level. These modifications are feasible with the existing structural conditions. The structure can be reinforced and/or modified to accommodate these renovations.

Based on my visual observation, the existing structure appears to be in good condition with no visual signs of distress and conforms to the provisions of the Massachusetts State Building Code. Please note that no structural testing was performed to make this determination.

If you have any questions regarding this matter, please feel free to contact me at (978) 562-6499.

Very truly yours,

Stacy R. Flood, P.E.
Principal

COMMONWEALTH OF MASSACHUSETTS
STACY R. FLOOD
No. 42253
STRUCTURAL
REGISTERED PROFESSIONAL ENGINEER

56 Laurel Drive • Hudson, MA 01749 • TEL: (978) 562-6499 • FAX: (978) 562-6246

APPENDIX D
OUR PROPOSAL

CRITERIUM®
DUDKA ENGINEERS

AJD Engineering Ventures, LLC
Independently Owned and Operated
34 Hayden Rowe Street, Suite #166
Hopkinton, MA 01748
(844)885-0153 Toll-Free
(508)589-8020 Office

December 17, 2018

Economic Development Committee – Upton, MA
c/o Bill McCormick
McCormick Properties
112 Main Street, P.O. Box 1004
Upton, MA 01568
508-320-3500
billmcproperty@gmail.com

RE: Structural Inspection – Holy Angels Church, Upton

Dear Mr. McCormick,

Thank you for giving us the opportunity to be of service to the Economic Development Committee in Upton, MA. This is to confirm the scope of engineering services that are to be provided by our office for your project.

As we understand it, your project involves a structural evaluation of the Holy Angels Church located at 3 Milford Street, Upton, MA. This building, a former church now vacant, was built in 1800 and consists of approximately 7,600 sq.ft of above grade space. The committee is interested in obtaining a professional opinion on whether the building is structurally sound and what, if any, significant repairs or rehabilitation would be needed if it were to be actively occupied again, perhaps as a mixed-use building. Further, if rehabilitation is feasible, the committee would also like to know the estimated cost for rehabilitation.

As part of preparing this proposal we have reviewed the engineering report by Flood Consulting dated November 26, 2014. Also, we understand that drawings are available which we will want to review as part of our evaluation of this building.

Our Evaluation

Upon the EDC's authorization, our engineers will conduct a site inspection of the above referenced property. Our site inspection will include all significant structural areas. We will identify any current deficiencies that pose a threat to life and safety, as well as those items that will require repair, rehabilitation or replacement. Included in our non-invasive investigation and report will be:

A. Foundation –

To be inspected: All accessible/visible portions of the foundation (i.e. slab, floor, walls) will be examined for evidence of distress and deterioration (e.g. cracks, movement, bowing, attachment).

To be reported: The significance of any distress or deterioration. Where appropriate, suggested approaches to repair including an estimated range of costs for the repairs will be provided.

B. Basement/crawl space

To be inspected: Surface drainage conditions around the building, evidence of water entry and/or accumulation in the crawl space/basement, excessive moisture, and the presence and condition of water control systems equipment.

To be reported: Description of water related conditions, adequacy of water control systems; limitations of inspection; potential risks of water entry; approximate scope of repairs recommended, approximate cost of repairs.

C. Framing

To be inspected: Investigate all accessible/visible portions of the building (e.g. floor, ceiling, roof framing); identify wood deterioration, insect activity and/or rot and other related deterioration; visually evaluate adequacy of framing other structural components.

To be reported: Evidence of structural deficiencies, approximate scope of structural repairs required, approximate cost of structural repairs required.

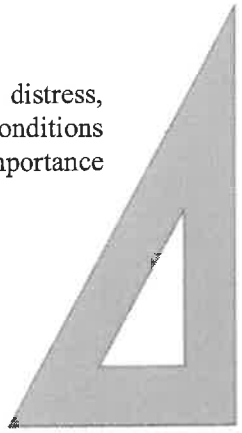
D. Roof

To be inspected: Roof surfacing, layers, flashing, sheathing (Fire Resistant Plywood), gutters for condition, type, current performance and evidence of leakage.

To be reported: Conditions requiring attention; and approximate cost to repair/replace

E. Interior/Exterior

To be inspected: Examine interior and exterior of building for evidence of distress, deterioration and weather tightness (siding and windows) that might indicate conditions affecting the overall structural integrity and stability of the building. Of particular importance for a building like this is the condition of the plaster wall and ceiling finishes.



To be reported: Evidence of distressed or deteriorated conditions and significance of same, as well as suggested approaches to the repair including an estimated range of costs for the repairs will be provided.

F. General

Other items related specifically to the structure will be examined and evaluated. These may include decks, porches and other attached structures. In addition, as engineers, we have an ethical obligation to report any significant safety hazards noted during an inspection.

Also, we will offer some limited observations regarding hazardous materials such as lead or asbestos. These materials would be common to a building of this age.

Limitations

An engineering inspection should not be construed to be any of the following:

1. A complete code compliance inspection.

   Such an inspection is a practical impossibility for any existing construction, since it is dependent on many things that cannot be seen, and on the status of codes that were applicable at the time the building was built.

2. This evaluation would not include a determination of possible uses for this building as it relates to local zoning ordinances and/or municipal regulations.

3. An inspection for hazardous materials.

   Except in the case of obvious visual evidence of hazardous materials, an engineering inspection is not a comprehensive evaluation for hazardous materials.

4. An inspection of heating, cooling, plumbing and electrical systems.

5. A detailed fire safety inspection.

   Except in the case of obvious visual evidence of violations of fire safety standards, an engineering inspection is not a comprehensive evaluation for fire safety.

6. Repair designs.

   Repairs or rehabilitation concepts will be suggested. However, the actual design of the repair nor any design drawings are included in the scope of the engineering evaluation but may be provided by Criterium Engineers for an additional fee.

Our Project Team

Our project team will consist of the following:

Project Lead - H. Alan Mooney, P.E., RS, President of Criterium Engineers. Alan is a civil and structural engineer with over 40 years of experience in engineering-related services. His experience includes complex multi-million-dollar engineering and construction projects, forensic engineering, numerous building envelope quality assurance and commissioning projects, expert witness testimony, and thousands of residential and commercial building inspections. He is a licensed Professional Engineer (P.E.) in Maine, Massachusetts and several other states. We have attached Alan's resume for your interest. Alan has had experience with several other similar buildings in New England.

Senior Engineer - J.T. Gaucher, P.E. J.T. is a civil engineer with over 30 years' experience in engineering related services in site development, construction management, building maintenance, contract administration, plumbing/mechanical maintenance, and a wide range of capital improvement plans, needs assessments and building renovations. J.T.'s resume is attached.

Field Engineer - Alex Dolphin, P.E. has 10 years' experience in civil engineering having worked in dredging, wastewater treatment, construction, and nuclear power. Most recently Alex supervised the construction of improvements and upgrades to the Upper Blackstone Wastewater Treatment facility. Prior to that project Alex was a construction manager in Oakland, CA working for an architectural and engineering services company. Alex received his Bachelor of Science in Civil Engineering from the University of Rhode Island. Alex's resume is attached.

Project Coordinator – Andrew Dudka,, President of Criterium Dudka Engineers. Andrew Dudka is a mechanical engineer/MBA and accomplished global executive successful at building corporate value for both public and private $20 million to $300+ million dollar OEM's. An entrepreneur, Andrew has been involved in planning and building several multi-use manufacturing facilities in the UK and USA.

The client would provide access to and make provisions for Criterium Dudka Engineers to enter the premises at all times during the inspection period. If needed, client would designate a person or persons to act as the project representative with respect to the work to be performed.

Our lump sum fee for the evaluation is: **$6,740.00**

This assumes no significant change in the scope of work you have requested of us. If additional work is requested, we will revise this fee accordingly.

In order to proceed with this project we require a retainer of $2,500.00. The balance will be billed at the completion of our work.

Our Standard Terms and Conditions, which are incorporated by reference into this confirmation letter, are enclosed.

In the event that you stop this project for any reason, you will only be responsible for the time and expenses we have accumulated up to the date when we receive your written notice to stop the project.

Schedule

We anticipate being able to begin the project with-in two weeks of receiving the retainer and signed agreement. We expect to be able to deliver the final report 3 - 4 weeks later. Our fee includes one review of the report with the Committee. If further reviews/meetings are required an additional fee will be estimated.

In Summary

We believe we are well qualified for this project. Our experience evaluating existing buildings is unmatched in New England. Our most experienced engineers will be assigned to this project. We are confident you will be satisfied with our work.

If you would like references for other similar work we have done, please let me know.

Sincerely,

Andrew Dudka
President
Criterium Dudka Engineers

Attachments: Client Authorization
Standard Terms and Conditions
Resume's

Appendix E – Site Plan Approval dated February 15, 2015

PLANNING BOARD

Town of Upton Massachusetts

E-Mail: planningboard@uptonma.gov
Phone: (508) 529-1008

1 Main St, Suite 10
Upton, Massachusetts 01568

February 12, 2015

Mr. Patrick Roche
Building Inspector
Department of Code Enforcement
1 Main St, Box 16
Upton, MA 01568

RE: 3 Milford St, Site Plan Approval Application

Dear Mr. Roche:

The Planning Board has reviewed the Site Plan Approval Application dated November 26, 2014 submitted by James and Leanne Maloney of 10 North Main St for the property located at 3 Milford St (Assessor's Map 201, Lot 55). The Site Plan Application was submitted to convert the existing non-residential structure into three (3) residential condominium units with parking underneath. The Planning Board voted (3 – 0) at its meeting on Tuesday, February 10, 2015 to approve the Site Plan Application subject to the following:

1. No left turn onto Milford St when exiting the property.
2. Upton Fire Chief's approval of a fire suppression plan.
3. Verification of 16 feet of drivable width on the driveway.
4. Submittal of a certified plot plan.

If you require any additional information please contact our office.

