HANCOCK
ASSOCIATES

December 3, 2014

Jeffrey Ribeiro
Regulatory Officer I
Cape Cod Commission
3225 Main Street, PO Box 226
Barnstable, MA 02630

Subject: Springhill Suites by Marriot
556 Main Street Falmouth
Limited DRI Application

Mr. Ribeiro:

Hancock Associates is pleased to resubmit the enclosed Limited DRI Application for the Springhill Suites by Marriot project that was originally submitted in July 11, 2014. The application has been revised to include all supplemental information that has been provided to the Commission since the original submission. We believe that the application addresses the Commission's comments to date.

Please do not hesitate to contact us with any additional comments or questions.

Sincerely,
Hancock Associates,
Acting On Behalf of Falmouth Hospitality, LLC

Joseph D. Peznola, PE
Principal - Director of Engineering

cc: Falmouth Hospitality, LLC

Application Cover Sheet

Cape Cod Commission
3225 Main Street, PO Box 226
Barnstable, MA 02630
Tel: (508) 362-3828 • Fax: (508) 362-3136

For Commission Use Only
Date Received:
Fee ($):
Check No:
File No:

A Type of Application (check all that apply)

- [ ] Development of Regional Impact (DRI)
- [ ] Hardship Exemption
- [x] Limited DRI Review
- [ ] Jurisdictional Determination
- [ ] DRI Exemption
- [ ] Request for Joint MEPA/DRI Review

B Project Information

Project Name: Springhill Suites by Marriot

Total Site Acreage: 2.2 Acres

Project/Property Location: 556 Main Street, Falmouth, MA

Zoning: 556 Main Street

Brief Project Description:

Include total square footage of proposed and existing development, gross floor area, number of lots existing or to be created, specific uses, description of existing conditions, as applicable (attach additional sheets if necessary).

Falmouth Hospitality, LLC proposes to construct a 110 room hotel which will be divided into two buildings with an upper level connector. Associated site improvements will include paved parking, driveway, recreation, and pedestrian areas, landscaped areas, utilities, and a stormwater management system. In the existing conditions, the project area consists of commercial and accessory buildings, a gravel parking area, paved vehicular and pedestrian areas, landscaped and wooded areas, and associated utilities. The project area in the existing and proposed conditions is 96,036 square feet. The floor area of the proposed buildings will be 65,000 square feet. There are are 4 lots in the existing condition and there will be 1 lot in the proposed condition.

C Owner(s) of Record

List the following information for all involved parcels. Provide copies of each Deed and Purchase and Sale Agreement and/or evidence of leasehold interest, if applicable, for all involved parcels. Proof of ownership/legal rights for Applicant(s) to proceed with the proposed development must be documented prior to the Commission deeming any application complete (attach additional sheets if necessary).

Map/Parcel	Owner's Name	Lot & Plan	Land Court Certificate of Title #	Registry of Deeds Book/Page #
47B-02-005-001 47B-03-017-002 47B-03-017A-004 47B-03-016-000	John J. Fay III & Robert A. Fay			Book 4774, Page 078 and Book 4806, Page 89

There **ARE/ARE NOT** (circle one) court claims, pending or completed, involving this property (if yes, please attach relevant information).

D Certification

I hereby certify that all information provided on this application form and in the required attachments is true and accurate to the best of my knowledge. I agree to notify the Cape Cod Commission of any changes on the information provided in this application, in writing, as soon as is practicable. I understand failure to provide the required information and any fees may result in a procedural denial of my project.
NOTE: For wireless communication facilities, a licensed carrier should be either an applicant or a co-applicant.

APPLICANT
Applicant(s) Name: Falmouth Hospitality, LLC Tel: 978-692-9450 Fax:
Address: 2 Lan Drive, Westford, MA 01886
Signature: Date: 12-4-14

CO-APPLICANT
Co-Applicant(s) Name: Tel: Fax:
Address:
Signature: Date:

CONTACT
Contact: Joseph Peznola, Hancock Associates Tel: 508-460-1111 Fax:
Address: 315 Elm Street, Marlborough, MA 01752
Signature: Date: 12-4-14

PROPERTY OWNER
Property Owner: Tel: Fax:
Address:
Signature: Date:

BILLABLE ENTITY
Name: Tel: Fax:
Address:

Civil Engineering Land Surveying Environmental Consulting Landscape Architecture

HANCOCK ASSOCIATES

Limited Development of Regional Impact Application

for

Springhill Suites by Marriot

556 Main Street
Falmouth, MA

Prepared By:
Hancock Associates
17791

Prepared For:
Falmouth Hospitality, LLC

July 11, 2014
Revised December 3, 2014

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1. Project Description

Introduction

Falmouth Hospitality, LLC proposes the redevelopment of an existing site at 556 Main Street in Falmouth, MA constructing a 110 room Springhill Suites by Marriot Hotel. The project is located in the Falmouth Business Redevelopment District and has been designed in compliance with Chapter 240-240 of the Falmouth Zoning Bylaw.

Hancock Associates and Vanasse & Associates, Inc. (VAI) has completed this report in support of an Application pursuant to Section 5 of the Cape Cod Commission Chapter A, *Enabling Regulations Governing Review of Developments of Regional Impact* (DRI), for a Limited DRI Review of a proposed extended stay hotel to be located at 556 Main Street (Route 28) in Falmouth, Massachusetts (the "Project"). The purpose of this preliminary report is to provide sufficient information to allow the Cape Cod Commission (the "Commission") to make a finding that the Project meets the requirements for Limited DRI review with respect to the required performance standards relative to those issues as identified in the 2009 *Cape Cod Regional Policy Plan* as amended the Commission believes are either satisfied herein or that are not applicable or in need of further study. The Applicant would endeavor to work with Commission to develop a full Developments of Regional Impact application to the Commission focused on the issues the Commission feels warrant further study.

Existing Conditions

The exiting site is comprised of several parcels acquired by the Fay Family starting in the 1940s (Assessor's 47B03-017A-004, 47B-02-005-001, 47B-03-017-002, 47B-02-004-003 and 47B-03-016).The site was bifurcated by Lantern Lane, a 40 foot wide private way created in 1947. The Falmouth Planning Board recently voted favorably to modify the original subdivision plan to eliminate a section of the Lantern Lane Right of Way from Main Street to the northern extent of the Fay property while maintaining an access and utility easement thus making the parcel a single parcel for development. The site is bounded to the south by Main Street, to the west by Pondview Park Commercial Condominiums, to the north by 5 and 6 Lantern Lane, which are single family residential properties and to the west by lands of the Correia Family Trust, which is a retail center containing a Dunkin Donuts, Anytime Fitness, Hair Essentials and Stone's Barber Shop. The property is also bounded to the east by land of Harriet Dugan where Dugan Real Estate resides.

The 2.03 acre site itself is fully developed consisting of commercial and accessory buildings, compacted gravel parking and material storage areas. Additionally, the 7,814 square foot property at 3 Lantern Lane owned by the Fay Family is included in the application for the purposes of meeting local zoning Lot Coverage requirements. However, no work is proposed on this lot that contains a small single family house. It is envisioned the house will continue to be rented on a seasonal basis. A triangular section of the site in the north abutting Lantern Lane and the home at 6 Lantern Lane is vegetated with grass and some trees. Elevations on-site range from elevation 10 at a depression in Lantern Lane to 18 at the northern corner. Four buildings exist on the main commercial site with a total floor area of 19,058 square feet. The main building is a two story gambrel wood framed building built in the 1940s and features storefront windows on the street level with six dormered windows facing Main Street. The building also features a one story showroom building on lantern Lane and a two story "L" wing off the northwest corner of the main structure. This building has been expanded over the years and connected to a one story masonry block building in the back serving as a warehouse with loading dock doors. Additional accessory building include a 400 square foot one story concrete block garage, a 5,000 square foot, one story concrete block building and a 120 square foot shed. The buildings on site are currently being utilized by several commercial entities including;

Fay's Gallery Antique Co-op, Clover Landscaping contractor's yard and Pristine Spring, a self-serve water dispensary that occupies the shed. The buildings are in varied states of disrepair and could be classified as a general blight on the area streetscape. The site is located 1500 to the east of the Falmouth Village Historic District. While not in the district, the area is considered part of Falmouth Center as evidenced by its inclusion in the Business Redevelopment (BR) Zoning District which runs east to 704 Main Street. The area is therefore considered an Economic Center as the Falmouth Zoning Bylaw the purpose of this article is to promote the revitalization of commercial centers. None of the buildings on site are listed on the Massachusetts Historical Commission's inventory or listed by the Town of Falmouth on their list of significant structures per the Town Clerk's Office.

Vehicular access to the site is currently provided via a 40 foot wide access easement (formerly a section of Lantern Lane) which runs from Main Street to the south and continues Lantern Lane to the north to a residential neighborhood abutting the property. The old section of Lantern Lane is in serious disrepair and experiences flooding during major rain events. The roadway drops from an elevation of 15 at Main Street to a catch basin a low point 200 feet from Main Street at an elevation of 10, then rises to an elevation if 17 near the homes at 3 and 6 Lantern Lane. This catch basin as well one just to the north appear to be leaching basins with no outlet. Other utilities in the area include a 6" water main in Lantern Lane connected to a 10" main in Main Street, sewer services servicing just the commercial buildings on site and overhead electric which do pass through to the northern section of Lantern Lane. Sewer, drainage, water and overhead electric, cable and telephone utilities exist within Main Street and are available to the project.

Proposed Conditions

The proposal calls for the demolition of all structures on site except the dwelling at 3 Lantern Lane and redevelopment of the parcel constructing a Springhill Suites by Marriot hotel with associated parking, on site amenities and necessary infrastructure improvements.

The hotel will be divided into two buildings with a upper level connectors on the second and third levels and will have 110 guest rooms and a total of 65,000 square foot floor area. The building has been designed in keeping with the Town Falmouth design principles with regard to redevelopment fostering pedestrian-friendly streetscapes by providing sheltered, rear and side yard parking, and allowing shared parking between businesses and uses. The project also takes advantage of the districts relaxed front and side yard setbacks to encourage sidewalk development and pedestrian-friendly buildings offering street side gathering places in front of redeveloped property, rather than front yard parking fields. The Project meets the Cape Cod Commission's Regional Policy Plan's preference for locating new development and redevelopment in existing village centers, economic centers, or concentrated development areas because of the efficiencies of providing infrastructure in more densely developed areas and because it supports the regional development pattern of dense village centers and outlying rural areas. The Commission’s design manual supports this pattern in its opening pages, stating: “Locate new development in or immediately adjacent to town, village, and growth centers to reinforce such centers and to preserve surrounding rural areas.”

The architectural design has also kept the town and Cape Cod Commission's directives. The design addresses the street and to maintain established setback patterns, consistent with traditional village design. Although a street-oriented entrance is not possible given the need for vehicle access for check-in, a faux entrance is included on Main Street with principal windows on the street elevation to reinforce the building’s primary relationship to the street. Windows, second floor decks and multiple articulated roof lines and architectural detailing on all street-facing elevations as well as pedestrian amenities have been included. The form and scale of the buildings should be consistent with their surroundings and should incorporate pedestrian-scaled amenities such as porches and stoops and doors and windows that are consistent with the pedestrian nature of the building.

Associated site improvements will include paved parking, driveway, recreation, and pedestrian areas, landscaped areas, utilities, and a stormwater management system. Vehicular access to the project site will be provided via a driveway located in approximately the same location as the abandoned portion of Lantern Lane. The driveway will provide an entrance and exit onto Main Street as well as a connection to the remaining portion of Lantern Lane. Parking areas will be provided on surface lots under the eastern building, along the driveway, in the northern portion of the site partially under the western building; an additional 37 spaces of parking needed for the hotel is provided within surplus parking within a proposed parking lot associated with a small retail building proposed at 587 Main Street approved by the Falmouth Planning Board on October 14, 2014 and located within 300 feet of the hotel lobby entrance as allowed by Falmouth By-laws as a matter of right (no Special Permit required).

New sanitary sewer, gas, and domestic and fire protection water services will be provided for each of the proposed buildings. The services will connect to the existing sewer, gas, and water mains in Main Street. The proposed stormwater management system has been designed in accordance with the Standards described in the Massachusetts Stormwater Handbook. It will include subsurface stormwater storage and treatment systems.

2. Limited DRI Review Scoping Checklist

- Checklist
- Narrative on Responses in Shaded Boxes

LIMITED DRI REVIEW - SCOPING CHECKLIST
REDEVELOPMENT/CHANGE OF USE

Land Use	Question	Required Info	Yes	No
Compact Growth and Resource Protection	Is the project consistent with the land use categories and their characteristics? (check "Yes" if Town has not adopted a Land Use Vision Map)	RPP Regional Land Use Vision Map which shows project site	☒	☐
Compact Growth and Resource Protection	Is the development clustered on the site?	Preliminary project plans, Local zoning	☒	☐
Capital Facilities and Infrastructure	Does the project create new infrastructure?	Preliminary project plans	☐	☒
Capital Facilities and Infrastructure	Does the project propose to construct a new wireless facility?	Preliminary project plans	☐	☒
Rural Lands	Is the project site adjacent to rural landscapes or land under active agricultural production?	Staff consultation/Preliminary project plans showing prime agricultural lands	☐	☒
Rural Lands	Is the land capable of sustained agricultural production as evidenced by recent use, soils, or adjacent land use?	Staff consultation/Preliminary project plans showing prime agricultural lands	☐	☒
Water Resources	**Question**	**Required Info**	**Yes**	**No**
Drinking Water Quality and Quantity, Marine Water Embayments and Estuaries, Freshwater Ponds and Lakes	Is the project located in a Wellhead Protection Area, Potential Public Water Supply Area, Marine Water Recharge Area, or Fresh Water Recharge Area?	Site locus map showing watersheds described by Water Resources Classifications Maps I & II	☒	☐
Public and Private Sewage Treatment Facilities	Is the project's wastewater facility an on-site septic system or private treatment plant?	Preliminary project plans	☐	☒
Water Quality Improvement Areas, General Aquifer Protection	Is there a net increase in nitrogen load from wastewater, stormwater and turf on-site and does the project's nitrogen load from wastewater, stormwater and turf exceed 5 parts per million?	Nitrogen loading calculations (Technical Bulletin 91-001) comparing existing system design / site development and proposed system design / site development	☐	☒
Stormwater Management	Does the project substantially improve stormwater management by incorporating Low Impact Design to the greatest extent possible?	Engineered grading, drainage, and erosion control plans that show existing and proposed conditions and stormwater design details	☒	☐
Stormwater Management	Does the project have a comprehensive engineer-certified Operations and Maintenance Plan (Plan) that 1) demonstrates compliance with the Massachusetts Stormwater Policy & Guidelines 2) provides a schedule for inspection, monitoring and maintenance 3) identifies the parties responsible for Plan implementation and 4) includes an inspection and maintenance log	Copy of project's Stormwater Operation and Maintenance Plan	☒	☐
Coastal Resources	**Question**	**Required Info**	**Yes**	**No**
Protecting Maritime Industry, Character and Public Access	Does the project involve a conversion or loss of an existing water-dependent use, any marine infrastructure, or an existing legal public access to the coast?	Preliminary project plans	☐	☒
Protecting Maritime Industry, Character and Public Access	Does the project limit views of the ocean and/or shoreline from public ways, waterways, access points, and existing development relative to existing conditions?	Preliminary project plans	☐	☒
Coastal Hazard Mitigation	Does the project involve any expansion or new site disturbance in, or within 100 feet of: land subject to coastal storm flowage, barrier beach, coastal dune, or coastal bank?	Preliminary project plans indicting flood zone boundary, and Resource Area Delineation through local Conservation Commission	☐	☒
Coastal Hazard Mitigation	Is the project located in land subject to coastal storm flowage, coastal beach, bank, dune or barrier beach?	Resource Area Delineation through local Conservation Commission	☐	☒
Preserving Coastal Water Quality and Habitat	Does the project involve any alteration of a coastal wetland or its 100 foot buffer zone?	Resource Area Delineation through local Conservation Commission	☐	☒

Responses in the shaded boxes may be included in the scope of CCC review. Consultation with CCC staff recommended.

LIMITED DRI REVIEW - SCOPING CHECKLIST
REDEVELOPMENT/CHANGE OF USE

Wetlands/Wildlife & Plant Habitat	Question	Required Info	Yes	No
Wetlands	Does the project involve any alteration of a wetland that is greater than 500 square feet in size?	Resource Area Delineation through local Conservation Commission	☐	☒
Wetlands	Does the project involve any alteration of a 100 foot buffer to a wetland that is greater than 500 square feet in size?	Resource Area Delineation through local Conservation Commission	☐	☒
Wetlands	Does the project involve any alteration of a 350 foot buffer to a vernal pool?	Resource Area Delineation through local Conservation Commission	☐	☒
Wetlands	Will the project result in any new or additional direct stormwater discharge into a wetland or waterbody that is greater than 500 square feet in size?	Preliminary project plans	☐	☒
Wildlife & Plant Habitat	Will the project disturb or alter naturally vegetated areas?	Existing conditions plan	☐	☒
Wildlife & Plant Habitat	Is the project site mapped as Estimated or Priority rare species habitat by the Massachusetts Natural Heritage & Endangered Species Program (NHESP)?	NHESP Atlas	☐	☒
Open Space Protection & Recreation	**Question**	**Required Info**	**Yes**	**No**
Open Space Protection & Recreation	Will the project disturb or alter a Significant Natural Resource Area (SNRA)?	SNRA map and preliminary project plans	☐	☒
Open Space Protection & Recreation	Will the project disturb or alter more than 2 acres of land outside a Significant Natural Resource Area?	SNRA map and preliminary project plans	☐	☒
Energy	**Question**	**Required Info**	**Yes**	**No**
Energy	Has the project been designed to meet LEED Certification?	Design information or LEED Certification Checklist	☒	☐
Energy	Is the project Mixed Use as defined by the Regional Policy Plan?	Project description, RPP definition of Mixed Use	☐	☒
Energy	Is the project located in an Economic Center? (check "No" if Town has not adopted a Land Use Vision Map)	RPP Regional Land Use Vision Map which shows project site	☐	☒
Economic Development	**Question**	**Required Info**	**Yes**	**No**
Low Impact and Compatible Development	Is the project located outside an Economic Center or an Industrial Trade Area? (Check "Yes" if Town has not adopted a Land Use Vision Map)	RPP Regional Land Use Vision Map which shows project site	☒	☐
Low Impact and Compatible Development	If located in an Industrial Trade Area, will this project accommodate non-industrial uses as defined in the Regional Policy Plan? (Check "Yes" if Town has not adopted a Land Use Vision Map)	Statement from Applicant	☒	☐
Low Impact and Compatible Development	Is the project located in a resource-based economically productive area?	Existing Conditions Plan, Assessors Data	☐	☒
Balanced Economy	Does the development involve class III gaming?	Preliminary project plans	☐	☒
Infrastructure Capacity	Will the project develop new infrastructure as defined in the Regional Policy Plan?	Preliminary project plans	☐	☒
Affordable Housing	**Question**	**Required Info**	**Yes**	**No**
Affordable Housing (Residential Projects)	Does the project include 10 or more units/lots in a Town that has an affordable housing bylaw under which this project will be permitted?	Project affordable housing narrative, Local affordable housing bylaw	☐	☐
Equal Opportunity	Does the project include 10 or more units/lots in a Town that has an affordable housing bylaw under which this project will be permitted?	Project affordable housing narrative, Local affordable housing bylaw	☐	☐
Community Participation (Commercial Projects)	Does the redevelopment project involve additional commercial development?	Preliminary project plans	☐	☒
Community Participation (Commercial Projects)	Does the change of use project require more mitigation than the credits received for the existing use?	MPS AH3.1	☐	☒

N/A - the project is not a residential project.

Responses in the shaded boxes may be included in the scope of CCC review. Consultation with CCC staff recommended.

LIMITED DRI REVIEW - SCOPING CHECKLIST
REDEVELOPMENT/CHANGE OF USE

Transportation	Question	Required Info	Yes	No
Congestion Management	Will the project generate more than 250 new daily trips?	ITE Trip Generation manual	☐	☒
Transportation Balance and Efficiency	Will the project generate more than 250 new daily trips?	ITE Trip Generation manual	☐	☒
Safety	Does the project have direct access on or does the project directly abut a regional roadway?	Cape Cod Metropolitan Planning Organization functional classification	☐	☒
Safety	Will the project generate more than 25 new peak hour trips at a high crash location?	State / Local crash data	☐	☒
Heritage Preservation & Community Character	**Question**	**Required Info**	**Yes**	**No**
Historic Structures / Cultural and Archaeological Resources	Is the building and/or site listed on the National Register of Historic Places or within a National or Local Historic District?	Historic District map	☐	☒
Historic Structures / Cultural and Archaeological Resources	Is any part of the site known to be archaeologically significant or archaeologically sensitive, including areas within 100 feet of a wetland or waterbody?	Massachusetts Historical Commission consultation, Resource Area Delineation through local Conservation Commission	☐	☒
Historic Structures / Cultural and Archaeological Resources	Is there a building or structure on the property, which is more than 75 years old or known to be historically significant?	Local Historical Commission / staff consultation	☐	☒
Site and Building Design	Is the redevelopment proposed within a distinctive area, such as a historic district, along a scenic road, cultural landscape, regional road or shoreline?	Staff consultation	☐	☒
Site and Building Design	Outside of distinctive areas, does the project consist of a single mass greater than 50,000 square feet?	Preliminary project plans	☐	☒
Site and Building Design	Does the project incorporate site design and building design features consistent with the Commission's design manual and design manual addendum guidelines?	Staff consultation	☒	☐
Landscape Design	Is the project subject to habitat restoration requirements resulting from on or off-site disturbance of significant wildlife and plant habitat?	SNRA map, Preliminary project plans	☐	☒
Landscape Design	Does the landscape design utilize appropriate, non-invasive plantings to reduce water use and maintenance needs, and is it consistent with existing landscape design features?	Preliminary landscape plans	☒	☐
Exterior Lighting Design	Is the project's exterior lighting design consistent with MPS HPCC2.11 and the Exterior Lighting Technical Bulletin and with the existing exterior lighting design?	Exterior lighting information including fixture cut sheets and foot-candle plans	☒	☐
Hazardous Materials & Waste	**Question**	**Required Info**	**Yes**	**No**
Hazardous Materials and Waste Management	Does the project involve a net increase in hazardous materials or hazardous wastes in an existing Wellhead Protection Area or a Potential Public Water Supply Area?	Project inventory, RPP map	☐	☒
Hazardous Materials and Waste Management	Does the project use, handle, generate, treat or store hazardous waste?	Project inventory	☐	☒
Solid Waste	Does the project involve a significant amount of land clearing wastes or construction and demolition debris?	Estimate of amounts of land clearing and construction/demo wastes, Plan to address recycling and disposal of wastes	☐	☒
Solid Waste	Does the project involve greater than 25,000 square feet of new development?	Preliminary project plans	☒	☐
Local Concerns	**Question**	**Required Info**	**Yes**	**No**
Town Concerns	Has the Town identified issues or concerns that should be addressed through DRI review?		☐	☒
Public Concerns	Has the public identified issues or concerns?		☐	☒

Responses in the shaded boxes may be included in the scope of CCC review. Consultation with CCC staff recommended.

Narrative on Responses in Shaded and Key Boxes

Land Use

Compact Growth and Resource Management: Is the development clustered on the site?

Response: The proposed project will be a hotel divided into two buildings. The two buildings will be connected on the upper levels. The hotel needs to be separated into two buildings due to the location of the site driveway which will be in the space currently occupied by a portion of Lantern Lane which will be abandoned. The driveway will connect to Main Street and to the remaining portion of Lantern Lane. While the project will include two buildings, a traditional cluster development does not apply since this project will be one lot the buildings are interconnected.

Water Resources

Drinking Water Quality and Quantity, Marine Water Embayments and Estuaries, Freshwater Ponds and Lakes: Is the project located in a Wellhead Protection Area, Potential Public Water Supply Area, Marine Water Recharge Area, or Fresh Water Recharge Area?

Response: The project is located in a Marine Water Recharge Area. The project is designed to provide an improvement in the quality of stormwater recharge from the existing condition by treating runoff from vehicular impervious areas for at least 80% TSS removal and reducing the amount of nitrogen load.

Energy

Energy: Has the project been designed to meet LEED Certification?

Response: The project intends to be a LEED certifiable project. A full analysis of the LEED credits will be performed as the design advances. This includes significant improvements to the stormwater management system, use of low impact development site techniques such as drought-tolerant native plants, energy efficient HVAC and appliances, low-flow plumbing fixtures, and locally-sourced, recycled construction materials.

Energy: Is the project Mixed Use as defined by the Regional Policy Plan?

Response: The project is not Mixed Use.

Energy: Is the project located outside an Economic Center? (Check "No" if Town has not adopted a Land Use Vision Map.)

Response: The project is located in Falmouth which has not adopted a Land Use Vision Map. The project is located on Main Street in Falmouth and is in the Business Redevelopment district. The purpose of this district is to promote downtown-type economic development and extend Falmouth's downtown area. This area has the characteristics of an Economic Center and the proposed development is in keeping with the goals of the Business Redevelopment district.

Economic Development

Low Impact and Compatible Development: Is the project located outside an Economic Center or an Industrial Trade Area? (Check "Yes" if Town has not adopted a Land Use Vision Map.)

Response: The project is located in Falmouth which has not adopted a Land Use Vision Map. The project is located on Main Street in Falmouth and is in the Business Redevelopment district. The purpose of this district is to promote downtown-type economic development and extend Falmouth's downtown area. This area has the characteristics of an Economic Center and the proposed development is in keeping with the goals of the Business Redevelopment district.

Low Impact and Compatible Development: Is the project located in an Industrial Trade Area? (Check "Yes" if Town has not adopted a Land Use Vision Map.)

Response: The project is located in Falmouth which has not adopted a Land Use Vision Map. The project is located on Main Street in Falmouth and is in the Business Redevelopment district as described above. This district, as it currently exists and as it is intended to exist in the future is not an Industrial Trade Area.

Affordable Housing

Community Participation (Commercial Projects): Does the change of use project require more mitigation than the credits received for the existing use?

Response: See Section 9 of this report for discussion.

Transportation

The following summarizes the guidance provided in the *Limited DRI Review Scoping Checklist* relative to Transportation as this guidance relates to the Project.

Congestion Management

Guidance: *Will the Project generate more than 250 new daily trips?*

Response: No. The Project is expected to generate 58 new daily vehicle trips on an average weekday and 102 new vehicle trips on a Saturday when compared to the existing uses that occupy the Project site.

Transportation Balance and Efficiency

Guidance: *Will the Project generate more than 250 new daily trips?*

Response: No. The Project is expected to generate 58 new daily vehicle trips on an average weekday and 102 new vehicle trips on a Saturday when compared to the existing uses that occupy the Project site.

Safety

Guidance: *Does the Project have direct access on or does the Project directly abut a regional roadway?*

Response: Yes. The Project site has direct access to and directly abuts Main Street (Route 28), a regional roadway under the jurisdiction of the Town of Falmouth.

Safety

Guidance: *Will the Project generate more than 25 new peak hour trips at a high crash location?*

Response: No. The Project is predicted to generate 3 new vehicle trips during the Saturday midday peak-hour (traffic volume hour with the highest predicted traffic volume increase).

See also Section 10 of this report

Hazardous Materials and Waste

Solid Waste: *Does the project involve greater than 25,000 square feet of new development?*

Response: Section 12 of this report

3. Massachusetts Historical Commission Notification Form

The following form was submitted to the Massachusetts Historical Commission. Per a phone conversation, the Commission stated that they have “no comments” and therefore did not provide a written response.

4. Nitrogen Loading Analysis

Hancock Associates has calculated the existing and proposed nitrogen loading at the site and found the proposal will result in a reduction in the loading from 2.40 ppm to 1.22 ppm. Please refer to the calculations in Appendix 2 of this report, performed in accordance with Cape Cod Commission Technical Bulletin 91-001 dated April 1992.

The project will maintain or reduce levels of nitrogen loading.

5. Stormwater Management and Landscape Design

In the existing condition stormwater from the majority of the project area drains to a drainage structure located in the central portion of the site. This structure does not appear to have an outlet and ponding has been observed during major storm events. Stormwater runoff from the remaining portions of the site drain over-land to the property lines. Stormwater runoff from a portion of properties to the north and a portion of Lantern Lane drain onto the property. There is a catch basin in that area that is full of debris and therefore not functioning.

In the proposed condition the drainage system will consist of catch basin filter insert treatment devices and a subsurface stormwater storage system consisting of plastic R-Tanks, both systems are manufactured by ACF Environmental.

Please refer to the Stormwater Management Report for more details. The system meets or exceeds MassDEP Stormwater Standards and the Town Of Falmouth requirements.

Similarly, a full landscape design has been submitted that utilizes appropriate, non-invasive plantings to reduce water use and maintenance needs consistent with existing landscape design features in the downtown Falmouth area.

See Landscape Plan for more detail.

6. Open Space Provisions

OS1.3 Open Space Requirements: *All development, excepting municipal projects serving municipal purposes, that qualifies as a DRI shall provide permanently restricted upland open space in accordance with the proportional calculation described below:*

Total Development Area to Total Open Space Provided:

Proportion Required	*Location of Development*
2:1	*Development in Growth Incentive Zones/Economic Centers*
1:2	*Development in Significant Natural Resource Areas*
1:1	*Development in all other areas*

For towns without designated Economic Centers, a DRI shall comply with the open space requirements based on its location relative to SNRA.

Calculation Based on Development Area:

A project's open space requirement is calculated in direct proportion to the project's development area. For the purposes of calculating the open space requirement, the development area for new development and redevelopment is any previously undisturbed upland area (including upland areas that are functioning as habitat) affected by "development" as defined in the Definitions section of this document. Additional guidance can be found in Guidelines for Calculation and Provision of Open Space in DRIs, Technical Bulletin 94-001, as amended.

Response:

The project is a redevelopment project that will realize 40% open space. The project is located in Falmouth which has not adopted a Land Use Vision Map and does not have mapped Growth Incentive Zones or Economic Centers. The project is however located on Main Street in Falmouth and is in the Business Redevelopment Zoning district. The purpose of this district is to promote downtown-type economic development and extend Falmouth's downtown area. This area has the characteristics of an Economic Center and the proposed development is in keeping with the goals of the Business Redevelopment district.

The exhibit below depict the existing and proposed disturbed areas within the site. There will be NO INCREASE IN THE DISTURBED AREA ON SITE as a result of the development. The project is a redevelopment project and is therefore exempt from the commission's Open Space requirements.

OS1.8 Open Space Requirements and Parking Garages: *As an incentive toward minimizing impervious areas, protecting open space, and maintaining or improving community character, projects meeting parking requirements under proposed buildings or as a multi-storied parking garage may reduce their open space requirement by an amount equivalent to the square footage of garaged parking. Open space credit as provided by this MPS may not be obtained for parking spaces provided in excess of the minimum number of spaces required by local zoning.*

Response: The project does not provide more parking than is required by Falmouth Zoning. 121 parking spaces are required by Falmouth Zoning (1.1 per guest room). 86 spaces are provided on site with 59 spaces provided under the building (garage), 25 provided open air spaces and 37 spaces provided off-site within a

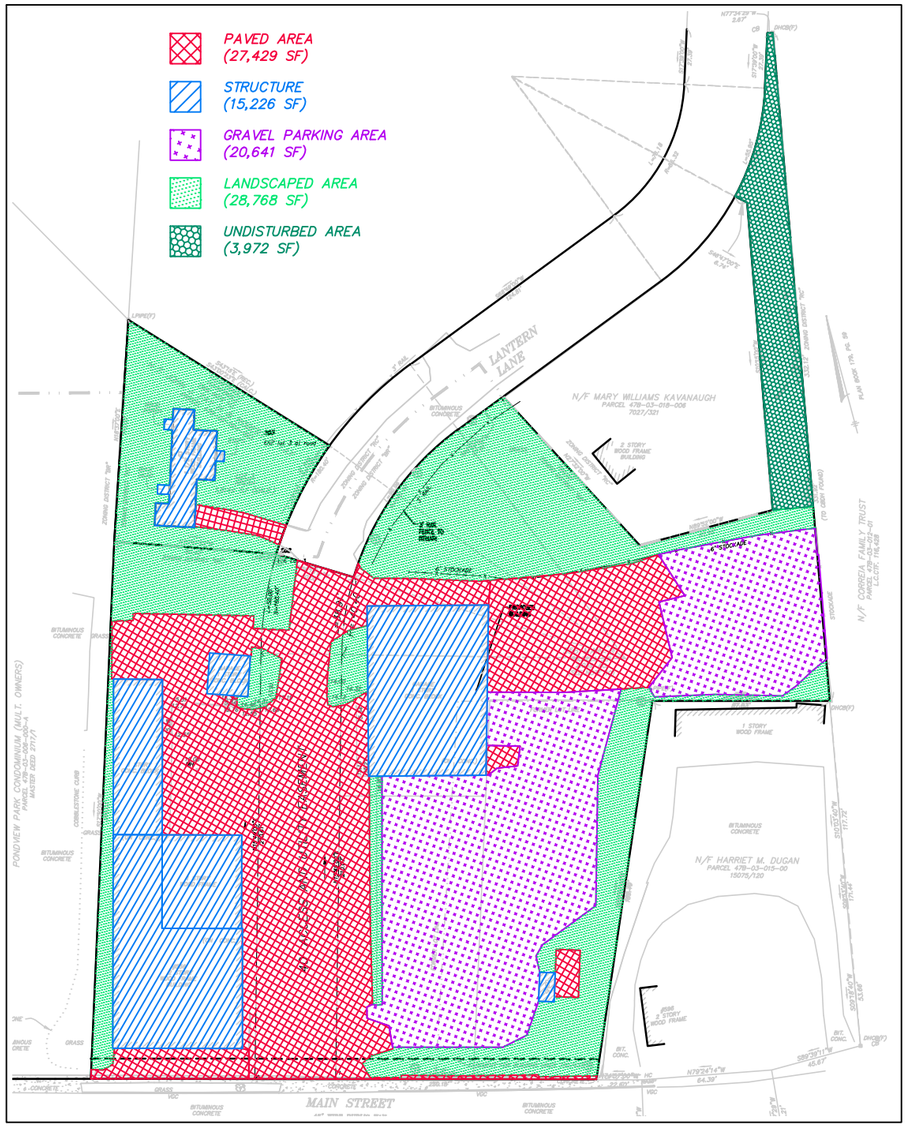
paring lot located within 300 feet of the site as allowed by Falmouth Zoning By-law. The garage spaces total approximately 19,000 SF of the parking areas, representing 20% of the site.

ZONING

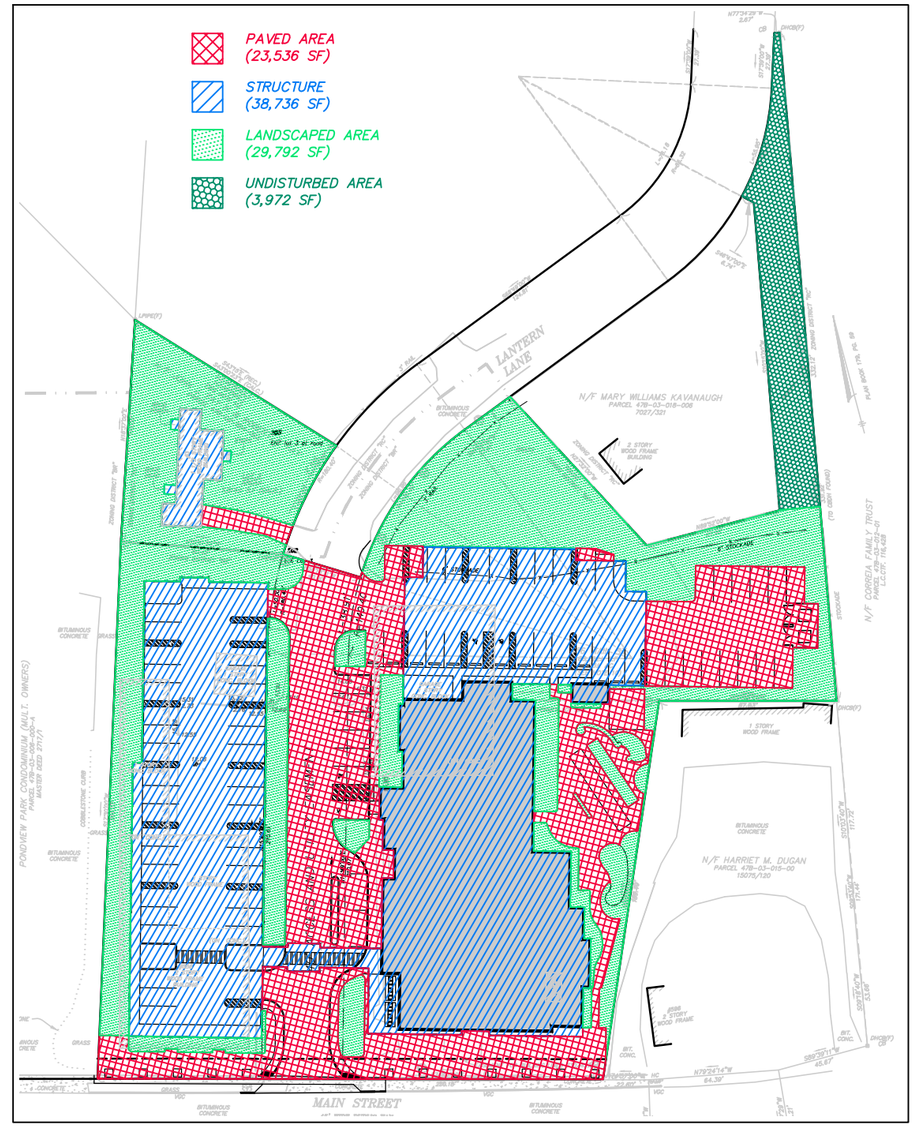
BUSINESS REDEVELOPMENT DISTRICT

ASSESSORS

PARCEL ID: 47B-02-005-001
PARCEL ID: 47B-02-005-001



EXISTING CONDITION



PROPOSED CONDITION

SCALE: 1" = 30'

0 30 60 120

SITE ADDRESS:

#556
MAIN STREET

Falmouth,
Massachusetts
02540

PREPARED FOR:

FALMOUTH
HOSPITALITY,
LLC

2 Lan Drive
Westford, Massachusetts 01886

HANCOCK
ASSOCIATES

Civil Engineers

Land Surveyors

Environmental
Consultants

315 Elm Street, Marlborough, MA 01752
Voice (508) 460-1111, Fax (508) 460-1121
www.hancockassociates.com

NO.	BY	APP	DATE	ISSUE/REVISION DESCRIPTION

DATE: 12/02/13	DRAWN BY: KAC
SCALE: 1"=40'	CHECK BY: JP

DISTURBED AREA PLAN

PLOT DATE: Dec 03, 2014 5:11 pm
PATH: F:\Civil 3D Projects\17791\DWG\

DWG: 17791driareas_recover.dwg

LAYOUT: ZA

SHEET: OF 6

PROJECT NO.: 17791

7. Energy Use

Information on the project's energy use in accordance with Technical Bulletin 09-002, *DRI Guidelines for Energy Compliance*, as amended.

The Applicant will cause an energy audit to be performed on the existing conditions and will incorporate recommendations from that audit into the project design in accordance with Minimum Performance Standard E1.1. Furthermore, the project shall be designed to earn Energy Star certification and to comply, where possible, with current ANSI/ASHRAE/IESNA Standard 90.1-2007, Section 5.4 or current prerequisite LEED certified standard. The project will be LEED certifiable to at least base standard. As such, the Project would be seeking a waiver from the Commission requiring redevelopment projects involving net new development providing a minimum of 10 percent of a building's electrical demand through on-site renewable energy generation.

8. Economic Impact

Project, employment, and economic impact information in accordance with Technical Bulletin 04-002, *DRI Economic Development Technical Bulletin*, as amended.

The proposed development will create temporary construction jobs as well as year round traveler accommodation jobs. The new, year round jobs will pay wages consistent with traveler accommodation wages for the area. Health benefits will be provided to the full time employees. It is estimated that the hotel will staff anywhere from 30 to 38 employees, including both full time and part time. The new hotel will directly benefit the area and it is expected that the majority of new employment positions will be filled locally as encouraged under ODRP 3.1.3. In addition, the Applicant will encourage the utilization of local contractors, workers and suppliers as recommended by ODRP 3.3.3. As a result, it is not anticipated that the development will have a meaningful impact on the need for affordable housing in the Falmouth Area. However, the Applicant has evaluated the affordable housing mitigation contribution for the project. More information regarding the same can be found in Section 7.

Although the hotel is not proposed within a certified Growth Activity Center or a Growth Incentive Zone, the project will be located on Main Street in Falmouth within a Business Redevelopment zoning district. The purpose of this zoning district is to promote downtown-type economic development and extend Falmouth's downtown area. Accordingly, this area has the characteristics of an Economic Center and will provide the same benefits to Falmouth as encouraged by the Regional Policy Plan MPS 3.2.1. The Applicant also believes the location meets the intent of ODRP 3.2.5 in that the infrastructure on Main Street in Falmouth is suitable for the project in question.

As referenced in the Existing Conditions narrative, there are currently four buildings located on the proposed project site. These buildings are presently utilized for commercial purposes and are all in a state of disrepair. ODRP 3.2.7 encourages redesign and revitalization of existing strip developments in situations where there is adequate infrastructure. This project will meet the intent of this recommendation by razing the existing, non-historic, buildings which have fallen into disrepair and replacing them with a brand new hotel designed to be in keeping with the character and nature of downtown Falmouth. The construction of a new hotel conveniently located in beautiful downtown Falmouth will also encourage increased tourism as recommended by ODRP 3.1.6. This increase in tourism will have a net economic benefit to local Cape Cod business, and in particular, to businesses located in Falmouth.

Finally, the proposed development does not have a significant impact upon the purposes and values identified by Section One of the Act. The property is previously developed and therefore the Applicant is not proposing to disturb "natural undeveloped areas, wildlife, flora and habitats for endangered species." *See Section 1(b) of the Act*. Furthermore, the property is not a historic property nor do the existing buildings or land possess any unique "natural, coastal, scientific, historical, cultural, [or] recreational values" for which there is a strong interest to preserve. *See Section 1(a) of the Act.* Rather, the majority of the property is in a dilapidated state and is primed for redevelopment. This redevelopment will bring balanced economic growth and promote the expansion of employment opportunities which is in furtherance of Section 1 of the Act. *See Sections 1(b) and 1(d).*

9. Affordable Housing Requirement

The proposed use falls into the "Other" category (AH 3.1). The Applicant has reviewed Technical Bulletin 10-001 and has calculated the amount of regional impact/affordable housing mitigation for development in the "Other" category. According to data provided by the Commercial Buildings Energy Consumption Survey from the U.S. Department of Energy, the project will generate one employee for every 2,074 square feet. [1] The Applicant currently estimates that the proposed building will be approximately 65,000 square feet. Therefore the expected number of employees will be 31.

In order to determine the percentage of employees that will earn less than the Average Wage, Technical Bulletin 10-001 requires the Applicant to refer to the U.S. Department of Labor's Bureau of Labor Statistics ("BLS"), National Industry-Specific Occupational Employment and Wage Estimates.[2] According to the BLS website, the National Average Wage for All Occupations as of May 2013 was $22.33. Technical Bulletin 10-001 then requires the Applicant to determine the percentage of workers in the proposed industry that will earn less than the National Average Wage for All Occupations. This is done by reviewing the data provided by BLS under their National Industry Specific Occupational Employment and Wage Estimates. The proposed use, hotel, qualifies as a Traveler Accommodation (NAICS 721100). According to the estimates provided, Traveler Accommodations account for a total of 1,771,940 jobs nationwide[3]. Of those, approximately 91% are estimated to pay below $22.33 per hour. Accordingly, the total percentage of jobs within the Traveler Accommodation industry below the National Average Wage for All Occupations is expected to be 91%.

Per Technical Bulletin 10-001, the total number of jobs expected in connection with the project that will fall below the National Average Wage for All Occupations is 28.[4] The Applicant is then directed to utilize that number to calculate the mitigation per square foot multiplier ("PSF"). As of March 2014, for all DRIs located outside of Economic Centers, the PSF for an "Other" category building is $5.11 x (# of jobs less than the average wage/ (total square feet/1000))[5]. Using that equation, the PSF for this project would be $2.20. That number is then used to calculate the total proposed mitigation amount.[6]

$2.20 x 65,000 = $143,000.00

However, the Applicant's proposal includes the redevelopment of 19,058 s.f. of existing commercial space. Of that total 19,058 s.f., approximately 11,802 s.f. is existing retail space and approximately 7,256 is existing warehouse space. See attach plan entitled "Building Areas Exhibit." As of March 1, 2014, for DRIs not located in economic centers, the PSF for retail uses is $10.75. The PSF for Warehouse Uses is $2.52. According, the total amount of credit for the existing uses that the Applicant is allowed to utilize to offset the mitigation amount described above is $145,156.62. [7]Accordingly, there is a net zero mitigation owed for this proposal and we believe this section is appropriate for scoping.

---

[1] http://www.eia.gov/consumption/commercial/data/2003/pdf/b1-b46.pdf "Lodging" building type.
[2] www.bls.gov/oes/current/oessrci.htm
[3] http://www.bls.gov/OES/Current/naics4_721100.htm
[4] 31 x .91 = 28.2
[5] $5.11(28/65) = $2.201
[6] PSF x total square footage = mitigation amount.
[7] ($10.75 x 11,802 s.f.) + ($2.52 x 7,256 s.f.) = $145,156.62

10. Transportation

See attached narrative and supplements from Vanasse Associates, Inc.

11. Exterior Lighting

Information on exterior lighting in accordance with Technical Bulletin 95-001, *DRI Guidance for Exterior Lighting Design*, as amended.

General Exterior Lighting Design Guidance ("GELDG") standard 2.1 states that light sources should be either high pressure sodium or metal halide. However, the standard suggests that other sources may be considered by the Commission. The Applicant is proposing to utilize LED lighting. LED lighting has been found to be efficient and extremely versatile. LEDs are "directional" light sources that emit light in a specific direction, unlike incandescent and compact fluorescent bulbs which emit light, and heat, in all directions.[8] Furthermore, LED lights have been demonstrated to be a better alternative than high pressure sodium in many instances for street and security lighting because of their efficiency, effectiveness and long lasting life. [9]The Applicant suggests that LED lighting is a suitable alternative and requests that the Commission allow the use of the same for this project.

The Applicant will ensure that "Pole Mount" or "Wall Pack" luminaires are "Shoe box" type or decorative (with interior directional shields). *See* GELDG standard 2.2. The Applicant is not proposing any flood, area and/or up-lighting and will equip any wall pack luminaires with prismatic lenses**.** *See* GELDG standard 2.2. Though the Applicant will make all efforts to ensure that all luminaires on site will have a total cutoff of all light at less than 90 degrees from vertical, the Applicant requests a limited waiver for situations where pole or wall mounted fixtures utilize bulbs similar to what would be used in a residential setting and to allow for the use of LED lighting as requested above. *See* GELDG standard 2.3.

The Applicant will select reflectors of IES distribution in an effort to maximize efficiency. *See* GELDG 2.4. No light poles shall be in excess of 20' (base + pole+head). Light poles for walkway lighting shall not be higher than 12'. Location of wall pack luminaires shall not exceed 20'. Landscape luminaires will not be more than 42". Safety Accent Luminaires will be mounted not more than 36" from surface. *See* GELDG standard 2.5. In addition, all exterior lights, excepting "Landscape and Safety Accent Luminaires" per the standard, shall have a maximum initial horizontal foot-candle level of 8.0 foot candles. *See* GELDG standard 2.6.

The Applicant will provide the Technical Submittals per Technical Bulletin 95-001.

---

[8] See http://www.energystar.gov/index.cfm?c=lighting.pr_what_are

[9] See http://www.al-e.com/led-vs-sodium-lamps.
See also http://www1.eere.energy.gov/buildings/ssl/gatewaydemos_results.html.

12. Solid Waste and Hazardous Waste

Garbage will be routinely disposed of and temporarily stored in waste receptacles and/or outside dumpsters. Dumpsters shall be emptied weekly or more frequently as needed. Recyclables will be stored in approved containers to be located throughout the hotel. Said containers will be marked for the disposal of plastic, glass, cardboard and other waste ban materials and will be transferred to a single stream recycling facility as needed.

For information regarding single stream recycling and the process, please see the pamphlet entitled "Single Stream 'Recycling Made Simple'" from FCR Recycling attached to this submittal. Applicant plans to utilize FCR Recycling or a facility similar thereto for its single stream recycling needs.

Construction Period

During construction, dumpsters for recyclables will be placed next to a dumpster designated for trash. Contractors will be provided with instructions as to what may be recycled and what must be disposed of as trash. Clean Wood Scrap /Metal /Gypsum /Masonry / Cardboard make up 80% of Construction and Demolition recyclables. The following containers will be available onsite to ensure the 80%:

A Clean Wood Container
Masonry Container
Metal Container
Cardboard container for Window and Cabinet deliveries.
Gypsum Container during Drywall process.

All recyclables and trash during demolition and construction will be sorted onsite and placed into either the trash dumpster or the appropriate recyclable dumpster. These dumpsters shall be stored onsite until removal/emptying becomes necessary. At which point, the site manager will coordinate trash and recyclable removal. Again, the recyclables during construction will ultimately be transferred to a single stream recycling facility similar to Devens Recycling Center (DRC) for its C&D recycling needs. Please see below excerpt and link to DRC's website.

The Future Of Construction & Demolition Recycling

Devens Recycling Center (DRC) is a full service, 90,000 sq. ft. Construction and Demolition Recycling facility located on 11 acres in Devens, MA.
With a recycling capacity of 1500 tons per day, 6 bays, and a railroad spur track for both inbound and outbound materials, DRC currently recovers over 80% of the raw material from C&D materials. This recycled material is used as feedstock for such end markets as biofuel, wood pellets, landscaping mulch, hot-mix asphalt, cold patch, new concrete, and recycled cardboard products.

http://www.devensrecycling.com/services/main.htm

No hazardous materials other than ordinary household cleaning products will be stored on site. These cleaning products will be stored in closets, accessible only to employees, and away from guests and invitees. Furthermore, the site will be serviced by municipal sewer and water.

SINGLE STREAM
"Recycling Made Simple"

It ALL goes in together:

Newspapers, Magazines, Catalogs
Telephone/Soft Cover Books
Junk Mail/Envelopes (all types)
Paper (all colors, staples/paperclips are okay)
Paperboard (cereal/shoe boxes)
Milk/Juice Cartons
Cardboard/Brown Paper Bags
Plastic bottles and containers numbered #1-7
Soda/Juice/Water Bottles (glass or plastic)
Milk Jugs, Bleach/Detergent, Shampoo Bottles
Food containers (cottage cheese/margarine/yogurt)
Glass Bottles/Jars (any color)
Aluminum (pie plates/trays/foil)
Metal Cans (tin/steel/aluminum)

What NOT to include:

No Plastic Bags
No Unmarked Plastics (laundry baskets/chairs/toys)
No Windows/Light Bulbs
No Dishes, No Pyrex, No Ceramics
No Foam Packaging, No Styrofoam
No Aerosol Cans (paint/hairspray/cleaners)
No Recyclables Containing Food Waste

FCR Recycling
A Casella Company

Shaunna Schiller
1-508-863-0517

casella WASTE SYSTEMS

Randy Bissell
1-888-532-2735

Auburn, Massachusetts

every day…

business for a better environment

13. Water and Sewer Infrastructure and Capacity

The project will be served by municipal sewer and water infrastructure readily available in Main Street.

A 6" water main in Lantern Lane connected to a 10" main in Main Street exist proximate to the site. The proposed building will have domestic and fire connection directly to the 10" pipe in Main Street.

The demand for the project is estimated to be approximately **12,000 gallons per day** with a peak demand of 10-20 gallons per minute. Initial discussions with the Town of Falmouth Public Works indicate there is sufficient capacity in the municipal system. The building will feature a fully compliant fire suppression system with connection to the same water line. Final construction plan will feature the sprinkler design based on pressure and flow tests to be performed proximate to the site.

The existing sewer flows from the project site are approximately 965 gallons per day. This flow comes from 11,802 square feet of retail area and 7,256 square feet of warehouse area. Per 310 CMR 15.203 the peak sewage flow from the retail area is 590 gallons per day (50 gallons per 1,000 square feet per day). Based on the Falmouth Zoning Bylaw the warehouse area should have available space for 1 parking space per 300 square feet. Therefore the warehouse space could have 25 employees. Per 310 CMR 15.203 the peak sewage flow from the warehouse is 375 gallons per day (15 gallons per day per employee).

Projected sewer flows are **12,100 gallons per day** based on 310 CMR 15.203 design flows for a 110 room hotel. A sewer service for the proposed building will be connected to the existing 18" sewer line in the center of Main Street. Initial discussions with the Town of Falmouth Public Works indicate there is sufficient capacity in the municipal system.

Appendix 1. Required Plans (Full Size Plans Under Separate Cover)

JD LaGrasse & Associates, Inc.
Architects, Engineers & Land Planners

One Elm Square
Andover, MA 01810

T 978.470.3675
F 978.470.3670

1420 Celebration Blvd.
Celebration, FL 34747

www.lagrassearchitects.com

Springhill Suites by Marriott

Falmouth, MA

No.	Description	Date
1	SUBMISSION	11/6/14

Street Perspective 1

Project number	2404
Date	9 APRIL 2014
Drawn by	DJM
Checked by	JDL

A1

Scale 12" = 1'-0"

11/6/2014 12:20:54 PM

JD LaGrasse & Associates, Inc.
Architects, Engineers & Land Planners

One Elm Square
Andover, MA 01810

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1420 Celebration Blvd.
Celebration, FL 34747

www.lagrassearchitects.com

Springhill Suites by Marriott

Falmouth, MA

No.	Description	Date
1	SUBMISSION	11/6/14

Street Perspective 2

Project number	2404	A2
Date	9 APRIL 2014	
Drawn by	DJM	
Checked by	JDL	Scale 12" = 1'-0"

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JD LaGrasse & Associates, Inc.
Architects, Engineers & Land Planners
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Andover, MA 01810
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1420 Celebration Blvd.
Celebration, FL 34747
www.lagrassearchitects.com

Springhill Suites by Marriott

Falmouth, MA

No.	Description	Date
1	SUBMISSION	11/6/14

Street Elevation

Project number	2404	A3
Date	9 APRIL 2014	
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Checked by	JDL	Scale 1/16" = 1'-0"

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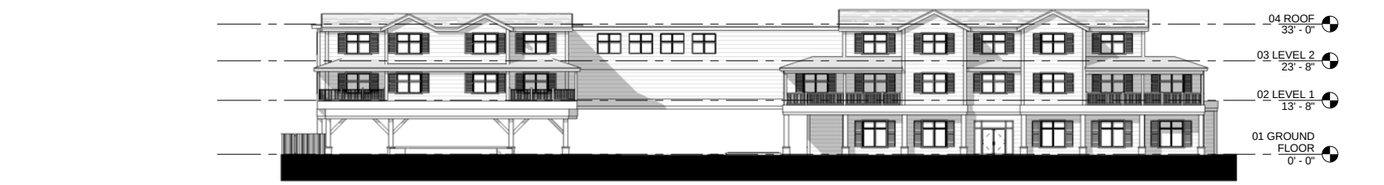
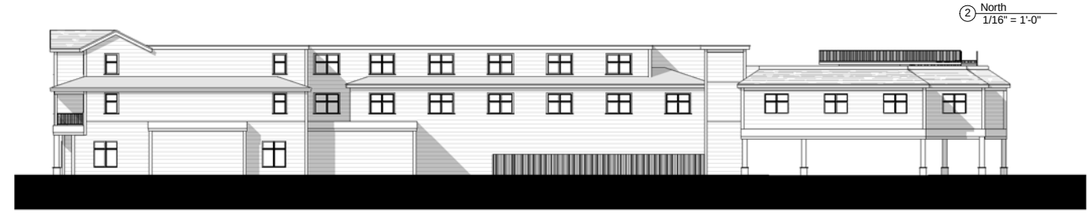


6 Copy of South
1/16" = 1'-0"

2 North
1/16" = 1'-0"



1 East
1/16" = 1'-0"

5 East1
1/16" = 1'-0"

3 West
1/16" = 1'-0"

4 West1
1/16" = 1'-0"

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Springhill Suites by Marriott
556 Main Street Falmouth, MA

PREPARED FOR: Falmouth Hospitality LLC.
2 LAN DRIVE
WESTFORD, MA.

TITLE
SCEMATIC ELEVATIONS

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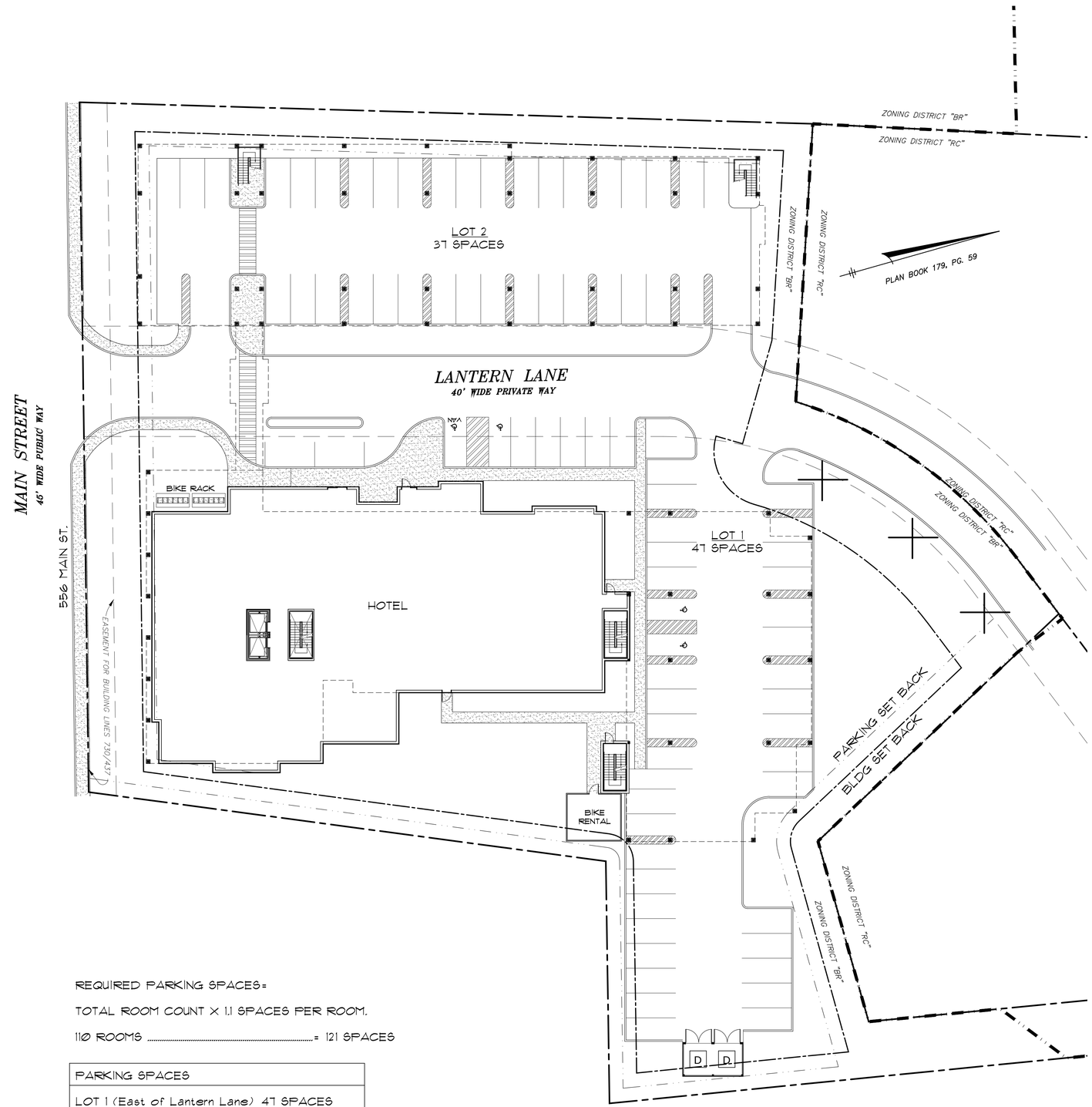
REVISION	
1	11/6/14

SCALE: 1/16" = 1'-0"
DATE: 9 APRIL 2014
JOB NO. 2404
SHEET # A4



REQUIRED PARKING SPACES=

TOTAL ROOM COUNT X 1.1 SPACES PER ROOM.

