1. Conservation Commission Digital Pack 06/25/2020 1pm Meeting

Documents:

CHUCKROW NOMINEE TRUST_25 QUAISE ROAD (26_12) SE48_3241.PDF
CROQUET PITCH LLC _ 24 WESTCHESTER STREET (42 4 3_57) SE48_3305.PDF
THE TOWN OF NANTUCKET _ 34 WASHINGTON STREET (42 2 3_2) SE48_3300.PDF
AMENDED ORDER _11 MEADOW LANE LLC _ 11 MEADOW LANE (41 448 1) SE48_3098.PDF
RDA 15 CLIFF ROAD NANTUCKET LLC _ 15 CLIFF ROAD (42 4 4_56).PDF
MMOD REQUEST LOTTE LESCHLY QPRT AND JAN LESCHLY QPRT _ 65 SQUAM ROAD (13_15) SE48_3233.PDF
COC REQUEST AMY AND MICHAEL MCGOWAN _ 10 BASSETT ROAD (26_39) SE48_2299.PDF
COC REQUEST AMY AND MICHAEL MCGOWAN _ 10 BASSETT ROAD (26_39) SE48_2427.PDF
COC REQUEST DAVID L DOUGLASS TRUST _ 20 FULLING MILL ROAD (27_23 1) SE48_3191.PDF
ROBERT C AND WELBY C KURATEK _ 312 POLPIS ROAD (20_46 2) SE48_3202.PDF
COCREQUEST LIBERTY REALTY TRUST _ 36 NORTH LIBERTY STREET (41_265) NAN_113.PDF
COC REQUEST SILVER FOX PARTNERS REAL ESTATE LLC _ 235 MADAKET ROAD (59 4_364) SE48_3121.PDF
DRAFT MINUTES 06_11_2020.PDF
NCC COMMENTS REGARDING ORDER OF CONDITIONS SE48_1659 AND SE48_1602.PDF

NOTICE OF INTENT APPLICATION

FOR INSTALLATION OF A STEEL BULKHEAD
ALONG AN EXISTING TIMBER BULKHEAD

At

25 QUAISE ROAD

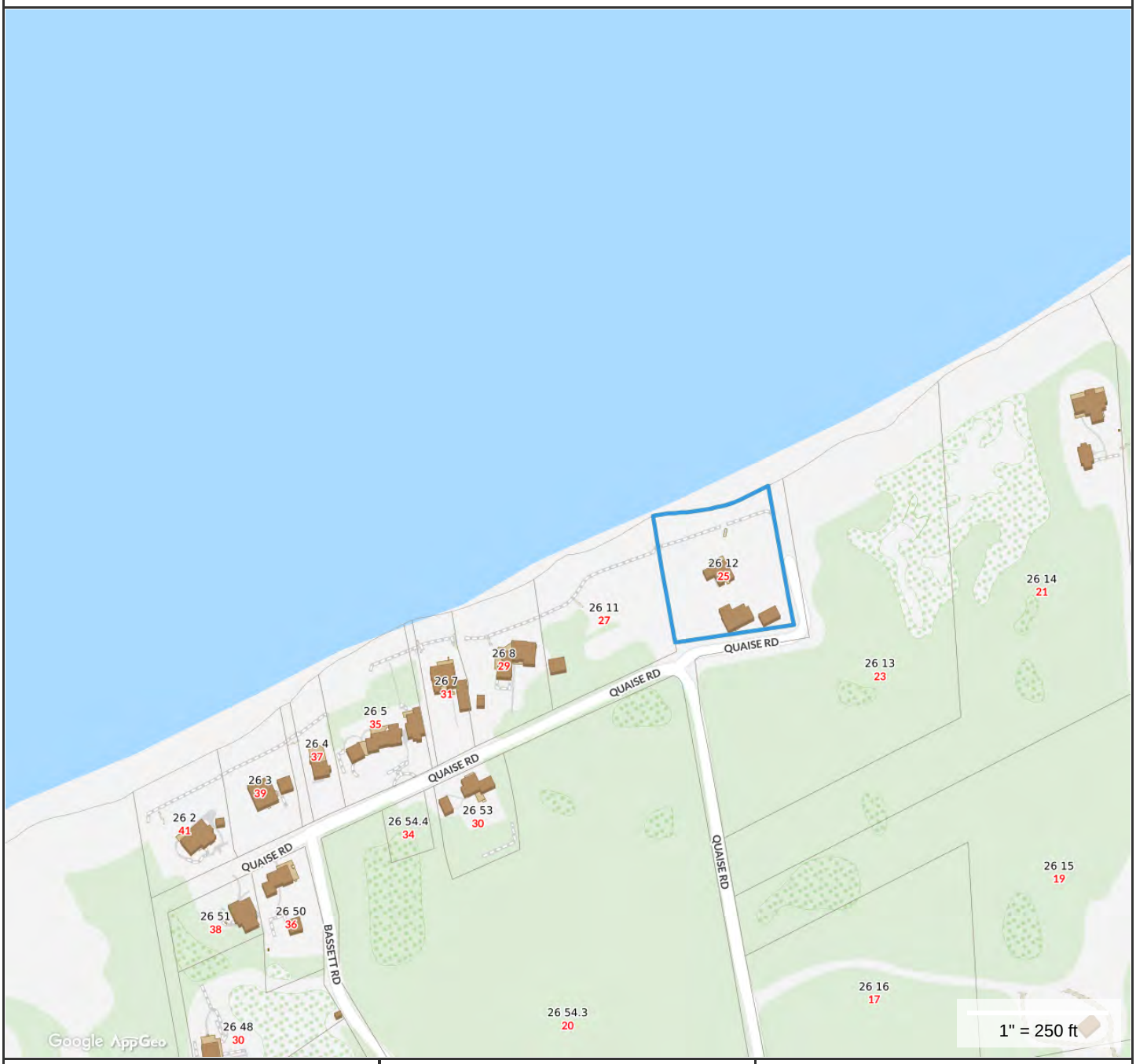
AUGUST 2019

Prepared For

CHUCKROW NOMINEE TRUST

20 Mary Ann Drive • Nantucket, MA 02554
508-825-5053 • www.NantucketEngineer.com

Locus Map



Property Information

Property ID	26 12
Location	25 QUAISE RD
Owner	GUERNSEY CAROL C & STULGIS AMY

MAP FOR REFERENCE ONLY
NOT A LEGAL DOCUMENT

Town and County of Nantucket, MA makes no claims and no warranties, expressed or implied, concerning the validity or accuracy of the GIS data presented on this map.

Geometry updated 11/13/2018
Data updated 11/19/2018

August 23, 2019

Ms. Ashley Erisman, Chair
Nantucket Conservation Commission
2 Bathing Beach Road
Nantucket, MA 02554

Re: Notice of Intent
25 Quaise Road
Map 26 Parcel 12

Dear Ms. Erisman:

On behalf of the property owner, Chuckrow Nominee Trust, Nantucket Engineering & Survey, P.C. is submitting this Notice of Intent (NOI) to the Nantucket Conservation Commission for proposed activities within the Buffer Zone, Coastal Bank, Coastal Beach and Land Subject to Coastal Storm Flowage resource areas at the above referenced property (the "Site") in Nantucket, Massachusetts.

Proposed activities at the Site consist of installing a steel sheet bulkhead along a failing timber bulkhead, plus a return along the easterly property line. Attached are permit drawings, including plans showing a site locus, existing conditions including resource area locations, and proposed construction areas.

A completed WPA Form 3 – Notice of Intent is attached along with the NOI Wetland Fee Transmittal Form including checks for $273.50, $498.50, $25 and $200 to cover the WPA filing fee, Nantucket Wetland by-law fee and the Nantucket Expert Review fee. Also included is a check for $291.40 to the Inquirer & Mirror for publication of the notice of the public hearing.

Notification of this NOI filing was provided to all abutting property owners by certified mail. This property owner listing was obtained from the Town of Nantucket Assessor's office. Documentation of the notification is provided including a copy of the notification letter, the property owner listing and certified mail receipts.

SITE DESCRIPTION

The subject property is approximately one-acre in size and is located in the Quaise area of Nantucket Island. The property is located at the northern end of a gravel road in an area of

residential development. The lot is currently armored by a timber bulkhead and contains three residential use structures which pre-date 1978.

The Wetland Resource Areas on-site subject to jurisdiction of the Commission are Coastal Bank, Coastal Beach and Land Subject to Coastal Storm Flowage, and the respective Buffer Zones.

A review of the August 1, 2017 "Massachusetts Natural Heritage Atlas", prepared by the Massachusetts Natural Heritage and Endangered Species Program (NHESP), indicates that the work area is not within the known range of state listed rare wildlife species defined by the Estimated Habitat mapping.

WORK DESCRIPTION

The access for the work will be from the existing driveway, through the yard, where materials will be stockpiled. A sand ramp will be created from the top of the bank to the top of the bulkhead. The steel sheets will be driven by an excavator with a vibratory attachment. The area between the bulkheads will be filled with flowable fill, then a concrete and/or timber cap will be installed over both. All disturbed resource area will be planted with American Beach Grass and upland areas covered with a minimum of 6” of topsoil and planted with grass seed.

CONCLUSION

The installation of steel sheeting will not result in an adverse impact on the areas or the interests protected by the Commission including flood control, erosion control, storm damage prevention, prevention of pollution, wildlife, and wetland scenic views. Further, the project represents responsible maintenance of an existing structure which if left to deteriorate could have an adverse impact on the aforementioned protected interests.

I plan to attend the Public Hearings for this application to address any questions, comments or concerns that the Commission may have.

Sincerely,

Arthur D. Gasbarro, PE, PLS

Cc: MassDEP
Chuckrow Nominee Trust

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

WPA Form 3 – Notice of Intent

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40
And the Town of Nantucket Wetlands Bylaw Chapter 136

Provided by MassDEP:

MassDEP File Number

Document Transaction Number

NANTUCKET
City/Town

A. General Information

1. Project Location (**Note:** electronic filers will click on button to locate project site):

25 Quaise Pastures Road — a. Street Address
Nantucket — b. City/Town
02554 — c. Zip Code

Latitude and Longitude:
41d17'56"N — d. Latitude
70d02'01"W — e. Longitude

26 — f. Assessors Map/Plat Number
12 — g. Parcel /Lot Number

2. Applicant:

Amy P. & Carol C. — a. First Name
Chuckrow & Guernsey, Trustees — b. Last Name
Chuckrow Nominee Trust — c. Organization
402 Hancock Rd — d. Street Address
Williamstown — e. City/Town
MA — f. State
01267 — g. Zip Code
h. Phone Number
i. Fax Number
j. Email Address

3. Property owner (required if different from applicant): ☐ Check if more than one owner

a. First Name
b. Last Name
c. Organization
d. Street Address
e. City/Town
f. State
g. Zip Code
h. Phone Number
i. Fax Number
j. Email address

4. Representative (if any):

Arthur D. — a. First Name
Gasbarro, PE, PLS — b. Last Name
Nantucket Engineering & Survey, PC — c. Company
20 Mary Ann Drive — d. Street Address
Nantucket — e. City/Town
MA — f. State
02554 — g. Zip Code
508-825-5053 — h. Phone Number
i. Fax Number
art@nantucketengineer.com — j. Email address

5. Total WPA Fee Paid (from NOI Wetland Fee Transmittal Form):

$972 + $25 + $200 — a. Total Fee Paid
$473.50 — b. State Fee Paid
$498.50 + $25 + $200 — c. City/Town Fee Paid

A. General Information (continued)

6. General Project Description:

The Applicant proposes to to install a steel bulkhead with a cap seaward of an existing timber bulkhead, and an extension/return along the easterly property line. Access will be from the upland portion of the bank with a ramp to the area above the bulkhead. Disturbed areas behind the bulkhead will be filled with clean, compatible sand then planted with American Beach Grass. Please refer to the attached Project Narrative and Site Plan for additional information.

7a. Project Type Checklist:

1. ☐ Single Family Home
2. ☐ Residential Subdivision
3. ☐ Limited Project Driveway Crossing
4. ☐ Commercial/Industrial
5. ☐ Dock/Pier
6. ☐ Utilities
7. ☒ Coastal Engineering Structure
8. ☐ Agriculture (e.g., cranberries, forestry)
9. ☐ Transportation
10. ☐ Other

7b. Is any portion of the proposed activity eligible to be treated as a limited project subject to 310 CMR 10.24 (coastal) or 310 CMR 10.53 (inland)?

1. ☐ Yes ☒ No If yes, describe which limited project applies to this project:

2. Limited Project

8. Property recorded at the Registry of Deeds for:

NANTUCKET	14,726
a. County	b. Certificate # (if registered land)
c. Book	d. Page Number

B. Buffer Zone & Resource Area Impacts (temporary & permanent)

1. ☐ Buffer Zone Only – Check if the project is located only in the Buffer Zone of a Bordering Vegetated Wetland, Inland Bank, or Coastal Resource Area.
2. ☐ Inland Resource Areas (see 310 CMR 10.54-10.58; if not applicable, go to Section B.3, Coastal Resource Areas).

Check all that apply below. Attach narrative and any supporting documentation describing how the project will meet all performance standards for each of the resource areas altered, including standards requiring consideration of alternative project design or location.

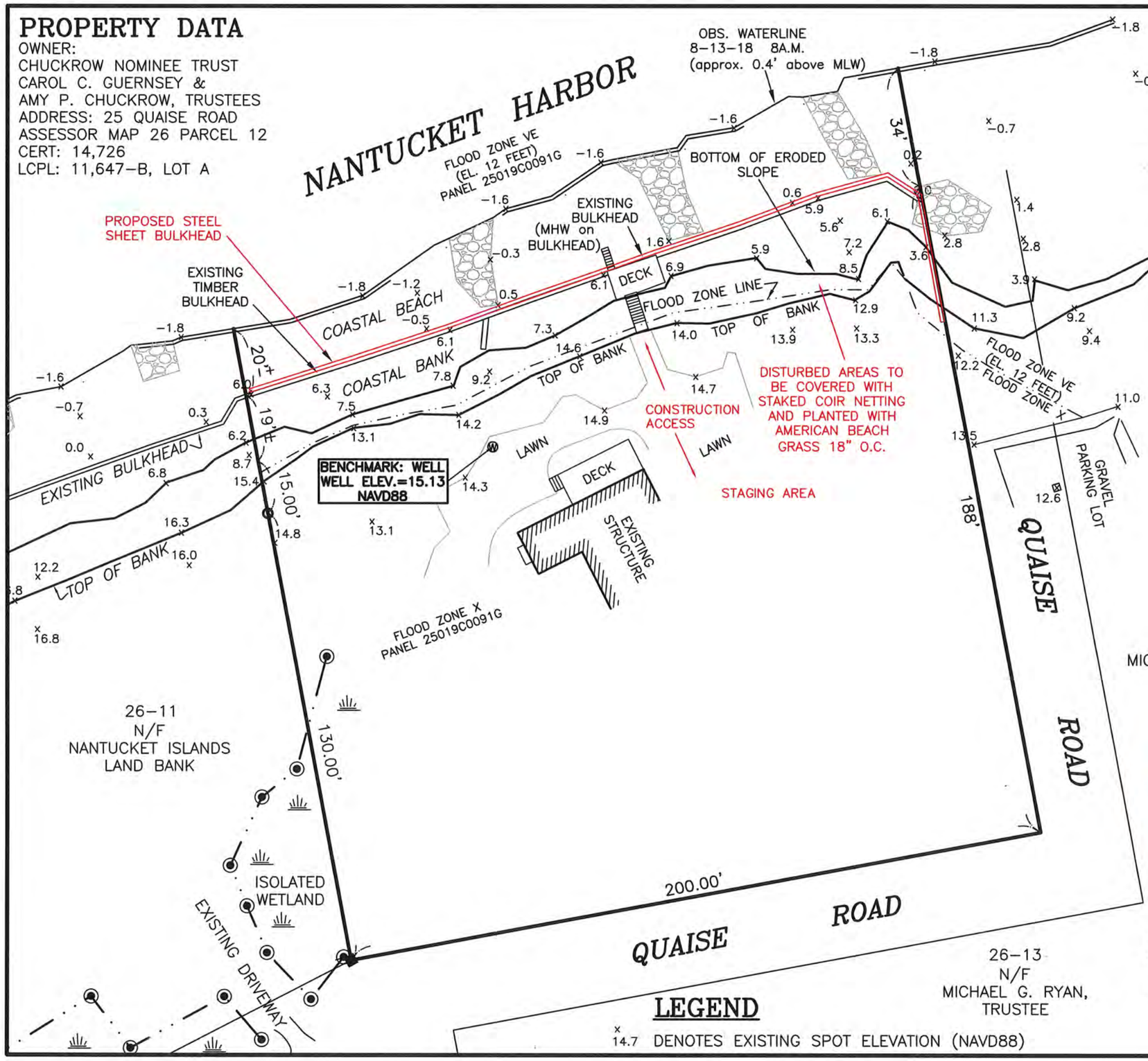
For all projects affecting other Resource Areas, please attach a narrative explaining how the resource area was delineated.

Resource Area	Size of Proposed Alteration	Proposed Replacement (if any)
a. ☐ Bank	1. linear feet	2. linear feet
b. ☐ Bordering Vegetated Wetland	1. square feet	2. square feet
c. ☐ Land Under Waterbodies and Waterways	1. square feet	2. square feet
	3. cubic yards dredged	

26 12
QUAISE RD
QUAISE RD
QUAISE RD
41.29896,-70.033744
asachusetts EOEA, Maxar Technologies
50 ft
Terms of Use
Report a map error

PROPERTY DATA

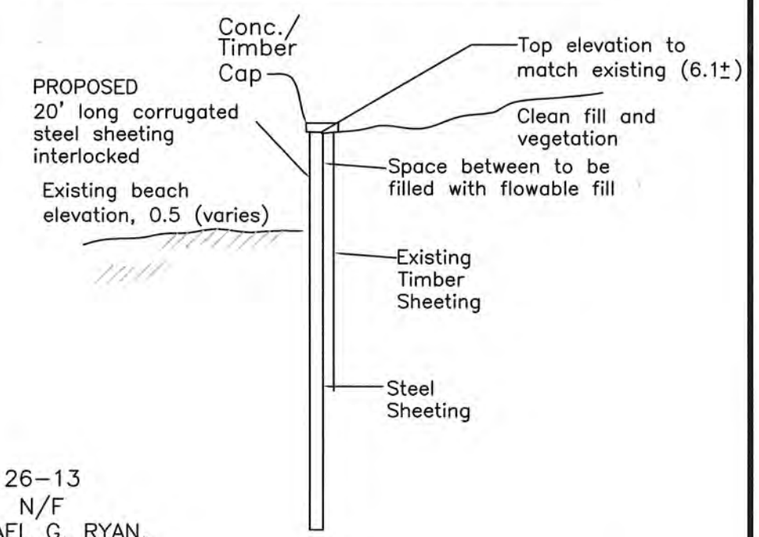
OWNER:
CHUCKROW NOMINEE TRUST
CAROL C. GUERNSEY &
AMY P. CHUCKROW, TRUSTEES
ADDRESS: 25 QUAISE ROAD
ASSESSOR MAP 26 PARCEL 12
CERT: 14,726
LCPL: 11,647–B, LOT A



THIS PLOT PLAN WAS PREPARED FOR THE NANTUCKET CONSERVATION COMMISION ONLY AND SHOULD NOT BE CONSIDERED A PROPERTY LINE SURVEY. THIS PLAN SHOULD NOT BE USED TO ESTABLISH PROPERTY LINES, FENCES, HEDGES OR ANY ANCILLARY STRUCTURES ON THE PREMISES. THE PROPERTY LINES SHOWN RELY ON CURRENT DEEDS AND PLANS OF RECORD.
THIS PLOT PLAN IS NOT A CERTIFICATION AS TO TITLE OR OWNERSHIP OF THE PROPERTY SHOWN. OWNERS OF ADJOINING PROPERTIES ARE SHOWN ACCORDING TO CURRENT ASSESOR RECORDS.

N

Bulkhead Cross–Section



COMMONWEALTH OF MASSACHUSETTS
ARTHUR D. GASBARRO
CIVIL
No. 45951
REGISTERED PROFESSIONAL ENGINEER
8/14/19

SITE PLAN OF LAND TO ACCOMPANY A NOTICE OF INTENT IN NANTUCKET, MA PREPARED FOR CHUCKROW NOMINEE TRUST 25 QUAISE ROAD MAP 26 PARCEL 12 AUGUST 14, 2019 SCALE: 1"=30'

GRAPHIC SCALE
15 0 15 30
(IN FEET)
1 inch = 30 ft.

LEGEND

x 14.7 DENOTES EXISTING SPOT ELEVATION (NAVD88)

NANTUCKET ENGINEERING & SURVEY, PC
20 Mary Ann Drive Nantucket, MA 02554
NantucketEngineer.com 508-825-5053

January 17, 2020

Jeff Carlson, Administrator
Nantucket Conservation Commission
2 Bathing Beach Road
Nantucket, MA 02554

RE: Notice of Intent – SE48-3241
25 Quaise Road

Dear Jeff:

I am writing to provide a revise site plan which relocates the project access from the east, to the west side of the house. In consultation with the contractor, this will minimize disturbance of the buffer zone.

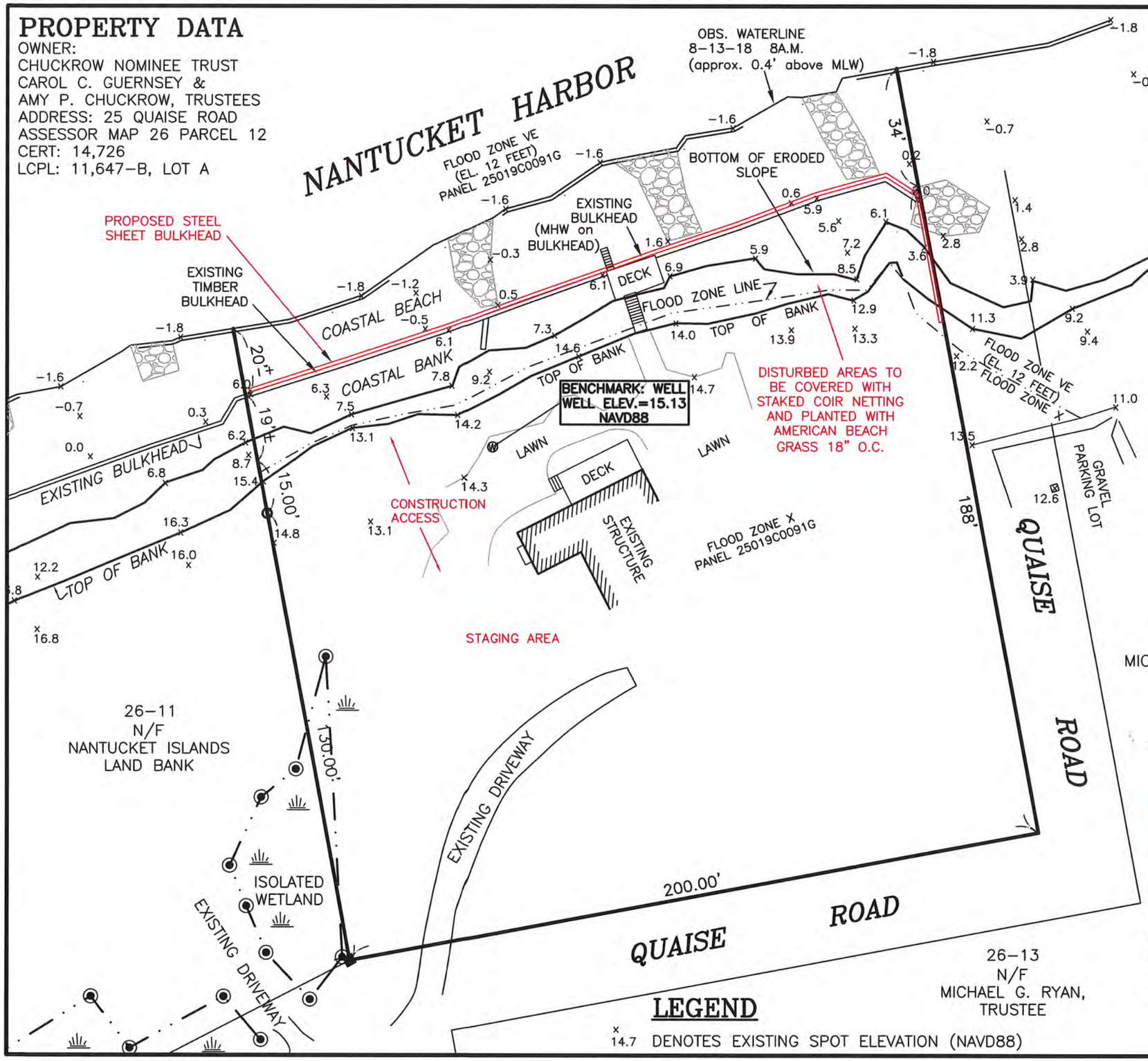
I plan to attend the public hearing on this matter, though please feel free to contact me should you have any questions or concerns with this request in the meantime.

Sincerely,
Nantucket Engineering & Survey, P.C.
By: Arthur D. Gasbarro, PE, PLS

20 Mary Ann Drive • Nantucket, MA 02554
508-825-5053 • www.NantucketEngineer.com

PROPERTY DATA

OWNER:
CHUCKROW NOMINEE TRUST
CAROL C. GUERNSEY &
AMY P. CHUCKROW, TRUSTEES
ADDRESS: 25 QUAISE ROAD
ASSESSOR MAP 26 PARCEL 12
CERT: 14,726
LCPL: 11,647-B, LOT A



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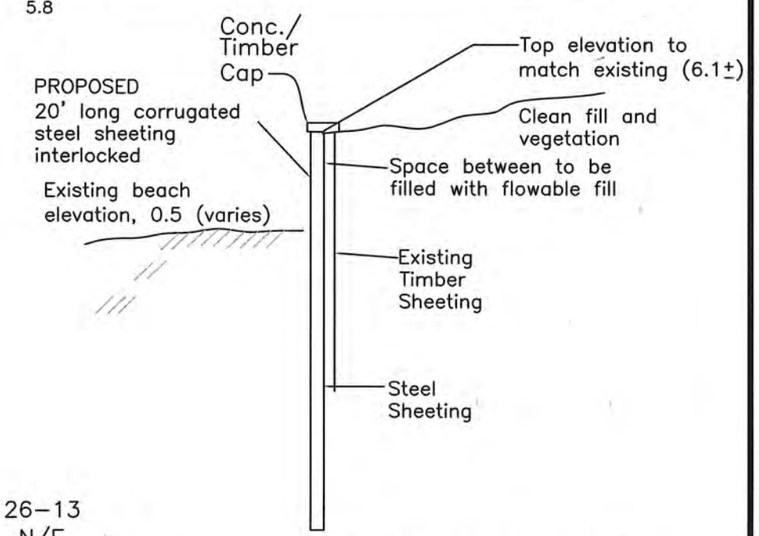
Bulkhead Cross-Section



COMMONWEALTH OF MASSACHUSETTS
ARTHUR D. GASBARRO
CIVIL
No. 45951
REGISTERED PROFESSIONAL ENGINEER
1/21/20

SITE PLAN OF LAND TO ACCOMPANY A NOTICE OF INTENT IN NANTUCKET, MA PREPARED FOR CHUCKROW NOMINEE TRUST 25 QUAISE ROAD MAP 26 PARCEL 12 AUGUST 14, 2019 REV. JANUARY 17, 2020 SCALE: 1"=30'

GRAPHIC SCALE
15 0 15 30
(IN FEET)
1 inch = 30 ft.

NANTUCKET ENGINEERING & SURVEY, PC
20 Mary Ann Drive Nantucket, MA 02554
NantucketEngineer.com 508-825-5053

LEGEND

x 14.7 DENOTES EXISTING SPOT ELEVATION (NAVD88)

Date: November 19, 2019 at 11:59:15 AM EST
To: Jeff Carlson <JCarlson@nantucket-ma.gov>
Subject: For ConCom: Living Shorelines as an Alternative to Repairing Failing Bulkheads

Hi Jeff,

I am sending three documents that discuss the appropriateness of using living shorelines in place of repairing bulkheads.
https://galvbay.org/wp-content/uploads/2014/03/LS_alternative.pdf
http://www.seattle.gov/documents/Departments/SDCI/Vault/ShorelineMasterProgram/GreenShorelines.pdf
https://www.cbf.org/document-library/cbf-publications-brochures-articles/Living_Shorelines011a.pdf

Although these documents are not from New England, they outline the design considerations and options available for using living shorelines in place of bulkheads, given different wave energy environments. They also discuss hybrid projects, in which a fringe marsh of other vegetative community is planted in combination with a structural technique. In some cases this is as easy as moving the bulkhead back and planting a living shoreline in front of it and in other cases a more complicated approach is taken.

Given that in our local regulations for Land Under the Ocean, Coastal Beach, and Coastal Bank, the Performance Standards indicate that "Bulkheads may be rebuilt only if the Commission determines there is no environmentally better way to control an erosion problem, including in appropriate cases the moving of the threatened building", I believe that it is prudent to raise the issue of environmentally better ways to control erosion with applicants seeking permits for bulkhead repair projects.

Please enter this information into the record as it will be relevant for the 11/20/19 meeting in reference to the Chuckrow Nominee Trust, 25 Quaise Rd application. I have also spoken to Dr. Jen Karberg on this issue and she is aware of additional regional evidence that living shorelines, especially hybrid projects, have been shown to work. She needs to find the references but once she does will send them to me and I can share with the Commission. These materials will be helpful in moving forward on this topic and assuring that we uphold the Performance Standards.

If you deem it beneficial, please also share this information with the other commissioners and/or the applicant I referenced.

Thanks,
Seth

Date: December 2, 2019 at 8:31:50 AM EST
To: Jeff Carlson <JCarlson@nantucket-ma.gov>
Subject: FW: For ConCom: Living Shorelines as an Alternative to Repairing Failing Bulkheads

Hi Jeff,

2 additional pieces for the 'Living Shorelines' file; 1 peer-reviewed journal article and 1 popular piece (These came from Jen Karberg as part of the journal club). Is it possible to make a folder of the resources somewhere that we can add to as new articles develop?

https://www.scientificamerican.com/article/rebuilt-wetlands-can-protect-shorelines-better-than-walls/

Thanks,
Seth

GREEN shorelines

Bulkhead alternatives for a healthier Lake Washington

Lake Washington embodies the best of Western Washington: clean water, bountiful recreational opportunities, striking mountain views, and access to thriving cities. These qualities have inspired thousands of people to make their homes on the shores of the lake, transforming a forested waterfront to a residential one over the past 100 years. This change has led to a variety of problems, including loss of important wildlife habitat and some of the area's natural charm, but lakefront homeowners are finding new ways to protect the lake.

note

This guidebook is about alternatives to the use of bulkheads and other shoreline armoring. Hard engineering is currently the standard approach for erosion control around the lake, but it has several negative impacts on nearshore habitats as well as the fish and wildlife that depend on them. More sustainable practices, referred to in this guidebook as green shorelines, use plants, beaches, and other natural materials to protect private property and the environment.

Green shorelines provide three types of benefits for homeowners:

1. they substantially improve habitat for Chinook salmon and other wildlife while maintaining shoreline stability;
2. they allow improved water access for homeowners and guests, making swimming and shoreline enjoyment easier;
3. they offer a softer, more natural aesthetic that can enhance views by adding variety and seasonal interest.

While homeowners often find green shorelines attractive, many have concerns about effectiveness, reliability, building and maintenance costs, the permitting process, and the potential loss of lawn. This guidebook specifically addresses these and other concerns by assembling technical information from a wide range of sources and providing local examples.

Although the guidebook was written by the City of Seattle, the principles described here can be applied to homes all around Lake Washington. Additionally, most of the information provided here is relevant to Lake Sammamish. Technical advice in these pages is offered as guidance; it is not building code. In the case of any discrepancies, defer to local, state, and federal regulations for shoreline development.

Green shorelines are attractive, reliable, and sustainable. The idea of having your own beach is a major motivator for many people to buy waterfront property – why give up your beach for a bulkhead?

Design and Photo:
Darwin Webb
Landscape Architects

Contents

GREEN SHORELINES
Bulkhead alternatives for a healthier Lake Washington

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  - Vegetated Buffers 12
  - Slope Bioengineering 14
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Design and Photo: Ecco Design Inc.

Introduction

The water's edge

People love to live in places where water and land meet. Shorelines provide work and recreation opportunities, mild climates, and tranquil views. Rapid growth in the communities around Lake Washington and Lake Sammamish is a clear demonstration of our desire to live near water.

People are not the only ones drawn to shorelines, however. Due to the diverse resources and habitats that occur along lakeshores, they tend to be biologically rich and productive places. Again, Lake Washington is no exception—numerous plant, bird, fish, mammal, and insect species call the lake's shorelines home.

Problems with "business as usual"

Unfortunately, some of the natural elements that attract people to waterfront properties are often casualties of development. Trees, shrubs, and wildflowers are cleared to make way for houses, lawns, and open views. Bulkheads built to control bank erosion displace beaches and cause erosion below the water line. Removal of vegetation along the shore allows contaminants to flow directly into the lake. As beaches and vegetation are replaced by lawn and concrete, prime wildlife habitat disappears, taking with it birds, beneficial insects, and fish.

Residential development on Lake Washington has taken a particularly heavy toll on Chinook salmon. These iconic fish of the Pacific Northwest hatch in the Cedar River, Issaquah Creek, and Bear Creek. Many rear in the lake for several months. Once they become smolts, Chinook swim through Lake Washington and Seattle's Ship Canal to reach the ocean. As they migrate through the lake, juveniles follow the shoreline, staying close to the shallow-water areas that help them to escape from predators and safely forage for food.

Bulkheads and docks have altered or eliminated much of the shallow-water habitat around the lake. A 2001 study found that 70% of Lake Washington's shoreline was armored with concrete, riprap, sheetpile, or another type of bulkhead. By reflecting wave energy back into the lake, these structures tend to wash away nearshore sediment, causing deeper water over time. Lawns have replaced much of the diverse vegetation that provided cover for young fish. While many factors are contributing to the decline of Puget Sound's endangered Chinook salmon populations, loss of rearing and refuge habitat is among the most serious problems.

Bulkheads also can compromise homeowners' access to the water and negatively affect views. Entering the water from a bulkhead can be awkward or even dangerous; shoreline armoring accelerates nearshore erosion, deepening the water and making wading difficult. Further, the widespread use of shoreline armoring is bad for waterfront aesthetics—while homeowners typically prefer greener, natural-looking lakeshores, armoring creates a more heavily developed look along the shoreline.

Attractive alternatives

The good news is that people are finding new strategies for protecting their property while also protecting and restoring habitat. Instead of concrete and sheetpile, these practices use a combination of plantings, gravel, stone, logs, and slope modification to protect against shoreline erosion.

The ideal is to set structures back far enough to preserve the natural shoreline and vegetation. However, given that the majority of Lake Washington is already developed, this guidebook focuses on positive steps that can be taken to reduce the impact of existing waterfront homes. Whether your site can accommodate a full beach restoration or only incremental improvements, a wide range of options is available, including:

- Full beaches
- Beach coves
- Setting back bulkheads
- Log installation
- Vegetated buffers
- Slope bioengineering

The following sections explain and illustrate how these approaches work, where they might be used, and what they look like. Although described separately, keep in mind that in most cases, these strategies are typically used in combination with one another. While the concepts outlined here will give you a broader understanding of the options for improving your shoreline, it is advisable for you to seek professional assistance to get your project designed and built. Suggestions for selecting designers and contractors are provided in the section titled "Choosing a Shoreline Professional."

note

When this guidebook uses the term "restoration," it does not mean returning Lake Washington to its pre-development condition. Rather, it refers to restoring specific ecological processes. The shorelines shown in this publication look different than they did 150 years ago, but they still can protect fish, wildlife, and water quality in many of the same ways.

Together with design and construction advice, this guidebook also provides suggestions to help you get through your permitting process more quickly. Because Lake Washington is home to multiple species on the Endangered Species list, lakeshore construction has to be approved by local, state, and federal agencies. While specifics vary, the growing trend across regulatory agencies is to encourage projects that improve shoreline habitat quality through requirements, incentives, and streamlined permitting. Following the principles in this guidebook can help you avoid unnecessary permitting hurdles (see "Getting Permits").

Photos of restored shorelines throughout the guidebook help demonstrate specific green shoreline techniques, and they also display the aesthetic benefits of natural beaches and plantings. Further, they provide samples of the diverse shoreline restoration projects that already exist around Lake Washington.

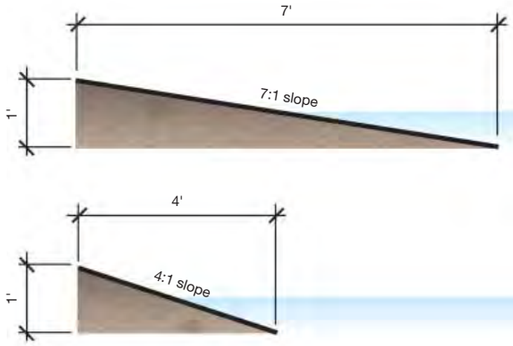
Design: The Watershed Company
Planting Design: The Berger Partnership

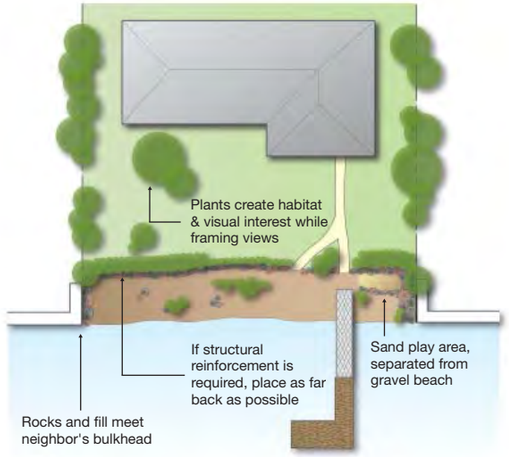
Green shoreline practices

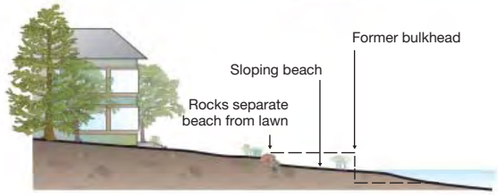
Full beaches

Restoring a beach along your entire lakeshore frontage is the ideal Green Shoreline improvement. On the right site, beach restoration can be straightforward: after removing your bulkhead, lay back the slope to a stable angle, and add appropriate gravel and plants. A few guidelines apply to most beach restoration projects.

Slopes of 7:1 or less are ideal for restored beaches, although slopes up to 4:1 can be stable.







Beach slope is a critical component of a successful restoration project. A well-designed slope provides resistance to erosion, reducing the need for maintenance. Slopes of 7:1 or flatter are ideal (seven horizontal feet for each vertical foot), but slopes up to 4:1 can be stable in some circumstances.

New beaches should be made of an appropriate gravel material. Although people tend to think of sand when they think of shorelines, sand erodes quickly in most parts of Lake Washington. Instead, use clean, well-rounded gravel 1/8" to 2" size – specifics will depend on wave energy and your proximity to known sockeye spawning grounds. Contact the Washington State Department of Fish and Wildlife to learn about requirements in your area (see "Contacts"). If sand is desired it should either be placed well above the water line or physically separated from the gravel beach using stone or wood.

Additionally, a successful design for a restored beach must address how the beach will meet neighboring properties. This is not a concern if your neighbors already have or are restoring their own beaches, but it is necessary to plan how the edges of a beach will meet any neighboring bulkheads.

There are two strategies for meeting adjacent bulkheads:

1. Install rocks, wood, plantings, or concrete walls at the edges of your beach to reinforce the transition area from beach to bulkhead – these areas will be subject to greater erosive forces.

2. Add extra fill below the water line at the edges of your property – this protects your beach from the erosive forces of neighboring bulkheads and protects the bulkheads from undercutting. For shoreline restoration purposes, 25 cubic yards of fill are allowed outright in the water so long as they do not create dry land. More may be approved depending on site conditions.

Some erosion to beaches is normal over time. This can be offset by beach nourishment, the periodic addition of gravel. When a project is designed and installed properly, some nourishment is likely to be necessary every five to ten years.

To make beach nourishment easier, it is ideal to include periodic fill as part of the maintenance plan in your initial construction permit. This can help you avoid needing to obtain a local permit to add gravel to your beach in the future. If nourishment is not covered in your initial permit, you will need to obtain a shoreline exemption for each instance of beach nourishment. Time and costs for this process depends on your local jurisdiction.

Regardless of whether a local permit is necessary, beach nourishment projects need permits from the Washington State Department of Fish and Wildlife and Army Corps of Engineers. Both have relatively simple application processes so long as your nourishment project will be adding 25 cubic yards of fill or less. Total wait time for both agencies is likely to be 10 to 30 days, and neither permit requires a fee (see "Getting Permits").

Design: The Watershed Company
Construction: Waterfront Construction

Beach coves

Beach coves or "pocket beaches" are currently the most common type of green shoreline installed around Lake Washington. A beach cove is a beach along a portion of a property's waterfront, flanked on both sides with hard structural elements. This is a useful strategy to improve habitat quality and water access while keeping armoring if it is necessary. While recommended slope, width, and depth of beach coves vary depending on site conditions, several features are advisable for most beach cove projects.

Like full beaches, beach coves should use appropriately sized gravel, and typically not sand. Beach nourishment will be needed with about the same frequency as with a full beach restoration (every 5-10 years), but less fill is needed since the beach area is smaller.

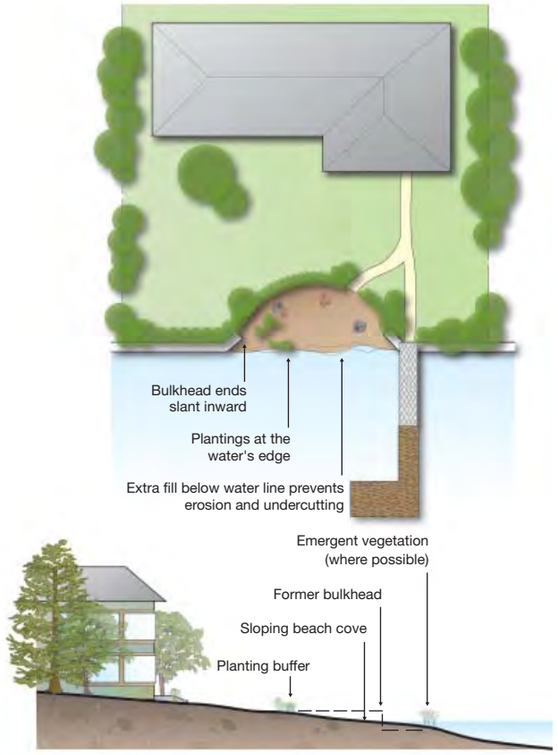
Localized erosion can occur where the bulkhead meets the beach on either side of the cove. Two techniques that help prevent this from happening include:

1. Angling the ends of the bulkhead away from the water to dissipate wave energy and decrease erosion.
2. Adding extra gravel fill below the water line to help prevent undercutting of the bulkhead.

As with full beaches, beach cove slopes should typically be no steeper than 4:1, i.e., four horizontal feet to one vertical foot. Again, 7:1 is a good goal, but steeper slopes can be stable when appropriate materials are used.

Beach coves should not be the first choice if your property can accommodate full beach restoration. They provide less shoreline for wading and other beach activities, and they do less to improve habitat. While fish biologists have observed juvenile salmon using pocket beaches around Lake Washington, research suggests that the fish gravitate to larger beaches and plantings when they are available.

Specific criteria to help you consider the practicality of a cove versus a full beach are discussed in "Selecting the Right Approach."



note

"I like beaches, but my property is worth too much to give up any land."

Some homeowners are reluctant to consider partial or full beach restoration because they are concerned about losing property. Although it is true that green shorelines sometimes result in smaller lawns, the square footage of dry land remains the same since these projects add beach and planting areas. Essentially, you are converting parts of your property from one use to another. A good design will maintain the ordinary high water line such that there is no loss of dry land.

Further, most homeowners do not actively use the full extent of their lawns. Green shorelines property owners often find that they use their beaches more than they did their lawns, and that plant diversity and visiting wildlife improve their yard's aesthetics by adding visual variety. One homeowner reported that a beach cove installed by previous owners had become his favorite place to entertain company. "I wasn't the one that had the foresight to build it, but I like to claim credit for it," he admitted. "Guests love sitting out there in the evening."

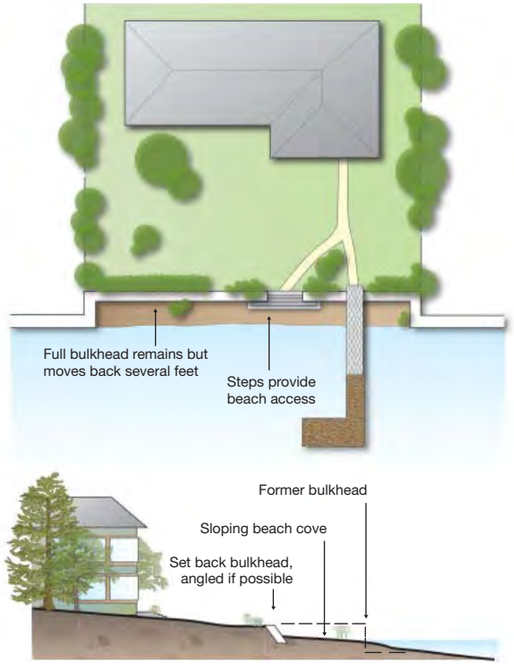
Setting back bulkheads

When houses have been built too close to the water, fewer options for shoreline management remain. If there is not an adequate setback between the water line and the house, a bulkhead really may be necessary to protect houses or other structures. In many cases, however, the bulkhead can at least be moved back from the high water mark, providing benefits to the homeowner and the lake ecosystem.

It is a simple concept but one that can make a big difference for access and ecological function. By moving a bulkhead back several feet from the water line, homeowners gain a beach and many of its advantages: safe wading and swimming access, an easy way to launch hand-carried boats, and waterfront play areas. The bulkhead is still there to help accommodate the grade change from house to water or to provide protection during large storms.

Part of the bulkhead can be set back to create a reinforced beach cove, or the whole thing can be set back to create new a new beach all across the shoreline.

If you need to keep a bulkhead because of how the site was developed, setting the bulkhead back from the water can simplify your permitting process. The Army Corps of Engineers does not claim jurisdiction above the ordinary high water line, so no federal permit is likely to be required for the new bulkhead provided that it is built before the existing bulkhead is removed. If the old bulkhead you are removing is located at high water, that part of the construction will still require an Army Corps permit.



As with beach coves, a project that sets back a bulkhead need not result in any loss of property. As long as beach fill is properly installed, the high water mark will remain the same distance away from your house as it was before renovation. You may displace some lawn or other upland planting area, but that area will be converted to usable beach. Like other beaches, a beach created by setting back a bulkhead will need periodic additions of gravel fill (see "Full Beaches").

Whether you are setting a bulkhead back or replacing it in the same location, angling back the batter (the slope of the bulkhead) is generally a good idea. With every wave that hits it, a vertical bulkhead reflects most of the wave energy back into the lake. This leads to turbulence and erosion, which results in deeper water at the bulkhead's base. A sloped bulkhead does a better job of absorbing and dissipating energy, creating less erosion and lengthening the service life of your investment. For Lake Washington, engineers generally recommend a bulkhead slope of 3:1 where site constraints will allow it.

note

"Won't a beach attract more geese to my yard?"

While wildlife sightings are a major benefit of living on the water, all creatures are not greeted with equal enthusiasm; the noise, aggressive behavior, and messy habits of Canada geese frequently make them unwelcome guests. Although many worry that creating a new beach may draw more geese into their yard, a more natural shoreline can actually decrease the number of visiting geese. A lawn extending to the lakeshore is a goose's equivalent of a 24-hour salad bar – geese eat turf grass and snails, and they prefer open areas with no shrubs and trees for predators to hide behind.

Two strategies, used separately or together, act as effective deterrents to geese. First, separating the beach from your yard by a few steps makes the ascent too much of a hassle for most geese. Second, plantings of native vegetation between your yard and the water can act as a visual and physical barrier, separating the geese from your grass. Even with a path through the plantings to allow beach access, geese are reluctant to walk through taller vegetation.

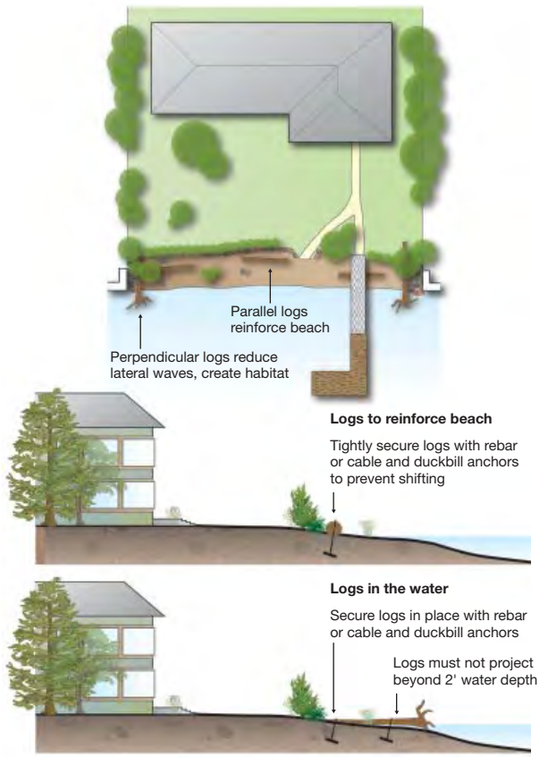
"Our old yard was a landing strip for geese. Since we shrank the lawn area and added plants, the geese almost never come here anymore," reports a Bellevue homeowner. In addition to discouraging Canada geese, diverse plantings are likely to increase visits by songbirds and other desirable wildlife.

Logs must be anchored securely in place. Although the dense, weathered wood used for these projects does not float easily, a little buoyancy can be enough to pull a log loose during a storm. A loose log can be hazardous to people, structures, or boats. There are several ways to secure a log, but it is most commonly done using duckbill anchors and cables or by partially burying the log.

Also, shorelines that place logs below or partially below the water line must be designed with particular care. Some restoration efforts around the lake have installed logs perpendicular to the shoreline to enhance fish habitat.

While logs in the water can improve nearshore habitat by creating salmon refuge areas, they should not extend beyond a depth of 2' below ordinary high water. Anything beyond this is thought to create habitat for predator fish species that prey on salmon. In some cases, logs are not allowed to extend beyond the water line, since they can interfere with natural movement of sediments.

If logs are used for habitat enhancement, they should be as complex as possible, with root wads and some branches still attached.



Log installation

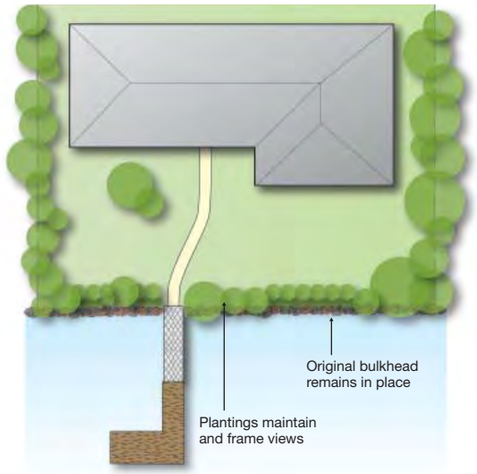
Logs are useful construction materials for green shorelines projects. They can provide strategically placed "hard engineering" structural reinforcement while complementing the aesthetic of a more natural beach project and, in some cases, enhancing ecological function. A few key principles increase the effectiveness of logs.

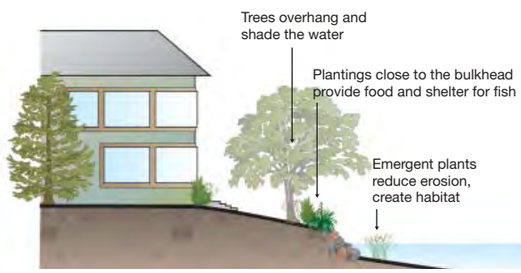
Design and Photo: The Watershed Company

Shoreline plantings

The use of trees, shrubs, and perennials is a key characteristic that distinguishes green shorelines from conventional shoreline management. When homeowners see examples of green shorelines, the plants are typically what make the biggest impression; instead of a monotonous swath of lawn and bulkhead, these shorelines use a rich variety of plantings to provide visual interest, create and protect habitat, and help stabilize the lakeshore.

In this guidebook, two categories of plantings are discussed: vegetated buffers and slope bioengineering. Vegetated buffers primarily contribute to a shoreline by adding beauty, improving habitat value, and protecting water quality. Slope bioengineering strategically uses plants as an engineering element to hold soil in place.





Vegetated Buffers

Vegetated buffers at the water's edge add visual interest to residential landscapes. A mix of textures, flowers, fruit, and colors brings a dynamic quality to your yard throughout the year. Native plants are ideal, not only because they have lower water and maintenance needs, but also because they help draw birds and beneficial insects to your yard. Vegetated buffers are great options for any lakefront property, whether you have a bulkhead, a beach or a combination of the two.

Diverse shoreline plantings contribute to aquatic habitat in four important ways. First, vegetation provides diffuse shade to the water's edge, creating conditions that help juvenile fish blend in with their surroundings. Second, they restore natural food web processes to the shoreline – plants are home to insects and other small organisms, which become fish food when they fall into the water. Third, they provide twigs, branches and leaves, which create important refuges from birds and bigger fish. Finally, planted strips protect water quality by filtering excess nutrients and other contaminants from stormwater. Rainwater flowing over lawns carries fertilizer, pet feces, gasoline, paint, and pesticides into the lake, but shrubs and perennials can help stop and neutralize these contaminants.

How wide should your buffer be? This depends on what your lot can accommodate. While bigger is better, even a few feet can provide benefits. For most new residences along Lake Washington, Seattle requires at least a 25' building setback. This means a 5-10' vegetated buffer can easily fit on most sites, and 15-20' is often feasible. An additional benefit of vegetated buffers: replacing turf with low-maintenance perennials and shrubs can cut down on yard work by shrinking the area that needs mowing.

Ideally, shrubs and perennials should be directly adjacent to the water's edge, overhanging the lake wherever possible. When a property has a bulkhead, however, trees and large shrubs need to be sited carefully to prevent damage to shoreline armoring. Black cottonwood, for example, is an ideal tree to plant next to beach areas, but its vigorous root system could cause problems for a riprap bulkhead.

Emergent plants provide excellent habitat and erosion control, but they often struggle on Lake Washington due to the lake's unusual hydrological conditions – the lake's water level is managed at the Ballard Locks such that high water occurs in the summer and low water occurs in the winter. Emergent plants may work well in protected parts of Lake Washington, or areas with shallow nearshore slopes.

As long as all plants are placed above the high water mark, no permits are necessary to plant shoreline vegetation.

"Sure, I like plants, but maintaining my view of the water is a higher priority."

Many homeowners favor large expanses of lawn because they see it as the best way to protect their view. The truth is that diverse plantings can accent and improve views.

Framing views is an important principle of garden and landscape design. Identify which views you want to keep and enhance, and which views would be better screened. Strategic plant placement can help block or soften undesirable views (such as a neighbor's shed or boat house) while maintaining views of the water.

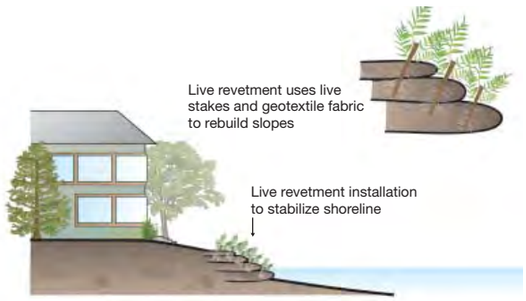
Since houses are always sited above the high water line, it's usually easy to keep views of the water over perennials and low shrubs. Most sites can also accommodate trees without losing views, so long as the trees are maintained properly; limbing them up (trimming out the lower branches to allow views under or through the canopy) may sometimes be desirable. Trees contribute to a sense of privacy, bring birds and other wildlife to your yard, absorb runoff, and can even reduce energy costs by shading your house in the summer.

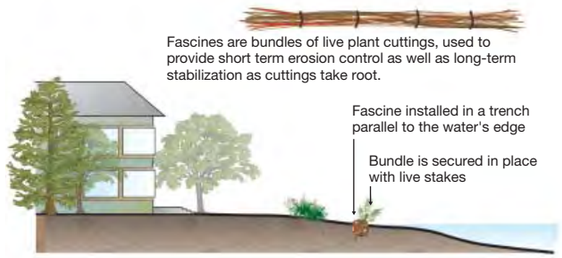
Looking at the examples throughout this guidebook will give you more specific ideas of how plantings can preserve and enhance views while reducing your impact on the environment.

note

Photo Above: Joanna A. Buehler
Photo Left: The Berger Partnership

Photos: Anchor Environmental





Slope Bioengineering

Slope bioengineering is a term used for an array of different techniques that share an elegant principle. Instead of using concrete or sheetpile, bioengineering uses plant material as a self-renewing, ecologically sustainable way to hold soil and gravel in place. These "soft engineering" techniques are commonly used in parks and natural areas for ecological restoration projects, but they may also be used on residential properties.

Each of the dozens of slope bioengineering techniques has its own advantages specific to different situations. A few examples are listed below:

1. Live stakes are a key element of almost all bioengineering projects. These are cuttings from plants that will grow roots when inserted into moist ground. Willows, dogwoods, and other shoreline species adapted to reproduce through cuttings are all viable candidates. Live stakes can be a simple and cost-effective way to bind soil in place and provide plant cover.

2. Fascines are long bundles of thin branches, tightly bound with twine. They are partially buried in trenches parallel to incoming waves and "nailed" into place with live stakes. These thick masses of branches provide immediate structural support, catch sediment coming from upslope, and can establish their own roots and new growth. Since they are usually composed of several different species, the resultant growth comes in as a thicket of mixed plants. For this reason, fascines should be placed carefully to avoid blocking views.

3. Live revetment is used to stabilize steep banks. Geotextile fabric holds earth-filled terraces in place. Further structural support is provided by live stakes driven through the fabric.

Be sure that cuttings are collected from an approved site – contact your city's parks department or the Washington Department of Natural Resources to find out where harvesting is allowed (see "Contacts"). Permits are required for any slope bioengineering installations at or below ordinary high water.

"How might climate change affect Lake Washington, and how can plantings help?"

Fortunately for homeowners on Lake Washington, climate change will not cause the lake to rise. Because the lake's level is managed at the Ballard Locks, the ordinary high water line should stay essentially the same.

The bad news is that a temperature change of just a few degrees can dramatically alter ecological relationships in the lake. University of Washington researchers have measured rising temperatures in the lake over the past 40 years. They suspect that the warmer water is linked to declining numbers of *Daphnia*, a tiny aquatic organism that provides a food source to Chinook, sockeye, and other fish.

As this food source diminishes, native vegetation along the shoreline becomes even more important as a source of insects, insect larvae, and other fish food. By increasing your waterfront vegetation, you are increasing habitat for beneficial insects, thereby providing an alternative food source for salmon.

Trees and shrubs also increase the amount of partial shade on the lake's surface, helping to moderate temperatures in shallow water.

Photos: Ben Legler

Plant List

Native plants offer many advantages for green shorelines and residential landscaping in general. Because they are adapted to local conditions, they rarely require irrigation. They are surprisingly diverse, offering a wide palette of shapes, textures, and colors to work with. They can be attractively mixed with many nonnative ornamental plants. Also importantly, they offer substantial habitat benefits for birds, beneficial insects, and fish. Finally, native plants do not need fertilizer and pesticide treatments that can put harmful chemicals in the lake.

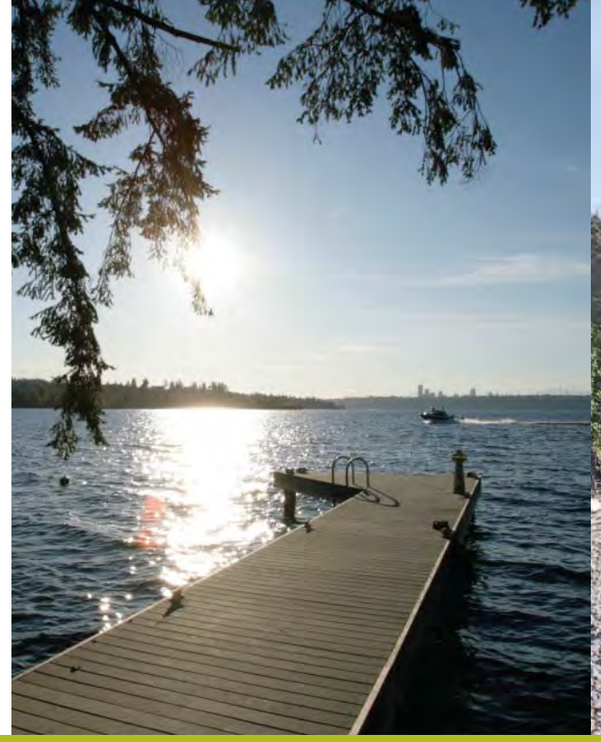
Many of the plants on this list, like Oregon grape and mock-orange, can be found at any nursery. Others will only be available through nurseries that specialize in native plants. For an up-to-date list of native plant retailers, please contact the Washington Native Plant Society (www.wnps.org).

Latin name	common name	exposure	moisture	height (ft.)
TREES				
Abies procera	noble fir	sun/part shade	dry/moist	200
Acer circinatum	vine maple	part shade/shade	dry/moist	25
Acer macrophyllum	bigleaf maple	sun/part shade	dry/moist	105
Alnus rubra	red alder	sun/part shade	moist/wet	70
Betula papyrifera	paper birch	sun	moist	80
Crataegus douglasii	black hawthorn	sun/part shade	dry/moist	25
Crataegus suksdorfii	Suksdorf's hawthorn	sun/part shade	dry/moist	20
Fraxinus latifolia	Oregon ash	sun/part shade	moist/wet	70
Malus fusca	Pacific crabapple	sun/part shade	dry/moist	40
Picea sitchensis	Sitka spruce	sun/part shade	dry/moist	200
Populus balsamifera	black cottonwood	sun	moist	100
Populus tremuloides	trembling aspen	sun	dry/moist	75
Pseudotsuga menziesii	Douglas fir	sun/part shade	dry/moist	200
Rhamnus purshiana	cascara	sun/part shade	dry/moist	30
Salix spp.	willow	sun/part shade	moist/wet	6-40
Thuja plicata	Western redcedar	part shade/shade	moist/wet	200
Tsuga heterophylla	Western hemlock	sun/part shade	dry/moist	180
GROUNDCOVER				
Achlys triphylla	vanilla leaf	part shade/shade	moist	1
Allium cernuum	nodding onion	sun	dry/moist	1
Asarum caudatum	wild ginger	part shade/shade	moist	0.5
Camassia quamash	common camas	sun/part shade	dry/moist	1
Cornus canadensis	bunchberry	part shade/shade	moist	0.5
Fragaria chiloensis	beach strawberry	sun/part shade	dry	1
Mahonia nervosa	low Oregon grape	sun/shade	dry/moist	2
Maianthemum dilatatum	false lily-of-the-valley	part shade/shade	dry/moist	1
Vancouveria hexandra	inside-out flower	part shade/shade	moist	1

Latin name	common name	exposure	moisture	height (ft.)
SHRUBS				
Amelanchier alnifolia	Saskatoon serviceberry	sun/shade	dry/moist	20
Andromeda polifolia	bog rosemary	sun/part shade	wet	1.5
Cornus stolonifera	red-osier dogwood	sun/shade	moist/wet	15
Corylus californica	beaked hazelnut	sun/shade	dry/moist	20
Gaultheria shallon	salal	part shade/shade	dry/moist	5
Holodiscus discolor	oceanspray	sun/shade	dry	15
Lonicera involucrata	black twinberry	sun/part shade	dry/wet	8
Mahonia aquifolium	tall Oregon grape	sun/shade	dry/moist	8
Philadelphus lewisii	mock-orange	sun/part shade	dry/moist	9
Physocarpus capitatus	Pacific ninebark	sun/shade	moist/wet	13
Rhododendron macrophyllum	Pacific rhododendron	part shade/shade	dry/moist	20
Ribes sanguineum	red-flowering currant	sun/part shade	dry/moist	6
Rosa gymnocarpa	bald-hip rose	sun/part shade	dry/moist	5
Rosa pisocarpa	cluster rose	sun/part shade	moist/wet	6
Rosa nutkana	nootka rose	sun/part shade	moist/wet	10
Rubus spectabilis	salmonberry	sun/shade	moist/wet	10
Salix scouleriana	Scouler willow	sun/part shade	moist/wet	25
Sambucus racemosa	red elderberry	sun/part shade	moist/wet	20
Sorbus sitchensis	Sitka mountain-ash	sun/part shade	moist	10
*Spiraea douglasii**	spiraea	sun/part shade	moist/wet	12
Symphoricarpos albus	snowberry	sun/shade	dry/moist	5
Vaccinium ovatum	evergreen huckleberry	part shade	dry	12
Viburnum edule	highbush cranberry	sun/part shade	moist/wet	12
PERENNIALS				
Aruncus sylvester	goat's beard	sun/part shade	moist/wet	5
Aster subspicatus	Douglas' aster	sun/part shade	moist	2
Athyrium filix-femina	lady fern	sun/shade	moist/wet	4
Aquilegia formosa	Western columbine	sun/part shade	moist	2
Blechnum spicant	deer fern	part shade/shade	moist/wet	3
Carex canescens	grey sedge	sun/part shade	moist/wet	2
Dicentra formosa	Pacific bleeding heart	sun/part shade	moist/wet	1
Iris tenax	Oregon iris	sun/part shade	moist/wet	1
Lupinus polyphyllus	large-leaved lupine	sun	moist/wet	4
Mimulus guttatus	yellow monkey-flower	sun/shade	moist/wet	2
Polystichum munitum	sword fern	part shade/shade	moist	4
Sisyrinchium californicum	golden-eyed-grass	sun/part shade	moist/wet	1
Sisyrinchium idahoense	Idaho blue-eyed-grass	sun/part shade	moist/wet	2
Solidago canadensis	goldenrod	sun/part shade	dry/moist	4
Trillium ovatum	Western trillium	part shade/shade	moist/wet	1.5
EMERGENT AQUATIC PLANTS**				
Alisma plantago-aquatica	water-plantain	sun-part shade	wet	3
Carex kelloggii	Kellogg's sedge	sun/part shade	moist/wet	2
Carex obnupta	slough sedge	sun/part shade	moist/wet	3
Carex stipata	sawbeak sedge	sun/part shade	moist/wet	2
Sagittaria latifolia	arrowhead	sun/part shade	wet	3
Scirpus microcarpus	small-fruited bulrush	sun/part shade	wet	3
Scirpus acutus	hardstem bulrush	sun	wet	9
*Typha latifolia**	cattail	sun/part shade	wet	8

* Potentially aggressive growth and spreading – not suitable where spreading is undesirable.
** See information on emergent plants under "Vegetated Buffers."

Photo and design: Anchor Environmental



Selecting the right approach

Not all of the practices discussed in this guidebook are appropriate for every waterfront parcel. Vegetated buffers and logs can be incorporated into just about any shoreline project, including those that require some form of bulkhead. Slope bioengineering and setting back bulkheads also can be used on most sites. While full beach restoration and beach coves are the most desirable options for shoreline management, they may not be effectively implemented on every site.

In cases where bulkheads serve only to maximize lawn area, they can typically be replaced by a beach with minimal grading and little additional reinforcement. Others cases, such as properties where houses are set back just a few feet from the water or are perched steeply above the shoreline, require some amount of armoring. How can you tell which practices might be the most appropriate for your property?

Your property's potential for green shoreline improvements is determined by a combination of four factors: building setback from the water, nearshore slope moving from your shoreline into the lake, yard slope leading from your house to the shoreline, and the intensity of waves in your area.

"High wave energy" on the decision tree does not include the typical waves experienced along Lake Washington, but rather refers to sites with one or more of the following conditions:

1. Site is adjacent to major boat traffic lane, such as the mouth of Union Bay.
2. Site receives waves that build up over a particularly long fetch (the distance over which waves pick up wind energy).
3. Site receives waves reflected off Highway 520 or Interstate 90.

The decision tree presented here helps evaluate options based on a site's characteristics, but it is not definitive – individual sites may have additional or special characteristics that increase or limit design options.

Green Shorelines Decision Tree

How do I know which options I can consider for my site?

Notes:
The use of plant buffers or logs is a viable option for any site, including those that employ hard engineering such as bulkheads.

Sites with less than a 10' setback are not included on this decision tree, because in most cases they will depend on concrete, sheetpile, or riprap. As noted above, plant buffers still may be appropriate.

1. full beach, beach coves, setting back bulkhead, bioengineering
2. beach coves, setting back bulkhead, bioengineering
3. setting back bulkhead, bioengineering
4. bioengineering

Building better docks

note

"What's the goal—shade or no shade?"

Permitting agencies encourage plants that hang over the water, but discourage overwater structures because they shade the water. So what's the difference?

Natural shorelines provide complex habitat: varied sediment sizes, dappled shade, leaves, twigs, branches, logs, and varying depths. All of these factors help juvenile fish by providing shelter and food sources. Shoreline development, especially bulkheads and docks, tend to simplify habitat. It creates large, homogenous swaths, with shallow-water areas alternating between full sun (between docks) and full shade (under docks). Essentially, speckled or patchy shade can be beneficial for salmon, but conventional docks are the equivalent of a dark alley.

More complex landscapes such as those promoted by green shoreline practices provide more habitat diversity, which in turn supports relatively high biological diversity. Simplified built landscapes provides homogenous habitat, and only support a few species.

People are often surprised to learn that docks can have a major impact on fish. While problems sometimes arise from toxic preservatives leaching off older docks, the bigger issue is that overwater structures change underwater light conditions, affecting the behavior of juvenile salmon and their predators. Regulators and the construction industry have worked together to address this problem, and new dock-building practices have dramatically decreased impacts on the nearshore environment.

Since water moves freely underneath docks, it seems logical that they are not barriers for fish. In fact, research shows that migrating smolts tend to swim around docks rather than underneath them. It is thought that this helps juvenile salmon avoid bass and other predators that hide in the dark shade under these structures. Taking this behavior into consideration, it is apparent that the 2,700+ docks around Lake Washington can add up to taxing and potentially dangerous detours for smolts. The docks add distance to a salmon's migration to the Ship Canal, and they push much of that migration out into deeper water where small fish are more vulnerable to predation.

Research suggests certain modifications to docks that can improve conditions for salmon while maintaining access for people.

Making construction clean and green

Like any construction along the shoreline, building or renovating a dock presents a potential disturbance to sensitive shoreline habitat. However, taking the following steps can decrease the impact:

1. Work with a contractor who is conscientious about preventing spills and minimizing disturbance of sediments, following Best Management Practices.
2. Carefully select wood preservatives for any lumber that will have contact with the water, or use untreated wood. The worst preservatives, creosote and pentachlorophenol, are now banned, but most of the remaining options contain arsenic or copper, which also pose threats to aquatic organisms. Nontoxic alternatives can be difficult to find and are not yet approved under International Building Code. Fortunately, untreated Douglas fir and galvanized or epoxy-coated steel piles last a long time in freshwater.
3. Use decking materials that will not require toxic finishes and cleaning agents. No matter how careful you are in applying these chemicals, they end up in the lake. Metal, fiberglass or plastic grating, recycled plastic lumber, and naturally rot-resistant wood can help avoid the problem. For wood needing finishes, look for the least toxic product for the job. The signal word ("poison," "warning," "caution," etc.) at the top of the label gives a general sense of the potential hazards. Avoid products labeled "poison" or "warning" if possible, as these indicate a relatively high hazard level.
4. Schedule construction within approved work windows to minimize disturbance to threatened species. These windows are determined based on the nesting season for bald eagles and the migration patterns of salmon. Work windows vary from one part of the lake to another. You will get information for your area during the application process for Hydraulic Project Approval (HPA) from the Washington Department of Fish and Wildlife (see "Getting Permits").

Let the sun shine in

Juvenile Chinook salmon have a complicated relationship with docks. As fry, Lake Washington salmon tend to congregate under docks during the day. This can protect them from bird predation, but may make it easier for larger fish to get them. Additionally, during their migration as smolts, docks present an obstacle for salmon to swim around. Allowing more light under docks is thought to help salmon during both the fry and smolt life stages. There are several ways to improve the light conditions under a dock:

1. Use grated decking with openings that allow light to pass through.
2. Make ramps and walkways narrower, ideally 4' or less for walkways and 3' or less for ramps.
3. Do not use "skirts," i.e., boards on the sides of the dock that extend down to the water. Multiple agencies prohibit skirts because of their effect on light in the nearshore area.
4. Design the dock such that the bottom of the entire structure is at least 18" above ordinary high water.
5. Use structural beams such as glu-lams, which allow longer spans between piles.
6. Avoid overwater lights that will be on all night. Although salmon need light during the day, artificial light makes them more vulnerable to predation at night.

These guidelines are highlights of a regional general permit for dock construction issued by the Army Corps of Engineers. Complying with these guidelines can substantially speed up the federal review and permitting for your dock (see "Getting Permits").

