

COMPREHENSIVE PERMIT APPLICATION

BIRCH STREET PLACE
Milford, MA

Submitted to:

Zoning Board of Appeals
Milford, MA

Submitted by:

88 CORP.

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BIRCH STREET PLACE
Comprehensive Permit Application

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TOWN OF MILFORD
PETITION FOR SPECIAL PERMIT
UNDER THE ZONING BY-LAW

To the Zoning Board of Appeals
Milford, MA 01757

Date: 4/6/18

The undersigned petitions the Zoning Board of Appeals to grant a special permit for the reasons hereinafter set forth and in accordance with the applicable provisions of the zoning by-law in relation to the following described premises:

Applicant: BB CORP. 31 Whitewood Road / Milford, MA 01757
(Full Name) (Address)

Owner: Corner Brook, LLC 11 Commercial Way / Milford, MA 01757
(Full Name) (Address)

Tenant (if any): N/A

1. Location of Premises Birch Street (Lot 1) / Milford, MA
(Name of Street)
2. Which Zoning District is the premises within? Highway Industrial (IB)
3. State the Registry of Deeds Book and Page number, or the Land Court
Certificate number for title of present owner L.C. Certificate 110366
L.C. Plan 32710-F filed with Certificate 9860
4. State present use of premises Vacant Land
5. State proposed use of premises Multi family housing (162 units), Clubhouse/Pool,
Maintenance/Bike Storage Building, four 8-bay Garage Buildings (Chapter 40B)
6. Give extent of proposed alterations
N/A
7. Number of families for which building is to be arranged 162 rental units
8. Have you submitted plans for above to the Building Inspector? No
9. Has a permit been refused? No
10. Pursuant to what provisions(s) of the zoning by-law do you seek a special permit and for what purpose(s)
Article 1.10 (Special Permits) under the
M.G.L. Chapter 40B (Sections 20-23)
Comprehensive Permit Program

11. Explain the reasons you assert that:

(a) the special permit sought is in harmony with the general purpose and intent of the zoning by-law The proposed development is consistent with Chapter 40B Guidelines.

(b) the proposed use of the premises will not create undue traffic congestion or impair pedestrian safety The proposed development is consistent with Chapter 40B Guidelines.

(c) the proposed use of the premises will not cause harm to the neighborhood or create a nuisance or hazard affecting the health, safety or general welfare of the public The proposed development is consistent with Chapter 40B Guidelines.

12. If applicant is not the owner, provide proof of authorization by owner, either by copy of executed agreement or by the owner's authorized signature below.

I hereby certify that the above statements are true to the best of my/our knowledge and belief.

Applicant BB CORP.
Signature: By: Kevin W. Lobisser
President

Address: 31 White Wood Road
Milford, MA 01757

Telephone: 508-478-6235

Attorney (if any) _____

Address: _____

Telephone: _____

Owner Corner Brook, LLC
Signature: By: David H. Pyne
Manager

Address: 11 Commercial Way
Milford, MA 01757

BE SURE THAT ALL QUESTIONS HAVE BEEN ANSWERED FULLY. IF MORE SPACE IS NECESSARY TO ANSWER ANY QUESTION(S), FEEL FREE TO USE AND ATTACH ADDITIONAL SHEETS.

88 CORP
31 WHITEWOOD RD.
MILFORD, MA 01757

53-332/113

152

DATE 4/6/18



PAY TO THE
ORDER OF

Town of Milford

\$ 24,300.00

Twenty four thousand three hundred

DOLLARS



Security Features
Included.
Details on Back.

**The
Milford
National**

The Milford National Bank
and Trust Company
Milford, Massachusetts 01757

MEMO

Ken W. Lohsen

MP

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PROJECT NARRATIVE

Project Summary

Birch Street Place is a proposed 162-unit, Chapter 40B multifamily rental housing development to be located on a 20.95 acre site which will be created through the subdivision of a larger land parcel located off of Birch Street in Milford, MA.

There will be four Residential Buildings, a Clubhouse/Pool Building, a Maintenance/Bike Storage Building, and four detached 8-Bay Parking Garages. Three of the residential buildings (Buildings 1, 2, and 3) will be three stories in height and one of the residential buildings will be a three/four split story building with a 6-unit Walkout Level and a Storage Area. Each residential building will have an elevator.

The unit mix will include 64-One Bedroom units, 78-Two Bedroom units, and 20-Three Bedroom Units. Each unit will feature either a balcony or a patio.

The Clubhouse/Pool Building will include a Community Room with a large-screen TV, soft seating, a café-style counter with stools, and a billiards area; a Fitness Center with a Yoga Area; a Pet Wash Room; a Leasing Office; Bathrooms; and a Package Delivery Room. In addition there will be an outdoor Swimming Pool and Grill Area, a Playground, and a Dog Park.

25% of the units (41 units) will be affordable to households at 80% of Median Family Income, adjusted for household size. All 162 units will be eligible for listing on Milford's Subsidized Housing Inventory (SHI). There will be a Local Preference Plan for up to 70% of the affordable units.

A total of 324 parking spaces, including 32 garage spaces in will be provided.

The Applicant is 88 CORP. The President of 88 CORP. is Kevin W. Lobisser.

Description of Design Approach (Paul Frederick AIA)

For the sake of this narrative and unless otherwise noted, when referring to distances from other buildings roadways, and properties surrounding the site, these distances will be taken from the apartment complex Clubhouse. This Clubhouse has been located in the center of the four apartment buildings which form a rectangle approximately 320' x 500' (with the long access running north and south). All four apartment buildings lie completely within this rectangle. I will refer to the center of the Clubhouse as the center of the "Quad".

The site is a 20.95± acre, wooded lot surrounded by both developed and undeveloped land (including some wetland areas). The developed land immediately surrounding the site varies greatly relative to lot size and coverage, building use, building area, scale, massing and architectural style.

Although the site is zoned Industrial Highway (IB), due to the size, shape and location of the property, the site provides a significant separation distance between the varying uses surrounding it and is naturally suited for a transitional type “buffer” use.

The following describes the distances and uses for the surrounding sites:

- a. To the North approximately 520’ (to the closest building to the “Quad”) is Birch Hills. It is a multiple building townhouse condominium community consisting of approximately 60 townhouses. Each building contains 4 living units and 4 attached garages. These buildings are 2 story, wood framed, New England style architecture. They have gabled roofs, porches, overhangs, divided lite, double hung windows and façade modulation. The site has a number of small, shed type buildings that contain centrally located mailboxes and appear to act as cover for a school bus stop.
- b. To the Northwest approximately 900’ (to the closest building to the “Quad”) is the neighborhood community on Ari’s Way. It is a multiple building townhouse condominium community also. Each building contains 2 or 3 living units with attached garages. The buildings are 2 story, wood framed New England style architecture. They have, gabled roofs, entry overhangs, double hung windows and façade modulation.
- c. Just beyond Ari’s Way is a skilled nursing facility building. It is a single story, 50,000+/- SF brick building with parking and drive lanes on all four sides of the building.
- d. Directly to the West approximately 1000’ is an undeveloped narrow strip of land which is part of the Ari’s Way project. The strip partially contains a utility easement running in the north-south direction.
- e. To the Southwest and approximately 850’ to the property line there is the single family residential neighborhood of Silva Street. Silva Street is entered off of Central Street which is at the opposite end from the project property line.
- f. Just to the East of the Silva Street neighborhood and 1000’ directly South of the project site, lies a 2 story, commercial office building. This building is accessed off of Industrial Road, is approximately 45,000 SF per floor, has a flat roof and exterior stucco and ribbon windows with on grade parking of approximately 90,000+/- SF in area.

- g. Southeast of the site approximately 1,300' away (on the opposite side of Industrial Road) is a very large, warehouse building. This building is on approximately 30 acres of land and has a first floor footprint area of approximately 345,000+/- SF with 2 second floor office areas of about 65,000+/- SF. It has a flat roof estimated at about 35' to 40' above grade. The exterior façade appears to be a mix of stucco, concrete and/or metal panels with minimal window openings on the Industrial Road side, none on the North side and 26 or so loading dock doors on the South side.
- h. On the Southeast side of the lot approximately 1,200' away (which is the end of Industrial Road) down Industrial Road to the intersection of Birch Street there are four, single story commercial/ industrial buildings on the far side (Southeast side) Industrial Road. They range in size from 7,100+/- SF to 22,000+/- SF. These buildings are mainly pre-engineered, metal wall and roof type structures used as storage and light commercial/industrial use.
- i. To the East, approximately 550' away (to the closest point from the "Quad") is a commercial use (Birchler's Automotive) single story, 17,500+/- SF, building. It consists of a mix of conventionally framed (flat roofed) and pre-engineered (low sloped roof) buildings attached together.
- j. To the Northeast approximately 750' away (to the rear) is Milford Fire Station 2. It is a 2 story, 12,700+/- SF per floor, brick and wood clad fire station with multiple pitched roofs. A Burn Tower is located to the rear of this site.
- k. From this referenced fire station up to the beginning of Birch Street (at the intersection of Route 109 (aka Medway Road) there a few single family homes on the far side (Northeast side) and a 90 room, 69,000+/- SF, 2 story assisted living facility (Cornerstone at Milford Assisted Living) at the corner of Birch and Route 109 on the Southwest side. These structures are typical New England style architecture consisting of double hung windows, gable roofs and modulated facades.

In summary, there is a wide variety of building sizes, styles and uses surrounding the site. By using this site for a more dense residential use with mid-scale 3-story buildings and one 3/4 split story building and including an attractive Clubhouse, all designed in a residential vernacular and sited in a "Quad" setting in the middle of the subject site, we believe that we have been able to design a project that acts as a perfect transition between the adjacent low density residential uses and the adjacent high intensity, industrial and commercial uses.



Massachusetts Housing Finance Agency
One Beacon Street, Boston, MA 02108

TEL: 617.854.1000
FAX: 617.854.1091 | www.masshousing.com

Videophone: 857.366.4157 or Relay: 711

March 5, 2018

88 CORP.
31 Whitewood Road
Milford, MA 01757
Attention: Kevin Lobisser

**Re: Birch Street Place
Project Eligibility/Site Approval
MassHousing ID No. 968**

Dear Mr. Lobisser:

This letter is in response to your application as "Applicant" for a determination of Project Eligibility ("Site Approval") pursuant to Massachusetts General Laws Chapter 40B ("Chapter 40B"), 760 CMR 56.00 (the "Regulations") and the Comprehensive Permit Guidelines issued by the Department of Housing and Community Development ("DHCD") (the "Guidelines" and, collectively with Chapter 40B and the Regulations, the "Comprehensive Permit Rules"), under the New England Fund ("NEF") Program ("the Program") of the Federal Home Loan Bank of Boston ("FHLBB").

88 CORP. has submitted an application with MassHousing pursuant to Chapter 40B. You have proposed to build 162 units of rental housing (the "Project") on approximately 21 acres of land located on Birch Street (the "Site") in Milford (the "Municipality").

In accordance with the Comprehensive Permit Rules, this letter is intended to be a written determination of Project Eligibility by MassHousing acting as Subsidizing Agency under the Guidelines, including Part V thereof, "Housing Programs In Which Funding Is Provided By Other Than A State Agency."

MassHousing has performed an on-site inspection of the Site, which local boards and officials were invited to attend, and has reviewed the pertinent information for the Project submitted by the Applicant, the Municipality and others in accordance with the Comprehensive Permit Rules.

Municipal Comments

The Municipality was given a thirty (30) day period in which to review the Site Approval application and submit comments to MassHousing. At the request of Milford Town Administrator, Richard A. Villani, this period was extended to forty-five (45) days.

The Milford Board of Selectmen expressed unanimous support for the Project, noting the Applicant's proactive engagement with the Municipality in numerous development review meetings and the proposed Project's efforts to preserve adjacent industrial land for future commercial development, balancing housing production with economic development. Given the preliminary nature of the plans, the Municipality offered the following comments to be addressed by the Applicant before the ZBA:

- Given the documented wetland resource areas on the Site, the Municipality noted that the Project will need to submit a Notice of Intent to the Conservation Commission for approval and the issuance of an Order of Conditions.
- Based on the analysis prepared by Tata and Howard, consultants for Milford Water Company, their review confirmed that capital improvements will be required to support additional demands placed on municipal hydraulic systems from the proposed Project. The Municipality is committed to improving capacity, but notes that improvements will be a costly and long-term investment. Concerns relative to municipal water infrastructure and service include:
 - Adequacy of hydrant locations and intervals on the proposed plans.
 - Anticipated irrigation demands relative to available water supply.
 - Information on required fire flow protections.
 - Collective impacts of other current 40B proposals on municipal water supply and wellfield capacity.
- The Fire Chief expressed general concern for the department's ability to handle call volume and multiple call scenarios given trends of increased housing development in Milford. The Chief also made note of the department's burn tower, which borders the Site. The Project may or may not compromise the use of the tower for live fire training. If future residents complain, the Fire Department noted they will have to eliminate use of the structure.

MassHousing staff has determined that the Project appears generally eligible under the requirements of the Program, subject to final review of eligibility and to Final Approval. As a result of our review, we have made the findings as required pursuant to 760 CMR 56.04(1) and (4). Each such finding, with supporting reasoning, is set forth in further detail on Attachment 1 hereto. It is important to note that Comprehensive Permit Rules limit MassHousing to these specific findings in order to determine Project Eligibility. If, as here, MassHousing issues a determination of Project Eligibility, the Developer may apply to the Zoning Board of Appeals of the Municipality for a Comprehensive Permit. At that time, local boards, officials and members of the public are provided the opportunity to further review the Project to ensure compliance with applicable state and local standards and regulations.

Based on MassHousing's consideration of comments received from the Municipality, and its site and design review, the following issues should be addressed in your application to the local Zoning Board of Appeals ("ZBA") for a Comprehensive Permit and fully explored in the public hearing process prior to submission of your application for final approval under the Program:

- Development of this Site will require compliance with all state and federal environmental laws, regulations and standards applicable to existing conditions and to the proposed use relating to floodplain management, wetland protection, wildlife conservation, water quality, stormwater management, wastewater treatment, and hazardous waste safety. The Applicant should expect that the Municipality will require evidence of such compliance prior to the issuance of a building permit for the Project.
- The Applicant should provide information relative to snow storage and snow removal.
- The Applicant should engage with the Milford Fire Department to review the plans and address fire emergency response and public safety concerns.
- The Applicant should consider incorporating additional opportunities for recreational areas and open space into the site plan.
- The Applicant should be prepared to discuss how the proposed Project will address the potential future impacts of commercial and industrial development along Industrial Road to the south of the Site.

This Site Approval is expressly limited to the development of no more than one hundred sixty-two (162) rental units under the terms of the Program, of which not less than forty-one (41) of such units shall be restricted as affordable for low or moderate income persons or families as required under the terms of the Guidelines. It is not a commitment or guarantee of financing and does not constitute a site plan or building design approval. Should you consider, prior to obtaining a comprehensive permit, the use of any other housing subsidy program, the construction of additional units or a reduction in the size of the Site, you may be required to submit a new Site Approval application for review by MassHousing. Should you consider a change in tenure type or a change in building type or height, you may be required to submit a new site approval application for review by MassHousing.

For guidance on the comprehensive permit review process, you are advised to consult the Guidelines. Further, we urge you to review carefully with legal counsel the M.G.L. c.40B Comprehensive Permit Regulations at 760 CMR 56.00.

This approval will be effective for a period of two (2) years from the date of this letter. Should the Applicant not apply for a comprehensive permit within this period this letter shall be considered to be expired and no longer in effect unless MassHousing extends the effective period of this letter in writing. In addition, the Applicant is required to notify MassHousing at the following times throughout this two-year period: (1) when the Applicant applies to the local ZBA for a Comprehensive Permit, (2) when the ZBA issues a decision and (3) if applicable, when any appeals are filed.

Should a comprehensive permit be issued, please note that prior to (i) commencement of construction of the Project or (ii) issuance of a building permit, the Applicant is required to submit to MassHousing a request for Final Approval of the Project (as it may have been

amended) in accordance with the Comprehensive Permit Rules (see especially 760 CMR 56.04(07) and the Guidelines including, without limitation, Part III thereof concerning Affirmative Fair Housing Marketing and Resident Selection). Final Approval will not be issued unless MassHousing is able to make the same findings at the time of issuing Final Approval as required at Site Approval.

Please note that MassHousing may not issue Final Approval if the Comprehensive Permit contains any conditions that are inconsistent with the regulatory requirements of the New England Fund Program of the FHLBB, for which MassHousing serves as Subsidizing Agency, as reflected in the applicable regulatory documents. In the interest of providing for an efficient review process and in order to avoid the potential lapse of certain appeal rights, the Applicant may wish to submit a "final draft" of the Comprehensive Permit to MassHousing for review. Applicants who avail themselves of this opportunity may avoid significant procedural delays that can result from the need to seek modification of the Comprehensive Permit after its initial issuance.

If you have any questions concerning this letter, please contact Katherine Miller at (617) 854-1116.

Sincerely,

A handwritten signature in cursive script that reads "Chrystal Kornegay".

Chrystal Kornegay,
Executive Director

cc: Ms. Jennifer Maddox, Acting Undersecretary, DHCD
The Honorable Ryan C. Fattman
The Honorable Brian Murray
William E. Kingkade, Chair, Board of Selectmen
David R. Consigli, Chair, Zoning Board of Appeals
Richard A. Villani, Town Administrator

Attachment 1.

760 CMR 56.04 Project Eligibility: Other Responsibilities of Subsidizing Agency Section (4) Findings and Determinations

Birch Street Place, Milford, MA, MH #968

After the close of a 30-day review period and 15-day extension, MassHousing hereby makes the following findings, based upon its review of the application, and taking into account information received during the site visit and from written comments:

(a) that the proposed Project appears generally eligible under the requirements of the housing subsidy program, subject to final approval under 760 CMR 56.04(7);

The Project is eligible under the NEF housing subsidy program and at least 25% of the units will be available to households earning at or below 80% of the Area Median Income, adjusted for household size, as published by the U.S. Department of Housing and Urban Development ("HUD"). The most recent HUD income limits indicate that 80% of the current median income for a four-person household in Milford is \$68,000.

Proposed gross rent levels of \$1,275 for a one-bedroom affordable unit, \$1,530 for a two-bedroom affordable unit and \$1,768 for a three-bedroom affordable unit accurately reflect current affordable rent levels for the Worcester HMFA under the NEF Program, less utility allowances of \$129, \$166, and \$196 for the one two- and three-bedroom units, respectively.

A letter of interest for project financing was provided by Fidelity Bank, a member bank of the Federal Home Loan Bank of Boston.

(b) that the site of the proposed Project is generally appropriate for residential development, taking into consideration information provided by the Municipality or other parties regarding municipal actions previously taken to meet affordable housing needs, such as inclusionary zoning, multifamily districts adopted under c.40A, and overlay districts adopted under c.40R, (such finding, with supporting reasoning, to be set forth in reasonable detail);

Based on MassHousing staff's site inspection, internal discussions, and a thorough review of the application, MassHousing finds that the Site is suitable for residential use and development and that such use would be compatible with surrounding uses.

Milford does not have a DHCD Certified Housing Production Plan. According to DHCD's Chapter 40B Subsidized Housing Inventory (SHI), updated through September, 2017, Milford has 708 Subsidized Housing Inventory (SHI) units (6.2 % of its housing inventory), which is 430 SHI units shy of the 10% SHI threshold.

(c) that the conceptual project design is generally appropriate for the site on which it is located, taking into consideration factors that may include proposed use, conceptual site plan and building massing, topography, environmental resources, and integration into existing

development patterns (such finding, with supporting reasoning, to be set forth in reasonable detail);

- **Relationship to Adjacent Building Typology (Including building massing, site arrangement, and architectural details):**

The building typology of adjacent structures reflects a mix of surrounding uses. Nearby residential development includes a townhouse condominium development to the north of the Site and a single-family subdivision to the west. Vacant industrial land borders the southern edge of the Site and is bounded by Industrial Road, which services additional industrial development, including an amazon distribution center, construction warehouses, and a brewery. The Site lies directly behind the Milford Fire Department, which fronts Birch Street to the east.

The proposed development consists of four multi-family structures comprising a total of 162 one- two- and three-bedroom rental apartments, with a central single-story clubhouse on the Site. Building elevations include features that break down the building massing by articulating various façade elements, such as decks and protruded bays, as well as utilizing different colors and materials. Stone veneer, clapboard style, and shake shingle siding make up the majority of the exterior design scheme.

- **Relationship to adjacent streets/Integration into existing development patterns**

The Site is located on the west side of Birch Street, roughly one-half mile south of Route 109, and one mile west of the Interstate 495 on-ramp. Site access is by a 2-lane driveway that extends back into the Site and forms a loop road with integrated surface parking that circulates around the development. Public transportation and pedestrian infrastructure are not immediately accessible from the Site.

Milford's town center is roughly 1.5 miles west of the Site. Larger-scale commercial development is found along Fortune Boulevard, roughly one mile north. The Site is generally consistent with nearby development patterns.

- **Density**

The Developer intends to build 162 homes on 20.95 acres, 16.84 of which are buildable. The resulting density is 9.62 units per buildable acre, which is acceptable given the proposed housing type and similar patterns of development found within the region.

- **Conceptual Site Plan**

The site plan consists of four, similarly sized, three-story buildings, organized in a rectangular pattern to create a central "quad" area, where a clubhouse and other amenity space including a pool and playground are located. Surface parking is arranged along the long edge of each apartment building, allowing access from both sides. A total of 324 parking spaces are proposed for a parking ratio of 2 parking spaces per rental unit. The site plan successfully accommodates areas for snow, trash, and bike storage. Overall, the site plan is well thought out and the proposed Project creates an inviting environment, while adequately and reasonably buffering the property from immediate adjacencies.

- **Environmental Resources**

Documented on-site resource areas are limited to approximately 4.11 acres of vegetated wetland. The site plan is organized in a way that physically separates these wetland areas from the built portion of the development.

- **Topography**

The Site's topography is characterized by moderately undulating slopes with several low wetland areas. Elevations across the Site vary from elevation 256 at the existing curb cut on Birch Street to elevation 320 near the northerly property line. The residential structures are situated at the higher elevations of the Site, away from the wetland areas.

(d) that the proposed Project appears financially feasible within the housing market in which it will be situated (based on comparable rentals or sales figures);

The Applicant proposes 162 rental apartments to be financed under the NEF Program. There will be 121 market-rate units with proposed average rent levels of \$1,625 for the one-bedroom units; \$1,900 for the two-bedroom units; \$2,225 for the two-bedroom units (with den); and \$2,375 for the three-bedroom units. MassHousing's Appraisal and Marketing team (A&M) performed a Competitive Market Analysis and found that proposed market rents for each unit type fall within the range of adjusted comparable market rents.

In-house data for larger market and mixed-income complexes (approximately 1,085 units) in the area revealed a strong rental market. Current occupancy rates of the comparable properties reviewed averaged approximately 97.7 %. *REIS, Inc.* data for the Worcester metro area have projected a vacancy rate at 3.3% (3rd Qt. 2017) and 3.8% YTD. This rate is projected to increase to 4.4% over the next five years.

(e) that an initial pro forma has been reviewed, including a land valuation determination consistent with the Department's Guidelines, and the Project appears financially feasible and consistent with the Department's Guidelines for Cost Examination and Limitations on Profits and Distributions (if applicable) on the basis of estimated development costs;

MassHousing has commissioned an "As-Is" appraisal which indicates a land valuation of \$900,000. The Project pro forma includes a proposed investment of \$10,699,445 in private equity. A preliminary review of the pro forma indicates that the per-unit construction costs are within the normal range for similar multi-family developments. Based on estimated development costs, the Project appears to be financially feasible and within the limitations on profits and distributions.

(f) that the Applicant is a public agency, a non-profit organization, or a Limited Dividend Organization, and it meets the general eligibility standards of the housing program; and

MassHousing finds that the Applicant must be organized as a Limited Dividend Organization. MassHousing sees no reason this requirement could not be met given information reviewed to date. The Applicant meets the general eligibility standards of the NEF housing subsidy program.

(g) that the Applicant controls the site, based on evidence that the Applicant or a related entity owns the site, or holds an option or contract to acquire such interest in the site, or has such other interest in the site as is deemed by the Subsidizing Agency to be sufficient to control the site.

The Applicant controls the entire 20.95 acre Site through a Purchase and Sale Agreement dated December 1, 2017 between Corner Brook, LLC (seller) and 88 CORP (buyer). Failure of delivery of the deed by August 3, 2018 will render the agreement void.

GREATER BOSTON REAL ESTATE BOARD

STANDARD FORM LAND
PURCHASE & SALE AGREEMENT

From the Office of:

1. PARTIES AND MAILING
ADDRESSES

(fill in)

This 1st day of December, 2017

Corner Brook LLC

11 Commercial Way, Milford, MA 01757

hereinafter called the SELLER, agrees to SELL and

88 Corp

31 Whitewood Road, Milford, MA 01757

hereinafter called the BUYER or PURCHASER, agrees to BUY, upon the terms hereinafter set forth, the following described premises:

2. DESCRIPTION

(fill in and include title
reference)

Lot 1 Birch Street, Milford, MA 01757

containing approximately 20.95 acres as referenced on plan of land dated May 20, 2017 prepared by Allen Engineering LLC

3. TITLE DEED

(fill in)

Insert proposed use of property
in (d) include in (e) by specific
reference any restrictions,
easements, leases, municipal
and other liens and other
encumbrances.

Said premises are to be conveyed by a good and sufficient quitclaim deed running to the BUYER, or to the nominee designated by the BUYER by written notice to the SELLER at least seven days before the deed is to be delivered as herein provided, and said deed shall convey a good and clear record and marketable title thereto, free from encumbrances, except

- Provisions of existing building and zoning laws;
- Such taxes for the then current year as are not due and payable on the date of the delivery of such deed;
- Any liens for municipal betterments assessed after the date of this agreement;
- Easements, restrictions and reservations of record, if any, so long as the same do not prohibit or materially interfere with the use of said premises for purposes,
-

4. PLANS

If said deed refers to a plan necessary to be recorded therewith the SELLER shall deliver such plan with the deed in form adequate for recording or registration.

5. REGISTERED TITLE

In addition to the foregoing, if the title to said premises is registered, said deed shall be in form sufficient for issuance of a Certificate of Title of said premises, and the SELLER shall deliver with said deed all instruments, if any, necessary to enable such Certificate of Title to be issued.

6. PURCHASE PRICE

The agreed purchase price for said premises is \$ 250,000.00

Two Hundred Fifty Thousand

dollars, of which

\$ 500.00 have been paid as a deposit this day and

\$ 249,500.00

\$ are to be paid at the time of delivery of the deed in cash, or by certified, cashier's check(s).

\$
\$ 250,000.00 TOTAL

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Form ID: RA720 REV/PD 08/13

Whitewood Real Estate Inc., 31 Whitewood Rd, Milford, MA 01757

Leslie Tabliser

Produced with zipForm® by zipLogix 18070 Fifteen Mile Road, Fraser, Michigan 48026

Phone: (508) 431-1985

Fax: (508) 473-0794

www.zipLogix.com

Birch Street



7. TIME FOR
PERFORMANCE;
DELIVERY OF DEED

Such deed is to be delivered at 11:00 o'clock M. on the 3rd day of
August, 2018, at the Steven Greenwald office

 Registry of Deeds, unless otherwise agreed upon in writing. It is agreed that time is of the
essence of this agreement.

8. POSSESSION &
CONDITION OF PREMISES
*(attach a list of
exceptions, if any)*

Full possession of said premises free of all tenants and occupants, except as herein provided,
is to be delivered at the time of the delivery of the deed, said premises to be then in compliance
with the provisions of any instrument referred to in clause 3 hereof.

9. EXTENSION TO
PERFECT TITLE
OR MAKE PREMISES
CONFORM
*(change period of time if
desired)*

If the SELLER shall be unable to give title or to make conveyance, or to deliver possession of
the premises, all as herein stipulated, or if at the time of the delivery of the deed the premises
do not conform with the provisions hereof, then any payments made under this agreement shall
be forthwith refunded and all other obligations of the parties hereto shall cease, and this
agreement shall be void without recourse to the parties hereto, unless the SELLER elects to
use reasonable efforts to remove any defects in title, or to deliver possession as provided
herein, or to make the said premises conform to the provisions hereof, as the case may be, in
which event the SELLER shall give written notice thereof to the BUYER at or before the time for
performance hereunder, and thereupon the time for performance hereof shall be extended for a
period of thirty days.

10. FAILURE TO PERFECT
TITLE OR MAKE
PREMISES CONFORM, etc.

If at the expiration of the extended time the SELLER shall have failed to remove any defects in
title, deliver possession, or make the premises conform, as the case may be, all as herein
agreed, then any payments made under this agreement shall be forthwith refunded and all other
obligations of the parties hereto shall cease and this agreement shall be void without recourse
to the parties hereto.

11. BUYER'S ELECTION
TO ACCEPT TITLE

The BUYER shall have the election, at either the original or any extended time for performance,
to accept such title as the SELLER can deliver to the said premises in their then condition and
to pay therefor the purchase price without deduction, in which case the SELLER shall convey
such title.

12. ACCEPTANCE OF DEED

The acceptance of a deed by the BUYER or the BUYER's nominee as the case may be, shall
be deemed to be a full performance and discharge of every agreement and obligation herein
contained or expressed, except such as are, by the terms hereof, to be performed after the
delivery of said deed.

13. USE OF MONEY TO
CLEAR TITLE

To enable the SELLER to make conveyance as herein provided the SELLER may, at the time
of delivery of the deed, use the purchase money or any portion thereof to clear the title of any or
all encumbrances or interests, provided that all instruments so procured are recorded
simultaneously with the delivery of said deed.

14. ADJUSTMENTS

Taxes for the then current fiscal year shall be apportioned as of the day of performance of this
agreement and the net amount thereof shall be added to or deducted from, as the case may be,
the purchase price payable by the BUYER at the time of delivery of the deed.



15. ADJUSTMENT OF
UNASSESSED AND
ABATED TAXES

If the amount of said taxes is not known at the time of the delivery of the deed, they shall be apportioned on the basis of the taxes assessed for the preceding fiscal year, with a reapportionment as soon as the new tax rate and valuation can be ascertained; and, if the taxes which are to be apportioned shall thereafter be reduced by abatement, the amount of such abatement, less the reasonable cost of obtaining the same, shall be apportioned between the parties, provided that neither party shall be obligated to institute or prosecute proceedings for an abatement unless herein otherwise agreed.

16. BROKER'S FEE
(fill in fee with dollar
amount or percentage;
also name of Brokerage
firm(s))

A Broker's fee for professional services of N/A
is due from the SELLER to _____

the Broker(s) herein, but if the SELLER pursuant to the terms of clause 19 hereof retains the deposits made hereunder by the BUYER, said Broker(s) shall be entitled to receive from the SELLER an amount equal to one-half the amount so retained or an amount equal to the Broker's fee for professional services according to this contract, whichever is the lesser.

17. BROKER(S) WARRANTY
(fill in name)

The Broker(s) named herein _____
warrant(s) that the Broker(s) is (are) duly licensed as such by the Commonwealth of Massachusetts.

18. DEPOSIT
(fill in name)

All deposits made hereunder shall be held in escrow by Steven Greenwald
_____ as escrow agent subject to the terms of this agreement and shall be duly accounted for at the time of performance of the agreement. In the event of any disagreement between the parties, the escrow agent may/shall retain all deposits made under this agreement pending instructions mutually given in writing by the SELLER and the BUYER.

19. BUYER'S DEFAULT
DAMAGES

If the BUYER shall fail to fulfill the BUYER's agreements herein, all deposits made hereunder by the BUYER shall be retained by the SELLER as liquidated damages unless within thirty days after the time for performance of this agreement or any extension hereof, the SELLER otherwise notifies the BUYER in writing.

20. RELEASE BY
HUSBAND OR WIFE

The SELLER's spouse hereby agrees to join in said deed and to release and convey all statutory and other rights and interests in said premises.

21. BROKER AS PARTY

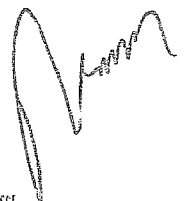
The Broker(s) named herein join(s) in this agreement and become(s) a party hereto, insofar as any provisions of this agreement expressly apply to the Broker(s), and to any amendments or modifications of such provisions to which the Broker(s) agree(s) in writing.

22. LIABILITY OF
TRUSTEE,
SHAREHOLDER,
BENEFICIARY, etc.

If the SELLER or BUYER executes this agreement in a representative or fiduciary capacity, only the principal or the estate represented shall be bound, and neither the SELLER or BUYER so executing, nor any shareholder or beneficiary of any trust, shall be personally liable for any obligation, express or implied, hereunder.

23. WARRANTIES AND
REPRESENTATIONS
(fill in); if none, state
"none"; if any listed,
indicate by whom each
warranty or representation
was made

The BUYER acknowledges that the BUYER has not been influenced to enter into this transaction nor has BUYER relied upon any warranties or representations not set forth or incorporated in this agreement. If any warranties or representations were relied upon, they are set forth here or incorporated elsewhere in this agreement:



24 MORTGAGE
CONTINGENCY
CLAUSE
(omit if not provided for
in Offer to Purchase)

In order to help finance the acquisition of said premises, the BUYER shall apply for a conventional bank or other institutional mortgage loan of \$ _____ at prevailing rates, terms and conditions. If despite the BUYER's diligent efforts a commitment for such loan cannot be obtained on or before _____, the BUYER may terminate this agreement by written notice to the SELLER and/or the Broker(s), as agent(s) for the SELLER, prior to the expiration of such time, whereupon any payments made under this agreement shall be forthwith refunded and all other obligations of the parties hereto shall cease and this agreement shall be void without recourse to the parties hereto. In no event will the BUYER be deemed to have used diligent efforts to obtain such commitment unless the BUYER submits a complete mortgage loan application conforming to the foregoing provisions on or before _____.

25 CONSTRUCTION
OF AGREEMENT


This instrument, executed in multiple counterparts, is to be construed as a Massachusetts contract, is to take effect as a sealed instrument, sets forth the entire contract between the parties, is binding upon and enures to the benefit of the parties hereto and their respective heirs, devisees, executors, administrators successors and assigns, and may be cancelled, modified or amended only by a written instrument executed by both the SELLER and the BUYER. If two or more persons are named herein as BUYER their obligations hereunder shall be joint and several. The captions and marginal notes are used only as a matter of convenience and are not to be considered a part of this agreement or to be used in determining the intent of the parties to it.

26 ADDITIONAL
PROVISIONS

The initiated rider, if any, attached hereto, are incorporated herein by reference.
Purchase is subject to buyer receiving all local and state approvals(40B) for 162 apartment units consisting on 4 residential units, 1 clubhouse, 1 outdoor pool and stand alone garage units. Subject to water and sewer hook up availability.

NOTICE: This is a legal document that creates binding obligations. If not understood, consult an attorney.

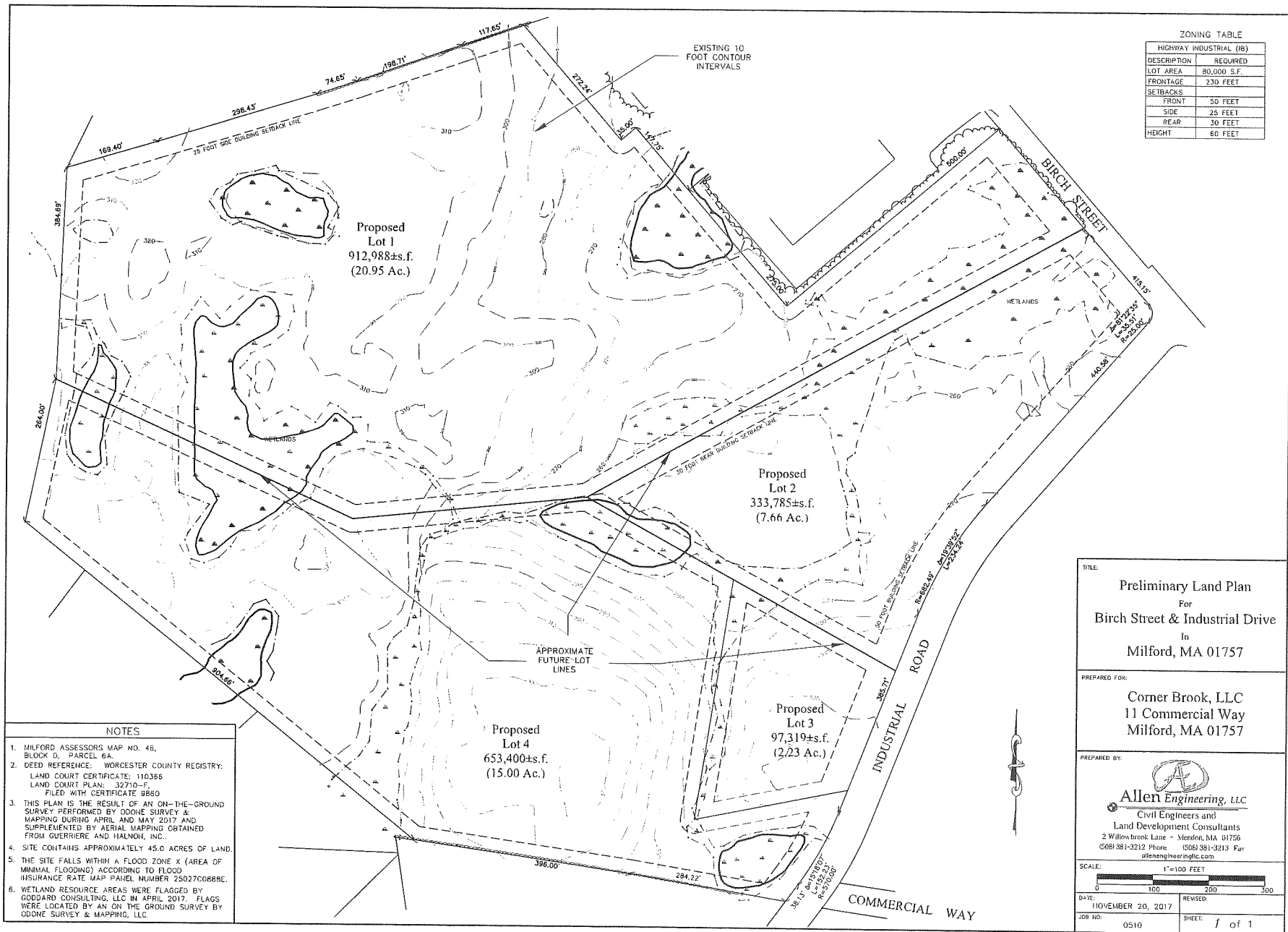
SELLER: 
Print Name: Corner Brook LLC

BUYER: 
Print Name: 88 Corp

SELLER (or Spouse): _____
Print Name: _____

BUYER: _____
Print Name: _____

BROKER(S)



ZONING TABLE	
HIGHWAY INDUSTRIAL (H)	
DESCRIPTION	REQUIRED
LOT AREA	80,000 S.F.
FRONTAGE	230 FEET
SETBACKS	
FRONT	50 FEET
SIDE	25 FEET
REAR	30 FEET
HEIGHT	60 FEET

NOTES

1. MILFORD ASSESSORS MAP NO. 46, BLOCK 0, PARCEL 6A.
2. DEED REFERENCE: WORCESTER COUNTY REGISTRY: LAND COURT CERTIFICATE: 110366 LAND COURT PLAN: 32710-F, FILED WITH CERTIFICATE 9860
3. THIS PLAN IS THE RESULT OF AN ON-THE-GROUND SURVEY PERFORMED BY ODOHE SURVEY & MAPPING DURING APRIL AND MAY 2017 AND SUPPLEMENTED BY AERIAL MAPPING OBTAINED FROM GUERRIERE AND HALNON, INC.
4. SITE CONTAINS APPROXIMATELY 45.0 ACRES OF LAND.
5. THE SITE FALLS WITHIN A FLOOD ZONE X (AREA OF MINIMAL FLOODING) ACCORDING TO FLOOD INSURANCE RATE MAP PANEL NUMBER 25027C0888E.
6. WETLAND RESOURCE AREAS WERE FLAGGED BY GODDARD CONSULTING, LLC IN APRIL 2017. FLAGS WERE LOCATED BY AN ON-THE-GROUND SURVEY BY ODOHE SURVEY & MAPPING, LLC.

TITLE:
Preliminary Land Plan
For
Birch Street & Industrial Drive
In
Milford, MA 01757

PREPARED FOR:
Corner Brook, LLC
11 Commercial Way
Milford, MA 01757

PREPARED BY:

Allen Engineering, LLC
Civil Engineers and
Land Development Consultants
2 Willowbrook Lane - Mendon, MA 01756
(508) 381-3212 Phone (508) 381-3213 Fax
allenengineeringllc.com

SCALE:
1"=100 FEET


DATE: NOVEMBER 20, 2017
JOB NO: 0510
REVISION:
SHEET: 1 of 1

LIMITED DIVIDEND ENTITY STATUS

The Applicant, 88 CORP., will execute the Subsidizing Agency's (MassHousing) Regulatory Agreement requiring that the Applicant's profits, cash flow, and distribution of returns will be limited as set forth in Chapter 40B and the regulations thereunder and as set forth under the Subsidizing Agency's equity and limited dividend policies.

DEVELOPMENT TEAM

APPLICANT/DEVELOPER

88 CORP.

Kevin Lobisser, President
David Pyne, Vice President

DEVELOPMENT CONSULTANT

Edward Marchant
EHM/Real Estate Advisor

ATTORNEY

John Smolak
Smolak & Vaughn LLP

CIVIL ENGINEER

Mark Allen, P.E.
Allen Engineering, LLC

ARCHITECT

F. Paul Frederick, AIA
HPA Design, Inc.

LANDSCAPE ARCHITECT

M.J. Mrva, R.L.A.
Bohler Engineering

TRAFFIC ENGINEER

Ronald Müller, P.E.
Ron Müller & Associates

GENERAL CONTRACTOR

Kevin Lobisser
Lobisser Building Corp. (or related party)

LOTTERY AGENT

Maureen O'Hagan
MCO Housing Services

PROPERTY MANAGER

88 CORP. (or related party)

Additional information on Development Team members is attached.

88 CORP.
KEVIN W. LOBISSER, PRESIDENT

Kevin W. Lobisser, the President of 88 CORP., has planned, designed, permitted and developed over 550 residential single-family homes, condos and rental units since 1995.

All of the projects are constructed through Lobisser Building Corp. for which Mr. Lobisser is the Owner and President. Lobisser Building Corp. includes 22 talented and dedicated professionals which include Project Manager, Site Supervisors, Laborers, Accountants and Office staff.

Currently Kevin Lobisser owns and manages over 100 apartment units and approximately 70,000 sq. ft. of medical office space and flex buildings.

A sample of past and current projects is listed below:

- Crystal Way, Bellingham MA / 21-residential condo units
- Woodland Hills, Bellingham, MA / 12-residential custom homes
- Rockwood Meadows, Upton, MA / 62-residential condo units
- Village at Cooks Farm, Franklin, MA / 55-residential condo units
- Kenneth Village, Upton, MA / 8-residential condo units
- Hecla Canal, Uxbridge, MA / 12-residential condo units
- 169 Medway Rd. Milford, MA / 24-residential rental units
- 75 Water St. Milford, MA / 7-residential rental units
- Minuteman Estates, Oxford, MA / 38-residential homes

88 CORP.
DAVID H. PYNE, VICE PRESIDENT

David H. Pyne is Vice President of 88 CORP. and has over 25 years of experience in developing commercial, industrial, and residential projects in the Milford, Massachusetts area.

Mr. Pyne owns several real estate companies and businesses, and has planned, developed, and overseen the construction of all of his projects for over 25 years. He is President of Hillview Equipment and Leasing in Milford, Massachusetts, a company that buys, rents, sells, and trades heavy construction equipment all over the world, employing over 30 people.

David Pyne also is involved in solar energy in the area, developing and investing in many large solar projects. He currently owns and manages over 150,000 square feet of industrial warehouse space, various residential properties, boat slips, and over \$7 million of local solar projects.

More specific information on Mr. Pyne's companies is listed below:

Hillview Equipment and Leasing Co., Inc. has traded in used Caterpillar equipment since 1994

Corner Brook, LLC has owned and managed industrial real estate since 1996

Dublin Group LLC has owned and managed industrial real estate since 1997

Hoboken LLC has managed residential and commercial properties since 2010

Milford Solar LLC has owned and managed and owns solar projects since 2012

308 Corp has owned medical office space since 2015

David Pyne has an Economics Degree from Lafayette College.

Edward H. Marchant

Edward H. Marchant has been actively involved with the development, financing, construction, and management of real estate over the past forty-six years. In addition to his experience as a real estate developer and consultant, Mr. Marchant has been a real estate educator at Harvard University over the past thirty-seven years.

As a Project Manager and then as Director of Development at Greater Boston Community Development, Inc. (GBCD), Mr. Marchant worked from 1971-1980 with a wide range of community-based housing sponsors in the successful development of numerous affordable housing projects. GBGD, a non-profit corporation and one of the leading affordable housing development firms in the country, is now known as The Community Builders, Inc. (TCB). Mr. Marchant served on its Board of Directors from 1985 to 1997 until he began providing real estate consulting services to TCB. Mr. Marchant no longer provides consulting services to TCB and was reelected as a member of the TCB Board of Directors in December 2010.

As a Vice President at John M. Corcoran & Co. (Corcoran), a private Boston real estate development and management company, Mr. Marchant was responsible for initiating real estate projects and serving as a development project manager on those projects that he initiated. As a development project manager, Mr. Marchant was responsible for identifying suitable sites and gaining site control, preparing feasibility studies, assembling development teams, negotiating required zoning approvals, securing construction and permanent financing, coordinating the design/construction process, and establishing and monitoring marketing programs. Mr. Marchant's real estate development experience at Corcoran included the development of residential, office, and R&D projects. One of his projects at Corcoran was the rehabilitation of a 392-unit Boston public housing project now known as Commonwealth Apartments. That project, owned by the Boston Housing Authority but privately managed by Corcoran, was awarded an Urban Land Institute Award of Excellence in 1989.

Since 1990 Mr. Marchant has worked as an independent real estate advisor. Clients have included developers, investors, private and quasi-public financial institutions, universities, foundations, and municipalities. Representative assignments have included advising Zoning Boards of Appeals and developers in Massachusetts on 174 proposed rental or for-sale Chapter 40B Comprehensive Permit mixed-income residential developments; quasi-public agencies on redevelopment planning, implementation, and/or developer selection for closing military bases (Ft. Devens, MA / Watertown, MA / and Bermuda); major urban universities on the development of a strategic neighborhood revitalization plan (with TCB) and on the development and/or acquisition of graduate student/faculty housing; a federal housing agency on the implementation of a public housing funding program for severely distressed public housing projects; the Ford Foundation on its mixed-income/mixed-race communities initiative (with Brophy & Reilly LLC); a non-profit on the development and financing of an assisted-living facility; private developers on structuring and negotiating joint venture development agreements; a private corporation on a valuation and disposition strategy for corporate real estate assets; a local foundation on pre-development loan due diligence reviews of proposed mixed-income housing developments; investors on acquiring real estate assets; and a private developer on the development of an 85,000 square foot ambulatory care center.

In addition to his direct real estate consulting work, served in the 1990's as a court-appointed Trustee or Examiner for the Office of the United States Trustee on four Chapter 11 bankruptcy cases, including two where the primary assets were real estate. These two cases included a mixed-use building (retail and office) and a mobile home park. Creditors in the two cases in which Marchant served as Chapter 11 Trustee received a 100 cent and 129 cent on the dollar dividend distribution respectively. Mr. Marchant has also served as a real estate expert for the United States Attorney, District of Massachusetts.

Since 1980, Mr. Marchant has been an Adjunct Lecturer in Public Policy at the Kennedy School of Government, Harvard University, where he has taught courses on real estate development and finance and on the development, financing, and management of affordable housing. Mr. Marchant also serves as a Core Faculty member of the Real Estate Academic Initiative at Harvard University. The quality of Mr. Marchant's teaching at the Kennedy School has been recognized numerous times through a Dean's Office award. Mr. Marchant also taught for over twenty years until 2014 a real estate finance and investment course at the Harvard University Extension School where he received the JoAnne Fussa Distinguished Teaching Award in 1997. Mr. Marchant has participated as a faculty member in numerous professional educational programs offered by Harvard Graduate School of Design (GSD), Harvard Business School (HBS), Harvard Kennedy School (HKS), and Harvard Divinity School (HDS). These professional programs have included the Advanced Management Development Program in Real Estate, the Affordable Housing Institute, Real Estate Development Fundamentals and Real Estate Finance Fundamentals (both at GSD); Real Estate Management Program, Real Estate Executive Seminar, and Leading Complex Capital Projects Program (HBS); HUD/CPD Community and Economic Development Institute and the HUD-sponsored Community Builders Fellowship and Public Trust Officers Training Program (HKS); and the Summer Leadership Institute (HDS).

Mr. Marchant has frequently served as an evaluator for the Innovations in American Government program, a program administered by the Ash Center at the Harvard Kennedy School. Mr. Marchant also designs and teaches corporate real estate training programs, including past programs for Jones Lang LaSalle (JLL), Boston Financial Investment Management, Copley Real Estate Advisors, the City of Boston's Department of Neighborhood Development and The Community Builders, Inc.

A graduate of Cornell University and Harvard Business School, Mr. Marchant is a member of the Urban Land Institute and a former Chairman of ULI's Boston District Council Executive Committee. Mr. Marchant is also a member of the Cornell University Real Estate Council and serves on the Cornell Baker Program in Real Estate Advisory Board.

***EHM/Real Estate Advisor
9 Rawson Road
Brookline, MA 02445-4507***

**617-739-2543
617-739-9234 (FAX)**

emarchant@msn.com

October 2017

Edward Marchant's Chapter 40B Comprehensive Permit Experience

Provided or Providing Technical Assistance to Zoning Boards of Appeal and/or Public Agencies (51 Municipalities / 112 Projects)

Andover	Marblehead (2)
Ashland	Marlborough
Barnstable (3 developments)	Merrimac
Bedford (3)	Methuen (4)
Bolton (4)	Millis
Bridgewater (6)	Nantucket (5)
Dedham (2)	Norwood
DHCD (Hingham)	Revere
Dighton (5)	Rutland (2)
Dover (3)	Saugus (4)
Easton (4)	Seekonk (2)
Falmouth	Sharon
Foxborough (3)	Southborough (3)
Georgetown (2)	Stoughton (2)
Gloucester	Sturbridge
Hanover (2)	Sudbury (6)
Harvard (2)	Swampscott
Harwich	Taunton
Hudson (4)	Townsend
Ipswich (4)	Waltham (2)
Lancaster	West Boylston
Lexington	Westminster
Littleton (4)	Winchester
Lynnfield	Winthrop
Manchester-by-the-Sea	Yarmouth (2)
Mansfield (4)	

Provided or Providing Development Consulting Services on Potential Chapter 40B Projects (44 Municipalities / 62 Projects)

Acton (3 developments)	Norfolk (2)
Andover	North Andover
Ashland	Norwood
Bellingham	Oxford
Billerica (2)	Pepperell
Burlington	Plainville (2)
Brookline (4)	Reading
Chelmsford (6)	Salisbury
Cohasset	Sharon
Dartmouth	Sherborn
Dracut (3)	Sterling
Duxbury	Stoneham
Easton	Tewksbury
Falmouth	Tyngsborough
Hopkinton	Upton
Ipswich	Wakefield (2)
Littleton	Walpole
Marshfield	Wareham
Merrimac	Weston
Middleborough	Westford (2)
Milford	Woburn (2)
Newton	Wrentham

Other Chapter 40B-Related Experience

Speaker at numerous Chapter 40B Training Conferences [Sponsored by Citizens' Housing & Planning Association (CHAPA), MA Department of Housing & Community Development (DHCD), Massachusetts Housing Partnership (MHP) and MassHousing] and the MHP-sponsored Massachusetts Housing Institute.

October 2017

AREAS OF EXPERIENCE

*Land Use Law
Real Estate Development
Environmental
Affordable Housing
Permitting*

BAR ADMISSIONS

*Massachusetts
New Hampshire*

EDUCATION

*Boston College Law School,
J.D., 1990
Columbia University School
of International and Public Affairs,
M.P.A. Public Policy and
Administration, 1987
University of Massachusetts
at Amherst B.A., summa
cum laude, 1985*

MEMBERSHIPS

*Governor's Economic
Development Planning Council,
member (2015-Present)*

*DHCD's Homeownership Advisory
Committee, MA DHCD (2012-
2015)*

*Merrimack Valley General Fund
Grants Committee, Essex County
Community Foundation (2012 –
Present)*

*Homebuilders Association of
Mass., Chair, Governmental
Affairs Committee (2013 to
Present), and Member of the Board
of Directors (2004 to Present)*

*NAIOP – Massachusetts Chapter,
Chairman, Environmental
Committee (2002-2004)*

*Boston Bar Association, Member,
Environmental Law Section
Steering Committee (2000 -2005)*

John Smolak is a Partner and Co-Founder of Smolak & Vaughan LLP. His practice is concentrated in the areas of land use, environmental, and real estate development law. Prior to forming the firm in 2004, John was Co-Chairman of the Real Estate and Environmental Group with Burns & Levinson LLP in Boston.

John has represented property owners and developers in over one hundred cities and towns in Massachusetts in all aspects of real estate development, including the licensing and permitting of land use projects such as multifamily residential, transit-oriented development, office and retail centers, institutional and educational facilities, hotels, and other mixed use developments. In 2004, John was named a Massachusetts SuperLawyer in the field of Real Estate based upon a survey of Massachusetts attorneys conducted by Law & Politics Media, and reviewed by an independent blue ribbon panel, and is AV Rated by Martindale Hubbard.

His practice includes obtaining approvals related to federal, state and local highway access, wetlands and waterways, air, water and sewer facilities, zoning, and other permitting before local, state and federal permitting boards and agencies. John also advises clients on environmental compliance with federal, state, and local laws governing oil or hazardous materials, water pollution control, underground storage tanks, occupational health and safety, and historic preservation.

John was appointed in 2015 by Governor Charlie Baker to serve on the Governor's Economic Development Planning Council which is charged with developing the Commonwealth's Economic Development Plan, and was appointed and currently serves as a Board Member of the University of Massachusetts Building Authority. John has also served on a number of committees and task forces, including the DHCD's Homeownership Advisory Group which was charged with advising on modifications to the Commonwealth's housing policies. John also served on several working group involving proposed amendments to the Massachusetts Endangered Species Regulations, and formerly served on the Zoning and Wetlands Committee of the Governor's Special Commission on Barriers to Housing Development. Additionally, John served on the Legislative Committee of the Commonwealth Housing Task Force, an ad hoc committee which developed the Smart Growth legislation which became M.G.L. Chapter 40R and Chapter 40S.

John serves as Chairman of the Governmental Affairs Committee of the Homebuilders and Remodelers Association of Massachusetts (HBRAMA), and is a past Chairman of the Environmental Committee for the Massachusetts Chapter of NAIOP. John was also a member of the Boston Bar Association Environmental Law Section's Steering Committee and remains an active Section Member. John served as Vice Chair of the Merrimack Valley Regional Planning Commission for nine years. He was also a member of the Massachusetts Executive Office of Transportation and Construction, Transportation Enhancements Steering Committee.

John served on the Board of Directors of Special Olympics Massachusetts, Inc., and served on its Governance Committee, Executive Committee and its Building Committee. He is also a member of the Essex County Community Foundation's Merrimack Valley General Fund Grants Committee.

AFFORDABLE AND MULTIFAMILY HOUSING

Smolak & Vaughan LLP has extensive experience in the area of affordable and multifamily housing. Our experience includes analyzing and structuring complex deals, coordinating projects of significant scope and complexity, and providing counsel throughout the development process. We actively represent owners and lenders in all aspects of multifamily and affordable housing. Representation includes comprehensive project analysis, obtaining approvals and funding from government subsidizing agencies and other governmental authorities, obtaining approvals under conventional zoning, obtaining Comprehensive Permits under Chapter 40B and other regulatory approvals, serving as a liaison with local, state and federal government agencies, representing developers before the Housing Appeals committee and courts, and closing construction and permanent loans for borrowers and lenders. We have significant expertise representing developers before local zoning boards of appeals in connection with the Massachusetts comprehensive permit process under Chapter 40B, and regulations promulgated by the Massachusetts Department of Housing and Community Development. We have also participated in commenting on, and drafting proposed modifications to, the updated Comprehensive Permit Regulations and related 40B Guidance issued by the DHCD. We have served as a member of the DHCD's Homeownership Advisory Group which was established to review current multifamily housing policy within Massachusetts. We have also represented developers in connection with Chapter 40R Smart Growth proposals, as well as other multifamily and mixed use projects throughout Massachusetts.

Representative Multifamily/Mixed Use Project Experience

Attorneys with the firm are currently, or have been, involved with the following Comprehensive Permit projects on behalf of non-profit and for profit developers:

• Northfield Commons, Andover	80 Units
• Thorndike Place, Arlington	219 Units
• Benfield Farms, Carlisle	27 Units
• Chicopee Assisted Living, Chicopee	95 Units
• Allard's Grove, Dracut	60 Units
• Broadway Village, Dracut	278 Units
• Grassfields, Dracut	48 Units
• Mascuppic Village, Dracut	44 Units
• Long Pond Village, Dracut	32 Units
• Pines at Marsh Hill, Dracut	34 Units
• Harbor Village, Gloucester	30 Units

Representative Multifamily/Mixed Use Project Experience
(Cont'd)

• Welcome Home Apts., Veterans Housing, Haverhill	27 Units
• Gerson Building Veterans Housing, Haverhill	44 Units
• Residences at Essex Pastures, Ipswich	194 Units
• Mashpee Village Apartments, Mashpee	145 Units
• Country Estates, Medfield	49 Units
• Broadway Building Apartments, Methuen	40 Units
• Hill's Farm, Methuen	156 Units
• Methuen Assisted Living, Methuen	92 Units
• The Preserve at Abbyville, Norfolk	168 Units
• Abbyville Commons, Norfolk	48 Units
• The Enclave at Norfolk, Norfolk	56 Units
• East Mill/West Mill, No. Andover	150 Units
• Meetinghouse Commons, North Andover	80 Units
• Princeton North Andover, No. Andover	194 Units
• Residences at Osgood Landing, North Andover (later converted to 40R District for 530 Units)	300 Units
• Stevens Corner, North Andover	42 Units
• Residences at O'Shea Field, Peabody	80 Units
• Maplewood Village, Reading	36 Units
• Herring Brook Meadow, Scituate	20 Units
• Christopher Street, Stoneham	12 Units
• Eaglebrook Village, Wrentham	104 Units
• Eaglebrook Village Extension, Wrentham	49 Units
• Eaglebrook Commons, Wrentham	100 Units

MARK ALLEN, P.E.

ALLEN ENGINEERING, LLC

CIVIL ENGINEERS AND LAND DEVELOPMENT CONSULTANTS

2 WILLOWBROOK LANE

MENDON, MA 01756

Allen Engineering, LLC, Civil Engineers and Land Development Consultants, was founded in 2004 to provide high-quality professional civil engineering, property surveying, land use planning and permitting services throughout Massachusetts.

Allen Engineering is a leader and has worked on various commercial, industrial and residential projects for land developers, town agencies and homeowners across Massachusetts.

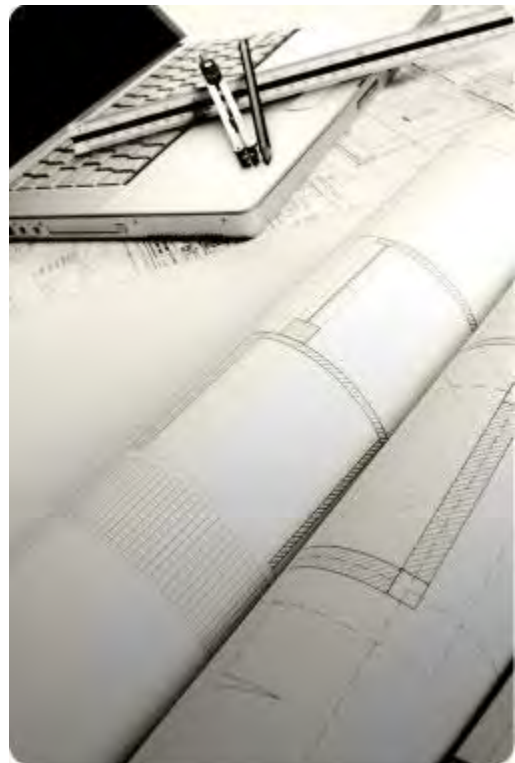
While environmental awareness continues to grow, Allen Engineering remains committed to working with clients' needs to create viable solutions that consider the environmental impacts of development.

At Allen Engineering, we strive to make Smart Growth and Green Development an integral part of our day-to-day design process, making a positive impact on our surroundings.

The firm has built its reputation on maintaining high standards on every project, focusing on superior quality and customer satisfaction. Allen Engineering is committed to staying ahead of the curve on which new technologies may benefit certain sites and staying current with the ever-changing local and state regulations. These two attributes have streamlined Allen Engineering's design and permitting throughout the years, which has saved its clients time and money.

As the owner of Allen Engineering, Mark Allen brings nearly two decades of experience and a wealth of knowledge to the civil engineering industry.

Mark Allen holds a Bachelor of Science degree in Civil Engineering from the University of New Hampshire. He is registered as a professional civil engineer, licensed soil evaluator and certified septic system inspector in Massachusetts.



HPA Design, Inc.

ARCHITECTS

Company Profile

HPA Design, Inc., Wrentham, MA 02093

(508)-384-8838

Summary:

For over 25 years, HPA Design Inc. Architects has been designing high quality single and multifamily residential and commercial buildings within the New England area.

The Beginning:

With its beginnings in residential architecture, HPA Design Inc. was founded in 1990 by Henry Arnaudo. Within a few years of its inception, Henry and the HPA Design team developed a remarkable reputation among its residential clients and has since become a recognized leader in traditional New England style residential architecture.

In 1999, HPA Design Inc. began designing some joint venture multifamily residential and small commercial projects with other local architectural firms.

Paul Frederick, a registered Architect with over 20 years of commercial, retail and multifamily residential experience, teamed up with Henry Arnaudo in 2004 to create a commercial division of the firm.

Henry and Paul, in combination with the other associates of HPA Design, the least of which has been with the firm over 15 years, form a dynamic group with a wealth of experience and skill in the field of architecture and construction.

The Philosophy:

The reason for HPA Design's history of success can be attributed to the firm's philosophy. This philosophy is to provide a comprehensive and unparalleled level of service second to none. Simply put, to be the best.

Although this philosophy seems somewhat apparent and should be commonplace within the industry, many firms fall short because they define **"the best"** in their own terms rather than with the client's needs and best interest in mind.

In order to make this philosophy a reality, HPA Design identifies the various but very specific needs of the client along with the design and construction principals that best apply. With these needs and principals clearly in focus the overall design parameters and project goals are set.

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Subsequently as the project progresses through design and construction, the adherence to these parameters and goals in conjunction with its functionality, aesthetics, constructability and cost are continuously reevaluated. This iterative process is critical in allowing for project flexibility when it's most beneficial, while never losing sight of the original benchmark for which the project's success can be judged.

HPA Design's dedication to providing a top quality level of service, along with the unwavering commitment to establish and preserve quality client relationships, have proven to be the linchpin of the firm's success. At HPA Design our philosophy becomes your reality.

The Results:

Due to the HPA Design philosophy, the diversified architectural and construction experience of the staff, the practical and holistic approach and the understanding that the client's projects must get constructed to their satisfaction, **97%** of HPA's commercial projects are from/for repeat clients. This is no accident. HPA's repeat client list is testament to the level of service one can expect.

Key Staff:

Henry Arnaudo AIA President

Henry Arnaudo is a registered architect with over 30 years of architectural and construction observation experience. He began his career working for a number of larger firms in and around the Boston area. In 1990, Henry founded HPA Design Inc. and has been responsible for many award winning projects throughout his career.

Henry is responsible for all aspects of the firm's operation including new client development and the continued successful relationships with current clients. On a day to day basis Henry oversees the entire process to insure that quality is maintained on all projects throughout all phases. Henry is also responsible for coordinating projects with various groups and municipalities including federal and local housing authorities, building and fire departments, zoning and planning boards, historical and conservation commissions and consulting engineers.

Henry's diversified experience includes commercial and institutional projects, however his expertise lies in single and multifamily residential. Henry has been involved in more than 7,000 residential projects since founding HPA Design. These projects vary in type and size from single family homes for private owners and developers through multiple lot subdivisions, duplexes, triplexes, townhouses and multiunit apartment and condominium buildings through custom single family homes ranging from 1,500 SF to 15,000 SF.

His design work has been selected for various awards year after year, including the BAGB Prism Awards and the 2015 Boston Preservation Achievement Award (*Walgreens – Downtown Crossing*).

Henry earned his Architectural Degree from Wentworth Institute of Technology and is a Registered Architect, a member of the American Institute of Architects and The Boston Society of Architects and has sat on the board of The Builder's Association of Greater Boston.

Paul Frederick AIA, Vice President

Paul Frederick is a registered architect with nearly 35 years of diversified architectural, engineering and construction experience. Throughout his career and prior to joining HPA in 2004, Paul worked at a number of small and large architectural, engineering and design/build firms in and around the Boston area. During this time he accumulated an impressive project resume consisting mainly of commercial, office, retail and mixed used projects along with food service/hospitality and multiunit residential developments.

As Vice President of HPA Design, Inc., Paul is involved in all managerial aspects of the firm, including marketing, client procurement and relations, project scheduling and consultant contracting. From a project standpoint Paul is unambiguously accountable to the client for the complete success of their project. This includes project management, programming and design, coordination with local, state and federal agencies, building, energy and accessibility regulation compliance, technical detailing, construction document preparation, engineering consultant coordination and finally, construction control. Overall Paul is directly responsible for the execution and successful completion of all commercial and multiunit residential projects at HPA Design.

From a practical standpoint Paul applies both his formal education and practical experience in architecture, engineering and construction, to all his projects. By combining the architect's creativity, the engineer's analytical approach and contractor's technical know-how, Paul is able to understand, address and balance all three components from design inception through construction completion.

Paul earned a Bachelor of Architectural Degree from Roger Williams University as well as a Bachelor of Science Degree (in Engineering) and an Associate's Degree in Civil Engineering Technology.

Paul is a Registered Architect in *Massachusetts, Connecticut, New Hampshire, Maine, Rhode Island, and Pennsylvania*. He is a member of the American Institute of Architects, The Boston Society of Architects and is NCARB certified.

Domenic W. DeAngelo, P.E., Structural Engineer

Domenic DeAngelo is a Structural Engineer with over 40 years of experience in office, commercial, retail, industrial, educational and residential projects.

As President of DWD Engineering, Inc., Domenic continues to work successfully with a broad range of clients including owners, developers, architects, contractors and building officials. His creative but pragmatic design approach combined with his uncanny ability to quickly assess and resolve construction site obstacles is critical to the perpetual success of all his design and construction projects.

Domenic has forged strong and lasting relationship with all his clients due to the quality, timeliness and practicality of his engineering. His ability to consider and strike a balance between building code requirements, good engineering practice and ultimately the construction process, are essential in the successful completion of all his projects.

Domenic earned a Bachelor of Science Degree in Civil Engineering from Worcester Polytechnic Institute and his education include graduate courses from Northwestern University.

Domenic is a Registered Structural Engineer in Massachusetts, Rhode Island, Maine, Connecticut, Vermont and New Hampshire. He is a member of the American Institute of Steel Construction, American Society of Civil Engineers and American Concrete Institute.

Henry P. Arnaudo AIA**HPA Design, Inc., Wrentham, MA 02093****(508)-384-8838****Profile:**

Henry is responsible for all aspects of the firm's operation including new client development and the continued successful relationships with current clients. On a day to day basis Henry oversees the entire process to insure that quality is maintained on all projects throughout all phases. Henry is also responsible for coordinating projects with various groups and municipalities including federal and local housing authorities, building and fire departments, zoning and planning boards, historical and conservation commissions and consulting engineers.

Henry's diversified experience includes commercial and institutional projects, however his expertise lies in single and multifamily residential. Henry has been involved in more than 7,000 residential projects since founding HPA Design. These projects vary in type and size from single family homes for private owners and developers through multiple lot subdivisions, duplexes, triplexes, townhouses and multiunit apartment and condominium buildings through custom single family homes ranging from 3,000 SF to 15,000 SF.

His design work has been selected for various awards year after year, including the BAGB Prism Awards and the 2015 Boston Preservation Achievement Award (*Walgreens – Downtown Crossing*).

Career Progression:

HPA Design, Inc., Wrentham, MA <i>President</i>	1990-current
Lane Associates, Dedham, MA <i>Architectural Draftsman</i>	1990-1991
Sanders, Wadsworth and Associates, Worcester, MA <i>Project Manager</i>	1989-1990
Bergmeyer Associates, Inc., Boston, MA <i>Project Manager</i>	1988-1989
Kubitz and Pepi Architects, Wellesley, MA <i>Architectural Designer/Draftsman</i>	1987-1988
Dion & Sokol Inc., Architects, Sudbury, MA, <i>Architectural Designer/Draftsman</i>	1986-1987

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Education:

Bachelor of Science in Architectural Engineering, Wentworth Institute of Technology,
Boston, MA 1990

Registrations and Professional Organizations

Registered Architect, State of Wisconsin
Member of the American Institute of Architects
Member of the Boston Society of Architects

F. Paul Frederick AIA**HPA Design, Inc., Wrentham, MA 02093****(508)-384-8838****Profile:**

As Vice President of HPA Design, Inc., Paul is involved in all managerial aspects of the firm, including marketing, client procurement and relations, project scheduling and consultant contracting. From a project standpoint Paul is unambiguously accountable to the client for the complete success of their project. This includes project management, programming and design, coordination with local, state and federal agencies, building, energy and accessibility regulation compliance, technical detailing, construction document preparation, engineering consultant coordination and finally, construction control. Overall Paul is directly responsible for the execution and successful completion of all commercial and multiunit residential projects at HPA Design.

From a practical standpoint Paul applies both his formal education and practical experience in architecture, engineering and construction, to all his projects. By combining the architect's creativity, the engineer's analytical approach and contractor's technical know-how, Paul is able to understand, address and balance all three components from design inception through construction completion.

Career Progression:

HPA Design, Inc., Wrentham, MA <i>Vice President</i>	2004-current
National Lumber Company, Mansfield, MA <i>Project Manager/Scheduling/Field Construction Rep</i>	2002-2004
Carlson Design & Construct Inc., (CDC), Boston, MA <i>Project Manager</i>	1999-2002
Asfour Associates Inc., Milford, MA <i>Associate/Project Manager/Project Architect</i>	1992-1999
Sumner Schein Architects and Engineers, (SSAE), Cambridge, MA, <i>Project Architect/Job Captain</i>	1991-1992
The Architects Collaborative Inc., (TAC), Cambridge, MA <i>Designer/Job Captain</i>	1990-1991
Primary Group Inc., Boston, MA <i>Job Captain</i>	1989-1990
EHA Architects/Planners, (Eisenberg Haven Associates) Boston, MA <i>Project Architect/Designer/Job Captain</i>	1987-1989
John R. Perry Architects, Ltd., Norwood, MA <i>Designer/Job Captain/ Draftsman</i>	1983-1987

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Education:

Bachelor of Architecture, Roger Williams College, Bristol, RI	1984
Bachelor of Science, Roger Williams College, Bristol, RI	1984
Associate of Civil Engineering Technology, Roger Williams College, Bristol, RI	1984
Overseas Studies Program, University of Venice, Italy	Summer 1982

Registrations and Professional Organizations

Registered Architect, Massachusetts, Rhode Island, Connecticut, New Hampshire, Maine, Pennsylvania

Member of the American Institute of Architects

Member of the Boston Society of Architects

Member of NCARB Certified

Project Addendum:

HPA Design, Inc., Wrentham, MA 02093

(508)-384-8838

Representative Projects

Hotel and Multifamily Residential

Franklin Heights Estates, Franklin, MA

Proposed new 28 building, 110 unit, townhouse community and 3 story, 18 unit apartment building.

Wayland Commons, Wayland, MA

Proposed new 14 building, 48 unit, townhouse community.

Mill Valley Estates, Amherst, MA

Design, document preparation and construction administration for a new 148-unit condominium complex in a residential suburban area.

Bigelow Court, Brighton, MA

Design and Boston Redevelopment Authority approvals for an 18 unit condominium building with parking under attached to 8 condominium townhouse units in urban setting.

Comfort Inn, Foxboro, MA

Design, document preparation and construction administration for the renovation and conversion of multiple hotel rooms into deluxe hotel suites.

Comfort Inn, Rockland, MA

Design, renovation and expansion of existing hotel restaurant and function area.

Easton Apartments, Easton, MA

Project Manager for the material supply and framing of a new 118-unit retirement complex.

Norwood Crossing, Norwood, MA

Project Manager for the material supply for a new 110-unit apartment complex.

Granite Properties, Boston, MA

Accessibility review and Rehabilitation of 110 urban apartments in 14 buildings in the Boston area for the U.S. Department of Housing and Urban Development.

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The Ledges, Groton, CT

Project Manager for the material supplier including Floor and Roof truss design, fabrication, distribution and erection for 350 apartments in 15 buildings and associated community buildings.

The Elms of Hanover, Hanover, MA

Project Manager for the material supply and framing of a 44 high end, over 50, townhouse units.

The Village at Auburnville, Whitman, MA

Project Management, Truss design, Wall panel review and construction administration for a 15 building, 92 unit, townhouse complex.

Baker Square, Dorchester Lower Mills, MA

Restoration/conversion of five historic mill buildings to 300 condominium units, a recreational athletic facility and a new 6-story structured parking garage.

Palace at Seaport, Marina Bay, Quincy, MA

Design, document preparation and construction administration for a new 125 Unit 6-story condominium with 2 level underground parking.

Harris Pond, Merrimack, NH

Design, document preparation and construction administration for a new 24-unit condominium building and 300 town houses.

Captain's Cove I and II, Quincy, MA

One 8-story and one 10-story, 180 unit condominium complex.

Comfort Inn, Rockland, MA

Design, renovation and expansion of existing hotel restaurant and function area.

Fafard Complex, Ashland, MA

Design for proposed 40-room motel, 10,000 sf restaurant and 30,000-sf retail strip mall.

Comfort Inn, Rockland, MA

Design, renovation and expansion of existing hotel restaurant and function area.

Webster Nursing Center, Webster, MA

Design, document preparation and construction administration Admin for a new 82-bed nursing and medical care facility including office, and resident dining and function areas.

Alternatives: Group Home, Holden, MA

New assisted living, group home.

Villas at Old Concord Apartment Complex, Billerica, MA

Field evaluation of 7 existing buildings and subsequent interior remodel/exterior addition to each building to house a new water filtration system.



mmrva@bohlereng.com

EDUCATION:

Bachelor of Science,
Landscape Architecture
The Pennsylvania State University

PROFESSIONAL LICENSES:

Connecticut Registered Landscape
Architect #LAR.0001359

Maine Registered Landscape Architect
LAR4248

Massachusetts Registered Landscape
Architect #1217

New Hampshire Registered Landscape
Architect #00109

New York Registered Landscape
Architect #002359-1

Rhode Island Registered Landscape
Architect #419

PROFESSIONAL AFFILIATIONS:

Urban Land Institute

American Society of Landscape
Architects

MATTHEW J. MRVA, RLA

DIRECTOR OF LANDSCAPE ARCHITECTURE

Matt serves as the New England Region Director of Landscape Architecture for Bohler. With over 22 years of experience, he has managed a wide range of project types, from downtown revitalization and campus planning, to resort and community development. Matt is a registered Landscape Architect responsible for design, coordination, quality control and the integration of the latest technology in designing the next generation of living, working and recreational environments.

Matt demonstrates a focused expertise in open space planning, urban design and streetscape improvements, and has a strong track record in implementing projects from conceptual design through construction, and strives to ensure the close coordination of planning and landscape architecture with engineering to achieve integrated results. He is skilled at the production of conceptual illustrative site plans, detailed landscape plans and three dimensional and hand rendered exhibits, and has helped lead a number of community-based consensus-building workshops on projects throughout New England and beyond.



BOHLER
ENGINEERING



RESUMÉ

Name: Ronald Müller, P.E.

Title: Principal

Education: BS Civil Engineering – 1986

Registration: MA Professional Engineer #40482

NH Professional Engineer #10509

CT Professional Engineer #23066

RI Professional Engineer #8318

Affiliations: Institute of Transportation Engineers (ITE), Member

Massachusetts Chapter of the ITE

New Hampshire Chapter of the ITE

Connecticut Chapter of the ITE

PROFESSIONAL PROFILE

Mr. Müller has over 25 years of experience in the permitting of land development projects through the preparation of Traffic Impact and Access Studies and Environmental Impact Reports involving the design of site access and off-site roadway improvements. He has extensive knowledge in the procedures and politics of governmental permitting in Massachusetts, New Hampshire, Connecticut, and Rhode Island and the approval of development projects and transportation improvements. He is capable of coordinating the permitting of development projects involving multiple consultants and numerous permitting issues.

Traffic Impact and Access Studies are an essential component of almost any development project and Mr. Müller has prepared hundreds of these studies necessary for permitting through the Massachusetts Environmental Policy Act (MEPA) process, the Connecticut State Traffic Commission (STC) process for major traffic generators, and the Departments of Transportation in Massachusetts, New Hampshire, Connecticut, and Rhode Island. In Massachusetts, these projects typically involve the preparation of an Environmental Notification Form (ENF), Draft and Final Environmental Impact Reports (EIR), and a MassDOT Section 61 Finding and



Highway Access Permits. In Connecticut, these projects require an Application for STC Certificate and an Encroachment Permit from the ConnDOT. In New Hampshire and Rhode Island, these projects involve the preparation of Traffic Impact and Access Studies in conformance with applicable standards and close coordination with the respective DOT's in securing access to state highways.

PROJECT EXPERIENCE

Traffic Permitting:

Mr. Müller has managed hundreds of development projects in securing permits and approvals through local and state agencies. A sample of these projects is provided below:

Colony Place – An 865,000 square foot shopping center on Commerce Way in Plymouth, Massachusetts. Approvals and permits were obtained from MEPA, MassDOT, and the Town of Plymouth.

Bose Corporation – An 850,000 square foot office development on Route 117 in Stow, Massachusetts. Approvals and permits were obtained from MEPA and the Town of Stow.

The Shoppes at Blackstone Valley – An 823,000 square foot shopping center on Route 146 in Millbury, Massachusetts. Approvals and permits were obtained from MEPA, MassDOT, and the Town of Millbury.

New London Mall – Redevelopment of a 275,000 square foot shopping center in New London, Connecticut. Approvals and permits were obtained from the STC, ConnDOT, and the City of New London.

East Cedar Street Shoppes - Permitting of a mixed-use development including hotel, retail, restaurant, and gas station uses on Route 175 in Newington, Connecticut. Approvals and permits were obtained from the STC, ConnDOT, and the Town of Newington.

Discount Department Stores – State and local permitting of Walmart and Target stores in Hudson, Oxford, Walpole, Plymouth, Dartmouth, Sturbridge, Ware, Raynham, Northbridge, Halifax, Swansea, Wilmington, and Saugus, Massachusetts and in Naugatuck, Waterford, and Putnam, Connecticut and in Woonsocket, Rhode Island.



Home Improvement Stores - State and local permitting of Home Depot and Lowe's stores in Littleton, Oxford, Ware, Plymouth, Raynham, and North Attleborough, Massachusetts and in Hooksett and Plaistow, New Hampshire.

Pharmacies – State and local permitting of CVS, Walgreens, Rite Aid, and Osco Drug stores in numerous communities throughout Massachusetts, New Hampshire, Rhode Island, and Connecticut.

Distribution Centers – State and local permitting of various distribution centers including a Home Depot Cross-Dock facility in Shrewsbury, Massachusetts, a Dunkin Donuts distribution center and a Best Buy distribution center in Bellingham, Massachusetts, and an AMB Property Corp. distribution center in Mansfield, Massachusetts.

Residential Developments - State and local permitting of numerous residential subdivisions, apartment complexes, and retirement communities throughout Massachusetts, New Hampshire, and Rhode Island.

Gasoline Stations - State and local permitting of a variety of gas station projects with ancillary uses such as convenience stores, donut shops, and car washes throughout Massachusetts, New Hampshire, Connecticut, and Rhode Island.

Donut Shops - Local permitting of numerous Dunkin Donuts and Honey Dew projects throughout Massachusetts and New Hampshire.

**Traffic Feasibility
and Site Sizing
Studies:**

Feasibility and due diligence studies are often required by proponents of potential new development projects to identify expected traffic impacts and likely traffic mitigation requirements early-on in the development process. Mr. Müller has prepared many of these studies, which often take the form of site sizing studies at locations where traffic impact and capacity are the constraining factors. In those instances, the studies identify the maximum level of site development feasible within the constraints of the surrounding roadway infrastructure. The studies typically provide preliminary construction cost estimates for potential traffic mitigation measures and identify the approval process likely to be required for the project.



**Traffic
Monitoring
Studies:**

Mr. Müller has prepared numerous Traffic Monitoring Studies that identify post-development traffic conditions and compare the results to the estimates made during the permitting process. Traffic Monitoring Studies are often required as part of local and state conditions for approval of land development projects.

Traffic Reviews:

Due to his extensive knowledge and reputation in the field of traffic engineering, Mr. Müller has also been asked to perform reviews of traffic studies prepared by other consultants. Such reviews are typically at the request of cities and towns who often require "third party" reviews of development applications for accuracy, completeness, and compliance with local and state regulations.

**Roadway and
Intersection
Design:**

Mr. Müller has prepared conceptual plans for the design of site access and off-site roadway improvements for most of the projects that he permitted. He is knowledgeable in the design of roadway widening and geometric modifications, traffic control signals and systems, signing and pavement markings, and traffic management during construction. Mr. Müller has also managed several highway design projects that involved the submission of construction, sign and pavement marking, traffic signal, and traffic management plans at the 25, 75, and 100 percent design stages as well as specifications and estimates in accordance with MassDOT submission guidelines. When required, Mr. Müller engages the services of subconsultants to prepare detailed construction documents for roadway and traffic signal improvements that may be required as mitigation for development projects.

**Expert
Testimony:**

Mr. Müller has provided expert testimony in several Land Court, Superior Court, and Housing Appeals Committee cases. These cases typically involve the defense of development projects whose local approvals have either been appealed, or that were denied by a city or town board.



Lobisser (/)
Building Corp.



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About Us

Lobisser Building Corp has a strong team of employees who combined have over 150 years of experience in the construction industry. All of our subcontractors are owner operated companies which insures strong quality control.

Throughout the past 17 years we have built hundreds of custom homes, subdivisions, additions, remodeled kitchens and baths, and finished basements. We can design build, build from one of your plans or you can check out the homes we have in our inventory.

On the commercial side, our team has design built many ground up office and medical buildings. In addition, we have completed dozens of small and large scale commercial fit-outs specializing in medical facilities.

Whether you are looking to build a custom home, add on an addition, fit out a commercial space or build a commercial building, Lobisser Building Corp. will work with you every step of the way. At the beginning of each project Kevin Lobisser, President of Lobisser Building Corp, meets with you often to determine exactly what you are looking for. He stays actively involved throughout the entire building process to insure the finished product meets with your expectations.

Contact us (<http://lobisserbuildingcorp.com/contact-us.php>) today for a quote on your next project.



Commercial

Dental Offices (projects-dc.php?g=2&c=16&dg=Dental-Offices)

Office Space, Medical Space (projects-dc.php?g=2&c=15&dg=Office-Space,-Medical-Space)

Medical Building (projects-dc.php?g=2&c=14&dg=Medical-Building)

Remodeled Buildings (projects-dc.php?g=2&c=5&dg=Remodeled-Buildings)

Project Management (projects-dc.php?g=2&c=4&dg=Project-Management)

Interior Fit-Outs (projects-dc.php?g=2&c=3&dg=Interior-Fit-Outs)

Our Projects:

In 2016 Lobisser Building Corp is excited to be working on numerous Residential and Commercial projects.

Residential:

- 1) Rockwood Meadows, Upton Ma. A distinctive 55+ condominium community. New constuction featuring free-standing, single family and townhouse style custom condos in a unique sub-division like setting. A total of 58 homes providing maintenance free living, 2 bedrooms, central air, 2 car garage, hardwood floors, open floor plan, community club house with work out room, walking trail, scenic pond, and more in a country setting. View our 5 available styles and enjoy the beauty of our natural woodlands. Homes selling weekly. Come see!
- 2) The Village @ Cooks Farm Franklin Ma. right off Route 140. Just awarded the Silver in the 2016 Prism Awards for Best Detached Home under 2500 square feet. A truly New England setting featuring 55 distinct free standing single family Townhouses. Featuring maintenance free living, 6 styles to choose from, most with 2 or 3 bedrooms, many with 2-3 baths and 1 (1/2) bath, 2 car garge with single door. Selling fast, take a drive and enjoy!
- 3) Sold Out! Aldrich Brook Estates, Clark Rd. Uxbridge, MA - 8 lot subdivision of custom built homes. Each home sits on acre + lots surrounded by peaceful open space. Completed!.
- 4) Sold Out! Crystal Springs Condominiums Bellingham, MA - Twenty-one 2 bed, 1-1/2 bath condos. Unit 101 is \$268,040.00 with upgrades and unit 102 is \$263,030.00 with upgrades. The 700's building prices start at \$264,900 for middle unit and end units start at \$274,900. Conveniently located off Rt. 140 with easy access to Rt. 495..
- 5) Woodland Hills, Julia Dr. Bellingham Ma. Newest 12 Lot Subdivision of Custom Homes only. Completed!

- 6) 191 Lowder St. Dedham, Ma. Beautiful 5000 sq/ft. Custom built home on private lot. Completed!
- 7) Diego Dr Milford, MA - Custom Built 4 lot cul-de-sac comprised of New England style colonial homes. Completed!
- 8) Needham, MA - Over 5,000 sq/ft with 5 beds, 6 bath custom built home on Owners lot. Completed!
- 9) Sudbury, MA - Over 3,500 sq/ft home exceptionally built with the finest quality with water views. Completed!

Commercial:

- 1) Milford Regional Medical Center Northbridge, MA - 25,000 sq/ft medical building completing exterior shell and interior fit-out. Completed!
- 2) Tri-County Urgent Care South Main St Milford Ma.- 6000 + sq/ft building. Completed!
- 3) Tri-County Ear Nose & Throat Surgery 308 Main Street Milford, Ma.- 7200 sq/ft. Completed!
- 4) Tri-County Medical Building Northbridge, Ma.- 1300 sq/ft. Completed!
- 5) Remodel of MetroWest Oral Surgical Associates 113 Water St. Milford Ma. Just Completed!
- 6) Kennedy Community Health Center Milford, MA - 5,500 + sq/ft medical facility added to existing Cape Road Plaza building. Completed!
- 7) Harris Rebar Milford, MA - Interior fit-out of new conference room. Completed!

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your resource for Affordable Housing



Background Information

MCO Housing Services has been dedicated to providing lottery services to developers and municipalities for over 20 years; within the last ten years MCO Housing Services has managed over 50 affordable housing homeownership and rental lotteries. Additionally, MCO Housing Services has provided consultant services to local municipalities; assisting them in managing their affordable unit resale's and homeowner refinancing; assisting with local buy down programs and training staff on affordable housing criteria.

MCO Housing Services has created a website, www.mcohousingservices.com, to announce and manage their affordable housing lotteries. All client lotteries are posted online. As a website member, applicants receive emails when new lotteries are posted or to notify of program changes.

