Commonwealth of Massachusetts
Executive Office of Energy and Environmental Affairs

MEPA Office

100 Cambridge St., Suite 900
Boston, MA 02114
Telephone 617-626-1020

The following should be completed and submitted to a local newspaper:

PUBLIC NOTICE OF ENVIRONMENTAL REVIEW

PROJECT: Regency at Boxborough

LOCATION: 700-800 Massachusetts Avenue, Boxborough, MA

PROPONENT: Boxborough Town Center, LLC

The undersigned is submitting an Expanded Environmental Notification Form ("EENF") to the Secretary of Energy & Environmental Affairs on or before December 15, 2016 *(date)*

This will initiate review of the above project pursuant to the Massachusetts Environmental Policy Act ("MEPA", M.G.L. c. 30, s.s. 61-62I). Copies of the EENF may be obtained from:
Stamski and McNary, Inc.
1000 Main Street, Acton, MA 01720
(978) 263-8585
(Name, address, phone number of proponent or proponent's agent)

Copies of the EENF are also being sent to the Conservation Commission and Planning Board of Boxborough *(Municipality)* **where they may be inspected.**

The Secretary of Energy & Environmental Affairs will publish notice of the EENF in the Environmental Monitor, will receive public comments on the project for 30 days, and will then decide, within ten days, if an environmental Impact Report is needed. A site visit and consultation session on the project may also be scheduled. All persons wishing to comment on the project, or to be notified of a site visit or consultation session, should write to the Secretary of Energy & Environmental Affairs, 100 Cambridge St., Suite 900, Boston, Massachusetts 02114, Attention: MEPA Office, referencing the above project.

By Boxborough Town Center, LLC *(Proponent)*

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Order of Conditions (Soil Testing) Issued May 18, 2016
Soil Testing Location Plan; Revised May 4, 2016; Scale 1"=120';
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Section 5
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Regency at Boxborough; Boxborough, MA; December 13, 2016
Prepared By: Mount Hope Engineering, Inc.; 1788 GAR Highway Swansea, MA 02777

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Regency at Boxborough; 700-800 Massachusetts Avenue, Boxborough, MA
Prepared By: Bayside Engineering; 600 Unicorn Park Drive; Woburn, MA

Section 7
Preliminary Stormwater Narrative – Stamski and McNary, Inc.; dated December 15, 2016
Pre-Development Drainage Map (2 Sheets); Scale 1"=60'; By: Stamski And McNary, Inc.
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Section 8
Alternative #1
- Preliminary Site Plan; Prepared by Stamski and McNary, Inc.; Date: March 14, 2016
- 100 Unit Concept Plan A1; Prepared by Stamski and McNary, Inc.; dated: September 30, 2015
- Definitive Subdivision Plan Set: Prepared by Stamski and McNary, Inc.; dated: January 12, 2015
- Definitive Subdivision Decision: dated April 28, 2014

Section 8 (cont'd)

Alternative #2

100 Unit Preliminary Site Plan; Prepared by Stamski and McNary, Inc.; dated: May 21, 2016
100 Unit Concept Plan A2; Prepared by Stamski and McNary, Inc.; dated: September 9, 2015
158 Unit Concept Plan 2 (Alternative Plan): Prepared by Stamski and McNary, Inc.; dated: March 30, 2015
208 Unit Concept Plan (Alternative Plan); Prepared by Stamski and McNary, Inc.; dated: January 20, 2015

Alternative #3

96 Unit Minuteman Village Comprehensive Permit Preliminary Plan (Alternative Plan); Prepared by Stamski and McNary, Inc.; dated: May 1, 2012

Section 9

Tisbury Meadow Senior Housing

Tisbury Meadow Site Plan: Prepared by Stamski and McNary, Inc.; dated: March 19, 1999
Site Plan Decision #99-01

Sheriff's Meadow Senior Housing

As-Built Plan: Prepared by Land Design Services; dated: November 9, 1995
Easement Plan (Plan 297 of 1995): Prepared by Michael R. Mische P.L.S.; dated April 1995
Grading & Drainage Plan: Prepared by Land Design Services; dated: September 16, 1994
Amendment to Site Plan Decision #90-07A; dated: February 9, 1999
Planning Board Decision #90-07A; dated: October 4, 1994
Planning Board Decision #90-07; dated: September 19, 1990

Section 10

MEPA Site Plan (3 Sheets); By: Stamski and McNary, Inc.; dated Decmber 9, 2016
Master Plan (Sheet 1); Scale 1"=120'
Site Development Plan (Sheets 2 & 3); Scale 1"=60'

STAMSKI AND MCNARY, INC.
1000 Main Street
Acton, Massachusetts 01720
(978) 263-8585
FAX (978) 263-9883

JOSEPH MARCH, P.E., P.L.S.
GEORGE DIMAKARAKOS, P.E.

December 15, 2016

Secretary Matthew A. Beaton
Executive Office of Energy and Environmental Affairs (EEA)
Attn: MEPA Office
100 Cambridge Street, Suite 900
Boston, MA 02114

RE: Expanded Environmental Notification Form
Regency at Boxborough, 700-800 Massachusetts Avenue, Boxborough, MA

Dear Secretary Beaton:

On behalf of our Client, Boxborough Town Center, LLC, we are pleased to submit this Expanded Environmental Notification Form (EENF) for the construction of the Regency at Boxborough in Boxborough, MA, a 100 unit Elderly two-family development. The proposed development results in 10 or more acres of impervious, the alteration of 25 or more acres of land, the construction of one or more new sewer main ½ mile or more, and requires a Highway Access Permit from the MassDOT. Therefore an Environmental Impact Report (EIR) is required pursuant to 301 CMR 11.03(1) . In accordance with 301 CMR 11.05 (7) and 301 CMR 11.06 (8), this document is being submitted as an Expanded ENF, and the proponent requests that the Secretary allow the filing of a single EIR.

We believe that this request has merit. According to the MEPA regulation, the Secretary may allow a single EIR when three conditions are met. These conditions include:

1. The EENF describes and analyzes all aspects of the project and feasible alternatives;

2. The EENF provides a detailed baseline in relation to which potential environmental impacts and mitigation measures can be assessed, and

3. The EENF demonstrates that the planning and design of the Project use all feasible means to avoid environmental impacts.

This Expanded ENF meets these tests in the following manner:

1. The EENF contains a detailed description of the proposed Regency at Boxborough and identifies clearly its limited environmental impacts. The EENF includes a

Community public water system report, a preliminary wastewater report, a comprehensive traffic study (attached) and a preliminary stormwater analysis. Also included are copies of previous site plan alternatives.

2. The MEPA site plan contains detailed existing conditions which include topography, edge of confirmed wetlands, buffer zones, including Zone I and IWPA of on-site and abutting public water systems. The site plan also contains detailed elevations and locations of the proposed driveway network, building locations and stormwater areas. The access location has been selected based on recommended guidance from our traffic consultant. The EENF provides a detailed baseline and also identifies specific mitigation measures the Proponent is committed to implementing.

3. The current MEPA site plan reflects a reduction in dwelling density, a reduction in the amount of land clearing and impervious area when compared to previous concept plans and alternatives provided within the EENF. A previous access alternative which did not propose a stream/wetland crossing was presented to the Planning Board by the Proponent utilizing Priest Lane and the Access Easement from Stow Road, but was not allowed based on local zoning requirements. An open bottom box culvert has been provided at the stream/wetland crossing to minimize environmental impacts. Secondary access, over upland area, is to be provided to Priest Lane and to Stow Road via "Access Easement C". The Proponent has also obtained an agreement from the abutter to purchase Parcel A. The use of Parcel A, for Zone I protection, allowed the installed wells to be relocated outside of the buffer zone. This reduced the environmental impact to the buffer zone associated with the water supply in close proximity to the on-site wetlands. The Proponent also considered alternative locations to the west for driveway access outside of the buffer zone, however sight distance requirements along Massachusetts Avenue hinder these alternatives. All dwelling locations have also been sited outside of the buffer zone.

Based on the above, we believe that the request for a Single EIR has merit, and that all remaining issues can be adequately addressed through a Single EIR.

Enclosed please find two copies of the EENF and appropriate attachments. Should you require any additional information please do not hesitate to contact me at (978) 263-8585.

Sincerely,

Stamski and McNary, Inc.

Richard J. Harrington, P.E.

George Dimakarakos, P.E.

Environmental Notification Form

Commonwealth of Massachusetts

Executive Office of Energy and Environmental Affairs
Massachusetts Environmental Policy Act (MEPA) Office

Environmental Notification Form

For Office Use Only
EEA#: 15624
MEPA Analyst: Purvi Patel

The information requested on this form must be completed in order to submit a document electronically for review under the Massachusetts Environmental Policy Act, 301 CMR 11.00.

Project Name: Regency at Boxborough		
Street Address: 700-800 Massachusetts Avenue		
Municipality: Boxborough	Watershed: SuAsCo River Basin	
Universal Transverse Mercator Coordinates: 4706266.8 N, 293078.6 W	Latitude: 42° 28' 52"N Longitude: 71° 31' 03"W	
Estimated commencement date: 06/01/2017	Estimated completion date: 06/01/2021	
Project Type: Elderly Two-Family	Status of project design: 75 %complete	
Proponent: Boxborough Town Center, LLC		
Street Address: P.O. Box 985		
Municipality: Acton	State: MA	Zip Code: 01720
Name of Contact Person: Richard J. Harrington, P.E.		
Firm/Agency: Stamski and McNary, Inc.	Street Address: 1000 Main Street	
Municipality: Acton	State: MA	Zip Code: 01720
Phone: 978-263-8585	Fax: 978-263-9883	E-mail: rjh@stamskiandmcnary.com

Does this project meet or exceed a mandatory EIR threshold (see 301 CMR 11.03)?
☒Yes ☐No

If this is an Expanded Environmental Notification Form (ENF) (see 301 CMR 11.05(7)) or a Notice of Project Change (NPC), are you requesting:

a Single EIR? (see 301 CMR 11.06(8)) ☒Yes ☐No
a Special Review Procedure? (see 301CMR 11.09) ☐Yes ☒No
a Waiver of mandatory EIR? (see 301 CMR 11.11) ☐Yes ☒No
a Phase I Waiver? (see 301 CMR 11.11) ☐Yes ☒No
(Note: Greenhouse Gas Emissions analysis must be included in the Expanded ENF.)

Which MEPA review threshold(s) does the project meet or exceed (see 301 CMR 11.03)?
301 CMR 11.03(1)(a)(2) – Creation of 10 or more acres of impervious
301 CMR 11.03(1)(b)(1) – Alteration of 25 or more acres of land
301 CMR 11.03(5)(b)3.c.-Construction of one or more new sewer mains ½ mile or more
Which State Agency Permits will the project require?
MassDEP Water Supply Permit, Groundwater Discharge Permit, Order of Conditions
Highway Access Permit from MassDOT
Identify any financial assistance or land transfer from an Agency of the Commonwealth, including the Agency name and the amount of funding or land area in acres: None

Summary of Project Size & Environmental Impacts	Existing	Change	Total
LAND			
Total site acreage	63.9024		
New acres of land altered		32.98 ac +/-	
Acres of impervious area	0.17 ac.	11.97 ac. +/-	12.14 ac.+/-
Square feet of new bordering vegetated wetlands alteration		471 (temporary)	
Square feet of new other wetland alteration (Bank, Land Under Water)		136 linear feet Bank 371 square feet Land Under Water (temporary)	
Acres of new non-water dependent use of tidelands or waterways		0.00	
STRUCTURES			
Gross square footage	2,836 s.f.	245,999	248,835 s.f.
Number of housing units	1	100	100
Maximum height (feet)	<45'	<45'	<45'
TRANSPORTATION			
Vehicle trips per day	10	634	644
Parking spaces	2	234	236
WASTEWATER			
Water Use (Gallons per day)	330	20,330	20,660
Water withdrawal (GPD)	330	20,330	20,660
Wastewater generation/treatment (GPD)	330	20,330	20,660
Length of water mains (miles)	0	0.84+/-	0.84+/-
Length of sewer mains (miles)	0	0.95+/-	0.95+/-

Has this project been filed with MEPA before?
☐ Yes (EEA #_____) ☒No

Has any project on this site been filed with MEPA before?
☐ Yes (EEA #_____) ☒No

GENERAL PROJECT INFORMATION – all proponents must fill out this section

PROJECT DESCRIPTION:

Describe the existing conditions and land uses on the project site The 63.90 acre site contains a single family dwelling and detached barn to be razed, wooded upland, and wetland resource areas. The dwelling is currently served by an on-site private well and septic system. The two proposed community on-site water supply wells for the project have been installed and the pump test has been completed. The site has two paved driveway curb cuts along Massachusetts Avenue, Route 111. The site also has frontage along a second public way, Priest Lane, for future access. The site also has existing access rights over an abutting 50'-wide Easement to Stow Road.

Describe the proposed project and its programmatic and physical elements: The site is located along the south side of Massachusetts Avenue, east of Hughes Lane and west of Stow Road in Boxborough, Massachusetts. The project site is bounded by Massachusetts Avenue to the north, Priest Lane to the south, two elderly housing complexes to the east, and some residential lots to the west and east. The proposed project consists of the construction of a 100 unit elderly two-family development, a clubhouse, outdoor swimming pool, pickleball court, bocce court, and their associated appurtenances. Access to the site will be provided by one proposed driveway off Massachusetts Avenue and will not be signalized. There will be a single entering and exiting lane. There will be two emergency exits, one through Sherriff's Meadow off Stow Road, and the other off the end of Priest Lane. A total of 236 parking spaces will be provided on site to accommodate anticipated parking demands (2 for each dwelling and 36 at the proposed clubhouse). Two on-site wells are proposed as a community public water system. A privately owned on-site wastewater treatment facility will be provided. A condominium consisting of the unit owners will be responsible for the operation and maintenance of the on-site water, sewer, irrigation and private driveway network with associated stormwater controls. Irrigation water will be provided by a combination of on-site surface waters and separate on-site irrigation wells (existing well & additional proposed wells across site to be determined). All irrigation wells will be sited outside of the Zone I radius of all potable supply wells. Use of surface waters and/or irrigation wells will be subject to additional permitting and review by local Board of Health and/or Conservation Commission. The cumulative water demand on-site to serve the dwelling units and the irrigation system will not exceed daily allowable MA DEP Thresholds of 100,000 GPD.

The site contains several wetland resource areas including an intermittent stream and its associated Bank, Bordering Vegetated Wetlands, and Isolated Vegetated Wetlands. The intermittent stream and a portion of the site drains to a fire pond close to Massachusetts Avenue, which then drains under Stow Road through a culvert. No direct impacts to these resource areas are proposed other than a temporary disturbance at the stream crossing. A portion of the proposed site work will occur within the 100' Buffer Zone to the wetlands. The work will include the construction of a private driveway network, associated utilities, drainage appurtenances, and grading. An open-bottom concrete box culvert is proposed to span the intermittent stream for the access drive from Massachusetts Avenue into the site. There may be temporary impacts during culvert installation to the wetland resource areas. Any disturbance, minus the vegetation removal, will be restored to existing conditions. The project has been designed to minimize the amount of work within the 100' Buffer Zone, and indirect impacts from stormwater discharge are mitigated through the use of Best Management Practices that comply with DEP standards. The design will be subject to an Order of Conditions from the Boxborough Conservation Commission following the submission of a Notice of Intent pursuant to the WPA and Boxborough's Wetland Bylaw.

Since there will be more than 25 acres of disturbance and creation of more than 10 acres of impervious, an ENF is required.

NOTE: The project description should summarize both the project's direct and indirect impacts

(including construction period impacts) in terms of their magnitude, geographic extent, duration and frequency, and reversibility, as applicable. It should also discuss the infrastructure requirements of the project and the capacity of the municipal and/or regional infrastructure to sustain these requirements into the future.

Describe the on-site project alternatives (and alternative off-site locations, if applicable), considered by the proponent, including at least one feasible alternative that is allowed under current zoning, and the reasons(s) that they were not selected as the preferred alternative:

The site is primarily located within the Town Center Zoning District. The permitted uses within the Town Center District considered by the proponent include: Two-family dwellings reserved exclusively for elderly occupancy; professional office space, retail space and accessory residential dwelling units. Also considered was a 31-seat restaurant option on a lot within Alternative #1, which is a use authorized only under special permit.

Alternative #1 was filed as a Preliminary Site Plan with the Planning Board in March of 2016, in accordance with the Site Plan Regulations. The purpose of the preliminary plan was to seek positive feedback from the town, for allowed uses under the applicable zoning bylaw prior to definitive site plan submittal for Lot 2. This preliminary site plan, evolved from Concept Plan A1, which was discussed with the Planning Board in 2015. Earlier conceptual plan discussions with the Planning Board in 2015, resulted in a reduction in the elderly dwelling unit density and the inclusion of two proposed mixed-use lots along Massachusetts Avenue and the proposed Hayward Lane. Hayward Lane, is a proposed definitive subdivision road, which was approved and endorsed by the Planning Board during 2013 – 2015. Hayward Lane, was to provide frontage and access to the three proposed lots as opposed to multiple curb cuts from frontage lots along Massachusetts Avenue within the Town Center District.

Preliminary Site Plan and public water supply permitting on Lot 2, for the one-hundred proposed dwelling units reserved exclusively for elderly occupancy was to proceed immediately within the rear portion of the site. While Site Plan permitting for the mixed use office/retail with residential accessory apartment on Lot 1, and the restaurant/office/retail with residential accessory apartment on Lot 3 were to follow at a later time. The proposed mixed-uses on Lot 1 & Lot 3 were in response to requests received from the Planning Board and Town Planner during conceptual plan discussion in 2015. It was recognized at this time that variances to the local Wetland Bylaw Regulations and local Board of Health regulations would be required to allow for the proposed mixed-use locations on Lot 1 & Lot 3, in addition to the locations of the proposed wells on all lots.

Anticipated work in the buffer zone included the construction of the Hayward Lane stormwater basins, proposed commercial buildings, water supply wells, septic systems and associated parking areas within Lot 1 & Lot 3 along Massachusetts Avenue. The buffer zone work on Lot 1 & Lot 3, would be in addition to the proposed buffer zone work on Lot 2 associated with access from its legal frontage, construction of stormwater controls and for siting of the public water supply within close proximity of the edge of wetlands.

On March 2, 2016, the proponent filed a Notice of Intent with the Boxborough Conservation Commission seeking approval to conduct the work associated with planning and design purposes, which are necessary for all projects at the preliminary level. The NOI application was filed under 310 CMR 10.000 and the local Town of Boxborough Wetland Bylaw. A local Wetland Bylaw regulation requires the issuance of an Order of Conditions prior to conducting soil testing within the buffer zone. The proposed location of the Lot 2 & Lot 3 wells, close to the edge of BVW, were sited in a similar fashion to the abutting Tisbury Meadow elderly project. Tisbury was previously permitted and constructed by the proponent in 1999, prior to adoption of current local wetland bylaw regulations.

During the NOI public hearing on March 3, 2106, the proposed preliminary test well work on Lot 2 & Lot 3 was seriously questioned by the Conservation Commission. The Commission's response during the hearing was that the work could be avoided or minimized by better utilizing the upland area on the property

for the test wells outside of the buffer zone. Our response during the NOI hearing was that the upland area was not available as an alternative for the public well locations since the upland area was to be utilized for elderly dwelling units which are a permitted use under other town regulations. Based on public water supply Zone I regulations, it is not possible to site both the public wells and the elderly dwelling units within the same upland area. We also stated that the proposed well and soil test locations were based on previous discussions with the Planning Board.

The position of the Commission was later reinforced via correspondence from the Conservation Commission Chairman to the Town Planner on April 1, 2016 in preparation of the April 4, 2016 Planning Board Preliminary Site Plan Hearing for the elderly units. On April 4, 2016, additional correspondence from a Conservation Commission Member highlighting a section of the performance standards of the local wetland bylaw: *"The following activities or uses may be allowed only with appropriate conditions - Wells and waterlines only when it can be shown that no other location outside the Adjacent Land Resource Area (i.e. buffer zone) is possible due to other town regulations"*. The Conservation Commission member also appeared at the Hearing on April 4, 2016 and presented additional testimony recognized in the Planning Board meeting minutes as follows: "...there are certain exceptions, but a well or wells in this location would probably not be allowed by the Conservation Commission". Following additional testimony from abutters, the Preliminary Hearing was continued.

At the PB continuation on May 23, 2016, an updated Preliminary Site Plan, Alternative #2, dated Revised May 21, 2016, was presented to the Planning Board. The proponent had completed a Purchase and Sale Agreement to acquire Parcel A, from the direct abutter, which allows the project team to relocate the proposed public wells outside the buffer zone for the elderly units. The NOI plan was revised to show all test well work outside of the buffer zone. An Order of Conditions was issued on May 18, 2016 by the Commission to allow the soil testing (if necessary) in the buffer zone.

Based on the unfavorable feedback received from the Conservation Commission regarding the test wells in the buffer zone, the proponent has removed the commercial/mixed use buildings from the project since they would also require relief from local wetland bylaw regulations. The proponent also will not be acting on the Hayward Lane, Definitive Subdivision Approval, but instead will access the site directly from its frontage along Massachusetts Avenue via a private driveway.

Alternative #2 - The current alternative (December 2016) seeks one Site Plan Approval for the majority of the site area to construct one-hundred dwelling units reserved exclusively for the elderly. Excluded from this Site Plan Area are Parcel B and Parcel C. Parcel B will be conveyed to an abutter, #864 Massachusetts Avenue, in response to their detached garage encroachment onto the site. Parcel C will remain as an undeveloped parcel of the Owner, since it is land located outside of the Town Center District along Burroughs Road. Parcel A is a parcel under agreement for purchase from the same abutter, #864 Massachusetts Avenue, involved with PARCEL B. The purpose of Parcel A is to provide Zone I protection for the two proposed public water supply wells. The current alternative of 100 units is a reduced density version of previous Concept Plans discussed with the Town of 208 units and 158 units reserved exclusively for elderly occupancy. The 2012 Zoning Bylaw allows a density of 314 elderly units.

Alternative #3 - A comprehensive permit (40B) development, Minuteman Village with 96 detached single family dwellings was considered in 2012

NOTE: *The purpose of the alternatives analysis is to consider what effect changing the parameters and/or siting of a project, or components thereof, will have on the environment, keeping in mind that the objective of the MEPA review process is to avoid or minimize damage to the environment to the greatest extent feasible. Examples of alternative projects include alternative site locations, alternative site uses, and alternative site configurations.*

Summarize the mitigation measures proposed to offset the impacts of the preferred alternative:

According to Boxborough's Zoning Bylaw, the maximum amount of units is 314. The preferred alternative proposes only 100 units. Many previous designs included more wetland alteration. The road layout was designed to keep construction as far from wetland resource areas as possible, and a majority of the work is outside the 100' Buffer Zone.

If the project is proposed to be constructed in phases, please describe each phase:

The first phase includes the Private Drive access from Massachusetts Avenue, the clubhouse, model unit, the water supply, the stream crossing, and the Wastewater Treatment Facility.
The next phase includes portions of Private Drive A, B, and C, and likely an emergency access connection.
The final phases include the remaining drives and the second emergency access connection.
The individual buildings will each be an individual phase. The sidewalk along Massachusetts Avenue will also be its own phase (see Stormwater Pollution Prevention Detail sheets for additional description.

AREAS OF CRITICAL ENVIRONMENTAL CONCERN:
Is the project within or adjacent to an Area of Critical Environmental Concern?
☐Yes (Specify_____)
☒No
if yes, does the ACEC have an approved Resource Management Plan? ___ Yes ___ No;
If yes, describe how the project complies with this plan.
_____
Will there be stormwater runoff or discharge to the designated ACEC? ___ Yes ___ No;
If yes, describe and assess the potential impacts of such stormwater runoff/discharge to the designated ACEC.
_____

RARE SPECIES:
Does the project site include Estimated and/or Priority Habitat of State-Listed Rare Species? (see http://www.mass.gov/dfwele/dfw/nhesp/regulatory_review/priority_habitat/priority_habitat_home.htm)
☐Yes (Specify_____) ☒No

HISTORICAL /ARCHAEOLOGICAL RESOURCES:
Does the project site include any structure, site or district listed in the State Register of Historic Place or the inventory of Historic and Archaeological Assets of the Commonwealth?
☐Yes (Specify_____) ☒No
If yes, does the project involve any demolition or destruction of any listed or inventoried historic or archaeological resources? ☐Yes (Specify_____) ☐No

WATER RESOURCES:
Is there an Outstanding Resource Water (ORW) on or within a half-mile radius of the project site? _X_Yes ___No; if yes, identify the ORW and its location. Certified Vernal Pool located approximately 0.33 miles southeast of the project.

(NOTE: Outstanding Resource Waters include Class A public water supplies, their tributaries, and bordering wetlands; active and inactive reservoirs approved by MassDEP; certain waters within Areas of Critical Environmental Concern, and certified vernal pools. Outstanding resource waters are listed in the Surface Water Quality Standards, 314 CMR 4.00.)

Are there any impaired water bodies on or within a half-mile radius of the project site? ___Yes _X_No; if yes, identify the water body and pollutant(s) causing the impairment:_____.

Is the project within a medium or high stress basin, as established by the Massachusetts Water Resources Commission? _X_Yes ___No Medium Stress Basin

STORMWATER MANAGEMENT:

Generally describe the project's stormwater impacts and measures that the project will take to comply with the standards found in MassDEP's Stormwater Management Regulations: The project has been designed in accordance with the 10 Standards of the Massachusetts Stormwater Handbook. The drainage system has been designed to include deep sump hooded catch basins and manholes, infiltration basins, subsurface infiltration areas, and roof drywells. The peak rate and volume of runoff will be controlled following development (see attached Preliminary Stormwater Management Narrative).

MASSACHUSETTS CONTINGENCY PLAN:

Has the project site been, or is it currently being, regulated under M.G.L.c.21E or the Massachusetts Contingency Plan? Yes ___ No _X_ ; if yes, please describe the current status of the site (including Release Tracking Number (RTN), cleanup phase, and Response Action Outcome classification):_____

Is there an Activity and Use Limitation (AUL) on any portion of the project site? Yes ___ No _X_;
if yes, describe which portion of the site and how the project will be consistent with the AUL: _____

Are you aware of any Reportable Conditions at the property that have not yet been assigned an RTN?

Yes ___ No _X_ ; if yes, please describe:_____

SOLID AND HAZARDOUS WASTE:

If the project will generate solid waste during demolition or construction, describe alternatives considered for re-use, recycling, and disposal of, e.g., asphalt, brick, concrete, gypsum, metal, wood:
The Proponent intends to remove an existing barn and single family dwelling with associated driveway on site. The waste will be removed offsite in accordance with current local, state, and federal regulations. There is no other significant need for disposal of solid waste.

(NOTE: Asphalt pavement, brick, concrete and metal are banned from disposal at Massachusetts landfills and waste combustion facilities and wood is banned from disposal at Massachusetts landfills. See 310 CMR 19.017 for the complete list of banned materials.)

Will your project disturb asbestos containing materials? Yes _*__ No _*__ ;
if yes, please consult state asbestos requirements at http://mass.gov/MassDEP/air/asbhom01.htm
*Proponent shall follow current regulations relative to demolition of existing dwelling and detached barn.

Describe anti-idling and other measures to limit emissions from construction equipment:
The Proponent is in control of all major construction equipment that will be used. It is the proponents company policy to not idle machines that are not in use. The Proponent has many other projects, therefore it is in the Proponents best interest to minimize equipment use by having a regimented schedule to maximize the efficiency of the equipment.

DESIGNATED WILD AND SCENIC RIVER:

Is this project site located wholly or partially within a defined river corridor of a federally designated Wild and Scenic River or a state designated Scenic River? Yes ___ No _X_ ;
if yes, specify name of river and designation:

If yes, does the project have the potential to impact any of the "outstandingly remarkable" resources of a federally Wild and Scenic River or the stated purpose of a state designated Scenic River?
Yes ___ No ___ ; if yes, specify name of river and designation: _____;
if yes, will the project will result in any impacts to any of the designated "outstandingly remarkable" resources of the Wild and Scenic River or the stated purposes of a Scenic River.
Yes ___ No ___ ;
if yes,describe the potential impacts to one or more of the "outstandingly remarkable" resources or stated purposes and mitigation measures proposed.

ATTACHMENTS:

1. List of all attachments to this document.
2. U.S.G.S. map (good quality color copy, 8-½ x 11 inches or larger, at a scale of 1:24,000)

indicating the project location and boundaries.

3.. Plan, at an appropriate scale, of existing conditions on the project site and its immediate environs, showing all known structures, roadways and parking lots, railroad rights-of-way, wetlands and water bodies, wooded areas, farmland, steep slopes, public open spaces, and major utilities.

4 Plan, at an appropriate scale, depicting environmental constraints on or adjacent to the project site such as Priority and/or Estimated Habitat of state-listed rare species, Areas of Critical Environmental Concern, Chapter 91 jurisdictional areas, Article 97 lands, wetland resource area delineations, water supply protection areas, and historic resources and/or districts.

5. Plan, at an appropriate scale, of proposed conditions upon completion of project (if construction of the project is proposed to be phased, there should be a site plan showing conditions upon the completion of each phase).

6. List of all agencies and persons to whom the proponent circulated the ENF, in accordance with 301 CMR 11.16(2).

7. List of municipal and federal permits and reviews required by the project, as applicable.

LAND SECTION – all proponents must fill out this section

I. Thresholds / Permits

A. Does the project meet or exceed any review thresholds related to **land** (see 301 CMR 11.03(1)
_X_ Yes ___ No; if yes, specify each threshold: Creation of ten or more acres of impervious, alteration of 25 or more acres of land, creation of 5 or more acres of impervious..

II. Impacts and Permits

A. Describe, in acres, the current and proposed character of the project site, as follows:

	Existing	Change	Total
Footprint of buildings	0.04	5.53	5.57
Internal roadways	0.00	3.31	3.31
Parking and other paved areas	0.10	3.16	3.26
Other altered areas	0.03	20.67	20.70
Undeveloped areas	63.73	-32.67	31.06
Total: Project Site Acreage	63.90	0.00	63.90

B. Has any part of the project site been in active agricultural use in the last five years?
__ Yes _X__ No; if yes, how many acres of land in agricultural use (with prime state or locally important agricultural soils) will be converted to nonagricultural use?

C. Is any part of the project site currently or proposed to be in active forestry use?
___ Yes _X_ No; if yes, please describe current and proposed forestry activities and indicate whether any part of the site is the subject of a forest management plan approved by the Department of Conservation and Recreation:

D. Does any part of the project involve conversion of land held for natural resources purposes in accordance with Article 97 of the Amendments to the Constitution of the Commonwealth to any purpose not in accordance with Article 97? ___ Yes _X_ No; if yes, describe:

E. Is any part of the project site currently subject to a conservation restriction, preservation restriction, agricultural preservation restriction or watershed preservation restriction?
___ Yes_X_ No; if yes, does the project involve the release or modification of such restriction?
___ Yes ___ No; if yes, describe:

F. Does the project require approval of a new urban redevelopment project or a fundamental change in an existing urban redevelopment project under M.G.L.c.121A? ___ Yes _X_ No; if yes, describe:

G. Does the project require approval of a new urban renewal plan or a major modification of an existing urban renewal plan under M.G.L.c.121B? Yes ___ No _X_; if yes, describe:

III. Consistency

A. Identify the current municipal comprehensive land use plan
Title:__Boxborough 2030__ Date;_October 2014

B. Describe the project's consistency with that plan with regard to:

1) economic development: The project will provide 100 dwelling units reserved exclusively for elderly occupancy. In the Boxborough buildout plan, it is anticipated that there will be a need for 110-125 apartments, condominiums, or townhouses.

2) adequacy of infrastructure: The property is not located in an area of concern of stressed infrastructure. The proposed access point for the project is MA-111 which is a state highway.

3) open space impacts: A large portion of the site will remain as open space. The development is below the maximum allowed density of units.

4) compatibility with adjacent land uses: The parcel abuts existing residential

neighborhoods. The project also abuts two developments reserved exclusively for the elderly (Sheriff's Meadow and Tisbury Meadow).

C. Identify the current Regional Policy Plan of the applicable Regional Planning Agency (RPA)
RPA: Metropolitan Area Planning Council

Title: Metro Future Date 2008

D. Describe the project's consistency with that plan with regard to:

1) economic development: The development of the homes will result in a positive economic impact on the local construction industry. The long term maintenance of the upscale homes and properties will bolster the maintenance industry. The dwellings will provide an influx of customers to existing businesses abutting the project.

2) adequacy of infrastructure: The proposed drives will connect to MA-111.The site is located in Boxborough center and 1.6 miles to Interstate 495.

3) open space impacts: A large portion of the lot will remain as open space. The development is below the maximum allowed density of units.

RARE SPECIES SECTION

I. Thresholds / Permits

A. Will the project meet or exceed any review thresholds related to **rare species or habitat** (see 301 CMR 11.03(2))? __ Yes __X__ No; if yes, specify, in quantitative terms:

(NOTE: If you are uncertain, it is recommended that you consult with the Natural Heritage and Endangered Species Program (NHESP) prior to submitting the ENF.)

B. Does the project require any state permits related to **rare species or habitat**? __ Yes __X__ No

C. Does the project site fall within mapped rare species habitat (Priority or Estimated Habitat?) in the current Massachusetts Natural Heritage Atlas (attach relevant page)? __ Yes __X__ No.

D. If you answered "No" to all questions A, B and C, proceed to the **Wetlands, Waterways, and Tidelands Section**. If you answered "Yes" to either question A or question B, fill out the remainder of the Rare Species section below.

II. Impacts and Permits

A. Does the project site fall within Priority or Estimated Habitat in the current Massachusetts Natural Heritage Atlas (attach relevant page)? __ Yes ___ No. If yes,

1. Have you consulted with the Division of Fisheries and Wildlife Natural Heritage and Endangered Species Program (NHESP)? __Yes ___No; if yes, have you received a determination as to whether the project will result in the "take" of a rare species? __ Yes ___ No; if yes, attach the letter of determination to this submission.

2. Will the project "take" an endangered, threatened, and/or species of special concern in accordance with M.G.L. c.131A (see also 321 CMR 10.04)? __ Yes ___ No; if yes, provide a summary of proposed measures to minimize and mitigate rare species impacts

3. Which rare species are known to occur within the Priority or Estimated Habitat?

4. Has the site been surveyed for rare species in accordance with the Massachusetts Endangered Species Act? ___ Yes __ No

5. If your project is within Estimated Habitat, have you filed a Notice of Intent or received an Order of Conditions for this project? __ Yes ___ No; if yes, did you send a copy of the Notice of Intent to the Natural Heritage and Endangered Species Program, in accordance with the Wetlands Protection Act regulations? __ Yes ___ No

B. Will the project "take" an endangered, threatened, and/or species of special concern in accordance with M.G.L. c.131A (see also 321 CMR 10.04)? __ Yes ___ No; if yes, provide a summary of proposed measures to minimize and mitigate impacts to significant habitat:

WETLANDS, WATERWAYS, AND TIDELANDS SECTION

I. Thresholds / Permits

A. Will the project meet or exceed any review thresholds related to **wetlands, waterways, and tidelands** (see 301 CMR 11.03(3))? ___ Yes _X_ No; if yes, specify, in quantitative terms:

B. Does the project require any state permits (or a local Order of Conditions) related to **wetlands, waterways, or tidelands**? _X_ Yes ___ No; if yes, specify which permit: Order Of Conditions

C. If you answered "No" to both questions A and B, proceed to the **Water Supply Section**. If you answered "Yes" to either question A or question B, fill out the remainder of the Wetlands, Waterways, and Tidelands Section below.

II. Wetlands Impacts and Permits

A. Does the project require a new or amended Order of Conditions under the Wetlands Protection Act (M.G.L. c.131A)? _X_ Yes ___ No; if yes, has a Notice of Intent been filed? __ Yes _X_ No; if yes, list the date and MassDEP file number: ; if yes, has a local Order of Conditions been issued? ___ Yes _X_ No; Was the Order of Conditions appealed? ___ Yes ___ No. Will the project require a Variance from the Wetlands regulations? ___ Yes _X_ No.

B. Describe any proposed permanent or temporary impacts to wetland resource areas located on the project site: Temporary disturbance of Bordering Vegetated Wetlands at the stream crossing and where a sidewalk is proposed along the lot's frontage. The disturbed areas will be brought back to original grade and reseeded with a wetland seed mix. Work is also proposed in the 100' Buffer Zone to BVW, which is a resource area according to the local Bylaw.

C. Estimate the extent and type of impact that the project will have on wetland resources, and indicate whether the impacts are temporary or permanent: 842 s.f., temporary disturbance at stream crossing and sidewalk extension on Massachusetts Avenue.

Coastal Wetlands	Area (square feet) or Length (linear feet)	Temporary or Permanent Impact?
Land Under the Ocean	0	
Designated Port Areas	0	
Coastal Beaches	0	
Coastal Dunes	0	
Barrier Beaches	0	
Coastal Banks	0	
Rocky Intertidal Shores	0	
Salt Marshes	0	
Land Under Salt Ponds	0	
Land Containing Shellfish	0	
Fish Runs	0	
Land Subject to Coastal Storm Flowage	0	
Inland Wetlands		
Bank (lf)	136 LF	temporary
Bordering Vegetated Wetlands	471 SF	temporary
Isolated Vegetated Wetlands		
Land under Water	371 SF	temporary
Isolated Land Subject to Flooding	0	
Bordering Land Subject to Flooding	0	
Riverfront Area	0	

D. Is any part of the project:

1. proposed as a **limited project**? ___ Yes _X_ No; if yes, what is the area (in sf)?____
2. the construction or alteration of a **dam**? ___ Yes _X_ No; if yes, describe:
3. fill or structure in a **velocity zone** or **regulatory floodway**? ___ Yes _X_ No
4. dredging or disposal of dredged material? ___ Yes _X_ No; if yes, describe the volume of dredged material and the proposed disposal site:
5. a discharge to an **Outstanding Resource Water (ORW)** or an **Area of Critical Environmental Concern (ACEC)**? ___ Yes _X_ No
6. subject to a wetlands restriction order? ___ Yes _X_ No; if yes, identify the area (in sf):
7. located in buffer zones? _X_Yes ___No; if yes, how much (in sf) 128,844 s.f.

E. Will the project:

1. be subject to a local wetlands ordinance or bylaw? _X_ Yes ___ No
2. alter any federally-protected wetlands not regulated under state law? ___ Yes _X_ No; if yes, what is the area (sf)?

III. Waterways and Tidelands Impacts and Permits

A. Does the project site contain waterways or tidelands (including filled former tidelands) that are subject to the Waterways Act, M.G.L.c.91? ___ Yes _X_ No; if yes, is there a current Chapter 91 License or Permit affecting the project site? ___ Yes ___ No; if yes, list the date and license or permit number and provide a copy of the historic map used to determine extent of filled tidelands:

B. Does the project require a new or modified license or permit under M.G.L.c.91?
___ Yes _X_ No; if yes, how many acres of the project site subject to M.G.L.c.91 will be for non-water-dependent use? Current ___ Change ___ Total ___
If yes, how many square feet of solid fill or pile-supported structures (in sf)?

C. For non-water-dependent use projects, indicate the following:

Area of filled tidelands on the site:___0_____
Area of filled tidelands covered by buildings:___0_____
For portions of site on filled tidelands, list ground floor uses and area of each use:
_____
Does the project include new non-water-dependent uses located over flowed tidelands?
Yes ___ No _X_
Height of building on filled tidelands_____

Also show the following on a site plan: Mean High Water, Mean Low Water, Water-dependent Use Zone, location of uses within buildings on tidelands, and interior and exterior areas and facilities dedicated for public use, and historic high and historic low water marks.

D. Is the project located on landlocked tidelands? ___ Yes _X_ No; if yes, describe the project's impact on the public's right to access, use and enjoy jurisdictional tidelands and describe measures the project will implement to avoid, minimize or mitigate any adverse impact:

E. Is the project located in an area where low groundwater levels have been identified by a municipality or by a state or federal agency as a threat to building foundations? ___Yes _X_ No; if yes, describe the project's impact on groundwater levels and describe measures the project will implement to avoid, minimize or mitigate any adverse impact:

E. Is the project non-water-dependent **and** located on landlocked tidelands **or** waterways or tidelands subject to the Waterways Act **and** subject to a mandatory EIR?
___ Yes _X_ No;

(NOTE: If yes, then the project will be subject to Public Benefit Review and Determination.)

G. Does the project include dredging? ___ Yes _X_ No; if yes, answer the following questions:

What type of dredging? Improvement ___ Maintenance ___ Both ____

What is the proposed dredge volume, in cubic yards (cys) _____

What is the proposed dredge footprint ____length (ft) ___width (ft)____depth (ft);

Will dredging impact the following resource areas?

Intertidal Yes__ No__; if yes, ___ sq ft

Outstanding Resource Waters Yes__ No__; if yes, ___ sq ft

Other resource area (i.e. shellfish beds, eel grass beds) Yes__ No__; if yes __ sq ft

If yes to any of the above, have you evaluated appropriate and practicable steps to: 1) avoidance; 2) if avoidance is not possible, minimization; 3) if either avoidance or minimize is not possible, mitigation?

If no to any of the above, what information or documentation was used to support this determination?

Provide a comprehensive analysis of practicable alternatives for improvement dredging in accordance with 314 CMR 9.07(1)(b). Physical and chemical data of the sediment shall be included in the comprehensive analysis.

Sediment Characterization

Existing gradation analysis results? __Yes ___No: if yes, provide results.

Existing chemical results for parameters listed in 314 CMR 9.07(2)(b)6? ___Yes ____No; if yes, provide results.

Do you have sufficient information to evaluate feasibility of the following management options for dredged sediment? If yes, check the appropriate option.

Beach Nourishment ___

Unconfined Ocean Disposal ___

Confined Disposal:

Confined Aquatic Disposal (CAD) ___

Confined Disposal Facility (CDF) ___

Landfill Reuse in accordance with COMM-97-001 ___

Shoreline Placement ___

Upland Material Reuse____

In-State landfill disposal____

Out-of-state landfill disposal ____

(NOTE: This information is required for a 401 Water Quality Certification.)

IV. Consistency:

A. Does the project have effects on the coastal resources or uses, and/or is the project located within the Coastal Zone? ___ Yes _X_ No; if yes, describe these effects and the projects consistency with the policies of the Office of Coastal Zone Management:

B. Is the project located within an area subject to a Municipal Harbor Plan? ___ Yes _X_ No; if yes, identify the Municipal Harbor Plan and describe the project's consistency with that plan:

WATER SUPPLY SECTION

I. Thresholds / Permits

A. Will the project meet or exceed any review thresholds related to **water supply** (see 301 CMR 11.03(4))? ___ Yes _X_ No; if yes, specify, in quantitative terms:

B. Does the project require any state permits related to **water supply**? __X__ Yes __ No; if yes, specify which permit: BRPWS13- Site Source <70 GPM (See Approval letter dated June 30, 2016).
BRPWS15- Pump Test Report & Construction Approval
BRPWS23A- Treatment Facility Construction Approval
BRPWS06- Underground Injection Control for water treatment backwash

C. If you answered "No" to both questions A and B, proceed to the **Wastewater Section**. If you answered "Yes" to either question A or question B, fill out the remainder of the Water Supply Section below.

II. Impacts and Permits

A. Describe, in gallons per day (gpd), the volume and source of water use for existing and proposed activities at the project site:

	Existing	Change	Total
Municipal or regional water supply			
Withdrawal from groundwater	330	20,330	20,660*
Withdrawal from surface water		**	**
Interbasin transfer			
Irrigation Wells	0	27,000**	27,000**

* Water Demand for Dwelling Units and Clubhouse based on Title 5 sewage design flows.
** Anticipated Water Demand for on-site Irrigation system based on one-inch per week application per square foot of area to be irrigated. Anticipated allowance of 3,000 square feet of lawn area per unit and 15,000 square feet for Clubhouse area. Water demand to be met by a combination of on-site irrigation wells to be located outside of ALL Zone I raduis' and possible use of existing surface water supply on-site. Use of irrigation wells and /or surface waters may be subject to additional permitting and review by the local Board of Health and/or Conservation Commission. The cumulative water demand on-site will not exceed daily allowable MA DEP Thresholds of 100,000 GPD. Demand does not reflect deduction of anticipated 20% recharge.
(NOTE: Interbasin Transfer approval will be required if the basin and community where the proposed water supply source is located is different from the basin and community where the wastewater from the source will be discharged.)

B. If the source is a municipal or regional supply, has the municipality or region indicated that there is adequate capacity in the system to accommodate the project? ___ Yes ___ No

C. If the project involves a new or expanded withdrawal from a groundwater or surface water source, has a pumping test been conducted? _X__ Yes __ No; if yes, attach a map of the drilling sites and a summary of the alternatives considered and the results.

Well	PT Rate (gpm)	App Rate (gpm)	App Rate (gpd)	Zone I (ft)	IWPA (ft)
PW-1	11.2	8.4	12,096	262	669
PW-2	8.0	6.0	8,640	240	592
		14.4	20,736		

D. What is the currently permitted withdrawal at the proposed water supply source (in gallons per day)? __330__Will the project require an increase in that withdrawal? _X__Yes ___No; if yes, then

WATER SUPPLY SECTION

I. Thresholds / Permits

A. Will the project meet or exceed any review thresholds related to **water supply** (see 301 CMR 11.03(4))? ___ Yes _X_ No; if yes, specify, in quantitative terms:

B. Does the project require any state permits related to **water supply**? __X__ Yes __ No; if yes, specify which permit: BRPWS13- Site Source <70 GPM (See Approval letter dated June 30, 2016).
BRPWS15- Pump Test Report & Construction Approval
BRPWS23A- Treatment Facility Construction Approval
BRPWS06- Underground Injection Control for water treatment backwash

C. If you answered "No" to both questions A and B, proceed to the **Wastewater Section**. If you answered "Yes" to either question A or question B, fill out the remainder of the Water Supply Section below.

II. Impacts and Permits

A. Describe, in gallons per day (gpd), the volume and source of water use for existing and proposed activities at the project site:

	Existing	Change	Total
Municipal or regional water supply			
Withdrawal from groundwater	330	20,330	20,660*
Withdrawal from surface water		**	**
Interbasin transfer			
Irrigation Wells	0	27,000**	27,000**

* Water Demand for Dwelling Units and Clubhouse based on Title 5 sewage design flows.
** Anticipated Water Demand for on-site Irrigation system based on one-inch per week application per square foot of area to be irrigated. Anticipated allowance of 3,000 square feet of lawn area per unit and 15,000 square feet for Clubhouse area. Water demand to be met by a combination of on-site irrigation wells to be located outside of ALL Zone I radius' and possible use of existing surface water supply on-site. Use of irrigation wells and /or surface waters may be subject to additional permitting and review by the local Board of Health and/or Conservation Commission. The cumulative water demand on-site will not exceed daily allowable MA DEP Thresholds of 100,000 GPD. Demand does not reflect deduction of anticipated 20% recharge.
(NOTE: Interbasin Transfer approval will be required if the basin and community where the proposed water supply source is located is different from the basin and community where the wastewater from the source will be discharged.)

B. If the source is a municipal or regional supply, has the municipality or region indicated that there is adequate capacity in the system to accommodate the project? ___ Yes ___ No

C. If the project involves a new or expanded withdrawal from a groundwater or surface water source, has a pumping test been conducted? __X__ Yes __ No; if yes, attach a map of the drilling sites and a summary of the alternatives considered and the results.

Well	PT Rate (gpm)	App Rate (gpm)	App Rate (gpd)	Zone I (ft)	IWPA (ft)
PW-1	11.2	8.4	12,096	262	669
PW-2	8.0	6.0	8,640	240	592
		14.4	20,736		

D. What is the currently permitted withdrawal at the proposed water supply source (in gallons per day)? __330__Will the project require an increase in that withdrawal? _X__Yes ___No; if yes, then

day)? 330 Will the project require an increase in that withdrawal? X Yes ___No; if yes, then how much of an increase (gpd)? 20,330

E. Does the project site currently contain a water supply well, a drinking water treatment facility, water main, or other water supply facility, or will the project involve construction of a new facility? X Yes ___No. If yes, describe existing and proposed water supply facilities at the project site: The existing dwelling on site is served by a private well, to be converted to an irrigation well. The proposed development proposes two public water supply wells.

	Permitted Flow	Existing Avg Daily Flow	Project Flow	Total
Capacity of water supply well(s) (gpd)	_____	330	20,660	20,660
Capacity of water treatment plant (gpd)	_____	_____	20,660	20,660

F. If the project involves a new interbasin transfer of water, which basins are involved, what is the direction of the transfer, and is the interbasin transfer existing or proposed?

G. Does the project involve:

1. new water service by the Massachusetts Water Resources Authority or other agency of the Commonwealth to a municipality or water district? ___ Yes X No
2. a Watershed Protection Act variance? ___ Yes X No; if yes, how many acres of alteration?
3. a non-bridged stream crossing 1,000 or less feet upstream of a public surface drinking water supply for purpose of forest harvesting activities? ___ Yes X No

III. Consistency

Describe the project's consistency with water conservation plans or other plans to enhance water resources, quality, facilities and services:

The existing private well will be converted to an irrigation well at the entrance. Each building to be constructed per current state building code. Water supply will be provided by on-site wells.

WASTEWATER SECTION

I. Thresholds / Permits

A. Will the project meet or exceed any review thresholds related to **wastewater** (see 301 CMR 11.03(5))? _X_ Yes __ No; if yes, specify, in quantitative terms: The project exceeds 11.03(5)(B)3.c. Construction of one or more new sewer mains ½ or more miles in length.

B. Does the project require any state permits related to **wastewater**? _X_ Yes __ No; if yes, specify which permit: Groundwater Discharge Permit

C. If you answered "No" to both questions A and B, proceed to the **Transportation -- Traffic Generation Section**. If you answered "Yes" to either question A or question B, fill out the remainder of the Wastewater Section below.

II. Impacts and Permits

A. Describe the volume (in gallons per day) and type of disposal of wastewater generation for existing and proposed activities at the project site (calculate according to 310 CMR 15.00 for septic systems or 314 CMR 7.00 for sewer systems): There is currently 330 GPD of on-site sewage disposal. The project proposes 20,660 GPD of on-site sewage disposal.

	Existing	Change	Total
Discharge of sanitary wastewater	330	20,330	20,660
Discharge of industrial wastewater			
TOTAL	330		20,660

	Existing	Change	Total
Discharge to groundwater (Title 5)	330	-330	0
Discharge to Groundwater (non Title 5)	0	20,660	20,660
Discharge to outstanding resource water			
Discharge to surface water			
Discharge to municipal or regional wastewater facility			
TOTAL	330	20,300	20,660

B. Is the existing collection system at or near its capacity? ___ Yes _X_ No; if yes, then describe the measures to be undertaken to accommodate the project's wastewater flows:

C. Is the existing wastewater disposal facility at or near its permitted capacity? ___ Yes_X_ No; if yes, then describe the measures to be undertaken to accommodate the project's wastewater flows:

D. Does the project site currently contain a wastewater treatment facility, sewer main, or other wastewater disposal facility, or will the project involve construction of a new facility? _X_ Yes ___ No; if yes, describe as follows: The existing single family dwelling has a 3 bedroom Title 5 septic system discharging 330 gallons per day. The proposed project will have a wastewater treatment facility designed under Massachusetts's "Guidelines for the Design, Construction, Operation, and Maintenance of Small Wastewater Treatment Facilities with Land Disposal" that will treat and discharge 20,660 gallons per day.

	Permitted	Existing Avg Daily Flow	Project Flow	Total
Wastewater treatment plant capacity (in gallons per day)	_____	0	20,660	20,660

E. If the project requires an interbasin transfer of wastewater, which basins are involved, what is the direction of the transfer, and is the interbasin transfer existing or new?

(NOTE: Interbasin Transfer approval may be needed if the basin and community where wastewater will be discharged is different from the basin and community where the source of water supply is located.)

F. Does the project involve new sewer service by the Massachusetts Water Resources Authority (MWRA) or other Agency of the Commonwealth to a municipality or sewer district? ___ Yes _X_ No

G. Is there an existing facility, or is a new facility proposed at the project site for the storage, treatment, processing, combustion or disposal of sewage sludge, sludge ash, grit, screenings, wastewater reuse (gray water) or other sewage residual materials? ___ Yes _X_ No; if yes, what is the capacity (tons per day):

	Existing	Change	Total
Storage	_____	_____	_____
Treatment	_____	_____	_____
Processing	_____	_____	_____
Combustion	_____	_____	_____
Disposal	_____	_____	_____

H. Describe the water conservation measures to be undertaken by the project, and other wastewater mitigation, such as infiltration and inflow removal.

III. Consistency

A. Describe measures that the proponent will take to comply with applicable state, regional, and local plans and policies related to wastewater management:
See attached Preliminary Wastewater Report provided by Mount Hope Engineering

B. If the project requires a sewer extension permit, is that extension included in a comprehensive wastewater management plan? ___ Yes _X_ No; if yes, indicate the EEA number for the plan and whether the project site is within a sewer service area recommended or approved in that plan:

TRANSPORTATION SECTION (TRAFFIC GENERATION)

I. Thresholds / Permit

A. Will the project meet or exceed any review thresholds related to **traffic generation** (see 301 CMR 11.03(6))? ___ Yes _X_ No; if yes, specify, in quantitative terms: The Project is projected to generate 644 daily vehicle trips and create approximately 236 new parking spaces (11.03 (6) (b) 14) – Below Threshold.

B. Does the project require any state permits related to **state-controlled roadways**? _X_ Yes ___ No; if yes, specify which permit: A Highway Access Permit is required from MassDOT for access to Massachusetts Avenue (Route 111)

C. If you answered "No" to both questions A and B, proceed to the **Roadways and Other Transportation Facilities Section**. If you answered "Yes" to either question A or question B, fill out the remainder of the Traffic Generation Section below.

II. Traffic Impacts and Permits

A. Describe existing and proposed vehicular traffic generated by activities at the project site:

	Existing	Change	Total
Number of Parking Spaces	2	234	236
Number of Vehicle Trips per day	10	634	644
ITE Land Use Code (s):	ITE LUC 230 – Residential Condominium/Townhouse		

B. What is the estimated average daily traffic on roadways serving the site?

Roadway	Existing	Change	Total
1.Massachusetts Ave. west of Site	7,150	304	7,454
2.Massachusetts Ave. east of Site	7,150	340	7,490
3.			

C. If applicable, describe proposed mitigation measures on state-controlled roadways that the project proponent will implement: The project proponent prepared a traffic study to identify appropriate mitigation measures for Massachusetts Avenue (Route 111). Massachusetts Avenue has adequate capacity to handle the traffic generated by the project. The project proponent is committed to working with both the Town and MassDOT.

D. How will the project implement and/or promote the use of transit, pedestrian and bicycle facilities and services to provide access to and from the project site? The project will have a transportation coordinator who will work with tenants interested in car pooling and rideshare programs. Bicycle racks will also be provided on-site.

E. Is there a Transportation Management Association (TMA) that provides transportation demand management (TDM) services in the area of the project site? ____ Yes _X_ No; if yes, describe if and how will the project will participate in the TMA: There is no TMA that currently serves the Town of Boxborough. The project proponent will assign an on-site Transportation Coordinator (TC) to coordinate TDM strategies.

F. Will the project use (or occur in the immediate vicinity of) water, rail, or air transportation facilities? ____ Yes _X_ No; if yes, generally describe:

G. If the project will penetrate approach airspace of a nearby airport, has the proponent filed a Massachusetts Aeronautics Commission Airspace Review Form (780 CMR 111.7) and a Notice of Proposed Construction or Alteration with the Federal Aviation Administration (FAA) (CFR Title 14 Part 77.13, forms 7460-1 and 7460-2)? N/A

III. Consistency

Describe measures that the proponent will take to comply with municipal, regional, state, and federal plans and policies related to traffic, transit, pedestrian and bicycle transportation facilities and services: Any proposed roadway improvements as well as the proposed site access will be designed in accordance with MassDOT and Town of Boxborough design regulations. All proposed pedestrian infrastructure, including any sidewalks or crosswalks, will be designed in accordance with Americans with Disabilities Act (ADA) and Commonwealth of Massachusetts Architectural Access Board (AAB) design guidelines.

TRANSPORTATION SECTION (ROADWAYS AND OTHER TRANSPORTATION FACILITIES)

I. Thresholds

A. Will the project meet or exceed any review thresholds related to **roadways or other transportation facilities** (see 301 CMR 11.03(6))? ___ Yes _X_ No; if yes, specify, in quantitative terms:

B. Does the project require any state permits related to **roadways or other transportation facilities**? ___ Yes _X_ No; if yes, specify which permit:

C. If you answered "No" to both questions A and B, proceed to the **Energy Section**. If you answered "Yes" to either question A or question B, fill out the remainder of the Roadways Section below.

II. Transportation Facility Impacts

A. Describe existing and proposed transportation facilities in the immediate vicinity of the project site:

B. Will the project involve any

1. Alteration of bank or terrain (in linear feet)? _____
2. Cutting of living public shade trees (number)? _____
3. Elimination of stone wall (in linear feet)? _____

III. Consistency -- Describe the project's consistency with other federal, state, regional, and local plans and policies related to traffic, transit, pedestrian and bicycle transportation facilities and services, including consistency with the applicable regional transportation plan and the Transportation Improvements Plan (TIP), the State Bicycle Plan, and the State Pedestrian Plan:

ENERGY SECTION

I. Thresholds / Permits

A. Will the project meet or exceed any review thresholds related to **energy** (see 301 CMR 11.03(7))?
___ Yes _X_ No; if yes, specify, in quantitative terms:

B. Does the project require any state permits related to **energy**? ___ Yes _X_ No; if yes, specify which permit:

C. If you answered "No" to both questions A and B, proceed to the **Air Quality Section**. If you answered "Yes" to either question A or question B, fill out the remainder of the Energy Section below.

II. Impacts and Permits

A. Describe existing and proposed energy generation and transmission facilities at the project site:

	Existing	Change	Total
Capacity of electric generating facility (megawatts)	_____	_____	_____
Length of fuel line (in miles)	_____	_____	_____
Length of transmission lines (in miles)	_____	_____	_____
Capacity of transmission lines (in kilovolts)	_____	_____	_____

B. If the project involves construction or expansion of an electric generating facility, what are:

1. the facility's current and proposed fuel source(s)?
2. the facility's current and proposed cooling source(s)?

C. If the project involves construction of an electrical transmission line, will it be located on a new, unused, or abandoned right of way? ___Yes ___No; if yes, please describe:

D. Describe the project's other impacts on energy facilities and services:

III. Consistency

Describe the project's consistency with state, municipal, regional, and federal plans and policies for enhancing energy facilities and services:

AIR QUALITY SECTION

I. Thresholds

A. Will the project meet or exceed any review thresholds related to **air quality** (see 301 CMR 11.03(8))? ___ Yes _X_ No; if yes, specify, in quantitative terms:

B. Does the project require any state permits related to **air quality**? ___ Yes _X_ No; if yes, specify which permit:

C. If you answered "No" to both questions A and B, proceed to the **Solid and Hazardous Waste Section**. If you answered "Yes" to either question A or question B, fill out the remainder of the Air Quality Section below.

II. Impacts and Permits

A. Does the project involve construction or modification of a major stationary source (see 310 CMR 7.00, Appendix A)? ___ Yes ___ No; if yes, describe existing and proposed emissions (in tons per day) of:

	Existing	Change	Total
Particulate matter	_____	_____	_____
Carbon monoxide	_____	_____	_____
Sulfur dioxide	_____	_____	_____
Volatile organic compounds	_____	_____	_____
Oxides of nitrogen	_____	_____	_____
Lead	_____	_____	_____
Any hazardous air pollutant	_____	_____	_____
Carbon dioxide	_____	_____	_____

B. Describe the project's other impacts on air resources and air quality, including noise impacts:

III. Consistency

A. Describe the project's consistency with the State Implementation Plan:

B. Describe measures that the proponent will take to comply with other federal, state, regional, and local plans and policies related to air resources and air quality:

SOLID AND HAZARDOUS WASTE SECTION

I. Thresholds / Permits

A. Will the project meet or exceed any review thresholds related to **solid or hazardous waste** (see 301 CMR 11.03(9))? ___ Yes _X_ No; if yes, specify, in quantitative terms:

C. Does the project require any state permits related to **solid and hazardous waste**?
___ Yes _X_ No; if yes, specify which permit:

C. If you answered "No" to both questions A and B, proceed to the **Historical and Archaeological Resources Section**. If you answered "Yes" to either question A or question B, fill out the remainder of the Solid and Hazardous Waste Section below.

II. Impacts and Permits

A. Is there any current or proposed facility at the project site for the storage, treatment, processing, combustion or disposal of solid waste? ___ Yes ___ No; if yes, what is the volume (in tons per day) of the capacity:

	Existing	Change	Total
Storage	_____	_____	_____
Treatment, processing	_____	_____	_____
Combustion	_____	_____	_____
Disposal	_____	_____	_____

B. Is there any current or proposed facility at the project site for the storage, recycling, treatment or disposal of hazardous waste? ___ Yes ___ No; if yes, what is the volume (in tons or gallons per day) of the capacity:

	Existing	Change	Total
Storage	_____	_____	_____
Recycling	_____	_____	_____
Treatment	_____	_____	_____
Disposal	_____	_____	_____

C. If the project will generate solid waste (for example, during demolition or construction), describe alternatives considered for re-use, recycling, and disposal:

D. If the project involves demolition, do any buildings to be demolished contain asbestos?
___ Yes ___ No

E. Describe the project's other solid and hazardous waste impacts (including indirect impacts):

III. Consistency

Describe measures that the proponent will take to comply with the State Solid Waste Master Plan:

HISTORICAL AND ARCHAEOLOGICAL RESOURCES SECTION

I. Thresholds / Impacts

A. Have you consulted with the Massachusetts Historical Commission? ___ Yes _X_ No; if yes, attach correspondence. For project sites involving lands under water, have you consulted with the Massachusetts Board of Underwater Archaeological Resources? ____Yes _X_ No; if yes, attach correspondence

B. Is any part of the project site a historic structure, or a structure within a historic district, in either case listed in the State Register of Historic Places or the Inventory of Historic and Archaeological Assets of the Commonwealth? ___ Yes _X_ No; if yes, does the project involve the demolition of all or any exterior part of such historic structure? ___ Yes ___ No; if yes, please describe:

C. Is any part of the project site an archaeological site listed in the State Register of Historic Places or the Inventory of Historic and Archaeological Assets of the Commonwealth? ___ Yes _X_ No; if yes, does the project involve the destruction of all or any part of such archaeological site? ___ Yes ___ No; if yes, please describe:

D. If you answered "No" to all parts of both questions A, B and C, proceed to the **Attachments and Certifications** Sections. If you answered "Yes" to any part of either question A or question B, fill out the remainder of the Historical and Archaeological Resources Section below.

II. Impacts

Describe and assess the project's impacts, direct and indirect, on listed or inventoried historical and archaeological resources:

III. Consistency

Describe measures that the proponent will take to comply with federal, state, regional, and local plans and policies related to preserving historical and archaeological resources:

CERTIFICATIONS:

1. The Public Notice of Environmental Review has been/will be published in the following newspapers in accordance with 301 CMR 11.15(1):

   (Name) The Acton Beacon (Date) 12 / 22 / 2016

2. This form has been circulated to Agencies and Persons in accordance with 301 CMR 11.16(2).

Signatures:

12/15/16 Member	12/15/16
Date Signature of Responsible Officer or Proponent	Date Signature of person preparing NPC (if different from above)
James Fenton	George Dimakarakos P.E.
Name (print or type)	Name (print or type)
Boxborough Town Center, LLC	Stamski and McNary, Inc.
Firm/Agency	Firm/Agency
P.O. Box 985	1000 Main Street
Street	Street
Acton, MA 01720	Acton, MA 01720
Municipality/State/Zip	Municipality/State/Zip
978-266-9751	978-263-8585
Phone	Phone

Distribution List in Accordance With 301 CMR 11.16(2)

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Secretary of Energy and Environmental Affairs
Executive Office of Energy and Environmental Affairs (EEA)
Attn: MEPA Office
100 Cambridge Street, Suite 900
Boston, MA 02114

Department of Environmental Protection
Boston Office
Commissioner's Office
One Winter Street
Boston, MA 02108

DEP/Central Regional Office
Attn: MEPA Coordinator
8 New Bond Street
Worcester, MA 01606

Massachusetts Department of Transportation
Public/Private Development Unit
10 Park Plaza
Boston, MA 02116

MassDOT District #3
Attn: MEPA Coordinator
403 Belmont Street
Worcester, MA 01604

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

Metropolitan Area Planning Council
60 Temple Place/6th Floor
Boston, MA 02111

Board of Selectmen
29 Middle Road
Boxborough, MA 01719

Planning Board
Town Hall
29 Middle Road
Boxborough, MA 01719

Conservation Commission
Town Hall
29 Middle Road
Boxborough, MA 01719

Board of Health
29 Middle Road
Boxborough, MA 01719

List of Attachments

Section 2
Distribution List 301 CMR 11.16(2)
List of Attachments
List of Municipal and Federal Permits and Reviews Required

Section 3
U.S.G.S. Map
Natural Heritage and Endangered Species Habitat Map

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Water Supply Plan; Dated May 20, 2016; Scale 1"=120';
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Section 8 (cont'd)

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Planning Board Decision #90-07A; dated: October 4, 1994
Planning Board Decision #90-07; dated: September 19, 1990

List of Municipal, State and Federal Permits and Reviews Required

List of Municipal, State and Federal Permits and Reviews Required:

- **Federal:**

  1. EPA NPDES Construction General Permit

- **State:**

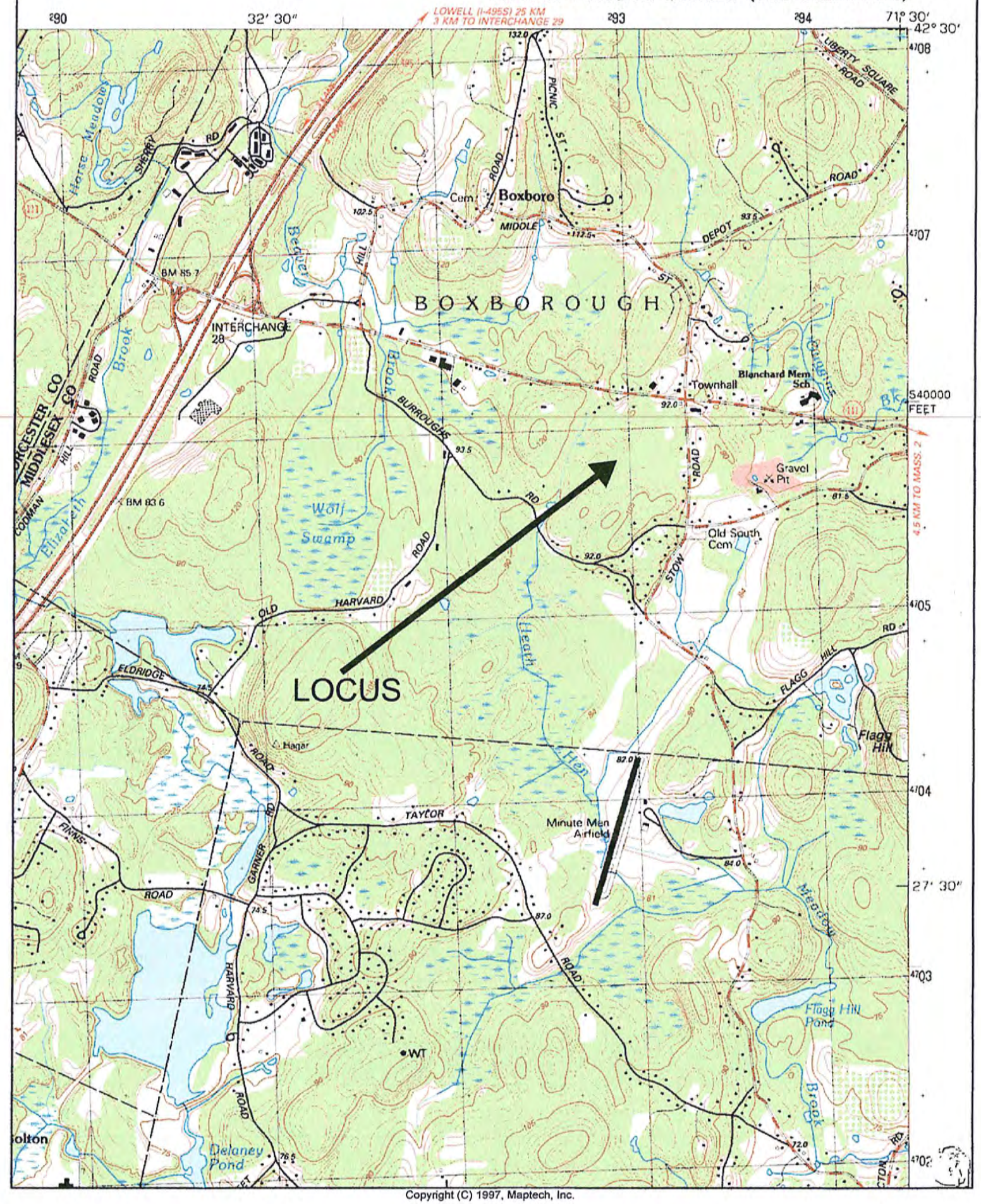
  1. Order of Conditions Under the Massachusetts Wetlands Protection Act
  2. Groundwater Discharge Permit BRP WP 79
  3. Hydrogeologic Application BRP WP 83
  4. BRPWS13- Site Source <70 GPM (See Approval letter dated June 30, 2016).
     BRPWS15- Pump Test Report & Construction Approval
     BRPWS23A- Treatment Facility Construction Approval
     BRPWS06- Underground Injection Control for water treatment backwash
  5. Highway Access Permit from MassDOT

- **Municipal:**

  1. Order of Conditions (Soil Testing) Issued: May 18, 2016 (Attached)
  2. Order of Resource Area Delineation Under the Massachusetts Wetlands Protection Act (Attached)
  3. Order of Conditions Under the Massachusetts Wetlands Protection Act and the Town of Boxborough Wetlands Bylaw
  4. Town of Boxborough Planning Board Site Plan Approval
  5. Town of Boxborough Stone Wall Removal Application (Priest Lane)
  6. Possible Special Permit for Alternate Access (Priest Lane & Easement "C")
  7. Town of Boxborough Building Permits Under the Massachusetts State Building Code
  8. Town of Boxborough Zoning Board of Appeals Special Permit (Sidewalk)
  9. Town of Boxborough Board of Health - Irrigation well permit

U.S.G.S. Map

7.5 X 15 MINUTE SERIES (TOPOGRAPHIC)



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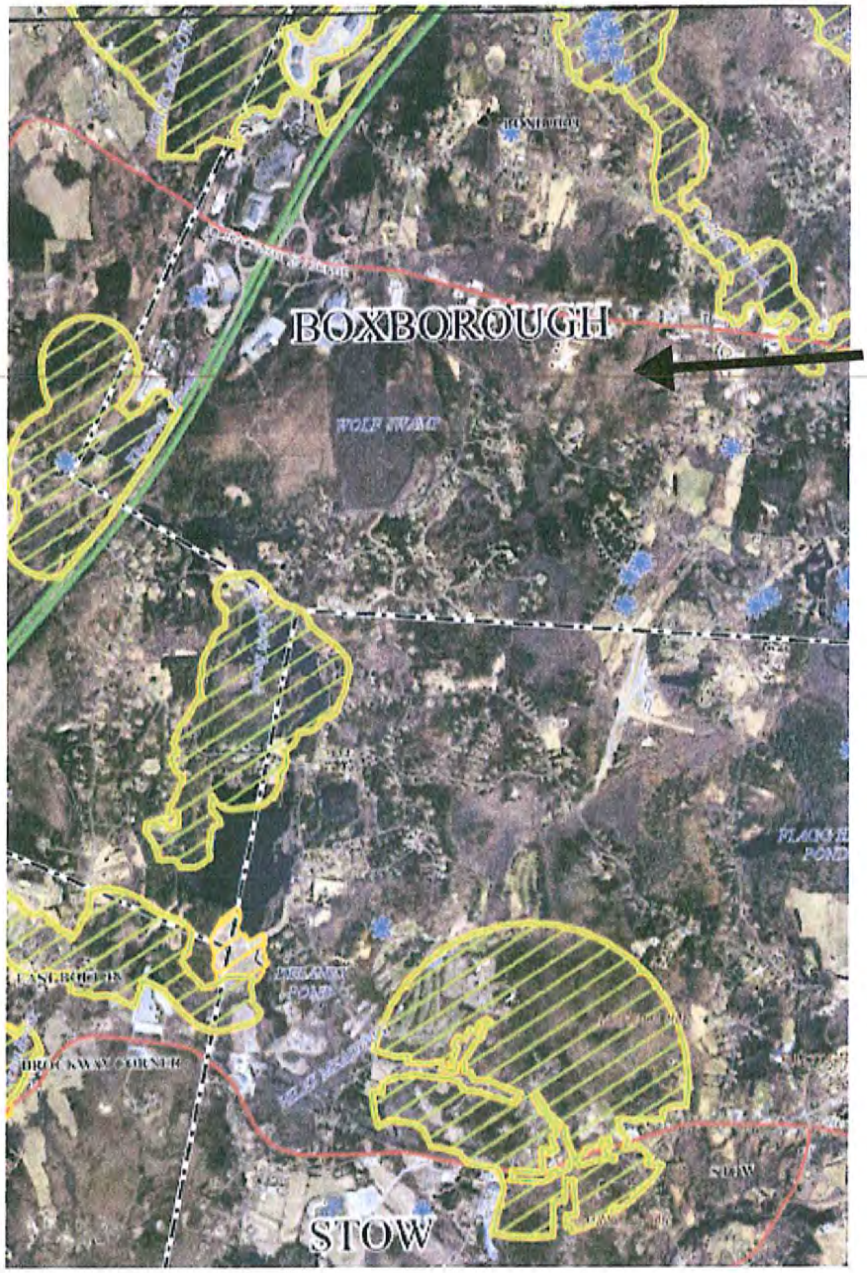
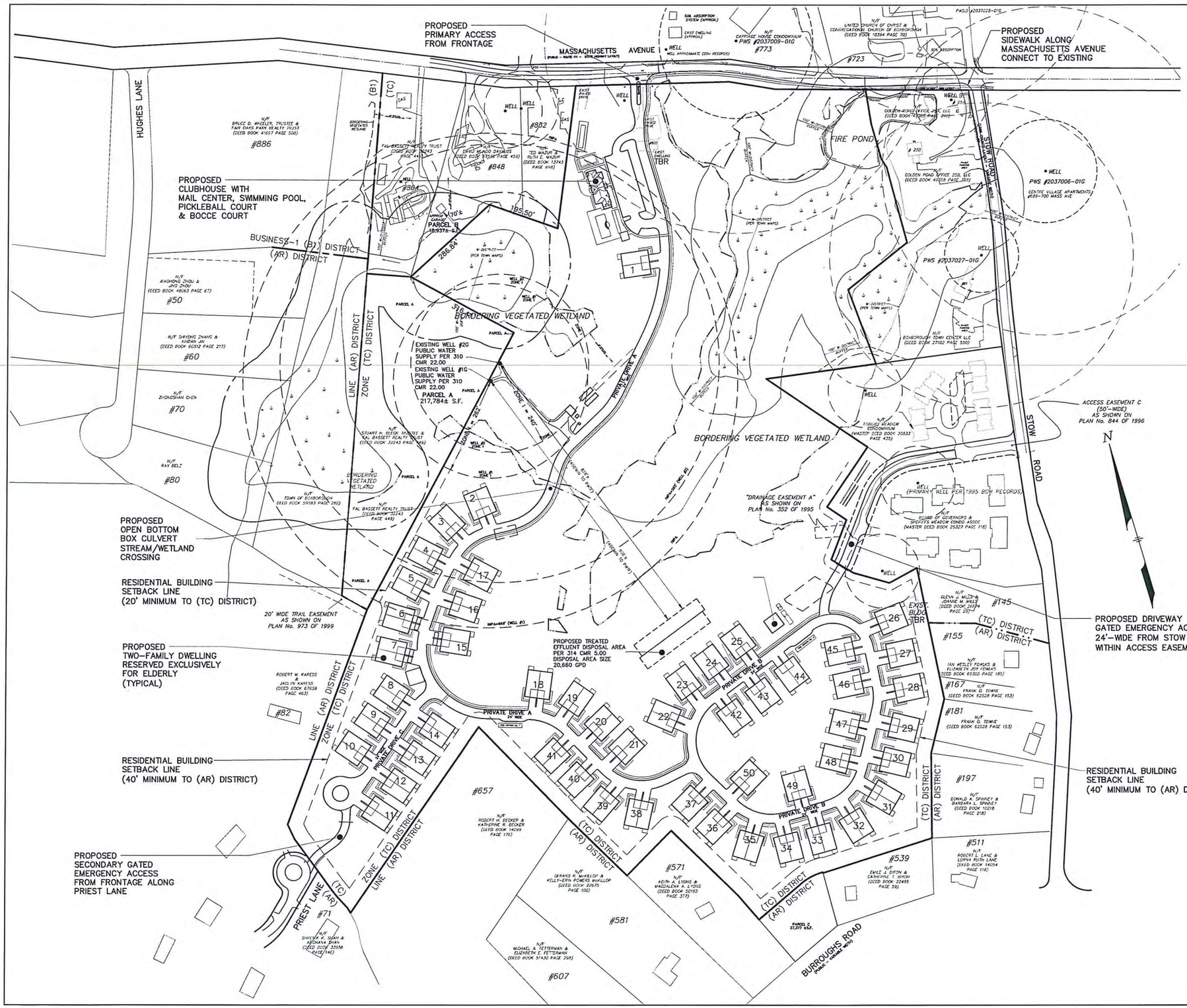
Natural Heritage and Endangered Species Habitat Map


BOXBOROUGH
LOCUS
STOW

MEPA Site Plan dated December 9, 2016



LAND USE DATA, TOWN OF BOXBOROUGH ZONING BYLAW AMENDED THROUGH TOWN MEETING MAY 2012

ZONING DISTRICT: TOWN CENTER DISTRICT & W-DISTRICT

ARTICLE IV, USE REGULATIONS	ALLOWED:
TWO-FAMILY DWELLING, RESERVED EXCLUSIVELY FOR ELDERLY OCCUPANCY	YES*

*REFER TO SECTION 5004(1): FOR MULTI-FAMILY DWELLING IN TC DISTRICT RESERVED EXCLUSIVELY FOR ELDERLY OCCUPANCY, DENSITY NOT TO EXCEED 10 UNITS/80,000 SF LAND AREA

2,519,642/80,000= 31.4 x 10 UNITS= 314 UNITS

MAX DENSITY: 157 DUPLEXES= 314 UNITS

PROPOSED DENSITY: 50 DUPLEXES= 100 UNITS

ARTICLE V, DIMENSIONAL REQUIREMENTS

	REQUIRED:	PROVIDED:
MIN LOT AREA:	40,000 SF	2,519,642 SF**
MIN UPLAND LOT AREA:	20,000 SF	196,928±SF***
MIN LOT FRONTAGE:	100 FT	785 FT (MASS AVE)
MIN LOT WIDTH:	100 FT	780+ FT
MIN FRONT SETBACK (PRIEST LANE)	25 FT	>25 FT
MIN FRONT SETBACK (STOW AND BURROUGHS ROAD)	50 FT	>50 FT
MIN FRONT SETBACK (MASS. AVE)	75 FT	217'± FT (CLUBHOUSE)
MIN SIDE & REAR YARD (TC DISTRICT):	20 FT	>20 FT
MIN SIDE & REAR YARD (AR DISTRICT):	40 FT	>40 FT
MAX STORIES	3	2
MAX BUILDING HEIGHT	45 FT	<45 FT
MAX LOT COVERAGE (EXCL. SIDEWALKS)	35%	20%
FLOOR AREA RATIO	NA	
MAX BUILDING SIZE (GROSS FLOOR AREA)	8,000 SF	4,851± SF
MIN OPEN SPACE (INCL SIDEWALKS):	65%	80%

**-SITE AREA EXCLUDES PARCEL A, PARCEL B AND PARCEL C.
***-ALONG MASSACHUSETTS AVENUE; 1,191,596± S.F. UPLAND AT PRIEST LANE.

DESIGN FLOW CALCULATIONS

100 DWELLING UNITS HOUSING FOR THE ELDERLY

70 (2 BDRM) UNITS AT 150 GPD/UNIT	=	10,500 GPD
30 (3 BDRM) UNITS AT 330 GPD/UNIT	=	9,900 GPD
13 CLUBHOUSE LOCKERS AT 20 GPD/LOCKER	=	260 GPD
TOTAL SEWAGE FLOW	=	20,660 GPD

PROPOSED APPROVED WITHDRAWALS

EXISTING WELLS - TOTAL FLOW RATE = 20,660 GPD MINIMUM
FLOWRATE PER EACH WELL BASED ON ACTUAL FIELD RESULTS

WELL #1 + WELL #2 = TOTAL DESIGN FLOW
12,096 GPD + 8,640 GPD = 20,736 GPD (> 20,660 GPD OK)

WELL #1 = 8.4 GPM = 12,096 GPD
WELL #1 - ZONE 1 RADIUS: [150 X LOG(12,096) GPD - 350]=262 FT
WELL #1 - IWPA = [(32 X 8.4 GPM) + 400] = 669 FT

WELL #2 = 6.00 GPM = 8,640 GPD
WELL #2 - ZONE 1 RADIUS: [150 X LOG(8,640) GPD - 350]=240 FT
WELL #2 - IWPA = [(32 X 6.00 GPM) + 400] = 592 FT

SITE PLAN IN BOXBOROUGH, MASSACHUSETTS

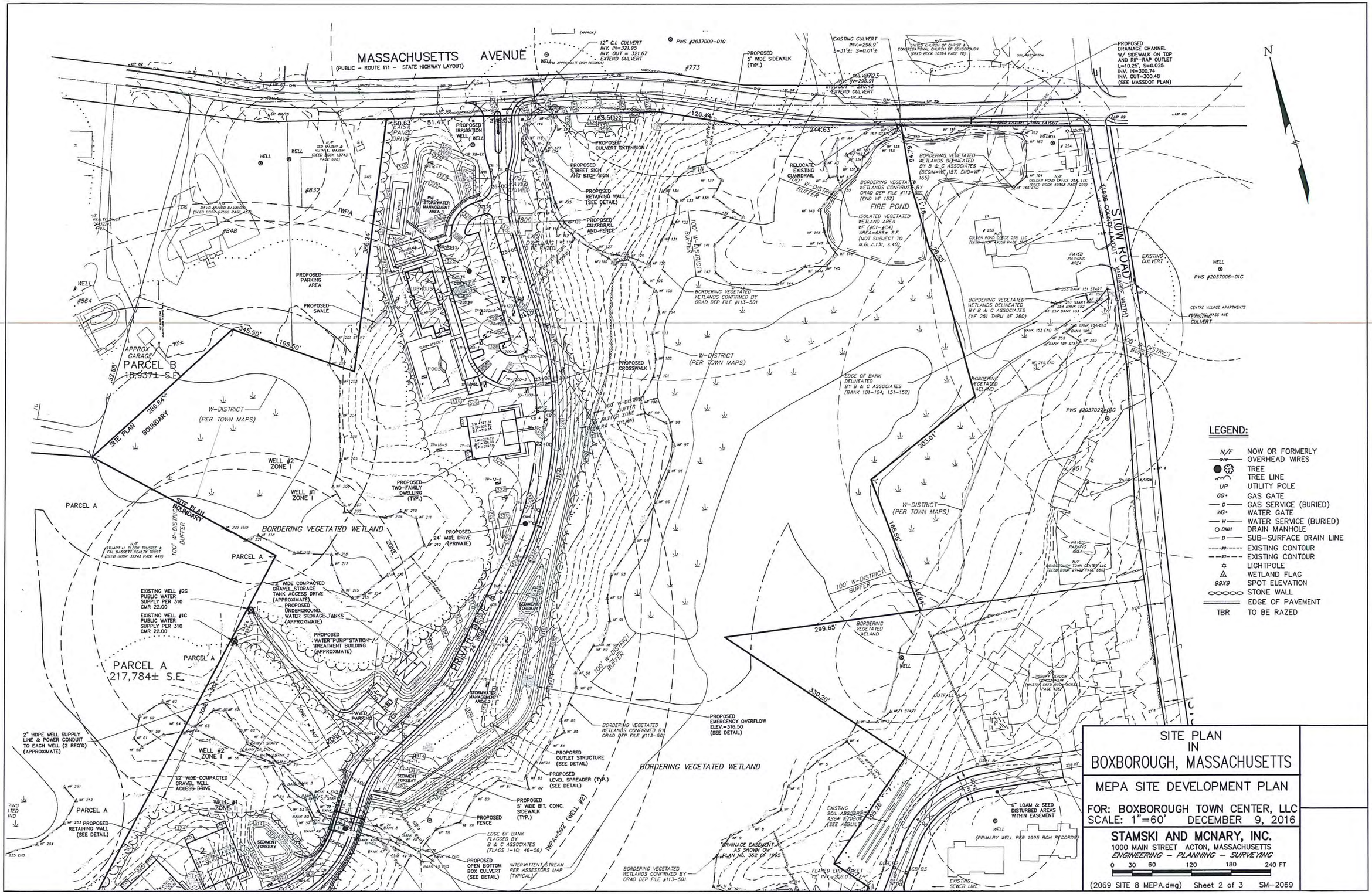
MEPA MASTER PLAN

FOR: BOXBOROUGH TOWN CENTER, LLC
SCALE: 1"=120' DECEMBER 9, 2016

STAMSKI AND MCNARY, INC.
1000 MAIN STREET ACTON, MASSACHUSETTS
ENGINEERING - PLANNING - SURVEYING

0 60 120 240 360 480 FT

(2069 SITE 8 MEPA.dwg) Sheet 1 of 3 SM-2069


MASSACHUSETTS AVENUE
(PUBLIC – ROUTE 111 – STATE HIGHWAY LAYOUT)
SIGN ROAD
(VARIABLE WIDTH)
N
PARCEL A
217,784± S.F.
PARCEL B
18,937± S.F.
SITE PLAN BOUNDARY
W-DISTRICT
(PER TOWN MAPS)
100' W-DISTRICT BUFFER
BORDERING VEGETATED WETLAND
FIRE POND
PRIVATE DRIVE
24' WIDE DRIVE (PRIVATE)
PROPOSED TWO-FAMILY DWELLING (TYP.)
PROPOSED PARKING AREA
PROPOSED SWALE
PROPOSED CROSSWALK
PROPOSED RETAINING WALL (SEE DETAIL)
PROPOSED GUARDRAIL AND FENCE
PROPOSED STREET SIGN AND STOP SIGN
PROPOSED CULVERT EXTENSION
PROPOSED IRRIGATION WELL
STORMWATER MANAGEMENT AREA
EXISTING DWELLING TO BE RAZED
EXISTING PAVED DRIVE
12" C.I. CULVERT INV. IN=321.95 INV. OUT = 321.67 EXTEND CULVERT
EXISTING CULVERT INV.=298.9' L=31'± S=0.01'±
CULVERT#3 IN=298.91 OUT=298.43 EXTEND CULVERT
PROPOSED 5' WIDE SIDEWALK (TYP.)
PROPOSED DRAINAGE CHANNEL W/ SIDEWALK ON TOP AND RIP-RAP OUTLET L=10.25', S=0.025 INV. IN=300.74 INV. OUT=300.48 (SEE MASSDOT PLAN)
RELOCATE EXISTING GUARDRAIL
BORDERING VEGETATED WETLANDS CONFIRMED BY GRAD DEP FILE #113-501
BORDERING VEGETATED WETLANDS DELINEATED BY B & C ASSOCIATES (BEGIN=WF 157, END=WF 165)
BORDERING VEGETATED WETLANDS DELINEATED BY B & C ASSOCIATES (WF 251 THRU WF 260)
ISOLATED VEGETATED WETLAND AREA WF (#C1-#C4) AREA=6852± S.F. (NOT SUBJECT TO M.G.L.c.131, §.40)
EDGE OF BANK DELINEATED BY B & C ASSOCIATES (BANK 101-104; 151-152)
EXISTING CULVERT
PWS #2037006-01G
WELL
APPROX GARAGE
PROPOSED WELL #2 ZONE I
PROPOSED WELL #1 ZONE I
EXISTING WELL #2G PUBLIC WATER SUPPLY PER 310 CMR 22.00
EXISTING WELL #1G PUBLIC WATER SUPPLY PER 310 CMR 22.00
12' WIDE COMPACTED GRAVEL STORAGE TANK ACCESS DRIVE (APPROXIMATE)
PROPOSED UNDERGROUND WATER STORAGE TANKS (APPROXIMATE)
PROPOSED WATER PUMP STATION TREATMENT BUILDING (APPROXIMATE)
2" HDPE WELL SUPPLY LINE & POWER CONDUIT TO EACH WELL (2 REQ'D) (APPROXIMATE)
12' WIDE COMPACTED GRAVEL WELL ACCESS DRIVE
PROPOSED RETAINING WALL (SEE DETAIL)
PROPOSED EMERGENCY OVERFLOW ELEV.=316.50 (SEE DETAIL)
PROPOSED OUTLET STRUCTURE (SEE DETAIL)
PROPOSED LEVEL SPREADER (TYP.) (SEE DETAIL)
PROPOSED 5' WIDE BIT. CONC. SIDEWALK (TYP.)
PROPOSED FENCE
PROPOSED OPEN BOTTOM BOX CULVERT (SEE DETAIL)
EDGE OF BANK FLAGGED BY B & C ASSOCIATES (FLAGS 1-10; 46-56)
INTERMITTENT STREAM PER ASSESSORS MAP (TYPICAL)
IWPA=592' (WELL #2)
IWPA
DRAINAGE EASEMENT AS SHOWN ON PLAN NO. 382 OF 1995
EXISTING SEWER LINE
6" LOAM & SEED DISTURBED AREAS WITHIN EASEMENT
(PRIMARY WELL PER 1995 BOH RECORDS)
CENTRE VILLAGE APARTMENTS
EXISTING MASS AVE CULVERT
LEGEND:
N/F NOW OR FORMERLY
OVERHEAD WIRES
TREE
TREE LINE
UTILITY POLE
GAS GATE
GAS SERVICE (BURIED)
WATER GATE
WATER SERVICE (BURIED)
DRAIN MANHOLE
SUB-SURFACE DRAIN LINE
EXISTING CONTOUR
EXISTING CONTOUR
LIGHTPOLE
WETLAND FLAG
SPOT ELEVATION
STONE WALL
EDGE OF PAVEMENT
TBR TO BE RAZED
SITE PLAN IN BOXBOROUGH, MASSACHUSETTS
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FOR: BOXBOROUGH TOWN CENTER, LLC
SCALE: 1"=60' DECEMBER 9, 2016
STAMSKI AND MCNARY, INC.
1000 MAIN STREET ACTON, MASSACHUSETTS
ENGINEERING – PLANNING – SURVEYING
0 30 60 120 180 240 FT
(2069 SITE 8 MEPA.dwg) Sheet 2 of 3 SM-2069

LEGEND:
N/F NOW OR FORMERLY
OHW OVERHEAD WIRES
TREE
TREE LINE
UP UTILITY POLE
GG GAS GATE
G GAS SERVICE (BURIED)
WG WATER GATE
W WATER SERVICE (BURIED)
DMH DRAIN MANHOLE
D SUB-SURFACE DRAIN LINE
99 EXISTING CONTOUR
95 EXISTING CONTOUR
LIGHTPOLE
WETLAND FLAG
99X9 SPOT ELEVATION
STONE WALL
EDGE OF PAVEMENT
TBR TO BE RAZED
PARCEL A
PRIVATE DRIVE A
PRIVATE DRIVE B
PRIVATE DRIVE C
PRIVATE DRIVE D
PRIEST LANE
BURROUGHS ROAD
PARCEL C 27,377 ±S.F.
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IN
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Planning Board Decision #90-07; dated: September 19, 1990

Section 10

MEPA Site Plan (3 Sheets); By: Stamski and McNary, Inc.; dated Decmber 9, 2016
Master Plan (Sheet 1); Scale 1"=120'
Site Development Plan (Sheets 2 & 3); Scale 1"=60'

List of Municipal, State and Federal Permits and Reviews Required:

- **Federal:**

  1. EPA NPDES Construction General Permit

- **State:**

  1. Order of Conditions Under the Massachusetts Wetlands Protection Act

  2. Groundwater Discharge Permit BRP WP 79

  3. Hydrogeologic Application BRP WP 83

  4. BRPWS13- Site Source <70 GPM (See Approval letter dated June 30, 2016).
     BRPWS15- Pump Test Report & Construction Approval
     BRPWS23A- Treatment Facility Construction Approval
     BRPWS06- Underground Injection Control for water treatment backwash

  5. Highway Access Permit from MassDOT

- **Municipal:**

  1. Order of Conditions (Soil Testing) Issued: May 18, 2016 (Attached)

  2. Order of Resource Area Delineation Under the Massachusetts Wetlands Protection Act (Attached)

  3. Order of Conditions Under the Massachusetts Wetlands Protection Act and the Town of Boxborough Wetlands Bylaw

  4. Town of Boxborough Planning Board Site Plan Approval

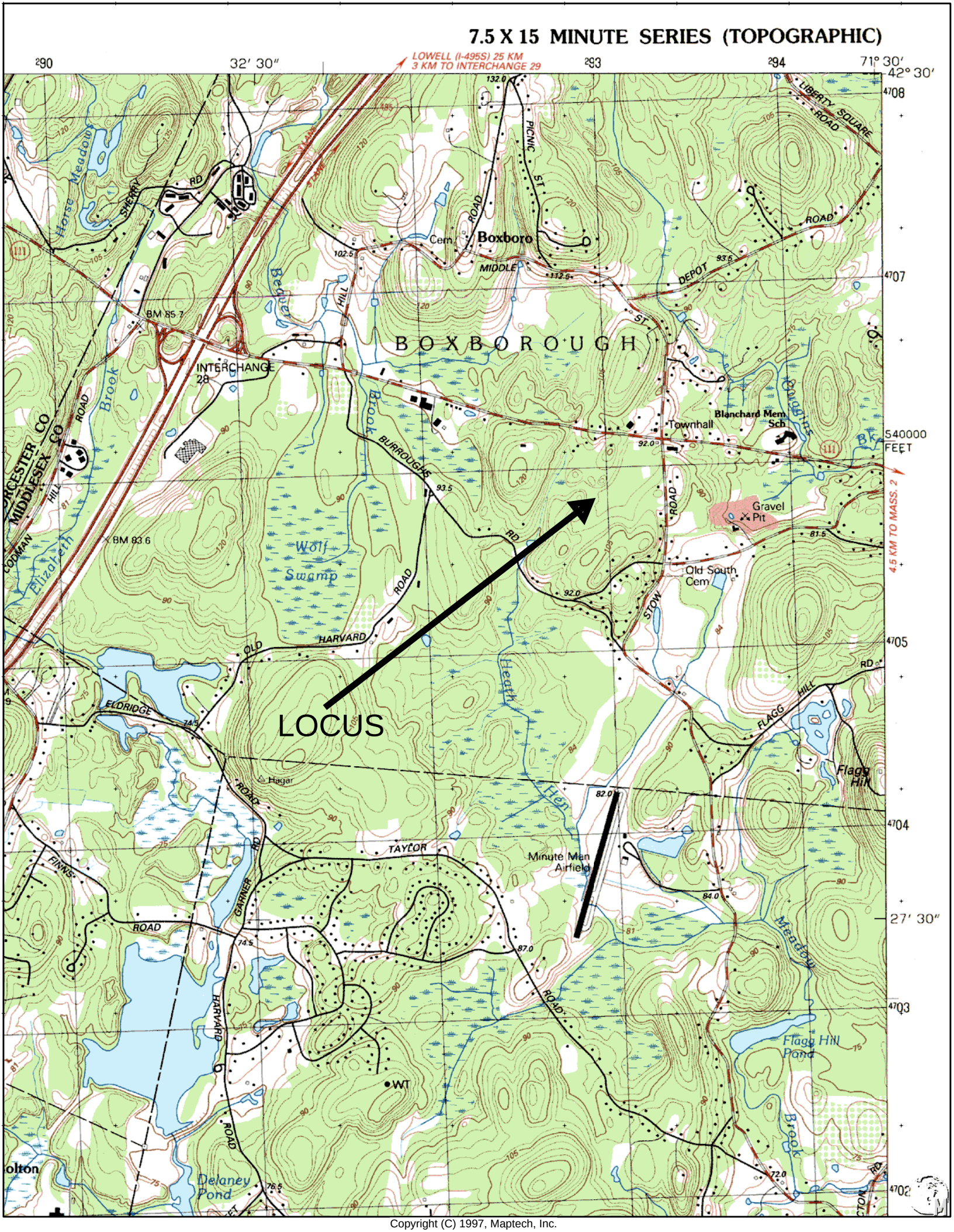
  5. Town of Boxborough Stone Wall Removal Application (Priest Lane)

  6. Possible Special Permit for Alternate Access (Priest Lane & Easement "C")

  7. Town of Boxborough Building Permits Under the Massachusetts State Building Code

  8. Town of Boxborough Zoning Board of Appeals Special Permit (Sidewalk)

  9. Town of Boxborough Board of Health - Irrigation well permit


7.5 X 15 MINUTE SERIES (TOPOGRAPHIC)
LOWELL (I-495S) 25 KM
3 KM TO INTERCHANGE 29
32' 30"
71° 30'
42° 30'
27' 30"
540000 FEET
4.5 KM TO MASS. 2
BOXBOROUGH
Boxboro
Cem
INTERCHANGE 28
Townhall
Blanchard Mem Sch
Gravel Pit
Old South Cem
Wolf Swamp
Heath
Hen
Minute Man Airfield
Flagg Hill
Flagg Hill Pond
Delaney Pond
Hagar
Horse Meadow
Elizabeth
Brook
Meadow
Cowgins
Bk
LOCUS
LIBERTY SQUARE ROAD
PICNIC ST
MIDDLE ROAD
DEPOT ST
BURROUGHS RD
STOW ROAD
FLAGG HILL RD
OLD HARVARD ROAD
ELDRIDGE RD
TAYLOR ROAD
FINNS ROAD
GARNER RD
HARVARD ROAD
SHERRY RD
CODMAN HILL ROAD
WORCESTER CO
MIDDLESEX CO
BM 85.7
BM 83.6
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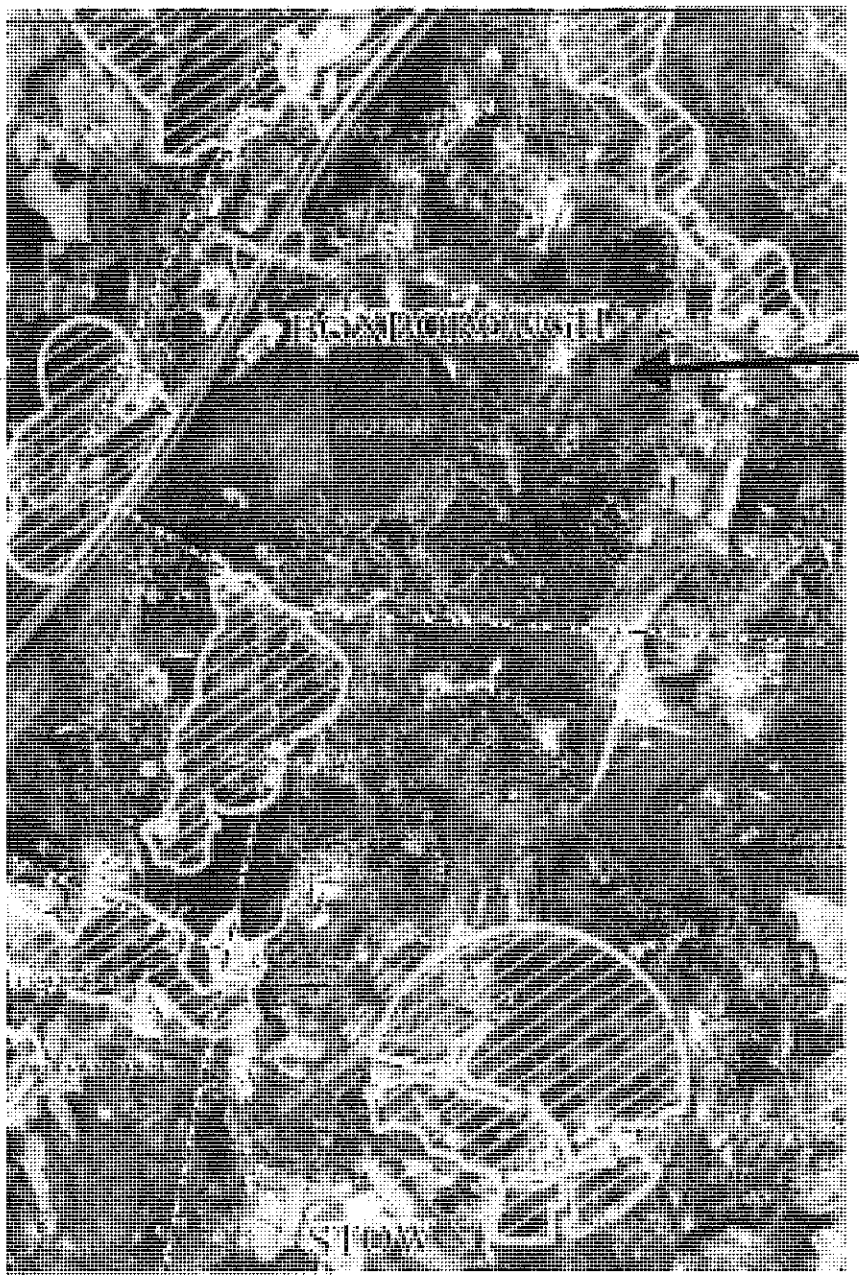
Natural Heritage and Endangered Species Habitat Map


LOCUS

Commonwealth of Massachusetts
Executive Office of Energy & Environmental Affairs

Department of Environmental Protection

Central Regional Office • 8 New Bond Street, Worcester MA 01606 • 508-792-7650

Charles D. Baker
Governor

Karyn E. Polito
Lieutenant Governor

Matthew A. Beaton
Secretary

Martin Suuberg
Commissioner

June 30, 2016

Boxborough Town Center, LLC
Attn: James Fenton
P.O. Box 985
Acton, MA 01720

Town: Boxborough
Facility: Regency at Boxborough
PWS ID: TBD RO: 575982
Permit: WS13
MassDEP Transmittal: X270140
Action: **Approved**

Dear Mr. Fenton,

The Central Regional Office of the Massachusetts Department of Environmental Protection received your permit application, WS13, Site Examination and Approval to Conduct Pumping Test on sources less than 70 gallons per minute for the proposed new wells to serve the proposed Regency at Boxborough Community Public Water System on May 27, 2016. The submittal includes:

BRP WS13, MassDEP Transmittal X270140
Report: "Regency at Boxborough, Proposed Community Wells, Boxborough, MA 01719"
Dated: May 25, 2016
Prepared by: GeoHydroCycle, Inc.
Contact: Stephen W. Smith
Start Date of Application: May 31, 2016

Project Description and Background

Boxborough Town Center LLC is proposing to develop the site at 700 Massachusetts Avenue in Boxborough as an age restricted (55 and older) residential development. The development is proposed to be thirty (30) three-bedroom units and seventy (70) two-bedroom units. The Title 5 design flow is 20,400 gallons per day (gpd) [30 x 330 gpd + 70 x 150 gpd]. A clubhouse is also proposed, but the design flow is suggested by the Applicant to be considered as part of the unit flow. If additional flow is required as part of the wastewater approval, then the water supply approved rate can be adjusted to include the flow, as long as the pumping test is conducted to accommodate the additional flow and the Zone I areas can be enlarged.

This information is available in alternate format. Call Michelle Waters-Ekanem, Diversity Director, at 617-292-5751. TTY# MassRelay Service 1-800-439-2370
MassDEP Website: www.mass.gov/dep

Printed on Recycled Paper

Site Description

Two new PWS wells are proposed with an average daily pumping volume of 10,200 gpd each. Each well will have a Zone I radius of 251 feet and an Interim Wellhead Protection Area (IWPA) of 627 feet. A site visit was conducted on June 24, 2016, and was attended by Susan Connors of MassDEP, Stephen Smith of GeoHydroCycle, Inc. and Richard Harrington of Stamski and McNary, Inc. The proposed Zone I area is forest and wetland resource area. The Zone I area currently extends onto an abutting parcel not owned by Boxborough Town Center LLC. The owner of that parcel where the Zone I extends has indicated to the Applicant, that they will sell a portion of the parcel that contains the Zone I radius to Boxborough Town Center LLC. The transfer will take place once all permits necessary to start construction have been issued. It is proposed that all of the land will then be transferred to a builder who will complete the project, and eventually transfer all of the land and the public water system to a condominium association.

According to a search of MassGIS data, there are no certified vernal pools, areas designated as Priority Habitat for Rare Species, Areas of Critical Environmental Concern, groundwater discharges, NPDES surface water discharges, or solid waste facilities within a one-half mile radius of the proposed wells. The groundwater discharge for the facility will be located outside of the IWPA.

There are five (5) public water supply sources within a one half mile radius of the proposed wells, but all are outside of the IWPA. The well for Carriage House Condominium is approximately 1,500 feet away from the proposed wells. Through a request to MassDEP, Carriage House Condominium requested that their well be monitored prior to, during, and after the pumping test. According to the Applicant two additional private wells abutting the project have also asked to have their wells monitored.

There are four (4) hazardous waste sites within a one-half mile radius of the proposed wells (RTN 2-0011582, 2-0013332, 2-0015550, and 2-0010209). All of the sites are outside of the IWPA and are classified as Response Action Outcome where response actions were sufficient to achieve a level of no significant risk, or to at least ensure that all substantial hazards were eliminated.

There are portions of four developed private properties within the proposed IWPA and likely all or most of the water supply wells and septic systems for those properties are within the IWPA. Surface waters within a one-half mile radius include Heath Hen Meadow Brook and wetland resource areas. A Notice of Intent was filed with the Boxborough Conservation Commission as MassDEP File Number 113-532. An Order of Conditions was recorded on June 9, 2016. The area of wetlands resource delineation was approved by the Boxborough Conservation Commission. The proposed location for the water supply wells and access to the wells is outside of the buffer zone. The discharge from the pumping test will be located outside of the Zone I area and not to the wetland resource area.

Review and Approval

This permit application complies with the requirements at 310 CMR 22.00 Drinking Water Program Regulations and MassDEP's Guidelines and Policies for Public Water Systems. MassDEP reviewed the permit application and supporting documentation, and hereby issues the permit/approval. In the event this permit conflicts with all or parts of prior approvals or permits, the terms and conditions of this permit shall supersede the conflicting provisions of prior permits and/or approvals. This permit does not convey property rights of any sort or any exclusive privilege. Pursuant to MassDEP's authority under 310 CMR 22.04(7) to require that each supplier of water operate and maintain its system in a manner that ensures the delivery of safe drinking water to consumers, this permit is made subject to the conditions set forth below.

General Permit Conditions

1. Compliance with Permit Approvals – The Applicant shall conduct activities in accordance with the approved plans, reports, and other submissions, except as may be modified by the conditions set forth in the General Permit Conditions and Special Permit Conditions. No material changes in the design or activities described in the approved documents shall be performed without prior written MassDEP approval.

2. Compliance with Other Approvals – The activities at this Public Water System shall be performed in compliance with all other applicable local, state and federal laws and regulations. This approval does not relieve the owner or operator of this Public Water System from complying with all other applicable local, state and federal requirements, licenses and permits.

3. Duty to Mitigate – The Applicant shall remedy and shall act to prevent all potential and actual adverse impacts to public health or the environment resulting from noncompliance with the terms or conditions of the permit or approval.

4. Duty to Provide Information – The Applicant shall furnish to MassDEP, within a reasonable time, any information MassDEP may request, and which is deemed by MassDEP to be relevant in determining compliance with permits, regulations, guidelines and policies.

Specific Permit Conditions

1. Pumping Test Design – In order to insure that an adequate volume of water is available to supply potable water for residential use, the prolonged pumping test shall be conducted as a five-day pumping test, and shall meet the stabilization criteria set forth in MassDEP's Guidelines and Policies. The pumping test shall be conducted as described in the WS13 application and with the following conditions:
   - Water level data shall be collected during the step-drawdown test in the opposite well at the same frequency as the pumping well. It is recommended that the data be submitted to MassDEP for review and discussion prior to initiating the prolonged pumping test.

- Manual water level measurements should be collected during the prolonged pumping test in addition to the electronic data in order to safeguard against a failed transducer.
- The minimum pumping rate of 9.5 gpm suggested in the permit may not be sufficient for additional flow for the clubhouse. Submit to MassDEP the results of the step tests and a proposed prolonged pumping rate prior to starting the five-day pumping test.
- Water level monitoring in the public water supply well for Carriage House Condominiums, and any other private wells who requested monitoring, is required before, during and after the pumping test. A temporary transducer shall be installed to record baseline water level trends in each well, ten days prior to initiating the prolonged pumping test, during the prolonged pumping test, and for one week after shutdown of the pumping test. The frequency of transducer readings should be at least hourly and even more frequent if possible.

2. Water Quality Sampling – All water quality sampling shall be conducted as stated in the WS13 application and in accordance with the requirements of 310 CMR 22.00 and MassDEP's Guidelines and Policies including Appendix A and with the following additions:
   - Sampling for perchlorate, all regulated and unregulated Volatile Organic Compounds, and all regulated and unregulated Synthetic Organic Chemicals shall be conducted at the end of the pumping test.
   - Radionuclide sampling at the end of the pumping test shall include gross alpha, uranium, radium-226, radium-228, and radon.
   - In lieu of proposed 48-hour and 96-hour samples for secondary contaminants, a single mid-point sample coordinated with the total coliform sampling is authorized. Alternatively, the proposed schedule for four samples is also approved.

3. Water Quality Analysis – All water quality analyses must be conducted by a Massachusetts certified laboratory, using approved methods and achieving the required method detection limits. All water quality analytical data shall be reported on MassDEP Forms.

4. MEPA – An Environmental Notification Form is required to be submitted to the Massachusetts Environmental Policy Act Office. No additional water supply permits will be issued until the MEPA process is complete.

5. Zone I Radius Ownership and Control – The Drinking Water Program Regulations at 310 CMR 22.21(3)(b) require that the Public Water System must have the ownership or control of the area within the Zone I radius of each of the proposed groundwater source wells to protect the water from contamination. The Applicant shall submit to MassDEP as part of the WS 15 Permit application, a surveyed plot plan of the Zone I area, clearly delineating the limits of Zone I property ownership. Furthermore, current and future land uses within the Zone I shall be limited to those land uses directly related to the provision of public water system.

6. Pumping Test Report and Construction of Source – The Applicant shall submit to MassDEP for review and approval, a completed Pumping Test Report and Construction of Source permit application (WS 15) in accordance with the requirements of MassDEP's Guidelines and Policies within two years of the date of this permit. The Reports and Plans shall include, but not be limited to, a summary of the results of the pumping test and water quality analyses and draft design plans for the water supply appurtenances.

7. Water Treatment – If the water samples collected during the pumping test exhibit the need for treatment (e.g. violations of MCLs), then the appropriate permit application for Approval to Construct a Treatment Facility shall be submitted concurrent with the pumping test.

8. Financial Capacity/Assurance – MassDEP Regulations 310 CMR 22.04(1)(a)3 require that the public water system shall demonstrate to MassDEP's satisfaction that it has the technical, managerial, and financial capacity to operate and maintain the public water system in compliance with 310 CMR 22.00 and each National Primary Drinking Water Regulation in effect at the time of MassDEP's determination of the public water system's capacity and in effect in the foreseeable future. Prior to transfer of the public water system to the condo association, the builder is required to provide an escrow agreement to demonstrate the ability to finance the operation, maintenance, repair, and replacement in the event of an emergency and on a long term basis. Provide prior to the final inspection, an itemized cost estimate of construction and operation and maintenance of the public water system components to provide the basis for escrow agreements for repair and maintenance, and the capital reserve account. This accounting will provide the basis for the escrow agreement. To aid in this requirement, an Excel spreadsheet, "Asset Management Worksheet", is available under the heading "Capacity Development: Asset Management" on MassDEP's web page at http://www.mass.gov/eea/agencies/massdep/water/drinking/water-systems-ops.html#3. An electronic copy is also available upon request.

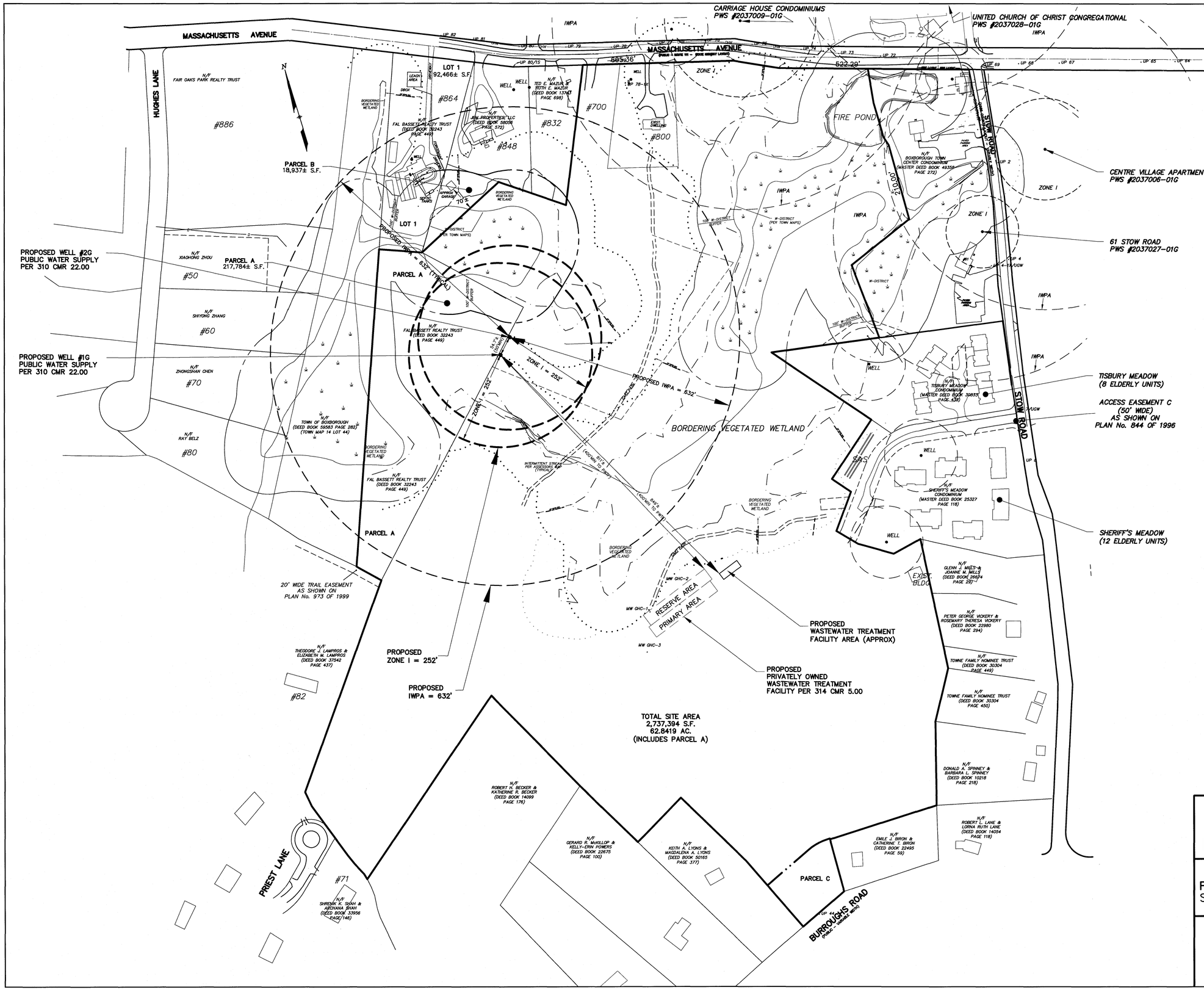
If you have any questions regarding this permit, please contact Susan Connors of the Drinking Water Program at 508-767-2701 or by email at Susan.Connors@state.ma.us.

Sincerely,

Robert A. Bostwick

Robert A. Bostwick, Section Chief
Drinking Water Program

Cc: Stephen Smith, GeoHydroCycle, Inc., 151B California Street, Newton, MA 02458
Richard Harrington, Stamski and McNary, Inc. (via email)
Boxborough Board of Health, 29 Middle Road, Boxborough, MA 01719



ZONING DISTRICT:

TOWN CENTER
WETLAND & WATERSHED OVERLAY DISTRICT

REFERENCE:

MIDDLESEX REGISTRY OF DEEDS
SOUTH DISTRICT
DEED BOOK 27102 PAGE 550
DEED BOOK 19267 PAGE 606
DEED BOOK 32243 PAGE 449
PLAN No. 891 OF 1967

TOWN OF BOXBOROUGH
PROPERTY MAP
ASSESSORS MAP 14, LOTS 46 AND 50
PARCELS 14-046-000 AND 14-050-000

PARCEL A – PORTION OF
ASSESSORS MAP 14, LOT 45, PARCEL 14-045-000

RECORD OWNERS:

BOXBOROUGH TOWN CENTER, LLC
PO BOX 985
WEST ACTON, MA 01720

MANE REALTY TRUST
TRUSTEE: JOHN J. LYONS
571 BURROUGHS ROAD
BOXBOROUGH, MA 01719

PARCEL A
FAL BASSETT REALTY TRUST
864 MASSACHUSETTS AVENUE
BOXBOROUGH, MA

APPLICANT:

BOXBOROUGH TOWN CENTER, LLC
PO BOX 985
WEST ACTON, MA 01720

NOTES:

1. PARCEL B TO BE COMBINED WITH LOT 1.
2. PARCEL A TO BE PURCHASED FROM ABUTTER, N/F FAL BASSETT REALTY TRUST
3. TOTAL SITE AREA INCLUDES PARCEL A AND EXCLUDES PARCEL B AND PARCEL C.

DESIGN CALCULATIONS

100 DWELLING UNITS HOUSING FOR THE ELDERLY
70 (2 BDRM) UNITS AT 150 GPD/UNIT = 10,500 GPD
30 (3 BDRM) UNITS AT 330GPD/UNIT = 9,900 GPD
TOTAL SEWAGE FLOW = 20,400 GPD (20,400 GPD PROVIDED)

PROPOSED WELLS
FLOW RATE = 20,400 GPD
FLOWRATE PER WELL
20,400 GPD ÷ 2= 10,200 GPD PER WELL = 8 GPM
ZONE 1 RADIUS: [150 X LOG(10,200) GPD – 350]=252 FT
IWPA = [(32 X 8 GPM) + 400] = 632 FT

WATER SUPPLY PLAN IN BOXBOROUGH, MASSACHUSETTS

FOR: BOXBOROUGH TOWN CENTER, LLC
SCALE: 1"=120' MAY 20, 2016

STAMSKI AND MCNARY, INC.
1000 MAIN STREET ACTON, MASSACHUSETTS
ENGINEERING – PLANNING – SURVEYING

0 60 120 240 360 480 FT

(2069 WATER SUPPLY.dwg) SM-2069

COMMONWEALTH OF MASSACHUSETTS
GEORGE DIMAKARAKOS
CIVIL
No. 41281
REGISTERED PROFESSIONAL ENGINEER

COMMONWEALTH OF MASSACHUSETTS
JOSEPH MARCH
36384
PROFESSIONAL LAND SURVEYOR

Regency at Boxborough

Proposed Community Wells
Boxborough, MA 01719

Site Exam
and
Approval to Conduct Pump Test
Transmittal No. X270140

Prepared by
GeoHydroCycle, Inc.

Prepared for:
Boxborough Town Center, LLC

May 25, 2016

GeoHydroCycle, Inc.

Hazardous Waste
Water Supply

Assessment
Remediation
Analyses
Permitting
Modeling
Software

May 25, 2016

Ms. Susan Connors
MassDEP Drinking Water Program
Central Regional Office
8 New Bond Street
Worcester, Massachusetts 01606

re: Regency at Boxborough
Proposed Community Wells
Boxborough, MA 01719
Site Exam and Approval to Conduct Pump Test
Transmittal X270140
GHC #15005

Dear Ms. Connors:

GeoHydroCycle, Inc. (GHC) is providing hydrogeologic services to our Client, Boxborough Town Center, LLC to permit water supply wells for a proposed development located at the Town Center property in Boxborough, MA 01719 (the Site). Figure 1 presents features of the Site.

Introduction

Following our March 4, 2016 meeting in DEP's Worcester office, an adjoining parcel of land on the west side of the property was placed under agreement to allow the proposed wells to be moved further from site wetlands and keep the Zone Is within to be owned property. Figure 2 shows the added Parcel A and the relocated wells.

Currently, the Town Center property is undeveloped. Natural drainage is to the center of the property to a local wetland that drains to the northeast corner of the property. The proposed wells are located in the western portion of the property, and as Figure 2 shows, the new parcel provides sufficient area to encompass the Zone I circles.

Site wastewater from the development is proposed to be discharged to an onsite leach field, as shown in Figure 2. Moving the wells to new locations also increases the distance between the wells and the leach field from 406 to 805 feet.

151B California Street
Newton, Massachusetts
02458

(617) 527-8074 (v)
(617) 527-8668 (f)

GeoHydroCycle, Inc.

Proposed Water Usage and Well Site

Developement plans for the Site are for 30 three-bedroom units and 70 elderly units (30 x 330 gpd + 70 x 150 gpd), which, based on Title 5, will require a water supply capable of producing 20,400 gallons per day.

For the Zone I wellhead protection area, Massachusetts Drinking Water Regulations, 310 CMR 22.21(3)(b) require a public water supply to own or control an area around public water supply wells. Using the daily usage rate of 20,400 gallons per day and two wells set 52 feet apart, yields an average daily pumping rate of 10.8 gallons per minute, which would require a Zone I radius of 251 feet, as shown in Figure 2.

Also, the Massachusetts Drinking Water Regulations require an Interim Wellhead Protection Area around the well to provide additional protection for the well. Using the daily average rate of 7.1 gallons per day, the IWPA for each of the wells would be a circles with radii of 627 feet, which places the leach field outside the IWPA.

Site Geology

In September 2003, GeoHydroCycle, Inc. prepared the Hydrogeologic Evaluation for a leach field associated with a proposed development of the land. GHC was involved in the subsurface explorations, which included both the test pit excavations, well drilling, well slug testing, and grain size analyses. Based on that data, the overburden beneath the site can be characterized as a sandy till, consisting of primarily is a fine to coarse Sand with little Gravel and trace Silt. This soil description is consistent with the surficial geology from the MassGIS web site (Figure 3).

Based on MassGIS data, bedrock beneath the Site are predominantly metamorphic rocks (Figure 4). Based on MassDEP well records, 908 bedrock wells have been reported being drilled Boxborough, and they range in depth between 25 and 1,200 feet, with an average depth of 347 feet. Most of Boxborough's wells are domestic, with a small portion of the wells being industrial, irrigation, and public water supply.

Local Land Use

The property on which the development is proposed is zoned as Town Center (Figure 5). Most of the land surrounding the Site is zoned as Agricultura/Residential and consists of mostly residences. Properties along Massachusetts Avenue are zoned either Town Center, Business or Business 1. All residences within ½ mile of the proposed well location have private wells and septic systems.

Table 1 lists the five public wells within ½ mile of the proposed wells.

151B California Street
Newton, Massachusetts
02458

(617) 527-8074 (v)
(617) 527-8668 (f)

Table 1. Public Wells within ½ Mile of Proposed Wells.

PWS No.	Location	Type
2037006-01G	Centre Village Apartments	Community Well
2037009-01G	Carriage House Condominium	Community Well
2037027-01G	The Marketplace	Non-Transient, Non-Community
2037028-01G	United Church of Christ Day Care	Non-Transient, Non-Community
2037031-01G	Boxborough Common	Non-Community

Figure 6 shows the locations of the public wells.

MassGIS web site indicates that three former hazardous waste sites are within ½ mile of the proposed wells. Records show that clean-ups are complete at each of the sites, and no further action is required.

Land Ownership and Control

The land that will be used for the proposed new wells is either owned or under agreement by the applicant. Stamski & McNary, Inc. has conducted property line surveys for the Site, and prepared a Figure 7 showing the property line. Parcel A is to be purchased subject to obtaining all approvals.

Proposed Pump Test

Following the successful drilling of the two bedrock wells at the proposed locations, and DEP approval of the well site, GHC plans to conduct hydraulic and water quality testing of the new well. Well testing will consist of a step-test, a five-day (120-hour) pump test, and water quality sampling of the wells during the hydraulic test. Figure 8 shows a schematic layout of the test. Details of the proposed pump test include:

Table 2. Proposed Pump Test.

Test Item	Details
Step-Test	Pump wells at 50, 100, 150 and 200% of proposed rate, sustained for 1 hour each.
Pre and Post Test Monitoring	Using pressure transducers, for 10 days after step-test recovery, and for 5 days after the pump test. At a minimum, readings taken every minute for the first 10 minutes; every 10 minutes for the first hour, and every hour until shutdown.
Ambient Well	USGS PHW 16 Petersham, MA (Till)
Pump Test Duration	120 hours
Pump size	Two 5 horsepower, 10 gallons per minute
Groundwater recording	Pressure transducers in stilling tubes
Discharge recording	Direct reading, totalizing in-line meter
Groundwater sampling location	Sampling ports near the well heads

151B California Street
Newton, Massachusetts
02458

(617) 527-8074 (v)
(617) 527-8668 (f)

GeoHydroCycle, Inc.

Table 2. Proposed Pump Test.

Test Item	Details
Discharge location	Nearby upland area (314 and 317 feet) outside Zone I
Power source	Power from portable generators
Pumping rate	Minimum of 9.5 gpm
Sampling parameters	See Enclosure 2

Please call if you have any questions.

Sincerely,
GeoHydroCycle, Inc.

Stephen W. Smith, P.E., P.HGW.

Enclosures: 1 - Figures
2 - Water Quality Sampling Requirements
3 - Copies of Transmittal and BRP WS-13 Forms

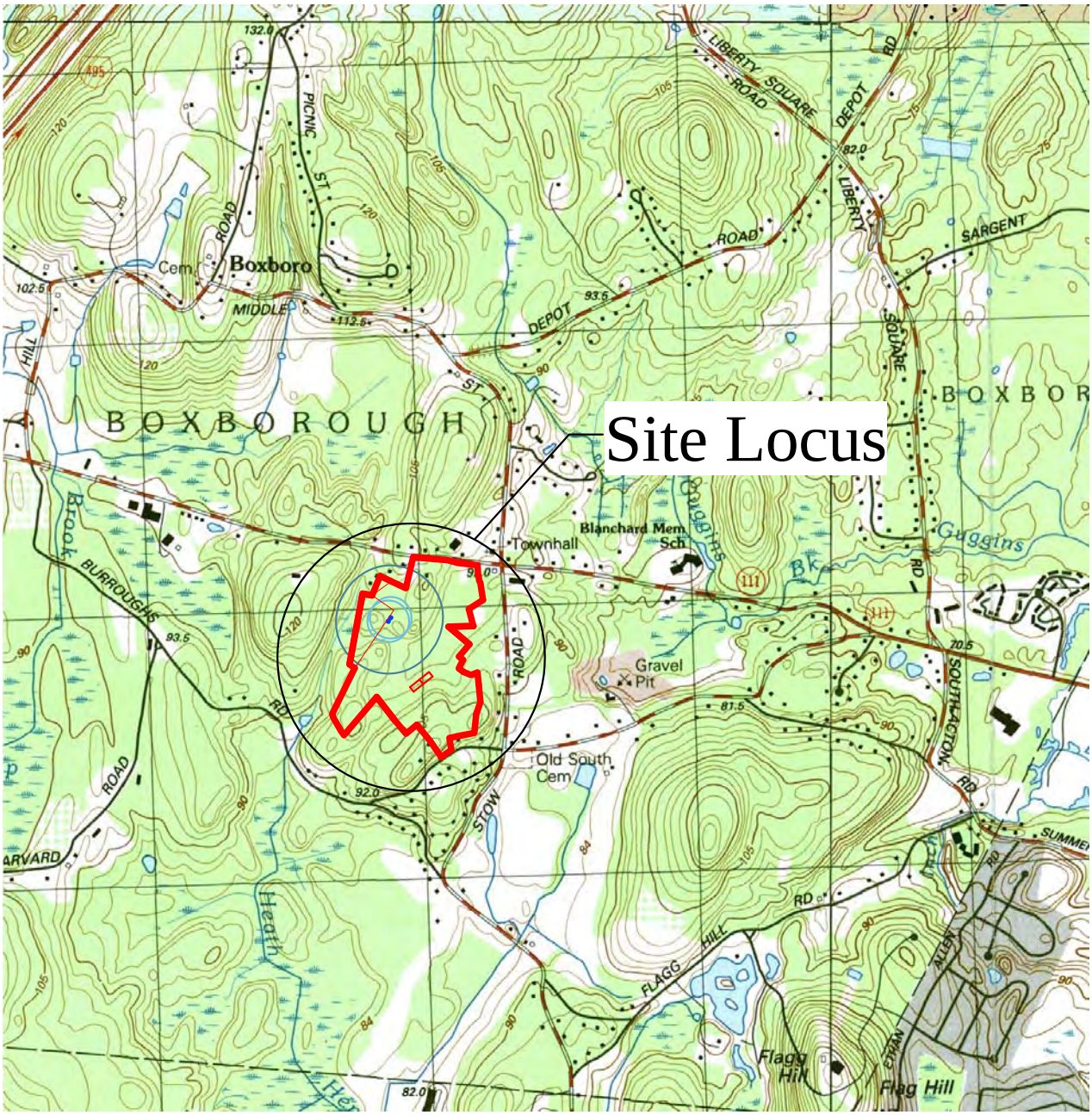
cc: Rich Harrington, Stamski & McNary, Inc.

Site Exam & PT Proposal.lwp

151B California Street
Newton, Massachusetts
02458

(617) 527-8074 (v)
(617) 527-8668 (f)

Enclosure 1 - Figures



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Scale in feet

Base Map: MassGIS Quads q201910 & q201914.

GeoHydroCycle, Inc.

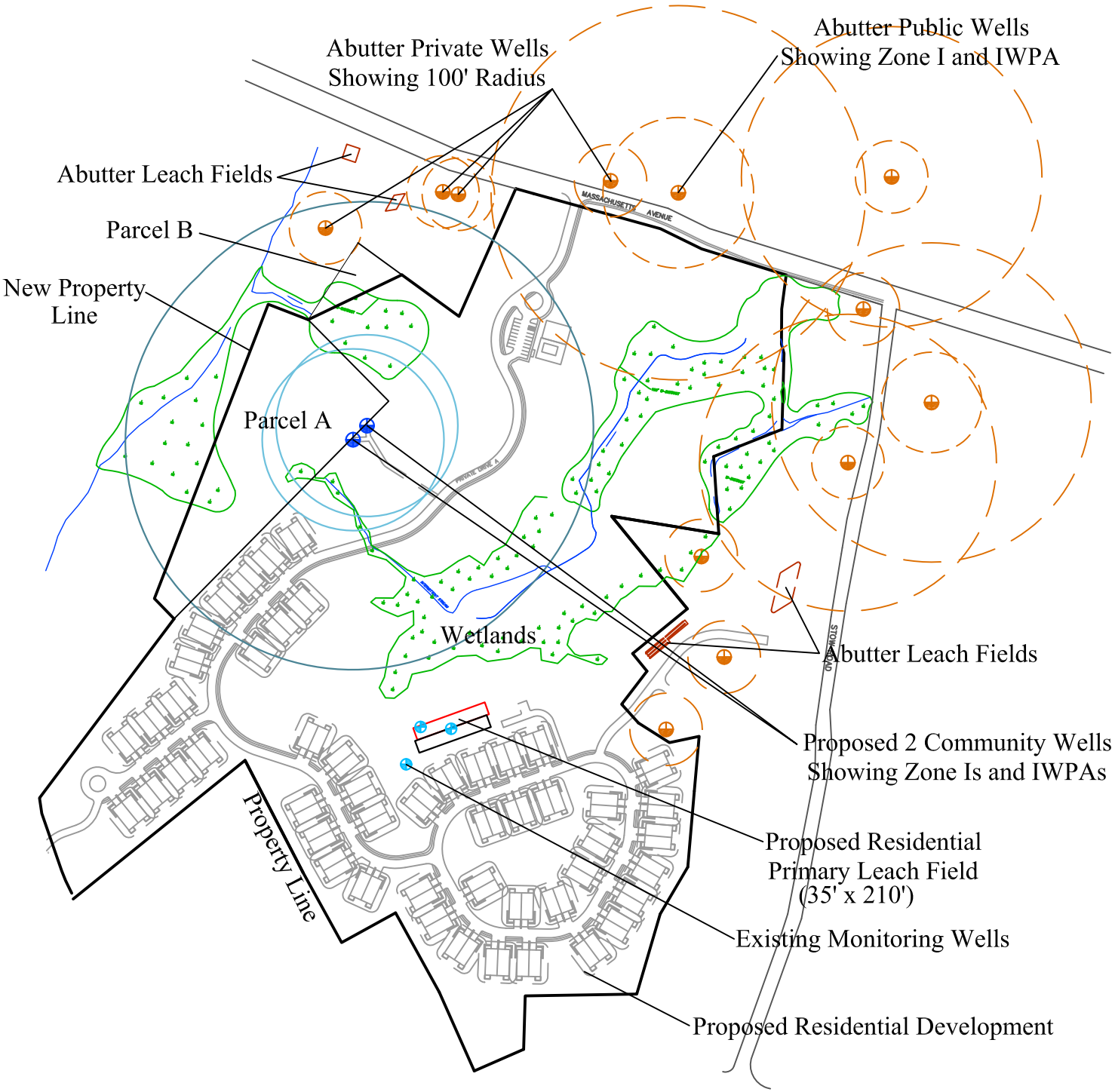
Figure 1. Site Locus.