Sincerely,

Gary Bohan
Chair

cc: Kelly McElreath, Town Clerk
James & Leanne Maloney

FYI
Original in file

PLANNING BOARD

Town of Upton — Massachusetts

E-Mail: planningboard@uptonma.gov
Phone: (508) 529-1008

1 Main St, Suite 10
Upton, Massachusetts 01568

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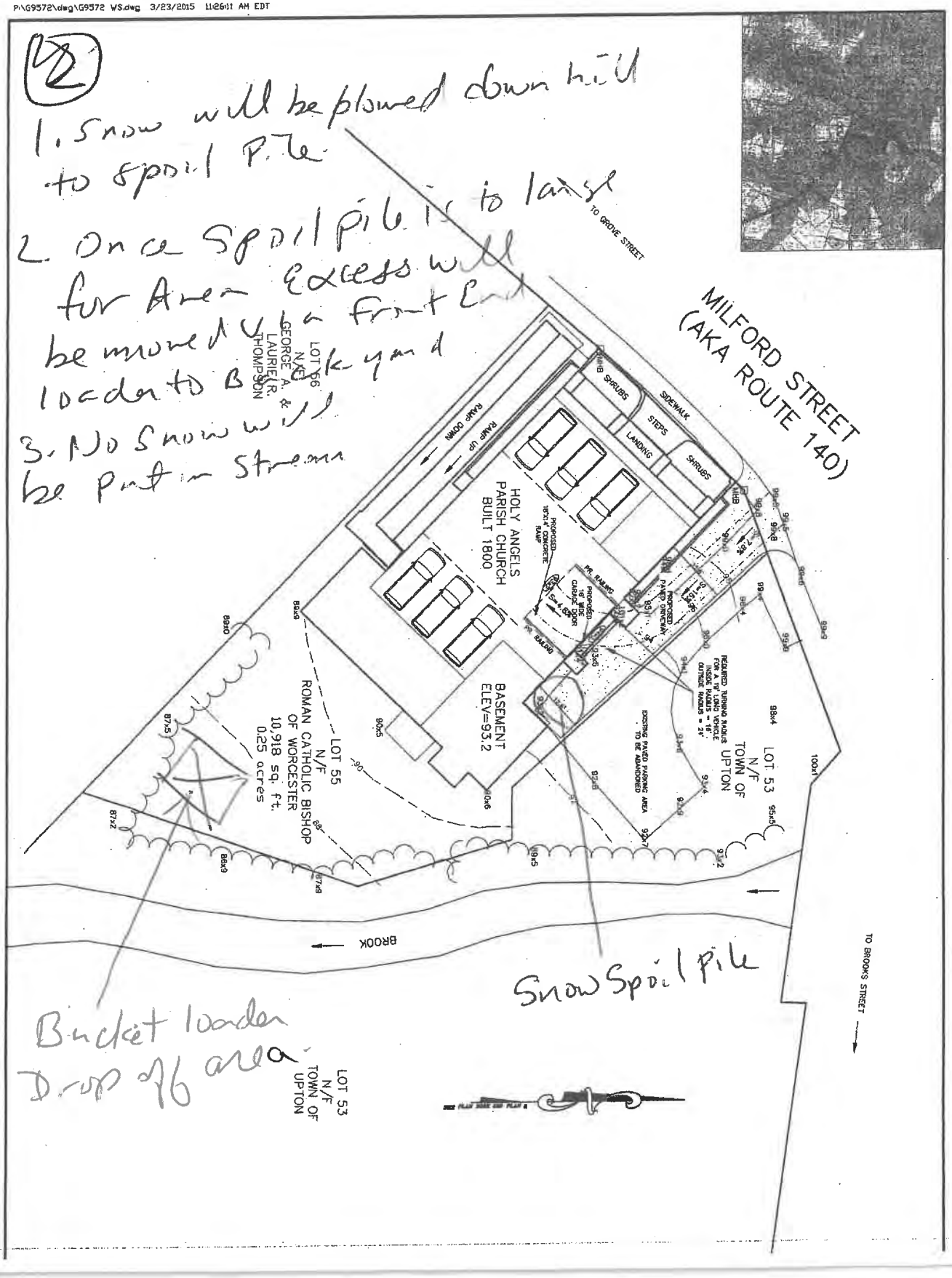
Sincerely,

Gary Bohan
Chair

cc: Kelly McElreath, Town Clerk
James & Leanne Maloney

4 A. Snow Removal Plan



PLANNING BOARD

Town of Upton Massachusetts

E-Mail: PlanningBoard@uptonma.gov
Phone: (508) 529-1008

1 MAIN ST, BOX 10
Upton, Massachusetts 01568

To: Board of Health
Code Enforcement
Conservation Commission
Fire Department
Police Department
Town Clerk

Date: December 9, 2014

Attn: Dept. Chief/Chair

Re: Site Plan Approval Application – 3 Milford St (former Holy Angels church)

We are sending you the following Items:	**[X] Attached**	[ ] Under Separate Cover	
[X] Drawings	[ ] Reports	[ ] Copy of Letter	**[X] Other - Application**

Reason for Transmittal:

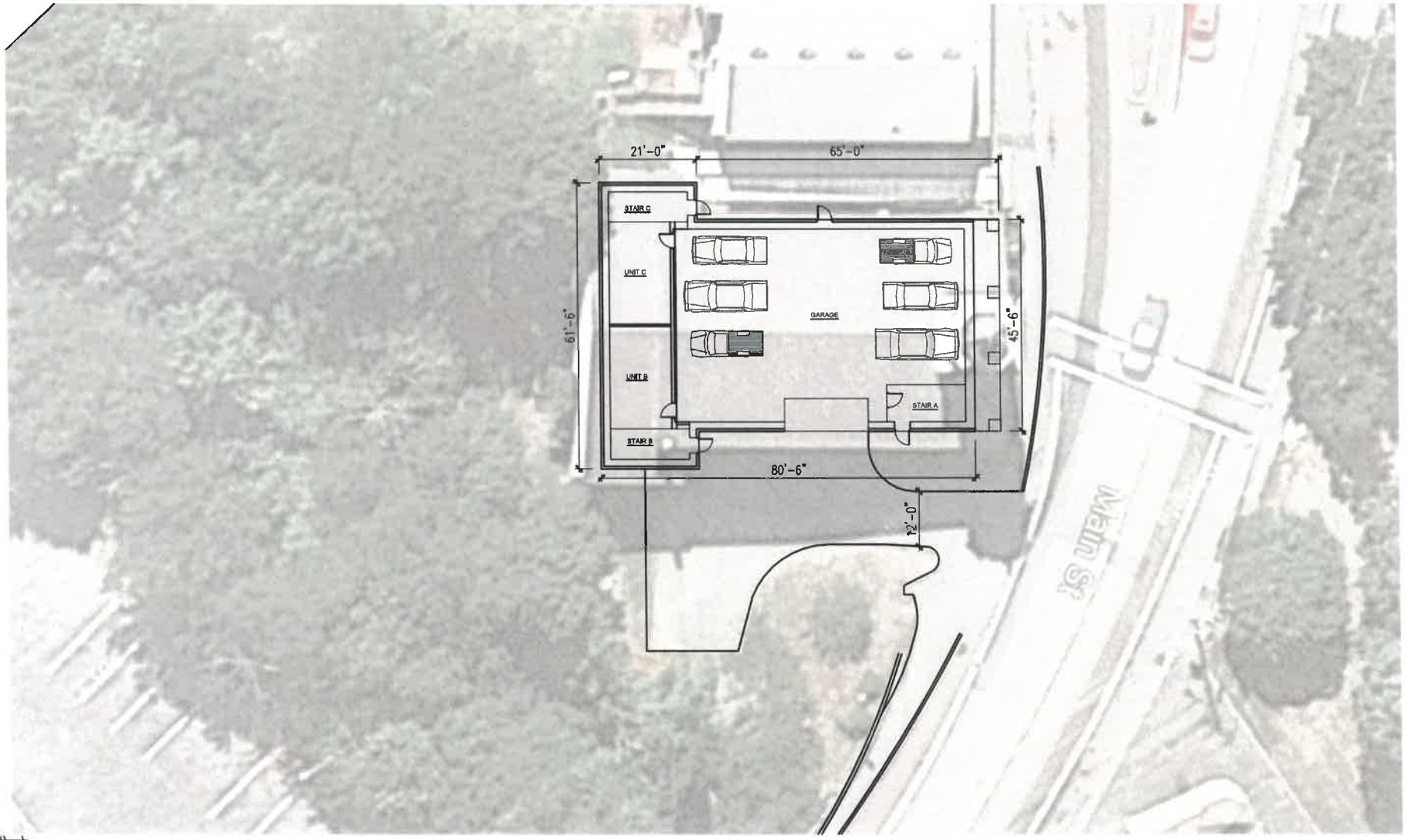
[ ] For Approval	[ ] For Your Use	[ ] As Requested
[X] Please Reply	[ ] No Reply Needed	**[X] For Review & Comments**

Comments:

Attached is a Site Plan Approval application of James and Leanne Maloney for the property located at 3 Milford St. Application is to convert the existing structure into 3 residential condo units with parking underneath. The Planning Board has set a public hearing for Tuesday, December 23, 2014. **Please submit comments to the Planning Board by December 19, 2014.** Thank you in advance for your attention to this matter.

Please contact me if you have questions or need anything further to assist in your review.