Photo and design: Anchor Environmental

Estimated costs & maintenance

A survey conducted by Seattle Public Utilities found that most lakefront homeowners prefer vegetation and beaches over bulkheads, but they assume that green shorelines are more expensive than armoring. So what do these projects really cost? It varies, but in general, green shorelines cost about the same as conventional bulkheads. Up-front design, permitting, and construction costs tend to be slightly lower, but maintenance costs make up the difference.

There is an enormous range of costs for shoreline construction. The price for any given renovation depends on site characteristics, the professionals that design and build your project, and, to a large extent, your preferences. Also, cost estimates presented here are based on 2008 rates – actual costs fluctuate.

Bulkhead removal

If your site has an existing bulkhead, the cost to remove it is the same whether you are replacing it with a new bulkhead or an alternative. Costs typically range from about $30 to $125 per linear foot, depending on bulkhead material and site access.

Design and Construction

Green shorelines project tend to cost slightly less for design and permitting, since they tend to require fewer revisions to meet regulatory conditions. "We've found that natural shoreline projects sail through the permitting process. We frequently get permits in three months or less, while bulkhead projects can take up to a year," says one designer who specializes in residential beach restoration. A faster permitting process translates to less money spent sending your designer or contractor to government offices.

Once the old bulkhead has been removed to make way for construction, slope bioengineering or beach construction cost about the same as a new bulkhead, while riprap generally costs somewhat less.

Maintenance

Maintenance and long-term costs represent important differences between conventional approaches and green shorelines. While residential bulkheads typically require no maintenance over the course of their 25-50 year life spans, green shorelines may require periodic beach nourishment (see "Full Beaches").

note

Although they require upkeep, beaches and bioengineered shorelines have an important long-term advantage: while bulkheads settle, weaken, and eventually fail, the alternatives can last indefinitely if maintained properly. Aside from supplementary gravel and any replacement plants needed during the establishment period, no large future investments are likely to be needed.

Several factors help determine whether your project is likely to fall at the low end or high end of the possible cost range:

1. **Grading:** Projects that require large volumes of cut or fill are more expensive than those that do not require major excavation.
2. **Access:** If your shoreline can be accessed by land, costs will be lower than they would be for sites that require equipment to be brought by water.
3. **Planting plan:** Planting in the fall and using native plants can bring down costs. Both strategies decrease the need for irrigation and improve plant survival, reducing the need for replacement plantings in the first year.
4. **Project size:** While larger projects cost more as a whole, they carry lower costs per unit. That is, cost per linear foot of a 70' long beach will be less than that of a 25' long beach. Along these lines, working with a neighbor to renovate both shorelines at the same time can substantially lower construction costs for each project.

Bulkhead removal costs

SITE ACCESS	BULKHEAD MATERIAL (REMOVAL)		
	Wood	**Riprap**	**Concrete**
Accessible from land and water	$30-40 per linear foot	$45-60 per linear foot	$95-110 per linear foot
Accessible from water only	$40-55 per linear foot	$55-80 per linear foot	$100-125 per linear foot

Shoreline construction costs (as of 2008)

	CONVENTIONAL TREATMENTS		GREEN SHORELINES		
Cost Category	**Solid bulkheads**	**Riprap**	**Beach Establishment**	**Slope bioengineering**	**Docks**
Capital Costs	Average rock or concrete bulkhead is $350 to $400 per linear foot, sheetpile is $800+ per linear foot	Average riprapped bank is $125 to $200 feet per linear foot	Average beach establishment is $200 to $500 per linear foot	Average bioengineering project is $200 to $500	Average new dock costs $100 to $130 per square foot
Design and Permitting	10-15% of capital costs for larger projects (greater than $100K), 20-25% for smaller projects		7-12% of capital costs for larger projects (greater than $100K), 15-20% for smaller projects		Similar to bulkheads
Maintenance	No maintenance is usually required for 25-50 year life span of projects		Sand replenishment at a 1-5 year frequency, gravel at a 5-10 years, both $3 to $6 per square foot of beach – with proper maintenance, project can last indefinitely		Similar to bulkheads

Design: The Watershed Company

Choosing a shoreline professional

Design: The Watershed Company

Almost all shoreline projects, aside from minor landscaping above the water line, will require some hired help from one or more professionals. These individuals use their training and experience to help you navigate the technical details of designing, permitting, building, and maintaining a durable, attractive shoreline. The professionals that you hire help determine how smoothly your design and permitting processes will go, as well as the final outcome of your project. It is worth taking extra care at the outset to find the right professional for you.

Depending on your time, budget, and the specifics of your site, you may find yourself looking for a landscape architect, landscape designer, engineer, contractor, and/or permit specialist. Some companies do all of these things, and others specialize in one. Start by identifying your priorities for your new waterfront. Make a list of features or qualities that you like, either from this guidebook or from projects that you have seen around the lake.

note

Talk to friends and neighbors who have undertaken recent shoreline work. Their experiences can give you leads, or can help you cross candidates off your list. After identifying several candidates, ask to see photos of recent work or to visit any of their projects. Be sure to tell them that you are interested in a green shorelines or "soft engineering" approach for your project so they can show you the most relevant examples. Inquire specifically about the practices that each contractor uses to minimize impacts on the shoreline environment. Once you have narrowed the list down to three or four companies, invite representatives to your property to get personalized recommendations and estimates.

As you interview potential designers or contractors, assess their experience as well as their willingness to help you realize your vision for the project. Make sure that you are confident in their abilities and that you will be able to have a collaborative relationship.

Getting permits

The permitting process can be daunting for any shoreline project. Agencies at local, state, and federal levels review shoreline plans to ensure that development in and around shorelines will protect safety, the aquatic environment, endangered species, and water quality. The resulting multilayered regulatory process can seem confusing and overwhelming. Fortunately, help is available.

Staff from the agencies listed in "Contacts" can help you navigate through specific requirements. The Governor's Office of Regulatory Assistance can also provide guidance: Call 1-800-917-0043 or visit www.ora.wa.gov for free support regarding environmental permits and permitting processes.

Additionally, jurisdictions at all levels are working to encourage the kinds of practices highlighted in this guidebook. Many of them already have some regulations that favor green shorelines, and most are working to make the process smoother for shoreline restoration. If you follow the recommendations in this guidebook, the permitting process is likely to be noticeably easier and faster. Good design and thorough documentation are always necessary for obtaining permits, but proposed projects that feature beaches and plantings will tend to be more successful than those that emphasize armoring.

Any project that involves work in, over, under, or adjacent to water requires review from three levels. Each project may be required to obtain the following permits from the following agencies:

1. **Local jurisdiction (your city or King County)**
   - Shoreline substantial development permit or exemption
   - Environmentally Critical Area permit
   - State Environmental Policy Act (SEPA) permit or exemption
   - General construction permits
2. **State agencies**
   - Washington State Department of Fish and Wildlife
     - Hydraulic Project Approval (HPA)
   - Washington Department of Ecology
     - Section 401 Water Quality Certification
     - Coastal Zone Management Certification
     - NPDES Stormwater General Permit
3. **United States Army Corps of Engineers**
     - Discharge of Dredge or Fill Material, Section 404 Permit
     - Work for Structures in Navigable Waters, Section 10 Permit

Application materials

In most cases, the permitting process will be handled by your project designer or contractor. Information that they will need to provide with the application includes:

1. Joint Aquatic Resources Permit Application (JARPA) form. In an effort to streamline permitting, multiple agencies have worked together to develop a single application form. The form is currently used by WDFW, Department of Ecology, and the Corps, and it may be used by some local jurisdictions in the future. Find the form and more information at http://www.epermitting.org/default.aspx.
2. Plans and, if applicable, surveys of existing conditions.
3. Plans for proposed construction, including plan (aerial) view and cross sections. The JARPA specifies an 8½"x 11" copy for fax and public notice purposes, but larger plans are required for most local reviews. Each municipality has its own standards for drawings, so be sure to research these before preparing your application packet.
4. Photos or aerial photos of existing conditions may be helpful.
5. Any additional studies or specifics you already have for your site—erring on the side of too much information will help your application get through the process faster. For example, if one agency requires you to conduct a geotechnical study or biological evaluation, include the results in all of your permit applications.

Many permit reviews are delayed while agencies wait for additional information from applicants. Remember to review application requirements, use the most current forms, provide all the required information, and obtain all the necessary signatures before attending a permit review meeting.

Permit application timeline

Permitting takes time. It is ideal to start the permit application process a full year before the desired work start date. While green shorelines projects are sometimes permitted in as little as three months, the process can be lengthy since several steps have to occur in a specific sequence.

Before you draw any plans, start by reviewing local permitting rules, Corps and WDFW design guidelines, and information requested on the JARPA form. Find out if there are any examples, conditions, or concerns for your specific type of project. Also understand what work windows are and how they might affect your project timeline (see "Building Better Docks").

Once you and your designer complete a concept design for your project, meet with your local agency for early design guidance and review of your preliminary plans. Taking this step before completing plans will save time and money.

note

Since Corps permits are the most complex, consider submitting your applications to both the Corps and local jurisdiction at the same time. As part of its review process, the Corps is required to consult with other agencies such as the Washington State Department of Ecology (DOE), tribal agencies, NOAA Fisheries, and the United States Department of Fish and Wildlife. Except for the DOE, you probably will not work directly with these other agencies. DOE will begin formal review of your application once it receives official notification from the Corps.

Tips to facilitate the Army Corps permit process

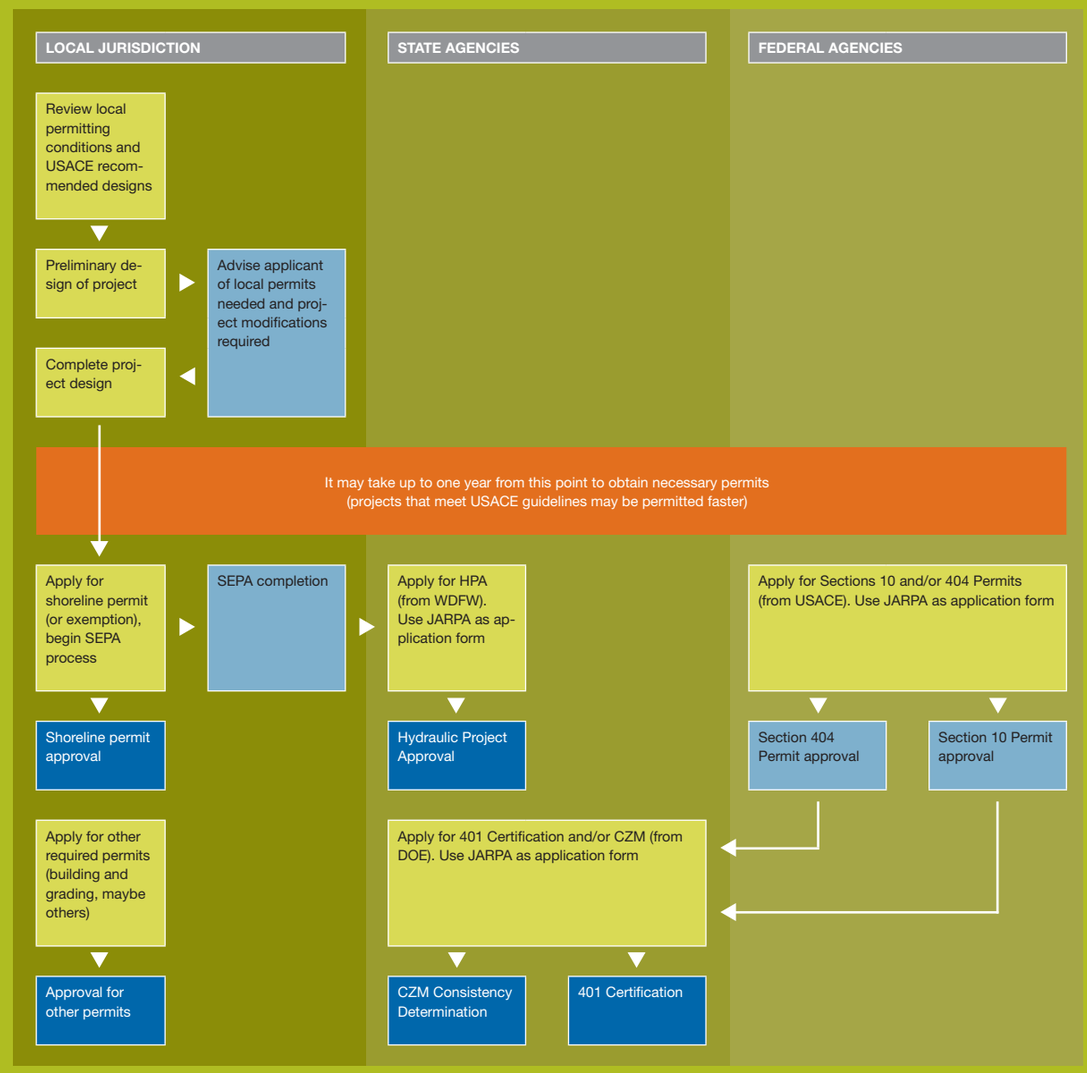
The Corps has written several documents that can accelerate the process of getting federal permits. Most significant for green shoreline projects is a "Programmatic Biological Evaluation" for shoreline restoration that the Army Corps wrote in collaboration with NOAA Fisheries and the U.S. Fish and Wildlife Service. It includes criteria for cut beaches, fill beaches, and bulkhead plantings. If your project meets the conditions listed, you will be able to forgo the site-specific Endangered Species Act analysis, which is typically the most involved part of getting federal permits. To determine whether your project meets the programmatic conditions, visit: http://www.nws.usace.army.mil/PublicMenu/Menu.cfm?sitename=REG&pagename=Programmatics

Also, a Regional General Permit (RGP3) provides clear guidelines for docks on Lake Washington and Lake Sammamish, most of which are outlined in "Building Better Docks." If you can demonstrate that your proposed project meets the conditions of RGP3, it will greatly simplify the Corps review. To download RGP3, visit: http://www.nws.usace.army.mil/PublicMenu/Menu.cfm?sitename=REG&pagename=mainpage_RGPs

The Corps has a series of general permits known as Nationwide Permits for activities that have minimal environmental impact. If your project does not meet the criteria of RGP3, Nationwide Permits 3, 13, and 27 may help streamline permitting. For more information, visit: http://www.nws.usace.army.mil/PublicMenu/Menu.cfm?sitename=REG&pagename=What_is_NWP

The flow chart provided here represents the process for a typical residential shoreline project. It does not cover every possible variation that can arise for specific projects.

Schematic of the permitting process for residential shoreline projects on Lake Washington



Applicant's responsibility
Permitting agency's responsibility
Permitting complete

CZM - Coastal Zone Management
DOE - WA Department of Ecology
HPA - Hydraulic Project Approval
JARPA - Joint Aquatic Resources Permit Application
SEPA - WA State Environmental Policy Act
WDFW - WA Department of Fish & Wildlife
USACE - US Army Corps of Engineers

Design and Photo:
J.A. Brennan Associates

Resources

The following publications and websites served as sources for this guidebook. They include additional information based on shoreline restoration efforts around the country. For links to these sites and more, please visit the Green Shorelines website, **www.seattle.gov/dpd/GreenShorelines.**

Lakeside Living (King County)
www.govlink.org/watersheds/8/action/lakeside-living

Salmon-Friendly Gardening (City of Seattle)
www.seattle.gov/util/Services/Yard/Natural_Lawn_&_Garden_Care/Salmon_Friendly_Gardening/index.asp

Lakescaping for Water Quality and Wildlife (Minnesota Department of Natural Resources),
by Carrol Henderson, Carolyn Dindorf, and Fred Rozumalski. May be purchased online at www.comm.media.state.mn.us/bookstore/bookstore.asp

Slope Stabilization and Erosion Control (Washington State Department of Ecology)
www.ecy.wa.gov/programs/sea/pubs/93-30/index.html

Alternative Bank Protection Methods for Puget Sound Shorelines (Department of Ecology)
www.ecy.wa.gov/biblio/0006012a.html

Native Plant Resources Directory (King County)
green.kingcounty.gov/GoNative

Puget Sound Shoreline Stewardship Guidebook (Puget Sound Action Team)
www.kingcounty.gov/environment/watersheds/central-puget-sound/shoreline-stewardship-guidebook.aspx

The Shoreline Stabilization Handbook: Lake Champlain and Other Inland Lakes (Northwest Regional Planning Commission)
www.nrpcvt.com/nrpcvt/shoreline.html

Green Home Remodel series (City of Seattle)
In particular, see "Landscape Materials" and "Hiring a Pro." www.seattle.gov/dpd/GreenBuilding/SingleFamilyResidential/Resources/RemodelingGuides/default.asp.

The Water's Edge: Helping fish and wildlife on your waterfront property (Wisconsin Department of Natural Resources)
www.dnr.wi.gov/fish/pubs/thewatersedge.pdf

Governor's Office of Regulatory Assistance,
including documents such as a Aquatic Permitting Fact Sheet, a Permit Handbook, permit schematics, and an on-line permit questionnaire, www.ora.wa.gov

Army Corps of Engineers permit process overview
www.nws.usace.army.mil/PublicMenu/Menu.cfm?sitename=REG&pagename=mainpage_Permit_Applicant_Info

Contacts

United States Army Corps of Engineers, Seattle District Office
Mailing Address:
P.O. Box 3755
Seattle, WA 98124

Street Address:
4735 E. Marginal Way South
Seattle, WA 98134
(206) 764-3742
www.nws.usace.army.mil

Washington Department of Fish and Wildlife, Region 4
1775 12th Ave NW
Issaquah, WA 98027
(425) 313-5660
www.wdfw.wa.gov/reg/region4.htm

Department of Ecology, Northwest Regional Office
3190 160th Ave SE
Bellevue, WA 98008
(425) 649-7000
www.ecy.wa.gov

Governor's Office of Regulatory Assistance
1-800-917-0043
www.ora.wa.gov

City of Seattle, Department of Planning and Development
700 5th Ave., Suite 2000
Seattle, WA 98124
(206) 684-8600
www.seattle.gov/dpd/Permits/default.asp

City of Mercer Island, Development Services
9611 SE 36th St.
Mercer Island, WA 98040
(206) 275-7605
www.ci.mercer-island.wa.us/SectionIndex.asp?SectionID=43

City of Bellevue, Development Services
450 110th Ave. NE
P.O. Box 90012
Bellevue, WA 98009
(425) 452-6800
www.ci.bellevue.wa.us/development_services_center_intro.htm

City of Renton, Development Services
Renton City Hall
1055 S. Grady Way
Renton, WA 98057
(425) 430-7200
www.rentonwa.gov/government/default.aspx?id=1112

City of Kirkland, Planning Department
123 5th Ave
Kirkland, WA 98033
(425) 587-2225
www.ci.kirkland.wa.us/depart/Planning.htm

City of Redmond, Department of Planning and Community Development
PO Box 97010
Redmond, WA 98073
(425) 556-2473
www.ci.redmond.wa.us/insidecityhall/planning/planning.asp

City of Sammamish, Community Development Department
801 228th Ave SE
Sammamish, WA 98075
(425) 295-0500
www.ci.sammamish.wa.us/CommunityDevelopment.aspx

City of Lake Forest Park, Planning and Building Department
17425 Ballinger Way NE
Lake Forest Park, WA 98155
(206) 368-5440
http://www.cityoflfp.com/city/planning.html

City of Kenmore, Community Development
6700 NE 181st Street
P.O. Box 82607
Kenmore, WA 98028
(425) 398-8900
http://www.cityofkenmore.com/dept/cd/cdindex.html

King County, Department of Development and Environmental Services
Black River Corporate Park
900 Oakesdale Avenue SW
Renton, WA 98057
(206) 296-6600
www.kingcounty.gov/permits

Glossary

Armoring: Any hard engineering approach to shoreline protection. This includes structures made of concrete, riprap, and sheetpile. While needed on some properties, armoring is often unnecessary, and causes negative impacts on fish habitat, water quality, and access to the water.

Beach nourishment: Adding appropriate gravel to the shoreline in order to offset gradual erosion. Typically needed every five to ten years for beaches on Lake Washington.

Emergent plants: Plants that thrive while partially submerged. In addition to having striking visual qualities, emergent plantings are an effective way to enhance nearshore habitat and provide reinforcement against erosion. Often difficult to establish in Lake Washington, given the lake's unusual hydrology (see "Plant List").

JARPA: Joint Aquatic Resources Permit Application, a form developed by multiple regulatory agencies to streamline the environmental permitting process (see "Getting Permits").

Nearshore habitat: Shallow areas waterward of the shoreline, which make up the most biologically active part of the lake. Aquatic plants, juvenile salmon, shore birds, and numerous other organisms depend on this habitat. Nearshore slope can be a key factor in determining which kinds of restoration work on a given site (see "Selecting the Right Approach").

Ordinary high water line: The elevation where high water meets the shore. Water level in Lake Washington, which peaks in the summer at 21.85 feet above sea level, is regulated at the Ballard Locks. In most cases, local, state, and federal permitting processes are triggered when development occurs at or below the ordinary high water line.

Riprap: Stone commonly used for bulkheads or other bank stabilization efforts; ranging from about 4" to 2' in diameter. Also known as rip-rap, rubble, revetment, or rock armoring.

SEPA: State Environmental Policy Act, a state process that requires state and local agencies to consider the environmental consequences of a proposal before approving or denying the proposal.

Sheetpile: A type of wall used as a bulkhead on sites with shallow setbacks. Typically made of steel, vinyl, fiberglass, or treated wood, sheetpile walls have all the negative effects of concrete and typically cost more.

Shoreline exemption: A determination that a proposed project does not require a shoreline substantial development permit. Shoreline substantial development permits are required by state law for many development activities in shoreline areas, but most single-family residential projects are exempt (see "Getting Permits").

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Lake Washington Cedar & Sammamish Watersheds

PugetSoundPartnership
our sound, our community, our chance

City of Seattle
Mayor Greg Nickels

Department of Planning and Development
Diane Sugimura, Director
www.seattle.gov/dpd/greenshorelines

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RESTORE OUR WATERS

LIVING SHORELINES:

A NATURAL APPROACH TO EROSION CONTROL

Introduction, Guidance, and Case Studies

GALVESTON BAY FOUNDATION

The Galveston Bay Foundation (GBF) is a 501(c)(3) non-profit organization established in 1987 under the laws of the State of Texas. The Foundation's strength is that it involves a true cross-section of Bay interests to address issues and concerns related to Galveston Bay. It is managed by a strong Board of Trustees whose members represent sport and commercial fishing groups, government agencies, recreational users, environmental groups, shipping, development, and business interests. The mission of the Foundation is to preserve, protect, and enhance the natural resources of the Galveston Bay estuarine system and its tributaries for present users and for posterity. Its programs in advocacy, conservation, education, and research strive to ensure that Galveston Bay remains a beautiful and productive place for generations to come.

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Fax: 281-332-3153
www.galvbay.org

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LIVING SHORELINES: A NATURAL APPROACH TO EROSION CONTROL AND PREVENTION

Introduction

A common concern of many landowners with shoreline property is erosion. A common response to erosion is "armoring": the installation of bulkheads, rip-rap, or other hard structures directly onshore to stop erosion and protect property. These shoreline protection methods, particularly bulkheads, can actually increase erosion on adjacent properties and in front of the structure itself. Wave energy from wind, boat wakes, and storm events is reflected back from the armored shoreline causing scouring in front of, and increased erosion on each side of, the bulkhead or armored area. Bulkheads are prone to undercutting and structural failure requiring costly periodic maintenance and eventual replacement. Additionally, bulkheads and other hard structures placed directly onshore often eliminate or reduce access to valuable shoreline marsh and other riparian habitats. Shoreline hardening separates uplands from lowlands and causes the loss of important vegetated shallows as the area in front of the armoring is typically converted to open water. These intertidal marshes are important habitat for many wildlife species including birds and economically valuable fisheries species.

Since the 1950s, Texas estuarine (saltwater) wetlands have decreased approximately 9.5 percent, or roughly 59,600 acres. This is an average net loss of 1,600 acres per year.[1] The Galveston Bay system has lost over 20 percent of its tidal marshes since the 1940s.[2] Some areas, such as the bay side of Galveston Island, have been hit even harder with marsh losses upwards of 80 percent.[3] In part, these losses can be attributed to subsidence which drowns the marshes as the water levels become too deep too rapidly for the marsh grasses to survive. The loss of soil-stabilizing vegetation makes the shoreline more vulnerable to erosion. The loss of vegetation exacerbates the negative effects of wind driven waves and boat wakes. In this way, marsh and shoreline are rapidly converted to open water. For these and other reasons, landowners face a constant battle to protect their property from loss due to erosion.

[1] Moulton, D.W. et al, "Texas Coastal Wetlands: Status and Trends, Mid-1950s to Early 1990s" 1997, USFWS, 17 October 2000 < http://library.fws.gov/Wetlands/TexasWetlands.pdf>

[2] The State of the Bay- A Characterization of the Galveston Bay Ecosystem, 2nd Ed. Galveston Bay Estuary Program Publication GBEP T-7. Lester and Gonzalez, Eds., 2002, 162 pages.

[3] Galveston Bay Estuary Program Publication GBNEP-49, The Galveston Bay Plan; The Comprehensive Conservation and Management Plan for the Galveston Bay System, 1994, 457 pages

What are Living Shorelines?

Innovative shoreline protection methods have been implemented within the Galveston Bay estuary system in an attempt to deal with shoreline erosion by mimicking natural coastal processes through the strategic placement of plants, stone, fill, and other structural and organic materials. Restoration specialists at some public lands, such as those near Anahuac and Brazoria National Wildlife Refuges, have built wave break structures from shell and/or rip-rap just offshore rather than directly onshore. Not only do these structures act as wave breaks, robbing the waves of their energy, they cause sediment-laden waves to deposit materials landward of the wave break. This process can build up sediment raising the elevation behind the wave break sufficiently to support marsh grasses without the need for extra fill-dirt. Many times, the wave break itself becomes encrusted with oysters and other crustaceans creating an artificial reef.

Local private landowners have incorporated smaller versions of the above projects and other techniques to stabilize their shorelines. Landowners are even creating projects incorporating these principles and techniques along canals or in front of existing armoring. This allows them to design a shoreline that incorporates environmental benefits, prolongs the life of their bulkhead, reduces long term maintenance and replacement costs, and protects their property from erosion. In addition to these important features, the end result is a shoreline that is functional as well as aesthetically appealing, often creating a lush green band of vegetation or a winding reef that follows the shoreline. Birds and fish are attracted to the restored areas, providing recreational opportunities and enjoyment for the landowner.

Living Shorelines are shoreline management options that provide erosion control while working with nature to restore, create or protect valuable habitat. As opposed to bulkheads or armoring, **Living Shorelines** are designed to allow natural coastal processes to take place by allowing the movement of organics in and out of the marsh; absorbing wave energy from wind, boats, and storm events; and filtering pollutants from runoff. In addition, they create and/or maintain vital habitat for economically and ecologically important fish and shellfish, and they provide nesting and foraging areas for resident and migratory birds. They can be built in front of bulkheads or armoring providing additional protection to existing structures while restoring shoreline habitat. **Living Shorelines** help protect landowner investments while enhancing the ecological value of the property. They are often less expensive than traditional shoreline armoring methods, and in some instances, grant funding is available to offset costs to landowners who are willing to protect and create habitat.

This document is intended to provide the reader with general guidelines for starting a **Living Shoreline** project through technical guidance and real examples. At the end of the document is a list of resources and agencies that are available to answer questions and help design a shoreline that meets landowner needs and plays an active role in protecting and restoring bay systems.

LIVING SHORELINES DESIGN GUIDELINES

When considering a **Living Shoreline** project the first question one must ask is, "Do I have an erosion problem?" If there is measurable land loss due to currents or waves and action is needed to stop or slow the loss of property, a **Living Shoreline** might be an option. If the shoreline is stable and stocked with quality, native high and low marsh plants – **STOP**! The first, and best, option in this situation is to do nothing. Local experts can help determine whether the shoreline is experiencing erosion and/or if it is already supporting beneficial plants that could be incorporated into the project design. (Agencies that can provide assistance are listed at the end of this document). If there is property loss or it is felt that action must be taken to prevent future loss, the following steps may be helpful. Depending on the reader's background or level of knowledge, this document may be all that is needed to get started. However, it is more likely to be a starting place to provide information and to raise questions that will need to be asked when contacting the agencies for assistance.

Site Assessment

In order to determine what sort of shoreline enhancement is right for a property, one must first answer some questions about the particular shoreline and what factors are occurring:

- **Rate of erosion**: Can property loss be measured in inches or feet per year, or is the erosion noticeable over a span of many years? Rapid erosion might indicate the need for a more permanent solution such as a rock or concrete breakwater, whereas a temporary breakwater and dense planting might be enough to protect where erosion is minimal.

- **Type of shoreline**: Is the shoreline severely cut like a bluff? How high is the bluff? Is the bluff undercut? Alternatively, is the shoreline sloped but not supporting plants? The severity of the erosion can help one choose the right protective measures.

- **Erosional forces**: Is the property routinely subjected to waves generated by passing boats and/or jet-skis? If so, how often? Is the property subject to a prevailing wind that keeps relatively strong waves hitting the shore much of the time? Is the property in a protected area that gets occasional boat traffic or storm generated waves? Understanding the factors contributing to the erosion at the property will help determine how strong and/or permanent a wave break will be needed. Additionally, if the property is in an area frequently used by commercial or recreational boat traffic, navigational hazards and signage must be considered.

- **Water depth**: How deep is the water just offshore? Will the area behind the breakwater require filling to raise the elevation to support plants? How quickly does the depth increase? Does the bottom drop off steeply or slope gently

getting gradually deeper? These questions can help determine what steps will be necessary to achieve satisfactory plant growth.

- **Substrate**: Is the bottom offshore from the property sand, silt, clay, or shell? Is it hard or soft? Understanding the substrate can help determine what methods will or won't work in an area and how much settling of materials might occur after installation.

- **Salinity**: Is the water body fresh or salty? Salinity will determine what plants are chosen for a **Living Shoreline** installation.

Project Design

Once the questions above have been answered, a project plan can begin to take shape. By looking at the methods available, a landowner can begin to determine what is right for the property. In some instances, a landowner in a high wave energy environment with an eroded, steep, bluff shoreline may have to install a substantial offshore rock or concrete breakwater to trip the waves and calm the waters so that plants can establish and grow in a permanently protected area. In lower energy conditions, shoreline grading and planting might be all that is needed.

This document presents case studies from actual projects and is intended to be a guide to help landowners decide what options are best for their unique situations. The examples presented here are not exhaustive, and there are many combinations of methods that may be implemented to address erosion and habitat loss. The most important thing to remember is that **ONE SIZE DOES NOT FIT ALL.**

Plant Selection

In most areas around Galveston Bay, smooth cordgrass (*Spartina alterniflora)* is an appropriate choice for establishing vegetation along the shoreline. This aquatic plant's elaborate root structure helps hold the substrate intact to reduce erosion and provide habitat for marine organisms. *Spartina alterniflora* is a perennial grass that grows from extensive rhizomes. The plant grows in intermediate to saline marshes, often forming dense stands over broad areas. It is a major contributor of organic material to aquatic food chains. This plant is native to the Gulf coast.

In areas farther up rivers or bayous, lower salinity levels dictate that different plants be selected. There are many species of plants suited to this type of environment that can be selected based on habitat value, aesthetic appeal and availability.

Examples of some of these plants include but are not limited to the plants listed in the table below.

Table 1. Some common beneficial plants for low salinity environments

Common name	Scientific name
Swamp lily	*Crinum americanum*
Black needle rush	*Juncus roemerianus*
Palmetto	*Sabal minor*
Spider lily	*Hymenocallis liriosme*
Iris	*Iris virginica*
Cutgrass	*Zizaniopsis miliacea*
Bulltongue	*Sagittaria lancifolia*

When planting in intertidal zones subject to changing water levels, sprigs (individual stems) are typically planted approximately three feet apart. To increase the chance of survival, the sprigs should be planted deeply enough that the roots are covered. Also, the stem must be secured by compacting the soil around the base of the stem to prevent the plant from washing out. In higher energy environments, it may be necessary to plant sprigs more densely, perhaps one or two feet apart. When planting behind a wave break, plants can be spaced three feet apart closer to shore decreasing to one foot apart directly behind the wave break. If plants are available and the budget allows, additional plants will increase vegetative cover and will help stabilize the shoreline more quickly.

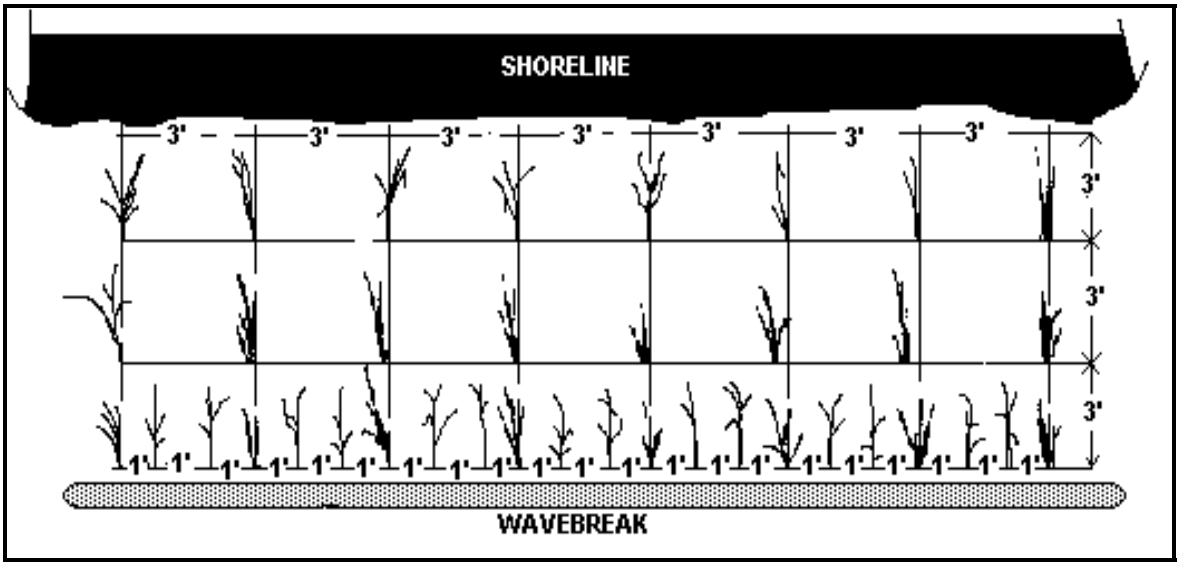

Figure 1. Planting diagram showing ideal plant spacing behind a wave break

Timing

If possible, it is best to begin construction on **Living Shoreline** projects during the winter months -- ideally November through January. Winter usually provides the lowest tides, making offshore construction easier. Also, beginning the project during the winter allows adequate time for any fill materials to settle before planting begins. The ideal months to begin planting are February through May. Planting during these months provides the plants a chance to become established during the growing season and allows the vegetation several months of growth before the following winter arrives. Obtaining the required construction and transplanting permits can take several months, so the application process should ideally be started in early summer; however, this is a guideline and not a rule.

Figure 2. Living Shoreline, Galveston Island

Permitting

Typically, when attempting shoreline work, there are four agencies that are part of the permitting process. These agencies must grant approval before work can commence. The U.S. Army Corps of Engineers (USACE) will determine whether the water body on which you are working is under their jurisdiction. If so, the landowner may be required to apply to the USACE for a permit under provisions of the Clean Water Act and/or the Rivers and Harbors Act. Certification from the Texas Commission on Environmental Quality (TCEQ) may also be required. During processing of the USACE permit application, the TCEQ will review the application to determine if the work will comply with state water quality standards. Since most submerged lands are considered "waters of the state" (i.e. they are the property of the State of Texas), a landowner may also have to apply for a state lease through the Texas General Land Office. An application must also be filed with the Texas Parks and Wildlife Department to gain approval to transplant vegetation into state waters. Finally, other agencies, including the National Ocean and Atmospheric Administration, the Environmental Protection Agency, and the U.S. Fish and Wildlife Service, will also review any proposed USACE applications to ensure environmental safeguards are taken into account during the permit review process.

While this may sound daunting at first, the agencies have worked together to simplify the process for landowners by forming the Permit Service Center (PSC). Established in 1999, the Permit Service Center is available to the public to assist with permitting on the Texas coast by acting as a clearinghouse for all permitting activities and offering information, guidance, and forms to those seeking to get their projects permitted. By consolidating forms and directing the forms to the responsible agencies, the PSC can be of great assistance in the permitting process. Landowners can also ask questions and seek guidance from state and federal agency experts through regular monthly pre-application meeting forums scheduled through the USACE. These meetings provide an informal setting through which applicants can obtain valuable advice prior to or during the formal permit application process.

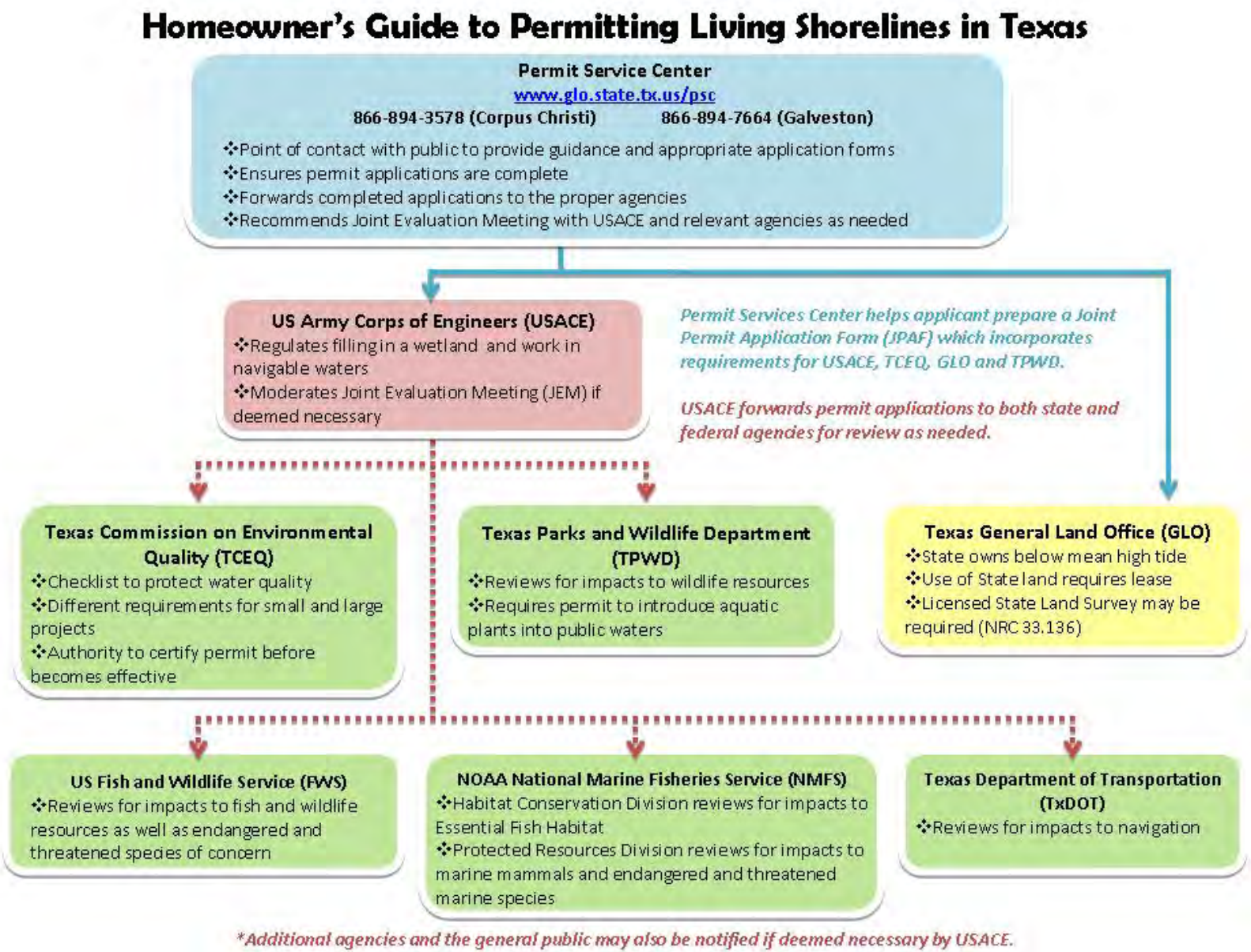

Figure 3. Permit Service Center flow chart, Amy Gohres, Weeks Bay Foundation

Costs

The current estimated pricing given in the tables below has been gathered from a variety of vendors and is presented for use as a comparison tool only. Pricing for individual projects will vary based on location, size, scope, materials and plants selected, and availability of materials.

Table 2. Pricing guidelines: Shoreline armoring

Type	Unit	Installed Cost - $/Unit (Labor and materials included)
Vinyl bulkhead*	Linear Foot	$125.00 - $200.00
Vinyl bulkhead* w/ toe protection	Linear Foot	$210.00 - $285.00
Wooden bulkhead	Linear Foot	$115.00 - $180.00
Wooden bulkhead w/ toe protection	Linear Foot	$200.00 - $265.00
Concrete bulkhead	Linear Foot	$100.00 - $200.00
Revetment	Cubic yard (yd^3)	$25.00 - $45.00 base cost $120.00 - $180.00 installed

*(based on 4-8' height)

Miscellaneous Costs: Possible need for earthwork or backfill

Maintenance: Additional fill and vegetation over time, structural repair due to scour or storm damage

Table 3. Pricing guidelines: Offshore/nearshore breakwater materials

Material	Unit	Base Cost $/Unit	Installed Cost $/Unit
Oyster shell	Yd^3 (loose shell)	$50.00 - $60.00/$yd^3$	Varies
	Bag	$5.00 without spat $30.00 with spat	
Concrete bags	Bag	$4.00 - $6.00/bag	$12.00 - $16.00/LF
Limestone rock	Linear Foot	Varies	~$125.00 - $200.00
Reef domes	Linear foot	--	$44.00 (incl. delivery)*
Erosion control ("snow") fence	100 feet	$45.00	Varies
Coir logs	10' lengths	$57.25 (incl. delivery)	Varies

*Delivery charges can be impacted by number of domes ordered, distance driven, fuel prices and other factors and can vary greatly.

Maintenance: Possible need for additional shell or rock over time, possible repair after storms, removal of fencing

Table 4. Pricing guidelines: Plants

Plant	Unit	Base Cost $/Unit	Installed Cost $/Unit
Smooth cordgrass *(Spartina alterniflora)*	Plug	$1.25	$2.00 - $3.00
Marshhay cordgrass *(Spartina patens)*	Plug	$1.25	$2.00 - $3.00
Mangrove	Gallon pot	$5.00	$10.00
Salt grass *(Distichlis spicata)*	2” Plug 4” Plug	$0.60 $1.00	$2.00 $3.00
Bitter Panicum *(Panicum vaginatum)*	Node	$1.00	$2.00 - $3.00
Freshwater species	Gallon pot	$5.00 - $6.00	Varies

Maintenance: Cost of additional plants/labor to replant any areas that don’t take in the first planting

Figure 4. Living Shoreline, Galveston Island

EXAMPLE METHODS AND CASE STUDIES

The Galveston Bay Foundation and its agency partners have implemented various shoreline protection methods around the bay. These methods are chosen for and tailored to the specific needs of each individual site. Things to consider include but are not limited to: exposure to wave action caused by wind, boat wakes or other factors; water depth; existing shoreline conditions; and salinity. It is important to note that every site is unique and **one size does not fit all.**

Below are some of the methods that have worked at various locations around the Galveston Bay watershed, with example projects given as case studies to illustrate implementation. These methods can be expanded to work on any part of the Texas coast as long as local hydrological processes and native plant selections are taken into consideration.

Permanent Installations

A. Offshore Rock or Concrete

In higher wave energy areas, hard materials such as rock, rip-rap or bags of concrete (sacrete) can be used just offshore to create a wave break in front of an eroded shoreline.

Figure 5. BEFORE: Heavily eroded bluff shoreline suitable for construction of an offshore wave break

This method works equally well in front of existing shoreline armoring (e.g. an existing bulkhead) where habitat creation and additional protection are the goals. By installing a wave break and planting behind it, one can provide valuable cover and food for small fish, shrimp, and crabs as well as habitat for birds that are attracted to the food and shelter behind the wave break. The area behind the wave break may fill naturally or may be filled with materials to achieve elevations suitable for planting. In order to create conditions that will encourage natural filling and mimic natural marsh conditions, the breakwater height should fall between mean high and mean low tide. At high tide, waves should wash over the breakwater bringing in fresh nutrients and organics and dropping sediments. At low tide, water should be allowed to run out of the marsh to allow for flushing of the area. Additionally, the breakwater should be planned with gaps (a one foot break for every 50 feet of wave break is typical) to allow ingress and egress of marine resources. The gaps may be staggered or overlapping to slow the flow of water which may carry sediments out of the project area. Maintaining sediment behind the breakwater is key to project success.

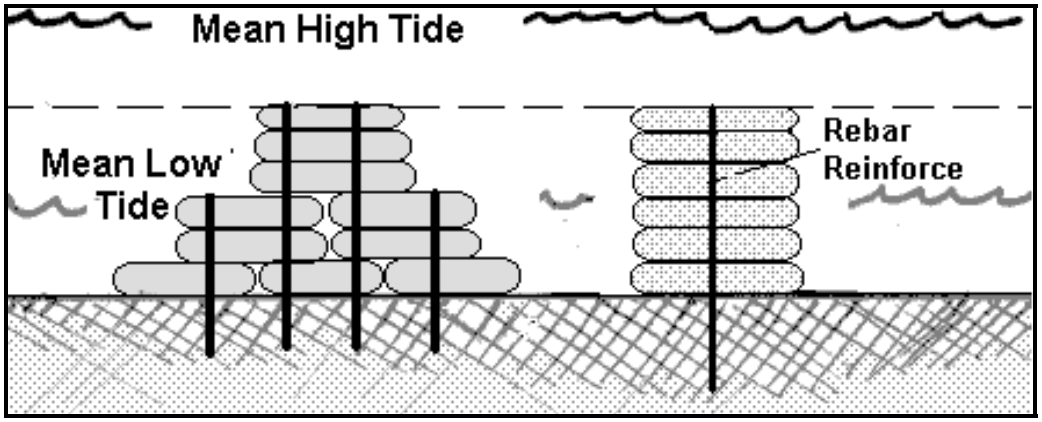

Figure 6. Pyramid vs. single stacking of sacrete in reference to mean high and mean low tide

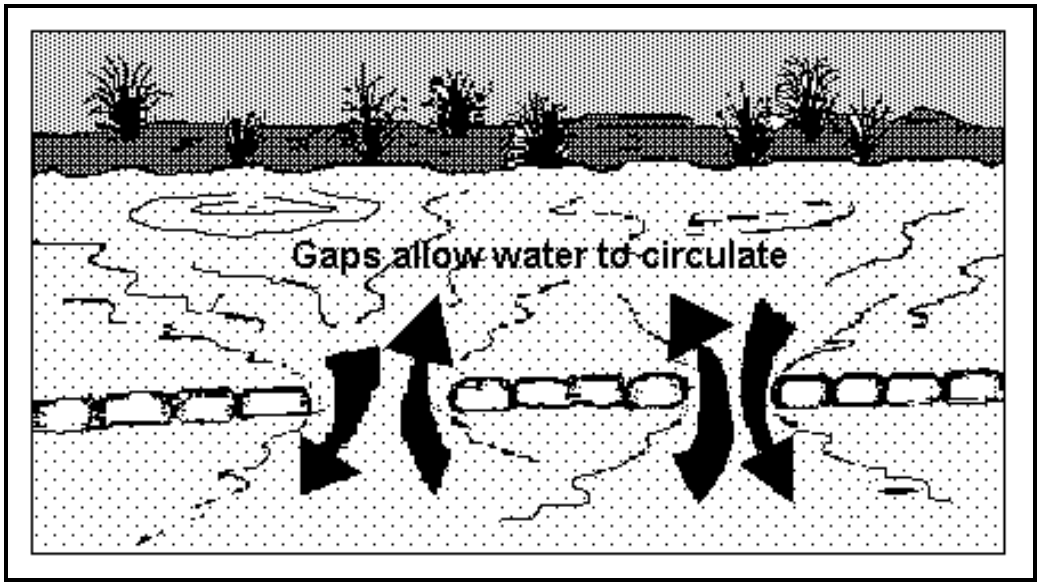

Figure 7. Gaps in the breakwater allow for flow of nutrients and organics

If rip-rap (broken concrete blocks) already exists along the present shoreline, all or part of it can be used to construct the wave break by moving and stacking it a short distance from and parallel to the existing shoreline. If rip-rap is not available, sacrete can be used. Sacrete can be purchased under the brand names QUIKRETE ® or Sakrete®. The material is packaged in biodegradable 80-pound paper bags so it can be stacked offshore where it is needed. Salinity can impact the ability of the concrete to set, so one should check with the vendor to determine which product is right for each project. The bags must be abutted against each other to ensure that the fill materials placed behind the wave break do not wash out. The bags may also be stacked in staggered rows to prevent wash-out and further stabilize the wave break. Also, shell hash or oysters placed behind the breakwater can minimize sediment loss.

Three 80-pound sacrete bags stacked vertically provide approximately one foot of elevation, and seven bags laid end-to-end provide about five feet of length. If the height of the wave break is more than a foot or so, stacking the sacrete in a pyramid shape is suggested to ensure that the structure does not fall over. Also, consider stacking the materials with the pyramid method if wave energy is high. Sacrete breakwaters can be reinforced by driving rebar through the bags and into the substrate, strengthening the structure.

Once a breakwater is complete, the elevation of the area behind the breakwater must be raised to a sufficient level to support marsh plants. The filled area should slope from the mean high water mark to the breakwater. A 10:1 slope is generally acceptable, but this will vary from site to site depending on local conditions, e.g. the distance from the mean high water mark to the breakwater.

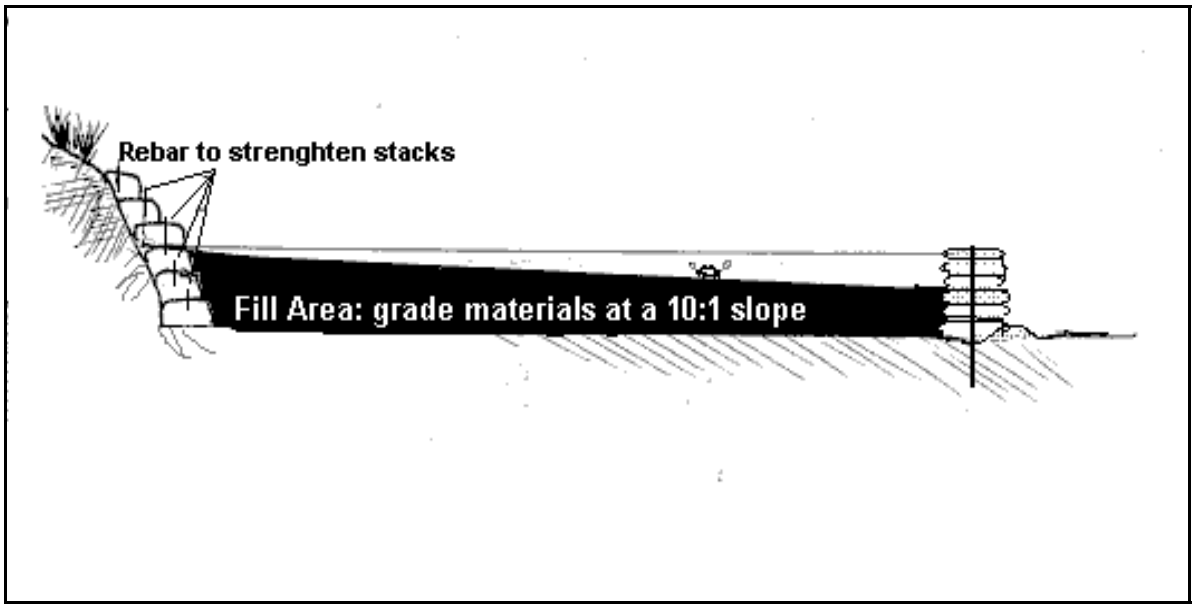

Figure 8. Standard drawing showing a 10:1 slope

Example: Diagrams and calculations for constructing a 300 foot long breakwater, 3 feet wide at the base, 30 feet from shore

Table 5. Estimated material needs for constructing an example breakwater

Calculations for 300' Example Breakwater	
Item	Size
Front Wall	300' x 3 ' = 900 square feet
Sides	3' x 30' = 90 square feet
Total	990 square feet
Wave break calculations:	
170 bags of material are needed for 100 square feet of barrier	
990 square feet / 100 square feet = 9.9	
9.9 x 170 bags = 1,683 bags of material	

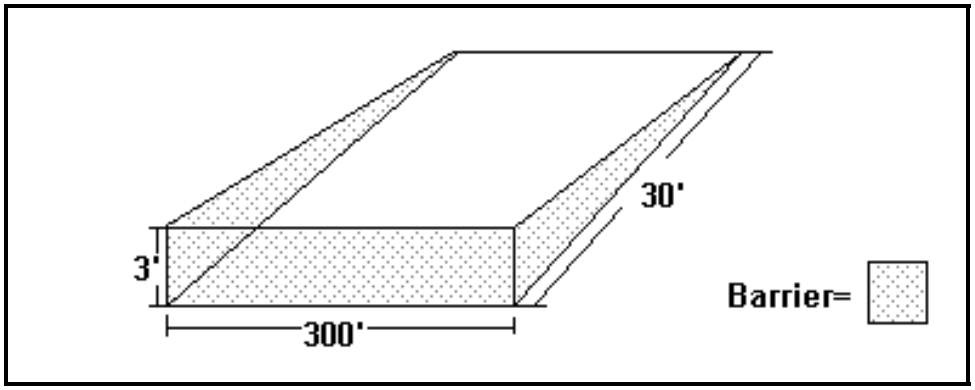

Figure 9. Dimensions of example 300' breakwater

Table 6. Estimated material needs for fill behind example breakwater

Fill Materials for 300' Example Breakwater
Calculations:
30' x 2' x 300' = 18,000 cubic feet
18,000 cubic feet / 2 (half the square) = 9,000 cubic feet
9,000 cubic feet / 27 (convert cubic feet to cubic yards) = 333 cubic yards

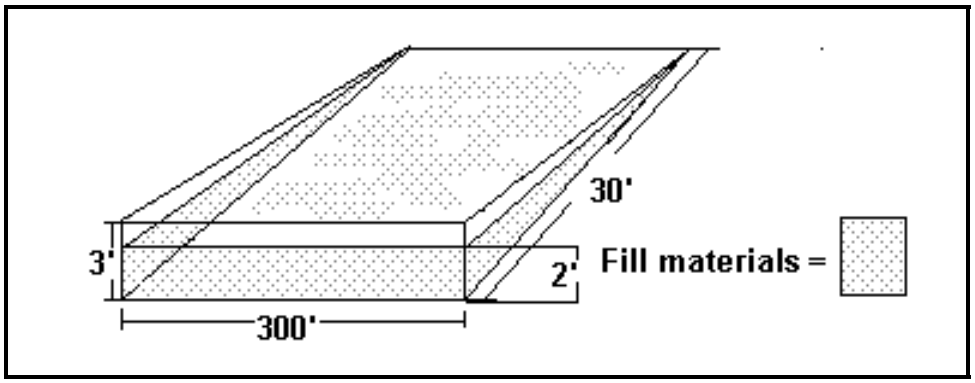

Figure 10. Dimensions of fill material behind example breakwater

Case Study: Asher Project

One of the Galveston Bay Foundation's early **Living Shoreline** projects involved the creation of a 450-foot rip-rap and sacrete breakwater that was constructed and backfilled to create approximately 4,000 square feet of tidal marsh along Dickinson Bayou in Galveston County, Texas. The bluff shoreline shown in Figure 5 above was graded to allow for more plantable area (Figure 11 below). A breakwater was constructed approximately 8-feet offshore, and the area between the breakwater and newly graded shoreline was filled with clean fill. The filled area was planted with *Spartina alterniflora.*

In addition to creating habitat, the project generated interest in the local community, serving as a prime example of an alternative method of shoreline protection that provides aquatic habitat while being significantly less expensive than traditional armoring.

Figure 11. DURING: Planting in constructed fill area behind rock breakwater at Asher site

Figure 12. AFTER: Asher shoreline six months after planting behind rock breakwater

B. Reef Domes

In some instances, landowners wish to specifically create oyster habitat in combination with their shoreline protection project. To achieve this goal, there are several routes that can be taken. In some instances, landowners can place old oyster shell or crushed concrete on open bottom offshore to provide a place for oyster larvae to attach and grow. Alternatively, reef domes can be used to encourage oyster colonization while also acting as a breakwater. Reef domes are patented hollow concrete dome-like structures used for shoreline protection and habitat creation. Reef domes placed offshore act to trip waves and calm waters near shore to allow for planting and shoreline stabilization. Because reef domes are large and heavy, barges or boats are often needed to move them from an onshore staging area to their offshore resting place. Galveston Bay Foundation or the agency resources listed at the end of this document can assist with determining whether reef domes would be suitable for specific projects. Once reef domes are installed, the area behind the domes can be allowed to fill naturally as waves drop sediment behind them or clean fill can be manually placed behind the domes.

Case Study: Sweetwater Property

Galveston Bay Foundation has placed over 1,000 feet of reef domes along the shore of its Sweetwater Property on Galveston Island. The property has approximately 3,500 feet of shoreline affected by severe erosion from wave energy that has resulted in the loss of fringing salt marsh habitat. At this property, reef domes were deployed both in single and double rows to allow for increased erosion control and sediment accretion.

Figure 13. Reef domes installed at Sweetwater (left), encrusted with oysters (right)

C. Vinyl Sheetpile

In areas where space is a concern, such as on a canal, one does not want to take up valuable planting area with rock or sacrete. In these cases, a plantable shelf can be created by driving vinyl sheetpile vertically into the substrate leaving some sticking up from the bottom to form the edge of the shelf. Just as with a rock or sacrete breakwater, the top of the vinyl sheetpile should fall between the mean high and mean low tide marks so that water will overtop the breakwater at high tide and leave it exposed at low tide.

Case Study: Alonso Project

Vinyl sheetpile has been employed successfully in the Lafitte's Cove canal subdivision on West Galveston Island. The property owners wished to create habitat in front of their existing bulkhead on the canal. Existing high marsh found on the property was incorporated into the final project design. In total, the project created approximately 2700 square feet of inter-tidal marsh along 180 feet of waterfront on a 150 foot wide canal. The amount of marsh created would have been significantly diminished had sacrete or rock been used as a breakwater. In this instance, a barge was used to bring in the sheetpile and the machinery used to install it. Fill material was dredged from the canal itself and deposited behind the sheetpile.

Figure 14. DURING: Vinyl sheetpile installation

Figure 15. AFTER: Canal planting

D. Shoreline Grading

In some instances, placing hard material offshore is not practical perhaps because it presents a hazard to navigation, or because the near shore bottom drops off steeply, or because of space limitations. One method that has been successful in such environments is grading the shoreline back from the waterline to maximize the suitable area for planting. By scraping back and gently sloping the shoreline, a larger area is made plantable.

Case Study: Scarborough Property

Located along a diversionary canal near Hitchcock, Texas, the Scarborough property offered a low wave energy environment on a relatively narrow water body. The near shore bottom dropped steeply leaving only a narrow band of ground suitable for planting between the bluff shoreline and the point where the water became too deep to support plants.

Figure 16. BEFORE: Scarborough shoreline before grading and planting

By grading the shoreline back from the waterline, the bluff was leveled out and the plantable area was widened toward the upland area. Pushing fill into the water was not feasible given the steep drop in the bottom just offshore. Smooth cordgrass was planted densely to increase its ability to take root and establish quickly. Because wave energy from boat wakes or wind driven waves is low in this area, no hard structure or even temporary fencing was deemed necessary.

Figure 17. AFTER: Scarborough shoreline six months after planting
Photo: Tom Scarborough

Temporary Wave breaks

A. Erosion Control Fencing

In many areas around Galveston Bay, subsidence due to the pumping out of groundwater is the main culprit in marsh loss. As the ground has sunk, marsh grasses have died. If other erosional forces are minimal, a temporary wave break such as erosion control fencing may be installed to temporarily cut down on wave action until plants installed behind the fence become established. Once the vegetation has taken hold and developed a strong root system, the fencing can be removed leaving behind a natural wave break of plants that will trap and hold additional sediments and filter impurities out of the water.

Case Study: Sullivan Project

The loss of marsh grass contributed to increased erosion and shoreline loss along this Trinity Bay property. To combat this, the property owner installed 955 linear feet of double row erosion control fencing and planted *Spartina alterniflora* behind it creating approximately 13,000 square feet of marsh. The fencing will be removed once the plants have established and grown dense enough to withstand the wind driven waves along his portion of the shore.

Figure 18. Double-row erosion control fencing

Figure 19. Planting behind erosion control fence

B. Coir Logs

Coir logs are constructed of interwoven coconut fibers that are bound together with biodegradable netting. Commercially produced coir logs come in various lengths and diameters. Coir logs are best used in low energy environments, as they are intended to biodegrade over time after plants have had a chance to become established. While the plants are growing and getting established, the coir logs provide a wave break to still the waters behind them. Plants can be planted into the coir logs themselves as well as behind them.

Coir logs will need to be secured to ensure that they are not dislodged by moving water. Stakes can be driven through the coir log netting and then into the substrate to anchor them. The higher the wave energy, the more stakes are required to hold the coir logs in place. Coir logs should not be used in areas where wave energy is significant. Logs should not be secured in areas where they are submerged most of the time. Excessive wave energy can cause the material to fall and the log to fail. Coir logs are an inexpensive alternative that can easily be deployed by a landowner or small work group. Placing the logs parallel to the shoreline has shown success. However, when wave energy is more significant, it may work better to place the logs perpendicular to the shoreline. This technique has shown success and works similar to a mini-jetty. The logs are biodegradable, and it is anticipated that the vegetation will establish before the logs fail.

Figure 20. Staked coir logs

CONCLUSION

Whatever methods are chosen, a **Living Shoreline** can provide erosion control with the added benefits of water quality improvement, habitat creation or restoration, and increased aesthetic value, often for less than the cost of traditional shoreline armoring. By installing a **Living Shoreline**, property owners are adding to cumulative habitat benefits within a water body. Small incremental landowner projects, when added together and taken into account with larger scale restoration and protection projects in a geographic area, can add up to big watershed level changes. **Living Shorelines** are a viable, beneficial method for controlling shoreline erosion that allows coastal residents to play an important part in saving habitat in their own backyard for the benefit of future generations.

Figure 21. Sunset on a Living Shoreline property
Photo: Bob Moore

STATE AND FEDERAL AGENCIES

U.S. Army Corps of Engineers
Regulatory Branch, CESWG-CO-RE
U.S. Army Engineer District, Galveston
CESWG-PE-R
P.O. Box 1220
Galveston, TX 77551
Phone: 409-766-3930
Fax: 409-766-3931
http://www.swg.usace.army.mil

Texas General Land Office:
Permit Service Centers
PO Box 1675
Galveston, Texas 77553-1675
Phone: 409-741-4057; 1-866-894-7664 (toll free)
Fax: 409-741-4010
http://www.glo.state.tx.us/psc

Texas A&M University-Corpus Christi
6300 Ocean Dr., NRC #2800, Unit 5841
Corpus Christi 78412-5841

Texas General Land Office – Field Office
11811 North D. St.
LaPorte, Texas 77571
Phone: 281-470-1191
Fax: 281-470-8071
http://www.glo.state.tx.us

Texas Commission on Environmental Quality
Watershed Management Division
P.O. Box 13087
Capitol Station
Austin, Texas 78711
http://www.tceq.state.tx.us

NOAA National Marine Fisheries Service
Habitat Conservation Division
4700 Avenue U
Galveston, TX 77551-5997
Phone: 409-766-3699
Fax: 409-766-3575
http://sero.nmfs.noaa.gov/hcd/hcd.htm

U.S. Fish and Wildlife Service
Clear Lake ES Field Office
17629 El Camino Real #211
Houston, TX 77058-3051
Phone: 281-286-8282

Natural Resource Conservation Service
7705 W. Bay Rd.
Baytown, Texas 77520
Phone: 281-383-4285
Fax: 281-383-4286
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NOTES AND CALCULATIONS

Living Shorelines

FOR THE CHESAPEAKE BAY WATERSHED

CHESAPEAKE BAY FOUNDATION
Saving a National Treasure

Living Shorelines are a creative and proven approach to protecting tidal shorelines from erosion. The technique consists of planting native wetland plants and grasses, shrubs, and trees at various points along the tidal water line. Plantings are often coordinated with carefully placed bioengineering materials, such as man-made coconut-fiber rolls (or biologs) to protect vegetation and soils. Where viable, oysters can be included as well. Projects may include stone elements, as long as they do not cut off access to the shore.

On College Creek, Annapolis, a natural shoreline showcases an extensive buffer of trees and wetland grasses. Ideal shoreline projects replicate these conditions.

Living shorelines have many benefits and vary with specific site conditions. They:

- improve water quality by settling sediments and filtering pollution;
- provide shoreline access to wildlife, such as nesting turtles, horseshoe crabs, and shorebirds;
- provide shallow water habitat and a diversity of plant species for aquatic and terrestrial animals;

DO YOU HAVE A FAILING BULKHEAD OR EROSION BEHIND A ROCK WALL?

Think about a living shoreline before you replace these structures with similar ones.

Substantial erosion is occuring behind a failing wooden bulkhead, and traditional turfgrass lawns do little to hold soil in place.

- provide shade to keep water temperatures cool, helping to increase oxygen levels for fish and other aquatic species;
- look natural rather than man-made and artificial;
- absorb wave energy so that reflected waves do not scour the shallow sub-tidal zone and hamper the growth of underwater grasses; and
- are often less costly than wooden bulkheads and rock walls (also known as "revetments").

Erosion: A natural process

Shorelines are continually eroded by the movement of water, waves, and wind. Deposition of sediments and sand along shorelines further downstream helps sustain natural habitats. Human activities like high-speed boating and hardened shorelines on adjacent properties can greatly increase the rates of erosion. Installing living shorelines is a way to work with natural processes while still protecting shorelines.

A newly created marsh island protects the sandy shoreline from waves and wind while allowing for the natural movement of sand and water.

In some instances, such as on steep slopes, regrading of the shoreline's bank may be necessary to provide a stable slope and allow newly-planted vegetation to become established. Fill material can also be extended out from the existing shoreline and then planted with appropriate vegetation to create a tidal wetland marsh. In mid-to-high wave energy areas, an offshore breakwater may be installed to diminish wave energy.

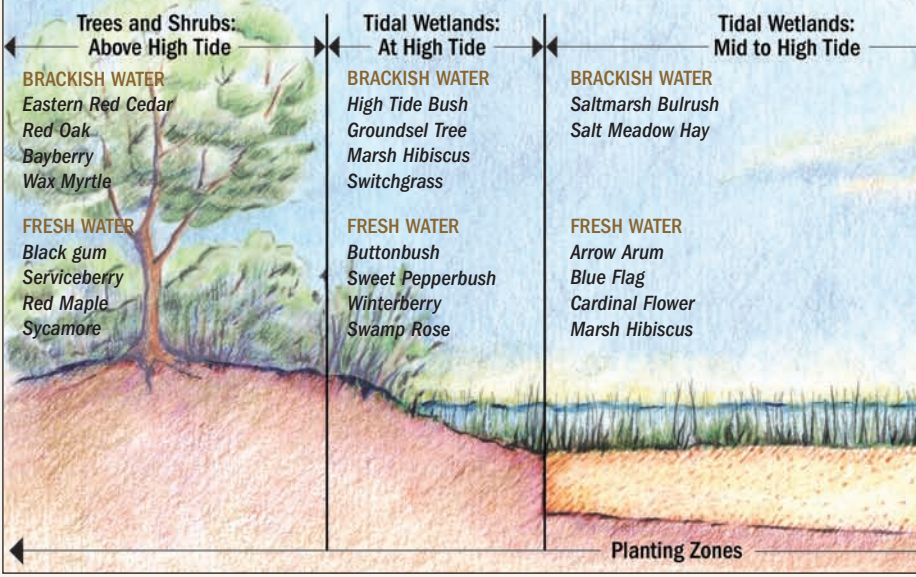
On the right side of the photo is a living shoreline, on the left a bulkheaded shoreline. The steep slopes of the living shoreline were stabilized by planting warm-season grasses, including switchgrass and little bluestem, and native shrubs.

IS "ARMORING" YOUR SHORELINE ALONG TIDAL CREEKS REALLY NECESSARY?

Many waterfront property owners who live on protected creeks and rivers see their neighbors' wooden bulkheads and rock walls and think that they are the only solution to erosion concerns. However, where there is low-to-moderate wave energy and minimal erosion, it is usually not necessary to install these hard structures. Not only are they more costly, but they can destroy shallow water habitats when wave energy is reflected back.

A contrast in shorelines: The living shoreline on the left provides many water quality and wildlife benefits while blending in with the natural environment. The shoreline on the right is completely covered in stone and has no vegetation behind it to prevent erosion.

THE "IDEAL" LIVING SHORELINE



The "Ideal" Living Shoreline

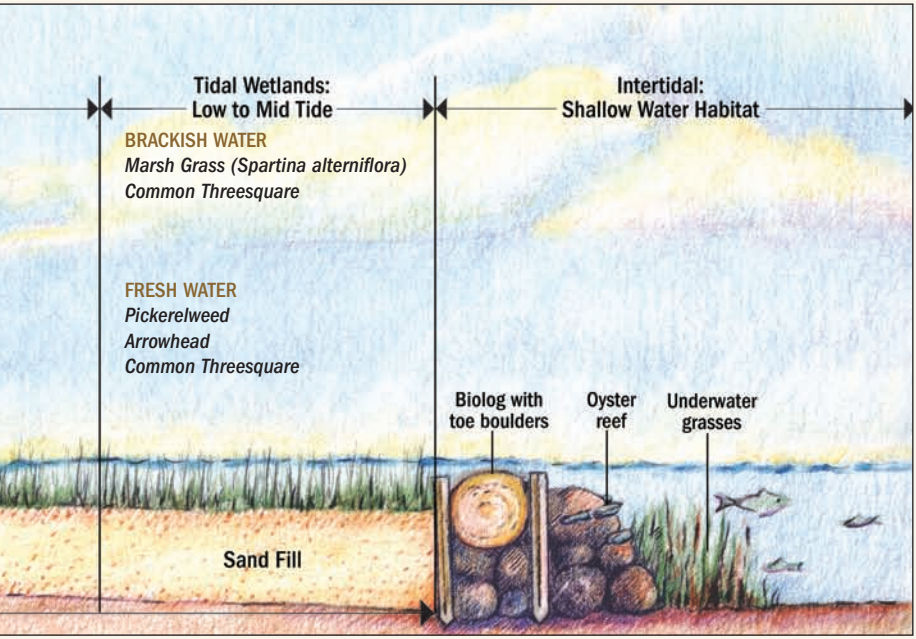
The "ideal" living shoreline in many tidal areas in the Bay watershed contains a succession of natural filters that normally would be found in undisturbed ecosystems. These filters include:

- riparian buffers above the tide line, made up of native trees and shrubs, including a mix of shrubs at high tide elevation;
- tidal wetlands, including grasses, rushes, and sedges at mid-tide elevation, and marsh grasses and common threesquare at low tide;
- oysters and an oyster reef—where appropriate; and
- underwater grasses in shallow water.

Selecting Native Plants

Native trees, shrubs, and grasses have expansive roots that hold soil in place and slow erosion from water and overland runoff. They add critical wildlife habitat and diversity, as well as beauty and value, to your property. Plant selection will depend on your site conditions.

If possible, purchase plants from a local nursery that propagates its own plants from regionally-obtained native stock or seed. (For a list of native plant nurs-



WHAT ARE THE CONDITIONS AT YOUR SITE?

Salinity: Is your water fresh or brackish?

Water depth: How great is the fluctuation between low and high tide?

Light: Does the site receive full sun, partial shade, or full shade?

Slope of bank: Are the shoreline's slopes gradual or steep?

eries, contact your state's native plant society or go to cbf.org/landscaping). If biologs are used as part of a living shoreline, herbaceous plants can be planted directly in the biologs. Over five to six years, the biolog will decompose naturally, but the plants' roots will grow throughout the log to hold the bank or shoreline edge in place.

An excellent guide on native plants for restoration in the Bay watershed is the U.S. Fish and Wildlife Service book *Native Plants for Wildlife Habitat and Conservation Landscaping* (www.nps.gov/plants/pubs/chesapeake/toc.htm).

Showy native wetland plants, like Blue Flag iris (left) and Marsh Hibiscus (right), attract pollinators, provide seasonal color, and have extensive root systems to hold shorelines in place.

When to Plant

Perennials and grasses should be planted during peak growing season (in mid-to-late summer) to allow enough time for their root systems to become established before they go dormant in the late fall. Trees and shrubs should be planted in spring and fall when there is adequate rainfall to help them develop strong roots and leafy growth.

Volunteers plant hundreds of marsh grass plugs (Spartina alterniflora) *at the Back Creek Nature Park waterfront.*

Maintenance

Fencing shown on the right keeps ducks and geese from browsing and pulling out recently planted marsh grass plugs (next to the biolog) and warm-season grasses (on the slope.) After the first full growing season, fences can usually be removed.