Project No. GHC #15005

Drafted SWS Checked

Date 6/18/15 Rev 5/24/16

Regency at Boxborough
Massachusetts Avenue
Boxborough, MA



Regency at Boxborough
Massachusetts Avenue
Boxborough, MA

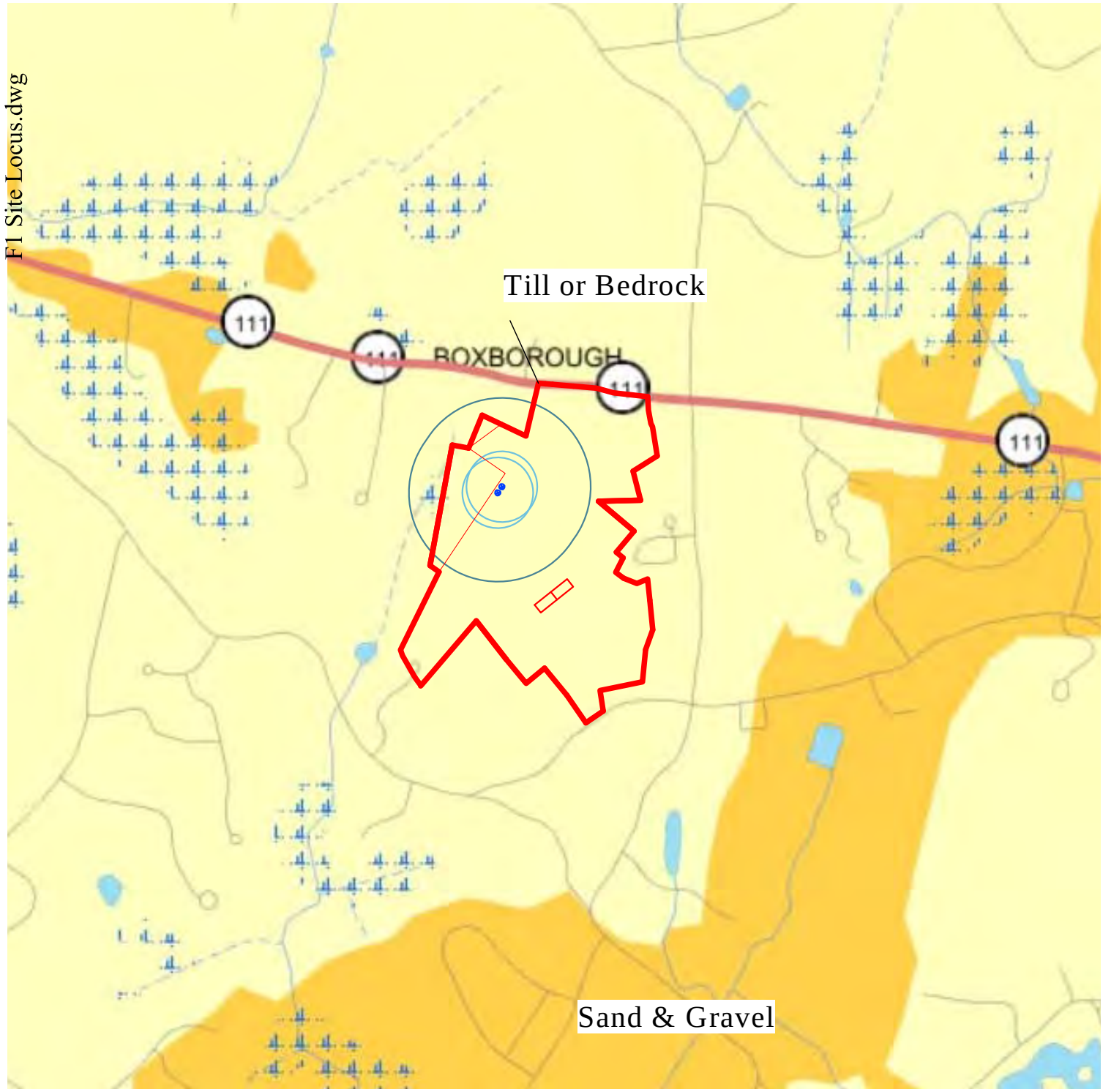
Figure 2. Site Features.

0 400

Scale in feet

Project No. GHC#15005
Drafted SWS Checked
Date 3/22/16 Rev 5/25/16
Base Map: CAD files obtained
from Stamski & McNary.

GeoHydroCycle, Inc.



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Scale in feet

Base Map: MassGIS Web Site.

GeoHydroCycle, Inc.

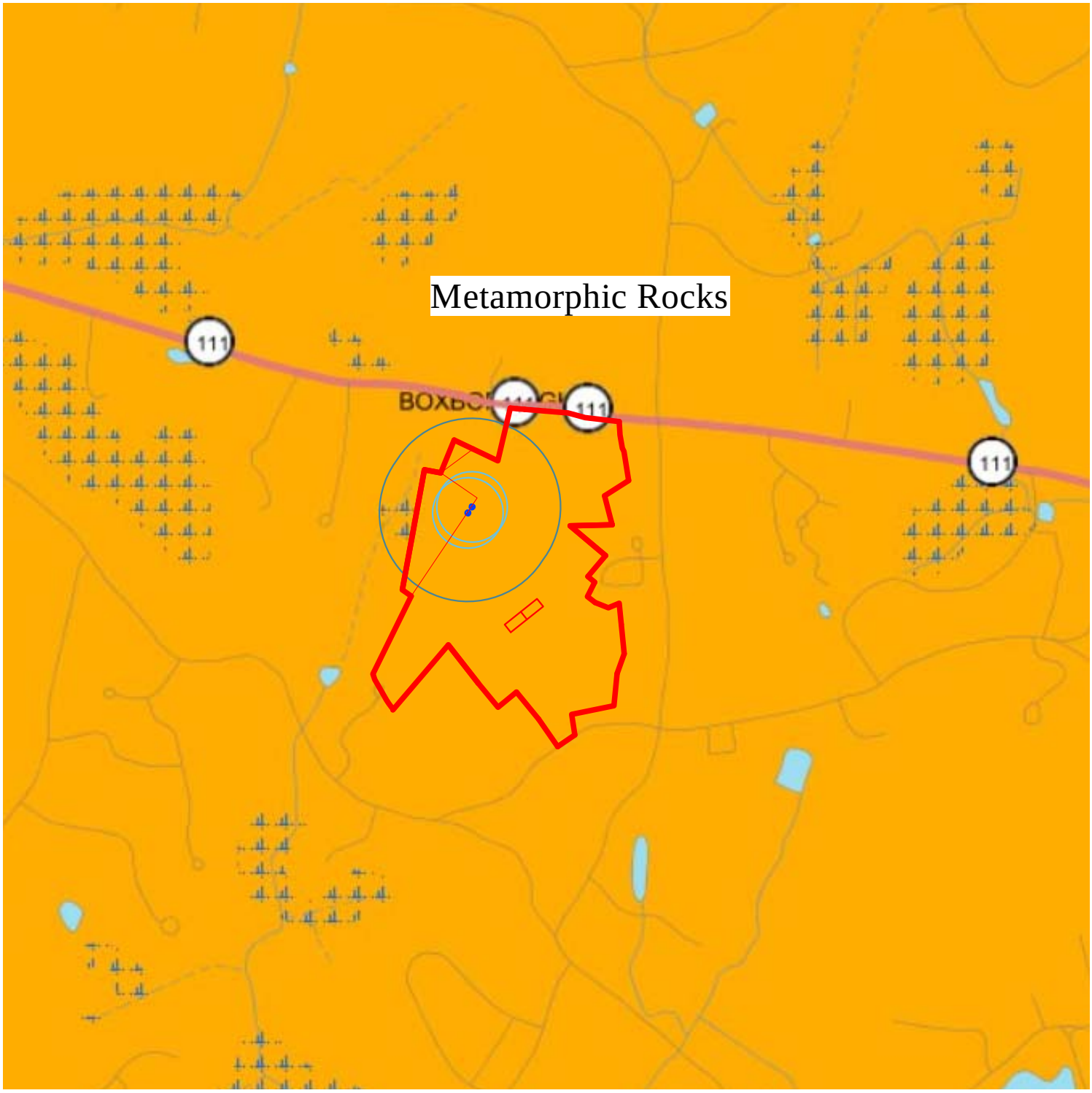
Figure 3. Surficial Geology.

Project No. GHC #15005

Drafted SWS Checked

Date 5/18/16 Rev

Regency at Boxborough
Massachusetts Avenue
Boxborough, MA



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Scale in feet

Base Map: MassGIS Web Site.

GeoHydroCycle, Inc.

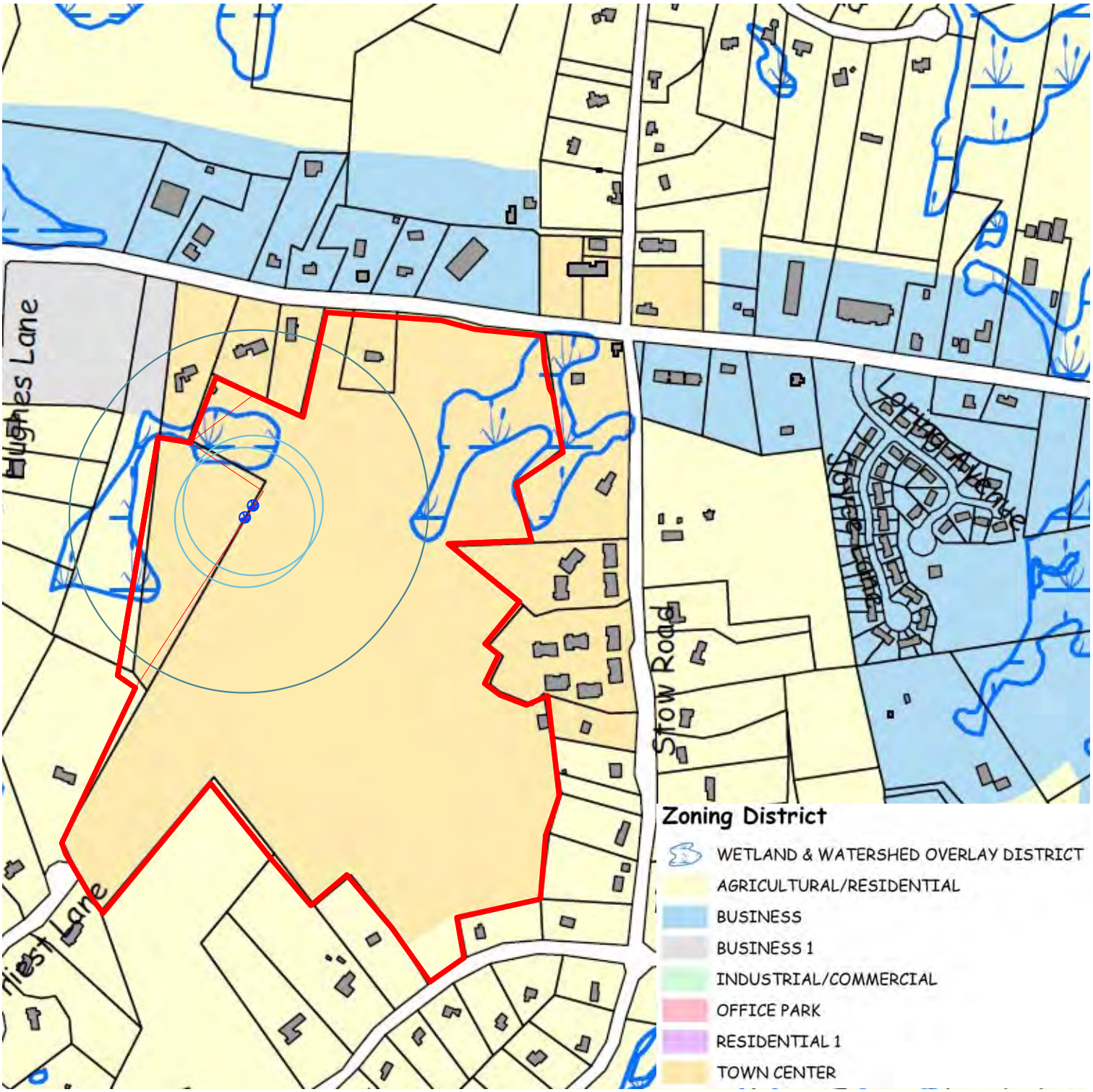
Figure 4. Bedrock Geology.

Project No. GHC #15005

Drafted SWS Checked

Date 5/18/16 Rev 5/24/16

Regency at Boxborough
Massachusetts Avenue
Boxborough, MA



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Scale in feet

Base Map: Boxborough Web Site.

GeoHydroCycle, Inc.

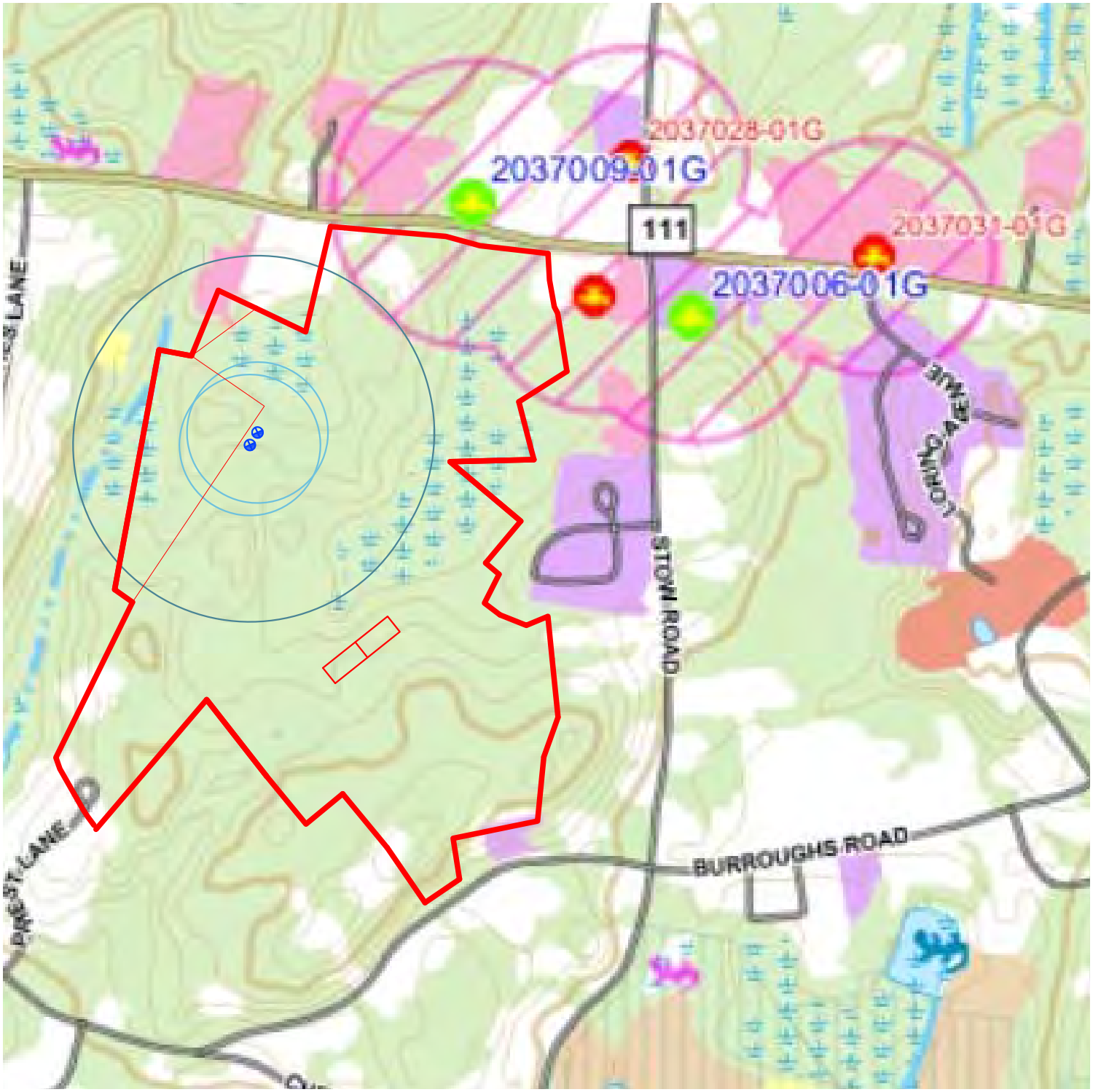
Figure 5. Boxborough Zoning.

Project No. GHC #15005

Drafted SWS Checked

Date 5/18/16 Rev 5/24/16

Regency at Boxborough
Massachusetts Avenue
Boxborough, MA



0 2,000

Scale in feet

Base Map: MassGIS Web Site.

GeoHydroCycle, Inc.

Figure 6. Nearby Public Wells.

Project No. GHC #15005

Drafted SWS Checked

Date 5/18/16 Rev 5/24/16

Regency at Boxborough
Massachusetts Avenue
Boxborough, MA

Figure 7. Site Survey.

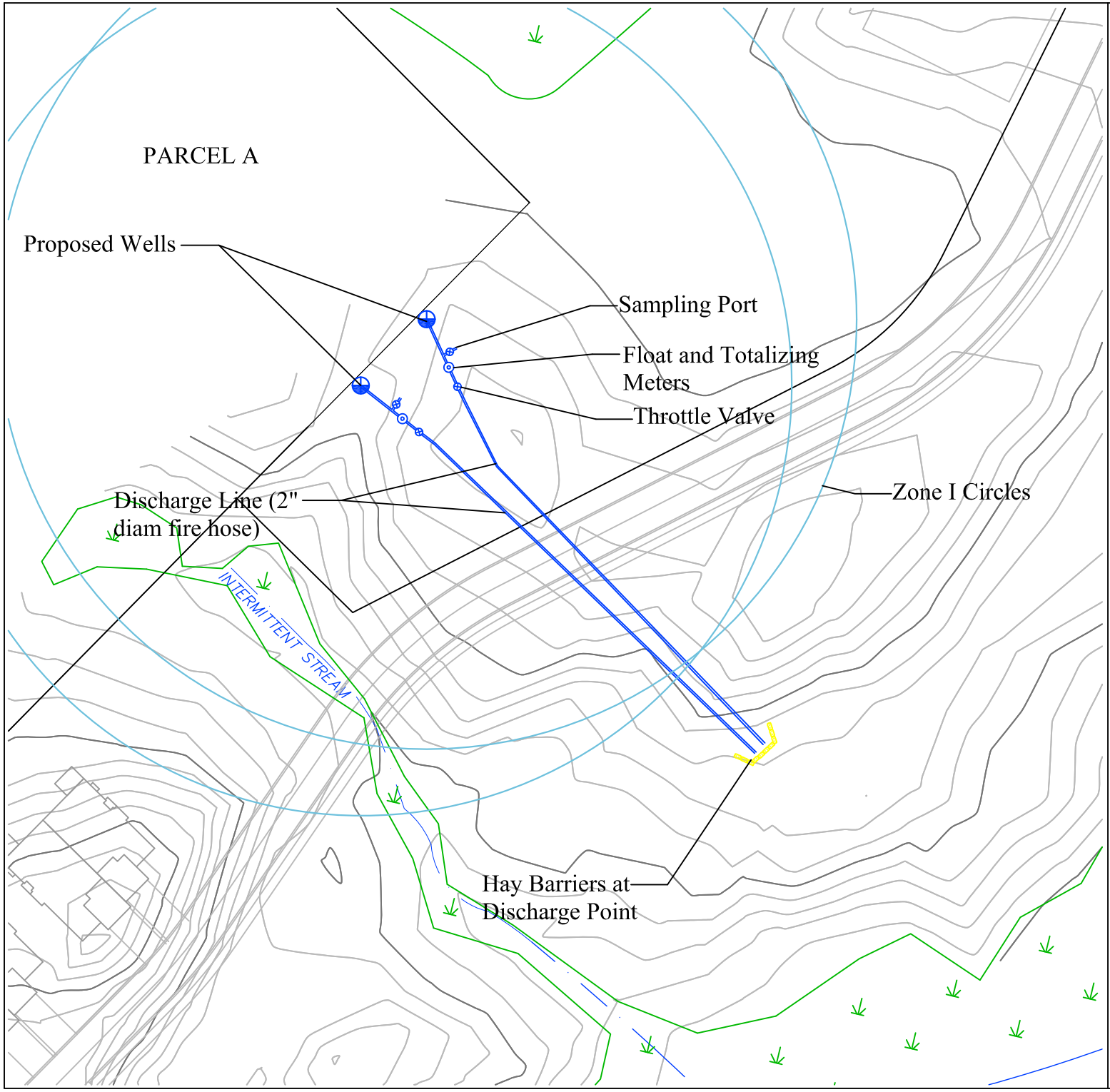
PRELIMINARY SITE PLAN
IN
BOXBOROUGH, MASSACHUSETTS

LAYOUT PLAN
FOR: BOXBOROUGH TOWN CENTER, LLC
SCALE: 1"=120' MARCH 14, 2016
REVISED: MAY 21, 2016

STAMSKI AND MCNARY, INC.
1000 MAIN STREET ACTON, MASSACHUSETTS
ENGINEERING – PLANNING – SURVEYING

0 60 120 240 360 480 FT

(2069 SITE3A.dwg) Sheet 1 of 3 SM-2069



Regency at Boxborough
Massachusetts Avenue
Boxborough, MA

Figure 8. Pump Test Layout.

0 80
Scale in feet

Project No. GHC#15005
Drafted SWS Checked
Date 3/22/16 Rev 5/24/16
Base Map: CAD files obtained from Stamski & McNary.

GeoHydroCycle, Inc.

Enclosure 2 - Water Quality Sampling Requirements

Table 1. Pump Test Sampling Schedule.

Field Testing (pH, odor, specific conductance, CO2, temperature)

1	@	After beginning of test.
2	@	24 hours into test.
3	@	72 hours into test.
4	@	120 hours into test.

Total Coliform

1	@	60 hours into test.
2	@	120 hours into test.

Radionuclides (Gross Alpha and Radium)

1	@	120 hours into test.

Inorganics (Attached Appendix A)

1	@	120 hours into test.

Secondary Contaminants (Attached Appendix A)

1	@	1 hour into test.
2	@	48 hours into test.
3	@	96 hours into test.
4	@	120 hours into test.

Appendix A
Water Quality Testing Requirements for Source Approval

All testing must be done in accordance with 310 CMR 22.00 (Massachusetts Drinking Water Regulations). Among these requirements are the use of a laboratory certified in the specific analyte, using approved methodology and reporting on MA Department forms (pursuant to 310 CMR 22.11A) as well as meeting all applicable method detection limits.

1. ***Coliform Bacteria****

2. ***Inorganic Compounds***

Arsenic	Mercury
Antimony	Nickel
Barium	Nitrate (N)
Beryllium	Nitrite
Cadmium	Perchlorate
Chromium	Selenium
Cyanide	Sodium
Fluoride	Sulfate
Lead	Thallium

3. ***Synthetic Organic Compounds (SOCs)***

All regulated and unregulated SOCs per 310 CMR 22.07A(1) and 22.07C(7) excluding:
- Diquat
- Endothall
- Glyphosate
- 2,3,7,8 -TCDD (Dioxin)

Surface water sources do not have to test for EDB and DBCP.

4. ***Volatile Organic Compounds (VOCs)***

All VOCs as per 22.07B(1), 22.07C(5)

***** If the result of any analysis is positive for total coliform, then the sample must be analyzed for enterococci (and/or coliphage at MassDEP's discretion).

****** If required by MassDEP

******* Testing for these parameter is only required if the gross beta particle activity is equal to or greater than 50 pCi/L.

5. ***Radionuclides***

Gross alpha activity
Radium-226 & 228
Beta particle activity******
Photon activity*******
Tritium*******
Strontium-90*******
Radon
Uranium********

6. ***Secondary Contaminants***

TDS
Color
Odor
pH
Alkalinity-Total ($CaCo_3$)
Hardness ($CaCO_3$)
Calcium (Ca)
Manganese (Mn)
Potassium (K)
Iron (Fe)
Magnesium (Mg)
Sulfate (SO_4)
Chloride (Cl)
Silver (Ag)
Turbidity
Aluminum (Al)
Zinc (Zn)
Copper (Cu)

7. ***Other***
Carbon dioxide
Nitrogen (Ammonia)
Specific conductance
Temperature

******** Testing for this parameter is only required if the gross alpha activity is greater than 15 pCi/L.

Encosure 3 - Copies of Transmittal and BRP WS-13 Forms

Enter your transmittal number → X270140
Transmittal Number

Your unique Transmittal Number can be accessed online: http://mass.gov/dep/service/online/trasmfrm.shtml

Massachusetts Department of Environmental Protection

Transmittal Form for Permit Application and Payment

1. Please type or print. A separate Transmittal Form must be completed for each permit application.

2. Make your check payable to the Commonwealth of Massachusetts and mail it with a copy of this form to: DEP, P.O. Box 4062, Boston, MA 02211.

3. Three copies of this form will be needed.

Copy 1 - the original must accompany your permit application. **Copy 2** must accompany your fee payment. **Copy 3** should be retained for your records

4. Both fee-paying and exempt applicants must mail a copy of this transmittal form to:

MassDEP
P.O. Box 4062
Boston, MA
02211

*** Note:**
For BWSC Permits, enter the LSP.

A. Permit Information

BRP WS-13
1. Permit Code: 7 or 8 character code from permit instructions

New Source Approval
2. Name of Permit Category

Request Site Exam and Propose Pump Test
3. Type of Project or Activity

B. Applicant Information – Firm or Individual

Boxborough Town Center, LLC
1. Name of Firm - Or, if party needing this approval is an individual enter name below:

2. **Last Name** of Individual
3. **First Name** of Individual
4. MI

PO Box 985
5. Street Address

6. City/Town	7. State	8. Zip Code	9. Telephone #	10. Ext. #
Acton	MA	01720	(978) 266-9751	

James Fenton
11. Contact Person

fentonandson@msn.com
12. e-mail address (optional)

C. Facility, Site or Individual Requiring Approval

Regency at Boxborough
1. Name of Facility, Site Or Individual

700 & 800 Massachusetts Avenue
2. Street Address

3. City/Town	4. State	5. Zip Code	6. Telephone #	7. Ext. #
Boxborough	MA	01719		

8. DEP Facility Number (if Known)
9. Federal I.D. Number (if Known)
10. BWSC Tracking # (if Known)

D. Application Prepared by (if different from Section B)*

GeoHydroCycle, Inc.
1. Name of Firm Or Individual

151B California Street
2. Address

3. City/Town	4. State	5. Zip Code	6. Telephone #	7. Ext. #
Newton	MA	02458	(617) 527-8074	

Stephen W. Smith, P.E., P.HGW
8. Contact Person

9. LSP Number (BWSC Permits only)

E. Permit - Project Coordination

1. Is this project subject to MEPA review? ☒ yes ☐ no
   If yes, enter the project's EOEA file number - assigned when an Environmental Notification Form is submitted to the MEPA unit:

EOEA File Number

F. Amount Due

DEP Use Only

Permit No:

Rec'd Date:

Reviewer:

Special Provisions:

1. ☐ **Fee** Exempt (city, town or municipal housing authority)(state agency if fee is $100 or less).
   There are no fee exemptions for BWSC permits, regardless of applicant status.
2. ☐ Hardship Request - payment extensions according to 310 CMR 4.04(3)(c).
3. ☐ Alternative Schedule Project (according to 310 CMR 4.05 and 4.10).
4. ☐ Homeowner (according to 310 CMR 4.02).

Check Number	Dollar Amount	Date
3424	$1,380.00	May 18, 2016

Massachusetts Department of Environmental Protection
Bureau of Resource Protection – Drinking Water Program

BRP WS Application

For Drinking Water Program (Water Supply) Permits or Approvals

X270140
Transmittal Number

Facility ID# (if known)

A. Application

Important: When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.

1. Is this application for ☒ an Original or ☐ a Resubmittal?

2. Applicant:

Name			Address	
Boxborough Town Center, LLC			PO Box 985	
City	**State**	**Zip**	**Contact**	**Telephone**
Acton	MA	01720	James Fenton	(978) 266-9751

3. Consultant:

Name			Address	
GeoHydroCycle, Inc.			151B California Street	
City	**State**	**Zip**	**Contact**	**Telephone**
Newton	MA	02458	Stephen W. Smith, P.E., P.HGW	(617) 527-8074

B. Permit

Please check the permit or approval for which you are applying:

Zone II Determination for Existing Sources
- ☐ BRP WS 07 Approval to Conduct Pump Test for Zone II Delineation
- ☐ BRP WS 08 Approval of Zone II Delineation

New Technology
- ☐ BRP WS 11 Minor New Technology Approval; where no field test required
  - ☐ Drinking Water Additive
  - ☐ Cross Connection Device
  - ☐ Water Vending Machine
  - ☐ Other (specify):
- ☐ BRP WS 12 Major New Technology Approval: where field testing is required
- ☐ BRP WS 27 New Technology with Third-party Approval
- ☐ BRP WS 28 Vending Site/Source Prototype
- ☐ BRP WS 31 Vending and POU/POE Devices with Third-party Approval

New Source Approvals <70 gpm
- ☒ BRP WS 13 Exploratory Phase, Site Examination, Land Use Survey and Approval to Conduct Pumping Test
- ☐ BRP WS 15 Pumping Test Report Approval and Approval to Construct Source
- ☐ BRP WS 37 Approval of Transient Non-Community Source Less than 7 Gallons per Minute (combines BRP WS 13 and BRP WS 15 submittals)

New Source Approvals = or > 70 gpm
- ☐ BRP WS 17 Exploratory Phase, Site Examination, Land Use Survey, and Conduct Pumping Test
- ☐ BRP WS 19 Pumping Test Report Approval
- ☐ BRP WS 20 To Construct Source

Water Treatment Approvals
- ☐ BRP WS 21A To Conduct Pilot Study < 40,000 gpd
- ☐ BRP WS 21B To Conduct Pilot Study = or > 40,000 gpd and < 200,000 gpd
- ☐ BRP WS 21C To Conduct Pilot Study = or > 200,000 gpd and < 1 mgd
- ☐ BRP WS 21D To Conduct Pilot Study = or > 1 mgd
- ☐ BRP WS 22A Pilot Study Report < 40,000 gpd
- ☐ BRP WS 22B Pilot Study Report = or > 40,000 gpd and < 200,000 gpd
- ☐ BRP WS 22C Pilot Study Report = or > 200,000 gpd and < 1 mgd
- ☐ BRP WS 22D Pilot Study Report = or > 1 mgd
- ☐ BRP WS 23A To Construct Facility <40,000 gpd
- ☐ BRP WS 23B To Construct Facility = or > 40,000 gpd and < 200,000 gpd
- ☐ BRP WS 23C To Construct Facility = or > 200,000 gpd and < 1 mgd
- ☐ BRP WS 24 To Construct Facility = or > 1 mgd
- ☐ BRP WS 25 Treatment Facility Modification
- ☐ BRP WS 29 Water Treatment: Chemical Addition Retrofits of Water Systems > 3,300 people
- ☐ BRP WS 30A Vending Installation Approval
- ☐ BRP WS 30B POU/POE Installation Approval
- ☐ BRP WS 34 Water Treatment: Chemical Addition Retrofits of Water Systems = or < 3,300 people
- ☐ BRP WS 35A Multiple Vending Installation Approval
- ☐ BRP WS 35B Multiple POU/POE Installation Approval

Water Quality Assurance
- ☐ BRP WS 26 Sale or Acquisition of Land for Water Source
- ☐ BRP WS 36 Abandonment of Water Source

Distribution System Modifications
- ☐ BRP WS 32 Systems > 3,300 people
- ☐ BRP WS 33 Systems = or < 3,300 people

Massachusetts Department of Environmental Protection
Bureau of Resource Protection – Drinking Water Program

BRP WS Application

For Drinking Water Program (Water Supply) Permits or Approvals

X270140
Transmittal Number

Facility ID# (if known)

C. Certification

"I certify, under penalty of law, that this application and all attachments were prepared under my supervision, in accordance with a system designed to ensure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information submitted in this application, the information submitted is, to the best of my knowledge and belief, true, accurate and complete."

Stephen W. Smith — 5/25/16

Authorized Signature — Date

Stephen W. Smith, P.E., P.HGW — President, GeoHydroCycle, Inc.

Print Name — Position/Title

Middlesex South Registry of Deeds

Electronically Recorded Document

This is the first page of the document - Do not remove

Recording Information

Document Number	: 92709
Document Type	: ORD
Recorded Date	: June 09, 2016
Recorded Time	: 03:39:12 PM
Recorded Book and Page	: 67404 / 265
Number of Pages(including cover sheet)	: 22
Receipt Number	: 1952477
Recording Fee	: $75.00

Middlesex South Registry of Deeds
Maria C. Curtatone, Register
208 Cambridge Street
Cambridge, MA 02141
617-679-6300
www.cambridgedeeds.com

21

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

WPA Form 5 – Order of Conditions

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

and the Boxborough Wetland Bylaw

Provided by MassDEP:
113-532
MassDEP File #

eDEP Transaction #

Boxborough
City/Town

A. General Information

Please note: this form has been modified with added space to accommodate the Registry of Deeds Requirements

Important: When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.

1. From: Boxborough
Conservation Commission

2. This issuance is for (check one): a. ☒ Order of Conditions b. ☐ Amended Order of Conditions

3. To: Applicant:

James — a. First Name
Fenton — b. Last Name
Boxborough Town Center, LLC — c. Organization
P.O. Box 985 — d. Mailing Address
Acton — e. City/Town
MA — f. State
01720 — g. Zip Code

4. Property Owner (if different from applicant):

the above and — a. First Name
b. Last Name
Mane Realty Trust, John J. Lyons Trustee — c. Organization
571 Burroughs Road — d. Mailing Address
Boxborough — e. City/Town
MA — f. State
01719 — g. Zip Code

5. Project Location:

700 & 800 Massachusetts Avenue — a. Street Address
Boxborough — b. City/Town
14 — c. Assessors Map/Plat Number
046 & 050 — d. Parcel/Lot Number

Latitude and Longitude, if known: 042d28m41Ns — d. Latitude; 071d31m7Ws — e. Longitude

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands
WPA Form 5 – Order of Conditions
Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:
113-532
MassDEP File #

eDEP Transaction #

Boxborough
City/Town

A. General Information (cont.)

6. Property recorded at the Registry of Deeds for (attach additional information if more than one parcel):

Middlesex South	
a. County	b. Certificate Number (if registered land)
27102 & 19267	550 & 606
c. Book	d. Page

7. Dates:

March 2, 2016	May 4, 2016	May 18, 2016
a. Date Notice of Intent Filed	b. Date Public Hearing Closed	c. Date of Issuance

8. Final Approved Plans and Other Documents (attach additional plan or document references as needed):

Soil Testing Location Plan	
a. Plan Title	
Stamski and McNary, Inc.	George Dimakarakos & Joseph March
b. Prepared By	c. Signed and Stamped by
May 4, 2016	1" = 120'
d. Final Revision Date	e. Scale
f. Additional Plan or Document Title	g. Date

B. Findings

1. Findings pursuant to the Massachusetts Wetlands Protection Act:

Following the review of the above-referenced Notice of Intent and based on the information provided in this application and presented at the public hearing, this Commission finds that the areas in which work is proposed is significant to the following interests of the Wetlands Protection Act (the Act). Check all that apply:

a. ☐ Public Water Supply
b. ☐ Land Containing Shellfish
c. ☒ Prevention of Pollution
d. ☒ Private Water Supply
e. ☐ Fisheries
f. ☒ Protection of Wildlife Habitat
g. ☒ Groundwater Supply
h. ☒ Storm Damage Prevention
i. ☒ Flood Control

2. This Commission hereby finds the project, as proposed, is: (check one of the following boxes)

Approved subject to:

a. ☒ the following conditions which are necessary in accordance with the performance standards set forth in the wetlands regulations. This Commission orders that all work shall be performed in accordance with the Notice of Intent referenced above, the following General Conditions, and any other special conditions attached to this Order. To the extent that the following conditions modify or differ from the plans, specifications, or other proposals submitted with the Notice of Intent, these conditions shall control.

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands
WPA Form 5 – Order of Conditions
Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

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Boxborough
City/Town

B. Findings (cont.)

Denied because:

b. ☐ the proposed work cannot be conditioned to meet the performance standards set forth in the wetland regulations. Therefore, work on this project may not go forward unless and until a new Notice of Intent is submitted which provides measures which are adequate to protect the interests of the Act, and a final Order of Conditions is issued. **A description of the performance standards which the proposed work cannot meet is attached to this Order.**

c. ☐ the information submitted by the applicant is not sufficient to describe the site, the work, or the effect of the work on the interests identified in the Wetlands Protection Act. Therefore, work on this project may not go forward unless and until a revised Notice of Intent is submitted which provides sufficient information and includes measures which are adequate to protect the Act's interests, and a final Order of Conditions is issued. **A description of the specific information which is lacking and why it is necessary is attached to this Order as per 310 CMR 10.05(6)(c).**

3. ☐ Buffer Zone Impacts: Shortest distance between limit of project disturbance and the wetland resource area specified in 310 CMR 10.02(1)(a) _____ a. linear feet

Inland Resource Area Impacts: Check all that apply below. (For Approvals Only)

Resource Area	Proposed Alteration	Permitted Alteration	Proposed Replacement	Permitted Replacement
4. ☐ Bank	a. linear feet	b. linear feet	c. linear feet	d. linear feet
5. ☐ Bordering Vegetated Wetland	a. square feet	b. square feet	c. square feet	d. square feet
6. ☐ Land Under Waterbodies and Waterways	a. square feet	b. square feet	c. square feet	d. square feet
	e. c/y dredged	f. c/y dredged		
7. ☐ Bordering Land Subject to Flooding	a. square feet	b. square feet	c. square feet	d. square feet
Cubic Feet Flood Storage	e. cubic feet	f. cubic feet	g. cubic feet	h. cubic feet
8. ☐ Isolated Land Subject to Flooding	a. square feet	b. square feet		
Cubic Feet Flood Storage	c. cubic feet	d. cubic feet	e. cubic feet	f. cubic feet
9. ☐ Riverfront Area	a. total sq. feet	b. total sq. feet		
Sq ft within 100 ft	c. square feet	d. square feet	e. square feet	f. square feet
Sq ft between 100-200 ft	g. square feet	h. square feet	i. square feet	j. square feet

Massachusetts Department of Environmental Protection
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Boxborough
City/Town

B. Findings (cont.)

Coastal Resource Area Impacts: Check all that apply below. (For Approvals Only)

	Proposed Alteration	Permitted Alteration	Proposed Replacement	Permitted Replacement
10. ☐ Designated Port Areas	Indicate size under Land Under the Ocean, below			
11. ☐ Land Under the Ocean	a. square feet	b. square feet		
	c. c/y dredged	d. c/y dredged		
12. ☐ Barrier Beaches	Indicate size under Coastal Beaches and/or Coastal Dunes below			
13. ☐ Coastal Beaches	a. square feet	b. square feet	cu yd c. nourishment	cu yd d. nourishment
14. ☐ Coastal Dunes	a. square feet	b. square feet	cu yd c. nourishment	cu yd d. nourishment
15. ☐ Coastal Banks	a. linear feet	b. linear feet		
16. ☐ Rocky Intertidal Shores	a. square feet	b. square feet		
17. ☐ Salt Marshes	a. square feet	b. square feet	c. square feet	d. square feet
18. ☐ Land Under Salt Ponds	a. square feet	b. square feet		
	c. c/y dredged	d. c/y dredged		
19. ☐ Land Containing Shellfish	a. square feet	b. square feet	c. square feet	d. square feet
20. ☐ Fish Runs	Indicate size under Coastal Banks, Inland Bank, Land Under the Ocean, and/or inland Land Under Waterbodies and Waterways, above			
	a. c/y dredged	b. c/y dredged		
21. ☐ Land Subject to Coastal Storm Flowage	a. square feet	b. square feet		
22. ☐ Riverfront Area	a. total sq. feet	b. total sq. feet		
Sq ft within 100 ft	c. square feet	d. square feet	e. square feet	f. square feet
Sq ft between 100-200 ft	g. square feet	h. square feet	i. square feet	j. square feet

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands
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Boxborough
City/Town

B. Findings (cont.)

* #23. If the project is for the purpose of restoring or enhancing a wetland resource area in addition to the square footage that has been entered in Section B.5.c (BVW) or B.17.c (Salt Marsh) above, please enter the additional amount here.

23. ☐ Restoration/Enhancement *:

a. square feet of BVW | b. square feet of salt marsh

24. ☐ Stream Crossing(s):

a. number of new stream crossings | b. number of replacement stream crossings

C. General Conditions Under Massachusetts Wetlands Protection Act

The following conditions are only applicable to Approved projects.

1. Failure to comply with all conditions stated herein, and with all related statutes and other regulatory measures, shall be deemed cause to revoke or modify this Order.
2. The Order does not grant any property rights or any exclusive privileges; it does not authorize any injury to private property or invasion of private rights.
3. This Order does not relieve the permittee or any other person of the necessity of complying with all other applicable federal, state, or local statutes, ordinances, bylaws, or regulations.
4. The work authorized hereunder shall be completed within three years from the date of this Order unless either of the following apply:
   a. The work is a maintenance dredging project as provided for in the Act; or
   b. The time for completion has been extended to a specified date more than three years, but less than five years, from the date of issuance. If this Order is intended to be valid for more than three years, the extension date and the special circumstances warranting the extended time period are set forth as a special condition in this Order.
   c. If the work is for a Test Project, this Order of Conditions shall be valid for no more than one year.
5. This Order may be extended by the issuing authority for one or more periods of up to three years each upon application to the issuing authority at least 30 days prior to the expiration date of the Order. An Order of Conditions for a Test Project may be extended for one additional year only upon written application by the applicant, subject to the provisions of 310 CMR 10.05(11)(f).
6. If this Order constitutes an Amended Order of Conditions, this Amended Order of Conditions does not extend the issuance date of the original Final Order of Conditions and the Order will expire on _____ unless extended in writing by the Department.
7. Any fill used in connection with this project shall be clean fill. Any fill shall contain no trash, refuse, rubbish, or debris, including but not limited to lumber, bricks, plaster, wire, lath, paper, cardboard, pipe, tires, ashes, refrigerators, motor vehicles, or parts of any of the foregoing.

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands
WPA Form 5 – Order of Conditions
Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:
113-532
MassDEP File #

eDEP Transaction #

Boxborough
City/Town

C. General Conditions Under Massachusetts Wetlands Protection Act

8. This Order is not final until all administrative appeal periods from this Order have elapsed, or if such an appeal has been taken, until all proceedings before the Department have been completed.

9. No work shall be undertaken until the Order has become final and then has been recorded in the Registry of Deeds or the Land Court for the district in which the land is located, within the chain of title of the affected property. In the case of recorded land, the Final Order shall also be noted in the Registry's Grantor Index under the name of the owner of the land upon which the proposed work is to be done. In the case of the registered land, the Final Order shall also be noted on the Land Court Certificate of Title of the owner of the land upon which the proposed work is done. The recording information shall be submitted to the Conservation Commission on the form at the end of this Order, which form must be stamped by the Registry of Deeds, prior to the commencement of work.

10. A sign shall be displayed at the site not less then two square feet or more than three square feet in size bearing the words,

    "Massachusetts Department of Environmental Protection" [or, "MassDEP"]

    "File Number 113-532 "

11. Where the Department of Environmental Protection is requested to issue a Superseding Order, the Conservation Commission shall be a party to all agency proceedings and hearings before MassDEP.

12. Upon completion of the work described herein, the applicant shall submit a Request for Certificate of Compliance (WPA Form 8A) to the Conservation Commission.

13. The work shall conform to the plans and special conditions referenced in this order.

14. Any change to the plans identified in Condition #13 above shall require the applicant to inquire of the Conservation Commission in writing whether the change is significant enough to require the filing of a new Notice of Intent.

15. The Agent or members of the Conservation Commission and the Department of Environmental Protection shall have the right to enter and inspect the area subject to this Order at reasonable hours to evaluate compliance with the conditions stated in this Order, and may require the submittal of any data deemed necessary by the Conservation Commission or Department for that evaluation.

16. This Order of Conditions shall apply to any successor in interest or successor in control of the property subject to this Order and to any contractor or other person performing work conditioned by this Order.

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands
WPA Form 5 – Order of Conditions
Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:
113-532
MassDEP File #

eDEP Transaction #

Boxborough
City/Town

C. General Conditions Under Massachusetts Wetlands Protection Act (cont.)

17. Prior to the start of work, and if the project involves work adjacent to a Bordering Vegetated Wetland, the boundary of the wetland in the vicinity of the proposed work area shall be marked by wooden stakes or flagging. Once in place, the wetland boundary markers shall be maintained until a Certificate of Compliance has been issued by the Conservation Commission.

18. All sedimentation barriers shall be maintained in good repair until all disturbed areas have been fully stabilized with vegetation or other means. At no time shall sediments be deposited in a wetland or water body. During construction, the applicant or his/her designee shall inspect the erosion controls on a daily basis and shall remove accumulated sediments as needed. The applicant shall immediately control any erosion problems that occur at the site and shall also immediately notify the Conservation Commission, which reserves the right to require additional erosion and/or damage prevention controls it may deem necessary. Sedimentation barriers shall serve as the limit of work unless another limit of work line has been approved by this Order.

19. The work associated with this Order (the "Project")
    (1) ☐ is subject to the Massachusetts Stormwater Standards
    (2) ☒ is NOT subject to the Massachusetts Stormwater Standards

    If the work is subject to the Stormwater Standards, then the project is subject to the following conditions:

    a) All work, including site preparation, land disturbance, construction and redevelopment, shall be implemented in accordance with the construction period pollution prevention and erosion and sedimentation control plan and, if applicable, the Stormwater Pollution Prevention Plan required by the National Pollution Discharge Elimination System Construction General Permit as required by Stormwater Condition 8. Construction period erosion, sedimentation and pollution control measures and best management practices (BMPs) shall remain in place until the site is fully stabilized.

    b) No stormwater runoff may be discharged to the post-construction stormwater BMPs unless and until a Registered Professional Engineer provides a Certification that:
    i. all construction period BMPs have been removed or will be removed by a date certain specified in the Certification. For any construction period BMPs intended to be converted to post construction operation for stormwater attenuation, recharge, and/or treatment, the conversion is allowed by the MassDEP Stormwater Handbook BMP specifications and that the BMP has been properly cleaned or prepared for post construction operation, including removal of all construction period sediment trapped in inlet and outlet control structures;
    ii. as-built final construction BMP plans are included, signed and stamped by a Registered Professional Engineer, certifying the site is fully stabilized;
    iii. any illicit discharges to the stormwater management system have been removed, as per the requirements of Stormwater Standard 10;

C. General Conditions Under Massachusetts Wetlands Protection Act (cont.)

iv. all post-construction stormwater BMPs are installed in accordance with the plans (including all planting plans) approved by the issuing authority, and have been inspected to ensure that they are not damaged and that they are in proper working condition;

v. any vegetation associated with post-construction BMPs is suitably established to withstand erosion.

c) The landowner is responsible for BMP maintenance until the issuing authority is notified that another party has legally assumed responsibility for BMP maintenance. Prior to requesting a Certificate of Compliance, or Partial Certificate of Compliance, the responsible party (defined in General Condition 18(e)) shall execute and submit to the issuing authority an Operation and Maintenance Compliance Statement ("O&M Statement) for the Stormwater BMPs identifying the party responsible for implementing the stormwater BMP Operation and Maintenance Plan ("O&M Plan") and certifying the following:

i.) the O&M Plan is complete and will be implemented upon receipt of the Certificate of Compliance, and

ii.) the future responsible parties shall be notified in writing of their ongoing legal responsibility to operate and maintain the stormwater management BMPs and implement the Stormwater Pollution Prevention Plan.

d) Post-construction pollution prevention and source control shall be implemented in accordance with the long-term pollution prevention plan section of the approved Stormwater Report and, if applicable, the Stormwater Pollution Prevention Plan required by the National Pollution Discharge Elimination System Multi-Sector General Permit.

e) Unless and until another party accepts responsibility, the landowner, or owner of any drainage easement, assumes responsibility for maintaining each BMP. To overcome this presumption, the landowner of the property must submit to the issuing authority a legally binding agreement of record, acceptable to the issuing authority, evidencing that another entity has accepted responsibility for maintaining the BMP, and that the proposed responsible party shall be treated as a permittee for purposes of implementing the requirements of Conditions 18(f) through 18(k) with respect to that BMP. Any failure of the proposed responsible party to implement the requirements of Conditions 18(f) through 18(k) with respect to that BMP shall be a violation of the Order of Conditions or Certificate of Compliance. In the case of stormwater BMPs that are serving more than one lot, the legally binding agreement shall also identify the lots that will be serviced by the stormwater BMPs. A plan and easement deed that grants the responsible party access to perform the required operation and maintenance must be submitted along with the legally binding agreement.

f) The responsible party shall operate and maintain all stormwater BMPs in accordance with the design plans, the O&M Plan, and the requirements of the Massachusetts Stormwater Handbook.

C. General Conditions Under Massachusetts Wetlands Protection Act (cont.)

g) The responsible party shall:
1. Maintain an operation and maintenance log for the last three (3) consecutive calendar years of inspections, repairs, maintenance and/or replacement of the stormwater management system or any part thereof, and disposal (for disposal the log shall indicate the type of material and the disposal location);
2. Make the maintenance log available to MassDEP and the Conservation Commission ("Commission") upon request; and
3. Allow members and agents of the MassDEP and the Commission to enter and inspect the site to evaluate and ensure that the responsible party is in compliance with the requirements for each BMP established in the O&M Plan approved by the issuing authority.

h) All sediment or other contaminants removed from stormwater BMPs shall be disposed of in accordance with all applicable federal, state, and local laws and regulations.

i) Illicit discharges to the stormwater management system as defined in 310 CMR 10.04 are prohibited.

j) The stormwater management system approved in the Order of Conditions shall not be changed without the prior written approval of the issuing authority.

k) Areas designated as qualifying pervious areas for the purpose of the Low Impact Site Design Credit (as defined in the MassDEP Stormwater Handbook, Volume 3, Chapter 1, Low Impact Development Site Design Credits) shall not be altered without the prior written approval of the issuing authority.

l) Access for maintenance, repair, and/or replacement of BMPs shall not be withheld. Any fencing constructed around stormwater BMPs shall include access gates and shall be at least six inches above grade to allow for wildlife passage.

Special Conditions (if you need more space for additional conditions, please attach a text document):
See attached Additional Conditions.

20. For Test Projects subject to 310 CMR 10.05(11), the applicant shall also implement the monitoring plan and the restoration plan submitted with the Notice of Intent. If the conservation commission or Department determines that the Test Project threatens the public health, safety or the environment, the applicant shall implement the removal plan submitted with the Notice of Intent or modify the project as directed by the conservation commission or the Department.

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands
WPA Form 5 – Order of Conditions
Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:
113-532
MassDEP File #

eDEP Transaction #

Boxborough
City/Town

D. Findings Under Municipal Wetlands Bylaw or Ordinance

1. Is a municipal wetlands bylaw or ordinance applicable? ☒ Yes ☐ No
2. The Boxborough Conservation Commission hereby finds (check one that applies):
   a. ☐ that the proposed work cannot be conditioned to meet the standards set forth in a municipal ordinance or bylaw, specifically:

      1. Municipal Ordinance or Bylaw — 2. Citation

      Therefore, work on this project may not go forward unless and until a revised Notice of Intent is submitted which provides measures which are adequate to meet these standards, and a final Order of Conditions is issued.

   b. ☒ that the following additional conditions are necessary to comply with a municipal ordinance or bylaw:
      Boxborough Wetland Bylaw
      1. Municipal Ordinance or Bylaw — 2. Citation
3. The Commission orders that all work shall be performed in accordance with the following conditions and with the Notice of Intent referenced above. To the extent that the following conditions modify or differ from the plans, specifications, or other proposals submitted with the Notice of Intent, the conditions shall control.
   The special conditions relating to municipal ordinance or bylaw are as follows (if you need more space for additional conditions, attach a text document):
   See attached Additional Conditions.

Boxborough Conservation Commission DEP File #113-532
Property Location: 700 & 800 Massachusetts Avenue
Assessor's Map 14-046 & 14-050

ADDITIONAL CONDITIONS

This purpose of this project is to find suitable locations for stormwater recharge. Test pits will be dug at several locations on the site.

The NOI for this project has been changed by the applicant. The applicant is no longer requesting permission to drill a well in the Resource Area. A new well location has been identified outside the Resource Area. Therefore, no NOI or OoC is needed for the new well.

This OoC applies to the test pits being dug to find suitable locations for stormwater recharge.

The proposed work is considered to have (potential) impact to the following interests of the Bylaw: protection of public and private water supply, protection of groundwater, flood control, erosion control, storm damage protection, prevention of pollution, protection of land containing wildlife (wildlife habitat), recreation, protection of aesthetics.

This project is approved by the Conservation Commission because it can be conditioned to meet the performance standards of the Wetlands Protection Act and (or) Town of Boxborough Wetland By-Law. The following additional conditions shall apply.

Additional General Conditions

20. In accordance with the Boxborough Wetland Bylaw, this Order of Conditions (Order) expires three years from date of issuance and may be extended for one year upon written request from the applicant at least 30 days prior to expiration of the Order.

21. After the expiration of the 10-day appeal period, and, if no request for appeal has been filed with the Department of Environmental Protection, record this Order at the Registry of Deeds and return a copy (proof) of recorded front page to the Commission.

**** <u>No work shall start until this Order of Conditions is recorded and a copy is received by the Commission.</u> ****

22. This Order shall apply to any successor in control or successor in interest of the property described in the Notice of Intent and accompanying plans. These obligations shall be expressed in covenants in all deeds to succeeding owners of portions of the property.

23. The Commission shall be notified in writing of all transfers of title of any portion of property that takes place prior to issuance of the certificate of compliance.

24. All proposed work shall be performed in accordance with the Notice of Intent filed March 2, 2016 and the Plans with a Revised date: May 4, 2016.

25. The Conservation Commission, the Boxborough Building Inspector, arborists, consultants, or conservation experts, as agents of the Commission, or the Department of Environmental Protection reserves the right to enter and inspect the property at all reasonable times, until a Certificate of Compliance is issued to evaluate compliance with this Order of Conditions, the Act, the Boxborough Wetland Bylaw, 310 CMR 10.00 and Boxborough wetland regulations, and may acquire any information, measurements, photographs, observations, and/or materials, or may require the submittal of any data or information deemed necessary by the Commission for that evaluation. Further, work shall be halted on the site if the Commission, agent or DEP determines that any of the work is not in compliance with this Order of Conditions. Work shall not resume until the Commission is satisfied that the work will comply, and has so notified the applicant in writing.

26. The Commission reserves the right to amend this Order of Conditions after a legally advertised public hearing if plans or circumstances are changed or if new conditions or information so warrant.

    Upon completion of this project, the applicant shall submit the following to the Conservation Commission to receive a Certificate of Compliance:

    1. DEP WPA Form 8A Request for Certificate of Compliance
    2. a. A written statement from the applicant certifying that the work has been conducted as shown on the plan(s) and documents referenced above, and as conditioned by the Commission.
       b. A written statement from a registered professional engineer of the Commonwealth certifying that the work has been conducted as shown on the plan(s) and documents referenced above, and as conditioned by the Commission.
    3. An "as-built" plan prepared and signed and stamped by a registered professional engineer or land surveyor of the Commonwealth for the public record.

27. The Perpetual Conditions listed on page 7-F shall continue in force beyond the Certificate of Compliance in perpetuity and shall be referred to in all future deeds to this property.

Pre-Construction Requirements

28. If there are any changes to the plans as submitted, the applicant shall have the responsibility to submit revised plans showing all changes to the Commission for review. This includes changes required by the Commission, other Town and/or State agencies as well as those introduced by the applicant. No work may start until the Commission has completed its review and notified the applicant in writing.

29. A complete copy of this Order, including its drawings, Special Conditions, and any amendments shall be maintained at the work site whenever work is being performed. The Applicant shall assure that all contractors, subcontractors and other personnel performing work in the resource area are fully aware of the terms and conditions of the Order. A complete copy of this Order and the project plans shall be given to every contractor and subcontractor performing the work defined and described here.

30. Prior to the start of any activity, the applicant shall schedule a pre-construction conference to be held on the site, involving the Contractor conducting the work, the Applicant or its authorized representative, and a member or agent of the Conservation Commission, to ensure that the requirements of this Order are understood by all parties. A reasonable period of time shall be provided as notice of the pre-construction meeting.

31. A set of plans for this project shall be submitted to the building inspector who may act as the Commission's agent.

32. The applicant shall inform the Commission in writing of the name, mailing address, e-mail address, business and home telephone number of the project supervisor who will be responsible for ensuring on-site compliance with this Order. The applicant will also supply the names and contact information for all the contractors and subcontractors.

33. All contractors working in the resource area shall be required to read this Order of Conditions and sign a document acknowledging their reading and understanding the Order of Conditions. This 'acknowledgement document' shall contain the printed name of the contractor/subcontractor, address, phone number, date and signature. One copy of the signed acknowledgement document shall be kept on site and a second copy shall be forwarded to the Conservation Commission before site clearing and excavation.

Erosion Controls

34. Before the start of any site work (e.g. earth disturbance, test pits), plans indicating sedimentation and erosion control locations shall be submitted to the Conservation Commission for review and approval. Sedimentation and erosion control devices shall be installed based on those approved plans.

35. On slopes of 25% (4:1) or less gradient, wire-reinforced silt fencing, staggered straw bales with a six- inch overlap or butted straw bales backed by silt fence may be used.

36. Slopes greater than 25% (4:1) require butting double staked straw bales backed by a silt fence dug-in 6 inches into the ground.

37. All silt fencing will be dug-in 6 inches into the ground. Space stakes a maximum of 8 feet if wire-reinforced fencing is used and a maximum of 6 feet if the fencing is not reinforced. All straw bales

will be double staked into the ground. Straw bales shall be dry, tight, consistent "stalk" material and free of seeds.

38. Within 30 days of the completion of test pit construction the test pits will be back filled and rough graded.

39. Prior to any work on site, the proposed limits of work shall be delineated with 5-foot high stakes spray painted bright orange placed every 25 feet with attached signs clearly displaying **"NO ACTIVITY BEYOND THIS POINT PER ORDER OF THE CONSERVATION COMMISSION"**. Such markers shall be checked and replaced as necessary and shall be maintained until all construction is complete. Workers shall be informed that no use of machinery, storage of machinery or materials, stockpiling of soil or construction activity is to occur beyond this line at any time. **No work shall be done in any wetland.**

Construction Management

Erosion Control

40. An adequate stockpile of erosion control materials shall be on site at all times for emergency or routine replacement and shall include materials to repair silt fences, straw bales, stone rip-rap filter dikes or any other devices planned for use during construction.

41. The Conservation Commission reserves the right to impose additional conditions on portions of this project to mitigate any impacts which could result from site erosion, or any noticeable degradation of surface water quality discharging from the site.

42. Erosion control devices may be modified based on experience at the site. All such devices shall be inspected, cleaned, and/or replaced during construction and shall remain in place until such time stabilization of all areas that may impact resource areas is permanent. These devices shall be inspected to assure maximum control has been provided after any rainfall.

43. Any straw bales or wattles that deteriorate during the activity period are to be replaced immediately. At the close of each construction day, and especially prior to weekends, the applicant shall assume responsibility for monitoring all erosion and sedimentation barriers to insure that all barriers are in place, secured, reinforced and properly maintained at day's end. In the event that an uncontrollable emergency occurs, such as a heavy rainstorm, causing erosion and sedimentation breakout, the applicant shall restore such barriers to the standards outlined in the Order and the satisfaction of the Commission. The straw bales shall be in place until revegetation takes place.

44. All erosion control and sedimentation prevention measures shall remain in place and be maintained for the purpose for which they were installed until the area upgradient is permanently stabilized, inspected and approved by the Commission. The applicant shall remove the erosion control and sedimentation devices by the end of construction, before applying for the Certificate of Compliance.

Equipment and Storage

45. Motorized equipment or any other machinery involved in the work shall be permitted in the buffer zone only when actually engaged in that work and must be removed from the buffer zone for overnight or weekend storage. No maintenance or refueling shall take place in the buffer zone and/or wetlands. This includes, but is not limited to fueling, lubricating and fluid replacement. Well drilling equipment shall not be permitted in the buffer zone or wetlands.

46. Equipment for fuel storage and refueling operations shall be located in an upland area greater than 100 feet from the limits of wetland areas.

47. Under no conditions shall operation of equipment, storage materials, stockpiling of soil or other temporary site disturbance take place on the wetland side of the limit of work line.

48. All equipment used in this project shall work from upland areas and shall not enter the wetlands at any time.

Other

49. There shall be no construction refuse buried within the 100-foot wetland buffer zone on the project site.

50. No work or activity including the cutting of vegetation shall take place in a wetland area or buffer zone other than that specifically allowed under this Order of Conditions.

51. Only clean fill shall be used on the site, i.e. clean granular materials free of organic matter, large stones, masonry, stumps, asphalt or waste material.

Boxborough Conservation Commission DEP File #113-532
Property Location: 700 & 800 Massachusetts Avenue
Assessor's Map 14-046 & 14-050

Perpetual Conditions

52. No further permanent structure of any kind shall ever be permitted within the 100-foot wetland buffer zone. No additional alterations of any kind within the wetlands and the buffer zone will be permitted without prior approval of the Conservation Commission.

53. No de-icing chemicals shall be used where runoff / drainage will discharge into the wetlands. This condition shall remain in perpetuity and shall be recorded as such on the Certificate of Compliance. No de-icing chemicals shall be used on any walk, drive, parking lot or private road except during severe ice storm. Any arrangement for snow removal shall so stipulate.

54. No herbicides or pesticides shall be used on this site within the100-foot wetland buffer zone. This condition shall remain in force permanently and shall be recorded as such on the Certificate of Compliance.

55. Fertilization and liming of soils on this site shall not take place within the 100-foot wetland buffer zone.

56. There shall be no storage of chemicals, oil, fuel, fertilizers or other potentially hazardous material within the wetlands or within the 100-foot wetland buffer zone.

TRUSTEE: JOHN J. LYONS
571 BURROUGHS ROAD
BOXBOROUGH, MA 01719

APPLICANT:

BOXBOROUGH TOWN CENTER, LLC
PO BOX 985
WEST ACTON, MA 01720

RECEIVED
MAY - 4 2016
113-532
BOXBOROUGH
CONSERVATION COMMISSION

PRELIMINARY SITE PLAN IN BOXBOROUGH, MASSACHUSETTS

SOIL TESTING LOCATION PLAN

FOR: BOXBOROUGH TOWN CENTER, LLC
SCALE: 1"=120' MARCH 1, 2016
REVISED: MARCH 14, 2016 REVISED: MAY 4, 2016

COMMONWEALTH OF MASSACHUSETTS
GEORGE DIMAKARAKOS
CIVIL
No. 41281
REGISTERED PROFESSIONAL ENGINEER

STAMSKI AND MCNARY, INC.
1000 MAIN STREET ACTON, MASSACHUSETTS
ENGINEERING – PLANNING – SURVEYING

0 60 120 240 360 480 FT

(2069 PRE A 2016.dwg) SM–2069

COMMONWEALTH OF MASSACHUSETTS
JOSEPH MARCH
#-56384
PROFESSIONAL LAND SURVEYOR

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands
WPA Form 5 – Order of Conditions
Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:
113-532
MassDEP File #

eDEP Transaction #

Boxborough
City/Town

E. Signatures

This Order is valid for three years, unless otherwise specified as a special condition pursuant to General Conditions #4, from the date of issuance.

May 18, 2016
1. Date of Issuance

Please indicate the number of members who will sign this form.
This Order must be signed by a majority of the Conservation Commission.

2. Number of Signers

The Order must be mailed by certified mail (return receipt requested) or hand delivered to the applicant. A copy also must be mailed or hand delivered at the same time to the appropriate Department of Environmental Protection Regional Office, if not filing electronically, and the property owner, if different from applicant.

Signatures:

☐ by hand delivery on

Date

☒ by certified mail, return receipt requested, on

May 20 2016

Date

F. Appeals

The applicant, the owner, any person aggrieved by this Order, any owner of land abutting the land subject to this Order, or any ten residents of the city or town in which such land is located, are hereby notified of their right to request the appropriate MassDEP Regional Office to issue a Superseding Order of Conditions. The request must be made by certified mail or hand delivery to the Department, with the appropriate filing fee and a completed Request for Departmental Action Fee Transmittal Form, as provided in 310 CMR 10.03(7) within ten business days from the date of issuance of this Order. A copy of the request shall at the same time be sent by certified mail or hand delivery to the Conservation Commission and to the applicant, if he/she is not the appellant.

Any appellants seeking to appeal the Department's Superseding Order associated with this appeal will be required to demonstrate prior participation in the review of this project. Previous participation in the permit proceeding means the submission of written information to the Conservation Commission prior to the close of the public hearing, requesting a Superseding Order, or providing written information to the Department prior to issuance of a Superseding Order.

The request shall state clearly and concisely the objections to the Order which is being appealed and how the Order does not contribute to the protection of the interests identified in the Massachusetts Wetlands Protection Act (M.G.L. c. 131, § 40), and is inconsistent with the wetlands regulations (310 CMR 10.00). To the extent that the Order is based on a municipal ordinance or bylaw, and not on the Massachusetts Wetlands Protection Act or regulations, the Department has no appellate jurisdiction.

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands
WPA Form 5 – Order of Conditions
Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:
113-532
MassDEP File #

eDEP Transaction #

Boxborough
City/Town

G. Recording Information

Prior to commencement of work, this Order of Conditions must be recorded in the Registry of Deeds or the Land Court for the district in which the land is located, within the chain of title of the affected property. In the case of recorded land, the Final Order shall also be noted in the Registry's Grantor Index under the name of the owner of the land subject to the Order. In the case of registered land, this Order shall also be noted on the Land Court Certificate of Title of the owner of the land subject to the Order of Conditions. The recording information on this page shall be submitted to the Conservation Commission listed below.

Conservation Commission

Detach on dotted line, have stamped by the Registry of Deeds and submit to the Conservation Commission.

To:

Conservation Commission

Please be advised that the Order of Conditions for the Project at:

Project Location | MassDEP File Number

Has been recorded at the Registry of Deeds of:

County | Book | Page

for: Property Owner

and has been noted in the chain of title of the affected property in:

Book | Page

In accordance with the Order of Conditions issued on:

Date

If recorded land, the instrument number identifying this transaction is:

Instrument Number

If registered land, the document number identifying this transaction is:

Document Number

Signature of Applicant

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

Request for Departmental Action Fee Transmittal Form

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

DEP File Number:

Provided by DEP

A. Request Information

1. Location of Project

a. Street Address | b. City/Town, Zip

c. Check number | d. Fee amount

Important: When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.

2. Person or party making request (if appropriate, name the citizen group's representative):

Name

Mailing Address

City/Town | State | Zip Code

Phone Number | Fax Number (if applicable)

3. Applicant (as shown on Determination of Applicability (Form 2), Order of Resource Area Delineation (Form 4B), Order of Conditions (Form 5), Restoration Order of Conditions (Form 5A), or Notice of Non-Significance (Form 6)):

Name

Mailing Address

City/Town | State | Zip Code

Phone Number | Fax Number (if applicable)

4. DEP File Number:

B. Instructions

1. When the Departmental action request is for (check one):

- ☐ Superseding Order of Conditions – Fee: $120.00 (single family house projects) or $245 (all other projects)
- ☐ Superseding Determination of Applicability – Fee: $120
- ☐ Superseding Order of Resource Area Delineation – Fee: $120

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

Request for Departmental Action Fee Transmittal Form

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

DEP File Number:

Provided by DEP

B. Instructions (cont.)

Send this form and check or money order, payable to the *Commonwealth of Massachusetts*, to:

Department of Environmental Protection
Box 4062
Boston, MA 02211

2. On a separate sheet attached to this form, state clearly and concisely the objections to the Determination or Order which is being appealed. To the extent that the Determination or Order is based on a municipal bylaw, and not on the Massachusetts Wetlands Protection Act or regulations, the Department has no appellate jurisdiction.

3. Send a **copy** of this form and a **copy** of the check or money order with the Request for a Superseding Determination or Order by certified mail or hand delivery to the appropriate DEP Regional Office (see http://www.mass.gov/eea/agencies/massdep/about/contacts/).

4. A copy of the request shall at the same time be sent by certified mail or hand delivery to the Conservation Commission and to the applicant, if he/she is not the appellant.

ZONING DISTRICT:

TOWN CENTER
WETLAND & WATERSHED OVERLAY DISTRICT

REFERENCE:

MIDDLESEX REGISTRY OF DEEDS
SOUTH DISTRICT
DEED BOOK 27102 PAGE 550
DEED BOOK 19267 PAGE 606

TOWN OF BOXBOROUGH
PROPERTY MAP
ASSESSORS MAP 14, LOTS 46 AND 50
PARCELS 14-046-000 AND 14-050-000

RECORD OWNERS:

BOXBOROUGH TOWN CENTER, LLC
PO BOX 985
WEST ACTON, MA 01720

MANE REALTY TRUST
TRUSTEE: JOHN J. LYONS
571 BURROUGHS ROAD
BOXBOROUGH, MA 01719

APPLICANT:

BOXBOROUGH TOWN CENTER, LLC
PO BOX 985
WEST ACTON, MA 01720

PRELIMINARY SITE PLAN IN BOXBOROUGH, MASSACHUSETTS

SOIL TESTING LOCATION PLAN
FOR: BOXBOROUGH TOWN CENTER, LLC
SCALE: 1"=120' MARCH 1, 2016
REVISED: MARCH 14, 2016 REVISED: MAY 4, 2016

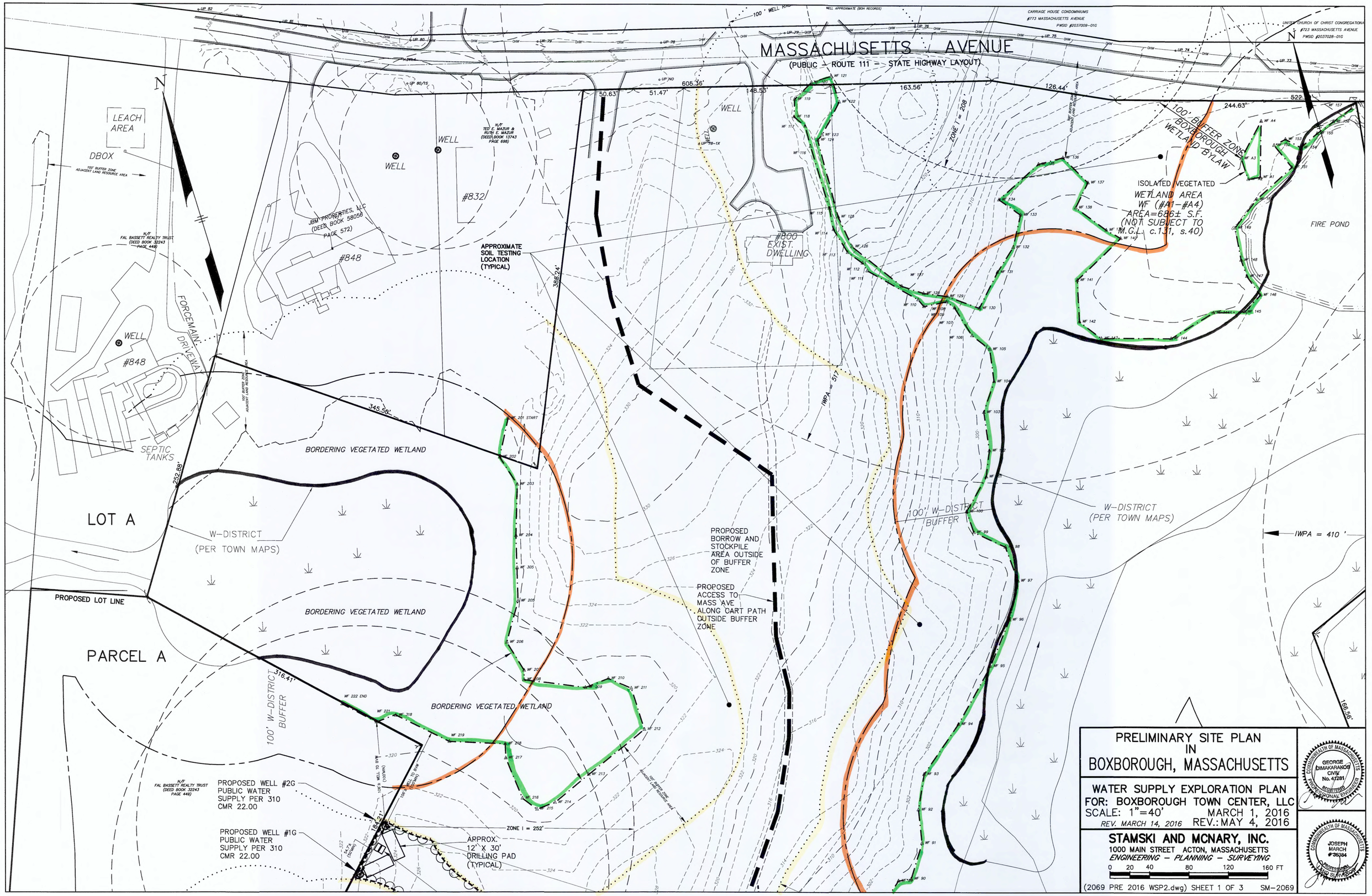
STAMSKI AND MCNARY, INC.
1000 MAIN STREET ACTON, MASSACHUSETTS
ENGINEERING - PLANNING - SURVEYING

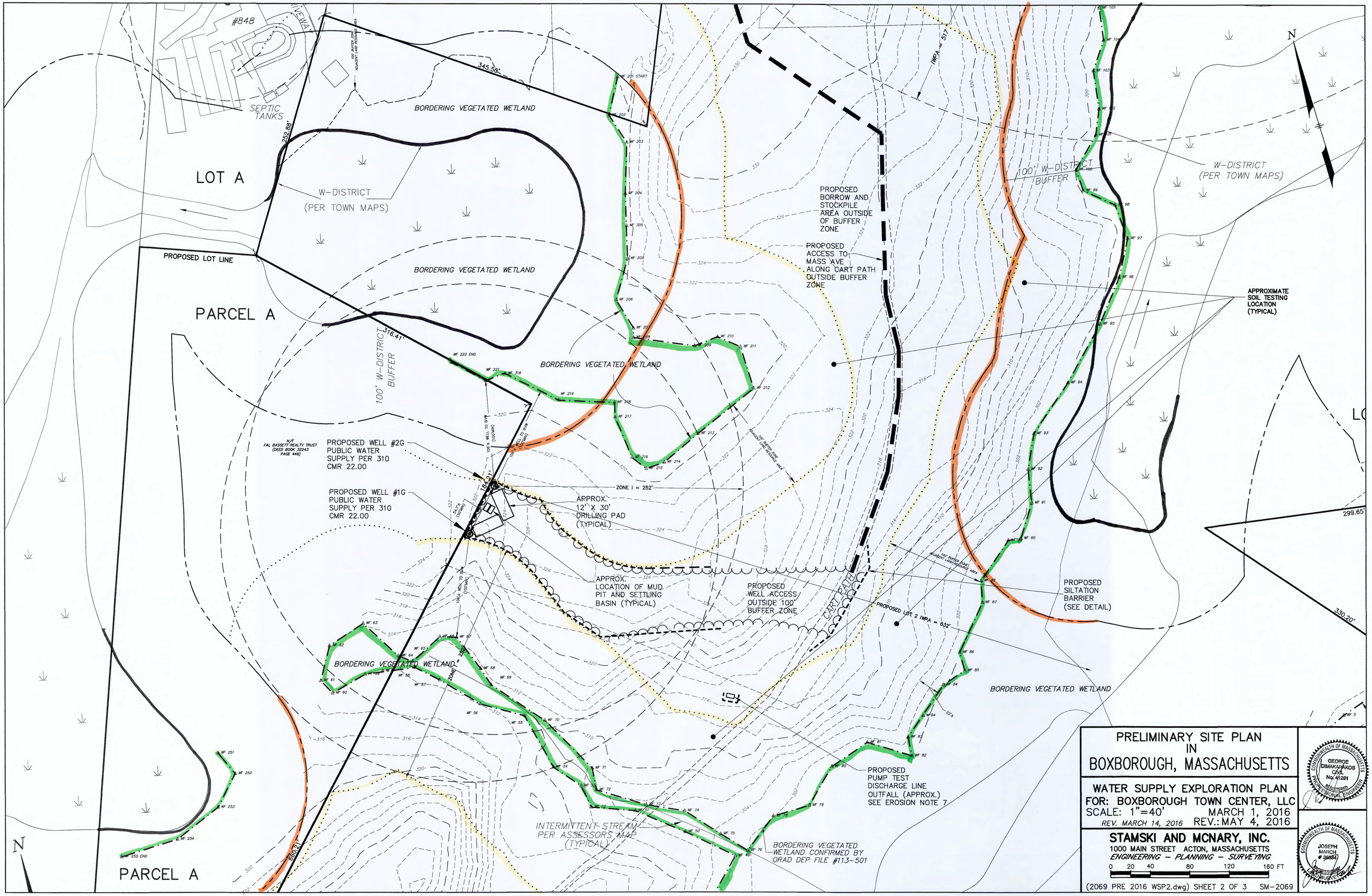
0 60 120 240 360 480 FT

(2069 PRE A 2016.dwg) SM-2069

COMMONWEALTH OF MASSACHUSETTS
GEORGE PIMAKARAKOS
CIVIL
No. 41281
REGISTERED PROFESSIONAL ENGINEER

COMMONWEALTH OF MASSACHUSETTS
JOSEPH MARCH
36394
PROFESSIONAL LAND SURVEYOR


MASSACHUSETTS AVENUE
(PUBLIC – ROUTE 111 – STATE HIGHWAY LAYOUT)
100' WELL ROAD
WELL APPROXIMATE (BOH RECORDS)
CARRIAGE HOUSE CONDOMINIUMS
#773 MASSACHUSETTS AVENUE
PWSID #2037009-01G
UNITED CHURCH OF CHRIST CONGREGATIONAL
#723 MASSACHUSETTS AVENUE
PWSID #2037028-01G
N
LEACH AREA
DBOX
100' BUFFER ZONE ADJACENT LAND RESOURCE AREA
WELL
#832
N/F TED E. MAZUR & RUTH E. MAZUR (DEED BOOK 13743 PAGE 698)
JBM PROPERTIES, LLC (DEED BOOK 58058 PAGE 572)
#848
N/F FAL BASSETT REALTY TRUST (DEED BOOK 32243 PAGE 449)
FORCEMAIN
DRIVEWAY
SEPTIC TANKS
APPROXIMATE SOIL TESTING LOCATION (TYPICAL)
#800 EXIST. DWELLING
ZONE I = 208'
IWPA = 517'
ISOLATED VEGETATED WETLAND AREA
WF (#A1–#A4)
AREA=686± S.F.
(NOT SUBJECT TO M.G.L. c.131, s.40)
100' BUFFER ZONE BOXBOROUGH WETLAND BYLAW
FIRE POND
BORDERING VEGETATED WETLAND
LOT A
W-DISTRICT (PER TOWN MAPS)
PROPOSED LOT LINE
PARCEL A
100' W-DISTRICT BUFFER
PROPOSED BORROW AND STOCKPILE AREA OUTSIDE OF BUFFER ZONE
PROPOSED ACCESS TO MASS AVE ALONG CART PATH OUTSIDE BUFFER ZONE
IWPA = 410'
PROPOSED WELL #2G PUBLIC WATER SUPPLY PER 310 CMR 22.00
PROPOSED WELL #1G PUBLIC WATER SUPPLY PER 310 CMR 22.00
ZONE I = 252'
APPROX. 12' X 30' DRILLING PAD (TYPICAL)
PRELIMINARY SITE PLAN
IN
BOXBOROUGH, MASSACHUSETTS
WATER SUPPLY EXPLORATION PLAN
FOR: BOXBOROUGH TOWN CENTER, LLC
SCALE: 1"=40'
MARCH 1, 2016
REV. MARCH 14, 2016
REV.: MAY 4, 2016
STAMSKI AND MCNARY, INC.
1000 MAIN STREET ACTON, MASSACHUSETTS
ENGINEERING – PLANNING – SURVEYING
0 20 40 80 120 160 FT
(2069 PRE 2016 WSP2.dwg) SHEET 1 OF 3
SM-2069
COMMONWEALTH OF MASSACHUSETTS
GEORGE DIMAKARAKOS
CIVIL
No. 47281
REGISTERED PROFESSIONAL ENGINEER
COMMONWEALTH OF MASSACHUSETTS
JOSEPH MARCH
#36384
PROFESSIONAL LAND SURVEYOR



PRELIMINARY SITE PLAN
IN
BOXBOROUGH, MASSACHUSETTS

WATER SUPPLY EXPLORATION PLAN
FOR: BOXBOROUGH TOWN CENTER, LLC
SCALE: 1"=40' MARCH 1, 2016
REV. MARCH 14, 2016 REV.: MAY 4, 2016

STAMSKI AND MCNARY, INC.
1000 MAIN STREET ACTON, MASSACHUSETTS
ENGINEERING – PLANNING – SURVEYING

0 20 40 80 120 160 FT

(2069 PRE 2016 WSP2.dwg) SHEET 2 OF 3 SM-2069

COMMONWEALTH OF MASSACHUSETTS GEORGE DIMAKARAKOS CIVIL No. 41281 REGISTERED PROFESSIONAL ENGINEER

COMMONWEALTH OF MASSACHUSETTS JOSEPH MARCH # 38854 PROFESSIONAL LAND SURVEYOR

BORDERING VEGETATED WETLAND

BORDERING VEGETATED WETLAND

PROPOSED PUMP TEST DISCHARGE LINE OUTFALL (APPROX.) SEE EROSION NOTE 7

INTERMITTENT STREAM PER ASSESSORS MAP (TYPICAL)

BORDERING VEGETATED WETLAND CONFIRMED BY ORAD DEP FILE #113-501

100' BUFFER ZONE ADJACENT LAND RESOURCE AREA

ISOLATED VEGETATED WETLAND AREA WF (#B1-#B4) AREA=999± S.F. (NOT SUBJECT TO M.G.L. c.131, s.40)

100' BUFFER ZONE BOXBOROUGH WETLAND BYLAW

ISOLATED VEGETATED WETLAND AREA WF (#A1-#A4) AREA=1,200± S.F. (NOT SUBJECT TO M.G.L. c.131, s.40)

100' BUFFER ZONE BOXBOROUGH WETLAND BYLAW

APPROXIMATE SOIL TESTING LOCATION (TYPICAL)

CART PATH

"DRAINAGE EASEMENT A" AS SHOWN ON PLAN No. 352 OF 1995

LOT 2

N/F SHERIFF'S MEADOW CONDOMINIUM (MASTER DEED BOOK 25327 PAGE 118)

(* FUTURE CONNECTION PER 1995 BOH WELL (CONFIRM USE*)

100' WELL RADIUS

MW GHC-1

MW GHC-2

MW GHC-3

PRELIMINARY SITE PLAN IN BOXBOROUGH, MASSACHUSETTS

WATER SUPPLY EXPLORATION PLAN

FOR: BOXBOROUGH TOWN CENTER, LLC

SCALE: 1"=40' MARCH 1, 2016

REV. MARCH 14, 2016 REV.: MAY 4, 2016

STAMSKI AND MCNARY, INC.

1000 MAIN STREET ACTON, MASSACHUSETTS

ENGINEERING – PLANNING – SURVEYING

0 20 40 80 120 160 FT

(2069 PRE 2016 WSP2.dwg) SHEET 3 OF 3 SM-2069

COMMONWEALTH OF MASSACHUSETTS GEORGE DIMAKARAKOS CIVIL No. 41281 REGISTERED PROFESSIONAL ENGINEER

COMMONWEALTH OF MASSACHUSETTS JOSEPH MARCH # 38384 PROFESSIONAL LAND SURVEYOR

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

WPA Form 4B – Order of Resource Area Delineation

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40 and the Boxborough Wetland Bylaw

Provided by MassDEP:
113-501
MassDEP File Number

eDEP Transaction Number

Boxborough
City/Town

A. General Information

Important: When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.

Note: Before completing this form consult your local Conservation Commission regarding any municipal bylaw or ordinance.

From: Boxborough
1. Conservation Commission

2. This Issuance is for (check one):

a. ☒ Order of Resource Area Delineation

b. ☐ Amended Order of Resource Area Delineation

3. Applicant:

a. First Name:
b. Last Name:
c. Organization: Boxborough Town Center, LLC
d. Mailing Address: P.O. Box 985
e. City/Town: Acton
f. State: MA
g. Zip Code: 01720

4. Property Owner (if different from applicant):

a. First Name:
b. Last Name:
c. Organization: Applicant and Mane Realty Trust
d. Mailing Address: above and 571 Burroughs Road
e. City/Town: above and Boxborough
f. State: MA
g. Zip Code: 01720

5. Project Location:

a. Street Address: Mass Ave & Stow Rd.
b. City/Town: Boxborough
c. Zip Code: 01719
d. Assessors Map/Plat Number: 6-4
e. Parcel/Lot Number: 122, 125, 126, 127-1, 128, 131-1, 103-3

Latitude and Longitude (in degrees, minutes, seconds):
f. Latitude: d m s
g. Longitude: d m s

6. Dates:
a. Date ANRAD filed: Aug. 3, 2011
b. Date Public Hearing Closed: Aug. 17, 2011
c. Date of Issuance: Aug. 17, 2011

7. Title and Date (or Revised Date if applicable) of Final Plans and Other Documents:

a. Title: Resource Area Delineation Plan
b. Date: Aug. 17, 2011
c. Title:
d. Date:

B. Order of Delineation

1. The Conservation Commission has determined the following (check whichever is applicable):

a. ☒ **Accurate**: The boundaries described on the referenced plan(s) above and in the Abbreviated Notice of Resource Area Delineation are accurately drawn for the following resource area(s):

1. ☒ Bordering Vegetated Wetlands

2. ☒ Other resource area(s), specifically:

a. A, B, and C series flags delineate isolated wetlands pursuant to the Boxborough Wetlands Bylaw. NOTE: As shown on the plans, wetland areas located in the northeast corner of the site have not been flagged, therefore those areas, along with their buffer zones, are not subject to the jurisdiction of this Order.

b. ☐ **Modified**: The boundaries described on the plan(s) referenced above, as modified by the Conservation Commission from the plans contained in the Abbreviated Notice of Resource Area Delineation, are accurately drawn from the following resource area(s):

1. ☐ Bordering Vegetated Wetlands

2. ☐ Other resource area(s), specifically:

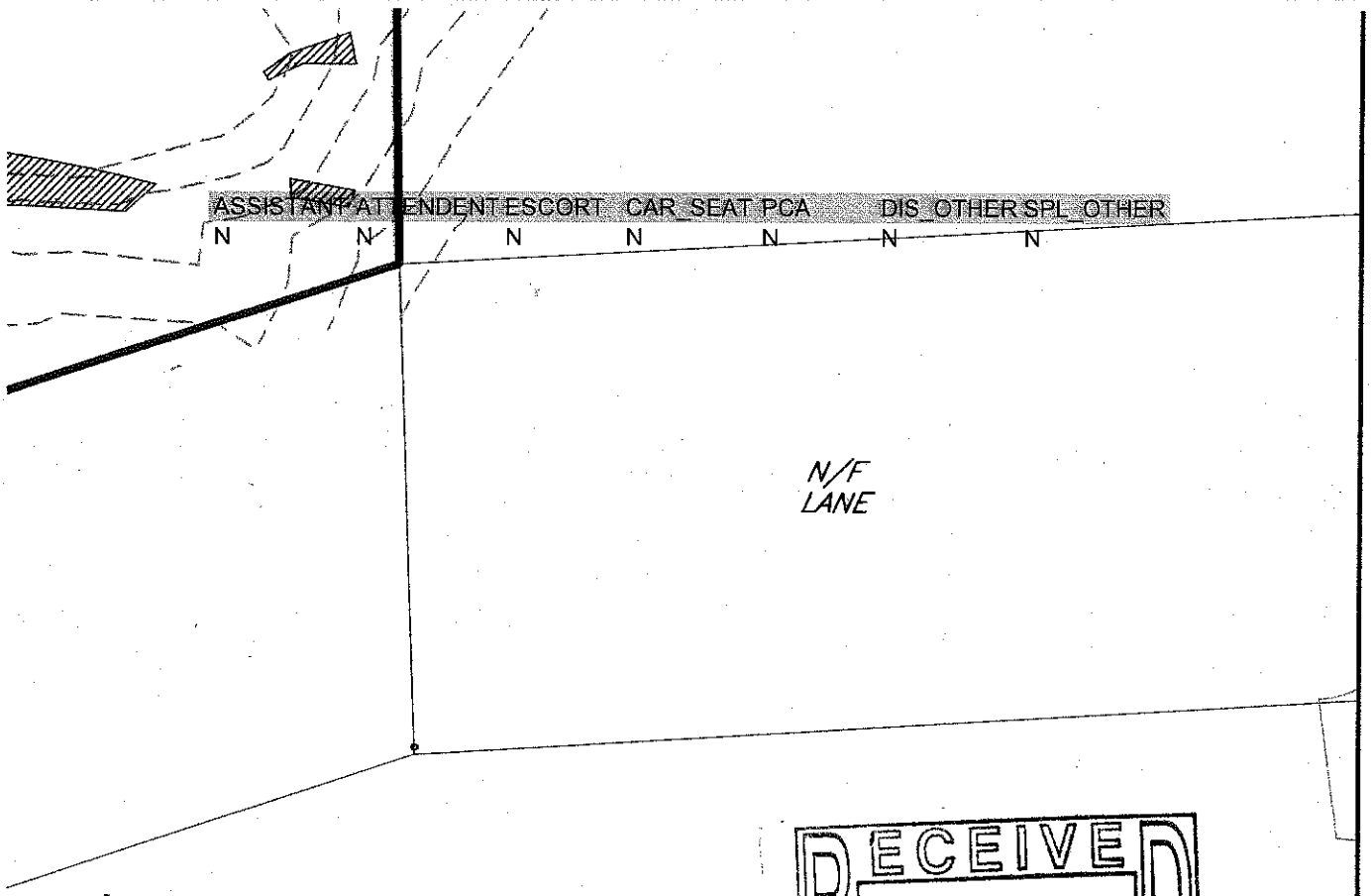
a.

c. ☐ **Inaccurate**: The boundaries described on the referenced plan(s) and in the Abbreviated Notice of Resource Area Delineation were found to be inaccurate and cannot be confirmed for the following resource area(s):

1. ☐ Bordering Vegetated Wetlands

2. ☐ Other resource area(s), specifically:

3. ☐ The boundaries were determined to be inaccurate because:



RECEIVED
AUG 17 2011
BOXBOROUGH
CONSERVATION COMMISSION

RESOURCE AREA DELINEATION PLAN
IN
BOXBOROUGH, MASSACHUSETTS
(MIDDLESEX COUNTY)

FOR: BOXBOROUGH TOWN CENTER, L.L.C.
SCALE: 1"=60' DATE: AUGUST 2, 2011
REV: AUG. 17, 2011

COMMONWEALTH OF MASSACHUSETTS
JOSEPH MARCH CIVIL
#40472
REGISTERED PROFESSIONAL ENGINEER

STAMSKI AND McNARY, INC.
1000 MAIN STREET – ACTON, MASS. 01720
ENGINEERING – PLANNING – SURVEYING
TELE. NO. (978)-263-8585

0 30 60 120 240 FEET

SM-2069 (2069ANRAD2011 R1.DWG)

C. Findings

This Order of Resource Area Delineation determines that the boundaries of those resource areas noted above, have been delineated and approved by the Commission and are binding as to all decisions rendered pursuant to the Massachusetts Wetlands Protection Act (M.G.L. c.131, § 40) and its regulations (310 CMR 10.00). This Order does not, however, determine the boundaries of any resource area or Buffer Zone to any resource area not specifically noted above, regardless of whether such boundaries are contained on the plans attached to this Order or to the Abbreviated Notice of Resource Area Delineation.

This Order must be signed by a majority of the Conservation Commission. The Order must be sent by certified mail (return receipt requested) or hand delivered to the applicant. A copy also must be mailed or hand delivered at the same time to the appropriate DEP Regional Office (see http://www.mass.gov/dep/about/region/findyour.htm).

D. Appeals

The applicant, the owner, any person aggrieved by this Order, any owner of land abutting the land subject to this Order, or any ten residents of the city or town in which such land is located, are hereby notified of their right to request the appropriate DEP Regional Office to issue a Superseding Order of Resource Area Delineation. When requested to issue a Superseding Order of Resource Area Delineation, the Department's review is limited to the objections to the resource area delineation(s) stated in the appeal request. The request must be made by certified mail or hand delivery to the Department, with the appropriate filing fee and a completed Request for Departmental Action Fee Transmittal Form, as provided in 310 CMR 10.03(7) within ten business days from the date of issuance of this Order. A copy of the request shall at the same time be sent by certified mail or hand delivery to the Conservation Commission and to the applicant, if he/she is not the appellant.

Any appellants seeking to appeal the Department's Superseding Order of Resource Area Delineation will be required to demonstrate prior participation in the review of this project. Previous participation in the permit proceeding means the submission of written information to the Conservation Commission prior to the close of the public hearing, requesting a Superseding Order or Determination, or providing written information to the Department prior to issuance of a Superseding Order or Determination.

The request shall state clearly and concisely the objections to the Order which is being appealed and how the Order does not contribute to the protection of the interests identified in the Massachusetts Wetlands Protection Act, (M.G.L. c. 131, § 40) and is inconsistent with the wetlands regulations (310 CMR 10.00). To the extent that the Order is based on a municipal bylaw or ordinance, and not on the Massachusetts Wetlands Protection Act or regulations, the Department of Environmental Protection has no appellate jurisdiction.

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

WPA Form 4B – Order of Resource Area Delineation

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:
113-501
MassDEP File Number

eDEP Transaction Number

Boxborough
City/Town

E. Signatures

August 17, 2011
Date of Issuance

4
1. Number of Signers

Please indicate the number of members who will sign this form.

Signature of Conservation Commission Member

Signature of Conservation Commission Member

Signature of Conservation Commission Member

Signature of Conservation Commission Member

Signature of Conservation Commission Member

Signature of Conservation Commission Member

Signature of Conservation Commission Member

Signature of Conservation Commission Member

This Order is valid for three years from the date of issuance.

If this Order constitutes an Amended Order of Resource Area Delineation, this Order does not extend the issuance date of the original Final Order, which expires on unless extended in writing by the issuing authority.

This Order is issued to the applicant and the property owner (if different) as follows:

2. ☐ By hand delivery on

a. Date

3. ☒ By certified mail, return receipt requested on

Aug. 22 2011

a. Date

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands
Request for Departmental Action Fee Transmittal Form
Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

A. Request Information

Important: When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.

1. Person or party making request (if appropriate, name the citizen group's representative):

Name

Mailing Address

City/Town | State | Zip Code

Phone Number | Fax Number (if applicable)

Project Location

Mailing Address

City/Town | State | Zip Code

2. Applicant (as shown on Notice of Intent (Form 3), Abbreviated Notice of Resource Area Delineation (Form 4A); or Request for Determination of Applicability (Form 1)):

Name

Mailing Address

City/Town | State | Zip Code

Phone Number | Fax Number (if applicable)

3. DEP File Number:

B. Instructions

1. When the Departmental action request is for (check one):

☐ Superseding Order of Conditions

☐ Superseding Determination of Applicability

☐ Superseding Order of Resource Area Delineation

Send this form and check or money order for $100.00 (single family house projects) or $200 (all other projects), payable to the *Commonwealth of Massachusetts* to:

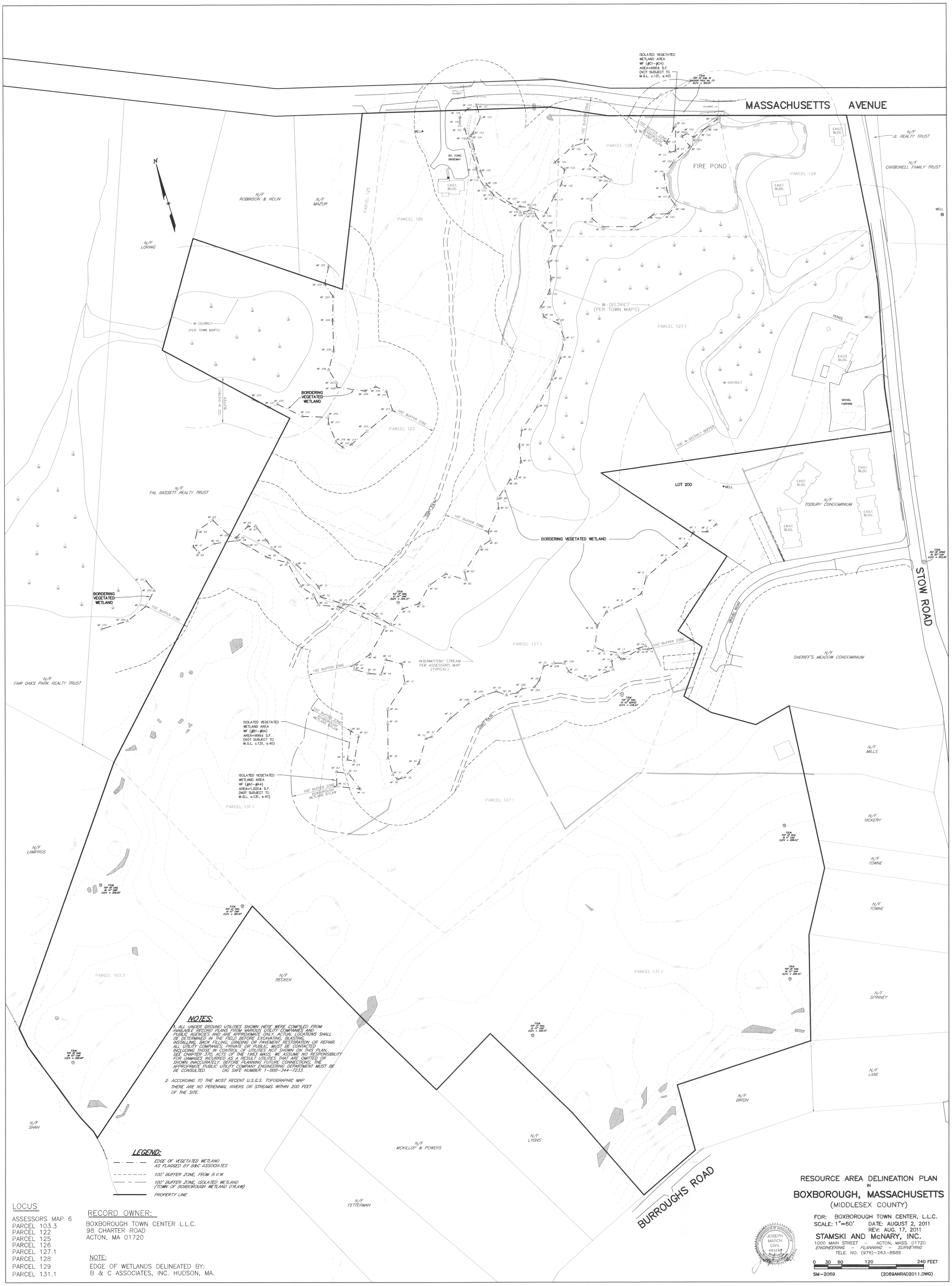
Department of Environmental Protection
Box 4062
Boston, MA 02211

B. Instructions (cont.)

2. On a separate sheet attached to this form, state clearly and concisely the objections to the Determination or Order which is being appealed. To the extent that the Determination or Order is based on a municipal bylaw, and not on the Massachusetts Wetlands Protection Act or regulations, the Department has no appellate jurisdiction.

3. Send a **copy** of this form and a **copy** of the check or money order with the Request for a Superseding Determination or Order by certified mail or hand delivery to the appropriate DEP Regional Office (see http://www.mass.gov/dep/about/region/findyour.htm).

4. A copy of the request shall at the same time be sent by certified mail or hand delivery to the Conservation Commission and to the applicant, if he/she is not the appellant.



NOTES:

1. ALL UNDER GROUND UTILITIES SHOWN HERE WERE COMPILED FROM AVAILABLE RECORD PLANS FROM VARIOUS UTILITY COMPANIES AND PUBLIC AGENCIES AND ARE APPROXIMATE ONLY. ACTUAL LOCATIONS SHALL BE DETERMINED IN THE FIELD BEFORE EXCAVATING, BLASTING, INSTALLING, BACK FILLING, GRADING OR PAVEMENT RESTORATION OR REPAIR. ALL UTILITY COMPANIES, PRIVATE OR PUBLIC, MUST BE CONTACTED INCLUDING THOSE IN CONTROL OF UTILITIES NOT SHOWN ON THIS PLAN. SEE CHAPTER 370, ACTS OF THE 1963 MASS. WE ASSUME NO RESPONSIBILITY FOR DAMAGES INCURRED AS A RESULT UTILITIES THAT ARE OMITTED OR SHOWN INACCURATELY. BEFORE PLANNING FUTURE CONNECTIONS, THE APPROPRIATE PUBLIC UTILITY COMPANY ENGINEERING DEPARTMENT MUST BE BE CONSULTED. DIG SAFE NUMBER 1–888–344–7233.
2. ACCORDING TO THE MOST RECENT U.S.G.S. TOPOGRAPHIC MAP THERE ARE NO PERENNIAL RIVERS OR STREAMS WITHIN 200 FEET OF THE SITE.

LEGEND:

- EDGE OF VEGETATED WETLAND AS FLAGGED BY B&C ASSOCIATES
- 100' BUFFER ZONE, FROM B.V.W.
- 100' BUFFER ZONE, ISOLATED WETLAND (TOWN OF BOXBOROUGH WETLAND BYLAW)
- PROPERTY LINE

LOCUS

ASSESSORS MAP 6
PARCEL 103.3
PARCEL 122
PARCEL 125
PARCEL 126
PARCEL 127.1
PARCEL 128
PARCEL 129
PARCEL 131.1

RECORD OWNER:

BOXBOROUGH TOWN CENTER L.L.C.
98 CHARTER ROAD
ACTON, MA 01720

NOTE:
EDGE OF WETLANDS DELINEATED BY:
B & C ASSOCIATES, INC. HUDSON, MA.

RESOURCE AREA DELINEATION PLAN
IN
BOXBOROUGH, MASSACHUSETTS
(MIDDLESEX COUNTY)

FOR: BOXBOROUGH TOWN CENTER, L.L.C.
SCALE: 1"=60' DATE: AUGUST 2, 2011
REV: AUG. 17, 2011

STAMSKI AND McNARY, INC.
1000 MAIN STREET – ACTON, MASS. 01720
ENGINEERING – PLANNING – SURVEYING
TELE. NO. (978)–263–8585

COMMONWEALTH OF MASSACHUSETTS JOSEPH MARCH CIVIL #40473 PROFESSIONAL ENGINEER

0 30 60 120 240 FEET

SM–2069 (2069ANRAD2011.DWG)

PRELIMINARY ENGINEERING REPORT ON PROPOSED WASTEWATER TREATMENT FACILITIES REGENCY AT BOXBOROUGH BOXBOROUGH, MASSACHUSETTS

December 13, 2016

PREPARED FOR:

Boxborough Town Center, LLC
PO Box 985
Acton, Massachusetts 01720

PREPARED BY:

Mount Hope Engineering, Inc.
1788 GAR Highway
Swansea, MA 02777
508.379.1234

fenton town center bxbro report, job 16-282

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INTRODUCTION

Boxborough Town Center, LLC is seeking to permit and construct a small wastewater treatment facility to serve the proposed Regency at Boxborough project off of Massachusetts and Stow Roads in Boxborough, Massachusetts. The project as envisioned will consist of approximately one hundred units with a mix of two and three-bedroom homes within the proposed Association. It is estimated that the facility will generate a total daily flow of approximately 20,660 gpd, and being in excess of 10,000 gpd, will therefore require the project to submit an application for a Groundwater Discharge Permit BRP WP 79 with the Department of Environmental Protection. The proposed treatment process will provide for primary settling, secondary biological treatment, and tertiary polishing with nitrogen removal and disinfection. The proposed treatment methods under consideration for the site are rotating biological contactors with denitrification and the fixed film batch reactor Amphidrome™ biological treatment system and filter. Both facilities are currently in use at numerous locations within the Commonwealth. The facility preliminary design basis and additional site information is included within this report.

It is the proponent's intention to provide the Department with complete final design plans for the selected treatment plant in the near future for final review and future issuance of a Final Groundwater Discharge Permit for the facility. Additional on-site studies are also on-going and will be made available to the Department when completed.

DESIGN FLOWS

The design flow to the wastewater treatment plant is calculated to be 20,660 gallons per day (gpd). The flow for this complex has been determined in accordance with the guidelines from Title 5 of the State Environmental Code., "Standard Requirements for the Siting, Construction, Inspection, Upgrade and Expansion of On-Site Sewage Disposal Systems and for the Transport of Septage" (310 CMR 15.00). Wastewater flows are calculated at 110 gpd per bedroom for residential dwellings. Therefore, the project design flow may be calculated as follows:

Design Flow =	70 2-bdrm elderly units x 150 gpd per unit = 10,500 gpd
	30 3-bdrm units x 330 gpd per unit = 9,900 gpd
	Clubhouse: 13 lockers x 20 gpd per unit = 260 gpd
Total Daily Flow	20,660 gpd = 14.3 gpm

The average total daily flow represents the average flow and is not representative of the flow variations which may typically occur at this type of development. Flow equalization facilities will be provided to attenuate these variations in hydraulic loading to the plant. The significance of flow equalization typically decreases as the plant size increases.

The permit application for the proposed treatment facility is seeking a flow of 20,660 gpd which will provide capacity for proposed operations within the project site. The Department's *Guidelines for the Design, Construction, Operation and Maintenance of Small Wastewater Treatment Facilities with Land Disposal* has also been utilized in the design flow calculations.

TREATMENT ALTERNATIVES

RBC TREATMENT

Organic and nutrient removal will be achieved by the use of Rotating Biological Contactors (RBC). The process provides improved secondary treatment of wastewater over conventional extended aeration treatment facilities in the same size range. In addition to providing efficient secondary treatment, the RBC's are capable of nitrification and denitrification.

The process is simple in that biological treatment is achieved by slowly rotating the RBC discs, which provide a medium for the growth of biological organisms. Rotation of the aerobic RBC's alternately exposes the organisms on the discs to the air and wastewater in the RBC tank. In this fashion, the organisms consume and remove biodegradable matter in the wastewater. The process is similar to that used when treating wastewater by trickling filters. However, the RBC system allows the process to operate under more controlled conditions and higher bacterial concentrations, resulting in a higher rate of biodegradation and greater treatment efficiency.

Fluctuations in wastewater flow or organic loading are handled by the RBC with relative ease. This is due to the biological growth being concentrated at the front end of the RBC surface during periods when loading is low; and conversely, growth is distributed over the entire surface area when loading is high. The efficiency of the operation (i.e., complying with final effluent discharge parameters for BOD, suspended solids, etc.) is maintained throughout periods of variable hydraulic or organic loading to the biological processes.

Another distinct benefit of the RBC treatment process is its ability to provide additional nitrification and denitrification steps. Nitrification is achieved by reducing organic strength of the waste in the aerobic RBC's to such a low level that organisms utilize ammonia compounds as an energy source and convert ammonia to nitrate. Denitrification then occurs in the deep bed sand filter where organisms utilize the oxygen from nitrate and produce harmless nitrogen gas. In this way, nitrogen is actually removed from the waste stream.

In addition to the paramount advantage of handling fluctuating organic and hydraulic loads, there are numerous other benefits, including lower operation and maintenance costs. The simplicity of the operation, which is more completely defined in the following section of this report, results in a stable operation that does not require plant operator supervision on a continuous basis. The treatment plant's performance does not depend on the skill of the operator mainly because (1) upsets do not occur due to fluctuating loadings, (2) no complicated sludge recycling system is necessary, and (3) there are no complicated controls.

The only real maintenance requirement is drive system lubrication, with no media cleaning and creates no foaming or odor problems. Operating costs are extremely low because such plants require 10% to 20% as much energy as similarly sized aeration plants (only about 0.4 HP hr per 1000 gallons treated). The components of the facility will be completely contained inside a building. A generator will be located within the building to provide emergency power if necessary.

The Massachusetts Department of Environmental Protection requires that the facility be owned and operated by the users that it serves. To that end, the facility will be owned by the Association and will serve the tenants of the project within the service area of the facility. The owner will have the authority over all plant operations and maintenance. The wastewater facility will be operated by a state-certified operator who will be responsible for daily testing and maintenance of the facility. A consulting engineer will also conduct inspections of the facilities on a monthly basis. A monthly report, including final effluent and groundwater monitor well sample results, will be submitted to State and local Board of Health as required. Final effluent and groundwater quality will be monitored as dictated by the facility's discharge permit.

TREATMENT SYSTEM DESCRIPTION

Upon receiving the wastewater, flow passes first through the pretreatment tank and then to the proposed flow equalization tank. RBC feed pumps located in the RBC feed tank will pump up into the RBC unit for biological treatment. The wastewater will pass through the aerobic RBC and then flow into the secondary clarifier where biological solids are allowed to settle, and then transferred back to the pretreatment tank. Secondary effluent flows to the deep bed sand filter which removes any remaining solids, provides a media for denitrification, and polishes the effluent prior to disinfection and final effluent disposal. The effluent is then subjected to an additional filtration and cleansing step as it proceeds down through a minimum of four feet of soil beneath the leaching system before it enters the water table, completing the groundwater recharge cycle.

As expressed earlier, a high degree of treatment is achieved by this process. The quickly developing biological growth results in excellent treatment over relatively short retention times. The type of solids created affords rapid settling, and therefore, minimizes solids washout problems at peak flows in the clarifier. With the virtual elimination of this type of problem, one has eliminated the most critical operational difficulty apparent in suspended growth systems.

In addition to the conventional secondary treatment described above, the subject treatment facility can achieve nitrification and denitrification of the wastewater as well.

Nitrification can be achieved by providing a suitable environment for nitrifying bacteria on the RBC. To provide such an environment, the carbonaceous BOD must first be reduced to a concentration where nitrifying bacteria dominate the biological population. This is accomplished by furnishing additional surface area on the RBC. Once the nitrifiers are established, ammonia compounds are converted to nitrates which can then be reduced in the deep bed filter.

In order to facilitate denitrification, an anoxic environment (minimal free oxygen) must be available as well as a carbon source to provide food for the denitrifying organisms. The anoxic deep bed filter provides such an environment, with the carbon source being methanol addition. Under these conditions, denitrifying bacteria will develop on the media. The bacteria utilize oxygen from the nitrates and produce harmless nitrogen gas which is released to the atmosphere. In this process, nitrogen compounds are removed from the waste stream.

Equipment selections and design criteria are presented below:

1. A pretreatment tank for primary sedimentation.
2. RBC feed tank/flow equalization tank to attenuate peak flows and provide a constant flow to the biological processes.
3. Aerobic Rotating Biological Contactor (RBC's) for biological secondary treatment and nitrification.
4. A secondary clarifier for final sedimentation.
5. A tertiary deep bed sand filter for final effluent polishing.
6. Final effluent disposal via subsurface chamber fields, at a loading rate of two and one half gallons per day per square foot.

The specific details and a schematic of the proposed treatment system are included in this report.

RBC SYSTEM DESIGN

The following is a presentation of the design criteria and calculations used for the preliminary sizing of various system components:

A. Design Criteria

1. Total Daily Design Flow: 20,660 GPD
2. Flow Rates:
   (a) Average Flow Rate: 20,660 GPD
   (b) Average Flow Rate: 14.4 GPM
3. Domestic Wastewater Characteristics
   (a) Raw BOD_5: 300 mg/l

   Soluble BOD_5: 300 - 60%TSS = 120 mg/l

   Raw Suspended Solids: 300 mg/l

   NHN_4: 45 mg/l

   Water Temperature: 55 Degrees F

B. Pretreatment Tank Sizing: 75% X 20,660 gpd = 15,495 gallons

Design Size = 16,000 gallons

C. Flow Equalization Tank: 50% X 20,660 gpd = 10,330 gallons

Design Size = 12,000 gallons

D. Rotating Biological Contactor (RBC) Selection

1. Final Effluent Requirements

Total BOD_5: 15 mg/l

Soluble BOD_5: 10 mg/l

$N\text{-}NH_3$: 3 mg/l

Total N: 10 mg/l

Suspended Solids: 30 mg/l

2. Surface Area Required for BOD Removal:

(a) Allowable Organic Loading: 0.825 lbs/BOD/1000 SF

(b) Design Organic Loading: 120.0 mg/l X 8.34 MGD/l/#/day

X 0.0226 MGD

= 20.7 lbs/BOD/day

(c) Surface Area Required: 20.7 lbs/BOD/day

0.825 lbs/BOD/day/1000/SF

= 16,541 SF

3. Surface Area Required for Nitrification

(a) Allowable Loading: 0.24 lb/day/1000 SF

(b) Design Ammonia Loading: 45.0 mg/l X 8.34 MGD/l/#/day

X 0.0226 MGD

= 7.75 lb/day

(c) Surface Area Required: 7.75 lbs/Ammonia/day

0.24 lbs/Ammonia/day/1000/SF

= 32,307 SF

4. Total Surface Area Required for Aerobic RBC

16,541 SF from Organic Loading

\+ 32,307 SF from Nitrification Loading

48,848 Total Surface Area Required

5. Total Surface Area Provided for Aerobic RBC as manufactured by Walker Process

One (1) Model L30N2 SF Surface Area Provided

(a) 51,000 Total Surface Area Provided

(b) 48,848 Total Surface Area Required

(c) First Stage Organic Loading =

$$\frac{(120\ mg/l)(8.34)(0.0226\ MGD)}{12{,}750\ sf/1000}$$

= 1.77 lbs SBOD/day/1000 SF

Maximum Allowable = 4.00 lbs SBOD/day/1000 SF

(d) Overall Loading

1. Overall Organic = 0.40 lbs BOD/day/1000 SF
2. Overall Nitrogen = 0.15 lbs Ammonia/day/1000 SF
3. Total Hydraulic = 0.40 GPD/SF
4. First Stage Hydraulic = 1.62 GPD/SF

E. Secondary Clarifier Sizing

1. Design based on Average Daily Flow

Design Flow = 15,840 GPD

2. Maximum Surface Overflow Rate(2) = 600 GPD/SF

3. Provide one clarifier, 8.0' diameter and 9.5' deep

(a) Surface Area = $\pi(8.0')^2/4 = 50.2$ SF

(b) Surface Overflow Rate = $\frac{15{,}840 \text{ GPD}}{50.2 \text{ SF}} = 315$ GPD/SF

(c) Detention Time = $\frac{476 \text{ FT}^3}{2{,}118 \text{ FT}^3/\text{day}} = 0.22$ days $= 5.4$ hours

F. Anoxic Denite Filter Sizing

1. Design Based on Average Daily Flow

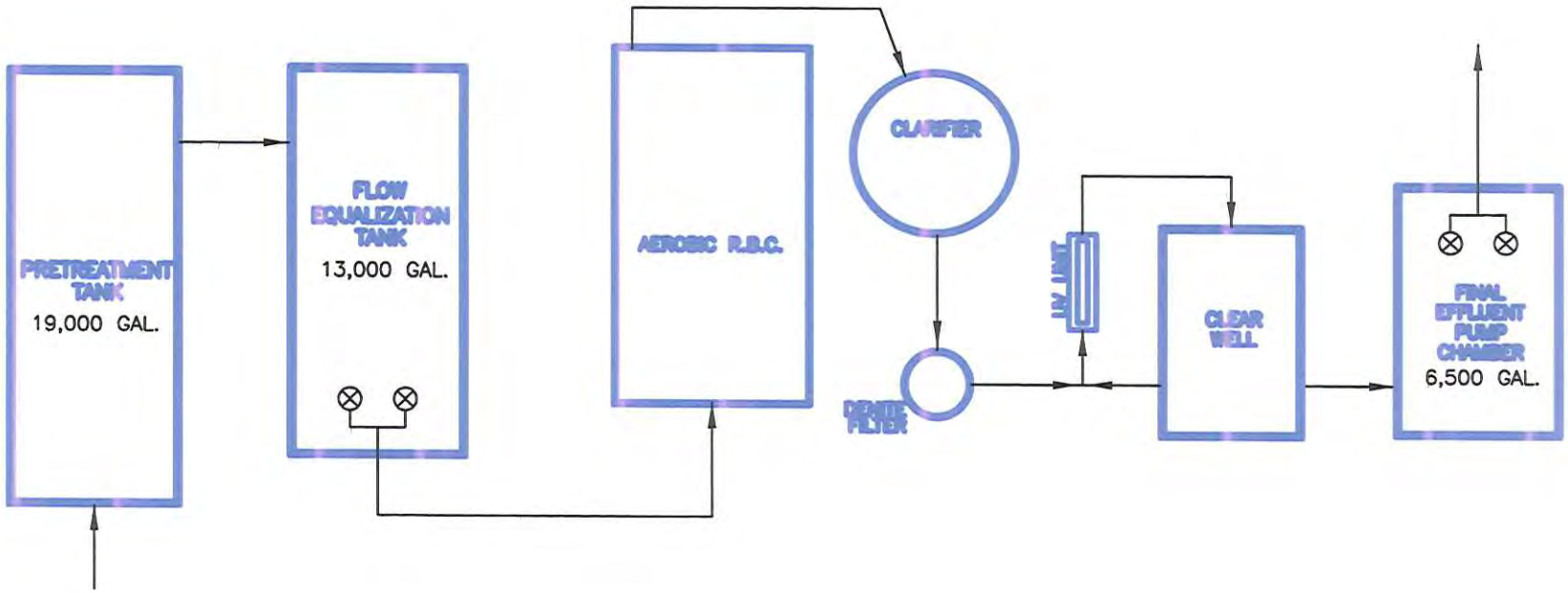
Design Flow = 120,000 GPD

2. Maximum Loading Rate = 2.0 GPM/SF

3. Provide two dual sand filters with two filter cells of 36 SF each

Area Required = $\frac{83.3 \text{ GPM}}{2 \text{ GPM/SF}} = 41.6$ SF

Loading = $\frac{83.3 \text{ GPM}}{72 \text{ SF}} = 1.16$ GPM/SF



RBC SCHEMATIC

MounT Hope ENGINEERING
CIVIL/ENVIRONMENTAL SERVICES
Post Office Box 943
Portsmouth, Rhode Island 02871

SCALE: NONE
DATE: 12/13/16
PROJECT NO.
16-282

G. Effluent Disposal by Subsurface Disposal:

1. Percolation Rate = < 2 MPI

   Allowable Effluent Loading = 3.0 GPD/SF

2. Surface Area Required = $\frac{20,60 \text{ GPD}}{3.0 \text{ GPD/SF}}$ = 6,887 SF

3. Surface Area Provided = 9,750 SF, four (4) beds final sizing to be determined based on BRP WP 83 Application and approval

AMPHIDROME TREATMENT

It is intended to provide advanced level treatment of the wastewater prior to the discharge to a subsurface effluent disposal area. Currently the design is considering to utilize an Amphidrome™ treatment facility currently in use in the Commonwealth which can achieve the desired level of advanced treatment to meet the discharge parameters anticipated to be required in the Groundwater Discharge Permit for the site. The process is described below with a summary of the design information used on a preliminary basis to size equipment.

The wastewater facility will be operated by a state-certified operator who will be responsible for daily testing and maintenance of the facility. A consulting engineer will also conduct inspections of the facility on a monthly basis. A monthly report, including final effluent and groundwater monitor well sample results, will be submitted to the State and local Board of Health as required. Final effluent and groundwater quality will be monitored as dictated by the facility's discharge permit.

The Amphidrome™ is an innovative process for wastewater treatment especially designed for filtration with the simultaneous removal of BOD, ammonia, suspended solids and nitrate-nitrogen. The system is best categorized as a fixed film sequencing batch biological filter. The sand and gravel media provide a surface for biological growth where secondary biological treatment may take place. The process operates in a batch mode with continuous recycle through the process units. This can be envisioned as being analogous to a tidal system which receives both an incoming unidirectional flow from a river and a bi-directional tidal flow from a connected body of water such as an ocean.

In the Amphidrome™ process, an alternating aerobic/anoxic cycle is created by alternately providing and denying air to the filter and the biological growth attached to the filter media. The cyclical action of the system is created by allowing a batch of flow to pass from the equalization tank through the granular biological filter to the clearwell, and then reversing flow by the use of a pump. The reverse flow passes from the clearwell up through the filter and back to the equalization tank. These cycles are repeated multiple times, with cycles alternating between the aerobic and anoxic filter modes. After sufficient cycles have been repeated to insure the degree of treatment required, a batch of effluent is discharged.

In a configuration of Tetra Technologies' ColoX™ and Denite® processes, the Amphidrome™ Process begins with wastewater flowing from the combined sewer system from all of the building sewers. As the typical flow diagram shows, that flow is joined by recycled flow from the system clearwell. The combined flows enter an equalization/return flow storage area, then move to an anoxic pretreatment/sludge storage area.

The equalization/return flow area and the anoxic pretreatment/sludge storage area may be in the same tank with a fluctuating water level, or in separate tanks. When a single tank is used, the upper portion of the tank has a fluctuating water level and functions as the equalization/return flow storage area, and the lower level of the tank has a fixed volume and functions as an anoxic pretreatment/sludge storage area. If separate tanks are used, the equalization/return flow tank has a fluctuating level, and the anoxic sludge storage tank has a fixed level. The system may also use a combination of these two configurations.
The equalization/return flow storage area is intended to equalize and store forward flow prior to treatment in the biological media filter. The anoxic pretreatment/sludge storage area is intended to: (1) settle solids from incoming material and return flow for storage in the sludge storage area, and (2) provide a degree of denitrification for the return flow using the incoming flow as a carbon source (soluble carbon released from the stored sludge is also a source of carbon for the denitrification process), and (3) to store and biologically digest settled sludge.

The granular media biological filter is multifunctional. It functions as a physical filter and as a fixed-film reactor. As a filter, the media provides physical removal of inorganic and suspended solids from the influent and recycled wastestreams. As a fixed film reactor it oxidizes carbonaceous BOD, ammonia and organic nitrogen-based compounds while operating in an aerobic mode, and reduces nitrite and nitrate while operating in an anoxic mode. These processes of nitrification and denitrification work to remove total nitrogen from the wastestream and provide for an advanced level of treatment. The incoming waste and the accumulated biomass are used as the primary sources of carbon for the denitrification process. For high strength nitrogenous wastes, supplementary carbon from an outside source may be required. Typical sources of carbon may be methanol (wood alcohol) or a sugar syrup. The final component in the flow train is the clearwell, which provides storage for flow to be recycled or used for backwash. The effluent is disinfected utilizing ultraviolet light prior to final discharge to the leaching area.

The process tankage, biological reactor vessel, and clearwell will consist of precast concrete tankage which will be located below grade. A small control building will be constructed for the electrical controls, any chemical storage, blowers, and operator work station. A standby generator will be located within or immediate adjacent to the building to provide emergency power if necessary. The entire development may also be served by standby power which could potentially eliminate the need for a dedicated unit at the treatment facility.

The Amphidrome unit provides an environment for the organic decomposition of the wastewater, the nitrification and the denitrification of the wastewater, and also serves as a final effluent polishing filter prior to disinfection. The unit functions as a fixed film sequencing batch reactor, utilizing the best properties of each of the respective technologies. The wastewater is treated through an alternating aerobic/anoxic cycle, with aeration, settling, oxygen deprivation, and filtration. The cyclical action is created by allowing a batch of flow to pass from the equalization tank through the granular media of the biological filter, to the clearwell, and then reversing flow

by the use of a recycling pump. The aerobic facilities will have sequentially reduced the biochemical oxygen demand (BOD) to low levels and converted ammonia and organic nitrogen to the nitrate form of nitrogen. This nitrate is then reduced in the anoxic environment through the respiratory processes of the nitrifying bacteria *nitrosomonas* and *nitrobacter*, which utilize the oxygen from the nitrate, utilize inorganic carbon as an energy source, and produce nitrogen gas to the atmosphere. The normal atmosphere is predominated by this nitrogen gas. In this manner, nitrogen is actually removed from the wastestream. The units operate on a timed basis and are automatically backwashed as called for by the timers in the control panel or the high water alarm floats.

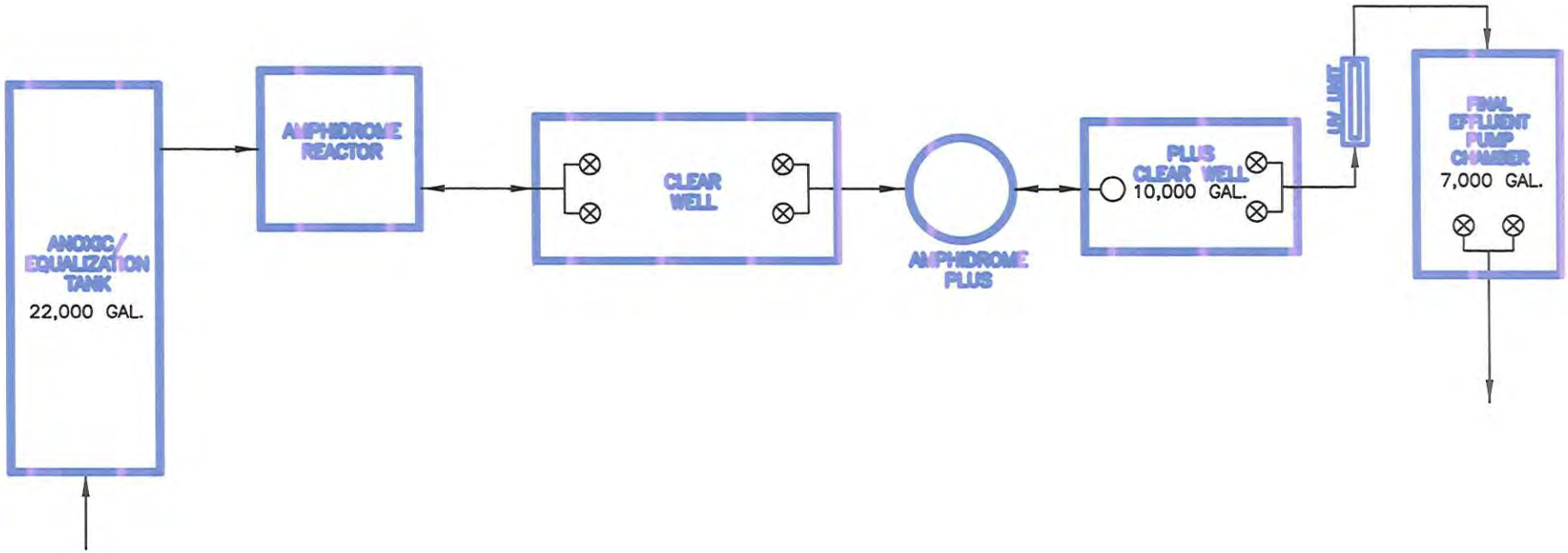
The granular media biological filter is multifunctional, serving as a filter and as a fixed film reactor. As a surface for the fixed film reactor, it oxidizes carbonaceous BOD , ammonia, and organic nitrogen while operating in an aerobic mode, and reduces nitrite and nitrate while operating in the anoxic mode.

The Amphidrome process provides both an environment for denitrification and a physical final polishing of the effluent prior to disinfection. The unit consists of a filter cell of sand media composed of specially layered and graded sand. The media filter provides a fixed film for biological treatment as well as an exceptional polishing and removal of any remaining suspended solids prior to the disinfection process. Operation is completely automatic, running on timed cycles or controlled by floats in the chamber. As suspended solids begin to plug the filter bed, head pressure increases in the filter cell until the liquid level rises sufficiently to trigger for automatic backwash as called for by the mercury float switches. The blowers would then air scour the filter cells and the backwash pumps would expand the bed approximately 15% to dislodge suspended solids particles from the filter media. This backwash water will be returned to the flow equalization tanks for treatment through the facility. These cycles are all programmable by the operator through the main control panel and should be set as per the recommended initial settings. These can then be adjusted by the operator as the duration of filter runs and nitrogen removal is evaluated during normal operation.

The Amphidrome unit is designed to provide the biological denitrification necessary for nitrogen removal. The denitrification process takes the nitrified effluent from the aerobic process and strips the oxygen from the nitrate molecule, leaving nitrogen gas as a by-product. As this is the dominant gas in the atmosphere, the nitrogen gas is quickly and harmlessly dissipated to the atmosphere and therefore removed from the liquid wastestream. This biological process takes place under controlled conditions within the Amphidrome unit.

An additional step which will be utilized with the anoxic environment of the Amphidrome unit is the use of methanol as a carbon source during the denitrification process. Methanol will be fed to the discharge side of the Amphidrome unit as shown on the drawings. Methanol dosages of approximately 4 mg/l per mg/l of nitrogen to be removed are typical. Feed pumps should be calibrated to determine the proper output at varying stroke and speeds of these feed pumps, with a dosage curve established for the facility.

Analysis of the nitrogen concentrations at the influent to the processes will dictate the levels which must be dosed. All methanol will be stored in the methanol storage area. Methanol,



AMPHIDROME SCHEMATIC

Mount Hope
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SCALE:	NONE
DATE:	12/13/16
PROJECT NO.	16-282

commonly known as wood alcohol, is an inexpensive and effective carbon source for the denitrification process. Alternative carbon sources such as sugar syrups, corn syrup, and similar carbon sources may be utilized depending on availability and the dosages required for proper treatment within the system.

The clearwell at the end of the process provides storage for backwash water to the biological filter and also serves as the final effluent chamber to dose the leaching facilities.

A summary of the design for the proposed facility indicates that a pretreatment and flow equalization tank of approximately 22,000 gallons is required as the first step in this process. Flow from the pretreatment facilities flows to an Amphidrome unit of approximately one hundred square feet, with a media depth of six and one-half feet. This unit is followed by a Deniter Reactor four foot square, with a media depth of six and one-half feet. A final clearwell of approximately 6,500 gallons is necessary for recycle storage and backwash supply, as well as final effluent dosing.

The effluent is then subjected to an additional filtration and cleansing step as it proceeds down through a minimum of four feet of soil beneath the leaching system before it enters the water table, completing the groundwater recharge cycle.

Equipment selections and design criteria for the process are outlined below:

1. A pretreatment/flow equalization tank for primary sedimentation and recycle.

2. A sludge holding/recycle return tank for sludge return.

3. Amphidrome™ Process fixed film sequencing reactor for biological secondary treatment and nitrification, during the aerobic phase, with biological denitrification during the anoxic phase.

4. Amphidrome™ Plus Denite Reactor for biological denitrification, during the anoxic phase, with physical filtration and effluent polishing.