Denise Smith
Department Coordinator



Aniello & Associates
architecture
design
planning
23 Florence Circle Upton MA 01568

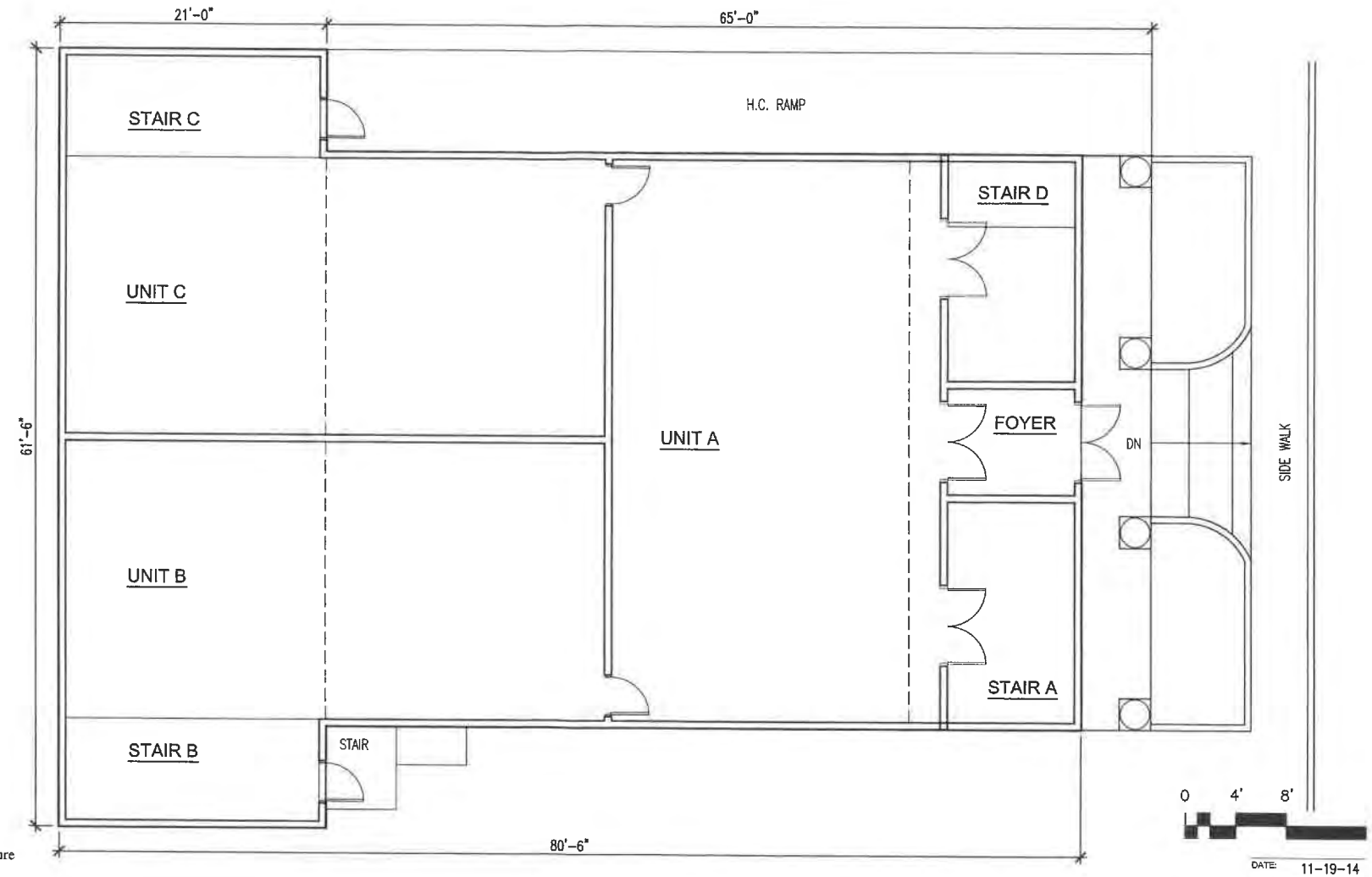
Upton Crossing
3 Milford Street Upton Massachusetts 01568

0 10' 20' 40'
SCALE: 1" = 20'

DATE: 12-3-14
SCALE: 1" = 20'-0
PROJECT NUMBER: 201419

SCHEMATIC DESIGN
GROUND FLOOR PLAN

DRAWING NUMBER:
SKC-2



Aniello & Associates
architecture
design
planning
23 Florence Circle Upton MA 01568

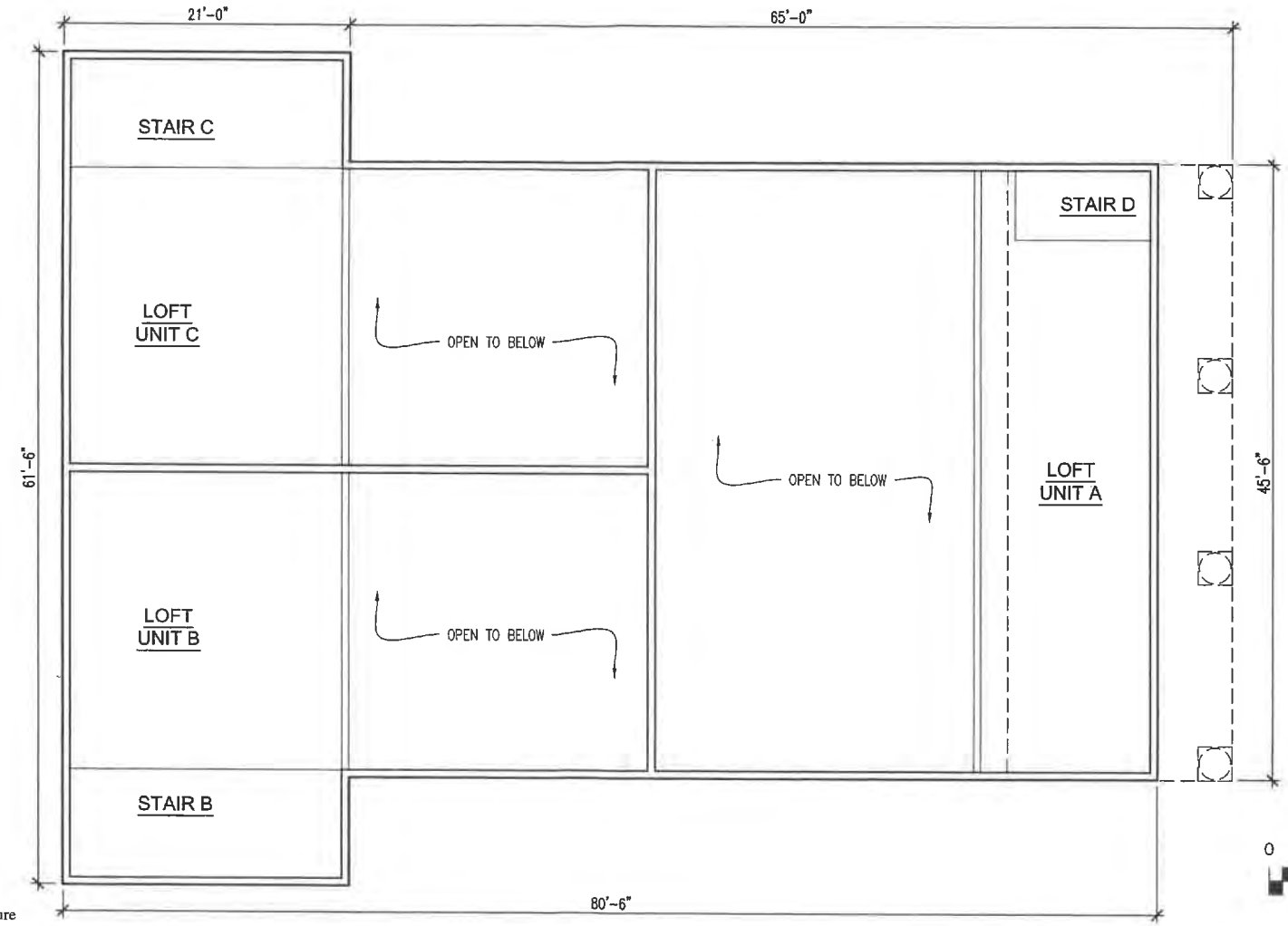
Upton Crossing
3 Milford Street Upton Massachusetts 01568

DATE: 11-19-14
SCALE: 1/8" = 1'-
PROJECT NUMBER: 201419

SCHEMATIC DESIGN
FIRST FLOOR PLAN

DRAWING NUMBER:
SKA-1

Rec'd 11-25-14



Aniello & Associates
architecture
design
planning
23 Florence Circle Upton MA 01568

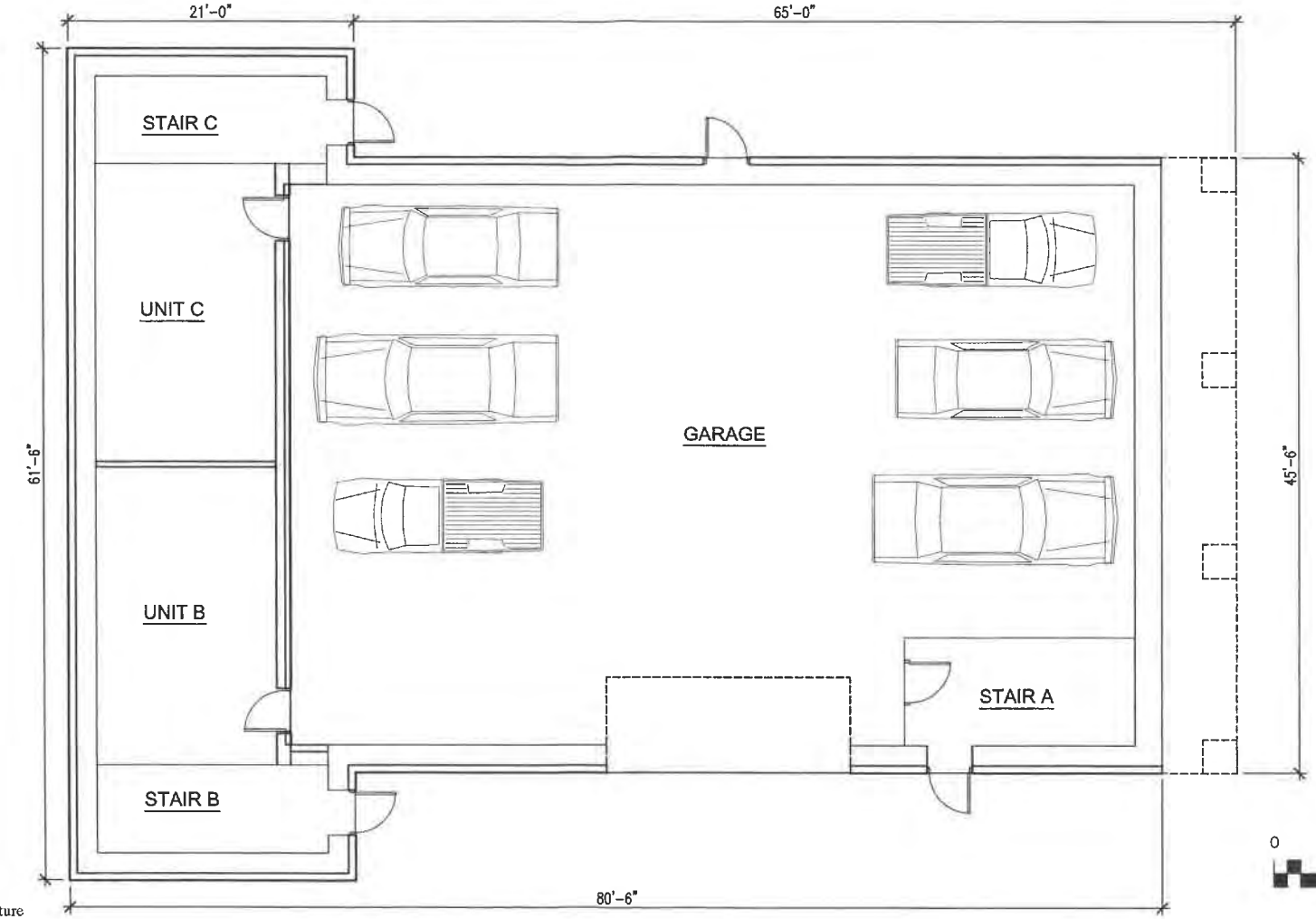
Upton Crossing
3 Milford Street Upton Massachusetts 01568