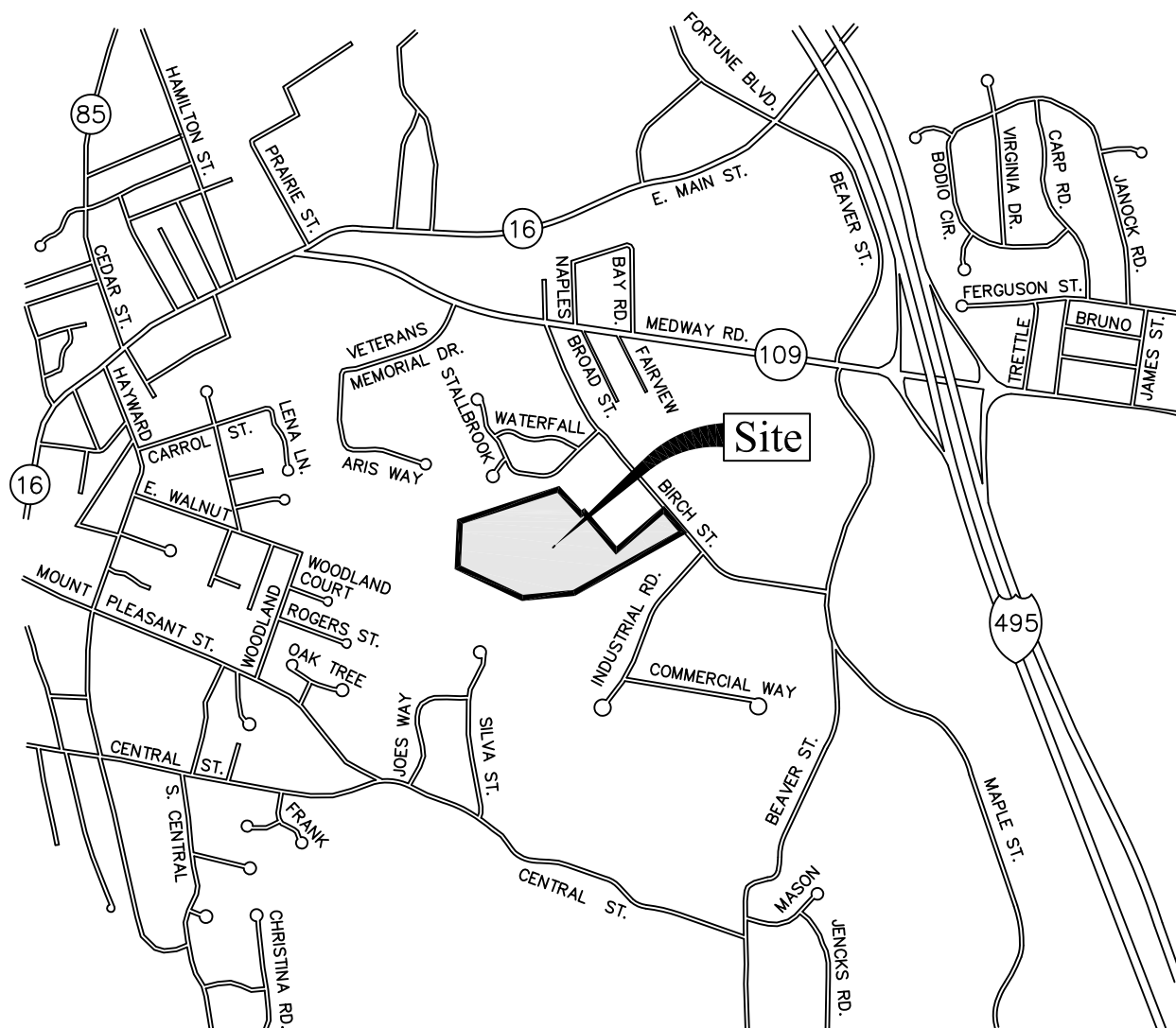
Maureen O'Hagan has been with MCO Housing Services for over 10 years specializing in the distribution of affordable housing units. As Director of Lottery Programs, she works with builders and municipalities in the marketing, managing and execution of affordable housing lotteries for homeownership and rental new construction projects, manages the annual recertification on rental units and consults with various towns on affordable housing. She also handles the resale's of existing affordable units for local communities and DHCD. Maureen has a Masters Degree in Education from Boston College and is a Licensed Real Estate Agent.

Following is a partial list of rental lotteries that MCO Housing Services has conducted with MassHousing, MHP or DHCD as the Project Administrators:

Rentals

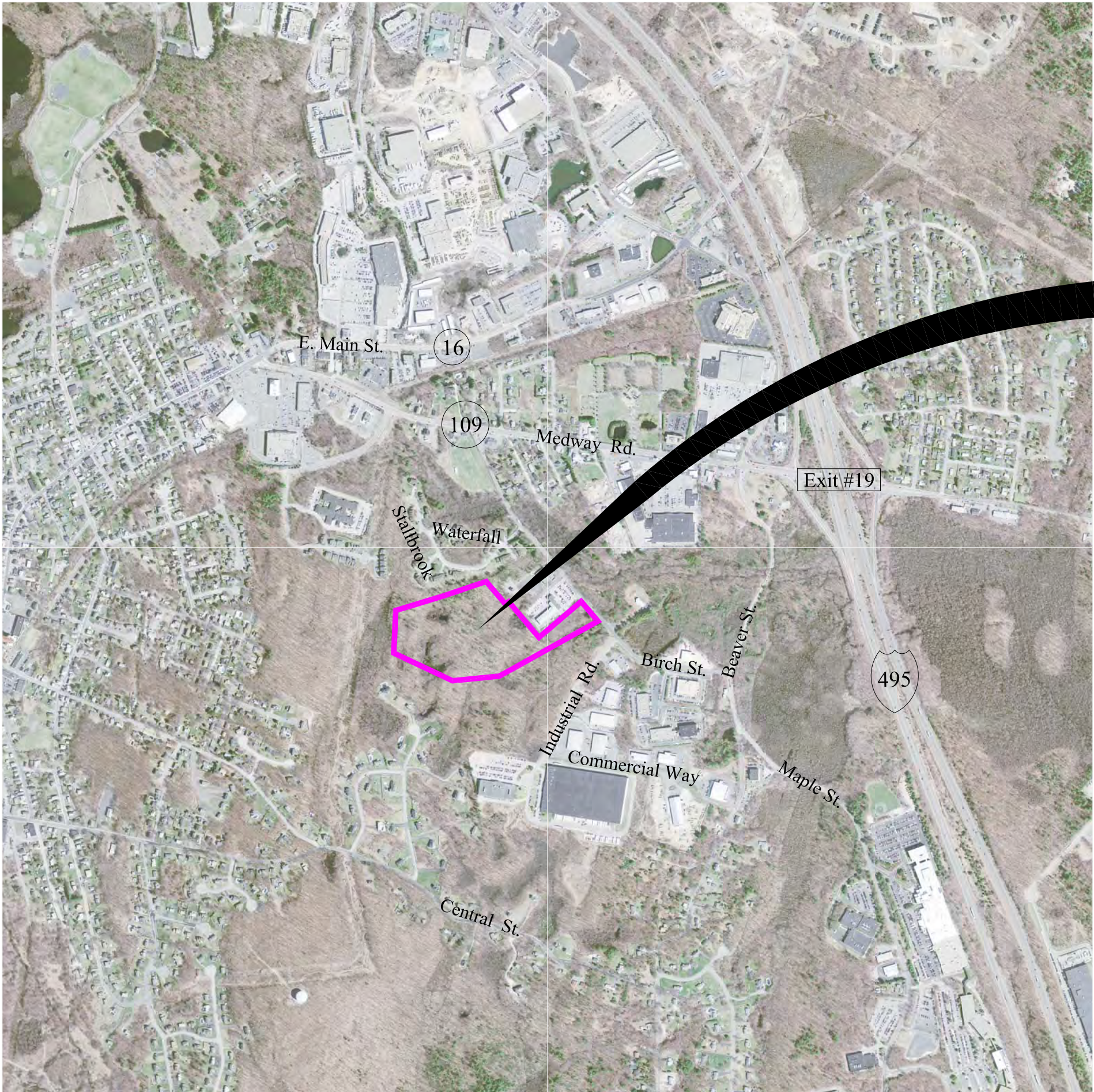
Archstone Avenir – Boston –	17 units
Madison Place – Shrewsbury –	15 units
Old Colony Square @ Cohasset Station – Cohasset –	2 units
Sudbury Housing Authority Duplex Project – Sudbury	
Acton Housing Authority Duplex Project – Acton	
Madison Place – Southborough -	35 units
Edgewood Apartments – Plainville –	30 units
Americana Apartments – Wakefield –	8 units
Walnut Place – Natick	8 units
Queset Commons – Easton (phase One)	13 units
Sunset Lake Apartments – Braintree	3 units
Turnpike Village – Townsend	12 units
Renaissance Station – Attleboro	5 units
Meadows at Acton – Acton	2 units

One Upland – Norwood	66 units – in process
Berry Farms – N. Andover	49 units – in process
Parc Westborough – Westborough	63 units – in process
Community Residences – Wayland	13 units – in process
Matrix Hudson	44 units – in process
The Tremont – Burlington	18 units – in process
Wakefield Vista	28 units recertifications
Pembroke Woods	60 units recertifications
Everly – Wakefield	33 units recertifications
Stonegate – Marlboro	83 units recertifications
West Village – Mansfield	50 units recertifications



LOCUS MAP

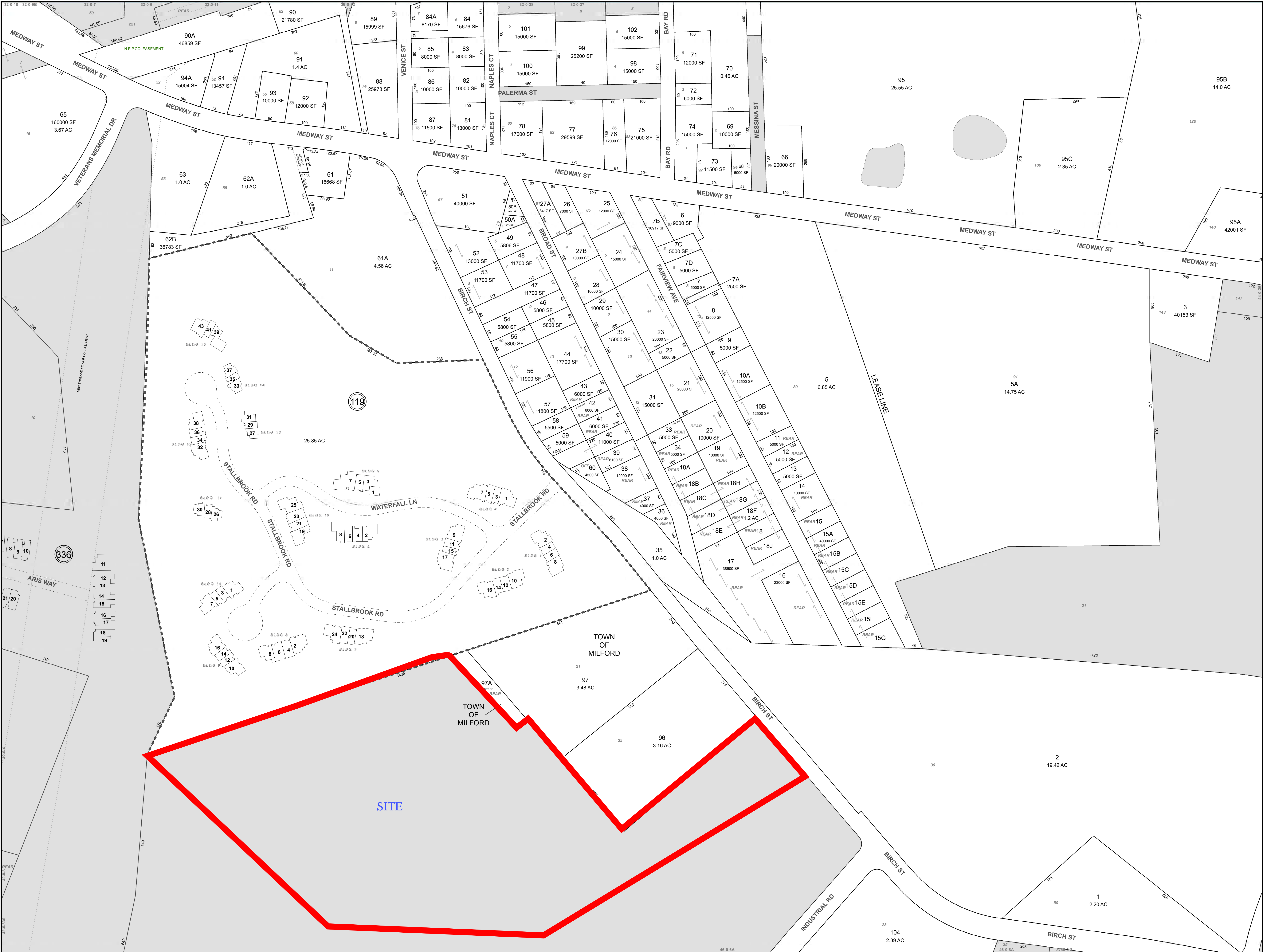
1" = 1,000± Feet



SITE



OWNER & APPLICANT:			
88 CORP. 31 Whitewood Road Milford, MA 01757			
TITLE:			
LOCUS PLAN For Birch Street Place In Milford, Massachusetts 01757			
ENGINEER:			
 Allen Engineering, LLC Civil Engineers and Land Development Consultants 2 Willowbrook Lane - Mendon, MA 01756 (508) 381-3212 Phone (508) 381-3213 Fax allenengineeringllc.com			
SCALE: 1" = 1,000 FEET			
			
DATE: DECEMBER 6, 2017			
REVISIONS			
#	DATE	DESCRIPTION	INIT
JOB NO: 0510		SHEET: 1 OF 1	



Legend

- Parcel boundary
-
- Parcel on adjacent map

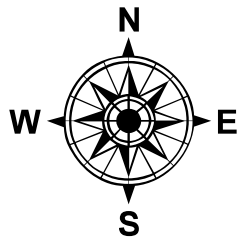
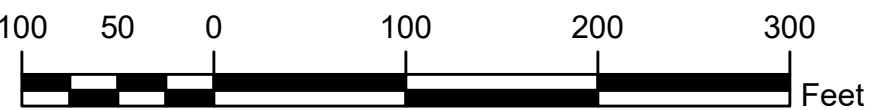
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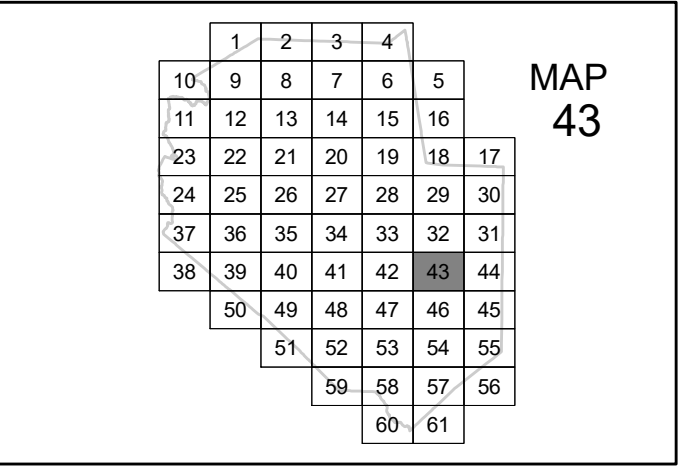
TOWN OF MILFORD
Massachusetts

ASSESSORS ATLAS

MAP NUMBER: 43



PLANS SHOWN HEREIN
ARE COMPILED FROM
AERIAL PHOTOGRAPHS,
DEEDS, AND PLANS OF
RECORD AND ARE NOT
TO BE CONSTRUED
AS HAVING SUFFICIENT
ACCURACY FOR
CONVEYANCES.



Preliminary Site Engineering, Landscaping and Lighting Plans

Preliminary Site Engineering, Landscaping and Lighting Plans (full size sets) have been submitted under separate cover to the Milford Zoning Board of Appeals. A Drainage Report will be submitted to the Milford Zoning Board of Appeals under separate cover in advance of the Initial Public Hearing.

PRELIMINARY SITE DESIGN PLAN

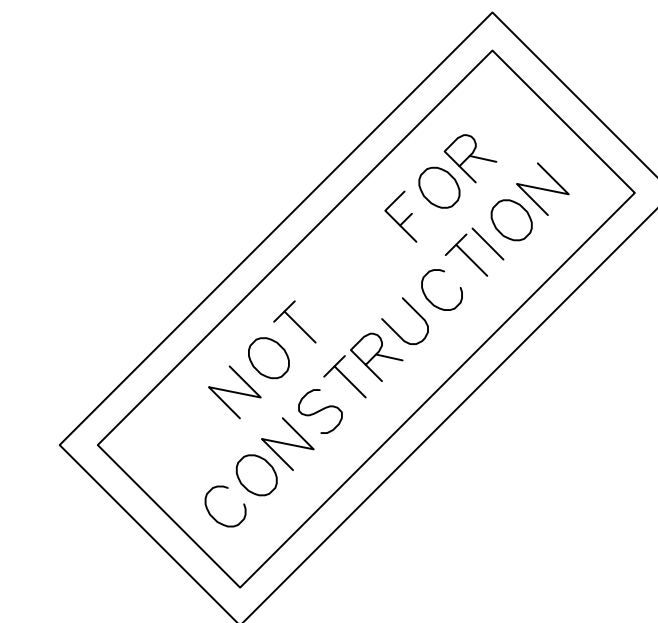
For

"Birch Street Place"

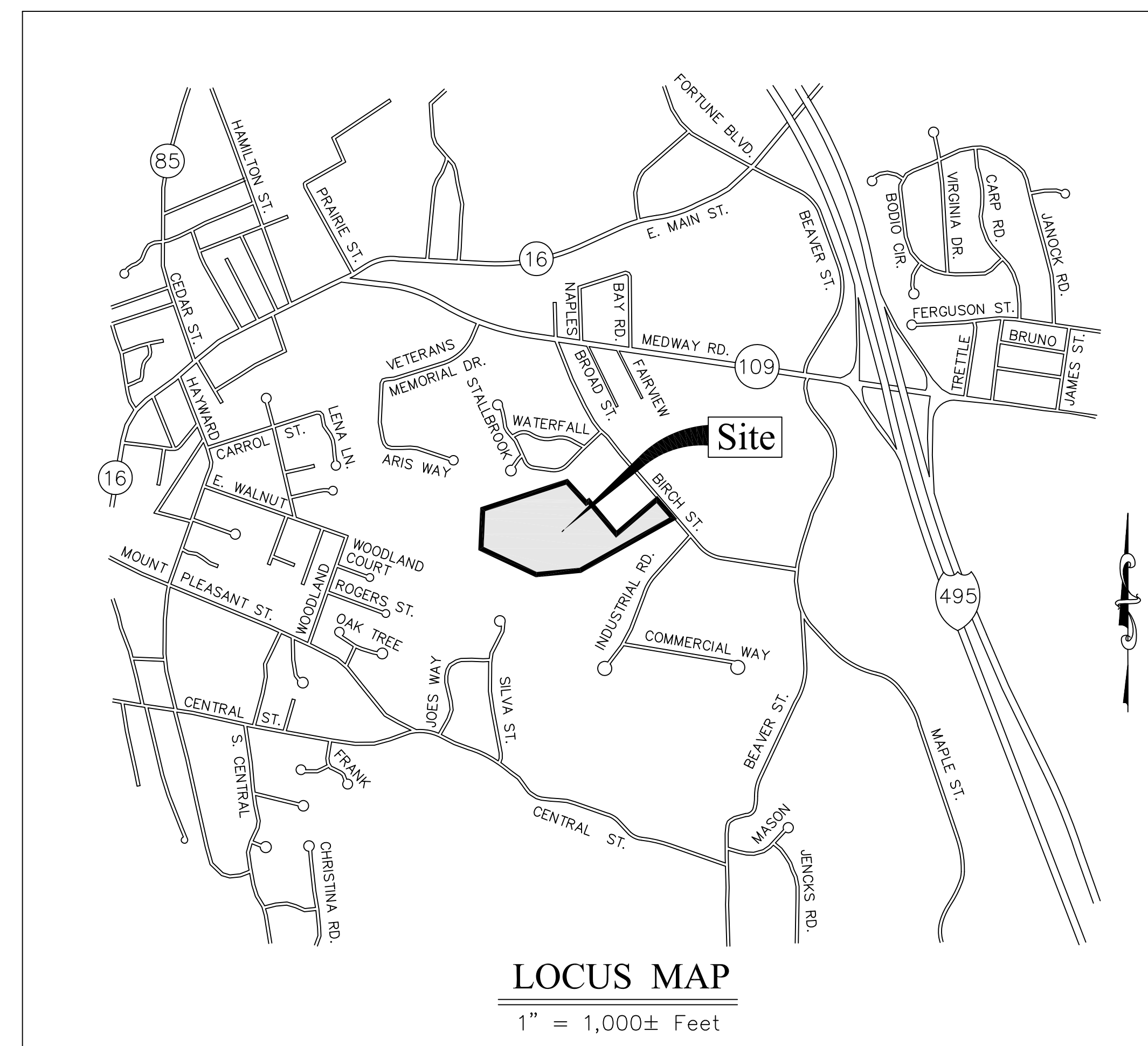
In

Milford, Massachusetts

DATE: March 29, 2018



TITLE	SHEET
Cover Sheet	1
Existing Conditions Plan	2
Parking & Layout Plan	3
Grading & Drainage Plan	4
Utility Plan	5
Landscape Plan	6
Landscape Plan	7
Landscape Detail Plan	8
Landscape Detail Plan	9
Lighting Plan	10
Lighting Detail Plan	11
Site Construction Details Plan	12
Site Construction Details Plan	13
Site Construction Details Plan	14



APPLICANT

88 CORP.
31 Whitewood Road
Milford, MA 01757

ARCHITECT

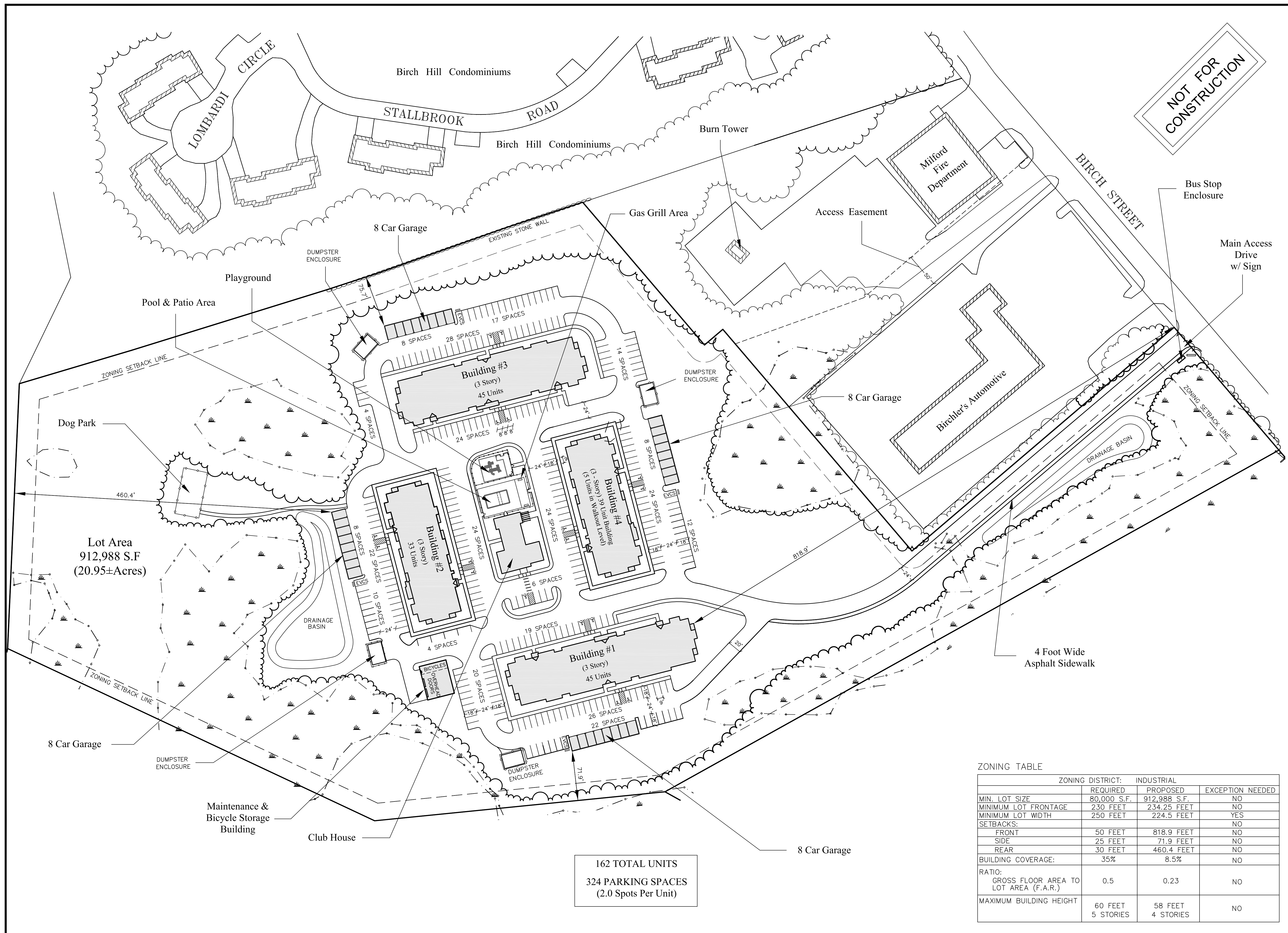
HPA Design, Inc.
200 Stonewall Blvd., Suite 5
Wrentham, MA 02093

CIVIL ENGINEER & SURVEYOR


Allen Engineering & Associates, Inc.
One Charlesview Road, Suite 2
Hopedale, MA 01747








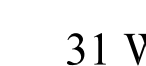
LANDSCAPE ARCHITECT

Bohler Engineering
352 Turnpike Road
Southborough, MA 01772



ZONING TABLE			
ZONING DISTRICT:		INDUSTRIAL	
	REQUIRED	PROPOSED	EXCEPTION NEEDED
MIN. LOT SIZE	80,000 S.F.	912,988 S.F.	NO
MINIMUM LOT FRONTAGE	230 FEET	234.25 FEET	NO
MINIMUM LOT WIDTH	250 FEET	224.5 FEET	YES
SETBACKS:			NO
FRONT	50 FEET	818.9 FEET	NO
SIDE	25 FEET	71.9 FEET	NO
REAR	30 FEET	460.4 FEET	NO
BUILDING COVERAGE:	35%	8.5%	NO
RATIO:			
GROSS FLOOR AREA TO LOT AREA (F.A.R.)	0.5	0.23	NO
MAXIMUM BUILDING HEIGHT	60 FEET 5 STORIES	58 FEET 4 STORIES	NO



LEGEND	
— 256 —	EXISTING CONTOUR
— 255 —	PROPOSED CONTOUR
x 177.5	EXIST. SPOT GRADE
x 177.5	PROP. SPOT GRADE
	PROP. SURFACE WATER FLOW
	DRAINAGE MANHOLE
— 0 —	DRAIN LINE
	UTILITY POLE
GW	GUY WIRE
— OHW —	OVERHEAD WIRES
— - - —	EROSION CONTROL
— ETC —	ELECTRIC, TELEPHONE & CABLE LINE
	STONE WALL
EQP	EDGE OF PAVEMENT
FND.	FOUND
N/F	NOW OR FORMERLY
DH	DRILLHOLE
I.P.	IRON PIPE/IRON PIN
A.P.	ASSESSORS PARCEL
BK. PG.	DEED BOOK/PAGE
	BOLLARD
	BUILDING
	EXISTING TREE LINE
	EDGE OF WETLAND

PREPARED FOR:


88 CORP.
31 Whitewood Road
Milford, MA 01757

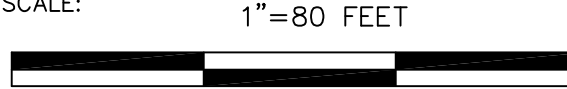
TITLE:

Preliminary
PARKING & LAYOUT PLAN
 For
"Birch Street Place"
 In
Milford, Massachusetts

PREPARED BY:


ALLEN ENGINEERING
& ASSOCIATES, INC.
 Civil Engineers • Surveyors
 Land Development Consultants
 One Charlesview Road
 Suite 2
 Hopedale, MA 01747
 (508) 381-3212 • Phone
www.allen-ea.com


 PROFESSIONAL ENGINEER

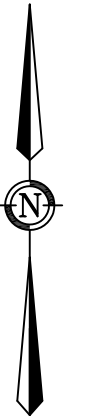
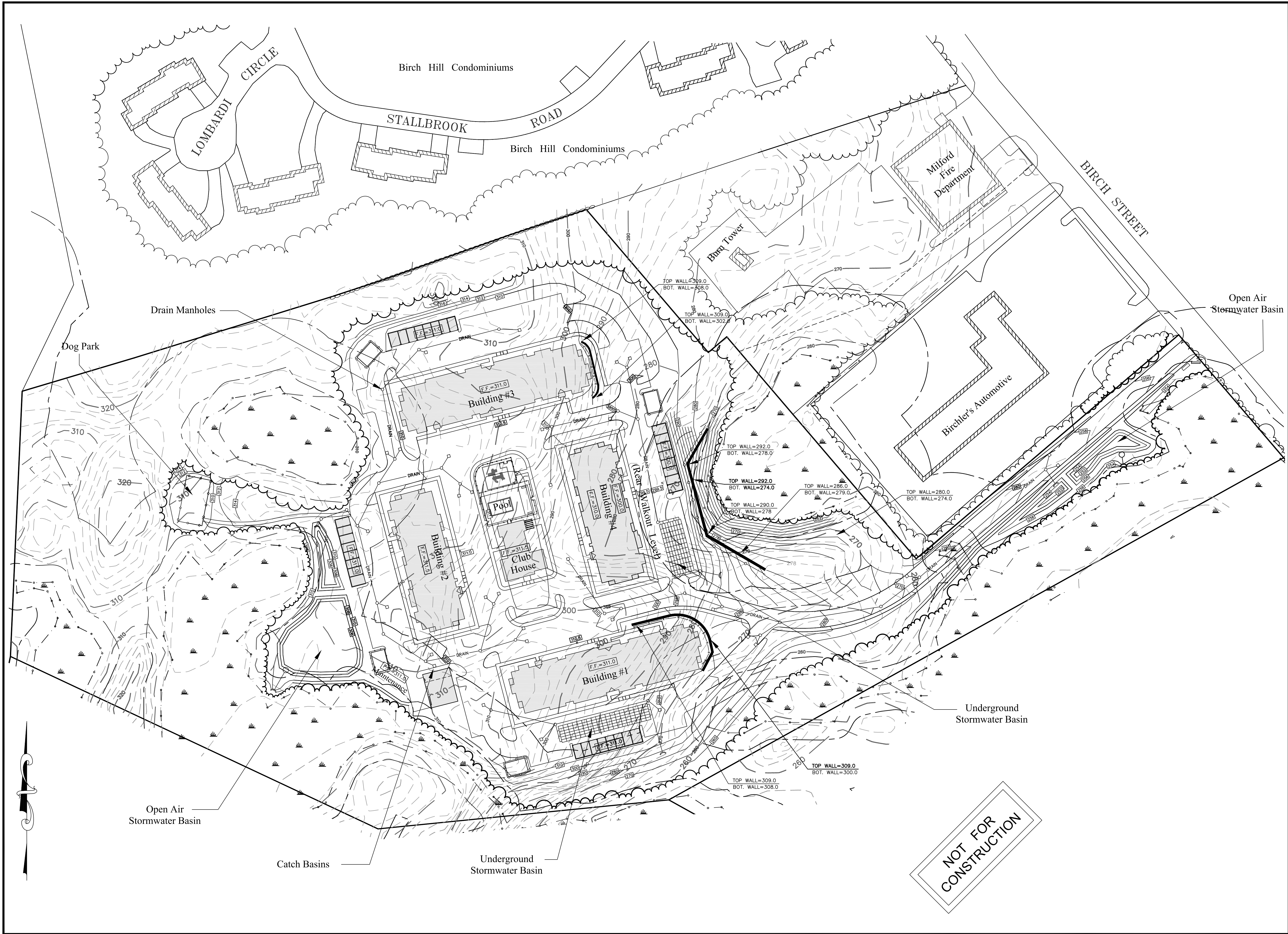
SCALE: 1"=80 FEET


DATE: **March 29, 2018**

REVISIONS			
#	DATE	DESCRIPTION	INIT

JOB NO: **0510**

SHEET: **3** of **14**



LEGEND

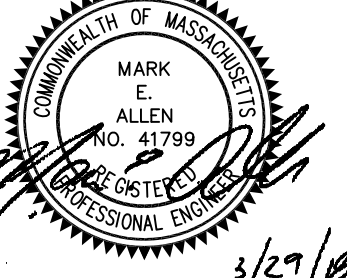
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- 256 — PROPOSED CONTOUR
- x 177.5 EXIST. SPOT GRADE
- x 177.5 PROP. SPOT GRADE
- PROP. SURFACE WATER FLOW
- ⊙ DRAINAGE MANHOLE
- D — DRAIN LINE
- UTILITY POLE
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- OHW — OVERHEAD WIRES
- ETC — EROSION CONTROL
- ELECTRIC, TELEPHONE & CABLE LINE
- STONE WALL
- EOP EDGE OF PAVEMENT
- FND. FOUND
- N/F. NOW OR FORMERLY
- DH DRILLHOLE
- I.P. IRON PIPE/IRON PIN
- A.P. ASSESSORS PARCEL
- BK. PG. DEED BOOK/PAGE
- BOLLARD
- BUILDING
- EXISTING TREE LINE
- EDGE OF WETLAND

PREPARED FOR:
88 CORP.
31 Whitewood Road
Milford, MA 01757

TITLE:
Preliminary
GRADING, DRAINAGE &
EROSION CONTROL PLAN
For
"Birch Street Place"
In
Milford, Massachusetts

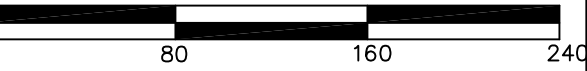
PREPARED BY:

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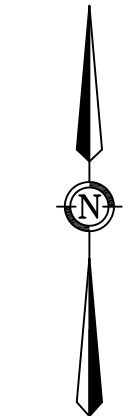
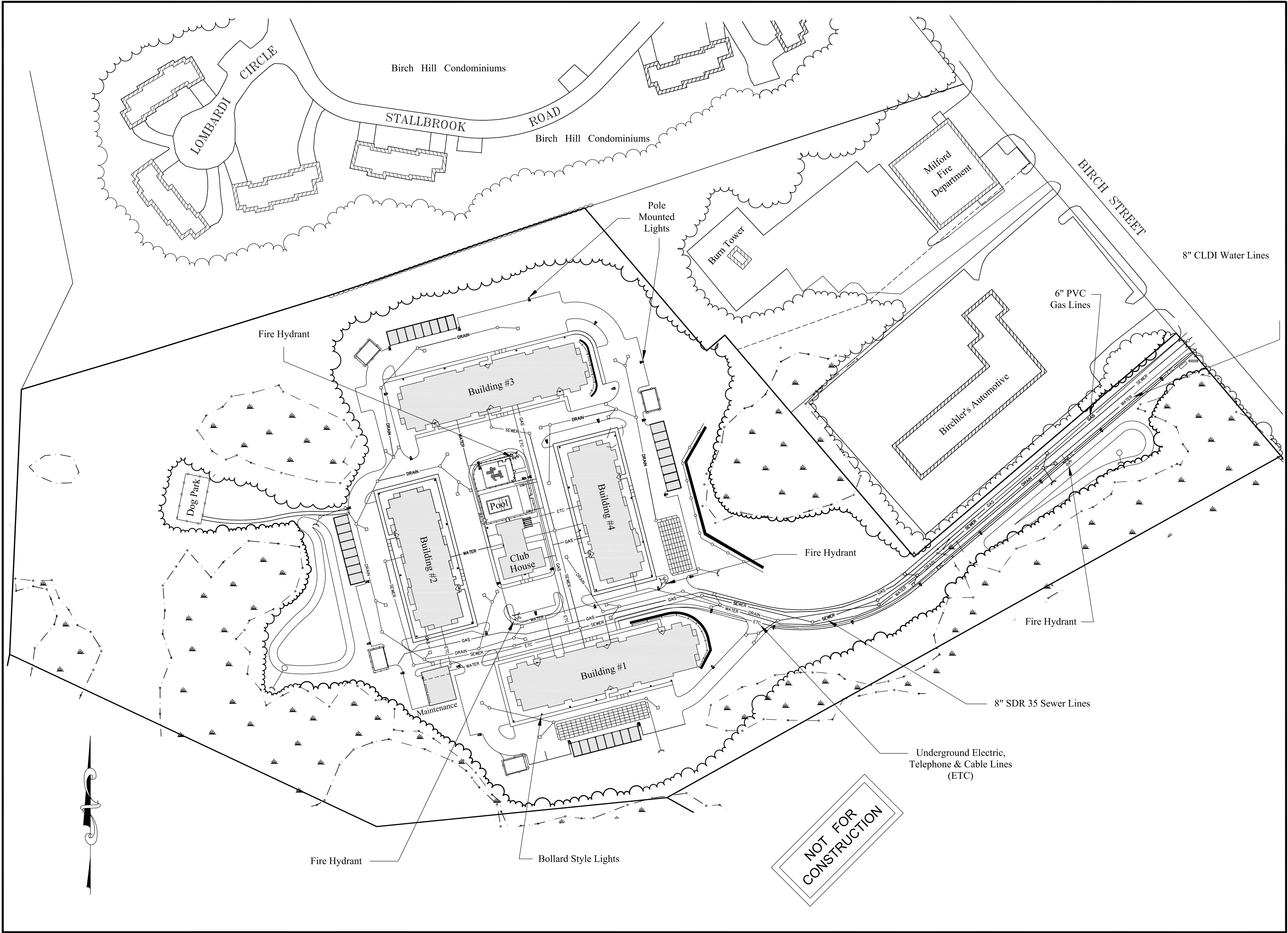


DATE: March 29, 2018

REVISIONS			
#	DATE	DESCRIPTION	INIT

JOB NO: 0510 SHEET: 4 of 14

NOT FOR
CONSTRUCTION



LEGEND

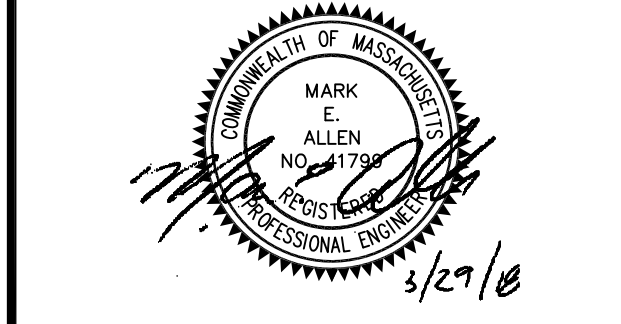
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- BOLLARD
- ▨ BUILDING
- EXISTING TREE LINE
- - - EDGE OF WETLAND

PREPARED FOR:
88 CORP.
 31 Whitewood Road
 Milford, MA 01757

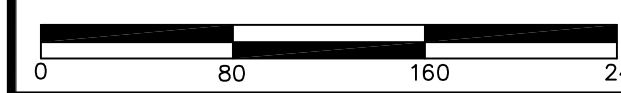
TITLE:
**Preliminary
 UTILITY PLAN**
 For
"Birch Street Place"
 In
 Milford, Massachusetts

PREPARED BY:

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 & ASSOCIATES, INC.**
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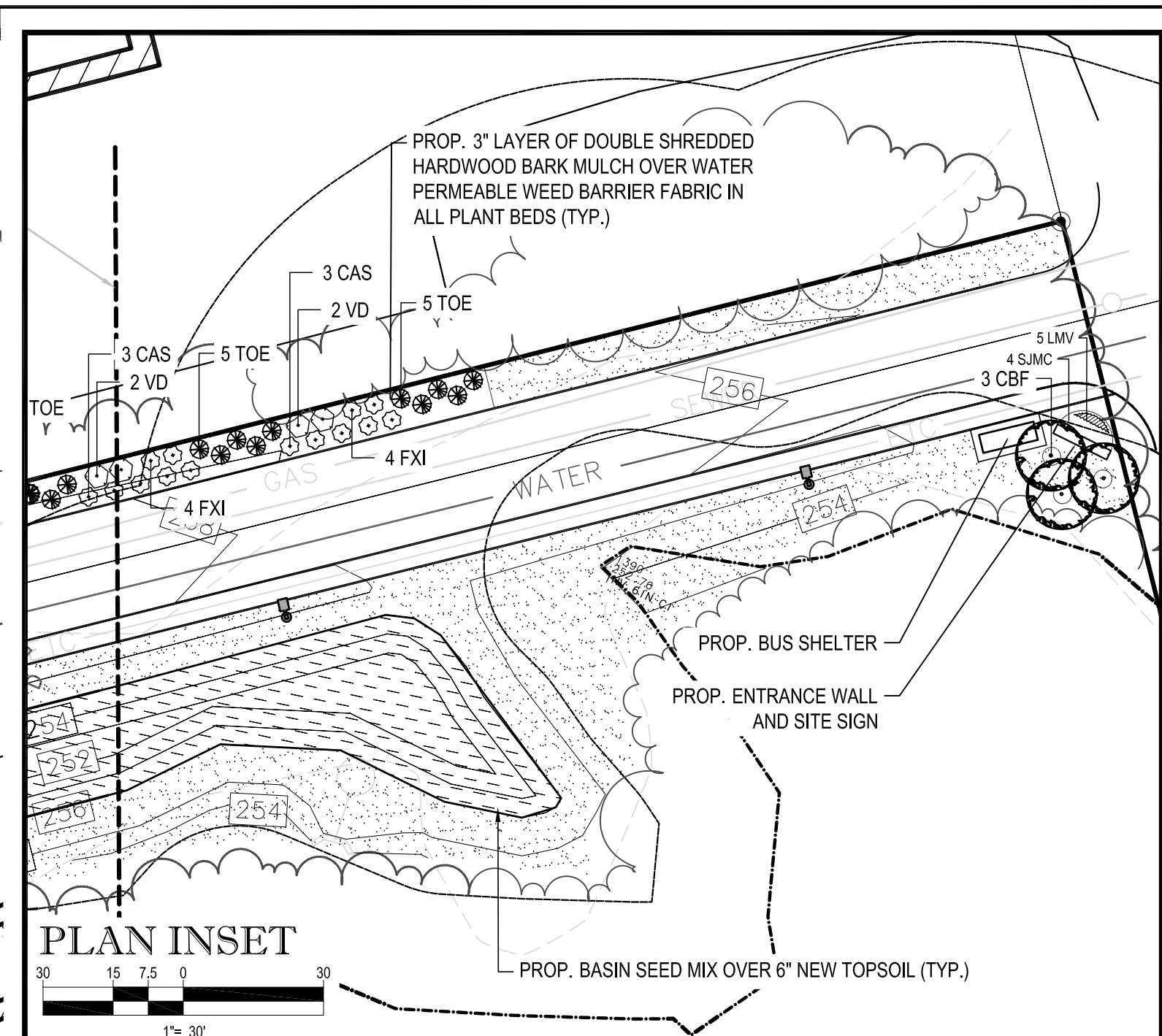
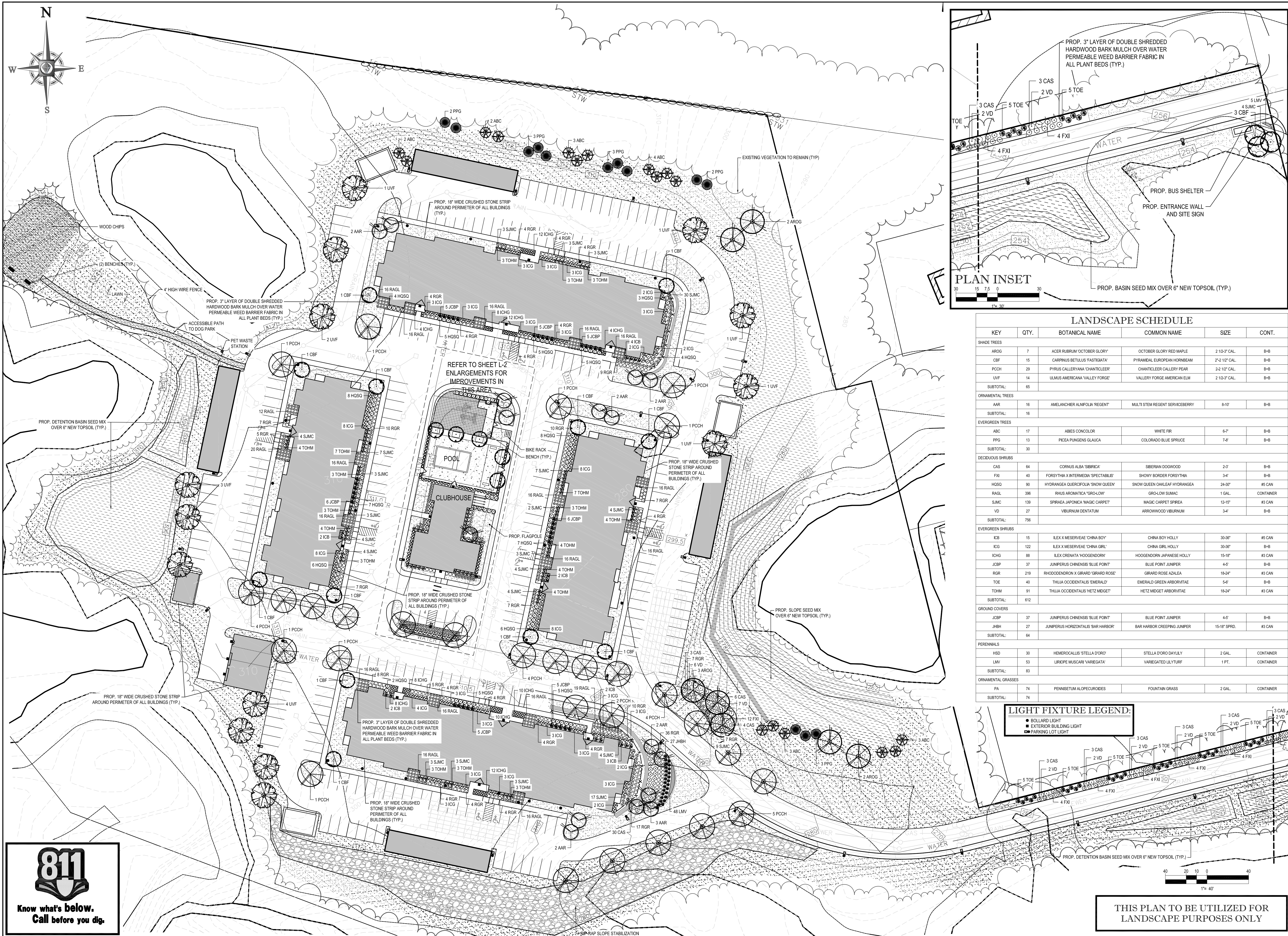
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 SCALE: 1"=80 FEET



DATE: **March 29, 2018**

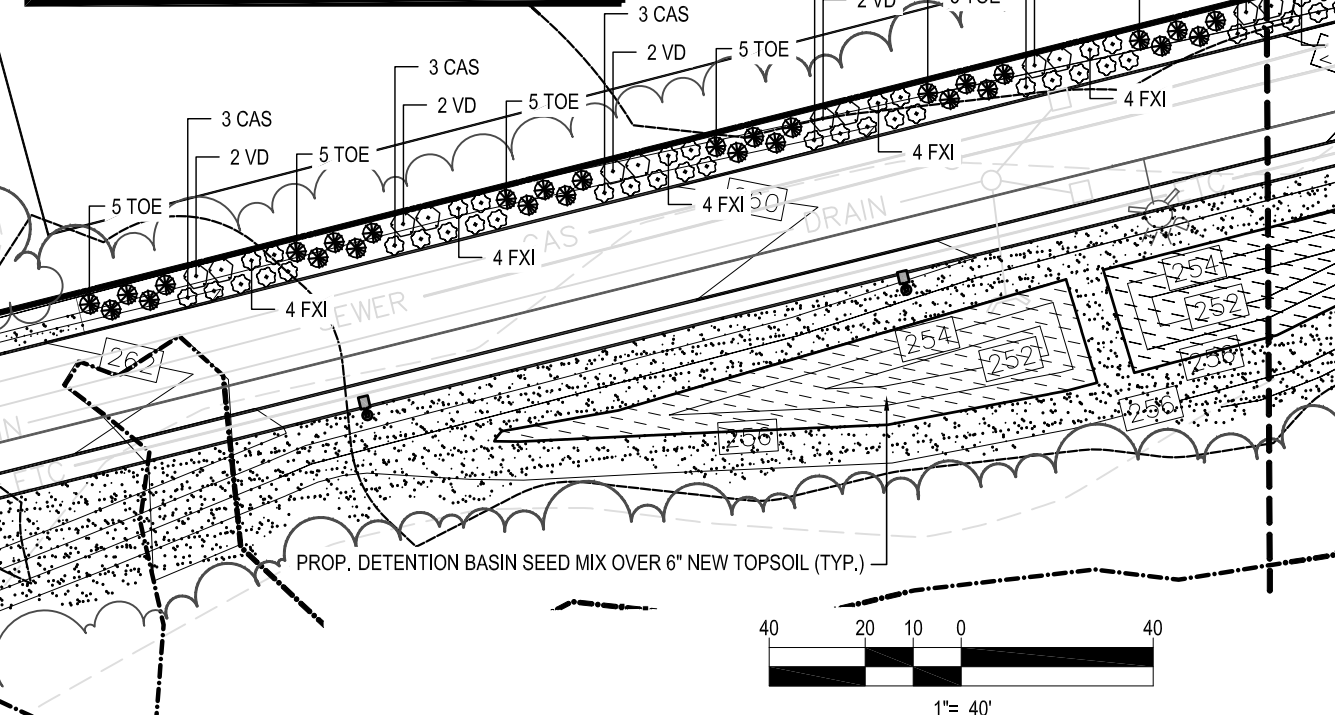
REVISIONS			
#	DATE	DESCRIPTION	INIT

JOB NO: 0510 SHEET: **5** of 14



LANDSCAPE SCHEDULE					
KEY	QTY.	BOTANICAL NAME	COMMON NAME	SIZE	CONT.
SHADE TREES					
AROG	7	ACER RUBRUM 'OCTOBER GLORY'	OCTOBER GLORY RED MAPLE	2 1/2-3' CAL.	B+B
CBF	15	CARPINUS BETULUS 'FASTIGIATA'	PYRAMIDAL EUROPEAN HORNBEAM	2'-3 1/2' CAL.	B+B
PCCH	29	PIRUS CALLERYANA 'CHANTICLEER'	CHANTICLEER CALLERY PEAR	2-2 1/2' CAL.	B+B
UVF	14	ULMUS AMERICANA 'VALLEY FORGE'	VALLEY FORGE AMERICAN ELM	2 1/2-3' CAL.	B+B
SUBTOTAL:					
ORNAMENTAL TREES					
AAR	16	AMELANCHIER ALNIFOLIA 'REGENCY'	MULTI STEM REGENT SERVICEBERRY	8-10'	B+B
SUBTOTAL:					
EVERGREEN TREES					
ABC	17	ABIES CONCOLOR	WHITE FIR	6-7'	B+B
PPG	13	PICEA PUNGENS GLAUCA	COLORADO BLUE SPRUCE	7-8'	B+B
SUBTOTAL:					
DECIDUOUS SHRUBS					
CAS	64	CORNUS ALBA 'SIBERICA'	SIBERIAN DOGWOOD	2-3'	B+B
FXI	40	FORSYTHIA X INTERMEDIA 'SPECTABILIS'	SHOWY BORDER FORSYTHIA	3-4'	B+B
HOSO	90	HYDRANGEA QUERCIFOLIA 'SNOW QUEEN'	SNOW QUEEN OAKLEAF HYDRANGEA	24-30"	#5 CAN
RAGL	396	RHUS AROMATICA 'GRO-LOW'	GRO-LOW SUMAC	1 GAL.	CONTAINER
SJMC	139	SPRAEA JAPONICA 'MAGIC CARPET'	MAGIC CARPET SPRAEA	12-15"	#3 CAN
VD	27	VIBURNUM DENTATUM	ARROWWOOD VIBURNUM	3-4'	B+B
SUBTOTAL:					
EVERGREEN SHRUBS					
ICB	15	ILEX X MESERVEAE 'CHINA BOY'	CHINA BOY HOLLY	30-36"	#5 CAN
ICG	122	ILEX X MESERVEAE 'CHINA GIRL'	CHINA GIRL HOLLY	30-36"	B+B
ICHG	88	ILEX CRENATA 'WOODGONDORF'	WOODGONDORF JAPANESE HOLLY	15-18"	#3 CAN
JCBP	37	JUNIPERUS CHINENSIS 'BLUE POINT'	BLUE POINT JUNIPER	4-5'	B+B
RGR	219	RHODODENDRON X GIRARD 'GIRARD ROSE'	GIRARD ROSE AZALEA	16-24"	#3 CAN
TOE	40	THUJA OCCIDENTALIS 'EMERALD'	EMERALD GREEN ARBORVITAE	5-6'	B+B
TOHM	91	THUJA OCCIDENTALIS 'HETZ MIDGET'	HETZ MIDGET ARBORVITAE	16-24"	#3 CAN
SUBTOTAL:					
GROUND COVERS					
JCBP	37	JUNIPERUS CHINENSIS 'BLUE POINT'	BLUE POINT JUNIPER	4-5'	B+B
JHBH	27	JUNIPERUS HORIZONTALIS 'BAR HARBOR'	BAR HARBOR CREEPING JUNIPER	15-18" SPRD.	#3 CAN
SUBTOTAL:					
PERENNIALS					
HSD	30	HEMEROCALLIS 'STELLA D'ORO'	STELLA D'ORO DAYLILY	2 GAL.	CONTAINER
LMV	53	LIRIOPE MUSCARI 'VARIEGATA'	VARIEGATED LILTURT	1 PT.	CONTAINER
SUBTOTAL:					
ORNAMENTAL GRASSES					
PA	74	PENNISETUM ALOPECUROIDES	FOUNTAIN GRASS	2 GAL.	CONTAINER
SUBTOTAL:					

LIGHT FIXTURE LEGEND:	
●	BOLLARD LIGHT
■	EXTERIOR BUILDING LIGHT
■	PARKING LOT LIGHT



THIS PLAN TO BE UTILIZED FOR
LANDSCAPE PURPOSES ONLY

PREPARED FOR:
88 CORP.
31 Whitewood Road
Milford, MA 01757

TITLE:
LANDSCAPE PLAN

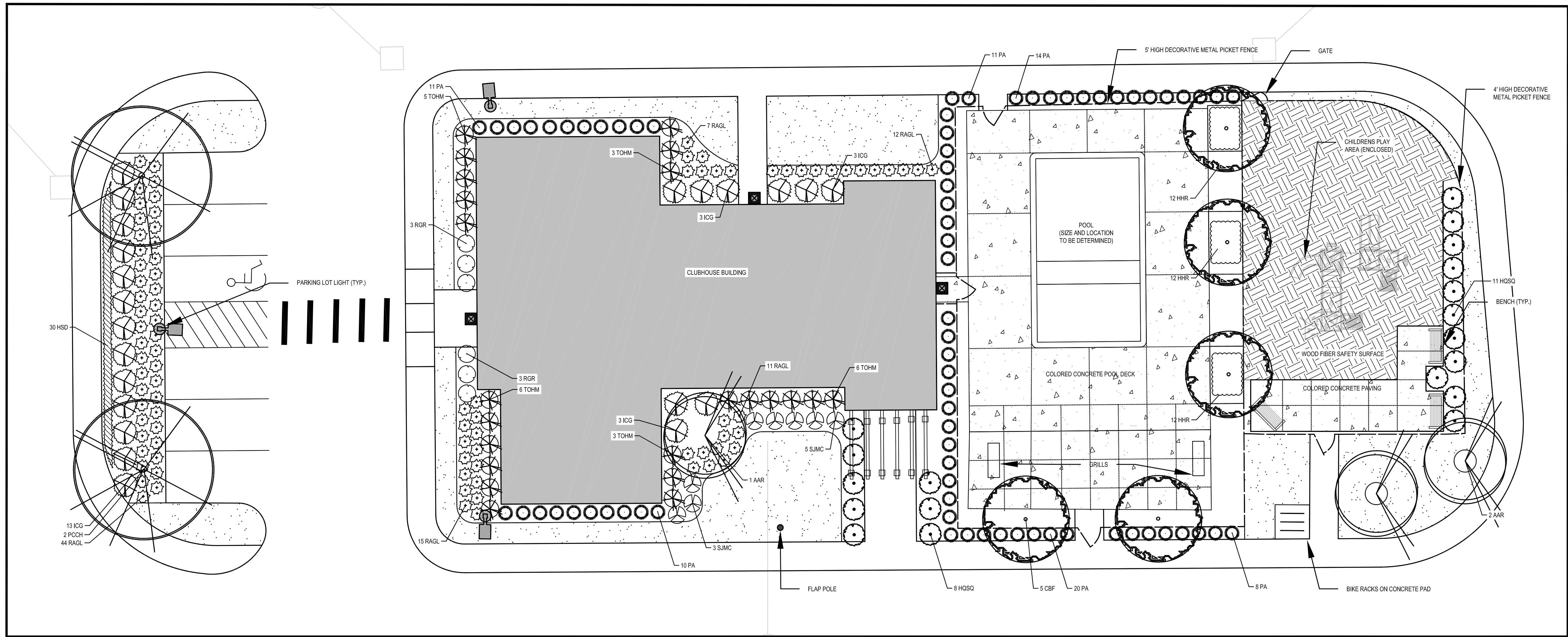
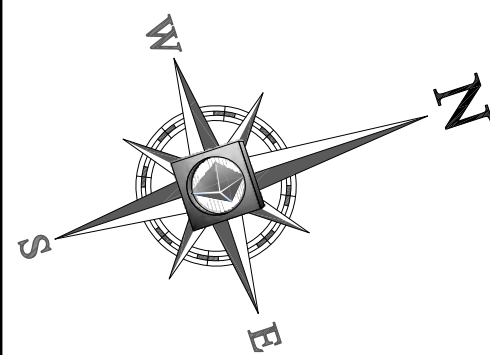
Bohler Project No. W171217

PREPARED BY:

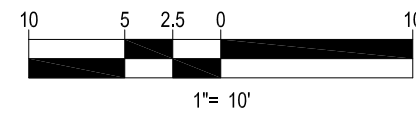
BOHLER
ENGINEERING
352 Turnpike Road
Southborough, MA 01772
(508) 480-9900

PROFESSIONAL LANDSCAPE ARCHITECT
SCALE: 1"=40' FEET
DATE: March 29, 2018

REVISIONS			
#	DATE	DESCRIPTION	INIT
JOB NO:	0510	SHEET:	6 of 14



CLUBHOUSE AREA
ENLARGEMENT



REFER TO SHEET 6 FOR LANDSCAPE
SCHEDULE

REFER TO SHEETS 8 & 9 FOR
LANDSCAPE NOTES AND DETAILS

THIS PLAN TO BE UTILIZED FOR
LANDSCAPE PURPOSES ONLY

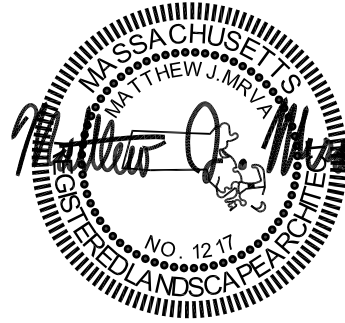
PREPARED FOR:
88 CORP.
31 Whitewood Road
Milford, MA 01757

TITLE:
LANDSCAPE PLAN

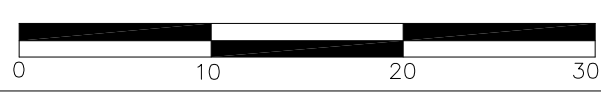
Bohler Project No. W171217

PREPARED BY:

 **BOHLER**
ENGINEERING
352 Turnpike Road
Southborough, MA 01772
(508) 480-9900



PROFESSIONAL LANDSCAPE ARCHITECT
SCALE: 1"=10' FEET



DATE: **March 29, 2018**

REVISIONS			
#	DATE	DESCRIPTION	INT

JOB NO: 0510 SHEET: 7 of 14



LANDSCAPE SPECIFICATIONS																		
<p>1. SCOPE OF WORK:</p> <p>THE LANDSCAPE CONTRACTOR SHALL BE REQUIRED TO PERFORM ALL CLEARING, FINISHED GRADING, SOIL PREPARATION, PERMANENT SEEDING OR SODDING, PLANTING AND MULCHING INCLUDING ALL LABOR, MATERIALS, TOOLS AND EQUIPMENT NECESSARY FOR THE COMPLETION OF THIS PROJECT, UNLESS OTHERWISE CONTRACTED BY THE GENERAL CONTRACTOR.</p> <p>2. MATERIALS</p> <p>A. GENERAL - ALL LANDSCAPE MATERIALS SHALL MEET OR EXCEED SPECIFICATIONS AS OUTLINED IN THE STATE DEPARTMENT OF TRANSPORTATION'S SPECIFICATIONS.</p> <p>B. TOPSOIL - NATURAL, FRIABLE, LOAMY SILT SOIL HAVING AN ORGANIC CONTENT NOT LESS THAN 5%, A PH RANGE BETWEEN 4.5-7.0. IT SHALL BE FREE OF DEBRIS, ROCKS LARGER THAN ONE INCH (1"), WOOD, ROOTS, VEGETABLE MATTER AND CLAY CLODS.</p> <p>C. LAWN - ALL DISTURBED AREAS ARE TO BE TREATED WITH A MINIMUM 6" THICK LAYER OF TOPSOIL, OR AS DIRECTED BY THE LOCAL ORDINANCE OR CLIENT, AND SEEDED OR SODDED IN ACCORDANCE WITH THE PERMANENT STABILIZATION METHODS INDICATED ON THE LANDSCAPE PLAN.</p> <p>1. LAWN SEED MIXTURE SHALL BE FRESH, CLEAN NEW CROP SEED.</p> <p>II. SOD SHALL BE STRONGLY ROOTED, WEED AND DISEASE/PEST FREE WITH A UNIFORM THICKNESS. SOD INSTALLED ON SLOPES GREATER THAN 4:1 SHALL BE PEGGED TO HOLD SOD IN PLACE.</p> <p>D. MULCH - ALL PLANTING BEDS SHALL BE MULCHED WITH A 3" THICK LAYER OF DOUBLE SHREDDED HARDWOOD BARK MULCH, UNLESS OTHERWISE STATED ON THE LANDSCAPE PLAN AND/OR LANDSCAPE PLAN NOTES/DETAILS.</p> <p>E. FERTILIZER</p> <p>I. FERTILIZER SHALL BE DELIVERED TO THE SITE MIXED AS SPECIFIED IN THE ORIGINAL UNOPENED STANDARD BAGS SHOWING WEIGHT, ANALYSIS AND NAME OF MANUFACTURER.</p> <p>FERTILIZER SHALL BE STORED IN A WEATHERPROOF PLACE SO THAT IT CAN BE KEPT DRY PRIOR TO USE.</p> <p>II. FOR THE PURPOSE OF BIDDING, ASSUME THAT FERTILIZER SHALL BE 10% NITROGEN, 6% PHOSPHORUS AND 4% POTASSIUM BY WEIGHT. A FERTILIZER SHOULD NOT BE SELECTED WITHOUT A SOIL TEST PERFORMED BY A CERTIFIED SOIL LABORATORY.</p> <p>F. PLANT MATERIAL</p> <p>I. ALL PLANTS SHALL IN ALL CASES CONFORM TO THE REQUIREMENTS OF THE "AMERICAN STANDARD FOR NURSERY STOCK" (ANSI Z60.1), LATEST EDITION, AS PUBLISHED BY THE "AMERICAN NURSERY & LANDSCAPE ASSOCIATION" (FORMERLY THE AMERICAN ASSOCIATION OF NURSERYMEN).</p> <p>II. IN ALL CASES, BOTANICAL NAMES SHALL TAKE PRECEDENCE OVER COMMON NAMES FOR ANY AND ALL PLANT MATERIAL.</p> <p>III. PLANTS SHALL BE LEGIBLY TAGGED WITH THE PROPER NAME AND SIZE. TAGS ARE TO REMAIN ON AT LEAST ONE PLANT OF EACH SPECIES FOR VERIFICATION PURPOSES DURING THE FINAL INSPECTION.</p> <p>IV. TREES WITH ABRASION OF THE BARK, SUN SCALDS, DISFIGURATION OR FRESH CUTS OF LIMBS OVER 1/4", WHICH HAVE NOT BEEN COMPLETELY CALLEDUS, SHALL BE REJECTED.</p> <p>V. PLANTS SHALL NOT BE BOUND WITH WIRE OR ROPE AT ANY TIME SO AS TO DAMAGE THE BARK OR BREAK BRANCHES.</p> <p>VI. ALL PLANTS SHALL BE TYPICAL OF THEIR SPECIES OR VARIETY AND SHALL HAVE A NORMAL HABIT OF GROWTH; WELL DEVELOPED BRANCHES, DENSELY FOLIATED, VIGOROUS ROOT SYSTEMS AND BE FREE OF DISEASE, INSECTS, PESTS, EGGS OR LARVAE.</p> <p>VII. CALIPER MEASUREMENTS OF NURSERY GROWN TREES SHALL BE TAKEN AT A POINT ON THE TRUNK SIX INCHES (6") ABOVE THE NATURAL GRADE FOR TREES UP TO AND INCLUDING A FOUR INCH (4") CALIPER SIZE. IF THE CALIPER AT SIX INCHES (6") ABOVE THE GROUND EXCEEDS FOUR INCHES (4") IN CALIPER, THE CALIPER SHOULD BE MEASURED AT A POINT 12" ABOVE THE NATURAL GRADE.</p> <p>VIII. SHRUBS SHALL BE MEASURED TO THE AVERAGE HEIGHT OR SPREAD OF THE SHRUB, AND NOT TO THE LONGEST BRANCH.</p> <p>IX. TREES AND SHRUBS SHALL BE HANDLED WITH CARE BY THE ROOT BALL.</p> <p>3. GENERAL WORK PROCEDURES</p> <p>A. CONTRACTOR TO UTILIZE WORKMANLIKE INDUSTRY STANDARDS IN PERFORMING ALL LANDSCAPE CONSTRUCTION. THE SITE IS TO BE LEFT IN A CLEAN STATE AT THE END OF EACH WORKDAY. ALL DEBRIS, MATERIALS AND TOOLS SHALL BE PROPERLY STORED, STOCKPILED OR DISPOSED OF.</p> <p>B. WASTE MATERIALS AND DEBRIS SHALL BE COMPLETELY DISPOSED OF AT THE CONTRACTOR'S EXPENSE. DEBRIS SHALL NOT BE BURIED, INCLUDING ORGANIC MATERIALS, BUT SHALL BE REMOVED COMPLETELY FROM THE SITE.</p> <p>4. SITE PREPARATIONS</p> <p>A. BEFORE AND DURING PRELIMINARY GRADING AND FINISHED GRADING, ALL WEEDS AND GRASSES SHALL BE DUG OUT BY THE ROOTS AND DISPOSED OF IN ACCORDANCE WITH GENERAL WORK PROCEDURES OUTLINED HEREIN.</p> <p>B. ALL EXISTING TREES TO REMAIN SHALL BE PRUNED TO REMOVE ANY DAMAGED BRANCHES. THE ENTIRE LIMB OF ANY DAMAGED BRANCH SHALL BE CUT OFF AT THE BRANCH COLLAR. CONTRACTOR SHALL ENSURE THAT CUTS ARE SMOOTH AND STRAIGHT. ANY EXPOSED ROOTS SHALL BE CUT BACK WITH CLEAN, SHARP TOOLS AND TOPSOIL SHALL BE PLACED AROUND THE REMAINDER OF THE ROOTS. EXISTING TREES SHALL BE MONITORED ON A REGULAR BASIS FOR ADDITIONAL ROOT OR BRANCH DAMAGE AS A RESULT OF CONSTRUCTION. ROOTS SHALL NOT BE LEFT EXPOSED FOR MORE THAN ONE (1) DAY. CONTRACTOR SHALL WATER EXISTING TREES AS NEEDED TO PREVENT SHOCK OR DECLINE.</p> <p>C. CONTRACTOR SHALL ARRANGE TO HAVE A UTILITY STAKE-OUT TO LOCATE ALL UNDERGROUND UTILITIES PRIOR TO INSTALLATION OF ANY LANDSCAPE MATERIAL. UTILITY COMPANIES SHALL BE CONTACTED THREE (3) DAYS PRIOR TO THE BEGINNING OF WORK.</p> <p>5. TREE PROTECTION</p> <p>A. CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF ALL EXISTING TREES TO REMAIN. A TREE PROTECTION ZONE SHALL BE ESTABLISHED AT THE DRIP LINE OR AT THE LIMIT OF CONSTRUCTION DISTURBANCE, WHICHEVER IS GREATER. LOCAL STANDARDS THAT MAY REQUIRE A MORE STRICT TREE PROTECTION ZONE SHALL BE HONORED.</p> <p>B. A FORTY-EIGHT INCH (48") HIGH WOODEN SNOW FENCE OR ORANGE COLORED HIGH-DENSITY "VISH-FENCE", OR APPROVED EQUAL, MOUNTED ON STEEL POSTS SHALL BE PLACED ALONG THE BOUNDARY OF THE TREE PROTECTION ZONE. POSTS SHALL BE LOCATED AT A MAXIMUM OF EIGHT FEET (8') ON CENTER OR AS INDICATED WITHIN THE TREE PROTECTION DETAIL.</p> <p>C. WHEN THE TREE PROTECTION FENCING HAS BEEN INSTALLED, IT SHALL BE INSPECTED BY THE APPROVING AGENCY PRIOR TO DEMOLITION, GRADING, TREE CLEARING OR ANY OTHER CONSTRUCTION. THE FENCING ALONG THE TREE PROTECTION ZONE SHALL BE REGULARLY INSPECTED BY THE LANDSCAPE CONTRACTOR AND MAINTAINED UNTIL ALL CONSTRUCTION ACTIVITY HAS BEEN COMPLETED.</p> <p>D. AT NO TIME SHALL MACHINERY, DEBRIS, FALLEN TREES OR OTHER MATERIALS BE PLACED, STOCKPILED OR LEFT STANDING IN THE TREE PROTECTION ZONE.</p> <p>6. SOIL MODIFICATIONS</p> <p>A. CONTRACTOR SHALL ATTAIN A SOIL TEST FOR ALL AREAS OF THE SITE PRIOR TO CONDUCTING ANY PLANTING. SOIL TESTS SHALL BE PERFORMED BY A CERTIFIED SOIL LABORATORY.</p> <p>B. LANDSCAPE CONTRACTOR SHALL REPORT ANY SOIL OR DRAINAGE CONDITIONS CONSIDERED DETRIMENTAL TO THE GROWTH OF PLANT MATERIAL. SOIL MODIFICATIONS, AS SPECIFIED HEREIN, MAY NEED TO BE CONDUCTED BY THE LANDSCAPE CONTRACTOR DEPENDING ON SITE CONDITIONS.</p> <p>C. THE FOLLOWING AMENDMENTS AND QUANTITIES ARE APPROXIMATE AND ARE FOR BIDDING PURPOSES ONLY. COMPOSITION OF AMENDMENTS SHOULD BE REVISED DEPENDING ON THE OUTCOME OF A TOPSOIL ANALYSIS PERFORMED BY A CERTIFIED SOIL LABORATORY.</p> <p>1. TO INCREASE A SANDY SOIL'S ABILITY TO RETAIN WATER AND NUTRIENTS, THOROUGHLY TILL ORGANIC MATTER INTO THE TOP 6-12". USE COMPOSTED BARK, COMPOSTED LEAF MULCH OR PEAT MOSS. ALL PRODUCTS SHOULD BE COMPOSTED TO A DARK COLOR AND BE FREE OF PIECES WITH IDENTIFIABLE LEAF OR WOOD STRUCTURE. AVOID MATERIAL WITH A PH HIGHER THAN 7.5.</p> <p>II. TO INCREASE DRAINAGE, MODIFY HEAVY CLAY OR SILT (MORE THAN 40% CLAY OR SILT) BY ADDING COMPOSTED PINE BARK (UP TO 30% BY VOLUME) AND/OR AGRICULTURAL GYPSUM. COARSE SAND MAY BE USED IF ENOUGH IS ADDED TO BRING THE SAND CONTENT TO MORE THAN 60% OF THE TOTAL MIX. SUBSURFACE DRAINAGE LINES MAY NEED TO BE ADDED TO INCREASE DRAINAGE.</p> <p>III. MODIFY EXTREMELY SANDY SOILS (MORE THAN 85%) BY ADDING ORGANIC MATTER AND/OR DRY, SHREDDED CLAY LOAM UP TO 30% OF THE TOTAL MIX.</p> <p>7. FINISHED GRADING</p> <p>A. UNLESS OTHERWISE CONTRACTED, THE LANDSCAPE CONTRACTOR SHALL BE RESPONSIBLE FOR THE INSTALLATION OF TOPSOIL AND THE ESTABLISHMENT OF FINE-GRADING WITHIN THE DISTURBANCE AREA OF THE SITE.</p> <p>B. LANDSCAPE CONTRACTOR SHALL VERIFY THAT SUBGRADE FOR INSTALLATION OF TOPSOIL HAS BEEN ESTABLISHED. THE SUBGRADE OF THE SITE MUST MEET THE FINISHED GRADE LESS THE REQUIRED TOPSOIL THICKNESS (1").</p> <p>C. ALL LAWN AND PLANTING AREAS SHALL BE GRADED TO A SMOOTH, EVEN AND UNIFORM PLANE WITH NO ABRUPT CHANGE OF SURFACE AS DEPICTED WITHIN THIS SET OF CONSTRUCTION PLANS, UNLESS OTHERWISE DIRECTED BY THE PROJECT ENGINEER OR LANDSCAPE ARCHITECT.</p> <p>D. ALL PLANTING AREAS SHALL BE GRADED AND MAINTAINED TO ALLOW FREE FLOW OF SURFACE WATER IN AND AROUND THE PLANTING BEDS. STANDING WATER SHALL NOT BE PERMITTED IN PLANTING BEDS.</p> <p>8. TOPSOILING</p> <p>A. CONTRACTOR SHALL PROVIDE A 6" THICK MINIMUM LAYER OF TOPSOIL, OR AS DIRECTED BY THE LOCAL ORDINANCE OR CLIENT, IN ALL PLANTING AREAS. TOPSOIL SHOULD BE SPREAD OVER A PREPARED SURFACE IN A UNIFORM LAYER TO ACHIEVE THE DESIRED COMPACTED THICKNESS.</p> <p>B. ON-SITE TOPSOIL MAY BE USED TO SUPPLEMENT THE TOTAL AMOUNT REQUIRED. TOPSOIL FROM THE SITE MAY BE REJECTED IF IT HAS NOT BEEN PROPERLY REMOVED, STORED AND PROTECTED PRIOR TO CONSTRUCTION.</p> <p>C. CONTRACTOR SHALL FURNISH TO THE APPROVING AGENCY AN ANALYSIS OF BOTH IMPORTED AND ON-SITE TOPSOIL TO BE UTILIZED IN ALL PLANTING AREAS. THE PH AND NUTRIENT LEVELS MAY NEED TO BE ADJUSTED THROUGH SOIL MODIFICATIONS AS NEEDED TO ACHIEVE THE REQUIRED LEVELS AS SPECIFIED IN THE MATERIALS SECTION ABOVE.</p>	<p>D. ALL LAWN AREAS ARE TO BE CULTIVATED TO A DEPTH OF SIX INCHES (6"). ALL DEBRIS EXPOSED FROM EXCAVATION AND CULTIVATION SHALL BE DISPOSED OF IN ACCORDANCE WITH GENERAL WORK PROCEDURES SECTION ABOVE. THE FOLLOWING SHALL BE TILLED INTO THE TOP FOUR INCHES (4") IN TWO DIRECTIONS (QUANTITIES BASED ON A 1,000 SQUARE FOOT AREA- FOR BID PURPOSES ONLY) (SEE SPECIFICATION 6.A.I.):</p> <p>I. 20 POUNDS "GRO-POWER" OR APPROVED SOIL CONDITIONER/FERTILIZER</p> <p>II. 20 POUNDS NITRO-FORM (COURSE) 36-0-0 BLUE CHIP OR APPROVED NITROGEN FERTILIZER</p> <p>E. THE SPREADING OF TOPSOIL SHALL NOT BE CONDUCTED UNDER MUDDY OR FROZEN CONDITIONS.</p> <p>9. PLANTING</p> <p>A. INsofar THAT IT IS FEASIBLE, PLANT MATERIAL SHALL BE PLANTED ON THE DAY OF DELIVERY. IN THE EVENT THAT THIS IS NOT POSSIBLE, LANDSCAPE CONTRACTOR SHALL PROTECT UNINSTALLED PLANT MATERIAL. PLANTS SHALL NOT REMAIN UNPLANTED FOR LONGER THAN A THREE DAY PERIOD AFTER DELIVERY. PLANTS THAT WILL NOT BE PLANTED FOR A PERIOD OF TIME GREATER THAN THREE DAYS SHALL BE HEALED IN WITH TOPSOIL OR MULCH TO HELP PRESERVE ROOT MOISTURE.</p> <p>B. PLANTING OPERATIONS SHALL BE PERFORMED DURING PERIODS WITHIN THE PLANTING SEASON WHEN WEATHER AND SOIL CONDITIONS ARE SUITABLE AND IN ACCORDANCE WITH ACCEPTED LOCAL PRACTICE. PLANTS SHALL NOT BE INSTALLED IN TOPSOIL THAT IS IN A MUDDY OR FROZEN CONDITION.</p> <p>C. ANY INJURED ROOTS OR BRANCHES SHALL BE PRUNED TO MAKE CLEAN-CUT ENDS PRIOR TO PLANTING UTILIZING CLEAN, SHARP TOOLS. ONLY INJURED OR DISEASED BRANCHING SHALL BE REMOVED.</p> <p>D. ALL PLANTING CONTAINERS, BASKETS AND NON-BIODEGRADABLE MATERIALS SHALL BE REMOVED FROM ROOT BALLS DURING PLANTING. NATURAL FIBER BURLAP MUST BE CUT FROM AROUND THE TRUNK OF THE TREE AND FOLDED DOWN AGAINST THE ROOT BALL PRIOR TO BACKFILLING.</p> <p>E. POSITION TREES AND SHRUBS AT THEIR INTENDED LOCATIONS AS PER THE PLANS AND SECURE THE APPROVAL OF THE LANDSCAPE ARCHITECT PRIOR TO EXCAVATING PITS, MAKING NECESSARY ADJUSTMENTS AS DIRECTED.</p> <p>F. PRIOR TO THE ISSUANCE OF ANY CERTIFICATE OF OCCUPANCY, THE PROPOSED LANDSCAPE, AS SHOWN ON THE APPROVED LANDSCAPE PLAN, MUST BE INSTALLED, INSPECTED AND APPROVED BY THE APPROVING AGENCY. THE APPROVING AGENCY SHALL TAKE INTO ACCOUNT SEASONAL CONSIDERATIONS IN THIS REGARD AS FOLLOWS. THE PLANTING OF TREES, SHRUBS, VINES OR GROUND COVER SHALL OCCUR ONLY DURING THE FOLLOWING PLANTING SEASONS:</p> <p>I. PLANTS: MARCH 15 TO DECEMBER 15</p> <p>II. LAWN: MARCH 15 TO JUNE 15 OR SEPT. 1 TO DECEMBER 1</p> <p>PLANTINGS REQUIRED FOR A CERTIFICATE OF OCCUPANCY SHALL BE PROVIDED DURING THE NEXT APPROPRIATE SEASON AT THE MUNICIPALITY'S DISCRETION. CONTRACTOR SHOULD CONTACT APPROVING AGENCY FOR POTENTIAL SUBSTITUTIONS.</p> <p>G. FURTHERMORE, THE FOLLOWING TREE VARIETIES ARE UNUSUALLY SUSCEPTIBLE TO WINTER DAMAGE, WITH TRANSPLANT SHOCK AND THE SEASONAL LACK OF NITROGEN AVAILABILITY. THE RISK OF PLANT DEATH IS GREATLY INCREASED. IT IS NOT RECOMMENDED THAT THESE SPECIES BE PLANTED DURING THE FALL PLANTING SEASON:</p> <table> <tr> <td>ACER RUBRUM</td><td>PLATANUS X ACERIFOLIA</td></tr> <tr> <td>BETULA VARIETIES</td><td>POPULUS VARIETIES</td></tr> <tr> <td>CARPINUS VARIETIES</td><td>PRUNUS VARIETIES</td></tr> <tr> <td>CRATAEGUS VARIETIES</td><td>PRUNUS VARIETIES</td></tr> <tr> <td>KOELERUTERIA</td><td>QUERCUS VARIETIES</td></tr> <tr> <td>LIQUIDAMBAR STYRACIFLUA</td><td>TILIA TOMENTOSA</td></tr> <tr> <td>LIRIODENDRON TULIPIFERA</td><td>ZELKOVA VARIETIES</td></tr> </table> <p>H. PLANTING PITS SHALL BE DUG WITH LEVEL BOTTOMS, WITH THE WIDTH TWICE THE DIAMETER OF ROOT BALL. THE ROOT BALL SHALL REST ON UNDISTURBED GRADE. EACH PLANT PIT SHALL BE BACKFILLED IN LAYERS WITH THE FOLLOWING PREPARED SOIL MIXED THOROUGHLY:</p> <p>I. 1 PART PEAT MOSS</p> <p>II. 1 PART COMPOSTED COW MANURE BY VOLUME</p> <p>III. 3 PARTS TOPSOIL BY VOLUME</p> <p>IV. 21 GRAMS AGRIFORM PLANTING TABLETS (OR APPROVED EQUAL) AS FOLLOWS:</p> <p>A) 2 TABLETS PER 1 GALLON PLANT</p> <p>B) 3 TABLETS PER 5 GALLON PLANT</p> <p>C) 4 TABLETS PER 15 GALLON PLANT</p> <p>D) LARGER PLANTS: 2 TABLETS PER 1/2" CALIPER OF TRUNK</p> <p>I. FILL PREPARED SOIL AROUND BALL OF PLANT HALF-WAY AND INSERT PLANT TABLETS. COMPLETE BACKFILL AND WATER THOROUGHLY.</p> <p>J. ALL PLANTS SHALL BE PLANTED SO THAT THE TOP OF THE ROOT BALL, THE POINT AT WHICH THE ROOT FLARE BEGINS, IS SET AT GROUND LEVEL AND IN THE CENTER OF THE PIT. NO SOIL IS TO BE PLACED DIRECTLY ON TOP OF THE ROOT BALL.</p> <p>K. ALL PROPOSED TREES DIRECTLY ADJACENT TO WALKWAYS OR DRIVEWAYS SHALL BE PRUNED AND MAINTAINED TO A MINIMUM BRANCHING HEIGHT OF 7' FROM GRADE.</p> <p>L. GROUND COVER AREAS SHALL RECEIVE A 1/2" LAYER OF HUMUS RAKED INTO THE TOP 1" OF PREPARED SOIL PRIOR TO PLANTING. ALL GROUND COVER AREAS SHALL BE COVERED AND TREATED WITH A PRE-EMERGENT CHEMICAL AS PER MANUFACTURER'S RECOMMENDATION.</p> <p>M. NO PLANT, EXCEPT GROUND COVERS, GRASSES OR VINES, SHALL BE PLANTED LESS THAN TWO FEET (2') FROM EXISTING STRUCTURES AND SIDEWALKS.</p> <p>N. ALL PLANTING AREAS AND PLANTING PITS SHALL BE MULCHED AS SPECIFIED HEREIN TO FILL THE ENTIRE BED AREA OR SAUCER. NO MULCH IS TO TOUCH THE TRUNK OF THE TREE OR SHRUB.</p> <p>O. ALL PLANTING AREAS SHALL BE WATERED IMMEDIATELY UPON INSTALLATION IN ACCORDANCE WITH THE WATERING SPECIFICATIONS AS LISTED HEREIN.</p> <p>10. TRANSPLANTING (WHEN REQUIRED)</p> <p>A. ALL TRANSPLANTS SHALL BE DUG WITH INTACT ROOT BALLS CAPABLE OF SUSTAINING THE PLANT.</p> <p>B. IF PLANTS ARE TO BE STOCKPILED BEFORE REPLANTING, THEY SHALL BE HEALED IN WITH MULCH OR SOIL, ADEQUATELY WATERED AND PROTECTED FROM EXTREME HEAT, SUN AND WIND.</p> <p>C. PLANTS SHALL NOT BE DUG FOR TRANSPLANTING BETWEEN APRIL 10 AND JUNE 30.</p> <p>D. UPON REPLANTING, BACKFILL SOIL SHALL BE AMENDED WITH FERTILIZER AND ROOT GROWTH HORMONE.</p> <p>E. TRANSPLANTS SHALL BE GUARANTEED FOR THE LENGTH OF THE GUARANTEE PERIOD SPECIFIED HEREIN.</p> <p>F. IF TRANSPLANTS DIE, SHRUBS AND TREES LESS THAN SIX INCHES (6") DBH SHALL BE REPLACED IN KIND. TREES GREATER THAN SIX INCHES (6") DBH MAY BE REQUIRED TO BE REPLACED IN ACCORDANCE WITH THE MUNICIPALITY'S TREE REPLACEMENT GUIDELINES.</p> <p>11. WATERING</p> <p>A. NEW PLANTINGS OR LAWN AREAS SHALL BE ADEQUATELY IRRIGATED BEGINNING IMMEDIATELY AFTER PLANTING. WATER SHALL BE APPLIED TO EACH TREE AND SHRUB IN SUCH MANNER AS NOT TO DISTURB BACKFILL AND TO THE EXTENT THAT ALL MATERIALS IN THE PLANTING HOLE ARE THOROUGHLY SATURATED. WATERING SHALL CONTINUE AT LEAST UNTIL PLANTS ARE ESTABLISHED.</p> <p>C. IF AN IRRIGATION SYSTEM HAS BEEN INSTALLED ON THE SITE, IT SHALL BE USED TO WATER PROPOSED PLANT MATERIAL, BUT ANY FAILURE OF THE SYSTEM DOES NOT ELIMINATE THE CONTRACTOR'S RESPONSIBILITY OF MAINTAINING THE DESIRED MOISTURE LEVEL FOR VIGOROUS, HEALTHY GROWTH.</p> <p>12. GUARANTEE</p> <p>A. THE LANDSCAPE CONTRACTOR SHALL GUARANTEE ALL PLANTS FOR A PERIOD OF 1 YEAR FROM APPROVAL OF LANDSCAPE INSTALLATION BY THE APPROVING AGENCY. CONTRACTOR SHALL SUPPLY THE OWNER WITH A MAINTENANCE BOND FOR TEN PERCENT (10%) OF THE VALUE OF THE LANDSCAPE INSTALLATION WHICH WILL BE RELEASED AT THE CONCLUSION OF THE GUARANTEE PERIOD AND WHEN A FINAL INSPECTION HAS BEEN COMPLETED AND APPROVED BY THE OWNER OR AUTHORIZED REPRESENTATIVE.</p> <p>B. ANY DEAD OR DYING PLANT MATERIAL SHALL BE REPLACED FOR THE LENGTH OF THE GUARANTEE PERIOD. REPLACEMENT OF PLANT MATERIAL SHALL BE CONDUCTED AT THE FIRST SUCCEEDING PLANTING SEASON. ANY DEBRIS SHALL BE DISPOSED OF OFF-SITE, WITHOUT EXCEPTION.</p> <p>C. TREES AND SHRUBS SHALL BE MAINTAINED BY THE CONTRACTOR DURING CONSTRUCTION AND THROUGHOUT THE 90 DAY MAINTENANCE PERIOD AS SPECIFIED HEREIN. CULTIVATION, WEEDING, WATERING AND THE PREVENTATIVE TREATMENTS SHALL BE PERFORMED AS NECESSARY TO KEEP PLANT MATERIAL IN GOOD CONDITION AND FREE OF INSECTS AND DISEASE.</p> <p>D. LAWNS SHALL BE MAINTAINED THROUGH WATERING, FERTILIZING, WEEDING, MOWING, TRIMMING AND OTHER OPERATIONS SUCH AS ROLLING, REGARDING AND REPLANTING AS REQUIRED TO ESTABLISH A SMOOTH, ACCEPTABLE LAWN, FREE OF ERODED OR BARE AREAS.</p> <p>13. CLEANUP</p> <p>A. UPON THE COMPLETION OF ALL LANDSCAPE INSTALLATION AND BEFORE THE FINAL ACCEPTANCE, THE CONTRACTOR SHALL REMOVE ALL UNUSED MATERIALS, EQUIPMENT AND DEBRIS FROM THE SITE. ALL PAVED AREAS ARE TO BE CLEANED.</p> <p>B. THE SITE SHALL BE CLEANED AND LEFT IN A NEAT AND ACCEPTABLE CONDITION AS APPROVED BY THE OWNER OR AUTHORIZED REPRESENTATIVE.</p> <p>14. MAINTENANCE (ALTERNATIVE BID):</p> <p>A. 90 DAY MAINTENANCE PERIOD SHALL COMMENCE AT THE END OF ALL LANDSCAPE INSTALLATION OPERATIONS. THE 90 DAY MAINTENANCE PERIOD ENSURES TO THE OWNER/OPERATOR THAT THE NEWLY INSTALLED LANDSCAPING HAS BEEN MAINTAINED AS SPECIFIED ON THE APPROVED LANDSCAPE PLAN. ONCE THE INITIAL 90 DAY MAINTENANCE PERIOD HAS EXPIRED, THE OWNER/OPERATOR MAY REQUEST THAT BIDDERS SUBMIT AN ALTERNATE MAINTENANCE BID FOR A MONTHLY MAINTENANCE CONTRACT. THE ALTERNATE MAINTENANCE CONTRACT WILL ENCOMPASS ANY WORK THAT IS CONSIDERED APPROPRIATE TO ENSURE THAT PLANT AND LAWN AREAS ARE HEALTHY AND MANICURED TO THE APPROVAL OF THE OWNER/OPERATOR.</p>	ACER RUBRUM	PLATANUS X ACERIFOLIA	BETULA VARIETIES	POPULUS VARIETIES	CARPINUS VARIETIES	PRUNUS VARIETIES	CRATAEGUS VARIETIES	PRUNUS VARIETIES	KOELERUTERIA	QUERCUS VARIETIES	LIQUIDAMBAR STYRACIFLUA	TILIA TOMENTOSA	LIRIODENDRON TULIPIFERA	ZELKOVA VARIETIES			
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				<p>GROUND COVER PLANTING</p> <p>N.T.S.</p>														
				<p>TREE PLANTING DETAIL - ON SLOPE</p> <p>N.T.S.</p>														
<p>1. PRIOR TO SEEDING, AREA IS TO BE TOPSOILED, FINE GRADED, AND RAKED OF ALL DEBRIS LARGER THAN 2" DIAMETER.</p> <p>2. PRIOR TO SEEDING, CONSULT MANUFACTURER'S RECOMMENDATIONS AND INSTRUCTIONS.</p> <p>3. SEEDING RATES:</p> <table> <tr> <td>• PERENNIAL RYEGRASS</td><td>12 LB/1000 SQ FT</td></tr> <tr> <td>• KENTUCKY BLUEGRASS</td><td>1 LB/1000 SQ FT</td></tr> <tr> <td>• RED FESCUE</td><td>12 LB/1000 SQ FT</td></tr> <tr> <td>• SPREADING FESCUE</td><td>12 LB/1000 SQ FT</td></tr> <tr> <td>• FERTILIZER (16-32-16)</td><td>2 LB/1000 SQ FT</td></tr> <tr> <td>• LIQUID LIME</td><td>1 GAL/800 GAL</td></tr> <tr> <td>• TANK TACKIFIER</td><td>35 LB/800 GAL</td></tr> <tr> <td>• TANK FIBER MULCH</td><td>30 LB/1000 SQ FT</td></tr> </table> <p>4. GERMINATION RATES WILL VARY AS TO TIME OF YEAR FOR SOWING. CONTRACTOR TO IRRIGATE SEEDED AREA UNTIL AN ACCEPTABLE STAND OF COVER IS ESTABLISHED BY OWNER.</p>	• PERENNIAL RYEGRASS	12 LB/1000 SQ FT	• KENTUCKY BLUEGRASS	1 LB/1000 SQ FT	• RED FESCUE	12 LB/1000 SQ FT	• SPREADING FESCUE	12 LB/1000 SQ FT	• FERTILIZER (16-32-16)	2 LB/1000 SQ FT	• LIQUID LIME	1 GAL/800 GAL	• TANK TACKIFIER	35 LB/800 GAL	• TANK FIBER MULCH	30 LB/1000 SQ FT	<p>"QUICK EROSION CONTROL COVER MIX" AS PREPARED BY:</p> <p>ERNST CONSERVATION SEEDS, INC. 8884 MERCER PIKE, MEADVILLE, PA 16335 PHONE: 800-873-3321 / 814-336-2404 EMAIL: SALES@ERNSTSEED.COM WEBSITE: WWW.ERNSTSEED.COM</p> <p>APPLICATION RATE: 50 LBS. / ACRE</p> <p>MIX COMPOSITION:</p> <p>50.0% Lolium multiflorum (Annual Ryegrass)</p>	<p>"NATIVE DETENTION AREA MIX" AS PREPARED BY:</p> <p>ERNST CONSERVATION SEEDS, INC. 8884 MERCER PIKE, MEADVILLE, PA 16335 PHONE: 800-873-3321 / 814-336-2404 EMAIL: SALES@ERNSTSEED.COM WEBSITE: WWW.ERNSTSEED.COM</p> <p>APPLICATION RATE: 1/2 LB. / 1000 SQ. FT. (20 LBS. / ACRE)</p> <p>MIX COMPOSITION:</p> <p>28.0% Panicum dandellium, 'Tioga' (Dontonogon, 'Tioga')</p> <p>24.0% Carex vulpinoidea, PA Ecotype (Fox Sedge, PA Ecotype)</p> <p>20.0% Elymus virginicus, PA Ecotype (Virginia Wildrye, PA Ecotype)</p> <p>20.0% Panicum virgatum, 'Shawnee' (Switchgrass, 'Shawnee')</p> <p>4.0% Agrostis perennans, PA Ecotype (Autumn Bentgrass, PA Ecotype)</p> <p>3.0% Juncus tenuis, PA Ecotype (Path Rush, PA Ecotype)</p> <p>1.0% Juncus effusus (Soft Rush)</p>
• PERENNIAL RYEGRASS	12 LB/1000 SQ FT																	
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HYDROSEED SPECIFICATIONS	SLOPE SEED MIX	DETENTION BASIN SEED MIX																

