DECEMBER 2019

PUBLIC SAFETY PROJECT FEASIBILITY STUDY

for

1300 MASSACHUSETTS AVENUE BOXBOROUGH, MASSACHUSETTS

Prepared For:
TOWN OF BOXBOROUGH, MA

HKT architects inc.
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FINAL REPORT

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EXECUTIVE SUMMARY

At the request of the Town of Boxborough, HKT Architects conducted an existing conditions study of a commercial office building and associated site located at 1300 Massachusetts Avenue in Boxborough. The purpose of this assessment was to document the existing conditions of the building and site and to determine the feasibility of converting the building into a future Public Safety Facility. In addition to evaluating the physical condition of the building and site, we were tasked with evaluating how the building program for the Boxborough police and fire departments, developed as part of an earlier feasibility study HKT completed for the Town in 2015, might be accommodated using the footprint of the existing office building. This was done by developing some “test fit” space diagrams which grouped program elements into larger blocks of spaces based on typical operational and adjacency requirements. Finally, high level professional cost estimates determined the approximate cost of developing the 1300 Massachusetts Avenue property into a future Boxborough Public Safety Facility.

EXISTING CONDITIONS ASSESSMENT

Existing conditions assessments were made by HKT and our structural and civil engineers from Pare Corporation. HKT evaluated the architectural components of the building as well as the life safety and accessibility components. Our structural engineer from Pare evaluated the structural components of the building. These architectural and structural evaluations were made during a site visit to the facility through visual investigations of accessible portions of the building. No destructive investigations were performed. Our civil engineers from Pare reviewed site conditions using publicly available information including MassGIS and then outlined potential permitting requirements. A site visit was not part of their scope of work. Copies of architectural, structural and site assessments are attached in the Appendices to this report. The following is a summary of observations made.

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The existing commercial office building at 1300 Massachusetts Avenue was constructed in the late 1980s and is currently operating as leased office space for a number of tenants. As a commercial office building, the building appears to function well and could operate as such into the future with regular maintenance and upgrades. In evaluating the existing conditions though, part of our task was to consider what the impact would be of a converting this commercial office building to a municipal public safety facility housing the Town of Boxborough’s police and fire departments. Conversion of a building from an office use to public safety facility constitutes a “Change in Occupancy” as defined by the 2015 International Existing Building Code (IEBC) and 2015 International Energy Conservation Code (IECC). The IEBC also looks at the overall scope of reconfigured areas in a building to determine the “work area” of a renovated building. In the case of this building, conversion to a public safety facility would require reconfiguration of more than 50% of the area of the building which would place the renovations in the “Alteration – Level 3”

category. The Change in Occupancy and Level 3 Alterations both trigger several code requirements which are discussed generally in the Architectural Assessment and Structural Assessment sections below. An in-depth code analysis is beyond the scope of this study, but would be recommended should the Town decide to proceed with this project.

Architectural Assessment

While the building interior is well maintained, the current layout of spaces would not function for a public safety facility. It is anticipated that a complete gut renovation would be required including new interior partitions, ceilings, fixtures and finishes in order to create a spatial arrangement that would support the operational needs of the Boxborough police and fire departments. Based on our test fits and given the location of existing plumbing / toilet rooms within the existing building, with a new spatial arrangement, removal of portions of the existing slab on grade would be required to accommodate relocated under-slab plumbing for locker rooms, toilet rooms, detention cells, decontamination facilities, laundry facilities and other spaces. Removal and replacement of other slab areas would be required should equipment or vehicles be parked within the building footprint and this is discussed further in the Structural Assessment and Test Fit Diagrams sections below.

The existing building envelope requires some upgrades as well. Exterior masonry appeared to be in relatively good condition with some repointing and minor repairs required. Sealant and control joints were degraded and in need of replacement throughout the wall assembly. Through wall flashing, designed to direct water from behind the masonry rainscreen veneer out of the wall assembly, was observed to be degrading where it penetrated the exterior wall. This condition was observed throughout the main building and the pump house across the street. Stepped through wall flashing appeared to be installed improperly in other locations. Flashing also seemed to be missing entirely in a few locations around louvers. The condition of visible flashing raises questions as to the condition of the concealed flashing within the wall and how well it is functioning. Further investigation of the wall assembly by an envelope consultant is recommended.

A history of water infiltration was observed around existing storefront ribbon windows wrapping the façade on both levels. Etched and/or fogged glass was observed in multiple locations indicating seals on the insulated glass units (IGUs) at the ribbon windows have failed. Storefront at the main lobby entrance appears to be non-thermal with only single paned glazing. With a major renovation, all storefront windows should be replaced with a new, more energy efficient storefront system.

In considering improvements to the building envelope, code triggers dictated by the IECC should be considered. In general, the IECC requires any alterations and new additions to comply with the code for new construction. There are several “exceptions” to this requirement for alterations, provided the energy

use of the building is not increased. The IECC also requires full compliance with current code requirements for any Change in Occupancy that results in an increase in demand for either fossil fuel or electrical energy. Additional analysis would be required to determine current and future energy use to determine the impacts of renovation and Change in Occupancy in this building and energy code triggers. At minimum all new work including new windows, doors and skylights would need to meet the current IECC requirements. As part of re-roofing activities (see Structural Assessment) insulation should be added to the roof to meet current R-value requirements and a thermally broken skylight system should be installed. The extent of insulation within the existing walls is unknown, although given the age of the building, it is likely batt insulation exists between metal studs. Insulation within stud cavities is not the most efficient manner of insulating walls as the insulation is not continuous and allows thermal bridging to occur at each stud location thereby reducing its overall effectiveness. If additional insulation value is required in the exterior walls for code or operational reasons to increase the building's energy efficiency, analysis will be required to determine the best approach.

During our site visit, the existing building manager indicated that the electric boiler is original to the building. Given the age of the boiler, it has exceeded its service life and should be replaced as part of any major renovation. The cooling tower is also original to the building although the manager reported it was partially rebuilt around three years ago. The age of the transformer and two fire pumps serving the building are unknown. It is recommended that replacement of all equipment and systems be planned for in any future development.

Structural Assessment

From a structural perspective, per the 2015 IEBC, a Change in Occupancy of a building triggers several code requirements including an analysis of the building's structural system for snow, wind and seismic loads prescribed by the current building code.

The IEBC classifies police and fire stations as "essential facilities", as these structures must remain operational after a significant storm or seismic event, and places them in a higher risk category (Risk Category IV) than a commercial office building (Risk Category II). Structural drawings of the existing building were not available however, it is assumed the structure was designed and built to meet the 4th edition of the Massachusetts State Building Code that was in effect around the time of construction. Our structural engineer from Pare undertook a comparative analysis of the code requirements for a Risk Category II office building that was constructed under the 4th edition of the code with those code requirements prescribed today for a Risk Category IV public safety building to determine the types of upgrades likely required.

The code also triggers structural analysis and possible upgrades based on the scope of the "work area" of

a given renovation. Conversion of this building would require reconfiguration of more than 50% of the area of the building which would place the renovations in the “Alteration – Level 3” category. A more detailed explanation of these code triggers and the analysis that would be required are included in the Structural Condition Assessment. However, based on the code mandated triggers for the increase in Risk Category and the assumed work area, extensive retrofitting of the structural system is likely. The following should be planned for as part of a public safety facility conversion:

- The existing stone ballast would need to be removed to lighten the load on the roof structure and make up for an increased snow load requirement. Removal of the ballast would require replacement of the roofing system. When the roofing system is replaced, the 2015 International Energy Conservation Code requirements for roof insulation would be triggered and additional roof insulation must be added. It is assumed that removal of the stone ballast would offset both the added snow load and additional weight of insulation. Any additional load to the roof framing, such as hanging more ductwork, piping or mechanical units than currently installed, would need to be evaluated further and might require additional support.
- As there is little to no existing rooftop equipment currently and any residual roof structural capacity would be used up by the snow load requirements above, installation of any new rooftop equipment would require retrofitting of the existing structural joists or steel dunnage framing spanning between columns to support rooftop equipment.
- It is unlikely that the existing building’s lateral load resisting system could withstand the approximately 300% seismic loading increase that would be required should the building be converted to a Risk Category IV occupancy. Detailed structural analysis would be required to determine the exact retrofits required, but it is assumed added diagonal bracing around the perimeter of the building would be required. The diagonal bracing would require reinforcement of the existing structure (floor/roof framing, columns and foundations) that it would attach to or addition of new supplemental columns and footings to accept the bracing loads.
- The metal roof deck would need to be analyzed for its attachment to the roof framing to resist horizontal forces imparted by the seismic loads. It is likely additional screws or welds would need to be added to the roof deck for this purpose.
- The load capacity of the second-floor framing is unknown, but may be as little as 50 pounds per square foot (psf) which is the minimum required by the code for offices. If spaces with live loads exceeding 50 psf, such as assembly gathering spaces or storage spaces, were required on the second floor, additional structural reinforcements may be required. More detailed structural measurements and analysis would be required to determine the exact impact.
- The existing first floor slab would need to be replaced in any areas that would require significant loads such as heavy equipment or vehicles (police cars or fire trucks). In these locations, a new thicker reinforced slab would be required.

Site Evaluation

Civil engineers from Pare Corporation evaluated the feasibility of developing the 1300 Massachusetts Avenue site for a public safety facility. Their assessment considered multiple site aspects based on publicly available information as well as some as-built drawings of the site provided to the team by the Town of Boxborough. Further investigation into a number of issues would be required prior to development on the site including geotechnical investigation and wetlands delineation. However, based on Pare's limited review, several items of note are detailed in their report and would impact the future development of this site into a public safety facility:

- The existing septic system is approximately 32 years old and approaching the end of a typical septic system's service life. While the condition of the system is unknown without a current Title V inspection, it is recommended that any new development planning account for replacement of the system.
- A traffic study is recommended as part of planning for a public safety facility. Based on aerial imagery, it appears sight lines may be an issue when exiting Burroughs Road. Sight lines from any new access points should also be evaluated. Traffic congestion is not known at this time, but traffic signalization may be warranted for safety purposes based on sight line visibility.
- Due to the two wells in the parking lot area, the site has both Zone I Wellhead Protection Areas and Interim Wellhead Protection Areas (IWPA). Systems that do not meet the DEP Zone I requirements must receive DEP approval and address Zone I issues prior to increasing water use or modifying systems. Pare reached out to the DEP for clarification on whether connecting a new building to the existing wells would constitute a "modification" in the system per DEP requirements but did not receive a response. Should the building be renovated or demolished with a new building constructed to house the public safety departments, we recommend coordination with the DEP early in the planning process to determine if the non-conforming use will be allowed to continue or if remedial steps will be required.
- A 2019 Drinking Water Quality Report on one of the wells listed lead above the MassDEP action level. The report notes the source of the lead may be the result of interior plumbing as the source water coming into the well is lead-free. Further review is required to determine the source of the lead.

Additional information on Pare's site assessment as well as an outline of relevant permitting requirements can be found in the Site Feasibility Study in the Appendix.

TEST FIT DIAGRAMS

Based on programmatic needs of the Boxborough police and fire departments defined as part of HKT's 2015 study, overall space needs for the departments are anticipated to be between 30,000 and 35,000

square feet. While fitting the program into this 62,000 square foot building was not a concern, fitting the program in a manner that would meet the operational needs of the departments was. To that end, conceptual “test fit” block diagrams were developed demonstrating how the proposed program might fit within the existing building footprint, how spaces might be organized to meet the department’s operational needs given the existing building constraints and what space would remain once the public safety space needs were addressed. Test fit diagrams were developed by taking the building program, grouping similar programmatic areas together into larger blocks of space and then arranging these blocks into the building according to ideal programmatic adjacency relationships. It should be noted that the test fit diagrams are not representative of building floor plans. Detailed floor plans with clear representations of all programmatic spaces and adjacency requirement were beyond the scope of this study and would be developed working closely with the police and fire departments and Town officials should the project move forward.

Two test fit diagrams were developed using the existing building footprint. In developing the diagrams, HKT set several goals relating to the facility operation:

- Keep the main public entrance, Dispatch and Detention areas on the same floor level to facilitate dispatch personnel workflows while greeting visitors and performing required detention cell checks.
- Provide good access to a main road for emergency vehicles, particularly fire apparatus, to exit the site quickly and safely, minimizing response times.
- Conceal the Sally Port entrance from public street view for safety and security of detainees and police officers.
- Provide access to windows and natural light in all fire department Bunk Rooms at minimum.

Option A first looked at how the program could be accommodated entirely within the existing footprint with no additions to accommodate vehicles. The fire department spaces were located north of the main entrance lobby so Apparatus Bays could be placed with overhead doors along the north façade allowing direct access onto Massachusetts Avenue. Fire department Operations and Staff Support (living quarters) are located adjacent to the Apparatus Bays to allow rapid response by firefighters. Police department spaces were arranged on the south side of the building to allow the Sally Port and Impound Bay overhead doors to be shielded from view of Massachusetts Avenue. Police department Staff Support and Operations spaces are located between Detention and Dispatch. Dispatch and public areas including the Training Room and Multi-Purpose / Safe Room are located with direct access to the public in the main first floor lobby.

With the Apparatus Bays located within the building footprint, there is not adequate space remaining on the first floor for all additional police and fire departments' space needs and a portion of the second floor would be required for public safety needs. Police and fire department Administration offices are located on the second floor off the lobby along with a Shared Conference Room and Fitness Room. Additional unprogrammed area on the second floor of approximately 9,900 square feet would be available for a Future Town Use, with considerations made to loading limitations noted in the structural assessment.

Figure 1 - Option A

Apparatus were arranged to create a 5-bay wide layout based on vehicle arrangements settled on during the 2015 study. The required height of the bays poses some challenges to the existing structure. The clearance from the first floor to the underside of the second-floor deck is only 14'-0" which is much too low for fire apparatus which typically require a minimum of 18'-0" from the floor to the underside of any obstructions to allow servicing of vehicles from the top. Therefore, in order to build the fire Apparatus Bays within the existing building footprint, a portion of the second floor must be removed with new structural framing added to support the perimeter of the opening.

The Apparatus Bay layout in this option is entirely dependent on the existing column grid and, as a result, not terribly efficient. The existing columns are spaced approximately 25'-0" on center with the end bay spacing at 27'-10". These dimensions are far greater than typical modern apparatus bay widths which vary between approximately 17'-0" to 18'-0" for middle bays and 20'-0" for end bays and therefore result in considerable unprogrammed space between vehicles.

As mentioned previously, the existing slab on grade likely cannot support the weight of apparatus and equipment and would therefore need to be removed and a new thicker reinforced slab installed in its place in the Apparatus Bays, Sally Port, Impound Bay and possibly other spaces depending on final

equipment layouts.

In this option, the existing two loading dock bays would be combined and repurposed to create an Impound Bay. This would require filling in the recessed loading ramp, reframing the two overhead door openings for a single opening, removal of the recessed loading dock lift and replacement of the floor slab to support vehicular loads as noted above. A portion of south exterior wall would be reframed to allow an additional overhead door in the Sally Port. Again, replacement of the floor slab would be required to accommodate vehicular loads.

Option B proposes building a new addition onto the north side of the building to create an appropriately sized Apparatus Bay outside the existing building footprint. With the proposed addition increasing the amount of square footage on the first floor, the entire police and fire department space programs can now be accommodated on the first floor with the entire second floor available for unprogrammed Future Town Use. The overall arrangement of spaces in Option B is similar to Option A, with the Fire Department occupying the north side of the building and Police Department the south side of the building. Dispatch and public areas are again accessed from the main public lobby.

Figure 2 - Option B

In this option, the existing two loading dock bays are again combined along with some additional office space north of the bays to create a double deep combined Sally Port and Impound Bay. Renovations described for the Option A Impound Bay would be relevant in this option as well including removal and replacement of the floor slab.

The overall depth of the existing floors poses a challenge to provide access to windows and natural light in all regularly occupied spaces. While detailed floor plans have not been developed, consideration was given to the program elements that should have access to windows and an attempt was made to organize the spatial blocks in a manner that would provide the most access to natural light and views possible. In Option A, fire department Staff Support spaces wrap the northeast corner in an attempt to maximize access to windows and natural light in Bunk Rooms and the Day Room. Similarly, Administration spaces are located in corners to maximize the number of individual offices with windows. This becomes more challenging in Option B where the program is accommodated only on the first floor and therefore there are fewer windows in general to provide access too. As a result, several spatial blocks extend deep into the building footprint, such as the police department Administration, resulting in only a few programmatic spaces at the exterior façade having access to windows. In Option B, priority was given again to providing natural light in Bunk Rooms, other living spaces such as the Day Room, might be instead located inboard.

Lastly, Option C was developed to show what might be possible on the site if the existing building was demolished in its entirety to make way for a new public safety facility. In this example, the footprint HKT developed for the Boxborough Public Safety Facility during the 2015 study was modified slightly and put on the site for demonstrative purposes. This exercise demonstrates that the site can accommodate an appropriately sized new two-story facility based on anticipated programmatic needs.

Figure 3 - Option C

PROBABLE COSTS

After reviewing the existing conditions assessments and test fits with the Town Administrator, Ryan Ferrara and Selectboard Members Les Fox and Maria Neyland, it was decided to proceed with developing some big picture total project cost estimates of the three options for comparison. The budget comparisons could then be used by the Town to discuss what next steps should be taken. HKT developed projected project costs for Options A, B and C as well as Option D identified as a new 35,000 square foot building on a new Town-Owned site the Committee suggested at 70 + 72 Stow Road. Total project cost is a combination of the cost of construction (hard costs) and the administrative costs borne directly by the Owner (soft costs). Below is an explanation of how these costs were arrived at.

Hard Costs

Professional cost estimator, TCi – Tortora Consulting reviewed project documentation including existing conditions reports prepared by HKT and Pare and the sketches of proposed options to estimate the cost of construction for Options A, B and C. In developing these hard costs, TCi took a hybrid approach to developing hard construction costs by starting with historic square foot costs for renovations, additions and new construction and overlaying more specific cost data related to potential issues and deficiencies with the existing building and site which were identified by HKT and Pare. Space in Options A and B which were identified for future Town uses were assumed to be fit-out at a later date and paid for out of another project. TCi's estimate assumes these spaces would only be developed as "shell" spaces with code mandated minimum lighting, heating/ventilation, fire protection, etc. and left open with no interior partitions dividing the spaces. Line item costs within the estimate are based on current market costs. The total of these current costs is then escalated 10% based on an anticipated construction start in 2021.

For Option D, less information was available to the design team to develop costs in any detail as assessment of 70 + 72 Stow Road was not part of the study scope. HKT worked with TCi to develop an analysis of cost based on what square foot costs would be for a typical public safety building on a "simple" site versus a "complex" site with the cost range attempting to capture the range in development cost dependent of a number of site issues such as topography, wetlands, subsurface conditions (rock and boulders), bringing utilities to the site, clearing the land and other issues. The actual cost of development on the 70 + 72 Stow Road site would likely fall within this range.

Soft Costs

Soft costs include a variety of administrative costs typical of a project such as this. Architectural and engineering fees and owner's project management fees are typically estimated as a percentage of the construction cost. Other costs can vary from project to project including costs associated with permitting, legal fees, commissioning, communications, printing of bid documents, advertisement of the project, testing during construction, a clerk of the works and furniture, fixtures and equipment, among others. As

detailed information on the soft costs for this project are not known at this early stage, soft costs were instead assumed at 25% of hard construction costs, a figure in line with other similar public safety projects in Massachusetts.

Owner's Contingency

The Owner's contingency is carried as a line item to cover changes that are initiated at the Owner's option or latent conditions such as unforeseen circumstances. Examples of unforeseen circumstances might be additional hazardous waste removal or boulder removal. This contingency can also cover changes that the Owner chooses to initiate. Upgrading to a better grade of equipment or deciding to change a spatial arrangement during construction are but two examples.

Site Acquisition Costs

Finally, an estimated cost of site acquisition based on current assessed value of 1300 Massachusetts Ave and 1223 Massachusetts Ave (the adjacent parcel with the fire pond and septic field) was added to Options A, B and C to determine the total projected project costs. The assessed value might vary from a negotiated sale price and it should be noted that the most recent sale of 1300 Massachusetts Avenue was considerably higher than the assessed value. Without consultation from a commercial real estate professional on property values, this methodology provided a means to compare development at 1300 Massachusetts Avenue and 70 + 72 Stow Road where acquisition cost was assumed to be $850,000, the amount the Town of Boxborough initially paid for the site when it was purchased for affordable housing development.

Total Projected Project Costs

The combination of hard and soft costs yields total projected project costs. Total projected project costs for the various options are outlined below:

	Total Projected Project Costs
Option A	$31,801,021
Option B	$36,249,887
Option C	$33,964,088
Option D – Simple Site	$28,014,325
Option D – Complex Site	$33,196,513

One potential variable to this budget is if there should be a significant change in the economy (such as a major rise in fuel costs or additional tariffs) which could affect the base cost and the escalation contingency. Another variable is timing as a delay to the project would also affect the total cost. It is important to keep monitoring costs as the project moves forward to make certain that factors such as "scope creep" do not distort the original size and intent of this study.

CONCLUSION

After analyzing the options and costs, the Committee and HKT agreed that developing 1300 Massachusetts Avenue into a public safety facility was not the best option available to the Town at this time. The decision was based on a number of factors. Potential operational compromises of Options A & B, including the lack of any drive through apparatus bays and the lack of access to natural light in many occupied spaces as a result of the deep floor plan, were considered too great. The Committee also cited the risk of possible unidentified building and site issues which could both increase the estimated initial development cost as well as long-term operations and maintenance cost of the facility. Finally, the projected project costs of Options A, B and C were equivalent to or more expensive than for the projected project costs of new construction at 70 + 72 Stow Road in Option D. In short, development of 70 + 72 Stow Road offered the possibility of building a new facility that would meet the operational needs of the police and fire departments at the right size for potentially less cost than development of 1300 Massachusetts Avenue.

Based on the study findings, the Town decided to further study development of 70 + 72 Stow Road as the future home of the Boxborough Public Safety Facility. The goal of the next study phase would be to conduct a preliminary site assessment and conceptual building and site designs to further define projected project costs and confirm feasibility of development of the Stow Road site.

APPENDICES

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ARCHITECTURAL EXISTING CONDITIONS REPORT

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EXISTING CONDITIONS REPORT

Building Name: Unknown

Address: 1300 Massachusetts Avenue, Boxborough, MA

Building Use: Commercial tenant office space

Type of Construction: Steel framed construction, concrete slab on grade, upper floors concrete on metal deck, brick veneer on stud framing at exterior walls

Year of Construction: 1987 (estimate) **Last Modification/Addition:** unknown

Report By: Amy J. Dunlap **GSF** Approximately 62,000 **Date:** 9/18/19

INTRODUCTION

On Wednesday, September 18, 2019, Amy J. Dunlap of HKT Architects conducted a site visit to 1300 Massachusetts Avenue, Boxborough, MA (photo 1) at the request of the Town of Boxborough. The purpose of the visit was to observe and report on the existing conditions of the tenant office building currently being considered for purchase by the Town of Boxborough. The Town of Boxborough is considering the property for the future location of the Boxborough Public Safety Facility. Kevin Champagne, structural engineer from Pare Corporation, accompanied HKT for the site visit. Several members of the Public Safety Building Committee and Town Staff were also in attendance. Representatives of the current Owner in attendance included Tim Latham of Lincoln Properties and Claude Girouard, Building Manager from Colliers International.

EXTERIOR CONDITIONS:

Wall Material(s): Brick with stud back-up; canopy façade clad with aluminum beadboard fascia

Wall Condition: Good – Brick appeared in be in good condition. Two areas of efflorescence were observed under the second floor window sills on the north and east façades (photo 2). Deteriorated mortar was observed in a few locations, primarily under the second floor window wills on the north façade (photo 3). Brick window sills at several corner locations also required repointing with bricks visibly loose (photo 4). Some damaged bricks were observed at the corner of the building near the loading dock (column A,1) (photo 5). Lichen and moss were observed on first floor window sills, primarily on the north and west elevations (photo 6).

Wall Insulation: Unknown – Given observed wall thickness and age of construction, if insulation exists it would likely be batt insulation within the stud cavity. GWB at exterior walls extended to the underside of the beam/decking above, preventing visual confirmation of insulation. Building manager had no memory of studs being exposed to confirm insulation. Building manager said the cavity was not exposed in any locations in the building to allow for visual inspection. See comments in “Other Ext. Issues” below.

Window Types: Aluminum fixed ribbon storefront with insulated glass units (double glazed); aluminum storefront with non-insulated glass units at lobby; skylight over lobby

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Window Conditions: Fair – Etched/fogged glass indicative of failed window seals were observed in multiple locations (photo 7).

Door Types(s): Aluminum storefront entrances with non-insulated glass units; overhead sectional doors at loading dock bays

Door Conditions: Good

Roof Type(s): Rubber membrane with stone ballast on main roof and over canopy (photo 8)

Roof Conditions: Building manager did not know the age of the current roof. He indicated leaks have appeared over the years and been patched. Some water stained ceiling tiles were observed, but it could not be determined how recent the staining was or its cause.

Other Ext. Issues: The base of column covers at the main entrance canopy are corroded (photo 9).

Flexible membrane thru-wall flashing was observed penetrating the masonry veneer throughout the main building and the fire pump house across the street. Flashing was observed in numerous locations including at window/door heads/sills, at wall base above concrete foundation walls, at main entrance canopy intersection with wall, etc. Flashing was not observed at some louver locations (photo 10). At almost all visible locations, the membrane protruding the wall appeared to be a rubberized asphalt membrane. Rubberized asphalt membranes are not UV-stable and therefore, when installed, should be held back from the building façade and terminated with a metal drip edge. No metal drip edges were visible at either the main building or pump house. Instead in all visible locations, the rubberized asphalt membrane protrudes from the building façade and has degraded with the asphalt having melted and dripped off, in some cases staining the wall below (photos 11, 12).

Stepped flexible membrane flashing was observed at the stepped foundation wall where the surrounding exterior grade is above finished floor level. Flashing appeared to run horizontally along the foundation wall, turning down vertically at the foundation wall step and then turning horizontally at the lower foundation wall elevation (photo 13). This is not the preferred method of installing stepped flashing. To form a step, the end of flashing at the highest elevation should be extended past the step, to overlap the flashing below by a minimum of 4 inches, and turned up to form an end dam. The lower piece of flashing should be formed with end dams at both ends. Evidence of the installation of end dams was not observed at this stepped flashing.

The condition of the visible flashing raises questions to the condition of the concealed flashing within the wall. Rubberized asphalt membranes have melting points above which the asphalt can melt off the membrane. It is possible for the temperature within masonry wall cavities to exceed this melting point temperature causing the asphalt to melt and flashings to fail. Conditions of the flashings in this case cannot be verified without removing bricks to inspect the wall cavity.

Sealant surrounding windows and doors was cracked and deteriorated (photo 14). In one location, it was observed that sealant had been installed just above the flashing at a window head, blocking the flow of water and trapping it within

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the window/wall assembly (photo 15). Control joints in the brick masonry were also cracked and deteriorated (photo 16).

A history of water infiltration around windows was evident on the interior of the building at water-stained wood window sills observed on both the first and second floors throughout the building (visible both inside during tour of selected vacant tenant spaces and through windows in other spaces from the outside of the building) and stained and/or peeling paint observed in several locations (photos 17, 18, 19, 20).

INTERIOR CONDITIONS:

Floor(s):	Carpet, VCT, raised rubber stair treads/risers in egress stair, ceramic tile in toilet rooms, porcelain tile in lobby, exposed concrete in service areas
Floor Conditions:	Good – Floor finishes were generally well maintained. Some zippering and pulls were observed in carpet. VCT was scuffed in numerous locations.
Wall Type(s):	Gypsum wallboard (GWB), ceramic mosaic tile walls in toilet rooms
Wall Conditions:	Good
Ceiling Type(s):	Acoustic ceiling tiles (ACT) on 2x4 metal grid, wood ceiling in lobby
Ceiling Conditions:	Good – ACT was generally in good condition with some water stained tiles observed on the second floor (photo 21). Some ACT tiles were chipped.
Door Type(s):	Clear stained wood doors (solid, glazed and glazed with wire glass)
Door Conditions:	Poor to good – Condition of doors varied widely. Observed deficiencies included chipped, peeling and delaminating wood veneer (photo 22). Some fire rating labels were observed on doors, but others were lacking on doors that should be fire rated.
Other:	Tenant improvements varied in type and condition. Many building finishes appear original (lobby stair guard rail, toilet room countertop, lobby ceiling tiles, etc.) and, while well maintained, appear dated.