DATE: 11-19-14
SCALE: 1/8" = 1'-
PROJECT NUMBER: 201419

SCHEMATIC DESIGN
SECOND FLOOR PLAN

DRAWING NUMBER:
SKA-2

Rec'd 11-25-14



Aniello & Associates
architecture
design
planning
23 Florence Circle Upton MA 01568

Upton Crossing
3 Milford Street Upton Massachusetts 01568

DATE: 11-19-14
SCALE: 1/8" = 1'-
PROJECT NUMBER: 201419

SCHEMATIC DESIGN
GROUND FLOOR PLAN

DRAWING NUMBER:
SKA-3

Rec'd 11-25-14

WE GO WHEN DUTY CALLS"

FIRE DEPARTMENT

Town of Upton, Massachusetts
20 CHURCH STREET
UPTON, MASSACHUSETTS 01568-1535

AARON GOODALE – CHIEF
MICHAEL J. MARCHAND – ASSISTANT CHIEF

BUSINESS: 508.529.3421
DISPATCHER: 508.529.3200
FAX: 508.529.1015

TO: Patrick Roche, Building Commissioner

From: Daniel Lazarz, Fire Captain

Subject: Upton Crossing Fire Protection Systems Construction Documents Review

Date: September 23, 2015

This is a follow-up memo to accompany the red-line comments forwarded on automatic sprinkler drawings and fire protection system narrative submitted with a preliminary construction document set for the proposed change of use of the former Holy Angels Church from an A-3 assembly building to a mixed use Group R-2 residential building with a Group S-2/special occupancy enclosed private parking garage. It is my understanding this drawing set was submitted for preliminary review but the applicant has not submitted a building permit application with this set of documents. As we previously discussed back in July and August these plans need to be rejected and resubmitted for the following reasons:

1. The Tier 1 automatic sprinkler plans and fire protection narrative submitted are for an NFPA 13D system. NFPA 13D systems are only permitted for one and two family dwellings not mixed used buildings. A mixed used building requires an NFPA 13 automatic sprinkler system per 780 CMR 903.2 (see Table & Note a).

2. Refer to the written comments forwarded via email on the submitted Tier 1 or 2 drawings and Fire Protection Narrative regarding the submitted plans providing an in-complete sprinkler layout, inappropriate system design and application. The contractor is required to submit a complete set of Tier 1 construction documents or Tier 2 working drawings to satisfy the minimum requirements for a building permit per 780 CMR 901.2.1.

3. The water service for the NFPA 13D sprinkler system indicted the use of an existing 1-1/2" domestic water service. This water service does not satisfy the minimum size requirements for an NFPA 13 sprinkler system. If a combined domestic and fire sprinkler water service is proposed, revised automatic sprinkler construction documents and plumbing system construction documents are required to review this proposed arrangement. A combined water service arrangement also needs to be reviewed and accepted by the Plumbing Inspector and the Department of Public Works Water/Wastewater Division to confirm the proposed access and backflow prevention is in compliance with 780 CMR 903.3.5.1.2 and the Water Division's service installation requirements.

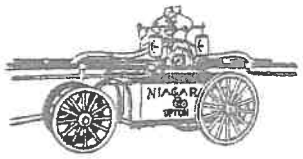
4. There were mechanical, electrical, fire alarm system or plumbing (MEP/FA) construction documents submitted for review. Per item #3 above plumbing plans are necessary to properly evaluate a combined domestic and fire service water connection. The lack of MEP/FA drawings in the submitted construction documents does not provide sufficient information to complete a construction document review per 780 CMR sections 901.2.1, 907 (Fire Alarm) and 916 (Carbon Monoxide). The Fire Protection Systems Narrative required by section 901.2.1 needs to be a single document encompassing all fire protection systems and also needs to incorporate the required interfaces with required mechanical systems.

5. The existing fire alarm system for the building is currently provided with an existing non-conforming fire alarm system that is connected to the Town's municipal master box fire alarm reporting system. The submitted construction documents do not provide any information on the removal of this existing fire alarm system or a proposed fire alarm system to replace it to for the proposed mixed used building and for supervision of the required automatic sprinkler system per 780 CMR 903.4.1.

Cc:

Aaron Goodale, Fire & EMS Chief
Brian Kemp, EMS Captain & Fire Alarm Superintendent
Steve Johnson, Department of Code Enforcement, Local Inspector

WE GO WHEN DUTY CALLS"



FIRE DEPARTMENT

Town of Upton, Massachusetts
20 CHURCH STREET
UPTON, MASSACHUSETTS 01568-1535

AARON GOODALE –CHIEF
MICHAEL J. MARCHAND – ASSISTANT CHIEF

BUSINESS: 508.529.3421
DISPATCHER: 508.529.3200
FAX: 508.529.1015

TO: Aaron Goodale, Fire EMS Chief & Patrick Roche, Building Commissioner

From: Daniel Lazarz, Fire Captain

Subject: Upton Crossing Fire Protection Systems Construction Documents Review, 2nd Submission

Date: May 21, 2016

This memo is a summary of the review of the revised Tier 1 construction documents for automatic sprinkler protection systems prepared by Mass Fire Prevention of Randolph Massachusetts. The submission included two sets of signed and sealed automatic sprinkler construction documents; three hydraulic calculations for the three wet type automatic sprinkler systems/zones proposed to protect the building garage, apartment units and the attic; a section 901 Fire Protection Systems Narrative that addresses the automatic sprinkler systems only; and photocopy of an automatic contractor's license for a Mr. John Conlin.

As previously identified in September the original preliminary submission filed for a Building Department & Fire Department review without a building permit application were returned rejected because it proposed only a NFPA 13D residential sprinkler system. NFPA 13D automatic sprinkler systems are only permitted to protect one & two family dwelling units. The building, as proposed, is mixed use occupancy building (common or shared three tenant vehicle garage in level 1 and three condominium apartment units on levels two and three. There remain no changes or revisions to the submitted construction documents still do not include fire alarm system construction documents or any mechanical, electrical, plumbing construction documents.

1. The Tier 1 automatic sprinkler plans and fire protection narrative submitted propose an NFPA 13 system for the garage and residential apartment units. The garage zone is arranged to provide ordinary hazard coverage applying reduced design remote areas as permitted by NFPA 13. The apartment units sprinkler zone is designed using residential criteria of four sprinklers in an apartment unit. Both of these systems zones are acceptable and NFPA 13 compliant approaches in these Tier 1 construction documents.

2. The water service proposed has been revised from an existing 1-1/2" service to for the proposed sprinkler systems to the use of a 2" water service connection to the Town water main in Milford Street. This water service still does not satisfy the minimum size requirements for an NFPA 13 sprinkler system because the

submitted hydraulic calculations does not provide a compliant sprinkler system for the attic. Per the previous review comment if a combined domestic and fire sprinkler water service is proposed, revised automatic sprinkler construction documents and plumbing system construction documents are required to review this proposed arrangement. A combined water service arrangement also needs to be reviewed and accepted by the Plumbing Inspector and the Department of Public Works Water/Wastewater Division to confirm the proposed access and backflow prevention is in compliance with 780 CMR 903.3.5.1.2 and the Water Division's service installation requirements. This previous comment remains open and not addressed.

3. No mechanical, electrical, fire alarm system or plumbing (MEP/FA) construction documents have ~~not~~ been submitted for review. Per item #3 above plumbing plans are necessary to properly evaluate a combined domestic and fire service water connection. The ~~lack of~~ MEP/FA drawings in the submitted construction documents does not provide sufficient information to complete a construction document review per 780 CMR sections 901.2.1, 907 (Fire Alarm) and 916 (Carbon Monoxide). The Fire Protection Systems Narrative required by section 901.2.1 needs to be a single document encompassing all fire protection systems and also needs to incorporate the required interfaces with required mechanical systems. This previous comment remains open and not addressed.

4. The existing fire alarm system for the building is currently provided with an existing non-conforming fire alarm system that is connected to the Town's municipal master box fire alarm reporting system. The submitted construction documents do not provide any information on the re-use, expansion or modification or removal of this existing fire alarm system. Fire alarm construction documents for this project are necessary to address the fire detection and alarm requirements for the proposed mixed used building and for supervision of the required automatic sprinkler system per 780 CMR 903.4.1. This previous comment remains open and not addressed.

5. Refer to the written comments forwarded via email on the submitted Tier 1 or 2 drawings and Fire Protection Narrative regarding the submitted plans providing an in-complete sprinkler layout, inappropriate system design and application. The contractor is required to submit a complete set of Tier 1 construction documents or Tier 2 working drawings to satisfy the minimum requirements for a building permit per 780 CMR 901.2.1. We recommend the owner have the contractor developTier 2 documents for the revised construction document submission to save the time and cost of a separate working drawing submission and review step.

These revised automatic sprinkler documents are an acceptable automatic sprinkler system concept or approach but the documents submitted need to address compliance deficiencies for proposed water service and the attic sprinkler system. The proposed use of the special application sprinklers to provide automatic sprinkler coverage to the attic is an acceptable and efficient solution to address the initial review comments but these sprinklers have specific application requirements based on their UL listing that cannot be evaluated due to the lack of complete construction documents. Therefore lack of mechanical, electrical, plumbing and fire alarm plans are identified as critical gap in the overall construction document submission that prevents have the following review comments resolved until this information is submitted for review and evaluation.

These revised automatic sprinkler system construction documents provide sufficient direction to further develop this proposed concept as part of a revised construction document submission that needs to include the MEP/FA construction documents. Attached are red-line comments of this submission and the Tyco Attic sprinkler data sheet with highlighted sections addressing the compliance items identified in this review. It is my understanding this drawing set was submitted for preliminary review but the applicant still has not submitted a building permit application and a complete set of construction documents.