5. Ultraviolet disinfection with final effluent disposal via subsurface chamber fields, at a loading rate of two and one-half gallons per day per square foot.

The design calculation summary is found below with a schematic of the proposed treatment system included as a figure in this report.

The following is a presentation of the design criteria and calculations used for the preliminary sizing of various system components:

A. Design Criteria

1. Total Daily Design Flow: 20,660 gpd

2. Flow Rates:

(a) Average Flow Rate: 20,660 gpd

(b) Average Flow Rate: 14.4 gpm

3. Domestic Wastewater Characteristics

(a) Raw BOD_5: 300 mg/l

Soluble BOD_5: 300 - 60%TSS = 120 mg/l

Raw Suspended Solids: 300 mg/l

NHN_4: 45 mg/l

Water Temperature: 55 Degrees F

B. Flow Equalization Tank: 50% x 20,660 gpd = 10,330 gallons

Design Size = 22,000 gallons

C. Amphidrome Reactor Selection

1. Final Effluent Requirements

Total BOD_5: 15 mg/l

Soluble BOD_5: 10 mg/l

$N\text{-}NH_3$: 3 mg/l

Total N: 10 mg/l

Suspended Solids: 30 mg/l

2. Surface Area Required for BOD Removal:

(a) Media surface area = 100 SF

(b) Media Volume = 648 CF, 31.8 gpd/cf

D. Anoxic Process (For Denitrification)

1. For the Reduction of Nitrogen from 70 mg/l to 3 mg/l

2. Surface Area Required for Denitrification:

(a) Media surface area = 16 sf

(b) Media Volume = 104 CF, 198 gpd/cf

MEMBRANE TREATMENT

A third option is also under early consideration for the treatment process of the wastewater utilizing flat sheet membranes. It is intended to provide advanced level treatment of the wastewater prior to the discharge to a subsurface effluent disposal area. Currently the design is preliminary and would similarly provide pretreatment and flow equalization of the influent via large subsurface concrete tanks. Effluent from the preliminary treatment would be fed to a large anoxic tank of approximately 5,000 gallons. Anoxic effluent would then flow to an aerobic /aeration tank prior to feeding via a pump system to the flat sheet membranes. Flow is transferred through the membranes and permeate recovered for final discharge. A series of effluent, return, and permeate pumps are utilized within the control system to recycle effluent through the various aerobic and anoxic stages of the system to provide similar biological treatment. In this manner, secondary treatment is achieved as well as nitrification and denitrification of the wastewater. This option continues to be investigated and could be utilized in the final design to meet the requirements of the Groundwater Discharge Permit.

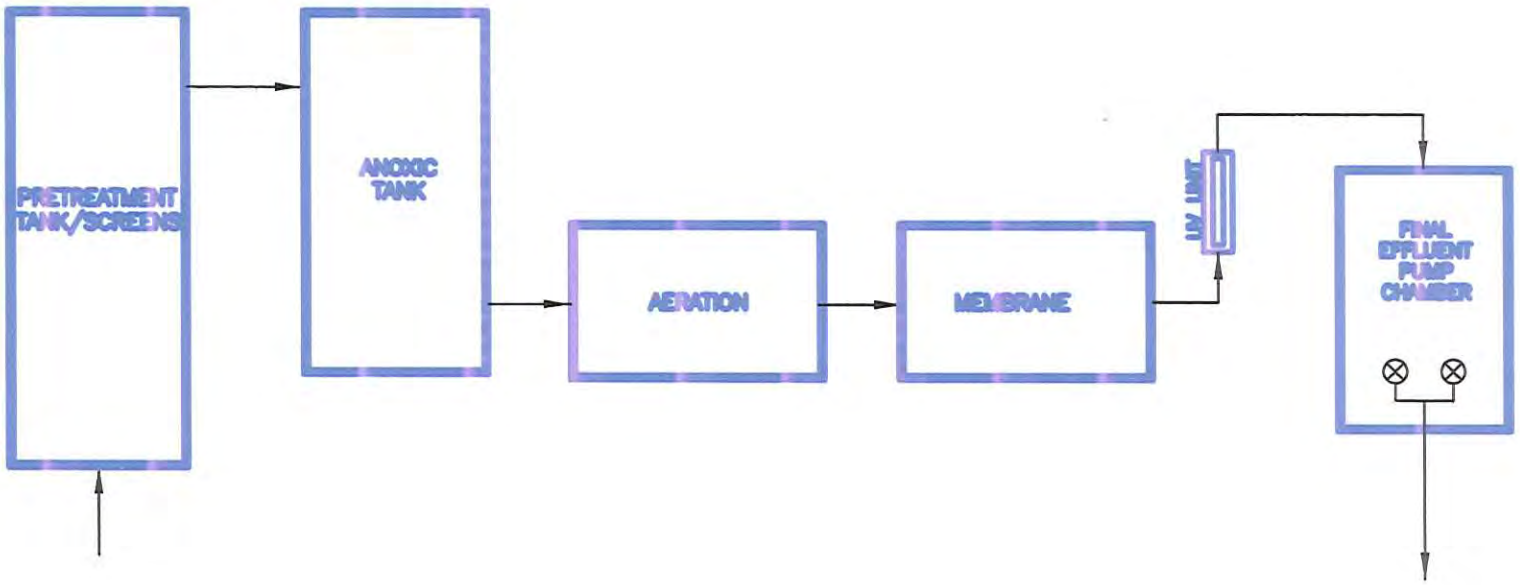
All options for wastewater treatment and the selected wastewater facility will be operated by a state-certified operator who will be responsible for daily testing and maintenance of the facility. A consulting engineer will also conduct inspections of the facility on a monthly basis. A monthly report, including final effluent and groundwater monitor well sample results, will be submitted to the State and local Board of Health as required. Final effluent and groundwater quality will be monitored as dictated by the facility's discharge permit. Standby power, high water alarms, security systems, and additional safeguards are all utilized to properly operate the modern small wastewater treatment facility.

SOILS

Subsurface soil explorations were conducted by Stamski & McNary, Inc. in the presence of representatives of the Nashoba Associated Boards of Health and the Department of Environmental Protection, Central Region. Deep test holes and percolation tests were performed at eight locations on the site. Soil evaluation forms and additional subsurface information will be contained within the Hydrogeological Application BRP WP 83 for the site.

The site subsurface conditions in the vicinity of the effluent disposal area were predominated by coarse sands and gravels to satisfactory depths. Test holes were excavated to satisfactory depths across the site. No holes were aborted due to the presence of ledge or impermeable surfaces within the excavation in the areas of the proposed disposal fields. Medium to coarse sands and gravel, with cobbles and stone, were encountered at consistent depths throughout the excavation. Several excavations also contained gravel with rounded cobbles and fist sized boulders. Groundwater elevations were observed at depths of twelve to fourteen feet below the ground surface. Percolation tests conducted in these layers indicated that the material was quite permeable, with percolation rates of less than two minutes per inch at each of the tested sites.

The soils encountered during this testing were very conducive to effluent disposal area from a wastewater treatment facility. Percolation rates were measured to be less than 2 minutes per inch, with less than 5 minutes per inch used for the estimate of area required for subsurface effluent disposal. Additional subsurface explorations in the form of borings have also been



MEMBRANE SCHEMATIC

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SCALE: NONE
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16-282

initiated and will be completed during the spring of 2003 to further characterize soil conditions and obtain on-site conductivity values for hydrogeological modeling of the site. These logs and additional information will be will be submitted in the hydrogeological study currently underway for future submittal as part of this Application. This study is intended to further explore subsurface conditions, define groundwater flow and direction, soil and subsurface characteristics, and depths of the unconsolidated deposits above the impermeable bedrock surface. These investigations will be submitted to the Department upon completion in the immediate future.

WATER SUPPLY

The area is not served by municipal water supply in the area and will rely on the proposed public water supply wells for the site. The water supply is a separate report and permit for the project and covered in detail elsewhere in the EENF. There are some private wells in the area and also several public water supply wells in the vicinity of the project.

The effluent disposal site itself does not fall within the Interim Wellhead Protection Area (IWPA) of the on-site proposed wells. These water supplies are identified by Public Water Supply Identification Number and location on the plans for the project. Town water is not readily available in the area, and it is therefore assumed that there are low yield private wells within the one-half mile radius. These wells have generally been identified on the plans. The anticipated high quality of the discharge and the horizontal and vertical separation distances from any potential well locations are not expected to have any deleterious impacts on nearby water supplies. This will be further examined during the hydrogeological investigations to be conducted at the site.

SUMMARY

This preliminary engineering report has provided pertinent design information and criteria for wastewater treatment at this site. The Permit Application is seeking the Department's preliminary approval and comment on the preliminary design outline. We hope to receive the Department's comments and approval as early as possible in this process so that we may complete our evaluation of the preliminary design and proceed into the final design.

REFERENCES

1. Autotrol Corporation Bio-Systems Division: "Wastewater Treatment Systems Design Manual" published by Envirex Corporation, Milwaukee, Wisconsin.

2. Metcalf & Eddy, Inc. "Wastewater Engineering: Treatment, Disposal, Reuse" McGraw Hill Book Company, Revised by George Tchobanoglous, Second Edition, 1979.

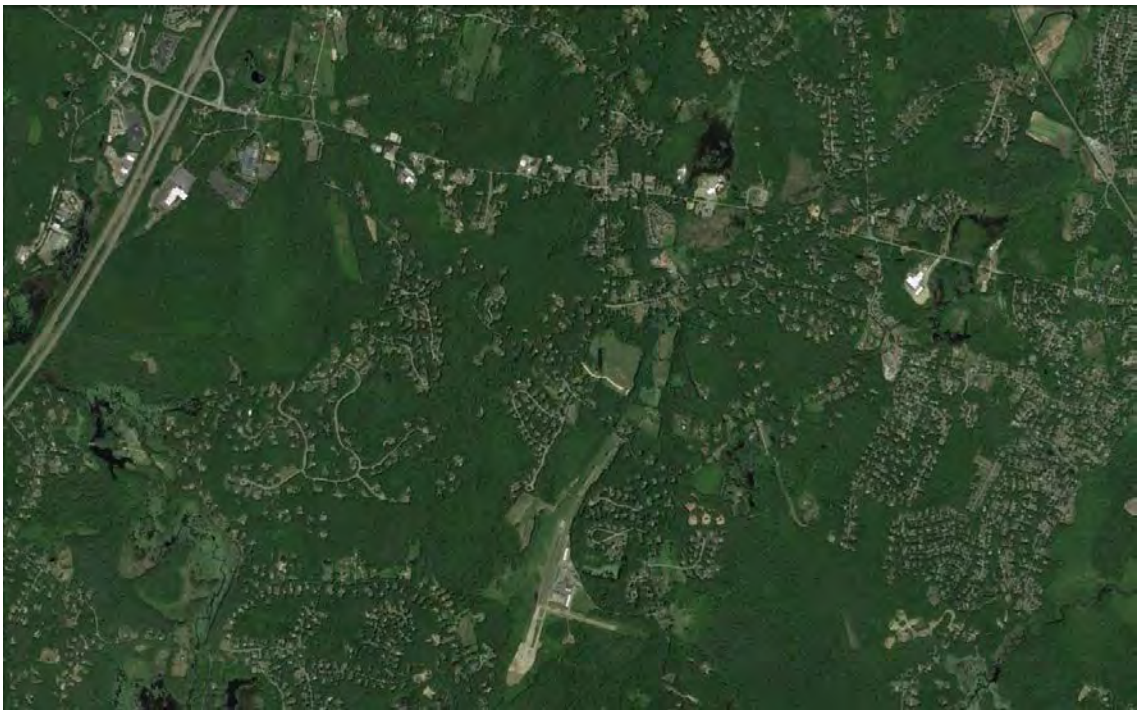
3. Commonwealth of Massachusetts, Department of Environmental Quality Engineering, Division of Water Pollution Control "Guidelines for the Design, Construction, Operation and Maintenance of Small Sewage Treatment Facilities with Land Disposal," Second Draft Edition, 2014.

4. US Environmental Protection Agency: "Process Design Manual for Nitrogen Control," October 1975.

5. Commonwealth of Massachusetts, "The State Environmental Code, Title 5: Standard Requirements for the Siting, Construction, Inspection, Upgrade, and Expansion of On-Site Sewage Treatment and Disposal Systems and for the Transport and Disposal of Septage", 310 CMR 15.00, March 31, 1995.

Traffic Impact and Access Study

REGENCY AT BOXBOROUGH
Massachusetts Avenue



Boxborough, MA
December 12, 2016

Prepared by:

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TRAFFIC IMPACT AND ACCESS STUDY

REGENCY AT BOXBOROUGH

Massachusetts Avenue
Boxborough, Massachusetts

Prepared for:

BOXBOROUGH TOWN CENTER, LLC

December 12, 2016

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SECTION 1: EXECUTIVE SUMMARY

Bayside Engineering has prepared this study to assess the traffic impact and to evaluate the access requirements of the proposed Regency at Boxborough located at 800 Massachusetts Avenue in Boxborough, Massachusetts.

This report identifies existing traffic operating parameters on key roadways and intersections within the study area, evaluates the anticipated traffic volume increases as a result of the proposed project, analyzes the project's traffic-related impacts, determines the projects access/egress requirements and identifies appropriate mitigating measures designed to minimize the traffic-related impacts created by the project. The following provides a brief summary of the study findings.

PROJECT DESCRIPTION

The existing site is located along the south side of Massachusetts Avenue (Route 111) west of the intersection of Stow Road and Middle Road in Boxborough, MA. Currently, the site contains a single-family home. Access to the home is currently provided by way of a single driveway.

As currently proposed, the project will consist of razing the existing home and the construction of 100 age-restricted townhouse units. Access to the site will be provided by way of a full-movement driveway to Massachusetts Avenue. Emergency access is proposed by way of driveway connections at the end of Priest's Lane and through the Sheriff's Meadow residential development on Stow Road. Figure 1 shows the site location in relation to the surrounding area.

Figure 1
Site Location Map

STUDY METHODOLOGY

This study has been prepared in three stages. The first stage involved an assessment of existing conditions within the study area and included an inventory of roadway geometrics, pedestrian and bicycle facilities and public transportation services. Existing traffic counts were performed at the study area intersections.

In the second stage of the study, future traffic conditions were projected and analyzed. Specific travel demand forecasts for the project were assessed along with future traffic demands due to expected traffic growth independent of the proposed project. In accordance with Massachusetts Department of Transportation (MassDOT) guidelines, the year 2023 was selected as the basis for modeling future transportation impacts of the proposed development to reflect a the opening year conditions and a seven-year planning horizon.

The third stage of the study presents and evaluates measures to address traffic issues, if any, and necessary improvements to accommodate the development.

STUDY AREA

Roadway geometry and traffic control information was collected for the following locations:

- Massachusetts Avenue, Stow Road and Middle Road
- Massachusetts Avenue, Burroughs Road and Hill Street
- Stow Road and Sheriff's Meadow Driveway
- Stow Road and Burroughs Road
- Burroughs Road and Priest's Lane

EXISTING CONDITIONS

Evaluation of existing conditions within the study area includes a description of roadway geometrics, traffic constraints, land uses at the intersections, and quantification of traffic volumes.

Existing Traffic Volumes

To establish base traffic conditions within the study area, manual turning movement and vehicle classification counts were obtained in February 2016. Peak-period turning movement counts were conducted during the weekday morning period (7:00 to 9:00 AM) and the weekday evening peak period (4:00 to 6:00 PM). Daily traffic counts were conducted on Massachusetts Avenue and Stow Road for a two day period using automatic traffic recorders (ATR).

The traffic-volume data gathered as part of this study was collected during the month of February 2016. Data from the MassDOT was reviewed to determine the monthly variations of the traffic volumes. Based upon the available traffic count data, February volumes are slightly lower than average month conditions. To represent average month conditions, existing volumes were adjusted upward by a factor of 1.07.

Massachusetts Avenue, west of Stow Road was recorded to carry approximately 7,150 vehicles per day (vpd). During the weekday morning peak hour, approximately 634 vehicles per hour (vph) were recorded and during the weekday evening peak hour, 696 vph were recorded.

Stow Road, south of Massachusetts Avenue was recorded to carry approximately 1,050 vpd. During the weekday morning peak hour, approximately 122 vph were recorded on Stow Road south of Massachusetts Avenue and during the weekday evening peak hour, 95 vph were recorded.

Motor Vehicle Crash Data

Motor vehicle crash data for the study area intersections and roadways were obtained

from the MassDOT for 2009 through 2013. Three (3) crashes were reported during the five year interval at the study area intersections. Over the five year period, two (2) crashes were reported at Massachusetts Avenue and Burroughs Road intersection (average of 0.4 crashes per year) and one (1) crash at Burroughs Road and Priests Lane (average of 0.2 crashes per year). No fatalities were reported.

PROBABLE IMPACTS OF THE PROJECT

No-Build Traffic Volumes

To determine the impact traffic volumes generated by the project on the roadway network under future conditions, baseline traffic volumes in the study area were projected to the year 2023. Traffic volumes on the roadway network at that time, in the absence of the proposed project, would include existing traffic, new traffic due to general background traffic growth, and traffic related to specific developments by others expected to be completed by 2023. Historical traffic count data from the MassDOT was reviewed. A one (1.0) percent compounded growth rate was used to develop future No-Build conditions. Two other background projects were identified and included in the background projections.

Build Traffic Volumes

Site generated traffic was based on trip-generation data published by the ITE *Trip Generation* manual[1]. The proposed project will consist of 100 age-restricted townhouses. Trip generation data for Land Use Code (LUC) 230 – Townhouse/Condominium was reviewed.

During an average weekday, the proposed project is expected to generate a total of 644 vehicle trips (322 vehicles entering and 322 vehicles exiting). During the weekday morning peak hour, the proposed project is expected to generate a total of 52 vehicle trips (9 vehicles entering and 43 vehicles exiting) and during the weekday evening peak hour, a total of 60 vehicle trips (40 vehicles entering and 20 vehicles exiting).

TRAFFIC OPERATIONS ANALYSIS

In order to assess the impacts of the proposed project on the roadway network, traffic operations analyses were performed at the study area intersections under 2016 Existing, 2023 No-Build and 2023 Build conditions. The capacity analyses performed for the unsignalized study area intersections indicate that generally, the new project trips will not significantly impact intersection operations. There is no significant reduction in levels of service at the study area intersections. The analysis shows the site driveway is projected to operate at a good level of service.

[1] *Trip Generation*, Eighth Edition; Institute of Transportation Engineers; Washington, DC; 2009.

RECOMMENDATIONS

As a result of the additional traffic generation being relatively low, it is expected that the project will not have a significant impact on intersection operations in the study area.

The Massachusetts Avenue main site driveway should permit entering movements from both directions on Massachusetts Avenue. Exiting movements should be in a single lane under STOP-sign control.

It is recommended that a sight distance easement be established east of the site driveway and that this area be re-graded to provide the sight lines and be kept clear of plantings that would obstruct sight distances. Also, at the site driveway intersection, and along the site frontage and within the existing Massachusetts Avenue layout, it is recommended that any proposed landscaping be designed to not exceed three (3) feet in height in order to maintain these sight lines.

SUMMARY

Review of the proposed project and the access plan shows that in relation to roadway capacity, traffic safety, and traffic impacts upon the surrounding roadway network, the proposed project will meet safety standards and have a minimal impact on existing traffic conditions. With the proposed access, and maintaining sight distances from the Massachusetts Avenue driveway (clear sight lines along frontage), safe and efficient access can be provided to the patrons of the proposed project and to the motoring public in the area.

SECTION 2: EXISTING TRAFFIC CONDITIONS

STUDY AREA

Roadway geometry and traffic control information was collected for the following locations:

- Massachusetts Avenue, Stow Road and Middle Road
- Massachusetts Avenue, Burroughs Road and Hill Street
- Stow Road and Sheriff's Meadow Driveway
- Stow Road and Burroughs Road
- Burroughs Road and Priest's Lane

FIELD SURVEY

A comprehensive field inventory of the proposed site was conducted in February 2016. The inventory included collection of existing roadway geometrics, traffic volumes, and safety data for the existing study area intersections and site access driveway location. Traffic volumes were measured by means of automatic traffic recorder (ATR) counts and substantiated by manual turning movement counts (TMCs) conducted at the study area intersections.

GEOMETRICS

Primary study area roadways are described below.

Roadways

Massachusetts Avenue (Route 111)

Massachusetts Avenue (Route 111) is classified as an Urban Minor Arterial and is under the jurisdiction of the MassDOT. Route 111 traverses northeastern Massachusetts in an east-west direction from its eastern terminus at the Concord Rotary in Concord, MA to Route 110 in Harvard, MA where the roadway then turns northerly to the New Hampshire state line. In the study area, Massachusetts Avenue is a two-lane roadway. Additional turn lanes are provided at major signalized intersections. The posted speed limit is 40 miles per hour (mph). Land use along Massachusetts Avenue in the study area is primarily residential, with several commercial properties along the north side of the road.

Stow Road

Stow Road is a local street extending in a north/south direction from Massachusetts Avenue southerly to the intersection of Boxboro Road, Fifers Lane and Flagg Hill Road. Stow Road is under the jurisdiction of the Town of Boxborough. Stow Road provides one travel lane per direction, separated by a double yellow centerline. The posted speed limit is 30 mph. Land use along Stow Road is residential.

Intersections

Massachusetts Avenue, Stow Road and Middle Road

Stow Road intersects Massachusetts Avenue from the south and Middle Road intersects from the north to form this four-legged, unsignalized intersection. The Massachusetts Avenue eastbound and westbound approaches each consist of a through lane permitting left- or right-turns. The Stow Road approach consists of a single lane permitting all movements and is under STOP-sign control. The Middle Road approach consists of a single lane permitting all movements and is under STOP-sign control. A sidewalk exists along the north side of Massachusetts Avenue east of the intersection. Land use in the vicinity of the intersection consists of a church, a single-family home, a multi-family apartment complex and a small commercial building.

Massachusetts Avenue, Burroughs Road and Hill Road

Burroughs Road intersects Massachusetts Avenue from the south and Hill Road intersects from the north to form this four-legged, unsignalized intersection. The Massachusetts Avenue eastbound and westbound approaches each consist of a through lane permitting left- or right-turns. The Burroughs Road approach consists of a single lane permitting all

movements and is under STOP-sign control. The Hill Road approach consists of a single lane permitting all movements and is under STOP-sign control. Land use in the vicinity of the intersection consists of wooded land, an office building and a single-family home.

Stow Road and Sheriff's Meadow Driveway

The Sheriff's Meadow driveway intersects Stow Road from the west to form this three-legged, unsignalized intersection. The Stow Road northbound and southbound approaches each consist of a through lane permitting left- or right-turns. The Sheriff's Meadow driveway approach consists of a single lane permitting all movements and is under STOP-sign control. Land use in the vicinity of the intersection consists of wooded land and residential homes.

Stow Road and Burroughs Road

Burroughs Road intersects Stow Road from the east and west to form this four-legged, unsignalized intersection. All approaches to the intersection consist of a through lane permitting left- or right-turns. The Burroughs Road approaches are under STOP-sign control. Land use in the vicinity of the intersection consists of wooded land, a cemetery and a single-family home.

Burroughs Road and Priest's Lane

Priest's Lane intersects Burroughs Road from the north to form this three-legged, unsignalized intersection. The Burroughs Road approaches to the intersection consist of a through lane permitting left- or right-turns. The Priest's Lane approach consists of a single lane and permit's left- or right-turns and is under STOP-sign control. Land use in the vicinity intersection consists of wooded land and single-family homes.

TRAFFIC VOLUMES

Existing Traffic Volumes

To establish base traffic conditions within the study area, manual turning movement and vehicle classification counts were obtained in February 2016. Peak-period turning movement counts were conducted on Wednesday, February 24, 2016 during the weekday morning and evening peak periods (7:00 to 9:00 AM and 4:00 to 6:00 PM) at the following intersections:

- Massachusetts Avenue, Stow Road and Middle Road
- Massachusetts Avenue, Burroughs Road and Hill Street
- Stow Road and Sheriff's Meadow Driveway
- Stow Road and Burroughs Road
- Burroughs Road and Priest's Lane

Daily traffic counts were conducted on Massachusetts Avenue and Stow Road for a two

day period using automatic traffic recorders (ATR).

Analysis of the peak-period traffic counts indicated that the weekday morning commuter peak hour generally occurs between 7:30 AM and 8:30 AM and the weekday evening commuter peak hour generally occurs between 5:00 and 6:00 PM. The traffic count worksheets are provided in the Appendix.

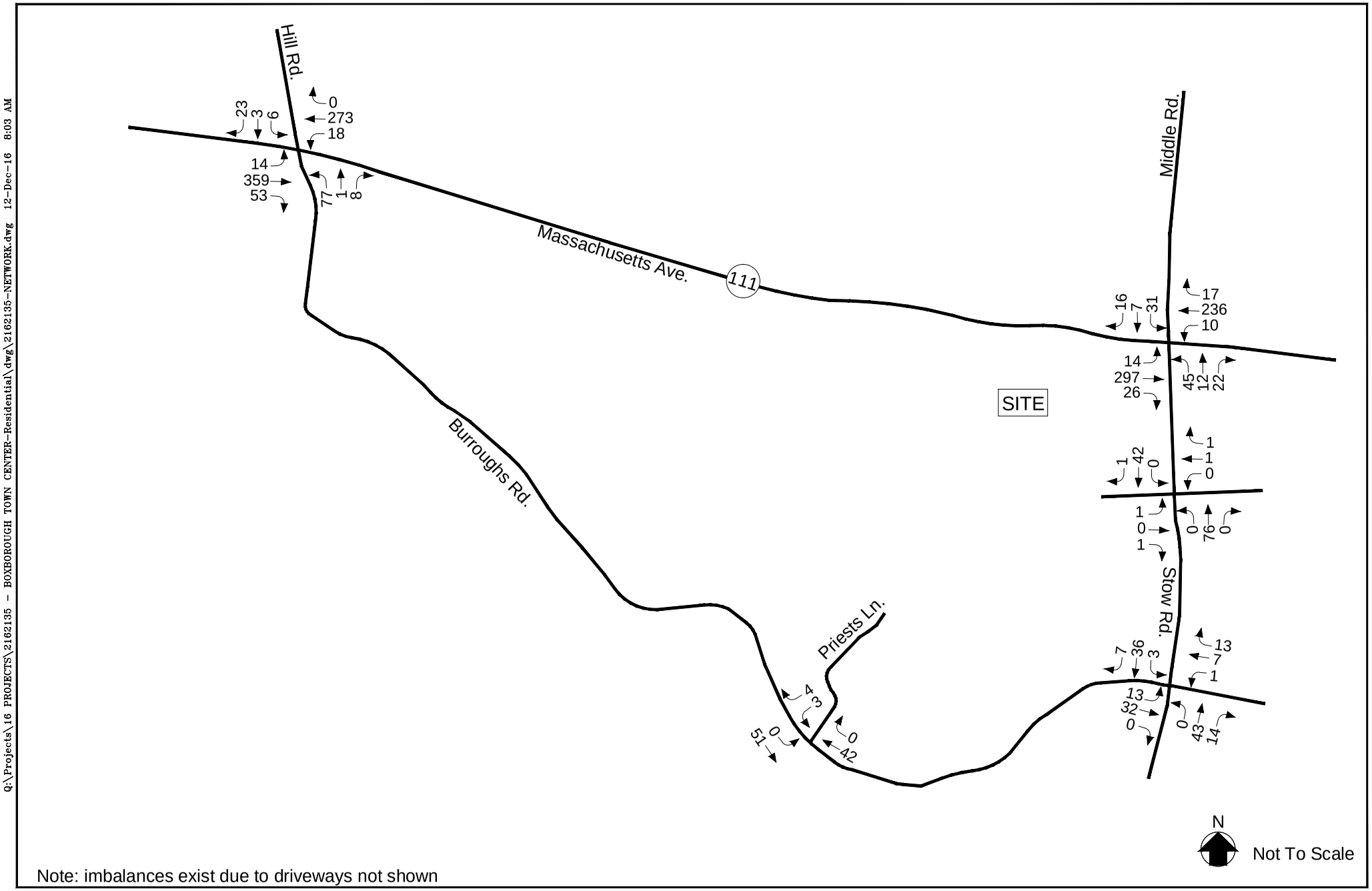
Seasonal Adjustment

The traffic-volume data gathered as part of this study was collected during the month of February 2016. Available traffic volume data from the MassDOT was reviewed to determine the monthly variations of the traffic volumes. The traffic data showed February volumes to be slightly lower than average month conditions. Therefore, the February traffic volumes were adjusted upward by a factor of 1.07 to represent average month conditions. The 2016 existing weekday daily and peak-hour traffic volumes for average-month conditions are summarized below in Table 1. The 2016 Existing weekday morning and weekday evening peak hour traffic flow networks are shown graphically on Figures 2 and 3. The seasonal worksheets are provided in the Appendix.

TABLE 1
EXISTING WEEKDAY TRAFFIC-VOLUME SUMMARY[a]

Location	Daily Traffic Volume[b]	Weekday Morning Peak Hour			Weekday Evening Peak Hour		
		Traffic Volume[c]	K Factor[d]	Directional Distribution[e]	Traffic Volume	K Factor	Directional Distribution
Massachusetts Avenue, west of Stow Road	7,150	634	8.9	53.2% EB	696	9.7	50.9% EB
Stow Road, south of Massachusetts Avenue	1,050	122	11.6	64.8% NB	95	9.0	56.8% NB

[a]Two-way traffic volume.
[b]Daily traffic expressed in vehicles per day.
[c]Expressed in vehicles per hour.
[d]Percent of daily traffic volumes which occurs during the peak hour.
[e]Percent of peak-hour volume in the predominant direction of travel.
NB = northbound; SB = southbound; EB = eastbound; WB = westbound.



Note: imbalances exist due to driveways not shown

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Figure 2

2016 Existing
Weekday Morning
Peak Hour Traffic Volumes

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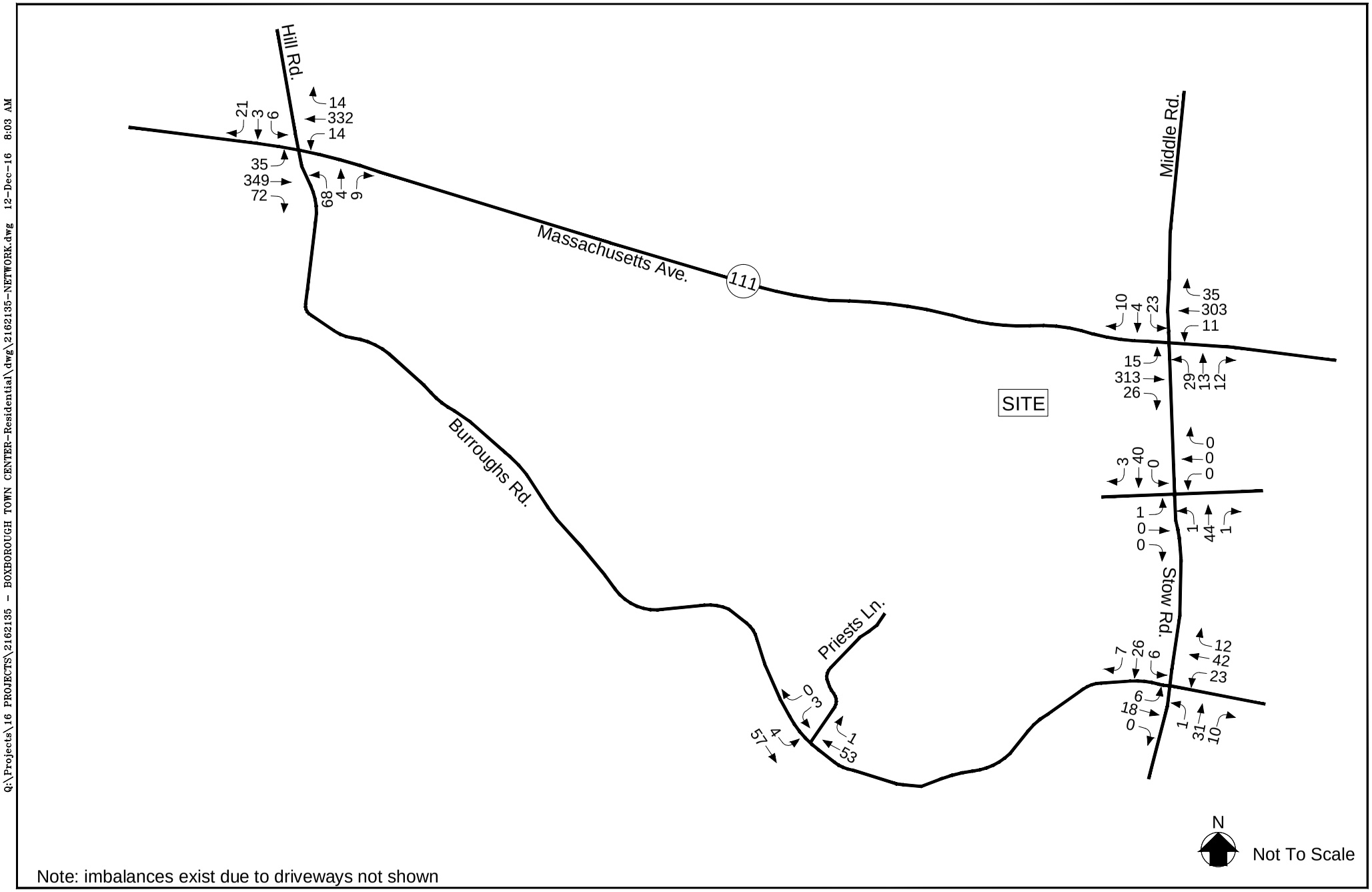

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Figure 3

2016 Existing
Weekday Evening
Peak Hour Traffic Volumes

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Massachusetts Avenue, west of Stow Road was recorded to carry approximately 7,150 vehicles per day (vpd). During the weekday morning peak hour, approximately 634 vehicles per hour (vph) were recorded and during the weekday evening peak hour, 696 vph were recorded.

Stow Road, south of Massachusetts Avenue was recorded to carry approximately 1,050 vpd. During the weekday morning peak hour, approximately 122 vph were recorded on Stow Road, south of Massachusetts Avenue and during the weekday evening peak hour, 95 vph were recorded.

MOTOR VEHICLE CRASH DATA

Motor vehicle crash data for the study area intersections and roadways were obtained from the MassDOT for 2009 through 2013. Three (3) crashes were reported during the five year interval at the study area intersections. Over the five year period, two (2) crashes were reported at Massachusetts Avenue and Burroughs Road intersection (average of 0.4 crashes per year) and one (1) crash at Burroughs Road and Priests Lane (average of 0.2 crashes per year). No fatalities were reported. The crash data is included in the Appendix. The crash data is summarized in Table 2.

None of the intersections experienced a significant crash rate.

TABLE 2
MOTOR VEHICLE CRASH DATA SUMMARY[a]

Scenario	Location: Massachusetts Avenue/ Stow Road/ Middle Road	Massachusetts Avenue/ Burroughs Road/Hill Street	Burroughs Road and Priests Lane	Stow Road/ Burroughs Road	Stow Road/ Sheriff's Meadow Driveway
Year[b]:					
2009	0	0	0	0	0
2010	0	0	0	0	0
2011	0	0	0	0	0
2012	0	0	1	0	0
2013	0	2	0	0	0
Total	0	2	1	0	0
Average[b]	0.0	0.4	0.2	0.0	0.0
Crash Rate[c]	0.00	0.11	0.42	0.00	0.00
Significant[d]	No	No	No	No	No
Type:					
Angle	0	1	0	0	0
Rear-End	0	0	0	0	0
Head-On	0	0	0	0	0
Sideswipe	0	0	0	0	0
Single Vehicle Crash	0	1	1	0	0
Unknown	0	0	0	0	0
Total	0	0	0	0	0
	0	2	1	0	0
Time of Day:					
Morning (7:00 to 9:00 AM)	0	0	0	0	0
Evening (4:00 to 6:00 PM)	0	0	0	0	0
Remainder of Day	0	2	1	0	0
Total	0	2	1	0	0
Pavement Conditions:					
Dry	0	1	0	0	0
Wet	0	1	0	0	0
Snow/Ice/Slush	0	0	1	0	0
Unknown	0	0	0	0	0
Total	0	0	0	0	0
Severity:					
Property Damage Only	0	1	1	0	0
Personal Injury	0	1	0	0	0
Fatal Accident	0	0	0	0	0
Unknown	0	0	0	0	0
Total	0	2	1	0	0

[a]Source: MassDOT.
[b]Average crashes over analysis period.
[c]Crash rate per million entering vehicles (mev).
[d]Signalized intersections are significant if rate >0.77 crashes per million vehicles, and unsignalized intersections are significant if rate >0.58 crashes per million vehicles.

VEHICLE SPEEDS

Existing speed data for Massachusetts Avenue were also collected using the automatic traffic recorder. The speed data is summarized in Table 3.

TABLE 3
OBSERVED VEHICLE SPEEDS

Direction	Posted Speed Limit (mph)	Average Observed Speed[a] (mph)	85th Percentile Speed (mph)
Massachusetts Avenue Eastbound	40	42	46
Massachusetts Avenue Westbound	40	41	44

[a]Based on speed data compiled in February 2016.

As shown in Table 3, the average speed of vehicles travelling eastbound or westbound was found to be 42 and 41 mph respectively on Massachusetts Avenue. The 85th percentile speed was found to be 46 mph for eastbound vehicles and 44 mph for westbound vehicles. The 85th percentile speed is the speed at which sight distances are typically evaluated.

PLANNED ROADWAY IMPROVEMENTS

Officials for the Town of Boxborough were contacted regarding roadway improvements planned for the study area intersections. No capacity related improvements are currently planned.

SECTION 3:
FUTURE NO-BUILD AND BUILD TRAFFIC CONDITIONS

To determine the impact of site-generated traffic volumes on the roadway network under future conditions, baseline traffic volumes in the study area were projected to the year 2023. Traffic volumes on the roadway network at that time, in the absence of the proposed project, would include existing traffic, new traffic due to general background traffic growth, and traffic related to specific developments by others expected to be completed by 2023. Consideration of these factors resulted in the development of 2023 No-Build traffic volumes. Anticipated site-generated traffic volumes were then superimposed upon these No-Build traffic flow networks to develop the 2023 Build conditions.

FUTURE 2023 NO-BUILD TRAFFIC VOLUMES

Traffic growth on area roadways is a function of the expected land development in the immediate area as well as the surrounding region. Several methods can be used to estimate this growth. A procedure frequently employed estimates an annual percentage increase in traffic growth and applies that percentage to all traffic volumes under study. The drawback to such a procedure is that some turning volumes may actually grow at either a higher or a lower rate at particular intersections.

An alternative procedure identifies the location and type of planned development, estimates the traffic to be generated, and assigns it to the area roadway network. This produces a more realistic estimate of growth for local traffic. However, the drawback of this procedure is that the potential growth in population and development external to the study area would not be accounted for in the traffic projections.

To provide a conservative analysis framework, both procedures were used.

Background Traffic Growth

Traffic-volume data compiled by MassDOT from permanent count stations and historic traffic counts in the area were reviewed in order to determine traffic growth trends. Based on a review of this data, it was determined that traffic volumes within the study area have shown little growth over the past several years. Based on the MassDOT data, a one (1.0) percent growth rate is appropriate and was used to account for potential future traffic growth external to the study area and presently unforeseen development. The MassDOT data is contained in the Appendix.

Specific Development by Others

Traffic volumes generated by the specific local developments by others were included in the 2023 No-Build condition. The Town of Boxborough was contacted to identify specific planned developments. Based on these discussions, there are two projects that are underway that would impact future volumes. This is the proposed residential development on Massachusetts Avenue near I-495 and a small industrial development on Massachusetts Avenue. Trips for the residential project were obtained from the January 2015 Traffic Impact and Access Study[2] and trips for the industrial project were obtained from the March 21 2016 Site Plan Approval submission. This data is included in the Appendix.

No-Build Condition Traffic Volumes

The 2023 No-Build weekday morning and weekday evening peak-hour traffic volumes were developed by applying a compounded one (1.0) percent annual growth rate to the 2016 Existing peak-hour traffic volumes and adding traffic from the identified background projects. Figures 4 and 5 show the projected 2023 No-Build peak hour traffic volumes for the respective weekday morning and weekday evening peak-hours.

[2] *Traffic Impact and Access Study Jefferson at Beaver Brook;* VHB; Worcester, MA; January 2015.

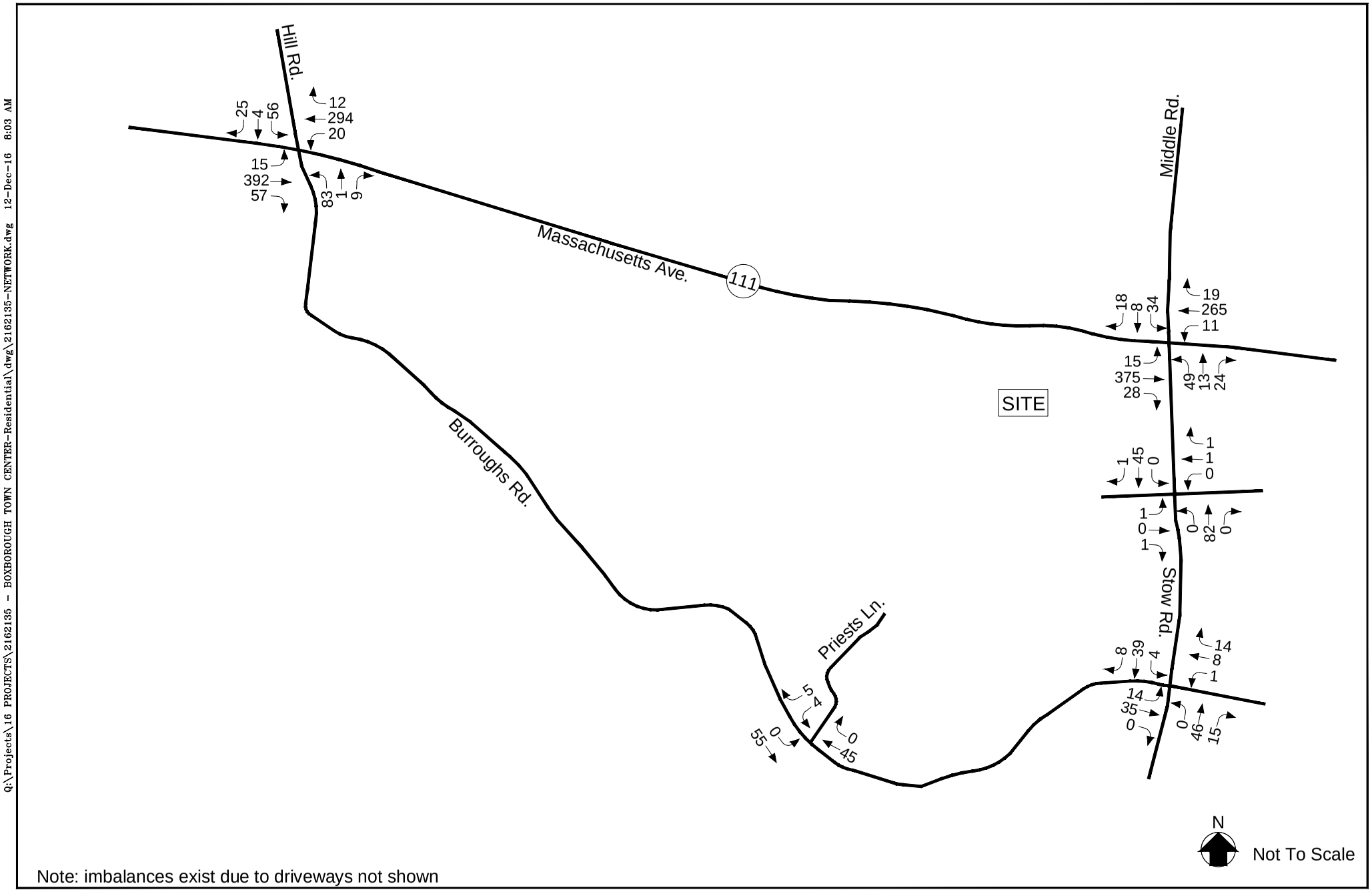

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Figure 4

2023 No-Build
Weekday Morning
Peak Hour Traffic Volumes

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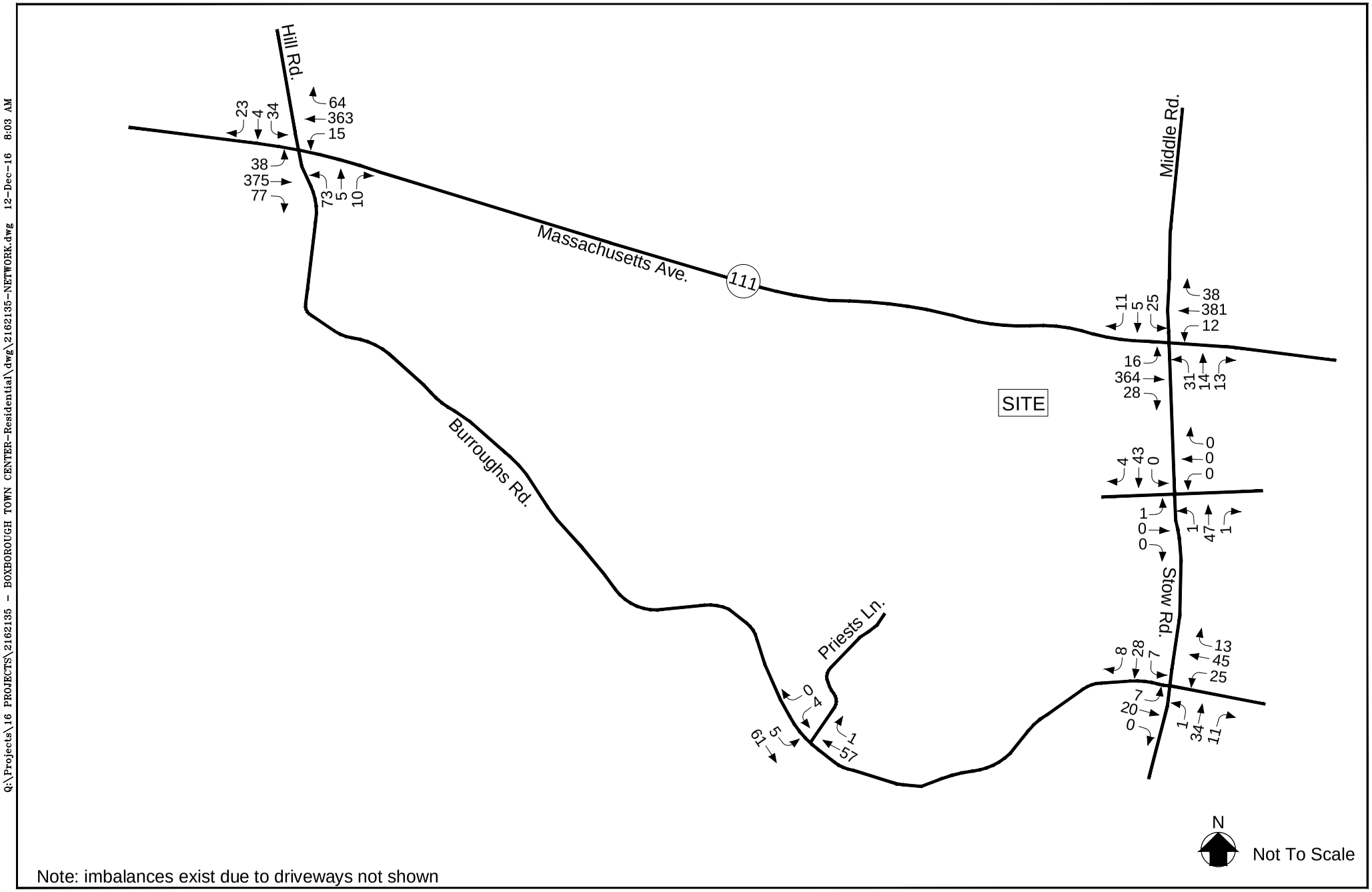

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Figure 5

2023 No-Build
Weekday Evening
Peak Hour Traffic Volumes

FUTURE 2017 BUILD CONDITIONS

Project Description

As currently proposed, the project will consist of razing of the existing home and the construction of 100 age-restricted townhouse units. Access to the site will be provided by way of a full-movement driveway to Massachusetts Avenue.

Traffic Generation

Trip-generation data published by the ITE *Trip Generation* manual[3] was reviewed. Trip generation data for Land Use Code (LUC) 230 – Residential Condominium/Townhouse was used to determine the expected trip generation for the proposed project. The expected trip generation for the proposed development is summarized in Table 4 and the trip generation worksheets are included in the Appendix.

TABLE 4
TRIP-GENERATION SUMMARY

	Proposed Condominiums Trips[a]
Average Weekday Daily Traffic	644
Weekday Morning Peak Hour:	
Entering	9
Exiting	43
Total	52
Weekday Evening Peak Hour:	
Entering	40
Exiting	20
Total	60

[a]Based on ITE LUC 230, Residential Condominium/Townhouse; 100 dwelling units.

On a typical weekday, the proposed development is expected to generate 644 vehicle trips (322 vehicles entering and 322 vehicles exiting). During the weekday morning peak hour, 52 vehicle trips (9 vehicles entering and 43 vehicles exiting) are expected. During the weekday evening peak hour, 60 vehicle trips (40 vehicles entering and 20 vehicles exiting) are expected.

[3]*Trip Generation*, Eighth Edition; Institute of Transportation Engineers; Washington, DC; 2009.

Trip Distribution

The directional distribution of the vehicular traffic approaching and departing the site is a function of population densities, the location of employment, existing travel patterns, similar uses, and the efficiency of the existing roadway system. Existing traffic flows were reviewed to determine the expected trip distribution pattern. Table 5 summarizes the expected trip distribution.

TABLE 5
PROPOSED TRIP DISTRIBUTION

Route	Direction	Percent of Trips
Massachusetts Avenue	East	31
Massachusetts Avenue	West	65
Stow Road	North	1
Stow Road	South	3
TOTAL		100

Future Traffic Volumes - Build Condition

The site-generated traffic was distributed within the study area according to the percentages summarized in Table 5. Figure 6 shows the site-generated traffic volumes associated with the project. The site generated volumes were then superimposed onto the 2023 No-Build traffic volumes to represent the 2023 Build traffic-volume conditions. The anticipated 2023 Build weekday morning and weekday evening traffic volumes are graphically presented in Figures 7 and 8, respectively. These volumes were used as the basis for all analysis as well as to identify potential mitigation measures to ameliorate the project's impacts.

A summary of 2023 peak-hour projected traffic-volume changes in the site vicinity are shown in Table 6. These volumes are based on the expected increases from the site traffic generation.

TABLE 6
TRAFFIC-VOLUME INCREASES[a]

Location/Peak Hour	2023 No-Build	2023 Build	Volume Increase over No-Build
Massachusetts Avenue, west of Site			
Weekday Morning	750	784	34
Weekday Evening	831	870	39
Massachusetts Avenue, east of Stow Road			
Weekday Morning	728	745	17
Weekday Evening	833	852	19
Massachusetts Avenue, west of Burroughs Road			
Weekday Morning	866	900	34
Weekday Evening	949	988	39
Stow Road, north of Massachusetts Avenue			
Weekday Morning	107	107	0
Weekday Evening	109	109	0
Stow Road, south of Burroughs Road			
Weekday Morning	101	102	1
Weekday Evening	99	101	2

[a]All volumes are vehicles per hour, total of both directions.

As shown in Table 6, project-related increases are in the range of 0 to 39 bi-directional vehicles during the peak hours. This is approximately equivalent to one additional vehicle every two minutes or less per direction on average during the peak hours.

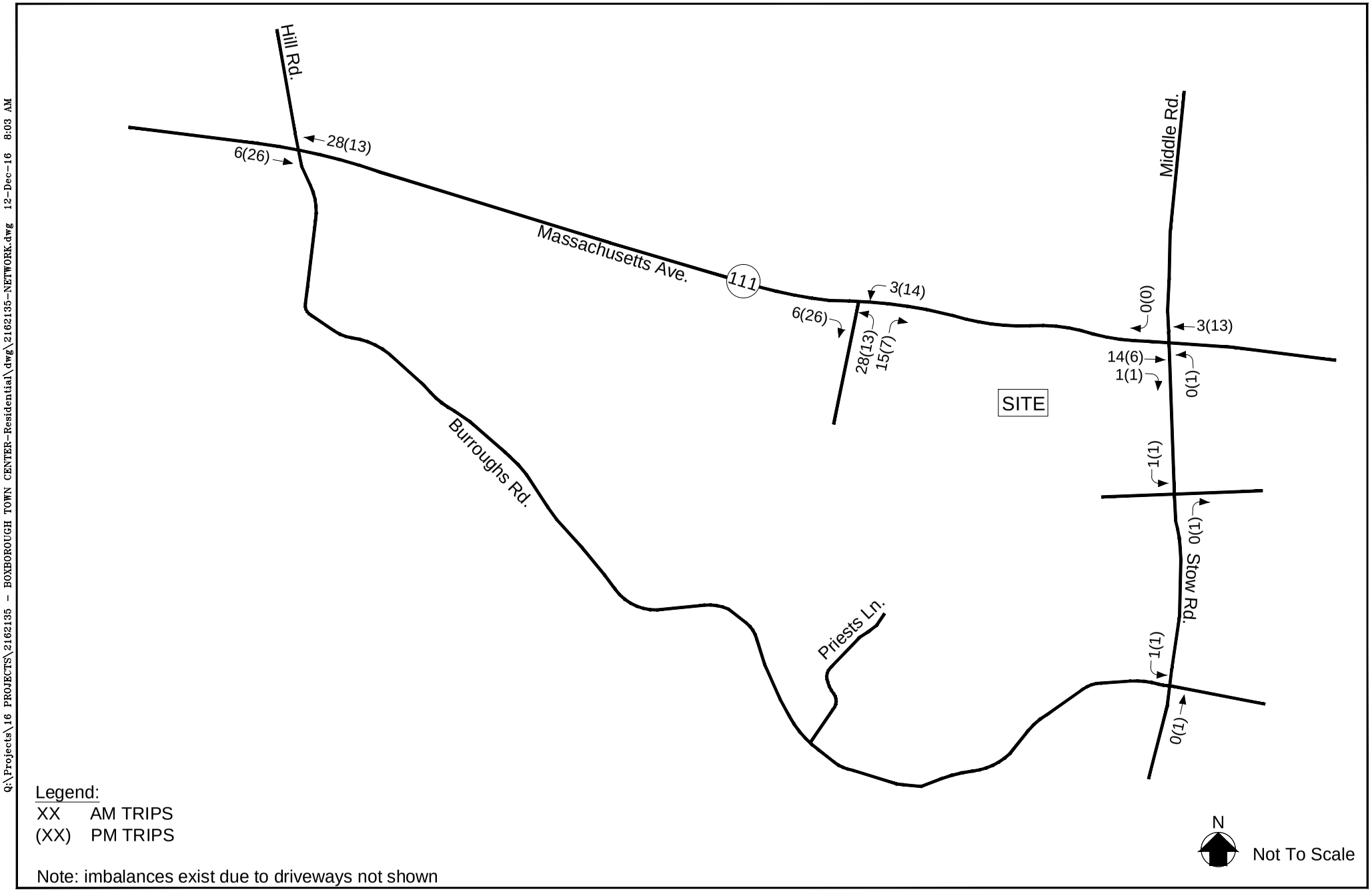

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Figure 6

Site Generated
Peak Hour Traffic Volumes

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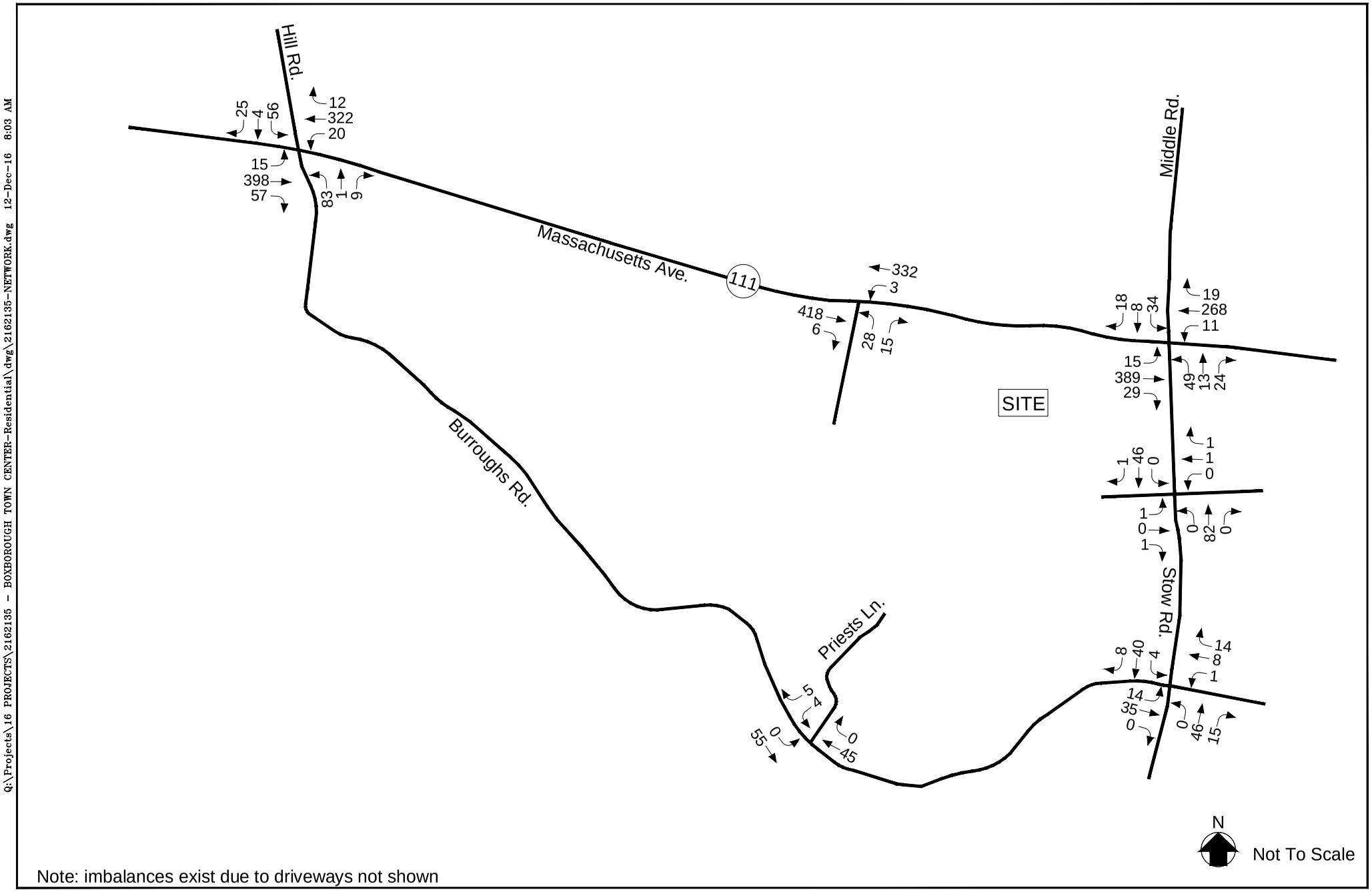

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Figure 7

2023 Build
Weekday Morning
Peak Hour Traffic Volumes

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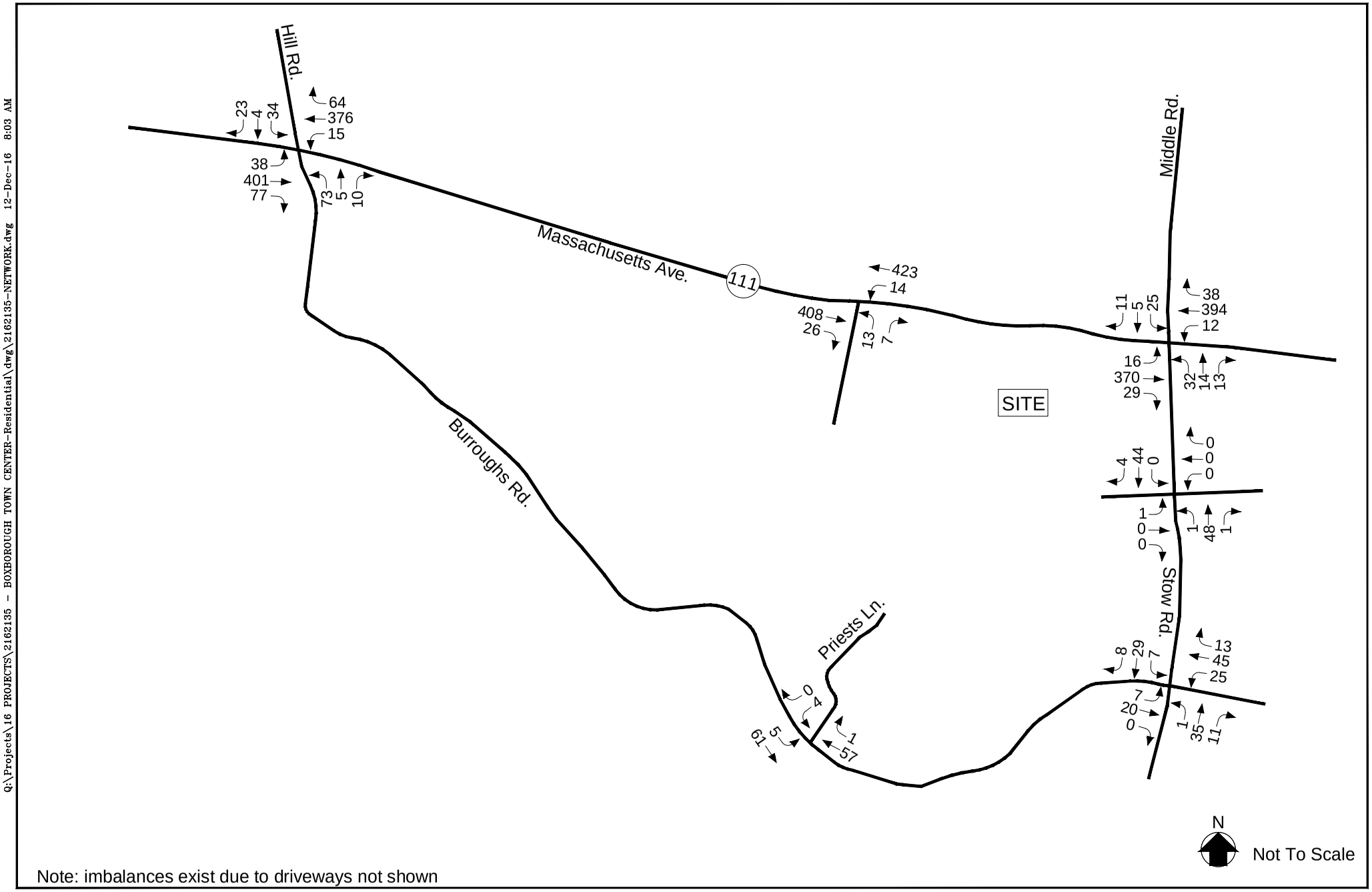

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Figure 8

2023 Build
Weekday Evening
Peak Hour Traffic Volumes

SECTION 4: ANALYSIS

To assess intersection operations, capacity analyses were conducted for Existing, No-Build, and Build traffic-volume conditions. Capacity analyses provide an indication of how well the study area intersections serve existing and projected traffic volumes. Vehicle queue analyses provide a secondary measure of the operational characteristics of an intersection or section of roadway under study in terms of lane use and demand.

METHODOLOGY

Levels of Service

Level of service (LOS) is a quantitative measure used to describe the operation of an intersection or roadway segment. The level of service definition is described by the quality of traffic flow and is primarily defined in terms of traffic delays. The primary result of capacity analyses[4] is the assignment of a level of service to traffic intersections or roadway segments under various traffic-flow conditions. Six levels of service are defined for traffic intersections and roadway segments. Levels of service range from LOS A to LOS F. LOS A represents very good operating conditions and LOS F represents very poor operating conditions.

Signalized Intersections

Levels of service for signalized intersections are calculated using the methodology and procedures described in the 2010 *Highway Capacity Manual*. The methodology assesses the intersection based on type of signal operation, signal timing and phasing, progression, vehicle mix, and intersection geometrics. Level-of-service designations are based on the delay per vehicle. Table 7 summarizes the relationship between level of service and delay. The calculated delay values result in level-of-service designations which are

[4]The capacity analysis methodology is based on procedures presented in the *Highway Capacity Manual;* Transportation Research Board; Washington, DC; 2010.

applied to individual lane groups, to individual intersection approaches, and to the entire intersection. In the 2010 HCM methodology, the critical lane group volume to capacity ratio is reported.

TABLE 7
LEVEL-OF-SERVICE CRITERIA FOR SIGNALIZED INTERSECTIONS[a]

Delay per Vehicle (Seconds)	Resulting Level of Service $v/c^b < 1.0$	Resulting Level of Service $v/c^b > 1.0$
≤10.0	A	F
10.1 to 20.0	B	F
20.1 to 35.0	C	F
35.1 to 55.0	D	F
55.1 to 80.0	E	F
>80.0	F	F

[a]*Highway Capacity Manual*; Transportation Research Board; Macy, DC; 2010; page 18-6.
[b]Volume to capacity ratio.

Unsignalized Intersections

The level of service for an unsignalized intersection is determined by the methodology and procedures described in the 2010 *Highway Capacity Manual.*[5] The level of service for unsignalized intersections is measured in terms of average delay for the critical movements (typically side street turning movements or mainline turning movements). The delay for the critical movements is a function of the available capacity for the movement and the degree of saturation of the lane group containing the critical movement. The delay calculation includes the effects of initial deceleration delay approaching a STOP sign, stopped delay, queue move-up time, and final acceleration delay from a stopped condition. The definitions for level of service at unsignalized intersections are also provided in the 2010 *Highway Capacity Manual*. Table 8 summarizes the relationship between level of service and average control delay for the critical movements at unsignalized intersections.

[5]*Highway Capacity Manual*; Transportation Research Board; Washington, DC; 2010.

TABLE 8
LEVEL-OF-SERVICE CRITERIA FOR UNSIGNALIZED INTERSECTIONS[a]

Average Delay (seconds per vehicle)	Resulting Level of Service v/c[b] < 1.0	Resulting Level of Service v/c > 1.0
≤ 10.0	A	F
10.1 to 15.0	B	F
15.1 to 25.0	C	F
25.1 to 35.0	D	F
35.1 to 50.0	E	F
>50.0	F	F

[a]*Highway Capacity Manual*; Transportation Research Board; Elm, DC; 2010; page 19-2
[b]Volume to capacity ratio.

The analytical methodologies used for the analysis of unsignalized intersections use conservative analysis parameters, such as high critical gaps. The critical gap is defined as the minimum time between successive main line vehicles for a side street vehicle to execute the appropriate turning maneuver. Actual field observations indicate that drivers on minor streets accept smaller gaps in traffic than those used in the analysis procedures and therefore experience less delay than calculated by the HCM methodology. **The analysis results overstate the actual delays experienced in the field.** It should be noted that the unsignalized intersections along heavily trafficked roadways operate at constrained levels and the resulting calculated results of the unsignalized intersection analyses should be considered highly conservative.

CAPACITY ANALYSIS RESULTS

Level-of-service analyses were conducted for 2016 Existing, 2023 No-Build, and 2023 Build conditions for the intersections within the study area. The results of the unsignalized analyses are summarized in Table 9. Detailed analysis sheets are presented in the Appendix.

TABLE 9
UNSIGNALIZED LEVEL-OF-SERVICE ANALYSIS SUMMARY

Critical Movement/ Peak Hour	2016 Existing				2023 No-Build				2023 Build			
	Demand[a]	V/C[b]	Delay[c]	LOS[d]	Demand	V/C	Delay	LOS	Demand	V/C	Delay	LOS
Massachusetts Avenue, Burroughs Road and Hill Road												
All movements Burroughs Road NB:												
Weekday Morning	86	0.41	28.8	D	93	0.52	38.1	E	93	0.55	42.6	E
Weekday Evening	81	0.58	38.0	E	88	0.76	61.7	F	88	0.81	73.5	F
Massachusetts Avenue and Proposed Site Driveway												
All movements from driveway:												
Weekday Morning	--	--	--	--	--	--	--	--	43	0.12	15.1	C
Weekday Evening	--	--	--	--	--	--	--	--	20	0.06	16.0	C
Massachusetts Avenue, Middle Road and Stow Road												
All movements from Stow Road:												
Weekday Morning	79	0.28	18.5	C	86	0.38	24.0	C	86	0.39	24.9	C
Weekday Evening	54	0.21	18.8	C	58	0.28	24.0	C	59	0.30	25.4	D
Stow Road and Sheriff's Meadow Driveway												
All movements from driveway:												
Weekday Morning	2	0.01	9.7	A	2	0.01	9.8	A	2	0.01	9.8	A
Weekday Evening	1	0.01	9.2	A	1	0.01	9.2	A	1	0.01	9.2	A
Stow Road and Burroughs Road												
All movements from Burroughs Road EB:												
Weekday Morning	45	0.07	10.2	B	49	0.08	10.3	B	49	0.08	10.3	B
Weekday Evening[e]	77	0.11	9.9	A	83	0.12	10.0	B	83	0.12	10.0	B
Burroughs Road and Priest's Lane												
All movements from Priest's Lane:												
Weekday Morning	7	0.02	8.9	A	9	0.02	9.0	A	9	0.02	9.0	A
Weekday Evening	3	0.01	9.3	A	4	0.02	9.3	A	4	0.02	9.3	A

[a]Demand of critical movements in vehicles per hour.
[b]Volume-to-capacity ratio.
[c]Delay in seconds per vehicle.
[d]Level of service.
[e]Critical movement is the westbound movements during the weekday evening peak hour.

Massachusetts Avenue, Burroughs Road and Hill Road

Under 2016 Existing conditions, the critical movements at this unsignalized intersection (all movements out of Burroughs Road) are modeled to operate at LOS D during the weekday morning peak hour and at LOS E during the weekday evening peak hour. Under future 2023 No-Build conditions, the critical movements are projected to operate at LOS E during the weekday morning peak hour and at LOS F during the weekday evening peak hour. Under 2023 Build conditions, with the project, the critical movements are projected to continue to operate at LOS E during the weekday morning peak hour and at LOS F during the weekday evening peak hour. The volume to capacity ration (v/c) is well below 1.00 (theoretical capacity) and the traffic generated by the project is not expected to cause a significant increase in queues on the Burroughs Road or Hill Road approaches.

Massachusetts Avenue and Site Driveway

Under 2023 Build conditions, the critical movements (all movements out of the driveway) are projected to continue to operate at LOS C during the weekday morning and weekday evening peak hours.

Massachusetts Avenue and Stow Road

Under 2016 Existing conditions, the critical movements at this unsignalized intersection (all movements out of Stow Road) are modeled to operate at LOS C during the weekday morning peak hour and at LOS C during the weekday evening peak hour. Under future 2023 No-Build conditions, the critical movements are projected to operate at LOS C during the weekday morning and weekday evening peak hours. Under 2023 Build conditions, with the project, the critical movements are projected to continue at LOS C during the weekday morning peak hour and at LOS D during the weekday evening peak hour.

Stow Road and Sheriff's Meadow Driveway

Under 2016 Existing conditions, the critical movements at this unsignalized intersection (all movements out of the driveway) are modeled to operate at LOS A during the weekday morning and weekday evening peak hours. Under future 2023 No-Build and Build conditions, the critical movements are projected to operate at LOS A during the weekday morning and weekday evening peak hours.

Stow Road and Burroughs Road

Under 2016 Existing conditions, the critical movements at this unsignalized intersection (all movements out of Burroughs Road) are modeled to operate at LOS B during the weekday morning peak hour and at LOS A during the weekday evening peak hour. Under future 2023 No-Build and Build conditions, the critical movements are projected to operate at LOS B during both the weekday morning and weekday evening peak hours.

Burroughs Road and Priest's Lane

Under 2016 Existing conditions, the critical movements at this unsignalized intersection (all movements out of Priest's Lane) are modeled to operate at LOS A during both the weekday morning and weekday evening peak hours. Under future 2023 No-Build and Build conditions, the critical movements are projected to continue to operate at LOS A during the weekday morning and weekday evening peak hours.

SIGHT DISTANCE ANALYSIS

Sight distance measurements were performed at the intersection of the site driveway along Massachusetts Avenue in accordance with MassDOT standards. Stopping sight distance (SSD) measurements were performed. In brief, SSD is the distance required by a vehicle traveling at the design speed of a roadway, on wet pavement, to stop prior to striking an object in its travel path. ISD or corner sight distance (CSD) is the sight distance required by a driver entering or crossing an intersecting roadway, to perceive an on-coming vehicle and safely complete a turning or crossing maneuver with on-coming traffic. In accordance with MassDOT standards, at a minimum, sufficient SSD must be provided to the intersection.

SSD is generally more important as it represents the minimum distance required for safe stopping while ISD is based only upon acceptable speed reductions to the approaching traffic stream. However, the ISD must be equal to or greater than the minimum required SSD in order to provide safe operations at the intersections. In accordance with the American Association of State Highway and Transportation Officials (AASHTO) manual, *"If the available sight distance for an entering or crossing vehicle is at least equal to the appropriate stopping sight distance for the major road, then drivers have sufficient sight distance to anticipate and avoid collisions. However, in some cases, this may require a major-road vehicle to stop or slow to accommodate the maneuver by a minor-road vehicle. To enhance traffic operations, intersection sight distances that exceed stopping sight distances are desirable along the major road."* Accordingly, the ISD should be at least equal to the SSD, which would allow a driver approaching the minor road to safely stop.

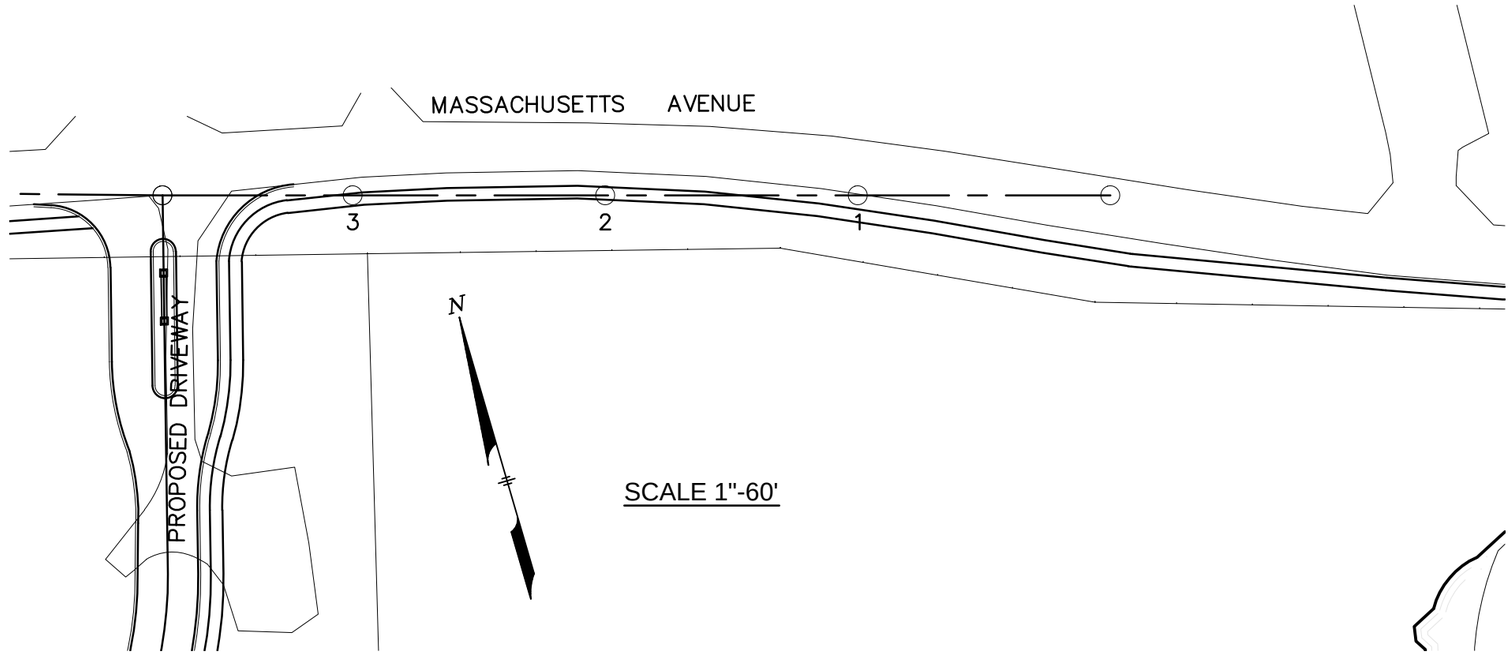
Both the SSD and ISD were measured in the field as well as plotted from the survey performed for the site plan. The distances were measured in accordance with AASHTO requirements. Table 10 presents the measured SSD and ISD at the site driveway intersection with Massachusetts Avenue. Figures 9 and 10 show the sight distance profiles approaching the proposed site driveway from the east and from the west. The sight distance worksheets are included in the Appendix.

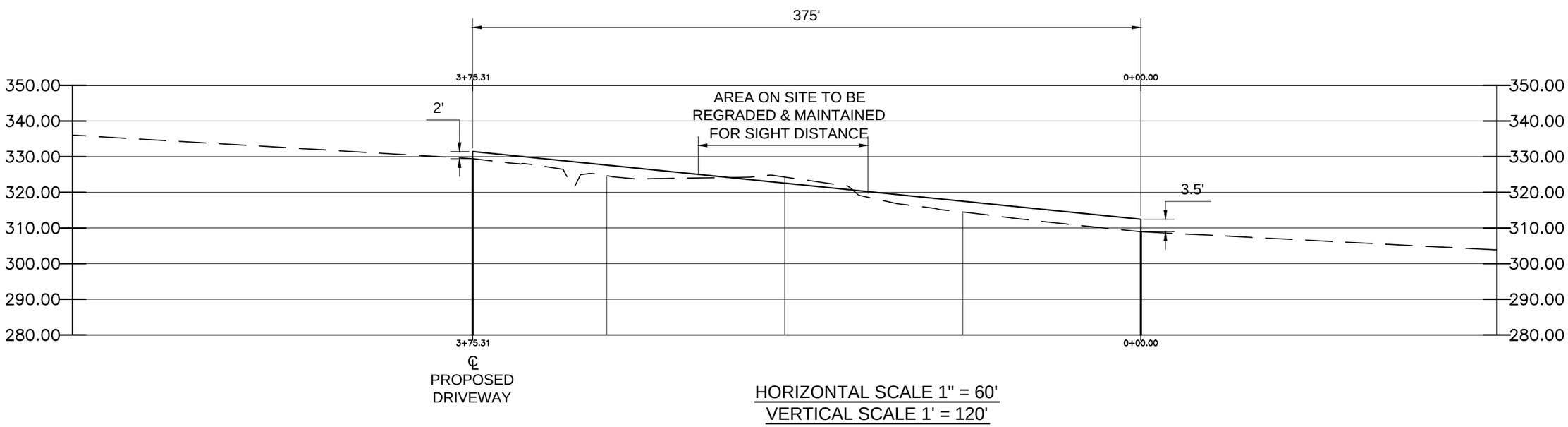
As can be seen in Table 10, the SSD measurements performed at the Massachusetts Avenue driveway intersection with Massachusetts Avenue indicates that the observed SSD will exceed the recommended minimum requirements based on the 85th percentile speed observed for eastbound vehicles. Westbound vehicles will have the sight distance impeded due to the alignment of Massachusetts Avenue and slope along the property frontage. It is recommended that a sight distance easement be established east of the site driveway and that this area be re-graded to provide the sight lines and be kept clear of plantings that would obstruct sight distances. Also, at the site driveway intersection, and along the site frontage and within the existing Massachusetts Avenue layout, it is recommended that any proposed landscaping be designed not exceed three (3) feet in height in order to maintain these sight lines.

TABLE 10
SIGHT DISTANCE SUMMARY

	Required Minimum (Feet)[a]	Measured (Feet)
Massachusetts Avenue and Proposed Site Driveway		
Stopping Sight Distance:		
Site Driveway approaching from the east	347	375
Site Driveway approaching from the west	372	375
Intersection Sight Distance:		
Exiting Site Driveway looking to the east	420[b]/507[c]	375
Exiting Site Driveway looking to the west	420[b]/507[c]	375

[a]Recommended minimum values obtained from *A Policy on Geometric Design of Highways and Streets*; American Association of State Highway and Transportation Officials (AASHTO); 2010, and based on a 85th percentile speed of 46 mph eastbound and 44 mph westbound as recorded with the ATR in February 2016.
[b]Recommended minimum value for vehicles turning right exiting a roadway under STOP-sign control.
[c]Recommended minimum value for vehicles turning left exiting a roadway under STOP-sign control.



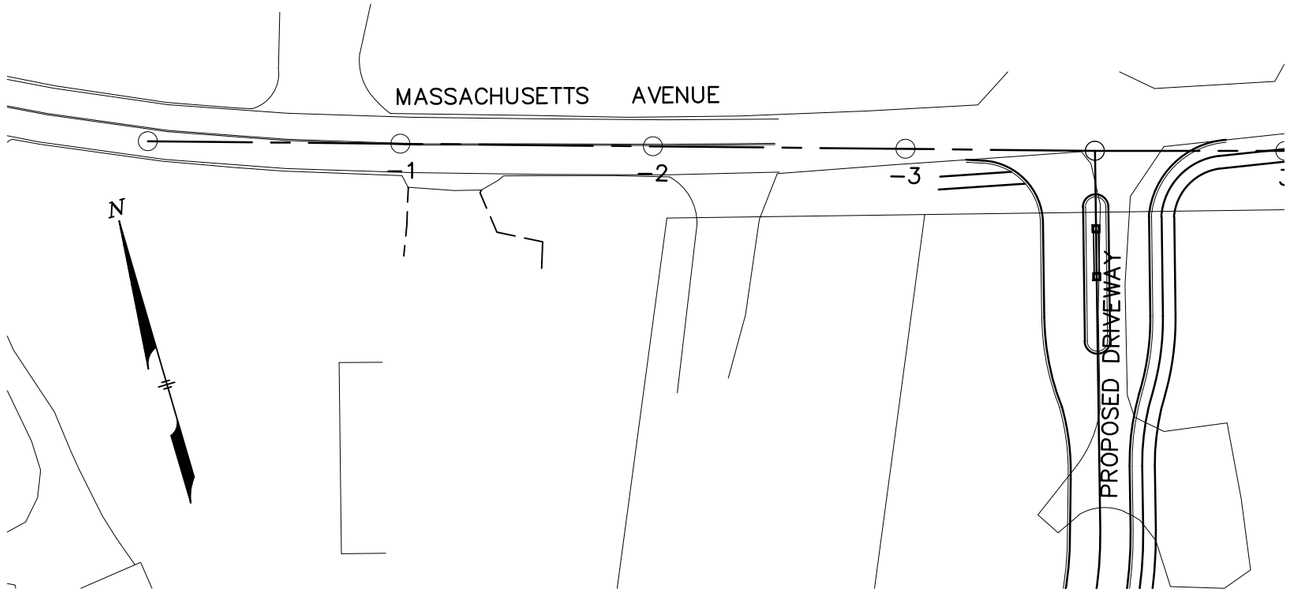


BAYSIDE ENGINEERING
600 Unicorn Park Drive Woburn, MA 01801
Phone: 781.932.3201 Fax: 781.932.3413
www.baysideengineering.com

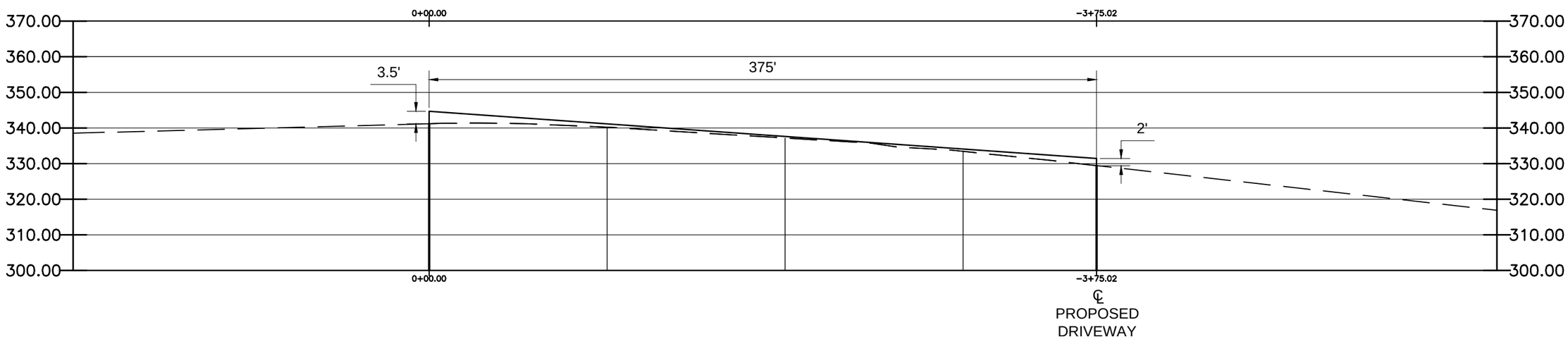
Regency At Boxborough
Boxborough, MA

Figure 9

Stopping SIght Distance Approaching Driveway From East



SCALE 1"-60'



HORIZONTAL SCALE 1" = 60'
VERTICAL SCALE 1' = 120'

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Figure 10

Stopping SIght Distance Approaching Driveway from West

SECTION 5: RECOMMENDATIONS AND CONCLUSION

RECOMMENDATIONS

The final phase of the analysis process is to identify the mitigation measures necessary to minimize the impact of the project on the transportation system. The proponent has made a commitment to implement the mitigation measures listed below.

The capacity analyses performed for the unsignalized study area intersections indicate that generally, the new project trips will not significantly impact intersection operations. There is no significant reduction in levels of service at the study area intersections. The analysis shows the site driveway is projected to operate at a good level of service.

As a result of the additional traffic generation being relatively low, it is expected that the project will not have a significant impact on intersection operations in the study area.

The Massachusetts Avenue main site driveway should permit entering movements from both directions on Massachusetts Avenue. Exiting movements should be in a single lane under STOP-sign control.

It is recommended that a sight distance easement be established east of the site driveway and that this area be re-graded to provide the sight lines and be kept clear of plantings that would obstruct sight distances. Also, at the site driveway intersection, and along the site frontage and within the existing Massachusetts Avenue layout, it is recommended that any proposed landscaping be designed not exceed three (3) feet in height in order to maintain these sight lines.

CONCLUSION

Review of the proposed project and the access plan shows that in relation to roadway capacity, traffic safety, and traffic impacts upon the surrounding roadway network, the proposed project will have a minimal impact on existing traffic conditions. With the proposed access, and maintaining sight distances from the driveways (clear sight lines

along frontage), safe and efficient access can be provided to the patrons of the proposed project and to the motoring public in the area.

APPENDIX

Traffic Count Data

Seasonal Adjustment Worksheets

Crash Data and Worksheets

Background Growth

Trip Generation Worksheets

Capacity Analysis Worksheets

Sight Distance Worksheets

Traffic Count Data

Massachusetts Avenue (Route 111)
east of Hughes Lane
City, State: Boxborough, MA
Client: Bayside Engineering / K. Cram

PRECISION DATA INDUSTRIES, LLC
P.O. Box 301 Berlin, MA 01503
Office: 508.481.3999 Fax: 508.545.1234
Email: datarequests@pdillc.com

164948 A Volume
Site Code: 2162135

Start	WB				EB				Combined				23-Feb-16
Time	A.M.		P.M.		A.M.		P.M.		A.M.		P.M.		Tue
12:00	1		38		2		55		3		93		
12:15	2		43		1		78		3		121		
12:30	3		43		1		31		4		74		
12:45	2	8	47	171	1	5	42	206	3	13	89	377	
01:00	3		65		0		37		3		102		
01:15	1		42		2		45		3		87		
01:30	2		57		0		39		2		96		
01:45	0	6	45	209	0	2	45	166	0	8	90	375	
02:00	1		42		1		43		2		85		
02:15	0		49		0		39		0		88		
02:30	0		72		0		57		0		129		
02:45	0	1	55	218	0	1	58	197	0	2	113	415	
03:00	0		59		1		36		1		95		
03:15	2		65		1		55		3		120		
03:30	1		79		2		56		3		135		
03:45	1	4	83	286	0	4	57	204	1	8	140	490	
04:00	1		83		7		73		8		156		
04:15	5		78		2		62		7		140		
04:30	1		79		2		58		3		137		
04:45	0	7	74	314	1	12	61	254	1	19	135	568	
05:00	1		93		4		81		5		174		
05:15	4		68		10		65		14		133		
05:30	8		66		18		89		26		155		
05:45	10	23	88	315	27	59	78	313	37	82	166	628	
06:00	8		70		24		63		32		133		
06:15	17		49		34		68		51		117		
06:30	38		69		39		48		77		117		
06:45	40	103	58	246	51	148	42	221	91	251	100	467	
07:00	47		55		56		34		103		89		
07:15	66		37		61		26		127		63		
07:30	64		37		73		24		137		61		
07:45	68	245	25	154	96	286	28	112	164	531	53	266	
08:00	76		19		72		16		148		35		
08:15	75		35		78		17		153		52		
08:30	66		23		62		13		128		36		
08:45	72	289	19	96	95	307	28	74	167	596	47	170	
09:00	68		20		65		20		133		40		
09:15	66		30		57		14		123		44		
09:30	41		23		53		16		94		39		
09:45	42	217	12	85	46	221	6	56	88	438	18	141	
10:00	44		15		35		9		79		24		
10:15	40		7		43		4		83		11		
10:30	43		7		37		6		80		13		
10:45	40	167	9	38	40	155	6	25	80	322	15	63	
11:00	47		3		34		4		81		7		
11:15	32		7		67		3		99		10		
11:30	39		5		64		3		103		8		
11:45	53	171	3	18	56	221	0	10	109	392	3	28	
Total	1241		2150		1421		1838		2662		3988		
Percent	46.6%		53.9%		53.4%		46.1%						
Day Total		3391				3259				6650			
Peak	08:00	-	04:15	-	07:30	-	05:00	-	07:30	-	05:00	-	- -
Vol.	289	-	324	-	319	-	313	-	602	-	628	-	- -
P.H.F.	0.951		0.871		0.831		0.879		0.918		0.902		

Massachusetts Avenue (Route 111)
east of Hughes Lane
City, State: Boxborough, MA
Client: Bayside Engineering / K. Cram

PRECISION DATA INDUSTRIES, LLC
P.O. Box 301 Berlin, MA 01503
Office: 508.481.3999 Fax: 508.545.1234
Email: datarequests@pdillc.com

164948 A Volume
Site Code: 2162135

Start	WB				EB				Combined				24-Feb-16
Time	A.M.		P.M.		A.M.		P.M.		A.M.		P.M.		Wed
12:00	3		58		2		44		5		102		
12:15	5		55		2		49		7		104		
12:30	4		64		2		42		6		106		
12:45	6	18	60	237	1	7	47	182	7	25	107	419	
01:00	5		47		2		39		7		86		
01:15	0		44		2		38		2		82		
01:30	2		55		1		39		3		94		
01:45	2	9	49	195	1	6	39	155	3	15	88	350	
02:00	1		41		2		45		3		86		
02:15	0		52		1		50		1		102		
02:30	3		75		3		53		6		128		
02:45	0	4	52	220	2	8	46	194	2	12	98	414	
03:00	5		67		2		55		7		122		
03:15	1		62		3		63		4		125		
03:30	2		59		1		50		3		109		
03:45	1	9	91	279	3	9	57	225	4	18	148	504	
04:00	0		79		4		62		4		141		
04:15	4		70		9		63		13		133		
04:30	3		81		5		59		8		140		
04:45	6	13	75	305	3	21	67	251	9	34	142	556	
05:00	4		70		4		72		8		142		
05:15	5		83		7		98		12		181		
05:30	8		73		19		87		27		160		
05:45	13	30	84	310	20	50	71	328	33	80	155	638	
06:00	10		75		19		64		29		139		
06:15	12		75		31		86		43		161		
06:30	31		51		46		62		77		113		
06:45	35	88	52	253	47	143	49	261	82	231	101	514	
07:00	47		36		46		35		93		71		
07:15	49		48		53		27		102		75		
07:30	88		44		70		25		158		69		
07:45	62	246	36	164	90	259	26	113	152	505	62	277	
08:00	63		55		71		19		134		74		
08:15	58		29		86		28		144		57		
08:30	72		18		65		17		137		35		
08:45	77	270	20	122	57	279	19	83	134	549	39	205	
09:00	67		41		67		17		134		58		
09:15	60		17		54		22		114		39		
09:30	41		26		48		14		89		40		
09:45	51	219	12	96	36	205	9	62	87	424	21	158	
10:00	36		11		42		11		78		22		
10:15	37		13		25		6		62		19		
10:30	34		1		32		7		66		8		
10:45	35	142	11	36	34	133	5	29	69	275	16	65	
11:00	44		8		43		6		87		14		
11:15	46		6		36		2		82		8		
11:30	42		7		37		2		79		9		
11:45	48	180	2	23	49	165	4	14	97	345	6	37	
Total	1228		2240		1285		1897		2513		4137		
Percent	48.9%		54.1%		51.1%		45.9%						
Day Total		3468				3182				6650			
Peak	08:30	-	03:45	-	07:30	-	05:00	-	07:30	-	05:00	-	- -
Vol.	276	-	321	-	317	-	328	-	588	-	638	-	- -
P.H.F.	0.896		0.882		0.881		0.837		0.930		0.881		

Massachusetts Avenue (Route 111)
east of Hughes Lane
City, State: Boxborough, MA
Client: Bayside Engineering / K. Cram

PRECISION DATA INDUSTRIES, LLC
P.O. Box 301 Berlin, MA 01503
Office: 508.481.3999 Fax: 508.545.1234
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164948 A Volume
Site Code: 2162135

Start	WB				EB				Combined				25-Feb-16
Time	A.M.		P.M.		A.M.		P.M.		A.M.		P.M.		Thu
12:00	1		52		2		55		3		107		
12:15	3		63		0		54		3		117		
12:30	5		58		0		47		5		105		
12:45	2	11	51	224	0	2	44	200	2	13	95	424	
01:00	1		55		2		41		3		96		
01:15	1		41		3		26		4		67		
01:30	0		68		0		44		0		112		
01:45	2	4	53	217	1	6	37	148	3	10	90	365	
02:00	1		38		3		44		4		82		
02:15	3		51		1		45		4		96		
02:30	0		66		2		42		2		108		
02:45	1	5	58	213	0	6	49	180	1	11	107	393	
03:00	0		58		0		55		0		113		
03:15	0		75		0		53		0		128		
03:30	4		73		2		56		6		129		
03:45	0	4	75	281	0	2	73	237	0	6	148	518	
04:00	0		79		2		66		2		145		
04:15	1		71		8		55		9		126		
04:30	1		79		3		54		4		133		
04:45	3	5	55	284	2	15	58	233	5	20	113	517	
05:00	4		76		6		80		10		156		
05:15	4		96		6		89		10		185		
05:30	7		81		13		87		20		168		
05:45	7	22	88	341	20	45	71	327	27	67	159	668	
06:00	12		78		14		72		26		150		
06:15	17		63		30		60		47		123		
06:30	31		79		49		45		80		124		
06:45	27	87	46	266	38	131	55	232	65	218	101	498	
07:00	46		53		58		48		104		101		
07:15	51		50		66		27		117		77		
07:30	61		41		71		33		132		74		
07:45	68	226	32	176	87	282	31	139	155	508	63	315	
08:00	68		41		71		28		139		69		
08:15	64		22		73		17		137		39		
08:30	74		33		64		12		138		45		
08:45	71	277	18	114	69	277	20	77	140	554	38	191	
09:00	79		29		67		23		146		52		
09:15	47		32		58		17		105		49		
09:30	41		19		44		13		85		32		
09:45	41	208	14	94	49	218	7	60	90	426	21	154	
10:00	47		10		45		4		92		14		
10:15	35		13		34		9		69		22		
10:30	41		10		41		10		82		20		
10:45	48	171	13	46	42	162	13	36	90	333	26	82	
11:00	32		4		48		5		80		9		
11:15	50		9		32		5		82		14		
11:30	47		4		52		1		99		5		
11:45	43	172	1	18	57	189	5	16	100	361	6	34	
Total	1192		2274		1335		1885		2527		4159		
Percent	47.2%		54.7%		52.8%		45.3%						
Day Total		3466				3220				6686			
Peak	08:15	-	05:15	-	07:30	-	05:00	-	07:45	-	05:00	-	- -
Vol.	288	-	343	-	302	-	327	-	569	-	668	-	- -
P.H.F.	0.911		0.893		0.868		0.919		0.918		0.903		

Massachusetts Avenue (Route 111)
east of Hughes Lane
City, State: Boxborough, MA
Client: Bayside Engineering / K. Cram

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P.O. Box 301 Berlin, MA 01503
Office: 508.481.3999 Fax: 508.545.1234
Email: datarequests@pdillc.com

164948 A Class
Site Code: 2162135

WB

Start Time	Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total
02/23/1														
6	0	6	2	0	0	0	0	0	0	0	0	0	0	8
01:00	0	4	2	0	0	0	0	0	0	0	0	0	0	6
02:00	0	1	0	0	0	0	0	0	0	0	0	0	0	1
03:00	0	3	0	0	1	0	0	0	0	0	0	0	0	4
04:00	0	5	2	0	0	0	0	0	0	0	0	0	0	7
05:00	0	16	4	1	2	0	0	0	0	0	0	0	0	23
06:00	1	78	15	5	4	0	0	0	0	0	0	0	0	103
07:00	1	201	31	1	9	1	1	0	0	0	0	0	0	245
08:00	1	227	42	5	11	1	0	2	0	0	0	0	0	289
09:00	3	156	45	0	10	1	0	2	0	0	0	0	0	217
10:00	2	115	36	3	8	1	2	0	0	0	0	0	0	167
11:00	0	121	34	1	11	2	0	1	1	0	0	0	0	171
12 PM	1	132	25	2	10	0	1	0	0	0	0	0	0	171
13:00	1	145	44	3	13	1	0	2	0	0	0	0	0	209
14:00	0	167	39	2	8	0	1	1	0	0	0	0	0	218
15:00	2	199	57	4	20	2	0	2	0	0	0	0	0	286
16:00	1	242	55	1	14	1	0	0	0	0	0	0	0	314
17:00	3	265	36	0	11	0	0	0	0	0	0	0	0	315
18:00	0	199	38	0	8	0	0	1	0	0	0	0	0	246
19:00	0	128	22	0	4	0	0	0	0	0	0	0	0	154
20:00	0	77	16	1	2	0	0	0	0	0	0	0	0	96
21:00	0	69	11	0	4	1	0	0	0	0	0	0	0	85
22:00	0	32	5	0	1	0	0	0	0	0	0	0	0	38
23:00	0	14	4	0	0	0	0	0	0	0	0	0	0	18
Total	16	2602	565	29	151	11	5	11	1	0	0	0	0	3391
Percent	0.5%	76.7%	16.7%	0.9%	4.5%	0.3%	0.1%	0.3%	0.0%	0.0%	0.0%	0.0%	0.0%	
AM Peak	09:00	08:00	09:00	06:00	08:00	11:00	10:00	08:00	11:00					08:00
Vol.	3	227	45	5	11	2	2	2	1					289
PM Peak	17:00	17:00	15:00	15:00	15:00	15:00	12:00	13:00						17:00
Vol.	3	265	57	4	20	2	1	2						315

Massachusetts Avenue (Route 111)
east of Hughes Lane
City, State: Boxborough, MA
Client: Bayside Engineering / K. Cram

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Office: 508.481.3999 Fax: 508.545.1234
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164948 A Class
Site Code: 2162135

WB

Start Time	Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total
02/24/1														
6	0	11	4	0	2	1	0	0	0	0	0	0	0	18
01:00	0	5	3	0	1	0	0	0	0	0	0	0	0	9
02:00	0	1	1	0	2	0	0	0	0	0	0	0	0	4
03:00	0	3	3	0	3	0	0	0	0	0	0	0	0	9
04:00	0	7	2	0	3	0	0	1	0	0	0	0	0	13
05:00	0	17	7	1	5	0	0	0	0	0	0	0	0	30
06:00	0	66	12	4	6	0	0	0	0	0	0	0	0	88
07:00	3	204	34	0	5	0	0	0	0	0	0	0	0	246
08:00	2	205	40	4	16	0	1	2	0	0	0	0	0	270
09:00	1	166	35	4	11	1	1	0	0	0	0	0	0	219
10:00	0	101	30	1	9	0	1	0	0	0	0	0	0	142
11:00	1	129	33	2	15	0	0	0	0	0	0	0	0	180
12 PM	4	171	38	2	19	1	1	1	0	0	0	0	0	237
13:00	0	143	39	2	11	0	0	0	0	0	0	0	0	195
14:00	3	156	44	2	12	2	1	0	0	0	0	0	0	220
15:00	3	192	59	5	19	0	0	1	0	0	0	0	0	279
16:00	3	234	53	0	14	1	0	0	0	0	0	0	0	305
17:00	2	249	50	0	8	0	0	1	0	0	0	0	0	310
18:00	1	215	31	0	6	0	0	0	0	0	0	0	0	253
19:00	1	135	22	0	6	0	0	0	0	0	0	0	0	164
20:00	1	103	15	0	3	0	0	0	0	0	0	0	0	122
21:00	0	85	9	0	2	0	0	0	0	0	0	0	0	96
22:00	0	29	4	0	3	0	0	0	0	0	0	0	0	36
23:00	0	22	1	0	0	0	0	0	0	0	0	0	0	23
Total	25	2649	569	27	181	6	5	6	0	0	0	0	0	3468
Percent	0.7%	76.4%	16.4%	0.8%	5.2%	0.2%	0.1%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	
AM Peak	07:00	08:00	08:00	06:00	08:00	00:00	08:00	08:00						08:00
Vol.	3	205	40	4	16	1	1	2						270
PM Peak	12:00	17:00	15:00	15:00	12:00	14:00	12:00	12:00						17:00
Vol.	4	249	59	5	19	2	1	1						310

Massachusetts Avenue (Route 111)
east of Hughes Lane
City, State: Boxborough, MA
Client: Bayside Engineering / K. Cram

PRECISION DATA INDUSTRIES, LLC
P.O. Box 301 Berlin, MA 01503
Office: 508.481.3999 Fax: 508.545.1234
Email: datarequests@pdillc.com

164948 A Class
Site Code: 2162135

WB

Start Time	Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total
02/25/16	0	10	1	0	0	0	0	0	0	0	0	0	0	11
01:00	0	2	1	0	1	0	0	0	0	0	0	0	0	4
02:00	0	3	1	0	1	0	0	0	0	0	0	0	0	5
03:00	0	2	1	0	1	0	0	0	0	0	0	0	0	4
04:00	0	1	2	0	2	0	0	0	0	0	0	0	0	5
05:00	0	16	3	0	2	0	0	0	1	0	0	0	0	22
06:00	0	69	12	2	4	0	0	0	0	0	0	0	0	87
07:00	1	184	23	3	13	1	0	1	0	0	0	0	0	226
08:00	2	218	39	3	13	0	1	1	0	0	0	0	0	277
09:00	1	154	43	3	7	0	0	0	0	0	0	0	0	208
10:00	1	115	31	2	17	1	1	3	0	0	0	0	0	171
11:00	2	118	32	3	12	1	1	3	0	0	0	0	0	172
12 PM	1	162	38	4	17	1	0	0	1	0	0	0	0	224
13:00	0	167	36	1	12	0	1	0	0	0	0	0	0	217
14:00	1	155	30	2	23	0	0	2	0	0	0	0	0	213
15:00	3	203	52	2	21	0	0	0	0	0	0	0	0	281
16:00	2	217	46	1	16	0	0	1	1	0	0	0	0	284
17:00	3	276	44	0	18	0	0	0	0	0	0	0	0	341
18:00	3	218	31	2	11	1	0	0	0	0	0	0	0	266
19:00	0	150	21	0	5	0	0	0	0	0	0	0	0	176
20:00	0	100	12	0	2	0	0	0	0	0	0	0	0	114
21:00	0	75	13	0	5	1	0	0	0	0	0	0	0	94
22:00	0	41	5	0	0	0	0	0	0	0	0	0	0	46
23:00	0	15	2	0	1	0	0	0	0	0	0	0	0	18
Total	20	2671	519	28	204	6	4	11	3	0	0	0	0	3466
Percent	0.6%	77.1%	15.0%	0.8%	5.9%	0.2%	0.1%	0.3%	0.1%	0.0%	0.0%	0.0%	0.0%	
AM Peak	08:00	08:00	09:00	07:00	10:00	07:00	08:00	10:00	05:00					08:00
Vol.	2	218	43	3	17	1	1	3	1					277
PM Peak	15:00	17:00	15:00	12:00	14:00	12:00	13:00	14:00	12:00					17:00
Vol.	3	276	52	4	23	1	1	2	1					341

Massachusetts Avenue (Route 111)
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164948 A Class
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EB

Start Time	Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total
02/23/1														
6	0	3	1	0	1	0	0	0	0	0	0	0	0	5
01:00	0	0	1	0	1	0	0	0	0	0	0	0	0	2
02:00	0	1	0	0	0	0	0	0	0	0	0	0	0	1
03:00	0	4	0	0	0	0	0	0	0	0	0	0	0	4
04:00	0	10	1	0	1	0	0	0	0	0	0	0	0	12
05:00	0	38	13	1	6	1	0	0	0	0	0	0	0	59
06:00	1	108	22	3	11	3	0	0	0	0	0	0	0	148
07:00	3	219	42	0	18	2	1	1	0	0	0	0	0	286
08:00	0	232	55	5	14	0	0	1	0	0	0	0	0	307
09:00	1	161	42	2	13	2	0	0	0	0	0	0	0	221
10:00	2	107	32	1	13	0	0	0	0	0	0	0	0	155
11:00	0	162	37	2	17	0	0	1	2	0	0	0	0	221
12 PM	0	159	23	1	17	4	0	1	1	0	0	0	0	206
13:00	0	129	27	0	10	0	0	0	0	0	0	0	0	166
14:00	1	146	35	1	13	0	0	1	0	0	0	0	0	197
15:00	3	142	40	2	16	0	0	1	0	0	0	0	0	204
16:00	1	199	43	1	9	0	0	1	0	0	0	0	0	254
17:00	2	259	46	0	6	0	0	0	0	0	0	0	0	313
18:00	0	179	32	0	10	0	0	0	0	0	0	0	0	221
19:00	0	87	24	0	1	0	0	0	0	0	0	0	0	112
20:00	0	60	12	0	1	1	0	0	0	0	0	0	0	74
21:00	0	47	6	0	3	0	0	0	0	0	0	0	0	56
22:00	0	20	4	0	1	0	0	0	0	0	0	0	0	25
23:00	0	7	3	0	0	0	0	0	0	0	0	0	0	10
Total	14	2479	541	19	182	13	1	7	3	0	0	0	0	3259
Percent	0.4%	76.1%	16.6%	0.6%	5.6%	0.4%	0.0%	0.2%	0.1%	0.0%	0.0%	0.0%	0.0%	
AM Peak	07:00	08:00	08:00	08:00	07:00	06:00	07:00	07:00	11:00					08:00
Vol.	3	232	55	5	18	3	1	1	2					307
PM Peak	15:00	17:00	17:00	15:00	12:00	12:00		12:00	12:00					17:00
Vol.	3	259	46	2	17	4		1	1					313

Massachusetts Avenue (Route 111)
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164948 A Class
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EB

Start Time	Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total
02/24/1														
6	0	6	0	0	0	0	1	0	0	0	0	0	0	7
01:00	0	3	1	0	2	0	0	0	0	0	0	0	0	6
02:00	0	4	3	0	1	0	0	0	0	0	0	0	0	8
03:00	0	2	2	0	5	0	0	0	0	0	0	0	0	9
04:00	0	13	3	1	4	0	0	0	0	0	0	0	0	21
05:00	0	33	11	0	6	0	0	0	0	0	0	0	0	50
06:00	1	98	26	1	17	0	0	0	0	0	0	0	0	143
07:00	2	210	28	1	15	1	0	2	0	0	0	0	0	259
08:00	0	212	38	1	24	4	0	0	0	0	0	0	0	279
09:00	0	135	45	4	15	4	0	2	0	0	0	0	0	205
10:00	0	89	27	0	16	1	0	0	0	0	0	0	0	133
11:00	1	125	26	2	11	0	0	0	0	0	0	0	0	165
12 PM	1	113	46	3	17	1	0	1	0	0	0	0	0	182
13:00	1	112	32	0	10	0	0	0	0	0	0	0	0	155
14:00	2	125	53	1	12	1	0	0	0	0	0	0	0	194
15:00	0	169	41	4	10	1	0	0	0	0	0	0	0	225
16:00	1	195	43	1	11	0	0	0	0	0	0	0	0	251
17:00	1	261	58	0	8	0	0	0	0	0	0	0	0	328
18:00	3	205	45	0	8	0	0	0	0	0	0	0	0	261
19:00	1	90	20	0	0	1	0	0	1	0	0	0	0	113
20:00	0	68	11	0	4	0	0	0	0	0	0	0	0	83
21:00	0	44	15	0	3	0	0	0	0	0	0	0	0	62
22:00	0	22	3	0	4	0	0	0	0	0	0	0	0	29
23:00	0	11	2	0	1	0	0	0	0	0	0	0	0	14
Total	14	2345	579	19	204	14	1	5	1	0	0	0	0	3182
Percent	0.4%	73.7%	18.2%	0.6%	6.4%	0.4%	0.0%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	
AM Peak	07:00	08:00	09:00	09:00	08:00	08:00	00:00	07:00						08:00
Vol.	2	212	45	4	24	4	1	2						279
PM Peak	18:00	17:00	17:00	15:00	12:00	12:00		12:00	19:00					17:00
Vol.	3	261	58	4	17	1		1	1					328

Massachusetts Avenue (Route 111)
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EB

Start Time	Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total
02/25/1														
6	0	2	0	0	0	0	0	0	0	0	0	0	0	2
01:00	0	5	1	0	0	0	0	0	0	0	0	0	0	6
02:00	0	2	2	0	2	0	0	0	0	0	0	0	0	6
03:00	0	1	0	0	1	0	0	0	0	0	0	0	0	2
04:00	0	9	3	0	2	0	0	0	1	0	0	0	0	15
05:00	0	28	11	0	5	1	0	0	0	0	0	0	0	45
06:00	0	91	21	7	10	2	0	0	0	0	0	0	0	131
07:00	0	228	28	4	20	1	0	1	0	0	0	0	0	282
08:00	2	211	44	1	15	1	0	1	2	0	0	0	0	277
09:00	0	154	39	4	17	2	0	1	1	0	0	0	0	218
10:00	1	110	34	0	13	2	0	2	0	0	0	0	0	162
11:00	0	139	31	2	16	0	0	1	0	0	0	0	0	189
12 PM	4	148	34	2	12	0	0	0	0	0	0	0	0	200
13:00	3	100	37	1	7	0	0	0	0	0	0	0	0	148
14:00	1	135	34	1	9	0	0	0	0	0	0	0	0	180
15:00	1	169	51	0	16	0	0	0	0	0	0	0	0	237
16:00	1	193	28	1	10	0	0	0	0	0	0	0	0	233
17:00	4	272	41	0	9	1	0	0	0	0	0	0	0	327
18:00	1	198	27	0	5	0	0	1	0	0	0	0	0	232
19:00	2	114	20	0	3	0	0	0	0	0	0	0	0	139
20:00	0	67	8	0	2	0	0	0	0	0	0	0	0	77
21:00	0	54	5	0	1	0	0	0	0	0	0	0	0	60
22:00	0	28	7	0	1	0	0	0	0	0	0	0	0	36
23:00	0	15	1	0	0	0	0	0	0	0	0	0	0	16
Total	20	2473	507	23	176	10	0	7	4	0	0	0	0	3220
Percent	0.6%	76.8%	15.7%	0.7%	5.5%	0.3%	0.0%	0.2%	0.1%	0.0%	0.0%	0.0%	0.0%	
AM Peak	08:00	07:00	08:00	06:00	07:00	06:00		10:00	08:00					07:00
Vol.	2	228	44	7	20	2		2	2					282
PM Peak	12:00	17:00	15:00	12:00	15:00	17:00		18:00						17:00
Vol.	4	272	51	2	16	1		1						327

Massachusetts Avenue (Route 111)
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164948 A Speed
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WB

Start Time	1 14	15 19	20 24	25 29	30 34	35 39	40 44	45 49	50 54	55 59	60 64	65 69	70 9999	Total	85th % ile	Ave Speed
02/23/ 16	0	0	0	0	0	0	5	0	3	0	0	0	0	8	52	46
01:00	0	0	0	0	1	2	2	0	1	0	0	0	0	6	49	40
02:00	0	0	0	0	0	0	0	1	0	0	0	0	0	1	48	47
03:00	0	0	0	0	0	0	2	2	0	0	0	0	0	4	47	45
04:00	0	0	0	0	0	1	3	3	0	0	0	0	0	7	47	43
05:00	0	0	0	1	0	3	14	4	1	0	0	0	0	23	45	42
06:00	**2**	1	0	0	4	26	47	22	1	0	0	0	0	103	45	41
07:00	0	0	1	**5**	3	41	130	**59**	**5**	**1**	0	0	0	245	46	42
08:00	0	0	0	0	5	**81**	**153**	47	2	0	0	0	**1**	**289**	44	41
09:00	0	**4**	**3**	4	4	45	123	29	5	0	0	0	0	217	44	41
10:00	1	0	1	3	**13**	30	86	33	0	0	0	0	0	167	45	41
11:00	1	1	0	0	1	39	92	35	2	0	0	0	0	171	45	42
12 PM	0	1	0	3	2	37	101	26	1	0	0	0	0	171	44	41
13:00	1	2	2	0	5	69	94	31	**5**	0	0	0	0	209	44	40
14:00	0	0	2	4	11	69	98	33	1	0	0	0	0	218	44	40
15:00	1	2	**3**	**7**	**25**	81	125	39	1	0	**1**	0	**1**	286	43	40
16:00	0	**3**	1	7	19	67	**170**	**47**	0	0	0	0	0	314	43	40
17:00	**3**	2	1	2	9	**92**	164	40	2	0	0	0	0	**315**	43	40
18:00	0	1	1	1	7	67	141	25	3	0	0	0	0	246	43	41
19:00	0	0	0	0	2	53	75	20	4	0	0	0	0	154	44	41
20:00	0	0	0	0	10	22	44	19	1	0	0	0	0	96	45	41
21:00	0	0	0	1	4	28	45	7	0	0	0	0	0	85	43	40
22:00	0	0	0	0	1	13	17	5	2	0	0	0	0	38	45	41
23:00	0	0	0	0	0	2	10	5	1	0	0	0	0	18	47	43
Total	9	17	15	38	126	868	1741	532	41	1	1	0	2	3391		
%	0.3%	0.5%	0.4%	1.1%	3.7%	25.6%	51.3%	15.7%	1.2%	0.0%	0.0%	0.0%	0.1%			
AM Peak	06:00	09:00	09:00	07:00	10:00	08:00	08:00	07:00	07:00	07:00			08:00	08:00		
Vol.	2	4	3	5	13	81	153	59	5	1			1	289		
PM Peak	17:00	16:00	15:00	15:00	15:00	17:00	16:00	16:00	13:00		15:00		15:00	17:00		
Vol.	3	3	3	7	25	92	170	47	5		1		1	315		

Stats

15th Percentile :	35 MPH
50th Percentile :	40 MPH
85th Percentile :	44 MPH
95th Percentile :	47 MPH
Mean Speed(Average) :	41 MPH
10 MPH Pace Speed :	35-44 MPH
Number in Pace :	2609
Percent in Pace :	76.9%
Number of Vehicles > 40 MPH :	1970
Percent of Vehicles > 40 MPH :	58.1%

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WB

Start Time	1 14	15 19	20 24	25 29	30 34	35 39	40 44	45 49	50 54	55 59	60 64	65 69	70 9999	Total	85th % ile	Ave Speed
02/24/ 16	0	0	0	0	5	4	5	2	1	0	0	0	**1**	18	45	39
01:00	0	**1**	0	0	2	4	0	2	0	0	0	0	0	9	45	36
02:00	0	0	0	1	2	0	1	0	0	0	0	0	0	4	41	33
03:00	0	1	0	0	1	5	0	2	0	0	0	0	0	9	45	36
04:00	0	0	0	0	2	6	5	0	0	0	0	0	0	13	42	38
05:00	0	0	1	0	4	10	10	5	0	0	0	0	0	30	44	39
06:00	0	0	0	1	4	26	43	14	0	0	0	0	0	88	44	41
07:00	2	0	0	0	9	62	**144**	28	1	0	0	0	0	246	43	41
08:00	**3**	0	0	0	**15**	**89**	134	26	1	**1**	0	0	1	**270**	43	40
09:00	1	0	3	3	12	53	109	**37**	1	0	0	0	0	219	44	40
10:00	0	0	3	0	6	41	63	27	2	0	0	0	0	142	45	41
11:00	0	0	**4**	**7**	11	40	82	29	**7**	0	0	0	0	180	45	40
12 PM	2	**2**	**5**	4	10	75	106	33	0	0	0	0	0	237	43	40
13:00	1	0	1	5	7	75	82	22	2	0	0	0	0	195	43	40
14:00	1	0	1	**6**	**21**	83	86	19	**3**	0	0	0	0	220	43	39
15:00	**3**	0	1	1	19	89	140	22	3	0	0	0	**1**	279	43	40
16:00	2	2	2	2	11	97	**147**	**40**	2	0	0	0	0	305	43	40
17:00	2	0	1	0	15	125	140	27	0	0	0	0	0	**310**	43	40
18:00	0	0	0	0	21	**128**	96	7	0	**1**	0	0	0	253	42	39
19:00	1	0	0	0	12	76	60	14	1	0	0	0	0	164	43	39
20:00	1	0	0	1	5	49	49	16	1	0	0	0	0	122	43	40
21:00	0	0	0	0	8	26	49	11	1	1	0	0	0	96	43	41
22:00	0	0	0	0	1	8	16	10	1	0	0	0	0	36	46	42
23:00	0	0	1	0	2	2	14	3	1	0	0	0	0	23	44	41
Total	19	6	23	31	205	1173	1581	396	28	3	0	0	3	3468		
%	0.5%	0.2%	0.7%	0.9%	5.9%	33.8%	45.6%	11.4%	0.8%	0.1%	0.0%	0.0%	0.1%			
AM Peak	08:00	01:00	11:00	11:00	08:00	08:00	07:00	09:00	11:00	08:00			00:00	08:00		
Vol.	3	1	4	7	15	89	144	37	7	1			1	270		
PM Peak	15:00	12:00	12:00	14:00	14:00	18:00	16:00	16:00	14:00	18:00			15:00	17:00		
Vol.	3	2	5	6	21	128	147	40	3	1			1	310		

Stats

15th Percentile :	35 MPH
50th Percentile :	39 MPH
85th Percentile :	43 MPH
95th Percentile :	47 MPH
Mean Speed(Average) :	40 MPH
10 MPH Pace Speed :	35-44 MPH
Number in Pace :	2754
Percent in Pace :	79.4%
Number of Vehicles > 40 MPH :	1695
Percent of Vehicles > 40 MPH :	48.9%

Massachusetts Avenue (Route 111)
east of Hughes Lane
City, State: Boxborough, MA
Client: Bayside Engineering / K. Cram

PRECISION DATA INDUSTRIES, LLC
P.O. Box 301 Berlin, MA 01503
Office: 508.481.3999 Fax: 508.545.1234
Email: datarequests@pdillc.com

164948 A Speed
Site Code: 2162135

WB

Start Time	1 14	15 19	20 24	25 29	30 34	35 39	40 44	45 49	50 54	55 59	60 64	65 69	70 9999	Total	85th % ile	Ave Speed
02/25/ 16	0	0	0	0	0	2	7	2	0	0	0	0	0	11	44	42
01:00	0	0	0	0	0	1	1	0	0	**1**	**1**	0	0	4	61	49
02:00	0	0	0	0	0	2	1	0	1	1	0	0	0	5	55	45
03:00	0	0	0	0	0	2	1	1	0	0	0	0	0	4	46	41
04:00	0	0	0	0	0	0	4	1	0	0	0	0	0	5	45	43
05:00	0	0	0	0	0	8	8	5	1	0	0	0	0	22	46	42
06:00	0	0	0	0	2	16	42	22	**5**	0	0	0	0	87	47	43
07:00	**1**	**1**	**1**	1	6	57	116	38	5	0	0	0	0	226	45	41
08:00	1	1	1	1	6	**82**	**135**	**46**	3	1	0	0	0	**277**	44	41
09:00	1	1	0	1	**11**	45	103	41	5	0	0	0	0	208	45	41
10:00	0	1	1	3	2	56	79	26	3	0	0	0	0	171	44	41
11:00	1	1	0	**4**	3	29	91	40	3	0	0	0	0	172	46	42
12 PM	1	1	1	6	**13**	36	121	39	**6**	0	0	0	0	224	45	41
13:00	0	0	0	4	11	50	106	42	3	0	0	0	**1**	217	45	41
14:00	1	0	1	**7**	10	59	110	22	3	0	0	0	0	213	43	40
15:00	2	2	**2**	4	12	88	130	37	3	**1**	0	0	0	281	43	40
16:00	1	**3**	2	0	10	59	155	**50**	4	0	0	0	0	284	45	41
17:00	1	0	1	3	8	**94**	**188**	42	3	0	**1**	0	0	**341**	43	41
18:00	**3**	0	0	2	11	92	126	27	5	0	0	0	0	266	43	40
19:00	0	0	0	0	1	56	86	29	3	1	0	0	0	176	45	41
20:00	0	0	2	0	10	39	49	14	0	0	0	0	0	114	43	40
21:00	0	0	0	0	5	32	45	11	1	0	0	0	0	94	43	40
22:00	0	0	0	0	0	11	25	9	1	0	0	0	0	46	45	42
23:00	0	0	0	0	1	4	9	3	0	1	0	0	0	18	46	42
Total	13	11	12	36	122	920	1738	547	58	6	2	0	1	3466		
%	0.4%	0.3%	0.3%	1.0%	3.5%	26.5%	50.1%	15.8%	1.7%	0.2%	0.1%	0.0%	0.0%			
AM Peak	07:00	07:00	07:00	11:00	09:00	08:00	08:00	08:00	06:00	01:00	01:00			08:00		
Vol.	1	1	1	4	11	82	135	46	5	1	1			277		
PM Peak	18:00	16:00	15:00	14:00	12:00	17:00	17:00	16:00	12:00	15:00	17:00		13:00	17:00		
Vol.	3	3	2	7	13	94	188	50	6	1	1		1	341		

Stats

15th Percentile :	35 MPH
50th Percentile :	40 MPH
85th Percentile :	44 MPH
95th Percentile :	48 MPH
Mean Speed(Average) :	41 MPH
10 MPH Pace Speed :	35-44 MPH
Number in Pace :	2658
Percent in Pace :	76.7%
Number of Vehicles > 40 MPH :	2004
Percent of Vehicles > 40 MPH :	57.8%

Massachusetts Avenue (Route 111)
east of Hughes Lane
City, State: Boxborough, MA
Client: Bayside Engineering / K. Cram

PRECISION DATA INDUSTRIES, LLC
P.O. Box 301 Berlin, MA 01503
Office: 508.481.3999 Fax: 508.545.1234
Email: datarequests@pdillc.com

164948 A Speed
Site Code: 2162135

EB

Start Time	1 14	15 19	20 24	25 29	30 34	35 39	40 44	45 49	50 54	55 59	60 64	65 69	70 9999	Total	85th % ile	Ave Speed
02/23/ 16	0	0	0	0	0	1	1	0	3	0	0	0	0	5	52	47
01:00	0	0	0	0	0	0	2	0	0	0	0	0	0	2	43	42
02:00	0	0	0	0	0	0	1	0	0	0	0	0	0	1	43	42
03:00	0	0	0	0	0	0	3	0	1	0	0	0	0	4	51	45
04:00	0	0	0	0	0	0	5	4	3	0	0	0	0	12	51	46
05:00	0	0	0	0	0	3	25	26	4	1	0	0	0	59	48	45
06:00	0	**2**	3	1	0	11	71	56	3	1	0	0	0	148	47	43
07:00	**2**	1	0	4	**9**	19	**163**	73	**13**	1	**1**	0	0	286	47	43
08:00	0	0	1	**7**	3	**40**	151	**99**	5	1	0	0	0	**307**	46	43
09:00	0	1	**4**	2	5	29	113	59	8	0	0	0	0	221	46	42
10:00	1	1	0	1	3	24	73	40	11	1	0	0	0	155	47	43
11:00	0	0	1	0	5	37	110	55	11	**2**	0	0	0	221	47	43
12 PM	1	1	1	**2**	6	37	104	50	4	0	0	0	0	206	46	42
13:00	0	0	1	0	3	32	85	42	3	0	0	0	0	166	46	42
14:00	0	1	1	0	5	18	93	**69**	**9**	**1**	0	0	0	197	47	43
15:00	**3**	3	**3**	2	**7**	34	113	37	2	0	0	0	0	204	45	41
16:00	1	**4**	1	0	0	39	137	67	5	0	0	0	0	254	46	42
17:00	1	1	1	2	7	**74**	**156**	64	7	0	0	0	0	**313**	45	41
18:00	2	0	1	0	3	47	120	45	2	1	0	0	0	221	45	42
19:00	0	0	0	0	2	25	54	27	3	0	**1**	0	0	112	46	42
20:00	0	0	0	1	2	19	40	9	3	0	0	0	0	74	44	41
21:00	0	0	0	1	3	17	27	7	1	0	0	0	0	56	43	40
22:00	0	0	0	0	1	8	9	4	3	0	0	0	0	25	48	42
23:00	0	0	0	0	2	6	1	1	0	0	0	0	0	10	41	38
Total	11	15	18	23	66	520	1657	834	104	9	2	0	0	3259		
%	0.3%	0.5%	0.6%	0.7%	2.0%	16.0%	50.8%	25.6%	3.2%	0.3%	0.1%	0.0%	0.0%			
AM Peak	07:00	06:00	09:00	08:00	07:00	08:00	07:00	08:00	07:00	11:00	07:00			08:00		
Vol.	2	2	4	7	9	40	163	99	13	2	1			307		
PM Peak	15:00	16:00	15:00	12:00	15:00	17:00	17:00	14:00	14:00	14:00	19:00			17:00		
Vol.	3	4	3	2	7	74	156	69	9	1	1			313		

Stats

15th Percentile :	37 MPH
50th Percentile :	41 MPH
85th Percentile :	46 MPH
95th Percentile :	48 MPH
Mean Speed(Average) :	42 MPH
10 MPH Pace Speed :	40-49 MPH
Number in Pace :	2491
Percent in Pace :	76.4%
Number of Vehicles > 40 MPH :	2275
Percent of Vehicles > 40 MPH :	69.8%

Massachusetts Avenue (Route 111)
east of Hughes Lane
City, State: Boxborough, MA
Client: Bayside Engineering / K. Cram

PRECISION DATA INDUSTRIES, LLC
P.O. Box 301 Berlin, MA 01503
Office: 508.481.3999 Fax: 508.545.1234
Email: datarequests@pdillc.com

164948 A Speed
Site Code: 2162135

EB

Start Time	1 14	15 19	20 24	25 29	30 34	35 39	40 44	45 49	50 54	55 59	60 64	65 69	70 9999	Total	85th % ile	Ave Speed
02/24/ 16	0	0	0	0	0	3	2	1	1	0	0	0	0	7	48	42
01:00	0	0	0	1	2	0	2	1	0	0	0	0	0	6	44	37
02:00	0	0	0	3	2	1	2	0	0	0	0	0	0	8	41	33
03:00	0	0	0	0	2	2	5	0	0	0	0	0	0	9	42	39
04:00	0	0	0	0	2	8	8	3	0	0	0	0	0	21	43	40
05:00	0	0	0	**4**	3	10	22	10	1	0	0	0	0	50	45	40
06:00	0	0	0	0	0	29	76	37	1	0	0	0	0	143	46	42
07:00	**1**	0	0	4	4	50	**152**	**42**	5	1	0	0	0	259	45	42
08:00	1	0	1	4	11	**85**	137	35	3	**2**	0	0	0	**279**	43	41
09:00	0	0	1	1	**13**	44	108	35	3	0	0	0	0	205	45	41
10:00	0	0	2	4	2	25	65	29	**6**	0	0	0	0	133	46	42
11:00	0	0	**3**	2	2	28	94	31	4	1	0	0	0	165	45	42
12 PM	1	0	0	0	1	48	72	45	**12**	**2**	**1**	0	0	182	47	43
13:00	1	**1**	0	**3**	1	38	75	33	3	0	0	0	0	155	45	41
14:00	1	1	0	0	4	37	101	44	6	0	0	0	0	194	46	42
15:00	0	0	**1**	1	2	42	124	48	7	0	0	0	0	225	46	42
16:00	0	0	1	1	0	30	151	**61**	7	0	0	0	0	251	46	43
17:00	1	0	0	1	**18**	86	**161**	57	4	0	0	0	0	**328**	45	41
18:00	**2**	0	0	0	15	**107**	121	13	3	0	0	0	0	261	43	39
19:00	0	0	0	0	11	40	51	10	1	0	0	0	0	113	43	40
20:00	0	1	0	0	5	32	33	8	4	0	0	0	0	83	43	40
21:00	0	0	0	0	1	27	20	11	3	0	0	0	0	62	46	41
22:00	0	0	0	1	2	5	13	6	2	0	0	0	0	29	47	42
23:00	0	0	0	0	1	5	7	0	1	0	0	0	0	14	43	40
Total	8	3	9	30	104	782	1602	560	77	6	1	0	0	3182		
%	0.3%	0.1%	0.3%	0.9%	3.3%	24.6%	50.3%	17.6%	2.4%	0.2%	0.0%	0.0%	0.0%			
AM Peak	07:00		11:00	05:00	09:00	08:00	07:00	07:00	10:00	08:00				08:00		
Vol.	1		3	4	13	85	152	42	6	2				279		
PM Peak	18:00	13:00	15:00	13:00	17:00	18:00	17:00	16:00	12:00	12:00	12:00			17:00		
Vol.	2	1	1	3	18	107	161	61	12	2	1			328		

Stats

15th Percentile :	36 MPH
50th Percentile :	41 MPH
85th Percentile :	45 MPH
95th Percentile :	48 MPH
Mean Speed(Average) :	41 MPH
10 MPH Pace Speed :	35-44 MPH
Number in Pace :	2384
Percent in Pace :	74.9%
Number of Vehicles > 40 MPH :	1926
Percent of Vehicles > 40 MPH :	60.5%

Massachusetts Avenue (Route 111)
east of Hughes Lane
City, State: Boxborough, MA
Client: Bayside Engineering / K. Cram

PRECISION DATA INDUSTRIES, LLC
P.O. Box 301 Berlin, MA 01503
Office: 508.481.3999 Fax: 508.545.1234
Email: datarequests@pdillc.com