EGRESS/LIFE SAFETY/CODE COMPLIANCE:

HCP Access:	Issues: Bi-level drinking fountains are not provided. All drinking fountains are single level (photos 23, 24). Mandated clear floor space and reach ranges around some doors are lacking. Pavers at main lobby entrance do not provide a smooth, heel-proof walking surface (photo 25).
Accessible Toilets:	Toilet rooms have accessible toilet stalls with grab bars. Some toilet accessories are not hung within code mandated reach ranges.
Vertical Access:	Two stop elevator provides access from first to second floor
Vertical Egress:	One open two-story stair in main lobby (photo 26); enclosed stair near loading dock (photo 27) – Egress route through enclosed stair raises concerns.

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Egressing from the second floor, an occupant would descend the stairs to the first floor where occupants must pass through another door and down an additional partial flight of stairs to egress to the outside at the loading dock/truck bay (photo 28). If a truck were parked at this location, it does not appear there would be adequate width for passage. Alternatively, an occupant could leave the stair at the first floor and travel down a 75' long corridor to another egress door. This is generally not allowable by building codes and would need to be reviewed further.

Horizontal Egress: At grade at the main lobby on the east façade and through a door on the south façade to the parking lot

BUILDING SYSTEMS:

Fire Suppression: Building is sprinklered throughout. Water is supplied from a fire pond located on the opposite side of Burroughs Road. A fire pump house is located adjacent to the fire pond (photo 29). The building manager said two fire pumps were located in the pump house and supply water directly from the pond to the sprinkler system. The building manager reported that the primary pump is electric and the secondary pump is diesel.

HVAC: The building manager reported on all aspects of the HVAC system: The electric boiler is the original one installed during construction in the late 1980s and has exceeded a typical service life. Heat pumps within tenant spaces have been switched out over the years during tenant fit-outs. The cooling tower is original to the building but was partially rebuilt around 3 years ago (photo 30).

Electric: Electric service is provided by Littleton Light. A transformer is located on the west side of the building adjacent to the loading docks. Age was not verified but the transformer enclosure appears older (photo 30).

RECOMMENDED ACTIONS:

If the building were to be reused, in order to accommodate the needs of a public safety facility, the building would require a complete gut renovation as the current spatial arrangements do not meet the needs of a police and fire department. Interior renovation work would include all new interior partitions and ceilings, fixtures, finishes and building systems. Exterior envelope work will be required as well including new energy efficient, thermally broken storefront window systems, doors, and skylights. Repointing of deteriorated mortar will be required as well as removal and replacement of degraded sealant and control joints. Flashing issues require additional investigation to determine what action is required and consultation with an envelope consultant is recommended should renovation of the existing building be pursued.

As stated previously, if insulation exists in the exterior walls, it would be batt insulation installed between the studs. When batt insulation is installed between studs, it is interrupted by the stud itself causing a thermal bridge which results in significant heat loss. Thermal bridges also exist where the batt insulated stud wall meets the non-insulated concrete foundation wall. This is a highly inefficient way to install insulation and is no longer allowed by building energy codes for new construction which require "continuous insulation". Continuous insulation extends from foundation footing, up walls and over roofs extending continuously across all structural members without thermal bridges. In contemporary building construction, continuous insulation is installed on the outside of the stud wall assembly, in the cavity wall behind the masonry. This location prevents water vapor in the air from condensing within the wall assembly and causing damage. In a retrofit project, installing continuous insulation in this location

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cannot be done without removing the brick veneer entirely. Installing additional insulation on the inside face of the stud wall can affect the location of the dew point, the location where water vapor condenses, which could also cause unintended water damage in the wall assemble. Further investigation of the existing wall system and a dew point analysis would be required to resolve how to better insulate the existing walls and meet energy code requirements while maintaining the brick veneer and prevent condensation from accumulating in the wall assembly.

The existing stone ballasted roof should be replaced with a new adhered membrane and roof insulation installed to meet current code requirements. Removing the stone ballast will address some structural issues which are addressed in the structural report.

PHOTOGRAPHS:

1 *- Office building at 1300 Massachusetts Ave*

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***2** - Efflorescence below window sills*

***3** - Deteriorated mortar joints and efflorescence*

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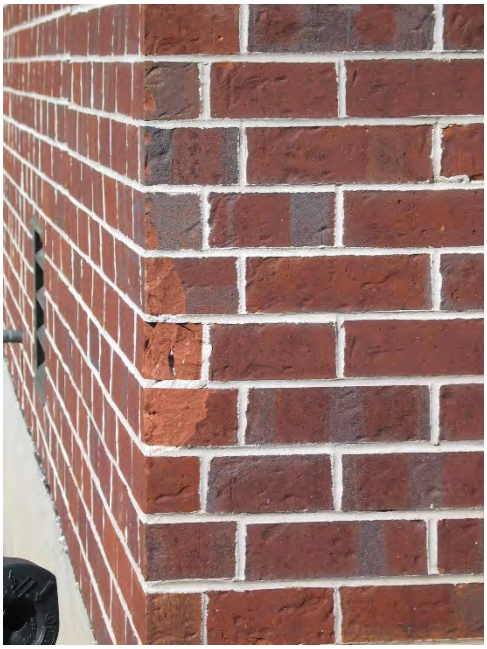
4 - Brick window sill requiring repointing



5 - Damaged bricks at building corner near loading docks

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6 - Lichen and moss growing on masonry and concrete wall

7 – Etched/fogged glass indicative of failed window seals

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8 - Stone ballasted rubber roof over main entrance canopy visible through storefront window

9 - Corroded column at main entrance canopy

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10 - Example of louver with no visible flashing or weeps at head

11 - Degraded flexible membrane thru-wall flashing where masonry meets concrete foundation wall

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12 - Degraded flexible membrane thru-wall flashing at window head

13 – Improperly installed flexible membrane thru-wall flashing at stepped foundation wall. No end dams are visible.

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14 - Cracked and deteriorated sealant around windows.

15 - Sealant installed above flexible flashing at the head of a window preventing water from exiting from wall cavity.

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16 - Cracked and deteriorated sealant at masonry control joint.

17 - Water stained wood window sill at second floor window along north wall.

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18 - Water stained wood window sill at first floor window along west wall.

19 - Water stained drip running from under wood window sill down to wall base at second floor window along west wall.

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20 - Chipped and peeling paint from water intrusion at head of lobby storefront. Water penetration likely from storefront above at second floor level entrance canopy.

21 - Water stained ceiling tiles on the second floor.

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22 - Delaminating wood veneer at wood door in second floor tenant space.

23 - Typical single level, non-ADA compliant drinking fountain outside toilet rooms.

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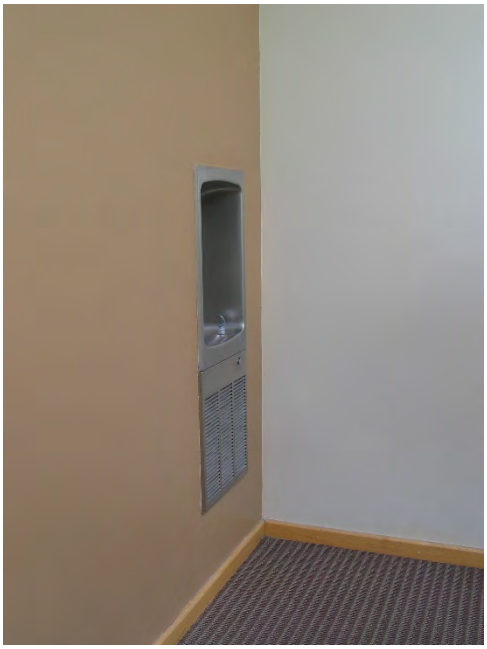

24 - Typical single level, non-ADA compliant drinking fountain in lobby.

25 - Pavers at main entrance provide an uneven walking surface.

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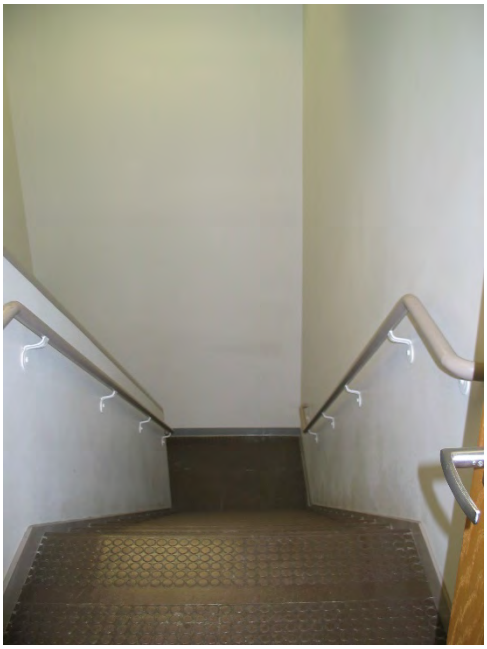
26 - Open stair at main entrance lobby



27 - Enclosed egress stair

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28 - Opening at the first floor in the corner is location of door exiting from egress stair. Note the close proximity to the truck loading bay. A vehicle in this location could impede emergency egress.

29 - Pump house and fire pond across Burroughs Ave.

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30 - From left to right: dumpster, cooling tower, transformer enclosure

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STRUCTURAL CONDITION ASSESSMENT

MEMORANDUM

DATE: September 30, 2019

TO: Amy Dunlap, LEED AP BD+C, HKT Architects

FROM: Kevin M. Champagne, P.E., Pare Corporation

CC: Lance A. Hill, P.E., Pare Corporation

RE: **Structural Condition Assessment**
1300 Massachusetts Avenue
Boxborough, Massachusetts
Pare Project No. 19140.00

Per your request, Pare Corporation has prepared this memorandum to present the findings of a structural condition assessment for the building located at 1300 Massachusetts Avenue in Boxborough, Massachusetts. The purpose of this assessment was to document the building's structural systems and its condition, where visible. A review of the structural systems relative to building code compliance for potential future renovations and the proposed "change in occupancy" (i.e. conversion to a public safety building) was also performed.

The findings herein are based upon observations made during a walkthrough of the building on September 18, 2019 and a review of the relevant provisions of the Massachusetts State Building Code, 9th Edition, which adopts the 2015 International Existing Building Code and 2015 International Building Code by reference. The walkthrough was conducted with representatives of HKT Architects (HKT) and the Town of Boxborough (Town) and was cursory in nature to generally identify framing configurations, lateral load (wind, seismic) resisting systems, and the condition of the structure. No destructive investigation or investigation for the presence of hazardous materials was performed.

No structural drawings of the building were made available for this assessment.

EXISTING CONDITIONS & CONDITION ASSESSMENT

The building is an approximately 60,000 square-foot, two-story structure with a flat roof, brick veneer, and "ribbon" windows. Pare was provided existing architectural floor plans titled "1300 Mass. Ave." prepared by Seppala & Aho for this assessment. According to the existing plans, the building was constructed circa 1987.

A general description of the building's structural systems and summary of observed conditions follows.

Structural Systems Description

- First Floor: The first floor consists of a slab-on-grade of unknown thickness with no basement spaces. The slab-on-grade was visible within the first floor mechanical room. The remainder of the building's foundation system was not visible.
- Second Floor: The second floor is typically framed with 24" deep steel joists supporting a concrete slab on metal deck, however framing along the perimeter/exterior walls of the building is wide-flange steel beams. Joist spacing varies, but is generally about 3'-2" on-center. The joists span approximately 25'-0" and are supported by joist girders at the building's interior and wide-flange steel girders at the building perimeter. The joist girders are approximately 28" deep. Steel tube columns spaced approximately 25'-0" on-center support the joist girders and wide-flange girders. The interior columns are approximately 10"x10" and the exterior columns are approximately 8"x8".
- Roof: The roof is generally flat and framed with 18" deep steel joists supporting 1.5" deep metal roof deck, however, framing along the perimeter/exterior walls of the building is 16" deep wide-flange steel beams. Joist spacing varies, but is generally about 5'-0" on-center. The joists span approximately 25'-0" and are supported by joist girders at the building's interior and wide-flange steel girders at the building's perimeter. The joist girders are approximately 28" deep and the wide-flange girders are approximately 18"-21" deep. Steel tube columns spaced approximately 25'-0" on-center support the joist girders and wide-flange girders. The interior columns are approximately 10"x10" and the exterior columns are approximately 8"x8".
- Walls: The exterior walls of the building consist of brick veneer backed by light-gauge studs and drywall. Continuous "ribbon" windows are present on all sides of the building. The interior walls are generally drywall partitions.
- Lateral load resisting system: No plans indicating a lateral-load resisting system for the building were made available for this assessment. The roof and floor decks likely act as horizontal diaphragms. Based on the column sizes observed, the vertical lateral-load resisting system may consist of moment frames utilizing the joist girders and some of the perimeter wide-flange steel beams. No wide-flange moment connections were observed during the visit, however not all locations were visible due to ceiling and wall finishes.

Observations/Recommendations

- Structural systems were largely covered by interior finishes and were only observed where the tile ceiling was locally removed. Where exposed, the structural systems appeared to be in good[1] condition overall with no apparent signs of structural distress.
- No significant equipment is installed on the roof. The roof is covered with stone ballast and is only accessible via a ladder and roof hatch.
- Conversion of the building to a public safety use will require the structure to be analyzed for snow loads, wind loads, and seismic loads associated with "essential facilities" (i.e. those structures that are anticipated to be operational after a significant storm or seismic event). As the building was originally designed as office space, these "essential facility" loads are

likely much larger than what the building was originally designed for, requiring significant retrofits. Refer to the "Building Code Review" section for further discussion.

BUILDING CODE REVIEW

Change of Occupancy

Conversion of the building from office use to a public safety complex constitutes a "Change In Occupancy" as defined by the 2015 International Existing Building Code (IEBC). Table 1604.5 of the International Building Code (IBC) identifies office use as a "Risk Category II" and a public safety complex as a "Risk Category IV" use (also known as an "essential facility"). Per Section 1007 of the IEBC, this risk category increase requires that the building be analyzed for snow, wind, and seismic loads prescribed by the current building code for a Risk Category IV use.

While structural drawings of the existing building were not made available for this assessment, it is assumed that the building was likely designed according to the 4th Edition of the Massachusetts Building Code, which was the building code enforced in 1987. Based on this assumption, a comparison of snow, wind, and seismic loads likely used in the original design of the building versus snow, wind, and seismic loads prescribed for a Risk Category IV use by current code (9th Edition) follows.

- **Snow Loads:** The 4th Edition flat roof snow load for this location was 35 pounds per square foot (psf). The 9th Edition flat roof snow load for this location is 42 psf, resulting in an *increase* of 7 psf. The existing roof is covered with stone ballast. Removal of the stone ballast could offset this increase, which would require replacement of the roofing system. If the ballast is not removed, extensive reinforcement of the roof structure should be anticipated.

- **Wind Loads:** The 4th Edition reference wind pressure for this location was 21 psf. The 9th Edition wind pressure for this location is approximately 17 psf, resulting in a net *decrease* of 4 psf. However, lateral load design of the building will likely be governed by seismic loading (see next bullet).

- **Seismic Loads:** A comparison of seismic loads developed according to the 4th Edition versus the 9th Edition indicates a significant *increase* in seismic loading (on the order of 300%). It is very unlikely that the existing building's lateral load resisting system will be sufficient to handle this increase. While a detailed structural analysis would need to be performed in a later design phase to determine exact retrofit requirements, the following work should be anticipated at a minimum:

    - Added diagonal bracing along the perimeter of the structure where wide-flange floor and roof framing is present. Adding this bracing will likely require reinforcement of the floor/roof framing, columns, and foundations it is attached to. Adding additional columns and footings may be possible to reduce the amount of reinforcement required, but the viability of this approach would require further investigation and need to be coordinated with proposed building programming.

- The metal roof deck will also need to be analyzed for its attachment to the roof framing to resist horizontal forces imparted by the seismic loads. This will likely require that additional screws or welds be added to the roof deck. This work would be performed after the existing roofing material is removed (see "snow load" bullet).

Renovation/Alterations

Based upon discussions with HKT, Pare understands that extensive renovation and re-programming would be required for the building to be used as a public safety complex. This renovation would likely be classified as an "Alteration – Level 3" by the Massachusetts Building Code as the "work area" would exceed 50% of the aggregate area of the building. The "work area" is defined by the International Existing Building Code as "that portion or portions of a building consisting of all reconfigured spaces as indicated on the construction documents." The following structural provisions of the Massachusetts Building Code apply to "Alteration – Level 3" work:

- Existing structural elements need to be analyzed (and retrofitted or replaced as necessary) if loads supported by those elements increase by more than 5%.
  - The existing roof structure would need to be analyzed, and retrofitted if necessary, to support new mechanical rooftop equipment. As little to no equipment is currently located on the roof and any residual roof capacity would be used up by the increase in snow loads due to the "Change in Occupancy" outlined above, it should be anticipated that installation of any rooftop equipment will require retrofitting of the existing joists. Alternatively, dunnage framing (i.e. steel rooftop frames) spanning between the building columns could be constructed to support new equipment.
  - The live load capacity of the second floor framing is not known. As the current use is office, the capacity may be as little as 50 pounds per square foot (psf), which is the minimum prescribed by the building code for offices. If spaces with live loads exceeding this amount (e.g. assembly areas, storage, etc.) are necessary, they should be programmed on the first floor/ground level of the building or retrofits/reinforcements to the second floor framing may be required.
  - If significant loads are proposed for the ground level (e.g. emergency/fire truck parking, etc.), removal and replacement of the slab-on-grade with a thicker, reinforced slab may be required in these areas.
- If the area of *structural* alterations exceeds 30% of the total floor and roof areas of the building, or if overall building weight is increased by more than 10%, then the structural work would be considered a "Substantial Structural Alteration" and the building must be analyzed and retrofitted to resist current building-code prescribed wind loads and seismic loads. Note that while this bullet has been included for completeness in listing the structural provisions that could be triggered by the renovation work, a lateral load analysis and upgrade to the building would still be required for this project due to the "Change in Occupancy" even if the 30% threshold is not met.

SUMMARY

Conversion of the existing building to a public safety use will likely require extensive retrofitting of the structure due to its classification as an "essential facility". In particular, the seismic loads that the building will need to be analyzed for greatly exceed those that were likely used during the building's original design. Based on the findings and observations outlined in this memorandum, the scope of work related to the building structure is anticipated to be as follows:

- Removal of the existing stone ballast to increase the residual capacity of the roof structure to resist the larger snow loads associated with an essential facility use. This typically requires replacement of the roofing system.

- If equipment will be placed on the roof structure, the existing roof framing will likely need to be reinforced or steel dunnage framing installed to span between building columns.

- Diagonal bracing will likely need to be added to the perimeter of the building. The amount of bracing needs to be confirmed by detailed structural analysis. Addition of the bracing will likely require that existing columns and footings be reinforced or supplemental columns and footings be added for the bracing loads. The metal roof deck will also need to be analyzed for its attachment to the roof framing to resist horizontal forces imparted by the seismic loads. This will likely require that additional screws or welds be added to the roof deck. This work would be performed after the existing roofing material is removed (see bullet #1).

- The floor structure may need to be reinforced if uses with relatively heavy live load requirements are placed on the second floor (e.g gathering spaces, storage, etc.). The existing live load capacity of the floor structure is not known and would need to be confirmed with more detailed measurements and structural analyses.

- The first floor slab-on-grade may need to be locally removed and replaced if heavy equipment or vehicles (e.g. fire trucks) will be placed on it.

Note that these are preliminary findings based upon a limited/cursory visual assessment of the structure and engineering judgment. A full structural analysis of the building has not been performed and extensive further investigation would be required including: detailed measurements of the existing superstructure; destructive investigation to observe hidden structural components such as slab-on-grade thickness, column baseplates, and interior footings; and test pits performed along the exterior of the structure to observe perimeter foundation walls and footings. A geotechnical investigation should also be performed to determine soil bearing capacities both inside and outside the building. Existing structural drawings would greatly assist in the retrofit design effort and further investigation should be done to determine if they can be found. However, even if existing drawings are found, some level of investigation should still be anticipated to verify their accuracy.

ASSESSMENT LIMITATIONS

This structural assessment is meant only as a guide to understanding the current condition of the building. It is not an airtight assessment. This was a visual investigation, general in nature, limited to reasonably safe and accessible portions of the building. Destructive investigation (e.g. removal of finishes) was not performed, and not all conditions were visually accessible. The assessment is based on general observations, reasonable assumptions, professional judgment, and experience with similar structures. A structural analysis of the existing building was not performed as part of this assessment.

Please feel free to contact me with any questions.

- Kevin Champagne, P.E.
  Pare Corporation

Attachments
Table 1604.5 – 2015 International Building Code

[1]Condition Assessment Nomenclature

Good: Structural elements have little to no observed deterioration and can perform their intended function. Steel members may have some light rusting. Concrete and masonry surfaces are clean with little to no cracking or spalling. Wood is clean with no staining or mold. Plaster surfaces are firm and crack free.

Fair: Structural elements have low levels of deterioration and can perform their intended function, but may have some minor reduction in capacity. Steel members may have localized, minor corrosion. Concrete and masonry elements may have hairline cracks and localized spalling, efflorescence, and staining, but surfaces are largely intact and clear. Wood members may have some checking and localized staining/mold, but appear sound. Plaster surfaces may have some staining and minor cracking at corners, but surfaces are firm.

Poor: Structural elements show advanced section loss or deterioration and have moderate reductions in capacity. Steel members may have extensive corrosion or delamination. Concrete may exhibit large spalls and/or extensive efflorescence. Large cracks may be observed in concrete or masonry elements. Wood may be stained and/or damp with mold and/or small areas of rot. Vertical elements may be out of plumb and have lost veneer elements. Floors/roofs may have rotted/missing finishes and/or are easily deflected.

tude to identify specific facilities that should be considered essential in responding to various types of emergencies. These could include structures that would not otherwise be included in this risk category. This designation would only be made with consideration of broader public policy, as well as emergency preparedness planning within the jurisdiction in question. The reasons for including facilities, such as hospitals, fire stations, police stations, emergency response operations centers, etc., should be self-evident. Some items warranting additional discussion are as follows:

- *Designated emergency shelters and designated emergency response facilities.* These items repeat the term "designated," which is referring to designation by the building official that the facilities have been identified as necessary for sheltering evacuees or responding to emergencies (see discussion of "designated" above). For example, an elementary school hav-

TABLE 1604.5
RISK CATEGORY OF BUILDINGS AND OTHER STRUCTURES

RISK CATEGORY	NATURE OF OCCUPANCY
I	Buildings and other structures that represent a low hazard to human life in the event of failure, including but not limited to: • Agricultural facilities. • Certain temporary facilities. • Minor storage facilities.
II	Buildings and other structures except those listed in Risk Categories I, III and IV.
III	Buildings and other structures that represent a substantial hazard to human life in the event of failure, including but not limited to: • Buildings and other structures whose primary occupancy is public assembly with an occupant load greater than 300. • Buildings and other structures containing Group E occupancies with an occupant load greater than 250. • Buildings and other structures containing educational occupancies for students above the 12th grade with an occupant load greater than 500. • Group I-2 occupancies with an occupant load of 50 or more resident care recipients but not having surgery or emergency treatment facilities. • Group I-3 occupancies. • Any other occupancy with an occupant load greater than 5,000.[a] • Power-generating stations, water treatment facilities for potable water, wastewater treatment facilities and other public utility facilities not included in Risk Category IV. • Buildings and other structures not included in Risk Category IV containing quantities of toxic or explosive materials that: Exceed maximum allowable quantities per control area as given in Table 307.1(1) or 307.1(2) or per outdoor control area in accordance with the *International Fire Code*; and Are sufficient to pose a threat to the public if released.[b]
IV	Buildings and other structures designated as essential facilities, including but not limited to: • Group I-2 occupancies having surgery or emergency treatment facilities. • Fire, rescue, ambulance and police stations and emergency vehicle garages. • Designated earthquake, hurricane or other emergency shelters. • Designated emergency preparedness, communications and operations centers and other facilities required for emergency response. • Power-generating stations and other public utility facilities required as emergency backup facilities for Risk Category IV structures. • Buildings and other structures containing quantities of highly toxic materials that: Exceed maximum allowable quantities per control area as given in Table 307.1(2) or per outdoor control area in accordance with the *International Fire Code*; and Are sufficient to pose a threat to the public if released.[b] • Aviation control towers, air traffic control centers and emergency aircraft hangars. • Buildings and other structures having critical national defense functions. • Water storage facilities and pump structures required to maintain water pressure for fire suppression.

a. For purposes of occupant load calculation, occupancies required by Table 1004.1.2 to use gross floor area calculations shall be permitted to use net floor areas to determine the total occupant load.

b. Where approved by the building official, the classification of buildings and other structures as Risk Category III or IV based on their quantities of toxic, highly toxic or explosive materials is permitted to be reduced to Risk Category II, provided it can be demonstrated by a hazard assessment in accordance with Section 1.5.3 of ASCE 7 that a release of the toxic, highly toxic or explosive materials is not sufficient to pose a threat to the public.

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SITE FEASIBILITY STUDY

PARE PROJECT NO. 19140.00

SITE FEASIBILITY STUDY

TOWN OF BOXBOROUGH
PUBLIC SAFETY FACILITY
BOXBOROUGH, MASSACHUSETTS

PREPARED FOR:

HKT Architects
24 Roland Street, Suite 301
Charlestown, MA 02129

OCTOBER 2019

TABLE OF CONTENTS

Introduction

The intent of this site feasibility study is to evaluate for the feasibility of developing a new Public Safety Facility in the Town of Boxborough, Massachusetts. As requested by HKT Architects (HKT), the properties included with this feasibility level evaluation is as follows:

- Existing Office Building, 1300 Massachusetts Avenue, Boxborough Massachusetts (Site).
- Existing appurtenant uses (septic system and fire pond) on adjacent parcel.*

* Note: This feasibility study includes evaluation of the existing building site. It is assumed that no development will occur on the adjacent parcel which contains the existing septic system and existing fire pond. Evaluation of this parcel was limited to a review of the infrastructure contained therein to support the existing facility located at 1300 Massachusetts Avenue.

Based on the findings contained herein, a constraints map has been included as Figure 1. This constraints map denotes the various jurisdictional areas, regulatory boundaries, and additional pertinent information reviewed as part of this feasibility study.

The methodology for obtaining the information within this feasibility level site evaluation included the comprehensive review of the following resources:

- Massachusetts Geographic Information System (MassGIS)/Boxborough Geographic Information System (Boxborough GIS) data layers, accessed on October 15, 2019;
- Town of Boxborough Tax Assessor's database, accessed on October 15, 2019;
- MACRIS Maps 2.0 Beta historical inventory, accessed October 15, 2019;
- NRCS Web Soil Survey, accessed on October 15, 2019;
- Boxborough Conservation Commission Regulations for Wetland Bylaw, Revised November 17, 2004;
- Boxborough Planning Board Site Plan Approval Rules and Regulations, Revised April 11, 2011;
- Boxborough Stone Walls Bylaw (No Date);
- Boxborough Significant Aquifers Areas Map, Revised September 1981;
- Boxborough Planning Board Scenic Road, Public Shade Tree, and Stone Wall Removal or Alteration Application (No Date);
- Boxborough Wireless Overlay District Map (No Date);

- Town of Boxborough Zoning Bylaw, Revised September 2018;
- Town of Boxborough Zoning Map, Dated May 2018;
- Flood Insurance Rate Map, Middlesex County MA Panel 331 of 656, Map number 25017C0331F, Revised July 7, 2014;
- Town of Boxborough Patriot Property Record Cards 13 021 000 and 12 020 000;
- National Grid Gas Map J535, received via email on October 15, 2019;
- As-Built Plan of Land at 1300 Massachusetts Avenue Boxborough MA, Prepared by Beals and Thomas Inc., Dated November 17, 1987;
- Nashoba Associated Boards of Health Sewage Disposal Works Construction Permit, Owner Munn/Hines Co., Located at Burroughs Rd. and Rte. 111 Lots 110 and 135, Dated April 2, 1985;
- Title 5 Official Inspection Form for 1300 Massachusetts Avenue, Dated October 16, 2001;
- Subsurface Sewage Disposal System Plan and Profile, Prepared by Beals and Thomas Inc., Dated August 17, 1984;
- Subsurface Sewage Disposal System Detail, Prepared by Beals and Thomas Inc., Dated August 17, 1984;
- Subsurface Sewage Disposal System, Prepared by Beals and Thomas Inc., Dated August 17, 1984;
- Source Water Assessment Program (SWAP) Report for Kurian Limited Partnership, Dated July 3, 2001;

This feasibility level evaluation excludes the following:

- In-person site reconnaissance;
- Hazardous materials identification and evaluation of any type;
- Capacity analysis for existing utilities;
- Existing conditions of existing utilities (including operability of well pumps, fire pumps, and septic systems);
- Analysis of existing traffic conditions;
- Historic/previous site development; and
- Any information not provided by the resources identified herein.