Cc:
Aaron Goodale, Fire & EMS Chief
Brian Kemp, EMS Captain & Fire Alarm Superintendent
Steve Johnson, Department of Code Enforcement, Local Inspector

Initial Construction Control Document

To be submitted with the building permit application by a
Registered Design Professional
for work per the 8th edition of the
Massachusetts State Building Code, 780 CMR, Section 107.6.2

Project Title: Upton Crossing

Date: June 16, 2015

Property Address: 3 Milford Street
Upton, Masssachusetts

Project: Check (x) one or both as applicable: New construction **X** Existing Construction

Project description: Conversion of an existing 2 story church structure into three residential units.

I, Michael H. Blanchette, MA Registration Number: 7717 Expiration date: 8/31/15 , am a *registered design professional,* and hereby certify to the best of my knowledge, information and belief, that I have prepared or directly supervised the preparation of all design plans, computations and specifications concerning[1]:

Entire Project	X Architectural	Structural	Mechanical
Fire Protection	Electrical	Other:	

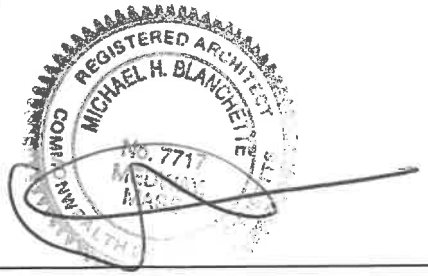
for the above named project and that such plans, computations and specifications meet the applicable provisions of the Massachusetts State Building Code, (780 CMR), and accepted engineering practices for the proposed project. I understand and agree that I (or my designee) shall perform the necessary professional services in accordance with the Professional Standard of Care and be present on the construction site on a regular and periodic basis to:

1. Review, for conformance to this code and the design concept, shop drawings, samples and other submittals by the contractor in accordance with the requirements of the construction documents. Such review shall not diminish or relieve the Contractor of its submittal and other responsibilities.
2. Perform the duties for registered design professionals in 780 CMR Chapter 17, as applicable.
3. Be present at intervals appropriate to the stage of construction to become generally familiar with the progress and quality of the work and to determine if the work is being performed in a manner consistent with the approved construction documents and this code. The Contractor shall be responsible for performing the work in accordance with the contract documents and shall be exclusively responsible for its construction means, methods, sequences and procedures, and for construction safety.
4. The performance of the services shall not require any special testing or inspections unless specifically stated in the Code.

When required by the building official, I shall submit field/progress reports (see item 3.) together with pertinent comments, in a form acceptable to the building official.

Upon completion of the work, I shall submit to the building official a 'Final Construction Control Document'.

Enter in the space to the right a "wet" or electronic signature and seal:



Phone number: 774-277-0353 (cell)

Email:

Building Official Use Only

Building Official Name: Permit No.: Date:

Note 1. Indicate with an 'x' project design plans, computations and specifications that you prepared or directly supervised. If 'other' is chosen, provide a description.

Investigation & Evaluation Report
Upton Crossings
Proposed 3 Unit Residential Complex
3 Milford Street Upton, MA
June 16, 2015

Preface:

The proposed work includes converting a former two story church building with approximately 4,200 sf per floor into a 3 unit condominium. The renovated building will have 3 units, Unit 1 in the front portion of the building, Unit 2 back left and Unit 3 back right portions of the building.

Unit 1 will maintain the existing loft area, which is open to the first floor below, and a new second floor bathroom will be added.

Unit 2 and Unit 3 will have a new second floor master bedroom, bath and closet. These units will each have a new stair going up to the second floor and down to the basement.

The existing lower level will be converted into a private, enclosed garage for six (6) passenger vehicles. In order for vehicles to maneuver safely one row of existing columns will be removed and new steel beams with new columns installed to support the existing first floor framing above. A new 7'x16' wide garage door to allow for proper turning radiuses of the vehicles will be provided. The private garage is considered an occupancy category U – Utility per IBC 406.1.2.

The former church occupancy is an A3 – Assembly occupancy. The proposed occupancy is R2 – Residential, therefore this project is a *Change of Occupancy* and shall conform to IEBC Section 307. The residential occupancy is a lesser hazard than the former assembly occupancy. Per IBC Table 1604.5 the assembly category is III and the residential category is II.

The compliance method selected for this project is the Prescriptive Compliance Method as described in IBC 101.5.1.

The Upton Planning Board granted approval for this project on February 10, 2015.

Relevant Codes:

2009 International Existing Building Code (IEBC-2009)

Prescriptive Compliance Method shall comply with IEBC Chapter 3

2009 International Building Code 2009 (IBC-2009)

Use Group: R2; Residential & U; Utility (private garage)

Building Type: VB

Stretch Energy Code (IECC-2009 with MA Amendments)

Investigation & Evaluation Report
Upton Crossings
Proposed 3 Unit Residential Complex
3 Milford Street Upton, MA
June 16, 2015

Applicable Code Section Summary:

International Existing Building Code (IEBC) – 2009

Chapter 3 – Prescriptive Compliance Method

301 General

301.1 Scope. The provisions of this chapter shall control the *alterations and change of occupancy* of existing structures.

301.2.1 Existing materials. Materials already in use in a building in compliance with requirements or approvals at the time of their erection shall be permitted to remain unless determined by the code official to be dangerous to life, health or safety.

301.2.1 New & replacement materials. Materials permitted by the code for new construction shall be used. Like materials shall be permitted for repairs and alterations provided no hazard to life, health or property is created.

307 Change of Occupancy

307.1 Conformance. No change to the use or occupancy of a building shall be allowed unless the building is made to comply with the requirements of this code. Subject to the approval of the building official the occupancy of a building is allowed to be changed, provided the new or proposed use is less hazardous, based on life and fire risk, than the existing use.

This project is considered a Change of Occupancy from A3 – Assembly to R2 – Residential. A residential hazard category is less than an assembly hazard category per IBC 1604.5.

307.4 Structural. An existing building that undergoes a change of use and occupancy that places the building in a higher occupancy category per IBC Table 1604.5 must be evaluated for its seismic resistance. The reclassified residential occupancy for this project is lower than the existing assembly occupancy. Per Table 1604.5 the assembly category is III and the residential category is II.

Refer to the Structural Engineering Report for additional information.

307.5 Energy. Upton adapted the Stretch Energy Code. The Stretch Energy Code is the 2009 IECC with Massachusetts amendments.

Refer to the Stretch Energy Code information below for additional information.

International Building Code (IBC) – 2009 with Massachusetts Amendments

406.1 Private Garages & Carports

406.1.2 Group U occupancies for the storage of private or pleasure type vehicles where no repair work is completed or fuel dispensed is permitted to be 3,000 square feet when the exterior walls and opening protection for the Group U portion is the same as required for the major occupancy of the building.

The proposed private garage is less than 3,000 square feet, therefore the garage is occupancy Group U – Utility.

406.1.3 The floor of the parking area shall slope for drainage to the main vehicle entry.

406.1.4 Garages beneath habitable rooms shall be separated from all habitable rooms by not less than one layer of 5/8" Type X gypsum board. Door openings between the garage and dwelling units shall be equipped with solid core wood doors or honeycomb core steel doors not less than 1 3/8" thick. Doors shall be self-closing and self-latching.

406.4.2 Ventilation. A mechanical ventilation system shall be provided for enclosed parking garages in accordance with the *International Mechanical Code.*

501 General Building Heights and Areas

Table 503	Allowable Building Height:	60 feet per 504.2
	Actual Building Height:	Approximately 46 feet
	Allowable Number of Stories:	3 per 504.2
	Actual Number of Stories:	2
	Allowable Building Area:	21,000 sf with sprinkler increase
	Actual Building Area:	4,200 sf

The proposed Residential use conforms to the Height, Number of Stories, and Building area as described in Chapter 5 of the IBC.

504.3 Roof Structures. Roof structures shall not exceed 20 feet above the allowable building height when the roof structure is of combustible construction.

The existing steeple is approximately 70 feet above grade and within the allowable height of 80 feet.

508.2.4 Separation of Occupancies. Group R-2 dwelling units shall be separated from other dwelling units in accordance with Section 420.

420.2 Fire partitions shall be provided between dwelling units in accordance with Section 709.

Each unit shall be separated from the adjoining units with fire partitions as indicated on the drawings.

601 Types of Construction

602.5 The construction type of the existing wood frame structure is Type VB as described in IBC 602.5 and IBC Table 601.

Table 602 The fire-resistance rating for exterior walls shall be one (1) hour when the fire separation distance is less than ten (10) feet. The fire separation distance shall be measured to the property line.

Existing exterior walls within 10 feet of the property line will be reconstructed for a one hour rating. Refer to the drawings for additional information.

701 Fire & Smoke Protection Features

709.3 Fire partitions shall have a fire resistance rating of not less than 30 minutes when the building is equipped with an automatic fire sprinkler system.

709.4 Fire partitions shall be constructed from the floor/ceiling assembly below to the underside of the floor or roof sheathing above. If the partitions are not constructed to the sheathing the space between ceiling and sheathing shall be fireblocked or draftstopped at the partition line. However, exception 5 states fireblocking or draftstopping is not required in Group R-2 buildings that do not exceed 4 stories, provided the attic space is subdivided by draftstopping into areas not exceeding 3,000 sf or above every two dwelling units, whichever is smaller.

901 Fire Protection Systems

903.2 Automatic fire sprinkler systems shall be provided in locations described in Table 903.2.

An automatic fire sprinkler system will be provided through-out the entire building including the private garage in accordance with NFPA 13. Refer to the fire sprinkler drawings and report for additional information.

Table 903.2 Automatic fire sprinkler systems are required in a Residential occupancy.

907.2.9 Fire & Smoke Alarm Systems for Group R-2 Occupancies

907.2.9.1 Manual Fire Alarm System. A manual fire alarm system is not required. Manual fire alarm systems are required in dwelling units located more than 3 stories above the lowest level of exit discharge.

907.2.11.2 Smoke Alarms. Smoke alarms shall be provided in each unit as directed by section 907.2.11.2 and as required by the Upton Fire Department.

Stretch Energy Code (IECC-2009 with MA amendments)

101.4.3 Alterations to an existing building shall conform to the requirements of this code as they relate to new construction without requiring the unaltered portions of the existing building to comply with this code.

101.4.4 Change in Use. Spaces undergoing a change in use or occupancy that would result in an increase in demand for either fossil fuel or electricity shall comply with this code.