164948 A Speed
Site Code: 2162135

EB

Start Time	1 14	15 19	20 24	25 29	30 34	35 39	40 44	45 49	50 54	55 59	60 64	65 69	70 9999	Total	85th % ile	Ave Speed
02/25/ 16	0	0	0	0	0	1	1	0	0	0	0	0	0	2	42	40
01:00	0	0	0	0	0	1	2	2	1	0	0	0	0	6	49	45
02:00	0	0	0	0	0	2	2	0	1	1	0	0	0	6	54	45
03:00	0	0	0	0	0	0	1	1	0	0	0	0	0	2	47	45
04:00	0	0	0	0	0	1	3	7	4	0	0	0	0	15	51	47
05:00	0	0	0	0	0	2	26	9	5	**3**	0	0	0	45	50	45
06:00	0	1	**2**	0	5	13	51	51	7	1	0	0	0	131	47	43
07:00	0	0	0	**2**	4	33	**164**	72	6	1	0	0	0	**282**	46	43
08:00	**3**	**2**	1	0	6	38	132	**79**	**15**	1	0	0	0	277	47	42
09:00	0	1	0	1	9	**48**	94	56	8	1	0	0	0	218	46	42
10:00	1	0	2	1	2	32	67	49	7	0	**1**	0	0	162	47	42
11:00	0	0	0	0	**11**	26	101	44	6	1	0	0	0	189	46	42
12 PM	**3**	0	0	**4**	5	27	98	55	7	0	**1**	0	0	200	46	42
13:00	1	0	1	3	1	22	60	52	8	0	0	0	0	148	47	43
14:00	0	0	1	1	**9**	38	78	45	8	0	0	0	0	180	46	42
15:00	1	0	1	2	3	42	118	64	5	**1**	0	0	0	237	46	42
16:00	1	0	0	2	1	33	133	60	2	1	0	0	0	233	46	42
17:00	0	**1**	2	3	9	52	**170**	**79**	**10**	1	0	0	0	**327**	46	42
18:00	1	0	**3**	0	7	**57**	121	42	1	0	0	0	0	232	44	41
19:00	0	0	0	0	4	24	72	36	2	0	1	0	0	139	46	42
20:00	0	0	0	0	5	20	37	15	0	0	0	0	0	77	45	41
21:00	0	0	0	1	4	30	16	9	0	0	0	0	0	60	43	39
22:00	0	0	0	0	1	8	17	10	0	0	0	0	0	36	46	42
23:00	0	0	0	0	1	4	5	3	2	1	0	0	0	16	50	43
Total	11	5	13	20	87	554	1569	840	105	13	3	0	0	3220		
%	0.3%	0.2%	0.4%	0.6%	2.7%	17.2%	48.7%	26.1%	3.3%	0.4%	0.1%	0.0%	0.0%			
AM Peak	08:00	08:00	06:00	07:00	11:00	09:00	07:00	08:00	08:00	05:00	10:00			07:00		
Vol.	3	2	2	2	11	48	164	79	15	3	1			282		
PM Peak	12:00	17:00	18:00	12:00	14:00	18:00	17:00	17:00	17:00	15:00	12:00			17:00		
Vol.	3	1	3	4	9	57	170	79	10	1	1			327		

Stats

15th Percentile :	37 MPH
50th Percentile :	41 MPH
85th Percentile :	46 MPH
95th Percentile :	48 MPH
Mean Speed(Average) :	42 MPH
10 MPH Pace Speed :	40-49 MPH
Number in Pace :	2409
Percent in Pace :	74.8%
Number of Vehicles > 40 MPH :	2216
Percent of Vehicles > 40 MPH :	68.8%

Stow Road
south of Massachusetts Avenue (Route 111)
City, State: Boxborough, MA
Client: Bayside Engineering / K. Cram

PRECISION DATA INDUSTRIES, LLC
P.O. Box 301 Berlin, MA 01503
Office: 508.481.3999 Fax: 508.545.1234
Email: datarequests@pdillc.com

164948 B Volume
Site Code: 2162135

Start	NB				SB				Combined				23-Feb-16
Time	A.M.		P.M.		A.M.		P.M.		A.M.		P.M.		Tue
12:00	0		4		0		5		0		9		
12:15	0		9		0		4		0		13		
12:30	0		5		1		4		1		9		
12:45	0	0	10	28	0	1	4	17	0	1	14	45	
01:00	0		7		1		7		1		14		
01:15	0		10		0		6		0		16		
01:30	0		9		0		9		0		18		
01:45	0	0	7	33	0	1	5	27	0	1	12	60	
02:00	0		3		0		3		0		6		
02:15	0		8		0		9		0		17		
02:30	0		9		0		8		0		17		
02:45	0	0	9	29	0	0	7	27	0	0	16	56	
03:00	0		13		0		6		0		19		
03:15	0		16		1		9		1		25		
03:30	1		13		0		20		1		33		
03:45	0	1	8	50	0	1	13	48	0	2	21	98	
04:00	0		11		0		9		0		20		
04:15	0		11		0		9		0		20		
04:30	1		11		1		10		2		21		
04:45	0	1	13	46	1	2	13	41	1	3	26	87	
05:00	0		9		0		16		0		25		
05:15	1		11		0		10		1		21		
05:30	0		9		0		12		0		21		
05:45	3	4	9	38	0	0	13	51	3	4	22	89	
06:00	2		11		1		12		3		23		
06:15	5		7		2		10		7		17		
06:30	9		7		6		7		15		14		
06:45	9	25	8	33	1	10	9	38	10	35	17	71	
07:00	12		3		5		4		17		7		
07:15	6		7		4		8		10		15		
07:30	14		5		6		3		20		8		
07:45	17	49	1	16	12	27	3	18	29	76	4	34	
08:00	20		3		8		5		28		8		
08:15	15		2		14		1		29		3		
08:30	11		2		7		1		18		3		
08:45	13	59	1	8	9	38	5	12	22	97	6	20	
09:00	16		3		9		5		25		8		
09:15	15		5		9		3		24		8		
09:30	6		0		5		4		11		4		
09:45	8	45	0	8	5	28	1	13	13	73	1	21	
10:00	8		0		4		2		12		2		
10:15	6		1		4		0		10		1		
10:30	3		3		9		2		12		5		
10:45	4	21	2	6	6	23	1	5	10	44	3	11	
11:00	7		0		6		0		13		0		
11:15	9		0		6		2		15		2		
11:30	8		1		6		1		14		2		
11:45	5	29	0	1	3	21	0	3	8	50	0	4	
Total	234		296		152		300		386		596		
Percent	60.6%		49.7%		39.4%		50.3%						
Day Total		530				452				982			
Peak	07:30	-	02:45	-	07:45	-	03:15	-	07:30	-	03:15	-	- -
Vol.	66	-	51	-	41	-	51	-	106	-	99	-	- -
P.H.F.	0.825		0.797		0.732		0.638		0.914		0.750		

Stow Road
south of Massachusetts Avenue (Route 111)
City, State: Boxborough, MA
Client: Bayside Engineering / K. Cram

PRECISION DATA INDUSTRIES, LLC
P.O. Box 301 Berlin, MA 01503
Office: 508.481.3999 Fax: 508.545.1234
Email: datarequests@pdillc.com

164948 B Volume
Site Code: 2162135

Start	NB				SB				Combined				24-Feb-16
Time	A.M.		P.M.		A.M.		P.M.		A.M.		P.M.		Wed
12:00	1		7		0		7		1		14		
12:15	0		3		0		9		0		12		
12:30	0		5		0		8		0		13		
12:45	0	1	6	21	0	0	3	27	0	1	9	48	
01:00	0		5		1		4		1		9		
01:15	0		4		1		7		1		11		
01:30	0		16		0		9		0		25		
01:45	0	0	9	34	0	2	7	27	0	2	16	61	
02:00	0		10		0		6		0		16		
02:15	0		5		0		7		0		12		
02:30	1		4		0		2		1		6		
02:45	1	2	7	26	0	0	8	23	1	2	15	49	
03:00	1		8		1		8		2		16		
03:15	0		16		0		4		0		20		
03:30	0		14		0		16		0		30		
03:45	1	2	10	48	0	1	11	39	1	3	21	87	
04:00	0		10		0		12		0		22		
04:15	1		8		0		4		1		12		
04:30	1		10		1		7		2		17		
04:45	0	2	7	35	0	1	8	31	0	3	15	66	
05:00	0		10		0		5		0		15		
05:15	0		8		0		10		0		18		
05:30	1		14		2		9		3		23		
05:45	2	3	11	43	2	4	12	36	4	7	23	79	
06:00	0		8		0		8		0		16		
06:15	6		11		3		6		9		17		
06:30	5		10		3		2		8		12		
06:45	5	16	18	47	2	8	6	22	7	24	24	69	
07:00	5		10		1		4		6		14		
07:15	6		5		4		1		10		6		
07:30	16		4		6		5		22		9		
07:45	16	43	3	22	9	20	2	12	25	63	5	34	
08:00	18		2		10		1		28		3		
08:15	23		2		15		7		38		9		
08:30	11		2		8		3		19		5		
08:45	15	67	0	6	4	37	5	16	19	104	5	22	
09:00	12		4		12		25		24		29		
09:15	13		1		6		9		19		10		
09:30	5		1		6		4		11		5		
09:45	4	34	4	10	1	25	1	39	5	59	5	49	
10:00	10		1		8		0		18		1		
10:15	3		1		4		1		7		2		
10:30	4		0		7		1		11		1		
10:45	7	24	0	2	2	21	2	4	9	45	2	6	
11:00	11		1		6		0		17		1		
11:15	9		1		3		1		12		2		
11:30	3		0		11		0		14		0		
11:45	4	27	0	2	8	28	1	2	12	55	1	4	
Total	221		296		147		278		368		574		
Percent	60.1%		51.6%		39.9%		48.4%						
Day Total		517				425				942			
Peak	07:30	-	03:15	-	07:45	-	03:15	-	07:30	-	03:15	-	- -
Vol.	73	-	50	-	42	-	43	-	113	-	93	-	- -
P.H.F.	0.793		0.781		0.700		0.672		0.743		0.775		

Stow Road
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164948 B Volume
Site Code: 2162135

Start	NB				SB				Combined				25-Feb-16
Time	A.M.		P.M.		A.M.		P.M.		A.M.		P.M.		Thu
12:00	0		2		0		7		0		9		
12:15	0		8		0		7		0		15		
12:30	0		6		0		9		0		15		
12:45	0	0	6	22	0	0	6	29	0	0	12	51	
01:00	0		7		0		4		0		11		
01:15	0		7		0		10		0		17		
01:30	0		9		0		8		0		17		
01:45	0	0	8	31	0	0	8	30	0	0	16	61	
02:00	0		10		0		7		0		17		
02:15	0		11		0		7		0		18		
02:30	0		9		0		4		0		13		
02:45	0	0	13	43	0	0	14	32	0	0	27	75	
03:00	0		8		0		4		0		12		
03:15	0		14		0		9		0		23		
03:30	1		13		0		6		1		19		
03:45	0	1	9	44	0	0	12	31	0	1	21	75	
04:00	0		11		0		13		0		24		
04:15	0		11		1		9		1		20		
04:30	1		7		0		10		1		17		
04:45	0	1	8	37	1	2	11	43	1	3	19	80	
05:00	0		9		1		10		1		19		
05:15	0		12		0		12		0		24		
05:30	0		12		0		16		0		28		
05:45	1	1	11	44	0	1	5	43	1	2	16	87	
06:00	2		7		0		15		2		22		
06:15	6		16		1		5		7		21		
06:30	7		11		10		9		17		20		
06:45	5	20	3	37	0	11	10	39	5	31	13	76	
07:00	8		3		7		3		15		6		
07:15	10		6		6		8		16		14		
07:30	15		5		3		4		18		9		
07:45	14	47	2	16	14	30	4	19	28	77	6	35	
08:00	14		2		8		4		22		6		
08:15	16		3		7		0		23		3		
08:30	10		2		15		2		25		4		
08:45	12	52	1	8	5	35	4	10	17	87	5	18	
09:00	20		2		10		3		30		5		
09:15	12		4		7		3		19		7		
09:30	8		3		4		0		12		3		
09:45	11	51	0	9	13	34	2	8	24	85	2	17	
10:00	8		0		2		1		10		1		
10:15	6		1		5		1		11		2		
10:30	10		0		5		2		15		2		
10:45	5	29	0	1	2	14	1	5	7	43	1	6	
11:00	6		0		7		0		13		0		
11:15	6		0		6		2		12		2		
11:30	8		0		8		0		16		0		
11:45	6	26	0	0	7	28	1	3	13	54	1	3	
Total	228		292		155		292		383		584		
Percent	59.5%		50.0%		40.5%		50.0%						
Day Total		520				447				967			
Peak	07:30	-	02:45	-	07:45	-	04:45	-	07:45	-	04:45	-	- -
Vol.	59	-	48	-	44	-	49	-	98	-	90	-	- -
P.H.F.	0.922		0.857		0.733		0.766		0.875		0.804		

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164948 B Class
Site Code: 2162135

NB

Start Time	Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total
02/23/16	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00	0	1	0	0	0	0	0	0	0	0	0	0	0	1
04:00	0	0	1	0	0	0	0	0	0	0	0	0	0	1
05:00	0	4	0	0	0	0	0	0	0	0	0	0	0	4
06:00	0	17	3	3	2	0	0	0	0	0	0	0	0	25
07:00	0	33	11	0	5	0	0	0	0	0	0	0	0	49
08:00	0	42	14	0	3	0	0	0	0	0	0	0	0	59
09:00	0	29	9	2	4	0	0	1	0	0	0	0	0	45
10:00	0	15	5	0	1	0	0	0	0	0	0	0	0	21
11:00	0	23	3	0	2	0	0	1	0	0	0	0	0	29
12 PM	1	21	3	0	3	0	0	0	0	0	0	0	0	28
13:00	0	23	7	2	1	0	0	0	0	0	0	0	0	33
14:00	0	18	6	0	5	0	0	0	0	0	0	0	0	29
15:00	0	31	15	2	2	0	0	0	0	0	0	0	0	50
16:00	0	27	10	0	6	2	0	1	0	0	0	0	0	46
17:00	0	35	2	0	1	0	0	0	0	0	0	0	0	38
18:00	0	20	10	0	2	0	0	1	0	0	0	0	0	33
19:00	0	12	3	0	1	0	0	0	0	0	0	0	0	16
20:00	0	7	1	0	0	0	0	0	0	0	0	0	0	8
21:00	0	7	1	0	0	0	0	0	0	0	0	0	0	8
22:00	0	2	0	0	4	0	0	0	0	0	0	0	0	6
23:00	0	0	1	0	0	0	0	0	0	0	0	0	0	1
Total	1	367	105	9	42	2	0	4	0	0	0	0	0	530
Percent	0.2%	69.2%	19.8%	1.7%	7.9%	0.4%	0.0%	0.8%	0.0%	0.0%	0.0%	0.0%	0.0%	
AM Peak		08:00	08:00	06:00	07:00			09:00						08:00
Vol.		42	14	3	5			1						59
PM Peak	12:00	17:00	15:00	13:00	16:00	16:00		16:00						15:00
Vol.	1	35	15	2	6	2		1						50

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NB

Start Time	Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total
02/24/1														
6	0	1	0	0	0	0	0	0	0	0	0	0	0	1
01:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:00	0	2	0	0	0	0	0	0	0	0	0	0	0	2
03:00	0	1	1	0	0	0	0	0	0	0	0	0	0	2
04:00	0	0	1	0	1	0	0	0	0	0	0	0	0	2
05:00	0	1	1	0	1	0	0	0	0	0	0	0	0	3
06:00	0	7	1	4	4	0	0	0	0	0	0	0	0	16
07:00	0	27	13	0	3	0	0	0	0	0	0	0	0	43
08:00	0	46	17	0	3	0	0	1	0	0	0	0	0	67
09:00	0	23	8	0	3	0	0	0	0	0	0	0	0	34
10:00	0	17	4	0	3	0	0	0	0	0	0	0	0	24
11:00	0	19	4	0	4	0	0	0	0	0	0	0	0	27
12 PM	0	13	4	1	3	0	0	0	0	0	0	0	0	21
13:00	0	22	7	2	3	0	0	0	0	0	0	0	0	34
14:00	0	19	3	1	3	0	0	0	0	0	0	0	0	26
15:00	0	28	15	1	4	0	0	0	0	0	0	0	0	48
16:00	0	20	12	0	3	0	0	0	0	0	0	0	0	35
17:00	0	33	8	0	2	0	0	0	0	0	0	0	0	43
18:00	0	38	8	0	1	0	0	0	0	0	0	0	0	47
19:00	0	20	2	0	0	0	0	0	0	0	0	0	0	22
20:00	0	5	1	0	0	0	0	0	0	0	0	0	0	6
21:00	0	8	2	0	0	0	0	0	0	0	0	0	0	10
22:00	0	0	2	0	0	0	0	0	0	0	0	0	0	2
23:00	0	2	0	0	0	0	0	0	0	0	0	0	0	2
Total	0	352	114	9	41	0	0	1	0	0	0	0	0	517
Percent	0.0%	68.1%	22.1%	1.7%	7.9%	0.0%	0.0%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	
AM Peak		08:00	08:00	06:00	06:00			08:00						08:00
Vol.		46	17	4	4			1						67
PM Peak		18:00	15:00	13:00	15:00									15:00
Vol.		38	15	2	4									48

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NB

Start Time	Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total
02/25/16	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00	0	1	0	0	0	0	0	0	0	0	0	0	0	1
04:00	0	0	1	0	0	0	0	0	0	0	0	0	0	1
05:00	0	1	0	0	0	0	0	0	0	0	0	0	0	1
06:00	0	15	3	2	0	0	0	0	0	0	0	0	0	20
07:00	0	34	4	3	6	0	0	0	0	0	0	0	0	47
08:00	1	38	8	1	3	1	0	0	0	0	0	0	0	52
09:00	0	33	10	1	7	0	0	0	0	0	0	0	0	51
10:00	0	18	4	0	6	0	0	1	0	0	0	0	0	29
11:00	0	13	7	0	5	0	0	1	0	0	0	0	0	26
12 PM	1	11	7	0	3	0	0	0	0	0	0	0	0	22
13:00	0	18	11	0	2	0	0	0	0	0	0	0	0	31
14:00	0	33	7	0	3	0	0	0	0	0	0	0	0	43
15:00	1	27	11	1	4	0	0	0	0	0	0	0	0	44
16:00	0	24	8	0	4	0	0	0	1	0	0	0	0	37
17:00	0	33	6	0	5	0	0	0	0	0	0	0	0	44
18:00	0	26	8	0	3	0	0	0	0	0	0	0	0	37
19:00	0	14	1	0	1	0	0	0	0	0	0	0	0	16
20:00	0	6	0	0	2	0	0	0	0	0	0	0	0	8
21:00	0	9	0	0	0	0	0	0	0	0	0	0	0	9
22:00	0	1	0	0	0	0	0	0	0	0	0	0	0	1
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	3	355	96	8	54	1	0	2	1	0	0	0	0	520
Percent	0.6%	68.3%	18.5%	1.5%	10.4%	0.2%	0.0%	0.4%	0.2%	0.0%	0.0%	0.0%	0.0%	
AM Peak	08:00	08:00	09:00	07:00	09:00	08:00		10:00						08:00
Vol.	1	38	10	3	7	1		1						52
PM Peak	12:00	14:00	13:00	15:00	17:00				16:00					15:00
Vol.	1	33	11	1	5				1					44

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SB

Start Time	Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total
02/23/16	0	1	0	0	0	0	0	0	0	0	0	0	0	1
01:00	0	0	1	0	0	0	0	0	0	0	0	0	0	1
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00	0	1	0	0	0	0	0	0	0	0	0	0	0	1
04:00	0	1	1	0	0	0	0	0	0	0	0	0	0	2
05:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:00	0	8	2	0	0	0	0	0	0	0	0	0	0	10
07:00	0	19	4	0	3	0	0	1	0	0	0	0	0	27
08:00	0	25	11	1	1	0	0	0	0	0	0	0	0	38
09:00	0	21	5	0	2	0	0	0	0	0	0	0	0	28
10:00	0	17	4	0	2	0	0	0	0	0	0	0	0	23
11:00	0	14	5	0	2	0	0	0	0	0	0	0	0	21
12 PM	0	9	7	0	1	0	0	0	0	0	0	0	0	17
13:00	0	20	5	0	2	0	0	0	0	0	0	0	0	27
14:00	0	18	6	0	1	0	0	2	0	0	0	0	0	27
15:00	0	33	9	2	4	0	0	0	0	0	0	0	0	48
16:00	0	33	8	0	0	0	0	0	0	0	0	0	0	41
17:00	1	37	13	0	0	0	0	0	0	0	0	0	0	51
18:00	0	32	6	0	0	0	0	0	0	0	0	0	0	38
19:00	0	13	5	0	0	0	0	0	0	0	0	0	0	18
20:00	0	11	1	0	0	0	0	0	0	0	0	0	0	12
21:00	0	11	1	0	1	0	0	0	0	0	0	0	0	13
22:00	0	3	1	0	1	0	0	0	0	0	0	0	0	5
23:00	0	3	0	0	0	0	0	0	0	0	0	0	0	3
Total	1	330	95	3	20	0	0	3	0	0	0	0	0	452
Percent	0.2%	73.0%	21.0%	0.7%	4.4%	0.0%	0.0%	0.7%	0.0%	0.0%	0.0%	0.0%	0.0%	
AM Peak		08:00	08:00	08:00	07:00			07:00						08:00
Vol.		25	11	1	3			1						38
PM Peak	17:00	17:00	17:00	15:00	15:00			14:00						17:00
Vol.	1	37	13	2	4			2						51

Stow Road
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Site Code: 2162135

SB

Start Time	Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total
02/24/16	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:00	0	2	0	0	0	0	0	0	0	0	0	0	0	2
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00	0	0	0	0	1	0	0	0	0	0	0	0	0	1
04:00	0	0	1	0	0	0	0	0	0	0	0	0	0	1
05:00	0	2	1	0	1	0	0	0	0	0	0	0	0	4
06:00	0	6	0	0	2	0	0	0	0	0	0	0	0	8
07:00	0	14	4	0	1	0	0	1	0	0	0	0	0	20
08:00	0	19	14	0	4	0	0	0	0	0	0	0	0	37
09:00	0	17	6	0	2	0	0	0	0	0	0	0	0	25
10:00	0	18	1	0	2	0	0	0	0	0	0	0	0	21
11:00	0	22	1	1	3	1	0	0	0	0	0	0	0	28
12 PM	0	19	4	0	4	0	0	0	0	0	0	0	0	27
13:00	0	18	7	0	1	1	0	0	0	0	0	0	0	27
14:00	0	20	2	0	1	0	0	0	0	0	0	0	0	23
15:00	0	27	8	2	2	0	0	0	0	0	0	0	0	39
16:00	0	26	4	0	1	0	0	0	0	0	0	0	0	31
17:00	0	27	7	0	2	0	0	0	0	0	0	0	0	36
18:00	0	17	5	0	0	0	0	0	0	0	0	0	0	22
19:00	0	11	1	0	0	0	0	0	0	0	0	0	0	12
20:00	0	14	2	0	0	0	0	0	0	0	0	0	0	16
21:00	0	34	4	0	1	0	0	0	0	0	0	0	0	39
22:00	0	3	1	0	0	0	0	0	0	0	0	0	0	4
23:00	0	2	0	0	0	0	0	0	0	0	0	0	0	2
Total	0	318	73	3	28	2	0	1	0	0	0	0	0	425
Percent	0.0%	74.8%	17.2%	0.7%	6.6%	0.5%	0.0%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	
AM Peak		11:00	08:00	11:00	08:00	11:00		07:00						08:00
Vol.		22	14	1	4	1		1						37
PM Peak		21:00	15:00	15:00	12:00	13:00								15:00
Vol.		34	8	2	4	1								39

Stow Road
south of Massachusetts Avenue (Route 111)
City, State: Boxborough, MA
Client: Bayside Engineering / K. Cram

PRECISION DATA INDUSTRIES, LLC
P.O. Box 301 Berlin, MA 01503
Office: 508.481.3999 Fax: 508.545.1234
Email: datarequests@pdillc.com

164948 B Class
Site Code: 2162135

SB

Start Time	Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total
02/25/16	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:00	0	1	1	0	0	0	0	0	0	0	0	0	0	2
05:00	0	1	0	0	0	0	0	0	0	0	0	0	0	1
06:00	1	6	1	2	0	1	0	0	0	0	0	0	0	11
07:00	0	21	5	2	2	0	0	0	0	0	0	0	0	30
08:00	0	19	13	1	2	0	0	0	0	0	0	0	0	35
09:00	0	19	8	0	6	0	0	0	1	0	0	0	0	34
10:00	0	12	2	0	0	0	0	0	0	0	0	0	0	14
11:00	0	16	10	0	2	0	0	0	0	0	0	0	0	28
12 PM	0	19	9	0	1	0	0	0	0	0	0	0	0	29
13:00	1	18	7	0	4	0	0	0	0	0	0	0	0	30
14:00	0	26	4	0	2	0	0	0	0	0	0	0	0	32
15:00	0	23	5	0	3	0	0	0	0	0	0	0	0	31
16:00	0	34	6	0	3	0	0	0	0	0	0	0	0	43
17:00	0	30	11	0	2	0	0	0	0	0	0	0	0	43
18:00	0	34	5	0	0	0	0	0	0	0	0	0	0	39
19:00	0	17	2	0	0	0	0	0	0	0	0	0	0	19
20:00	0	10	0	0	0	0	0	0	0	0	0	0	0	10
21:00	0	8	0	0	0	0	0	0	0	0	0	0	0	8
22:00	0	5	0	0	0	0	0	0	0	0	0	0	0	5
23:00	0	3	0	0	0	0	0	0	0	0	0	0	0	3
Total	2	322	89	5	27	1	0	0	1	0	0	0	0	447
Percent	0.4%	72.0%	19.9%	1.1%	6.0%	0.2%	0.0%	0.0%	0.2%	0.0%	0.0%	0.0%	0.0%	
AM Peak	06:00	07:00	08:00	06:00	09:00	06:00			09:00					08:00
Vol.	1	21	13	2	6	1			1					35
PM Peak	13:00	16:00	17:00		13:00									16:00
Vol.	1	34	11		4									43

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164948 B Speed
Site Code: 2162135

NB

Start Time	1 14	15 19	20 24	25 29	30 34	35 39	40 44	45 49	50 54	55 59	60 64	65 69	70 9999	Total	85th % ile	Ave Speed
02/23/ 16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
01:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
03:00	0	0	0	0	1	0	0	0	0	0	0	0	0	1	33	32
04:00	0	0	0	0	1	0	0	0	0	0	0	0	0	1	33	32
05:00	0	0	0	1	1	1	1	0	0	0	0	0	0	4	41	34
06:00	0	0	**2**	3	11	6	3	0	0	0	0	0	0	25	38	33
07:00	0	0	2	3	21	17	**6**	0	0	0	0	0	0	49	38	34
08:00	0	0	1	**7**	20	**27**	4	0	0	0	0	0	0	**59**	38	34
09:00	0	**2**	1	7	**23**	9	3	0	0	0	0	0	0	45	36	32
10:00	0	0	1	4	3	10	3	0	0	0	0	0	0	21	38	34
11:00	0	0	1	3	11	12	1	**1**	0	0	0	0	0	29	38	34
12 PM	**2**	0	1	4	13	5	2	0	**1**	0	0	0	0	28	37	31
13:00	0	**1**	0	6	14	8	**4**	0	0	0	0	0	0	33	38	33
14:00	0	0	0	5	15	6	3	0	0	0	0	0	0	29	37	33
15:00	0	0	**3**	**12**	12	**21**	2	0	0	0	0	0	0	**50**	37	33
16:00	0	0	0	9	**22**	12	3	0	0	0	0	0	0	46	37	33
17:00	0	0	0	6	17	14	1	0	0	0	0	0	0	38	37	33
18:00	0	0	3	4	21	5	0	0	0	0	0	0	0	33	34	31
19:00	0	0	0	4	6	5	1	0	0	0	0	0	0	16	37	33
20:00	0	0	0	0	6	2	0	0	0	0	0	0	0	8	36	33
21:00	0	0	1	1	6	0	0	0	0	0	0	0	0	8	33	30
22:00	0	0	1	1	1	3	0	0	0	0	0	0	0	6	37	32
23:00	0	0	0	0	1	0	0	0	0	0	0	0	0	1	33	32
Total	2	3	17	80	226	163	37	1	1	0	0	0	0	530		
%	0.4%	0.6%	3.2%	15.1%	42.6%	30.8%	7.0%	0.2%	0.2%	0.0%	0.0%	0.0%	0.0%			
AM Peak		09:00	06:00	08:00	09:00	08:00	07:00	11:00						08:00		
Vol.		2	2	7	23	27	6	1						59		
PM Peak	12:00	13:00	15:00	15:00	16:00	15:00	13:00		12:00					15:00		
Vol.	2	1	3	12	22	21	4		1					50		

Stats

15th Percentile :	27 MPH
50th Percentile :	32 MPH
85th Percentile :	37 MPH
95th Percentile :	40 MPH
Mean Speed(Average) :	33 MPH
10 MPH Pace Speed :	30-39 MPH
Number in Pace :	389
Percent in Pace :	73.4%
Number of Vehicles > 30 MPH :	383
Percent of Vehicles > 30 MPH :	72.2%

Stow Road
south of Massachusetts Avenue (Route 111)
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Client: Bayside Engineering / K. Cram

PRECISION DATA INDUSTRIES, LLC
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Office: 508.481.3999 Fax: 508.545.1234
Email: datarequests@pdillc.com

164948 B Speed
Site Code: 2162135

NB

Start Time	1 14	15 19	20 24	25 29	30 34	35 39	40 44	45 49	50 54	55 59	60 64	65 69	70 9999	Total	85th % ile	Ave Speed
02/24/ 16	0	0	0	1	0	0	0	0	0	0	0	0	0	1	28	27
01:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
02:00	0	0	0	2	0	0	0	0	0	0	0	0	0	2	28	27
03:00	0	0	0	2	0	0	0	0	0	0	0	0	0	2	28	27
04:00	0	0	1	0	1	0	0	0	0	0	0	0	0	2	32	27
05:00	**1**	0	0	2	0	0	0	0	0	0	0	0	0	3	27	20
06:00	0	0	**3**	5	7	0	1	0	0	0	0	0	0	16	33	29
07:00	0	0	2	6	22	12	1	0	0	0	0	0	0	43	36	32
08:00	0	**1**	1	**10**	**26**	**23**	**6**	0	0	0	0	0	0	**67**	38	33
09:00	0	0	1	2	16	11	3	**1**	0	0	0	0	0	34	38	34
10:00	0	0	0	3	9	11	1	0	0	0	0	0	0	24	37	34
11:00	0	1	3	7	7	9	0	0	0	0	0	0	0	27	36	31
12 PM	0	0	0	4	7	8	2	0	0	0	0	0	0	21	38	34
13:00	0	**1**	2	8	13	7	**3**	0	0	0	0	0	0	34	37	32
14:00	0	0	1	2	12	9	1	0	**1**	0	0	0	0	26	37	34
15:00	0	0	0	6	**25**	**15**	2	0	0	0	0	0	0	**48**	37	33
16:00	0	0	1	2	18	13	1	0	0	0	0	0	0	35	37	34
17:00	0	0	1	8	25	9	0	0	0	0	0	0	0	43	35	32
18:00	0	0	**3**	**9**	24	11	0	0	0	0	0	0	0	47	35	32
19:00	0	1	0	6	11	4	0	0	0	0	0	0	0	22	34	31
20:00	0	1	0	2	1	2	0	0	0	0	0	0	0	6	36	29
21:00	0	0	0	1	3	6	0	0	0	0	0	0	0	10	37	35
22:00	0	0	0	1	1	0	0	0	0	0	0	0	0	2	32	30
23:00	0	0	0	0	2	0	0	0	0	0	0	0	0	2	33	32
Total	1	5	19	89	230	150	21	1	1	0	0	0	0	517		
%	0.2%	1.0%	3.7%	17.2%	44.5%	29.0%	4.1%	0.2%	0.2%	0.0%	0.0%	0.0%	0.0%			
AM Peak	05:00	08:00	06:00	08:00	08:00	08:00	08:00	09:00						08:00		
Vol.	1	1	3	10	26	23	6	1						67		
PM Peak		13:00	18:00	18:00	15:00	15:00	13:00		14:00					15:00		
Vol.		1	3	9	25	15	3		1					48		

Stats

15th Percentile :	26 MPH
50th Percentile :	32 MPH
85th Percentile :	37 MPH
95th Percentile :	38 MPH
Mean Speed(Average) :	33 MPH
10 MPH Pace Speed :	30-39 MPH
Number in Pace :	380
Percent in Pace :	73.5%
Number of Vehicles > 30 MPH :	357
Percent of Vehicles > 30 MPH :	69.1%

Stow Road
south of Massachusetts Avenue (Route 111)
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Client: Bayside Engineering / K. Cram

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Email: datarequests@pdillc.com

164948 B Speed
Site Code: 2162135

NB

Start Time	1 14	15 19	20 24	25 29	30 34	35 39	40 44	45 49	50 54	55 59	60 64	65 69	70 9999	Total	85th % ile	Ave Speed
02/25/ 16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
01:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
03:00	0	0	0	0	1	0	0	0	0	0	0	0	0	1	33	32
04:00	0	0	0	0	1	0	0	0	0	0	0	0	0	1	33	32
05:00	0	0	0	0	0	1	0	0	0	0	0	0	0	1	38	37
06:00	0	0	0	2	12	3	2	0	**1**	0	0	0	0	20	39	34
07:00	0	0	**4**	7	17	**18**	0	**1**	0	0	0	0	0	47	37	33
08:00	0	0	3	5	**22**	16	**5**	1	0	0	0	0	0	**52**	38	34
09:00	0	0	1	**12**	18	14	5	1	0	0	0	0	0	51	38	33
10:00	0	0	2	5	10	11	1	0	0	0	0	0	0	29	37	33
11:00	0	0	2	8	8	7	1	0	0	0	0	0	0	26	36	31
12 PM	0	0	1	5	8	5	2	**1**	0	0	0	0	0	22	38	33
13:00	0	0	0	7	14	7	3	0	0	0	0	0	0	31	37	33
14:00	0	0	**4**	**9**	15	12	2	1	0	0	0	0	0	43	37	32
15:00	0	0	1	7	**25**	7	**4**	0	0	0	0	0	0	**44**	37	33
16:00	0	0	0	8	22	5	2	0	0	0	0	0	0	37	35	32
17:00	0	**1**	0	3	25	**15**	0	0	0	0	0	0	0	44	36	33
18:00	0	0	1	7	18	10	0	1	0	0	0	0	0	37	36	33
19:00	0	0	0	3	9	4	0	0	0	0	0	0	0	16	36	32
20:00	0	0	0	1	3	4	0	0	0	0	0	0	0	8	37	34
21:00	0	0	0	1	4	4	0	0	0	0	0	0	0	9	37	34
22:00	0	0	0	0	1	0	0	0	0	0	0	0	0	1	33	32
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
Total	0	1	19	90	233	143	27	6	1	0	0	0	0	520		
%	0.0%	0.2%	3.7%	17.3%	44.8%	27.5%	5.2%	1.2%	0.2%	0.0%	0.0%	0.0%	0.0%			
AM Peak			07:00	09:00	08:00	07:00	08:00	07:00	06:00					08:00		
Vol.			4	12	22	18	5	1	1					52		
PM Peak		17:00	14:00	14:00	15:00	17:00	15:00	12:00						15:00		
Vol.		1	4	9	25	15	4	1						44		

Stats

15th Percentile :	27 MPH
50th Percentile :	32 MPH
85th Percentile :	37 MPH
95th Percentile :	40 MPH
Mean Speed(Average) :	33 MPH
10 MPH Pace Speed :	30-39 MPH
Number in Pace :	376
Percent in Pace :	72.3%
Number of Vehicles > 30 MPH :	363
Percent of Vehicles > 30 MPH :	69.9%

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164948 B Speed
Site Code: 2162135

SB

Start Time	1 14	15 19	20 24	25 29	30 34	35 39	40 44	45 49	50 54	55 59	60 64	65 69	70 9999	Total	85th % ile	Ave Speed
02/23/ 16	0	0	1	0	0	0	0	0	0	0	0	0	0	1	23	22
01:00	0	0	1	0	0	0	0	0	0	0	0	0	0	1	23	22
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
03:00	0	0	0	0	1	0	0	0	0	0	0	0	0	1	33	32
04:00	0	0	0	2	0	0	0	0	0	0	0	0	0	2	28	27
05:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
06:00	0	**1**	1	0	5	2	1	0	0	0	0	0	0	10	37	32
07:00	0	1	**3**	5	9	7	2	0	0	0	0	0	0	27	37	31
08:00	0	0	1	**8**	**17**	**11**	1	0	0	0	0	0	0	**38**	36	32
09:00	0	1	2	5	13	5	2	0	0	0	0	0	0	28	36	31
10:00	0	0	0	5	10	5	**3**	0	0	0	0	0	0	23	38	33
11:00	0	0	1	5	11	2	2	0	0	0	0	0	0	21	36	32
12 PM	0	0	2	3	9	2	1	0	0	0	0	0	0	17	35	31
13:00	0	0	**5**	4	11	6	1	0	0	0	0	0	0	27	36	31
14:00	0	0	3	7	12	5	0	0	0	0	0	0	0	27	34	31
15:00	0	0	3	14	23	7	1	0	0	0	0	0	0	48	34	31
16:00	0	0	0	7	20	**12**	**2**	0	0	0	0	0	0	41	37	33
17:00	**1**	0	0	13	**27**	9	1	0	0	0	0	0	0	**51**	35	31
18:00	1	0	0	**19**	11	6	1	0	0	0	0	0	0	38	35	30
19:00	0	0	1	6	8	3	0	0	0	0	0	0	0	18	34	31
20:00	0	0	2	3	6	1	0	0	0	0	0	0	0	12	33	30
21:00	0	0	1	7	4	1	0	0	0	0	0	0	0	13	32	29
22:00	0	0	0	4	1	0	0	0	0	0	0	0	0	5	30	28
23:00	0	0	0	2	1	0	0	0	0	0	0	0	0	3	31	29
Total	2	3	27	119	199	84	18	0	0	0	0	0	0	452		
%	0.4%	0.7%	6.0%	26.3%	44.0%	18.6%	4.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			
AM Peak		06:00	07:00	08:00	08:00	08:00	10:00							08:00		
Vol.		1	3	8	17	11	3							38		
PM Peak	17:00		13:00	18:00	17:00	16:00	16:00							17:00		
Vol.	1		5	19	27	12	2							51		

Stats

15th Percentile :	25 MPH
50th Percentile :	30 MPH
85th Percentile :	36 MPH
95th Percentile :	38 MPH
Mean Speed(Average) :	31 MPH
10 MPH Pace Speed :	25-34 MPH
Number in Pace :	318
Percent in Pace :	70.4%
Number of Vehicles > 30 MPH :	261
Percent of Vehicles > 30 MPH :	57.8%

Stow Road
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Site Code: 2162135

SB

Start Time	1 14	15 19	20 24	25 29	30 34	35 39	40 44	45 49	50 54	55 59	60 64	65 69	70 9999	Total	85th % ile	Ave Speed
02/24/ 16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
01:00	0	0	0	1	0	1	0	0	0	0	0	0	0	2	37	32
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
03:00	0	0	1	0	0	0	0	0	0	0	0	0	0	1	23	22
04:00	0	0	0	1	0	0	0	0	0	0	0	0	0	1	28	27
05:00	0	**2**	0	1	1	0	0	0	0	0	0	0	0	4	31	23
06:00	0	0	1	4	1	1	**1**	0	0	0	0	0	0	8	38	30
07:00	0	0	**3**	7	5	5	0	0	0	0	0	0	0	20	36	30
08:00	**1**	0	2	7	**17**	**10**	0	0	0	0	0	0	0	**37**	36	31
09:00	0	0	1	**8**	10	6	0	0	0	0	0	0	0	25	35	31
10:00	0	0	2	5	11	2	0	**1**	0	0	0	0	0	21	33	31
11:00	0	1	0	8	17	1	1	0	0	0	0	0	0	28	33	31
12 PM	0	0	2	4	16	4	1	0	0	0	0	0	0	27	35	32
13:00	0	0	**4**	5	13	3	2	0	0	0	0	0	0	27	35	31
14:00	0	0	1	3	15	4	0	0	0	0	0	0	0	23	34	32
15:00	0	0	1	11	**25**	2	0	0	0	0	0	0	0	**39**	33	31
16:00	0	0	0	9	13	6	**3**	0	0	0	0	0	0	31	37	32
17:00	0	0	3	10	16	**7**	0	0	0	0	0	0	0	36	35	31
18:00	0	**1**	1	4	14	2	0	0	0	0	0	0	0	22	33	30
19:00	0	0	2	1	9	0	0	0	0	0	0	0	0	12	33	30
20:00	0	0	1	5	9	1	0	0	0	0	0	0	0	16	33	30
21:00	0	0	0	**15**	19	5	0	0	0	0	0	0	0	39	33	31
22:00	0	0	0	3	1	0	0	0	0	0	0	0	0	4	31	28
23:00	0	0	2	0	0	0	0	0	0	0	0	0	0	2	23	22
Total	1	4	27	112	212	60	8	1	0	0	0	0	0	425		
%	0.2%	0.9%	6.4%	26.4%	49.9%	14.1%	1.9%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%			
AM Peak	08:00	05:00	07:00	09:00	08:00	08:00	06:00	10:00						08:00		
Vol.	1	2	3	8	17	10	1	1						37		
PM Peak		18:00	13:00	21:00	15:00	17:00	16:00							15:00		
Vol.		1	4	15	25	7	3							39		

Stats		
	15th Percentile :	25 MPH
	50th Percentile :	30 MPH
	85th Percentile :	34 MPH
	95th Percentile :	37 MPH
	Mean Speed(Average) :	31 MPH
	10 MPH Pace Speed :	25-34 MPH
	Number in Pace :	324
	Percent in Pace :	76.2%
	Number of Vehicles > 30 MPH :	239
	Percent of Vehicles > 30 MPH :	56.1%

Stow Road
south of Massachusetts Avenue (Route 111)
City, State: Boxborough, MA
Client: Bayside Engineering / K. Cram

PRECISION DATA INDUSTRIES, LLC
P.O. Box 301 Berlin, MA 01503
Office: 508.481.3999 Fax: 508.545.1234
Email: datarequests@pdillc.com

164948 B Speed
Site Code: 2162135

SB

Start Time	1 14	15 19	20 24	25 29	30 34	35 39	40 44	45 49	50 54	55 59	60 64	65 69	70 9999	Total	85th % ile	Ave Speed
02/25/ 16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
01:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
04:00	0	0	1	1	0	0	0	0	0	0	0	0	0	2	27	25
05:00	0	0	0	0	1	0	0	0	0	0	0	0	0	1	33	32
06:00	0	0	**2**	1	5	1	**2**	0	0	0	0	0	0	11	39	32
07:00	0	0	1	5	17	6	1	0	0	0	0	0	0	30	36	32
08:00	0	0	0	**11**	**19**	5	0	0	0	0	0	0	0	**35**	33	31
09:00	0	**2**	2	8	16	6	0	0	0	0	0	0	0	34	34	30
10:00	0	0	0	7	3	4	0	0	0	0	0	0	0	14	36	31
11:00	0	0	0	7	12	**9**	0	0	0	0	0	0	0	28	36	32
12 PM	0	0	2	7	13	6	**1**	0	0	0	0	0	0	29	36	31
13:00	0	0	3	6	14	7	0	0	0	0	0	0	0	30	35	31
14:00	0	**2**	2	4	18	6	0	0	0	0	0	0	0	32	35	31
15:00	0	1	0	8	15	7	0	0	0	0	0	0	0	31	35	31
16:00	0	0	**4**	**10**	17	11	0	**1**	0	0	0	0	0	**43**	36	32
17:00	0	0	3	5	**20**	13	1	1	0	0	0	0	0	43	37	33
18:00	0	0	3	5	16	**14**	1	0	0	0	0	0	0	39	37	33
19:00	0	0	4	8	3	3	1	0	0	0	0	0	0	19	35	29
20:00	0	0	0	6	4	0	0	0	0	0	0	0	0	10	32	29
21:00	0	0	1	2	4	1	0	0	0	0	0	0	0	8	33	30
22:00	0	0	0	0	3	2	0	0	0	0	0	0	0	5	37	34
23:00	0	0	0	2	0	1	0	0	0	0	0	0	0	3	36	30
Total	0	5	28	103	200	102	7	2	0	0	0	0	0	447		
%	0.0%	1.1%	6.3%	23.0%	44.7%	22.8%	1.6%	0.4%	0.0%	0.0%	0.0%	0.0%	0.0%			
AM Peak		09:00	06:00	08:00	08:00	11:00	06:00							08:00		
Vol.		2	2	11	19	9	2							35		
PM Peak		14:00	16:00	16:00	17:00	18:00	12:00	16:00						16:00		
Vol.		2	4	10	20	14	1	1						43		

Stats

15th Percentile :	25 MPH
50th Percentile :	31 MPH
85th Percentile :	36 MPH
95th Percentile :	38 MPH
Mean Speed(Average) :	31 MPH
10 MPH Pace Speed :	25-34 MPH
Number in Pace :	303
Percent in Pace :	67.8%
Number of Vehicles > 30 MPH :	271
Percent of Vehicles > 30 MPH :	60.6%

PRECISION DATA INDUSTRIES, LLC
P.O. Box 301 Berlin, MA 01503
Office: 508.481.3999 Fax: 508.545.1234
Email: datarequests@pdillc.com

N/S: Middle Road/ Stow Road
E/W: Massachusetts Avenue (Route 111)
City, State: Boxborough, MA
Client: Bayside Engineering/ K. Cram

File Name : 164948 A
Site Code : 2162135
Start Date : 2/24/2016
Page No : 1

Groups Printed- Cars - Heavy Vehicles

	Middle Road From North				Massachusetts Avenue (Route 111) From East				Stow Road From South				Massachusetts Avenue (Route 111) From West				
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Int. Total
07:00 AM	5	0	12	0	0	40	0	0	1	1	3	0	1	43	1	0	107
07:15 AM	3	1	8	0	8	44	2	0	2	0	4	0	1	53	3	0	129
07:30 AM	6	1	3	0	4	74	1	0	3	0	13	0	4	64	3	0	176
07:45 AM	4	3	6	0	4	50	3	0	7	5	4	0	3	77	4	0	170
Total	18	5	29	0	16	208	6	0	13	6	24	0	9	237	11	0	582
08:00 AM	4	1	11	0	5	55	4	0	5	4	8	0	5	64	2	0	168
08:15 AM	1	1	9	0	3	41	1	0	5	2	17	0	12	72	4	0	168
08:30 AM	10	3	8	0	5	55	0	0	2	2	7	0	5	54	7	0	158
08:45 AM	2	3	8	0	6	72	2	0	6	3	7	0	0	58	4	0	171
Total	17	8	36	0	19	223	7	0	18	11	39	0	22	248	17	0	665
Grand Total	35	13	65	0	35	431	13	0	31	17	63	0	31	485	28	0	1247
Apprch %	31	11.5	57.5	0	7.3	90	2.7	0	27.9	15.3	56.8	0	5.7	89.2	5.1	0	
Total %	2.8	1	5.2	0	2.8	34.6	1	0	2.5	1.4	5.1	0	2.5	38.9	2.2	0	
Cars	33	12	65	0	33	416	12	0	30	16	60	0	27	470	26	0	1200
% Cars	94.3	92.3	100	0	94.3	96.5	92.3	0	96.8	94.1	95.2	0	87.1	96.9	92.9	0	96.2
Heavy Vehicles	2	1	0	0	2	15	1	0	1	1	3	0	4	15	2	0	47
% Heavy Vehicles	5.7	7.7	0	0	5.7	3.5	7.7	0	3.2	5.9	4.8	0	12.9	3.1	7.1	0	3.8

	Middle Road From North					Massachusetts Avenue (Route 111) From East					Stow Road From South					Massachusetts Avenue (Route 111) From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:30 AM																					
07:30 AM	**6**	1	3	0	10	4	**74**	1	0	**79**	3	0	13	0	16	4	64	3	0	71	**176**
07:45 AM	4	**3**	6	0	13	4	50	3	0	57	**7**	**5**	4	0	16	3	**77**	**4**	0	84	170
08:00 AM	4	1	**11**	0	**16**	**5**	55	**4**	0	64	5	4	8	0	17	5	64	2	0	71	168
08:15 AM	1	1	9	0	11	3	41	1	0	45	5	2	**17**	0	**24**	**12**	72	4	0	**88**	168
Total Volume	15	6	29	0	50	16	220	9	0	245	20	11	42	0	73	24	277	13	0	314	682
% App. Total	30	12	58	0		6.5	89.8	3.7	0		27.4	15.1	57.5	0		7.6	88.2	4.1	0		
PHF	.625	.500	.659	.000	.781	.800	.743	.563	.000	.775	.714	.550	.618	.000	.760	.500	.899	.813	.000	.892	.969
Cars	15	6	29	0	50	16	214	9	0	239	19	10	40	0	69	20	270	12	0	302	660
% Cars	100	100	100	0	100	100	97.3	100	0	97.6	95.0	90.9	95.2	0	94.5	83.3	97.5	92.3	0	96.2	96.8
Heavy Vehicles	0	0	0	0	0	0	6	0	0	6	1	1	2	0	4	4	7	1	0	12	22
% Heavy Vehicles	0	0	0	0	0	0	2.7	0	0	2.4	5.0	9.1	4.8	0	5.5	16.7	2.5	7.7	0	3.8	3.2

N/S: Middle Road/ Stow Road
E/W: Massachusetts Avenue (Route 111)
City, State: Boxborough, MA
Client: Bayside Engineering/ K. Cram

PRECISION DATA INDUSTRIES, LLC
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File Name : 164948 A
Site Code : 2162135
Start Date : 2/24/2016
Page No : 1

Groups Printed- Cars

	Middle Road From North				Massachusetts Avenue (Route 111) From East				Stow Road From South				Massachusetts Avenue (Route 111) From West				
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Int. Total
07:00 AM	5	0	12	0	0	39	0	0	1	1	3	0	1	42	0	0	104
07:15 AM	3	1	8	0	7	44	1	0	2	0	4	0	1	51	3	0	125
07:30 AM	6	1	3	0	4	71	1	0	3	0	12	0	4	64	3	0	172
07:45 AM	4	3	6	0	4	50	3	0	6	4	4	0	2	75	4	0	165
Total	18	5	29	0	15	204	5	0	12	5	23	0	8	232	10	0	566
08:00 AM	4	1	11	0	5	54	4	0	5	4	7	0	5	61	2	0	163
08:15 AM	1	1	9	0	3	39	1	0	5	2	17	0	9	70	3	0	160
08:30 AM	8	3	8	0	4	50	0	0	2	2	7	0	5	51	7	0	147
08:45 AM	2	2	8	0	6	69	2	0	6	3	6	0	0	56	4	0	164
Total	15	7	36	0	18	212	7	0	18	11	37	0	19	238	16	0	634
Grand Total	33	12	65	0	33	416	12	0	30	16	60	0	27	470	26	0	1200
Apprch %	30	10.9	59.1	0	7.2	90.2	2.6	0	28.3	15.1	56.6	0	5.2	89.9	5	0	
Total %	2.8	1	5.4	0	2.8	34.7	1	0	2.5	1.3	5	0	2.2	39.2	2.2	0	

	Middle Road From North					Massachusetts Avenue (Route 111) From East					Stow Road From South					Massachusetts Avenue (Route 111) From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:30 AM																					
07:30 AM	**6**	1	3	0	10	4	**71**	1	0	**76**	3	0	12	0	15	4	64	3	0	71	**172**
07:45 AM	4	**3**	6	0	13	4	50	3	0	57	**6**	**4**	4	0	14	2	**75**	**4**	0	81	165
08:00 AM	4	1	**11**	0	**16**	**5**	54	**4**	0	63	5	4	7	0	16	5	61	2	0	68	163
08:15 AM	1	1	9	0	11	3	39	1	0	43	5	2	**17**	0	**24**	**9**	70	3	0	**82**	160
Total Volume	15	6	29	0	50	16	214	9	0	239	19	10	40	0	69	20	270	12	0	302	660
% App. Total	30	12	58	0		6.7	89.5	3.8	0		27.5	14.5	58	0		6.6	89.4	4	0		
PHF	.625	.500	.659	.000	.781	.800	.754	.563	.000	.786	.792	.625	.588	.000	.719	.556	.900	.750	.000	.921	.959

N/S: Middle Road/ Stow Road
E/W: Massachusetts Avenue (Route 111)
City, State: Boxborough, MA
Client: Bayside Engineering/ K. Cram

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File Name : 164948 A
Site Code : 2162135
Start Date : 2/24/2016
Page No : 1

Groups Printed- Heavy Vehicles

	Middle Road From North				Massachusetts Avenue (Route 111) From East				Stow Road From South				Massachusetts Avenue (Route 111) From West				
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Int. Total
07:00 AM	0	0	0	0	0	1	0	0	0	0	0	0	0	1	1	0	3
07:15 AM	0	0	0	0	1	0	1	0	0	0	0	0	0	2	0	0	4
07:30 AM	0	0	0	0	0	3	0	0	0	0	1	0	0	0	0	0	4
07:45 AM	0	0	0	0	0	0	0	0	1	1	0	0	1	2	0	0	5
Total	0	0	0	0	1	4	1	0	1	1	1	0	1	5	1	0	16
08:00 AM	0	0	0	0	0	1	0	0	0	0	1	0	0	3	0	0	5
08:15 AM	0	0	0	0	0	2	0	0	0	0	0	0	3	2	1	0	8
08:30 AM	2	0	0	0	1	5	0	0	0	0	0	0	0	3	0	0	11
08:45 AM	0	1	0	0	0	3	0	0	0	0	1	0	0	2	0	0	7
Total	2	1	0	0	1	11	0	0	0	0	2	0	3	10	1	0	31
Grand Total	2	1	0	0	2	15	1	0	1	1	3	0	4	15	2	0	47
Apprch %	66.7	33.3	0	0	11.1	83.3	5.6	0	20	20	60	0	19	71.4	9.5	0	
Total %	4.3	2.1	0	0	4.3	31.9	2.1	0	2.1	2.1	6.4	0	8.5	31.9	4.3	0	

	Middle Road From North					Massachusetts Avenue (Route 111) From East					Stow Road From South					Massachusetts Avenue (Route 111) From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 08:00 AM																					
08:00 AM	0	0	0	0	0	0	1	0	0	1	0	0	**1**	0	**1**	0	**3**	0	0	3	5
08:15 AM	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	**3**	2	**1**	0	**6**	8
08:30 AM	**2**	0	0	0	**2**	**1**	**5**	0	0	**6**	0	0	0	0	0	0	3	0	0	3	**11**
08:45 AM	0	**1**	0	0	1	0	3	0	0	3	0	0	1	0	1	0	2	0	0	2	7
Total Volume	2	1	0	0	3	1	11	0	0	12	0	0	2	0	2	3	10	1	0	14	31
% App. Total	66.7	33.3	0	0		8.3	91.7	0	0		0	0	100	0		21.4	71.4	7.1	0		
PHF	.250	.250	.000	.000	.375	.250	.550	.000	.000	.500	.000	.000	.500	.000	.500	.250	.833	.250	.000	.583	.705

N/S: Middle Road/ Stow Road
E/W: Massachusetts Avenue (Route 111)
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File Name : 164948 A
Site Code : 2162135
Start Date : 2/24/2016
Page No : 1

Groups Printed- Peds and Bicycles

	Middle Road From North					Massachusetts Avenue (Route 111) From East					Stow Road From South					Massachusetts Avenue (Route 111) From West					
Start Time	Right	Thru	Left	Peds EB	Peds WB	Right	Thru	Left	Peds SB	Peds NB	Right	Thru	Left	Peds WB	Peds EB	Right	Thru	Left	Peds NB	Peds SB	Int. Total
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Apprch %	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Total %																					

	Middle Road From North						Massachusetts Avenue (Route 111) From East						Stow Road From South						Massachusetts Avenue (Route 111) From West						
Start Time	Right	Thru	Left	Peds EB	Peds WB	App. Total	Right	Thru	Left	Peds SB	Peds NB	App. Total	Right	Thru	Left	Peds WB	Peds EB	App. Total	Right	Thru	Left	Peds NB	Peds SB	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																									
Peak Hour for Entire Intersection Begins at 07:00 AM																									
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

PRECISION DATA INDUSTRIES, LLC
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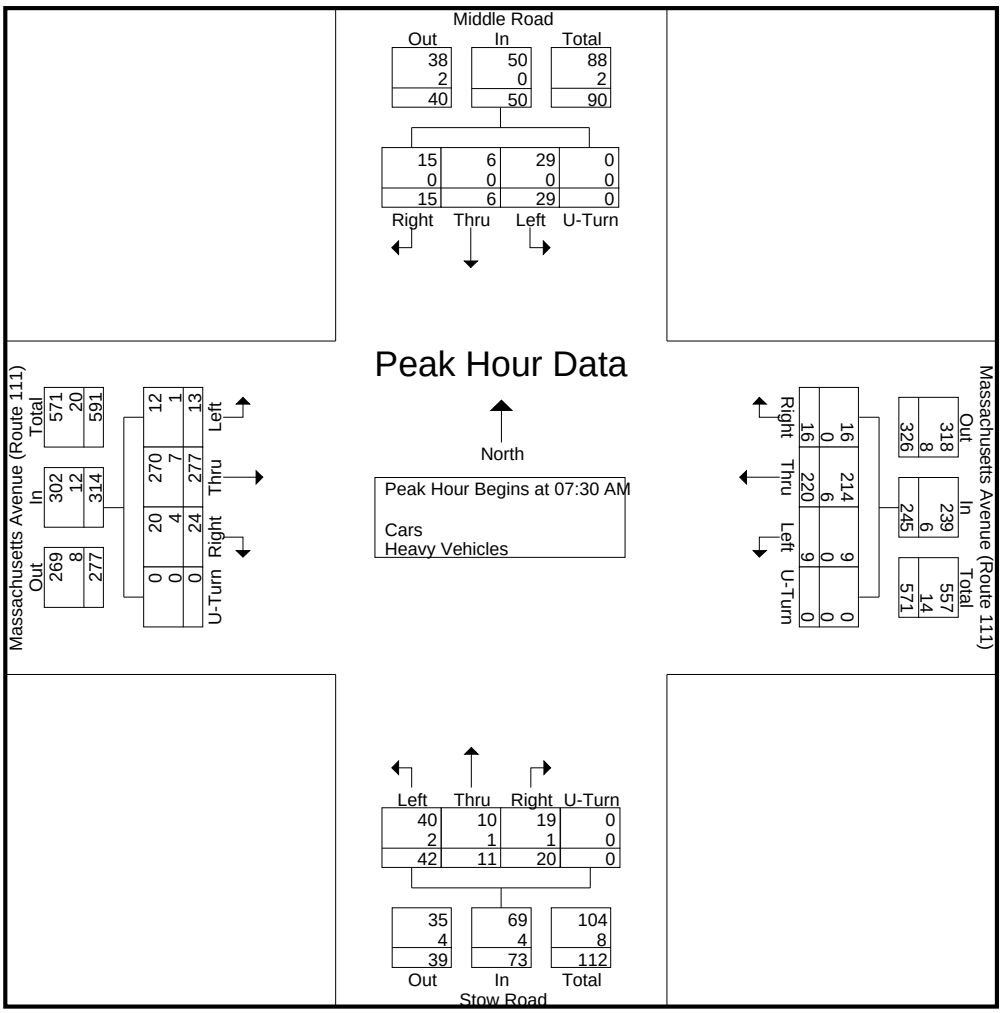
N/S: Middle Road/ Stow Road
E/W: Massachusetts Avenue (Route 111)
City, State: Boxborough, MA
Client: Bayside Engineering/ K. Cram

File Name : 164948 A
Site Code : 2162135
Start Date : 2/24/2016
Page No : 1

	Middle Road From North					Massachusetts Avenue (Route 111) From East					Stow Road From South					Massachusetts Avenue (Route 111) From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:30 AM																					
07:30 AM	**6**	1	3	0	10	4	**74**	1	0	**79**	3	0	13	0	16	4	64	3	0	71	**176**
07:45 AM	4	**3**	6	0	13	4	50	3	0	57	**7**	**5**	4	0	16	3	**77**	**4**	0	84	170
08:00 AM	4	1	**11**	0	**16**	**5**	55	**4**	0	64	5	4	8	0	17	5	64	2	0	71	168
08:15 AM	1	1	9	0	11	3	41	1	0	45	5	2	**17**	0	**24**	**12**	72	4	0	**88**	168
Total Volume	15	6	29	0	50	16	220	9	0	245	20	11	42	0	73	24	277	13	0	314	682
% App. Total	30	12	58	0		6.5	89.8	3.7	0		27.4	15.1	57.5	0		7.6	88.2	4.1	0		
PHF	.625	.500	.659	.000	.781	.800	.743	.563	.000	.775	.714	.550	.618	.000	.760	.500	.899	.813	.000	.892	.969
Cars	15	6	29	0	50	16	214	9	0	239	19	10	40	0	69	20	270	12	0	302	660
% Cars	100	100	100	0	100	100	97.3	100	0	97.6	95.0	90.9	95.2	0	94.5	83.3	97.5	92.3	0	96.2	96.8
Heavy Vehicles	0	0	0	0	0	0	6	0	0	6	1	1	2	0	4	4	7	1	0	12	22
% Heavy Vehicles	0	0	0	0	0	0	2.7	0	0	2.4	5.0	9.1	4.8	0	5.5	16.7	2.5	7.7	0	3.8	3.2



N/S: Middle Road/ Stow Road
E/W: Massachusetts Avenue (Route 111)
City, State: Boxborough, MA
Client: Bayside Engineering/ K. Cram

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File Name : 164948 AA
Site Code : 2162135
Start Date : 2/24/2016
Page No : 1

Groups Printed- Cars - Heavy Vehicles

	Middle Road From North				Massachusetts Avenue (Route 111) From East				Stow Road From South				Massachusetts Avenue (Route 111) From West				
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Int. Total
04:00 PM	7	3	9	0	11	64	9	0	4	0	5	0	5	55	4	0	176
04:15 PM	4	1	6	0	8	67	1	0	3	1	4	0	2	63	1	0	161
04:30 PM	2	1	5	0	8	69	6	0	3	2	7	0	2	51	5	0	161
04:45 PM	1	2	5	0	11	68	2	0	3	1	3	0	4	62	3	0	165
Total	14	7	25	0	38	268	18	0	13	4	19	0	13	231	13	0	663
05:00 PM	4	0	3	0	8	62	4	0	0	3	6	0	1	67	2	0	160
05:15 PM	1	1	6	0	7	74	1	0	5	3	8	0	7	82	4	0	199
05:30 PM	3	1	8	0	10	66	0	0	5	3	7	0	8	83	4	0	198
05:45 PM	1	1	4	0	7	81	5	0	1	3	6	0	8	60	4	0	181
Total	9	3	21	0	32	283	10	0	11	12	27	0	24	292	14	0	738
06:00 PM	4	1	5	0	12	61	1	0	2	0	7	0	5	55	3	0	156
06:15 PM	1	1	6	0	5	71	2	0	6	1	4	0	2	81	3	0	183
Grand Total	28	12	57	0	87	683	31	0	32	17	57	0	44	659	33	0	1740
Apprch %	28.9	12.4	58.8	0	10.9	85.3	3.9	0	30.2	16	53.8	0	6	89.5	4.5	0	
Total %	1.6	0.7	3.3	0	5	39.3	1.8	0	1.8	1	3.3	0	2.5	37.9	1.9	0	
Cars	27	12	56	0	86	673	31	0	32	17	55	0	43	651	33	0	1716
% Cars	96.4	100	98.2	0	98.9	98.5	100	0	100	100	96.5	0	97.7	98.8	100	0	98.6
Heavy Vehicles	1	0	1	0	1	10	0	0	0	0	2	0	1	8	0	0	24
% Heavy Vehicles	3.6	0	1.8	0	1.1	1.5	0	0	0	0	3.5	0	2.3	1.2	0	0	1.4

	Middle Road From North					Massachusetts Avenue (Route 111) From East					Stow Road From South					Massachusetts Avenue (Route 111) From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 06:15 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 05:00 PM																					
05:00 PM	**4**	0	3	0	7	8	62	4	0	74	0	**3**	6	0	9	1	67	2	0	70	160
05:15 PM	1	**1**	6	0	8	7	74	1	0	82	**5**	3	**8**	0	**16**	7	82	**4**	0	93	**199**
05:30 PM	3	1	**8**	0	**12**	**10**	66	0	0	76	5	3	7	0	15	**8**	**83**	4	0	**95**	198
05:45 PM	1	1	4	0	6	7	**81**	**5**	0	**93**	1	3	6	0	10	8	60	4	0	72	181
Total Volume	9	3	21	0	33	32	283	10	0	325	11	12	27	0	50	24	292	14	0	330	738
% App. Total	27.3	9.1	63.6	0		9.8	87.1	3.1	0		22	24	54	0		7.3	88.5	4.2	0		
PHF	.563	.750	.656	.000	.688	.800	.873	.500	.000	.874	.550	1.00	.844	.000	.781	.750	.880	.875	.000	.868	.927
Cars	8	3	20	0	31	31	278	10	0	319	11	12	27	0	50	23	288	14	0	325	725
% Cars	88.9	100	95.2	0	93.9	96.9	98.2	100	0	98.2	100	100	100	0	100	95.8	98.6	100	0	98.5	98.2
Heavy Vehicles	1	0	1	0	2	1	5	0	0	6	0	0	0	0	0	1	4	0	0	5	13
% Heavy Vehicles	11.1	0	4.8	0	6.1	3.1	1.8	0	0	1.8	0	0	0	0	0	4.2	1.4	0	0	1.5	1.8

N/S: Middle Road/ Stow Road
E/W: Massachusetts Avenue (Route 111)
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File Name : 164948 AA
Site Code : 2162135
Start Date : 2/24/2016
Page No : 1

Groups Printed- Cars

	Middle Road From North				Massachusetts Avenue (Route 111) From East				Stow Road From South				Massachusetts Avenue (Route 111) From West				
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Int. Total
04:00 PM	7	3	9	0	11	63	9	0	4	0	4	0	5	53	4	0	172
04:15 PM	4	1	6	0	8	67	1	0	3	1	3	0	2	62	1	0	159
04:30 PM	2	1	5	0	8	68	6	0	3	2	7	0	2	51	5	0	160
04:45 PM	1	2	5	0	11	67	2	0	3	1	3	0	4	62	3	0	164
Total	14	7	25	0	38	265	18	0	13	4	17	0	13	228	13	0	655
05:00 PM	3	0	2	0	7	61	4	0	0	3	6	0	1	66	2	0	155
05:15 PM	1	1	6	0	7	72	1	0	5	3	8	0	7	80	4	0	195
05:30 PM	3	1	8	0	10	66	0	0	5	3	7	0	8	83	4	0	198
05:45 PM	1	1	4	0	7	79	5	0	1	3	6	0	7	59	4	0	177
Total	8	3	20	0	31	278	10	0	11	12	27	0	23	288	14	0	725
06:00 PM	4	1	5	0	12	60	1	0	2	0	7	0	5	55	3	0	155
06:15 PM	1	1	6	0	5	70	2	0	6	1	4	0	2	80	3	0	181
Grand Total	27	12	56	0	86	673	31	0	32	17	55	0	43	651	33	0	1716
Apprch %	28.4	12.6	58.9	0	10.9	85.2	3.9	0	30.8	16.3	52.9	0	5.9	89.5	4.5	0	
Total %	1.6	0.7	3.3	0	5	39.2	1.8	0	1.9	1	3.2	0	2.5	37.9	1.9	0	

	Middle Road From North					Massachusetts Avenue (Route 111) From East					Stow Road From South					Massachusetts Avenue (Route 111) From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 06:15 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 05:00 PM																					
05:00 PM	**3**	0	2	0	5	7	61	4	0	72	0	**3**	6	0	9	1	66	2	0	69	155
05:15 PM	1	**1**	6	0	8	7	72	1	0	80	**5**	3	**8**	0	**16**	7	80	**4**	0	91	195
05:30 PM	3	1	**8**	0	**12**	**10**	66	0	0	76	5	3	7	0	15	**8**	**83**	4	0	**95**	**198**
05:45 PM	1	1	4	0	6	7	**79**	**5**	0	**91**	1	3	6	0	10	7	59	4	0	70	177
Total Volume	8	3	20	0	31	31	278	10	0	319	11	12	27	0	50	23	288	14	0	325	725
% App. Total	25.8	9.7	64.5	0		9.7	87.1	3.1	0		22	24	54	0		7.1	88.6	4.3	0		
PHF	.667	.750	.625	.000	.646	.775	.880	.500	.000	.876	.550	1.00	.844	.000	.781	.719	.867	.875	.000	.855	.915

N/S: Middle Road/ Stow Road
E/W: Massachusetts Avenue (Route 111)
City, State: Boxborough, MA
Client: Bayside Engineering/ K. Cram

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File Name : 164948 AA
Site Code : 2162135
Start Date : 2/24/2016
Page No : 1

Groups Printed- Heavy Vehicles

	Middle Road From North				Massachusetts Avenue (Route 111) From East				Stow Road From South				Massachusetts Avenue (Route 111) From West				
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Int. Total
04:00 PM	0	0	0	0	0	1	0	0	0	0	1	0	0	2	0	0	4
04:15 PM	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	2
04:30 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
04:45 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
Total	0	0	0	0	0	3	0	0	0	0	2	0	0	3	0	0	8
05:00 PM	1	0	1	0	1	1	0	0	0	0	0	0	0	1	0	0	5
05:15 PM	0	0	0	0	0	2	0	0	0	0	0	0	0	2	0	0	4
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	2	0	0	0	0	0	0	1	1	0	0	4
Total	1	0	1	0	1	5	0	0	0	0	0	0	1	4	0	0	13
06:00 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
06:15 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	2
Grand Total	1	0	1	0	1	10	0	0	0	0	2	0	1	8	0	0	24
Apprch %	50	0	50	0	9.1	90.9	0	0	0	0	100	0	11.1	88.9	0	0	
Total %	4.2	0	4.2	0	4.2	41.7	0	0	0	0	8.3	0	4.2	33.3	0	0	

	Middle Road From North					Massachusetts Avenue (Route 111) From East					Stow Road From South					Massachusetts Avenue (Route 111) From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 06:15 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 05:00 PM																					
05:00 PM	**1**	0	**1**	0	**2**	**1**	1	0	0	**2**	0	0	0	0	0	0	1	0	0	1	**5**
05:15 PM	0	0	0	0	0	0	**2**	0	0	2	0	0	0	0	0	0	**2**	0	0	**2**	4
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	**1**	1	0	0	2	4
Total Volume	1	0	1	0	2	1	5	0	0	6	0	0	0	0	0	1	4	0	0	5	13
% App. Total	50	0	50	0		16.7	83.3	0	0		0	0	0	0		20	80	0	0		
PHF	.250	.000	.250	.000	.250	.250	.625	.000	.000	.750	.000	.000	.000	.000	.000	.250	.500	.000	.000	.625	.650

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Groups Printed- Peds and Bicycles

	Middle Road From North					Massachusetts Avenue (Route 111) From East					Stow Road From South					Massachusetts Avenue (Route 111) From West					
Start Time	Right	Thru	Left	Peds EB	Peds WB	Right	Thru	Left	Peds SB	Peds NB	Right	Thru	Left	Peds WB	Peds EB	Right	Thru	Left	Peds NB	Peds SB	Int. Total
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Apprch %	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Total %																					

	Middle Road From North						Massachusetts Avenue (Route 111) From East						Stow Road From South						Massachusetts Avenue (Route 111) From West						
Start Time	Right	Thru	Left	Peds EB	Peds WB	App. Total	Right	Thru	Left	Peds SB	Peds NB	App. Total	Right	Thru	Left	Peds WB	Peds EB	App. Total	Right	Thru	Left	Peds NB	Peds SB	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 06:15 PM - Peak 1 of 1																									
Peak Hour for Entire Intersection Begins at 04:00 PM																									
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

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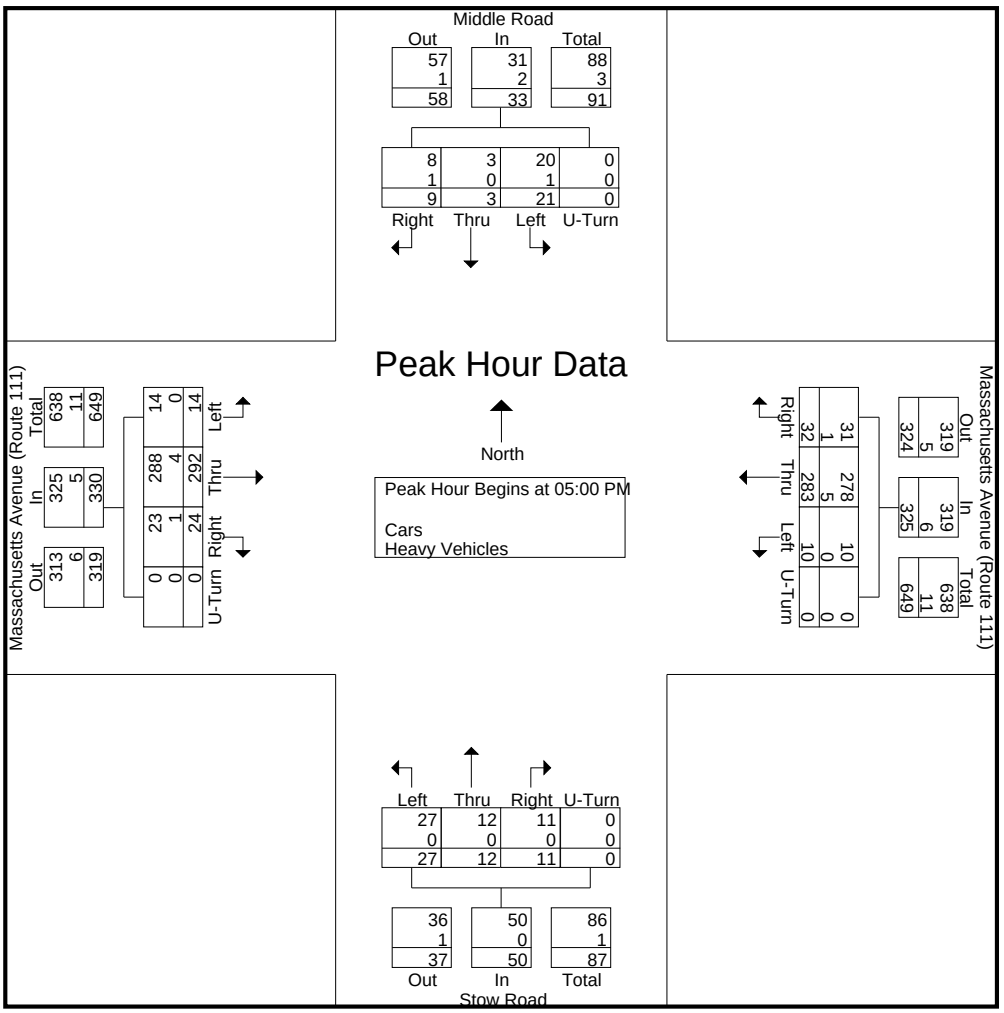
	Middle Road From North					Massachusetts Avenue (Route 111) From East					Stow Road From South					Massachusetts Avenue (Route 111) From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 06:15 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 05:00 PM																					
05:00 PM	**4**	0	3	0	7	8	62	4	0	74	0	**3**	6	0	9	1	67	2	0	70	160
05:15 PM	1	**1**	6	0	8	7	74	1	0	82	**5**	3	**8**	0	**16**	7	82	**4**	0	93	**199**
05:30 PM	3	1	**8**	0	**12**	**10**	66	0	0	76	5	3	7	0	15	**8**	**83**	4	0	**95**	198
05:45 PM	1	1	4	0	6	7	**81**	**5**	0	**93**	1	3	6	0	10	8	60	4	0	72	181
Total Volume	9	3	21	0	33	32	283	10	0	325	11	12	27	0	50	24	292	14	0	330	738
% App. Total	27.3	9.1	63.6	0		9.8	87.1	3.1	0		22	24	54	0		7.3	88.5	4.2	0		
PHF	.563	.750	.656	.000	.688	.800	.873	.500	.000	.874	.550	1.00	.844	.000	.781	.750	.880	.875	.000	.868	.927
Cars	8	3	20	0	31	31	278	10	0	319	11	12	27	0	50	23	288	14	0	325	725
% Cars	88.9	100	95.2	0	93.9	96.9	98.2	100	0	98.2	100	100	100	0	100	95.8	98.6	100	0	98.5	98.2
Heavy Vehicles	1	0	1	0	2	1	5	0	0	6	0	0	0	0	0	1	4	0	0	5	13
% Heavy Vehicles	11.1	0	4.8	0	6.1	3.1	1.8	0	0	1.8	0	0	0	0	0	4.2	1.4	0	0	1.5	1.8



N/S: Hill Road/ Burroughs Road
E/W: Massachusetts Avenue (Route 111)
City, State: Boxborough, MA
Client: Bayside Engineering/ K. Cram

PRECISION DATA INDUSTRIES, LLC
P.O. Box 301 Berlin, MA 01503
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File Name : 164948 B
Site Code : 2162135
Start Date : 2/24/2016
Page No : 1

Groups Printed- Cars - Heavy Vehicles

	Hill Road From North				Massachusetts Avenue (Route 111) From East				Burroughs Road From South				Massachusetts Avenue (Route 111) From West				
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Int. Total
07:00 AM	6	0	3	0	1	41	0	0	5	0	17	0	6	48	3	0	130
07:15 AM	4	0	2	0	0	50	1	0	4	1	25	0	3	65	1	0	156
07:30 AM	4	0	1	0	0	79	5	0	3	0	16	0	14	75	5	0	202
07:45 AM	7	1	0	0	0	65	2	0	1	0	19	0	12	103	6	0	216
Total	21	1	6	0	1	235	8	0	13	1	77	0	35	291	15	0	704
08:00 AM	4	1	1	0	0	55	4	0	2	0	15	0	7	75	1	0	165
08:15 AM	6	0	3	0	0	56	5	0	1	1	22	0	16	82	1	0	193
08:30 AM	4	0	2	0	1	71	3	0	3	0	12	0	15	64	5	1	181
08:45 AM	5	0	5	0	1	77	2	0	0	1	11	0	15	66	3	0	186
Total	19	1	11	0	2	259	14	0	6	2	60	0	53	287	10	1	725
Grand Total	40	2	17	0	3	494	22	0	19	3	137	0	88	578	25	1	1429
Apprch %	67.8	3.4	28.8	0	0.6	95.2	4.2	0	11.9	1.9	86.2	0	12.7	83.5	3.6	0.1	
Total %	2.8	0.1	1.2	0	0.2	34.6	1.5	0	1.3	0.2	9.6	0	6.2	40.4	1.7	0.1	
Cars	40	0	15	0	3	476	20	0	19	3	137	0	83	554	25	1	1376
% Cars	100	0	88.2	0	100	96.4	90.9	0	100	100	100	0	94.3	95.8	100	100	96.3
Heavy Vehicles	0	2	2	0	0	18	2	0	0	0	0	0	5	24	0	0	53
% Heavy Vehicles	0	100	11.8	0	0	3.6	9.1	0	0	0	0	0	5.7	4.2	0	0	3.7

	Hill Road From North					Massachusetts Avenue (Route 111) From East					Burroughs Road From South					Massachusetts Avenue (Route 111) From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:30 AM																					
07:30 AM	4	0	1	0	5	0	**79**	**5**	0	**84**	**3**	0	16	0	19	14	75	5	0	94	202
07:45 AM	**7**	**1**	0	0	8	0	65	2	0	67	1	0	19	0	20	12	**103**	**6**	0	**121**	**216**
08:00 AM	4	1	1	0	6	0	55	4	0	59	2	0	15	0	17	7	75	1	0	83	165
08:15 AM	6	0	**3**	0	**9**	0	56	5	0	61	1	**1**	**22**	0	**24**	**16**	82	1	0	99	193
Total Volume	21	2	5	0	28	0	255	16	0	271	7	1	72	0	80	49	335	13	0	397	776
% App. Total	75	7.1	17.9	0		0	94.1	5.9	0		8.8	1.2	90	0		12.3	84.4	3.3	0		
PHF	.750	.500	.417	.000	.778	.000	.807	.800	.000	.807	.583	.250	.818	.000	.833	.766	.813	.542	.000	.820	.898
Cars	21	0	5	0	26	0	249	15	0	264	7	1	72	0	80	48	321	13	0	382	752
% Cars	100	0	100	0	92.9	0	97.6	93.8	0	97.4	100	100	100	0	100	98.0	95.8	100	0	96.2	96.9
Heavy Vehicles	0	2	0	0	2	0	6	1	0	7	0	0	0	0	0	1	14	0	0	15	24
% Heavy Vehicles	0	100	0	0	7.1	0	2.4	6.3	0	2.6	0	0	0	0	0	2.0	4.2	0	0	3.8	3.1

N/S: Hill Road/ Burroughs Road
E/W: Massachusetts Avenue (Route 111)
City, State: Boxborough, MA
Client: Bayside Engineering/ K. Cram

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File Name : 164948 B
Site Code : 2162135
Start Date : 2/24/2016
Page No : 1

Groups Printed- Cars

	Hill Road From North				Massachusetts Avenue (Route 111) From East				Burroughs Road From South				Massachusetts Avenue (Route 111) From West				
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Int. Total
07:00 AM	6	0	2	0	1	40	0	0	5	0	17	0	6	45	3	0	125
07:15 AM	4	0	2	0	0	50	1	0	4	1	25	0	3	63	1	0	154
07:30 AM	4	0	1	0	0	77	4	0	3	0	16	0	14	74	5	0	198
07:45 AM	7	0	0	0	0	64	2	0	1	0	19	0	12	98	6	0	209
Total	21	0	5	0	1	231	7	0	13	1	77	0	35	280	15	0	686
08:00 AM	4	0	1	0	0	55	4	0	2	0	15	0	6	72	1	0	160
08:15 AM	6	0	3	0	0	53	5	0	1	1	22	0	16	77	1	0	185
08:30 AM	4	0	2	0	1	65	2	0	3	0	12	0	14	61	5	1	170
08:45 AM	5	0	4	0	1	72	2	0	0	1	11	0	12	64	3	0	175
Total	19	0	10	0	2	245	13	0	6	2	60	0	48	274	10	1	690
Grand Total	40	0	15	0	3	476	20	0	19	3	137	0	83	554	25	1	1376
Apprch %	72.7	0	27.3	0	0.6	95.4	4	0	11.9	1.9	86.2	0	12.5	83.6	3.8	0.2	
Total %	2.9	0	1.1	0	0.2	34.6	1.5	0	1.4	0.2	10	0	6	40.3	1.8	0.1	

	Hill Road From North					Massachusetts Avenue (Route 111) From East					Burroughs Road From South					Massachusetts Avenue (Route 111) From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:30 AM																					
07:30 AM	4	0	1	0	5	0	**77**	4	0	**81**	**3**	0	16	0	19	14	74	5	0	93	198
07:45 AM	**7**	0	0	0	7	0	64	2	0	66	1	0	19	0	20	12	**98**	**6**	0	**116**	**209**
08:00 AM	4	0	1	0	5	0	55	4	0	59	2	0	15	0	17	6	72	1	0	79	160
08:15 AM	6	0	**3**	0	**9**	0	53	**5**	0	58	1	**1**	**22**	0	**24**	**16**	77	1	0	94	185
Total Volume	21	0	5	0	26	0	249	15	0	264	7	1	72	0	80	48	321	13	0	382	752
% App. Total	80.8	0	19.2	0		0	94.3	5.7	0		8.8	1.2	90	0		12.6	84	3.4	0		
PHF	.750	.000	.417	.000	.722	.000	.808	.750	.000	.815	.583	.250	.818	.000	.833	.750	.819	.542	.000	.823	.900

N/S: Hill Road/ Burroughs Road
E/W: Massachusetts Avenue (Route 111)
City, State: Boxborough, MA
Client: Bayside Engineering/ K. Cram

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File Name : 164948 B
Site Code : 2162135
Start Date : 2/24/2016
Page No : 1

Groups Printed- Heavy Vehicles

	Hill Road From North				Massachusetts Avenue (Route 111) From East				Burroughs Road From South				Massachusetts Avenue (Route 111) From West				
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Int. Total
07:00 AM	0	0	1	0	0	1	0	0	0	0	0	0	0	3	0	0	5
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2
07:30 AM	0	0	0	0	0	2	1	0	0	0	0	0	0	1	0	0	4
07:45 AM	0	1	0	0	0	1	0	0	0	0	0	0	0	5	0	0	7
Total	0	1	1	0	0	4	1	0	0	0	0	0	0	11	0	0	18
08:00 AM	0	1	0	0	0	0	0	0	0	0	0	0	1	3	0	0	5
08:15 AM	0	0	0	0	0	3	0	0	0	0	0	0	0	5	0	0	8
08:30 AM	0	0	0	0	0	6	1	0	0	0	0	0	1	3	0	0	11
08:45 AM	0	0	1	0	0	5	0	0	0	0	0	0	3	2	0	0	11
Total	0	1	1	0	0	14	1	0	0	0	0	0	5	13	0	0	35
Grand Total	0	2	2	0	0	18	2	0	0	0	0	0	5	24	0	0	53
Apprch %	0	50	50	0	0	90	10	0	0	0	0	0	17.2	82.8	0	0	
Total %	0	3.8	3.8	0	0	34	3.8	0	0	0	0	0	9.4	45.3	0	0	

	Hill Road From North					Massachusetts Avenue (Route 111) From East					Burroughs Road From South					Massachusetts Avenue (Route 111) From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 08:00 AM																					
08:00 AM	0	**1**	0	0	**1**	0	0	0	0	0	0	0	0	0	0	1	3	0	0	4	5
08:15 AM	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	0	**5**	0	0	**5**	8
08:30 AM	0	0	0	0	0	0	**6**	**1**	0	**7**	0	0	0	0	0	1	3	0	0	4	**11**
08:45 AM	0	0	**1**	0	1	0	5	0	0	5	0	0	0	0	0	**3**	2	0	0	5	11
Total Volume	0	1	1	0	2	0	14	1	0	15	0	0	0	0	0	5	13	0	0	18	35
% App. Total	0	50	50	0		0	93.3	6.7	0		0	0	0	0		27.8	72.2	0	0		
PHF	.000	.250	.250	.000	.500	.000	.583	.250	.000	.536	.000	.000	.000	.000	.000	.417	.650	.000	.000	.900	.795

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N/S: Hill Road/ Burroughs Road
E/W: Massachusetts Avenue (Route 111)
City, State: Boxborough, MA
Client: Bayside Engineering/ K. Cram

File Name : 164948 B
Site Code : 2162135
Start Date : 2/24/2016
Page No : 1

Groups Printed- Peds and Bicycles

	Hill Road From North					Massachusetts Avenue (Route 111) From East					Burroughs Road From South					Massachusetts Avenue (Route 111) From West					
Start Time	Right	Thru	Left	Peds EB	Peds WB	Right	Thru	Left	Peds SB	Peds NB	Right	Thru	Left	Peds WB	Peds EB	Right	Thru	Left	Peds NB	Peds SB	Int. Total
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Apprch %	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Total %																					

	Hill Road From North						Massachusetts Avenue (Route 111) From East						Burroughs Road From South						Massachusetts Avenue (Route 111) From West						
Start Time	Right	Thru	Left	Peds EB	Peds WB	App. Total	Right	Thru	Left	Peds SB	Peds NB	App. Total	Right	Thru	Left	Peds WB	Peds EB	App. Total	Right	Thru	Left	Peds NB	Peds SB	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																									
Peak Hour for Entire Intersection Begins at 07:00 AM																									
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

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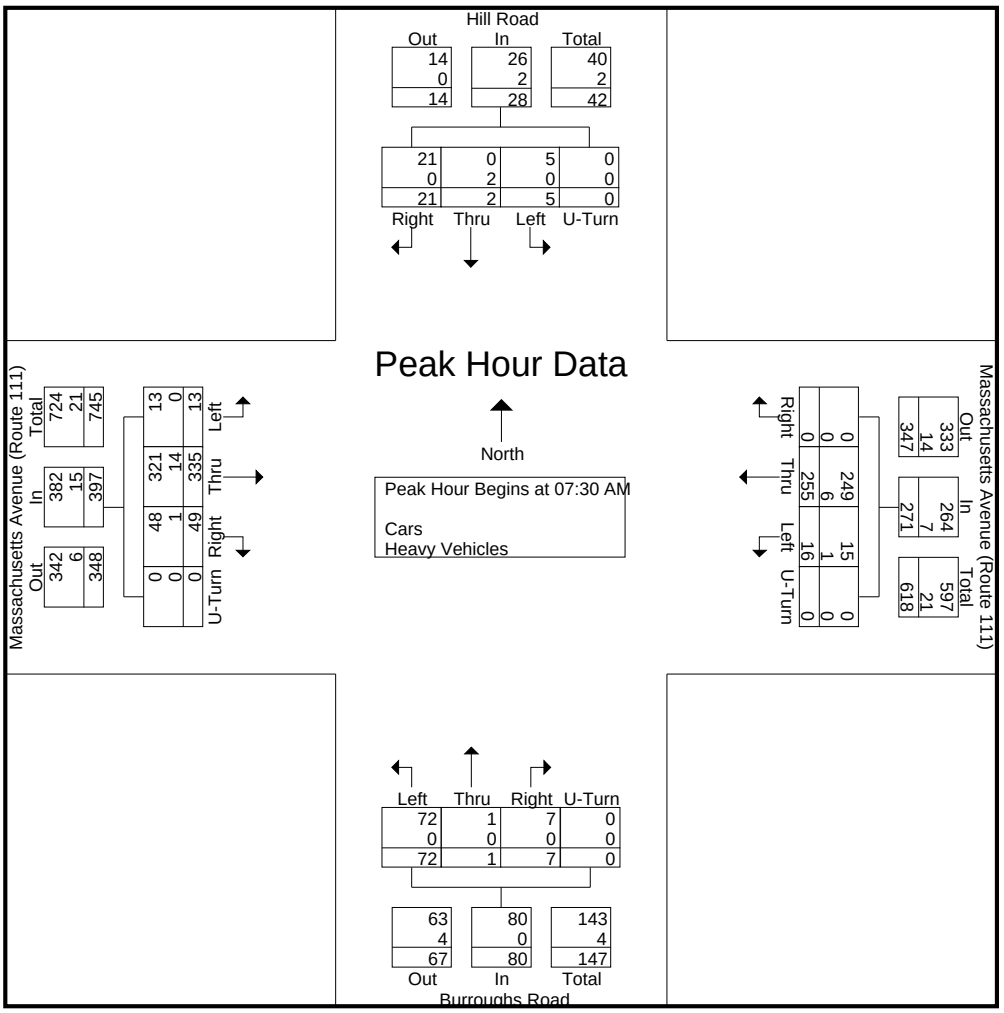
	Hill Road From North					Massachusetts Avenue (Route 111) From East					Burroughs Road From South					Massachusetts Avenue (Route 111) From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:30 AM																					
07:30 AM	4	0	1	0	5	0	**79**	**5**	0	**84**	**3**	0	16	0	19	14	75	5	0	94	202
07:45 AM	**7**	**1**	0	0	8	0	65	2	0	67	1	0	19	0	20	12	**103**	**6**	0	**121**	**216**
08:00 AM	4	1	1	0	6	0	55	4	0	59	2	0	15	0	17	7	75	1	0	83	165
08:15 AM	6	0	**3**	0	**9**	0	56	5	0	61	1	**1**	**22**	0	**24**	**16**	82	1	0	99	193
Total Volume	21	2	5	0	28	0	255	16	0	271	7	1	72	0	80	49	335	13	0	397	776
% App. Total	75	7.1	17.9	0		0	94.1	5.9	0		8.8	1.2	90	0		12.3	84.4	3.3	0		
PHF	.750	.500	.417	.000	.778	.000	.807	.800	.000	.807	.583	.250	.818	.000	.833	.766	.813	.542	.000	.820	.898
Cars	21	0	5	0	26	0	249	15	0	264	7	1	72	0	80	48	321	13	0	382	752
% Cars	100	0	100	0	92.9	0	97.6	93.8	0	97.4	100	100	100	0	100	98.0	95.8	100	0	96.2	96.9
Heavy Vehicles	0	2	0	0	2	0	6	1	0	7	0	0	0	0	0	1	14	0	0	15	24
% Heavy Vehicles	0	100	0	0	7.1	0	2.4	6.3	0	2.6	0	0	0	0	0	2.0	4.2	0	0	3.8	3.1



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Groups Printed- Cars - Heavy Vehicles

	Hill Road From North				Massachusetts Avenue (Route 111) From East				Burroughs Road From South				Massachusetts Avenue (Route 111) From West				
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Int. Total
04:00 PM	3	0	1	0	4	85	4	0	4	0	11	0	9	60	3	0	184
04:15 PM	3	0	1	0	2	77	2	0	1	0	10	0	13	55	5	0	169
04:30 PM	2	0	1	0	3	83	1	0	3	0	6	0	7	59	5	0	170
04:45 PM	6	0	2	0	0	70	4	0	1	1	12	0	10	68	3	0	177
Total	14	0	5	0	9	315	11	0	9	1	39	0	39	242	16	0	700
05:00 PM	4	1	1	0	2	76	3	0	3	3	27	0	15	69	7	0	211
05:15 PM	6	0	1	0	3	82	1	0	0	0	14	0	14	101	8	0	230
05:30 PM	5	1	0	0	3	79	2	0	3	0	13	0	15	81	8	0	210
05:45 PM	4	0	3	0	3	73	7	0	2	0	9	0	23	75	9	0	208
Total	19	2	5	0	11	310	13	0	8	3	63	0	67	326	32	0	859
06:00 PM	2	0	2	0	5	72	3	0	2	0	8	0	14	62	2	0	172
06:15 PM	3	1	3	0	3	81	2	0	2	0	13	0	17	79	3	0	207
Grand Total	38	3	15	0	28	778	29	0	21	4	123	0	137	709	53	0	1938
Apprch %	67.9	5.4	26.8	0	3.4	93.2	3.5	0	14.2	2.7	83.1	0	15.2	78.9	5.9	0	
Total %	2	0.2	0.8	0	1.4	40.1	1.5	0	1.1	0.2	6.3	0	7.1	36.6	2.7	0	
Cars	38	3	14	0	28	771	27	0	21	4	118	0	136	706	53	0	1919
% Cars	100	100	93.3	0	100	99.1	93.1	0	100	100	95.9	0	99.3	99.6	100	0	99
Heavy Vehicles	0	0	1	0	0	7	2	0	0	0	5	0	1	3	0	0	19
% Heavy Vehicles	0	0	6.7	0	0	0.9	6.9	0	0	0	4.1	0	0.7	0.4	0	0	1

	Hill Road From North					Massachusetts Avenue (Route 111) From East					Burroughs Road From South					Massachusetts Avenue (Route 111) From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 06:15 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 05:00 PM																					
05:00 PM	4	**1**	1	0	6	2	76	3	0	81	**3**	**3**	**27**	0	**33**	15	69	7	0	91	211
05:15 PM	**6**	0	1	0	**7**	**3**	**82**	1	0	**86**	0	0	14	0	14	14	**101**	8	0	**123**	**230**
05:30 PM	5	1	0	0	6	3	79	2	0	84	3	0	13	0	16	15	81	8	0	104	210
05:45 PM	4	0	**3**	0	7	3	73	**7**	0	83	2	0	9	0	11	**23**	75	**9**	0	107	208
Total Volume	19	2	5	0	26	11	310	13	0	334	8	3	63	0	74	67	326	32	0	425	859
% App. Total	73.1	7.7	19.2	0		3.3	92.8	3.9	0		10.8	4.1	85.1	0		15.8	76.7	7.5	0		
PHF	.792	.500	.417	.000	.929	.917	.945	.464	.000	.971	.667	.250	.583	.000	.561	.728	.807	.889	.000	.864	.934
Cars	19	2	5	0	26	11	307	13	0	331	8	3	62	0	73	66	325	32	0	423	853
% Cars	100	100	100	0	100	100	99.0	100	0	99.1	100	100	98.4	0	98.6	98.5	99.7	100	0	99.5	99.3
Heavy Vehicles	0	0	0	0	0	0	3	0	0	3	0	0	1	0	1	1	1	0	0	2	6
% Heavy Vehicles	0	0	0	0	0	0	1.0	0	0	0.9	0	0	1.6	0	1.4	1.5	0.3	0	0	0.5	0.7

N/S: Hill Road/ Burroughs Road
E/W: Massachusetts Avenue (Route 111)
City, State: Boxborough, MA
Client: Bayside Engineering/ K. Cram

PRECISION DATA INDUSTRIES, LLC
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File Name : 164948 BB
Site Code : 2162135
Start Date : 2/24/2016
Page No : 1

Groups Printed- Cars

	Hill Road From North				Massachusetts Avenue (Route 111) From East				Burroughs Road From South				Massachusetts Avenue (Route 111) From West				
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Int. Total
04:00 PM	3	0	0	0	4	83	4	0	4	0	9	0	9	60	3	0	179
04:15 PM	3	0	1	0	2	77	2	0	1	0	10	0	13	54	5	0	168
04:30 PM	2	0	1	0	3	82	1	0	3	0	6	0	7	59	5	0	169
04:45 PM	6	0	2	0	0	70	4	0	1	1	12	0	10	68	3	0	177
Total	14	0	4	0	9	312	11	0	9	1	37	0	39	241	16	0	693
05:00 PM	4	1	1	0	2	75	3	0	3	3	26	0	15	69	7	0	209
05:15 PM	6	0	1	0	3	80	1	0	0	0	14	0	14	101	8	0	228
05:30 PM	5	1	0	0	3	79	2	0	3	0	13	0	14	81	8	0	209
05:45 PM	4	0	3	0	3	73	7	0	2	0	9	0	23	74	9	0	207
Total	19	2	5	0	11	307	13	0	8	3	62	0	66	325	32	0	853
06:00 PM	2	0	2	0	5	71	2	0	2	0	8	0	14	61	2	0	169
06:15 PM	3	1	3	0	3	81	1	0	2	0	11	0	17	79	3	0	204
Grand Total	38	3	14	0	28	771	27	0	21	4	118	0	136	706	53	0	1919
Apprch %	69.1	5.5	25.5	0	3.4	93.3	3.3	0	14.7	2.8	82.5	0	15.2	78.9	5.9	0	
Total %	2	0.2	0.7	0	1.5	40.2	1.4	0	1.1	0.2	6.1	0	7.1	36.8	2.8	0	

	Hill Road From North					Massachusetts Avenue (Route 111) From East					Burroughs Road From South					Massachusetts Avenue (Route 111) From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 06:15 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 05:00 PM																					
05:00 PM	4	**1**	1	0	6	2	75	3	0	80	**3**	**3**	**26**	0	**32**	15	69	7	0	91	209
05:15 PM	**6**	0	1	0	**7**	**3**	**80**	1	0	**84**	0	0	14	0	14	14	**101**	8	0	**123**	**228**
05:30 PM	5	1	0	0	6	3	79	2	0	84	3	0	13	0	16	14	81	8	0	103	209
05:45 PM	4	0	**3**	0	7	3	73	**7**	0	83	2	0	9	0	11	**23**	74	**9**	0	106	207
Total Volume	19	2	5	0	26	11	307	13	0	331	8	3	62	0	73	66	325	32	0	423	853
% App. Total	73.1	7.7	19.2	0		3.3	92.7	3.9	0		11	4.1	84.9	0		15.6	76.8	7.6	0		
PHF	.792	.500	.417	.000	.929	.917	.959	.464	.000	.985	.667	.250	.596	.000	.570	.717	.804	.889	.000	.860	.935

N/S: Hill Road/ Burroughs Road
E/W: Massachusetts Avenue (Route 111)
City, State: Boxborough, MA
Client: Bayside Engineering/ K. Cram

PRECISION DATA INDUSTRIES, LLC
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File Name : 164948 BB
Site Code : 2162135
Start Date : 2/24/2016
Page No : 1

Groups Printed- Heavy Vehicles

	Hill Road From North				Massachusetts Avenue (Route 111) From East				Burroughs Road From South				Massachusetts Avenue (Route 111) From West				
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Int. Total
04:00 PM	0	0	1	0	0	2	0	0	0	0	2	0	0	0	0	0	5
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
04:30 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	1	0	0	3	0	0	0	0	2	0	0	1	0	0	7
05:00 PM	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	2
05:15 PM	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	2
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
Total	0	0	0	0	0	3	0	0	0	0	1	0	1	1	0	0	6
06:00 PM	0	0	0	0	0	1	1	0	0	0	0	0	0	1	0	0	3
06:15 PM	0	0	0	0	0	0	1	0	0	0	2	0	0	0	0	0	3
Grand Total	0	0	1	0	0	7	2	0	0	0	5	0	1	3	0	0	19
Apprch %	0	0	100	0	0	77.8	22.2	0	0	0	100	0	25	75	0	0	
Total %	0	0	5.3	0	0	36.8	10.5	0	0	0	26.3	0	5.3	15.8	0	0	

	Hill Road From North					Massachusetts Avenue (Route 111) From East					Burroughs Road From South					Massachusetts Avenue (Route 111) From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 06:15 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 05:30 PM																					
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**	0	0	0	**1**	1
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**	0	0	1	1
06:00 PM	0	0	0	0	0	0	**1**	**1**	0	**2**	0	0	0	0	0	0	1	0	0	1	**3**
06:15 PM	0	0	0	0	0	0	0	1	0	1	0	0	**2**	0	**2**	0	0	0	0	0	3
Total Volume	0	0	0	0	0	0	1	2	0	3	0	0	2	0	2	1	2	0	0	3	8
% App. Total	0	0	0	0		0	33.3	66.7	0		0	0	100	0		33.3	66.7	0	0		
PHF	.000	.000	.000	.000	.000	.000	.250	.500	.000	.375	.000	.000	.250	.000	.250	.250	.500	.000	.000	.750	.667

N/S: Hill Road/ Burroughs Road
E/W: Massachusetts Avenue (Route 111)
City, State: Boxborough, MA
Client: Bayside Engineering/ K. Cram

PRECISION DATA INDUSTRIES, LLC
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File Name : 164948 BB
Site Code : 2162135
Start Date : 2/24/2016
Page No : 1

Groups Printed- Peds and Bicycles

	Hill Road From North					Massachusetts Avenue (Route 111) From East					Burroughs Road From South					Massachusetts Avenue (Route 111) From West					
Start Time	Right	Thru	Left	Peds EB	Peds WB	Right	Thru	Left	Peds SB	Peds NB	Right	Thru	Left	Peds WB	Peds EB	Right	Thru	Left	Peds NB	Peds SB	Int. Total
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Apprch %	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Total %																					

	Hill Road From North						Massachusetts Avenue (Route 111) From East						Burroughs Road From South						Massachusetts Avenue (Route 111) From West						
Start Time	Right	Thru	Left	Peds EB	Peds WB	App. Total	Right	Thru	Left	Peds SB	Peds NB	App. Total	Right	Thru	Left	Peds WB	Peds EB	App. Total	Right	Thru	Left	Peds NB	Peds SB	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 06:15 PM - Peak 1 of 1																									
Peak Hour for Entire Intersection Begins at 04:00 PM																									
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

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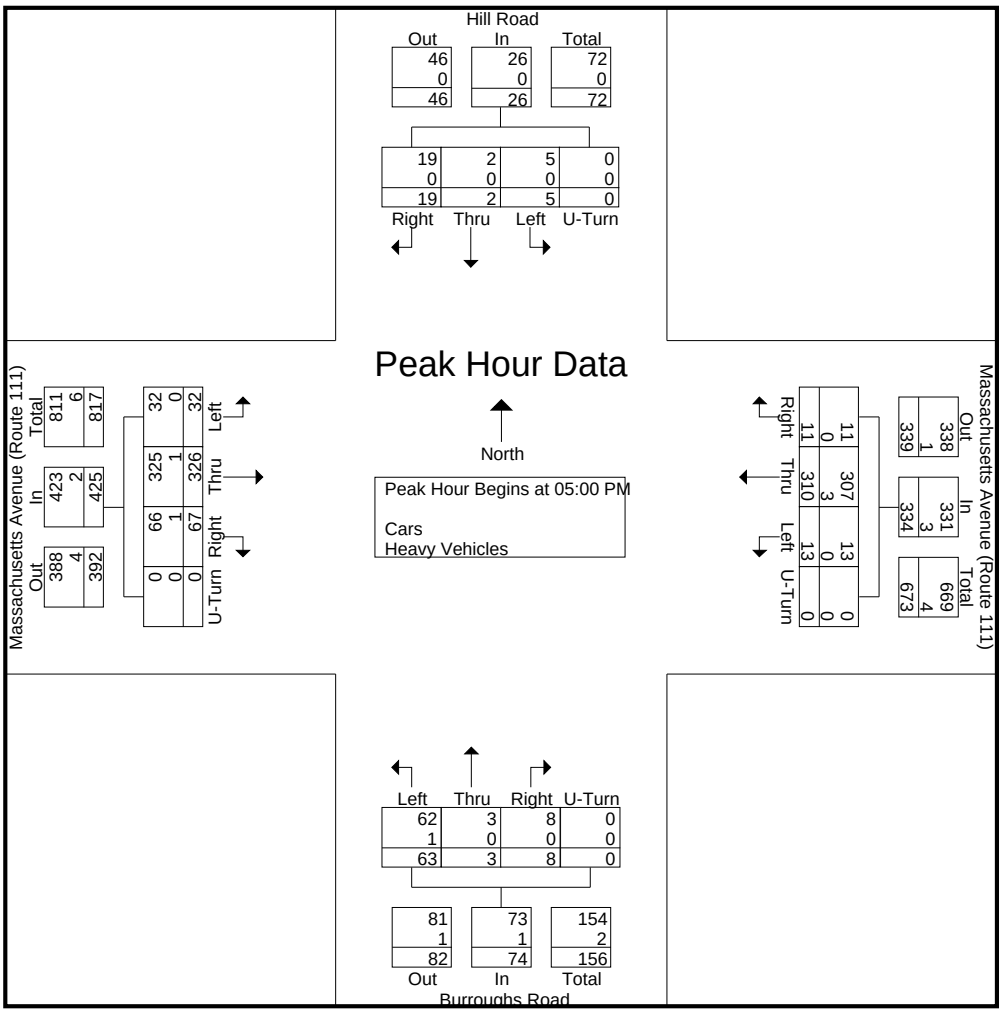
N/S: Hill Road/ Burroughs Road
E/W: Massachusetts Avenue (Route 111)
City, State: Boxborough, MA
Client: Bayside Engineering/ K. Cram

File Name : 164948 BB
Site Code : 2162135
Start Date : 2/24/2016
Page No : 1

	Hill Road From North					Massachusetts Avenue (Route 111) From East					Burroughs Road From South					Massachusetts Avenue (Route 111) From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 06:15 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 05:00 PM																					
05:00 PM	4	**1**	1	0	6	2	76	3	0	81	**3**	**3**	**27**	0	**33**	15	69	7	0	91	211
05:15 PM	**6**	0	1	0	**7**	**3**	**82**	1	0	**86**	0	0	14	0	14	14	**101**	8	0	**123**	**230**
05:30 PM	5	1	0	0	6	3	79	2	0	84	3	0	13	0	16	15	81	8	0	104	210
05:45 PM	4	0	**3**	0	7	3	73	**7**	0	83	2	0	9	0	11	**23**	75	**9**	0	107	208
Total Volume	19	2	5	0	26	11	310	13	0	334	8	3	63	0	74	67	326	32	0	425	859
% App. Total	73.1	7.7	19.2	0		3.3	92.8	3.9	0		10.8	4.1	85.1	0		15.8	76.7	7.5	0		
PHF	.792	.500	.417	.000	.929	.917	.945	.464	.000	.971	.667	.250	.583	.000	.561	.728	.807	.889	.000	.864	.934
Cars	19	2	5	0	26	11	307	13	0	331	8	3	62	0	73	66	325	32	0	423	853
% Cars	100	100	100	0	100	100	99.0	100	0	99.1	100	100	98.4	0	98.6	98.5	99.7	100	0	99.5	99.3
Heavy Vehicles	0	0	0	0	0	0	3	0	0	3	0	0	1	0	1	1	1	0	0	2	6
% Heavy Vehicles	0	0	0	0	0	0	1.0	0	0	0.9	0	0	1.6	0	1.4	1.5	0.3	0	0	0.5	0.7



N/S: Stow Road
E/W: Driveway/ Tisbury Meadows
City, State: Boxborough, MA
Client: Bayside Engineering/ K. Cram

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File Name : 164948 C
Site Code : 2162135
Start Date : 2/24/2016
Page No : 1

Groups Printed- Cars - Heavy Vehicles

	Stow Road From North				Driveway From East				Stow Road From South				Tisbury Meadows From West				
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Int. Total
07:00 AM	0	2	0	0	0	0	0	0	0	5	0	0	0	0	0	0	7
07:15 AM	1	3	0	0	0	0	0	0	0	6	1	0	0	0	0	0	11
07:30 AM	0	6	0	0	0	1	0	0	0	16	0	0	1	0	1	0	25
07:45 AM	0	8	0	0	0	0	0	0	0	15	0	0	0	0	0	0	23
Total	1	19	0	0	0	1	0	0	0	42	1	0	1	0	1	0	66
08:00 AM	1	10	0	0	0	0	0	0	0	19	0	0	0	0	0	0	30
08:15 AM	0	15	0	0	1	0	0	0	0	21	0	0	0	0	0	0	37
08:30 AM	1	7	0	0	0	0	0	0	0	11	1	0	2	0	0	0	22
08:45 AM	0	4	0	0	0	0	0	0	0	15	0	0	0	0	1	0	20
Total	2	36	0	0	1	0	0	0	0	66	1	0	2	0	1	0	109
Grand Total	3	55	0	0	1	1	0	0	0	108	2	0	3	0	2	0	175
Apprch %	5.2	94.8	0	0	50	50	0	0	0	98.2	1.8	0	60	0	40	0	
Total %	1.7	31.4	0	0	0.6	0.6	0	0	0	61.7	1.1	0	1.7	0	1.1	0	
Cars	2	52	0	0	1	1	0	0	0	104	2	0	3	0	1	0	166
% Cars	66.7	94.5	0	0	100	100	0	0	0	96.3	100	0	100	0	50	0	94.9
Heavy Vehicles	1	3	0	0	0	0	0	0	0	4	0	0	0	0	1	0	9
% Heavy Vehicles	33.3	5.5	0	0	0	0	0	0	0	3.7	0	0	0	0	50	0	5.1

	Stow Road From North					Driveway From East					Stow Road From South					Tisbury Meadows From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:30 AM																					
07:30 AM	0	6	0	0	6	0	**1**	0	0	**1**	0	16	0	0	16	**1**	0	**1**	0	**2**	25
07:45 AM	0	8	0	0	8	0	0	0	0	0	0	15	0	0	15	0	0	0	0	0	23
08:00 AM	**1**	10	0	0	11	0	0	0	0	0	0	19	0	0	19	0	0	0	0	0	30
08:15 AM	0	**15**	0	0	**15**	**1**	0	0	0	1	0	**21**	0	0	**21**	0	0	0	0	0	**37**
Total Volume	1	39	0	0	40	1	1	0	0	2	0	71	0	0	71	1	0	1	0	2	115
% App. Total	2.5	97.5	0	0		50	50	0	0		0	100	0	0		50	0	50	0		
PHF	.250	.650	.000	.000	.667	.250	.250	.000	.000	.500	.000	.845	.000	.000	.845	.250	.000	.250	.000	.250	.777
Cars	1	36	0	0	37	1	1	0	0	2	0	68	0	0	68	1	0	0	0	1	108
% Cars	100	92.3	0	0	92.5	100	100	0	0	100	0	95.8	0	0	95.8	100	0	0	0	50.0	93.9
Heavy Vehicles	0	3	0	0	3	0	0	0	0	0	0	3	0	0	3	0	0	1	0	1	7
% Heavy Vehicles	0	7.7	0	0	7.5	0	0	0	0	0	0	4.2	0	0	4.2	0	0	100	0	50.0	6.1

PRECISION DATA INDUSTRIES, LLC
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N/S: Stow Road
E/W: Driveway/ Tisbury Meadows
City, State: Boxborough, MA
Client: Bayside Engineering/ K. Cram

File Name : 164948 C
Site Code : 2162135
Start Date : 2/24/2016
Page No : 1

Groups Printed- Cars

	Stow Road From North				Driveway From East				Stow Road From South				Tisbury Meadows From West				
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Int. Total
07:00 AM	0	2	0	0	0	0	0	0	0	5	0	0	0	0	0	0	7
07:15 AM	0	3	0	0	0	0	0	0	0	6	1	0	0	0	0	0	10
07:30 AM	0	6	0	0	0	1	0	0	0	15	0	0	1	0	0	0	23
07:45 AM	0	7	0	0	0	0	0	0	0	14	0	0	0	0	0	0	21
Total	0	18	0	0	0	1	0	0	0	40	1	0	1	0	0	0	61
08:00 AM	1	10	0	0	0	0	0	0	0	18	0	0	0	0	0	0	29
08:15 AM	0	13	0	0	1	0	0	0	0	21	0	0	0	0	0	0	35
08:30 AM	1	7	0	0	0	0	0	0	0	11	1	0	2	0	0	0	22
08:45 AM	0	4	0	0	0	0	0	0	0	14	0	0	0	0	1	0	19
Total	2	34	0	0	1	0	0	0	0	64	1	0	2	0	1	0	105
Grand Total	2	52	0	0	1	1	0	0	0	104	2	0	3	0	1	0	166
Apprch %	3.7	96.3	0	0	50	50	0	0	0	98.1	1.9	0	75	0	25	0	
Total %	1.2	31.3	0	0	0.6	0.6	0	0	0	62.7	1.2	0	1.8	0	0.6	0	

	Stow Road From North					Driveway From East					Stow Road From South					Tisbury Meadows From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:30 AM																					
07:30 AM	0	6	0	0	6	0	**1**	0	0	**1**	0	15	0	0	15	**1**	0	0	0	**1**	23
07:45 AM	0	7	0	0	7	0	0	0	0	0	0	14	0	0	14	0	0	0	0	0	21
08:00 AM	**1**	10	0	0	11	0	0	0	0	0	0	18	0	0	18	0	0	0	0	0	29
08:15 AM	0	**13**	0	0	**13**	**1**	0	0	0	1	0	**21**	0	0	**21**	0	0	0	0	0	**35**
Total Volume	1	36	0	0	37	1	1	0	0	2	0	68	0	0	68	1	0	0	0	1	108
% App. Total	2.7	97.3	0	0		50	50	0	0		0	100	0	0		100	0	0	0		
PHF	.250	.692	.000	.000	.712	.250	.250	.000	.000	.500	.000	.810	.000	.000	.810	.250	.000	.000	.000	.250	.771

N/S: Stow Road
E/W: Driveway/ Tisbury Meadows
City, State: Boxborough, MA
Client: Bayside Engineering/ K. Cram

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File Name : 164948 C
Site Code : 2162135
Start Date : 2/24/2016
Page No : 1

Groups Printed- Heavy Vehicles

	Stow Road From North				Driveway From East				Stow Road From South				Tisbury Meadows From West				
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Int. Total
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
07:30 AM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	2
07:45 AM	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	2
Total	1	1	0	0	0	0	0	0	0	2	0	0	0	0	1	0	5
08:00 AM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
08:15 AM	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:45 AM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
Total	0	2	0	0	0	0	0	0	0	2	0	0	0	0	0	0	4
Grand Total	1	3	0	0	0	0	0	0	0	4	0	0	0	0	1	0	9
Apprch %	25	75	0	0	0	0	0	0	0	100	0	0	0	0	100	0	
Total %	11.1	33.3	0	0	0	0	0	0	0	44.4	0	0	0	0	11.1	0	

	Stow Road From North					Driveway From East					Stow Road From South					Tisbury Meadows From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:30 AM																					
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	**1**	0	0	**1**	0	0	**1**	0	**1**	**2**
07:45 AM	0	1	0	0	1	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	2
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1
08:15 AM	0	**2**	0	0	**2**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Total Volume	0	3	0	0	3	0	0	0	0	0	0	3	0	0	3	0	0	1	0	1	7
% App. Total	0	100	0	0		0	0	0	0		0	100	0	0		0	0	100	0		
PHF	.000	.375	.000	.000	.375	.000	.000	.000	.000	.000	.000	.750	.000	.000	.750	.000	.000	.250	.000	.250	.875

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N/S: Stow Road
E/W: Driveway/ Tisbury Meadows
City, State: Boxborough, MA
Client: Bayside Engineering/ K. Cram

File Name : 164948 C
Site Code : 2162135
Start Date : 2/24/2016
Page No : 1

Groups Printed- Peds and Bicycles

	Stow Road From North					Driveway From East					Stow Road From South					Tisbury Meadows From West					
Start Time	Right	Thru	Left	Peds EB	Peds WB	Right	Thru	Left	Peds SB	Peds NB	Right	Thru	Left	Peds WB	Peds EB	Right	Thru	Left	Peds NB	Peds SB	Int. Total
07:00 AM	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
Apprch %	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0	
Total %	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0	

	Stow Road From North						Driveway From East						Stow Road From South						Tisbury Meadows From West						
Start Time	Right	Thru	Left	Peds EB	Peds WB	App. Total	Right	Thru	Left	Peds SB	Peds NB	App. Total	Right	Thru	Left	Peds WB	Peds EB	App. Total	Right	Thru	Left	Peds NB	Peds SB	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																									
Peak Hour for Entire Intersection Begins at 07:00 AM																									
07:00 AM	0	0	0	0	0	0	0	0	0	**1**	0	**1**	0	0	0	0	0	0	0	0	0	0	0	0	**1**
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
% App. Total	0	0	0	0	0		0	0	0	100	0		0	0	0	0	0		0	0	0	0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.250	.000	.250	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.250

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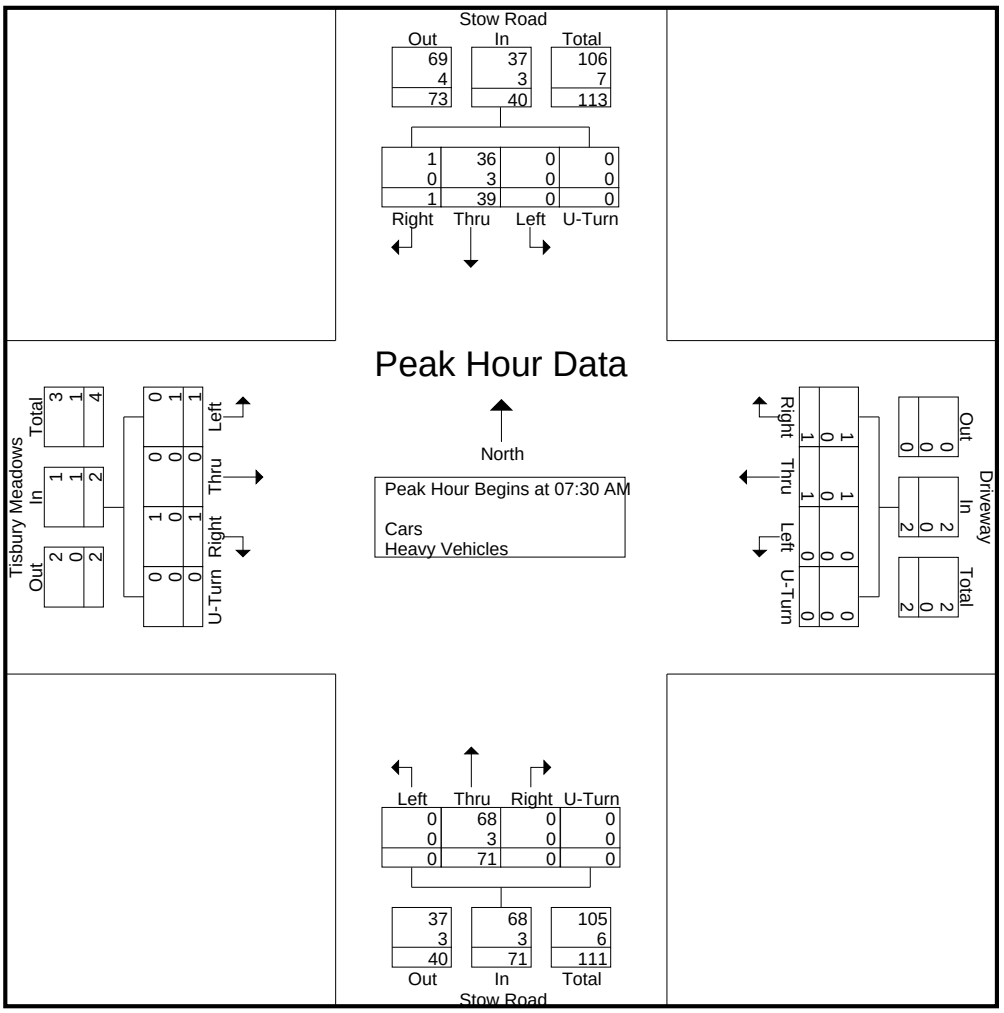
N/S: Stow Road
E/W: Driveway/ Tisbury Meadows
City, State: Boxborough, MA
Client: Bayside Engineering/ K. Cram

File Name : 164948 C
Site Code : 2162135
Start Date : 2/24/2016
Page No : 1

	Stow Road From North					Driveway From East					Stow Road From South					Tisbury Meadows From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:30 AM																					
07:30 AM	0	6	0	0	6	0	**1**	0	0	**1**	0	16	0	0	16	**1**	0	**1**	0	**2**	25
07:45 AM	0	8	0	0	8	0	0	0	0	0	0	15	0	0	15	0	0	0	0	0	23
08:00 AM	**1**	10	0	0	11	0	0	0	0	0	0	19	0	0	19	0	0	0	0	0	30
08:15 AM	0	**15**	0	0	**15**	**1**	0	0	0	1	0	**21**	0	0	**21**	0	0	0	0	0	**37**
Total Volume	1	39	0	0	40	1	1	0	0	2	0	71	0	0	71	1	0	1	0	2	115
% App. Total	2.5	97.5	0	0		50	50	0	0		0	100	0	0		50	0	50	0		
PHF	.250	.650	.000	.000	.667	.250	.250	.000	.000	.500	.000	.845	.000	.000	.845	.250	.000	.250	.000	.250	.777
Cars	1	36	0	0	37	1	1	0	0	2	0	68	0	0	68	1	0	0	0	1	108
% Cars	100	92.3	0	0	92.5	100	100	0	0	100	0	95.8	0	0	95.8	100	0	0	0	50.0	93.9
Heavy Vehicles	0	3	0	0	3	0	0	0	0	0	0	3	0	0	3	0	0	1	0	1	7
% Heavy Vehicles	0	7.7	0	0	7.5	0	0	0	0	0	0	4.2	0	0	4.2	0	0	100	0	50.0	6.1



N/S: Stow Road
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File Name : 164948 CC
Site Code : 2162135
Start Date : 2/24/2016
Page No : 1

Groups Printed- Cars - Heavy Vehicles

	Stow Road From North				Driveway From East				Stow Road From South				Tisbury Meadows From West				
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Int. Total
04:00 PM	0	12	0	0	0	0	0	0	0	10	0	0	0	0	0	0	22
04:15 PM	0	4	0	0	0	0	0	0	0	8	0	0	0	0	0	0	12
04:30 PM	1	6	0	0	0	0	0	0	0	10	0	0	1	0	0	0	18
04:45 PM	0	7	1	0	0	0	0	0	0	7	1	0	0	0	0	0	16
Total	1	29	1	0	0	0	0	0	0	35	1	0	1	0	0	0	68
05:00 PM	0	5	0	0	0	0	0	0	0	10	0	0	0	0	0	0	15
05:15 PM	0	10	0	0	0	0	0	0	1	8	0	0	0	0	1	0	20
05:30 PM	0	9	0	0	0	0	0	0	0	13	1	0	0	0	0	0	23
05:45 PM	2	10	0	0	0	0	0	0	0	12	0	0	0	0	0	0	24
Total	2	34	0	0	0	0	0	0	1	43	1	0	0	0	1	0	82
06:00 PM	0	8	0	0	0	0	0	0	0	8	0	0	0	0	0	0	16
06:15 PM	1	5	0	0	0	0	0	0	0	10	0	0	0	0	0	0	16
Grand Total	4	76	1	0	0	0	0	0	1	96	2	0	1	0	1	0	182
Apprch %	4.9	93.8	1.2	0	0	0	0	0	1	97	2	0	50	0	50	0	
Total %	2.2	41.8	0.5	0	0	0	0	0	0.5	52.7	1.1	0	0.5	0	0.5	0	
Cars	4	75	1	0	0	0	0	0	1	94	2	0	1	0	1	0	179
% Cars	100	98.7	100	0	0	0	0	0	100	97.9	100	0	100	0	100	0	98.4
Heavy Vehicles	0	1	0	0	0	0	0	0	0	2	0	0	0	0	0	0	3
% Heavy Vehicles	0	1.3	0	0	0	0	0	0	0	2.1	0	0	0	0	0	0	1.6

	Stow Road From North					Driveway From East					Stow Road From South					Tisbury Meadows From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 06:15 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 05:15 PM																					
05:15 PM	0	**10**	0	0	10	0	0	0	0	0	**1**	8	0	0	9	0	0	**1**	0	**1**	20
05:30 PM	0	9	0	0	9	0	0	0	0	0	0	**13**	**1**	0	**14**	0	0	0	0	0	23
05:45 PM	**2**	10	0	0	**12**	0	0	0	0	0	0	12	0	0	12	0	0	0	0	0	**24**
06:00 PM	0	8	0	0	8	0	0	0	0	0	0	8	0	0	8	0	0	0	0	0	16
Total Volume	2	37	0	0	39	0	0	0	0	0	1	41	1	0	43	0	0	1	0	1	83
% App. Total	5.1	94.9	0	0		0	0	0	0		2.3	95.3	2.3	0		0	0	100	0		
PHF	.250	.925	.000	.000	.813	.000	.000	.000	.000	.000	.250	.788	.250	.000	.768	.000	.000	.250	.000	.250	.865
Cars	2	36	0	0	38	0	0	0	0	0	1	41	1	0	43	0	0	1	0	1	82
% Cars	100	97.3	0	0	97.4	0	0	0	0	0	100	100	100	0	100	0	0	100	0	100	98.8
Heavy Vehicles	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
% Heavy Vehicles	0	2.7	0	0	2.6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.2

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Client: Bayside Engineering/ K. Cram

File Name : 164948 CC
Site Code : 2162135
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Page No : 1

Groups Printed- Cars

	Stow Road From North				Driveway From East				Stow Road From South				Tisbury Meadows From West				
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Int. Total
04:00 PM	0	12	0	0	0	0	0	0	0	9	0	0	0	0	0	0	21
04:15 PM	0	4	0	0	0	0	0	0	0	7	0	0	0	0	0	0	11
04:30 PM	1	6	0	0	0	0	0	0	0	10	0	0	1	0	0	0	18
04:45 PM	0	7	1	0	0	0	0	0	0	7	1	0	0	0	0	0	16
Total	1	29	1	0	0	0	0	0	0	33	1	0	1	0	0	0	66
05:00 PM	0	5	0	0	0	0	0	0	0	10	0	0	0	0	0	0	15
05:15 PM	0	10	0	0	0	0	0	0	1	8	0	0	0	0	1	0	20
05:30 PM	0	9	0	0	0	0	0	0	0	13	1	0	0	0	0	0	23
05:45 PM	2	9	0	0	0	0	0	0	0	12	0	0	0	0	0	0	23
Total	2	33	0	0	0	0	0	0	1	43	1	0	0	0	1	0	81
06:00 PM	0	8	0	0	0	0	0	0	0	8	0	0	0	0	0	0	16
06:15 PM	1	5	0	0	0	0	0	0	0	10	0	0	0	0	0	0	16
Grand Total	4	75	1	0	0	0	0	0	1	94	2	0	1	0	1	0	179
Apprch %	5	93.8	1.2	0	0	0	0	0	1	96.9	2.1	0	50	0	50	0	
Total %	2.2	41.9	0.6	0	0	0	0	0	0.6	52.5	1.1	0	0.6	0	0.6	0	

	Stow Road From North					Driveway From East					Stow Road From South					Tisbury Meadows From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 06:15 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 05:15 PM																					
05:15 PM	0	**10**	0	0	10	0	0	0	0	0	**1**	8	0	0	9	0	0	**1**	0	**1**	20
05:30 PM	0	9	0	0	9	0	0	0	0	0	0	**13**	**1**	0	**14**	0	0	0	0	0	**23**
05:45 PM	**2**	9	0	0	**11**	0	0	0	0	0	0	12	0	0	12	0	0	0	0	0	23
06:00 PM	0	8	0	0	8	0	0	0	0	0	0	8	0	0	8	0	0	0	0	0	16
Total Volume	2	36	0	0	38	0	0	0	0	0	1	41	1	0	43	0	0	1	0	1	82
% App. Total	5.3	94.7	0	0		0	0	0	0		2.3	95.3	2.3	0		0	0	100	0		
PHF	.250	.900	.000	.000	.864	.000	.000	.000	.000	.000	.250	.788	.250	.000	.768	.000	.000	.250	.000	.250	.891

N/S: Stow Road
E/W: Driveway/ Tisbury Meadows
City, State: Boxborough, MA
Client: Bayside Engineering/ K. Cram

PRECISION DATA INDUSTRIES, LLC
P.O. Box 301 Berlin, MA 01503
Office: 508.481.3999 Fax: 508.545.1234
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File Name : 164948 CC
Site Code : 2162135
Start Date : 2/24/2016
Page No : 1

Groups Printed- Heavy Vehicles

	Stow Road From North				Driveway From East				Stow Road From South				Tisbury Meadows From West				
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Int. Total
04:00 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
04:15 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	2
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Total	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
06:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	1	0	0	0	0	0	0	0	2	0	0	0	0	0	0	3
Apprch %	0	100	0	0	0	0	0	0	0	100	0	0	0	0	0	0	
Total %	0	33.3	0	0	0	0	0	0	0	66.7	0	0	0	0	0	0	

	Stow Road From North					Driveway From East					Stow Road From South					Tisbury Meadows From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 06:15 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:00 PM																					
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	**1**	0	0	**1**	0	0	0	0	0	**1**
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	2
% App. Total	0	0	0	0		0	0	0	0		0	100	0	0		0	0	0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.500	.000	.000	.500	.000	.000	.000	.000	.000	.500

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N/S: Stow Road
E/W: Driveway/ Tisbury Meadows
City, State: Boxborough, MA
Client: Bayside Engineering/ K. Cram

File Name : 164948 CC
Site Code : 2162135
Start Date : 2/24/2016
Page No : 1

Groups Printed- Peds and Bicycles

	Stow Road From North					Driveway From East					Stow Road From South					Tisbury Meadows From West					
Start Time	Right	Thru	Left	Peds EB	Peds WB	Right	Thru	Left	Peds SB	Peds NB	Right	Thru	Left	Peds WB	Peds EB	Right	Thru	Left	Peds NB	Peds SB	Int. Total
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
06:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Apprch %	0	0	0	50	50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Total %	0	0	0	50	50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

	Stow Road From North						Driveway From East						Stow Road From South						Tisbury Meadows From West						
Start Time	Right	Thru	Left	Peds EB	Peds WB	App. Total	Right	Thru	Left	Peds SB	Peds NB	App. Total	Right	Thru	Left	Peds WB	Peds EB	App. Total	Right	Thru	Left	Peds NB	Peds SB	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 06:15 PM - Peak 1 of 1																									
Peak Hour for Entire Intersection Begins at 04:30 PM																									
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	**1**	**1**	**2**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**2**
Total Volume	0	0	0	1	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
% App. Total	0	0	0	50	50		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		
PHF	.000	.000	.000	.250	.250	.250	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.250

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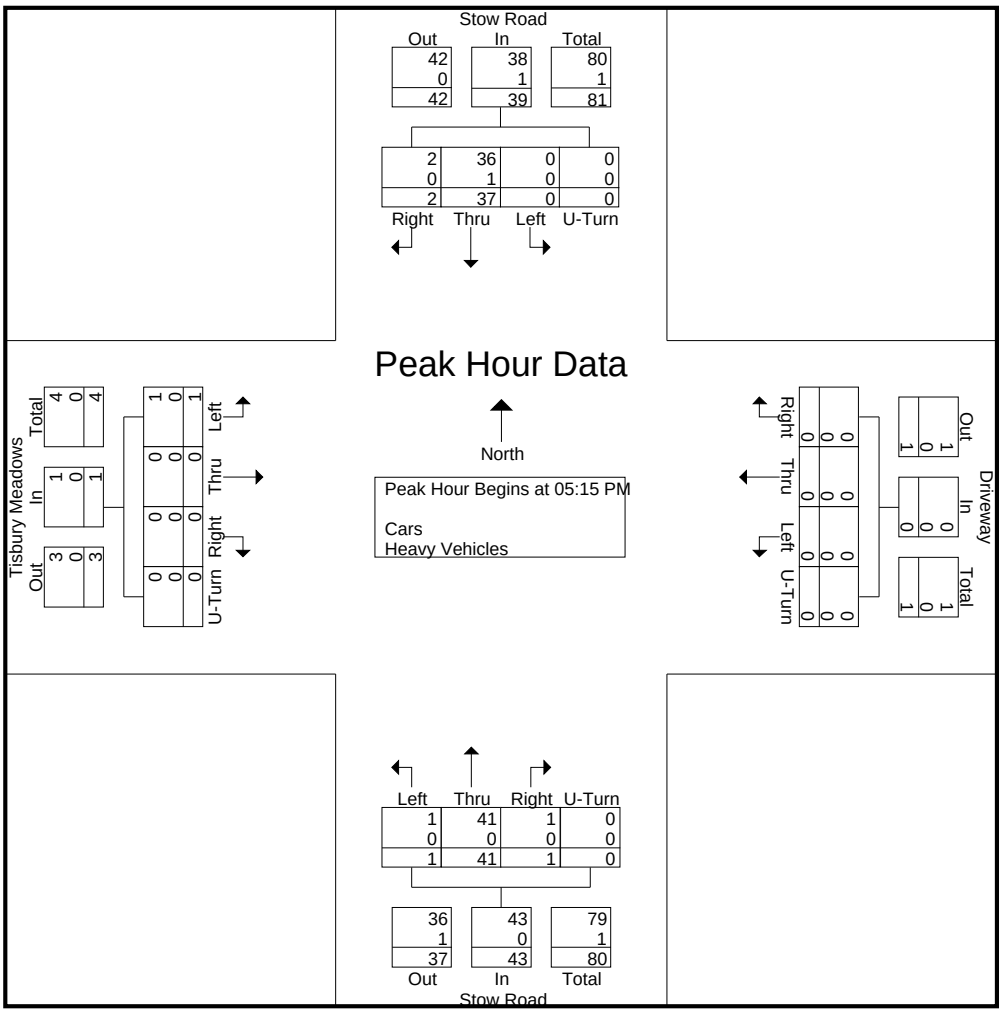
N/S: Stow Road
E/W: Driveway/ Tisbury Meadows
City, State: Boxborough, MA
Client: Bayside Engineering/ K. Cram