SITE EVALUATION

Pare evaluated the feasibility of development at the Site provided by HKT. The existing conditions and constraints at the Site are described in this section of the report. A structural review of the existing building located on the Site was performed by Pare Corporation, and is contained under separate cover.

EXISTING OFFICE BUILDING, 1300 MASSACHUSETTS AVENUE

The Site at 1300 Massachusetts Avenue is comprised of a single parcel currently owned by Drake G Behrakis and C/O Meredith and Drew, Inc., according to the Boxborough Assessor's Database. The 7.06 acre (307,534 square foot) parcel identified as Map 13, Parcel 021 000 in the Boxborough Assessor's Database includes the existing office building. The adjacent parcel directly across Burroughs Road to the east, identified as Map 13, Parcel 020-000 (13-020-000) in the Boxborough Assessor's Database, contains the Site's septic system and fire pond. Records indicate that this parcel is also owned by Drake G Behrakis and C/O Meredith and Drew, Inc. The adjacent parcel (13-020-000) is 11.14 acres (485,258 square feet) and is otherwise undeveloped.

The Boxborough Zoning Map (Revision: May 2018) indicates that the property is located within the Office Park (OP) District. The Site is currently developed with a 60,000 square foot, 2-story office building and its associated parking lot. The office building is located on the northern portion of the Site, and the parking lot is located immediately south of the existing building. The Site is bounded by Massachusetts Avenue to the north, Burroughs Road to the east, residential property to the south, and wetlands to the west.

The Site is generally flat with the topography gently sloping down towards Massachusetts Ave to the north and Burroughs Rd to the east. The grassed lawn at the northern edge of the site slopes down to the north and the parking area slopes down from the southwest edge to the northeast edge. Based on available MassGIS data, no wetlands, streams, surface water protection areas, vernal pools, or flood plains were identified on the Site. Beaver Brook flows through the adjacent parcel (13-020-000), with the existing septic system pumped under the river to an upland east of Beaver Brook.

The 200-foot Riverfront Area associated with the Beaver Brook encroaches into the east side of the

Site, and the 200-foot Riverfront Area associated with an unnamed stream encroaches into the west side of the Site. Based on USGS topography map located in Appendix E, both streams are mapped and therefore considered perennial streams. Wetlands are present in the parcels east and west of the Site and have associated 100-foot buffers that encroach into the Site. Based on available MassGIS data maps, there are no known Natural Heritage and Endangered Species Program (NHESP) mapped habitat onsite.

According to NRCS Web Soil Survey mapping, the Site contains Woodbridge fine sandy loam, 3 to 8 percent slopes (310B). Woodbridge fine sandy loam has a dual hydrologic soil group C/D, where the soil is in group C in its drained condition and group D in its undrained condition. Note that soils are only assigned to a dual hydrologic soil group when their natural condition is in group D. Group C soils have a slow rate of water transmission, and group D soils have a very slow rate of water transmission. It is anticipated that further geotechnical investigation including test pits and soil borings will be required prior to future development of the Site. Refer to Appendix D of the report for further soils information.

Based on available aerial imagery and street imagery, existing impervious area onsite appears to be in good condition with no cracking and minimal patching observed. Parking striping appears to be fairly recent, although curbing appears worn and partially deteriorating. Existing vehicular access to the Site is limited to a single two-way driveway on Burroughs Road.

Based on available street imagery, discussion with Littleton Municipal Electric Light Co (which provides service in this area), and as-builts of the Site, electricity appears to be supplied to the existing office building via overhead wires along Massachusetts Ave. The overhead wires connect to a meter pole at the northwest corner of the site, after which the wires run underground to a pad mounted transformer west of the building and then into the building. The light poles in the parking lot are powered by an electric line that runs underground out of the southwest corner of the building. According to as-builts and street imagery, telecommunications is also supplied to the building from the same overhead wires on Massachusetts Ave. The telecommunications lines run underground to the north side of the building from a riser pole at the northern property line. As-builts of the Site are included in Appendix G.

According to mapping provided by National Grid Gas, a 4" carbon steel (CS) natural gas main line runs under Massachusetts Avenue. Connections from the natural gas main on Massachusetts Ave to the building are not shown on the as-built or on the provided mapping; it is unknown if the building has a current connection to the main.

According to records and as-builts provided by the Town, the existing office building receives its water supply from a pair of non-transient, non-community wells located under the existing parking lot (MassDEP IDs 2037020-01G and 2037020-02G). A Zone 1 wellhead protection zone is located around these well sources. Location of this protection zone is shown on the constraints map. According to email correspondence between the Town regarding DEP data, it is suspected that only Well 1 has been in service since 2009. The well's 2019 Drinking Water Quality Report listed lead as above the 0.015 ppb MassDEP action level; however, the report notes that the source water is lead-free and may be as a result of the interior plumbing. Further review should be considered to assess whether the current system will support the proposed uses onsite. A review of the source of lead should be considered. Testing to determine the existing well yield should also be considered.

Regarding fire protection, there are two fire hydrants located on the Site, one at the northeast corner of the Site on Burroughs Rd and one on the western edge of the parking area. Additionally, a fire pond, pump house, and access point are present adjacent to the Site within the parcel on the eastern side of Burroughs Rd. The pump house serves the hydrants onsite. Pare did not evaluate the operability of the pump or assess the condition of the pump house. Pare recommends a review of service records provided by the existing Owner, if available.

According to records and as-builts provided by the Town, the existing office building is served by a septic system. Sewer service lines from the office building connect into a 9000 gallon septic tank at the southern edge of the building, which in turn, flows by gravity into a pump station and valve chamber on the eastern side of Burroughs Rd. A pair of 4" PVC force mains convey wastewater under Beaver Brook and a second unnamed brook to a pair of d-boxes and leaching field. The pump station, valve chamber, force main, and leaching field are all located on parcel 13-020-000, 1223 Massachusetts Avenue. A copy of the existing septic plan was obtained from the Town for review. This plan is included in Appendix H.

According to the 2001 Title-V inspection report, the septic system is designed for 4,500 gallons per day (gpd), using a basis of 75 gallons per 1000 square feet (sqft). While proposed occupancy and uses are currently undetermined, Title-V lists approximately 150 gpd per bed under institutional uses (assisted living/nursing). The 4,500 gpd system would support 30 full-time personnel under this loading, not accounting for additional load from part-time staff, visitors, or other uses. Note that the septic system is approximately 32 years old and approaching the end of a typical septic system's life cycle. While the condition of the system is unknown until a current Title-V inspection is performed, replacement of the system should be considered and accounted for during planning stages.

According to as-built mapping, stormwater is directed from the parking lot via overland flow to a series of catch basins at the eastern and northern edges of the lot. Runoff captured by these catch basins are conveyed through drainage piping and manholes, to an outfall into the fire pond east of the Site. The building also appears to have a drainage line running from the eastern edge of the building to the fire pond, presumably a connection to the roof drain. Based on the Site's topography, overland flow from the northern grassed area flows to the western wetlands and towards Massachusetts Ave.

Based on MACRIS mapping and data, the Site is adjacent to several historic inventoried properties. BXB31 and 32, located north of the Site at 8 Hill Road, contain the Captain Oliver Taylor House and Captain Oliver Taylor Barn/Milk Shed. Located further north of the Site is the Boxborough District Schoolhouse at 45 Hill Road. Refer to Appendix E of the report for information related to these inventoried properties.

Based on review of available street imagery, there is concern about intersection sight lines when exiting Burroughs Road and turning onto Massachusetts Ave. While a traffic signal may not be warranted from the perspective of traffic congestion, a signal may be warranted for safety purposes. A traffic study is recommended for future planning, especially when considering additional accesses to the Site.

PERMITTING

Based on the location Site evaluated, there are multiple permits that may be required at the local, state, and federal levels for future development of the Site. Review periods are assumed and may vary. The local permitting information was compiled from the Boxborough Zoning By-laws and

Wetland Regulations. The Site is located in the Office Park (OP) District and the adjacent property (13-020-000) to the east is located in the Industrial-Commercial (IC) District, as shown on the Town of Boxborough Zoning map. Site dimensional constraints are defined in Table 1.

Per Section 5000

Table 1: Schedule of Dimensional Requirements

	Min Lot Area (Sq. Ft.)	Min Lot Width (Foot)	Min Lot Frontage (Foot)	Minimum Setbacks (foot)			Expressed as % of Lot Area		
				Front	Side	Rear	Min. Upland Lot area	Max Floor Area Ratio	Lot Coverage by Impervious
Site: 1300 Mass. Ave. (OP)	160,000	125	200	50	50	50	20%	10% (0.1)	30%
Eastern property: 1223 Mass Ave. (IC)	80,000	125	200	50	50	50	20%	10% (0.1)	30%

Per the Zoning Bylaw Section 4003 (3) Use Regulations, governmental uses are permitted within the Office Park (OP) and Industrial Commercial (IC) districts.

Per the Zoning Bylaw Section 6006 Off-Street Parking Requirements table, minimum parking requirements for governmental buildings is “One (1) space for every 250 square feet of gross floor area.” The as-built plan shows 208 existing parking spaces, including 6 accessible parking spaces. If the existing 60,000 sqft building is used in its entirety for governmental purposes, 240 spaces are required. For a site with between 201 and 300 parking spaces the Americans with Disabilities Act (ADA) requires 7 accessible parking spaces. Any additions contemplated may increase the number of parking spaces required by this Bylaw Section, making this requirement further non-conforming.

Per the Zoning Bylaw Section 6007 Off-Street Loading Requirements table, minimum off-street loading requirements for “uses occupying greater than 5,000 sq. ft. not normally handling goods in large quantities including hospitals, office buildings, restaurants, auditoria, hotels, motels, funeral homes and similar uses” is “One space for buildings of 5,000 - 50,000 sq. ft. gross floor area and one bay per each additional 50,000 sq. ft. gross floor area or fraction thereof.” Note that further assessment of parking requirements will be required once the building’s use or uses has been determined.

Per the Zoning Bylaw Section 6200, In any Business, Office Park, or Industrial-Commercial District, the required front yard setback may not be used for parking. A landscaped area shall be required for at least the depth of the front yard setback beginning at the street line and extending the full length of the frontage uninterrupted except for permitted entrance and exit drives. Screening is required for parking and loading areas, storage of commercial vehicles, and open lot storage. Screening shall consist of natural materials three feet high at the time of planting and growing to five feet, or a wall or fence not more than 8 feet high.

PLANNING BOARD

Site Plan Approval

Per the Zoning Bylaw Section 8000 Site Plan Approval and Design Review, this project will be subject to a site plan approval by the Boxborough Planning Board based on its requirement for site plan approval for institutional purposes. Further, Section 8002 requires site plan approval for "….municipal…purposes." No permit for construction, exterior alteration, relocation, occupancy, or change in use of any building or lot that results in the substantial alteration of an existing building or lot shall be given and no existing use shall be extended unless site plan approval has been granted by the Planning Board. After a complete application for site plan approval is submitted to the Planning Board, the review process is estimated to take approximately 2 months depending on public notice and additional information requirements. An applicant may also request a pre-application conference with the board. A pre-application conference is not legally binding nor will it alter the legally required schedule for site plan approval.

Special Permits

Burroughs Road is designated as a Scenic Road by the Boxborough Planning Board per the Boxborough Scenic Road Application form located in Appendix E. After a road has been designated as a Scenic Road, any repair, maintenance, reconstruction, or paving work done with respect thereto shall not involve or include the cutting or removal of trees, or the tearing down or destruction of stone walls, or portions thereof, except with the prior written consent of the Planning Board. Per the Boxborough Stone Walls Bylaw, prior written approval must also be given by the Planning Board for the removal, tearing down, or destruction of stone walls or portions thereof within or on the boundary of any Town Way. Note that Massachusetts Avenue is listed as Minor Arterial Road on the MassDOT

Road Inventory, and would not fall under stone walls bylaw.

TOWN MEETING

As part of the Site Plan Approval process, a public hearing will be held within 35 days of the submission of the Site Plan Review application per section 3.5 of the Site Plan Approval Rules and Regulations. Notice of the time and place as well as the subject matter shall be given by Board in a paper of general circulation in the Town of Boxborough once the first notice being not less than 7 days before the day of such hearing.

CONSERVATION COMMISSION

Based on available MassGIS data, wetland and riverfront resource areas are present onsite. Any activity proposed within one of these resource areas is regulated by the Boxborough Conservation Commission and will require review and approval under the jurisdiction of Massachusetts Wetlands Protection Act and Boxborough Wetlands Bylaw.

If development occurs within jurisdictional resource areas, submission of a Notice of Intent (NOI) to the Boxborough Conservation Commission and Massachusetts Department of Environmental Protection (Mass DEP) will be required. Delineation of jurisdictional resource areas will be required at all three sites prior to future development.

After a completed NOI is filed with the Commission, the project will be reviewed at a public hearing. Per the Boxborough Wetlands Protection Bylaw Rules and Regulations, Section 3, the public hearing will be held within 21 calendar days of receipt of the NOI. Permitting will likely require attendance at one hearing prior to closing. Written order from the Conservation Commission will be issued within 21 days of the hearing. It is anticipated that the permitting process with the Commission would take approximately 1-2 months.

The Site is outside of FEMA floodplains. A copy of the FEMA Firmette is included in Appendix C.

DEPARTMENT OF PUBLIC WORKS

Future development will likely require trench and street opening permits through the Boxborough Department of Public Works (DPW). Such permits are typically obtained immediately before the start of construction, and obtained by the Selected Contractor.

BUILDING DEPARTMENT

No building permit shall be issued by the Inspector of Buildings without the written approval of a site plan by the Planning Board, where applicable, or unless thirty (30) days lapse from the date of the close of the public hearing without action by the Planning Board. No permit or license shall be granted for a use of a building, structure or land unless such use shall conform in all respects with all Boxborough Zoning Bylaw Section 9000 provisions.

FIRE DEPARTMENT / POLICE DEPARTMENT

Future development of a public safety facility will require coordination with the Boxborough Fire Department and Police Department. Once a schematic design is developed, a meeting with the Boxborough Fire Chief and Police Chief should be arranged to review emergency vehicle accessibility, hydrant locations, and fire safety.

MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION (MASS DEP)

Future development of a public safety facility will be required to meet the 2008 Stormwater Management Guidelines. Submissions will be made to the Boxborough Planning Board, Conservation Commission, and Mass DEP, the jurisdictional entities for these guidelines.

Due to the two wells in the parking area, the Site contains both Zone I wellhead protection areas and IWPAs. Per the 2001 Source Water Assessment Program (SWAP) Report for the Site, systems not meeting DEP Zone I requirements must get DEP approval and address Zone I issues prior to increasing water use or modifying systems. Per 310 CMR 22.21(5), the Department may grant a variance if the Department finds that strict compliance with such requirements would result in an undue hardship and would not serve to further the intent of 310 CMR 22.21.

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)

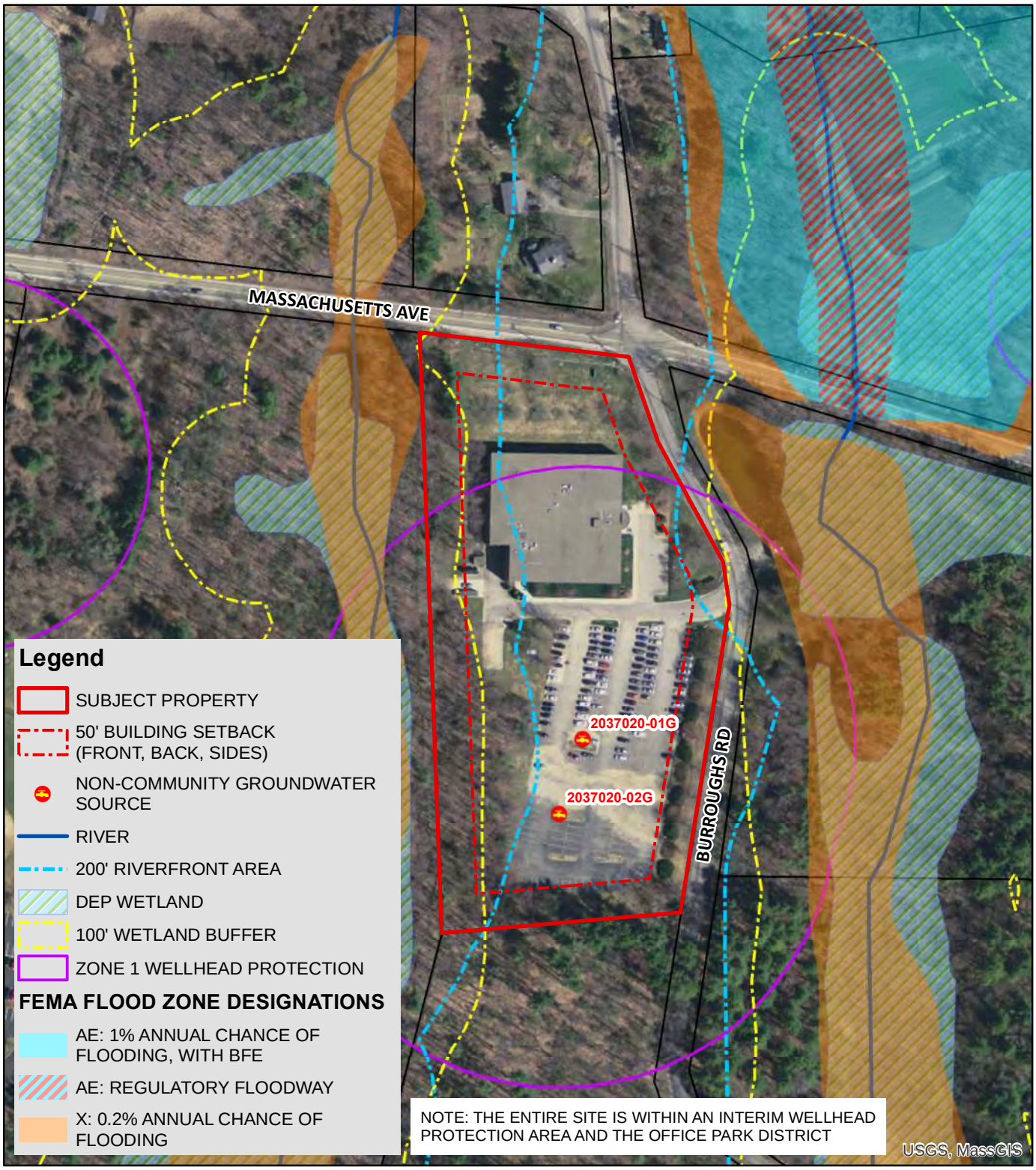
Development of a public safety facility will likely require filing of a NPDES construction general permit with the EPA, as it is anticipated that more than one acre of land will be disturbed. The Contractor awarded the contract is typically responsible for filing the NPDES General Permit and preparing a project specific Stormwater Pollution Prevention Plan.

MASSACHUSETTS ENVIRONMENTAL POLICY ACT (MEPA)

It is not anticipated that the future development of a public safety facility will trigger MEPA thresholds; however potential triggers that would require filing of an Environmental Notification Form and Environmental Impact Report will be monitored as the design progresses. If MEPA review is required, MEPA requires applications to be submitted one year prior to construction. MEPA submission will include approved Schematic Design plans. MEPA review thresholds are detailed in 301 CMR 11.00, section 11.03, and include thresholds for land, state listed species, wetlands, waterways, tidelands, water, wastewater, transportation, energy, solid and hazardous waste, historical and archeological resources, areas of critical environmental concern, and regulations.

FIGURES:

Site Constraints Map



MASS GIS

SITE CONSTRAINTS

SCALE:1"=200'

N
W E
S

8 BLACKSTONE VALLEY PLACE
LINCOLN, RI 02865
(401) 334-4100

10 LINCOLN ROAD, SUITE 210
FOXBORO, MA 02035
(508) 543-1755

PARE PROJECT No. 19140.00 OCTOBER 2019

1300 MASSACHUSETTS AVENUE
BOXBOROUGH, MA

APPENDIX A:

Zoning Map

Town of Boxborough
Massachusetts
May 2018

N
W E
S

1,000 500 0 1,000 Feet

Zoning Districts

- AGRICULTURAL-RESIDENTIAL
- BUSINESS
- BUSINESS-1
- INDUSTRIAL-COMMERCIAL
- OFFICE PARK
- RESIDENTIAL-1
- TOWN CENTER

APPENDIX B:

Property Records

13	021	000	1 of 1	INDUSTRIAL
MAP	LOT	BLOCK	CARD	*Boxborough*

	Total Card	/	Total Parcel
APPRAISED:	4,269,100	/	4,269,100
USE VALUE:	4,269,100	/	4,269,100
ASSESSED:	4,269,100	/	4,269,100

PROPERTY LOCATION

No	Alt No	Direction/Street/City
1300		MASSACHUSETTS AVENUE, BOXBO

OWNERSHIP

Unit #:

Owner 1:	BEHRAKIS DRAKE G.
Owner 2:	C/O MEREDITH AND GREW, INC.
Owner 3:	BOXMASS TRUST
Street 1:	160 FEDERAL STREET
Street 2:	
Twn/City:	BOSTON
St/Prov:	MA Cntry Own Occ: I
Postal:	02110 Type:

PREVIOUS OWNER

Owner 1:	BER TECH BOXBOROUGH LLC -
Owner 2:	C/0 BERKELEY INVESTMENTS INC -
Street 1:	121 HIGH ST
Twn/City:	BOSTON
St/Prov:	MA Cntry
Postal:	02110

NARRATIVE DESCRIPTION

This parcel contains 7.06 ACRES of land mainly classified as R+D BLD with a R+D Building built about 1987, having primarily BRICK VENR Exterior and 59925 Square Feet, with 7 Units, 0 Bath, 0 3/4 Bath, 4 HalfBaths, 0 Rooms, and 0 Bdrm.

OTHER ASSESSMENTS

Code	Descrip/No	Amount	Com. Int

PROPERTY FACTORS

Item	Code	Description	%	Item	Code	Description
Z	OP	OP	100	water	9	ART WL
o				Sewer	A	SEPTIC
n				Electri		
Census:				Exmpt		
Flood Haz:						
D				Topo		
s				Street	PT	PAVED TW
t				Gas:	5	HEAVY

IN PROCESS APPRAISAL SUMMARY

Use Code	Land Size	Building Value	Yard Items	Land Value	Total Value
404	7.060	3,582,000	50,900	636,200	4,269,100
Total Card	7.060	3,582,000	50,900	636,200	4,269,100
Total Parcel	7.060	3,582,000	50,900	636,200	4,269,100

Source: Market Adj Cost | Total Value per SQ unit /Card: 71.24 | /Parcel 71.24

Legal Description

User Acct

GIS Ref

GIS Ref

Insp Date

08/21/17

Entered Lot Size	
Total Land:	7.06
Land Unit Type:	AC

PREVIOUS ASSESSMENT

Parcel ID 13-021-000

Tax Yr	Use	Cat	Bldg Value	Yrd Items	Land Size	Land Value	Total Value	Asses'd Value	Notes	Date
2017	340	FV	3,986,900	67500	7.06	636,200	4,690,600		Year End Roll	12/6/2016
2016	340	FV	4,035,400	68200	7.06	636,200	4,739,800		Year end	1/6/2016
2015	340	AB	3,521,600	68200	7.06	627,700	4,217,500			4/6/2015
2015	340	FV	3,802,200	68200	7.06	671,000	4,541,400	4,541,400	Year End Roll	12/12/2014
2014	340	FV	3,587,200	68200	7.06	671,000	4,326,400	4,326,400	Year End Roll	1/22/2014
2013	340	FV	3,395,700	68200	7.06	671,000	4,134,900	4,134,900		10/22/2012
2012	340	FV	3,161,800	60400	7.06	1,317,500	4,539,700	4,539,700	Year End	11/30/2011
2011	340	FV	3,155,900	57300	7.06	1,311,700	4,524,900	4,524,900		9/14/2010

!581!

PRINT

Date	Time
09/25/17	14:18:26

LAST REV

Date	Time
08/21/17	16:44:12

apro

581

SALES INFORMATION

TAX DISTRICT

PAT ACCT.

Grantor	Legal Ref	Type	Date	Sale Code	Sale Price	V	Tst	Verif	Notes
BER TECH BOXBOR	35823-379	Q	7/2/2002	PORTION/ASSE	7,900,000	No	No		
KURIAN LP	31149/399		2/18/2000	PORTION/ASSE	9,850,000	No	No		
	17639/166		12/5/1986	OTHER	1,000,000	Yes	No		

BUILDING PERMITS

Date	Number	Descrip	Amount	C/O	Last Visit	Fed Code	F. Descrip	Comment
7/2/2013	20140002	INT ALTE	104,055	C				
8/2/2012	20130015	MISC		C				
7/20/2011	20120012	INT ALTE	449,000	C				TENANT FITUP
3/23/2010	OP20100068	OCC PERM						
1/5/2010	20100068	INT ALTE	1,065,750	C				
1/18/2008	20080064	INT ALTE	150,000	C				TENANT FIT-UP-NEW
10/18/2005	20060045	INT ALTE	120,000	C				TENANT FIT-UP
4/18/2005	20050129	INT ALTE	80,000	C				DEMO WALLS, CONSTR
12/23/2004	20050090	INT ALTE	152,700	C				5300 S.F. FITUP
12/27/2002	20030088	INT REMO	3,000	C				ERECT OFFICE PARTI

ACTIVITY INFORMATION

Date	Result	By	Name
8/21/2017	MEAS&INSPECT	185	CHRIS KEEFE
5/25/2013	PERMIT EXT	538	WILL NASER
1/30/2012	PERMIT EXT	105	DUANE ADAMS
6/6/2011	PERMIT INT	105	DUANE ADAMS
4/5/2010	PERMIT INT	105	DUANE ADAMS
8/17/2009	MEAS&INSPECT	105	DUANE ADAMS
1/1/2006	ABATEMENT	999	COLLEEN W
1/1/2005	ABATEMENT	999	COLLEEN W
9/13/2002	MEAS&INSPECT	185	CHRIS KEEFE

Sign: VERIFICATION OF VISIT NOT DATA __/__/__

USER DEFINED

Prior Id # 1:	02-2-135
Prior Id # 2:	0
Prior Id # 3:	
Prior Id # 1:	
Prior Id # 2:	
Prior Id # 3:	
Prior Id # 1:	
Prior Id # 2:	
Prior Id # 3:	
ASR Map:	
Fact Dist:	
Reval Dist:	
Year:	
LandReason:	
BldReason:	
CivilDistrict:	
Ratio:	

LAND SECTION (First 7 lines only)

Use Code	Description	LUC Fact	No of Units	Depth / PriceUnits	Unit Type	Land Type	LT Facto	Base Value	Unit Price	Adj	Neigh	Neigh Influ	Neigh Mod	Infl 1	%	Infl 2	%	Infl 3	%	Appraised Value	Alt Class	%	Spec Land	J Code	Fact	Use Value	Notes
404	R+D BLD		160000		SQUARE FE	SITE		0	3.5	1.00	C2									560,000						560,000	
404	R+D BLD		3.3869		ACRES	EXCESS		0	22,500.	1.00	C2									76,205						76,200	

Total AC/HA:	7.05999	Total SF/SM:	307533	Parcel LUC:	404	R+D BLD	Prime NB Desc	C2	Total:	636,205	Spl Credi		Total:	636,200

EXTERIOR INFORMATION

Type:	73 - R+D		
Sty Ht:	2 - 2		
(Liv) Units:	7	Total:	7
Foundation:	6 - SLAB		
Frame:	2 - STEEL		
Prime Wall:	8 - BRICK VENR		
Sec Wall:			%
Roof Struct:	4 - FLAT		
Roof Cover:	11 - MEMBRANE		
Color:	BRICK		
View / Desir			

GENERAL INFORMATION

Grade:	B - GOOD		
Year Blt:	1987	Eff Yr Blt:	
Alt LUC:		Alt %:	
Jurisdict:		Fact:	.
Const Mod:			
Lump Sum Adj:			

INTERIOR INFORMATION

Avg Ht/FL:	STD		
Prim Int Wal	1 - DRYWALL		
Sec Int Wall			%
Partition:	T - TYPICAL		
Prim Floors:	4 - CARPET		
Sec Floors:			%
Bsmnt Flr:			
Subfloor:			
Bsmnt Gar:			
Electric:	1 - EXTENSIVE		
Insulation:	2 - TYPICAL		
Int vs Ext:	S		
Heat Fuel:	2 - GAS		
Heat Type:	1 - FORCED H/A		
# Heat Sys:	1		
% Heated:	100	% AC:	100
Solar HW:	NO	Central Vac:	NO
% Com Wal		% Sprinkled	100

BATH FEATURES

Full Bath		Rating:	
A Bath:		Rating:	
3/4 Bath:		Rating:	
A 3QBth		Rating:	
1/2 Bath:	4	Rating:	VERY GOOD
A HBth:		Rating:	
OthrFix:	22	Rating:	VERY GOOD

OTHER FEATURES

Kits:		Rating:	
A Kits:		Rating:	
Frpl:		Rating:	
WSFlue:		Rating:	

CONDO INFORMATION

Location:	
Total Units:	
Floor:	
% Own:	
Name:	

DEPRECIATION

Phys Cond:	AV - Average	27.	%
Functional:			%
Economic:			%
Special:			%
Override:			%
Total:		27	%

CALC SUMMARY

Basic $ / SQ:	65.00
Size Adj.:	0.85006261
Const Adj.:	1.05017972
Adj $ / SQ:	58.027
Other Features:	116644
Grade Factor:	1.35
NBHD Inf:	1.00000000
NBHD Mod:	
LUC Factor:	1.00
Adj Total:	4861390
Depreciation:	1312575
Depreciated Total:	3548815

COMMENTS

1BLDG-1SEC-4GRPS //2-2007, TRUSTEE NAME CHANGE. 3-2008 MEREDITH & GREW, MANAGERS.