401.5 Prescriptive Option. Alterations, Renovations or Repairs that involve accessing the building envelope shall require the affected portion of the envelope to comply with 401.3. Envelope insulation shall meet or exceed IECC 2009 requirements or fully fill existing cavities with insulating material that meets or exceeds an R value of R 3.5/inch.

Michael Blanchette

5/16/15
Date

Initial Construction Control Document

To be submitted with the building permit application by a
Registered Design Professional
for work per the 8th edition of the
Massachusetts State Building Code, 780 CMR, Section 107

Project Title: Upton Crossings – Building Renovations Date: June 16, 2015

Property Address: 3 Milford Street, Upton, MA

Project: Check (x) one or both as applicable: New construction X Existing Construction

Project description: Structural design and detailing of existing building renovations to include new partial second floor addition, modification of support column locations and new rear deck framing.

I , Stacy R. Flood, MA Registration Number: 42868 Expiration date: June 30, 2016 , am a *registered design professional,* and I have prepared or directly supervised the preparation of all design plans, computations and specifications concerning[1]:

Architectural	X Structural	Mechanical
Fire Protection	Electrical	Other:

for the above named project and that to the best of my knowledge, information, and belief such plans, computations and specifications meet the applicable provisions of the Massachusetts State Building Code, (780 CMR), and accepted engineering practices for the proposed project. I understand and agree that I (or my designee) shall perform the necessary professional services and be present on the construction site on a regular and periodic basis to:

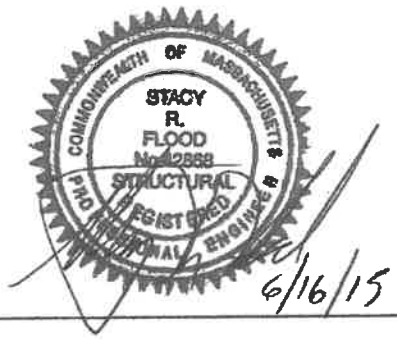
1. Review, for conformance to this code and the design concept, shop drawings, samples and other submittals by the contractor in accordance with the requirements of the construction documents.
2. Perform the duties for registered design professionals in 780 CMR Chapter 17, as applicable.
3. Be present at intervals appropriate to the stage of construction to become generally familiar with the progress and quality of the work and to determine if the work is being performed in a manner consistent with the approved construction documents and this code.

Nothing in this document relieves the contractor of its responsibility regarding the provisions of 780 CMR 107.

When required by the building official, I shall submit field/progress reports (see item 3.) together with pertinent comments, in a form acceptable to the building official.

Upon completion of the work, I shall submit to the building official a 'Final Construction Control Document'.

Enter in the space to the right a "wet" or electronic signature and seal:



Phone number: (978) 562-6499 Email: srflood@verizon.net

Building Official Use Only		
Building Official Name:	Permit No.:	Date:

Note 1. Indicate with an 'x' project design plans, computations and specifications that you prepared or directly supervised. If 'other' is chosen, provide a description.

FLOOD CONSULTING

Structural Engineering

June 16, 2015

Upton Crossings
International Existing Building Code Structural Review Report
Upton, MA
FC Project No. 1494

Per the request of the building department, this brief report shall describe the cumulative effects of the alterations and renovations to the existing structure. The existing church building consists of the original building and an addition at the rear of the structure. The existing church structure consists of heavy timber wood roof trusses supported by wood columns within the exterior wood-framed walls. These walls are founded on a granite wall foundation. The first floor structure consists of wood floor joists supported by wood beams in alignment with the roof trusses above. The wood beams are supported within the interior basement area by steel pipe columns. The existing rear addition is a conventional wood framed structure founded on a conventional concrete foundation system.

The existing building review was done in conformance with the Prescriptive Compliance Method. The existing roof structure is in good condition and no structural modifications and/or alterations are planned for the roof. The existing first floor structure will not be modified. The live load on this floor will be reduced due to change from assembly area loading to residential loading. The some of the existing columns within the basement area are being relocated to allow for car parking within the basement area. The new partial second floor area will be supported by the existing exterior wood framing walls and a new support beam below the first floor framing. The existing walls were reviewed for the additional load and reduced unbraced length and were found to meet the current code. A new exterior wall opening was added to allow car access into the basement. The framing for this new opening was designed to meet current code. The new wood framed decks at the rear of the structure. All new framing, support beams, columns and foundations for the new work described in this report were design to meet the requirement of the current code.

The existing structure utilizes a light-framed wood wall system for lateral resistance. Per section 303.4 of IEBC and our analysis, wind controls the lateral loading requirement for this structure. The proposed alterations to the structure do not increase the design lateral loads. The addition of the second floor framing has reduced the unbraced length of exterior load bearing shear walls thereby increasing their lateral load carrying capacity.

This review was done in conformance with the 2009 International Existing Building Code and the Eighth Edition of the Massachusetts State Building Code. If you have any questions, please contact our office at (978) 562-6499.

Very truly yours,

Flood Consulting

Stacy R. Flood, P.E.
Principal

COMMONWEALTH OF MASSACHUSETTS
STACY R. FLOOD
No.42968
STRUCTURAL
REGISTERED
PROFESSIONAL ENGINEER

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J B ENGINEERING, INC.
96 RESERVOIR PARK DRIVE
ROCKLAND, MA 02370

Tel:781-871-8277 Fax:781-871-0156 www.jbengine@aol.com

May 4, 2015

FIRE PROTECTION NARRATIVE
Building Located at
3 Milford Street
Upton MA

BASIS (METHODOLOGY) OF DESIGN

Section 1 - Building Description

1.	Building "Use" Group:	780 CMR 310.0 Residential Use Group
2.	Total square footage of building:	See architectural plans for total square footage
3.	Building height:	Varies with pitch of the roof
4.	Number of floors below grade:	Garage Level
5.	Number of floors above grade:	Two floors above grade
6.	Type(s) of occupancies (hazards):	Residential (light hazard)
7.	Type(s) of construction:	Wood Frame/Wood joist
8.	Height storage of commodities	N/A
9.	Site access arrangement for emergency response vehicles	Site accessible

Section 2 – Applicable Laws and Governing Codes

1. Building Code: Massachusetts State Building Code, 780 CMR, 8th Edition, IBC code 2009
2. The following sections of chapter 9 (Fire Protection Systems) relate to this facility
3. All of section 901.2.1
4. Local Fire Prevention Requirements
5. Applicable Sections of M.G.L.., Chapter 148 Fire Protection
6. Applicable Federal Laws such as OSHA, ADA, etc.

Section 3 – Design Responsibility

1. J B Engineering, Inc. is providing sprinkler plans, calculations and narrative
   The design will be based on Fire Protection Systems, Chapter 9, Guidelines for the Preparation of the Narrative Reports.
2. The professional Fire Protection Engineer of record will be James N McHugh., Massachusetts No.38572 for the sprinkler system only..

Section 4 – Fire Protection System to be installed

1. Sprinkler System
   a. The sprinkler system is a new wet type sprinkler system
   b. New 1-1/2" Underground located on First Floor
   c. Sprinkler heads will be quick response heads
   d. The sprinkler system will meet the NFPA 13D, 2007 criteria and the Upton Building and Fire Departments.

Section 5 – Special Consideration and Description

1. Sprinkler System
   a. The sprinkler system will be based on "prescriptive code requirements". No variances will be required.
   b. Maintenance, inspection, and testing will be done as per NFPA 13D, 2007

Section 6 – Sequence of Operation

1. Sprinkler System

a. Wet System – When a single heat activated sprinkler fuses and discharges water, pressure switch at the main sprinkler rise assembly is actuated and sends an alarm signal to the main fire alarm control panel. In addition to the rise main flow switch individual floor flow switches with notify the Upton Fire Dept.

Section 7 – Testing Criteria

1. Sprinkler System
   a. Notify the authority having jurisdiction and Owner's representative of the time and date of all testing
   b. Perform all required acceptance test as required by NFPA 13D, 2007
   c. Complete and sign the appropriate Contractor's material and test Certificate(s).

Approval Requirements

The following approvals are necessary prior to the start of work:

1. Approval of Sprinkler plans,
2. Permit from local Authorities no work is to proceed until all permits have been obtained.
3. All sprinkler work is to be performed by a Registered Massachusetts Sprinkler Contractor.

H Y D R A U L I C C A L C U L A T I O N S

C O V E R S H E E T

Building Located at 3 Milford Street Upton

W A T E R S U P P L Y

STATIC PRESSURE	(psi)	115
RESIDUAL PRESSURE	(psi)	110
RESIDUAL FLOW	(gpm)	1680

B O O S T E R P U M P S

NUMBER OF BOOSTER PUMPS 0

S P R I N K L E R S

MAXIMUM SPACING OF SPRINKLERS	(ft)	9.08
MAXIMUM SPACING OF SPRINKLER LINES	(ft)	11
SPECIFIED DISCHARGE DENSITY	(gpm/sq. ft.)	.15

THIS SPRINKLER SYSTEM WILL DELIVER A DENSITY OF .15 gpm/sq. ft.
FOR A DESIGN AREA OF 900 SQ. FT. OF FLOOR AREA

THIS SYSTEM OPERATES AT A FLOW OF 125.21 gpm AT A PRESSURE OF 61.23 psi
AT THE BASE OF THE RISER (REF. PT. 3)

PIPES USED FOR THIS SYSTEM

001 SCHEDULE 40
002 SCHEDULE 10

Building Located at 3 Milford Street Upton

SPRINKLER SYSTEM ANALYSIS TO SHOW THE MAXIMUM DENSITY AVAILABLE
WITH ZERO PRESSURE REMAINING

THE FOLLOWING SPRINKLERS ARE OPERATING IN:

[ ] TEST AREA 1 [ ] TEST AREA 2 [ ] TEST AREA 3 [ ] REMOTE AREA

Elevation of sprinklers = Elevation above water test.

REF. PT.	K	ELEV. ft	FLOW gpm	PRESSURE (psi) Total	Velocity	Normal
20	5.60	10.50	18.75	11.20	0.00	11.20
21	5.60	10.50	18.68	11.56	0.43	11.13
22	5.60	10.50	18.99	12.48	0.99	11.50
23	5.60	10.50	19.95	14.50	1.81	12.69
24	5.60	10.50	18.01	10.35	0.00	10.35
25	5.60	10.50	17.90	10.62	0.40	10.22
26	5.60	10.50	18.16	11.42	0.91	10.52
27	5.60	10.50	19.13	13.33	1.66	11.67

THE SPRINKLER SYSTEM FLOW IS 149.59 gpm

THE OUTSIDE HOSE FLOW AT REFERENCE POINT NO. 1 IS 250.00 gpm

[ ] THE INSIDE HOSE [ ] RACK SPKLR'S.