File Name : 164948 CC
Site Code : 2162135
Start Date : 2/24/2016
Page No : 1

	Stow Road From North					Driveway From East					Stow Road From South					Tisbury Meadows From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 06:15 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 05:15 PM																					
05:15 PM	0	**10**	0	0	10	0	0	0	0	0	**1**	8	0	0	9	0	0	**1**	0	**1**	20
05:30 PM	0	9	0	0	9	0	0	0	0	0	0	**13**	**1**	0	**14**	0	0	0	0	0	23
05:45 PM	**2**	10	0	0	**12**	0	0	0	0	0	0	12	0	0	12	0	0	0	0	0	**24**
06:00 PM	0	8	0	0	8	0	0	0	0	0	0	8	0	0	8	0	0	0	0	0	16
Total Volume	2	37	0	0	39	0	0	0	0	0	1	41	1	0	43	0	0	1	0	1	83
% App. Total	5.1	94.9	0	0		0	0	0	0		2.3	95.3	2.3	0		0	0	100	0		
PHF	.250	.925	.000	.000	.813	.000	.000	.000	.000	.000	.250	.788	.250	.000	.768	.000	.000	.250	.000	.250	.865
Cars	2	36	0	0	38	0	0	0	0	0	1	41	1	0	43	0	0	1	0	1	82
% Cars	100	97.3	0	0	97.4	0	0	0	0	0	100	100	100	0	100	0	0	100	0	100	98.8
Heavy Vehicles	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
% Heavy Vehicles	0	2.7	0	0	2.6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.2



PRECISION DATA INDUSTRIES, LLC
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N/S: Stow Road
E/W: Burroughs Road
City, State: Boxborough, MA
Client: Bayside Engineering/ K. Cram

File Name : 164948 D
Site Code : 2162135
Start Date : 2/24/2016
Page No : 1

Groups Printed- Cars - Heavy Vehicles

	Stow Road From North				Burroughs Road From East				Stow Road From South				Burroughs Road From West				
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Int. Total
07:00 AM	0	2	0	0	0	2	3	0	1	2	0	0	1	14	0	0	25
07:15 AM	0	2	1	0	1	2	2	0	3	4	0	0	0	2	2	0	19
07:30 AM	0	7	1	0	0	3	1	0	0	15	0	0	0	7	0	0	34
07:45 AM	1	6	0	0	3	2	0	0	1	6	0	0	0	7	5	0	31
Total	1	17	2	0	4	9	6	0	5	27	0	0	1	30	7	0	109
08:00 AM	2	9	0	0	4	2	1	0	7	14	0	0	0	7	4	0	50
08:15 AM	2	11	0	0	3	1	0	0	0	12	0	0	0	7	2	0	38
08:30 AM	1	7	2	0	2	1	0	0	5	8	0	0	0	9	1	0	36
08:45 AM	2	3	0	0	8	1	1	0	5	5	0	0	0	4	2	0	31
Total	7	30	2	0	17	5	2	0	17	39	0	0	0	27	9	0	155
Grand Total	8	47	4	0	21	14	8	0	22	66	0	0	1	57	16	0	264
Apprch %	13.6	79.7	6.8	0	48.8	32.6	18.6	0	25	75	0	0	1.4	77	21.6	0	
Total %	3	17.8	1.5	0	8	5.3	3	0	8.3	25	0	0	0.4	21.6	6.1	0	
Cars	8	46	2	0	21	13	8	0	21	65	0	0	1	55	15	0	255
% Cars	100	97.9	50	0	100	92.9	100	0	95.5	98.5	0	0	100	96.5	93.8	0	96.6
Heavy Vehicles	0	1	2	0	0	1	0	0	1	1	0	0	0	2	1	0	9
% Heavy Vehicles	0	2.1	50	0	0	7.1	0	0	4.5	1.5	0	0	0	3.5	6.2	0	3.4

	Stow Road From North					Burroughs Road From East					Stow Road From South					Burroughs Road From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:45 AM																					
07:45 AM	1	6	0	0	7	3	**2**	0	0	5	1	6	0	0	7	0	7	**5**	0	**12**	31
08:00 AM	**2**	9	0	0	11	**4**	2	**1**	0	**7**	**7**	**14**	0	0	**21**	0	7	4	0	11	**50**
08:15 AM	2	**11**	0	0	**13**	3	1	0	0	4	0	12	0	0	12	0	7	2	0	9	38
08:30 AM	1	7	**2**	0	10	2	1	0	0	3	5	8	0	0	13	0	**9**	1	0	10	36
Total Volume	6	33	2	0	41	12	6	1	0	19	13	40	0	0	53	0	30	12	0	42	155
% App. Total	14.6	80.5	4.9	0		63.2	31.6	5.3	0		24.5	75.5	0	0		0	71.4	28.6	0		
PHF	.750	.750	.250	.000	.788	.750	.750	.250	.000	.679	.464	.714	.000	.000	.631	.000	.833	.600	.000	.875	.775
Cars	6	32	1	0	39	12	5	1	0	18	12	40	0	0	52	0	29	11	0	40	149
% Cars	100	97.0	50.0	0	95.1	100	83.3	100	0	94.7	92.3	100	0	0	98.1	0	96.7	91.7	0	95.2	96.1
Heavy Vehicles	0	1	1	0	2	0	1	0	0	1	1	0	0	0	1	0	1	1	0	2	6
% Heavy Vehicles	0	3.0	50.0	0	4.9	0	16.7	0	0	5.3	7.7	0	0	0	1.9	0	3.3	8.3	0	4.8	3.9

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N/S: Stow Road
E/W: Burroughs Road
City, State: Boxborough, MA
Client: Bayside Engineering/ K. Cram

File Name : 164948 D
Site Code : 2162135
Start Date : 2/24/2016
Page No : 1

Groups Printed- Cars

	Stow Road From North				Burroughs Road From East				Stow Road From South				Burroughs Road From West				
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Int. Total
07:00 AM	0	2	0	0	0	2	3	0	1	2	0	0	1	14	0	0	25
07:15 AM	0	2	1	0	1	2	2	0	3	4	0	0	0	2	2	0	19
07:30 AM	0	7	0	0	0	3	1	0	0	15	0	0	0	7	0	0	33
07:45 AM	1	5	0	0	3	2	0	0	1	6	0	0	0	7	4	0	29
Total	1	16	1	0	4	9	6	0	5	27	0	0	1	30	6	0	106
08:00 AM	2	9	0	0	4	2	1	0	7	14	0	0	0	7	4	0	50
08:15 AM	2	11	0	0	3	0	0	0	0	12	0	0	0	6	2	0	36
08:30 AM	1	7	1	0	2	1	0	0	4	8	0	0	0	9	1	0	34
08:45 AM	2	3	0	0	8	1	1	0	5	4	0	0	0	3	2	0	29
Total	7	30	1	0	17	4	2	0	16	38	0	0	0	25	9	0	149
Grand Total	8	46	2	0	21	13	8	0	21	65	0	0	1	55	15	0	255
Apprch %	14.3	82.1	3.6	0	50	31	19	0	24.4	75.6	0	0	1.4	77.5	21.1	0	
Total %	3.1	18	0.8	0	8.2	5.1	3.1	0	8.2	25.5	0	0	0.4	21.6	5.9	0	

	Stow Road From North					Burroughs Road From East					Stow Road From South					Burroughs Road From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:45 AM																					
07:45 AM	1	5	0	0	6	3	**2**	0	0	5	1	6	0	0	7	0	7	**4**	0	**11**	29
08:00 AM	**2**	9	0	0	11	**4**	2	**1**	0	**7**	**7**	**14**	0	0	**21**	0	7	4	0	11	**50**
08:15 AM	2	**11**	0	0	**13**	3	0	0	0	3	0	12	0	0	12	0	6	2	0	8	36
08:30 AM	1	7	**1**	0	9	2	1	0	0	3	4	8	0	0	12	0	**9**	1	0	10	34
Total Volume	6	32	1	0	39	12	5	1	0	18	12	40	0	0	52	0	29	11	0	40	149
% App. Total	15.4	82.1	2.6	0		66.7	27.8	5.6	0		23.1	76.9	0	0		0	72.5	27.5	0		
PHF	.750	.727	.250	.000	.750	.750	.625	.250	.000	.643	.429	.714	.000	.000	.619	.000	.806	.688	.000	.909	.745

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N/S: Stow Road
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City, State: Boxborough, MA
Client: Bayside Engineering/ K. Cram

File Name : 164948 D
Site Code : 2162135
Start Date : 2/24/2016
Page No : 1

Groups Printed- Heavy Vehicles

	Stow Road From North				Burroughs Road From East				Stow Road From South				Burroughs Road From West				
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Int. Total
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
07:45 AM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	2
Total	0	1	1	0	0	0	0	0	0	0	0	0	0	0	1	0	3
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	2
08:30 AM	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	2
08:45 AM	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	2
Total	0	0	1	0	0	1	0	0	1	1	0	0	0	2	0	0	6
Grand Total	0	1	2	0	0	1	0	0	1	1	0	0	0	2	1	0	9
Apprch %	0	33.3	66.7	0	0	100	0	0	50	50	0	0	0	66.7	33.3	0	
Total %	0	11.1	22.2	0	0	11.1	0	0	11.1	11.1	0	0	0	22.2	11.1	0	

	Stow Road From North					Burroughs Road From East					Stow Road From South					Burroughs Road From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:45 AM																					
07:45 AM	0	**1**	0	0	**1**	0	0	0	0	0	0	0	0	0	0	0	0	**1**	0	**1**	**2**
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	0	**1**	0	0	**1**	0	0	0	0	0	0	**1**	0	0	1	2
08:30 AM	0	0	**1**	0	1	0	0	0	0	0	**1**	0	0	0	**1**	0	0	0	0	0	2
Total Volume	0	1	1	0	2	0	1	0	0	1	1	0	0	0	1	0	1	1	0	2	6
% App. Total	0	50	50	0		0	100	0	0		100	0	0	0		0	50	50	0		
PHF	.000	.250	.250	.000	.500	.000	.250	.000	.000	.250	.250	.000	.000	.000	.250	.000	.250	.250	.000	.500	.750

PRECISION DATA INDUSTRIES, LLC
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N/S: Stow Road
E/W: Burroughs Road
City, State: Boxborough, MA
Client: Bayside Engineering/ K. Cram

File Name : 164948 D
Site Code : 2162135
Start Date : 2/24/2016
Page No : 1

Groups Printed- Peds and Bicycles

	Stow Road From North					Burroughs Road From East					Stow Road From South					Burroughs Road From West					
Start Time	Right	Thru	Left	Peds EB	Peds WB	Right	Thru	Left	Peds SB	Peds NB	Right	Thru	Left	Peds WB	Peds EB	Right	Thru	Left	Peds NB	Peds SB	Int. Total
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
Apprch %	0	0	0	0	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	
Total %	0	0	0	0	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	

	Stow Road From North						Burroughs Road From East						Stow Road From South						Burroughs Road From West						
Start Time	Right	Thru	Left	Peds EB	Peds WB	App. Total	Right	Thru	Left	Peds SB	Peds NB	App. Total	Right	Thru	Left	Peds WB	Peds EB	App. Total	Right	Thru	Left	Peds NB	Peds SB	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																									
Peak Hour for Entire Intersection Begins at 07:00 AM																									
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	**1**	0	0	**1**	0	0	0	0	0	0	0	0	0	0	0	0	**1**
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
% App. Total	0	0	0	0	0		0	0	100	0	0		0	0	0	0	0		0	0	0	0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.250	.000	.000	.250	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.250

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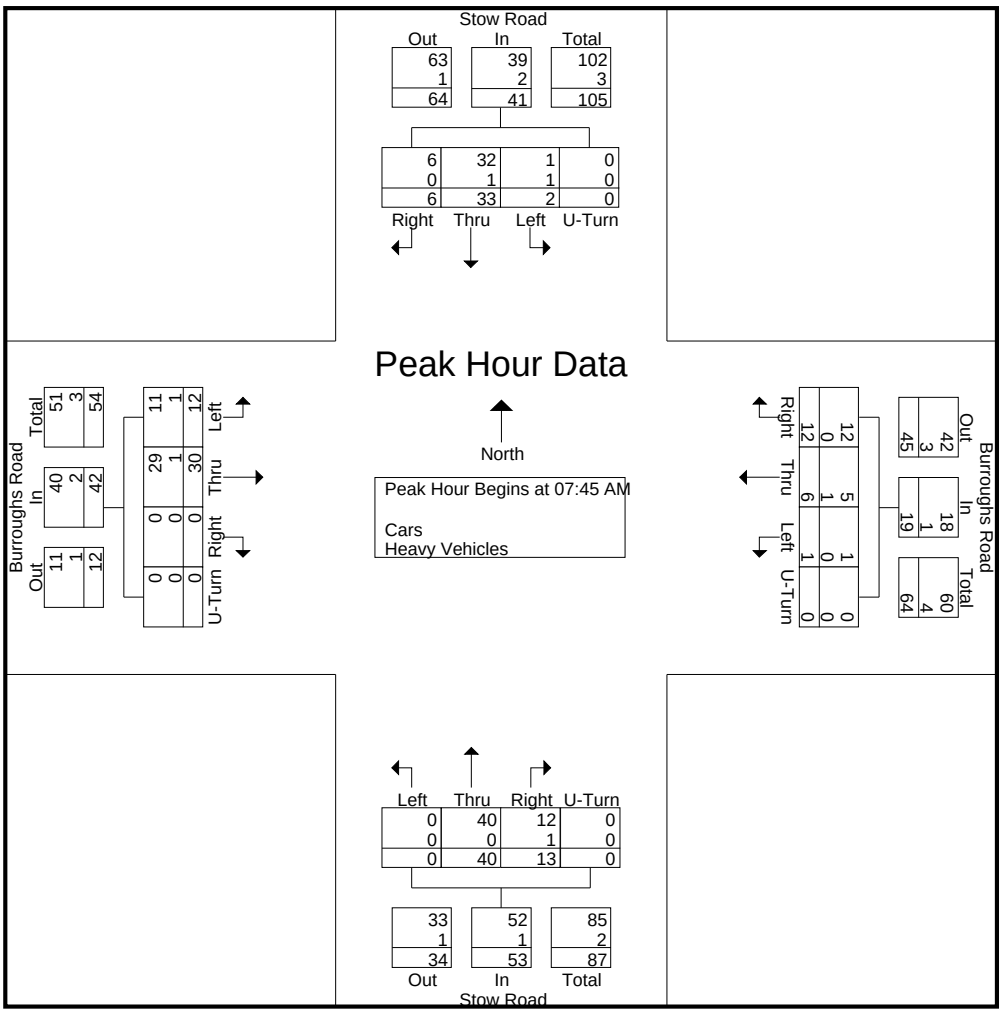
N/S: Stow Road
E/W: Burroughs Road
City, State: Boxborough, MA
Client: Bayside Engineering/ K. Cram

File Name : 164948 D
Site Code : 2162135
Start Date : 2/24/2016
Page No : 1

	Stow Road From North					Burroughs Road From East					Stow Road From South					Burroughs Road From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:45 AM																					
07:45 AM	1	6	0	0	7	3	**2**	0	0	5	1	6	0	0	7	0	7	**5**	0	**12**	31
08:00 AM	**2**	9	0	0	11	**4**	2	**1**	0	**7**	**7**	**14**	0	0	**21**	0	7	4	0	11	**50**
08:15 AM	2	**11**	0	0	**13**	3	1	0	0	4	0	12	0	0	12	0	7	2	0	9	38
08:30 AM	1	7	**2**	0	10	2	1	0	0	3	5	8	0	0	13	0	**9**	1	0	10	36
Total Volume	6	33	2	0	41	12	6	1	0	19	13	40	0	0	53	0	30	12	0	42	155
% App. Total	14.6	80.5	4.9	0		63.2	31.6	5.3	0		24.5	75.5	0	0		0	71.4	28.6	0		
PHF	.750	.750	.250	.000	.788	.750	.750	.250	.000	.679	.464	.714	.000	.000	.631	.000	.833	.600	.000	.875	.775
Cars	6	32	1	0	39	12	5	1	0	18	12	40	0	0	52	0	29	11	0	40	149
% Cars	100	97.0	50.0	0	95.1	100	83.3	100	0	94.7	92.3	100	0	0	98.1	0	96.7	91.7	0	95.2	96.1
Heavy Vehicles	0	1	1	0	2	0	1	0	0	1	1	0	0	0	1	0	1	1	0	2	6
% Heavy Vehicles	0	3.0	50.0	0	4.9	0	16.7	0	0	5.3	7.7	0	0	0	1.9	0	3.3	8.3	0	4.8	3.9



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N/S: Stow Road
E/W: Burroughs Road
City, State: Boxborough, MA
Client: Bayside Engineering/ K. Cram

File Name : 164948 DD
Site Code : 2162135
Start Date : 2/24/2016
Page No : 1

Groups Printed- Cars - Heavy Vehicles

	Stow Road From North				Burroughs Road From East				Stow Road From South				Burroughs Road From West				
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Int. Total
04:00 PM	3	7	3	0	5	10	0	0	2	5	0	0	0	5	1	0	41
04:15 PM	0	1	3	0	0	6	2	0	0	7	0	0	0	3	1	0	23
04:30 PM	0	6	1	0	0	4	4	0	3	9	0	0	0	2	1	0	30
04:45 PM	2	5	0	0	2	10	1	0	3	6	0	0	0	5	3	0	37
Total	5	19	7	0	7	30	7	0	8	27	0	0	0	15	6	0	131
05:00 PM	3	1	1	0	2	3	3	0	1	7	1	0	0	6	0	0	28
05:15 PM	2	5	3	0	3	10	8	0	3	8	0	0	0	3	0	0	45
05:30 PM	1	7	0	0	4	11	2	0	2	7	0	0	0	6	3	0	43
05:45 PM	2	7	1	0	1	8	7	0	2	10	1	0	0	2	1	0	42
Total	8	20	5	0	10	32	20	0	8	32	2	0	0	17	4	0	158
06:00 PM	1	5	1	0	3	10	4	0	2	4	0	0	0	5	1	0	36
06:15 PM	1	0	2	0	2	4	4	0	2	8	0	0	0	6	1	0	30
Grand Total	15	44	15	0	22	76	35	0	20	71	2	0	0	43	12	0	355
Apprch %	20.3	59.5	20.3	0	16.5	57.1	26.3	0	21.5	76.3	2.2	0	0	78.2	21.8	0	
Total %	4.2	12.4	4.2	0	6.2	21.4	9.9	0	5.6	20	0.6	0	0	12.1	3.4	0	
Cars	15	42	15	0	21	76	34	0	19	70	1	0	0	42	12	0	347
% Cars	100	95.5	100	0	95.5	100	97.1	0	95	98.6	50	0	0	97.7	100	0	97.7
Heavy Vehicles	0	2	0	0	1	0	1	0	1	1	1	0	0	1	0	0	8
% Heavy Vehicles	0	4.5	0	0	4.5	0	2.9	0	5	1.4	50	0	0	2.3	0	0	2.3

	Stow Road From North					Burroughs Road From East					Stow Road From South					Burroughs Road From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 06:15 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 05:15 PM																					
05:15 PM	**2**	5	**3**	0	**10**	3	10	**8**	0	**21**	**3**	8	0	0	11	0	3	0	0	3	**45**
05:30 PM	1	**7**	0	0	8	**4**	**11**	2	0	17	2	7	0	0	9	0	**6**	**3**	0	**9**	43
05:45 PM	2	7	1	0	10	1	8	7	0	16	2	**10**	**1**	0	**13**	0	2	1	0	3	42
06:00 PM	1	5	1	0	7	3	10	4	0	17	2	4	0	0	6	0	5	1	0	6	36
Total Volume	6	24	5	0	35	11	39	21	0	71	9	29	1	0	39	0	16	5	0	21	166
% App. Total	17.1	68.6	14.3	0		15.5	54.9	29.6	0		23.1	74.4	2.6	0		0	76.2	23.8	0		
PHF	.750	.857	.417	.000	.875	.688	.886	.656	.000	.845	.750	.725	.250	.000	.750	.000	.667	.417	.000	.583	.922
Cars	6	22	5	0	33	11	39	21	0	71	9	29	1	0	39	0	16	5	0	21	164
% Cars	100	91.7	100	0	94.3	100	100	100	0	100	100	100	100	0	100	0	100	100	0	100	98.8
Heavy Vehicles	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
% Heavy Vehicles	0	8.3	0	0	5.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.2

PRECISION
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N/S: Stow Road
E/W: Burroughs Road
City, State: Boxborough, MA
Client: Bayside Engineering/ K. Cram

File Name : 164948 DD
Site Code : 2162135
Start Date : 2/24/2016
Page No : 1

Groups Printed- Cars

	Stow Road From North				Burroughs Road From East				Stow Road From South				Burroughs Road From West				
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Int. Total
04:00 PM	3	7	3	0	4	10	0	0	1	5	0	0	0	4	1	0	38
04:15 PM	0	1	3	0	0	6	1	0	0	6	0	0	0	3	1	0	21
04:30 PM	0	6	1	0	0	4	4	0	3	9	0	0	0	2	1	0	30
04:45 PM	2	5	0	0	2	10	1	0	3	6	0	0	0	5	3	0	37
Total	5	19	7	0	6	30	6	0	7	26	0	0	0	14	6	0	126
05:00 PM	3	1	1	0	2	3	3	0	1	7	0	0	0	6	0	0	27
05:15 PM	2	5	3	0	3	10	8	0	3	8	0	0	0	3	0	0	45
05:30 PM	1	7	0	0	4	11	2	0	2	7	0	0	0	6	3	0	43
05:45 PM	2	5	1	0	1	8	7	0	2	10	1	0	0	2	1	0	40
Total	8	18	5	0	10	32	20	0	8	32	1	0	0	17	4	0	155
06:00 PM	1	5	1	0	3	10	4	0	2	4	0	0	0	5	1	0	36
06:15 PM	1	0	2	0	2	4	4	0	2	8	0	0	0	6	1	0	30
Grand Total	15	42	15	0	21	76	34	0	19	70	1	0	0	42	12	0	347
Apprch %	20.8	58.3	20.8	0	16	58	26	0	21.1	77.8	1.1	0	0	77.8	22.2	0	
Total %	4.3	12.1	4.3	0	6.1	21.9	9.8	0	5.5	20.2	0.3	0	0	12.1	3.5	0	

	Stow Road From North					Burroughs Road From East					Stow Road From South					Burroughs Road From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 06:15 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 05:15 PM																					
05:15 PM	**2**	5	**3**	0	**10**	3	10	**8**	0	**21**	**3**	8	0	0	11	0	3	0	0	3	**45**
05:30 PM	1	**7**	0	0	8	**4**	**11**	2	0	17	2	7	0	0	9	0	**6**	**3**	0	**9**	43
05:45 PM	2	5	1	0	8	1	8	7	0	16	2	**10**	**1**	0	**13**	0	2	1	0	3	40
06:00 PM	1	5	1	0	7	3	10	4	0	17	2	4	0	0	6	0	5	1	0	6	36
Total Volume	6	22	5	0	33	11	39	21	0	71	9	29	1	0	39	0	16	5	0	21	164
% App. Total	18.2	66.7	15.2	0		15.5	54.9	29.6	0		23.1	74.4	2.6	0		0	76.2	23.8	0		
PHF	.750	.786	.417	.000	.825	.688	.886	.656	.000	.845	.750	.725	.250	.000	.750	.000	.667	.417	.000	.583	.911

N/S: Stow Road
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File Name : 164948 DD
Site Code : 2162135
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Page No : 1

Groups Printed- Heavy Vehicles

	Stow Road From North				Burroughs Road From East				Stow Road From South				Burroughs Road From West				
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Int. Total
04:00 PM	0	0	0	0	1	0	0	0	1	0	0	0	0	1	0	0	3
04:15 PM	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	2
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	1	0	1	0	1	1	0	0	0	1	0	0	5
05:00 PM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Total	0	2	0	0	0	0	0	0	0	0	1	0	0	0	0	0	3
06:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	2	0	0	1	0	1	0	1	1	1	0	0	1	0	0	8
Apprch %	0	100	0	0	50	0	50	0	33.3	33.3	33.3	0	0	100	0	0	
Total %	0	25	0	0	12.5	0	12.5	0	12.5	12.5	12.5	0	0	12.5	0	0	

	Stow Road From North					Burroughs Road From East					Stow Road From South					Burroughs Road From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 06:15 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:00 PM																					
04:00 PM	0	0	0	0	0	**1**	0	0	0	**1**	**1**	0	0	0	**1**	0	**1**	0	0	**1**	**3**
04:15 PM	0	0	0	0	0	0	0	**1**	0	1	0	**1**	0	0	1	0	0	0	0	0	2
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	1	0	1	0	2	1	1	0	0	2	0	1	0	0	1	5
% App. Total	0	0	0	0		50	0	50	0		50	50	0	0		0	100	0	0		
PHF	.000	.000	.000	.000	.000	.250	.000	.250	.000	.500	.250	.250	.000	.000	.500	.000	.250	.000	.000	.250	.417

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Groups Printed- Peds and Bicycles

	Stow Road From North					Burroughs Road From East					Stow Road From South					Burroughs Road From West					
Start Time	Right	Thru	Left	Peds EB	Peds WB	Right	Thru	Left	Peds SB	Peds NB	Right	Thru	Left	Peds WB	Peds EB	Right	Thru	Left	Peds NB	Peds SB	Int. Total
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Apprch %	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Total %																					

	Stow Road From North						Burroughs Road From East						Stow Road From South						Burroughs Road From West						
Start Time	Right	Thru	Left	Peds EB	Peds WB	App. Total	Right	Thru	Left	Peds SB	Peds NB	App. Total	Right	Thru	Left	Peds WB	Peds EB	App. Total	Right	Thru	Left	Peds NB	Peds SB	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 06:15 PM - Peak 1 of 1																									
Peak Hour for Entire Intersection Begins at 04:00 PM																									
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

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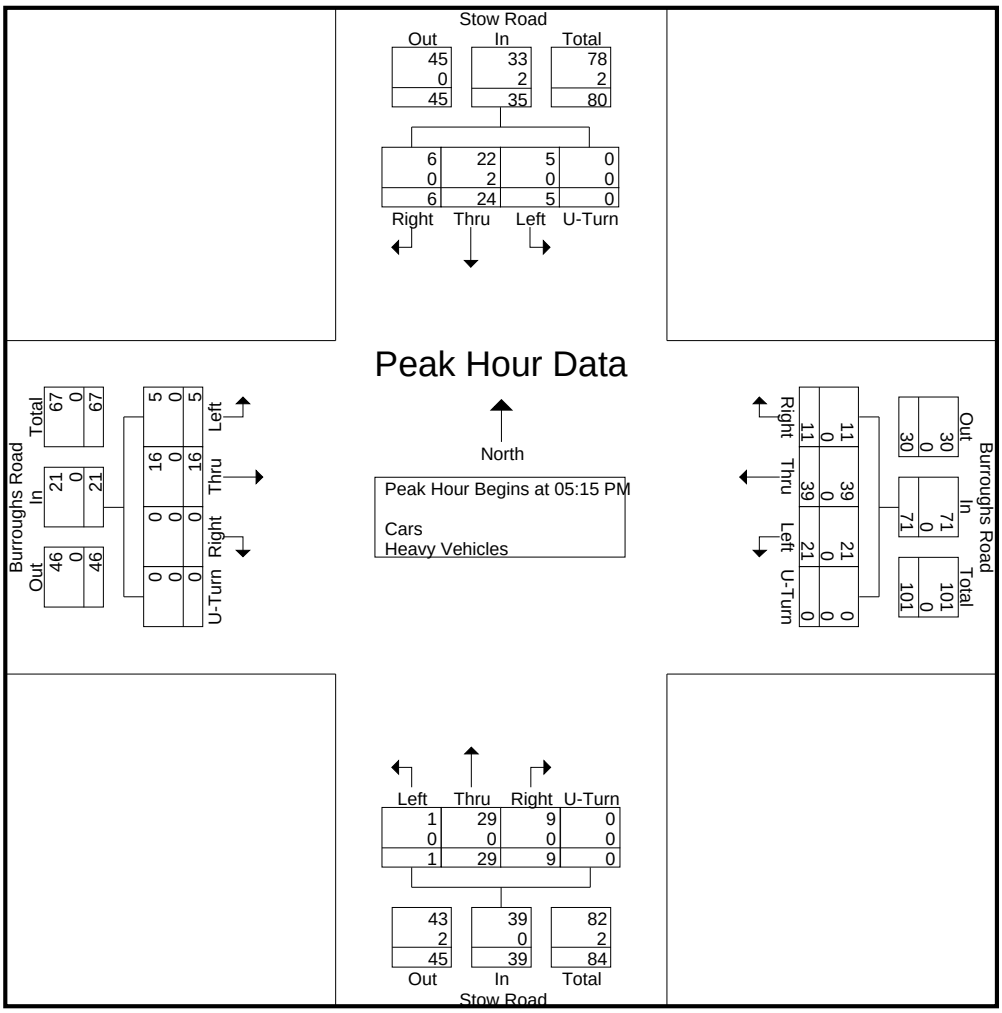
N/S: Stow Road
E/W: Burroughs Road
City, State: Boxborough, MA
Client: Bayside Engineering/ K. Cram

File Name : 164948 DD
Site Code : 2162135
Start Date : 2/24/2016
Page No : 1

	Stow Road From North					Burroughs Road From East					Stow Road From South					Burroughs Road From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 06:15 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 05:15 PM																					
05:15 PM	**2**	5	**3**	0	**10**	3	10	**8**	0	**21**	**3**	8	0	0	11	0	3	0	0	3	**45**
05:30 PM	1	**7**	0	0	8	**4**	**11**	2	0	17	2	7	0	0	9	0	**6**	**3**	0	**9**	43
05:45 PM	2	7	1	0	10	1	8	7	0	16	2	**10**	**1**	0	**13**	0	2	1	0	3	42
06:00 PM	1	5	1	0	7	3	10	4	0	17	2	4	0	0	6	0	5	1	0	6	36
Total Volume	6	24	5	0	35	11	39	21	0	71	9	29	1	0	39	0	16	5	0	21	166
% App. Total	17.1	68.6	14.3	0		15.5	54.9	29.6	0		23.1	74.4	2.6	0		0	76.2	23.8	0		
PHF	.750	.857	.417	.000	.875	.688	.886	.656	.000	.845	.750	.725	.250	.000	.750	.000	.667	.417	.000	.583	.922
Cars	6	22	5	0	33	11	39	21	0	71	9	29	1	0	39	0	16	5	0	21	164
% Cars	100	91.7	100	0	94.3	100	100	100	0	100	100	100	100	0	100	0	100	100	0	100	98.8
Heavy Vehicles	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
% Heavy Vehicles	0	8.3	0	0	5.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.2



N/S: Burroughs Road
E: Priest Lane
City, State: Boxborough, MA
Client: Bayside Engineering/ K. Cram

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File Name : 164948 E
Site Code : 2162135
Start Date : 2/24/2016
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Groups Printed- Cars - Heavy Vehicles

	Burroughs Road From North			Priest Lane From East			Burroughs Road From South			
Start Time	Thru	Left	U-Turn	Right	Left	U-Turn	Right	Thru	U-Turn	Int. Total
07:00 AM	19	0	0	0	1	0	0	6	0	26
07:15 AM	5	0	0	1	0	0	0	12	0	18
07:30 AM	10	0	0	0	0	0	0	14	0	24
07:45 AM	13	0	0	2	1	0	0	7	0	23
Total	47	0	0	3	2	0	0	39	0	91
08:00 AM	15	0	0	1	0	0	0	9	0	25
08:15 AM	8	0	0	0	0	0	0	9	0	17
08:30 AM	10	0	0	0	0	0	0	6	0	16
08:45 AM	10	0	0	0	1	0	1	5	0	17
Total	43	0	0	1	1	0	1	29	0	75
Grand Total	90	0	0	4	3	0	1	68	0	166
Apprch %	100	0	0	57.1	42.9	0	1.4	98.6	0	
Total %	54.2	0	0	2.4	1.8	0	0.6	41	0	
Cars	84	0	0	4	3	0	1	67	0	159
% Cars	93.3	0	0	100	100	0	100	98.5	0	95.8
Heavy Vehicles	6	0	0	0	0	0	0	1	0	7
% Heavy Vehicles	6.7	0	0	0	0	0	0	1.5	0	4.2

	Burroughs Road From North				Priest Lane From East				Burroughs Road From South				
Start Time	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 07:00 AM													
07:00 AM	**19**	0	0	**19**	0	**1**	0	1	0	6	0	6	**26**
07:15 AM	5	0	0	5	1	0	0	1	0	12	0	12	18
07:30 AM	10	0	0	10	0	0	0	0	0	**14**	0	**14**	24
07:45 AM	13	0	0	13	**2**	1	0	**3**	0	7	0	7	23
Total Volume	47	0	0	47	3	2	0	5	0	39	0	39	91
% App. Total	100	0	0		60	40	0		0	100	0		
PHF	.618	.000	.000	.618	.375	.500	.000	.417	.000	.696	.000	.696	.875
Cars	46	0	0	46	3	2	0	5	0	39	0	39	90
% Cars	97.9	0	0	97.9	100	100	0	100	0	100	0	100	98.9
Heavy Vehicles	1	0	0	1	0	0	0	0	0	0	0	0	1
% Heavy Vehicles	2.1	0	0	2.1	0	0	0	0	0	0	0	0	1.1

N/S: Burroughs Road
E: Priest Lane
City, State: Boxborough, MA
Client: Bayside Engineering/ K. Cram

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File Name : 164948 E
Site Code : 2162135
Start Date : 2/24/2016
Page No : 1

Groups Printed- Cars

	Burroughs Road From North			Priest Lane From East			Burroughs Road From South			
Start Time	Thru	Left	U-Turn	Right	Left	U-Turn	Right	Thru	U-Turn	Int. Total
07:00 AM	19	0	0	0	1	0	0	6	0	26
07:15 AM	5	0	0	1	0	0	0	12	0	18
07:30 AM	10	0	0	0	0	0	0	14	0	24
07:45 AM	12	0	0	2	1	0	0	7	0	22
Total	46	0	0	3	2	0	0	39	0	90
08:00 AM	14	0	0	1	0	0	0	9	0	24
08:15 AM	7	0	0	0	0	0	0	8	0	15
08:30 AM	10	0	0	0	0	0	0	6	0	16
08:45 AM	7	0	0	0	1	0	1	5	0	14
Total	38	0	0	1	1	0	1	28	0	69
Grand Total	84	0	0	4	3	0	1	67	0	159
Apprch %	100	0	0	57.1	42.9	0	1.5	98.5	0	
Total %	52.8	0	0	2.5	1.9	0	0.6	42.1	0	

	Burroughs Road From North				Priest Lane From East				Burroughs Road From South				
Start Time	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 07:00 AM													
07:00 AM	**19**	0	0	**19**	0	**1**	0	1	0	6	0	6	**26**
07:15 AM	5	0	0	5	1	0	0	1	0	12	0	12	18
07:30 AM	10	0	0	10	0	0	0	0	0	**14**	0	**14**	24
07:45 AM	12	0	0	12	**2**	1	0	**3**	0	7	0	7	22
Total Volume	46	0	0	46	3	2	0	5	0	39	0	39	90
% App. Total	100	0	0		60	40	0		0	100	0		
PHF	.605	.000	.000	.605	.375	.500	.000	.417	.000	.696	.000	.696	.865

N/S: Burroughs Road
E: Priest Lane
City, State: Boxborough, MA
Client: Bayside Engineering/ K. Cram

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File Name : 164948 E
Site Code : 2162135
Start Date : 2/24/2016
Page No : 1

Groups Printed- Heavy Vehicles

	Burroughs Road From North			Priest Lane From East			Burroughs Road From South			
Start Time	Thru	Left	U-Turn	Right	Left	U-Turn	Right	Thru	U-Turn	Int. Total
07:00 AM	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0
07:45 AM	1	0	0	0	0	0	0	0	0	1
Total	1	0	0	0	0	0	0	0	0	1
08:00 AM	1	0	0	0	0	0	0	0	0	1
08:15 AM	1	0	0	0	0	0	0	1	0	2
08:30 AM	0	0	0	0	0	0	0	0	0	0
08:45 AM	3	0	0	0	0	0	0	0	0	3
Total	5	0	0	0	0	0	0	1	0	6
Grand Total	6	0	0	0	0	0	0	1	0	7
Apprch %	100	0	0	0	0	0	0	100	0	
Total %	85.7	0	0	0	0	0	0	14.3	0	

	Burroughs Road From North				Priest Lane From East				Burroughs Road From South				
Start Time	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 08:00 AM													
08:00 AM	1	0	0	1	0	0	0	0	0	0	0	0	1
08:15 AM	1	0	0	1	0	0	0	0	0	**1**	0	**1**	2
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
08:45 AM	**3**	0	0	**3**	0	0	0	0	0	0	0	0	**3**
Total Volume	5	0	0	5	0	0	0	0	0	1	0	1	6
% App. Total	100	0	0		0	0	0		0	100	0		
PHF	.417	.000	.000	.417	.000	.000	.000	.000	.000	.250	.000	.250	.500

N/S: Burroughs Road
E: Priest Lane
City, State: Boxborough, MA
Client: Bayside Engineering/ K. Cram

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File Name : 164948 E
Site Code : 2162135
Start Date : 2/24/2016
Page No : 1

Groups Printed- Peds and Bicycles

	Burroughs Road From North				Priest Lane From East				Burroughs Road From South				
Start Time	Thru	Left	Peds EB	Peds WB	Right	Left	Peds SB	Peds NB	Right	Thru	Peds WB	Peds EB	Int. Total
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0
Apprch %	0	0	0	0	0	0	0	0	0	0	0	0	
Total %													

	Burroughs Road From North					Priest Lane From East					Burroughs Road From South					
Start Time	Thru	Left	Peds EB	Peds WB	App. Total	Right	Left	Peds SB	Peds NB	App. Total	Right	Thru	Peds WB	Peds EB	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																
Peak Hour for Entire Intersection Begins at 07:00 AM																
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0	0	0		0	0	0	0		0	0	0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

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N/S: Burroughs Road
E: Priest Lane
City, State: Boxborough, MA
Client: Bayside Engineering/ K. Cram

File Name : 164948 E
Site Code : 2162135
Start Date : 2/24/2016
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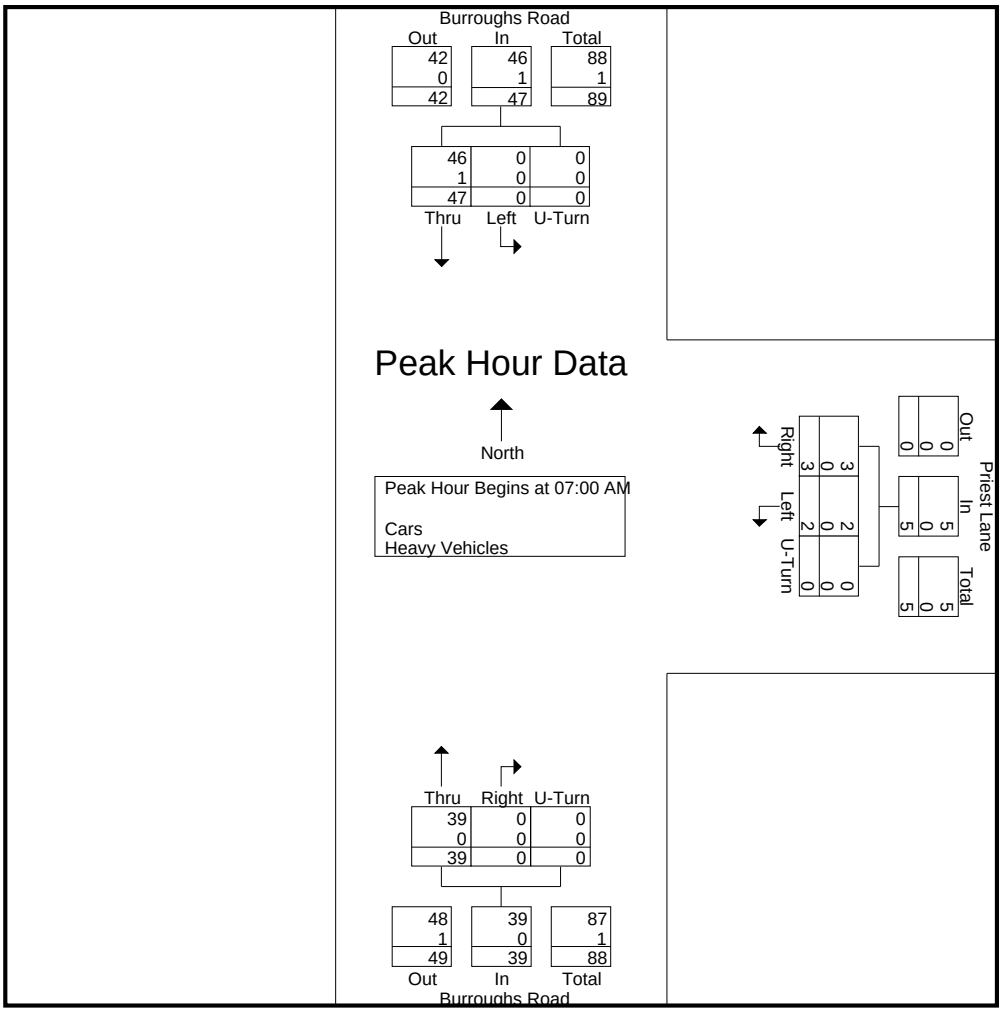
	Burroughs Road From North				Priest Lane From East				Burroughs Road From South				
Start Time	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 07:00 AM													
07:00 AM	**19**	0	0	**19**	0	**1**	0	1	0	6	0	6	**26**
07:15 AM	5	0	0	5	1	0	0	1	0	12	0	12	18
07:30 AM	10	0	0	10	0	0	0	0	0	**14**	0	**14**	24
07:45 AM	13	0	0	13	**2**	1	0	**3**	0	7	0	7	23
Total Volume	47	0	0	47	3	2	0	5	0	39	0	39	91
% App. Total	100	0	0		60	40	0		0	100	0		
PHF	.618	.000	.000	.618	.375	.500	.000	.417	.000	.696	.000	.696	.875
Cars	46	0	0	46	3	2	0	5	0	39	0	39	90
% Cars	97.9	0	0	97.9	100	100	0	100	0	100	0	100	98.9
Heavy Vehicles	1	0	0	1	0	0	0	0	0	0	0	0	1
% Heavy Vehicles	2.1	0	0	2.1	0	0	0	0	0	0	0	0	1.1



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N/S: Burroughs Road
E: Priest Lane
City, State: Boxborough, MA
Client: Bayside Engineering/ K. Cram

File Name : 164948 EE
Site Code : 2162135
Start Date : 2/24/2016
Page No : 1

Groups Printed- Cars - Heavy Vehicles

	Burroughs Road From North			Priest Lane From East			Burroughs Road From South			
Start Time	Thru	Left	U-Turn	Right	Left	U-Turn	Right	Thru	U-Turn	Int. Total
04:00 PM	10	0	0	1	0	0	0	16	0	27
04:15 PM	12	1	0	0	0	0	1	12	0	26
04:30 PM	4	0	0	0	0	0	0	7	0	11
04:45 PM	8	1	0	0	0	0	1	13	0	23
Total	34	2	0	1	0	0	2	48	0	87
05:00 PM	14	1	0	0	0	0	0	8	0	23
05:15 PM	9	0	0	0	1	0	0	11	0	21
05:30 PM	15	0	0	0	0	0	0	13	0	28
05:45 PM	10	2	0	0	2	0	0	11	0	25
Total	48	3	0	0	3	0	0	43	0	97
06:00 PM	14	1	0	0	0	0	1	15	0	31
06:15 PM	14	0	0	0	0	0	0	10	0	24
Grand Total	110	6	0	1	3	0	3	116	0	239
Apprch %	94.8	5.2	0	25	75	0	2.5	97.5	0	
Total %	46	2.5	0	0.4	1.3	0	1.3	48.5	0	
Cars	109	6	0	1	3	0	3	113	0	235
% Cars	99.1	100	0	100	100	0	100	97.4	0	98.3
Heavy Vehicles	1	0	0	0	0	0	0	3	0	4
% Heavy Vehicles	0.9	0	0	0	0	0	0	2.6	0	1.7

	Burroughs Road From North				Priest Lane From East				Burroughs Road From South				
Start Time	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 06:15 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 05:30 PM													
05:30 PM	**15**	0	0	**15**	0	0	0	0	0	13	0	13	28
05:45 PM	10	**2**	0	12	0	**2**	0	**2**	0	11	0	11	25
06:00 PM	14	1	0	15	0	0	0	0	**1**	**15**	0	**16**	**31**
06:15 PM	14	0	0	14	0	0	0	0	0	10	0	10	24
Total Volume	53	3	0	56	0	2	0	2	1	49	0	50	108
% App. Total	94.6	5.4	0		0	100	0		2	98	0		
PHF	.883	.375	.000	.933	.000	.250	.000	.250	.250	.817	.000	.781	.871
Cars	53	3	0	56	0	2	0	2	1	48	0	49	107
% Cars	100	100	0	100	0	100	0	100	100	98.0	0	98.0	99.1
Heavy Vehicles	0	0	0	0	0	0	0	0	0	1	0	1	1
% Heavy Vehicles	0	0	0	0	0	0	0	0	0	2.0	0	2.0	0.9

N/S: Burroughs Road
E: Priest Lane
City, State: Boxborough, MA
Client: Bayside Engineering/ K. Cram

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File Name : 164948 EE
Site Code : 2162135
Start Date : 2/24/2016
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Groups Printed- Cars

	Burroughs Road From North			Priest Lane From East			Burroughs Road From South			
Start Time	Thru	Left	U-Turn	Right	Left	U-Turn	Right	Thru	U-Turn	Int. Total
04:00 PM	9	0	0	1	0	0	0	15	0	25
04:15 PM	12	1	0	0	0	0	1	12	0	26
04:30 PM	4	0	0	0	0	0	0	6	0	10
04:45 PM	8	1	0	0	0	0	1	13	0	23
Total	33	2	0	1	0	0	2	46	0	84
05:00 PM	14	1	0	0	0	0	0	8	0	23
05:15 PM	9	0	0	0	1	0	0	11	0	21
05:30 PM	15	0	0	0	0	0	0	13	0	28
05:45 PM	10	2	0	0	2	0	0	11	0	25
Total	48	3	0	0	3	0	0	43	0	97
06:00 PM	14	1	0	0	0	0	1	14	0	30
06:15 PM	14	0	0	0	0	0	0	10	0	24
Grand Total	109	6	0	1	3	0	3	113	0	235
Apprch %	94.8	5.2	0	25	75	0	2.6	97.4	0	
Total %	46.4	2.6	0	0.4	1.3	0	1.3	48.1	0	

	Burroughs Road From North				Priest Lane From East				Burroughs Road From South				
Start Time	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 06:15 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 05:30 PM													
05:30 PM	**15**	0	0	**15**	0	0	0	0	0	13	0	13	28
05:45 PM	10	**2**	0	12	0	**2**	0	**2**	0	11	0	11	25
06:00 PM	14	1	0	15	0	0	0	0	**1**	**14**	0	**15**	**30**
06:15 PM	14	0	0	14	0	0	0	0	0	10	0	10	24
Total Volume	53	3	0	56	0	2	0	2	1	48	0	49	107
% App. Total	94.6	5.4	0		0	100	0		2	98	0		
PHF	.883	.375	.000	.933	.000	.250	.000	.250	.250	.857	.000	.817	.892

PRECISION DATA INDUSTRIES, LLC
P.O. Box 301 Berlin, MA 01503
Office: 508.481.3999 Fax: 508.545.1234
Email: datarequests@pdillc.com

N/S: Burroughs Road
E: Priest Lane
City, State: Boxborough, MA
Client: Bayside Engineering/ K. Cram

File Name : 164948 EE
Site Code : 2162135
Start Date : 2/24/2016
Page No : 1

Groups Printed- Heavy Vehicles

	Burroughs Road From North			Priest Lane From East			Burroughs Road From South			
Start Time	Thru	Left	U-Turn	Right	Left	U-Turn	Right	Thru	U-Turn	Int. Total
04:00 PM	1	0	0	0	0	0	0	1	0	2
04:15 PM	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	1	0	1
04:45 PM	0	0	0	0	0	0	0	0	0	0
Total	1	0	0	0	0	0	0	2	0	3
05:00 PM	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0
06:00 PM	0	0	0	0	0	0	0	1	0	1
06:15 PM	0	0	0	0	0	0	0	0	0	0
Grand Total	1	0	0	0	0	0	0	3	0	4
Apprch %	100	0	0	0	0	0	0	100	0	
Total %	25	0	0	0	0	0	0	75	0	

	Burroughs Road From North				Priest Lane From East				Burroughs Road From South				
Start Time	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 06:15 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 04:00 PM													
04:00 PM	**1**	0	0	**1**	0	0	0	0	0	**1**	0	**1**	**2**
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	1	0	1	1
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	1	0	0	1	0	0	0	0	0	2	0	2	3
% App. Total	100	0	0		0	0	0		0	100	0		
PHF	.250	.000	.000	.250	.000	.000	.000	.000	.000	.500	.000	.500	.375

N/S: Burroughs Road
E: Priest Lane
City, State: Boxborough, MA
Client: Bayside Engineering/ K. Cram

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File Name : 164948 EE
Site Code : 2162135
Start Date : 2/24/2016
Page No : 1

Groups Printed- Peds and Bicycles

	Burroughs Road From North				Priest Lane From East				Burroughs Road From South				
Start Time	Thru	Left	Peds EB	Peds WB	Right	Left	Peds SB	Peds NB	Right	Thru	Peds WB	Peds EB	Int. Total
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0
06:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
06:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0
Apprch %	0	0	0	0	0	0	0	0	0	0	0	0	
Total %													

	Burroughs Road From North					Priest Lane From East					Burroughs Road From South					
Start Time	Thru	Left	Peds EB	Peds WB	App. Total	Right	Left	Peds SB	Peds NB	App. Total	Right	Thru	Peds WB	Peds EB	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 06:15 PM - Peak 1 of 1																
Peak Hour for Entire Intersection Begins at 04:00 PM																
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0	0	0		0	0	0	0		0	0	0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

PRECISION DATA INDUSTRIES, LLC
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N/S: Burroughs Road
E: Priest Lane
City, State: Boxborough, MA
Client: Bayside Engineering/ K. Cram

File Name : 164948 EE
Site Code : 2162135
Start Date : 2/24/2016
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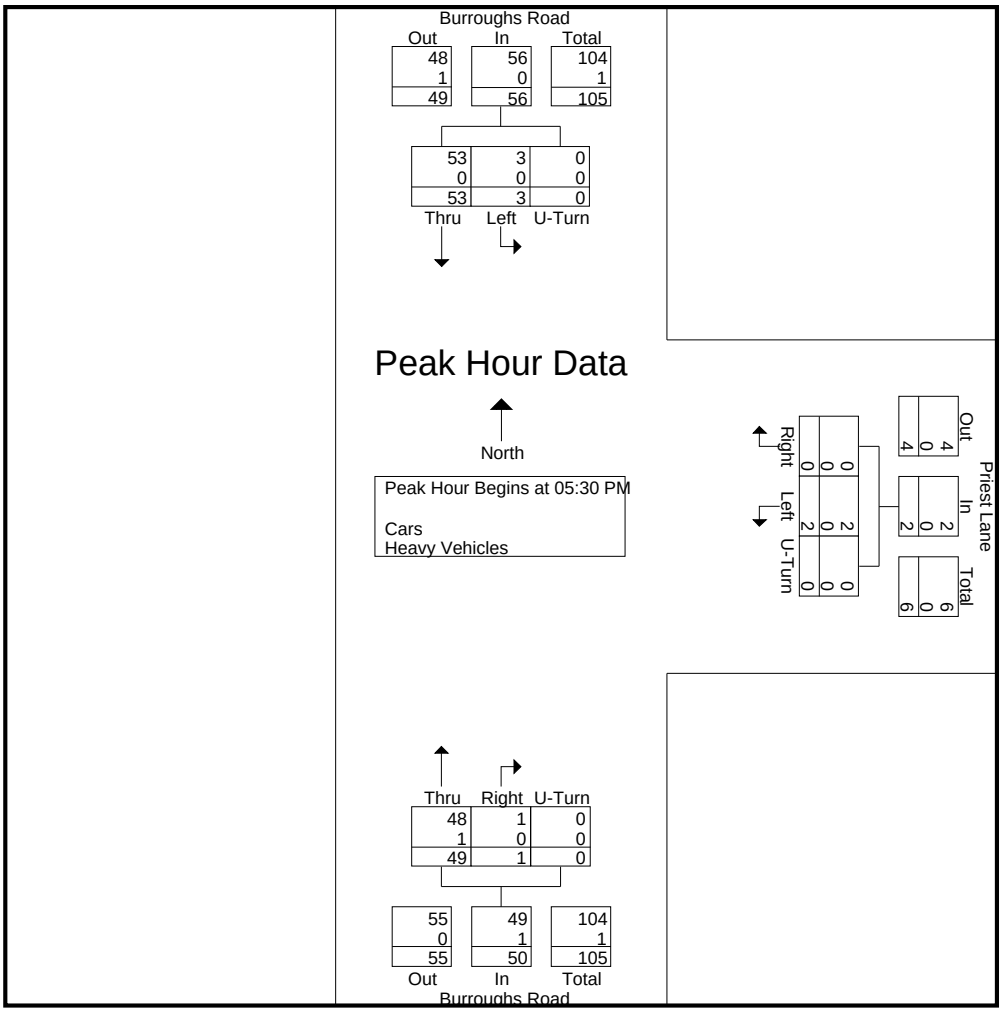
	Burroughs Road From North				Priest Lane From East				Burroughs Road From South				
Start Time	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 06:15 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 05:30 PM													
05:30 PM	**15**	0	0	**15**	0	0	0	0	0	13	0	13	28
05:45 PM	10	**2**	0	12	0	**2**	0	**2**	0	11	0	11	25
06:00 PM	14	1	0	15	0	0	0	0	**1**	**15**	0	**16**	**31**
06:15 PM	14	0	0	14	0	0	0	0	0	10	0	10	24
Total Volume	53	3	0	56	0	2	0	2	1	49	0	50	108
% App. Total	94.6	5.4	0		0	100	0		2	98	0		
PHF	.883	.375	.000	.933	.000	.250	.000	.250	.250	.817	.000	.781	.871
Cars	53	3	0	56	0	2	0	2	1	48	0	49	107
% Cars	100	100	0	100	0	100	0	100	100	98.0	0	98.0	99.1
Heavy Vehicles	0	0	0	0	0	0	0	0	0	1	0	1	1
% Heavy Vehicles	0	0	0	0	0	0	0	0	0	2.0	0	2.0	0.9



Seasonal Adjustment Worksheets

SECTION I - CONTINUOUS COUNTING STATION MONTHLY AVERAGE DAILY TRAFFIC

STATION 8 - MARLBOROUGH - RTE.I-290 - WEST OF RTE.I-495

YR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
07	66,587	67,855	69,846	73,306	*75,498*	*77,000*	77,844	81,188	76,066	*76,335*	74,038	65,437
	2%	0%	0%	-1%	-3%	-3%	-3%	-4%	-2%	-1%	-2%	7%
08	67,794	67,889	69,577	72,226	*73,569*	*75,018*	75,602	78,040	74,362	75,697	72,485	69,732
	-3%	2%	-1%	-2%	0%	2%	0%	-3%	2%	-1%	0%	2%
09	65,746	68,956	69,153	71,000	*73,926*	*76,716*	75,748	75,450	76,157	75,242	72,186	71,240

STATION 390 - MARLBOROUGH - RTE.I-495 - SOUTH OF RTE.20

YR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
06	86,269	86,441	84,642	91,303	88,163	91,712	97,673	104,423	99,909	97,909	94,085	89,441
	-1%	-4%	5%	3%	11%	9%	5%	1%	0%	3%	1%	-1%
07	*85,627*	*83,083*	89,220	*94,261*	*98,013*	*99,999*	102,709	105,612	99,506	100,441	94,601	88,882
	4%	8%	2%	0%	-4%	-3%	-6%	-7%	-7%	-6%	-7%	-4%
08	*89,000*	89,913	90,969	94,598	*94,065*	*97,344*	96,983	98,326	93,037	94,807	87,606	84,995
	-11%	1%	-4%	-2%	-2%	-4%	3%	0%	-8%	-12%	-9%	-10%
09	*79,401*	91,089	87,605	92,618	*92,248*	*93,552*	100,053	98,460	85,169	83,804	79,928	76,879

STATION 4089 - MARLBOROUGH - RTE.I-495 - NORTH OF RTE.I-290

YR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
05	86,000	88,000	91,400	93,441	102,364	106,066	115,416	115,922	96,206	99,993	93,582	95,470
	7%	7%	4%	4%	-2%	0%	-6%	-2%	9%	-1%	0%	-5%
06	91,632	93,896	94,654	97,548	99,848	106,518	107,960	113,530	104,483	99,380	93,184	90,801
	-8%	-9%	-5%	-7%	-6%	3%	7%	0%	7%	9%	-3%	-8%
07	84,308	85,309	89,689	90,259	*93,798*	*110,000*	*115,167*	*113,408*	*111,734*	*108,209*	90,152	83,708

STATION 4164 - MARLBOROUGH - RTE.I-495 - SOUTH OF RTE.I-290

YR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
05	79,000	81,755	84,587	92,269	96,161	100,110	95,264	100,510	93,379	92,615	93,638	90,255
	3%	1%	2%	-7%	-6%	-4%	-2%	-1%	2%	1%	-5%	-7%
06	81,709	82,413	86,405	86,233	90,449	96,153	92,889	99,498	94,991	93,287	89,334	84,009
	0%	6%	3%	1%	2%	-4%	5%	2%	-1%	3%	0%	-5%
07	81,359	*87,036*	88,601	87,201	92,467	92,014	97,474	101,137	94,027	95,651	89,108	80,171
	8%	1%	-3%	0%	-5%	0%	-7%	-9%	-6%	-8%	-8%	1%
08	87,565	*87,968*	85,500	86,831	88,261	91,613	90,668	92,227	88,209	88,415	82,077	80,721
	0%	0%	2%	-1%	0%	0%	0%	0%	5%	4%	12%	14%
09	87,565	*87,565*	87,565	85,992	88,261	91,613	90,668	92,227	92,227	92,227	92,227	92,227

1,249,168

1

February is 6.72 % lower than average

1.07 multiplier

ITALICS = ESTIMATED DATA

MADT

Crash Data and Worksheets

MassDOT Crash Report for BOXBOROUGH for the year 2009

Crash Number	City/Town Name	Crash Date	Crash Time	Crash Severity	Number of Vehicles	Total Nonfatal Injuries	Total Fatal Injuries	Manner of Collision	Vehicle Action Prior to Crash	Vehicle Travel Directions	Most Harmful Events	Vehicle Configuration	Road Surface Condition	Ambient Light	Weather Condition	At Roadway Intersection	Distance from Nearest Roadway Intersection	Distance from Nearest Milemarker	Distance from Nearest Exit	Distance from Nearest Landmark	Non Motorist Type

MassDOT Crash Report for BOXBOROUGH for the year 2010

Crash Number	City/Town Name	Crash Date	Crash Time	Crash Severity	Number of Vehicles	Total Nonfatal Injuries	Total Fatal Injuries	Manner of Collision	Vehicle Action Prior to Crash	Vehicle Travel Directions	Most Harmful Events	Vehicle Configuration	Road Surface Condition	Ambient Light	Weather Condition	At Roadway Intersection	Distance from Nearest Roadway Intersection	Distance from Nearest Milemarker	Distance from Nearest Exit	Distance from Nearest Landmark	Non Motorist Type

MassDOT Crash Report for BOXBOROUGH for the year 2011

Crash Number	City/Town Name	Crash Date	Crash Time	Crash Severity	Number of Vehicles	Total Nonfatal Injuries	Total Fatal Injuries	Manner of Collision	Vehicle Action Prior to Crash	Vehicle Travel Directions	Most Harmful Events	Vehicle Configuration	Road Surface Condition	Ambient Light	Weather Condition	At Roadway Intersection	Distance from Nearest Roadway Intersection	Distance from Nearest Milemarker	Distance from Nearest Exit	Distance from Nearest Landmark	Non Motorist Type

MassDOT Crash Report for BOXBOROUGH for the year 2012

Crash Number	City/Town Name	Crash Date	Crash Time	Crash Severity	Number of Vehicles	Total Nonfatal Injuries	Total Fatal Injuries	Manner of Collision	Vehicle Action Prior to Crash	Vehicle Travel Directions	Most Harmful Events	Vehicle Configuration	Road Surface Condition	Ambient Light	Weather Condition	At Roadway Intersection	Distance from Nearest Roadway Intersection	Distance from Nearest Milemarker	Distance from Nearest Exit	Distance from Nearest Landmark	Non Motorist Type
3283378	BOXBOROUGH	13-Jan-2012	6:28 AM	Property damage only (none injured)	1	0	0	Single vehicle crash	V1: Travelling straight ahead	V1:Eastbound	V1: Collision with ditch	V1: Passenger car	Ice	Dark - roadway not lighted	Sleet, hail (freezing rain or drizzle)	BURROUGHS RD / PRIEST LN					

MassDOT Crash Report for BOXBOROUGH for the year 2013

Crash Number	City/Town Name	Crash Date	Crash Time	Crash Severity	Number of Vehicles	Total Nonfatal Injuries	Total Fatal Injuries	Manner of Collision	Vehicle Action Prior to Crash	Vehicle Travel Directions	Most Harmful Events	Vehicle Configuration	Road Surface Condition	Ambient Light	Weather Condition	At Roadway Intersection	Distance from Nearest Roadway Intersection	Distance from Nearest Milemarker	Distance from Nearest Exit	Distance from Nearest Landmark	Non Motorist Type
3366321	BOXBOROUGH	10-Feb-2013	3:38 PM	Non-fatal injury	2	1	0	Angle	V1: Travelling straight ahead / V2:Travelling straight ahead	V1:Southbound / V2:Eastbound	V1: Collision with motor vehicle in traffic / V2: Collision with motor vehicle in traffic	V1: Passenger car / V2:Passenger car	Dry	Daylight	Clear	HILL ROAD / MASSACHUSETTS AVENUE Rte 111 / BURROUGHS ROAD					

INTERSECTION CRASH RATE WORKSHEET

CITY/TOWN : Boxborough COUNT DATE : Feb 2016

DISTRICT : 3 UNSIGNALIZED : x SIGNALIZED :

~ INTERSECTION DATA ~

MAJOR STREET : Burroughs Road

MINOR STREET(S) : Priests Lane

INTERSECTION DIAGRAM (Label Approaches)

North

PEAK HOUR VOLUMES

APPROACH :	1	2	3	4	5	Total Peak Hourly Approach Volume
DIRECTION :	EB	WB	NB	SB		
PEAK HOURLY VOLUMES (AM/PM) :	61	54	0	3		**118**

" K " FACTOR : **0.090** INTERSECTION ADT (**V**) = TOTAL DAILY APPROACH VOLUME : **1,311**

TOTAL # OF CRASHES : 1 # OF YEARS : 5 AVERAGE # OF CRASHES PER YEAR (**A**) : **0.20**

CRASH RATE CALCULATION : 0.42

$$\text{RATE} = \frac{(A * 1{,}000{,}000)}{(V * 365)}$$

Comments :

Project Title & Date:

INTERSECTION CRASH RATE WORKSHEET

CITY/TOWN : Boxborough COUNT DATE : Feb 2016

DISTRICT : 3 UNSIGNALIZED : x SIGNALIZED :

~ INTERSECTION DATA ~

MAJOR STREET : Massachusetts Avenue

MINOR STREET(S) : Burroughs Road/Hill Street

INTERSECTION DIAGRAM (Label Approaches)

North

PEAK HOUR VOLUMES

APPROACH :	1	2	3	4	5	Total Peak Hourly Approach Volume
DIRECTION :	EB	WB	NB	SB		
PEAK HOURLY VOLUMES (AM/PM) :	456	360	81	30		**927**

" K " FACTOR : **0.097** INTERSECTION ADT (**V**) = TOTAL DAILY APPROACH VOLUME : **9,557**

TOTAL # OF CRASHES : 2 # OF YEARS : 5 AVERAGE # OF CRASHES PER YEAR (**A**) : **0.40**

CRASH RATE CALCULATION : 0.11

$$\text{RATE} = \frac{(A * 1{,}000{,}000)}{(V * 365)}$$

Comments :

Project Title & Date:

Background Growth

SECTION I - CONTINUOUS COUNTING STATION MONTHLY AVERAGE DAILY TRAFFIC

STATION 8 - MARLBOROUGH - RTE.I-290 - WEST OF RTE.I-495

YR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR	
07	66,587	67,855	69,846	73,306	*75,498*	*77,000*	77,844	81,188	76,066	*76,335*	74,038	65,437	73,417	
	2%	0%	0%	-1%	-3%	-3%	-3%	-4%	-2%	-1%	-2%	7%	-1%	
08	67,794	67,889	69,577	72,226	*73,569*	*75,018*	75,602	78,040	74,362	75,697	72,485	69,732	72,666	
	-3%	2%	-1%	-2%	0%	2%	0%	-3%	2%	-1%	0%	2%	0%	
09	65,746	68,956	69,153	71,000	*73,926*	*76,716*	75,748	75,450	76,157	75,242	72,186	71,240	72,627	(0.5395)

STATION 390 - MARLBOROUGH - RTE.I-495 - SOUTH OF RTE.20

YR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR	
06	86,269	86,441	84,642	91,303	88,163	91,712	97,673	104,423	99,909	97,909	94,085	89,441	92,664	
	-1%	-4%	5%	3%	11%	9%	5%	1%	0%	3%	1%	-1%	3%	
07	*85,627*	*83,083*	89,220	*94,261*	*98,013*	*99,999*	102,709	105,612	99,506	100,441	94,601	88,882	95,163	
	4%	8%	2%	0%	-4%	-3%	-6%	-7%	-7%	-6%	-7%	-4%	-3%	
08	*89,000*	89,913	90,969	94,598	*94,065*	*97,344*	96,983	98,326	93,037	94,807	87,606	84,995	92,637	
	-11%	1%	-4%	-2%	-2%	-4%	3%	0%	-8%	-12%	-9%	-10%	-5%	
09	*79,401*	91,089	87,605	92,618	*92,248*	*93,552*	100,053	98,460	85,169	83,804	79,928	76,879	88,401	(1.5579)

STATION 4089 - MARLBOROUGH - RTE.I-495 - NORTH OF RTE.I-290

YR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR	
05	86,000	88,000	91,400	93,441	102,364	106,066	115,416	115,922	96,206	99,993	93,582	95,470	98,655	
	7%	7%	4%	4%	-2%	0%	-6%	-2%	9%	-1%	0%	-5%	1%	
06	91,632	93,896	94,654	97,548	99,848	106,518	107,960	113,530	104,483	99,380	93,184	90,801	99,453	
	-8%	-9%	-5%	-7%	-6%	3%	7%	0%	7%	9%	-3%	-8%	-1%	
07	84,308	85,309	89,689	90,259	*93,798*	*110,000*	*115,167*	*113,408*	*111,734*	*108,209*	90,152	83,708	97,978	(0.3435)

STATION 4164 - MARLBOROUGH - RTE.I-495 - SOUTH OF RTE.I-290

YR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
05	79,000	81,755	84,587	92,269	96,161	100,110	95,264	100,510	93,379	92,615	93,638	90,255	91,629
	3%	1%	2%	-7%	-6%	-4%	-2%	-1%	2%	1%	-5%	-7%	-2%
06	81,709	82,413	86,405	86,233	90,449	96,153	92,889	99,498	94,991	93,287	89,334	84,009	89,781
	0%	6%	3%	1%	2%	-4%	5%	2%	-1%	3%	0%	-5%	1%
07	81,359	*87,036*	88,601	87,201	92,467	92,014	97,474	101,137	94,027	95,651	89,108	80,171	90,521
	8%	1%	-3%	0%	-5%	0%	-7%	-9%	-6%	-8%	-8%	1%	-3%
08	87,565	*87,968*	85,500	86,831	88,261	91,613	90,668	92,227	88,209	88,415	82,077	80,721	87,505
	0%	0%	2%	-1%	0%	0%	0%	0%	5%	4%	12%	14%	3%
09	87,565	*87,565*	87,565	85,992	88,261	91,613	90,668	92,227	92,227	92,227	92,227	92,227	90,030	(0.4389)

Station 4010
2004-2015
92,499
86,500
0.61144

Station 4090
2004-2015
98,559
83,300
1.54090

Station 9
2004-2015
100,251
95,336
0.45804

AVG 0.870
MADT

ITALICS = ESTIMATED DATA

Site Plan Approval Application

Boxborough Planning Board
29 Middle Road
Boxborough, MA 01719
978-264-1723
www.boxborough-ma.gov

Town Clerk Received

RECEIVED

MAR 21 2016
@ 10:30 AM
TOWN CLERK
TOWN OF BOXBOROUGH

Planning Board Received

RECEIVED

MAR 21 2016

Boxborough
Planning Department

Property Location: 593 Massachusetts Ave

Assessor Parcel Number(s): Map 14 Lot 159 Block 000

Zoning District(s): Business, Wetland Flood Hazard District, Aquifer Recharge Area, Agricultural/Residential

Name of Owner: Boxboro Properties, LLC Phone # (978) 430-4000

Address: 6 Proctor Street, Acton, MA 01720

Email Address: autoplex3@aol.com

Name of Owner: _____ Phone # _____

Address: _____

Email Address: _____

Name of Applicant: Same as Owner Phone # _____

Address: _____

Email Address: _____

Name of Engineer: Stamski and McNary, Inc Phone # (978) 263-8585

Address: 1000 Main Street, Acton, MA 01720

Email Address: _____

Name of Surveyor: Stamski and McNary, Inc Phone # (978) 263-8585

Address: 1000 Main Street, Acton, MA 01720

Email Address: _____

1) Describe briefly the development for which Site Plan Approval is sought:
A proposed 2 story building consisting of 8,712 square feet of trade shop space with parking, sewage disposal, drainage and associated grading.

2) Describe briefly the uses or activities for which site plan approval is sought:
Landscape contractor/trade shop use.

3) Lot Area 273,047 sf Frontage 187.11' Building Height < 45' Number of Stories 2

4) Building Setbacks: Front 51' Rear 176' Left Side 33.7' Right Side 33'

5) Parking Setbacks: Front 147.2' Rear 131.7' Left Side 11' Right Side 11'

6) Lot Coverage (buildings, parking, paving): 27,211 square feet

7) Floor Area Ratio (Industrial-Commercial & Office Park Districts): No Requirement

8) Number of Parking Spaces: 24 Future Parking Spaces: 0

9) Number of Loading Spaces: Provided within unit

10) Estimate the Daily Traffic: No. of Employees: 24
Total No. of Trips: 73 Peak A.M.: 13.2 Peak P.M.: 14
Sight distance along the road at driveway entrance: >600 ft

11) Sewage Discharge Rate (gals/day): 360 GPD Water Usage (gals/day): 360 GPD

12) Describe any proposed on-site stormwater and drainage system and submit pre- and post-drainage calculations: Stormwater will be treated on site with deep sump hooded catch basins, a deep sump hooded manhole and subsurface infiltration chambers. Detailed calculations are attached.

13) Describe any proposed signs: 1 sign per tenant (4) and 1 freestanding sign

14) Describe any proposed outdoor lighting (include hours of use, lighting type, directional shielding, and height of fixtures) and provide manufacturer's light fixture cut-sheets:
Cut sheets of the proposed lighting are attached. Light locations are shown on the plan.

15) Discuss any hazardous materials or wastes to be used or generated on site, including quantities, safety procedures, storage and disposal methods:
No hazardous waste is to be generated.

16) Indicate any sources of loud noise, vibration, glare, odors, air or water pollutants, or electrical disturbances: No sources of loud noise, vibration, glare, odors, air or water pollutants, or electrical disturbances are expected.

17) Is removal of soils from the site required? ☒ Yes ☐ No If yes, cubic feet: 1,300 +/-

18) Will important wildlife habitats and/or outstanding botanical features be affected? ☐ Yes ☒ No

19) Historic sites or buildings listed in the Historic Survey? ☐ Yes ☒ No

20) Historic sites/buildings eligible or listed on the Federal/State Historic Register? ☐ Yes ☒ No

21) Proposed work within ☒ 100 ft. of a wetland resource area and/or ☐ 200 ft. of a stream or river?

22) Is the project within the Flood Plain District? ☒ Yes ☐ No

23) Is the site or portion of the site within the Aquifer Protection District? ☒ Yes ☐ No

24) List any Board of Appeals decisions pertaining to this site: 2010-02

I, the undersigned Owner and Applicant, request that my Site Plan Application be reviewed by the Boxborough Planning Board. I understand that my Application may be reviewed by outside consultants as defined in the Board's Site Plan Approval Rules & Regulations and allowed by MGL Ch. 44, Sec. 53G, for which payments to the Town of Boxborough will be made by me in accordance with Section VI.D.

Signature of owner(s) (Required) Leo Berlow Date: March 18, 2016

Date:

Signature of Applicant(s): (if different than Owner) Date:

Date:

Application Submittal Check List

- ☑ 1. One original Site Plan Application; filled out and signed by owner and applicant with all supporting information required pursuant to Section III of the Site Plan Approval Rules & Regulations and ten copies. **Only two copies of the drainage calculations are required.**
- ☑ 2. One full size set of Site Plans, Building Elevations, Floor Plans and Landscape Plans in conformance with Section III and seven copies.
- ☑ 3. Three 11" x 17" reduced Site Plans, Building Elevations, Floor Plans and Landscape Plans
- ☑ 4. A CD with the Plan and all supporting documentation in a PDF file format.
- ☑ 5. Certified List of Abutters
- ☑ 6. Application fee as established in the Planning Board Fee Schedule

Narrative

Narrative

The site, 593 Massachusetts Avenue, is located on the northerly side of Massachusetts Avenue. The project involves the razing of three existing buildings and the construction of a new building to house trade shops. The parcel is located within an Aquifer Protection District and partially within a Wetland Protection District (W-District).

The site presently contains two existing curb cuts and 3 existing buildings with a paved area, gravel driveway, gravel parking and associated appurtenances. The existing buildings will be razed and a proposed building and associated parking area shall be constructed on the site. Parking will be provided to the rear of the proposed building and the entrance to the proposed parking area shall be provided in the same location as the existing curb cuts.

Evaluation of Impact on Water Resource:

The project has been designed to meet the contemporary standards and safeguards related to protection of Water Resources. The potential impacts associated with stormwater runoff shall be mitigated by fulfilling the design standards outlined in the Massachusetts Stormwater Handbook. The stormwater runoff produced from the parking area and access driveway is to be collected in deep sump/hooded catch basins. The runoff will then be directed to subsurface infiltration chambers where the runoff will be recharged. A Sewage Disposal System shall be constructed on site and in accordance with Title V and Town of Boxborough Board of Health Regulations. A Drainage System Operation and Maintenance Plan, as well as Erosion and Sediment Control Notes have been included in the design to mitigate potential erosion during and post construction. The water table shall be maintained with recharge being provided through the sewage disposal system and subsurface infiltration chambers. Adjacent properties shall not be effected by stormwater runoff from the site as the design meets the Stormwater Management Policy standards. For further detail of drainage calculations see attached Drainage Analysis.

Evaluation of Impact on Landscape:

The project has been designed to minimize impact on the landscape and the Route 111 corridor. The parking area shall be located to the rear of the proposed building. The building has been designed to complement the surrounding area.

For further detail see attached Landscape Plan (sheet 5 of 6 of Site Plan)

Evaluation of Traffic Impacts:

The proposed use on the site consists of a landscaping contractor/trade shop building. The use will be limited to 24 employees due to parking constraints. Using the ITE Trip Generation Manual, 9th Edition, the proposed use will generate an additional 11.5 AM Peak Hour trips, 12.2 PM Peak Hour trips and 72.5 Weekday trips. Per Section 3.1 (14) of the Town of Boxborough Planning Board Site Plan Approval Rules & Regulations, the requirement of a traffic study may be waived if the proposed use will not generate more than 75 vehicle trips per day. Based on the above calculations, we hereby request a waiver from the requirement of a traffic study.

Traffic Study

Stamski and McNary, Inc.
Location: 593 Massachusetts Avenue, Boxborough
Date: 2/3/2016

Proposed Conditions

General Light Industrial (24 Employees) (LUC 110)

A.M. Peak Hour	P.M. Peak Hour	Weekday
(0.48 Trips/Employee)	(0.51 Trips/Employee)	(3.02 Trips/Employee)
11.52	12.24	72.48

Attachment B

Traffic Impact and Access Study

Jefferson at Beaver Brook
Boxborough, Massachusetts

Technical Appendix Provide to:

- MassDOT – District #3
- MassDOT – P/PDU
- CMRPC
- Town of Boxborough Planning Department

Avaialble to others upon request.

Site-generated Traffic Volumes

The rate at which any development generates traffic is dependent upon a number of factors such as size, location, and nature of the use. To estimate the trip-generating characteristics for a new development, traffic projections are typically derived from trip generation rates published in the Institute of Transportation Engineers (ITE) Trip Generation[2] manual. The analysis methodology used for the estimation of Project related traffic volumes in this Study is described below.

Project Trip Generation

For the proposed residential development, peak hour trip generation equations for ITE Land Use Code (LUC) 220 – Apartment were used. Table 4 provides the daily and peak hour trip projections based on the ITE methodology.

Table 4 Trip Generation

Peak Condition	Trips
Weekday Daily (Enter + Exit)	1,600
Weekday Morning Peak Hour (vph)	
Enter	25
Exit	100
Total	125
Weekday Evening Peak Hour (vph)	
Enter	100
Exit	55
Total	155

vph vehicle trips per hour

As shown in Table 4, the Project is estimated to generate approximately 125 vehicle trips (25 entering/100 exiting) during the weekday morning peak hour and 155 new trips (100 entering/55 exiting) during the weekday evening peak hour.

Modal Split

Transportation mode split data for the Town of Boxborough, provided by the American Community Survey, was reviewed to determine the percentage of potential residents that may be expected to utilize public transportation. Based on the most recent projections available approximately two percent of current Boxborough

[2] Trip Generation Handbook, *9th Edition*, Institute of Transportation Engineers; Washington, D.C.; 2009

Trip Generation Worksheets

Proposed Townhouses, Boxborough, MA

Land Use Code (LUC) 230 - Residential Condominium/Townhouse
Source: Institute of Transportation Engineers (ITE) - 9th Edition

Average Vehicle Trips Ends vs.: Dwelling Units
Independent Variable (X): 100 DU

AVERAGE WEEKDAY DAILY

Ln T = 0.87 * Ln (X) + 2.46 $R^2 = 0.80$
Ln T = 0.87 * Ln (100) + 2.46
Ln T = 6.47
T = 643.23
T = 644 vehicle trips
with 50% (322 vpd) entering and 50% (322 vpd) exiting.

WEEKDAY MORNING PEAK HOUR OF ADJACENT STREET TRAFFIC

Ln T = 0.80 * Ln (X) + 0.26 $R^2 = 0.76$
Ln T = 0.80 * Ln (100) + 0.26
Ln T = 3.94
T = 51.63
T = 52 vehicle trips
with 17% (9 vph) entering and 83% (43 vph) exiting.

WEEKDAY MORNING PEAK HOUR OF GENERATOR

Ln T = 0.82 * Ln (X) + 0.15 $R^2 = 0.68$
Ln T = 0.82 * Ln (0) + 0.15
Ln T = 3.93
T = 50.72
T = 51 vehicle trips
with 19% (10 vph) entering and 81% (41 vph) exiting.

WEEKDAY EVENING PEAK HOUR OF ADJACENT STREET TRAFFIC

Ln T = 0.82 * Ln (X) + 0.32 $R^2 = 0.80$
Ln T = 0.82 * Ln (100) + 0.32
Ln T = 4.10
T = 60.11
T = 60 vehicle trips
with 67% (40 vph) entering and 33% (20 vph) exiting.

WEEKDAY EVENING PEAK HOUR OF GENERATOR

T = 0.34 * (X) + 35.87 $R^2 = 0.75$
T = 0.34 * (100) + 35.87
T = 69.87
T = 70 vehicle trips
with 64% (45 vph) entering and 36% (25 vph) exiting.

Proposed Townhouses, Boxborough, MA

Land Use Code (LUC) 230 - Residential Condominium/Townhouse
Source: Institute of Transportation Engineers (ITE) - 9th Edition

Average Vehicle Trips Ends vs.: Dwelling Units
Independent Variable (X): 100 DU

SATURDAY DAILY

T = 3.62 * (X) + 427.93 $R^2 = 0.84$
T = 3.62 * (100)+ 427.93
T = 789.93
T = 790 vehicle trips
with 50% (395 vpd) entering and 50% (395 vpd) exiting.

SATURDAY MIDDAY PEAK HOUR OF GENERATOR

T = 0.29 * (X) + 42.63 $R^2 = 0.84$
T = 0.29 * (100) + 42.63
T = 71.63
T = 72 vehicle trips
with 54% (39 vph) entering and 46% (33 vph) exiting.

SUNDAY

T = 3.13 * (X) + 357.26 $R^2 = 0.88$
T = 3.13 * (100) + 357.26
T = 670.26
T = 670 vehicle trips
with 50% (335 vpd) entering and 50% (335 vpd) exiting.

SUNDAY PEAK HOUR OF GENERATOR

T = 0.23 * (X) + 50.01 $R^2 = 0.78$
T = 0.23 * (100) + 50.01
T = 73.01
T = 73 vehicle trips
with 49% (36 vph) entering and 51% (37 vph) exiting.

Capacity Analysis Worksheets

Lanes, Volumes, Timings
4: Burroughs Rd./Hill Rd. & Massachusetts Ave./Massachussetts Ave.

12/10/2016

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	14	359	53	18	273	0	77	1	8	6	3	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.983						0.987			0.905	
Flt Protected		0.998			0.997			0.957			0.990	
Satd. Flow (prot)	0	1799	0	0	1853	0	0	1795	0	0	1551	0
Flt Permitted		0.998			0.997			0.957			0.990	
Satd. Flow (perm)	0	1799	0	0	1853	0	0	1795	0	0	1551	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		329			416			467			306	
Travel Time (s)		7.5			9.5			10.6			7.0	
Peak Hour Factor	0.82	0.82	0.82	0.81	0.81	0.81	0.83	0.83	0.83	0.78	0.78	0.78
Heavy Vehicles (%)	0%	4%	2%	6%	2%	0%	0%	0%	0%	0%	100%	0%
Adj. Flow (vph)	17	438	65	22	337	0	93	1	10	8	4	29
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	520	0	0	359	0	0	104	0	0	41	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 44.4%	ICU Level of Service A
Analysis Period (min) 15	

Intersection	
Int Delay, s/veh	3.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	14	359	53	18	273	0	77	1	8	6	3	23
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	82	82	82	81	81	81	83	83	83	78	78	78
Heavy Vehicles, %	0	4	2	6	2	0	0	0	0	0	100	0
Mvmt Flow	17	438	65	22	337	0	93	1	10	8	4	29

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	337	0	0	502	0	0	902	885	470	891	918	337
Stage 1	-	-	-	-	-	-	504	504	-	381	381	-
Stage 2	-	-	-	-	-	-	398	381	-	510	537	-
Critical Hdwy	4.1	-	-	4.16	-	-	7.1	6.5	6.2	7.1	7.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	6.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	6.5	-
Follow-up Hdwy	2.2	-	-	2.254	-	-	3.5	4	3.3	3.5	4.9	3.3
Pot Cap-1 Maneuver	1234	-	-	1042	-	-	261	286	598	265	190	710
Stage 1	-	-	-	-	-	-	554	544	-	645	473	-
Stage 2	-	-	-	-	-	-	632	617	-	550	393	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1234	-	-	1042	-	-	238	273	598	251	182	710
Mov Cap-2 Maneuver	-	-	-	-	-	-	238	273	-	251	182	-
Stage 1	-	-	-	-	-	-	543	534	-	633	461	-
Stage 2	-	-	-	-	-	-	585	601	-	530	386	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	0.5	28.8	14
HCM LOS			D	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	253	1234	-	-	1042	-	-	440
HCM Lane V/C Ratio	0.41	0.014	-	-	0.021	-	-	0.093
HCM Control Delay (s)	28.8	8	0	-	8.5	0	-	14
HCM Lane LOS	D	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	1.9	0	-	-	0.1	-	-	0.3

Lanes, Volumes, Timings
6: Stow Rd./Middle Rd. & Massachusetts Ave.

12/10/2016

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	14	297	26	10	236	17	45	12	22	31	7	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.990			0.991			0.962			0.959	
Flt Protected		0.998			0.998			0.972			0.972	
Satd. Flow (prot)	0	1800	0	0	1830	0	0	1682	0	0	1771	0
Flt Permitted		0.998			0.998			0.972			0.972	
Satd. Flow (perm)	0	1800	0	0	1830	0	0	1682	0	0	1771	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1062			463			987			333	
Travel Time (s)		24.1			10.5			22.4			7.6	
Peak Hour Factor	0.89	0.89	0.89	0.78	0.78	0.78	0.76	0.76	0.76	0.78	0.78	0.78
Heavy Vehicles (%)	8%	3%	17%	0%	3%	0%	5%	9%	5%	0%	0%	0%
Adj. Flow (vph)	16	334	29	13	303	22	59	16	29	40	9	21
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	379	0	0	338	0	0	104	0	0	70	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 34.8%	ICU Level of Service A
Analysis Period (min) 15	

Intersection	
Int Delay, s/veh	3.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	14	297	26	10	236	17	45	12	22	31	7	16
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	89	89	78	78	78	76	76	76	78	78	78
Heavy Vehicles, %	8	3	17	0	3	0	5	9	5	0	0	0
Mvmt Flow	16	334	29	13	303	22	59	16	29	40	9	21

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	324	0	0	363	0	0	734	730	348	741	733	313
Stage 1	-	-	-	-	-	-	380	380	-	339	339	-
Stage 2	-	-	-	-	-	-	354	350	-	402	394	-
Critical Hdwy	4.18	-	-	4.1	-	-	7.15	6.59	6.25	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.15	5.59	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.15	5.59	-	6.1	5.5	-
Follow-up Hdwy	2.272	-	-	2.2	-	-	3.545	4.081	3.345	3.5	4	3.3
Pot Cap-1 Maneuver	1203	-	-	1207	-	-	332	341	688	335	350	732
Stage 1	-	-	-	-	-	-	636	602	-	680	643	-
Stage 2	-	-	-	-	-	-	657	621	-	629	609	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1203	-	-	1207	-	-	309	331	688	302	340	732
Mov Cap-2 Maneuver	-	-	-	-	-	-	309	331	-	302	340	-
Stage 1	-	-	-	-	-	-	625	592	-	668	635	-
Stage 2	-	-	-	-	-	-	621	613	-	576	599	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	0.3	18.5	16.9
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	369	1203	-	-	1207	-	-	372
HCM Lane V/C Ratio	0.282	0.013	-	-	0.011	-	-	0.186
HCM Control Delay (s)	18.5	8	0	-	8	0	-	16.9
HCM Lane LOS	C	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	1.1	0	-	-	0	-	-	0.7

Lanes, Volumes, Timings
14: Stow Rd. & Sheriff's Meadow

12/10/2016

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	1	0	1	0	1	1	0	76	0	0	42	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.932			0.932						0.998	
Flt Protected		0.976										
Satd. Flow (prot)	0	1152	0	0	1771	0	0	1827	0	0	1758	0
Flt Permitted		0.976										
Satd. Flow (perm)	0	1152	0	0	1771	0	0	1827	0	0	1758	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		499			490			1249			987	
Travel Time (s)		11.3			11.1			28.4			22.4	
Peak Hour Factor	0.25	0.25	0.25	0.50	0.50	0.50	0.85	0.85	0.85	0.67	0.67	0.67
Heavy Vehicles (%)	100%	0%	0%	0%	0%	0%	0%	4%	0%	0%	8%	0%
Adj. Flow (vph)	4	0	4	0	2	2	0	89	0	0	63	1
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	8	0	0	4	0	0	89	0	0	64	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 14.0%	ICU Level of Service A
Analysis Period (min) 15	

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	1	0	1	0	1	1	0	76	0	0	42	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	25	25	25	50	50	50	85	85	85	67	67	67
Heavy Vehicles, %	100	0	0	0	0	0	0	4	0	0	8	0
Mvmt Flow	4	0	4	0	2	2	0	89	0	0	63	1

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	154	152	63	154	153	89	64	0	0	89	0	0
Stage 1	63	63	-	89	89	-	-	-	-	-	-	-
Stage 2	91	89	-	65	64	-	-	-	-	-	-	-
Critical Hdwy	8.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	7.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	7.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	4.4	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	635	743	1007	817	742	975	1551	-	-	1519	-	-
Stage 1	751	846	-	923	825	-	-	-	-	-	-	-
Stage 2	722	825	-	951	846	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	632	743	1007	814	742	975	1551	-	-	1519	-	-
Mov Cap-2 Maneuver	632	743	-	814	742	-	-	-	-	-	-	-
Stage 1	751	846	-	923	825	-	-	-	-	-	-	-
Stage 2	719	825	-	947	846	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.7	9.3	0	0
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1551	-	-	777	843	1519	-	-
HCM Lane V/C Ratio	-	-	-	0.01	0.005	-	-	-
HCM Control Delay (s)	0	-	-	9.7	9.3	0	-	-
HCM Lane LOS	A	-	-	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0	0	0	-	-

Lanes, Volumes, Timings
11: Burroughs Rd. & Stow Rd.

12/10/2016

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	13	32	0	1	7	13	0	43	14	3	36	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.914			0.967			0.979	
Flt Protected		0.986			0.998						0.997	
Satd. Flow (prot)	0	1793	0	0	1640	0	0	1802	0	0	1754	0
Flt Permitted		0.986			0.998						0.997	
Satd. Flow (perm)	0	1793	0	0	1640	0	0	1802	0	0	1754	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		375			418			229			1249	
Travel Time (s)		8.5			9.5			5.2			28.4	
Peak Hour Factor	0.88	0.88	0.88	0.68	0.68	0.68	0.63	0.63	0.63	0.79	0.79	0.79
Heavy Vehicles (%)	8%	3%	0%	0%	17%	0%	0%	0%	8%	50%	3%	0%
Adj. Flow (vph)	15	36	0	1	10	19	0	68	22	4	46	9
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	51	0	0	30	0	0	90	0	0	59	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 18.6%	ICU Level of Service A
Analysis Period (min) 15	

Intersection	
Int Delay, s/veh	3.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	13	32	0	1	7	13	0	43	14	3	36	7
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	68	68	68	63	63	63	79	79	79
Heavy Vehicles, %	8	3	0	0	17	0	0	0	8	50	3	0
Mvmt Flow	15	36	0	1	10	19	0	68	22	4	46	9

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	152	148	50	155	141	79	54	0	0	90	0	0
Stage 1	58	58	-	79	79	-	-	-	-	-	-	-
Stage 2	94	90	-	76	62	-	-	-	-	-	-	-
Critical Hdwy	7.18	6.53	6.2	7.1	6.67	6.2	4.1	-	-	4.6	-	-
Critical Hdwy Stg 1	6.18	5.53	-	6.1	5.67	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.18	5.53	-	6.1	5.67	-	-	-	-	-	-	-
Follow-up Hdwy	3.572	4.027	3.3	3.5	4.153	3.3	2.2	-	-	2.65	-	-
Pot Cap-1 Maneuver	802	742	1024	816	723	987	1564	-	-	1251	-	-
Stage 1	939	845	-	935	801	-	-	-	-	-	-	-
Stage 2	898	818	-	938	815	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	776	740	1024	784	721	987	1564	-	-	1251	-	-
Mov Cap-2 Maneuver	776	740	-	784	721	-	-	-	-	-	-	-
Stage 1	939	842	-	935	801	-	-	-	-	-	-	-
Stage 2	869	818	-	895	813	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	10.2	9.3	0	0.5
HCM LOS	B	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1564	-	-	750	869	1251	-	-
HCM Lane V/C Ratio	-	-	-	0.068	0.036	0.003	-	-
HCM Control Delay (s)	0	-	-	10.2	9.3	7.9	0	-
HCM Lane LOS	A	-	-	B	A	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.2	0.1	0	-	-

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	0	51	42	0	3	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.921	
Flt Protected					0.980	
Satd. Flow (prot)	0	1863	1900	0	1715	0
Flt Permitted					0.980	
Satd. Flow (perm)	0	1863	1900	0	1715	0
Link Speed (mph)		30	30		30	
Link Distance (ft)		547	616		609	
Travel Time (s)		12.4	14.0		13.8	
Peak Hour Factor	0.62	0.62	0.70	0.70	0.42	0.42
Heavy Vehicles (%)	0%	2%	0%	0%	0%	0%
Adj. Flow (vph)	0	82	60	0	7	10
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	82	60	0	17	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 13.3%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	0.9

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	0	51	42	0	3	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	62	62	70	70	42	42
Heavy Vehicles, %	0	2	0	0	0	0
Mvmt Flow	0	82	60	0	7	10

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	60	0	-	0	142	60
Stage 1	-	-	-	-	60	-
Stage 2	-	-	-	-	82	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1556	-	-	-	856	1011
Stage 1	-	-	-	-	968	-
Stage 2	-	-	-	-	946	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1556	-	-	-	856	1011
Mov Cap-2 Maneuver	-	-	-	-	856	-
Stage 1	-	-	-	-	968	-
Stage 2	-	-	-	-	946	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	8.9
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1556	-	-	-	938
HCM Lane V/C Ratio	-	-	-	-	0.018
HCM Control Delay (s)	0	-	-	-	8.9
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Lanes, Volumes, Timings
4: Burroughs Rd./Hill Rd. & Massachusetts Ave./Massachussetts Ave.

12/10/2016

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	15	392	57	20	294	12	83	1	9	56	4	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.983			0.995			0.987			0.960	
Flt Protected		0.998			0.997			0.957			0.968	
Satd. Flow (prot)	0	1799	0	0	1845	0	0	1795	0	0	1688	0
Flt Permitted		0.998			0.997			0.957			0.968	
Satd. Flow (perm)	0	1799	0	0	1845	0	0	1795	0	0	1688	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		329			416			467			306	
Travel Time (s)		7.5			9.5			10.6			7.0	
Peak Hour Factor	0.82	0.82	0.82	0.81	0.81	0.81	0.83	0.83	0.83	0.78	0.78	0.78
Heavy Vehicles (%)	0%	4%	2%	6%	2%	0%	0%	0%	0%	0%	100%	0%
Adj. Flow (vph)	18	478	70	25	363	15	100	1	11	72	5	32
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	566	0	0	403	0	0	112	0	0	109	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type: Other
Control Type: Unsignalized
Intersection Capacity Utilization 42.0% ICU Level of Service A
Analysis Period (min) 15

Intersection	
Int Delay, s/veh	6.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	15	392	57	20	294	12	83	1	9	56	4	25
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	82	82	82	81	81	81	83	83	83	78	78	78
Heavy Vehicles, %	0	4	2	6	2	0	0	0	0	0	100	0
Mvmt Flow	18	478	70	25	363	15	100	1	11	72	5	32

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	378	0	0	548	0	0	987	976	513	975	1004	370
Stage 1	-	-	-	-	-	-	549	549	-	420	420	-
Stage 2	-	-	-	-	-	-	438	427	-	555	584	-
Critical Hdwy	4.1	-	-	4.16	-	-	7.1	6.5	6.2	7.1	7.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	6.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	6.5	-
Follow-up Hdwy	2.2	-	-	2.254	-	-	3.5	4	3.3	3.5	4.9	3.3
Pot Cap-1 Maneuver	1192	-	-	1002	-	-	228	253	565	233	166	680
Stage 1	-	-	-	-	-	-	524	520	-	615	452	-
Stage 2	-	-	-	-	-	-	601	589	-	520	371	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1192	-	-	1002	-	-	203	240	565	218	157	680
Mov Cap-2 Maneuver	-	-	-	-	-	-	203	240	-	218	157	-
Stage 1	-	-	-	-	-	-	512	509	-	601	438	-
Stage 2	-	-	-	-	-	-	548	570	-	498	363	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	0.5	38.1	27.6
HCM LOS			E	D

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	217	1192	-	-	1002	-	-	266
HCM Lane V/C Ratio	0.516	0.015	-	-	0.025	-	-	0.41
HCM Control Delay (s)	38.1	8.1	0	-	8.7	0	-	27.6
HCM Lane LOS	E	A	A	-	A	A	-	D
HCM 95th %tile Q(veh)	2.7	0	-	-	0.1	-	-	1.9

Lanes, Volumes, Timings
6: Stow Rd./Middle Rd. & Massachusetts Ave.

12/10/2016

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	15	375	28	11	265	19	49	13	24	34	8	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.991			0.991			0.962			0.960	
Flt Protected		0.998			0.998			0.972			0.972	
Satd. Flow (prot)	0	1805	0	0	1830	0	0	1682	0	0	1773	0
Flt Permitted		0.998			0.998			0.972			0.972	
Satd. Flow (perm)	0	1805	0	0	1830	0	0	1682	0	0	1773	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1062			463			987			333	
Travel Time (s)		24.1			10.5			22.4			7.6	
Peak Hour Factor	0.89	0.89	0.89	0.78	0.78	0.78	0.76	0.76	0.76	0.78	0.78	0.78
Heavy Vehicles (%)	8%	3%	17%	0%	3%	0%	5%	9%	5%	0%	0%	0%
Parking (#/hr)						0						
Adj. Flow (vph)	17	421	31	14	340	24	64	17	32	44	10	23
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	469	0	0	378	0	0	113	0	0	77	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 39.9%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	4.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	15	375	28	11	265	19	49	13	24	34	8	18
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	89	89	78	78	78	76	76	76	78	78	78
Heavy Vehicles, %	8	3	17	0	3	0	5	9	5	0	0	0
Mvmt Flow	17	421	31	14	340	24	64	17	32	44	10	23

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	364	0	0	453	0	0	868	863	437	875	867	352
Stage 1	-	-	-	-	-	-	471	471	-	380	380	-
Stage 2	-	-	-	-	-	-	397	392	-	495	487	-
Critical Hdwy	4.18	-	-	4.1	-	-	7.15	6.59	6.25	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.15	5.59	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.15	5.59	-	6.1	5.5	-
Follow-up Hdwy	2.272	-	-	2.2	-	-	3.545	4.081	3.345	3.5	4	3.3
Pot Cap-1 Maneuver	1162	-	-	1118	-	-	269	285	613	272	293	696
Stage 1	-	-	-	-	-	-	568	548	-	646	617	-
Stage 2	-	-	-	-	-	-	623	594	-	560	554	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1162	-	-	1118	-	-	246	275	613	239	283	696
Mov Cap-2 Maneuver	-	-	-	-	-	-	246	275	-	239	283	-
Stage 1	-	-	-	-	-	-	557	537	-	633	607	-
Stage 2	-	-	-	-	-	-	583	584	-	504	543	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	0.3	24	20.7
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	301	1162	-	-	1118	-	-	306
HCM Lane V/C Ratio	0.376	0.015	-	-	0.013	-	-	0.251
HCM Control Delay (s)	24	8.1	0	-	8.3	0	-	20.7
HCM Lane LOS	C	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	1.7	0	-	-	0	-	-	1

Lanes, Volumes, Timings
14: Stow Rd. & Sheriff's Meadow

12/10/2016

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	1	0	1	0	1	1	0	82	0	0	45	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.932			0.932						0.998	
Flt Protected		0.976										
Satd. Flow (prot)	0	1152	0	0	1771	0	0	1827	0	0	1758	0
Flt Permitted		0.976										
Satd. Flow (perm)	0	1152	0	0	1771	0	0	1827	0	0	1758	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		499			490			1249			987	
Travel Time (s)		11.3			11.1			28.4			22.4	
Peak Hour Factor	0.25	0.25	0.25	0.50	0.50	0.50	0.85	0.85	0.85	0.67	0.67	0.67
Heavy Vehicles (%)	100%	0%	0%	0%	0%	0%	0%	4%	0%	0%	8%	0%
Adj. Flow (vph)	4	0	4	0	2	2	0	96	0	0	67	1
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	8	0	0	4	0	0	96	0	0	68	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 14.3%	ICU Level of Service A
Analysis Period (min) 15	

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	1	0	1	0	1	1	0	82	0	0	45	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	25	25	25	50	50	50	85	85	85	67	67	67
Heavy Vehicles, %	100	0	0	0	0	0	0	4	0	0	8	0
Mvmt Flow	4	0	4	0	2	2	0	96	0	0	67	1

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	166	164	68	166	165	96	69	0	0	96	0	0
Stage 1	68	68	-	96	96	-	-	-	-	-	-	-
Stage 2	98	96	-	70	69	-	-	-	-	-	-	-
Critical Hdwy	8.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	7.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	7.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	4.4	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	622	732	1001	803	731	966	1545	-	-	1510	-	-
Stage 1	746	842	-	916	819	-	-	-	-	-	-	-
Stage 2	716	819	-	945	841	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	619	732	1001	800	731	966	1545	-	-	1510	-	-
Mov Cap-2 Maneuver	619	732	-	800	731	-	-	-	-	-	-	-
Stage 1	746	842	-	916	819	-	-	-	-	-	-	-
Stage 2	713	819	-	941	841	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.8	9.3	0	0
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1545	-	-	765	832	1510	-	-
HCM Lane V/C Ratio	-	-	-	0.01	0.005	-	-	-
HCM Control Delay (s)	0	-	-	9.8	9.3	0	-	-
HCM Lane LOS	A	-	-	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0	0	0	-	-

Lanes, Volumes, Timings
11: Burroughs Rd. & Stow Rd.

12/10/2016

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	14	35	0	1	8	14	0	46	15	4	39	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.917			0.967			0.979	
Flt Protected		0.986			0.999						0.996	
Satd. Flow (prot)	0	1794	0	0	1642	0	0	1802	0	0	1744	0
Flt Permitted		0.986			0.999						0.996	
Satd. Flow (perm)	0	1794	0	0	1642	0	0	1802	0	0	1744	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		375			418			229			1249	
Travel Time (s)		8.5			9.5			5.2			28.4	
Peak Hour Factor	0.88	0.88	0.88	0.68	0.68	0.68	0.63	0.63	0.63	0.79	0.79	0.79
Heavy Vehicles (%)	8%	3%	0%	0%	17%	0%	0%	0%	8%	50%	3%	0%
Adj. Flow (vph)	16	40	0	1	12	21	0	73	24	5	49	10
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	56	0	0	34	0	0	97	0	0	64	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 20.6%	ICU Level of Service A
Analysis Period (min) 15	

Intersection	
Int Delay, s/veh	3.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	14	35	0	1	8	14	0	46	15	4	39	8
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	68	68	68	63	63	63	79	79	79
Heavy Vehicles, %	8	3	0	0	17	0	0	0	8	50	3	0
Mvmt Flow	16	40	0	1	12	21	0	73	24	5	49	10

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	166	162	54	169	155	85	59	0	0	97	0	0
Stage 1	65	65	-	85	85	-	-	-	-	-	-	-
Stage 2	101	97	-	84	70	-	-	-	-	-	-	-
Critical Hdwy	7.18	6.53	6.2	7.1	6.67	6.2	4.1	-	-	4.6	-	-
Critical Hdwy Stg 1	6.18	5.53	-	6.1	5.67	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.18	5.53	-	6.1	5.67	-	-	-	-	-	-	-
Follow-up Hdwy	3.572	4.027	3.3	3.5	4.153	3.3	2.2	-	-	2.65	-	-
Pot Cap-1 Maneuver	785	729	1019	799	710	980	1558	-	-	1243	-	-
Stage 1	931	839	-	928	796	-	-	-	-	-	-	-
Stage 2	891	813	-	929	808	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	756	726	1019	763	707	980	1558	-	-	1243	-	-
Mov Cap-2 Maneuver	756	726	-	763	707	-	-	-	-	-	-	-
Stage 1	931	836	-	928	796	-	-	-	-	-	-	-
Stage 2	859	813	-	881	805	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	10.3	9.4	0	0.6
HCM LOS	B	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1558	-	-	734	855	1243	-	-
HCM Lane V/C Ratio	-	-	-	0.076	0.04	0.004	-	-
HCM Control Delay (s)	0	-	-	10.3	9.4	7.9	0	-
HCM Lane LOS	A	-	-	B	A	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.2	0.1	0	-	-

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	0	55	45	0	4	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.926	
Flt Protected					0.978	
Satd. Flow (prot)	0	1863	1900	0	1721	0
Flt Permitted					0.978	
Satd. Flow (perm)	0	1863	1900	0	1721	0
Link Speed (mph)		30	30		30	
Link Distance (ft)		547	616		609	
Travel Time (s)		12.4	14.0		13.8	
Peak Hour Factor	0.62	0.62	0.70	0.70	0.42	0.42
Heavy Vehicles (%)	0%	2%	0%	0%	0%	0%
Adj. Flow (vph)	0	89	64	0	10	12
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	89	64	0	22	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 13.3%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	0	55	45	0	4	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	62	62	70	70	42	42
Heavy Vehicles, %	0	2	0	0	0	0
Mvmt Flow	0	89	64	0	10	12

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	64	0	-	0	153	64
Stage 1	-	-	-	-	64	-
Stage 2	-	-	-	-	89	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1551	-	-	-	843	1006
Stage 1	-	-	-	-	964	-
Stage 2	-	-	-	-	940	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1551	-	-	-	843	1006
Mov Cap-2 Maneuver	-	-	-	-	843	-
Stage 1	-	-	-	-	964	-
Stage 2	-	-	-	-	940	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	9
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1551	-	-	-	926
HCM Lane V/C Ratio	-	-	-	-	0.023
HCM Control Delay (s)	0	-	-	-	9
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Lanes, Volumes, Timings
4: Burroughs Rd./Hill Rd. & Massachusetts Ave./Massachussetts Ave.

12/10/2016

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	15	398	57	20	322	12	83	1	9	56	4	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.984			0.995			0.987			0.960	
Flt Protected		0.998			0.997			0.957			0.968	
Satd. Flow (prot)	0	1801	0	0	1845	0	0	1795	0	0	1688	0
Flt Permitted		0.998			0.997			0.957			0.968	
Satd. Flow (perm)	0	1801	0	0	1845	0	0	1795	0	0	1688	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		329			416			467			306	
Travel Time (s)		7.5			9.5			10.6			7.0	
Peak Hour Factor	0.82	0.82	0.82	0.81	0.81	0.81	0.83	0.83	0.83	0.78	0.78	0.78
Heavy Vehicles (%)	0%	4%	2%	6%	2%	0%	0%	0%	0%	0%	100%	0%
Adj. Flow (vph)	18	485	70	25	398	15	100	1	11	72	5	32
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	573	0	0	438	0	0	112	0	0	109	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 42.6%	ICU Level of Service A
Analysis Period (min) 15	

Intersection	
Int Delay, s/veh	6.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	15	398	57	20	322	12	83	1	9	56	4	25
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	82	82	82	81	81	81	83	83	83	78	78	78
Heavy Vehicles, %	0	4	2	6	2	0	0	0	0	0	100	0
Mvmt Flow	18	485	70	25	398	15	100	1	11	72	5	32

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	412	0	0	555	0	0	1030	1019	520	1017	1045	405
Stage 1	-	-	-	-	-	-	557	557	-	454	454	-
Stage 2	-	-	-	-	-	-	473	462	-	563	591	-
Critical Hdwy	4.1	-	-	4.16	-	-	7.1	6.5	6.2	7.1	7.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	6.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	6.5	-
Follow-up Hdwy	2.2	-	-	2.254	-	-	3.5	4	3.3	3.5	4.9	3.3
Pot Cap-1 Maneuver	1158	-	-	996	-	-	214	239	560	218	156	650
Stage 1	-	-	-	-	-	-	518	515	-	589	434	-
Stage 2	-	-	-	-	-	-	576	568	-	514	368	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1158	-	-	996	-	-	190	226	560	204	147	650
Mov Cap-2 Maneuver	-	-	-	-	-	-	190	226	-	204	147	-
Stage 1	-	-	-	-	-	-	506	503	-	575	420	-
Stage 2	-	-	-	-	-	-	523	549	-	491	360	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	0.5	42.6	30.1
HCM LOS			E	D

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	203	1158	-	-	996	-	-	250
HCM Lane V/C Ratio	0.552	0.016	-	-	0.025	-	-	0.436
HCM Control Delay (s)	42.6	8.2	0	-	8.7	0	-	30.1
HCM Lane LOS	E	A	A	-	A	A	-	D
HCM 95th %tile Q(veh)	2.9	0	-	-	0.1	-	-	2.1

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	418	6	3	332	28	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.998				0.953	
Flt Protected					0.968	
Satd. Flow (prot)	1859	0	0	1863	1718	0
Flt Permitted					0.968	
Satd. Flow (perm)	1859	0	0	1863	1718	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	107			955	362	
Travel Time (s)	2.4			21.7	8.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	454	7	3	361	30	16
Shared Lane Traffic (%)						
Lane Group Flow (vph)	461	0	0	364	46	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 32.4%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	0.9

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	418	6	3	332	28	15
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	454	7	3	361	30	16

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	461	0	825	458
Stage 1	-	-	-	-	458	-
Stage 2	-	-	-	-	367	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1100	-	342	603
Stage 1	-	-	-	-	637	-
Stage 2	-	-	-	-	701	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1100	-	341	603
Mov Cap-2 Maneuver	-	-	-	-	341	-
Stage 1	-	-	-	-	637	-
Stage 2	-	-	-	-	699	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	15.1
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	402	-	-	1100	-
HCM Lane V/C Ratio	0.116	-	-	0.003	-
HCM Control Delay (s)	15.1	-	-	8.3	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	0.4	-	-	0	-

Lanes, Volumes, Timings
6: Stow Rd./Middle Rd. & Massachusetts Ave.

12/10/2016

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	15	389	29	11	268	19	49	13	24	34	8	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.991			0.992			0.962			0.960	
Flt Protected		0.998			0.998			0.972			0.972	
Satd. Flow (prot)	0	1805	0	0	1832	0	0	1682	0	0	1773	0
Flt Permitted		0.998			0.998			0.972			0.972	
Satd. Flow (perm)	0	1805	0	0	1832	0	0	1682	0	0	1773	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		955			463			987			333	
Travel Time (s)		21.7			10.5			22.4			7.6	
Peak Hour Factor	0.89	0.89	0.89	0.78	0.78	0.78	0.76	0.76	0.76	0.78	0.78	0.78
Heavy Vehicles (%)	8%	3%	17%	0%	3%	0%	5%	9%	5%	0%	0%	0%
Adj. Flow (vph)	17	437	33	14	344	24	64	17	32	44	10	23
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	487	0	0	382	0	0	113	0	0	77	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 40.8%	ICU Level of Service A
Analysis Period (min) 15	

Intersection	
Int Delay, s/veh	4.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	15	389	29	11	268	19	49	13	24	34	8	18
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	89	89	78	78	78	76	76	76	78	78	78
Heavy Vehicles, %	8	3	17	0	3	0	5	9	5	0	0	0
Mvmt Flow	17	437	33	14	344	24	64	17	32	44	10	23

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	368	0	0	470	0	0	888	883	453	895	887	356
Stage 1	-	-	-	-	-	-	487	487	-	384	384	-
Stage 2	-	-	-	-	-	-	401	396	-	511	503	-
Critical Hdwy	4.18	-	-	4.1	-	-	7.15	6.59	6.25	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.15	5.59	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.15	5.59	-	6.1	5.5	-
Follow-up Hdwy	2.272	-	-	2.2	-	-	3.545	4.081	3.345	3.5	4	3.3
Pot Cap-1 Maneuver	1158	-	-	1102	-	-	261	277	601	264	285	693
Stage 1	-	-	-	-	-	-	556	539	-	643	615	-
Stage 2	-	-	-	-	-	-	620	592	-	549	545	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1158	-	-	1102	-	-	238	267	601	231	275	693
Mov Cap-2 Maneuver	-	-	-	-	-	-	238	267	-	231	275	-
Stage 1	-	-	-	-	-	-	545	528	-	630	605	-
Stage 2	-	-	-	-	-	-	580	583	-	493	534	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	0.3	24.9	21.3
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	292	1158	-	-	1102	-	-	297
HCM Lane V/C Ratio	0.388	0.015	-	-	0.013	-	-	0.259
HCM Control Delay (s)	24.9	8.2	0	-	8.3	0	-	21.3
HCM Lane LOS	C	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	1.8	0	-	-	0	-	-	1

Lanes, Volumes, Timings
14: Stow Rd. & Sheriff's Meadow

12/10/2016

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	1	0	1	0	1	1	0	82	0	0	46	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.932			0.932						0.998	
Flt Protected		0.976										
Satd. Flow (prot)	0	1152	0	0	1771	0	0	1827	0	0	1758	0
Flt Permitted		0.976										
Satd. Flow (perm)	0	1152	0	0	1771	0	0	1827	0	0	1758	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		499			490			1249			987	
Travel Time (s)		11.3			11.1			28.4			22.4	
Peak Hour Factor	0.25	0.25	0.25	0.50	0.50	0.50	0.85	0.85	0.85	0.67	0.67	0.67
Heavy Vehicles (%)	100%	0%	0%	0%	0%	0%	0%	4%	0%	0%	8%	0%
Adj. Flow (vph)	4	0	4	0	2	2	0	96	0	0	69	1
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	8	0	0	4	0	0	96	0	0	70	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 14.3%	ICU Level of Service A
Analysis Period (min) 15	

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	1	0	1	0	1	1	0	82	0	0	46	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	25	25	25	50	50	50	85	85	85	67	67	67
Heavy Vehicles, %	100	0	0	0	0	0	0	4	0	0	8	0
Mvmt Flow	4	0	4	0	2	2	0	96	0	0	69	1

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	167	165	69	167	166	96	70	0	0	96	0	0
Stage 1	69	69	-	96	96	-	-	-	-	-	-	-
Stage 2	98	96	-	71	70	-	-	-	-	-	-	-
Critical Hdwy	8.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	7.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	7.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	4.4	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	621	731	1000	802	730	966	1544	-	-	1510	-	-
Stage 1	745	841	-	916	819	-	-	-	-	-	-	-
Stage 2	716	819	-	944	841	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	618	731	1000	799	730	966	1544	-	-	1510	-	-
Mov Cap-2 Maneuver	618	731	-	799	730	-	-	-	-	-	-	-
Stage 1	745	841	-	916	819	-	-	-	-	-	-	-
Stage 2	713	819	-	940	841	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.8	9.3	0	0
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1544	-	-	764	832	1510	-	-
HCM Lane V/C Ratio	-	-	-	0.01	0.005	-	-	-
HCM Control Delay (s)	0	-	-	9.8	9.3	0	-	-
HCM Lane LOS	A	-	-	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0	0	0	-	-

Lanes, Volumes, Timings
11: Burroughs Rd. & Stow Rd.

12/10/2016

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	14	35	0	1	8	14	0	46	15	4	40	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.917			0.967			0.980	
Flt Protected		0.986			0.999						0.996	
Satd. Flow (prot)	0	1794	0	0	1642	0	0	1802	0	0	1748	0
Flt Permitted		0.986			0.999						0.996	
Satd. Flow (perm)	0	1794	0	0	1642	0	0	1802	0	0	1748	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		375			418			229			1249	
Travel Time (s)		8.5			9.5			5.2			28.4	
Peak Hour Factor	0.88	0.88	0.88	0.68	0.68	0.68	0.63	0.63	0.63	0.79	0.79	0.79
Heavy Vehicles (%)	8%	3%	0%	0%	17%	0%	0%	0%	8%	50%	3%	0%
Adj. Flow (vph)	16	40	0	1	12	21	0	73	24	5	51	10
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	56	0	0	34	0	0	97	0	0	66	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 20.6%	ICU Level of Service A
Analysis Period (min) 15	

Intersection	
Int Delay, s/veh	3.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	14	35	0	1	8	14	0	46	15	4	40	8
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	68	68	68	63	63	63	79	79	79
Heavy Vehicles, %	8	3	0	0	17	0	0	0	8	50	3	0
Mvmt Flow	16	40	0	1	12	21	0	73	24	5	51	10

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	167	163	56	171	156	85	61	0	0	97	0	0
Stage 1	66	66	-	85	85	-	-	-	-	-	-	-
Stage 2	101	97	-	86	71	-	-	-	-	-	-	-
Critical Hdwy	7.18	6.53	6.2	7.1	6.67	6.2	4.1	-	-	4.6	-	-
Critical Hdwy Stg 1	6.18	5.53	-	6.1	5.67	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.18	5.53	-	6.1	5.67	-	-	-	-	-	-	-
Follow-up Hdwy	3.572	4.027	3.3	3.5	4.153	3.3	2.2	-	-	2.65	-	-
Pot Cap-1 Maneuver	784	728	1016	797	709	980	1555	-	-	1243	-	-
Stage 1	930	838	-	928	796	-	-	-	-	-	-	-
Stage 2	891	813	-	927	807	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	755	725	1016	761	706	980	1555	-	-	1243	-	-
Mov Cap-2 Maneuver	755	725	-	761	706	-	-	-	-	-	-	-
Stage 1	930	835	-	928	796	-	-	-	-	-	-	-
Stage 2	859	813	-	879	804	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	10.3	9.4	0	0.6
HCM LOS	B	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1555	-	-	733	854	1243	-	-
HCM Lane V/C Ratio	-	-	-	0.076	0.04	0.004	-	-
HCM Control Delay (s)	0	-	-	10.3	9.4	7.9	0	-
HCM Lane LOS	A	-	-	B	A	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.2	0.1	0	-	-

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	0	55	45	0	4	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.926	
Flt Protected					0.978	
Satd. Flow (prot)	0	1863	1900	0	1721	0
Flt Permitted					0.978	
Satd. Flow (perm)	0	1863	1900	0	1721	0
Link Speed (mph)		30	30		30	
Link Distance (ft)		547	616		609	
Travel Time (s)		12.4	14.0		13.8	
Peak Hour Factor	0.62	0.62	0.70	0.70	0.42	0.42
Heavy Vehicles (%)	0%	2%	0%	0%	0%	0%
Adj. Flow (vph)	0	89	64	0	10	12
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	89	64	0	22	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 13.3%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	0	55	45	0	4	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	62	62	70	70	42	42
Heavy Vehicles, %	0	2	0	0	0	0
Mvmt Flow	0	89	64	0	10	12

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	64	0	-	0	153	64
Stage 1	-	-	-	-	64	-
Stage 2	-	-	-	-	89	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1551	-	-	-	843	1006
Stage 1	-	-	-	-	964	-
Stage 2	-	-	-	-	940	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1551	-	-	-	843	1006
Mov Cap-2 Maneuver	-	-	-	-	843	-
Stage 1	-	-	-	-	964	-
Stage 2	-	-	-	-	940	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	9
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1551	-	-	-	926
HCM Lane V/C Ratio	-	-	-	-	0.023
HCM Control Delay (s)	0	-	-	-	9
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Lanes, Volumes, Timings
4: Burroughs Rd./Hill Rd. & Massachusetts Ave./Massachussetts Ave.

12/10/2016

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	35	349	72	14	332	14	68	4	9	6	3	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.979			0.995			0.985			0.903	
Flt Protected		0.996			0.998			0.960			0.991	
Satd. Flow (prot)	0	1847	0	0	1869	0	0	1767	0	0	1700	0
Flt Permitted		0.996			0.998			0.960			0.991	
Satd. Flow (perm)	0	1847	0	0	1869	0	0	1767	0	0	1700	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		329			416			467			306	
Travel Time (s)		7.5			9.5			10.6			7.0	
Peak Hour Factor	0.86	0.86	0.86	0.97	0.97	0.97	0.56	0.56	0.56	0.93	0.93	0.93
Heavy Vehicles (%)	0%	0%	2%	0%	1%	0%	2%	0%	0%	0%	0%	0%
Adj. Flow (vph)	41	406	84	14	342	14	121	7	16	6	3	23
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	531	0	0	370	0	0	144	0	0	32	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 54.8%	ICU Level of Service A
Analysis Period (min) 15	

Intersection	
Int Delay, s/veh	5.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	35	349	72	14	332	14	68	4	9	6	3	21
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	86	86	86	97	97	97	56	56	56	93	93	93
Heavy Vehicles, %	0	0	2	0	1	0	2	0	0	0	0	0
Mvmt Flow	41	406	84	14	342	14	121	7	16	6	3	23

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	357	0	0	490	0	0	920	915	448	919	949	349
Stage 1	-	-	-	-	-	-	529	529	-	378	378	-
Stage 2	-	-	-	-	-	-	391	386	-	541	571	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.12	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.518	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1213	-	-	1084	-	-	251	275	615	254	262	699
Stage 1	-	-	-	-	-	-	533	530	-	648	619	-
Stage 2	-	-	-	-	-	-	633	614	-	529	508	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1213	-	-	1084	-	-	229	258	615	231	246	699
Mov Cap-2 Maneuver	-	-	-	-	-	-	229	258	-	231	246	-
Stage 1	-	-	-	-	-	-	508	505	-	618	609	-
Stage 2	-	-	-	-	-	-	600	604	-	484	484	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.6	0.3	38	13.8
HCM LOS			E	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	248	1213	-	-	1084	-	-	440
HCM Lane V/C Ratio	0.583	0.034	-	-	0.013	-	-	0.073
HCM Control Delay (s)	38	8.1	0	-	8.4	0	-	13.8
HCM Lane LOS	E	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	3.3	0.1	-	-	0	-	-	0.2

Lanes, Volumes, Timings
6: Stow Rd./Middle Rd. & Massachusetts Ave.

12/10/2016

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	15	313	26	11	303	35	29	13	12	23	4	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.990			0.987			0.971			0.964	
Flt Protected		0.998			0.998			0.974			0.970	
Satd. Flow (prot)	0	1855	0	0	1834	0	0	1797	0	0	1676	0
Flt Permitted		0.998			0.998			0.974			0.970	
Satd. Flow (perm)	0	1855	0	0	1834	0	0	1797	0	0	1676	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1062			463			987			333	
Travel Time (s)		24.1			10.5			22.4			7.6	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.78	0.78	0.78	0.69	0.69	0.69
Heavy Vehicles (%)	0%	1%	4%	0%	2%	3%	0%	0%	0%	5%	0%	11%
Adj. Flow (vph)	17	360	30	13	348	40	37	17	15	33	6	14
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	407	0	0	401	0	0	69	0	0	53	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 34.6%	ICU Level of Service A
Analysis Period (min) 15	

Intersection	
Int Delay, s/veh	2.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	15	313	26	11	303	35	29	13	12	23	4	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	87	87	87	87	87	87	78	78	78	69	69	69
Heavy Vehicles, %	0	1	4	0	2	3	0	0	0	5	0	11
Mvmt Flow	17	360	30	13	348	40	37	17	15	33	6	14

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	389	0	0	390	0	0	813	823	375	819	818	368
Stage 1	-	-	-	-	-	-	409	409	-	394	394	-
Stage 2	-	-	-	-	-	-	404	414	-	425	424	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.15	6.5	6.31
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.15	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.15	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.545	4	3.399
Pot Cap-1 Maneuver	1181	-	-	1180	-	-	299	311	676	291	313	658
Stage 1	-	-	-	-	-	-	623	600	-	625	609	-
Stage 2	-	-	-	-	-	-	627	597	-	601	590	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1181	-	-	1180	-	-	281	301	676	266	303	658
Mov Cap-2 Maneuver	-	-	-	-	-	-	281	301	-	266	303	-
Stage 1	-	-	-	-	-	-	612	589	-	614	600	-
Stage 2	-	-	-	-	-	-	599	589	-	560	579	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	0.3	18.8	18.4
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	329	1181	-	-	1180	-	-	322
HCM Lane V/C Ratio	0.21	0.015	-	-	0.011	-	-	0.167
HCM Control Delay (s)	18.8	8.1	0	-	8.1	0	-	18.4
HCM Lane LOS	C	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	0.8	0	-	-	0	-	-	0.6

Lanes, Volumes, Timings
14: Stow Rd. & Sheriff's Meadow

12/10/2016

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	1	0	0	0	0	0	1	44	1	0	40	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt								0.998			0.990	
Flt Protected		0.950						0.999				
Satd. Flow (prot)	0	1805	0	0	1900	0	0	1894	0	0	1830	0
Flt Permitted		0.950						0.999				
Satd. Flow (perm)	0	1805	0	0	1900	0	0	1894	0	0	1830	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		499			490			1249			987	
Travel Time (s)		11.3			11.1			28.4			22.4	
Peak Hour Factor	0.25	0.25	0.25	0.25	0.25	0.25	0.77	0.77	0.77	0.81	0.81	0.81
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	3%	0%
Adj. Flow (vph)	4	0	0	0	0	0	1	57	1	0	49	4
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	4	0	0	0	0	0	59	0	0	53	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 13.3%	ICU Level of Service A
Analysis Period (min) 15	

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	1	0	0	0	0	0	1	44	1	0	40	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	25	25	25	25	25	25	77	77	77	81	81	81
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	3	0
Mvmt Flow	4	0	0	0	0	0	1	57	1	0	49	4

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	111	112	51	111	113	58	53	0	0	58	0	0
Stage 1	51	51	-	60	60	-	-	-	-	-	-	-
Stage 2	60	61	-	51	53	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	872	782	1023	872	781	1014	1566	-	-	1559	-	-
Stage 1	967	856	-	957	849	-	-	-	-	-	-	-
Stage 2	957	848	-	967	855	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	871	781	1023	871	780	1014	1566	-	-	1559	-	-
Mov Cap-2 Maneuver	871	781	-	871	780	-	-	-	-	-	-	-
Stage 1	966	856	-	956	848	-	-	-	-	-	-	-
Stage 2	956	847	-	967	855	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.2	0	0.2	0
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1566	-	-	871	-	1559	-	-
HCM Lane V/C Ratio	0.001	-	-	0.005	-	-	-	-
HCM Control Delay (s)	7.3	0	-	9.2	0	0	-	-
HCM Lane LOS	A	A	-	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0	-	0	-	-

Lanes, Volumes, Timings
11: Burroughs Rd. & Stow Rd.

12/10/2016

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	6	18	0	23	42	12	1	31	10	6	26	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.979			0.968			0.976	
Flt Protected		0.988			0.985			0.999			0.992	
Satd. Flow (prot)	0	1877	0	0	1832	0	0	1837	0	0	1746	0
Flt Permitted		0.988			0.985			0.999			0.992	
Satd. Flow (perm)	0	1877	0	0	1832	0	0	1837	0	0	1746	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		375			418			229			1249	
Travel Time (s)		8.5			9.5			5.2			28.4	
Peak Hour Factor	0.58	0.58	0.58	0.85	0.85	0.85	0.75	0.75	0.75	0.88	0.88	0.88
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	8%	0%
Adj. Flow (vph)	10	31	0	27	49	14	1	41	13	7	30	8
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	41	0	0	90	0	0	55	0	0	45	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 17.7%	ICU Level of Service A
Analysis Period (min) 15	

Intersection	
Int Delay, s/veh	5.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	6	18	0	23	42	12	1	31	10	6	26	7
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	58	58	58	85	85	85	75	75	75	88	88	88
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	8	0
Mvmt Flow	10	31	0	27	49	14	1	41	13	7	30	8

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	129	104	34	114	102	48	38	0	0	55	0	0
Stage 1	47	47	-	51	51	-	-	-	-	-	-	-
Stage 2	82	57	-	63	51	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	849	790	1045	868	792	1027	1585	-	-	1563	-	-
Stage 1	972	860	-	967	856	-	-	-	-	-	-	-
Stage 2	931	851	-	953	856	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	794	785	1045	838	787	1027	1585	-	-	1563	-	-
Mov Cap-2 Maneuver	794	785	-	838	787	-	-	-	-	-	-	-
Stage 1	971	856	-	966	855	-	-	-	-	-	-	-
Stage 2	864	850	-	914	852	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.8	9.9	0.2	1.1
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1585	-	-	787	832	1563	-	-
HCM Lane V/C Ratio	0.001	-	-	0.053	0.109	0.004	-	-
HCM Control Delay (s)	7.3	0	-	9.8	9.9	7.3	0	-
HCM Lane LOS	A	A	-	A	A	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.2	0.4	0	-	-

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	4	57	53	1	3	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.998			
Flt Protected		0.997			0.950	
Satd. Flow (prot)	0	1894	1860	0	1805	0
Flt Permitted		0.997			0.950	
Satd. Flow (perm)	0	1894	1860	0	1805	0
Link Speed (mph)		30	30		30	
Link Distance (ft)		547	616		609	
Travel Time (s)		12.4	14.0		13.8	
Peak Hour Factor	0.93	0.93	0.78	0.78	0.25	0.25
Heavy Vehicles (%)	0%	0%	2%	0%	0%	0%
Adj. Flow (vph)	4	61	68	1	12	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	65	69	0	12	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 16.3%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	4	57	53	1	3	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	93	93	78	78	25	25
Heavy Vehicles, %	0	0	2	0	0	0
Mvmt Flow	4	61	68	1	12	0

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	69	0	-	0	139	69
Stage 1	-	-	-	-	69	-
Stage 2	-	-	-	-	70	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1545	-	-	-	859	1000
Stage 1	-	-	-	-	959	-
Stage 2	-	-	-	-	958	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1545	-	-	-	856	1000
Mov Cap-2 Maneuver	-	-	-	-	856	-
Stage 1	-	-	-	-	959	-
Stage 2	-	-	-	-	955	-

Approach	EB	WB	SB
HCM Control Delay, s	0.5	0	9.3
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1545	-	-	-	856
HCM Lane V/C Ratio	0.003	-	-	-	0.014
HCM Control Delay (s)	7.3	0	-	-	9.3
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0

Lanes, Volumes, Timings
4: Burroughs Rd./Hill Rd. & Massachusetts Ave./Massachussetts Ave.