RESIDENTIAL GRID

1st Res Grid	Desc:		# Units	

Level	FY	LR	DR	D	K	FR	RR	BR	FB	HB	L	O
Other												
Upper												
Lvl 2												
Lvl 1												
Lower												

Totals	RMs:		BRs:		Baths:		HB	4

REMODELING

Exterior:	
Interior:	
Additions:	
Kitchen:	
Baths:	
Plumbing	
Electric:	
Heating:	
General:	

RES BREAKDOWN

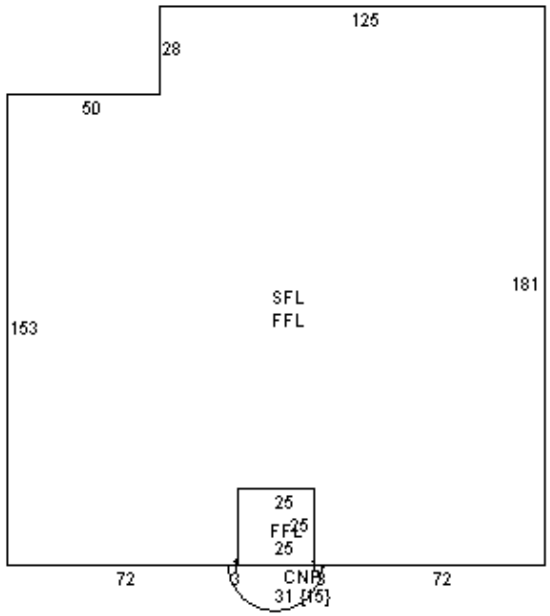
No Unit	RMS	BRS	FL
Totals			

COMPARABLE SALES

Rate	Parcel ID	Typ	Date	Sale Price

WtAv$/SQ:		AvRate	Ind.Val
Juris. Factor:		Before Depr	78.34
Special Features:	33200	Val/Su Net:	59.39
Final Total:	3582000	Val/Su SzA	59.77

SKETCH



SUB AREA

Code	Description	Area - SQ	Rate - AV	Undepr Value
FFL	1ST FLOOR	30,275	58.030	1,756,758
SFL	2ND FLOOR	29,650	58.030	1,720,492
CNP	CANOPY	393	18.160	7,136

Net Sketched Area:	60,318	Total:	3,484,386
Size Ad	59925	Gross Are	60318	FinAre	59925
---	---	---	---	---	---

SUB AREA DETAIL

Sub Area	% Usbl	Descrip	% Type	Qu	# Ten

MOBILE HOME

Make:		Model:		Serial #		Year:		Color:	

SPEC FEATURES/YARD ITEMS

Code	Description	A	Y/	Qty	Size/Dim	Qual	Con	Year	Unit Price	D/	Dep	LUC	Fact	NB F	Appr Value	JCo	JFac	Juris. Value
85	PAVING	A	Y	1	65000	G	GD	1987	1.27	T	43	404			47,000			47,000
91	LOAD LEV	M	S	1	2	G	GD	1987	2,760.00	B	27	404			4,000			4,000
77	LITE-SIN	D	Y	1	4	G	GD	1987	431.25	T	43	404			1,000			1,000
78	LITE-DBL	D	Y	1	4	G	GD	1987	603.75	T	43	404			1,400			1,400
83	SIGN	D	Y	1	36	A	AV	1987	23.09	T	50	404			400			400
84	SIGN-ILU	D	Y	1	20	G	GD	1987	42.77	T	43	404			500			500
61	ELEV-PAS	D	S	1	2	A	AV	1987	20,000.00	B	27	404			29,200			29,200
86	CONC PAV	D	Y	1	20X30	A	FR	1987	2.33	T	55	404			600			600

PARCEL ID

13-021-000

IMAGE

AssessPro Patriot Properties, Inc

More:	N	Total Yard Items:	50,900	Total Special Featues:	33,200	Total:	84,100

13	020	000	1 of 1	Boxborough
MAP	LOT	BLOCK	CARD	

	Total Card	/	Total Parcel
APPRAISED:	155,700	/	155,700
USE VALUE:	155,700	/	155,700
ASSESSED:	155,700	/	155,700

PROPERTY LOCATION

No	Alt No	Direction/Street/City
1223		MASSACHUSETTS AVENUE, BOXBO

OWNERSHIP

Unit #:

Owner 1:	BEHRAKIS DRAKE G
Owner 2:	C/O MEREDITH AND GREW, INC.
Owner 3:	BOXMASS TRUST
Street 1:	160 FEDERAL STREET
Street 2:	
Twn/City:	BOSTON
St/Prov:	MA Cntry: Own Occ:
Postal:	02110 Type:

PREVIOUS OWNER

Owner 1:	BER TECH BOXBOROUGH LLC -
Owner 2:	CO BERKELEY INVESTMENTS INC -
Street 1:	121 HIGH ST
Twn/City:	BOSTON
St/Prov:	MA Cntry:
Postal:	02110

NARRATIVE DESCRIPTION

This Parcel contains 11.14 ACRES of land mainly classified as UNDEV

OTHER ASSESSMENTS

Code	Descrip/No	Amount	Com. Int

PROPERTY FACTORS

Item	Code	Description	%	Item	Code	Description
Z	C	C	100	water	9	ART WL
o				Sewer	A	SEPTIC
n				Electri		
Census:				Exmpt		
Flood Haz:						
D				Topo		
s				Street	PT	PAVED TW
t				Gas:	5	HEAVY

IN PROCESS APPRAISAL SUMMARY

Use Code	Land Size	Building Value	Yard Items	Land Value	Total Value
392	11.140		2,900	152,800	155,700
Total Card	11.140		2,900	152,800	155,700
Total Parcel	11.140		2,900	152,800	155,700

Source: Market Adj Cost | Total Value per SQ unit /Card: N/A | /Parcel: N/A

Legal Description

Entered Lot Size	
Total Land:	11.14
Land Unit Type:	AC

User Acct

GIS Ref

GIS Ref

Insp Date 03/20/08

PREVIOUS ASSESSMENT

Parcel ID: 13-020-000

Tax Yr	Use	Cat	Bldg Value	Yrd Items	Land Size	Land Value	Total Value	Asses'd Value	Notes	Date
2019	392	FV		2900	11.14	152,800	155,700		YER	1/4/2019
2018	392	FV		2900	11.14	125,300	128,200		Year End Roll	1/5/2018
2017	392	FV		3500	11.14	125,300	128,800		Year End Roll	12/6/2016
2016	392	FV		3500	11.14	125,300	128,800		Year end	1/6/2016
2015	392	FV		2200	11.14	111,400	113,600	113,600	Year End Roll	12/12/2014
2014	392	FV		2200	11.14	111,400	113,600	113,600	Year End Roll	1/22/2014
2013	392	FV		2200	11.14	111,400	113,600	113,600		10/22/2012
2012	392	FV		2000	11.14	132,900	134,900	134,900	Year End	11/30/2011

!618!

PRINT

Date	Time
08/06/19	10:10:02

LAST REV

Date	Time
03/02/18	08:06:43
apro	
618	

SALES INFORMATION

TAX DISTRICT

PAT ACCT.

Grantor	Legal Ref	Type	Date	Sale Code	Sale Price	V	Tst	Verif	Notes
BER TECH BOXBOR	35823-379	Q	7/2/2002	PORTION/ASSE	7,900,000	No	No		
KURIAN LP	31149/399		2/18/2000	PORTION/ASSE	9,850,000	No	No		
	17639/166		12/5/1986	OTHER	1,000,000	Yes	No		

BUILDING PERMITS

Date	Number	Descrip	Amount	C/O	Last Visit	Fed Code	F. Descrip	Comment

ACTIVITY INFORMATION

Date	Result	By	Name
3/20/2008	ABATEMENT	538	WILL NASER

Sign: VERIFICATION OF VISIT NOT DATA __/__/__

USER DEFINED

Prior Id # 1:	02-4-110
Prior Id # 2:	0
Prior Id # 3:	
Prior Id # 1:	
Prior Id # 2:	
Prior Id # 3:	
Prior Id # 1:	
Prior Id # 2:	
Prior Id # 3:	
ASR Map:	
Fact Dist:	
Reval Dist:	
Year:	
LandReason:	
BldReason:	
CivilDistrict:	
Ratio:	

LAND SECTION (First 7 lines only)

Use Code	Description	LUC Fact	No of Units	Depth / PriceUnits	Unit Type	Land Type	LT Factor	Base Value	Unit Price	Adj	Neigh	Neigh Influ	Neigh Mod	Infl 1	%	Infl 2	%	Infl 3	%	Appraised Value	Alt Class	%	Spec Land	J Code	Fact	Use Value	Notes
392	UNDEV		80000		SQUARE FE	UNDEV	0.3	0	3.75	0.30	C2									90,000						90,000	WET
392	UNDEV		9.30345		ACRES	UNDEV	0.3	0	22,500.	0.30	C2									62,798						62,800	WET

Total AC/HA:	11.14000	Total SF/SM:	485258	Parcel LUC:	392	UNDEV	Prime NB Desc	C2	Total:	152,798	Spl Credit		Total:	152,800

EXTERIOR INFORMATION

Type:	
Sty Ht:	
(Liv) Units:	Total:
Foundation:	
Frame:	
Prime Wall:	
Sec Wall:	%
Roof Struct:	
Roof Cover:	
Color:	
View / Desir:	

GENERAL INFORMATION

Grade:	
Year Blt:	Eff Yr Blt:
Alt LUC:	Alt %:
Jurisdict:	Fact:
Const Mod:	
Lump Sum Adj:	

INTERIOR INFORMATION

Avg Ht/FL:	
Prim Int Wal	
Sec Int Wall:	%
Partition:	
Prim Floors:	
Sec Floors:	%
Bsmnt Flr:	
Subfloor:	
Bsmnt Gar:	
Electric:	
Insulation:	
Int vs Ext:	
Heat Fuel:	
Heat Type:	
# Heat Sys:	
% Heated:	% AC:
Solar HW:	Central Vac:
% Com Wal	% Sprinkled

BATH FEATURES

Full Bath		Rating:	
A Bath:		Rating:	
3/4 Bath:		Rating:	
A 3QBth		Rating:	
1/2 Bath:		Rating:	
A HBth:		Rating:	
OthrFix:		Rating:	

OTHER FEATURES

Kits:		Rating:	
A Kits:		Rating:	
Frpl:		Rating:	
WSFlue:		Rating:	

CONDO INFORMATION

Location:	
Total Units:	
Floor:	
% Own:	
Name:	

DEPRECIATION

Phys Cond:	0.0	%
Functional:		%
Economic:		%
Special:		%
Override:		%
Total:	0	%

CALC SUMMARY

Basic $ / SQ:	
Size Adj.:	1.00000000
Const Adj.:	16.00000000
Adj $ / SQ:	
Other Features:	0
Grade Factor:	
NBHD Inf:	1.00000000
NBHD Mod:	
LUC Factor:	1.00
Adj Total:	0
Depreciation:	0
Depreciated Total:	0

COMMENTS

SEPTIC SYSTEM FOR 1300 MASS AVE
LOCATED ON THIS PARCEL.

RESIDENTIAL GRID

1st Res Grid	Desc:	# Units

Level	FY	LR	DR	D	K	FR	RR	BR	FB	HB	L	O
Other												
Upper												
Lvl 2												
Lvl 1												
Lower												

Totals	RMs:	BRs:	Baths:	HB

REMODELING

Exterior:	
Interior:	
Additions:	
Kitchen:	
Baths:	
Plumbing:	
Electric:	
Heating:	
General:	

RES BREAKDOWN

No Unit	RMS	BRS	FL
Totals			

COMPARABLE SALES

Rate	Parcel ID	Typ	Date	Sale Price

WtAv$/SQ:		AvRate:	Ind.Val
Juris. Factor:		Before Depr:	0.00
Special Features:	0	Val/Su Net:	
Final Total:	0	Val/Su SzAd	

SKETCH

SUB AREA

Code	Description	Area - SQ	Rate - AV	Undepr Value

Net Sketched Area:		Total:	
Size Ad	Gross Area		FinArea

SUB AREA DETAIL

Sub Area	% Usbl	Descrip	% Type	Qu	# Ten

IMAGE

AssessPro Patriot Properties, Inc

MOBILE HOME

Make:		Model:		Serial #		Year:		Color:	

SPEC FEATURES/YARD ITEMS

PARCEL ID 13-020-000

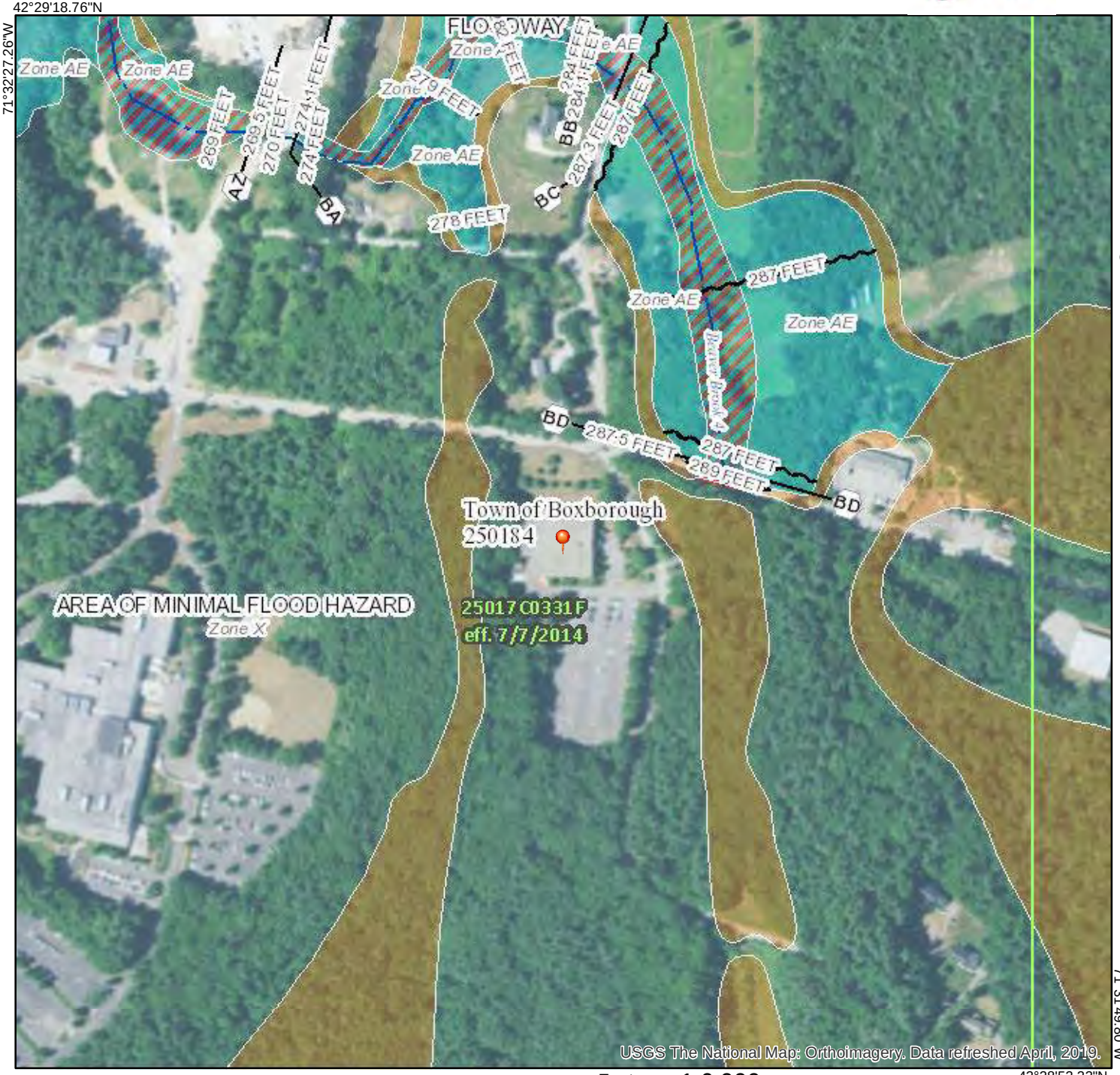
Code	Description	A	Y/S	Qty	Size/Dim	Qual	Con	Year	Unit Price	D/S	Dep	LUC	Fact	NB Fa	Appr Value	JCod	JFact	Juris. Value
2	SHED/FR		Y	1	420	A	AV	1987	13.76	T	50	392			2,900			2,900

More:	N	Total Yard Items:	2,900	Total Special Featues:		Total:	2,900

APPENDIX C:

FEMA Mapping

National Flood Hazard Layer FIRMette



Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN — Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 / 17.5 — Cross Sections with 1% Annual Chance / Water Surface Elevation
- Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 10/18/2019 at 12:14:32 AM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) Report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS Report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study Report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study Report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Massachusetts State Plane Mainland Zone (FIPS zone 2001). The **horizontal datum** was NAD 83, GRS 1980 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713- 3242**, or visit its website at http://www.ngs.noaa.gov.

Base map information shown on this FIRM was derived from orthophotography provided by MassGIS at a scale of 1:500 from photography dated April 2008.

The **profile baselines** depicted on this map represent the hydraulic modeling baselines that match the flood profiles in the FIS report. As a result of improved topographic data, the **profile baseline**, in some cases, may deviate significantly from the channel centerline or appear outside the SFHA.

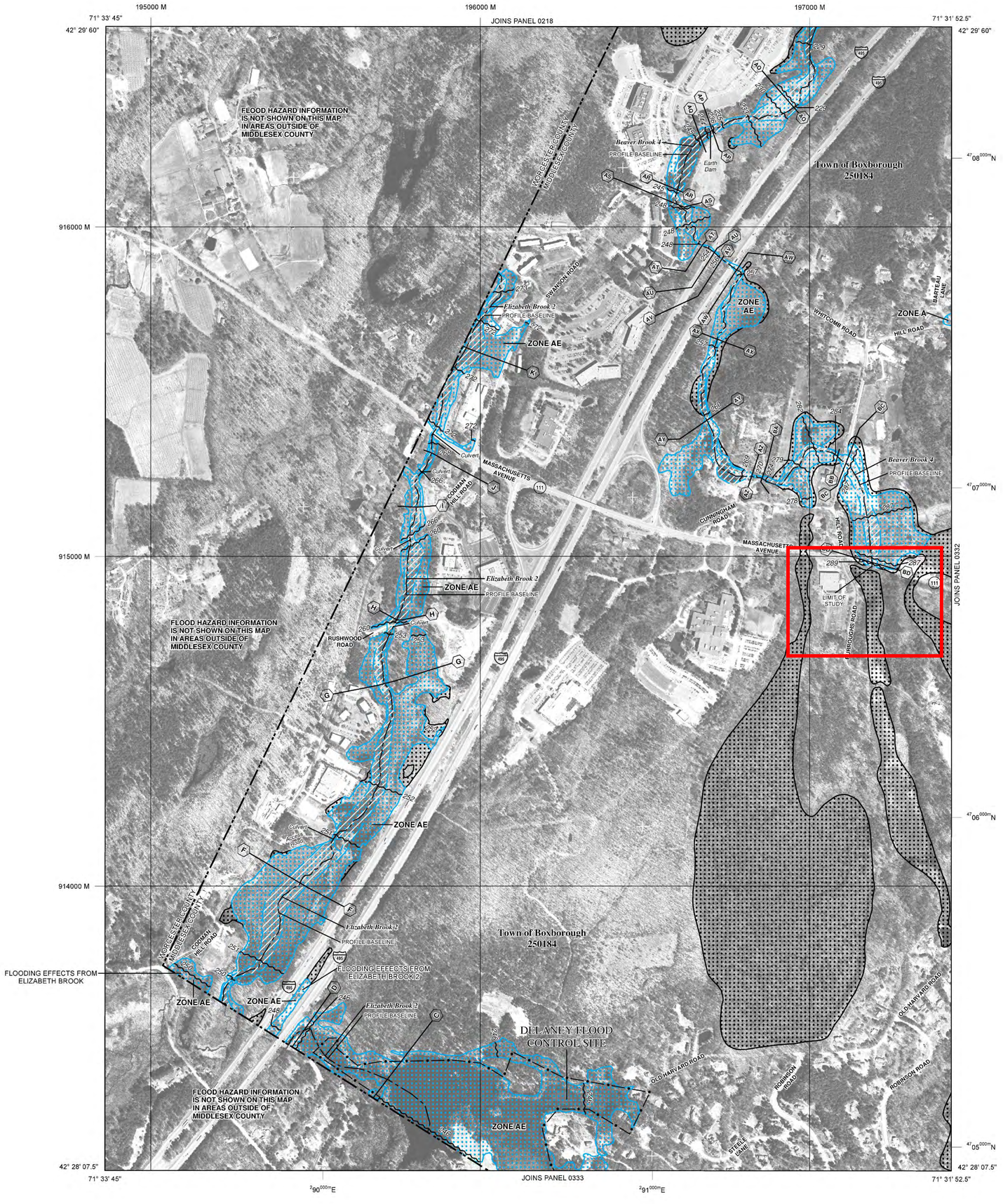
This map reflects more detailed and up-to-date **stream channel configurations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables for multiple streams in the Flood Insurance Study Report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on this map.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

For information on available products associated with this FIRM visit the **Map Service Center (MSC)** website at http://msc.fema.gov. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the MSC website.

If you have **questions about this map**, how to order products, or the National Flood Insurance Program in general, please call the **FEMA Map Information eXchange (FMIX)** at **1-877-FEMA-MAP** (1-877-336-2627) or visit the FEMA website at http://www.fema.gov/business/nfip.



LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Areas formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D	Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

	1% Annual Chance Floodplain Boundary
	0.2% Annual Chance Floodplain Boundary
	Floodway boundary
	Zone D boundary
	CBRS and OPA boundary
	Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths, or flood velocities.
513	Base Flood Elevation line and value; elevation in feet*
(EL 987)	Base Flood Elevation value where uniform within zone; elevation in feet*

*Referenced to the North American Vertical Datum of 1988

A — A	Cross section line
23 — 23	Transect line
45° 02' 08", 93° 02' 12"	Geographic coordinates referenced to the North American Datum of 1983 (NAD 83) Western Hemisphere
4989000 M	1000-meter ticks: Massachusetts State Plane Mainland Zone (FIPS Zone 2001), Lambert Conformal Conic projection
4708000mN	1000-meter Universal Transverse Mercator grid values, zone 19
DX5510 ×	Bench mark (see explanation in Notes to Users section of this FIRM panel)
M1.5	River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
June 4, 2010

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

July 7, 2014 - to update corporate limits, to change Base Flood Elevations and Special Flood Hazard Areas, to add roads and road names, and to incorporate previously issued Letters of Map Revision.