Waterfowl, such as ducks and geese, love to feed on newly-planted vegetation. To keep them out of the area for the first full growing season, a three-to-four foot tall mesh enclosure—tied onto wooden stakes—should be erected. Large debris, such as logs, algae mats, and trash, should be periodically cleared from the site to protect wetland plants from smothering. For beach and water access, keep a narrow path to the water unplanted to avoid trampling vegetation. Control non-native invasive plants, such as English ivy and multi-flora rose, and replace them with native wetland plants and shrubs.

Expand Your Buffer

Well-established shoreline buffers include mature native trees and shrubs to help frame the view. Extensive buffers anchor the soil, provide wildlife habitat, and make the shoreline more aesthetically pleasing.

If your property is experiencing erosion, it is important to understand where it is coming from; not all erosion is due to waves, wind, and tides. On properties with steep slopes leading to the water, a major source of severe erosion can be runoff from rooftops, downspouts, and paved driveways unless adequate tree and shrub buffers are planted closer to the house.

By planting woody vegetation such as shrubs and smaller trees to create an understory, and large canopy trees as part of the buffer, you can greatly reduce runoff and soil loss coming from the land. The wider the buffer the better, but a width of at least 30 feet is ideal. If you are concerned about maintaining your view, plant larger trees away from sight lines and plant low-growing shrubs instead.

Three Types of Shoreline Projects

NONSTRUCTURAL:
Biologs and vegetation

HYBRID:
Segmented sills, jetties, or groins with natural beach shoreline and/or marsh plantings

STRUCTURAL:
Offshore breakwater (openings provide wildlife access)

WHICH PROJECT IS RIGHT FOR MY SITE?

(source: MD Department of Natural Resources)

Site Conditions	Low Energy (Nonstructural)	Medium Energy (Hybrid)		High Energy (Structural)
Shoreline Location	creek or cove	minor river	major tributary	mainstem Bay
Water Depth (ft/near shore)	-1.0	-1.0 to -2.0	2.0 to -4.0	-4.0 to -15.0
Fetch (mi/distance to nearest opposite shore)	0.5	1.0 to 1.5	2.0 or more	2.0 or more
Erosion Rate (ft/yr)	2 or less	2 to 4	4 to 8	8 to 20
Erosion Control Treatment Options	**Nonstructural projects**	**Hybrid Project**		**Structural Projects**
	beach replenishment	marsh fringe w/groins		bulkheads
	marsh fringe	marsh fringe w/sills		revetments
	marshy islands	marsh fringe w/breakwaters		stone reinforcing
	biologs, groins	beach replenishment w/breakwaters		groins and jetties
Cost per foot	$50–100	$150-300	$350–500	$500–1,200

Permit Process

Permit requirements for installation of living shorelines vary depending on state and local laws. No permits are required to plant vegetation on existing substrate on tidal or non-tidal shorelines unless fill is introduced or damaging equipment is required. However, permits are required for any alteration of shorelines in tidal areas, as well as wetlands. This includes:

- removal of vegetation;
- grading and introducing fill material;
- installation of nonstructural materials like biologs with toe boulders (narrow bands of rock that hold sand-fill and biologs in place); and
- installation of hard structures like bulkheads, sills, and revetments.

A joint federal/state permit application (JPA) from the U.S. Army Corps of Engineers is now in place to help streamline the process. Go to cbf.org/livingshorelines for appropriate links.

Getting Help: Demonstration Projects and Workshops

Many living shoreline projects have been successfully installed in the Chesapeake Bay watershed. For a list of publicly-accessible projects, go to cbf.org/livingshorelines.

Getting Help: Financial Assistance for Public and Private Living Shoreline Projects

Maryland has a wide range of loan, grant, and cost-share programs available for homeowners, communities, local governments, and non-profit organizations through state agencies and private foundations.

Virginia has grants available for private individuals through the Chesapeake Bay Trust's Living Shorelines Initiative. The Chesapeake Bay Restoration Fund in Virginia only funds projects for public and non-profit organizations.

ORGANIZATION	PROGRAM	PROJECT TYPES	ELIGIBLE	STATE	AMOUNT	DUE DATE	CONTACT INFORMATION
Chesapeake Bay Trust, NOAA-Restoration Center, Campbell Foundation, National Fish and Wildlife Foundation	Living Shorelines Initiative	grant	public and private	VA, MD	up to $75,000	Sept.	www.cbtrust.org
Chesapeake Bay Trust Program	Stewardship	grant	public and some private	MD	up to $25,000	July, Dec.	www.cbtrust.org
National Fish and Wildlife Foundation Program	Chesapeake Bay Small Watersheds	grant	public and private	VA, MD	up to $50,000	Feb.	www.nfwf.org
Maryland Department of the Environment, Water Management Administration	Small Creeks and Estuary Restoration Program	grant	public and private	MD	75% cost share	Feb.	www.mde.state.md.us
Maryland Department of the Environment, Tidal Wetlands Division	Tidal Wetland Compensation Fund	grant	private	MD	generally up to $50,000	on-going	www.mde.state.md.us
Maryland Department of the Environment, Water Quality Financing Administration	Water Quality Revolving Loan Fund	low interest loan	public and private, applicant must be local gov't.	MD		Feb.	www.mde.state.md.us
Maryland Department of the Environment, Water Quality Financing Administration	Linked Deposit Program	low interest loan	private	MD		Feb.	www.mde.state.md.us
Maryland Department of Natural Resources Shore Erosion Control Program	Nonstructural Erosion Control	no interest loan	public and private	MD	public: no limit; private: up to $25,000	on-going	www.dnr.state.md.us

(Source: Chesapeake Bay Trust and Maryland Department of Natural Resources)

How to Make Your Living Shoreline Happen:

1. Identify your site conditions and determine suitable types of projects.
2. Contact your local and state agencies to get technical assistance and arrange a site visit.
3. Contact consultants and contractors who specialize in constructing living shorelines for a site visit, information, and financial estimates.
4. Plan ahead!
   - Permits take time (four months or longer depending on the type of work needed) so if you want construction to begin in the spring, you will need to start the permit process in the fall.
   - For grasses and herbaceous perennials, the best time to start construction is in the spring since plants are available from nurseries at the start of the peak summer growing season. (Trees and shrubs can also be ordered for a fall planting.)
5. Take photos before, during, and after your project.
6. Educate your neighbors and community about why you are constructing a living shoreline and what the benefits are to your local watershed and the Bay.
7. Enjoy your beautiful shoreline and the wildlife that you will attract!

Go to **cbf.org/livingshorelines** for more information.

Living shorelines provide a natural setting for both humans and wildlife. They play an important role in restoring water quality in our rivers and streams, and ensure a future for fishing, crabbing, and boating on the Bay.

ABOUT THE COVER:
Shown one year after planting, this living shoreline project at St. John's College, Annapolis, replaced 800 feet of wooden bulkhead with native plantings, tidal wetlands, oysters, and underwater grasses.

bottom photo: Beth LeFebvre/CBF Staff

Living shorelines offer wildlife vital habitat. Diamondback Terrapins need access to shorelines to lay their eggs.

inset photo: Willem M. Roosenburg

PHOTO CREDITS:

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page 10: Rob Schnabel/CBF Staff

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CHESAPEAKE BAY WATERSHED

The Chesapeake Bay's 64,000-square-mile watershed covers parts of six states and is home to more than 17 million people.

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CONSERVATION

Rebuilt Wetlands Can Protect Shorelines Better Than Walls

Fortified wetlands can protect shorelines better than hard structures

By Rowan Jacobsen on April 1, 2019

Oysters are tested in experimental configurations for shoring up a coastline near Beaufort, N.C. Credit: John Althouse

On August 27, 2011, Hurricane Irene crashed into North Carolina, eviscerating the Outer Banks. The storm dumped rain shin-high and hurled three-meter storm surges against the barrier island shores that faced the mainland, destroying roads and 1,100 homes.

After the storm, a young ecologist then at the University of North Carolina at Chapel Hill named Rachel K. Gittman decided to survey the affected areas. Gittman had worked as an environmental consultant for the U.S. Navy on a shoreline-stabilization project and had been shocked to discover how little information existed on coastal resilience. “The more I researched, the more I realized that we just don’t know very much,” she explains. “So much policy and management is being made without the underlying science.” She decided to make shorelines her specialty.

What Gittman found was eye-opening. Along the hard-hit shorelines, three quarters of the bulkheads were damaged. The walls, typically concrete and about two meters high, are the standard homeowner defense against the sea in many parts of the country. Yet none of the natural marsh shorelines were impaired. The marshes, which extended 10 to 40 meters from the shore, had lost no sediment or elevation from Irene. Although the storm initially reduced the density of their vegetation by more than a third, a year later the greenery had bounced back and was as thick as ever in many cases.

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Gittman's study confirmed what many experts had begun to suspect. "Armored" shorelines such as bulkheads offer less protection against big storms than people think. By reflecting wave energy instead of dispersing it, they tend to wear away at the base, which causes them to gradually tilt seaward. Although they still function well in typical storms, they often backfire when high storm surges overtop them, causing them to breach or collapse, releasing an entire backyard into the sea.

In a later study, Gittman and other researchers surveyed 689 waterfront owners and found that the 37 percent of properties protected by bulkheads had suffered 93 percent of the damage. And bulkhead owners routinely had four times the annual maintenance costs of residents who relied on nature instead. Salt marshes bent but did not break.

In recent years more scientists and policy makers have come to believe that "living shorelines"—natural communities of salt marsh, mangrove, oyster reef, beach and coral reef—can be surprisingly effective in a battle coastal residents have been losing for years. U.S. shores are disintegrating as higher seas, stronger storms and runaway development trigger an epidemic of erosion and flood damage. Every day waves bite off another 89 hectares of the country. Every year another $500 million of property disappears. Overall, some 40 percent of the U.S. coastline is suffering ongoing erosion. In some places, the rate of loss is breathtaking. Go to Google Earth Engine's Timelapse feature and watch Shackleford Banks melt away like ice cream on a summer sidewalk.

Historically, almost all money spent on coastal defense has gone toward "gray" infrastructure: seawalls, bulkheads, levees and rock revetments. That is beginning to

change as researchers become more sophisticated in measuring the long-term impact of "green" coastal defenses. Insurance companies and governments are finally taking notice and might actually turn the tide toward living defenses.

WETLANDS OUTPERFORM WALLS

Around the time that Hurricane Irene was barreling up the East Coast, Michael W. Beck, a research professor at the University of California, Santa Cruz, and then lead marine scientist for the Nature Conservancy, was initiating a collaboration with the insurance industry that today may begin to change coastal conservation. "A lot of people were saying that ecosystems worked for flood protection, but the evidence was thin," Beck tells me at his Santa Cruz office. The physical mechanisms were clear: oyster and coral reefs limited erosion and flood damage by acting as natural breakwaters (offshore seawalls), dispersing wave energy with their corrugated surfaces. Salt marshes and mangroves, with their earthen berms and friction-generating forests of stalks, could rake more than 50 percent of the energy out of storm surges in less than 15 meters of territory.

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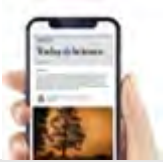
Developerts survey oysters that have settled onto Oyster Catcher, a jute-and-cement material designed to help babies and adults thrive, protecting marshes between them and solid land. Credit: John Althouse

But although scientists understood the physics, no one had put it into a form that could be used easily by policy makers. Beck set out to rectify that. "If I want to change practices, I can't bring my ecosystem model to FEMA or the U.S. Army Corps of

Engineers," he explains. "I have to look at *their* risk model and put ecosystems into *that*."

Beck and his colleagues began collaborating with Lloyd's of London, Swiss Re and others in the insurance industry, which have some of the best data and models in the world on assets and risk. When he plugged data on coastal ecosystems into their risk models, it became clear that living shorelines were excellent defenses. And, he notes, "when I tell the Corps, FEMA and the development banks that these are the numbers from the insurance industry, I automatically have a different level of credibility."

The first study focused on damages from Superstorm Sandy, which clobbered New York and New Jersey in 2012. Working with Risk Management Solutions, a leading risk-modeling firm, the scientists showed that wetlands prevented $625 million of flood damage from the storm, which was surprising given that the coasts in the region had already lost 60 to 90 percent of their protective wetlands over time. In areas that flooded, the few remaining wetlands lowered flood damage by 11 percent on average. As important was the ability to buffer garden-variety floods: in one local study, properties behind marshes suffered 16 percent less annual flood damage than properties that had lost their marshes. "That's well within the range for which you could expect [insurance] premium reductions," Beck points out.



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He and his partners then turned their economic and risk-management models on the Gulf Coast from Texas to Florida, which is regularly battered by big storms. They did an exhaustive analysis of the annual expected benefits and costs of all types of infrastructure. The team estimated that the coast would suffer $134 billion of losses over 20 years if no preventive measures were taken. Elevating homes could prevent $39.4 billion of those losses, but it is incredibly expensive. At an average of $83,300 per house, it would cost $54 billion to prevent that $39 billion in damages. The six-meter-high dikes being built in Louisiana were a worse option; at $33,000 per meter, they were an absurdly expensive way to protect a relatively limited amount of property, returning just

$1 in savings for every $4 of expense. Smaller levees built on land in front of many low-lying coastal communities prevented much more damage for almost the same cost.

In terms of bang for the buck, sandbags were the best investment, saving $8.4 billion of damages for a mere $0.84 billion in expense. Natural defenses ranked high as well. Wetlands restoration, which could prevent $18.2 billion of losses, would cost just $2 billion. Oyster-reef restoration could prevent $9.7 billion in losses for $1.3 billion. Barrier island restoration offered $5.9 billion of prevention for $1.2 billion. And "beach nourishment" (replenishing depleted beaches with sand dredged from the seafloor) in the eastern Gulf could save $9.3 billion for $5.5 billion.

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That last one surprised many people because replacing beach sand year after year is often seen as a fool's errand. "If the only choices you gave me were beach nourishment versus fully gray infrastructure," Beck says, "I'd choose the former as the lesser of two evils."

Overall, the research found that $57.4 of the $134 billion could be prevented cost-effectively, almost all of it through green infrastructure.

One type of restoration that was not part of the study is large-scale diversion of the Mississippi River. Diverting sediment-laden water through a gap in the river's levees and letting that sediment filter into struggling marshes can restore their health and elevation, but the region is subsiding so quickly that not even the famously muddy Mississippi can save it from the encroaching sea. "It is going to be expensive to re-create an entire ecosystem," Beck says, "and it is better and cheaper to start earlier."

Cost-effective restoration may be tricky on long, sandy coasts, too. Beaches and barrier islands are by nature transient. Planting grasses to rebuild dunes can help keep beaches in place but only temporarily in many cases. At some point, residents will have to move back from the receding shoreline.

Beck is quick to point out that built infrastructure is still incredibly important and that cost-effectiveness is not the only consideration. “Anywhere you’ve got significant people and property,” he says, natural solutions will “be used together with some form of built infrastructure.” Metropolitan areas, ports and other places where the risk tolerance for a major flood would be extremely low need seawalls, even if such structures are not cost-effective. Still, Beck says, certain populated areas can benefit from a hybrid approach: “Even if you’re building levees, they can be shorter if they have marshes in front.”

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SHORELINE TRIALS AND ERRORS

One reason living shorelines are becoming an economically viable approach for coastal defense is that researchers and municipalities are getting better at rebuilding them. Early marsh-restoration designs, which followed forestry science and gave each plant plenty of space to avoid competition, were actually counterproductive. It turns out that in bare mudflats, “when marsh plants are together, they share oxygen, so their growth rate is twice as high,” says Brian Silliman, an ecologist at Duke University. Root them in large clumps, and the growth rate of each individual plant can triple. Add blue crabs, which eat the snails that eat the salt-marsh grasses, and the plants do even better.

Scientists are also finding that marshes do best when they have a protective sill—a linear berm that fronts the seaside edge of the grass and stands. Made of hard material such as shell, stone or concrete, its height and position are typically chosen so that water covers it at high tide, but it is exposed during low tide. The sill takes the brunt of wave energy but also traps sediment behind it, allowing the grass to thrive and marsh floor to retain its elevation or even rise.

Almost any hard material can make a successful sill. Large shoreline-stabilization projects use big boulders or stackable concrete blocks, a practice that has been criticized by some experts who say that these structures are living shorelines in name only. But many lower-profile restorations integrate sills more seamlessly into the natural habitat. In the Southeast and Gulf Coast regions, marshes historically possessed a natural sill in

the form of an intertidal oyster reef. Many of those reefs were overharvested long ago, ruining the sill and exposing the marshes to erosion.

Ecologists, including Rachel Gittman (*in white*), measure water levels and grasses at Carrot Island, N.C. Credit: John Althouse

In these warm, oyster-friendly waters, new sills can be formed by placing a hard substrate along the low-tide line at the front edge of the marsh for baby oysters to set on. Some sites with lots of wave action have used small, hollow concrete structures or plastic mesh “onion bags” stuffed with shell and lashed together. When successful, these artificial materials are quickly covered by oysters and disappear into the interstices of the growing reef. But the concrete often remains visible for years, and the bags have been criticized for breaking and scattering plastic through the environment.

Gittman, now at East Carolina University, is testing an alternative material called Oyster Catcher that is made of jute cloth dipped in Portland cement and rolled into various hollow configurations. It hardens with extensive surface area to recruit larval oysters. In addition to being light and flexible, it holds together just long enough to get a reef established, then disintegrates. The product received its first big test when Hurricanes Florence and Michael struck North Carolina last fall. Michael tossed shell bags up into the marshes, but the Oyster Catcher reefs did not budge. The showing was encouraging, but Gittman worries that conservation groups may oversell the potential. “A living shoreline can’t save your house from a Category 5 storm. Although neither can a bulkhead.”

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Gittman and Beck both stress the need to tailor living shorelines to local conditions. One reason oyster restoration is so cost-effective in the Gulf and the Southeast is because there have been plentiful wild oysters to seed new reefs with babies. That is not the case in most of the country. Chesapeake Bay, for example, was long the poster child for futile oyster restoration. Oyster populations in the bay had fallen to less than 1 percent of historical norms, and decades of effort and tens of millions of dollars barely budged the needle.

“Conceptually, Chesapeake Bay was not our best model,” Beck says. “It put oyster-reef restoration back because it made it look so difficult and expensive. Well, when you’re working in a system where you’ve only got 1 percent left, guess what? It ain’t easy. When you’re in the Gulf of Mexico and you’ve still got 50 percent of your reefs left, it’s a different story. If you build it, the oysters will come.”

Beck extends that lesson to coral reefs, the most underappreciated of natural defenses. “Coral reefs are the single most effective ecosystem for flood-risk reduction,” he says. Corals, which have evolved to take a daily pounding that would destroy most other living things, form natural seawalls exactly where you want them—just offshore, in front of resorts, beach towns, coastal roads and other pricey assets. When healthy, they make remarkably effective breakwaters, reducing wave energy up to 97 percent. They are also affordable: reef restoration averages about $1,300 per meter versus $20,000 for artificial breakwater construction. The insurance industry’s assessment for mitigating risk from climate change in the Caribbean found that reviving reefs and mangroves was an order of magnitude more cost-effective than seawalls or breakwaters.

Even though reefs do not line a lot of shorefronts, the annual expected benefits they generate are significant—more than $100 million a year in the U.S. alone and more than $400 million a year each in Mexico, Malaysia, Indonesia, the Philippines and Cuba.

Of course, many coral reefs are not healthy, and losing just a single meter of reef height doubles the direct damages from flooding. For that reason alone, Beck believes reef-restoration projects will multiply. Although the science of coral restoration is young, the potential is enormous—so long as a reef has not already collapsed. “Some of these corals actually grow pretty fast,” Beck says. “For example, in places in Indonesia where there’s still good reef habitat and lots of healthy corals around small sites that have been destroyed by blast fishing, reefs can turn around pretty quickly.”

RISING TIDE OF SUPPORT

Coastal restoration may finally be getting the attention it deserves. “Things are really beginning to change,” Beck says. The Army Corps, which for decades has favored hardscape solutions, has launched an Engineering With Nature initiative—something many planners thought they would never see. The National Oceanic and Atmospheric Administration has made living shorelines a centerpiece of its coastal-resilience blueprint. Hundreds of projects have been completed or are underway around the country, ranging from shoreline stabilizations in Maryland to bulkhead removal in Puget Sound. Most are small, community-based efforts, but larger ventures are becoming more common.

Stimulus funding that flowed after the American Recovery and Reinvestment Act of 2009 increased the size of some projects significantly. Kilometers of oyster-reef projects now line Alabama, Texas and Louisiana. The flagship is Coffee Island, off the Alabama coast. The shoreline had receded up to 100 meters. The Nature Conservancy placed a three-kilometer-long line of shell bags and concrete balls about 30 meters offshore, paralleling the island. The reef immediately blocked wave energy, allowing the marsh to rebuild. Within two years approximately 200 baby oysters per square meter had colonized the structure, covering it and attracting fish, crabs and birds.

Outside the Gulf Coast and the Southeast, restoration projects may be more challenging. California, for example, is a tough undertaking. “In San Francisco Bay,” Beck says, “we’ve lost more than 90 percent of the natural marshes, so you have to go in and re-create an environment wholesale in and around a hell of a lot of people.”

Yet where there is a will—and local money—there is a way. The San Francisco Bay Clean Water, Pollution Prevention, and Habitat Restoration Measure, passed by Bay Area voters in 2016, raises $25 million a year for 20 years through a parcel tax. That $500 million will be used to build 40,000 hectares of wetlands—the largest shoreline restoration undertaken in the U.S.—using various techniques. The most novel is horizontal levees. Instead of a high, narrow mound that lines the shore, horizontal levees are broad mudflats, marshes and grasslands that gradually rise from the water’s edge, sometimes for hundreds of meters back onto the land. They are graded with vast amounts of earth (often repurposed from building projects) and planted with starter plugs. They can be lower and 40 percent less costly than a traditional levee because the breadth absorbs floodwater. The configuration also gives marsh communities space to retreat as seas rise.

Another encouraging sign is the Living Shorelines Act, introduced in the U.S. House of Representatives by Frank Pallone, whose New Jersey district was devastated by Superstorm Sandy. The bill would designate $20 million in grants a year to living-shoreline work. A Senate version was introduced by Chris Murphy of Connecticut and Kamala Harris of California. Their prospects in the current Congress were uncertain at press time, but their existence shows that living shorelines are gaining ground.

North Carolina's Coastal Resources Commission recently approved a new process that will make it as easy to obtain a living-shoreline permit as that for a bulkhead. Maryland has an even stronger law in place, requiring a homeowner to prove why a bulkhead is needed instead of a natural shoreline. Other states may follow these leads.

The most promising indication of all may be the 2018 agreement made by the Nature Conservancy, the reinsurance industry and the Mexican state of Quintana Roo to create a trust fund to protect the Mesoamerican Reef, off the coast of Cancún and Puerto Morelos. The deal will include the first insurance policy ever taken out on a natural ecosystem. If the reef is damaged by a storm, insurance funds are released to rebuild its natural capital.

For living shorelines to become an important part of any long-term coastal defense plan, policy makers in government, insurance and development will have to start improving and installing them before bad storms hit—and funding the next round of projects through postdisaster spending afterward. That requires good science and good economic numbers—which now exist—as well as good proof in the form of demonstration projects, which are increasingly common.

The first significant examples of postdisaster spending on natural infrastructure could occur as FEMA and other agencies look to spend more than $100 billion in recovery funds from recent hurricanes. Although FEMA's traditional hazard-mitigation investments have focused on tactics such as buying out damaged coastal homes or elevating them, the agency has adjusted its new "benefit-cost analysis" policy to favor investment in natural infrastructure. Beck expects this change in emphasis to result in federally funded projects of unprecedented scope in Florida, Puerto Rico and the Gulf Coast. Other large-scale development may soon follow worldwide as governments, disaster-risk managers, businesses, banks and insurers look to mitigate their risk exposure as cost-effectively as possible. When that happens, it will mark a moment when society realizes nature is not a luxury. It is the future.

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Credit: Nick Higgins

MORE TO EXPLORE

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Living Shorelines Academy: www.livingshorelinesacademy.org

FROM OUR ARCHIVES

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PRACTITIONER'S PERSPECTIVE

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Embracing dynamic design for climate-resilient living shorelines

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KEYWORDS
climate change, coastal resilience, defenses, erosion, green infrastructure, marsh, nature-based, sea level rise

1 | INTRODUCTION

As natural marshes are lost to erosion, sea level rise, and human activity, small created marshes, (sometimes with ancillary stabilization structures, and frequently called living shorelines) have gained interest as a replacement habitat; providing both shoreline stabilization and restoration of important ecological functions. These living shorelines enhance ecological function while reducing erosion through the use of marsh plants (Table 1). In all but the lowest energy settings, oyster reefs, low rock structures, or other stabilizing material are frequently used to enhance marsh establishment. Due to their ability to stabilize the shoreline with minimal impact to the ecology, living shorelines are considered a method to increase coastal community resilience to sea level rise (e.g., Sutton-Grier, Wowk, & Bamford, 2015; Van Slobbe et al., 2013) but little consideration is being given to living shoreline resilience under changing climate. Although it has been stated that living shorelines have the capacity to adapt to rising sea levels (e.g., Moosavi, 2017; Sutton-Grier et al., 2015; Toft, Bilkovic, Mitchell, & La Peyre, 2017), their ability to fulfill this potential relies on being designed to incorporate all the processes occurring in natural systems. The extent to which living shorelines can mimic the resiliency of natural marshes and oyster reefs will depend on their setting, design and the type of human maintenance provided. Truly resilient projects will require engineers and ecologists to work together to describe the dynamics of shoreline processes under sea level rise and translate this understanding into living shoreline design.

The potential for living shorelines to self-adapt to rising sea levels comes from their biotic components. When properly constructed, living shorelines provide a plethora of ecological services through their biotic components, including: nursery, nesting and feeding habitat (Bilkovic & Mitchell, 2017; Davis, Takacs, & Schnabel, 2006; Gittman et al., 2015); filtering of sediments and nutrients from waterways (Beck, Chambers, Mitchell, & Bilkovic, 2017); reduction of wave energy (Gedan, Kirwan, Wolanski, Barbier, & Silliman, 2011; Gittman, Popowich, Bruno, & Peterson, 2014); and carbon storage (Davis, Currin, O'Brien, Raffenburg, & Davis, 2015). In this respect, they have the potential to provide ecological functions that are similar to natural marshes and it is tempting to assume that living shorelines incorporate all the same dynamic processes. However, living shorelines are engineered systems which frequently differ from natural coastal marshes in a few key elements: (a) Plantings are done on a grid, so initial plant density is controlled by design, not inundation; (b) living shorelines typically have a gradual, constant slope while natural shorelines (particularly in erosional areas) often have a scarped edge and complex microtopography; (c) living shorelines frequently have associated engineered structures designed to mitigate wave energy, which can affect sedimentation and faunal settlement patterns. These differences can translate into a system which is stable in the short term, but may have difficulty adapting to a changing environment.

Much of the monitoring or assessment of living shorelines is related to ensuring ecological functions (habitat, nutrient transformations) are equivalent to those of natural marshes; however, assessments of living shoreline sustainability are equally important. Natural coastal marshes are dynamic systems, with some natural adaptation to sea level rise realized through feedback loops (Morris, 2007) involving plant production and sediment capture that result in marsh vertical growth (accretion) and migration into adjacent lands

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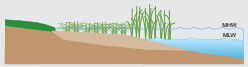
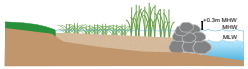
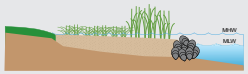
TABLE 1 Comparison of different shoreline stabilization methods

	Potential functions								
	Dissapates wave energy	**Prevents flooding**	**Reduces erosion**	**Provides native habitat**	**Supports native populations**	**Provides foreign habitats, may promote invasion**	**Prevents faunal access to shoreline**	**Living organism subject to disease**	**Potentially self-sustaining under SLR**
Living shorelines									
 Marsh	Yes, amount depends on marsh width	No	Depends on setting (Yes in low energy)	Yes	Yes	No (typically)	No	Yes	Yes, with retreat corridor
 Marsh with rock sill	Yes	No	Yes	Depends on setting (Yes on rocky coast)	Yes, although possibly reduced	Depends on setting	Reduces access	Partially	Marsh only, with retreat corridor
 Marsh with oyster sill	Yes, amount depends on marsh width	No	Yes	Yes	Yes	No (typically)	No	Yes	Both, but marsh requires retreat corridor
Traditional hardening									
Rock Revetment	Yes	No	Yes	Depends on setting (Yes on rocky coast)	Possible	Depends on setting	Replaces shoreline	No	No, and may prevent retreat of other habitats
Timber/concrete Bulkhead	Reflects energy	Depends on design/ height	Yes	No	Possible	Yes	Replaces shoreline	No	No, and may prevent retreat of other habitats

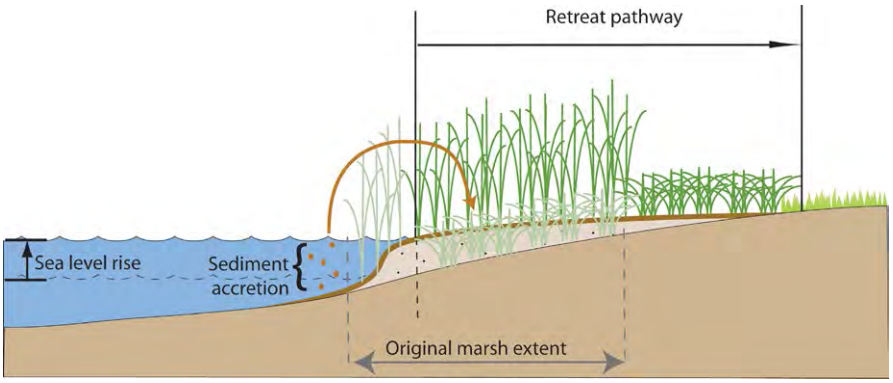


FIGURE 1 Dynamic processes help natural marshes adapt to rising sea level. Tall, dense marsh plants dissipate wave energy and collect sediment, allowing the marsh surface elevation to increase. Their roots also contribute to accretion. Natural, low elevation lands allow marshes to retreat into upland areas as sea level rises. This maintains marsh extent under changing conditions

where possible (Figure 1). In contrast, living shorelines are typically engineered as static systems that reduce erosion and mimic the flora (primarily) and the fauna (secondarily) of natural marshes, but with little emphasis on creating the characteristics of natural marshes that allow for self-evolution under changing water levels. Appropriate design of living shorelines should enhance longevity by embracing the dynamic characteristics of natural marshes and leveraging natural feedback loops to maximize sediment accretion and stabilization (Bilkovic & Mitchell, 2017). In this article, we draw on scientific literature and practical experience with living shoreline design and application to make recommendations for how living shorelines can be sited, built and maintained to be resilient to sea level rise.

2 | LIVING SHORELINE SITING IS CRITICAL FOR ENHANCED LONGEVITY

Longevity of living shorelines under sea level rise is largely dependent on their location in the coastal system. There are three siting factors that affect persistence: (a) wave energy at the site, (b) the potential for upland marsh retreat, and (c) the sediment supply (which is critical for marsh accretion). Ideally, living shorelines should be placed to minimize wave energy and maximize the other two factors (Figure 2). Rock sill or oyster reef structures can be used to mitigate high wave energy and maximize sediment capture, but cannot completely compensate for poor siting.

Living shorelines are most appropriate in low to moderate energy settings since plants have difficulty establishing and thriving in high energy areas (Currin, Davis, & Malhotra, 2017). This means that most estuarine, riverine or creek settings should be appropriate, assuming that the shorelines are not subject to high wave energy. The exception is the outer bends of river meanders, where water flow can be swift and natural processes lead to erosion and migration of the bend. With appropriately-sized structures, living shorelines have been built in open coastal areas. However, their long-term prognosis under sea level rise may be difficult to predict. These areas are subject to high wave energy and although structures placed channelward of the marsh can reduce wave energy somewhat, coastal sediment dynamics can also be very different from the more sheltered coastlines where natural marshes are typically found. Alongshore sand movement and barrier island migration are both important processes on open coasts that are critical components of coastal resilience but are not compatible with stabilized living shoreline design. The development of dynamic living shoreline designs specifically for high-energy coastal areas, such as barrier islands, would have enormous resilience potential.

Marsh retreat potential is linked to local land use and surrounding elevations (Mitchell, Herman, Bilkovic, & Hershner, 2017). Living shorelines built in low elevation areas will naturally be able to migrate landward, as long as the surrounding land use is compatible. The adjacent upland/riparian area should be preserved as natural lands, ideally populated with native grass or shrubs. Marshes can migrate into forested riparian areas, but shade from the trees can slow migration and competition from invasive species (e.g. Smith, 2013) can alter the floral community. There may be plants that enhance the migration of marsh flora that could be planted in riparian zones and research on this topic would be timely. Steeper elevations or impervious surfaces (roads, driveways, buildings, etc.) interrupt the marsh retreat corridor and should be avoided where possible. In areas where there are sharp inclines, elevation breaks, or retaining walls in the riparian zone, grading of the land may be possible to create a gentle slope and ensure that the marsh isn't compressed during migration. Where living shorelines are backed by bluffs, migration won't be a viable process and significant accretion (equivalent to sea level rise rates) will be crucial to maintain the marsh.

Another important siting factor for living shoreline persistence is local sediment supply. This is particularly critical where marsh retreat is limited. Sediment from both the waterway and the surrounding upland can be captured, contributing to marsh accretion. Accretion slowly raises the surface of the marsh over time, and can keep it in the proper position in the tidal frame. Accretion increases with time of submergence (Temmerman, Govers, Wartel, & Meire, 2004) and with increased plant productivity (Kirwan & Murray, 2007; Morris, Sundareshwar, Nietch, Kjerfve, & Cahoon, 2002), both processes increase with sea level rise. Together these processes can contribute significantly to marsh persistence under moderate sea level rise (Gedan et al., 2011). However, in areas where sea level rise is accelerating (Boon & Mitchell, 2015), high sediment supply will be an important consideration when

FIGURE 2 Comparison of retreat potential for living shorelines. (a) This living shoreline was constructed adjacent to natural marshes and on a low elevation shoreline with ample opportunity for retreat. However, the somewhat sparse grass may limit its ability to accrete sediment. (b) This marsh is in front of a bluff, which cuts off the retreat pathway but provides sediment for accretion. (c) This living shoreline is built in front of a block retaining wall that cuts off the retreat pathway. Survival under sea level rise will require sufficient sediment accretion to maintain its elevation within the tidal frame

migration potential is limited, so consideration should be given to the surrounding shorelines. Local sediment supply can be greatly reduced by shoreline and bank stabilization, such as retaining walls or bulkheads; therefore, living shorelines in front of or adjacent to unstablilized banks should be more resilient than those where bulkheads and revetments are pervasive. It is also important to consider local conditions that might lead to high subsidence at the marsh location. Marshes persist in areas where the surface accretion is higher than the subsidence rate plus the local sea level rise rate. Some subsidence rates, such as subsidence due to glacial isostatic rebound, are widespread with reliable estimates of magnitude (Piecuch et al., 2018). However, subsidence rates can vary greatly on small scales (20–30 m, Bekaert, Hamlington, Buzzanga, & Jones, 2017) due to local processes such as groundwater withdrawals. In marsh sediments, some subsidence is due to the breakdown of organic material (Morris, 2007); this should be a minor issue for living shorelines since most of them are built on inorganic sediment surfaces and take years (>8 year) to develop typical marsh sediments (Beck et al., 2017). Locally high subsidence rates result in an increased rate of relative sea level rise in the affected area. Living shorelines in these areas will require higher accretion rates to compensate for the sea level rise and this should be taken into account during project design.

3 | DYNAMIC DESIGN CONSIDERATIONS

Living shorelines can be designed to take advantage of natural processes that enhance sediment accretion, marsh surface elevation, marsh stability and adaptability. Plant growth is an important moderator of all of these characteristics; therefore marsh plantings are integral to living shoreline sustainability. Plant height and density are positively related to the marshes ability to dissipate wave energy (Gedan et al., 2011), which can increase sediment capture (as long as there is sufficient sediment supply) and stimulate accretion. Plants also contribute organic matter to the sediment through root

production, taking up space in the sediment and raising the surface elevation (Baustian, Mendessohn, & Hester, 2012). Maximizing plant height and root growth requires appropriate nutrient availability. Adding fertilizer to the initial plantings may help maximize plant productivity (Priest, 2017), at least in the early years (2–3 year) after creation. Living shorelines that are partially groundwater-fed may benefit from natural fertilization since they have been shown to remove nitrogen from the groundwater (Beck et al., 2017). Maximizing plant density could be achieved through denser initial planting or encouraging plant spread. Adjusting planting configurations, such as planting marsh vegetation in clumps rather than evenly dispersed, may promote high density plant growth and rapid expansion (Silliman et al., 2015).

Sediment stability is important to prevent marsh erosion and create a stable base for accretion. Edge stabilization is frequently achieved through the use of a rock or oyster sill structures. Sill inclusion in living shorelines can enhance sediment deposition and accretion, given sufficient sediment supply and wave reduction capacity (Currin, Delano, & Valdes-Weaver, 2008), and therefore may help increase their resilience. Marsh-wide, sediment stability can be enhanced by root production which helps to bind the sediment together. In some living shorelines, there may also be fauna that can help bind sediments, such as ribbed mussels (*Geukensia demissa*), which are considered important components of natural marsh stability (Bertness, 1984). Encouraging the settlement of these species may increase marsh stability; however, the construction of ancillary stabilization structures (e.g., rock sills) in living shorelines is likely one contributing factor to observed low recruitment of mussels in living shoreline by reducing larval access to the marsh surface (Bilkovic & Mitchell, 2017). This suggests that using sills to increase edge stability has the potential to affect marsh-wide stability. However, with careful design, impacts from sills can be minimized; enhancing overall marsh resilience. When sills are necessary or desirable to promote sediment accretion and reduce erosion, the use of low elevation sills or low elevation "windows" in the sills should be considered to maximize faunal access to the marsh. Although sills can enhance living shoreline resilience, their effectiveness may decline over time. Rock sills are static structures; as sea level rises, their elevation in the tidal frame and their effectiveness in reducing wave energy will be reduced. Adding biotic components (e.g. oysters) can create a dynamic reef sill (Hall, Beine, & Ortego, 2017) that maintains its elevations under rising sea levels. The oysters also add roughness and complexity to sills, creating natural habitat and dissipating wave energy (Whitman & Reidenbach, 2012).

The slope of the living shoreline marsh and the way in which water enters and leaves the marsh may also affect its resilience. Living shorelines typically have more "perfect" slopes than natural marshes and the high and low marsh widths are controlled by design, not natural feedback loops. Water access may be through more constricted channels than in natural marshes, leading to changes in inundation periods, sedimentation patterns and plant species distributions. All of these factors can affect the living shoreline's response to sea level rise. At this time, there is little research addressing this issue. One model, which looked at the persistence of a created marsh under sea level rise, suggested that a consistent slope and controlled inundation can lead to a problematic response to sedimentation under accelerated sea level (Vandenbruwaene et al., 2011). As mentioned above, accretion is expected to increase with increasing inundation (under sea level rise); if this is not happening, the living shoreline will eventually drown. More studies of this issue should be done, both models and field tests of different grading plans (e.g. flatter gradients or more microtography) and water access designs should be studied.

Ultimately, achieving the dynamic design necessary for sea level rise resilience requires a change in attitude by engineers and property owners. Since shoreline stabilization is typically meant to "hold the line" against changing coastal boundaries, there is an expectation that the initial design is also the final design of the project. To truly incorporate sea level rise into a living shoreline requires acceptance and tolerance by the property owners for a dynamic stabilization technique—i.e. their sand and plants may move around over time by design. These shifts are necessary for the living shorelines to be resilient to storms and long-term changes in sea level. Natural succession of plant and animal species and landward retreat of marsh plants should be expected and part of the initial design (Bilkovic, Mitchell, Mason, & Duhring, 2016).

4 | MAINTENANCE

Although the goal is to design living shorelines that naturally accrete and retreat with rising sea levels, it is unrealistic to think this can be achieved in all places and human maintenance of living shorelines may be necessary. Studies of natural marshes show that sea level rise is accelerating at stressful rates in some areas, leading to marsh loss (Mitchell et al., 2017); this is likely also going to be a problem for the living shorelines in the absence of intervention. Long-term augmentation of living shoreline accretion rates may be possible through thin-layer dredge disposal. This is one method that has been used to raise natural marsh elevations (Croft, Leonard, Alphin, Cahoon, & Posey, 2006; Ford, Cahoon, & Lynch, 1999), and may be applicable to living shoreline resilience. In this process, a thin deposit of sediment is sprayed over the marsh surface, with the idea that it will be captured by the vegetation, enhancing marsh accretion. The transferability of this technique to living shorelines needs more research. Even if technically feasible, thin layer dredge disposal may be too expensive and labor intensive for smaller projects. In addition, the depth of the sediment deposit and frequency of application would need to be assessed for each project since local rates of sea level rise and subsidence can vary on small spatial scales.

5 | CONCLUSIONS

Tidal marshes are naturally adaptive systems that alter their location and elevation to fit changing sea levels. Embracing the dynamic characteristics of these systems when designing living shorelines

will result in more resilient shoreline designs. Considering longevity in both project siting and project design is critical to ensuring shoreline protection and the continuation of ecological services from living shorelines. Key considerations include:

- Siting that allows for landward marsh retreat with rising sea levels, wherever possible
- Healthy and appropriate plant communities that can stabilize and accrete sediments with consideration of species diversity and density of plantings to maximize productivity and sediment accretion
- Sill structures designed to enhance sedimentation while not limiting faunal use of the marsh, including the use of "windows" in the sill to promote faunal movement; and which include biotic components, such as oysters, allowing adaptation to rising sea levels
- An improved societal understanding of the benefits of dynamic shoreline protection designs

Living shorelines are rapidly populating our coasts, and are increasingly being considered critical components of flood wave reduction and erosion protection for coastal communities (Sutton-Grier et al., 2015). The resilience of these coastal communities is reliant on the resilience of their living shorelines. A key element mentioned in this paper is the need for the integration of ecologist and engineers in the design of living shorelines. This need has been recognized (e.g. Airoldi et al., 2005; Bilkovic & Mitchell, 2017; Moosavi, 2017) and there are a few examples of it being put into practice (Chapman & Blockley, 2009; Firth et al., 2014). However, there is room for improvement. We recommend three steps towards achieving this goal. First, as mentioned in Toft et al. (2017) the creation of "virtual" forums can help facilitate discussion across disciplines. Second, funding agencies can promote transdisciplinary research through their funding programs. Third, universities can break down barriers between their educational tracks and make cross-disciplinary learning more accessible. These actions could help change the landscape of living shoreline design, resulting in more sustainable coastlines.

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AUTHORS' CONTRIBUTIONS

M.M. and D.M.B. conceived the ideas for this manuscript. M.M. led the writing of the manuscript. All authors contributed critically to the drafts and gave final approval for publication.

DATA ACCESSIBILITY

Data have not been archived because this article does not contain data.

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How to cite this article: Mitchell M, Bilkovic DM. Embracing dynamic design for climate-resilient living shorelines. *J Appl Ecol*. 2019;00:1–7. https://doi.org/10.1111/1365-2664.13371

View publication stats

March 23, 2020

Ashley Erisman, Chair
Nantucket Conservation Commission
2 Bathing Beach Road
Nantucket, MA 02554

RE: Notice of Intent – SE48-3241
25 Quaise Road

Dear Ms. Erisman:

I am writing to provide information in response to comments at the first public hearing. The existing timber bulkhead has the benefit of appropriate permitting and licenses. Attached is the 1981 Order of Conditions, as well as the 1984 Certificate of Compliance for the structure.

Also attached is the Chapter 91 Waterways License for the existing coastal engineering structure. From Page 3: "*This license is granted upon the further express condition that the authorization contained herein may be modified or may be revoked in whole or in part in the event of the licensee, its successors and assigns, failing to comply with said authorization or any provisions of the license <u>or failing to maintain all authorized structures and installations in good condition</u>, to the satisfaction of the Department of Environmental Quality Engineering or its successors.*"

The purpose of the pending application is to comply with the requirements of the License to maintain the permitted structure. The alternative of installing the exact same configuration as permitted was examined and dismissed on the basis of a greater impact to the interests protected by the Commission. Specifically, the existing bulkhead is supported by steel tie-back rods every eight-feet connected to sheet pile anchors. The replacement of these structural elements would require a much a greater degree of disturbance than the proposed project. The selected alternative of driven steel sheets, which are self-supporting, will not require the excavation and removal of the existing coastal engineering structure, which would destabilize the coastal resource areas.

20 Mary Ann Drive • Nantucket, MA 02554
508-825-5053 • www.NantucketEngineer.com

The proposed return of the bulkhead along the easterly property line has also been selected as the best alternative to maintain the integrity of the licensed structure with minimal impact to the interests protected by the Commission. Also considered were alternatives to install gabions, a stone revetment or coir fiber rolls. All of these alternatives would require excavation and much greater disturbance than the installation of the driven steel sheeting. Without the return, the easterly end of the licensed structure will be subject to erosion behind it, destabilizing both the resource areas and structure.

To the raised question of public access, the proposal does not change the existing condition in terms of access to the intertidal zone. As the tide allows, the public can freely transit the intertidal zone seaward of the bulkhead of the structure in accordance with existing laws and regulations.

I plan to attend the public hearing on this matter to address any questions or concerns.

Sincerely,
Nantucket Engineering & Survey, P.C.
By: Arthur D. Gasbarro, PE, PLS

CC: Chuckrow Nominee Trust
Steven L. Cohen
MassDEP - SERO

DOCUMENT No. 26131

Nantucket Registry District
NOV 3 1982
RECEIVED FOR REGISTRATION
_____ O'CLOCK _____ m _____ M

Order of Conditions

NCC
to
Adelaide P. Chuckrow

DOCUMENT No. 26131

Nantucket Registry District
NOV 3 1982
RECEIVED FOR REGISTRATION
2 O'CLOCK 10 m P. M

NOTED ON CERTIFICATE No. 4849
IN REGISTRATION BOOK 24 PAGE 114

Attest Josie L. Barrett
Assistant Recorder

N 54F

Form 4

COMMONWEALTH OF MASSACHUSETTS

WETLANDS PROTECTION ACT, G.L. C.131, s.40

ORDER OF CONDITIONS

CITY/TOWN NANTUCKET

FILE NUMBER: SE 48 - 161

TO: Name: Adelaide P. Chuckrow

Address: 225 Millwood Road
Chappaqua, New York 10514

THIS ORDER IS ISSUED ON: August 28, 1981
(date of mailing)

CERTIFIED MAIL NUMBER: Hand Delivered

PROJECT LOCATION: Address: Beach and Quaise Roads

Recorded at Registry of Nantucket, Book _____, Page _____.

Certificate (if registered) 4849.

REGARDING: Notice of Intent dated: July 30, 1981, and plans titled and dated: July 27, 1981. Date of Public Hearing: August 13, 1981.

Pursuant to the authority of G.L. C. 131, s. 40, the NANTUCKET CONSERVATION COMMISSION has reviewed your Notice of Intent and plans identified above, and has determined that the area on which the proposed work is to be done is significant to one or more of the interests listed in G.L. C. 131, s. 40. The NANTUCKET CONSERVATION COMMISSION hereby orders that the following conditions are necessary to protect said interests and all work shall be performed in strict accordance with them and with the Notice of Intent and plans identified above except where such plans are modified by said conditions.

CONDITIONS:

1. Failure to comply with all conditions stated herein, and with all related statutes and other regulatory measures, shall be deemed cause to revoke or modify this order.
2. This order does not grant any property rights or any exclusive privileges; it does not authorize any injury to private property or invasion of private rights.
3. This order does not relieve the permittee or any other person of the necessity of complying with all other applicable federal, state or local statutes, ordinances, by-laws and/or regulations.
4. The work authorized hereunder shall be completed within one (1) year from the date of this order unless it is for a maintenance dredging project subject to Section 5(9). The order may be extended by the issuing authority for one or more additional one--year periods upon application to the said issuing authority at least thirty (30) days prior to the expiration date of the order or its extension.
5. Any fill used in connection with this project shall be clean fill, containing no trash, refuse, rubbish or debris, including, without limiting the generality of the foregoing, lumber, bricks, plaster, wire, lath,paper, cardboard, pipe, tires, ashes, refrigerators, motor vehicles or parts of any of the foregoing.
6. No work may be commenced until all appeal periods have elapsed from the order of the Conservation Commission or from a final order by the Department of Environmental Quality Engineering.

7. No work shall be undertaken until the final order, with respect to the proposed project, has been recorded in the Registry of Deeds for the district in which the land is located within the chain of title of the affected property. The Document number indicating such recording shall be submitted on the form at the end of this order to the issuer of this order prior to commencement of work.

8. A sign shall be displayed at the site not less than two square feet or more than three square feet bearing the words, "Massachusetts Department of Environmental Quality Engineering. Number SE 48- 161".

9. Where the Department of Environmental Quality Engineering is requested to make a determination and to issue a superseding order, the Conservation Commission shall be a party to all agency proceedings and hearings before the Department.

10. Upon completion of the work described herein, the applicant shall forthwith request, in writing, that a Certificate of Compliance be issued stating that ~~the work has been satisfactorily completed.~~

11. The work shall conform to the following described plans and additional conditions:

    a. The proposed project as set forth in the Notice of Intent and the plans attached thereto, dated July 30, 1981, is hereby approved, subject to the following conditions:

        (1). That members and agents of the Conservation Commission shall have the right to enter and inspect the premises to evaluate compliance with these conditions.

        (2). That accepted engineering and construction standards and procedures shall be followed in completion of the project.

        (3). That any changes made or intended to be made in the plans or methods described in the Notice of Intent shall require the applicant to inquire of the Conservation Commission, in writing, whether the change is substantial enough to require a new filing.

        (4). The new wood bulkhead shall be angled to the northeast corner of the existing concrete seawall at the junction of the bulkhead and the boundary line between the properties. The bulkhead need not extend across the existing stone and concrete revetment but may terminate at its eastern edge.

        (5). The top of the bulkhead from the point of angle shall taper downwards to the elevation of the ~~seawall or the~~ revetment, whichever is the terminal point.

        (6). The clean fill placed behind the new bulkhead shall be to the top of the bulkhead and up the face of the eroding bank to the angle of repose. The filled area shall be planted with vegetation compatable with existing vegetation along the bank to reduce further erosion.

        (7). Beach replenishment may be carried out along the existing wood bulkhead using sand compatable in grain size to that existing in the area.

* * * * * * * * *

The applicant, any person aggrieved by this order, any owner of land abutting the land upon which the proposed work is to be done, or any ten residents of the city or town in which such land is located, are hereby notified of their right to appeal this order to the Department of Environmental Quality Engineering provided the request is made in writing and by certified mail to the Department within ten (10) days from the issuance of this order.

ISSUED BY: The NANTUCKET CONSERVATION COMMISSION

Benjamin S. Richmond
Paul B. Wani
Carl Barnhart
Paul Bennett
Gilbert E. Burchell

On this 28 day of August 1981, before me personally appeared Benjamin S. Richmond to me known to be the person described in and who executed the foregoing instrument and acknowledged that he executed the same as his free act and deed.

Notary Public

May 6, 1983
My commission expires

DOCUMENT No. 28802

Nantucket Registry District
JAN 23 1984

RECEIVED FOR REGISTRATION
1 O'CLOCK 05 m P. M

NOTED ON CERTIFICATE NO. 4849
IN REGISTRATION BOOK 24 PAGE 114

Attest Margaret C. Pignato
Assistant Recorder

DOCUMENT No. 28802

Nantucket Registry District
JAN 23 1984

RECEIVED FOR REGISTRATION
O'CLOCK m M

Cert. of Compliance

NCC

to

Adelaide P. Chuckrow

Form 8

Commonwealth of Massachusetts

DEQE File No. SE 48-161
(To be provided by DEQE)

City/Town Nantucket

Applicant Adelaide P. Chuckrow

Certificate of Compliance
Massachusetts Wetlands Protection Act, G.L. c. 131, §40

From NANTUCKET CONSERVATION COMMISSION Issuing Authority

To Ms. Adelaice P. Chuckrow (Name) 225 Millwood Rd., Chappaqua, NY 10514 (Address)

Date of Issuance November 17, 1983

This Certificate is issued for work regulated by an Order of Conditions issued to Adelaide P. Chuckrow dated August 28, 1981 and issued by the Nantucket Conservation Commission.

1. ☑ It is hereby certified that the work regulated by the above-referenced Order of Conditions has been satisfactorily completed.

2. ☐ It is hereby certified that only the following portions of the work regulated by the above-referenced Order of Conditions have been satisfactorily completed: (If the Certificate of Compliance does not include the entire project, specify what portions are included.)

3. ☐ It is hereby certified that the work regulated by the above-referenced Order of Conditions was never commenced. The Order of Conditions has lapsed and is therefore no longer valid. No future work subject to regulation under the Act may be commenced without filing a new Notice of Intent and receiving a new Order of Conditions.

4. ☐ This certificate shall be recorded in the Registry of Deeds or the Land Court for the district in which the land is located. The Order was originally recorded on Nov. 3, 1982 (date) at the Registry of Nantucket County, Book _____, Page _____.
Registered Land transaction #26131

5. ☐ The following conditions of the Order shall continue: (Set forth any conditions contained in the Final Order, such as maintenance or monitoring, which are to continue for a longer period.)

Issued by NANTUCKET CONSERVATION COMMISSION

Signature(s) Carl Borchert

Paul A Bennett

Gilbert E Burchell Jr

When issued by the Conservation Commision this Certificate must be signed by a majority of is members.

On this 20th day of January, 19 84, before me personally appeared Carl Borchert, to me known to be the person described in and who executed the foregoing instrument and acknowledged that he/she executed the same as his/her free act and deed.

Notary Public

My commission expires 6-7-88

Detach on dotted line and submit to the

DOCUMENT No. 26239

License No. 933

DEPARTMENT OF ENVIRONMENTAL QUALITY ENGINEERING

TO

Adelaide P. Chuckrow

To Nantucket Registry District

NOV 30 1982

RECEIVED FOR REGISTRATION

O'CLOCK m M

Dated

DOCUMENT No. 26239

Nantucket Registry District

NOV 30 1982

RECEIVED FOR REGISTRATION

11 O'CLOCK 43 m A M

NOTED ON CERTIFICATE NO. 4849

IN REGISTRATION BOOK 24 PAGE 114

Attest Josiah S. Barrett

Assistant Recorder

LC
11/30
1982

Form WD 54

The Commonwealth of Massachusetts

No. 933

Whereas, ADELAIDE P. CHUCKROW----------

of Nantucket----------, in the County of Nantucket---------- and Commonwealth aforesaid, has applied to the Department of Environmental Quality Engineering for license to construct and maintain a bulkhead in Nantucket Harbor, in the town of Nantucket----------

and has submitted plans of the same; and whereas due notice of said application, and of the time and place fixed for a hearing thereon, has been given, as required by law, to the Board of Selectmen---------- of the Town---------- of Nantucket---------- :

Now said Department, having heard all parties desiring to be heard, and having fully considered said application, hereby, ~~subject to the approval of the Governor,~~ authorizes and licenses the said

Adelaide P. Chuckrow---------- , subject to the provisions of the ninety-first chapter of the General Laws, and of all laws which are or may be in force applicable thereto, to

construct and maintain a bulkhead in Nantucket Harbor, at her property in the Town of Nantucket, in conformity with the accompanying License Plan No. 933, (two sheets).

An existing timber bulkhead may be maintained as constructed along the mean high water line of Nantucket Harbor, described as follows:

Commencing at the licensee's easterly property line said bulkhead may extend in a northwesterly direction a distance of approximately 10 feet, thence turn in a westerly direction along said mean high water for a distance of approximately 120 feet.

A timber bulkhead with a tie-back system may be constructed and maintained, extending from said existing bulkhead in a southwesterly direction a distance of approximately 81 feet where it may meet existing mortared riprap. Said bulkhead may have a top elevation varying from 9.0 to 9.5 feet above the mean low water datum.

Fill may be placed and maintained on the upland side of said bulkhead as indicated of the sectional views of the license plans.

All work authorized hereby shall be in the location shown and in accordance with the details indicated on License Plan No. 933.

Duplicate of said plan, numbered -------933------is on file in the office of said Department, and original of said plan accompanies this License, and is to be referred to as a part hereof.

The amount of tide-water displaced by the work hereby authorized has been ascertained ~~by said Department, and compensation thereof~~ has been made by the said

Nothing in this license shall be construed as authorizing encroachment on or over property not owned or controlled by the licensee, except with the consent of the owner or owners thereof.

Acceptance of this license shall constitute an agreement by the licensee, to conform to all terms and conditions herein stated.

This license is granted subject to all applicable Federal, State, County and Municipal laws, ordinances and regulations.

This license is granted upon the express condition that use by boats or otherwise of the structures hereby licensed shall involve no discharge of sewage or other polluting matter into the adjacent tidewaters, except in strict conformity with the requirements of the local and State health departments and the Division of Water Pollution Control.

This license is granted upon the further express condition that any other authorizations necessitated due to the provisions hereof shall be secured prior to the commencement of any work under this license.

This license is granted upon the further express condition that the authorization contained herein may be modified or may be revoked in whole or in part in the event of the licensee, its successors and assigns, failing to comply with said authorization or any provisions of the license or failing to maintain all authorized structures and installations in good condition, to the satisfaction of the Department of Environmental Quality Engineering or its successors. This condition permitting modification or revocation of the license shall also apply in the event of the failure of the licensee, its successors and assigns, to secure approval under all other applicable laws, ordinances or regulations or failure to adhere to the conditions of such approvals upon receipt of such failure provided by an agency having jurisdiction. Revocation or modification of this license as provided herein shall be without liability to the Commonwealth or claim for compensation by the licensee, its successors and assigns.

This license is granted upon the further express condition that the licensee, its successors and assigns, shall upon request in writing by the Department of Environmental Quality Engineering or its successors, change the location of said lower it to such depth, or raise it to such height, as said Department may prescribe or remove it entirely from said waters, and said licensee, by accepting this license shall be deemed to consent and agree to the condition herein set forth, and in case of any refusal or neglect on the part of the licensee, its successors and assigns, to comply with this condition, then this license shall be wholly void and the Commonwealth, by its proper officers, may proceed to remove or to cause the removal of said at the expense of said licensee, its successors and assigns, as an unauthorized and unlawful structure in said waters.

by paying into the treasury of the Commonwealth

~~for each cubic yard so displaced~~, being the amount hereby assessed by ~~said Department~~.

Nothing in this License shall be so construed as to impair the legal rights of any person.

This License shall be void unless the same and the accompanying plans are recorded within one year from the date hereof, in the Registry of Deeds for the ~~District of the~~ County of Nantucket.

In Witness Whereas, said Department of Environmental Quality Engineering have hereunto set their hands this eighteenth day of November in the year nineteen hundred and eighty-two.

Commissioner

Chief Engineer

John J. Hannon, P.E.

Department of Environmental Quality Engineering

THE COMMONWEALTH OF MASSACHUSETTS

This license is approved in consideration of the payment into the treasury of the Commonwealth by the said

of the further sum of

the amount determined by the Governor as a just and equitable charge for rights and privileges hereby granted in land of the Commonwealth.

BOSTON, ...

Approved by the Governor.

.....

Governor

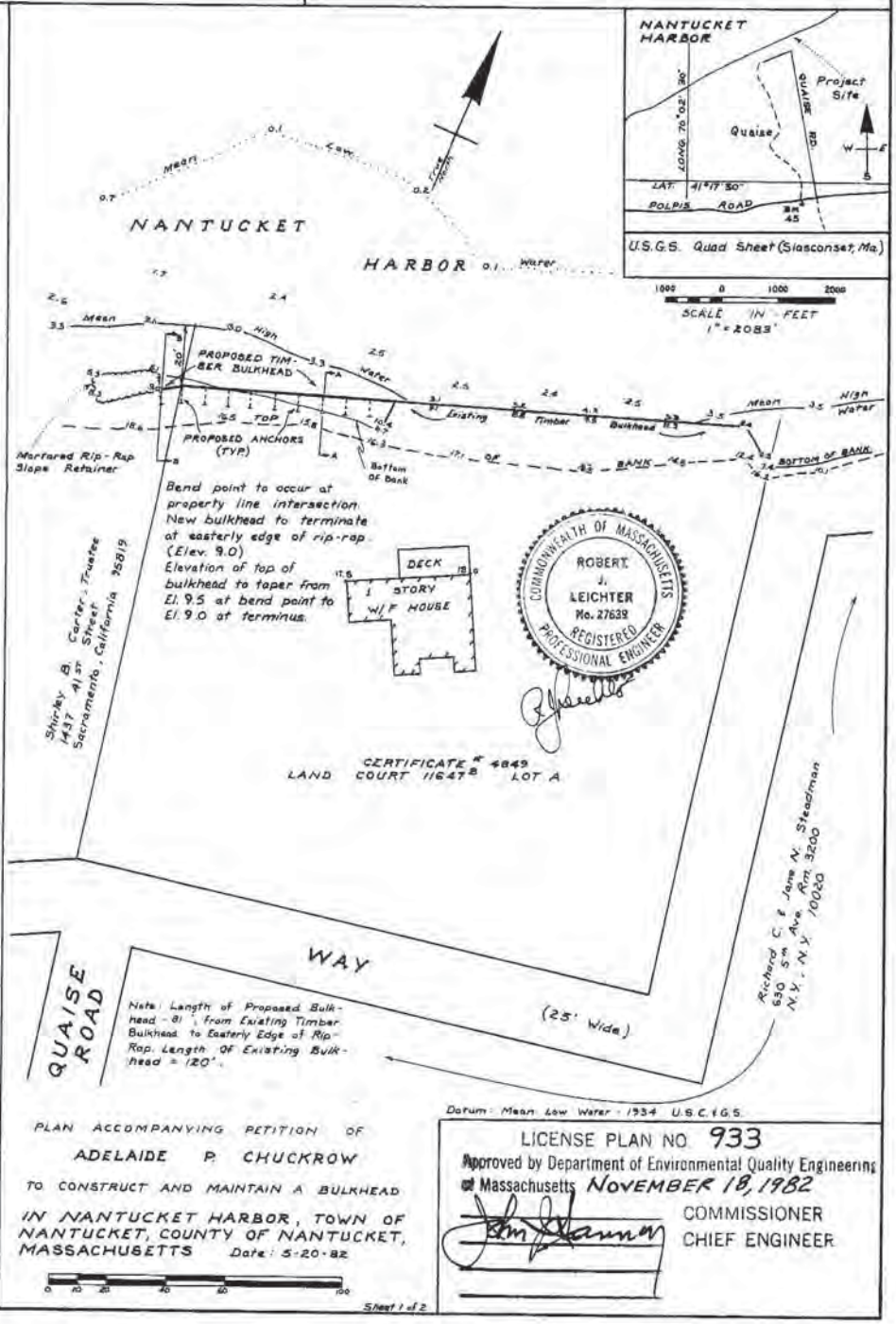
GENERAL LAW 36 SECTION 13A

I CERTIFY THAT THIS PLAN CONFORMS WITH THE RULES AND REGULATIONS OF THE REGISTERS OF DEEDS.

Michael S Bachman 5-20-82

REGISTERED LAND SURVEYOR

COMMONWEALTH OF MASSACHUSETTS
MICHAEL S. BACHMAN
No. 27858
REGISTERED LAND SURVEYOR



PLAN ACCOMPANYING PETITION OF

ADELAIDE P. CHUCKROW

TO CONSTRUCT AND MAINTAIN A BULKHEAD

IN NANTUCKET HARBOR, TOWN OF NANTUCKET, COUNTY OF NANTUCKET, MASSACHUSETTS Date: 5-20-82

0 10 20 40 60 100

Sheet 1 of 2

LICENSE PLAN NO. 933

Approved by Department of Environmental Quality Engineering of Massachusetts NOVEMBER 18, 1982

COMMISSIONER

CHIEF ENGINEER

GENERAL LAW 36 SECTION 13A

I CERTIFY THAT THIS PLAN CONFORMS WITH THE RULES AND REGULATIONS OF THE REGISTERS OF DEEDS.

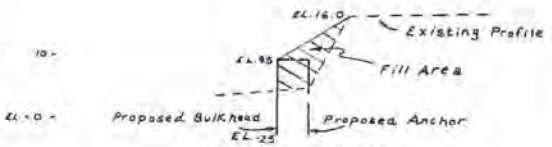
Michael S Bachman 5-20-82

REGISTERED LAND SURVEYOR

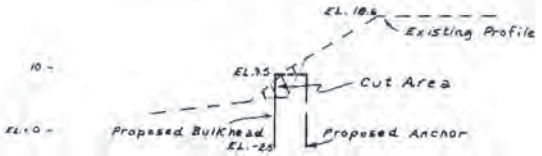
COMMONWEALTH OF MASSACHUSETTS
MICHAEL S. BACHMAN
No. 27868
REGISTERED LAND SURVEYOR

COMMONWEALTH OF MASSACHUSETTS
ROBERT J. LEICHTER
No. 27639
REGISTERED PROFESSIONAL ENGINEER

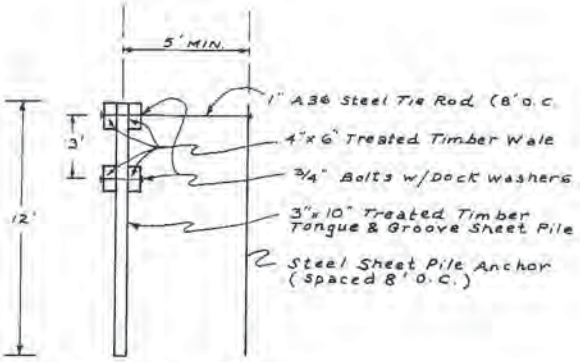
R. J. Leichter



SEC. A-A (1" = 20')



SEC. B-B (1" = 20')



TYPICAL CROSS-SECTION
(NO SCALE)

LICENSE PLAN NO. 933

Approved by Department of Environmental Quality Engineering
NOVEMBER 18, 1982

April 24, 2020

Ashley Erisman, Chair
Nantucket Conservation Commission
2 Bathing Beach Road
Nantucket, MA 02554

RE: Notice of Intent – SE48-3241
25 Quaise Road

Dear Ms. Erisman:

In response to the discussion at the last public meeting (4/16/20), the Applicant would like to offer a five-foot wide pedestrian easement along the top of the bulkhead, as shown in the attached, revised site plan. The easement would connect from the Land Bank property to the west, to the Town-owned Quaise Road layout on the east. The Applicant is providing this as a substantial benefit to the both the Public, and to further the interests protected by the Commission.

I plan to attend the public hearing on this matter, though please feel free to contact me should you have any questions or concerns with this request in the meantime.

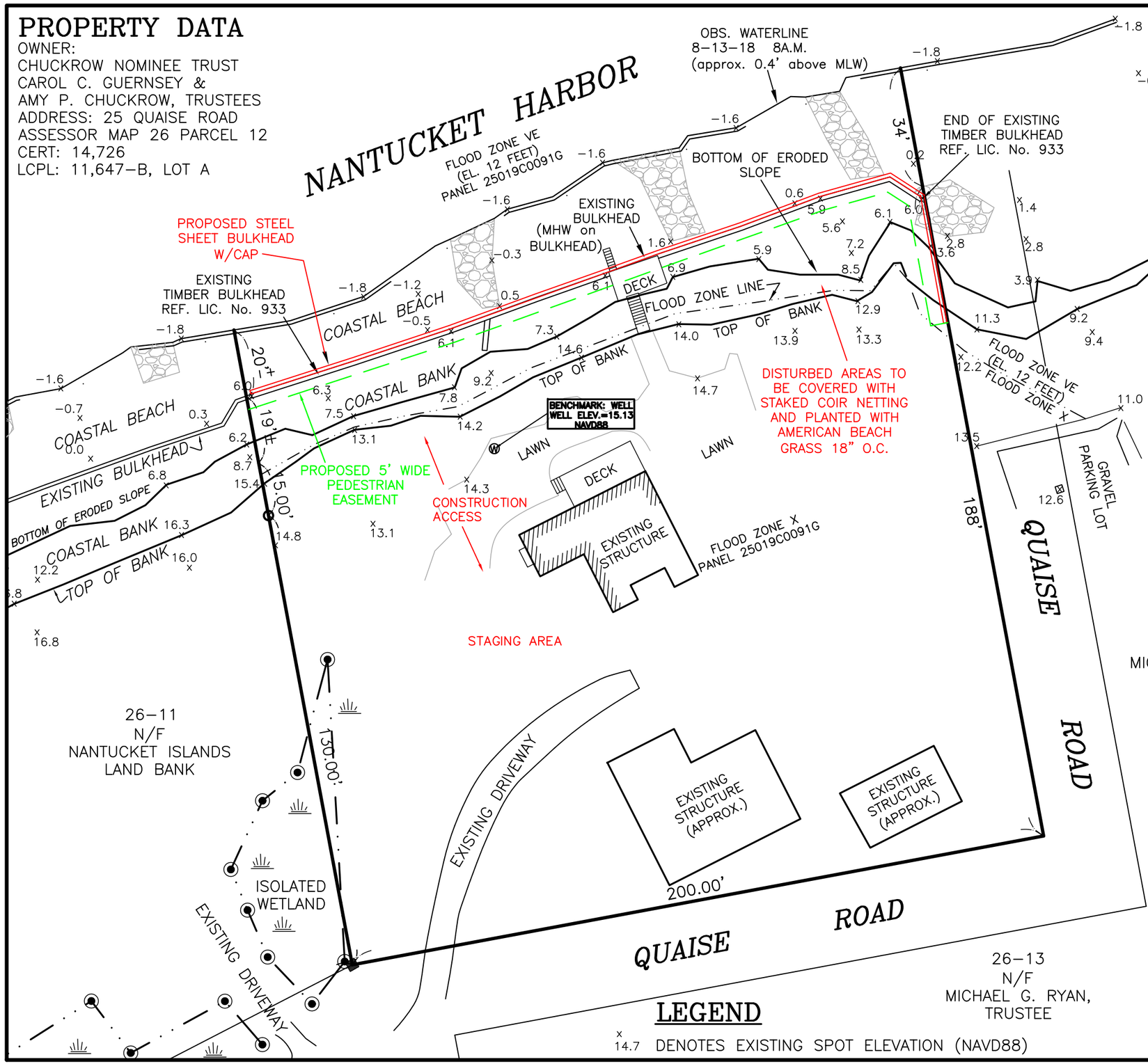
Sincerely,
Nantucket Engineering & Survey, P.C.
By: Arthur D. Gasbarro, PE, PLS

Cc: MassDEP – SERO
Chuckrow Nominee Trust
Steven L. Cohen

20 Mary Ann Drive • Nantucket, MA 02554
508-825-5053 • www.NantucketEngineer.com

PROPERTY DATA

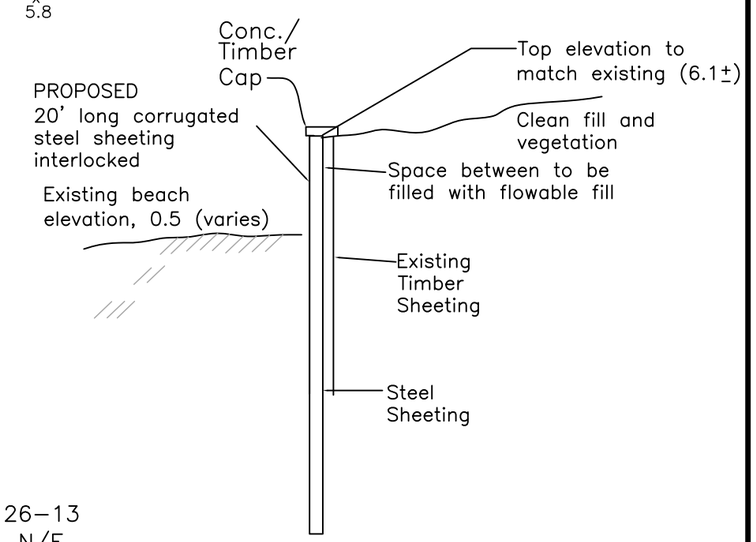
OWNER:
CHUCKROW NOMINEE TRUST
CAROL C. GUERNSEY &
AMY P. CHUCKROW, TRUSTEES
ADDRESS: 25 QUAISE ROAD
ASSESSOR MAP 26 PARCEL 12
CERT: 14,726
LCPL: 11,647–B, LOT A



THIS PLOT PLAN WAS PREPARED FOR THE NANTUCKET CONSERVATION COMMISION ONLY AND SHOULD NOT BE CONSIDERED A PROPERTY LINE SURVEY. THIS PLAN SHOULD NOT BE USED TO ESTABLISH PROPERTY LINES, FENCES, HEDGES OR ANY ANCILLARY STRUCTURES ON THE PREMISES. THE PROPERTY LINES SHOWN RELY ON CURRENT DEEDS AND PLANS OF RECORD.
THIS PLOT PLAN IS NOT A CERTIFICATION AS TO TITLE OR OWNERSHIP OF THE PROPERTY SHOWN. OWNERS OF ADJOINING PROPERTIES ARE SHOWN ACCORDING TO CURRENT ASSESSOR RECORDS.

N

Bulkhead Cross–Section



COMMONWEALTH OF MASSACHUSETTS
ARTHUR D. GASBARRO
CIVIL
No. 45951
REGISTERED PROFESSIONAL ENGINEER

4/21/20

Arthur D. Gasbarro

GRAPHIC SCALE
15 0 15 30
(IN FEET)
1 inch = 30 ft.