[ ] YARD HYDT. FLOW IS 0.00 gpm

THE MINIMUM DENSITY PROVIDED BY THIS SYSTEM IS 0.179 gpm/sq. ft.

THE FOLLOWING PRESSURES & FLOWS OCCUR
---> AT REF. PT. 1 <---

STATIC PRESSURE	115.00 psi		
RESIDUAL PRESSURE	110.00 psi	AT	1680.00 gpm
TOTAL SYSTEM FLOW	399.59 gpm		
AVAILABLE PRESSURE	114.65 psi	AT	399.59 gpm
OPERATING PRESSURE	114.65 psi	AT	399.59 gpm
PRESSURE REMAINING	0.00 psi		

THE ABOVE RESULTS INCLUDE 5.00 psi FRICTION LOSS AT REF. PT. # 3 FOR A

[ ] BACKFLOW PREVENTER [ ] METER

[ ] DETECTOR CHECK VALVE [ ] OTHER DEVICE

HYDRAULIC CALCULATIONS AT SPECIFIED DENSITY

THE FOLLOWING SPRINKLERS ARE OPERATING IN:

[ ] TEST AREA 1 [ ] TEST AREA 2 [ ] TEST AREA 3 [ ] REMOTE AREA

Elevation of sprinklers = Elevation above water test.

REF. PT.	K	ELEV. ft	FLOW gpm	PRESSURE (psi) Total	Velocity	Normal
20	5.60	10.50	15.70	7.86	0.00	7.86
21	5.60	10.50	15.60	8.07	0.30	7.76
22	5.60	10.50	15.83	8.68	0.69	7.99
23	5.60	10.50	16.71	10.16	1.26	8.90
24	5.60	10.50	15.09	7.26	0.00	7.26
25	5.60	10.50	14.98	7.43	0.28	7.15
26	5.60	10.50	15.18	7.98	0.63	7.34
27	5.60	10.50	16.12	9.45	1.17	8.29

THE SPRINKLER SYSTEM FLOW IS 125.21 gpm

THE OUTSIDE HOSE FLOW AT REFERENCE POINT NO. 1 IS 250.00 gpm

[ ] THE INSIDE HOSE [ ] RACK SPKLR'S.

[ ] YARD HYDT. FLOW IS 0.00 gpm

THE MINIMUM DENSITY PROVIDED BY THIS SYSTEM IS 0.150 gpm/sq. ft.

THE FOLLOWING PRESSURES & FLOWS OCCUR
---> AT REF. PT. 1 <---

STATIC PRESSURE	115.00 psi		
RESIDUAL PRESSURE	110.00 psi	AT	1680.00 gpm
TOTAL SYSTEM FLOW	375.21 gpm		
AVAILABLE PRESSURE	114.69 psi	AT	375.21 gpm
OPERATING PRESSURE	84.95 psi	AT	375.21 gpm
PRESSURE REMAINING	29.74 psi		

THE ABOVE RESULTS INCLUDE 5.00 psi FRICTION LOSS AT REF. PT. # 3 FOR A

[ ] BACKFLOW PREVENTER [ ] METER

[ ] DETECTOR CHECK VALVE [ ] OTHER DEVICE

FITTING Equivalent Length per NFPA 13 1994, 6-4.3
'-' Indicates Equivalent Length. 'T' Indicates Threaded Fitting
1=45 Elbow, 2=90 Elbow, 3='T'/Cross, 4=Butterfly Valve, 5=Gate Valve, 6=Swing Check Valve

FROM	TO	FLOW (gpm)	PIPE (ft)	FITS	EQV. (ft)	H-W C	PIPE TYPE	DIA. (in)	FRIC. (psi)	ELEV. (psi)	PRESSURE (psi) Pt Pv Pn	Pt Pv Pn	DIFF
1	2	125.21	75.00	235	11.34	150	1	1.780	0.195	0.000	84.95	68.09	16.86
2	3	125.21	3.00	2553	9.00	120	1	1.610	0.481	1.083	68.09	61.23	5.78
3	4	125.21	8.00	22	6.44	120	2	1.682	0.389	3.467	61.23	47.14	10.62
4	5	125.21	5.00	22	6.44	120	2	1.682	0.389	0.000	47.14	42.69	4.45
5	6	125.21	3.00	256	14.38	120	2	1.682	0.389	0.000	42.69	35.90	6.80
6	7	125.21	30.00	23	11.16	120	2	1.682	0.389	0.000	35.90	19.88	16.01
7	8	125.21	15.00	0	0.00	120	2	1.682	0.389	0.000	19.88	14.05	5.84
8	9	63.84	11.00	0	0.00	120	2	1.682	0.112	0.000	14.05	12.74	1.31
20	21	-15.70	9.08	0	0.00	120	1	1.380	0.022	0.000	7.86	8.07	-0.21
21	22	-31.30	9.08	0	0.00	120	1	1.380	0.078	0.000	8.07	8.68	-0.61
22	23	-47.14	9.08	0	0.00	120	1	1.380	0.167	0.000	8.68	10.16	-1.48
23	9	-63.84	3.50	3	5.30	120	1	1.380	0.293	0.000	10.16	12.74	-2.58
24	25	-15.09	9.08	0	0.00	120	1	1.380	0.020	0.000	7.26	7.43	-0.17

H Y D R A U L I C C A L C U L A T I O N S

C O V E R S H E E T

Building Located at 3 Milford Street Upton (second floor)

W A T E R S U P P L Y

STATIC PRESSURE	(psi)	115
RESIDUAL PRESSURE	(psi)	110
RESIDUAL FLOW	(gpm)	1680

B O O S T E R P U M P S

NUMBER OF BOOSTER PUMPS 0

S P R I N K L E R S

MINIMUM FLOW PER SPRINKLER (gpm) 16

MINIMUM PRESSURE PER SPRINKLER (psi) 14.51

THIS SYSTEM OPERATES AT A FLOW OF 32.00 gpm AT A PRESSURE OF 77.18 psi
AT THE BASE OF THE RISER (REF. PT. 3)

PIPES USED FOR THIS SYSTEM

001 SCHEDULE 40

Building Located at 3 Milford Street Upton (second floor)

~~~~~~

SYSTEM ANALYSIS TO SHOW MAXIMUM FLOW
WITH ZERO PRESSURE REMAINING

~~~~~~

THE FOLLOWING SPRINKLERS ARE OPERATING IN:

[ ] TEST AREA 1   [ ] TEST AREA 2   [ ] TEST AREA 3   [ ] REMOTE AREA

Elevation of sprinklers = Elevation above water test.

REF. PT.	K	ELEV. ft	FLOW gpm	---- PRESSURE (psi)---- Total	Velocity	Normal
30	4.20	30.50	20.28	23.30	0.00	23.30
31	4.20	30.50	20.28	23.31	0.00	23.31

THE SPRINKLER SYSTEM FLOW IS 40.56 gpm

THE OUTSIDE HOSE FLOW AT REFERENCE POINT NO. 1 IS 100.00 gpm
[ ] THE INSIDE HOSE   [ ] RACK SPKLR'S.
[ ] YARD HYDT. FLOW   IS 0.00 gpm

THE FOLLOWING PRESSURES & FLOWS OCCUR
---> AT REF. PT. 1 <---

STATIC PRESSURE	115.00 psi		
RESIDUAL PRESSURE	110.00 psi	AT	1680.00 gpm
TOTAL SYSTEM FLOW	140.56 gpm		
AVAILABLE PRESSURE	114.95 psi	AT	140.56 gpm
OPERATING PRESSURE	114.95 psi	AT	140.56 gpm
PRESSURE REMAINING	0.00 psi		

THE ABOVE RESULTS INCLUDE 5.00 psi FRICTION LOSS AT REF. PT. # 3 FOR A

[ ] BACKFLOW PREVENTER   [ ] METER
[ ] DETECTOR CHECK VALVE   [ ] OTHER DEVICE

HYDRAULIC CALCULATIONS AT SPECIFIED FLOW

THE FOLLOWING SPRINKLERS ARE OPERATING IN:

[ ] TEST AREA 1 [ ] TEST AREA 2 [ ] TEST AREA 3 [ ] REMOTE AREA

Elevation of sprinklers = Elevation above water test.

REF. PT.	K	ELEV. ft	FLOW gpm	---- PRESSURE (psi)---- Total	Velocity	Normal
30	4.20	30.50	16.00	14.51	0.00	14.51
31	4.20	30.50	16.00	14.51	0.00	14.51

THE SPRINKLER SYSTEM FLOW IS 32.00 gpm

THE OUTSIDE HOSE FLOW AT REFERENCE POINT NO. 1 IS 100.00 gpm

[ ] THE INSIDE HOSE [ ] RACK SPKLR'S.