BOHLER

ENGINEERING

352 Turnpike Road

Southborough, MA 01772

(508) 480-9900

PROFESSIONAL LANDSCAPE ARCHITECT

SCALE: 1" = 40' FEET

DATE: March 29, 2018

REVISIONS

#	DATE	DESCRIPTION	INIT

JOB NO: 0510

SHEET: 8 of 14

PREPARED FOR:

88 CORP.
31 Whitewood Road
Milford, MA 01757

TITLE:

LANDSCAPE DETAIL PLAN

Bohler Project No. W171217

PREPARED BY:

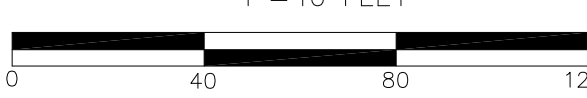


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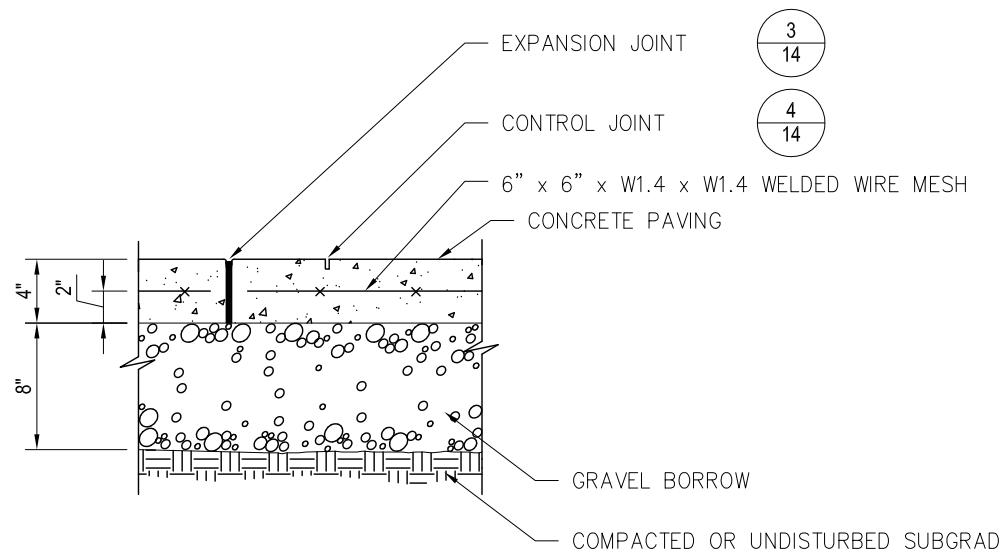
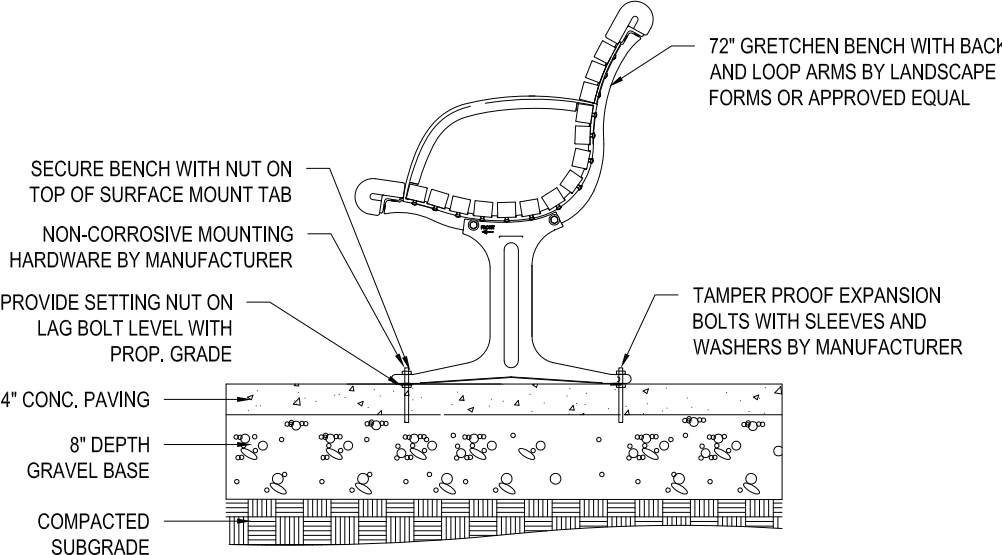
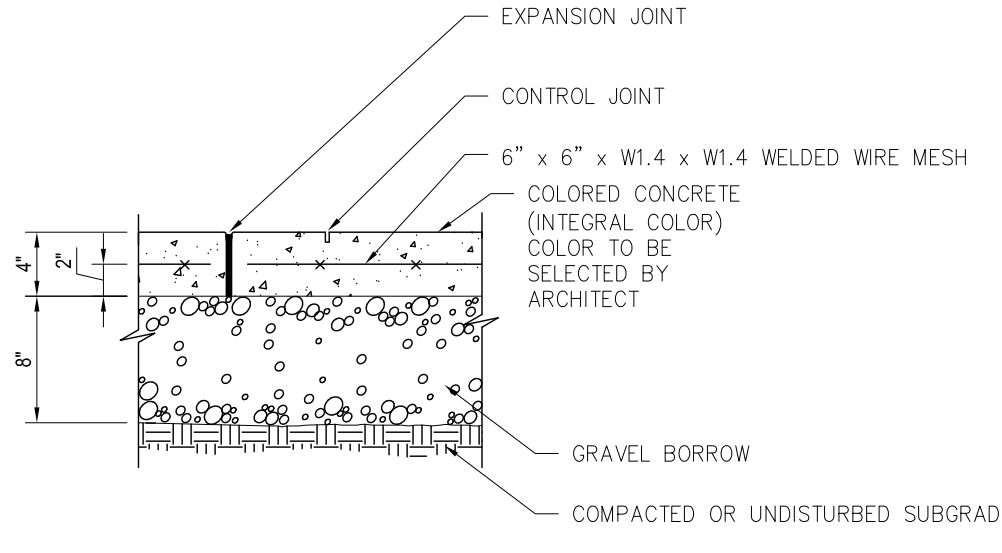
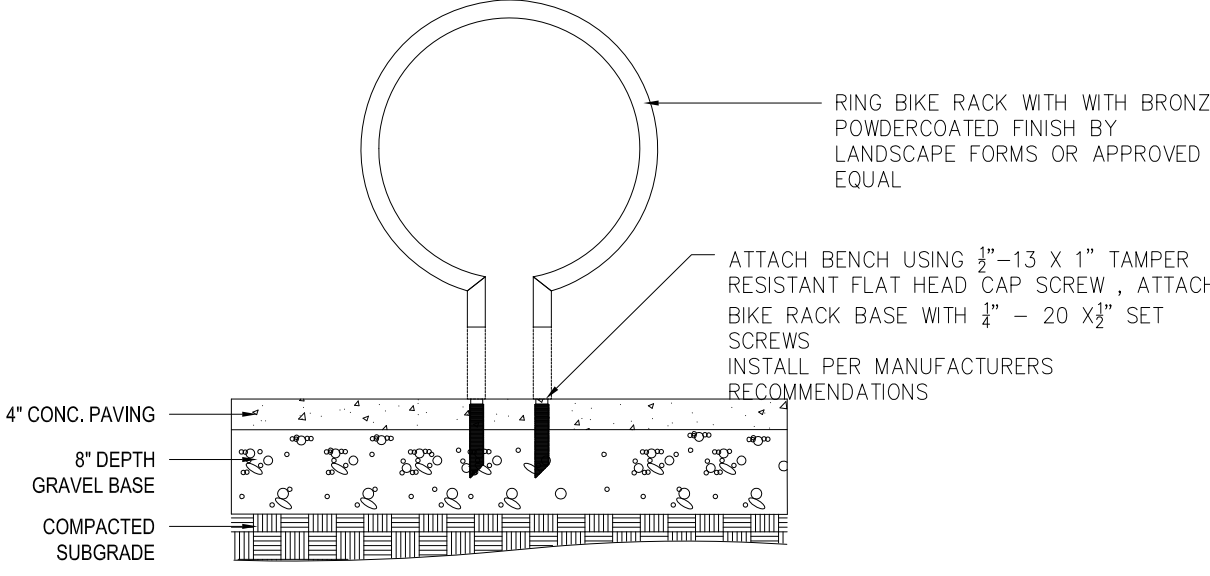
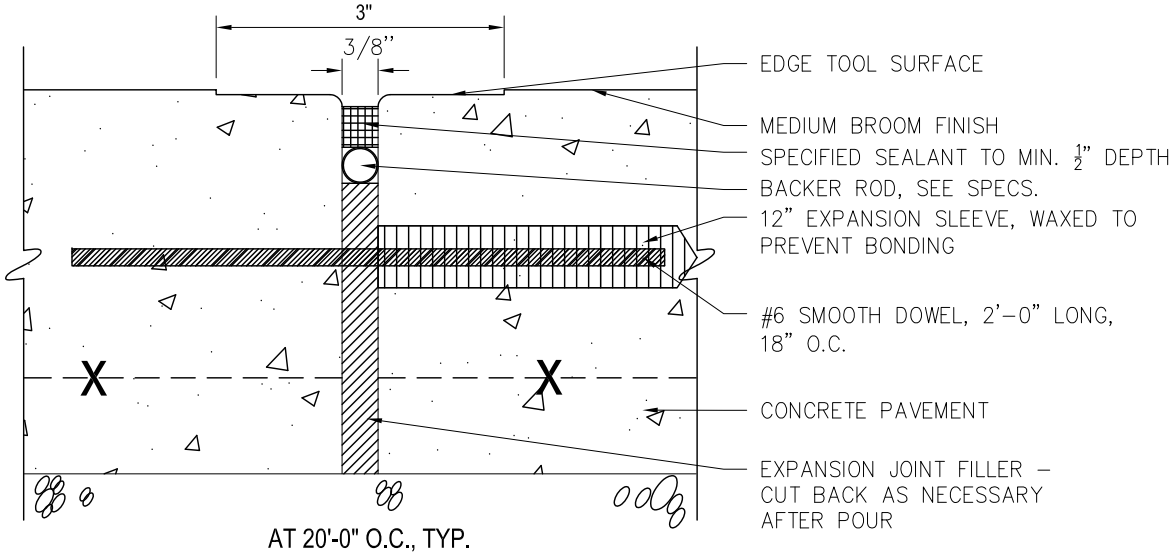
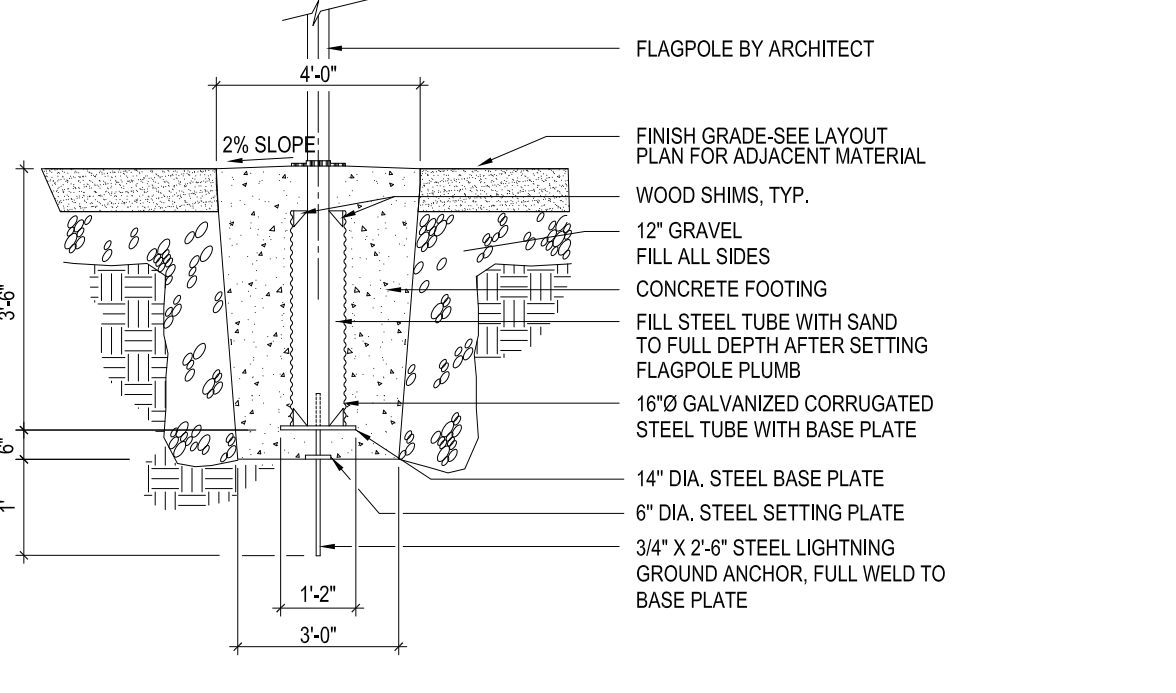
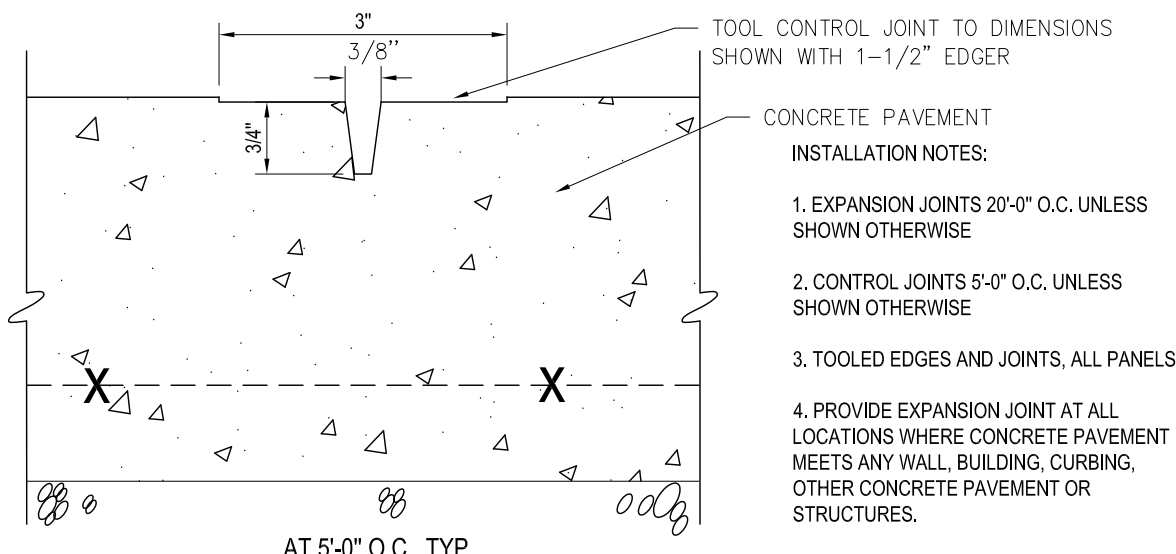
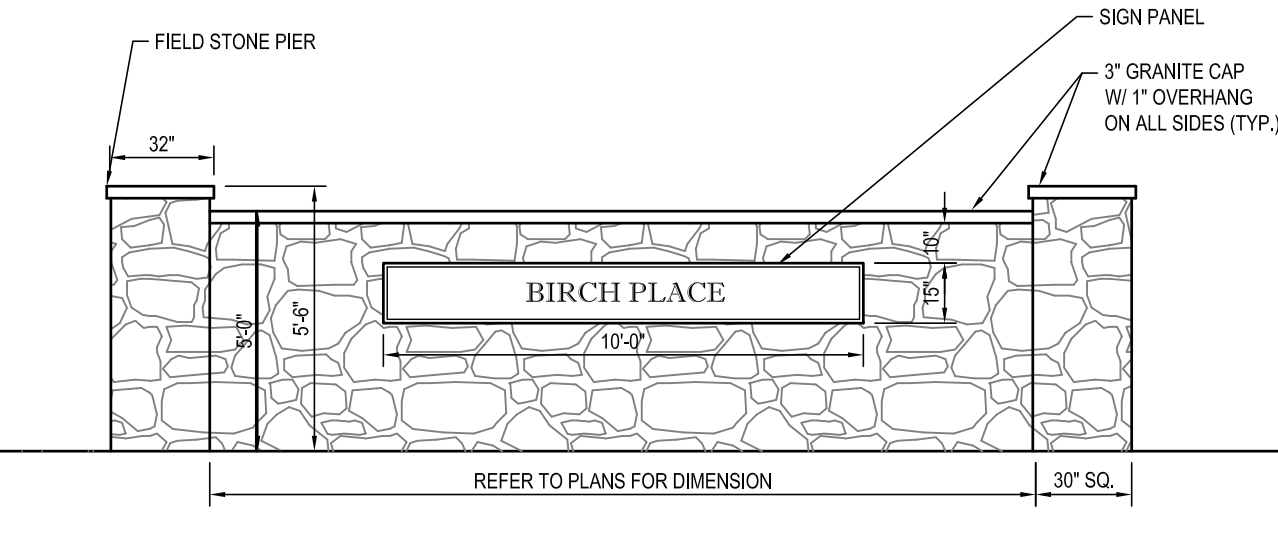


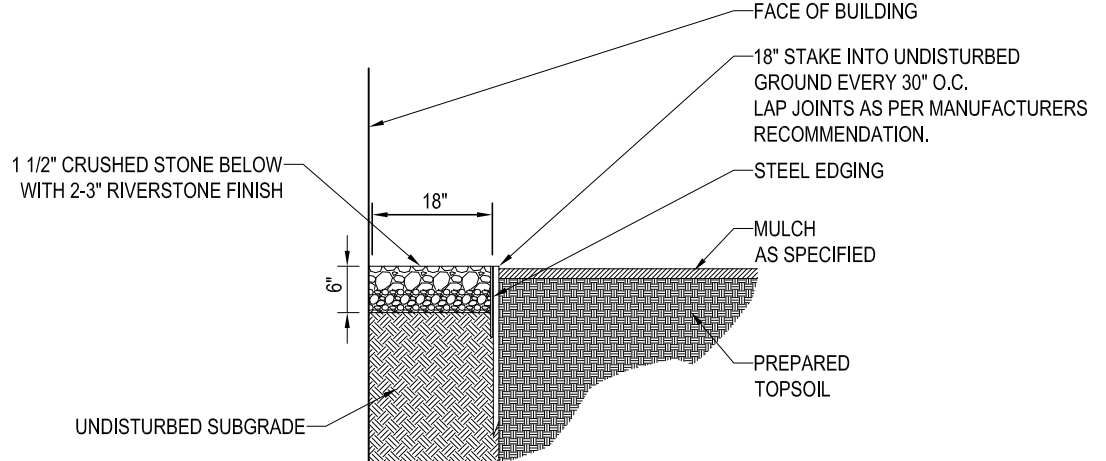
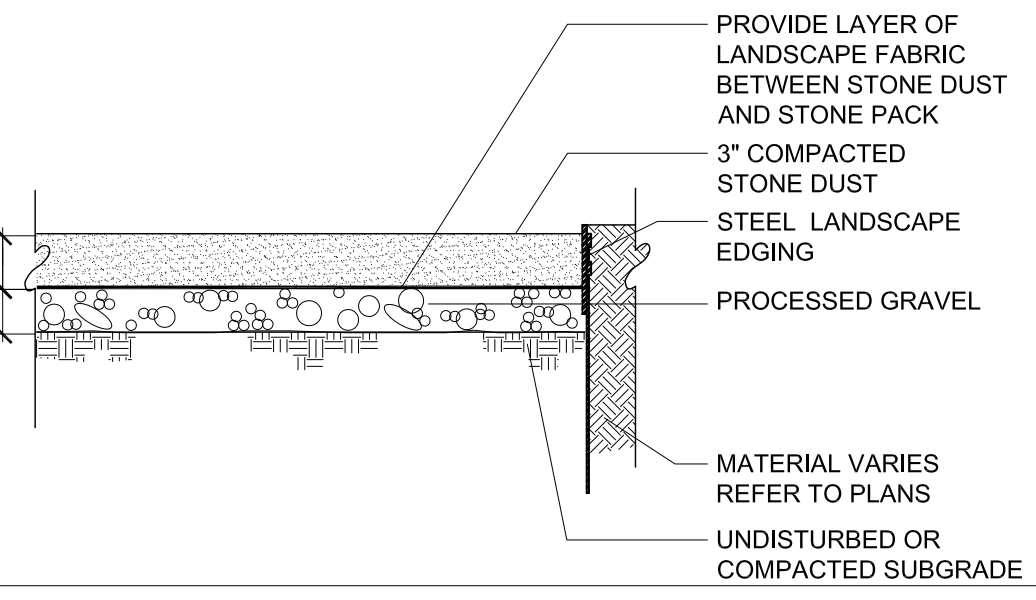
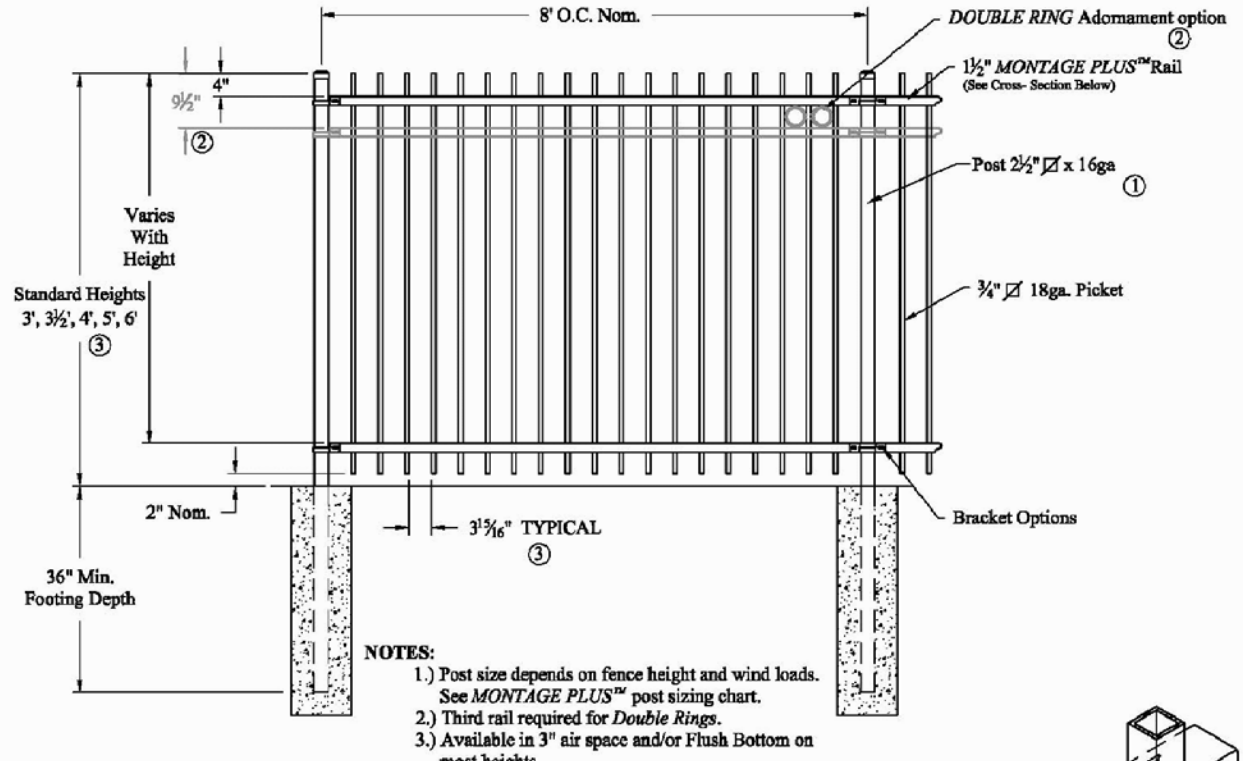

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#	DATE	DESCRIPTION	INT

JOB NO: 0510 SHEET: 8 of 14

			
CONCRETE PAVING	N.T.S.	BENCH	N.T.S.
			
COLORED CONCRETE PAVING	N.T.S.	BIKE RACK	N.T.S.
			
EXPANSION JOINT	N.T.S.	FLAGPOLE	N.T.S.
			
CONTROL JOINT	N.T.S.	ENTRANCE WALL AND SITE SIGN	N.T.S.
			
PET WASTE STATION	N.T.S.	BUS SHELTER EXAMPLE	N.T.S.
			
CRUSHED STONE STRIP		ACCESSIBLE PATH	
			
DECORATIVE METAL PICKET FENCE		N.T.S.	

PREPARED FOR:


88 CORP.
31 Whitewood Road
Milford, MA 01757

TITLE:

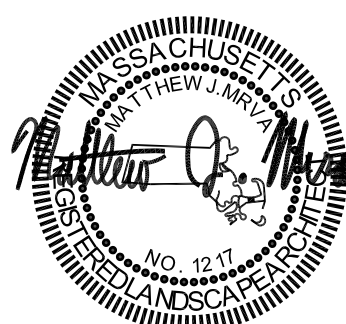
LANDSCAPE DETAIL PLAN

Bohler Project No. W171217

PREPARED BY:

 **BOHLER**
ENGINEERING


352 Turnpike Road
Southborough, MA 01772
(508) 480-9900



PROFESSIONAL LANDSCAPE ARCHITECT

SCALE:

1"=40' FEET



DATE:

March 29, 2018

REVISIONS

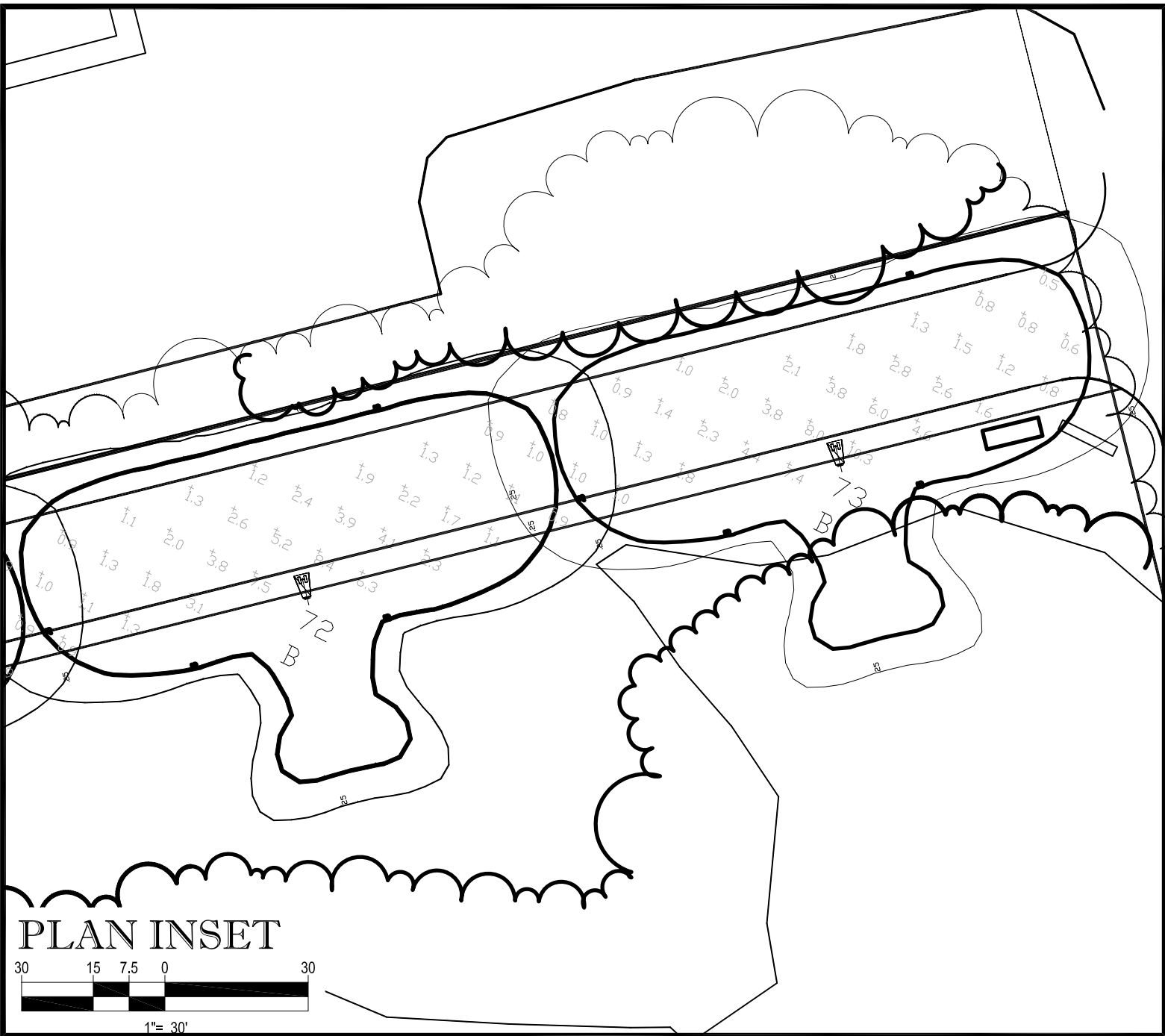
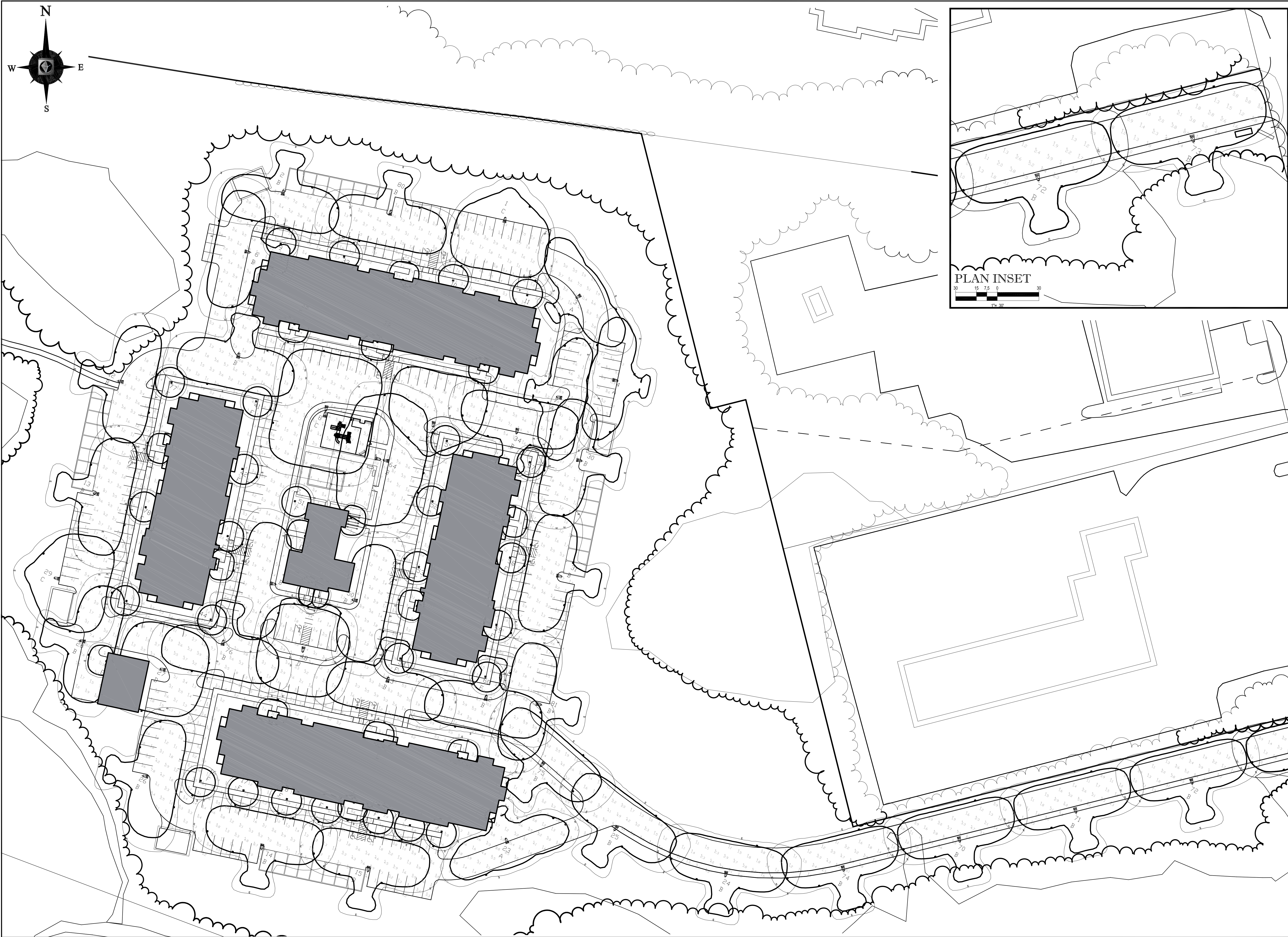
#	DATE	DESCRIPTION	INIT

JOB NO:

0510

SHEET:

9 of 14



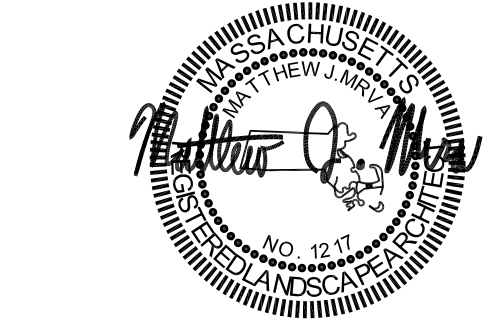
PREPARED FOR:
88 CORP.
31 Whitewood Road
Milford, MA 01757

TITLE:
LIGHTING PLAN


Bohler Project No. W171217

PREPARED BY:

 **BOHLER**
ENGINEERING
352 Turnpike Road
Southborough, MA 01772
(508) 480-9900



PROFESSIONAL LANDSCAPE ARCHITECT

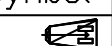
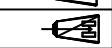
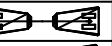

SCALE: 1"=40' FEET


DATE: March 29, 2018

REVISIONS			
#	DATE	DESCRIPTION	INIT

JOB NO: 0510 SHEET: 10 of 14

Calculation Summary											
Label	CalcType	Units	Avg	Max	Min	Avg/Min	Max/Min	Description	PtSpCL	PtSpCL	Meter Type
CalcPts_1	Illuminance	Fc	216	122	0.2	10.80	61.00	Readings taken @ 0'-0" AFG	10	10	Horizontal

Luminaire Schedule													
Symbol	Tag	Qty	Label	Arrangement	Lum. Lumens	Arr. Lum. Lumens	LLF	Description	Lum. Watts	Arr. Watts	Total Watts	Filename	BUG Rating
	A	4	LDT2T110 D10	SINGLE	12706	12706	1.000	LDT2T110_D10	110.7	110.7	442.8	LDT2T110_D10 - Cool - RAB02511MOD11050.IES	B3-U0-G3
	B	27	LDT3T110 D10	SINGLE	12807	12807	1.000	LDT3T110_D10	110.3	110.3	2978.1	LDT3T110_D10 - Cool - RAB02512MOD11050.IES	B3-U0-G3
	B	1	LDT3T110 D10 x 2 @ 180°	BACK-BACK	12807	25614	1.000	LDT3T110_D10	110.3	220.6	220.6	LDT3T110_D10 - Cool - RAB02512MOD11050.IES	B3-U0-G3
	C	3	LDT4T110 D10	SINGLE	12008	12008	1.000	LDT4T110_D10	110.7	110.7	332.1	LDT4T110_D10 - Cool - RAB02516MOD50.IES	B2-U0-G2
	C	1	LDT4T110 D10 x 2 @ 180°	BACK-BACK	12008	24016	1.000	LDT4T110_D10	110.7	221.4	221.4	LDT4T110_D10 - Cool - RAB02516MOD50.IES	B2-U0-G2
	D	2	LDT5T110 D10	SINGLE	12876	12876	1.000	LDT5T110_D10	110.8	110.8	221.6	LDT5T110_D10 - Cool - RAB02643MOD11050.IES	B3-U0-G2
	E	16	SLIM12	SINGLE	1978	1978	1.000	SLIM12	15.8	15.8	252.8	SLIM12 - Cool - RAB02338MOD50.IES	B1-U0-G0
	F	27	BDLEDRI8	SINGLE	1865	1865	1.000	BDLEDRI8_D10 (42_ ROUND BOLLARD)	17.3	17.3	467.1	BDLEDRI8 - Cool - RAB03691MOD50.IES	B1-U3-G2

Expanded Luminaire Location Summary							
LumNd	Tag	X	Y	MTG HT	Orient	Tilt	
1	C	657137.293	2877743.684	18	284.444	0	
2	B	656934.655	2877673.233	18	284.444	0	
3	A	657232.778	2877706.282	18	58.736	0	
4	A	657302.548	2877651.623	18	194.576	0	
5	B	656965.635	2877513.901	18	284.618	0	
6	B	656931.864	2877605.497	18	194.931	0	
7	A	657258.455	2877612.364	18	14.036	0	
8	C	657064.626	2877502.453	18	104.444	0	
8	C	657065.374	2877499.547	18	284.444	0	
9	F	656955	2877626	3.5	104.444	0	
10	F	657119	2877668	3.5	104.444	0	
11	F	657189	2877687	3.5	104.444	0	
12	B	656873.868	2877438.854	18	14.618	0	
13	B	656900.745	2877331.825	18	14.618	0	
14	B	657196.286	2877097.401	18	104.599	0	
15	B	657297.392	2877123.649	18	104.599	0	
16	F	657115	2877130	3.5	284.599	0	
17	F	657156	2877140	3.5	284.826	0	
18	F	657197	2877151	3.5	284.599	0	
19	F	657235	2877161	3.5	284.599	0	
20	F	657284	2877174	3.5	284.599	0	
21	F	657314	2877181	3.5	284.599	0	
22	F	657344	2877189	3.5	284.599	0	
23	A	657402.728	2877209.908	18	316.312	0	
24	B	657607.151	2877271.706	18	104.583	0	
25	B	657492.099	2877264.11	18	79.583	0	
26	B	657063.532	2877109.748	18	15.124	0	
27	D	657033.468	2877209.306	18	11.768	0	
28	B	656951.755	2877199.402	18	12.907	0	
29	C	656903.451	2877242.379	18	14.618	0	
30	B	657306.258	2877567.547	18	194.576	0	
31	B	657338.258	2877459.547	18	194.576	0	
32	C	657163.626	2877534.453	18	104.444	0	
33	F	657015	2877642	3.5	98.899	0	
34	B	657238.549	2877563.743	18	104.497	0	
35	E	656943.434	2877399.883	8	193.181	0	
36	E	657035.613	2877322.806	8	14.618	0	
37	E	657075.539	2877647.165	8	104.444	0	
38	E	657001.042	2877562.838	8	284.444	0	
39	E	657080.042	2877582.838	8	284.444	0	
40	E	657182.042	2877608.838	8	284.444	0	
41	F	657001	2877480	3.5	14.618	0	
42	F	657018	2877416	3.5	14.618	0	
43	F	657034	2877352	3.5	14.618	0	
44	F	657054.99	2877272.906	3.5	14.618	0	
45	E	657100.523	2877385.088	8	194.618	0	
46	E	657131.525	2877343.276	8	284.599	0	
47	E	657129.696	2877417.417	8	14.497	0	
48	D	657147.562	2877285.116	18	104.599	0	
49	B	657095.57	2877330.889	18	194.618	0	
50	B	657168.606	2877350.504	18	14.497	0	
51	F	657076.976	2877410.655	3.5	14.618	0	
52	F	657195.334	2877469.224	3.5	193.707	0	
53	F	657211.603	2877406.995	3.5	194.497	0	
54	F	657234.787	2877320.362	3.5	194.497	0	
55	F	657181.912	2877527.386	3.5	194.497	0	
56	E	657226.588	2877372.529	8	194.497	0	
57	F	657262.359	2877544.414	3.5	14.497	0	
58	F	657286.023	2877453.936	3.5	14.497	0	
59	F	657303.016	2877390.297	3.5	14.497	0	
60	F	657315.677	2877340.984	3.5	14.497	0	
61	E	657269.619	2877484.713	8	14.497	0	
62	B	657324.531	2877325.004	18	285.426	0	
63	B	657232.423	2877298.803	18	284.599	0	
64	B	657135.878	2877483.964	18	14.497	0	
64	B	657132.392	2877483.062	18	194.497	0	
65	E	657330.157	2877260.664	8	104.507	0	
66	E	657250.34	2877240.538	8	104.253	0	
67	E	657149.049	2877214.816	8	104.599	0	
68	E	657256.122	2877176.661	8	284.599	0	
69	E	656982.912	2877192.713	8	194.321	0	
70	B	657794.18	2877401.46	18	130.333	0	
71	B	657881.791	2877475.954	18	130.333	0	
72	B	657969.401	2877550.448	18	130.333	0	
73	B	658057.012	2877624.942	18	130.333	0	
74	B	657706.608	2877326.921	18	130.333	0	
75	B	657401.347	2877287.645	18	75.056	0	
76	B	657074.88	2877260.357	18	284.599	0	
77	F	656920.177	2877460.027	3.5	194.618	0	
78	F	656951.089	2877341.913	3.5	194.618	0	
79	F	656974.516	2877253.084	3.5	194.618	0	
80	B	657035.7	2877701.659	18	284.444	0	
81	B	657375.352	2877340.457	18	194.576	0	
Total Quantity: 83							

NOTES:

* The light loss factor (LLF) is a product of many variables, only lamp lumen depreciation (LLD) has been applied to the calculated results unless otherwise noted. The LLD is the result (quotient) of mean lumens / initial lumens per lamp manufacturers' specifications.

* Illumination values shown (in footcandles) are the predicted results for planes of calculation either horizontal, vertical or inclined as designated in the calculation summary. Meter orientation is normal to the plane of calculation.

* The calculated results of this lighting simulation represent an anticipated prediction of system performance. Actual measured results may vary from the anticipated performance and are subject to means and methods which are beyond the control of RAB Lighting Inc.

* Mounting height determination is job site specific, our lighting simulations assume a mounting height (insertion point of the luminaire symbol) to be taken at the top of the symbol for ceiling mounted luminaires and at the bottom of the symbol for all other luminaire mounting configurations.

* It is the Owner's responsibility to confirm the suitability of the existing or proposed poles and bases to support the proposed fixtures, based on the weight and EPA of the proposed fixtures and the owner's site soil conditions and wind zone. It is recommended that a professional engineer licensed to practice in the state the site is located be engaged to assist in this determination.

* The landscape material shown hereon is conceptual, and is not intended to be an accurate representation of any particular plant, shrub, bush, or tree, as these materials are living objects, and subject to constant change. The conceptual objects shown are for illustrative purposes only. The actual illumination values measured in the field will vary.

* Photometric model elements such as buildings, rooms, plants, furnishings or any architectural details which impact the dispersion of light must be detailed by the customer documents for inclusion in the RAB lighting design model. RAB is not responsible for any inaccuracies caused by incomplete information on the part of the customer, and reserves the right to use best judgement when translating customer requests into photometric studies.

* RAB Lighting Inc. luminaire and product designs are protected under U.S. and International intellectual property laws. Patents issued or pending apply.

The Lighting Analysis, ezLayout, Energy Analysis and/or Visual Simulation ("Lighting Design") provided by RAB Lighting Inc. ("RAB") represents an anticipated prediction of lighting system performance based upon design parameters and information supplied by others. These design parameters and information provided by others have not been field verified by RAB and therefore actual measured results may vary from the actual field conditions. RAB recommends that design parameters and other information be field verified to reduce variation.

RAB neither warranties, either implied or stated with regard to actual measured light levels or energy consumption levels as compared to those illustrated by the Lighting Design. RAB neither warranties, either implied or stated, nor represents the appropriateness, completeness or suitability of the Lighting Design. Intent as compliant with any applicable regulatory code requirements with the exception of those specifically stated on drawings created and submitted by RAB. The Lighting design is issued, in whole or in part, as advisory documents for informational purposes and is not intended for construction nor as being part of a project's construction documentation package.

POTENTIAL RAB LIGHTING FIXTURES FOR BIRCH PLACE, MILFORD



LED LOTBLASTER Type II Area Lights
PARKING LOT LIGHTS ON 18' POLES

LED 20 Watt Bollards

42" high rectangular Bollard with (1) 20 Watt LE
WA

WALKWAY BOLLARD LIGHTS



LED Wall Sconces

18 Watt LED wall sconce

EXTERIOR LIGHT AT BUILDING DOORWAYS



PREPARED FOR:

88 CORP.
31 Whitewood Road
Milford, MA 01757

TITLE:

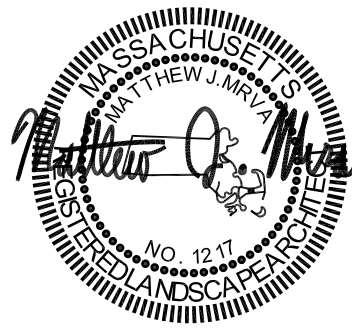
LIGHTING DETAIL PLAN

Bohler Project No. W171217

PREPARED BY:

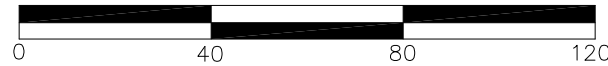


352 Turnpike Road
Southborough, MA 01772
(508) 480-9900



PROFESSIONAL LANDSCAPE ARCHITECT

SCALE: 1"=40 FEET

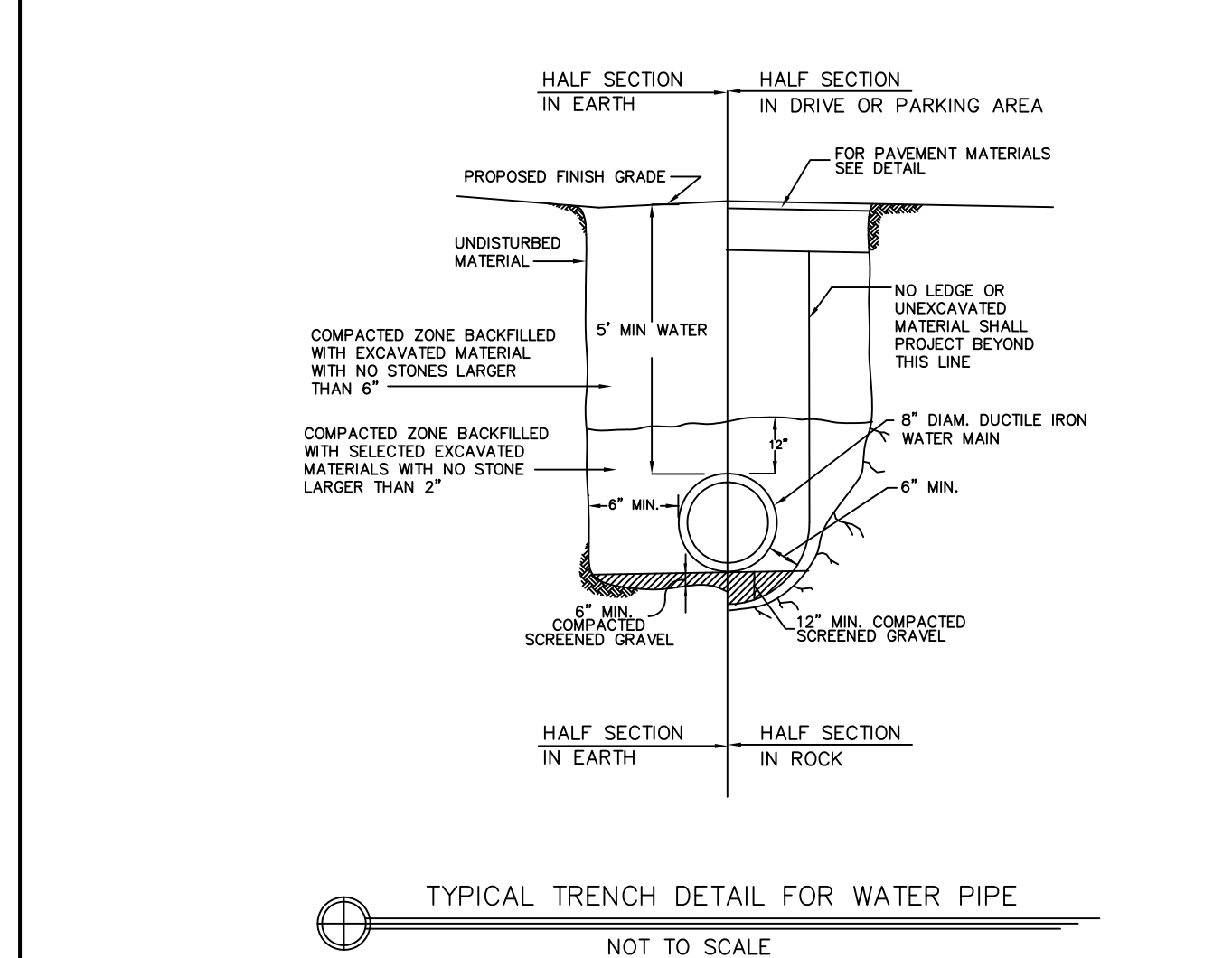
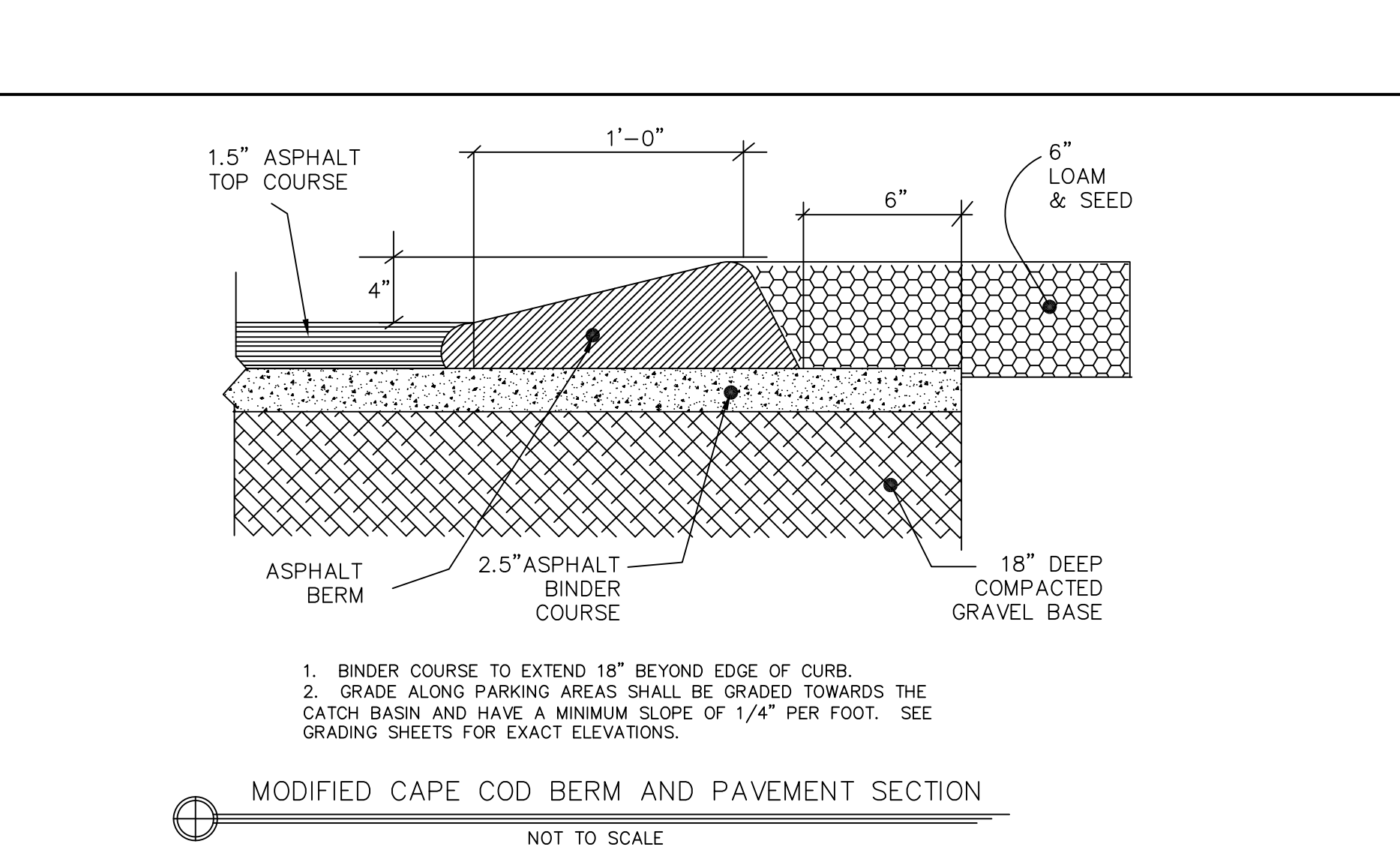
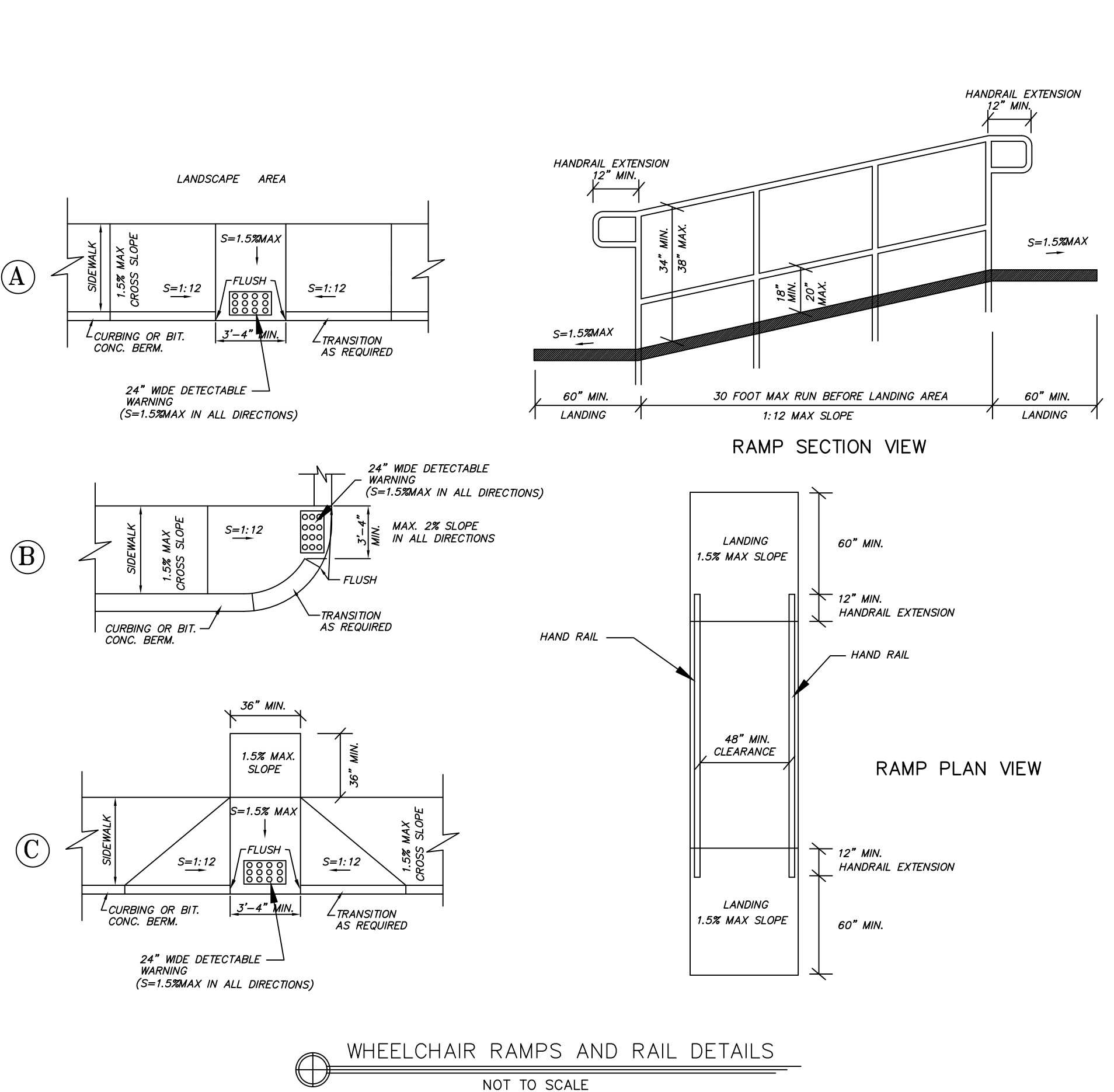
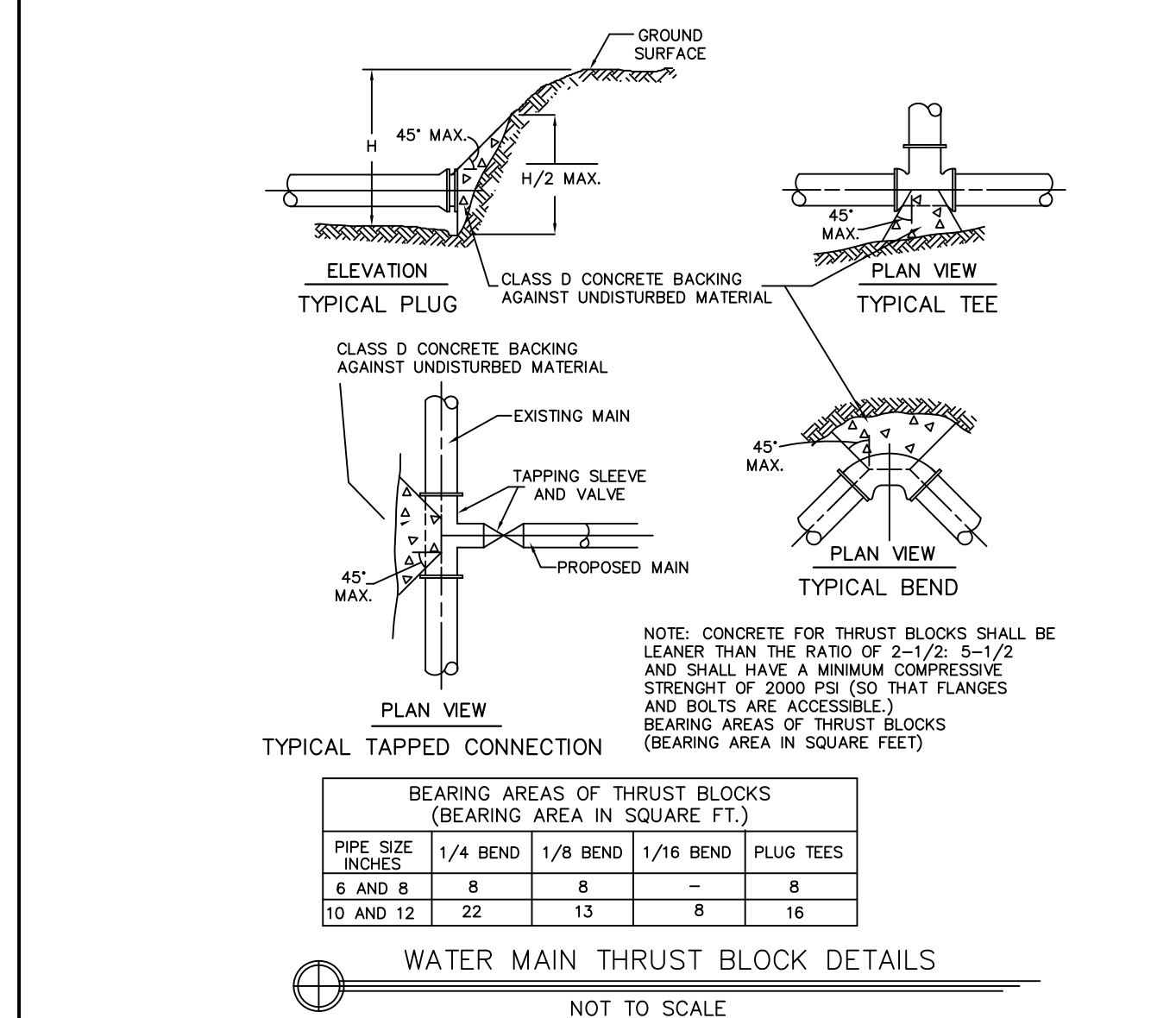
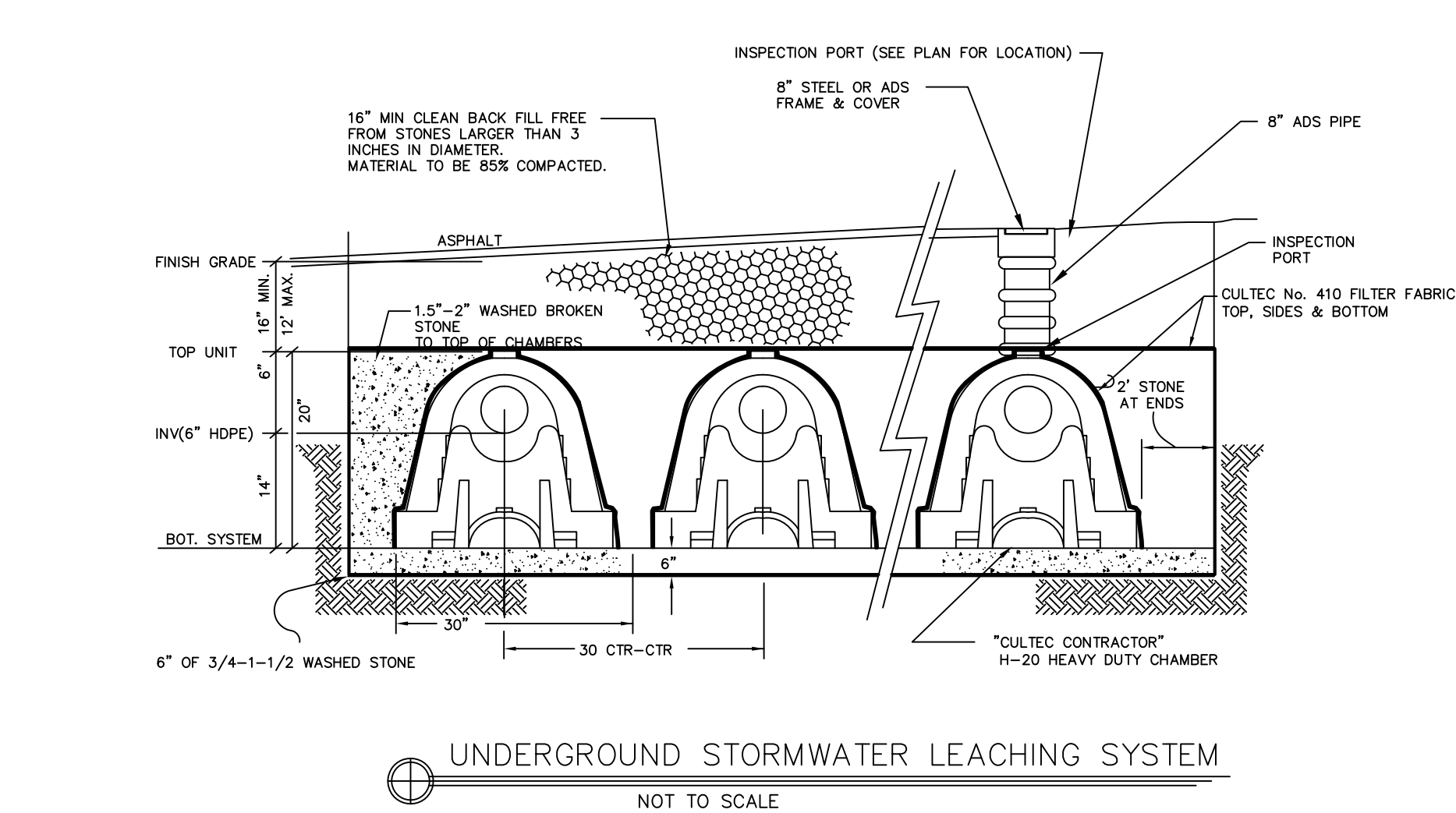
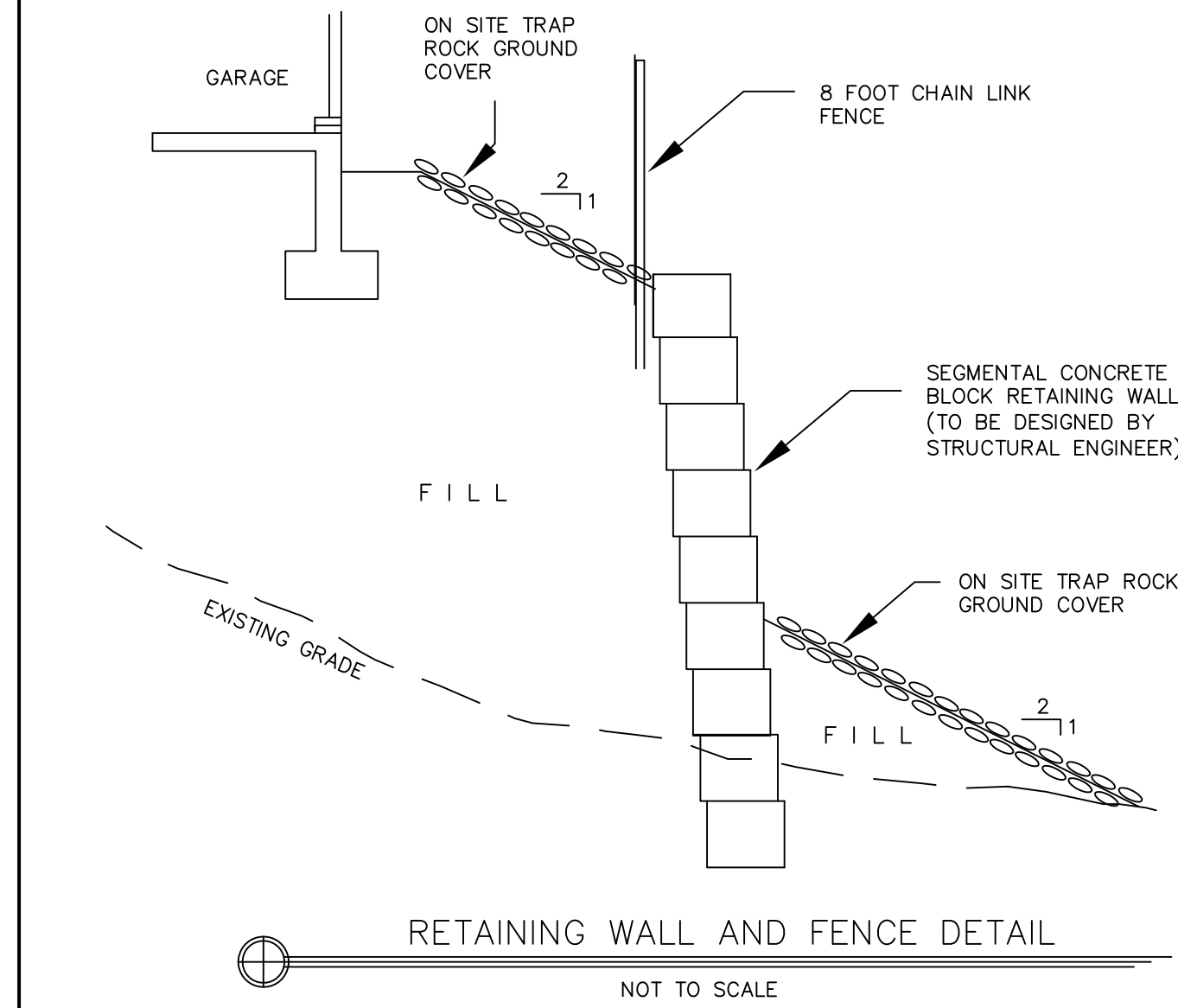
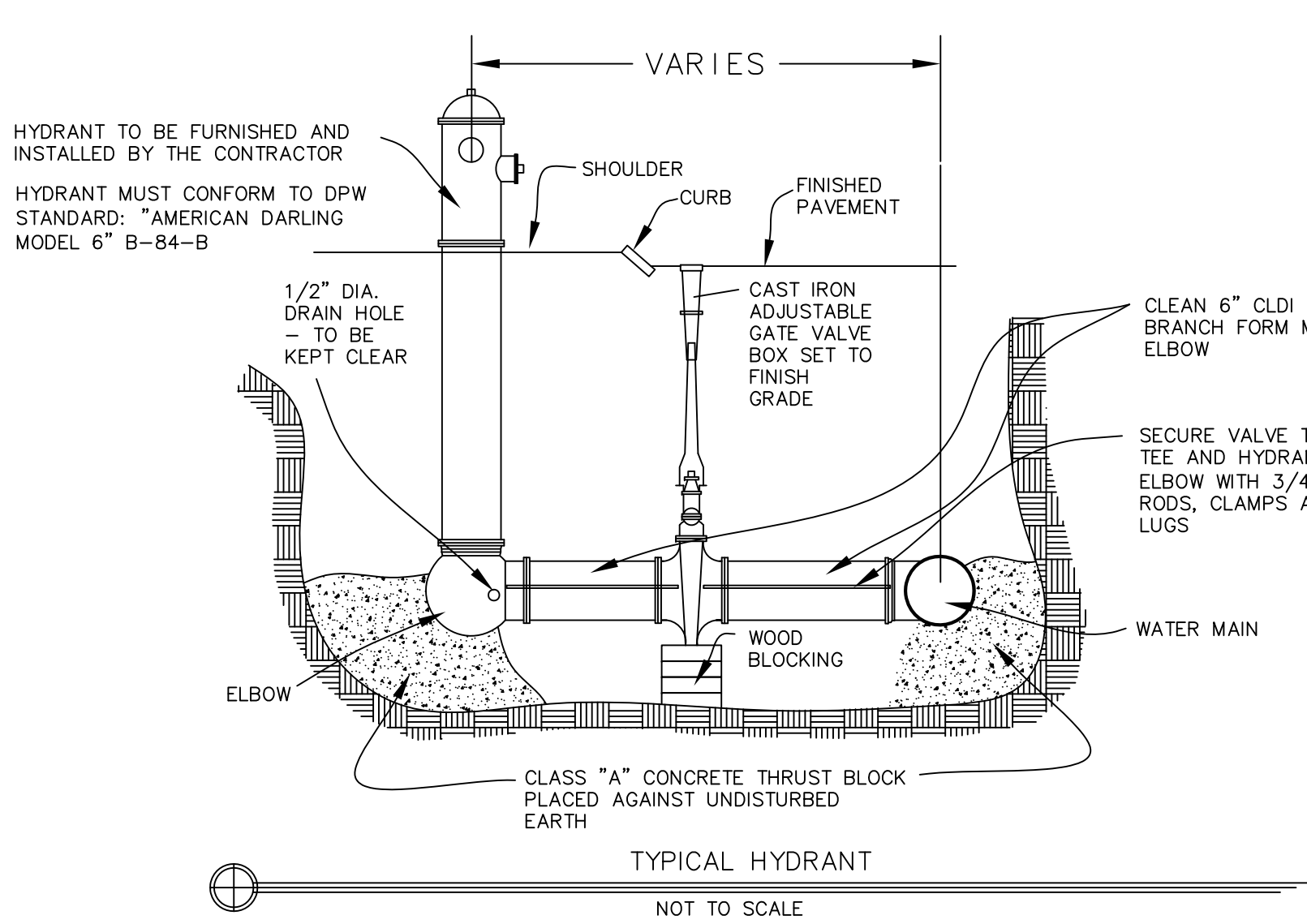
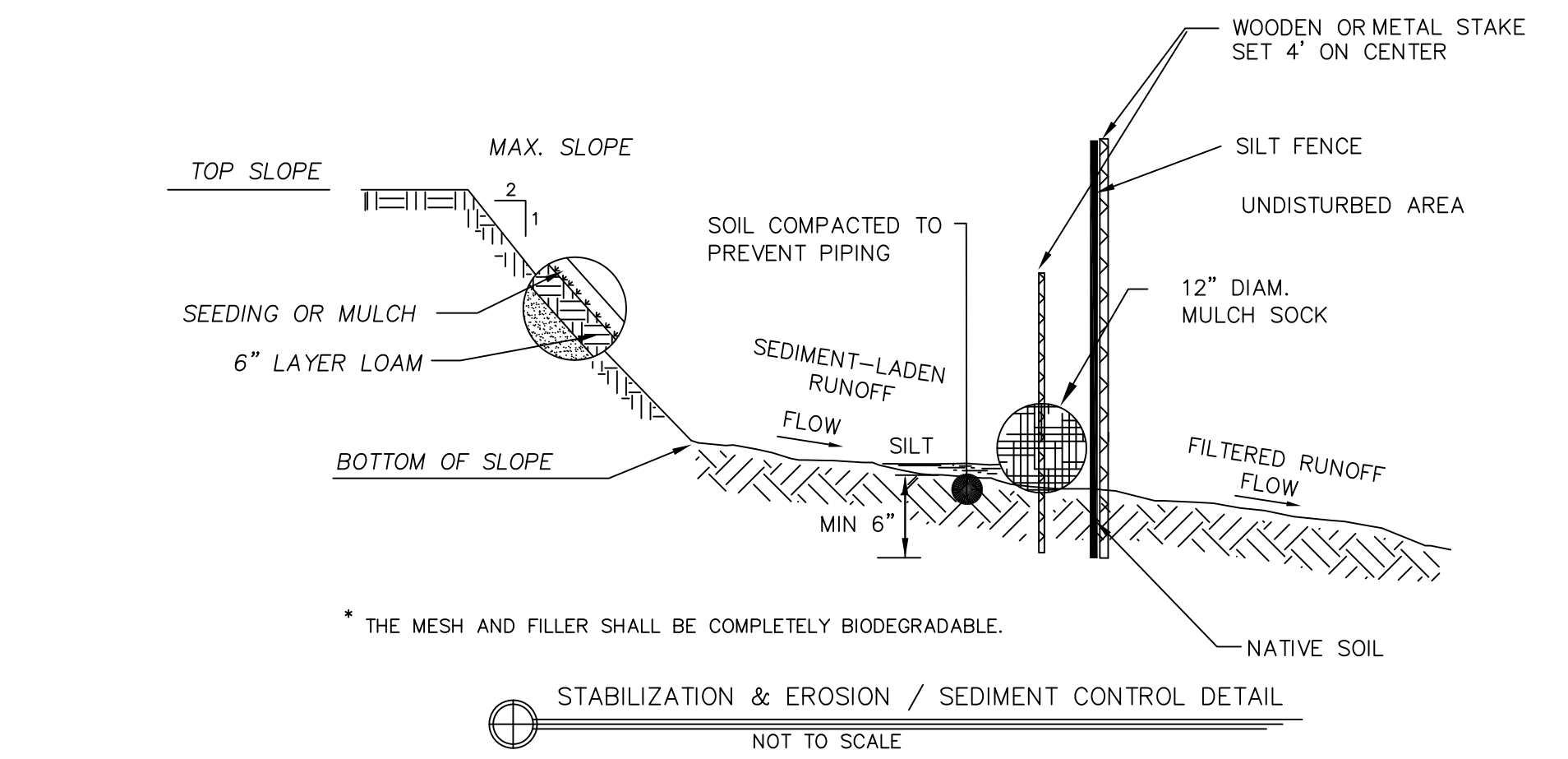
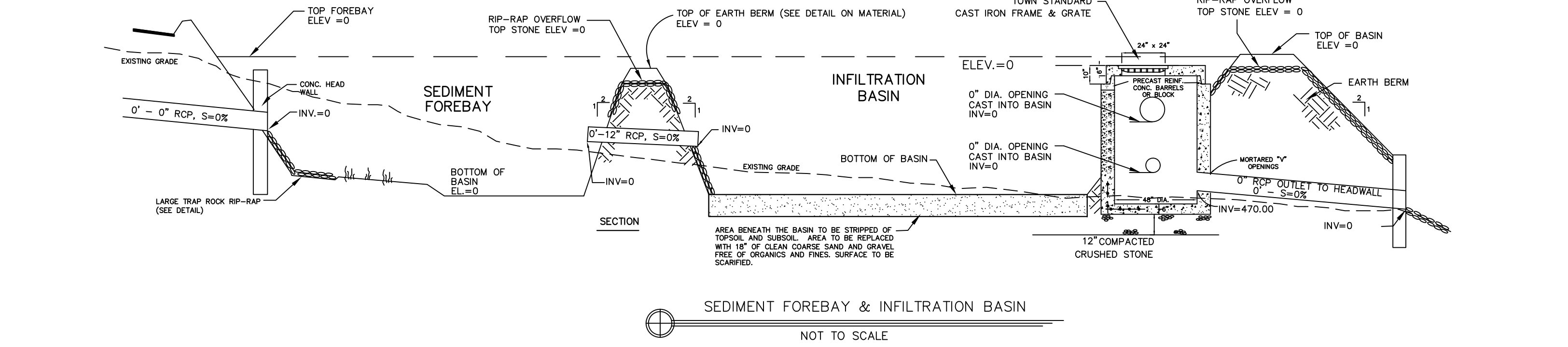
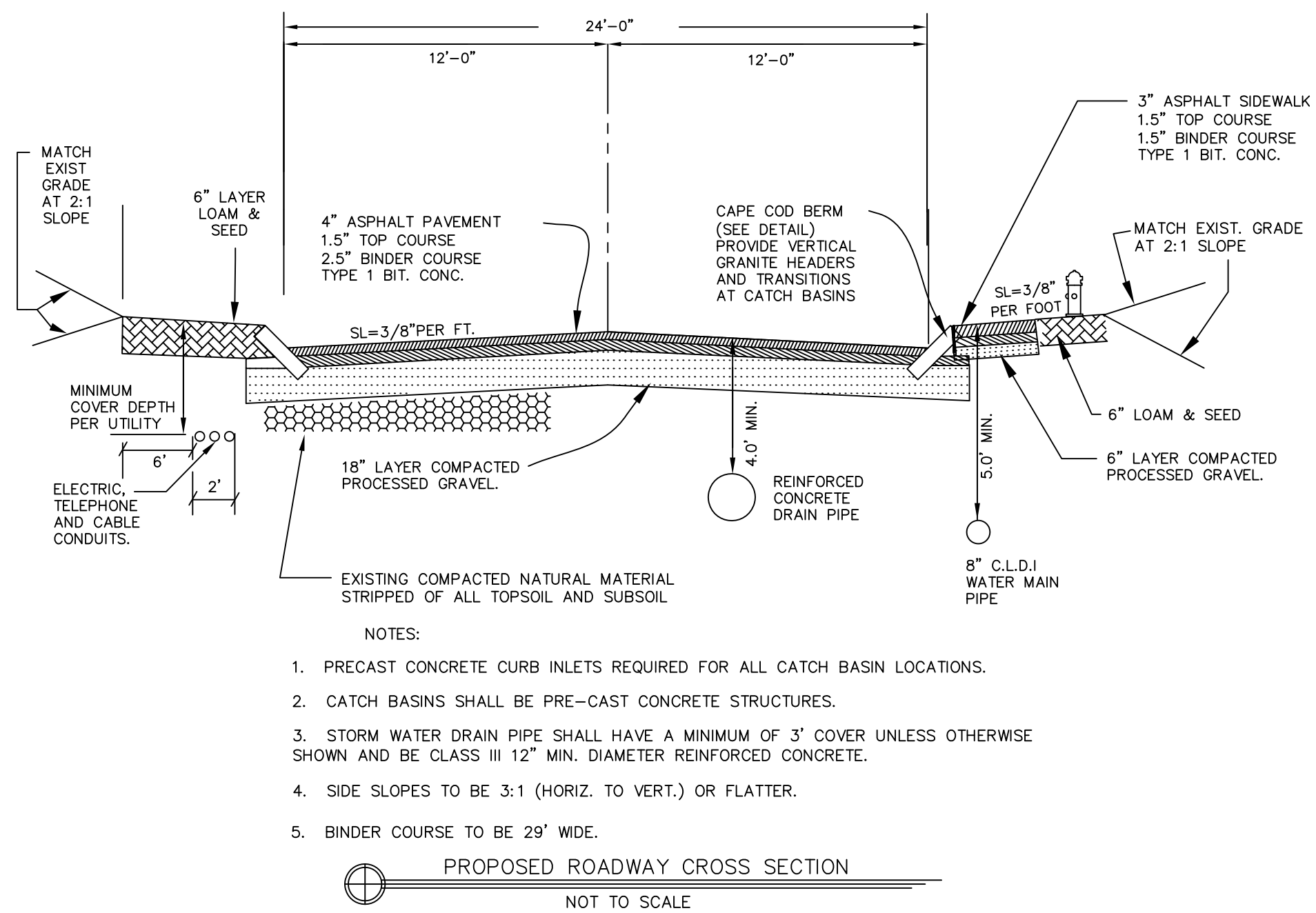


DATE: March 29, 2018

REVISIONS

#	DATE	DESCRIPTION	INT

JOB NO: 0510 SHEET: 11 of 14



NOT FOR CONSTRUCTION

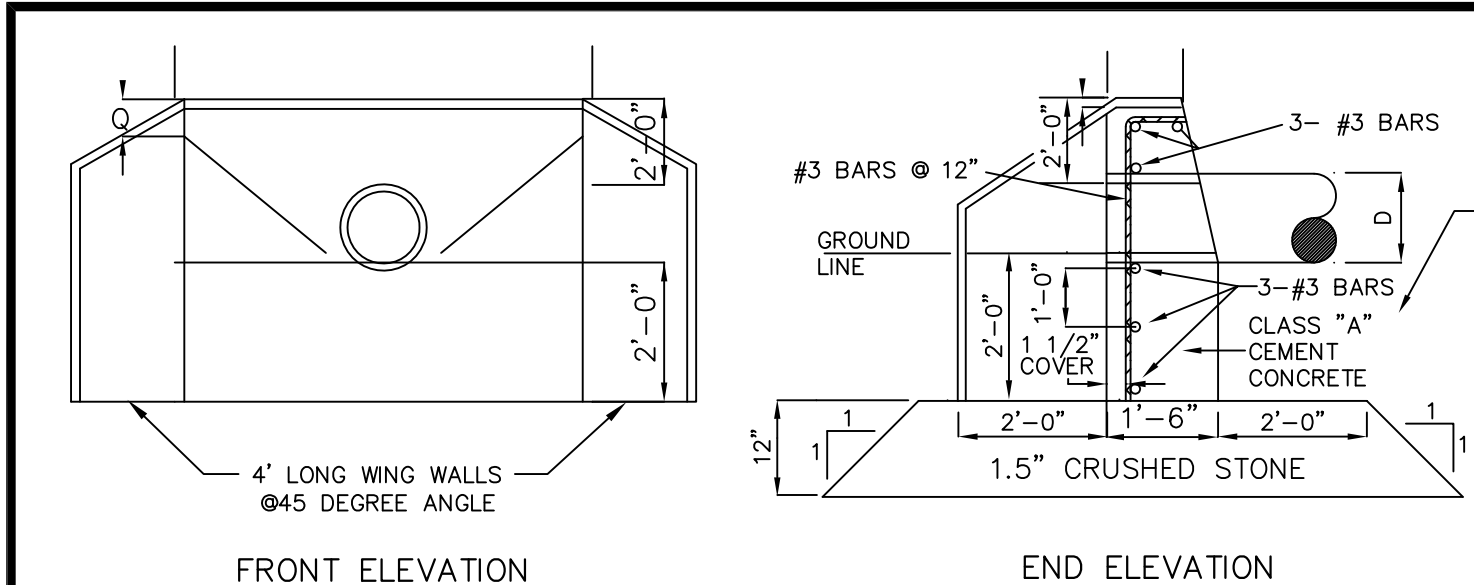
LEGEND	
— 256 —	EXISTING CONTOUR
— 256 —	PROPOSED CONTOUR
x 177.5	EXIST. SPOT GRADE
x 177.5	PROP. SPOT GRADE
—	PROP. SURFACE WATER FLOW
⊙	DRAINAGE MANHOLE
—	DRAIN LINE
—	UTILITY POLE
GW	GUY WIRE
— OHW —	OVERHEAD WIRES
—	EROSION CONTROL
— ETC —	ELECTRIC, TELEPHONE & CABLE LINE
—	STONE WALL
EQP	EDGE OF PAVEMENT
FND.	FOUND
N/F	NOW OR FORMERLY
DH	DRILLHOLE
I.P.	IRON PIPE/IRON PIN
A.P.	ASSESSORS PARCEL
BK. PG.	DEED BOOK/PAGE
● B	BOLLARD
—	BUILDING
—	EXISTING TREE LINE
—	EDGE OF WETLAND

PREPARED FOR:
88 CORP.
31 Whitewater Road
Milford, MA 01757

TITLE:
Preliminary
CONSTRUCTION DETAIL
PLAN
For
"Birch Street Place"
In
Milford, Massachusetts

PREPARED BY:
ALLEN ENGINEERING
& ASSOCIATES, INC.
Civil Engineers - Surveyors
Land Development Consultants
One Charlesview Road
Suite 2
Hopedale, Ma 01747
(508) 381-3212 • Phone
www.allen-ea.com

PROFESSIONAL ENGINEER
SCALE: 1"=80 FEET
DATE: March 29, 2018
REVISIONS
DATE DESCRIPTION INIT
JOB NO: 0510 SHEET: 12 of 14

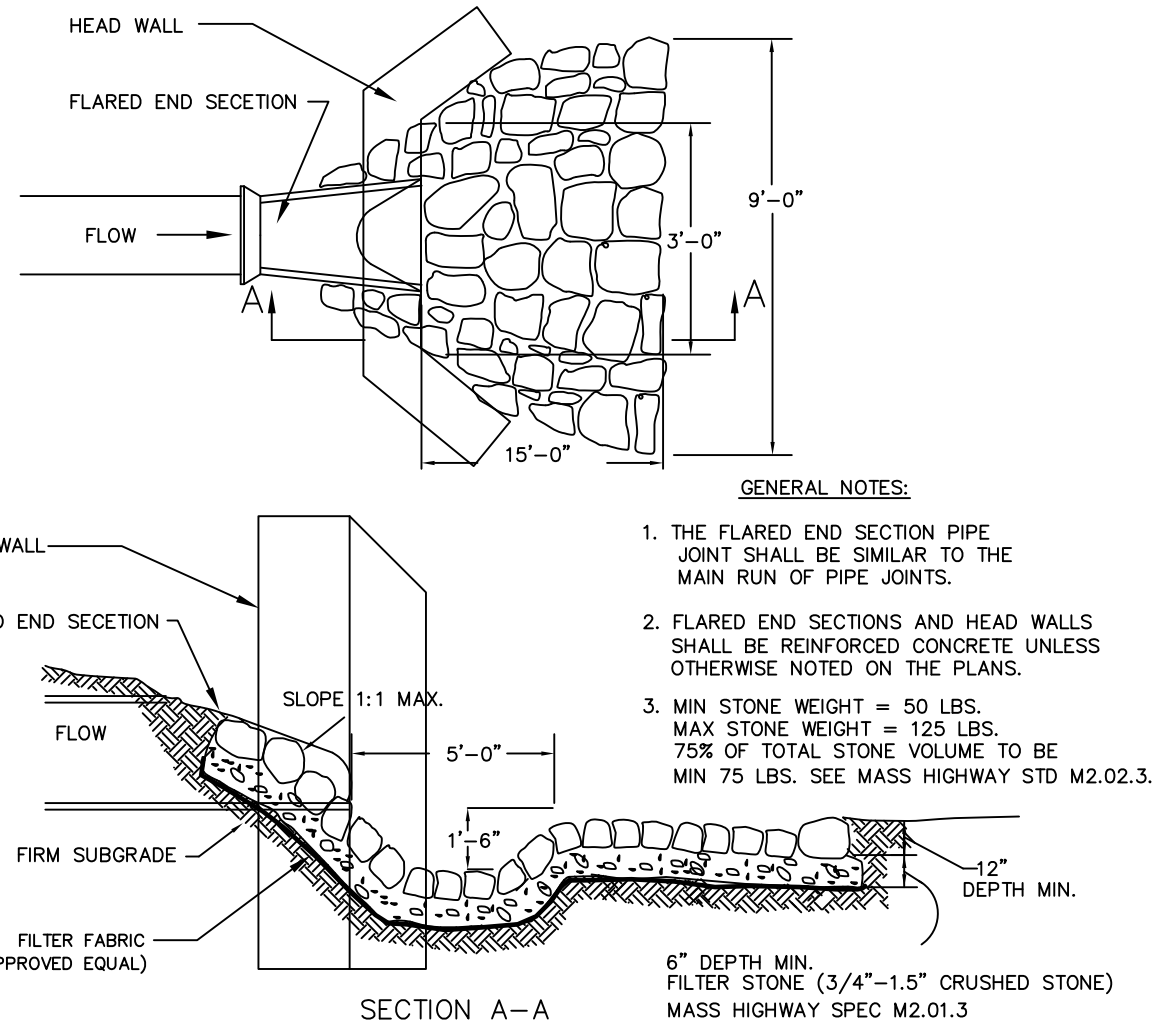


INCH EQUIV. DEPTH	1:5:1 SLOPE					2:1 SLOPE					INCH EQUIV. DEPTH
	PIPE DIAM.										
CU. FT.	D	L	C&C OR FSH CU. YDS.	STEEL LBS.	D	L	C&C OR FSH CU. YDS.	STEEL LBS.	CU. FT.		
26.25	12"	5'-6"	1.08	21	7'-6"	1.49	29	33.25			
29.75	15"	6'-6"	1.34	24	8'-9"	1.82	32	37.63			
33.25	18"	7'-6"	1.61	30	10'-0"	2.18	39	42.00			
37.35	21"	8'-8"	1.95	34	11'-6"	2.62	43	47.25			
39.38	24"	9'-3"	2.16	35	12'-6"	2.97	50	50.75			
43.75	30"	10'-6"	2.63	44	15'-0"	3.86	62	59.50			
Q	4" FOR 1:5:1 SLOPE				6" FOR 2:1 SLOPE						

NOTE:
1. ALL DIMENSIONS AND QUANTITIES SHOWN ARE MINIMUM.