SITE PLAN OF LAND TO ACCOMPANY A NOTICE OF INTENT IN NANTUCKET, MA PREPARED FOR CHUCKROW NOMINEE TRUST
25 QUAISE ROAD
MAP 26 PARCEL 12
AUGUST 14, 2019
REV. APRIL 21, 2020
SCALE: 1"=30'

NANTUCKET ENGINEERING & SURVEY, PC
20 Mary Ann Drive Nantucket, MA 02554
NantucketEngineer.com 508-825-5053

LEGEND

x 14.7 DENOTES EXISTING SPOT ELEVATION (NAVD88)

Nantucket Land Council

Six Ash Lane
Post Office Box 502
Nantucket, Massachusetts 02554

508 228-2818
Fax 508 228-6456
nlc@nantucketlandcouncil.org
www.nantucketlandcouncil.org

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Resource Ecologist

Meg McNeely Browers
Development Director

May 8, 2020

Ms. Ashley Erisman, Chair
Nantucket Conservation Commission
2 Bathing Beach Road
Nantucket, MA 02554

Re: re: NOI; Chuckrow Nominee Trust, 25 Quaise Road (Map 26, Parcel 12)

Dear Commissioners,

The Nantucket Land Council, Inc. is a 501(c)(3) member supported non-profit organization. We have reviewed the material related to the Notice of Intent filing by Chuckrow Nominee Trust for the installation of a steel sheet bulkhead in front of the existing timber bulkhead, as well as the construction of a steel sheet return bulkhead along the eastern boundary of the property. We would like to make the following comments.

RESOURCE AREA IMPACTS

Installation of a steel sheet bulkhead in front of the failing timber bulkhead: While we acknowledge the applicant's right to maintain this existing structure, the applicant has not demonstrated a detailed alternatives analysis for options suggested by Commissioners such as green shoreline bulkhead alternatives or moving the dwelling away from the eroding coastal bank. The applicant must demonstrate to the Commission why these alternatives are not possible before proceeding with the new steel bulkhead option.

Proposed steel sheet bulkhead return along the eastern property line: This structure must be considered separately by the Commission as a new structure. It is not grandfathered in the manner the rest of the proposed bulkhead structure is. The grandfathering/pre-existing use clause in the Bylaw reads:

"Allows that the use and normal maintenance of any structure or alteration of land, within wetland resource areas and their buffers, existing at the time of enactment of MGLCh131s40 (effective date 1972) or the Town of Nantucket Wetlands Protection Bylaw (effective date 1983), or subsequent revisions, may be continued subject to the following:

- *Existing structures, uses and/or alterations of land may not be extended and/or modified unless such extension or modification is permitted by a finding of the Commission that such alteration or modification shall have no adverse impact to the resource areas and interests protected by the Town of Nantucket Wetlands Protection Bylaw.*
- *Existing structures, uses and/or alterations of land which have been abandoned for five years or more shall not be reestablished, and any future use shall conform with then-current provisions of the Town of Nantucket Wetlands Protection Bylaw, as appropriate."*

PERFORMANCE STANDARDS

Nantucket Wetland Protection Regulations

Section 2.02, Coastal Beaches, (B) #2 states "No new bulkheads or coastal engineering structures shall be permitted to protect structures constructed, or substantially improved, after 8/78. Bulkheads may be rebuilt only if the Commission determines there is no environmentally better way to control an erosion problem, including in appropriate cases the moving of the threatened building. Other coastal engineering structures may be permitted only upon a clear showing that no other alternative exists to protect a structure built prior to 9/78, and not substantially improved, from imminent danger."

The applicant has not provided a detailed alternatives analysis for the reasonable alternatives presented by Commissioners and members of the public, such as green shoreline bulkhead alternatives, or moving the dwelling away from the coastal beach. This performance standard has not been met.

Section 2.05, Coastal Banks, (B) #1 states "No new bulkheads, coastal revetments, groins, or other coastal engineering structures shall be permitted to protect structures constructed, or substantially improved, after 8/78 except for public infrastructures. Bulkheads and groins may be rebuilt only if the Commission determines there is no environmentally better way to control an erosion problem, including in appropriate cases the moving of the threatened buildings and/or public infrastructure. Other coastal engineering structures may be permitted only upon a clear showing that no other alternative exists to protect a structure that has not been substantially improved or public infrastructure built prior to 9/78, from imminent danger."

The applicant has not provided a detailed alternatives analysis for the reasonable alternatives presented by Commissioners and members of the public, such as green shoreline bulkhead alternatives, or moving the dwelling away from the coastal beach. This performance standard has not been met.

Section 2.05, Coastal Banks, (B) #3 states "All projects shall be restricted to activity as determined by the Commission to have no adverse effect on bank height, bank stability, wildlife habitat, vegetation, wetland scenic view, or the use of the bank as a sediment source."

The new steel sheet bulkhead return along the eastern property line will have an adverse impact on bank stability and the use of the bank as a sediment source. Not only will this new structure eliminate the subject parcel as a sediment source for Nantucket Harbor, but it will also accelerate erosion on the adjacent town owned property, hindering public access and creating another "private peninsula" in Nantucket harbor. This performance standard has not been met.

Section 2.05, Coastal Banks, (B) #7 states "In areas of an eroding coastal bank, the distance from all new structures to the coastal bank shall be at least 20 times the average annual erosion rate or 100 feet, whichever is the lesser. The average annual erosion rate shall be determined by averaging the annual erosion rate over a 150-year period ending with the date the NOI was filed, or if no NOI was filed, the date construction began. If erosion data is not available for the 150-year period, the Commission shall determine the average annual erosion rate from such lesser time for which erosion data is available. In cases where documentation can be provided to show that the use of the 150-year period is inappropriate to existing coastal shoreline characteristics and trends, alternate shoreline change rates may be used with the approval of the Commission."

Since the proposed eastern return, a steel sheet bulkhead, is not grandfathered under the Bylaw and thus defined as a new structure, it cannot be constructed in the location proposed under the Nantucket Wetland Protection Bylaw. This performance standard has not been met.

CONCLUSION

The project proposed in this NOI will have adverse impacts to resources protected under the Nantucket Wetlands Protection Bylaw including Coastal Beach and Coastal Bank. The structure as proposed will exacerbate erosion along Nantucket Harbor, hinder public access to the shore, and eliminate the coastal bank and beach on the subject parcel as a sediment source for the littoral system. The return proposed along the easterly property line is not grandfathered under the Bylaw and must be considered a new and separate coastal engineering structure. This return, if permitted, will accelerate erosion on the Town-owned property to the east of 25 Quaise Road, eliminate the coastal bank and coastal beach as sediment sources, and hinder public access along the shore of Nantucket Harbor.

The applicant has not provided a detailed alternatives analysis detailing why the dwelling cannot be moved elsewhere on the property or why the use of green shoreline bulkhead alternatives is not feasible. The applicant has stated that the steel bulkhead proposed will cause less disturbance

to the resource area during installation than the bulkhead alternatives. While this may be true, the long-term benefits of a bulkhead alternative for the resource area have not been addressed by the applicant. As stated above, the project as proposed does not meet the performance standards of the Nantucket Wetland Protection Regulations or the Massachusetts Wetlands Protection Act Regulations.

Thank you for your time.

Sincerely,

RJ Turcotte
Resource Ecologist

June 5, 2020

Ms. Ashley Erisman, Chair
Nantucket Conservation Commission
2 Bathing Beach Road
Nantucket, MA 02554

Re: Notice of Intent
25 Quaise Road
SE48-3241

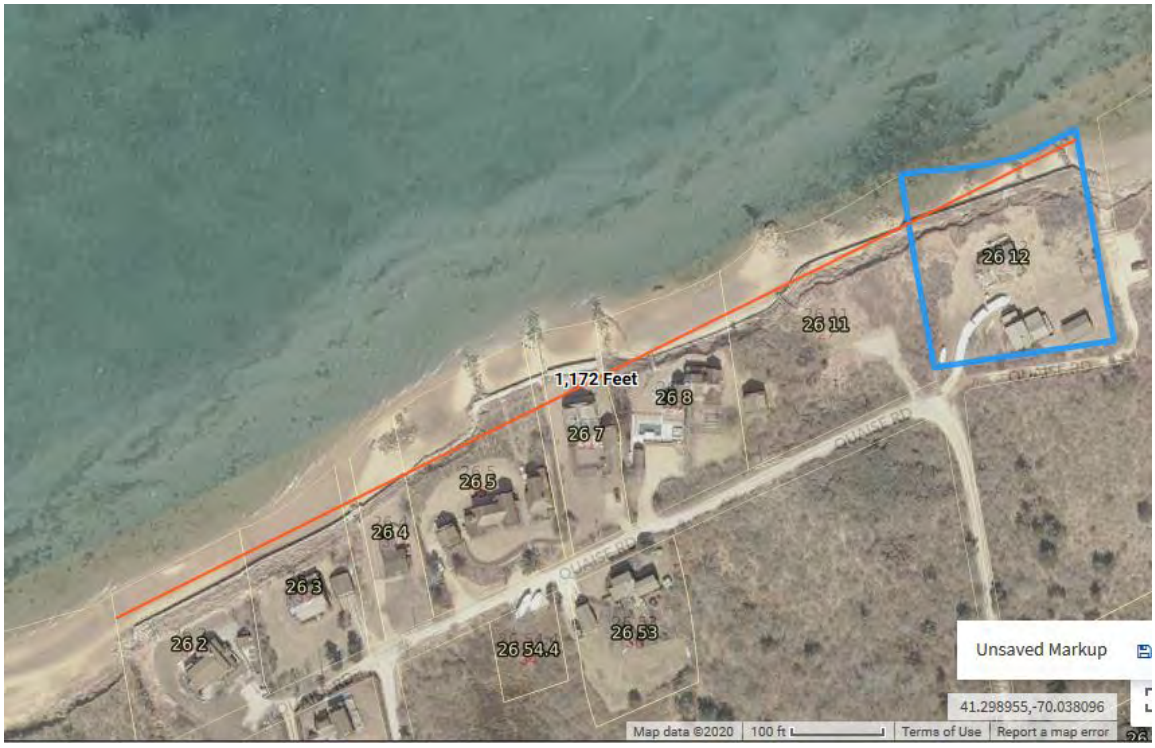
Dear Ms. Erisman:

I am writing to provide additional information related to the pending referenced application. We understand from the comments at the first two public hearings that the Commission is interested in reviewing a more detailed analysis of the alternatives to the project. The analysis below evaluates the merits of 10 alternative approaches, including review of protected interests of the Wetlands Protection Act and Nantucket Wetlands Bylaw and a project-impact analysis on potential effects from the proposed work. Further, the Applicant agrees with a condition that no work will be performed between April 1st and August 31st.

The conclusions of this analysis are:

- The project is being permitted under an existing Chapter91 Waterways License with a right to maintain and repair; this project is proposed as a more environmentally sensitive option than rebuilding the wooden bulkhead per the referenced license. The Applicant prefers not to exercise that right when there are preferred environmental alternatives as demonstrated by the materials provided with this application.
- The impact and alternatives analysis demonstrate that the project is approvable as proposed, and that softer coastal stabilization alternatives are not a viable option to replace the licensed and permitted coastal structure in this location.
- The Living Shoreline alternative was investigated and determined not to be well-suited for this location due to the steep coastal bank in proximity to the water sheet. Further, it is well established by State and Local regulation, as well as long-standing policy of this Commission that one resource area is not destroyed to create another.
- The public access proposed here along the top of the bulkhead is a large benefit that cannot be required beyond the intertidal zone.
- The Commission has approved similar projects recently, including last month and next door.

As an overarching consideration, we wish to emphasize that the proposed project is a small part of an armored shoreline that extends more than 1000-feet to the west (see figure on the following page). Deviation from the current armoring approach at the property could jeopardize the integrity and resiliency of the other protected properties. The proposed extension landward at the eastern end of the property to maintain the structural integrity of the structure represents only 3% (approximately 37 feet) of the overall length of the armored shoreline and is a valuable component to reduce future disturbance to the resource area for further maintenance. The minor extension proposed here is comparable to the extension permitted immediately next door, with no waivers required as a water-dependent use. The difference with this application is that an easement for pedestrian access is being offered along the top of the bulkhead, beyond the limit of intertidal zone. Without the extension to protect the end of the structure, the offered pedestrian easement along the top of the bulkhead is impractical.



Alternatives Analysis

The first alternative requires no action, but is deemed to be non-viable as it does not meet current licensing requirements:

- **No Action** – The Coastal Bank and Permitted/Licensed Coastal Engineering Structure (CES) will continue to be damaged by storm-related erosion if no action is taken. This alternative would not meet the requirements of the current waterways License that the CES is to be maintained in good repair.

Nine alternatives require removal of the existing wood bulkhead prior to installation, a process that will create substantial disturbance to the resource areas. Further, these alternatives could involve construction within the coastal beach area, which at this site is in the inter-tidal zone. Impacts to this area can be avoided by the selected alternative. These alternatives include:

- **Sand Drift Fence with Nourishment** – This option allows for the rapid transport of unconsolidated nourishment material which may have a detrimental effect on nearby eelgrass beds. Further, this alternative does not provide adequate protection for the property and coastal engineering structure on the property. This alternative would not meet the requirements of the current waterways License that the CES is to be maintained in good repair.

- **Living Shoreline –** This alternative would require extensive disturbance to the resource areas and buffer zones. The 15-foot-high coastal bank would need to be substantially destroyed in order to provide beach area for the living shoreline installation above mean high water. This is due to the current location of mean high water on the face of the existing bulkhead. Further, the top of the coastal bank would need to be relocated a substantial distance southerly toward the existing pre-1978 structures. Those structures would then be at greater risk of loss due to erosion. The alternative to relocate the structures on the property is limited by the number of structures, the size of the lot, zoning and setbacks to the septic system. Also, of concern is the impact on the stability of the existing CES on the adjacent property; a living shoreline would put the structural integrity of that structure into jeopardy and substantially increase instability of the coastal bank and increase erosion. Finally, the Living Shoreline concept is not well suited to this location due to the steep coastal bank in proximity to the water sheet.

- **Anchored Coir Fiber Rolls with Reinforced Sand Lifts and Cover Nourishment –** This option would not achieve the goal of the proposed project as it would require extensive disturbance to the resource areas and buffer zones. The coastal bank would need to be altered and partially destroyed in order to provide the area above mean high water for the installation. This alternative would also require considerable maintenance effort and future activity/disturbance.

- **Geotextile Fabric Tubes –** This option would provide good resistance to wave damage however this option is also susceptible to damage from vandalism, debris, and UV degradation. It would also require extensive disturbance of the resource areas.

- **Stone Gabions** – This option would provide good resistance to wave damage. However, it would also require extensive disturbance of the resource areas, as well as consideration of past unfavorable action by the Commission. Disposal of materials could be a concern if removal was required in the future.

- **Marine Mattresses –** This option would provide good resistance to wave damage. However, it would also require extensive disturbance of the resource areas. Other concerns about this option include some on-going maintenance costs and past unfavorable action by the Commission.

- **Stone Revetment –** This option provides a high level of protection but is dismissed due to requiring extensive disturbance of the resource areas and buffer zones, as well as consideration of past unfavorable action by the Commission.

- **Wooden Bulkhead –** This option provides a high level of protection but is dismissed due to concern for extensive disturbance of the resource areas and related impacts. In order to rebuild the existing bulkhead, new tiebacks would be required which would necessitate excavation behind the timber. It would be very difficult to do so at this site in a manner which protects the adjacent coastal beach and land under the ocean from impacts.

The following preferred alternative does not require removal of the existing bulkhead, which substantially reducing impact on the resource area during construction:

- **Steel Bulkhead with Extension *(Most Favorable Alternative)*** This option provides a high level of protection, is consistent with past approvals of the Commission as described below, and minimizes disturbance of the resource areas and related impacts. As previously presented, the steel bulkhead will be self-supporting so that it can be driven in front of the timber bulkhead without the need for removal of that structure or extensive excavation behind it.

Project-Impact Analysis of Protected Interests of Coastal Bank and Coastal Beach Resource Areas

Bank Height – The project will not alter, and therefore have no adverse effect or impact on the height of the bank.

Bank Stability – The project will improve the stability of the bank, without adverse impact on the stability of the bank.

Wildlife Habitat – The project will have no adverse effect or impact on wildlife through the utilization of protective measures including no work on the project between April 1st and August 31st.

Vegetation – The project will have no adverse effect or impact on vegetation on the bank. The project will improve the stability of the bank, thereby providing better conditions for survival of vegetation.

Use of the Bank as a Sediment Source – The project will not alter the rate at which sediment is available to the Beach due to the current bulkhead and existence of boulders and rocks along the proposed extension.

Wetland Scenic Views – The project will have no adverse effect or impact on the wetland scenic views as views will not be altered from a public way to the resource area.

Public or Private Water Supply – The project will not interfere with water supplies in any way, and therefore have no impact on public or private water supplies.

Groundwater – The project will have no impact to groundwater. No dewatering or handling of water is proposed as part of this project.

Flood Control – The project will not alter the flood control function of the Bank.

Erosion Control – The project will not alter the ability of the bank to buffer against erosion.

Storm Damage Prevention – The project will not alter the function of the Bank to prevent storm damage.

Water Pollution – The project will not cause pollution of surface water or groundwater. The proposed project will contain and stabilize materials from the failing bulkhead which could otherwise lead to pollution.

Fisheries – The project will have no adverse impact on fisheries because the work proposed below the mean high-water line is less than two-feet from the existing bulkhead in the intertidal zone where fish could not exist at low-tide.

Shellfish – The project will have no adverse impact on shellfish because the work is proposed below the mean high-water line is less than two-feet from the existing bulkhead in an area devoid of shellfish.

Rare species, including rare, threatened or endangered plant species and animals and habitats – The project will have no adverse impact on rare species as the work will adhere to time of year restrictions.

Recreation – The project will have no adverse impact on recreation because the use of the property is not changing. Access across the beach in the intertidal zone will be maintained at all times during construction.

Near-term resources-area impacts – the ability to construct the proposed structure without removing the old structure will mean substantially reduced disturbance to the protected resource areas and adjacent buffer zones

Long-term resource area impacts – long-term disruption to the resource area will be best avoided by the project's choice of durable materials, which eliminate the need for replacement more often in the future.

Approved Comparison Projects

The Commission has issued Orders of Conditions for very similar projects in nearly identical situations. As just a few examples within Nantucket Harbor -

- Most recently, at 27 Easy Street, the attached Amended Order of Conditions (SE48-3002) was issued on May 1, 2020 to the Nantucket Islands Land Bank for the installation of steel sheet bulkhead seaward of a timber bulkhead, including an additional structural wall return along the abutting property.
- At 28 Easton Street, an Order of Conditions (SE48-2978) was issued for the installation of steel sheet bulkhead seaward of a timber bulkhead, and a Certificate of Compliance for the work issued in October 2019.
- Immediately adjacent to the proposed project, at 27 Quaise Road, an Order of Conditions (SE48-1900) was issued for the installation of steel sheet bulkhead seaward of a timber bulkhead, including an extension. This structure was constructed, including the extension, with an issued Certificate of Compliance.

In closing, the proposed project represents responsible maintenance of a permitted and licensed structure, while minimizing adverse impacts to the interests in the resource areas protected by the Commission. Further, the project is very similar to others for which Orders of Conditions have been approved, and the Applicant agrees to the same set of conditions for the proposed project. I plan to attend your next hearing to review this material and address any questions.

Sincerely,

Arthur D. Gasbarro, PE, PLS

Cc: MassDEP – SERO
Chuckrow Nominee Trust
Steven L. Cohen

FINDINGS and ADDITIONAL CONDITIONS
Nantucket Islands Land Bank
DEP FILE NUMBER SE48 – 1900
ASSESSOR'S MAP 26 PARCEL 11
27 Quaise Road
UNDER THE MASSACHUSETTS WETLANDS PROTECTION ACT
(MGL CHAPTER 131, SECTION 40)
AND THE WETLANDS BYLAW OF THE TOWN OF NANTUCKET
(CHAPTER 136)

This Order permits the repair/reconstruction and extension of a bulkhead with steel sheeting along the base of an eroding coastal bank, reconstruction of beach stairs, repair and planting of portions of the coastal bank and limited beach nourishment within beach and coastal bank resource areas.

FINDINGS

1. Applicant Names Nantucket Islands Land Bank DEP File Number SE48-1900 .
2. This Order of Conditions is being issued based upon strict accordance with the information submitted in the Notice of Intent dated 3/23/06 and the Plans of Record dated 7/7/06 and stamped by Arthur Gasbarro. Also considered was other pertinent supplemental information including but not limited to:
   Letter from Blackwell & Associates, Inc. dated 7/7/06
   Letter from the Massachusetts Division of Marine Fisheries dated 5/30/06
   Letters from Town Biologist dated 4/13/06 & 5/22/06
3. Areas subject to protection/regulation are coastal bank and coastal beach. The Town Biologist examined the site and offered no findings relative to shellfish or shellfish habitat therefore resource areas including land containing shellfish and/or land containing scallops are determined not to be present within the project site.
4. This Order is in accordance with a vote by the Nantucket Conservation Commission to close the public hearing on 7/12/06 and a vote to issue Orders taken by the Commission on 7/12/06.
5. This Order permits the repair/reconstruction and extension of a bulkhead with steel sheeting along the base of an eroding coastal bank, reconstruction of beach stairs, repair and planting of portions of the coastal bank and limited beach nourishment within beach and coastal bank resource areas.
6. The Commission finds the applicant has documented that the construction of the existing and threatened residential structure predates 8/78. Further, the Commission has determined that there is no environmentally better way to control the erosion problem then as proposed (reconfiguration of the existing bulkhead, coastal bank repair and plantings with limited beach nourishment) by the applicant.

7. The Commission finds that the placement of controlled amounts of clean fill on the beach constitutes beach nourishment.
8. The Commission finds that the work proposed and permitted by this Order will serve to protect the interests of MGLCh131s40 and the Nantucket Wetlands Protection Bylaw by minimizing the design of a previously permitted coastal erosion control structure and will serve to enhance the interests of MGLCh131s40 and the Nantucket Wetlands Protection bylaw by repairing the integrity of the coastal bank face and carefully nourishing a sediment depleted coastal beach system.

In addition to the above referenced GENERAL CONDITIONS the Commission has found it necessary to include the following Additional Conditions pursuant to MGLCh131s40 and the Town of Nantucket Wetlands Protection Bylaw, Chapter 136. The above listed General Conditions and Findings are automatically part of this Order of Conditions.

ADDITIONAL CONDITIONS

18. A minimum of three weeks prior to the start of work, the applicant, construction supervisor and Commission staff shall meet on the site to confirm all construction protocols. Within 48 hours of the pre-construction onsite, the applicant shall provide the Commission with construction protocols for final review and approval.
19. No machinery or materials shall be stored within 25 feet of the top of the coastal bank or on the coastal beach.
20. All beach nourishment materials shall consist of medium to coarse grained sands and shall be approved as to source and composition by the Commission staff. The applicant shall provide the Commission with the source of nourishment materials and a sieve analysis or sample a minimum of 48 hours prior to use at the site.
21. Should it be determined that any portion of the existing backfill material behind the timber bulkhead and in front of the proposed steel sheeting is unsuitable for beach nourishment that material shall be removed and disposed of outside the jurisdiction of the Commission.
22. During installation of the steel sheet pilings, the applicant shall provide the Commission office with daily construction reports and photographs.

WAIVERS UNDER THE NANTUCKET WETLANDS BYLAW/REGULATIONS:

No waivers are required based on Findings #6, 7 and 8.

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

WPA Form 8B – Certificate of Compliance

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40
And the Town of Nantucket Bylaw Chapter 136

NILB - Quaise
DEP File Number:

SE48-1900
Provided by DEP

2009 00002666
Bk: 1200 Pg: 161 Page: 1 of 2
Doc: COC 09/25/2009 11:52 AM

A. Project Information

1. This Certificate of Compliance is issued to:

Nantucket Islands Land Bank
Name

22 Broad Street
Mailing Address

Nantucket | MA | 02554
City/Town | State | Zip Code

2. This Certificate of Compliance is issued for work regulated by a final Order of Conditions issued to:

Nantucket Islands Land Bank
Name

July 14, 2006 | SE48-1900
Dated | DEP File Number

3. The project site is located at:

27 Quaise Road | Nantucket
Street Address | City/Town

26 | 11
Assessors Map/Plat Number | Parcel/Lot Number

the final Order of Condition was recorded at the Registry of Deeds for:

Nantucket Islands Land Bank
Property Owner (if different)

Nantucket | 1032 | 16
County | Book | Page

Certificate

4. A site inspection was made in the presence of the applicant, or the applicant's agent, on:

Date

B. Certification

Check all that apply:

☒ **Complete Certification**: It is hereby certified that the work regulated by the above-referenced Order of Conditions has been satisfactorily completed.

☐ **Partial Certification:** It is hereby certified that only the following portions of work regulated by the above-referenced Order of Conditions have been satisfactorily completed. The project areas or work subject to this partial certification that have been completed and are released from this Order are:

B. Certification (cont.)

☐ Invalid Order of Conditions: It is hereby certified that the work regulated by the above-referenced Order of Conditions never commenced. The Order of Conditions has lapsed and is therefore no longer valid. No future work subject to regulation under the Wetlands Protection Act may commence without filing a new Notice of Intent and receiving a new Order of Conditions.

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands
WPA Form 8B – Certificate of Compliance
Massachusetts Wetlands Protection Act M.G.L. c. 131, §40
And-the Town of Nantucket Bylaw Chapter 136

NILB - Quaise
DEP File Number:
SE48-1900
Provided by DEP

☐ **Ongoing Conditions**: The following conditions of the Order shall continue: (Include any conditions contained in the Final Order, such as maintenance or monitoring, that should continue for a longer period).
Condition Numbers:

C. Authorization

Issued by:

Nantucket — Conservation Commission
September 18, 2009 — Date of Issuance

This Certificate must be signed by a majority of the Conservation Commission and a copy sent to the applicant and appropriate DEP Regional Office (See Attachment).

Signatures:

Ernest Steinauer — Ernest Steinauer
Sarah Oktay — Sarah Oktay
Andrew Bennett — Andrew Bennett
Mary Wawro — Mary Wawro
John D. Braginton-Smith — John D. Braginton-Smith
David Gray, Sr. — David Gray, Sr.
John Brescher — John Brescher

Notary Acknowledgement

Commonwealth of Massachusetts County of Nantucket

On this 16th (Day) Of September (Month) 2009 (Year)

before me, the undersigned Notary Public, personally appeared
Ernest Steinauer
Name of Document Signer

proved to me through satisfactory evidence of identification, which was/were
Personally Known
Description of evidence of identification

to be the person whose name is signed on the preceding or attached document, and acknowledged to me that he/she signed it voluntarily for its stated purpose.

As member of Nantucket (City/Town) Conservation Commission

CATHERINE M. DICKEY
Notary Public
COMMONWEALTH OF MASSACHUSETTS
My Commission Expires
February 25, 2016

Catherine M. Dickey
Signature of Notary Public
Catherine M. Dickey
Printed Name of Notary Public
2/25/2016
My Commission Expires

Place notary seal and/or any stamp above

NANTUCKET COUNTY Received & Entered
Attest: Jennifer M. Ferreira, Register of Deeds

FINDINGS and ADDITIONAL CONDITIONS

Massachusetts Wetlands Protection Act (MGL Chapter 131, Section 40)
Town of Nantucket Wetlands Bylaw (Chapter 136)

Address:	28 Easton Street
Assessor's Map and Parcel:	42.1.4-15
Property Owner:	28 Easton Street Realty Trust
Applicant:	28 Easton Street Realty Trust
DEP File Number:	SE48-2978
Filing Date:	June 9, 2017
Date Hearing Closed:	June 21, 2017
Date Orders Issued:	June 21, 2017
Plan of Record Information:	Site Plan of Land, dated June 1, 2017 and stamped by Arthur D. Gasbarro, P.E.

Permit Overview:
This order permits the construction of a new bulkhead in front of an existing failing bulkhead, replacement of the pier and the installation of pilings. Waivers are not required for this project.

Additional Findings:

1. The area falls outside mapped habitat areas and does not require NHESP review.
2. The Commission finds that the existing structure was constructed prior to the enacting of the Wetlands Protection Act and Town of Nantucket Wetlands Bylaw.

In addition to the General Conditions contained elsewhere in this document, the Commission includes the following Special Conditions pursuant to MGLCh131s40 and the Town of Nantucket Wetlands Protection Bylaw, Chapter 136:

18. All work shall be performed in accordance with the Site and Work Description contained within the Notice of Intent and plan notes set out on the plan of record, provided project narratives, and protocols.
19. Excluding the barge and materials on the barge all materials and machinery are to be stored outside of the resource areas.
20. All refueling of land based machinery must be done in excess of fifty feet from the upland side of the timber bulkhead.
21. The barge shall maintain the best possible separation from the bottom of the vessel and Land Under the Ocean at all times.
22. A siltation boom shall be attached to the barge and setup to confine the active work area.
23. Any work beyond May 1st will require authorization from Commission staff.

WAIVERS UNDER THE NANTUCKET WETLANDS BYLAW/REGULATIONS
Waivers are not required for the project as proposed.

2019 00163164
Cert: 26177 Doc: COC
Registered: 10/02/2019 11:00 AM

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands
WPA Form 8B – Certificate of Compliance
Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

DEP File Number:
SE48-2978
Provided by DEP

A. Project Information

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

1. This Certificate of Compliance is issued to:

   28 Easton Street Realty Trust, Richard J. Glidden, Trustee
   Name
   37 Centre Street
   Mailing Address
   Nantucket | MA | 02554
   City/Town | State | Zip Code

2. This Certificate of Compliance is issued for work regulated by a final Order of Conditions issued to:
   28 Easton Street Realty Trust, Richard J. Glidden, Trustee
   Name
   06/21/2017 | SE48-2978
   Dated | DEP File Number

3. The project site is located at:

   28 Easton Street | Nantucket
   Street Address | City/Town
   42.1.4 | 15
   Assessors Map/Plat Number | Parcel/Lot Number

   the final Order of Condition was recorded at the Registry of Deeds for:

   28 Easton Street Realty Trust, Richard J. Glidden, Trustee
   Property Owner (if different)
   Nantucket
   County
   DOC NO. 155509 ~~Book~~ ~~Page~~
   26177
   Certificate

4. A site inspection was made in the presence of the applicant, or the applicant's agent, on:
   09/22/2019
   Date

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands
WPA Form 8B – Certificate of Compliance
Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

DEP File Number:
SE48-2978
Provided by DEP

B. Certification

Check all that apply:

☒ **Complete Certification**: It is hereby certified that the work regulated by the above-referenced Order of Conditions has been satisfactorily completed.

☐ **Partial Certification:** It is hereby certified that only the following portions of work regulated by the above-referenced Order of Conditions have been satisfactorily completed. The project areas or work subject to this partial certification that have been completed and are released from this Order are:

☐ Invalid Order of Conditions: It is hereby certified that the work regulated by the above-referenced Order of Conditions never commenced. The Order of Conditions has lapsed and is therefore no longer valid. No future work subject to regulation under the Wetlands Protection Act may commence without filing a new Notice of Intent and receiving a new Order of Conditions.

☐ **Ongoing Conditions**: The following conditions of the Order shall continue: (Include any conditions contained in the Final Order, such as maintenance or monitoring, that should continue for a longer period).

Condition Numbers:

C. Authorization

Issued by:

Nantucket
Conservation Commission

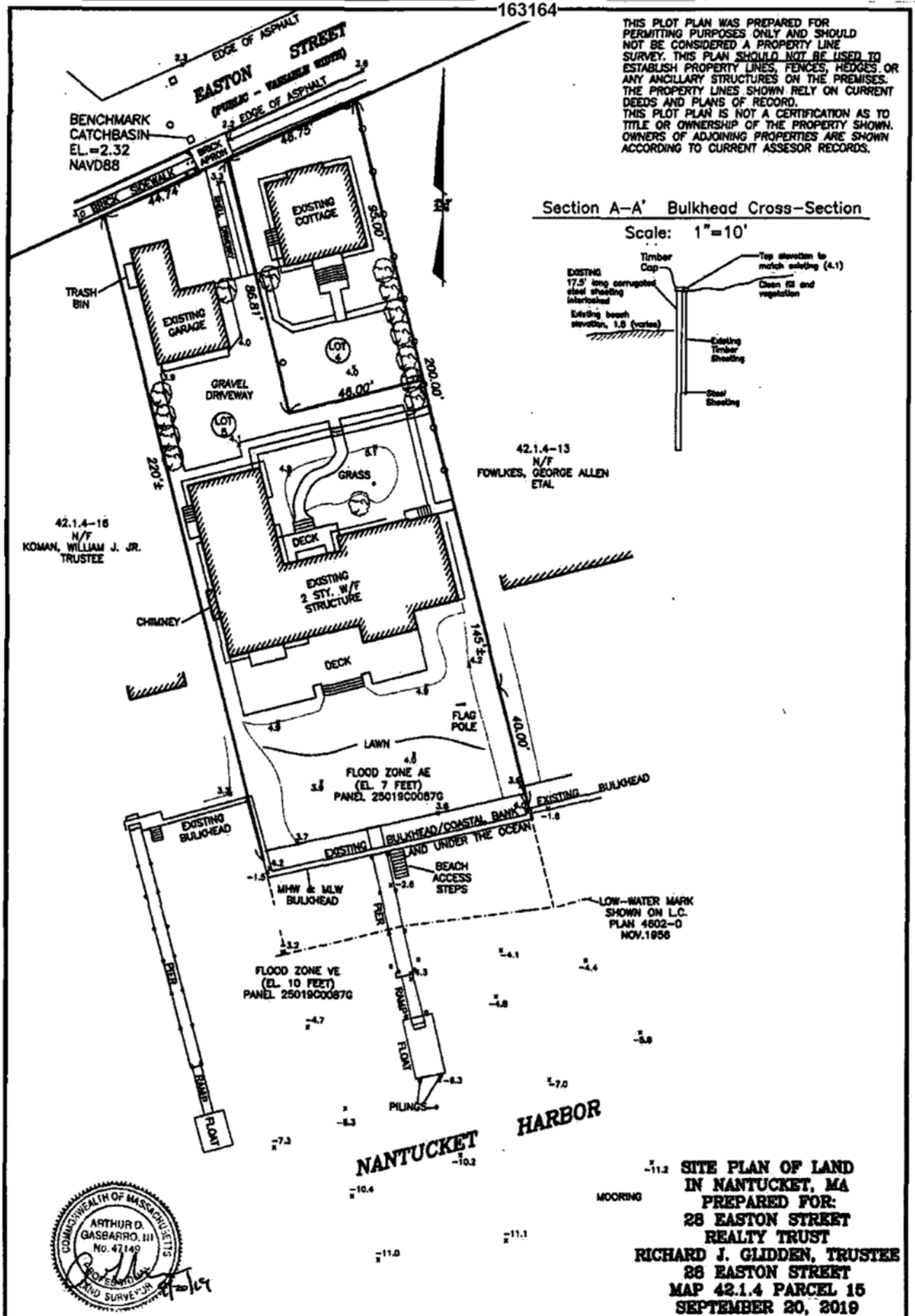
09/25/2019
Date of Issuance

This Certificate must be signed by a majority of the Conservation Commission and a copy sent to the applicant and appropriate DEP Regional Office (See http://www.mass.gov/dep/about/region/findyour.htm).

Signatures:

163164

THIS PLOT PLAN WAS PREPARED FOR PERMITTING PURPOSES ONLY AND SHOULD NOT BE CONSIDERED A PROPERTY LINE SURVEY. THIS PLAN SHOULD NOT BE USED TO ESTABLISH PROPERTY LINES, FENCES, HEDGES, OR ANY ANCILLARY STRUCTURES ON THE PREMISES. THE PROPERTY LINES SHOWN RELY ON CURRENT DEEDS AND PLANS OF RECORD.
THIS PLOT PLAN IS NOT A CERTIFICATION AS TO TITLE OR OWNERSHIP OF THE PROPERTY SHOWN. OWNERS OF ADJOINING PROPERTIES ARE SHOWN ACCORDING TO CURRENT ASSESOR RECORDS.



Section A–A' Bulkhead Cross-Section

Scale: 1"=10'

COMMONWEALTH OF MASSACHUSETTS
ARTHUR D. GASBARRO, III
No. 47149
PROFESSIONAL LAND SURVEYOR
9/20/19

SITE PLAN OF LAND IN NANTUCKET, MA
PREPARED FOR:
28 EASTON STREET REALTY TRUST
RICHARD J. GLIDDEN, TRUSTEE
28 EASTON STREET
MAP 42.1.4 PARCEL 15
SEPTEMBER 20, 2019
SCALE: 1"=30'

PROPERTY DATA
OWNER: 28 EASTON STREET REALTY TRUST
RICHARD J. GLIDDEN, TRUSTEE
ADDRESS: 28 EASTON STREET
ASSESSOR MAP 42.1.4 PARCEL 15
CERT: 22985
LCPL 4602-D LOTS 4 & 5

GRAPHIC SCALE
30 0 15 30
(IN FEET)
1 inch = 30 ft.

NANTUCKET ENGINEERING & SURVEY, PC
20 Mary Ann Drive Nantucket, MA 02584
NantucketEngineer.com 508-825-6083

FINDINGS and ADDITIONAL CONDITIONS

Massachusetts Wetlands Protection Act (MGL Chapter 131, Section 40)
Town of Nantucket Wetlands Bylaw (Chapter 136)

Address:	21 & 27 Easy Street
Assessor's Map and Parcel:	42.4.2 – 20 & 18
Property Owner:	Nantucket Islands Land Bank
Applicant:	Nantucket Islands Land Bank
DEP File Number:	SE48-3002
Filing Date:	August 18, 2017
Date Hearing Closed:	November 15, 2017
Date Orders Issued:	November 15, 2017
Date Amended:	**July 31, 2019**
Date 2nd Amendment:	**April 30, 2020**
Plan of Record Information:	Existing Conditions Plan (Sheet 1 of 2) and Proposed Site Plan (Sheet 2 of 2), dated 8/17/207 and stamped by Roger Paul Michniewicz Materials and Grading Plan (L1.01), dated 8/18/2017
Amended Plan of Record:	**21 & 27 Easy Street (2 sheets) dated 08.17.2017, final revision of 07/10/19, and stamped by Roger Paul Michniewicz**
2nd Amended Plan of Record:	**Proposed Site Plan, dated 08.17.2017, final revision of 04/08/20 and stamped by Roger Paul Michniewicz, P.E.**

Permit Overview:

This order permits the removal of an existing dwelling, installation of piles, installation of decking, installation of brick walkways, installation of hardscaping, plantings with associated grading, landscaping and utilities within Land Under the Ocean, Coastal Bank, Land Subject to Coastal Storm Flowage and their accompanying buffer zones. Waivers are not required for this project. **This project is amended to include the repair/ replacement of the existing bulkhead, the installation of a subsurface wall, and sand blasting of the existing bulkhead. This Order is amended to include the installation of fencing, installation of rip-rap, installation at safety ladders, elimination of the mock trolley rail lines in the walkways.**

Additional Findings:

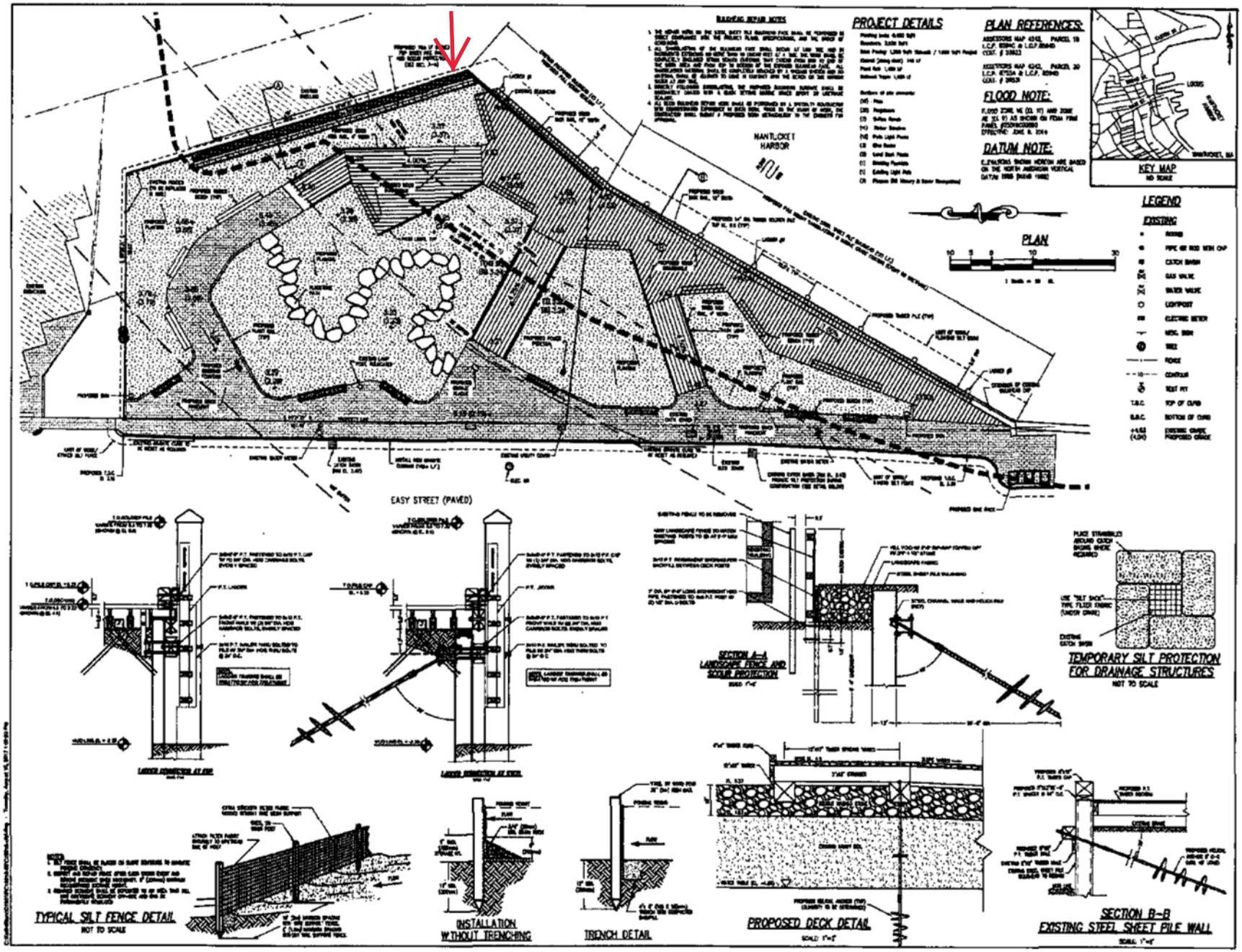
1. The area falls outside mapped habitat areas and required NHESP review.
2. The Commission finds that the public purpose of this project is to provide access to Nantucket Harbor and constitutes a water dependent use.

In addition to the General Conditions contained elsewhere in this document, the Commission includes the following Special Conditions pursuant to MGLCh131s40 and the Town of Nantucket Wetlands Protection Bylaw, Chapter 136:

18. All work shall be performed in accordance with the Site and Work Description contained within the Notice of Intent and plan notes set out on the plan of record, provided project narratives, and protocols.

WAIVERS UNDER THE NANTUCKET WETLANDS BYLAW/REGULATIONS

Waivers are not required for the project as proposed.



21 & 27 EASY STREET

Nantucket, MA

Conservation Commission Submission

PROPOSED SITE PLAN

JOB NUMBER C18015.00 SHEET NO. 2 OF 2

DATE 08.17.2017

SCALE AS NOTED

DRAWN BY NDJ

165298

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands
WPA Form 5 – Amended Order of Conditions
Massachusetts Wetlands Protection Act M.G.L. c. 131, §40
And the Town of Nantucket Wetlands Bylaw Chapter 136

Provided by MassDEP:
SE48-3002
MassDEP File #

eDEP Transaction #

Nantucket
City/Town

E. Signatures

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

05/1/2020
1. Date of Issuance

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

6
2. Number of Signers

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

See Vote Recorded in Book 1743 Page 48 Doc #COV
Signatures:

Ashley Erisman (C)

Jan Golding (VC)

David La Fleur

Joseph Topham

Seth Engelbourg

Maureen Philips

Mark C. Beale

☒ by hand delivery on

05/01/2020
Date

☐ by certified mail, return receipt requested, on

Date

F. Appeals

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

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

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

June 19, 2020

Ms. Ashley Erisman, Chair
Nantucket Conservation Commission
2 Bathing Beach Road
Nantucket, MA 02554

Re: Notice of Intent
25 Quaise Road
SE48-3241

Dear Ms. Erisman:

I am writing to provide additional information related to the pending referenced application. We understand from the comments at the first three public hearings that there are some outstanding concerns with the extension of the existing permitted and licensed coastal engineering structure. To meet those concerns, attached is a revised plan which removes the extension and easement from the proposal. Without the extension to support the eastern end, it is logistically challenging to provide a walking access from the Quaise Road layout across the top of the bulkhead. Such an access would likely create additional damage and impact to the coastal resource areas.

The project remains justified and supported by the previously submitted and presented materials, incorporated by reference. In summary:

- The project is being permitted under an existing Chapter 91 Waterways License with a right to maintain and repair; this project is proposed as a more environmentally sensitive option than rebuilding the wooden bulkhead per the referenced license. The Applicant prefers not to exercise that right when there are preferred environmental alternatives as demonstrated by the materials provided with this application.
- The impact and alternatives analysis demonstrate that the project is approvable as proposed, and that softer coastal stabilization alternatives are not a viable option to replace the licensed and permitted coastal structure in this location.
- The Commission has approved similar projects recently, including last month and next door.

In closing, the proposed project represents responsible maintenance of a permitted and licensed structure, while minimizing adverse impacts to the interests in the resource areas protected by the Commission. Further, the project is very similar to others for which Orders of Conditions have been approved, and the Applicant agrees to the same set of conditions for the proposed project. I plan to attend your next hearing to review this material and address any questions.

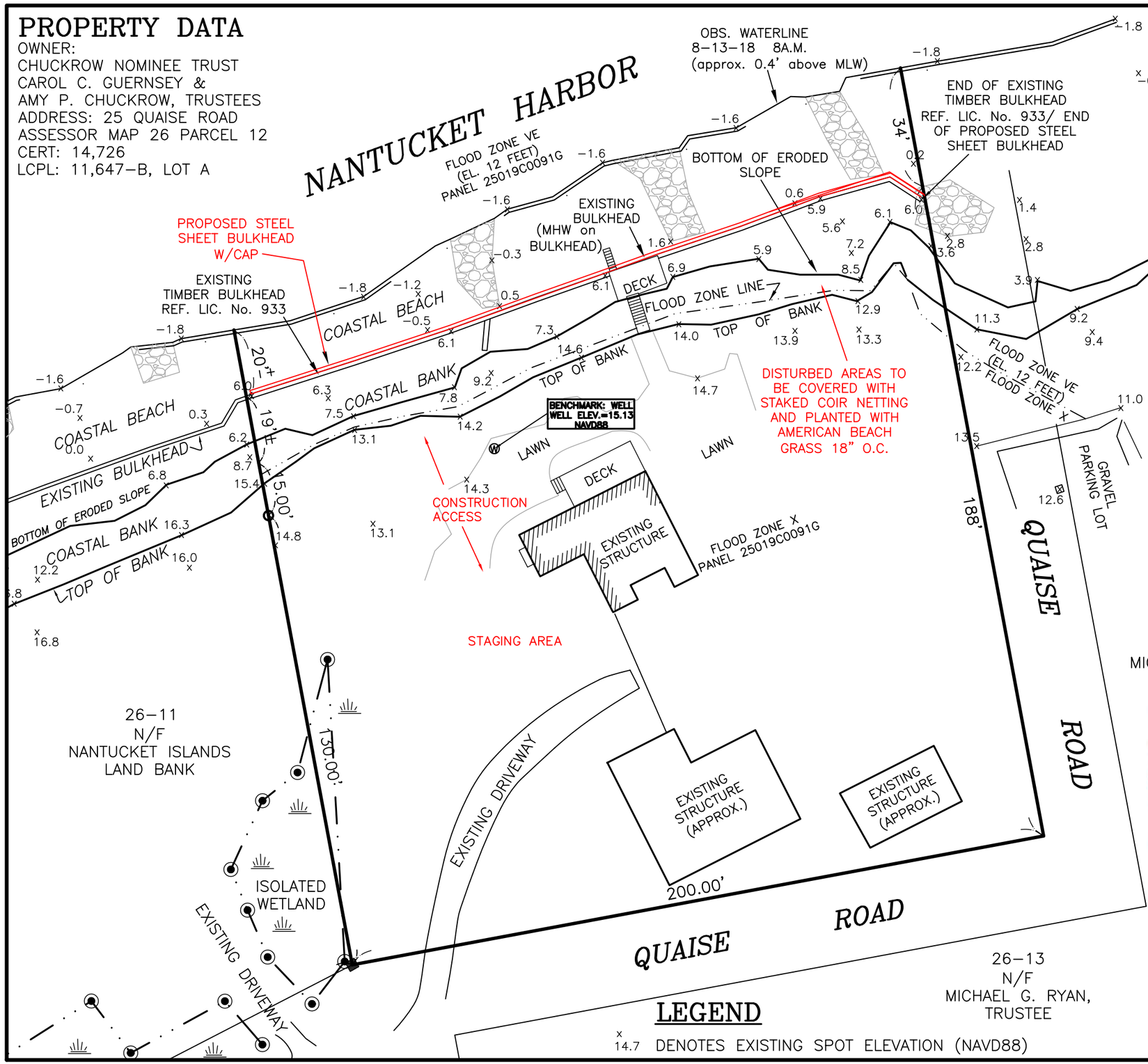
Sincerely,

Arthur D. Gasbarro, PE, PLS

Cc: MassDEP – SERO
Chuckrow Nominee Trust
Steven L. Cohen

PROPERTY DATA

OWNER:
CHUCKROW NOMINEE TRUST
CAROL C. GUERNSEY &
AMY P. CHUCKROW, TRUSTEES
ADDRESS: 25 QUAISE ROAD
ASSESSOR MAP 26 PARCEL 12
CERT: 14,726
LCPL: 11,647–B, LOT A



THIS PLOT PLAN WAS PREPARED FOR THE NANTUCKET CONSERVATION COMMISION ONLY AND SHOULD NOT BE CONSIDERED A PROPERTY LINE SURVEY. THIS PLAN SHOULD NOT BE USED TO ESTABLISH PROPERTY LINES, FENCES, HEDGES OR ANY ANCILLARY STRUCTURES ON THE PREMISES. THE PROPERTY LINES SHOWN RELY ON CURRENT DEEDS AND PLANS OF RECORD.
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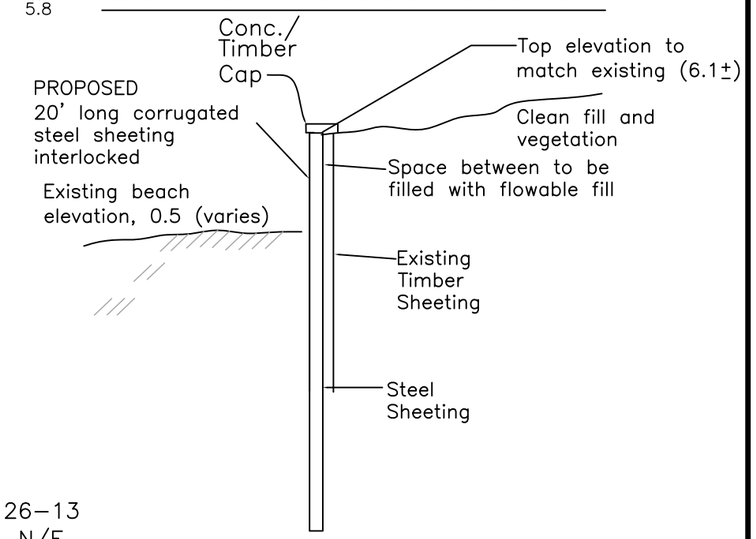
N

Bulkhead Cross–Section



26–13
N/F
MICHAEL G. RYAN,
TRUSTEE

COMMONWEALTH OF MASSACHUSETTS
ARTHUR D. GASBARRO
CIVIL
No. 45951
REGISTERED PROFESSIONAL ENGINEER

6/19/20

Arthur D. Gasbarro

GRAPHIC SCALE
15 0 15 30
(IN FEET)
1 inch = 30 ft.

SITE PLAN OF LAND TO ACCOMPANY A NOTICE OF INTENT IN NANTUCKET, MA PREPARED FOR CHUCKROW NOMINEE TRUST
25 QUAISE ROAD
MAP 26 PARCEL 12
AUGUST 14, 2019
REV. JUNE 19, 2020
SCALE: 1"=30'

NANTUCKET ENGINEERING & SURVEY, PC
20 Mary Ann Drive Nantucket, MA 02554
NantucketEngineer.com 508-825-5053

LEGEND

x 14.7 DENOTES EXISTING SPOT ELEVATION (NAVD88)

NOTICE OF INTENT APPLICATION

FOR ADDITIONS TO SINGLE-FAMILY DWELLINGS
WITHN A LANDSCAPED BUFFER ZONE TO
VEGETATED WETLANDS

At

24 WESTCHESTER STREET

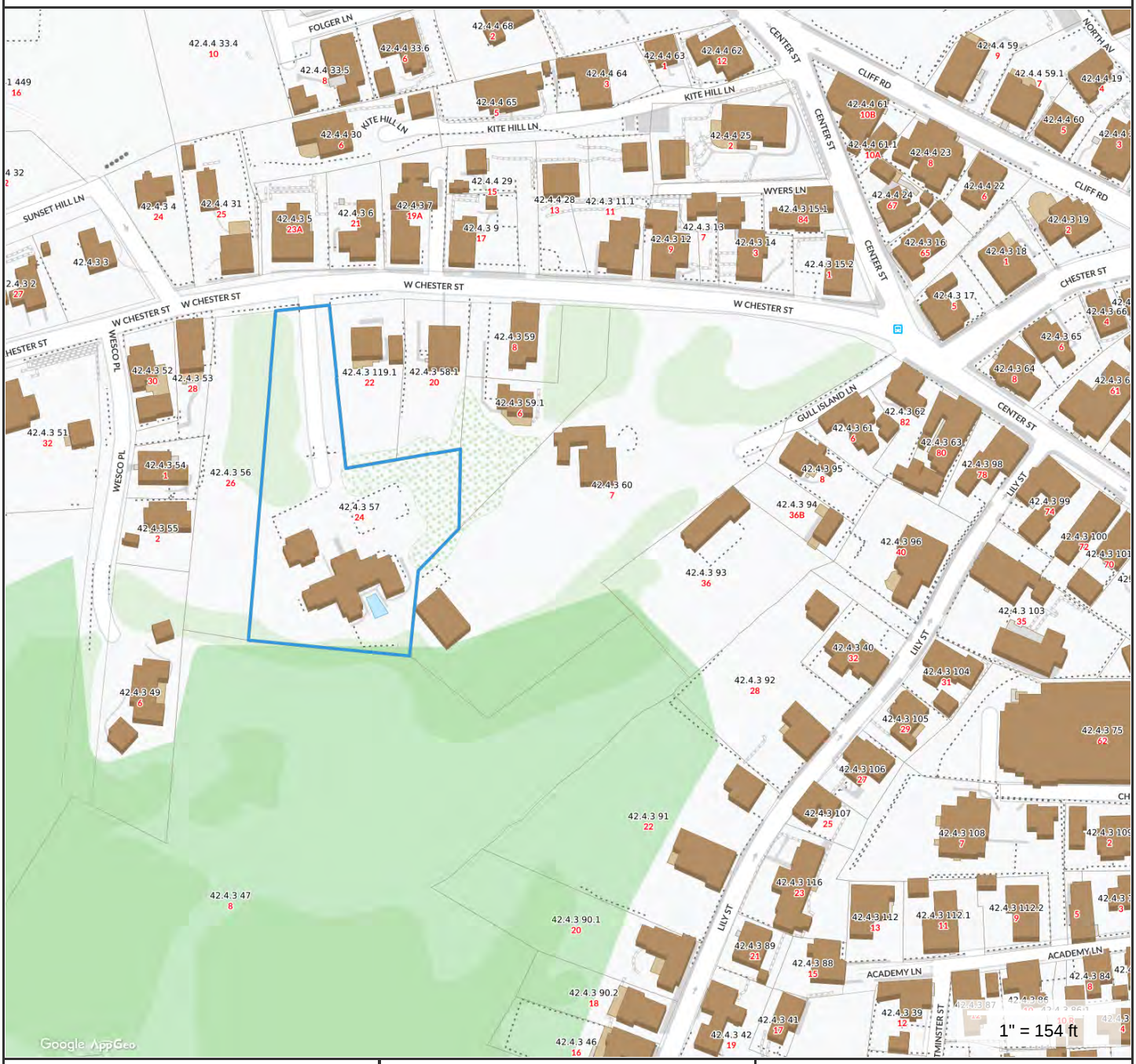
MAY 2020

Prepared For

CROQUET PITCH, LLC

20 Mary Ann Drive • Nantucket, MA 02554
508-825-5053 • www.NantucketEngineer.com

Locus Map



Property Information

Property ID	42.4.3 57
Location	24 W CHESTER ST
Owner	ZEVNIK PAUL A

MAP FOR REFERENCE ONLY
NOT A LEGAL DOCUMENT

Town and County of Nantucket, MA makes no claims and no warranties, expressed or implied, concerning the validity or accuracy of the GIS data presented on this map.

Geometry updated 11/13/2018
Data updated 11/19/2018

May 21, 2020

Ms. Ashley Erisman, Chair
Nantucket Conservation Commission
2 Bathing Beach Road
Nantucket, MA 02554

Re: Notice of Intent
24 Westchester Street
Map 42 .4.3 Parcel 57

Dear Ms. Erisman:

On behalf of the property owner, Croquet Pitch, LLC, Nantucket Engineering & Survey, P.C. is submitting this Notice of Intent (NOI) to the Nantucket Conservation Commission for proposed activities within the Buffer Zone to Vegetated Wetlands at the above referenced property (the "Site") in Nantucket, Massachusetts.

Proposed activities at the Site consist of constructing additions to existing structures within landscaped areas of the Buffer Zones to Vegetated Wetlands, which is located on an adjacent lot. Attached are permit drawings, including plans showing a site locus, existing conditions including resource area locations, and proposed construction areas.

A completed WPA Form 3 – Notice of Intent is attached along with the NOI Wetland Fee Transmittal Form including checks for $42.50, $67.50, $25 and $200 to cover the WPA filing fee, Nantucket Wetland by-law fee and the Nantucket Expert Review fee. Also included is a check for $335.10 to the Inquirer & Mirror for publication of the notice of the public hearing. Waivers are required from the Town of Nantucket Bylaw Chapter 136 for the proposed project to allow for the conversion of structure from porch to interior space within the 50-foot buffer zone, and for the bottom of the foundation slab within two-feet of estimated seasonal high groundwater.

Notification of this NOI filing was provided to all abutting property owners by certified mail. This property owner listing was obtained from the Town of Nantucket Assessor's office. Documentation of the notification is provided including a copy of the notification letter, the property owner listing and certified mail receipts.

SITE DESCRIPTION

The subject property is approximately 1.1-acres in size and is located on the edge of the Town Area of Nantucket Island. The property is located on the south side of Westchester Street, surrounded by developed residential-use properties. The lot contains two existing single-family dwellings with appurtenant landscaping/hardscaping, and is served by Town sewer and water service.

The Wetland Resource Areas on-site were delineated by Brian Madden of LEC Environmental. There are three vegetated wetlands which each run off of locus. A soil test was performed in the

buffer zone which established both estimated seasonal high groundwater elevation at 9.4, and observed groundwater at elevation 8.8 (NAVD88).

A review of the August 1, 2017 "Massachusetts Natural Heritage Atlas", prepared by the Massachusetts Natural Heritage and Endangered Species Program (NHESP), indicates that the work area is not within the known range of state listed rare wildlife species defined by the Estimated Habitat mapping.

WORK DESCRIPTION

Prior to commencement of work, a silt fence will be placed at the limit of work as shown on the site plan. This fence will be inspected regularly and kept in good repair until the work has been completed and the site has stabilized. The Applicant proposes to first excavate for the shallow foundations and will truck the material off-site. Temporary dewatering may be required, for which a settling basin will be established as shown on the site plan.

The foundation will then be constructed and soil brought back to restore the areas to match the surrounding grades. The structures will then be built according to the attached architectural plans. Finally, the landscaping will be restored, with all disturbed areas will be covered with a minimum of 6” of topsoil and planted with the specified seed mix and native plants per the landscape design plan.

WAIVER REQUEST

A waiver is required from Section 3.02.B.1 to allow for the bottom of the foundation slab within two-feet of estimated seasonal high groundwater. A waiver is also requested, to the extent required, for the conversion of an existing porch structure into interior space on a slab foundation within the 50-foot buffer zone. No work is proposed outside of areas which are not currently landscaped and maintained. Disturbed areas will be covered with topsoil and then be restored with Cape Cod Special Grass Seed Mix. Waivers from the By-law can be granted for a number of reasons including:

> **Chapter 1.03 F.3.a** *The Commission may grant a waiver from these regulations when the Commission finds that given existing conditions, the proposed project will not adversely impact the interests identified in the Bylaw and there are no reasonable conditions or alternatives that would allow that project to proceed in compliance with the regulations.*

The additions to the existing structures were designed so as to remain outside of the 50-foot buffer zone. However, there is no alternative location for the supporting footings at a greater distance than two-feet from estimated seasonal high groundwater. Alternatives were considered and, the foundation design was modified and engineered so as to be as shallow as possible. The bottom of the structural slab will be above the groundwater level, and as such will not have any adverse impact to the interests protected in the resource areas by the Commission.

CONCLUSION

The proposed project will not result in an adverse impact on the areas or the interests protected by the Commission including public and private water supply, groundwater, flood control, erosion control, storm damage prevention, water pollution, fisheries, shellfish, wildlife, scenic views, and recreation.

I plan to attend the Public Hearings for this application to address any questions, comments or concerns that the Commission may have.

Sincerely,

Arthur D. Gasbarro, PE, PLS

Cc: MassDEP
Croquet Pitch, LLC

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

WPA Form 3 – Notice of Intent

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40
And the Town of Nantucket Wetlands Bylaw Chapter 136

Provided by MassDEP:

MassDEP File Number

Document Transaction Number

NANTUCKET
City/Town

A. General Information

1. Project Location (**Note:** electronic filers will click on button to locate project site):

24 Westchester St	Nantucket	02554
a. Street Address	b. City/Town	c. Zip Code

Latitude and Longitude:

41d 17' 10"N	70d 06' 16"W
d. Latitude	e. Longitude

42.4.3	57
f. Assessors Map/Plat Number	g. Parcel /Lot Number

2. Applicant:

a. First Name
b. Last Name

Croquet Pitch LLC
c. Organization

1111 Pennsylvania Dr, NW
d. Street Address

Washington	DC	20016
e. City/Town	f. State	g. Zip Code

h. Phone Number
i. Fax Number
j. Email Address

3. Property owner (required if different from applicant): ☐ Check if more than one owner

a. First Name
b. Last Name

c. Organization

d. Street Address

e. City/Town
f. State
g. Zip Code

h. Phone Number
i. Fax Number
j. Email address

4. Representative (if any):

Arthur D.	Gasbarro, PE, PLS
a. First Name	b. Name

Nantucket Engineering & Survey, P.C.
c. Company

20 Mary Ann Drive
d. Street Address

Nantucket	MA	02554
e. City/Town	f. State	g. Zip Code

508-825-5053		art@nantucketengineer.com
h. Phone Number	i. Fax Number	j. Email address

5. Total WPA Fee Paid (from NOI Wetland Fee Transmittal Form):

$110 + $25 + $200	$42.50	$67.50 + $25 + $200
a. Total Fee Paid	b. State Fee Paid	c. City/Town Fee Paid

A. General Information (continued)

6. General Project Description:

The Applicant proposes to construct additions to an existing structure within landscaped areas of the buffer zone to a Vegetated Wetland on a developed residential-use lot. Please refer to the Site Plan for additional information.

7a. Project Type Checklist:

1. ☒ Single Family Home
2. ☐ Residential Subdivision
3. ☐ Limited Project Driveway Crossing
4. ☐ Commercial/Industrial
5. ☐ Dock/Pier
6. ☐ Utilities
7. ☐ Coastal Engineering Structure
8. ☐ Agriculture (e.g., cranberries, forestry)
9. ☐ Transportation
10. ☐ Other

7b. Is any portion of the proposed activity eligible to be treated as a limited project subject to 310 CMR 10.24 (coastal) or 310 CMR 10.53 (inland)?

1. ☐ Yes ☒ No If yes, describe which limited project applies to this project:

2. Limited Project

8. Property recorded at the Registry of Deeds for:

NANTUCKET	
a. County	b. Certificate # (if registered land)
952	13
c. Book	d. Page Number

B. Buffer Zone & Resource Area Impacts (temporary & permanent)

1. ☒ Buffer Zone Only – Check if the project is located only in the Buffer Zone of a Bordering Vegetated Wetland, Inland Bank, or Coastal Resource Area.
2. ☐ Inland Resource Areas (see 310 CMR 10.54-10.58; if not applicable, go to Section B.3, Coastal Resource Areas).

Check all that apply below. Attach narrative and any supporting documentation describing how the project will meet all performance standards for each of the resource areas altered, including standards requiring consideration of alternative project design or location.

For all projects affecting other Resource Areas, please attach a narrative explaining how the resource area was delineated.

Resource Area	Size of Proposed Alteration	Proposed Replacement (if any)
a. ☐ Bank	1. linear feet	2. linear feet
b. ☐ Bordering Vegetated Wetland	1. square feet	2. square feet
c. ☐ Land Under Waterbodies and Waterways	1. square feet	2. square feet
	3. cubic yards dredged	

QUITCLAIM DEED

I, PAUL A. ZEVNIK, of 2930 44th Street, NW, Washington, DC 20016, for non-monetary consideration paid as a transfer in exchange for an interest in the grantee, grant to CROQUET PITCH, L.L.C., a Delaware Limited Liability Company registered with the Commonwealth of Massachusetts, with a mailing address of 2930 44th Street, NW, Washington, DC 20016, with QUITCLAIM COVENANTS,

That certain parcel of land, together with the buildings and improvements erected thereon, situated in the Town and County of Nantucket, Commonwealth of Massachusetts, now known and numbered as 24 West Chester Street, bounded and described as follows:

NORTHERLY	by	West Chester Street, fifty-eight and 34/100 (58.34) feet;
EASTERLY	by	Lot 7 on plan hereinafter referred to, one hundred sixty-seven and 91/100 (167.91) feet;
NORTHERLY	by	said Lot 7 and by Lot 5 on said plan, and by land now or formerly of Trudy Howard, one hundred nineteen and 83/100 (119.83) feet;
EASTERLY SOUTHEASTERLY and EASTERLY	by	lands now or formerly of Shaun J. Ruddy and Millicent K. Ruddy, and Jane Magee Murkland, on three corners, two hundred twenty-nine and 69/100 (229.69) feet;
SOUTHERLY	by	land now or formerly of Robert B. Blair and Erna Blair, one hundred seventy-one and 44/100 (171.44) feet;
WESTERLY	by	land now or formerly of Peter Lowenstein and Susan Lowenstein, three hundred thirty-eight and 92/100 (338.92) feet.

Said land is shown on Lot 2 on plan dated October 16, 1984, and recorded with the Nantucket Registry of Deeds in Plan File 15-E.

The property is conveyed SUBJECT TO the mortgage from Paul A. Zevnik to Chevy Chase Bank, F.S.B., in the original face amount of $3,200,000.00, dated March 18, 2005 and recorded with the Nantucket Registry of Deeds at Book 946, Page 76.

For title reference, see deed recorded with the Nantucket Registry of Deeds at Book 946, Page 73.

WITNESS my hand and seal this 11th day of April, 2005..

PAUL A. ZEVNIK

~~STATE OF~~ Washington, D.C.
~~County of~~ _____, ss.

On this 11th day of April, 2005, before me, the undersigned notary public, personally appeared the above-named Paul A. Zevnik (a) personally known to me or (b) proved to me through satisfactory evidence of identification, which was Paul A. Zevnik, to be the person whose name is signed on the foregoing instrument, and acknowledged to me that he signed it voluntarily, for its stated purpose.

Notary Public
Printed Name: JoAnn Mimms
My Commission Expires:

JO ANN MIMMS
Notary Public, District Of Columbia
My Commission Expires November 30, 2006

NANTUCKET LAND BANK CERTIFICATE
☐ Paid $
☑ Exempt d, i
☐ Non-applicable
25657 4/22/05
No. Date
Authorization KH

Nantucket County Received & Entered
Date: APR 22 2005 Time: 2:52
Attest: Joanne L. Kelley Register of Deeds

End of Instrument

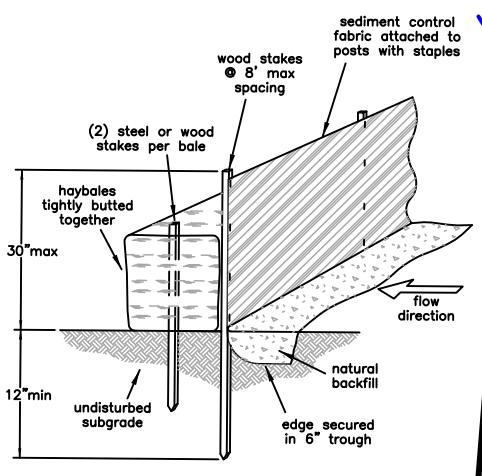
CURRENT ZONING CLASSIFICATION:
RESIDENTIAL OLD HISTORIC (ROH)

MINIMUM LOT SIZE: 5,000 S.F.
MINIMUM FRONTAGE: 50 FT.
FRONT YARD SETBACK: 0 FT.
REAR/SIDE SETBACK: 5 FT.
GROUND COVER % : 50%

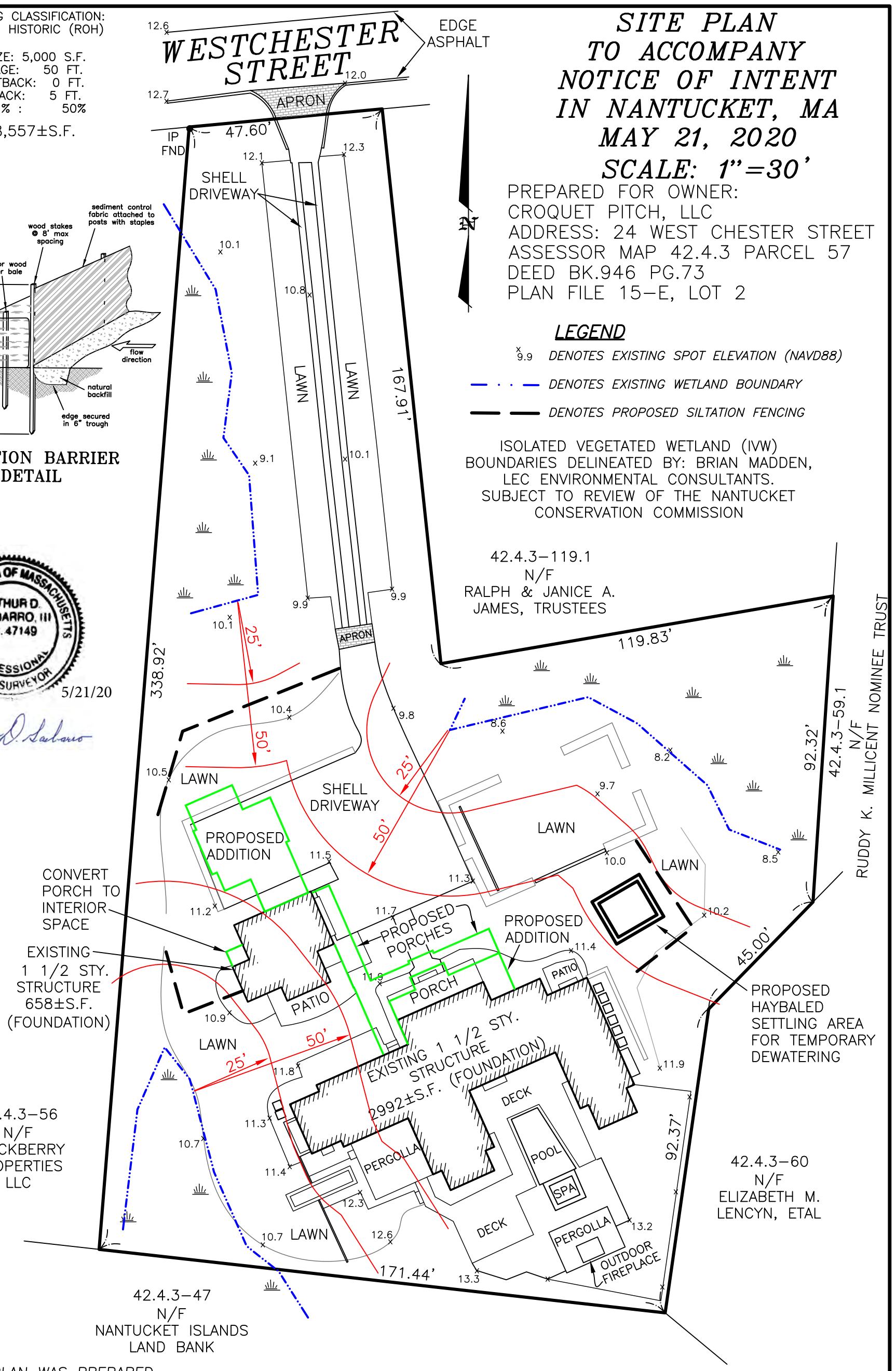
LOT AREA=48,557±S.F.