110 ROOMS ..... = 121 SPACES

PARKING SPACES	
LOT 1 (East of Lantern Lane)	47 SPACES
LOT 2 (West of Lantern Lane)	37 SPACES
LOT 3 (OFF-SITE)	37 SPACES
TOTAL	121 SPACES

JD LaGrasse & Associates, Inc.
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Springhill Suites by Marriott

556 Main Street Falmouth, MA

prepared for: Falmouth Hospitality, LLC

location: 2 Lan Drive Westford, MA 01886

Title

GROUND FLOOR PLAN

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Revisions

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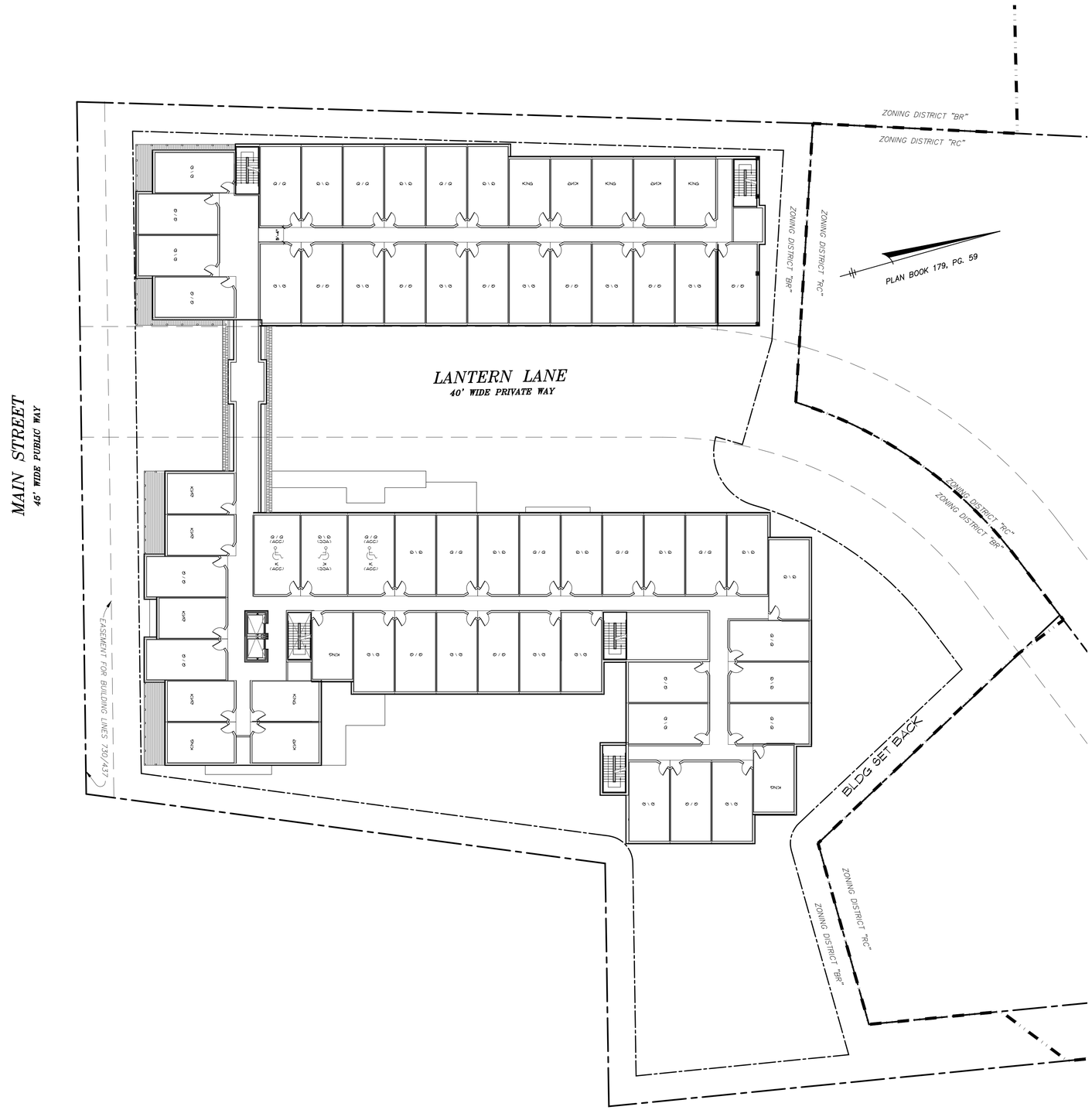

JD LaGrasse
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Springhill Suites by Marriott

556 Main Street Falmouth, MA

prepared for: Falmouth Hospitality, LLC

location: 2 Lan Drive Westford, MA 01886

Title

1ST FLOOR PLAN

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Revisions

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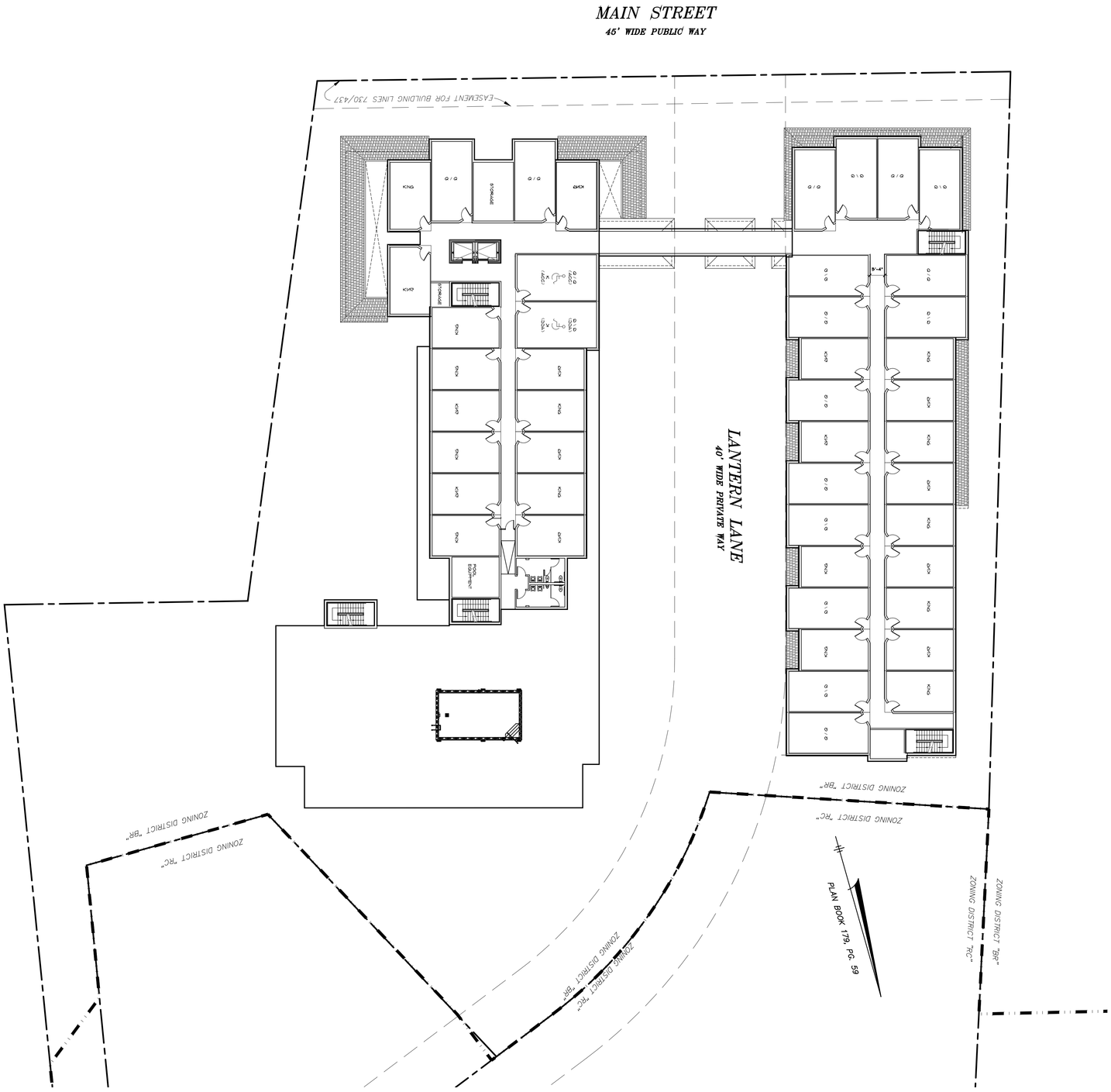

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prepared for: Falmouth Hospitality, LLC

location: 2 Lan Drive Westford, MA 01886

title

2ND FLOOR PLAN

Springhill Suites by Marriott

556 Main Street Falmouth, MA

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Revisions	
Mark	Date
01	08 NOV. 2014

Date 2 JUNE 2014
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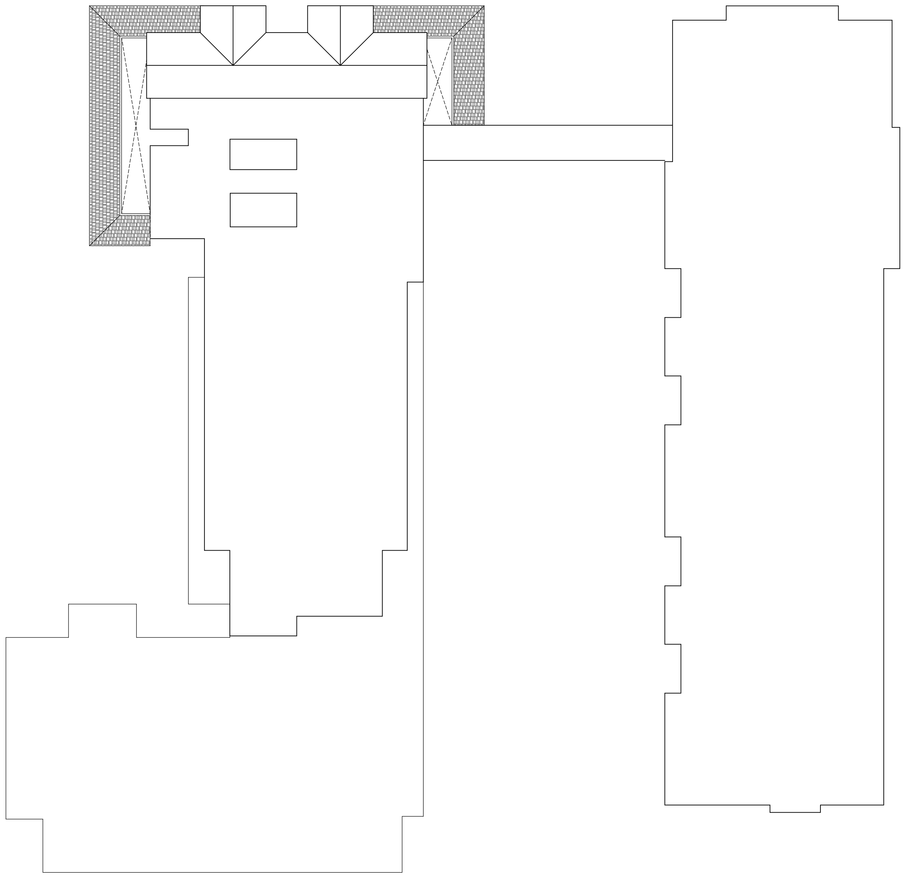
Job No. 2404
Sheet No. A7



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Sheet No.

2404

Job No.

1"=20'

Scale

2 JUNE 2014

Date

Revisions

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	08 NOV 2014

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prepared for: Falmouth Hospitality, LLC

location: 2 Lan Drive Westford, MA 01886

title

ROOF PLAN

Springhill Suites
by
Marriott

556 Main Street Falmouth, MA

JD LaGrasse
& Associates, Inc.
Architects - Engineers - Interiors - Land Planning
One Elm Square, Andover, MA 01810
T. 978-470-3675 F. 978-470-3670
www.lagrasseorchitects.com ~ E-mail: JDLA@AOL.COM

PERMIT SET

Springhill Suites

556 Main Street
Falmouth, Massachusetts 02540

Prepared for

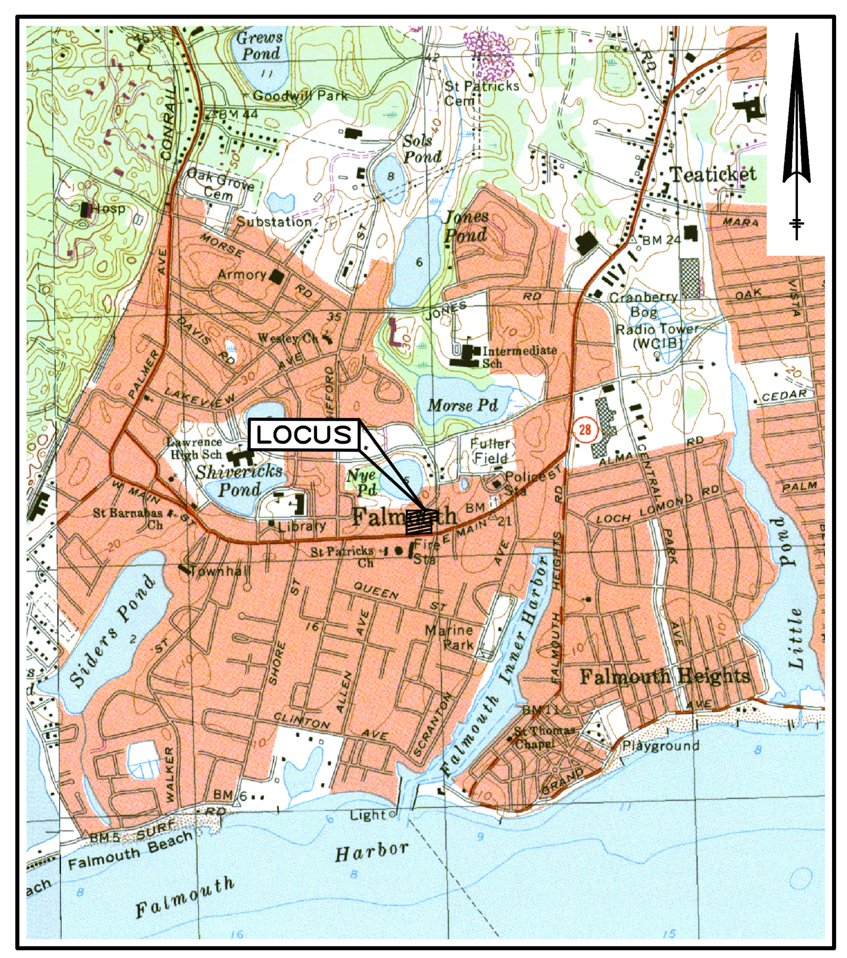
Falmouth Hospitality, LLC

GENERAL NOTES

1. THE CONTRACTOR SHALL VERIFY THE LOCATION AND RELATIVE ELEVATION OF BENCH MARKS PRIOR TO COMMENCEMENT OF CONSTRUCTION. ANY DISCREPANCY SHALL BE REPORTED TO THE ENGINEER.
2. CONTRACTOR SHALL FURNISH CONSTRUCTION LAYOUT OF BUILDING AND SITE IMPROVEMENTS. THIS WORK SHALL BE PERFORMED BY A PROFESSIONAL LAND SURVEYOR.
3. SAFETY MEASURES, CONSTRUCTION METHODS AND CONTROL OF WORK SHALL BE RESPONSIBILITY OF THE CONTRACTOR.
4. ALL SITE CONSTRUCTION SHALL COMPLY WITH THE FALMOUTH DEPARTMENT OF PUBLIC WORK STANDARDS.
5. CONTRACTOR SHALL BE RESPONSIBLE FOR REPAIR AND/OR REPLACEMENT OF ANY EXISTING IMPROVEMENTS DAMAGED DURING CONSTRUCTION THAT ARE NOT DESIGNATED FOR DEMOLITION AND / OR REMOVAL HEREON. DAMAGED IMPROVEMENTS SHALL BE REPAIRED TO THE SATISFACTION OF THEIR RESPECTIVE OWNERS.
6. ANY INTENDED REVISION OF THE HORIZONTAL AND/OR VERTICAL LOCATION OF IMPROVEMENTS TO BE CONSTRUCTED AS SHOWN HEREON SHALL BE REVIEWED AND APPROVED BY ENGINEER PRIOR TO IMPLEMENTATION.
7. THIS PLAN IS NOT INTENDED TO SHOW AN ENGINEERED BUILDING FOUNDATION DESIGN, WHICH WOULD INCLUDE DETAILS AND FINAL ELEVATIONS OF FOOTINGS, WALLS AND SUBSURFACE DRAINAGE TO PREVENT INTERIOR FLOODING. SEE ARCHITECTURAL AND/OR STRUCTURAL DRAWINGS.
8. PROPOSED BUILDING FOUNDATION CONFIGURATION AND LOCATION ON THE LOT AS SHOWN ARE CONCEPTUAL AND SHALL BE VERIFIED AS TO CONFORMANCE WITH FINAL ARCHITECTURAL PLANS AND ZONING ORDINANCES PRIOR TO CONSTRUCTION.
9. THE CONTRACTOR SHALL BE RESPONSIBLE FOR RECORDING HORIZONTAL AND VERTICAL MEASUREMENTS FOR ALL SUBSURFACE STRUCTURES. THIS INFORMATION SHALL BE REPORTED TO THE ENGINEER.
10. TRASH AND RECYCLING COLLECTION AREAS ARE LOCATED WITHIN THE BUILDINGS.
11. STANDARD PARKING SPACES ARE 9' X 18', TYPICAL SITE DRIVEWAYS ARE 24' WIDE. HANDICAP PARKING SPACES SHALL MEET ADA REQUIREMENTS.

REGULATORY NOTES

1. CONTRACTOR SHALL CONTACT "DIG-SAFE" FOR AN UNDERGROUND UTILITY MARKING AT 811 AT LEAST 72 HOURS PRIOR TO THE COMMENCEMENT OF ANY WORK.
2. CONTRACTOR SHALL MAKE HIMSELF AWARE OF ALL CONSTRUCTION REQUIREMENTS, CONDITIONS AND LIMITATIONS IMPOSED BY PERMITS AND APPROVALS ISSUED BY REGULATORY AUTHORITIES PRIOR TO THE COMMENCEMENT OF ANY WORK. CONTRACTOR SHALL COORDINATE AND OBTAIN ALL CONSTRUCTION PERMITS REQUIRED BY REGULATORY AUTHORITIES.
3. ALL WORK OUTSIDE OF THE BUILDING THAT IS LESS THAN 10 FEET FROM THE INSIDE FACE OF THE BUILDING FOUNDATION SHALL CONFORM WITH THE UNIFORM STATE PLUMBING CODE OF MASSACHUSETTS, 248 CMR 2.00.
4. CONSTRUCTION ACTIVITIES SHALL CONFORM TO THE RULES AND REGULATIONS OF THE OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA).



VICINITY MAP

SCALE: 1"=2,000'

PROJECT TEAM

OWNER & APPLICANT:
RYAN DEVELOPMENT, LLC
2 LAN DRIVE
WESTFORD, MASSACHUSETTS 01886

CIVIL ENGINEERS:
HANCOCK ASSOCIATES
185 CENTRE STREET
DANVERS, MASSACHUSETTS 01923

ARCHITECT:
JD LAGRASSE AND ASSOCIATES, INC.
ONE ELM SQUARE
ANDOVER, MASSACHUSETTS 01810

SHEET INDEX

C1.. TITLE SHEET
EC.. EXISTING CONDITIONS PLAN
C2.. SITE PREPARATION AND EROSION CONTROL PLAN
C3.. LAYOUT AND MATERIALS PLAN
C4.. GRADING AND UTILITIES PLAN
C5,C6.................................. SITE DETAILS
L1.0...................................... LANDSCAPE PLAN

LEGEND

EXISTING	DESCRIPTION	PROPOSED
234	SURFACE CONTOUR	18
	EDGE OF PAVEMENT	
x	FENCE	
	EDGE OF WOODED AREA	
8"CI S	SEWERLINE & MANHOLE WITH PIPE SIZE, MATERIAL & FLOW DIRECTION	S
12"RCP D	DRAINLINE WITH PIPE SIZE, MATERIAL & FLOW DIRECTION, CATCHBASIN, MANHOLE & ROUND CATCHBASIN	SD D
WV W 6"CI	WATER MANHOLE, WATER MAIN WITH SIZE, TEE, GATE VALVE & FIRE HYDRANT	TSV W WG
GV G 10"DI	GAS MAIN WITH SIZE & GATE VALVE	
#181 OHW	EXISTING UTILITY POLE WITH DESIGNATION OVERHEAD WIRES AND GUY POLE	
× 232.6	SPOT ELEVATION	16.60 ×
26.8 12"M	PROMINENT DECIDUOUS TREE WITH ELEVATION, SIZE AND SPECIES	
M	MANHOLE (UNKNOWN UTILITY)	
BM	BENCHMARK	
DHCB	DRILL HOLE IN CONCRETE BOUND	
I.PIPE	IRON PIPE	
I.ROD	IRON ROD	

SITE ADDRESS:

#556
MAIN STREET
Falmouth,
Massachusetts
02540

PREPARED FOR:

FALMOUTH HOSPITALITY, LLC
2 Lan Drive
Westford, Massachusetts 01886

HANCOCK ASSOCIATES

Civil Engineers
Land Surveyors
Environmental Consultants

315 Elm Street, Marlborough, MA 01752
Voice (508) 460-1111, Fax (508) 460-1121
www.hancockassociates.com

NO.	BY	APP	DATE	ISSUE/REVISION DESCRIPTION
1	KAC	JP	11/6/14	MISCELLANEOUS REVISIONS

DATE: 12/02/13 DRAWN BY: KAC
SCALE: AS NOTED CHECK BY: JP

TITLE SHEET

PLOT DATE: Nov 06, 2014 2:01 pm
PATH: F:\Civil 3D Projects\17791\DWG\

DWG: 17791title.dwg
LAYOUT: TS
SHEET: 1 OF 6

C1

PROJECT NO.: 17791

REFERENCES:

DEED BOOK 4774, PAGE 078 & CONF.
DEED IN DEED BOOK 4806, PAGE 89; AND CLAUSES 6 & 11 OF TRUST IN DEED BOOK 4737, PAGE 136.
PLAN BOOK 179, PAGE 59

EASEMENTS:
DEED BOOK 730, PAGE 437, BUILDING LINE EASEMENT TO TOWN OF FALMOUTH;

DEED BOOK 1115, PAGE 111, (ETC.)
PRIVATE ROAD RIGHTS IN LANTERN LA.

DEED BOOK 1157, PAGE 257, C & V ELECT. COM. & NET&T

DEED BOOK 1205, PAGE 563, TOWN OF FALMOUTH FOR WATER

OTHER PLANS:
PLAN BOOK 72, PAGE 77
PLAN BOOK 81, PAGE 19
PLAN BOOK 87, PAGE 105
PLAN BOOK 129, PAGE 59
PLAN BOOK 157, PAGE 133
PLAN BOOK 253, PAGE 29
PLAN BOOK 322, PAGE 92
PLAN BOOK 356, PAGE 40
PLAN BOOK 362, PAGE 45
LAND COURT PLAN 10790-D
LAND COURT PLAN 13871-A
LAND COURT PLAN 36330-B
OCTOBER 1923 LAYOUT OF A PORTION OF EAST MAIN ST.

RECORD OWNER:

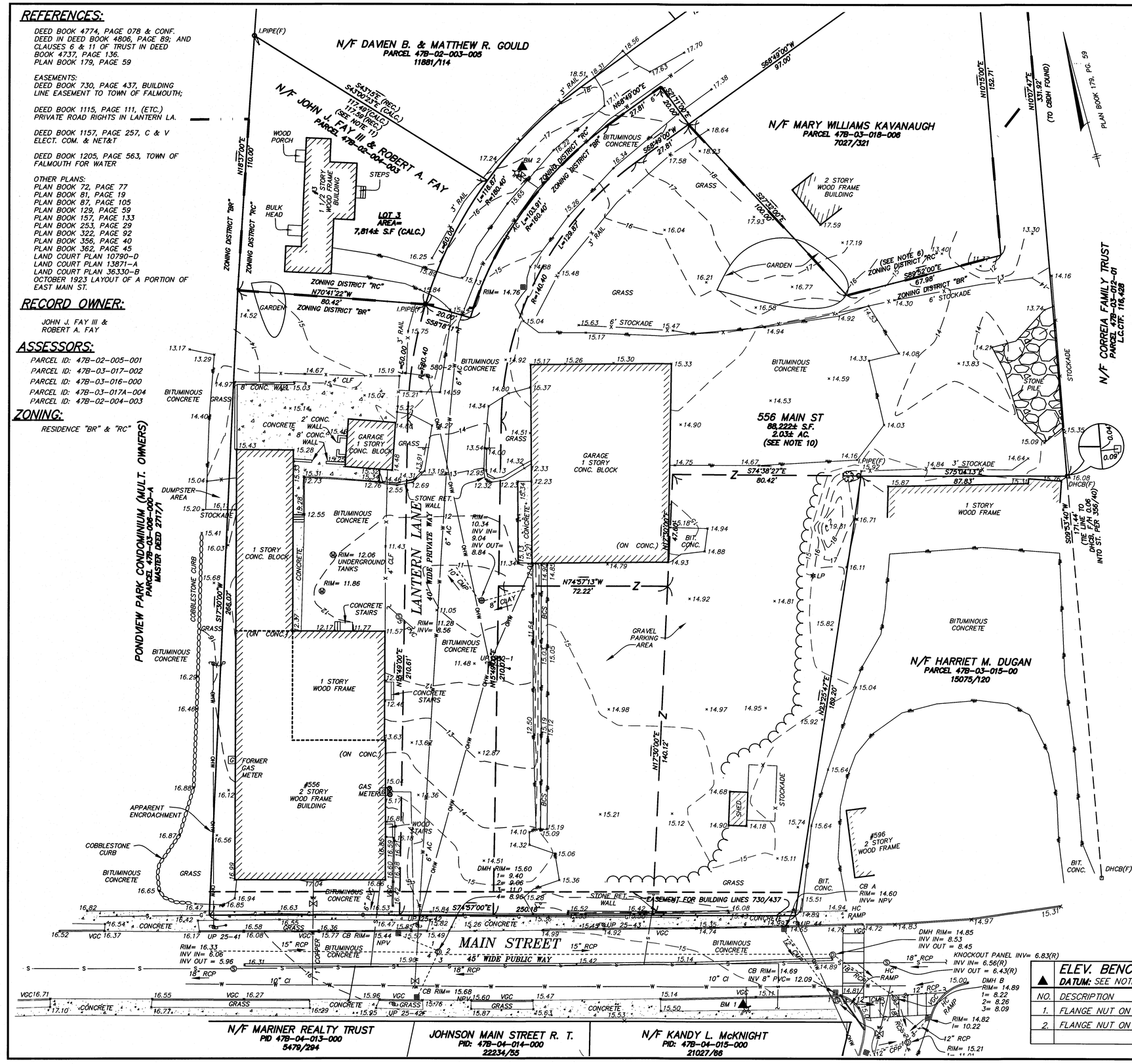
JOHN J. FAY III &
ROBERT A. FAY

ASSESSORS:

PARCEL ID: 47B-02-005-001
PARCEL ID: 47B-03-017-002
PARCEL ID: 47B-03-016-000
PARCEL ID: 47B-03-017A-004
PARCEL ID: 47B-02-004-003

ZONING:

RESIDENCE "BR" & "RC"



NOTES:

1) PROJECT SOURCE BENCHMARK IS THE RIM AND INVERT ELEVATION OF A DRAIN MANHOLE AT THE INTERSECTION OF LANTERN LANE AND MAIN STREET. SAID RIM ELEVATION IS REPORTED TO BE 15.60 AND SAID INVERT IS REPORTED TO BE 9.06. SHOWN ON A PLAN ENTITLED "TOWN OF FALMOUTH WASTEWATER IMPROVEMENTS, MAIN STREET STATION 30+33 TO 39+40,", DATED JANUARY 1983..

2) FIELD LOCATIONS OF STRUCTURES AND FROM AVAILABLE RECORD INFORMATION ON FILE AT THE TOWN ENGINEERING OFFICES, TOWN D.P.W., MASS HIGHWAY DEPT. AND UTILITY COMPANIES. OTHER UNDERGROUND UTILITIES MAY EXIST. IT SHALL BE THE RESPONSIBILITY OF THE DESIGN ENGINEER AND THE CONTRACTOR TO VERIFY THE LOCATION, SIZE & ELEVATION OF ALL UTILITIES WITHIN THE AREA OF PROPOSED WORK AND TO CONTACT "DIG-SAFE" AT 1-888-344-7233 AT LEAST 72 HOURS PRIOR TO ANY EXCAVATION, DEMOLITION OR CONSTRUCTION.

3) THE LOCATION OF UNDERGROUND STORAGE TANKS, IF ANY, ARE UNKNOWN.

4) THIS TOPOGRAPHIC SURVEY WAS PREPARED TO MEET NATIONAL MAP ACCURACY STANDARDS AT A SCALE OF 1"=20' HORIZONTALLY AND A 1 FOOT CONTOUR INTERVAL VERTICALLY. ANY REPRODUCTIONS OR RE-SCALING MAY EFFECT THE MAP ACCURACY.

5) THE PROPERTY IS LOCATED IN FLOOD ZONE X (OTHER FLOOD AREAS) AS SHOWN ON THE FLOOD INSURANCE RATE MAP PANEL NUMBER 255211 0736 J, DATED MAY 13, 2013.

6) APPROXIMATE LOCATION OF ZONING LINE COMPLIED FROM TOWN OF FALMOUTH GIS ON-LINE MAPPING ON NOVEMBER 18, 2013.

7) LANTERN LANE (F.K.A. FAY LANE & FAYLANE ROAD) IS A PRIVATE WAY.

8) EASEMENTS:
BUILDING LINE EASEMENT TO TOWN OF FALMOUTH IN DD. BK. 730, PG. 437;
PRIVATE ROAD RIGHTS IN LANTERN LA. IN DD. BK. 1115, PG. 111 ETC.;
TO C & V ELECT. COM. & NET&T IN DD. BK. 1157, PG. 257;
TO TOWN OF FALMOUTH FOR WATER DD. BK. 1205, PG. 563;

9) PLANS USED IN PREPARING THIS PLAN INCLUDED: 72/77, 81/19, 87/105, 129/59, 157/133, 179/59, 253/29, 322/92, 356/40, 362/45, LC 10790-D, LC 13871-A, LC 36330-B; OCTOBER 1923 LAYOUT OF A PORTION OF EAST MAIN ST.

10) AREA LISTED FOR 556 MAIN STREET INCLUDES LOTS 1, 2 & 4 FROM PLAN BOOK 179, PAGE 59; "0" MAIN STREET PARCEL BETWEEN SAID LOT 2 AND ABUTTER DUGAN; AND AREA OF PRIVATE ROAD IN FRONT OF LOCUS AND TO THE CENTER OF THE PRIVATE WAY IN FRONT PART OF LOT 4 AS DEPICTED. THE 88,222± S.F TOTAL INCLUDES 55,063± S.F EAST OF LANTERN LANE; 20,462± S.F. WEST OF LANTERN LANE; AND 12,697± S.F. IN THE PORTION OF LANTERN LANE AS DEPICTED.

11) PLAN BOOK 179 PAGE 59 CONTAINED A 0.51' MISCLOSURE AROUND LOT 5. FRONTAGE FROM PLAN AND DEED WAS HELD AND THE NORTHERLY LOT LINE WAS ADJUSTED ACCORDINGLY.

12) THE PURPOSE OF THE 6-25-14 REVISION IS TO DEPICT LOT COVERAGE FEATURES ADDED FOR #3 LANTERN LANE. NO TOPOGRAPHY OR UTILITY INFORMATION WAS COLLECTED PERTAINING TO THIS LOT.

LEGEND

234	SURFACE CONTOUR
	STONE CURB
	EDGE OF PAVEMENT
x x x	FENCE
	EDGE OF WOODED AREA
8"CI	SEWERLINE & MANHOLE WITH PIPE SIZE, MATERIAL & FLOW DIRECTION
12"RCP	DRAINLINE WITH PIPE SIZE, MATERIAL & FLOW DIRECTION, CATCHBASIN, MANHOLE & ROUND CATCHBASIN
WV W 6"CI	WATER MANHOLE, WATER MAIN WITH SIZE, TEE, GATE VALVE & FIRE HYDRANT
GV G 10"DI	GAS MAIN WITH SIZE & GATE VALVE
#81 OHW	EXISTING UTILITY POLE WITH DESIGNATION OVERHEAD WIRES AND GUY POLE
× 232.6	SPOT ELEVATION
26.8 12"M	PROMINENT DECIDUOUS TREE WITH ELEVATION, SIZE AND SPECIES
	LIGHT POLE
	BOLLARD
	SIGN
M	MANHOLE (UNKNOWN UTILITY)
BM	BENCHMARK
CB	CATCH BASIN
DHCB	DRILL HOLE IN CONCRETE BOUND
D	DRAIN MANHOLE
I.PIPE	IRON PIPE
I.ROD	IRON ROD
RCB	ROUND CATCH BASIN
S	SEWER MANHOLE
ASB.	ASBESTOS PIPE
BB	BITUMINOUS BERM
BIT.	BITUMINOUS
BS	BOTTOM SLOPE
BCS	BITUMINOUS CONCRETE SIDEWALK
CI	CAST IRON
CMP	CORRUGATED METAL PIPE
CONC.	CONCRETE
(F)	FOUND
FF	FIRST FLOOR ELEVATION
NPV	NO PIPES VISIBLE
PVC	POLYVINYL CHLORIDE
RCP	REINFORCED CONCRETE PIPE
VGC	VERTICAL GRANITE CURB

SCALE: 1" = 20'

0 20 40 80

ELEV. BENCH MARKS

DATUM: SEE NOTE 1

NO.	DESCRIPTION	ELEV.
1.	FLANGE NUT ON HYDRANT	17.83
2.	FLANGE NUT ON HYDRANT	18.77

SITE ADDRESS:

#556 MAIN STREET

Falmouth, Massachusetts 02540

PREPARED FOR:

FALMOUTH HOSPITALITY, LLC
2 Lan Drive
Westford, Massachusetts 01886

HANCOCK ASSOCIATES

Civil Engineers

Land Surveyors

Environmental Consultants

315 Elm Street, Marlborough, MA 01752
Voice (508) 460-1111, Fax (508) 460-1121
www.hancockassociates.com

COMMONWEALTH OF MASSACHUSETTS JOHN D. BREMSER No. 35380 LAND SURVEYOR

6-25-14

NO.	BY	APP	DATE	ISSUE/REVISION DESCRIPTION
4	CMC	JDB	6-25-14	ADD LOT 3 INFORMATION
3	CMC	JDB	5-20-14	ADD'L INFO. AT NYE RD. INT.
2	AKG	JDB	3-14-14	ASSESSORS LIST REVISED
1	JDB	JDB	12-12-13	TYPO- CMP/RCP FIXED

DATE: 12/02/13 DRAWN BY: CMC
SCALE: 1" = 20' CHECK BY: JDB

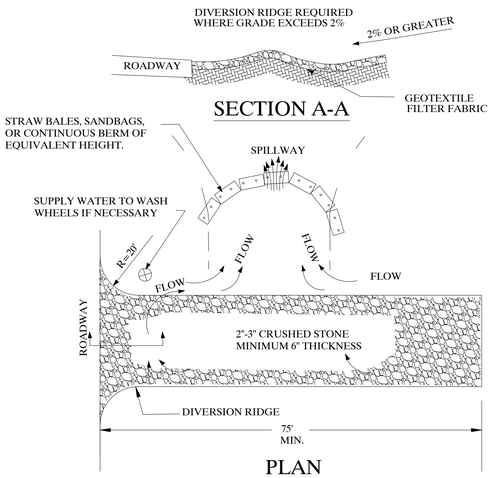
EXISTING CONDITIONS PLAN

PLOT DATE: Jun 25, 2014 10:33 am
PATH: L:\17791\dwg\

DWG: 17791-SV-02.dwg
LAYOUT: EC
SHEET: 1 OF 1

EC

PROJECT NO.: 17791



NOTES:

1. THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION THAT WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHT-OF-WAYS. THIS MAY REQUIRE TOP DRESSING, REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT.

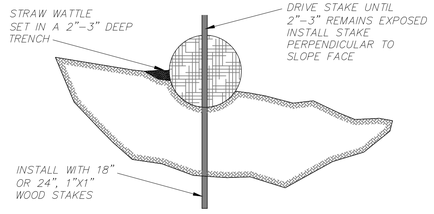
2. WHEN NECESSARY WHEELS SHALL BE CLEANED PRIOR TO ENTRANCE ONTO PUBLIC RIGHT-OF-WAY.

3. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH CRUSHED STONE THAT DRAINS INTO AN APPROVED SEDIMENT TRAP OR SEDIMENT BASIN.

4. IN THE DIRECTION OF TRAVEL, THE CONSTRUCTION ENTRANCE/EXIT SHALL SLOPE DOWN TOWARDS THE SITE AND AWAY FROM THE ROADWAY.

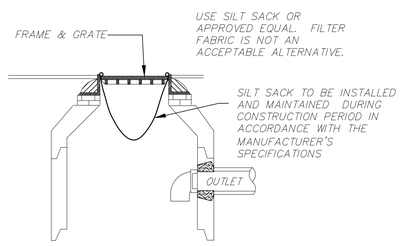
TEMPORARY GRAVEL CONSTRUCTION ENTRANCE/EXIT

NOT TO SCALE



STRAW WATTLE INSTALLATION

NOT TO SCALE



CATCH BASIN SILT SACK

TYPICAL CROSS SECTION – NOT TO SCALE

SITE PREPARATION NOTES

1. CONTRACTOR TO IDENTIFY AND NOTIFY TOWN OF FALMOUTH PUBLIC WORKS OF ANY ABANDONED UTILITIES ENCOUNTERED DURING CONSTRUCTION.

2. ALL WATER AND SEWER SERVICES TO BE REMOVED AND CAPPED IN ACCORDANCE WITH FALMOUTH WATER DEPARTMENT REQUIREMENTS.

SCALE: 1" = 20'

0 20 40 80

SITE ADDRESS:

#556 MAIN STREET

Falmouth, Massachusetts 02540

PREPARED FOR:

FALMOUTH HOSPITALITY, LLC

2 Lan Drive
Westford, Massachusetts 01886

HANCOCK ASSOCIATES

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NO.	BY	APP	DATE	ISSUE/REVISION DESCRIPTION
1	KAC	JP	11/6/14	MISCELLANEOUS REVISIONS

DATE: 12/02/13 DRAWN BY: KAC
SCALE: 1" = 20' CHECK BY: JP

SITE PREPARATION AND EROSION CONTROL PLAN

PLOT DATE: Nov 06, 2014 2:05 pm
PATH: F:\Civil 3D Projects\17791\DWG\

DWG: 17791SP.dwg
LAYOUT: SP
SHEET: 2 OF 6

C2

PROJECT NO.: 17791

DIMENSIONAL REQUIREMENTS (EXISTING)

(PER SECTION 240–240. BUSINESS REDEVELOPMENT DISTRICT OF THE TOWN OF FALMOUTH ZONING BYLAW)

	REQUIRED	PROVIDED
LOT AREA	20,000 SQ. FT.	96,036 SQ. FT.
FRONTAGE	100 FT.	250.18 FT.
LOT WIDTH	125 FT.	128.63 FT.
MAX. LOT COVERAGE BY STRUCTURES, PAVING AND PARKING	60 %	48 %
MAX. LOT COVERAGE BY STRUCTURES	20 %	16.0 %
MAXIMUM BUILDING HEIGHT	35 FT.	2.5 STORIES
FRONT YARD	20 FT.	20.25 FT.
SIDE YARD	10 FT.	12.5 FT.
REAR YARD	10 FT.	N/A FT.

DIMENSIONAL REQUIREMENTS (PROPOSED)

(PER SECTION 240–240. BUSINESS REDEVELOPMENT DISTRICT OF THE TOWN OF FALMOUTH ZONING BYLAW)

	REQUIRED	PROVIDED
LOT AREA	20,000 SQ. FT.	96,036 SQ. FT.
LOT WIDTH	125 FT.	128.63 FT.
MAX. LOT COVERAGE BY STRUCTURES, PAVING AND PARKING	60 %	60 %
MAX. LOT COVERAGE BY STRUCTURES	20 %	17 %
MAXIMUM BUILDING HEIGHT	35 FT.	2.5 STORIES*
FRONT YARD	20 FT.	21 FT.
SIDE YARD	10 FT.	12 FT.
REAR YARD	10 FT.	N/A FT.
FRONTAGE	100 FT.	250.18 FT.
PARKING	121 SPACES (110 HOTEL GUEST UNITS)	84 SPACES ON-SITE 37 SPACES OFF-SITE

*AREA OF UPPER LEVEL OF EAST BUILDING IS 1/2 OF THE AREA OF THE MIDDLE LEVEL OF THE EAST BUILDING.

ZONING

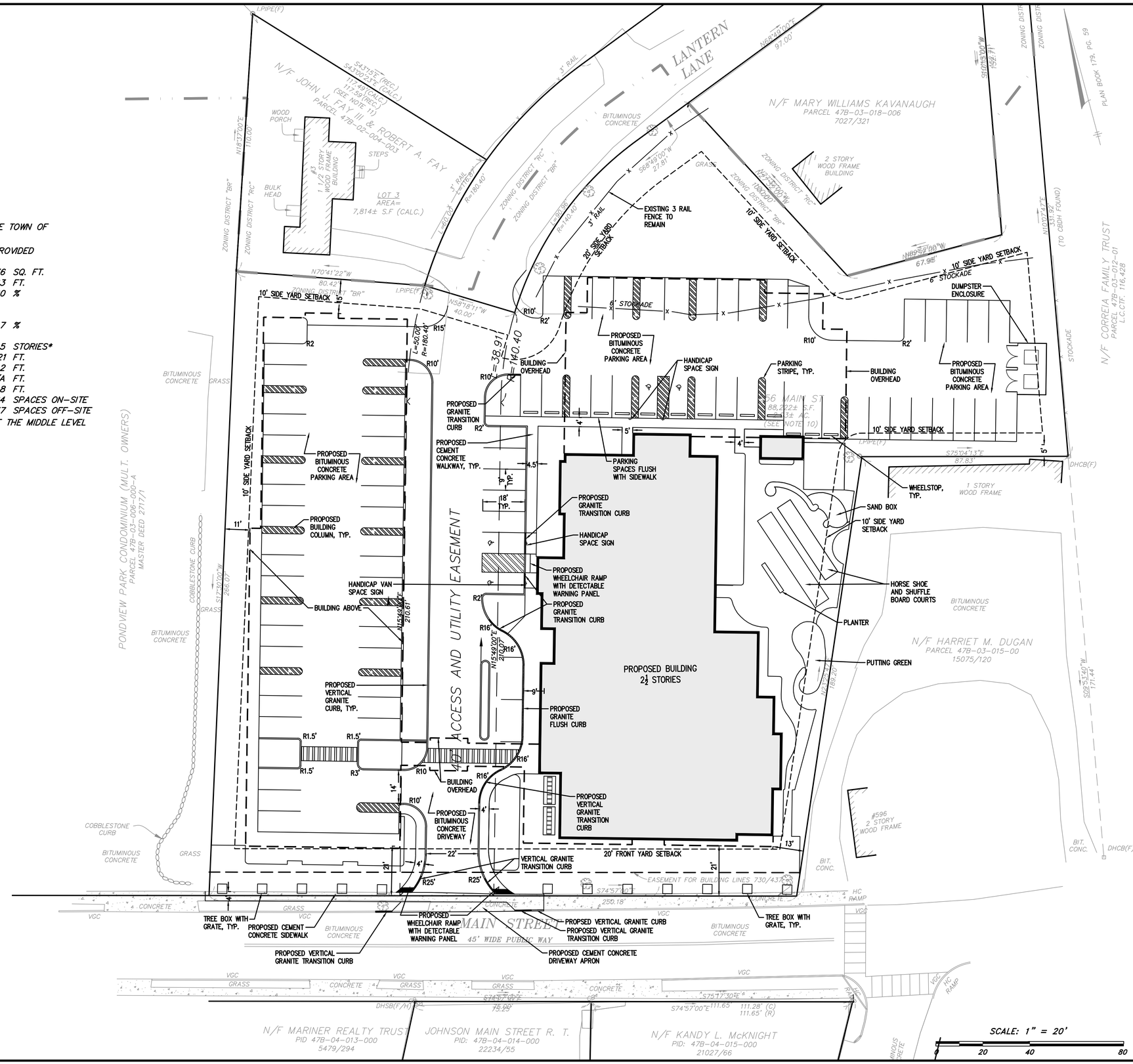
BUSINESS REDEVELOPMENT DISTRICT

ASSESSORS

PARCEL ID: 47B–02–005–001
PARCEL ID: 47B–02–005–001

LAYOUT AND MATERIALS NOTE

1. PROPOSED PARKING STRIPES IN GRASS PAVE PARKING AREA TO BE APPLIED USING WORLD CLASS PREMIUM (ACRYLIC) FIELD PAINT BY BEACON ALTHETICS OR APPROVED EQUAL. PARKING LINES SHAL BE CAREFULLY LAID OUT AND MARKED USING A LINE MARKING MACHINE. INSTALL PER MANUFACTURER'S RECOMMENDATIONS. SUFFICIENT PAINT SHOULD BE APPLIED AND REAPPLIED AS REQUIRED TO ASSURE COMPLETE OPACITY AND UNIFORMITY OF COLOR.



SITE ADDRESS:

#556
MAIN STREET

Falmouth,
Massachusetts
02540

PREPARED FOR:

FALMOUTH HOSPITALITY, LLC

2 Lan Drive
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1	KAC	JP	11/6/14	MISCELLANEOUS REVISIONS

DATE: 12/02/13 DRAWN BY: KAC
SCALE: 1"=20' CHECK BY: JP

LAYOUT AND MATERIALS PLAN

PLOT DATE: Nov 06, 2014 2:06 pm
PATH: F:\Civil 3D Projects\17791\DWG\

DWG: 17791LM.dwg
LAYOUT: LM
SHEET: 3 OF 6

C3

PROJECT NO.: 17791

GRADING AND UTILITY PLAN NOTES

1. LOCATIONS OF EXISTING UNDERGROUND UTILITIES/OBSTRUCTIONS/SYSTEMS SHOWN HEREON ARE APPROXIMATE ONLY. ALL UTILITIES/OBSTRUCTIONS/SYSTEMS MAY NOT BE SHOWN. CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING AND PROTECTING ALL UNDERGROUND UTILITIES/OBSTRUCTIONS/SYSTEMS, WHETHER OR NOT SHOWN HEREON.
2. UNLESS OTHERWISE SHOWN, ALL NEW UTILITIES SHALL BE UNDERGROUND.
3. RIM ELEVATIONS SHOWN FOR NEW STRUCTURES ARE APPROXIMATE AND ARE PROVIDED TO ASSIST CONTRACTOR WITH MATERIAL TAKEOFFS. FINISH RIM ELEVATIONS SHOULD MATCH PAVEMENT, GRADING OR LANDSCAPING, UNLESS SPECIFICALLY INDICATED OTHERWISE.
4. WHERE EXISTING UTILITY LINES/STRUCTURES ARE TO BE CUT/BROKEN DOWN/ ABANDONED, LINES/STRUCTURES SHALL BE PLUGGED/CAPPED/FILLED IN ACCORDANCE WITH OWNER REQUIREMENTS.
5. THE CONTRACTOR SHALL ENCASE AND/OR SLEEVE SEWER AND WATER MAINS WHERE THE CROWN OF THE SEWER PIPE IS LESS THAN 18 INCHES BELOW THE INVERT OF THE WATER PIPE AND WHERE THE HORIZONTAL SEPARATION IS LESS THAN 10 FEET, AS REQUIRED BY THE MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION.
6. STRUCTURE DETAILS FROM INDEPENDENT VENDORS ARE CONSTANTLY CHANGING. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL VERIFY THAT DETAILS SHOWN MATCH CURRENT DETAILS AND SPECIFICATIONS FROM VENDORS.
7. CONTRACTOR SHALL INSTALL ALL PARKING AREAS AND WALKWAYS IN ACCORDANCE WITH APPLICABLE ADA AND MAAB REQUIREMENTS, INCLUDING BUT NOT LIMITED TO THE FOLLOWING:
   - HANDICAPPED SPACES AND STRIPED AREA SLOPES SHALL NOT EXCEED 2% IN ANY DIRECTION.
   - HANDICAPPED RAMPS SHALL NOT EXCEED 8% FOR A MAXIMUM VERTICAL DISTANCE OF 6 INCHES.
   - SIDEWALKS SHALL HAVE A MAXIMUM SLOPE IN THE PATH OF TRAVEL OF 5% AND A MAXIMUM CROSS SLOPE OF 2% CONTRACTOR SHOULD NOT LAYOUT SLOPES EXCEEDING 4.5% AND 1.5% RESPECTIVELY TO ALLOW FOR CONSTRUCTION TOLERANCES. IF THE CONTRACTOR DETERMINES THAT THE REQUIRED SLOPES CANNOT BE ACHIEVED, THE CONTRACTOR SHALL BE RESPONSIBLE FOR REPORTING THE INFORMATION TO THE ENGINEER FOR RESOLUTION.
8. ALL PROPOSED TOP OF VERTICAL CURB ELEVATIONS ARE 6" ABOVE THE BOTTOM OF CURB UNLESS OTHERWISE SHOWN.
9. WHERE NEW PAVING MEETS EXISTING PAVING, MEET LINE AND GRADE OF EXISTING WITH NEW PAVING.
10. AT LOCATIONS WHERE EXISTING PAVEMENT ABUTS NEW CONSTRUCTION, THE EDGE OF THE EXISTING PAVEMENT SHALL BE SAWCUT TO A CLEAN, SMOOTH EDGE.
11. EXCAVATION REQUIRED WITHIN PROXIMITY OF EXISTING UTILITY LINES SHALL BE DONE BY HAND. CONTRACTOR SHALL REPAIR ANY DAMAGE TO EXISTING UTILITY LINES OR STRUCTURES INCURRED DURING CONSTRUCTION OPERATIONS AT NO ADDITIONAL COST TO THE OWNER.
12. CONTRACTOR SHALL VERIFY ALL PROPOSED TOP OF CURB ELEVATIONS BEFORE PROCEEDING WITH ANY CONSTRUCTION AND ADVISE THE ENGINEER OF ANY DISCREPANCY WHICH MAY IMPACT DESIGN.
13. ALL DISTURBED AREAS NOT COVERED WITH PAVEMENT, STRUCTURES, INDIVIDUAL PLANTINGS, OR MULCH SHALL HAVE LOAM AND SOD, OR LOAM AND SEED AS SHOWN ON THE LANDSCAPE PLANS OR AS DIRECTED BY THE ENGINEER.
14. ALL UNDERGROUND STRUCTURES AND UTILITIES SHALL BE CAPABLE OF WITHSTANDING H20 WHEEL LOADS.
15. THE CONTRACTOR SHALL FIELD VERIFY THE LOCATION, SIZE, INVERTS AND TYPES OF EXISTING PIPES AT ALL PROPOSED POINTS OF CONNECTION PRIOR TO ORDERING MATERIALS. WHERE AN EXISTING UTILITY IS FOUND TO CONFLICT WITH THE PROPOSED WORK, THE LOCATION, ELEVATION AND SIZE OF THE UTILITY SHALL BE ACCURATELY DETERMINED WITHOUT DELAY AT NO ADDITIONAL COST BY THE CONTRACTOR, AND THE INFORMATION FURNISHED IN WRITING TO THE OWNER'S REPRESENTATIVE FOR THE RESOLUTION OF THE CONFLICT.
16. SILT FENCE AND/OR HAYBALES SHOWN HEREON SHALL BE INSTALLED BEFORE EARTH DISTURBANCE OCCURS WITHIN BUFFER ZONE, AND SHALL SERVE AS THE LIMIT OF WORK.
17. CONTRACTOR SHALL PROVIDE DUST CONTROL FOR CONSTRUCTION OPERATIONS AS APPROVED BY THE ENGINEER.
18. ALL POINTS OF CONSTRUCTION EGRESSOR INGRESS SHALL BE MAINTAINED TO PREVENT TRACKING OR FLOWING OF SEDIMENT ON TO PUBLIC ROADS.

SOIL TEST DATA:

TP-1
0-61" FILL LAYER
61-80" Bw LAYER, FINE SANDY LOAM
80-94" C1 LAYER, LOAMY SAND
94-135" C2 LAYER, LOAMY SAND
GROUND EL.=3.7
ADJUSTED E.S.H.W.T. EL.=7.4

TP-2
0-5" BITUMINOUS CONCRETE
5-36" FILL LAYER
36-76" C1 LAYER, GRAVELLY COARSE SAND
76-126" C2 LAYER, MEDIUM SAND
GROUND EL.=3.8
ADJUSTED E.S.H.W.T. EL.=7.5

TP-3
0-66" FILL LAYER
66-109" C1 LAYER, LOAMY SAND
109-138" C2 LAYER, SANDY LOAM
GROUND EL.=3.1
ADJUSTED E.S.H.W.T. EL.=6.8

TP-4
0-11" FILL LAYER
11-30" Bw LAYER, LOAMY SAND
30-48" C1 LAYER, SANDY LOAM
48"-137" C2 LAYER, MEDIUM SAND
GROUND EL.=3.6
ADJUSTED E.S.H.W.T. EL.=7.3

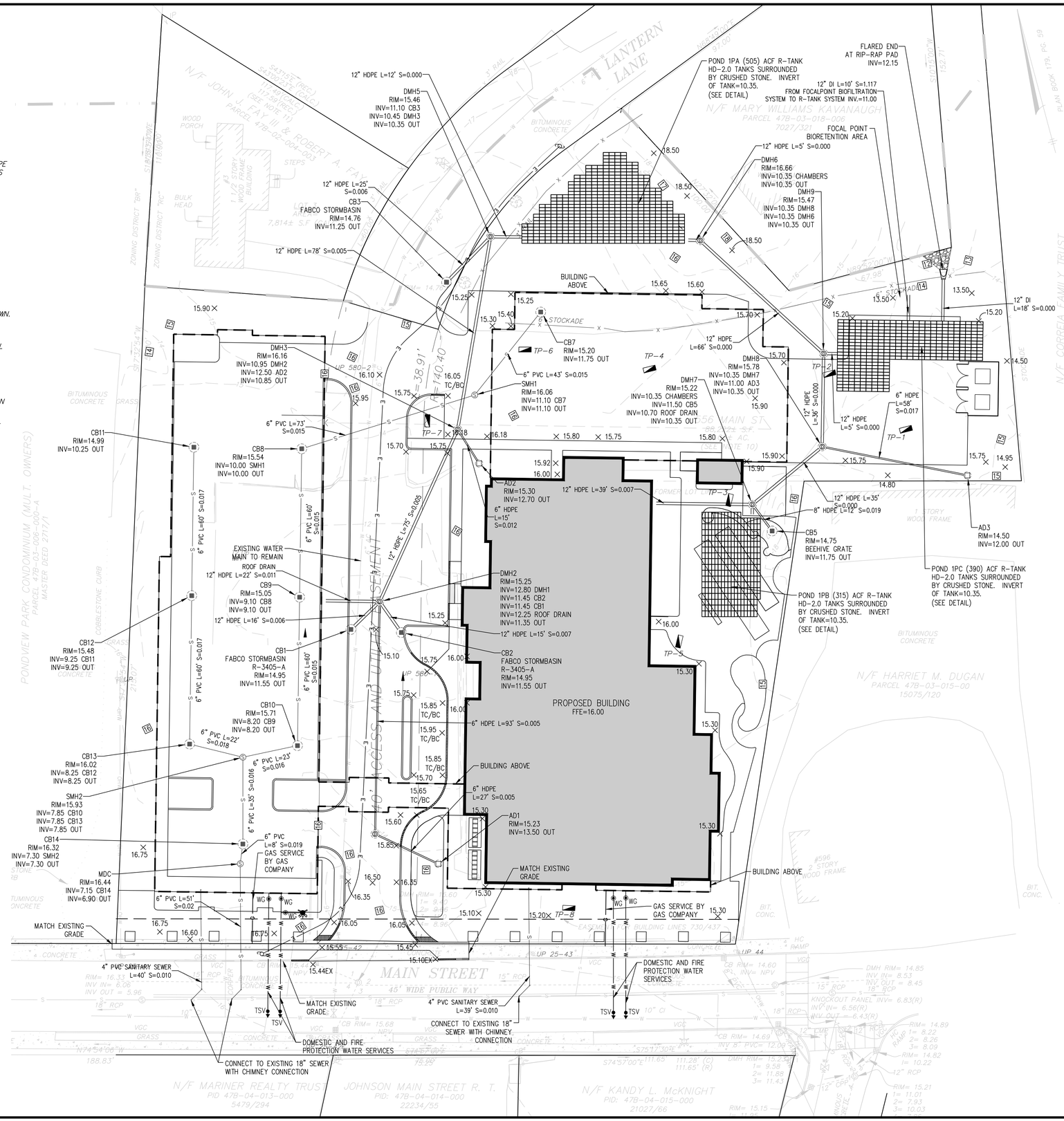
TP-5
0-141" FILL LAYER
GROUND EL.=3.0
NO GROUNDWATER OBSERVED
ADJUSTED E.S.H.W.T. EL.=6.7

TP-6
0-64" FILL LAYER
64-94" C1 LAYER, GRAVELLY COARSE SAND
94-130" C2 LAYER, MEDIUM SAND
GROUND EL.=4.4
ADJUSTED E.S.H.W.T. EL.=8.1

TP-7
0-49" FILL LAYER
49-89" C1 LAYER, GRAVELLY COARSE SAND
89-139" C2 LAYER, MEDIUM SAND
GROUND EL.=2.8
ADJUSTED E.S.H.W.T. EL.=6.5

TP-8
0-55" FILL LAYER
55-64" Ap LAYER, FINE SANDY LOAM
64-74" Bw LAYER, SANDY LOAM
74"-147" C1 LAYER, SILT LOAM
GROUND EL.=3.1
ADJUSTED E.S.H.W.T. EL.=6.8

SCALE: 1" = 20'
0 20 40 80



SITE ADDRESS:

#556 MAIN STREET

Falmouth, Massachusetts 02540

PREPARED FOR:

FALMOUTH HOSPITALITY, LLC
2 Lan Drive
Westford, Massachusetts 01886

HANCOCK ASSOCIATES

Civil Engineers

Land Surveyors

Environmental Consultants

315 Elm Street, Marlborough, MA 01752
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NO.	BY	APP	DATE	ISSUE/REVISION DESCRIPTION
1	KAC	JP	11/6/14	MISCELLANEOUS REVISIONS

DATE: 12/02/13 DRAWN BY: KAC
SCALE: 1"=20' CHECK BY: JP

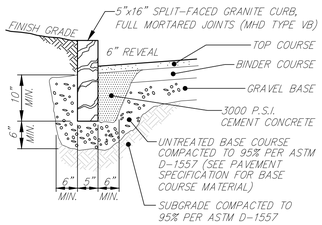
GRADING, DRAINAGE, AND UTILITY PLAN

PLOT DATE: Dec 03, 2014 5:21 pm
PATH: F:\Civil 3D Projects\17791\DWG\

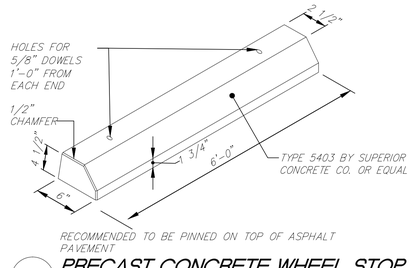
DWG: 17791U.dwg
LAYOUT: U
SHEET: 4 OF 6

C4

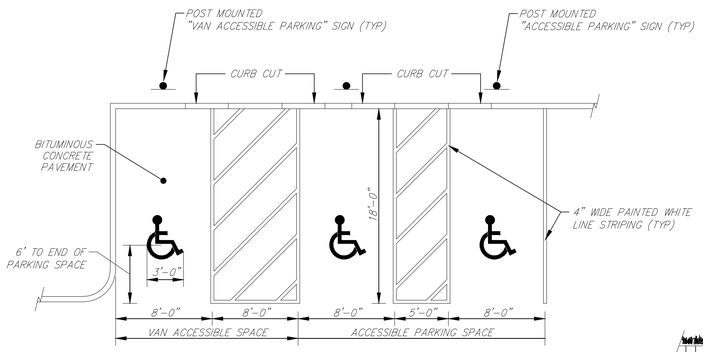
PROJECT NO.: 17791



VERTICAL GRANITE CURB
CROSS SECTION
NOT TO SCALE

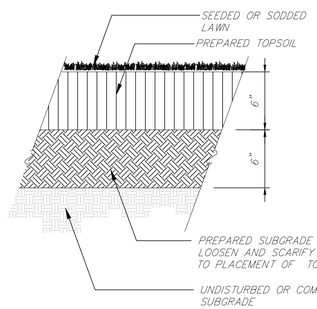


PRECAST CONCRETE WHEEL STOP
ISOMETRIC VIEW
NOT TO SCALE

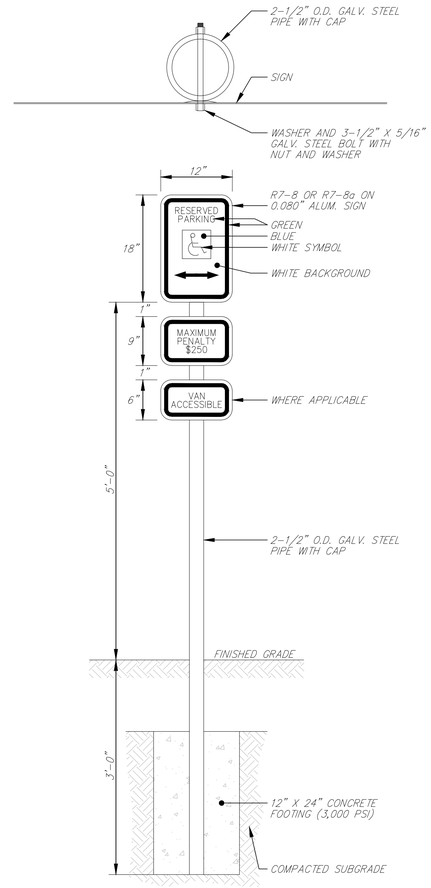


NOTES;
1. MAXIMUM SLOPE 2% IN ANY DIRECTION.
2. LOCATE SIGN WITHIN 10 FT OF ACCESSIBLE SPACE.
3. PROVIDE AN ACCESSIBLE CURB CUT AT EACH ACCESS AISLE BETWEEN ACCESSIBLE SPACES.

ACCESSIBLE PARKING STALL DETAIL
NOT TO SCALE



LOAM AND SEED
NOT TO SCALE



ACCESSIBLE SIGN DETAIL
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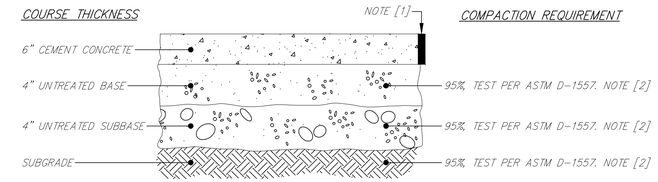
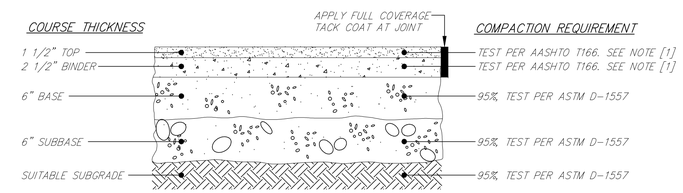


NOTES:
[1] CONTROL JOINT EVERY 10 FEET, EXPANSION JOINT EVERY 50 FEET.
[2] COMPACT TO TEST AVERAGE OF 95% NO TEST LOWER THAN 93%

MATERIAL	SPECIFICATION	MAXIMUM AGGREGATE OR PARTICLE SIZE (IN.)
TOP - CEMENT CONCRETE	MHD M4.02.00 4000 PSI AT 28 DAYS	3/4
BASE - SAND BORROW	MHD M1.04.0 TYPE b	3/8
SUBBASE - GRAVEL BORROW	MHD M1.03.0 TYPE c	2
UNSUITABLE SUBGRADE - ORDINARY BORROW	MHD M1.01.0	12

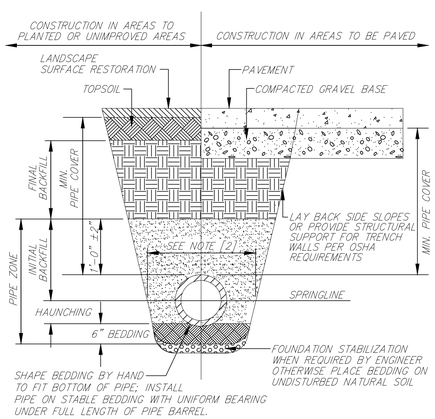
CEMENT CONCRETE PAVEMENT
TYPICAL CROSS SECTION
NOT TO SCALE



NOTES:
[1] COMPACT TO TEST AVERAGE OF 96% NO TEST LOWER THAN 94%

MATERIAL	SPECIFICATION	MAXIMUM AGGREGATE OR PARTICLE SIZE (IN.)
TOP - BITUMINOUS CONCRETE	MHD M3.11.03 CLASS I, TYPE I-1	1/2
BINDER- BITUMINOUS CONCRETE	MHD M3.11.03 CLASS I, TYPE I-1	1
BASE - DENSE GRADED CRUSHED STONE	MHD M2.01.7	1 1/2
SUBBASE - GRAVEL BORROW	MHD M1.03.0 TYPE C	2

BITUMINOUS CONCRETE PAVEMENT
TYPICAL CROSS SECTION
NOT TO SCALE



FOUNDATION, BEDDING, & BACKFILL MATERIALS		
PIPE MATERIAL	HDP, PVC	RC, DI
FOUNDATION STABILIZATION	[6]	[6]
BEDDING	[1]	[1]
HAUNCHING	[1]	[1]
INITIAL BACKFILL	[1]	[1]
FINAL BACKFILL	[4]	[4]
MIN. PIPE COVER	[5]	[5]

NOTES:
[1] PLACE 3/4"± GRADED GRANULAR BACKFILL AT OPTIMUM MOISTURE IN HORIZONTAL, 8"-DEEP, LOOSE LAYERS; COMPACT TO 95% PER ASTM D-1557.
[2] MINIMUM WIDTH OF TRENCH MEASURED AT THE SPRINGLINE OF THE PIPE, INCLUDING ANY NECESSARY SHEATHING:

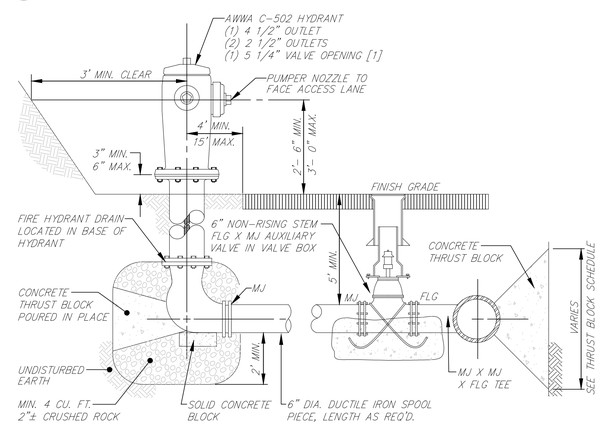
PIPE I.D.	WIDTH
LESS THAN 21"	O.D. + 12"
21" TO 42"	O.D. + 24"
GREATER THAN 42"	O.D. + 30"

[3] INSTALL PIPE IN CENTER OF TRENCH.
[4] IN PLANTED OR UNIMPROVED AREAS, USE ON-SITE EXCAVATED MATERIAL FOR FINAL BACKFILL. COMPACT TO 95% PER ASTM D-1557. IN PAVED AREAS, OBTAIN ENGINEER APROVAL OF ON-SITE EXCAVATED MATERIALS FOR USE AS FINAL BACKFILL.
[5] MINIMUM COVER OVER TOP OF PIPE:

PIPE MATERIAL	HDP, PVC	RC, DI
WATER	5'-0"	5'-0"
SEWER	4'-0"	4'-0"
DRAIN	1'-6"	1'-0"

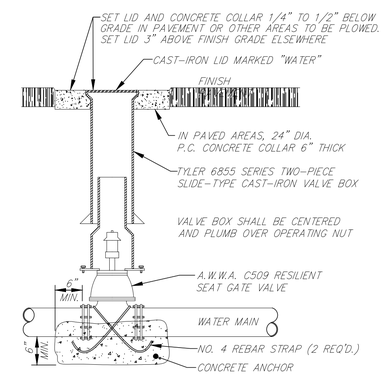
[6] FOR FOUNDATION STABILIZATION, USE 2"± CRUSHED STONE.