DRAIN OUTLET FOR HEADWALL W/ RIP RAP

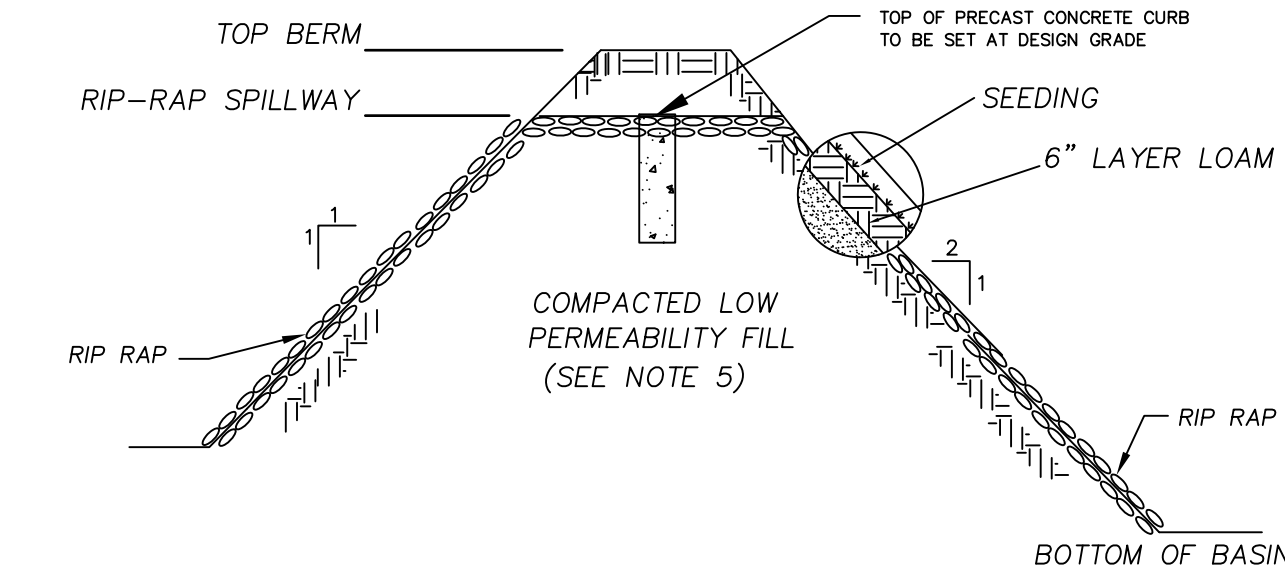
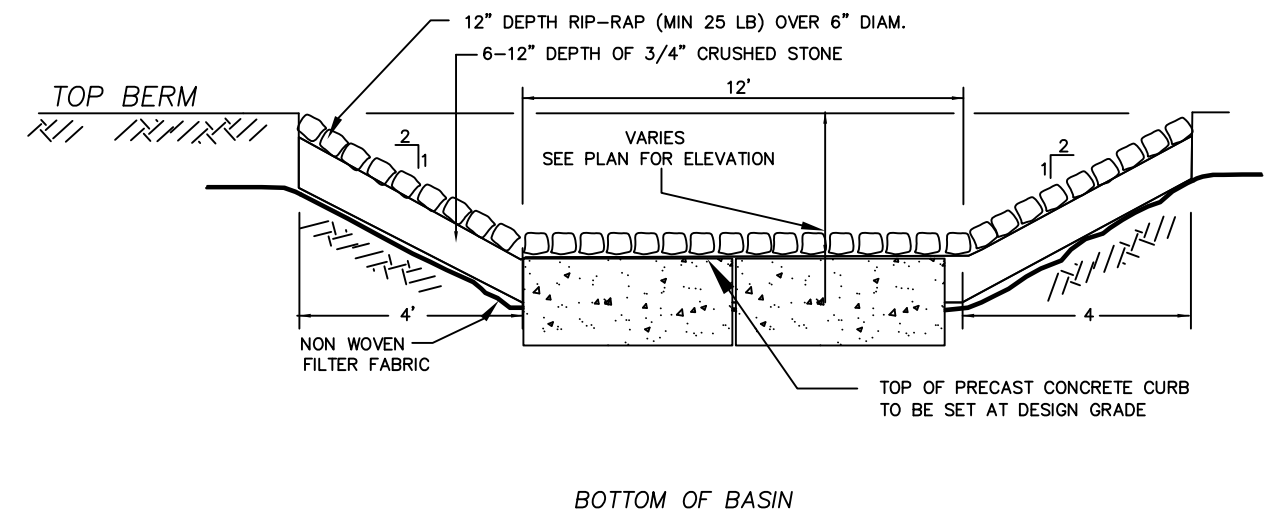
NOT TO SCALE



- GENERAL NOTES:
1. THE FLARED END SECTION PIPE JOINT SHALL BE SIMILAR TO THE MAIN RUN OF PIPE JOINTS.
 2. FLARED END SECTIONS AND HEAD WALLS SHALL BE REINFORCED CONCRETE UNLESS OTHERWISE NOTED ON THE PLANS.
 3. MIN STONE WEIGHT = 50 LBS. MAX STONE WEIGHT = 125 LBS. 75% OF TOTAL STONE VOLUME TO BE MIN 75 LBS. SEE MASS HIGHWAY STD M2.02.3.

6" DEPTH MIN. FILTER STONE (3/4"-1.5" CRUSHED STONE) MASS HIGHWAY SPEC M2.01.3

OUTLET



NOTES:

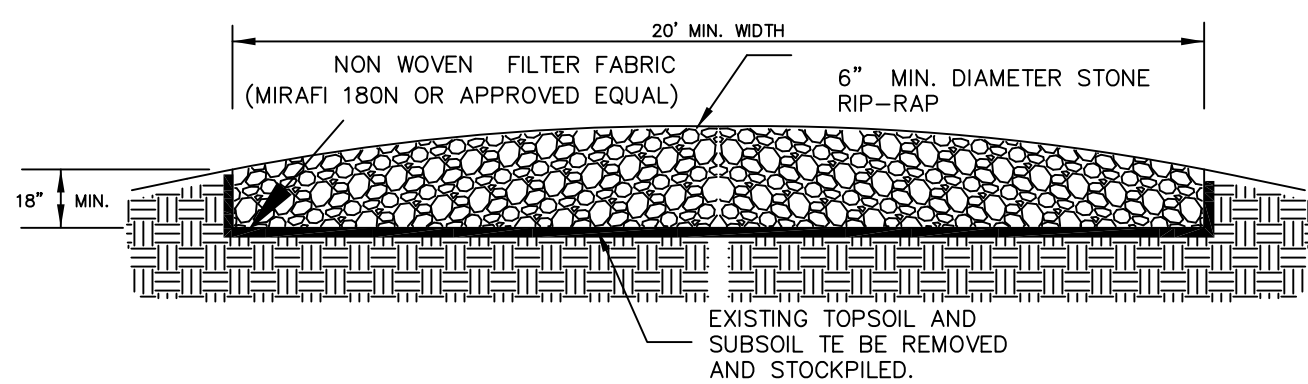
1. ALL WORK IS TO BE STAKED AND INSPECTED BY THE DESIGN ENGINEER.
2. AREAS UNDER THE EMBANKMENT AND ANY STRUCTURAL WORKS SHALL BE CLEARED.
3. NO PIPE SHALL BE LAID ON ROCK. ALL ROCK SHALL BE OVERCAVATED TO A MINIMUM OF 18" BELOW THE PROPOSED INVERT AND BE REPLACED BY COMPACTED LOW PERMEABILITY FILL.
4. ALL STRUCTURES TO MEET A.S.T.M.D. C 478 LATEST REVISION.
5. COMPACTED LOW PERMEABILITY FILL MATERIAL SHALL BE WELL GRADED, SILTY, GRAVELLY SAND WITH A MINIMUM OF 15% PASSING SIEVE #200. FILL SHALL BE FREE OF STONES GREATER THAN 6" IN DIA., ORGANIC MATTER, CONSTRUCTION DEBRIS, SNOW, OR FROZEN SOIL. MATERIAL SHALL BE REPLACED IN LAYERS NOT EXCEEDING 6" IN THICKNESS, AND SHALL BE COMPACTED BY

CONTINUOUS PASSES WITH HEAVY DOZERS, HAULING EQUIPMENT AND APPROPRIATE COMPACTORS. MINIMUM DEGREE OF COMPACTION SHALL BE 95% OF MAXIMUM DRY DENSITY AS SPECIFIED BY A.S.T.M. D1557C.

6. 12 FOOT WIDE EMERGENCY SPILLWAY TO BE RIP-RAPPED WITH 3:1 SIDE SLOPES.
7. THE EMBANKMENT WILL BE CONSTRUCTED TO THE DESIGN ELEVATION PLUS 0.5 FEET TO ALLOW FOR SETTLEMENT.
8. A MINIMUM OF 1.0 FEET OF COMPACTED BACKFILL SHALL BE PLACED OVER THE CONDUIT BEFORE CROSSING IT WITH CONSTRUCTION EQUIPMENT.
9. SEED MIX TO BE SPREAD AS SOON AS PRACTICAL TO MINIMIZE EROSION.

EARTH BERM WITH RIP RAP SPILLWAY DETAIL

NOT TO SCALE

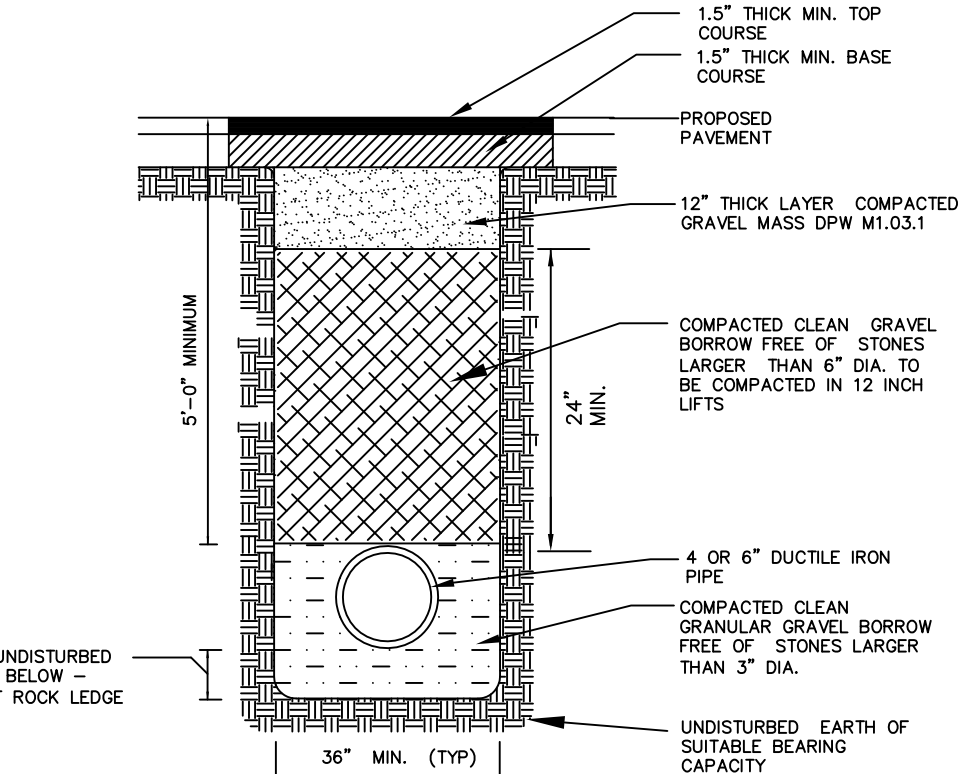


NOTES:

1. MINIMUM DEPTH OF RIP-RAP TO BE 18".
2. RIP-RAP TO BE SHARP ANGULAR ROCK APPROXIMATELY 3" IN DIAMETER.
3. SIZE OF ENTRANCE TO BE A MINIMUM OF 50' FEET LONG AND 30 FEET WIDE.
4. ENTRANCE IS TO BE CLEARED OF SILT AND DEBRIS AFTER EACH MAJOR STORM EVENT.
5. RIP-RAP IS TO BE REMOVED PRIOR TO ACTUAL ROADWAY CONSTRUCTION. THE INTENT OF THIS RIP-RAP ENTRANCE IS TO KEEP EAST STREET FREE OF SILT DURING CONSTRUCTION.

RIP RAP CONSTRUCTION ENTRANCE

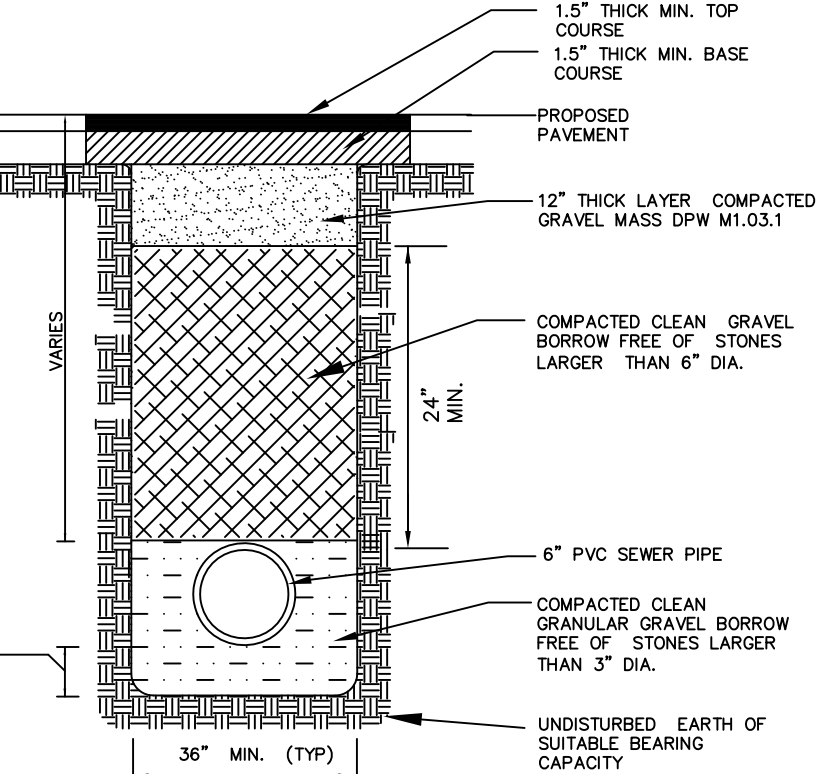
NOT TO SCALE



- NOTES:
1. INSTALLATION OF WATER PIPE TO CONFORM TO FRANKLIN DPW "STANDARD DOCUMENTS FOR WATER MATERIALS AND INSTALLATION, MAY 2013".

TRENCH DETAIL FOR DUCTILE IRON WATER PIPE

NOT TO SCALE

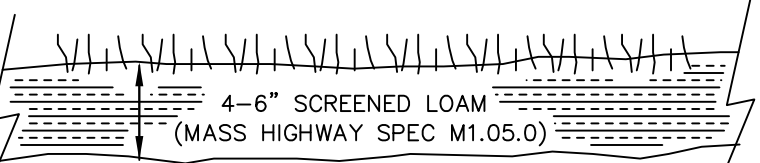


- NOTES:
1. INSTALLATION OF SEWER PIPE TO CONFORM TO FRANKLIN DPW "STANDARD DOCUMENTS FOR SEWER MATERIALS AND INSTALLATION, MAY 2013".
 2. PVC SEWER PIPE AND FITTINGS TO MEET ASTM SPEC. D3034, SDR 35.
 3. CLEAN OUTS TO BE INSTALLED WITH A CAST IRON BOX ASSEMBLY AS MANUFACTURED BY LEBARRON OR APPROVED EQUAL.
 4. COUPLINGS TO BE MANUFACTURED BY "TERNCO" OR APPROVED EQUAL.
 5. JOINTS FOR GRAVITY SEWER SHALL BE BELL AND SPIGOT (PUSH-IN) WITH ELASTOMERIC GASKET SEAL CONFORMING TO ASTM D-3212.

TRENCH DETAIL FOR GRAVITY PVC SEWER PIPE

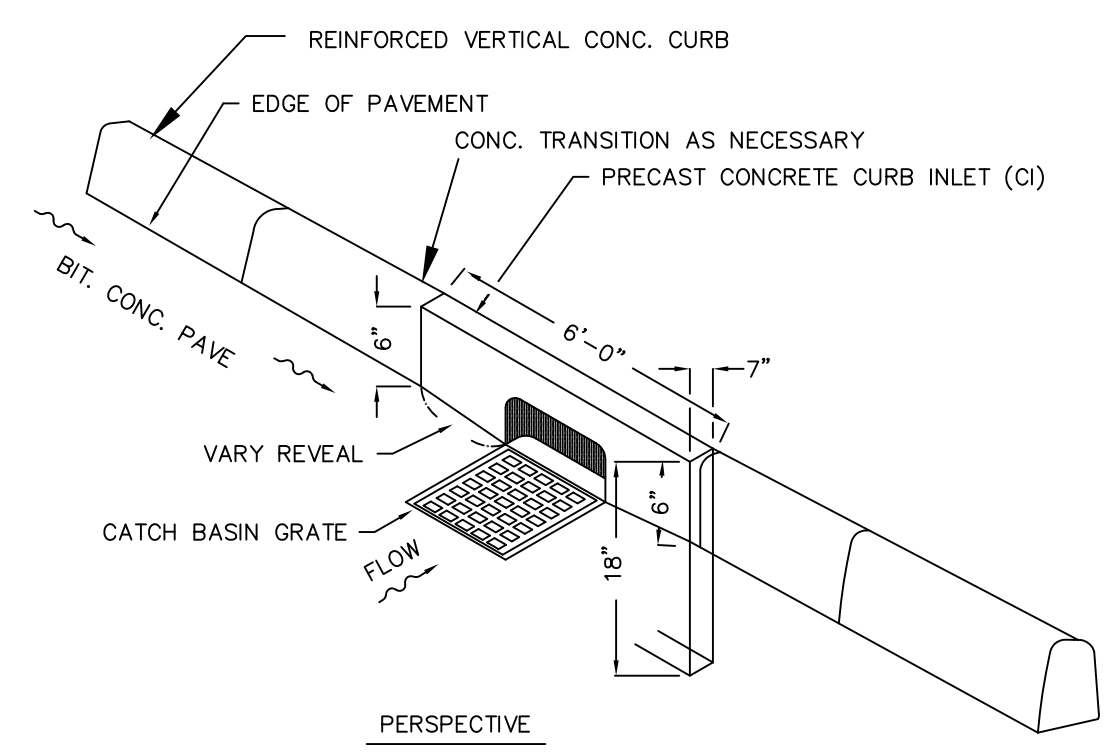
NOT TO SCALE

- NOTE:
1. AREA WITHIN GRASS STRIPS SHALL BE LOAMED WITH A MINIMUM OF 4 INCHES OF COMPACTED DEPTH OF GOOD QUALITY SCREENED LOAM, FREE OF STONES LARGER THAN 2". INSTALLATION SHALL BE PERFORMED IN ACCORDANCE WITH MASS HIGHWAY SPEC 751 & M1.05.0
 2. THE LOAMED AREAS SHALL BE ROLLED AND COMPACTED.
 3. THE LOAMED AREAS SHALL BE FINISHED BY SPREADING QUALITY GRASS SEED OR HYDROSEED. SEEDING SHALL BE DONE BETWEEN APRIL 1 - SEPTEMBER 30 IN ORDER TO INSURE GROWTH.
 4. ALL AREAS DISTURBED BY CONSTRUCTION SHALL BE LOAMED AND SEEDED.
 5. ANY AREAS THAT MY REQUIRE SEED AND/OR MULCH SHALL BE INSTALLED IN CONFORMANCE WITH MASS HIGHWAY SPEC 765 AND/OR M6.

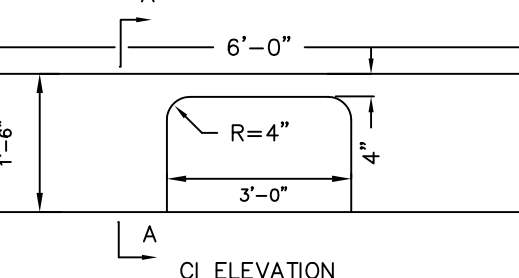


LOAM & SEED DETAIL

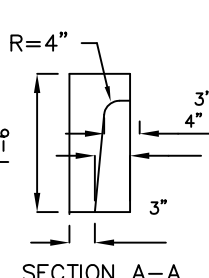
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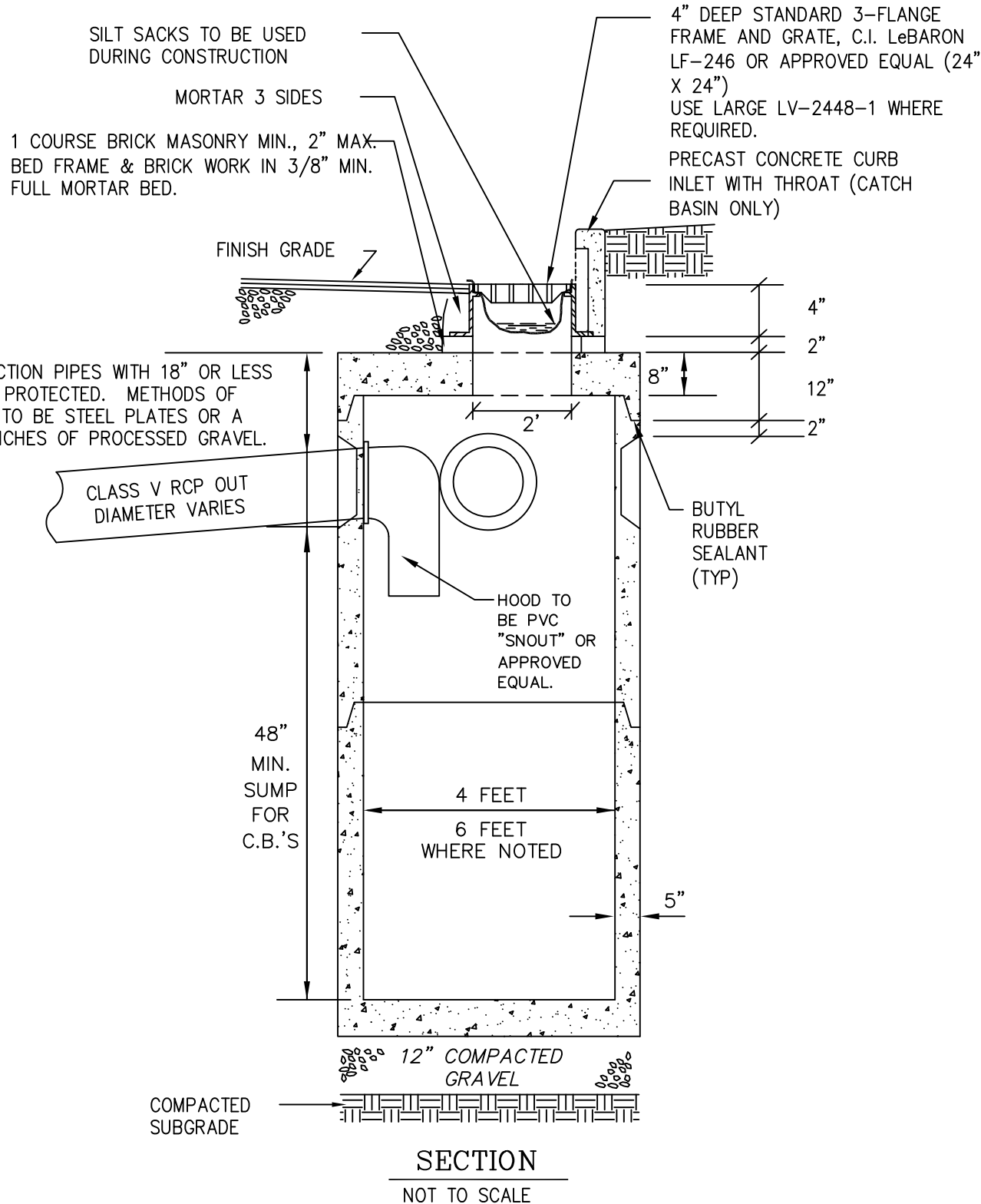
PERSPECTIVE



CI ELEVATION



SECTION A-A



SECTION

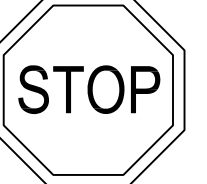
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NOTES:

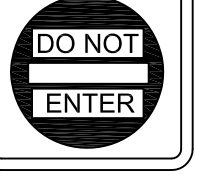
1. CONCRETE: 4,000 PSI MINIMUM AFTER 28 DAYS.
2. ALL STRUCTURES TO BE DESIGNED FOR H-20 LOADING AND SHALL MEET ASTM C478.
3. FRAMES AND GRATES SHALL BE SET AT THE BINDER ELEVATION DURING CONSTRUCTION FOR STORM WATER COLLECTION.
4. PRECAST REINFORCED CONCRETE BASE & LID (SHEA CONCRETE OR APPROVED EQUAL)

DEEP SUMP HOODED CATCH BASIN W/ CURB INLET DETAIL

NOT TO SCALE



R1-1



R5-1



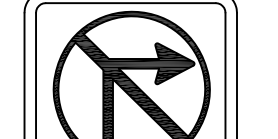
R3-7L



R6-1L



R6-1R



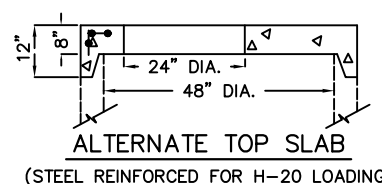
R3-1



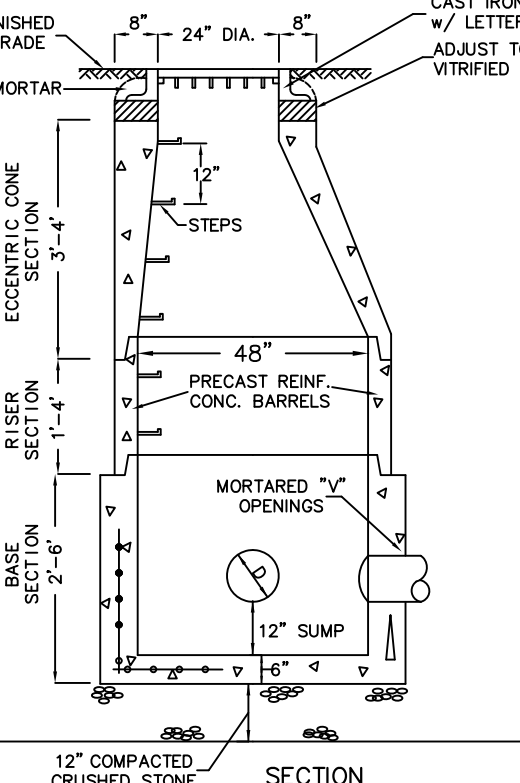
R3-2

STREET SIGN LEGEND

NOT TO SCALE



ALTERNATE TOP SLAB
(STEEL REINFORCED FOR H-20 LOADING)

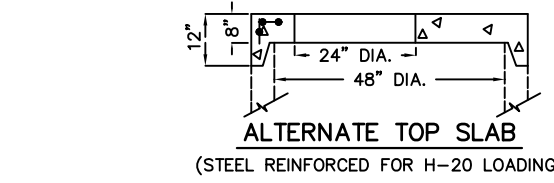


SECTION

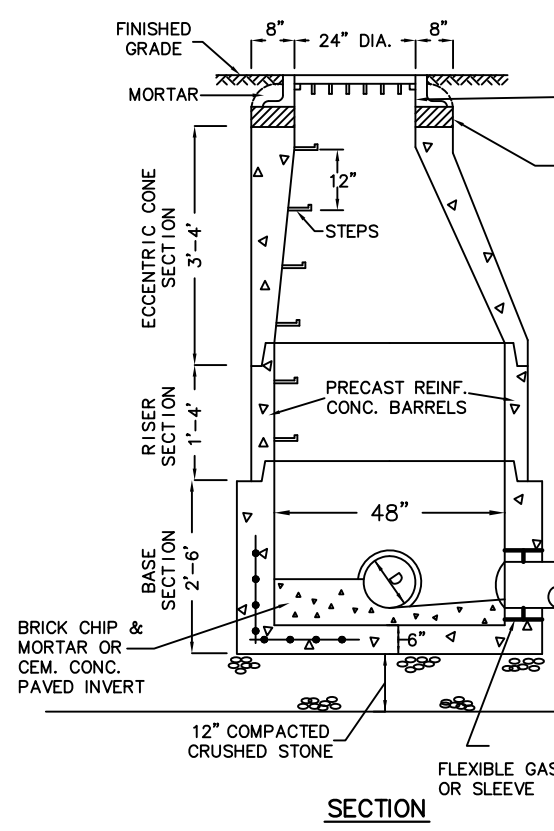
- GENERAL NOTES:
1. REINFORCED STEEL CONFORMS TO LATEST AISC SPEC. 0.12 SQ. IN./LINEAL FT. AND 0.12 SQ. IN. (BOTH WAYS) BASE BOTTOM.
 2. CONCRETE COMPRESSIVE STRENGTH-4000 PSI MIN.
 3. MANHOLE DESIGN-SPECS. CONFORMS TO LATEST ASTM C478 SPEC. FOR "PRECAST REINFORCED CONCRETE MANHOLE SECTIONS".
 4. STEPS SHALL BE STEEL REINFORCED COPOLYMER POLYPROPYLENE ELASTIC PER ASTM C-478, PARA. 11.
 5. "V" PIPE OPENINGS W/ 2" MAX. OUTSIDE PIPE CLEARANCE TO BE CAST AS REQUIRED.
 6. JOINT SEALANT SHALL BE PERFORMED BUTYL RUBBER MASTIC TAPE SEAL THAT COMPLIES W/ AASHTO SPECIFICATION M-198 OR SYNTHETIC RUBBER GASKET THAT COMPLIES W/ C-443 OR C-361.
 7. BASE SECTION SHALL BE ONE FOUR MONOLITHIC.

48" DIAMETER PRECAST DRAIN MANHOLE FOR PIPE DIAMETERS UP TO 24"

NOT TO SCALE



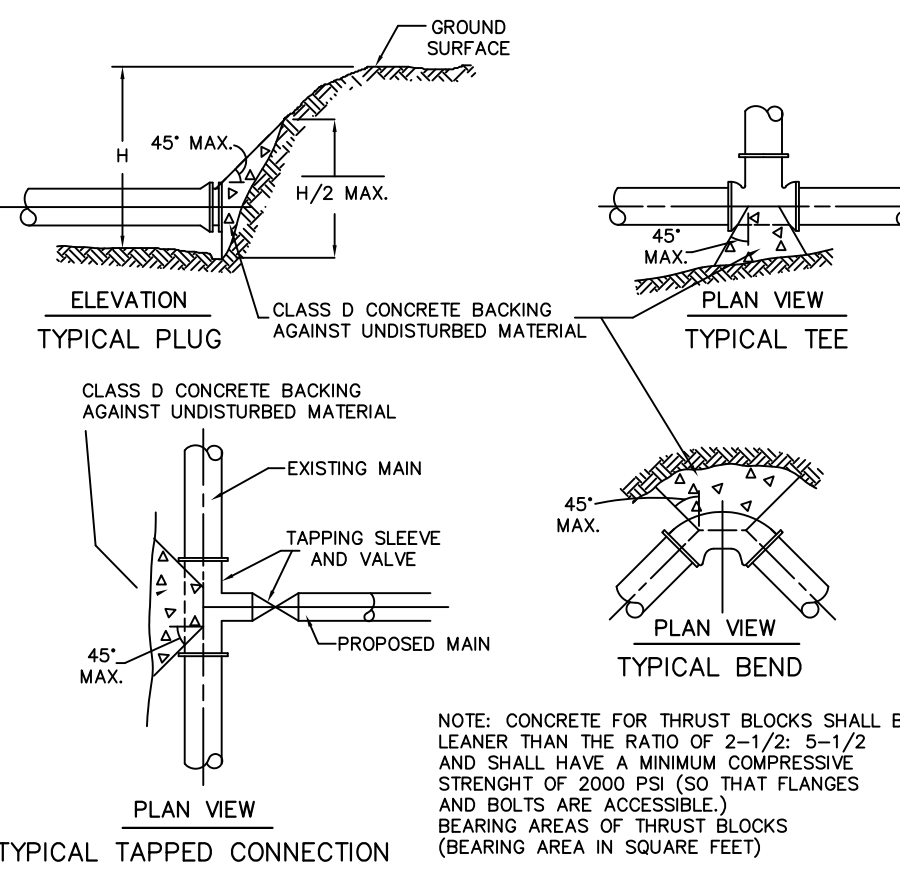
ALTERNATE TOP SLAB
(STEEL REINFORCED FOR H-20 LOADING)



SECTION

SANITARY SEWER MANHOLE

NOT TO SCALE



PIPE SIZE INCHES	1/4 BEND	1/8 BEND	1/16 BEND	PLUG TEES
6 AND 8	8	8	8	8
10 AND 12	22	13	8	16

WATER MAIN THRUST BLOCK DETAILS

NOT TO SCALE



LEGEND

- 256 — EXISTING CONTOUR
- 256 — PROPOSED CONTOUR
- x 177.5 EXIST. SPOT GRADE
- x 177.5 PROP. SPOT GRADE
- — PROP. SURFACE WATER FLOW
- — DRAINAGE MANHOLE
- — DRAIN LINE
- — UTILITY POLE
- — GUY WIRE
- — OVERHEAD WIRES
- — EROSION CONTROL
- — ELECTRIC, TELEPHONE & CABLE LINE
- — STONE WALL
- — EDGE OF PAVEMENT
- — FOUND
- — NOW OR FORMERLY
- — DRILLHOLE
- — IRON PIPE/IRON PIN
- — ASSESSORS PARCEL
- — DEED BOOK/PAGE
- — BOLLARD
- — BUILDING
- — EXISTING TREE LINE
- — EDGE OF WETLAND

PREPARED FOR:

88 CORP.
31 Whitewood Road
Milford, MA 01757

TITLE:

Preliminary
CONSTRUCTION DETAIL
PLAN
For
"Birch Street Place"
In
Milford, Massachusetts

PREPARED BY:

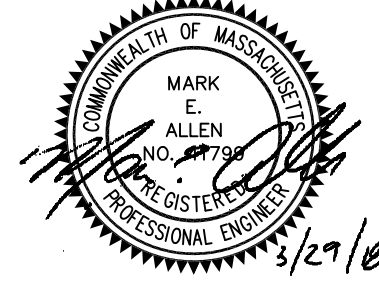


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Land Development Consultants

One Charlesview Road
Suite 2

Hopedale, MA 01747
(508) 381-3212 • Phone
www.allen-ea.com



PROFESSIONAL ENGINEER

SCALE: 1"=80 FEET

DATE:

March 29, 2018

REVISIONS

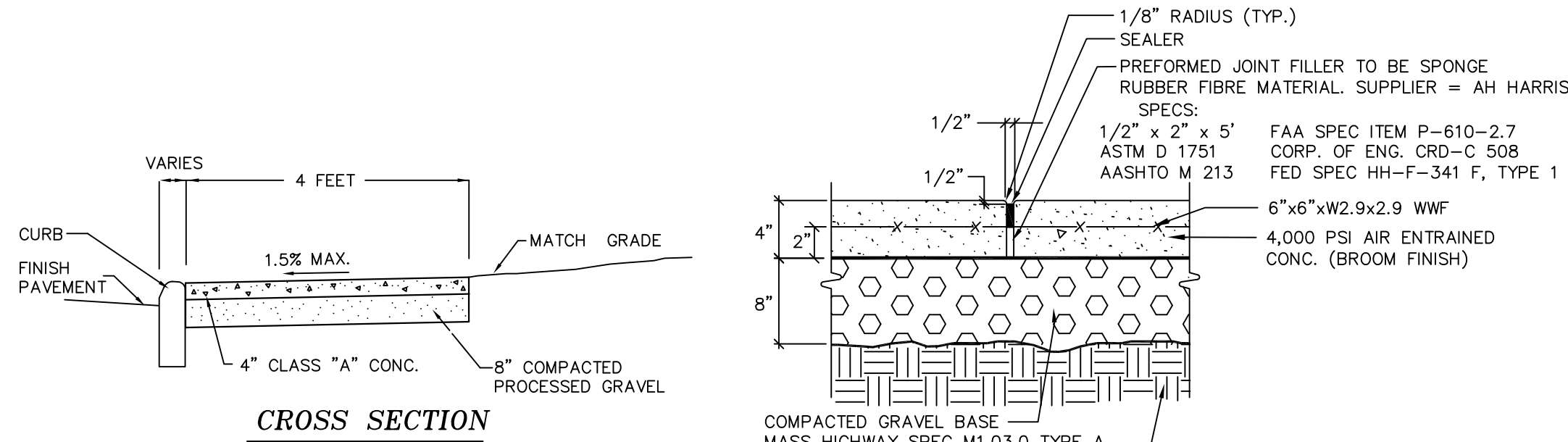
#	DATE	DESCRIPTION	INIT

JOB NO:

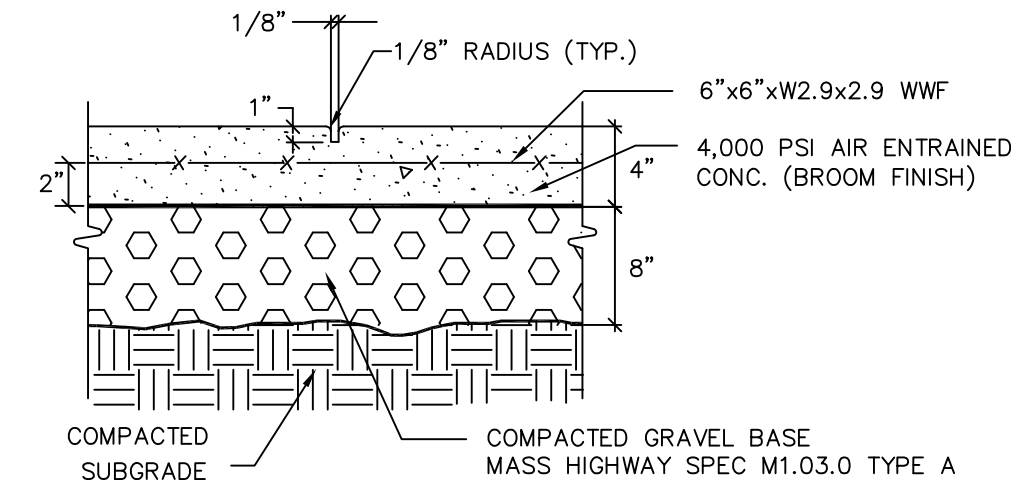
0510

SHEET:

13 of 14

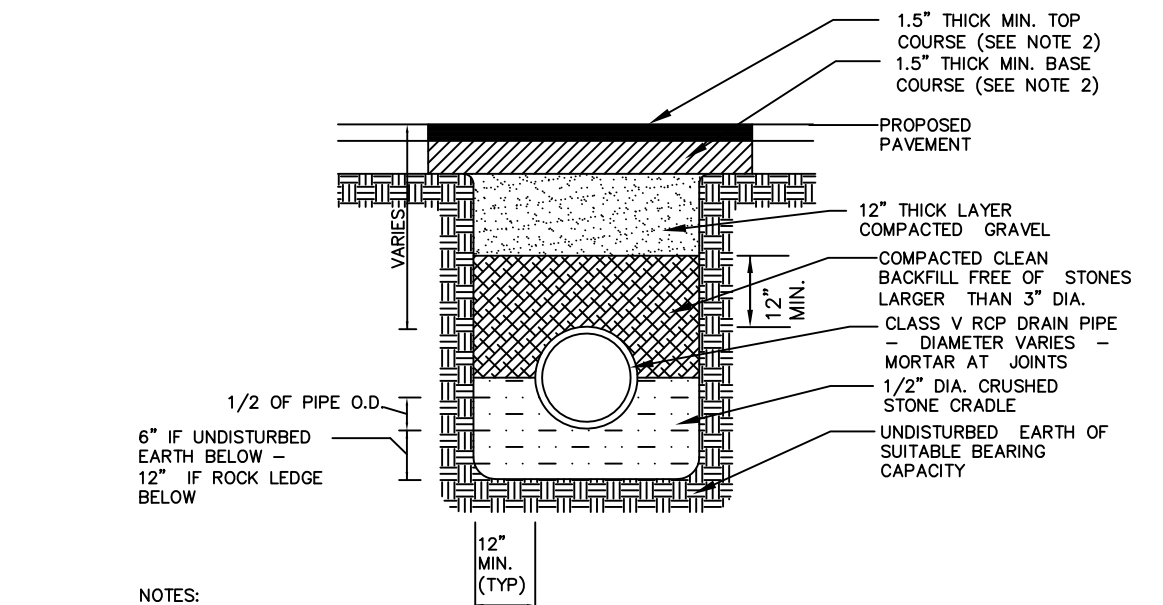


EXPANSION JOINT

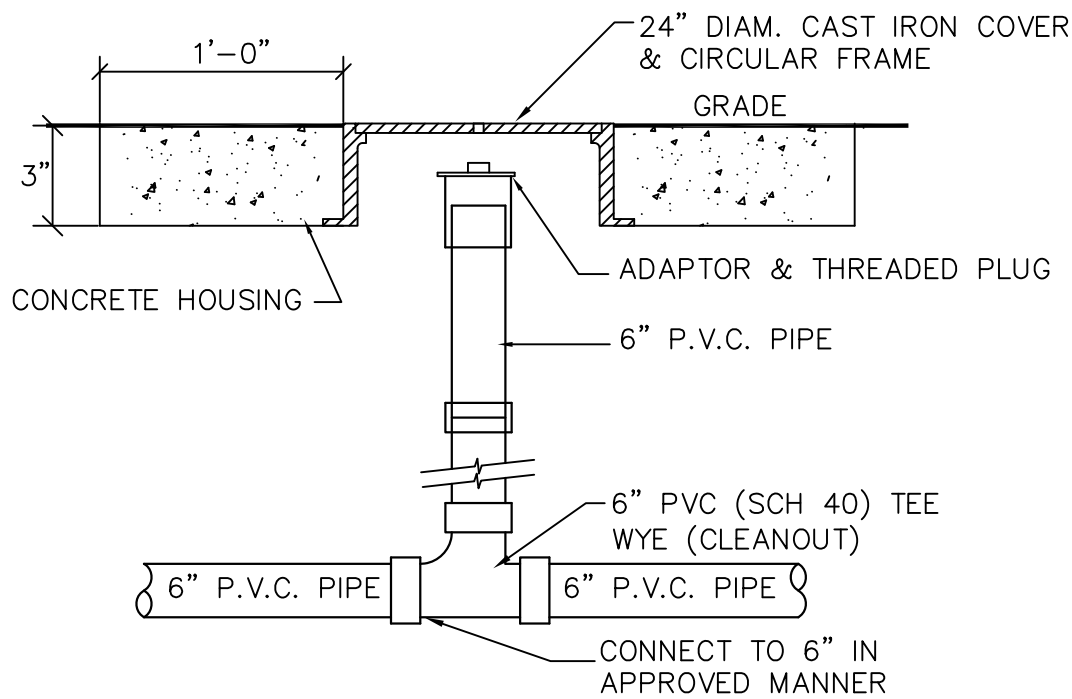


CONTROL JOINT

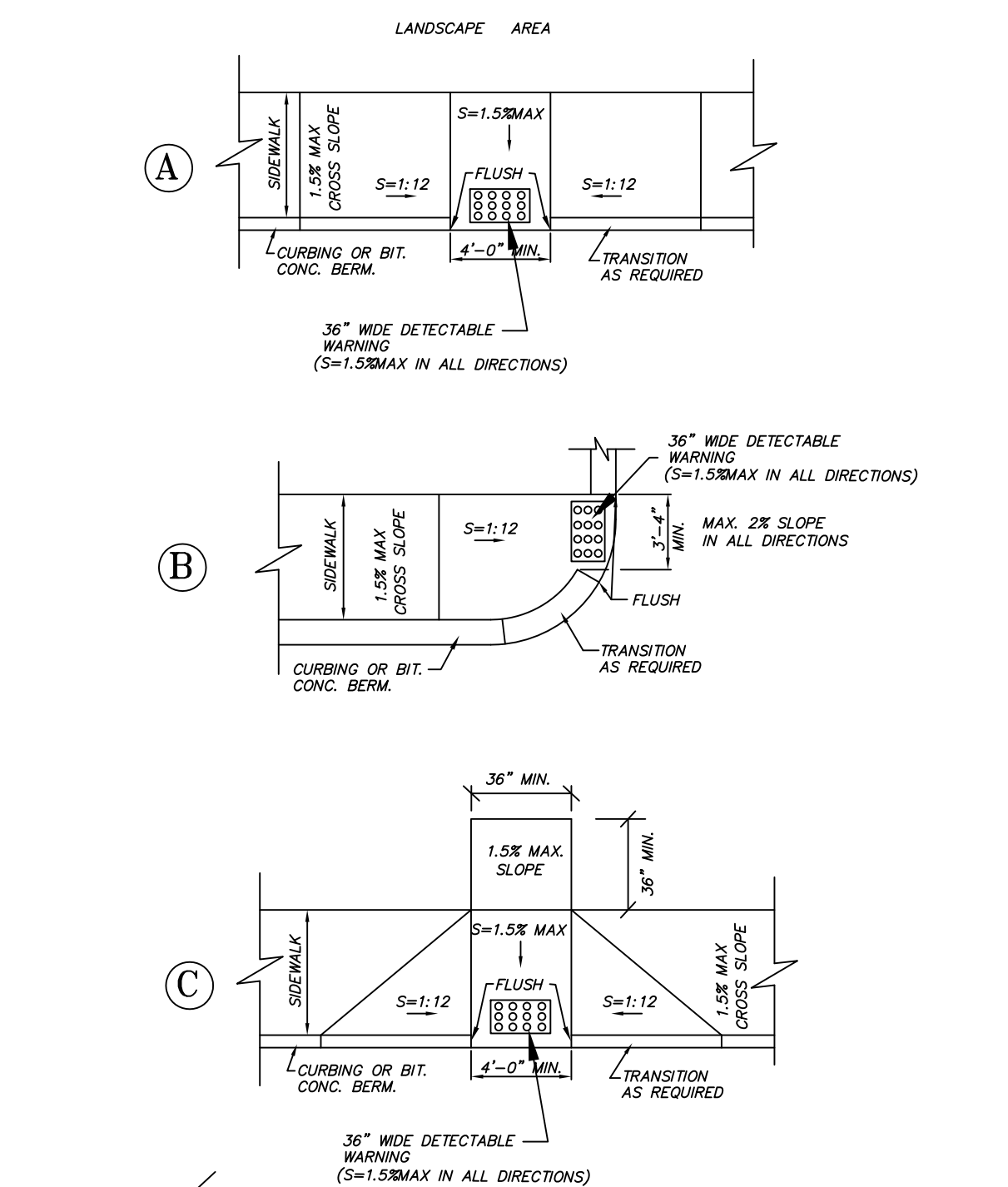
- NOTES:
- CROSS SLOPE TO BE 1.5% FLOWING TOWARDS THE PAVED ROADWAY.
 - PROVIDE BROOM FINISH IN DIRECTION PERPENDICULAR TO CURB.
 - PROVIDE EXPANSION JOINTS AT 16' ON CENTER. CONCRETE TO BE POURED AT 16 FOOT INTERVALS. THE CONCRETE POURS SHALL BE ALTERNATED LEAVING 16 FOOT SPACES BETWEEN POURS.
 - PROVIDE CONTROL JOINTS AT 4' ON CENTER.
 - ACCEPTABLE TOLERANCE FOR ELEVATION DIFFERENCE SHALL BE 1/4" BETWEEN 16 FOOT POURS.
 - SEE DESIGN PLANS FOR LOCATION AND GRADES.



TYPICAL TRENCH DETAIL FOR REINFORCED CONCRETE PIPE



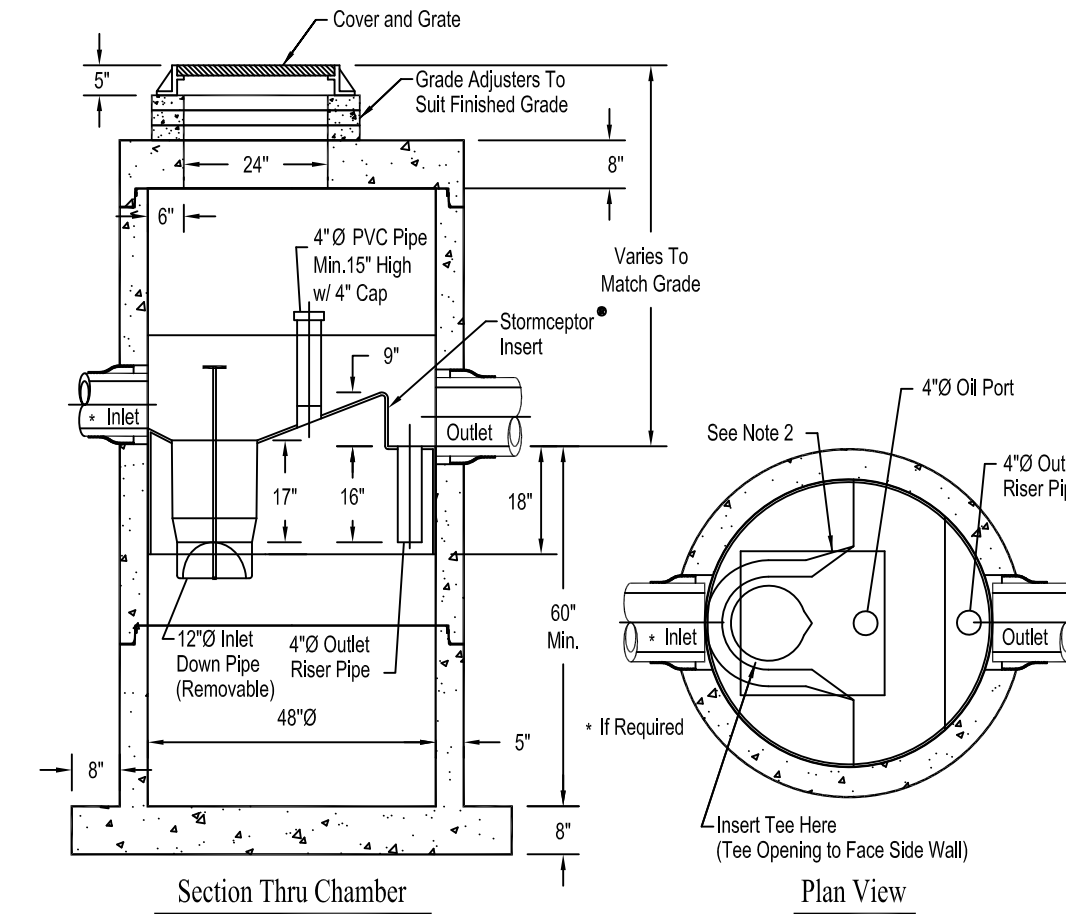
SEWER CLEAN OUT DETAIL



WHEELCHAIR RAMP DETAILS

Concrete Pipe Division

STC 450i Precast Concrete Stormceptor® (450 U.S. Gallon Capacity)



- Notes:
- The Use Of Flexible Connection is Recommended at the Inlet and Outlet Where Applicable.
 - The Cover Should be Positioned Over The Inlet Drop Pipe and The Oil Port.
 - The Stormceptor System is protected by one or more of the following U.S. Patents: #4985148, #5498331, #5725760, #5753115, #5849181, #6068765, #6371690.
 - Contact a Concrete Pipe Division representative for further details not listed on this drawing.

STORMCEPTOR MANHOLE

EROSION & SEDIMENT CONTROL NOTES

- ALL SEDIMENT AND EROSION CONTROL MEASURES SHALL BE DONE AS SET FORTH IN THE MOST CURRENT STATE SEDIMENT AND EROSION CONTROL MANUAL.
- THOSE AREAS UNDERGOING ACTUAL CONSTRUCTION WILL BE LEFT IN AN UNTREATED OR UNVEGETATED CONDITION FOR A MINIMUM TIME. AREAS SHALL BE PERMANENTLY STABILIZED WITHIN 15 DAYS OF FINAL GRADING AND TEMPORARILY STABILIZED WITHIN 30 DAYS OF INITIAL DISTURBANCE OF THE SOIL. IF THE DISTURBANCE IS WITHIN 100 FEET OF A STREAM OR POND, THE AREA SHALL BE STABILIZED WITHIN 7 DAYS OR PRIOR TO ANY STORM EVENT (THIS WOULD INCLUDE WETLANDS).
- SEDIMENT BARRIERS (SILT FENCE, STRAW BARRIERS, ETC.) SHOULD BE INSTALLED PRIOR TO ANY SOIL DISTURBANCE OF THE CONTRIBUTING DRAINAGE AREA ABOVE THEM. MULCH NETTING SHALL BE USED TO ANCHOR MULCH IN ALL AREAS WITH SLOPES GREATER THAN 15% AFTER OCTOBER 1ST. THE SAME APPLIES FOR ALL SLOPES GREATER THAN 8%.
- INSTALL SILTATION BARRIER AT TOE OF SLOPE TO FILTER SILT FROM RUNOFF. SEE SILTATION BARRIER DETAILS FOR PROPER INSTALLATION. SILTATION BARRIER WILL REMAIN IN PLACE PER NOTE #5.
- ALL EROSION CONTROL STRUCTURES WILL BE INSPECTED, REPLACED AND/OR REPAIRED EVERY 7 DAYS AND IMMEDIATELY FOLLOWING ANY SIGNIFICANT RAINFALL OR SNOW MELT OR WHEN NO LONGER SERVICEABLE DUE TO SEDIMENT ACCUMULATION OR DECOMPOSITION. SEDIMENT DEPOSITS SHOULD BE REMOVED AFTER EACH STORM EVENT. THEY MUST BE REMOVED WHEN DEPOSITS REACH APPROXIMATELY ONE HALF THE HEIGHT OF THE BARRIER. SEDIMENT CONTROL DEVICES SHALL REMAIN IN PLACE AND BE MAINTAINED BY THE CONTRACTOR UNTIL AREAS UPSLOPE ARE STABILIZED BY TURF.
- NO SLOPES, EITHER PERMANENT OR TEMPORARY, SHALL BE STEEPER THAN TWO TO ONE (2:1).
- IF FINAL SEEDING OF THE DISTURBED AREAS IS NOT COMPLETED 45 DAYS PRIOR TO THE FIRST KILLING FROST, USE TEMPORARY MULCH (DORMANT SEEDING MAY BE ATTEMPTED AS WELL) TO PROTECT THE SITE AND DELAY SEEDING UNTIL THE NEXT RECOMMENDED SEEDING PERIOD.
- TEMPORARY SEEDING OF DISTURBED AREAS THAT HAVE NOT BEEN FINAL GRADED SHALL BE COMPLETED 45 DAYS PRIOR TO THE FIRST KILLING FROST TO PROTECT FROM SPRING RUNOFF PROBLEMS.
- DURING THE CONSTRUCTION PHASE, INTERCEPTED SEDIMENT WILL BE RETURNED TO THE SITE AND REGRADED ONTO OPEN AREAS.
- REVEGETATION MEASURES WILL COMMENCE UPON COMPLETION OF CONSTRUCTION EXCEPT AS NOTED ABOVE. ALL DISTURBED AREAS NOT OTHERWISE STABILIZED WILL BE GRADED, SMOOTHED, AND PREPARED FOR FINAL SEEDING AS FOLLOWS:
 - SIX INCHES OF LOAM WILL BE SPREAD OVER DISTURBED AREAS AND SMOOTHED TO A UNIFORM SURFACE.
 - APPLY LIMESTONE AND FERTILIZER ACCORDING TO SOIL TEST. IF SOIL TESTING IS NOT FEASIBLE ON SMALL OR VARIABLE SITES, OR WHERE TIMING IS CRITICAL, FERTILIZER MAY BE APPLIED AT THE RATE OF 800 LB PER ACRE OR 18.4 LB PER 1,000 SF USING 10-20-20 OR EQUIVALENT. APPLY GROUND LIMESTONE (EQUIVALENT TO 50% CALCIUM PLUS MAGNESIUM OXIDE) AT A RATE OF 3 TONS PER ACRE (18 LB PER 1,000 SF).
 - FOLLOWING SEED BED PREPARATION, DITCHES AND BACK SLOPES WILL BE SEED TO A MIXTURE OF 4% CREEPING RED FESCUE, 3% REDTOP, AND 48% TALL FESCUE. THE LAWN AREAS WILL BE SEED TO A PREMIUM TURF MIXTURE OF 44% KENTUCKY BLUEGRASS, 44% CREEPING RED FESCUE, AND 12% PERENNIAL RYEGRASS. SEEDING RATE IS 1.05 LBS PER 1,000 SF LAWN QUALITY SOD MAY BE SUBSTITUTED FOR SEED.
 - STRAW MULCH AT THE RATE OF 70-90 LBS PER 1,000 SF. A HYDRO-APPLICATION OF WOOD OR PAPER FIBER SHALL BE APPLIED FOLLOWING SEEDING. A SUITABLE BINDER SUCH AS CURASOL OR RMB PLUS WILL BE USED ON STRAW MULCH FOR WIND CONTROL.
- ALL TEMPORARY EROSION CONTROL MEASURES SHALL BE REMOVED ONCE THE SITE IS STABILIZED.
- WETLANDS WILL BE PROTECTED WITH straw BALES AND/OR SILT FENCE INSTALLED AT THE EDGE OF THE WETLAND OR THE BOUNDARY OF WETLAND DISTURBANCE.
- ALL AREAS WITHIN 100 FEET OF A FLAGGED WETLAND OR STREAM SHALL HAVE AN EXPOSURE WINDOW OF NOT MORE THAN 7 DAYS.
- ALL AREAS WITHIN 100 FEET OF A FLAGGED WETLAND OR STREAM SHALL FOLLOW APPROPRIATE EROSION CONTROL MEASURES PRIOR TO EACH STORM IF NOT BEING ACTIVELY WORKED.

MULCH

LOCATION	MULCH	RATE (1000 SF)
PROTECT AREA	STRAW	100 POUNDS
WINDY AREA	SHREDDED OR CHOPPED CORNSTALKS STRAW (ANCHORING)	185-275 POUNDS 100 POUNDS
MODERATE TO HIGH VELOCITY AREAS OR STEEP SLOPES GREATER THAN 3:1	JUTE MESH OR EXCELSIOR MAT	AS REQUIRED
GREATER THAN 3:1	(REFER TO GEOTECHNICAL REPORT FOR FINAL DESIGN REQUIREMENT)	

* A HYDRO-APPLICATION OF WOOD OR PAPER FIBER MAY BE APPLIED FOLLOWING SEEDING. A SUITABLE BINDER SUCH AS CURASOL OR RMB PLUS SHALL BE USED ON straw MULCH FOR WIND CONTROL.

MULCH ANCHORING
ANCHOR MULCH WITH PEG AND TWINE (1 SQ. YD. BLOCK); MULCH NETTING (AS PER MANUFACTURER); WOOD CELLULOSE FIBER (750 LBS/ACRE); CHEMICAL TACK (AS PER MANUFACTURER'S SPECIFICATIONS); USE OF A SERRATED STRAIGHT DISK. WETTING FOR SMALL AREAS AND ROAD DITCHES MAY BE PERMITTED.

EROSION & SEDIMENT CONTROL NOTES – WINTER CONSTRUCTION

- WINTER CONSTRUCTION PERIOD: NOVEMBER 1 THROUGH APRIL 15.
- WINTER EXCAVATION AND EARTHWORK SHALL BE DONE SUCH THAT NO MORE THAN 1 ACRE OF THE SITE IS WITHOUT STABILIZATION AT ANY ONE TIME.
- EXPOSED AREA SHOULD BE LIMITED TO THAT WHICH CAN BE MULCHED IN ONE DAY PRIOR TO ANY SNOW EVENT.
- CONTINUATION OF EARTHWORK OPERATION ON ADDITIONAL AREAS SHALL NOT BEGIN UNTIL THE EXPOSED SOIL SURFACE ON THE AREA BEING WORKED HAS BEEN STABILIZED SUCH THAT NO LARGER AREA OF THE SITE IS WITHOUT EROSION CONTROL PROTECTION AS LISTED IN ITEM 2 ABOVE.
- AN AREA SHALL BE CONSIDERED TO HAVE BEEN STABILIZED WHEN EXPOSED SURFACES HAVE BEEN EITHER MULCHED WITH STRAW OR straw AT A RATE OF 100 LB. PER 1,000 SQUARE FEET (WITH OR WITHOUT SEEDING) OR DORMANT SEED, MULCHED AND ADEQUATELY ANCHORED BY AN APPROVED ANCHORING TECHNIQUE.
- BETWEEN THE DATES OF OCTOBER 15 AND APRIL 15, LOAM OR SEED WILL NOT BE REQUIRED. DURING PERIODS OF ABOVE FREEZING TEMPERATURES THE SLOPES SHALL BE FINE GRADED AND EITHER PROTECTED WITH MULCH OR TEMPORARILY SEEDED AND MULCHED UNTIL SUCH TIME AS THE FINAL TREATMENT CAN BE APPLIED. IF THE DATE IS AFTER NOVEMBER 1ST AND IF THE EXPOSED AREA HAS BEEN LOADED, FINAL GRADED AND IS SMOOTH, THEN THE AREA MAY BE DORMANT SEED AT A RATE OF 200-300% HIGHER THAN SPECIFIED FOR PERMANENT SEED AND THEN MULCHED. IF CONSTRUCTION CONTINUES DURING FREEZING WEATHER, ALL EXPOSED AREAS SHALL BE CONTINUOUSLY GRADED BEFORE FREEZING AND THE SURFACE TEMPORARILY PROTECTED FROM EROSION BY THE APPLICATION OF MULCH. SLOPES SHALL NOT BE LEFT UNEXPOSED OVER THE WINTER OR ANY OTHER EXTENDED TIME OF WORK SUSPENSION UNLESS TREATED IN THE ABOVE MANNER. UNTIL SUCH TIME AS WEATHER CONDITIONS ALLOW DITCHES TO BE FINISHED WITH THE PERMANENT SURFACE TREATMENT, EROSION SHALL BE CONTROLLED BY THE INSTALLATION OF BALES OF straw OR STONE CHECK DAMS IN ACCORDANCE WITH THE STANDARD DETAILS.
- MULCHING REQUIREMENTS:
 - BETWEEN THE DATES OF NOVEMBER 1ST AND APRIL 15TH ALL MULCH SHALL BE ANCHORED BY EITHER PEG LINE, MULCH NETTING OR WOOD CELLULOSE FIBER.
 - MULCH NETTING SHALL BE USED TO ANCHOR MULCH IN ALL DRAINAGE WAYS WITH A SLOPE GREATER THAN 3% FOR SLOPE EXPOSED TO DIRECT WINDS AND FOR ALL OTHER SLOPES GREATER THAN 8%.
 - MULCH NETTING SHALL BE USED TO ANCHOR MULCH IN ALL AREAS WITH SLOPES GREATER THAN 15% AFTER OCTOBER 1ST. THE SAME APPLIES FOR ALL SLOPES GREATER THAN 8%.
- AFTER NOVEMBER 1ST THE CONTRACTOR SHALL APPLY DORMANT SEEDING OR MULCH AND ANCHORING ON ALL BARE EARTH AT THE END OF EACH WORKING DAY.
- DURING THE WINTER CONSTRUCTION PERIOD ALL SNOW SHALL BE REMOVED FROM AREAS OF SEEDING AND MULCH PRIOR TO PLACEMENT.
- STOCKPILING OF MATERIALS (DIRT, WOOD, CONSTRUCTION MATERIALS, ETC.) MUST REMAIN COVERED AT ALL TIMES TO MINIMIZE ANY DUST PROBLEMS THAT MAY OCCUR WITH ADJACENT PROPERTIES AND TO PROVIDE MAXIMUM PROTECTION AGAINST EROSION RUNOFF.
- EXISTING CATCH BASIN STRUCTURES SHALL BE PROTECTED UNTIL SUCH TIME AS THEY ARE REMOVED.

NOT FOR CONSTRUCTION

LEGEND

— 256 —	EXISTING CONTOUR
— 256 —	PROPOSED CONTOUR
x 177.5	EXIST. SPOT GRADE
x 177.5	PROP. SPOT GRADE
~ ~ ~	PROP. SURFACE WATER FLOW
⊙	DRAINAGE MANHOLE
— D —	DRAIN LINE
— • —	UTILITY POLE
— GW —	GUY WIRE
— OHW —	OVERHEAD WIRES
— • —	EROSION CONTROL
— ETC —	ELECTRIC, TELEPHONE & CABLE LINE
— • —	STONE WALL
— • —	EDGE OF PAVEMENT
— • —	FOUND
— N/F —	NOW OR FORMERLY
— DH —	DRILLHOLE
— I.P. —	IRON PIPE/IRON PIN
— A.P. —	ASSESSORS PARCEL
— BK. PG. —	DEED BOOK/PAGE
— • —	BOLLARD
— • —	BUILDING
— • —	EXISTING TREE LINE
— • —	EDGE OF WETLAND

PREPARED FOR:

88 CORP.
31 Whitewood Road
Milford, MA 01757

TITLE:

Preliminary
CONSTRUCTION DETAIL
PLAN
For
"Birch Street Place"
In
Milford, Massachusetts

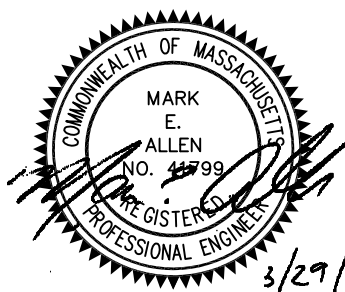
PREPARED BY:



**ALLEN ENGINEERING
& ASSOCIATES, INC.**

Civil Engineers • Surveyors
Land Development Consultants

One Charlesview Road
Suite 2
Hopedale, MA 01747
(508) 381-3212 • Phone
www.allen-rea.com



PROFESSIONAL ENGINEER

SCALE: 1"=80 FEET

DATE: March 29, 2018

#	DATE	DESCRIPTION	INIT

JOB NO: 0510 SHEET: 14 of 14

BIRCH STREET PLACE
Tabulation of Proposed Building
Type, Size, Square Footage and Ground Coverage

<i>Building Type</i>	<i>Number of Stories</i>	<i>Gross Square Feet (GSF)</i>	<i>Ground Coverage (Square Feet)</i>
Multifamily Rental Housing			
Building 1 (45 Units)	3	53,512	18,153
Building 2 (33 Units)	3	39,259	13,315
Building 3 (45 Units)	3	53,512	18,153
Building 4 (39 Units)	3/4 Split	53,512	13,315
Clubhouse/Pool Building	1	4,195	4,195
Maintenance Bike Storage Building	1	2,000	2,000
Parking Garages (Four 8-Bay Garages)	1	<u>8,511</u> 214,501	<u>8,511</u> 77,642

Summary of Site Coverage

Site Area (Acres) 20.959 ±
Site Area (Square Feet) 912,988 ±

<i>Use</i>	<i>Ground Coverage (Square Feet)</i>	<i>% of Site Occupied</i>
Proposed Buildings	77,642	8.5%
Surface Parking and Other Paved Surfaces	175,353	19.2%
Open Space	<u>659,993</u>	<u>72.3%</u>
TOTAL	912,988	100.0%

Note: All Gross Square Feet (GSF) estimates for proposed buildings are approximate and based upon Preliminary Plans.

EXISTING SITE CONDITIONS

Existing Conditions Plan

An Existing Conditions Plan has been included as Sheet 2 in Tab 8, Preliminary Site Engineering Plans.

Location and Boundaries

The “Birch Street Place” apartment project site will be located on a proposed 20.95± acre parcel of land, as shown on the attached Preliminary Land Plan, on the west side of Birch Street in Milford, MA. The future lot will be roughly bounded by Birch Street to the east; a condominium development to the north; vacant industrial land to the south; and residential homes to the west. The site has approximately 240 linear feet of frontage along Birch Street.

Existing Road Network and Access

Birch Street is a town-owned roadway providing one lane of travel in each direction. The 30 foot wide paved travel way is striped at its center with a double yellow line. The roadway is curbed with sloped asphalt berms. The road is posted for 30 mph and serves approximately 6,380 vehicles per day. The primary site access for “Birch Street Place” is proposed to align perpendicularly with Birch Street just south of the abutting Birchler’s Automotive access point. Sight lines along Birch Street at the driveway curb cut are clear and extend more than 500’ in each direction of travel. There is an existing traffic light on Birch Street at the intersection of Medway Road (Route 109) approximately 2,000 feet from the proposed entrance to “Birch Street Place”.

Existing Transportation Resources

The MBTA corridor is the Franklin Line providing daily commuter service between Forge Park in Franklin and South Station, Boston. The nearest MBTA stop is in Franklin at the Forge Park station. This stop is approximately five miles from the proposed entrance to “Birch Street Place.”

Existing Zoning and Adjacent Land Uses

The site is currently zoned for Highway Industrial uses (IB). Use and Intensity Regulations have been included at Tab 2.5. A Single Family Residential (RB) zone is to the north of the property while a Rural Residential (RC) zone abuts the property to the west.

The closest residential homes (the condominium development known as Birch Hill Condominiums) are located along Stallbrook Road. These homes, on average, are approximately 250-300 feet away from the closest proposed apartment building (Building 3). There is a natural wooded buffer between these homes and the proposed project. The developer intends to maintain as much of this buffer as possible and also supplement the existing buffer with new evergreen trees in areas with less existing screening. This wooded area is also a raised natural berm between the existing condominiums and the proposed development.

Physical Site Characteristics: Topography and Resource Areas

The future project site parcel is an approximately 20.95± acre tract of land characterized by moderately dense woods, undulating moderate slopes and several depressions which are flagged as wetland areas. Elevations across the site vary from elevation 256 at the existing curb cut on Birch Street to elevation 320 nearest the northerly property line. The buildings are situated at higher elevations of the site and should offer attractive views for the residents. There are several areas of bordering vegetated wetlands within the parcel boundary; however, no area on the site is within a 100-year flood boundary or floodway as presently mapped by FEMA. An ORAD has been issued by the Milford Conservation Commission.

Availability of Existing Utilities

Water – An 8” water main extends up Birch Street at the subject site.

Sewer – There is an 8” municipal gravity sewer within Birch Street. Milford has a waste water treatment plant on Maple Street which is approximately 4 miles from the site.

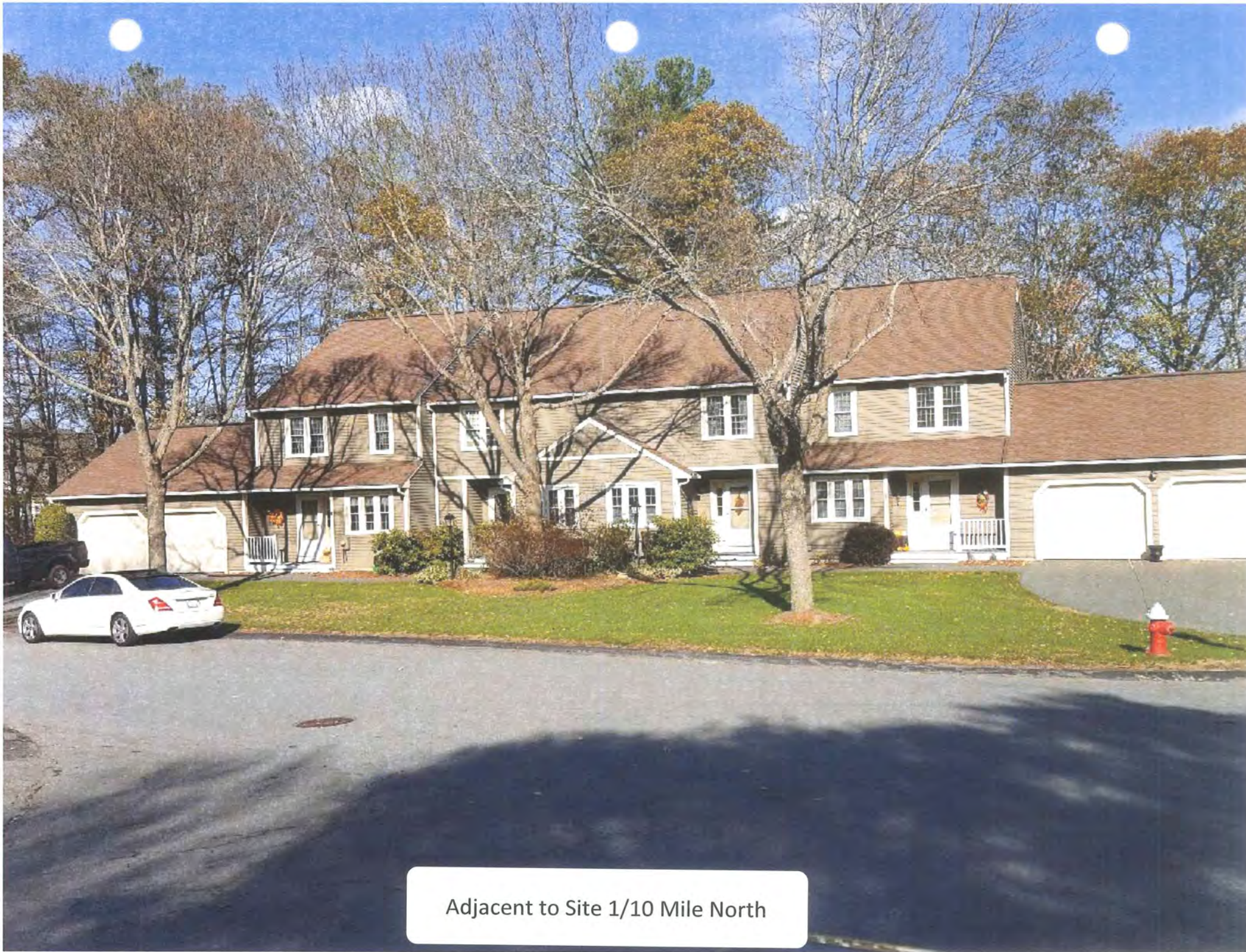
Natural Gas – There is a 6” high pressure gas main in Birch Street.

Electric – Utility poles with overhead wires provide electric service along Birch Street.

Telephone and Cable – Verizon provides service through overhead wires along Birch Street.