SITE PLAN TO ACCOMPANY NOTICE OF INTENT IN NANTUCKET, MA MAY 21, 2020 SCALE: 1"=30'

PREPARED FOR OWNER:
CROQUET PITCH, LLC
ADDRESS: 24 WEST CHESTER STREET
ASSESSOR MAP 42.4.3 PARCEL 57
DEED BK.946 PG.73
PLAN FILE 15-E, LOT 2



SILTATION BARRIER DETAIL



COMMONWEALTH OF MASSACHUSETTS
ARTHUR D. GASBARRO, III
No. 47149
PROFESSIONAL LAND SURVEYOR

5/21/20

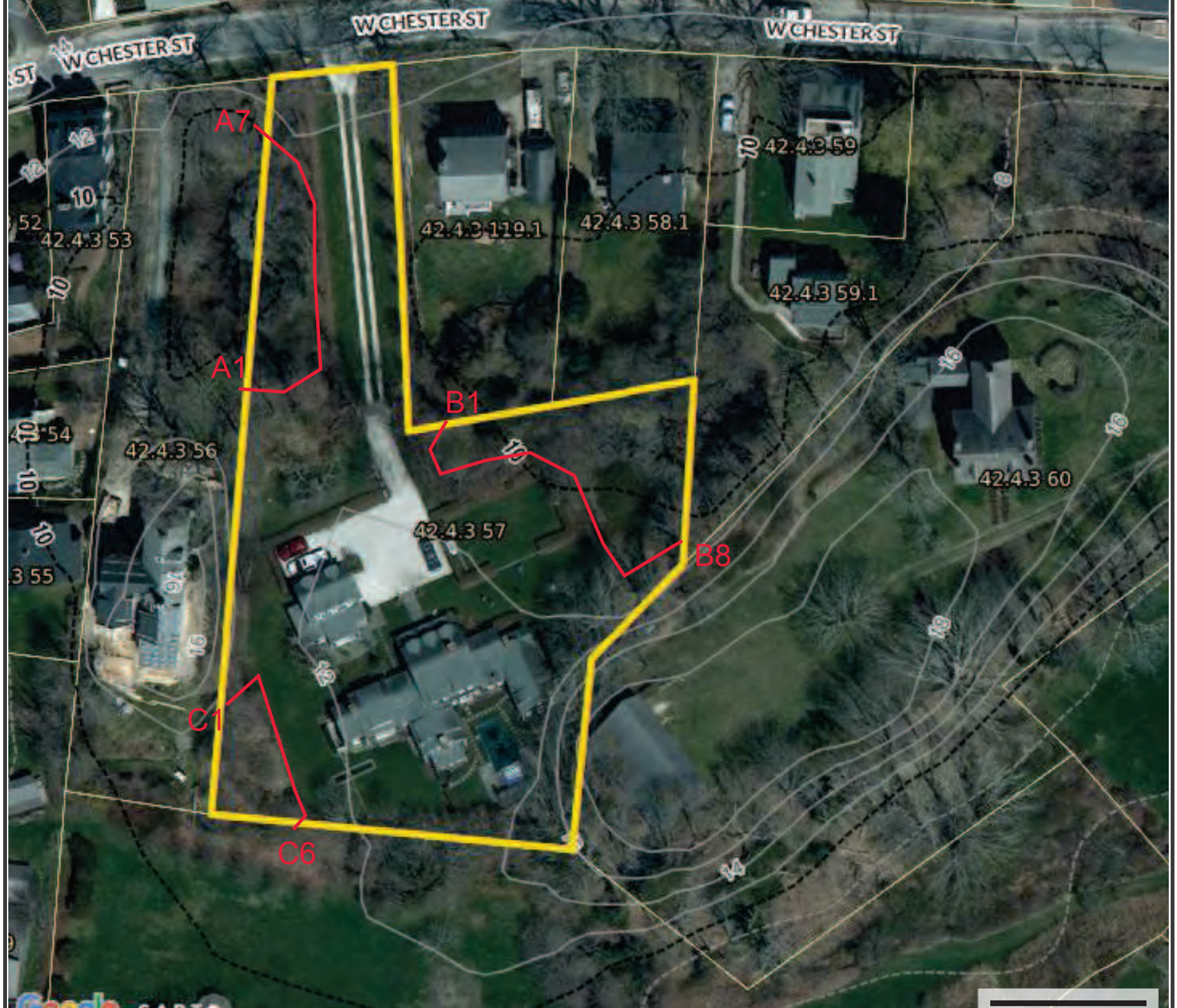
Arthur D. Gasbarro

THIS PLOT PLAN WAS PREPARED FOR PERMITTING PURPOSES ONLY.
IT SHOULD NOT BE CONSIDERED A PROPERTY LINE SURVEY. THIS PLAN SHOULD NOT BE USED TO ESTABLISH PROPERTY LINES, FENCES, HEDGES OR ANY ANCILLARY STRUCTURES ON THE PREMISES.
THE PROPERTY LINES SHOWN RELY ON CURRENT DEEDS AND PLANS OF RECORD.
THIS PLOT PLAN IS NOT A CERTIFICATION AS TO TITLE OR OWNERSHIP OF THE PROPERTY SHOWN.
OWNERS OF ADJOINING PROPERTIES ARE SHOWN ACCORDING TO CURRENT ASSESOR RECORDS.
LAYOUT SHOWN HEREON FROM PLANS BY EMERITUS, & DOES NOT IMPLY CONFORMANCE WITH ZONING BYLAWS.

LOCUS PARTIALLY FALLS WITHIN FLOOD HAZARD ZONE "X" (0.2% ANNUAL CHANCE FLOOD) AS SHOWN ON FEMA MAP NO. 25019C0086-G DATED 06/09/14.

GRAPHIC SCALE
30 0 15 30
(IN FEET)
1 inch = 30 ft.

NANTUCKET ENGINEERING & SURVEY, PC
20 Mary Ann Drive Nantucket, MA 02554
NantucketEngineer.com 508-825-5053


W CHESTER ST
W CHESTER ST
W CHESTER ST
A7
A1
B1
B8
C1
C6
42.4.3 53
42.4.3 119.1
42.4.3 58.1
42.4.3 59
42.4.3 59.1
42.4.3 56
42.4.3 57
42.4.3 60

Guest House

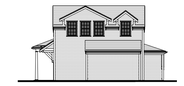
24 West Chester Str
Nantucket, MA 02554

04. 28 .20

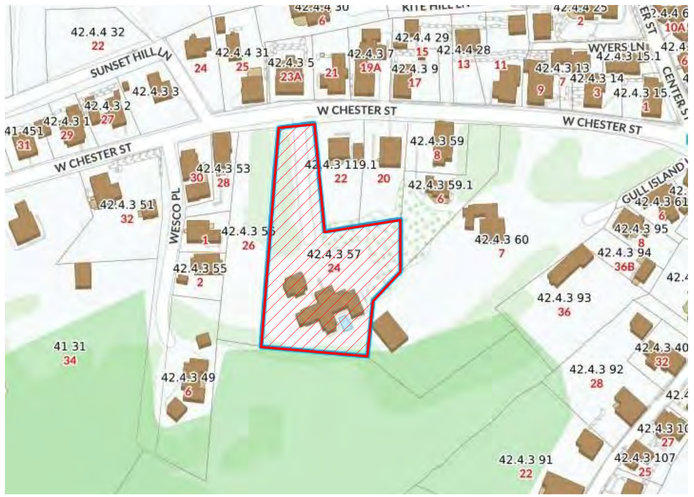
East

South

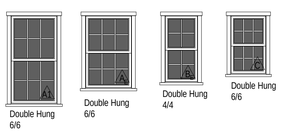
West



North



1 Locus Map
12" = 1'-0"

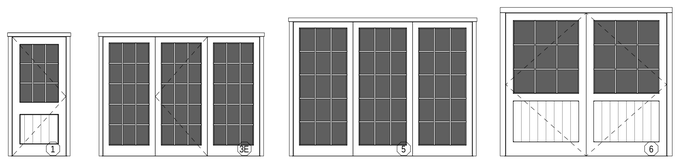


Double Hung 6/6 | Double Hung 6/6 | Double Hung 4/4 | Double Hung 6/6

2 Window Legend
1/4" = 1'-0"

WINDOW SCHEDULE				
WINDOW	QUANTITY	UNIT WIDTH	UNIT HEIGHT	DP RATING
A	16	2'-9 1/4"	4'-1 1/2"	≥ 30
A1	2	2'-9 1/4"	5'-0"	≥ 30
C	3	2'-2"	3'-4"	≥ 30

WINDOW & DOOR NOTES
1. Impact Resistant Glazing Required or Plywood Cutouts Meeting The Requirements Specified in IRC 2015 R301.2.1.2 "Protection of Openings"
2. Windows w/ DP Rating of 30 or Greater Required
3. Contractor to Confirm New Windows & Doors Match Existing Rough Openings Prior to Placing Order
4. Refer To Plan For Tempered Glass Locations; Contrator To Verify Tempered Windows Are Provided Where Required
5. Contractor Shall Install Self Adhesive Flexible Window Flashing by Grace or Equal
6. General Contractor to Verify All Egress Windows Have @ Least 20"x24" Clear Opening & Are In Accordance w/ Massachusetts Minimum Egress Requirements
7. General Contractor To Verify Window & Door Order Matches Or Exceeds Required Energy Ratings Per ResCheck Calculation
8. Contractor Shall Provide Architect w/ Window & Door Quote For Quantity & Type Verification Prior To Order
9. Contractor To Verify All Window & Door Colors As Quoted Match The Latest HDC Approval Prior To Order
10. The Unit Measurements Given In this Document Are For A Guide Only
11. Due To Slight Discrepancies & Changes In Manufacturing, Contractors Must Verify Rough Opening Dimensions Of All Windows & Doors w/ Manufacturer Prior Framing

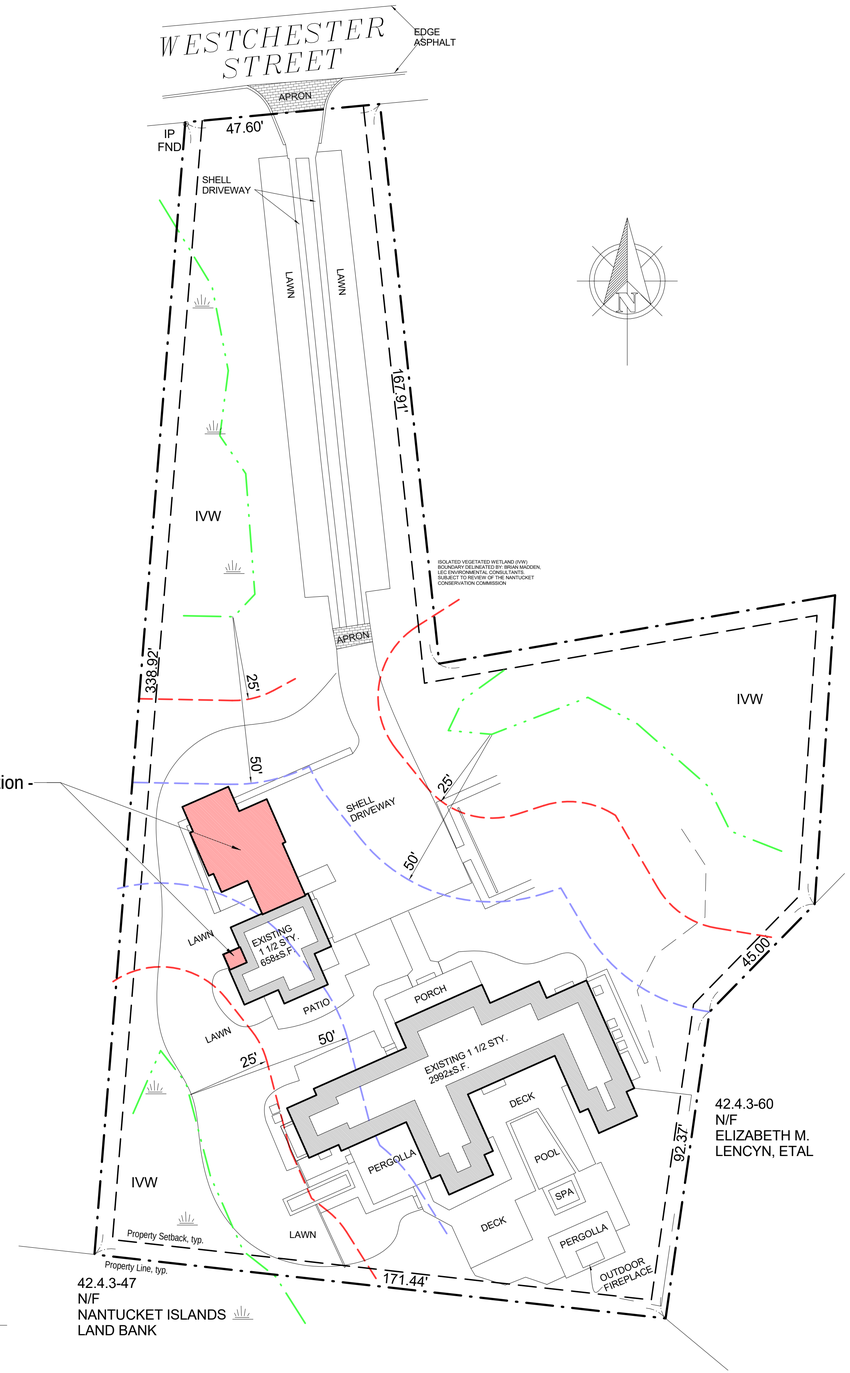


Single Door / Existing 1 Panel w/ 9 lite | Triple French Door 15 Lite | Triple French Door 15 Lite | Garage Door / NEW 1 panel w/ 9 Lite

3 Door Legend
1/4" = 1'-0"

EXTERIOR DOOR SCHEDULE				
DOOR	QUANTITY	UNIT WIDTH	UNIT HEIGHT	DP RATING
1	1	3'-0"	6'-8"	≥ 30
3E	1	8'-9"	6'-8"	≥ 30
5	1	10'-0"	7'-6"	≥ 30
6	1	9'-0"	8'-0"	≥ 30

DESIGN PROGRESS



4 Site Plan
3/64" = 1'-0"

2002

Guest House

24 West Chester Str
Nantucket, MA 02554

emeritus
8 Williams Lane Nantucket, MA 02554
P: 508.325.4995
F: 508.325.6980
www.emeritusdevelopment.com

Cover Sheet

Site Information

Map & Parcel:	42.4.3 / 57
Current Zoning:	ROH
Minimum Frontage:	50 ft
Front Setback:	0 ft
Side/Rear Setback:	5 ft
Lot Size:	48,557 sq.ft.
Min. Lot Size:	5, 000 sq.ft.
Allowable G.C.:	40%
Existing G.C.:	+/- 658 sq.ft.
Proposed G.C.:	_____ sq.ft.
Total Proposed G.C.:	_____ sq.ft.

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SHEET INDEX

G.1.1 Cover Sheet
A.1.1 Floor Plans
A.2.1 Exterior Elevations
S.0.1 Foundation & Roof Plan
S.0.2 Building Sections

Revisions

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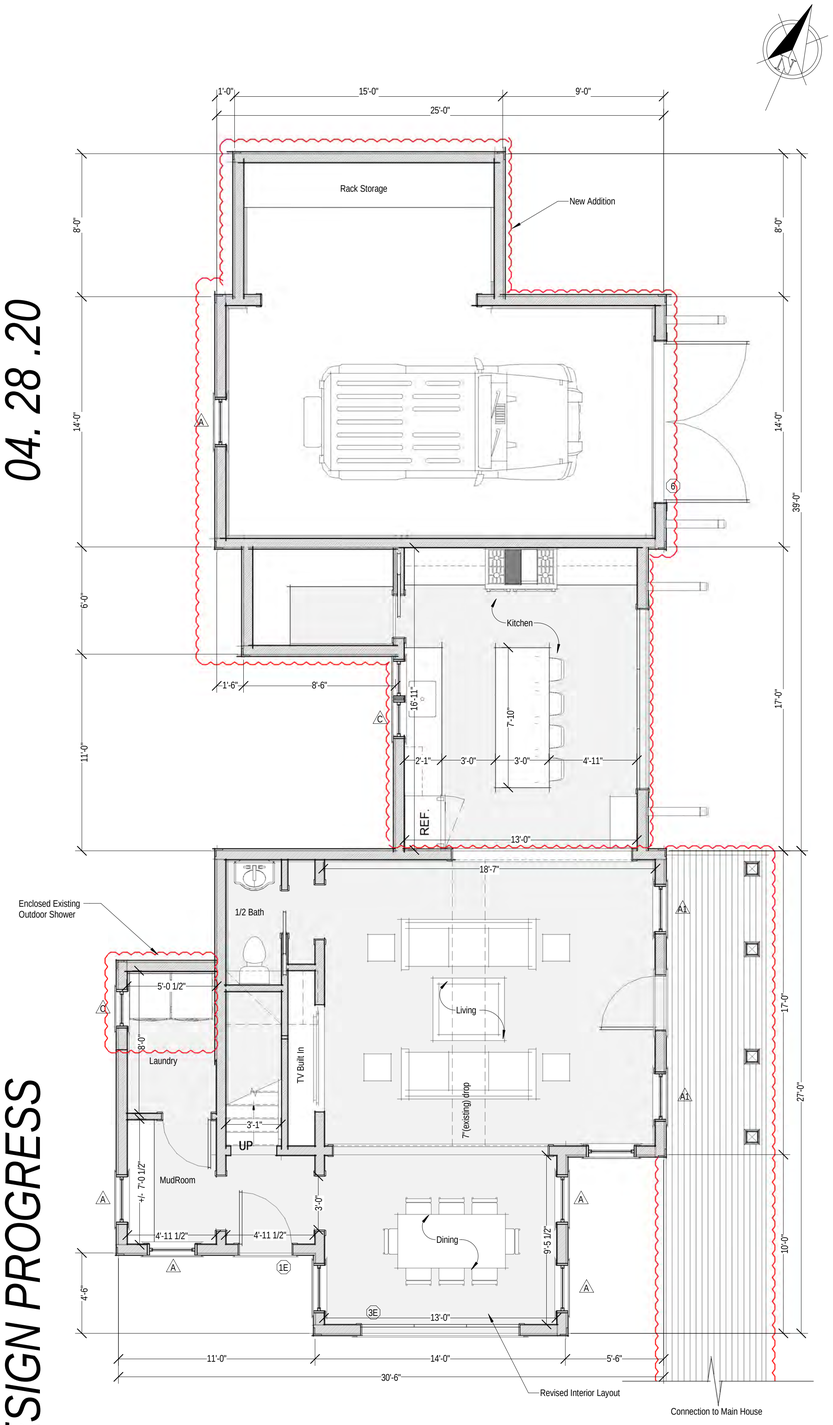
G.1.1

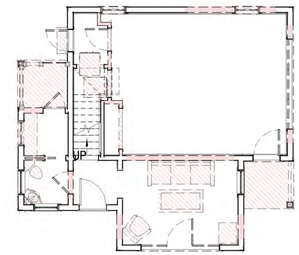
2002

04. 28 .20

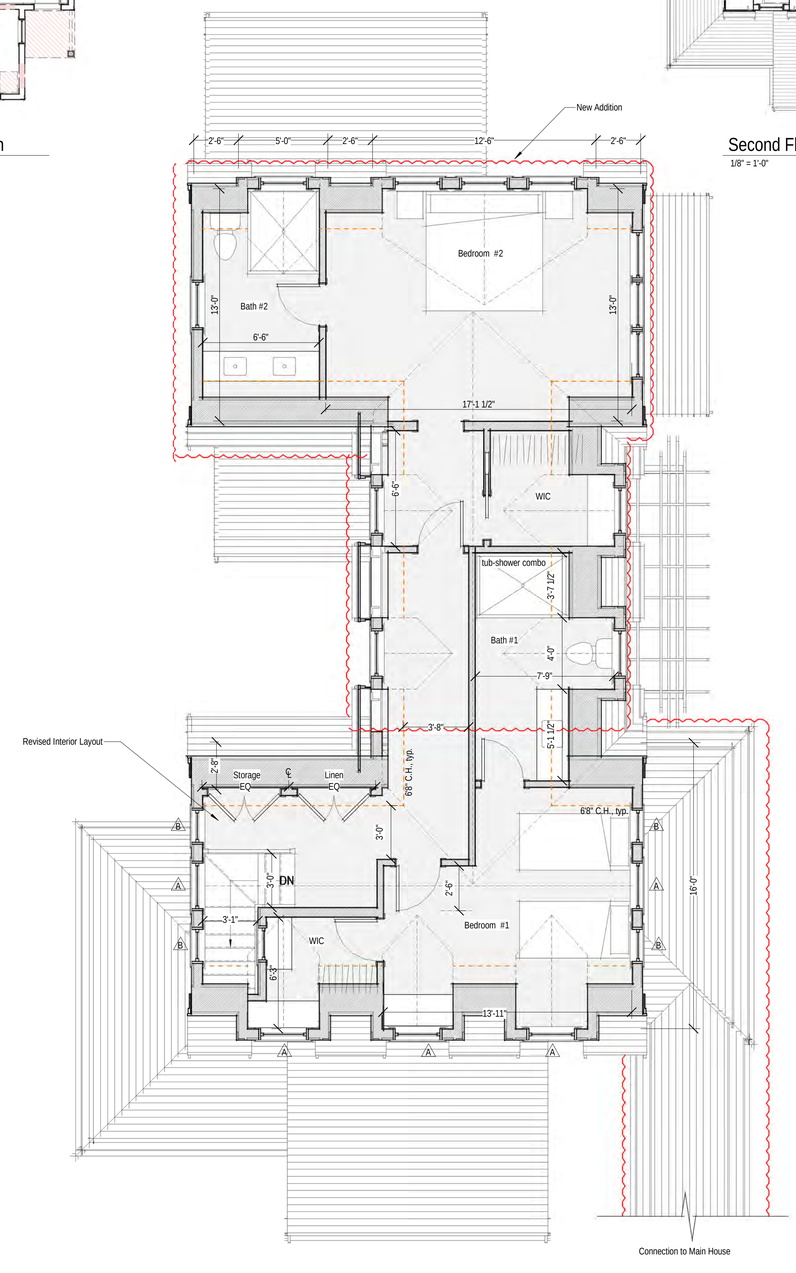
DESIGN PROGRESS



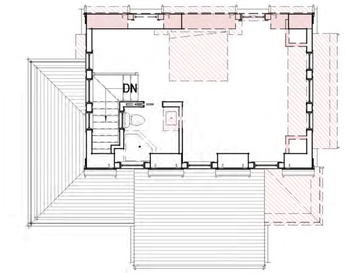
1 First Floor
1/4" = 1'-0"



First Floor - Demo Plan
1/8" = 1'-0"



2 Second Floor
1/4" = 1'-0"



Second Floor - Demo Plan
1/8" = 1'-0"

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Guest House

24 West Chester Str
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emeritus

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P: 508.325.4995
F: 508.325.6980
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Floor Plans

Site Information

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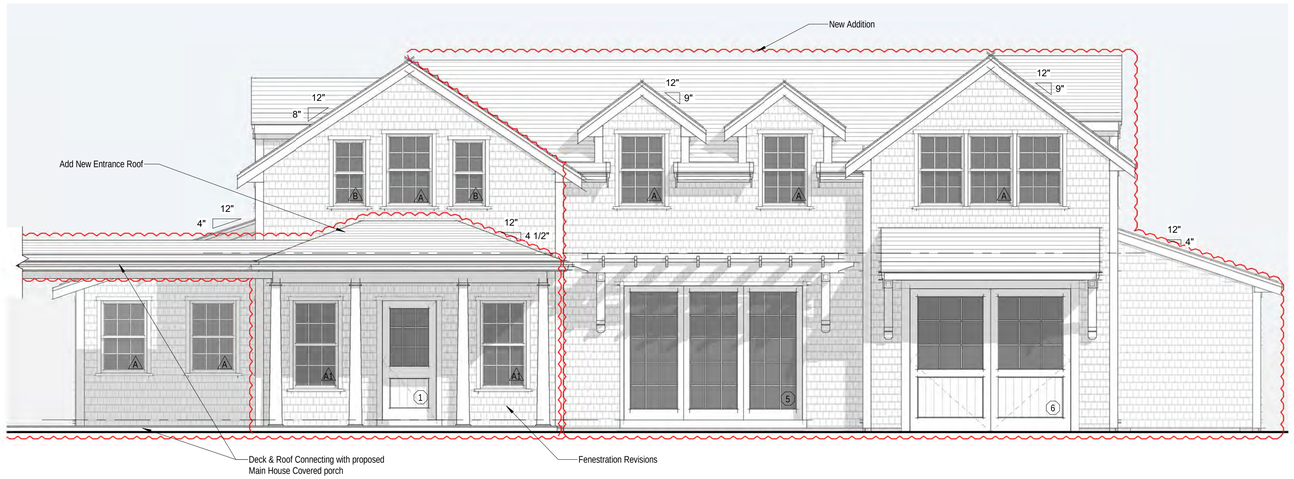
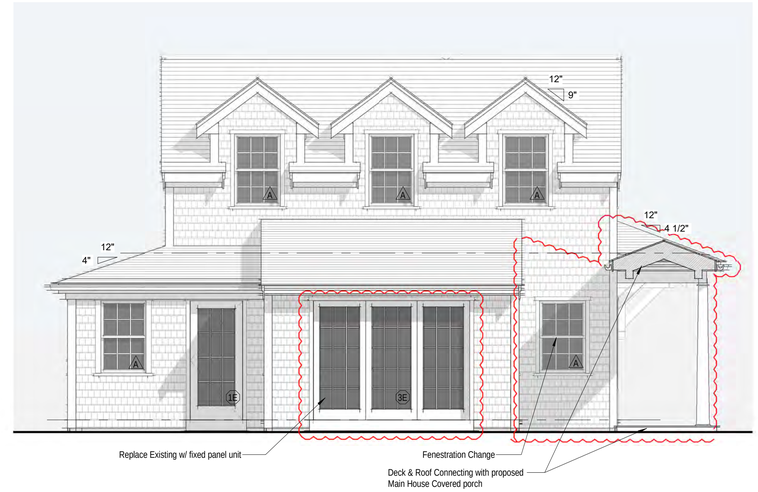
A.1.1

2002

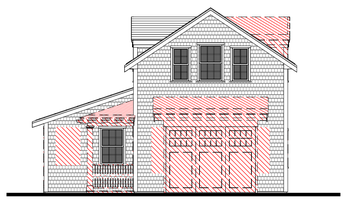
04. 28 .20



1 East Elevation
1/4" = 1'-0"

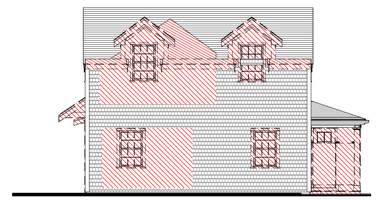


2 South Elevation
1/4" = 1'-0"

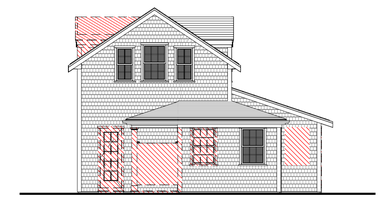


East Elevation - Existing & Demo
1/8" = 1'-0"

South Elevation - Existing & Demo
1/8" = 1'-0"

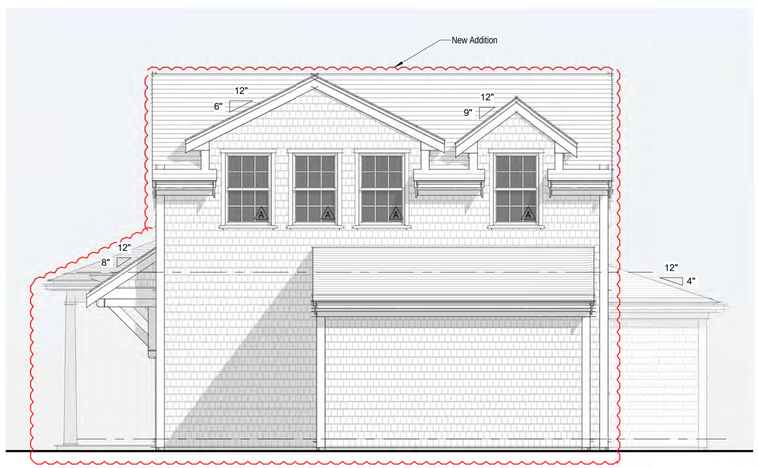


North Elevation - Existing & Demo
1/8" = 1'-0"

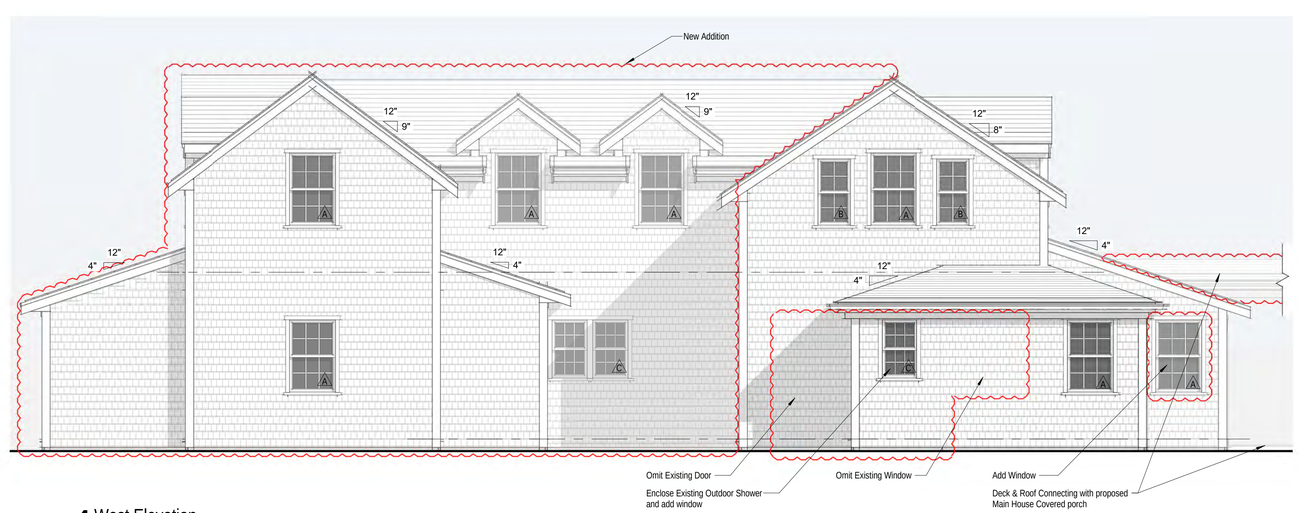


West Elevation - Existing & Demo
1/8" = 1'-0"

DESIGN PROGRESS



3 North Elevation
1/4" = 1'-0"



4 West Elevation
1/4" = 1'-0"

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Guest House

24 West Chester Str
Nantucket, MA 02554

emeritus

8 Williams Lane Nantucket, MA
02554
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www.emeritusdevelopment.com

Exterior Elevations

Site Information

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Current Zoning:	ROH
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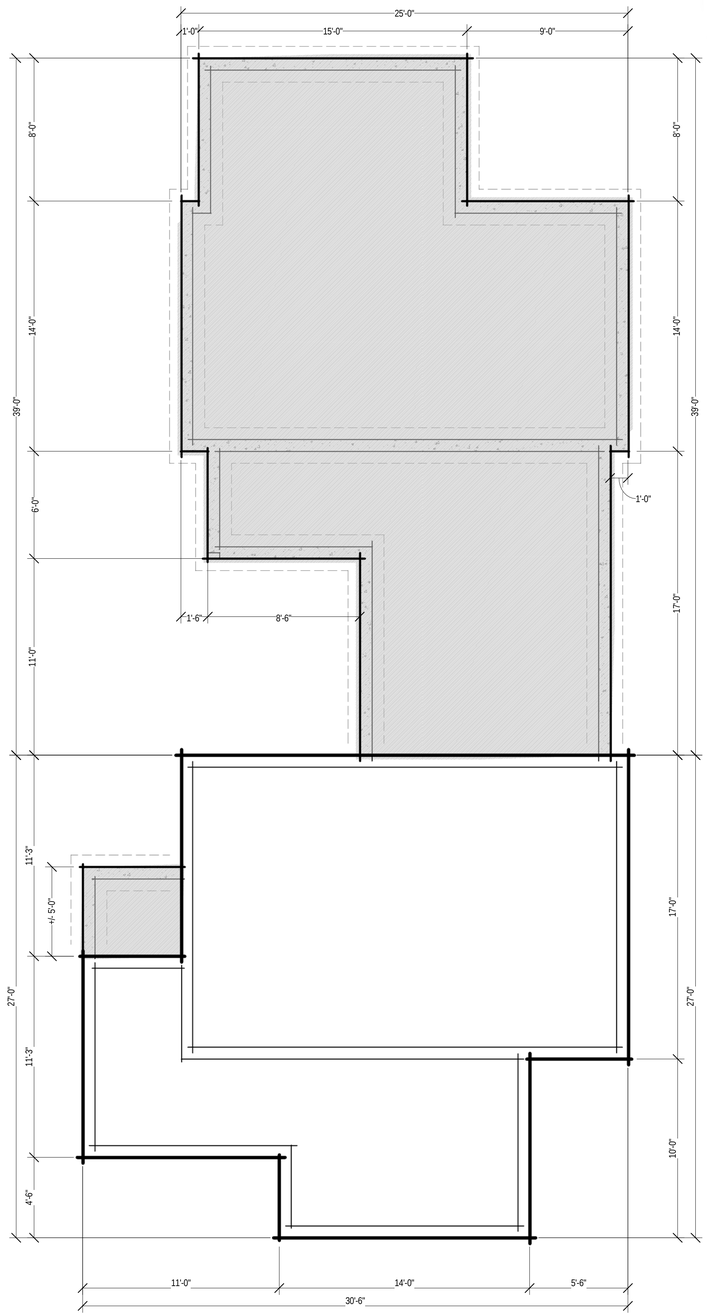
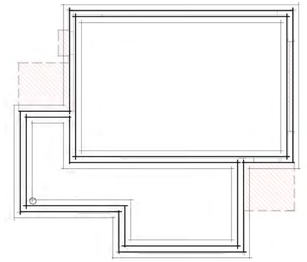
A.2.1
2002

04. 28 .20

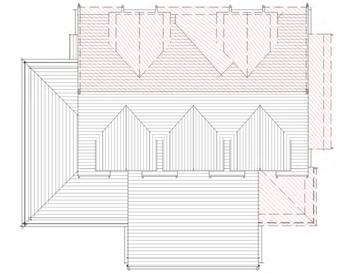
DESIGN PROGRESS



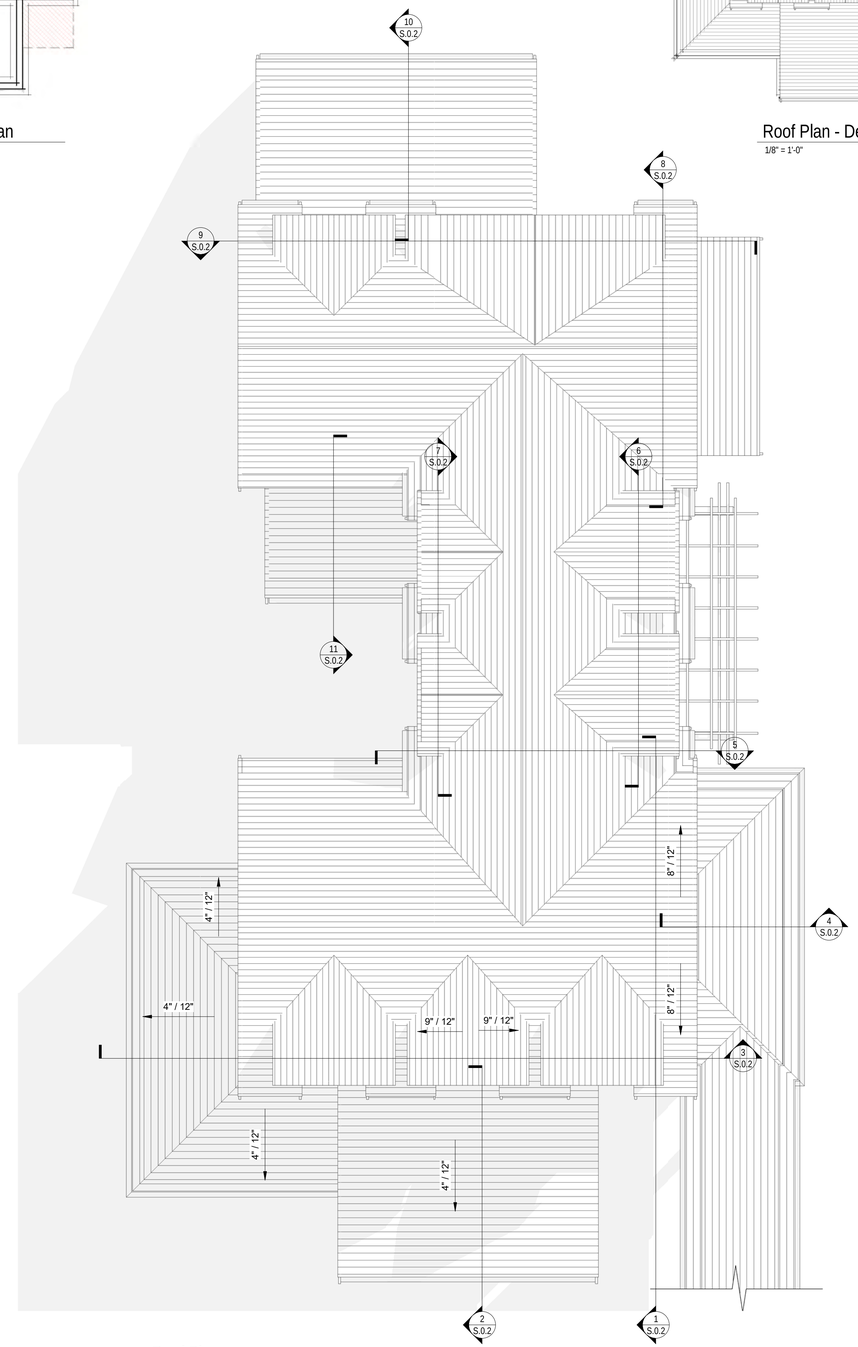
0 Foundation Plan
1/4" = 1'-0"



Foundation Plan- Demo Plan
1/8" = 1'-0"



Roof Plan - Demo Plan
1/8" = 1'-0"



1 Roof Plan
1/4" = 1'-0"

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emeritus

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Foundation & Roof Plan

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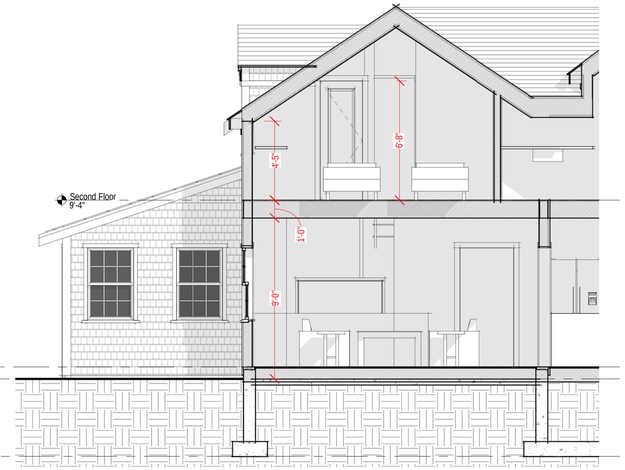
S.0.1

2002

04.28.20

DESIGN PROGRESS



1 Section A
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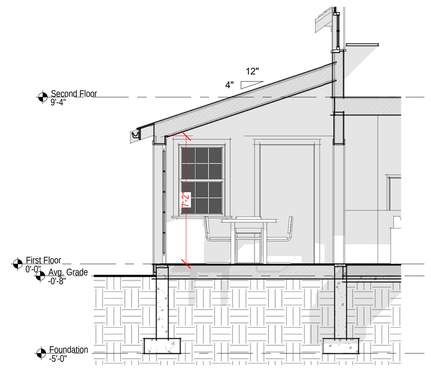
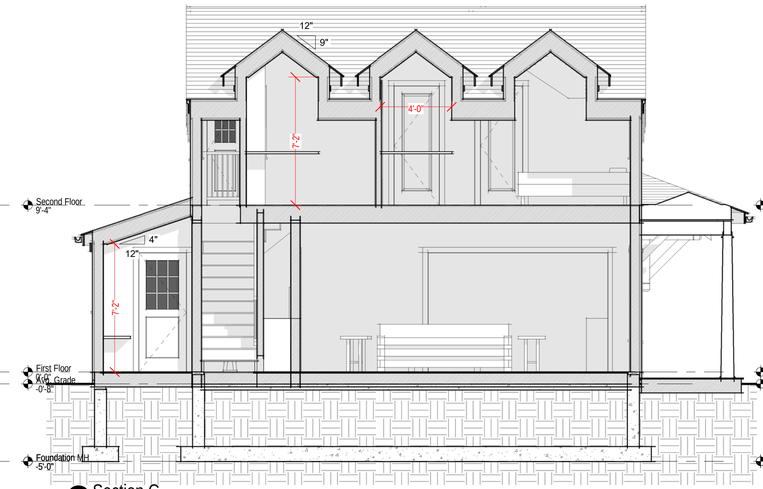
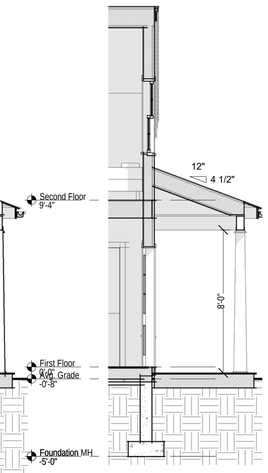


2 Section B
1/4" = 1'-0"



3 Section C
1/4" = 1'-0"



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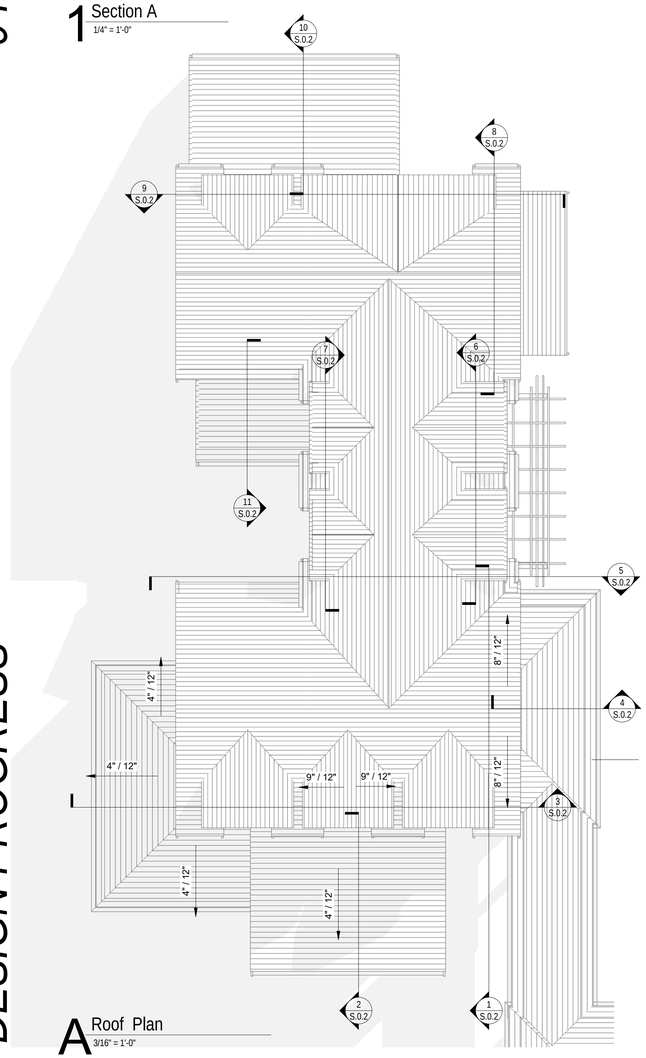
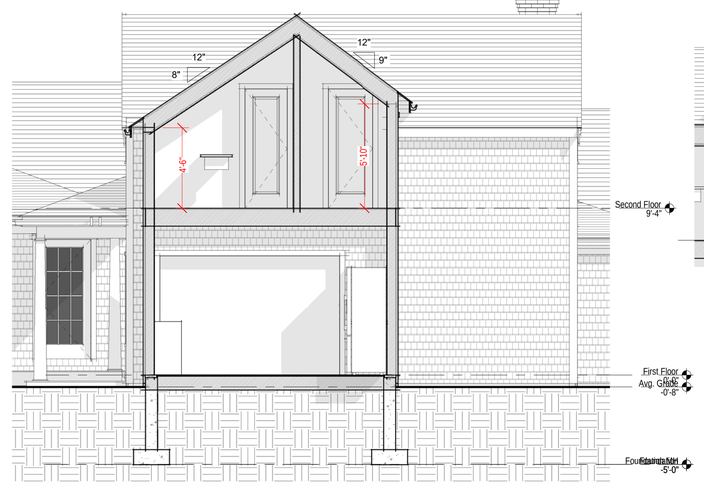


A Roof Plan
3/16" = 1'-0"



5 Addition Section A
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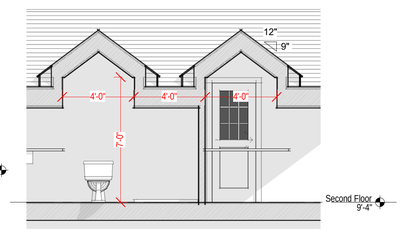

6 Addition Section B
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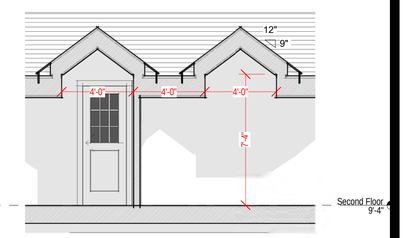

7 Addition Section B2
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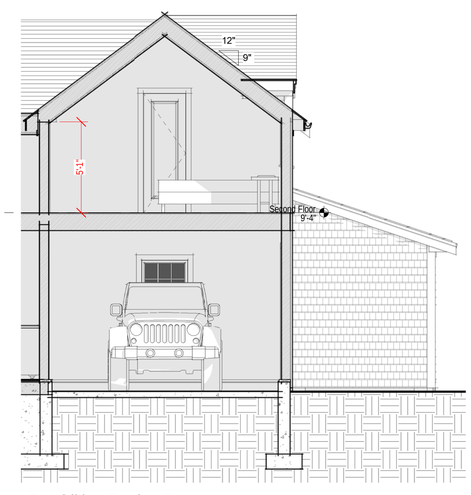
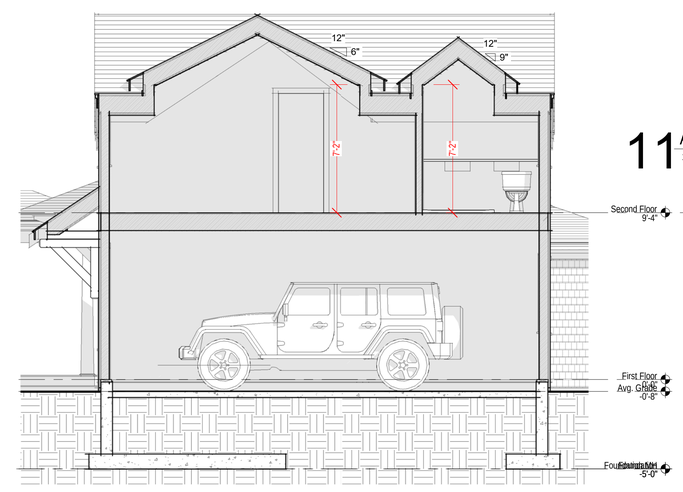


8 Addition Section C
1/4" = 1'-0"



9 Addition Section D
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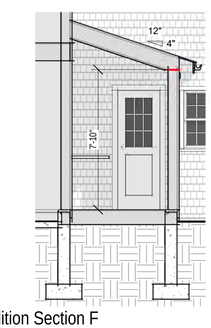
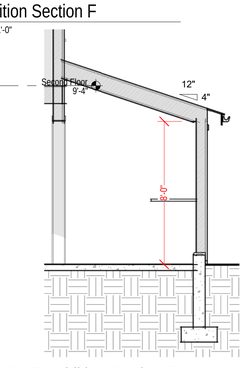


11 Addition Section F
1/4" = 1'-0"



10 Addition Section E
1/4" = 1'-0"

2002

Guest House

24 West Chester Str
Nantucket, MA 02554

emeritus

8 Williams Lane Nantucket, MA 02554
P: 508.325.4995
F: 508.325.6980
www.emeritusdevelopment.com

Building Sections

Site Information

Map & Parcel:	42.4.3 / 57
Current Zoning:	ROH
Minimum Frontage:	50 ft
Front Setback:	0 ft
Side/Rear Setback:	5 ft
Lot Size:	48,557 sq.ft.
Min. Lot Size:	5, 000 sq.ft.
Allowable G.C.:	40%
Existing G.C.:	+/- 658 sq.ft.
Proposed G.C.:	_____ sq.ft.
Total Proposed G.C.:	_____ sq.ft.

Information for this site plan was taken from the Nantucket G.I.S. This drawing does not constitute a registered survey. All site work should be verified by a Registered Land Surveyor prior to and during construction.

SHEET INDEX

G.1.1	Cover Sheet
A.1.1	Floor Plans
A.2.1	Exterior Elevations
S.0.1	Foundation & Roof Plan
S.0.2	Building Sections

Revisions

THESE DRAWINGS AND THE DESIGNS THEY ILLUSTRATE ARE THE SOLE PROPERTY OF EMERITUS DEVELOPMENT LTD. AND MAY NOT BE USED IN WHOLE OR IN PART WITHOUT WRITTEN AUTHORIZATION OF EMERITUS DEVELOPMENT LTD.

DRAWINGS THAT ARE NOT CLEARLY LABELED "FOR CONSTRUCTION" SHOULD NOT BE USED FOR CONSTRUCTION OR FOR PURCHASING, WITHOUT THE EXPRESS WRITTEN CONSENT OF THE PRINCIPAL OR THE DESIGNATED PROJECT MANAGER.

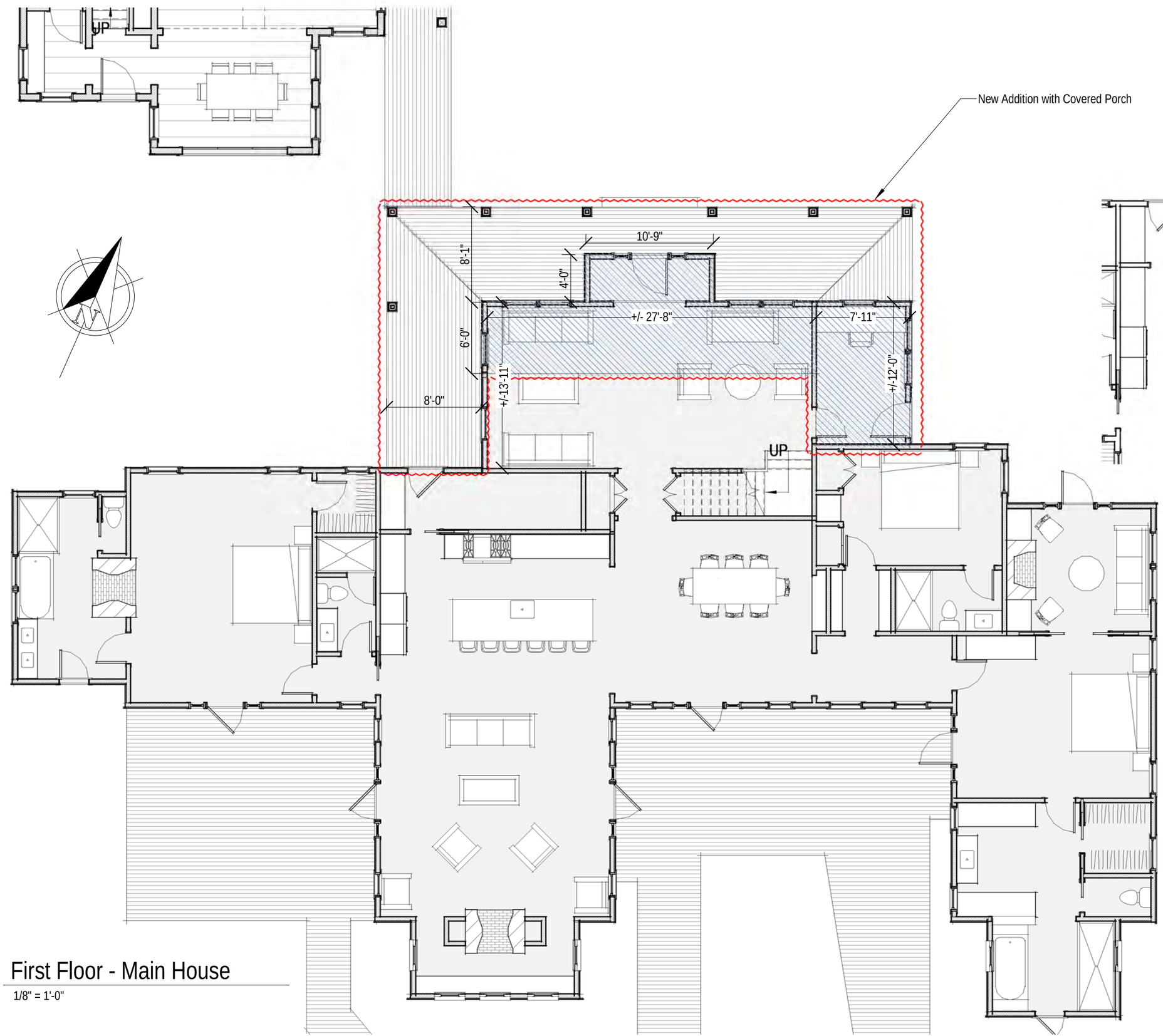
S.0.2

2002

Proposed - Site Plan

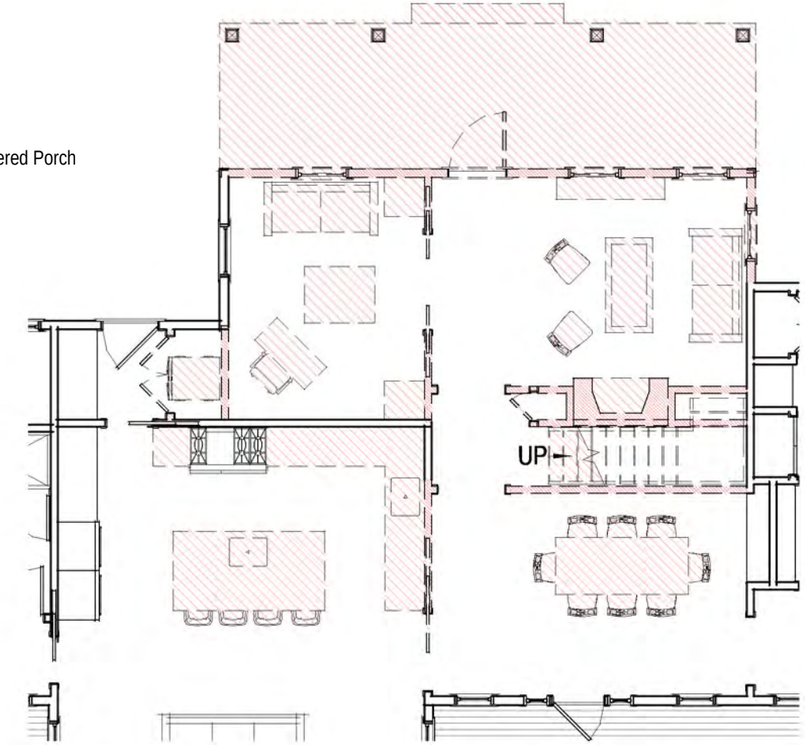
1/16" = 1'-0"

emeritus



First Floor - Main House

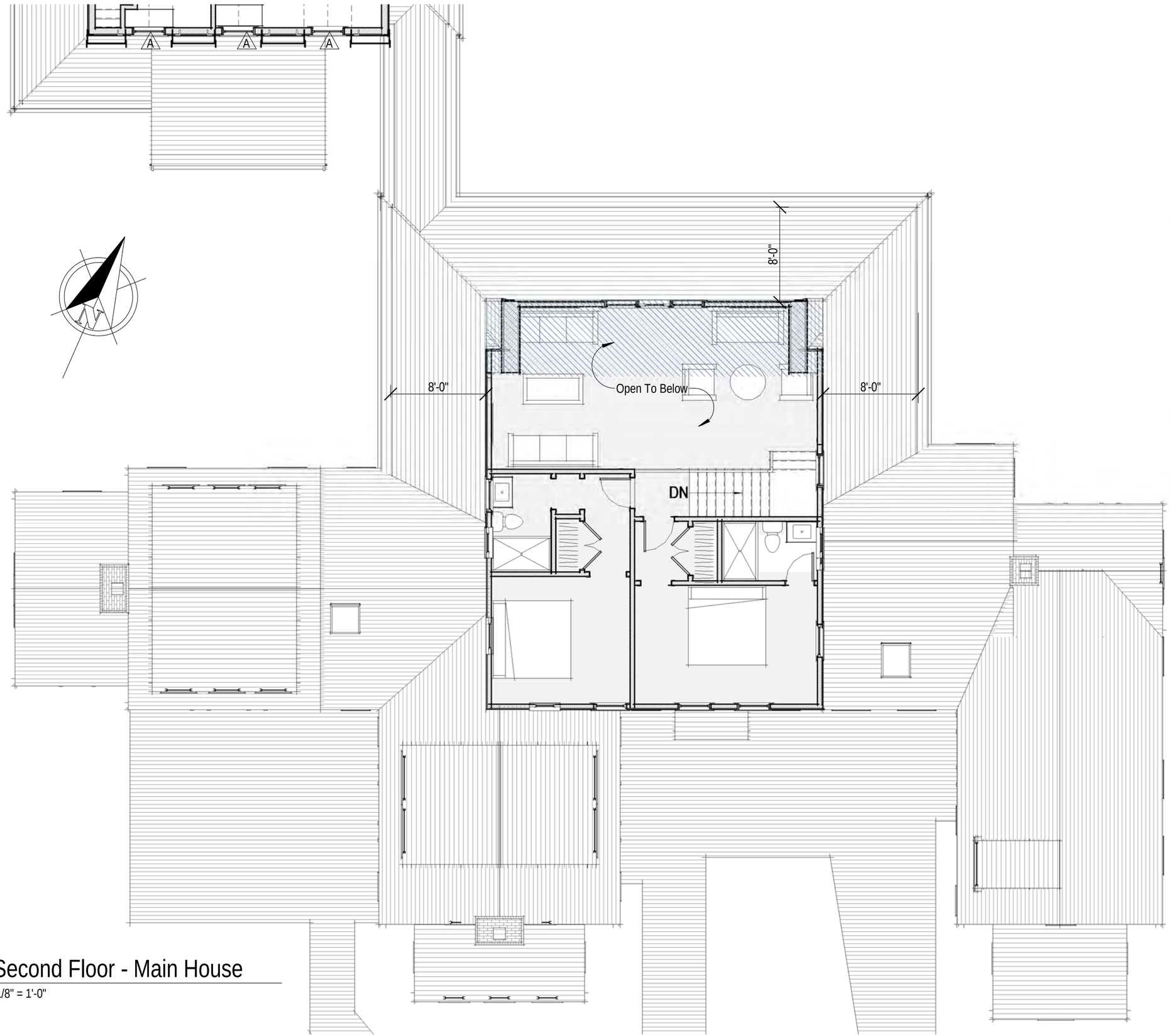
1/8" = 1'-0"



First Floor - Demo Plan - Main House

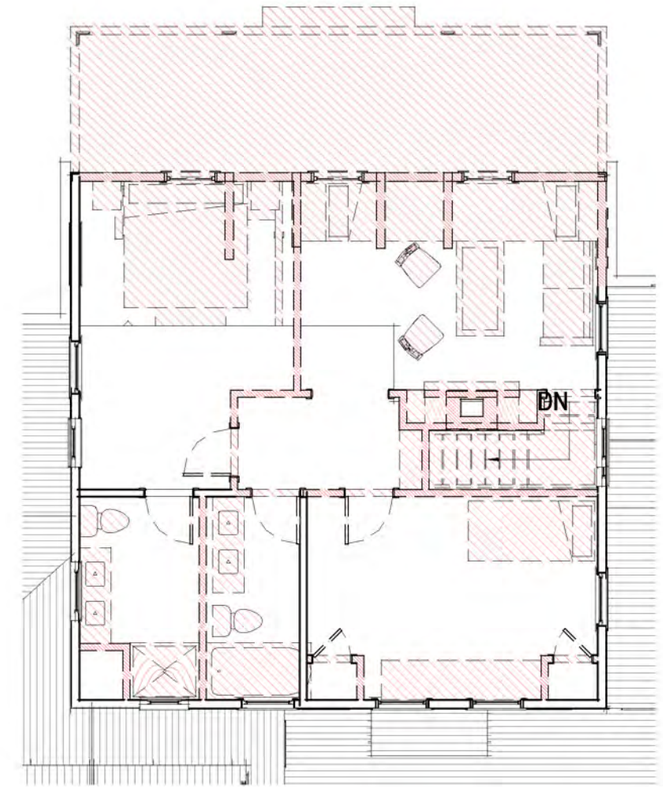
1/8" = 1'-0"

emeritus



Second Floor - Main House

1/8" = 1'-0"



Second Floor - Demo Plan - Main House

1/8" = 1'-0"

emeritus

North Elevation - Existing & Demo - Main House

1/8" = 1'-0"

Proposed North Elevation - Main House

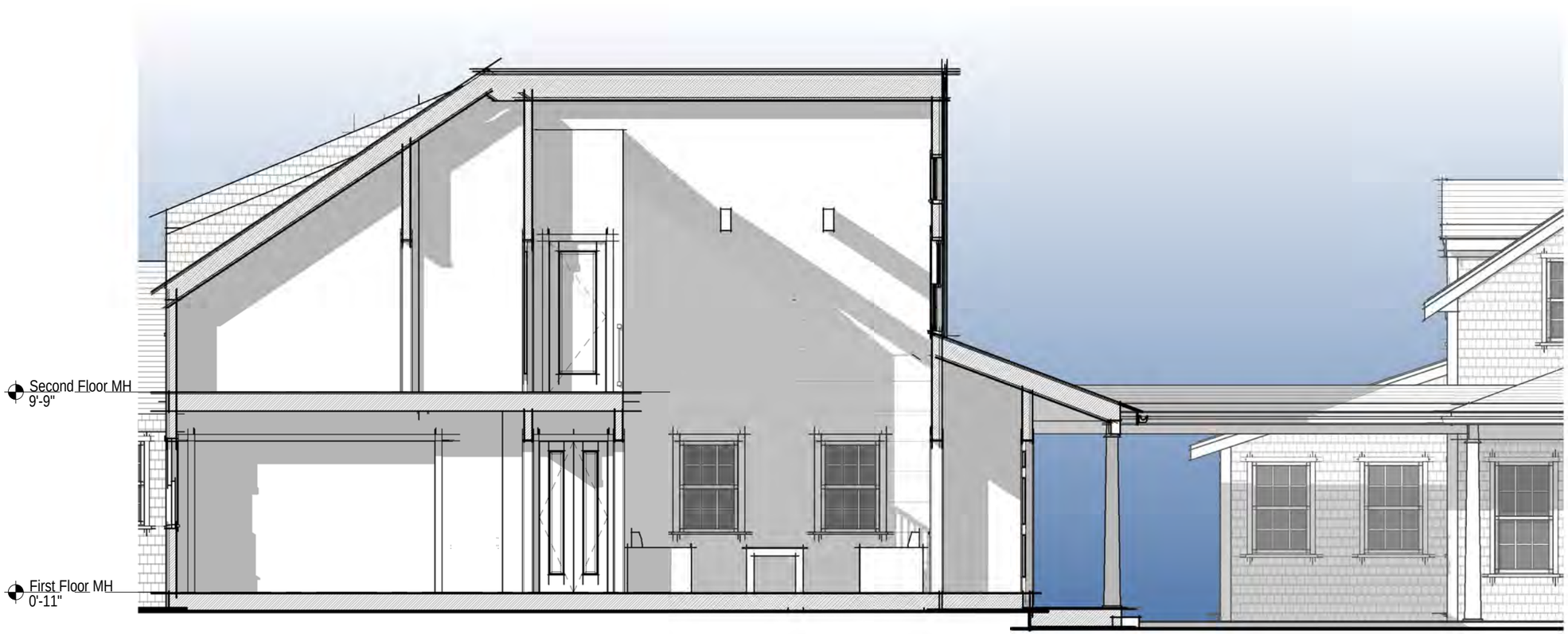
1/8" = 1'-0"

emeritus

North Elevation - Main House

3/16" = 1'-0"

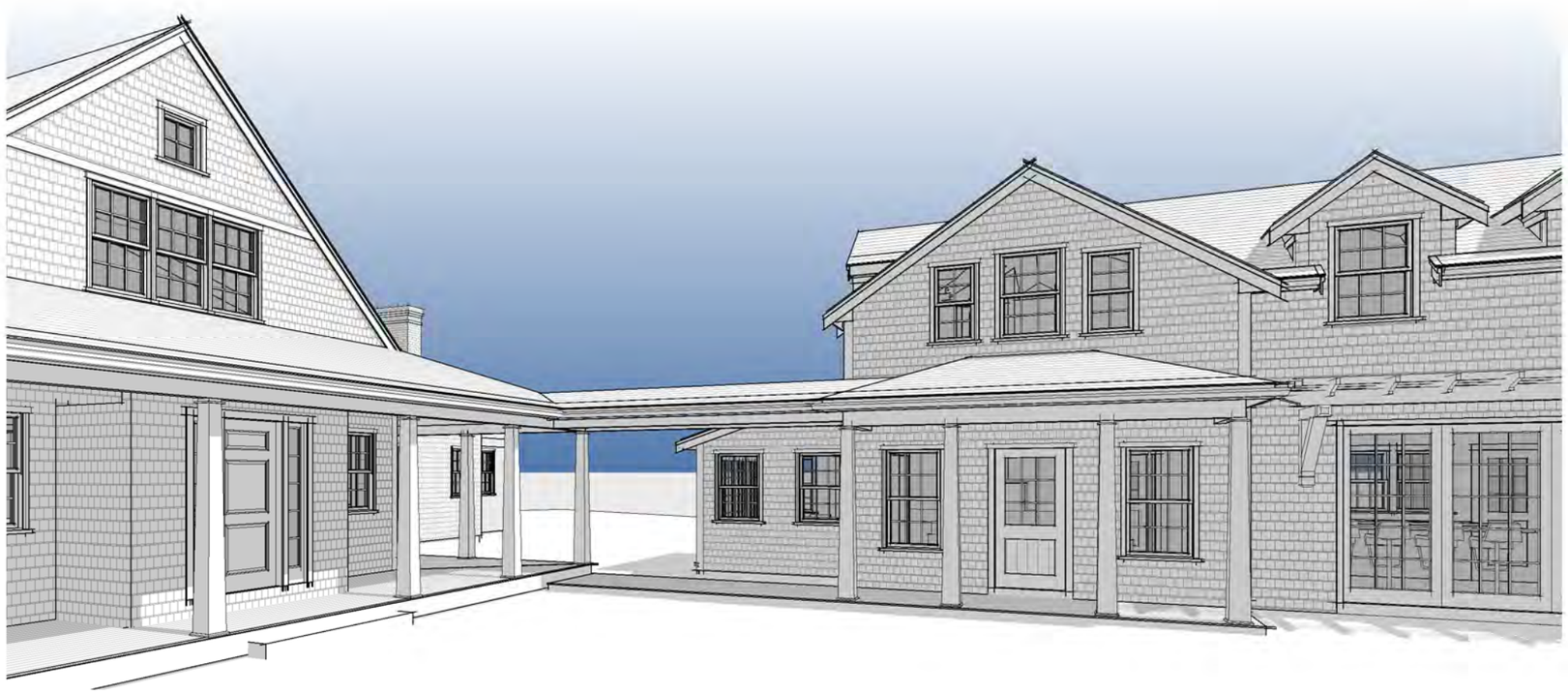
emeritus



Section Addition & 3D Views

3/16" = 1'-0"

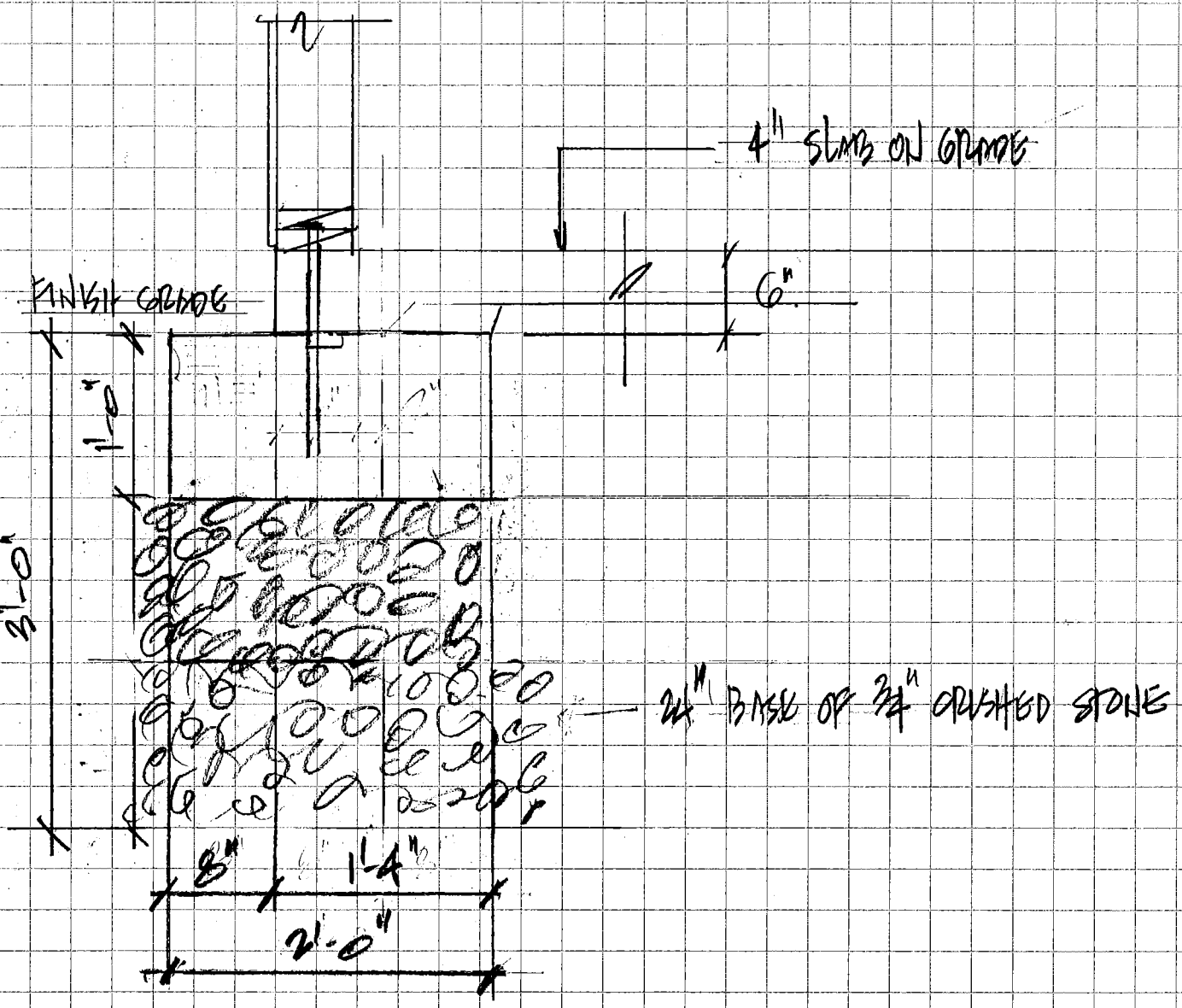
emeritus



emeritus

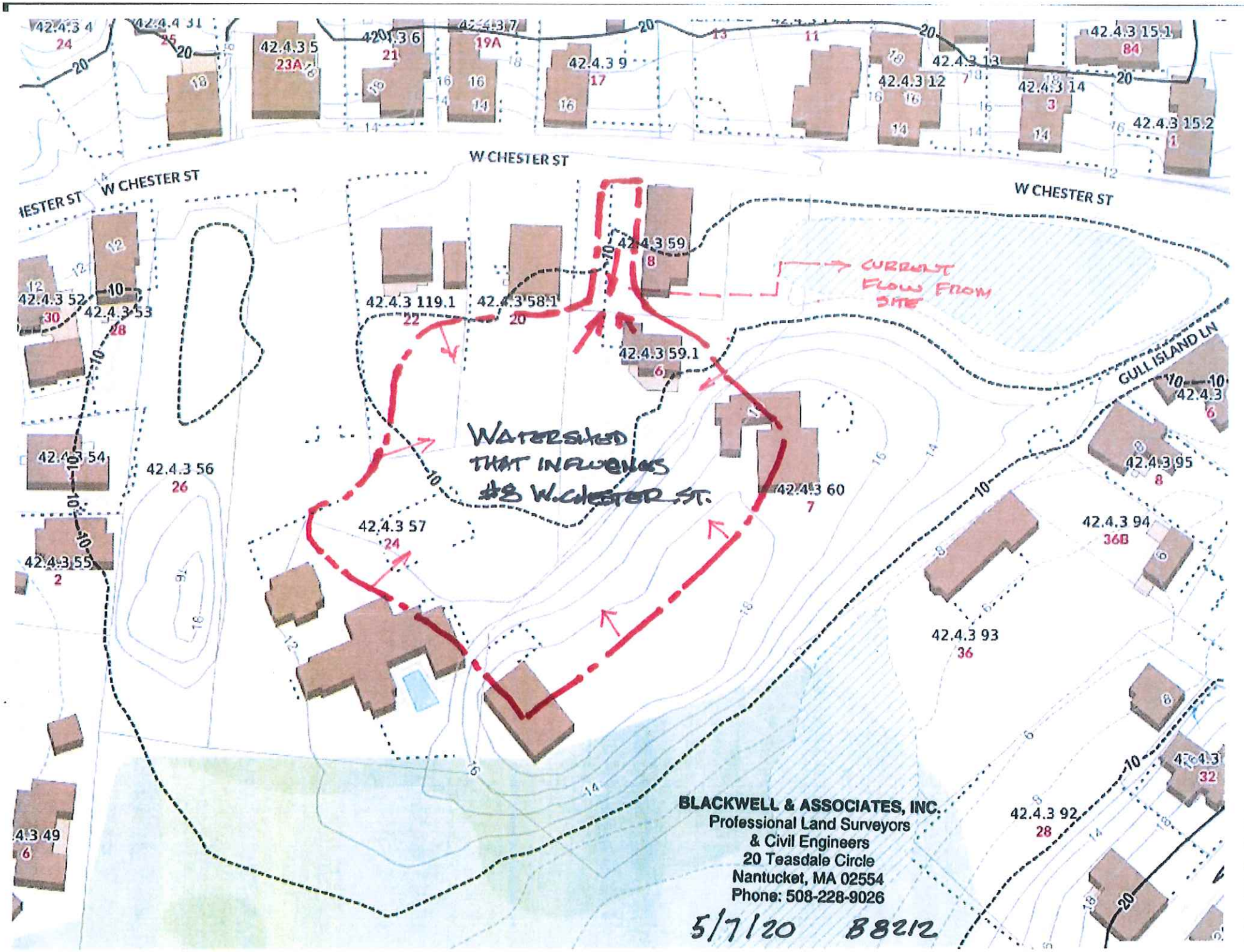
DWD ENGINEERING, INC.
5 Michael Road
East Bridgewater, MA 02333
(508) 378-9602
domdean@aol.com

JOB 24 WEST CHESTER STREET WALPOLE, MA
SHEET NO. SK5-21-20-1 OF
CALCULATED BY DWD DATE 5-21-20
CHECKED BY DATE
SCALE 20x247



FOUNDATION DETAIL
SCALE: 1/4" = 1'-0"

Ref No: G441597330


W CHESTER ST
W CHESTER ST
W CHESTER ST
GULL ISLAND LN
42.4.3 59
42.4.3 119.1
42.4.3 58.1
42.4.3 59.1
42.4.3 60
42.4.3 56
42.4.3 57
42.4.3 54
42.4.3 55
42.4.3 52
42.4.3 53
42.4.3 95
42.4.3 94
42.4.3 93
42.4.3 92
42.4.3 49
CURRENT FLOW FROM SITE
WATERSHED THAT INFLUENCES #3 W. CHESTER ST.
BLACKWELL & ASSOCIATES, INC.
Professional Land Surveyors
& Civil Engineers
20 Teasdale Circle
Nantucket, MA 02554
Phone: 508-228-9026
5/7/20 B8212

June 19, 2020

Ashley Erisman, Chair
Nantucket Conservation Commission
2 Bathing Beach Road
Nantucket, MA 02554

RE: Notice of Intent – SE48-3305
24 Westchester Street

Dear Ms. Erisman:

I am writing to provide information in response to comments at the first public hearing. Attached is a revised plan for your review. The proposed conversation of a porch to interior space within the 50-foot buffer zone has been removed. Also, the temporary dewatering area, should it be needed, has been relocated to the western side of the property. As previously submitted, the proposed footings are above the estimated seasonal high groundwater elevation, so dewatering is not necessary for pouring the concrete. The footings will be placed on a layer of gravel within an excavated trench, which groundwater will be able to pass through unimpeded, impacted or altered.