12/10/2016

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	38	375	77	15	363	64	73	5	10	34	4	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.979			0.980			0.985			0.949	
Flt Protected		0.996			0.998			0.960			0.973	
Satd. Flow (prot)	0	1847	0	0	1843	0	0	1767	0	0	1754	0
Flt Permitted		0.996			0.998			0.960			0.973	
Satd. Flow (perm)	0	1847	0	0	1843	0	0	1767	0	0	1754	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		329			416			467			306	
Travel Time (s)		7.5			9.5			10.6			7.0	
Peak Hour Factor	0.86	0.86	0.86	0.97	0.97	0.97	0.56	0.56	0.56	0.93	0.93	0.93
Heavy Vehicles (%)	0%	0%	2%	0%	1%	0%	2%	0%	0%	0%	0%	0%
Adj. Flow (vph)	44	436	90	15	374	66	130	9	18	37	4	25
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	570	0	0	455	0	0	157	0	0	66	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 54.8%	ICU Level of Service A
Analysis Period (min) 15	

Intersection	
Int Delay, s/veh	9.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	38	375	77	15	363	64	73	5	10	34	4	23
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	86	86	86	97	97	97	56	56	56	93	93	93
Heavy Vehicles, %	0	0	2	0	1	0	2	0	0	0	0	0
Mvmt Flow	44	436	90	15	374	66	130	9	18	37	4	25

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	440	0	0	526	0	0	1022	1040	481	1021	1052	407
Stage 1	-	-	-	-	-	-	569	569	-	438	438	-
Stage 2	-	-	-	-	-	-	453	471	-	583	614	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.12	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.518	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1131	-	-	1051	-	-	214	232	589	217	228	648
Stage 1	-	-	-	-	-	-	507	509	-	601	582	-
Stage 2	-	-	-	-	-	-	586	563	-	502	486	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1131	-	-	1051	-	-	191	215	589	192	211	648
Mov Cap-2 Maneuver	-	-	-	-	-	-	191	215	-	192	211	-
Stage 1	-	-	-	-	-	-	479	480	-	567	571	-
Stage 2	-	-	-	-	-	-	549	552	-	451	459	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.6	0.3	61.7	23.2
HCM LOS			F	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	208	1131	-	-	1051	-	-	263
HCM Lane V/C Ratio	0.755	0.039	-	-	0.015	-	-	0.249
HCM Control Delay (s)	61.7	8.3	0	-	8.5	0	-	23.2
HCM Lane LOS	F	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	5.1	0.1	-	-	0	-	-	1

Lanes, Volumes, Timings
6: Stow Rd./Middle Rd. & Massachusetts Ave.

12/10/2016

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	16	364	18	12	381	38	31	14	13	25	5	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.994			0.988			0.969			0.963	
Flt Protected		0.998			0.999			0.974			0.970	
Satd. Flow (prot)	0	1864	0	0	1838	0	0	1793	0	0	1674	0
Flt Permitted		0.998			0.999			0.974			0.970	
Satd. Flow (perm)	0	1864	0	0	1838	0	0	1793	0	0	1674	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1062			463			987			333	
Travel Time (s)		24.1			10.5			22.4			7.6	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.78	0.78	0.78	0.69	0.69	0.69
Heavy Vehicles (%)	0%	1%	4%	0%	2%	3%	0%	0%	0%	5%	0%	11%
Adj. Flow (vph)	18	418	21	14	438	44	40	18	17	36	7	16
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	457	0	0	496	0	0	75	0	0	59	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 37.9%	ICU Level of Service A
Analysis Period (min) 15	

Intersection	
Int Delay, s/veh	3.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	16	364	18	12	381	38	31	14	13	25	5	11
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	87	87	87	87	87	87	78	78	78	69	69	69
Heavy Vehicles, %	0	1	4	0	2	3	0	0	0	5	0	11
Mvmt Flow	18	418	21	14	438	44	40	18	17	36	7	16

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	482	0	0	439	0	0	965	975	429	970	963	460
Stage 1	-	-	-	-	-	-	466	466	-	487	487	-
Stage 2	-	-	-	-	-	-	499	509	-	483	476	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.15	6.5	6.31
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.15	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.15	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.545	4	3.399
Pot Cap-1 Maneuver	1091	-	-	1132	-	-	236	253	630	230	258	583
Stage 1	-	-	-	-	-	-	581	566	-	556	554	-
Stage 2	-	-	-	-	-	-	557	541	-	559	560	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1091	-	-	1132	-	-	218	243	630	205	248	583
Mov Cap-2 Maneuver	-	-	-	-	-	-	218	243	-	205	248	-
Stage 1	-	-	-	-	-	-	568	554	-	544	545	-
Stage 2	-	-	-	-	-	-	525	532	-	515	548	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	0.2	24	23.4
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	263	1091	-	-	1132	-	-	255
HCM Lane V/C Ratio	0.283	0.017	-	-	0.012	-	-	0.233
HCM Control Delay (s)	24	8.4	0	-	8.2	0	-	23.4
HCM Lane LOS	C	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	1.1	0.1	-	-	0	-	-	0.9

Lanes, Volumes, Timings
14: Stow Rd. & Sheriff's Meadow

12/10/2016

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	1	0	0	0	0	0	1	47	1	0	43	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt								0.998			0.988	
Flt Protected		0.950						0.999				
Satd. Flow (prot)	0	1805	0	0	1900	0	0	1894	0	0	1827	0
Flt Permitted		0.950						0.999				
Satd. Flow (perm)	0	1805	0	0	1900	0	0	1894	0	0	1827	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		499			490			1249			987	
Travel Time (s)		11.3			11.1			28.4			22.4	
Peak Hour Factor	0.25	0.25	0.25	0.25	0.25	0.25	0.77	0.77	0.77	0.81	0.81	0.81
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	3%	0%
Adj. Flow (vph)	4	0	0	0	0	0	1	61	1	0	53	5
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	4	0	0	0	0	0	63	0	0	58	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 13.3%	ICU Level of Service A
Analysis Period (min) 15	

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	1	0	0	0	0	0	1	47	1	0	43	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	25	25	25	25	25	25	77	77	77	81	81	81
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	3	0
Mvmt Flow	4	0	0	0	0	0	1	61	1	0	53	5

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	120	121	56	120	122	62	58	0	0	62	0	0
Stage 1	56	56	-	64	64	-	-	-	-	-	-	-
Stage 2	64	65	-	56	58	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	860	773	1016	860	772	1009	1559	-	-	1554	-	-
Stage 1	961	852	-	952	846	-	-	-	-	-	-	-
Stage 2	952	845	-	961	851	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	859	772	1016	859	771	1009	1559	-	-	1554	-	-
Mov Cap-2 Maneuver	859	772	-	859	771	-	-	-	-	-	-	-
Stage 1	960	852	-	951	845	-	-	-	-	-	-	-
Stage 2	951	844	-	961	851	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.2	0	0.1	0
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1559	-	-	859	-	1554	-	-
HCM Lane V/C Ratio	0.001	-	-	0.005	-	-	-	-
HCM Control Delay (s)	7.3	0	-	9.2	0	0	-	-
HCM Lane LOS	A	A	-	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0	-	0	-	-

Lanes, Volumes, Timings
11: Burroughs Rd. & Stow Rd.

12/10/2016

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	7	20	0	25	45	13	1	34	11	7	28	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.979			0.967			0.975	
Flt Protected		0.987			0.985			0.999			0.992	
Satd. Flow (prot)	0	1875	0	0	1832	0	0	1835	0	0	1746	0
Flt Permitted		0.987			0.985			0.999			0.992	
Satd. Flow (perm)	0	1875	0	0	1832	0	0	1835	0	0	1746	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		375			418			229			1249	
Travel Time (s)		8.5			9.5			5.2			28.4	
Peak Hour Factor	0.58	0.58	0.58	0.85	0.85	0.85	0.75	0.75	0.75	0.88	0.88	0.88
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	8%	0%
Adj. Flow (vph)	12	34	0	29	53	15	1	45	15	8	32	9
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	46	0	0	97	0	0	61	0	0	49	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 19.0%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	5.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	7	20	0	25	45	13	1	34	11	7	28	8
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	58	58	58	85	85	85	75	75	75	88	88	88
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	8	0
Mvmt Flow	12	34	0	29	53	15	1	45	15	8	32	9

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	141	115	36	125	112	53	41	0	0	60	0	0
Stage 1	52	52	-	55	55	-	-	-	-	-	-	-
Stage 2	89	63	-	70	57	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	833	779	1042	854	782	1020	1581	-	-	1556	-	-
Stage 1	966	856	-	962	853	-	-	-	-	-	-	-
Stage 2	923	846	-	945	851	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	774	774	1042	821	777	1020	1581	-	-	1556	-	-
Mov Cap-2 Maneuver	774	774	-	821	777	-	-	-	-	-	-	-
Stage 1	965	852	-	961	852	-	-	-	-	-	-	-
Stage 2	852	845	-	902	847	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.9	10	0.2	1.2
HCM LOS	A	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1581	-	-	774	821	1556	-	-
HCM Lane V/C Ratio	0.001	-	-	0.06	0.119	0.005	-	-
HCM Control Delay (s)	7.3	0	-	9.9	10	7.3	0	-
HCM Lane LOS	A	A	-	A	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.2	0.4	0	-	-

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	5	61	57	1	4	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.998			
Flt Protected		0.996			0.950	
Satd. Flow (prot)	0	1892	1860	0	1805	0
Flt Permitted		0.996			0.950	
Satd. Flow (perm)	0	1892	1860	0	1805	0
Link Speed (mph)		30	30		30	
Link Distance (ft)		547	616		609	
Travel Time (s)		12.4	14.0		13.8	
Peak Hour Factor	0.93	0.93	0.78	0.78	0.25	0.25
Heavy Vehicles (%)	0%	0%	2%	0%	0%	0%
Adj. Flow (vph)	5	66	73	1	16	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	71	74	0	16	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 17.3%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	5	61	57	1	4	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	93	93	78	78	25	25
Heavy Vehicles, %	0	0	2	0	0	0
Mvmt Flow	5	66	73	1	16	0

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	74	0	-	0	150	74
Stage 1	-	-	-	-	74	-
Stage 2	-	-	-	-	76	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1538	-	-	-	847	993
Stage 1	-	-	-	-	954	-
Stage 2	-	-	-	-	952	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1538	-	-	-	844	993
Mov Cap-2 Maneuver	-	-	-	-	844	-
Stage 1	-	-	-	-	954	-
Stage 2	-	-	-	-	949	-

Approach	EB	WB	SB
HCM Control Delay, s	0.6	0	9.3
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1538	-	-	-	844
HCM Lane V/C Ratio	0.003	-	-	-	0.019
HCM Control Delay (s)	7.3	0	-	-	9.3
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Lanes, Volumes, Timings
4: Burroughs Rd./Hill Rd. & Massachusetts Ave./Massachussetts Ave.

12/10/2016

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	38	401	77	15	376	64	73	5	10	34	4	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.980			0.981			0.985			0.949	
Flt Protected		0.996			0.998			0.960			0.973	
Satd. Flow (prot)	0	1849	0	0	1845	0	0	1767	0	0	1754	0
Flt Permitted		0.996			0.998			0.960			0.973	
Satd. Flow (perm)	0	1849	0	0	1845	0	0	1767	0	0	1754	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		329			416			467			306	
Travel Time (s)		7.5			9.5			10.6			7.0	
Peak Hour Factor	0.86	0.86	0.86	0.97	0.97	0.97	0.56	0.56	0.56	0.93	0.93	0.93
Heavy Vehicles (%)	0%	0%	2%	0%	1%	0%	2%	0%	0%	0%	0%	0%
Adj. Flow (vph)	44	466	90	15	388	66	130	9	18	37	4	25
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	600	0	0	469	0	0	157	0	0	66	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 56.3%	ICU Level of Service B
Analysis Period (min) 15	

Intersection	
Int Delay, s/veh	10.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	38	401	77	15	376	64	73	5	10	34	4	23
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	86	86	86	97	97	97	56	56	56	93	93	93
Heavy Vehicles, %	0	0	2	0	1	0	2	0	0	0	0	0
Mvmt Flow	44	466	90	15	388	66	130	9	18	37	4	25

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	454	0	0	556	0	0	1065	1084	511	1065	1096	421
Stage 1	-	-	-	-	-	-	599	599	-	452	452	-
Stage 2	-	-	-	-	-	-	466	485	-	613	644	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.12	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.518	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1117	-	-	1025	-	-	200	219	567	202	215	637
Stage 1	-	-	-	-	-	-	488	494	-	591	574	-
Stage 2	-	-	-	-	-	-	577	555	-	483	471	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1117	-	-	1025	-	-	178	202	567	178	198	637
Mov Cap-2 Maneuver	-	-	-	-	-	-	178	202	-	178	198	-
Stage 1	-	-	-	-	-	-	460	465	-	557	563	-
Stage 2	-	-	-	-	-	-	539	544	-	432	444	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.6	0.3	73.5	24.8
HCM LOS			F	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	194	1117	-	-	1025	-	-	247
HCM Lane V/C Ratio	0.81	0.04	-	-	0.015	-	-	0.266
HCM Control Delay (s)	73.5	8.4	0	-	8.6	0	-	24.8
HCM Lane LOS	F	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	5.7	0.1	-	-	0	-	-	1

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	408	26	14	423	13	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.992				0.951	
Flt Protected				0.998	0.969	
Satd. Flow (prot)	1848	0	0	1859	1717	0
Flt Permitted				0.998	0.969	
Satd. Flow (perm)	1848	0	0	1859	1717	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	107			955	362	
Travel Time (s)	2.4			21.7	8.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	443	28	15	460	14	8
Shared Lane Traffic (%)						
Lane Group Flow (vph)	471	0	0	475	22	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 43.6%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	0.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	408	26	14	423	13	7
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	443	28	15	460	14	8

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	472	0	948	458
Stage 1	-	-	-	-	458	-
Stage 2	-	-	-	-	490	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1090	-	289	603
Stage 1	-	-	-	-	637	-
Stage 2	-	-	-	-	616	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1090	-	284	603
Mov Cap-2 Maneuver	-	-	-	-	284	-
Stage 1	-	-	-	-	637	-
Stage 2	-	-	-	-	605	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.3	16
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	349	-	-	1090	-
HCM Lane V/C Ratio	0.062	-	-	0.014	-
HCM Control Delay (s)	16	-	-	8.3	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	0.2	-	-	0	-

Lanes, Volumes, Timings
6: Stow Rd./Middle Rd. & Massachusetts Ave.

12/10/2016

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	16	370	29	12	394	38	32	14	13	25	5	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.991			0.988			0.970			0.963	
Flt Protected		0.998			0.999			0.974			0.970	
Satd. Flow (prot)	0	1857	0	0	1838	0	0	1795	0	0	1674	0
Flt Permitted		0.998			0.999			0.974			0.970	
Satd. Flow (perm)	0	1857	0	0	1838	0	0	1795	0	0	1674	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		955			463			987			333	
Travel Time (s)		21.7			10.5			22.4			7.6	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.78	0.78	0.78	0.69	0.69	0.69
Heavy Vehicles (%)	0%	1%	4%	0%	2%	3%	0%	0%	0%	5%	0%	11%
Adj. Flow (vph)	18	425	33	14	453	44	41	18	17	36	7	16
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	476	0	0	511	0	0	76	0	0	59	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 39.1%	ICU Level of Service A
Analysis Period (min) 15	

Intersection	
Int Delay, s/veh	3.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	16	370	29	12	394	38	32	14	13	25	5	11
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	87	87	87	87	87	87	78	78	78	69	69	69
Heavy Vehicles, %	0	1	4	0	2	3	0	0	0	5	0	11
Mvmt Flow	18	425	33	14	453	44	41	18	17	36	7	16

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	497	0	0	459	0	0	993	1003	442	998	997	475
Stage 1	-	-	-	-	-	-	479	479	-	502	502	-
Stage 2	-	-	-	-	-	-	514	524	-	496	495	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.15	6.5	6.31
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.15	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.15	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.545	4	3.399
Pot Cap-1 Maneuver	1077	-	-	1113	-	-	226	244	620	220	246	572
Stage 1	-	-	-	-	-	-	571	558	-	546	545	-
Stage 2	-	-	-	-	-	-	547	533	-	550	549	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1077	-	-	1113	-	-	208	234	620	196	236	572
Mov Cap-2 Maneuver	-	-	-	-	-	-	208	234	-	196	236	-
Stage 1	-	-	-	-	-	-	558	545	-	533	536	-
Stage 2	-	-	-	-	-	-	516	524	-	506	536	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	0.2	25.4	24.4
HCM LOS			D	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	251	1077	-	-	1113	-	-	244
HCM Lane V/C Ratio	0.301	0.017	-	-	0.012	-	-	0.244
HCM Control Delay (s)	25.4	8.4	0	-	8.3	0	-	24.4
HCM Lane LOS	D	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	1.2	0.1	-	-	0	-	-	0.9

Lanes, Volumes, Timings
14: Stow Rd. & Sheriff's Meadow

12/10/2016

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	1	0	0	0	0	0	1	48	1	0	44	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt								0.998			0.989	
Flt Protected		0.950						0.999				
Satd. Flow (prot)	0	1805	0	0	1900	0	0	1894	0	0	1829	0
Flt Permitted		0.950						0.999				
Satd. Flow (perm)	0	1805	0	0	1900	0	0	1894	0	0	1829	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		499			490			1249			987	
Travel Time (s)		11.3			11.1			28.4			22.4	
Peak Hour Factor	0.25	0.25	0.25	0.25	0.25	0.25	0.77	0.77	0.77	0.81	0.81	0.81
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	3%	0%
Adj. Flow (vph)	4	0	0	0	0	0	1	62	1	0	54	5
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	4	0	0	0	0	0	64	0	0	59	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 13.4%	ICU Level of Service A
Analysis Period (min) 15	

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	1	0	0	0	0	0	1	48	1	0	44	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	25	25	25	25	25	25	77	77	77	81	81	81
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	3	0
Mvmt Flow	4	0	0	0	0	0	1	62	1	0	54	5

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	123	123	57	123	125	63	59	0	0	64	0	0
Stage 1	57	57	-	66	66	-	-	-	-	-	-	-
Stage 2	66	66	-	57	59	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	856	771	1015	856	769	1007	1558	-	-	1551	-	-
Stage 1	960	851	-	950	844	-	-	-	-	-	-	-
Stage 2	950	844	-	960	850	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	855	770	1015	855	768	1007	1558	-	-	1551	-	-
Mov Cap-2 Maneuver	855	770	-	855	768	-	-	-	-	-	-	-
Stage 1	959	851	-	949	843	-	-	-	-	-	-	-
Stage 2	949	843	-	960	850	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.2	0	0.1	0
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1558	-	-	855	-	1551	-	-
HCM Lane V/C Ratio	0.001	-	-	0.005	-	-	-	-
HCM Control Delay (s)	7.3	0	-	9.2	0	0	-	-
HCM Lane LOS	A	A	-	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0	-	0	-	-

Lanes, Volumes, Timings
11: Burroughs Rd. & Stow Rd.

12/10/2016

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	7	20	0	25	45	13	1	35	11	7	29	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.979			0.968			0.976	
Flt Protected		0.987			0.985			0.999			0.992	
Satd. Flow (prot)	0	1875	0	0	1832	0	0	1837	0	0	1747	0
Flt Permitted		0.987			0.985			0.999			0.992	
Satd. Flow (perm)	0	1875	0	0	1832	0	0	1837	0	0	1747	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		375			418			229			1249	
Travel Time (s)		8.5			9.5			5.2			28.4	
Peak Hour Factor	0.58	0.58	0.58	0.85	0.85	0.85	0.75	0.75	0.75	0.88	0.88	0.88
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	8%	0%
Adj. Flow (vph)	12	34	0	29	53	15	1	47	15	8	33	9
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	46	0	0	97	0	0	63	0	0	50	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 19.0%	ICU Level of Service A
Analysis Period (min) 15	

Intersection	
Int Delay, s/veh	5.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	7	20	0	25	45	13	1	35	11	7	29	8
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	58	58	58	85	85	85	75	75	75	88	88	88
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	8	0
Mvmt Flow	12	34	0	29	53	15	1	47	15	8	33	9

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	144	117	38	128	115	54	42	0	0	61	0	0
Stage 1	53	53	-	57	57	-	-	-	-	-	-	-
Stage 2	91	64	-	71	58	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	830	777	1040	850	779	1019	1580	-	-	1555	-	-
Stage 1	965	855	-	960	851	-	-	-	-	-	-	-
Stage 2	921	846	-	944	851	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	771	772	1040	817	774	1019	1580	-	-	1555	-	-
Mov Cap-2 Maneuver	771	772	-	817	774	-	-	-	-	-	-	-
Stage 1	964	851	-	959	850	-	-	-	-	-	-	-
Stage 2	850	845	-	901	847	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	10	10	0.2	1.2
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1580	-	-	772	818	1555	-	-
HCM Lane V/C Ratio	0.001	-	-	0.06	0.119	0.005	-	-
HCM Control Delay (s)	7.3	0	-	10	10	7.3	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.2	0.4	0	-	-

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	5	61	57	1	4	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.998			
Flt Protected		0.996			0.950	
Satd. Flow (prot)	0	1892	1860	0	1805	0
Flt Permitted		0.996			0.950	
Satd. Flow (perm)	0	1892	1860	0	1805	0
Link Speed (mph)		30	30		30	
Link Distance (ft)		547	616		609	
Travel Time (s)		12.4	14.0		13.8	
Peak Hour Factor	0.93	0.93	0.78	0.78	0.25	0.25
Heavy Vehicles (%)	0%	0%	2%	0%	0%	0%
Adj. Flow (vph)	5	66	73	1	16	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	71	74	0	16	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 17.3%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	5	61	57	1	4	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	93	93	78	78	25	25
Heavy Vehicles, %	0	0	2	0	0	0
Mvmt Flow	5	66	73	1	16	0

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	74	0	-	0	150	74
Stage 1	-	-	-	-	74	-
Stage 2	-	-	-	-	76	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1538	-	-	-	847	993
Stage 1	-	-	-	-	954	-
Stage 2	-	-	-	-	952	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1538	-	-	-	844	993
Mov Cap-2 Maneuver	-	-	-	-	844	-
Stage 1	-	-	-	-	954	-
Stage 2	-	-	-	-	949	-

Approach	EB	WB	SB
HCM Control Delay, s	0.6	0	9.3
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1538	-	-	-	844
HCM Lane V/C Ratio	0.003	-	-	-	0.019
HCM Control Delay (s)	7.3	0	-	-	9.3
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Sight Distance Worksheets

Sight Distance Calculations

Proposed Residential, Boxborough, MA

Inputs

Posted Speed Limit = 30 mph WB and 30 mph EB

Direction 1 =	Mass Avenue EB	85% Speed =	46	mph	Grade =	0	t=	2.5	s	a=	11.2	ft/s^2
Direction 2 =	Mass Avenue WB	85% Speed =	44	mph	Grade =	0	t=	2.5	s	a=	11.2	ft/s^2
						Left:	t_g =	7.5	s			
						Right:	t_g =	6.5	s			

SSD = Reaction Distance + Braking Distance

Reaction Distance = 1.47 x V x t

Braking Distance = $V^2/(30 \times ((a/32.2) + G))$

ISD = 1.47 x V x t_g

Where
- t = reaction time (sec)
- t_g = time gap for minor road vehicle to enter the major road
- V= travel speed (mph)
- G= roadway grade
- a= deceleration rate (ft/s^2)

Calculations

	Reaction Distance (ft)	Brake Distance (ft)	SSD (ft)
Mass Avenue EB	169.1	202.8	372
Mass Avenue WB	161.7	185.5	347

For 46 mph:

Left Turn ISD =	507	ft
Right Turn ISD =	440	ft

For 44 mph:

Left Turn ISD =	485	ft
Right Turn ISD =	420	ft

Source: AASHTO Geometric Design of Highways and Streets; FHWA; Washington, D.C.; 2011

Preliminary
Stormwater Management Narrative
Stamski And McNary, Inc.

Preliminary
Stormwater Management Narrative
December 15, 2016

The proposed project is the construction of a 100 unit elderly two-family development, a clubhouse, pool, pickleball court, bocce court, and their associated appurtenances on a 62.84 acre lot. Stormwater management practices have been designed for the proposed roadway, dwellings, and other impervious surfaces.

According to the Natural Resources Conservation Service (N.R.C.S.) soil survey indicated the presence of Swansea Muck, Freetown Muck, Ridgebury Fine Sandy Loam, Whitman Fine Sandy Loam, Charlton-Hollis-Rock outcrop, Hollis-Rock Outcrop-Charlton Complex, Paxton Fine Sandy Loam, Woodbridge Fine Sandy Loam, and Carlton Fine Sandy Loam. Carlton Fine Sandy Loam rate as Hydrologic Group A. Charlton-Hollis-Rock outcrop and Hollis-Rock Outcrop-Charlton complex rate as Hydrologic Group B. Paxton Fine Sandy Loam and Woodbridge Fine Sandy Loam rate as Hydrologic Group C. Swansea Muck, Freetown Muck, Ridgebury Fine Sandy Loam, and Whitman Fine Sandy Loam rate as Hydrologic Group D.

Pre-Development

The site currently consists of primarily woodlands with a single family dwelling located in the northern portion of the property. There is Bordering Vegetated Wetland (BVW) located in the northeast and northwest portion of the property. The development drainage was broken up into 6 subcatchments.

Runoff from subcatchment E1A remains in the site and drains to the Bordering Vegetated Wetlands and intermittent stream in the center of the property. The vegetative coverage is primarily wooded with small amounts of impervious coverage from a portion of the existing dwelling and an old driveway.

Runoff from subcatchment E1B remains in the site and drains to the Bordering Vegetated Wetlands and intermittent stream in the center of the property. The vegetative coverage is primarily wooded with the exception of an offsite portion of neighboring Sheriff's Meadow which includes three condominiums and a portion of the driveway.

Runoff from subcatchment E2 exits the site to the northwest and eventually drains to the same Bordering Vegetated Wetland system. The vegetative coverage is primarily wooded with small amounts of impervious coverage from a portion of the existing dwelling and an old driveway.

Runoff from subcatchment E3 exits the site to the southwest near Priest Lane. The vegetative coverage is primarily wooded.

Runoff from subcatchment E4 exits the site to the south closer to Burroughs Road. The vegetative coverage is primarily wooded.

Runoff from subcatchment E5 exits the site to the southeast to a lot on Burroughs Road. The vegetative site coverage is primarily wooded.

Post-Development

The project proposes a series of private roads to serve 50 two-family dwellings reserved for the elderly. A clubhouse, pool, pickleball court, bocce court, and extra parking are also proposed. The total length of road is approximately 4,958 feet long. The roadway will make use of deep sump hooded catch basins and a combination of infiltration basins and underground chambers. Most of the dwellings are connected to roof drywells, while others utilize infiltration basins.

Subcatchment P1A remains undeveloped with the exception of some grading for the road and infiltration basins, and remains similar to subcatchment E1A but a smaller area. It will continue to drain to the Bordering Vegetated Wetlands and intermittent stream in the center of the site.

Subcatchment P1B remains undeveloped with the exception of some grading for the infiltration basins, soil absorption system, and a portion of the existing Sheriff's Meadow dwellings on the neighboring lot. It will remain similar to subcatchment E1B but a smaller area. It will continue to drain to the Bordering Vegetated Wetlands and intermittent stream in the center of the site.

Subcatchment P1C contains a portion of Private Drive A, associated sidewalk, a portion of the parking associated with the clubhouse, and the model unit (Unit 1). It also contains open space around the proposed clubhouse. Runoff from the road flows to two catch basins at the low point in the road, directing runoff to a drainage manhole, sediment forebay, and infiltration basin. The runoff is treated before being infiltrated in the basin.

Subcatchment P1D contains a portion of Private Drive A, the associated sidewalks, and the private drives to several of the two-family dwellings. It also contains open space around the proposed dwellings. Runoff from the road flows to catch basins, directing runoff to drainage manholes, a sediment forebay, and infiltration basin. The runoff is treated before being infiltrated in the basin.

Subcatchment P1E contains a portion of Private Drive A, all of Private Drive C, open space around the proposed dwellings, and a portion of off-site land. It also contains units 18 and 19. Runoff from the road flows to catch basins, directing runoff to drainage manholes, a sediment forebay, and infiltration basin. The roof runoff from the units will be piped directly into the infiltration basin. The road runoff is treated before being infiltrated in the basin.

Subcatchment P1F contains units 38-41 and some open space around the infiltration basin. Roof runoff will be piped directly into the basin.

Subcatchment P1G contains units 20-22, 32-37, 49-50 open space around these units, and some off-site land. Roof runoff will be piped directly into the basin. Open space runoff flows overland and eventually drains to a series of infiltration areas connected via pipes underneath Private Drive A and Private Drive C.

Subcatchment P1H contains all of Private Drive B, units 26-28, and open space around these units. Roof runoff will be piped directly into the subsurface chambers. Runoff from the road flows to catch basins, directing runoff to drainage manholes, a sediment forebay, and subsurface infiltration chambers. The road runoff is treated before being infiltrated in the basin.

Subcatchment P1I contains units 28-31 and 23-25, and the open space in the center of Private Drive B. Roof runoff will be piped directing into the basin. Open space runoff flows overland and eventually drains to a series of infiltration areas connected via pipes underneath Private Drive B.

Subcatchment P2A contains the portion of Private Drive A that connects to Massachusetts Avenue, the bocce and pickleball courts, the pool and surrounding patio, the clubhouse, and a portion of the associated parking. Runoff from the road and parking area flows to catch basins, directing runoff to drainage manholes, a sediment forebay, and infiltration basin.

Subcatchment P2B contains undeveloped open space behind the proposed clubhouse and amenities. Runoff will drain offsite to the northwest and eventually drains into the same Bordering Vegetated Wetland system.

Subcatchment P3 contains open space around the end of Private Drive C, and the emergency connection to Priest Lane. Runoff from this subcatchment flows overland towards the southwest near Priest Lane.

Subcatchment P4 contains a small amount of open space around the southern portion of Private Drive B. Runoff flows offsite to the south.

Subcatchment P5 contains a small amount of open space behind units off Private Drive B at the southeastern portion of the site. Runoff flows offsite to the southeast.

There will be no increase in runoff leaving the site for the 2 year, 10 year, 25 year, and 100 year storm event comparing pre-development to post-development.

Compliance with the Stormwater Management Standards is as follows:

Standard 1: No Untreated Discharges
No untreated discharges to the wetlands are proposed. Infiltration basins with grassed channels and deep sump hooded catch basins as pretreatment will treat impervious runoff prior to runoff reaching the BVW.

Standard 2: Peak Rate Attenuation

The Post-Development peak discharge rates must not be increased from pre-development rates for the 2-year, 10-year, 25-year, and 100-year storm events. Also, offsite flood impact from the 100-year storm must not be increased. With a combination of infiltration and detention, the peak runoff rate and volume have been decreased. The peak runoff rates have been summarized in the following tables.

Discharge Summary Tables

Total Runoff – On-Site Bordering Vegetated Wetlands (1)

2-year Storm		10-year Storm		25-year Storm		100-year Storm	
Pre (cfs)	Post (cfs)	Pre (cfs)	Post (cfs)	Pre (cfs)	Post (cfs)	Pre (cfs)	Post (cfs)
3.523	3.210	20.61	15.61	35.27	26.47	58.93	49.72

Total Runoff – Northwestern Off-Site (2)

2-year Storm		10-year Storm		25-year Storm		100-year Storm	
Pre (cfs)	Post (cfs)	Pre (cfs)	Post (cfs)	Pre (cfs)	Post (cfs)	Pre (cfs)	Post (cfs)
0.338	0.287	1.790	1.429	2.977	2.381	4.885	4.021

Total Runoff – Southwestern Off-Site (3)

2-year Storm		10-year Storm		25-year Storm		100-year Storm	
Pre (cfs)	Post (cfs)	Pre (cfs)	Post (cfs)	Pre (cfs)	Post (cfs)	Pre (cfs)	Post (cfs)
0.216	0.127	1.284	0.768	2.195	1.324	3.681	2.223

Total Runoff – Southern Off-Site (4)

2-year Storm		10-year Storm		25-year Storm		100-year Storm	
Pre (cfs)	Post (cfs)	Pre (cfs)	Post (cfs)	Pre (cfs)	Post (cfs)	Pre (cfs)	Post (cfs)
0.133	0.127	0.795	0.489	1.359	0.757	2.279	1.175

Total Runoff – Southeastern Off-Site (5)

2-year Storm		10-year Storm		25-year Storm		100-year Storm	
Pre (cfs)	Post (cfs)	Pre (cfs)	Post (cfs)	Pre (cfs)	Post (cfs)	Pre (cfs)	Post (cfs)
0.035	0.012	0.234	0.079	0.412	0.133	0.691	0.219

Standard 3: Stormwater Recharge

The infiltration basins have been sized to infiltrate the required recharge volume as specified in the Massachusetts Stormwater Handbook. The "Simple Dynamic" method was used with the Rawls Rate in sizing the required storage volume to infiltrate the recharging runoff. Calculations were performed to insure drawdown within 72 hours to provide storage for the next storm event. Detailed calculations showing compliance with Standard 3 have been attached to this report.

Standard 4: Water Quality

The required water quality volume for this project is 0.5" of runoff over the impervious area in the areas where the soils are not classified as rapid infiltration. In the IWPA

regions and in the areas of soil classified as rapid infiltration, the required water quality volume is 1" of runoff over the imperious area. This volume will be treated to meet the 80% TSS removal requirement of Standard 4. The infiltration basins will treat much greater than the required water quality volume. Calculations showing treatment levels are attached.

Standard 5: Land Uses with Higher Potential Pollutant Loads
The site is will not contain "land uses with higher potential pollutant loads."

Standard 6: Critical Areas
The site does not discharge runoff to critical areas.

Standard 7: Redevelopment
The proposed project is new development.

Standard 8: Construction Period Controls
The erosion and sedimentation control measures will be followed in accordance with the Erosion and Sedimentation Control Plan and will be consistent with the requirements of the NPDES Construction General Permit. The project will require coverage under the NPDES Construction General Permit.

Standard 9: Operation and Maintenance Plan
An Operation and Maintenance Plan will be provided.

Standard 10: Illicit Discharges to Drainage System
An Illicit Discharge Compliance will be provided prior to the discharge of stormwater runoff to the post-construction stormwater BMP's.

Design Basis

1. The United States Department of Agriculture Natural Resource Conservation Service (N.R.C.S.) TR55 methodology was used to determine offsite rates of runoff.
2. The twenty-four hour rainfall, taken from N.R.C.S. publications, is 6.4 inches for the 100-year storm, 5.3 inches for the 25-year storm, 4.5 inches for the 10-year storm, and 3.1 inches for the 2-year storm event.
3. The hydrologic calculations were performed using the computer program: "Hydraflow Hydrographs 2007" by Intelisolve.
4. The soil types of the site were taken from the N.R.C.S. Soil Survey Map for Middlesex County.
5. Soil conditions and estimated seasonal high groundwater table were based on on-site soil evaluations.
6. The Natural Resources Conservation Service (N.R.C.S.) soil survey indicated the presence of Swansea Muck, Freetown Muck, Ridgebury Fine Sandy Loam, Whitman Fine Sandy Loam, Charlton-Hollis-Rock outcrop, Hollis-Rock Outcrop-Charlton Complex, Paxton Fine Sandy Loam, Woodbridge Fine Sandy Loam, and Carlton Fine Sandy Loam. Carlton Fine Sandy Loam rate as Hydrologic Group A. Charlton-Hollis-Rock outcrop and Hollis-Rock Outcrop-Charlton complex rate as Hydrologic Group B. Paxton Fine Sandy Loam and Woodbridge Fine Sandy Loam rate as Hydrologic Group C. Swansea Muck, Freetown Muck, Ridgebury Fine Sandy Loam, and Whitman Fine Sandy Loam rate as Hydrologic Group D.

SOIL TYPES:

51A	SWANSEA MUCK, HYDROLOGIC SOIL GROUP: B/D
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73B	WHITMAN FINE SANDY LOAM, HYDROLOGIC SOIL GROUP: D
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310B	WOODBRIDGE FINE SANDY LOAM, HYDROLOGIC SOIL GROUP: C/D
422C	CARLTON FINE SANDY LOAM, HYDROLOGIC SOIL GROUP: A

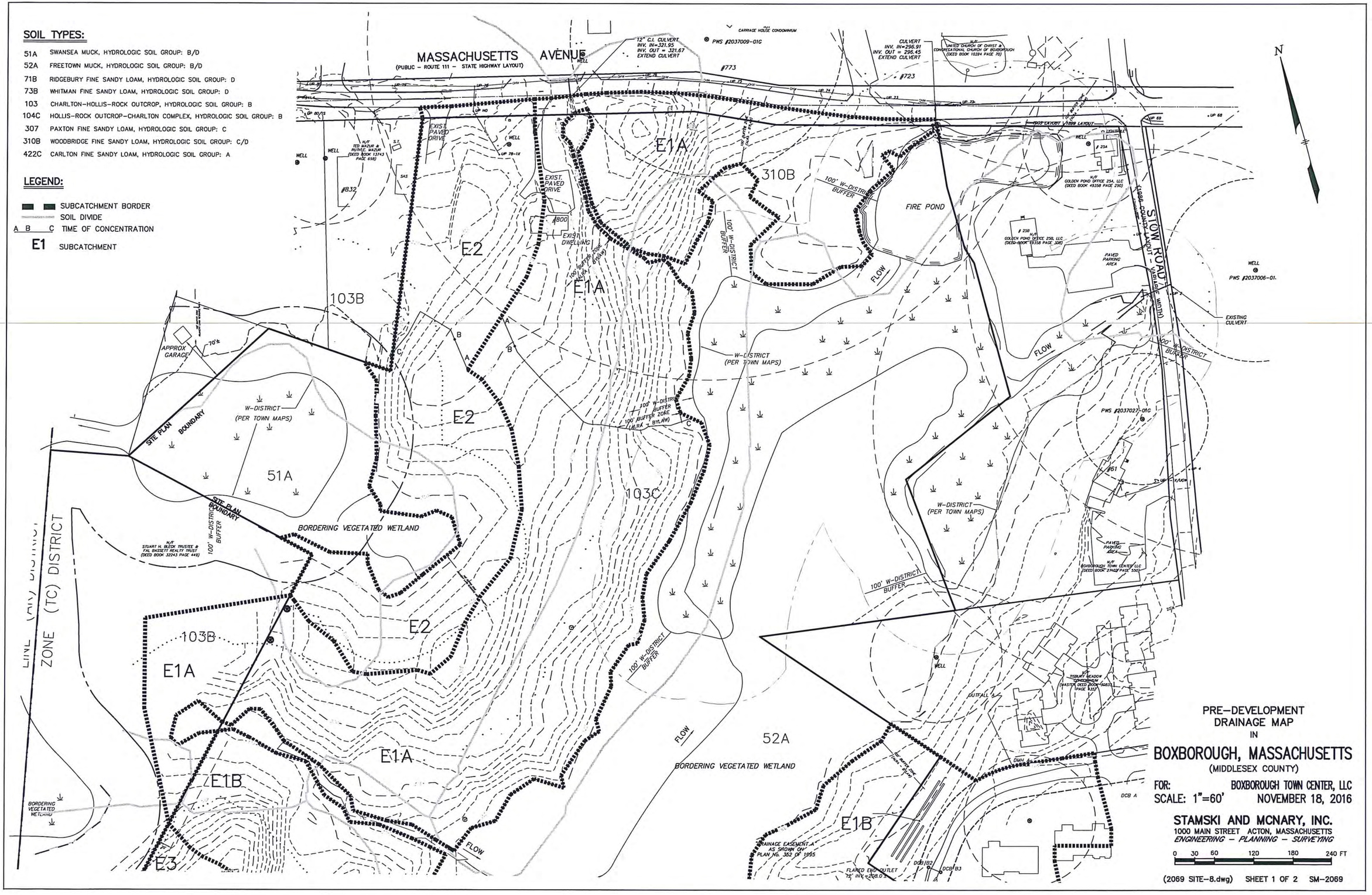
LEGEND:

SUBCATCHMENT BORDER

SOIL DIVIDE

A B C TIME OF CONCENTRATION

E1 SUBCATCHMENT



PRE–DEVELOPMENT
DRAINAGE MAP
IN

BOXBOROUGH, MASSACHUSETTS

(MIDDLESEX COUNTY)

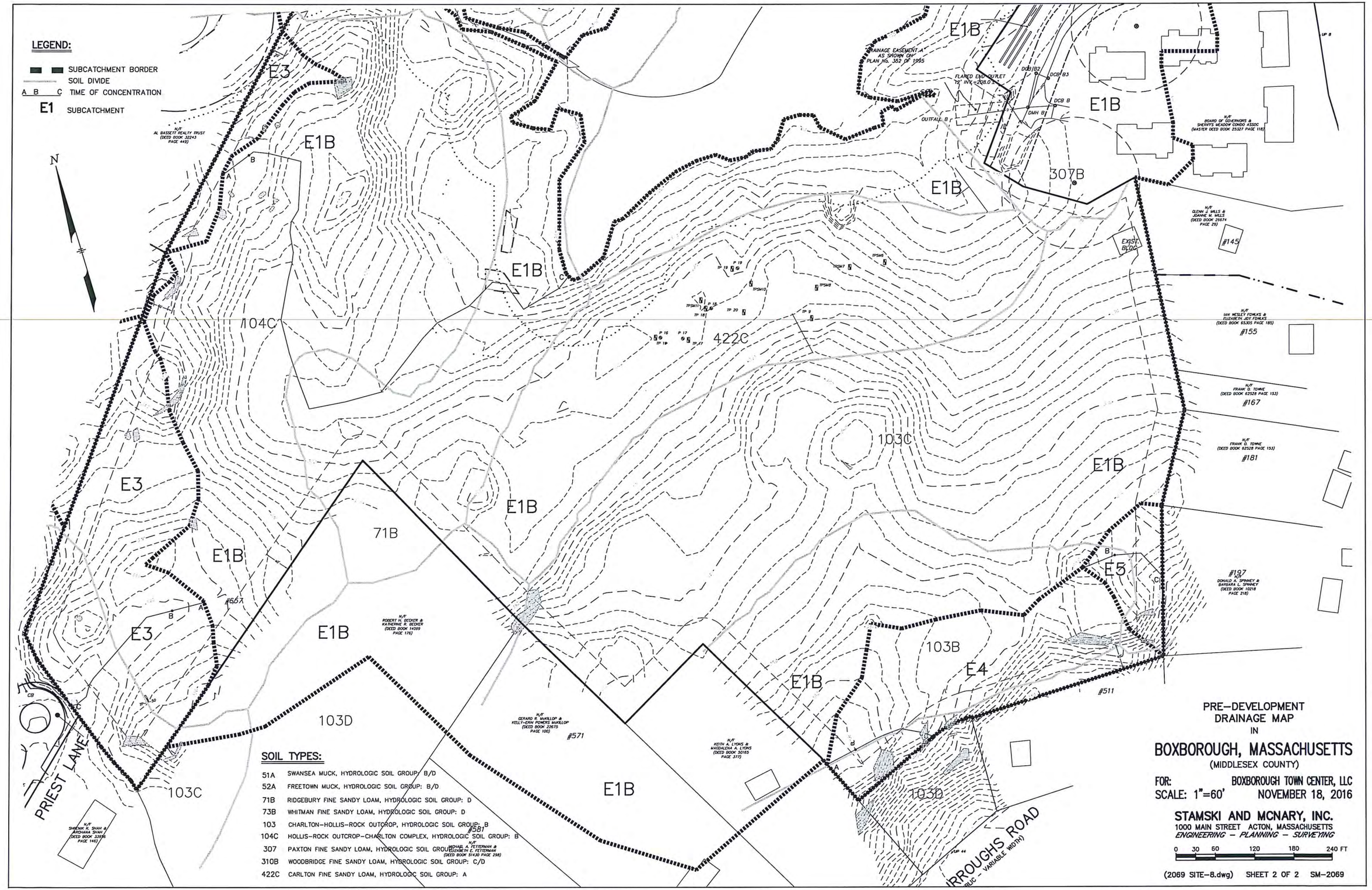
FOR: BOXBOROUGH TOWN CENTER, LLC

SCALE: 1"=60' NOVEMBER 18, 2016

STAMSKI AND MCNARY, INC.
1000 MAIN STREET ACTON, MASSACHUSETTS
ENGINEERING – PLANNING – SURVEYING

0 30 60 120 180 240 FT

(2069 SITE–8.dwg) SHEET 1 OF 2 SM–2069


LEGEND:
SUBCATCHMENT BORDER
SOIL DIVIDE
A B C TIME OF CONCENTRATION
E1 SUBCATCHMENT
N
E1B
E3
E4
E5
104C
422C
103C
103B
103D
307B
71B
DRAINAGE EASEMENT A AS SHOWN ON PLAN No. 352 OF 1995
FLARED END OUTLET 12" INV.=208.0
OUTFALL B
DCB B
DMH B1
EXIST. BLDG
#145
#155
#167
#181
#197
#511
#571
#581
#667
PRIEST LANE
BURROUGHS ROAD
(PUBLIC - VARIABLE WIDTH)
SOIL TYPES:
51A SWANSEA MUCK, HYDROLOGIC SOIL GROUP: B/D
52A FREETOWN MUCK, HYDROLOGIC SOIL GROUP: B/D
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PRE-DEVELOPMENT
DRAINAGE MAP
IN
BOXBOROUGH, MASSACHUSETTS
(MIDDLESEX COUNTY)
FOR: BOXBOROUGH TOWN CENTER, LLC
SCALE: 1"=60' NOVEMBER 18, 2016
STAMSKI AND MCNARY, INC.
1000 MAIN STREET ACTON, MASSACHUSETTS
ENGINEERING - PLANNING - SURVEYING
0 30 60 120 180 240 FT
(2069 SITE-8.dwg) SHEET 2 OF 2 SM-2069

SOIL TYPES:

51A	SWANSEA MUCK, HYDROLOGIC SOIL GROUP: B/D
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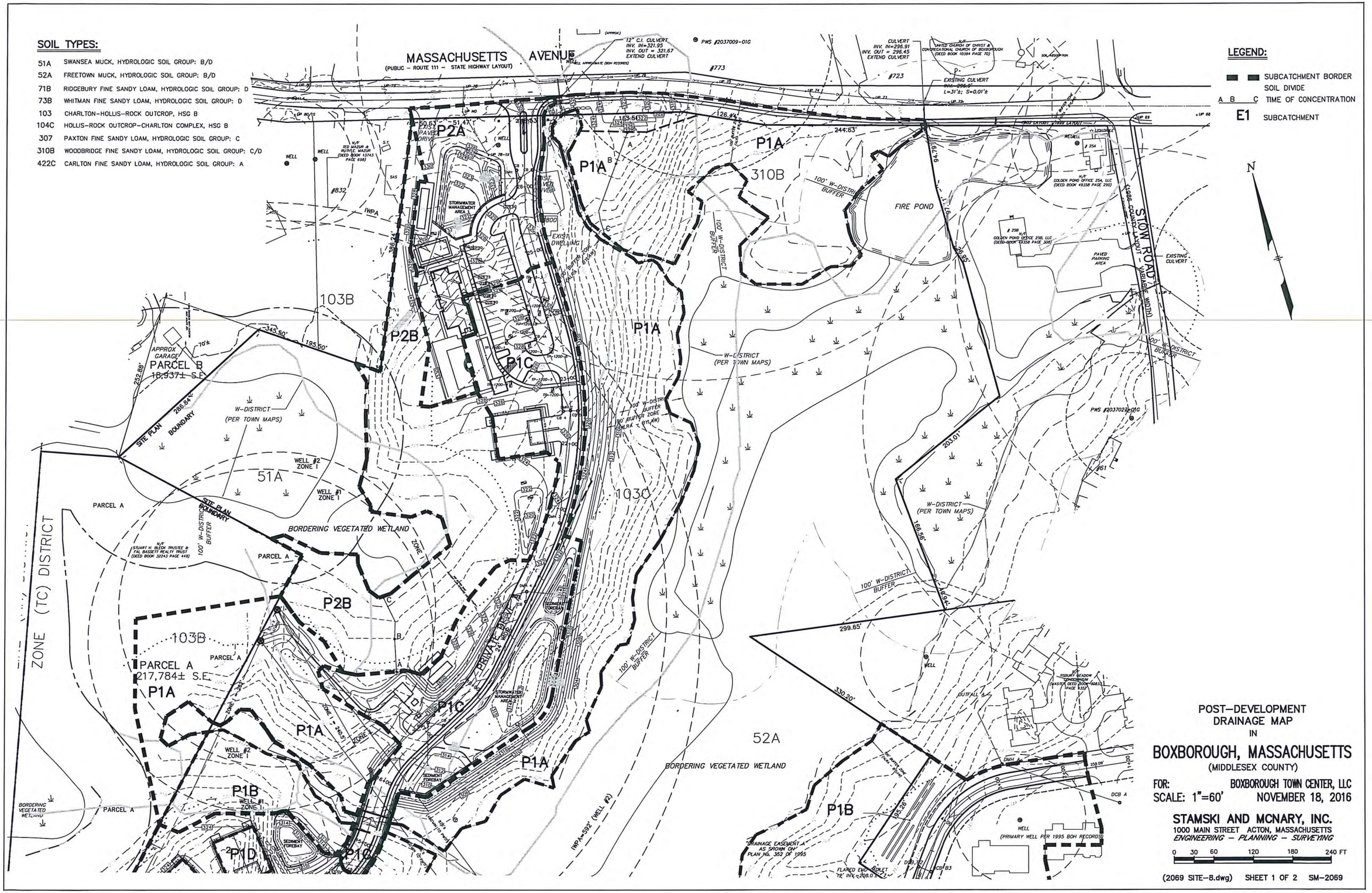


LEGEND:

- SUBCATCHMENT BORDER
- SOIL DIVIDE
- A B C TIME OF CONCENTRATION
- E1 SUBCATCHMENT

N

POST–DEVELOPMENT
DRAINAGE MAP
IN

BOXBOROUGH, MASSACHUSETTS

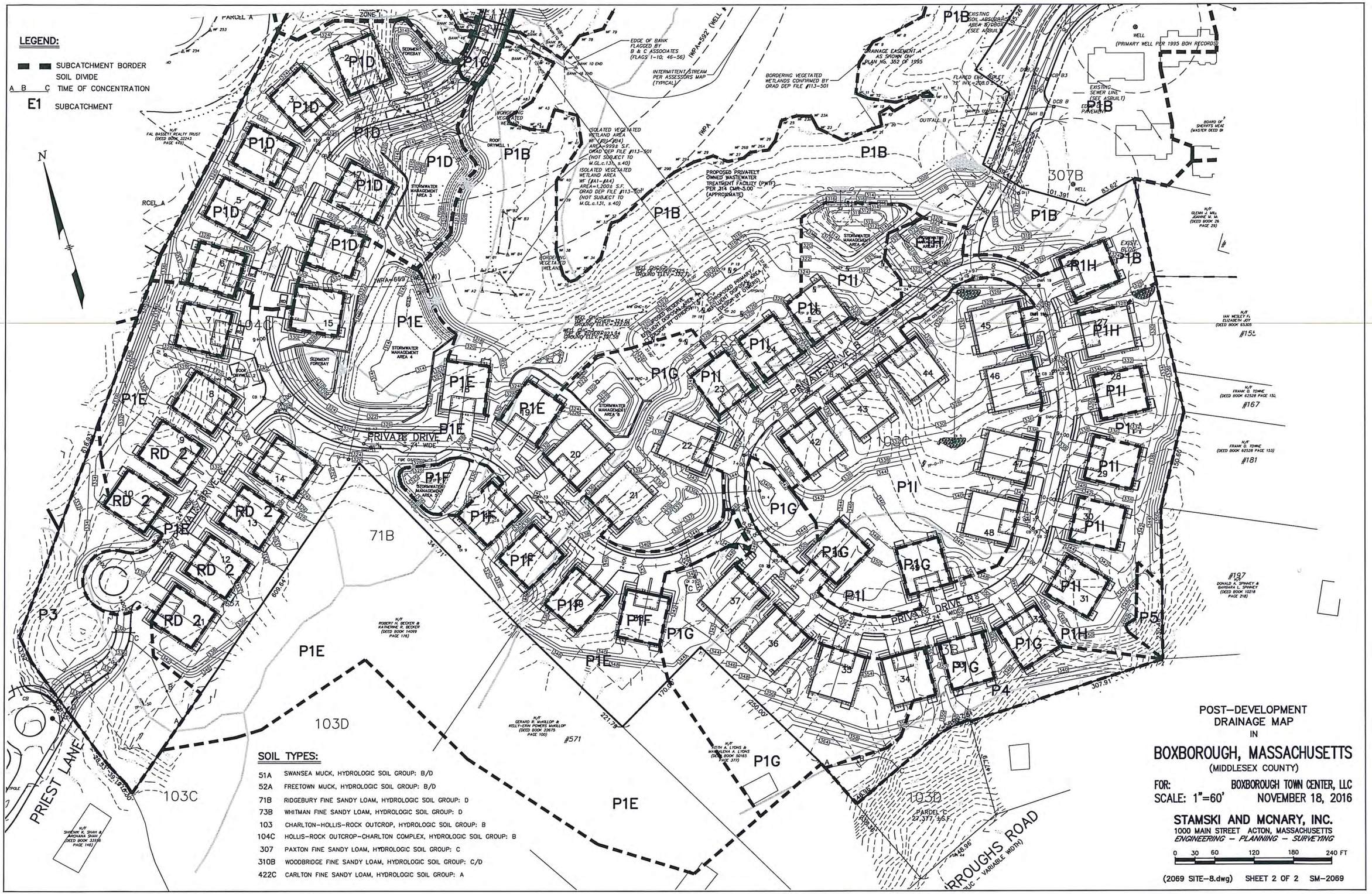
(MIDDLESEX COUNTY)

FOR: BOXBOROUGH TOWN CENTER, LLC
SCALE: 1"=60' NOVEMBER 18, 2016

STAMSKI AND MCNARY, INC.
1000 MAIN STREET ACTON, MASSACHUSETTS
ENGINEERING – PLANNING – SURVEYING

0 30 60 120 180 240 FT

(2069 SITE–8.dwg) SHEET 1 OF 2 SM–2069



POST-DEVELOPMENT
DRAINAGE MAP
IN

BOXBOROUGH, MASSACHUSETTS

(MIDDLESEX COUNTY)

FOR: BOXBOROUGH TOWN CENTER, LLC
SCALE: 1"=60' NOVEMBER 18, 2016

STAMSKI AND MCNARY, INC.
1000 MAIN STREET ACTON, MASSACHUSETTS
ENGINEERING – PLANNING – SURVEYING

(2069 SITE-8.dwg) SHEET 2 OF 2 SM-2069

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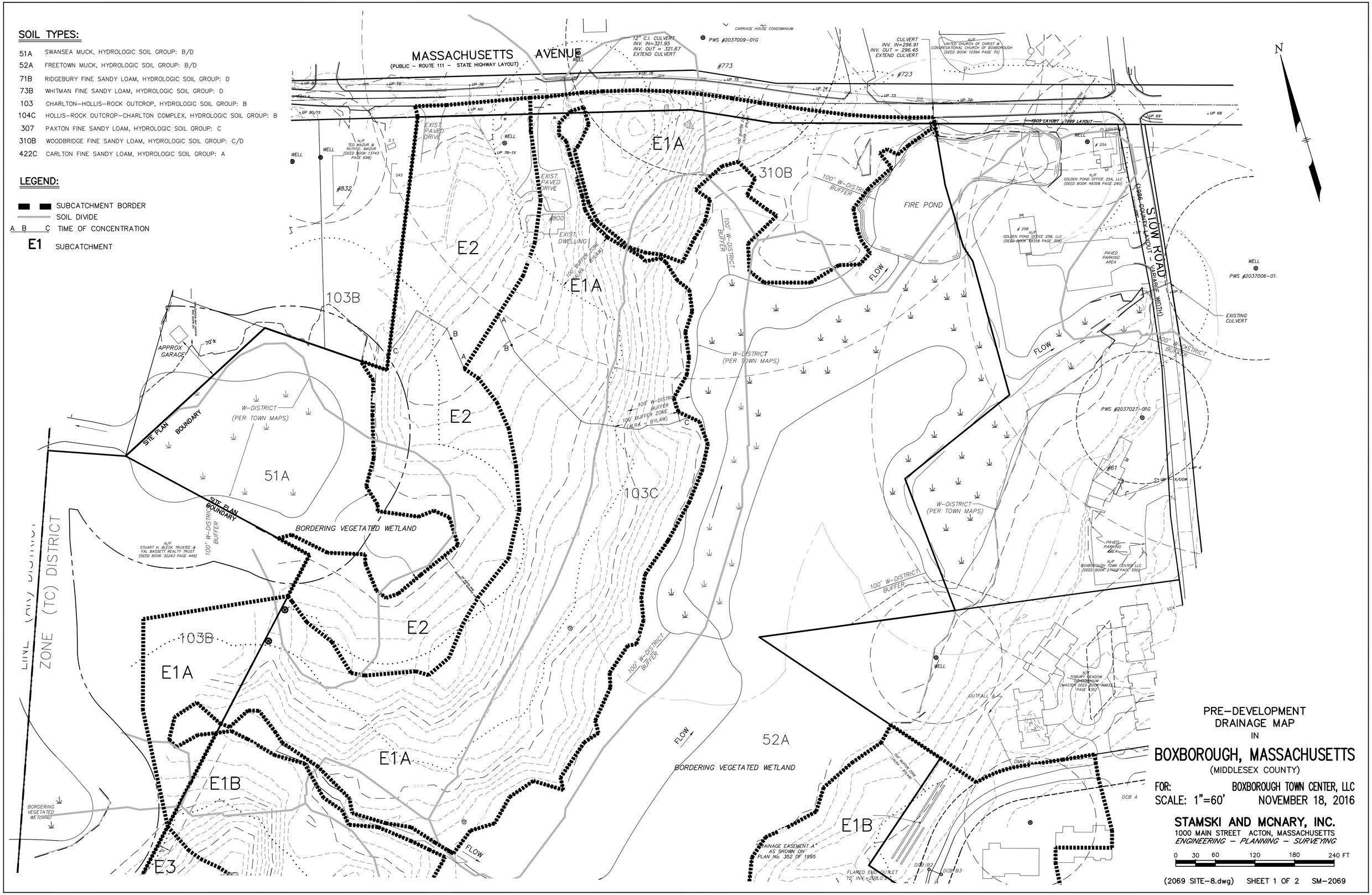
LEGEND:

SUBCATCHMENT BORDER

SOIL DIVIDE

A B C TIME OF CONCENTRATION

E1 SUBCATCHMENT



PRE–DEVELOPMENT
DRAINAGE MAP
IN

BOXBOROUGH, MASSACHUSETTS

(MIDDLESEX COUNTY)

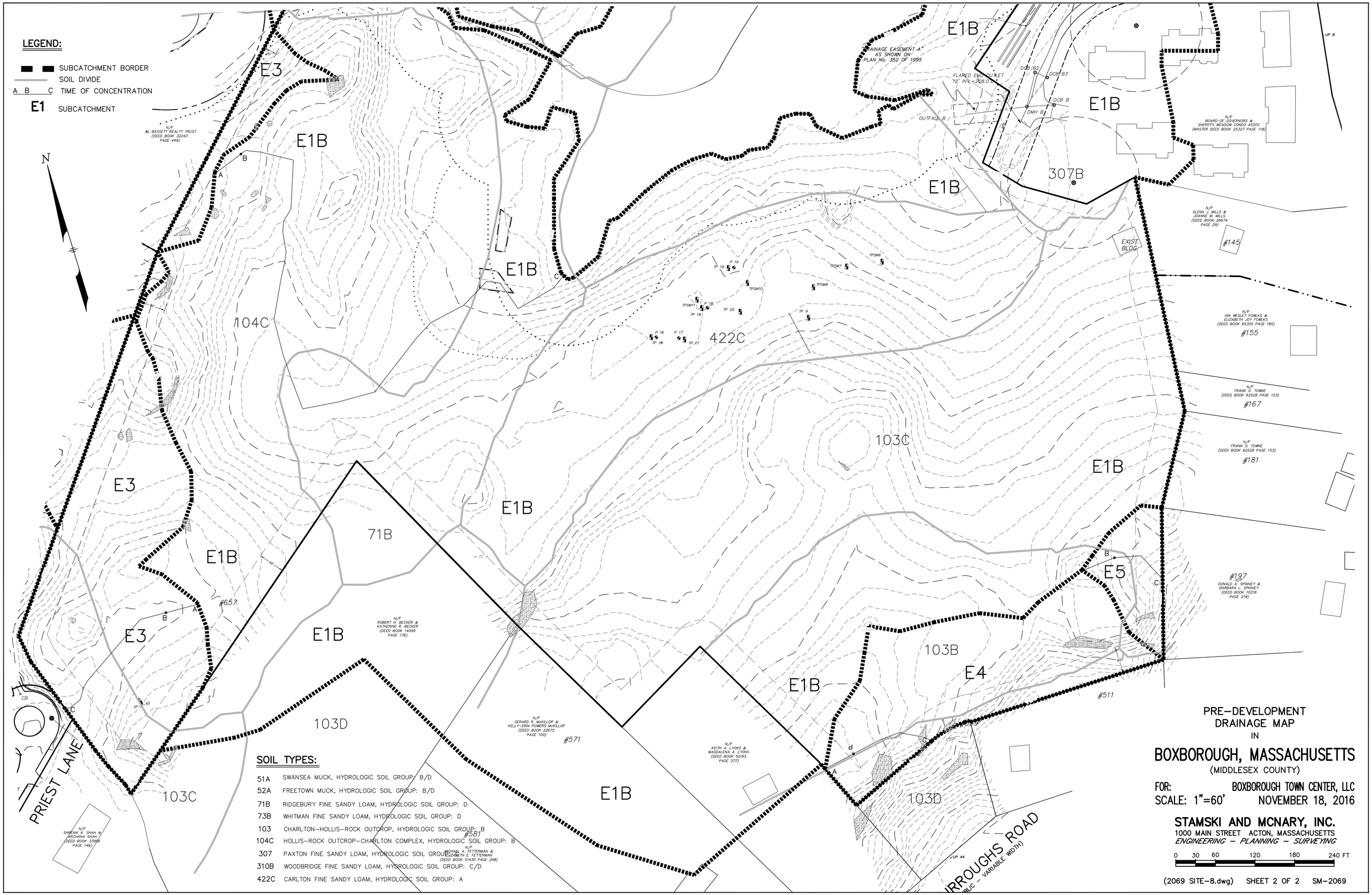
FOR: BOXBOROUGH TOWN CENTER, LLC

SCALE: 1"=60' NOVEMBER 18, 2016

STAMSKI AND MCNARY, INC.
1000 MAIN STREET ACTON, MASSACHUSETTS
ENGINEERING – PLANNING – SURVEYING

0 30 60 120 180 240 FT

(2069 SITE–8.dwg) SHEET 1 OF 2 SM–2069



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422C	CARLTON FINE SANDY LOAM, HYDROLOGIC SOIL GROUP: A

PRE-DEVELOPMENT DRAINAGE MAP IN BOXBOROUGH, MASSACHUSETTS

(MIDDLESEX COUNTY)

FOR: BOXBOROUGH TOWN CENTER, LLC

SCALE: 1"=60' NOVEMBER 18, 2016

STAMSKI AND MCNARY, INC.

1000 MAIN STREET ACTON, MASSACHUSETTS

ENGINEERING - PLANNING - SURVEYING

0 30 60 120 180 240 FT

(2069 SITE-8.dwg) SHEET 2 OF 2 SM-2069

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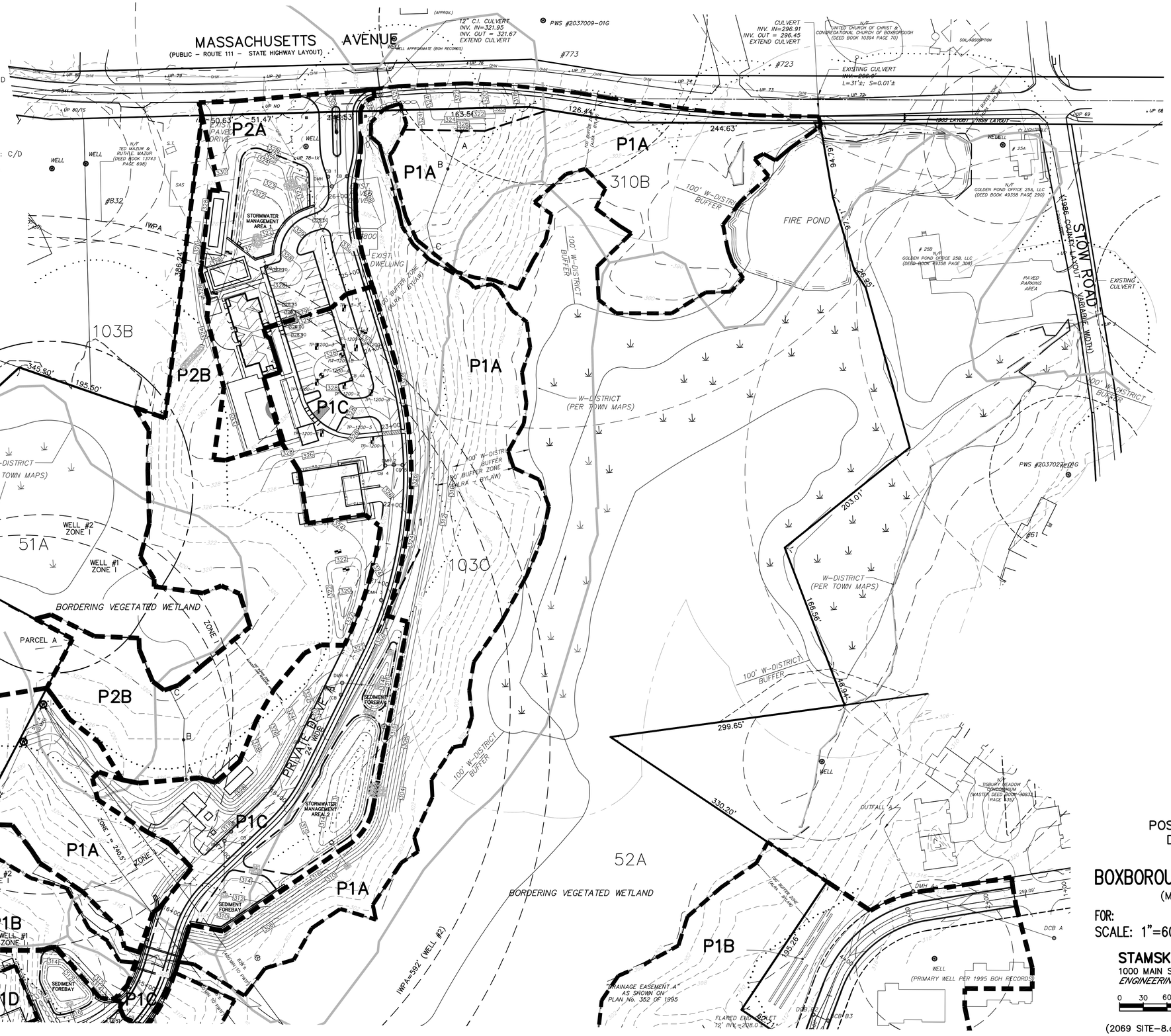


LEGEND:

- SUBCATCHMENT BORDER
- SOIL DIVIDE
- A B C TIME OF CONCENTRATION
- E1 SUBCATCHMENT

POST–DEVELOPMENT
DRAINAGE MAP
IN

BOXBOROUGH, MASSACHUSETTS

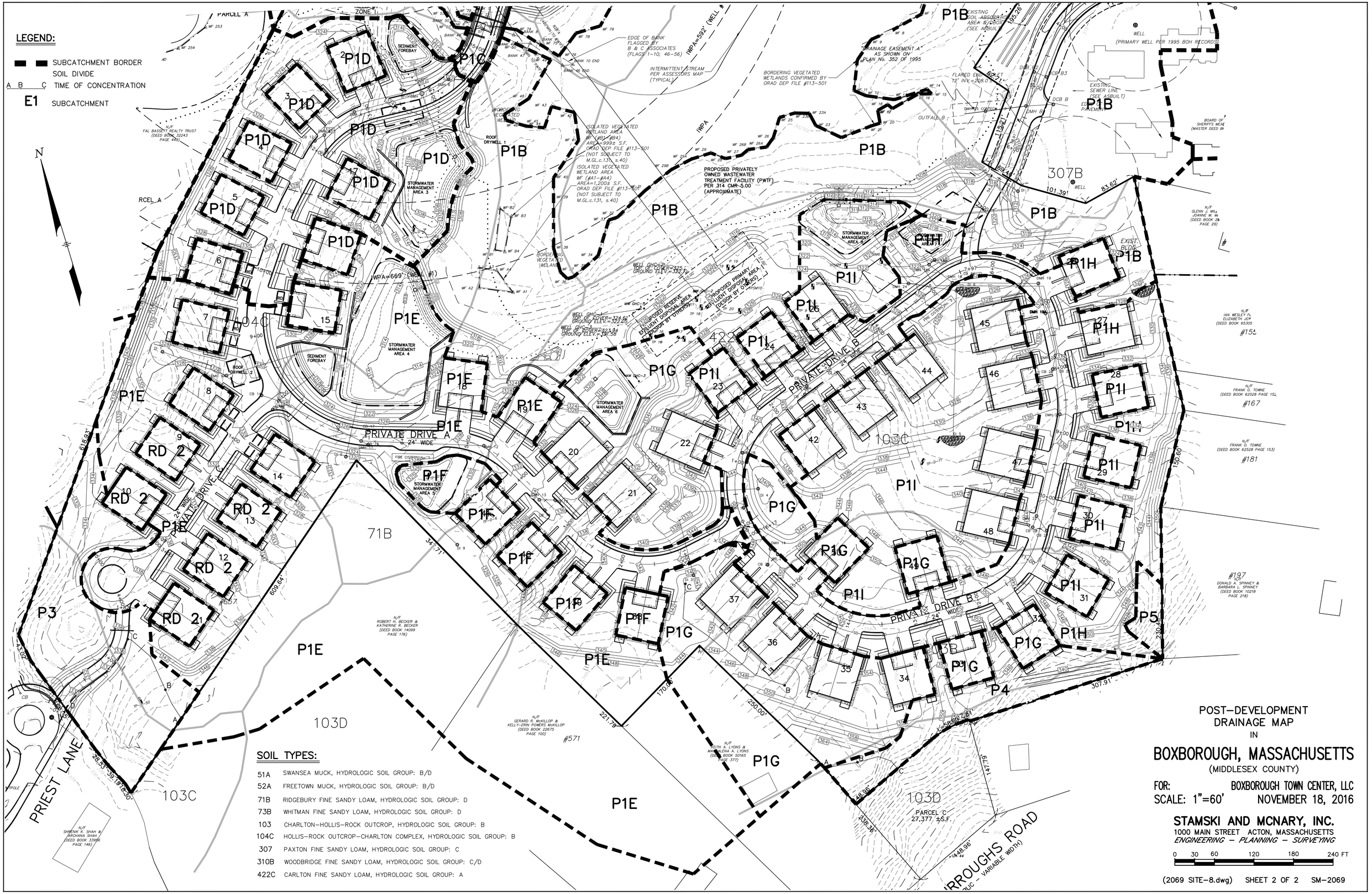
(MIDDLESEX COUNTY)

FOR: BOXBOROUGH TOWN CENTER, LLC
SCALE: 1"=60' NOVEMBER 18, 2016

STAMSKI AND MCNARY, INC.
1000 MAIN STREET ACTON, MASSACHUSETTS
ENGINEERING – PLANNING – SURVEYING

0 30 60 120 180 240 FT

(2069 SITE–8.dwg) SHEET 1 OF 2 SM–2069


LEGEND:
SUBCATCHMENT BORDER
SOIL DIVIDE
A B C TIME OF CONCENTRATION
E1 SUBCATCHMENT
N
PRIVATE DRIVE A 24' WIDE
PRIVATE DRIVE B 24' WIDE
PRIVATE DRIVE C 24' WIDE
PRIEST LANE
BURROUGHS ROAD
PROPOSED PRIVATELY OWNED WASTEWATER TREATMENT FACILITY (PWTF) PER 314 CMR-5.00 (APPROXIMATE)
STORMWATER MANAGEMENT AREA 1
STORMWATER MANAGEMENT AREA 2
STORMWATER MANAGEMENT AREA 3
STORMWATER MANAGEMENT AREA 4
STORMWATER MANAGEMENT AREA 5
STORMWATER MANAGEMENT AREA 6
STORMWATER MANAGEMENT AREA 7
STORMWATER MANAGEMENT AREA 8
SEDIMENT FOREBAY
ROOF DRYWELL 1
ROOF DRYWELL 2
EDGE OF BANK FLAGGED BY B & C ASSOCIATES (FLAGS 1-10; 46-56)
INTERMITTENT STREAM PER ASSESSORS MAP (TYPICAL)
BORDERING VEGETATED WETLANDS CONFIRMED BY ORAD DEP FILE #113-501
ISOLATED VEGETATED WETLAND AREA
ISOLATED VEGETATED WETLAND AREA
PROPOSED RESERVE EFFLUENT DISPOSAL AREA (DESIGN BY OTHERS)
PROPOSED PRIMARY EFFLUENT DISPOSAL AREA (DESIGN BY OTHERS)
DRAINAGE EASEMENT "A" AS SHOWN ON PLAN No. 352 OF 1995
EXISTING SOIL ABSORPTION AREA & DBOX (SEE ASBUILT)
WELL (PRIMARY WELL PER 1995 BOH RECORDS)
EXISTING SEWER LINE (SEE ASBUILT)
EXIST. BLDG.
BOARD OF SHERIFFS MEAD (MASTER DEED BK
N/F GLENN J. MILA JOANNE M. MA (DEED BOOK 26 PAGE 29)
N/F IAN WESLEY & ELIZABETH JOY (DEED BOOK 65305
N/F FRANK D. TOWNE (DEED BOOK 62528 PAGE 153)
N/F FRANK D. TOWNE (DEED BOOK 62528 PAGE 153)
N/F DONALD A. SPINNEY & BARBARA L. SPINNEY (DEED BOOK 10218 PAGE 218)
N/F ROBERT H. BECKER & KATHERINE R. BECKER (DEED BOOK 14099 PAGE 176)
N/F GERARD R. McKILLOP & KELLY-ERIN POWERS McKILLOP (DEED BOOK 22675 PAGE 100)
N/F SHRENIK K. SHAH & ARCHANA SHAH (DEED BOOK 33996 PAGE 146)
PARCEL C 27,377 ±S.F.
#167
#181
#197
#571
#657
#157
#15
SOIL TYPES:
51A SWANSEA MUCK, HYDROLOGIC SOIL GROUP: B/D
52A FREETOWN MUCK, HYDROLOGIC SOIL GROUP: B/D
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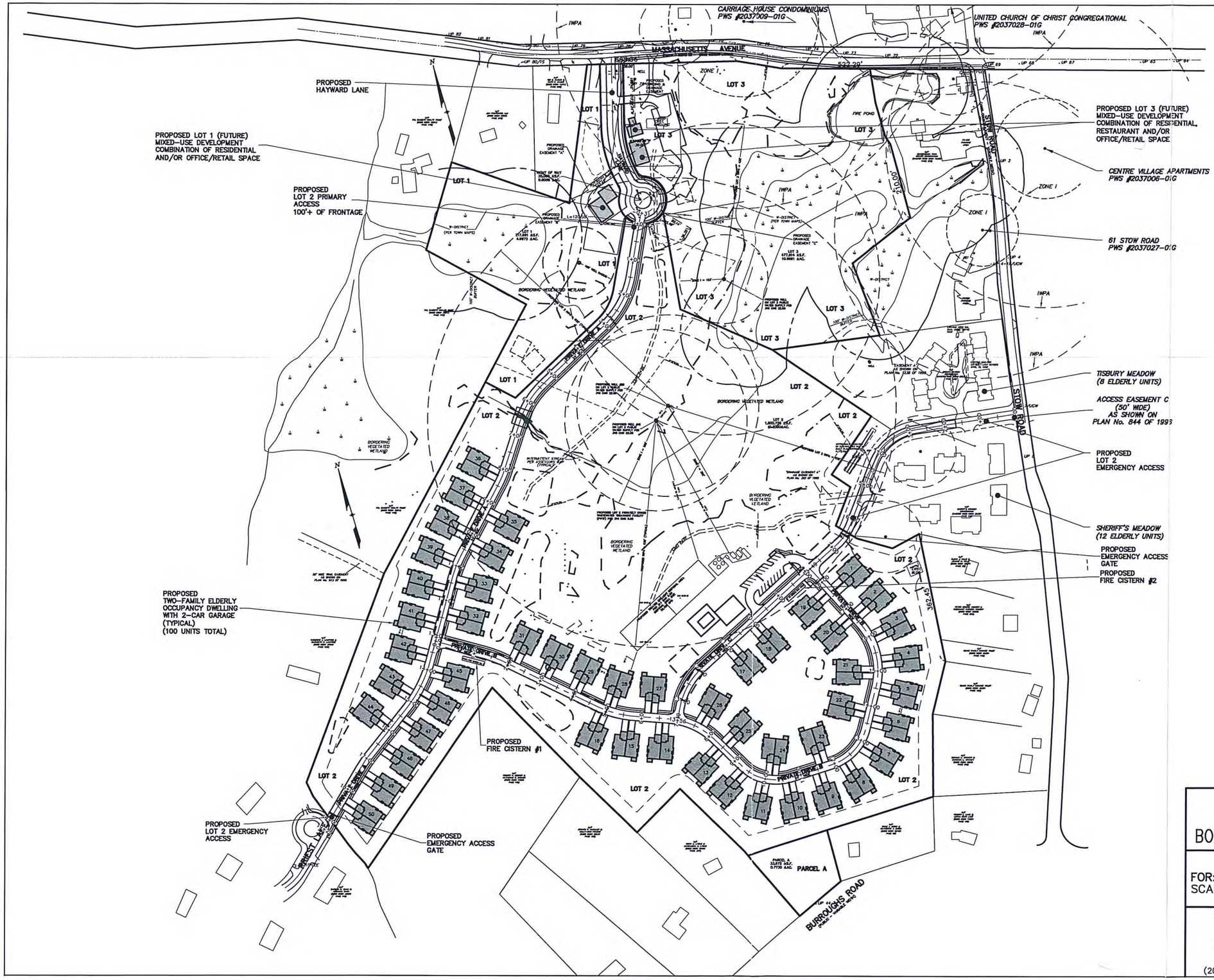
422C CARLTON FINE SANDY LOAM, HYDROLOGIC SOIL GROUP: A
POST-DEVELOPMENT DRAINAGE MAP IN
BOXBOROUGH, MASSACHUSETTS
(MIDDLESEX COUNTY)
FOR: BOXBOROUGH TOWN CENTER, LLC
SCALE: 1"=60' NOVEMBER 18, 2016
STAMSKI AND MCNARY, INC.
1000 MAIN STREET ACTON, MASSACHUSETTS
ENGINEERING - PLANNING - SURVEYING
0 30 60 120 180 240 FT
(2069 SITE-8.dwg) SHEET 2 OF 2 SM-2069

Alternative #1

Preliminary Site Plan- March 14, 2016
Concept Plan A1- Revised September 30, 2015
Definitive Subdivision- December 4, 2013
Last Revised January 12, 2015
Definitive Plan Decision dated April 28, 2014



GENERAL NOTES

1. PROPOSED BUILDINGS, DRIVES, AND STORMWATER MANAGEMENT AREAS ARE APPROXIMATE AND SHOWN FOR ILLUSTRATIVE PURPOSES ONLY.

ZONING DISTRICT:

TOWN CENTER
WETLAND & WATERSHED OVERLAY DISTRICT

REFERENCE:

MIDDLESEX REGISTRY OF DEEDS
SOUTH DISTRICT
DEED BOOK 27102 PAGE 550
DEED BOOK 19267 PAGE 606

TOWN OF BOXBOROUGH
PROPERTY MAP
ASSESSORS MAP 14, LOTS 46 AND 50
PARCELS 14-046-000 AND 14-050-000

RECORD OWNERS:

BOXBOROUGH TOWN CENTER, LLC
PO BOX 985
WEST ACTON, MA 01720

MANE REALTY TRUST
TRUSTEE: JOHN J. LYONS
571 BURROUGHS ROAD
BOXBOROUGH, MA 01719

APPLICANT:

BOXBOROUGH TOWN CENTER, LLC
PO BOX 985
WEST ACTON, MA 01720

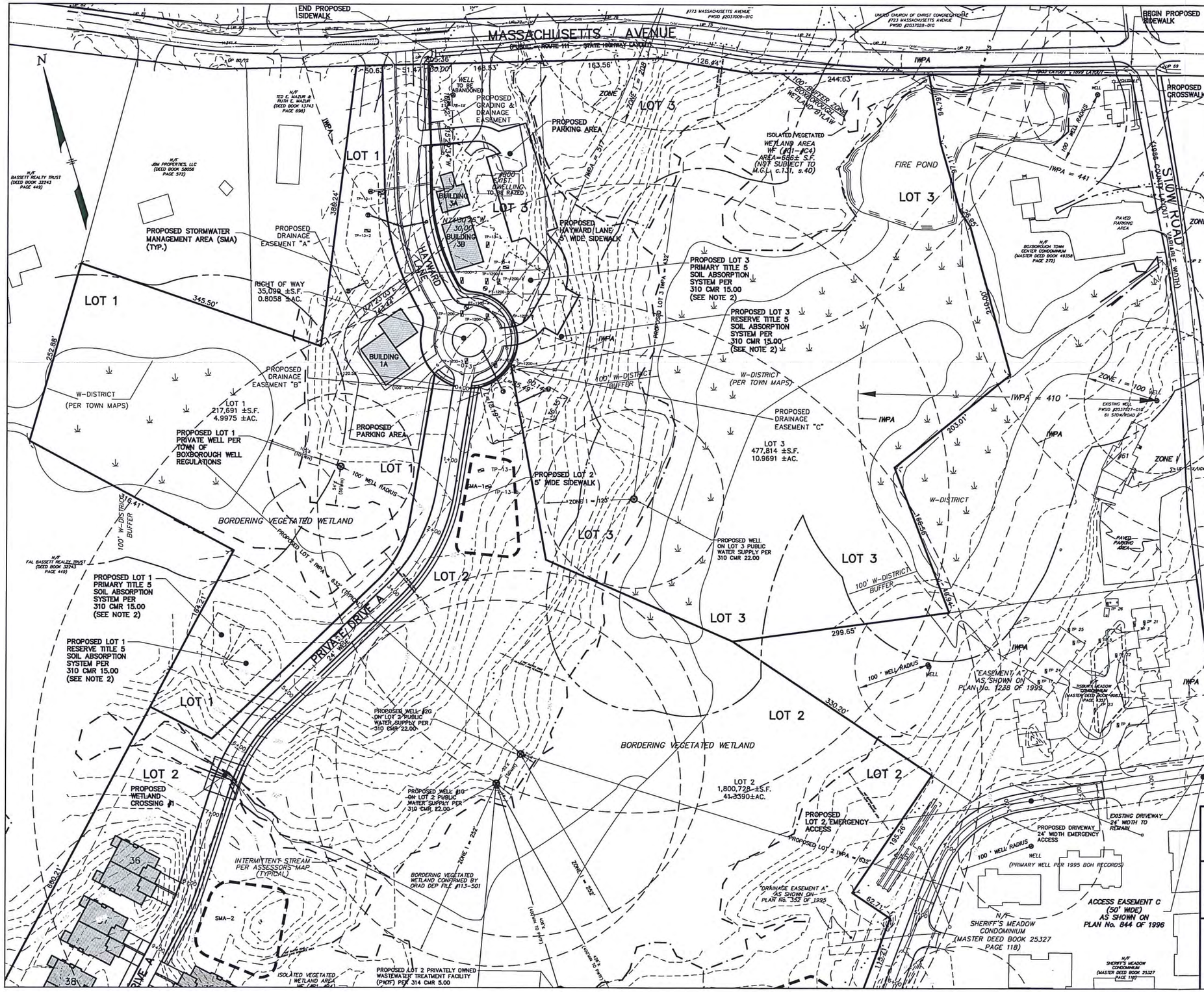
PRELIMINARY SITE PLAN
IN
BOXBOROUGH, MASSACHUSETTS

LOT 2 – LAYOUT PLAN
FOR: BOXBOROUGH TOWN CENTER, LLC
SCALE: 1"=120' MARCH 14, 2016

STAMSKI AND MCNARY, INC.
1000 MAIN STREET ACTON, MASSACHUSETTS
ENGINEERING – PLANNING – SURVEYING

0 60 120 240 360 480 FT

(2069 PRE 2016.dwg) Sheet 1 of 3 SM-2069



LOT 2 – LAND USE DATA, BOXBOROUGH ZONING BYLAW AMENDED THROUGH TOWN MEETING MAY 2012

ZONING DISTRICT: TOWN CENTER DISTRICT & W-DISTRICT

ARTICLE IV. USE REGULATIONS	ALLOWED:
TWO-FAMILY DWELLING, RESERVED EXCLUSIVELY FOR ELDERLY OCCUPANCY	YES*

*REFER TO SECTION 5004: FOR MULTI-FAMILY DWELLING IN TC DISTRICT RESERVED EXCLUSIVELY FOR ELDERLY OCCUPANCY, DENSITY NOT TO EXCEED 10 UNITS/80,000 SF LAND AREA

MAX DENSITY: 1,800,728/80,000= 22.5 x 10 UNITS= 224 UNITS
PROPOSED DENSITY: 50 DUPLEXES= 100 UNITS

ARTICLE V. DIMENSIONAL REQUIREMENTS

	REQUIRED:	PROVIDED:
MIN LOT AREA:	40,000 SF	1,800,728 SF**
MIN UPLAND LOT AREA:	20,000 SF	1,184,316 SF**
MIN LOT FRONTAGE:	100 FT	120± FT (HAYWARD LANE)
MIN LOT WIDTH:	100 FT	100FT
MIN FRONT SETBACK	25 FT	>25 FT
MIN FRONT SETBACK (STOW AND BURROUGHS ROAD)	50 FT	>50 FT
MIN FRONT SETBACK (MASS. AVE)	75 FT	>75 FT
MIN SIDE & REAR YARD:	20 FT	>20 FT
MIN SIDE & REAR YARD: (STOW AND BURROUGHS ROAD)	30 FT	>30 FT
MIN SIDE & REAR YARD: (MASS. AVE)	75 FT	>75 FT
MAX STORIES	3	3
MAX BUILDING HEIGHT	45 FT	<45 FT
MAX LOT COVERAGE (EXCL. SIDEWALKS)	35%	24.5%
FLOOR AREA RATIO	NA	NA
MAX BUILDING SIZE (GROSS FLOOR AREA)	8,000 SF	3,200± SF
MIN OPEN SPACE (INCL SIDEWALKS):	65%	75.5%

**–NOT INCLUDING SECTION OF LAND IN AR DISTRICT ALONG BURROUGHS RD.

LOT 1 DESIGN CALCULATIONS

3,900S.F. OFFICE/RETAIL AT 75 GPD/1000S.F. = 293
TWO BEDROOM DWELLING 110 GPD X 2 BDRM = 220 GPD
TOTAL SEWAGE FLOW = 513 GPD
PERCOLATION RATE:
TESTING: TO BE CONFIRMED; DESIGN: ASSUME 10 MPI
SOIL ABSORPTION SYSTEM
TRENCHES: 8 TRENCHES 2'W X 2'D X 41'L = 1,968 S.F.

LOT 1 PARKING CALCULATIONS

3,900S.F. OFFICE/RETAIL AT 1 SPACE/150S.F. = 26
TWO BEDROOM DWELLING AT 2 SPACES/ DWELLING = 2
TOTAL SPACES = 28

LOT 2 DESIGN CALCULATIONS

100 DWELLING UNITS HOUSING FOR THE ELDERLY
70 (2 BDRM) UNITS AT 150 GPD/UNIT = 10,500 GPD
30 (3 BDRM) UNITS AT 330GPD/UNIT = 9,900 GPD
TOTAL SEWAGE FLOW = 20,400 GPD (20,400 GPD PROVIDED)
PROPOSED LOT 2 WELLS
FLOW RATE = 20,400 GPD
FLOWRATE PER WELL
20,400 GPD ÷ 2= 10,200 GPD PER WELL = 8 GPM
ZONE 1 RADIUS: [150 X LOG(10,200) GPD – 350]=252 FT
IWPA = [(32 X 8 GPM) + 400] = 632 FT

LOT 2 TRAFFIC GENERATION (ITE LAND USE CODE 230)

ESTIMATED TRAFFIC GENERATION	(TRIPS)
DAILY TRIPS	644 (6.44/UNIT)*
WEEKDAY PEAK HOUR MORNING	52 (0.52/UNIT)*
WEEKDAY PEAK HOUR EVENING	60 (0.60/UNIT)*

*PER BAYSIDE ENGINEERING CALCULATIONS

LOT 3 DESIGN CALCULATIONS

31 SEAT RESTAURANT AT 35 GPD/SEAT = 1,085
1,500S.F. OFFICE/RETAIL AT 75 GPD/1000S.F. = 113
TWO BEDROOM DWELLING 110 GPD X 2 BDRM = 220 GPD
TOTAL SEWAGE FLOW = 1,418 GPD
PERCOLATION RATE:
TESTED: TO BE CONFIRMED
DESIGN: 10 MPI
SOIL ABSORPTION SYSTEM
TRENCHES: 8 TRENCHES 2'W X 2'D X 57'L
2,376 S.F.
PROPOSED LOT 3 WELL
FLOW RATE = 1,418 GPD = < 1 GPM
ZONE 1 RADIUS
150 X LOG(1,418) GPD – 350=123 FT
IWPA = [(32 X 1 GPM) + 400] = 432 FT

LOT 3 PARKING CALCULATIONS

31 SEAT RESTAURANT AT 1 SPACE/2 SEATS = 16
1,500S.F. OFFICE/RETAIL AT 1 SPACE/150S.F. = 10
TWO BEDROOM DWELLING AT 2 SPACES/ DWELLING = 2
TOTAL SPACES = 28

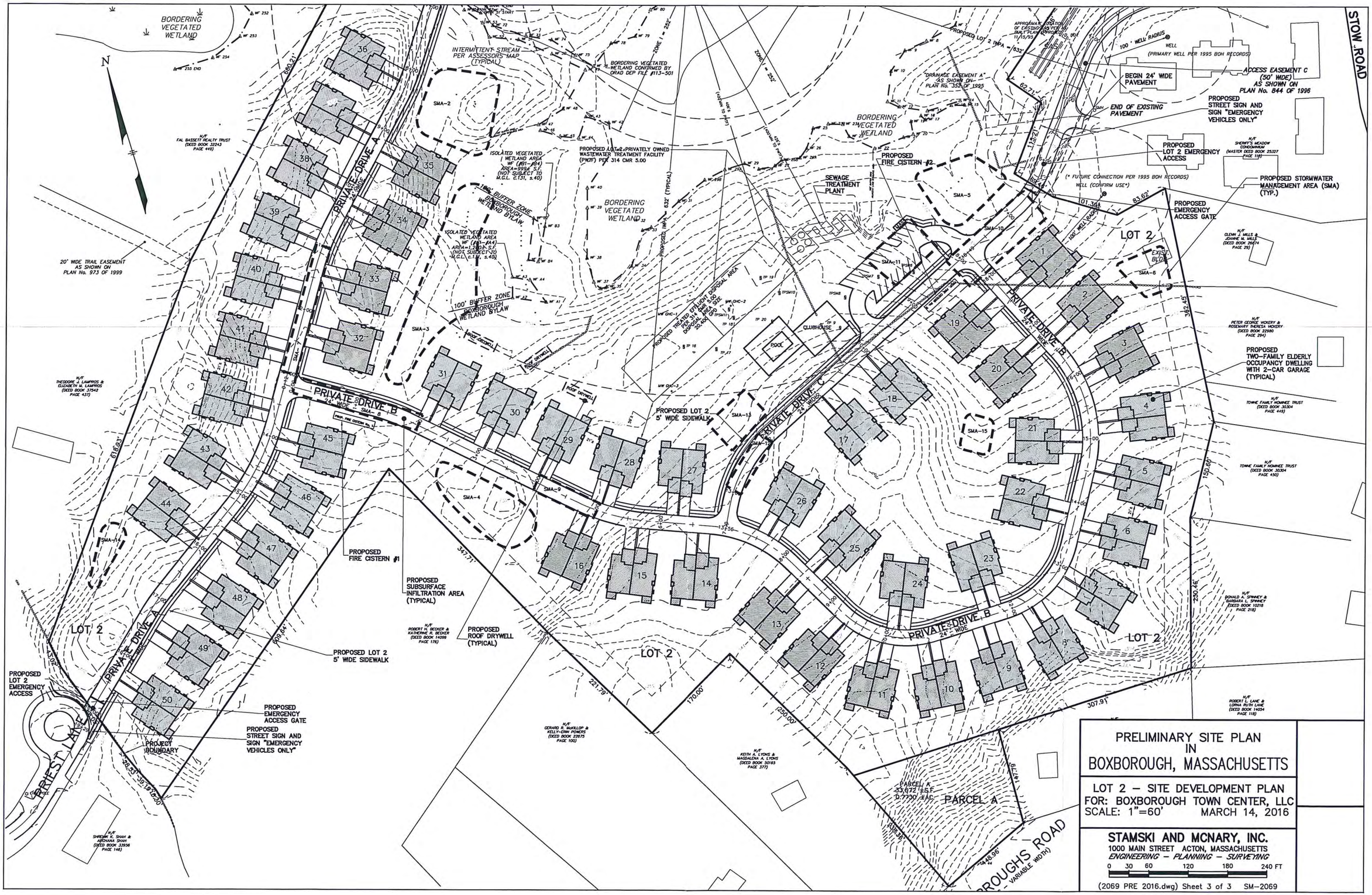
PRELIMINARY SITE PLAN IN BOXBOROUGH, MASSACHUSETTS

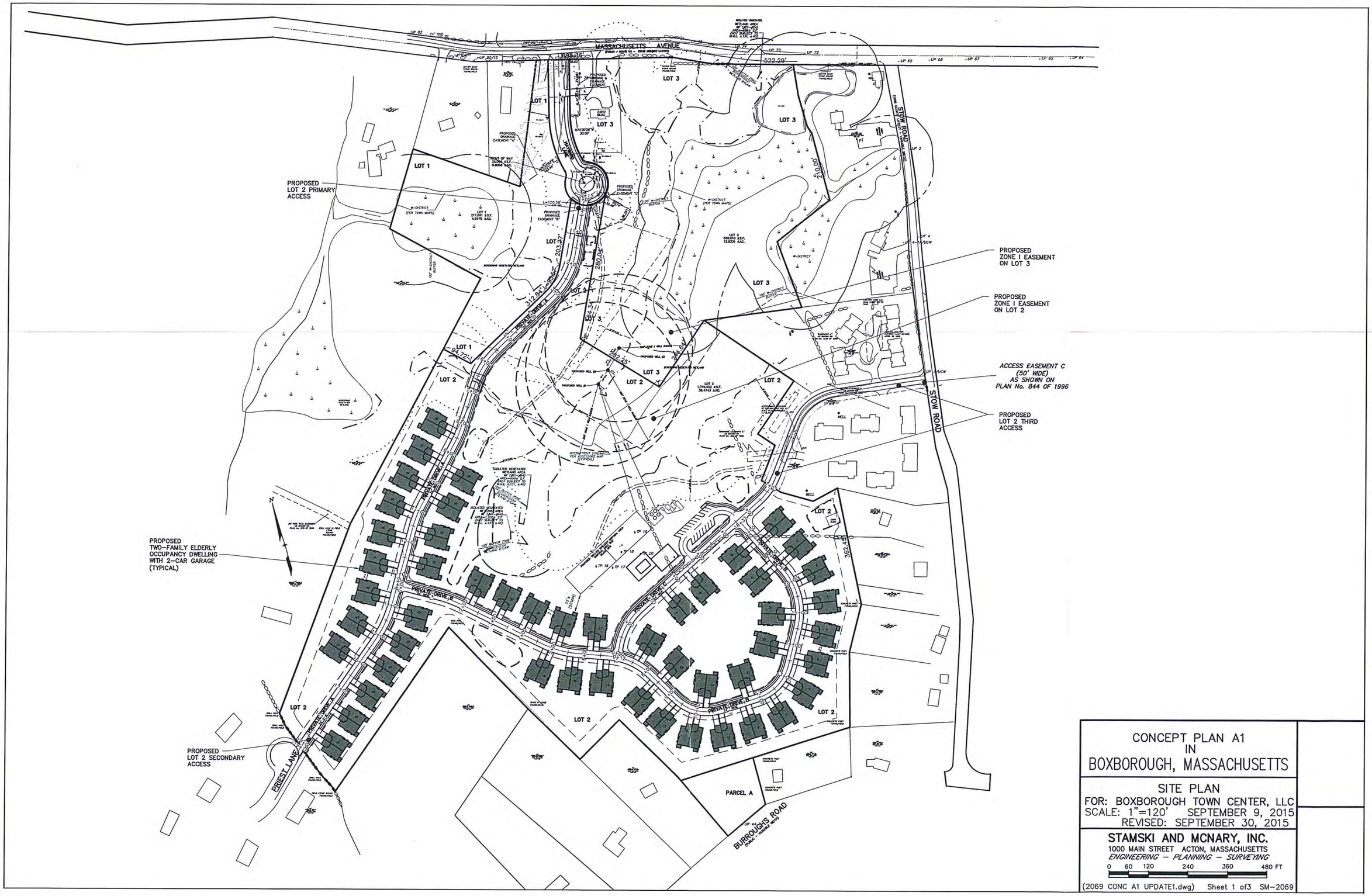
LOT 2 – SITE DEVELOPMENT PLAN
FOR: BOXBOROUGH TOWN CENTER, LLC
SCALE: 1"=60' MARCH 14, 2016

STAMSKI AND MCNARY, INC.
1000 MAIN STREET ACTON, MASSACHUSETTS
ENGINEERING – PLANNING – SURVEYING

0 30 60 120 180 240 FT

(2069 PRE 2016.dwg) Sheet 2 of 3 SM–2069


STOW ROAD
BORDERING VEGETATED WETLAND
N
INTERMITTENT STREAM PER ASSESSORS MAP (TYPICAL)
BORDERING VEGETATED WETLAND CONFIRMED BY ORAD DEP FILE #113-501
PROPOSED AOTW2 PRIVATELY OWNED WASTEWATER TREATMENT FACILITY (PWTF) PER 314 CMR 5.00
ISOLATED VEGETATED WETLAND AREA
100' BUFFER ZONE BOXBOROUGH WETLAND BYLAW
BORDERING VEGETATED WETLAND
SEWAGE TREATMENT PLANT
PROPOSED FIRE CISTERN #2
"DRAINAGE EASEMENT A" AS SHOWN ON PLAN NO. 353 OF 1995
100' WELL RADIUS
WELL (PRIMARY WELL PER 1995 BOH RECORDS)
ACCESS EASEMENT C (50' WIDE) AS SHOWN ON PLAN No. 844 OF 1996
BEGIN 24' WIDE PAVEMENT
END OF EXISTING PAVEMENT
PROPOSED STREET SIGN AND SIGN "EMERGENCY VEHICLES ONLY"
PROPOSED LOT 2 EMERGENCY ACCESS
PROPOSED STORMWATER MANAGEMENT AREA (SMA) (TYP.)
PROPOSED EMERGENCY ACCESS GATE
LOT 2
PRIVATE DRIVE A
PRIVATE DRIVE B
PRIVATE DRIVE C
PRIVATE DRIVE D
24' WIDE
CLUBHOUSE
POOL
PROPOSED LOT 2 5' WIDE SIDEWALK
PROPOSED TWO-FAMILY ELDERLY OCCUPANCY DWELLING WITH 2-CAR GARAGE (TYPICAL)
PROPOSED FIRE CISTERN #1
PROPOSED SUBSURFACE INFILTRATION AREA (TYPICAL)
PROPOSED ROOF DRYWELL (TYPICAL)
PROPOSED LOT 2 EMERGENCY ACCESS
PROPOSED EMERGENCY ACCESS GATE
PROPOSED STREET SIGN AND SIGN "EMERGENCY VEHICLES ONLY"
PROJECT BOUNDARY
PRIEST LANE
20' WIDE TRAIL EASEMENT AS SHOWN ON PLAN No. 973 OF 1999
PARCEL A
PARCEL A 33,672 ±S.F. 0.7730 ±AC.
BOROUGHS ROAD (VARIABLE WIDTH)
PRELIMINARY SITE PLAN IN BOXBOROUGH, MASSACHUSETTS
LOT 2 – SITE DEVELOPMENT PLAN
FOR: BOXBOROUGH TOWN CENTER, LLC
SCALE: 1"=60' MARCH 14, 2016
STAMSKI AND MCNARY, INC.
1000 MAIN STREET ACTON, MASSACHUSETTS
ENGINEERING – PLANNING – SURVEYING
0 30 60 120 180 240 FT
(2069 PRE 2016.dwg) Sheet 3 of 3 SM-2069

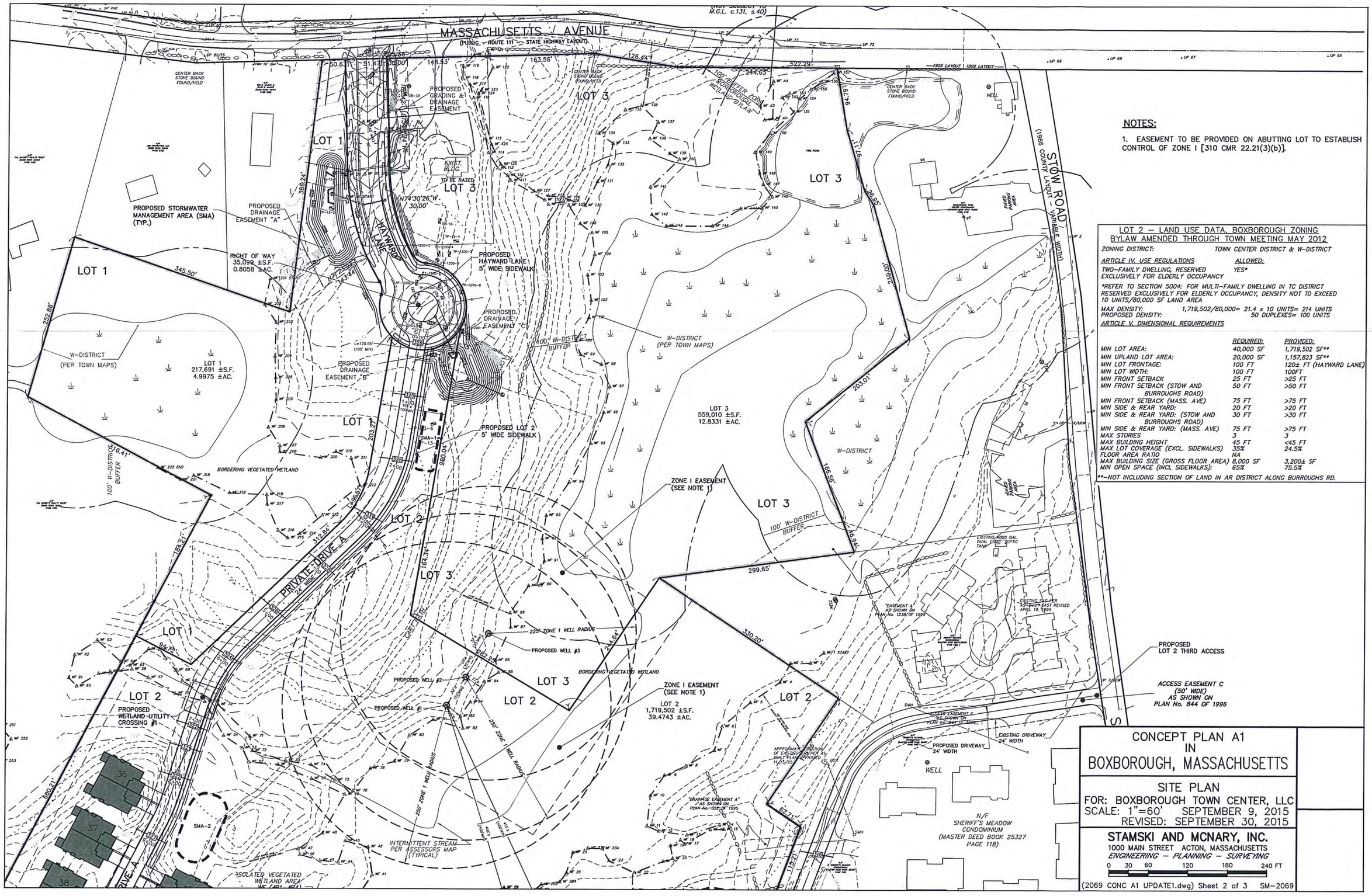


CONCEPT PLAN A1
IN
BOXBOROUGH, MASSACHUSETTS

SITE PLAN
FOR: BOXBOROUGH TOWN CENTER, LLC
SCALE: 1"=120' SEPTEMBER 9, 2015
REVISED: SEPTEMBER 30, 2015

STAMSKI AND MCNARY, INC.
1000 MAIN STREET ACTON, MASSACHUSETTS
ENGINEERING – PLANNING – SURVEYING
0 60 120 240 360 480 FT

(2069 CONC A1 UPDATE1.dwg) Sheet 1 of3 SM-2069



NOTES:

1. EASEMENT TO BE PROVIDED ON ABUTTING LOT TO ESTABLISH CONTROL OF ZONE I [310 CMR 22.21(3)(b)].

LOT 2 – LAND USE DATA, BOXBOROUGH ZONING BYLAW AMENDED THROUGH TOWN MEETING MAY 2012

ZONING DISTRICT: TOWN CENTER DISTRICT & W-DISTRICT

ARTICLE IV. USE REGULATIONS	ALLOWED:
TWO-FAMILY DWELLING, RESERVED EXCLUSIVELY FOR ELDERLY OCCUPANCY	YES*

*REFER TO SECTION 5004: FOR MULTI-FAMILY DWELLING IN TC DISTRICT RESERVED EXCLUSIVELY FOR ELDERLY OCCUPANCY, DENSITY NOT TO EXCEED 10 UNITS/80,000 SF LAND AREA

MAX DENSITY: 1,719,502/80,000= 21.4 x 10 UNITS= 214 UNITS
PROPOSED DENSITY: 50 DUPLEXES= 100 UNITS

ARTICLE V. DIMENSIONAL REQUIREMENTS

	REQUIRED:	PROVIDED:
MIN LOT AREA:	40,000 SF	1,719,502 SF**
MIN UPLAND LOT AREA:	20,000 SF	1,157,823 SF**
MIN LOT FRONTAGE:	100 FT	120± FT (HAYWARD LANE)
MIN LOT WIDTH:	100 FT	100FT
MIN FRONT SETBACK	25 FT	>25 FT
MIN FRONT SETBACK (STOW AND BURROUGHS ROAD)	50 FT	>50 FT
MIN FRONT SETBACK (MASS. AVE)	75 FT	>75 FT
MIN SIDE & REAR YARD:	20 FT	>20 FT
MIN SIDE & REAR YARD: (STOW AND BURROUGHS ROAD)	30 FT	>30 FT
MIN SIDE & REAR YARD: (MASS. AVE)	75 FT	>75 FT
MAX STORIES	3	3
MAX BUILDING HEIGHT	45 FT	<45 FT
MAX LOT COVERAGE (EXCL. SIDEWALKS)	35%	24.5%
FLOOR AREA RATIO	NA	
MAX BUILDING SIZE (GROSS FLOOR AREA)	8,000 SF	3,200± SF
MIN OPEN SPACE (INCL SIDEWALKS):	65%	75.5%

**–NOT INCLUDING SECTION OF LAND IN AR DISTRICT ALONG BURROUGHS RD.

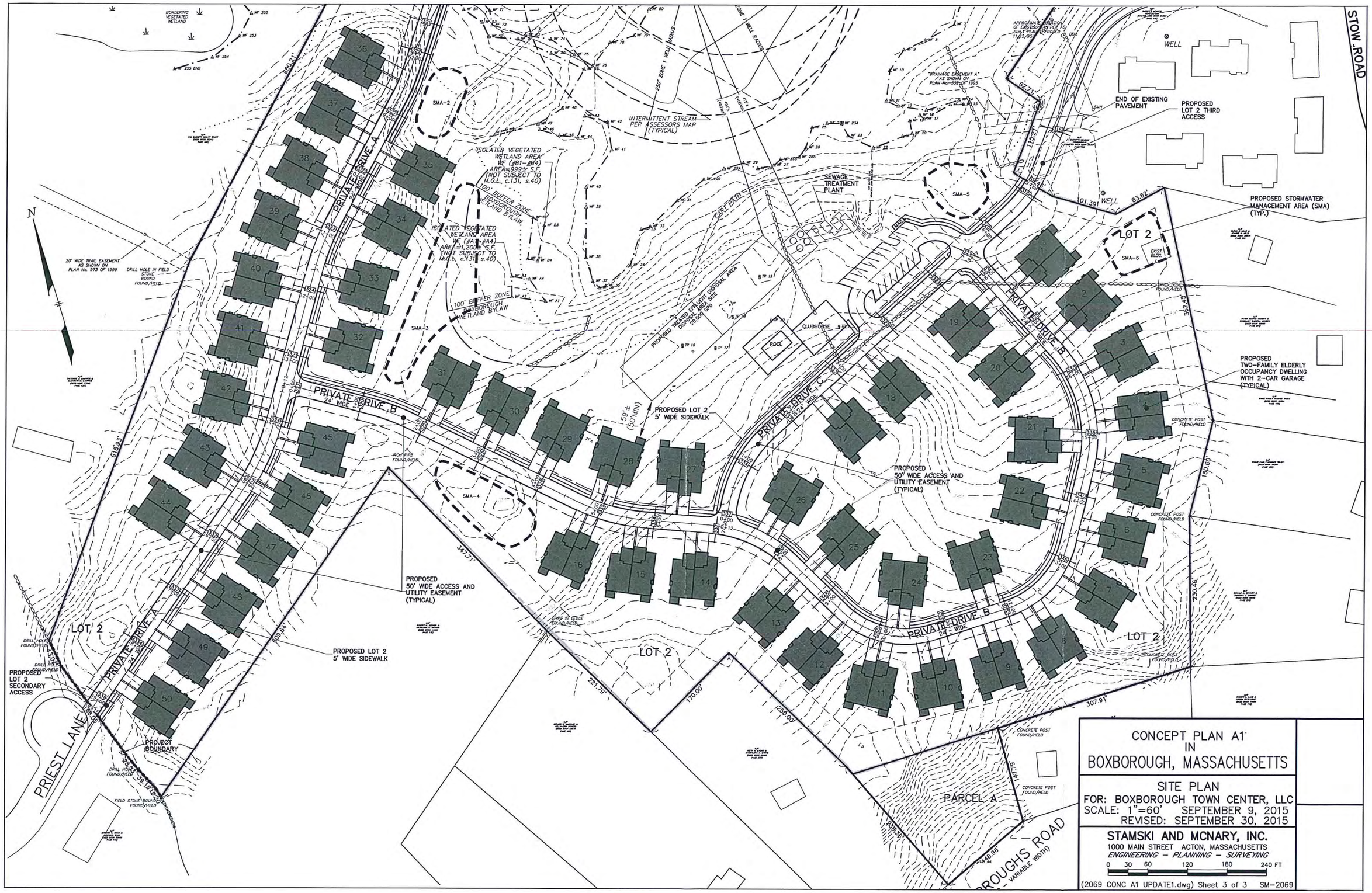
CONCEPT PLAN A1 IN BOXBOROUGH, MASSACHUSETTS

SITE PLAN
FOR: BOXBOROUGH TOWN CENTER, LLC
SCALE: 1"=60' SEPTEMBER 9, 2015
REVISED: SEPTEMBER 30, 2015

STAMSKI AND MCNARY, INC.
1000 MAIN STREET ACTON, MASSACHUSETTS
ENGINEERING – PLANNING – SURVEYING

0 30 60 120 180 240 FT

(2069 CONC A1 UPDATE1.dwg) Sheet 2 of 3 SM–2069



CONCEPT PLAN A1
IN
BOXBOROUGH, MASSACHUSETTS

SITE PLAN
FOR: BOXBOROUGH TOWN CENTER, LLC
SCALE: 1"=60' SEPTEMBER 9, 2015
REVISED: SEPTEMBER 30, 2015

STAMSKI AND MCNARY, INC.
1000 MAIN STREET ACTON, MASSACHUSETTS
ENGINEERING – PLANNING – SURVEYING

0 30 60 120 180 240 FT

(2069 CONC A1 UPDATE1.dwg) Sheet 3 of 3 SM-2069

DEFINITIVE PLAN
OF
BOXBOROUGH CENTER SUBDIVISION
IN
BOXBOROUGH, MASSACHUSETTS

DECEMBER 4, 2013
REVISED: FEBRUARY 19, 2014, REVISED: APRIL 2, 2014
REVISED: JANUARY 12, 2015

ZONING DISTRICT:

TOWN CENTER
WETLAND & WATERSHED OVERLAY DISTRICT

REFERENCE:

MIDDLESEX REGISTRY OF DEEDS
SOUTH DISTRICT
DEED BOOK 27102 PAGE 550
DEED BOOK 19267 PAGE 606

TOWN OF BOXBOROUGH
PROPERTY MAP
ASSESSORS MAP 14, LOTS 46 AND 50
PARCELS 14-046-000 AND 14-050-000

RECORD OWNERS:

BOXBOROUGH TOWN CENTER, LLC
PO BOX 985
WEST ACTON, MA 01720

MANE REALTY TRUST
TRUSTEE: JOHN J. LYONS
571 BURROUGHS ROAD
BOXBOROUGH, MA 01719

APPLICANT:

BOXBOROUGH TOWN CENTER, LLC
PO BOX 985
WEST ACTON, MA 01720

I CERTIFY THAT THIS PLAN HAS BEEN PREPARED IN CONFORMITY WITH THE RULES AND REGULATIONS OF THE REGISTERS OF DEEDS OF THE COMMONWEALTH OF MASSACHUSETTS.

3/11/15
DATE

REGISTERED PROFESSIONAL LAND SURVEYOR

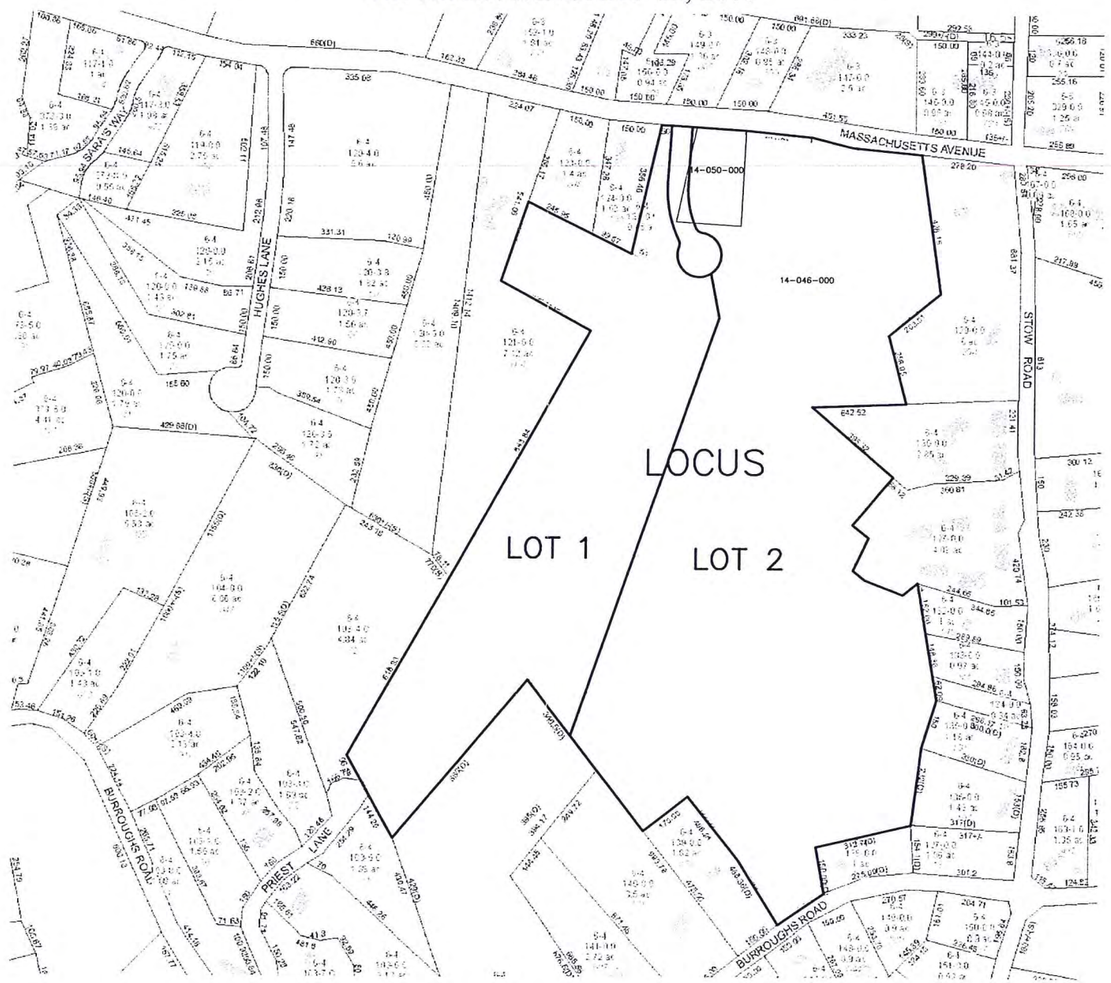
I, CLERK OF THE TOWN OF BOXBOROUGH, MASSACHUSETTS HEREBY CERTIFY THE NOTICE OF THE APPROVAL OF THIS PLAN BY THE BOXBOROUGH PLANNING BOARD HAS BEEN RECEIVED AND RECORDED AT THIS OFFICE AND NO APPEAL WAS RECEIVED DURRING THE TWENTY DAYS NEXT AFTER SUCH RECEIPT AND RECORDING OF SAID NOTICE.

April 1, 2015
DATE

TOWN CLERK

APPROVED BY:
BOXBOROUGH
PLANNING BOARD

DATE: April 28, 2014



LOCUS PLAN
1"=200'

N

PLAN INDEX

SHEET 1	TITLE SHEET
SHEET 2-3	RECORD PLAN
SHEET 4-5	SITE DEVELOPMENT PLAN
SHEET 6	PLAN AND PROFILE
SHEET 7	EROSION & SEDIMENTATION CONTROL PLAN
SHEET 8-9	CONSTRUCTION DETAILS
SHEET 10	LANDSCAPE PLAN

ENGINEER/SURVEYOR

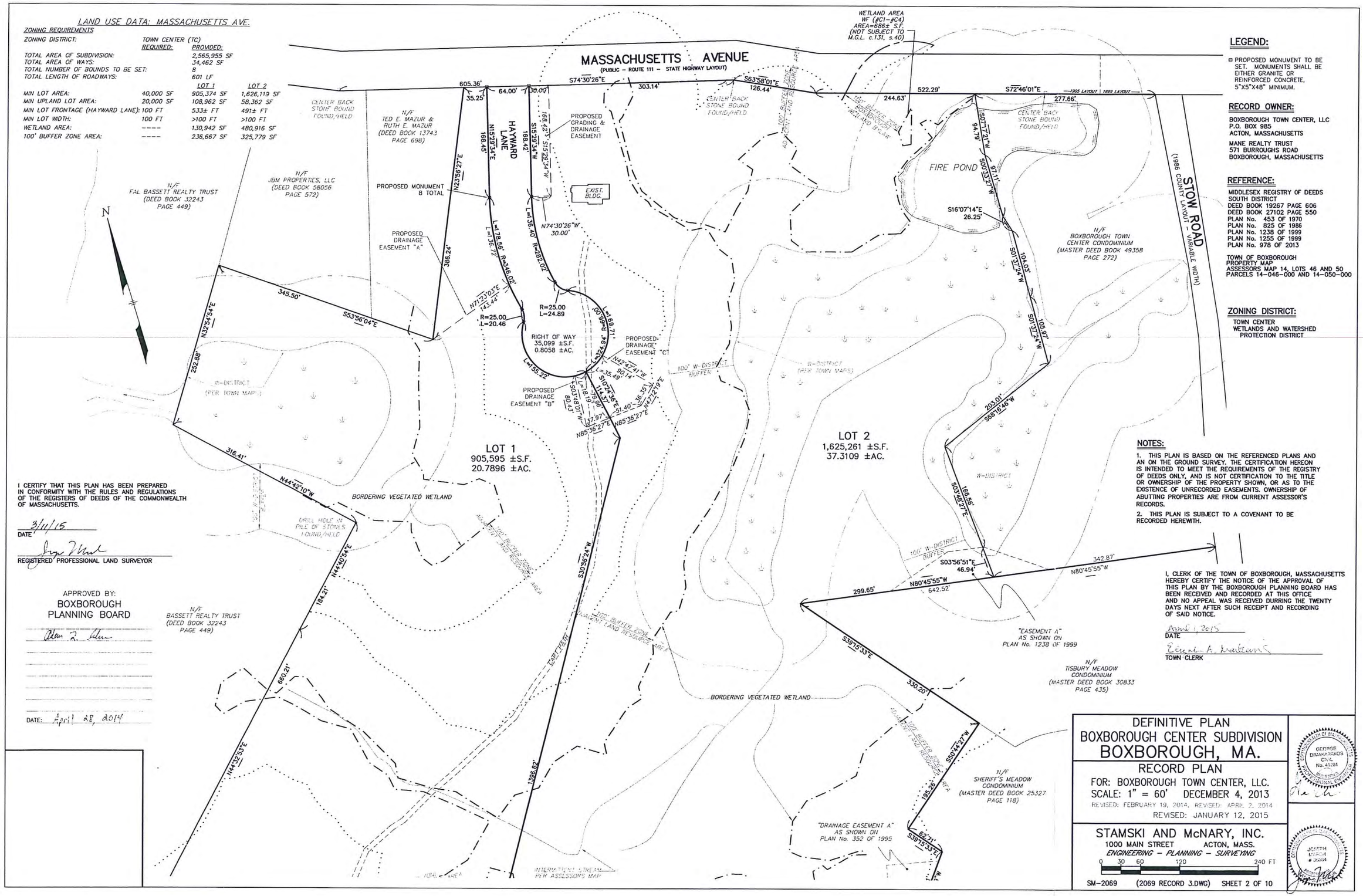
STAMSKI AND MCNARY, INC.
1000 MAIN STREET
ACTON, MA 01720
978-263-8585

LAND USE DATA: MASSACHUSETTS AVE.

ZONING REQUIREMENTS

ZONING DISTRICT: TOWN CENTER (TC)

	REQUIRED:	PROVIDED:	
TOTAL AREA OF SUBDIVISION:		2,565,955 SF	
TOTAL AREA OF WAYS:		34,462 SF	
TOTAL NUMBER OF BOUNDS TO BE SET:		8	
TOTAL LENGTH OF ROADWAYS:		601 LF	
		LOT 1	LOT 2
MIN LOT AREA:	40,000 SF	905,374 SF	1,626,119 SF
MIN UPLAND LOT AREA:	20,000 SF	108,962 SF	58,362 SF
MIN LOT FRONTAGE (HAYWARD LANE):	100 FT	533± FT	491± FT
MIN LOT WIDTH:	100 FT	>100 FT	>100 FT
WETLAND AREA:	----	130,942 SF	480,916 SF
100' BUFFER ZONE AREA:	----	236,667 SF	325,779 SF



I CERTIFY THAT THIS PLAN HAS BEEN PREPARED IN CONFORMITY WITH THE RULES AND REGULATIONS OF THE REGISTERS OF DEEDS OF THE COMMONWEALTH OF MASSACHUSETTS.

3/11/15
DATE

REGISTERED PROFESSIONAL LAND SURVEYOR

APPROVED BY:
BOXBOROUGH PLANNING BOARD

DATE: April 28, 2014

LEGEND:

⊡ PROPOSED MONUMENT TO BE SET. MONUMENTS SHALL BE EITHER GRANITE OR REINFORCED CONCRETE, 5"X5"X48" MINIMUM.

RECORD OWNER:

BOXBOROUGH TOWN CENTER, LLC
P.O. BOX 985
ACTON, MASSACHUSETTS

MANE REALTY TRUST
571 BURROUGHS ROAD
BOXBOROUGH, MASSACHUSETTS

REFERENCE:

MIDDLESEX REGISTRY OF DEEDS
SOUTH DISTRICT
DEED BOOK 19267 PAGE 606
DEED BOOK 27102 PAGE 550
PLAN No. 453 OF 1970
PLAN No. 825 OF 1986
PLAN No. 1238 OF 1999
PLAN No. 1255 OF 1999
PLAN No. 978 OF 2013

TOWN OF BOXBOROUGH
PROPERTY MAP
ASSESSORS MAP 14, LOTS 46 AND 50
PARCELS 14-046-000 AND 14-050-000

ZONING DISTRICT:

TOWN CENTER
WETLANDS AND WATERSHED PROTECTION DISTRICT

NOTES:

1. THIS PLAN IS BASED ON THE REFERENCED PLANS AND AN ON THE GROUND SURVEY. THE CERTIFICATION HEREON IS INTENDED TO MEET THE REQUIREMENTS OF THE REGISTRY OF DEEDS ONLY, AND IS NOT CERTIFICATION TO THE TITLE OR OWNERSHIP OF THE PROPERTY SHOWN, OR AS TO THE EXISTENCE OF UNRECORDED EASEMENTS. OWNERSHIP OF ABUTTING PROPERTIES ARE FROM CURRENT ASSESSOR'S RECORDS.
2. THIS PLAN IS SUBJECT TO A COVENANT TO BE RECORDED HEREWITH.

I, CLERK OF THE TOWN OF BOXBOROUGH, MASSACHUSETTS HEREBY CERTIFY THE NOTICE OF THE APPROVAL OF THIS PLAN BY THE BOXBOROUGH PLANNING BOARD HAS BEEN RECEIVED AND RECORDED AT THIS OFFICE AND NO APPEAL WAS RECEIVED DURRING THE TWENTY DAYS NEXT AFTER SUCH RECEIPT AND RECORDING OF SAID NOTICE.

April 1, 2015
DATE

TOWN CLERK

DEFINITIVE PLAN
BOXBOROUGH CENTER SUBDIVISION
BOXBOROUGH, MA.

RECORD PLAN

FOR: BOXBOROUGH TOWN CENTER, LLC.
SCALE: 1" = 60' DECEMBER 4, 2013
REVISED: FEBRUARY 19, 2014, REVISED: APRIL 2, 2014
REVISED: JANUARY 12, 2015

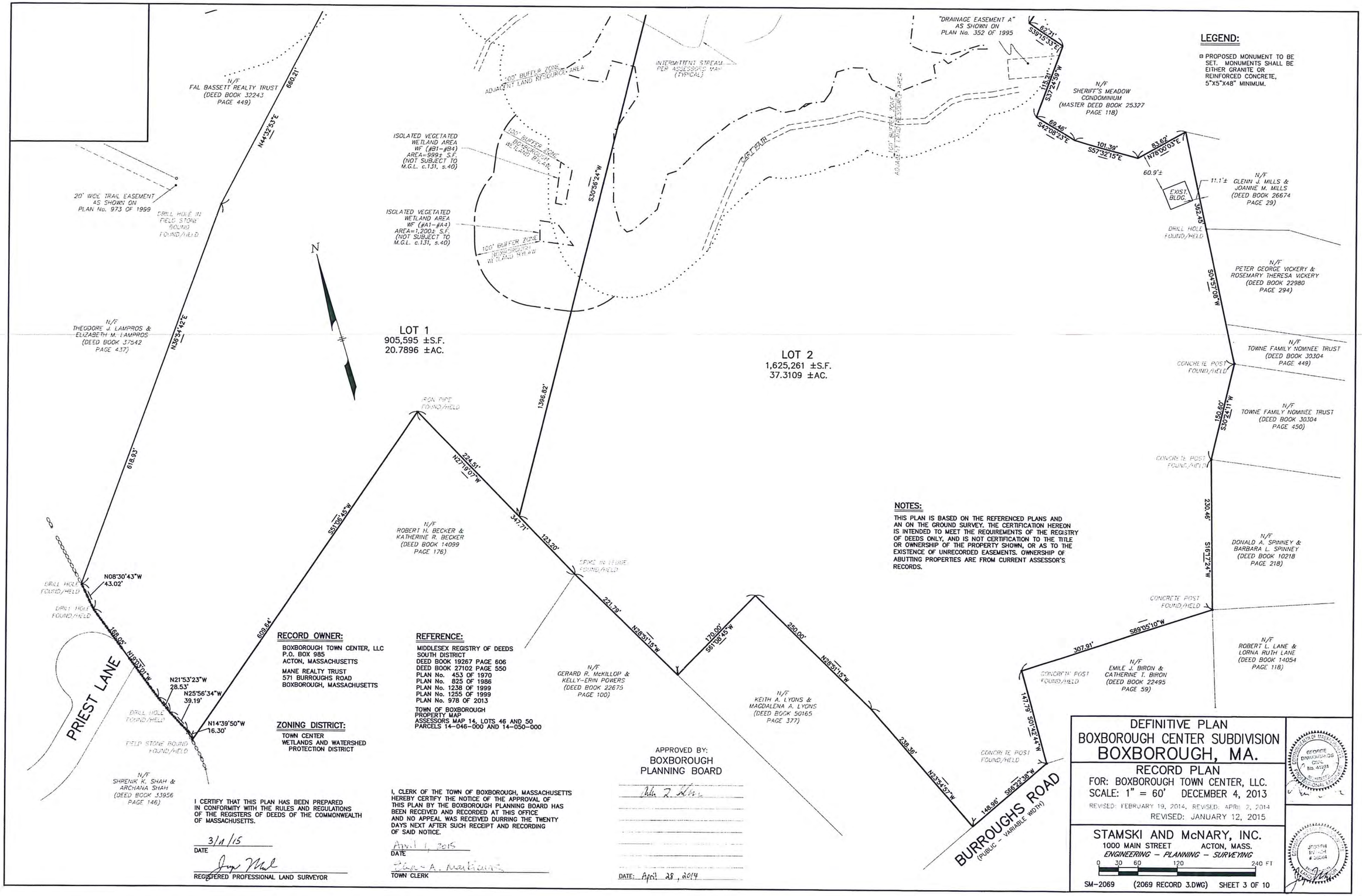
STAMSKI AND McNARY, INC.
1000 MAIN STREET ACTON, MASS.
ENGINEERING – PLANNING – SURVEYING

0 30 60 120 240 FT

SM-2069 (2069 RECORD 3.DWG) SHEET 2 OF 10

COMMONWEALTH OF MASSACHUSETTS GEORGE DIMAKARAKOS CIVIL No. 41281 REGISTERED PROFESSIONAL ENGINEER

COMMONWEALTH OF MASSACHUSETTS JOSEPH MARCH # 36894 REGISTERED PROFESSIONAL LAND SURVEYOR


LEGEND:
PROPOSED MONUMENT TO BE SET. MONUMENTS SHALL BE EITHER GRANITE OR REINFORCED CONCRETE, 5"X5"X48" MINIMUM.
N/F FAL BASSETT REALTY TRUST (DEED BOOK 32243 PAGE 449)
N/F THEODORE J. LAMPROS & ELIZABETH M. LAMPROS (DEED BOOK 37542 PAGE 437)
N/F SHREWIK K. SHAH & ARCHANA SHAH (DEED BOOK 33956 PAGE 146)
N/F ROBERT H. BECKER & KATHERINE R. BECKER (DEED BOOK 14099 PAGE 176)
N/F GERARD R. McKILLOP & KELLY-ERIN POWERS (DEED BOOK 22675 PAGE 100)
N/F KEITH A. LYONS & MAGDALENA A. LYONS (DEED BOOK 50165 PAGE 377)
N/F EMILE J. BIRON & CATHERINE T. BIRON (DEED BOOK 22495 PAGE 59)
N/F ROBERT L. LANE & LORNA RUTH LANE (DEED BOOK 14054 PAGE 118)
N/F DONALD A. SPINNEY & BARBARA L. SPINNEY (DEED BOOK 10218 PAGE 218)
N/F TOWNE FAMILY NOMINEE TRUST (DEED BOOK 30304 PAGE 450)
N/F TOWNE FAMILY NOMINEE TRUST (DEED BOOK 30304 PAGE 449)
N/F PETER GEORGE VICKERY & ROSEMARY THERESA VICKERY (DEED BOOK 22980 PAGE 294)
N/F GLENN J. MILLS & JOANNE M. MILLS (DEED BOOK 26674 PAGE 29)
N/F SHERIFF'S MEADOW CONDOMINIUM (MASTER DEED BOOK 25327 PAGE 118)
"DRAINAGE EASEMENT A" AS SHOWN ON PLAN No. 352 OF 1995
20' WIDE TRAIL EASEMENT AS SHOWN ON PLAN No. 973 OF 1999
ISOLATED VEGETATED WETLAND AREA WF (#B1-#B4) AREA=999± S.F. (NOT SUBJECT TO M.G.L. c.131, s.40)
ISOLATED VEGETATED WETLAND AREA WF (#A1-#A4) AREA=1,200± S.F. (NOT SUBJECT TO M.G.L. c.131, s.40)
100' BUFFER ZONE ADJACENT LAND RESOURCE AREA
INTERMITTENT STREAM PER ASSESSORS MAP (TYPICAL)
EXIST. BLDG.
LOT 1
905,595 ±S.F.
20.7896 ±AC.
LOT 2
1,625,261 ±S.F.
37.3109 ±AC.
PRIEST LANE
BURROUGHS ROAD (PUBLIC - VARIABLE WIDTH)
N08°30'43"W 43.02'
N21°53'23"W 28.53'
N25°56'34"W 39.19'
N14°39'50"W 16.30'
S30°56'24"W 1396.82'
S51°06'45"W 609.64'
N44°32'53"E 660.21'
N39°54'42"E 618.93'
S39°15'33"E 62.71'
S37°24'59"W 115.71'
S42°08'23"E 69.46'
S57°32'15"E 101.39'
N78°00'03"E 83.62'
S04°57'08"W 382.45'
S16°17'24"W 230.46'
S89°05'10"W 307.91'
S07°42'44"W 147.79'
S66°22'38"W 149.96'
N23°54'52"W 238.36'
N28°51'15"W 250.00'
S61°08'45"W 170.00'
N28°51'15"W 221.79'
N27°19'07"W 224.51'
S30°24'11"W 1520.60'
NOTES:
THIS PLAN IS BASED ON THE REFERENCED PLANS AND AN ON THE GROUND SURVEY. THE CERTIFICATION HEREON IS INTENDED TO MEET THE REQUIREMENTS OF THE REGISTRY OF DEEDS ONLY, AND IS NOT CERTIFICATION TO THE TITLE OR OWNERSHIP OF THE PROPERTY SHOWN, OR AS TO THE EXISTENCE OF UNRECORDED EASEMENTS. OWNERSHIP OF ABUTTING PROPERTIES ARE FROM CURRENT ASSESSOR'S RECORDS.
RECORD OWNER:
BOXBOROUGH TOWN CENTER, LLC
P.O. BOX 985
ACTON, MASSACHUSETTS
MANE REALTY TRUST
571 BURROUGHS ROAD
BOXBOROUGH, MASSACHUSETTS
ZONING DISTRICT:
TOWN CENTER
WETLANDS AND WATERSHED PROTECTION DISTRICT
REFERENCE:
MIDDLESEX REGISTRY OF DEEDS
SOUTH DISTRICT
DEED BOOK 19267 PAGE 606
DEED BOOK 27102 PAGE 550
PLAN No. 453 OF 1970
PLAN No. 825 OF 1986
PLAN No. 1238 OF 1999
PLAN No. 1255 OF 1999
PLAN No. 978 OF 2013
TOWN OF BOXBOROUGH PROPERTY MAP
ASSESSORS MAP 14, LOTS 46 AND 50
PARCELS 14-046-000 AND 14-050-000
I CERTIFY THAT THIS PLAN HAS BEEN PREPARED IN CONFORMITY WITH THE RULES AND REGULATIONS OF THE REGISTERS OF DEEDS OF THE COMMONWEALTH OF MASSACHUSETTS.
3/11/15
DATE
REGISTERED PROFESSIONAL LAND SURVEYOR
I, CLERK OF THE TOWN OF BOXBOROUGH, MASSACHUSETTS HEREBY CERTIFY THE NOTICE OF THE APPROVAL OF THIS PLAN BY THE BOXBOROUGH PLANNING BOARD HAS BEEN RECEIVED AND RECORDED AT THIS OFFICE AND NO APPEAL WAS RECEIVED DURRING THE TWENTY DAYS NEXT AFTER SUCH RECEIPT AND RECORDING OF SAID NOTICE.
April 1, 2015
DATE
TOWN CLERK
APPROVED BY:
BOXBOROUGH PLANNING BOARD
DATE: April 28, 2014
DEFINITIVE PLAN
BOXBOROUGH CENTER SUBDIVISION
BOXBOROUGH, MA.
RECORD PLAN
FOR: BOXBOROUGH TOWN CENTER, LLC.
SCALE: 1" = 60' DECEMBER 4, 2013
REVISED: FEBRUARY 19, 2014, REVISED: APRIL 7, 2014
REVISED: JANUARY 12, 2015
STAMSKI AND McNARY, INC.
1000 MAIN STREET ACTON, MASS.
ENGINEERING - PLANNING - SURVEYING
0 30 60 120 240 FT
SM-2069 (2069 RECORD 3.DWG) SHEET 3 OF 10

NOTES:

ALL UNDER GROUND UTILITIES SHOWN HERE WERE COMPILED FROM AVAILABLE RECORD PLANS FROM VARIOUS UTILITY COMPANIES AND PUBLIC AGENCIES AND ARE APPROXIMATE ONLY. ACTUAL LOCATIONS SHALL BE DETERMINED IN THE FIELD BEFORE EXCAVATING, BLASTING, INSTALLING, BACK FILLING, GRADING OR PAVEMENT RESTORATION OR REPAIR. ALL UTILITY COMPANIES, PRIVATE OR PUBLIC, MUST BE CONTACTED INCLUDING THOSE IN CONTROL OF UTILITIES NOT SHOWN ON THIS PLAN. SEE CHAPTER 370, ACTS OF THE 1963 MASS. WE ASSUME NO RESPONSIBILITY FOR DAMAGES INCURRED AS A RESULT UTILITIES THAT ARE OMITTED OR SHOWN INACCURATELY. BEFORE PLANNING FUTURE CONNECTIONS, THE APPROPRIATE PUBLIC UTILITY COMPANY ENGINEERING DEPARTMENT MUST BE BE CONSULTED. DIG SAFE NUMBER 1-888-344-7233.