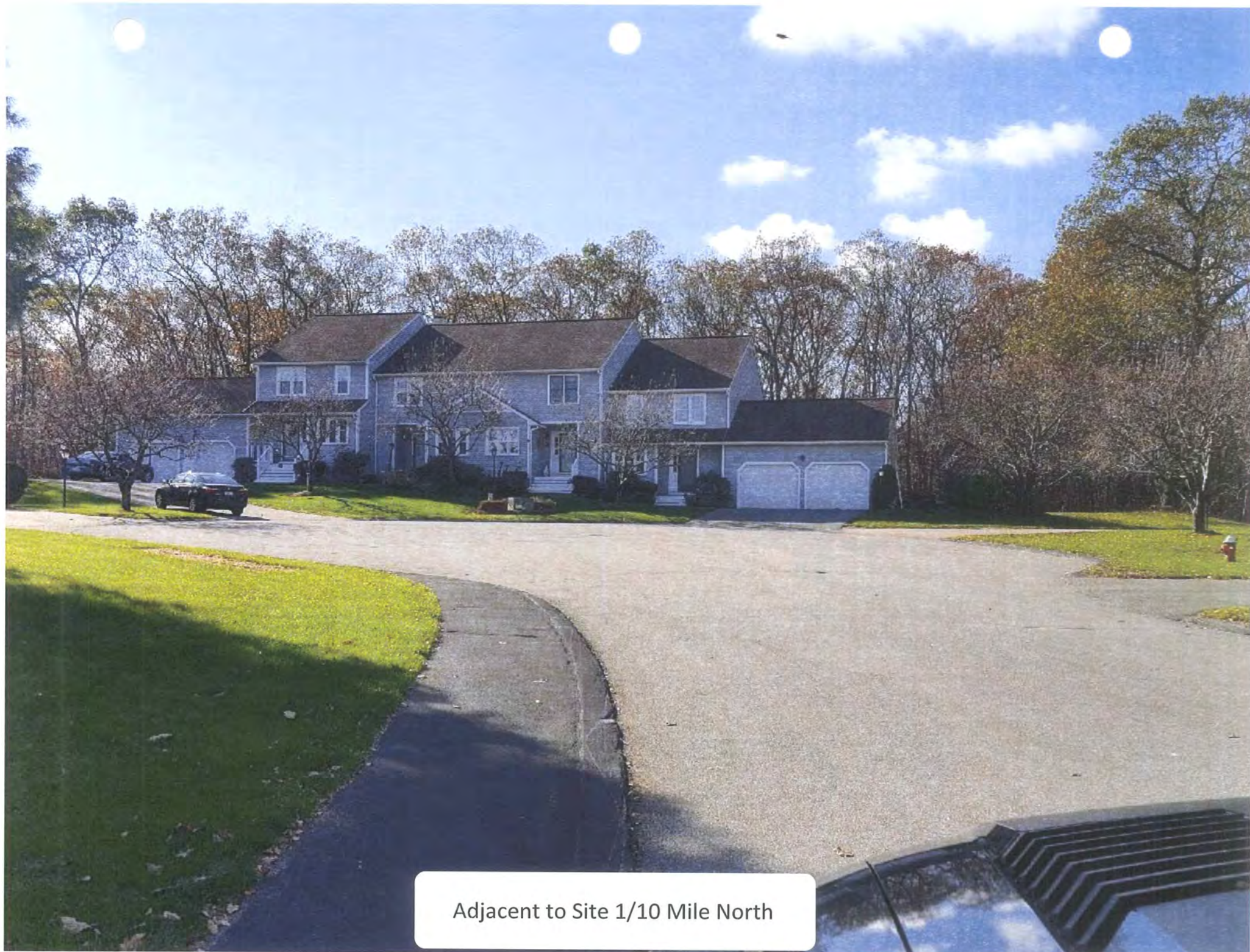
3/10 Mile to the North



Adjacent to Site 1/10 Mile North



Adjacent to Site 1/10 Mile North



Adjacent to Site 1/10 Mile North



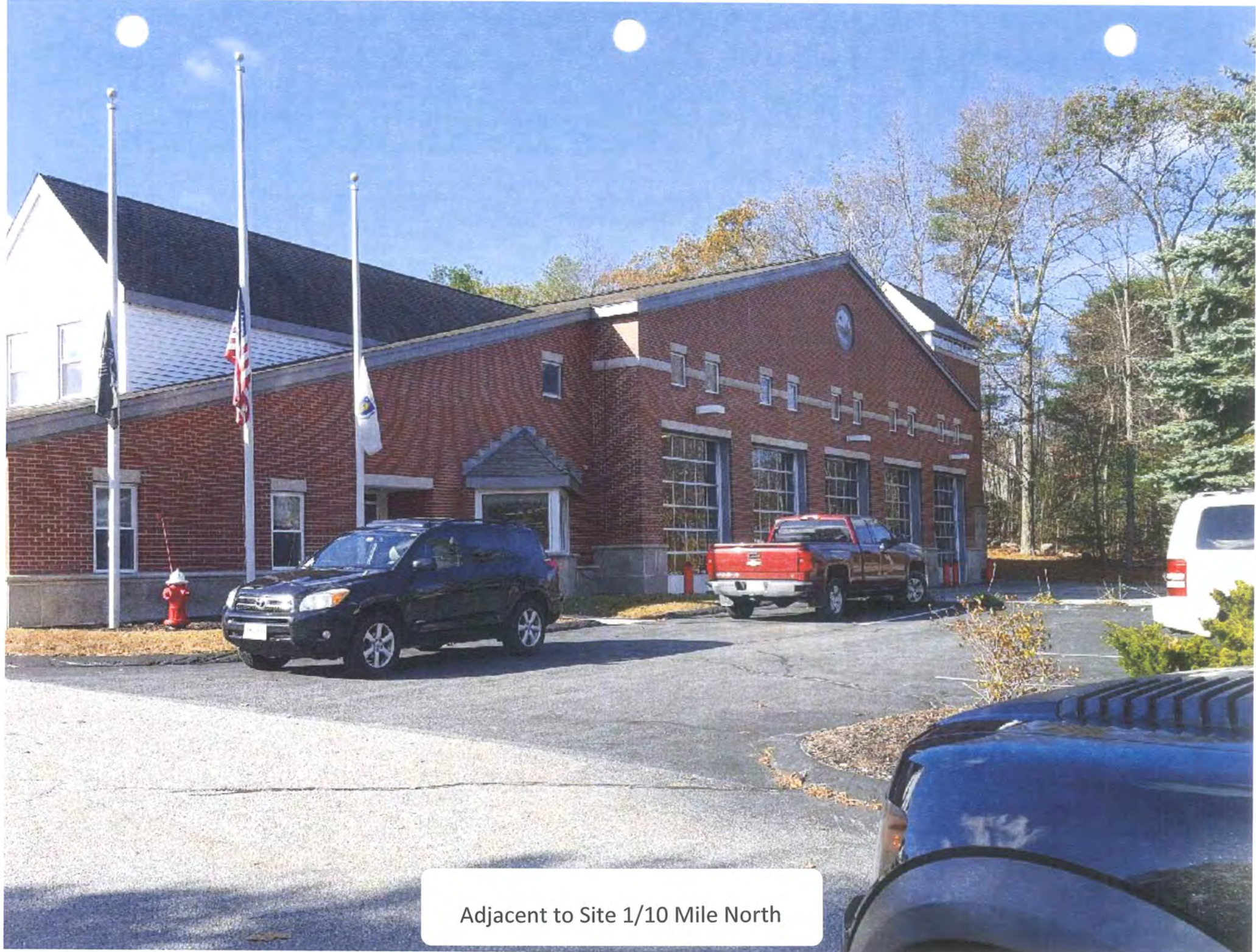
6/10 Mile to North East



5/10 Mile to North East



5/10 Mile to North East



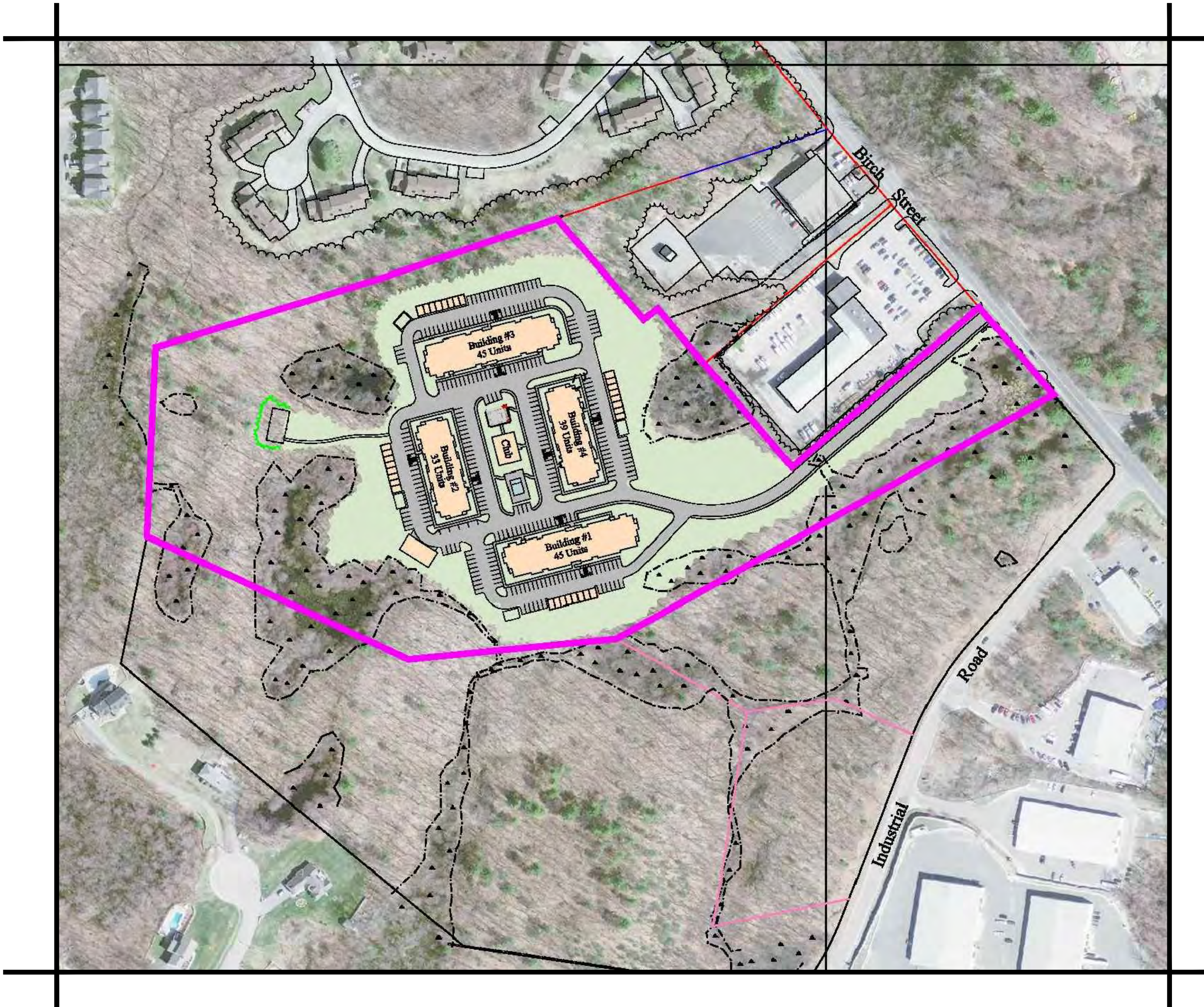
Adjacent to Site 1/10 Mile North

Preliminary Architectural Plans

Preliminary Architectural Plans (full size sets) have been submitted under separate cover to the Milford Zoning Board of Appeals.

BIRCH STREET PLACE

BIRCH STREET, MILFORD, MA



APPLICANT:

88 CORP.

DATE: DATE

DRAWN BY: FPF
contact@hpadesign.com

CHECKED BY: FPF

PATH:
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SCALE: SEE DRAWING

REVISIONS:

DATE DESC.

A 11-22-17 PEL Submission

B 4-4-18 ISS FOR COMP PERMIT

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SCHEDULE OF DRAWINGS:

Iss For Comp Permit 4-4-18		PEL Submission REV A 11-22-17		ARCHITECTURAL	
o	o	A0.0	TITLE SHEET		
		A#1.1	BLD #1 (45 UNIT) 1ST & 2ND FLOOR PLANS		
		A#1.2	BLD #1 (45 UNIT) 3RD FLOOR & ROOF PLAN		
		A#1.3	BLD #1 (45 UNIT) ELEVATIONS		
		A#2.1	BLD #2 (33 UNIT) 1ST & 2ND FLOOR PLANS		
		A#2.2	BLD #2 (33 UNIT) 3RD FLOOR & ROOF PLAN		
		A#2.3	BLD #2 (33 UNIT) ELEVATIONS		
		A#3.1	BLD #3 (45 UNIT) 1ST & 2ND FLOOR PLANS		
		A#3.2	BLD #3 (45 UNIT) 3RD FLOOR & ROOF PLAN		
		A#3.3	BLD #3 (45 UNIT) ELEVATIONS		
		A#4.0	BLD #4 (39 UNIT) WALK-OUT LEVEL PLAN		
		A#4.1	BLD #4 (39 UNIT) 1ST & 2ND FLOOR PLANS		
		A#4.2	BLD #4 (39 UNIT) 3RD FLOOR & ROOF PLAN		
		A#4.3	BLD #4 (39 UNIT) ELEVATIONS		
o	o	A#C.1	8 BAY GARAGE PLAN AND ELEVATION (TYP FOR 3)		
		A#C.1	CLUBHOUSE ELEVATIONS		
		A#C.2	CLUBHOUSE ELEVATIONS		
		A#C.3	CLUBHOUSE PLAN		

TITLE SHEET

BIRCH STREET PLACE
BIRCH STREET, MILFORD, MA
Applicant: 88 CORP.

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JOB NO. 20170202



SECOND FLOOR UNIT COUNT

2ND FLOOR 15 UNITS:

1 BEDROOM	6 @	712 5F
2 BEDROOM	5 @	972 5F
2 BEDROOM-DEN	2 @	1,140 5F
3 BEDROOM	2 @	1,265 5F

SECOND FLOOR PLAN

3/32" = 1'



FIRST FLOOR UNIT COUNT

1ST FLOOR 15 UNITS:

1 BEDROOM	5 @	712 5F
1 BEDROOM GROUP 2	1 @	712 5F
2 BEDROOM	4 @	972 5F
2 BEDROOM GROUP 2	1 @	972 5F
2 BEDROOM-DEN	2 @	1,140 5F
3 BEDROOM	2 @	1,265 5F

NOTE: UNIT NUMBERS SHOWN ON THIS FLOOR PLAN REPRESENT THE UNIT NUMBER/LOCATION WITHIN THE BLD. EVERY UNIT NUMBER WILL ALSO HAVE A PREFIX NUMBER WHICH REPRESENTS THE BLD NUMBER IN WHICH IT IS LOCATED. I.E. UNIT 102 IN BLD #1 IS 1102 WHILE UNIT 102 IN BLD #3 IS 3102.

FIRST FLOOR PLAN

3/32" = 1'

BUILDING #1 SUMMARY

BLD #1 45 Units	1 Bedroom	2 Bedroom	3 Bedroom	Total
Walk out (NA)	0	0	0	0
1st FL	6	7	2	15
2nd FL	6	7	2	15
3rd FL	6	7	2	15
Total	18	21	6	45
% of Total	40.0%	46.7%	13.3%	100%

DATE: DATE

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FIRST AND SECOND FLOOR PLANS

BLD #1

45 UNIT BUILDING

BIRCH STREET PLACE
BIRCH STREET, MILFORD, MA

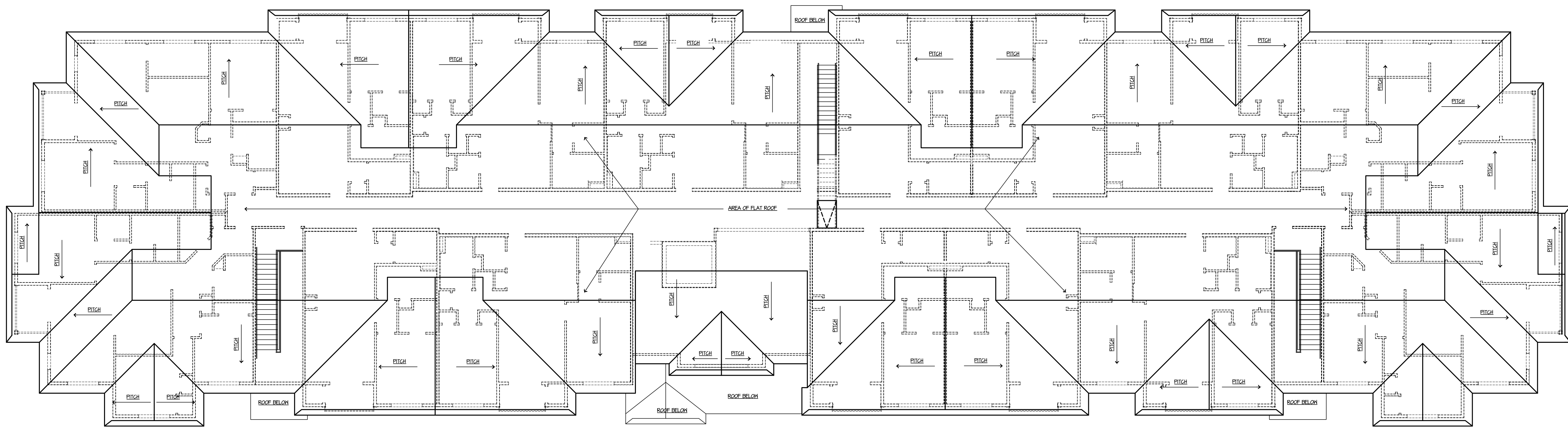
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JOB NO. 20160007



B ROOF PLAN
3/32" = 1'



THIRD FLOOR UNIT COUNT		
3RD FLOOR 15 UNITS:		
1 BEDROOM	6 @	712 SF
2 BEDROOM	5 @	972 SF
2 BEDROOM-DEN	2 @	1140 SF
3 BEDROOM	2 @	1265 SF

A THIRD FLOOR PLAN
3/32" = 1'

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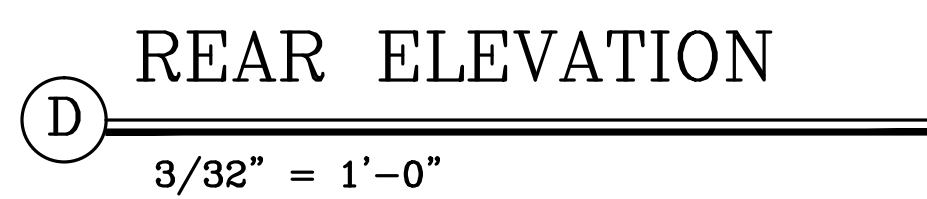
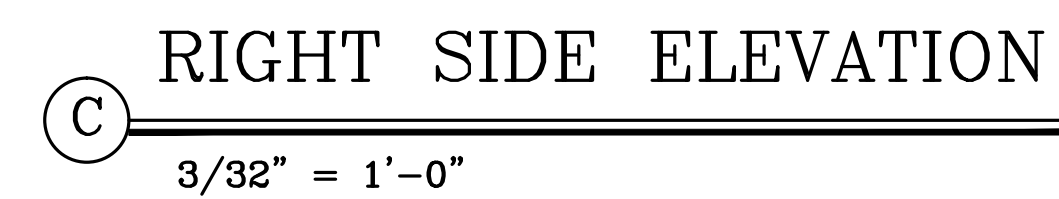
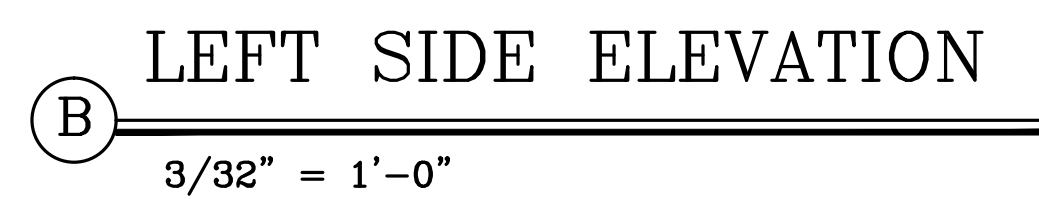
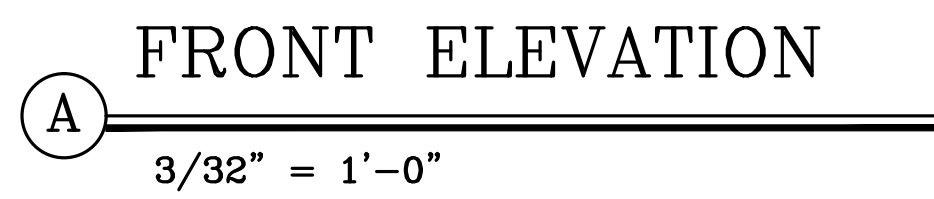
THIRD FLOOR & ROOF PLAN
BLD #1
45 UNIT BLD

BIRCH STREET PLACE
BIRCH STREET, MILFORD, MA
Applicant: 88 CORP.

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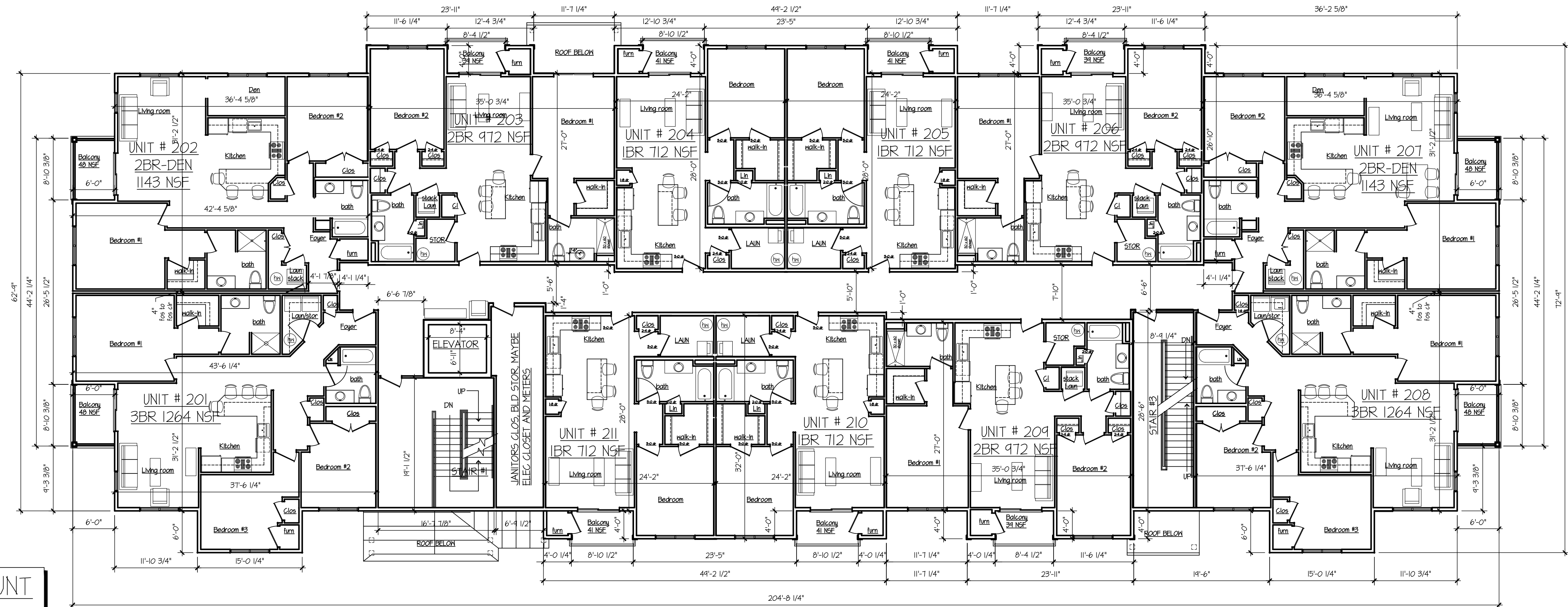
BUILDING ELEVATIONS
BLD #1 45 UNIT BLD

BIRCH STREET PLACE
BIRCH STREET, MILFORD, MA
Applicant: **BB CORP.**

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JOB NO. 20170202



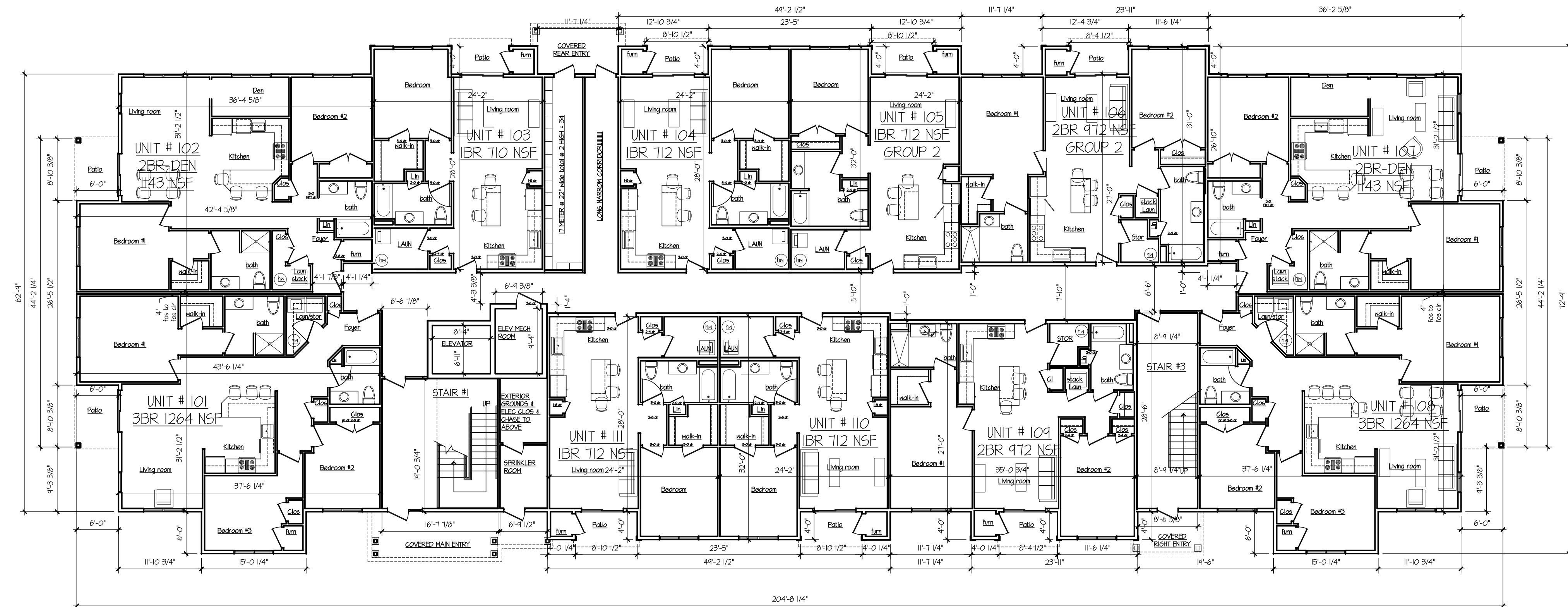
SECOND FLOOR UNIT COUNT

2ND FLOOR II UNITS:

1 BEDROOM	4	@	712 SF
2 BEDROOM	3	@	972 SF
2 BEDROOM-DEN	2	@	1,143 SF
3 BEDROOM	2	@	1,264 SF

B SECOND FLOOR PLAN

3/32" = 1'



FIRST FLOOR UNIT COUNT

1ST FLOOR II UNITS:

1 BEDROOM	4	@	712 SF
1 BEDROOM GROUP 2	1	@	712 SF
2 BEDROOM	1	@	972 SF
2 BEDROOM GROUP 2	1	@	972 SF
2 BEDROOM-DEN	2	@	1,143 SF
3 BEDROOM	2	@	1,264 SF

NOTE: UNIT NUMBERS SHOWN ON THIS FLOOR PLAN REPRESENT THE UNIT NUMBER/LOCATION WITHIN THE BLD. EVERY UNIT NUMBER WILL ALSO HAVE A PREFIX NUMBER WHICH REPRESENTS THE BLD NUMBER IN WHICH IT IS LOCATED. I.E. UNIT 102 IN BLD #2 IS 2102 WHILE UNIT 102 IN BLD #4 IS 4102.

A FIRST FLOOR PLAN

3/32" = 1'

BUILDING #2 SUMMARY

BLD #2 33 Units	1 Bedroom	2 Bedroom	3 Bedroom	Total
Walk out (NA)	0	0	0	0
1st FL	5	4	2	11
2nd FL	4	5	2	11
3rd FL	4	7	0	11
Total	13	16	4	33
% of Total	39.4%	48.5%	12.1%	100%

DATE: DATE

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FIRST AND SECOND FLOOR PLANS

BLD # 2

33 UNIT BUILDING

BIRCH STREET PLACE
BIRCH STREET, MILFORD, MA

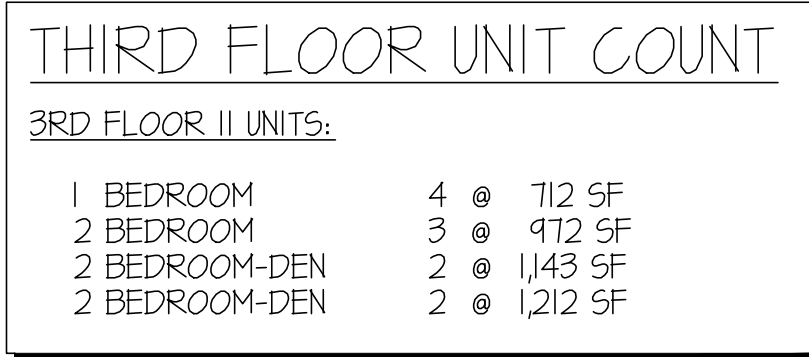
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508 384 8838 (T)

Figure 1

1. ☐ 2. ☐ 3. ☐ 4. ☐ 5. ☐ 6. ☐ 7. ☐ 8. ☐ 9. ☐ 10. ☐ 11. ☐ 12. ☐ 13. ☐ 14. ☐ 15. ☐ 16. ☐ 17. ☐ 18. ☐ 19. ☐ 20. ☐ 21. ☐ 22. ☐ 23. ☐ 24. ☐ 25. ☐ 26. ☐ 27. ☐ 28. ☐ 29. ☐ 30. ☐ 31. ☐ 32. ☐ 33. ☐ 34. ☐ 35. ☐ 36. ☐ 37. ☐ 38. ☐ 39. ☐ 40. ☐ 41. ☐ 42. ☐ 43. ☐ 44. ☐ 45. ☐ 46. ☐ 47. ☐ 48. ☐ 49. ☐ 50. ☐ 51. ☐ 52. ☐ 53. ☐ 54. ☐ 55. ☐ 56. ☐ 57. ☐ 58. ☐ 59. ☐ 60. ☐ 61. ☐ 62. ☐ 63. ☐ 64. ☐ 65. ☐ 66. ☐ 67. ☐ 68. ☐ 69. ☐ 70. ☐ 71. ☐ 72. ☐ 73. ☐ 74. ☐ 75. ☐ 76. ☐ 77. ☐ 78. ☐ 79. ☐ 80. ☐ 81. ☐ 82. ☐ 83. ☐ 84. ☐ 85. ☐ 86. ☐ 87. ☐ 88. ☐ 89. ☐ 90. ☐ 91. ☐ 92. ☐ 93. ☐ 94. ☐ 95. ☐ 96. ☐ 97. ☐ 98. ☐ 99. ☐ 100. ☐

contact@npaadsign.com

 www.HPAdesign.com

THIRD FLOOR & ROOF PLAN

BLDS #2
33 UNIT BUILDING

BIRCH STREET PLACE
BIRCH STREET, MILFORD, MA

Applicant: 88 CORP.

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A #2.2

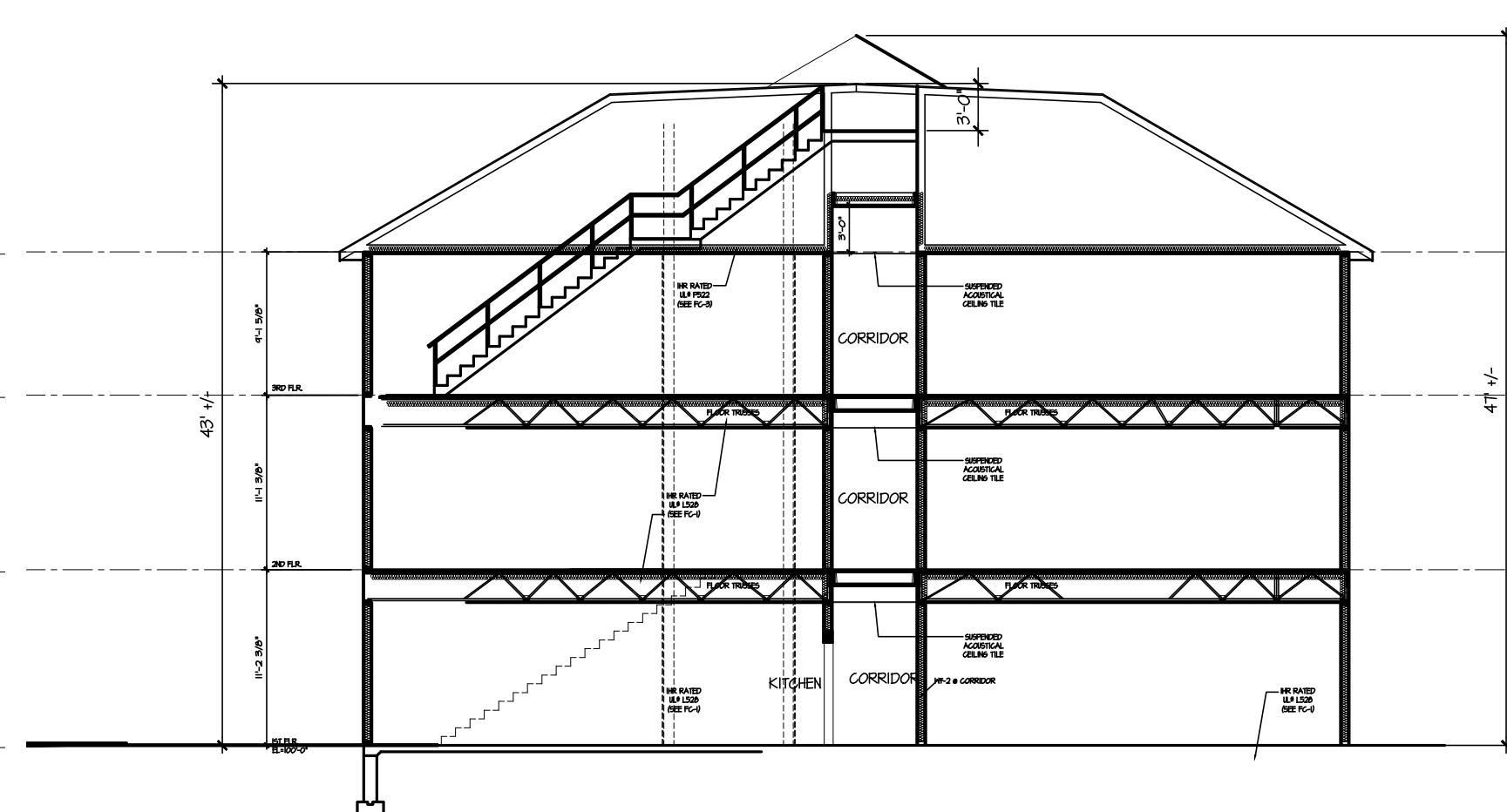
JOB NO.	2016000
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A FRONT ELEVATION
3/32" = 1'-0"



B LEFT SIDE ELEVATION
3/32" = 1'-0"



E GENERIC SECTION
3/32" = 1'-0"



C RIGHT SIDE ELEVATION
3/32" = 1'-0"



D REAR ELEVATION
3/32" = 1'-0"

DATE: DATE

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BUILDING ELEVATIONS
BLD # 2 33 UNIT BLD

BIRCH STREET PLACE
BIRCH STREET, MILFORD, MA
Applicant: 88 CORP.

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JOB NO. 20170202



SECOND FLOOR UNIT COUNT

2ND FLOOR 15 UNITS:

1 BEDROOM	6 @	712 5F
2 BEDROOM	5 @	972 5F
2 BEDROOM-DEN	2 @	1,140 5F
3 BEDROOM	2 @	1,265 5F

SECOND FLOOR PLAN

3/32" = 1'



FIRST FLOOR UNIT COUNT

1ST FLOOR 15 UNITS:

1 BEDROOM	5 @	712 5F
1 BEDROOM GROUP 2	1 @	712 5F
2 BEDROOM	4 @	972 5F
2 BEDROOM GROUP 2	1 @	972 5F
2 BEDROOM-DEN	2 @	1,140 5F
3 BEDROOM	2 @	1,265 5F

NOTE: UNIT NUMBERS SHOWN ON THIS FLOOR PLAN REPRESENT THE UNIT NUMBER/LOCATION WITHIN THE BLD. EVERY UNIT NUMBER WILL ALSO HAVE A PREFIX NUMBER WHICH REPRESENTS THE BLD NUMBER IN WHICH IT IS LOCATED. I.E. UNIT 102 IN BLD #1 IS 1102 WHILE UNIT 102 IN BLD #3 IS 3102.

FIRST FLOOR PLAN

3/32" = 1'

BUILDING #3 SUMMARY

BLD #3 45 Units	1 Bedroom	2 Bedroom	3 Bedroom	Total
Walk out (NA)	0	0	0	0
1st FL	6	7	2	15
2nd FL	6	7	2	15
3rd FL	6	7	2	15
Total	18	21	6	45
% of Total	40.0%	46.7%	13.3%	100%

DATE: DATE

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PATH:
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SCALE: SEE DRAWING

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FIRST AND SECOND FLOOR PLANS
BLD #3.
45 UNIT BUILDING

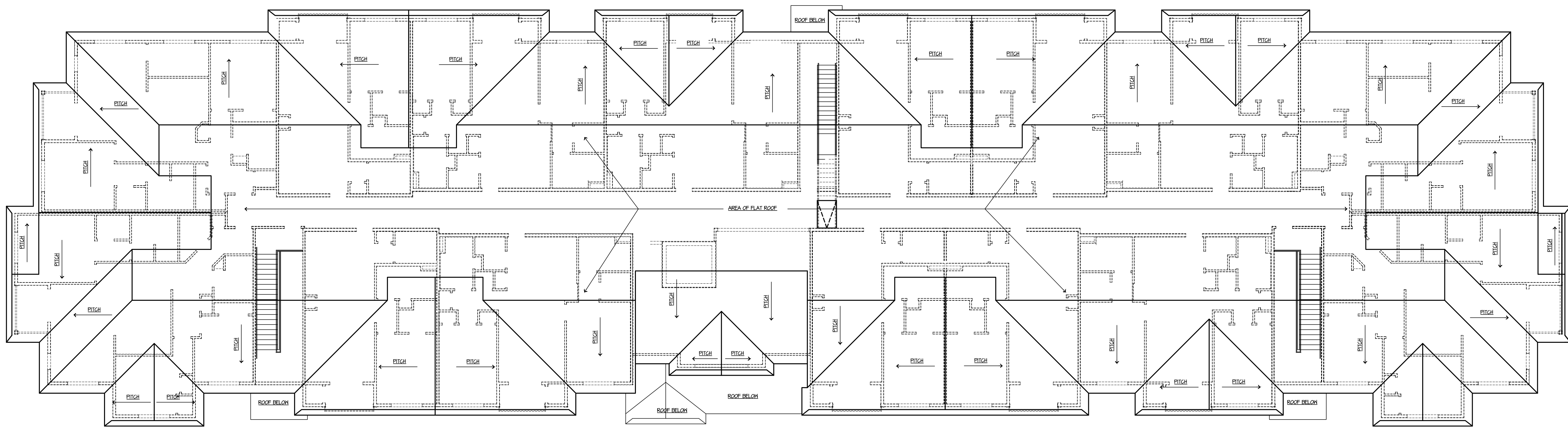
BIRCH STREET PLACE
BIRCH STREET, MILFORD, MA
Applicant: 88 CORP.

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A#3.1

JOB NO. 20160007



B ROOF PLAN
3/32" = 1'



THIRD FLOOR UNIT COUNT		
3RD FLOOR 15 UNITS:		
1 BEDROOM	6 @	712 SF
2 BEDROOM	5 @	972 SF
2 BEDROOM-DEN	2 @	1140 SF
3 BEDROOM	2 @	1265 SF

A THIRD FLOOR PLAN
3/32" = 1'

DATE: DATE

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SCALE: SEE DRAWING

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THIRD FLOOR & ROOF PLAN
BLD #3
45 UNIT BLD

BIRCH STREET PLACE
BIRCH STREET, MILFORD, MA
Applicant: 88 CORP.

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SHEET:
A#3.2

JOB NO. 20160007

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SCALE: SEE DRAWING

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Walk out floor plan
BLD #4
39 UNIT BUILDING

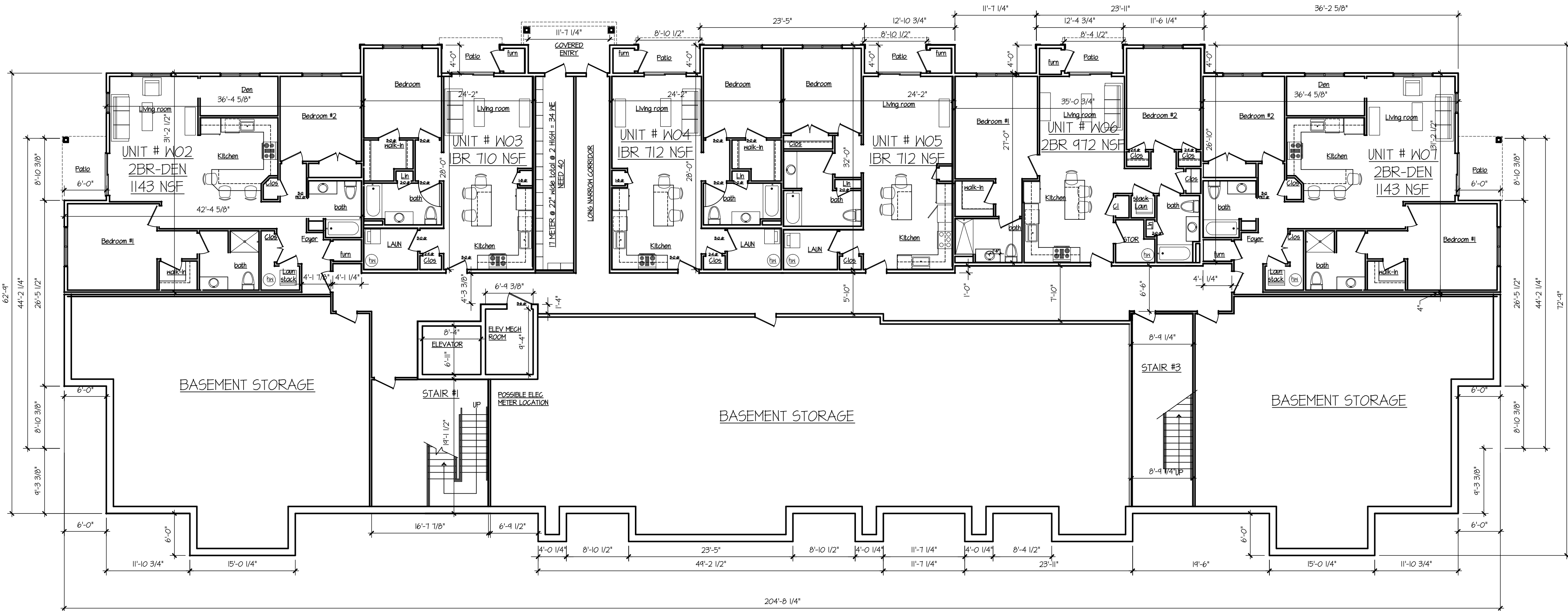
BIRCH STREET PLACE
BIRCH STREET, MILFORD, MA
Applicant: BB CORP.

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SHEET:

A #4.0

JOB NO. 20160007



WALK OUT FLOOR UNIT COUNT

WALK OUT 6 UNITS:

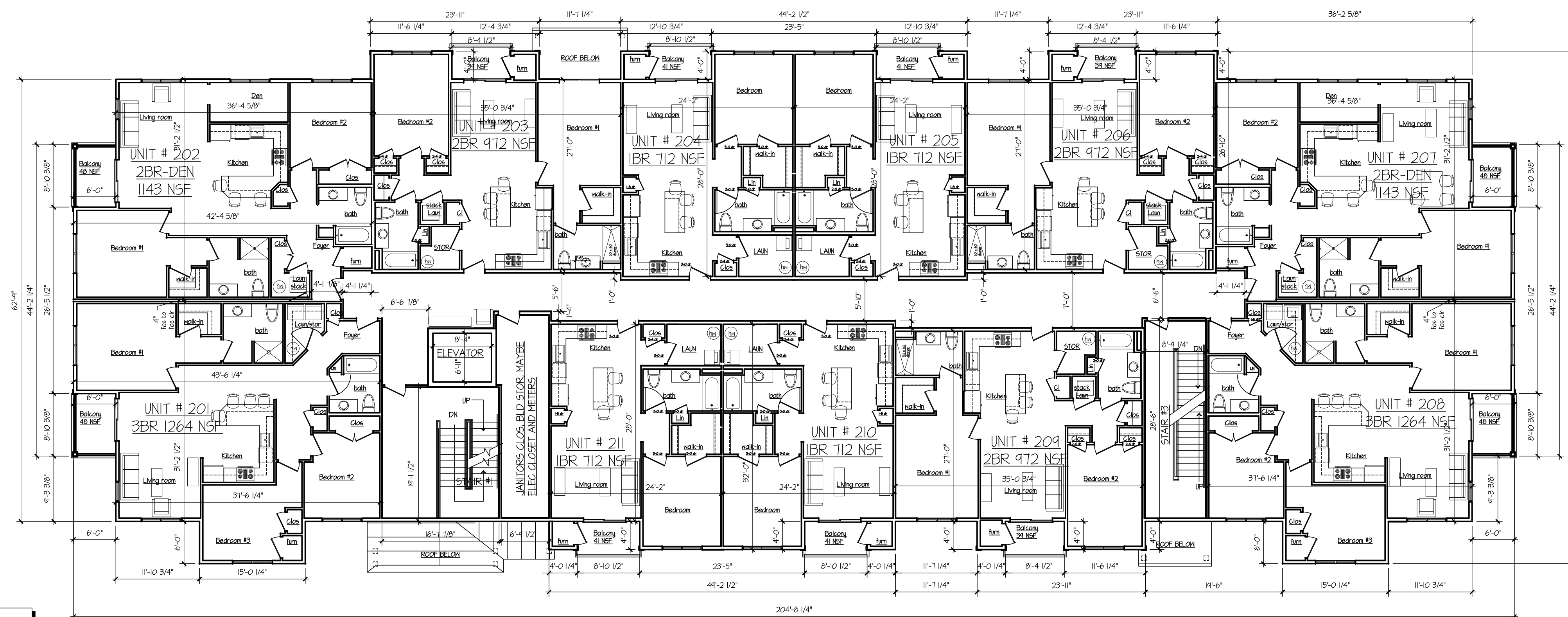
1 BEDROOM	3 @	712 SF
2 BEDROOM	1 @	972 SF
2 BEDROOM-DEN	2 @	1,143 SF

WALKOUT FLOOR PLAN

3/32" = 1'

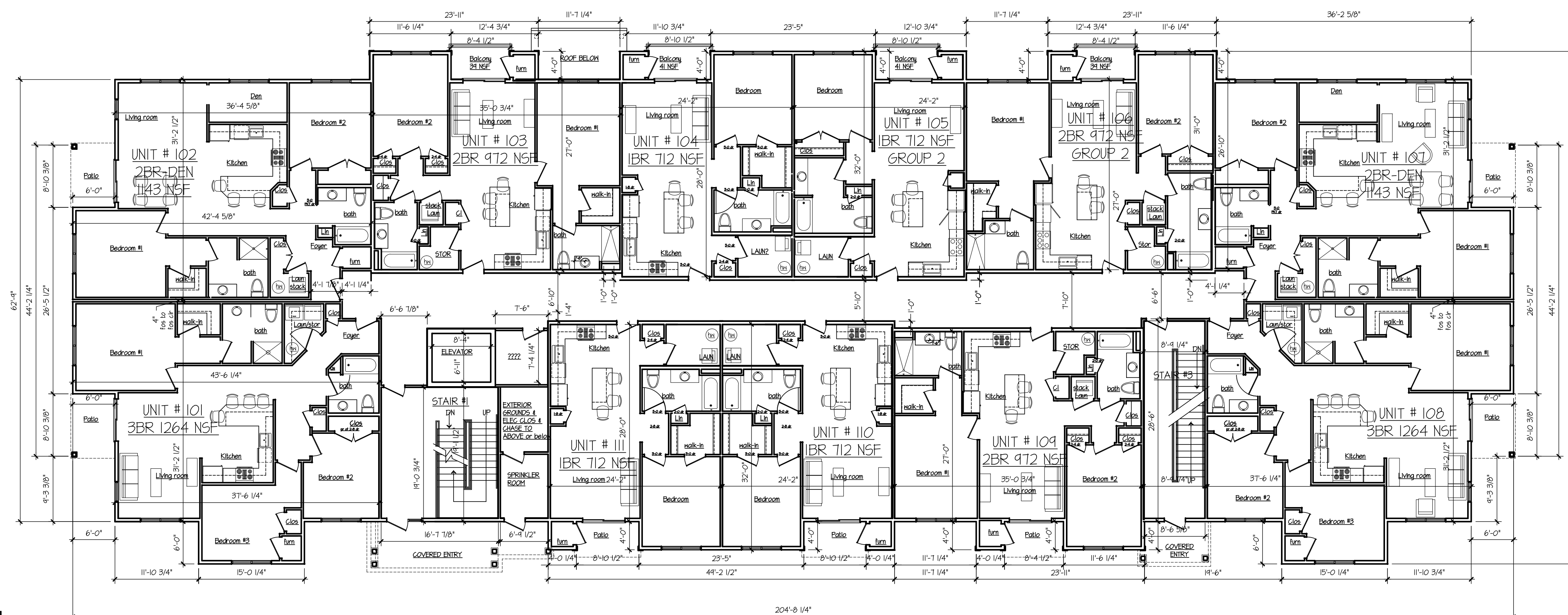
BUILDING #4 SUMMARY

BLD #4 39 Units	1 Bedroom	2 Bedroom	3 Bedroom	Total
Walk out	3	3	0	6
1st FL	4	5	2	11
2nd FL	4	5	2	11
3rd FL	4	7	0	11
Total	15	20	4	39
% of Total	38.5%	51.3%	10.3%	100%

SECOND FLOOR UNIT COUNT

2ND FLOOR II UNITS:

1 BEDROOM	4 @	712 SF
2 BEDROOM	3 @	972 SF
2 BEDROOM-DEN	2 @	1,143 SF
3 BEDROOM	2 @	1,264 SF



FIRST FLOOR UNIT COUNT

1ST FLOOR II UNITS:

1 BEDROOM	3 @	712 SF
1 BEDROOM GROUP 2	1 @	712 SF
2 BEDROOM	2 @	972 SF
2 BEDROOM GROUP 2	1 @	972 SF
2 BEDROOM-DEN	2 @	1,143 SF
3 BEDROOM	2 @	1,264 SF

NOTE: UNIT NUMBERS SHOWN ON THIS FLOOR PLAN REPRESENT THE UNIT NUMBER/LOCATION WITHIN THE BLD. EVERY UNIT NUMBER WILL ALSO HAVE A PREFIX NUMBER WHICH REPRESENTS THE BLD NUMBER WHERE IT IS LOCATED. I.E. UNIT 102 IN BLD #2 IS 2102 WHILE UNIT 102 IN BLD #4 IS 4102.

FIRST FLOOR PLAN

$$3/32'' = 1'$$

DATE: DATE

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PATH:
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FIRST AND SECOND FLOOR PLANS

BLD #4

**BLD #4
39 UNIT BUILDING**

BIRCH STREET PLACE
BIRCH STREET, MILFORD, MA

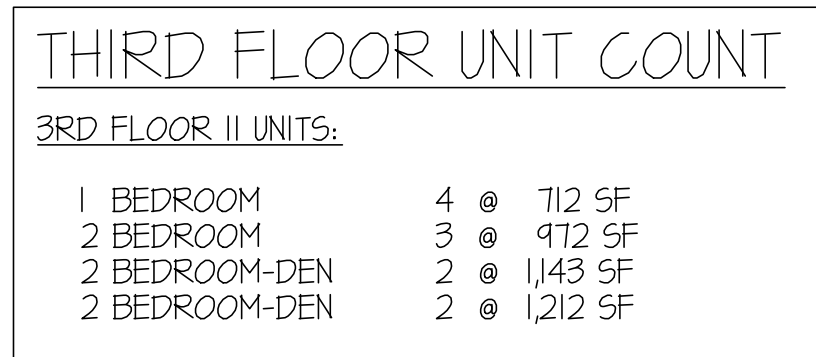
Applicant: 88 CORP.

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SCALE: SEE DRAWING

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HPA Des

ARCHITE

200 Stonewall

Wrentham, MA

508.384.8838

508.384.0483

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THIRD FLOOR & ROOF PLAN

BLDS #4

39 UNIT BUILDINGS

Abstract

BIRCH STREET, MILFORD, MA

Applicant: 88 CORP.

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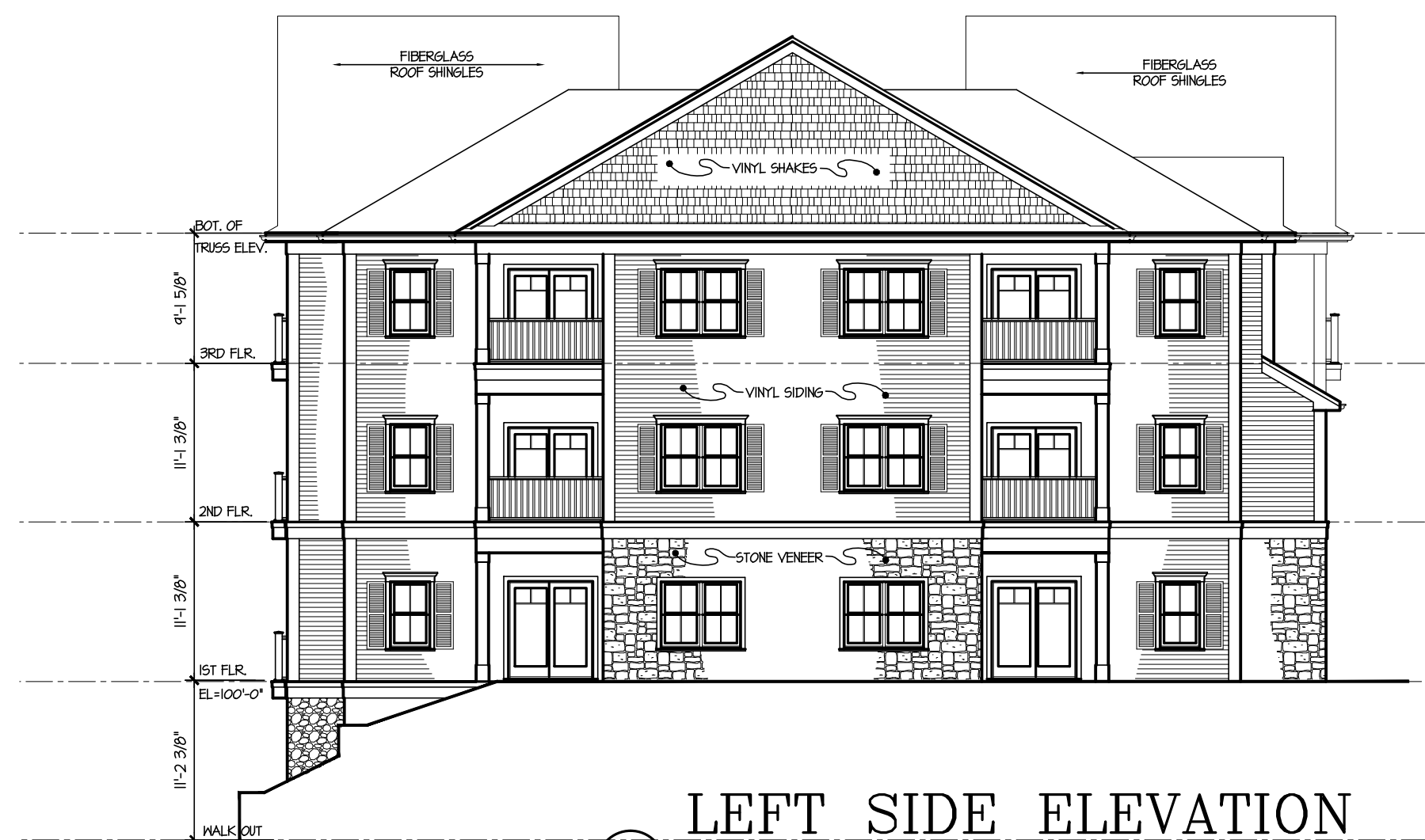
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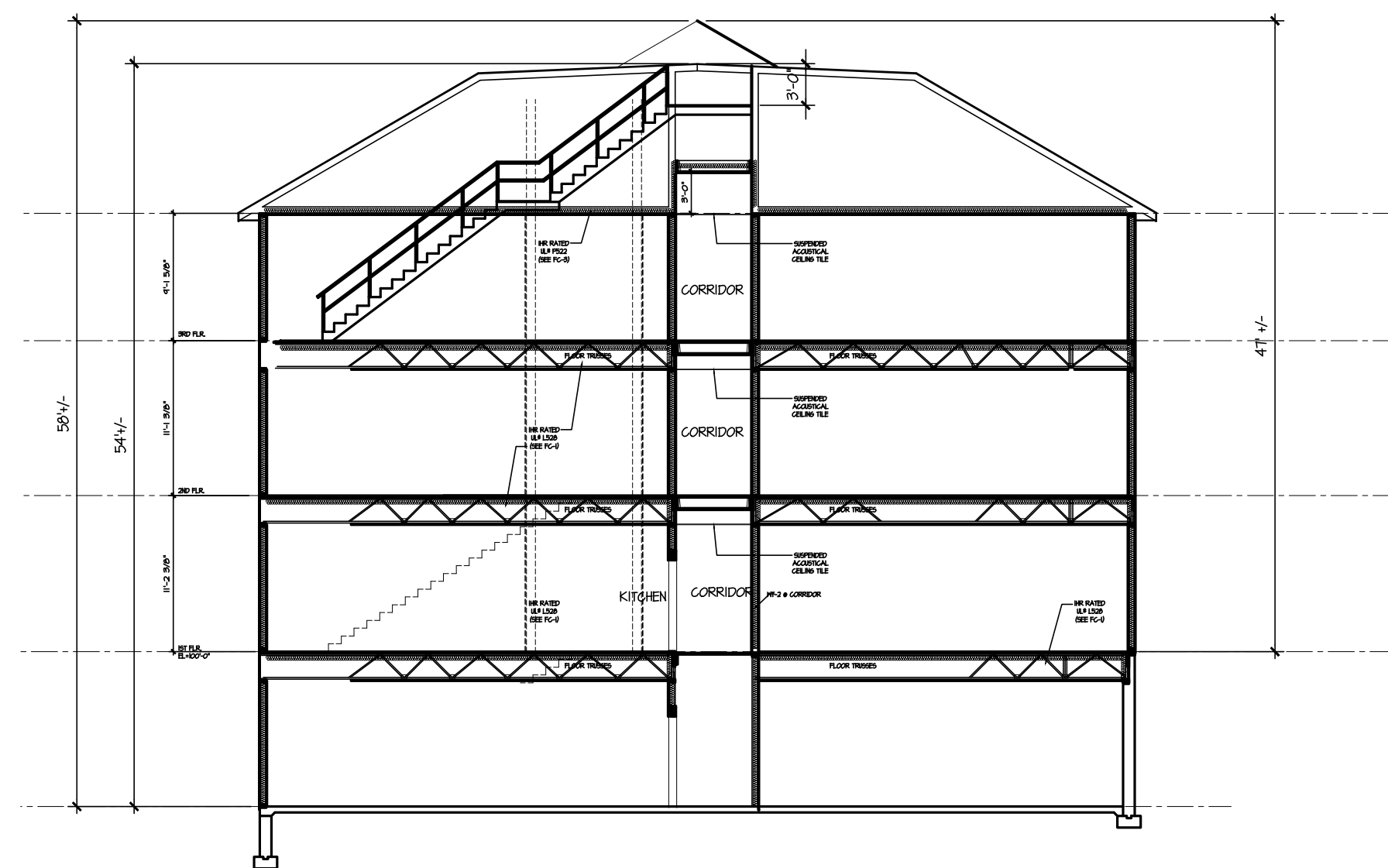
JOB NO.	2016000
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A FRONT ELEVATION
3/32" = 1'-0"



B LEFT SIDE ELEVATION
3/32" = 1'-0"



E GENERIC SECTION
3/32" = 1'-0"



C RIGHT SIDE ELEVATION
3/32" = 1'-0"



D REAR ELEVATION
3/32" = 1'-0"

DATE: DATE

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SCALE: SEE DRAWING

REVISIONS:
DATE DESC.
A 11-22-17 PEL Submission

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BUILDING ELEVATIONS
BLD #4 39 UNIT BLD

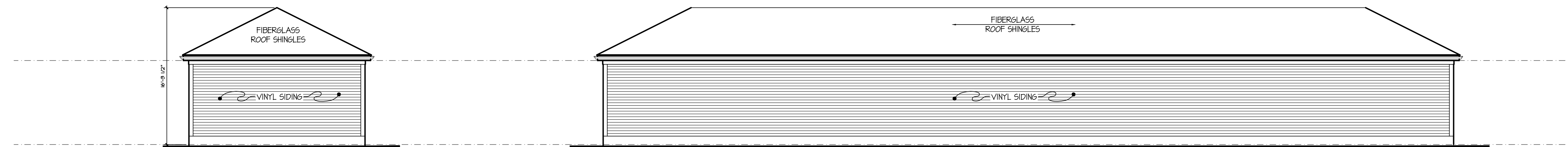
BIRCH STREET PLACE
BIRCH STREET, MILFORD, MA
Applicant: 88 CORP.

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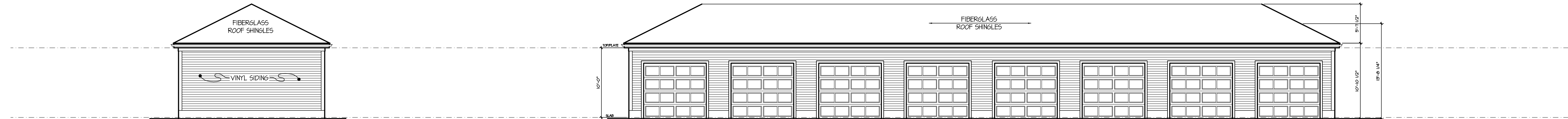
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JOB NO. 20170202



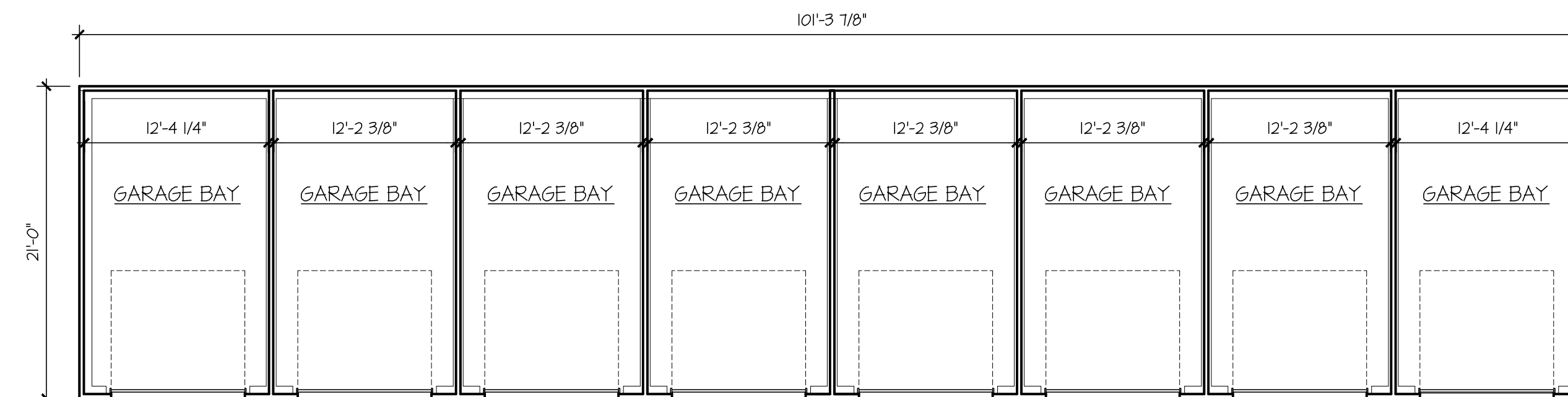
C RIGHT SIDE ELEVATION
1/8" = 1'-0"

D REAR ELEVATION
1/8" = 1'-0"



B LEFT SIDE ELEVATION
1/8" = 1'-0"

A FRONT ELEVATION
1/8" = 1'-0"



E FLOOR PLAN
1/8" = 1'-0"

DATE: DATE

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GARAGE FLOOR PLAN & ELEVATIONS
TYPICAL FOR 4 GARAGE BUILDINGS

BIRCH STREET PLACE
BIRCH STREET, MILFORD, MA
Applicant: BB CORP.

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JOB NO. 20170202



FRONT ELEVATION

A
1/4" = 1'-0"



RIGHT ELEVATION

B
1/4" = 1'-0"

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SCALE: SEE DRAWING

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B	4-4-18	ISS FOR COMP PERMIT

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CLUBHOUSE ELEVATIONS

BIRCH STREET PLACE
BIRCH STREET, MILFORD, MA
Applicant: BB CORP.

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A#C.1

JOB NO. 20170202



A REAR ELEVATION
1/4" = 1'-0"



B LEFT ELEVATION
1/4" = 1'-0"

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SCALE: SEE DRAWING

REVISIONS:

DATE

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A 4-4-10 ISS FOR COMP PERMIT

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CLUBHOUSE ELEVATIONS

BIRCH STREET PLACE
BIRCH STREET, MILFORD, MA
Applicant: 88 CORP.

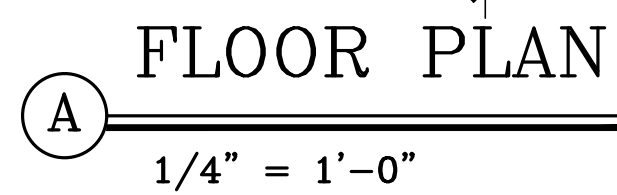
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BIRCH STREET PLACE
BIRCH STREET, MILFORD, MA
Applicant: 88 CORP.

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JOB NO. 20170202

Applicant: 88 CORP.
Project: Birch Street Place
Industrial Way & Birch Street
Assessors Parcel ID No. 48-0-6A

LIST OF WAIVERS

Off Industrial Way & Birch Street

As required under 760 CMR 56.05(2)(h), the following is a list of Waivers to “Local Requirements and Regulations,” including waivers from the General By-Laws of the Town of Milford, with amendments through the Special Town Meeting held on October 30, 2017, as amended (“General Bylaw”), the Zoning By-Law, Town of Milford, Massachusetts, with amendments through the Special Town Meeting held on October 30, 2017, as amended (“Zoning Bylaw”), the Town of Milford, Massachusetts Rules and Regulations Relating to the Subdivision of Land, as most recently amended through April, 2015, as amended, and other Local Requirements and Regulations as defined under Section 56.02 of the Chapter 40B Regulations, including all local legislative, regulatory, or other actions which are more restrictive than state requirements, if any, including local zoning and wetlands ordinances, subdivision and board of health rules, and other local bylaws, codes, and regulations, in each case which are in effect on the date of the Project’s application to the Board. In addition to the following list of requested Waivers listed below, the Applicant requests an exception from each and every provision or requirement of all Local Requirements and Regulations issued by a “Local Board” (defined under the Chapter 40B Regulations as meaning any local board or official, including, but not limited to any board of survey; board of health; planning board; conservation commission; historical commission; water, sewer, or other commission or district; fire, police, traffic, or other department; building inspector or similar official or board; board of selectmen, as well as all boards, regardless of their geographical jurisdiction or their source of authority [that is, including boards created by special acts of the legislature or by other legislative action] if such local board perform functions usually performed by locally created boards) with which any aspect of its Comprehensive Permit Application, including but not limited to its proposed site development plans and any other information hereinafter submitted to the Board, is inconsistent.

****Note that pursuant to 760 CMR 56.00 (the “Chapter 40B Rules”), and as specifically described under 760 CMR 56.05(7), “zoning waivers are required solely from the “as-of-right” requirements of the zoning district where the project site is located; there shall be no requirement to obtain waivers from the special permit requirements of the district.” Accordingly, any waivers which reference special permit requirements are included only for illustration purposes.**

Applicant: 88 CORP.
Project: Birch Street Place
Industrial Way & Birch Street
Assessors Parcel ID No. 48-0-6A

A. GENERAL BY-LAWS OF THE TOWN OF MILFORD, MASSACHUSETTS, WITH AMENDMENTS THROUGH THE SPECIAL TOWN MEETING HELD ON OCTOBER 30, 2017, AS AMENDED (GENERAL BYLAW)				
<u>BY-LAW/REG.</u>	<u>TITLE</u>	<u>DESCRIPTION</u>	<u>REQUIRED</u>	<u>PROPOSED</u>
ARTICLE 8	Planning Board	Planning Board	Enumerated duties of the Planning Board	Waived, as the Zoning Board of Appeals is the comprehensive permit granting authority, including for endorsement of approval not required (ANR) plans and to be governed by the Site Plans and Comprehensive Permit Decision.
ARTICLE 12	Streets and Sidewalks, Street Opening/Curb Cut	Permit, fee, bond, performance and other requirements for work within any street, sidewalk or public way.	No person, except the Selectmen or the Highway Surveyor in the lawful performance of their duties or those acting under their orders, except such other persons as are or may be authorized by statute, shall break or dig up the ground in any street, sidewalk or public way in the Town without obtaining a written permit from the Highway Surveyor which shall state the regulations under which the work shall be done.	Waived. To allow the Zoning Board of Appeals to issue such permits, as governed by the Site Plans and Comprehensive Permit Decision.
ARTICLE 33	Wetlands Administrative Bylaw	Application, fee, permit, and other requirements for work authorized within wetland resource jurisdictional areas.	Except as permitted by the Conservation Commission, or as provided in this bylaw, no person shall remove, fill, dredge, build upon, or alter specified resource areas or land within 100 feet of said resource areas, or within 100 feet of any land subject to flooding or inundation by ground water, or surface water.	Waived. All work to be governed by the Massachusetts Wetlands Protection Act (MGL c. 131, s. 40) and accompanying regulations at 310 CMR 10.000 et seq..

{00111931;v3}3

Applicant: 88 CORP.
Project: Birch Street Place
Industrial Way & Birch Street
Assessors Parcel ID No. 48-0-6A

ARTICLE 36	Stormwater Management By-Law	Stormwater Permit, O & M and other requirements.	Prior to the issuance of any building permit for any proposed development, a stormwater management permit, or a waiver of the requirement for a stormwater management permit, must be approved by the Office of Planning and Engineering. No person shall initiate any land clearing, land grading, earth moving or development activities without first complying with this By-Law unless exempted.	Waived, unless exempted. Stormwater to be managed in accordance with MassDEP's Stormwater Management Policy and related technical guidance, as provided in the Comprehensive Permit Decision, and will also be managed in accordance with the requirements, and permit coverage conditions, of a US EPA 2017 NPDES Stormwater Construction General Permit (CGP) for Massachusetts which the Applicant will file and implement prior to construction commencement.
ARTICLE 37, Sections 1 through 6	Occupancy of Buildings	Registration, Enforcement, Penalties.	No person shall rent or lease, offer to rent or lease, or make or have available for rent or lease any building or any portion of a building to be used for human habitation without first registering with the Board of Health, which shall determine the number of persons such building or portion of a building may lawfully accommodate under the provisions of the Massachusetts State Sanitary Code and applicable Board of Health Regulations, and without first also conspicuously posting within such building or portion of a building a Certificate of Registration provided by the Board of Health specifying the number of persons such building or portion of a building may lawfully accommodate.	Waived to the extent more restrictive than the Massachusetts State Sanitary Code, as the Zoning Board of Appeals is the comprehensive permit granting authority with the authority to issue all local permits and approvals. The applicant will satisfy all applicable Massachusetts State Sanitary Code requirements.

{00111931;v3}4

Applicant: 88 CORP.
Project: Birch Street Place
Industrial Way & Birch Street
Assessors Parcel ID No. 48-0-6A

B. ZONING BY-LAW, TOWN OF MILFORD, MASSACHUSETTS, WITH AMENDMENTS THROUGH THE SPECIAL TOWN MEETING HELD ON OCTOBER 30, 2017, AS AMENDED (ZONING BYLAW)				
<u>BY-LAW/REG.</u>	<u>TITLE</u>	<u>DESCRIPTION</u>	<u>REQUIRED</u>	<u>PROPOSED</u>
Section 1.4, Subsection 1.4.1	Building Permit	Compliance with Zoning Bylaw	No building permit shall be issued until such construction, alteration or use, as proposed, shall comply in all respects with the provisions of this By-Law, or with a decision rendered or special permit granted by the Board of Appeals or other designated special permit granting authority.	Waived. To be governed by the Comprehensive Permit Decision issued by the Zoning Board of Appeals, and to allow proposed Project in conformity with all use, dimensional, parking and other requirements of the Zoning By-law except as modified by the approved Waivers described in this Comprehensive Permit Decision.
Section 1.4.2	Permit Procedure	Building Permits	Allows Building Commissioner to request other information to be accompanied by Building Permit Application as the Building Commissioner may require to ensure compliance with this By-Law.	Waived. To be governed by the Comprehensive Permit Decision issued by the Zoning Board of Appeals, and to allow the Building Inspector to request such information required in order to issue a Building Permit for the proposed Project in conformity with Zoning By-law except as modified by the approved Waivers described in this Comprehensive Permit Decision

Applicant: 88 CORP.
Project: Birch Street Place
Industrial Way & Birch Street
Assessors Parcel ID No. 48-0-6A

B. ZONING BY-LAW, TOWN OF MILFORD, MASSACHUSETTS, WITH AMENDMENTS THROUGH THE SPECIAL TOWN MEETING HELD ON OCTOBER 30, 2017, AS AMENDED (ZONING BYLAW)				
<u>BY-LAW/REG.</u>	<u>TITLE</u>	<u>DESCRIPTION</u>	<u>REQUIRED</u>	<u>PROPOSED</u>
Section 1.5	Certificate of Zoning Compliance	Certificate of Zoning Compliance, Procedures for issuance of Certificate.	No premises and no building or structure, erected, constructed, enlarged or altered, or in any way changed as to use, under a permit or otherwise, shall be occupied or used unless a Certificate of Zoning Compliance for such occupancy or use is issued by the Building Commissioner. Such certificate shall not be issued until the premises, building or structure, and the proposed use and accessory uses comply in all respects with this By-Law, and with any applicable decision of the Board of Appeals or other designated special permit granting authority including site plans approved by the Planning Board under Section 1.15 of this bylaw.	Waived. To be governed by the Comprehensive Permit Decision, and to allow proposed Project to be constructed and operated in conformity with all use, dimensional, parking and other requirements of the Zoning Bylaw except as modified by the approved Waivers described in this Comprehensive Permit Decision. The Zoning Board of Appeals shall act as the comprehensive permit granting authority.
Section 1.6, Subsections 1.6.2 & 1.6.3	Violations	Violations of Zoning Bylaw;; notice; withholding of permit; stop order; permit revocation; prosecution of violations.	If any violation of the Zoning Bylaw or any decision of the Board of Appeals or other special permit granting authority is found by the Building Commissioner, the violator shall be duly notified of the nature of the violation and shall be subject to any and all actions specified in Section 1.6 that may be deemed appropriate by the Commissioner to correct that violation.	Waived. To be governed by the Comprehensive Permit Decision, and to allow proposed Project in conformity with all requirements of the Zoning By-law except as modified by the approved Waivers described in this Comprehensive Permit Decision. Enforcement of violations of Zoning Bylaw except as waived by Comprehensive Permit Decision.

Applicant: 88 CORP.
Project: Birch Street Place
Industrial Way & Birch Street
Assessors Parcel ID No. 48-0-6A

B. ZONING BY-LAW, TOWN OF MILFORD, MASSACHUSETTS, WITH AMENDMENTS THROUGH THE SPECIAL TOWN MEETING HELD ON OCTOBER 30, 2017, AS AMENDED (ZONING BYLAW)				
<u>BY-LAW/REG.</u>	<u>TITLE</u>	<u>DESCRIPTION</u>	<u>REQUIRED</u>	<u>PROPOSED</u>
Section 1.15	Site Plan Review	Requirements for Site Plan Review	Planning Board authorized to review certain uses and structures, as indicated in Section 2.3, below, and in other provisions of the Zoning Bylaw, which have been deemed to have a significant impact on the health, safety, convenience and general welfare of the citizens of the Town of Milford. In exercising its authority under this section, the Planning Board shall not withhold its approval of any proposed use or structure unless it shall determine that such use or structure does not comply with the requirements of this By-Law.	Waived. To be governed by Comprehensive Permit Decision. The Zoning Board of Appeals shall act as the comprehensive permit granting authority and the Applicant also seeks a waiver to allow the Zoning Board of Appeals to endorse plans, including approval not required plans.
Section 2.2, Subsection 2.2.1	Use Regulations	Table of Principal Uses	No buildings or structure shall be erected or used and no premises shall be used except as set forth in the "Use Regulation Schedule".	Waived. Allow proposed residential rental and associated uses as described below.

Applicant: 88 CORP.

Project: Birch Street Place

Industrial Way & Birch Street

Assessors Parcel ID No. 48-0-6A

B. ZONING BY-LAW, TOWN OF MILFORD, MASSACHUSETTS, WITH AMENDMENTS THROUGH THE SPECIAL TOWN MEETING HELD ON OCTOBER 30, 2017, AS AMENDED (ZONING BYLAW)				
<u>BY-LAW/REG.</u>	<u>TITLE</u>	<u>DESCRIPTION</u>	<u>REQUIRED</u>	<u>PROPOSED</u>
Section 2.3	Use Regulation Schedule	Table of Principal Uses; Accessory Uses	Within the Highway Industrial (IB) Zoning District, single family, two-family and Multi-Family Dwellings are prohibited within the IB Zoning District.	Waived to permit the use of the Property for no less than a total of 162 garden-style residential rental apartment units, all of which are contained within one of four proposed buildings, as well as customary accessory uses, including but not limited to, administrative/ rental offices, club house/pool building, pool and patio area, outdoor gas grill area, maintenance/bike storage building, bus stop enclosure structure, a dog park area, signage, flex space for use of residents, and related customary accessory uses, along with passive recreational open space, playground areas, a total of 324 parking spaces (or an average of 2.0 spaces per unit, including surface parking and enclosed garage parking as depicted on the Site Plans), trash receptacle areas, lighting, utilities, and other appurtenant uses customary to such residential uses, as well as designated open space uses. Also allow the use of one temporary construction and/or marketing trailer as Applicant's project office until all units are leased.

Applicant: 88 CORP.
Project: Birch Street Place
Industrial Way & Birch Street
Assessors Parcel ID No. 48-0-6A

B. ZONING BY-LAW, TOWN OF MILFORD, MASSACHUSETTS, WITH AMENDMENTS THROUGH THE SPECIAL TOWN MEETING HELD ON OCTOBER 30, 2017, AS AMENDED (ZONING BYLAW)				
<u>BY-LAW/REG.</u>	<u>TITLE</u>	<u>DESCRIPTION</u>	<u>REQUIRED</u>	<u>PROPOSED</u>
Section 2.3 (fn#3), and Section 3.7	Use Regulation Schedule	Earth Removal	Within the Highway Industrial (IB) Zoning District, earth removal is allowed as an accessory use within the IB Zoning District by Zoning Board of Appeals Special Permit. The removal of sod, peat, loam, humus, clay, sand or gravel forming a part of the real estate of the town, except when necessarily incidental to and in conjunction with the construction or demolition of a structure or other activity for which a permit has been issued within the past six months, or except when necessarily incidental to and in conjunction with the installation of municipal services in accordance with a plan approved by the Planning Board, or for grading or improving the premises of which such structure is a part, or on which such installation and maintenance work is performed, shall not be permitted except in accordance with the conditions and procedures described in Section 3.7.	Waived. Allow earth removal as conditioned within Comprehensive Permit Decision.

Applicant: 88 CORP.
Project: Birch Street Place
Industrial Way & Birch Street
Assessors Parcel ID No. 48-0-6A

B. ZONING BY-LAW, TOWN OF MILFORD, MASSACHUSETTS, WITH AMENDMENTS THROUGH THE SPECIAL TOWN MEETING HELD ON OCTOBER 30, 2017, AS AMENDED (ZONING BYLAW)				
<u>BY-LAW/REG.</u>	<u>TITLE</u>	<u>DESCRIPTION</u>	<u>REQUIRED</u>	<u>PROPOSED</u>
Section 2.3 (fn#26), and Section 3.9, Subsection 3.9.7	Use Regulation Schedule	Signs As Accessory Uses; Permitted Signs	Various requirements for signs within IB Districts. One wall sign on each side of a building per use per lot provided that the aggregate of all wall signs does not exceed 20% of the wall area upon which they are displayed. One free-standing sign per street frontage provided that that the aggregate of all free-standing signs does not exceed one square foot per foot of lot frontage on the street towards which they are oriented. Free-standing signs shall not exceed 30' in height. The total area of all signs, either wall mounted or free-standing, shall aggregate not more than four square feet per foot of lot frontage on the street towards which they are oriented. Sections 3.9.7.9 through 3.9.7.12.	Waived to allow conforming signs, plus: (a) one temporary non-illuminated construction sign of no more than sixty-four (64) square feet in size from the commencement until completion of construction; (b) one temporary on-site sign pertaining to the advertisement of the lease of a dwelling unit not-to-exceed six square feet and no portion of which is greater than five feet above ground level with such temporary sign shall be removed within one week following the date of the signing of the lease; and, (c) One permanent on-site sign pertaining to the Project, where such sign is depicted on the Site Plans.

Applicant: 88 CORP.
Project: Birch Street Place
Industrial Way & Birch Street
Assessors Parcel ID No. 48-0-6A

B. ZONING BY-LAW, TOWN OF MILFORD, MASSACHUSETTS, WITH AMENDMENTS THROUGH THE SPECIAL TOWN MEETING HELD ON OCTOBER 30, 2017, AS AMENDED (ZONING BYLAW)				
<u>BY-LAW/REG.</u>	<u>TITLE</u>	<u>DESCRIPTION</u>	<u>REQUIRED</u>	<u>PROPOSED</u>
Section 2.3 (fn#26), Section 3.9, Subsection 3.9.9 through 3.9.11	Use Regulation Schedule	Signs As Accessory Uses; Permitted Signs	<p>A building permit is required for the placement, construction, erection, or modification of any sign except within the RA, RB, RC, and RD zoning districts. The permit application shall be accompanied by detailed drawings to show the dimensions, design, structure, and location of each sign, to the extent that such details are not contained on a Common Signage Plan then in effect for the premises. A single application and permit may include multiple signs on the same premises.</p> <p>3.9.10 Site Plan Required: Site plan approval by the Planning Board shall be required for all free-standing signs prior to the issuance of a building permit, except for temporary signs as provided for in Section 3.9.12 herein.</p> <p>3.9.11 Common Signage Plan: On lots containing existing multiple uses and/or buildings where a change to the signage is proposed, a common signage plan shall be submitted to the Building Commissioner to provide coordination among the various interests in providing signage on such lots. Such common signage plans may be approved by the Building Commissioner prior to the issuance of applicable permits.</p>	Waived as noted above, and as described in the Comprehensive Permit Decision.

Applicant: 88 CORP.
Project: Birch Street Place
Industrial Way & Birch Street
Assessors Parcel ID No. 48-0-6A

B. ZONING BY-LAW, TOWN OF MILFORD, MASSACHUSETTS, WITH AMENDMENTS THROUGH THE SPECIAL TOWN MEETING HELD ON OCTOBER 30, 2017, AS AMENDED (ZONING BYLAW)				
<u>BY-LAW/REG.</u>	<u>TITLE</u>	<u>DESCRIPTION</u>	<u>REQUIRED</u>	<u>PROPOSED</u>
Section 2.4, Subsection 2.4.1	Intensity of use Regulations	All Buildings; Compliance	All buildings hereinafter erected in any district shall be located on a lot such that all the minimum requirements set forth in the following table are conformed with, except where specifically exempted by this By-Law or by the General Laws.	Waived. To be governed by Comprehensive Permit Decision.
Section 2.4, Subsection 2.4.2	Intensity of use Regulations	Lot Size	No existing lot shall be changed in size or shape except through a public taking so as to result in violation of the requirements set forth below.	Waived. To be governed by Comprehensive Permit Decision.

Applicant: 88 CORP.
Project: Birch Street Place
Industrial Way & Birch Street
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B. ZONING BY-LAW, TOWN OF MILFORD, MASSACHUSETTS, WITH AMENDMENTS THROUGH THE SPECIAL TOWN MEETING HELD ON OCTOBER 30, 2017, AS AMENDED (ZONING BYLAW)				
<u>BY-LAW/REG.</u>	<u>TITLE</u>	<u>DESCRIPTION</u>	<u>REQUIRED</u>	<u>PROPOSED</u>
Section 2.4, Subsection 2.4.8	Setbacks	Setbacks From Wetlands	Notwithstanding any other set-back requirement or other provision of the By-Law, there shall be minimum set-back requirement for any structure from a freshwater wetland, pond, stream or detention area as set forth below for various zoning districts. Freshwater wetland, pond and stream, and their limits, shall be defined and determined in accordance with M.G.L. c.131, Section 40 and the regulations adopted thereunder. A detention area is defined as an area, either man-made or natural, which has been designated to detain or retain rainfall runoff. The limits of a detention area shall be the high mark which occurs during a 100 year storm event. This elevation shall be determined by a Registered Engineer using acceptable methods of calculation. All Residential Districts: 25 feet All Commercial Districts: 15 feet All Industrial Districts: 15 feet	Waived. Setbacks as depicted on the Site Plans.

Applicant: 88 CORP.
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B. ZONING BY-LAW, TOWN OF MILFORD, MASSACHUSETTS, WITH AMENDMENTS THROUGH THE SPECIAL TOWN MEETING HELD ON OCTOBER 30, 2017, AS AMENDED (ZONING BYLAW)				
<u>BY-LAW/REG.</u>	<u>TITLE</u>	<u>DESCRIPTION</u>	<u>REQUIRED</u>	<u>PROPOSED</u>
Section 2.5	Intensity of use	Dimensional Requirements	<p>The following are the required dimensional provisions for a building located within the IB Zoning District:</p> <p>--Min Lot Size (s.f.) = 80,000</p> <p>--Min. Lot Width (l.f.) = 250</p> <p>--Min. Lot Frontage (l.f.) = 230</p> <p>--Min Yard Setback (in feet)</p> <p> Front = 50</p> <p> Side = 25</p> <p> Rear = 30</p> <p>--Max. Building Coverage (%)= 35</p> <p>--Max. F.A.R.= 0.50</p> <p>--Min. Open Space (%)= 20</p> <p>--Max Building Height – lesser of either:</p> <p>Stories = 5.0</p> <p>Feet = 60</p>	<p>912,988 s.f.</p> <p>224.5 l.f. [waiver]</p> <p>234.25 l.f.</p> <p>818.9 Feet</p> <p>71.9 Feet</p> <p>460.4 Feet</p> <p>8.5%</p> <p>0.23</p> <p>72.4%</p> <p>4.0</p> <p>58 Feet</p>
Section 3.2, Subsection 3.2.2	Accessory Use	Accessory Use Restrictions	<p>Customary accessory uses are permitted except as specifically restricted in Article II or elsewhere. Uses shall not be considered "accessory" if they occupy more than 30% of the floor area or more than 50% of the land area on any lot.</p>	Waived. To be governed by Comprehensive Permit Decision.

Applicant: 88 CORP.
Project: Birch Street Place
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Assessors Parcel ID No. 48-0-6A

B. ZONING BY-LAW, TOWN OF MILFORD, MASSACHUSETTS, WITH AMENDMENTS THROUGH THE SPECIAL TOWN MEETING HELD ON OCTOBER 30, 2017, AS AMENDED (ZONING BYLAW)				
<u>BY-LAW/REG.</u>	<u>TITLE</u>	<u>DESCRIPTION</u>	<u>REQUIRED</u>	<u>PROPOSED</u>
Section 3.2, Subsection 3.2.5	Accessory Use	Accessory Use Restrictions - Trailers	No trailer or other vehicle may be utilized for commercial purposes (other than active transportation) or as a base for conduct of retail sales from any fixed location(s) within any district.	Waived. Allow the use of one temporary construction and/or marketing trailer as Applicant's project office until all units are leased.
Section 3.4, Subsection 3.4.2(a)	Section 3.4.2(a) requires parking spaces to have certain dimensions.	Section 3.4.2(a) requires parking spaces to have certain dimensions.	Section 3.4.2(a) requires parking spaces to have certain dimensions.	Waived to allow the parking space dimensions, including any compact parking spaces, as shown on the Site Plans.
Section 3.4, Subsection 3.4.4 (a)	Parking	Entrances and Exits.	Provides that not more than one entrance and one exit shall be permitted onto a street from any parking area per 200 feet of frontage or fraction thereof in a commercial district and per 300 feet of frontage or fraction thereof in other districts. Each entrance and exit shall not be more than thirty feet in width.	Waived to allow the number of entrances and exits as shown on the Plans.
Section 3.4, Subsection 3.4.4(b) and (d)	Parking Requirements	Screening, Landscaping and Lighting Standards Associated with Parking	Screening, Landscaping and Lighting Standards Associated with Parking	Waived. To be governed by the screening, landscaping and lighting as shown on the Site Plans.

Applicant: 88 CORP.
Project: Birch Street Place
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B. ZONING BY-LAW, TOWN OF MILFORD, MASSACHUSETTS, WITH AMENDMENTS THROUGH THE SPECIAL TOWN MEETING HELD ON OCTOBER 30, 2017, AS AMENDED (ZONING BYLAW)				
<u>BY-LAW/REG.</u>	<u>TITLE</u>	<u>DESCRIPTION</u>	<u>REQUIRED</u>	<u>PROPOSED</u>
Section 3.16	Individual Lot Drainage	Specifications for Grading Plan	Individual lots shall be prepared and graded in such a manner that development of one lot shall not cause detrimental drainage onto another lot or onto streets, either during construction or upon completion. Therefore, the grading plan required by Section 1.4.2(a) herein shall provide certain requirements described in Subsection 3.16.	Waived. Grading plan requirements will be satisfied either as a part of the conditions contained within the Comprehensive Permit Decision, or as part of a wetlands filing and approval by the Milford Conservation Commission pursuant to 310 CMR 10.00. Drainage and stormwater management facilities will be designed in accordance with MassDEP Stormwater Management Policy and related technical guidance, as required under the State Wetlands Regulations, 310 CMR 10.00.
Article VII, Sections 7.1 through 7.5	Water Resource Protection District	Restrictions within Water Resource Protection District as defined as land depicted on a map entitled "Town of Milford Water Resource Protection District" and Section 7.4.2.	Allowed and prohibited uses, as well as uses permitted by special permit within the subdistricts, WR1 and WR2.	Waived, if applicable. To be governed by Comprehensive Permit Decision.

Applicant: 88 CORP.

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Industrial Way & Birch Street

Assessors Parcel ID No. 48-0-6A

B. ZONING BY-LAW, TOWN OF MILFORD, MASSACHUSETTS, WITH AMENDMENTS THROUGH THE SPECIAL TOWN MEETING HELD ON OCTOBER 30, 2017, AS AMENDED (ZONING BYLAW)				
<u>BY-LAW/REG.</u>	<u>TITLE</u>	<u>DESCRIPTION</u>	<u>REQUIRED</u>	<u>PROPOSED</u>
Section 9.0, Subsections 9.1.1, 9.1.2 and 9.2.3.	Administration and Procedures	Permits and Enforcement; Penalties	Buildings, structures or signs may not be erected, substantially altered, moved, or changed in use and land may not be substantially altered or changed in principal use unless in compliance with then-applicable zoning and after all necessary permits have been received under federal, state, or local law. The Building Inspector shall institute and take any and all such action as may be necessary to enforce full compliance with any and all of the provisions of this By-Law and of permits and variances issued thereunder, including notification of noncompliance and request for legal action through the Selectmen to Town Counsel. The penalty for violation of any provision of this By-Law, of any of the conditions under which a permit is issued, or of any decision rendered by the Board of Appeals shall be three hundred dollars (\$300.00) for each offense. Each day that each violation continues shall constitute a separate offense.	Waived. To be governed by the Comprehensive Permit Decision, and to allow proposed Project in conformity with all use, dimensional, parking and other requirements of the Zoning By-law except as modified by the approved Waivers described in this Comprehensive Permit Decision.. Also allow Building Inspector to enforce Zoning By-law, except as waived as provided in the Comprehensive permit Decision. Waived to exempt Project from penalties for violation of those provisions of the Zoning By-Law which have been waived pursuant to the Comprehensive Permit Decision.