A proposed rain garden swale has been added along the westerly property line as discussed at the first hearing. The downspouts from the structures will be directed to this swale. Also added to the plan is the replacement of lawn area on the easterly side of the property with native species. The plants for both this area, and the rain garden will be selected from the attached brochure, *Landscaping with Native Plants on Nantucket* by the Nantucket Biodiversity Initiative. Approximately 850-s.f. of lawfully existing lawn area within the 25-foot buffer zone will be removed and restored to an undisturbed native buffer zone.

Attached are aerial photos from 1971, 2003 and 2019 which depict clearing and lawn areas around the existing house. The photos also depict the extensive residential development and cleared areas surrounding locus and the wetland resource areas.

With respect to the density of development on this site, the lot area is approximately 48,557-s.f., while the overall proposed structural ground cover, as defined in the local regulations, is approximately 7,820-s.f. This represents less approximately 16% of the site, and while the structures are concentrated in the southern portion of the lot, that should be considered beneficial as it leaves much of the remainder of the lot as open space.

A waiver is required and requested from the following sections of the Wetland Protection Regulations for Administering the Town of Nantucket By-law Chapter 136:

Section 3.02.B.4 to allow the restoration and rain garden within the 25-foot buffer zone to a Vegetated Wetland. Waivers from the By-law can be granted for a number of reasons including:

- **Chapter 1.03 F.3.c** *The Commission may grant a waiver from these regulations when the Commission finds that a project will provide a long-term net benefit/improvement to the resource area, provided any adverse effects are minimized by carefully considered conditions. However, no such project may be permitted which could have an adverse effect on rare wildlife species.*

The project as proposed will result in an improvement to interests protected by the Commission through the reclamation of lawn area within the 25-foot buffer zone. Further, the project has been designed and will be implemented to avoid impact to the protected interests through the presented construction methodologies and footing design.

I plan to attend the public hearing on this matter to address any questions or concerns.

Sincerely,
Nantucket Engineering & Survey, P.C.
By: Arthur D. Gasbarro, PE, PLS

CC: Chuckrow Nominee Trust
Steven L. Cohen
MassDEP - SERO

CURRENT ZONING CLASSIFICATION:
RESIDENTIAL OLD HISTORIC (ROH)

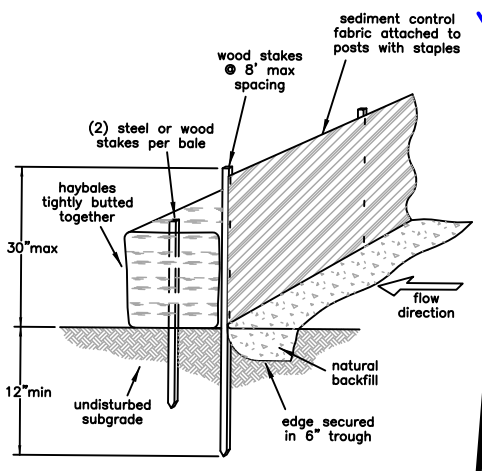
MINIMUM LOT SIZE: 5,000 S.F.
MINIMUM FRONTAGE: 50 FT.
FRONT YARD SETBACK: 0 FT.
REAR/SIDE SETBACK: 5 FT.
GROUND COVER % : 50%

LOT AREA=48,557±S.F.

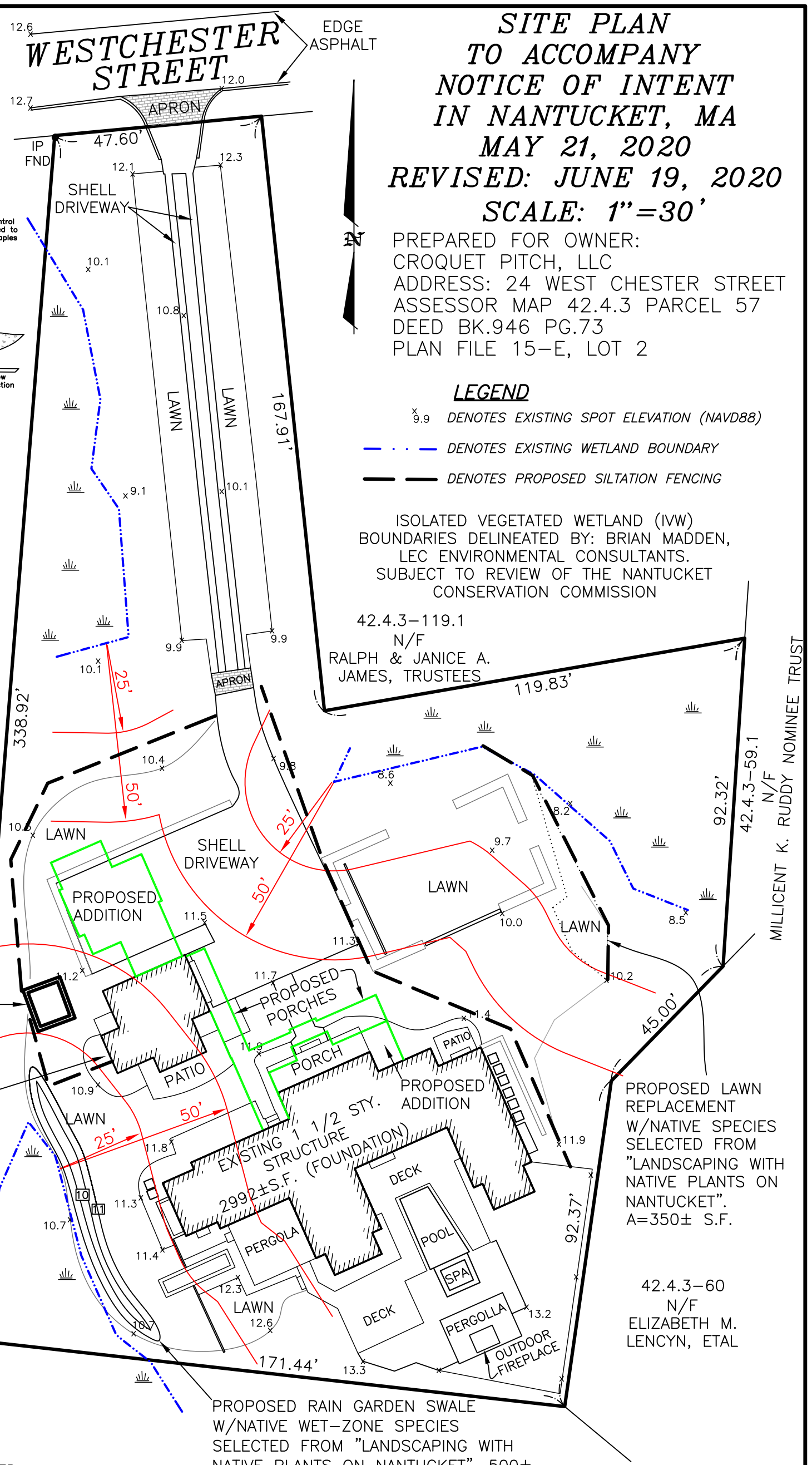
SITE PLAN TO ACCOMPANY NOTICE OF INTENT IN NANTUCKET, MA

MAY 21, 2020
REVISED: JUNE 19, 2020
SCALE: 1"=30'

PREPARED FOR OWNER:
CROQUET PITCH, LLC
ADDRESS: 24 WEST CHESTER STREET
ASSESSOR MAP 42.4.3 PARCEL 57
DEED BK.946 PG.73
PLAN FILE 15-E, LOT 2



SILTATION BARRIER DETAIL



COMMONWEALTH OF MASSACHUSETTS
ARTHUR D. GASBARRO, III
No. 47149
PROFESSIONAL LAND SURVEYOR
6/19/20

THIS PLOT PLAN WAS PREPARED FOR PERMITTING PURPOSES ONLY. IT SHOULD NOT BE CONSIDERED A PROPERTY LINE SURVEY. THIS PLAN SHOULD NOT BE USED TO ESTABLISH PROPERTY LINES, FENCES, HEDGES OR ANY ANCILLARY STRUCTURES ON THE PREMISES. THE PROPERTY LINES SHOWN RELY ON CURRENT DEEDS AND PLANS OF RECORD. THIS PLOT PLAN IS NOT A CERTIFICATION AS TO TITLE OR OWNERSHIP OF THE PROPERTY SHOWN. OWNERS OF ADJOINING PROPERTIES ARE SHOWN ACCORDING TO CURRENT ASSESOR RECORDS. LAYOUT SHOWN HEREON FROM PLANS BY EMERITUS, & DOES NOT IMPLY CONFORMANCE WITH ZONING BYLAWS.

LOCUS PARTIALLY FALLS WITHIN FLOOD HAZARD ZONE "X" (0.2% ANNUAL CHANCE FLOOD) AS SHOWN ON FEMA MAP NO. 25019C0086-G DATED 06/09/14.

GRAPHIC SCALE
30 0 15 30
(IN FEET)
1 inch = 30 ft.

NANTUCKET ENGINEERING & SURVEY, PC
20 Mary Ann Drive Nantucket, MA 02554
NantucketEngineer.com 508-825-5053

Aerial Photos – 24 Westchester Street

1971

2003

W CHESTER ST
CHESTER ST
42.4.3 59
42.4.3 119.1
42.4.3 58.1
4.3 53
42.4.3 59.
42.4.3 56
42.4.3 57
41.287162,-70.105458
Map data ©2020
50 ft
Terms of Use
Report a map error

2019

42.4.3 59
42.4.3 119.1
42.4.3 58.1
42.4.3 59.
42.4.3 56
42.4.3 57
41.286997,-70.105646
Map data ©2020
50 ft
Terms of Use
Report a map error

Why Choose Natives?

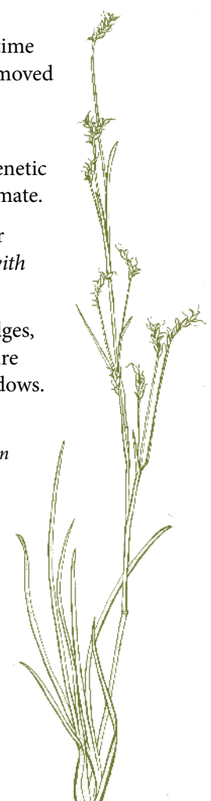
Selecting Natives Will:

- **Save Water**—Native plants are adapted to the local climate and site conditions.
- **Save Time**—Less maintenance is required with native plants once established.
- **Reduce Pesticide Use**—Native plants have developed their own defenses against many pests and diseases.
- **Enhance Wildlife Habitat**—Provide shelter and high quality food for native wildlife.
- **Protect Nantucket's Distinctive Landscape and Fragile Ecosystem.**

Tips for Using Native Plants

- Use this guide to familiarize yourself with plants that may be suitable for your yard—you may already have some great native species to work with. Assess your site and consider your goals for the landscape.
- Check with local nurseries to find out which natives they have in stock, and what they recommend based on your needs. Or, ask your landscape designer to incorporate natives.
- Replace invasives with natives when it's time for garden improvements. Dispose of removed material appropriately.
- Source plants grown from island or northeastern stock—to maintain local genetic variation and have best results in our climate.
- Collect local seed and grow your own, or salvage plants from construction sites *(with permission of landowner)*.
- *Ideas:* Plant edible or wildlife habitat hedges, pollinator gardens, rain gardens to capture runoff, and wildflower/native grass meadows.

*E—*Please use caution when consuming plants on the landscape. Ensure the ID of the plant and what parts of the plant are edible to humans. Just because a particular plant is edible, that doesn't mean that every part of it should be eaten.*



RESOURCES

Massachusetts Prohibited Plants List
www.mass.gov/eea/agencies/agr/farm-products/plants/massachusetts-prohibited-plant-list.html

Nantucket Invasive Plants List (Wetland Regulations)
nantucket-ma.gov/documentcenter/view/1008

Native Plant Nurseries in MA/New England
grownativemass.org/resources/nurseries

Coastal Zone Landscaping
https://www.mass.gov/service-details/stormsmart-coasts-coastal-landscaping-in-massachusetts

Integrated Landscaping
www.upne.com/1611682786.html
http://www.plantnative.org/books_gb.htm

Go Botany
(Plant I.D. and Range Info)
gobotany.newenglandwild.org

Nantucket Invasive Plant Species Committee (IPSC)
The Invasive Plant Species Committee is a standing committee of the NBI focused on evaluating, managing and educating the public about Nantucket's invasive plant species

Nantucket Biodiversity Initiative (NBI)
NBI seeks to conserve the native biodiversity of Nantucket through collaborative research, monitoring, and education. NBI is a collaborative effort of the following organizations:

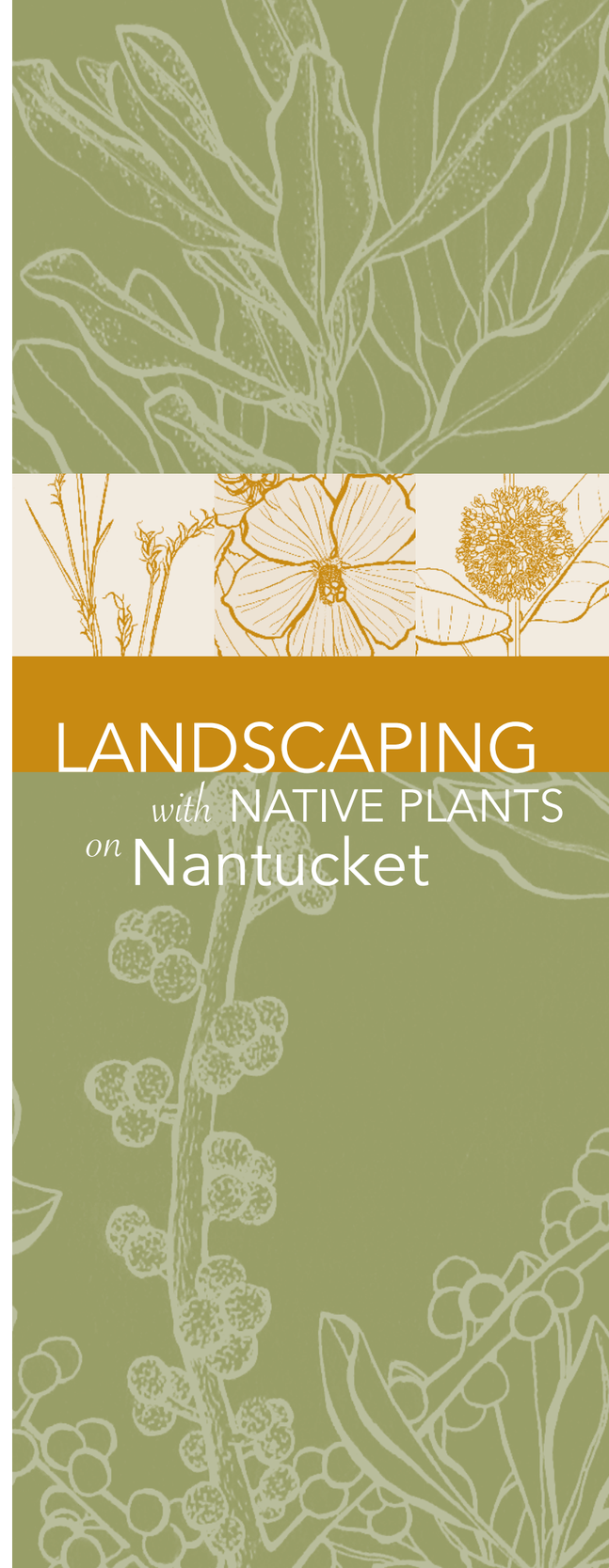
Linda Loring Nature Foundation
Maria Mitchell Association
Massachusetts Audubon Society
Massachusetts Natural Heritage & Endangered Species Program
Nantucket Conservation Foundation
Nantucket Islands Land Bank
Nantucket Land Council
Nantucket Memorial Airport
Science Department of the Nantucket High School
The Trustees of Reservations
Town of Nantucket Natural Resources Department
Tuckernuck Land Trust
UMass Boston Nantucket Field Station
U.S. Fish & Wildflife Service

Pamphlet created and printed by

Nantucket Conservation Foundation

Nantucket Biodiversity Initiative

www. nantucketbiodiversity.org



LANDSCAPING *with* NATIVE PLANTS *on* Nantucket

Native vs. Non Native Plants

Native plants are species that are indigenous to the island. Having grown and evolved here for thousands of years, native plants are well-adapted to living in Nantucket's coastal habitats and have formed complex and interdependent relationships with the island's wildlife. Some native plants are aggressive growers, such as grape and scrub oak, but they are key dominant plants in local ecosystems.

Non-native plants are those that have been introduced to an area by humans, either intentionally or accidentally. Over time, these plants can expand their range without human interference. They are also called exotic, alien, or non-indigenous plants.

Invasive Plants

Invasive species are non native species that grow aggressively, reproducing rapidly to crowd out other plants, and are difficult to remove once established. These traits make them troublesome garden weeds; as they expand into natural areas, they can also threaten native plant communities and reduce wildlife habitat quality.

The Nantucket Landscape

Nantucket's glacial landscape consists of moraines with scattered boulders in the northern part of the island, and sandy, flat, well-drained outwash plains along the south shore. Bogs, marshes, pocket wetlands and larger coastal ponds provide variation. The climate and growing conditions are similar to those found on Cape Cod, Martha's Vineyard, and Long Island.

The whole island is low-lying, with a maximum elevation of 111ft., and is subjected to strong winds and salt spray, particularly during the stormy winter months. The climate is moderated by the island's location offshore, about 27 miles south of Cape Cod. Winters tend to be milder than on the mainland, while summers are cooler with frequent fog. The USDA hardiness zone is 7b, more similar to the Mid Atlantic coastal states than to the rest of New England.

Nantucket is home to globally rare sandplain grassland and coastal heathland plant communities characterized by low growing grasses, wildflowers, and shrubs. Small areas of mixed deciduous forest, pitch pine and scrub oak barrens, beaches, dunes, marshes, and coastal plain ponds round out the island's diversity.

SHRUBS & VINES

COMMON NAME	SCIENTIFIC NAME	Light F	Light P	Light S	Water D	Water M	Water W	Best Uses D	Best Uses E	Best Uses H	Best Uses P	Best Uses W
Azalea, Swamp	*Rhododendron viscosum*	•	•			•	•			•	•	
Bayberry	*Morella caroliniensis*	•	•		•	•		•		•	•	•
Beach Plum	*Prunus maritima*	•			•	•			•	•		•
Bearberry	*Arctostaphylos uva-ursi*	•	•		•	•		•		•		•
Blueberry, Highbush	*Vaccinum corymbosum*	•	•			•	•		•	•	•	
Blueberry, Lowbush	*Vaccinium angustifolium*	•	•		•	•		•	•	•		•
Bower, Virgin's	*Clematis virginiana*	•	•			•				•	•	
Buttonbush	*Cephalanthus occidentalis*	•				•	•			•		
Chokeberry, Black	*Aronia melanocarpa*	•	•			•	•			•		
Creeper, Virginia	*Parthenocissus quinquefolia*	•	•	•	•	•				•	•	
Elderberry, Black	*Sambucus nigra*	•				•			•	•		
Grape, Fox	*Vitis labrusca*	•	•			•		•	•	•	•	
Groundsel	*Baccharis halimifolia*	•	•			•	•			•	•	•
Hazelnut, American	*Corylus americana*	•	•		•	•			•	•		
Hazelnut, Beaked	*Corylus cornuta*	•	•	•	•	•			•	•		
Heather, Golden False	*Hudsonia ericoides*	•			•					•		
Holly, American	*Ilex opaca*	•	•			•				•	•	
Holly, Winterberry	*Ilex verticillata*	•	•			•	•	•		•	•	
Huckleberry, Black	*Gaylussacia baccata*	•	•		•			•	•	•		•
Huckleberry, Blue Dangle	*Gaylussacia frondosa*	•	•	•		•			•	•		
Inkberry	*Ilex glabra*	•	•			•	•	•		•		
Laurel, Sheep	*Kalmia angustifolia*	•	•			•		•		•		
Marsh-elder, Maritime	*Iva frutescens*	•	•			•	•			•		•
Oak, Dwarf Chinquapin	*Quercus prinoides*	•			•	•				•		•
Oak, Scrub	*Quercus ilicifolia*	•			•	•		•		•		
Pepperbush, Sweet	*Clethra alnifolia*	•	•			•	•	•		•	•	
Rose, Carolina	*Rosa carolina*	•				•	•	•		•		
Rose, Virginia	*Rosa virginiana*	•				•		•		•		
Shadbush, Downy	*Amelanchier arborea*	•	•			•			•	•		
Shadbush, Eastern	*Amelanchier canadensis*	•	•			•			•	•		
Sumac, Smooth	*Rhus glabra*	•	•		•	•		•		•		
Sumac, Winged	*Rhus copallinum*	•	•		•	•		•		•		•
Sweetfern	*Comptonia peregrina*	•	•		•	•		•		•		
Viburnum, Arrowwood	*Viburnum dentatum*	•	•			•				•	•	
Willow, Pussy	*Salix discolor*	•	•			•	•			•		
Wintergreen	*Gaultheria procumbens*	•	•		•	•		•	•	•		

TREES

COMMON NAME	SCIENTIFIC NAME	Light F	Light P	Light S	Water D	Water M	Water W	Best Uses D	Best Uses E	Best Uses H	Best Uses S	Best Uses W
Cedar, Red	*Juniperus virginiana*	•	•		•	•		•		•		•
Cherry, Black	*Prunus serotina*	•				•			•	•	•	•
Elm, American (cultivar)	*Ulmus americana* cultivar	•	•		•	•				•	•	
Hickory, Mockernut	*Carya tomentosa*	•	•		•	•			•	•	•	
Maple, Red	*Acer rubrum*	•	•			•	•			•	•	•
Oak, White	*Quercus alba*	•				•				•	•	•
Oak, Black	*Quercus velutina*	•	•		•	•				•	•	•
Pine, Pitch	*Pinus rigida*	•	•		•	•				•	•	•
Sassafras	*Sassafras albidum*	•	•		•	•			•	•		•
Tupelo (Black Gum)	*Nyssa sylvatica*	•	•			•	•			•		•

FLOWERING PERENNIALS

COMMON NAME	SCIENTIFIC NAME	Light F	Light P	Light S	Water D	Water M	Water W	Best Uses B	Best Uses D	Best Uses N	Best Uses H	Best Uses W
Aster, Bushy	*Symphyotrichum dumosum*	•	•		•	•		•		•	•	•
Aster, Sickle-leaved Golden	*Pityopsis falcata*	•			•			•		•	•	•
Aster, Heath	*Symphyotrichum ericoides*	•			•	•		•		•	•	•
Aster, Stiff	*Ionactis linariifolia*	•			•	•		•		•	•	•
Aster, Toothed White-Top	*Sericocarpus asteroides*	•			•	•		•		•	•	•

FLOWERING PERENNIALS *CONTINUED*

COMMON NAME	SCIENTIFIC NAME	Light F	Light P	Light S	Water D	Water M	Water W	Best Uses B	Best Uses D	Best Uses N	Best Uses H	Best Uses W
Boneset	*Eupatorium perfoliatum*	•				•	•	•		•	•	
Boneset, Hyssop-Leaved	*Eupatorium hyssopifolium*	•	•		•	•		•		•	•	•
Everlasting, Pearly	*Anaphalis margaritacea*	•			•	•		•		•	•	•
Geranium, Cranesbill	*Geranium maculatum*	•	•			•		•		•	•	
Goat's Rue	*Tephrosia virginiana*	•	•		•	•		•		•	•	•
Goldenrod, Grass-Leaved	*Euthamia graminifolia*	•	•		•	•		•		•	•	•
Goldenrod, Seaside	*Solidago sempervirens*	•			•			•		•	•	•
Goldenrod, Sweet	*Solidago odora*	•	•		•	•		•	•	•	•	•
Indigo, Yellow Wild	*Baptisia tinctoria*	•	•		•	•		•		•	•	•
Iris, Blue Flag	*Iris versicolor, I. prismatica*	•	•			•	•			•	•	•
Joe-pye Weed, Coastal	*Eutrochium dubium*	•				•	•	•		•	•	
Lily, Turk's Cap	*Lilium superbum*	•	•			•	•	•		•		
Lily, Wood	*Lilium philadelphicum*	•	•		•	•		•		•		
Mallow, Swamp Rose	*Hibiscus moscheutos*	•				•	•	•		•	•	
Milkweed, Common	*Asclepias syriaca*	•			•	•		•		•	•	
Milkweed, Orange	*Asclepias tuberosa*	•	•		•	•		•		•	•	
Milkweed, Purple Swamp	*Asclepias incarnata*	•	•			•	•	•		•	•	
Mint, Clustered Mountain	*Pycnanthemum muticum*	•	•			•	•	•	•	•	•	
Primrose, Evening	*Oenothera biennis*	•	•		•	•		•		•	•	
Rabbit-tobacco	*Pseudognaphalium obtusifolium*	•			•	•		•		•	•	•
Sunflower, Woodland	*Helianthus divaricatus*	•	•		•	•		•		•	•	
Loosestrife, Yellow	*Lysimachia quadrifolia*	•	•		•	•		•		•	•	

GRASSES, SEDGES & RUSHES

COMMON NAME	SCIENTIFIC NAME	Light F	Light P	Light S	Water D	Water M	Water W	Best Uses D	Best Uses H	Best Uses L	Best Uses N	Best Uses W
Beach Grass, American	*Ammophila breviligulata*	•			•				•		•	•
Bentgrass, Autumn	*Agrostis perennans*	•	•			•	•	•	•	•	•	
Bentgrass, Rough	*Agrostis scabra*	•	•			•	•	•	•	•	•	
Bentgrass, Winter	*Agrostis hyemalis*	•	•			•		•	•	•	•	
Bluestem, Big	*Andropogon gerardii*	•	•			•			•	•	•	
Bluestem, Bushy	*Andropogon glomeratus*	•				•	•		•	•	•	•
Bluestem, Little	*Schizachyrium scoparium*	•	•		•	•		•	•	•	•	•
Cordgrass, Prairie	*Spartina pectinata*	•	•			•	•	•	•		•	•
Cordgrass, Saltmeadow	*Spartina patens*	•					•		•			•
Cordgrass, Smooth	*Spartina alterniflora*	•					•		•			•
Grass, Poverty-oats	*Danthonia spicata*	•	•		•	•		•	•	•	•	•
Hairgrass, Wavy	*Deschampsia flexuosa*	•	•		•	•		•	•	•	•	•
Indiangrass	*Sorghastrum nutans*	•			•	•			•		•	
Lovegrass, Purple	*Eragrostis spectabilis*	•			•	•		•	•	•	•	•
Rush, Soft	*Juncus effusus*	•	•			•	•			•		
Sedge, Pennsylvania	*Carex pensylvanica*	•	•		•			•	•	•	•	•
Switchgrass	*Panicum virgatum*	•	•		•	•			•			•
Wildrye, Common	*Elymus virginicus*	•				•			•			•

FERNS

COMMON NAME	SCIENTIFIC NAME	Light F	Light P	Light S	Water D	Water M	Water W	Best Uses D	Best Uses H	Best Uses L	Best Uses N	Best Uses W
Fern, Cinnamon	*Osmundastrum cinnamomeum*		•	•		•	•	•	•	•	•	•
Fern, Marsh	*Thelypteris palustris*	•	•			•	•	•	•	•	•	
Fern, Massachusetts	*Parathelypteris simulata*		•				•	•	•	•	•	
Fern, New York	*Parathelypteris noveboracensis*	•	•			•	•	•	•	•	•	
Fern, Royal	*Osmunda regalis*		•	•		•	•	•	•	•	•	

SITE CONDITION CODES

Sun Exposure
F=Full Sun
P=Partial Sun
S=Shade

Soil Moisture
D=Dry
M=Moderate
W=Wet

Best Use Codes
B=Bee/Butterfly Garden
D=Deer Resistant
*E=Edible Value
H=Habitat/Restoration
L=Lawns/Groundcover
N=Naturalizing/Wildflower Meadow
P=Privacy Hedge/Screening
S=Shade Tree
W=Wind/Salt spray Tolerant

CURRENT ZONING CLASSIFICATION:
RESIDENTIAL OLD HISTORIC (ROH)

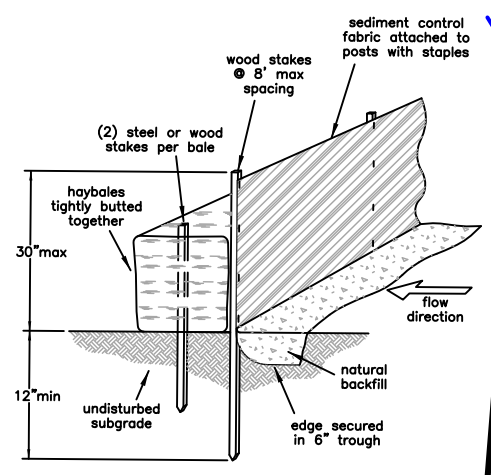
MINIMUM LOT SIZE: 5,000 S.F.
MINIMUM FRONTAGE: 50 FT.
FRONT YARD SETBACK: 0 FT.
REAR/SIDE SETBACK: 5 FT.
GROUND COVER % : 50%

LOT AREA=48,557±S.F.

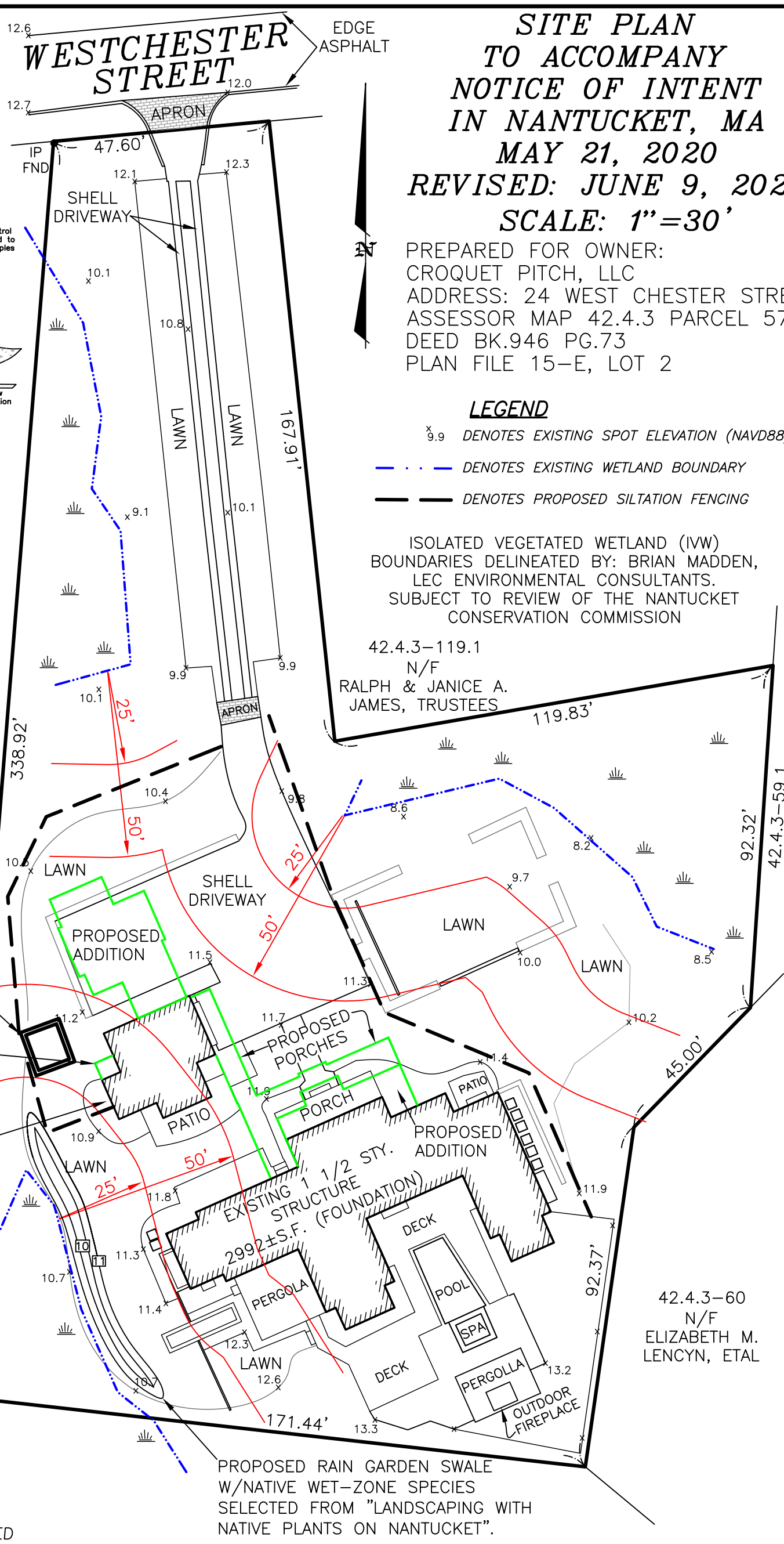
SITE PLAN TO ACCOMPANY NOTICE OF INTENT IN NANTUCKET, MA

MAY 21, 2020
REVISED: JUNE 9, 2020
SCALE: 1"=30'

PREPARED FOR OWNER:
CROQUET PITCH, LLC
ADDRESS: 24 WEST CHESTER STREET
ASSESSOR MAP 42.4.3 PARCEL 57
DEED BK.946 PG.73
PLAN FILE 15-E, LOT 2



SILTATION BARRIER DETAIL



COMMONWEALTH OF MASSACHUSETTS
ARTHUR D. GASBARRO, III
No. 47149
PROFESSIONAL LAND SURVEYOR
6/9/20

THIS PLOT PLAN WAS PREPARED FOR PERMITTING PURPOSES ONLY. IT SHOULD NOT BE CONSIDERED A PROPERTY LINE SURVEY. THIS PLAN SHOULD NOT BE USED TO ESTABLISH PROPERTY LINES, FENCES, HEDGES OR ANY ANCILLARY STRUCTURES ON THE PREMISES. THE PROPERTY LINES SHOWN RELY ON CURRENT DEEDS AND PLANS OF RECORD. THIS PLOT PLAN IS NOT A CERTIFICATION AS TO TITLE OR OWNERSHIP OF THE PROPERTY SHOWN. OWNERS OF ADJOINING PROPERTIES ARE SHOWN ACCORDING TO CURRENT ASSESOR RECORDS. LAYOUT SHOWN HEREON FROM PLANS BY EMERITUS, & DOES NOT IMPLY CONFORMANCE WITH ZONING BYLAWS.

LOCUS PARTIALLY FALLS WITHIN FLOOD HAZARD ZONE "X" (0.2% ANNUAL CHANCE FLOOD) AS SHOWN ON FEMA MAP NO. 25019C0086-G DATED 06/09/14.

GRAPHIC SCALE
30 0 15 30
(IN FEET)
1 inch = 30 ft.

NANTUCKET ENGINEERING & SURVEY, PC
20 Mary Ann Drive Nantucket, MA 02554
NantucketEngineer.com 508-825-5053

COASTAL
engineering co.

March 13, 2020

C19031.00

Conservation Commission
Attn: Jeff Carlson, Natural Resources Director
2 Bathing Beach Road
Nantucket, MA 02554

By Email & FedEx Delivery

Re: **Notice of Intent Application Filing Package**
Proposed Addition to Nantucket Harbormaster Building and Associated Site Improvements
Stephen Kelleher, Stephen Kelleher Architects
34 Washington Street
Nantucket, MA
Map: 42.2.3 Parcel: 2

On behalf of our client, Stephen Kelleher of Stephen Kelleher Architects, Inc., we are submitting an original plus 1 copy of a Notice of Intent Application Filing Package, 1 original check for legal ad fee, and 2 full size copies and 1 reduced size copy of the plan for the above referenced project. The following items are enclosed:

- Notice of Intent Application
- Project Description, Performance Standards Narrative, Construction Protocol
- NOI Wetland Fee Transmittal Form
- Copy of $335.10 check made payable to Inquirer and Mirror for the advertising fee (All other fees: state share of DEP fee, town share of DEP fee, town bylaw fee and reviewer fee are EXEMPT due to Town project)
- Certified Abutter List, Affidavit of Service, Abutter Notification Letter
- Copy of Certified Mail Receipts for Abutter Notification and MassDEP mailing
- USGS Map, identifying locus
- Coastal Engineering Co., Inc. Stormwater Report, Dated 3/12/2020
- Coastal Engineering Co., Inc. Plan Showing Existing Site Conditions, Dated 7/10/2019
- Stephen Kelleher Architects, Inc. Rendering, Dated 3/4/2020
- Stephen Kelleher Architects, Inc. Architectural Plan Set, Dated 2/25/2020 and 3/2/2020
- Stephen Kelleher Architects, Inc. Structural Plan Set, Dated 12/4/2019 and 12/5/2019
- Stephen Kelleher Architects, Inc. and Coastal Engineering Co., Inc. Civil Plan Set, Dated 3/12/2020

Please schedule this for the **April 1, 2020** public hearing. If you have any questions or require additional information, please give our office a call. Thank you.

Sincerely,

COASTAL ENGINEERING CO., INC.

Carla Davis

Enclosures: as stated

cc: Mass. DEP/SERO - Wetlands
Stephen Kelleher Architects, Inc.
Town of Nantucket
Tarja L. McGrail, Project Manager

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

WPA Form 3 – Notice of Intent

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

Provided by MassDEP:

MassDEP File Number

Document Transaction Number

Nantucket
City/Town

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

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

A. General Information

1. Project Location (**Note:** electronic filers will click on button to locate project site):

34 Washington Street — a. Street Address
Nantucket — b. City/Town
02554 — c. Zip Code

Latitude and Longitude:
41° 16' 53.184" N — d. Latitude
70° 5' 43.404" W — e. Longitude

42.2.3 — f. Assessors Map/Plat Number
2 — g. Parcel /Lot Number

2. Applicant:

Stephen — a. First Name
Kelleher — b. Last Name
Stephen Kelleher Architects, Inc. — c. Organization
57 Alden Road — d. Street Address
Fairhaven — e. City/Town
MA — f. State
02719 — g. Zip Code
h. Phone Number
i. Fax Number
j. Email Address

3. Property owner (required if different from applicant): ☐ Check if more than one owner

a. First Name
b. Last Name
Town of Nantucket — c. Organization
16 Broad Street — d. Street Address
Nantucket — e. City/Town
MA — f. State
02554 — g. Zip Code
h. Phone Number
i. Fax Number
j. Email address

4. Representative (if any):

Tarja L. — a. First Name
McGrail — b. Last Name
Coastal Engineering Co., Inc. — c. Company
260 Cranberry Highway — d. Street Address
Orleans — e. City/Town
MA — f. State
02653 — g. Zip Code
508-255-6511 — h. Phone Number
508-255-6700 — i. Fax Number
tmcgrail@coastalengineeringcompany.com — j. Email address

5. Total WPA Fee Paid (from NOI Wetland Fee Transmittal Form):

(EXEMPT) — a. Total Fee Paid
(EXEMPT) — b. State Fee Paid
(EXEMPT) — c. City/Town Fee Paid

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

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Provided by MassDEP:

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A. General Information (continued)

6. General Project Description:

Proposed Addition to the Harbormaster Building and Associated Site Improvements

7a. Project Type Checklist: (Limited Project Types see Section A. 7b.)

1. ☐ Single Family Home
2. ☐ Residential Subdivision
3. ☐ Commercial/Industrial
4. ☐ Dock/Pier
5. ☐ Utilities
6. ☐ Coastal engineering Structure
7. ☐ Agriculture (e.g., cranberries, forestry)
8. ☐ Transportation
9. ☒ Other

7b. Is any portion of the proposed activity eligible to be treated as a limited project (including Ecological Restoration Limited Project) subject to 310 CMR 10.24 (coastal) or 310 CMR 10.53 (inland)?

1. ☐ Yes ☒ No

If yes, describe which limited project applies to this project. (See 310 CMR 10.24 and 10.53 for a complete list and description of limited project types)

2. Limited Project Type

If the proposed activity is eligible to be treated as an Ecological Restoration Limited Project (310 CMR10.24(8), 310 CMR 10.53(4)), complete and attach Appendix A: Ecological Restoration Limited Project Checklist and Signed Certification.

8. Property recorded at the Registry of Deeds for:

Nantucket	C7858 Doc # 17777
a. County	b. Certificate # (if registered land)
c. Book	d. Page Number

B. Buffer Zone & Resource Area Impacts (temporary & permanent)

1. ☐ Buffer Zone Only – Check if the project is located only in the Buffer Zone of a Bordering Vegetated Wetland, Inland Bank, or Coastal Resource Area.
2. ☐ Inland Resource Areas (see 310 CMR 10.54-10.58; if not applicable, go to Section B.3, Coastal Resource Areas).

Check all that apply below. Attach narrative and any supporting documentation describing how the project will meet all performance standards for each of the resource areas altered, including standards requiring consideration of alternative project design or location.

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B. Buffer Zone & Resource Area Impacts (temporary & permanent) (cont'd)

For all projects affecting other Resource Areas, please attach a narrative explaining how the resource area was delineated.

Resource Area	Size of Proposed Alteration	Proposed Replacement (if any)
a. ☐ Bank	1. linear feet	2. linear feet
b. ☐ Bordering Vegetated Wetland	1. square feet	2. square feet
c. ☐ Land Under Waterbodies and Waterways	1. square feet 3. cubic yards dredged	2. square feet

Resource Area	Size of Proposed Alteration	Proposed Replacement (if any)
d. ☐ Bordering Land Subject to Flooding	1. square feet 3. cubic feet of flood storage lost	2. square feet 4. cubic feet replaced
e. ☐ Isolated Land Subject to Flooding	1. square feet 2. cubic feet of flood storage lost	3. cubic feet replaced

f. ☐ Riverfront Area

1. Name of Waterway (if available) - **specify coastal or inland**

2. Width of Riverfront Area (check one):

☐ 25 ft. - Designated Densely Developed Areas only

☐ 100 ft. - New agricultural projects only

☐ 200 ft. - All other projects

3. Total area of Riverfront Area on the site of the proposed project: _____ square feet

4. Proposed alteration of the Riverfront Area:

a. total square feet _____ b. square feet within 100 ft. _____ c. square feet between 100 ft. and 200 ft. _____

5. Has an alternatives analysis been done and is it attached to this NOI? ☐ Yes ☐ No

6. Was the lot where the activity is proposed created prior to August 1, 1996? ☐ Yes ☐ No

3. ☒ Coastal Resource Areas: (See 310 CMR 10.25-10.35)

Note: for coastal riverfront areas, please complete **Section B.2.f**. above.

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B. Buffer Zone & Resource Area Impacts (temporary & permanent) (cont'd)

Check all that apply below. Attach narrative and supporting documentation describing how the project will meet all performance standards for each of the resource areas altered, including standards requiring consideration of alternative project design or location.

Online Users: Include your document transaction number (provided on your receipt page) with all supplementary information you submit to the Department.

Resource Area	Size of Proposed Alteration	Proposed Replacement (if any)
a. ☐ Designated Port Areas	Indicate size under Land Under the Ocean, below	
b. ☐ Land Under the Ocean	1. square feet 2. cubic yards dredged	
c. ☐ Barrier Beach	Indicate size under Coastal Beaches and/or Coastal Dunes below	
d. ☐ Coastal Beaches	1. square feet	2. cubic yards beach nourishment
e. ☒ Coastal Dunes	450 1. square feet	25 cubic yards (900 s.f.) 2. cubic yards dune nourishment

	Size of Proposed Alteration	Proposed Replacement (if any)
f. ☐ Coastal Banks	1. linear feet	
g. ☐ Rocky Intertidal Shores	1. square feet	
h. ☐ Salt Marshes	1. square feet	2. sq ft restoration, rehab., creation
i. ☐ Land Under Salt Ponds	1. square feet 2. cubic yards dredged	
j. ☐ Land Containing Shellfish	1. square feet	
k. ☐ Fish Runs	Indicate size under Coastal Banks, inland Bank, Land Under the Ocean, and/or inland Land Under Waterbodies and Waterways, above 1. cubic yards dredged	
l. ☒ Land Subject to Coastal Storm Flowage	12,000 s.f. 1. square feet	

4. ☐ Restoration/Enhancement
If the project is for the purpose of restoring or enhancing a wetland resource area in addition to the square footage that has been entered in Section B.2.b or B.3.h above, please enter the additional amount here.

a. square feet of BVW

b. square feet of Salt Marsh

5. ☐ Project Involves Stream Crossings

a. number of new stream crossings

b. number of replacement stream crossings

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C. Other Applicable Standards and Requirements

☐ This is a proposal for an Ecological Restoration Limited Project. Skip Section C and complete Appendix A: Ecological Restoration Limited Project Checklists – Required Actions (310 CMR 10.11).

Streamlined Massachusetts Endangered Species Act/Wetlands Protection Act Review

1. Is any portion of the proposed project located in **Estimated Habitat of Rare Wildlife** as indicated on the most recent Estimated Habitat Map of State-Listed Rare Wetland Wildlife published by the Natural Heritage and Endangered Species Program (NHESP)? To view habitat maps, see the *Massachusetts Natural Heritage Atlas* or go to http://maps.massgis.state.ma.us/PRI_EST_HAB/viewer.htm.

a. ☐ Yes ☒ No

If yes, include proof of mailing or hand delivery of NOI to:

Natural Heritage and Endangered Species Program
Division of Fisheries and Wildlife
1 Rabbit Hill Road
Westborough, MA 01581

2019
b. Date of map

If *yes*, the project is also subject to Massachusetts Endangered Species Act (MESA) review (321 CMR 10.18). To qualify for a streamlined, 30-day, MESA/Wetlands Protection Act review, please complete Section C.1.c, and include requested materials with this Notice of Intent (NOI); *OR* complete Section C.2.f, if applicable. *If MESA supplemental information is not included with the NOI, by completing Section 1 of this form, the NHESP will require a separate MESA filing which may take up to 90 days to review (unless noted exceptions in Section 2 apply, see below).*

c. Submit Supplemental Information for Endangered Species Review*

1. ☐ Percentage/acreage of property to be altered:

(a) within wetland Resource Area _____ percentage/acreage

(b) outside Resource Area _____ percentage/acreage

2. ☐ Assessor's Map or right-of-way plan of site

2. ☐ Project plans for entire project site, including wetland resource areas and areas outside of wetlands jurisdiction, showing existing and proposed conditions, existing and proposed tree/vegetation clearing line, and clearly demarcated limits of work **

(a) ☐ Project description (including description of impacts outside of wetland resource area & buffer zone)

(b) ☐ Photographs representative of the site

* Some projects **not** in Estimated Habitat may be located in Priority Habitat, and require NHESP review (see http://www.mass.gov/eea/agencies/dfg/dfw/natural-heritage/regulatory-review/). Priority Habitat includes habitat for state-listed plants and strictly upland species not protected by the Wetlands Protection Act.

** MESA projects may not be segmented (321 CMR 10.16). The applicant must disclose full development plans even if such plans are not required as part of the Notice of Intent process.

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C. Other Applicable Standards and Requirements (cont'd)

(c) ☐ MESA filing fee (fee information available at http://www.mass.gov/dfwele/dfw/nhesp/regulatory_review/mesa/mesa_fee_schedule.htm). Make check payable to "Commonwealth of Massachusetts - NHESP" and ***mail to NHESP*** at above address

*Projects altering **10 or more acres** of land, also submit:*

(d) ☐ Vegetation cover type map of site

(e) ☐ Project plans showing Priority & Estimated Habitat boundaries

(f) OR Check One of the Following

1. ☐ Project is exempt from MESA review.
Attach applicant letter indicating which MESA exemption applies. (See 321 CMR 10.14, http://www.mass.gov/dfwele/dfw/nhesp/regulatory_review/mesa/mesa_exemptions.htm; the NOI must still be sent to NHESP if the project is within estimated habitat pursuant to 310 CMR 10.37 and 10.59.)

2. ☐ Separate MESA review ongoing. a. NHESP Tracking # b. Date submitted to NHESP

3. ☐ Separate MESA review completed.
Include copy of NHESP "no Take" determination or valid Conservation & Management Permit with approved plan.

3. For coastal projects only, is any portion of the proposed project located below the mean high water line or in a fish run?

a. ☐ Not applicable – project is in inland resource area only b. ☐ Yes ☒ No

If yes, include proof of mailing, hand delivery, or electronic delivery of NOI to either:

South Shore - Cohasset to Rhode Island border, and the Cape & Islands:

Division of Marine Fisheries -
Southeast Marine Fisheries Station
Attn: Environmental Reviewer
836 South Rodney French Blvd.
New Bedford, MA 02744
Email: DMF.EnvReview-South@state.ma.us

North Shore - Hull to New Hampshire border:

Division of Marine Fisheries -
North Shore Office
Attn: Environmental Reviewer
30 Emerson Avenue
Gloucester, MA 01930
Email: DMF.EnvReview-North@state.ma.us

Also if yes, the project may require a Chapter 91 license. For coastal towns in the Northeast Region, please contact MassDEP's Boston Office. For coastal towns in the Southeast Region, please contact MassDEP's Southeast Regional Office.

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C. Other Applicable Standards and Requirements (cont'd)

Online Users: Include your document transaction number (provided on your receipt page) with all supplementary information you submit to the Department.

4. Is any portion of the proposed project within an Area of Critical Environmental Concern (ACEC)?

   a. ☐ Yes ☒ No If yes, provide name of ACEC (see instructions to WPA Form 3 or MassDEP Website for ACEC locations). **Note:** electronic filers click on Website.

   b. ACEC

5. Is any portion of the proposed project within an area designated as an Outstanding Resource Water (ORW) as designated in the Massachusetts Surface Water Quality Standards, 314 CMR 4.00?

   a. ☐ Yes ☒ No

6. Is any portion of the site subject to a Wetlands Restriction Order under the Inland Wetlands Restriction Act (M.G.L. c. 131, § 40A) or the Coastal Wetlands Restriction Act (M.G.L. c. 130, § 105)?

   a. ☐ Yes ☒ No

7. Is this project subject to provisions of the MassDEP Stormwater Management Standards?

   a. ☒ Yes. Attach a copy of the Stormwater Report as required by the Stormwater Management Standards per 310 CMR 10.05(6)(k)-(q) and check if:

      1. ☐ Applying for Low Impact Development (LID) site design credits (as described in Stormwater Management Handbook Vol. 2, Chapter 3)

      2. ☐ A portion of the site constitutes redevelopment

      3. ☒ Proprietary BMPs are included in the Stormwater Management System.

   b. ☐ No. Check why the project is exempt:

      1. ☐ Single-family house

      2. ☐ Emergency road repair

      3. ☐ Small Residential Subdivision (less than or equal to 4 single-family houses or less than
      or equal to 4 units in multi-family housing project) with no discharge to Critical Areas.

D. Additional Information

☐ This is a proposal for an Ecological Restoration Limited Project. Skip Section D and complete Appendix A: Ecological Restoration Notice of Intent – Minimum Required Documents (310 CMR 10.12).

Applicants must include the following with this Notice of Intent (NOI). See instructions for details.

Online Users: Attach the document transaction number (provided on your receipt page) for any of the following information you submit to the Department.

1. ☒ USGS or other map of the area (along with a narrative description, if necessary) containing sufficient information for the Conservation Commission and the Department to locate the site. (Electronic filers may omit this item.)

2. ☐ Plans identifying the location of proposed activities (including activities proposed to serve as a Bordering Vegetated Wetland [BVW] replication area or other mitigating measure) relative to the boundaries of each affected resource area.

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D. Additional Information (cont'd)

3. ☐ Identify the method for BVW and other resource area boundary delineations (MassDEP BVW Field Data Form(s), Determination of Applicability, Order of Resource Area Delineation, etc.), and attach documentation of the methodology.

4. ☒ List the titles and dates for all plans and other materials submitted with this NOI.

Plan Showing Proposed Layout & Materials Plan
a. Plan Title

Coastal Engineering Co., Inc.
b. Prepared By

Tarja L. McGrail, PE
c. Signed and Stamped by

03/12/2020
d. Final Revision Date

1" = 20'
e. Scale

Stephen Kelleher Architects, Inc. Architectural Plans 2/25/20 & 3/2/20
Stephen Kelleher Architects, Inc. Structural Plans 12/4/19 & 12/5/19

5. ☐ If there is more than one property owner, please attach a list of these property owners not listed on this form.

6. ☐ Attach proof of mailing for Natural Heritage and Endangered Species Program, if needed.

7. ☐ Attach proof of mailing for Massachusetts Division of Marine Fisheries, if needed.

8. ☒ Attach NOI Wetland Fee Transmittal Form

9. ☒ Attach Stormwater Report, if needed.

E. Fees

1. ☐ Fee Exempt: No filing fee shall be assessed for projects of any city, town, county, or district of the Commonwealth, federally recognized Indian tribe housing authority, municipal housing authority, or the Massachusetts Bay Transportation Authority.

Applicants must submit the following information (in addition to pages 1 and 2 of the NOI Wetland Fee Transmittal Form) to confirm fee payment:

N/A
2. Municipal Check Number

EXEMPT
3. Check date

N/A
4. State Check Number

EXEMPT
5. Check date

6. Payor name on check: First Name

Coastal Engineering Co.,Inc.
7. Payor name on check: Last Name

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

WPA Form 3 – Notice of Intent

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

Provided by MassDEP:

MassDEP File Number

Document Transaction Number

Nantucket
City/Town

F. Signatures and Submittal Requirements

I hereby certify under the penalties of perjury that the foregoing Notice of Intent and accompanying plans, documents, and supporting data are true and complete to the best of my knowledge. I understand that the Conservation Commission will place notification of this Notice in a local newspaper at the expense of the applicant in accordance with the wetlands regulations, 310 CMR 10.05(5)(a).

I further certify under penalties of perjury that all abutters were notified of this application, pursuant to the requirements of M.G.L. c. 131, § 40. Notice must be made by Certificate of Mailing or in writing by hand delivery or certified mail (return receipt requested) to all abutters within 100 feet of the property line of the project location.

Stephen Kelleher, pres. A.I.A.	3/9/20
1. Signature of Applicant	2. Date March 9, 2020
3. Signature of Property Owner (if different)	4. Date
5. Signature of Representative (if any)	6. Date

For Conservation Commission:
Two copies of the completed Notice of Intent (Form 3), including supporting plans and documents, two copies of the NOI Wetland Fee Transmittal Form, and the city/town fee payment, to the Conservation Commission by certified mail or hand delivery.

For MassDEP:
One copy of the completed Notice of Intent (Form 3), including supporting plans and documents, one copy of the NOI Wetland Fee Transmittal Form, and a **copy** of the state fee payment to the MassDEP Regional Office (see Instructions) by certified mail or hand delivery.

Other:
If the applicant has checked the "yes" box in any part of Section C, Item 3, above, refer to that section and the Instructions for additional submittal requirements.

The original and copies must be sent simultaneously. Failure by the applicant to send copies in a timely manner may result in dismissal of the Notice of Intent.

Project Description

The proposed project includes redevelopment of the existing Harbormaster Facility that is located adjacent to Nantucket Harbor at the Town pier. The property has the following wetland resource areas: Coastal Beach, Coastal Dune, and Land Subject to Coastal Storm Flowage (Flood Zone VE El. 11). The entire property is located within land subject to coastal storm flowage, and the buffer to both coastal dune and beach resource areas. Currently, the project site is improved with a building (slab foundation), decks, steps, access ramps, parking area, walkways, and an access path with cobble stone edge that provides public access from the neighboring park to the pier and harbormaster building. The project site is not mapped as priority and/or estimated habitat for rare or endangered species by the Natural Heritage and Endangered Species program. Similarly, the project site is not located in an Area of Critical Environmental Concern (ACEC).

The applicant is proposing the following site improvements:

- Remove the existing Harbormaster Building and associated slab on grade foundation;
- Construct a new building on pile foundation that is designed to improve flood resilience and sized to meet the needs of the Town's Harbormaster and staff;
- Construct an accessory storage shelter (slab on grade with roof, see A-1.2) to the south of the new building that is sized to shelter a materials storage trailer;
- Improve the existing parking area and install ramps, decks, and stairs to provide access to the new building.
- Alterations to the existing pervious shell path from the neighboring park to the pier to maintain direct public access from the park to pier.
- Install 900 s.f. of dune restoration area to mitigate for installation of new pervious shell paths to connect the existing park to the pier. The dune restoration will include compatible sand and native plantings that will help to stabilize and nourish the dune resource area.
- Installation of stormwater practices to manage and infiltrate all roof runoff from the proposed buildings.

The proposed harbormaster building is a water dependent municipal safety building. Due to the use of the building, it is important for the building layout and orientation to provide the best possible visibility and accessibility to the Harbor for staff working in the building. As a result of this design objective, the Applicant is proposing a building that will be constructed on a pile foundation with a finish floor elevation of 9.9 +/- ft. The elevation of the finish floor allows for a single direction ramp to access the main entrance of the building from the pier. Since the site is located within a velocity flood zone having a base flood elevation of 11, the Applicant applied to the State Board of Building and successfully received a variance from the Massachusetts Building Code that allows the building to be constructed in the velocity zone at the proposed elevation utilizing a design that incorporates a steel pile foundation, an elevated ferro cement foundation, and flood resistant building materials up to the design flood elevation, elevation 13.

As a result of the proposed building and site improvements, the overall area of impervious ground cover located within the buffer to the Coastal Dune and within Land Subject To Coastal Storm Flowage will be reduced by 900 +/-± S.F. This proposed large reduction in impervious groundcover is attributed to removing the existing building's slab foundation and installing the

new building on a pile foundation system. In comparison with the existing slab foundation, the pile foundation raises the elevation of the lowest horizontal member of the building up to approximately 3 feet above the existing grade. Upon completion of the new building, the expected soil conditions beneath the building will be pervious sandy soils. The pervious soils will allow for natural infiltration/ recharge of stormwater runoff during a storm event. This will improve the ability of the land to absorb and contain flood waters, and buffer inland areas from flood damage.

In addition to reduction in impervious ground cover, the proposed redevelopment project includes stormwater management BMP's to manage and recharge/infiltrate stormwater runoff onsite from the roofs of the proposed buildings. In comparison with existing conditions, through reduction of impervious ground cover and onsite management of roof runoff, the proposed redevelopment will greatly reduce the peak flow and volume of runoff contributed to the offsite drainage system. This is described in more detail in the Stormwater Management Report submitted with this application.

Performance Standards Narrative

Wetland Performance Standards - (310 CMR) State WPA Regulations

The subject property has the following **State Defined resource areas**:

An explanation is provided to show how each performance standard is met.

310 CMR 10.04 Land Subject to Coastal Storm Flowage (LSCSF)

"land subject to any inundation caused by coastal storms up to and including that caused by the 100-year storm, surge of record or storm of record, whichever is greater"

The entire project is located in Land Subject to Coastal Storm Flowage. The LSCSF does not have regulation performance standards to follow though it is a protected resource area and therefore approval is needed to perform work within the LSCSF. However, as a result of the proposed building and site improvements, the overall area of impervious ground cover located within Land Subject To Coastal Storm Flowage will be reduced by 900 +/- S.F. This will improve the ability of the land to absorb and contain flood waters, and buffer inland areas from flood damage. Therefore, no negative impacts to this interest are proposed.

310 CMR 10.27 Coastal Beaches

(3) Any project on a coastal beach, except any project permitted under 310 CMR 10.30(3)(a), shall not have an adverse effect by increasing erosion, decreasing the volume or changing the form of any such coastal beach or an adjacent or down drift coastal beach.

The proposed project is in the buffer to the coastal beach resource area and will not have an effect on erosion, volume, or the change of the form of any such coastal beach or an adjacent or down drift coastal beach.

(4) Any groin, jetty, solid pier, or other such solid fill structure which will interfere with littoral drift, in addition to complying with 310 CMR 10.27(3), shall be constructed as follows:

No groin, jetty, solid pier, or other such solid fill structures are proposed at the site.

(a) It shall be the minimum length and height demonstrated to be necessary to maintain beach form and volume. In evaluating necessity, coastal engineering, physical oceanographic and/or coastal geologic information shall be considered.

(b) Immediately after construction any groin shall be filled to entrapment capacity in height and length with sediment of grain size compatible with that of the adjacent beach.

(c) Jetties trapping littoral drift material shall contain a sand by-pass system to transfer sediments to the down drift side of the inlet or shall be periodically redredged to provide beach nourishment to ensure that down drift or adjacent beaches are not starved of sediments.

(5) Notwithstanding 310 CMR 10.27(3), beach nourishment with clean sediment of a grain size compatible with that on the existing beach may be permitted.

N/A

WHEN A TIDAL FLAT IS DETERMINED TO BE SIGNIFICANT TO MARINEFISHERIES OR THE PROTECTION OF WILDLIFE HABITAT, 310 CMR 10.27(6) SHALLAPPLY:

No tidal flats are located within the proposed project area, therefore 310 CMR 10.27(6) does not apply.

(6) In addition to complying with the requirements of 310 CMR 10.27(3) and (4), a project on a tidal flat shall if water-dependent be designed and constructed, using best available measures, so as to minimize adverse effects, and if non-water-dependent, have no adverse effects, on marine fisheries and wildlife habitat caused by:
   (a) alterations in water circulation;
   (b) alterations in the distribution of sediment grain size; and
   (c) changes in water quality, including, but not limited to, other than natural fluctuations in the levels of dissolved oxygen, temperature or turbidity, or the addition of pollutants.

(7) Notwithstanding the provisions of 310 CMR 10.27(3) through (6), no project may be permitted which will have any adverse effect on specified habitat sites or rare vertebrate or invertebrate species, as identified by procedures established under 310 CMR 10.37.

The subject property is not identified as an area for rare vertebrate or invertebrate species by the latest mapping by the Natural Heritage Endangered Species Program (NHESP).

310 CMR Section 10.28: Coastal Dune

(3) Any alteration of, or structure on, a coastal dune or within 100 feet of a coastal dune shall not have an adverse effect on the coastal dune by:

   (a) affecting the ability of waves to remove sand from the dune;

   A portion of the proposed shell walkway and building access steps are located within the dune; however, to mitigate for this encroachment, two dune restoration areas are proposed. The total combined area of the proposed dune restoration is 900 s.f., this exceeds a 2:1 mitigation rate. Additionally, the new building will be raised up on a pile foundation. Raising the building multiple feet above grade will allow for natural groundwater recharge of stormwater in an area that is currently impervious (occupied by a slab building foundation).

(b) disturbing the vegetative cover so as to destabilize the dune;

Vegetative cover will only be disturbed in the area of the dune which falls into the proposed shell walkway/ or steps, this will be mitigated with two proposed dune restoration areas that will include placement of sand that is compatible with the existing dune and through the installation of native plants. These areas of dune will exceed a 2:1 mitigation rate.

(c) causing any modification of the dune form that would increase the potential for storm or flood damage;

The proposed project will not increase the potential for storm or flood damage. The addition of enhanced plantings in the areas of dune restoration will improve stabilization of the dunal areas on the subject property. This will decrease the potential for storm and flood damage. Additionally, the shell path will be pervious; therefore, the stormwater flow and recharge conditions will not be altered.

(d) interfering with the landward or lateral movement of the dune;

The proposed project will not interfere with the landward or lateral movement of the dune it will still be able to react naturally. The proposed project will enhance the dunal area by increasing the overall size of the dune formation. The addition of native plants will improve dune stabilization.

(e) causing removal of sand from the dune artificially; or

A portion of the dune is located within the footprint of the proposed pervious shell walkway; however, to mitigate for the alteration two areas of dune restoration are proposed. Overall, the area of dune restoration will exceed a 2:1 mitigation rate. Compatible sand will be added in the dune restoration areas.

(f) interfering with mapped or otherwise identified bird nesting habitat.

The project locus is not within a mapped NHESP habitat.

(4) Notwithstanding the provisions of 310 CMR 10.28(3), when a building already exists upon a coastal dune, a project accessory to the existing building may be permitted, provided that such work, using the best commercially available measures, minimizes the adverse effect on the coastal dune caused by the impacts listed in 310 CMR 10.28(3)(b) through (e). Such an accessory project may include, but is not limited to, a small shed or a small parking area for residences. It shall not include coastal engineering structures.

N/A

(5) The following projects may be permitted, provided that they adhere to the provisions of 310 CMR 10.28(3):

(a) pedestrian walkways, designed to minimize the disturbance to the vegetative cover and traditional bird nesting habitat;

The proposed pervious shell walkway is designed to minimize the disturbance to the dune. To mitigate for the shell walkway improvement, two areas of dune restoration are proposed which will include the installation of native plants to enhance the vegetative cover.

(b) fencing and other devices designed to increase dune development; and

N/A

(c) plantings compatible with the natural vegetative cover.

In the proposed dune restoration areas native plantings will be installed.

(6) Notwithstanding the provisions of 310 CMR 10.28(3) through (5), no project may be permitted which will have any adverse effect on specified habitat sites of Rare Species, as identified by procedures established under 310 CMR 10.37.

The subject property is not identified as an area for rare vertebrate or invertebrate species by the latest mapping by the Natural Heritage Endangered Species Program (NHESP).

Wetland Performance Standards – Local Nantucket Wetland Regulations

The subject property has the following have the following **Locally Defined Resource Areas and associated Performance Standards:**

An explanation is provided to show how each performance standard is met.

2.02 COASTAL BEACHES (and TIDAL FLATS)

B. PERFORMANCE STANDARDS

A Coastal Beach, Tidal Flat or Land within 100 feet of a Coastal Beach or Tidal Flat shall be presumed significant to the Interests Protected by the Bylaw, as referenced in Section A, therefore the following regulations shall apply.

1. The provisions of Section 2.01B (1-8) (Land Under the Ocean) shall apply to coastal beaches and tidal flats.

   The proposed project does not fall within Land Under the Ocean, nor are there tidal flats within the project locus.

2. No new bulkheads or coastal engineering structures shall be permitted to protect structures constructed, or substantially improved, after 8/78. Bulkheads may be rebuilt only if the Commission determines there is no environmentally better way to control an erosion problem, including in appropriate cases the moving of the threatened building. Other coastal engineering structures may be permitted only upon a clear showing that no other alternative exists to protect a structure built prior to 9/78, and not substantially improved, from imminent danger.

   N/A - The proposed project does not include new bulkheads or coastal engineering structures.

3. Dredging projects in flats must be done in accordance with such procedures as the Commission determines would disturb the absolute minimum amount of habitat possible for both the borrow site and the area in which spoils are placed.

   N/A - The proposed project does not include dredging.

4. Clean fill of compatible grain size may be used on a Coastal Beach but not on a Tidal Flat, only if the Commission authorizes its use, and only if such fill is to be used for a beach or dune nourishment project. All possible mitigation measures shall be taken, as determined by the Commission, to limit the adverse effects of the fill.

   N/A – The proposed project does not include beach or dune nourishment.

5. No part of any septic system shall be placed in shifting sands or on a coastal beach. The septic leach facility shall be at least 100 feet from the spring high tide line.

   N/A - The proposed project is connected to the public sanitary sewer system.

6. All work on projects which are not water dependent shall maintain at least a 25-foot natural undisturbed area adjacent to a coastal beach. All structures which are not water dependent shall be at least 50 feet from a coastal beach.

   The proposed Harbormaster building is a water dependent public safety facility. For quick response times in an emergency, it is critical that the building be positioned to provide the Harbormaster and staff with the best possible visibility of the harbor, and be located within close proximity to the pier to access the water/harbor.

7. In areas of eroding shoreline, the distance from all buildings to the coastal beach shall be at least 20 times the average annual shoreline erosion or 100 feet, whichever is the lesser. The average annual shoreline erosion rate shall be determined by averaging the annual erosion rate over a 150 year period ending the date the NNOI was filed, or if no NNOI was filed, the date construction began. If erosion data is not available for the 150-year period, the Commission shall determine the average annual erosion rate from such lesser time period for which erosion data is available. In cases where documentation can be provided to show that the use of the 150-year period is inappropriate to existing shoreline characteristics and trends, alternate shoreline change rates may be used when based on a preponderance of credible evidence.

N/A

8. Vehicular access for existing houses or for recreational use shall be as unpaved ways and shall be done in accordance with such procedures as the Commission determines will minimize any adverse effect on the beach and the Interests of the Bylaw.

   N/A – There is no proposed vehicular access for existing homes or recreational use on the project site.

9. Fertilizers shall be used in accordance with the "Best Management Practices for Landscape Fertilizer Use on Nantucket Island" (a copy of which is attached to these regulations as appendix A).

   N/A – No Fertilizers will be used on the proposed project site.

10. The Commission may impose such additional requirements as are necessary to protect the Interests Protected by the Bylaw.