LEGEND:

- EDGE OF VEGETATED WETLAND AS FLAGGED BY B&C ASSOCIATES
- 100' BUFFER ZONE, FROM B.V.W.
- 100' BUFFER ZONE, ISOLATED WETLAND (TOWN OF BOXBOROUGH WETLAND BYLAW)
- PROPERTY LINE
- 323 EXISTING CONTOUR
- 323 PROPOSED CONTOUR

APPROVED BY:
BOXBOROUGH
PLANNING BOARD

DATE: April 28, 2014

I, CLERK OF THE TOWN OF BOXBOROUGH, MASSACHUSETTS HEREBY CERTIFY THE NOTICE OF THE APPROVAL OF THIS PLAN BY THE BOXBOROUGH PLANNING BOARD HAS BEEN RECEIVED AND RECORDED AT THIS OFFICE AND NO APPEAL WAS RECEIVED DURRING THE TWENTY DAYS NEXT AFTER SUCH RECEIPT AND RECORDING OF SAID NOTICE.

April 1, 2015
DATE

TOWN CLERK

DEFINITIVE PLAN
BOXBOROUGH CENTER SUBDIVISION
BOXBOROUGH, MA.

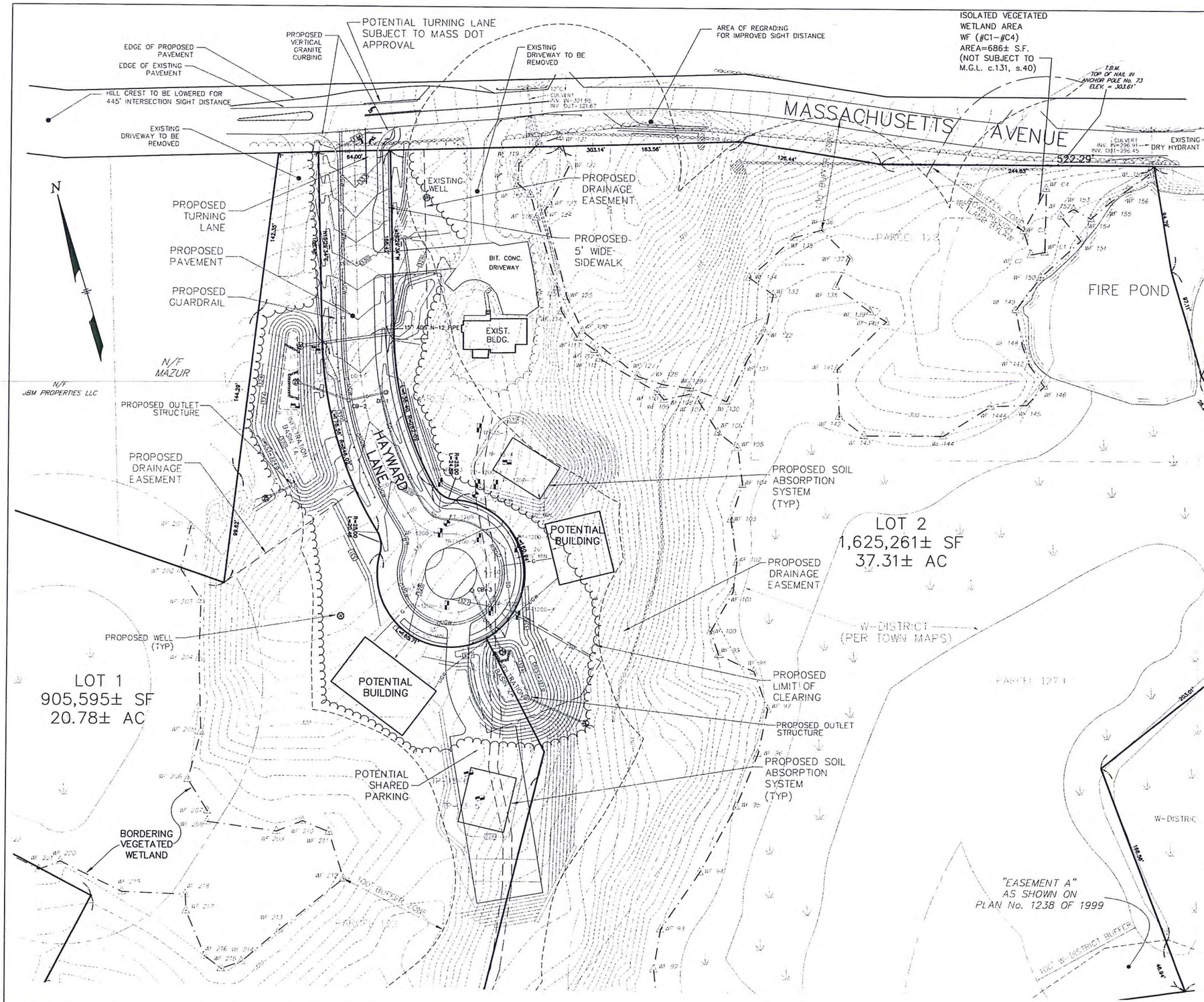
SITE DEVELOPMENT PLAN

FOR: BOXBOROUGH TOWN CENTER, LLC.
SCALE: 1" = 120' DECEMBER 4, 2013
REVISED: FEBRUARY 19, 2014, REVISED: APRIL 2, 2014
REVISED: JANUARY 12, 2015

STAMSKI AND McNARY, INC.
1000 MAIN STREET ACTON, MASS.
ENGINEERING - PLANNING - SURVEYING

0 60 120 240 480

SM-2069 (2069 DEF 3.DWG) SHEET 4 OF 10



LAND USE DATA: MASSACHUSETTS AVE.

ZONING REQUIREMENTS

ZONING DISTRICT:	TOWN CENTER (TC)		
	REQUIRED:	PROVIDED:	
TOTAL AREA OF SUBDIVISION:		2,565,955 SF	
TOTAL AREA OF WAYS:		34,462 SF	
TOTAL NUMBER OF BOUNDS TO BE SET:		8	
TOTAL LENGTH OF ROADWAYS:		601 LF	
		LOT 1	LOT 2
MIN LOT AREA:	40,000 SF	905,374 SF	1,626,119 SF
MIN UPLAND LOT AREA:	20,000 SF	108,962 SF	58,362 SF
MIN LOT FRONTAGE (HAYWARD LANE):	100 FT	533± FT	491± FT
MIN LOT WIDTH:	100 FT	>100 FT	>100 FT
WETLAND AREA:	----	130,942 SF	480,916 SF
100' BUFFER ZONE AREA:	----	236,667 SF	325,779 SF

NOTES:

ALL UNDER GROUND UTILITIES SHOWN HERE WERE COMPILED FROM AVAILABLE RECORD PLANS FROM VARIOUS UTILITY COMPANIES AND PUBLIC AGENCIES AND ARE APPROXIMATE ONLY. ACTUAL LOCATIONS SHALL BE DETERMINED IN THE FIELD BEFORE EXCAVATING, BLASTING, INSTALLING, BACK FILLING, GRADING OR PAVEMENT RESTORATION OR REPAIR. ALL UTILITY COMPANIES, PRIVATE OR PUBLIC, MUST BE CONTACTED INCLUDING THOSE IN CONTROL OF UTILITIES NOT SHOWN ON THIS PLAN. SEE CHAPTER 370, ACTS OF THE 1963 MASS. WE ASSUME NO RESPONSIBILITY FOR DAMAGES INCURRED AS A RESULT UTILITIES THAT ARE OMITTED OR SHOWN INACCURATELY. BEFORE PLANNING FUTURE CONNECTIONS, THE APPROPRIATE PUBLIC UTILITY COMPANY ENGINEERING DEPARTMENT MUST BE BE CONSULTED. DIG SAFE NUMBER 1-888-344-7233.

LENGTH OF PROPOSED ROAD IS MEASURED FROM EXISTING EDGE OF PAVEMENT TO THE CENTER POINT OF THE PROPOSED CUL-DE-SAC.

LEGEND:

- EDGE OF VEGETATED WETLAND AS FLAGGED BY B&C ASSOCIATES
- 100' BUFFER ZONE, FROM B.V.W.
- 100' BUFFER ZONE, ISOLATED WETLAND (TOWN OF BOXBOROUGH WETLAND BYLAW)
- PROPERTY LINE
- 323 EXISTING CONTOUR
- 323 PROPOSED CONTOUR

APPROVED BY:
BOXBOROUGH
PLANNING BOARD

Alan Z. Phillips

DATE: April 28, 2014

I, CLERK OF THE TOWN OF BOXBOROUGH, MASSACHUSETTS HEREBY CERTIFY THE NOTICE OF THE APPROVAL OF THIS PLAN BY THE BOXBOROUGH PLANNING BOARD HAS BEEN RECEIVED AND RECORDED AT THIS OFFICE AND NO APPEAL WAS RECEIVED DURRING THE TWENTY DAYS NEXT AFTER SUCH RECEIPT AND RECORDING OF SAID NOTICE.

April 1, 2015
DATE

Loren A. Markowski
TOWN CLERK

DEFINITIVE PLAN
BOXBOROUGH CENTER SUBDIVISION
BOXBOROUGH, MA.

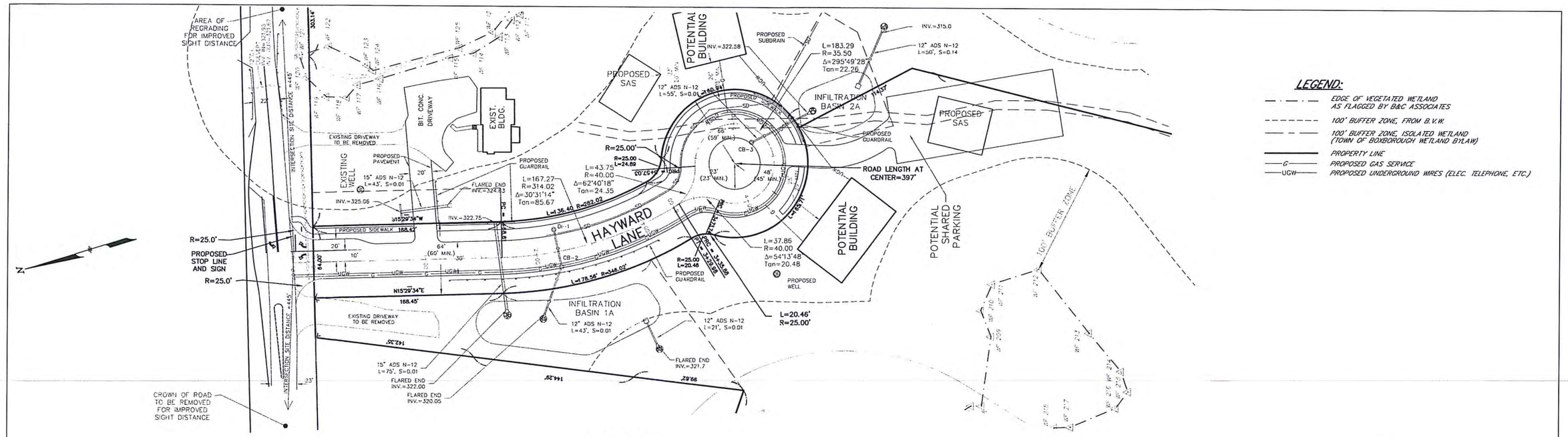
SITE DEVELOPMENT PLAN

FOR: BOXBOROUGH TOWN CENTER, LLC.
SCALE: 1" = 40' DECEMBER 4, 2013
REVISED: FEBRUARY 19, 2014 REVISED: APRIL 2, 2014
REVISED: JANUARY 12, 2015

STAMSKI AND McNARY, INC.
1000 MAIN STREET ACTON, MASS.
ENGINEERING – PLANNING – SURVEYING

0 20 40 80 160

SM-2069 (2069 DEF 3.DWG) SHEET 5 OF 10

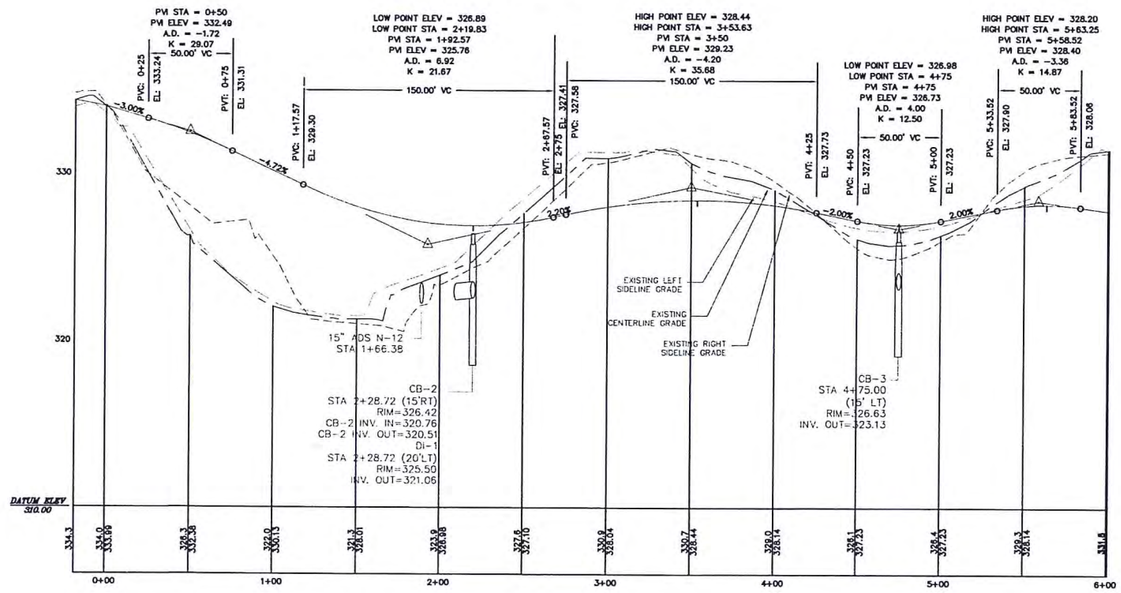


LEGEND:

- EDGE OF VEGETATED WETLAND AS FLAGGED BY B&C ASSOCIATES
- 100' BUFFER ZONE, FROM B.V.W.
- 100' BUFFER ZONE, ISOLATED WETLAND (TOWN OF BOXBOROUGH WETLAND BYLAW)
- PROPERTY LINE
- —G— PROPOSED GAS SERVICE
- —UGW— PROPOSED UNDERGROUND WIRES (ELEC. TELEPHONE, ETC.)

PLAN

SCALE: 1"=40'



PROFILE

SCALE: HORIZ.: 1"=40'
VERT: 1"=4'

APPROVED BY:
BOXBOROUGH
PLANNING BOARD

DATE: April 28, 2014

I, CLERK OF THE TOWN OF BOXBOROUGH, MASSACHUSETTS HEREBY CERTIFY THE NOTICE OF THE APPROVAL OF THIS PLAN BY THE BOXBOROUGH PLANNING BOARD HAS BEEN RECEIVED AND RECORDED AT THIS OFFICE AND NO APPEAL WAS RECEIVED DURRING THE TWENTY DAYS NEXT AFTER SUCH RECEIPT AND RECORDING OF SAID NOTICE.

April 1, 2015
DATE

TOWN CLERK

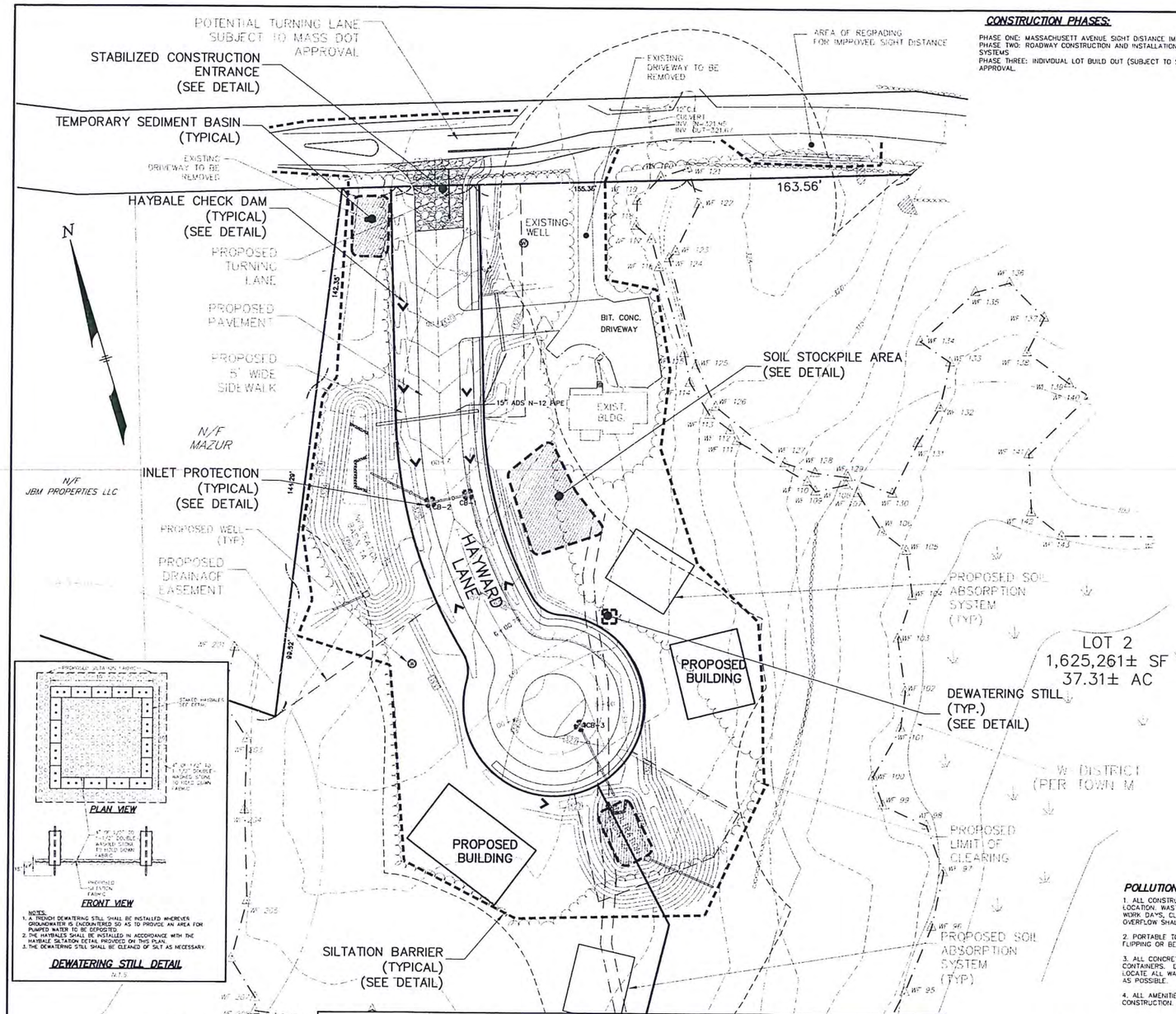
DEFINITIVE PLAN
BOXBOROUGH CENTER SUBDIVISION
BOXBOROUGH, MA.

PLAN & PROFILE

FOR: BOXBOROUGH TOWN CENTER, LLC.
SCALE: AS SHOWN DECEMBER 4, 2013
REVISED: FEBRUARY 19, 2014 REVISED: APRIL 2, 2014
REVISED: JANUARY 12, 2015

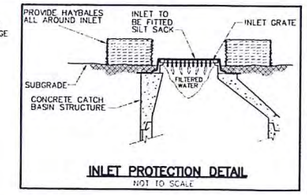
STAMSKI AND McNARY, INC.
1000 MAIN STREET ACTON, MASS.
ENGINEERING - PLANNING - SURVEYING
0 20 40 80 160

SM-2069 (2069 DEF 3.DWG) SHEET 6 OF 10

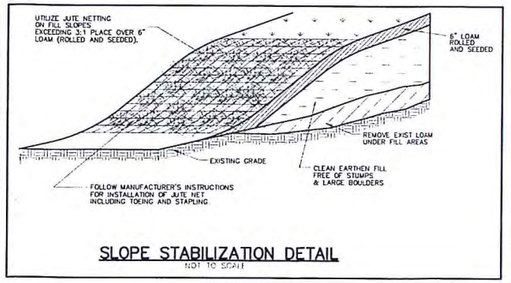


CONSTRUCTION PHASES:

PHASE ONE: MASSACHUSETT AVENUE SIGHT DISTANCE IMPROVEMENTS
PHASE TWO: ROADWAY CONSTRUCTION AND INSTALLATION OF DRAINAGE SYSTEMS
PHASE THREE: INDIVIDUAL LOT BUILD OUT (SUBJECT TO SITE PLAN APPROVAL.



INLET PROTECTION DETAIL
NOT TO SCALE



SLOPE STABILIZATION DETAIL
NOT TO SCALE

EROSION AND SEDIMENTATION CONTROL NOTES

1. THE LIMIT OF WORK LINE SHALL BE CLEARLY MARKED IN THE FIELD BY FIELD SURVEY PRIOR TO CONSTRUCTION WITHIN DESIGNATED AREA. LIMIT OF WORK LINE SHALL NOT EXCEED THE LINE SHOWN.
2. EROSION AND SEDIMENT CONTROL MEASURES SHALL BE IMPLEMENTED FOR EACH PHASE PRIOR TO ANY CONSTRUCTION ON THE SITE. CONTRACTOR IS ENCOURAGED TO USE "FILTERMITT" IN LIEU OF STRAW BALE/SILTATION BARRIER.
3. DURING DEVELOPMENT AND CONSTRUCTION, ADEQUATE PROTECTIVE MEASURES SHALL BE PROVIDED TO MINIMIZE DAMAGE FROM SURFACE WATER TO THE CUT FACE OF EXCAVATIONS OR THE SLOPING SURFACE OF FILLS.
4. LAND SHALL BE DEVELOPED IN INCREMENTS OF WORKABLE SIZE WHICH CAN BE COMPLETED DURING A SINGLE CONSTRUCTION SEASON. EROSION AND SEDIMENT CONTROL MEASURES SHALL BE COORDINATED WITH THE SEQUENCE OF GRADING, DEVELOPMENT, AND CONSTRUCTION, OPERATIONS. CONTROL MEASURES SUCH AS HYDROSEEDING, BERMS, INTERCEPTOR DITCHES, TERRACES, AND SEDIMENT TRAPS SHALL BE PUT INTO EFFECT PRIOR TO THE COMMENCEMENT OF EACH INCREMENT OF THE DEVELOPMENT/CONSTRUCTION PROCESS.
5. THE CONTRACTOR SHALL INSPECT AND REPAIR ALL EROSION CONTROL DEVICES, WHEN INTENSE RAINFALL IS PREDICTED. THE CONTRACTOR'S REPRESENTATIVE SHALL INSPECT THE CONSTRUCTION SITE AT LEAST EVERY 7 DAYS AND WITHIN 24 HOURS OF A RAINFALL OF 0.5 INCHES OR MORE. AREAS WITH SITES THAT HAVE BEEN FINALLY STABILIZED MUST BE INSPECTED AT LEAST ONCE A MONTH.
6. STOCK PILES SHALL BE SET BACK A MINIMUM OF 5 FEET FROM THE EDGE OF PAVEMENT. ALL STOCK PILES SHALL BE CONTAINED WITH SILT FENCES OR STRAW BALES TO PREVENT EROSION FROM ENTERING THE STREET DRAINAGE. NPDES PERMITS REQUIRE THE STOCKPILES TO BE STABILIZED WITH SEED OR MULCH IF NOT BEING USED WITHIN 21 DAYS. SOIL STOCK PILES SHALL BE COVERED WITH TEMPORARY VEGETATION OR FASTENED WITH TARPAULIN SHEETS. STOCKPILES SHALL AVOID ALL SOIL ABSORPTION AREAS.
7. DURING CONSTRUCTION, THE CONTRACTOR SHALL MAINTAIN A ONE FOOT HIGH BY TWO FOOT WIDE EARTHEN BERM ALONG THE EDGES OF THE ROADWAY TO DIVERT RUNOFF TO SEDIMENT BASINS. STRAW BALES MAY BE UTILIZED TO DIVERT RUNOFF FROM THE DRIVEWAY LOW POINTS TO THE SEDIMENT BASIN DURING CONSTRUCTION UNTIL THE DRAINAGE SYSTEM IS INSTALLED (SEE EARTHEN BERM DETAIL.)
8. ALL CATCH BASIN AND MANHOLE RIMS SHALL BE FITTED w/ SILT SACK DURING CONSTRUCTION. CATCH BASIN GRATES ARE TO BE SET AT BINDER GRADE UNTIL IT IS TIME TO APPLY THE PAVEMENT WEARING COURSE. SEE INLET PROTECTION DETAIL.
9. ALL CATCH BASIN SUMPS AND DRAINAGE BASINS SHALL BE CLEANED DURING AND FOLLOWING CONSTRUCTION. THEREAFTER REFER TO THE STORMWATER MANAGEMENT SYSTEM OPERATION AND MAINTENENACE PLAN.
10. SEDIMENT BASINS (DEBRIS, BASINS, DE-SILTING BASINS, OR SILT TRAPS) SHALL BE INSTALLED IN CONJUNCTION WITH THE INITIAL GRADING OPERATIONS AND MAINTAINED THROUGH THE DEVELOPMENT PROCESS TO REMOVE SEDIMENT FROM RUNOFF WATERS DRAINING FROM LAND UNDERGOING DEVELOPMENT. SEDIMENT BASINS SHALL BE INSTALLED OUTSIDE OF INFILTRATION PORTION OF INFILTRATION BASINS AND PROPOSED SEPTIC LEACHING AREAS.
11. THE DEVELOPER IS REQUIRED TO CLEAN UP ANY SAND, DIRT, OR DEBRIS WHICH ERODES FROM THE SITE ONTO ANY PUBLIC STREET OR PRIVATE PROPERTY, AND TO REMOVE SILT OR DEBRIS THAT ENTERS ANY EXISTING DRAINAGE SYSTEM INCLUDING CATCH BASIN SUMPS, PIPE LINES, MANHOLES AND DITCHES.
12. VELOCITY CHECK DAMS – STRAW BALES WILL BE USED AROUND THE CATCH BASINS ON THE PROPOSED ROAD TO PROTECT THEM FROM THE ERODING SOILS AND PROVIDE A CHECK DAM* TO SLOW THE RUNOFF DURING THE CONSTRUCTION. THE DEVELOPER SHALL PROVIDE VELOCITY CHECK DAMS* IN ALL UNPAVED STREET AREAS AT THE INTERVALS INDICATED BELOW:

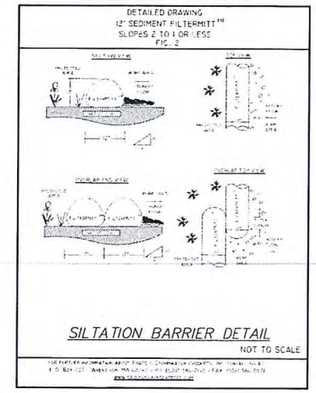
GRADE OF THE ROAD	INTERVALS BETWEEN CHECKDAMS
LESS THAN 4%	100 FEET
4% TO 10%	50 FEET
OVER 10%	25 FEET

THE DEVELOPER SHALL PROVIDE VELOCITY CHECK DAMS* IN ALL UN-VEGETATED OR UNPAVED CHANNELS AT THE INTERVALS INDICATED BELOW:

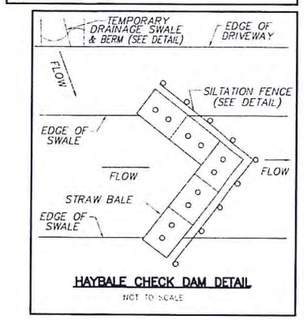
GRADE OF THE CHANNEL	INTERVALS BETWEEN CHECK DAMS
LESS THAN 3%	100 FEET
3% TO 6%	50 FEET
OVER 6%	25 FEET

*CHECK DAMS IN UNPAVED DRIVES AND UN-VEGETATED OR UNPAVED GRADED CHANNELS SHALL BE CONSTRUCTED OF STAKED STRAW BALES OR OTHER EROSION RESISTANT MATERIALS APPROVED BY THE BOARD. THE CHECK DAMS SHALL BE INSTALLED AT THE END OF EACH WORKING DAY, AND IN THE EVENT OF RAINFALL BEING PREDICTED. THE STRAW BALES SHOULD BE SECURELY STAKED TO PREVENT OVERTURNING, FLOATATION, OR DISPLACEMENT. THEY SHALL EXTEND COMPLETELY ACROSS THE STREET OR CHANNEL AT RIGHT ANGLES TO THE CENTERLINE. ALSO, A VELOCITY CHECK DAM SHALL BE PROVIDED ALONG THE ENTRANCE OF THE LOT TO PROTECT THE PUBLIC STREETS AND ADJACENT PROPERTIES FROM THE HAZARDS OF EROSION. ALL CHECK DAMS SHALL BE CLEANED OF DEBRIS AND SILT PERIODICALLY.

13. ALL CUT AND FILL SLOPES SHALL BE IMMEDIATELY COVERED WITH 6" LOAM AND SEEDED DURING THE GROWING SEASON (MARCH THROUGH MAY AND AUGUST TO OCTOBER 15) OR COVERED WITH A HAY MULCH DURING THE NON-GROWING SEASON (NOVEMBER 1 TO APRIL 1 AND JUNE AND JULY). PERMENANT SEEDING MAY BE DONE IN PEAK SUMMER MONTHS WITH PROPER MULCHING AND WATERING.
14. DISTURBED AREAS WHERE CONSTRUCTION HAS PERMANENTLY OR TEMPORARILY CEASED MUST BE STABILIZED WITHIN 14 DAYS OF THE LAST DISTURBANCE. AREAS WHICH WILL BE REDISTURBED WITHIN 21 DAYS DO NOT HAVE TO BE STABILIZED.
15. ADDITIONAL EROSION CONTROL MEASURES SHALL BE STOCK-PILED ON-SITE, INCLUDING BUT NOT LIMITED TO CRUSHED STONE, STRAW BALES, SILT FENCE AND EROSION CONTROL MATS.
16. THE SEDIMENT SHALL BE REMOVED BEHIND ALL STRAW BALES AND SILT FENCES IF DEPTH EXCEEDS 6". SEDIMENT SHALL BE REMOVED TO OUTSIDE THE BUFFER ZONE OF THE WETLANDS WHERE APPLICABLE.
17. THE EROSION CONTROL DEVICES SHALL BE MAINTAINED UNTIL ALL TRIBUTARY SURFACES ARE STABILIZED.
18. REMOVAL OF EXISTING VEGETATION SHALL BE WITHIN THE LIMIT OF WORK AREA.
19. ALL EXCESS SOIL SHALL REMAIN ON-SITE IN AREAS TO BE DESIGNATED BY THE OWNER.
20. DISTURBED SOIL RESULTING FROM THE REMOVAL OF TEMPORARY MEASURES SHALL BE PERMENANTLY STABILIZED WITHIN 30 DAYS OF REMOVAL.



SILTATION BARRIER DETAIL
NOT TO SCALE

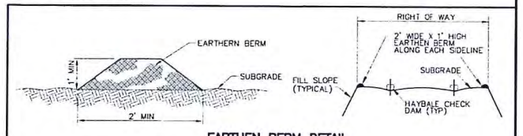


HAYBALE CHECK DAM DETAIL
NOT TO SCALE

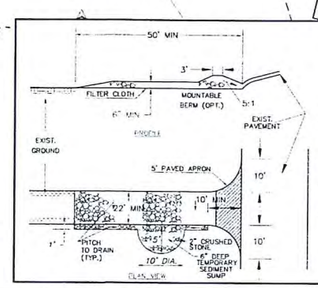
DEWATERING STILL DETAIL
N.T.S.

POLLUTION PREVENTION STANDARDS

1. ALL CONSTRUCTION AND DOMESTIC WASTE SHALL BE DISPOSED OF OFFSITE AT AN APPROVED LOCATION. WASTE CONTAINERS SHALL BE PROVIDED AT TEH START OF CONSTRUCTION. ON WORK DAYS, CLEAN UP AND DISPOSE OF WASTE INJ DESIGNATED WASTE CONTAINERS. ANY OVERFLOW SHALL BE CLEANED UP IMMEDIATELY.
2. PORTABLE TOILETS SHALL BE LOCATED ON SECURE GROUND IN AREA NOT PRONE TO FLIPPING OR BEING KNOCKED OVER.
3. ALL CONCRETE AND OTHER MATERIAL WASTEWATER MUST BE DIRECTED INTO LEAK-PROOF CONTAINERS. DO NOT DUMP LIQUID WASTE INTO STORM DRAINS. DISPOSE OF WASTE PROPERLY. LOCATE ALL WASHOUT AREAS AS FAR FROM ANY SURFACE WATERS AND STORMWATER INLETS AS POSSIBLE.
4. ALL AMENITIES SHALL BE LOCATED PRIOR TO THE START OF EACH PHASE OF CONSTRUCTION. ALL AMENITIES SHALL BE LOCATED OUTSIDE OF ANY BUFFER ZONES.



EARTHEN BERM DETAIL
NOT TO SCALE



CONSTRUCTION SPECIFICATIONS

1. THE ENTRANCE TO EACH PHASE SHALL INITIALLY HAVE 6" OF 2" CRUSHED STONE LAID DOWN AS A TRAFFIC SEDIMENT CONTROL SURFACE, AS SHOWN IN THE STABILIZED CONSTRUCTION ENTRANCE DETAIL. THIS STONE PACK SHALL BE PLACED OVER THE DRIVEWAY FOR A MINIMUM DISTANCE OF 50 FEET FROM THE EDGE OF PAVEMENT AND SHALL BE REMOVED AND REPLACED WITH DRIVEWAY GRAVEL PRIOR TO THE PLACEMENT OF PAVEMENT.
2. STONE SIZE – USE 2" CRUSHED STONE.
3. WIDTH – TWENTY (20) FOOT MINIMUM, BUT NOT LESS THAN THE FULL WIDTH AT POINTS OF INGRESS OR EGRESS.
4. FILTER CLOTH – WILL BE PLACED OVER THE ENTIRE AREA PRIOR TO THE PLACEMENT OF STONE.
5. SURFACE WATER – ALL SURFACE WATER FLOWING OR DIVERTED NEAR CONSTRUCTION ENTRANCES SHALL BE PIPED ACROSS THE ENTRANCE. IF PIPING IS IMPRACTICAL, A MOUNTABLE BERM WITH 5:1 SLOPES WILL BE PERMITTED.
6. MAINTENANCE – THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHT-OF-WAYS. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE AS CONDITIONS DEMAND AND REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT.
7. WASHING – WHEELS SHALL BE CLEANED TO REMOVE SEDIMENT PRIOR TO ENTRANCE ONTO PUBLIC RIGHT-OF-WAYS. WHEN WASHING IS DONE IT SHALL BE DONE ON STABILIZED ENTRANCE WITH STONE AND WHICH DRAINS INTO THE SEDIMENT SUMP AS SHOWN.
8. PERIODIC INSPECTION AND NEEDED MAINTENANCE SHALL BE PROVIDED AFTER EACH RAIN.

STABILIZED CONSTRUCTION ENTRANCE
NOT TO SCALE

LEGEND:

- EDGE OF VEGETATED WETLAND AS FLAGGED BY B&C ASSOCIATES
- 100' BUFFER ZONE, FROM B.V.W.
- 100' BUFFER ZONE, ISOLATED WETLAND (TOWN OF BOXBOROUGH WETLAND BYLAW)
- PROPERTY LINE

APPROVED BY:
BOXBOROUGH PLANNING BOARD

DATE: April 28, 2014

I, CLERK OF THE TOWN OF BOXBOROUGH, MASSACHUSETTS HEREBY CERTIFY THE NOTICE OF THE APPROVAL OF THIS PLAN BY THE BOXBOROUGH PLANNING BOARD HAS BEEN RECEIVED AND RECORDED AT THIS OFFICE AND NO APPEAL WAS RECEIVED DURRING THE TWENTY DAYS NEXT AFTER SUCH RECEIPT AND RECORDING OF SAID NOTICE.

April 1, 2015
DATE

TOWN CLERK

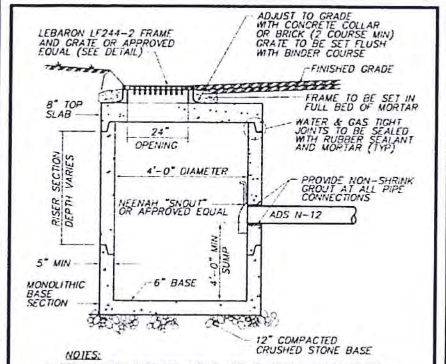
DEFINITIVE PLAN
BOXBOROUGH CENTER SUBDIVISION
BOXBOROUGH, MA.

EROSION AND SEDIMENTATION CONTROL PLAN

FOR: BOXBOROUGH TOWN CENTER, LLC.
SCALE: 1" = 40' DECEMBER 4, 2013
REVISED: FEBRUARY 19, 2014 REVISED: APRIL 7, 2014
REVISED: JANUARY 12, 2015

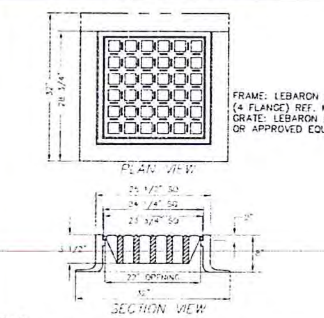
STAMSKI AND McNARY, INC.
1000 MAIN STREET ACTON, MASS.
ENGINEERING – PLANNING – SURVEYING
0 20 40 80 160

SM-2069 (2069 DEF ERO AND DETAIL 3.DWG) SHEET 7 OF 10



NOTES:
1. DETAILS NOT INDICATED ABOVE ARE TO BE SIMILAR TO THOSE SHOWN ON MHD STANDARD 201.4.0
2. FOR DESCRIPTION, MATERIALS AND CONSTRUCTION METHOD, SEE MHD SPECIFICATIONS.

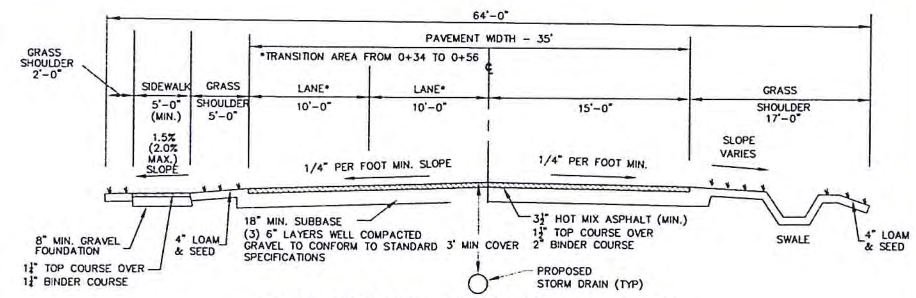
PRECAST CONCRETE CATCH BASIN DETAIL
NOT TO SCALE



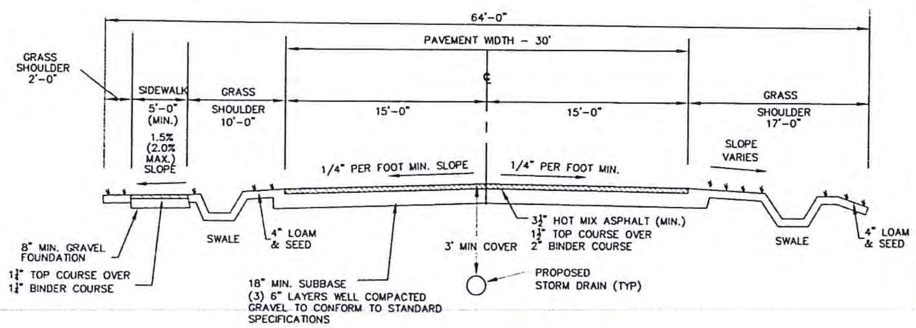
NOTES
FULLY MACHINED AND INTERCHANGABLE FRAMES AND COVERS
HIGH QUALITY MATERIALS AND WORKMANSHIP
COAL TAR EPOXY PAINTED
NO ROCK COVERS
H-20 LOADING RATE
WEIGHT OF GRATE 215 LBS
WEIGHT OF FRAME, 4 FLANGES 295 LBS
REFERENCE MHD STANDARD DETAIL 201.6.0

GRATE TO BE SET FLUSH WITH BINDER COURSE

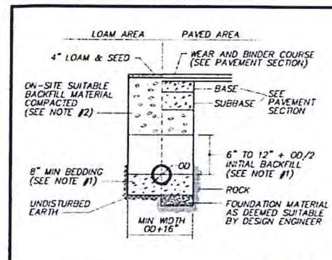
CATCH BASIN FRAME AND GRATE
NOT TO SCALE



TYPICAL ROAD CROSS-SECTION STA 0+00 TO 0+56
NOT TO SCALE (RS-19)



TYPICAL ROAD CROSS-SECTION STA 0+56 TO END
NOT TO SCALE



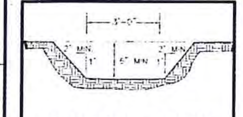
NOTES:
1. 3/4" SCREENED GRAVEL COMPACTED IN 6" MAX LIFTS TO AT LEAST 90% OF STANDARD PROCTOR DENSITY.

3/4" SCREENED GRAVEL REQUIREMENTS:

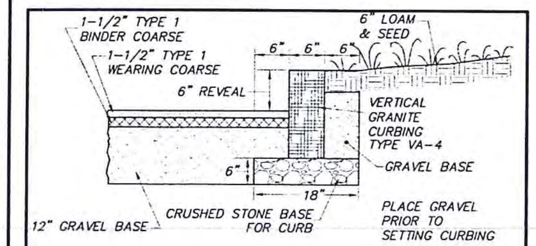
SIEVE SIZE	% FINER BY WEIGHT
1"	100
3/4"	90 - 100
1/2"	20 - 50
3/8"	0 - 20
# 4	0 - 5

2. BACKFILL MATERIAL, BELOW PAVED OR LOAM AREAS COMPACTED IN 6" MAX LIFTS TO NOT LESS THAN 90% OF STANDARD PROCTOR DENSITY, WITH STONES NO LARGER THAN 8 INCHES

TYPICAL DRAIN TRENCH DETAIL
NOT TO SCALE



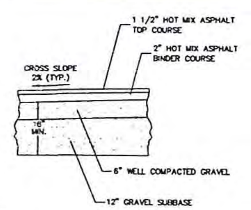
GRASSED CHANNEL DETAIL
NOT TO SCALE



VERTICAL GRANITE CURBING DETAIL
NOT TO SCALE VERTICAL GRANITE CURB.DWG

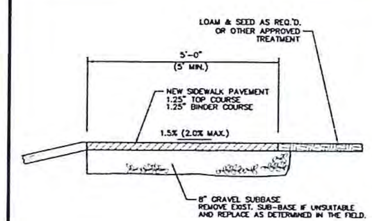
GENERAL NOTES:

1.) NO DEBRIS, JUNK, RUBBISH, OR OTHER NON-BIODEGRADABLE WASTE MATERIALS SHALL BE BURIED ON ANY LAND IN THE SUBDIVISION OR LEFT ON ANY LOT OR ON THE STREET RIGHT OF WAY, AND REMOVAL OF SAME SHALL BE REQUIRED PRIOR TO FINAL RELEASE OF ANY COVENANT OR SECURITY. BURIAL OF BIODEGRADABLE MATERIALS ON THE SITE SHALL BE SUBJECT TO APPROVAL OF THE BOARD OF HEALTH AND THE TOWN ENGINEER. THE BURIAL LOCATIONS AND DESCRIPTION OF BURIED MATERIALS SHALL BE NOTED ON THE AS-BUILT DRAWINGS. THE PLANNING BOARD MAY REQUIRE THAT THE DESCRIPTION AND LOCATION OF BURIED MATERIALS BE RECORDED IN THE REGISTRY OF DEEDS PRIOR TO RELEASE OF AFFECTED LOTS FOR SALE OR BUILDING.
2.) THE AREA BETWEEN PROPERTY LINES WITHIN THE RIGHT OF WAY SHALL BE CLEARED AND GRUBBED EXCEPT FOR THOSE TREES WHICH ARE INTENDED TO BE PRESERVED AS STREET TREES.
3.) ALL EXCAVATION SHALL CONFORM TO THE LINES AND GRADES SHOWN ON THE APPROVED DEFINITIVE PLAN. WHERE MUCKY SOILS, LEDGE, OR CLAY IS ENCOUNTERED WITHIN THE RIGHT-OF-WAY, IT SHALL BE REMOVED ENTIRELY AND, WHERE NECESSARY, REPLACED WITH SAND AND GRAVEL. WHERE WATER IS ENCOUNTERED, OR IS EXPECTED TO BE ENCOUNTERED, WITHIN FOUR FEET OF THE FINISHED GRADE OF THE STREET, SUBSURFACE DRAINAGE, OF A DESIGN ACCEPTABLE TO THE TOWN ENGINEER, SHALL BE CONSTRUCTED.
4.) BOULDERS OR LEDGE SHALL BE REMOVED TO A DEPTH OF AT LEAST TWENTY-FOUR INCHES BELOW FINAL GRADE WHEN WITHIN THE PAVEMENT AREA.
5.) MONUMENTS SHALL BE STANDARD GRANITE MARKERS OF NOT LESS THAN FOUR FEET IN LENGTH AND NOT LESS THAN FIVE INCHES IN WIDTH AND BREADTH, AND SHALL HAVE A DRILLHOLE IN THE CENTER. MONUMENTS SHALL BE SET FLUSH WITH THE FINAL GRADE.
6.) ALL UTILITY LINES AND/OR OTHER SUBSURFACE FACILITIES WITHIN RIGHT-OF-WAYS SHALL BE INSTALLED PRIOR TO THE PREPARATION OF THE STREET SUB-BASE.
7.) THE SUBDIVIDER SHALL PROVIDE AND INSTALL UTILITY IDENTIFICATION TAPE AT ALL UNDERGROUND UTILITY INSTALLATIONS. THE TAPE SHALL BE PLACED IN THE TRENCH A MINIMUM TWELVE INCHES TO THE FINAL GRADE. IDENTIFICATION TAPE FOR UTILITIES SHALL BE A DURABLE, NON-BIODEGRADABLE PLASTIC, APPROXIMATELY SIX INCHES WIDE BY FOUR-THOUSANDTHS INCHES IN THICKNESS. THE FOLLOWING COLORS SHALL BE USED:
ORANGE - COMMUNICATION CABLES OR CONDUIT, ALARM OR SIGNAL LINES
YELLOW - GAS, OIL PETROLEUM, STEAM OR OTHER GASEOUS MATERIAL
GREEN - SEWER AND DRAIN LINES
BLUE - WATER AND IRRIGATION
RED - ELECTRIC POWER LINES, CABLES, CONDUIT OR LIGHT CABLES
8.) ALL ELECTRIC AND COMMUNICATION LINES SHALL BE INSTALLED UNDERGROUND. COMMUNICATION LINES SHALL INCLUDE, BUT NOT BE LIMITED TO TELEPHONE, FIRE ALARM, AND CABLE TV.
9.) STREET SIGNS SHALL BE INSTALLED AT ALL INTERSECTIONS IN CONFORMITY WITH THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES AND THE SPECIFICATIONS OF PUBLIC WORKS. UNTIL SUCH TIME AS EACH STREET IS ACCEPTED BY THE TOWN AS A PUBLIC WAY, THE SIGN POSTS AT THE INTERSECTION OF SUCH STREET WITH ANY OTHER STREET SHALL HAVE AFFIXED THERETO A SIGN DESIGNATING SUCH STREET AS A PRIVATE WAY.
10.) STORMWATER MANAGEMENT ON LOTS SHALL BE DESIGNED IN CONJUNCTION WITH SITE PLAN REVIEW.

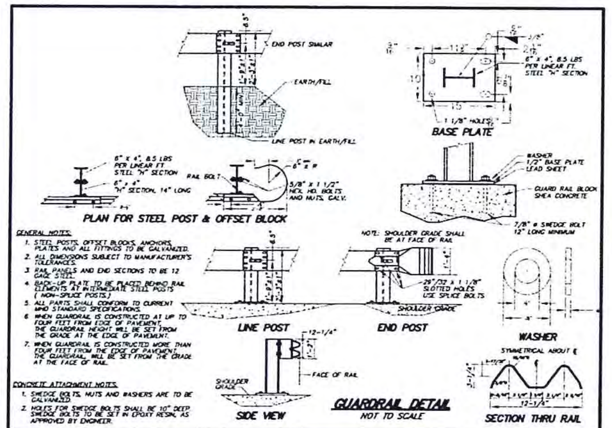


NOTES:
1. MINIMUM PAVEMENT THICKNESS SHOWN IS FOR RESIDENTIAL STREETS. PROPOSED PAVEMENT DESIGNS FOR OTHER ROADWAYS TO BE APPROVED BY TOWN ENGINEER.
2. RECLAIMED ASPHALT PAVEMENT MATERIAL MAY BE SUBSTITUTED FOR DENSE GRADED CRUSHED STONE AND GRAVEL SUB-BASE IF APPROVED BY TOWN ENGINEER.

TYPICAL PAVEMENT SECTION
NOT TO SCALE



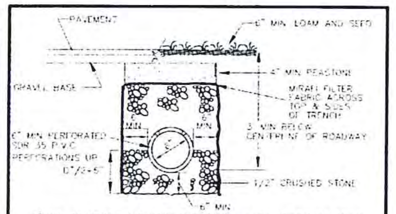
BITUMINOUS CONCRETE SIDEWALK
NOT TO SCALE (RS-7)



GENERAL NOTES:
1. STEEL POSTS, OFFSET BLOCKS, ANCHORS, PLATES AND ALL FITTINGS TO BE GALVANIZED.
2. ALL DIMENSIONS SUBJECT TO MANUFACTURER'S TOLERANCES.
3. RAIL PANELS AND END SECTIONS TO BE 12 GAGE STEEL.
4. BACK-UP PLATE TO BE PLACED BEHIND RAIL ELEMENTS AT INTERMEDIATE STEEL POSTS (NON-SPLICE POSTS.)
5. ALL PARTS SHALL CONFORM TO CURRENT MHD STANDARD SPECIFICATIONS.
6. WHEN GUARDRAIL IS CONSTRUCTED AT UP TO FOUR FEET FROM EDGE OF PAVEMENT, THE GUARDRAIL HEIGHT WILL BE SET FROM THE GRADE AT THE EDGE OF PAVEMENT.
7. WHEN GUARDRAIL IS CONSTRUCTED MORE THAN FOUR FEET FROM THE EDGE OF PAVEMENT, THE GUARDRAIL WILL BE SET FROM THE GRADE AT THE FACE OF RAIL.

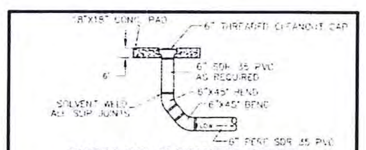
CONCRETE ATTACHMENT NOTES:
1. SWEDGE BOLTS, NUTS AND WASHERS ARE TO BE GALVANIZED.
2. HOLES FOR SWEDGE BOLTS SHALL BE 10" DEEP SWEDGE BOLTS TO BE SET IN EPOXY RESIN, AS APPROVED BY ENGINEER.

GUARDRAIL DETAIL
NOT TO SCALE



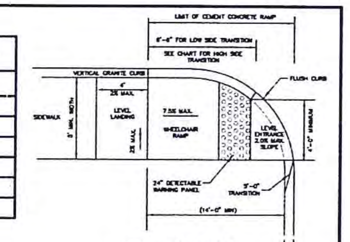
6" INV. TO BE SET 3.0' MINIMUM DISTANCE BELOW CENTERLINE GRADE

TYPICAL SUBDRAIN DETAIL
NOT TO SCALE



SUBDRAIN CLEANOUT DETAIL
NOT TO SCALE

ROADWAY PROFILE GRADE	*HIGH SIDE TRANSITION LENGTH
%	ENGLISH UNITS
=0%	6'-6"
>0% TO 1%	7'-8"
>1% TO 2%	9'-0"
>2% TO 3%	11'-0"
>3% TO 4%	14'-0"
>4% TO 5%	15'-0" MAX



CURB CUT DETAIL
NOT TO SCALE

APPROVED BY:
BOXBOROUGH
PLANNING BOARD

Adam Z. [signature]

DATE: April 28, 2014

I, CLERK OF THE TOWN OF BOXBOROUGH, MASSACHUSETTS HEREBY CERTIFY THE NOTICE OF THE APPROVAL OF THIS PLAN BY THE BOXBOROUGH PLANNING BOARD HAS BEEN RECEIVED AND RECORDED AT THIS OFFICE AND NO APPEAL WAS RECEIVED DURRING THE TWENTY DAYS NEXT AFTER SUCH RECEIPT AND RECORDING OF SAID NOTICE.

April 1, 2015
DATE

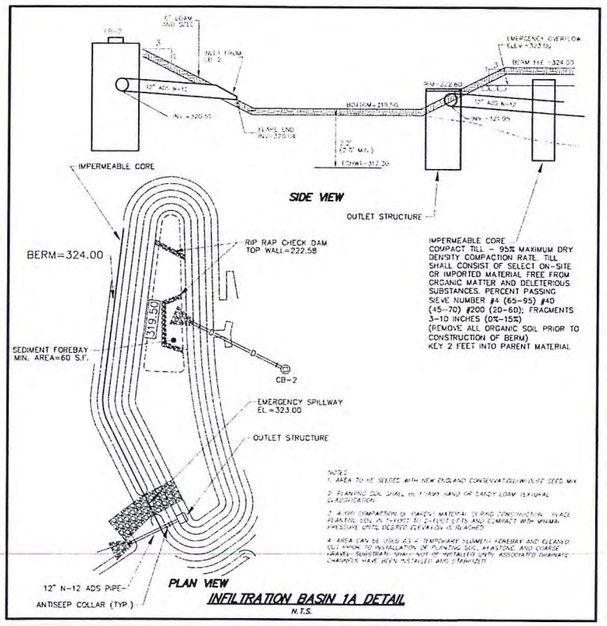
[signature]
TOWN CLERK

DEFINITIVE PLAN
BOXBOROUGH CENTER SUBDIVISION
BOXBOROUGH, MA.

CONSTRUCTION DETAILS
FOR: BOXBOROUGH TOWN CENTER, LLC.
DATE: DECEMBER 4, 2013
REVISED: FEBRUARY 19, 2014 REVISED: APRIL 2, 2014
REVISED: JANUARY 12, 2015

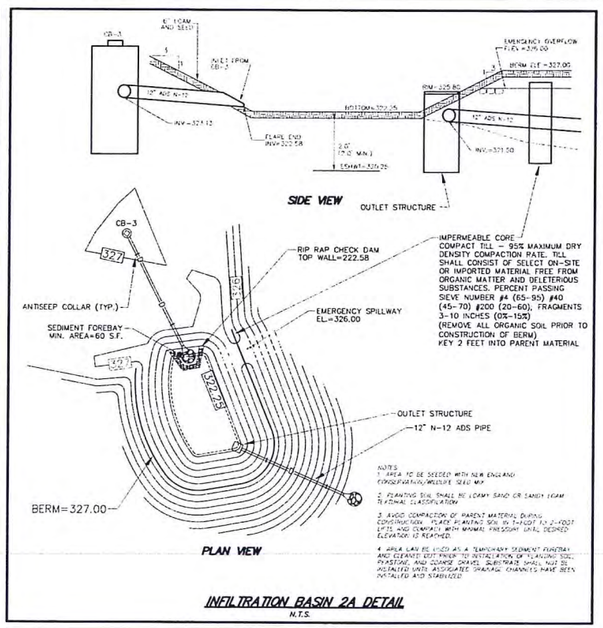
STAMSKI AND McNARY, INC.
1000 MAIN STREET ACTON, MASS.
ENGINEERING – PLANNING – SURVEYING
0 20 40 80 160

SM-2069 (2069 Def ERO AND DETAILS 3.DWG) SHEET 8 OF 10



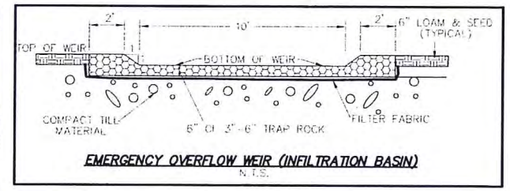
INFILTRATION BASIN 1A DETAIL

N.T.S.



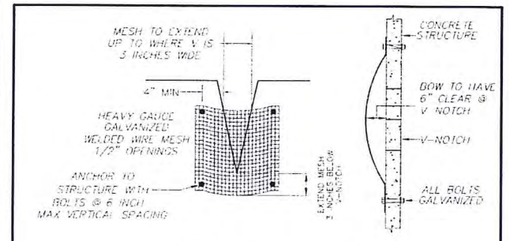
INFILTRATION BASIN 2A DETAIL

N.T.S.



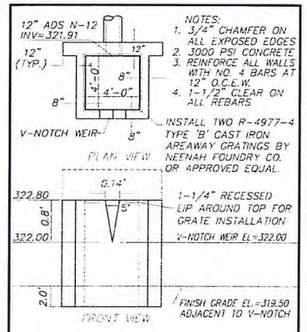
EMERGENCY OVERFLOW WEIR (INFILTRATION BASIN)

N.T.S.



TRASH SCREEN FOR ALL V-NOTCH WEIRS

NOT TO SCALE

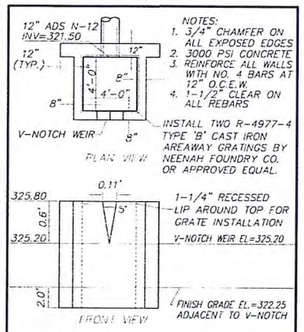


NOTES:
1. 3/4" CHAMFER ON ALL EXPOSED EDGES
2. 3000 PSI CONCRETE
3. REINFORCE ALL WALLS WITH NO. 4 BARS AT 12" O.C.E.W.
4. 1-1/2" CLEAR ON ALL REBARS

INSTALL TWO R-4977-4 TYPE 'B' CAST IRON AREAWAY GRATINGS BY NEENAH FOUNDRY CO. OR APPROVED EQUAL.

OUTLET STRUCTURE 1A DETAIL

NOT TO SCALE



NOTES:
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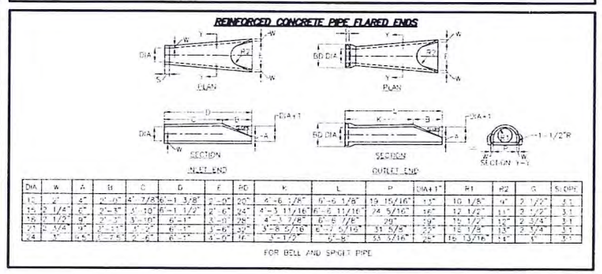
4. 1-1/2" CLEAR ON ALL REBARS

INSTALL TWO R-4977-4 TYPE 'B' CAST IRON AREAWAY GRATINGS BY NEENAH FOUNDRY CO. OR APPROVED EQUAL.

OUTLET STRUCTURE 2A DETAIL

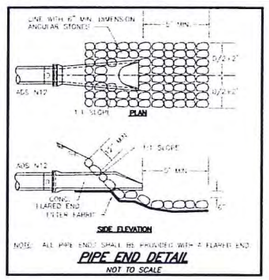
NOT TO SCALE



REINFORCED CONCRETE PIPE FLARED ENDS

DIA.	W	A	B	C	D	E	RD	K	L	P	DIA+1"	R1	R2	G	% DRP
12"	2'	4"	2'-0"	4'-7/8"	6'-1 3/8"	2'-0"	90°	4'-6 1/8"	6'-6 1/8"	19 15/16"	15"	10 1/8"	14"	2 1/2"	3:1
15"	2 1/4"	6"	2'-6"	5'-10"	6'-1 1/2"	2'-6"	84°	4'-3 11/16"	6'-6 11/16"	24 5/16"	18"	12 1/2"	15"	2 1/2"	3:1
18"	2 1/2"	9"	2'-9"	5'-10"	6'-1"	3'-0"	78°	4'-3 7/8"	6'-6 7/8"	28"	24"	15 1/2"	18"	2 3/4"	3:1
21"	2 3/4"	9"	3'-3"	6'-4"	6'-1"	3'-6"	72°	4'-8 5/16"	6'-7 5/16"	31 5/8"	33"	18 1/8"	21"	3 1/4"	3:1
24"	3"	12"	3'-6"	6'-8"	6'-1"	4'-0"	66°	5'-1 1/2"	6'-8"	35 7/16"	36"	19 13/16"	24"	3"	3:1

FOR BELL AND SPIGOT PIPE



NOTE: ALL PIPE ENDS SHALL BE PROVIDED WITH A FLARED END

PIPE END DETAIL

NOT TO SCALE

DRAINAGE SYSTEM OPERATION AND MAINTENANCE PLAN

1. BMP OWNER:
   DURING CONSTRUCTION: BOXBOROUGH TOWN CENTER, LLC
   AFTER CONSTRUCTION: TOWN OF BOXBOROUGH

2. PARTIES RESPONSIBLE FOR OPERATION/MAINTENANCE:
   DURING CONSTRUCTION: BOXBOROUGH TOWN CENTER, LLC
   AFTER CONSTRUCTION: TOWN OF BOXBOROUGH

3. SCHEDULE FOR INSPECTION AND MAINTENANCE:

DEEP SUMP AND HOODED CATCH BASINS:
DURING CONSTRUCTION, CATCH BASIN GRATES SHALL BE WRAPPED WITH FILTER FABRIC. CATCH BASINS SHALL BE CLEANED UPON THE COMPLETION OF CONSTRUCTION. AFTER CONSTRUCTION, THE DEEP SUMPS FOR ALL CATCH BASINS SHALL BE INSPECTED MONTHLY AND CLEANED FOUR TIMES A YEAR. SEDIMENT REMOVED SHALL BE DISPOSED OF IN ACCORDANCE WITH APPLICABLE LOCAL, STATE, AND FEDERAL GUIDELINES AND REGULATIONS.

STREET SWEEPING:
THE ROADWAYS SHALL BE SWEPT UPON THE COMPLETION OF CONSTRUCTION. ROADWAYS SHALL BE SWEPT AT LEAST TWICE A YEAR, ONCE AT THE BEGINNING OF SPRING AND ONCE AT THE END OF AUTUMN. THE ROADS SHALL ALSO BE SWEPT UPON THE DISCOVERY OF ANY SIGNIFICANT AMOUNTS OF SEDIMENT.

INFILTRATION / DETENTION BASINS:
DURING CONSTRUCTION, SIDE SLOPES OF THE BASINS SHALL BE INSPECTED FOR EROSION. ALL ERODED AREAS SHALL RECEIVE 6" OF LOAM AND SHALL BE RESEEDED PER THE DESIGN PLAN. DURING THE FIRST YEAR AFTER CONSTRUCTION INSPECTION SHOULD BE CONDUCTED MONTHLY. AREAS OF CONTINUED EROSION SHOULD BE STABILIZED WITH CRUSHED STONE. THE BASINS SHALL BE CLEANED UPON THE ACCUMULATION OF 6 INCHES OF SEDIMENT DURING CONSTRUCTION. THE BASINS SHALL BE CLEANED UPON THE COMPLETION OF CONSTRUCTION.

AFTER CONSTRUCTION, THE INLET PIPE AREA SHOULD BE CLEANED ONCE PER YEAR. SEDIMENT SHALL BE REMOVED FROM THE BASINS BY HAND ONCE EVERY 10 YEARS TO THE DEPTHS SPECIFIED ON THE PLANS. DURING THE FIRST THREE YEARS AFTER CONSTRUCTION, THE BASINS SHALL BE INSPECTED DURING THE GROWING AND NON-GROWING SEASON TWICE PER YEAR. DATA GATHERED DURING THESE INSPECTIONS SHOULD BE RECORDED, MAPPED AND ASSESSED.

- GRASSES SHALL BE INSPECTED FOR SURVIVAL RATE. ANY BARE AREAS SHALL BE RESEEDED PRIOR TO THE END OF THE GROWING SEASON.
- THE BASINS SHALL BE INSPECTED FOR AREAS OF CONCENTRATED SEDIMENT DEPOSITS. CONCENTRATED SEDIMENT DEPOSITS SHALL BE REMOVED BY HAND.
- SIDESLOPES OF THE BASINS SHALL BE INSPECTED FOR EROSION. ALL ERODED AREAS SHALL RECEIVE 6" OF LOAM AND SEED ACCORDING TO THE PLANS.

THE OUTLET STRUCTURES SHALL BE INSPECTED FOR OBSTRUCTIONS. ALL
- OBSTRUCTIONS SHALL BE REMOVED UPON INSPECTION. ALL SEDIMENT THAT HAS ACCUMULATED IN THE STRUCTURE SHALL BE REMOVED BY HAND.

GRASSED CHANNELS:
GRASSED CHANNELS SHALL BE INSPECTED SEMI-ANNUALLY THE FIRST YEAR AND AT LEAST ONCE A YEAR THEREAFTER. INSPECT THE GRASS FOR GROWTH AND THE SIDE SLOPES FOR SIGNS OF EROSION AND FORMATION OF RILLS AND GULLIES. IF GRASS GROWTH IS IMPAIRED BY WINTER ROAD SALT OR OTHER DEICER USE, RE-ESTABLISH THE GRASS IN THE SPRING. REMOVE ACCUMULATED THRASH AND DEBRIS PRIOR TO MOWING. CHECK SEDIMENT BUILDUP YEARLY AND CLEAN AS NEEDED USING HAND METHODS.

EMERGENCY CONTACTS:
IN THE EVENT OF A HAZARDOUS MATERIALS SPILL ON THE SITE THE FOLLOWING PARTIES SHALL BE CONTACTED:

BOXBOROUGH FIRE DEPARTMENT

RECORDS:
THE OWNER SHALL MAINTAIN AN INSPECTION LOG OF ALL ELEMENTS OF THE STORM WATER MANAGEMENT PLAN. THE OWNER SHALL MAINTAIN A MAINTENANCE LOG DOCUMENTING THE INSPECTION AND MAINTENANCE OF THE DRAINAGE STRUCTURES UNDER HIS CONTROL. A COPY OF THE EROSION CONTROL AND STORM WATER MAINTENANCE PLAN AND INSPECTION LOGS SHALL BE KEPT ONSITE AT ALL TIMES.

APPROVED BY:
BOXBOROUGH
PLANNING BOARD

DATE: April 28, 2014

I, CLERK OF THE TOWN OF BOXBOROUGH, MASSACHUSETTS HEREBY CERTIFY THE NOTICE OF THE APPROVAL OF THIS PLAN BY THE BOXBOROUGH PLANNING BOARD HAS BEEN RECEIVED AND RECORDED AT THIS OFFICE AND NO APPEAL WAS RECEIVED DURRING THE TWENTY DAYS NEXT AFTER SUCH RECEIPT AND RECORDING OF SAID NOTICE.

April 1, 2015
DATE

TOWN CLERK

DEFINITIVE PLAN
BOXBOROUGH CENTER SUBDIVISION
BOXBOROUGH, MA.

CONSTRUCTION DETAILS
FOR: BOXBOROUGH TOWN CENTER, LLC.
DATE: DECEMBER 4, 2013
REVISED: FEBRUARY 19, 2014, REVISED: APRIL 2, 2014
REVISED: JANUARY 12, 2015

STAMSKI AND McNARY, INC.
1000 MAIN STREET ACTON, MASS.
ENGINEERING – PLANNING – SURVEYING
0 20 40 80 160

SM-2069 (2069 Def ERO AND DETAILS 3.DWG) SHEET 9 OF 10

Concept Plant Schedule

- Shade Specimen – Gleditsia triacanthos inermis "Shademaster" 2½"
- Winter Pine – Pinus strobus 6-7'
- Heritage River Birch – Betula nigra 8-10'
- Kwanzan Cherry – Cerasus serrulata 2"
- Evergreen [illegible]
- Flowering [illegible]

Ground Cover Specifications for Disturbed Areas

- Lawn Areas: Fairway Pro Seed
  - 35% Perennial Rye
  - 30% Creeping Red
  - 35% Kentucky Blue Grass
- Wet Areas: New England Wet Mix (Regional Wetlands)
- Dry Natural Areas: New England Conservation Mix by New England Wetland Plants, Inc.

Plantings Notes:

1.) All [illegible] to be planted shall conform to all applicable local, state and [illegible].

2.) Plant material and installation must meet the current standards recommended by the [illegible] of the [illegible].

3.) All plants material shall have a one year guarantee from date of acceptance.

4.) Contractor shall adhere to the [illegible] of the [illegible] approved.

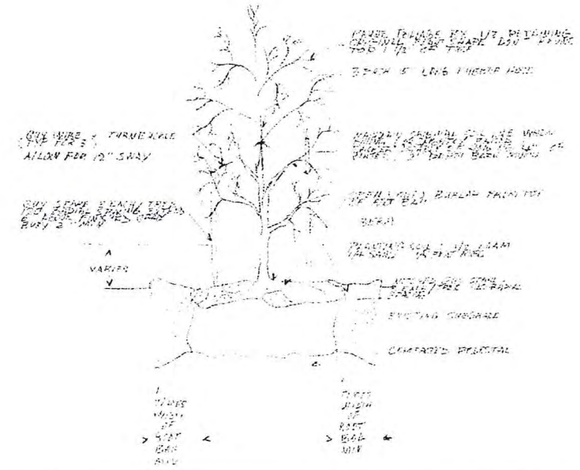
5.) Apply [illegible] to the growth mix of the plantings.

6.) [illegible] shall be [illegible] to [illegible].

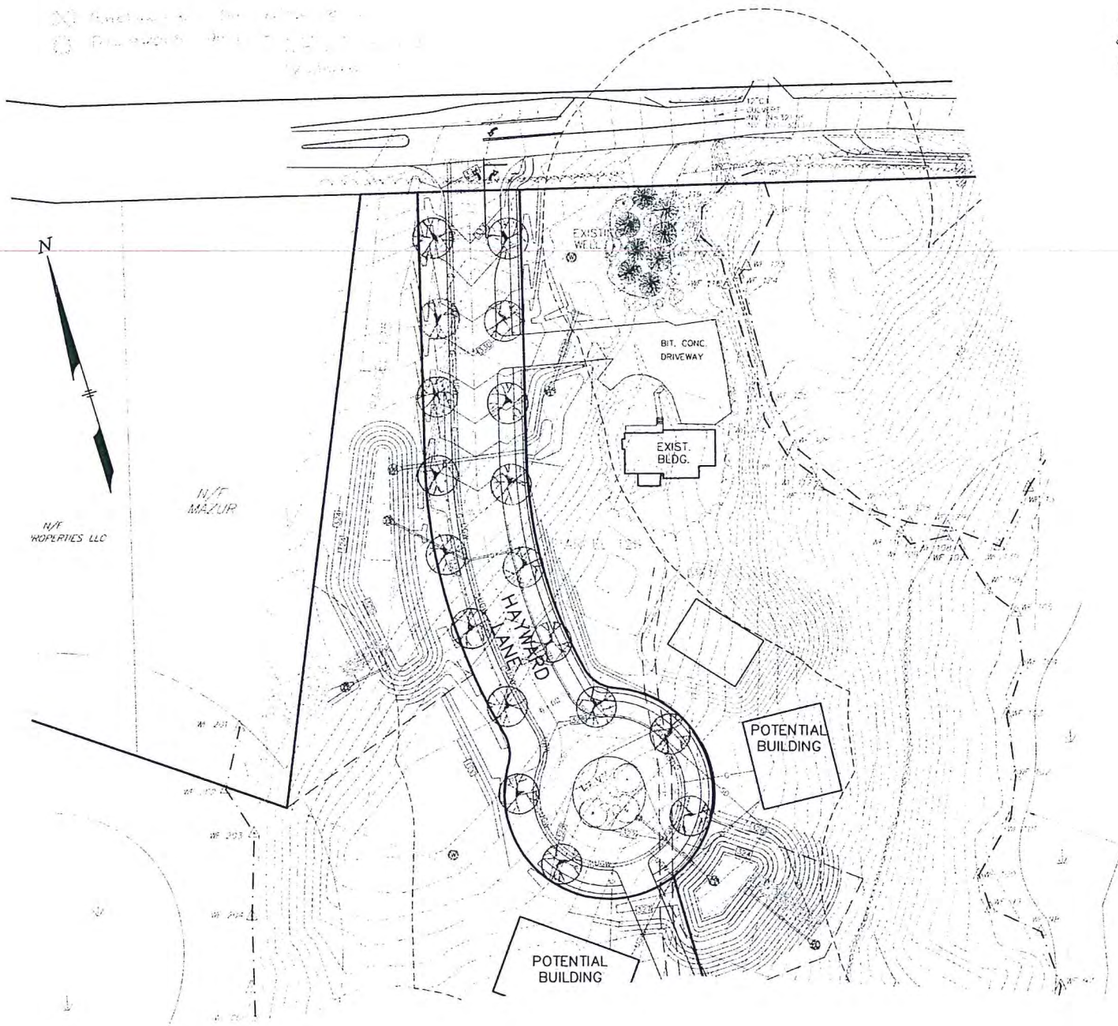
7.) Staking – [illegible] to [illegible].

8.) Testing of all on-site [illegible] is required [illegible].

9.) Site will be kept in a neat and orderly manner.



Tree Planting



APPROVED BY:
BOXBOROUGH
PLANNING BOARD

Adam L. [illegible]

DATE: April 28, 2014

I, CLERK OF THE TOWN OF BOXBOROUGH, MASSACHUSETTS HEREBY CERTIFY THE NOTICE OF THE APPROVAL OF THIS PLAN BY THE BOXBOROUGH PLANNING BOARD HAS BEEN RECEIVED AND RECORDED AT THIS OFFICE AND NO APPEAL WAS RECEIVED DURRING THE TWENTY DAYS NEXT AFTER SUCH RECEIPT AND RECORDING OF SAID NOTICE.

April 1, 2015
DATE

[illegible]
TOWN CLERK

DEFINITIVE PLAN
BOXBOROUGH CENTER SUBDIVISION
BOXBOROUGH, MA.

LANDSCAPE PLAN

FOR: BOXBOROUGH TOWN CENTER, LLC.
SCALE: 1" = 40' DECEMBER 4, 2013
REVISED: FEBRUARY 19, 2014

DESIGN BY: [illegible]

STAMSKI AND McNARY, INC.
1000 MAIN STREET ACTON, MASS.
ENGINEERING – PLANNING – SURVEYING

0 20 40 80 160

SM-2069 (2069 DEF 1.DWG) SHEET 10 OF 10

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

Certified Mail: 70092250000225615260

April 29, 2014

Boxborough Town Center, LLC
P.O. Box 985
West Acton, MA 01720

Re: Boxborough Town Center Definitive Subdivision Plan

Dear Applicant,

On April 28, 2014, the Planning Board voted to grant approval of the Boxborough Town Center Definitive Subdivision Plan. Enclosed is a copy of the Decision, which was filed with the Town Clerk on Monday, April 28, 2014.

Following the 20-day appeal period, you will receive the original signed decision. Pursuant to Subdivision Rules & Regulations, this original decision is required to be recorded with the Middlesex South Registry of Deeds and proof of recording provided to the Planning Department.

Please give me a call if you have any questions or need any assistance as you move forward through the permitting process.

Sincerely,

Elizabeth Hughes

Elizabeth Hughes
Town Planner

cc: File Copy
John J. Lyons, Trustee of Mane Realty Trust, 571 Burroughs Rd., Boxborough, MA 01719
Stamski and McNary, Inc., 1000 Main Street, Acton, MA 01720

H:\My Documents\Applications\Subdivisions\Letters\Decision Transmittal

APR 30 2014

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

James Faulkner, Chairman Eduardo Pontoriero, Clerk Owen Neville John Markiewicz Nancy Fillmore

DECISION AND CERTIFICATE OF CONDITIONAL APPROVAL
BOXBOROUGH TOWN CENTER DEFINITIVE SUBDIVISION PLAN

DECISION of the Planning Board (the Board) on the application of Boxborough Town Center, LLC. (Applicant) for a Definitive Subdivision Plan for properties located on the south side of Massachusetts Avenue, approximately 300 feet west of the intersection of Massachusetts Avenue and Stow Road. The properties are identified as Assessor's Parcel Number: 06-4-122-0.0 and 06-4-126-0.0 (800 Massachusetts Avenue).

This Decision is in response to an application filed on December 9, 2013 to subdivide 2 existing lots into two buildable lots with access off a new subdivision roadway.

After causing notice of the time and place of the public hearing and of the subject matter thereof to be published on January 9th and 16th, 2014, posted and mailed to the Applicant, abutters and other parties of interest as required by law, the public hearing was conducted on January 27, 2014 and continued to February 24th, March 24th, April 7th, and April 28th. A site visit was conducted on February 18, 2014. The applicant granted two extensions the 90-day final action time period to April 8th and to April 29th, 2014 that were accepted by the Planning Board and filed with the Town Clerk on February 24th and April 3rd respectively.

After due consideration of the application, the record, the Town Planner's reports, the Town's Consulting Engineer's reviews, comments from other Town Boards, Committees and Departments, and based upon the findings set forth herein, the Board closed the public hearing on April 28, 2014 and voted 4 to 0 to **GRANT** conditional approval of the Definitive Subdivision Plan.

This Decision and Certificate of Conditional Approval is granted with no waivers and is subject to conditions, limitations and restrictions outlined herein. Final approval will be indicated by endorsement on the Definitive Plan after the statutory twenty (20) day appeal period and shall be contingent upon the Applicant's provision of an adequate Performance Guarantee for installation of all roadway improvements and monuments and compliance with the conditions of approval.

Definitive Subdivision Plan Requested Waivers

In approving the Definitive Subdivision Plan (Plan), the Planning Board reviewed and acted on the following requested waiver:

1. Section III.C.4 requires the submission with the Plan a landscape plan prepared by a registered landscaped architect. The landscape plan submitted by the applicant was not prepared by a registered landscape architect and the Board found the proposed plantings to be inappropriate for their location. The Board **DENIES** this requested waiver and requires a landscape plan prepared by a registered landscape architect to be submitted and approved prior to endorsement of the Definitive Plan.

Findings for Approval of a Definitive Subdivision Plan

1. The Plan is for two lots with frontage on a new right-of-way to allow the construction of a 397-foot long and 30-foot wide roadway with a fully compliant cul-de-sac and designated turning lanes for the future development of a mixed use retail-residential project.
2. The Plan incorporates significant improvements to Massachusetts Avenue (Route 111) to meet the AASHTO minimum standard for the posted speed limit to provide safe access, sight distance and stopping sight distance to the site for construction and future uses of the site so that the development does not entail unwarranted hazard to safety, health and convenience because of possible traffic hazards.
3. The Plan has been prepared in conformance with Section IV Design Standards for an arterial roadway with no waivers to those standards and additional traffic studies may be required for the future development of the properties so that the development does not entail unwarranted hazard to safety, health and convenience because of possible traffic hazards.
4. The existing driveway off Massachusetts Avenue to the residence at 800 Massachusetts Avenue is to be relocated to the new roadway to improve vehicle safety and the Board consents pursuant to Section IV.H to allowing the existing residential use to remain.
5. The proposed on-site drainage incorporates Low Impact Design concepts and infiltration basins to collect and control run-off from the roadway and has been found by the Town's Consulting Engineer to be adequate to handle stormwater runoff.
6. The construction of the stormwater infiltration basin 1A encroaches into the 100-foot buffer of a wetland and will require conformance with the Town's Wetland Bylaw and the filing of a Notice of Intent with the Boxborough Conservation Commission.
7. The Applicant has not proposed any street lighting, but the Plan incorporates adequate area within the road right-of-way for the installation of underground utilities should it be determined that street lights are required in the future for public safety.
8. The Plan does not incorporate any fire protection system(s) as part of the development of the subdivision roadway and the future development of the properties may require the installation of fire protection system(s) for adequate public health and safety.
9. The Board of Health has approved the Plan with conditions and those conditions have been incorporated into this Decision.
10. The Plan as conditioned by this Decision has been found to be consistent with the purposed of the Subdivision Control Law.

Conditions of Approval

1. Approval is based upon the following Plans prepared for Boxborough Town Center, LLC. by Stamski and McNary, Inc. dated December 4, 2013 and revised through April 2, 2014, as amended by Condition #2:
   a. Sheet 1 Cover, Sheet 2 & 3 Definitive Record Plan, Sheet 4 & 5 Site Development Plan, Sheet 6 Plan & Profile, Sheet 7 Erosion & Sediment Control Plan, Sheet 8 & 9 Construction Details.

2. **Prior to endorsement of approval of the Plan,** the Plan shall be revised to show:
   a) The road cross-section is not centered at the intersection with the creation of two turning lanes. The geometry shall be labeled on the Plan to facilitate construction.
   b) Correction of the parcel boundaries and Assessor Parcel Numbers in conformance with the Plan #278 of 2013 recorded with the Middlesex South Registry of Deeds on December 10, 2013.
3. **Prior to endorsement of approval of the Plan,** the Applicant shall provide to the Board for approval the following:
   a) An acceptable Performance Guarantee reviewed and approved as to form by Town Counsel and the Town's Consulting Engineer.
   b) A Landscape Plan prepared by a registered landscape architect that incorporates appropriate street trees and plantings in the cul-de-sac island and a mixture of deciduous trees and shrubs in the location of the existing driveway for 800 Massachusetts Avenue.
   c) The Applicant shall submit a fee of $160 to the GIS Assessor Map Revolving Fund.
4. **Prior to the commencement of any site work for the roadway construction,** the Applicant shall complete all required improvements to Massachusetts Avenue (Route 111) and a stamped drawing by a Professional Land Surveyor or Engineer has been provided certifying that the sight distance meets the AASHTO standards. The applicant shall send to the Town Planner in a timely manner copies of all submittals and communications with MassDOT relative to the improvements in Massachusetts Avenue.
5. **Prior to the commencement of any site work for the roadway construction,** the Applicant shall receive and record with the Middlesex South Registry of Deeds an Order of Conditions, or Superseding Order of Conditions, issued under the Wetlands Protection Act. A copy of the recorded Order or Superseding Order shall be provided to the Town Planner.
6. **Prior to the commencement of any site work for the roadway construction,** the Applicant shall provide to the Town Planner and the Town's Consulting Engineer an approved copy of the Stormwater Pollution Prevention Plan as required for the National Pollution Discharge Elimination System (NPDES) permit.
7. **Prior to the commencement of any site work for the roadway construction,** the Applicant shall to submit to the Town Planner written confirmation from the Tax Collector that all taxes, including any roll back taxes, have been paid in full for the properties.
8. **Prior to the commencement of any site work for the roadway construction,** the Applicant shall record the Decision, the Plan, and the Performance Guarantee with the Middlesex South Registry of Deeds and provide verification of recording to the Town Planner.
9. **During construction of the roadway,** the Applicant shall provide 72 hours notice to the Town Planner and the Town's Consulting Engineer for the following required inspections:
   a) Pre-construction meeting with contractor after installation of erosion control, provisions to protect stonewalls and any other site feature identified as to remain.
   b) After clearing, grubbing, stump removal, excavation to subgrade and excavation of ditches for utilities. Each utility is responsible for inspections of their respective utility installation.

c) After drainage system (pipe, manholes, catch basins and other drainage structures) is installed, but before it is covered. The Town's Consulting Engineer shall sight drainage pipe runs to adjacent basins. Any defective runs shall be corrected before approval is given.

d) Prior to the installation of binder course, the Town's Consulting Engineer shall inspect and verify the roadway base is adequate. Such verification shall include the results of any material sample testing and compaction testing (95% Proctor). All sampling, testing and analysis shall be at the sole expense of the Applicant.

e) The roadway binder course shall be laid within one week of the completion of construction of the roadway base, unless otherwise authorized by the Town's Consulting Engineer.

f) During the installation of binder and finish bituminous concrete. The Town's Consulting Engineer shall be on-site during the installation of any pavement for the roadway.

g) Periodic inspection of erosion control practices. Inspection shall be a minimum of twice a year if construction is initiated but not complete.

h) Review of completed as built plans for accuracy.

i) At other specific times deemed necessary by the Board, Town Planner, Building Inspector or Town's Consulting Engineer.

10. **Prior to the release of the Performance Guarantee,** the driveway for 800 Massachusetts Avenue shall be relocated to the new roadway.

11. **Prior to the release of the Performance Guarantee,** the Town Planner shall verify that all plantings shown on the approved Landscape Plan have been installed. Any minor modification or substitutions shall be reviewed and approved by the Town Planner.

12. **Prior to the release of the Performance Guarantee,** the Town Planner and/or the Town's Consulting Engineer shall confirm that all site work has been maintained within the "Limit of Clearing" as defined on the Plan. Should it be determined that work has been done outside of the "Limit of Clearing", the Planning Board will withhold the release of the Performance Guarantee until the area has been restored or draw upon the Performance Guarantee and have the restoration completed by an outside contractor.

13. **Prior to the release of the Performance Guarantee,** the Applicant shall provide to the Town Planner as built drawings of the roadway improvements, location of utilities and pavement. The Town Planner shall also receive final As Built plans in electronic format compatible with the Town's GIS system.

<u>General Permit Conditions</u>

14. This Decision is for the subdivision roadway and appurtenances only. The future development of each lot shall be subject to Site Plan Approval.

15. Any changes or modifications to the stormwater drainage system shall be re-evaluated by the Applicant to accommodate all tributary runoff from the roadway and site development. Any changes or modification shall be reviewed by the Town's Consulting Engineer and the Planning Board to determine whether the applicant is required to file for a modification to this Decision.

16. The number of dwelling units served by the new dead-end subdivision roadway shall not exceed ten (10) units.
17. All lots shall have a source of potable water, as defined by the Boxborough Well Regulations.
18. All lots shall comply with Title 5 and Boxborough Sewage Disposal System regulations.
19. All grading and clearing of the site shall comply with DEP's Woodwaste Policy and Site Assignment Regulations.
20. Standing water in any retention/detention structures shall be minimized.
21. The use of perchlorate based blasting materials is prohibited.
22. The Applicant shall install all required conduit for the installation of underground utilities should it be determined that street lights are required in the future for public safety.
23. The Applicant shall reserve the fee in the roadway and easements on any conveyances of the subdivision lots.
24. The Applicant shall maintain the road, including plowing and treating, and all other improvements within the subdivision in a condition which meets all the requirements of the Subdivision Rules and Regulations until such time as the road is accepted by Town Meeting as a public way.
25. No loam shall be removed from the site. Any other earth material required to be removed from the site shall leave the premises only during permitted hours. All loaded vehicles shall be suitably covered to prevent dust and contents from spilling and blowing from the load.
26. Site preparation, grading and exterior construction shall be conducted during the hours of 7:00 A.M. to 6:00 P.M., Monday through Friday and 8:00 A.M. to 4:00 P.M. on Saturday. No earth is to be excavated or removed on Sundays or Massachusetts legal holidays. These hours of operation may be altered only upon written authorization of the Planning Board.
27. No earth work operation shall be conducted, maintained, and/or left in a condition so as to alter the natural drainage flow beyond the property; or cause dust, silt, soil, or other materials to be deposited on adjacent properties; or to otherwise cause nuisances, hazards, or other objectionable conditions detrimental to health, safety, or property values in adjacent areas.
28. The Applicant shall pay all fees and costs incurred by the Board for the employment of outside consultants, such as Town Counsel and Engineers, engaged by the Board for review of any project plans, documents and construction activity associated with this project. Funds received by the Board shall be deposited with the municipal treasurer who shall, pursuant to MGL Ch. 44, Sec. 53G, establish a special account for this purpose.
29. Violation of any of the conditions of this decision shall be grounds for revocation of this Decision, or of any building or occupancy permit granted hereunder. In case of any violation of the continuing obligations of this Decision, the Town will notify the owner of such violation and give the owner reasonable time, not to exceed thirty (30) days, to cure the violation and to enforce the conditions of this permit. The Town may enforce compliance with the conditions of this Decision by any action of injunctive relief before any court of competent jurisdiction.
30. Construction of all ways and all installation of municipal services shown on the Plan shall be completed within three (3) years of the date of approval unless the Applicant obtains a

written extension from the Planning Board. If the construction and installation is not completed within the three (3) year period or an extension granted, the approval shall automatically lapse and no way shall be laid out, constructed or opened for public use unless and until a new Definitive Plan application has been filed in accordance with the Rules and Regulations then in effect and the new plan has been approved by the Board. The Board may enforce or draw upon any Performance Guarantee to complete the construction of the roadway if it is not completed within three (3) years or a written extension has not been requested by the Applicant.

31. If at any time, the construction of the roadway is not in compliance with the Decision and Certificate of Conditional Approval and the Subdivision Rules and Regulations, the Planning Board may order that work on the construction of the roadway be stopped, and request the Building Inspector defer the issuance of any building permits or certificates of occupancy until the non-compliance is corrected.

This Decision applies only to the site which is the subject of this application. All construction to be conducted on the site shall be conducted in accordance with the terms of this Decision and shall be limited to the improvements shown on the Plan.

The Planning Board shall have the power to modify or amend the terms and conditions of this Certificate of Approval on the application of the owner or mortgagee of the premises or upon its own motion to correct technical errors in this Decision. The Board further reserves its powers to amend this Decision to correct technical errors without a new public hearing provided that the Board finds that such amendment is not significant to the public interest and that such amendment is not inconsistent with the purpose and intent of the Subdivision Rules & Regulations, the Zoning Bylaw or with the terms of this Decision. All the provisions of this paragraph applicable to approval shall, where appropriate, be applicable to such modification or amendment.

The foregoing conditions are stated for the purpose of emphasizing their importance, but are not intended to be all inclusive or to negate the remainder of the Boxborough Zoning Bylaw. Other permits or approvals required by the Boxborough Zoning Bylaw, other governmental boards, agencies or bodies having jurisdiction shall not be assumed or implied by this Decision.

By acceptance of this Decision by the Applicant and recording thereof the Applicant acknowledges the binding effect of the conditions of this Decision. Appeals, if any, shall be made in accordance with M.G.L. Ch. 41S. 81BB within twenty (20) days after this decision is filed with the Town Clerk.

ON BEHALF OF THE BOXBOROUGH PLANNING BOARD:

Elizabeth Hughes

Elizabeth Hughes, Town Planner

Decision filed with the Office of the Town Clerk:

Elizabeth A. Markiewicz, Town Clerk

April 28, 2014
Date

Alternative #2

Preliminary Site Plan- May 21, 2016
Concept Plan A2- September 9, 2015
Concept Plan 2- March 30, 2015
Concept Plan- January 20, 2015

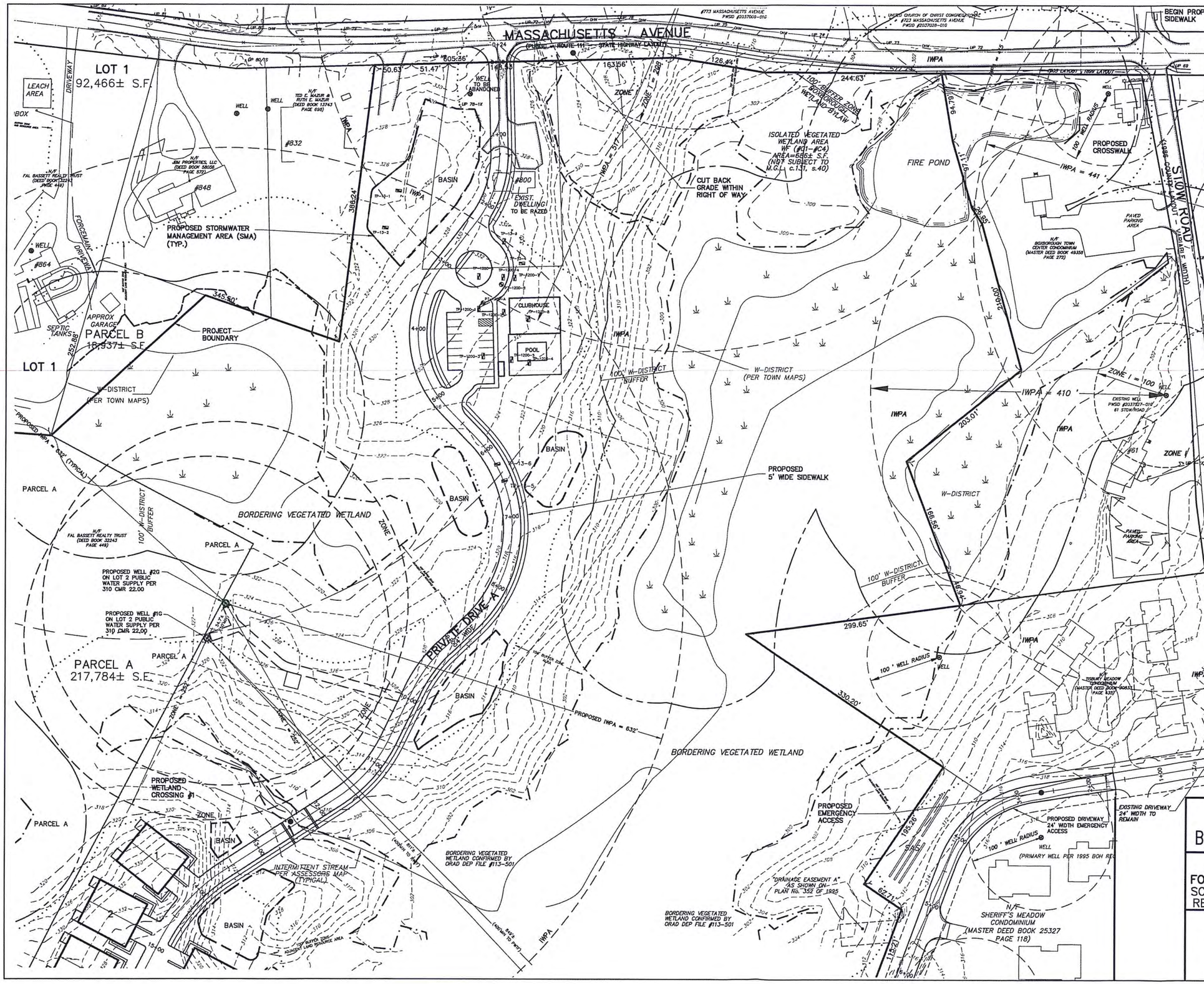
PRELIMINARY SITE PLAN
IN
BOXBOROUGH, MASSACHUSETTS

LAYOUT PLAN
FOR: BOXBOROUGH TOWN CENTER, LLC
SCALE: 1"=120' MARCH 14, 2016
REVISED: MAY 21, 2016

STAMSKI AND MCNARY, INC.
1000 MAIN STREET ACTON, MASSACHUSETTS
ENGINEERING – PLANNING – SURVEYING

0 60 120 240 360 480 FT

(2069 SITE3A.dwg) Sheet 1 of 3 SM-2069



LAND USE DATA, BOXBOROUGH ZONING BYLAW AMENDED THROUGH TOWN MEETING MAY 2012

ZONING DISTRICT: TOWN CENTER DISTRICT & W-DISTRICT

ARTICLE IV. USE REGULATIONS	ALLOWED:
TWO-FAMILY DWELLING, RESERVED EXCLUSIVELY FOR ELDERLY OCCUPANCY	YES*

*REFER TO SECTION 5004: FOR MULTI-FAMILY DWELLING IN TC DISTRICT RESERVED EXCLUSIVELY FOR ELDERLY OCCUPANCY, DENSITY NOT TO EXCEED 10 UNITS/80,000 SF LAND AREA

MAX DENSITY: 2,519,610/80,000= 31.4 x 10 UNITS= 314 UNITS
PROPOSED DENSITY: 50 DUPLEXES= 100 UNITS

ARTICLE V. DIMENSIONAL REQUIREMENTS

	REQUIRED:	PROVIDED:
MIN LOT AREA:	40,000 SF	2,519,610 SF**
MIN UPLAND LOT AREA:	20,000 SF	1,361,148 SF**
MIN LOT FRONTAGE:	100 FT	785± FT
MIN LOT WIDTH:	100 FT	>100FT
MIN FRONT SETBACK	25 FT	>25 FT
MIN FRONT SETBACK (STOW AND BURROUGHS ROAD)	50 FT	>50 FT
MIN FRONT SETBACK (MASS. AVE)	75 FT	>75 FT
MIN SIDE & REAR YARD:	20 FT	>20 FT
MIN SIDE & REAR YARD: (STOW AND BURROUGHS ROAD)	30 FT	>30 FT
MIN SIDE & REAR YARD: (MASS. AVE)	75 FT	>75 FT
MAX STORIES	3	3
MAX BUILDING HEIGHT	45 FT	<45 FT
MAX LOT COVERAGE (EXCL. SIDEWALKS)	35%	24.5%
FLOOR AREA RATIO	NA	
MAX BUILDING SIZE (GROSS FLOOR AREA)	8,000 SF	3,200± SF
MIN OPEN SPACE (INCL SIDEWALKS):	65%	75.5%

**–NOT INCLUDING SECTION OF LAND IN AR DISTRICT ALONG BURROUGHS RD.

DESIGN CALCULATIONS

100 DWELLING UNITS HOUSING FOR THE ELDERLY
70 (2 BDRM) UNITS AT 150 GPD/UNIT = 10,500 GPD
30 (3 BDRM) UNITS AT 330GPD/UNIT = 9,900 GPD
TOTAL SEWAGE FLOW = 20,400 GPD (20,400 GPD PROVIDED)

PROPOSED WELLS
FLOW RATE = 20,400 GPD
FLOWRATE PER WELL
20,400 GPD ÷ 2= 10,200 GPD PER WELL = 8 GPM
ZONE 1 RADIUS: [150 X LOG(10,200) GPD – 350]=252 FT
IWPA = [(32 X 8 GPM) + 400] = 632 FT

TRAFFIC GENERATION (ITE LAND USE CODE 230)

ESTIMATED TRAFFIC GENERATION	(TRIPS)
DAILY TRIPS	644 (6.44/UNIT)*
WEEKDAY PEAK HOUR MORNING	52 (0.52/UNIT)*
WEEKDAY PEAK HOUR EVENING	60 (0.60/UNIT)*

*PER BAYSIDE ENGINEERING CALCULATIONS

PRELIMINARY SITE PLAN IN BOXBOROUGH, MASSACHUSETTS

SITE DEVELOPMENT PLAN
FOR: BOXBOROUGH TOWN CENTER, LLC
SCALE: 1"=60' MARCH 14, 2016
REVISED: MAY 21, 2016

STAMSKI AND MCNARY, INC.
1000 MAIN STREET ACTON, MASSACHUSETTS
ENGINEERING – PLANNING – SURVEYING

0 30 60 120 180 240 FT

(2069 SITE3A.dwg) Sheet 2 of 3 SM-2069

STOW ROAD
PRIVATE DRIVE A
24' WIDE
PRIVATE DRIVE B
24' WIDE
PRIVATE DRIVE C
24' WIDE
PRIEST LANE
PROJECT BOUNDARY
PARCEL A
BORDERING VEGETATED WETLAND
INTERMITTENT STREAM PER ASSESSORS MAP (TYPICAL)
BORDERING VEGETATED WETLAND CONFIRMED BY ORAD DEP FILE #113-501
ISOLATED VEGETATED WETLAND AREA WF (#B1-#B4) AREA=999± S.F. (NOT SUBJECT TO M.G.L. c.131, s.40)
ISOLATED VEGETATED WETLAND AREA WF (#A1-#A4) AREA=1,200± S.F. (NOT SUBJECT TO M.G.L. c.131, s.40)
100' BUFFER ZONE BOXBOROUGH WETLAND BYLAW
IWPA
PROPOSED PRIVATELY OWNED WASTEWATER TREATMENT FACILITY (PWTF) PER 314 CMR 5.00 (APPROXIMATE)
PROPOSED TREATED EFFLUENT DISPOSAL AREA PER 314 CMR 5.00 DISPOSAL AREA SIZE: 20,400 GPD
RESERVE AREA
PRIMARY AREA
PROPOSED FIRE CISTERN #2
PROPOSED FIRE CISTERN #1
PROPOSED INFILTRATION AREA (TYPICAL)
"DRAINAGE EASEMENT A" AS SHOWN ON PLAN No. 352 OF 1995
100' WELL RADIUS
WELL (PRIMARY WELL PER 1995 BOH RECORDS)
PROP. PAVEMENT CONNECTION
ACCESS EASEMENT C (50' WIDE) AS SHOWN ON PLAN No. 844 OF 1996
END OF EXISTING PAVEMENT
PROPOSED STREET SIGN "EMERGENCY VEHICLES ONLY"
PROPOSED EMERGENCY ACCESS 24' WIDTH
(* FUTURE CONNECTION PER 1995 BOH RECORDS) WELL (CONFIRM USE*)
PROPOSED EMERGENCY ACCESS GATE
EXIST. BLDG.
20' WIDE TRAIL EASEMENT AS SHOWN ON PLAN No. 973 OF 1999
PROPOSED TWO-FAMILY ELDERLY OCCUPANCY DWELLING WITH 2-CAR GARAGE (TYPICAL)
PROPOSED 5' WIDE SIDEWALK
PROPOSED EMERGENCY ACCESS 20' WIDTH
PROPOSED EMERGENCY ACCESS GATE
PROPOSED SIGN "EMERGENCY VEHICLES ONLY"
PARCEL C
PARCEL C 27,377 ±S.F.
TOWN CENTER DISTRICT
BOROUGHS ROAD (VARIABLE WIDTH)
BASIN
N/F FAL BASSETT REALTY TRUST (DEED BOOK 32243 PAGE 449)
N/F SHERIFF'S MEADOW CONDOMINIUM (MASTER DEED BOOK 35327 PAGE 118)
N/F GLENN J. MILLS & JOANNE M. MILLS (DEED BOOK 26474 PAGE 20)
N/F PETER GEORGE MOKERY & ROSEMARY THERESA MOKERY (DEED BOOK 22580 PAGE 204)
N/F TOWNE FAMILY NOMINEE TRUST (DEED BOOK 33304 PAGE 449)
N/F TOWNE FAMILY NOMINEE TRUST (DEED BOOK 33304 PAGE 450)
N/F RONALD A. SPINNEY & BARBARA L. SPINNEY (DEED BOOK 10218 PAGE 218)
N/F ROBERT L. LANE & LORNA RUTH LANE (DEED BOOK 14054 PAGE 118)
N/F THEODORE J. LAMPROS & ELIZABETH M. LAMPROS (DEED BOOK 37342 PAGE 437)
N/F ROBERT N. BECKER & KATHERINE R. BECKER (DEED BOOK 14099 PAGE 176)
N/F GERARD R. MACLLOP & KELLY-ERIN POWERS (DEED BOOK 22675 PAGE 100)
N/F KEITH A. LYONS & MAGDALENA A. LYONS (DEED BOOK 50185 PAGE 377)
N/F SHREMIK K. SHAH & ARCHANA SHAH (DEED BOOK 33595 PAGE 140)
PRELIMINARY SITE PLAN
IN
BOXBOROUGH, MASSACHUSETTS
SITE DEVELOPMENT PLAN
FOR: BOXBOROUGH TOWN CENTER, LLC
SCALE: 1"=60' MARCH 14, 2016
REVISED: MAY 21, 2016
STAMSKI AND MCNARY, INC.
1000 MAIN STREET ACTON, MASSACHUSETTS
ENGINEERING – PLANNING – SURVEYING
0 30 60 120 180 240 FT
(2069 SITE3A.dwg) Sheet 3 of 3 SM-2069

CONCEPT PLAN A2
IN
BOXBOROUGH, MASSACHUSETTS

SITE PLAN
FOR: BOXBOROUGH TOWN CENTER, LLC
SCALE: 1"=120' SEPTEMBER 9, 2015

STAMSKI AND MCNARY, INC.
1000 MAIN STREET ACTON, MASSACHUSETTS
ENGINEERING – PLANNING – SURVEYING
0 60 120 240 360 480 FT

(2069 CONC A1.dwg) SM-2069

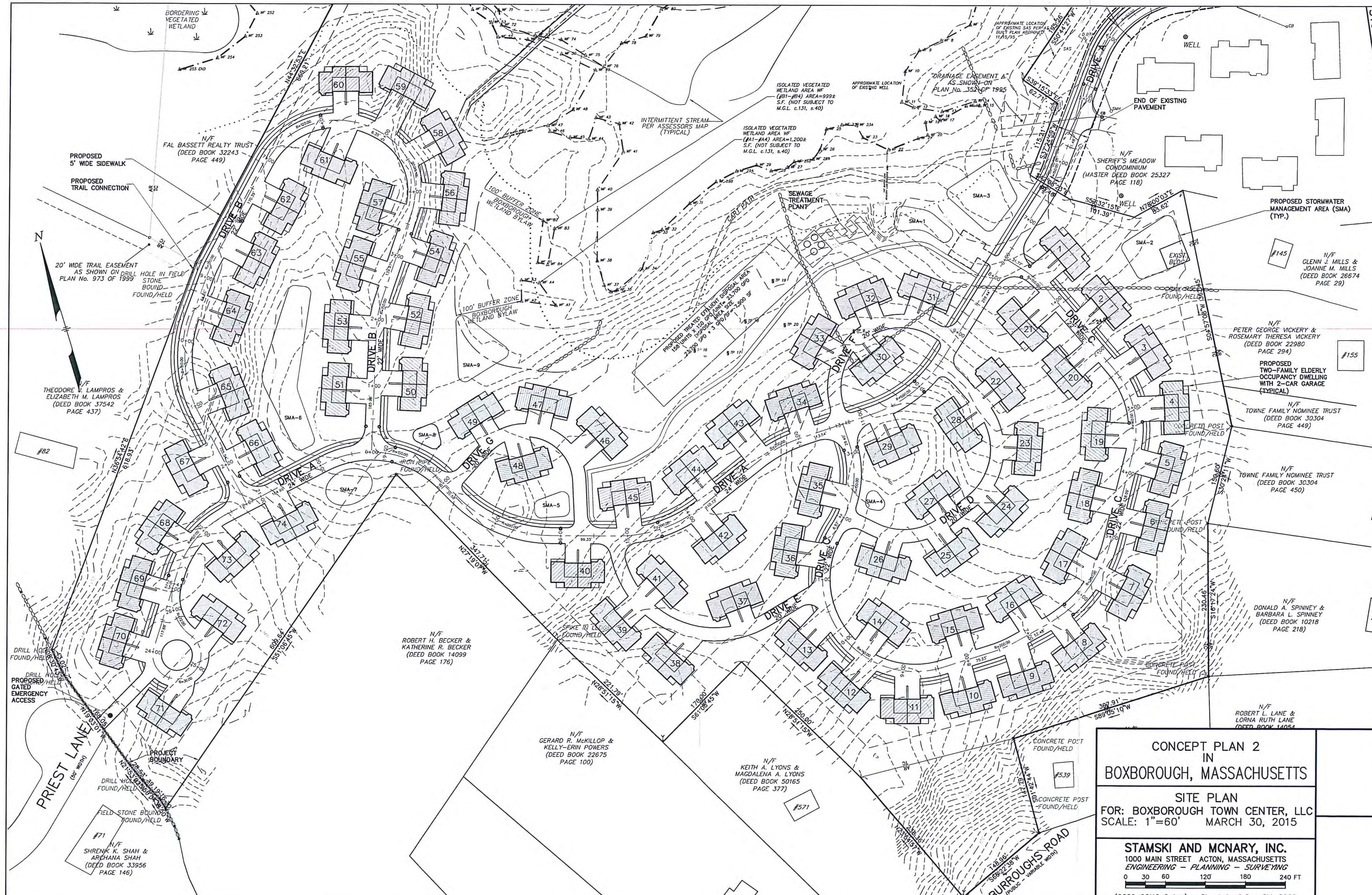
CONCEPT PLAN 2
IN
BOXBOROUGH, MASSACHUSETTS

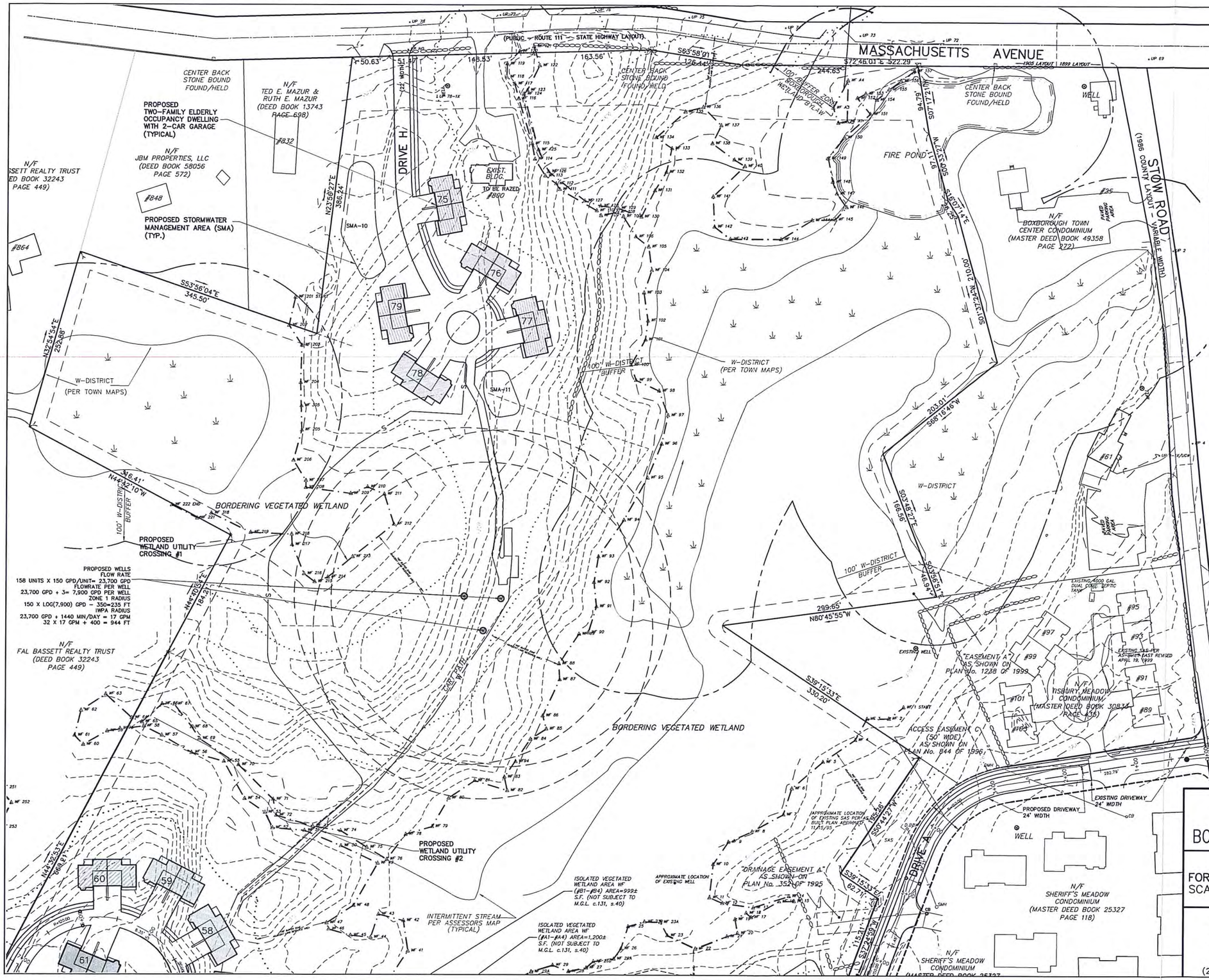
SITE PLAN
FOR: BOXBOROUGH TOWN CENTER, LLC
SCALE: 1"=120' MARCH 30, 2015

STAMSKI AND MCNARY, INC.
1000 MAIN STREET ACTON, MASSACHUSETTS
ENGINEERING – PLANNING – SURVEYING

0 60 120 240 360 480 FT

(2069 CONC 2.dwg) SM-2069


CONCEPT PLAN 2
IN
BOXBOROUGH, MASSACHUSETTS
SITE PLAN
FOR: BOXBOROUGH TOWN CENTER, LLC
SCALE: 1"=60' MARCH 30, 2015
STAMSKI AND MCNARY, INC.
1000 MAIN STREET ACTON, MASSACHUSETTS
ENGINEERING - PLANNING - SURVEYING
0 30 60 120 180 240 FT
(2069 CONC 2.dwg) Sheet 1 of 2 SM-2069
STOW ROAD
PRIEST LANE (50' WIDTH)
BURROUGHS ROAD (PUBLIC - VARIABLE WIDTH)
BORDERING VEGETATED WETLAND
PROPOSED 5' WIDE SIDEWALK
PROPOSED TRAIL CONNECTION
20' WIDE TRAIL EASEMENT AS SHOWN ON PLAN No. 973 OF 1999
DRILL HOLE IN FIELD STONE BOUND FOUND/HELD
N/F FAL BASSETT REALTY TRUST (DEED BOOK 32243 PAGE 449)
N/F THEODORE J. LAMPROS & ELIZABETH M. LAMPROS (DEED BOOK 37542 PAGE 437)
INTERMITTENT STREAM PER ASSESSORS MAP (TYPICAL)
100' BUFFER ZONE BOXBOROUGH WETLAND BYLAW
ISOLATED VEGETATED WETLAND AREA WF (#B1-#B4) AREA=999± S.F. (NOT SUBJECT TO M.G.L. c.131, s.40)
ISOLATED VEGETATED WETLAND AREA WF (#A1-#A4) AREA=1,200± S.F. (NOT SUBJECT TO M.G.L. c.131, s.40)
APPROXIMATE LOCATION OF EXISTING WELL
"DRAINAGE EASEMENT A" AS SHOWN ON PLAN No. 352 OF 1995
APPROXIMATE LOCATION OF EXISTING SAS PER AS BUILT PLAN APPROVED 11/15/95
END OF EXISTING PAVEMENT
N/F SHERIFF'S MEADOW CONDOMINIUM (MASTER DEED BOOK 25327 PAGE 118)
WELL
SEWAGE TREATMENT PLANT
CART PATH
PROPOSED TREATED EFFLUENT DISPOSAL AREA 158 UNITS X 150 GPD/UNIT= 23,700 GPD DISPOSAL AREA SIZE 23,700 GPD ÷ 3 GPD/SF= 7,900 SF
PROPOSED STORMWATER MANAGEMENT AREA (SMA) (TYP.)
N/F GLENN J. MILLS & JOANNE M. MILLS (DEED BOOK 26674 PAGE 29)
N/F PETER GEORGE VICKERY & ROSEMARY THERESA VICKERY (DEED BOOK 22980 PAGE 294)
PROPOSED TWO-FAMILY ELDERLY OCCUPANCY DWELLING WITH 2-CAR GARAGE (TYPICAL)
N/F TOWNE FAMILY NOMINEE TRUST (DEED BOOK 30304 PAGE 449)
N/F TOWNE FAMILY NOMINEE TRUST (DEED BOOK 30304 PAGE 450)
N/F DONALD A. SPINNEY & BARBARA L. SPINNEY (DEED BOOK 10218 PAGE 218)
N/F ROBERT L. LANE & LORNA RUTH LANE (DEED BOOK 14054
N/F ROBERT H. BECKER & KATHERINE R. BECKER (DEED BOOK 14099 PAGE 176)
N/F GERARD R. McKILLOP & KELLY-ERIN POWERS (DEED BOOK 22675 PAGE 100)
N/F KEITH A. LYONS & MAGDALENA A. LYONS (DEED BOOK 50165 PAGE 377)
N/F SHRENIK K. SHAH & ARCHANA SHAH (DEED BOOK 33956 PAGE 146)
PROPOSED GATED EMERGENCY ACCESS
PROJECT BOUNDARY
DRIVE A 24' WIDE
DRIVE B 22' WIDE
DRIVE C 22' WIDE
DRIVE D 20' WIDE
DRIVE E 20' WIDE
DRIVE F 20' WIDE
DRIVE G 20' WIDE
CONCRETE POST FOUND/HELD
IRON PIPE FOUND/HELD
SPIKE IN LEDGE FOUND/HELD
FIELD STONE BOUND FOUND/HELD
DRILL HOLE FOUND/HELD
#82
#145
#155
#539
#571
#71



LAND USE DATA, TOWN OF BOXBOROUGH ZONING BYLAW AMENDED THROUGH TOWN MEETING MAY 2012

ZONING DISTRICT: TOWN CENTER DISTRICT & W-DISTRICT

ARTICLE IV. USE REGULATIONS	ALLOWED:
TWO-FAMILY DWELLING, RESERVED EXCLUSIVELY FOR ELDERLY OCCUPANCY	YES*

*REFER TO SECTION 5004: FOR MULTI-FAMILY DWELLING IN TC DISTRICT RESERVED EXCLUSIVELY FOR ELDERLY OCCUPANCY, DENSITY NOT TO EXCEED 10 UNITS/80,000 SF LAND AREA

MAX DENSITY: 2,530,337/80,000= 31.6 x 10 UNITS= 316 UNITS
PROPOSED DENSITY: 79 DUPLEXES= 158 UNITS

ARTICLE V. DIMENSIONAL REQUIREMENTS

	REQUIRED:	PROVIDED:
MIN LOT AREA:	40,000 SF	2,530,337 SF**
MIN UPLAND LOT AREA:	20,000 SF	1,353,224 SF**
MIN LOT FRONTAGE:	100 FT	785 FT
MIN LOT WIDTH:	100 FT	>100FT
MIN FRONT SETBACK	25 FT	>25 FT
MIN FRONT SETBACK (STOW AND BURROUGHS ROAD)	50 FT	>50 FT
MIN FRONT SETBACK (MASS. AVE)	75 FT	>75 FT
MIN SIDE & REAR YARD:	20 FT	>20 FT
MIN SIDE & REAR YARD: (STOW AND BURROUGHS ROAD)	30 FT	>30 FT
MIN SIDE & REAR YARD: (MASS. AVE)	75 FT	>75 FT
MAX STORIES	3	3
MAX BUILDING HEIGHT	45 FT	<45 FT
MAX LOT COVERAGE (EXCL. SIDEWALKS)	35%	XX%
FLOOR AREA RATIO	NA	
MAX BUILDING SIZE (GROSS FLOOR AREA)	8,000 SF	3,200± SF
MIN OPEN SPACE (INCL SIDEWALKS):	65%	XX%

**–NOT INCLUDING SECTION OF LAND IN AR DISTRICT ALONG BURROUGHS RD.

CONCEPT PLAN 2 IN BOXBOROUGH, MASSACHUSETTS

SITE PLAN
FOR: BOXBOROUGH TOWN CENTER, LLC
SCALE: 1"=60' MARCH 30, 2015

STAMSKI AND MCNARY, INC.
1000 MAIN STREET ACTON, MASSACHUSETTS
ENGINEERING – PLANNING – SURVEYING

0 30 60 120 180 240 FT

(2069 CONC 2.dwg) Sheet 2 of 2 SM–2069

BORDERING VEGETATED WETLAND

100' BUFFER ZONE

N/F FAIR OAKS PARK REALTY TRUST

PROPOSED WETLAND UTILITY CROSSING #2

PARCEL 127.1

INTERMITTENT STREAM PER ASSESSORS MAP (TYPICAL)

ISOLATED VEGETATED WETLAND AREA, WF (#B1–#B4) AREA=995± S.F. AS DELINEATED BY B+C ASSOCIATES, SEE ORAD DEP #113-501 ISSUED 8/17/2011 (NOT SUBJECT TO M.G.L. c.131, s.40)

ISOLATED VEGETATED WETLAND AREA, WF (#A1–#A4) AREA=1,200± S.F. AS DELINEATED BY B+C ASSOCIATES, SEE ORAD DEP #113-501 ISSUED 8/17/2011 (NOT SUBJECT TO M.G.L. c.131, s.40)

100' BUFFER ZONE BOXBOROUGH WETLAND BYLAW

PROPOSED TREATED EFFLUENT DISPOSAL AREA
208 UNITS x 150 GPD/UNIT = 31,200 GPD
31,200 GPD ÷ 3 GPD/SF = (10,400) SF

SEWAGE TREATMENT PLANT

PARCEL 127.1

PROPOSED DRIVEWAY 24' WIDTH

EXISTING DRIVEWAY 24' WIDTH

WELL

EXISTING 50' WIDE ACCESS EASEMENT (AS SHOWN ON PLAN No. 297 OF 1993)

N/F SHERIFF'S MEADOW CONDOMINIUM

EXISTING DU

PROPOSED STORMWATER MANAGEMENT SYSTEM

PROPOSED FIRE CISTERN

#145 N/F MILLS

PROPOSED TWO-FAMILY ELDERLY OCCUPANCY DWELLING WITH 2-CAR GARAGE (TYPICAL)

PROPOSED E-ONE GRINDER PUMP FOR DWELLING (TYPICAL)

PROPOSED 2" SDR 21 PVC LOW PRESSURE SEWER FORCEMAIN

N/F VICKERY

N/F TOWNE

PROPOSED WATER SERVICE (TYPICAL)

N/F TOWNE

N/F SPINNEY

DRIVE A 22' WIDE

DRIVE B 22' WIDE

DRIVE C 22' WIDE

DRIVE D 22' WIDE

DRIVE E 22' WIDE

DRIVE F 22' WIDE

PARCEL 131.1

PARCEL 131.1

PARCEL 103.3

N/F LAMPROS

#82

F FAMILY ICAL)

PROPOSED STORMWATER MANAGEMENT SYSTEM

N/F BECKER

PROPOSED FIRE CISTERN

PROPOSED GATED EMERGENCY ACCESS

PRIEST LANE (MOTH-297)

PROJECT BOUNDARY

N/F SHAH

#71

PROPOSED STORMWATER MANAGEMENT SYSTEM

N/F LYONS

PROJECT BOUNDARY

#539

#571

N/F MCKILLOP & POWERS

EXCLUDED AREA

BURROUGHS ROAD

CONCEPT PLAN IN BOXBOROUGH, MASSACHUSETTS

SITE PLAN

FOR: BOXBOROUGH TOWN CENTER, LLC

SCALE: 1"=60' JANUARY 20, 2015

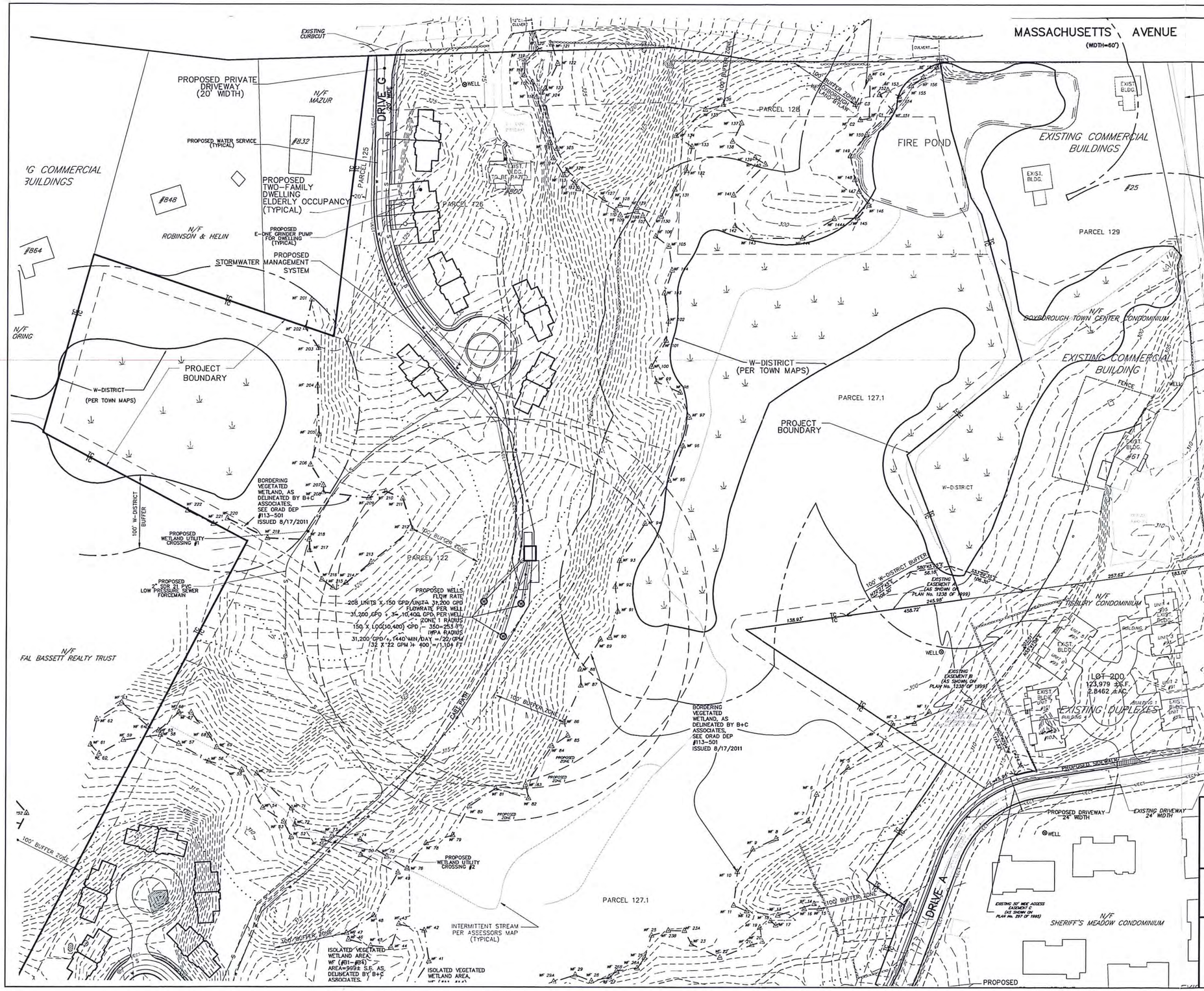
STAMSKI AND MCNARY, INC.