PIPE TRENCH
TYPICAL CROSS SECTION
NOT TO SCALE



NOTES:
[1] DANVERS STANDARD: DARLING B-84-B

FIRE HYDRANT ASSEMBLY
TYPICAL CROSS SECTION
NOT TO SCALE



GATE VALVE
TYPICAL CROSS SECTION
NOT TO SCALE

SITE ADDRESS:

#556
MAIN STREET

Falmouth,
Massachusetts
02540

PREPARED FOR:

FALMOUTH HOSPITALITY, LLC
2 Lan Drive
Westford, Massachusetts 01886

HANCOCK ASSOCIATES

Civil Engineers

Land Surveyors

Environmental Consultants

315 Elm Street, Marlborough, MA 01752
Voice (508) 460-1111, Fax (508) 460-1121
www.hancockassociates.com

NO.	BY	APP	DATE	ISSUE/REVISION DESCRIPTION
1	KAC	JP	11/6/14	MISCELLANEOUS REVISIONS

DATE: 12/02/13 DRAWN BY: KAC
SCALE: CHECK BY: JP

SITE DETAILS

PLOT DATE: Nov 07, 2014 9:03 am
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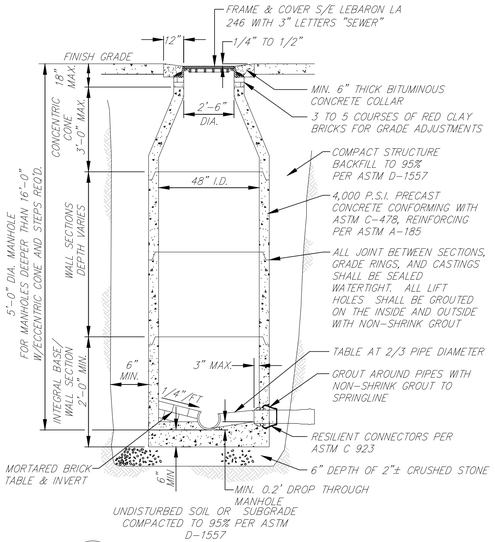
DWG: 17791Details.dwg
LAYOUT: Details
SHEET: 5 OF 6

C5

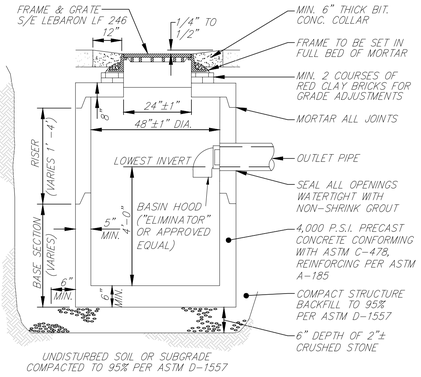
PROJECT NO.: 17791



SEWER MANHOLE

TYPICAL CROSS SECTION

NOT TO SCALE

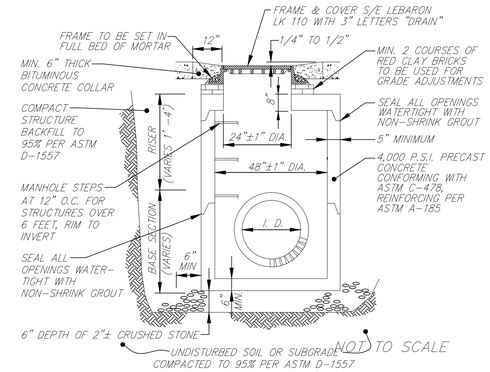


NOTE: CONICAL TOP MAY ALSO BE USED.

CATCH BASIN WITH HOOD

TYPICAL CROSS SECTION

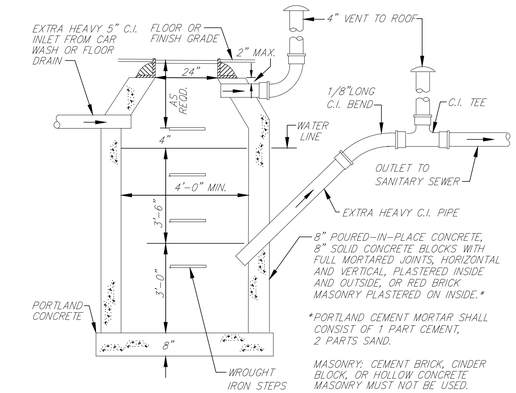
NOT TO SCALE



NOTE: CONICAL TOP MAY ALSO BE USED

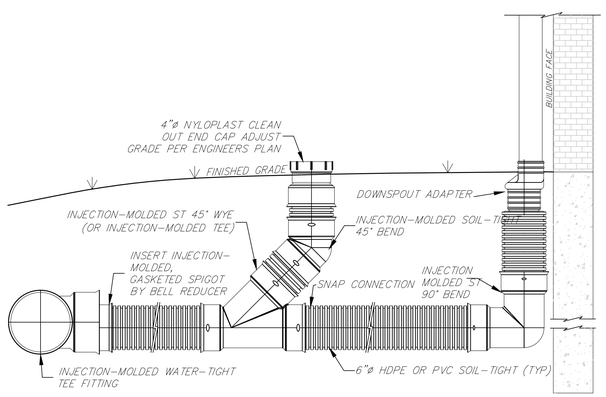
DRAIN MANHOLE

TYPICAL CROSS SECTION



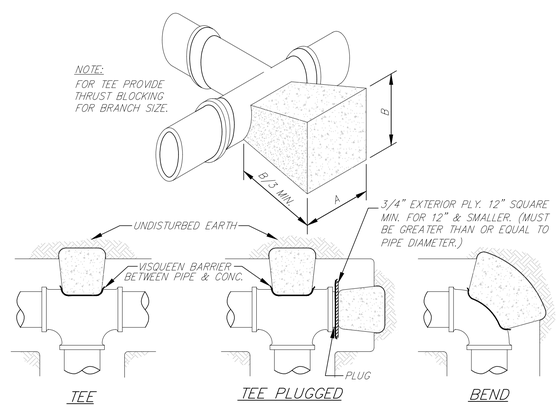
M.D.C. OIL SEPARATOR

NOT TO SCALE



ROOF DRAIN DETAIL WITH CLEANOUT

NOT TO SCALE



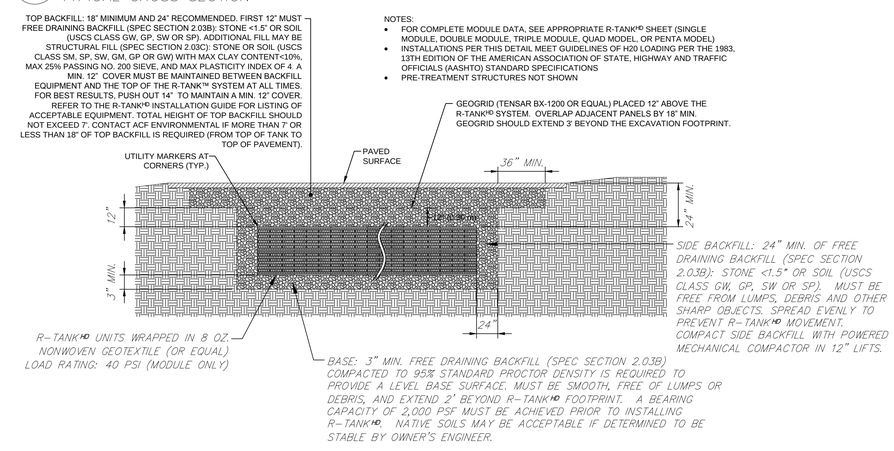
DIMENSION FOR THRUST BLOCKING

FITTING	TEES & PLUGS		90° BENDS		45° BENDS & "Y's"		22 1/2° BENDS	
SIZES	A	B	A	B	A	B	A	B
4"	1'-6"	1'-6"	1'-6"	1'-9"	1'-3"	0'-6"	1'-0"	0'-6"
6"	2'-0"	1'-0"	2'-0"	2'-0"	1'-3"	1'-6"	1'-0"	1'-5"
8"	2'-0"	1'-6"	2'-3"	2'-3"	1'-8"	1'-8"	1'-0"	1'-3"
10"	2'-6"	2'-3"	2'-9"	2'-10"	2'-3"	1'-10"	1'-3"	2'-0"
12"	3'-0"	2'-9"	3'-6"	3'-3"	2'-6"	2'-4"	2'-0"	1'-6"
14"	3'-5"	3'-0"	4'-0"	3'-8"	3'-6"	2'-4"	2'-0"	2'-3"

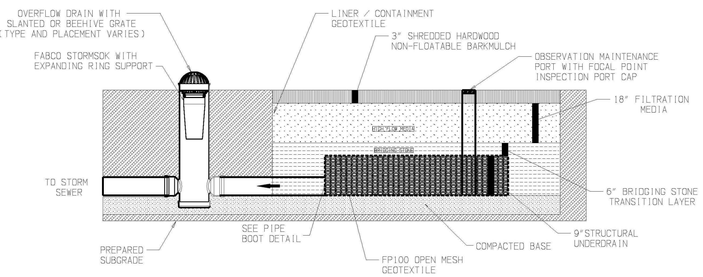
1. THIS TABLE IS BASED ON 200 P.S.I. MAIN PRESSURE AND 2000 P.S.F. SOIL-BEARING PRESSURE. ADJUST BEARING AREAS IN ACCORDANCE WITH SOIL CONDITIONS AND PRESSURES ENCOUNTERED.
2. USE VISQUEEN BARRIER BETWEEN PIPE AND CONCRETE AS SHOWN IN DETAIL ABOVE.
3. CONCRETE SHALL HAVE A COMPRESSIVE STRENGTH OF 2500 PSI AT 28 DAYS.
4. BLOCKING SIZE/FREQUENCY SHALL BE INCREASED IF REQUIRED BY ENGINEER.

THRUST BLOCK SCHEDULE

NOT TO SCALE

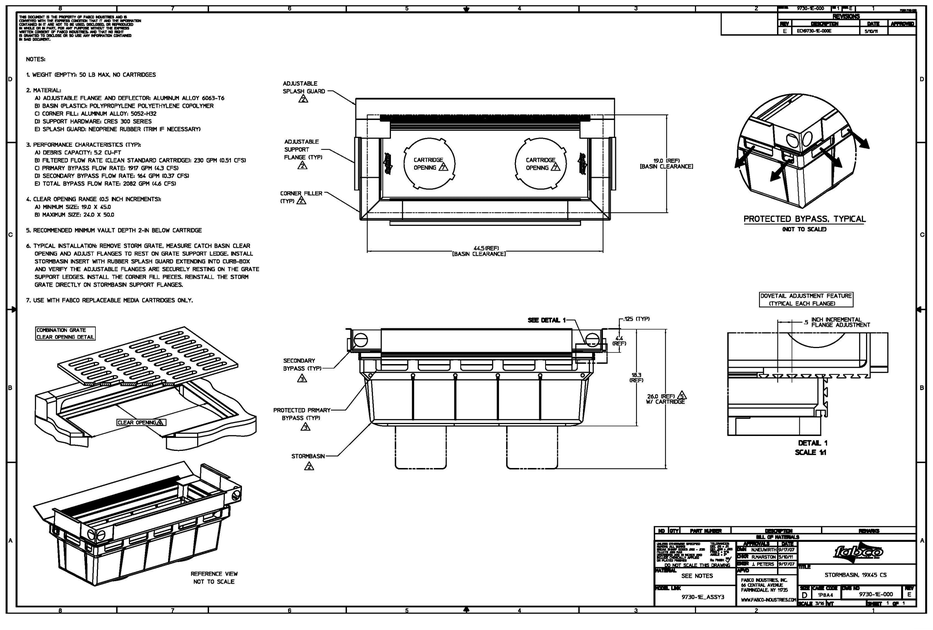


ACF R-TANKS



FOCAL POINT BIORETENTION

NOT TO SCALE



SITE ADDRESS:

#556 MAIN STREET

Falmouth, Massachusetts 02540

PREPARED FOR:

FALMOUTH HOSPITALITY, LLC

2 Lan Drive
Westford, Massachusetts 01886

HANCOCK ASSOCIATES

Civil Engineers

Land Surveyors

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315 Elm Street, Marlborough, MA 01752
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NO.	BY	APP	DATE	ISSUE/REVISION DESCRIPTION
1	KAC	JP	11/6/14	MISCELLANEOUS REVISIONS

DATE: 12/02/13 DRAWN BY: KAC
SCALE: CHECK BY: JP

SITE DETAILS

PLOT DATE: Dec 03, 2014 5:34 pm
PATH: F:\Civil 3D Projects\17791\DWG\

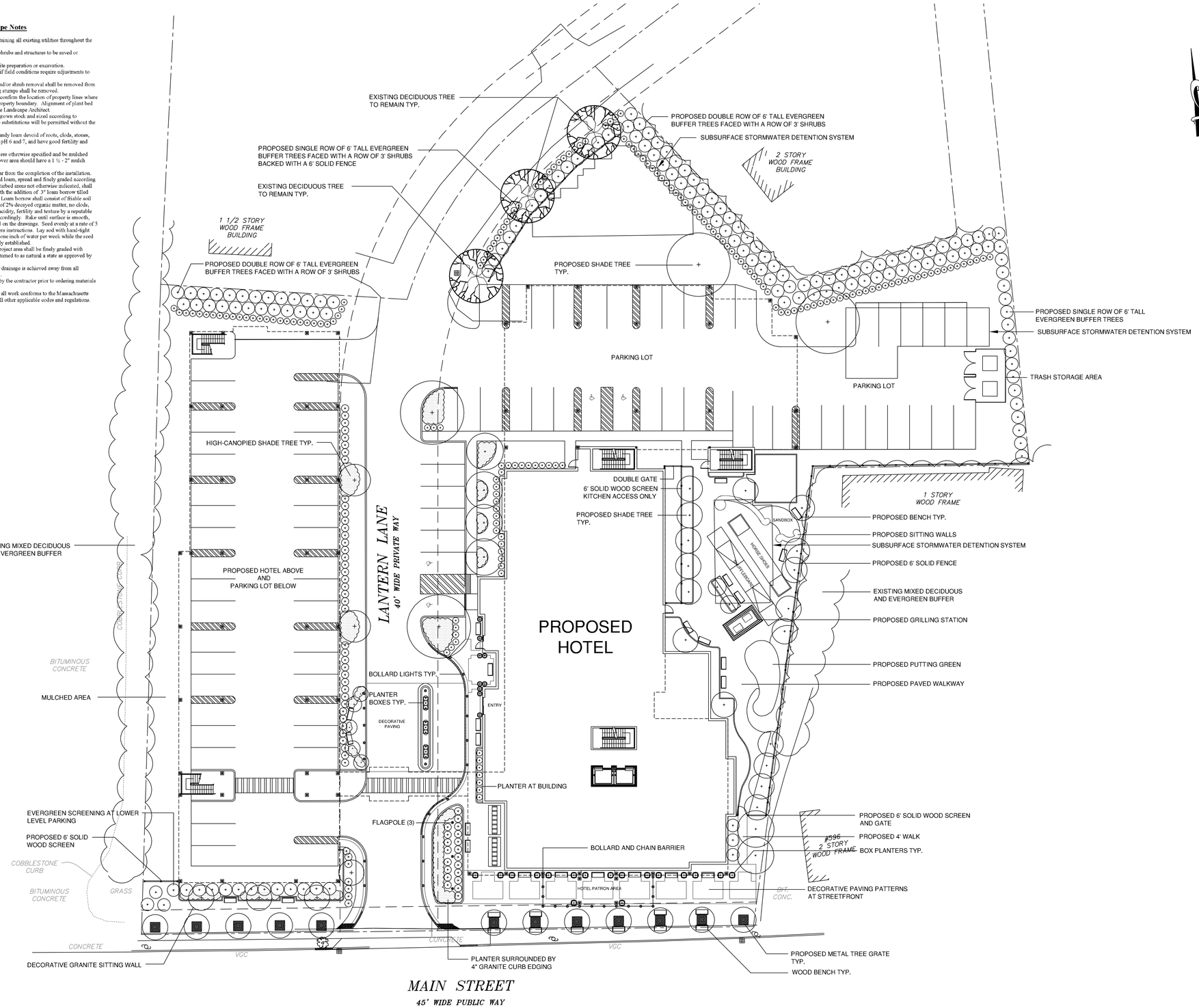
DWG: 17791Details.dwg
LAYOUT: Details2
SHEET: 6 OF 6

C6

PROJECT NO.: 17791

General Landscape Notes

1. The Contractor is responsible for protecting and maintaining all existing utilities throughout the duration of the contracted work.
2. The Contractor is responsible for protecting all trees, shrubs and structures to be saved or protected.
3. The Contractor shall contact "Dig-Safe" prior to any site preparation or excavation.
4. The Contractor shall contact the Landscape Architect if field conditions require adjustments to construction.
5. Unless otherwise directed, all debris from tree work and/or shrub removal shall be removed from the project site and properly disposed of. Any remaining stumps shall be removed.
6. Prior to commencement of work, the Contractor shall confirm the location of property lines where critical to building setbacks and/or planting within the property boundary. Alignment of plant bed lines shall be staked by the Contractor for approval of the Landscape Architect.
7. All plants shall be the highest quality, heavy nursery-grown stock and sized according to Massachusetts Nurseryman's Association Standards. No substitutions will be permitted without the prior approval of the Landscape Architect.
8. Topsoil for plant beds and pits shall be good quality sandy loam devoid of roots, clods, stones, rubbish, glass, brick, or asphalt. Soil should be between pH 6 and 7, and have good fertility and organic content.
9. Plant beds shall have a minimum soil depth of 10" unless otherwise specified and be mulched with 2-3" of finely shredded pine bark mulch. Groundcover area should have a 1 ½ - 2" mulch depth.
10. All plant material shall be guaranteed for one full year from the completion of the installation.
11. All seeded and sodded areas shall have 6" of screened loam, spread and finely graded according to the plans. All areas indicated of the drawings and disturbed areas not otherwise indicated, shall receive 6" of loam previously stripped and stockpiled with the addition of 3" loam borrow tilled together and finely graded over all areas to receive seed. Loam borrow shall consist of friable soil typical of locally cultivated soils containing a minimum of 2% decayed organic matter, no clods, sticks and debris, and have a pH of 6 to 7. Test soil for acidity, fertility and texture by a reputable soils testing lab. Amend soil with lime and fertilizers accordingly. Rake until surface is smooth, friable, and uniform in texture to the elevations indicated on the drawings. Seed evenly at a rate of 5 lbs. per 1000 square feet or according to the manufacturers instructions. Lay sod with hand-tight joints. Irrigate immediately and as necessary to provide one inch of water per week while the seed germinates and sod takes root until the grass is thoroughly established.
12. All disturbed areas within the contract limit line or project area shall be finely graded with screened loam to the proper elevations, and seeded or returned to as natural a state as approved by the Landscape Architect.
13. The contractor is responsible for insuring that proper drainage is achieved away from all buildings in accordance with the plans. See also note #4.
14. All dimensions and quantities shall be field verified by the contractor prior to ordering materials or construction.
15. It is the responsibility of the contractor to insure that all work conforms to the Massachusetts State Building Code, the National Electrical Code, and all other applicable codes and regulations.



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Elliott Brundage
Landscape Design
190 High Plain Road Andover, MA 01810
t 978 470 4970 www.elliottbrundage.com

Springhill Suites by Marriott

556 Main Street Falmouth, MA

prepared for: Falmouth Hospitality, LLC

location: 2 Lan Drive Westford, MA 01886

title: SCHEMATIC LANDSCAPE PLAN

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Mark	Date
#	REV6
#	REV5 03DEC2014
#	REV4 06NOV2014
#	REV3 11-3-14
#	REV2 11-3-14
#	REV1 8-21-14

Revisions

Date	7-23-14
Scale	1"=20'-0"
Job No.	2404
Sheet No.	L1

General Landscape Notes

1. The Contractor is responsible for protecting and maintaining all existing utilities throughout the duration of the contracted work.
2. The Contractor is responsible for protecting all trees, shrubs and structures to be saved or protected.
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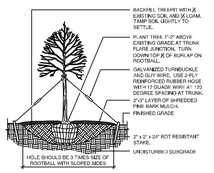
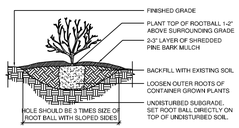
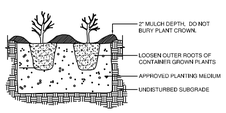
9. Plant beds shall have a minimum soil depth of 10" unless otherwise specified and be mulched with 2-3" of finely shredded pine bark mulch. Groundcover area should have a 1 ½ - 2" mulch depth.
10. All plant material shall be guaranteed for one full year from the completion of the installation.
11. All seeded and sodded areas shall have 6" of screened loam, spread and finely graded according to the plans. All areas indicated of the drawing and disturbed areas not otherwise indicated, shall receive 6" of loam previously stripped and stockpiled with the addition of 3" loam borrow tilled together and finely graded over all areas to receive seed. Loam borrow shall consist of friable soil typical of locally cultivated soils containing a minimum of 2% decayed organic matter, no clods, sticks and debris, and have a pH of 6 to 7. Test soil for acidity, fertility and texture by a reputable soils testing lab. Amend soil with lime and fertilizers accordingly. Rake until surface is smooth, friable, and uniform in texture to the elevations indicated on the drawings. Seed evenly at a rate of 5 lbs. per 1000 square feet or according to the manufacturers instructions. Lay sod with hand-tight joints. Irrigate immediately and as necessary to provide one inch of water per week while the seed germinates and sod takes root until the grass is thoroughly established.
12. All disturbed areas within the contract limit line or project area shall be finely graded with screened loam to the proper elevations, and seeded or returned to as natural a state as approved by the Landscape Architect.
13. The contractor is responsible for insuring that proper drainage is achieved away from all buildings in accordance with the plans. See also note #4.
14. All dimensions and quantities shall be field verified by the contractor prior to ordering materials or construction.
15. It is the responsibility of the contractors to insure that all work conforms to the Massachusetts State Building Code, the National Electrical Code, and all other applicable codes and regulations.



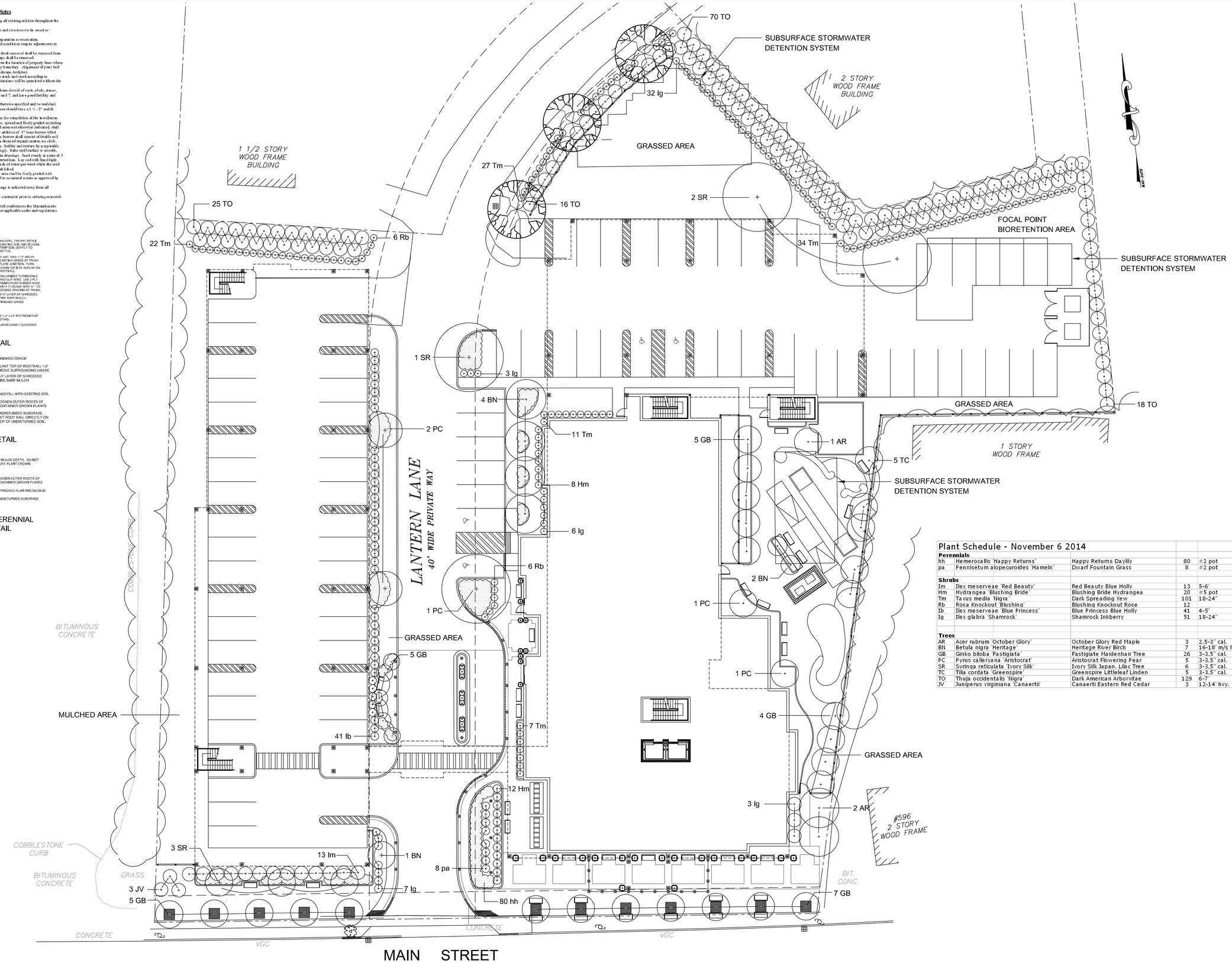
TREE PLANTING DETAIL



SHRUB PLANTING DETAIL



GROUNDCOVER & PERENNIAL PLANTING DETAIL



Plant Schedule - November 6 2014				
Perennials				
hh	Hemerocallis 'Happy Returns'	Happy Returns Daylily	80	#2 pot
pa	Pennisetum alopecuroides 'Hameln'	Dwarf Fountain Grass	8	#2 pot
Shrubs				
Im	Ilex meserveae 'Red Beauty'	Red Beauty Blue Holly	13	5-6'
Hm	Hydrangea 'Blushing Bride'	Blushing Bride Hydrangea	20	#5 pot
Tm	Taxus media 'Nigra'	Dark Spreading Yew	101	18-24"
Rb	Rosa Knockout 'Blushing'	Blushing Knockout Rose	12	
Ib	Ilex meserveae 'Blue Princess'	Blue Princess Blue Holly	41	4-5'
Ig	Ilex glabra 'Shamrock'	Shamrock Inkberry	51	18-24"
Trees				
AR	Acer rubrum 'October Glory'	October Glory Red Maple	3	2.5-3" cal.
BN	Betula nigra 'Heritage'	Heritage River Birch	7	16-18' m/s heavy
GB	Ginko biloba 'Fastigiata'	Fastigiate Maidenhair Tree	26	3-3.5" cal.
PC	Pyrus calleryana 'Aristocrat'	Aristocrat Flowering Pear	5	3-3.5" cal.
SR	Syringa reticulata 'Ivory Silk'	Ivory Silk Japan. Lilac Tree	6	3-3.5" cal.
TC	Tilia cordata 'Greenspire'	Greenspire Littleleaf Linden	5	3-3.5" cal.
TO	Thuja occidentalis 'Nigra'	Dark American Arborvitae	129	6-7'
JV	Juniperus virginiana 'Canaerti'	Canaerti Eastern Red Cedar	3	12-14' hvy.

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Springhill Suites by Marriott

556 Main Street Falmouth, MA

prepared for: Falmouth Hospitality, LLC
location: 2 Lan Drive Westford, MA 01886
title

PLANTING PLAN

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Mark	Date
#	REV6
#	REV5
#	REV4
#	REV3 04DEC2014
#	REV2 03DEC2014
#	REV1 06NOV2014

Revisions

Date	7-23-14
Scale	1/16"=1'-0"
Job No.	2404
Sheet No.	L2

Appendix 2. Nitrogen Loading Calculations

INTRODUCTION

The purpose of this report is to assess the current levels of Nitrate-Nitrogen (NO_3-N) at #556 Main Street in Falmouth, MA as well as estimated levels after redevelopment of the property. Falmouth Hospitality, LLC proposes the redevelopment of the site at 556 Main Street in Falmouth, MA by constructing a 110 room Springhill Suites by Marriot Hotel. Associated site improvements will include paved parking, driveway, recreation, and pedestrian areas, landscaped areas, utilities, and a stormwater management system.

The project site is within a watershed to an embayment that has been identified as having a critical nitrogen load. The calculations that follow demonstrate that the nitrogen load from the project site will be less in the proposed condition than in the existing condition.

PROCEDURE

To conduct this site analysis of NO_3-N, several different areas of the site needed to be measured since they all contribute different concentration levels. According to the USEPA and MA EOEA, the loading values of different areas and the way to calculate the nitrate-nitrogen levels for them are as followed:

Table 1

SUMMARY OF NITROGEN LOADING VALUES

TARGET CONCENTRATION:	5 ppm (milligram/liter) NO_3-N
WASTEWATER	
Residences	
Concentration:	35 ppm NO_3-N
Flow:	Title 5 (310 CMR 15.02)
Nonresidences	
Concentration:	35 ppm NO_3-N
Flow:	Title 5; Frimpter, *et al.* (1988): Documented flows satisfactory to CCC WRO staff
OCCUPANCY:	Range (Actual town rate to 2 people per bedroom)
LAWNS	
Area:	5,000 ft^2
Fertilizer:	3 lbs/1,000 ft^2 of lawn
Leaching:	25%
RECHARGE	
Off of impervious surfaces:	40 inches per year
Concentrations	
Road runoff:	1.5 ppm NO_3-N
Roof runoff:	0.75 ppm NO_3-N
Natural areas	

Barnstable:	18 inches per year	Mashpee:	19 in/yr
Bourne:	21 in/yr	Orleans:	16 in/yr
Brewster:	17 in/yr	Provincetown:	16 in/yr
Chatham:	16 in/yr	Sandwich:	19 in/yr
Dennis:	18 in/yr	Truro:	16 in/yr
Eastham:	16 in/yr	Wellfleet:	16 in/yr
Falmouth:	21 in/yr	Yarmouth:	18 in/yr
Harwich:	17 in/yr		

Recommended Nitrogen Loading Limits for Coastal Embayments

EMBAYMENT	WATERS CLASSIFIED SB	WATERS CLASSIFIED SA	OUTSTANDING RESOURCE AREAS
Shallow			
• flushing: 4.5 days or less	350 $mg/m^3/Vr$	200 $mg/m^3/Vr$	100 $mg/m^3/Vr$
• flushing: greater than 4.5 days	30 $g/m^2/yr$	15 $g/m^2/yr$	5 $g/m^2/yr$
Deep			
• select rate resulting in lesser annual loading	500 $mg/m^3/Vr$ or 45 $g/m^2/yr$	260 $mg/m^3/Vr$ or 20 $g/m^2/yr$	130 $mg/m^3/Vr$ or 10 $g/m^2/yr$

Note: Vr = Vollenweider flushing term

$$Vr = \frac{r}{1 + \text{sqrt}(r)}$$

r = flushing time (yrs)

Source: USEPA and MA EOEA, 1991

Table 1-A

EXAMPLE NONRESIDENTIAL LOADING CALCULATIONS

Office Building:

Lot Size: 5 acres (217,800 ft²)
Impervious Surfaces: Roof Area: 15,000 ft²; Paving Area: 30,000 ft²
Natural Area: 172,800 ft²; Lawn Area: 10,000 ft²
Title V Flow: 75 gallons/day per 1,000 ft²

WASTEWATER

$$15{,}000\ \text{ft}^2 \left[\frac{75\ \text{gpd}}{1{,}000\ \text{ft}^2}\right]\left[\frac{3.785\ \text{L}}{\text{gal}}\right] = 4{,}258.1\ \text{L/d} \qquad \left[\frac{35\ \text{mg}}{\text{L}}\right] = 149{,}034.4\ \text{mg/d}$$

IMPERVIOUS SURFACES

$$15{,}000\ \text{ft}^2 \left[\frac{40\ \text{in}}{\text{yr}}\right]\left[\frac{\text{ft}}{12\ \text{in}}\right]\left[\frac{28.32\ \text{L}}{\text{ft}^3}\right]\left[\frac{1\ \text{yr}}{365\ \text{d}}\right] = 3{,}879.5\ \text{L/d} \qquad \left[\frac{0.75\ \text{mg}}{\text{L}}\right] = 2{,}909.6\ \text{mg/d}$$

$$30{,}000\ \text{ft}^2 \left[\frac{40\ \text{in}}{\text{yr}}\right]\left[\frac{\text{ft}}{12\ \text{in}}\right]\left[\frac{28.32\ \text{L}}{\text{ft}^3}\right]\left[\frac{1\ \text{yr}}{365\ \text{d}}\right] = 7{,}758.9\ \text{L/d} \qquad \left[\frac{1.5\ \text{mg}}{\text{L}}\right] = 11{,}638.4\ \text{mg/d}$$

LAWN

$$10{,}000\ \text{ft}^2 \left[\frac{3\ \text{lbs}}{1{,}000\ \text{ft}^2 * \text{yr}}\right]\left[\frac{1\ \text{yr}}{365\ \text{d}}\right]\left[\frac{454{,}000\ \text{mg}}{\text{lb}}\right]\left[0.25\right] = 9{,}328.8\ \text{mg/d}$$

NATURAL

$$5\ \text{acres} \left[\frac{43{,}560\ \text{ft}^2}{\text{acre}}\right] = 217{,}800\ \text{ft}^2; \quad 217{,}800\ \text{ft}^2 - 45{,}000\ \text{ft}^2 = 172{,}800\ \text{ft}^2$$

$$172{,}800\ \text{ft}^2 \left[\frac{1.5\ \text{ft}}{\text{yr}}\right]\left[\frac{28.32\ \text{L}}{\text{ft}^3}\right]\left[\frac{1\ \text{yr}}{365\ \text{d}}\right] = 20{,}111.1\ \text{L/d}$$

SUMMARY

$$\frac{149{,}304.4 + 2{,}909.6 + 11{,}638.4 + 9{,}328.8\ \text{mg}}{4{,}258.1 + 3{,}879.5 + 7{,}758.9 + 20{,}111.1\ \text{liters}} = \frac{172{,}911.2\ \text{mg}}{36{,}007.6\ \text{liters}} = \boxed{4.80\ \text{ppm}}$$

Table 1-B

By referring to Table 1-A and Table 1-B, it is possible to see that the areas of interest for this site are the lawn areas, the impervious areas which include the roof of the building and the pavement, and the natural areas. It is also important to take into consideration the recharge from precipitation because it is the *only* way to dilute NO_3-N loading on an aquifer-wide basis and it provides an important source of dilution for concentrations on smaller scales. (CCC WRO, April 1992) Note that there is no wastewater contributing to the NO_3-N concentrations, so it was not used in the following calculations. The areas were calculated below in Table 2-A.

Existing Site Areas (ft^2)		**Percentages**
Total Area	88,222	100.00%
Building	14,123	16.01%
Paved	28,655	32.48%
Gravel	20,641	23.40%
Natural	20,831	11.61%
Lawn	3,972	4.50%

4,935 2 story wood, 1,821 1 story wood, 1867 1 story conc block, 408 1 story garage, 4,981 1 story garage, 110 shed)

Total Area 19,058

Table 2-A

By using the equation provided in Table 1-B, the existing NO_3-N concentration was then calculated for #556 Main Street, Falmouth, MA.

Existing NO3-N Concentrations

<u>Roof Areas</u>

$$14{,}123\,ft^2\left[\frac{40in}{yr}\right]\left[\frac{ft}{12in}\right]\left[\frac{28.32L}{ft^3}\right]\left[\frac{1yr}{365d}\right]=3{,}653L/d$$

$$3{,}653L/d\left[\frac{0.75mg}{L}\right]=2{,}740mg/d$$

<u>Impervious Areas</u>

$$28{,}655\,ft^2\left[\frac{40in}{yr}\right]\left[\frac{ft}{12in}\right]\left[\frac{28.32L}{ft^3}\right]\left[\frac{1yr}{365d}\right]=7{,}411L/d$$

$$7{,}411L/d\left[\frac{1.5mg}{L}\right]=11{,}117mg/d$$

<u>Gravel Areas</u>

$$20{,}641\,ft^2\left[\frac{40in}{yr}\right]\left[\frac{ft}{12in}\right]\left[\frac{28.32L}{ft^3}\right]\left[\frac{1yr}{365d}\right]=5{,}338L/d$$

$$5{,}338L/d\left[\frac{1.5mg}{L}\right]=8{,}008mg/d$$

Note: 1.75 ft comes from a recharge rate of 21 in/yr in Falmouth, MA

Lawn

$$20{,}831\,ft^2\left[\frac{1.75\,ft}{yr}\right]\left[\frac{yr}{365d}\right]\left[\frac{28.32L}{ft^3}\right]=2{,}828L/d$$

$$20{,}831\,ft^2\left[\frac{3lbs}{1{,}000\,ft^2 * yr}\right]\left[\frac{yr}{365d}\right]\left[\frac{453{,}585mg}{lb}\right][0.25]=19{,}415mg/d$$

Natural

$$3{,}972\,ft^2\left[\frac{1.75\,ft}{yr}\right]\left[\frac{28.32L}{ft^3}\right]\left[\frac{yr}{365d}\right]=539L/d$$

Note: 1.75 ft comes from a recharge rate of 21 in/yr in Falmouth, MA

Summary

$$2{,}740+11{,}117+8{,}008+19{,}415=\mathbf{41{,}280\ mg}$$

$$3{,}653+7{,}411+5{,}338+2{,}828+539=19{,}769\ L$$

$$\frac{41{,}280mg}{17{,}234L}=\mathbf{2.40\ ppm}$$

With redevelopment, the areas of interest for the site will change, as shown in Table 3-A. The site will consist only of impervious areas i.e. pavement and sidewalks, roof areas and lawn areas.

Proposed Site Areas (ft^2)		**Percentages**
Total Area	88,222	100.00%
Building	37,360	42.35%
Paved	22,792	25.83%
Lawn	24,098	27.32%
Natural	3,972	4.50%

Table 3-A

Proposed NO3-N Concentrations

Roof Areas

$$37{,}360\,ft^2\left[\frac{40in}{yr}\right]\left[\frac{ft}{12in}\right]\left[\frac{28.32L}{ft^3}\right]\left[\frac{1yr}{365d}\right]=9{,}662L/d$$

$$9{,}662.4L/d\left[\frac{0.75mg}{L}\right]=7{,}247mg/d$$

Impervious Areas

$$22{,}792\,ft^2\left[\frac{40in}{yr}\right]\left[\frac{ft}{12in}\right]\left[\frac{28.32L}{ft^3}\right]\left[\frac{1yr}{365d}\right]=5{,}895L/d$$

$$5{,}894.7L/d\left[\frac{1.5mg}{L}\right]=8{,}842mg/d$$

Lawn

$$24{,}098\,ft^2\left[\frac{1.75\,ft}{yr}\right]\left[\frac{yr}{365d}\right]\left[\frac{28.32L}{ft^3}\right]=3{,}272L/d$$

$$24{,}098\,ft^2\left[\frac{3lbs}{1{,}000\,ft^2*yr}\right]\left[\frac{yr}{365d}\right]\left[\frac{453{,}585mg}{lb}\right][0.25]=22{,}460mg/d$$

Natural

$$3{,}972\,ft^2\left[\frac{1.75\,ft}{yr}\right]\left[\frac{28.32L}{ft^3}\right]\left[\frac{yr}{365d}\right]=539L/d$$

Note: 1.75 ft comes from a recharge rate of 21 in/yr in Falmouth, MA

Summary

$$7{,}247+8{,}842+22{,}460=\mathbf{38{,}549\ \boldsymbol{mg}}$$

$$9{,}662+5{,}895+3{,}272+539=19{,}368\ L$$

$$\frac{7{,}247+8{,}842+22{,}460}{9{,}662+5{,}895+3{,}272+539}=\frac{38{,}549mg}{19{,}368L}=\mathbf{1.99\ ppm}$$

The proposed NO3-N concentration above was calculated using loading rates of 3 lbs nitrogen per 1,000 ft^2/yr per Technical Bulleting 91-001. Nitrogen will be applied at the recommended loading rate in the Falmouth Nitrogen Loading Bylaw which is 1 lb per 1,000 ft^2. The proposed NO3-N loading for lawns are calculated for this recommended loading rate below.

Lawn

$$24{,}098\,ft^2\left[\frac{1lbs}{1{,}000\,ft^2*yr}\right]\left[\frac{yr}{365d}\right]\left[\frac{453{,}585mg}{lb}\right][0.25]=7{,}487mg/d$$

Therefore, the proposed NO3-N concentration will be as follows:

$$7{,}247 + 8{,}842 + 7{,}487 = \mathbf{23{,}576}\ \boldsymbol{mg}$$

$$9{,}662 + 5{,}895 + 3{,}272 + 539 = 19{,}368\ L$$

$$\frac{7{,}247 + 8{,}842 + 7{,}487}{9{,}662 + 5{,}895 + 3{,}272 + 539} = \frac{23{,}576 mg}{19{,}368 L} = \mathbf{1.22\ ppm}$$

Conclusion

The existing nitrogen load at #556 Main Street, Falmouth, MA is 41,280 mg/day. The existing nitrogen concentration is 2.40 ppm. After redevelopment of the site, the nitrogen load will be 23,576 mg/day and the nitrogen concentration will be 1.22 ppm, both of which are less than the existing values. This will result in less nitrogen from the project site entering the embayment.

A turf and landscape management plan will be implemented and will include use of native and drought resistant plantings. Fertilizer usage will be avoided. If deemed necessary, slow release fertilizer will be used. Fertilizer will be used to begin the establishment of vegetation in bare or damaged areas, but will not be applied on a regular basis unless necessary. Fertilizer use will be in accordance with the Falmouth Fertilizer Management Bylaw. No pesticides are to be used unless a single spot treatment is required for a specific control application.

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Appendix 3. Transportation Narrative and Supplements

TRANSPORTATION

Vanasse & Associates, Inc. (VAI) has completed a Transportation Impact Assessment (TIA) in support of this Application pursuant to Section 5 of the Cape Cod Commission Chapter A, *Enabling Regulations Governing Review of Developments of Regional Impact* (DRI), for a Limited DRI Review of a proposed extended stay hotel to be located at 556 Main Street (Route 28) in Falmouth, Massachusetts (the "Project"). The purpose of this TIA is to provide sufficient information to allow the Cape Cod Commission (the "Commission") to make a finding that the Project meets the requirements for Limited DRI review with respect to Transportation and the goals and performance standards relative to Transportation as identified in the 2009 *Cape Cod Regional Policy Plan* as amended. The following details our findings with respect to the Project and its interface with the Transportation system.

PROJECT DESCRIPTION

The Project will entail the redevelopment of an existing commercial property located at 556 Main Street (Route 28) in Falmouth, Massachusetts, to accommodate a 110-room extended stay hotel with 121 parking spaces (86 on-site and 35 off-site at 19 Nye Road). The Project site is generally bounded by residential properties to the north; Main Street to the south; and commercial properties to the east and west; and currently contains approximately 16,272 square feet (sf) of commercial/retail space (antique store and ancillary storage space) that will be removed to accommodate the redevelopment of the Project site. Figure 1 depicts the Project site location in relation to the existing roadway network.

Access to the Project site will be provided by way of Lantern Lane, a private way which bisects the Project site and intersects the north side of Main Street approximately 180 feet west of Nye Road. Lantern Lane will be reconstructed to accommodate the Project and will continue to provide access to the residential properties to the north of the Project site. Access to the off-site parking lot will be provided by way of a gated (key card activated) driveway that will intersect the west side of Nye Road approximately 190 feet south of Main Street. A sidewalk is provided along Nye Road that will be improved as a part of the Project and marked crosswalks are afforded at the Main Street/Nye Road intersection for hotel guests to cross Main Street between the Project site and the off-site parking lot.

TRAFFIC CHARACTERISTICS

The anticipated traffic characteristics of the Project were developed using trip-generation statistics published by the Institute of Transportation Engineers (ITE).[1] The ITE provides trip-generation information for various types of land uses developed as a result of scientific studies that have been conducted over the past 50 plus years. This information includes trip characteristics for uses similar to those that currently occupy the Project site, as well as for the proposed use. The traffic characteristics of the existing uses (antique store and ancillary storage space) were calculated using ITE Land Use Code (LUC) 826, *Specialty Retail Center*, and assuming 16,272 sf of space,[2] with those of the proposed use (extended stay hotel) calculated using LUC 310, *Hotel*, and following the guidance provided in the Cape Cod Commission Technical Bulletin 96-003.

[1] *Trip Generation*, 9th Edition; Institute of Transportation Engineers; Washington, DC; 2012.

[2] ITE LUC 820, *Shopping Center*, was also reviewed for use in developing the traffic characteristics of the existing uses and was determined to result in similar or higher trip estimates.

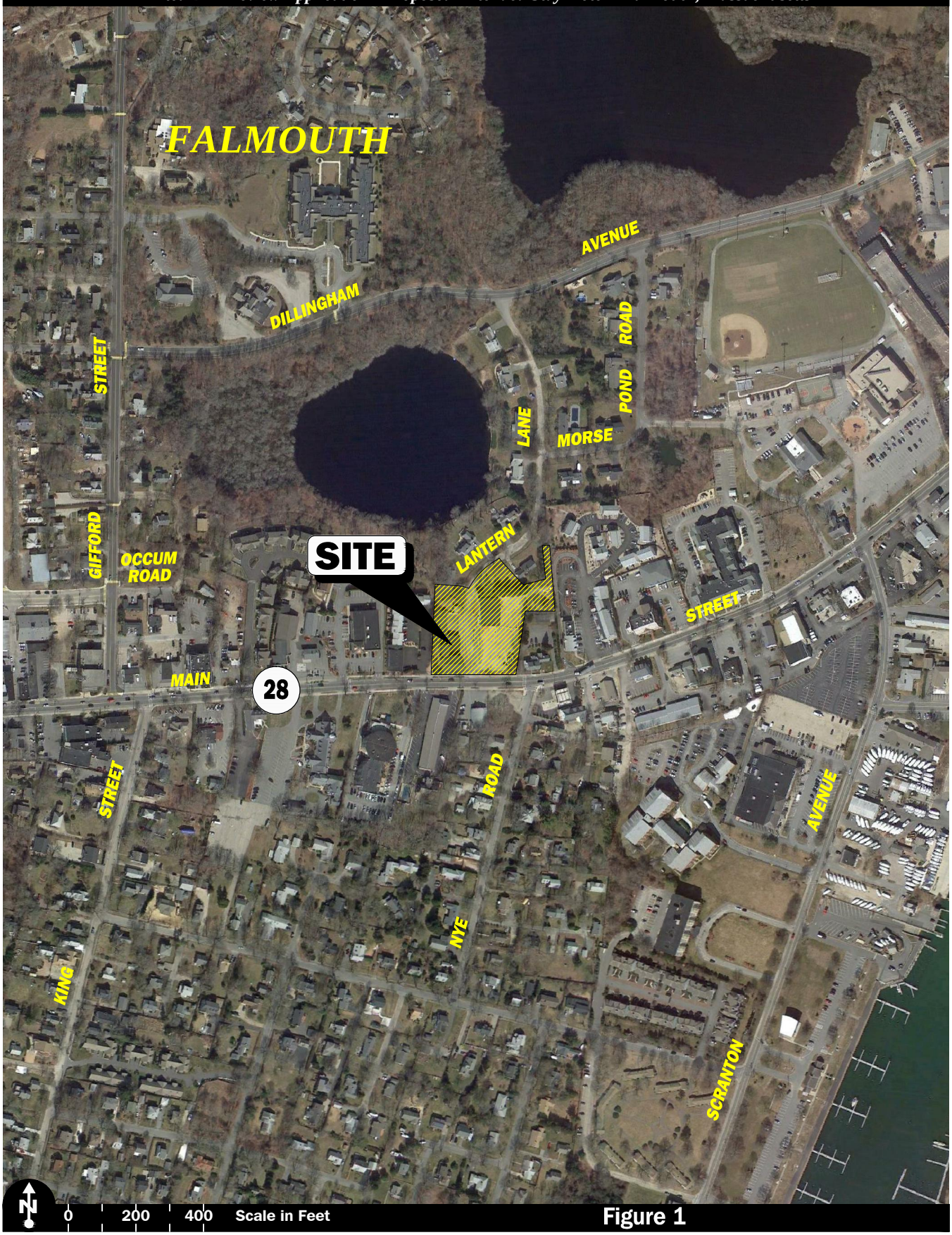

Figure 1

Site Location Map

Vanasse & Associates, Inc.
Transportation Engineers & Planners

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Table 1 summarizes and compares the traffic characteristics of the current and proposed use of the Project site.

Table 1
566 MAIN STREET REDEVELOPMENT PROJECT
EXISTING AND PROPOSED TRAFFIC VOLUME COMPARISON

	Vehicle Trips		
Time Period/Direction	(A) Proposed Extended Stay Hotel (110 Rooms)[a]	(B) Existing Uses[b]	(C = A - B) Difference
Average Weekday Daily:			
Entering	445	361	
Exiting	445	361	
Total	900	722	+178
Weekday Morning Peak-Hour of Generator:			
Entering	33	53	
Exiting	28	58	
Total	61	111	-50
Weekday Evening Peak-Hour of Generator:			
Entering	39	46	
Exiting	28	36	
Total	67	82	-15
Saturday Daily:			
Entering	451	342	
Exiting	451	342	
Total	902	684	+218
Saturday Midday Peak-Hour:			
Entering	45	33	
Exiting	35	33	
Total	80	66	+14

[a]Based on ITE LUC 310, *Hotel*; 110 rooms.
[b]Based on ITE LUC 826, *Specialty Retail*; 16,272 sf.

As can be seen in Table 1, the redevelopment of the Project site as an extended stay hotel is expected to result in 178 additional vehicle trips on an average weekday (two-way, 24-hour volume) when compared to the projected traffic characteristics of the existing uses that occupy the Project site, with 50 fewer vehicle trips predicted during the weekday morning peak-hour and 15 fewer vehicle trips predicted during the weekday evening peak-hour. On a Saturday, the redevelopment of the Project site is expected to result in 218 additional vehicle trips, with 14 additional vehicle trips predicted during the Saturday midday peak-hour. The detailed trip-generation calculations are attached.

PROJECT SITE ACCESS EVALUATION

As described previously, access to the Project site will be provided by way of Lantern Lane, a private way that bisects the Project site and intersects the north side of Main Street approximately 180 feet west of Nye Road. Lantern Lane will be reconstructed to accommodate the Project and will continue to provide access to the residential properties to the north of the Project site. Access to the off-site parking lot will be provided by way of a gated (key card activated) driveway that will intersect the west side of Nye Road approximately 190 feet south of Main Street. A sidewalk is provided along Nye Road that will be improved as a part of the Project and marked crosswalks are afforded at the Main Street/Nye Road intersection for hotel guests to cross Main Street between the Project site and the off-site parking lot. The following provides a description of the roadways that will provide access to the Project site and includes an assessment of sight lines at the Project site driveway intersections with both Main Street and Nye Road.

Roadways

Main Street

Within the study area, Main Street (Route 28) is a two-lane, urban principal arterial roadway that is under Town jurisdiction and traverses the study area in a general east-west direction. In the vicinity of the Project site, Main Street provides two (2) travel lanes per direction that are approximately 15-feet in width and are separated by a double-yellow centerline with no marked shoulders provided. Four to eight-foot wide cement concrete sidewalks are provided continuously along both sides of Main Street with wheelchair ramps provided for crossing intersecting roadways and driveways. Formal bicycle accommodations are not provided along Main Street; however, the 15-foot wide travel lanes provide sufficient width to accommodate bicycle travel in a shared travelled-way configuration.[3] The posted speed limit along Main Street within the study area is 35 miles per hour (mph). Traffic volume and speed data collected in May 2014 on Main Street in the vicinity of the Project site reported the following data:

- ***Average Weekday Traffic:*** 16,600 vehicles per day
- ***Saturday Traffic:*** 16,900 vehicles
- ***Average Travel Speed:*** 23 mph
- ***85th Percentile Travel Speed:*** 29 mph

Bus service is provided along Main Street by the Cape Cod Regional Transit Authority (CCRTA) by way of the *SeaLine* bus service and the Woods Hole Shuttle (*WHOOSH trolley*) (discussion follows). Land use along Main Street within the study area consists of the Project site and residential and commercial properties.

Nye Road

Nye Road is a two-lane local roadway that is under Town jurisdiction and traverses a general north-south direction between Main Street and Queen Street. Nye Road is approximately 18-feet in width and accommodates two-way travel with no marked centerline or shoulders provided. Four-foot wide cement or bituminous concrete sidewalks are provided along both sides of Nye Road. Formal bicycle accommodations are not provided along Nye Road; however, the low traffic volumes and travel speeds along this residential roadway are conducive to bicycle and motor vehicle travel within the travelled-way. A posted speed limit is not provided for Nye Road. Peak-hour traffic volumes measured in May 2014

[3] A minimum width of 14-feet consisting of the travel lane and paved shoulder (where present) is required to support bicycle travel in a shared travelled-way configuration.

indicate that Nye Road accommodates approximately 45 vehicles per hour during both the weekday morning and evening peak hours, and approximately 30 vehicles per hour during the Saturday midday peak-hour. Land use along Nye Road consists of residential and commercial properties.

Intersection

Nye Road intersects Main Street from the south to form a three-legged intersection under STOP-sign control. The Main Street east and westbound approaches consist of a 15-foot wide general purpose travel lane with no marked shoulder provided. The directions of travel along Main Street are separated by a double-yellow centerline. Nye Road consists of an 18-foot wide roadway that accommodates two-way travel with no marked centerline or shoulders provided and vehicles approaching Main Street under STOP-sign control. Sidewalks are provided along both sides of the intersecting roadways, with marked crosswalks for crossing Nye Road and the Main Street west leg of the intersection. Pedestrian crossing warning signs are provided in advance of the crossing on Main Street. Land use in the vicinity of the intersection consists of the Project site and commercial properties.

Public Transportation Services

Public transportation services are provided to the Town of Falmouth by the Cape Cod Regional Transit Authority (CCRTA). Within the study area, the CCRTA operates the *SeaLine* bus service which will be available to both guests and employees of the Project. The *SeaLine* bus route travels along Route 28 and past the Project site from the Hyannis Transportation Center to the Woods Hole Ferry Terminal in Falmouth, with numerous local stops including: the Cape Cod Mall; Centerville; Osterville; Marstons Mills Marketplace; Mashpee Commons; South Cape Village; East Falmouth; the Falmouth Mall; and the Falmouth Bus Depot. Connections to other CCRTA bus routes and to regional bus service provided by Plymouth & Brockton (P&B) Street Railway Co. (service to Boston (South Station)) and Peter Pan Bus Lines (service to Providence and New York City) can be made at the Hyannis Transportation Center located in downtown Hyannis. During the summer, the *SeaLine* route terminates at the Falmouth Mall, with service between the Falmouth Mall and Woods Hole provided by trolley (the WHOOSH trolley). *SeaLine* service is provided Monday through Saturday, with 18 buses per day (nine in each direction); headways range from one to two hours. Fares for adults and youths are $2.00, with a $1.00 fare for senior citizens and people with disabilities. All CCRTA buses are handicapped and wheelchair accessible, and are equipped with bicycle racks.

The Woods Hole Shuttle (*WHOOSH trolley*) operates seven days a week from mid-June through late-September and provides service between the Falmouth Mall and the Woods Hole Aquarium. Service is provided every half-hour on weekdays and hourly on weekends. The adult trolley fare is $1.00, with a $0.50 fare for senior citizens and people with disabilities.

In addition to the fixed-route bus service, the CCRTA provides door-to-door bus service by way of the Dial-A-Ride Transportation (DART). DART service is provided by appointment to Cape Cod residents of all ages for trips of any purpose including school, work, shopping, medical visits, and visiting friends, and is provided in all 15 towns on Cape Cod. DART vehicles carry 19 passengers and have hydraulic lifts for people with disabilities. New subscribers must pre-enroll; once enrolled, reservations may be made up to one week in advance. DART service is generally provided between 7:00 AM and 7:00 PM Monday through Friday; between 9:00 AM and 7:00 PM on Saturday; and between 9:00 AM to 1:00 PM on Sunday. Fares for adults and youths is $3.00, with a $1.50 fare for seniors and people with disabilities; children five and younger ride for free when accompanied by a paying adult.

Sight Distance Evaluation

Sight distance measurements were performed at the Project site driveway/Lantern Lane intersection with Main Street in accordance with MassDOT and American Association of State Highway and Transportation Officials (AASHTO)[4] standards. Both stopping sight distance (SSD) and intersection sight distance (ISD) measurements were performed. In brief, SSD is the distance required by a vehicle traveling at the design speed of a roadway, on wet pavement, to stop prior to striking an object in its travel path. ISD or corner sight distance (CSD) is the sight distance required by a driver entering or crossing an intersecting roadway to perceive an on-coming vehicle and safely complete a turning or crossing maneuver with on-coming traffic. In accordance with AASHTO standards, at a minimum, sufficient SSD should be provided at an intersection. ISD, while desirable to maintain efficient traffic flow, is not required for an intersection to function in a safe manner.

As discussed previously, vehicle travel speed measurements were performed along Main Street in the vicinity of the Project site over a continuous 72-hour period (Thursday through Saturday) in May 2014. Based on these measurements, the average observed travel speed was found to be 23 mph and the 85th percentile vehicle travel speed was found to be 29 mph, or 5 mph below the posted speed limit along this section of Main Street (35 mph). The 85th percentile speed is used as the basis of engineering design and in the evaluation of sight distances. That being said, given that the measured 85th percentile vehicle travel speed was found to be below the posted speed limit, the posted speed limit (35 mph) was used to assess sight lines at the Project site driveway intersection. Table 2 presents the measured SSD and ISD at the subject intersection.

Table 2
SIGHT DISTANCE MEASUREMENTS[a]

Intersection/Sight Distance Measurement	Feet		
	Recommended Minimum (SSD)	Desirable (ISD)[b]	Measured
Main Street at the Project Site Driveway/Lantern Lane			
Stopping Sight Distance:			
Main Street approaching from the east	250	--	325
Main Street approaching from the west	250	--	500+
Intersection Sight Distance:			
Looking to the east from the Project site driveway/Lantern Lane	250	455/395	250
Looking to the west from the Project site driveway/Lantern Lane	250	455/395	500+

[a]Recommended minimum values obtained from: *A Policy on Geometric Design of Highways and Streets*, 6th Edition; American Association of State Highway and Transportation Officials (AASHTO); 2011; and based on an approach speed of 35 mph along Main Street.

[b]Value shown is the intersection sight distance for a vehicle turning left/right exiting a roadway under STOP control such that motorists approaching the intersection on the major street should not need to adjust their travel speed to less than 70 percent of their initial approach speed.

[4]*A Policy on Geometric Design of Highways and Streets, 6th Edition*; American Association of State Highway and Transportation Officials (AASHTO); 2011.

As can be seen in Table 2, lines of sight at the Project site driveway/Lantern Lane intersection with Main Street meet or exceed the recommended minimum sight distance (SSD) to function in a safe manner based on a 35 mph approach speed along Main Street, which is consistent with the posted speed limit and 6 mph above the measured 85th percentile travel speed (29 mph).

Lines of sight to and from the driveway that will serve the proposed overflow parking lot on Nye Road will meet or exceed 155 feet, the minimum sight distance required for a 25 mph approach speed, which is consistent with the residential setting of the abutting land use and the relatively low volume of traffic using the roadway.

MOTOR VEHICLE CRASH ANALYSIS

Motor vehicle crash information for the study area intersections was provided by the MassDOT Highway Division Safety Management/Traffic Operations Unit for the most recent three-year period available (2010 through 2012, inclusive) in order to examine motor vehicle crash trends occurring within the study area. Based on a review of this data, no motor vehicle crashes were reported to have occurred at the Main Street/Lantern Lane intersection. Three (3) motor vehicle crashes were reported at or in the vicinity of the Main Street/Nye Road intersection over the three-year review period, or approximately one (1) crash per year, none of which were reported to have involved a pedestrian or bicyclist. Of the three (3) reported crashes, two (2) involved property damage only; two (2) were reported a rear-end type collisions; and all three (3) crashes occurred on dry pavement. No roadway defects were noted as a contributing cause in any of the reported crashes; all were attributed to driver error or inattentiveness. The calculated motor vehicle crash rate for the Main Street/Nye Road intersection per million entering vehicles is 0.20, which is below both the MassDOT statewide and District 5 (the MassDOT Highway Division District in which the intersection is located) average crash rates for an unsignalized intersection of 0.60 and 0.58 crashes per million entering vehicles, respectively. The detailed MassDOT Crash Rate Worksheet is attached.

Based on a review of the MassDOT motor vehicle crash data, no inherent safety deficiencies were noted with respect to the design or operation of the Main Street/Lantern Lane or Main Street/Nye Road intersections.

SUMMARY

VAI has completed a Transportation Impact Assessment in support of this Application pursuant to Section 5 of the Cape Cod Commission Chapter A, *Enabling Regulations Governing Review of Developments of Regional Impact* (DRI), for a Limited DRI Review of a proposed extended stay hotel to be located at 556 Main Street (Route 28) in Falmouth, Massachusetts. This assessment has provided relevant information and analyses to support a finding by the Cape Cod Commission that the Project meets the requirements for Limited DRI review with respect to Transportation and the goals and performance standards relative to Transportation as identified in the 2009 *Cape Cod Regional Policy Plan* as amended. Based on the information prepared as a part of this assessment, the following has been concluded with respect to the Project:

1. The redevelopment of the Project site as an extended stay hotel is expected to result in 178 additional vehicle trips on an average weekday (two-way, 24-hour volume) when compared to the projected traffic characteristics of the existing uses that occupy the Project site, with 50 fewer vehicle trips predicted during the weekday morning peak-hour and 15 fewer vehicle trips predicted during the weekday evening peak-hour. On a Saturday, the redevelopment of the

Project site is expected to result in 218 additional vehicle trips, with 14 additional vehicle trips predicted during the Saturday midday peak-hour;

2. Both Main Street and Nye Road provide pedestrian and bicycle accommodations that currently exist or will be improved as a part of the Project to safely convey patrons, guests and employees to and from the Project site and the overflow parking lot;

3. Public transportation services provided by the CCRTA are available to the Project site;

4. Lines of sight to and from the Project site driveway on Main Street (Lantern Lane) and for the overflow parking lot on Nye Road meet, exceed or will be made to meet or exceed the required minimum sight distance to function in a safe manner based on the appropriate approach speed along these roadways (35 mph along Main Street and 25 mph along Nye Road); and

5. No inherent safety deficiencies were noted with respect to the design or operation of Main Street proximate to the Project site or the Main Street/Nye Road intersection based on a review of motor vehicle crash data provided by MassDOT.

In consideration of the above and presuming a favorable finding by the Commission granting Limited DRI review with respect to Transportation, the Applicant will work with Commission Transportation Staff with respect to the design of the Project site driveway and other such measures as deemed appropriate to: i) mitigate the projected impact of the Project on the regional roadway network serving the Project locus; and ii) afford safe and convenient access to the Project site for all roadway users.

Limited DRI Review Scoping Checklist – Redevelopment/Change of Use - Transportation

The following summarizes the guidance provided in the *Limited DRI Review Scoping Checklist* relative to Transportation as this guidance relates to the Project.

Congestion Management

Guidance: *Will the Project generate more than 250 new daily trips?*

Response: No. The Project is expected to generate 178 new daily vehicle trips on an average weekday and 218 new vehicle trips on a Saturday when compared to the existing uses that occupy the Project site.

Transportation Balance and Efficiency

Guidance: *Will the Project generate more than 250 new daily trips?*

Response: No. The Project is expected to generate 178 new daily vehicle trips on an average weekday and 218 new vehicle trips on a Saturday when compared to the existing uses that occupy the Project site.

Safety

Guidance: *Does the Project have direct access on or does the Project directly abut a regional roadway?*

Response: Yes. The Project site has direct access to and directly abuts Main Street (Route 28), a regional roadway under the jurisdiction of the Town of Falmouth.

Safety

Guidance: *Will the Project generate more than 25 new peak hour trips at a high crash location?*

Response: No. The Project is predicted to generate 14 new vehicle trips during the Saturday midday peak-hour (traffic volume hour with the highest predicted traffic volume increase).