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 500'

250 0 500 1000 FEET
150 0 150 300 METERS

NFIP

PANEL 0331F

FIRM

FLOOD INSURANCE RATE MAP

MIDDLESEX COUNTY, MASSACHUSETTS (ALL JURISDICTIONS)

PANEL 331 OF 656
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
BOXBOROUGH, TOWN OF	250184	0331	F

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
25017C0331F
MAP REVISED
JULY 7, 2014

Federal Emergency Management Agency

NATIONAL FLOOD INSURANCE PROGRAM

APPENDIX D:

Soil Information

Map Scale: 1:3,030 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 40 80 160 240

Feet: 0 100 200 400 600

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 19N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:25,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Middlesex County, Massachusetts
Survey Area Data: Version 19, Sep 12, 2019

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Sep 12, 2014—Sep 28, 2014

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
6A	Scarboro mucky fine sandy loam, 0 to 3 percent slopes	A/D	10.8	26.3%
51A	Swansea muck, 0 to 1 percent slopes	B/D	1.5	3.6%
52A	Freetown muck, 0 to 1 percent slopes	B/D	5.6	13.7%
71B	Ridgebury fine sandy loam, 3 to 8 percent slopes, extremely stony	D	2.8	6.8%
310B	Woodbridge fine sandy loam, 3 to 8 percent slopes	C/D	15.8	38.4%
623C	Woodbridge-Urban land complex, 3 to 15 percent slopes	C/D	0.3	0.7%
653	Udorthents, sandy		4.3	10.5%
Totals for Area of Interest			**41.2**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Middlesex County, Massachusetts

310B—Woodbridge fine sandy loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2t2ql
Elevation: 0 to 1,470 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Woodbridge, fine sandy loam, and similar soils: 82 percent
Minor components: 18 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Woodbridge, Fine Sandy Loam

Setting

Landform: Drumlins, ground moraines, hills
Landform position (two-dimensional): Backslope, footslope, summit
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Coarse-loamy lodgment till derived from gneiss, granite, and/or schist

Typical profile

Ap - 0 to 7 inches: fine sandy loam
Bw1 - 7 to 18 inches: fine sandy loam
Bw2 - 18 to 30 inches: fine sandy loam
Cd - 30 to 65 inches: gravelly fine sandy loam

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 20 to 39 inches to densic material
Natural drainage class: Moderately well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)
Depth to water table: About 18 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water storage in profile: Low (about 3.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: C/D

Hydric soil rating: No

Minor Components

Paxton

Percent of map unit: 10 percent
Landform: Ground moraines, drumlins, hills
Landform position (two-dimensional): Shoulder, backslope, summit
Landform position (three-dimensional): Nose slope, side slope, crest
Down-slope shape: Convex, linear
Across-slope shape: Convex
Hydric soil rating: No

Ridgebury

Percent of map unit: 8 percent
Landform: Depressions, ground moraines, hills, drainageways
Landform position (two-dimensional): Toeslope, backslope, footslope
Landform position (three-dimensional): Base slope, head slope, dip
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Data Source Information

Soil Survey Area: Middlesex County, Massachusetts
Survey Area Data: Version 19, Sep 12, 2019

Middlesex County, Massachusetts

6A—Scarboro mucky fine sandy loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2svky
Elevation: 0 to 1,320 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 250 days
Farmland classification: Not prime farmland

Map Unit Composition

Scarboro and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Scarboro

Setting

Landform: Depressions, outwash deltas, outwash terraces, drainageways
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope, tread, dip
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Sandy glaciofluvial deposits derived from schist and/or sandy glaciofluvial deposits derived from gneiss and/or sandy glaciofluvial deposits derived from granite

Typical profile

Oe - 0 to 3 inches: mucky peat
A - 3 to 11 inches: mucky fine sandy loam
Cg1 - 11 to 21 inches: sand
Cg2 - 21 to 65 inches: gravelly coarse sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (1.42 to 14.17 in/hr)
Depth to water table: About 0 to 2 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Salinity, maximum in profile: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water storage in profile: Low (about 4.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: A/D
Hydric soil rating: Yes

Minor Components

Swansea
Percent of map unit: 10 percent
Landform: Bogs, swamps
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Walpole
Percent of map unit: 5 percent
Landform: Outwash plains, depressions, depressions, outwash terraces, deltas
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread, dip, talf
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

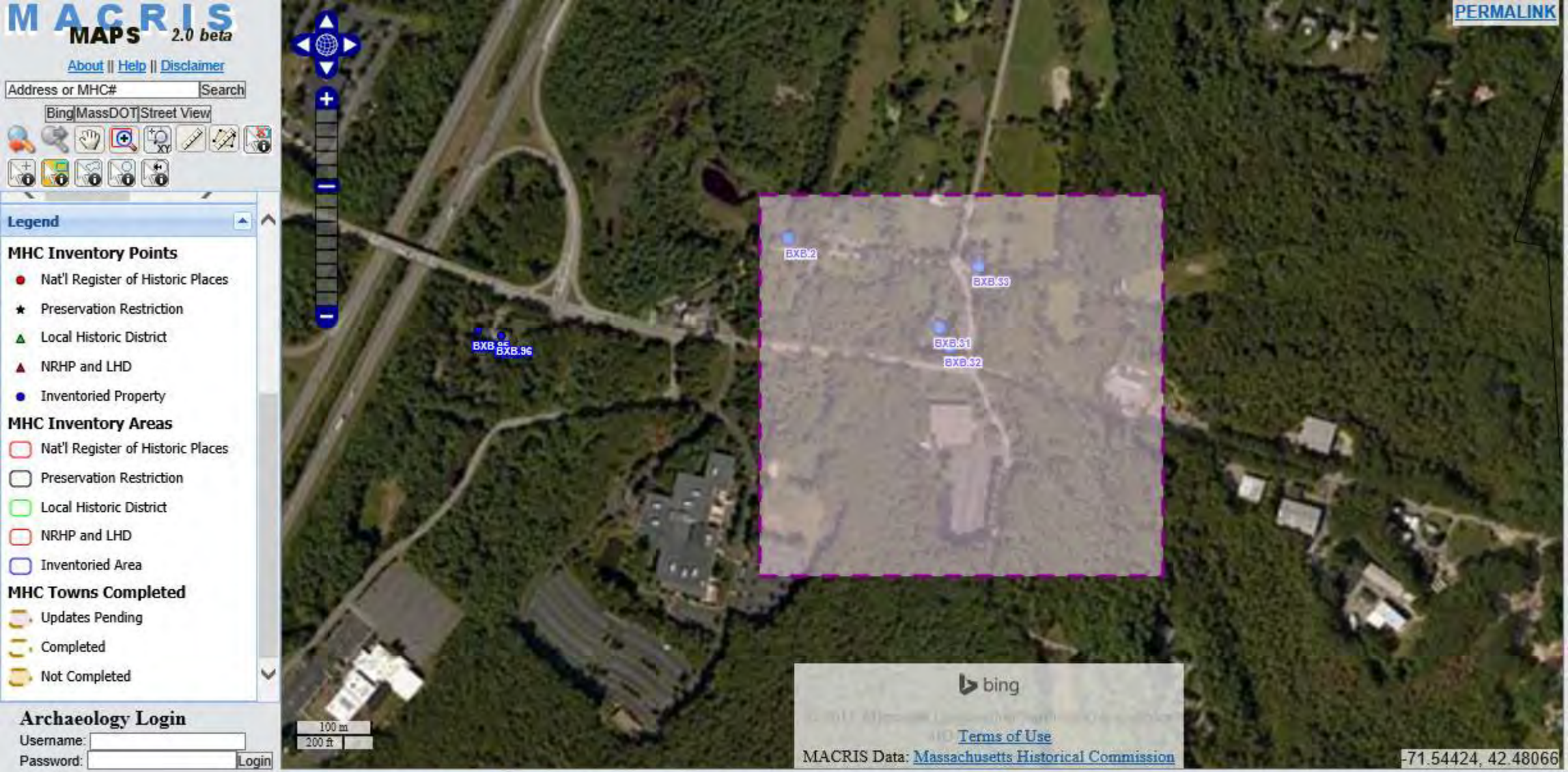
Wareham
Percent of map unit: 5 percent
Landform: Depressions
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Data Source Information

Soil Survey Area: Middlesex County, Massachusetts
Survey Area Data: Version 19, Sep 12, 2019

APPENDIX E:

Historic Mapping and Information



Historic Inventory Points (4) | Historic Inventory Areas

Demolished?	MACRIS #	Historic Name	Common Name	Address	Designations	Architectural Style
	BXB.2	Whitcomb, James Family Homes…		Cunningham Rd		Georgian;
	BXB.32	Taylor, Capt. Oliver Barn and Mil…		8 Hill Rd		No style;
	BXB.33	Boxborough District Schoolhouse…		45 Hill Rd		Victorian Eclectic;
	BXB.31	Taylor, Capt. Oliver House	Kimball, Richard House	8 Hill Rd		Federal;

Massachusetts Cultural Resource Information System

Scanned Record Cover Page

Inventory No:	BXB.31
Historic Name:	Taylor, Capt. Oliver House
Common Name:	Kimball, Richard House
Address:	8 Hill Rd
City/Town:	Boxborough
Village/Neighborhood:	
Local No:	2-3-101
Year Constructed:	c 1782
Architect(s):	
Architectural Style(s):	Federal
Use(s):	Agricultural; Single Family Dwelling House
Significance:	Agriculture; Archaeology, Historic; Architecture; Industry
Area(s):	
Designation(s):	
Building Materials(s):	Roof: Asphalt Shingle Wall: Wood; Wood Clapboard

Commonwealth of Massachusetts
Massachusetts Historical Commission
220 Morrissey Boulevard, Boston, Massachusetts 02125
www.sec.state.ma.us/mhc

BxB.31

FORM B - Building

Massachusetts Historical Commission
Massachusetts Archives Building
220 Morrissey Boulevard
Boston, Massachusetts 02125

Map and Lot #	USGS Quad	Area(s)	Form Number
2 3 101	Hudson		31, 32

Town Boxborough

Place (neighborhood or village)

Photograph

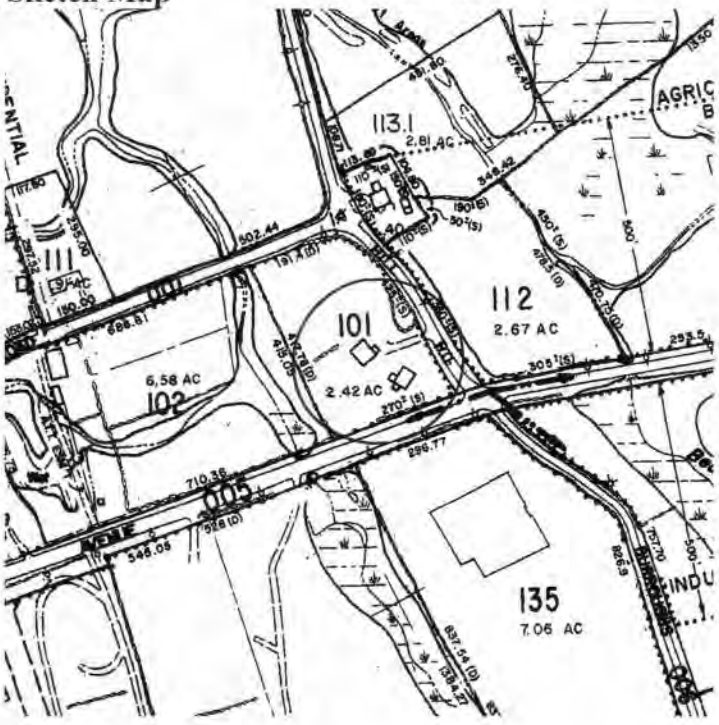
(3"x3" or 3-1/2x5" black and white only) Label photo on back with town and property address. Record film roll and negative numbers here on form. Staple photo to left side of form over this space. Attach additional photos to continuation sheets.

Roll Negative(s)

3

Sketch Map

North Toward Top



Recorded by Sanford Johnson

Organization Boxborough Historical Commission

Date (month/year) 3/03

Address 8 Hill Road

Historic Name Captain Oliver Taylor House

Uses: Present Residence

Original Residence/agriculture

Date of Construction c. 1782

Source H&H Study

Style/Form Federal

Architect/Builder

Exterior Material:

Foundation Undetermined

Wall/Trim Wood clapboard

Roof Asphalt shingle

Outbuildings/secondary structure

Detached 18th c. barn (MHC 32)

Major Alterations (with dates)

Porch added, early 20th c.

Condition Excellent

Moved no ✓ yes ☐ **Date**

Acreage 2.4

Setting Rural

Follow Massachusetts Historical Commission Survey Manual instructions for completing this form.

BUILDING FORM

ARCHITECTURAL DESCRIPTION

see continuation sheet

Describe architectural features. Evaluate the characteristics of this building in terms of other buildings within the community.

* The well-preserved side-gabled, 2 1/2-story, 5x3-bay house has elements of the Federal style
* Open porches on the east and west side elevations have turned posts and exposed rafter ends
* Decorative elements include the symmetrical fenestration, molded cornice, corner boards and gable returns
* Windows are 6/6 double-hung sash with slim hoods
* The center entry has flanking pilasters and a tall hood with entablature
* The stout center brick chimney has a corbel
* The detached, side-gabled, wood shingled barn has a vehicle door and an attached milk room or shed on the west elevation
* 18th century characteristics of the barn include the 45'x33' dimensions, gunstock or flared posts in the post and beam frame, wind bracing in the roof, swinging doors in the eave side main entrance, lack of a transom and vertical sheathing visible on interior walls
* The house and barn occupy a prominent, well-landscaped parcel and are more well-preserved than most other former agricultural properties in the town

HISTORICAL NARRATIVE

☐ see continuation sheets

Discuss the history of the building. Explain its associations with local (or state) history. Include uses of the building, and the role(s) the owners /occupants played within the community.

The house at 8 Hill Road was built near the site of the 17th century cabin of John Taylor and his son Solomon and grandsons John, Solomon and Oliver. The cabin burned in 1782 according to the H&H Study and was replaced within a month with the core of the existing house which was constructed by neighbors as a salt-box with three fireplaces. In 1784, Oliver Taylor was taxed for ownership of 87 acres, a house, barn and 14 animals. This was an amount nearly identical to property held by his brother Solomon, suggesting they shared ownership of the property. Both had served in the military during the Revolutionary War. Solomon is noted as having marched on Concord in April, 1775 with Captain William Whitcomb's Stow company of militia. Oliver, who appears in tax and census records from 1789 through 1820, acquired full ownership by the time of the 1798 direct tax which describes the house as a two story building covering 864 square feet of ground with 20 windows, the form of the existing house. There were also a 75'x28' barn which may refer in part to the existing barn , a shed, one of the town's five cooper shops and 141 acres, indicating the mixed agricultural and small industrial nature of the property. Another cooper shop was located 150 Summer Road** Oliver Taylor's son Oliver Jr. occupied the house in the 1820s and 1830s and appears on federal census schedules. The cooper shop is not reflected in the schedule of industries in the town for 1837 due to its small scale. Oliver Jr.'s son Varnum, a farmer according to the 1855 state census, and his wife Mary were the occupants from 1837 until 1886 and are listed in tax records, federal census schedules, maps and atlases of the 19th century. The Taylors shared the house with the family of the farmer P. W. Houghton for a time in the 1850s. The property remained in the Taylor family until 1912 when Charles Adams acquired it and within a year sold to Richard Kimball, the occupant from 1913-1956. Mr. Kimball owned 28 acres but kept no animals according to tax records from 1928. His family remained here until the late 1960s.

BIBLIOGRAPHY and/or REFERENCES

☐ continuation sheet

Bigelow. Statistical Tables: Exhibiting the Condition and Products of Certain Branches of Industry in Massachusetts for the Year April 1,1837. (Based on the state census. Available at the State Library); 1978 Pettingell Map of Boxborough; 1794, 1831 Series Maps; 1875, 1889 Middlesex County Atlases; 1856 Walling Map of Middlesex County; Houses and Homesites Study, 1962-1970; Talmadge, Et. al. Boxborough: Portrait of a Town; History of Middlesex County, 1890; 1928 Valuation and Taxes

*** All properties mentioned in bold type with ** are individually inventoried resources*

☑ Recommended for listing in the National Register of Historic Places. If checked, you must attach a completed National Register Criteria Statement Form.

Capt. Oliver Taylor House (BXB.31)

Capt. Oliver Taylor Barn & Milk Shed (BXB.32)

BYB. 31

Massachusetts Historical Commission
Massachusetts Archives Building
220 Morrissey Boulevard
Boston, Massachusetts 02125

Community
Boxborough

Property Address
8 Hill Road

Area(s)

Form No.
31, 32

National Register of Historic Places Criteria Statement Form

Check all that apply:

Individually eligible **X** Eligible only in a historic district

Contributing to a potential historic district Potential historic district

Criteria: **X** A B **X** C D

Criteria considerations: A B C D E F G

Statement of significance by: Sanford Johnson
The criteria that are checked in the above sections must be justified here.

The Federal Style Captain Oliver Taylor House at 8 Hill Road is potentially eligible for the National Register of Historic Places as an individual resource at the local level. It was the home of the farmer and Revolutionary War veteran Captain Oliver Taylor and his descendants from its time of construction c. 1782 until 1912. The barn located north of the house was probably built during the 18th century judging by its vertical sheathing visible from the interior, wind-braced roof structure and gunstock posts. The buildings' associations with historic military and agricultural activity in Boxborough establish their significance under Criterion A. The symmetrical fenestration, stout center brick chimney and classical ornament are typical of Federal style residential construction in Boxborough, making the property eligible under Criterion C. The buildings retain integrity of design, materials, setting and workmanship.

BOXBOROUGH PLANNING BOARD
29 Middle Road, Boxborough, Massachusetts 01719
Phone: (978) 264-1723 · Fax: (978) 264-3127
www.boxborough-ma.gov

Scenic Road Permit Application
Public Shade Tree Removal Application
Stone Wall Removal or Alteration Application

Assessor Parcel Number:_____

Project Location:_____

Project Description:_____

_____

_____

Applicant Name:_____

Applicant Address:_____

Applicant Phone Number:_____

Property Owner (if different):_____

Owner Address:_____

Owner Phone Number:_____

☐ Scenic Road Permit ☐ Public Shade Tree Removal ☐ Stone Wall Application
(check all that apply)

1. Does the project require the removal or destruction of a stone wall? ☐ Yes ☐ No

   If yes, what is the length of the proposed removal or destruction? _____

2. Will any Public Shade Trees as defined by MGL Ch. 87, Sec. 1 be removed or significantly impacted because of the proposed construction? ☐ Yes ☐ No

   If yes, what is the type of tree(s) to be removed and the diameter measured 2 feet from the ground?_____

   Please note: It is the applicant's responsibility to meet with the Tree Warden prior to the filing of this application to determine if there are Public Shade Trees on the subject property.

Scenic Road Permit - Public Shade Tree Removal - Stone Wall Application

Attach a plan drawn to scale showing the property boundaries, the location of the proposed construction and location of any trees or portions of stone walls that will be removed or damaged. For a new driveway, the width of the driveway and limit of disturbance **shall be** marked on the road at least one week prior to the public hearing.

NOTE: A public hearing is required before a Scenic Road or a Public Shade Tree Removal Permit can be issued. The notice of the hearing must be published, at the applicant's expense, in The Beacon twice, the last publication to occur not less than 7 days prior to the hearing. The applicant will be notified by mail of the hearing date and is required to attend the hearing.

The undersigned hereby certifies that he/she has read and examined this application and that the proposed project is accurately represented in the statements made in this application.

Owner(s): _____ Date: _____

_____ Date: _____

Applicant(s): _____ Date: _____

_____ Date: _____

** The signature of the property owner(s) is required for the application to be accepted.

H:…Applications/Forms/Scenic Road 2-12

BOXBOROUGH PLANNING BOARD
29 Middle Road, Boxborough, Massachusetts 01719
Phone: (978) 264-1723 · Fax: (978) 264-3127
www.boxborough-ma.gov

Scenic Road Requirements

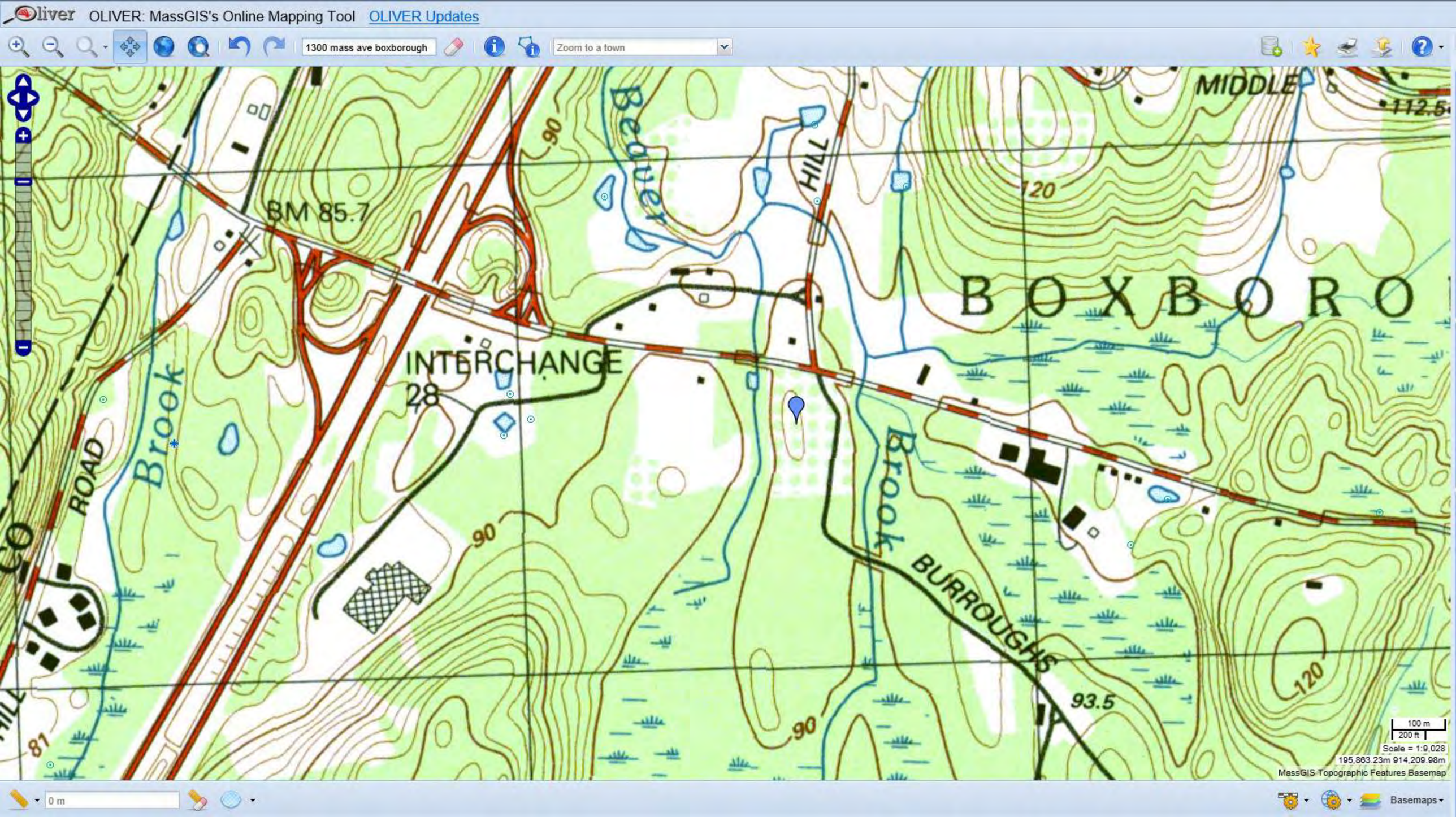
The Town voted at the Special Town Meeting on February 3, 1975 to designate the following roads as Scenic Roads as provided for in Section 15C, Chapter 40 of the Massachusetts General Laws:

Burroughs Road
Davidson Road
Depot Road
Hill Road
Liberty Square Road between Depot Road and Sargent Road
Littlefield Road between Sargent Road and Depot Road
Middle Road between Hill Road and Depot Road
Old Harvard Road
Picnic Street
Pine Hill Road**
Sargent Road
Stow Road from Route 111 to Stow Town Line

** Voted at Special Town Meeting on October 7, 1975

Section 15C, Chapter 40 of the General Laws defines the following:

"After a road has been designated as a Scenic Road, any repair, maintenance, reconstruction, or paving work done with respect thereto shall not involve or include the cutting or removal of trees, or the tearing down or destruction of stone walls, or portions thereof, except with the prior written consent of the planning board, after a public hearing duly advertised twice in a newspaper of general circulation in the area, as to time, date, place and purpose, the last publication to occur at least seven days prior to such hearing."


OLIVER: MassGIS's Online Mapping Tool
OLIVER Updates
1300 mass ave boxborough
Zoom to a town
MIDDLE
112.5
Bequer
HILL
120
BM 85.7
INTERCHANGE
28
BOXBORO
ROAD
Brook
90
Brook
BURROUGHS
93.5
120
81
100 m
200 ft
Scale = 1:9,028
195,863.23m 914,209.98m
MassGIS Topographic Features Basemap
0 m
Basemaps

APPENDIX F:

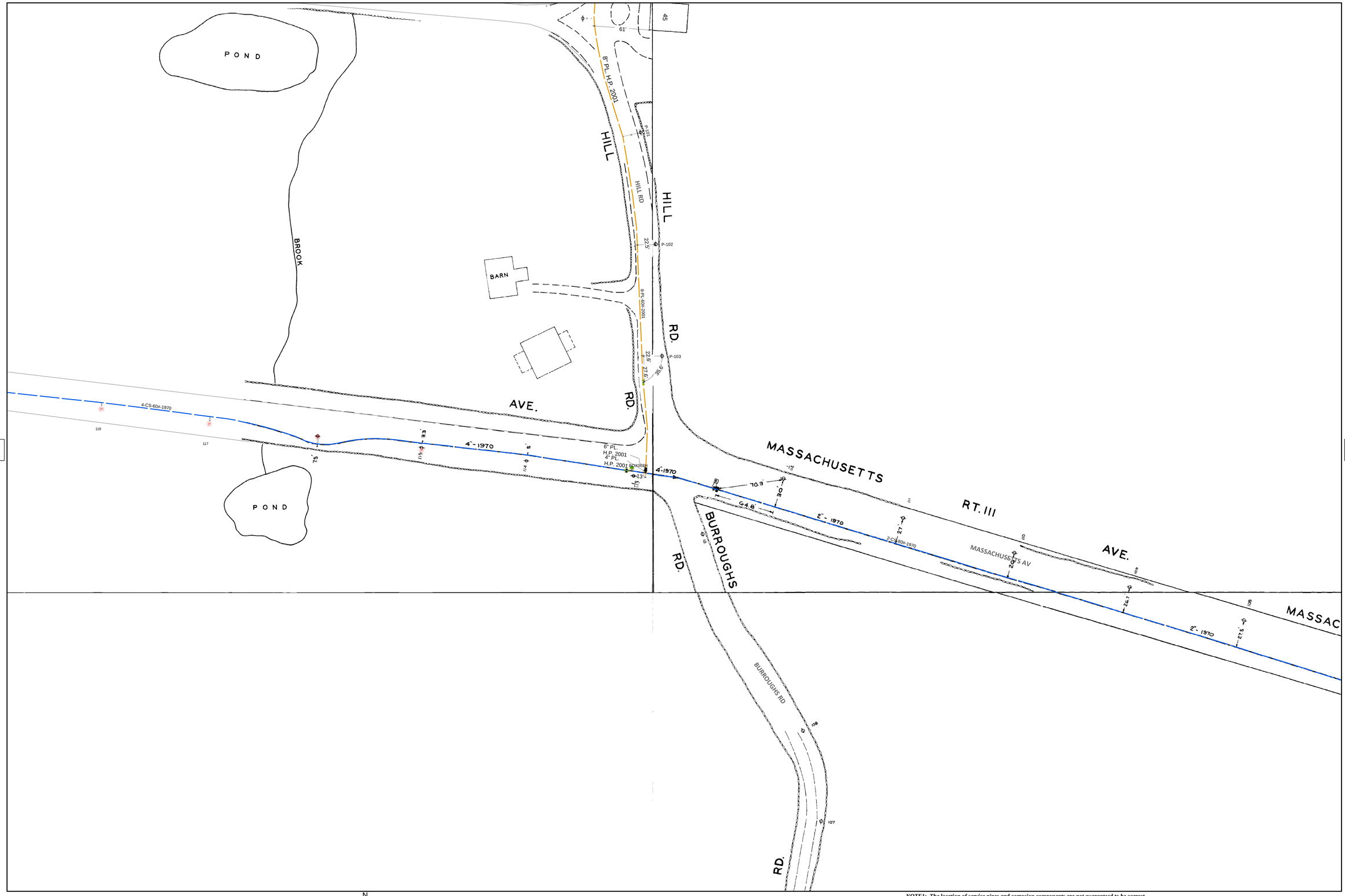
Gas Utility Mapping

CALL BEFORE YOU DIG
1-888-DIG-SAFE
NOTE
THE LOCATION OF SURFACE AND UNDERGROUND OBJECTS SHOWN ARE NOT WARRANTED TO BE CORRECT

Generated by luckep at 10/15/2019 3:33:22 PM on 10/15/2019

NATIONAL GRID

BOXJ525



BOXJ534

NONE

BOXJ545

BOX

J535

N
W E
S

NOTE1: ***The location of service pipes and corrosion components are not guaranteed to be correct. SPIPE, as well as original record documents, should be utilized for this information.***

NOTE2: ***The mains in NH without dimensions are not drawn to scale. These mains are intended to show the existence of gas main on the street and do not reflect the exact location of the main in the street.***

APPENDIX G:

As-Built Mapping

NOTES:

1) UNDERGROUND UTILITIES WERE COMPILED FROM AVAILABLE RECORD PLANS OF UTILITY COMPANIES AND PUBLIC AGENCIES AND ARE APPROXIMATE ONLY. BEFORE CONSTRUCTION CALL "DIG SAFE" 1-800-322-4844
2) ALL ELEVATIONS ARE BASED ON THE NATIONAL GEODETIC VERTICAL DATUM OF 1929. BENCH MARK USED M.D.P.W. DISK STAMPED 51052A, LOCATED ON ROUTE 111 BRIDGE OVER ROUTE 495, ELEVATION = 307.807.
3) FOR PROPERTY LINE DIMENSIONS AND EXISTING TOPOGRAPHY SEE PLAN ENTITLED "SITE PLAN, PLAN OF LAND IN BOXBOROUGH, MA (MIDDLESEX COUNTY) SCALE: 1"=40' AUG. 17, 1984 PREPARED BY BEALS AND THOMAS, INC.
4) DATA COLLECTION PERFORMED BY ZEISS ELTA 46R TOTAL STATION (INSTRUMENT).
5) UNDERGROUND ELECTRIC LINE LOCATION SUPPLIED BY SEPPALA & AHO FROM SITE AS-BUILT DWG'S
6) BITUMINOUS CONCRETE BERM, GRANITE CURB AND CONCRETE CURB ARE 0.5± HIGHER THAN FINISH PAVEMENT. (TYPICAL)

LEGEND

T	TREE
L.P.	LIGHT POLE
G.C.	GRANITE CURB
L.S.	LAND SCAPING
UP	UTILITY POLE
GW	GUY WIRE
HYD	HYDRANT
V	VENT
W	WELL
H.P.	HANDICAPPED PARKING
S	SEWER
L	LIGHT
C	CATCH BASIN
D	DRAIN
E	ELECTRIC
T	TELEPHONE
OHW	OVERHEAD WIRE
D	DRAIN MANHOLE
S	SEWER MANHOLE
W	WELL
L	LIGHT
S	SIGN
INV	INVERT
CONC	CONCRETE
BIT	BITUMINOUS
R	RIM

REFERENCE:
TOWN OF BOXBOROUGH, MA
ASSESSORS SHEET 2 OF 12

MASSACHUSETTS AVENUE
STATE HIGHWAY (PUBLIC-60' WIDE)
(ROUTE 111)
OFFICE PARK DISTRICT 10
#1300 2 STORY BUILDING
LOT 135 7.06 ± AC.
LOT 110 11.138 ±AC.
BURROUGHS (COUNTY ROAD-NO LAYOUT) (PUBLIC-VARIABLE WIDTH) ROAD
OFFICE PARK DISTRICT 10
AGRICULTURAL - RESIDENTIAL
INDUSTRIAL - COMMERCIAL DISTRICT 12A
WETLAND & WATERSHED PROTECTION DISTRICT
TBM BOLT ON HYDRANT ELEV=296.93
TBM SPK 2" UP 30" PINE ELEV.=302.16
WATER ELEV. 286.7 NOV. 17, 1987
LANDSCAPING (UNDER CONSTRUCTION)
EDGE OF TREELINE
GRASS
CONCRETE CURB
WHEEL CHAIR RAMP
GRANITE CURB
BIT CONC BERM
RIP-RAP
FIRE PUMP HOUSE (BRICK)
PUMP STATION (CONC)
VALVE CHAMBER (CONC)
OBSERVATION WELL
LEACHING AREA
ASPHALT PATH
BRIDGE
WETLANDS & WATERSHED PROTECTION DISTRICT
BEAVER BROOK
E DITCH

REVISIONS
NO. DATE
0 WORKSHEET NOT PREPARED

BEALS AND THOMAS, INC.
Two Westborough Business Park
200 Friberg Parkway
Westborough, Massachusetts 01581
(617) 366-0560

PREPARED FOR
SEPPALA & AHO CONSTRUCTION CO., INC.
Route 24
New Ipswich, New Hampshire

TITLE
AS-BUILT PLAN OF LAND
AT
1300 MASSACHUSETTS AVENUE
BOXBOROUGH, MA
(MIDDLESEX COUNTY)

DATE NOVEMBER 17, 1987 | SCALE 1" = 40'
DESIGNED BY B.T.L.
CHECKED BY A.D.C., D.L.B.
DRAWN BY DAVID B. PACKERT
SHEET NO. 1 OF 1 | JOB NO. W-01.02 | DWG NO. W-01.02.03

HARLANT SPILLER CU INC

APPENDIX H:

Wastewater Utility Mapping and Information

PERMIT VOID IF FOUND TO BE IN VIOLATION OF CHAPTER 131 SECTION 40A

NASHOBA ASSOCIATED BOARDS OF HEALTH

ENVIRONMENTAL HEALTH DIVISION
AYER, MA 01432 772-3338

SEWAGE DISPOSAL WORKS CONSTRUCTION PERMIT

☒ To install a new Sewage Disposal system
☐ To repair existing Sewage Disposal system

ISSUED FOR THE BOXBOROUGH BOARD OF HEALTH

OWNER Munn/Hines Co.
(NOT TRANSFERABLE)

LOCATION OF LOT OR INSTALLATION Burroughs Rd. & Rte. 111 Mass Ave LOT NO. 110 & 135

DATE PERMIT ISSUED April 2, 1985 LOT SIZE 11+ acres

SOIL DESCRIPTION

PERC. RATE 2 min/inch

ENGINEERING OR SPECIAL PREPARATION: ☒ System to be installed according to engineered plan No. W-01
by Beals & Thomas Inc., Two Westborough Business Park
or 200 Friberg Parkway, Westborough, MA 01581

SYSTEM DESIGNED FOR: Research & Dev. Building (60,000 s.f.) WATER SUPPLY: ☐ Town ☒ Well

PRIMARY INSTALLATION 9,000 gallon septic tank

SECONDARY INSTALLATION Pump station and leaching field as per engineered plan.