[ ] YARD HYDT. FLOW IS 0.00 gpm

THE FOLLOWING PRESSURES & FLOWS OCCUR

---> AT REF. PT. 1 <---

STATIC PRESSURE	115.00 psi		
RESIDUAL PRESSURE	110.00 psi	AT	1680.00 gpm
TOTAL SYSTEM FLOW	132.00 gpm		
AVAILABLE PRESSURE	114.96 psi	AT	132.00 gpm
OPERATING PRESSURE	80.07 psi	AT	132.00 gpm
PRESSURE REMAINING	34.89 psi		

THE ABOVE RESULTS INCLUDE 5.00 psi FRICTION LOSS AT REF. PT. # 3 FOR A

[ ] BACKFLOW PREVENTER [ ] METER

[ ] DETECTOR CHECK VALVE [ ] OTHER DEVICE

FITTING Equivalent Length per NFPA 13 1994, 6-4.3
'-' Indicates Equivalent Length. 'T' Indicates Threaded Fitting
1=45 Elbow, 2=90 Elbow, 3='T'/Cross, 4=Butterfly Valve, 5=Gate Valve, 6=Swing Check Valve

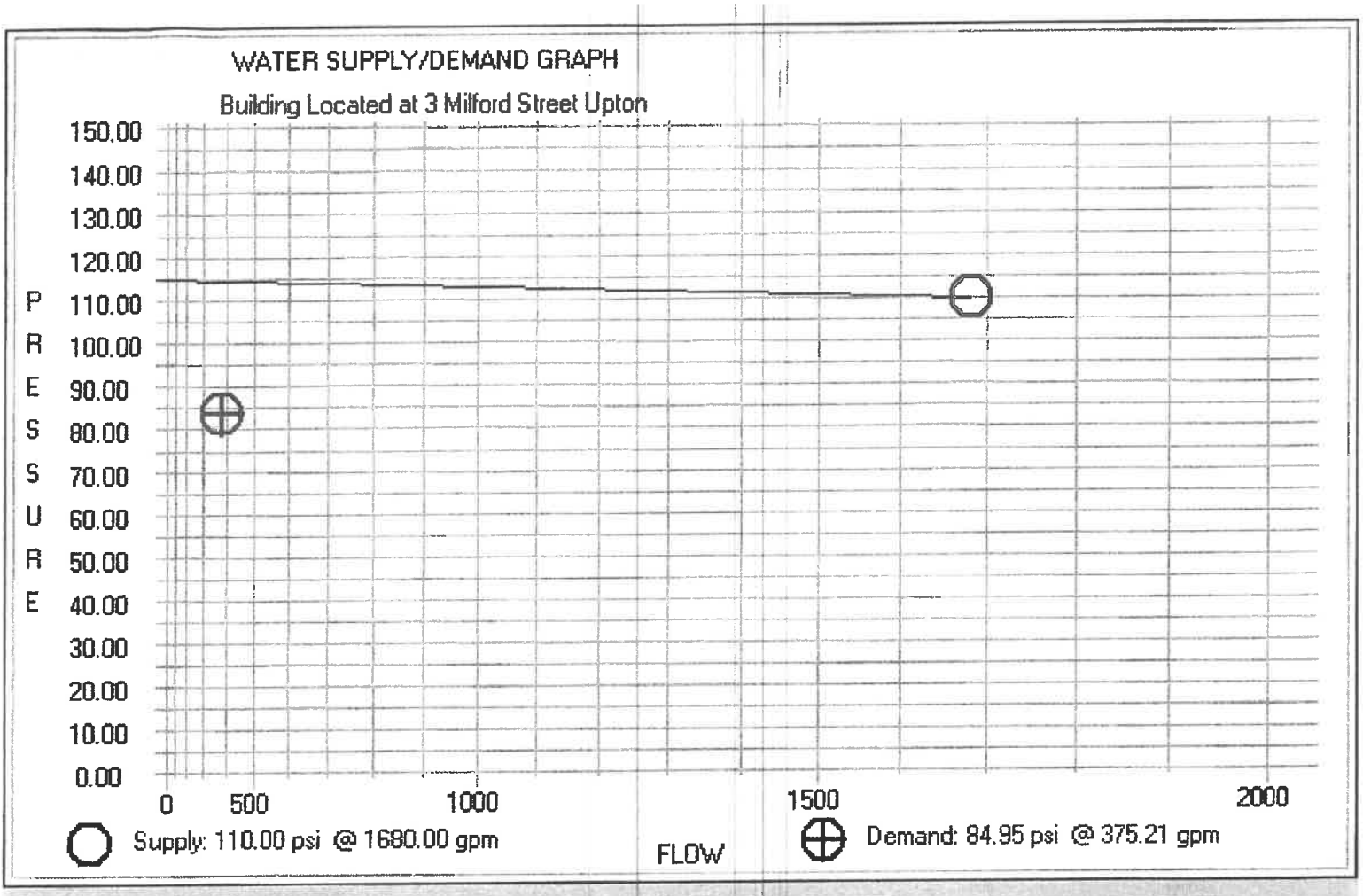
FROM	TO	FLOW (gpm)	PIPE (ft)	FITS	EQV. (ft)	H-W C	PIPE TYPE	DIA. (in)	FRIC. (psi)	ELEV. (psi)	PRESSURE (psi) Pt / Pv / Pn	Pt / Pv / Pn	DIFF
1	2	32.00	75.00	235	11.34	150	1	1.780	0.016	0.000	80.07	78.72	1.35
2	3	32.00	3.00	2553	9.00	120	1	1.610	0.038	1.083	78.72	77.18	0.46
3	4	32.00	8.00	25	2.60	120	1	1.610	0.038	3.467	77.18	68.30	5.41
4	90	32.00	4.00	22	3.40	120	1	1.049	0.310	0.000	68.30	66.01	2.29
90	91	32.00	4.00	256	6.70	120	1	1.049	0.310	0.000	66.01	62.69	3.32
91	92	32.00	62.25	22	3.40	120	1	1.049	0.310	0.000	62.69	42.33	20.36
92	93	32.00	10.00	2	1.70	120	1	1.049	0.310	4.333	42.33	34.37	3.63
93	94	32.00	32.00	222	5.10	120	1	1.049	0.310	0.000	34.37	22.87	11.50
94	95	32.00	10.00	2	1.70	120	1	1.049	0.310	4.333	22.87	14.91	3.63
30	95	-16.00	0.50	3	4.20	120	1	1.049	0.086	0.000	14.51	14.91	-0.40
31	95	-16.00	0.50	3	4.20	120	1	1.049	0.086	0.000	14.51	14.91	-0.40

A MAX. VELOCITY OF 11.87 ft./sec. OCCURS BETWEEN REF. PT. 94 AND 95

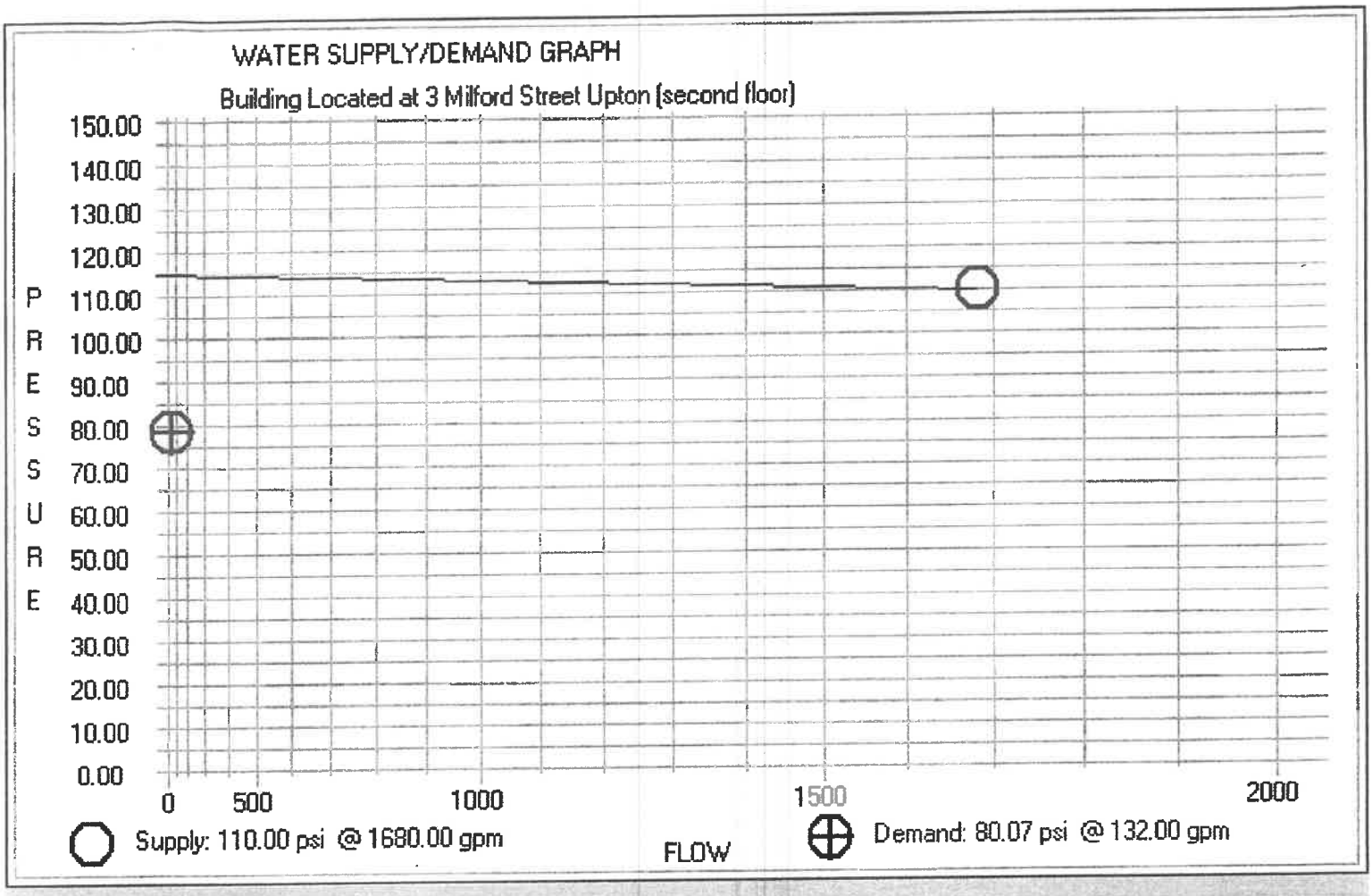
FITTING Equivalent Length per NFPA 13 1994, 6-4.3
'-' Indicates Equivalent Length. 'T' Indicates Threaded Fitting
1=45 Elbow, 2=90 Elbow, 3='T'/Cross, 4=Butterfly Valve, 5=Gate Valve, 6=Swing Check Valve

FROM	TO	FLOW (gpm)	PIPE (ft)	FITS	EQV. (ft)	H-W C	PIPE TYPE	DIA. (in)	FRIC. (psi)	ELEV. (psi)	PRESSURE (psi) Pt / Pv / Pn	Pt / Pv / Pn	DIFF
25	26	-30.07	9.08	0	0.00	120	1	1.380	0.073	0.000	7.43	7.98	-0.54
26	27	-45.25	9.08	0	0.00	120	1	1.380	0.155	0.000	7.98	9.45	-1.48
27	8	-61.37	3.50	3	5.30	120	1	1.380	0.272	0.000	9.45	14.05 2.20 11.85	-4.59

A MAX. VELOCITY OF 19.73 ft./sec. OCCURS BETWEEN REF. PT. 2 AND 3



Sprinkler-CALC 7.2 Win



Sprinkler-CALC 7.2 Win