2.03 COASTAL DUNES

B. PERFORMANCE STANDARDS

A Coastal dune, coastal dune field, or land within 100 Feet of a coastal dune or coastal dune field, shall be presumed significant to the Interests Protected by the Bylaw as referenced in Section A, therefore the following regulations shall apply.

1. No coastal revetments or coastal engineering structures of any type shall be constructed, rebuilt, or repaired.

   N/A - The proposed project does not include new bulkheads or coastal engineering structures.

2. All projects which are not water dependent shall maintain at least a 25-foot natural undisturbed area adjacent to a coastal dune. All structures which are not water dependent shall be at least 50 feet from a coastal dune.

   The proposed Harbormaster building is a water dependent public safety facility. For quick response times in an emergency, it is critical that the building be positioned to provide the Harbormaster and staff with the best possible visibility of the harbor, and be located within close proximity to the pier to access the water/harbor.

3. No excavation or disturbance of vegetative cover shall be allowed on a coastal dune unless the area is completely restored, replanted, and stabilized to its original form and volume.

   Vegetative cover will only be disturbed in the area of the dune which falls into the proposed shell walkway/steps; this will be mitigated in two proposed dune restoration areas with the

installation of compatible sand and native plants. The proposed areas of restoration will exceed the area of disturbance at a 2:1 mitigation rate.

4. Fill may be used only if the Commission authorizes its use and only if such fill is to be used for beach and dune nourishment projects.

   The two dune restoration areas are proposed adjacent to the existing dunal formation. The addition of compatible sand to create the restoration areas will help to nourish the existing dunal area.

5. No part of any septic system shall be placed in shifting sands or on or in a coastal dune. The septic leach facility shall be at least 100 feet from the upland edge of a coastal dune or coastal dune field.

   N/A - The proposed project is connected to the public sanitary sewer system.

6. Any activity allowed on a coastal dune or within 100 feet of a dune shall be restricted to such activity that is determined by the Commission not to have any adverse effect on the dune by altering the ability of wind or waves to remove sand from or deposit sand on a dune; by disturbing vegetative cover in a manner sufficient to destabilize the dune; by causing any modification of the dune form and slope which would increase the potential for erosion, storm or flood damage; by interfering with landward or lateral movement of the dune; or by causing the rate of sand removal to increase through man-made means or structures.

   The proposed project will not have adversely effect the ability of wind or waves to remove sand from or deposit sand on a dune; by disturbing vegetative cover in a manner sufficient to destabilize the dune; by increasing the potential for erosion, storm or flood damage; by interfering with landward or lateral movement of the dune; or by causing the rate of sand removal to increase through man-made means or structures.

7. No activity shall be permitted, other than the maintenance and repair of a structure existing on the effective date of these regulations that will result in construction of a building upon a coastal dune or within 50 feet of any coastal dune.

   The proposed Harbor master building will replace the existing building that has a slab on grade foundation. The new building will be elevated on piles. By elevating the building on piles the area previously occupied by the slab on grade building will become pervious. This will greatly improve the ability of flood waters to flow beneath the building and reduce the risk of storm damage to the subject site and neighboring properties. Overall, the proposed re-development project will result in a great environmental benefit through the reduction of impervious ground cover area and enhancement of the dune on the subject site.

8. Any pedestrian or elevated walkway must be designed as determined by the Commission so as to minimize disturbances of vegetative cover.

   The proposed pedestrian shell walkway is designed to maintain public access between the existing park that is adjacent to the Harbormaster building and the existing pier. The pervious

shell walkway has been sited to minimize the disturbance to the dune. As mentioned previously, to mitigate for the walkway alteration, two areas of dune restoration are proposed which will include the installation of native plants to enhance the vegetative cover.

9. Fertilizers shall be used in accordance with the "Best Management Practices for Landscape Fertilizer Use on Nantucket Island" (a copy of which is attached to these regulations as appendix A).

   N/A – No Fertilizers will be used on the proposed project site.

10. Vehicular access for existing homes or recreational use shall be as unpaved ways and shall be done in accordance with such procedures as the Commission determines will minimize any adverse effect on the dune and the Interests of the Bylaw.

    N/A – There is no proposed vehicular access for existing homes or recreational use on the project site.

11. The Commission may impose such additional requirements as are necessary to protect the Interests Protected by the Bylaw.

2.10 LAND SUBJECT TO COASTAL STORM FLOWAGE

B. PERFORMANCE STANDARDS

Land Subject to Coastal Storm Flowage or Land within 100 feet of Land Subject to Coastal Storm Flowage shall be presumed significant to the Interests Protected by the Bylaw as referenced in Section A, therefore the following regulations shall apply:(Specific resource areas that lie within the area of land subject to coastal storm flowage, and the wetland values they protect, are otherwise addressed elsewhere in these regulations. The regulations concerning those areas are additional to the regulations set forth in this section.)

1. The work shall not reduce the ability of the land to absorb and contain flood waters, or to buffer inland areas from flooding and wave damage.

   The proposed project will reduce impervious ground cover on the property. Raising the building on a pile foundation will allow flood waters to move below the building; this reduces the risk of storm damage and debris from wave action. Therefore, the project does not reduce the ability of the land to absorb and contain flood waters, or to buffer inland areas from flooding and wave damage.

2. Projects shall not cause ground, surface, or salt water pollution triggered by coastal storm flowage. All septic tanks and leach facilities shall be located outside the 100-year floodplain.

   N/A - The proposed project is connected to the public sanitary sewer system.

3. All private underground fuel tanks shall be outside the 100-year floodplain. Commercial tanks shall be outside the 100-year floodplain, or if the Commission determines this is not practicable, the commercial tanks shall be secured so that they cannot float loose.

   The entire site is located within the 100-year floodplain, so it is not possible to locate the new propane tank outside of the 100-year flood plain. Currently, the existing Harbormaster facility utilizes a propane tank that is above ground and located adjacent to the building. The elevation of the tank is at existing grade (El. ~4.5). The proposed redevelopment project includes installation of a new thank that will be underground. The tank will be designed with a concrete slab and anchor system designed to provide ballast during a flood event and prevent the tank from becoming exposed.

4. Building upon areas subject to coastal storm flowage in locations where such structure would be subject to storm damage may not be permitted. If permitted, all construction must be in compliance with state and local building code regulations for flood hazard areas.

   The Applicant applied to the State Board of Building and successfully received a variance from the Massachusetts Building Code that allows the building to be constructed in the velocity zone at the proposed elevation utilizing a design that incorporates a steel pile foundation, an elevated ferro cement foundation, and flood resistant structure up to the design flood elevation, elevation 13.

5. Fertilizers shall be used in accordance with the "Best Management Practices for Landscape Fertilizer Use on Nantucket Island" (a copy of which is attached to these regulations as appendix A).

   N/A – No Fertilizers will be used on the proposed project site.

6. The Commission may impose such additional requirements as are necessary to protect the Interests Protected By the Bylaw.

Construction Protocol

Pre-Construction Requirements

- A sign bearing the MA DEP file number shall be posted in compliance with the Order of Conditions issued by the Nantucket Conservation Commission.
- Prior to any construction or site disturbance activity, the erosion and sedimentation barriers shall be installed in the location(s) shown on the plan. The Silt barrier will be a staked silt sock or silt fence as indicated on the plans.
- Prior to any site disturbance activity silt sacks shall be installed in all catch basins located down gradient of the project site.
- A copy of the approved plans and the Order of Conditions shall be provided to the Contractor and shall be on site at all times.
- A dewatering plan shall be provided to the Conservation Agent and Engineer by the Contractor.

On-Site Pre-Construction Conference

Prior to the start of any sitework or construction, a pre-construction meeting will be held on site to discuss the project requirements with the following parties represented:

- Sitework Contractor
- Coastal Engineering Co. Inc., Engineer
- Nantucket Conservation Agent

Topics to be discussed during the meeting:

- Maintenance of Erosion and Sedimentation Control barrier and protection of existing stormwater management systems
- Limit of Work
- Construction sequencing and schedule
- Material and Equipment Storage
- Project contacts

During the preconstruction conference, the Engineer and Conservation Agent shall inspect the erosion and sedimentation barrier. Any deficiencies shall be addressed prior to the commencement of work

Erosion Control

Areas outside of the construction work area shall be protected from erosion and sedimentation by the placement of an erosion and sedimentation barrier as shown on the site plan. The barrier shall be maintained in good condition at all times. The erosion and sedimentation control measures shall remain in place until stabilization of disturbed areas. The erosion control measures shall not be removed without the approval of the Conservation Agent.

Sediment shall be removed by hand anytime the erosion and sedimentation barrier has a thirty percent load of sediment, or as directed by the engineer or an agent of the Conservation Commission.

Limit of Work

The Sitework Contractor shall familiarize himself with the boundaries of the property and the limit of work. The Contractor shall exercise care in order to protect adjacent properties and wetland resource areas. The Contractor shall not operate heavy equipment outside the work limit as shown on the approved plan and delineated by the erosion and sedimentation control barrier.

The Contractor shall practice good housekeeping measures during the day-to-day operations at the site. The site should be policed daily to remove any litter or construction debris. Care shall be taken that no debris be allowed outside the work limit. Debris outside the work limit shall be picked up immediately.

Construction Access

Construction access shall be from the existing driveway. The staging area on the project site is to be the existing driveway/parking area.

Construction Operations

The contractor shall practice good housekeeping measures during the day-to-day operations at the site. The site shall be policed daily to remove any litter or construction debris. Care shall be taken that no debris be allowed outside the work limit. Debris outside the work limit shall be picked up immediately.

Any construction debris which will not be removed from the site at the end of the workday shall be placed in dumpsters. The dumpsters shall be located in the existing driveway or proposed driveway. The dumpsters shall be covered at the end of the workday and emptied when full. The Contractor shall police the site daily in order to prevent wind-blown material from entering abutting properties or resource areas.

Material stockpiles that are in place for an extended period of time shall be stabilized with vegetation, mulching, erosion control blankets, and other measures that are necessary to prevent the discharge of sediment from the project site.

Replanting of areas disturbed by construction activities shall be performed as early in the project as practicable.

Construction Dewatering

It is anticipated that groundwater will be encountered during installation of subsurface utilities. The Contractor shall provide the Engineer and Conservation Agent with a dewatering plan for review and approval prior to initiating de-watering activities. The Contractor should conduct dewatering (and discharging of water) in accordance with all applicable regulations.

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

NOI Wetland Fee Transmittal Form

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

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

A. Applicant Information

1. Location of Project:

34 Washington Street	Nantucket
a. Street Address	b. City/Town
EXEMPT	EXEMPT
c. Check number	d. Fee amount

2. Applicant Mailing Address:

Stephen	Kelleher
a. First Name	b. Last Name

Stephen Kelleher Architects, Inc.
c. Organization

57 Alden Road
d. Mailing Address

Fairhaven	MA	02719
e. City/Town	f. State	g. Zip Code

h. Phone Number	i. Fax Number	j. Email Address

3. Property Owner (if different):

a. First Name	b. Last Name

Town of Nantucket
c. Organization

16 Broad Street
d. Mailing Address

Nantucket	MA	02554
e. City/Town	f. State	g. Zip Code

h. Phone Number	i. Fax Number	j. Email Address

To calculate filing fees, refer to the category fee list and examples in the instructions for filling out WPA Form 3 (Notice of Intent).

B. Fees

Fee should be calculated using the following process & worksheet. ***Please see Instructions before filling out worksheet.***

Step 1/Type of Activity: Describe each type of activity that will occur in wetland resource area and buffer zone.

Step 2/Number of Activities: Identify the number of each type of activity.

Step 3/Individual Activity Fee: Identify each activity fee from the six project categories listed in the instructions.

Step 4/Subtotal Activity Fee: Multiply the number of activities (identified in Step 2) times the fee per category (identified in Step 3) to reach a subtotal fee amount. Note: If any of these activities are in a Riverfront Area in addition to another Resource Area or the Buffer Zone, the fee per activity should be multiplied by 1.5 and then added to the subtotal amount.

Step 5/Total Project Fee: Determine the total project fee by adding the subtotal amounts from Step 4.

Step 6/Fee Payments: To calculate the state share of the fee, divide the total fee in half and subtract $12.50. To calculate the city/town share of the fee, divide the total fee in half and add $12.50.

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

NOI Wetland Fee Transmittal Form

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

B. Fees (continued)

Step 1/Type of Activity	Step 2/Number of Activities	Step 3/Individual Activity Fee	Step 4/Subtotal Activity Fee
Cat 3a (Site Preparation)	1	$1,050.00	EXEMPT (TOWN PROJECT)
Cat 3b (Building Construction)	1	$1,050.00	EXEMPT (TOWN PROJECT)

Step 5/Total Project Fee: EXEMPT

Step 6/Fee Payments:

Total Project Fee:	EXEMPT a. Total Fee from Step 5
State share of filing Fee:	EXEMPT b. 1/2 Total Fee **less** $12.50
City/Town share of filling Fee:	EXEMPT c. 1/2 Total Fee **plus** $12.50

C. Submittal Requirements

a.) Complete pages 1 and 2 and send with a check or money order for the state share of the fee, payable to the Commonwealth of Massachusetts.

Department of Environmental Protection
Box 4062
Boston, MA 02211

b.) **To the Conservation Commission:** Send the Notice of Intent or Abbreviated Notice of Intent; a **copy** of this form; and the city/town fee payment.

To MassDEP Regional Office (see Instructions): Send a copy of the Notice of Intent or Abbreviated Notice of Intent; a **copy** of this form; and a **copy** of the state fee payment. (E-filers of Notices of Intent may submit these electronically.)

COASTAL
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C19031.00/TLM

AFFIDAVIT OF SERVICE

Massachusetts Wetlands Protection Act

M.G.L., CH 131, Sec. 40

I, Carla Davis, of Coastal Engineering Co., Inc. hereby certify under the pains and penalties of perjury that on March 13, 2020 I sent notification to abutters in compliance with the second paragraph of Massachusetts General Laws Chapter 131 Section 40 and the Department of Environmental Protection's Guide to Abutter Notification dated April 8, 1994 in connection with the following matter:

A Notice of Intent was filed under the Massachusetts Wetlands Protection Act and the Nantucket Wetlands Protection By-law, by Stephen Kelleher of Stephen Kelleher Architects, Inc. with the Nantucket Conservation Commission on March 13, 2020 for property located at 34 Washington Street Map 42.2.3 Parcel 2 in Nantucket, MA. The project is for the Proposed Addition to the Harbormaster Building and Associated Site Improvements.

The form of the notification and a list of the abutters to whom the notice was given and their addresses are attached to this Affidavit of Service.

Very truly yours,

COASTAL ENGINEERING CO., INC.

Carla Davis

Carla Davis

Enclosures

cc: Mass. DEP/ SERO – Wetlands
Nantucket Conservation Commission
Stephen Kelleher Architects, Inc.
Town of Nantucket
Tarja L. McGrail, Project Manager

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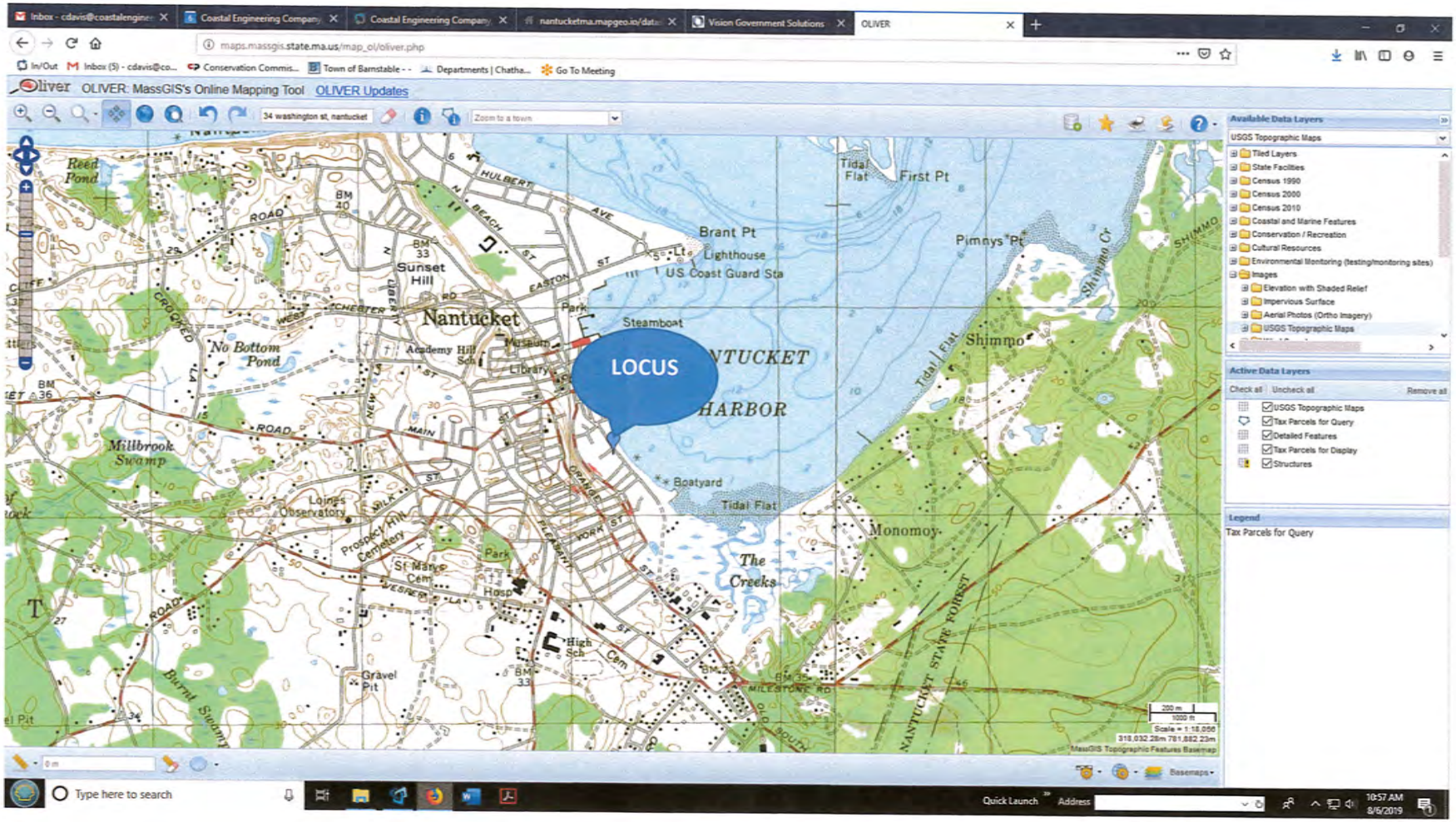

C19031.00, Stephen Kelleher / Nantucket Harbormaster
34 Washington Street, Nantucket, MA
Parcel ID: 42.2.3.2
41° 16' 53.184'' N 70° 5' 43.404'' W

FILE NO. C19031.00

STORMWATER MANAGEMENT REPORT

Nantucket Harbormaster Facility
34 Washington Street
Nantucket, MA

March 2020

Prepared for:

Town of Nantucket

Prepared by:

COASTAL ENGINEERING CO., INC.
260 Cranberry Highway
Orleans, MA 02653

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STORMWATER MANAGEMENT SYSTEM DESCRIPTION

The proposed project includes redevelopment of the existing Harbormaster Facility that is located adjacent to Nantucket Harbor at the Town pier. The property is situated within the following wetland resource areas and/or resource area buffer zones: Coastal Beach, Coastal Dune, and Land Subject to Coastal Storm Flowage (Flood Zone VE El. 11). The entire property is located within land subject to coastal storm flowage, and the buffer to both coastal dune and beach resource areas. Currently, the project site is improved with a building (on slab foundation), decks, steps, access ramps, parking area, walkways, and an access path with cobble stone edge.

The existing topography of the site where the proposed redevelopment work will take place varies in elevation; elevations within the project site range from 0 to 5 feet. Currently, the project site does not have a formal drainage system, and runoff from a majority of the roof of the existing Harbormaster building and the developed site flows towards the existing catch basins that are located in Washington Street. The catch basins located in Washington Street collect runoff from the roadway and adjacent properties, and the captured runoff is then conveyed via pipe to an outfall that is located to the east of the project site.

The proposed redevelopment includes the following site improvements:

- Remove the existing Harbormaster Building and associated slab on grade foundation;
- Construct a new building on pile foundation that is designed to improve flood resilience and sized to meet the needs of the Town's Harbormaster and staff;
- Construct an accessory storage shelter (slab on grade with roof, see A-1.2) to the south of the new building that is sized to shelter a materials storage trailer;
- Improve the existing parking area and install ramps, decks, and stairs to provide access to the new building.
- Alterations to the existing pervious shell path from the neighboring park to the pier to maintain direct public access from the park to pier.
- Install 900 s.f. of dune restoration area to mitigate for installation of new pervious shell paths to connect the existing park to the pier. The dune restoration will include native plantings that will help to stabilize the dune resource area.
- Installation of stormwater practices to manage and infiltrate/recharge all roof runoff from the proposed buildings.

As part of the proposed redevelopment design for the Harbormaster Facility, roof runoff from the proposed building and storage shelter will be captured and recharged onsite utilizing stone infiltration trenches. The stone infiltration trenches are shallow to maximize the separation between the bottom of trench and groundwater. The trenches are sized to manage and recharge runoff generated during the 2-year, 10-year, and 25-year-24 hour design storm events. Appendix E of this Stormwater Report includes HydroCAD sizing calculations for the infiltration trenches. By redeveloping the site and managing roof runoff onsite, there will be a reduction in runoff volume and peak flow contributed from the project site to the Washington Street drainage system and study point in the post development conditions. The proposed design will be a great improvement over the existing conditions.

In addition to capturing and managing roof runoff onsite, impervious ground cover on the site will be reduced by removal of the existing slab building foundation and installation of the new building on a pile foundation. Installed on a pile foundation the lowest horizontal member of the new harbormaster building will be approximately 3 feet above existing grade. Upon completion of the new building, it is anticipated that the soil conditions beneath the building will be pervious sandy soils. The pervious soils will allow for natural infiltration/ recharge of stormwater runoff during a

storm event. This will improve the ability of the land to absorb stormwater runoff, contain flood waters, and buffer inland areas from flood damage.

The proposed redevelopment project will provide on-site management and recharge of the stormwater runoff generated within the redevelopment site to the maximum extent practicable. In comparison with current site conditions, the proposed site improvements will result in a substantial reduction in the volume and peak flow of runoff contributed to the existing roadway drainage system.

The Stormwater Management Plan for this facility is based upon the source control of pollutants by the application of Best Management Practices (BMP's) and good housekeeping measures during the day to day operation of the facility.

Massachusetts Stormwater Management Design Standards

The following is a description of how the proposed project meets the Massachusetts Stormwater Handbook design Standards:

Standard 1: No new untreated discharges
This standard is met since there are no new untreated stormwater discharges proposed.

Standard 2: Maintain Pre-development peak discharge rate
This standard has been met. The overall area of impervious ground coverage on the project site has been reduce by 900 s.f.+/-. The proposed stone infiltration trenches are sized to manage and recharge runoff from the building roof onsite. As a result, there is a reduction in the post development peak discharge rate of runoff from the re-developed site during the 2 year-24 hour, and 10 year-24 hour design storm events. Reduction resulting from the redevelopment during the 100 year-24 hour storm event has not been evaluated since the site will be inundated with floodwaters during the 100 year storm event. Table 3.0 summarizes the resulting reduction of peak discharge rates for the pre-development and post-development conditions to the study point located in the Harbor to the east of the project site.

Standard 3: Groundwater Recharge
This standard has been met. The proposed stormwater management systems are sized such that the total recharge volume provided exceeds the minimum groundwater recharge volume specified in the handbook (see Table 3.0 for recharge volume calculation) and the proposed stormwater recharge basins will drawdown within 72 hours of a storm event (see Table 4.0 for drawdown calculation).
In accordance with MASWMS (Chapter 1, p.6), the required recharge volume factor required across the impervious area is 0.60 inches of runoff for hydraulic soil group A soils, sand soils (assumed). The assumed soil conditions are based on soil borings performed at the site for the building foundation design. Additional Soil testing will be performed prior to installation of the trenches to confirm soil conditions in area of proposed BMP's prior to installation of drainage systems.
HydroCAD stormwater modeling software was used to size the stone trench using the simple dynamic method, the results of this analysis for the 2 year, 10 year, and 25 year - 24 hour storm events are presented in the HydroCAD report included in Appendix E.

Standard 4: Water Quality
This standard has been met. The proposed infiltration trenches are receiving runoff from a non-metal roof.

Standard 5: Land uses with higher pollutant loads
This standard is not applicable.

Standard 6: Stormwater discharges within the Zone II or Interim Wellhead protection area of a public water supply, and stormwater discharges near or to any critical area
This standard is not applicable.

Standard 7: Redevelopment
This project is a redevelopment project.

Standard 8: Construction Erosion Control Plan

Erosion control measures are shown on the proposed site plan and discussed in the project construction protocol.

Standard 9: Long Term Operation and Maintenance Plan
A long-term operations and maintenance plan has been submitted with this report.

Standard 10: Illicit Discharges
This standard is met since there are no known illicit discharges at this site and no illicit discharges are proposed.

Owner and Responsible Party

The owner and responsible party for Stormwater Management System:

<u>Owner / Operator:</u>

Town of Nantucket
Harbormaster

Phone: (508) 228-7261

COASTAL
engineering co.

SCHEDULE OF INSPECTION AND MAINTENANCE OF SYSTEM

The stormwater system requires regular attention in order to ensure the effectiveness of the system.

1. Landscaped areas should be adequately maintained and vegetated to prevent the presence of exposed soil/eroded areas. In rain events, exposed soil will lead to a greater amount of sediment that can be transported by runoff toward the stormwater management systems.

LONG TERM POLLUTION PREVENTION PLAN

DESCRIPTION OF POLLUTANT SOURCES:

Source Control Best Management Practices

- Trash receptacles shall be covered. If leaks are found, the receptacle shall be replaced. Trash receptacle areas shall be kept clear of debris.
- Good housekeeping measures shall be implemented throughout the site in order to keep the driveways and parking lot areas clean of debris.
- Regularly sweep streets and driveways to remove debris and any other potential stormwater pollutants.
- The use of winter de-icing sand and salt materials shall be minimized to the maximum extent practicable.
- Winter de-icing sand and salt materials shall be stored in garage.
- Immediately clean up any spillage on paved areas and dispose of the wastes properly.
- Do not wash vehicles or equipment in a location where cleaning water, oil, fuel and grease can drain to the wetland resource areas.

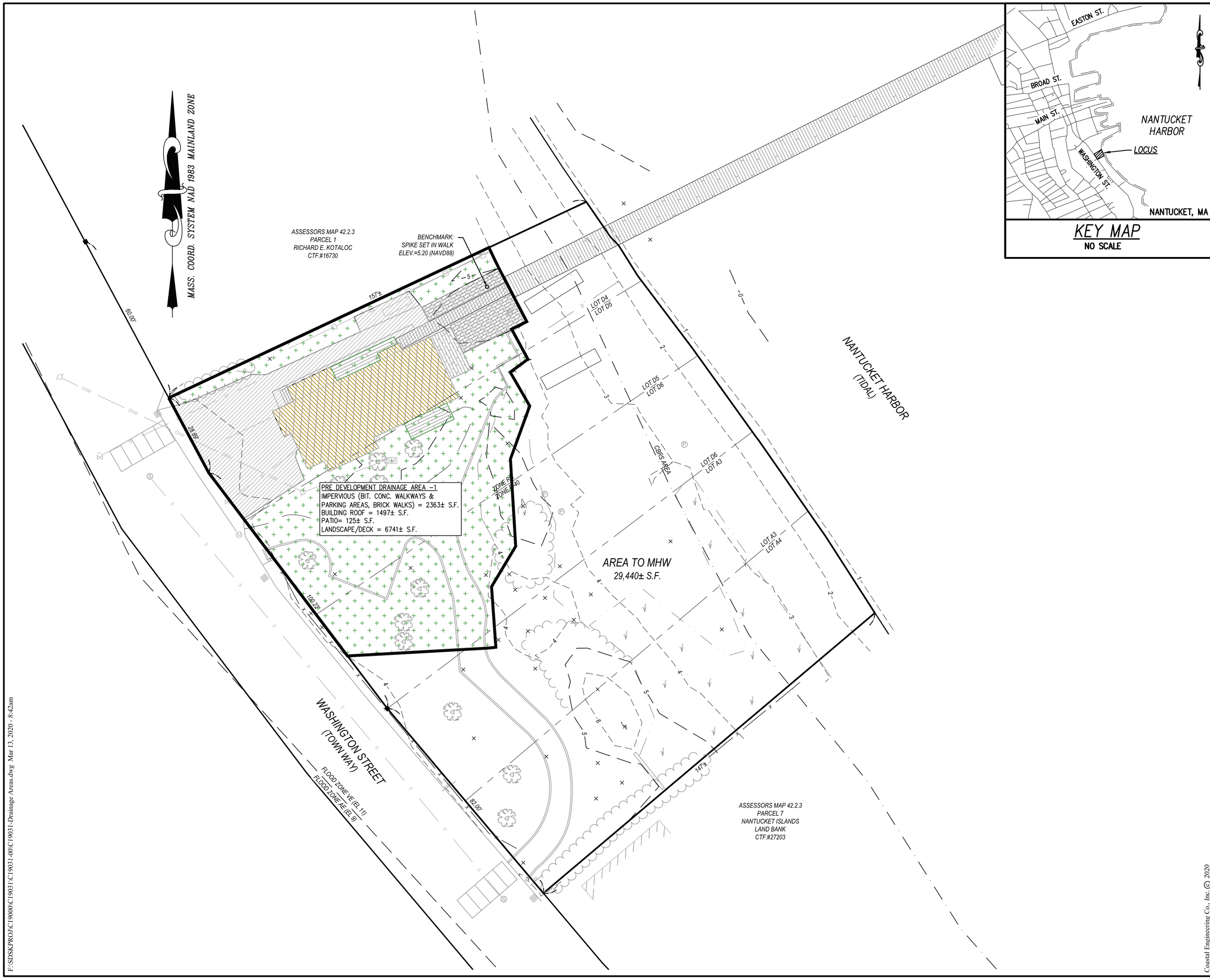
Emergency Spill Cleanup Plans

1. The owner of the facility shall have a designated person with overall responsibility for spill response cleanup.
2. Key personnel shall be trained in the use of this plan and spill containment and cleanup methods. All employees should have basic knowledge of spill control procedures.
3. A summary of this plan shall be written and posted in a prominent location. The summary shall identify the spill cleanup coordinators, location of cleanup kit and phone numbers of regulatory agencies and individuals to be contacted in the event of a spill.
4. In the event of a spill the following shall be notified:
   A. Nantucket Fire Department..... (508) 228-2323
   (For a gasoline or hazardous material spill).....911
   B. Massachusetts Department of Environmental Protection
   Emergency Response.....(800) 304-1133
   C. Nantucket Health Department..... (508) 228-7200
5. Cleanup of spills shall begin immediately.
6. The emergency spill cleanup plan shall be updated regularly.

APPENDIX A

Drainage Areas & Calculations

- DA-1 Plan Showing Pre-Development Drainage Areas, Sheet 1 of 2
- DA-2 Plan Showing Post-Development Drainage Areas, Sheet 2 of 2
- Table 1.0: Pre-Development Subcatchment Areas and Peak Flow
- Table 2.0: Post-Development Subcatchment Areas and Peak Flow
- Table 3.0: Summary of Peak Flow Reduction Post Development
- Table 4.0: Post Development Recharge Volume Calculations
- Table 5.0: Infiltration Practice –Drawdown Calculations



KEY MAP
NO SCALE

COASTAL engineering co.
260 Cranberry Hwy. Orleans, MA 02653
508.255.6511 P 508.255.6700 F

NO.	DATE	REVISION	BY

SEAL

PROJECT
HARBOR MASTER BUILDING
34 WASHINGTON ST
NANTUCKET, MA

SHEET TITLE
PRE DEVELOPMENT DRAINAGE PLAN

SCALE	AS NOTED
DRAWING FILE	C19031.dwg
DATE	03-06-2020
DRAWN BY	DAV
CHECKED BY	TLM

DA-1

1 OF 1 SHEETS

PROJECT NO. C19031.00

Coastal Engineering Co., Inc. © 2020

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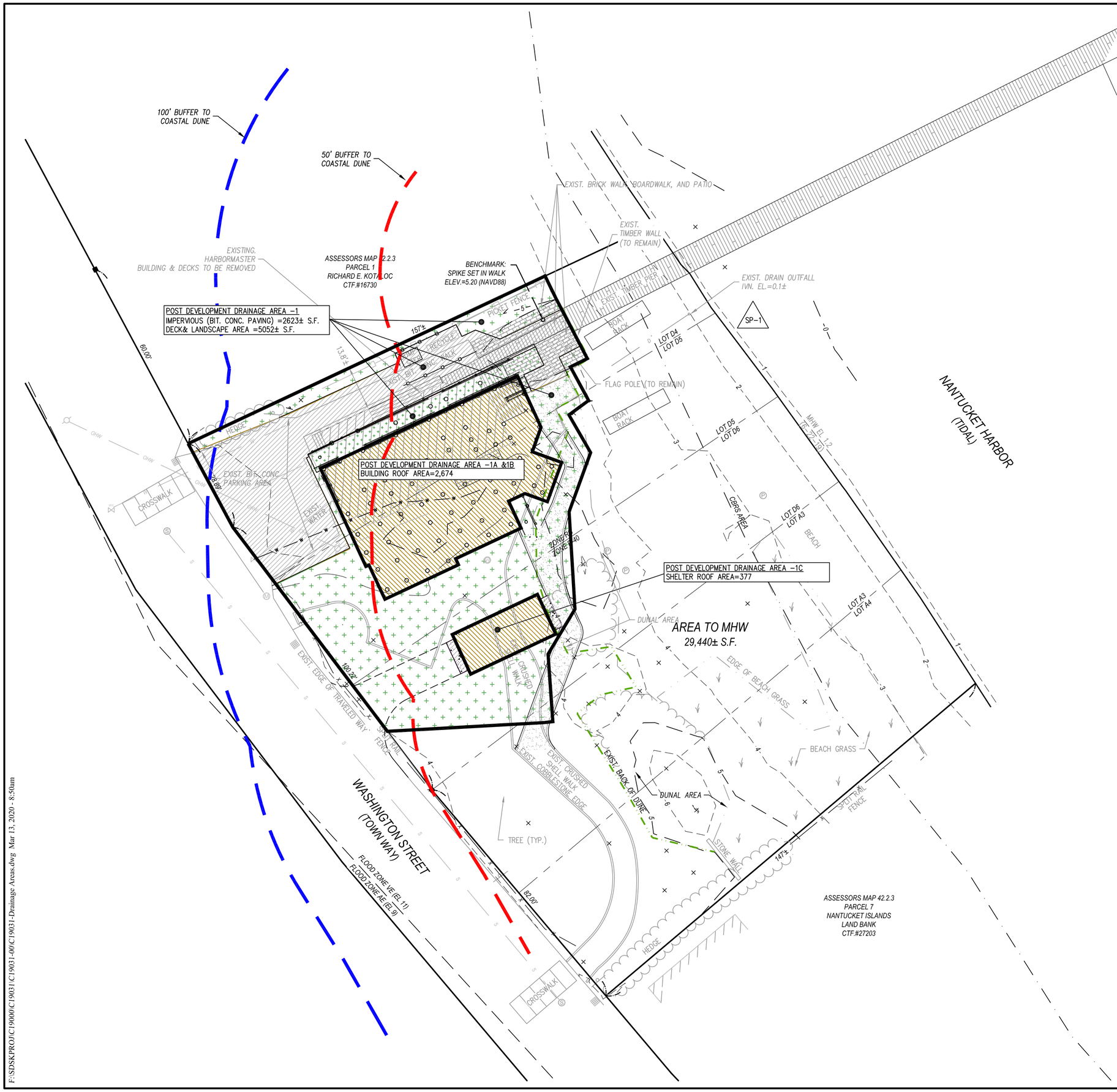

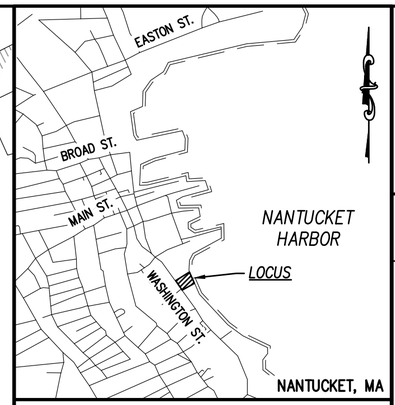

KEY MAP
NO SCALE

COASTAL engineering co.
260 Cranberry Hwy. Orleans, MA 02653
508.255.6511 P 508.255.6700 F

NO.	DATE	REVISION	BY

SEAL

PROJECT
HARBOR MASTER BUILDING
34 WASHINGTON ST
NANTUCKET, MA

SHEET TITLE
POST DEVELOPMENT DRAINAGE PLAN

SCALE	AS NOTED
DRAWING FILE	C19031.dwg
DATE	03-06-2020
DRAWN BY	DAV
CHECKED BY	TLM

DA-2

1 OF 1 SHEETS

PROJECT NO. C19031.00

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Table 1.0 Pre-Development Subcatchment Areas and Peak Flow

	AREA (S.F.)					PEAK FLOW (CFS)		
SUB-CATCHMENT AREA	BUILDING SLAB/ROOF	PATIO	LANDSCAPE/ DECK	IMPERVIOUS PAVING (PARKING, BRICK WALKS, BIT. CONC WALKS)	TOTAL AREA	2 YR/ 24-HOUR	10 YR/ 24-HOUR	25 YR/ 24-HOUR
PRE DA-1	1497	125	6,741	2363	10,726	0.11	0.30	0.44

Table 2.0 Post-Development Sub-Catchment Areas and Peak Flow

	AREA (S.F.)					PEAK FLOW (CFS)		
SUB-CATCHMENT AREA	ROOF	PATIO	LANDSCAPE/ DECK	IMPERVIOUS PAVING (PARKING, BRICK WALKS, BIT. CONC WALKS)	TOTAL AREA	2 YR/ 24-HOUR	10 YR/ 24-HOUR	25 YR/ 24-HOUR
DA-1 (OVERLAND)	0	0	5,052	2,623	7,675	0.06	0.18	0.28
DA-1A (HARBOR MASTER BLDG NORTHERN HALF)	1,337	0	0	0	1,337	0.00	0.00	0.00
DA-1B (HARBOR MASTER BLDG SOUTHERN HALF)	1,337	0	0	0	1,337	0.00	0.00	0.00
DA-1C (STORAGE SHELTER ROOF)	377	0	0	0	377	0.00	0.00	0.00
TOTAL AREA MANAGED	3,051	0	5,052	2,623	10,726	0.06	0.18	0.28

Table 3.0 Summary of Peak Flow Reduction Post Development

SUB-CATCHMENT AREA	TOTAL AREA	2 YR/ 24-HOUR	10 YR/ 24-HOUR	25 YR/ 24-HOUR
DA-1	10,726	0.05	0.12	0.16

Table 4.0:
Post-Development Recharge Volume Calculations

DRAINAGE AREA	Impervious Area (S.F.)	Impervious Area (Pavement) (Ac.)	Roof Area (S.F.)	Roof Area (Ac.)	Impervious Pavement & Roof Area (Ac.)	Re_v (C.F.)**	BMP	BMP Storage Volume (C.F.)
DA-1	2,623	0.06	0	0.00	0.06	131		0
DA-1a			1337.00	0.03	0.03	67	35'L x 6'Wx1'D	168
DA-1b			1337	0.03	0.03	67	58'Lx4'Wx1'D	93
DA-1c			377	0.01	0.01	19	56'L x 1'Wx 1'D	23
Total						284		284

****Re_v= Required recharge volume**
Re_v= F x impervious area
F = Target Depth Factor ; 0.6-inch (assumed for NRCS HSG A soils present on site)

Table 5.0:
Infiltration Practice - Drawdown Calculations

Time $_{drawdown}$ = (Rv) / (K)x(Surface Area); must be <72 hours				
	Surface Area (S.F.)	(R_v) Storage Volume (C.F.)	(K) Sat. Hydraulic Conductivity Rate (inches/hour)	Drawdown Time (hours)
DA-1a	210	168	8.27	1.16
DA-1b	232	93	8.27	0.58
DA-1c	56	23	8.27	0.60

APPENDIX B

TSS Removal Calculation

- TSS Removal Calculation Worksheet

INSTRUCTIONS:
1. In BMP Column, click on Blue Cell to Activate Drop Down Menu
2. Select BMP from Drop Down Menu
3. After BMP is selected, TSS Removal and other Columns are automatically completed.

Version 1, Automated: Mar. 4, 2008

Location: roof

TSS Removal Calculation Worksheet

B BMP[1]	C TSS Removal Rate[1]	D Starting TSS Load*	E Amount Removed (C*D)	F Remaining Load (D-E)
Subsurface Infiltration Structure	**0.80**	**1.00**	**0.80**	**0.20**
	0.00	**0.20**	**0.00**	**0.20**
	0.00	**0.20**	**0.00**	**0.20**
	0.00	**0.20**	**0.00**	**0.20**
	0.00	**0.20**	**0.00**	**0.20**

Total TSS Removal = 80%

Separate Form Needs to be Completed for Each Outlet or BMP Train

Project: c19031.00
Prepared By: cec
Date: 3/12/2020

*Equals remaining load from previous BMP (E) which enters the BMP

Non-automated TSS Calculation Sheet must be used if Proprietary BMP Proposed
1. From MassDEP Stormwater Handbook Vol. 1

APPENDIX C

Soil Information

- Geotechnical Report

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GEOTECHNICAL ENGINEERING REPORT

PROPOSED HARBOR MASTER BUILDING

34 WASHINGTON STREET
NANTUCKET, MASSACHUSETTS

PREPARED FOR:
STEPHEN KELLEHER ARCHITECTS, INC.
57 ALDEN ROAD
FAIRHAVEN, MA 02719

PREPARED BY:
MCARDLE GANNON ASSOCIATES, INC.
300 OAK STREET, SUITE 460
PEMBROKE, MA 02359

MGA FILE NO:
W0760

DATE:
JULY 2019

McArdle Gannon Associates, Inc.
Engineers & Consultants

July 15, 2019
MGA File No. W0760

Stephen L. Kelleher, AIA
President / Principal Architect
Stephen Kelleher Architects, Inc.
57 Alden Road
Fairhaven, MA 02719

RE: Geotechnical Engineering Report – Proposed Harbor Master Building – 34 Washington Street, Nantucket, Massachusetts.

Stephen:

McArdle Gannon Associates, Inc. (MGA) is pleased to present the results of our geotechnical engineering studies performed for the referenced project. The purpose of our studies was to assess subsurface conditions within/near the footprint of the proposed harbor master building and provide recommendations for site development as they relate to building foundation design and related construction considerations.

Our geotechnical engineering studies have been performed in accordance with our proposal dated April 12, 2019 and are subject to the Statement of Limitations attached as Appendix A.

BACKGROUND

Our understanding of the current project is based on our discussions with you, our site visits, and a review of the following documents:

- A plan packet entitled "Nantucket Harbor Master Building Design Drawings Combined," by Stephen Kelleher Architects, Inc. (SKA), dated April 09, 2019,
- A plan entitled "Existing Site Conditions," dated July 10, 2019, by Coastal Engineering Company (Coastal)
- A PDF of an email provided by SKA from Coastal containing borehole drilling information from January 2015 at 26 Washington Street, Nantucket, MA, and
- A plan entitled "Surficial Geologic Map of the Nantucket, Tuckernuck, and Muskeget Islands, Massachusetts," by the United States Geological Survey (USGS), dated 2009.

The site is located at 34 Washington Street in Nantucket, Massachusetts. A Site Locus is attached as Figure 1. The site is bounded by Washington Street to the west, commercial properties to the north, residential properties to the south, and Nantucket Harbor to the east. The site is currently developed with an existing 2-story structure that we understand will be demolished.

A new 2-story new harbor master building is planned at the property. The majority of the new building will be located within the existing structure footprint and will be located within the VE flood zone vicinity. The first floor of the building will be elevated about 3.75 feet above existing site grade with a crawl space below. Existing site grades are relatively flat, ranging from about Elevation 4± to 5± feet in the area of the proposed building, sloping down to the east near Nantucket Harbor.

The preliminary foundation design consists of concrete piers supported on shallow foundations. To resist the anticipated uplift loads due to the structure being elevated, the foundations would be interconnected to provide additional dead weight.

SUBSURFACE EXPLORATIONS

A subsurface exploration program consisting of 4 soil test borings was completed as part of our studies to gather information on the subsurface conditions at the site. The purpose of the explorations was to assess subsurface soil and groundwater conditions within/near the proposed building footprint with particular emphasis on assessing the thickness and quality of existing fill soils, the density characteristics of the natural soils, and the depth to groundwater.

Technical Drilling Services of Sterling, Massachusetts performed four borings (MGA-1 through MGA-4) at the site on June 4 and 5, 2019 using an all-terrain vehicle mounted drill rig. The borings were advanced using 3 inch inside diameter flush jointed casing to a depth of 41± feet below existing ground surface elevations, terminating in natural sand soils.

Standard penetration testing (SPT) and split spoon samples were generally obtained at 5-foot intervals during advancement of the borings. The testing was performed by driving a standard 2 inch outside diameter split spoon sampler up to 24 inches using a standard 140 pound automatic hammer falling 30 inches. The number of hammer blows required to drive the sampler in 6 inch increments (or to refusal) are recorded on the boring logs attached in Appendix B.

The soil samples retrieved in the split spoon sampler during each SPT were visually described in the field by MGA using Burmister soil descriptions. It should be recognized that the inside diameter of the split spoon sampler is 1.4± inches. Therefore, soil samples obtained via Standard Penetration Testing do not account for soil fractions in excess of about 1.4± inches in diameter, which may be present in any given strata.

A 2-inch diameter groundwater monitoring well was installed in the completed borehole at boring location MGA-3 to measure stabilized groundwater levels at the site.

MGA personnel observed the explorations, visually described the conditions encountered and prepared the logs. The test boring locations are shown on the attached "Exploration Location Plan" (Figure No. 2). MGA estimated the test boring locations by taping and/or line of sight from existing site features. Ground surface elevations shown on the logs and discussed in this report were interpolated from ground surface contours or spot grades shown on the referenced "Existing Site Conditions" by Coastal. The exploration locations and elevations should be considered accurate to the degree implied by the methods used.

LABORATORY SOIL TESTING

A laboratory soil testing program consisting of 5 wash sieve, 2 organic content, and 7 moisture content analyses was performed on selected samples of the existing fill and natural sand soils collected during the exploration phase from borings MGA-1 through MGA-4. The testing was performed to aid in classifying the soil and assess grain size distribution which is useful in assessing engineering design parameters and predicting soil behavior. The results of these tests are provided in Appendix C.

SUBSURFACE CONDITIONS

Based on the subsurface conditions observed in the explorations, the vicinity of the proposed building is underlain by about 4± to 9± feet of existing fill over natural sand soils to the depths explored (41± feet).

Existing Fill: Fill was encountered at the ground surface at each boring location. The fill was about 4± to 9± feet thick at the boring locations. The existing fill generally consist of a very loose to loose, dark brown to brown to black, fine to medium/fine to coarse sand with about 10 to 40 percent silt, and up to about 20 percent debris (brick, organic matter, roots, seashells).

Refer to Appendix C for gradation curves of the 1-3/8 inch minus fraction of the existing fill soils collected from borings MGA-2 through MGA-4.

Natural Sand: Natural sand was encountered below the existing fill at about 4± to 9± feet below existing grade at the boring locations, corresponding to about Elevation -4± to 0.5± feet. The sand generally consists of loose to medium dense, brown/gray/gray-brown/olive, fine to medium/fine to coarse sand with up to about 10 percent silt.

Refer to Appendix C for gradation curves of the 1-3/8 inch minus fraction of the natural sand collected from borings MGA-1, MGA-3, and MGA-4.

Groundwater: Groundwater levels for our study were recorded in the completed test borings and test pits at the times and under the conditions noted on the logs. A stabilized groundwater reading was obtained in the monitoring well installed in boring MGA-3 at approximately 2.4± feet below existing ground surface on June 5, 2019, corresponding to about Elevation 2.1± feet.

Groundwater was measured in the remaining borings during drilling at about 2± to 4± feet below existing grades, corresponding to about Elevation 1± to 2.5± feet.

It should be expected that groundwater levels will fluctuate due to variations in temperature, tidal fluctuations, rainfall and other factors. Therefore, groundwater levels during construction and thereafter may be different than those reported herein.

GEOTECHNICAL ENGINEERING RECOMMENDATIONS

The existing fill soils are not considered suitable for support of the proposed foundation loads. The erratic density, composition, and thickness of these materials results in these soils being unpredictable as an engineering material. Constructing a shallow spread footing foundation on the current subsurface profile would likely result in intolerable settlement of the structure.

To support the building on shallow foundations as currently designed, the existing fill soils would need to be completely removed and replaced with compacted structural fill within the stress zone of the new foundations. Due to the depth of the existing fill soils (4± to 9± feet) and the presence of a shallow water table (2± feet below existing grade in the monitoring well), excavating and replacing the existing fill soils would likely require temporary excavation support and a significant dewatering effort during construction. While technically feasible, this option may be less economically attractive than supporting the new building loads on deep foundations extending through these unsuitable soils.

The type of deep foundation (pile) suitable for a particular project depends on the local subsurface soil conditions, the anticipated loading, the amount of allowable settlement and the compatibility of the chosen pile with site constraints and other construction requirements. Driven timber piles are a foundation support option that we consider technically and economically feasible for this project. Their use would eliminate the need for any significant excavation/dewatering.

Alternatively, if timber piles do not meet the project structural requirements (for instance impact loading), drilled mini-piles are an alternative pile option that could be considered. Drilled mini piles (DMPs) are small diameter structural deep foundation units consisting of high strength grout and steel installed by advancing a cased hole to a sufficient depth into a competent bearing stratum. The grout is then injected under pressure within the bearing stratum and the casing either removed or left in place. We anticipate that DMPs would be significantly more expensive than timber piles.

Shallow groundwater was encountered about 2.4± feet below existing grades in the monitoring well installed at the site. We anticipate a significant dewatering effort will be required for excavation of any planned below grade structures or utilities.

Our recommendations addressing design and earthwork construction issues are made in the following sections as outlined below:

- Building Foundations
- Seismic Design Criteria
- Dewatering

Building Foundations

As discussed above, deep foundations are recommended for support of the proposed building structural loads. Based on the subsurface conditions encountered, the size of the proposed structure, the elevated first floor level, and the anticipated foundation loads, we anticipate that driven timber piles bearing in the natural sand soils would be suitable for support of the proposed building. Alternatively, if timber piles do not meet the project structural requirements (for instance impact loading), drilled mini-piles could be used to support the proposed building. Piles should be designed in accordance with the applicable sections within Section 1810 of the Ninth Edition of The Massachusetts State Building Code (MSBC). Both pile options are discussed below.

Timber Piles

The timber piles for this project will derive their capacity through a combination of side friction and end-bearing in the natural sand soils. The pile tips should be driven through existing fill soils and for a minimum distance of 5 feet into natural sand soils or the distance estimated to derive the required capacity, whichever is greater. The approximate elevation of the bottom of fill soils is shown adjacent to each boring on the attached Figure No. 2.

Considering a pile butt diameter of 12 inches and a pile tip diameter of 8 inches, we estimate the following allowable pile capacities that can be used for preliminary design of the timber piles:

TABLE I. Timber Pile Allowable Design Capacities

Pile Embedment (feet)	Allowable Vertical Design Capacity (kips)
30	18.5
35	26
40	34

The maximum allowable load on an individual timber pile should not exceed 35 tons (70 kips). Based on Section 1810.3.3.1.1 of the MSBC, a pile load test is not required for pile design loads of less than 50 tons (100 kips) provided the allowable load capacity is determined based on final driving criteria obtained from an appropriate pile driving formula with appropriate factors of safety.

We recommend the design uplift capacity (if needed) of a single pile be taken as 1/3 of the net vertical design load for this project. If a tensile load test is performed for design confirmation, the design uplift load may be increased to ½ of the tensile load at failure.

We recommend the maximum lateral load capacity for a single pile be taken as 5 percent of the unfactored vertical design load. Higher loads could be utilized based upon satisfactory load tests results.

The minimum center-to-center pile spacing should be as required by Section 1810.3.14 of the MSBC.

Timber piles used for foundation support should consist of new Longleaf, Shortleaf, Loblolly or Slash species of Southern Pine or new Coastal species of Pacific Coast Douglas Fir, supplied to the jobsite in accordance with the requirements of ASTM D 25, latest revisions. Wood piling should be pressure treated in accordance with AWPA U1 and have a minimum of 1,200 psi allowable design strength and be capable of withstanding driving stresses of 3,000 psi. Pile cutoffs should be treated in the field in accordance with AWPA M4. CCA and ACZA piles that are frozen should not be driven. In addition, all requirements set forth in Section 1810 of the MSBC should be met.

Foundation piles for this project should be installed using impact equipment (pile-driving hammer). Jetting should not be permitted. The pile-driving hammer shall be capable of delivering a minimum of 35 percent of its energy to the pile. Pile hammer type, hammer base, cushion material and specifications should be submitted to the engineer for approval.

Leads are recommended and should be fixed at the top and adjustable at the bottom. Swinging leads may be allowed if job conditions merit their use. Final pile design capacities shall be determined by the structural engineer and provided to the geotechnical engineer for review.

All production piles shall be installed using the same equipment. Splices will not be permitted. If the head end of a timber pile brooms more than 2 inches, the broomed material should be cut off and the driving resumed. Wood piles should be installed as plumb as possible, or at the designated batter, with the pile, hammer and leads kept in alignment to prevent impact bowing action. Pile whiplash should be minimized using cables, chains, rabbits, etc. as required.

Pile heads should be cut perpendicular to the pile. The contractor may chamfer the head to minimize splitting. Pile head cut-off elevations should be within (3) inches of plan location. Furthermore, the as-driven center of gravity of any pile group at cut-off head elevation should be within 6 inches of the plan location center of gravity. Replacement or relocated pile requirements should be determined by the engineer based on survey, theoretical pile capacity, and structural analysis.

MGA should review the contractor's submittal and observe and document the timber pile installation in accordance with the requirements of the MSBC and this report.

Drilled Mini-Piles

The proposed building loads could be supported on drilled mini-piles (DMPs) bearing below the existing fill soils in the underlying natural sand deposits. The DMPs for this project would derive their capacity through friction in the natural sand soils. Piles should be cased and advanced through existing fill soils to a minimum distance of 5 feet into natural sand soils or the estimated embedment to derive the required capacity, whichever is greater. We anticipate the DMPs would consist of an upper length reinforced with permanent steel casing and central reinforcing bar and a lower pressure grouted bond length reinforced with a center reinforcing bar.

We recommend the following allowable frictional capacity per foot of embedment into the natural sand soils be used for preliminary design of the drilled mini-piles:

TABLE II. Drilled Mini-Pile Design Parameters	
Drilled Mini-Pile Grout Bond Zone Diameter (inches)	**Allowable Frictional Capacity (kips per foot)**
6	1.9
7	2.2
8	2.5

Installation of the drilled mini-piles should be performed by a specialty contractor who can demonstrate qualifications in regards to experience in work of this type and scope. The installation Contractor should be responsible for the mini-pile design and be required to submit a DMP design for review by the project team prior to construction. Drilled mini-piles should be designed in accordance with Section 1810.3.10 of the MSBC and stamped by a Professional Engineer registered in the state of Massachusetts.

A pile load test would need to be performed in accordance with the MSBC to verify the DMP design prior to production pile installation.

Scour

The effects of localized scour around the piles should be accounted for when determining the pile capacities. Localized scour adjacent to the pile foundations can be estimated as 2 times the pile diameter (for instance, 2 feet of scour for a 12 inch diameter timber pile). Pile capacities should be determined neglecting the soils within the calculated scour depth.

Seismic Design Criteria

Based on the results of our explorations, the site of the proposed building is considered a Site Class E soil site in accordance with Section 1613 of the MSBC. In accordance with table 1604.11 in the MSBC, maximum considered earthquake response accelerations factors of S_S=0.113 and S_1=0.047 should be utilized for the town of Nantucket.

The maximum considered earthquake spectral response accelerations adjusted for Site Class effects are S_{MS}=0.283 and S_{M1}=0.165 in accordance with Section 1613.3.3. Design spectral response accelerations of S_{DS}=0.188 and S_{D1}=0.110 (in accordance with Section 1613.3.4) should be used in determining the Seismic Design Category.

Dewatering

Due to the shallow groundwater at the site (2.4± feet below existing grade in the monitoring well), we anticipate that a significant dewatering effort will be required for excavation of any below grade structures or utilities. We recommend that groundwater be drawn down at least one foot below the base of any excavation to provide dry working conditions and to help minimize instability of the excavation bottom.

Dewatering by the use of sumps and submersible pumps should be adequate for shallow excavations where the depth of excavation below groundwater levels is only a few feet. It may be possible to manage the water on-site by pumping the water into other excavations at the site. For deeper excavations (possible deeper site utilities), well point systems or steel interlocking sheet piling may be required to ensure proper groundwater cutoff/control. Deeper utilities may need to be permanently waterproofed.

The Contractor should be solely responsible for the design, construction, and performance of dewatering systems. The Contractor should limit the size of the excavation open at any time to that which can be adequately handled by the Contractor's chosen dewatering methods.

Discharge of pumped water is subject to local, state and federal regulations. The contractor should conduct dewatering and discharge water in accordance with all applicable regulations. The contractor should implement temporary surface water runoff control measures during construction. Temporary measures should include, but are not necessarily limited to, the use of small earth berms or construction of a drainage ditch adjacent to the top of proposed excavations to divert and/or reduce the amount of surface water flowing over exposed slopes and into excavations during construction.

CONSTRUCTION OBSERVATION AND REVIEW

MGA should be retained to perform on-site construction observation and soil testing services during the installation of deep foundations. The purpose of our services is to assess the contractor's compliance with the project plans and specifications as well as our recommendations included in this report. Our on-site presence will allow us the opportunity to provide geotechnical engineering input on a timely basis if encountered subsurface conditions differ from those reported herein.

We also respectfully request the opportunity to review final site and foundation plans to see that our recommendations have been properly interpreted and included.

We appreciate the opportunity to assist you on this project and look forward to providing construction observation services as the project moves forward. Please feel free to contact us should you have any questions regarding this report or require additional information.

Very truly yours,

MCARDLE GANNON ASSOCIATES, INC.

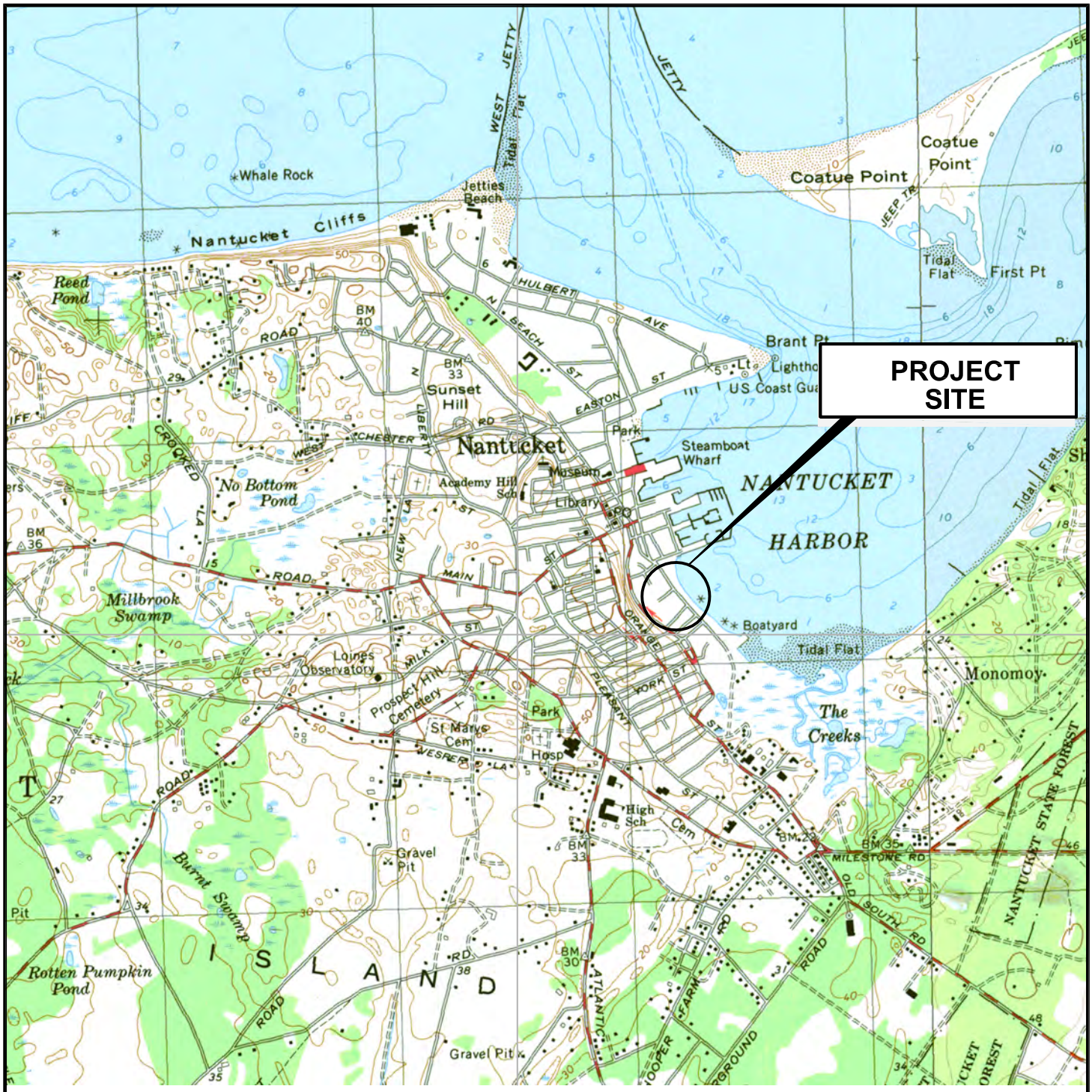
Wayne A. McArdle, P.E.
Principal

Sherry L. Holmes, P.E.
Geotechnical Engineer

WAM/slh

Attachments: Figure 1 – Site Locus
Figure 2 – Exploration Location Plan
Appendix A – Statement of Limitations
Appendix B – Test Boring Logs
Appendix C – Geotechnical Laboratory Test Results

FIGURES



SCALE: 1"=1500'

0 750 1500 3000 FEET

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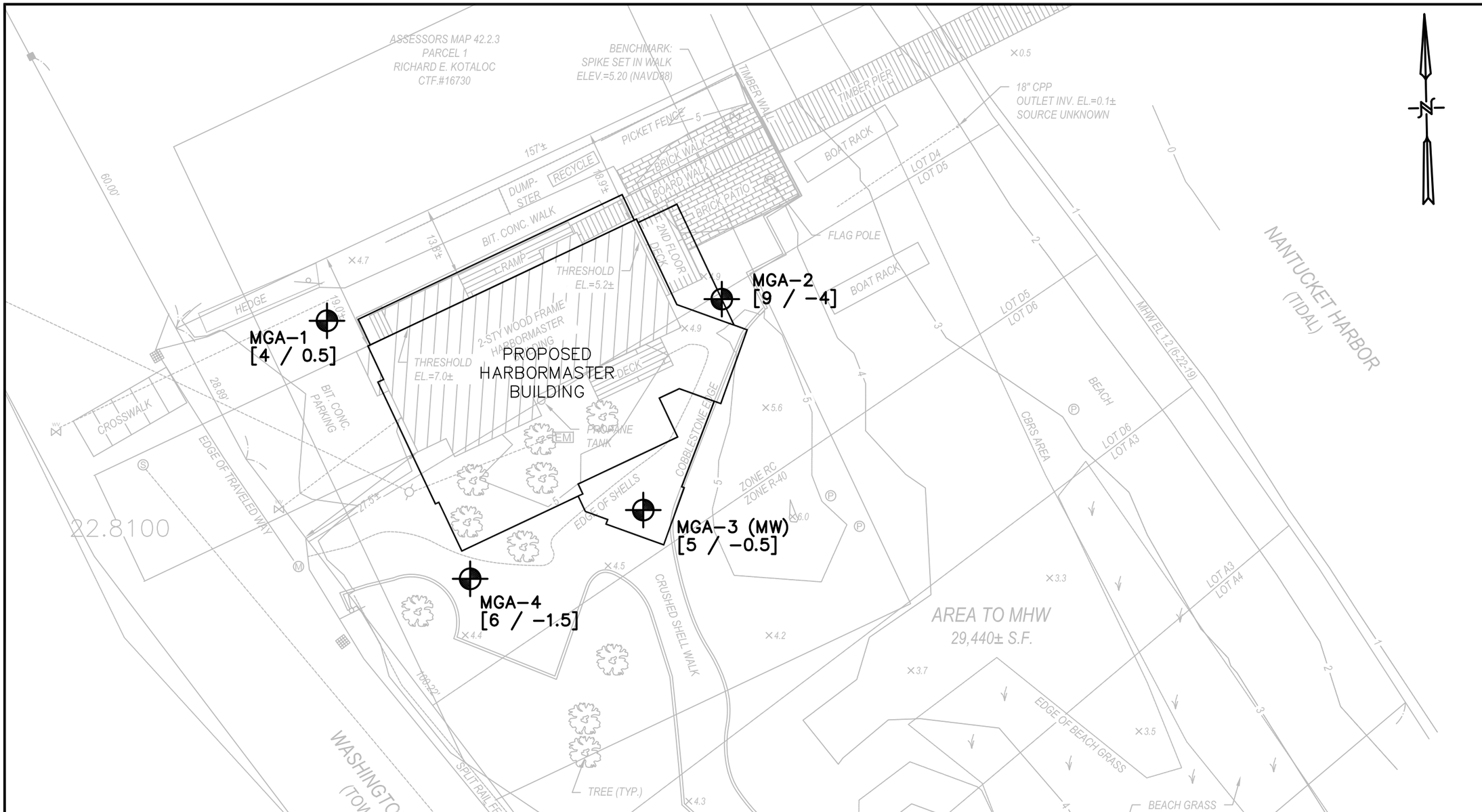
LOCUS PLAN
HARBOR MASTER BUILDING

34 WASHINGTON STREET
NANTUCKET, MASSACHUSETTS

PROJECT: W0760 | DATE: 7/2019 | SCALE: AS NOTED

SKETCH NO.:
FIG. No. 1

DRAWN: SLH
CHECKED: WAM



LEGEND:

TEST BORINGS PERFORMED BY TECHNICAL DRILLING SERVICES OF STERLING, MA ON JUNE 5, 2019.

[9 / −4] INDICATES APPROXIMATE DEPTH / ELEVATION OF BOTTOM OF EXISTING FILL AT TEST BORING LOCATION.

NOTES:

1. BASE PLAN DEVELOPED FROM PLAN ENTITLED "EXISTING SITE CONDITIONS," SHEET C1.2.1, DATED JULY 10, 2019, BY COASTAL ENGINEERING CO.
2. THE BORING LOCATIONS SHOWN WERE DETERMINED BY TAPE MEASUREMENT AND/OR LINE OF SIGHT FROM EXISTING SITE FEATURES. BORING LOCATIONS ARE APPROXIMATE.
3. MGA OBSERVED AND LOGGED THE BORINGS SHOWN.

SCALE: 1"=20'

0 10 20 40

SKETCH NO.: FIG. No. 2

DRAWN: RED
CHECKED: SLH

EXPLORATION LOCATION PLAN

HARBOR MASTER BUILDING
34 WASHINGTON STREET, NANTUCKET, MASSACHUSETTS

PROJECT: W0760 | DATE: 07/2019 | SCALE: AS NOTED

MGA
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Engineers & Consultants
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APPENDIX A: STATEMENT OF LIMITATIONS

STATEMENT OF LIMITATIONS

Explorations

The analysis and recommendations submitted in this report are based in part upon the data obtained from subsurface explorations. The nature and extent of variations between these explorations may not become evident until construction. If variations then appear evident, it will be necessary to re-evaluate the recommendations of this report.

The stratification lines on the logs represent the approximate boundary between soil types and the transition may be gradual.

Water level readings have been made in the explorations at the time and under the conditions stated on the logs. This data has been reviewed and interpretations made in the text of this report. However, it must be noted that fluctuations in the level of the groundwater may occur due to variations in rainfall, temperature, and other factors that are different from the time the measurements were made.

Review

In the event that any change in the nature, design or location of the proposed structure are planned, the conclusions and recommendations contained in this report shall not be considered valid unless the changes are reviewed and conclusions of this report modified or verified in writing.

It is recommended that this firm be provided the opportunity for a general review of final design and specifications in order that earthwork recommendations may be properly interpreted and implemented in the design and specifications.

Construction

It is recommended that this firm be retained to provide soil engineering services during the construction phase of the work. This is to observe compliance with design concepts, specifications, and recommendations and to allow design changes in the event that subsurface conditions differ from those anticipated prior to start of construction.

Use of Report

This report has been prepared for the exclusive use of Stephen Kelleher Architects, Inc. for specific application to the Proposed Harbor Master Building at 34 Washington Street in Nantucket, Massachusetts, in accordance with generally accepted geotechnical engineering practices. No other warranty, expressed or implied, is made.

APPENDIX B: TEST BORING LOGS

McArdle Gannon Associates, Inc.
Engineers & Consultants

TEST BORING LOG

BORING MGA-1

PROJECT: Harbor Master Building, 34 Washington St, Nantucket, MA
CLIENT: Stephen Kelleher Architects, Inc.
CONTRACTOR: Technical Drilling Services

MGA NO. : W0760
SHEET NO. : 1 of 2
LOCATION N : See Plan
E :
ELEVATION : 4.5'±
DATE START : 6/4/19
END : 6/4/19
DRILLER : Brett Balyk
ENGINEER : Robert Drown

GROUNDWATER		DEPTH (ft) OF:			EQUIPMENT	CASING	SAMPLER	CORE
Date	Time	Water	Casing	Hole	Type	NW	Split Spoon	----
6/4/19	8:15	2	0	2.5	Size I.D.	3"	1-3/8"	----
					Hammer Wt.	140#	140#	- - - -
					Hammer Fall	30"	30"	- - - -

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number/ Type	Sample Depth Range (ft)	Sample Recovery (in)	Elevation/ Depth (ft)	FIELD CLASSIFICATION AND REMARKS
0							4.3	-ASPHALT-
			4 3 2 2	S-1	0.5 2.5	14	0.2	Loose, dark brown, fine to coarse SAND, little Silt, trace (+) Seashells/ Brick. [Bottom 6± inches of sample wet]
								-FILL-
4							0.5	
		PUSH	5 4 5 5	S-2	4.0 6.0	10	4.0	Loose, brown, fine to medium SAND, trace (-) Silt, trace (-) fine Gravel.
		PUSH						
		PUSH						
8		PUSH						
		25						
		10	8 9 13 13	S-3	9.0 11.0	12		Medium dense, gray, fine to coarse SAND, trace (-) Silt.
		18						
12		55						-SAND-
		67						
		89						
		25	7 11 15 14	S-4	14.0 16.0	24		Medium dense, olive, fine to medium SAND, trace Silt.
16		35						
		55						
		54						
		59						
20		33	7 10 12 15	S-5	19.0 21.0	18		Medium dense, olive-gray, fine to coarse SAND, trace (-) Silt.
		47						
		65						
		69						

BLOWS/FT.	DENSITY	BLOWS/FT.	CONSISTENCY	SAMPLE IDENTIFICATION	SUMMARY
0 - 4	Very Loose	0 - 2	Very Soft	- S - Split Spoon	Station:
4 - 10	Loose	2 - 4	Soft	- T - Thin Wall Tube	Rock:
10 - 30	Medium Dense	4 - 8	Medium Stiff	- U - Undisturbed Piston	Samples:
30 - 50	Dense	8 - 15	Stiff	- C - Diamond Core	BORING MGA-1
50 +	Very Dense	15 - 30	Very Stiff	- B - Bulk/Grab Sample	
		30+	Hard		

McArdle Gannon Associates, Inc.
Engineers & Consultants

TEST BORING LOG

BORING MGA-1

PROJECT: Harbor Master Building, 34 Washington St, Nantucket, MA
CLIENT: Stephen Kelleher Architects, Inc.