No industrial or processed waste/not approved for food service.

PERMIT PREPARED ~~FOR BOARD~~ BY THE BOXBOROUGH BOARD OF HEALTH

BOARD OF HEALTH BOARD OF HEALTH BOARD OF HEALTH

DATE: 12/9/87 Donald A. Deas
BOXBOROUGH BOARD OF HEALTH: Donald G. Mackie Marcia S. Hodgson

I agree upon accepting this PERMIT to comply with all Board of Health regulations and the State Environmental Code during all phases of installing the septic system; and if I am the contractor installing this system, I further agree to correct any fault caused by defective material or workmanship appearing in this system within one year from date of occupancy.

XSIGNED Roland D. Tarbox Jr. Supt. Nota Corp. ☐ Owner ☐ Contractor ☑ Sub-Contractor

CERTIFICATE OF COMPLIANCE

INSPECTIONS REQUIRED:

- ☒ Bed and trench excavation, before fill/stone
- ☐ Fill in place
- ☒ Completed system Bed area & D-Boxes 7-31-87
- ☒ Engineer certification in writing of completed system
- ☒ As built plan ☒ By Engineer - design
- ☒ Water supply (if well)
- ☒ pump station by Nashoba and
- ☐ engineer
- ☐ Inspections completed

Installer Roland Nota Corp

Date: 7/22/87 By: LMF
Date: _____ By: _____
Date: 12-7-87 complete SDS function LMF
Date: 12-9-87 By: LMF
Date: 12-9-87 By: LMF
Date: State approval 12-10-87
Date: NABOH 12-7-87 By: LMF
Date: _____ By: _____
Date: 12-9-87 By: LMFogarty RS

A NEW HOUSE CANNOT BE OCCUPIED OR SOLD UNTIL THIS CERTIFICATE IS COMPLETED.

IMPORTANT NOTES

1. THE ISSUANCE OF THIS CERTIFICATE SHALL NOT BE CONSTRUED A GUARANTEE THAT THE SYSTEM WILL FUNCTION PROPERLY.
2. INSTALLATION OR REPAIR MUST BE PERFORMED BY NASHOBA LICENSED INSTALLER.
3. FAILURE BY INSTALLER TO CONFORM TO ALL REQUIREMENTS OF THIS PERMIT MAY LEAD TO SUSPENSION OR REVOCATION OF INSTALLER'S PERMIT.
4. THE OWNER SHOULD BE AWARE OF WETLANDS PROTECTION REQUIREMENTS OF THE LOCAL CONSERVATION COMMISSION.
5. THE SYSTEM IS NOT DESIGNED FOR GARBAGE DISPOSAL.
6. THE SYSTEM IS DESIGNED FOR USE STATED ABOVE.
7. PERMIT IS VOID TWO YEARS AFTER DATE OF ISSUE.
8. LEACH SYSTEMS MUST BE KEPT 100 FEET FROM ALL WELLS.
9. PROPER MAINTENANCE OF A SYSTEM REQUIRES ANNUAL PUMPING.

BOH FINAL

2-2-135 ✓ 11/26/0

COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF ENVIRONMENTAL AFFAIRS
DEPARTMENT OF ENVIRONMENTAL PROTECTION

TITLE 5
OFFICIAL INSPECTION FORM – NOT FOR VOLUNTARY ASSESSMENTS
SUBSURFACE SEWAGE DISPOSAL SYSTEM FORM
PART A
CERTIFICATION

Property Address: 1300 MASS AVE
Boxborough
Owner's Name: BER TECH Boxborough LLC & BER TECH
Owner's Address: 1300 MASS AVE
Boxborough
Date of Inspection: 10-16-01

RECEIVED
NOV - 8 2001

Name of Inspector: (please print) MICHAEL J. DECOSTA
Company Name: Windriver Environmental
Mailing Address: 561 Main Street
Hudson, MA 01749
Telephone Number: 978-562-4500

CERTIFICATION STATEMENT

I certify that I have personally inspected the sewage disposal system at this address and that the information reported below is true, accurate and complete as of the time of the inspection. The inspection was performed based on my training and experience in the proper function and maintenance of on site sewage disposal systems. **I am a DEP approved system inspector pursuant to Section 15.340 of Title 5 (310 CMR 15.000).** The system:

YES Passes
___ Conditionally Passes
___ Needs Further Evaluation by the Local Approving Authority
___ Fails

Inspector's Signature: [signature] **Date:** 10-16-01

The system inspector shall submit a copy of this inspection report to the Approving Authority (Board of Health or DEP) within 30 days of completing this inspection. If the system is a shared system or has a design flow of 10,000 gpd or greater, the inspector and the system owner shall submit the report to the appropriate regional office of the DEP. The original should be sent to the system owner and copies sent to the buyer, if applicable, and the approving authority.

Notes and Comments RECOMMEND PUMPING TANK EVERY 6 MONTHS
RECOMMEND REPAIRING BROKEN VENT PIPE ON PUMP CHAMB
RECOMMEND CLEANING OUT BOTH PUMP CHAMBER & VALVE CHAMBER

******This report only describes conditions at the time of inspection and under the conditions of use at that time. This inspection does not address how the system will perform in the future under the same or different conditions of use.**

OFFICIAL INSPECTION FORM – NOT FOR VOLUNTARY ASSESSMENTS
SUBSURFACE SEWAGE DISPOSAL SYSTEM INSPECTION FORM
PART A
CERTIFICATION (continued)

Property Address: 1300 MASS AVE
Boxborough MASS
Owner: BER TECH Boxborough LLC & BERTECH
Date of Inspection: 10-16-01

Inspection Summary: Check A,B,C,D or E / ALWAYS complete all of Section D

A. System Passes:

YES I have not found any information which indicates that any of the failure criteria described in 310 CMR 15.303 or in 310 CMR 15.304 exist. Any failure criteria not evaluated are indicated below.

Comments:

B. System Conditionally Passes:

_____ One or more system components as described in the "Conditional Pass" section need to be replaced or repaired. The system, upon completion of the replacement or repair, as approved by the Board of Health, will pass.

Answer yes, no or not determined (Y,N,ND) in the ____ for the following statements. If "not determined" please explain.

_____ The septic tank is metal and over 20 years old* **or** the septic tank (whether metal or not) is structurally unsound, exhibits substantial infiltration or exfiltration or tank failure is imminent. System will pass inspection if the existing tank is replaced with a complying septic tank as approved by the Board of Health.
*A metal septic tank will pass inspection if it is structurally sound, not leaking and if a Certificate of Compliance indicating that the tank is less than 20 years old is available.

ND explain:

_____ Observation of sewage backup or break out or high static water level in the distribution box due to broken or obstructed pipe(s) or due to a broken, settled or uneven distribution box. System will pass inspection if (with approval of Board of Health):

____ broken pipe(s) are replaced
____ obstruction is removed
____ distribution box is leveled or replaced

ND explain:

_____ The system required pumping more than 4 times a year due to broken or obstructed pipe(s). The system will pass inspection if (with approval of the Board of Health):

____ broken pipe(s) are replaced
____ obstruction is removed

ND explain:

OFFICIAL INSPECTION FORM - NOT FOR VOLUNTARY ASSESSMENTS
SUBSURFACE SEWAGE DISPOSAL SYSTEM INSPECTION FORM
PART A
CERTIFICATION (continued)

Property Address: 1300 MASS AVE
BOXBOROUGH
Owner: BERTECH BOXBORO LLC & BER TECH
Date of Inspection: 10-16-01

C. Further Evaluation is Required by the Board of Health:

_____ Conditions exist which require further evaluation by the Board of Health in order to determine if the system is failing to protect public health, safety or the environment.

1. **System will pass unless Board of Health determines in accordance with 310 CMR 15.303(1)(b) that the system is not functioning in a manner which will protect public health, safety and the environment:**

___ Cesspool or privy is within 50 feet of a surface water
___ Cesspool or privy is within 50 feet of a bordering vegetated wetland or a salt marsh

2. **System will fail unless the Board of Health (and Public Water Supplier, if any) determines that the system is functioning in a manner that protects the public health, safety and environment:**

___ The system has a septic tank and soil absorption system (SAS) and the SAS is within 100 feet of a surface water supply or tributary to a surface water supply.

___ The system has a septic tank and SAS and the SAS is within a Zone 1 of a public water supply.

___ The system has a septic tank and SAS and the SAS is within 50 feet of a private water supply well.

___ The system has a septic tank and SAS and the SAS is less than 100 feet but 50 feet or more from a private water supply well**. Method used to determine distance _____

**This system passes if the well water analysis, performed at a DEP certified laboratory, for coliform bacteria and volatile organic compounds indicates that the well is free from pollution from that facility and the presence of ammonia nitrogen and nitrate nitrogen is equal to or less than 5 ppm, provided that no other failure criteria are triggered. A copy of the analysis must be attached to this form.

3. **Other:**

_____
_____
_____

OFFICIAL INSPECTION FORM – NOT FOR VOLUNTARY ASSESSMENTS
SUBSURFACE SEWAGE DISPOSAL SYSTEM INSPECTION FORM
PART A
CERTIFICATION (continued)

Property Address: 1300 MASS AVE
Boxbough
Owner: BER TECH Boxbough LLC & BER TECH
Date of Inspection: 10-16-01

D. System Failure Criteria applicable to all systems:
You **must** indicate "yes" or "no" to each of the following for **all** inspections:

Yes No
___ ___ Backup of sewage into facility or system component due to overloaded or clogged SAS or cesspool
___ ___ Discharge or ponding of effluent to the surface of the ground or surface waters due to an overloaded or clogged SAS or cesspool
___ ___ Static liquid level in the distribution box above outlet invert due to an overloaded or clogged SAS or cesspool
___ ___ Liquid depth in cesspool is less than 6" below invert or available volume is less than ½ day flow
___ ___ Required pumping more than 4 times in the last year NOT due to clogged or obstructed pipe(s). Number of times pumped ____.
___ ___ Any portion of the SAS, cesspool or privy is below high ground water elevation.
___ ___ Any portion of cesspool or privy is within 100 feet of a surface water supply or tributary to a surface water supply.
___ ___ Any portion of a cesspool or privy is within a Zone 1 of a public well.
___ ___ Any portion of a cesspool or privy is within 50 feet of a private water supply well.
___ ___ Any portion of a cesspool or privy is less than 100 feet but greater than 50 feet from a private water supply well with no acceptable water quality analysis. **[This system passes if the well water analysis, performed at a DEP certified laboratory, for coliform bacteria and volatile organic compounds indicates that the well is free from pollution from that facility and the presence of ammonia nitrogen and nitrate nitrogen is equal to or less than 5 ppm, provided that no other failure criteria are triggered. A copy of the analysis must be attached to this form.]**

_____ (Yes/No) **The system fails.** I have determined that one or more of the above failure criteria exist as described in 310 CMR 15.303, therefore the system fails. The system owner should contact the Board of Health to determine what will be necessary to correct the failure.

E. Large Systems:
To be considered a large system the system must serve a facility with a design flow of 10,000 gpd to 15,000 gpd.
You must indicate either "yes" or "no" to each of the following:
(The following criteria apply to large systems in addition to the criteria above)

yes no
___ ___ the system is within 400 feet of a surface drinking water supply

___ ___ the system is within 200 feet of a tributary to a surface drinking water supply

___ ___ the system is located in a nitrogen sensitive area (Interim Wellhead Protection Area – IWPA) or a mapped Zone II of a public water supply well

If you have answered "yes" to any question in Section E the system is considered a significant threat, or answered "yes" in Section D above the large system has failed. The owner or operator of any large system considered a significant threat under Section E or failed under Section D shall upgrade the system in accordance with 310 CMR 15.304. The system owner should contact the appropriate regional office of the Department.

OFFICIAL INSPECTION FORM – NOT FOR VOLUNTARY ASSESSMENTS
SUBSURFACE SEWAGE DISPOSAL SYSTEM INSPECTION FORM
PART B
CHECKLIST

Property Address: 1300 MASS AVE Boxborough

Owner: BER TECH Boxborough LLC & BER TECH

Date of Inspection: 10-16-01

Check if the following have been done. You **must** indicate "yes" or "no" as to each of the following:

Yes No

YES ___ Pumping information was provided by the owner, occupant, or Board of Health

___ NO Were any of the system components pumped out in the previous two weeks ?

YES ___ Has the system received normal flows in the previous two week period ?

___ NO Have large volumes of water been introduced to the system recently or as part of this inspection ?

YES ___ Were as built plans of the system obtained and examined? (If they were not available note as N/A)

YES ___ Was the facility or dwelling inspected for signs of sewage back up ?

YES ___ Was the site inspected for signs of break out ?

YES ___ Were all system components, excluding the SAS, located on site ?

YES ___ Were the septic tank manholes uncovered, opened, and the interior of the tank inspected for the condition of the baffles or tees, material of construction, dimensions, depth of liquid, depth of sludge and depth of scum ?

YES ___ Was the facility owner (and occupants if different from owner) provided with information on the proper maintenance of subsurface sewage disposal systems ?

The **size and location of the Soil Absorption System (SAS)** on the site has been determined based on:

Yes no

YES ___ Existing information. For example, a plan at the Board of Health.

___ ___ Determined in the field (if any of the failure criteria related to Part C is at issue approximation of distance is unacceptable) [310 CMR 15.302(3)(b)]

OFFICIAL INSPECTION FORM – NOT FOR VOLUNTARY ASSESSMENTS
SUBSURFACE SEWAGE DISPOSAL SYSTEM INSPECTION FORM
PART C
SYSTEM INFORMATION

Property Address: 1300 MASS AVE Boxborough

Owner: BERTECH BOXBOUGH LLC & BERTECH

Date of Inspection: 10-16-01

FLOW CONDITIONS

RESIDENTIAL

Number of bedrooms (design): ____ Number of bedrooms (actual): N/A

DESIGN flow based on 310 CMR 15.203 (for example: 110 gpd x # of bedrooms): _____

Number of current residents: _____

Does residence have a garbage grinder (yes or no): ___

Is laundry on a separate sewage system (yes or no): ___ [if yes separate inspection required]

Laundry system inspected (yes or no): ___

Seasonal use: (yes or no): ___

Water meter readings, if available (last 2 years usage (gpd)): _____

Sump pump (yes or no): ___

Last date of occupancy: _____

COMMERCIAL/INDUSTRIAL

Type of establishment: RESEARCH & DEVELOPEMENT 60,000 SQ FT

Design flow (based on 310 CMR 15.203): 4,500 gpd

Basis of design flow (seats/persons/sqft,etc.): @ 75 GAL/1,000 SQ FT, 4500 gpd.

Grease trap present (yes or no): NO

Industrial waste holding tank present (yes or no): NO

Non-sanitary waste discharged to the Title 5 system (yes or no): NO

Water meter readings, if available: PRIVATE WATER SUPPLY

Last date of occupancy/use: PRESENT

OTHER (describe): _____

GENERAL INFORMATION

Pumping Records

Source of information: LAST PUMPED 1-11-00

Was system pumped as part of the inspection (yes or no): YES

If yes, volume pumped: 9,000 gallons -- How was quantity pumped determined? MEASURED

Reason for pumping: T-5 INSPECTION

TYPE OF SYSTEM

YES Septic tank, distribution box, soil absorption system

___ Single cesspool

___ Overflow cesspool

___ Privy

___ Shared system (yes or no) (if yes, attach previous inspection records, if any)

___ Innovative/Alternative technology. Attach a copy of the current operation and maintenance contract (to be obtained from system owner)

___ Tight tank ___ Attach a copy of the DEP approval

___ Other (describe): _____

Approximate age of all components, date installed (if known) and source of information:

INSTALLED 1987 APPROX 14 YEARS OLD

Were sewage odors detected when arriving at the site (yes or no): NO

OFFICIAL INSPECTION FORM – NOT FOR VOLUNTARY ASSESSMENTS
SUBSURFACE SEWAGE DISPOSAL SYSTEM INSPECTION FORM
PART C
SYSTEM INFORMATION (continued)

Property Address: 1300 MASS AVE
BOXBOROUGH
Owner: BER TECH Boxborough LLC & BER TECH
Date of Inspection: 10-16-01

BUILDING SEWER (locate on site plan)

Depth below grade: 4'
Materials of construction: ___cast iron ___40 PVC ___other (explain): CAST LEAVING BUILDING 6" PVC ENTERING TANK
Distance from private water supply well or suction line: _____
Comments (on condition of joints, venting, evidence of leakage, etc.):
ALL USABLE PIPE IN GOOD CONDITION
NO EVIDENCE OF LEAKAGE

SEPTIC TANK: ___ (locate on site plan)

Depth below grade: 3' INLET BUILT-UP TO SURFACE
Material of construction: X concrete ___metal ___fiberglass ___polyethylene
___other(explain)_____
If tank is metal list age: ___ Is age confirmed by a Certificate of Compliance (yes or no): ___ (attach a copy of certificate)
Dimensions: 10'W x 17'L x 8'D
Sludge depth: 28"
Distance from top of sludge to bottom of outlet tee or baffle: _____
Scum thickness: 1"
Distance from top of scum to top of outlet tee or baffle: 6"
Distance from bottom of scum to bottom of outlet tee or baffle: 23"
How were dimensions determined: MEASURED
Comments (on pumping recommendations, inlet and outlet tee or baffle condition, structural integrity, liquid levels as related to outlet invert, evidence of leakage, etc.):
RECOMMEND PUMPING EVERY 6 MONTHS INLET & OUTLET TEES INTACT TANK AT PROPER WORKING LEVEL

GREASE TRAP: ___(locate on site plan)

N/A

Depth below grade: ___
Material of construction: ___concrete ___metal ___fiberglass ___polyethylene ___other (explain):_____
Dimensions: _____
Scum thickness: _____
Distance from top of scum to top of outlet tee or baffle: _____
Distance from bottom of scum to bottom of outlet tee or baffle: _____
Date of last pumping: _____
Comments (on pumping recommendations, inlet and outlet tee or baffle condition, structural integrity, liquid levels as related to outlet invert, evidence of leakage, etc.):
_____
_____

OFFICIAL INSPECTION FORM – NOT FOR VOLUNTARY ASSESSMENTS
SUBSURFACE SEWAGE DISPOSAL SYSTEM INSPECTION FORM
PART C
SYSTEM INFORMATION (continued)

Property Address: 1300 MASS AVE
Boxborough
Owner: BER TECH BOXBORO LLC & BER TECH
Date of Inspection: 10-16-01

TIGHT or HOLDING TANK: ____ (tank must be pumped at time of inspection)(locate on site plan)

Depth below grade: _____
Material of construction: ____concrete ____metal ____fiberglass ____polyethylene ____other(explain):
N/A
Dimensions: _____
Capacity: _____gallons
Design Flow: _____gallons/day
Alarm present (yes or no): _____
Alarm level: _____ Alarm in working order (yes or no): ____
Date of last pumping: _____
Comments (condition of alarm and float switches, etc.):

34'6" BETWEEN BOXES

DISTRIBUTION BOX: YES (if present must be opened)(locate on site plan) (2) 24"L x 12"W BOTH CAST IRON COVERS BUILT TO GRADE

Depth of liquid level above outlet invert: 0
Comments (note if box is level and distribution to outlets equal, any evidence of solids carryover, any evidence of leakage into or out of box, etc.):
BOTH D-BOX LEVEL NO EVIDENCE OF SOLIDS CARRYOVER NO LEAKAGE INTO OR OUT OF BOX

15'L x 9'W x 14'D

PUMP CHAMBER: YES (locate on site plan)

Pumps in working order (yes or no): YES
Alarms in working order (yes or no): YES
Comments (note condition of pump chamber, condition of pumps and appurtenances, etc.):
PUMP CHAMBER VENT IS MISSING FILTER ALSO BROKEN OFF AT OUTSIDE CHAMBER WALL

OFFICIAL INSPECTION FORM – NOT FOR VOLUNTARY ASSESSMENTS
SUBSURFACE SEWAGE DISPOSAL SYSTEM INSPECTION FORM
PART C
SYSTEM INFORMATION (continued)

Property Address: 1300 MASS AVE
BOXBOROUGH
Owner: BER TECH BOXBOROUGH L.L.C. & BER TECH
Date of Inspection: 10-16-01

SOIL ABSORPTION SYSTEM (SAS): ____ **(locate on site plan, excavation not required)**

If SAS not located explain why:

Type
____ leaching pits, number: ___
____ leaching chambers, number: ____
____ leaching galleries, number: ____
____ leaching trenches, number, length: _____
2 leaching fields, number, dimensions: 60' x 95' TOTAL
____ overflow cesspool, number: ____
____ innovative/alternative system Type/name of technology: _____
Comments (note condition of soil, signs of hydraulic failure, level of ponding, damp soil, condition of vegetation, etc.):
DRY, FINE TO COARSE GRAVEL DRY NO SIGNS OF PONDING OR HYDRAULIC FAILURE

CESSPOOLS: ____ (cesspool must be pumped as part of inspection)(locate on site plan)

Number and configuration: _____
Depth – top of liquid to inlet invert: _____
Depth of solids layer: _____
Depth of scum layer: _____
Dimensions of cesspool: _____
Materials of construction: _____
Indication of groundwater inflow (yes or no): ____
Comments (note condition of soil, signs of hydraulic failure, level of ponding, condition of vegetation, etc.):

N/A

PRIVY: ____ (locate on site plan)

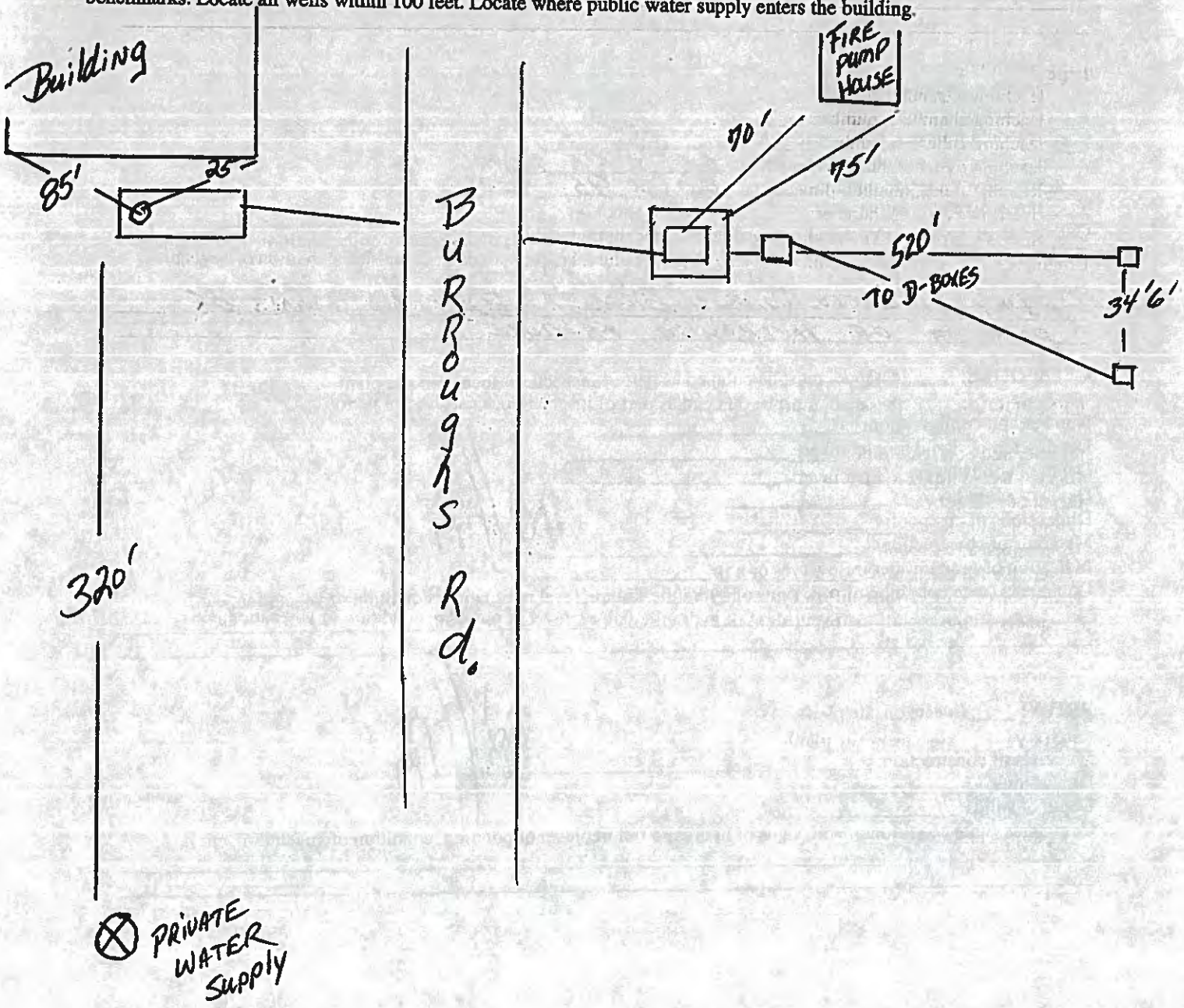
Materials of construction: _____
Dimensions: _____
Depth of solids: _____
Comments (note condition of soil, signs of hydraulic failure, level of ponding, condition of vegetation, etc.):

N/A

OFFICIAL INSPECTION FORM – NOT FOR VOLUNTARY ASSESSMENTS
SUBSURFACE SEWAGE DISPOSAL SYSTEM INSPECTION FORM
PART C
SYSTEM INFORMATION (continued)

Property Address: 1300 MASS AVE
Boxborough
Owner: BERTECH LLC & BERTECH
Date of Inspection: 10-16-01

SKETCH OF SEWAGE DISPOSAL SYSTEM
Provide a sketch of the sewage disposal system including ties to at least two permanent reference landmarks or benchmarks. Locate all wells within 100 feet. Locate where public water supply enters the building.