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Assessors Parcel ID No. 48-0-6A

C. TOWN OF MILFORD, MASSACHUSETTS RULES AND REGULATIONS RELATING TO THE SUBDIVISION OF LAND (APRIL 2015), AS AMENDED (SUBDIVISION REGULATIONS)				
<u>REGULATION</u>	<u>TITLE</u>	<u>DESCRIPTION</u>	<u>REQUIRED</u>	<u>PROPOSED</u>
Subdivision Regulations	Requirements for ANR Plans	Endorsement Requirements for ANR Plans	ANR Plan Endorsed by Planning Board	Waived. The Zoning Board of Appeals, under the authority of Sections 20 through 23 of MGL c. 40B, or the Planning Board, shall be authorized to endorse the ANR Plan notwithstanding any waivers granted under the terms of the Comprehensive Permit Decision.

D. RULES AND REGULATIONS OF THE TOWN OF MILFORD SEWER DEPARTMENT DATED AUGUST 12, 1992, AS AMENDED				
<u>REGULATION</u>	<u>TITLE</u>	<u>DESCRIPTION</u>	<u>REQUIRED</u>	<u>PROPOSED</u>
Article II, Section 6	Service Charges, Fees and Related Costs	Service Charges, Fees and Related Costs	Service Charges, Fees and Related Costs	Waived in connection with sewer connection fees for the affordable units to be constructed at the proposed Project
Article III, Section 1	Approval of Wastewater Discharges	Approval of Wastewater Discharges	Wastewater discharges to Milford's wastewater facilities are not authorized unless approved in writing by the Director in accordance with these Rules and Regulations.	Waived, as the Zoning Board of Appeals is the comprehensive permit granting authority with the authority to issue all local permits and approvals. To be governed by the Comprehensive Permit Decision.

Applicant: 88 CORP.
Project: Birch Street Place
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Assessors Parcel ID No. 48-0-6A

Article IV, Section 1(a)	Connection Permit	Connection Permit	No unauthorized person shall uncover, make any connection with or opening into, use, extend, alter, or disturb any wastewater sewer without first obtaining a written permit from the Board.	Waived. The Zoning Board of Appeals is the comprehensive permit granting authority with the authority to issue all local permits and approvals. The Applicant also seeks a waiver from the permit fees and related costs for the affordable units to be constructed at the proposed project and to pay such fees and costs on a pro rate basis at the time of filing of the building permit application for each residential building.
Article IV, Section 10	Protection of Capacity for Existing Users	Protection of Capacity for Existing Users	The Board may not issue a permit for any class of connection to Milford's wastewater facilities unless there is sufficient capacity not legally committed to other users in the wastewater sewers and treatment facilities to convey and adequately treat the quantity of wastewater that the requested connection will add to the system.	Waived to the extent it is determined to be insufficient capacity for the proposed Project.

Applicant: 88 CORP.
Project: Birch Street Place
Industrial Way & Birch Street
Assessors Parcel ID No. 48-0-6A

Article VIII, Section 3	Service Charges, Fees and Costs	Service Charges, Fees and Costs	All applications for connections to the Milford Wastewater Facilities shall be accompanied by the appropriate fee as contained in Appendix A •Schedule of Service Charges and Fees. Applications which are not accompanied by the appropriate fee will not be considered and will be returned to the applicant.	Waiver of connection fee for the affordable units in the proposed Project, and to allow the timing of the payment of such fees on a pro rata basis at the time of filing the building permit application for each residential building.

E. TOWN OF MILFORD FEE, BOND OR OTHER SECURITY REQUIREMENTS				
<u>REGULATION</u>	<u>TITLE</u>	<u>DESCRIPTION</u>	<u>REQUIRED</u>	<u>PROPOSED</u>
	Town Bond, Security, Building Permit Fees and other Fees and Related Costs/Requirements			Waive all fees and surety requirements except as provided in the Comprehensive Permit Decision.
Department of Public Works	Fee and Service Schedule	Schedule of Water Rates and Fees	Application Fee, Standard Inspection Fee, Service Connection Fees, Semi-Annual Service Charges, Backflow Inspection Fees, and, Field Services.	Waived with respect to Affordable Units. To be governed by Comprehensive Permit Decision.
Waivers from Town of Milford Requirements	Waivers	Waivers	Waivers not requested but shown on Approved Plans.	Waived. To the extent that the Site Plans approved by the Board show the need for additional waivers not expressly set forth in the list of approved waivers granted as a part of the Comprehensive Permit Decision, the Applicant requests that these waivers shall also be deemed granted.

TRAFFIC IMPACT AND ACCESS STUDY

A Traffic Impact and Access Study (TIAS) was completed by Ron Müller & Associates on October 4, 2017. At that time, the project was proposed as a 159 unit rental development. Since then the size of the project has been increased to 162 rental units. The increase in the number of units by three has no material impact on the conclusions of the TIAS.

The following information is attached in each of the Comprehensive Permit Application binders submitted to the Milford Zoning Board of Appeals:

- Cover page and Conclusions section of the Traffic Impact and Access Study dated October 4, 2017

Two full copies of the TIAS (107 pages) have been submitted to the Milford Zoning Board of Appeals under separate cover.



Ron Müller & Associates

Traffic Engineering and Consulting Services

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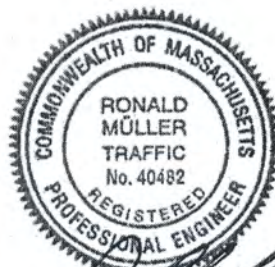
www.RonMullerAssociates.com

Traffic Impact and Access Study

**Apartment Development
Birch Street
Milford, Massachusetts**

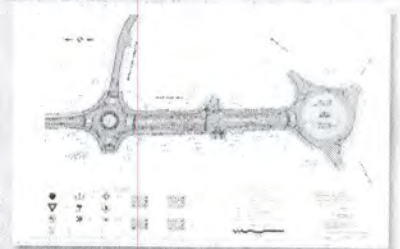
Prepared for:

**88 Corporation
31 Whitewood Road
Milford, MA 01757**



October 4, 2017

Quality



Accuracy



Integrity



CONCLUSIONS

Existing and future conditions at the study area intersections have been described and analyzed with respect to traffic operations and the impact of the proposed site development. Conclusions of this effort and recommendations are presented below.

- The project consists of constructing 159 apartment units contained in four buildings with a common shared club house, pool, playground, and dog walking area. Site access is proposed via a new driveway to intersect with Birch Street adjacent to the driveway to Birchler's Automotive. An emergency access way will be created through an easement within the fire department parcel to Birch Street, but will be restricted to emergency use only and closed with a gate and lock.
- Ample sight distances will exist at the proposed site driveway intersection with Birch Street exceeding the minimum requirements and safe operation can therefore be expected. It is recommended that any proposed landscaping or signs in the vicinity of the site driveways be kept low to the ground or outside the sight triangles so as not to impede the available sight distances.
- The proposed apartment project is expected to generate 82 to 105 peak hour vehicle trips (total entering and exiting). Once distributed onto the adjacent roadways, the largest increase in traffic is expected on Beaver Street north of Birch Street during the weekday AM peak hour and on Route 109 east of Birch Street during the weekday PM peak hour with an additional 30 to 42 vehicle trips. These increases represent approximately one additional vehicle every 1½ to 2 minutes during peak hours.
- Increases on Route 109 west of Birch Street and on Beaver Street south of Birch Street are expected between 12 and 31 vehicles during the peak hours, representing approximately one additional vehicle every 2 to 5 minutes. Much smaller traffic increases are expected during all other hours of the day.
- The study locations experienced crash rates well below statewide and district-wide averages. Accordingly, there are no identified safety concerns based on these data.
- The proposed site driveway intersection with Birch Street is expected to operate at acceptable levels (LOS C) during both the weekday AM and PM peak hours.
- Operational deficiencies are expected at the Birch Street intersection with Route 109. To address these deficiency, the project proponent has agreed to implement improvements including reallocating signal green time from the Route 109 through movements to provide a longer Route 109 westbound left-turn lead phase for left-turns onto Birch Street. This improvement will result in acceptable traffic operations during both peak hours.
- The Birch Street approach to Beaver Street is expected to operate with very long delays under future conditions due to the existing single-lane approach. The project proponent has accordingly agreed to widen the Birch Street approach to provide separate left- and right-turn

lanes to allow right turns to be made without being impeded by vehicles waiting to turn left. This improvement will result in acceptable traffic operations during both peak hours.

- The site driveway is proposed to be 24-feet wide providing one lane in each direction with a sidewalk proposed along one side of the driveway. A covered bus shelter is also proposed at the site driveway intersection with Birch Street for school children waiting for the school bus. The proposed driveway design, sidewalk, and bus shelter are appropriate for the proposed use. It is recommended that the driveway corner radii at Birch Street be constructed at 20 feet and the driveway approach be placed under STOP-sign control with a painted stop line.



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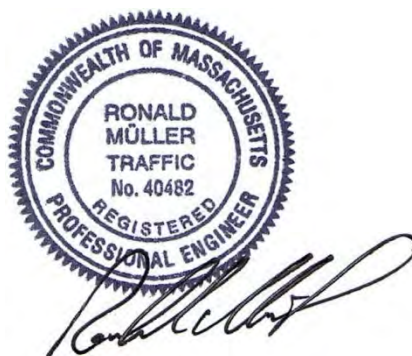
Traffic Impact and Access Study

**Apartment Development
Birch Street
Milford, Massachusetts**

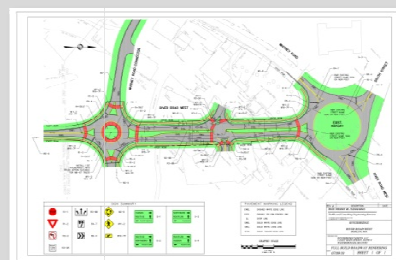
Prepared for:

**88 Corporation
31 Whitewood Road
Milford, MA 01757**

October 4, 2017



Quality



Accuracy



Integrity





Traffic Impact and Access Study

To: Mr. Kevin Lobisser
88 Corporation
31 Whitewood Road
Milford, MA 01757

Reg: Apartment Development
Birch Street
Milford, Massachusetts

Date: October 4, 2017

From: Ron Müller, P.E., Principal

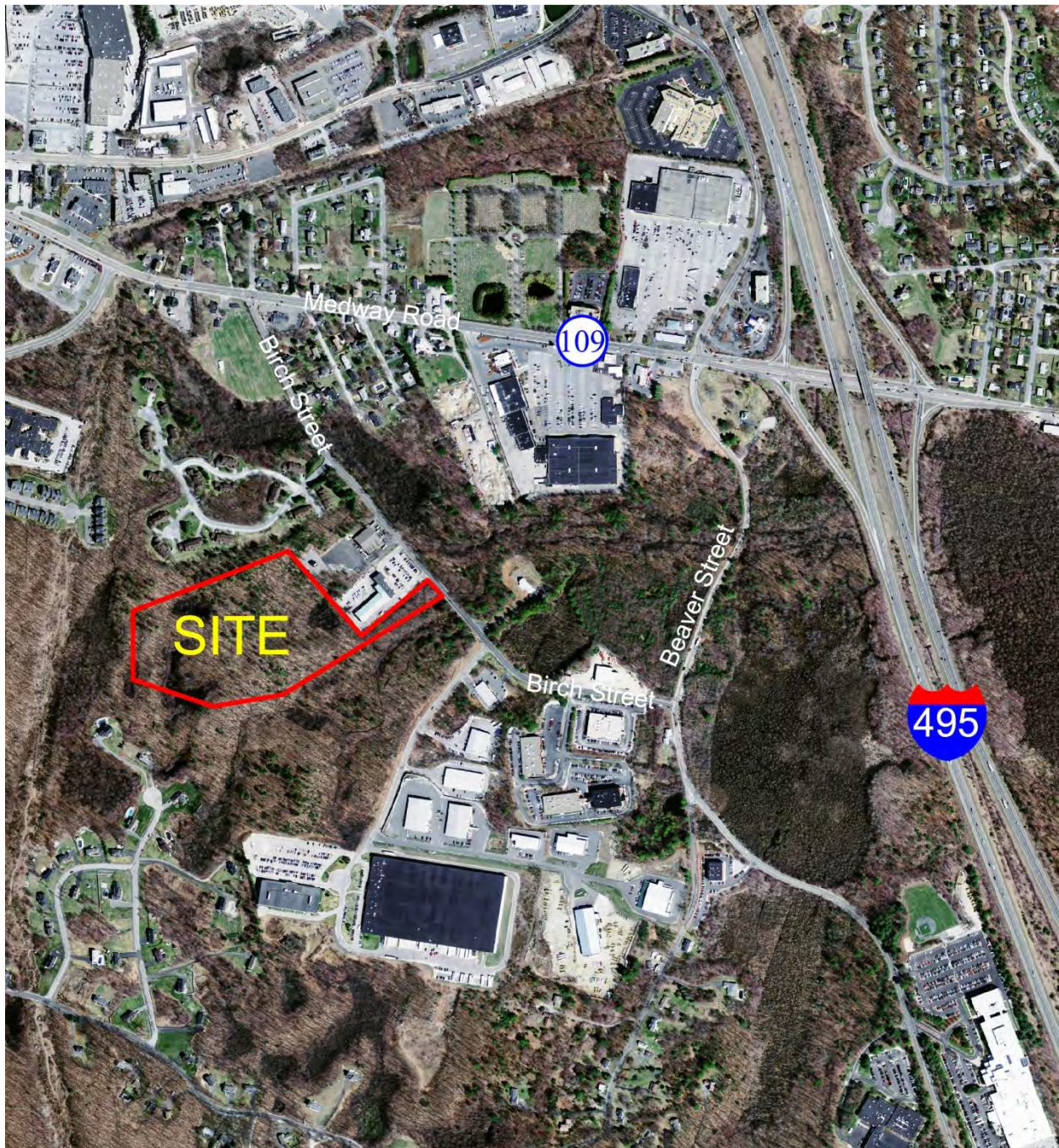
Project #: 17041

INTRODUCTION

Ron Müller & Associates (RMA) has conducted this Traffic Impact and Access Study for a proposed apartment development project to be located along Birch Street in Milford, Massachusetts. As proposed, the project includes the construction of 159 apartment units contained in four buildings with a common shared club house, pool, playground, and dog walking area. Site access is proposed via a new driveway to intersect with Birch Street adjacent to the driveway to Birchler's Automotive. An emergency access way will be created through an easement within the fire department parcel to Birch Street, but will be restricted to emergency use only and closed with a gate and lock. The site location is shown on Figure 1.

This report has been prepared to assess the safety of the proposed site driveway, estimate the increase in traffic as a result of site development, evaluate the impacts of this traffic on the adjacent streets and nearby intersections, and provide recommendations for the proposed site driveway intersection and other locations necessary to accommodate the proposed project. As this report shows, the largest increases in traffic are expected on Beaver Street north of Birch Street during the weekday AM peak hour and on Route 109 east of Birch Street during the weekday PM peak hour with an additional 30 to 42 vehicle trips. These increases represent approximately one additional vehicle every 1½ to 2 minutes during peak hours. Increases on Route 109 west of Birch Street and on Beaver Street south of Birch Street are expected between 12 and 31 vehicles during the peak hours, representing approximately one additional vehicle every 2 to 5 minutes. Much smaller traffic increases are expected during all other hours of the day.

Figure 1
Site Location Map



With clearing of existing vegetation along Birch Street at the site driveway location, ample sight distances will exist to exceed the minimum requirements. It is recommended that any proposed landscaping or signs in the vicinity of the site driveway be kept low to the ground or outside the sight triangles so as not to impede the available sight distances.

Operational deficiencies are expected at the Birch Street intersections with Route 109 as well as with Beaver Street both with and without the proposed project. To address these deficiencies, it is recommended that the signal timing at the Route 109 and Birch Street intersection be adjusted to provide a longer Route 109 westbound lead phase for those vehicles turning left onto Birch Street. At the Birch Street approach to Beaver Street, it is recommended that Birch Street be widened to provide a two-lane approach to allow right turns to be made without being impeded by vehicles waiting to turn left. These improvements, which the project proponent has agreed to implement, will bring traffic operations back to acceptable levels.

EXISTING CONDITIONS

Study Area

Evaluation of the traffic impacts associated with the proposed site development requires an evaluation of existing and projected traffic volumes, the volume of traffic expected to be generated by the project, and the impact that this traffic will have on the adjacent street. In preparing this study, the following intersections were analyzed and evaluated:

- Route 109 (Medway Street) at Birch Street
- Birch Street at Beaver Street
- Birch Street at the proposed site driveway

The project is expected to have a minimal effect on traffic operations beyond this study area.

Traffic Volumes

Base traffic conditions were developed by conducting an automatic traffic recorder (ATR) count on Birch Street adjacent to the site to collect weekday daily and peak hour traffic volume information. The counts were collected over a 48-hour weekday period. In addition, manual turning movement and vehicle classification counts (TMC's) were conducted at the study area intersections during the weekday morning peak period (7:00 to 9:00 AM) and the weekday afternoon peak period (4:00 to 6:00 PM). The Birch Street ATR and peak hour counts at the Route 109 and Birch Street intersection were collected at the end of August 2017 when public

schools were back in session, while the peak hour counts at the Beaver Street and Birch Street intersection were collected in November 2016 as part of another traffic study.¹

The count data indicate that the weekday AM peak hour generally occurs from 7:15 to 8:15 AM and the weekday PM peak hour occurs from 4:30 to 5:30 PM. However, the individual intersection peak hours were used and balanced to present a conservative analytical scenario. All traffic count data are provided in the Appendix.

To determine if the count data needed to be adjusted to represent annual average month conditions consistent with Massachusetts Department of Transportation (MassDOT) guidelines for traffic impact assessment, historical traffic volume data were obtained from MassDOT. The closest permanent count station to the project site is located on I-495 in Bellingham at the Franklin town line (Station No. 6125). Based on this information, traffic during the month of August is approximately 14 percent above annual average-month conditions (representing peak month conditions) while traffic during the month of November is approximately 2 percent below annual average-month conditions. Accordingly, the collected August data were used as collected and the November data were increased by 2 percent to represent average-month traffic volume conditions. In addition, the November counts were collected in 2016 but conducted less than 12 months prior to the preparation of this traffic study. Accordingly, and based on historical traffic volume increases in the area, the 2016 seasonally adjusted counts were also increased by one percent to reflect 2017 existing traffic volume conditions. The MassDOT seasonal adjustment data are provided in the Appendix and the daily and peak hour traffic flows are summarized in Table 1. The 2017 Existing peak hour traffic flow networks are shown graphically on Figure 2.

Table 1
Existing Traffic Volume Summary

Location	Daily Volume ^a	Peak Hour Volume ^b	K-Factor ^c	Directional Distribution ^d
Birch Street				
Adjacent to the Site:	6,380	AM: 729	11.4%	93% SB
		PM: 733	11.5%	78% SB

^a In vehicles per day.

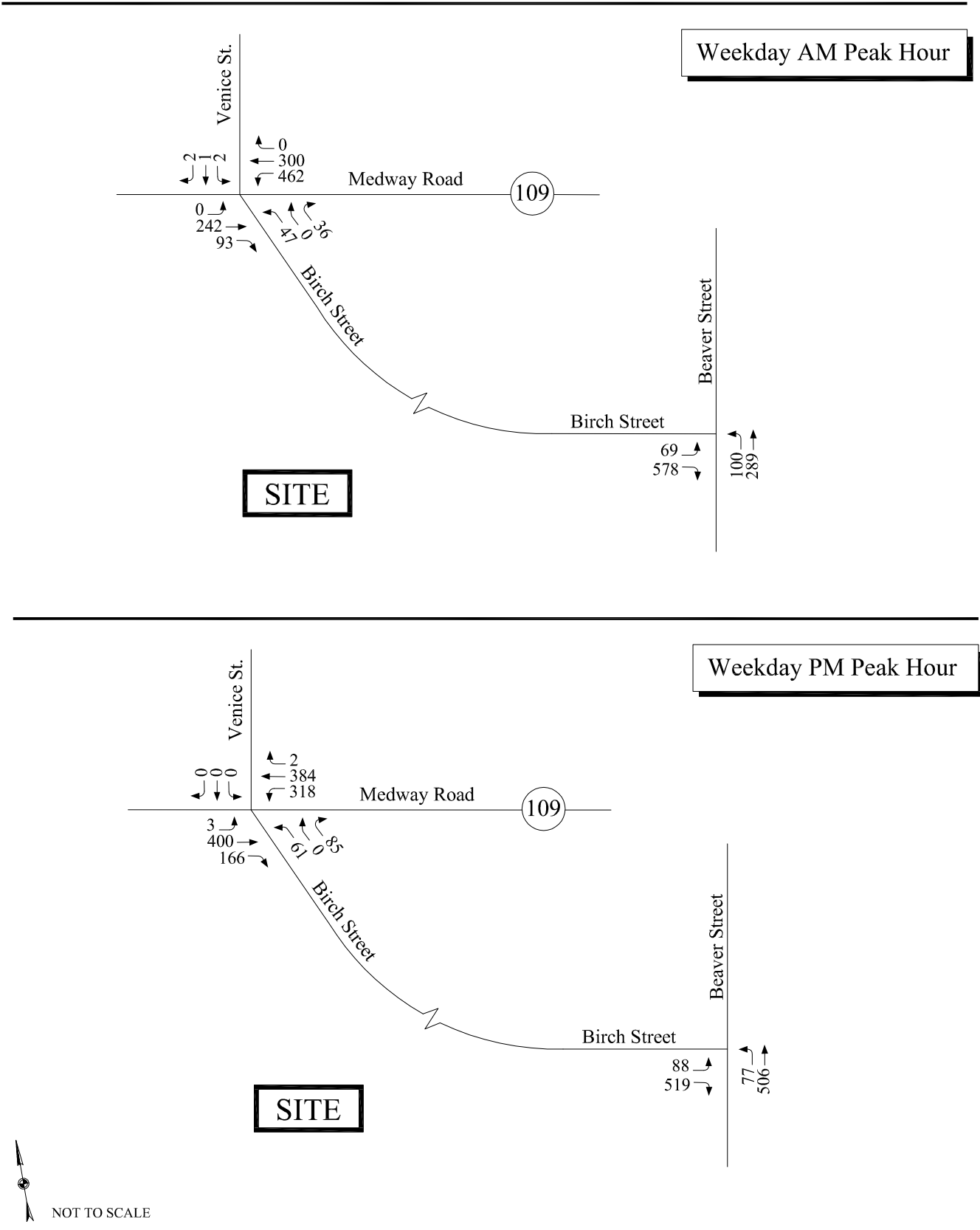
^b In vehicles per hour.

^c Percentage of daily traffic occurring during the peak hour.

^d NB = northbound, SB = southbound.

¹ *Traffic Impact and Access Study, Bear Hill Village, Milford, MA*; prepared for Guerriere & Halnon, Inc.; prepared by Ron Müller & Associates; December 13, 2016.

Figure 2
2017 Existing
Peak Hour Traffic Volumes



Accidents

Accident data for the study area intersections were obtained from MassDOT for the period between 2012 and 2014, the most recent three-year period available at the time this report was prepared. A summary of the MassDOT accident data is provided in Table 2. In addition to the summary, accident occurrence should also be compared to the volume of traffic through a particular intersection to determine any significance. Accordingly, the accident rate was calculated for the study intersections and compared with the statewide and district-wide averages. An intersection accident rate is a measure of the frequency of accidents compared to the volume of traffic through an intersection and is presented in accidents per million entering vehicles (acc/mev). For signalized intersections, the statewide average accident rate is 0.77 acc/mev and the district-wide (District 3) accident rate is 0.90 acc/mev. For unsignalized intersections, the statewide average accident rate is 0.58 acc/mev and the district-wide accident rate is 0.65 acc/mev. A comparison of the calculated accident rate to the statewide and district-wide averages can be used to establish the significance of accident occurrence and whether or not potential safety problems exist. The crash rate worksheets are provided in the Appendix.

Table 2
Accident Summary

Location	Number of Accidents		Accident Rate ^c	Severity ^a			Accident Type ^b						% During Wet/Icy Conditions
	Total	Avg./ Year		PD	PI	F	CM	RE	HO	FO	Ped	Other	
Route 109 at Birch Street	6	2.0	0.44	4	2	0	3	2	0	0	0	1	33%
Beaver Street at Birch Street	2	0.7	0.17	2	0	0	0	1	0	1	0	0	0%

Source: MassDOT Traffic Operations Safety Management System – 2012 through 2014 data.

^a PD = property damage only; PI = personal injury; F = fatality.

^b CM = cross movement/angle; RE = rear end; HO = head on; FO = fixed object; Ped = pedestrian.

^c Measured in accidents per million entering vehicles.

As shown in Table 2, there were six accidents over the three-year analysis period at the intersection of Route 109 and Birch Street. Half of the accidents were cross-movements, but all three occurred on different intersection approaches. The two rear-end accidents also occurred on different approaches. Of the six accidents, two (33%) occurred during adverse weather conditions.

There were only two accidents reported at the Beaver Street and Birch Street intersection with one rear-end incident and one vehicle hitting a fixed object. The calculated crash rates at these locations are well below the statewide and district-wide averages. In addition, the study

intersections are not listed as a Highway Safety Improvement Program (HSIP) High Crash Clusters, indicating that the intersections do not fall within the top 5 percent of High Crash Locations within the Central Massachusetts Regional Planning Commission (CMRPC) area. Accordingly, there are no identified safety concerns based on these data.

Vehicle Speeds

Speed measurements were conducted along Birch Street adjacent to the site by measuring the elapsed time for vehicles traveling a short, pre-measured distance between two checkpoints. The travel time was recorded using automatic traffic recorders and the speed is derived by dividing the elapsed time into the measured distance between checkpoints. The results of the speed measurements are summarized in Table 3.

Table 3
Observed Travel Speeds ^a

Location/Direction	Posted Speed Limit	Average Speed	85 th Percentile Speed ^b
Birch Street adjacent to the site			
Northbound	30	38	43
Southbound	30	36	41

^a In miles per hour (mph).

^b Speed at, or below which 85 percent of all observed vehicles travel.

As shown, the average recorded speed along Birch Street adjacent to the site is higher than the speed limit of 30 miles per hour (mph) with 38 mph northbound and 36 mph southbound. The 85th percentile speeds were recorded to be 43 mph northbound and 41 mph southbound, significantly higher than the posted speed limit. These higher speeds were accordingly used in the calculation of minimum sight distance requirements, as described below.

Sight Distance

To identify potential safety concerns associated with site access and egress, sight distances have been evaluated at the proposed site driveway intersection with Birch Street to determine if the available sight distances for vehicles exiting the site meet or exceed the minimum distances required for approaching vehicles to safely stop. The available sight distances were compared with minimum requirements, as established by the American Association of State Highway and

Transportation Officials (AASHTO).² AASHTO is the national standard by which vehicle sight distance is calculated, measured, and reported. The MassDOT and the Executive Office of Energy and Environmental Affairs (EEA) require the use of AASHTO sight distance standards when preparing traffic impact assessments and studies, as stated in their guidelines for traffic impact assessments.

Sight distance is the length of roadway ahead that is visible to the driver. Stopping Sight Distance (SSD) is the minimum distance required for a vehicle traveling at a certain speed to safely stop before reaching a stationary object in its path. The values are based on a driver perception and reaction time of 2.5 seconds and a braking distance calculated for wet, level pavements. When the roadway is either on an upgrade or downgrade, grade correction factors are applied. Stopping sight distance is measured from an eye height of 3.5 feet to an object height of 2 feet above street level, equivalent to the taillight height of a passenger car. The SSD is measured along the centerline of the traveled way of the major road.

Intersection sight distance (ISD) is provided on minor street approaches to allow the drivers of stopped vehicles a sufficient view of the major roadway to decide when to enter the major roadway. By definition, ISD is the minimum distance required for a motorist exiting a minor street to turn onto the major street, without being overtaken by an approaching vehicle reducing its speed from the design speed to 70 percent of the design speed. ISD is measured from an eye height of 3.5 feet to an object height of 3.5 feet above street level. The use of an object height equal to the driver eye height makes intersection sight distances reciprocal (i.e., if one driver can see another vehicle, then the driver of that vehicle can also see the first vehicle). When the minor street is on an upgrade that exceeds 3 percent, grade correction factors are applied.

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 intersection. In accordance with the 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, ISD should be at least equal to the distance required to allow a driver approaching the minor road to safely stop.

The available intersection sight distances at the proposed site driveway intersection with Birch Street were measured and compared to minimum requirements as established by AASHTO based on the observed speeds and are shown in Table 4. It should be noted that all sight distance measurements were made assuming that existing roadside vegetation in the vicinity of the new site driveway will be cleared either within the Birch Street layout or on property controlled by the project proponent.

²A *Policy on Geometric Design of Highways and Streets*; American Association of State Highway and Transportation Officials (AASHTO); 2004.

Table 4
Sight Distance Summary

Location/Direction	Sight Distance (feet)		
	Measured	Minimum Required (SSD) ^a	Desirable (ISD) ^b
Birch St. at Site Driveway			
North of intersection	500+	315	335
South of intersection	500+	335	335

^a Values based on AASHTO SSD requirements for observed 85th percentile travel speeds of 43 mph on Birch Street northbound and 41 mph southbound.

^b Values based on AASHTO ISD requirements for posted speed limit of 30 mph on Birch Street.

As shown in Table 4, ample sight distances exist at the proposed site driveway intersection with Birch Street, exceeding both minimum requirements and desirable distances and safe operation can therefore be expected. It is recommended that existing vegetation at the proposed site driveway intersection as well as any proposed landscaping, fences, walls, or signs in the vicinity of the driveway intersection be removed or set back outside the sight triangles as defined by AASHTO so as not to impede the available sight distances shown in Table 4.

FUTURE CONDITIONS

Traffic Growth

Future traffic conditions were projected to the year 2024, representing a 7-year design horizon consistent with MassDOT requirements for traffic impact analysis. To project traffic conditions within this design horizon, two components of traffic growth were included. First, an annual average traffic growth rate was determined to account for general population growth and smaller development projects (i.e. small residential subdivisions) that may impact traffic in the site vicinity. Based on historical traffic volume information from MassDOT permanent count station on Route 109 just west of Beaver Street in Milford (Station #3219), traffic volumes have increased an average of 0.05 percent per year in the past 10 years. To present a conservative analytical scenario, a 1.0 percent per year traffic growth rate was used in this study. The MassDOT historical traffic data are provided in the Appendix.

Second, any planned or approved specific developments in the area that would generate a significant volume of traffic on study area roadways within the next seven years were included. Based on discussions with Milford planning staff, there are four residential development projects

in the area that are planned or have been approved as well as the Milford Commons retail redevelopment project:

- The first is Phase III of South Central Estates, which proposes 33 single-family homes on an extension of Casey Drive. The roadway is currently under construction and six of the homes have been constructed and occupied.
- The second is the proposed Gordon Drive 18 single-family lot subdivision that will connect Beaver Street with Mellen Street. The subdivision roadway is currently under construction but the homes have not yet been constructed.
- The third project is the 73-unit Beaver Pond Commons Chapter 40B Comprehensive Permit residential development project located on Beaver Street opposite Roland Way. At the time of the traffic counts, the majority of these condominiums have been constructed and occupied. Accordingly, any additional traffic from occupancy of the remaining units was assumed to be accounted for in the annual traffic growth rate.
- The fourth project is the proposed Bear Hill Village condominium development project to be located off Beaver Street and Casey Drive. Casey Drive will be extended as a public way to intersect with Beaver Street opposite the southern end of Maple Street. A total of 147 residential units will be built with access via the Casey Drive extension as well as two new roads to intersect with Beaver Street south of Casey Drive. Construction of this project has not yet begun.
- The redevelopment of the existing shopping center at 120-128 Medway Street (Route 109) will include a relocated Stop and Shop supermarket as well as many other retail and restaurant uses. The existing plaza contains the Bugaboo Creek restaurant, Dollar Tree retail store, Salon Centric, and over 120,000 square feet of vacant space. This space will be renovated and expanded to create the new Milford Commons shopping center.

The traffic generated by the South Central Estates and Gordon Drive residential projects was estimated using the 9th Edition of the Institute of Transportation Engineers (ITE) *Trip Generation Manual*³ using Land Use Code 210 (Single-Family Detached Housing) and Land Use Code 230 (Residential Condominium/ Townhouse) for those units that have not yet been constructed and/or occupied. The additional traffic from these projects was distributed on the study roadways based on the trip distribution pattern described later in this report. The traffic from the Bear Hill Village residential development was taken from the traffic study prepared for that project.⁴ The additional traffic to be generated by the redevelopment and expansion of the Milford Commons shopping center was obtained from the project's submitted traffic study.⁵

³ *Trip Generation Manual, 9th Edition*; Institute of Transportation Engineers; Washington, DC; 2012.

⁴ *Traffic Impact and Access Study, Bear Hill Village, Milford, MA*; prepared for Guerriere & Halnon, Inc.; prepared by Ron Müller & Associates; December 13, 2016.

⁵ *Traffic Impact and Access Study*; Proposed Shopping Center Redevelopment, 120-128 Medway Road, Milford, MA; prepared by WorldTech Engineering. March 2015

No-Build Conditions

The 2024 No-Build conditions were accordingly developed by applying a compounded 1.0 percent annual growth rate (7.2 percent over seven years) to the existing adjacent street volumes and by assuming completion of the above area residential development projects and the Milford Commons redevelopment project. The 2024 No-Build peak-hour traffic volumes are shown on Figure 3.

Trip Generation

The traffic to be generated by the proposed 159-unit apartment project was estimated using 9th Edition of the ITE *Trip Generation Manual* using Land Use Code 220 (Apartment). A summary of the expected trip generation of the project is shown in Table 5 and all trip generation calculations are provided in the Appendix.

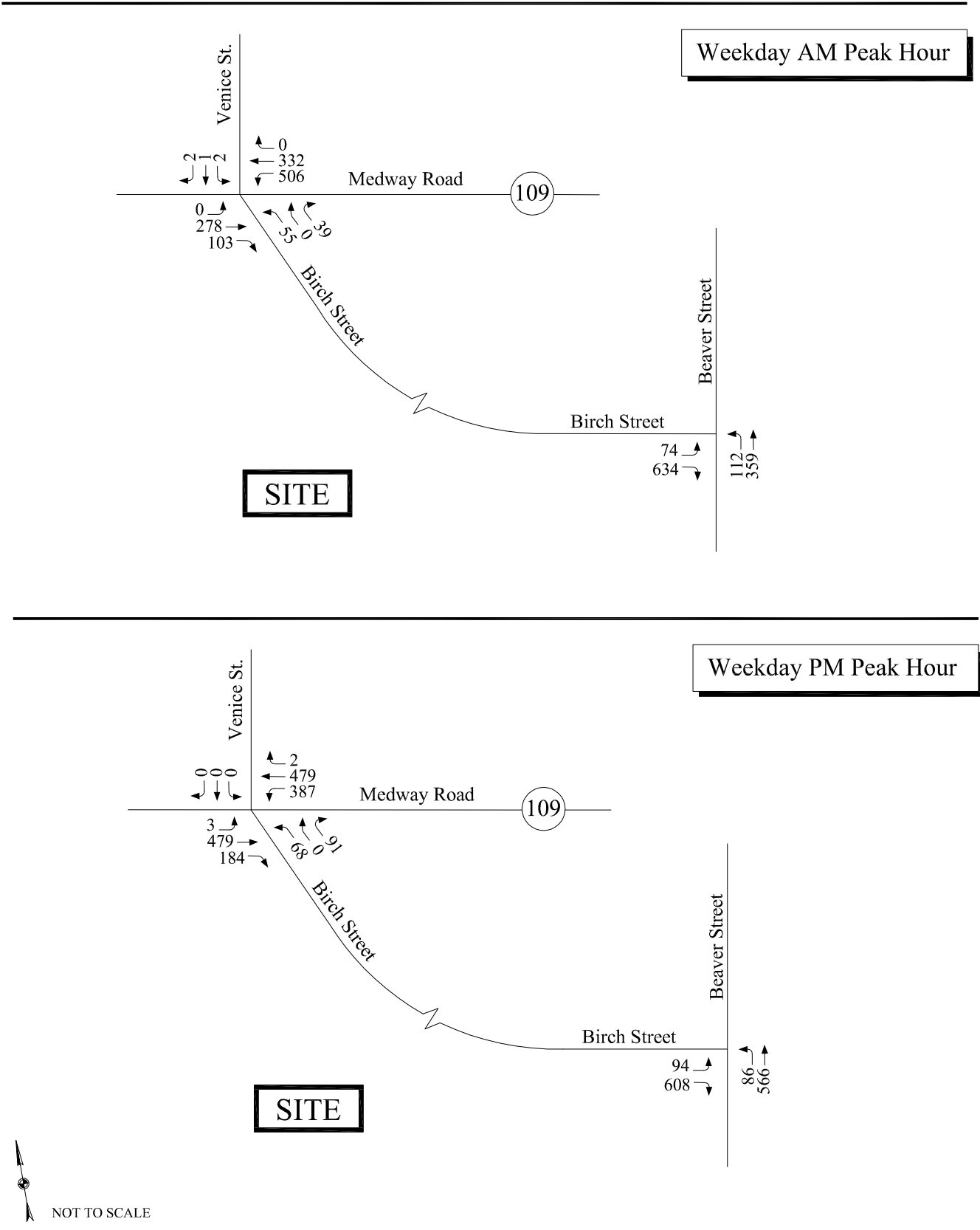
Table 5
Trip Generation Summary

<u>Time Period</u>	<u>Proposed Condominiums ^a</u>
Weekday Daily	1,090
Weekday AM Peak Hour	
Enter	16
<u>Exit</u>	<u>66</u>
Total	82
Weekday PM Peak Hour	
Enter	68
<u>Exit</u>	<u>37</u>
Total	105

^a ITE Land Use Code 220 (Apartment) for 159 units.

As shown, development of the site as proposed will generate 1,090 trips (545 in and 545 out) on a weekday daily basis, of which 82 trips (16 in and 66 out) would occur during the weekday AM peak hour and 105 trips (68 in and 37 out) would occur during the weekday PM peak hour. It should be noted that during preparation of this report, the ITE issued the 10th Edition of the *Trip Generation Manual*. Based on this latest information, the project would generate slightly less peak hour traffic than shown in Table 5. Using the 10th Edition ITE manual, the project would generate only 74 vehicle trips during the weekday AM peak hour and 89 vehicle trips during the weekday PM peak hour. To present a conservative analytical scenario, the higher trip generation numbers from the 9th Edition were used in this report.

Figure 3
2024 No-Build
Peak Hour Traffic Volumes



Trip Distribution

The distribution of traffic generated by the project is based on Journey-to-Work data provided by the U.S. Census Bureau for people residing in Milford as well as the observed travel routes/patterns of the existing traffic. It is accordingly expected that approximately 55 percent of the site traffic will be oriented to/from the east on Route 109 and 30 percent to/from the west. The remaining 15 percent are expected to travel on Beaver Street to/from the south.

Since Beaver Street is one-way northbound between Birch Street and Route 109, all traffic destined to the site from Route 109 east will turn left onto Birch Street and then right into the site. For traffic exiting the site and destined to Route 109 east, the majority (45 percent) is expected to use Beaver Street north while 10 percent are expected to use Birch Street to access Route 109. The distribution and assignment of site traffic are shown graphically on Figure 4 and the U.S. Census data are provided in the Appendix.

Build Conditions

Based on the traffic generation and distribution estimates for this project, the traffic volumes generated by the proposed project were assigned to the roadway network as shown on Figure 4 and were added to the 2024 No-Build traffic volumes to develop the 2024 Build traffic volumes. The 2024 Build weekday AM and PM peak hour traffic volume networks are graphically depicted on Figure 5.

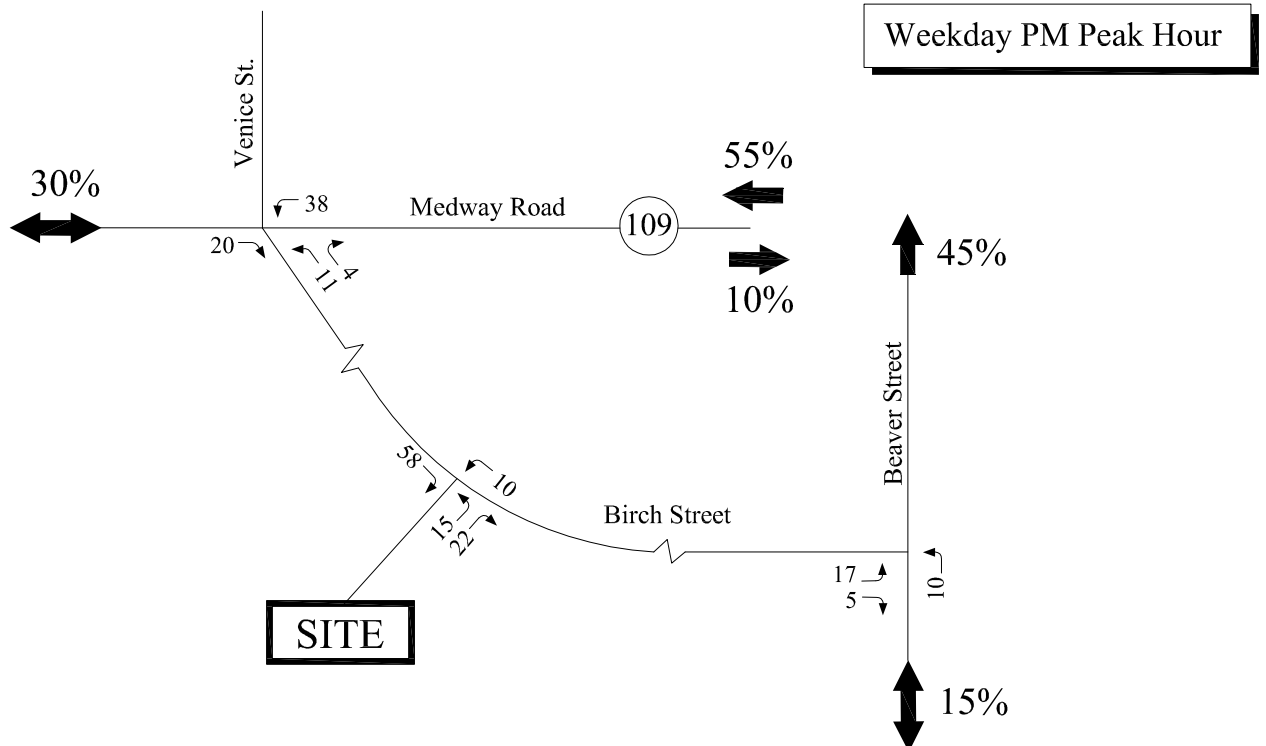
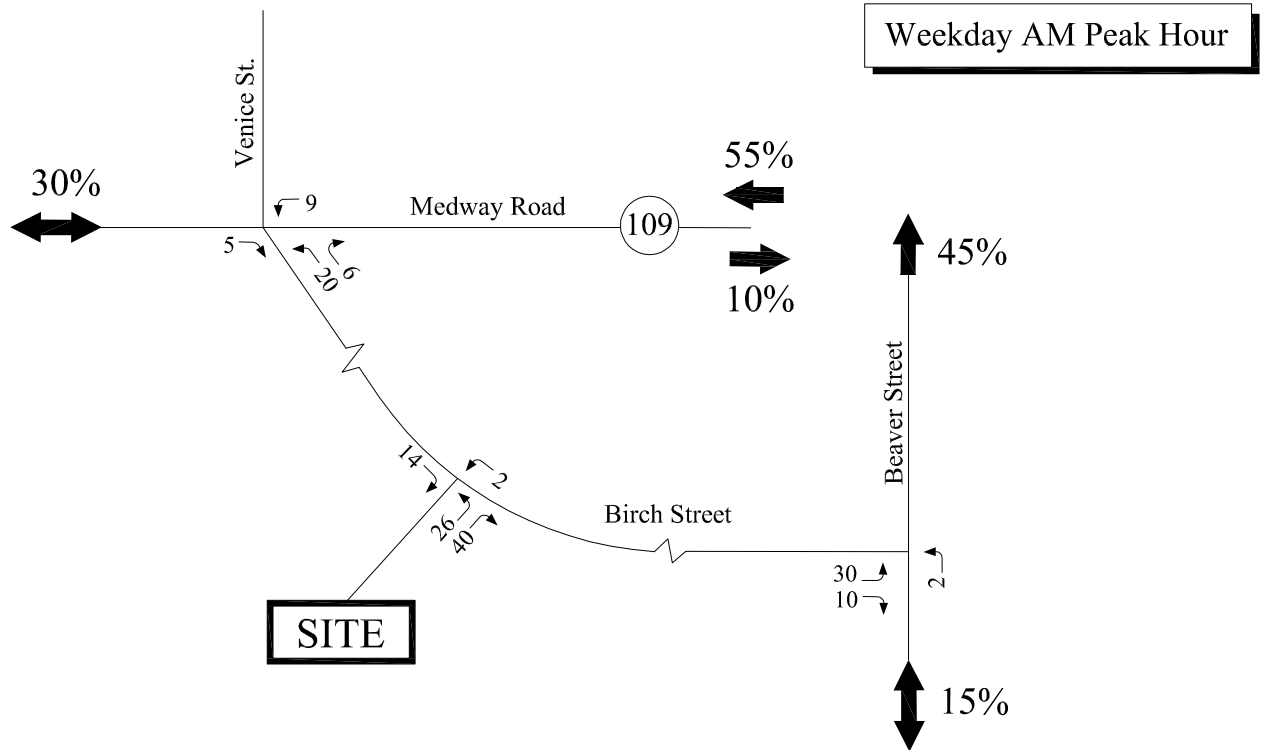
Traffic Increases

Based on the above traffic generation and distribution patterns, the largest increases in traffic are expected on Beaver Street north of Birch Street during the weekday AM peak hour with an additional 30 vehicle trips and on Route 109 east of Birch Street during the weekday PM peak hour with an additional 42 vehicle trips. These increases represent approximately one additional vehicle every 1½ to 2 minutes during peak hours, on average. On Route 109 west of Birch Street, peak hour traffic increases of 25 to 31 vehicles are expected, representing on average approximately one additional vehicle every two minutes. Between 12 and 15 additional peak hour vehicles are expected on Beaver Street south of Birch Street representing an average increase of approximately one additional vehicle every 4 to 5 minutes. Much smaller traffic increases are expected during all other hours of the day.

Site Access

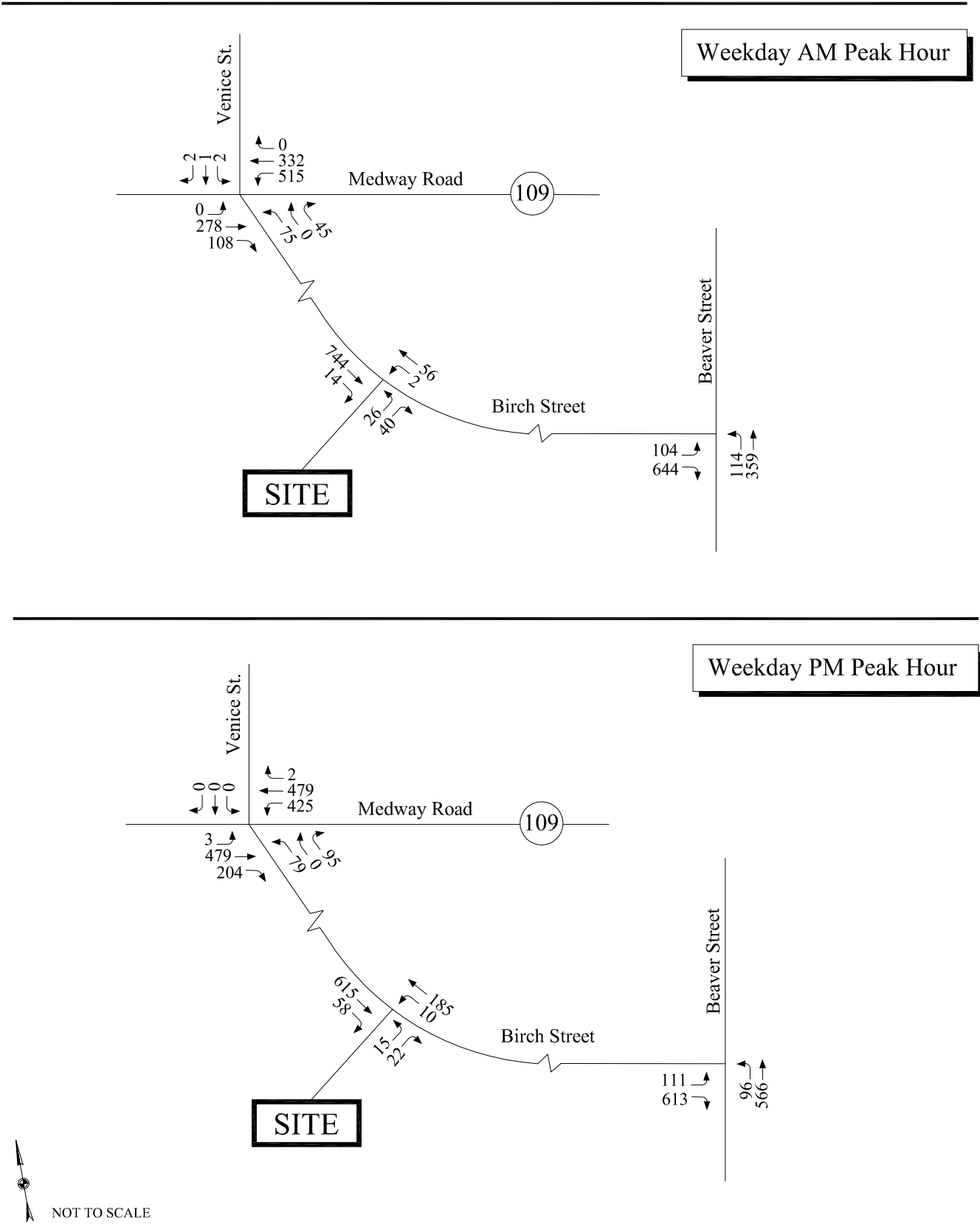
The proposed 159 apartment units will be constructed on the westerly side of Birch Street behind the existing fire station and Birchler's Automotive repair building. Site access is proposed via a new driveway to intersect with Birch Street south of the automotive repair building driveway.

Figure 4
Site Generated
Peak Hour Traffic Volumes



NOT TO SCALE

Figure 5
2024 Build
Peak Hour Traffic Volumes



An emergency access way will be created through an easement within the fire department parcel to Birch Street, but will be restricted to emergency use only and closed with a gate and lock. Birch Street adjacent to the proposed site driveway is approximately 30 feet wide with one travel lane in each direction separated by a double yellow centerline.

The site driveway is proposed to be 24-feet wide providing one lane in each direction with a sidewalk proposed along one side of the driveway. A covered bus shelter is also proposed at the site driveway intersection with Birch Street for school children waiting for the school bus. The proposed driveway design, sidewalk, and bus shelter are appropriate for the proposed use. It is recommended that the driveway corner radii at Birch Street be constructed at 20 feet and the driveway approach be placed under STOP-sign control with a painted stop line.

CAPACITY ANALYSIS

Level-of-service (LOS) analyses were conducted at the study area intersections under existing and projected volume conditions to determine the effects that the site generated traffic will have on traffic operations. The capacity analysis methodology is based on the concepts and procedures in the *Highway Capacity Manual*⁶ (HCM) and is described in the Appendix. For signalized intersections, the maximum back of queue during an average signal cycle and a 95th percentile signal cycle were calculated for each lane group during the peak periods studied. The back of queue is the length of a backup of vehicles from the stop line of a signalized intersection to the last car in the queue that is required to stop, regardless of the signal indication. The length of this queue depends on a number of factors including signal timing, vehicle arrival patterns, and the saturation flow rate. For unsignalized intersections, the 95th percentile queue represents the length of queue of the critical minor-street movement that is not expected to be exceeded 95 percent of the time during the analysis period (typically one hour). In this case, the queue length is a function of the capacity of the movement and the movement's degree of saturation.

Due to the one-way section of Beaver Street at the Birch Street intersection, the HCM 2000 methodology had to be utilized since this geometry cannot be modeled using the more recent HCM 2010 methodology. However, both methodologies are accepted by MassDOT. The level-of-service and queue results are presented in Table 6 and are discussed below. All analysis worksheets are provided in the Appendix.

⁶ *Highway Capacity Manual 2000*; Transportation Research Board; Washington, DC; 2000.

Table 6
Level-of-Service Analysis Summary

Location/Peak Hour/Movement	2017 Existing				2024 No-Build				2024 Build			
	v/c ^a	Del. ^b	LOS ^c	Queue ^d	v/c	Del.	LOS	Queue	v/c	Del.	LOS	Queue
Route 109 at Birch Street and Venice Street												
<i>Weekday AM Peak</i>												
EB All	0.24	12.8	B	40/68	0.27	13.2	B	50/81	0.28	13.4	B	51/81
WB Left (def.)	1.15	120.0	F	300/493	1.26	164.3	F	352/548	1.29	176.2	F	372/561
WB Thru/Right	0.23	2.5	A	36/66	0.25	2.7	A	43/74	0.26	2.7	A	47/74
NB Left/Thru	0.26	34.3	C	24/57	0.29	34.5	C	27/64	0.38	35.2	D	38/82
NB Right	0.38	35.7	D	0/0	0.39	35.8	D	0/0	0.43	36.0	D	0/1
SB All	0.03	32.7	C	1/11	0.03	32.7	C	1/11	0.03	32.6	C	1/11
Overall	--	53.6	D	--	--	70.5	E	--	--	74.6	E	--
<i>Weekday PM Peak</i>												
EB All	0.40	15.3	B	85/129	0.46	16.5	B	110/160	0.48	16.9	B	114/163
WB Left (def.)	0.79	40.2	D	160/301	0.96	63.4	E	207/392	1.06	89.6	F	265/441
WB Thru/Right	0.29	3.0	A	52/88	0.37	3.5	A	72/116	0.37	3.6	A	75/116
NB Left/Thru	0.32	34.6	C	31/69	0.34	34.7	C	34/75	0.39	35.0	D	40/85
NB Right	0.71	41.0	D	0/31	0.72	41.0	D	0/36	0.72	40.8	D	0/39
SB All	0.00	0.0	A	0/0	0.00	0.0	A	0/0	0.00	0.0	C	0/0
Overall	--	19.8	B	--	--	25.4	C	--	--	32.7	C	--
Birch Street at Beaver Street												
<i>Weekday AM Peak</i>												
EB Left/Right	0.80	21.8	C	--/215	0.90	32.4	D	--/320	1.00	53.4	F	--/457
NB Left	0.07	2.4	A	--/6	0.08	2.4	A	--/6	0.08	2.4	A	--/7
<i>Weekday PM Peak</i>												
EB Left/Right	0.89	33.1	D	--/295	1.06	70.4	F	--/523	1.15	103.9	F	--/665
NB Left	0.06	1.5	A	--/5	0.06	1.6	A	--/5	0.07	1.8	A	--/6
Birch Street at proposed site driveway												
<i>Weekday AM Peak</i>												
EB Left/Right	--	--	--	--	--	--	--	--	0.21	18.3	C	--/20
NB Left	--	--	--	--	--	--	--	--	0.00	9.5	A	--/0
<i>Weekday PM Peak</i>												
EB Left/Right	--	--	--	--	--	--	--	--	0.11	15.9	C	--/9
NB Left	--	--	--	--	--	--	--	--	0.01	9.1	A	--/1

^a Volume-to-capacity ratio.

^b Average control delay in seconds per vehicle.

^c Level of service.

^d Average/95th percentile queue in feet, assuming 25 feet per vehicle.

As shown in Table 6, capacity deficiencies either currently exist or are expected under future conditions for the Route 109 westbound left-turn movement onto Birch Street during both the weekday AM and PM peak hours (LOS F). This intersection is under semi-actuated signal control and provides a Route 109 westbound lead phase allowing both protected and permissive left-turn movements onto Birch Street. However, due to the high volume of left-turns from Route 109 onto Birch Street, the current 15-second allocation of green time for the lead phase creates a deficiency for this movement. Although improvements are required to address this condition independent of the proposed project, project proponent has agreed to provide mitigation measures as described in the *Recommended Improvements* section of this report to address this condition.

Capacity deficiencies also are expected under future volume conditions for the Birch Street approach to Beaver Street. Although the vast majority (85 percent) of the approach vehicles are right turns, the single lane approach requires those vehicles turning right to wait for vehicles turning left. As shown in Table 6, the Birch Street approach is expected to operate at LOS F during the weekday PM peak hour with or without the addition of site traffic. However, as the project will significantly increase these delays and also cause LOS F operations during the weekday AM peak hour, the project proponent has agreed to provide mitigation measures as described in the *Recommended Improvements* section of this report to address this condition.

The proposed site driveway intersection with Birch Street is expected to operate at desirable levels (LOS C) during both peaks hours with minimal vehicle queuing.

RECOMMENDED IMPROVEMENTS

Improvements are recommended to alleviate existing or future capacity constraints as described in this report and to mitigate the expected traffic impacts of the project. The recommended measures and the parties responsible for implementation are described below:

Route 109 at Birch Street

The Route 109 westbound left-turn movement onto Birch Street is expected to operate at LOS F under 2024 No-Build conditions during the weekday AM peak hour with a volume-to-capacity ratio over 1.0, indicating that the volume of traffic through the intersection exceeds its capacity. Under the Build condition, this movement is also expected to operate at LOS F and over capacity during the weekday PM peak hour. With volume-to-capacity ratios of under 0.50 for the Route 109 through movements, the signal green times on the Route 109 approaches can be reallocated to provide a longer left-turn lead phase for left-turns onto Birch Street with little impact on the through movements. Since the timing reallocation maintains the overall signal cycle length, this change would have no impact on the Birch Street northbound or the Venice Street southbound approaches. It is therefore recommended that the signal timing be adjusted to increase the Route

109 left-turn lead phase to 32 seconds. The operational benefits gained from this change are summarized in Table 7. As shown, the intersection will operate at an overall LOS C with all lane groups operating at LOS D or better under future volume conditions during both peak hours. Although this deficiency will exist independent of the project, the proponent has agreed to make the necessary signal changes as part of the proposed apartment development project.

Beaver Street at Birch Street

The Birch Street approach to Beaver Street is projected to operate at LOS F under 2024 future conditions with a volume-to-capacity ratio exceeding 1.0, indicating that the volume of traffic through the intersection exceeds its capacity. There is currently a heavy volume of right-turning traffic from Birch Street and comparatively little left-turning traffic. Birch Street is currently 30 feet in width and provides a single approach lane for left and right turns onto Beaver Street. Therefore, right-turning traffic is often blocked from making the turn by vehicles waiting to turn left. It is recommended that the Birch Street approach be widened and striped to provide two approach lanes to Beaver Street. This will allow the heavy right-turning traffic on Birch Street to bypass any traffic that is waiting to turn left onto Beaver Street. The operational benefits gained from this change are summarized in Table 7. As shown, left-turning traffic would operate at acceptable levels (LOS C) during peak hours, while right turns would incur no delay as there is no opposing traffic for this movement. Although this deficiency will exist independent of the project, the proponent has agreed to make implement the improvements as part of the proposed apartment development project.

Table 7
Level-of-Service Analysis Summary - With Improvements

Location/Peak Hour/Movement	2024 No-Build				2024 Build				2024 Build Mitigated			
	v/c ^a	Del. ^b	LOS ^c	Queue ^d	v/c	Del.	LOS	Queue	v/c	Del.	LOS	Queue
Route 109 at Birch Street and Venice Street												
<i>Weekday AM Peak</i>												
EB All	0.27	13.2	B	50/81	0.28	13.4	B	51/81	0.36	19.7	B	64/102
WB Left (def.)	1.26	164.3	F	352/548	1.29	176.2	F	372/561	0.91	43.0	D	268/471
WB Thru/Right	0.25	2.7	A	43/74	0.26	2.7	A	47/74	0.26	2.7	A	47/74
NB Left/Thru	0.29	34.5	C	27/64	0.38	35.2	D	38/82	0.38	35.2	D	38/82
NB Right	0.39	35.8	D	0/0	0.43	36.0	D	0/1	0.43	36.0	D	0/1
SB All	0.03	32.7	C	1/11	0.03	32.6	C	1/11	0.03	32.6	C	1/11
Overall	--	70.5	E	--	--	74.6	E	--	--	25.8	C	--
<i>Weekday PM Peak</i>												
EB All	0.46	16.5	B	110/160	0.48	16.9	B	114/163	0.62	26.1	C	142/201
WB Left (def.)	0.96	63.4	E	207/392	1.06	89.6	F	265/441	0.75	30.0	C	203/350
WB Thru/Right	0.37	3.5	A	72/116	0.37	3.6	A	75/116	0.37	3.6	A	75/116
NB Left/Thru	0.34	34.7	C	34/75	0.39	35.0	D	40/85	0.39	35.0	D	40/85
NB Right	0.72	41.0	D	0/36	0.72	40.8	D	0/39	0.72	40.8	D	0/39
SB All	0.00	0.0	A	0/0	0.00	0.0	C	0/0	0.00	0.0	A	0/0
Overall	--	25.4	C	--	--	32.7	C	--	--	21.7	C	--
Birch Street at Beaver Street												
<i>Weekday AM Peak</i>												
EB Left/Right	0.90	32.4	D	--/320	1.00	53.4	F	--/457	0.69	15.7	C	--/148
NB Left	0.08	2.4	A	--/6	0.08	2.4	A	--/7	0.08	2.4	A	--/7
<i>Weekday PM Peak</i>												
EB Left/Right	1.06	70.4	F	--/523	1.15	103.9	F	--/665	0.68	17.1	C	--/143
NB Left	0.06	1.6	A	--/5	0.07	1.8	A	--/6	0.07	1.8	A	--/6

^a Volume-to-capacity ratio.

^b Average control delay in seconds per vehicle.

^c Level of service.

^d Average/95th percentile queue in feet, assuming 25 feet per vehicle.

CONCLUSIONS

Existing and future conditions at the study area intersections have been described and analyzed with respect to traffic operations and the impact of the proposed site development. Conclusions of this effort and recommendations are presented below.

- The project consists of constructing 159 apartment units contained in four buildings with a common shared club house, pool, playground, and dog walking area. Site access is proposed via a new driveway to intersect with Birch Street adjacent to the driveway to Birchler's Automotive. An emergency access way will be created through an easement within the fire department parcel to Birch Street, but will be restricted to emergency use only and closed with a gate and lock.
- Ample sight distances will exist at the proposed site driveway intersection with Birch Street exceeding the minimum requirements and safe operation can therefore be expected. It is recommended that any proposed landscaping or signs in the vicinity of the site driveways be kept low to the ground or outside the sight triangles so as not to impede the available sight distances.
- The proposed apartment project is expected to generate 82 to 105 peak hour vehicle trips (total entering and exiting). Once distributed onto the adjacent roadways, the largest increase in traffic is expected on Beaver Street north of Birch Street during the weekday AM peak hour and on Route 109 east of Birch Street during the weekday PM peak hour with an additional 30 to 42 vehicle trips. These increases represent approximately one additional vehicle every 1½ to 2 minutes during peak hours.
- Increases on Route 109 west of Birch Street and on Beaver Street south of Birch Street are expected between 12 and 31 vehicles during the peak hours, representing approximately one additional vehicle every 2 to 5 minutes. Much smaller traffic increases are expected during all other hours of the day.
- The study locations experienced crash rates well below statewide and district-wide averages. Accordingly, there are no identified safety concerns based on these data.
- The proposed site driveway intersection with Birch Street is expected to operate at acceptable levels (LOS C) during both the weekday AM and PM peak hours.
- Operational deficiencies are expected at the Birch Street intersection with Route 109. To address these deficiency, the project proponent has agreed to implement improvements including reallocating signal green time from the Route 109 through movements to provide a longer Route 109 westbound left-turn lead phase for left-turns onto Birch Street. This improvement will result in acceptable traffic operations during both peak hours.
- The Birch Street approach to Beaver Street is expected to operate with very long delays under future conditions due to the existing single-lane approach. The project proponent has accordingly agreed to widen the Birch Street approach to provide separate left- and right-turn

lanes to allow right turns to be made without being impeded by vehicles waiting to turn left. This improvement will result in acceptable traffic operations during both peak hours.

- The site driveway is proposed to be 24-feet wide providing one lane in each direction with a sidewalk proposed along one side of the driveway. A covered bus shelter is also proposed at the site driveway intersection with Birch Street for school children waiting for the school bus. The proposed driveway design, sidewalk, and bus shelter are appropriate for the proposed use. It is recommended that the driveway corner radii at Birch Street be constructed at 20 feet and the driveway approach be placed under STOP-sign control with a painted stop line.

APPENDIX

Traffic Count Data
Seasonal/Historical/Background Growth Adjustment Data
Crash Rate, Trip Generation, and Distribution Worksheets
Capacity Analysis Methodology and Worksheets

Traffic Count Data

Birch Street
north of Industrial Road
City,State: Milford, MA
Client: RMA/ R. Muller



PRECISION
D A T A
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46 Morton Street, Framingham, MA 01702
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175814 A Volume
Site Code: 17041

Start	SB		NB		Combin		ed		08/30/17	
Time	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	Wed	
12:00	0	78	0	47	0		0	125		
12:15	6	79	0	40	6		6	119		
12:30	5	80	1	35	6		6	115		
12:45	4	96	0	27	4	149	4	123	482	
01:00	16	105	1	21	17		17	126		
01:15	26	66	1	18	27		27	84		
01:30	3	71	0	20	3		3	91		
01:45	1	77	0	22	1	81	1	99	400	
02:00	1	59	1	21	2		2	80		
02:15	3	72	1	15	4		4	87		
02:30	2	61	0	14	2		2	75		
02:45	2	75	0	19	2	69	2	94	336	
03:00	2	67	1	26	3		3	93		
03:15	4	81	0	15	4		4	96		
03:30	0	79	0	31	0		0	110		
03:45	5	88	3	25	8	97	8	113	412	
04:00	1	95	0	28	1		1	123		
04:15	2	102	0	26	2		2	128		
04:30	9	95	4	39	13		13	134		
04:45	4	136	1	35	5	128	5	171	556	
05:00	9	147	1	53	10		10	200		
05:15	13	147	2	43	15		15	190		
05:30	29	141	2	31	31		31	172		
05:45	43	143	6	11	49	138	49	154	716	
06:00	49	119	2	22	51		51	141		
06:15	62	90	3	9	65		65	99		
06:30	60	70	1	11	61		61	81		
06:45	98	56	9	10	107	52	107	66	387	
07:00	112	51	8	9	120		120	60		
07:15	156	46	10	9	166		166	55		
07:30	164	39	10	6	174		174	45		
07:45	173	23	14	9	187	33	187	32	192	
08:00	188	18	14	9	202		202	27		
08:15	136	23	22	7	158		158	30		
08:30	145	15	27	8	172		172	23		
08:45	145	10	11	4	156	28	156	14	94	
09:00	119	9	13	2	132		132	11		
09:15	104	11	14	4	118		118	15		
09:30	74	8	16	7	90		90	15		
09:45	76	11	19	2	95	15	95	13	54	
10:00	52	9	17	1	69		69	10		
10:15	37	2	16	2	53		53	4		
10:30	43	5	18	1	61		61	6		
10:45	53	5	19	2	72	6	72	7	27	
11:00	42	5	24	0	66		66	5		
11:15	36	6	19	0	55		55	6		
11:30	40	4	30	1	70		70	5		
11:45	54	9	42	0	96	1	96	9	25	
Total	2408	2884	403	797	2811		2811	3681		
Percent	85.7%	78.3%	14.3%	21.7%						
Day Total		5292		1200			6492			
Peak	07:15	-	05:00	-	11:00	-	04:30	-	07:15	-
Vol.	681	-	578	-	115	-	170	-	729	-
P.H.F.	0.906	-	0.983	-	0.685	-	0.802	-	0.902	-

Birch Street
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Client: RMA/ R. Muller



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Start	SB		NB		Combin		ed		08/31/17	
Time	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	Thu	
12:00	1	85	2	47	3	132				
12:15	7	98	0	37	7	135				
12:30	4	90	0	32	4	122				
12:45	7	102	1	3	8	126	22	515		
01:00	13	103	0	21	13	124				
01:15	22	70	3	15	25	85				
01:30	3	72	0	20	3	92				
01:45	4	65	0	13	69	78	45	379		
02:00	1	54	0	23	1	77				
02:15	0	45	0	24	0	69				
02:30	2	71	0	14	2	85				
02:45	3	77	0	19	80	96	6	327		
03:00	0	82	1	22	1	104				
03:15	1	70	0	14	1	84				
03:30	1	67	1	23	2	90				
03:45	3	74	1	3	25	84	4	8	99	377
04:00	3	102	0	30	3	132				
04:15	2	101	0	20	2	121				
04:30	5	105	1	40	6	145				
04:45	12	114	0	1	24	114	12	23	138	536
05:00	15	113	3	54	18	167				
05:15	18	122	1	24	19	146				
05:30	31	119	4	19	35	138				
05:45	47	111	3	11	24	121	50	122	135	586
06:00	41	97	6	20	47	117				
06:15	54	74	12	12	66	86				
06:30	57	63	5	10	62	73				
06:45	99	50	7	30	7	49	106	281	57	333
07:00	109	78	9	13	118	91				
07:15	159	54	14	6	173	60				
07:30	135	44	6	9	141	53				
07:45	172	25	11	40	5	33	183	615	30	234
08:00	175	29	23	6	198	35				
08:15	152	24	21	8	173	32				
08:30	118	15	15	6	133	21				
08:45	117	21	19	78	5	25	136	640	26	114
09:00	102	16	14	5	116	21				
09:15	80	13	12	2	92	15				
09:30	72	11	15	6	87	17				
09:45	62	6	13	54	4	17	75	370	10	63
10:00	50	10	19	0	69	10				
10:15	44	9	17	2	61	11				
10:30	47	5	14	3	61	8				
10:45	51	10	17	67	3	8	68	259	13	42
11:00	44	5	21	7	65	12				
11:15	39	7	32	0	71	7				
11:30	53	2	35	0	88	2				
11:45	67	203	7	140	1	8	119	343	8	29
Total	2304	2787	430	748	2734	3535				
Percent	84.3%	78.8%	15.7%	21.2%						
Day Total		5091		1178		6269				
Peak	07:15	-	04:45	-	11:00	-	04:30	-	07:15	-
Vol.	641	-	468	-	140	-	142	-	695	-
P.H.F.	0.916	-	0.959	-	0.673	-	0.657	-	0.878	-

Birch Street
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175814 A Class
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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
08/30/1														
7	1	12	1	0	1	0	0	0	0	0	0	0	0	15
01:00	0	45	1	0	0	0	0	0	0	0	0	0	0	46
02:00	0	4	3	0	0	0	0	1	0	0	0	0	0	8
03:00	0	8	1	0	1	0	0	0	1	0	0	0	0	11
04:00	0	12	3	1	0	0	0	0	0	0	0	0	0	16
05:00	0	77	13	0	2	2	0	0	0	0	0	0	0	94
06:00	2	222	33	3	7	2	0	0	0	0	0	0	0	269
07:00	2	505	80	3	10	2	0	3	0	0	0	0	0	605
08:00	4	549	47	1	7	2	0	2	2	0	0	0	0	614
09:00	1	308	44	2	13	1	0	2	2	0	0	0	0	373
10:00	2	139	27	2	8	1	0	5	1	0	0	0	0	185
11:00	0	139	23	1	7	0	0	2	0	0	0	0	0	172
12 PM	3	279	36	3	7	1	0	4	0	0	0	0	0	333
13:00	3	269	27	8	4	7	0	0	1	0	0	0	0	319
14:00	0	215	30	5	14	1	0	2	0	0	0	0	0	267
15:00	2	242	47	4	15	2	0	3	0	0	0	0	0	315
16:00	3	338	67	3	14	2	0	1	0	0	0	0	0	428
17:00	3	466	92	1	14	1	0	0	1	0	0	0	0	578
18:00	1	251	69	1	12	0	0	1	0	0	0	0	0	335
19:00	2	116	33	0	8	0	0	0	0	0	0	0	0	159
20:00	0	50	15	0	1	0	0	0	0	0	0	0	0	66
21:00	1	31	5	0	1	1	0	0	0	0	0	0	0	39
22:00	0	18	2	0	0	0	0	1	0	0	0	0	0	21
23:00	0	21	3	0	0	0	0	0	0	0	0	0	0	24
Total	30	4316	702	38	146	25	0	27	8	0	0	0	0	5292
Percent	0.6%	81.6%	13.3%	0.7%	2.8%	0.5%	0.0%	0.5%	0.2%	0.0%	0.0%	0.0%	0.0%	
AM Peak	08:00	08:00	07:00	06:00	09:00	05:00		10:00	08:00					08:00
Vol.	4	549	80	3	13	2		5	2					614
PM Peak	12:00	17:00	17:00	13:00	15:00	13:00		12:00	13:00					17:00
Vol.	3	466	92	8	15	7		4	1					578

Birch Street
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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
08/31/1														
7	1	15	2	0	1	0	0	0	0	0	0	0	0	19
01:00	0	40	1	0	0	0	0	0	1	0	0	0	0	42
02:00	1	1	3	0	1	0	0	0	0	0	0	0	0	6
03:00	0	4	1	0	0	0	0	0	0	0	0	0	0	5
04:00	0	17	5	0	0	0	0	0	0	0	0	0	0	22
05:00	1	87	13	1	8	1	0	0	0	0	0	0	0	111
06:00	0	210	37	2	1	0	0	0	1	0	0	0	0	251
07:00	5	495	65	4	3	1	0	1	1	0	0	0	0	575
08:00	1	504	45	1	4	1	0	4	2	0	0	0	0	562
09:00	1	270	26	3	13	2	0	0	1	0	0	0	0	316
10:00	4	146	30	2	4	2	0	3	1	0	0	0	0	192
11:00	0	170	25	1	2	1	0	1	3	0	0	0	0	203
12 PM	3	306	47	2	8	2	0	5	2	0	0	0	0	375
13:00	2	263	29	4	7	2	0	2	1	0	0	0	0	310
14:00	0	204	30	3	7	0	0	3	0	0	0	0	0	247
15:00	2	222	52	5	10	0	0	0	2	0	0	0	0	293
16:00	1	326	81	3	8	1	0	0	2	0	0	0	0	422
17:00	4	371	73	1	16	0	0	0	0	0	0	0	0	465
18:00	0	217	56	0	11	0	0	0	0	0	0	0	0	284
19:00	1	142	50	1	6	1	0	0	0	0	0	0	0	201
20:00	0	72	11	0	5	0	0	0	1	0	0	0	0	89
21:00	0	37	7	0	1	0	0	0	1	0	0	0	0	46
22:00	2	26	4	0	0	2	0	0	0	0	0	0	0	34
23:00	1	18	0	0	2	0	0	0	0	0	0	0	0	21
Total	30	4163	693	33	118	16	0	19	19	0	0	0	0	5091
Percent	0.6%	81.8%	13.6%	0.6%	2.3%	0.3%	0.0%	0.4%	0.4%	0.0%	0.0%	0.0%	0.0%	
AM Peak	07:00	08:00	07:00	07:00	09:00	09:00		08:00	11:00					07:00
Vol.	5	504	65	4	13	2		4	3					575
PM Peak	17:00	17:00	16:00	15:00	17:00	12:00		12:00	12:00					17:00
Vol.	4	371	81	5	16	2		5	2					465

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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
08/30/17	0	1	0	0	0	0	0	0	0	0	0	0	0	1
01:00	0	2	0	0	0	0	0	0	0	0	0	0	0	2
02:00	0	2	0	0	0	0	0	0	0	0	0	0	0	2
03:00	0	0	2	0	1	0	0	0	1	0	0	0	0	4
04:00	0	3	1	0	1	0	0	0	0	0	0	0	0	5
05:00	0	9	0	0	0	1	0	0	1	0	0	0	0	11
06:00	1	9	2	1	1	1	0	0	0	0	0	0	0	15
07:00	0	33	5	1	1	1	0	1	0	0	0	0	0	42
08:00	1	36	28	2	4	3	0	0	0	0	0	0	0	74
09:00	1	43	12	1	4	1	0	0	0	0	0	0	0	62
10:00	0	52	13	0	3	2	0	0	0	0	0	0	0	70
11:00	1	81	25	1	5	1	0	1	0	0	0	0	0	115
12 PM	0	119	25	1	4	0	0	0	0	0	0	0	0	149
13:00	0	62	9	0	8	2	0	0	0	0	0	0	0	81
14:00	1	53	9	1	3	2	0	0	0	0	0	0	0	69
15:00	1	69	17	2	5	1	0	2	0	0	0	0	0	97
16:00	1	104	19	0	4	0	0	0	0	0	0	0	0	128
17:00	1	113	19	0	2	2	0	0	1	0	0	0	0	138
18:00	1	45	4	0	1	0	0	0	1	0	0	0	0	52
19:00	0	28	4	0	1	0	0	0	0	0	0	0	0	33
20:00	0	20	7	0	1	0	0	0	0	0	0	0	0	28
21:00	1	13	1	0	0	0	0	0	0	0	0	0	0	15
22:00	0	2	3	0	0	0	0	1	0	0	0	0	0	6
23:00	0	1	0	0	0	0	0	0	0	0	0	0	0	1
Total	10	900	205	10	49	17	0	5	4	0	0	0	0	1200
Percent	0.8%	75.0%	17.1%	0.8%	4.1%	1.4%	0.0%	0.4%	0.3%	0.0%	0.0%	0.0%	0.0%	
AM Peak	06:00	11:00	08:00	08:00	11:00	08:00		07:00	03:00					11:00
Vol.	1	81	28	2	5	3		1	1					115
PM Peak	14:00	12:00	12:00	15:00	13:00	13:00		15:00	17:00					12:00
Vol.	1	119	25	2	8	2		2	1					149

Birch Street
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08/31/17	0	3	0	0	0	0	0	0	0	0	0	0	0	3
01:00	0	2	0	0	0	0	0	0	1	0	0	0	0	3
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00	0	1	2	0	0	0	0	0	0	0	0	0	0	3
04:00	0	1	0	0	0	0	0	0	0	0	0	0	0	1
05:00	0	8	0	0	2	1	0	0	0	0	0	0	0	11
06:00	0	18	5	2	2	0	0	1	2	0	0	0	0	30
07:00	0	34	4	0	2	0	0	0	0	0	0	0	0	40
08:00	3	46	13	1	10	4	0	0	1	0	0	0	0	78
09:00	0	30	18	2	2	1	0	1	0	0	0	0	0	54
10:00	0	44	17	0	5	0	0	1	0	0	0	0	0	67
11:00	1	111	20	0	5	2	0	0	1	0	0	0	0	140
12 PM	2	114	20	0	2	2	0	0	0	0	0	0	0	140
13:00	1	55	8	0	3	1	0	0	1	0	0	0	0	69
14:00	1	57	16	1	5	0	0	0	0	0	0	0	0	80
15:00	0	65	15	0	4	0	0	0	0	0	0	0	0	84
16:00	0	91	15	0	5	0	0	0	2	1	0	0	0	114
17:00	0	100	17	0	4	0	0	0	0	0	0	0	0	121
18:00	0	40	7	0	2	0	0	0	0	0	0	0	0	49
19:00	0	30	3	0	0	0	0	0	0	0	0	0	0	33
20:00	0	22	2	0	1	0	0	0	0	0	0	0	0	25
21:00	0	14	3	0	0	0	0	0	0	0	0	0	0	17
22:00	0	5	3	0	0	0	0	0	0	0	0	0	0	8
23:00	1	5	1	0	1	0	0	0	0	0	0	0	0	8
Total	9	896	189	6	55	11	0	3	8	1	0	0	0	1178
Percent	0.8%	76.1%	16.0%	0.5%	4.7%	0.9%	0.0%	0.3%	0.7%	0.1%	0.0%	0.0%	0.0%	
AM Peak	08:00	11:00	11:00	06:00	08:00	08:00		06:00	06:00					11:00
Vol.	3	111	20	2	10	4		1	2					140
PM Peak	12:00	12:00	12:00	14:00	14:00	12:00			16:00	16:00				12:00
Vol.	2	114	20	1	5	2			2	1				140

Birch Street
north of Industrial Road
City,State: Milford, MA
Client: RMA/ R. Muller



PRECISION
D A T A
INDUSTRIES, LLC

46 Morton Street, Framingham, MA 01702
Office: 508-875-0100 Fax: 508-875-0118
Email: datarequests@pdillc.com

175814 A Speed
Site Code: 17041

Email: datarequests@pdillc.com

SB	Start Time	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
08/30/17	0	0	0	0	2	3	8	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	38	35	
01:00	0	0	0	0	2	16	18	8	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	46	40	36	
02:00	0	0	1	1	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	37	32	
03:00	0	0	0	0	2	2	3	2	1	0	1	0	1	0	0	0	0	0	1	0	0	0	0	0	0	11	45	38	
04:00	0	0	0	0	0	5	4	6	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16	42	38	
05:00	0	0	0	0	2	19	56	14	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	94	40	37	
06:00	0	1	3	10	49	136	64	5	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	269	41	37	
07:00	0	0	2	35	128	328	97	13	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	605	40	36	
08:00	0	1	3	28	146	341	91	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	614	39	36	
09:00	0	0	0	4	82	190	89	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	373	41	37	
10:00	0	0	0	6	39	90	38	11	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	185	41	37	
11:00	0	0	0	5	25	96	40	5	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	172	41	38	
12 PM	0	1	0	12	73	162	70	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	333	41	37	
13:00	0	2	3	16	68	151	66	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	319	41	37	
14:00	0	0	4	11	43	129	66	11	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	267	42	37	
15:00	0	0	8	14	47	151	86	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	315	41	37	
16:00	0	0	2	16	75	212	106	14	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	428	41	37	
17:00	0	0	5	11	93	316	139	13	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	578	41	37	
18:00	1	0	0	1	65	158	99	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	335	42	38	
19:00	0	0	2	5	32	84	30	5	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	159	41	37	
20:00	0	0	1	7	14	29	14	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	66	40	36	
21:00	0	0	1	5	12	15	5	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	39	39	35	
22:00	0	0	0	1	5	13	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	21	38	36	
23:00	0	0	0	0	3	12	8	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24	42	39	
Total	1	5	35	196	1047	2705	1141	146	14	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5292			
%	0.0%	0.1%	0.7%	3.7%	19.8%	51.1%	21.6%	2.8%	0.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%				
AM Peak		06:00	06:00	07:00	08:00	08:00	07:00	07:00	07:00	03:00																	08:00		
Vol.		1	3	35	146	341	97	13	2	1																	614		
PM Peak	18:00	13:00	15:00	13:00	17:00	17:00	17:00	12:00	14:00																		17:00		
Vol.	1	2	8	16	93	316	139	15	3																		578		

Stats

15th Percentile :	31 MPH
50th Percentile :	36 MPH
85th Percentile :	41 MPH
95th Percentile :	43 MPH
Mean Speed(Average) :	37 MPH
10 MPH Pace Speed :	35-44 MPH
Number in Pace :	3846
Percent in Pace :	72.7%
Number of Vehicles > 30 MPH :	4846
Percent of Vehicles > 30 MPH :	91.6%

Birch Street
north of Industrial Road
City, State: Milford, MA
Client: RMA/ R. Muller



PRECISION
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INDUSTRIES, LLC

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175814 A Speed
Site Code: 17041

SB

Start Time	14	15	20	25	30	35	40	45	50	55	60	65	70	Total	85th % ile	Ave Speed
08/31/17	0	0	0	2	1	12	2	2	0	0	0	0	0	19	41	37
01:00	0	0	0	1	12	19	7	2	1	0	0	0	0	42	41	37
02:00	0	0	0	2	0	1	3	0	0	0	0	0	0	6	42	36
03:00	0	0	0	0	0	3	2	0	0	0	0	0	0	5	42	39
04:00	0	0	0	3	3	7	6	1	1	1	0	0	0	22	43	38
05:00	0	0	0	1	28	60	19	3	0	0	0	0	0	111	40	37
06:00	0	0	0	7	39	115	74	13	0	3	0	0	0	251	42	38
07:00	0	0	4	8	139	294	114	15	1	0	0	0	0	575	40	37
08:00	0	5	17	6	101	314	113	6	0	0	0	0	0	562	40	36
09:00	0	1	4	14	66	144	77	10	0	0	0	0	0	316	41	37
10:00	0	0	5	17	46	76	45	2	1	0	0	0	0	192	41	36
11:00	0	1	0	6	35	103	52	4	2	0	0	0	0	203	41	37
12 PM	0	1	4	10	77	196	80	7	0	0	0	0	0	375	40	37
13:00	0	0	1	11	57	160	69	9	3	0	0	0	0	310	41	37
14:00	1	0	3	8	63	112	48	12	0	0	0	0	0	247	41	37
15:00	0	0	2	5	58	146	78	3	1	0	0	0	0	293	41	37
16:00	0	3	15	17	75	207	90	15	0	0	0	0	0	422	41	36
17:00	0	0	1	15	90	222	121	15	0	0	0	0	1	465	41	37
18:00	0	0	0	22	75	124	53	9	1	0	0	0	0	284	40	36
19:00	0	0	1	7	47	104	37	5	0	0	0	0	0	201	40	37
20:00	0	0	0	0	30	48	7	3	0	0	0	0	1	89	38	36
21:00	0	0	0	1	8	27	10	0	0	0	0	0	0	46	40	37
22:00	0	1	3	3	8	13	4	2	0	0	0	0	0	34	40	34
23:00	0	0	0	2	4	7	6	1	1	0	0	0	0	21	43	38
Total	1	12	60	168	1062	2514	1117	139	12	4	0	0	2	5091		
%	0.0%	0.2%	1.2%	3.3%	20.9%	49.4%	21.9%	2.7%	0.2%	0.1%	0.0%	0.0%	0.0%			
AM Peak		08:00	08:00	10:00	07:00	08:00	07:00	07:00	11:00	06:00				07:00		
Vol.		5	17	17	139	314	114	15	2	3				575		
PM Peak	14:00	16:00	16:00	18:00	17:00	17:00	16:00	13:00					17:00	17:00		
Vol.	1	3	15	22	90	222	121	15	3				1	465		

Stats

15th Percentile :	31 MPH
50th Percentile :	36 MPH
85th Percentile :	41 MPH
95th Percentile :	43 MPH

Mean Speed(Average) :	37 MPH
10 MPH Pace Speed :	35-44 MPH
Number in Pace :	3631
Percent in Pace :	71.3%
Number of Vehicles > 30 MPH :	4638
Percent of Vehicles > 30 MPH :	91.1%

Birch Street
north of Industrial Road
City, State: Milford, MA
Client: RMA/ R. Muller



PRECISION
D A T A
INDUSTRIES, LLC

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Email: datarequests@pdillc.com