ATTACHMENTS

AUTOMATIC TRAFFIC RECORDER COUNTS
MANUAL TURNING MOVEMENT COUNTS
VEHICLE TRAVEL SPEED MEASUREMENTS
TRIP-GENERATION CALCULATIONS
CCRTA BUS ROUTE, SCHEDULE AND FARE INFORMATION
MASSDOT CRASH RATE WORKSHEET

AUTOMATIC TRAFFIC RECORDER COUNTS

Accurate Counts
978-664-2565

Location : Main Street (Route 28)
Location : East of Lantern Lane
City/State: Falmouth, MA

Site Code: 66680001
6668VOL1

Start	29-May-14	WB		Hour Totals		EB		Hour Totals		Combined Totals	
Time	Thu	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon
12:00		6	119			15	180				
12:15		3	149			3	193				
12:30		5	141			9	157				
12:45		4	143	18	552	3	157	30	687	48	1239
01:00		4	137			4	162				
01:15		2	121			2	145				
01:30		2	147			3	165				
01:45		2	105	10	510	5	167	14	639	24	1149
02:00		3	119			7	184				
02:15		4	129			4	222				
02:30		3	142			3	181				
02:45		2	139	12	529	1	168	15	755	27	1284
03:00		0	140			5	175				
03:15		1	118			2	192				
03:30		0	123			3	175				
03:45		6	123	7	504	3	157	13	699	20	1203
04:00		5	123			5	182				
04:15		11	137			5	198				
04:30		7	131			9	187				
04:45		20	115	43	506	7	197	26	764	69	1270
05:00		19	135			10	197				
05:15		22	117			13	227				
05:30		31	104			24	153				
05:45		41	122	113	478	20	142	67	719	180	1197
06:00		24	109			16	144				
06:15		40	106			35	125				
06:30		85	110			50	119				
06:45		95	117	244	442	54	119	155	507	399	949
07:00		96	109			57	126				
07:15		113	93			94	131				
07:30		122	100			112	141				
07:45		141	79	472	381	83	121	346	519	818	900
08:00		136	64			124	102				
08:15		115	66			118	82				
08:30		139	55			111	101				
08:45		146	64	536	249	146	95	499	380	1035	629
09:00		144	63			148	84				
09:15		128	44			141	69				
09:30		121	42			150	48				
09:45		130	43	523	192	125	57	564	258	1087	450
10:00		141	30			155	30				
10:15		160	24			118	55				
10:30		123	26			162	36				
10:45		137	23	561	103	142	28	577	149	1138	252
11:00		133	10			161	28				
11:15		124	19			139	18				
11:30		133	12			126	25				
11:45		142	12	532	53	153	14	579	85	1111	138
Total		3071	4499			2885	6161			5956	10660
Percent		40.6%	59.4%			31.9%	68.1%			35.8%	64.2%

Accurate Counts
978-664-2565

Location : Main Street (Route 28)
Location : East of Lantern Lane
City/State: Falmouth, MA

Site Code: 66680001
6668VOL1

Start	30-May-14	WB		Hour Totals		EB		Hour Totals		Combined Totals	
Time	Fri	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon
12:00		7	136			16	194				
12:15		4	164			6	175				
12:30		3	146			7	202				
12:45		4	148	18	594	14	188	43	759	61	1353
01:00		6	145			6	195				
01:15		1	143			3	196				
01:30		1	142			8	181				
01:45		6	148	14	578	6	178	23	750	37	1328
02:00		3	127			5	207				
02:15		3	122			2	198				
02:30		3	160			2	185				
02:45		1	141	10	550	2	199	11	789	21	1339
03:00		1	144			0	205				
03:15		1	130			2	213				
03:30		1	139			4	202				
03:45		1	121	4	534	2	171	8	791	12	1325
04:00		8	119			2	189				
04:15		9	128			8	197				
04:30		6	142			10	195				
04:45		17	115	40	504	6	195	26	776	66	1280
05:00		15	102			16	212				
05:15		23	116			15	178				
05:30		47	122			24	172				
05:45		32	134	117	474	25	145	80	707	197	1181
06:00		44	113			32	165				
06:15		65	94			48	146				
06:30		76	102			65	130				
06:45		100	118	285	427	53	140	198	581	483	1008
07:00		76	111			63	122				
07:15		109	120			99	150				
07:30		132	106			105	142				
07:45		139	98	456	435	104	113	371	527	827	962
08:00		145	78			108	114				
08:15		129	83			129	118				
08:30		138	68			116	109				
08:45		166	67	578	296	133	81	486	422	1064	718
09:00		134	63			189	92				
09:15		146	67			134	76				
09:30		167	59			154	75				
09:45		145	58	592	247	141	71	618	314	1210	561
10:00		137	72			143	102				
10:15		149	36			174	81				
10:30		145	42			175	53				
10:45		147	34	578	184	187	60	679	296	1257	480
11:00		154	28			170	44				
11:15		124	22			219	41				
11:30		130	23			199	31				
11:45		159	15	567	88	179	30	767	146	1334	234
Total		3259	4911			3310	6858			6569	11769
Percent		39.9%	60.1%			32.6%	67.4%			35.8%	64.2%

Accurate Counts
978-664-2565

Location : Main Street (Route 28)
Location : East of Lantern Lane
City/State: Falmouth, MA

Site Code: 66680001
6668VOL1

Start Time	31-May-14 Sat	WB Morning	WB Afternoon	Hour Totals Morning	Hour Totals Afternoon	EB Morning	EB Afternoon	Hour Totals Morning	Hour Totals Afternoon	Combined Totals Morning	Combined Totals Afternoon
12:00		14	146			31	188				
12:15		11	129			17	196				
12:30		8	149			18	151				
12:45		9	135	42	559	16	193	82	728	124	1287
01:00		10	135			15	197				
01:15		10	134			11	149				
01:30		6	122			14	165				
01:45		7	130	33	521	13	165	53	676	86	1197
02:00		6	151			6	164				
02:15		4	154			4	169				
02:30		4	134			4	167				
02:45		2	129	16	568	5	181	19	681	35	1249
03:00		0	111			3	164				
03:15		1	133			2	189				
03:30		5	130			5	177				
03:45		6	136	12	510	4	160	14	690	26	1200
04:00		6	125			2	172				
04:15		2	127			4	146				
04:30		9	129			4	158				
04:45		18	110	35	491	5	173	15	649	50	1140
05:00		13	116			8	162				
05:15		12	136			26	154				
05:30		25	101			20	136				
05:45		25	109	75	462	15	132	69	584	144	1046
06:00		21	125			30	112				
06:15		32	114			26	143				
06:30		42	116			37	126				
06:45		57	91	152	446	62	138	155	519	307	965
07:00		47	113			58	113				
07:15		82	87			56	140				
07:30		77	90			68	130				
07:45		112	84	318	374	93	117	275	500	593	874
08:00		97	103			82	135				
08:15		79	76			97	112				
08:30		95	73			136	86				
08:45		118	84	389	336	174	110	489	443	878	779
09:00		107	75			148	91				
09:15		118	70			151	78				
09:30		144	52			142	83				
09:45		132	51	501	248	183	59	624	311	1125	559
10:00		129	65			171	66				
10:15		153	46			180	60				
10:30		130	53			172	81				
10:45		146	39	558	203	157	48	680	255	1238	458
11:00		131	26			176	44				
11:15		145	25			169	43				
11:30		132	21			194	43				
11:45		143	22	551	94	211	33	750	163	1301	257
Total		2682	4812			3225	6199			5907	11011
Percent		35.8%	64.2%			34.2%	65.8%			34.9%	65.1%
Grand Total		9012	14222			9420	19218			18432	33440
Percent		38.8%	61.2%			32.9%	67.1%			35.5%	64.5%

ADT ADT 17,291 AADT 17,291

Accurate Counts
978-664-2565

Location : Main Street (Route 28)
Location : East of Lantern Lane
City/State: Falmouth, MA

Site Code: 66680001
6668VOL1

Start	26-May-14		Tue		Wed		Thu		Fri		Sat		Sun		Week Average	
Time	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB
12:00 AM	*	*	*	*	*	*	18	30	18	43	42	82	*	*	26	52
01:00	*	*	*	*	*	*	10	14	14	23	33	53	*	*	19	30
02:00	*	*	*	*	*	*	12	15	10	11	16	19	*	*	13	15
03:00	*	*	*	*	*	*	7	13	4	8	12	14	*	*	8	12
04:00	*	*	*	*	*	*	43	26	40	26	35	15	*	*	39	22
05:00	*	*	*	*	*	*	113	67	117	80	75	69	*	*	102	72
06:00	*	*	*	*	*	*	244	155	285	198	152	155	*	*	227	169
07:00	*	*	*	*	*	*	472	346	456	371	318	275	*	*	415	331
08:00	*	*	*	*	*	*	536	499	578	486	389	489	*	*	501	491
09:00	*	*	*	*	*	*	523	564	**592**	618	501	624	*	*	539	602
10:00	*	*	*	*	*	*	**561**	577	578	679	**558**	680	*	*	**566**	645
11:00	*	*	*	*	*	*	532	**579**	567	**767**	551	**750**	*	*	550	**699**
12:00 PM	*	*	*	*	*	*	**552**	687	**594**	759	559	**728**	*	*	**568**	725
01:00	*	*	*	*	*	*	510	639	578	750	521	676	*	*	536	688
02:00	*	*	*	*	*	*	529	755	550	789	**568**	681	*	*	549	**742**
03:00	*	*	*	*	*	*	504	699	534	**791**	510	690	*	*	516	727
04:00	*	*	*	*	*	*	506	**764**	504	776	491	649	*	*	500	730
05:00	*	*	*	*	*	*	478	719	474	707	462	584	*	*	471	670
06:00	*	*	*	*	*	*	442	507	427	581	446	519	*	*	438	536
07:00	*	*	*	*	*	*	381	519	435	527	374	500	*	*	397	515
08:00	*	*	*	*	*	*	249	380	296	422	336	443	*	*	294	415
09:00	*	*	*	*	*	*	192	258	247	314	248	311	*	*	229	294
10:00	*	*	*	*	*	*	103	149	184	296	203	255	*	*	163	233
11:00	*	*	*	*	*	*	53	85	88	146	94	163	*	*	78	131
Lane	0	0	0	0	0	0	7570	9046	8170	10168	7494	9424	0	0	7744	9546
Day	0		0		0		16616		18338		16918		0		17290	
AM Peak	-	-	-	-	-	-	10:00	11:00	09:00	11:00	10:00	11:00	-	-	10:00	11:00
Vol.	-	-	-	-	-	-	561	579	592	767	558	750	-	-	566	699
PM Peak	-	-	-	-	-	-	12:00	16:00	12:00	15:00	14:00	12:00	-	-	12:00	14:00
Vol.	-	-	-	-	-	-	552	764	594	791	568	728	-	-	568	742

Comb. Total	0	0	0	16616	18338	16918	0	17290

ADT ADT 17,291 AADT 17,291

MANUAL TURNING MOVEMENT COUNTS

Accurate Counts
978-664-2565

N/S Street : Nye Road
E/W Street : Main Street
City/State : Falmouth, MA
Weather : Clear

File Name : 666800W2
Site Code : 66680002
Start Date : 5/20/2014
Page No : 1

Groups Printed- Cars - Trucks

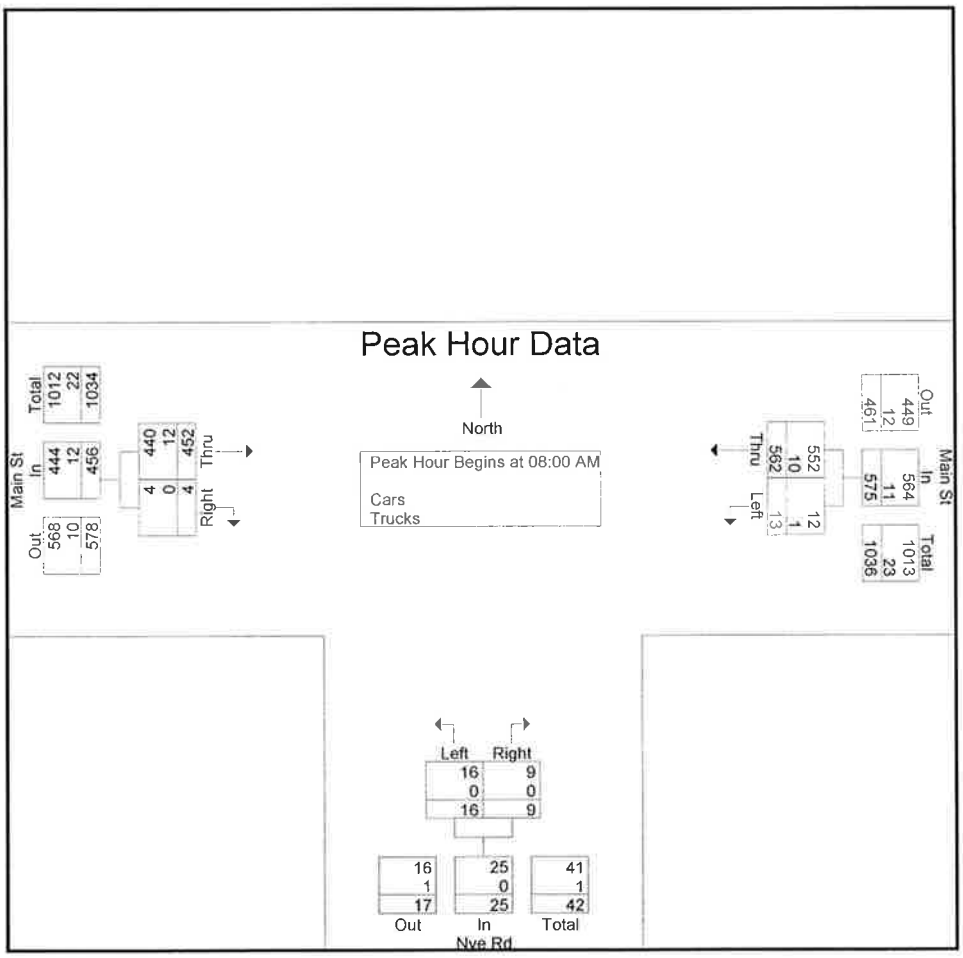
	Main St From East		Nye Rd From South		Main St From West		
Start Time	Left	Thru	Left	Right	Thru	Right	Int. Total
07:00 AM	1	90	2	1	66	1	161
07:15 AM	4	96	3	2	91	2	198
07:30 AM	2	138	3	5	82	2	232
07:45 AM	6	140	2	0	94	0	242
Total	13	464	10	8	333	5	833
08:00 AM	4	153	2	2	102	2	265
08:15 AM	6	128	3	5	117	0	259
08:30 AM	0	128	5	1	127	1	262
08:45 AM	3	153	6	1	106	1	270
Total	13	562	16	9	452	4	1056
Grand Total	26	1026	26	17	785	9	1889
Apprch %	2.5	97.5	60.5	39.5	98.9	1.1	
Total %	1.4	54.3	1.4	0.9	41.6	0.5	
Cars	24	1010	26	16	761	9	1846
% Cars	92.3	98.4	100	94.1	96.9	100	97.7
Trucks	2	16	0	1	24	0	43
% Trucks	7.7	1.6	0	5.9	3.1	0	2.3

Accurate Counts
978-664-2565

N/S Street : Nye Road
E/W Street : Main Street
City/State : Falmouth, MA
Weather : Clear

File Name : 666800W2
Site Code : 66680002
Start Date : 5/20/2014
Page No : 2

	Main St From East			Nye Rd From South			Main St From West			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	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	4	**153**	**157**	2	2	4	102	**2**	104	265
08:15 AM	**6**	128	134	3	**5**	**8**	117	0	117	259
08:30 AM	0	128	128	5	1	6	**127**	1	**128**	262
08:45 AM	3	153	156	**6**	1	7	106	1	107	**270**
Total Volume	13	562	575	16	9	25	452	4	456	1056
% App. Total	2.3	97.7		64	36		99.1	0.9		
PHF	.542	.918	.916	.667	.450	.781	.890	.500	.891	.978
Cars	12	552	564	16	9	25	440	4	444	1033
% Cars	92.3	98.2	98.1	100	100	100	97.3	100	97.4	97.8
Trucks	1	10	11	0	0	0	12	0	12	23
% Trucks	7.7	1.8	1.9	0	0	0	2.7	0	2.6	2.2

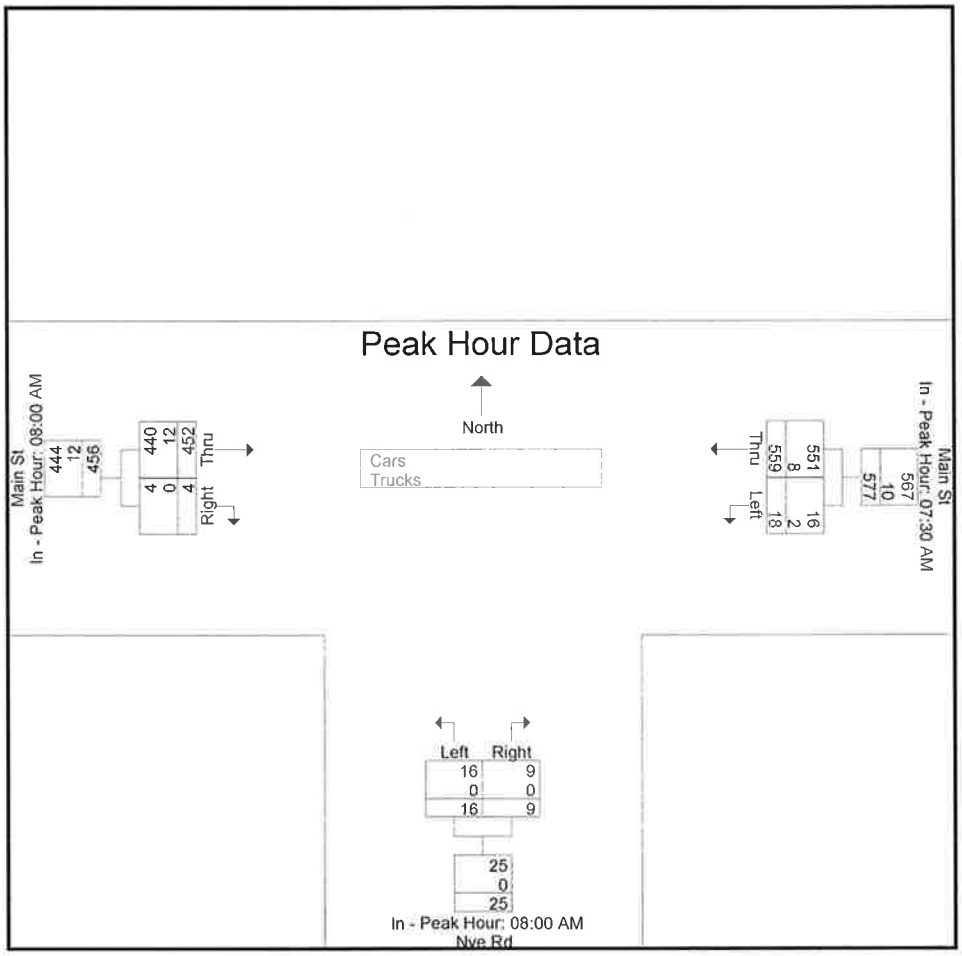


Accurate Counts
978-664-2565

N/S Street : Nye Road
E/W Street : Main Street
City/State : Falmouth, MA
Weather : Clear

File Name : 666800W2
Site Code : 66680002
Start Date : 5/20/2014
Page No : 3

	Main St From East			Nye Rd From South			Main St From West			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1										
Peak Hour for Each Approach Begins at:										
	07:30 AM			08:00 AM			08:00 AM			
+0 mins.	2	138	140	2	2	4	102	**2**	104	
+15 mins.	**6**	140	146	3	**5**	**8**	117	0	117	
+30 mins.	4	**153**	**157**	5	1	6	**127**	1	**128**	
+45 mins.	6	128	134	**6**	1	7	106	1	107	
Total Volume	18	559	577	16	9	25	452	4	456	
% App. Total	3.1	96.9		64	36		99.1	0.9		
PHF	.750	.913	.919	.667	.450	.781	.890	.500	.891	
Cars	16	551	567	16	9	25	440	4	444	
% Cars	88.9	98.6	98.3	100	100	100	97.3	100	97.4	
Trucks	2	8	10	0	0	0	12	0	12	
% Trucks	11.1	1.4	1.7	0	0	0	2.7	0	2.6	



Accurate Counts
978-664-2565

N/S Street : Nye Road
E/W Street : Main Street
City/State : Falmouth, MA
Weather : Clear

File Name : 666800W2
Site Code : 66680002
Start Date : 5/20/2014
Page No : 4

Groups Printed- Cars

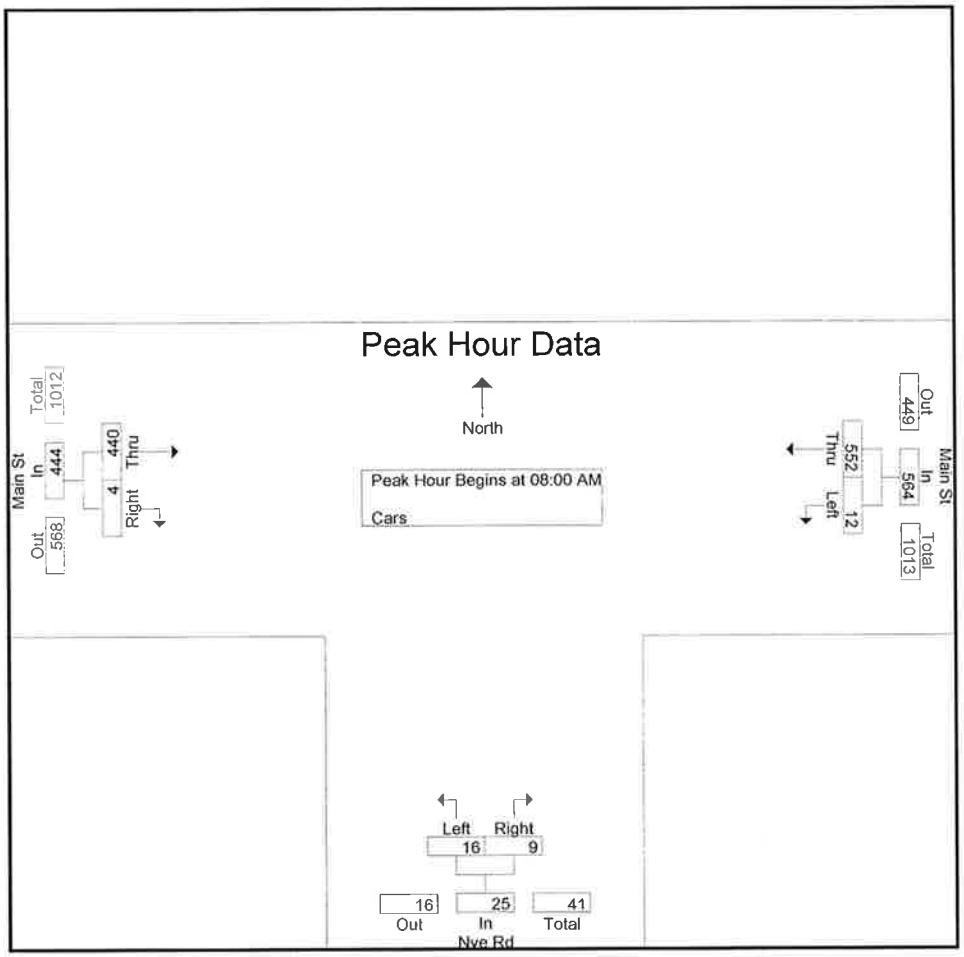
	Main St From East		Nye Rd From South		Main St From West		
Start Time	Left	Thru	Left	Right	Thru	Right	Int. Total
07:00 AM	1	89	2	1	64	1	158
07:15 AM	4	94	3	2	87	2	192
07:30 AM	2	136	3	4	79	2	226
07:45 AM	5	139	2	0	91	0	237
Total	12	458	10	7	321	5	813
08:00 AM	4	150	2	2	101	2	261
08:15 AM	5	126	3	5	114	0	253
08:30 AM	0	127	5	1	122	1	256
08:45 AM	3	149	6	1	103	1	263
Total	12	552	16	9	440	4	1033
Grand Total	24	1010	26	16	761	9	1846
Apprch %	2.3	97.7	61.9	38.1	98.8	1.2	
Total %	1.3	54.7	1.4	0.9	41.2	0.5	

Accurate Counts
978-664-2565

N/S Street : Nye Road
E/W Street : Main Street
City/State : Falmouth, MA
Weather : Clear

File Name : 666800W2
Site Code : 66680002
Start Date : 5/20/2014
Page No : 5

	Main St From East			Nye Rd From South			Main St From West			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	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	4	**150**	**154**	2	2	4	101	**2**	103	261
08:15 AM	**5**	126	131	3	**5**	**8**	114	0	114	253
08:30 AM	0	127	127	5	1	6	**122**	1	**123**	256
08:45 AM	3	149	152	**6**	1	7	103	1	104	**263**
Total Volume	12	552	564	16	9	25	440	4	444	1033
% App. Total	2.1	97.9		64	36		99.1	0.9		
PHF	.600	.920	.916	.667	.450	.781	.902	.500	.902	.982

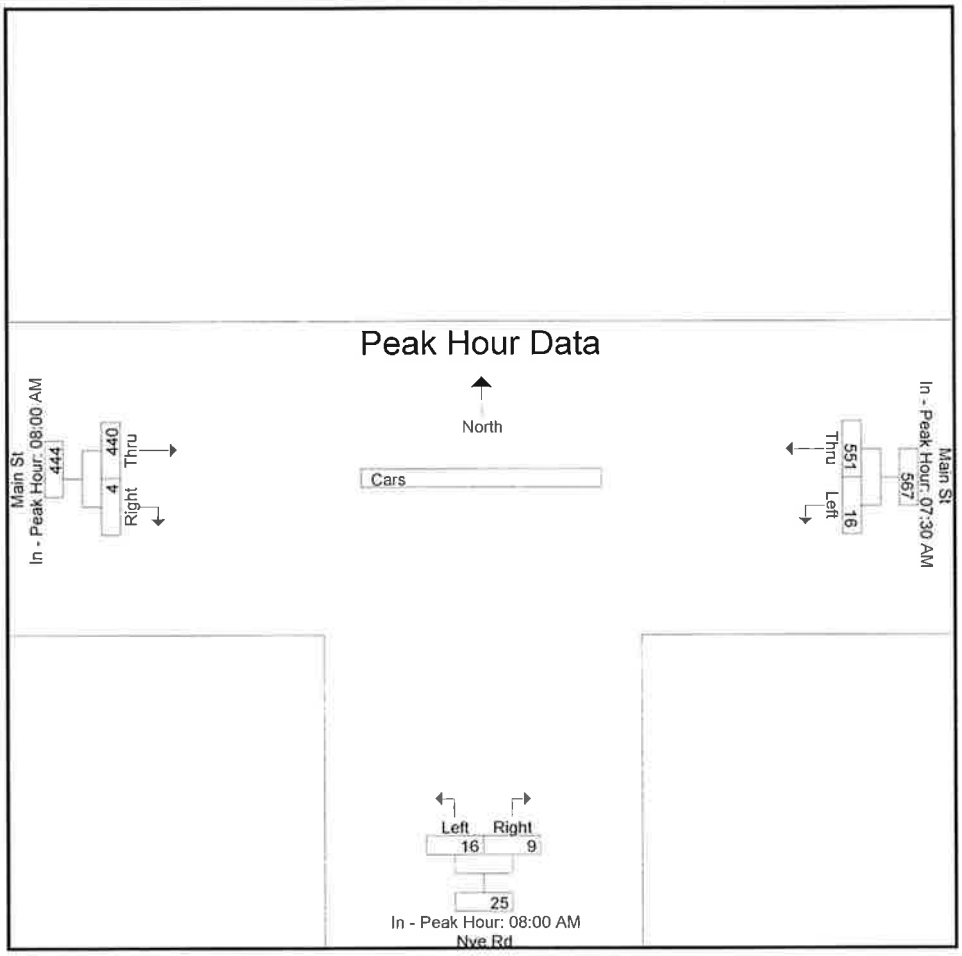


Accurate Counts
978-664-2565

N/S Street : Nye Road
E/W Street : Main Street
City/State : Falmouth, MA
Weather : Clear

File Name : 666800W2
Site Code : 66680002
Start Date : 5/20/2014
Page No : 6

	Main St From East			Nye Rd From South			Main St From West			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1										
Peak Hour for Each Approach Begins at:										
	07:30 AM			08:00 AM			08:00 AM			
+0 mins.	2	136	138	2	2	4	101	2	103	
+15 mins.	5	139	144	3	5	8	114	0	114	
+30 mins.	4	150	154	5	1	6	122	1	123	
+45 mins.	5	126	131	6	1	7	103	1	104	
Total Volume	16	551	567	16	9	25	440	4	444	
% App. Total	2.8	97.2		64	36		99.1	0.9		
PHF	.800	.918	.920	.667	.450	.781	.902	.500	.902	



Accurate Counts
978-664-2565

N/S Street : Nye Road
E/W Street : Main Street
City/State : Falmouth, MA
Weather : Clear

File Name : 666800W2
Site Code : 66680002
Start Date : 5/20/2014
Page No : 7

Groups Printed- Trucks

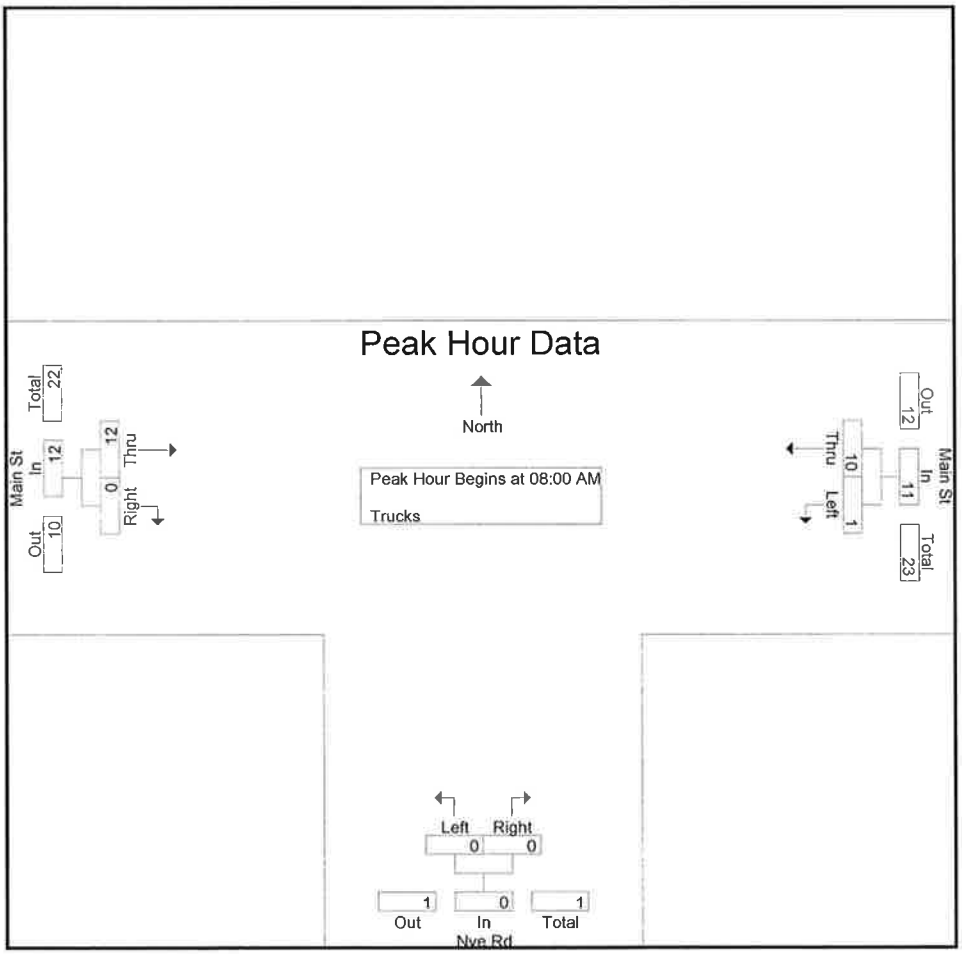
	Main St From East		Nye Rd From South		Main St From West		
Start Time	Left	Thru	Left	Right	Thru	Right	Int. Total
07:00 AM	0	1	0	0	2	0	3
07:15 AM	0	2	0	0	4	0	6
07:30 AM	0	2	0	1	3	0	6
07:45 AM	1	1	0	0	3	0	5
Total	1	6	0	1	12	0	20
08:00 AM	0	3	0	0	1	0	4
08:15 AM	1	2	0	0	3	0	6
08:30 AM	0	1	0	0	5	0	6
08:45 AM	0	4	0	0	3	0	7
Total	1	10	0	0	12	0	23
Grand Total	2	16	0	1	24	0	43
Apprch %	11.1	88.9	0	100	100	0	
Total %	4.7	37.2	0	2.3	55.8	0	

Accurate Counts
978-664-2565

N/S Street : Nye Road
E/W Street : Main Street
City/State : Falmouth, MA
Weather : Clear

File Name : 666800W2
Site Code : 66680002
Start Date : 5/20/2014
Page No : 8

	Main St From East			Nye Rd From South			Main St From West			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 08:00 AM										
08:00 AM	0	3	3	0	0	0	1	0	1	4
08:15 AM	1	2	3	0	0	0	3	0	3	6
08:30 AM	0	1	1	0	0	0	5	0	5	6
08:45 AM	0	4	4	0	0	0	3	0	3	7
Total Volume	1	10	11	0	0	0	12	0	12	23
% App. Total	9.1	90.9		0	0		100	0		
PHF	.250	.625	.688	.000	.000	.000	.600	.000	.600	.821

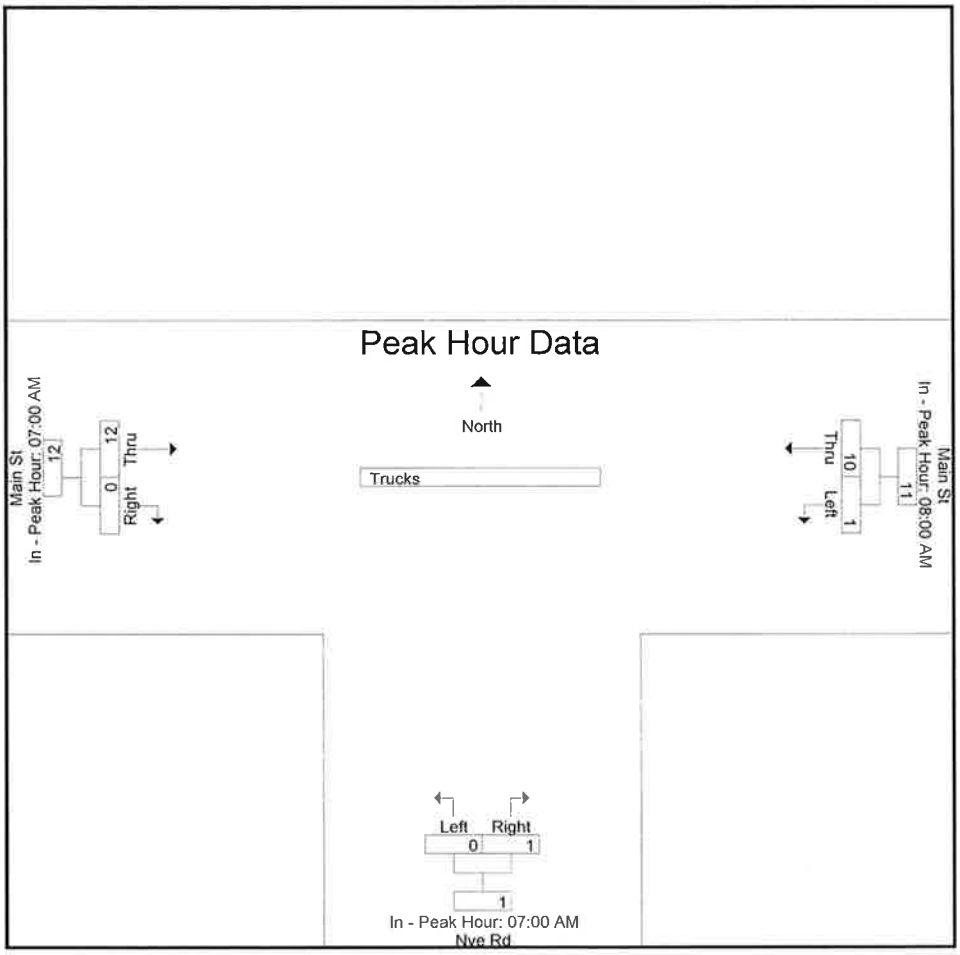


Accurate Counts
978-664-2565

N/S Street : Nye Road
E/W Street : Main Street
City/State : Falmouth, MA
Weather : Clear

File Name : 666800W2
Site Code : 66680002
Start Date : 5/20/2014
Page No : 9

	Main St From East			Nye Rd From South			Main St From West			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1										
Peak Hour for Each Approach Begins at:										
	08:00 AM			07:00 AM			07:00 AM			
+0 mins.	0	3	3	0	0	0	2	0	2	
+15 mins.	1	2	3	0	0	0	4	0	4	
+30 mins.	0	1	1	0	1	1	3	0	3	
+45 mins.	0	4	4	0	0	0	3	0	3	
Total Volume	1	10	11	0	1	1	12	0	12	
% App. Total	9.1	90.9		0	100		100	0		
PHF	.250	.625	.688	.000	.250	.250	.750	.000	.750	



Accurate Counts
978-664-2565

N/S Street : Nye Road
E/W Street : Main Street
City/State : Falmouth, MA
Weather : Clear

File Name : 666800W2
Site Code : 66680002
Start Date : 5/20/2014
Page No : 10

Groups Printed- Bikes Peds

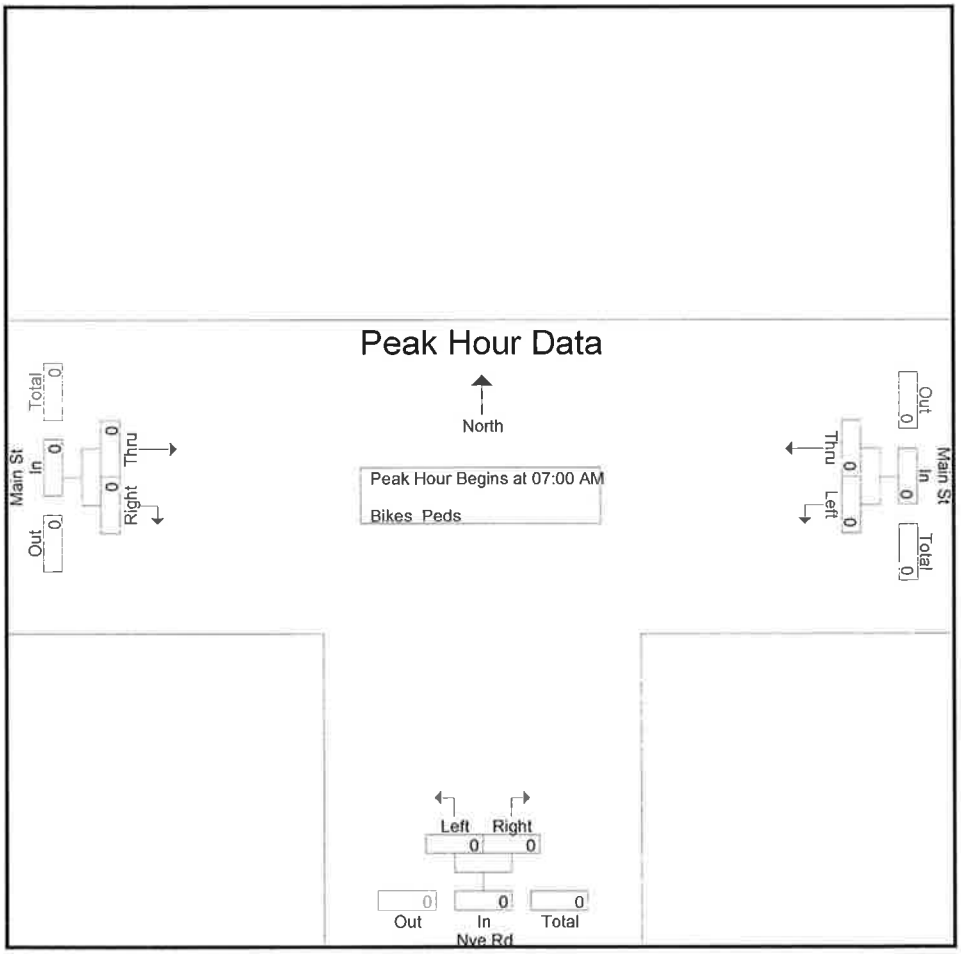
	Main St From East			Nye Rd From South			Main St From West					
Start Time	Left	Thru	Peds	Left	Right	Peds	Thru	Right	Peds	Exclu. Total	Inclu. Total	Int. Total
07:00 AM	0	0	0	0	0	5	0	0	0	5	0	5
07:15 AM	0	0	2	0	0	2	0	0	0	4	0	4
07:30 AM	0	0	0	0	0	2	0	0	0	2	0	2
07:45 AM	0	0	0	0	0	3	0	0	0	3	0	3
Total	0	0	2	0	0	12	0	0	0	14	0	14
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	1	0	0	0	1	0	1
08:30 AM	0	0	0	0	0	5	0	0	3	8	0	8
08:45 AM	0	0	0	0	0	3	0	0	0	3	0	3
Total	0	0	0	0	0	9	0	0	3	12	0	12
Grand Total	0	0	2	0	0	21	0	0	3	26	0	26
Apprch %	0	0		0	0		0	0				
Total %										100	0	

Accurate Counts
978-664-2565

N/S Street : Nye Road
E/W Street : Main Street
City/State : Falmouth, MA
Weather : Clear

File Name : 666800W2
Site Code : 66680002
Start Date : 5/20/2014
Page No : 11

	Main St From East			Nye Rd From South			Main St From West			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 07:00 AM										
07:00 AM	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0		0	0		0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

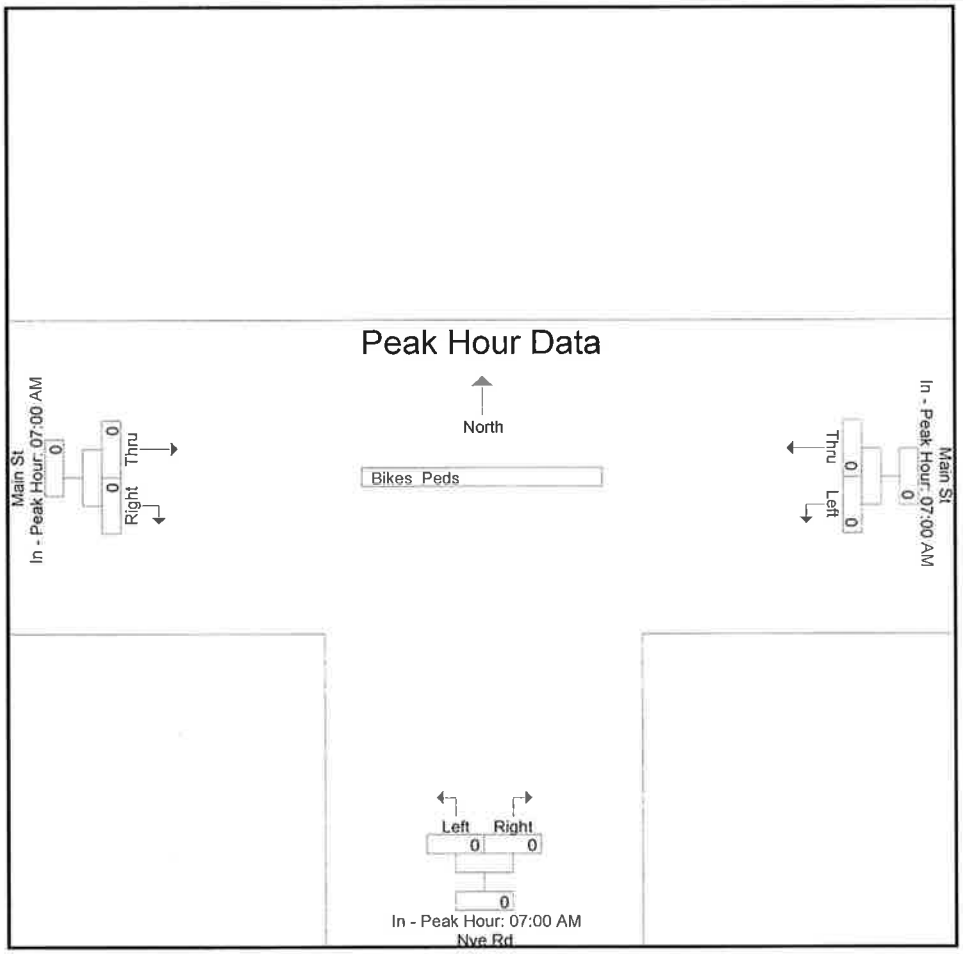


Accurate Counts
978-664-2565

N/S Street : Nye Road
E/W Street : Main Street
City/State : Falmouth, MA
Weather : Clear

File Name : 666800W2
Site Code : 66680002
Start Date : 5/20/2014
Page No : 12

	Main St From East			Nye Rd From South			Main St From West			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1										
Peak Hour for Each Approach Begins at:										
	07:00 AM			07:00 AM			07:00 AM			
+0 mins.	0	0	0	0	0	0	0	0	0	
+15 mins.	0	0	0	0	0	0	0	0	0	
+30 mins.	0	0	0	0	0	0	0	0	0	
+45 mins.	0	0	0	0	0	0	0	0	0	
Total Volume	0	0	0	0	0	0	0	0	0	
% App. Total	0	0		0	0		0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	



Accurate Counts
978-664-2565

N/S Street : Nye Road
E/W Street : Main Street
City/State : Falmouth, MA
Weather : Clear

File Name : 666800W2
Site Code : 66680002
Start Date : 5/20/2014
Page No : 1

Groups Printed- Cars - Trucks

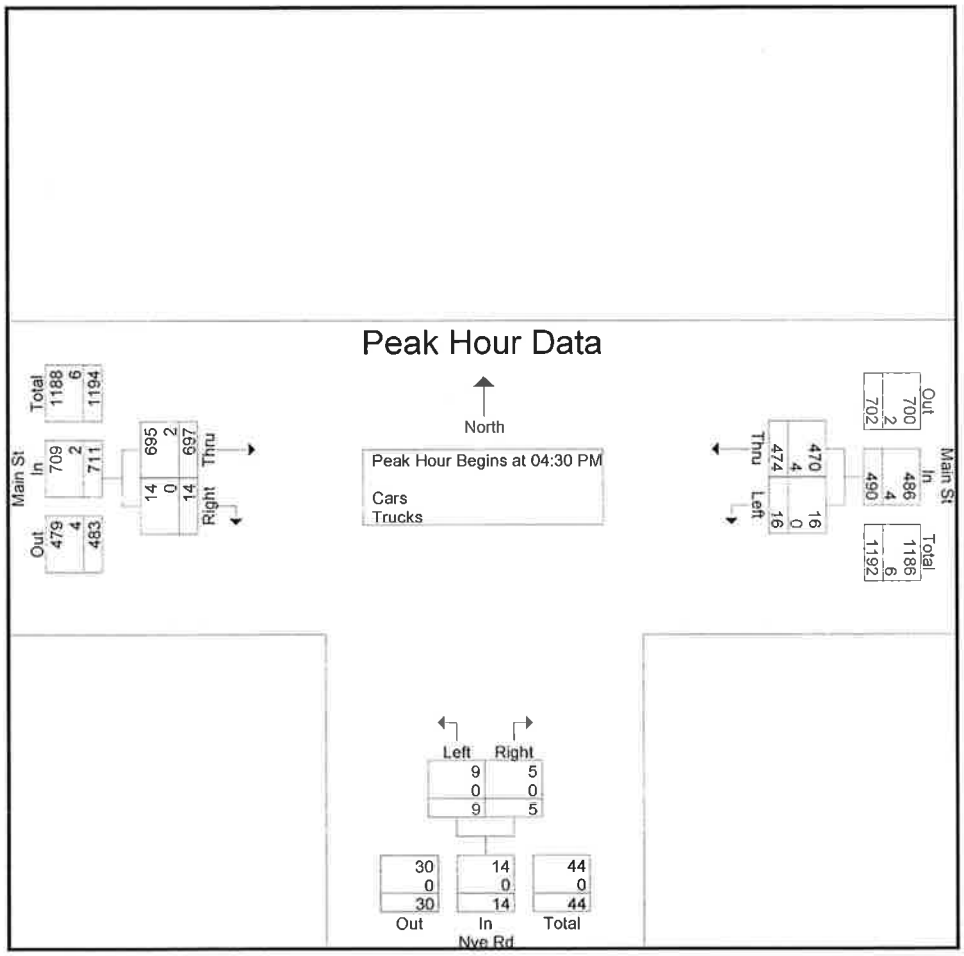
	Main St From East		Nye Rd From South		Main St From West		
Start Time	Left	Thru	Left	Right	Thru	Right	Int. Total
04:00 PM	3	131	1	3	174	2	314
04:15 PM	4	132	6	1	149	1	293
04:30 PM	4	102	1	0	152	3	262
04:45 PM	5	127	4	4	175	2	317
Total	16	492	12	8	650	8	1186
05:00 PM	3	113	1	1	179	6	303
05:15 PM	4	132	3	0	191	3	333
05:30 PM	0	112	2	1	135	2	252
05:45 PM	3	88	2	0	129	0	222
Total	10	445	8	2	634	11	1110
Grand Total	26	937	20	10	1284	19	2296
Apprch %	2.7	97.3	66.7	33.3	98.5	1.5	
Total %	1.1	40.8	0.9	0.4	55.9	0.8	
Cars	26	929	20	10	1278	19	2282
% Cars	100	99.1	100	100	99.5	100	99.4
Trucks	0	8	0	0	6	0	14
% Trucks	0	0.9	0	0	0.5	0	0.6

Accurate Counts
978-664-2565

N/S Street : Nye Road
E/W Street : Main Street
City/State : Falmouth, MA
Weather : Clear

File Name : 666800W2
Site Code : 66680002
Start Date : 5/20/2014
Page No : 2

	Main St From East			Nye Rd From South			Main St From West			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	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	4	102	106	1	0	1	152	3	155	262
04:45 PM	**5**	127	132	**4**	**4**	**8**	175	2	177	317
05:00 PM	3	113	116	1	1	2	179	**6**	185	303
05:15 PM	4	**132**	**136**	3	0	3	**191**	3	**194**	**333**
Total Volume	16	474	490	9	5	14	697	14	711	1215
% App. Total	3.3	96.7		64.3	35.7		98	2		
PHF	.800	.898	.901	.563	.313	.438	.912	.583	.916	.912
Cars	16	470	486	9	5	14	695	14	709	1209
% Cars	100	99.2	99.2	100	100	100	99.7	100	99.7	99.5
Trucks	0	4	4	0	0	0	2	0	2	6
% Trucks	0	0.8	0.8	0	0	0	0.3	0	0.3	0.5



1,215

Accurate Counts
978-664-2565

N/S Street : Nye Road
E/W Street : Main Street
City/State : Falmouth, MA
Weather : Clear

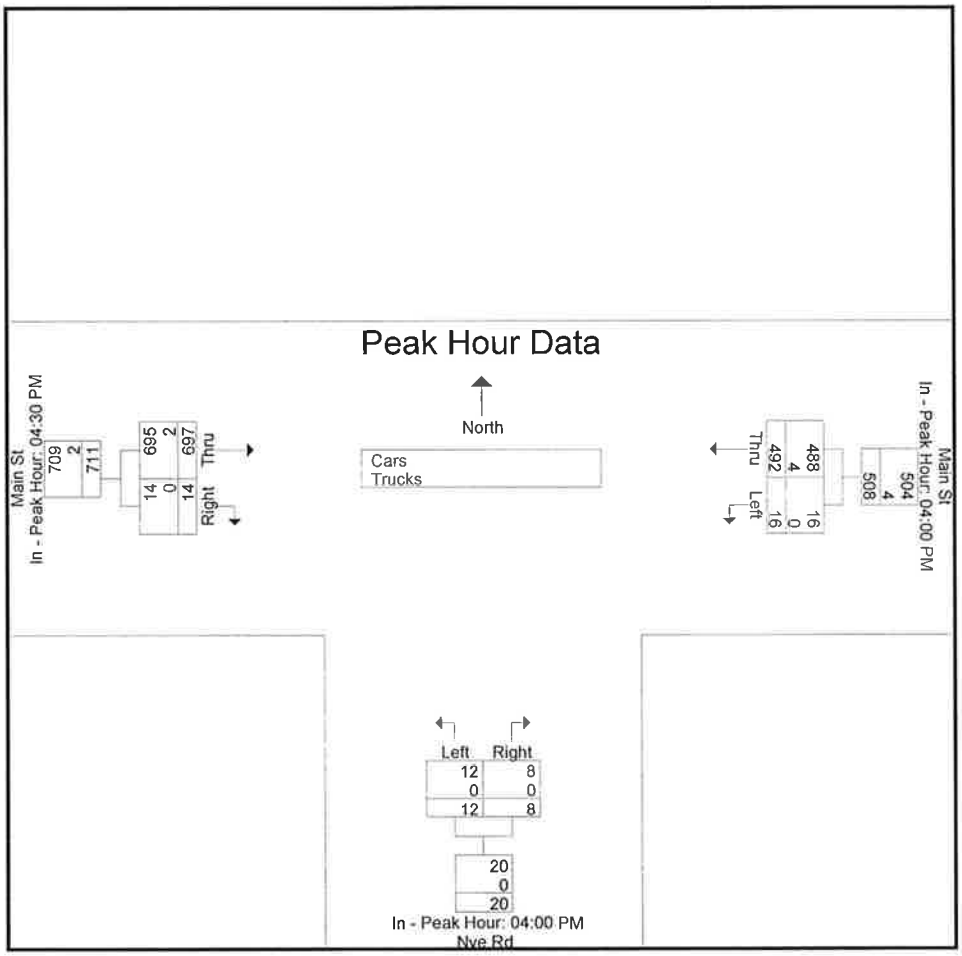
File Name : 666800W2
Site Code : 66680002
Start Date : 5/20/2014
Page No : 3

	Main St From East			Nye Rd From South			Main St From West			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total

Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	04:00 PM			04:00 PM			04:30 PM		
+0 mins.	3	131	134	1	3	4	152	3	155
+15 mins.	4	**132**	**136**	**6**	1	7	175	2	177
+30 mins.	4	102	106	1	0	1	179	**6**	185
+45 mins.	**5**	127	132	4	**4**	**8**	**191**	3	**194**
Total Volume	16	492	508	12	8	20	697	14	711
% App. Total	3.1	96.9		60	40		98	2	
PHF	.800	.932	.934	.500	.500	.625	.912	.583	.916
Cars	16	488	504	12	8	20	695	14	709
% Cars	100	99.2	99.2	100	100	100	99.7	100	99.7
Trucks	0	4	4	0	0	0	2	0	2
% Trucks	0	0.8	0.8	0	0	0	0.3	0	0.3



Accurate Counts
978-664-2565

N/S Street : Nye Road
E/W Street : Main Street
City/State : Falmouth, MA
Weather : Clear

File Name : 666800W2
Site Code : 66680002
Start Date : 5/20/2014
Page No : 4

Groups Printed- Cars

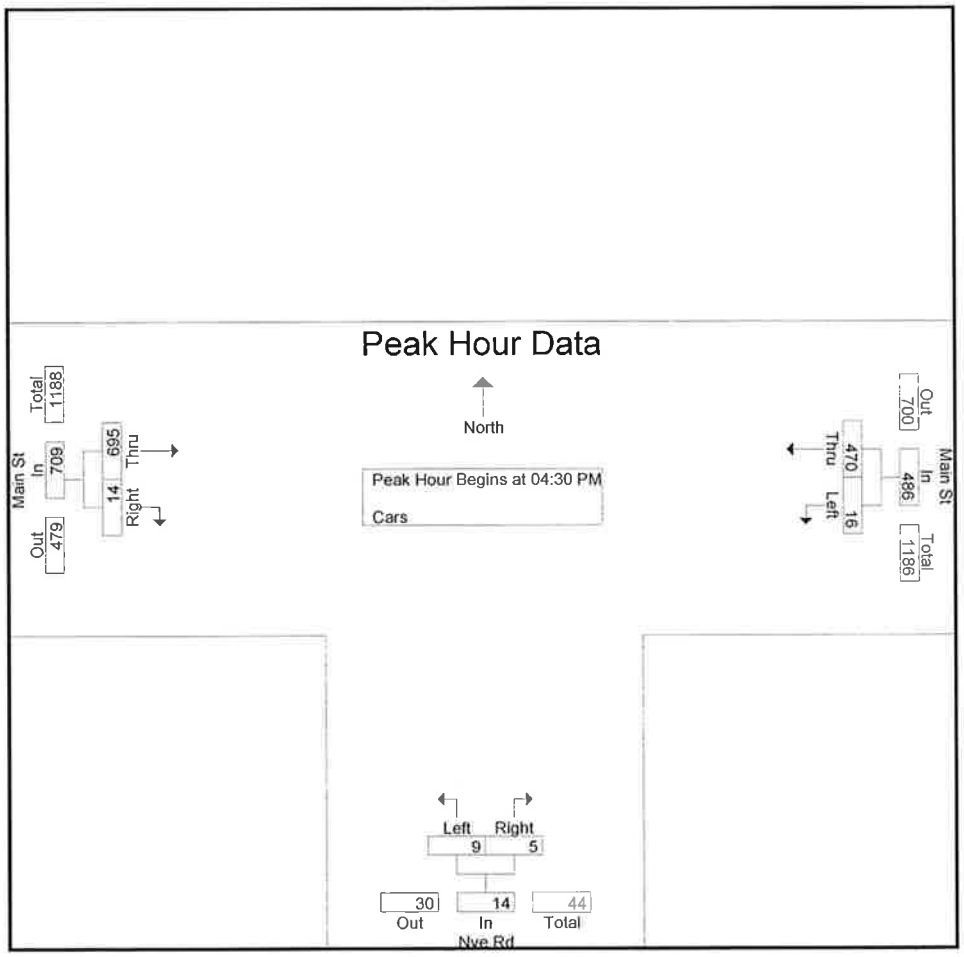
	Main St From East		Nye Rd From South		Main St From West		
Start Time	Left	Thru	Left	Right	Thru	Right	Int. Total
04:00 PM	3	129	1	3	174	2	312
04:15 PM	4	132	6	1	148	1	292
04:30 PM	4	101	1	0	151	3	260
04:45 PM	5	126	4	4	174	2	315
Total	16	488	12	8	647	8	1179
05:00 PM	3	111	1	1	179	6	301
05:15 PM	4	132	3	0	191	3	333
05:30 PM	0	111	2	1	134	2	250
05:45 PM	3	87	2	0	127	0	219
Total	10	441	8	2	631	11	1103
Grand Total	26	929	20	10	1278	19	2282
Apprch %	2.7	97.3	66.7	33.3	98.5	1.5	
Total %	1.1	40.7	0.9	0.4	56	0.8	

Accurate Counts
978-664-2565

N/S Street : Nye Road
E/W Street : Main Street
City/State : Falmouth, MA
Weather : Clear

File Name : 666800W2
Site Code : 66680002
Start Date : 5/20/2014
Page No : 5

	Main St From East			Nye Rd From South			Main St From West			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	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	4	101	105	1	0	1	151	3	154	260
04:45 PM	5	126	131	4	4	8	174	2	176	315
05:00 PM	3	111	114	1	1	2	179	6	185	301
05:15 PM	4	132	136	3	0	3	191	3	194	333
Total Volume	16	470	486	9	5	14	695	14	709	1209
% App. Total	3.3	96.7		64.3	35.7		98	2		
PHF	.800	.890	.893	.563	.313	.438	.910	.583	.914	.908

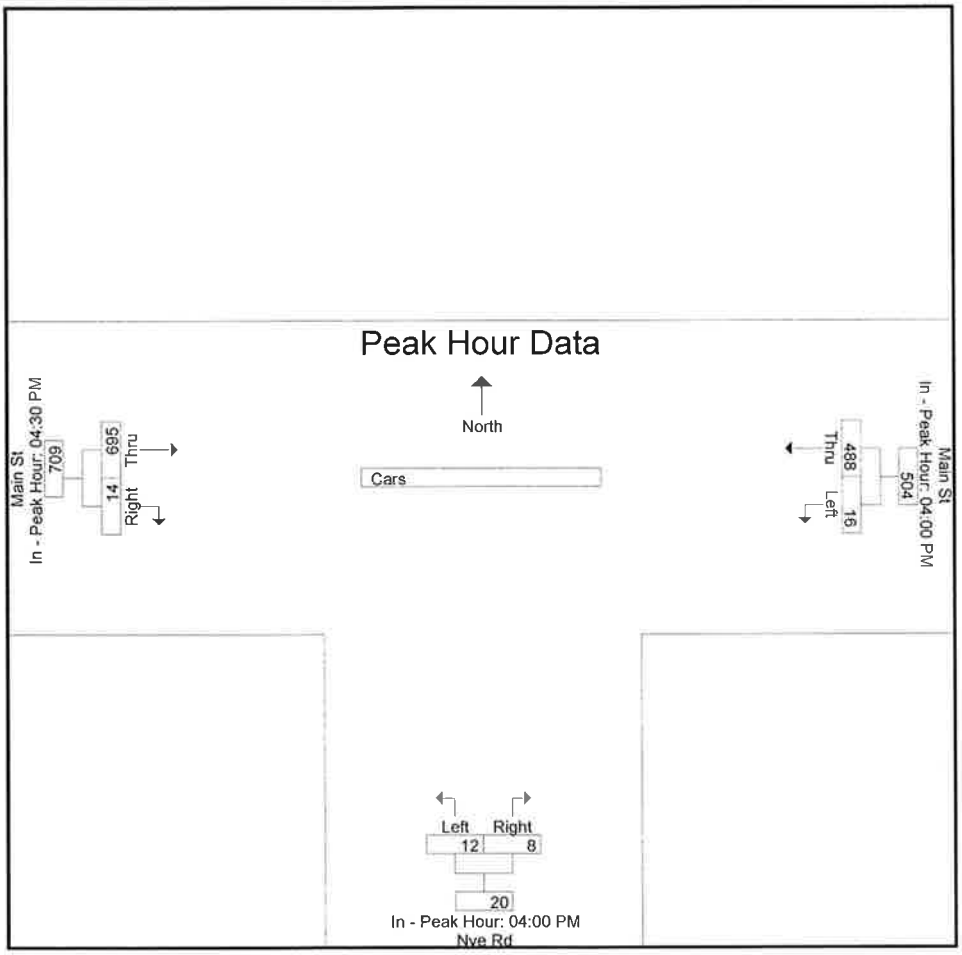


Accurate Counts
978-664-2565

N/S Street : Nye Road
E/W Street : Main Street
City/State : Falmouth, MA
Weather : Clear

File Name : 666800W2
Site Code : 66680002
Start Date : 5/20/2014
Page No : 6

	Main St From East			Nye Rd From South			Main St From West			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Each Approach Begins at:										
	04:00 PM			04:00 PM			04:30 PM			
+0 mins.	3	129	132	1	3	4	151	3	154	
+15 mins.	4	132	136	6	1	7	174	2	176	
+30 mins.	4	101	105	1	0	1	179	6	185	
+45 mins.	5	126	131	4	4	8	191	3	194	
Total Volume	16	488	504	12	8	20	695	14	709	
% App. Total	3.2	96.8		60	40		98	2		
PHF	.800	.924	.926	.500	.500	.625	.910	.583	.914	



Accurate Counts
978-664-2565

N/S Street : Nye Road
E/W Street : Main Street
City/State : Falmouth, MA
Weather : Clear

File Name : 666800W2
Site Code : 66680002
Start Date : 5/20/2014
Page No : 7

Groups Printed- Trucks

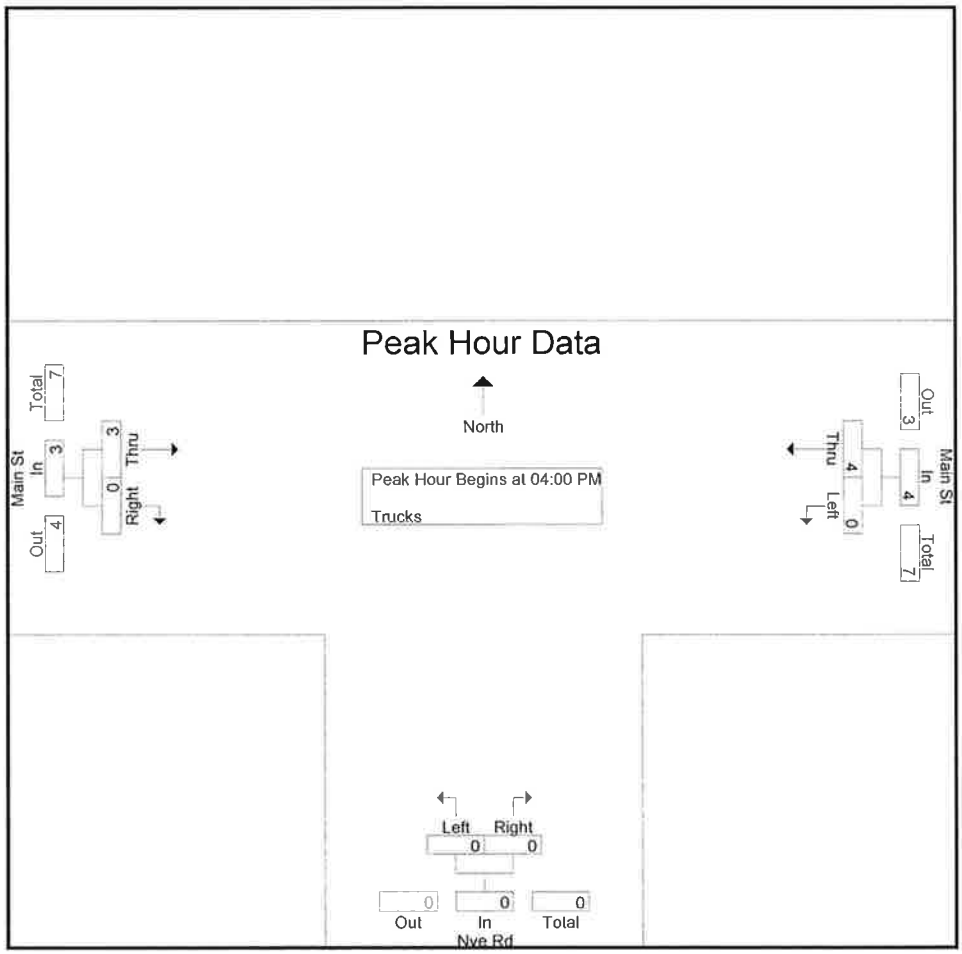
	Main St From East		Nye Rd From South		Main St From West		
Start Time	Left	Thru	Left	Right	Thru	Right	Int. Total
04:00 PM	0	2	0	0	0	0	2
04:15 PM	0	0	0	0	1	0	1
04:30 PM	0	1	0	0	1	0	2
04:45 PM	0	1	0	0	1	0	2
Total	0	4	0	0	3	0	7
05:00 PM	0	2	0	0	0	0	2
05:15 PM	0	0	0	0	0	0	0
05:30 PM	0	1	0	0	1	0	2
05:45 PM	0	1	0	0	2	0	3
Total	0	4	0	0	3	0	7
Grand Total	0	8	0	0	6	0	14
Apprch %	0	100	0	0	100	0	
Total %	0	57.1	0	0	42.9	0	

Accurate Counts
978-664-2565

N/S Street : Nye Road
E/W Street : Main Street
City/State : Falmouth, MA
Weather : Clear

File Name : 666800W2
Site Code : 66680002
Start Date : 5/20/2014
Page No : 8

	Main St From East			Nye Rd From South			Main St From West			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	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 04:00 PM										
04:00 PM	0	**2**	**2**	0	0	0	0	0	0	**2**
04:15 PM	0	0	0	0	0	0	**1**	0	**1**	1
04:30 PM	0	1	1	0	0	0	1	0	1	2
04:45 PM	0	1	1	0	0	0	1	0	1	2
Total Volume	0	4	4	0	0	0	3	0	3	7
% App. Total	0	100		0	0		100	0		
PHF	.000	.500	.500	.000	.000	.000	.750	.000	.750	.875