OFFICIAL INSPECTION FORM – NOT FOR VOLUNTARY ASSESSMENTS
SUBSURFACE SEWAGE DISPOSAL SYSTEM INSPECTION FORM
PART C
SYSTEM INFORMATION (continued)

Property Address: 1300 MASS AVE BOXBORO
Owner: BERTECH BOXBORO LLC & BER TECH
Date of Inspection: 10-16-01

SITE EXAM
Slope
Surface water
Check cellar
Shallow wells

Estimated depth to ground water 8' feet

Please indicate (check) all methods used to determine the high ground water elevation:

YES Obtained from system design plans on record - If checked, date of design plan reviewed: REVIEWED 10/16/01
___ Observed site (abutting property/observation hole within 150 feet of SAS)
___ Checked with local Board of Health-explain: _____
___ Checked with local excavators, installers- (attach documentation)
___ Accessed USGS database-explain: _____

You must describe how you established the high ground water elevation:
NO GROUND WATER FOUND ON TEST PIT #5 35436
AT 10' BG 4-26-84
TEST PIT # 14 GROUND WATER OBSERVED AT 8' BG.
TEST PIT # 14 IS IN CURRENT LEACH FIELD

TEST PIT DATA 4-26-84
BY ROBINSON & FOX WITNESS BY LYNDA FOGARTY NASHOBA B.O.H.
TEST PITS #38 – 42 DATED 3-2-85

DATE AUGUST 17, 1984	SCALE AS NOTED	
DESIGNED BY DAVID L. BRAMLEY		
CHECKED BY RANDY WATERMAN		
DRAWN BY COLLEEN COURTNEY		
SHEET NO. 7 OF 9	JOB NO. W-01	DWG NO. W-01.00.03

TITLE

SUBSURFACE SEWAGE DISPOSAL SYSTEM
PLAN & PROFILE
in
BOXBOROUGH, MA.
(MIDDLESEX COUNTY)

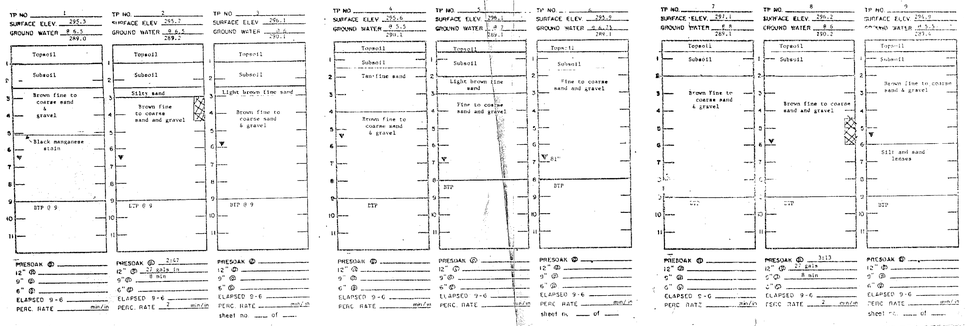
PREPARED FOR
MUNN/HINES CO.
% HINES INDUSTRIAL
124 MT. AUBURN STREET
CAMBRIDGE, MASSACHUSETTS
02138-5701

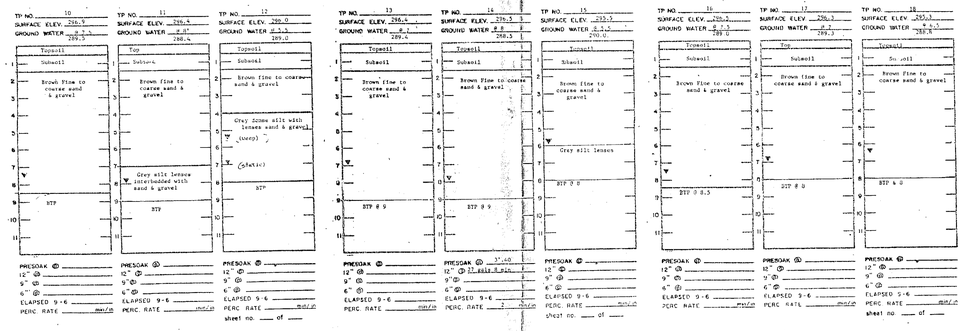
BEALS AND THOMAS, INC.
Two Westborough Business Park
200 Friberg Parkway
Westborough, Massachusetts
01581
(617) 366-0560

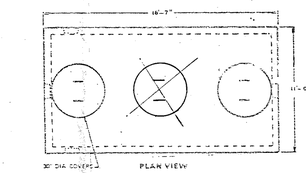
REVISIONS
NO. DATE
1 6/27/85 REVISE PROFILE

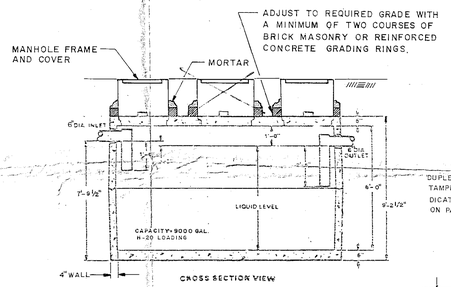
TEST PIT LOGS

BY: ROBINSON & FOX
NASHOBA B.O.H. INSPECTOR: LYNDA FOGARTY
4/26/84

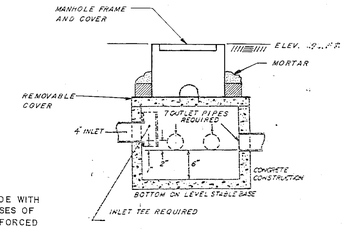




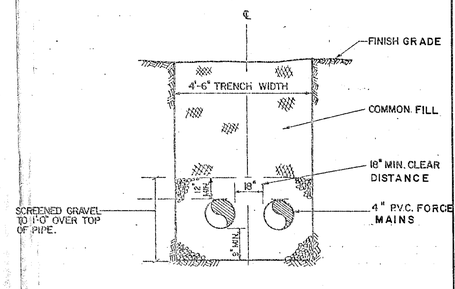




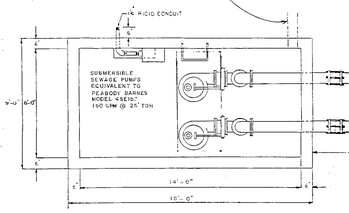
SEPTIC TANK
NOT TO SCALE

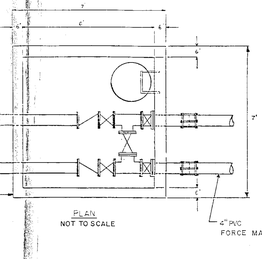


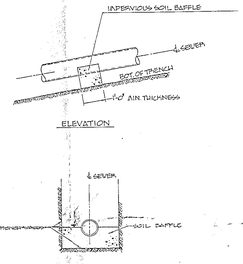
DISTRIBUTION BOX
NOT TO SCALE



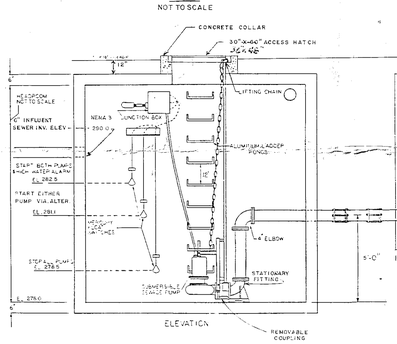
TYPICAL SEWER FORCE MAIN DETAIL
NOT TO SCALE

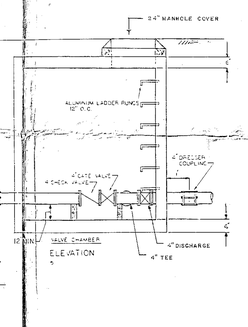




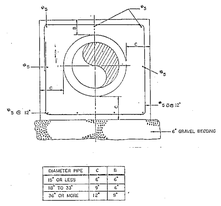


TRENCH BAFFLE DETAILS
NOT TO SCALE



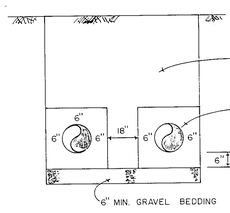


PUMP STATION & VALVE BOX
NOT TO SCALE



DIAMETER PIPE	C	D
10" OR LESS	6"	6"
12" TO 32"	9"	9"
36" OR MORE	12"	9"

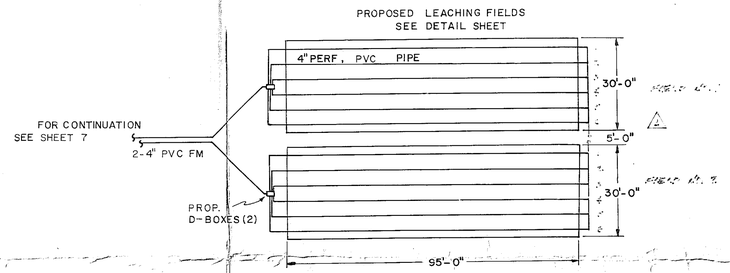
REINFORCEMENT DETAIL
NOT TO SCALE



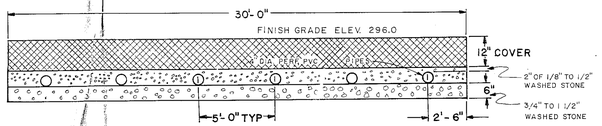
CONCRETE ENCASEMENT
NOT TO SCALE

NOTE:
FORCE MAINS TO BE ENCASED SEPARATELY. FOR REINFORCEMENT SEE DETAIL. CONCRETE MIX TO INCLUDE LOW-ALKALI PORTLAND CEMENT OR CONCRETE COMPLYING WITH ASTM C295.

PROPOSED LEACHING FIELDS
SEE DETAIL SHEET



PLAN
1"= 20'



LEACHING FIELD
NOT TO SCALE

SCHEDULE OF ELEVATIONS

		AS-BUILT ⚠2
INVERT AT BUILDING	297.00	293.74
INVERT INTO SEPTIC TANK	295.35	293.41
INVERT OUT OF SEPTIC TANK	295.10	293.42
INVERT INTO PUMP STATION	290.00	290 E
INVERT OUT OF PUMP STATION	282.70	283.1
INVERT AT VALVE CHAMBER	282.75	283.1
INVERT INTO DISTRIBUTION BOX	294.72	D-BOX 1 294.84 D-BOX 2 294.93
INVERT OUT OF DISTRIBUTION BOX	294.55	" 294.76 " 294.79
INVERT AT START LEACHING FIELD	294.47	294.67-294.49 (CONSISTENT WITH INV'S AT END OF SYSTEM)
INVERT AT END OF LEACHING FILED	294.00	
MAXIMUM OBSERVED GROUNDWATER	289.50	
BOTTOM OF FIELD	293.50	
BUILDING AREA (SF)	60,000	
WASTEWATER GENERATION @ 75 GAL/1000 SF (GPD)	4,500	
PERCOLATION RATE (MIN/INCH)	2	
LEACHING AREA REQUIRED (SF)	4,500	
LEACHING AREA PROVIDED (SF)	5,700	
LEACHING FIELD DIMENSIONS (FT)	2 @ 30W x 95L	

I,1	294.00
I,2	294.15
I,4	294.18
I,5	294.04
I,4	294.16
I,6	294.20

REVISIONS
NO. DATE
1 11/1/84 AS-BUILT INFORMATION ADDED
2 3/4/85 PUMP STATION ELEVATIONS, DETAILS

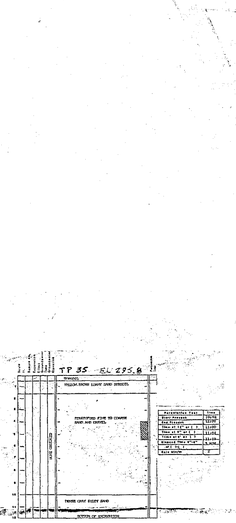
Donald L. Bramley

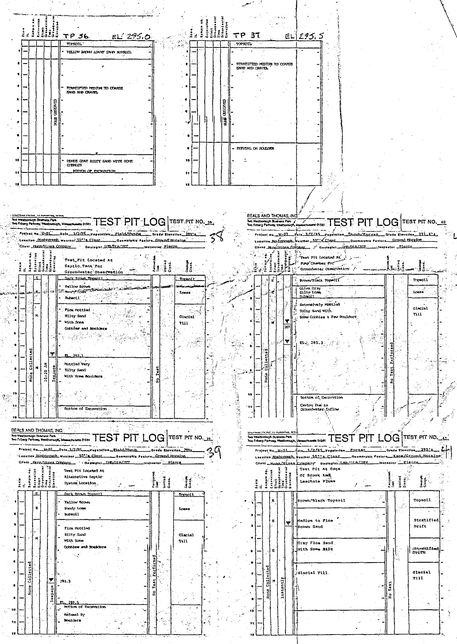
BEALS AND THOMAS, INC.
Two Westborough Business Park
200 Friberg Parkway
Westborough, Massachusetts 01581
(617) 366-0560

PREPARED FOR
MUNN/HINES CO
% HINES INDUSTRIAL
124 MT. AUBURN STREET
CAMBRIDGE, MASSACHUSETTS
02138-5701

TITLE
SUBSURFACE SEWAGE DISPOSAL DETAIL
BOXBOROUGH, MA.
(MIDDLESEX COUNTY)

DATE	AUGUST 17, 1984
SCALE	AS NOTED
DESIGNED BY	DAVID L. BRAMLEY
CHECKED BY	RANDY WATERMAN
DRAWN BY	KEVIN M. McCARTHY
SHEET NO.	9 OF 9
JOB NO.	W-01
DWG NO.	W-01.0005





NOTE:
TEST PITS 35-37 EXCAVATED 9/10/84
TEST PITS 38-42 EXCAVATED 3/2/85

NOTE:

FOR ADDITIONAL TEST PIT INFORMATION CONTAINING SOIL TYPE AND GROUNDWATER CONDITIONS, SEE SHEET 9 OF 9.

SCHEDULE OF ELEVATIONS	
INVERT AT BUILDING	297.00
INVERT INTO SEPTIC TANK	295.35
INVERT OUT OF SEPTIC TANK	295.10
INVERT INTO PUMP STATION	290.00
INVERT OUT OF PUMP STATION	282.70
INVERT AT VALVE CHAMBER	282.75
INVERT INTO DISTRIBUTION BOX	294.72
INVERT OUT OF DISTRIBUTION BOX	294.55
INVERT AT START OF LEACHING FIELD	294.47
INVERT AT END OF LEACHING FISLD	294.00
MAXIMUM OBSERVED GROUNDWATER	289.50
BOTTOM OF FIELD	293.50
BUILDING AREA (SF)	60,000
WASTEWATER GENERATION 375GPD/1000SF	4,500
PERCOLATION RATE (MIN/INCH)	2
LEACHING AREA REQUIRED (SF)	4,500
LEACHING AREA PROVIDED (SF)	5,700
LEACHING FIELD DIMENSIONS (FT)	2 @ 30W x 95L

LEGEND
TP #F -TEST PIT LOCATION & NUMBER
TP #F -INDICATES DEEP TEST HOLE

REVISIONS NO.	DATE
1	3/4/85 ADDED TEST PITS

BEALS AND THOMAS, INC.
Two Westborough Business Park
200 Friberg Parkway
Westborough, Massachusetts 01581
(617) 366-0560

PREPARED FOR
MUNN/HINES CO.
%HINES INDUSTRIAL
124 MT. AUBURN STREET
CAMBRIDGE, MASSACHUSETTS
02138-5701

TITLE
SUBSURFACE SEWAGE DISPOSAL SYSTEM
IN
BOXBOROUGH, MA.
(MIDDLESEX COUNTY)

DATE AUGUST 17, 1984
SCALE 1" = 20'
DESIGNED BY DAVID L. BRAMLEY
CHECKED BY RANDY WATERMAN
DRAWN BY KEVIN M. McCARTHY
SHEET NO. 8 OF 9
JOB NO. W-01
DWG NO. W-01.0008

APPENDIX I:

Water Utility Information

Source Water Assessment Program (SWAP) Report
For
KURIAN LIMITED PARTNERSHIP

Prepared by the Massachusetts Department of Environmental Protection, Bureau of Resource Protection, Drinking Water Program

Date Prepared:
July 3, 2001

Table 1: Public Water System (PWS) Information

PWS NAME	KURIAN LIMITED PARTNERSHIP
PWS Address	1300 MASSACHUSETTS AVE.
City/Town	BOXBOROUGH
PWS ID Number	2037020
Local Contact	DEBORAH BRAY
Phone Number	(978) 486-3395

Well Name	*Source ID#*	*Zone I (in feet)*	*IWPA (in feet)*	*Source Susceptibility*
Well #1	2037020-O1G	379	2000	Moderate
Well #2	2037020-O2G	385	2155	Moderate

What is SWAP?

The Source Water Assessment Program (SWAP), established under the federal Safe Drinking Water Act, requires every state to:

? inventory land uses within the recharge areas of all public water supply sources;
? assess the susceptibility of drinking water sources to contamination from these land uses; and
? publicize the results to provide support for improved protection.

Maintaining Your Good Water Quality

Susceptibility of a drinking water source does *not* imply poor water quality. Actual water quality is best reflected by the results of regular water tests.

Water suppliers protect drinking water by monitoring for more than 100 chemicals, treating water supplies, and using source protection measures to ensure that safe water is delivered to the tap.

Introduction

We are all concerned about the quality of the water we drink. Drinking water wells may be threatened by many potential contaminant sources, including septic systems, road salting, and improper disposal of hazardous materials. Citizens and local officials can work together to better protect these drinking water sources.

Purpose of this report:
This report is a planning tool to support local and state efforts to improve water supply protection. By identifying land uses within water supply protection areas that may be potential contaminant sources, the assessment helps focus protection efforts on appropriate best management practices (BMPs) and drinking water source protection measures. Department of Environmental Protection (DEP) staff are available to provide information about funding and other resources that may be available to your community.

This report includes:
1. Description of the Water System
2. Discussion of Land Uses within Protection Areas
3. Recommendations for Protection
4. Attached Map of the Protection Areas
5.

1. Description of the Water System

The two wells for Kurian Limited Partnership are located on the northeast portion of the site. The wells are six-inch wells that were drilled in bedrock, each well to a depth of 250 feet. Well #1 has a Zone I of 379 feet and an Interim Wellhead Protection Area (IWPA) of 2000 feet, and Well #2 has a Zone I of 385 feet and an Interim Wellhead Protection Area (IWPA) of 2155 feet. The wells are located in an aquifer with a high vulnerability to contamination due to the absence of hydrogeologic barriers that can prevent contaminant migration. Please refer to the attached map of the Zone Is and IWPAs. The wells serving the facility have no treatment at this time. For current information on monitoring results and treatment, please contact the Public Water System contact person listed above in Table 1.

What is a Protection Area?

A well's water supply protection area is the land around the well where protection activities should be focused. Each well has a Zone I protective radius and an Interim Wellhead Protection Area (IWPA).

- **The Zone I** is the area that should be owned or controlled by the water supplier and limited to water supply activities.

- **The IWPA** is the larger area that is likely to contribute water to the well.

In many instances the IWPA does not include the entire land area that could contribute water to the well. Therefore, the well may be susceptible to contamination from activities outside of the IWPA that are not identified in this report.

What is Susceptibility?

Susceptibility is a measure of a well's potential to become contaminated due to land uses and activities within the Zone I and Interim Wellhead Protection Area (IWPA).

2. Discussion of Land Uses in the Protection Areas

There are a number of land uses and activities within the drinking water supply protection areas that are potential sources of contamination.

Key issues include:

1. **Inappropriate activities in Zone Is;**
2. **Landscaping and Lawncare**
3. **Septic system within the IWPA; and**
4. **Transportation corridor .**

The overall ranking of susceptibility to contamination for the well is Moderate, based on the presence of only moderate and low threat land uses in the IWPA.

1. **Zone Is** - Currently, the well does not meet DEP's restrictions, which only allow water supply related activities in Zone Is. The facility's Zone Is contain parking areas and a portion of the on-site building. Please note that systems not meeting DEP Zone I requirements must get DEP approval and address Zone I issues prior to increasing water use or modifying systems.

   Recommendation:

   ✓ Remove all non-water supply activities from the Zone I to comply with DEP's Zone I requirements. Please note that water systems not meeting DEP Zone I requirements must get DEP approval and address Zone I issues prior to increasing water use or modifying their system.

   ✓ If the facility intends to continue utilizing the structures and parking in the Zone Is, use BMPs and restrict activities that could pose a threat to the water supply.

2. **Landscaping and lawncare** - Fertilizer is applied to the lawn that is located within the Zone I and IWPA. Fertilizers and pesticides, if improperly applied or stored, can be potential sources of contamination to the water supply.

   Recommendations:

   ✓ Do not use fertilizers or pesticides in the Zone I.

   ✓ Use best management practices when applying fertilizer in the IWPA.

3. **Septic systems** - The septic system is located within the IWPA of the wells. If a septic system fails or is not properly maintained it could be a potential source of microbial contamination. Improper disposal of household hazardous chemicals to septic systems is a potential source of contamination to the water supply.

Table 2: Table of Activities within the Water Supply Protection Areas

Facility Type	Potential Contaminant Sources	Zone I	IWPA	Threat	Comments
Commercial	Parking lot	Yes	Yes	Moderate	Limit road salt usage and provide drainage away from wells
	Landscaping and lawn care	Yes	Yes	Moderate	Fertilizer and pesticide use
	Septic System	No	Yes	Moderate	See septic systems brochure in the appendix
	Transportation corridor	No	Yes	Moderate	Limit road salt usage and provide drainage away from wells

*** -For more information on Contaminants of Concern associated with individual facility types and land uses please see the SWAP Draft Land Use / Associated Contaminants Matrix on DEP's website - www.state.ma.us/dep/brp/dws/.**

Glossary

Zone I: The area closest to a well; a 100 to 400 foot radius proportional to the well's pumping rate. To determine your Zone I radius, refer to the attached map.

IWPA: A 400 foot to ½ mile radius around a public water supply well proportional to its pumping rate; the area DEP recommends for protection in the absence of a defined Zone II. To determine IWPA radius, refer to the attached map.

Zone II: The primary recharge area defined by a hydrogeologic study.

Aquifer: An underground water-bearing layer of permeable material that will yield water in a usable quantity to a well.

Hydrogeologic Barrier: An underground layer of impermeable material that resists penetration by water.

Recharge Area: The surface area that contributes water to a well.

Recommendations:

- ✓ Staff should be instructed on the proper disposal of spent household chemicals. Include custodial staff, groundskeepers, and certified operator.
- ✓ Septic system components should be located, inspected, and maintained on a regular basis. Refer to the appendices for more information regarding.

4. **Transportation Corridor –** Route 111 (Massachusetts Avenue) is located within the IWPA. Major roads are potential sources of contamination due to salting of roadways and leaks or spills of fuels and other hazardous materials during accidents.
Recommendation:
   - ✓ Contact local fire department to ensure that the IWPA is included in Emergency Response Planning.

5. **Presence of a contamination site within the IWPA** The IWPA contains a DEP Tier Classified Oil and/or Hazardous Material Release Site indicated on the map as Release Tracking Number 2-0026. The referenced site is a gas station with underground storage tanks (USTs) (see #2 above). The site's responsible party is cleaning up the site and monitoring groundwater quality. See the attached map and Appendix 1 for more information.

Implementing the following recommendations will reduce the system's susceptibility to contamination.

3. Protection Recommendations

Kurian Limited Partnership should review and adopt the following recommendations at the facility:

Zone I:

- ✓ Keep non-water supply activities out of the Zone I
- ✓ Consider well relocation if Zone I threats cannot be mitigated. Please note that DEP Permit Approvals must be obtained prior to the installation of a new well.
- ✓ Do not use or store pesticides, fertilizers or road salt within Zone I.

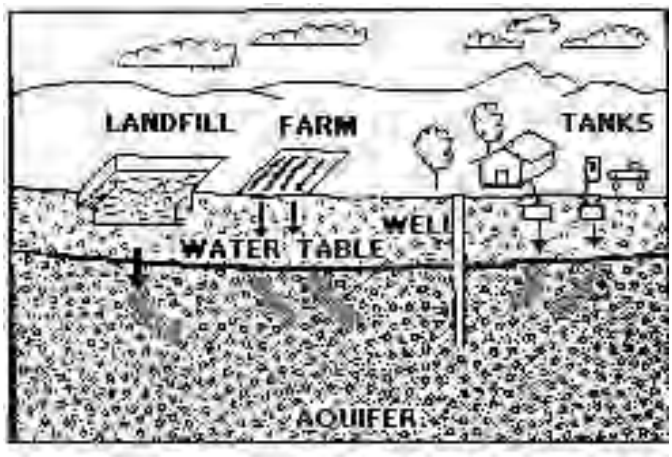


Figure 1: Example of how a well could become contaminated by different land uses and activities.

Training and Education:

- ✓ Train staff on proper hazardous material use, disposal, emergency response, and best management practices; include custodial staff, groundskeepers, and certified operator.
- ✓ Post drinking water protection area signs at key visibility locations.

Facilities Management:

- ✓ Implement standard operating procedures regarding proper storage, use and disposal of hazardous materials.
- ✓ Implement Best Management Practices (BMPs) for the use of fertilizer, herbicides and pesticides on facility property.

For More Information:

Contact Josephine Yemoh-Ndi in DEP's Worcester Office at (508) 792-7650 x 5030 for more information and for assistance in improving current protection measures.

More information relating to drinking water and source protection is available on DEP's web site at: www.state.ma.us/dep/brp/dws.

Copies of this assessment have been provided to the water department, town boards, the town library and the local media.

Planning:

- ✓ Work with local officials in Boxborough to include the facility's IWPA in Aquifer Protection District Bylaws and to assist you in improving protection.
- ✓ Have a plan to address short-term water shortages and long-term water demands. Keep the phone number of a bottled water company readily available.
- ✓ Supplement the SWAP assessment with additional local information and incorporate it into water supply educational efforts. Use a potential contaminant threat inventory to assist in setting priorities, focusing inspections, and creating educational activities.

These recommendations are only part of your ongoing local drinking water source protection. Citizens and community officials should use this SWAP report to spur discussion of local drinking water protection measures.

4. Attachments:

- Map of the Public Water Supply (PWS) Protection Area.
- Recommended Source Protection Measures Factsheet
- Your Septic System Brochure
- Pesticide Use Factsheet
- Source Protection Sign Order Form

5. Appendix

1. Table of DEP Regulated Chapter 21E Hazardous Materials Release Sites within the Water Supply Protection Areas

APPENDIX 1 – Table of Tier Classified Oil and/or Hazardous Material Sites within the Water Supply Protection Areas

DEP's datalayer depicting oil and/or hazardous material (OHM) sites is a statewide point data set that contains the approximate location of known sources of contamination that have been both reported and classified under Chapter 21E of the Massachusetts General Laws. Location types presented in the layer include the approximate center of the site, the center of the building on the property where the release occurred, the source of contamination, or the location of an on-site monitoring well. Although this assessment identifies OHM sites near the source of your drinking water, the risks to the source posed by each site may be different. The kind of contaminant and the local geology may have an effect on whether the site poses an actual or potential threat to the source.

The DEP's Chapter 21E program relies on licensed site professionals (LSPs) to oversee cleanups at most sites, while the DEP's Bureau of Waste Site Cleanup (BWSC) program retains oversight at the most serious sites. This privatized program obliges potentially responsible parties and LSPs to comply with DEP regulations (the Massachusetts Contingency Plan – MCP), which require that sites within drinking water source protection areas be cleaned up to drinking water standards.

For more information about the state's OHM site cleanup process to which these sites are subject and how this complements the drinking water protection program, please visit the BWSC web page at http://www.state.ma.us/dep/bwsc. You may obtain site -specific information two ways: by using the BWSC Searchable Sites database at http://:www.state.ma.us/dep/bwsc/sitellst.htm, or you may visit the DEP regional office and review the site file. These files contain more detailed information, including cleanup status, site history, contamination levels, maps, correspondence and investigation reports, however you must call the regional office in order to schedule an appointment to view the file.