175814 A Speed
Site Code: 17041

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
08/30/ 17	0	0	0	0	1	0	0	0	0	0	0	0	0	1	33	32
01:00	0	0	0	1	0	1	0	0	0	0	0	0	0	2	37	32
02:00	0	0	1	1	0	0	0	0	0	0	0	0	0	2	27	25
03:00	0	0	0	1	0	3	0	0	0	0	0	0	0	4	38	34
04:00	0	0	0	0	2	1	2	0	0	0	0	0	0	5	42	37
05:00	0	0	0	1	1	5	4	0	0	0	0	0	0	11	41	37
06:00	0	0	0	4	1	7	3	0	0	0	0	0	0	15	40	35
07:00	0	0	0	1	9	18	11	3	0	0	0	0	0	42	42	38
08:00	0	0	2	3	13	30	19	7	0	0	0	0	0	74	42	38
09:00	0	0	3	1	9	23	20	5	1	0	0	0	0	62	43	38
10:00	0	1	1	2	12	26	23	4	1	0	0	0	0	70	42	38
11:00	1	0	2	6	15	39	35	17	0	0	0	0	0	115	43	38
12 PM	0	1	2	3	17	67	51	7	1	0	0	0	0	149	42	38
13:00	0	2	2	0	10	31	23	10	3	0	0	0	0	81	44	39
14:00	0	0	0	2	4	27	26	8	2	0	0	0	0	69	43	40
15:00	0	1	4	4	8	27	36	12	2	3	0	0	0	97	45	39
16:00	0	0	0	0	12	38	51	22	5	0	0	0	0	128	45	41
17:00	0	1	1	5	10	38	52	30	1	0	0	0	0	138	45	40
18:00	0	0	0	1	4	19	20	6	2	0	0	0	0	52	44	40
19:00	0	0	0	0	5	13	10	2	3	0	0	0	0	33	44	40
20:00	0	0	1	1	4	5	13	2	1	1	0	0	0	28	43	40
21:00	0	0	0	1	3	8	2	1	0	0	0	0	0	15	40	37
22:00	0	0	0	0	0	5	0	1	0	0	0	0	0	6	44	39
23:00	0	0	0	0	1	0	0	0	0	0	0	0	0	1	33	32
Total	1	6	19	38	141	431	401	137	22	4	0	0	0	1200		
%	0.1%	0.5%	1.6%	3.2%	11.8%	35.9%	33.4%	11.4%	1.8%	0.3%	0.0%	0.0%	0.0%			
AM Peak	11:00	10:00	09:00	11:00	11:00	11:00	11:00	11:00	09:00					11:00		
Vol.	1	1	3	6	15	39	35	17	1					115		
PM Peak		13:00	15:00	17:00	12:00	12:00	17:00	17:00	16:00	15:00				12:00		
Vol.		2	4	5	17	67	52	30	5	3				149		

Stats

15th Percentile :	33 MPH
50th Percentile :	38 MPH
85th Percentile :	43 MPH
95th Percentile :	47 MPH
Mean Speed(Average) :	39 MPH
10 MPH Pace Speed :	35-44 MPH
Number in Pace :	832
Percent in Pace :	69.3%
Number of Vehicles > 30 MPH :	1108
Percent of Vehicles > 30 MPH :	92.3%

Birch Street
north of Industrial Road
City,State: Milford, MA
Client: RMA/ R. Muller



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175814 A Speed
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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
08/31/ 17	0	0	0	1	0	2	0	0	0	0	0	0	0	3	37	34
01:00	0	0	1	0	0	1	1	0	0	0	0	0	0	3	41	34
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
03:00	0	0	0	0	0	2	1	0	0	0	0	0	0	3	41	39
04:00	0	0	0	0	0	1	0	0	0	0	0	0	0	1	38	37
05:00	0	0	0	0	3	5	3	0	0	0	0	0	0	11	41	37
06:00	0	0	0	5	7	10	4	4	0	0	0	0	0	30	43	36
07:00	0	0	0	1	7	11	15	6	0	0	0	0	0	40	44	39
08:00	1	2	11	6	10	18	23	6	1	0	0	0	0	78	42	35
09:00	0	0	1	2	9	17	17	8	0	0	0	0	0	54	43	39
10:00	0	0	1	2	12	31	20	1	0	0	0	0	0	67	41	37
11:00	2	2	8	7	22	56	33	10	0	0	0	0	0	140	42	36
12 PM	0	0	2	2	17	59	52	6	2	0	0	0	0	140	42	39
13:00	0	0	0	1	7	35	21	4	1	0	0	0	0	69	42	39
14:00	0	0	1	2	10	36	27	4	0	0	0	0	0	80	42	38
15:00	0	0	1	1	11	34	30	7	0	0	0	0	0	84	43	39
16:00	0	0	0	1	11	38	46	16	2	0	0	0	0	114	44	40
17:00	0	3	2	1	11	46	39	18	1	0	0	0	0	121	44	39
18:00	0	0	0	2	6	25	13	1	2	0	0	0	0	49	42	38
19:00	0	0	0	0	6	15	8	4	0	0	0	0	0	33	43	39
20:00	0	0	0	2	6	8	7	2	0	0	0	0	0	25	42	37
21:00	0	0	0	1	7	5	1	2	1	0	0	0	0	17	45	37
22:00	0	0	0	0	2	3	3	0	0	0	0	0	0	8	42	38
23:00	1	0	1	0	2	2	2	0	0	0	0	0	0	8	41	31
Total	4	7	29	37	166	460	366	99	10	0	0	0	0	1178		
%	0.3%	0.6%	2.5%	3.1%	14.1%	39.0%	31.1%	8.4%	0.8%	0.0%	0.0%	0.0%	0.0%			
AM Peak	11:00	08:00	08:00	11:00	11:00	11:00	11:00	11:00	08:00					11:00		
Vol.	2	2	11	7	22	56	33	10	1					140		
PM Peak	23:00	17:00	12:00	12:00	12:00	12:00	12:00	17:00	12:00					12:00		
Vol.	1	3	2	2	17	59	52	18	2					140		

Stats

15th Percentile :	32 MPH
50th Percentile :	37 MPH
85th Percentile :	43 MPH
95th Percentile :	46 MPH
Mean Speed(Average) :	38 MPH
10 MPH Pace Speed :	35-44 MPH
Number in Pace :	826
Percent in Pace :	70.1%
Number of Vehicles > 30 MPH :	1068
Percent of Vehicles > 30 MPH :	90.6%

Ron Müller & Associates

Traffic Engineering and Consulting Services

E-W Street: Birch Street
N-S Street: Beaver Street

File Name : 16048 Beaver-Birch AM
Site Code : 16048
Start Date : 11/30/2016
Page No : 1

Groups Printed- Cars - Trucks

Start Time	Beaver Street From North				Beaver Street From South				Birch Street From West				Int. Total
	Thru	Right	Peds	App. Total	Left	Thru	Peds	App. Total	Left	Right	Peds	App. Total	
07:00 AM	0	0	0	0	21	52	0	73	15	66	0	81	154
07:15 AM	0	0	0	0	17	56	0	73	26	119	0	145	218
07:30 AM	0	0	0	0	17	64	0	81	14	130	0	144	225
07:45 AM	0	0	0	0	29	85	0	114	7	165	0	172	286
Total	0	0	0	0	84	257	0	341	62	480	0	542	883
08:00 AM	0	0	0	0	28	60	0	88	20	147	0	167	255
08:15 AM	0	0	0	0	34	60	0	94	9	98	0	107	201
08:30 AM	0	0	0	0	19	58	0	77	17	100	0	117	194
08:45 AM	0	0	0	0	13	42	0	55	6	122	0	128	183
Total	0	0	0	0	94	220	0	314	52	467	0	519	833
Grand Total	0	0	0	0	178	477	0	655	114	947	0	1061	1716
Apprch %	0	0	0		27.2	72.8	0		10.7	89.3	0		
Total %	0	0	0	0	10.4	27.8	0	38.2	6.6	55.2	0	61.8	
Cars	0	0	0	0	177	470	0	647	105	942	0	1047	1694
% Cars	0	0	0	0	99.4	98.5	0	98.8	92.1	99.5	0	98.7	98.7
Trucks	0	0	0	0	1	7	0	8	9	5	0	14	22
% Trucks	0	0	0	0	0.6	1.5	0	1.2	7.9	0.5	0	1.3	1.3

E-W Street: Birch Street
N-S Street: Beaver Street

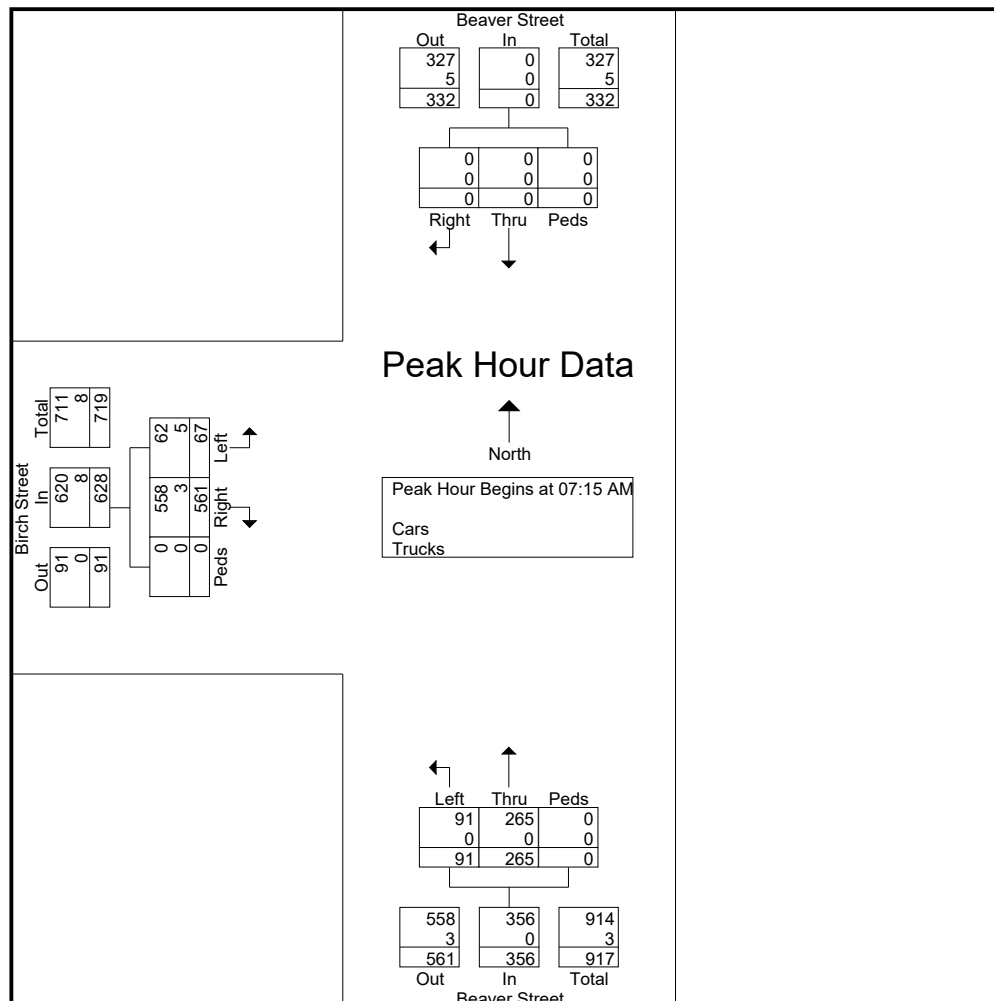
File Name : 16048 Beaver-Birch AM
Site Code : 16048
Start Date : 11/30/2016
Page No : 2

	Beaver Street From North				Beaver Street From South				Birch Street From West				
Start Time	Thru	Right	Peds	App. Total	Left	Thru	Peds	App. Total	Left	Right	Peds	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 07:15 AM

07:15 AM	0	0	0	0	17	56	0	73	26	119	0	145	218
07:30 AM	0	0	0	0	17	64	0	81	14	130	0	144	225
07:45 AM	0	0	0	0	29	85	0	114	7	165	0	172	286
08:00 AM	0	0	0	0	28	60	0	88	20	147	0	167	255
Total Volume	0	0	0	0	91	265	0	356	67	561	0	628	984
% App. Total	0	0	0	0	25.6	74.4	0		10.7	89.3	0		
PHF	.000	.000	.000	.000	.784	.779	.000	.781	.644	.850	.000	.913	.860
Cars	0	0	0	0	91	265	0	356	62	558	0	620	976
% Cars	0	0	0	0	100	100	0	100	92.5	99.5	0	98.7	99.2
Trucks	0	0	0	0	0	0	0	0	5	3	0	8	8
% Trucks	0	0	0	0	0	0	0	0	7.5	0.5	0	1.3	0.8



File Name : 16048 Beaver-Birch PM
Site Code : 16048
Start Date : 11/29/2016
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E-W Street: Birch Street
N-S Street: Beaver Street

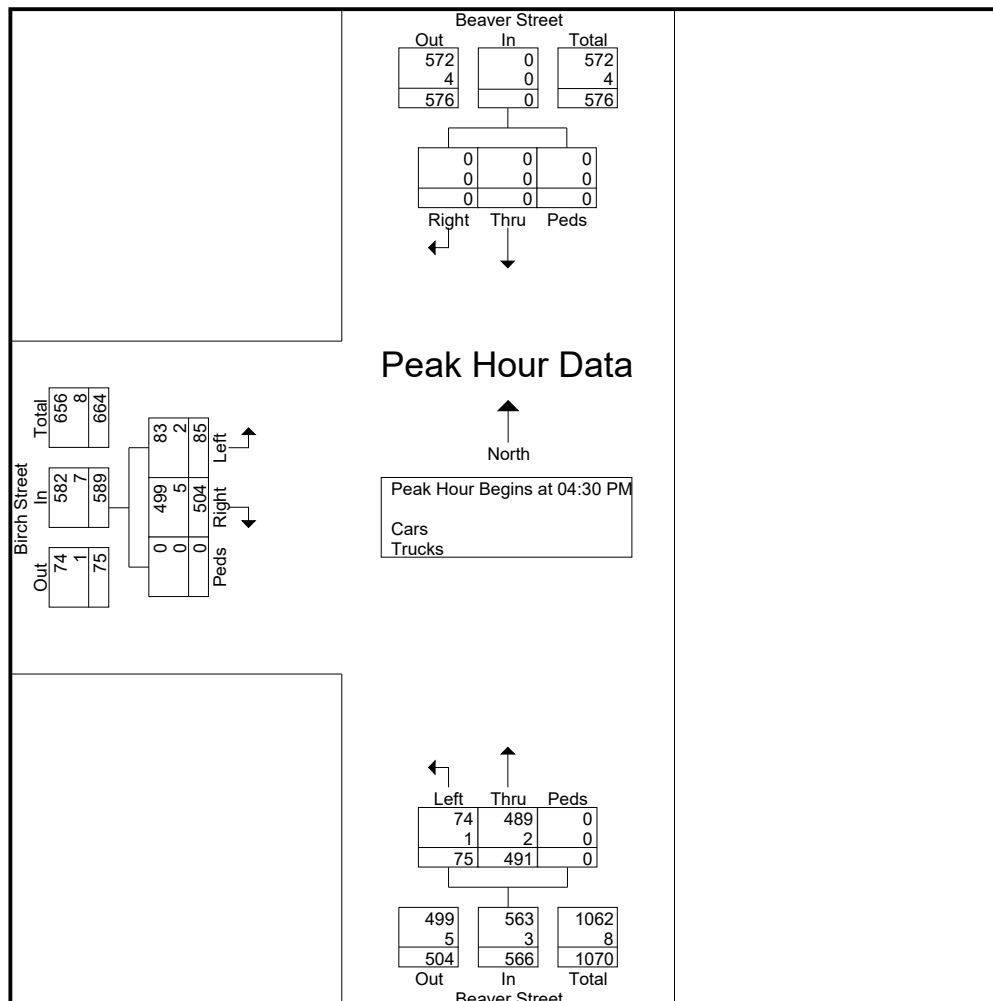
Groups Printed- Cars - Trucks

	Beaver Street From North				Beaver Street From South				Birch Street From West				
Start Time	Thru	Right	Peds	App. Total	Left	Thru	Peds	App. Total	Left	Right	Peds	App. Total	Int. Total
04:00 PM	0	0	0	0	18	108	0	126	25	113	0	138	264
04:15 PM	0	0	0	0	12	78	0	90	5	100	0	105	195
04:30 PM	0	0	0	0	24	138	0	162	18	112	0	130	292
04:45 PM	0	0	0	0	20	122	0	142	18	99	0	117	259
Total	0	0	0	0	74	446	0	520	66	424	0	490	1010
05:00 PM	0	0	0	0	18	138	0	156	26	167	0	193	349
05:15 PM	0	0	0	0	13	93	0	106	23	126	0	149	255
05:30 PM	0	0	0	0	12	88	0	100	13	114	0	127	227
05:45 PM	0	0	0	0	9	77	0	86	17	82	0	99	185
Total	0	0	0	0	52	396	0	448	79	489	0	568	1016
Grand Total	0	0	0	0	126	842	0	968	145	913	0	1058	2026
Apprch %	0	0	0		13	87	0		13.7	86.3	0		
Total %	0	0	0	0	6.2	41.6	0	47.8	7.2	45.1	0	52.2	
Cars	0	0	0	0	125	839	0	964	143	908	0	1051	2015
% Cars	0	0	0	0	99.2	99.6	0	99.6	98.6	99.5	0	99.3	99.5
Trucks	0	0	0	0	1	3	0	4	2	5	0	7	11
% Trucks	0	0	0	0	0.8	0.4	0	0.4	1.4	0.5	0	0.7	0.5

E-W Street: Birch Street
 N-S Street: Beaver Street

File Name : 16048 Beaver-Birch PM
 Site Code : 16048
 Start Date : 11/29/2016
 Page No : 2

	Beaver Street From North				Beaver Street From South				Birch Street From West				
Start Time	Thru	Right	Peds	App. Total	Left	Thru	Peds	App. Total	Left	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 04:30 PM													
04:30 PM	0	0	0	0	24	138	0	162	18	112	0	130	292
04:45 PM	0	0	0	0	20	122	0	142	18	99	0	117	259
05:00 PM	0	0	0	0	18	138	0	156	26	167	0	193	349
05:15 PM	0	0	0	0	13	93	0	106	23	126	0	149	255
Total Volume	0	0	0	0	75	491	0	566	85	504	0	589	1155
% App. Total	0	0	0	0	13.3	86.7	0		14.4	85.6	0		
PHF	.000	.000	.000	.000	.781	.889	.000	.873	.817	.754	.000	.763	.827
Cars	0	0	0	0	74	489	0	563	83	499	0	582	1145
% Cars	0	0	0	0	98.7	99.6	0	99.5	97.6	99.0	0	98.8	99.1
Trucks	0	0	0	0	1	2	0	3	2	5	0	7	10
% Trucks	0	0	0	0	1.3	0.4	0	0.5	2.4	1.0	0	1.2	0.9



Ron Müller & Associates

Traffic Engineering and Consulting Services

File Name : 17041 Birch-Rte 109 AM

Site Code : 17041

Start Date : 8/31/2017

Page No : 1

E-W Street: Medway Road/Rte 109

N-S Street: Venice St.-Birch St.

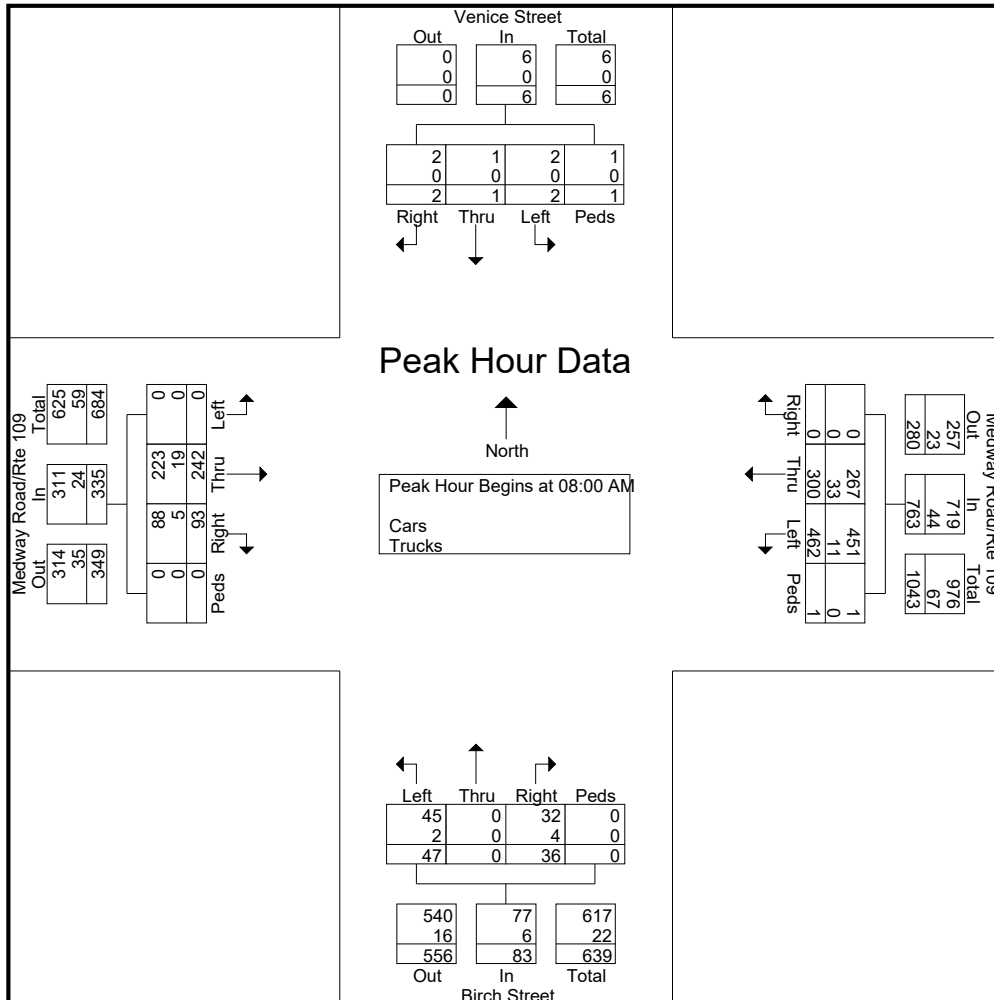
Groups Printed- Cars - Trucks

	Venice Street From North					Medway Road/Rte 109 From East					Birch Street From South					Medway Road/Rte 109 From West					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
07:00 AM	1	0	1	0	2	96	46	0	0	142	9	0	9	0	18	0	81	22	0	103	265
07:15 AM	0	0	0	2	2	141	65	0	1	207	11	0	8	0	19	0	46	21	0	67	295
07:30 AM	0	0	1	1	2	103	56	0	0	159	6	0	3	2	11	1	62	28	1	92	264
07:45 AM	0	0	1	0	1	131	53	0	0	184	7	0	5	0	12	0	64	25	0	89	286
Total	1	0	3	3	7	471	220	0	1	692	33	0	25	2	60	1	253	96	1	351	1110
08:00 AM	1	0	1	1	3	139	67	0	0	206	8	0	11	0	19	0	62	30	0	92	320
08:15 AM	1	0	1	0	2	122	81	0	1	204	20	0	7	0	27	0	55	23	0	78	311
08:30 AM	0	1	0	0	1	99	73	0	0	172	8	0	7	0	15	0	61	19	0	80	268
08:45 AM	0	0	0	0	0	102	79	0	0	181	11	0	11	0	22	0	64	21	0	85	288
Total	2	1	2	1	6	462	300	0	1	763	47	0	36	0	83	0	242	93	0	335	1187
Grand Total	3	1	5	4	13	933	520	0	2	1455	80	0	61	2	143	1	495	189	1	686	2297
Apprch %	23.1	7.7	38.5	30.8		64.1	35.7	0	0.1		55.9	0	42.7	1.4		0.1	72.2	27.6	0.1		
Total %	0.1	0	0.2	0.2	0.6	40.6	22.6	0	0.1	63.3	3.5	0	2.7	0.1	6.2	0	21.5	8.2	0	29.9	
Cars	3	1	5	4	13	916	468	0	2	1386	77	0	56	2	135	0	461	178	1	640	2174
% Cars	100	100	100	100	100	98.2	90	0	100	95.3	96.2	0	91.8	100	94.4	0	93.1	94.2	100	93.3	94.6
Trucks	0	0	0	0	0	17	52	0	0	69	3	0	5	0	8	1	34	11	0	46	123
% Trucks	0	0	0	0	0	1.8	10	0	0	4.7	3.8	0	8.2	0	5.6	100	6.9	5.8	0	6.7	5.4

File Name : 17041 Birch-Rte 109 AM
Site Code : 17041
Start Date : 8/31/2017
Page No : 2

E-W Street: Medway Road/Rte 109
N-S Street: Venice St.-Birch St.

	Venice Street From North					Medway Road/Rte 109 From East					Birch Street From South					Medway Road/Rte 109 From West					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	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	1	1	3	139	67	0	0	206	8	0	11	0	19	0	62	30	0	92	320
08:15 AM	1	0	1	0	2	122	81	0	1	204	20	0	7	0	27	0	55	23	0	78	311
08:30 AM	0	1	0	0	1	99	73	0	0	172	8	0	7	0	15	0	61	19	0	80	268
08:45 AM	0	0	0	0	0	102	79	0	0	181	11	0	11	0	22	0	64	21	0	85	288
Total Volume	2	1	2	1	6	462	300	0	1	763	47	0	36	0	83	0	242	93	0	335	1187
% App. Total	33.3	16.7	33.3	16.7		60.6	39.3	0	0.1		56.6	0	43.4	0		0	72.2	27.8	0		
PHF	.500	.250	.500	.250	.500	.831	.926	.000	.250	.926	.588	.000	.818	.000	.769	.000	.945	.775	.000	.910	.927
Cars	2	1	2	1	6	451	267	0	1	719	45	0	32	0	77	0	223	88	0	311	1113
% Cars	100	100	100	100	100	97.6	89.0	0	100	94.2	95.7	0	88.9	0	92.8	0	92.1	94.6	0	92.8	93.8
Trucks	0	0	0	0	0	11	33	0	0	44	2	0	4	0	6	0	19	5	0	24	74
% Trucks	0	0	0	0	0	2.4	11.0	0	0	5.8	4.3	0	11.1	0	7.2	0	7.9	5.4	0	7.2	6.2



Ron Müller & Associates

Traffic Engineering and Consulting Services

File Name : 17041 Birch-Rte 109 PM

Site Code : 17041

Start Date : 8/31/2017

Page No : 1

E-W Street: Medway Road/Rte 109

N-S Street: Venice St.-Birch St.

Groups Printed- Cars - Trucks

	Venice Street From North					Medway Road/Rte 109 From East					Birch Street From South					Medway Road/Rte 109 From West					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
04:00 PM	0	0	2	0	2	71	81	0	0	152	10	0	21	1	32	0	83	24	0	107	293
04:15 PM	0	0	0	0	0	86	100	0	0	186	5	0	16	0	21	0	94	18	0	112	319
04:30 PM	0	0	0	0	0	84	84	0	0	168	17	0	27	2	46	1	84	27	0	112	326
04:45 PM	0	0	0	0	0	82	85	1	0	168	17	0	19	2	38	0	98	44	0	142	348
Total	0	0	2	0	2	323	350	1	0	674	49	0	83	5	137	1	359	113	0	473	1286
05:00 PM	0	0	0	0	0	85	104	0	0	189	22	0	34	1	57	2	100	35	0	137	383
05:15 PM	0	0	0	1	1	75	107	1	0	183	7	0	20	2	29	0	107	47	0	154	367
05:30 PM	0	0	0	0	0	76	88	0	0	164	15	0	12	0	27	1	95	40	0	136	327
05:45 PM	1	0	1	0	2	85	89	1	0	175	9	0	14	1	24	0	112	33	0	145	346
Total	1	0	1	1	3	321	388	2	0	711	53	0	80	4	137	3	414	155	0	572	1423
Grand Total	1	0	3	1	5	644	738	3	0	1385	102	0	163	9	274	4	773	268	0	1045	2709
Apprch %	20	0	60	20		46.5	53.3	0.2	0		37.2	0	59.5	3.3		0.4	74	25.6	0		
Total %	0	0	0.1	0	0.2	23.8	27.2	0.1	0	51.1	3.8	0	6	0.3	10.1	0.1	28.5	9.9	0	38.6	
Cars	1	0	2	1	4	617	712	3	0	1332	97	0	160	9	266	4	757	260	0	1021	2623
% Cars	100	0	66.7	100	80	95.8	96.5	100	0	96.2	95.1	0	98.2	100	97.1	100	97.9	97	0	97.7	96.8
Trucks	0	0	1	0	1	27	26	0	0	53	5	0	3	0	8	0	16	8	0	24	86
% Trucks	0	0	33.3	0	20	4.2	3.5	0	0	3.8	4.9	0	1.8	0	2.9	0	2.1	3	0	2.3	3.2

File Name : 17041 Birch-Rte 109 PM

Site Code : 17041

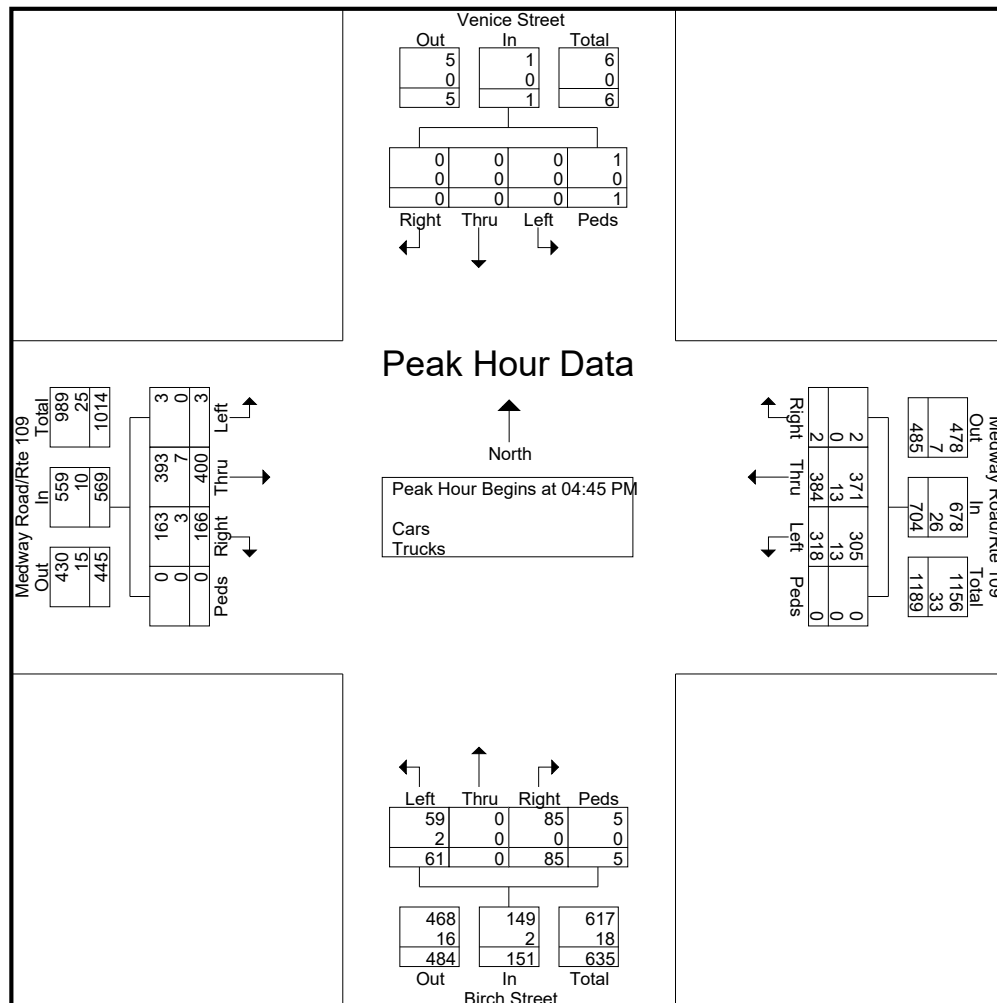
Start Date : 8/31/2017

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E-W Street: Medway Road/Rte 109

N-S Street: Venice St.-Birch St.

	Venice Street From North					Medway Road/Rte 109 From East					Birch Street From South					Medway Road/Rte 109 From West					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:45 PM																					
04:45 PM	0	0	0	0	0	82	85	1	0	168	17	0	19	2	38	0	98	44	0	142	348
05:00 PM	0	0	0	0	0	85	104	0	0	189	22	0	34	1	57	2	100	35	0	137	383
05:15 PM	0	0	0	1	1	75	107	1	0	183	7	0	20	2	29	0	107	47	0	154	367
05:30 PM	0	0	0	0	0	76	88	0	0	164	15	0	12	0	27	1	95	40	0	136	327
Total Volume	0	0	0	1	1	318	384	2	0	704	61	0	85	5	151	3	400	166	0	569	1425
% App. Total	0	0	0	100		45.2	54.5	0.3	0		40.4	0	56.3	3.3		0.5	70.3	29.2	0		
PHF	.000	.000	.000	.250	.250	.935	.897	.500	.000	.931	.693	.000	.625	.625	.662	.375	.935	.883	.000	.924	.930
Cars	0	0	0	1	1	305	371	2	0	678	59	0	85	5	149	3	393	163	0	559	1387
% Cars	0	0	0	100	100	95.9	96.6	100	0	96.3	96.7	0	100	100	98.7	100	98.3	98.2	0	98.2	97.3
Trucks	0	0	0	0	0	13	13	0	0	26	2	0	0	0	2	0	7	3	0	10	38
% Trucks	0	0	0	0	0	4.1	3.4	0	0	3.7	3.3	0	0	0	1.3	0	1.8	1.8	0	1.8	2.7



Seasonal/Historical/Background Growth Adjustment Data

STATION 6125 - BELLINGHAM - RTE.I-495 - AT FRANKLIN T.I.

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
2005	68,859	75,000	76,114	81,056	84,692	92,299	90,531	93,731	85,564	81,684	78,522	76,419	82,039
2006	74,825	72,901	78,382	80,386	82,080	86,982	86,481	90,748	84,958	81,767	80,901	77,982	81,533
2007	72,153	71,826	75,186	78,376	84,242	88,793	87,242	91,996	85,043	83,370	79,615	72,604	80,871
2008	71,744	70,760	73,000	77,938	81,066	83,867	84,721	88,163	80,551	81,608	75,924	71,971	78,443
2009	67,317	71,174	71,926	74,852	75,774	84,000	89,606	89,969	85,237	81,173	76,814	74,493	78,528
Average:	70,980	72,332	74,922	78,522	81,571	87,188	87,716	90,921	84,271	81,920	78,355	74,694	80,283
Factor to													
Annual Avg.:	1.13	1.11	1.07	1.02	0.98	0.92	0.92	0.88	0.95	0.98	1.02	1.07	

Annual Growth:

2005-2006	-0.62%
2005-2007	-0.71%
2005-2008	-1.46%
2005-2009	-1.07%
2006-2007	-0.81%
2006-2008	-1.89%
2006-2009	-1.23%
2007-2008	-3.00%
2007-2009	-1.45%
2008-2009	0.11%
Avg. Growth:	-1.21%

MassDOT Transportation Data Management System

STATION 3219 - MILFORD - RTE 109 - WEST OF BEAVER STREET

YEAR #	YEAR	AADT	Traffic Growth Calculations									
1	2006	25,735	Year 1-2	3.75%	Year 2-3	-1.88%	Year 3-4	1.13%	Year 4-5	1.54%	Year 5-6	1.48%
2	2007	26,700	Year 1-3	0.90%	Year 2-4	-0.39%	Year 3-5	1.34%	Year 4-6	1.52%	Year 5-7	1.26%
3	2008	26,198	Year 1-4	0.98%	Year 2-5	0.25%	Year 3-6	1.40%	Year 4-7	1.37%	Year 5-8	-2.64%
4	2009	26,493	Year 1-5	1.13%	Year 2-6	0.56%	Year 3-7	1.32%	Year 4-8	-1.62%	Year 5-9	-0.71%
5	2010	26,900	Year 1-6	1.22%	Year 2-7	0.66%	Year 3-8	-1.09%	Year 4-9	-0.27%	Year 5-10	-0.36%
6	2011	27,299	Year 1-7	1.19%	Year 2-8	-1.20%	Year 3-9	-0.04%	Year 4-10	-0.05%		
7	2012	27,579	Year 1-8	-0.54%	Year 2-9	-0.30%	Year 3-10	0.12%				
8	2013	24,771	Year 1-9	0.19%	Year 2-10	-0.13%						
9	2014	26,133	Year 1-10	0.30%								
10	2015	26,420										
			Year 6-7	1.03%	Year 7-8	-10.18%	Year 8-9	5.50%	Year 9-10	1.10%		
2011-2015 Annual Growth:			Year 6-8	-4.63%	Year 7-9	-2.62%	Year 8-10	3.33%				
Year 6-7			Year 6-9	-1.42%	Year 7-10	-1.40%						
Year 6-8			Year 6-10	-0.80%								
Year 6-9												
Year 6-10												
Year 7-8												
Year 7-9												
Year 7-10												
Year 8-9												
Year 8-10												
Year 9-10												
Avg. Growth:												

2006-2015 Annual Average Traffic Growth Rate: 0.05%

17041 - Milford, MA

Prop. Apartments

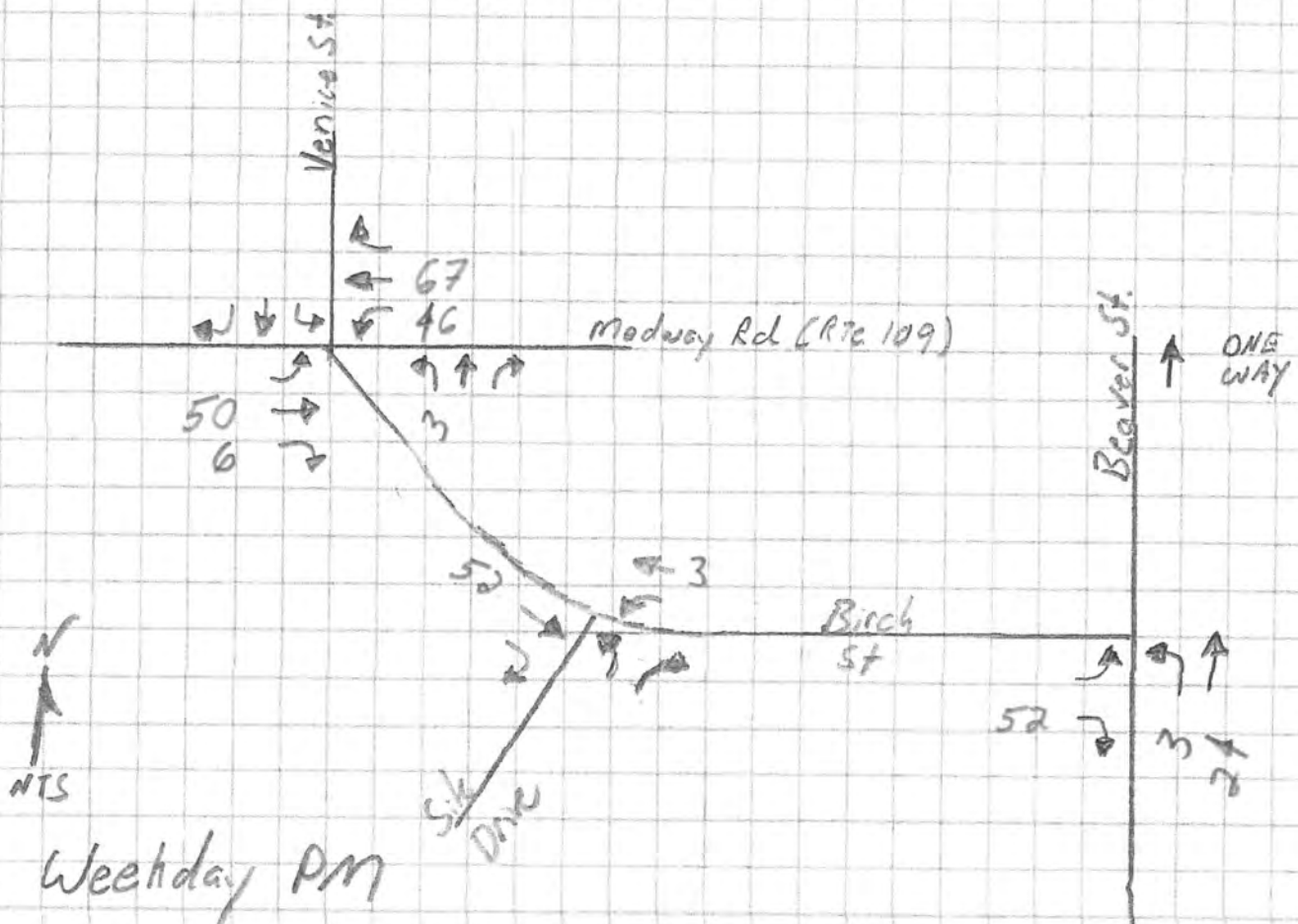
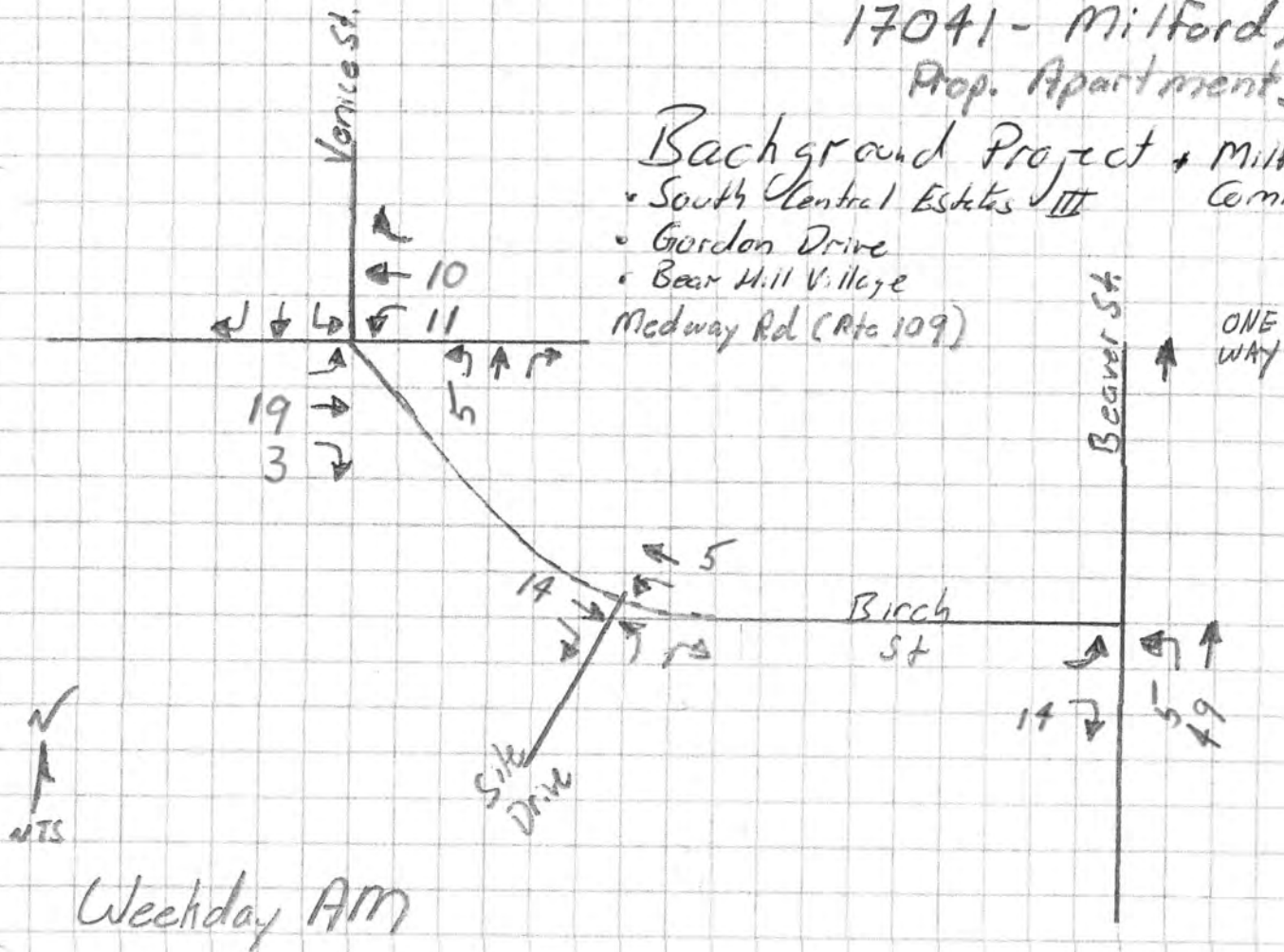
Background Project + Milford Commons

• South Central Estates III

• Gordon Drive

• Bear Hill Village

Medway Rd (Rte 109)



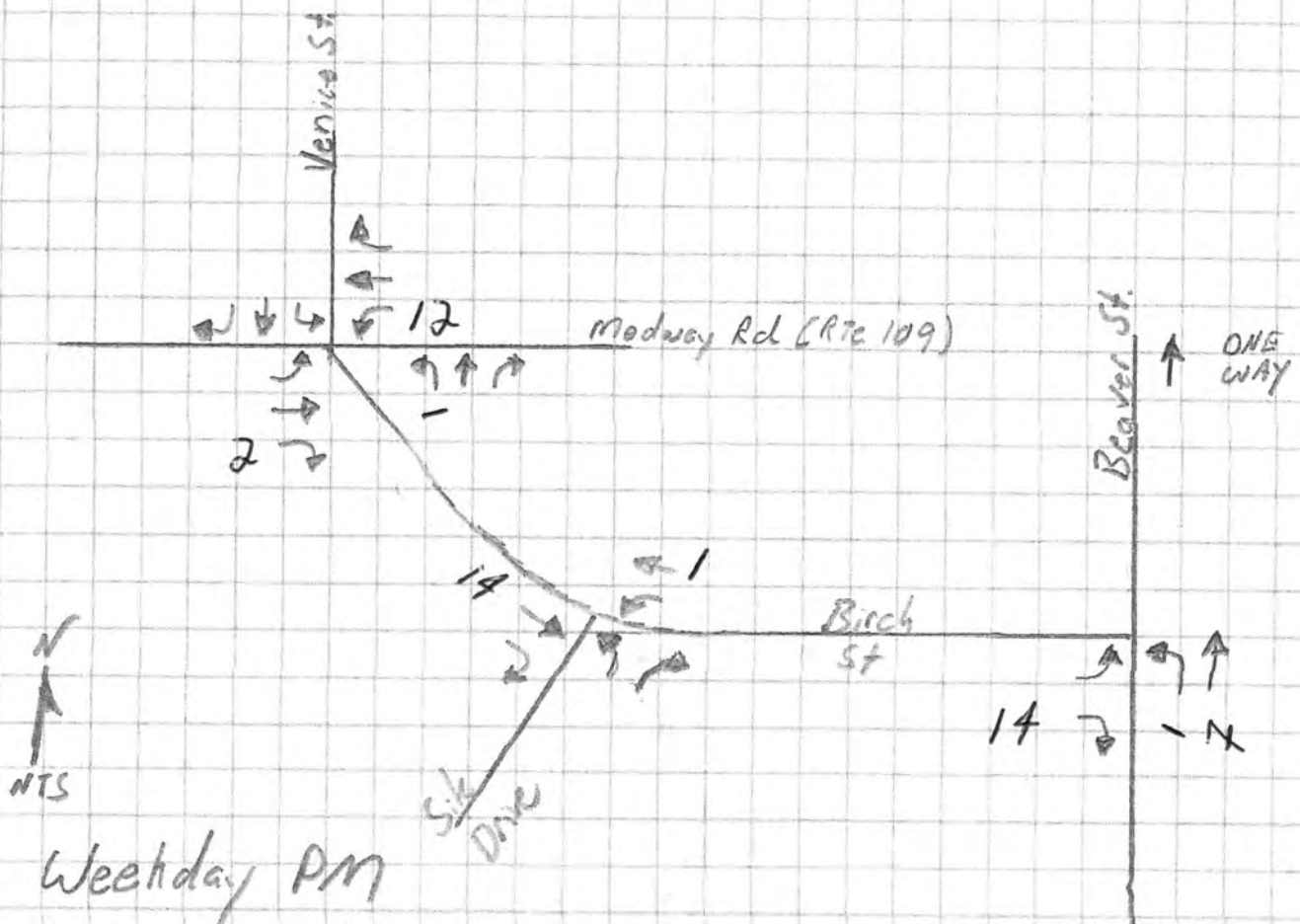
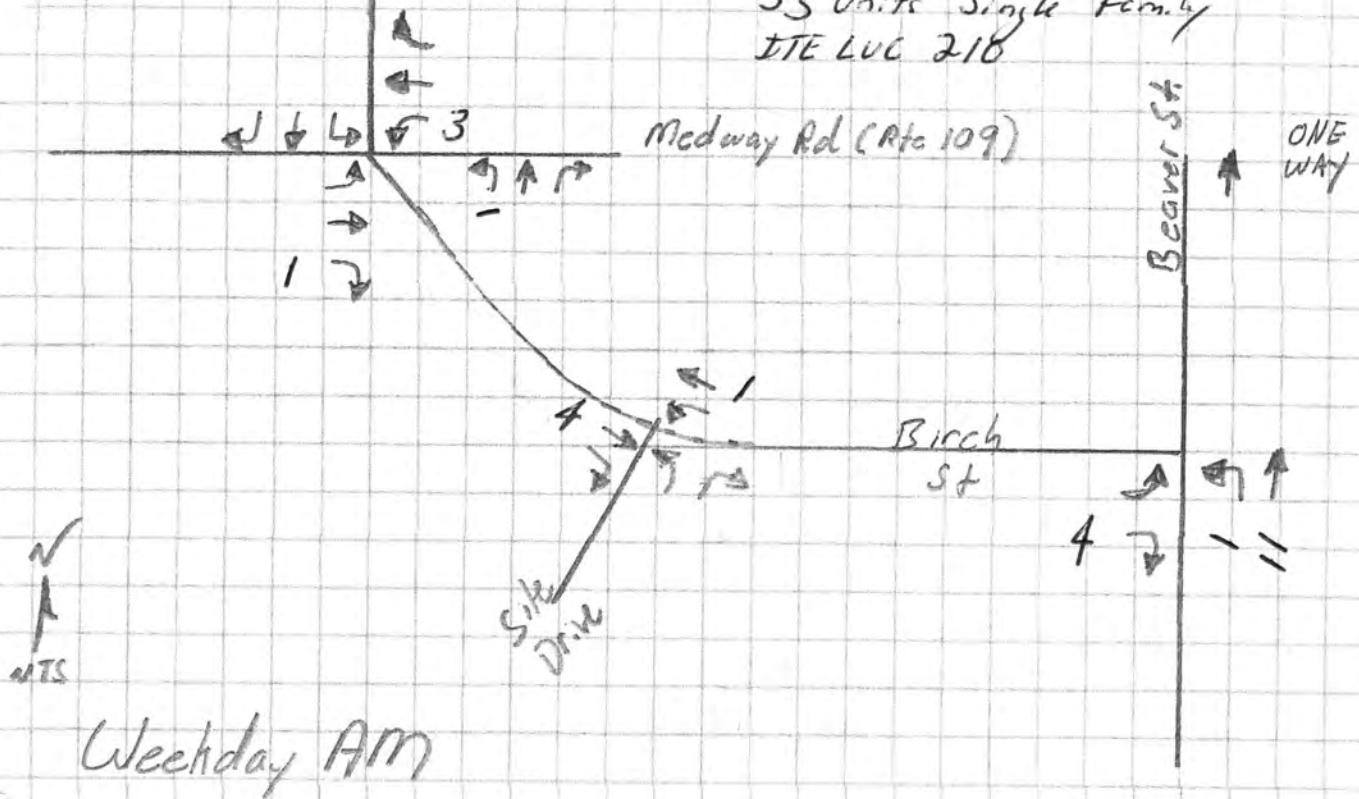
17041 - Milford, MA

Prop. Apartments

South Central Estates III

33 units Single Family

ITE LUC 210



Institute of Transportation Engineers (ITE); 9th Edition
Land Use Code (LUC) 210 - Single-Family Detached Housing

Average Vehicle Trips Ends vs: Dwelling Units
Independent Variable (X): 33

AVERAGE WEEKDAY DAILY

$$\ln T = 0.92 \ln (X) + 2.72$$

$$\ln T = 5.94$$

$$T = 378.72$$

$$T = 380 \quad \text{vehicle trips}$$

with 50% (190 vpd) entering and 50% (190 vpd) exiting.

WEEKDAY MORNING PEAK HOUR OF ADJACENT STREET TRAFFIC

$$T = 0.70 (X) + 9.74$$

$$T = 32.84$$

$$T = 33 \quad \text{vehicle trips}$$

with 25% (8 vph) entering and 75% (25 vph) exiting.

WEEKDAY EVENING PEAK HOUR OF ADJACENT STREET TRAFFIC

$$\ln T = 0.90 \ln (X) + 0.51$$

$$\ln T = 3.66$$

$$T = 38.74$$

$$T = 39 \quad \text{vehicle trips}$$

with 63% (25 vph) entering and 37% (14 vph) exiting.

SATURDAY DAILY

$$\ln T = 0.93 \ln (X) + 2.64$$

$$\ln T = 5.89$$

$$T = 362.04$$

$$T = 360 \quad \text{vehicle trips}$$

with 50% (180 vpd) entering and 50% (180 vpd) exiting.

SATURDAY MIDDAY PEAK HOUR OF GENERATOR

$$T = 0.89 (X) + 8.77$$

$$T = 38.14$$

$$T = 38 \quad \text{vehicle trips}$$

with 53% (20 vph) entering and 47% (18 vph) exiting.

SUNDAY DAILY

$$T = 8.63 (X) - 0.63$$

$$T = 284.16$$

$$T = 280 \quad \text{vehicle trips}$$

with 50% (140 vpd) entering and 50% (140 vpd) exiting.

SUNDAY MIDDAY PEAK HOUR OF GENERATOR

$$\ln T = 0.91 \ln (X) + 0.31$$

$$\ln T = 3.49$$

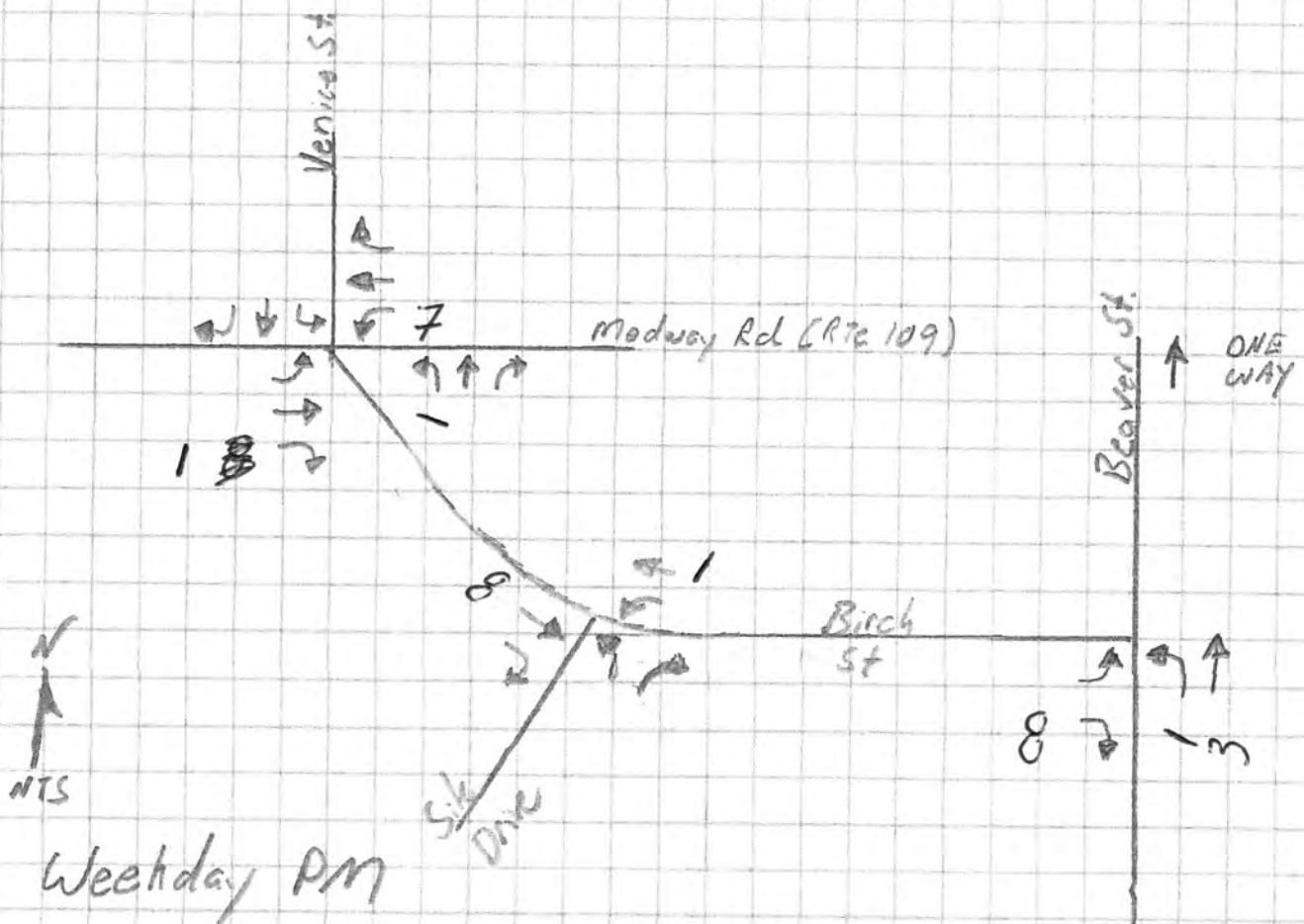
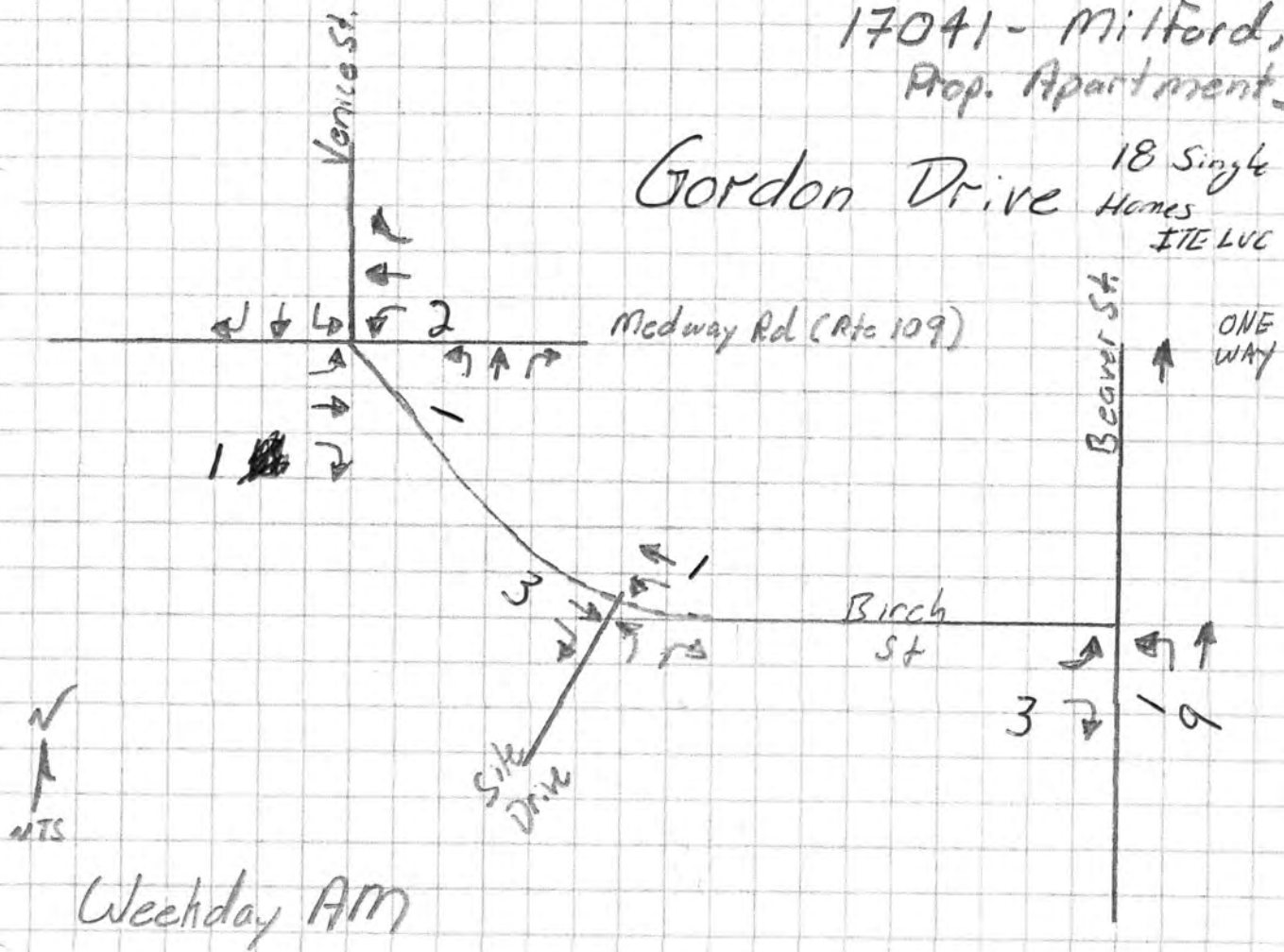
$$T = 32.85$$

$$T = 33 \quad \text{vehicle trips}$$

with 53% (17 vph) entering and 47% (16 vph) exiting.

17041 - Milford, MA
Prop. Apartments

Gordon Drive 18 Single Family
Homes
ITE LUC 210



Institute of Transportation Engineers (ITE); 9th Edition
Land Use Code (LUC) 210 - Single-Family Detached Housing

Average Vehicle Trips Ends vs: Dwelling Units
Independent Variable (X): 18

AVERAGE WEEKDAY DAILY

$$\ln T = 0.92 \ln (X) + 2.72$$

$$\ln T = 5.38$$

$$T = 216.84$$

$$T = 220 \quad \text{vehicle trips}$$

with 50% (110 vpd) entering and 50% (110 vpd) exiting.

WEEKDAY MORNING PEAK HOUR OF ADJACENT STREET TRAFFIC

$$T = 0.70 (X) + 9.74$$

$$T = 22.34$$

$$T = 22 \quad \text{vehicle trips}$$

with 25% (6 vph) entering and 75% (17 vph) exiting.

WEEKDAY EVENING PEAK HOUR OF ADJACENT STREET TRAFFIC

$$\ln T = 0.90 \ln (X) + 0.51$$

$$\ln T = 3.11$$

$$T = 22.45$$

$$T = 22 \quad \text{vehicle trips}$$

with 63% (14 vph) entering and 37% (8 vph) exiting.

SATURDAY DAILY

$$\ln T = 0.93 \ln (X) + 2.64$$

$$\ln T = 5.33$$

$$T = 206.03$$

$$T = 210 \quad \text{vehicle trips}$$

with 50% (105 vpd) entering and 50% (105 vpd) exiting.

SATURDAY MIDDAY PEAK HOUR OF GENERATOR

$$T = 0.89 (X) + 8.77$$

$$T = 24.79$$

$$T = 25 \quad \text{vehicle trips}$$

with 53% (13 vph) entering and 47% (12 vph) exiting.

SUNDAY DAILY

$$T = 8.63 (X) - 0.63$$

$$T = 154.71$$

$$T = 150 \quad \text{vehicle trips}$$

with 50% (75 vpd) entering and 50% (75 vpd) exiting.

SUNDAY MIDDAY PEAK HOUR OF GENERATOR

$$\ln T = 0.91 \ln (X) + 0.31$$

$$\ln T = 2.94$$

$$T = 18.92$$

$$T = 19 \quad \text{vehicle trips}$$

with 53% (10 vph) entering and 47% (9 vph) exiting.

17041 - Milford, MA
Prop. Apartments

Bear Hill Village

147 unit Condominium

Dec 13, 2016 Traffic Study
Miller & Associates

Medway Rd (Rte 109)

Beaver St

ONE WAY

Birch St

Site Drive



Weekday AM

Venice St

Medway Rd (Rte 109)

Beaver St

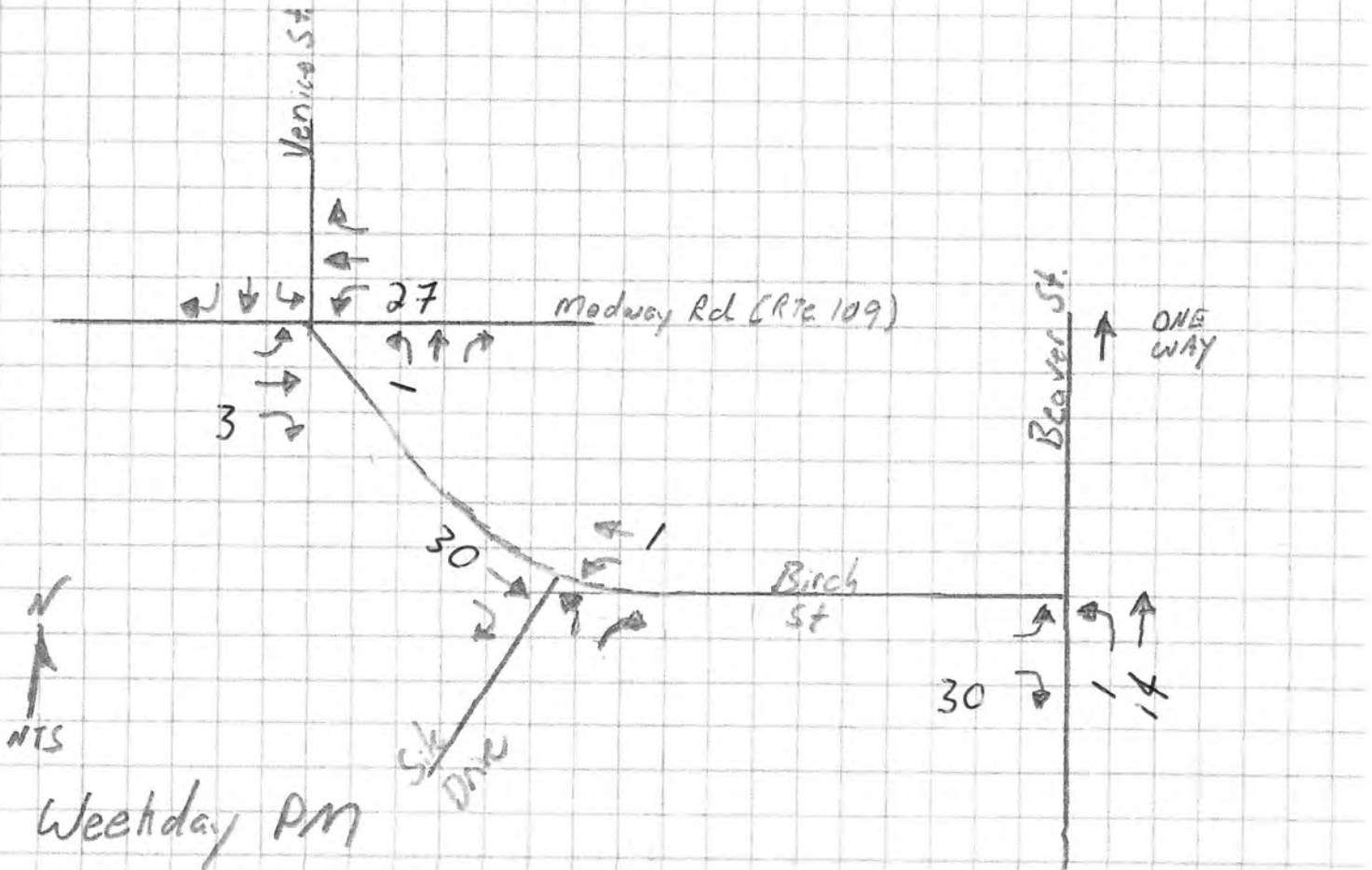
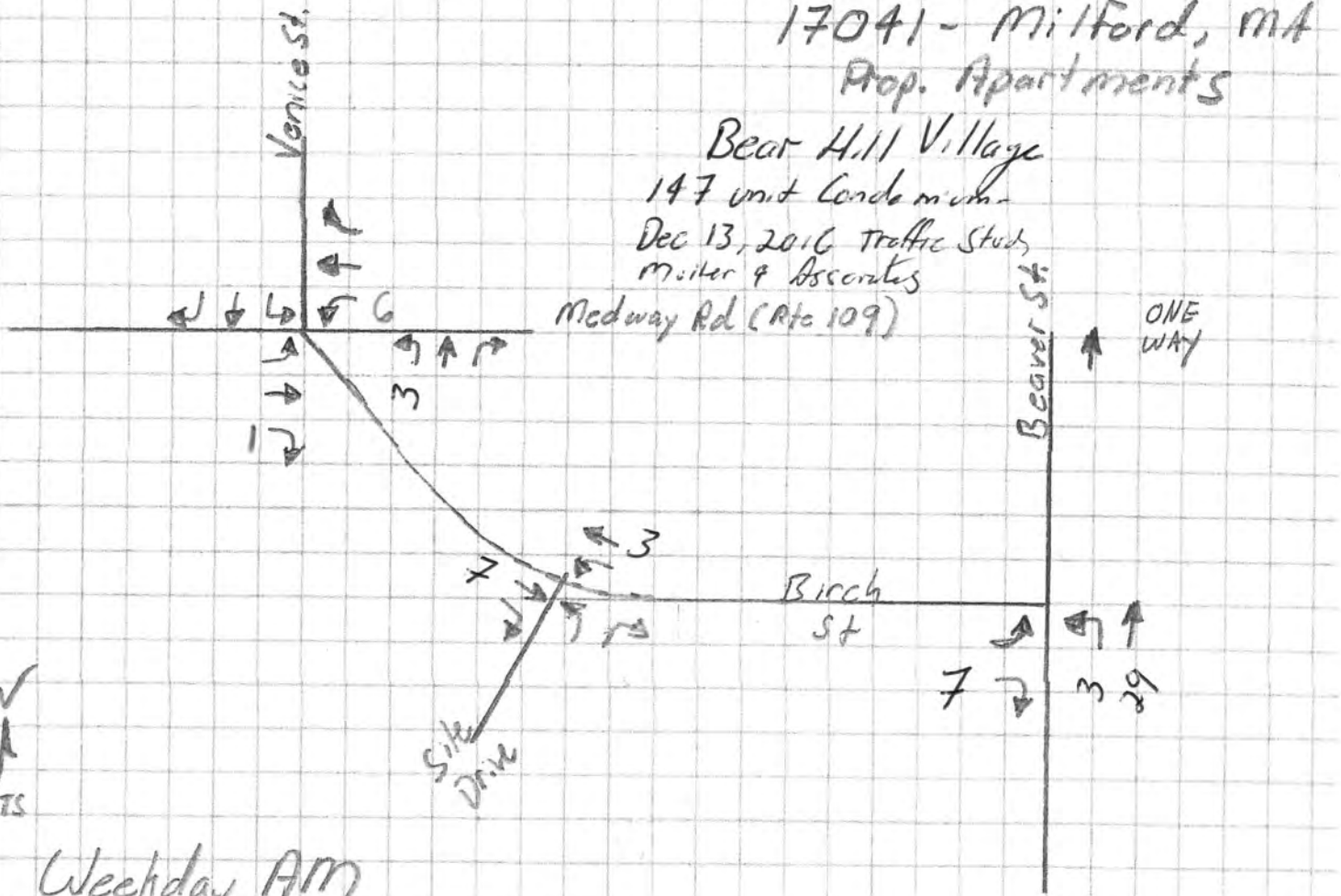
ONE WAY

Birch St

Site Drive

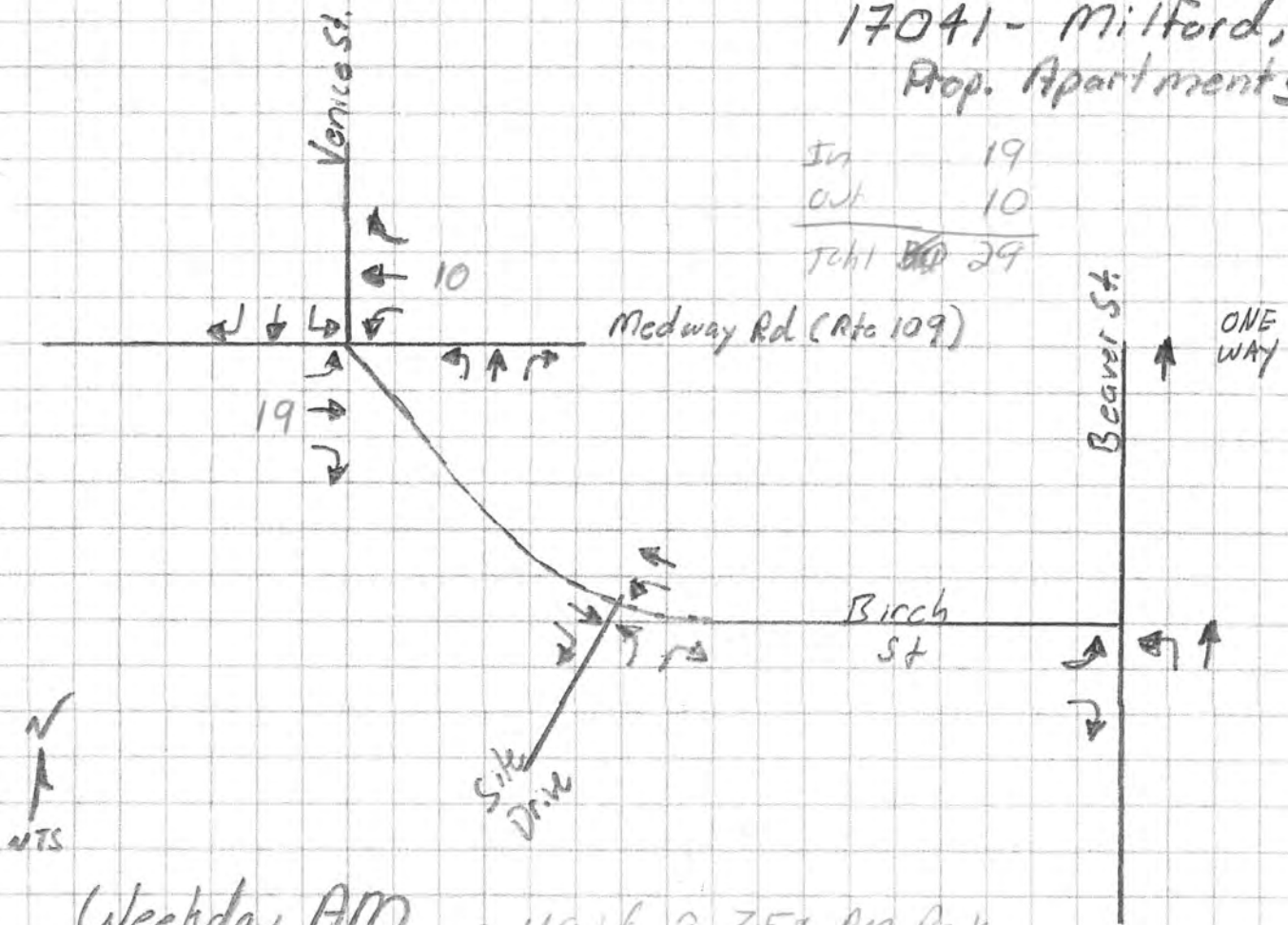


Weekday PM



17041 - Milford, MA Prop. Apartments

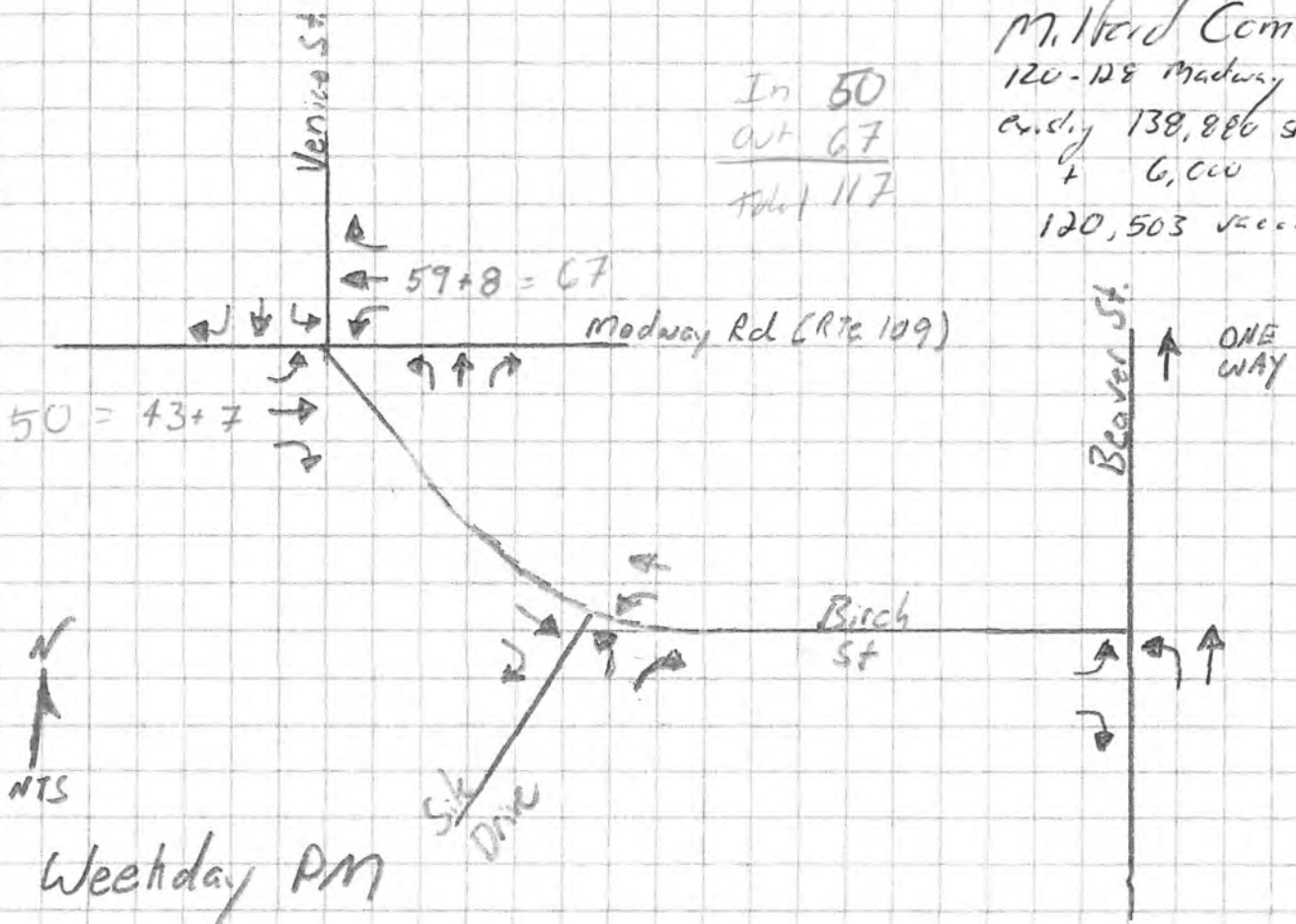
In	19
Out	10
Total	29 29



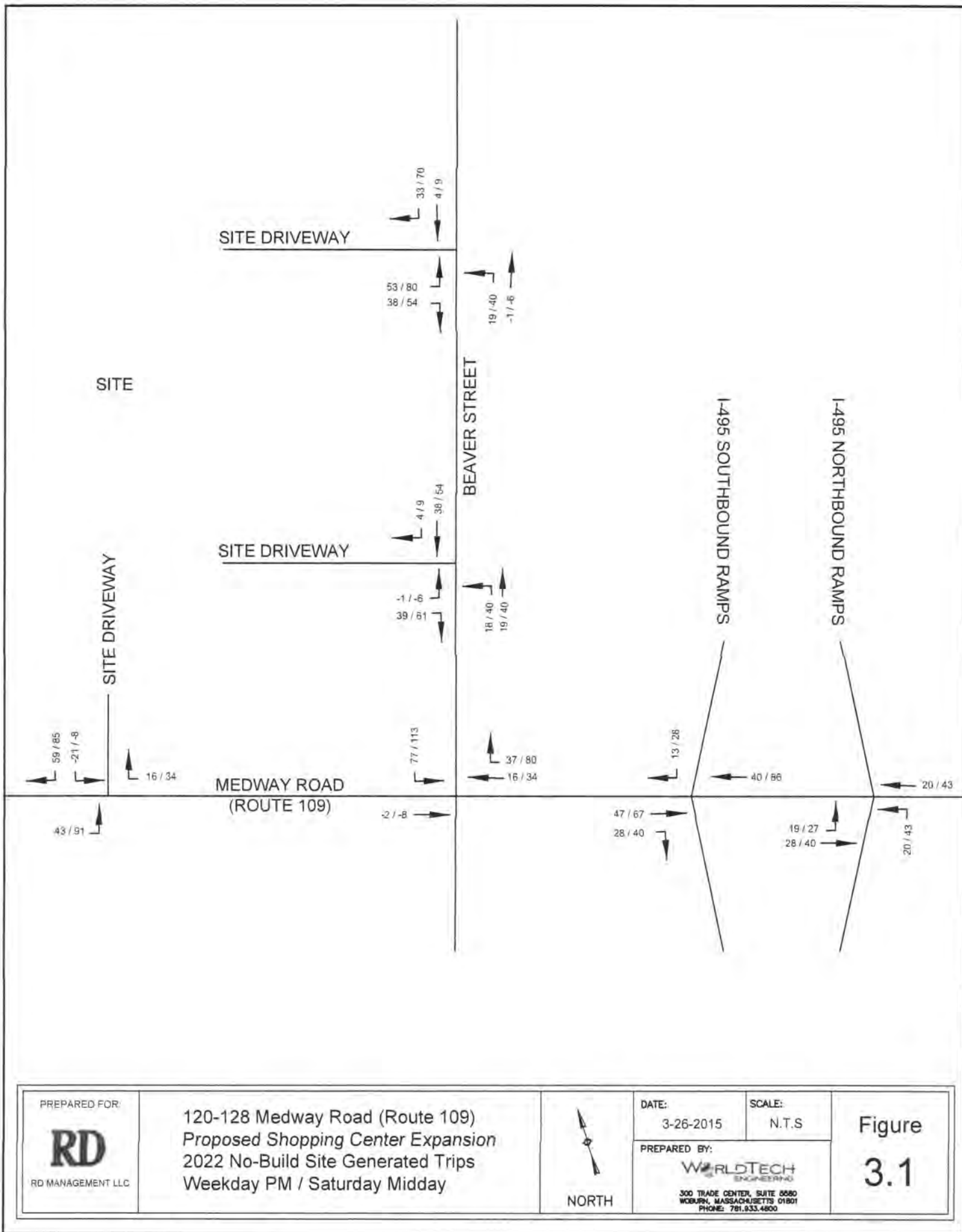
Weekday AM @ 140 kcf ~ 25% PM Peak
62% in / 38% out

Milford Commons
120-128 Medway St
ex. dy 138,886 sf
+ 6,000
120,503 sq. ft.

In	50
Out	67
Total	117



Weekday PM



PREPARED FOR:

RD

RD MANAGEMENT LLC

120-128 Medway Road (Route 109)
 Proposed Shopping Center Expansion
 2022 No-Build Site Generated Trips
 Weekday PM / Saturday MIDDAY



NORTH

DATE:

3-26-2015

SCALE:

N.T.S

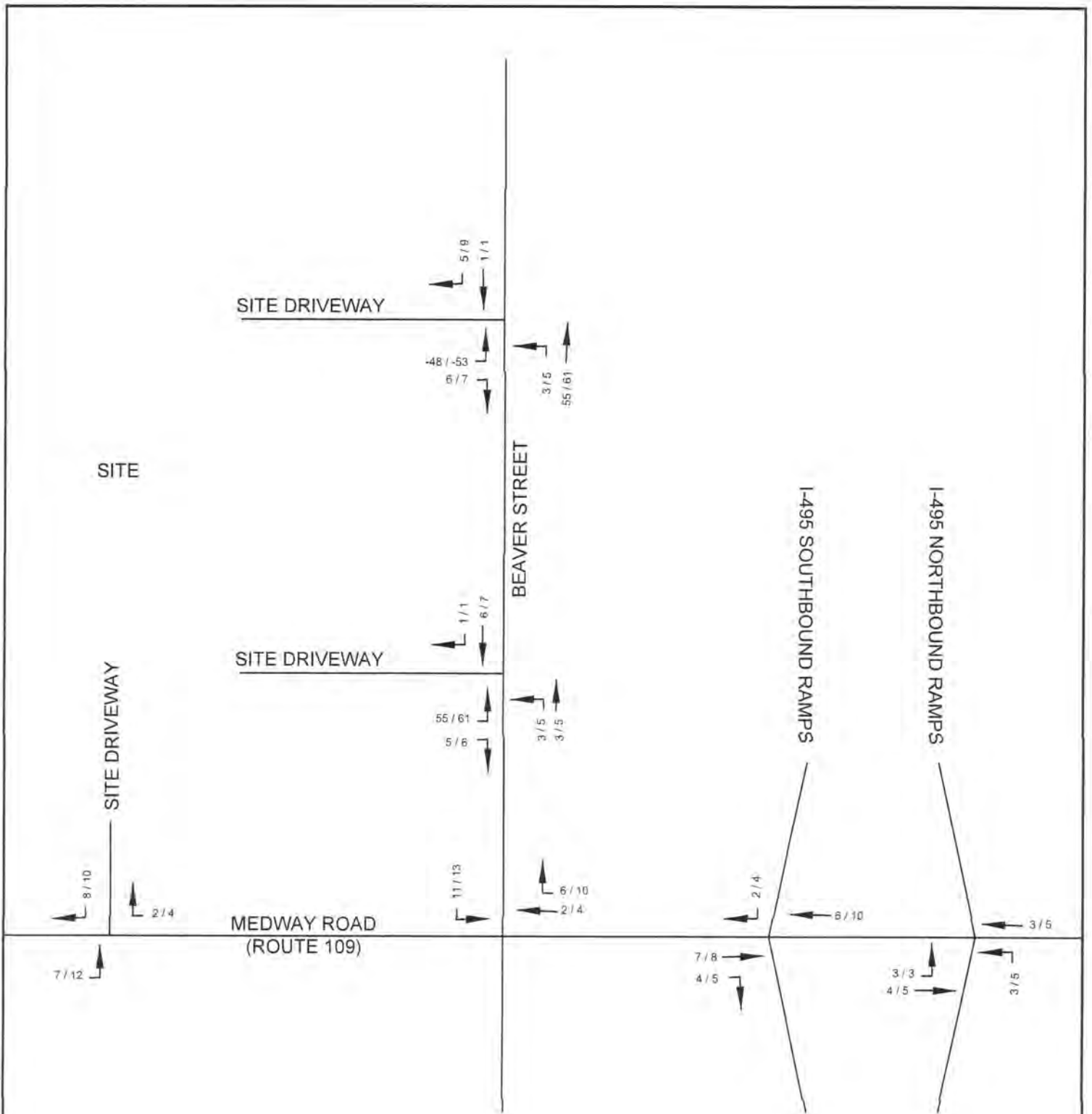
PREPARED BY:




WORLDTECH
 ENGINEERING

300 TRADE CENTER, SUITE 0580
 WOBURN, MASSACHUSETTS 01801
 PHONE: 781.933.4800

Figure

3.1



PREPARED FOR:  RD MANAGEMENT LLC	120-128 Medway Road (Route 109) Proposed Shopping Center Expansion 2022 Build Net Project Generated Trips Weekday PM / Saturday MIDDAY	 NORTH	DATE: 3-26-2015 SCALE: N.T.S. PREPARED BY:  300 TRADE CENTER, SUITE 5580 WOBURN, MASSACHUSETTS 01801 PHONE: 781.933.4800	Figure 3.4
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Crash Rate, Trip Generation, and Distribution Worksheets

INTERSECTION CRASH RATE WORKSHEET

CITY/TOWN : Milford COUNT DATE : November 2016

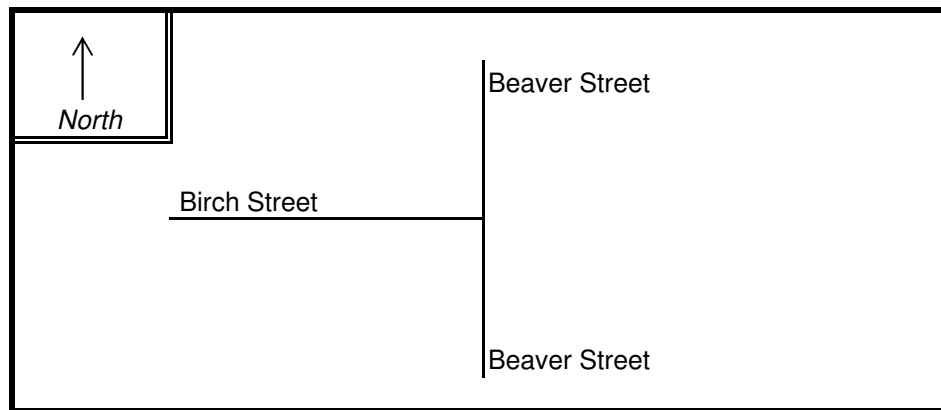
DISTRICT : 3 UNSIGNALIZED : ☒ SIGNALIZED : ☐

~ INTERSECTION DATA ~

MAJOR STREET : Beaver Street

MINOR STREET(S) : Birch Street

**INTERSECTION
DIAGRAM**
(Label Approaches)



PEAK HOUR VOLUMES

APPROACH :	1	2	3	4	5	Total Peak Hourly Approach Volume
DIRECTION :	NB	SB	EB			
PEAK HOURLY VOLUMES (AM/PM) :	577	0	601			1,178

" K " FACTOR :

0.110

INTERSECTION ADT (V) = TOTAL DAILY APPROACH VOLUME :

10,709

TOTAL # OF CRASHES :

2

OF YEARS :

3

AVERAGE # OF CRASHES PER YEAR (A) :

0.67

CRASH RATE CALCULATION :

0.17

$$\text{RATE} = \frac{(A * 1,000,000)}{(V * 365)}$$

Comments : Crash rate less than both the statewide and district-wide averages

Project Title & Date: Proposed Apartment Development - Milford MA, Sept. 2017

INTERSECTION CRASH RATE WORKSHEET

CITY/TOWN : Milford COUNT DATE : August 2017

DISTRICT : 3 UNSIGNALIZED : ☒ SIGNALIZED : ☒

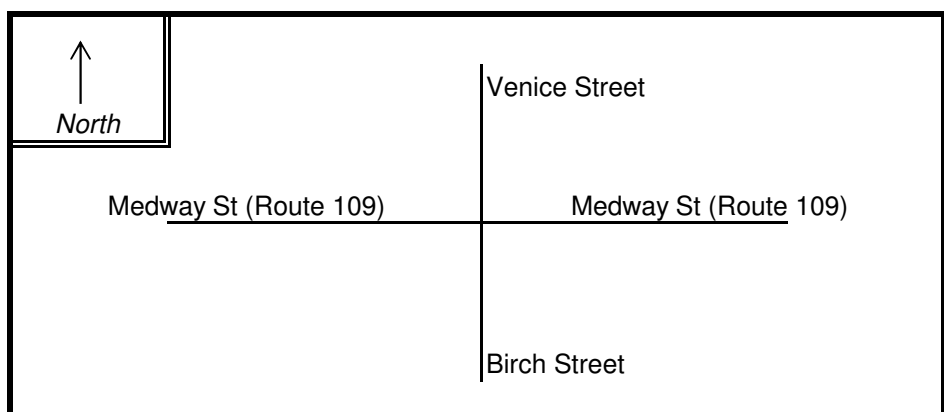
~ INTERSECTION DATA ~

MAJOR STREET : Medway Street (Route 109)

MINOR STREET(S) : Birch Street

Venice Street

**INTERSECTION
DIAGRAM**
(Label Approaches)



PEAK HOUR VOLUMES

APPROACH :	1	2	3	4	5	Total Peak Hourly Approach Volume
DIRECTION :	NB	SB	EB	WB		
PEAK HOURLY VOLUMES (AM/PM) :	146	0	569	704		1,419

" K " FACTOR : 0.115 INTERSECTION ADT (V) = TOTAL DAILY APPROACH VOLUME : 12,339

TOTAL # OF CRASHES : 6 # OF YEARS : 3 AVERAGE # OF CRASHES PER YEAR (A) : 2.00

CRASH RATE CALCULATION :

0.44

$$\text{RATE} = \frac{(A * 1,000,000)}{(V * 365)}$$

Comments : Crash rate less than both the statewide and district-wide averages

Project Title & Date: Proposed Apartment Development - Milford MA, Sept. 2017

Institute of Transportation Engineers (ITE); 9th Edition
Land Use Code (LUC) 220 - Apartment

Average Vehicle Trips Ends vs: Dwelling Units
Independent Variable (X): 159

AVERAGE WEEKDAY DAILY

$$T = 6.06 * (X) + 123.56$$

$$T = 1087.10$$

$$T = 1,090 \quad \text{vehicle trips}$$

with 50% (545 vpd) entering and 50% (545 vpd) exiting.