Accurate Counts
978-664-2565

N/S Street : Nye Road
E/W Street : Main Street
City/State : Falmouth, MA
Weather : Clear

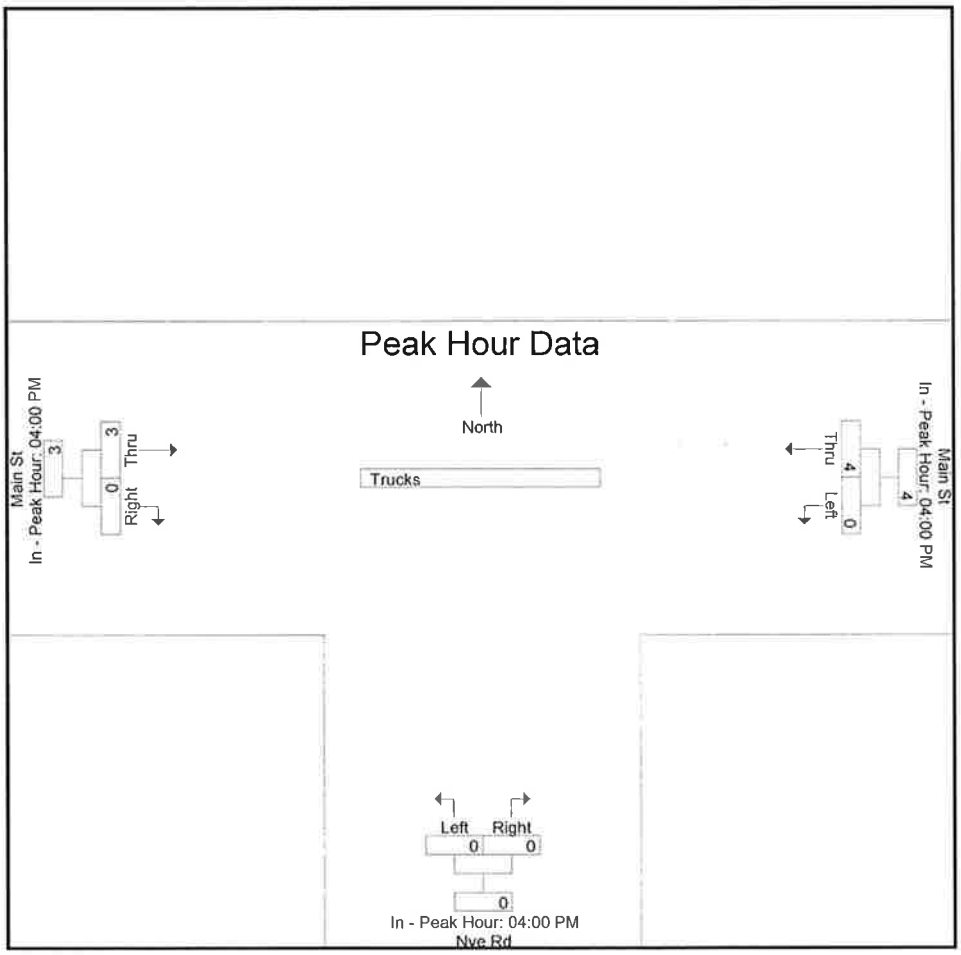
File Name : 666800W2
Site Code : 66680002
Start Date : 5/20/2014
Page No : 9

	Main St From East			Nye Rd From South			Main St From West			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total

Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	04:00 PM			04:00 PM			04:00 PM		
+0 mins.	0	2	2	0	0	0	0	0	0
+15 mins.	0	0	0	0	0	0	1	0	1
+30 mins.	0	1	1	0	0	0	1	0	1
+45 mins.	0	1	1	0	0	0	1	0	1
Total Volume	0	4	4	0	0	0	3	0	3
% App. Total	0	100		0	0		100	0	
PHF	.000	.500	.500	.000	.000	.000	.750	.000	.750



Accurate Counts
978-664-2565

N/S Street : Nye Road
E/W Street : Main Street
City/State : Falmouth, MA
Weather : Clear

File Name : 666800W2
Site Code : 66680002
Start Date : 5/20/2014
Page No : 10

Groups Printed- Bikes Peds

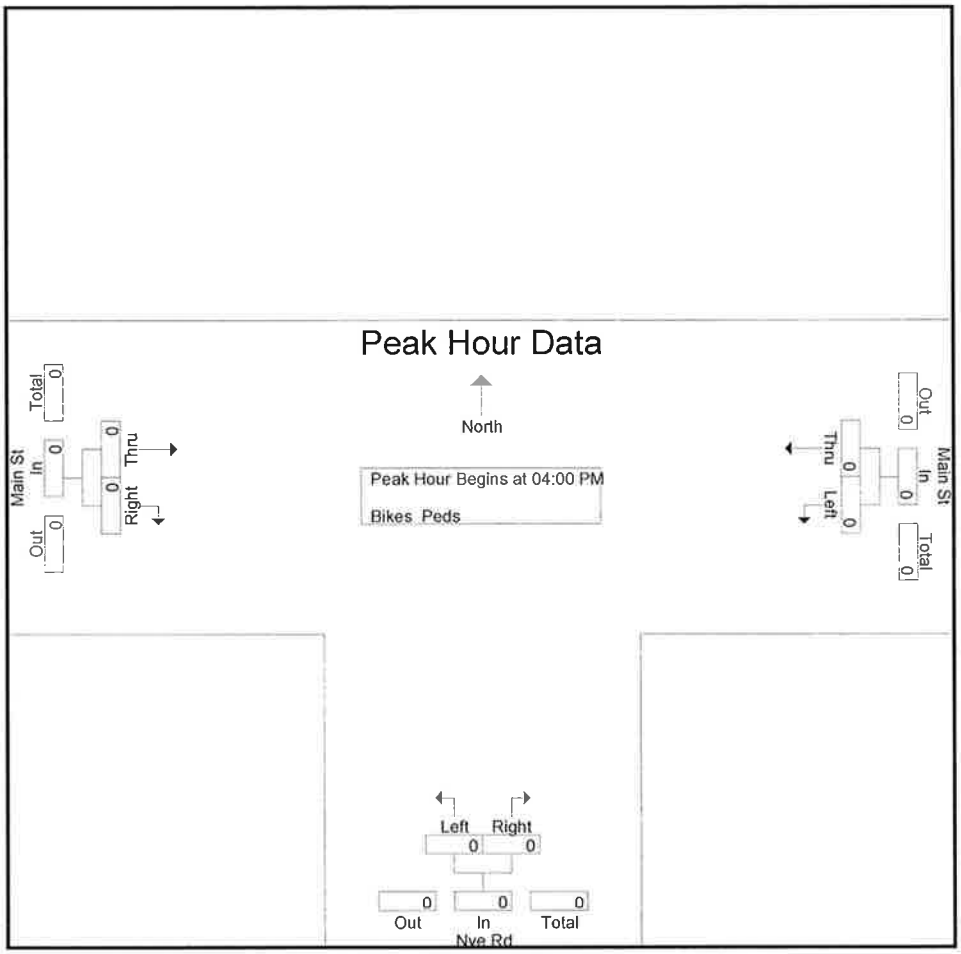
	Main St From East			Nye Rd From South			Main St From West					
Start Time	Left	Thru	Peds	Left	Right	Peds	Thru	Right	Peds	Exclu. Total	Inclu. Total	Int. Total
04:00 PM	0	0	0	0	0	2	0	0	0	2	0	2
04:15 PM	0	0	1	0	0	4	0	0	0	5	0	5
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	1	0	0	6	0	0	0	7	0	7
05:00 PM	0	0	0	0	0	0	0	0	1	1	0	1
05:15 PM	0	0	0	0	0	5	0	0	0	5	0	5
05:30 PM	0	0	0	0	0	1	0	0	0	1	0	1
05:45 PM	0	0	0	0	0	7	0	0	0	7	0	7
Total	0	0	0	0	0	13	0	0	1	14	0	14
Grand Total	0	0	1	0	0	19	0	0	1	21	0	21
Apprch %	0	0		0	0		0	0				
Total %										100	0	

Accurate Counts
978-664-2565

N/S Street : Nye Road
E/W Street : Main Street
City/State : Falmouth, MA
Weather : Clear

File Name : 666800W2
Site Code : 66680002
Start Date : 5/20/2014
Page No : 11

	Main St From East			Nye Rd From South			Main St From West			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	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 04:00 PM										
04:00 PM	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0		0	0		0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000



Accurate Counts
978-664-2565

N/S Street : Nye Road
E/W Street : Main Street
City/State : Falmouth, MA
Weather : Clear

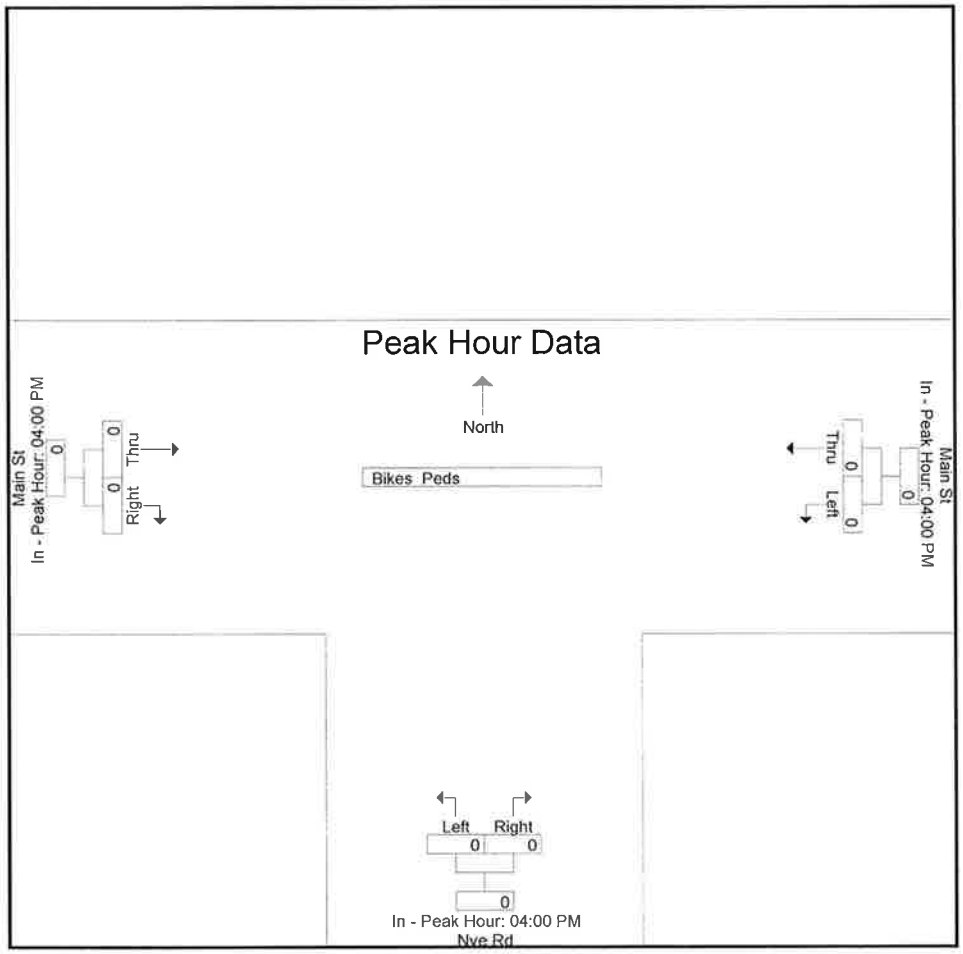
File Name : 666800W2
Site Code : 66680002
Start Date : 5/20/2014
Page No : 12

	Main St From East			Nye Rd From South			Main St From West			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total

Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	04:00 PM			04:00 PM			04:00 PM		
+0 mins.	0	0	0	0	0	0	0	0	0
+15 mins.	0	0	0	0	0	0	0	0	0
+30 mins.	0	0	0	0	0	0	0	0	0
+45 mins.	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0
% App. Total	0	0		0	0		0	0	
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000



Accurate Counts
978-664-2565

/S Street : Nye Road
/W Street : Main Street
ity/State : Falmouth, MA
/eather : Cloudy

File Name : 666800
Site Code : 666800
Start Date : 5/17/2C
Page No : 1

Groups Printed- Cars - Trucks

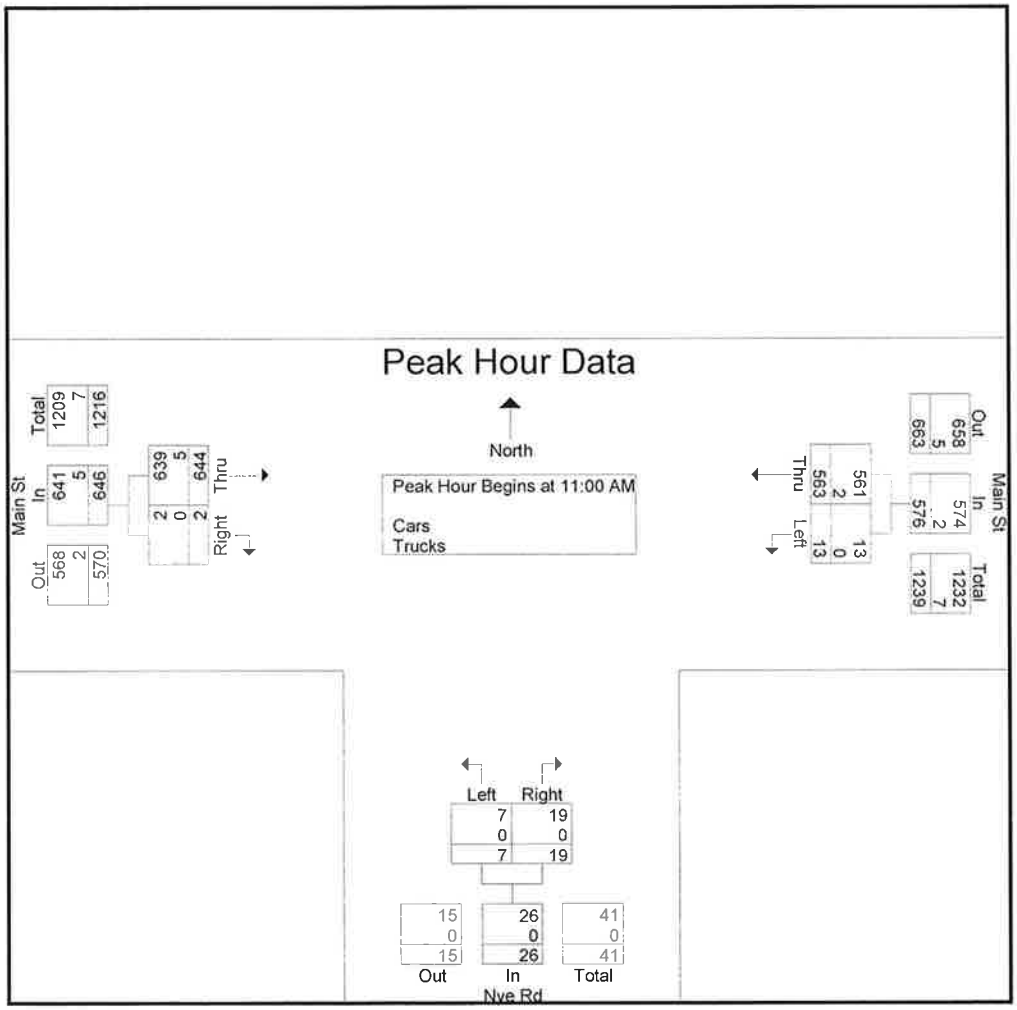
	Main St From East		Nye Rd From South		Main St From West		
Start Time	Left	Thru	Left	Right	Thru	Right	Int. Tota
11:00 AM	3	146	2	7	166	0	32
11:15 AM	2	144	1	7	135	0	28
11:30 AM	1	126	3	2	141	1	27
11:45 AM	7	147	1	3	202	1	36
Total	13	563	7	19	644	2	124
12:00 PM	3	139	0	7	164	3	31
12:15 PM	2	127	4	0	144	1	27
12:30 PM	5	158	2	4	115	0	28
12:45 PM	4	132	1	3	148	4	29
Total	14	556	7	14	571	8	117
01:00 PM	4	134	3	8	157	3	30
01:15 PM	1	141	2	0	143	2	28
01:30 PM	3	121	4	0	117	2	24
01:45 PM	4	120	1	1	147	1	27
Total	12	516	10	9	564	8	111
Grand Total	39	1635	24	42	1779	18	353
Apprch %	2.3	97.7	36.4	63.6	99	1	
Total %	1.1	46.2	0.7	1.2	50.3	0.5	
Cars	39	1623	24	42	1770	18	351
% Cars	100	99.3	100	100	99.5	100	99.
Trucks	0	12	0	0	9	0	2
% Trucks	0	0.7	0	0	0.5	0	0.

Accurate Counts
978-664-2565

/S Street : Nye Road
/W Street : Main Street
ity/State : Falmouth, MA
/eather : Cloudy

File Name : 666800
Site Code : 666800
Start Date : 5/17/2C
Page No : 2

	Main St From East			Nye Rd From South			Main St From West			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Tota
eak Hour Analysis From 11:00 AM to 01:45 PM - Peak 1 of 1										
eak Hour for Entire Intersection Begins at 11:00 AM										
11:00 AM	3	146	149	2	**7**	**9**	166	0	166	32
11:15 AM	2	144	146	1	7	8	135	0	135	28
11:30 AM	1	126	127	**3**	2	5	141	**1**	142	27
11:45 AM	**7**	**147**	**154**	1	3	4	**202**	1	**203**	**36**
Total Volume	13	563	576	7	19	26	644	2	646	124
% App. Total	2.3	97.7		26.9	73.1		99.7	0.3		
PHF	.464	.957	.935	.583	.679	.722	.797	.500	.796	.86
Cars	13	561	574	7	19	26	639	2	641	124
% Cars	100	99.6	99.7	100	100	100	99.2	100	99.2	99.
Trucks	0	2	2	0	0	0	5	0	5	
% Trucks	0	0.4	0.3	0	0	0	0.8	0	0.8	0.



Accurate Counts
978-664-2565

/S Street : Nye Road
/W Street : Main Street
ity/State : Falmouth, MA
/eather : Cloudy

File Name : 666800
Site Code : 666800
Start Date : 5/17/2C
Page No : 4

Groups Printed- Cars

	Main St From East		Nye Rd From South		Main St From West		
Start Time	Left	Thru	Left	Right	Thru	Right	Int. Tot
11:00 AM	3	144	2	7	165	0	32
11:15 AM	2	144	1	7	134	0	28
11:30 AM	1	126	3	2	139	1	27
11:45 AM	7	147	1	3	201	1	36
Total	13	561	7	19	639	2	124
12:00 PM	3	137	0	7	164	3	31
12:15 PM	2	126	4	0	144	1	27
12:30 PM	5	157	2	4	115	0	28
12:45 PM	4	130	1	3	148	4	29
Total	14	550	7	14	571	8	116
01:00 PM	4	134	3	8	156	3	30
01:15 PM	1	141	2	0	141	2	28
01:30 PM	3	120	4	0	117	2	24
01:45 PM	4	117	1	1	146	1	27
Total	12	512	10	9	560	8	111
Grand Total	39	1623	24	42	1770	18	351
Apprch %	2.3	97.7	36.4	63.6	99	1	
Total %	1.1	46.2	0.7	1.2	50.3	0.5	

Accurate Counts
978-664-2565

/S Street : Nye Road
/W Street : Main Street
ity/State : Falmouth, MA
/eather : Cloudy

File Name : 666800
Site Code : 666800
Start Date : 5/17/20
Page No : 7

Groups Printed- Trucks

	Main St From East		Nye Rd From South		Main St From West		
Start Time	Left	Thru	Left	Right	Thru	Right	Int. Tot
11:00 AM	0	2	0	0	1	0	
11:15 AM	0	0	0	0	1	0	
11:30 AM	0	0	0	0	2	0	
11:45 AM	0	0	0	0	1	0	
Total	0	2	0	0	5	0	
12:00 PM	0	2	0	0	0	0	
12:15 PM	0	1	0	0	0	0	
12:30 PM	0	1	0	0	0	0	
12:45 PM	0	2	0	0	0	0	
Total	0	6	0	0	0	0	
01:00 PM	0	0	0	0	1	0	
01:15 PM	0	0	0	0	2	0	
01:30 PM	0	1	0	0	0	0	
01:45 PM	0	3	0	0	1	0	
Total	0	4	0	0	4	0	
Grand Total	0	12	0	0	9	0	2
Apprch %	0	100	0	0	100	0	
Total %	0	57.1	0	0	42.9	0	

Accurate Counts
978-664-2565

/S Street : Nye Road
/W Street : Main Street
ity/State : Falmouth, MA
/eather : Cloudy

File Name : 666800
Site Code : 666800
Start Date : 5/17/20
Page No : 10

Groups Printed- Bikes Peds

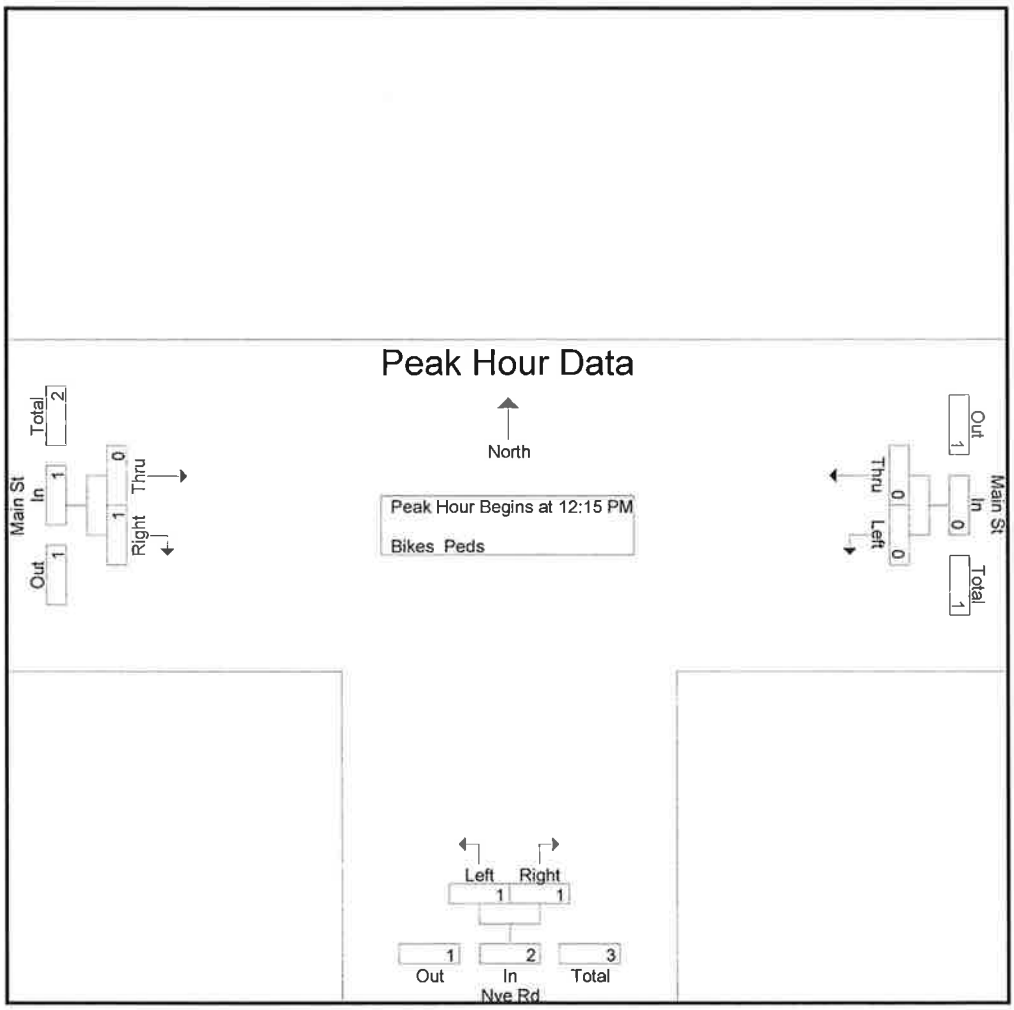
	Main St From East			Nye Rd From South			Main St From West					
Start Time	Left	Thru	Peds	Left	Right	Peds	Thru	Right	Peds	Exclu. Total	Inclu. Total	Int. Tota
11:00 AM	0	0	0	0	0	6	0	0	0	6	0	6
11:15 AM	0	0	1	0	0	6	0	0	1	8	0	8
11:30 AM	0	0	0	0	0	9	0	0	1	10	0	10
11:45 AM	0	0	0	0	0	7	0	0	3	10	0	10
Total	0	0	1	0	0	28	0	0	5	34	0	34
12:00 PM	1	0	0	0	0	4	0	0	0	4	1	5
12:15 PM	0	0	0	0	0	13	0	0	3	16	0	16
12:30 PM	0	0	0	0	0	6	0	0	2	8	0	8
12:45 PM	0	0	0	0	0	6	0	1	0	6	1	7
Total	1	0	0	0	0	29	0	1	5	34	2	36
01:00 PM	0	0	0	1	1	5	0	0	0	5	2	7
01:15 PM	0	0	0	0	0	12	0	0	0	12	0	12
01:30 PM	0	0	0	0	0	7	0	0	0	7	0	7
01:45 PM	0	0	0	0	0	7	0	0	1	8	0	8
Total	0	0	0	1	1	31	0	0	1	32	2	34
Grand Total	1	0	1	1	1	88	0	1	11	100	4	104
Apprch %	100	0		50	50		0	100				
Total %	25	0		25	25		0	25		96.2	3.8	

Accurate Counts
978-664-2565

/S Street : Nye Road
/W Street : Main Street
ity/State : Falmouth, MA
/eather : Cloudy

File Name : 666800
Site Code : 666800
Start Date : 5/17/2C
Page No : 11

	Main St From East			Nye Rd From South			Main St From West			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Tota
eak Hour Analysis From 11:00 AM to 01:45 PM - Peak 1 of 1										
eak Hour for Entire Intersection Begins at 12:15 PM										
12:15 PM	0	0	0	0	0	0	0	0	0	(
12:30 PM	0	0	0	0	0	0	0	0	0	(
12:45 PM	0	0	0	0	0	0	0	**1**	**1**	
01:00 PM	0	0	0	**1**	**1**	**2**	0	0	0	
Total Volume	0	0	0	1	1	2	0	1	1	
% App. Total	0	0		50	50		0	100		
PHF	.000	.000	.000	.250	.250	.250	.000	.250	.250	.37



VEHICLE TRAVEL SPEED MEASUREMENTS

Accurate Counts
978-664-2565

Location : Main Street (Route 28)
Location : East of Lantern Lane
City/State: Falmouth, MA
Westbound

Site Code: 66680001
6668SPD1

Start Time	1 15	16 20	21 25	26 30	31 35	36 40	41 45	46 50	51 55	56 60	61 65	66 70	71 75	76 999	Total	85th Percent	95th Percent
05/29/14	0	1	1	9	5	2	0	0	0	0	0	0	0	0	18	34	37
01:00	0	0	1	6	1	1	0	1	0	0	0	0	0	0	10	37	47
02:00	0	0	4	3	5	0	0	0	0	0	0	0	0	0	12	33	34
03:00	0	1	2	3	0	1	0	0	0	0	0	0	0	0	7	30	38
04:00	0	2	11	18	11	1	0	0	0	0	0	0	0	0	43	32	35
05:00	0	3	13	45	42	8	2	0	0	0	0	0	0	0	113	34	37
06:00	1	8	38	125	65	7	0	0	0	0	0	0	0	0	244	32	35
07:00	5	22	150	194	87	14	0	0	0	0	0	0	0	0	472	31	34
08:00	13	58	192	202	62	8	0	1	0	0	0	0	0	0	536	30	33
09:00	35	81	227	144	33	3	0	0	0	0	0	0	0	0	523	28	31
10:00	41	114	229	153	23	1	0	0	0	0	0	0	0	0	561	27	30
11:00	42	67	245	149	27	2	0	0	0	0	0	0	0	0	532	27	30
12 PM	31	128	250	123	18	2	0	0	0	0	0	0	0	0	552	26	30
13:00	82	123	197	93	15	0	0	0	0	0	0	0	0	0	510	25	29
14:00	27	135	206	128	31	2	0	0	0	0	0	0	0	0	529	27	30
15:00	37	102	231	122	11	1	0	0	0	0	0	0	0	0	504	26	29
16:00	9	76	221	152	46	2	0	0	0	0	0	0	0	0	506	28	32
17:00	5	51	173	203	44	2	0	0	0	0	0	0	0	0	478	29	32
18:00	4	30	140	221	44	3	0	0	0	0	0	0	0	0	442	29	32
19:00	7	19	102	196	49	8	0	0	0	0	0	0	0	0	381	30	33
20:00	1	8	63	130	45	2	0	0	0	0	0	0	0	0	249	31	34
21:00	0	4	42	98	44	3	1	0	0	0	0	0	0	0	192	32	34
22:00	0	0	20	41	35	4	3	0	0	0	0	0	0	0	103	33	37
23:00	0	0	14	16	17	3	3	0	0	0	0	0	0	0	53	34	40
Total	340	1033	2772	2574	760	80	9	2	0	0	0	0	0	0	7570		
Percent	4.5%	13.6%	36.6%	34.0%	10.0%	1.1%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			
AM Peak	11:00	10:00	11:00	08:00	07:00	07:00	05:00	01:00							10:00		
Vol.	42	114	245	202	87	14	2	1							561		
PM Peak	13:00	14:00	12:00	18:00	19:00	19:00	22:00								12:00		
Vol.	82	135	250	221	49	8	3								552		

Accurate Counts
978-664-2565

Location : Main Street (Route 28)
Location : East of Lantern Lane
City/State: Falmouth, MA
Westbound

Site Code: 66680001
6668SPD1

Start Time	1 15	16 20	21 25	26 30	31 35	36 40	41 45	46 50	51 55	56 60	61 65	66 70	71 75	76 999	Total	85th Percent	95th Percent
05/30/14	0	0	2	8	6	2	0	0	0	0	0	0	0	0	18	34	37
01:00	0	1	0	6	5	2	0	0	0	0	0	0	0	0	14	35	38
02:00	0	0	1	3	4	2	0	0	0	0	0	0	0	0	10	36	38
03:00	0	0	1	3	0	0	0	0	0	0	0	0	0	0	4	29	30
04:00	0	5	7	15	11	2	0	0	0	0	0	0	0	0	40	33	35
05:00	0	5	23	44	38	5	**2**	0	0	0	0	0	0	0	117	33	36
06:00	1	11	67	126	**73**	7	0	0	0	0	0	0	0	0	285	32	35
07:00	13	35	152	195	51	**9**	1	0	0	0	0	0	0	0	456	30	33
08:00	5	84	251	**202**	33	3	0	0	0	0	0	0	0	0	578	28	31
09:00	24	124	281	147	15	1	0	0	0	0	0	0	0	0	**592**	27	29
10:00	22	132	256	144	24	0	0	0	0	0	0	0	0	0	578	27	30
11:00	**33**	**139**	**287**	100	7	1	0	0	0	0	0	0	0	0	567	25	28
12 PM	30	**195**	**258**	94	16	1	0	0	0	0	0	0	0	0	**594**	25	29
13:00	**58**	163	244	103	9	1	0	0	0	0	0	0	0	0	578	25	28
14:00	48	115	258	119	9	1	0	0	0	0	0	0	0	0	550	26	29
15:00	38	159	235	93	8	1	0	0	0	0	0	0	0	0	534	25	28
16:00	16	54	219	184	27	4	0	0	0	0	0	0	0	0	504	28	31
17:00	14	53	175	195	34	3	0	0	0	0	0	0	0	0	474	29	31
18:00	3	33	142	186	**58**	5	0	0	0	0	0	0	0	0	427	30	33
19:00	7	22	153	**207**	39	**6**	**1**	0	0	0	0	0	0	0	435	29	33
20:00	0	17	104	133	39	3	0	0	0	0	0	0	0	0	296	30	33
21:00	0	3	58	139	46	1	0	0	0	0	0	0	0	0	247	31	33
22:00	2	4	41	95	40	2	0	0	0	0	0	0	0	0	184	31	34
23:00	0	1	15	42	29	1	0	0	0	0	0	0	0	0	88	32	34
Total	314	1355	3230	2583	621	63	4	0	0	0	0	0	0	0	8170		
Percent	3.8%	16.6%	39.5%	31.6%	7.6%	0.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			
AM Peak	11:00	11:00	11:00	08:00	06:00	07:00	05:00								09:00		
Vol.	33	139	287	202	73	9	2								592		
PM Peak	13:00	12:00	12:00	19:00	18:00	19:00	19:00								12:00		
Vol.	58	195	258	207	58	6	1								594		

Accurate Counts
978-664-2565

Location : Main Street (Route 28)
Location : East of Lantern Lane
City/State: Falmouth, MA
Westbound

Site Code: 66680001
6668SPD1

Start Time	1 15	16 20	21 25	26 30	31 35	36 40	41 45	46 50	51 55	56 60	61 65	66 70	71 75	76 999	Total	85th Percent	95th Percent
05/31/14	0	0	3	15	14	**8**	**2**	0	0	0	0	0	0	0	42	37	40
01:00	0	2	4	8	17	2	0	0	0	0	0	0	0	0	33	34	36
02:00	0	0	1	9	3	3	0	0	0	0	0	0	0	0	16	36	38
03:00	0	0	1	6	4	0	1	0	0	0	0	0	0	0	12	34	41
04:00	0	3	6	14	11	1	0	0	0	0	0	0	0	0	35	32	35
05:00	1	7	17	26	17	7	0	0	0	0	0	0	0	0	75	33	37
06:00	0	3	40	63	39	6	1	0	0	0	0	0	0	0	152	32	35
07:00	3	25	92	138	**56**	4	0	0	0	0	0	0	0	0	318	31	34
08:00	15	39	129	160	41	5	0	0	0	0	0	0	0	0	389	29	33
09:00	11	68	226	**175**	20	1	0	0	0	0	0	0	0	0	501	28	30
10:00	36	138	**244**	125	15	0	0	0	0	0	0	0	0	0	**558**	26	29
11:00	**69**	**139**	213	107	21	2	0	0	0	0	0	0	0	0	551	26	29
12 PM	**87**	**156**	**235**	71	7	3	0	0	0	0	0	0	0	0	559	24	28
13:00	23	113	232	131	22	0	0	0	0	0	0	0	0	0	521	27	30
14:00	47	143	232	130	15	1	0	0	0	0	0	0	0	0	**568**	26	29
15:00	10	108	204	153	34	1	0	0	0	0	0	0	0	0	510	28	31
16:00	7	56	196	188	40	4	0	0	0	0	0	0	0	0	491	29	32
17:00	9	37	157	**200**	**55**	4	0	0	0	0	0	0	0	0	462	30	33
18:00	6	41	181	172	41	5	0	0	0	0	0	0	0	0	446	29	32
19:00	6	25	109	186	44	4	0	0	0	0	0	0	0	0	374	30	33
20:00	0	16	127	156	36	1	0	0	0	0	0	0	0	0	336	29	32
21:00	1	13	52	140	39	3	0	0	0	0	0	0	0	0	248	30	33
22:00	2	4	34	105	52	**6**	0	0	0	0	0	0	0	0	203	32	35
23:00	0	3	19	44	21	6	**1**	0	0	0	**0**	0	0	0	94	33	36
Total	333	1139	2754	2522	664	77	5	0	0	0	0	0	0	0	7494		
Percent	4.4%	15.2%	36.7%	33.7%	8.9%	1.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			
AM Peak	11:00	11:00	10:00	09:00	07:00	00:00	00:00								10:00		
Vol.	69	139	244	175	56	8	2								558		
PM Peak	12:00	12:00	12:00	17:00	17:00	22:00	23:00								14:00		
Vol.	87	156	235	200	55	6	1								568		
Grand Total	987	3527	8756	7679	2045	220	18	2	0	0	0	0	0	0	23234		
Percent	4.2%	15.2%	37.7%	33.1%	8.8%	0.9%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			

15th Percentile : 15 MPH
50th Percentile : 23 MPH
85th Percentile : 29 MPH
95th Percentile : 32 MPH

Statistics

10 MPH Pace Speed : 20-29 MPH
Number in Pace : 13668
Percent in Pace : 58.8%
Number of Vehicles > 25 MPH : 9964
Percent of Vehicles > 25 MPH : 42.9%
Mean Speed(Average) : 23 MPH

Accurate Counts
978-664-2565

Location : Main Street (Route 28)
Location : East of Lantern Lane
City/State: Falmouth, MA

Site Code: 66680001
6668SPD1

Eastbound

Start Time	1 15	16 20	21 25	26 30	31 35	36 40	41 45	46 50	51 55	56 60	61 65	66 70	71 75	76 999	Total	85th Percent	95th Percent
05/29/14	0	0	3	5	12	7	3	0	0	0	0	0	0	0	30	39	42
01:00	0	0	0	3	9	0	2	0	0	0	0	0	0	0	14	36	43
02:00	0	0	1	3	5	3	2	0	0	**1**	0	0	0	0	15	41	56
03:00	0	0	5	5	2	1	0	0	0	0	0	0	0	0	13	32	36
04:00	0	0	3	10	7	5	1	0	0	0	0	0	0	0	26	37	40
05:00	0	0	1	25	22	13	**6**	0	0	0	0	0	0	0	67	38	42
06:00	3	7	13	57	59	**15**	1	0	0	0	0	0	0	0	155	34	37
07:00	1	13	77	153	90	11	1	0	0	0	0	0	0	0	346	32	35
08:00	15	51	118	215	**92**	8	0	0	0	0	0	0	0	0	499	31	34
09:00	32	72	209	205	43	3	0	0	0	0	0	0	0	0	564	28	31
10:00	**37**	57	211	**225**	40	6	1	0	0	0	0	0	0	0	577	29	31
11:00	16	**82**	**237**	191	50	3	0	0	0	0	0	0	0	0	**579**	29	32
12 PM	33	113	290	214	34	2	1	0	0	0	0	0	0	0	687	28	30
13:00	**106**	**125**	224	154	26	4	0	0	0	0	0	0	0	0	639	27	30
14:00	47	121	**299**	234	47	7	0	0	0	0	0	0	0	0	755	28	31
15:00	98	123	231	204	41	2	0	0	0	0	0	0	0	0	699	27	30
16:00	52	101	243	**305**	53	10	0	0	0	0	0	0	0	0	**764**	29	31
17:00	43	66	208	282	110	10	0	0	0	0	0	0	0	0	719	30	33
18:00	6	15	110	247	**121**	7	1	0	0	0	0	0	0	0	507	32	34
19:00	5	30	139	237	94	**14**	0	0	0	0	0	0	0	0	519	31	34
20:00	6	15	68	195	85	11	0	0	0	0	0	0	0	0	380	32	35
21:00	0	3	33	126	83	12	1	0	0	0	0	0	0	0	258	33	36
22:00	1	1	13	60	61	13	0	0	0	0	0	0	0	0	149	34	37
23:00	0	5	10	27	27	12	**4**	0	0	0	0	0	0	0	85	36	40
Total	501	1000	2746	3382	1213	179	24	0	0	1	0	0	0	0	9046		
Percent	5.5%	11.1%	30.4%	37.4%	13.4%	2.0%	0.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			
AM Peak	10:00	11:00	11:00	10:00	08:00	06:00	05:00			02:00					11:00		
Vol.	37	82	237	225	92	15	6			1					579		
PM Peak	13:00	13:00	14:00	16:00	18:00	19:00	23:00								16:00		
Vol.	106	125	299	305	121	14	4								764		

Accurate Counts
978-664-2565

Location : Main Street (Route 28)
Location : East of Lantern Lane
City/State: Falmouth, MA
Eastbound

Site Code: 66680001
6668SPD1

Start Time	1 15	16 20	21 25	26 30	31 35	36 40	41 45	46 50	51 55	56 60	61 65	66 70	71 75	76 999	Total	85th Percent	95th Percent
05/30/14	0	1	3	9	18	10	2	0	0	0	0	0	0	0	43	37	40
01:00	0	1	1	5	9	7	0	0	0	0	0	0	0	0	23	37	39
02:00	0	0	1	2	7	1	0	0	0	0	0	0	0	0	11	35	37
03:00	0	0	1	0	6	1	0	0	0	0	0	0	0	0	8	35	37
04:00	0	2	2	7	9	5	1	0	0	0	0	0	0	0	26	36	40
05:00	0	2	11	27	30	9	1	0	0	0	0	0	0	0	80	35	38
06:00	3	8	19	88	61	**15**	**4**	0	0	0	0	0	0	0	198	34	37
07:00	6	11	63	167	**108**	14	2	0	0	0	0	0	0	0	371	33	35
08:00	26	53	128	207	62	9	1	0	0	0	0	0	0	0	486	30	33
09:00	31	106	228	211	39	3	0	0	0	0	0	0	0	0	618	28	31
10:00	52	89	263	**236**	39	0	0	0	0	0	0	0	0	0	679	28	31
11:00	**89**	**211**	**315**	131	20	1	0	0	0	0	0	0	0	0	**767**	25	29
12 PM	**107**	159	310	159	23	1	0	0	0	0	0	0	0	0	759	26	29
13:00	53	134	335	183	43	2	0	0	0	0	0	0	0	0	750	27	30
14:00	54	128	**363**	220	24	0	0	0	0	0	0	0	0	0	789	27	30
15:00	83	**178**	326	169	33	2	0	0	0	0	0	0	0	0	**791**	26	30
16:00	32	91	311	**272**	62	6	**2**	0	0	0	0	0	0	0	776	29	32
17:00	34	69	220	269	101	14	0	0	0	0	0	0	0	0	707	30	33
18:00	9	34	157	256	**115**	10	0	0	0	0	0	0	0	0	581	31	34
19:00	9	23	145	242	84	**24**	0	0	0	0	0	0	0	0	527	31	35
20:00	1	17	108	212	76	7	1	0	0	0	0	0	0	0	422	31	34
21:00	1	8	50	169	72	10	1	**3**	0	0	0	0	0	0	314	32	35
22:00	1	8	60	152	56	18	1	0	0	0	0	0	0	0	296	32	36
23:00	0	4	4	53	68	14	2	1	0	0	0	0	0	0	146	35	38
Total	591	1337	3424	3446	1165	183	18	4	0	0	0	0	0	0	10168		
Percent	5.8%	13.1%	33.7%	33.9%	11.5%	1.8%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			
AM Peak	11:00	11:00	11:00	10:00	07:00	06:00	06:00								11:00		
Vol.	89	211	315	236	108	15	4								767		
PM Peak	12:00	15:00	14:00	16:00	18:00	19:00	16:00	21:00							15:00		
Vol.	107	178	363	272	115	24	2	3							791		

Accurate Counts
978-664-2565

Location : Main Street (Route 28)
Location : East of Lantern Lane
City/State: Falmouth, MA

Site Code: 66680001
6668SPD1

Eastbound

Start Time	1 15	16 20	21 25	26 30	31 35	36 40	41 45	46 50	51 55	56 60	61 65	66 70	71 75	76 999	Total	85th Percent	95th Percent
05/31/14	1	2	5	16	39	14	2	**3**	0	0	0	0	0	0	82	37	42
01:00	0	1	3	17	21	8	**3**	0	0	0	0	0	0	0	53	36	40
02:00	0	1	1	5	6	2	3	1	0	0	0	0	0	0	19	41	45
03:00	0	0	2	2	7	1	2	0	0	0	0	0	0	0	14	39	43
04:00	0	0	0	3	7	4	1	0	0	0	0	0	0	0	15	38	41
05:00	1	5	10	25	15	12	1	0	0	0	0	0	0	0	69	35	39
06:00	0	2	30	60	46	**15**	2	0	0	0	0	0	0	0	155	34	38
07:00	4	5	51	134	66	14	1	0	0	0	0	0	0	0	275	32	36
08:00	17	43	114	**214**	**95**	6	0	0	0	0	0	0	0	0	489	31	34
09:00	40	92	236	211	44	1	0	0	0	0	0	0	0	0	624	28	31
10:00	53	134	296	179	17	1	0	0	0	0	0	0	0	0	680	27	29
11:00	**54**	**166**	**344**	161	25	0	0	0	0	0	0	0	0	0	**750**	26	29
12 PM	**67**	**172**	**346**	123	18	2	0	0	0	0	0	0	0	0	**728**	25	29
13:00	23	103	278	214	52	4	2	0	0	0	0	0	0	0	676	28	31
14:00	32	115	326	182	25	0	1	0	0	0	0	0	0	0	681	27	30
15:00	19	86	312	235	35	3	0	0	0	0	0	0	0	0	690	28	31
16:00	17	33	277	240	72	10	0	0	0	0	0	0	0	0	649	30	33
17:00	18	23	183	257	95	6	2	0	0	0	0	0	0	0	584	30	34
18:00	8	21	153	**264**	64	8	1	0	0	0	0	0	0	0	519	30	33
19:00	1	21	122	248	**96**	12	0	0	0	0	0	0	0	0	500	31	34
20:00	4	19	144	215	59	2	0	0	0	0	0	0	0	0	443	30	33
21:00	0	13	59	158	68	13	0	0	0	0	0	0	0	0	311	32	35
22:00	1	1	27	122	84	**17**	**3**	0	0	0	0	0	0	0	255	34	37
23:00	0	1	8	58	77	16	3	0	0	0	0	0	0	0	163	35	38
Total	360	1059	3327	3343	1133	171	27	4	0	0	0	0	0	0	9424		
Percent	3.8%	11.2%	35.3%	35.5%	12.0%	1.8%	0.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			
AM Peak	11:00	11:00	11:00	08:00	08:00	06:00	01:00	00:00							11:00		
Vol.	54	166	344	214	95	15	3	3							750		
PM Peak	12:00	12:00	12:00	18:00	19:00	22:00	22:00								12:00		
Vol.	67	172	346	264	96	17	3								728		
Grand Total	1452	3396	9497	10171	3511	533	69	8	0	1	0	0	0	0	28638		
Percent	5.1%	11.9%	33.2%	35.5%	12.3%	1.9%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			

15th Percentile : 15 MPH
50th Percentile : 24 MPH
85th Percentile : 30 MPH
95th Percentile : 33 MPH

Statistics

10 MPH Pace Speed : 21-30 MPH
Number in Pace : 16490
Percent in Pace : 57.6%
Number of Vehicles > 25 MPH : 14293
Percent of Vehicles > 25 MPH : 49.9%
Mean Speed(Average) : 24 MPH

Accurate Counts
978-664-2565

Location : Main Street (Route 28)
Location : East of Lantern Lane
City/State: Falmouth, MA
Westbound, Eastbound

Site Code: 66680001
6668SPD1

Start Time	1 15	16 20	21 25	26 30	31 35	36 40	41 45	46 50	51 55	56 60	61 65	66 70	71 75	76 999	Total	85th Percent	95th Percent
05/29/14	0	1	4	14	17	9	3	0	0	0	0	0	0	0	48	37	41
01:00	0	0	1	9	10	1	2	**1**	0	0	0	0	0	0	24	36	44
02:00	0	0	5	6	10	3	2	0	0	**1**	0	0	0	0	27	38	44
03:00	0	1	7	8	2	2	0	0	0	0	0	0	0	0	20	32	37
04:00	0	2	14	28	18	6	1	0	0	0	0	0	0	0	69	34	37
05:00	0	3	14	70	64	21	**8**	0	0	0	0	0	0	0	180	35	40
06:00	4	15	51	182	124	22	1	0	0	0	0	0	0	0	399	33	36
07:00	6	35	227	347	**177**	**25**	1	0	0	0	0	0	0	0	818	32	35
08:00	28	109	310	**417**	154	16	0	1	0	0	0	0	0	0	1035	30	33
09:00	67	153	436	349	76	6	0	0	0	0	0	0	0	0	1087	28	31
10:00	**78**	**171**	440	378	63	7	1	0	0	0	0	0	0	0	**1138**	28	31
11:00	58	149	**482**	340	77	5	0	0	0	0	0	0	0	0	1111	28	31
12 PM	64	241	**540**	337	52	4	1	0	0	0	0	0	0	0	1239	27	30
13:00	**188**	248	421	247	41	4	0	0	0	0	0	0	0	0	1149	26	29
14:00	74	**256**	505	362	78	9	0	0	0	0	0	0	0	0	**1284**	28	31
15:00	135	225	462	326	52	3	0	0	0	0	0	0	0	0	1203	27	30
16:00	61	177	464	457	99	12	0	0	0	0	0	0	0	0	1270	29	32
17:00	48	117	381	**485**	154	12	0	0	0	0	0	0	0	0	1197	30	33
18:00	10	45	250	468	**165**	10	1	0	0	0	0	0	0	0	949	31	34
19:00	12	49	241	433	143	**22**	0	0	0	0	0	0	0	0	900	31	34
20:00	7	23	131	325	130	13	0	0	0	0	0	0	0	0	629	31	34
21:00	0	7	75	224	127	15	2	0	0	0	0	0	0	0	450	32	35
22:00	1	1	33	101	96	17	3	0	0	0	0	0	0	0	252	34	37
23:00	0	5	24	43	44	15	**7**	0	0	0	0	0	0	0	138	35	40
Total	841	2033	5518	5956	1973	259	33	2	0	1	0	0	0	0	16616		
Percent	5.1%	12.2%	33.2%	35.8%	11.9%	1.6%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			
AM Peak	10:00	10:00	11:00	08:00	07:00	07:00	05:00	01:00		02:00					10:00		
Vol.	78	171	482	417	177	25	8	1		1					1138		
PM Peak	13:00	14:00	12:00	17:00	18:00	19:00	23:00								14:00		
Vol.	188	256	540	485	165	22	7								1284		

Accurate Counts
978-664-2565

Location : Main Street (Route 28)
Location : East of Lantern Lane
City/State: Falmouth, MA
Westbound, Eastbound

Site Code: 66680001
6668SPD1

Start Time	1 15	16 20	21 25	26 30	31 35	36 40	41 45	46 50	51 55	56 60	61 65	66 70	71 75	76 999	Total	85th Percent	95th Percent
05/30/14	0	1	5	17	24	12	2	0	0	0	0	0	0	0	61	36	40
01:00	0	2	1	11	14	9	0	0	0	0	0	0	0	0	37	36	39
02:00	0	0	2	5	11	3	0	0	0	0	0	0	0	0	21	35	38
03:00	0	0	2	3	6	1	0	0	0	0	0	0	0	0	12	34	36
04:00	0	7	9	22	20	7	1	0	0	0	0	0	0	0	66	34	38
05:00	0	7	34	71	68	14	3	0	0	0	0	0	0	0	197	34	37
06:00	4	19	86	214	134	22	**4**	0	0	0	0	0	0	0	483	33	36
07:00	19	46	215	362	**159**	**23**	3	0	0	0	0	0	0	0	827	31	34
08:00	31	137	379	**409**	95	12	1	0	0	0	0	0	0	0	1064	29	32
09:00	55	230	509	358	54	4	0	0	0	0	0	0	0	0	1210	27	30
10:00	74	221	519	380	63	0	0	0	0	0	0	0	0	0	1257	28	30
11:00	**122**	**350**	**602**	231	27	2	0	0	0	0	0	0	0	0	**1334**	25	29
12 PM	**137**	**354**	568	253	39	2	0	0	0	0	0	0	0	0	**1353**	26	29
13:00	111	297	579	286	52	3	0	0	0	0	0	0	0	0	1328	26	30
14:00	102	243	**621**	339	33	1	0	0	0	0	0	0	0	0	1339	27	29
15:00	121	337	561	262	41	3	0	0	0	0	0	0	0	0	1325	26	29
16:00	48	145	530	456	89	10	**2**	0	0	0	0	0	0	0	1280	28	31
17:00	48	122	395	**464**	135	17	0	0	0	0	0	0	0	0	1181	29	33
18:00	12	67	299	442	**173**	15	0	0	0	0	0	0	0	0	1008	31	34
19:00	16	45	298	449	123	**30**	1	0	0	0	0	0	0	0	962	30	34
20:00	1	34	212	345	115	10	1	0	0	0	0	0	0	0	718	31	34
21:00	1	11	108	308	118	11	1	**3**	0	0	0	0	0	0	561	32	34
22:00	3	12	101	247	96	20	1	0	0	0	0	0	0	0	480	32	35
23:00	0	5	19	95	97	15	2	1	0	0	0	0	0	0	234	34	37
Total	905	2692	6654	6029	1786	246	22	4	0	0	0	0	0	0	18338		
Percent	4.9%	14.7%	36.3%	32.9%	9.7%	1.3%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			
AM Peak	11:00	11:00	11:00	08:00	07:00	07:00	06:00								11:00		
Vol.	122	350	602	409	159	23	4								1334		
PM Peak	12:00	12:00	14:00	17:00	18:00	19:00	16:00	21:00							12:00		
Vol.	137	354	621	464	173	30	2	3							1353		

Accurate Counts
978-664-2565

Location : Main Street (Route 28)
Location : East of Lantern Lane
City/State: Falmouth, MA
Westbound, Eastbound

Site Code: 66680001
6668SPD1

Start Time	1 15	16 20	21 25	26 30	31 35	36 40	41 45	46 50	51 55	56 60	61 65	66 70	71 75	76 999	Total	85th Percent	95th Percent
05/31/14	1	2	8	31	53	**22**	**4**	**3**	0	0	0	0	0	0	124	37	41
01:00	0	3	7	25	38	10	3	0	0	0	0	0	0	0	86	35	39
02:00	0	1	2	14	9	5	3	1	0	0	0	0	0	0	35	38	43
03:00	0	0	3	8	11	1	3	0	0	0	0	0	0	0	26	36	42
04:00	0	3	6	17	18	5	1	0	0	0	0	0	0	0	50	34	38
05:00	2	12	27	51	32	19	1	0	0	0	0	0	0	0	144	34	38
06:00	0	5	70	123	85	21	3	0	0	0	0	0	0	0	307	33	37
07:00	7	30	143	272	122	18	1	0	0	0	0	0	0	0	593	32	35
08:00	32	82	243	374	**136**	11	0	0	0	0	0	0	0	0	878	30	33
09:00	51	160	462	**386**	64	2	0	0	0	0	0	0	0	0	1125	28	31
10:00	89	272	540	304	32	1	0	0	0	0	0	0	0	0	1238	26	29
11:00	**123**	**305**	**557**	268	46	2	0	0	0	0	0	0	0	0	**1301**	26	29
12 PM	**154**	**328**	**581**	194	25	5	0	0	0	0	0	0	0	0	**1287**	25	28
13:00	46	216	510	345	74	4	2	0	0	0	0	0	0	0	1197	28	31
14:00	79	258	558	312	40	1	1	0	0	0	0	0	0	0	1249	27	30
15:00	29	194	516	388	69	4	0	0	0	0	0	0	0	0	1200	28	31
16:00	24	89	473	428	112	14	0	0	0	0	0	0	0	0	1140	29	32
17:00	27	60	340	**457**	**150**	10	2	0	0	0	0	0	0	0	1046	30	33
18:00	14	62	334	436	105	13	1	0	0	0	0	0	0	0	965	30	33
19:00	7	46	231	434	140	16	0	0	0	0	0	0	0	0	874	31	34
20:00	4	35	271	371	95	3	0	0	0	0	0	0	0	0	779	30	33
21:00	1	26	111	298	107	16	0	0	0	0	0	0	0	0	559	31	34
22:00	3	5	61	227	136	**23**	3	0	0	0	0	0	0	0	458	33	36
23:00	0	4	27	102	98	22	**4**	0	0	0	0	0	0	0	257	34	37
Total	693	2198	6081	5865	1797	248	32	4	0	0	0	0	0	0	16918		
Percent	4.1%	13.0%	35.9%	34.7%	10.6%	1.5%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			
AM Peak	11:00	11:00	11:00	09:00	08:00	00:00	00:00	00:00							11:00		
Vol.	123	305	557	386	136	22	4	3							1301		
PM Peak	12:00	12:00	12:00	17:00	17:00	22:00	23:00								12:00		
Vol.	154	328	581	457	150	23	4								1287		
Grand Total	2439	6923	18253	17850	5556	753	87	10	0	1	0	0	0	0	51872		
Percent	4.7%	13.3%	35.2%	34.4%	10.7%	1.5%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			

15th Percentile : 15 MPH
50th Percentile : 23 MPH
85th Percentile : 29 MPH
95th Percentile : 33 MPH

Statistics

10 MPH Pace Speed : 21-30 MPH
Number in Pace : 30125
Percent in Pace : 58.1%
Number of Vehicles > 25 MPH : 24257
Percent of Vehicles > 25 MPH : 46.8%
Mean Speed(Average) : 23 MPH

TRIP-GENERATION CALCULATIONS

3225 MAIN STREET • P.O. BOX 226
BARNSTABLE, MASSACHUSETTS 02630

(508) 362-3828 • Fax (508) 362-3136 • www.capecodcommission.org

CAPE COD
COMMISSION

May 20, 2014

Jeffrey S. Dirk, P.E., PTOE, FITE
Principal
Vanasse & Associates, Inc.
10 New England Business Center Drive
Suite 314
Andover, MA 01810-1066

Re: Traffic Impact Assessment – Proposed Scope of Work – Proposed Extended Stay Hotel – 566 Man Street (Route 28), Falmouth

Dear Mr. Dirk,

Thank you for submitting the letter dated April 30, 2014 regarding traffic study requirements for the proposed extended stay hotel to be located at 556 Main Street (Route 28) in Falmouth. Cape Cod Commission Transportation staff has reviewed the document and offer the following comments.

PROJECT DESCRIPTION

As outlined in the letter, the Applicant is proposing to redevelop the existing commercial property at 556 Main Street (Route 28) in Falmouth that currently contains 16,272 square feet (sf) of commercial/retail space. The Applicant is proposing to construct a 108-room extended stay hotel.

TRIP GENERATION

Commission Transportation staff has reviewed the trip generation calculations as outlined in the letter. The letter states that the trip generation estimates are based on trip generation data in *Institute of Transportation Engineers' (ITE) Trip Generation*, 9th Edition, for Land Use Code (LUC) 826, Specialty Retail, for the existing use, and LUC 310, Hotel, for the proposed use. Commission Transportation staff agrees with the characterization of the existing and proposed uses, but suggests that some of the calculations do not follow guidance provided in the Cape Cod Commission Technical 96-003. Specifically, the "Peak Hour of Generator" should be used for the Weekday AM and

COUNTY OF BARNSTABLE MASSACHUSETTS

PM Peak Hour analysis as opposed to the Peak of Hour of Adjacent Street Traffic. Additionally, the regression equation should only be used "when statistically appropriate and used according to the methods outlined" in the *ITE Trip Generation Manual.*

Commission Transportation staff suggests that the expected increase in traffic from the project during different time periods is as presented in Table 1. Trip generation calculations are attached and Commission Transportation staff is available for any questions.

Table 1: Estimated Project Trip Generation

	Trip Generation (trips)		
Time Period	**Proposed Use Hotel (108 rooms)[1]**	**Existing Use[2]**	**Net New Trips[3]**
Weekday Daily Trips	882	721	+161
Weekday AM Peak Hour	60	111	-51
Weekday PM Peak Hour	66	82	-16
Saturday Daily	885	684	+201
Saturday Midday Peak Hour	79	66	+13

Note:
[1] Based on ITE LUC 310, Hotel, 108 rooms
[2] Based on ITE LUC 826, Specialty Retail, 16,272 sf
[3] Trip from proposed use minus credit for trips from existing use

Based on these estimates, the project would add 161 new Weekday Daily trips and 13 new trips during the project's Peak Hour (Saturday Midday Peak Hour). Based on the fact that the project is anticipated to generate less the 250 daily and 25 peak hour trips, the Applicant could consider pursuing Limited Development of Regional Impact (DRI) Review. In addition to the trip generation related questions, the Limited DRI Review scoping checklists asks whether the project is on or abuts a regional roadway. If the Applicant considers Limited DRI Review, discussions with Commission staff about site drive design may be able to address potential impacts on this regional roadway without the need for full DRI review.

If the Applicant pays careful attention to site drive design and provided analysis of safety and other safety characteristics of the driveway, Commission Transportation staff may

Commission Transportation staff notes that while staff suggests that the existing use credits shown in Table 1 are appropriately calculated and applied, it is at the Cape Cod Commission's discretion, per Minimum Performance Standard TR0.2, whether or not to allow such credits.

Extended Stay Hotel – Falmouth
May 20, 2014

STUDY AREA

Based on the current estimates of project trip generation, Commission Transportation staff suggests that the proposed study area, as presented in the letter and shown below, is appropriate for the traffic impact assessment for the proposed development.

1. Main Street, east and west of the project site (roadway links)
2. Main Street at Lantern Lane/Proposed Site Drive (intersection)
3. Main Street at Nye Road (intersection)

TRIP DISTRIBUTION

To be provided following further analysis by the Applicant.

OTHER STUDY PARAMETERS

Commission Transportation staff suggests that the study time periods, analysis conditions, background traffic growth rate, background develop project, and roadway improvement projects, as presented in the letter, are appropriate for the traffic impact assessment for the proposed development.

Please feel free to contact me with any questions regarding these comments or anything else.

Sincerely,

Glenn Cannon, P.E.
CCC Director of Technical Services

Cc: Steven Tupper, CCC Technical Services Planner
Jonathan Idman, CCC Chief Regulatory Officer

Attachments (1)

Trip Generation Calculation Sheet
Institute of Transportation Engineers (ITE)
Land Use Code (LUC) 826 - Specialty Retail

Average Vehicle Trip Ends per:	1000 Sq. Feet Gross Leasable Area
Independent Variable (X):	16.272

Average Weekday Daily

Available Data

Number of Studies:	4
Directional Distribution:	50 % Entering 50 % Exiting
Average Rate:	44.32
Standard Deviation:	15.52
R^2	0.69
Regression Equation:	T = 42.78(X) + 37.66

Regression Equation Check

Regression Equation?	Yes
Indep. Var. within Data Range?	Yes
20 points or $R^2 \geq 0.75$	No
Equation within data cluster?	Yes
Std. Dev. > 110% of Ave. Rate?	No
Use Regression Equation?	**No**

Estimate Based on Regression Equation

T = 42.78(X) + 37.66
T = 42.78(16.272) + 37.66
T = 733.78
T = 734 vehicle trips with 50% (367) entering and 50% (367) exiting.

Estimate Based on Weighted Average Rate

T = 44.32 (X)
T = 44.32 (16.272)
T = 721.18
T = 721 vehicle trips with 50% (361) entering and 50% (360) exiting.

Weekday AM Peak Hour of Generator

Available Data

Number of Studies:	4
Directional Distribution:	48 % Entering 52 % Exiting
Average Rate:	6.84
Standard Deviation:	3.55
R^2	0.9
Regression Equation:	T = 4.91(X)+115.59

Regression Equation Check

Regression Equation?	Yes
Indep. Var. within Data Range?	Yes
20 points or $R^2 \geq 0.75$	Yes
Equation within data cluster?	Yes
Std. Dev. > 110% of Ave. Rate?	No
Use Regression Equation?	**No**

Estimate Based on Regression Equation

T = 4.91(X)+115.59
T = 4.91(16.272)+115.59
T = 195.49
T = 195 vehicle trips with 48% (94) entering and 52% (101) exiting.

Estimate Based on Weighted Average Rate

T = 6.84 (X)
T = 6.84 (16.272)
T = 111.3
T = 111 vehicle trips with 48% (53) entering and 52% (58) exiting.

Weekday PM Peak Hour of Generator

Available Data

Number of Studies:	3
Directional Distribution:	56 % Entering 44 % Exiting
Average Rate:	5.02
Standard Deviation:	2.31
R^2	-
Regression Equation:	Not Given

Regression Equation Check

Regression Equation?	No
Indep. Var. within Data Range?	-
20 points or $R^2 \geq 0.75$	-
Equation within data cluster?	-
Std. Dev. > 110% of Ave. Rate?	-
Use Regression Equation?	**No**

Estimate Based on Regression Equation

-
-
-
-

Estimate Based on Weighted Average Rate

T = 5.02 (X)
T = 5.02 (16.272)
T = 81.69
T = 82 vehicle trips with 56% (46) entering and 44% (36) exiting.

Trip Generation Calculation Sheet
Institute of Transportation Engineers (ITE)
Land Use Code (LUC) 826 - Specialty Retail

Average Vehicle Trip Ends per:	1000 Sq. Feet Gross Leasable Area
Independent Variable (X):	**16.272**

Saturday Daily

Available Data

Number of Studies:	3
Directional Distribution:	50 % Entering 50 % Exiting
Average Rate:	42.04
Standard Deviation:	13.97
R^2	-
Regression Equation:	Not Given

Regression Equation Check

Regression Equation?	No
Indep. Var. within Data Range?	-
20 points or $R^2 \geq 0.75$	-
Equation within data cluster?	-
Std. Dev. > 110% of Ave. Rate?	-
Use Regression Equation?	**No**

Estimate Based on Regression Equation

-
-
-
-

Estimate Based on Weighted Average Rate

T = 42.04 (X)
T = 42.04 (16.272)
T = 684.07
T = 684 vehicle trips with 50% (342) entering and 50% (342) exiting.