The table below contains the list of Tier Classified oil and/or Hazardous Material Release Sites that are located within your drinking water source protection area.

Table 1: Bureau of Waste Site Cleanup Tier Classified Oil and/or Hazardous Material Release Sites (Chapter 21E Sites) - Listed by Release Tracking Number (RTN)

RTN	Release Site Address	Town	Contaminant Type
2-0026	1425 Massachusetts Ave.	Boxborough	Oil

For more location information, please see the attached map. The map lists the release sites by RTN.

POSTED FOR CUSTOMER REVIEW AS REQUIRED BY THE MASSACHUSETTS DEP/DWP

Massachusetts Drinking Water Regulations 310 CMR 22.16A (23)

2019 DRINKING WATER QUALITY REPORT

For the period January 1, 2018 to December 31, 2018

1300 MASS AVE
PWS ID: 2037020
1300 MASSACHUSETTS AVE
BOXBOROUGH MA 01719

The drinking water system at the facility noted above is registered in the Commonwealth as a non-transient non-community (NTNC) public water system. It is an NTNC public water system because it owns and/or controls its source of water and supplies potable water to at least 15 service connections or regularly serves at least 25 of the same persons or more approximately four or more hours per day, four or more days per week, more than six months or 180 days per year. Examples of NTNCs include: schools, and workplaces providing water to its employees such as factories and office buildings.

NTNC systems must routinely test for coliform bacteria, 18 inorganics, 26 synthetic organic compounds, and 35 volatile organic compounds. MassDEP may also require or a NTNC system may elect to conduct additional testing as needed. Below is a list of contaminants found in the water during the reporting period.

If the facility was required to monitor for Lead and Copper, the results are listed in the Lead and Copper (LCR) section of this report. If the facility was required by the U.S. Environmental Protection Agency (USEPA) to monitor for unregulated contaminants under the Unregulated Contaminant Monitoring Rule (UCMR), the results are listed in the Unregulated Contaminant Monitoring Rule 4 (UCMR4) section of this report.

Please be aware that "all drinking water, including bottled water, may contain small amounts of some contaminants. The presence of contaminants does not necessarily indicate that the water poses a health risk."

For more information please contact the persons listed at the end of this report.

MONITORING RESULTS TABLE

CONTAMINANT	HIGHEST DETECT VALUE[1]	MCL [2]	MCLG [3]	VIOLATION [4] (YES or NO)		POSSIBLE SOURCES OF CONTAMINATION
				MCL	FAILURE TO MONITOR **	
TOTAL COLIFORM	NO DATA	0	0	N	N	Naturally Present in the environment
CHROMIUM (MG/L)	0.002	.1	0.1	N	N	Discharge from steel and pulp mills; Erosion of natural deposits
BERYLLIUM (MG/L)	0.002	.004	0.004	N	N	Discharge from metal refineries and coal-burning factories; discharge from electrical, aerospace, and defense industries
BARIUM (MG/L)	0.002	2	2	N	N	Discharge of drilling wastes; Discharge from metal refineries; Erosion of natural deposits
SODIUM (MG/L)	19.7	20 (ORSG)		N	N	Naturally present in the environment; may also be due to salt runoff from deicing practices.
IRON (MG/L)	0.704	.3 (SMCL)		N	N	Natural and industrial sources as well as aging and corroding distribution systems and household pipes
MANGANESE (MG/L)	0.534	.05 (SMCL)		N	N	Natural sources as well as discharges from industrial uses

POSTED FOR CUSTOMER REVIEW AS REQUIRED BY THE MASSACHUSETTS DEP/DWP
Massachusetts Drinking Water Regulations 310 CMR 22.16A (23)

2019 DRINKING WATER QUALITY REPORT

For the period January 1, 2018 to December 31, 2018

1300 MASS AVE
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BOXBOROUGH MA 01719

[1] **Detect** – any levels found at or above the detection limits in the Massachusetts Drinking Water Regulations, 310 CMR 22.00.
[2] **Maximum Contaminant Level (MCL)** – the highest level of a contaminant that is allowed in drinking water.
Office of Research and Standards Guideline (ORSG) – MassDEP health-based guideline.
Secondary Maximum Contaminant Level (SMCL) – typically aesthetic standards that represent reasonable goals for drinking water quality. See 310 CMR 22.07D for situations that may warrant enforcement of these levels.
Treatment Technique (TT) – A required process intended to reduce the level of a contaminant in drinking water.
[3] **Maximum Contaminant Level Goal (MCLG)** – the level of a contaminant in drinking water below which there is no known or expected risk to health.
[4] **For any violations**, health effects language for these contaminants is available from the owner/operator of this Public Water System upon request and can also be found in Attachments C and D of Appendix M of the *Guidelines and Policies for Public Water Systems* (see link below).
** If "Y", one or more times during the reporting period this system did not monitor and/or report to the MassDEP as required.
" We are required to monitor your drinking water for specific contaminants on a regular basis. Results of the regular monitoring are an indicator of whether or not our drinking water meets health standards. During the above noted reporting period we did not monitor or test and/or did not complete all monitoring or testing for contaminant(s) noted above and therefore cannot be sure of the quality of our drinking water during that time. "

The posting of this report meets the public notification Tier 3 requirements of 310 CMR 22.16(4).

Appendix M - *Guidelines and Policies for Public Water Systems*
https://www.mass.gov/doc/consumer-confidence-reporting-requirements (1.91 MB)

For more information contact:

_____	_____	_____
Owner/Responsible Person	Signature of Owner/Responsible Person	Phone
_____	_____	_____
Certified Operator Name	Signature of Certified Operator	Phone

These results are on file with the Massachusetts Department of Environmental Protection Drinking Water Program (MassDEP/DWP). If you have any questions on the MADEP Drinking Water Program contact MassDEP at (617) 292-5770 or email **program.director-dwp@mass.gov**.

You can refer to Attachments C and D of Appendix M of the *Guidelines and Policies for Pubilc Water Systems* (see link below) for more information on contaminants and potential health effects or you can call the U.S. EPA Safe Drinking Water Hotline at (800) 426-4791.

Date This Was Posted:_____ Location of Posting:_____

POSTED FOR CUSTOMER REVIEW AS REQUIRED BY THE MASSACHUSETTS DEP/DWP
Massachusetts Drinking Water Regulations 310 CMR 22.16A (23)

2019 DRINKING WATER QUALITY REPORT*

For the period January 1, 2018 to December 31, 2018

1300 MASS AVE
PWS ID: 2037020
1300 MASSACHUSETTS AVE
BOXBOROUGH, MA 01719

Lead and Copper (LCR)

Our source water is lead-free. However, lead can get into water from the service line to our facility and our interior plumbing.

Under MassDEP rules, public water systems are required to test for Lead and Copper semi-annually, annually, or trienially. For more information about how testing frequencies are determined refer to 310 CMR 22.06B. The requirement is that 90% of the samples must have lead levels below the Lead Action Level of 15ppb (part per billion). The following is the testing results from our most recent round of sampling.

For more information please contact the persons listed at the end of this report.

LEAD & COPPER RESULTS TABLE

CONTAMINANT	COMPLIANCE PERIOD	90% VALUE[1]	ACTION LEVEL[2]	MCLG[3]
COPPER (MG/L)	FROM: 1/1/2018 TO: 12/31/2018	0.49	1.3	1.3
LEAD (MG/L)	FROM: 1/1/2018 TO: 12/31/2018	0.025	0.015	0

[1] **90th Value** – Out of every 10 samples, 9 were at or below this level.
[2] **Action Level (AL)** – The concentration of a contaminant which, if exceeded, triggers treatment or other requirements that a water system must follow.
[3] **Maximum Contaminant Level Goal (MCLG)** – the level of a contaminant in drinking water below which there is no known or expected risk to health.

For more information contact:

_____	_____	_____
Owner/Responsible Person	Signature of Owner/Responsible Person	Phone
_____	_____	_____
Certified Operator Name	Signature of Certified Operator	Phone

These results are on file with the Massachusetts Department of Environmental Protection Drinking Water Program (MassDEP/DWP). If you have any questions on the MADEP Drinking Water Program contact MassDEP at (617) 292-5770 or email **program.director-dwp@mass.gov**.

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Date This Was Posted:_____ Location of Posting:_____

Appendix M - *Guidelines and Policies for Public Water Systems*
https://www.mass.gov/doc/consumer-confidence-reporting-requirements (1.91 MB)

HKT architects inc.

OPTION A

PUBLIC SAFETY FACILITY Boxborough, MA

PROPOSED SECOND FLOOR
1/16" = 1'-0"

PROPOSED FIRST FLOOR
1/16" = 1'-0"

LEGEND

- SHARED SPACES
- FIRE DEPARTMENT ADMINISTRATION
- FIRE DEPARTMENT STAFF SUPPORT
- FIRE DEPARTMENT OPERATIONS
- POLICE DEPARTMENT DISPATCH
- POLICE DEPARTMENT ADMINISTRATION
- POLICE DEPARTMENT STAFF SUPPORT + OPERATIONS
- POLICE DEPARTMENT DETENTION
- FUTURE TOWN USE

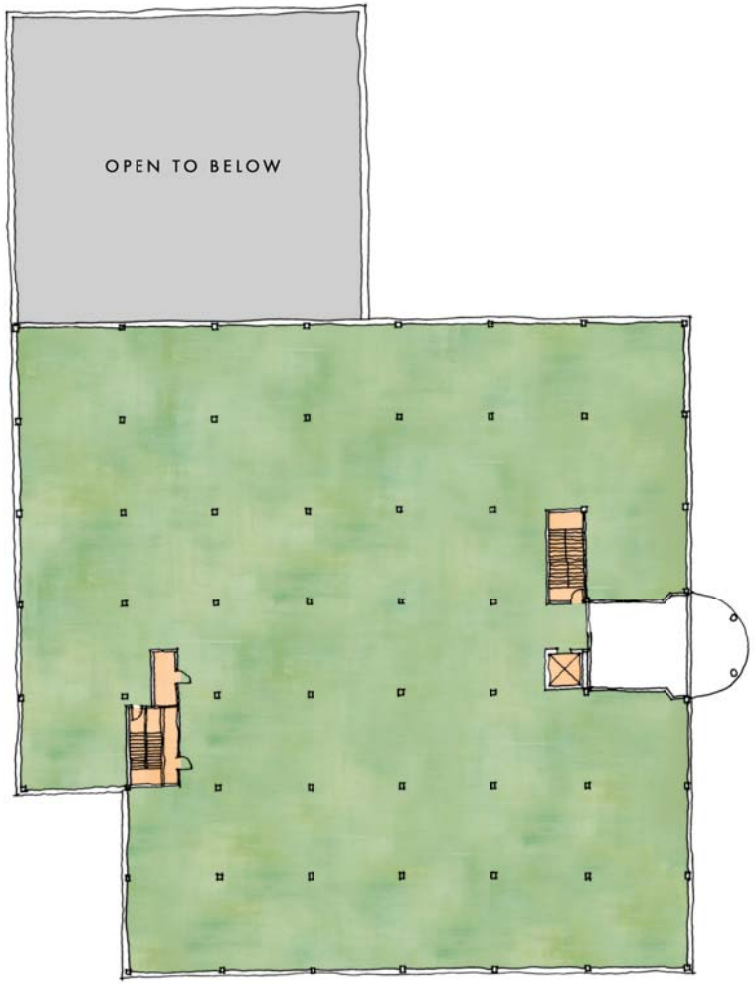
OPTION A

HKT architects inc.

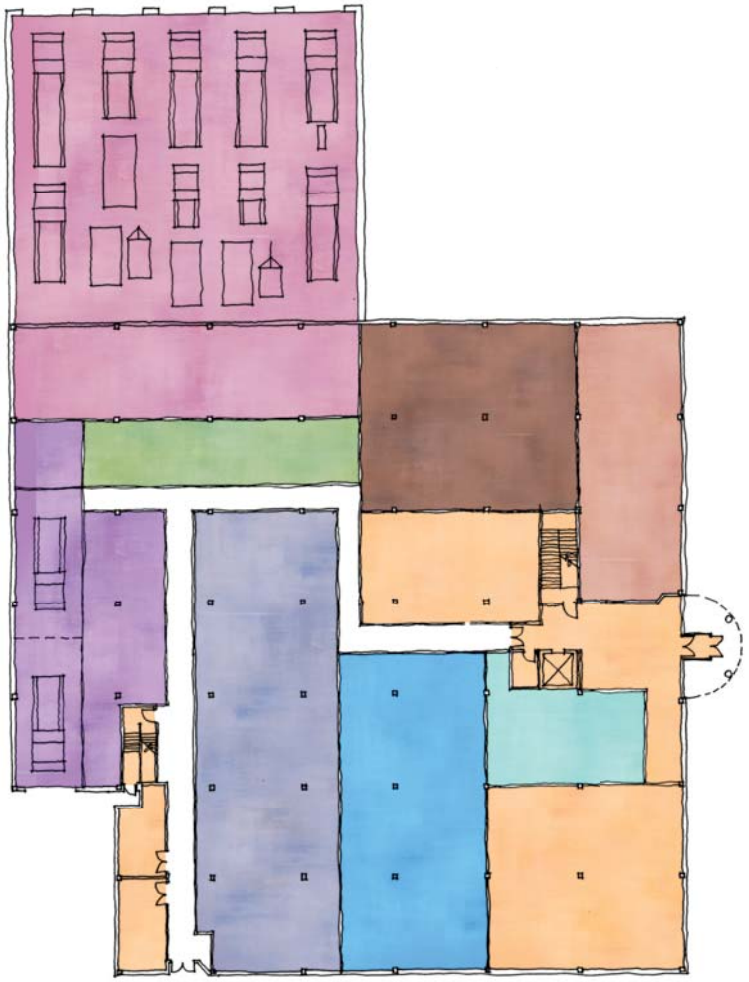
HKT architects inc.

OPTION B

PUBLIC SAFETY FACILITY Boxborough, MA



PROPOSED SECOND FLOOR
1/16" = 1'-0"



LEGEND

- SHARED SPACES
- FIRE DEPARTMENT ADMINISTRATION
- FIRE DEPARTMENT STAFF SUPPORT
- FIRE DEPARTMENT OPERATIONS
- POLICE DEPARTMENT DISPATCH
- POLICE DEPARTMENT ADMINISTRATION
- POLICE DEPARTMENT STAFF SUPPORT + OPERATIONS
- POLICE DEPARTMENT DETENTION
- FUTURE TOWN USE

PROPOSED FIRST FLOOR
1/16" = 1'-0"

OPTION B

HKT architects inc.

HKT architects inc.

OPTION C

HKT architects, inc.
24 Roland Street
Charlestown, MA 02129
T: 617.776.6565
F: 617.776.8678
www.hktarchitects.com

Number	Revision	Date

Registrations

Consultants

Project
BOXBOROUGH PUBLIC SAFETY FACILITY
1300 MASSACHUSETTS AVE
FEASIBILITY STUDY
TOWN OF BOXBOROUGH, MA

Drawing Title
OPTION C:
NEW PUBLIC SAFETY BUILDING

Drawn by	AJD
Checked by	AJD
Date	24 OCTOBER 2019
Job number	21936
Drawing set	FEASIBILITY STUDY
Drawing number	OPT. C

Drawing name: F:\Projects\21936 Boxborough PS III\Master\21936 footprint 1300 MA AVE.dwg
Oct 18, 2019 - 13:51pm
Xref: .\21936 X2436.dwg

HKT architects inc.

COST ESTIMATES

Boxborough Public Safety Building - Projected Project Costs

	1300 Massachusetts Avenue			New Town-Owned Site		
	Option A Fit program within existing footprint. Demo portion of second floor for apparatus bay height. Approximately 10,000 sf unfinished shell space for Future Town Use. Fit out of Future Town Use space is excluded.	**Option B** New apparatus bay addition to existing building. Approximately 31,000 sf unfinished shell space for Future Town Use. Fit out of Future Town Use space is excluded.	**Option C** Demo existing building. Build new 35,000 sf public safety building.	**Option D** New construction of 35,000 sf building on a new Town-Owned site		
				Simple Site: $600/sf (2021 construction) + $98,505 demo of existing structures ($15/sf X 5970 sf + 10% escalation)	**Complex Site: $715/sf (2021 construction) + $98,505 demo of existing structures ($15/sf X 5970 sf + 10% escalation)**	**Comments**
Projected Hard Construction Costs	**$21,144,948**	**$24,600,378**	**$22,825,000**	**$21,098,505**	**$25,123,505**	Escalated to 2021 Construction
Projected Soft Construction Costs - 25%	**$5,286,237**	**$6,150,095**	**$5,706,250**	**$5,274,626**	**$6,280,876**	Assumed at 25% of Projected Hard Construction Costs. Examples of soft costs include architectural/engineering fees, Owner's Project Manager fees, clerk of the works, printing, legal, communications/radio equipment, furniture, fixtures and equipment, utility company backcharges. Site acquisition costs are excluded.
Owner's Contingency - 3%	$792,936	$922,514	$855,938	$791,194	$942,131	
Subtotal Projected Hard and Soft Construction Costs	**$27,224,121**	**$31,672,987**	**$29,387,188**	**$27,164,325**	**$32,346,513**	
Site Acquisition Costs (See Comments)	$4,576,900	$4,576,900	$4,576,900	$850,000	$850,000	Actual cost of acquiring 1300 Mass Ave is unknown. Figure shown is sum of Boxborough's FY19 Assessed value of 1300 Mass Ave and 1223 Mass Avenue (parcel with fire pond and septic). Sale price may vary.
Total Projected Project Costs	**$31,801,021**	**$36,249,887**	**$33,964,088**	**$28,014,325**	**$33,196,513**	

Public Safety Facility - 1300 Massachusetts Avenue Study Options

Town of Boxborough
Boxborough, Ma

Prepared by:

TCi Construction Cost Estimating

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Prepared for:

HKT Architects

November 13, 2019

Public Safety Facility - 1300 Massachusetts Avenue Study Options

Town of Boxborough

November 13, 2019

MAIN SUMMARY

Options		Estimated costs
OPTION A	***Modify existing building and fit public safety building program and future shell space***	$21,144,948
OPTION B	***Modify existing building and fit public safety building program including new addition and future shell space***	$24,600,378
OPTION C	***Demolish existing building and build new 35,000 sf public safety building***	$22,825,000

Qualifications

This cost estimate was produced from October 2019 Study documents provided by HKT Architects. Design and engineering changes occurring subsequent to the issue of these documents have not been incorporated in this estimate.

This estimate includes all direct construction costs, general contractor's overhead and profit and design contingency. Cost escalation assumes two years to construction start.

Bidding conditions are expected to be public bidding utilizing chapter 149 filed sub bidding and DCAM qualified general contractors.

The estimate is based on prevailing wage rates for construction in this market and represents a reasonable opinion of cost. It is not a prediction of the successful bid from a contractor as bids will vary due to fluctuating market conditions, errors and omissions, proprietary specifications, lack or surplus of bidders, perception of risk, etc. Consequently the estimate is expected to fall within the range of bids from a number of competitive contractors or subcontractors, however we do not warrant that bids or negotiated prices will not vary from the final construction cost estimate.

Items not included in this estimate are:

Land acquisition, feasibility, and financing costs
Items identified in the design as Not In Contract (NIC)
Items identified in the design as by others
Utility company back charges, including work required off-site
Work to City streets and sidewalks, (except as noted in this estimate)
Construction or occupancy phasing or off hours' work, (except as noted in this estimate)
Rock excavation; special foundations (unless indicated by design engineers)
Contaminated or unsuitable soils removal or replacement
Building permits waived by town
Hazardous material abatement
Sales tax
Phasing or off hours schedule

Recommendations For Cost Control

TCI recommends that the Owner and Architect carefully review this document, including line item descriptions, unit prices, clarifications, exclusions, inclusions and assumptions, contingencies, escalation and mark-ups. Request for modifications of any apparent errors or omissions to this document must be made to TCI with in ten (10) days of receipt of this estimate. Otherwise, it will be understood that the contents have been concurred with and accepted.
It is recommended that TCI using bid documents produce a final update estimate, to determine overall costs changes which have occurred since the preparation of the estimate. The final update estimate will address changes and additions to the document, as well as addenda issued during bidding process. TCI cannot reconcile bid results to an estimate not produced from bid documents.

Statement Of Probable Cost

TCI has no control over the cost of labor and materials, the general contractor's or any subcontractor's method of determining prices, or competitive bidding and market conditions. The opinion of construction is made on the basis of the experience, qualifications, and best judgment of the professional estimator familiar with the industry. TCI does not guarantee that bids will not vary form this estimate.

TCI staff of professional cost estimators has prepared this estimate in accordance with generally accepted principles and practices.

Acceptance of Report

With acceptance of this report, the holder shall indemnify and hold harmless Tortora Consulting from and against all claims, damages, losses and expenses, including but not limited to attorney fees and court costs arising out of or as a result of the performance of this work, including third party claims.

Public Safety Facility - 1300 Massachusetts Avenue Study Options
Town of Boxborough

November 13, 2019

TCi Construction Cost Estimating

OPTION A

Item #	PROJECT	AREA	UNIT	COST/SF	EST'D COST	SUB TOTAL	TOTAL COST
	Option A - the program fits within the existing building footprint. Part of the second floor slab is demolished to accommodate the apparatus bays. The second floor is also demolished for a new egress stair. The existing slab on grade at the apparatus bays would be demolished and replaced with a thicker slab. The existing loading dock would be modified to create an impound bay (grade raised outside, slab removed and rebuilt, 2 overhead doors removed and replaced with one smaller overhead door). Part of the existing slab would be removed and replaced for the sally port. Slab on grade would be removed for plumbing in many locations for FD and PD locker/shower rooms, detention area, etc.						
	Base building						
1	Complete gut reno inside	**62,000**	sf	10.00	620,000		
2	New stair and opening	**1**	ls	50,000.00	50,000		
3	Building entry	**1**	ls	100,000.00	100,000		
4	Apparatus bay slab modifications	**10,800**	sf	25.00	270,000		
5	Apparatus bay structure modifications	**8,956**	sf	50.00	447,800		
6	Impound sally port new slab	**1,844**	sf	50.00	92,200		
7	Infill loading dock area	**1,500**	sf	200.00	300,000		
8	Slab mods	**51,200**	sf	5.00	256,000		
9	Remove stone ballasted roof. Provide additional welds/screws attaching roof deck to structure (see structural report), New roof insulation and membrane roofing.	**31,000**	sf	35.00	1,085,000		
10	New storefront throughout	**10,656**	sf	100.00	1,065,600		
11	Overhead door mods	**2**	ea	25,000.00	50,000		
12	Open all exterior walls and Provide spray insulation in stud cavity at minimum	**13,024**	sf	15.00	195,360		
13	Other envelope: all New sealant/control joints, possible flashing issues/replacement required	**13,024**	sf	30.00	390,720		
14	HVAC systems - base building	**50,000**	sf	8.00	400,000		
15	New plumbing system - base building	**50,000**	sf	3.00	150,000		
16	Electrical upgrades	**50,000**	sf	2.00	100,000		
17	Structural seismic upgrades, possible additional support required for second floor storage or assembly occupancy	**62,000**	sf	30.00	1,860,000.00		
	Fit-ups						
18	Fit-out Public Safety program	**38,400**	sf	250.00	9,600,000		
19	Egress and circulation space	**1,600**	sf	200.00	320,000		
20	Future town use shell space prep/temp	**10,000**	sf	15.00	150,000		
	Total Building - $/sf	**50,000**	sf	**350.05**	**17,502,680**		
	Sitework						
21	Sitework	**50,000**	sf	20.00	1,000,000		
22	Traffic signalization	**1**	ls	120,000.00	120,000		
23	Fire pump upgrades	**2**	ea	50,000.00	100,000		
24	Sitework - septic upgrade	**1**	ls	500,000.00	500,000		
	Total Site - $/sf	**50,000**	sf	**34.40**	**1,720,000**		
	Total Buildings and Site - $/sf	**50,000**	sf	**384.45**	**19,222,680**	19,222,680	
25	Escalation to 2021 - 10%	**1**	ls	1,922,268.00	1,922,268	1,922,268	
						PROJECTED 2021 CONSTRUCTION COSTS	***$21,144,948***

Public Safety Facility - 1300 Massachusetts Avenue Study Options
Town of Boxborough

November 13, 2019

TCi Construction Cost Estimating

OPTION B

Item #	*PROJECT*	*AREA*	*UNIT*	*COST/SF*	*EST'D COST*	*SUB TOTAL*	*TOTAL COST*
	Option B - there's a +/-8,500 sf apparatus bay addition. The second floor is demolished for a new egress stair. The existing loading dock would be modified to create a combined impound bay and sally port (grade raised outside, slab removed and rebuilt, 2 overhead doors removed and replaced with one smaller overhead door). Slab on grade would be removed for plumbing in many locations for FD and PD locker/shower rooms, detention area, etc.						
	Base building						
1	Complete gut reno inside	**62,000**	sf	10.00	620,000		
2	New stair and opening	**1**	ls	50,000.00	50,000		
3	Building entry	**1**	ls	100,000.00	100,000		
4	Apparatus bay addition	**8,500**	sf	300.00	2,550,000		
5	Infill loading dock area	**1,500**	sf	200.00	300,000		
7	Slab mods	**60,560**	sf	5.00	302,800		
8	Impound sally port new slab	**1,440**	sf	50.00	72,000		
9	Remove stone ballasted roof. Provide additional welds/screws attaching roof deck to structure (see structural report), New roof insulation and membrane roofing.	**31,000**	sf	35.00	1,085,000		
10	New storefront throughout	**10,656**	sf	100.00	1,065,600		
11	Overhead door mods	**2**	ea	25,000.00	50,000		
12	Open all exterior walls and Provide spray insulation in stud cavity at minimum	**13,024**	sf	15.00	195,360		
13	Other envelope: all New sealant/control joints, possible flashing issues/replacement required	**13,024**	sf	30.00	390,720		
14	HVAC systems - base building	**70,500**	sf	8.00	564,000		
15	New plumbing system - base building	**70,500**	sf	3.00	211,500		
16	Electrical upgrades	**70,500**	sf	2.00	141,000		
17	Structural seismic upgrades, possible additional support required for second floor storage or assembly occupancy	**60,000**	sf	30.00	1,800,000.00		
	Fit-ups						
18	Fit-out Public Safety program	**39,500**	sf	250.00	9,875,000		
19	Egress and circulation space	**1,800**	sf	200.00	360,000		
20	Future town use shell space prep/temp	**31,000**	sf	15.00	465,000		
	Total Building - $/sf	**72,300**	sf	**279.36**	**20,197,980**		
	Sitework						
21	Sitework	**72,300**	sf	20.00	1,446,000		
22	Traffic signalization	**1**	ls	120,000.00	120,000		
23	Fire pump upgrades	**2**	ea	50,000.00	100,000		
24	Sitework - septic upgrade	**1**	ls	500,000.00	500,000		
	Total Site - $/sf	**72,300**	sf	**29.96**	**2,166,000**		
	Total Buildings and Site - $/sf	**72,300**	sf	**309.32**	**22,363,980**	22,363,980	
25	Escalation to 2021 - 10%	**1**	ls	2,236,398.00	2,236,398	2,236,398	
						PROJECTED 2021 CONSTRUCTION COSTS	***$24,600,378***

Public Safety Facility - 1300 Massachusetts Avenue Study Options
Town of Boxborough

November 13, 2019

TCi Construction Cost Estimating

OPTION C

Item #	*PROJECT*	*AREA*	*UNIT*	*COST/SF*	*EST'D COST*	*SUB TOTAL*	*TOTAL COST*
	Option C - Demolish existing building and build new 35,000 sf public safety building.						
1	Demolish existing building	**62,000**	sf	15.00	930,000		
	New Building						
2	New Public Safety building	**35,000**	sf	500.00	17,500,000		
	Total Building - $/sf	**35,000**	sf	**526.57**	**18,430,000**		
	Sitework						
3	Sitework	**35,000**	sf	45.00	1,575,000		
4	Traffic signalization	**1**	ls	120,000.00	120,000		
5	Fire pump upgrades	**2**	ea	50,000.00	100,000		
6	Sitework - septic upgrade	**35,000**	sf	15.00	525,000		
	Total Site - $/sf	**35,000**	sf	**66.29**	**2,320,000**		
	Total Buildings and Site - $/sf	**35,000**	sf	**592.86**	**20,750,000**	20,750,000	
7	Escalation to 2021 - 10%	**1**	ls	2,075,000.00	2,075,000	2,075,000	
					PROJECTED 2021 CONSTRUCTION COSTS		***$22,825,000***