1000 MAIN STREET ACTON, MASSACHUSETTS

ENGINEERING – PLANNING – SURVEYING

0 50 100 200 300 400 FT

(2069 MINUTEMAN1dwg) Sheet 1 of 2 SM-2069



LAND USE DATA, TOWN OF BOXBOROUGH ZONING BYLAW AMENDED THROUGH TOWN MEETING MAY 2012

ZONING DISTRICT: TOWN CENTER DISTRICT & W-DISTRICT

ARTICLE IV. USE REGULATIONS	ALLOWED:
TWO-FAMILY DWELLING, RESERVED EXCLUSIVELY FOR ELDERLY OCCUPANCY	YES*

*REFER TO SECTION 5004: FOR MULTI-FAMILY DWELLING IN TC DISTRICT RESERVED EXCLUSIVELY FOR ELDERLY OCCUPANCY, DENSITY NOT TO EXCEED 10 UNITS/80,000 SF LAND AREA

MAX DENSITY: 2,530,337/80,000= 31.6 x 10 UNITS= 316 UNITS
PROPOSED DENSITY: 104 DUPLEXES= 208 UNITS

ARTICLE V. DIMENSIONAL REQUIREMENTS

	REQUIRED:	PROVIDED:
MIN LOT AREA:	40,000 SF	2,530,337 SF**
MIN UPLAND LOT AREA:	20,000 SF	1,353,224 SF**
MIN LOT FRONTAGE:	100 FT	785 FT
MIN LOT WIDTH:	100 FT	>100FT
MIN FRONT SETBACK	25 FT	>25 FT
MIN FRONT SETBACK (STOW AND BURROUGHS ROAD)	50 FT	>50 FT
MIN FRONT SETBACK (MASS. AVE)	75 FT	>75 FT
MIN SIDE & REAR YARD:	20 FT	>20 FT
MIN SIDE & REAR YARD: (STOW AND BURROUGHS ROAD)	30 FT	>30 FT
MIN SIDE & REAR YARD: (MASS. AVE)	75 FT	>75 FT
MAX STORIES	3	3
MAX BUILDING HEIGHT	45 FT	<45 FT
MAX LOT COVERAGE (EXCL. SIDEWALKS)	35%	XX%
FLOOR AREA RATIO	NA	
MAX BUILDING SIZE (GROSS FLOOR AREA)	8,000 SF	<8,000 SF
MIN OPEN SPACE (INCL SIDEWALKS):	65%	XX%

**-NOT INCLUDING SECTION OF LAND IN AR DISTRICT ALONG BURROUGHS RD.

CONCEPT PLAN IN BOXBOROUGH, MASSACHUSETTS

SITE PLAN
FOR: BOXBOROUGH TOWN CENTER, LLC
SCALE: 1"=60' JANUARY 20, 2015

STAMSKI AND MCNARY, INC.
1000 MAIN STREET ACTON, MASSACHUSETTS
ENGINEERING - PLANNING - SURVEYING

0 50 100 200 300 400 FT

(2069 MINUTEMAN1dwg) Sheet 2 of 2 SM-2069

Alternative #3

Comprehensive Permit Preliminary Plan- Minuteman Village- May 1, 2012

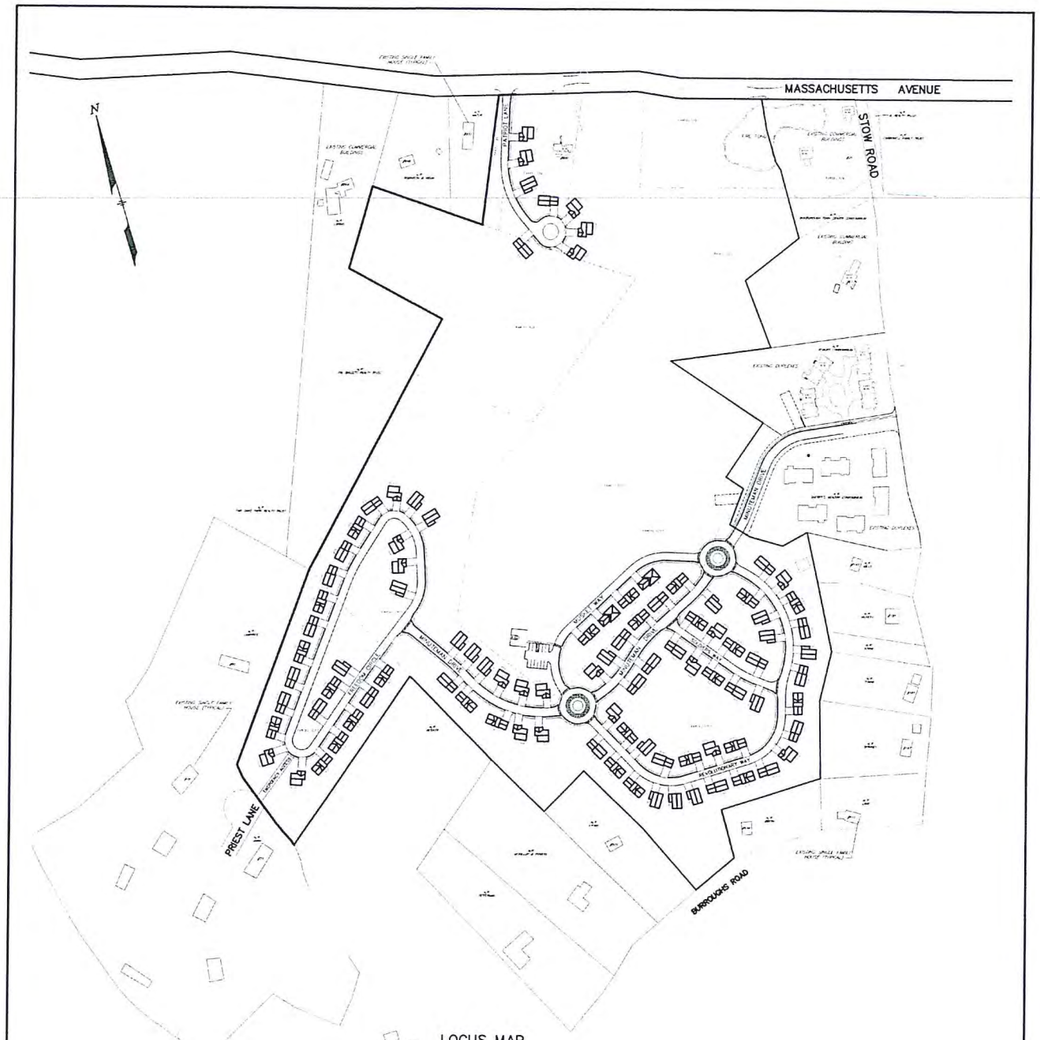
MINUTEMAN VILLAGE

COMPREHENSIVE PERMIT
PRELIMINARY PLAN
BOXBOROUGH, MASSACHUSETTS

MAY 1, 2012

PLAN INDEX

SHEET 1 COVER SHEET
SHEET 2 EXISTING CONDITIONS PLAN
SHEET 3 & 4 SITE PLAN
SHEET 5 & 6 UTILITIES PLAN



LOCUS MAP
SCALE: 1"=200'

LAND USE DATA

BUILDING TYPE:
DETACHED SINGLE FAMILY
1,700 TO 2,350 S.F.
96 UNITS WITH 2 STORIES
3 BEDROOMS / 2.5 BATHS
3 HANDICAPPED ACCESSIBLE UNITS WITH 1 STORY

PARKING:
96 TOTAL UNITS
2 PARKING SPACES PER UNIT (2:1)
(VISITOR PARKING IN FRONT OF GARAGE)

ALL BUILDINGS RESIDENTIAL
SITE AREA = 58.9 AC±
PROPOSED DENSITY = 1.6 UNITS/ACRE
ALLOWED DENSITY = 5.4 UNITS/ACRE

7.2% BUILDINGS
7.8% PAVED
85.0% OPEN SPACE

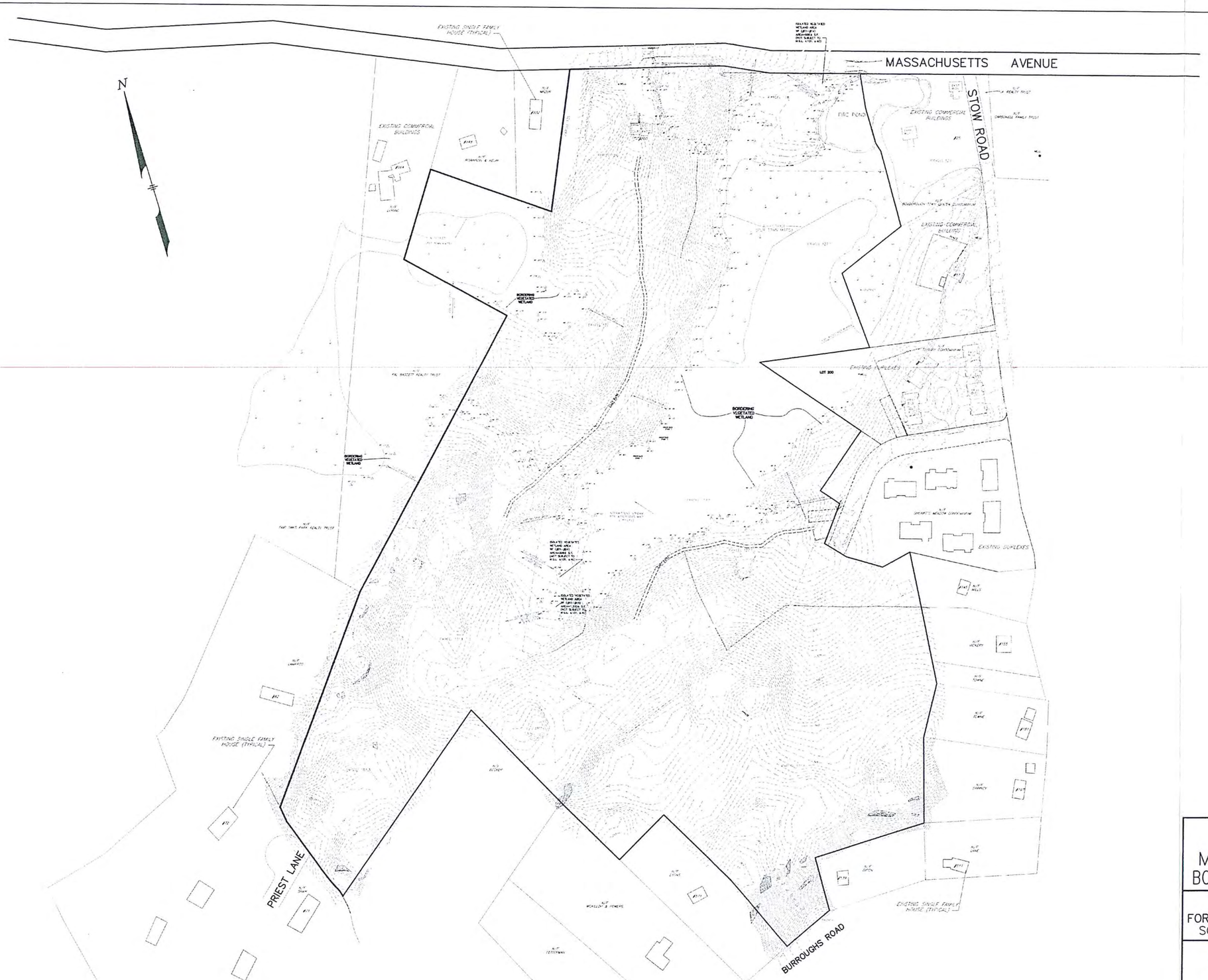
APPLICANT
MINUTEMAN VILLAGE, LLC
P.O. BOX 985
ACTON, MA 01720

RECORD OWNERS
BOXBOROUGH TOWN CENTER L.L.C.
98 CHARTER ROAD
ACTON, MA 01720

MANE REALTY TRUST
57 BURROUGHS ROAD
BOXBOROUGH, MA 01719

ZONING DISTRICT
TOWN CENTER DISTRICT

ENGINEER/SURVEYOR
STAMSKI AND MCNARY, INC.
1000 MAIN STREET
ACTON, MA 01720



COMPREHENSIVE PERMIT
PRELIMINARY PLAN

MINUTEMAN VILLAGE
BOXBOROUGH, MASSACHUSETTS

EXISTING CONDITIONS PLAN
FOR: MINUTEMAN VILLAGE, LLC
SCALE: 1"=120' MAY 1, 2012

STAMSKI AND MCNARY, INC.
1000 MAIN STREET ACTON, MASSACHUSETTS
ENGINEERING – PLANNING – SURVEYING

0 50 100 200 300 400 FT

(2069 MINUTEMINAdwg) Sheet 2 of 6 SM-2069

N/F
FAIR OAKS PARK REALTY TRUST

ISOLATED VEGETATED
WETLAND AREA
WF (#B1-#B4)
AREA=999± S.F.
(NOT SUBJECT TO
M.G.L. c.131, s.40)

ISOLATED VEGETATED
WETLAND AREA
WF (#A1-#A4)
AREA=1,200± S.F.
(NOT SUBJECT TO
M.G.L. c.131, s.40)

PARCEL 127.1

INTERMITTENT STREAM
(SEE ASSESSORS MAP
TYPICAL)

CART PATH

SEWAGE
TREATMENT
PLANT

PROPOSED TREATED EFFLUENT DISPOSAL AREA
10,000 GPD

PROPOSED
RECREATIONAL AREA

MINUTEMAN DRIVE

MUSKET WAY

MINUTEMAN DRIVE

SOLDIERS WAY

REVOLUTIONARY WAY

FREEDOM CIRCLE

EMERGENCY ACCESS

PRIEST LANE

BURROUGHS ROAD

PROPOSED
STORMWATER MANAGEMENT
SYSTEM

PROPOSED
DWELLING
(TYPICAL)

PROJECT
BOUNDARY

PROPOSED
FIRE CISTERN

N/F
SHERIFF'S MEADOW CONDOMINIUM

EXISTING DU.

N/F
MILLS

N/F
VICKERY

N/F
TOWNE

N/F
SPINNEY

N/F
LANE

N/F
BIRON

N/F
LYONS

N/F
MCKILLOP & POWERS

N/F
FETTERMAN

N/F
BECKER

N/F
LAMPROS

N/F
SHAH

FAMILY
(CAI)

#145

#511

#539

#571

#71

COMPREHENSIVE PERMIT
PRELIMINARY PLAN

MINUTEMAN VILLAGE
BOXBOROUGH, MASSACHUSETTS

SITE PLAN

FOR: MINUTEMAN VILLAGE, LLC

SCALE: 1"=60' MAY 1, 2012

STAMSKI AND MCNARY, INC.

1000 MAIN STREET ACTON, MASSACHUSETTS

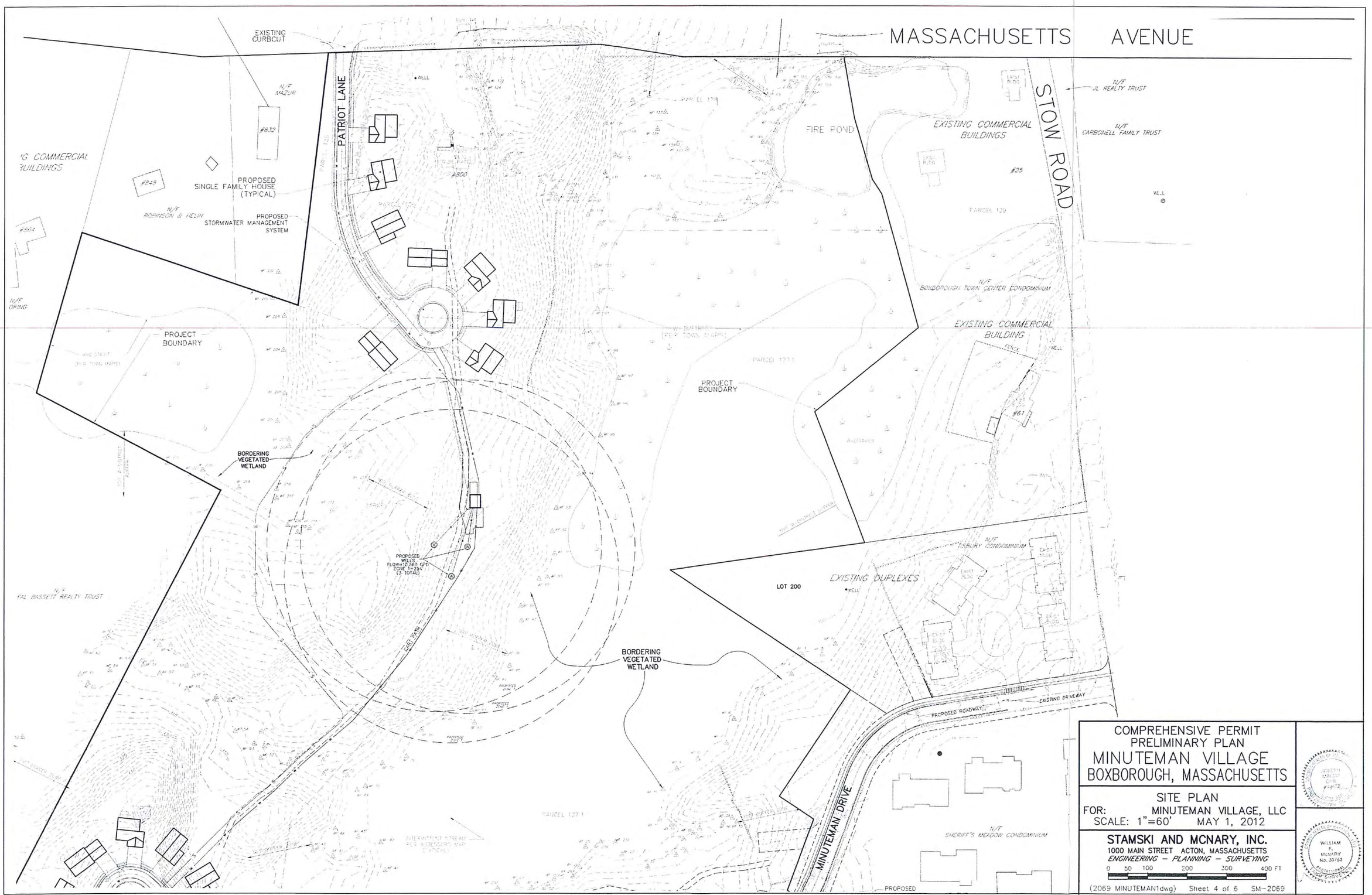
ENGINEERING – PLANNING – SURVEYING

0 50 100 200 300 400 FT

(2069 MINUTEMAN1dwg) Sheet 3 of 6 SM-2069

JOSEPH
MANGIN
CIVIL
#49472
REGISTERED
PROFESSIONAL ENGINEER
COMMONWEALTH OF MASSACHUSETTS

WILLIAM
F.
McNARY
No. 32753
REGISTERED
PROFESSIONAL ENGINEER
COMMONWEALTH OF MASSACHUSETTS



COMPREHENSIVE PERMIT
PRELIMINARY PLAN

MINUTEMAN VILLAGE
BOXBOROUGH, MASSACHUSETTS

SITE PLAN

FOR: MINUTEMAN VILLAGE, LLC

SCALE: 1"=60' MAY 1, 2012

STAMSKI AND MCNARY, INC.

1000 MAIN STREET ACTON, MASSACHUSETTS

ENGINEERING – PLANNING – SURVEYING

0 50 100 200 300 400 FT

(2069 MINUTEMAN1dwg) Sheet 4 of 6 SM-2069

N/F
FAIR OAKS PARK REALTY TRUST

ISOLATED VEGETATED
WETLAND AREA
WF (#B1–#B4)
AREA=999± S.F.
(NOT SUBJECT TO
M.G.L. c.131, s.40)

ISOLATED VEGETATED
WETLAND AREA
WF (#A1–#A4)
AREA=1,200± S.F.
(NOT SUBJECT TO
M.G.L. c.131, s.40)

PROPOSED
UNDERGROUND
ELCTRIC, CABLE, TELEPHONE

PROPOSED
SEWER MAIN

PROPOSED
WATER MAIN

N/F
LAMPROS

PROPOSED
DRAIN LINE

#82

FAMILY
(TYPICAL)

PROPOSED
RECREATIONAL AREA

PROPOSED TREATED EFFLUENT DISPOSAL AREA
31,600 GPD

SEWAGE
TREATMENT
PLANT

DRY PARK

MUSKET WAY

MINUTEMAN DRIVE

FREEDOM CIRCLE

EMERGENCY ACCESS

PRIEST LANE

PROJECT
BOUNDARY

PROPOSED
STORMWATER MANAGEMENT
SYSTEM

N/F
BECKER

PROPOSED
DWELLING
(TYPICAL)

PROPOSED
STORMWATER MANAGEMENT
SYSTEM

N/F
LYONS

#571

N/F
MCNILLOP & POWERS

N/F
FETTERMAN

PROJECT
BOUNDARY

BURROUGHS ROAD

N/F
SHAH

#71

MINUTEMAN DRIVE

SOLDIERS WAY

REVOLUTIONARY WAY

PROPOSED
FIRE CISTERN

PROPOSED
FIRE CISTERN

N/F
SHERIFF'S MEADOW CONDOMINIUM

EXISTING DW

PROPOSED
STORMWATER MANAGEMENT
SYSTEM

#145

N/F
MILLS

PROPOSED
DWELLING
(TYPICAL)

N/F
VICKERY

N/F
TOWNE

N/F
TOWNE

PROPOSED
UNDERGROUND WIRES

PROPOSED
SEWER MAIN

PROPOSED
WATER MAIN

N/F
SPINNEY

N/F
LANE

#511

N/F
BIRON

#539

COMPREHENSIVE PERMIT
PRELIMINARY PLAN

MINUTEMAN VILLAGE
BOXBOROUGH, MASSACHUSETTS

UTILITIES PLAN

FOR: MINUTEMAN VILLAGE, LLC

SCALE: 1"=60' MAY 1, 2012

STAMSKI AND MCNARY, INC.

1000 MAIN STREET ACTON, MASSACHUSETTS

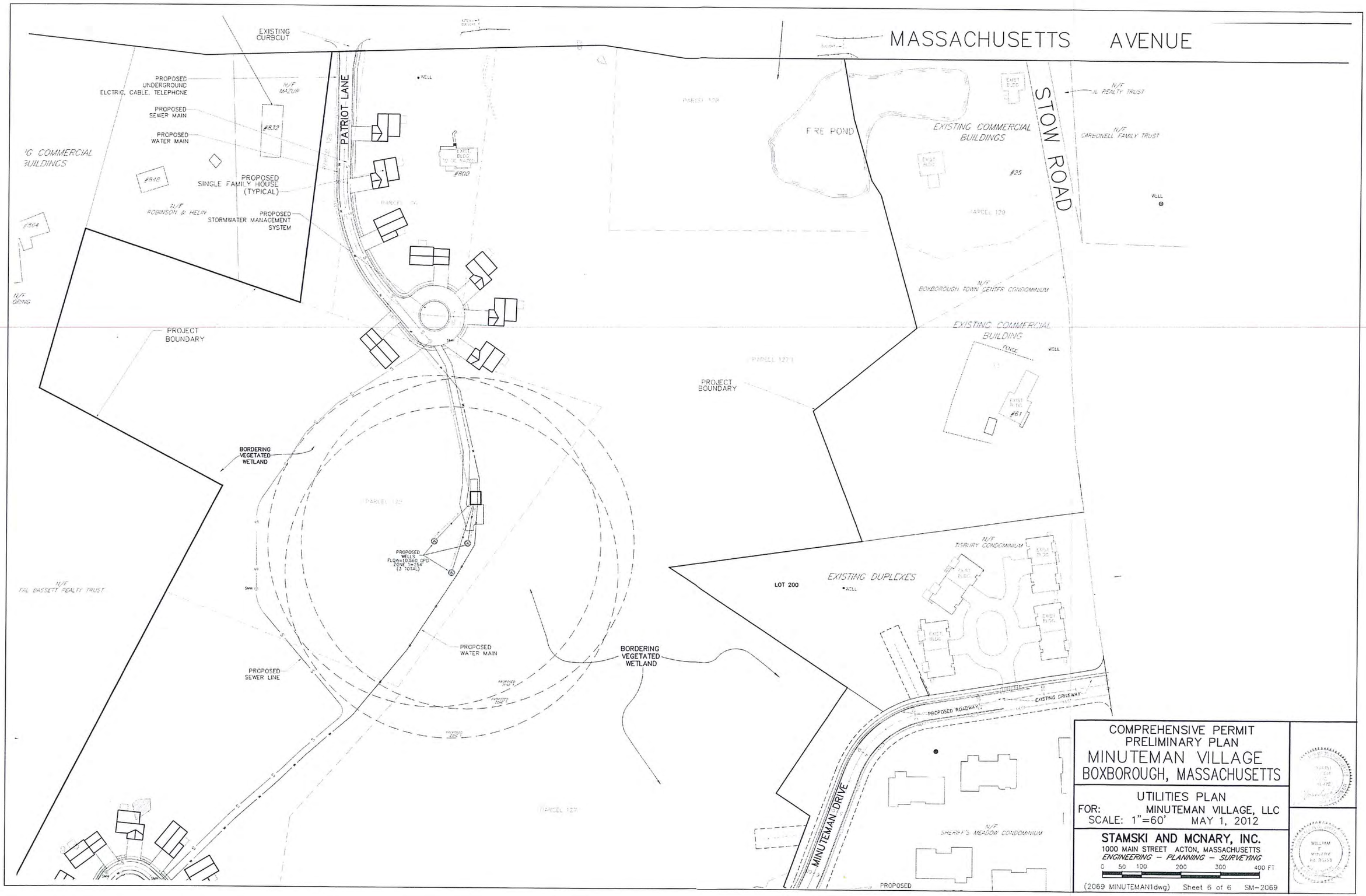
ENGINEERING – PLANNING – SURVEYING

0 50 100 200 300 400 FT

(2069 MINUTEMAN1dwg) Sheet 5 of 6 SM-2069

JOSEPH MARTIN OVIA No. 40472

WILLIAM F. MCNARY No. 30753



COMPREHENSIVE PERMIT
PRELIMINARY PLAN

MINUTEMAN VILLAGE
BOXBOROUGH, MASSACHUSETTS

UTILITIES PLAN

FOR: MINUTEMAN VILLAGE, LLC
SCALE: 1"=60' MAY 1, 2012

STAMSKI AND MCNARY, INC.
1000 MAIN STREET ACTON, MASSACHUSETTS
ENGINEERING – PLANNING – SURVEYING

0 50 100 200 300 400 FT

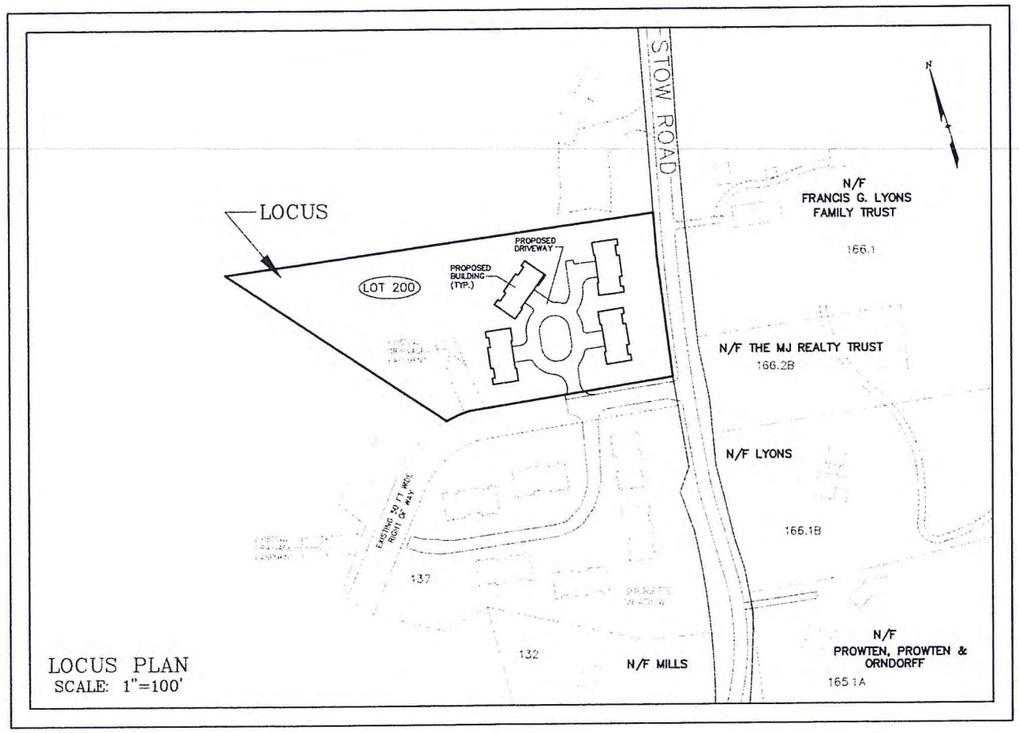
(2069 MINUTEMAN1dwg) Sheet 6 of 6 SM-2069

Tisbury Meadow Senior Housing

Site Plan- Revised March 19, 1999

Site Plan Decision #99-01

SITE PLAN
FOR
TISBURY MEADOW
AN ELDERLY HOUSING DEVELOPMENT
BOXBOROUGH, MA



LOCUS PLAN
SCALE: 1"=100'

APPLICANT
BOXBOROUGH TOWN CENTER, L.L.C.
98 CHARTER ROAD
ACTON, MA 01720

RECORD OWNER
BOXBOROUGH TOWN CENTER, L.L.C.
98 CHARTER ROAD
ACTON, MA 01720

ZONING DISTRICT
TOWN CENTER

REFERENCE
MIDDLESEX REGISTRY OF DEEDS
SOUTH DISTRICT
DEED BOOK: 27102 PAGE: 550
PLAN NO: 458 OF 1970
PLAN NO: 297 OF 1995
PLAN NO: 298 OF 1995

TOWN OF BOXBOROUGH
ASSESSORS TAX MAPS
SHEET 6 – GROUP 4 – PARCELS 127.1.129,130

DATE: JANUARY 11, 1999
REV: MARCH 19, 1999

PLAN INDEX

SHEET 1 OF 5	TITLE SHEET
SHEET 2 OF 5	EXISTING CONDITIONS PLAN
SHEET 3 OF 5	LAND USE & LANDSCAPING PLAN
SHEET 4 OF 5	GRADING PLAN
SHEET 5 OF 5	DETAIL SHEET

BY
STAMSKI & McNARY, INC.
80 HARRIS STREET
ACTON, MA 01720

Joseph Marel Joseph Marel

N

OTHER LAND OF
BOXBOROUGH TOWN CENTER L.L.C.

W-DISTRICT

100 W-DISTRICT BUFFER

642.52'

GRAVEL PARKING

EXISTING DRIVE

LOT 200
123,979 SF±
2.85 AC±

TP 26

TP SM3

TP 21

TP 25

TP SM2

TP SM5

P 22

TP 22

EXIST. WELL TO BE FILLED

EXIST. HOUSE

APPROX LOCATION OF GAS SERVICE

TP 34

TP SM1

DISTURBED AREA

EXIST. GRAVEL DRIVE

P 23

TP 23

TP SM4

BORDERING VEGETATED WETLAND (FLAGGED BY B&C ASSOCIATES)

396.32'

OTHER LAND OF
BOXBOROUGH TOWN CENTER L.L.C.

100' BUFFER ZONE FROM BORDERING VEGETATED WETLAND

EXISTING DRAINAGE EASEMENT

45.00'

STOW ROAD

L=31.42'

259.09'

CONC. PADS

RIP RAP

EXISTING PAVEMENT

L=70.30'

EXIST GRAVEL ROAD

EXISTING 50' R.O.W.

I.B.M.
"10" 0" SPIKE"
IN 30" OAK"
ELEV = 318.39'

SHERIFF'S MEADOW

EXISTING WELL

SHERIFF'S MEADOW

LEGEND

200	CONTOUR
	STONE WALL
	100 FOOT BUFFER ZONE
	EDGE OF WETLAND
	PROPOSED DRIVE OR BUILDING
	W-DISTRICT BOUNDARY
	100' W-DISTRICT BUFFER
	GAS VALVE
	GAS SERVICE
	UTILITY POLE
	OVER HEAD WIRES
P 22	PERCOLATION TEST LOCATION
TP 22	TEST PIT LOCATION

TISBURY MEADOW
AN ELDERLY HOUSING DEVELOPMENT
BOXBOROUGH, MASS.

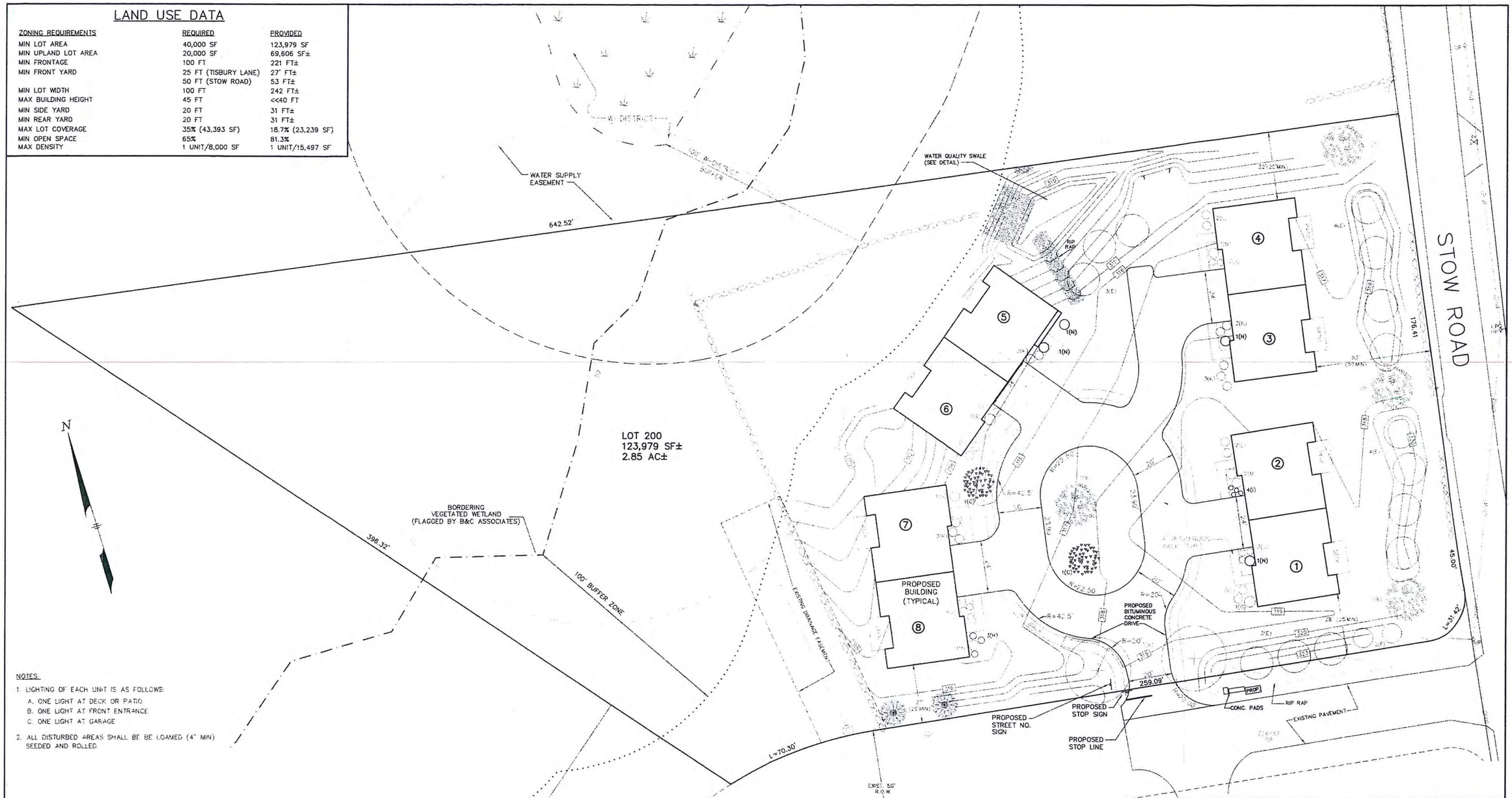
EXISTING CONDITIONS PLAN
FOR: BOXBOROUGH TOWN CENTER L.L.C.
SCALE: 1"=20' DATE: JANUARY 11,1999
REV: MARCH 19, 1999

STAMSKI AND McNARY, INC.
80 HARRIS STREET – ACTON, MASS.
ENGINEERING – PLANNING – SURVEYING

SM –2069 FILE:2069EXb.DWG SHEET 2 OF 5

LAND USE DATA

ZONING REQUIREMENTS	REQUIRED	PROVIDED
MIN LOT AREA	40,000 SF	123,979 SF
MIN UPLAND LOT AREA	20,000 SF	69,606 SF±
MIN FRONTAGE	100 FT	221 FT±
MIN FRONT YARD	25 FT (TISBURY LANE)	27' FT±
	50 FT (STOW ROAD)	53 FT±
MIN LOT WIDTH	100 FT	242 FT±
MAX BUILDING HEIGHT	45 FT	<<40 FT
MIN SIDE YARD	20 FT	31 FT±
MIN REAR YARD	20 FT	31 FT±
MAX LOT COVERAGE	35% (43,393 SF)	18.7% (23,239 SF)
MIN OPEN SPACE	65%	81.3%
MAX DENSITY	1 UNIT/8,000 SF	1 UNIT/15,497 SF



NOTES:

1. LIGHTING OF EACH UNIT IS AS FOLLOWS:
   A. ONE LIGHT AT DECK OR PATIO
   B. ONE LIGHT AT FRONT ENTRANCE
   C. ONE LIGHT AT GARAGE
2. ALL DISTURBED AREAS SHALL BE BE LOAMED (4" MIN) SEEDED AND ROLLED.

TYPE	KEY	QTY	BOTANICAL / COMMON NAME	SIZE	MATURE SPREAD
DECIDUOUS TREES	A	2	ACER RUBRUM 'OCT. GLORY' / OCT. GLORY MAPLE	2-2.5" CAL	35'
FLOWERINGTREES	B	4	CORNUS KOUSA / KOUSA DOGWOOD	7-8' HT	20'
	C	2	MALUS FLORIBUNDA / JAP. FLOWERING CRAB	6-8' HT	15'
EVERGREEN TREES	D	2	PICEA EXCELSA (ABIES) / NORWAY SPRUCE	6-8' HT	30'
	E	11	TSUGA CANADENSIS / CANADIAN HEMLOCK	6-8' HT	30'
SHRUBS	F	2	EUONYMUS ALATA COMPACTA / DWARF BURNING BUSH	18-24"	30'
FOUNDATION PLANTING	G	2	AZALEA DEL. VALLEY WHITE / DVW AZALEA	18-24"	3'
	H	3	JUNIPERUS HORIZONTALIS 'BAR HARBOR' / BAR HARBOR JUNIPER	15-18"	2-3'
	I	4	JUNIPERUS HORIZONTALIS WILTONI / BLUE RUG JUNIPER	15-18"	2'
	J	9	EUONYMUS FORTUNEI COL. / WINTER CREEPER	FLATS	12"
	K	10	SPIREA 'GOLD MOUND' / GOLD MOUND SPIREA	12-18"	2.5'
	L	9	ILEX CRENTA HELLERI / DWARF JAP. HOLLY	18-24"	3'
	M	5	PIERIS JAPONICA / JAP. ANDROMEDA	2-2.5'	4'
	N	4	TAXUS BACCATA REPANDENS / SPR. YEW	18-24"	3'

LEGEND

- EXISTING STONE WALL
- 100 FOOT BUFFER ZONE
- EDGE OF WETLAND
- UNIT #
- PROPOSED CONTOUR
- PROPOSED SEWER MANHOLE
- W-DISTRICT BOUNDARY
- 100 FT W-DISTRICT BUFFER
- EXISTING WELL

TISBURY MEADOW

AN ELDERLY HOUSING DEVELOPMENT

BOXBOROUGH, MASS.

LAND USE & LANDSCAPE PLAN

FOR: BOXBOROUGH TOWN CENTER L.L.C.

SCALE: 1"=20' DATE: JANUARY 11,1999

REV: MARCH 19, 1999

STAMSKI AND McNARY, INC.

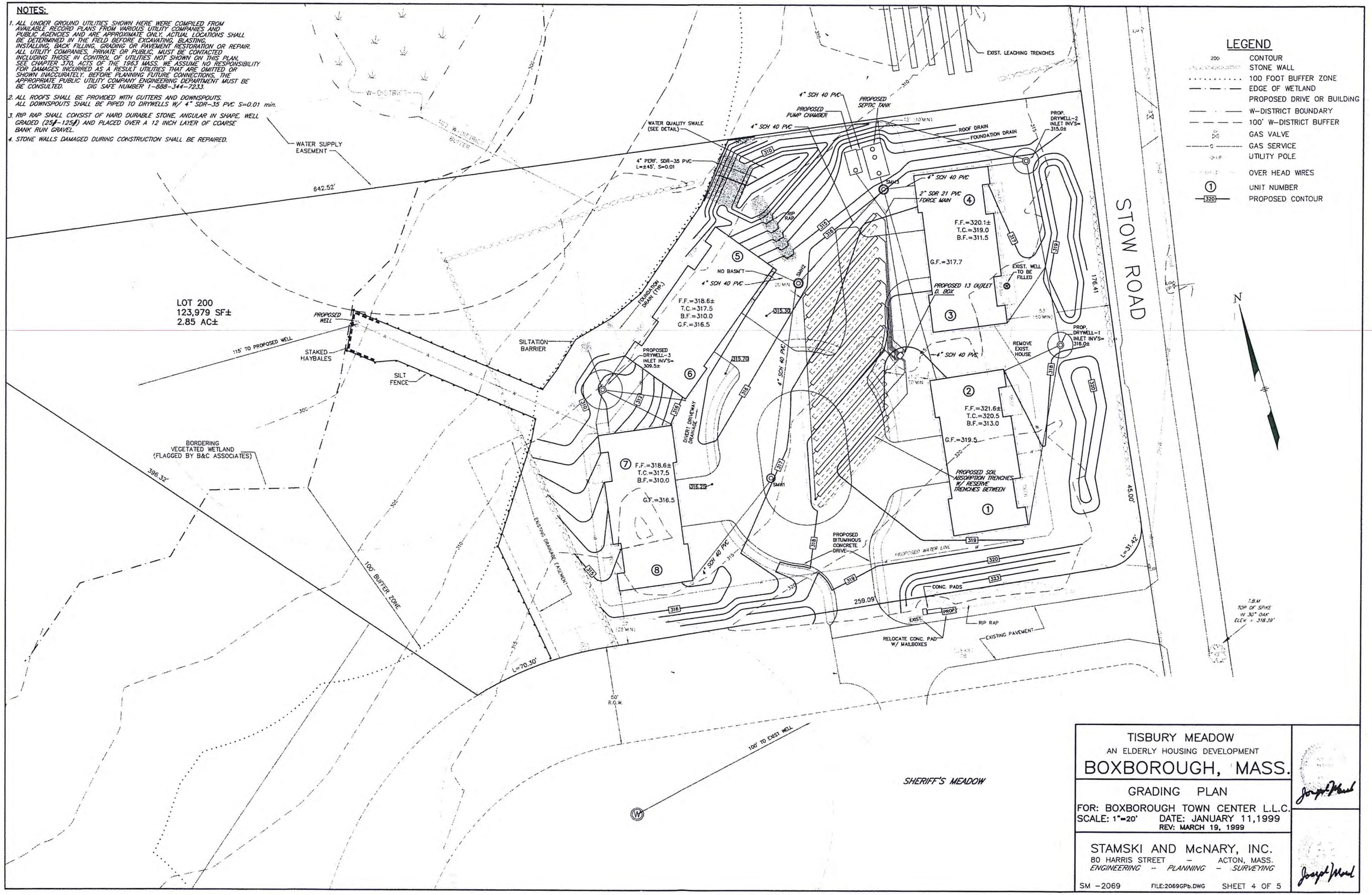
80 HARRIS STREET – ACTON, MASS.

ENGINEERING – PLANNING – SURVEYING

SM –2069 FILE:2069LUPb.DWG SHEET 3 OF 5

NOTES:

1. ALL UNDER GROUND UTILITIES SHOWN HERE WERE COMPILED FROM AVAILABLE RECORD PLANS FROM VARIOUS UTILITY COMPANIES AND PUBLIC AGENCIES AND ARE APPROXIMATE ONLY. ACTUAL LOCATIONS SHALL BE DETERMINED IN THE FIELD BEFORE EXCAVATING, BLASTING, INSTALLING, BACK FILLING, GRADING OR PAVEMENT RESTORATION OR REPAIR. ALL UTILITY COMPANIES, PRIVATE OR PUBLIC, MUST BE CONTACTED INCLUDING THOSE IN CONTROL OF UTILITIES NOT SHOWN ON THIS PLAN. SEE CHAPTER 370, ACTS OF THE 1963 MASS. WE ASSUME NO RESPONSIBILITY FOR DAMAGES INCURRED AS A RESULT UTILITIES THAT ARE OMITTED OR SHOWN INACCURATELY. BEFORE PLANNING FUTURE CONNECTIONS, THE APPROPRIATE PUBLIC UTILITY COMPANY ENGINEERING DEPARTMENT MUST BE CONSULTED. DIG SAFE NUMBER 1-888-344-7233.
2. ALL ROOFS SHALL BE PROVIDED WITH GUTTERS AND DOWNSPOUTS. ALL DOWNSPOUTS SHALL BE PIPED TO DRYWELLS W/ 4" SDR-35 PVC S=0.01 min.
3. RIP RAP SHALL CONSIST OF HARD DURABLE STONE, ANGULAR IN SHAPE, WELL GRADED (25#-125#) AND PLACED OVER A 12 INCH LAYER OF COARSE BANK RUN GRAVEL.
4. STONE WALLS DAMAGED DURING CONSTRUCTION SHALL BE REPAIRED.



TISBURY MEADOW

AN ELDERLY HOUSING DEVELOPMENT

BOXBOROUGH, MASS.

GRADING PLAN

FOR: BOXBOROUGH TOWN CENTER L.L.C.

SCALE: 1"=20' DATE: JANUARY 11,1999

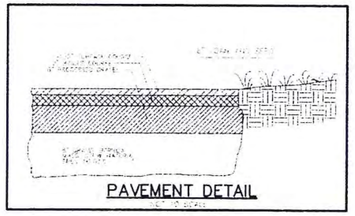
REV: MARCH 19, 1999

STAMSKI AND McNARY, INC.

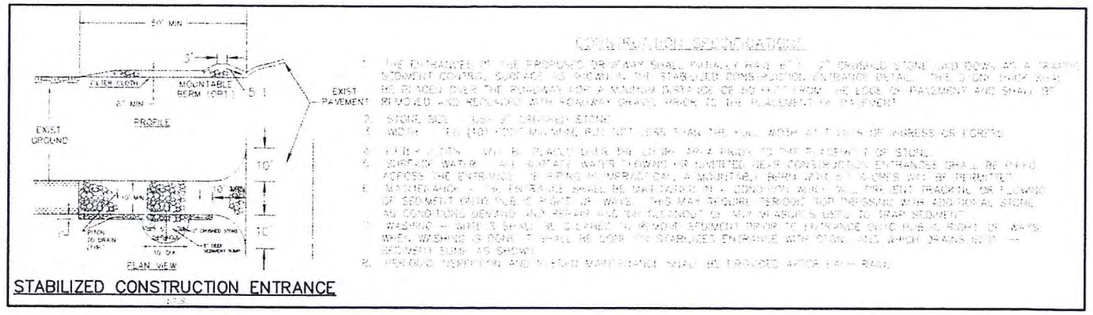
80 HARRIS STREET - ACTON, MASS.

ENGINEERING - PLANNING - SURVEYING

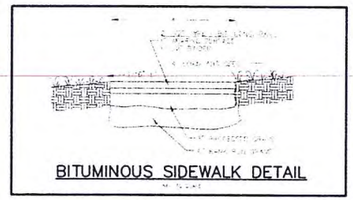
SM -2069 FILE:2069GPb.DWG SHEET 4 OF 5



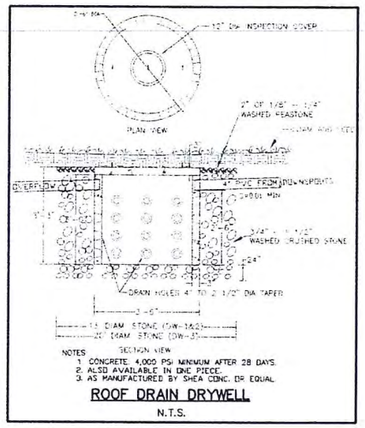
PAVEMENT DETAIL



STABILIZED CONSTRUCTION ENTRANCE

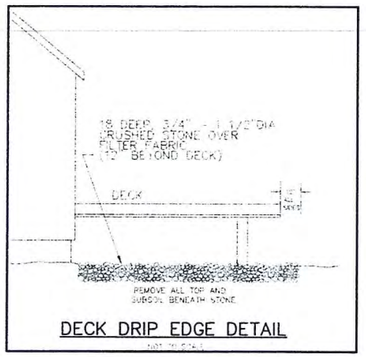


BITUMINOUS SIDEWALK DETAIL

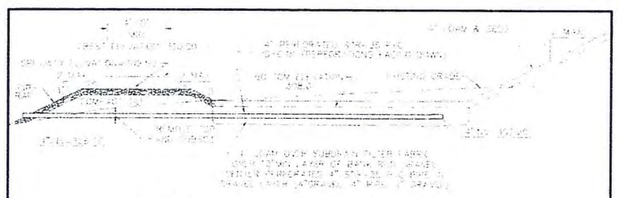


ROOF DRAIN DRYWELL

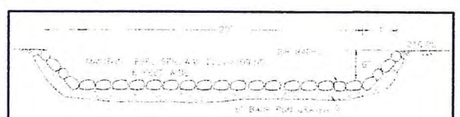
N.T.S.



DECK DRIP EDGE DETAIL

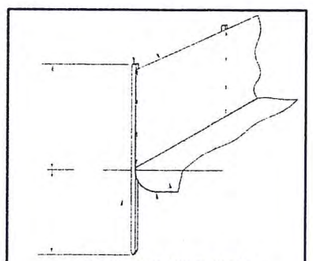


WATER QUALITY SWALE DETAIL

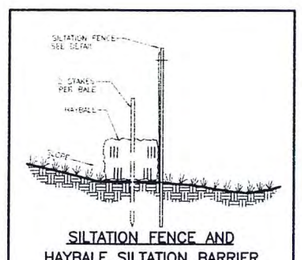


SWALE SPILLWAY DETAIL

N.T.S.



SILTATION BARRIER DETAIL



SILTATION FENCE AND HAYBALE SILTATION BARRIER

NOT TO SCALE

TISBURY MEADOW

AN ELDERLY HOUSING DEVELOPMENT

BOXBOROUGH, MASS.

DETAIL SHEET

FOR: BOXBOROUGH TOWN CENTER L.L.C.

SCALE: AS SHOWN DATE: JANUARY 11,1999

REV: MARCH 19, 1999

STAMSKI AND McNARY, INC.

80 HARRIS STREET – ACTON, MASS.

ENGINEERING – PLANNING – SURVEYING

SM -2069 FILE:2069DETb.DWG SHEET 5 OF 5

TOWN OF BOXBOROUGH
PLANNING BOARD

PLANNING BOARD DECISION #99-01
SITE PLAN DECISION - Tisbury Meadow Senior Housing
APPLICANT/OWNER: Town Center Development LLC
98 Charter Road
Acton, MA 01720

LOCATION: MAP 6 GROUP 4 PARCEL(S) 127.1, 129 and 130

ZONING DISTRICT: Town Center

APPLICATION: Request under Section 5400 Site Plan Approval to construct four buildings containing a total of eight dwelling units reserved exclusively for elderly occupancy on 2.85 acres of land.

After causing notice of the time and place of the public hearing and of the subject matter thereof to be published, posted and mailed to the applicant, abutters and other parties of interest as required by law, the hearing was conducted on March 9, 1999 in the Town Hall Upstairs Meeting Room. The hearing was continued to March 14, 1999 for a site walk and March 23, 1999 to receive additional information. The hearing was closed on March 23, 1999.

Board members: Richard Scarlet, Chairman, Anthony D'Agostino, and Jennie L. Rawski were present throughout all of the proceedings.

Present for the applicant: George Dimakarakos, project engineer, Stamski and McNary; James Fenton and John Lyons, Town Center Limited Partnership.

The following exhibits were submitted prior to the close of the public hearing:

Exhibit A: Site Plan Application book dated 2-2-99
Exhibit B: Site Plan for Sheriff's Meadow Phase II dated 1-11-99 sheets 1-5
Exhibit C: Certificate of submission from the Town Clerk
Exhibit D: Legal Notice of Public Hearing
Exhibit E: Report of Westcott Site Services dated 3-5-99
Exhibit F: Referral from the Zoning Board of Appeals dated 3-2-99
Exhibit G: Referral from the Board of Selectmen
Exhibit H: Memo to Conservation Commission from the Board of Health dated 3-4-99

Exhibit I: Referral from the Fire Department dated 3-3-99
Exhibit J: Revisions to Site Plan dated 3-23-99
Exhibit K: Revised Site Plans Sheets 1-5 dated 3-19-99

After reviewing the exhibits and record of proceedings, the Planning Board finds and concludes the following:

1. The applicant proposes to construct four (4) buildings containing a total of eight (8) dwelling units reserved exclusively for elderly occupancy in the Town Center District. The proposed use is allowed by right in the Town Center District.

2. The original development name of Sheriff's Meadow Phase II was changed to Tisbury Meadow after a resident of Sheriff's Meadow informed the applicant that the Master Deed for the Sheriff's Meadow Condominium Association refers to a phase II.

3. All residents of Tisbury Meadow will belong to a separate condominium association. A draft of the Master Deed has been submitted with the plan. The deed restricts ownership to two persons age 55 or older or to a person age 55 or older and his or her spouse, a third person may be allowed for the express purpose of providing health care to the occupants.

4. The parcel of land contains 124,146 square feet including 69,000 square feet of upland lot area. The proposed lot meets all dimensional requirements of the Zoning Bylaw. In addition, the proposed buildings meet setback, dimensional and density requirements for the Town Center Zoning District.

5. The units will be accessed by a circular driveway meeting fire engine turning requirements. A sidewalk along the driveway has been added to the plans. Therefore, the roadway and circulation system is designed to promote convenience for pedestrians and vehicles. The access road by which the development is reached is adequate in width, grade and construction to carry the additional traffic that is generated from the development. In addition, the existing fire pond on Massachusetts Avenue will be used for fire protection. Therefore, adequate access is provided for fire and emergency vehicles.

6. The Board of Health has requested that the applicant apply for an Order of Conditions from the Conservation Commission to construct the drinking water well within 100 feet of the vegetated wetlands. No other construction or disturbance is proposed in the wetlands or buffer zone. The Board of Health has reviewed the septic system however they will not issue a permit until the well issue is resolved. Once approved, adequate facilities for water supply and waste disposal will be provided.

7. Two parking spaces per unit are provided as required by the Parking Schedule in the Zoning Bylaw.

8. Each unit will have three exterior lights, no other lighting is proposed.

9. The buildings will be similar in architectural style to the Sheriff's Meadow development, therefore, the architectural style will be in harmony with the prevailing style of buildings in the neighborhood.

10. The Landscape Plan has been revised to show an evergreen screen along the proposed berm beside unit #1. The Landscape Plan also shows plantings along Stow Road, therefore, adequate landscaped buffers are provided.

11. The existing mailbox pad is proposed to be moved in order to provide clear sight distances.

12. A note has been added to the plans stating that all stonewalls that are disturbed during construction will be repaired.

13. The drainage design incorporated infiltration and water quality measures. The drainage calculations have been approved by the Town's consulting engineer. Adequate measures have been proposed to prevent pollution of surface and ground water, to minimize erosion and sedimentation, to prevent changes in groundwater levels, to minimize potential for flooding and to provide for stormwater drainage consistent with the requirements of the Subdivision Rules and Regulations.

14. The engineer has submitted a plan showing handicap access ramps to each of the units.

15. The developer of Sheriff's Meadow, Compass Builders, planned to construct a total of 50 senior housing units on the land now owned by the Town Center LLC. A total of twelve units have been constructed in Sheriff's Meadow. Compass Builders agreed that a total of 10 percent (five units) would be deed restricted as affordable housing that would qualify under the states definition of affordable housing. None of the units in this development are proposed as affordable housing.

Therefore, the Planning Board votes to **GRANT** the requested Site Plan Approval Permit subject to the following conditions, modifications and limitations:

CONDITIONS:

1. The applicant shall submit a legally binding agreement to create at least five affordable units in the Town in association with further development of land in the Town Center owned by the applicant.

2. The plan shall be implemented as shown on the plan entitled: "Site Plan for Tisbury Meadow an Elderly Housing Development in Boxborough, MA.," prepared by Stamski

and McNary Inc. dated January 11, 1999, revised March 19, 1999, Sheets 1-5 (Exhibit K).

3. The draft Master Deed shall be reviewed and approved by the Planning Board and Town Counsel before being recorded. Once approved the Master Deed shall be recorded in the South Middlesex Registry of Deeds by the applicant. A final copy with recording information shall be provided to the Planning Board. No building permit shall be issued for any of the units in the development until proof of recording is provided to the Planning Board and the Inspector of Buildings.

4. All outdoor lighting shall conform to Section 3340 of the Zoning Bylaw. Should any outdoor lighting be erected that does not comply with the Bylaw requirements, the applicant shall be responsible for correcting the lighting at his/her expense.

5. Catch basins shall be regularly maintained by the Condominium Association and shall be cleaned yearly in the spring. Proof of same shall be submitted to the Inspector of Buildings.

6. No building permit shall be issued until the driveway is completed or bonded to an amount approved by the Planning Board.

7. The site shall be landscaped in accordance with the plan entitled: "Land Use and Landscape Plan, last revised March 19, 1999." No building permit shall be issued until all landscaping work is bonded to an amount approved by the Planning Board.

8. All site landscaping shall be maintained in a healthful condition, plants that die or become unhealthy shall be replaced during the next growing season. This condition shall apply for two years after all landscaping has been installed.

9. Violation of Conditions. Violation of any of the conditions of this decision shall be grounds for revocation of this Special Permit, or of any building or occupancy permit granted hereunder. In case of any violation of the continuing obligations of this permit, the Town will notify the owner of such violation and give the owner reasonable time, not to exceed thirty (30) days, to cure the violation and to enforce the conditions of this permit. The Town may enforce compliance with the conditions of this permit by any action of injunctive relief before any court of competent jurisdiction.

The authority granted to the applicant by this permit is limited as follows:

APPLICABILITY OF PERMIT: This permit applies only to the site which is the subject of this application. All construction to be conducted on the site shall be conducted in accordance with the terms of this permit and shall be limited to the improvements shown on the Plan.

OTHER PERMITS OR APPROVALS: This decision applies only to the requested Site

Plan Permit. Other permits or approvals required by the Boxborough Zoning Bylaw, other governmental boards, agencies or bodies having jurisdiction shall not be assumed or implied by this decision.

BYLAW COMPLIANCE: The foregoing conditions are stated for the purpose of emphasizing their importance but are not intended to be all inclusive or to negate the remainder of the Boxborough Zoning Bylaw.

AMENDMENT OF PERMIT: The Board hereby reserves its powers to modify or amend the terms and conditions of this permit upon its own motion with consent from the owner, or on the application of the owner. The Board further reserves its powers to amend this permit without a new public hearing provided that the Board finds that such amendment is not significant to the public interest and that such amendment is not inconsistent with the purpose and intent of the Bylaw or with the terms of this permit.

LAPSE OF PERMIT: This permit shall lapse on April 20, 2001, if a substantial use thereof has not sooner commenced except for good cause or if any construction has not begun by said date except for good cause. Any request for an extension of the time limitation set forth herein shall be made in writing to the Board at least 30 days prior to April 20, 2001 and the Board reserves its rights and powers to grant or deny such request without a public hearing. The Board, however, shall not grant any extension herein provided unless it finds that the use of the property in question or construction on the site has not begun except for good cause.

The applicant by acceptance of this permit and recording thereof acknowledges the binding effect of the conditions of this permit. Proof of recording shall be submitted to the Planning Board prior to the issuance of a building permit.

As Built Plans certified by a registered surveyor or professional engineer setting forth the status of construction and noting compliance with the approved site plan addressed herein including the location of all pavement, buildings, and utilities above and below grade; and the location, area and depth of buried stumps, debris or boulders shall be submitted to and approved by the Planning Board before an Occupancy Permit may be issued by the Inspector of Buildings.

This permit shall run with the land and its applicability shall continue regardless of any change in ownership.

APPEALS: Any person aggrieved by this decision may appeal pursuant to the Massachusetts General Laws, within 20 days after the filing of this Decision with the Boxborough Town Clerk.

WITNESS our hand this day of

THE BOXBOROUGH PLANNING BOARD:

Richard Scarlet, Chairman

Anthony D'Agostino, Member

Bruce Taylor, Clerk

John Markiewicz, Member

Jennie Rawski, Member

VIRGINIA B. RICHARDSON hereby certify that this is a true copy of the decision of the Planning Board.

April 21, 1999
Date filed with the Town Clerk

TO WHOM IT MAY CONCERN:

I, hereby certify that the 20-day appeal period on this decision has expired, and no appeals have been filed with this office.

VIRGINIA B. RICHARDSON
Town Clerk

DATE

Copy sent to:
Applicant
Inspector of Buildings
Board of Health
Conservation Commission
Board of Appeals
Fire Chief
Police Chief

Notice of Decision sent to:
Town of Acton
Town of Littleton
Town of Harvard
Town of Stow
Board of Selectmen
Director of Public Works
Abutters

FILE:tismead.doc

Sheriff's Meadow Senior Housing

As Built Plan- Revised November 9, 1995
Easement Plan (Plan 297 of 1995) - April 1995
Grading & Drainage Plan- Revised September 16, 1994
Amendment to Site Plan Decision #90-07A- February 9, 1999
Planning Board Decision #90-07A- October 4, 1994
Planning Board Decision #90-07- September 10, 1990

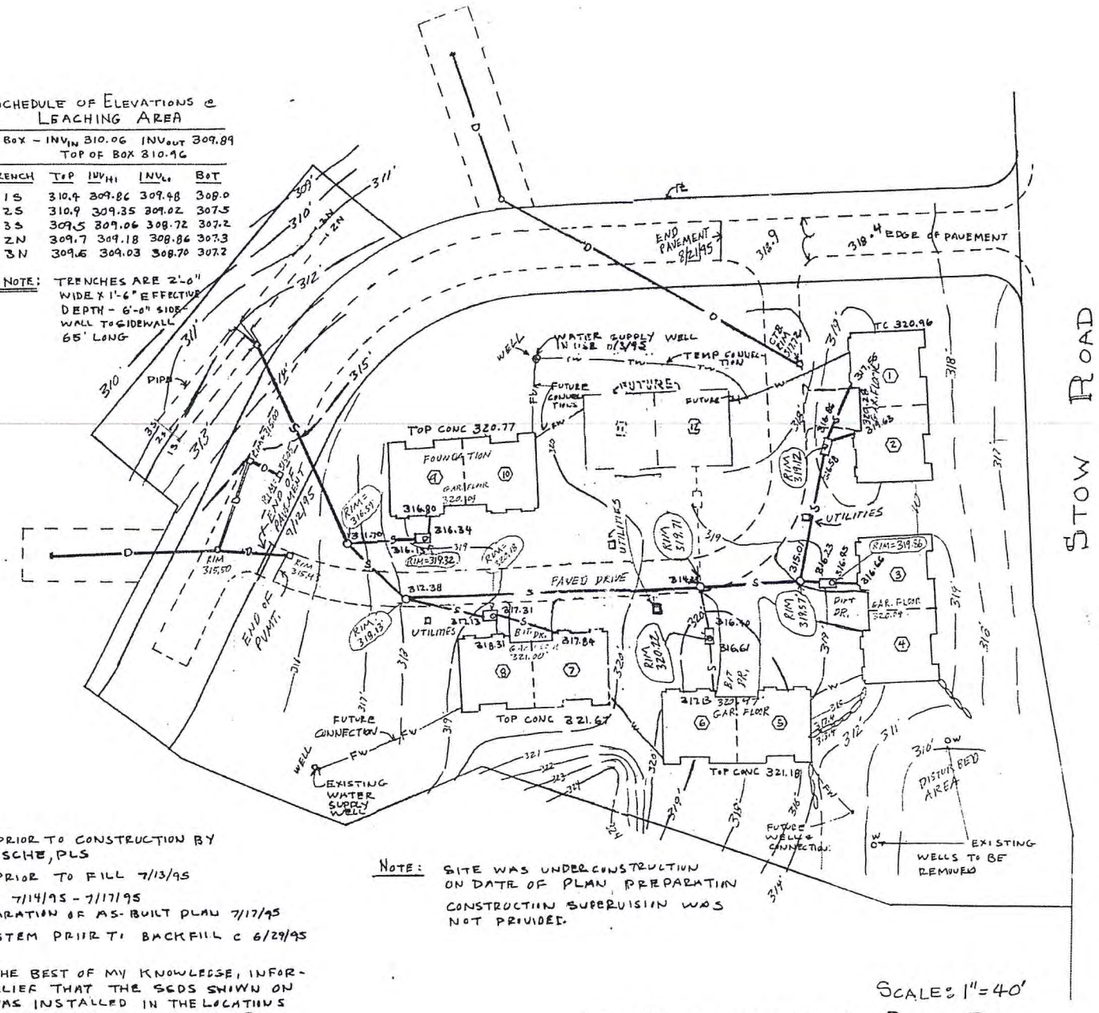
NORTH

SCHEDULE OF ELEVATIONS @ LEACHING AREA

'D' BOX – INV_{IN} 310.06 INV_{OUT} 309.89
TOP OF BOX 310.46

TRENCH	TOP	INV_{HI}	INV_{LO}	BOT
1S	310.4	309.86	309.48	308.0
2S	310.9	309.35	309.02	307.5
3S	309.5	309.06	308.72	307.2
2N	309.7	309.18	308.86	307.3
3N	309.6	309.03	308.70	307.2

NOTE: TRENCHES ARE 2'-0" WIDE X 1'-6" EFFECTIVE DEPTH – 6'-0" SIDE WALL TO SIDEWALL 65' LONG



SDS STAKED PRIOR TO CONSTRUCTION BY MICHAEL R MISCHE, PLS

EXCAVATION PRIOR TO FILL 7/13/95

FILL IN PLACE 7/14/95 – 7/17/95

DURING PREPARATION OF AS-BUILT PLAN 7/17/95

GRAVITY SYSTEM PRIOR TO BACKFILL @ 6/29/95

I CERTIFY TO THE BEST OF MY KNOWLEDGE, INFORMATION AND BELIEF THAT THE SEDS SHOWN ON THIS PLAN WAS INSTALLED IN THE LOCATIONS AND AT THE ELEVATIONS SHOWN AS OF 7/25/95 AND CONFORMS TO THE APPROVED PLAN (WITHIN ACCEPTABLE TOLERANCES) AND

NOTE: SITE WAS UNDER CONSTRUCTION ON DATE OF PLAN PREPARATION CONSTRUCTION SUPERVISION WAS NOT PROVIDED.

SCALE: 1" = 40'

REV #2/95 - SCALE & WATER LINES

COMMONWEALTH OF MASSACHUSETTS MARK T. DONOHOE No. 27148 REGISTERED PROFESSIONAL ENGINEER

7/25/93

AS BUILT PLAN OF SEWAGE DISPOSAL SYSTEM

SHERIFF'S MEADOW BOXBOROUGH

LAND DESIGN SERVICES - P.O. BOX 647
ACTON, MA
508-635-9112

FILE 441-AB1/1

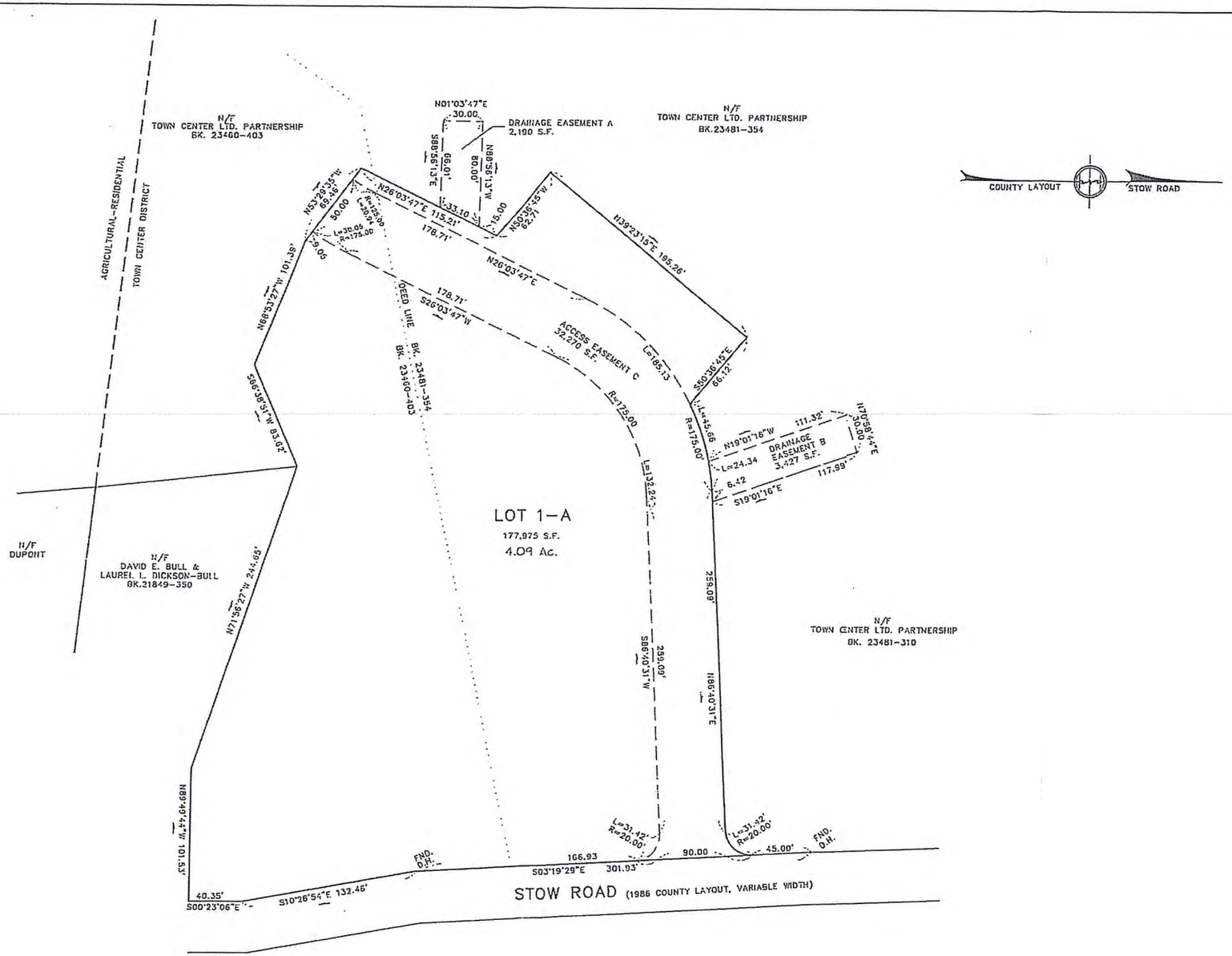
APPROVED
BOXBOROUGH BOARD OF HEALTH
DATE: 11/6/95

COMMONWEALTH OF MASSACHUSETTS MICHAEL R. MISCHE No. 35408 REGISTERED PROFESSIONAL SURVEYOR

REVISED 8/21/95
CONTOURS ADDED AT UNITS 1/2, 5/6, & SEPTIC BED. M. MISCHE, PLS. SHOT IN FIELD 8/21/95

REVISED 9/12/95
COUNTOURS ADDED AT UNITS 7/8. M.M.

REVISED 11/09/95
CONTOURS ADDED FROM UNITS 7/8 TO LEACH FIELD.
MANHOLE RIM ELEVATIONS ADDED
OLD HOUSE REMOVED.
WELLS ADDED. M.M.



RESERVED FOR REGISTRY USE
Middlesex Registry of Deeds,
Southern District
Cambridge, Massachusetts
Plan No. 297 of 19 95
Rec'd 3-14 19 95
at 12 h 21 m 0m Doc No. 327
Rec'd, Bk 25286 Page 49
Attest
Register

DEED REFERENCE: BK.23481-354, BK.23460-403

PLAN REFERENCE: PLAN #836 OF 1977, PLAN #453 OF 1970, PLAN #1093 OF 1975

ASSESSORS REFERENCE: GROUP 4 SHEET 6 PARCELS 127,131

1" = 40'
0 10 25 50 100 200

I HEREBY CERTIFY THAT THE PROPERTY LINES SHOWN ON THIS PLAN ARE THE LINES DIVIDING EXISTING OWNERSHIPS, AND THE LINES OF THE STREETS AND WAYS SHOWN ARE THOSE OF PUBLIC OR PRIVATE STREETS OR WAYS ALREADY ESTABLISHED, AND THAT NO LINES FOR DIVISION OF OWNERSHIP OR FOR NEW WAYS ARE SHOWN.

Michael R. Mische 4/13/95
PROFESSIONAL LAND SURVEYOR DATE

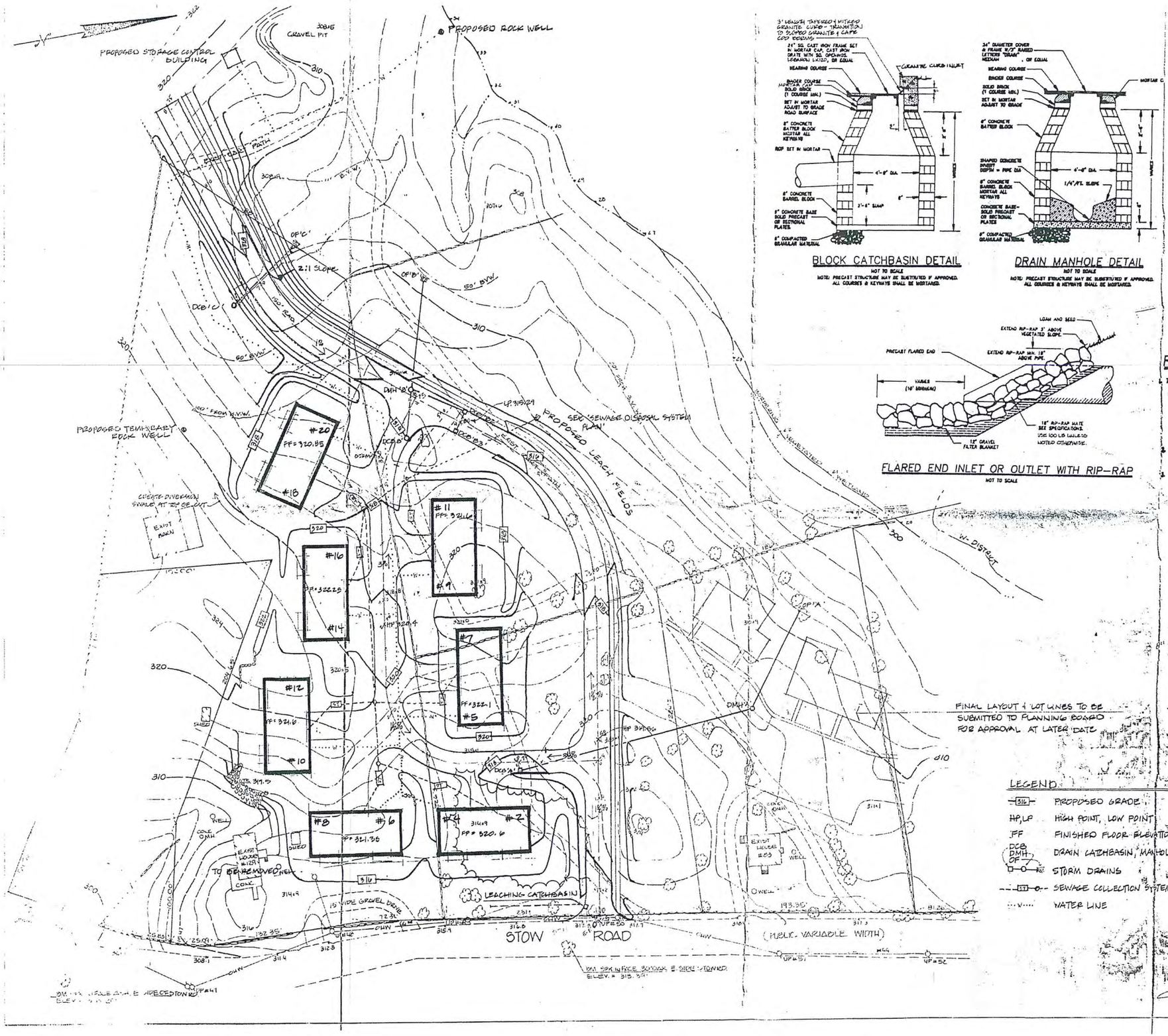
I CERTFY THAT THIS PLAN CONFORMS TO THE RULES AND REGULATIONS OF THE REGISTERS OF DEEDS OF THE COMMONWEALTH OF MASSACHUSETTS

Michael R. Mische 4/13/95
PROFESSIONAL LAND SURVEYOR DATE

EASEMENT PLAN IN
BOXBOROUGH, MASSACHUSETTS
SCALE 1 in. = 40' APRIL, 1995
PREPARED FOR: COMPASS BUILDERS, INC.

MICHAEL R. MISCHE P.L.S.
12 MAPLE STREET EXT.
HOPKINTON, MA 01748
(508) 435-5459
PROFESSIONAL LAND SURVEYOR
FILE No. 9417 PLAN No. 9417E

297



BLOCK CATCHBASIN DETAIL

NOT TO SCALE

NOTE: PRECAST STRUCTURE MAY BE SUBSTITUTED IF APPROVED. ALL COURSES & KEYWAYS SHALL BE MORTARED.

DRAIN MANHOLE DETAIL

NOT TO SCALE

NOTE: PRECAST STRUCTURE MAY BE SUBSTITUTED IF APPROVED. ALL COURSES & KEYWAYS SHALL BE MORTARED.

FLARED END INLET OR OUTLET WITH RIP-RAP

NOT TO SCALE

Drainage Schedule

Structure	Rim	Invert
DCB A	317.7	313.4
DMH A	314.0	310.0
OF A	**	308.0
DCBB-1	316.0	311.3
DMH B	315.0	311.0
DCB B3	315.04	310.75
DCB B2	315.04	310.05
DMH B	315.58	310.05
OF B	**	308.0
DCB C	312.0	308.0
OF C	**	307.6
Leaching CB	317.38	315.0

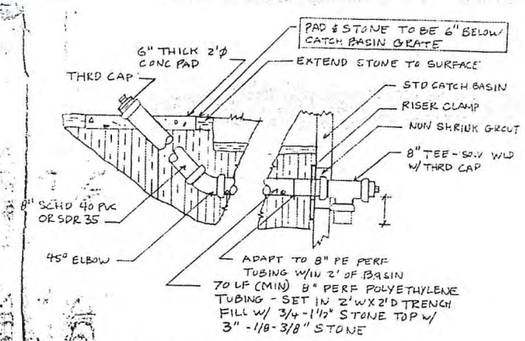
All piping is 12" RCP, Except from DCB C to OF C, which is 24" RCP & 8" perforated pipe from leaching catchbasin

RIP-RAP SPECIFICATIONS

1. THE RIP-RAP SHALL BE COMPRISED OF DURABLE ANGULAR STONE WHICH MEETS THE FOLLOWING GRADATION REQUIREMENTS:

STONE SIZE	% OF TOTAL WEIGHT SMALLER THAN GIVEN SIZE
100 LB.	100%
50 LB.	80%
25 LB.	50%
? LB.	NOT TO EXCEED 10%

2. THE RIP-RAP SHALL BE UNDERLAYED WITH A FILTER BLANKET CONSISTING OF CLEAN COARSE GRAVEL WITH NO 2" ONES OVER 3" & FEWER THAN 10% PASSING A #200 SIEVE.
3. THE FILTER BLANKET NEED NOT BE COMPACTED, BUT SHALL BE GRADED TO A UNIFORM SURFACE WITH A MINIMUM THICKNESS OF 12".



Leaching Catchbasin Details

N. T. S.

LEGEND

316	PROPOSED GRADE
HP, LP	HIGH POINT, LOW POINT
FF	FINISHED FLOOR ELEVATION
DCB, DMH, OF	DRAIN CATCHBASIN, MANHOLE, OUTFALL
	STORM DRAINS
SEWAGE COLLECTION SYSTEM	
WATER LINE	

COMMONWEALTH OF MASSACHUSETTS MARK T. DONOHOE No 27141 REGISTERED PROFESSIONAL ENGINEER

7/28/94

GRADING & DRAINAGE

SITE PLAN OF LAND
SHERIFF'S MEADOW
BOXBOROUGH, MA

PREPARED FOR
COMPASS BUILDERS INC.

PREPARED BY
LAND DESIGN SERVICES
P.O. BOX 647 ACTON, MA
508-635-9112

SCALE: 1"=40' JUNE 1994 REV. AUG. 1994 FILE NO. 49: S/1 1/2
REV. SEPT. 16, 1994

MSD 05/04/99 02:31:20 729 10.00

TOWN OF BOXBOROUGH

PLANNING BOARD

AMENDMENT TO SITE PLAN DECISION 90-07A Dated: 2-9-99
Issued to: Anthony DeMarco, Compass Builders
(Tisbury Partners)
Recorded in Book 25961 Page 098

Current Owner: Sheriff's Meadow Condominium Association
P.O. Box 936
Acton, MA 01720

Location of Property: Stow Road
Map 6 Group 4 Parcel 127

At a duly called and properly posted meeting on February 9, 1999, the undersigned being a majority of the Planning Board of the town of Boxborough voted to amend Site Plan Decision #90-07A issued to Compass Builders for the Sheriff's Meadow Condominiums as follows:

1. The future subdivision roadway and sidewalk beginning at Stow Road and continuing to the southerly property line does not have to be paved as shown on the site plan until phase II of Sheriff's Meadow development or a similar senior housing development.

2. The proposed evergreen screen and proposed deciduous trees located along the future subdivision roadway; and the two stop signs shown on the plan entitled: "Layout and Landscaping Plan - Site Plan of Sheriff's Meadow, Boxborough, MA," Sheets 1-2, scale: 1"=40' dated June 1994 and revised August 1994, do not have to be installed until the future subdivision road is paved.

3. The crushed stone temporary T-turnaround constructed within the future subdivision roadway easement shall be paved to binder course.

4. Phase II development of Sheriff's Meadow or similar senior housing development will require the use of the future subdivision roadway for access and egress.

12/10/99

5. The Sheriff's Meadow Condominium Association and all units thereto are released from completing any of items 1 through 4 set forth in this site plan amendment.

This amendment is being made on the Planning Board's motion with consent from the owners of the property as permitted in Planning Board Decision 90-07A. The Planning Board finds that this amendment is within the scope of the original Site Plan Decision and therefore, a new public hearing is not required.

This amendment shall not take effect until it is recorded at the Middlesex South Registry of Deeds. Proof of recording shall be provided to the Planning Board and the Inspector of Buildings.

WITNESS our hand this 9th day of February, 1999.

THE BOXBOROUGH PLANNING BOARD:

Bruce Taylor, ~~Chairman~~ Clerk

Anthony D'Agostino, Member

Richard Scarlet, ~~Clerk~~ Chairman

John Markiewicz, Member

Virginia B. Richardson
VIRGINIA B. RICHARDSON
Town Clerk

February 10, 1999
Date filed with the Town Clerk

90-07a2.doc

TOWN CLERK

29 MIDDLE ROAD
BOXBOROUGH, MASSACHUSETTS 01719
508-263-1116

April 26, 1999

I, Virginia B. Richardson, Clerk of the Town of Boxborough, hereby do certify that twenty (20) days have elapsed since the Planning Board filed their decision on an Amendment To Site Plan Decision #90-07A, with me in the name of Anthony DeMarco, Compass Builders (Tisbury Partners), Location: Map 6, Group 4, Parcel 127 and no appeals have been received.

Virginia B. Richardson

VIRGINIA B. RICHARDSON
Town Clerk of Boxborough

BK26506PG237

TOWN OF BOXBOROUGH

PLANNING BOARD

PLANNING BOARD DECISION #90-07A
SITE PLAN DECISION - TOWN CENTER - PHASE ONE AMENDMENT

APPLICANT: Compass Builders, Inc.
P.O. Box 777
Acton, MA 01720

OWNER: John J. Lyons
571 Burroughs Road
Boxborough, MA 01719

LOCATION: MAP 6 GROUP 4 PARCEL(S) 127, 129, 130 & 131

ZONING DISTRICT: Town Center District ACREAGE: 23

APPLICATION: Request to modify Site Plan Decision #90-07 to construct seven (7) senior housing duplexes (14 units); to reduce the amount of approved commercial square footage; and to separate the residential area from the commercial area.

After causing notice of the time and place of the public hearing and of the subject matter thereof to be published, posted and mailed to the applicant, abutters and other parties of interest as required by law, the hearing was conducted on August 2, 1994 and continued to September 6, 1994.

Board members: Bruce Taylor, Kenneth Gregson, and Richard Scarlet were present throughout the proceedings. Anthony D'Agostino abstained from the proceedings.

Present for the applicant: Anthony DeMarco, Compass Builders, Inc.; Mark Donohoe, Land Design Services (LDS) and Joan Ferguson (LDS). Also present: Laurel Dickson-Bull, David Bull and Mark Starr.

The following exhibits were submitted prior to the close of the public hearing:

Exhibit A: Public Hearing Notice published in The Beacon

Exhibit B: Plan entitled "Site Plan of Land Sheriff's Meadow Boxborough, MA" dated June 1994, 1"=40', Sheets 1-2

Plan entitled "Conceptual Subdivision Plan for Boxborough, MA" prepared for Compass Builders, Inc. prepared by Land Design Services at a scale of 1"=100' dated June 1994

Exhibit C: Floor layout plan and front building elevation plan

MSD 07/19/96 08:46:31 43 13.00

Exhibit D: Letter from Land Design Services dated June 30, 1994 and Application for Modification of Site Plan Approval

Exhibit E: Conservation Commission referral dated July 11, 1994

Exhibit F: Board of Appeals referral dated July 11, 1994

Exhibit G: Letter from Compass Builders re: An Adult Community

Exhibit H: Report from Westcott Site Services dated July 29, 1994

Exhibit I: Draft Sheriff's Meadow Master Deed Phase I

Exhibit J: Layout and Landscaping Plan Site Plan of Land Sheriff's Meadow Boxborough MA, Sheets 1/2, Scale: 1"=40', dated June, 1994, revised August 1994

Exhibit K: Grading and Drainage
Site Plan of Land Sheriff's Meadow, Boxborough, MA, Sheet 2/2, Scale: 1"=40', dated June, 1994

Exhibit L: Sewage Disposal System Plan
Site Plan of Land Sheriff's Meadow, Boxborough, MA, Scale: 1"=40', dated August 1994

Exhibit M: SDS Detain Sheet
Site Plan of Land Sheriff's Meadow, Boxborough, MA, dated August 1994

Exhibit N: Letter from Board of Health dated August 5, 1994

Exhibit O: Town Counsel dated September 7, 1994

After reviewing the exhibits and record of proceedings, the Planning Board finds and concludes the following:

1. The applicant proposes to construct seven (7) duplexes (14 units) to be owned and occupied by persons age 55 or older in the Town Center District. A portion of this land is subject to Site Plan Decision #90-07, which was extended by vote of the Planning Board to September 10, 1994. Therefore, this request has been submitted as an amendment.

2. Site Plan Decision #90-07 approved the construction of four commercial buildings:

   Building 1 (5,800 sq. ft.) retail/restaurant;
   Building 2 (2,400 sq. ft.) office/retail;
   Building 3 (5,694 sq. ft.) bed & breakfast; and
   Building 4 (4,360 sq. ft.) restaurant

Building 1, Boxborough Marketplace, has been constructed, the other three buildings have not been.

3. A traffic analysis was submitted for the proposed commercial buildings. According to the traffic study, the present roadway system can accommodate the additional traffic resulting from the project. The four commercial buildings were predicted to generate 536 vehicle trips per day: 19 during the morning peak hour and 54 during the evening peak hour. The revised plan will generate less traffic than the commercial buildings.

4. The applicant proposes to restrict the units so that the units must be occupied by a person age 55 or older and their spouse. The deed also limits sale of the units to persons 55 or older or the sons or daughters of such persons, and limits leasing or renting any unit to persons age 55 or older and their spouse.

5. The proposed senior housing as shown on the plan meets density and setback requirements in the Town Center District; multi-family senior housing is allowed by right in the Town Center District.

6. The applicant has agreed to set aside 10% of the units in the total project for affordable senior housing. The applicant proposes to build a total of 50 units.

7. The access roadway will be constructed in accordance with the Subdivision Rules and Regulations, a Preliminary Plan that shows this roadway as a subdivision road will be filed in the future.

8. The water supply is being reviewed by the Massachusetts Department of Public Health. The septic system is also under review, once approved adequate water and septic will be provided.

9. Two street lights are proposed at the intersection of the driveway and the proposed road. In addition, the units will have decorative lighting.

10. A sidewalk will be constructed on one side of the proposed roadway.

11. The plan preserves many existing trees. Additional plantings are proposed to create natural buffers, therefore adequate buffers are provided.

12. The housing units have been relocated to address the concerns of the Conservation Commission regarding wetland impacts.

13. The applicant has shown three conceptual house designs. The units and materials shown meet the criteria of Section 5354. The applicant did not submit final building designs.

14. Adequate drainage facilities are provided which are in conformance with the Subdivision Rules and Regulations.

15. The roadway and access drive promote safety for both pedestrians and vehicles; the sight distances along Stow Road meet AASHTO standards; a sidewalk along one side of the road is proposed to separate pedestrians from vehicles.

16. The Fire Chief has stated that adequate access for emergency vehicles is provided to the units, also a sprinkler system will be installed.

17. The Planning Board expressed concern about converting all of the commercial buildings to residential uses. The applicant has stated his intention to use two of the approved buildings for commercial purposes, at a later date.

Therefore, the Planning Board votes to GRANT the Modification under the following conditions:

CONDITIONS:

1. All conditions in Special Permit #90-07 shall remain in full force and effect; the conditions specified herein are only related to the modification which is to construct seven (7) senior housing duplexes and to separate them from the commercial area.

2. At a minimum, the deed shall require that a unit be occupied by no more than two (2) persons, one of whom must be age 55 or older. A third occupant may be allowed for the express purpose of providing health care to the occupant. The deed restriction shall be reviewed and approved by the Planning Board and Town Counsel before being recorded. Once approved, the restriction shall be recorded at the South Middlesex Registry of Deeds. A final copy with recording information shall be provided to the Board. The deed restriction shall be recorded before the issuance of an occupancy permit.

3. All signage shall be reviewed by the Planning Board before the issuance of a sign permit from the Inspector of Buildings.

4. All outdoor lighting shall conform to Section 3340 of the Zoning Bylaw. Should any outdoor lighting be erected that does not comply with the Bylaw requirements, the Petitioner shall be responsible for correcting the lighting at his/her expense. The plan note shall be modified to read: "1. Street lights shall conform with Littleton Light and Water Department Regulations and lighting requirements in Section 3340 of the Boxborough Zoning Bylaws."

5. Catch basins shall be regularly maintained by the Homeowner's Association and shall be cleaned yearly in the spring. Proof of same shall be submitted to the Building Inspector and the Director of Public Works.

6. Two leaching catch basins shall be installed on the proposed road at the intersection with Stow Road to prevent run-off from flowing onto Stow Road.

7. The site shall be landscaped in accordance with the Layout and Landscaping Plan (Exhibit J). If all landscaping is not complete prior to the request for an occupancy permit, a bond covering the cost of such work shall be submitted and approved by the Planning Board prior to the issuance of an occupancy permit. All landscaping shall be in place within one year of occupancy.

8. All site landscaping shall be maintained in a healthful condition, plants that die or become unhealthy shall be replaced during the next growing season. This condition shall apply for two (2) years after all units are complete.

9. An erosion control plan approved by the Conservation Commission shall be submitted to the Board prior to site construction.

10. The access roadway will be constructed in accordance with the Rules and Regulations Governing the Subdivision of Land. The engineering plan showing the road shall be approved by the Planning Board prior to construction.

11. The applicant shall notify the Planning Board and the abutter when the barn is being relocated. The applicant shall take the necessary precautions to ensure that the barn site is left in such a condition as not to create a safety hazard.

12. No further development of any residential units in subsequent phases of this development shall be allowed unless 10% of the total number of units are set aside as affordable senior housing.

13. At least three different house designs shall be intermixed in this phase of the development. The final house designs must be approved by the Planning Board prior to the issuance of building permits.

14. The results of the drinking water quality tests required for a community water system shall be submitted to the Planning Board.

15. Violation of Conditions. Violation of any of the conditions of this decision shall be grounds for revocation of this Special Permit, or of any building or occupancy permit granted hereunder. In case of any violation of the continuing obligations of this permit, the Town will notify the owner of such violation and give the owner reasonable time, not to exceed thirty (30) days, to cure the violation and to enforce the conditions of this permit. The Town may enforce compliance with the conditions of this permit by any action of injunctive relief before any court of competent jurisdiction.

PLANNING BOARD DECISION #90-07A
SITE PLAN DECISION - TOWN CENTER - PHASE ONE AMENDMENT
APPLICANT: Compass Builders, Inc.

The authority granted to the applicant by this permit is limited as follows:

APPLICABILITY OF PERMIT: This permit applies only to the site which is the subject of this application. All construction to be conducted on the site shall be conducted in accordance with the terms of this permit and shall be limited to the improvements shown on the Plan.

OTHER PERMITS OR APPROVALS: This decision applies only to the requested Site Plan Permit. Other permits or approvals required by the Boxborough Zoning Bylaw, other governmental boards, agencies or bodies having jurisdiction shall not be assumed or implied by this decision.

BYLAW COMPLIANCE: The foregoing conditions are stated for the purpose of emphasizing their importance but are not intended to be all inclusive or to negate the remainder of the Boxborough Zoning Bylaw.

AMENDMENT OF PERMIT: The Board hereby reserves its powers to modify or amend the terms and conditions of this permit upon its own motion with consent from the owner, or on the application of the owner. The Board further reserves its powers to amend this permit without a new public hearing provided that the Board finds that such amendment is not significant to the public interest and that such amendment is not inconsistent with the purpose and intent of the Bylaw or with the terms of this permit.

LAPSE OF PERMIT: This permit shall lapse on October 4, 1996, if a substantial use thereof has not sooner commenced except for good cause or if any construction has not begun by said date except for good cause. Any request for an extension of the time limitation set forth herein shall be made in writing to the Board at least 30 days prior to October 4, 1996, and the Board reserves its rights and powers to grant or deny such request without a public hearing. The Board, however, shall not grant any extension herein provided unless it finds that the use of the property in question or construction on the site has not begun except for good cause.

The applicant by acceptance of this permit and recording thereof acknowledges the binding effect of the conditions of this permit. Proof of recording shall be submitted to the Planning Board prior to the issuance of a building permit.

As Built Plans certified by a registered surveyor or professional engineer setting forth the status of construction and noting compliance with the approved site plan addressed herein including the location of all pavement, buildings, and utilities above and below grade; and the location, area and depth of buried stumps, debris or boulders shall be submitted to and approved by the Planning Board before an Occupancy Permit may be issued by the Inspector of Buildings.

PLANNING BOARD DECISION #90-07A
SITE PLAN DECISION - TOWN CENTER - PHASE ONE AMENDMENT
APPLICANT: Compass Builders, Inc.

APPEALS: Any person aggrieved by this decision may appeal pursuant to the Massachusetts General Laws, within 20 days after the filing of this Decision with the Boxborough Town Clerk.

WITNESS our hand this 4th day of October, 1994

BOXBOROUGH PLANNING BOARD:

David L. Farrington
DAVID FARRINGTON, CHAIRMAN

Kenneth L. Gregson
KENNETH GREGSON, MEMBER

Abstain
ANTHONY D'AGOSTINO, MEMBER

Richard Scarlet
RICHARD SCARLET, MEMBER

Bruce Taylor
BRUCE TAYLOR, CLERK

I, Virginia B. Richardson hereby certify that this is a true
VIRGINIA B. RICHARDSON
copy of the decision of the Planning Board.

October 5, 1994
Date filed with the Town Clerk

TO WHOM IT MAY CONCERN:

I, hereby certify that the 20-day appeal period on this decision has expired, and no appeals have been filed with this office.

Virginia B. Richardson
VIRGINIA B. RICHARDSON
Town Clerk

November 2, 1994
DATE

Copy sent to:
Petitioner - Certified Mail #Hand Delivered
Inspector of Buildings
Board of Health
Conservation Commission
Board of Appeals
Fire Chief
Police Chief
Littleton Water Dept.

Notice of Decision sent to:
Town of Acton
Town of Littleton
Town of Harvard
Town of Stow
Board of Selectmen
Director of Public Works
Water Resources Commission
Abutters

Record Owner: Tisbury Partners, Inc.
Title Ref: Book 25961, Page 098

TOWN OF BOXBOROUGH

PLANNING BOARD

PLANNING BOARD DECISION #90-07
SITE PLAN SPECIAL PERMIT
TOWN CENTER - PHASE ONE

APPLICANT: John J. Lyons
145 Stow Road
Boxborough, MA 01719

LOCATION: MAP 6 GROUP 4 PARCELS 127, 129, 130 and 131.

ZONING: Town Center District - ACREAGE: 23 acres.

APPLICATION: Request for Special Permit under Section 7.4 Site Plan Approval to construct four buildings: building one (retail/office) 5,800 square feet; building two (retail/office) 2,400 square feet; building three (bed and breakfast) 5,694 square feet; and building four (restaurant) 4,360 square feet.

After causing notice of the time and place of the public hearing and the subject matter thereof to be published, posted and mailed to the applicant, abutters and other parties of interest as required by law the hearing was called to order on June 12, 1990, at 8:30 p.m. and continued to June 19, 1990.

Board Members: David Farrington, Chairman; Joan Huntley; Harold Noftle and Bruce Taylor were present throughout the proceedings.

Present for the applicant: Cynthia O'Connell, Beals and Thomas Inc.; John and Elizabeth Lyons, applicants.

The following Exhibits were submitted prior to the close of the public hearing:

Exhibit A: Public hearing notice
Exhibit B-1: Site Plan Approval application and Supplemental information.
Exhibit B-2: Site Plan entitled "Town Center Project Phase 1, Construction Phase 1, Site Plan Submission in Boxborough, Mass." prepared by Beals and Thomas Inc. dated May 4, 1990, Sheets 1-6.
Exhibit C: Referral request sent to all Boards.
Exhibit D: Response from Fire Chief dated June 1, 1990.
Exhibit E: Board of Health Comments dated June 11, 1990.
Exhibit F: Conservation Commission hearing minutes dated May 23, 1990.

Exhibit G: Letter from the Executive Office of Environmental Affairs, Department of Environmental Quality Engineering dated May 8, 1990.
Exhibit H: Request for engineering review dated May 9, 1990.
Exhibit I: Letter from Westcott Site Services dated June 19, 1990.

After reviewing the Exhibits and record of the proceedings, the Planning Board finds and concludes the following:

1.0 FINDINGS

1.1 The project is located in the Town Center Zoning District. The two proposed retail/office buildings are allowed in the Town Center District. The bed and breakfast and the restaurant uses are allowed by Special Permit #90-01, issued by the Board of Appeals on August 31, 1990.

1.2 The four buildings to be reconstructed on the site are 18th and 19th century post and beam structures acquired from towns throughout New England.

1.3 The buildings are located along a triangular shaped open space adjacent to Stow Road. In addition, as part of the Town Center Agreement executed by John Lyons prior to ATM 1989, a minimum of ten acres will be donated to the Town.

1.4 The buildings and parking areas are set back a minimum of 50 feet from Stow Road. Lot coverage for buildings one and two is 12 percent, lot coverage for buildings three and four is 7 percent. The maximum coverage allowed by the Bylaw is 35%.

1.5 The Landscape Plan preserves many of the existing large trees located throughout the site. The Plan also preserves many existing stone walls. Where stone walls cannot be preserved, they will be reconstructed elsewhere on the site.

1.6 The parcel is not within the Aquifer Protection District. Portions of the parcel are within the Wetlands and Watershed Protection District (W-District), however, no construction is proposed within the "W-District." There are vegetated wetlands and buffer zone on the site. The applicant proposes to create a walking trail and to build a foot bridge within the wetlands buffer. At this time, the Conservation Commission has not issued an Order of Conditions for the trail or the bridge.

1.7 The parking areas will be crushed stone, with railroad tie stops. The driveway will be constructed with crushed stone and a form of pavement (brick or cobbles) at the entrance ways.

1.8 Bedrock water supply wells will service the proposed project. Sanitary sewage will be disposed via two septic systems. Septic system and well permits are pending. Once these permits are issued, adequate provision for water supply and septic disposal will be provided.

1.9 In accordance with Section 5.9.2, the project is designed in harmony with the surrounding area, the buildings are attractively designed and sited. Also, the proposed uses will contribute to the diversity of services and land uses in the Town Center.

1.10 No signs are proposed at this time.

1.11 The applicant prefers not to install a dumpster at this time.

1.12 The proposed uses are not anticipated to use hazardous materials or generate hazardous wastes.

1.13 All utilities will be located underground. The buildings will be heated with natural gas.

1.14 Fire protection will be provided by the existing fire pond on Massachusetts Avenue.

1.15 According to the traffic study, the present roadway network can accommodate the additional traffic resulting from the project. The project will generate a total of 536 vehicle trips per day: 19 during the morning peak hour and 54 during the evening peak hour. Minimum stopping sight distances as specified by AASHTO for speeds 35 to 40 mph are met. Therefore, the traffic generated will not create a serious hazard to pedestrians or vehicles.

1.16 The proposed uses are not detrimental to adjoining premises, nor are the uses against the public interest.

1.17 With the conditions and limitations the project complies with the provisions of the Zoning By-Law.

1.18 The proposed site plan has frontage on an existing way; access to it is therefore considered a driveway. The proposed subdivision roadway will be reviewed when a Definitive Plan is submitted.

Therefore, on September 10, 1990 the Planning Board voted unanimously to GRANT the requested Site Plan Special Permit subject to the following conditions and limitations:

2.0 CONDITIONS

2.1 The owner shall maintain all crushed stone parking areas and driveways in a safe, convenient and passable condition at all times. The owner shall be responsible for removing snow from the driveways and parking areas.

2.2 The owner shall landscape the property in accordance with the concept shown on the Landscape and Planting Plan. Plantings shall be installed as soon as possible consistent with construction activities.

2.3 The driveway entrances shall be widened to 24 feet and tapered to 20 feet. The southerly access road shall be widened to Subdivision Standards when a Definitive Subdivision Plan is approved.

2.4 No dumpsters shall be placed on the premises without first receiving approval from the Planning Board for the placement and screening of the dumpster.

2.5 The applicant shall remove the existing southerly lot line of lot 130 by an appropriate plan filed in the South Middlesex Registry of Deeds before a building permit can be issued for Building Four. Proof of same shall be submitted to the Building Inspector.

2.6 All signs shall be reviewed and approved by the Planning Board before they are erected. The proposed lighting design shall also be reviewed and approved by the Board.

2.7 A Master Fire Box shall be installed in accordance with the Fire Chief's specifications.

2.8 Traffic Study Agreement.
Prior to the issuance of a building permit or the start of any construction activity on the site the owner shall submit, for written approval of the Board, a letter of agreement that at such time as traffic conditions on Massachusetts Avenue, in the opinion of the Board, reach levels that constitute a hazard to the citizens of the Town of Boxborough or others, the Petitioner or the owner of the property will contribute, on a proportional basis, a fair share toward a traffic study to be conducted at the direction of and to the satisfaction of the Board, focused on alleviating the problem. The Petitioner's share shall be based on metering of traffic to and from the subject property, compared to the traffic to all sites included within the study area, as determined by the Board. The Petitioner herein shall agree to assume all costs necessary and associated with the metering of traffic associated with the subject property. Furthermore, the letter shall express the agreement that the owner of the property will contribute, according to the established proportional basis, a fair share towards mitigation measures recommended in the traffic study.

2.9 All outdoor lighting shall conform to Section 6.6.6.1 of the Zoning Bylaw. Should any outdoor lighting be erected that does not

2.10 If deemed necessary by the Planning Board, the Board of Selectmen, or the Police Chief, the owner shall reimburse the Town for police officer control at the intersection of the proposed site drive and Stow Road during peak hours of traffic.

2.11 The owner shall maintain an up-to-date hazardous material plan for this site on file with the Fire Chief. Such plan shall include a listing of all hazardous materials in use or storage at the site, and for each material shall list probable maximum monthly use, the probable maximum amount stored at the site and method and location of storage, the manner of delivery or generation of such materials, the method of disposal of such materials, and the plan of action to be followed in the event of a spill, discharge, or other disposal of such material not in accord with the planned method of disposal. Hazardous materials shall not be stored underground. Such plans must specify that the financial burden and responsibility for any clean-up required of such hazardous materials shall be jointly and severally the responsibility of the owner and tenant (if different). If the Fire Chief notifies the applicant within 60 days of receiving a new or modified hazardous materials plan that the plan for specified materials is unacceptable, then the owner and tenants shall not use or store such specified materials at the site until a new plan is accepted in writing by the Fire Chief. The owner shall include clauses in the lease of any and every tenant sufficient to assure compliance with all parts of this condition, and all hazardous materials plans must be signed by both the applicant and the tenants.

a) The owner(s) shall inform the Board of Health and the Fire Chief as soon as possible but not later than 24 hours after the discovery of any accidental discharge or spillage of hazardous material.

b) In all areas where hazardous materials are stored or handled, the owner shall prominently post a notice that references the hazardous material plan, indicating where within the facility copies can be obtained and stating that employees must transport, handle, and dispose of hazardous materials in accordance with such plan.

c) A hazardous material is any substance or combination of substances which because of quantity, concentration, or physical, chemical, or infectious characteristics poses, in the Board of Health's judgement, a substantial present or potential hazard to human health, safety, or welfare, or to the environment, when improperly treated, stored, transported, used, disposed of, or otherwise managed. Hazardous materials include, but are not limited to, all substances controlled by 40 CFR Parts 117 and 302, as authorized by the Federal Comprehensive Environmental Response and Liability Act of 1980 (42 USC 9601 et seq.).

d) The total quantity of any hazardous material stored, used, generated, and otherwise present on the premises at any time shall not exceed the reportable quantity for such substance (that is, the minimum quantity which if released into the environment must be reported) as set forth in 40 CFR Parts 117 and 302.

e) Groundwater Monitoring: The applicant shall install a minimum of three monitoring wells located and designed as directed by the Littleton Water Department and shall pay for the expense of semi-annual (or more frequently if problems are detected) sampling and testing by the Littleton Water Department.

2.12 All landscaping and plant materials shall be maintained in a healthful condition. Plants that die or become unhealthy shall be replaced within the next growing season.

2.13 The Planning Board shall be notified within 10 days of any change in ownership or occupancy.

2.14 Violation of Conditions. Violation of any of the conditions of this decision shall be grounds for revocation of this Special Permit, or of any building or occupancy permit granted hereunder. In case of any violation of the continuing obligations of this permit, the Town will notify the owner of such violation and give the owner reasonable time, not to exceed thirty (30) days, to cure the violation and to enforce the conditions of this permit. The Town may enforce compliance with the conditions of this permit by any action of injunctive relief before any court of competent jurisdiction. The owner agrees to pay the Town for the enforcement of the conditions of this permit.

The authority granted to the applicant by this permit is limited as follows:

APPLICABILITY OF PERMIT: This permit applies only to the site which is the subject of this application. All construction to be conducted on the site shall be conducted in accordance with the terms of this permit and shall be limited to the improvements shown on the Plan.

OTHER PERMITS OR APPROVALS: This decision applies only to the requested Special Permit. Other permits or approvals required by the Boxborough Zoning Bylaw, other governmental boards, agencies or bodies having jurisdiction shall not be assumed or implied by this decision.

BYLAW COMPLIANCE: The foregoing conditions are stated for the purpose of emphasizing their importance but are not intended to be all inclusive or to negate the remainder of the Boxborough Zoning Bylaw.

AMENDMENT OF PERMIT: The Board hereby reserves its powers to modify or amend the terms and conditions of this special permit upon its own motion with the consent of the owner or on the application of the owner. The Board further reserves its powers to amend this permit without a new public hearing provided that the Board finds that such amendment is not significant to the public interest and that such amendment is not inconsistent with the purpose and intent of the Bylaw or with the terms of this permit.

LAPSE OF PERMIT: This special permit shall lapse on September 10, 1992, if a substantial use thereof has not sooner commenced except for good cause or if any construction has not begun by said date except for good cause. Any request for an extension of the time limitation set forth herein shall be made in writing to the Board at least 30 days prior to September 10, 1992 and the Board reserves its rights and powers to grant or deny such request without a public hearing. The Board, however, shall not grant any extension herein provided unless it finds that the use of the property in question or construction on the site has not begun except for good cause.

The applicant by acceptance of this special permit and recording thereof acknowledges the binding effect of the conditions of this permit. Proof of recording shall be submitted to the Planning Board prior to the issuance of a building permit.

As Built Plans certified by a registered surveyor or professional engineer setting forth the status of construction and noting compliance with the approved site plans addressed herein including the location, area and depth of buried stumps, debris or boulders, and location of all utilities shall be submitted to and approved by the Planning Board before an Occupancy Permit may be issued by the Building Inspector.

APPEALS: Any person aggrieved by this decision may appeal pursuant to the General Laws, Chapter 40A Section 17 within 20 days after the filing of this Decision with the Boxborough Town Clerk.

WITNESS our hand this 10th day of September 1990

BOXBOROUGH PLANNING BOARD:

DAVID FARRINGTON, CHAIRMAN

JOAN HUNTLEY, MEMBER

HAROLD NOFTLE, MEMBER

Absent
WILLIAM LONG, MEMBER

BRUCE TAYLOR, CLERK

I, Virginia B. Richardson hereby certify that this is a true copy of the decision of the Planning Board.
VIRGINIA B. RICHARDSON

October 5, 1994
Date filed with the Town Clerk

TO WHOM IT MAY CONCERN:

I, hereby certify that the 20-day appeal period on this decision has expired, and no appeals have been filed with this office.

Virginia B. Richardson
VIRGINIA B. RICHARDSON
Town Clerk

November 2, 1994
DATE

Here is the paper re-signed

Copy sent to
Petitioner -
Building Ins
Board of Hea
Conservation
Board of App
Fire Chief
Police Chief
Littleton Li
file:twncnt.

otice of Decision sent to:
own of Acton
own of Littleton
own of Harvard
own of Stow
oard of Selectmen
ater Resources Commission
outters

PLANNING BOARD DECISION #90-07
SITE PLAN SPECIAL PERMIT TOWN CENTER - PHASE ONE
APPLICANT: John J. Lyons

APPEALS: Any person aggrieved by this decision may appeal pursuant to the General Laws, Chapter 40A Section 17 within 20 days after the filing of this Decision with the Boxborough Town Clerk.

WITNESS our hand this 10th day of September

BOXBOROUGH PLANNING BOARD:

DAVID FARRINGTON, CHAIRMAN

JOAN HUNTLEY, MEMBER

HAROLD NOFTLE, MEMBER

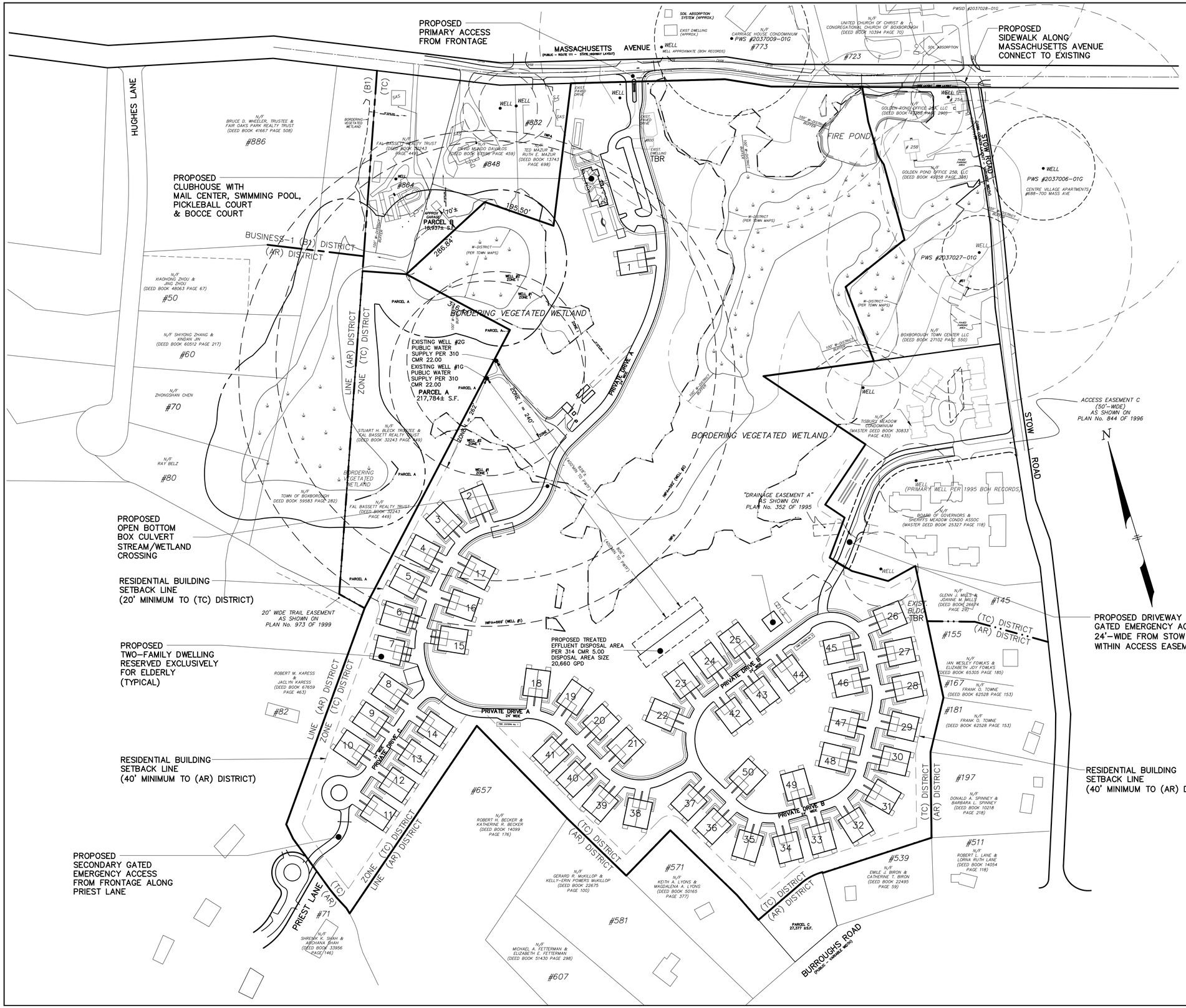
Absent
WILLIAM LONG, MEMBER

BRUCE TAYLOR, CLERK

I, Virginia B. Richardson hereby certify that this is a true copy of the decision of the Planning Board.
VIRGINIA B. RICHARDSON

Copy sent to:
Petitioner - Certified Mail # (hand delivered)
Building Inspector
Board of Health
Conservation Commission
Board of Appeals
Fire Chief
Police Chief
Littleton Light and Water
file:twncnt.dec

Notice of Decision sent to:
Town of Acton
Town of Littleton
Town of Harvard
Town of Stow
Board of Selectmen
Water Resources Commission
Abutters



LAND USE DATA, TOWN OF BOXBOROUGH ZONING BYLAW AMENDED THROUGH TOWN MEETING MAY 2012

ZONING DISTRICT: TOWN CENTER DISTRICT & W-DISTRICT

ARTICLE IV, USE REGULATIONS	ALLOWED:
TWO-FAMILY DWELLING, RESERVED EXCLUSIVELY FOR ELDERLY OCCUPANCY	YES*

*REFER TO SECTION 5004(1): FOR MULTI-FAMILY DWELLING IN TC DISTRICT RESERVED EXCLUSIVELY FOR ELDERLY OCCUPANCY, DENSITY NOT TO EXCEED 10 UNITS/80,000 SF LAND AREA

2,519,642/80,000= 31.4 x 10 UNITS= 314 UNITS

MAX DENSITY:	157 DUPLEXES= 314 UNITS
PROPOSED DENSITY:	50 DUPLEXES= 100 UNITS

ARTICLE V, DIMENSIONAL REQUIREMENTS

	REQUIRED:	PROVIDED:
MIN LOT AREA:	40,000 SF	2,519,642 SF**
MIN UPLAND LOT AREA:	20,000 SF	196,928±SF***
MIN LOT FRONTAGE:	100 FT	785 FT (MASS AVE)
MIN LOT WIDTH:	100 FT	780+ FT
MIN FRONT SETBACK (PRIEST LANE)	25 FT	>25 FT
MIN FRONT SETBACK (STOW AND BURROUGHS ROAD)	50 FT	>50 FT
MIN FRONT SETBACK (MASS. AVE)	75 FT	217'± FT (CLUBHOUSE)
MIN SIDE & REAR YARD (TC DISTRICT):	20 FT	>20 FT
MIN SIDE & REAR YARD (AR DISTRICT):	40 FT	>40 FT
MAX STORIES	3	2
MAX BUILDING HEIGHT	45 FT	<45 FT
MAX LOT COVERAGE (EXCL. SIDEWALKS)	35%	20%
FLOOR AREA RATIO	NA	
MAX BUILDING SIZE (GROSS FLOOR AREA)	8,000 SF	4,851± SF
MIN OPEN SPACE (INCL SIDEWALKS):	65%	80%

**-SITE AREA EXCLUDES PARCEL A, PARCEL B AND PARCEL C.
***-ALONG MASSACHUSETTS AVENUE; 1,191,596± S.F. UPLAND AT PRIEST LANE.

DESIGN FLOW CALCULATIONS

100 DWELLING UNITS HOUSING FOR THE ELDERLY

70 (2 BDRM) UNITS AT 150 GPD/UNIT	= 10,500 GPD
30 (3 BDRM) UNITS AT 330 GPD/UNIT	= 9,900 GPD
13 CLUBHOUSE LOCKERS AT 20 GPD/LOCKER	= 260 GPD
TOTAL SEWAGE FLOW	= 20,660 GPD

PROPOSED APPROVED WITHDRAWALS

EXISTING WELLS - TOTAL FLOW RATE = 20,660 GPD MINIMUM
FLOWRATE PER EACH WELL BASED ON ACTUAL FIELD RESULTS

WELL #1 + WELL #2 = TOTAL DESIGN FLOW
12,096 GPD + 8,640 GPD = 20,736 GPD (> 20,660 GPD OK)

WELL #1 = 8.4 GPM = 12,096 GPD
WELL #1 - ZONE 1 RADIUS: [150 X LOG(12,096) GPD - 350]=262 FT
WELL #1 - IWPA = [(32 X 8.4 GPM) + 400] = 669 FT

WELL #2 = 6.00 GPM = 8,640 GPD
WELL #2 - ZONE 1 RADIUS: [150 X LOG(8,640) GPD - 350]=240 FT
WELL #2 - IWPA = [(32 X 6.00 GPM) + 400] = 592 FT

SITE PLAN IN BOXBOROUGH, MASSACHUSETTS

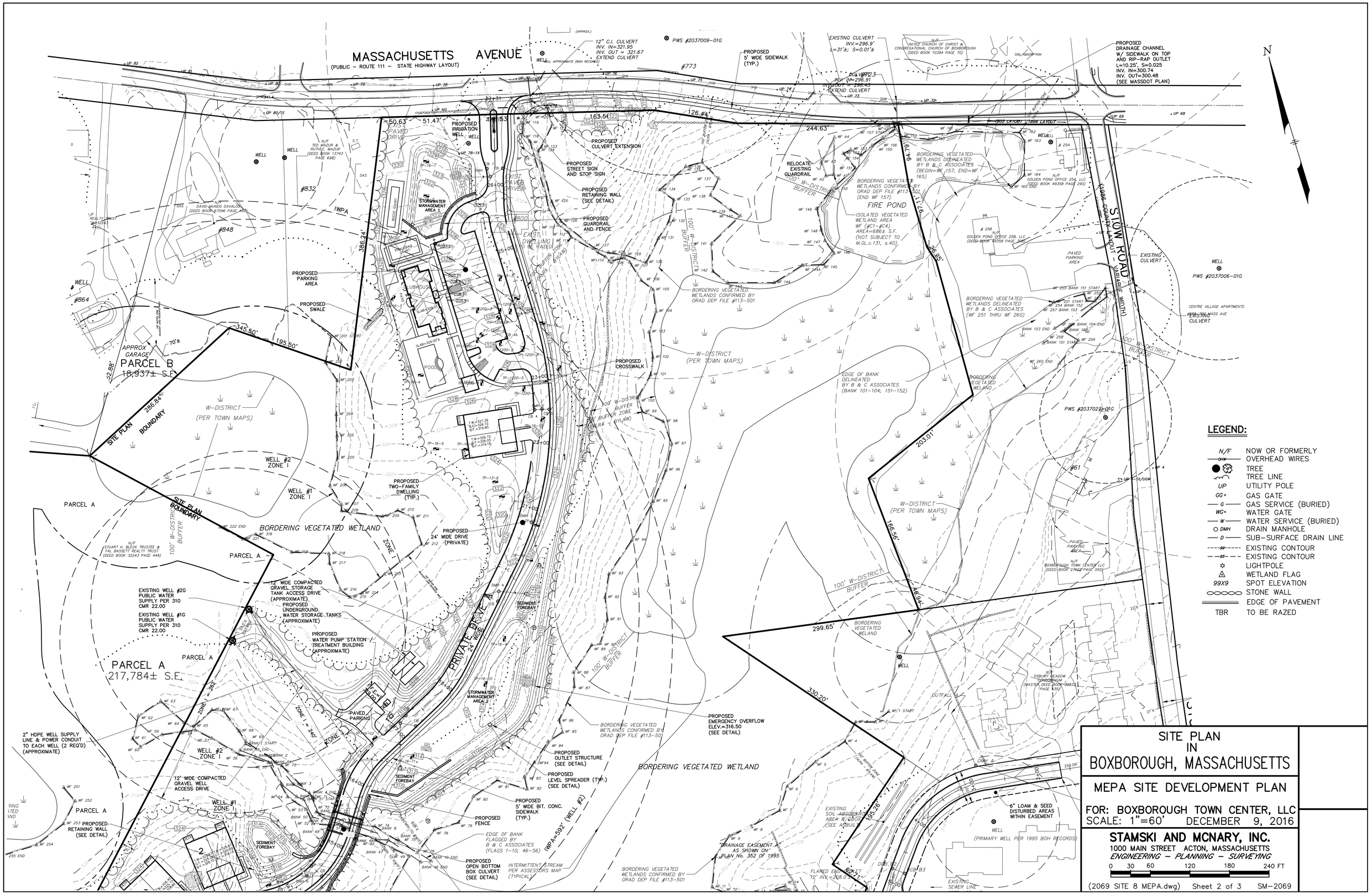
MEPA MASTER PLAN

FOR: BOXBOROUGH TOWN CENTER, LLC
SCALE: 1"=120' DECEMBER 9, 2016

STAMSKI AND MCNARY, INC.
1000 MAIN STREET ACTON, MASSACHUSETTS
ENGINEERING - PLANNING - SURVEYING

0 60 120 240 360 480 FT

(2069 SITE 8 MEPA.dwg) Sheet 1 of 3 SM-2069



SITE PLAN IN BOXBOROUGH, MASSACHUSETTS

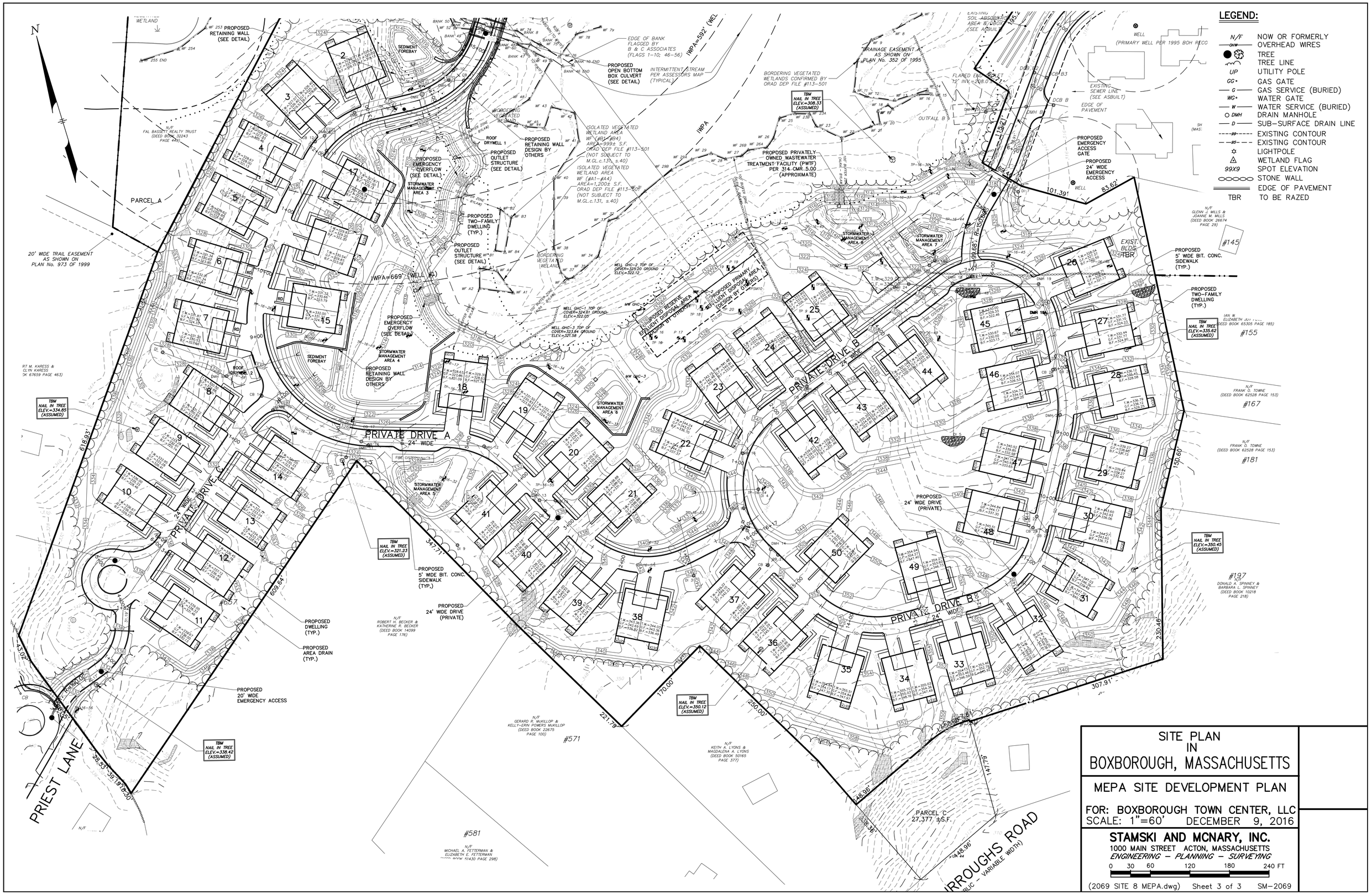
MEPA SITE DEVELOPMENT PLAN

FOR: BOXBOROUGH TOWN CENTER, LLC
SCALE: 1"=60' DECEMBER 9, 2016

STAMSKI AND MCNARY, INC.
1000 MAIN STREET ACTON, MASSACHUSETTS
ENGINEERING – PLANNING – SURVEYING

0 30 60 120 180 240 FT

(2069 SITE 8 MEPA.dwg) Sheet 2 of 3 SM–2069


LEGEND:
N/F NOW OR FORMERLY
OHW OVERHEAD WIRES
TREE
TREE LINE
UP UTILITY POLE
GG GAS GATE
G GAS SERVICE (BURIED)
WG WATER GATE
W WATER SERVICE (BURIED)
DMH DRAIN MANHOLE
D SUB-SURFACE DRAIN LINE
EXISTING CONTOUR
EXISTING CONTOUR
LIGHTPOLE
WETLAND FLAG
99X9 SPOT ELEVATION
STONE WALL
EDGE OF PAVEMENT
TBR TO BE RAZED
N
PRIVATE DRIVE A 24' WIDE
PRIVATE DRIVE B 24' WIDE
PRIEST LANE
PARCEL A
PARCEL C 27,377 ±S.F.
IWPA=669' (WELL #1)
IWPA=592' (WELL
IWPA
PROPOSED PRIVATELY OWNED WASTEWATER TREATMENT FACILITY (PWTF) PER 314 CMR 5.00 (APPROXIMATE)
PROPOSED RESERVE EFFLUENT DISPOSAL AREA (DESIGN BY OTHERS)
PROPOSED PRIMARY EFFLUENT DISPOSAL AREA (DESIGN BY OTHERS)
PROPOSED OPEN BOTTOM BOX CULVERT (SEE DETAIL)
PROPOSED RETAINING WALL (SEE DETAIL)
PROPOSED RETAINING WALL DESIGN BY OTHERS
PROPOSED EMERGENCY OVERFLOW (SEE DETAIL)
PROPOSED OUTLET STRUCTURE (SEE DETAIL)
PROPOSED TWO-FAMILY DWELLING (TYP.)
PROPOSED DWELLING (TYP.)
PROPOSED AREA DRAIN (TYP.)
PROPOSED 5' WIDE BIT. CONC. SIDEWALK (TYP.)
PROPOSED 24' WIDE DRIVE (PRIVATE)
PROPOSED 20' WIDE EMERGENCY ACCESS
PROPOSED 24' WIDE EMERGENCY ACCESS
PROPOSED EMERGENCY ACCESS GATE
STORMWATER MANAGEMENT AREA 3
STORMWATER MANAGEMENT AREA 4
STORMWATER MANAGEMENT AREA 5
STORMWATER MANAGEMENT AREA 6
STORMWATER MANAGEMENT AREA 7
SEDIMENT FOREBAY
ROOF DRYWELL 1
ROOF DRYWELL 2
EDGE OF BANK FLAGGED BY B & C ASSOCIATES (FLAGS 1-10; 46-56)
INTERMITTENT STREAM PER ASSESSORS MAP (TYPICAL)
BORDERING VEGETATED WETLANDS CONFIRMED BY ORAD DEP FILE #113-501
ISOLATED VEGETATED WETLAND AREA WF (#B1-#B4) AREA=999± S.F. ORAD DEP FILE #113-501 (NOT SUBJECT TO M.GL.c.131, s.40)
ISOLATED VEGETATED WETLAND AREA WF (#A1-#A4) AREA=1,200± S.F. ORAD DEP FILE #113-501 (NOT SUBJECT TO M.GL.c.131, s.40)
DRAINAGE EASEMENT A AS SHOWN ON PLAN No. 352 OF 1995
20' WIDE TRAIL EASEMENT AS SHOWN ON PLAN No. 973 OF 1999
TBM NAIL IN TREE ELEV.=334.85 (ASSUMED)
TBM NAIL IN TREE ELEV.=321.23 (ASSUMED)
TBM NAIL IN TREE ELEV.=338.42 (ASSUMED)
TBM NAIL IN TREE ELEV.=350.12 (ASSUMED)
TBM NAIL IN TREE ELEV.=335.62 (ASSUMED)
TBM NAIL IN TREE ELEV.=350.45 (ASSUMED)
TBM NAIL IN TREE ELEV.=308.33 (ASSUMED)
N/F FAL BASSETT REALTY TRUST (DEED BOOK 32243 PAGE 490)
N/F RT M. KARESS & CLYN KARESS (BK 67659 PAGE 463)
N/F ROBERT H. BECKER & KATHERINE R. BECKER (DEED BOOK 14099 PAGE 176)
N/F GERARD R. McKILLOP & KELLY-ERIN POWERS McKILLOP (DEED BOOK 22675 PAGE 100)
N/F KEITH A. LYONS & MAGDALENA A. LYONS (DEED BOOK 50165 PAGE 377)
N/F MICHAEL A. FETTERMAN & ELIZABETH E. FETTERMAN (DEED BOOK 51430 PAGE 298)
N/F GLENN J. MILLS & JOANNE M. MILLS (DEED BOOK 26674 PAGE 29)
N/F FRANK D. TOWNE (DEED BOOK 62528 PAGE 153)
N/F DONALD A. SPINNEY & BARBARA L. SPINNEY (DEED BOOK 10218 PAGE 218)
#637
#571
#581
#145
#155
#167
#181
#197
EXIST. BLDG. TBR
WELL (PRIMARY WELL PER 1995 BOH RECO)
EXISTING SEWER LINE (SEE ASBUILT)
EDGE OF PAVEMENT
OUTFALL B
FLARED END 12" INV.=208.0±
WELL GHC-2 TOP OF COVER=325.20 GROUND ELEV.=322.12
WELL GHC-1 TOP OF COVER=324.61 GROUND ELEV.=322.05
WELL GHC-3 TOP OF COVER=323.64 GROUND ELEV.=321.58
PARCEL A
PRIEST LANE
BORROUGHS ROAD
SITE PLAN
IN
BOXBOROUGH, MASSACHUSETTS
MEPA SITE DEVELOPMENT PLAN
FOR: BOXBOROUGH TOWN CENTER, LLC
SCALE: 1"=60' DECEMBER 9, 2016
STAMSKI AND MCNARY, INC.
1000 MAIN STREET ACTON, MASSACHUSETTS
ENGINEERING - PLANNING - SURVEYING
0 30 60 120 180 240 FT
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