Saturday Midday Peak Hour

Available Data

Number of Studies:	3
Directional Distribution:	50 % Entering 50 % Exiting
Average Rate:	4.06
Standard Deviation:	-
R^2	-
Regression Equation:	Not Given

Regression Equation Check

Regression Equation?	No
Indep. Var. within Data Range?	-
20 points or $R^2 \geq 0.75$	-
Equation within data cluster?	-
Std. Dev. > 110% of Ave. Rate?	-
Use Regression Equation?	**No**

Estimate Based on Regression Equation

-
-
-
-

Estimate Based on Weighted Average Rate

T = 4.06 (X)
T = 4.06 (16.272)
T = 66.06
T = 66 vehicle trips with 50% (33) entering and 50% (33) exiting.

Note: Assumes same Directional Distribution as Saturday Daily, Average Rate based on Daily Rate factored to Peak Hour using Saturday Midday Peak Hour rate/Saturday Daily Rate (4.82/49.97) for ITE LUC 820

Trip Generation Calculation Sheet
Institute of Transportation Engineers (ITE)
Land Use Code (LUC) 310 - Hotel

Average Vehicle Trip Ends per:	Rooms
Independent Variable (X):	108

Average Weekday Daily

Available Data

Number of Studies:	10
Directional Distribution:	50 % Entering 50 % Exiting
Average Rate:	8.17
Standard Deviation:	3.38
R^2	0.98
Regression Equation:	T = 8.95(X)-373.16

Regression Equation Check

Regression Equation?	Yes
Indep. Var. within Data Range?	Yes
20 points or $R^2 \geq 0.75$	Yes
Equation within data cluster?	Yes
Std. Dev. > 110% of Ave. Rate?	No
Use Regression Equation?	**No**

Estimate Based on Regression Equation

T = 8.95(X)-373.16
T = 8.95(108)-373.16
T = 593.44
T = 593 vehicle trips with 50% (297) entering and 50% (296) exiting.

Estimate Based on Weighted Average Rate

T = 8.17 (X)
T = 8.17 (108)
T = 882.36
T = 882 vehicle trips with 50% (441) entering and 50% (441) exiting.

Weekday AM Peak Hour of Generator

Available Data

Number of Studies:	34
Directional Distribution:	54 % Entering 46 % Exiting
Average Rate:	0.52
Standard Deviation:	0.75
R^2	0.56
Regression Equation:	Ln(T) = 0.85*Ln(X)+0.12

Regression Equation Check

Regression Equation?	Yes
Indep. Var. within Data Range?	Yes
20 points or $R^2 \geq 0.75$	Yes
Equation within data cluster?	Yes
Std. Dev. > 110% of Ave. Rate?	Yes
Use Regression Equation?	**Yes**

Estimate Based on Regression Equation

Ln(T) = 0.85*Ln(X)+0.12
Ln(T) = 0.85*Ln(108)+0.12
T = 60.33
T = 60 vehicle trips with 54% (32) entering and 46% (28) exiting.

Estimate Based on Weighted Average Rate

T = 0.52 (X)
T = 0.52 (108)
T = 56.16
T = 56 vehicle trips with 54% (30) entering and 46% (26) exiting.

Weekday PM Peak Hour of Generator

Available Data

Number of Studies:	35
Directional Distribution:	58 % Entering 42 % Exiting
Average Rate:	0.61
Standard Deviation:	0.81
R^2	-
Regression Equation:	Not Given

Regression Equation Check

Regression Equation?	No
Indep. Var. within Data Range?	-
20 points or $R^2 \geq 0.75$	-
Equation within data cluster?	-
Std. Dev. > 110% of Ave. Rate?	-
Use Regression Equation?	**No**

Estimate Based on Regression Equation

-
-
-
-

Estimate Based on Weighted Average Rate

T = 0.61 (X)
T = 0.61 (108)
T = 65.88
T = 66 vehicle trips with 58% (38) entering and 42% (28) exiting.

Trip Generation Calculation Sheet
Institute of Transportation Engineers (ITE)
Land Use Code (LUC) 310 - Hotel

Average Vehicle Trip Ends per:	Rooms
Independent Variable (X):	108

Saturday Daily

Available Data

Number of Studies:	8
Directional Distribution:	50 % Entering 50 % Exiting
Average Rate:	8.19
Standard Deviation:	3.13
R^2	0.93
Regression Equation:	T = 9.62(X)-294.56

Regression Equation Check

Regression Equation?	Yes
Indep. Var. within Data Range?	Yes
20 points or $R^2 \geq 0.75$	Yes
Equation within data cluster?	Yes
Std. Dev. > 110% of Ave. Rate?	No
Use Regression Equation?	**No**

Estimate Based on Regression Equation

T = 9.62(X)-294.56
T = 9.62(108)-294.56
T = 744.4
T = 744 vehicle trips with 50% (372) entering and 50% (372) exiting.

Estimate Based on Weighted Average Rate

T = 8.19 (X)
T = 8.19 (108)
T = 884.52
T = 885 vehicle trips with 50% (443) entering and 50% (442) exiting.

Saturday Midday Peak Hour

Available Data

Number of Studies:	9
Directional Distribution:	56 % Entering 44 % Exiting
Average Rate:	0.72
Standard Deviation:	0.87
R^2	0.8
Regression Equation:	T = 0.69(X)+4.32

Regression Equation Check

Regression Equation?	Yes
Indep. Var. within Data Range?	Yes
20 points or $R^2 \geq 0.75$	Yes
Equation within data cluster?	Yes
Std. Dev. > 110% of Ave. Rate?	Yes
Use Regression Equation?	**Yes**

Estimate Based on Regression Equation

T = 0.69(X)+4.32
T = 0.69(108)+4.32
T = 78.84
T = 79 vehicle trips with 56% (44) entering and 44% (35) exiting.

Estimate Based on Weighted Average Rate

T = 0.72 (X)
T = 0.72 (108)
T = 77.76
T = 78 vehicle trips with 56% (44) entering and 44% (34) exiting.

Institute of Transportation Engineers (ITE)
Trip Generation, 9th Edition
Land Use Code (LUC) 310 - Hotel

Average Vehicle Trips Ends vs: Rooms
Independent Variable (X): 110

Average Weekday Daily

T = 8.17 * (X)
T = 8.17 * 110
T = 898.70
T = 900 vehicle trips
with 50% (450 vpd) entering and 50% (450 vpd) exiting.

Weekday Morning Peak Hour of Generator

Ln T = 0.85 Ln (X) +0.12
Ln T = 0.85 Ln 110 + (0.12)
Ln T = 4.12
T = 61.28
T = 61 vehicle trips
with 54% (33 vpd) entering and 46% (28 vpd) exiting.

Weekday Evening Peak Hour of Generator

T = 0.61 * (X)
T = 0.60 * 110
T = 67.10
T = 67 vehicle trips
with 58% (39 vpd) entering and 42% (28 vpd) exiting.

SATURDAY DAILY

T = 8.19 * (X)
T = 8.19 * 110
T = 900.90
T = 902 vehicle trips
with 50% (451 vpd) entering and 50% (451 vpd) exiting.

Saturday Midday Peak Hour of Generator

T = 0.69 * (X) + 4.32
T = 0.69 * 110 + 4.32
T = 80.22
T = 80 vehicle trips
with 56% (45 vph) entering and 44% (35 vph) exiting.

CCRTA BUS ROUTE, SCHEDULE AND FARE INFORMATION

Sealine Hyannis to Falmouth/Woods Hole

June 21 through September 1, 2014

RUNS 7 DAYS A WEEK

CCRTA Fares and Information

The CCRTA Fixed Route buses use an Electronic Farebox System. Visit capecodrta.org for more information.

	Adults and Youth	*60+ and People with disabilities***
One-way ride	$2	$1
One-way ride plus off-route trip (FLEX bus only)	$4	$2
Passes		
Day Pass	$6	$3
Monthly Pass (unlimited rides)	$60	$30
Transfers to other CCRTA buses	$2	$1

Exact fare only. Drivers will not make change.
Children age five and younger ride free.
**Persons holding Medicare and/or Transit Access Passes.

CCRTA buses have bike racks. Space is limited.

Pets: Service animals and pets in secured carriers are allowed to board.

CCRTA buses are accessible to people with disabilities.

CCRTA Special Services and Connections

DEMAND RESPONSE SERVICE: The CCRTA provides a public demand service that is door-to-door, ride by appointment transportation. This service is available to all Cape Cod residents and visitors for any purpose.

ADA Paratransit Service: Door-to-door shared-ride service for qualified individuals unable to use the CCRTA fixed route buses.

Please call 800.352.7155 to schedule your service.

◎ The Sealine connects with the Bourne Route in Mashpee, Barnstable Villager, Hyannis Trolley, H2O and the Sandwich Line at the Hyannis Transportation Center.

◎ The run on the timetable marked Friday Only connects with the CapeFLYER train.

◎ Connections

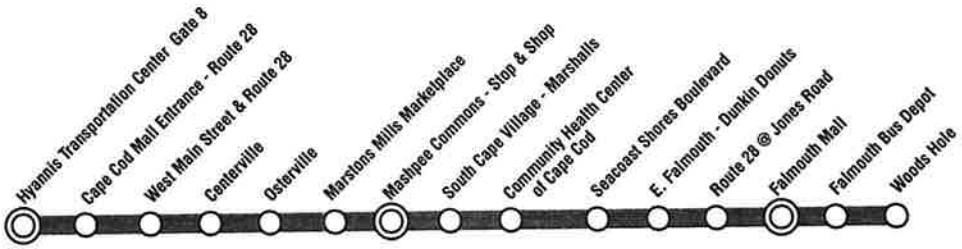
215 Iyannough Road
P.O. Box 1988
Hyannis, MA 02601
800.352.7155 Information
508.385.1430 Local Number
800.439.0183 TTY Number
www.capecodrta.org

Plan your Cape Cod travel on
www.google.com/transit

The Sealine services Route 28 from the Hyannis Transportation Center to Woods Hole.

Use the Sealine Hyannis-Falmouth/Woods Hole for:

- Barnstable Municipal Airport (on request)
- Barnstable Senior Center (on request)
- Boys & Girls Club, Mashpee (on request)
- Mashpee Health Center (on request)



Sealine Hyannis to Falmouth/Woods Hole

NextBus Stop #	Hyannis to Falmouth/Woods Hole	AM						PM									Friday Only
1	Hyannis Transportation Center	5:30*	6:30*	7:30*	8:30*	9:30	10:30	11:30	12:30	1:30	2:30	3:30	4:30	5:30	6:30	7:30	8:15
17	Cape Cod Mall Entrance - Route 28 ☐	5:35*	6:35*	7:35*	8:35*	9:35	10:35	11:35	12:35	1:35	2:35	3:35	4:35	5:35	6:35	7:35	8:20
18	West Main Street & Route 28	5:38*	6:38*	7:38*	8:38*	9:38	10:38	11:38	12:38	1:38	2:38	3:38	4:38	5:38	6:38	7:38	8:23
19	Centerville	--	--	7:44*	8:44*	9:44	10:44	11:44	12:44	1:44	2:44	3:44	4:44	5:44	6:44	7:44	8:29
20	Osterville	--	--	7:52*	8:52*	9:52	10:52	11:52	12:52	1:52	2:52	3:52	4:52	5:52	6:52	7:52	8:37
21	Marstons Mills Marketplace	5:45*	6:45*	8:03*	9:03*	10:03	11:03	12:03	1:03	2:03	3:03	4:03	5:03	6:03	7:03	8:03	8:48
22	Mashpee Commons Stop & Shop	5:54*	6:54*	8:12*	9:12*	10:12	11:12	12:12	1:12	2:12	3:12	4:12	5:12	6:12	7:12	8:12	8:57
23	South Cape Village - Marshalls	--	--	8:19*	9:19*	10:19	11:19	12:19	1:19	2:19	3:19	4:19	5:19	6:19	7:19	8:19	--
24	Community Health Center of Cape Cod ☐	--	--	8:23*	9:23*	10:23	11:23	12:23	1:23	2:23	3:23	4:23	5:23	6:23	7:23	8:23	--
140	Seacoast Shores Boulevard ☐	--	--	8:31*	9:31*	10:31	11:31	12:31	1:31	2:31	3:31	4:31	5:31	6:31	7:31	8:31	
25	East Falmouth - Dunkin Donuts ☐	6:02*	7:02*	8:34*	9:34*	10:34	11:34	12:34	1:34	2:34	3:34	4:34	5:34	6:34	7:34	8:34	--
28	Route 28 @ Jones Road	6:10*	7:10*	--	--	--	--	--	--	--	--	--	--	--	--	--	--
29	Falmouth Mall	--	--	8:40*	9:40*	10:40	11:40	12:40	1:40	2:40	3:40	4:40	5:40	6:40	7:40	8:40	--
30	Falmouth Bus Depot	6:16*	7:16*	8:48*	--	--	--	--	--	--	--	--	--	--	--	--	--
31	Woods Hole	6:26*	7:26*	8:59*	--	--	--	--	--	--	--	--	--	--	--	--	--

NextBus Stop #	Falmouth/Woods Hole to Hyannis	AM			PM											
31	Woods Hole	6:45*	8:30*	9:30	--	--	--	--	--	--	--	--	--	--	--	--
30	Falmouth Bus Depot	6:56*	8:42*	9:42	--	--	--	--	--	--	--	--	--	--	--	--
29	Falmouth Mall	7:02*	8:49*	9:49	10:49	11:49	12:49	1:49	2:49	3:49	4:49	5:49	6:49	7:49		
25	East Falmouth - Dunkin Donuts ☐	7:07*	8:54*	9:54	10:54	11:54	12:54	1:54	2:54	3:54	4:54	5:54	6:54	7:54		
140	Seacoast Shores Boulevard ☐	7:10*	8:57*	9:57	10:57	11:57	12:57	1:57	2:57	3:57	4:57	5:57	6:57	7:57		
24	Community Health Center of Cape Cod ☐	--	9:04*	10:04	11:04	12:04	1:04	2:04	3:04	4:04	5:04	6:04	7:04	8:04		
23	South Cape Village - Marshalls	7:20*	9:06*	10:06	11:06	12:06	1:06	2:06	3:06	4:06	5:06	6:06	7:06	8:06		
22	Mashpee Commons Stop & Shop	7:26*	9:15*	10:15	11:15	12:15	1:15	2:15	3:15	4:15	5:15	6:15	7:15	8:15		
21	Marstons Mills Marketplace	7:34*	9:24*	10:24	11:24	12:24	1:24	2:24	3:24	4:24	5:24	6:24	7:24	8:24		
20	Osterville	--	9:34*	10:34	11:34	12:34	1:34	2:34	3:34	4:34	5:34	6:34	7:34	8:34		
19	Centerville	--	9:42*	10:42	11:42	12:42	1:42	2:42	3:42	4:42	5:42	6:42	7:42	8:42		
18	West Main Street & Route 28	7:41*	9:49*	10:49	11:49	12:49	1:49	2:49	3:49	4:49	5:49	6:49	7:49	8:49		
17	Cape Cod Mall Entrance - Route 28 ☐	7:44*	9:53*	10:53	11:53	12:53	1:53	2:53	3:53	4:53	5:53	6:53	7:53	8:53		
1	Hyannis Transportation Center	7:47*	9:58*	10:58	11:58	12:58	1:58	2:58	3:58	4:58	5:58	6:58	7:58	8:58		

Sealine On Request:

To schedule a pick-up from one of the following On Request locations, please call CCRTA Customer Service at 800.352.7155.

- Barnstable Municipal Airport
- Barnstable Senior Center
- Boys & Girls Club, Mashpee
- Mashpee Medical Center

NextBus

NextBus is a service designed to help both you and your bus get to your stop at the same time.

1. **Call 508.683.0013** or visit capecodrta.org.
2. **Enter your bus stop number** when prompted (listed on all CCRTA bus schedules). Using satellite technology, NextBus finds your bus and tells you when you can expect it at your stop.
3. **Catch your bus** without spending a lot of time waiting.

LEGEND

- * No service at these times on Saturdays and Sundays.
- -- No service at this time.
- ☐ Bus Shelter

Service from the Falmouth Mall to Woods Hole is provided by the **WHOOSH Trolley** beginning at 9:45 am.

- The *Sealine* conveniently connects to: the *H2O* bus for travel east to Orleans; the *Barnstable Villager* to shopping malls, Cape Cod Community College, Barnstable Village and the Barnstable County Complex; the complimentary *Hyannis Trolley* to Main Street and the Steamship Authority; *The Bourne Run* for travel through Bourne; *The Sandwich Line* for travel through West Main Street (Hyannis), Centerville and Sandwich; also connects with inter-city buses.

MASSDOT CRASH RATE WORKSHEET

Moving Massachusetts Forward.
massDOT
Highway

INTERSECTION CRASH RATE WORKSHEET

CITY/TOWN : FALMOUTH COUNT DATE : 5/20/14

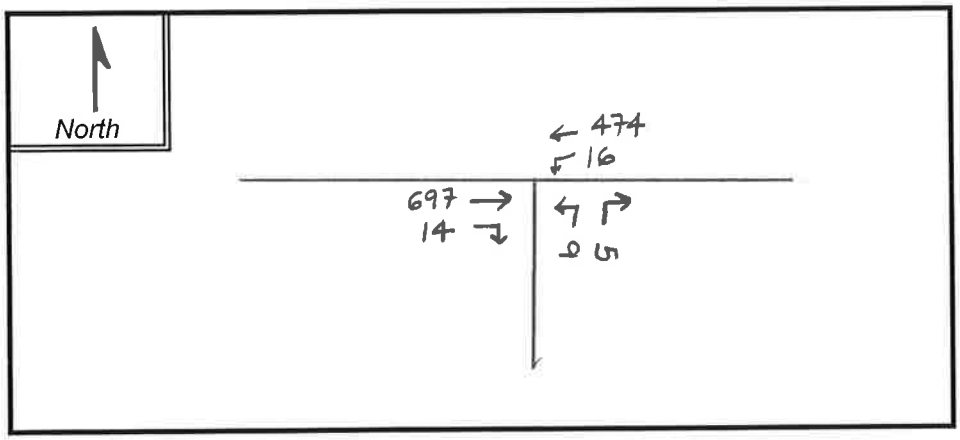
DISTRICT : 5 UNSIGNALIZED : X SIGNALIZED :

~ INTERSECTION DATA ~

MAJOR STREET : MAIN STREET (ROUTE 28)

MINOR STREET(S) : NYE ROAD

INTERSECTION DIAGRAM (Label Approaches)



PEAK HOUR VOLUMES

APPROACH :	1	2	3	4	5	Total Peak Hourly Approach Volume
DIRECTION :	MAIN ST. EB	MAIN ST. WB	NYE ROAD NB			
PEAK HOURLY VOLUMES (AM/PM) :	711	490	14			1,215

" K " FACTOR : 0.09

INTERSECTION ADT (**V**) = TOTAL DAILY APPROACH VOLUME : 13,500

TOTAL # OF CRASHES : 3

OF YEARS : 3

AVERAGE # OF CRASHES PER YEAR (**A**) : 1.0

CRASH RATE CALCULATION : 0.20

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

Comments : THE CALCULATED CRASH RATE IS BELOW BOTH THE STATEWIDE (0.60) AND DISTRICT 5 (0.58) AVE. CRASH RATE

Project Title & Date: EXTENDED STAY HOTEL - 556 MAIN STREET - FALMOUTH, MA

Vanasse & Associates, Inc.
Transportation Engineers & Planners

10 New England Business Center Drive
Suite 314
Andover, MA 01810-1066
Office 978-474-8800
Fax 978-688-6508
Web: www.rdva.com

Ref: 6668

November 20, 2014

Mr. Glenn Cannon, P.E.
Director of Technical Services
Cape Cod Commission
3225 Main Street, P.O. Box 226
Barnstable, MA 02630

Re: Limited Development of Regional Impact Application
Springhill Suites by Marriot - 556 Main Street
Falmouth, Massachusetts

Dear Glenn:

Vanasse & Associates, Inc. (VAI) is providing supplemental information in support of the *Limited Development of Regional Impact Application* dated July 11, 2014 and revised November 6, 2014 (the "Application") for the proposed Springhill Suites by Marriot Hotel to be located at 556 Main Street in Falmouth, Massachusetts (hereafter referred to as the "Project"). Specifically, VAI is providing updated trip-generation calculations for the existing buildings that currently occupy the Project site.

As presented in the Application, the Project site is currently occupied by 19,000± square feet (sf) of commercial buildings that include an antique store and ancillary storage and warehouse space; however, the trip-generation calculations that were presented in the Application reflected 16,272 sf of existing commerical space. In order to correct this discrepancy, the traffic characteristics of the existing uses that were presened in Table 1 of the Transportation component of the Application were revised to reflect 19,000 sf of commercial space using Institute of Transportation Engineers (ITE)[1] Land Use Code (LUC) 826, *Specialty Retail Center*,[2] consitent with the methodology presented therein. The traffic characteristics of the Project (extended stay hotel) did not change from the values that were presented in the Application. Table 1R provides an updated summary and comparison of the traffic characteristics of the Proejct to those of the existing uses that occupy the Proejct site (19,000± sf of commercial space conisting of an antique store and ancillary storage and warehouse space)

[1] *Trip Generation*, 9th Edition; Institute of Transportation Engineers; Washington, DC; 2012.
[2] ITE LUC 820, *Shopping Center*, was also reviewed for use in developing the traffic characteristics of the existing uses and was determined to result in similar or higher trip estimates.

Table 1R
566 MAIN STREET REDEVELOPMENT PROJECT
EXISTING AND PROPOSED TRAFFIC VOLUME COMPARISON

	Vehicle Trips		
Time Period/Direction	(A) Proposed Extended Stay Hotel (110 Rooms)[a]	(B) Existing Uses[b]	(C = A - B) Difference
Average Weekday Daily:			
Entering	445	421	
Exiting	445	421	
Total	900	842	+58
Weekday Morning Peak-Hour of Generator:			
Entering	33	62	
Exiting	28	68	
Total	61	130	-69
Weekday Evening Peak-Hour of Generator:			
Entering	39	53	
Exiting	28	42	
Total	67	95	-28
Saturday Daily:			
Entering	451	400	
Exiting	451	400	
Total	902	800	+102
Saturday Midday Peak-Hour:			
Entering	45	39	
Exiting	35	38	
Total	80	77	+3

[a]Based on ITE LUC 310, *Hotel*; 110 rooms.
[b]Based on ITE LUC 826, *Specialty Retail*; 19,000 sf.

As can be seen in Table 1R, the redevelopment of the Project site as an extended stay hotel (Springhill Suites by Marriot) is expected to result in 58 additional vehicle trips on an average weekday (two-way, 24-hour volume) when compared to the projected traffic characteristics of the existing uses that occupy the Project site, with 69 fewer vehicle trips predicted during the weekday morning peak-hour and 28 fewer vehicle trips predicted during the weekday evening peak-hour. On a Saturday, the redevelopment of the Project site is expected to result in 102 additional vehicle trips, with 3 additional vehicle trips predicted during the Saturday midday peak-hour. The detailed trip-generation calculations are attached.

If you should have any questions regarding this supplemental information, please feel free to contact me.

Sincerely,

VANASSE & ASSOCIATES, INC.

Jeffrey S. Dirk, P.E., PTOE, FITE
Principal

JSD/jsd

Attachments

cc: R. Walker – Falmouth Hospitality, LLC (via email)
J. Peznola, P.E.-Hancock Associates (via email)
BG, File

ATTACHMENT

TRIP-GENERATION CALCULATIONS

TRIP-GENERATION CALCULATIONS

Institute of Transportation Engineers (ITE)
*Trip Generation, 9*th Edition
Land Use Code (LUC) 826 - Specialty Retail Center

Average Vehicle Trips Ends vs: 1,000 Sq. Feet Gross Floor Area
Independent Variable (X): 19.000

AVERAGE WEEKDAY DAILY
T = 44.32 * (X)
T = 44.32 * 19.000
T = 842.08
T = 842 vehicle trips
with 50% (421 vpd) entering and 50% (421 vpd) exiting.

WEEKDAY MORNING PEAK HOUR OF GENERATOR
T = 6.84 * (X)
T = 6.84 * 19.000
T = 129.96
T = 130 vehicle trips
with 48% (62 vph) entering and 52% (68 vph) exiting.

WEEKDAY EVENING PEAK HOUR OF GENERATOR
T = 5.02 * (X)
T = 5.02 * 19.000
T = 95.38
T = 95 vehicle trips
with 56% (53 vph) entering and 44% (42 vph) exiting.

SATURDAY DAILY
T = 42.04 * (X)
T = 42.04 * 19.000
T = 798.76
T = 800 vehicle trips
with 50% (400 vpd) entering and 50% (400 vpd) exiting.

SATURDAY MIDDAY PEAK HOUR

$$\frac{\text{ITE LUC 820 Saturday Midday Trip Rate}}{\text{ITE LUC 820 Saturday Daily Trip Rate}} = \frac{\text{ITE LUC 826 Saturday Midday Trip Rate}}{\text{ITE LUC 826 Saturday Daily Trip Rate}}$$

$$\frac{4.82}{49.97} = \frac{(Y)}{42.04} \qquad Y = 4.0550891$$

T = Y * 19.000
T = 77
T = 77 vehicle trips
with 5% (39 vph) entering and 50% (38 vph) exiting.
(same distribution split as ITE LUC 820 during the Saturday midday peak hour of generator)

Institute of Transportation Engineers (ITE)
Trip Generation, 9th Edition
Land Use Code (LUC) 310 - Hotel

Average Vehicle Trips Ends vs: Rooms
Independent Variable (X): 110

Average Weekday Daily

T = 8.17 * (X)
T = 8.17 * 110
T = 898.70
T = 900 vehicle trips
with 50% (450 vpd) entering and 50% (450 vpd) exiting.

Weekday Morning Peak Hour of Generator

Ln T = 0.85 Ln (X) +0.12
Ln T = 0.85 Ln 110 + (0.12)
Ln T = 4.12
T = 61.28
T = 61 vehicle trips
with 54% (33 vpd) entering and 46% (28 vpd) exiting.

Weekday Evening Peak Hour of Generator

T = 0.61 * (X)
T = 0.60 * 110
T = 67.10
T = 67 vehicle trips
with 58% (39 vpd) entering and 42% (28 vpd) exiting.

SATURDAY DAILY

T = 8.19 * (X)
T = 8.19 * 110
T = 900.90
T = 902 vehicle trips
with 50% (451 vpd) entering and 50% (451 vpd) exiting.

Saturday Midday Peak Hour of Generator

T = 0.69 * (X) + 4.32
T = 0.69 * 110 + 4.32
T = 80.22
T = 80 vehicle trips
with 56% (45 vph) entering and 44% (35 vph) exiting.

Vanasse & Associates, Inc.
Transportation Engineers & Planners

10 New England Business Center Drive
Suite 314
Andover, MA 01810-1066
Office 978-474-8800
Fax 978-688-6508
Web: www.rdva.com

Ref: 6668

November 21, 2014

Mr. Glenn Cannon, P.E.
Director of Technical Services
Cape Cod Commission
3225 Main Street, P.O. Box 226
Barnstable, MA 02630

Re: Limited Development of Regional Impact Application
Springhill Suites by Marriot - 556 Main Street
Falmouth, Massachusetts

Dear Glenn:

Vanasse & Associates, Inc. (VAI) is providing supplemental information concerning the elements of the planned pedestrian access improvements that are to be completed in conjunction with the proposed Springhill Suites by Marriot Hotel to be located at 556 Main Street in Falmouth, Massachusetts (hereafter referred to as the "Project"). This information is being provided as a supplement to the Transportation component of the Limited Development of Regional Impact Application dated July 11, 2014 and revised November 6, 2014 (the "Application") submitted in support of the Project.

As detailed in the Application, the Project proponent has committed to the implementation of specific pedestrian safety improvements along Main Street and Nye Road in order to facilitate the safe and efficient conveyance of pedestrians to the Project site from these roadways and the proposed overflow parking lot that is to be constructed off Nye Road. By way of specificity, these improvements will include the following measures subject to receipt of all necessary rights, permits and approvals:

- Reconstruct sidewalks along the Project site frontage on Main Street and along the west side of Nye Road between Main Street and the overflow parking lot as necessary to ensure that these facilities are compliant with the applicable standards of the Americans with Disables Act (ADA) and those of the Massachusetts Architectural Access Board (MAAB).

- Reconstruct the wheelchair ramps serving the crosswalks at the Main Street/Nye Road intersection as necessary to meet ADA and MAAB standards.

- Reapply the crosswalk markings at the Main Street/Nye Road intersection to improve visibility and the retroreflective properties of the crossings.

- Replace the pedestrian crossing warring signs on Main Street at and in advance of the crossings at the Main Street/Nye Road intersection, and install high visibility reflective tape on the sign posts for the pedestrian crossing warning signs at the crossing.

- Install a STOP-sign and marked STOP-line on the Nye Road approach to Main Street in order to define the stopping point for vehicles in advance of the crosswalk.

If you should have any questions regarding this supplemental information, please feel free to contact me.

Sincerely,

VANASSE & ASSOCIATES, INC.

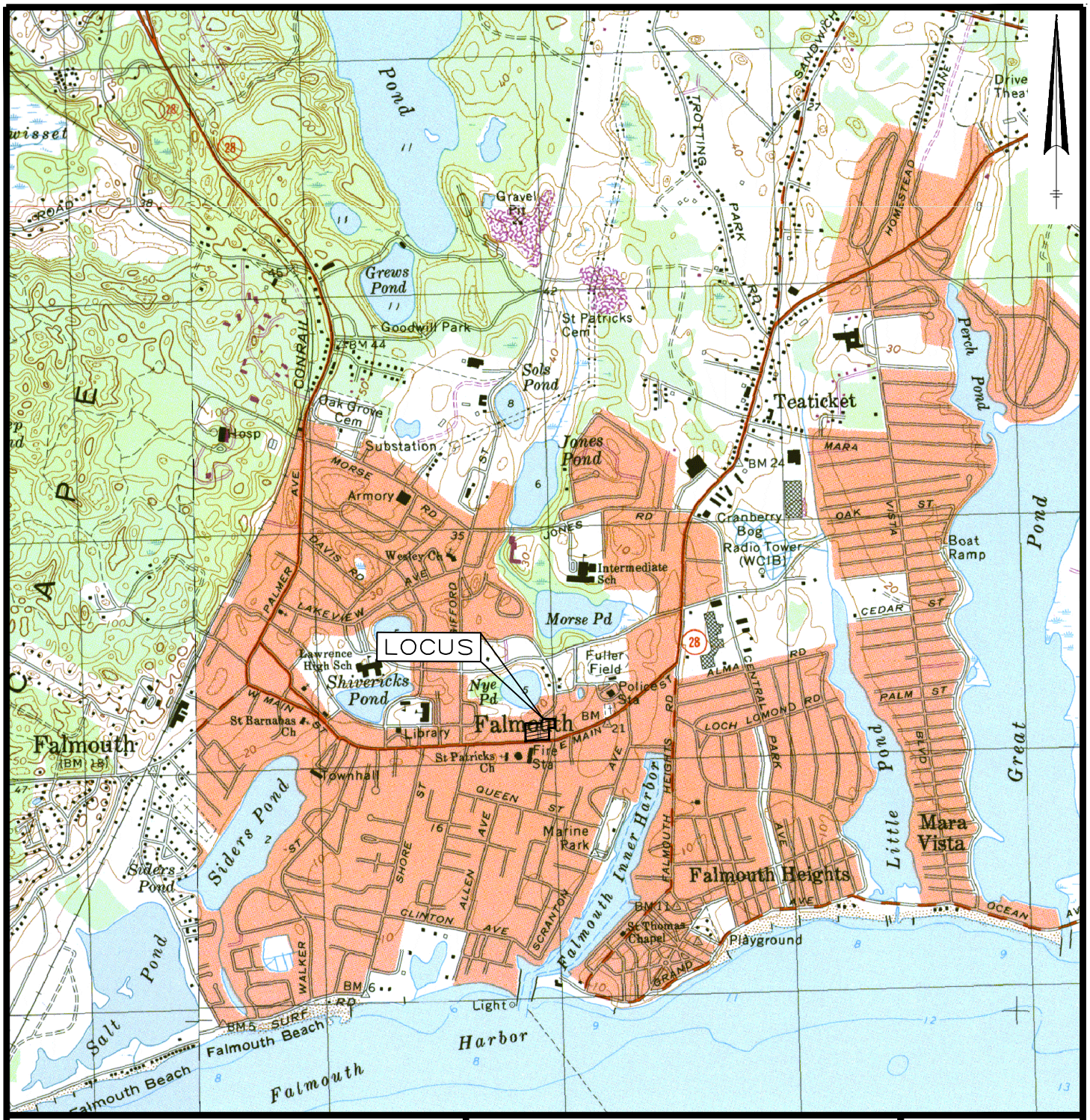
Jeffrey S. Dirk, P.E., PTOE, FITE
Principal

JSD/jsd

cc: R. Walker – Falmouth Hospitality, LLC (via email)
J. Peznola, P.E.-Hancock Associates (via email)
BG, File

Appendix 4: Required Figures

- USGS Locus Map
- Water Resource Classification Maps 1 and 2
- FEMA Flood Plain Map
- NHESP Map
- SNRA Map
- Historic District Map
- MHC Inventory List
- Business Redevelopment District Zoning Map
- Building Areas Exhibit



LOCUS MAP

556 MAIN STREET
FALMOUTH, MA

HANCOCK ASSOCIATES
185 CENTRE STREET, DANVERS, MA. 01923
VOICE (978) 777-3050, FAX (978) 774-7816

DATE: 04/25/14
SCALE: 1"=2,000'
DESIGN: KAC
DRAWN: KAC
LAYOUT: LOCUS
JOB NO.: 17791

PATH: F:\Civil 3D Projects\17791\DWG\ PLOT DATE: Apr 25, 2014 DWG: 17791title.dwg

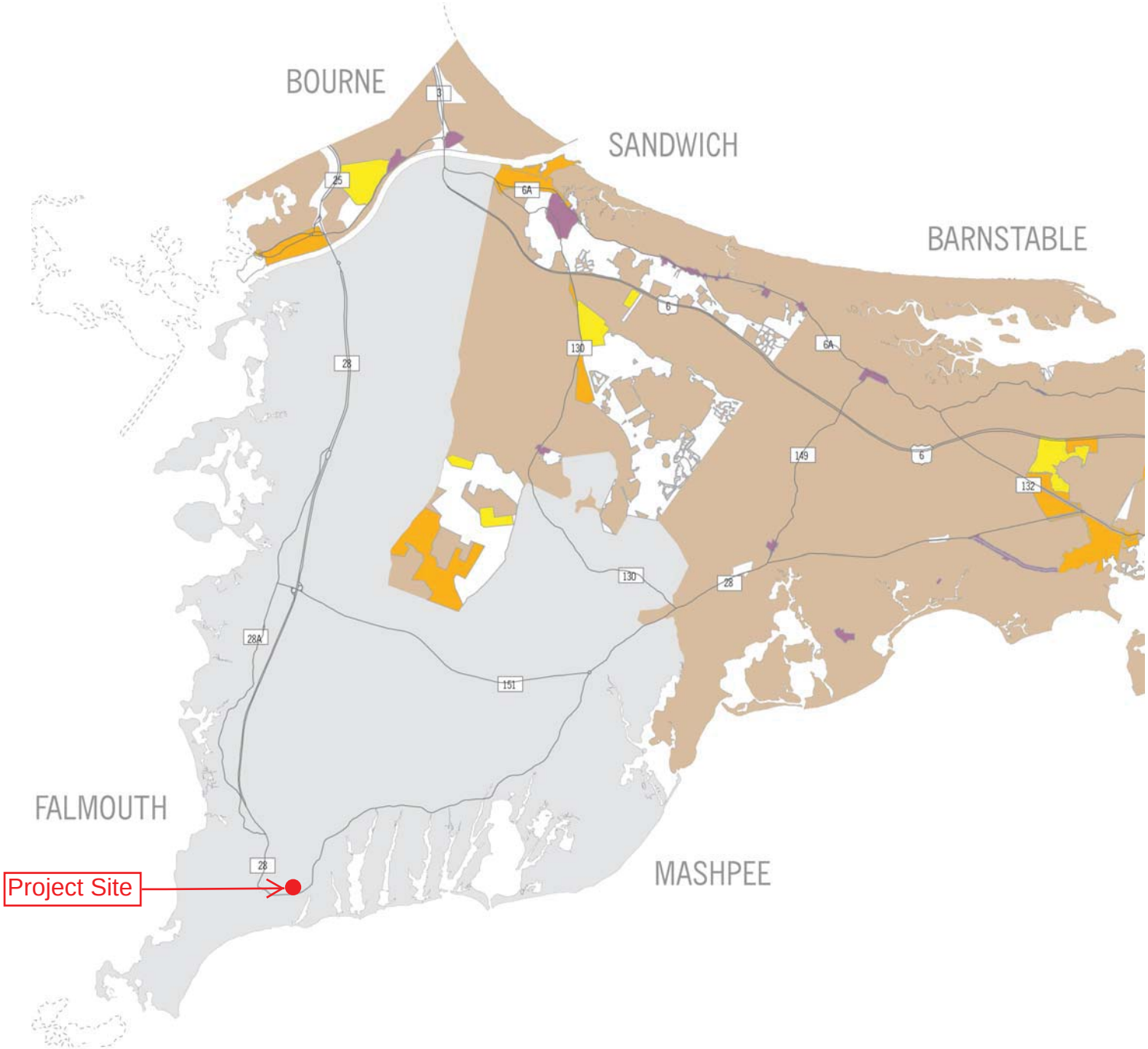
Map LU1a

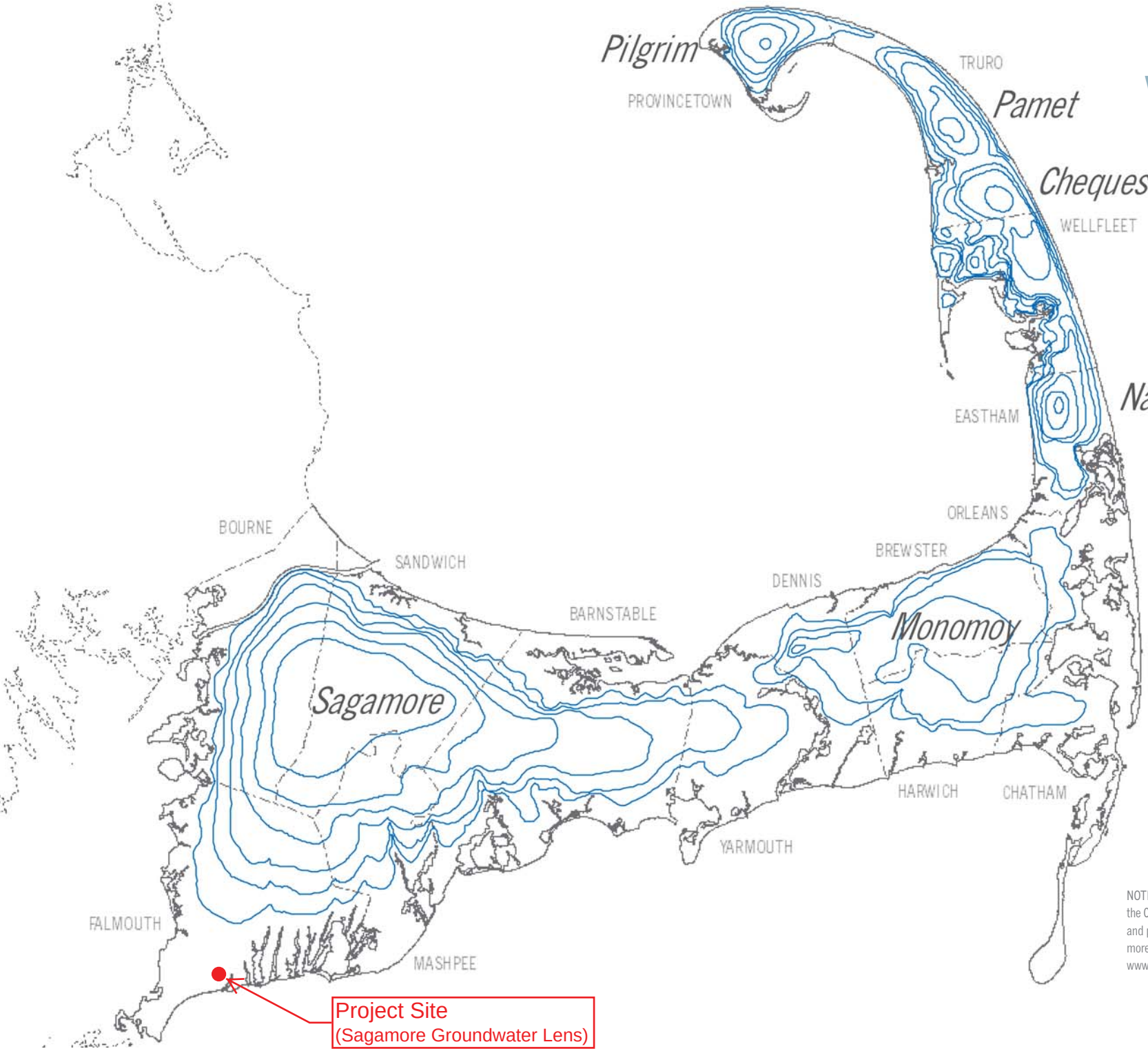
Upper and Mid Cape: Regional Land Use Vision Map

As of March 4, 2011

The Regional Land Use Vision Map for the Upper and Mid Cape shows target areas for growth. (Some towns have not yet completed the regional land use vision mapping process.) Focusing growth in identified areas and minimizing it in others will help protect Cape Cod's natural resources and traditional character.

- Economic Center
- Industrial/Service Trade Area
- Village
- Resource Protection Area
- Areas Yet to Complete Mapping
- Other



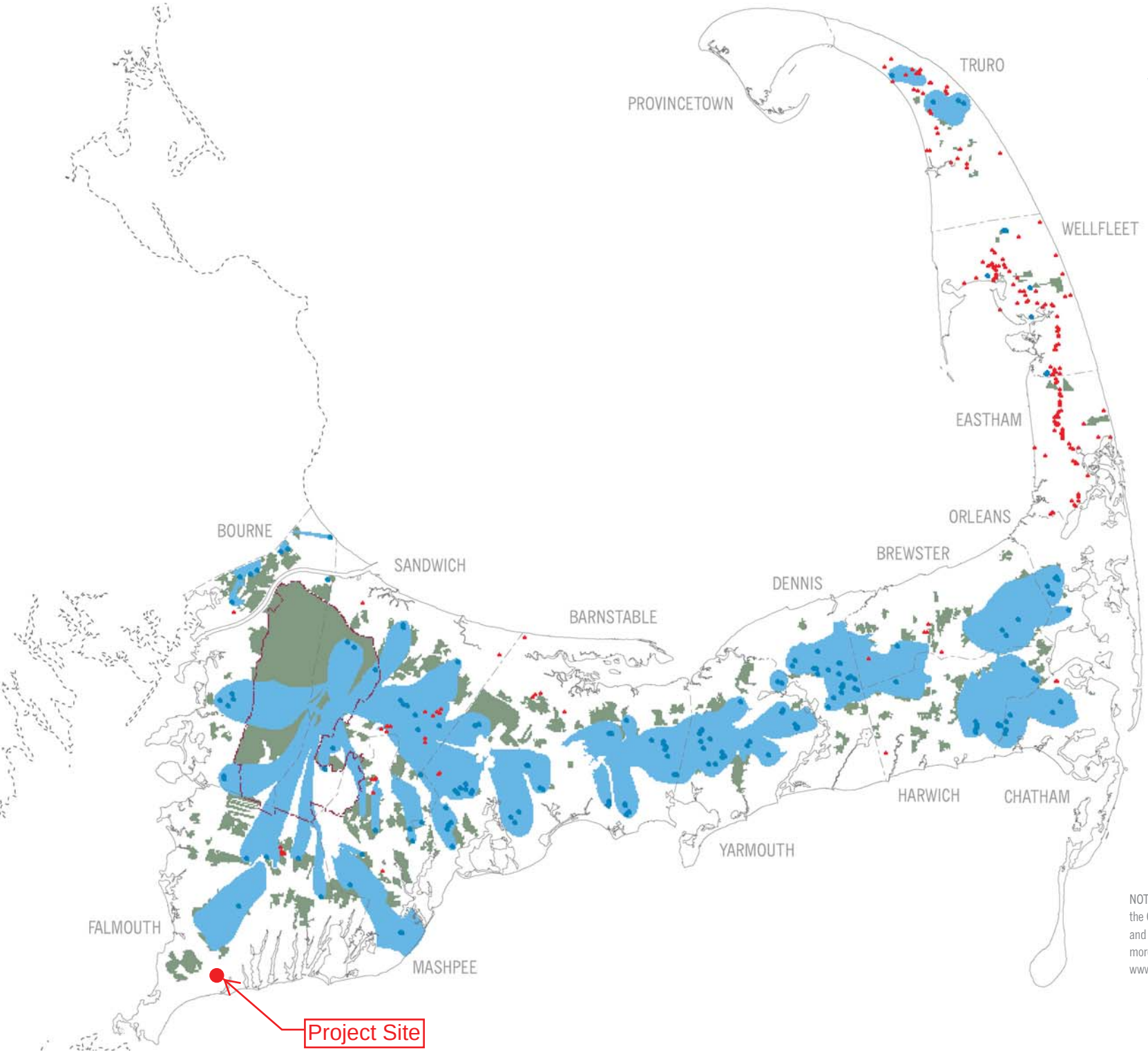


Groundwater Lenses

This map illustrates the six groundwater lenses (Sagamore, Monomoy, Nauset, Chequesset, Pamet, and Pilgrim) that comprise Cape Cod's sole source aquifer. The underground topography influences groundwater flow direction and speed. The water table contour lines indicate the height of groundwater above sea level.

Water Table Contour

NOTE: All maps in the Regional Planning section of the Cape Cod Regional Policy Plan are for illustration and planning purposes only. They may be viewed in more detail online: www.capecodcommission.org/regionalplans/RPP/



Drinking Water Resources

As of June 18, 2010

The Drinking Water Resources map illustrates the location of Cape Cod's existing Wellhead Protection Areas and Potential Public Water Supply Areas. These areas provide the majority of Cape Cod's drinking water. Monitoring and reducing groundwater pollution levels is critical to ensuring their future use.

- Public Water Supply Wellhead Protection Area (Zone II)
- Potential Public Water Supply Area
- Public Supply Well
- Small Volume Well
- Mass. Military Reservation

NOTE: All maps in the Regional Planning section of the Cape Cod Regional Policy Plan are for illustration and planning purposes only. They may be viewed in more detail online: www.capecodcommission.org/regionalplans/RPP/

APPROXIMATE SCALE

500 0 500 FEET

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

TOWN OF
FALMOUTH, MASSACHUSETTS
BARNSTABLE COUNTY

PANEL 11 OF 13
(SEE MAP INDEX FOR PANELS NOT PRINTED)

COMMUNITY-PANEL NUMBER
255211 0011 F

MAP REVISED:
MAY 15, 1986

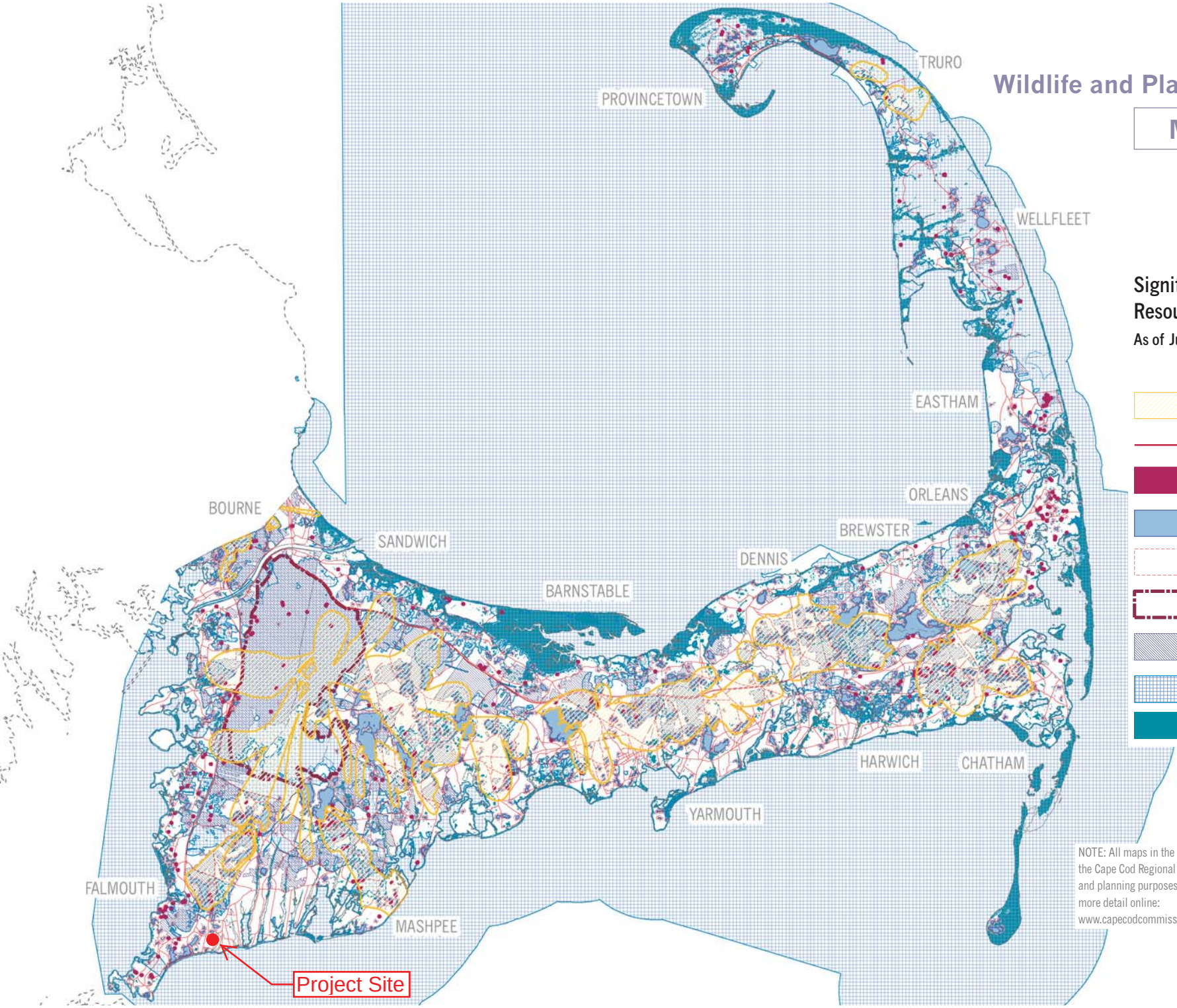
Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

NHESP
Project Site
NHESP Priority Habitats of Rare Species
NHESP Estimated Habitats of Rare Wildlife
Tax Parcels for Query
Detailed Features
Tax Parcels
Structures
Main Street
Dillingham Avenue
Shivericks Pond
Nye Pond
Falmouth Fire Rescue Headquarters
Falmouth Police Dept.
Falmouth Harbor
Robbins Road
Falmouth Heights Road
Jericho Path
Nye Road
Savery Lane
Wright Way
Queen Street
Meribah Lane
Handy Lane
Linden Road
Pelican Lane
Shore Street
Gifford Street
Occum Lane
Boxwood Circle
Haddon Avenue
Library Lane
Academy Lane
Bates Road
Elm Arch Way
Morse Pond Road
Lawrence School
Mullen-Hall School
50 m
100 ft
N

Wildlife and Plant Habitat

Map SNRA



Significant Natural Resource Areas

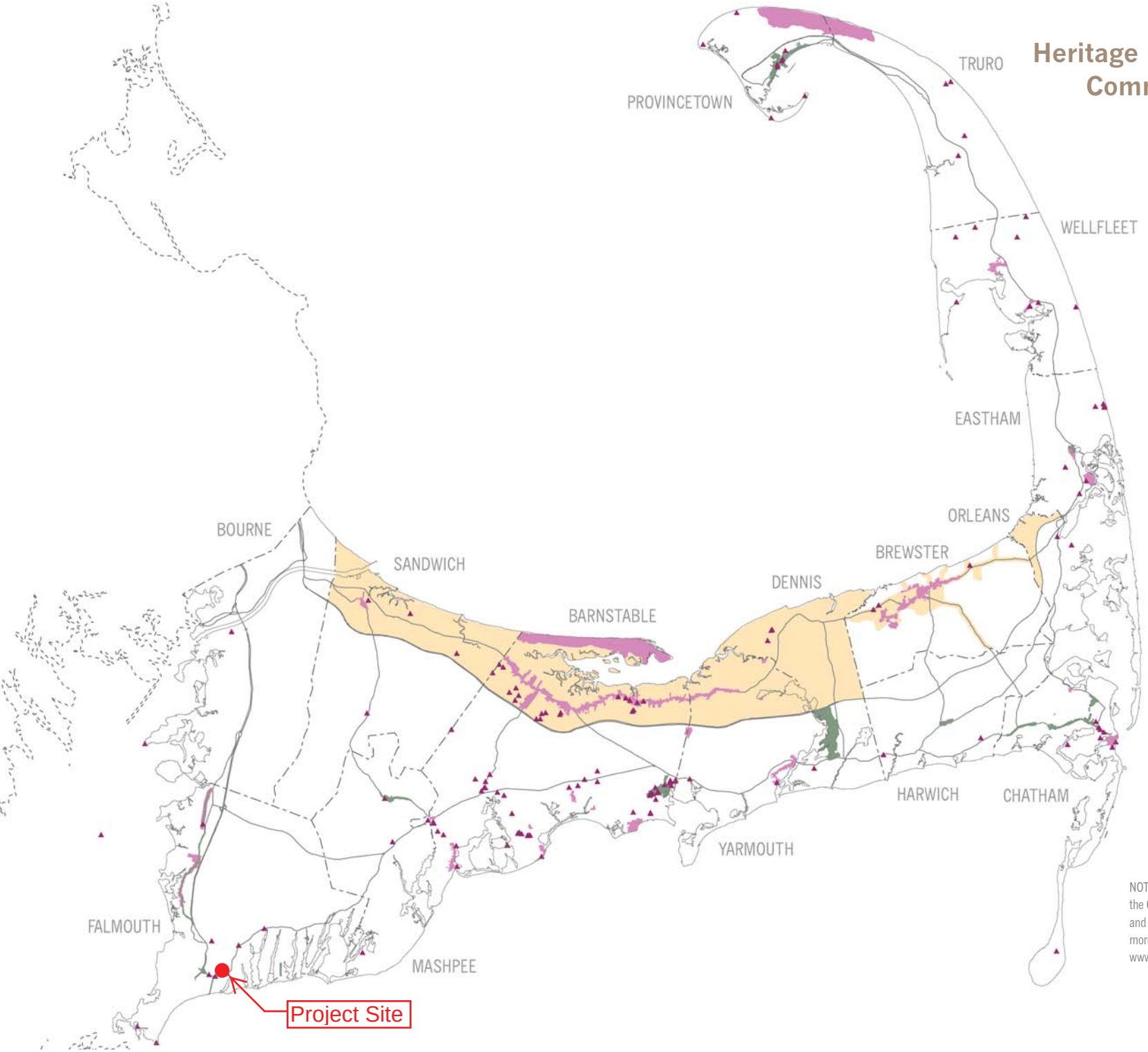
As of June 18, 2010

- Current DEP Zone II (March 30, 2010)
- Major Roads
- 350-foot Buffer of Certified Vernal Pool
- Water Body
- 300-foot Buffer from Pond Shore
- Massachusetts Military Reservation
- Potential Public Water Supply Area (PLAAP)
- Priority Habitats (NHESP 2008)
- DEP Wetland Area

NOTE: All maps in the Regional Planning section of the Cape Cod Regional Policy Plan are for illustration and planning purposes only. They may be viewed in more detail online: www.capecodcommission.org/regionalplans/RPP/

Heritage Preservation and Community Character

Map HPCC1



Historic Resources

Significant historic buildings in areas under high development pressures are in danger of being demolished. This map shows the Cape Cod properties that receive some protection through historic district review at the town or county level. Note: If a Local Historic District is also a National Register Historic District, the Local Historic District alone is visible on this map.

- National Register Historic Properties
- Local Historic District
- National Register Historic Districts
- Old King's Highway Regional Historic District

NOTE: All maps in the Regional Planning section of the Cape Cod Regional Policy Plan are for illustration and planning purposes only. They may be viewed in more detail online: www.capecodcommission.org/regionalplans/RPP/

Massachusetts Cultural Resource Informati

MACRIS

MHC Home | MACRIS Home

Results

Get Results in Report Format

PDF Spreadsheet

Below are the results of your search, using the following search criteria:

Town(s): Falmouth
Street No: 556
Street Name: main
Resource Type(s): Area, Building, Burial Ground, Object, Structure

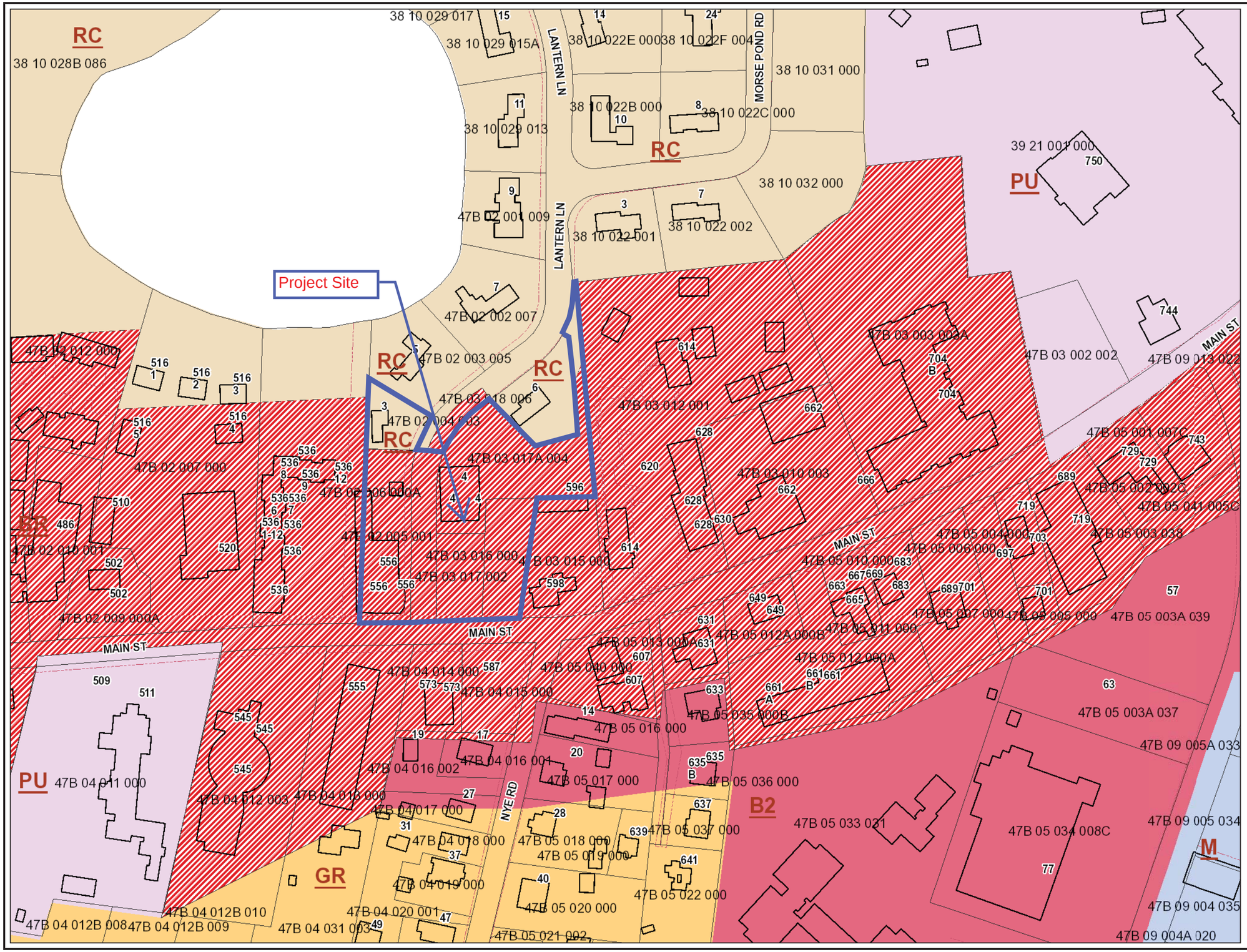
For more information about this page and how to use it, click here

No Results Found.

New Search | New Search – Same Town(s) | Previous

MHC Home | MACRIS Home

556 Main Street

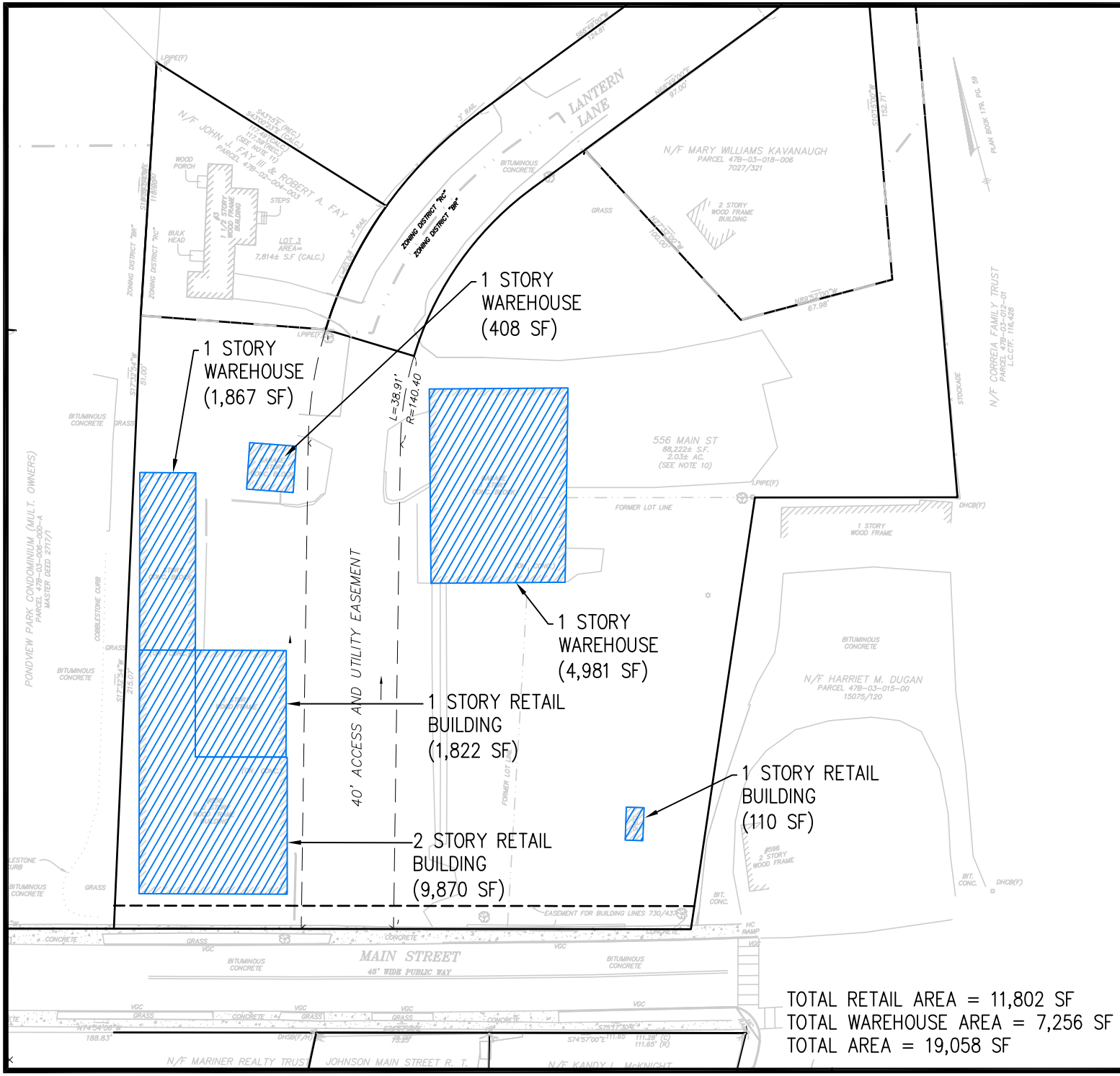


Disclaimer
The Town of Falmouth makes no claims,no representations and no warranties,
express or implied, concerning the validity (express or implied), the reliability or
the accuracy of the GIS data and/or GIS products furnished by the Town, including
the implied validity of any uses of such data.Parcel lines are graphic representations only.
Planimetric features derived from 3/05 Aerials.
Prepared by Falmouth G.I.S.