WEEKDAY MORNING PEAK HOUR OF ADJACENT STREET TRAFFIC

$$T = 0.49 * (X) + 3.73$$

$$T = 81.64$$

$$T = 82 \quad \text{vehicle trips}$$

with 20% (16 vph) entering and 80% (66 vph) exiting.

WEEKDAY EVENING PEAK HOUR OF ADJACENT STREET TRAFFIC

$$T = 0.55 * (X) + 17.65$$

$$T = 105.10$$

$$T = 105 \quad \text{vehicle trips}$$

with 65% (68 vph) entering and 35% (37 vph) exiting.

SATURDAY DAILY

$$T = 7.85 * (X) - 256.19$$

$$T = 991.96$$

$$T = 992 \quad \text{vehicle trips}$$

with 50% (496 vpd) entering and 50% (496 vpd) exiting.

SATURDAY MIDDAY PEAK HOUR OF GENERATOR

$$T = 0.41 * (X) + 19.23$$

$$T = 84.42$$

$$T = 84 \quad \text{vehicle trips}$$

with 50% (42 vph) entering and 50% (42 vph) exiting.

100% #

EXITING				
Rte. 109 (West)	Rte. 109 (East)	Beaver St. (North)	Beaver St. (South)	TOTAL
WB	EB	NB	SB	
75%		5%	20%	100%
	15%	85%		100%
	10%	50%	40%	100%
	15%	85%		100%
	15%	85%		100%
	15%	85%		100%
30%	10%	60%		100%
	15%	85%		100%
	15%	85%		100%
	15%	85%		100%
	5%	15%	80%	100%
80%			20%	100%
	15%	85%		100%
	10%	60%	30%	100%
	15%	85%		100%
	15%	85%		100%
	15%	85%		100%
	5%	25%	70%	100%
	15%	85%		100%
	15%	85%		100%
			100%	100%
			100%	100%
	15%	85%		100%
	15%	85%		100%
	5%	30%	70%	105%
30%	10%	70%		110%
			100%	100%
	15%	85%		100%
	15%	85%		100%
100%				100%
	5%	25%	70%	100%
			100%	100%
			100%	100%
	15%	85%		100%
	15%	85%		100%
			100%	100%
	15%	85%		100%

30.0%	52.3%	0.0%	17.6%	100.0%
Rte. 109 (West)	Rte. 109 (East)	Beaver St. (North)	Beaver St. (South)	TOTAL
EB	WB	X	NB	
30%	55%		15%	70%

30.0%	7.7%	44.8%	17.6%	100.1%
Rte. 109 (West)	Rte. 109 (East)	Beaver St. (North)	Beaver St. (South)	TOTAL
WB	EB	NB	SB	
30%	10%	45%	15%	100%

Capacity Analysis Methodology and Worksheets

General

A primary result of capacity analysis is the assignment of levels of service to traffic facilities under various traffic flow conditions. The capacity analysis methodology is based on the concepts and procedures in the *Highway Capacity Manual* (HCM); Transportation Research Board; Washington, D.C.; 2010. The concept of level of service (LOS) is defined as a qualitative measure describing operational conditions within a traffic stream and their perception by motorists and/or passengers. A level of service definition provides an index to quality of traffic flow in terms of such factors as speed, travel time, freedom to maneuver, traffic interruptions, comfort, convenience, and safety.

Six levels of service are defined for each type of facility. They are given letter designations from A to F, with LOS A representing the best operating conditions and LOS F the worst. Since the level of service of a traffic facility is a function of the traffic flows placed upon it, such a facility may operate at a wide range of levels of service, depending on the time of day, day of week, or period of year. A description of the operating condition under each level of service is provided below:

- LOS A describes conditions with little to no delay to motorists.
- LOS B represents a desirable level with relatively low delay to motorists.
- LOS C describes conditions with average delays to motorists.
- LOS D describes operations where the influence of congestion becomes more noticeable. Delays are still within an acceptable range.
- LOS E represents operating conditions with high delay values. This level is considered by many agencies to be the limit of acceptable delay.
- LOS F is considered to be unacceptable to most drivers with high delay values that often occur, when arrival flow rates exceed the capacity of the intersection.

Unsignalized Intersections

Levels of service for unsignalized intersections are calculated using the operational analysis methodology of the HCM. The procedure accounts for lane configuration on both the minor and major street approaches, conflicting traffic stream volumes, and the type of intersection control (STOP, YIELD, or all-way STOP control). The definition of level of service for unsignalized intersections is a function of average *control* delay. Control delay includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. The level-of-service criteria for unsignalized intersections are shown in Table A-1.

Signalized Intersections

Levels of service for signalized intersections are also calculated using the operational analysis methodology of the HCM. The methodology for signalized intersections assesses the effects of signal type, timing, phasing, and progression; vehicle mix; and geometries on average *control* delay. Control delay includes queue move-up time and stopped delay. Table A-1 summarizes the relationship between level of service and average control delay.

Table A-1
Level-of-Service Criteria for Intersections



















Level of Service	Unsignalized Criteria	Signalized Criteria
	Average Control Delay In Seconds Per Vehicle	Average Control Delay In Seconds Per Vehicle
A	≤ 10	≤ 10
B	10.1 to 15.0	10.1 to 20.0
C	15.1 to 25.0	20.1 to 35.0
D	25.1 to 35.0	35.1 to 55.0
E	35.1 to 50.0	55.1 to 80.0
F	>50	>80

For signalized intersections, this delay criterion may be applied in assigning level of service designations to individual lane groups, to individual intersection approaches, or to the entire intersection. For unsignalized intersections, this delay criterion may be applied in assigning level of service designations to individual lane groups or to individual intersection approaches.

Lanes, Volumes, Timings
3: Birch St/Venice St & Rte 109

Muller & Associates

9/10/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	242	93	462	300	0	47	0	36	2	1	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		150	0		0
Storage Lanes	0		0	1		0	0		1	0		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		679			909			1000			335	
Travel Time (s)		15.4			20.7			22.7			7.6	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	7%	7%	7%	6%	6%	6%	7%	7%	7%	0%	0%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	360	0	497	323	0	0	51	39	0	5	0
Turn Type		NA		Prot	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2						8		8	4		
Detector Phase	2	2		1	6		8	8	8	4	4	
Switch Phase												
Minimum Initial (s)	35.0	35.0		15.0	35.0		6.0	6.0	6.0	6.0	6.0	
Minimum Split (s)	41.0	41.0		20.0	41.0		11.0	11.0	11.0	11.0	11.0	
Total Split (s)	41.0	41.0		24.0	65.0		15.0	15.0	15.0	15.0	15.0	
Total Split (%)	51.3%	51.3%		30.0%	81.3%		18.8%	18.8%	18.8%	18.8%	18.8%	
Yellow Time (s)	4.0	4.0		3.0	4.0		3.0	3.0	3.0	3.0	3.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)		0.0		0.0	0.0			0.0	0.0		0.0	
Total Lost Time (s)		6.0		5.0	6.0			5.0	5.0		5.0	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?												
Recall Mode	Max	Max		Max	Max		None	None	None	None	None	
v/c Ratio		0.23		1.16	0.23			0.36	0.15		0.03	
Control Delay		10.3		126.1	3.3			39.7	1.2		27.0	
Queue Delay		0.0		0.0	0.0			0.0	0.0		0.0	
Total Delay		10.3		126.1	3.3			39.7	1.2		27.0	
Queue Length 50th (ft)		40		~300	36			24	0		1	
Queue Length 95th (ft)		68		#493	66			57	0		11	
Internal Link Dist (ft)		599			829			920			255	
Turn Bay Length (ft)									150			
Base Capacity (vph)		1545		428	1432			177	294		208	
Starvation Cap Reductn		0		0	0			0	0		0	
Spillback Cap Reductn		0		0	0			0	0		0	
Storage Cap Reductn		0		0	0			0	0		0	
Reduced v/c Ratio		0.23		1.16	0.23			0.29	0.13		0.02	

Intersection Summary

Area Type: Other

Cycle Length: 80

Actuated Cycle Length: 76

Natural Cycle: 80

Control Type: Semi Act-Uncoord






~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.



















Queue shown is maximum after two cycles.

Splits and Phases: 3: Birch St/Venice St & Rte 109

 <p>ø1</p>	 <p>ø2</p>	 <p>ø4</p>
24 s	41 s	15 s
 <p>ø6</p>		 <p>ø8</p>
65 s		15 s









HCM 2010 Signalized Intersection Summary
3: Birch St/Venice St & Rte 109

Muller & Associates
9/10/2017

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	242	93	462	300	0	47	0	36	2	1	2
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1776	1900	1792	1792	1900	1900	1776	1776	1900	1900	1900
Adj Flow Rate, veh/h	0	260	100	497	323	0	51	0	39	2	1	2
Adj No. of Lanes	0	2	0	1	1	0	0	1	1	0	1	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	7	7	7	6	6	6	7	7	7	0	0	0
Cap, veh/h	0	1119	419	431	1407	0	199	0	104	92	43	45
Arrive On Green	0.00	0.47	0.47	0.25	0.78	0.00	0.07	0.00	0.07	0.07	0.07	0.07
Sat Flow, veh/h	0	2491	901	1707	1792	0	1494	0	1509	358	631	659
Grp Volume(v), veh/h	0	181	179	497	323	0	51	0	39	5	0	0
Grp Sat Flow(s),veh/h/ln	0	1687	1617	1707	1792	0	1494	0	1509	1648	0	0
Q Serve(g_s), s	0.0	4.8	5.0	19.0	3.6	0.0	0.0	0.0	1.9	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.0	4.8	5.0	19.0	3.6	0.0	2.2	0.0	1.9	2.2	0.0	0.0
Prop In Lane	0.00		0.56	1.00		0.00	1.00		1.00	0.40		0.40
Lane Grp Cap(c), veh/h	0	785	753	431	1407	0	199	0	104	181	0	0
V/C Ratio(X)	0.00	0.23	0.24	1.15	0.23	0.00	0.26	0.00	0.38	0.03	0.00	0.00
Avail Cap(c_a), veh/h	0	785	753	431	1407	0	285	0	201	281	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	1.00	1.00	0.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	12.0	12.1	28.1	2.1	0.0	33.6	0.0	33.5	32.7	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.7	0.7	91.9	0.4	0.0	0.7	0.0	2.2	0.1	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	2.4	2.4	19.9	1.9	0.0	1.1	0.0	0.8	0.1	0.0	0.0
LnGrp Delay(d),s/veh	0.0	12.7	12.8	120.0	2.5	0.0	34.3	0.0	35.7	32.7	0.0	0.0
LnGrp LOS		B	B	F	A		C		D	C		
Approach Vol, veh/h		360			820			90			5	
Approach Delay, s/veh		12.8			73.7			34.9			32.7	
Approach LOS		B			E			C			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	24.0	41.0		10.2		65.0		10.2				
Change Period (Y+Rc), s	5.0	6.0		5.0		6.0		5.0				
Max Green Setting (Gmax), s	19.0	35.0		10.0		59.0		10.0				
Max Q Clear Time (g_c+l1), s	21.0	7.0		4.2		5.6		4.2				
Green Ext Time (p_c), s	0.0	2.1		0.1		2.1		0.1				
Intersection Summary												
HCM 2010 Ctrl Delay				53.6								
HCM 2010 LOS				D								

Lanes, Volumes, Timings
6: Beaver St & Birch St

Muller & Associates
9/10/2017

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	69	578	100	289	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	150	0			0
Storage Lanes	1	0	0			0
Taper Length (ft)	25		25			
Link Speed (mph)	30			30	30	
Link Distance (ft)	882			499	690	
Travel Time (s)	20.0			11.3	15.7	
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles (%)	1%	1%	0%	0%	0%	0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	752	0	0	452	0	0
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type: Other









Control Type: Unsignalized

HCM Unsignalized Intersection Capacity Analysis

6: Beaver St & Birch St

Muller & Associates



















9/10/2017

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	69	578	100	289	0	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Hourly flow rate (vph)	80	672	116	336	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	569	0	0			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	569	0	0			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	82	38	93			
cM capacity (veh/h)	451	1088	1636			
Direction, Lane #	EB 1	NB 1				
Volume Total	752	452				
Volume Left	80	116				
Volume Right	672	0				
cSH	946	1636				
Volume to Capacity	0.80	0.07				
Queue Length 95th (ft)	215	6				
Control Delay (s)	21.8	2.4				
Lane LOS	C	A				
Approach Delay (s)	21.8	2.4				
Approach LOS	C					
Intersection Summary						
Average Delay		14.5				
Intersection Capacity Utilization		66.9%		ICU Level of Service		C
Analysis Period (min)		15				

Lanes, Volumes, Timings
3: Birch St/Venice St & Rte 109

Muller & Associates

9/10/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	3	400	166	318	384	2	61	0	85	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		150	0		0
Storage Lanes	0		0	1		0	0		1	0		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		679			909			1000			335	
Travel Time (s)		15.4			20.7			22.7			7.6	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	2%	2%	2%	4%	4%	4%	1%	1%	1%	0%	0%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	611	0	342	415	0	0	66	91	0	0	0
Turn Type	Perm	NA		Prot	NA		Perm	NA	Perm			
Protected Phases		2		1	6			8			4	
Permitted Phases	2						8		8	4		
Detector Phase	2	2		1	6		8	8	8	4	4	
Switch Phase												
Minimum Initial (s)	35.0	35.0		15.0	35.0		6.0	6.0	6.0	6.0	6.0	
Minimum Split (s)	41.0	41.0		20.0	41.0		11.0	11.0	11.0	11.0	11.0	
Total Split (s)	41.0	41.0		24.0	65.0		15.0	15.0	15.0	15.0	15.0	
Total Split (%)	51.3%	51.3%		30.0%	81.3%		18.8%	18.8%	18.8%	18.8%	18.8%	
Yellow Time (s)	4.0	4.0		3.0	4.0		3.0	3.0	3.0	3.0	3.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)		0.0		0.0	0.0			0.0	0.0		0.0	
Total Lost Time (s)		6.0		5.0	6.0			5.0	5.0		5.0	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?												
Recall Mode	Max	Max		Max	Max		None	None	None	None	None	
v/c Ratio		0.40		0.79	0.29			0.42	0.33			
Control Delay		12.8		43.0	3.7			41.2	9.0			
Queue Delay		0.0		0.0	0.0			0.0	0.0			
Total Delay		12.8		43.0	3.7			41.2	9.0			
Queue Length 50th (ft)		85		160	52			31	0			
Queue Length 95th (ft)		129		#301	88			69	31			
Internal Link Dist (ft)		599			829			920			255	
Turn Bay Length (ft)									150			
Base Capacity (vph)		1542		435	1454			188	305			
Starvation Cap Reductn		0		0	0			0	0			
Spillback Cap Reductn		0		0	0			0	0			
Storage Cap Reductn		0		0	0			0	0			
Reduced v/c Ratio		0.40		0.79	0.29			0.35	0.30			

Intersection Summary

Area Type: Other

Cycle Length: 80

Actuated Cycle Length: 76.3

Natural Cycle: 75

Lanes, Volumes, Timings
 3: Birch St/Venice St & Rte 109

Muller & Associates






9/10/2017

Control Type: Semi Act-Uncoord

95th percentile volume exceeds capacity, queue may be longer.



















Queue shown is maximum after two cycles.

Splits and Phases: 3: Birch St/Venice St & Rte 109

 ø1	 ø2	 ø4
24 s	41 s	15 s
 ø6		 ø8
65 s		15 s









HCM 2010 Signalized Intersection Summary
3: Birch St/Venice St & Rte 109

Muller & Associates
9/10/2017

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	3	400	166	318	384	2	61	0	85	0	0	0
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1900	1827	1827	1900	1900	1881	1881	1900	1900	1900
Adj Flow Rate, veh/h	3	430	178	342	413	2	66	0	91	0	0	0
Adj No. of Lanes	0	2	0	1	1	0	0	1	1	0	1	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	4	4	4	1	1	1	0	0	0
Cap, veh/h	49	1104	450	434	1408	7	209	0	129	0	153	0
Arrive On Green	0.46	0.46	0.46	0.25	0.77	0.77	0.08	0.00	0.08	0.00	0.00	0.00
Sat Flow, veh/h	3	2402	978	1740	1817	9	1426	0	1599	0	1900	0
Grp Volume(v), veh/h	334	0	277	342	0	415	66	0	91	0	0	0
Grp Sat Flow(s),veh/h/ln	1860	0	1522	1740	0	1825	1426	0	1599	0	1900	0
Q Serve(g_s), s	0.0	0.0	9.1	14.0	0.0	5.0	3.4	0.0	4.2	0.0	0.0	0.0
Cycle Q Clear(g_c), s	9.0	0.0	9.1	14.0	0.0	5.0	3.4	0.0	4.2	0.0	0.0	0.0
Prop In Lane	0.01		0.64	1.00		0.00	1.00		1.00	0.00		0.00
Lane Grp Cap(c), veh/h	903	0	700	434	0	1415	209	0	129	0	153	0
V/C Ratio(X)	0.37	0.00	0.40	0.79	0.00	0.29	0.32	0.00	0.71	0.00	0.00	0.00
Avail Cap(c_a), veh/h	903	0	700	434	0	1415	282	0	210	0	250	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	0.00	0.00	0.00
Uniform Delay (d), s/veh	13.5	0.0	13.6	26.7	0.0	2.5	33.7	0.0	34.1	0.0	0.0	0.0
Incr Delay (d2), s/veh	1.2	0.0	1.7	13.5	0.0	0.5	0.9	0.0	6.9	0.0	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.8	0.0	4.2	8.3	0.0	2.6	1.4	0.0	2.1	0.0	0.0	0.0
LnGrp Delay(d),s/veh	14.7	0.0	15.3	40.2	0.0	3.0	34.6	0.0	41.0	0.0	0.0	0.0
LnGrp LOS	B		B	D		A	C		D			
Approach Vol, veh/h		611			757			157			0	
Approach Delay, s/veh		15.0			19.8			38.3			0.0	
Approach LOS		B			B			D				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	24.0	41.0		11.1		65.0		11.1				
Change Period (Y+Rc), s	5.0	6.0		5.0		6.0		5.0				
Max Green Setting (Gmax), s	19.0	35.0		10.0		59.0		10.0				
Max Q Clear Time (g_c+I1), s	16.0	11.1		0.0		7.0		6.2				
Green Ext Time (p_c), s	0.3	3.3		0.0		3.4		0.1				
Intersection Summary												
HCM 2010 Ctrl Delay				19.8								
HCM 2010 LOS				B								

Lanes, Volumes, Timings
6: Beaver St & Birch St

Muller & Associates
9/10/2017

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	88	519	77	506	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	150	0			0
Storage Lanes	1	0	0			0
Taper Length (ft)	25		25			
Link Speed (mph)	30			30	30	
Link Distance (ft)	882			499	690	
Travel Time (s)	20.0			11.3	15.7	
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83
Heavy Vehicles (%)	1%	1%	1%	1%	0%	0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	731	0	0	703	0	0
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type: Other









Control Type: Unsignalized

HCM Unsignalized Intersection Capacity Analysis

6: Beaver St & Birch St

Muller & Associates



















9/10/2017

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	88	519	77	506	0	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83
Hourly flow rate (vph)	106	625	93	610	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	795	0	0			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	795	0	0			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	69	43	94			
cM capacity (veh/h)	337	1088	1630			
Direction, Lane #	EB 1	NB 1				
Volume Total	731	702				
Volume Left	106	93				
Volume Right	625	0				
cSH	823	1630				
Volume to Capacity	0.89	0.06				
Queue Length 95th (ft)	295	5				
Control Delay (s)	33.1	1.5				
Lane LOS	D	A				
Approach Delay (s)	33.1	1.5				
Approach LOS	D					
Intersection Summary						
Average Delay		17.6				
Intersection Capacity Utilization		74.5%		ICU Level of Service		D
Analysis Period (min)		15				

Lanes, Volumes, Timings
3: Birch St/Venice St & Rte 109

Muller & Associates

9/10/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	278	103	506	332	0	55	0	39	2	1	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		150	0		0
Storage Lanes	0		0	1		0	0		1	0		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		679			909			1000			335	
Travel Time (s)		15.4			20.7			22.7			7.6	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	7%	7%	7%	6%	6%	6%	7%	7%	7%	0%	0%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	410	0	544	357	0	0	59	42	0	5	0
Turn Type		NA		Prot	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2						8		8	4		
Detector Phase	2	2		1	6		8	8	8	4	4	
Switch Phase												
Minimum Initial (s)	35.0	35.0		15.0	35.0		6.0	6.0	6.0	6.0	6.0	
Minimum Split (s)	41.0	41.0		20.0	41.0		11.0	11.0	11.0	11.0	11.0	
Total Split (s)	41.0	41.0		24.0	65.0		15.0	15.0	15.0	15.0	15.0	
Total Split (%)	51.3%	51.3%		30.0%	81.3%		18.8%	18.8%	18.8%	18.8%	18.8%	
Yellow Time (s)	4.0	4.0		3.0	4.0		3.0	3.0	3.0	3.0	3.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)		0.0		0.0	0.0			0.0	0.0		0.0	
Total Lost Time (s)		6.0		5.0	6.0			5.0	5.0		5.0	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?												
Recall Mode	Max	Max		Max	Max		None	None	None	None	None	
v/c Ratio		0.27		1.27	0.25			0.40	0.16		0.03	
Control Delay		11.1		169.8	3.5			41.2	1.3		26.8	
Queue Delay		0.0		0.0	0.0			0.0	0.0		0.0	
Total Delay		11.1		169.8	3.5			41.2	1.3		26.8	
Queue Length 50th (ft)		50		~352	43			27	0		1	
Queue Length 95th (ft)		81		#548	74			64	0		11	
Internal Link Dist (ft)		599			829			920			255	
Turn Bay Length (ft)									150			
Base Capacity (vph)		1541		427	1429			176	294		208	
Starvation Cap Reductn		0		0	0			0	0		0	
Spillback Cap Reductn		0		0	0			0	0		0	
Storage Cap Reductn		0		0	0			0	0		0	
Reduced v/c Ratio		0.27		1.27	0.25			0.34	0.14		0.02	

Intersection Summary

Area Type: Other

Cycle Length: 80

Actuated Cycle Length: 76.2

Natural Cycle: 80

Control Type: Semi Act-Uncoord






~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.



















Queue shown is maximum after two cycles.

Splits and Phases: 3: Birch St/Venice St & Rte 109

 Ø1	 Ø2	 Ø4
24 s	41 s	15 s
 Ø6		 Ø8
65 s		15 s









HCM 2010 Signalized Intersection Summary
3: Birch St/Venice St & Rte 109

Muller & Associates
9/10/2017

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	278	103	506	332	0	55	0	39	2	1	2
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1776	1900	1792	1792	1900	1900	1776	1776	1900	1900	1900
Adj Flow Rate, veh/h	0	299	111	544	357	0	59	0	42	2	1	2
Adj No. of Lanes	0	2	0	1	1	0	0	1	1	0	1	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	7	7	7	6	6	6	7	7	7	0	0	0
Cap, veh/h	0	1126	410	430	1404	0	203	0	107	90	43	44
Arrive On Green	0.00	0.46	0.46	0.25	0.78	0.00	0.07	0.00	0.07	0.07	0.07	0.07
Sat Flow, veh/h	0	2514	882	1707	1792	0	1507	0	1509	328	609	625
Grp Volume(v), veh/h	0	206	204	544	357	0	59	0	42	5	0	0
Grp Sat Flow(s),veh/h/ln	0	1687	1620	1707	1792	0	1507	0	1509	1563	0	0
Q Serve(g_s), s	0.0	5.6	5.8	19.0	4.1	0.0	0.0	0.0	2.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.0	5.6	5.8	19.0	4.1	0.0	2.5	0.0	2.0	2.5	0.0	0.0
Prop In Lane	0.00		0.54	1.00		0.00	1.00		1.00	0.40		0.40
Lane Grp Cap(c), veh/h	0	784	753	430	1404	0	203	0	107	178	0	0
V/C Ratio(X)	0.00	0.26	0.27	1.26	0.25	0.00	0.29	0.00	0.39	0.03	0.00	0.00
Avail Cap(c_a), veh/h	0	784	753	430	1404	0	285	0	200	274	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	1.00	1.00	0.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	12.3	12.4	28.2	2.2	0.0	33.7	0.0	33.4	32.6	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.8	0.9	136.1	0.4	0.0	0.8	0.0	2.3	0.1	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	2.8	2.8	25.1	2.2	0.0	1.2	0.0	0.9	0.1	0.0	0.0
LnGrp Delay(d),s/veh	0.0	13.1	13.2	164.3	2.7	0.0	34.5	0.0	35.8	32.7	0.0	0.0
LnGrp LOS		B	B	F	A		C		D	C		
Approach Vol, veh/h		410			901			101			5	
Approach Delay, s/veh		13.2			100.3			35.0			32.7	
Approach LOS		B			F			D			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	24.0	41.0		10.3		65.0		10.3				
Change Period (Y+Rc), s	5.0	6.0		5.0		6.0		5.0				
Max Green Setting (Gmax), s	19.0	35.0		10.0		59.0		10.0				
Max Q Clear Time (g_c+I1), s	21.0	7.8		4.5		6.1		4.5				
Green Ext Time (p_c), s	0.0	2.4		0.1		2.4		0.1				
Intersection Summary												
HCM 2010 Ctrl Delay				70.2								
HCM 2010 LOS				E								

Lanes, Volumes, Timings
6: Beaver St & Birch St

Muller & Associates
9/10/2017

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	74	634	112	359	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	150	0			0
Storage Lanes	1	0	0			0
Taper Length (ft)	25		25			
Link Speed (mph)	30			30	30	
Link Distance (ft)	882			499	690	
Travel Time (s)	20.0			11.3	15.7	
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles (%)	1%	1%	0%	0%	0%	0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	823	0	0	547	0	0
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type: Other









Control Type: Unsignalized

HCM Unsignalized Intersection Capacity Analysis

6: Beaver St & Birch St

Muller & Associates



















9/10/2017

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	74	634	112	359	0	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Hourly flow rate (vph)	86	737	130	417	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	678	0	0			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	678	0	0			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	78	32	92			
cM capacity (veh/h)	386	1088	1636			
Direction, Lane #	EB 1	NB 1				
Volume Total	823	548				
Volume Left	86	130				
Volume Right	737	0				
cSH	914	1636				
Volume to Capacity	0.90	0.08				
Queue Length 95th (ft)	320	6				
Control Delay (s)	32.4	2.4				
Lane LOS	D	A				
Approach Delay (s)	32.4	2.4				
Approach LOS	D					
Intersection Summary						
Average Delay		20.4				
Intersection Capacity Utilization		75.0%		ICU Level of Service		D
Analysis Period (min)		15				

Lanes, Volumes, Timings
3: Birch St/Venice St & Rte 109

Muller & Associates

9/10/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	3	479	184	387	479	2	68	0	91	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		150	0		0
Storage Lanes	0		0	1		0	0		1	0		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		679			909			1000			335	
Travel Time (s)		15.4			20.7			22.7			7.6	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	2%	2%	2%	4%	4%	4%	1%	1%	1%	0%	0%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	716	0	416	517	0	0	73	98	0	0	0
Turn Type	Perm	NA		Prot	NA		Perm	NA	Perm			
Protected Phases		2		1	6			8			4	
Permitted Phases	2						8		8	4		
Detector Phase	2	2		1	6		8	8	8	4	4	
Switch Phase												
Minimum Initial (s)	35.0	35.0		15.0	35.0		6.0	6.0	6.0	6.0	6.0	
Minimum Split (s)	41.0	41.0		20.0	41.0		11.0	11.0	11.0	11.0	11.0	
Total Split (s)	41.0	41.0		24.0	65.0		15.0	15.0	15.0	15.0	15.0	
Total Split (%)	51.3%	51.3%		30.0%	81.3%		18.8%	18.8%	18.8%	18.8%	18.8%	
Yellow Time (s)	4.0	4.0		3.0	4.0		3.0	3.0	3.0	3.0	3.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)		0.0		0.0	0.0			0.0	0.0		0.0	
Total Lost Time (s)		6.0		5.0	6.0			5.0	5.0		5.0	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?												
Recall Mode	Max	Max		Max	Max		None	None	None	None	None	
v/c Ratio		0.47		0.96	0.36			0.46	0.36			
Control Delay		14.2		66.3	4.1			42.5	10.1			
Queue Delay		0.0		0.0	0.0			0.0	0.0			
Total Delay		14.2		66.3	4.1			42.5	10.1			
Queue Length 50th (ft)		110		~207	72			34	0			
Queue Length 95th (ft)		160		#392	116			75	36			
Internal Link Dist (ft)		599			829			920			255	
Turn Bay Length (ft)									150			
Base Capacity (vph)		1538		434	1452			187	305			
Starvation Cap Reductn		0		0	0			0	0			
Spillback Cap Reductn		0		0	0			0	0			
Storage Cap Reductn		0		0	0			0	0			
Reduced v/c Ratio		0.47		0.96	0.36			0.39	0.32			

Intersection Summary

Area Type: Other

Cycle Length: 80

Actuated Cycle Length: 76.4

Natural Cycle: 75

Control Type: Semi Act-Uncoord






~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.



















Queue shown is maximum after two cycles.

Splits and Phases: 3: Birch St/Venice St & Rte 109

 ø1	 ø2	 ø4
24 s	41 s	15 s
 ø6		 ø8
65 s		15 s









HCM 2010 Signalized Intersection Summary
3: Birch St/Venice St & Rte 109

Muller & Associates
9/10/2017

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	3	479	184	387	479	2	68	0	91	0	0	0
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1900	1827	1827	1900	1900	1881	1881	1900	1900	1900
Adj Flow Rate, veh/h	3	515	198	416	515	2	73	0	98	0	0	0
Adj No. of Lanes	0	2	0	1	1	0	0	1	1	0	1	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	4	4	4	1	1	1	0	0	0
Cap, veh/h	49	1122	427	432	1402	5	216	0	137	0	162	0
Arrive On Green	0.46	0.46	0.46	0.25	0.77	0.77	0.09	0.00	0.09	0.00	0.00	0.00
Sat Flow, veh/h	2	2453	934	1740	1819	7	1426	0	1599	0	1900	0
Grp Volume(v), veh/h	392	0	324	416	0	517	73	0	98	0	0	0
Grp Sat Flow(s),veh/h/ln	1860	0	1530	1740	0	1826	1426	0	1599	0	1900	0
Q Serve(g_s), s	0.0	0.0	11.2	18.1	0.0	6.9	3.8	0.0	4.6	0.0	0.0	0.0
Cycle Q Clear(g_c), s	11.1	0.0	11.2	18.1	0.0	6.9	3.8	0.0	4.6	0.0	0.0	0.0
Prop In Lane	0.01		0.61	1.00		0.00	1.00		1.00	0.00		0.00
Lane Grp Cap(c), veh/h	898	0	700	432	0	1407	216	0	137	0	162	0
V/C Ratio(X)	0.44	0.00	0.46	0.96	0.00	0.37	0.34	0.00	0.72	0.00	0.00	0.00
Avail Cap(c_a), veh/h	898	0	700	432	0	1407	280	0	209	0	248	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	0.00	0.00	0.00
Uniform Delay (d), s/veh	14.3	0.0	14.3	28.4	0.0	2.8	33.7	0.0	34.1	0.0	0.0	0.0
Incr Delay (d2), s/veh	1.5	0.0	2.2	35.0	0.0	0.7	0.9	0.0	6.9	0.0	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.0	0.0	5.1	12.9	0.0	3.7	1.5	0.0	2.3	0.0	0.0	0.0
LnGrp Delay(d),s/veh	15.8	0.0	16.5	63.4	0.0	3.5	34.7	0.0	41.0	0.0	0.0	0.0
LnGrp LOS	B		B	E		A	C		D			
Approach Vol, veh/h		716			933			171			0	
Approach Delay, s/veh		16.1			30.2			38.3			0.0	
Approach LOS		B			C			D				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	24.0	41.0		11.5		65.0		11.5				
Change Period (Y+Rc), s	5.0	6.0		5.0		6.0		5.0				
Max Green Setting (Gmax), s	19.0	35.0		10.0		59.0		10.0				
Max Q Clear Time (g_c+l1), s	20.1	13.2		0.0		8.9		6.6				
Green Ext Time (p_c), s	0.0	4.1		0.0		4.4		0.1				
Intersection Summary												
HCM 2010 Ctrl Delay			25.4									
HCM 2010 LOS			C									

Lanes, Volumes, Timings
6: Beaver St & Birch St

Muller & Associates
9/10/2017

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	94	608	86	566	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	150	0			0
Storage Lanes	1	0	0			0
Taper Length (ft)	25		25			
Link Speed (mph)	30			30	30	
Link Distance (ft)	882			499	690	
Travel Time (s)	20.0			11.3	15.7	
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83
Heavy Vehicles (%)	1%	1%	1%	1%	0%	0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	846	0	0	786	0	0
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type: Other









Control Type: Unsignalized

HCM Unsignalized Intersection Capacity Analysis

6: Beaver St & Birch St



















Muller & Associates

9/10/2017

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	94	608	86	566	0	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83
Hourly flow rate (vph)	113	733	104	682	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	889	0	0			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	889	0	0			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	62	33	94			
cM capacity (veh/h)	295	1088	1630			
Direction, Lane #	EB 1	NB 1				
Volume Total	846	786				
Volume Left	113	104				
Volume Right	733	0				
cSH	800	1630				
Volume to Capacity	1.06	0.06				
Queue Length 95th (ft)	523	5				
Control Delay (s)	70.4	1.6				
Lane LOS	F	A				
Approach Delay (s)	70.4	1.6				
Approach LOS	F					
Intersection Summary						
Average Delay		37.3				
Intersection Capacity Utilization		84.0%		ICU Level of Service	E	
Analysis Period (min)		15				

Lanes, Volumes, Timings
3: Birch St/Venice St & Rte 109

Muller & Associates
9/10/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	278	108	515	332	0	75	0	45	2	1	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		150	0		0
Storage Lanes	0		0	1		0	0		1	0		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		679			909			1000			335	
Travel Time (s)		15.4			20.7			22.7			7.6	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	7%	7%	7%	6%	6%	6%	7%	7%	7%	0%	0%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	415	0	554	357	0	0	81	48	0	5	0
Turn Type		NA		Prot	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2						8		8	4		
Detector Phase	2	2		1	6		8	8	8	4	4	
Switch Phase												
Minimum Initial (s)	35.0	35.0		15.0	35.0		6.0	6.0	6.0	6.0	6.0	
Minimum Split (s)	41.0	41.0		20.0	41.0		11.0	11.0	11.0	11.0	11.0	
Total Split (s)	41.0	41.0		24.0	65.0		15.0	15.0	15.0	15.0	15.0	
Total Split (%)	51.3%	51.3%		30.0%	81.3%		18.8%	18.8%	18.8%	18.8%	18.8%	
Yellow Time (s)	4.0	4.0		3.0	4.0		3.0	3.0	3.0	3.0	3.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)		0.0		0.0	0.0			0.0	0.0		0.0	
Total Lost Time (s)		6.0		5.0	6.0			5.0	5.0		5.0	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?												
Recall Mode	Max	Max		Max	Max		None	None	None	None	None	
v/c Ratio		0.27		1.31	0.25			0.53	0.18		0.03	
Control Delay		11.1		182.4	3.6			46.2	1.4		26.8	
Queue Delay		0.0		0.0	0.0			0.0	0.0		0.0	
Total Delay		11.1		182.4	3.6			46.2	1.4		26.8	
Queue Length 50th (ft)		51		~372	47			38	0		1	
Queue Length 95th (ft)		81		#561	74			82	1		11	
Internal Link Dist (ft)		599			829			920			255	
Turn Bay Length (ft)									150			
Base Capacity (vph)		1535		424	1421			176	293		207	
Starvation Cap Reductn		0		0	0			0	0		0	
Spillback Cap Reductn		0		0	0			0	0		0	
Storage Cap Reductn		0		0	0			0	0		0	
Reduced v/c Ratio		0.27		1.31	0.25			0.46	0.16		0.02	

Intersection Summary

Area Type: Other

Cycle Length: 80

Actuated Cycle Length: 76.6






Natural Cycle: 90

Control Type: Semi Act-Uncoord

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.



















95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Birch St/Venice St & Rte 109

 ø1	 ø2	 ø4
24 s	41 s	15 s
 ø6		 ø8
65 s		15 s









HCM 2010 Signalized Intersection Summary
3: Birch St/Venice St & Rte 109

Muller & Associates
9/10/2017

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	278	108	515	332	0	75	0	45	2	1	2
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1776	1900	1792	1792	1900	1900	1776	1776	1900	1900	1900
Adj Flow Rate, veh/h	0	299	116	554	357	0	81	0	48	2	1	2
Adj No. of Lanes	0	2	0	1	1	0	0	1	1	0	1	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	7	7	7	6	6	6	7	7	7	0	0	0
Cap, veh/h	0	1107	421	429	1398	0	212	0	113	84	41	39
Arrive On Green	0.00	0.46	0.46	0.25	0.78	0.00	0.07	0.00	0.07	0.07	0.07	0.07
Sat Flow, veh/h	0	2482	909	1707	1792	0	1560	0	1509	234	549	522
Grp Volume(v), veh/h	0	209	206	554	357	0	81	0	48	5	0	0
Grp Sat Flow(s),veh/h/ln	0	1687	1615	1707	1792	0	1560	0	1509	1305	0	0
Q Serve(g_s), s	0.0	5.7	5.9	19.0	4.1	0.0	0.0	0.0	2.3	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.0	5.7	5.9	19.0	4.1	0.0	3.5	0.0	2.3	3.5	0.0	0.0
Prop In Lane	0.00		0.56	1.00		0.00	1.00		1.00	0.40		0.40
Lane Grp Cap(c), veh/h	0	781	747	429	1398	0	212	0	113	164	0	0
V/C Ratio(X)	0.00	0.27	0.28	1.29	0.26	0.00	0.38	0.00	0.43	0.03	0.00	0.00
Avail Cap(c_a), veh/h	0	781	747	429	1398	0	289	0	200	254	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	1.00	1.00	0.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	12.5	12.5	28.3	2.3	0.0	34.0	0.0	33.5	32.5	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.8	0.9	147.9	0.4	0.0	1.1	0.0	2.5	0.1	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	2.9	2.8	26.4	2.2	0.0	1.7	0.0	1.0	0.1	0.0	0.0
LnGrp Delay(d),s/veh	0.0	13.3	13.4	176.2	2.7	0.0	35.2	0.0	36.0	32.6	0.0	0.0
LnGrp LOS		B	B	F	A		D		D	C		
Approach Vol, veh/h		415			911			129			5	
Approach Delay, s/veh		13.4			108.2			35.5			32.6	
Approach LOS		B			F			D			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	24.0	41.0		10.6		65.0		10.6				
Change Period (Y+Rc), s	5.0	6.0		5.0		6.0		5.0				
Max Green Setting (Gmax), s	19.0	35.0		10.0		59.0		10.0				
Max Q Clear Time (g_c+I1), s	21.0	7.9		5.5		6.1		5.5				
Green Ext Time (p_c), s	0.0	2.4		0.1		2.4		0.1				
Intersection Summary												
HCM 2010 Ctrl Delay				74.6								
HCM 2010 LOS				E								

Lanes, Volumes, Timings
6: Beaver St & Birch St

Muller & Associates
9/10/2017

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	104	644	114	359	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	150	0			0
Storage Lanes	1	0	0			0
Taper Length (ft)	25		25			
Link Speed (mph)	30			30	30	
Link Distance (ft)	882			499	690	
Travel Time (s)	20.0			11.3	15.7	
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles (%)	1%	1%	0%	0%	0%	0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	870	0	0	550	0	0
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type: Other









Control Type: Unsignalized

HCM Unsignalized Intersection Capacity Analysis

6: Beaver St & Birch St










Muller & Associates

9/10/2017

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	104	644	114	359	0	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Hourly flow rate (vph)	121	749	133	417	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	683	0	0			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	683	0	0			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	68	31	92			
cM capacity (veh/h)	383	1088	1636			
Direction, Lane #	EB 1	NB 1				
Volume Total	870	550				
Volume Left	121	133				
Volume Right	749	0				
cSH	866	1636				
Volume to Capacity	1.00	0.08				
Queue Length 95th (ft)	457	7				
Control Delay (s)	53.4	2.4				
Lane LOS	F	A				
Approach Delay (s)	53.4	2.4				
Approach LOS	F					
Intersection Summary						
Average Delay		33.7				
Intersection Capacity Utilization		77.4%		ICU Level of Service		D
Analysis Period (min)		15				

Lanes, Volumes, Timings
9: Birch St & Site Drive

Muller & Associates
9/10/2017

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	26	40	2	56	744	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	30			30	30	
Link Distance (ft)	603			707	900	
Travel Time (s)	13.7			16.1	20.5	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	0%	0%	0%	7%	7%	0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	73	0	0	64	843	0
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection

Int Delay, s/veh 1.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	26	40	2	56	744	14
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	0	0	0	7	7	0
Mvmt Flow	29	44	2	62	827	16

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	901	834	842	0	-	0
Stage 1	834	-	-	-	-	-
Stage 2	67	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	311	371	802	-	-	-
Stage 1	430	-	-	-	-	-
Stage 2	961	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	310	371	802	-	-	-
Mov Cap-2 Maneuver	310	-	-	-	-	-
Stage 1	430	-	-	-	-	-
Stage 2	958	-	-	-	-	-



















Approach	EB	NB	SB
HCM Control Delay, s	18.3	0.3	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	802	-	344	-	-
HCM Lane V/C Ratio	0.003	-	0.213	-	-
HCM Control Delay (s)	9.5	0	18.3	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0	-	0.8	-	-

Lanes, Volumes, Timings
3: Birch St/Venice St & Rte 109

Muller & Associates

9/10/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	3	479	204	425	479	2	79	0	95	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		150	0		0
Storage Lanes	0		0	1		0	0		1	0		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		679			909			1000			335	
Travel Time (s)		15.4			20.7			22.7			7.6	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	2%	2%	2%	4%	4%	4%	1%	1%	1%	0%	0%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	737	0	457	517	0	0	85	102	0	0	0
Turn Type	Perm	NA		Prot	NA		Perm	NA	Perm			
Protected Phases		2		1	6			8			4	
Permitted Phases	2						8		8	4		
Detector Phase	2	2		1	6		8	8	8	4	4	
Switch Phase												
Minimum Initial (s)	35.0	35.0		15.0	35.0		6.0	6.0	6.0	6.0	6.0	
Minimum Split (s)	41.0	41.0		20.0	41.0		11.0	11.0	11.0	11.0	11.0	
Total Split (s)	41.0	41.0		24.0	65.0		15.0	15.0	15.0	15.0	15.0	
Total Split (%)	51.3%	51.3%		30.0%	81.3%		18.8%	18.8%	18.8%	18.8%	18.8%	
Yellow Time (s)	4.0	4.0		3.0	4.0		3.0	3.0	3.0	3.0	3.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)		0.0		0.0	0.0			0.0	0.0		0.0	
Total Lost Time (s)		6.0		5.0	6.0			5.0	5.0		5.0	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?												
Recall Mode	Max	Max		Max	Max		None	None	None	None	None	
v/c Ratio		0.48		1.06	0.36			0.52	0.37			
Control Delay		14.2		91.0	4.2			45.0	10.6			
Queue Delay		0.0		0.0	0.0			0.0	0.0			
Total Delay		14.2		91.0	4.2			45.0	10.6			
Queue Length 50th (ft)		114		~265	75			40	0			
Queue Length 95th (ft)		163		#441	116			85	39			
Internal Link Dist (ft)		599			829			920			255	
Turn Bay Length (ft)									150			
Base Capacity (vph)		1536		433	1448			187	304			
Starvation Cap Reductn		0		0	0			0	0			
Spillback Cap Reductn		0		0	0			0	0			
Storage Cap Reductn		0		0	0			0	0			
Reduced v/c Ratio		0.48		1.06	0.36			0.45	0.34			

Intersection Summary

Area Type: Other

Cycle Length: 80

Actuated Cycle Length: 76.7

Natural Cycle: 80

Lanes, Volumes, Timings 3: Birch St/Venice St & Rte 109






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Control Type: Semi Act-Uncoord

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.



















95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Birch St/Venice St & Rte 109

 ø1	 ø2	 ø4
24 s	41 s	15 s
 ø6		 ø8
65 s		15 s









HCM 2010 Signalized Intersection Summary
3: Birch St/Venice St & Rte 109

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9/10/2017

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	3	479	204	425	479	2	79	0	95	0	0	0
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1900	1827	1827	1900	1900	1881	1881	1900	1900	1900
Adj Flow Rate, veh/h	3	515	219	457	515	2	85	0	102	0	0	0
Adj No. of Lanes	0	2	0	1	1	0	0	1	1	0	1	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	4	4	4	1	1	1	0	0	0
Cap, veh/h	48	1083	456	430	1397	5	220	0	141	0	168	0
Arrive On Green	0.46	0.46	0.46	0.25	0.77	0.77	0.09	0.00	0.09	0.00	0.00	0.00
Sat Flow, veh/h	2	2375	1001	1740	1819	7	1426	0	1599	0	1900	0
Grp Volume(v), veh/h	405	0	332	457	0	517	85	0	102	0	0	0
Grp Sat Flow(s),veh/h/ln	1860	0	1518	1740	0	1826	1426	0	1599	0	1900	0
Q Serve(g_s), s	0.0	0.0	11.7	19.0	0.0	7.0	4.4	0.0	4.8	0.0	0.0	0.0
Cycle Q Clear(g_c), s	11.6	0.0	11.7	19.0	0.0	7.0	4.4	0.0	4.8	0.0	0.0	0.0
Prop In Lane	0.01		0.66	1.00		0.00	1.00		1.00	0.00		0.00
Lane Grp Cap(c), veh/h	895	0	692	430	0	1403	220	0	141	0	168	0
V/C Ratio(X)	0.45	0.00	0.48	1.06	0.00	0.37	0.39	0.00	0.72	0.00	0.00	0.00
Avail Cap(c_a), veh/h	895	0	692	430	0	1403	279	0	208	0	247	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	0.00	0.00	0.00
Uniform Delay (d), s/veh	14.5	0.0	14.6	28.9	0.0	2.9	33.9	0.0	34.1	0.0	0.0	0.0
Incr Delay (d2), s/veh	1.6	0.0	2.4	60.7	0.0	0.7	1.1	0.0	6.7	0.0	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.4	0.0	5.3	16.2	0.0	3.7	1.8	0.0	2.4	0.0	0.0	0.0
LnGrp Delay(d),s/veh	16.2	0.0	16.9	89.6	0.0	3.6	35.0	0.0	40.8	0.0	0.0	0.0
LnGrp LOS	B		B	F		A	D		D			
Approach Vol, veh/h		737			974			187			0	
Approach Delay, s/veh		16.5			43.9			38.2			0.0	
Approach LOS		B			D			D				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	24.0	41.0		11.8		65.0		11.8				
Change Period (Y+Rc), s	5.0	6.0		5.0		6.0		5.0				
Max Green Setting (Gmax), s	19.0	35.0		10.0		59.0		10.0				
Max Q Clear Time (g_c+I1), s	21.0	13.7		0.0		9.0		6.8				
Green Ext Time (p_c), s	0.0	4.2		0.0		4.5		0.2				
Intersection Summary												
HCM 2010 Ctrl Delay			32.7									
HCM 2010 LOS			C									

Lanes, Volumes, Timings
6: Beaver St & Birch St

Muller & Associates
9/10/2017

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	111	613	96	566	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	150	0			0
Storage Lanes	1	0	0			0
Taper Length (ft)	25		25			
Link Speed (mph)	30			30	30	
Link Distance (ft)	882			499	690	
Travel Time (s)	20.0			11.3	15.7	
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83
Heavy Vehicles (%)	1%	1%	1%	1%	0%	0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	873	0	0	798	0	0
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type: Other









Control Type: Unsignalized

HCM Unsignalized Intersection Capacity Analysis

6: Beaver St & Birch St










Muller & Associates

9/10/2017

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	111	613	96	566	0	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83
Hourly flow rate (vph)	134	739	116	682	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	913	0	0			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	913	0	0			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	53	32	93			
cM capacity (veh/h)	283	1088	1630			
Direction, Lane #	EB 1	NB 1				
Volume Total	872	798				
Volume Left	134	116				
Volume Right	739	0				
cSH	758	1630				
Volume to Capacity	1.15	0.07				
Queue Length 95th (ft)	665	6				
Control Delay (s)	103.9	1.8				
Lane LOS	F	A				
Approach Delay (s)	103.9	1.8				
Approach LOS	F					
Intersection Summary						
Average Delay		55.2				
Intersection Capacity Utilization		85.7%		ICU Level of Service	E	
Analysis Period (min)		15				

Lanes, Volumes, Timings
9: Birch St & Site Drive

Muller & Associates
9/10/2017

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	15	22	10	185	615	58
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	30			30	30	
Link Distance (ft)	603			707	900	
Travel Time (s)	13.7			16.1	20.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	1%	3%	0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	40	0	0	212	731	0
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection

Int Delay, s/veh 0.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	15	22	10	185	615	58
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
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, %	0	0	0	1	3	0
Mvmt Flow	16	24	11	201	668	63

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	923	700	732	0	-	0
Stage 1	700	-	-	-	-	-
Stage 2	223	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	302	443	882	-	-	-
Stage 1	496	-	-	-	-	-
Stage 2	819	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	298	443	882	-	-	-
Mov Cap-2 Maneuver	298	-	-	-	-	-
Stage 1	496	-	-	-	-	-
Stage 2	808	-	-	-	-	-



















Approach	EB	NB	SB
HCM Control Delay, s	15.9	0.5	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	882	-	370	-	-
HCM Lane V/C Ratio	0.012	-	0.109	-	-
HCM Control Delay (s)	9.1	0	15.9	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0	-	0.4	-	-

Lanes, Volumes, Timings
3: Birch St/Venice St & Rte 109

Muller & Associates

9/10/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	278	108	515	332	0	75	0	45	2	1	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		150	0		0
Storage Lanes	0		0	1		0	0		1	0		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		679			909			1000			335	
Travel Time (s)		15.4			20.7			22.7			7.6	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	7%	7%	7%	6%	6%	6%	7%	7%	7%	0%	0%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	415	0	554	357	0	0	81	48	0	5	0
Turn Type		NA		Prot	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2						8		8	4		
Detector Phase	2	2		1	6		8	8	8	4	4	
Switch Phase												
Minimum Initial (s)	27.0	27.0		27.0	27.0		6.0	6.0	6.0	6.0	6.0	
Minimum Split (s)	33.0	33.0		32.0	41.0		11.0	11.0	11.0	11.0	11.0	
Total Split (s)	33.0	33.0		32.0	65.0		15.0	15.0	15.0	15.0	15.0	
Total Split (%)	41.3%	41.3%		40.0%	81.3%		18.8%	18.8%	18.8%	18.8%	18.8%	
Yellow Time (s)	4.0	4.0		3.0	4.0		3.0	3.0	3.0	3.0	3.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)		0.0		0.0	0.0			0.0	0.0		0.0	
Total Lost Time (s)		6.0		5.0	6.0			5.0	5.0		5.0	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?												
Recall Mode	Max	Max		Max	Max		None	None	None	None	None	
v/c Ratio		0.35		0.92	0.25			0.53	0.18		0.03	
Control Delay		16.5		48.5	3.6			46.2	1.4		26.8	
Queue Delay		0.0		0.0	0.0			0.0	0.0		0.0	
Total Delay		16.5		48.5	3.6			46.2	1.4		26.8	
Queue Length 50th (ft)		64		268	47			38	0		1	
Queue Length 95th (ft)		102		#471	74			82	1		11	
Internal Link Dist (ft)		599			829			920			255	
Turn Bay Length (ft)									150			
Base Capacity (vph)		1195		603	1421			176	293		207	
Starvation Cap Reductn		0		0	0			0	0		0	
Spillback Cap Reductn		0		0	0			0	0		0	
Storage Cap Reductn		0		0	0			0	0		0	
Reduced v/c Ratio		0.35		0.92	0.25			0.46	0.16		0.02	

Intersection Summary

Area Type: Other

Cycle Length: 80

Actuated Cycle Length: 76.6

Natural Cycle: 80






Lanes, Volumes, Timings 3: Birch St/Venice St & Rte 109

Muller & Associates
9/10/2017

Control Type: Semi Act-Uncoord



















95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Birch St/Venice St & Rte 109

 ø1	 ø2	 ø4
32 s	33 s	15 s
 ø6		 ø8
65 s		15 s










HCM 2010 Signalized Intersection Summary
3: Birch St/Venice St & Rte 109

Muller & Associates
9/10/2017

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	278	108	515	332	0	75	0	45	2	1	2
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1776	1900	1792	1792	1900	1900	1776	1776	1900	1900	1900
Adj Flow Rate, veh/h	0	299	116	554	357	0	81	0	48	2	1	2
Adj No. of Lanes	0	2	0	1	1	0	0	1	1	0	1	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	7	7	7	6	6	6	7	7	7	0	0	0
Cap, veh/h	0	854	324	609	1398	0	212	0	113	84	41	39
Arrive On Green	0.00	0.36	0.36	0.36	0.78	0.00	0.07	0.00	0.07	0.07	0.07	0.07
Sat Flow, veh/h	0	2482	909	1707	1792	0	1560	0	1509	234	549	522
Grp Volume(v), veh/h	0	209	206	554	357	0	81	0	48	5	0	0
Grp Sat Flow(s),veh/h/ln	0	1687	1615	1707	1792	0	1560	0	1509	1305	0	0
Q Serve(g_s), s	0.0	6.9	7.1	23.4	4.1	0.0	0.0	0.0	2.3	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.0	6.9	7.1	23.4	4.1	0.0	3.5	0.0	2.3	3.5	0.0	0.0
Prop In Lane	0.00		0.56	1.00		0.00	1.00		1.00	0.40		0.40
Lane Grp Cap(c), veh/h	0	602	577	609	1398	0	212	0	113	164	0	0
V/C Ratio(X)	0.00	0.35	0.36	0.91	0.26	0.00	0.38	0.00	0.43	0.03	0.00	0.00
Avail Cap(c_a), veh/h	0	602	577	609	1398	0	289	0	200	254	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	1.00	1.00	0.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	17.8	17.9	23.2	2.3	0.0	34.0	0.0	33.5	32.5	0.0	0.0
Incr Delay (d2), s/veh	0.0	1.6	1.7	19.9	0.4	0.0	1.1	0.0	2.5	0.1	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	3.5	3.4	14.3	2.2	0.0	1.7	0.0	1.0	0.1	0.0	0.0
LnGrp Delay(d),s/veh	0.0	19.4	19.7	43.0	2.7	0.0	35.2	0.0	36.0	32.6	0.0	0.0
LnGrp LOS		B	B	D	A		D		D	C		
Approach Vol, veh/h		415			911			129			5	
Approach Delay, s/veh		19.5			27.2			35.5			32.6	
Approach LOS		B			C			D			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	32.0	33.0		10.6		65.0		10.6				
Change Period (Y+Rc), s	5.0	6.0		5.0		6.0		5.0				
Max Green Setting (Gmax), s	27.0	27.0		10.0		59.0		10.0				
Max Q Clear Time (g_c+l1), s	25.4	9.1		5.5		6.1		5.5				
Green Ext Time (p_c), s	0.4	2.3		0.1		2.4		0.1				
Intersection Summary												
HCM 2010 Ctrl Delay				25.8								
HCM 2010 LOS				C								

Lanes, Volumes, Timings
6: Beaver St & Birch St

Muller & Associates
9/10/2017

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	104	644	114	359	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	50	0			0
Storage Lanes	1	1	0			0
Taper Length (ft)	25		25			
Link Speed (mph)	30			30	30	
Link Distance (ft)	882			499	690	
Travel Time (s)	20.0			11.3	15.7	
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles (%)	1%	1%	0%	0%	0%	0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	121	749	0	550	0	0
Sign Control	Stop			Free	Free	

Intersection Summary










Area Type: Other

Control Type: Unsignalized

HCM Unsignalized Intersection Capacity Analysis

6: Beaver St & Birch St



















Muller & Associates
9/10/2017

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	104	644	114	359	0	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Hourly flow rate (vph)	121	749	133	417	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)		2				
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	683	0	0			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	683	0	0			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	68	31	92			
cM capacity (veh/h)	383	1088	1636			
Direction, Lane #	EB 1	NB 1				
Volume Total	870	550				
Volume Left	121	133				
Volume Right	749	0				
cSH	1264	1636				
Volume to Capacity	0.69	0.08				
Queue Length 95th (ft)	148	7				
Control Delay (s)	15.7	2.4				
Lane LOS	C	A				
Approach Delay (s)	15.7	2.4				
Approach LOS	C					
Intersection Summary						
Average Delay		10.6				
Intersection Capacity Utilization		43.2%		ICU Level of Service		A
Analysis Period (min)		15				

Lanes, Volumes, Timings
3: Birch St/Venice St & Rte 109

Muller & Associates

9/10/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	3	479	204	425	479	2	79	0	95	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		150	0		0
Storage Lanes	0		0	1		0	0		1	0		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		679			909			1000			335	
Travel Time (s)		15.4			20.7			22.7			7.6	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	2%	2%	2%	4%	4%	4%	1%	1%	1%	0%	0%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	737	0	457	517	0	0	85	102	0	0	0
Turn Type	Perm	NA		Prot	NA		Perm	NA	Perm			
Protected Phases		2		1	6			8			4	
Permitted Phases	2						8		8	4		
Detector Phase	2	2		1	6		8	8	8	4	4	
Switch Phase												
Minimum Initial (s)	27.0	27.0		27.0	27.0		6.0	6.0	6.0	6.0	6.0	
Minimum Split (s)	33.0	33.0		32.0	41.0		11.0	11.0	11.0	11.0	11.0	
Total Split (s)	33.0	33.0		32.0	65.0		15.0	15.0	15.0	15.0	15.0	
Total Split (%)	41.3%	41.3%		40.0%	81.3%		18.8%	18.8%	18.8%	18.8%	18.8%	
Yellow Time (s)	4.0	4.0		3.0	4.0		3.0	3.0	3.0	3.0	3.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)		0.0		0.0	0.0			0.0	0.0		0.0	
Total Lost Time (s)		6.0		5.0	6.0			5.0	5.0		5.0	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?												
Recall Mode	Max	Max		Max	Max		None	None	None	None	None	
v/c Ratio		0.62		0.74	0.36			0.52	0.37			
Control Delay		21.3		32.1	4.2			45.0	10.6			
Queue Delay		0.0		0.0	0.0			0.0	0.0			
Total Delay		21.3		32.1	4.2			45.0	10.6			
Queue Length 50th (ft)		142		203	75			40	0			
Queue Length 95th (ft)		201		#350	116			85	39			
Internal Link Dist (ft)		599			829			920			255	
Turn Bay Length (ft)									150			
Base Capacity (vph)		1198		615	1448			187	304			
Starvation Cap Reductn		0		0	0			0	0			
Spillback Cap Reductn		0		0	0			0	0			
Storage Cap Reductn		0		0	0			0	0			
Reduced v/c Ratio		0.62		0.74	0.36			0.45	0.34			

Intersection Summary

Area Type: Other

Cycle Length: 80

Actuated Cycle Length: 76.7

Natural Cycle: 80

Lanes, Volumes, Timings
3: Birch St/Venice St & Rte 109

Muller & Associates

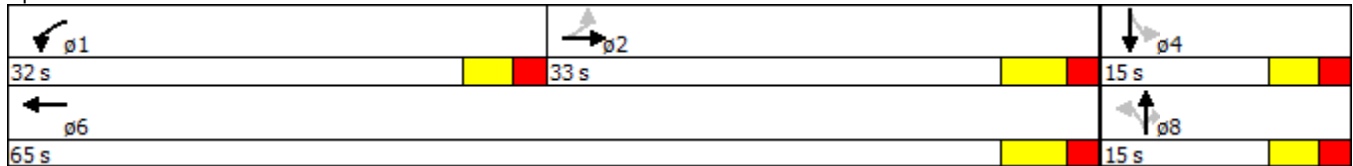
9/10/2017

Control Type: Semi Act-Uncoord

95th percentile volume exceeds capacity, queue may be longer.



















Queue shown is maximum after two cycles.

Splits and Phases: 3: Birch St/Venice St & Rte 109












HCM 2010 Signalized Intersection Summary
3: Birch St/Venice St & Rte 109

Muller & Associates
9/10/2017

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	3	479	204	425	479	2	79	0	95	0	0	0
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1900	1827	1827	1900	1900	1881	1881	1900	1900	1900
Adj Flow Rate, veh/h	3	515	219	457	515	2	85	0	102	0	0	0
Adj No. of Lanes	0	2	0	1	1	0	0	1	1	0	1	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	4	4	4	1	1	1	0	0	0
Cap, veh/h	48	835	352	612	1397	5	220	0	141	0	168	0
Arrive On Green	0.35	0.35	0.35	0.35	0.77	0.77	0.09	0.00	0.09	0.00	0.00	0.00
Sat Flow, veh/h	3	2375	1001	1740	1819	7	1426	0	1599	0	1900	0
Grp Volume(v), veh/h	405	0	332	457	0	517	85	0	102	0	0	0
Grp Sat Flow(s),veh/h/ln	1860	0	1518	1740	0	1826	1426	0	1599	0	1900	0
Q Serve(g_s), s	0.0	0.0	13.9	17.7	0.0	7.0	4.4	0.0	4.8	0.0	0.0	0.0
Cycle Q Clear(g_c), s	13.8	0.0	13.9	17.7	0.0	7.0	4.4	0.0	4.8	0.0	0.0	0.0
Prop In Lane	0.01		0.66	1.00		0.00	1.00		1.00	0.00		0.00
Lane Grp Cap(c), veh/h	701	0	534	612	0	1403	220	0	141	0	168	0
V/C Ratio(X)	0.58	0.00	0.62	0.75	0.00	0.37	0.39	0.00	0.72	0.00	0.00	0.00
Avail Cap(c_a), veh/h	701	0	534	612	0	1403	279	0	208	0	247	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	0.00	0.00	0.00
Uniform Delay (d), s/veh	20.6	0.0	20.7	21.9	0.0	2.9	33.9	0.0	34.1	0.0	0.0	0.0
Incr Delay (d2), s/veh	3.4	0.0	5.4	8.1	0.0	0.7	1.1	0.0	6.7	0.0	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.8	0.0	6.6	9.9	0.0	3.7	1.8	0.0	2.4	0.0	0.0	0.0
LnGrp Delay(d),s/veh	24.1	0.0	26.1	30.0	0.0	3.6	35.0	0.0	40.8	0.0	0.0	0.0
LnGrp LOS	C		C	C		A	D		D			
Approach Vol, veh/h		737			974			187			0	
Approach Delay, s/veh		25.0			16.0			38.2			0.0	
Approach LOS		C			B			D				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	32.0	33.0		11.8		65.0		11.8				
Change Period (Y+Rc), s	5.0	6.0		5.0		6.0		5.0				
Max Green Setting (Gmax), s	27.0	27.0		10.0		59.0		10.0				
Max Q Clear Time (g_c+l1), s	19.7	15.9		0.0		9.0		6.8				
Green Ext Time (p_c), s	0.9	3.4		0.0		4.5		0.2				
Intersection Summary												
HCM 2010 Ctrl Delay			21.7									
HCM 2010 LOS			C									

Lanes, Volumes, Timings
6: Beaver St & Birch St

Muller & Associates
9/10/2017

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	111	613	96	566	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	50	0			0
Storage Lanes	1	1	0			0
Taper Length (ft)	25		25			
Link Speed (mph)	30			30	30	
Link Distance (ft)	882			499	690	
Travel Time (s)	20.0			11.3	15.7	
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83
Heavy Vehicles (%)	1%	1%	1%	1%	0%	0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	134	739	0	798	0	0
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type: Other










Control Type: Unsignalized

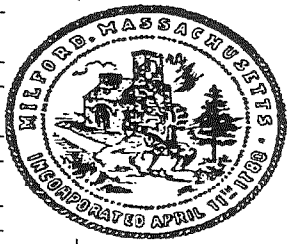
HCM Unsignalized Intersection Capacity Analysis

6: Beaver St & Birch St

Muller & Associates

9/10/2017

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	111	613	96	566	0	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83
Hourly flow rate (vph)	134	739	116	682	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)		2				
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	913	0	0			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	913	0	0			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	53	32	93			
cM capacity (veh/h)	283	1088	1630			
Direction, Lane #	EB 1	NB 1				
Volume Total	872	798				
Volume Left	134	116				
Volume Right	739	0				
cSH	1285	1630				
Volume to Capacity	0.68	0.07				
Queue Length 95th (ft)	143	6				
Control Delay (s)	17.1	1.8				
Lane LOS	C	A				
Approach Delay (s)	17.1	1.8				
Approach LOS	C					
Intersection Summary						
Average Delay			9.8			
Intersection Capacity Utilization			47.9%	ICU Level of Service		A
Analysis Period (min)			15			



TOWN OF MILFORD

BOARD OF ASSESSORS

CERTIFIED ABUTTERS LIST

Certified by:

Date:

Property data updated March 27, 2018
300 ft.

Subject Properties - Corner of Industrial Rd. & Birch St.

46-0-6A

Abutters

ID	Site Address	Owner Name	Owner Name2	Owner Address	Owner City	Owner	Owner Zip
42-0-4	CARROLL ST	TOWN OF MILFORD		52 MAIN ST	MILFORD	MA	01757
43-0-97	21 BIRCH ST	TOWN OF MILFORD		52 MAIN ST	MILFORD	MA	01757
43-0-35	BIRCH ST	TOWN OF MILFORD	C/O LEGAL DEPT	52 MAIN ST	MILFORD	MA	01757
43-0-2	30 BIRCH ST	TSS REALTY INC		PO BOX 766	MARLBOROUGH	MA	01752
43-0-97A	REAR BIRCH ST	TOWN OF MILFORD		52 MAIN STREET	MILFORD	MA	01757
43-119-10-5	5 LOMBARDI CR	DONAHUE JOHN L		5 LOMBARDI CIR	MILFORD	MA	01757
43-119-11-28	28 STALL BROOK RD	ALLEN DAVID GOREN		28 STALL BROOK ROAD	MILFORD	MA	01757
43-119-13-27	27 STALL BROOK RD	VENEZIANO DONNA		27 STALLBROOK ROAD	MILFORD	MA	01757
43-119-14-33	33 STALL BROOK RD	MILANI LOUISE M		33 STALL BROOK RD	MILFORD	MA	01757
43-119-16-19	19 STALL BROOK RD	POTTER CHARLES R	+ MARY JT TENS	19 STALL BROOK RD	MILFORD	MA	01757
43-119-2-16	16 STALL BROOK RD	RESNIK LOUIS A	+ MARCIA E H+W T BY E	16 STALL BROOK RD	MILFORD	MA	01757
43-119-3-9	9 STALL BROOK RD	CUTLER JONATHAN M	NANCY G CUTLER H + W T BY E	9 STALLBROOK RD	MILFORD	MA	01757
43-119-4-5	5 STALL BROOK RD	RANIERI THEODORE A	TRUSTEE	PO BOX 314 15 DEERFOOT	SOUTHBORO	MA	01772
43-119-6-1	1 WATERFALL LN	DORJAHN RENEE V		1 WATERFALL LN UNIT W-1	MILFORD	MA	01757
43-119-9-16	16 LOMBARDI CR	MEYER ROBERT WAYNE		16 LOMBARDI CIRCLE	MILFORD	MA	01757
43-119-12-34	34 STALL BROOK RD	MITIDES BARBARA A		34 STALL BROOK RD	MILFORD	MA	01757
43-119-7-20	20 STALL BROOK RD	MACKENZIE DONALD W +	JEAN H + W	20 STALLBROOK RD	MILFORD	MA	01757
46-140-11	19 SILVA ST	GONCALVES ANTONIO	+ ROSA H+W T BY E	19 SILVA ST	MILFORD	MA	01757
46-140-8	12 SILVA ST	FERREIRA DAVID J JR	+ TRACY L HOMMEL JT TENS	12 SILVA ST	MILFORD	MA	01757
46-140-6	12 JOE'S WAY	MOBILIA STEPHEN D	+ CLAUDIA M H+W T BY E	12 JOE'S WAY	MILFORD	MA	01757
46-140-9	14 SILVA ST	CELOZZI ANTHONY M JR	+ MARGUERITE F H+W T BY E	14 SILVA ST	MILFORD	MA	01757
43-119-12-32	32 STALL BROOK RD	BARD JOANNE M	+ PETER L H+W T BY E	32 STALL BROOK RD	MILFORD	MA	01757
43-119-3-15	15 STALL BROOK RD	KELLOGG ROBERT E	+ MARGARET H H+W T BY E	15 STALLBROOK RD.	MILFORD	MA	01757
46-140-12	17 SILVA ST	ZAGAME ROBERT G JR	+ ANTONETTE M H+W T BY E	17 SILVA ST	MILFORD	MA	01757
46-0-16	4 INDUSTRIAL RD	PYNE DAVID H TRUSTEE	DUBLIN GROUP RLTY TRUST	PO BOX 834 72 DEPOT ST	MILFORD	MA	01757
43-119-2-14	14 STALL BROOK RD	MORIN MARYKATE		14 STALL BROOK RD	MILFORD	MA	01757
43-119-15-41	41 STALL BROOK RD	AUBUCHON FRANCIS		41 STALLBROOK ROAD	MILFORD	MA	01757
43-119-4-1	1 STALL BROOK RD	COMERFORD VALERIE E		1 STALLBROOK LANE	MILFORD	MA	01757
43-119-7-22	22 STALL BROOK RD	MOORE LESLIE		22 STALL BROOK RD	MILFORD	MA	01757
43-119-6-5	5 WATERFALL LN	HART MARY ELLEN		5 WATERFALL LN UNIT E-5	MILFORD	MA	01757
43-119-8-8	8 LOMBARDI CR	MCCARTHY PATRICK G +	JOAN T H+W T BY E	11 STUBTOE LANE	SUDBURY	MA	01776
43-119-6-3	3 WATERFALL LN	FRAINE JOYCE		3 WATERFALL LANE	MILFORD	MA	01757
42-0-336-5	5 ARI'S WAY	BELLACQUA FREDERICK V+	ROSEMARY H+W TBYE	5 ARI'S WAY	MILFORD	MA	01757
42-0-336-4	4 ARI'S WAY	CANOLE JEAN		4 ARI'S WAY	MILFORD	MA	01757
43-0-16	REAR FAIRVIEW AV	TOWN OF MILFORD		52 MAIN ST	MILFORD	MA	01757
42-0-336-28	28 ARI'S WAY	FERRARI CHRISTINA L		28 ARI'S WAY	MILFORD	MA	01757
43-119-7-18	18 STALL BROOK RD	MANGINI DANTE J & LUCY M TRUS	DANTE J & LUCY M MANGINI IRREVOCABLE TRUST	18 STALLBROOK RD.	MILFORD	MA	01757
43-119-3-17	17 STALL BROOK RD	MANNHEIM JUDITH		17 STALL BROOK RD	MILFORD	MA	01757
43-119-1-8	8 STALL BROOK RD	JANKOT SHEILA C		8 STALL BROOK RD	MILFORD	MA	01757
46-0-17A	8 COMMERCIAL WAY	PYNE DAVID H TRUSTEE	DUBLIN GROUP RLTY TRUST	PO BOX 834	MILFORD	MA	01757
46-0-17	6 COMMERCIAL WAY	PYNE DAVID H TRUSTEE	DUBLIN GROUP RLTY TRUST	PO BOX 834	MILFORD	MA	01757
42-0-336-23	23 ARI'S WAY	BRANCELY MARINA L		23 ARI'S WAY	MILFORD	MA	01757

43-0-336-21	21 ARI'S WAY	CHAWLA SUNIL K		21 ARI'S WAY	MILFORD	MA	01757
42-0-336-25	25 ARI'S WAY	CORNELIA SUSAN E		25 ARI'S WAY	MILFORD	MA	01757
43-119-1-2	2 STALL BROOK RD	RYAN SHAWN C		22 DAVENPORT LANE	HOPKINTON	MA	01748
42-0-336-24	24 ARI'S WAY	GUENARD JOSEPHINE		24 ARI'S WAY	MILFORD	MA	01757
43-0-336-13	13 ARI'S WAY	GILMAN SANDRA		13 ARI'S WAY	MILFORD	MA	01757
42-0-336-1B	1 ARI'S WAY	MASSAUA ANDREW J		1 B ARI'S WAY	MILFORD	MA	01757
43-119-12-38	38 STALL BROOK RD	MCWADE PAUL E II+	MCWADE TRACIE L H+WTBYE	38 STALL BROOK RD	MILFORD	MA	01757
42-0-336-1A	1 ARI'S WAY	DAHMER MATTHEW T +	DAHMER JESSICA L H+WTBYE	1A ARIS WAY	MILFORD	MA	01757
43-119-8-2	2 LOMBARDI CR	FORTIN LOUIS D & PAULA L - LE	FORTIN CHRISTOPHER & MELISSA	2 LOMBARDI CIR	MILFORD	MA	01757
43-0-336-10	10 ARI'S WAY	WILLIAMS TRACI L		10 ARI'S WAY	MILFORD	MA	01757
43-119-2-10	10 STALL BROOK RD	DOLAN ROGER E & TERESE		10 STALLBROOK RD	MILFORD	MA	01757
43-119-16-23	23 STALL BROOK RD	MACLEOD KENNETH G+	MICKELL CHRISTOPHER M JT WROS	23 STALL BROOK RD	MILFORD	MA	01757
42-0-336-31	31 ARI'S WAY	FORTIN CHRISTOPHER		31 ARI'S WAY	MILFORD	MA	01757
43-0-336-19	19 ARI'S WAY	FITZBACK BARBARA C - LE & JEFF CUNNINGHAM TRACY F TRTEES	BARBARA C FITZBACK IRR TRUST	19 ARI'S WAY	MILFORD	MA	01757
43-119-5-2	2 WATERFALL LN	ALBERT ROBERT J & LINDA M		2 WATERFALL LANE	MILFORD	MA	01757
46-140-10	16 SILVA ST	BERRY JOSEPH P JR+	BERRY JANE M H+W TBYE	16 SILVA ST	MILFORD	MA	01757
42-0-336-22	22 ARI'S WAY	NICHOLSON CHRISTOPHER		22 ARI'S WAY	MILFORD	MA	01757
43-119-11-26	26 STALL BROOK RD	TRUONG NOBEL T		26 STALL BROOK RD	MILFORD	MA	01757
43-119-12-36	36 STALL BROOK RD	NIRO MATTHEW R		36 STALL BROOK RD	MILFORD	MA	01757
43-119-15-39	39 STALL BROOK RD	COLLAZZO SUZANNE L		39 STALL BROOK RD	MILFORD	MA	01757
43-119-13-29	29 STALL BROOK RD	GAVIN KIMBERLY +	PACELLA DEBORAH	29 STALLBROOK RD	MILFORD	MA	01757
43-0-17	REAR FAIRVIEW AV	BONETTI LAWRENCE F JR		22 CONCORD LANE	UXBRIDGE	MA	01569
43-119-5-8	8 WATERFALL LN	WOJDAG PAUL M & EILEEN		8 WATERFALL LN	MILFORD	MA	01757
43-119-1-6	6 STALL BROOK RD	RAINERI MICHAEL A		6 STALL BROOK RD	MILFORD	MA	01757
43-119-10-1	1 LOMBARDI CR	GOODWIN GARY B & THERESA M		1 LOMBARDI CIR	MILFORD	MA	01757
43-119-5-6	6 WATERFALL LN	ROESSLER MARGARET M+	ROESSLER CHARLES H+W TBYE	6 WATERFALL LN UNIT E-6	MILFORD	MA	01757
43-119-8-4	4 LOMBARDI CR	YAN LINDY		4318 JEFFERSON PLACE	BELLINGHAM	MA	02019
42-0-336-30	30 ARI'S WAY	PAI SHARMILA	ROSS PHILLIP	30 ARI'S WAY	MILFORD	MA	01757
43-119-2-12	12 STALL BROOK RD	SOLTOW KATHERINE W & CHRISTOPH		12 STALL BROOK RD	MILFORD	MA	01757
43-119-9-14	14 LOMBARDI CR	SULLIVAN DIANE M TRUSTEE	DIANE M SULLIVAN 2010 RLTY TR	14 LOMBARDI CIRCLE	MILFORD	MA	01757
43-119-15-43	43 STALL BROOK RD	NEVEUX DAVID P JR		43 STALL BROOK RD	MILFORD	MA	01757
43-119-13-31	31 STALL BROOK RD	BALDUCCI GERALDINE+	BALDUCCI LON H+W TBYE	51 BEAVER ST	MILFORD	MA	01757
43-119-8-6	6 LOMBARDI CR	VILLANI KATHY M		6 LOMBARDI CIR	MILFORD	MA	01757
43-119-5-4	4 WATERFALL LN	FAHEY SUSAN E		4 WATERFALL LANE	MILFORD	MA	01757
43-0-336-20	20 ARI'S WAY	WALSH MACKENZIE D		20 ARI'S WAY	MILFORD	MA	01757
43-119-7-24	24 STALL BROOK RD	ANDERSON SCOTT P & CENTAZZO MELANIE J	C/O EUGENIA ANDERSON	24 STALL BROOK ROAD	MILFORD	MA	01757
46-140-13	15 SILVA ST	SWIFT ANDREW B+	SWIFT DEBORAH JT TEN WROS	64 MELLE STREET	BELLINGHAM	MA	02019
43-0-336-12	12 ARI'S WAY	LEVCHENKO IRYNA	LEVCHENKO NICK	12 ARI'S WAY	MILFORD	MA	01757
43-0-336-18	18 ARI'S WAY	CHANDRA SUBHASH TRUSTEE JAIN NILOO TRUSTE	SCNJ LIVING TRUST	18 ARI'S WAY	MILFORD	MA	01757
43-0-336-17	17 ARI'S WAY	SUN LING CHEN+	YING QIAN H+W TBYE	17 ARI'S WAY	MILFORD	MA	01757
46-0-9F	9 INDUSTRIAL RD	BROOKWOOD MILFORD LLC	ATTN. ACCOUNTING DEPARTMENT	138 CONTANT ST	BEVERLY	MA	01915
43-0-336-8	8 ARI'S WAY	DRESS SUSAN H		8 ARI'S WAY	MILFORD	MA	01757
43-119-14-35	35 STALL BROOK RD	KHA ANH B		35 STALLBROOK RD	MILFORD	MA	01757
43-0-336-15	15 ARI'S WAY	YOUNG CLAIRE P		15 ARI'S WAY	MILFORD	MA	01757
42-0-336-6	6 ARI'S WAY	OCONNELL JOHN J III +	OCONNELL KELLEY K H+WTBYE	6 ARI'S WAY	MILFORD	MA	01757
43-119-3-11	11 STALL BROOK RD	HUGHES LEO P+	HUGHES ELAINE M H+W TBYE	11 STALL BROOK RD	MILFORD	MA	01757
43-119-10-7	7 LOMBARDI CR	HOFHUIS TAMI A		7 LOMBARDI CIR	MILFORD	MA	01757
43-0-96	35 BIRCH ST	JWB REAL ESTATE LLC		85 SOUTH AVE	NATICK	MA	01760
43-119-11-30	30 STALL BROOK RD	FORTIN CATHERINE F		30 STALL BROOK RD	MILFORD	MA	01757
43-0-336-16	16 ARI'S WAY	FORD THOMAS P +	FORD LYNN M H+W TBYE	16 ARI'S WAY	MILFORD	MA	01757
43-119-1-4	4 STALL BROOK RD	CASTAGNA OSVALDO & SILVANA - L	CASTAGNA ROBERT J & PAUL A & HAMEL DIANA	4 STALL BROOK RD	MILFORD	MA	01757
43-119-10-3	3 LOMBARDI CR	MACDONALD THOMAS A+	MACDONALD AMANDA H+W TBYE	3 LOMBARDI CIRCLE	MILFORD	MA	01757
43-0-336-14	14 ARI'S WAY	MILLER ROANNE D		14 ARI'S WAY	MILFORD	MA	01757
43-0-336-11	11 ARI'S WAY	MAKEPAR CORP		236 SOUTH MAIN STREET	HOPEDALE	MA	01747
42-0-336-29	29 ARI'S WAY	GORDON STEPHEN L		31 SORREL CIRCLE	EAST FALMOUTH	MA	02536
43-119-9-12	12 LOMBARDI CR	GAUTREAU RONALD P & ROBIN M		12 LOMBARDI CIR	MILFORD	MA	01757
43-0-336-9	9 ARI'S WAY	SERVELLO FRANK		9 ARI'S WAY	MILFORD	MA	01757
43-119-16-25	25 STALL BROOK RD	HOPKINS DORIS A		25 STALL BROOK ROAD	MILFORD	MA	01757
42-0-336	ARI'S WAY	GRANITE WOODS CONDOMINIUM TR		P O BOX 301	HOPEDALE	MA	01747
42-0-336-3	3 ARI'S WAY	JOHNSON JULIE A		3 ARI'S WAY	MILFORD	MA	01757
42-0-336-27	27 ARI'S WAY	PEDINI JOSEPH P+	PEDINI LINDA M H+W TBYE	27 ARI'S WAY	MILFORD	MA	01757

43-119-9-10	10 LOMBARDI CR	HERLIHY, SUSAN	HERLIHY, ROBERT E.	12 PADDOCK LANE	MEDWAY	MA	02053
43-119-6-7	7 WATERFALL LN	BRADY CHARLOTTE E		7 WATERFALL LN	MILFORD	MA	01757
42-0-336-2	2 ARI'S WAY	OLIVERI LORRAINE		2 ARI'S WAY	MILFORD	MA	01757
42-0-336-7	7 ARI'S WAY	GEDEN PATRICK C		7 ARI'S WAY	MILFORD	MA	01757
43-119-14-37	37 STALL BROOK RD	GRIER KWAME MICHAEL	BENDER SARA	37 STALLBROOK ROAD	MILFORD	MA	01757
43-119-4	STALL BROOK RD	BIRCH HILL CONDOMINIUM TRUST		STALL BROOK RD	MILFORD	MA	01757
43-0-104	23 BIRCH ST	FIREMAGIC REALTY LLC		10 RAMSEY ROAD	EAST YAPHANK	NY	11967
46-0-9	6 INDUSTRIAL RD	CRP 3 MILFORD LLC	c/o LINCOLN PROPERTY COMPANY	161 WORCESTER ROAD	FRAMINGHAM	MA	01701
46-0-15A	2 INDUSTRIAL RD	MASCO CONTRACTOR SERVICES EAST INC	C/O RYAN TAX COMP SERVICES, LLC	PO BOX 4900, DEPT 720	SCOTTSDALE	AZ	85261-4900
46-140-14	13 SILVA ST	MELANSON, TIMOTHY P.	MELANSON, MARY BETH	13 SILVA ST	MILFORD	MA	01757
43-119-4-7	7 STALL BROOK RD	HAWKINS SEAN D		7 STALL BROOK ROAD	MILFORD	MA	01757
42-0-336-26	26 ARI'S WAY	HULITZKY DEREK		56 RAEURN DRIVE	ATTLEBORO	MA	02703
43-119-4-3	3 STALL BROOK RD	PHILAN CATHERINE M		3 STALL BROOK ROAD	MILFORD	MA	01757
43-119-16-21	21 STALL BROOK RD	BISICCIA JOHN R +	BISICCIA MELISSA A H+W TBYE	21 STALL BROOK RD	MILFORD	MA	01757