1" = 145 ft

Town of Falmouth

December 3, 2014



Prepared for:

556 Main Street

Falmouth, MA

HANCOCK ASSOCIATES

Civil Engineers
Land Surveyors
Wetland Scientists

185 CENTRE STREET
DANVERS, MA. 01923
VOICE (978) 777-3050
FAX (978) 774-7816

BUILDING AREAS EXHIBIT

DATE:	09/12/14
DWG:	17791building exhibit.dwg
SCALE:	1"=60'
DESIGN:	KAC
LAYOUT:	ZA (3)
DRAWN:	KAC
JOB NO.:	17791

Appendix 5: Stormwater Management Report

Civil Engineering Land Surveying Environmental Consulting Landscape Architecture

HANCOCK ASSOCIATES

Stormwater Report
In Support of

Site Plan Review Filing
for
556 Main Street
Falmouth, MA

Prepared By:
Hancock Associates
#17791

Prepared For:
Ryan Development, LLC

May, 2014
Revised September 15, 2014

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Standard 7: Redevelopment

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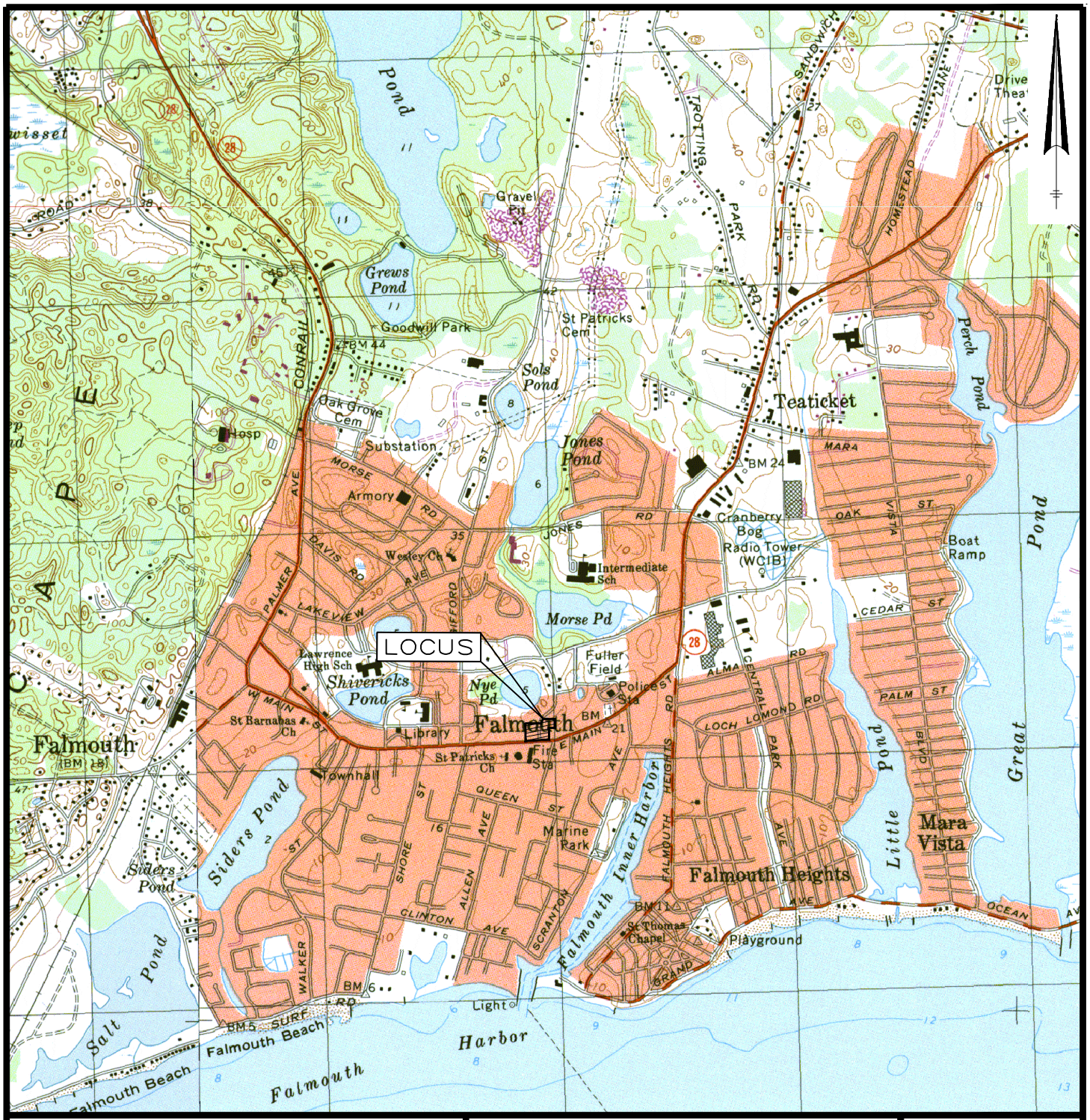
Appendix

I. NRCS Soils Map
II. Existing and Proposed Drainage Figures
III. Hydrocad Output
IV. Soil Evaluation for Drainage Design
V. ACF Environmental Product Information
VI. Operations and Maintenance Log



LOCUS MAP

556 MAIN STREET
FALMOUTH, MA

HANCOCK ASSOCIATES
185 CENTRE STREET, DANVERS, MA. 01923
VOICE (978) 777-3050, FAX (978) 774-7816

DATE: 04/25/14
SCALE: 1"=2,000'
DESIGN: KAC
DRAWN: KAC
LAYOUT: LOCUS
JOB NO.: 17791

PATH: F:\Civil 3D Projects\17791\DWG\ PLOT DATE: Apr 25, 2014 DWG: 17791title.dwg

Introduction

Falmouth Hospitality, LLC proposes to construct a hotel at 556 Main Street in Falmouth, MA. The hotel will be divided into two buildings with an upper level connector and will have a total of 110 guest rooms. Associated site improvements will include paved parking, driveway, recreation, and pedestrian areas, landscaped areas, utilities, and a stormwater management system. In the existing conditions, the project area consists of commercial and accessory buildings, a gravel parking area, paved vehicular and pedestrian areas, landscaped and wooded areas, and associated utilities. The project area consists of 2.20 acres and is bounded by Main Street to the South, commercial properties to the east and west, and residential properties to the north. Elevations on-site range from 12' at the northeast corner to 18' at the northern corner.

The proposed site and stormwater management system was designed to meet the Stormwater Management Standards described in the Massachusetts Stormwater Handbook. The following narrative describes the system's compliance with these standards.

Standard 1: No New Untreated Discharges

The Massachusetts Stormwater Handbook states that no new stormwater conveyances may discharge untreated stormwater directly to or cause erosions in wetlands or waters of the Commonwealth. The project will have one discharge point from the drainage system located at the northeast corner of the site. Stormwater outflow from the subsurface R-Tanks will flow out of a flared-end section with a rip-rap pad to prevent erosion. Stormwater discharge will be treated for at least 80% TSS removal.

Standard 2: Peak Rate Attenuation

The Massachusetts Stormwater Handbook states that stormwater management systems shall be designed so that post-development peak discharge rates do not exceed pre-development peak discharge rates. A summary of the existing and proposed discharge rates follows. The proposed condition discharge rates of runoff are at or below the existing rates to the same discharge points. Please see the attached "Existing Drainage Areas" and "Proposed Drainage Areas" figures (Appendix II) and Hydrocad summary (Appendix III) for more information.

For the purpose of these calculations the following assumptions were made:

- The project property lines were used to delineate watershed boundaries.
- The same total watershed area of the drainage areas is used to compare the existing and proposed conditions.
- The Natural Resources Conservation Service (NRCS) Web Soil Survey of Barnstable County defines soils in the project area as
  - 602, Urban Land (Hydrologic Soil Group not rated)
  - 265A, Enfield Silt Loam, 0 to 3 percent slopes (Hydrologic Soil Group B)
  - 265B, Enfield Silt Loam, 3 to 8 percent slopes (Hydrologic Soil Group B)

  For the purpose of these calculations, soils within the drainage area are assumed to be Hydrologic Soil Group B. Please see the attached NRCS Web Soil Survey summary (Appendix I).

Five drainage areas have been modeled to represent the existing conditions:

- Drainage Area EX1 consists of roof area, paved pedestrian and vehicular areas, gravel parking area, and landscaped areas. Stormwater runoff from EX1 drains over-land to a drainage structure located in the central portion of the site. Ponding over this structure is represented as pond 1P on the attached Hydrocad summary.
- Drainage Area EX2 consists of roof area, paved pedestrian and vehicular areas, gravel areas, and landscaped areas. Stormwater runoff from EX2 drains to the northern and western property lines which are assumed to be discharge point DP1 for the purpose of these calculations.
- Drainage Area EX3 consists of landscaped areas. Stormwater runoff from EX3 drains to the northern and eastern property line which is assumed to be discharge point DP3 for the purpose of these calculations.
- Drainage Area EX4 consists of roof area, paved pedestrian area, and landscaped areas. Stormwater runoff from EX4 drains to the existing drainage system in Main Street which is assumed to be discharge point DP4 for the purpose of these calculations.

In the proposed condition a stormwater detention system has been designed to collect, treat, and mitigate the rates of stormwater runoff from the project site to at or below the existing condition. This system will include a surface drains and networks of pipes, stormwater treatment devices, and a subsurface system of chambers. Eleven drainage areas have been modeled to represent the proposed condition:

- Drainage Area PR1A will consist of pedestrian and vehicular paved areas, and landscaped areas. Stormwater runoff from PR1A will drain via a network of pipes and treatment devices to a subsurface system of R-Tanks. Overflow from the R-Tank system will drain to the northeast property line which is assumed to be discharge point DP1 for the purpose of these calculations.
- Drainage Area PR1B will consist of paved pedestrian and vehicular areas and landscaped areas. Stormwater runoff from PR1B will drain via a network of pipes and treatment devices to the subsurface system of R-Tanks described under PR1A. Overflow from the R-Tank system will drain to the northeast property line (discharge point DP1).
- Drainage Area PR1C will consist of pedestrian paved areas and landscaped areas. Stormwater runoff from PR1C will drain via a network of pipes to the subsurface system of R-Tanks described under PR1A. Overflow from the R-Tank system will drain to the northeast property line (discharge point DP1).
- Drainage Area PR1D will consist of landscaped areas. Stormwater runoff will drain to the northeast property line (discharge point DP1).
- Drainage Area PR1E will consist of roof area and landscaped areas. Stormwater runoff from PR1E will drain via a network of pipes to the subsurface system of R-Tanks described under PR1A. Overflow from the R-Tank system will drain to the northeast property line (discharge point DP1).
- Drainage Area PR1F will consist of roof area and landscaped areas. Stormwater runoff from PR1E will drain via a network of pipes to the subsurface system of R-Tanks described under PR1A. Overflow from the R-Tank system will drain to the northeast property line (discharge point DP1).
- Drainage Area PR1F will consist of roof area and landscaped areas. Stormwater runoff from PR1E will drain via a network of pipes to the subsurface system of R-Tanks described under PR1A. Overflow from the R-Tank system will drain to the northeast property line (discharge point DP1).
- Drainage Area PR1F will consist of roof area and landscaped areas. Stormwater runoff from PR1F will drain via a network of pipes to the subsurface system of R-Tanks described under

PR1A. Overflow from the R-Tank system will drain to the northeast property line (discharge point DP1).

- Drainage Area PR1G will consist of vehicular paved areas and landscaped areas. Stormwater runoff from PR1G will drain via a network of pipes and treatment devices to the subsurface system of R-Tanks described under PR1A. Overflow from the R-Tank system will drain to the northeast property line (discharge point DP1).
- Drainage Area PR3 will consist of landscaped areas. Stormwater runoff will drain to the western property line (discharge point DP3).
- Drainage Area PR4 will consist of vehicular and pedestrian paved areas and landscaped areas. Stormwater runoff from PR4 drains to the existing drainage system in Main Street which is assumed to be discharge point DP4 for the purpose of these calculations.

The following table compares the peak rates of runoff under the existing and proposed conditions:

Discharge Point	**2-Year Storm** (3.5" Rainfall Depth)		**10-Year Storm** (4.9" Rainfall Depth)		**100-Year Storm** (7.2" Rainfall Depth)	
	Existing (cfs)	Proposed (cfs)	Existing (cfs)	Proposed (cfs)	Existing (cfs)	Proposed (cfs)
EX CB	3.36	0	5.36	0	8.65	0
DP1	1.56	0.01	2.65	0.62	4.53	4.27
DP3	0.04	0.03	0.12	0.10	0.28	0.23
DP4	0.23	0.09	0.33	0.16	0.49	0.27

cfs - Cubic Feet per Second

<u>Standard 3: Recharge</u>

The Massachusetts Stormwater Handbook states that loss of annual recharge to groundwater shall be eliminated or minimized. The annual recharge from the post-development site shall approximate the annual recharge from the pre-development conditions based on soil type. As discussed under Standard 2, soils on-site are assumed to be Hydrologic Soil Group B. Therefore, the required recharge volume is calculated based on a target depth of 0.35" over the proposed impervious area. The required volume is as follows:

Required Recharge Volume = Target Depth * Impervious Area = 0.35" * 62,659 SF = 1,828 Cubic Feet

Since not all of the impervious areas will be drained to the provided recharge volume a capture area adjustment is applied to the required volume. The calculation is as follows:

Capture Area Adjustment Factor = Total Impervious Area / Impervious Area Draining to Recharge Volume
= 62,659 SF / 61,625 SF = 1.02

Adjusted Required Recharge Volume = Required Recharge Volume * Capture Area Adjustment Factor
= 1,828 CF * 1.02 = **1,865 Cubic Feet**

The recharge volume will be provided within the subsurface chambers and the void spaces in the crushed stone surrounding the chambers below the invert elevation (12.15) of the outlet pipe to discharge point DP1. The volume provided is **8,074** cubic feet (3,626 cf in pond 1PA, 1,994 cf in pond 1PB, and 2,451 in pond

1PC) which is greater than the required 1,865 cubic feet. Please see the attached Hydrocad summary (Appendix III).

The Massachusetts Stormwater Handbook states that the recharge volume must drain within 72 hours. Observations in test pits performed on-site indicate that the soil that pond 1PA will be installed upon is sand, pond 1PB will be installed on loamy sand, and pond 1PC will be installed on sandy loam. Please see the attached "Soil Evaluation for Drainage Design" (Appendix V) for more information. The following "drawdown" calculations assumes a Rawl's Rates of 8.27 inches per hour for sand, 2.41 inches per hour for loamy sand, and 1.02 inches per hour for sandy loam.

Drawdown Time 1PA = Storage Volume / (Rawl's Rate * Bottom Area)
= 6,060 CF / (8.27 in/hr * 2,544 SF) = 4 Hours

Drawdown Time 1PB = Storage Volume / (Rawl's Rate * Bottom Area)
= 3,523 CF / (2.41 in/hr * 1,262 SF) = 14 Hours

Drawdown Time 1PC = Storage Volume / (Rawl's Rate * Bottom Area)
= 4,333 CF / (1.02 in/hr * 1,547 SF) = 33 Hours

Since the drawdown times are less than 72 hours, the requirement is met.

Standard 4: Water Quality

The Massachusetts Stormwater Handbook states that systems shall be designed to remove 80% of the average annual post-development construction load of Total Suspended Solids (TSS). Stormwater runoff from vehicular paved areas will be treated wither with Fabco StormBasin Structures or FocalPoint systems, manufactured by ACF Environmental. All treatment devices are sized to provie at least 80% TSS removal. Please see the attached ACF Environmental product information (appendix V) for more information.

Standard 5: Land Uses with Higher Potential Pollutant Loads

The proposed project is not considered a Land Use with Higher Potential Pollutant Loads. Therefore this standard is not applicable.

Standard 6: Critical Areas

The proposed project is not in a critical area. Therefore this standard is not applicable.

Standard 7: Redevelopment

The proposed project is considered a new development. Therefore this standard is not applicable.

Standard 8: Construction Period Pollution Prevention and Erosion & Sedimentation Control

Best management practices (BMP) for erosion and sedimentation control are staked straw bales, filter fences, wattles, hydro seeding, and phased development. Many stormwater BMP technologies (e.g., infiltration technologies) are not designed to handle the high concentrations of sediments typically found in construction runoff and must be protected from construction-related sediment loadings. Construction BMP's **must** be maintained. In developing the proposed project certain measures will be implemented to minimize impacts erosion and sedimentation could have on surrounding areas. This section addresses items that involve proper construction techniques, close surveillance of workmanship, and immediate response to emergency situations. The developer must be prepared to provide whatever reasonable measures are necessary to protect the environment during construction and to stabilize all disturbed areas as soon as construction ends.

Pre-Construction

1. The contractor shall have a stockpile of materials required to control erosion on-site to be used to supplement or repair erosion control devices. These materials shall include, but are not limited to straw bales, silt fence, wattles and crushed stone.
2. The contractor is responsible for erosion control on site and shall utilize erosion control measures where needed, regardless of whether the measures are specified on the plan or in the order of conditions.

Preliminary Site Work

1. Excavated materials should be stockpiled, separating the topsoil for future use on the site. Erosion control shall be utilized along the down slope side of the piles and side slopes shall not exceed 2:1.
2. If intense rainfall is anticipated, the installation of supplemental straw bale dikes, silt fences, or armored dikes shall be considered.
3. Unsuitable excavated material shall be removed from the site.
4. Construction entrance shall be installed.
5. Existing catchbasins shall be protected with silt sacks.

Ongoing Site Work

1. Erosion control measures shall be regularly inspected and replaced as needed.
2. dewatering shall be done in a manner so as not to transmit silt, sand or particulate matter to the receiving water or existing drainage system.

Landscaping

1. Landscaping shall occur as soon as possible to provide permanent stabilization of disturbed surfaces.
2. If the season or adverse weather conditions do not allow the establishment of vegetation, temporary mulching with straw, wood chips weighted with snow fence or branches, or other methods shall be provided.
3. A minimum of 4 inches of topsoil shall be placed and its surface smoothed to the specified grades.
4. The use of herbicides is strongly discouraged.
5. Hydro seeding is encouraged for steep slopes. Application rates on slopes greater than 3:1 shall have a minimum seeding rate of 5-lbs/1000 SF. A latex or fiber tackifier shall be used on these slopes at a minimum rate of 50 lbs. of tackifier per 500 gallons of water used.

Standard 9: Operations and Maintenance Plan

The information provided herein is intended to provide the base information for operation and maintenance of the site in perpetuity subject to updates and revisions as required at a future date. As such all future property owners must be notified in writing of the this plan and be provided with a copy of this plan, a complete set of the design drawings and/or a completed as-built plan showing all the drainage features as they were constructed, which are considered part of this document. Please see the attached Operations and Maintenance Log (Appendix VII).

Stormwater management system owner:	Falmouth Hospitality, LLC
The party responsible for operation and maintenance:	Falmouth Hospitality, LLC

Preliminary Stormwater Operation and Maintenance Budget
Quarterly Inspection and Maintenance x $2,500 per visit = $10,000 annually

Illicit Discharge - Practices to Minimize Storm Water Contamination

- All waste materials will be collected and stored in a securely lidded metal dumpster.
- All trash and debris from the site will be deposited in the dumpster. The dumpster will be emptied on a regular schedule prior to being over full.
- All personnel will be instructed regarding the correct procedure for waste disposal.
- Good housekeeping and spill control practices will be followed to minimize storm water contamination from petroleum products, paints, and cleaning products.
- All site vehicles will be monitored for leaks and receive regular preventive maintenance to reduce the chance of leakage.
- Spill kits will be provided with any activity that could provide contamination.
- All paint containers and curing compounds will be tightly sealed and stored when not required for use. Excess paint will not be discharged to the storm sewers, but will be properly disposed according to the manufacturer's instructions.
- All spills will be cleaned up immediately upon discovery. Spills large enough to reach the storm sewers will be reported to the Massachusetts Department of Environmental Protection Northeast Regional Office at 1-888-304-1133.

StormBasin and FocalPoint Structures
All catch basins shall be StormBasins as manufactured by ACF Environmental. FocalPoint water treatment devices are also manufactured by ACF Environmental. All StormBasins and FocalPoints shall be maintained per ACF Environmental's recommendations.

Infiltration BMP
The infiltration BMP (subsurface chamber system) shall be inspected after every major storm for the first few months to ensure it is stabilized and functioning properly. If necessary, corrective action shall be taken until the system functions properly. Inspectors should note how long water remains standing in the inspection port after a storm; standing water within the basin 48 to 72 hours after a storm indicates that the infiltration capacity may have been overestimated. If the ponding is due to clogging, immediately address the reasons for the clogging. Thereafter, inspect the infiltration BMP at least twice per year.

Trench Drain

Trench drain inspections shall be performed two times per year and after large storm events. The trench drain grate shall be kept clean of debris at all times. Any accumulated debris within the structure shall be removed as observed during inspections.

Roof Drain Leaders

Routine roof inspections shall be performed two times per year. The roof shall be kept clean and free of debris, and the roof drainage systems shall be kept clear. Gutters and downspouts shall be cleaned at least twice per year, or more frequently as necessary.

Vegetated Areas Maintenance

Although not a structural component of the drainage system, the maintenance of vegetated areas may affect the functioning of stormwater management practices. This includes the health/density of vegetative cover and activities such as the application and disposal of lawn and garden care products, disposal of leaves and yard trimmings.

Initial Post-Construction Inspection

During the initial period of vegetation establishment pruning and weeding are required twice in first year by contractor or owner. Any dead vegetation/plantings found after the first year will be replaced. Proper mulching is mandatory and regular watering may be required initially to ensure proper establishment of new vegetation.

Long-Term Maintenance

The planted areas shall be inspected on a semi-annual basis and any litter removed. Weeds and invasive plant species shall be removed by hand. Maintain planted areas adjacent to pavement to prevent soil washout. Immediately clean any soil deposits on pavement. Leaf litter and other detritus shall be removed twice per year. If needed to maintain aesthetic appearance, perennial plantings may be trimmed at the end of the growing season.

Trees and shrubs shall be inspected twice per year to evaluate health and attended to as necessary. Seeded ground cover or grass areas shall not receive mulching. Re-seed bare areas; install appropriate erosion control measures when native soil is exposed or erosion channels are forming. Plant alternative mixtures of grass species in the event of unsuccessful establishment. The grass vegetation should not be cut to a height less than four inches.

Pesticide/Herbicide Usage

No pesticides are to be used unless a single spot treatment is required for a specific control application.

Standard 9: Prohibition of Illicit Discharges

Illicit Discharge Compliance Statement

To the best of my knowledge no illicit discharges currently exist on the site and no future illicit discharge will be allowed, including wastewater discharges and discharges of stormwater contaminated by contact with process wastes, raw materials, toxic pollutants, hazardous substances, oil, or grease.

_____

Signed by Owner *Date*

Appendix I. NRCS Soils Map

Hydrologic Soil Group—Barnstable County, Massachusetts
(556 Main Street)

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

Soil Rating Polygons

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

Soil Rating Lines

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

Soil Rating Points

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

Water Features

- Streams and Canals

Transportation

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

Background

- Aerial Photography

MAP INFORMATION

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

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

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

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

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: Web Mercator (EPSG:3857)

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

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

Soil Survey Area: Barnstable County, Massachusetts
Survey Area Data: Version 9, Jul 23, 2010

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

Date(s) aerial images were photographed: Mar 30, 2011—Oct 8, 2011

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

Hydrologic Soil Group

Hydrologic Soil Group— Summary by Map Unit — Barnstable County, Massachusetts (MA001)				
Map unit symbol	**Map unit name**	**Rating**	**Acres in AOI**	**Percent of AOI**
1	Water		0.0	0.3%
265A	Enfield silt loam, 0 to 3 percent slopes	B	0.4	4.5%
265B	Enfield silt loam, 3 to 8 percent slopes	B	3.7	46.5%
602	Urban land		3.9	48.7%
Totals for Area of Interest			**8.0**	**100.0%**

Description

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

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

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

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

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

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

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

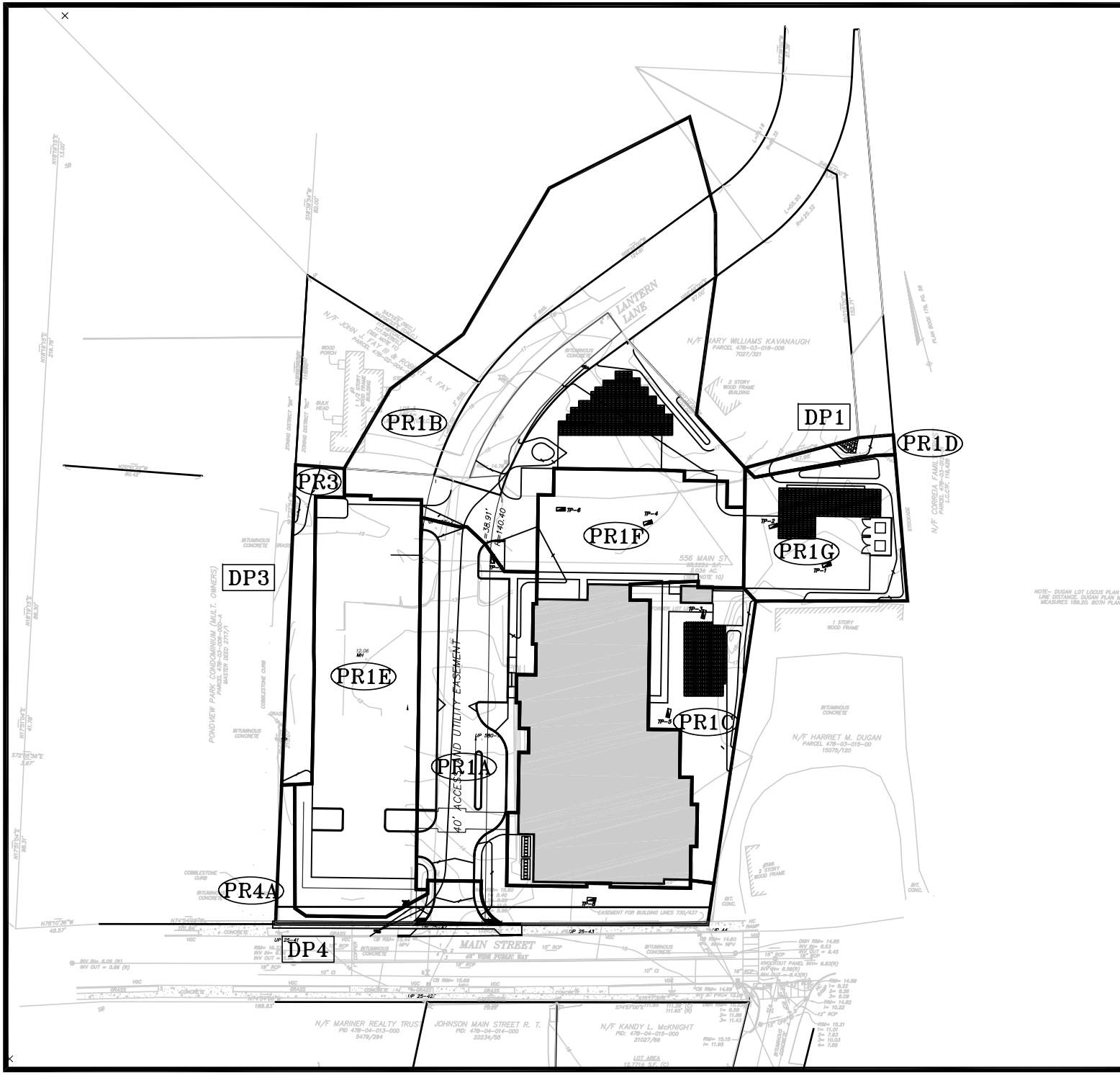
Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: *None Specified*

Tie-break Rule: Higher

Appendix II. Existing and Proposed Drainage Figures



Prepared for:

587 Main Street
17 & 19 Nye Road

Falmouth, MA

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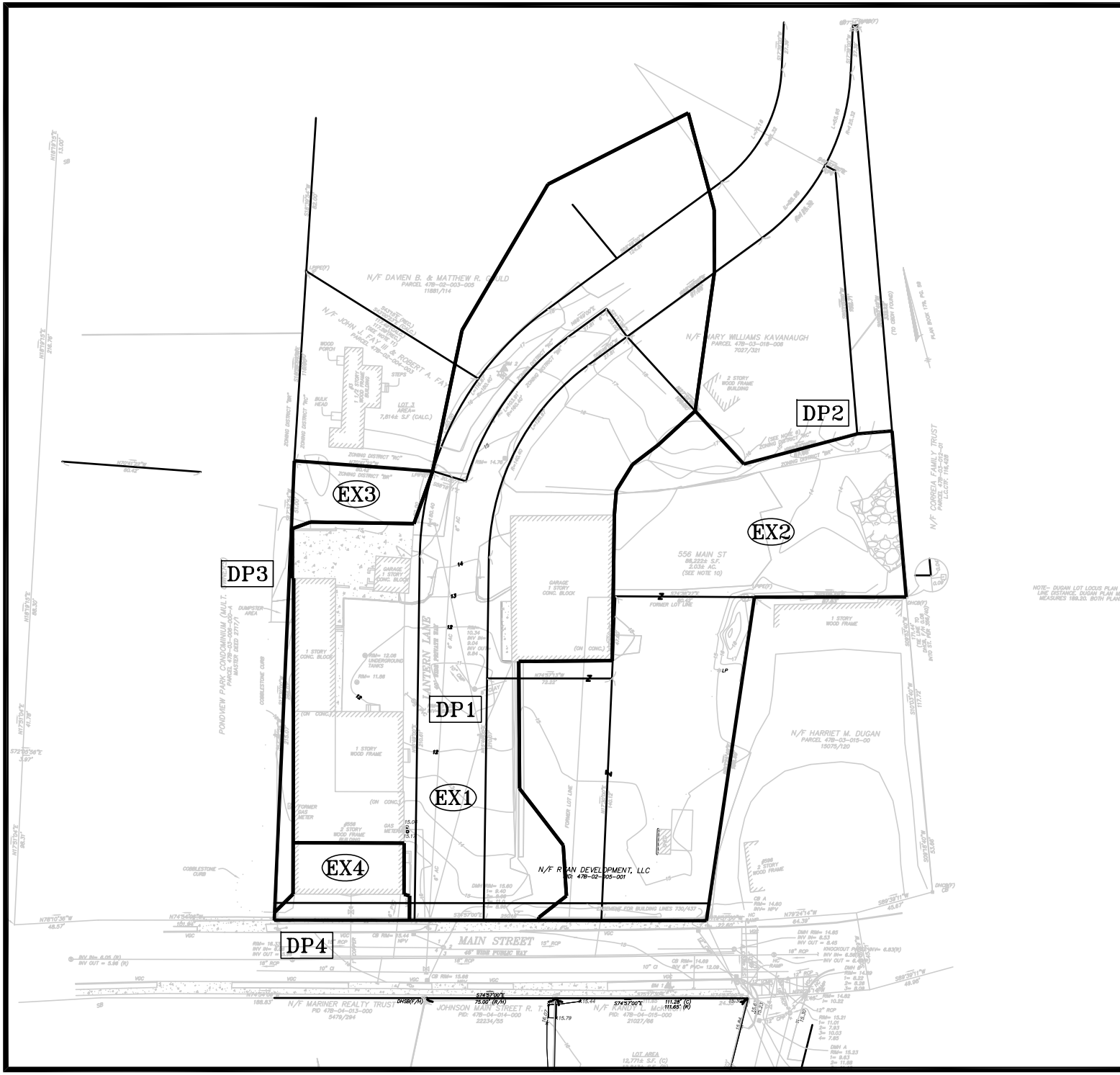
VOICE (978) 777-3050
FAX (978) 774-7816

PROPOSED DRAINAGE AREAS

DATE:	04/01/14
DWG: *17791U.dwg*	
SCALE:	1"=50'
DESIGN:	KAC
LAYOUT: *Layout1*	
DRAWN:	KAC
JOB NO.: 17791	



Prepared for:

587 Main Street
17 & 19 Nye Road

Falmouth, MA

HANCOCK ASSOCIATES

Civil Engineers
Land Surveyors
Wetland Scientists

185 CENTRE STREET
DANVERS, MA. 01923
VOICE (978) 777-3050
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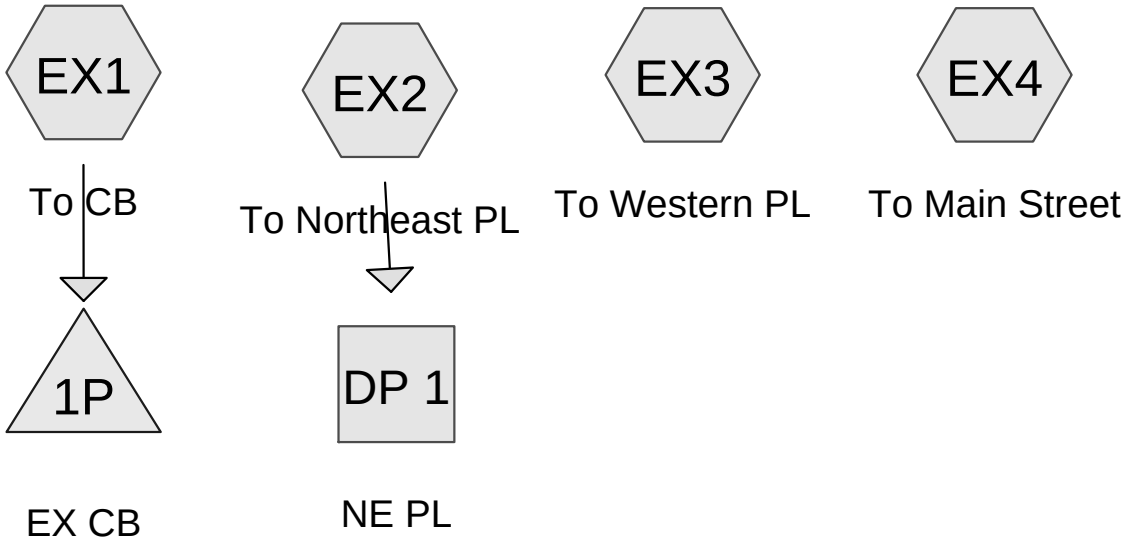
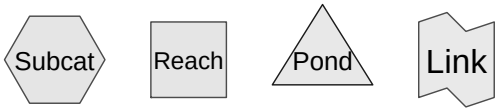
EXISTING DRAINAGE AREAS

DATE:	04/01/14
DWG:	17791-ex hotel.dwg
SCALE:	1"=80'
DESIGN:	KAC
LAYOUT:	EX
DRAWN:	KAC
JOB NO.:	17791

Appendix III. Hydrocad Output





Routing Diagram for 17791 Falmouth 140814
Prepared by Microsoft, Printed 9/17/2014
HydroCAD® 10.00-12 s/n 00821 © 2014 HydroCAD Software Solutions LLC

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment EX1: To CB Runoff Area=59,515 sf 66.54% Impervious Runoff Depth>2.10"
Tc=5.0 min CN=86 Runoff=3.36 cfs 0.239 af

Subcatchment EX2: To Northeast PL Runoff Area=34,019 sf 17.15% Impervious Runoff Depth>1.71"
Tc=5.0 min CN=81 Runoff=1.56 cfs 0.111 af

Subcatchment EX3: To Western PL Runoff Area=3,772 sf 0.00% Impervious Runoff Depth>0.57"
Tc=5.0 min CN=61 Runoff=0.04 cfs 0.004 af

Subcatchment EX4: To Main Street Runoff Area=3,023 sf 98.18% Impervious Runoff Depth>3.15"
Tc=5.0 min CN=97 Runoff=0.23 cfs 0.018 af

Reach DP 1: NE PL Inflow=1.56 cfs 0.111 af
Outflow=1.56 cfs 0.111 af

Pond 1P: EX CB Peak Elev=12.97' Storage=10,397 cf Inflow=3.36 cfs 0.239 af
Outflow=0.00 cfs 0.000 af

Summary for Subcatchment EX1: To CB

Runoff = 3.36 cfs @ 12.08 hrs, Volume= 0.239 af, Depth> 2.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 Year Rainfall=3.50"

Area (sf)	CN	Description
27,491	98	Paved
12,113	98	Roof
1,021	85	Gravel roads, HSG B
18,890	61	>75% Grass cover, Good, HSG B
59,515	86	Weighted Average
19,911		33.46% Pervious Area
39,604		66.54% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment EX2: To Northeast PL

Runoff = 1.56 cfs @ 12.08 hrs, Volume= 0.111 af, Depth> 1.71"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 Year Rainfall=3.50"

Area (sf)	CN	Description
5,725	98	Paved
110	98	Roof
19,621	85	Gravel roads, HSG B
8,563	61	>75% Grass cover, Good, HSG B
34,019	81	Weighted Average
28,184		82.85% Pervious Area
5,835		17.15% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment EX3: To Western PL

Runoff = 0.04 cfs @ 12.11 hrs, Volume= 0.004 af, Depth> 0.57"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 Year Rainfall=3.50"

Area (sf)	CN	Description
3,772	61	>75% Grass cover, Good, HSG B
3,772		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment EX4: To Main Street

Runoff = 0.23 cfs @ 12.07 hrs, Volume= 0.018 af, Depth> 3.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 Year Rainfall=3.50"

	Area (sf)	CN	Description
	1,068	98	Paved
	55	61	>75% Grass cover, Good, HSG B
*	1,900	98	Roof
	3,023	97	Weighted Average
	55		1.82% Pervious Area
	2,968		98.18% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Reach DP 1: NE PL

Inflow Area = 0.781 ac, 17.15% Impervious, Inflow Depth > 1.71" for 2 Year event
Inflow = 1.56 cfs @ 12.08 hrs, Volume= 0.111 af
Outflow = 1.56 cfs @ 12.08 hrs, Volume= 0.111 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Pond 1P: EX CB

Inflow Area = 1.366 ac, 66.54% Impervious, Inflow Depth > 2.10" for 2 Year event
Inflow = 3.36 cfs @ 12.08 hrs, Volume= 0.239 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 12.97' @ 24.00 hrs Surf.Area= 9,384 sf Storage= 10,397 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1	10.34'	35,913 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
10.34	0	0	0
11.00	795	262	262
12.00	5,242	3,019	3,281
13.00	9,499	7,371	10,651
14.00	11,681	10,590	21,241
14.80	24,998	14,672	35,913

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment EX1: To CB Runoff Area=59,515 sf 66.54% Impervious Runoff Depth>3.37"
Tc=5.0 min CN=86 Runoff=5.36 cfs 0.384 af

Subcatchment EX2: To Northeast PL Runoff Area=34,019 sf 17.15% Impervious Runoff Depth>2.90"
Tc=5.0 min CN=81 Runoff=2.65 cfs 0.188 af

Subcatchment EX3: To Western PL Runoff Area=3,772 sf 0.00% Impervious Runoff Depth>1.31"
Tc=5.0 min CN=61 Runoff=0.12 cfs 0.009 af

Subcatchment EX4: To Main Street Runoff Area=3,023 sf 98.18% Impervious Runoff Depth>4.55"
Tc=5.0 min CN=97 Runoff=0.33 cfs 0.026 af

Reach DP 1: NE PL Inflow=2.65 cfs 0.188 af
Outflow=2.65 cfs 0.188 af

Summary for Pond 1P: EX CB

Inflow Area = 1.366 ac, 66.54% Impervious, Inflow Depth > 3.37" for 10 Year event
Inflow = 5.36 cfs @ 12.07 hrs, Volume= 0.384 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 13.60' @ 24.00 hrs Surf.Area= 10,803 sf Storage= 16,718 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1	10.34'	35,913 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
10.34	0	0	0
11.00	795	262	262
12.00	5,242	3,019	3,281
13.00	9,499	7,371	10,651
14.00	11,681	10,590	21,241
14.80	24,998	14,672	35,913

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment EX1: To CB Runoff Area=59,515 sf 66.54% Impervious Runoff Depth>5.56"
Tc=5.0 min CN=86 Runoff=8.65 cfs 0.632 af

Subcatchment EX2: To Northeast PL Runoff Area=34,019 sf 17.15% Impervious Runoff Depth>4.99"
Tc=5.0 min CN=81 Runoff=4.53 cfs 0.325 af

Subcatchment EX3: To Western PL Runoff Area=3,772 sf 0.00% Impervious Runoff Depth>2.84"
Tc=5.0 min CN=61 Runoff=0.28 cfs 0.021 af

Subcatchment EX4: To Main Street Runoff Area=3,023 sf 98.18% Impervious Runoff Depth>6.84"
Tc=5.0 min CN=97 Runoff=0.49 cfs 0.040 af

Reach DP 1: NE PL Inflow=4.53 cfs 0.325 af
Outflow=4.53 cfs 0.325 af

Summary for Pond 1P: EX CB

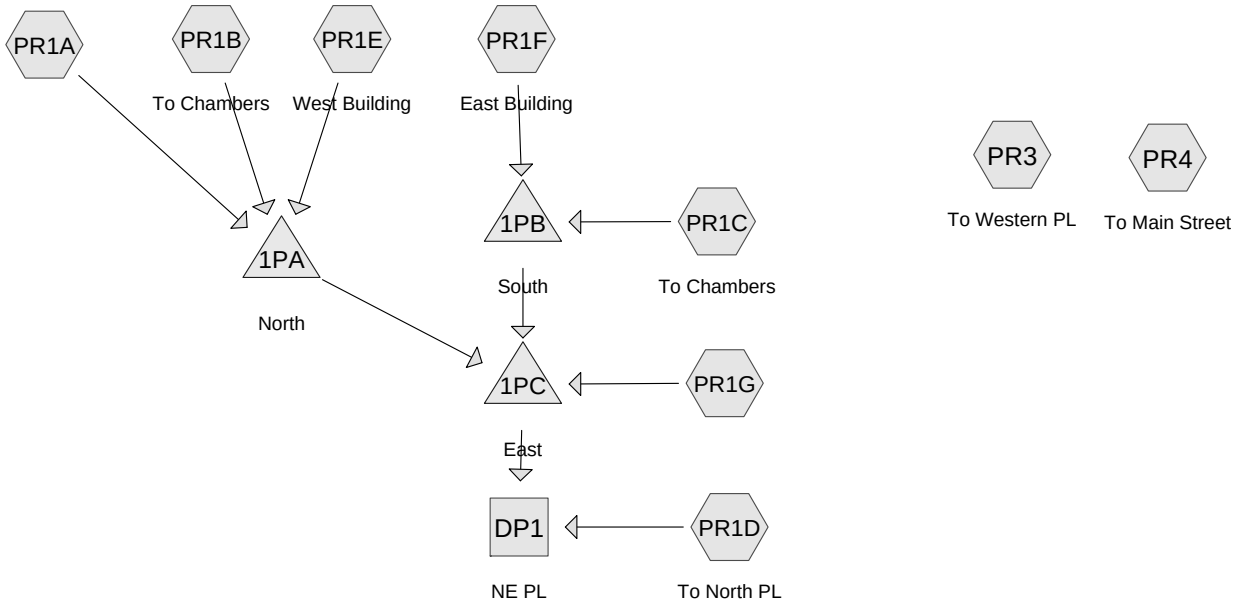
Inflow Area = 1.366 ac, 66.54% Impervious, Inflow Depth > 5.56" for 100 Year event
Inflow = 8.65 cfs @ 12.07 hrs, Volume= 0.632 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min

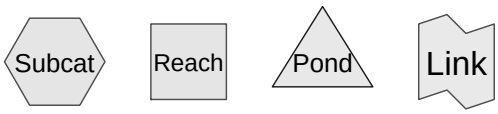
Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 14.42' @ 24.00 hrs Surf.Area= 18,608 sf Storage= 27,544 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1	10.34'	35,913 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
10.34	0	0	0
11.00	795	262	262
12.00	5,242	3,019	3,281
13.00	9,499	7,371	10,651
14.00	11,681	10,590	21,241
14.80	24,998	14,672	35,913





Routing Diagram for 17791 Falmouth 140814
Prepared by Microsoft, Printed 9/17/2014
HydroCAD® 10.00-12 s/n 00821 © 2014 HydroCAD Software Solutions LLC

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment PR1A: Runoff Area=14,798 sf 59.20% Impervious Runoff Depth>1.86"
Tc=5.0 min CN=83 Runoff=0.74 cfs 0.053 af

Subcatchment PR1B: To Chambers Runoff Area=30,655 sf 42.81% Impervious Runoff Depth>1.43"
Tc=5.0 min CN=77 Runoff=1.16 cfs 0.084 af

Subcatchment PR1C: To Chambers Runoff Area=6,654 sf 15.16% Impervious Runoff Depth>0.85"
Tc=5.0 min CN=67 Runoff=0.14 cfs 0.011 af

Subcatchment PR1D: To North PL Runoff Area=826 sf 0.00% Impervious Runoff Depth>0.57"
Tc=5.0 min CN=61 Runoff=0.01 cfs 0.001 af

Subcatchment PR1E: West Building Runoff Area=15,446 sf 84.60% Impervious Runoff Depth>2.64"
Tc=5.0 min CN=92 Runoff=1.07 cfs 0.078 af

Subcatchment PR1F: East Building Runoff Area=22,392 sf 94.77% Impervious Runoff Depth>3.04"
Tc=5.0 min CN=96 Runoff=1.71 cfs 0.130 af

Subcatchment PR1G: Runoff Area=7,120 sf 62.40% Impervious Runoff Depth>1.94"
Tc=5.0 min CN=84 Runoff=0.37 cfs 0.026 af

Subcatchment PR3: To Western PL Runoff Area=3,013 sf 0.00% Impervious Runoff Depth>0.57"
Tc=5.0 min CN=61 Runoff=0.03 cfs 0.003 af

Subcatchment PR4: To Main Street Runoff Area=2,119 sf 48.80% Impervious Runoff Depth>1.56"
Tc=5.0 min CN=79 Runoff=0.09 cfs 0.006 af

Reach DP1: NE PL Inflow=0.01 cfs 0.001 af
Outflow=0.01 cfs 0.001 af

Pond 1PA: North Peak Elev=11.50' Storage=2,410 cf Inflow=2.96 cfs 0.214 af
Discarded=0.49 cfs 0.210 af Primary=0.55 cfs 0.005 af Outflow=1.04 cfs 0.215 af

Pond 1PB: South Peak Elev=11.83' Storage=1,664 cf Inflow=1.84 cfs 0.141 af
Discarded=0.07 cfs 0.095 af Primary=1.34 cfs 0.035 af Outflow=1.41 cfs 0.131 af

Pond 1PC: East Peak Elev=11.83' Storage=2,045 cf Inflow=2.24 cfs 0.066 af
Discarded=0.04 cfs 0.040 af Primary=0.00 cfs 0.000 af Outflow=0.04 cfs 0.040 af

Summary for Subcatchment PR1A:

Runoff = 0.74 cfs @ 12.08 hrs, Volume= 0.053 af, Depth> 1.86"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 Year Rainfall=3.50"

Area (sf)	CN	Description
6,037	61	>75% Grass cover, Good, HSG B
8,761	98	Paved parking, HSG A
14,798	83	Weighted Average
6,037		40.80% Pervious Area
8,761		59.20% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment PR1B: To Chambers

Runoff = 1.16 cfs @ 12.08 hrs, Volume= 0.084 af, Depth> 1.43"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 Year Rainfall=3.50"

Area (sf)	CN	Description
13,123	98	Paved parking, HSG A
17,532	61	>75% Grass cover, Good, HSG B
30,655	77	Weighted Average
17,532		57.19% Pervious Area
13,123		42.81% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment PR1C: To Chambers

Runoff = 0.14 cfs @ 12.09 hrs, Volume= 0.011 af, Depth> 0.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 Year Rainfall=3.50"

	Area (sf)	CN	Description
	814	98	Paved parking, HSG A
*	195	98	Roof
	5,645	61	>75% Grass cover, Good, HSG B
	6,654	67	Weighted Average
	5,645		84.84% Pervious Area
	1,009		15.16% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment PR1D: To North PL

Runoff = 0.01 cfs @ 12.11 hrs, Volume= 0.001 af, Depth> 0.57"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 Year Rainfall=3.50"

Area (sf)	CN	Description
826	61	>75% Grass cover, Good, HSG B
826		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment PR1E: West Building

Runoff = 1.07 cfs @ 12.07 hrs, Volume= 0.078 af, Depth> 2.64"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 Year Rainfall=3.50"

Area (sf)	CN	Description
13,068	98	Paved parking, HSG A
2,378	61	>75% Grass cover, Good, HSG B
15,446	92	Weighted Average
2,378		15.40% Pervious Area
13,068		84.60% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment PR1F: East Building

Runoff = 1.71 cfs @ 12.07 hrs, Volume= 0.130 af, Depth> 3.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 Year Rainfall=3.50"

Area (sf)	CN	Description
21,221	98	Paved parking, HSG A
1,171	61	>75% Grass cover, Good, HSG B
22,392	96	Weighted Average
1,171		5.23% Pervious Area
21,221		94.77% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment PR1G:

Runoff = 0.37 cfs @ 12.08 hrs, Volume= 0.026 af, Depth> 1.94"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 Year Rainfall=3.50"

Area (sf)	CN	Description
4,443	98	Paved parking, HSG A
2,677	61	>75% Grass cover, Good, HSG B
7,120	84	Weighted Average
2,677		37.60% Pervious Area
4,443		62.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment PR3: To Western PL

Runoff = 0.03 cfs @ 12.11 hrs, Volume= 0.003 af, Depth> 0.57"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 Year Rainfall=3.50"

Area (sf)	CN	Description
3,013	61	>75% Grass cover, Good, HSG B
3,013		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment PR4: To Main Street

Runoff = 0.09 cfs @ 12.08 hrs, Volume= 0.006 af, Depth> 1.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 Year Rainfall=3.50"

Area (sf)	CN	Description
1,034	98	Paved parking, HSG A
1,085	61	>75% Grass cover, Good, HSG B
2,119	79	Weighted Average
1,085		51.20% Pervious Area
1,034		48.80% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Reach DP1: NE PL

Inflow Area = 2.247 ac, 62.95% Impervious, Inflow Depth > 0.00" for 2 Year event
Inflow = 0.01 cfs @ 12.11 hrs, Volume= 0.001 af
Outflow = 0.01 cfs @ 12.11 hrs, Volume= 0.001 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Pond 1PA: North

Inflow Area = 1.398 ac, 57.39% Impervious, Inflow Depth > 1.84" for 2 Year event
Inflow = 2.96 cfs @ 12.08 hrs, Volume= 0.214 af
Outflow = 1.04 cfs @ 12.11 hrs, Volume= 0.215 af, Atten= 65%, Lag= 1.9 min
Discarded = 0.49 cfs @ 11.80 hrs, Volume= 0.210 af
Primary = 0.55 cfs @ 12.11 hrs, Volume= 0.005 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 11.50' @ 12.57 hrs Surf.Area= 2,545 sf Storage= 2,410 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 30.0 min (852.3 - 822.3)

Volume	Invert	Avail.Storage	Storage Description
#1A	10.10'	2,390 cf	**10.56'W x 240.93'L x 4.07'H Field A** 10,360 cf Overall - 4,386 cf Embedded = 5,974 cf x 40.0% Voids
#2A	10.35'	4,167 cf	**ACF R-Tank HD 2.0** x 505 Inside #1 Inside= 15.7"W x 33.9"H => 3.52 sf x 2.35'L = 8.3 cf Outside= 15.7"W x 33.9"H => 3.70 sf x 2.35'L = 8.7 cf 5 Rows of 101 Chambers
		6,557 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	10.10'	**8.270 in/hr Exfiltration over Surface area**
#2	Primary	10.35'	**24.0" Round Culvert** L= 81.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 10.35' / 10.35' S= 0.0000 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Discarded OutFlow Max=0.49 cfs @ 11.80 hrs HW=10.15' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.49 cfs)

Primary OutFlow Max=0.00 cfs @ 12.11 hrs HW=10.89' TW=11.04' (Dynamic Tailwater)
└**2=Culvert** (Controls 0.00 cfs)

Summary for Pond 1PB: South

Inflow Area = 0.667 ac, 76.53% Impervious, Inflow Depth > 2.54" for 2 Year event
Inflow = 1.84 cfs @ 12.07 hrs, Volume= 0.141 af
Outflow = 1.41 cfs @ 12.11 hrs, Volume= 0.131 af, Atten= 23%, Lag= 2.3 min
Discarded = 0.07 cfs @ 10.55 hrs, Volume= 0.095 af
Primary = 1.34 cfs @ 12.11 hrs, Volume= 0.035 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 11.83' @ 14.67 hrs Surf.Area= 1,262 sf Storage= 1,664 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 110.0 min (888.5 - 778.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	10.10'	960 cf	**23.69'W x 53.26'L x 4.07'H Field A** 5,136 cf Overall - 2,736 cf Embedded = 2,400 cf x 40.0% Voids
#2A	10.35'	2,599 cf	**ACF R-Tank HD 2.0** x 315 Inside #1 Inside= 15.7"W x 33.9"H => 3.52 sf x 2.35'L = 8.3 cf Outside= 15.7"W x 33.9"H => 3.70 sf x 2.35'L = 8.7 cf 15 Rows of 21 Chambers
		3,559 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	10.10'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	10.35'	**24.0" Round Culvert** L= 57.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 10.35' / 10.35' S= 0.0000 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Discarded OutFlow Max=0.07 cfs @ 10.55 hrs HW=10.15' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.07 cfs)

Primary OutFlow Max=0.63 cfs @ 12.11 hrs HW=11.09' TW=11.05' (Dynamic Tailwater)
└**2=Culvert** (Outlet Controls 0.63 cfs @ 0.89 fps)

Summary for Pond 1PC: East

Inflow Area =	2.228 ac, 63.49% Impervious, Inflow Depth > 0.36" for 2 Year event				
Inflow =	2.24 cfs @	12.11 hrs,	Volume=	0.066 af	
Outflow =	0.04 cfs @	11.75 hrs,	Volume=	0.040 af,	Atten= 98%, Lag= 0.0 min
Discarded =	0.04 cfs @	11.75 hrs,	Volume=	0.040 af	
Primary =	0.00 cfs @	0.00 hrs,	Volume=	0.000 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 11.83' @ 14.62 hrs Surf.Area= 1,561 sf Storage= 2,045 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 267.9 min (1,042.7 - 774.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	10.10'	1,209 cf	**19.75'W x 79.07'L x 4.07'H Field A** 6,357 cf Overall - 3,335 cf Embedded = 3,022 cf x 40.0% Voids
#2A	10.35'	3,169 cf	**ACF R-Tank HD 2.0** x 384 Inside #1 Inside= 15.7"W x 33.9"H => 3.52 sf x 2.35'L = 8.3 cf Outside= 15.7"W x 33.9"H => 3.70 sf x 2.35'L = 8.7 cf 12 Rows of 32 Chambers
		4,377 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	10.10'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	12.15'	**12.0" Round Culvert** L= 18.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 12.15' / 12.15' S= 0.0000 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Discarded OutFlow Max=0.04 cfs @ 11.75 hrs HW=10.17' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.04 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=10.10' TW=0.00' (Dynamic Tailwater)
└─**2=Culvert** (Controls 0.00 cfs)

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment PR1A: Runoff Area=14,798 sf 59.20% Impervious Runoff Depth>3.08"
Tc=5.0 min CN=83 Runoff=1.22 cfs 0.087 af

Subcatchment PR1B: To Chambers Runoff Area=30,655 sf 42.81% Impervious Runoff Depth>2.54"
Tc=5.0 min CN=77 Runoff=2.10 cfs 0.149 af

Subcatchment PR1C: To Chambers Runoff Area=6,654 sf 15.16% Impervious Runoff Depth>1.73"
Tc=5.0 min CN=67 Runoff=0.30 cfs 0.022 af

Subcatchment PR1D: To North PL Runoff Area=826 sf 0.00% Impervious Runoff Depth>1.31"
Tc=5.0 min CN=61 Runoff=0.03 cfs 0.002 af

Subcatchment PR1E: West Building Runoff Area=15,446 sf 84.60% Impervious Runoff Depth>3.99"
Tc=5.0 min CN=92 Runoff=1.59 cfs 0.118 af

Subcatchment PR1F: East Building Runoff Area=22,392 sf 94.77% Impervious Runoff Depth>4.43"
Tc=5.0 min CN=96 Runoff=2.44 cfs 0.190 af

Subcatchment PR1G: Runoff Area=7,120 sf 62.40% Impervious Runoff Depth>3.18"
Tc=5.0 min CN=84 Runoff=0.61 cfs 0.043 af

Subcatchment PR3: To Western PL Runoff Area=3,013 sf 0.00% Impervious Runoff Depth>1.31"
Tc=5.0 min CN=61 Runoff=0.10 cfs 0.008 af

Subcatchment PR4: To Main Street Runoff Area=2,119 sf 48.80% Impervious Runoff Depth>2.71"
Tc=5.0 min CN=79 Runoff=0.16 cfs 0.011 af

Reach DP1: NE PL Inflow=0.62 cfs 0.065 af
Outflow=0.62 cfs 0.065 af

Summary for Pond 1PA: North

Inflow Area =	1.398 ac, 57.39% Impervious, Inflow Depth > 3.04" for 10 Year event				
Inflow =	4.89 cfs @	12.08 hrs,	Volume=	0.354 af	
Outflow =	2.03 cfs @	12.08 hrs,	Volume=	0.354 af,	Atten= 59%, Lag= 0.5 min
Discarded =	0.49 cfs @	11.70 hrs,	Volume=	0.327 af	
Primary =	1.54 cfs @	12.08 hrs,	Volume=	0.027 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 12.65' @ 12.64 hrs Surf.Area= 2,545 sf Storage= 4,568 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 63.1 min (872.6 - 809.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	10.10'	2,390 cf	**10.56'W x 240.93'L x 4.07'H Field A** 10,360 cf Overall - 4,386 cf Embedded = 5,974 cf x 40.0% Voids
#2A	10.35'	4,167 cf	**ACF R-Tank HD 2.0** x 505 Inside #1 Inside= 15.7"W x 33.9"H => 3.52 sf x 2.35'L = 8.3 cf Outside= 15.7"W x 33.9"H => 3.70 sf x 2.35'L = 8.7 cf 5 Rows of 101 Chambers
		6,557 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	10.10'	**8.270 in/hr Exfiltration over Surface area**
#2	Primary	10.35'	**24.0" Round Culvert** L= 81.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 10.35' / 10.35' S= 0.0000 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Discarded OutFlow Max=0.49 cfs @ 11.70 hrs HW=10.19' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.49 cfs)

Primary OutFlow Max=0.00 cfs @ 12.08 hrs HW=11.42' TW=11.75' (Dynamic Tailwater)
└─**2=Culvert** (Controls 0.00 cfs)

Summary for Pond 1PB: South

Inflow Area =	0.667 ac, 76.53% Impervious, Inflow Depth > 3.81" for 10 Year event				
Inflow =	2.74 cfs @	12.07 hrs,	Volume=	0.212 af	
Outflow =	1.48 cfs @	12.05 hrs,	Volume=	0.182 af,	Atten= 46%, Lag= 0.0 min
Discarded =	0.07 cfs @	9.40 hrs,	Volume=	0.103 af	
Primary =	1.41 cfs @	12.05 hrs,	Volume=	0.079 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 12.65' @ 12.65 hrs Surf.Area= 1,262 sf Storage= 2,517 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 72.8 min (844.2 - 771.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	10.10'	960 cf	**23.69'W x 53.26'L x 4.07'H Field A** 5,136 cf Overall - 2,736 cf Embedded = 2,400 cf x 40.0% Voids
#2A	10.35'	2,599 cf	**ACF R-Tank HD 2.0** x 315 Inside #1 Inside= 15.7"W x 33.9"H => 3.52 sf x 2.35'L = 8.3 cf Outside= 15.7"W x 33.9"H => 3.70 sf x 2.35'L = 8.7 cf 15 Rows of 21 Chambers
		3,559 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	10.10'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	10.35'	**24.0" Round Culvert** L= 57.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 10.35' / 10.35' S= 0.0000 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Discarded OutFlow Max=0.07 cfs @ 9.40 hrs HW=10.15' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.07 cfs)

Primary OutFlow Max=0.00 cfs @ 12.05 hrs HW=11.26' TW=11.48' (Dynamic Tailwater)
└─**2=Culvert** (Controls 0.00 cfs)

Summary for Pond 1PC: East

Inflow Area = 2.228 ac, 63.49% Impervious, Inflow Depth > 0.80" for 10 Year event
Inflow = 3.33 cfs @ 12.07 hrs, Volume= 0.149 af
Outflow = 0.66 cfs @ 12.74 hrs, Volume= 0.106 af, Atten= 80%, Lag= 39.8 min
Discarded = 0.04 cfs @ 11.10 hrs, Volume= 0.043 af
Primary = 0.62 cfs @ 12.74 hrs, Volume= 0.063 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 12.70' @ 12.74 hrs Surf.Area= 1,561 sf Storage= 3,153 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 115.8 min (891.4 - 775.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	10.10'	1,209 cf	**19.75'W x 79.07'L x 4.07'H Field A** 6,357 cf Overall - 3,335 cf Embedded = 3,022 cf x 40.0% Voids
#2A	10.35'	3,169 cf	**ACF R-Tank HD 2.0** x 384 Inside #1 Inside= 15.7"W x 33.9"H => 3.52 sf x 2.35'L = 8.3 cf Outside= 15.7"W x 33.9"H => 3.70 sf x 2.35'L = 8.7 cf 12 Rows of 32 Chambers
		4,377 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	10.10'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	12.15'	**12.0" Round Culvert** L= 18.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 12.15' / 12.15' S= 0.0000 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Discarded OutFlow Max=0.04 cfs @ 11.10 hrs HW=10.15' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.04 cfs)

Primary OutFlow Max=0.60 cfs @ 12.74 hrs HW=12.69' TW=0.00' (Dynamic Tailwater)
└─**2=Culvert** (Barrel Controls 0.60 cfs @ 2.00 fps)

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment PR1A: Runoff Area=14,798 sf 59.20% Impervious Runoff Depth>5.21"
Tc=5.0 min CN=83 Runoff=2.05 cfs 0.148 af

Subcatchment PR1B: To Chambers Runoff Area=30,655 sf 42.81% Impervious Runoff Depth>4.54"
Tc=5.0 min CN=77 Runoff=3.73 cfs 0.266 af

Subcatchment PR1C: To Chambers Runoff Area=6,654 sf 15.16% Impervious Runoff Depth>3.46"
Tc=5.0 min CN=67 Runoff=0.62 cfs 0.044 af

Subcatchment PR1D: To North PL Runoff Area=826 sf 0.00% Impervious Runoff Depth>2.84"
Tc=5.0 min CN=61 Runoff=0.06 cfs 0.004 af

Subcatchment PR1E: West Building Runoff Area=15,446 sf 84.60% Impervious Runoff Depth>6.25"
Tc=5.0 min CN=92 Runoff=2.42 cfs 0.185 af

Subcatchment PR1F: East Building Runoff Area=22,392 sf 94.77% Impervious Runoff Depth>6.72"
Tc=5.0 min CN=96 Runoff=3.62 cfs 0.288 af

Subcatchment PR1G: Runoff Area=7,120 sf 62.40% Impervious Runoff Depth>5.33"
Tc=5.0 min CN=84 Runoff=1.00 cfs 0.073 af

Subcatchment PR3: To Western PL Runoff Area=3,013 sf 0.00% Impervious Runoff Depth>2.84"
Tc=5.0 min CN=61 Runoff=0.23 cfs 0.016 af

Subcatchment PR4: To Main Street Runoff Area=2,119 sf 48.80% Impervious Runoff Depth>4.76"
Tc=5.0 min CN=79 Runoff=0.27 cfs 0.019 af

Reach DP1: NE PL Inflow=4.27 cfs 0.326 af
Outflow=4.27 cfs 0.326 af

Summary for Pond 1PA: North

Inflow Area =	1.398 ac,	57.39% Impervious,	Inflow Depth >	5.14"	for 100 Year event
Inflow =	8.22 cfs @	12.07 hrs,	Volume=	0.599 af	
Outflow =	5.67 cfs @	12.65 hrs,	Volume=	0.599 af,	Atten= 31%, Lag= 34.6 min
Discarded =	0.49 cfs @	11.30 hrs,	Volume=	0.434 af	
Primary =	5.19 cfs @	12.65 hrs,	Volume=	0.165 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 14.03' @ 12.35 hrs Surf.Area= 2,545 sf Storage= 6,409 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 56.5 min (852.6 - 796.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	10.10'	2,390 cf	**10.56'W x 240.93'L x 4.07'H Field A** 10,360 cf Overall - 4,386 cf Embedded = 5,974 cf x 40.0% Voids
#2A	10.35'	4,167 cf	**ACF R-Tank HD 2.0** x 505 Inside #1 Inside= 15.7"W x 33.9"H => 3.52 sf x 2.35'L = 8.3 cf Outside= 15.7"W x 33.9"H => 3.70 sf x 2.35'L = 8.7 cf 5 Rows of 101 Chambers
		6,557 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	10.10'	**8.270 in/hr Exfiltration over Surface area**
#2	Primary	10.35'	**24.0" Round Culvert** L= 81.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 10.35' / 10.35' S= 0.0000 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Discarded OutFlow Max=0.49 cfs @ 11.30 hrs HW=10.15' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.49 cfs)

Primary OutFlow Max=0.00 cfs @ 12.65 hrs HW=13.36' TW=13.63' (Dynamic Tailwater)
└─**2=Culvert** (Controls 0.00 cfs)

Summary for Pond 1PB: South

Inflow Area =	0.667 ac,	76.53% Impervious,	Inflow Depth >	5.97"	for 100 Year event
Inflow =	4.24 cfs @	12.07 hrs,	Volume=	0.332 af	
Outflow =	3.54 cfs @	12.50 hrs,	Volume=	0.293 af,	Atten= 17%, Lag= 25.7 min
Discarded =	0.07 cfs @	8.15 hrs,	Volume=	0.113 af	
Primary =	3.47 cfs @	12.50 hrs,	Volume=	0.180 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 14.06' @ 12.44 hrs Surf.Area= 1,262 sf Storage= 3,503 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 40.1 min (804.1 - 764.0)

Volume	Invert	Avail.Storage	Storage Description
#1A	10.10'	960 cf	**23.69'W x 53.26'L x 4.07'H Field A** 5,136 cf Overall - 2,736 cf Embedded = 2,400 cf x 40.0% Voids
#2A	10.35'	2,599 cf	**ACF R-Tank HD 2.0** x 315 Inside #1 Inside= 15.7"W x 33.9"H => 3.52 sf x 2.35'L = 8.3 cf Outside= 15.7"W x 33.9"H => 3.70 sf x 2.35'L = 8.7 cf 15 Rows of 21 Chambers
		3,559 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	10.10'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	10.35'	**24.0" Round Culvert** L= 57.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 10.35' / 10.35' S= 0.0000 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Discarded OutFlow Max=0.07 cfs @ 8.15 hrs HW=10.14' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.07 cfs)

Primary OutFlow Max=0.00 cfs @ 12.50 hrs HW=13.75' TW=13.89' (Dynamic Tailwater)
└─**2=Culvert** (Controls 0.00 cfs)

Summary for Pond 1PC: East

Inflow Area = 2.228 ac, 63.49% Impervious, Inflow Depth > 2.25" for 100 Year event
Inflow = 8.29 cfs @ 12.50 hrs, Volume= 0.418 af
Outflow = 4.28 cfs @ 12.39 hrs, Volume= 0.369 af, Atten= 48%, Lag= 0.0 min
Discarded = 0.04 cfs @ 9.85 hrs, Volume= 0.048 af
Primary = 4.24 cfs @ 12.39 hrs, Volume= 0.321 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 14.08' @ 12.39 hrs Surf.Area= 1,561 sf Storage= 4,322 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 36.7 min (805.2 - 768.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	10.10'	1,209 cf	**19.75'W x 79.07'L x 4.07'H Field A** 6,357 cf Overall - 3,335 cf Embedded = 3,022 cf x 40.0% Voids
#2A	10.35'	3,169 cf	**ACF R-Tank HD 2.0** x 384 Inside #1 Inside= 15.7"W x 33.9"H => 3.52 sf x 2.35'L = 8.3 cf Outside= 15.7"W x 33.9"H => 3.70 sf x 2.35'L = 8.7 cf 12 Rows of 32 Chambers
		4,377 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	10.10'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	12.15'	**12.0" Round Culvert** L= 18.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 12.15' / 12.15' S= 0.0000 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Discarded OutFlow Max=0.04 cfs @ 9.85 hrs HW=10.15' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.04 cfs)

Primary OutFlow Max=4.13 cfs @ 12.39 hrs HW=14.04' TW=0.00' (Dynamic Tailwater)
└─**2=Culvert** (Barrel Controls 4.13 cfs @ 5.26 fps)

Stage-Area-Storage for Pond 1PA: North (continued)

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
11.16	2,545	1,771	11.69	2,545	2,764
11.17	2,545	1,790	11.70	2,545	2,783
11.18	2,545	1,809	11.71	2,545	2,802
11.19	2,545	1,828	11.72	2,545	2,820
11.20	2,545	1,846	11.73	2,545	2,839
11.21	2,545	1,865	11.74	2,545	2,858
11.22	2,545	1,884	11.75	2,545	2,876
11.23	2,545	1,903	11.76	2,545	2,895
11.24	2,545	1,921	11.77	2,545	2,914
11.25	2,545	1,940	11.78	2,545	2,933
11.26	2,545	1,959	11.79	2,545	2,951
11.27	2,545	1,978	11.80	2,545	2,970
11.28	2,545	1,996	11.81	2,545	2,989
11.29	2,545	2,015	11.82	2,545	3,008
11.30	2,545	2,034	11.83	2,545	3,026
11.31	2,545	2,052	11.84	2,545	3,045
11.32	2,545	2,071	11.85	2,545	3,064
11.33	2,545	2,090	11.86	2,545	3,083
11.34	2,545	2,109	11.87	2,545	3,101
11.35	2,545	2,127	11.88	2,545	3,120
11.36	2,545	2,146	11.89	2,545	3,139
11.37	2,545	2,165	11.90	2,545	3,157
11.38	2,545	2,184	11.91	2,545	3,176
11.39	2,545	2,202	11.92	2,545	3,195
11.40	2,545	2,221	11.93	2,545	3,214
11.41	2,545	2,240	11.94	2,545	3,232
11.42	2,545	2,258	11.95	2,545	3,251
11.43	2,545	2,277	11.96	2,545	3,270
11.44	2,545	2,296	11.97	2,545	3,289
11.45	2,545	2,315	11.98	2,545	3,307
11.46	2,545	2,333	11.99	2,545	3,326
11.47	2,545	2,352	12.00	2,545	3,345
11.48	2,545	2,371	12.01	2,545	3,363
11.49	2,545	2,390	12.02	2,545	3,382
11.50	2,545	2,408	12.03	2,545	3,401
11.51	2,545	2,427	12.04	2,545	3,420
11.52	2,545	2,446	12.05	2,545	3,438
11.53	2,545	2,464	12.06	2,545	3,457
11.54	2,545	2,483	12.07	2,545	3,476
11.55	2,545	2,502	12.08	2,545	3,495
11.56	2,545	2,521	12.09	2,545	3,513
11.57	2,545	2,539	12.10	2,545	3,532
11.58	2,545	2,558	12.11	2,545	3,551
11.59	2,545	2,577	12.12	2,545	3,569
11.60	2,545	2,596	12.13	2,545	3,588
11.61	2,545	2,614	12.14	2,545	3,607
11.62	2,545	2,633	12.15	2,545	3,626
11.63	2,545	2,652	12.16	2,545	3,644
11.64	2,545	2,670	12.17	2,545	3,663
11.65	2,545	2,689	12.18	2,545	3,682
11.66	2,545	2,708	12.19	2,545	3,701
11.67	2,545	2,727	12.20	2,545	3,719
11.68	2,545	2,745	12.21	2,545	3,738

Volume in Pond 1PA Below Invert of Outlet Pipe

Stage-Area-Storage for Pond 1PA: North (continued)

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
13.28	2,545	5,649
13.29	2,545	5,659
13.30	2,545	5,670
13.31	2,545	5,680
13.32	2,545	5,690
13.33	2,545	5,700
13.34	2,545	5,710
13.35	2,545	5,720
13.36	2,545	5,731
13.37	2,545	5,741
13.38	2,545	5,751
13.39	2,545	5,761
13.40	2,545	5,771
13.41	2,545	5,782
13.42	2,545	5,792
13.43	2,545	5,802
13.44	2,545	5,812
13.45	2,545	5,822
13.46	2,545	5,832
13.47	2,545	5,843
13.48	2,545	5,853
13.49	2,545	5,863
13.50	2,545	5,873
13.51	2,545	5,883
13.52	2,545	5,894
13.53	2,545	5,904
13.54	2,545	5,914
13.55	2,545	5,924
13.56	2,545	5,934
13.57	2,545	5,944
13.58	2,545	5,955
13.59	2,545	5,965
13.60	2,545	5,975
13.61	2,545	5,985
13.62	2,545	5,995
13.63	2,545	6,005
13.64	2,545	6,016
13.65	2,545	6,026
13.66	2,545	6,036
13.67	2,545	6,046
13.68	2,545	6,056
13.69	2,545	6,067
13.70	2,545	6,077
13.71	2,545	6,087
13.72	2,545	6,097
13.73	2,545	6,107
13.74	2,545	6,117
13.75	2,545	6,128
13.76	2,545	6,138
13.77	2,545	6,148
13.78	2,545	6,158
13.79	2,545	6,168
13.80	2,545	6,179
13.81	2,545	6,189
13.82	2,545	6,199
13.83	2,545	6,209
13.84	2,545	6,219
13.85	2,545	6,229
13.86	2,545	6,240
13.87	2,545	6,250
13.88	2,545	6,260
13.89	2,545	6,270
13.90	2,545	6,280
13.91	2,545	6,290
13.92	2,545	6,301
13.93	2,545	6,311
13.94	2,545	6,321
13.95	2,545	6,331
13.96	2,545	6,341
13.97	2,545	6,352
13.98	2,545	6,362
13.99	2,545	6,372
14.00	2,545	6,382
14.01	2,545	6,392
14.02	2,545	6,402
14.03	2,545	6,413
14.04	2,545	6,423
14.05	2,545	6,433
14.06	2,545	6,443
14.07	2,545	6,453
14.08	2,545	6,464
14.09	2,545	6,474
14.10	2,545	6,484
14.11	2,545	6,494
14.12	2,545	6,504
14.13	2,545	6,514
14.14	2,545	6,525
14.15	2,545	6,535
14.16	2,545	6,545
14.17	2,545	**6,555**

Total Volume in Pond 1PA

Stage-Area-Storage for Pond 1PB: South (continued)

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
11.16	1,262	967	11.69	1,262	1,517
11.17	1,262	977	11.70	1,262	1,527
11.18	1,262	988	11.71	1,262	1,538
11.19	1,262	998	11.72	1,262	1,548
11.20	1,262	1,008	11.73	1,262	1,559
11.21	1,262	1,019	11.74	1,262	1,569
11.22	1,262	1,029	11.75	1,262	1,579
11.23	1,262	1,040	11.76	1,262	1,590
11.24	1,262	1,050	11.77	1,262	1,600
11.25	1,262	1,060	11.78	1,262	1,610
11.26	1,262	1,071	11.79	1,262	1,621
11.27	1,262	1,081	11.80	1,262	1,631
11.28	1,262	1,091	11.81	1,262	1,642
11.29	1,262	1,102	11.82	1,262	1,652
11.30	1,262	1,112	11.83	1,262	1,662
11.31	1,262	1,123	11.84	1,262	1,673
11.32	1,262	1,133	11.85	1,262	1,683
11.33	1,262	1,143	11.86	1,262	1,693
11.34	1,262	1,154	11.87	1,262	1,704
11.35	1,262	1,164	11.88	1,262	1,714
11.36	1,262	1,174	11.89	1,262	1,725
11.37	1,262	1,185	11.90	1,262	1,735
11.38	1,262	1,195	11.91	1,262	1,745
11.39	1,262	1,206	11.92	1,262	1,756
11.40	1,262	1,216	11.93	1,262	1,766
11.41	1,262	1,226	11.94	1,262	1,776
11.42	1,262	1,237	11.95	1,262	1,787
11.43	1,262	1,247	11.96	1,262	1,797
11.44	1,262	1,258	11.97	1,262	1,808
11.45	1,262	1,268	11.98	1,262	1,818
11.46	1,262	1,278	11.99	1,262	1,828
11.47	1,262	1,289	12.00	1,262	1,839
11.48	1,262	1,299	12.01	1,262	1,849
11.49	1,262	1,309	12.02	1,262	1,860
11.50	1,262	1,320	12.03	1,262	1,870
11.51	1,262	1,330	12.04	1,262	1,880
11.52	1,262	1,341	12.05	1,262	1,891
11.53	1,262	1,351	12.06	1,262	1,901
11.54	1,262	1,361	12.07	1,262	1,911
11.55	1,262	1,372	12.08	1,262	1,922
11.56	1,262	1,382	12.09	1,262	1,932
11.57	1,262	1,392	12.10	1,262	1,943
11.58	1,262	1,403	12.11	1,262	1,953
11.59	1,262	1,413	12.12	1,262	1,963
11.60	1,262	1,424	12.13	1,262	1,974
11.61	1,262	1,434	12.14	1,262	1,984
11.62	1,262	1,444	12.15	1,262	1,994
11.63	1,262	1,455	12.16	1,262	2,005
11.64	1,262	1,465	12.17	1,262	2,015
11.65	1,262	1,475	12.18	1,262	2,026
11.66	1,262	1,486	12.19	1,262	2,036
11.67	1,262	1,496	12.20	1,262	2,046
11.68	1,262	1,507	12.21	1,262	2,057

Volume in Pond 1PB Below Invert of Outlet Pipe

Stage-Area-Storage for Pond 1PB: South (continued)

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
13.28	1,262	3,109
13.29	1,262	3,115
13.30	1,262	3,120
13.31	1,262	3,125
13.32	1,262	3,130
13.33	1,262	3,135
13.34	1,262	3,140
13.35	1,262	3,145
13.36	1,262	3,150
13.37	1,262	3,155
13.38	1,262	3,160
13.39	1,262	3,165
13.40	1,262	3,170
13.41	1,262	3,175
13.42	1,262	3,180
13.43	1,262	3,185
13.44	1,262	3,190
13.45	1,262	3,195
13.46	1,262	3,200
13.47	1,262	3,205
13.48	1,262	3,210
13.49	1,262	3,215
13.50	1,262	3,220
13.51	1,262	3,226
13.52	1,262	3,231
13.53	1,262	3,236
13.54	1,262	3,241
13.55	1,262	3,246
13.56	1,262	3,251
13.57	1,262	3,256
13.58	1,262	3,261
13.59	1,262	3,266
13.60	1,262	3,271
13.61	1,262	3,276
13.62	1,262	3,281
13.63	1,262	3,286
13.64	1,262	3,291
13.65	1,262	3,296
13.66	1,262	3,301
13.67	1,262	3,306
13.68	1,262	3,311
13.69	1,262	3,316
13.70	1,262	3,321
13.71	1,262	3,326
13.72	1,262	3,332
13.73	1,262	3,337
13.74	1,262	3,342
13.75	1,262	3,347
13.76	1,262	3,352
13.77	1,262	3,357
13.78	1,262	3,362
13.79	1,262	3,367
13.80	1,262	3,372
13.81	1,262	3,377
13.82	1,262	3,382
13.83	1,262	3,387
13.84	1,262	3,392
13.85	1,262	3,397
13.86	1,262	3,402
13.87	1,262	3,407
13.88	1,262	3,412
13.89	1,262	3,417
13.90	1,262	3,422
13.91	1,262	3,427
13.92	1,262	3,432
13.93	1,262	3,437
13.94	1,262	3,443
13.95	1,262	3,448
13.96	1,262	3,453
13.97	1,262	3,458
13.98	1,262	3,463
13.99	1,262	3,468
14.00	1,262	3,473
14.01	1,262	3,478
14.02	1,262	3,483
14.03	1,262	3,488
14.04	1,262	3,493
14.05	1,262	3,498
14.06	1,262	3,503
14.07	1,262	3,508
14.08	1,262	3,513
14.09	1,262	3,518
14.10	1,262	3,523
14.11	1,262	3,528
14.12	1,262	3,533
14.13	1,262	3,538
14.14	1,262	3,543
14.15	1,262	3,548
14.16	1,262	3,554
14.17	1,262	**3,559**

Total Volume in Pond 1PB

Stage-Area-Storage for Pond 1PC: East (continued)

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
11.16	1,561	1,189	11.69	1,561	1,864
11.17	1,561	1,201	11.70	1,561	1,877
11.18	1,561	1,214	11.71	1,561	1,890
11.19	1,561	1,227	11.72	1,561	1,903
11.20	1,561	1,240	11.73	1,561	1,915
11.21	1,561	1,252	11.74	1,561	1,928
11.22	1,561	1,265	11.75	1,561	1,941
11.23	1,561	1,278	11.76	1,561	1,954
11.24	1,561	1,291	11.77	1,561	1,966
11.25	1,561	1,303	11.78	1,561	1,979
11.26	1,561	1,316	11.79	1,561	1,992
11.27	1,561	1,329	11.80	1,561	2,004
11.28	1,561	1,342	11.81	1,561	2,017
11.29	1,561	1,354	11.82	1,561	2,030
11.30	1,561	1,367	11.83	1,561	2,043
11.31	1,561	1,380	11.84	1,561	2,055
11.32	1,561	1,393	11.85	1,561	2,068
11.33	1,561	1,405	11.86	1,561	2,081
11.34	1,561	1,418	11.87	1,561	2,094
11.35	1,561	1,431	11.88	1,561	2,106
11.36	1,561	1,444	11.89	1,561	2,119
11.37	1,561	1,456	11.90	1,561	2,132
11.38	1,561	1,469	11.91	1,561	2,145
11.39	1,561	1,482	11.92	1,561	2,157
11.40	1,561	1,495	11.93	1,561	2,170
11.41	1,561	1,507	11.94	1,561	2,183
11.42	1,561	1,520	11.95	1,561	2,196
11.43	1,561	1,533	11.96	1,561	2,208
11.44	1,561	1,546	11.97	1,561	2,221
11.45	1,561	1,558	11.98	1,561	2,234
11.46	1,561	1,571	11.99	1,561	2,247
11.47	1,561	1,584	12.00	1,561	2,259
11.48	1,561	1,597	12.01	1,561	2,272
11.49	1,561	1,609	12.02	1,561	2,285
11.50	1,561	1,622	12.03	1,561	2,298
11.51	1,561	1,635	12.04	1,561	2,310
11.52	1,561	1,648	12.05	1,561	2,323
11.53	1,561	1,660	12.06	1,561	2,336
11.54	1,561	1,673	12.07	1,561	2,349
11.55	1,561	1,686	12.08	1,561	2,361
11.56	1,561	1,699	12.09	1,561	2,374
11.57	1,561	1,711	12.10	1,561	2,387
11.58	1,561	1,724	12.11	1,561	2,400
11.59	1,561	1,737	12.12	1,561	2,412
11.60	1,561	1,750	12.13	1,561	2,425
11.61	1,561	1,762	12.14	1,561	2,438
11.62	1,561	1,775	12.15	1,561	2,451
11.63	1,561	1,788	12.16	1,561	2,463
11.64	1,561	1,801	12.17	1,561	2,476
11.65	1,561	1,813	12.18	1,561	2,489
11.66	1,561	1,826	12.19	1,561	2,502
11.67	1,561	1,839	12.20	1,561	2,514
11.68	1,561	1,852	12.21	1,561	2,527

Volume in Pond 1PC Below Invert of Outlet Pipe

Stage-Area-Storage for Pond 1PC: East (continued)

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
13.28	1,561	3,821
13.29	1,561	3,827
13.30	1,561	3,833
13.31	1,561	3,839
13.32	1,561	3,846
13.33	1,561	3,852
13.34	1,561	3,858
13.35	1,561	3,864
13.36	1,561	3,871
13.37	1,561	3,877
13.38	1,561	3,883
13.39	1,561	3,889
13.40	1,561	3,896
13.41	1,561	3,902
13.42	1,561	3,908
13.43	1,561	3,914
13.44	1,561	3,920
13.45	1,561	3,927
13.46	1,561	3,933
13.47	1,561	3,939
13.48	1,561	3,945
13.49	1,561	3,952
13.50	1,561	3,958
13.51	1,561	3,964
13.52	1,561	3,970
13.53	1,561	3,977
13.54	1,561	3,983
13.55	1,561	3,989
13.56	1,561	3,995
13.57	1,561	4,002
13.58	1,561	4,008
13.59	1,561	4,014
13.60	1,561	4,020
13.61	1,561	4,027
13.62	1,561	4,033
13.63	1,561	4,039
13.64	1,561	4,045
13.65	1,561	4,052
13.66	1,561	4,058
13.67	1,561	4,064
13.68	1,561	4,070
13.69	1,561	4,077
13.70	1,561	4,083
13.71	1,561	4,089
13.72	1,561	4,095
13.73	1,561	4,102
13.74	1,561	4,108
13.75	1,561	4,114
13.76	1,561	4,120
13.77	1,561	4,127
13.78	1,561	4,133
13.79	1,561	4,139
13.80	1,561	4,145
13.81	1,561	4,152
13.82	1,561	4,158
13.83	1,561	4,164
13.84	1,561	4,170
13.85	1,561	4,177
13.86	1,561	4,183
13.87	1,561	4,189
13.88	1,561	4,195
13.89	1,561	4,202
13.90	1,561	4,208
13.91	1,561	4,214
13.92	1,561	4,220
13.93	1,561	4,227
13.94	1,561	4,233
13.95	1,561	4,239
13.96	1,561	4,245
13.97	1,561	4,252
13.98	1,561	4,258
13.99	1,561	4,264
14.00	1,561	4,270
14.01	1,561	4,276
14.02	1,561	4,283
14.03	1,561	4,289
14.04	1,561	4,295
14.05	1,561	4,301
14.06	1,561	4,308
14.07	1,561	4,314
14.08	1,561	4,320
14.09	1,561	4,326
14.10	1,561	4,333
14.11	1,561	4,339
14.12	1,561	4,345
14.13	1,561	4,351
14.14	1,561	4,358
14.15	1,561	4,364
14.16	1,561	4,370
14.17	1,561	**4,376**

Total Volume in Pond 1PC

Appendix IV. Soil Evaluation for Drainage Design

Soil Evaluation for Drainage Design **556 Main Street** **17791**
December 19, 2013 **Falmouth, MA**
Evaluation by: Edward Cullen
See Site Plan for Locations

HANCOCK ASSOCIATES

TP-1

Depth	Soil Horizon/ Layer	Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)
			Depth	Color	Percent		Gravel	Cobbles & Stones		
0-61"	Fill		n/a	n/a	n/a					
61-80"	Bw	10yr 5/4	n/a	n/a	n/a	Fine Sandy Loam			loose	dry
80-94"	C1	10 yr 5/2	n/a	n/a	n/a	Loamy Sand			loose	dry
94-135"	C2	7.5yr5/3	n/a	n/a	n/a	Loamy Sand			loose	dry
Weeping @ 126" Standing @ 135" No Mottling, No refusal										

TP-2

Depth	Soil Horizon/ Layer	Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)
			Depth	Color	Percent		Gravel	Cobbles & Stones		
0-5"	Bit Conc		n/a	n/a	n/a					
5-36"	Fill		n/a	n/a	n/a					dry
36-76	C1	10yr6/8	n/a	n/a	n/a	Gravelly Coarse Sand	20		loose & single grained	dry
76-126"	C2	2.5y7/6	n/a	n/a	n/a	Medium Sand			loose & single grained	dry

Weeping @ 126", No Mottling, No refusal

HANCOCK ASSOCIATES

TP-3

Depth	Soil Horizon/ Layer	Matrix: Color- Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)
			Depth	Color	Percent		Gravel	Cobbles & Stones		
0-66"	Fill		n/a	n/a	n/a					dry
66-109"	C1	10yr 5/2	n/a	n/a	n/a	Loamy Sand				dry
109-138"	C2	2.5y4/4	116"	7.5r5/8		Sandy Loam			Loose	
Weeping @ 134", No refusal										

TP-4

Depth	Soil Horizon/ Layer	Matrix: Color- Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)
			Depth	Color	Percent		Gravel	Cobbles & Stones		
0-11"	Fill		n/a	n/a	n/a					dry
11-30"	Bw	10yr6/8	n/a	n/a	n/a	Loamy Sand				dry
30-48"	C1	5y6/2	n/a	n/a	n/a	Sandy loam				dry
48-137"	C2	10yr8/8	n/a	n/a	n/a	Medium Sand			Loose & single grained	
Weeping @ 137", No refusal, hole collapsing										

HANCOCK ASSOCIATES

TP-5

Depth	Soil Horizon/ Layer	Matrix: Color- Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistenc e (Moist)
			Depth	Color	Percent		Gravel	Cobbles & Stones		
0-141"	Fill	2.5y5/4	n/a	n/a	n/a	Pockets of Sandy loam & Loamy sand			Loose	
No groundwater, No Mottling, No refusal, Garbage found @ 120"										

TP-6

Depth	Soil Horizon/ Layer	Matrix: Color- Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistenc e (Moist)
			Depth	Color	Percent		Gravel	Cobbles & Stones		
0-64"	Fill		n/a	n/a	n/a					dry
64-94"	C1	10yr 6/8	n/a	n/a	n/a	Gravelly coarse sand	20		loose & single grained	dry
94-130"	C2	2.5y7/6	n/a	n/a	n/a	Medium sand			loose & single grained	dry
Saturated @ 130", No Mottling, No refusal										

HANCOCK ASSOCIATES

TP-7

Depth	Soil Horizon/ Layer	Matrix: Color- Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistenc e (Moist)
			Depth	Color	Percent		Gravel	Cobbles & Stones		

0-49"	Fill		n/a	n/a	n/a					dry
49-89"	C1	10yr 6/8	n/a	n/a	n/a	Gravelly coarse sand	20		loose & single grained	dry
89-139"	C2	2.5y7/6	n/a	n/a	n/a	Medium sand			loose & single grained	
Saturated @ 139", No Mottling, No refusal										

TP-8

Depth	Soil Horizon/ Layer	Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)
			Depth	Color	Percent		Gravel	Cobbles & Stones		
0-55"	Fill		n/a	n/a	n/a					dry
55-64"	Ap	10yr3/4	n/a	n/a	n/a	Fine sandy loam				dry
64-74"	Bw	7.5yr5/4	n/a	n/a	n/a	Sandy loam				dry
74-147"	C1	2.5y6/2	91"	7.5r5/8		Silt loam			Firm	
Weeping @ 147", No refusal										

Appendix V. ACF Environmental Product Information

SUSPENDED SOLIDS REMOVAL TEST OF A 22 X 44 INCH STORMBASIN MODULAR STORMWATER FILTRATION SYSTEM

By

James T. Mailloux

Submitted to

FABCO INDUSTRIES, INC.

June 2005

ALDEN RESEARCH LABORATORY, INC.

30 Shrewsbury Street

Holden, MA 01520

SUSPENDED SOLIDS REMOVAL EFFICIENCY TEST OF A 22 X 44 INCH STORMBASIN MODULAR STORMWATER FILTRATION SYSTEM

1.0 INTRODUCTION

Under a contract from Fabco Industries, Inc. (Fabco), a sediment removal efficiency test of a StormBasin Modular Stormwater Filtration System, using OK110 silica sand, was conducted at Alden Research Laboratory, Inc. (Alden), Holden, Massachusetts. The filtration system consisted of a 22 x 44 inch molded StormBasin unit which housed two (2) filter cartridges.

2.0 TEST FACILITY DESCRIPTION

A closed test loop, located in Alden's laboratory testing facility was used to facilitate the testing of the StormBasin unit. The test loop consisted of a 15 HP pump drawing water from a laboratory sump, 2-inch calibrated flow meter, influent piping, test unit, collection tank and effluent piping to return the water to the sump. The influent piping contained a sampling port approximately 3 ft upstream of the test unit for collecting the influent concentration samples and consisted of a 3-inch tee, pipe and quick-turn butterfly valve. A 3-inch tee was used for injecting the OK110 silica sand and was positioned 10 pipe diameters upstream of the sampling port to assure thorough mixing. The effluent concentration samples were collected at the free-discharge of the effluent piping.

3.0 INSTRUMENTATION AND MEASURING TECHNIQUES

3.1 Flow

The inflow to the test unit was set with a 2-inch butterfly valve and measured using an orifice plate fabricated and installed per ASME guidelines. The fabricated flow meter was calibrated in Alden's Calibration Department and is NIST traceable. The accuracy of the flow measurement is estimated at ±1%. The differential head from the orifice meter was measured using a

Rosemount 0 to 250-inch Differential Pressure Cell, calibrated at the laboratory prior to testing. The test flow was averaged and recorded every 10 seconds throughout the duration of the test, using a computerized data acquisition program.

3.2 Temperature

Temperature measurements were achieved using an Omega DP41 temperature probe and readout device, which was calibrated at the laboratory prior to testing.

3.3 Pressure Head

The pressure head within the StormBasin unit was measured using a Druck, 2-psi single-ended pressure cell, which was calibrated at the laboratory prior to testing. Pressure readings were averaged and recorded every 10 seconds throughout the duration of the test, using a computerized data acquisition program.

3.4 Sediment Injection

OK110 silica sand was used to test the StormBasin unit. The test sand was introduced into the system using an Auger volumetric screw feeder, model VF-1. A ½ inch feed auger was driven with a variable speed drive, which was calibrated with the OK110 sand prior to testing. The feed unit contains a 1.5 cubic foot hopper at the upper end of the auger to provide a constant supply of dry test sand.

3.5 Sample Analysis

Samples of approximately 1 Liter were collected at each location in graduated 2-Liter beakers. The samples were weighed to the nearest 0.1gram, using an Ohaus 4000g x 0.1g digital scale, model SCD-010. Each sample was filtered through a Whatman 934-AH, 42 mm, 1.5-micron, glass microfiber filter paper. Each sediment sample was dried and then weighed to the nearest 0.0001gram, using an AND analytical balance, model ER-182A.

4.0 TEST PROCEDURE

The Fabco StormBasin modular stormwater filtration system was tested at a flow of 60 gpm, with a sediment injection concentration of approximately 200 mg/L. The test was conducted under 100% filtration, with no flow going into bypass.

The system flow was set and allowed to stabilize. The OK110 test sand was introduced into the inflow line and three system volumes were allowed to pass through the system prior to the collection of samples. Four pairs of influent/effluent samples were collected, with the effluent samples taken 1 unit residence time after the influent sample. At the completion of the sample collections, the sediment injection was stopped and three system volumes were again passed through the unit.

The collected samples were filtered and analyzed in accordance with Method B, as described in ASTM Designation: D 3977-97 (Re-approved 2002), "Standard Test Methods for Determining Sediment Concentration in Water Samples."

5.0 RESULTS

The test was conducted at a nominal flow of 60 gpm. The average flow was 60.1 gpm, with a minimum and maximum-recorded flow of 58.2 gpm and 61.6 gpm, respectively. The recorded temperature was 60.0 degrees Fahrenheit.

The measured influent sediment concentrations ranged from 95.6 mg/L to 139.2 mg/L, with a mean concentration of 114.6 mg/L. The effluent concentrations ranged from 1.4 mg/L to 3.3 mg/L, with a mean concentration of 2.5 mg/L. The resulting sediment concentration removal efficiencies ranged from 96.6% to 99.0%, with a mean of 97.8%.

FABCO INDUSTRIES, INC.

60 GPM SEDIMENT REMOVAL TEST
OK110 SILICA SAND

Red Tag Filters 0580026 0580031

Sample	Influent mg/L	Effluent mg/L	**Efficiency (%)**
1	108.6	2.1	**98.1**
2	115.2	3.3	**97.2**
3	139.2	1.4	**99.0**
4	95.6	3.3	**96.6**
MEAN	114.6	2.5	**97.8**

556 Main Street, Falmouth MA Development

Proprietary Water Quality Unit Sizing Computations

Proposed Pretreatment Unit: Fabco StormBasin

Catch Basin I.D.	Tributary Area (sf)	Tributary Area (ac)	Water Quality Volume (cf) (0.5" x tributary area)	Tc (hrs)	qu (unit discharge) (csm/inch)	$Q_{0.5}$ (cfs)	Number of Cartridges Req'd *	Fabco StormBasin Model Proposed	Neenah Grate Model Selected	Clear Opening	Min Catch Basin Size Required
CB1	4,700	0.11	195.8	0.1	752	0.063	1	10047-2	R-3405-A	22" x 22"	2' x 2'
CB2	7,000	0.16	291.7	0.1	752	0.094	1	10047-2	R-3405-A	22" x 22"	2' x 2'
CB3	22,000	0.51	916.7	0.1	752	0.297	3	10105-1	R-3415	19" x 52"	2' x 5'

* Each Standard Fabco Cartridge can treat 0.134 cfs

September 9, 2014

Mr. Robert Adair
President
Convergent Water Technologies
1930 Aldine Western Road
Houston, TX 77038

Dear Mr. Adair:

Subject: Summary Letter - FocalPoint Biofiltration System Performance (Virginia Mixture) Testing for Total Suspended Solids Removal Efficiencies
CEC Project 142-508

On July 23, 2014, Convergent Water Technologies of Houston, Texas authorized Civil & Environmental Consultants, Inc. (CEC) to perform a series of laboratory-scale column tests to assess the performance of the FocalPoint Biofiltration System, incorporating media sourced from their blending facility in Virginia, in attenuating suspended solids within the water column of simulated stormwater solutions.

The FocalPoint High Performance Modular Biofiltration System (HPMBS) is a site-built system utilizing open source components for the treatment of stormwater runoff. The FocalPoint system was developed by Convergent Water Technologies based in Houston, Texas. Like all biofiltration/bioretention systems, FocalPoint utilizes physical, chemical and biological mechanisms of a soil, plant and microbe complex to remove pollutants typically found in urban stormwater runoff. The modular treatment system, containing biologically active biofiltration media, is used as a complete, integrated system designed for installation in square foot increments to treat contaminated runoff.

FocalPoint is a scalable biofiltration system which combines the efficiency of high flow rate media with the durability and modularity of a highly pervious, open cell underdrain/storage/infiltration system, allowing the system to manage both water quality and volume. The typical implementation employs a cross-section that includes a 3-inch uppermost layer of mulch, 18-inch biofiltration media, and 6 inches of washed bridging stone. The stone layer is underlain by an open-mesh micro-grid followed by the modular underdrain storage system [1].

Laboratory testing of the FocalPoint Biofiltration System (Virginia mixture) followed the CEC-developed protocol designed to effectively assess the product as a water quality treatment best management practice (BMP) and analyze the efficiency removals of suspended solids for a given set of flow conditions and a limited range of influent concentrations that are within the range of typical concentrations for permanent, urban stormwater runoff.

The experimental setup consisted of multiple individual column test apparatuses using 6 inch diameter PVC-pipe sections containing each given layer of the FocalPoint Biofiltration System. The system layers consisting of 3 inches of shredded mulch, 18 inches of high-flow biofiltration filter media, and 6 inches of washed, bridging stone were layered within each PVC column section. The modular underdrain was excluded. The installation of the layers included minimal compaction effort. All testing was performed on unvegetated columns. Column sections were fastened together using flexible couplings tightened around the outside of the column section using stainless steel bands. The open-flow mesh was fastened to the ends of the columns using stainless steel bands.

After pre-flushing the column with deionized water, several replicate passes of simulated stormwater solutions using Sil-Co-Sil 106 silica were poured into the tops of the columns at an average suspended solids influent concentration of 450 mg/L. Effluent from the columns was collected and composite samples were taken from the given effluent collected from each pass through the column. Both influent volumes and collected effluent volumes per replicate were measured and solids removal efficiencies for each replicate were calculated on a mass basis. The removal efficiency statistics for the Virginia mixture of the FocalPoint Biofiltration System are shown in Table 1.

Table 1. Removal Efficiency Results for Suspended Solids

Mean Removal Efficiency	**91.2%**
Std.Deviation	1.1%
*RPD	1.2 %

*RPD-Relative Percent Deviation computed as (std. deviation/mean)*100

We appreciate the opportunity to provide performance testing services to Convergent Water Technologies. If you have any questions or desire additional information beyond this summary letter, please feel free to call me at (615) 333-7797.

Thank you!

Sincerely,

CIVIL & ENVIRONMENTAL CONSULTANTS, INC.

Kevin B. Wolfe, PhD, PE, D.WRE
Vice-President

[1] Convergent Water Technologies. Retrieved on August 9, 2014 from http://www.convergentwater.com/

FOCALPOINT SIZING AND CALCULATION SHEET
** WESTERLY SYSTEM **

Evolved Stormwater Solutions

PROJECT: #556 MAIN STREET DEVELOPMENT

PREPARED BY: ROB WOODMAN, PE – FABCO INDUSTRIES, INC.

PREPARED FOR: KATIE CRUZ, PE – HANCOCK ASSOCIATES

DATE: JULY 30, 2014

Based on the following data provided by the project engineer, Fabco Industries has calculated the proposed sizing of the FocalPoint system and the ability of the system to treat the Water Quality Volume (W_{QV}) prior to overflow/bypass.

- Tributary Area to system = 9,000 sf
- Water Quality Volume (W_{QV})* = 375 cf ---- use **375 cf** for water quality goal -----

* The Water Quality Volume is based on the MassDEP requirement to treat 0.5" of runoff from the tributary area.

Using the *ACF FP and RT Calc version 1.8*, with a type III rainfall distribution. The proposed size of the FocalPoint unit shall be **20 sf** with a minimum ponding volume of **29 cf** above the unit prior to overflow. The chart below summarizes the associated calculation and performance verification.

FocalPoint BIOFILTRATION SYSTEMS

ACF FP and RT Calc 1.8

Water Quality Volume and Design Event			**Directions**
Water Quality Volume (WQv)	375	ft^3	Water Quality Volume calculated from previous Sheet
Design Event	375	ft^3	Total event volume calculated from previous sheet
System Configuration			
Is FocalPoint used?	Yes		Enter Yes if FocalPoint used. Enter No if runoff flows directly into RTank and proceed to RTank Design worksheet
Step 4 - FocalPoint Configuration			
4.1 - FocalPoint Factor of Safety	1		Enter optional factor-of-safety
4.2 - FocalPoint bed area	20	ft^2	Enter target FocalPoint footprint, 20 SF min. (See Step 4.5)
4.3 - Storage volume above FocalPoint provided	29	ft^3	Enter available surface storage volume (See Step 4.5)
4.4 - Desired treatment time	24	hours	Select 24, 48, 72 or 96 hrs from toggle
4.5 - Water Quality Volume treated prior to overflow?	Yes		If Yes = WQv has been treated If No = larger FocalPoint bed (Step 4.2) and/or surface storage volume (Step 4.3) required
4.6 - FocalPoint drain within desired time?	Yes		If Yes = time goal has been met If No = larger FocalPoint bed (Step 4.2) required
4.7 - Flow in excess of storage volume above	To RTank		Select routing location for overflow/bypass vol. from toggle: Off site to disregard flow, RTank to store for retention / detention, harvesting, or infiltration
Step 5 - Evaluation of Design			
5.1 - Volume treated prior to overflow	No Overflow	ft^3	Result = Volume ft3 treated prior to overflow/bypass
5.2 - Total volume treated	375	ft^3	Result = Total Volume ft3 treated

Based on the elevation data provided, the top of the FocalPoint would be set at elevation 14.00 with an invert out/bottom of system at elevation 11.00. The Harco overflow beehive structure rim would be set at elevation 14.50 (6 inches above the FocalPoint surface).

Figure 1 provides a conceptual illustration of the proposed FocalPoint superimposed on the current grading plan for this area.

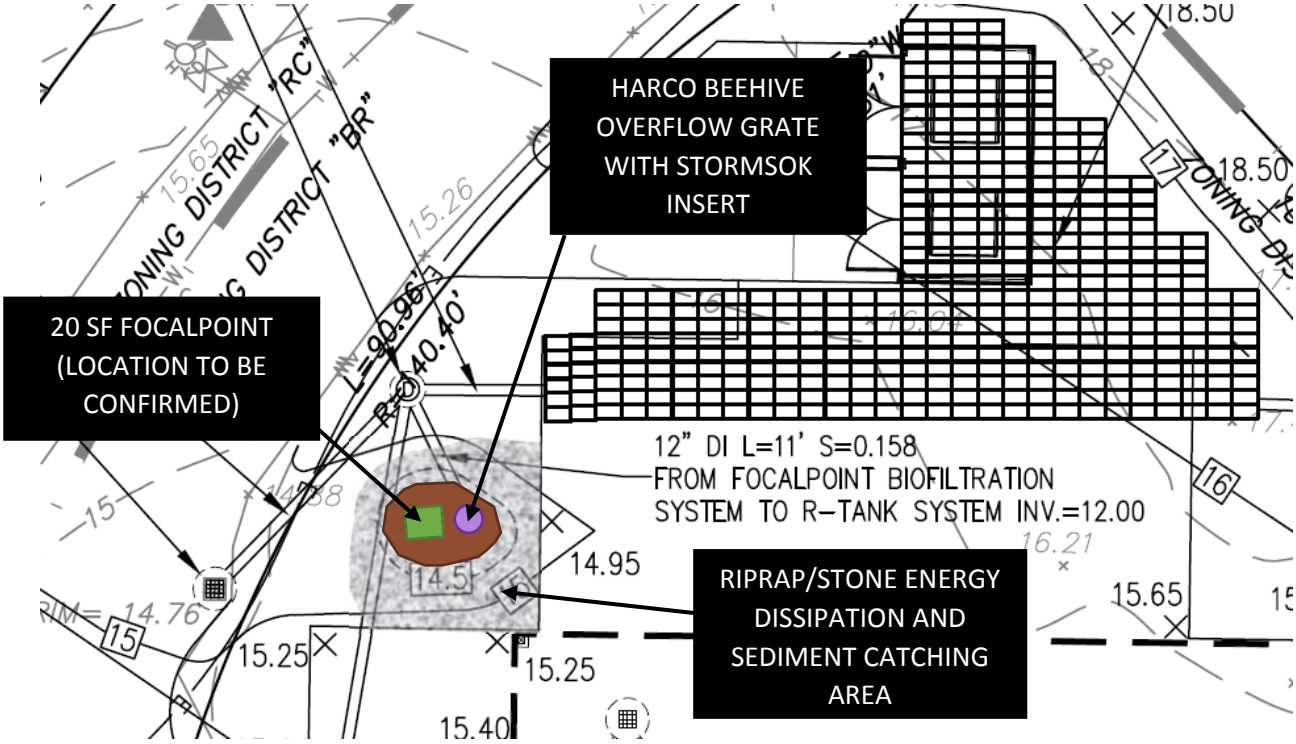


Figure 1 – FocalPoint layout and features Illustration

FOCALPOINT SIZING AND CALCULATION SHEET
** EASTERLY SYSTEM **

Evolved Stormwater Solutions

PROJECT: #556 MAIN STREET DEVELOPMENT

PREPARED BY: ROB WOODMAN, PE – FABCO INDUSTRIES, INC.

PREPARED FOR: KATIE CRUZ, PE – HANCOCK ASSOCIATES

DATE: JULY 30, 2014

Based on the following data provided by the project engineer, Fabco Industries has calculated the proposed sizing of the FocalPoint system and the ability of the system to treat the Water Quality Volume (W_{QV}) prior to overflow/bypass.

- Tributary Area to system = 6,500 sf
- Water Quality Volume (W_{QV})* = 271 cf ---- use **271 cf** for water quality goal -----

* The Water Quality Volume is based on the MassDEP requirement to treat 0.5" of runoff from the tributary area.

Using the *ACF FP and RT Calc version 1.8*, with a type III rainfall distribution. The proposed size of the FocalPoint unit shall be **20 sf** with a minimum ponding volume of **3 cf** above the unit prior to overflow. The chart below summarizes the associated calculation and performance verification.

FocalPoint BIOFILTRATION SYSTEMS

ACF FP and RT Calc 1.8

Water Quality Volume and Design Event			**Directions**
Water Quality Volume (WQv)	271	ft^3	Water Quality Volume calculated from previous Sheet
Design Event	271	ft^3	Total event volume calculated from previous sheet
System Configuration			
Is FocalPoint used?	Yes		Enter Yes if FocalPoint used. Enter No if runoff flows directly into RTank and proceed to RTank Design worksheet
Step 4 - FocalPoint Configuration			
4.1 - FocalPoint Factor of Safety	1		Enter optional factor-of-safety
4.2 - FocalPoint bed area	20	ft^2	Enter target FocalPoint footprint, 20 SF min. (See Step 4.5)
4.3 - Storage volume above FocalPoint provided	140	ft^3	Enter available surface storage volume (See Step 4.5)
4.4 - Desired treatment time	24	hours	Select 24, 48, 72 or 96 hrs from toggle
4.5 - Water Quality Volume treated prior to overflow?	Yes		If Yes = WQv has been treated If No = larger FocalPoint bed (Step 4.2) and/or surface storage volume (Step 4.3) required
4.6 - FocalPoint drain within desired time?	Yes		If Yes = time goal has been met If No = larger FocalPoint bed (Step 4.2) required
4.7 - Flow in excess of storage volume above	To RTank		Select routing location for overflow/bypass vol. from toggle: Off site to disregard flow, RTank to store for retention / detention, harvesting, or infiltration
Step 5 - Evaluation of Design			
5.1 - Volume treated prior to overflow	No Overflow	ft^3	Result = Volume ft3 treated prior to overflow/bypass
5.2 - Total volume treated	271	ft^3	Result = Total Volume ft3 treated

Based on the elevation data provided, the top of the FocalPoint would be set at elevation 13.50 with an invert out/bottom of system at elevation 10.50. The Harco overflow beehive structure rim would be set at elevation 14.00 (6 inches above the FocalPoint surface).

Figure 1 provides a conceptual illustration of the proposed FocalPoint superimposed on the current grading plan for this area.

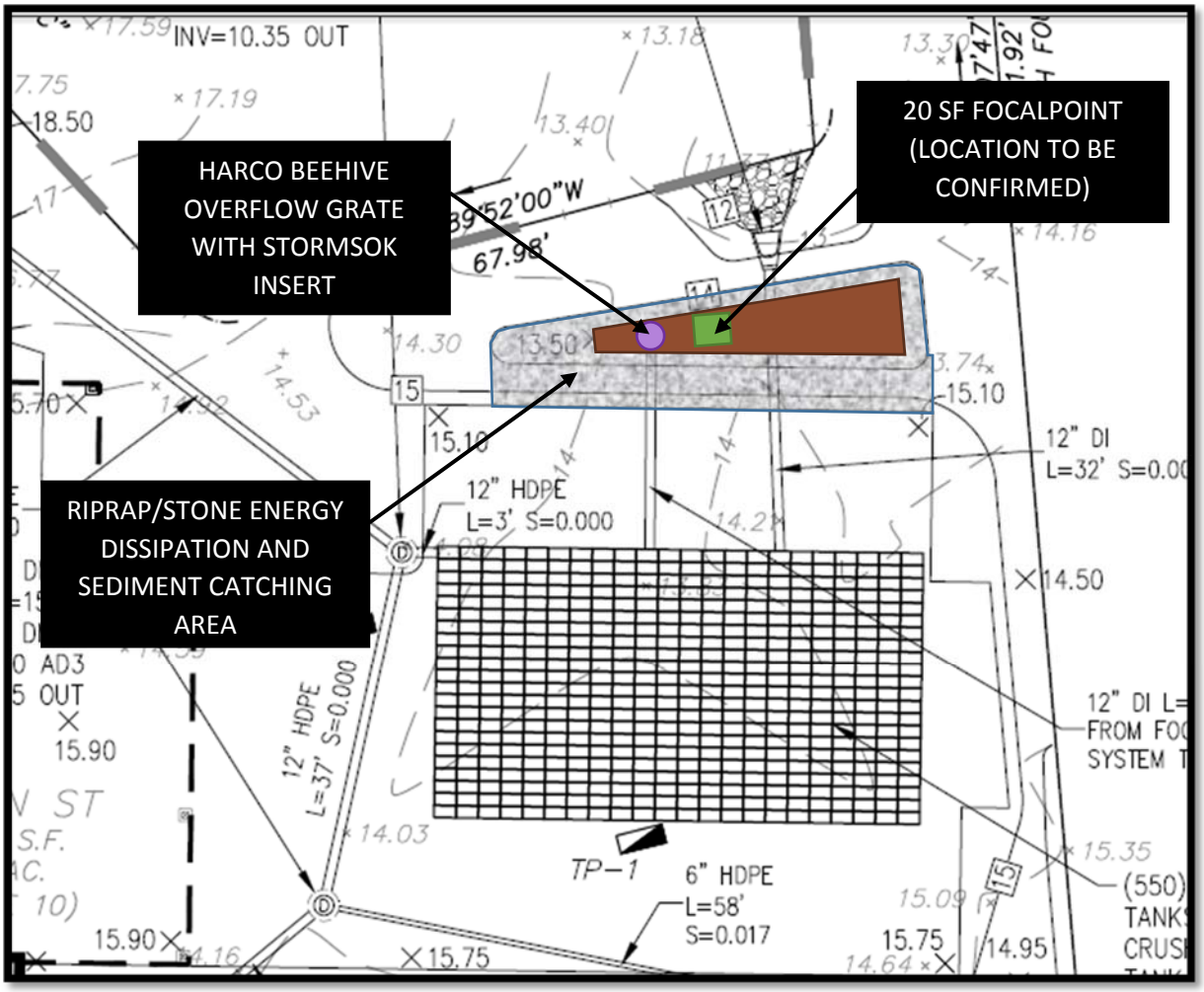


Figure 1 – FocalPoint layout and features Illustration

Appendix VI. Operations and Maintenance Log

556 Main Street

Operation and Maintenance Log

Inspections for Year:_____

Structural Best Management Practice	Action	Date Completed	Completed By	Comments
StormBasins and FocalPoints Inspect 4 times per year, clean as required.	Inspect/ Clean			
	Inspect/ Clean			
	Inspect/ Clean			
	Inspect/ Clean			
	Inspect/ Clean			
Infiltration BMP – Inspect twice per year. Clean as required	Inspect			
	Inspect			
Trench Drain – Inspect/clean twice per year.	Inspect/Clean			
	Inspect/Clean			
Roof Drain Leaders – Inspect/clean twice per year.	Inspect/Clean			
	Inspect/Clean			
Vegetated Areas Maintenance – Inspect twice per year. Maintain as required.	Inspect			
	Inspect			

NOTE: See Operations and Maintenance Plan for details of inspection requirements.

Appendix 6: Grounds and Landscape Maintenance Scope of Work

Grounds and Landscape Maintenance

Scope of Work

NOTE: All Lawn Care provided under this Scope of Work shall be done in accordance with the Town of Falmouth fertilizer management bylaw.

Spring Clean-up

Remove all leaves, branches and debris from the lawn and mulched areas, including in and around shrubbery and plantings. Weed beds.

Clean all sand and salt from lawn areas, walkways, parking lot areas and roadways. Remove off site.

Remove all dead and broken branches from all planted trees

Power edging of all mulch beds

Top dress mulch beds to a depth of 1" pure red hemlock mulch

Repair as needed lawn damaged from snow removal equipment

Activate and check Irrigation system, make all necessary repairs. Office to be notified prior to any work on system.

Remove all debris from property

Weekly Maintenance

Mow and trim lawn areas to maintain a well-groomed appearance throughout the growing season, including weeding.

Clean-up of debris and clippings and removal from property. All walkways shall be swept as needed.

Fertilization Program

Provide a five-step fertilization program. Applications to be applied beginning in the early spring through late fall.

Office to be notified the date fertilization is done.

Spot treatment with broadleaf weed control to be applied where needed only

Ornamental Plant Maintenance

Approximately mid-season, shape to natural form and uniform size all planted shrubs that require pruning. Inspect all planted trees and shrubs for pests.

Fall Clean-up

Remove all leaves, branches and debris from the lawn and beds areas to maintain a well-groomed appearance.

Winterize the irrigation system

Seasonal Color *– Flowers optional as per location quoted with unit price*

Approximately end of May plant assorted 6” annuals

Approximately mid-September plant 150 pots of jumbo mums

Optional Services

Approximately mid-May provide an additional application of crabgrass control to lawn edges, walkway and driveway borders

Summer provide an application of season-long grub preventer

Late fall apply a lime application

Appendix 7: Planning Board Road Rescission Decision and 587 Main Street Site Plan Review Decision

RECEIVED
JUL - 9 2014
FALMOUTH TOWN CLERK

FALMOUTH PLANNING BOARD
59 TOWN HALL SQUARE
FALMOUTH, MASSACHUSETTS 02540
(508) 495-7440 • FAX (508) 495-7443
E-Mail: planning@falmouthmass.us

July 9, 2014

Mr. Michael Palmer, Town Clerk
Town Hall
Falmouth, Massachusetts 02540

Re: Falmouth Hospitality, LLC, Definitive Plan
47B03 016 000; 017 002; 017A004

Dear Michael,

At its meeting of July 8, 2014 the Planning Board voted to approve the application of Falmouth Hospitality, LLC under Article IV - Definitive Plans - Chapter 305 Subdivision Regulations of the Town of Falmouth for a plan entitled: "Definitive Plan for Abandonment of a Portion of Lantern Lane" prepared by Hancock Associates, dated February 24, 2014, scale 1" = 20' with the following findings and conditions:

The applicant seeks to abandon a 10,179 sq. ft. portion of Lantern Lane, a private subdivision road first approved by the Falmouth Planning Board in 1947 as "Fay Lane Road." Lantern Lane intersects with two public ways, Main Street at the southerly end, and Dillingham Avenue at the northern end. The portion proposed to be abandoned is at the southern intersection with Main Street. The applicant is further proposing to replace the abandoned portion of the road layout with an "access and utility easement."

The Planning Board has received a memorandum from Town Counsel dated May 27, 2014 advising that a written easement be required. The Board shall condition this decision accordingly. The Board finds that the easement will allow the lot owners along Lantern Lane access to Main Street, and shall require that the easement be maintained and periodically improved so that access is not impaired.

Furthermore, the Board received correspondence from the Falmouth Fire and Rescue Department dated April 25, 2014, stating that the FFRD reviewed the proposed plans, and did not raise any concerns regarding the proposed abandonment. Finally, the Board received correspondence from the Building Commissioner dated June 3, 2014, stating that it does not appear that the proposed abandonment and easement would create a zoning violation.

CONDITIONS:

1. Prior to plan endorsement, the applicant shall submit a written easement for access and utility purposes, to the Planning Board for approval, in form for recording at the Barnstable County

Registry of Deeds. Furthermore, the applicant shall submit details of how the easement shall be maintained and improved to insure that access to Main Street is not impaired.

Sincerely,

Marlene V. McCollem
Assistant Town Planner

cc: applicant

FALMOUTH PLANNING BOARD
59 TOWN HALL SQUARE
FALMOUTH, MASSACHUSETTS 02540
(508) 495-7440 • FAX (508) 495-7443
E-Mail: planning@falmouthmass.us

October 15, 2014

Mr. Eladio Gore, Building Commissioner
Town Hall
Falmouth, Massachusetts 02540

re: Ryan Development LLC – Site Plan Review
587 Main Street
47B 04 015 000; 47B 04 016 001,002

Dear Eladio,

At its meeting of October 14, 2014 the Planning Board voted to approve the application of Ryan Development LLC under Article XXXIX (39) - Site Plan Review – of the Zoning Bylaw for a plan entitled: *"#587 Main Street & #17&19 Nye Road, Falmouth, Massachusetts"* prepared by Hancock Associates, dated April 1, 2014, and revised October 6, 2014 (six sheets) together with a landscape plan of the same title and date with the following findings and conditions:

FINDINGS

The applicant proposes to construct a commercial building containing 2,400 square feet of retail space together with the associated parking, drainage and landscaping. Parking is located behind the building and green space with pedestrian amenities has been provided in the front of the building. The curb cut is located off Nye Road and has been moved closer to Main Street, away from the adjacent residence. The storm water management system has been reviewed by the Engineering Division and found acceptable. The site is served by town water and sewer facilities, therefore no nitrogen mitigation is required. The landscape plan has been prepared and provides screening for abutters and provides an attractive setting for the building and site.

CONDITIONS

1. A left turn only sign will be added at the exit onto Nye Road.
2. The parking space adjacent to the northerly sideline of curb cut shall be removed and the area landscaped.
3. A 54" concrete sidewalk shall be provide along the Main Street and Nye Road frontage to the curb cut. The sidewalk from the curb cut for the remainder of the Nye Road frontage shall be repaired as bituminous concrete at 48" to avoid the existing trees.

4. The plan shall be constructed as approved. Any changes shall be reviewed by the Planning Board to determine if a modification of this decision is necessary. Pursuant to §240-183.B. of the zoning bylaw, no permit for full or partial occupancy shall be issued until the Planning Board is satisfied that the conditions of this approval and predecessor approvals have been met.
5. Prior to the issuance of a building permit, the applicant shall obtain a curb-opening permit from the Department of Public Works, Engineering Division for all utility work. All work performed within the public right-of-way shall be conducted under the direction of the Town Engineer.

Sincerely,

Brian A. Currie, Town Planner

cc: applicant

Appendix 8: Redacted Copy of Ground Lease

GROUND LEASE

LEASE dated October 16, 2013 between John J. Fay III and Robert A. Fay, as "LANDLORD" and Falmouth Hospitality, LLC, as "TENANT".

Section 1.1. The Subject Premises; the Abutting Premises

(a) The Lease concerns a certain parcel of land (referred to below as the "Subject Premises", whose address is 556 Main Street, 0 Main Street, 0 Lantern Lane and 4 Lantern Lane, together totaling 1.73 acres, and which is situated in Falmouth, Massachusetts. The Subject Premises is described on a plan attached hereto as Exhibit "B" attached hereto and made a part hereof.

(b) In addition to the Subject Premises, LANDLORD owns a parcel of land abutting the Subject Premises (referred to below as "Abutting Premises"), whose address is 3 Lantern Lane, Falmouth and contains approximately .173 acres of land. The Abutting Premises is described on a plan attached hereto as Exhibit "B" attached hereto and made a part hereof.

Section 1.2 Description of the Parties

(a) (i) John J. Fay III and Robert A. Fay are individuals and they have an address of 12 Canapitsit Drive, East Falmouth, Massachusetts. Said John J. Fay III and Robert A. Fay are collectively referred to in this Lease as "LANDLORD" unless and until they transfer the "Reversionary Estate" (as defined in Section 2.1.2).

(ii) Each person or entity that owns the "Reversionary Estate" is referred to as "LANDLORD" during the period of its ownership.

(b) (i) Falmouth Hospitality, LLC is a Massachusetts limited liability company established under the laws of the Commonwealth of Massachusetts and it has an office at 2 Lan Drive, Westford, Massachusetts. Falmouth Springhill Inn, LLC is referred to in this Lease as "TENANT" unless and until it assigns the "Leasehold Estate" (as defined in Section 2.1.2) validly in accordance with Chapter 6.2, the assignee shall become the "TENANT" under this Lease, and the assignor shall no longer be the "TENANT".

Section 1.3.1 The Leasehold Improvements

(a) TENANT has advised LANDLORD that it intends to construct lawful allowed improvements (referred to below as the "Project") on, under and over Subject Premises. The construction of the Project and the other improvements to the Subject Premises is governed by Article 3.

(b) The Project and other improvements situated on, over or under Subject Premises from time to time are referred to below as the "Leasehold Improvements".

Section 1.3.2 Financing the Leasehold Improvements

TENANT intends to finance the development of the Leasehold improvements with loans to be secured by one or more mortgages of the "Leasehold Estate" (as defined in Section 2.1.2). A mortgage of the Leasehold Estate is referred to below as a "Leasehold Mortgage"; a holder of a Leasehold Mortgage is referred to below as "Leasehold Mortgagee".

Section 2.1.1 Lease of Subject Premises; Lease of Abutting Premises

(a) LANDLORD leases the Subject Premises to TENANT, together with all rights, obligations and burdens in connection with any rights of way contained therein.
(b) LANDLORD may lease the Abutting Premises to TENANT, together with all rights, obligations and burdens in connection with any rights of way contained therein, [redacted].

Section 2.1.2 The Leasehold Estate and The Reversionary Estate

(a) The rights granted to TENANT under this Lease are referred to in this Lease as the "Leasehold Estate".

(b) The rights of LANDLORD in the Subject Premises after giving effect to the Leasehold Estate are referred to in this Lease as the "Reversionary Estate". The "Reversionary Estate" includes all of LANDLORD'S rights pursuant to this Lease.

Section 2.2.1 Commencement of the Term

The term of this Lease will begin on the day immediately following the one year anniversary of the expiration of the Permitting Period (the "Commencement Date"). (the "Commencement Date"). The LANDLORD and TENANT shall execute and record at the Barnstable County Registry of Deeds a Lease Commencement Certificate to evidence the Commencement of the Term.

Section 2.2.2 Expiration of the Term

(a) The term of this Lease will expire on the "Expiration Date", provided however, that the term of this Lease shall expire earlier upon a transfer of the Reversionary Estate to the TENANT.

(b) (i) Except as provided in part (ii), the 99th anniversary of the "Commencement Date" [as defined in subsection (c)] will be the "Expiration Date".

(ii) If this Lease is canceled or terminated before the 99th anniversary of the "Commencement Date", the "Expiration Date" will be the effective date of cancellation.

(c) (i) The "Commencement Date" is as set forth in Section 2.2.1 above .

Section 2.3.1 Delivery of Possession, Due Diligence and Permitting

(a) LANDLORD shall deliver actual and exclusive possession of the Subject Premises to TENANT on the day this Lease is executed by both parties. From the date on which the Lease is executed by both parties, TENANT shall have 60 days ("Due Diligence Period") to conduct its due diligence on the Subject Premises, including but not limited to: title, encumbrances and zoning matters, inspection for hazardous materials, inspection and review of geotechnical and topographical survey, and

TENANT shall surrender possession of Subject Premises to LANDLORD on the Expiration Date.

Section 3.1.1 Application for Approvals and Permits

(a) TENANT may apply to appropriate governmental authorities in the name of LANDLORD, TENANT or both for all necessary approvals and permits, or both so that the construction of the Project and other initial Leasehold Improvements.

(b) (i) If an approval or permit for which TENANT is entitled to apply pursuant to subsection (a) is not issued within a reasonable time in TENANT'S opinion, TENANT may bring legal proceedings to require that the approval or permit be issued, appeal any adverse decisions, and defend any appeals of favorable decisions; and TENANT may do so in the name of LANDLORD, TENANT, or both.

(ii) If an approval or permit for which TENANT is entitled to apply pursuant to subsection (a) is issued and any person commences legal proceedings to contest the issuance, TENANT may dispute the proceedings, appeal any adverse decisions and defend any appeals of favorable decision; and TENANT, at its sole cost and expense, may do so in the name of LANDLORD, TENANT or both. TENANT hereby indemnifies and hold harmless LANDLORD for all costs, expenses, losses and other damages incurred by LANDLORD in connection herewith.

Section 3.1.2 Covenant to Cooperate

(a) Except as provided in subsection (b), LANDLORD shall cooperate promptly with TENANT in all respects in connection with the applications referred to in Section 3.1.1. To the extent reasonably necessary, the obligation to cooperate includes the obligation to execute appropriate documents needed to support the application and proceedings.

(b) LANDLORD shall not be required to pay application fees or any expenses related to such proceedings.

Section 3.2 Intentionally omitted.

Section 3.3.1 Application for Building Permit

(a) Promptly after the Tenant's final plans for the hotel are adopted, TENANT shall apply in the name of LANDLORD, TENANT or both to the appropriate authorities for building permits to construct the Project and other initial Leasehold Improvements. The applications shall be prosecuted diligently.

(b) (i) If the building permit is not issued within the Permitting Period, TENANT may dispute the failure to issue the Project permit, bring legal proceedings to require that the building permit be issued, appeal any adverse decisions and defend any favorable decisions; and TENANT may do so in the name of LANDLORD, TENANT or both.

(ii) If the building permit is issued and any person commences legal proceedings to contest the issuance, TENANT may dispute the proceedings, appeal any adverse decision, and

defend any appeals of favorable decisions; and TENANT may do so in the name of LANDLORD, TENANT or both.

(c) (i) LANDLORD shall reasonably cooperate with TENANT in all respects in connection with the applications. To the extent necessary, the obligation to cooperate includes the obligation to execute appropriate documents needed to support the application.

(ii) LANDLORD shall not be required to pay application fees or any other fees related to such proceeding.

Section 3.3.2 Definition of "Construction Work"

The construction of the Project and other initial Leasehold Improvements including all labor and materials required in connection with the construction is referred to below as the "Construction Work".

Section 3.3.3 Progress of the Construction Work

The following shall apply after a building permit is issued with respect to the Project and other initial Leasehold Improvements.

(a) As soon as practicable, subject to the other provisions of this Lease, TENANT shall begin the Construction Work, which may include demolition of any and all existing structures. Construction Work shall be deemed to have begun when any excavation work shall have begun.

(b) After having begun, construction shall be prosecuted diligently, subject to "Excusable Delays". "Excusable Delays" are delays caused by Acts of God, strike, lockout, organized slowdown, major accident, civil commotion, war, fire, catastrophe, significant legal requirement, inclement weather, shortage of materials or labor, action of the other party, or cause beyond the reasonable control of a party.

(c) Construction shall be deemed to have been "substantially completed" for the purposes of Sections 3.3 and 3.4 on the date on which the TENANT's Architect issues a certificate that, to the best of its knowledge, information and belief and on the basis of its observations, the Construction Work shall have been substantially completed.

Section 3.3.4 Quality of the Construction Work

The Construction Work shall be performed in accordance with applicable legal requirements. The Construction Work shall also be performed in a good and workmanlike manner in a timely manner and in accordance with good construction practices.

Section 3.3.5 Inspection Rights

(a) After the execution of the Lease, LANDLORD shall have the right to enter the Subject Premises to inspect it at reasonable times during the course of the Construction Work.

(b) (i) LANDLORD may exercise the right of entry after reasonable intervals and with prior reasonable notice to TENANT.

[redacted]

Section 5.1.1 Permitted Uses of the Project

The Leasehold Improvements may be used for "Commercial Purposes" and purposes incidental to Commercial Purposes. "Commercial Purposes" shall mean all lawful activities or other lawful purposes in connection with, and relating to, a hotel, restaurant or bar services. Any proposed used outside of the Commercial Purposes shall require the prior written consent of the LANDLORD, such consent not to be unreasonably withheld, conditioned or delayed.

Section 5.2.1 Intentionally omitted

[redacted]

The rights and privileges of TENANT under this Lease shall also inure to the benefit of each Leasehold Mortgagee.

Witness our hands and seals this 16 day of OCTOBER, 2013.

Attest:

LANDLORD:

John J. Fay III

Myrna R. Blakeney

MYRNA R. BLAKENEY
Notary Public
Commonwealth of Massachusetts
My Commission Expires
September 26, 2014

Robert A. Fay

Robert A. Fay

TENANT:

Falmouth Hospitality, LLC

By:
Name:
Title:

Witness our hands and seals this 16 day of October 2013.

Attest:

LANDLORD:

_____

_____
John J. Fay III

_____

_____
Robert A. Fay

TENANT:

Falmouth Hospitality, LLC

_____

By: _____
Name: Robert A. Walker
Title: Manager

Exhibit B

Subject Premises Description

0 Main Street, Falmouth, Massachusetts as described in Barnstable County Registry of Deeds Book 2005 Page 69.

556 Main Street and 4 Lantern Lane, Falmouth, Massachusetts as described in Barnstable County Registry of Deeds Book 4806 Page 89.

0 Lantern Lane Street, Falmouth, Massachusetts as described in Barnstable County Registry of Deeds Book 4806 Page 89.

All interests retained in Lantern Lane (f/k/a Faylane), Falmouth, Massachusetts.

Abutting Premises Description

3 Lantern Lane Street, Falmouth, Massachusetts as described in Barnstable County Registry of Deeds Book 3120 Page 230.

All interests retained in Lantern Lane (f/k/a Faylane), Falmouth, Massachusetts.