MGA NO. : W0760
SHEET NO. : 2 of 2

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number/ Type	Sample Depth Range (ft)	Sample Recov-ery (in)	Elev-ation/ Depth (ft)	FIELD CLASSIFICATION AND REMARKS
24		75						
		41	1 2 3 5	S-6	24.0 26.0	9		Loose, brown, fine to coarse SAND, trace Silt.
		51						
		75						
28		80						
		74						
		47	4 6 9 7	S-7	29.0 31.0	20		Medium dense, olive-brown, fine to medium SAND, trace (+) Silt.
		56						
32		54						-SAND-
		66						
		54						
		62	6 5 4 5	S-8	34.0 36.0	6		Loose, olive-brown, fine to coarse SAND, trace (-) Silt.
36		67						
		91						
		111						
		121						
40			4 6 5 10	S-9	39.0 41.0	0		[No Recovery]
							-36.5 41.0	BOTTOM OF BORING AT 41 FEET.
44								
48								

BLOWS/FT.	DENSITY
0 - 4	Very Loose
4 - 10	Loose
10 - 30	Medium Dense
30 - 50	Dense
50 +	Very Dense

BLOWS/FT.	CONSISTENCY
0 - 2	Very Soft
2 - 4	Soft
4 - 8	Medium Stiff
8 - 15	Stiff
15 - 30	Very Stiff
30+	Hard

SAMPLE IDENTIFICATION

- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- B - Bulk/Grab Sample

SUMMARY

Station:
Rock:
Samples:

BORING MGA-1

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McArdle Gannon Associates, Inc.
Engineers & Consultants

TEST BORING LOG

BORING MGA-2

PROJECT: Harbor Master Building, 34 Washington St, Nantucket, MA
CLIENT: Stephen Kelleher Architects, Inc.
CONTRACTOR: Technical Drilling Services

MGA NO. : W0760
SHEET NO. : 1 of 2
LOCATION N : See Plan
E :
ELEVATION : 5'±
DATE START : 6/4/19
END : 6/4/19
DRILLER : Brett Balyk
ENGINEER : Robert Drown

GROUNDWATER		DEPTH (ft) OF:			EQUIPMENT	CASING	SAMPLER	CORE
Date	Time	Water	Casing	Hole	Type	NW	Split Spoon	----
6/4/19	1:40	4	4	6	Size I.D.	3"	1-3/8"	----
					Hammer Wt.	140#	140#	- - - -
					Hammer Fall	30"	30"	- - - -

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number/ Type	Sample Depth Range (ft)	Sample Recov-ery (in)	Elev-ation/ Depth (ft)	FIELD CLASSIFICATION AND REMARKS
0			1 2 2 5	S-1	0.0 2.0	16		Very loose to loose, dark brown to brown, fine to coarse SAND, little Silt, trace Seashells.
								-FILL-
4		2	1 1	S-2	4.0 5.0	12		Dark brown, fine to medium SAND, trace (-) Silt, trace (-) fine Gravel.
		2	1/12"	S-2A	5.0 6.0	2		Black, fine to medium SAND, some Silt, trace Roots/Seashells.
		2	1 2	S-3	6.0 8.0	12		Loose, dark brown to black, fine to coarse SAND, some (-) Silt, trace Organics, trace Brick.
		6	3 6					
8		14					-4.0	
			3 5 9 11	S-4	9.0 11.0	14	9.0	Medium dense, brown to olive-brown, fine to coarse SAND, trace (+) Silt.
12								
			6 6 9 12	S-5	14.0 16.0	20		Medium dense, dark gray, fine to medium SAND, trace Silt.
16								-SAND-
20			4 2 2 9	S-6	19.0 21.0	12		Very loose to loose, gray-brown, fine to medium SAND, little Silt, trace Seashells.

BLOWS/FT.	DENSITY	BLOWS/FT.	CONSISTENCY	SAMPLE IDENTIFICATION	SUMMARY
0 - 4	Very Loose	0 - 2	Very Soft	- S - Split Spoon	Station:
4 - 10	Loose	2 - 4	Soft	- T - Thin Wall Tube	Rock:
10 - 30	Medium Dense	4 - 8	Medium Stiff	- U - Undisturbed Piston	Samples:
30 - 50	Dense	8 - 15	Stiff	- C - Diamond Core	BORING MGA-2
50 +	Very Dense	15 - 30	Very Stiff	- B - Bulk/Grab Sample	
		30+	Hard		

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McArdle Gannon Associates, Inc.
Engineers & Consultants

TEST BORING LOG

BORING MGA-2

PROJECT: Harbor Master Building, 34 Washington St, Nantucket, MA
CLIENT: Stephen Kelleher Architects, Inc.

MGA NO. : W0760
SHEET NO. : 2 of 2

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number/ Type	Sample Depth Range (ft)	Sample Recov-ery (in)	Elev-ation/ Depth (ft)	FIELD CLASSIFICATION AND REMARKS
24			7 8 12 11	S-7	24.0 26.0	12		Medium dense, gray-brown, fine to coarse SAND, trace Silt.
28			9 10 10 9	S-8	29.0 31.0	8		Medium dense, olive-brown, fine to coarse SAND, trace Silt.
32								-SAND-
36			6 7 6 6	S-9	34.0 36.0	11		Medium dense, brown, fine to coarse SAND, trace Silt.
40			7 7 9 12	S-10	39.0 41.0	5	-36.0 41.0	Medium dense, brown, fine to coarse SAND, trace Silt. BOTTOM OF BORING AT 41 FEET.
44								
48								

BLOWS/FT.	DENSITY
0 - 4	Very Loose
4 - 10	Loose
10 - 30	Medium Dense
30 - 50	Dense
50 +	Very Dense

BLOWS/FT.	CONSISTENCY
0 - 2	Very Soft
2 - 4	Soft
4 - 8	Medium Stiff
8 - 15	Stiff
15 - 30	Very Stiff
30+	Hard

SAMPLE IDENTIFICATION
- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- B - Bulk/Grab Sample

SUMMARY
Station:
Rock:
Samples:

BORING MGA-2

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McArdle Gannon Associates, Inc.
Engineers & Consultants

TEST BORING LOG

BORING MGA-3 (MW)

PROJECT: Harbor Master Building, 34 Washington St, Nantucket, MA
CLIENT: Stephen Kelleher Architects, Inc.
CONTRACTOR: Technical Drilling Services

MGA NO. : W0760
SHEET NO. : 1 of 2
LOCATION N : See Plan
E :
ELEVATION : 4.5'±
DATE START : 6/5/19
END : 6/5/19
DRILLER : Brett Balyk
ENGINEER : Robert Drown

GROUNDWATER		DEPTH (ft) OF:			EQUIPMENT	CASING	SAMPLER	CORE
Date	Time	Water	Casing	Hole	Type	NW	Split Spoon	----
6/5/19	8:15	4	4	6	Size I.D.	3"	1-3/8"	----
6/5/19	2:40	2.4	MW		Hammer Wt.	140#	140#	- - - -
					Hammer Fall	30"	30"	- - - -

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number/ Type	Sample Depth Range (ft)	Sample Recov-ery (in)	Elev-ation/ Depth (ft)	FIELD CLASSIFICATION AND REMARKS	Well Schematic
-4									
0			1 2 3 3	S-1	0.0 2.0	18	4.5 0.0	Loose, dark brown to brown to beige, fine to coarse SAND, little (-) Silt. -FILL-	
4			2 3	S-2	4.0 5.0	8	-0.5	Black, fine to medium SAND and SILT, little Roots/Seashells.	
		22 26 30 25	10 13	S-2A	5.0 6.0	12	5.0	Dark brown to light brown, fine to medium SAND, trace Silt, trace fine Gravel.	
8		10 10	4 7 9 12	S-3	9.0 11.0	12		Medium dense, beige, fine to coarse SAND, trace Silt. -SAND-	
12		26 42 53							
16		18 26 52 56	6 10 14 14	S-4	14.0 16.0	12		Medium dense, gray-brown, fine to coarse SAND, trace Silt.	

BLOWS/FT.	DENSITY	BLOWS/FT.	CONSISTENCY	SAMPLE IDENTIFICATION	SUMMARY
0 - 4	Very Loose	0 - 2	Very Soft	- S - Split Spoon	Overburden:
4 - 10	Loose	2 - 4	Soft	- T - Thin Wall Tube	Rock:
10 - 30	Medium Dense	4 - 8	Medium Stiff	- U - Undisturbed Piston	Samples:
30 - 50	Dense	8 - 15	Stiff	- C - Diamond Core	
50 +	Very Dense	15 - 30	Very Stiff	- W - Wash Sample	**BORING MGA-3 (MW)**
		30+	Hard		

McArdle Gannon Associates, Inc.
Engineers & Consultants

TEST BORING LOG

BORING MGA-3 (MW)

PROJECT: Harbor Master Building, 34 Washington St, Nantucket, MA
CLIENT: Stephen Kelleher Architects, Inc.

MGA NO. : W0760
SHEET NO. : 2 of 2

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number/ Type	Sample Depth Range (ft)	Sample Recov-ery (in)	Elev-ation/ Depth (ft)	FIELD CLASSIFICATION AND REMARKS	Well Schematic
		45							
20		29 26	3 9 11 10	S-5	19.0 21.0	14		Medium dense, gray-brown, fine to coarse SAND, trace Silt.	
		29 21 34							
24		36 44	5 4 5 6	S-6	24.0 26.0	12		Loose, gray-brown, fine to coarse SAND, trace Silt.	
		63 72 79							
28		38 36	2 2 3 3	S-7	29.0 31.0	13		Loose, gray-brown, fine to coarse SAND, trace Silt.	
32		44 65 68						-SAND-	
36		44 49 52 63 65	5 5 6 7	S-8	34.0 36.0	24		Medium dense, brown, fine to coarse SAND, trace Silt.	
40			5 5 6 9	S-9	39.0 41.0	20	-36.5	Medium dense, brown, fine to coarse SAND, trace Silt.	
44							41.0	BOTTOM OF BORING AT 41 FEET.	

BLOWS/FT.	DENSITY	BLOWS/FT.	CONSISTENCY	SAMPLE IDENTIFICATION	SUMMARY
0 - 4	Very Loose	0 - 2	Very Soft	- S - Split Spoon	**Overburden:**
4 - 10	Loose	2 - 4	Soft	- T - Thin Wall Tube	**Rock:**
10 - 30	Medium Dense	4 - 8	Medium Stiff	- U - Undisturbed Piston	**Samples:**
30 - 50	Dense	8 - 15	Stiff	- C - Diamond Core	**BORING MGA-3 (MW)**
50 +	Very Dense	15 - 30	Very Stiff	- W - Wash Sample	
		30+	Hard		

McArdle Gannon Associates, Inc.
Engineers & Consultants

TEST BORING LOG

BORING MGA-4

PROJECT: Harbor Master Building, 34 Washington St, Nantucket, MA
CLIENT: Stephen Kelleher Architects, Inc.
CONTRACTOR: Technical Drilling Services

MGA NO. : W0760
SHEET NO. : 1 of 2
LOCATION N : See Plan
E :
ELEVATION : 4.5'±
DATE START : 6/5/19
END : 6/5/19
DRILLER : Brett Balyk
ENGINEER : Robert Drown

GROUNDWATER		DEPTH (ft) OF:			EQUIPMENT	CASING	SAMPLER	CORE
Date	Time	Water	Casing	Hole	Type	NW	Split Spoon	----
6/5/19	12:30	2	0	4	Size I.D.	3"	1-3/8"	----
					Hammer Wt.	140#	140#	- - - -
					Hammer Fall	30"	30"	- - - -

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number/ Type	Sample Depth Range (ft)	Sample Recovery (in)	Elevation/ Depth (ft)	FIELD CLASSIFICATION AND REMARKS
0			2 2 3 4	S-1	0.0 2.0	17		Loose, beige, fine to coarse SAND, little (-) Silt. -FILL-
			4 3 3 3	S-2	2.0 4.0	9		Loose, wet, dark brown to black, fine to caorse SAND, little (+) Seashells, little (-) Silt, trace Organics.
4		1 1	4 3 4 4	S-3	4.0 6.0	16	-1.5	Loose, dark brown, fine to medium SAND, trace fine Gravel, trace (-) Silt, trace (-) Fibrous Peat, trace (-) Seashells.
8		3 7 21	3 4 5 6	S-4	6.0 8.0	18	6.0	Loose, brown, fine to medium SAND, trace (-) Silt, trace (-) fine Gravel.
		3 10	8 9 13 16	S-5	9.0 11.0	18		Medium dense, brown to gray, fine to coarse SAND, trace Silt.
12		24 61 87						-SAND-
16		10 12 18 21 19	6 9 9 10	S-6	14.0 16.0	14		Medium dense, brown, fine to coarse SAND, trace Silt.
20		17 32 34 50	6 9 10 10	S-7	19.0 21.0	16		Medium dense, brown, fine to coarse SAND, trace fine Gravel, trace (-) Silt.

BLOWS/FT.	DENSITY	BLOWS/FT.	CONSISTENCY	SAMPLE IDENTIFICATION	SUMMARY
0 - 4	Very Loose	0 - 2	Very Soft	- S - Split Spoon	Station:
4 - 10	Loose	2 - 4	Soft	- T - Thin Wall Tube	Rock:
10 - 30	Medium Dense	4 - 8	Medium Stiff	- U - Undisturbed Piston	Samples:
30 - 50	Dense	8 - 15	Stiff	- C - Diamond Core	BORING MGA-4
50 +	Very Dense	15 - 30	Very Stiff	- B - Bulk/Grab Sample	
		30+	Hard		

McArdle Gannon Associates, Inc.
Engineers & Consultants

TEST BORING LOG

BORING MGA-4

PROJECT: Harbor Master Building, 34 Washington St, Nantucket, MA
CLIENT: Stephen Kelleher Architects, Inc.

MGA NO. : W0760
SHEET NO. : 2 of 2

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number/ Type	Sample Depth Range (ft)	Sample Recov-ery (in)	Elev-ation/ Depth (ft)	FIELD CLASSIFICATION AND REMARKS
		62						
24		34	4 4 8 7	S-8	24.0 26.0	18		Medium dense, brown, fine to coarse SAND, trace fine Gravel, trace Silt.
		32						
		48						
28		45						
		58						
		45	3 4 5 7	S-9	29.0 31.0	14		Loose, brown, fine to coarse SAND, trace Silt.
		52						
32		63						-SAND-
		68						
		67						
		48	5 7 6 6	S-10	34.0 36.0	12		Medium dense, brown, fine to coarse SAND, trace Silt.
36		52						
		55						
		62						
		72						
40			5 6 8 10	S-11	39.0 41.0	16		Medium dense, brown, fine to coarse SAND, trace Silt.
							-36.5 41.0	BOTTOM OF BORING AT 41 FEET.
44								
48								

BLOWS/FT.	DENSITY
0 - 4	Very Loose
4 - 10	Loose
10 - 30	Medium Dense
30 - 50	Dense
50 +	Very Dense

BLOWS/FT.	CONSISTENCY
0 - 2	Very Soft
2 - 4	Soft
4 - 8	Medium Stiff
8 - 15	Stiff
15 - 30	Very Stiff
30+	Hard

SAMPLE IDENTIFICATION

- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- B - Bulk/Grab Sample

SUMMARY

Station:
Rock:
Samples:

BORING MGA-4

300 Oak Street, Suite 460 Pembroke, MA 02359 | Telephone 781.826.0040 | Fax 781.735.0418 | mcardlegannon.com

KEY TO SYMBOLS

Symbol	Description
Strata symbols	
	Asphalt
	Fill
	Sand
Soil Samplers	
	Split Spoon
Monitor Well Details	
	pipe riser
	assorted cuttings
	bentonite pellets
	silica sand, blank PVC
	slotted pipe w/ sand
	end of well installation

Notes:

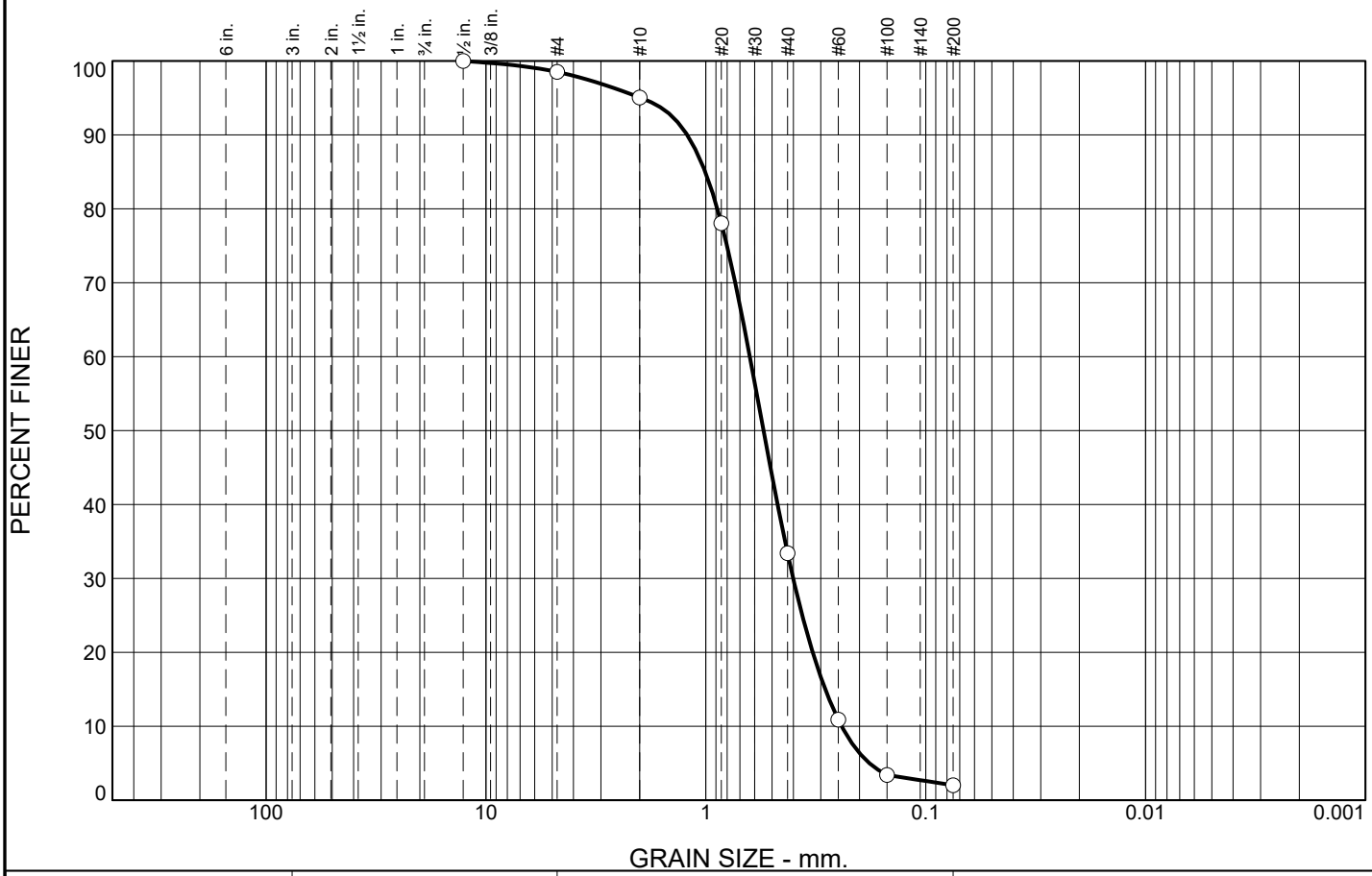
1. Test borings performed by Technical Drilling Services on June 4 and 5, 2019 using a all terrain vehicle mounted drill rig equipped with a 140-pound automatic hammer.

2. Test boring elevations were estimated from ground surface contours and spot grades shown on a plan entitled "Existing Site Conditions," dated July 10, 2019, by Coastal Engineering Company.

3. Test borings observed and logged by MGA.

APPENDIX C: GEOTECHNICAL LABORATORY TEST RESULTS

PARTICLE SIZE DISTRIBUTION REPORT



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	1.5	3.4	61.7	31.4	2.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1/2	100.0		
#4	98.5		
#10	95.1		
#20	78.1		
#40	33.4		
#60	10.9		
#100	3.4		
#200	2.0		

* (no specification provided)

Material Description

Brown, fine to medium SAND, trace (-) Silt, trace (-) fine Gravel.

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 1.2157 D_{85}= 1.0069 D_{60}= 0.6307
D_{50}= 0.5461 D_{30}= 0.4006 D_{15}= 0.2865
D_{10}= 0.2412 C_u= 2.61 C_c= 1.05

Classification

USCS= SP AASHTO=

Remarks

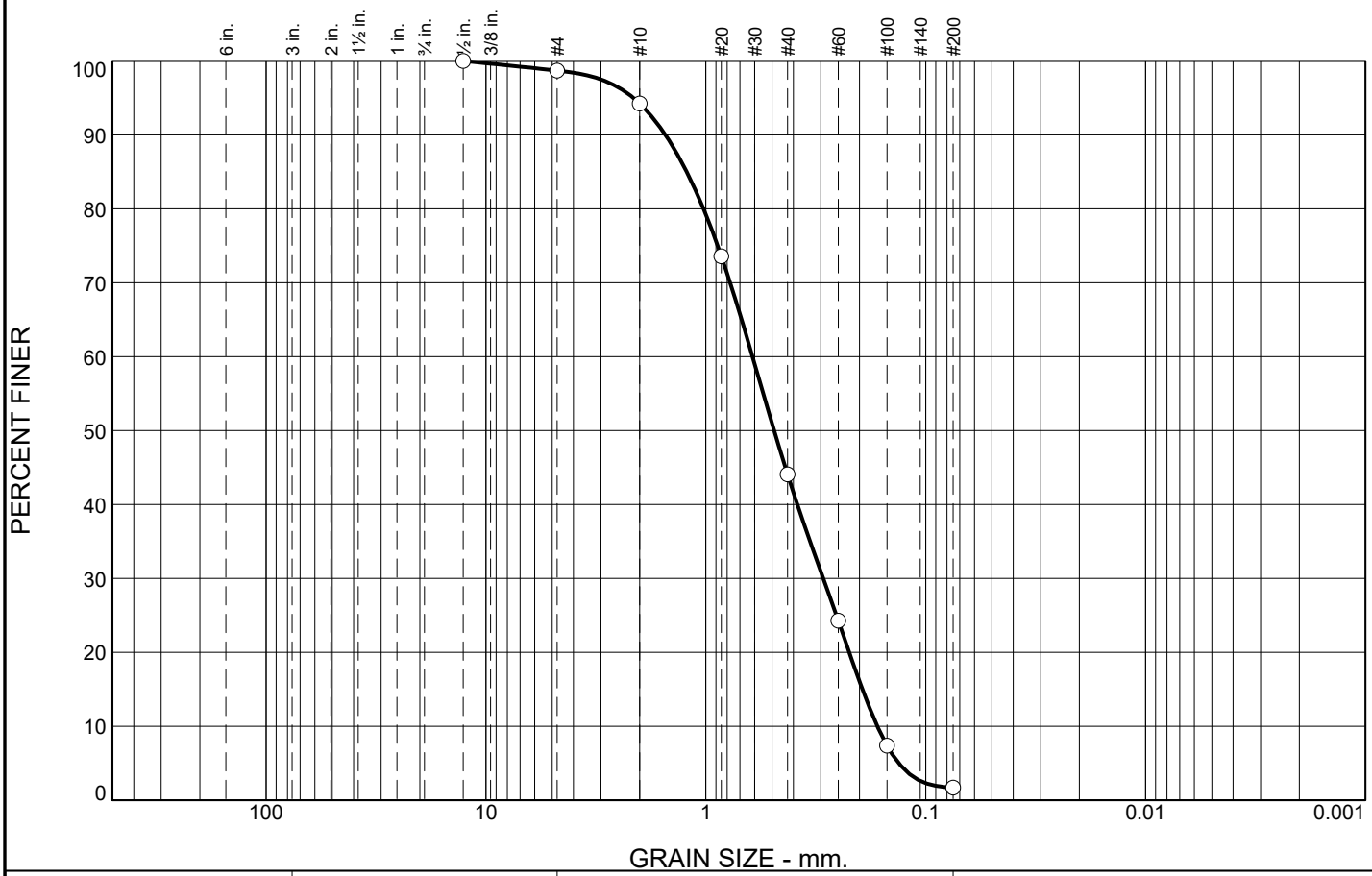
Natural Sand
Water Content: 20.5%

Source of Sample: MGA-1 **Depth:** 4-6'
Sample Number: S-2 **Date:** 06/06/2019

McArdle Gannon Associates, Inc.
Engineers & Consultants

Client: Stephen Kelleher Architects, Inc.
Project: Proposed Harbor Master Building
34 Washington Street, Nantucket, MA
Project No: W0760 **Figure**

PARTICLE SIZE DISTRIBUTION REPORT



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	1.3	4.4	50.2	42.4	1.7	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1/2	100.0		
#4	98.7		
#10	94.3		
#20	73.6		
#40	44.1		
#60	24.3		
#100	7.4		
#200	1.7		

* (no specification provided)

Material Description

Dark brown, fine to medium SAND, trace (-) Silt, trace (-) fine Gravel.

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 1.5258 D_{85}= 1.2217 D_{60}= 0.6132
D_{50}= 0.4890 D_{30}= 0.2926 D_{15}= 0.1939
D_{10}= 0.1659 C_u= 3.70 C_c= 0.84

Classification

USCS= SP AASHTO=

Remarks

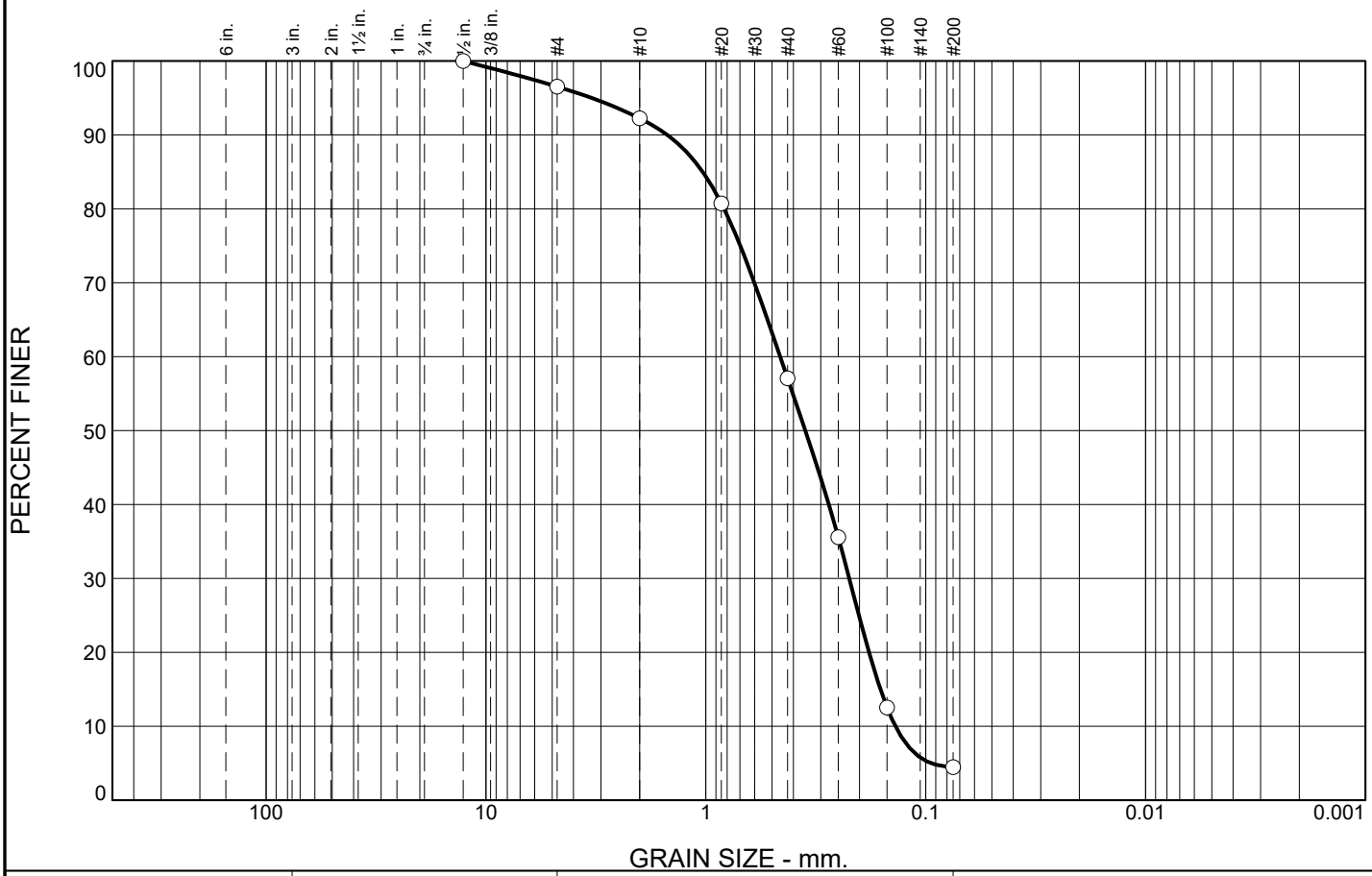
Existing Fill
Water Content: 18.5%

Source of Sample: MGA-2 **Depth:** 4-5'
Sample Number: S-2 **Date:** 06/06/2019

McArdle Gannon Associates, Inc.
Engineers & Consultants

Client: Stephen Kelleher Architects, Inc.
Project: Proposed Harbor Master Building
34 Washington Street, Nantucket, MA
Project No: W0760 **Figure**

PARTICLE SIZE DISTRIBUTION REPORT



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	3.5	4.3	35.1	52.6	4.5	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1/2	100.0		
#4	96.5		
#10	92.2		
#20	80.7		
#40	57.1		
#60	35.6		
#100	12.5		
#200	4.5		

* (no specification provided)

Material Description

Dark brown to light brown, fine to medium SAND, trace Silt, trace fine Gravel.

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 1.4962 D_{85}= 1.0341 D_{60}= 0.4590
D_{50}= 0.3529 D_{30}= 0.2227 D_{15}= 0.1607
D_{10}= 0.1373 C_u= 3.34 C_c= 0.79

Classification

USCS= SP AASHTO=

Remarks

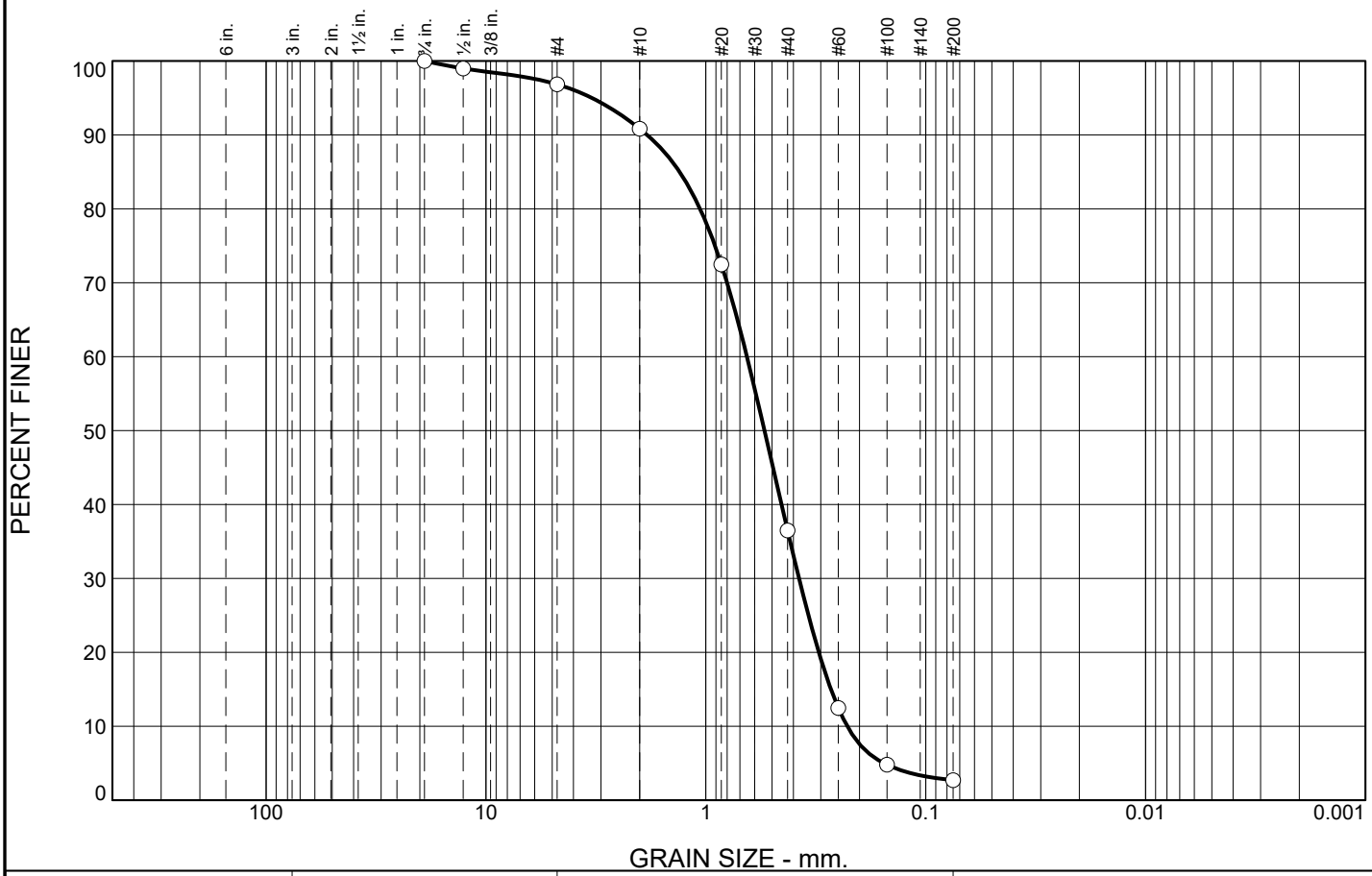
Natural Sand
Water Content: 18.0%

Source of Sample: MGA-3 **Depth:** 5-6'
Sample Number: S-2A **Date:** 06/06/2019

McArdle Gannon Associates, Inc.
Engineers & Consultants

Client: Stephen Kelleher Architects, Inc.
Project: Proposed Harbor Master Building
34 Washington Street, Nantucket, MA
Project No: W0760 **Figure**

PARTICLE SIZE DISTRIBUTION REPORT



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	3.2	6.0	54.3	33.8	2.7	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4	100.0		
1/2	99.0		
#4	96.8		
#10	90.8		
#20	72.5		
#40	36.5		
#60	12.5		
#100	4.8		
#200	2.7		

* (no specification provided)

Material Description

Dark brown, fine to medium SAND, trace fine Gravel, trace (-) Silt.

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 1.8491 D_{85}= 1.3163 D_{60}= 0.6503
D_{50}= 0.5408 D_{30}= 0.3768 D_{15}= 0.2701
D_{10}= 0.2275 C_u= 2.86 C_c= 0.96

Classification

USCS= SP AASHTO=

Remarks

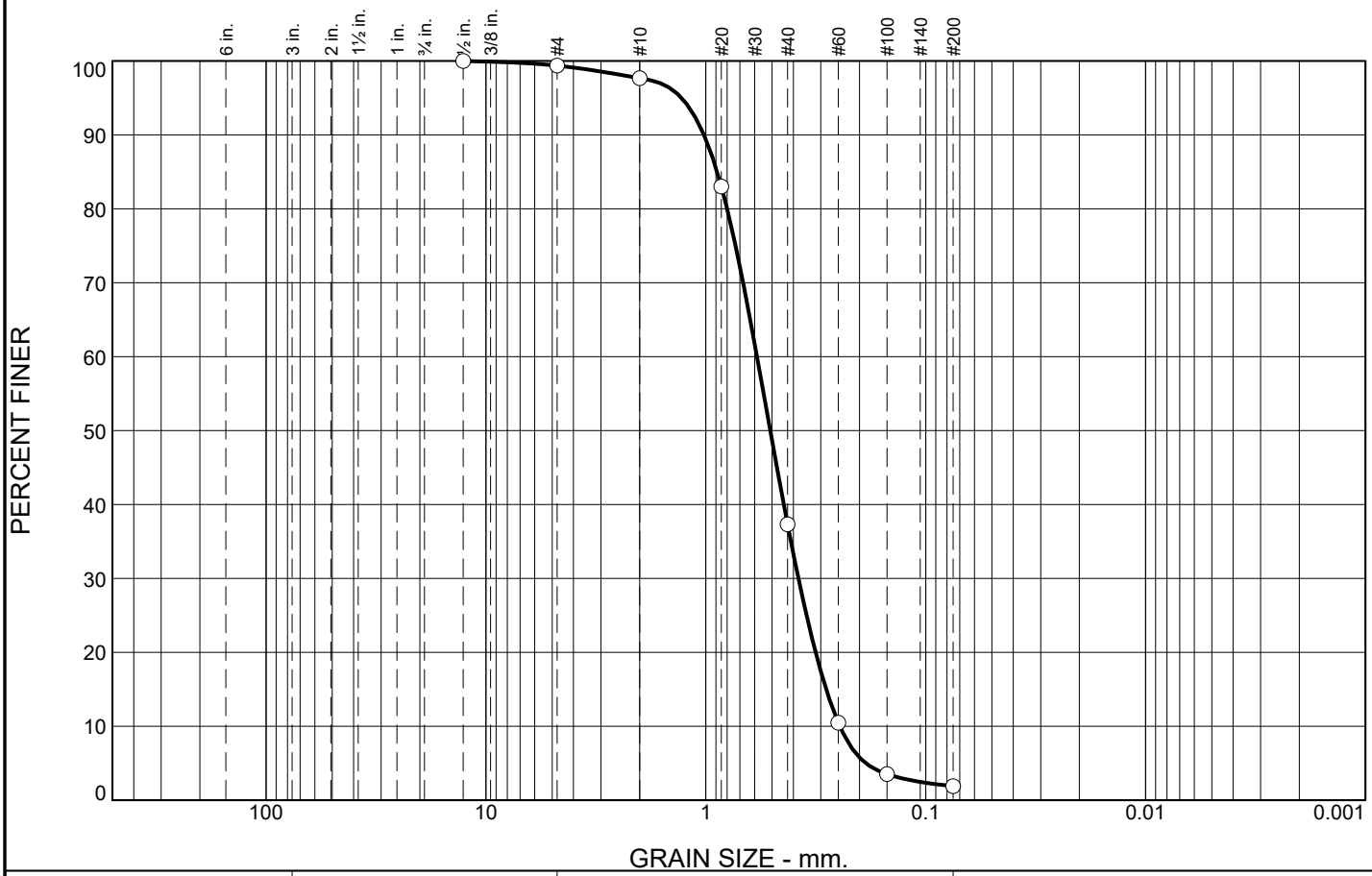
Existing Fill
Water Content: 18.4%

Source of Sample: MGA-4 **Depth:** 4-6'
Sample Number: S-3 **Date:** 06/06/2019

McArdle Gannon Associates, Inc.
Engineers & Consultants

Client: Stephen Kelleher Architects, Inc.
Project: Proposed Harbor Master Building
34 Washington Street, Nantucket, MA
Project No: W0760 **Figure**

PARTICLE SIZE DISTRIBUTION REPORT



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.6	1.7	60.4	35.4	1.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1/2	100.0		
#4	99.4		
#10	97.7		
#20	83.0		
#40	37.3		
#60	10.5		
#100	3.5		
#200	1.9		

* (no specification provided)

Material Description

Brown, fine to medium SAND, trace (-) Silt, trace (-) fine Gravel.

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 1.0207 D_{85}= 0.8885 D_{60}= 0.5850
D_{50}= 0.5091 D_{30}= 0.3792 D_{15}= 0.2838
D_{10}= 0.2460 C_u= 2.38 C_c= 1.00

Classification

USCS= SP AASHTO=

Remarks

Natural Sand
Water Content: 20.1%

Source of Sample: MGA-4 **Depth:** 6-8'
Sample Number: S-4 **Date:** 06/06/2019

McArdle Gannon Associates, Inc.
Engineers & Consultants

Client: Stephen Kelleher Architects, Inc.
Project: Proposed Harbor Master Building
34 Washington Street, Nantucket, MA
Project No: W0760 **Figure**

McArdle Gannon Associates, Inc.
Engineers & Consultants

Natural Water Content - Organic Content – pH Laboratory Testing Results

PROJECT:	Proposed Harbor Master Building	**LAB JOB NO:**	SL-1169		
LOCATION:	34 Washington Street, Nantucket, MA	**TEST BY:**	CRB	**DATE:**	06/06/2019
CLIENT:	Stephen Kelleher Architects, Inc.	**CHECK BY:**	SLH	**DATE:**	06/06/2019
MGA FILE NO:	W0760				

INDENTIFICATION				**PROPERTIES**			**OTHER TESTS AND REMARKS**
Boring No.	Sample No.	Sample Depth (feet)	Soil Strata	Natural Water Content (%)	Organic Content (%)	pH	
MGA-2	S-3	6-8	Existing Fill	29.4	3.0		
MGA-3	S-2	4-5	Existing Fill	22.0	2.4		

APPENDIX D

MassDEP Checklist for Stormwater Report

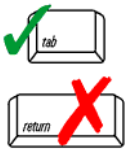
COASTAL
engineering co.

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands Program

Checklist for Stormwater Report

A. Introduction

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



A Stormwater Report must be submitted with the Notice of Intent permit application to document compliance with the Stormwater Management Standards. The following checklist is NOT a substitute for the Stormwater Report (which should provide more substantive and detailed information) but is offered here as a tool to help the applicant organize their Stormwater Management documentation for their Report and for the reviewer to assess this information in a consistent format. As noted in the Checklist, the Stormwater Report must contain the engineering computations and supporting information set forth in Volume 3 of the Massachusetts Stormwater Handbook. The Stormwater Report must be prepared and certified by a Registered Professional Engineer (RPE) licensed in the Commonwealth.

The Stormwater Report must include:

- The Stormwater Checklist completed and stamped by a Registered Professional Engineer (see page 2) that certifies that the Stormwater Report contains all required submittals.[1] This Checklist is to be used as the cover for the completed Stormwater Report.
- Applicant/Project Name
- Project Address
- Name of Firm and Registered Professional Engineer that prepared the Report
- Long-Term Pollution Prevention Plan required by Standards 4-6
- Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan required by Standard 8[2]
- Operation and Maintenance Plan required by Standard 9

In addition to all plans and supporting information, the Stormwater Report must include a brief narrative describing stormwater management practices, including environmentally sensitive site design and LID techniques, along with a diagram depicting runoff through the proposed BMP treatment train. Plans are required to show existing and proposed conditions, identify all wetland resource areas, NRCS soil types, critical areas, Land Uses with Higher Potential Pollutant Loads (LUHPPL), and any areas on the site where infiltration rate is greater than 2.4 inches per hour. The Plans shall identify the drainage areas for both existing and proposed conditions at a scale that enables verification of supporting calculations.

As noted in the Checklist, the Stormwater Management Report shall document compliance with each of the Stormwater Management Standards as provided in the Massachusetts Stormwater Handbook. The soils evaluation and calculations shall be done using the methodologies set forth in Volume 3 of the Massachusetts Stormwater Handbook.

To ensure that the Stormwater Report is complete, applicants are required to fill in the Stormwater Report Checklist by checking the box to indicate that the specified information has been included in the Stormwater Report. If any of the information specified in the checklist has not been submitted, the applicant must provide an explanation. The completed Stormwater Report Checklist and Certification must be submitted with the Stormwater Report.

[1] The Stormwater Report may also include the Illicit Discharge Compliance Statement required by Standard 10. If not included in the Stormwater Report, the Illicit Discharge Compliance Statement must be submitted prior to the discharge of stormwater runoff to the post-construction best management practices.

[2] For some complex projects, it may not be possible to include the Construction Period Erosion and Sedimentation Control Plan in the Stormwater Report. In that event, the issuing authority has the discretion to issue an Order of Conditions that approves the project and includes a condition requiring the proponent to submit the Construction Period Erosion and Sedimentation Control Plan before commencing any land disturbance activity on the site.

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands Program

Checklist for Stormwater Report

B. Stormwater Checklist and Certification

The following checklist is intended to serve as a guide for applicants as to the elements that ordinarily need to be addressed in a complete Stormwater Report. The checklist is also intended to provide conservation commissions and other reviewing authorities with a summary of the components necessary for a comprehensive Stormwater Report that addresses the ten Stormwater Standards.

Note: Because stormwater requirements vary from project to project, it is possible that a complete Stormwater Report may not include information on some of the subjects specified in the Checklist. If it is determined that a specific item does not apply to the project under review, please note that the item is not applicable (N.A.) and provide the reasons for that determination.

A complete checklist must include the Certification set forth below signed by the Registered Professional Engineer who prepared the Stormwater Report.

Registered Professional Engineer's Certification

I have reviewed the Stormwater Report, including the soil evaluation, computations, Long-term Pollution Prevention Plan, the Construction Period Erosion and Sedimentation Control Plan (if included), the Long-term Post-Construction Operation and Maintenance Plan, the Illicit Discharge Compliance Statement (if included) and the plans showing the stormwater management system, and have determined that they have been prepared in accordance with the requirements of the Stormwater Management Standards as further elaborated by the Massachusetts Stormwater Handbook. I have also determined that the information presented in the Stormwater Checklist is accurate and that the information presented in the Stormwater Report accurately reflects conditions at the site as of the date of this permit application.

Registered Professional Engineer Block and Signature

COMMONWEALTH OF MASSACHUSETTS
TARJA L. McGRAIL
CIVIL
No. 47593
REGISTERED PROFESSIONAL ENGINEER

3/12/2020

Signature and Date

Checklist

Project Type: Is the application for new development, redevelopment, or a mix of new and redevelopment?

☐ New development

☒ Redevelopment

☐ Mix of New Development and Redevelopment

Checklist for Stormwater Report

Checklist (continued)

LID Measures: Stormwater Standards require LID measures to be considered. Document what environmentally sensitive design and LID Techniques were considered during the planning and design of the project:

- ☐ No disturbance to any Wetland Resource Areas
- ☐ Site Design Practices (e.g. clustered development, reduced frontage setbacks)
- ☒ Reduced Impervious Area (Redevelopment Only)
- ☐ Minimizing disturbance to existing trees and shrubs
- ☐ LID Site Design Credit Requested:
  - ☐ Credit 1
  - ☐ Credit 2
  - ☐ Credit 3
- ☐ Use of "country drainage" versus curb and gutter conveyance and pipe
- ☐ Bioretention Cells (includes Rain Gardens)
- ☐ Constructed Stormwater Wetlands (includes Gravel Wetlands designs)
- ☐ Treebox Filter
- ☐ Water Quality Swale
- ☐ Grass Channel
- ☐ Green Roof
- ☐ Other (describe): _____

Standard 1: No New Untreated Discharges

- ☒ No new untreated discharges
- ☐ Outlets have been designed so there is no erosion or scour to wetlands and waters of the Commonwealth
- ☐ Supporting calculations specified in Volume 3 of the Massachusetts Stormwater Handbook included.

Checklist for Stormwater Report

Checklist (continued)

Standard 2: Peak Rate Attenuation – N/A Redevelopment

☒ Standard 2 waiver requested because the project is located in land subject to coastal storm flowage and stormwater discharge is to a wetland subject to coastal flooding.

☐ Evaluation provided to determine whether off-site flooding increases during the 100-year 24-hour storm.

☐ Calculations provided to show that post-development peak discharge rates do not exceed pre-development rates for the 2-year and 10-year 24-hour storms. If evaluation shows that off-site flooding increases during the 100-year 24-hour storm, calculations are also provided to show that post-development peak discharge rates do not exceed pre-development rates for the 100-year 24-hour storm.

Standard 3: Recharge

☐ Soil Analysis provided. NRCS Report

☒ Required Recharge Volume calculation provided.

☐ Required Recharge volume reduced through use of the LID site Design Credits.

☒ Sizing the infiltration, BMPs is based on the following method: Check the method used.

☐ Static ☒ Simple Dynamic ☐ Dynamic Field[1]

☐ Runoff from all impervious areas at the site discharging to the infiltration BMP.

☒ Runoff from all impervious areas at the site is *not* discharging to the infiltration BMP and calculations are provided showing that the drainage area contributing runoff to the infiltration BMPs is sufficient to generate the required recharge volume.

☒ Recharge BMPs have been sized to infiltrate the Required Recharge Volume.

☒ Recharge BMPs have been sized to infiltrate the Required Recharge Volume *only* to the maximum extent practicable for the following reason:

- ☐ Site is comprised solely of C and D soils and/or bedrock at the land surface
- ☐ M.G.L. c. 21E sites pursuant to 310 CMR 40.0000
- ☐ Solid Waste Landfill pursuant to 310 CMR 19.000
- ☒ Project is otherwise subject to Stormwater Management Standards only to the maximum extent practicable.

☒ Calculations showing that the infiltration BMPs will drain in 72 hours are provided.

☐ Property includes a M.G.L. c. 21E site or a solid waste landfill and a mounding analysis is included.

[1] 80% TSS removal is required prior to discharge to infiltration BMP if Dynamic Field method is used.

Checklist for Stormwater Report

Checklist (continued)

Standard 3: Recharge (continued)

☐ The infiltration BMP is used to attenuate peak flows during storms greater than or equal to the 10-year 24-hour storm and separation to seasonal high groundwater is less than 4 feet and a mounding analysis is provided.

☐ Documentation is provided showing that infiltration BMPs do not adversely impact nearby wetland resource areas.

Standard 4: Water Quality

The Long-Term Pollution Prevention Plan typically includes the following:

- Good housekeeping practices;
- Provisions for storing materials and waste products inside or under cover;
- Vehicle washing controls;
- Requirements for routine inspections and maintenance of stormwater BMPs;
- Spill prevention and response plans;
- Provisions for maintenance of lawns, gardens, and other landscaped areas;
- Requirements for storage and use of fertilizers, herbicides, and pesticides;
- Pet waste management provisions;
- Provisions for operation and management of septic systems;
- Provisions for solid waste management;
- Snow disposal and plowing plans relative to Wetland Resource Areas;
- Winter Road Salt and/or Sand Use and Storage restrictions;
- Street sweeping schedules;
- Provisions for prevention of illicit discharges to the stormwater management system;
- Documentation that Stormwater BMPs are designed to provide for shutdown and containment in the event of a spill or discharges to or near critical areas or from LUHPPL;
- Training for staff or personnel involved with implementing Long-Term Pollution Prevention Plan;
- List of Emergency contacts for implementing Long-Term Pollution Prevention Plan.

☒ A Long-Term Pollution Prevention Plan is attached to Stormwater Report and is included as an attachment to the Wetlands Notice of Intent.

☐ Treatment BMPs subject to the 44% TSS removal pretreatment requirement and the one inch rule for calculating the water quality volume are included, and discharge:

- ☐ is within the Zone II or Interim Wellhead Protection Area
- ☐ is near or to other critical areas
- ☐ is within soils with a rapid infiltration rate (greater than 2.4 inches per hour)
- ☐ involves runoff from land uses with higher potential pollutant loads.

☐ The Required Water Quality Volume is reduced through use of the LID site Design Credits.

☐ Calculations documenting that the treatment train meets the 80% TSS removal requirement and, if applicable, the 44% TSS removal pretreatment requirement, are provided.

Checklist for Stormwater Report

Checklist (continued)

Standard 4: Water Quality (continued)

☒ The BMP is sized (and calculations provided) based on:

- ☐ The ½" or 1" Water Quality Volume or
- ☐ The equivalent flow rate associated with the Water Quality Volume and documentation is provided showing that the BMP treats the required water quality volume.

☐ The applicant proposes to use proprietary BMPs, and documentation supporting use of proprietary BMP and proposed TSS removal rate is provided. This documentation may be in the form of the propriety BMP checklist found in Volume 2, Chapter 4 of the Massachusetts Stormwater Handbook and submitting copies of the TARP Report, STEP Report, and/or other third party studies verifying performance of the proprietary BMPs.

☐ A TMDL exists that indicates a need to reduce pollutants other than TSS and documentation showing that the BMPs selected are consistent with the TMDL is provided.

Standard 5: Land Uses With Higher Potential Pollutant Loads (LUHPPLs)

☐ The NPDES Multi-Sector General Permit covers the land use and the Stormwater Pollution Prevention Plan (SWPPP) has been included with the Stormwater Report.

☐ The NPDES Multi-Sector General Permit covers the land use and the SWPPP will be submitted ***prior to*** the discharge of stormwater to the post-construction stormwater BMPs.

☐ The NPDES Multi-Sector General Permit does ***not*** cover the land use.

☐ LUHPPLs are located at the site and industry specific source control and pollution prevention measures have been proposed to reduce or eliminate the exposure of LUHPPLs to rain, snow, snow melt and runoff, and been included in the long term Pollution Prevention Plan.

☐ All exposure has been eliminated.

☐ All exposure has ***not*** been eliminated and all BMPs selected are on MassDEP LUHPPL list.

☐ The LUHPPL has the potential to generate runoff with moderate to higher concentrations of oil and grease (e.g. all parking lots with >1000 vehicle trips per day) and the treatment train includes an oil grit separator, a filtering bioretention area, a sand filter or equivalent.

Standard 6: Critical Areas

☐ The discharge is near or to a critical area and the treatment train includes only BMPs that MassDEP has approved for stormwater discharges to or near that particular class of critical area.

☐ Critical areas and BMPs are identified in the Stormwater Report.

Checklist for Stormwater Report

Checklist (continued)

Standard 7: Redevelopments and Other Projects Subject to the Standards only to the maximum extent practicable

☒ The project is subject to the Stormwater Management Standards only to the maximum Extent Practicable as a:

- ☐ Limited Project
- ☐ Small Residential Projects: 5-9 single family houses or 5-9 units in a multi-family development provided there is no discharge that may potentially affect a critical area.
- ☐ Small Residential Projects: 2-4 single family houses or 2-4 units in a multi-family development with a discharge to a critical area
- ☐ Marina and/or boatyard provided the hull painting, service and maintenance areas are protected from exposure to rain, snow, snow melt and runoff
- ☐ Bike Path and/or Foot Path
- ☒ Redevelopment Project
- ☐ Redevelopment portion of mix of new and redevelopment.

☐ Certain standards are not fully met (Standard No. 1, 8, 9, and 10 must always be fully met) and an explanation of why these standards are not met is contained in the Stormwater Report.

☒ The project involves redevelopment and a description of all measures that have been taken to improve existing conditions is provided in the Stormwater Report. The redevelopment checklist found in Volume 2 Chapter 3 of the Massachusetts Stormwater Handbook may be used to document that the proposed stormwater management system (a) complies with Standards 2, 3 and the pretreatment and structural BMP requirements of Standards 4-6 to the maximum extent practicable and (b) improves existing conditions.

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

A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan must include the following information:

- Narrative;
- Construction Period Operation and Maintenance Plan;
- Names of Persons or Entity Responsible for Plan Compliance;
- Construction Period Pollution Prevention Measures;
- Erosion and Sedimentation Control Plan Drawings;
- Detail drawings and specifications for erosion control BMPs, including sizing calculations;
- Vegetation Planning;
- Site Development Plan;
- Construction Sequencing Plan;
- Sequencing of Erosion and Sedimentation Controls;
- Operation and Maintenance of Erosion and Sedimentation Controls;
- Inspection Schedule;
- Maintenance Schedule;
- Inspection and Maintenance Log Form.

☒ A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan containing the information set forth above has been included in the Stormwater Report.

Checklist for Stormwater Report

Checklist (continued)

Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control (continued)

☐ The project is highly complex and information is included in the Stormwater Report that explains why it is not possible to submit the Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan with the application. A Construction Period Pollution Prevention and Erosion and Sedimentation Control has ***not*** been included in the Stormwater Report but will be submitted ***before*** land disturbance begins.

☒ The project is ***not*** covered by a NPDES Construction General Permit.

☐ The project is covered by a NPDES Construction General Permit and a copy of the SWPPP is in the Stormwater Report.

☐ The project is covered by a NPDES Construction General Permit but no SWPPP been submitted. The SWPPP will be submitted BEFORE land disturbance begins.

Standard 9: Operation and Maintenance Plan

☒ The Post Construction Operation and Maintenance Plan is included in the Stormwater Report and includes the following information:

- ☒ Name of the stormwater management system owners;
- ☒ Party responsible for operation and maintenance;
- ☒ Schedule for implementation of routine and non-routine maintenance tasks;
- ☒ Plan showing the location of all stormwater BMPs maintenance access areas;
- ☐ Description and delineation of public safety features;
- ☐ Estimated operation and maintenance budget; and
- ☒ Operation and Maintenance Log Form.

☐ The responsible party is ***not*** the owner of the parcel where the BMP is located and the Stormwater Report includes the following submissions:

- ☐ A copy of the legal instrument (deed, homeowner's association, utility trust or other legal entity) that establishes the terms of and legal responsibility for the operation and maintenance of the project site stormwater BMPs;
- ☐ A plan and easement deed that allows site access for the legal entity to operate and maintain BMP functions.

Standard 10: Prohibition of Illicit Discharges

☒ The Long-Term Pollution Prevention Plan includes measures to prevent illicit discharges;

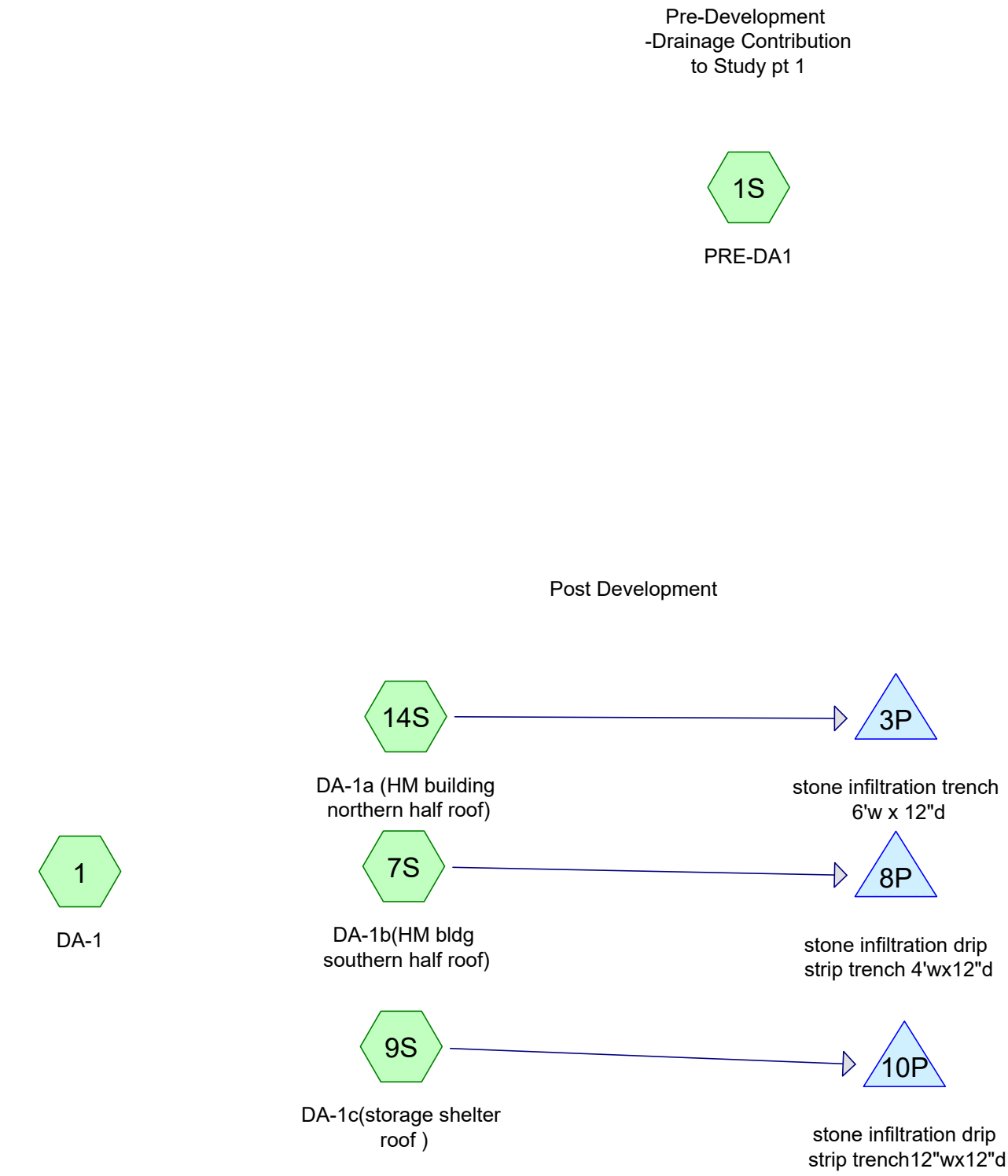
☐ An Illicit Discharge Compliance Statement is attached;

☒ NO Illicit Discharge Compliance Statement is attached but will be submitted ***prior to*** the discharge of any stormwater to post-construction BMPs.

APPENDIX E

Hydro-CAD CALCULATIONS

COASTAL
engineering co.



Subcat Reach Pond Link

Routing Diagram for C19031_DRAINAGE
Prepared by Coastal Engineering Co., Inc., Printed 3/12/2020
HydroCAD® 10.00-16 s/n 04240 © 2015 HydroCAD Software Solutions LLC

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.271	39	>75% Grass cover, Good, HSG A (1, 1S)
0.114	98	Paved parking, HSG A (1, 1S)
0.104	98	Roofs, HSG A (1S, 7S, 9S, 14S)
0.003	98	patio (1S)

Summary for Subcatchment 1: DA-1

Runoff = 0.06 cfs @ 12.18 hrs, Volume= 0.007 af, Depth> 0.47"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 Rainfall=3.60"

Area (sf)	CN	Description
2,623	98	Paved parking, HSG A
5,052	39	>75% Grass cover, Good, HSG A
7,675	59	Weighted Average
5,052		65.82% Pervious Area
2,623		34.18% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, DIRECT**
6.0	0	Total, Increased to minimum Tc = 10.0 min			

Summary for Subcatchment 1S: PRE-DA1

Runoff = 0.11 cfs @ 12.17 hrs, Volume= 0.011 af, Depth> 0.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 Rainfall=3.60"

	Area (sf)	CN	Description
	6,741	39	>75% Grass cover, Good, HSG A
	1,497	98	Roofs, HSG A
	2,363	98	Paved parking, HSG A
*	125	98	patio
	10,726	61	Weighted Average
	6,741		62.85% Pervious Area
	3,985		37.15% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Direct**
6.0	0	Total, Increased to minimum Tc = 10.0 min			

Summary for Subcatchment 7S: DA-1b(HM bldg southern half roof)

Runoff = 0.09 cfs @ 12.13 hrs, Volume= 0.008 af, Depth> 3.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 Rainfall=3.60"

Area (sf)	CN	Description
0	98	Paved parking, HSG A
1,337	98	Roofs, HSG A
1,337	98	Weighted Average
1,337		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, direct**
6.0	0	Total, Increased to minimum Tc = 10.0 min			

Summary for Subcatchment 9S: DA-1c(storage shelter roof)

Runoff = 0.03 cfs @ 12.13 hrs, Volume= 0.002 af, Depth> 3.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 Rainfall=3.60"

Area (sf)	CN	Description
0	98	Paved parking, HSG A
377	98	Roofs, HSG A
377	98	Weighted Average
377		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, direct**
6.0	0	Total, Increased to minimum Tc = 10.0 min			

Summary for Subcatchment 14S: DA-1a (HM building northern half roof)

Runoff = 0.09 cfs @ 12.13 hrs, Volume= 0.008 af, Depth> 3.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 Rainfall=3.60"

Area (sf)	CN	Description
0	98	Paved parking, HSG A
1,337	98	Roofs, HSG A
1,337	98	Weighted Average
1,337		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, direct**
6.0	0	Total, Increased to minimum Tc = 10.0 min			

Summary for Pond 3P: stone infiltration trench 6'w x 12"d

Inflow Area = 0.031 ac,100.00% Impervious, Inflow Depth > 3.20" for 2 event
Inflow = 0.09 cfs @ 12.13 hrs, Volume= 0.008 af
Outflow = 0.08 cfs @ 12.19 hrs, Volume= 0.008 af, Atten= 14%, Lag= 3.7 min
Discarded = 0.08 cfs @ 12.19 hrs, Volume= 0.008 af

Routing by Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs
Peak Elev= 3.53' @ 12.19 hrs Surf.Area= 420 sf Storage= 5 cf

Plug-Flow detention time= 0.4 min calculated for 0.008 af (100% of inflow)
Center-of-Mass det. time= 0.4 min (730.0 - 729.6)

Volume	Invert	Avail.Storage	Storage Description
#1	3.50'	168 cf	**6.00'W x 35.00'L x 1.00'H Prismatoid** x 2 420 cf Overall x 40.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Discarded	3.50'	**8.270 in/hr Exfiltration over Wetted area**

Discarded OutFlow Max=0.08 cfs @ 12.19 hrs HW=3.53' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.08 cfs)

Summary for Pond 8P: stone infiltration drip strip trench 4'wx12"d

Inflow Area = 0.031 ac,100.00% Impervious, Inflow Depth > 3.20" for 2 event
Inflow = 0.09 cfs @ 12.13 hrs, Volume= 0.008 af
Outflow = 0.05 cfs @ 12.31 hrs, Volume= 0.008 af, Atten= 45%, Lag= 10.4 min
Discarded = 0.05 cfs @ 12.31 hrs, Volume= 0.008 af

Routing by Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs
Peak Elev= 3.82' @ 12.31 hrs Surf.Area= 232 sf Storage= 29 cf

Plug-Flow detention time= 2.4 min calculated for 0.008 af (100% of inflow)
Center-of-Mass det. time= 2.3 min (731.9 - 729.6)

Volume	Invert	Avail.Storage	Storage Description
#1	3.50'	93 cf	**4.00'W x 58.00'L x 1.00'H Prismatoid** 232 cf Overall x 40.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Discarded	3.50'	**8.270 in/hr Exfiltration over Wetted area**

Discarded OutFlow Max=0.05 cfs @ 12.31 hrs HW=3.82' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.05 cfs)

Summary for Pond 10P: stone infiltration drip strip trench12"wx12"d

Inflow Area = 0.009 ac,100.00% Impervious, Inflow Depth > 3.20" for 2 event
Inflow = 0.03 cfs @ 12.13 hrs, Volume= 0.002 af
Outflow = 0.02 cfs @ 12.25 hrs, Volume= 0.002 af, Atten= 33%, Lag= 7.2 min
Discarded = 0.02 cfs @ 12.25 hrs, Volume= 0.002 af

Routing by Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs
Peak Elev= 3.80' @ 12.25 hrs Surf.Area= 58 sf Storage= 7 cf

Plug-Flow detention time= 1.8 min calculated for 0.002 af (100% of inflow)
Center-of-Mass det. time= 1.7 min (731.3 - 729.6)

Volume	Invert	Avail.Storage	Storage Description
#1	3.50'	23 cf	**1.00'W x 58.00'L x 1.00'H Prismatoid** 58 cf Overall x 40.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Discarded	3.50'	**8.270 in/hr Exfiltration over Wetted area**

Discarded OutFlow Max=0.02 cfs @ 12.25 hrs HW=3.80' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Summary for Subcatchment 1: DA-1

Runoff = 0.18 cfs @ 12.16 hrs, Volume= 0.016 af, Depth> 1.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 Rainfall=4.90"

Area (sf)	CN	Description
2,623	98	Paved parking, HSG A
5,052	39	>75% Grass cover, Good, HSG A
7,675	59	Weighted Average
5,052		65.82% Pervious Area
2,623		34.18% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, DIRECT**
6.0	0	Total, Increased to minimum Tc = 10.0 min			

Summary for Subcatchment 1S: PRE-DA1

Runoff = 0.30 cfs @ 12.15 hrs, Volume= 0.024 af, Depth> 1.18"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 Rainfall=4.90"

	Area (sf)	CN	Description
	6,741	39	>75% Grass cover, Good, HSG A
	1,497	98	Roofs, HSG A
	2,363	98	Paved parking, HSG A
*	125	98	patio
	10,726	61	Weighted Average
	6,741		62.85% Pervious Area
	3,985		37.15% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Direct**
6.0	0	Total, Increased to minimum Tc = 10.0 min			

Summary for Subcatchment 7S: DA-1b(HM bldg southern half roof)

Runoff = 0.13 cfs @ 12.13 hrs, Volume= 0.011 af, Depth> 4.44"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 Rainfall=4.90"

Area (sf)	CN	Description
0	98	Paved parking, HSG A
1,337	98	Roofs, HSG A
1,337	98	Weighted Average
1,337		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, direct**
6.0	0	Total, Increased to minimum Tc = 10.0 min			

Summary for Subcatchment 9S: DA-1c(storage shelter roof)

Runoff = 0.04 cfs @ 12.13 hrs, Volume= 0.003 af, Depth> 4.44"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 Rainfall=4.90"

Area (sf)	CN	Description
0	98	Paved parking, HSG A
377	98	Roofs, HSG A
377	98	Weighted Average
377		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, direct**
6.0	0	Total, Increased to minimum Tc = 10.0 min			

Summary for Subcatchment 14S: DA-1a (HM building northern half roof)

Runoff = 0.13 cfs @ 12.13 hrs, Volume= 0.011 af, Depth> 4.44"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 Rainfall=4.90"

Area (sf)	CN	Description
0	98	Paved parking, HSG A
1,337	98	Roofs, HSG A
1,337	98	Weighted Average
1,337		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, direct**
6.0	0	Total, Increased to minimum Tc = 10.0 min			

Summary for Pond 3P: stone infiltration trench 6'w x 12"d

Inflow Area = 0.031 ac,100.00% Impervious, Inflow Depth > 4.44" for 10 event
Inflow = 0.13 cfs @ 12.13 hrs, Volume= 0.011 af
Outflow = 0.08 cfs @ 12.26 hrs, Volume= 0.011 af, Atten= 34%, Lag= 7.5 min
Discarded = 0.08 cfs @ 12.26 hrs, Volume= 0.011 af

Routing by Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs
Peak Elev= 3.64' @ 12.26 hrs Surf.Area= 420 sf Storage= 24 cf

Plug-Flow detention time= 1.1 min calculated for 0.011 af (100% of inflow)
Center-of-Mass det. time= 1.1 min (725.2 - 724.2)

Volume	Invert	Avail.Storage	Storage Description
#1	3.50'	168 cf	**6.00'W x 35.00'L x 1.00'H Prismatoid** x 2 420 cf Overall x 40.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Discarded	3.50'	**8.270 in/hr Exfiltration over Wetted area**

Discarded OutFlow Max=0.08 cfs @ 12.26 hrs HW=3.64' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.08 cfs)

Summary for Pond 8P: stone infiltration drip strip trench 4'wx12"d

Inflow Area = 0.031 ac,100.00% Impervious, Inflow Depth > 4.44" for 10 event
Inflow = 0.13 cfs @ 12.13 hrs, Volume= 0.011 af
Outflow = 0.06 cfs @ 12.36 hrs, Volume= 0.011 af, Atten= 54%, Lag= 13.8 min
Discarded = 0.06 cfs @ 12.36 hrs, Volume= 0.011 af

Routing by Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs
Peak Elev= 4.15' @ 12.36 hrs Surf.Area= 232 sf Storage= 60 cf

Plug-Flow detention time= 4.6 min calculated for 0.011 af (100% of inflow)
Center-of-Mass det. time= 4.6 min (728.7 - 724.2)

Volume	Invert	Avail.Storage	Storage Description
#1	3.50'	93 cf	**4.00'W x 58.00'L x 1.00'H Prismatoid** 232 cf Overall x 40.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Discarded	3.50'	**8.270 in/hr Exfiltration over Wetted area**

Discarded OutFlow Max=0.06 cfs @ 12.36 hrs HW=4.15' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.06 cfs)

Summary for Pond 10P: stone infiltration drip strip trench12"wx12"d

Inflow Area = 0.009 ac,100.00% Impervious, Inflow Depth > 4.44" for 10 event
Inflow = 0.04 cfs @ 12.13 hrs, Volume= 0.003 af
Outflow = 0.02 cfs @ 12.27 hrs, Volume= 0.003 af, Atten= 36%, Lag= 7.9 min
Discarded = 0.02 cfs @ 12.27 hrs, Volume= 0.003 af

Routing by Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs
Peak Elev= 4.04' @ 12.27 hrs Surf.Area= 58 sf Storage= 13 cf

Plug-Flow detention time= 2.7 min calculated for 0.003 af (100% of inflow)
Center-of-Mass det. time= 2.7 min (726.8 - 724.2)

Volume	Invert	Avail.Storage	Storage Description
#1	3.50'	23 cf	**1.00'W x 58.00'L x 1.00'H Prismatoid** 58 cf Overall x 40.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Discarded	3.50'	**8.270 in/hr Exfiltration over Wetted area**

Discarded OutFlow Max=0.02 cfs @ 12.27 hrs HW=4.04' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Summary for Subcatchment 1: DA-1

Runoff = 0.28 cfs @ 12.15 hrs, Volume= 0.023 af, Depth> 1.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Rainfall=5.80"

Area (sf)	CN	Description
2,623	98	Paved parking, HSG A
5,052	39	>75% Grass cover, Good, HSG A
7,675	59	Weighted Average
5,052		65.82% Pervious Area
2,623		34.18% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, DIRECT**
6.0	0	Total, Increased to minimum Tc = 10.0 min			

Summary for Subcatchment 1S: PRE-DA1

Runoff = 0.44 cfs @ 12.15 hrs, Volume= 0.035 af, Depth> 1.70"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Rainfall=5.80"

	Area (sf)	CN	Description
	6,741	39	>75% Grass cover, Good, HSG A
	1,497	98	Roofs, HSG A
	2,363	98	Paved parking, HSG A
*	125	98	patio
	10,726	61	Weighted Average
	6,741		62.85% Pervious Area
	3,985		37.15% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Direct**
6.0	0	Total, Increased to minimum Tc = 10.0 min			

Summary for Subcatchment 7S: DA-1b(HM bldg southern half roof)

Runoff = 0.15 cfs @ 12.13 hrs, Volume= 0.014 af, Depth> 5.30"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Rainfall=5.80"

Area (sf)	CN	Description
0	98	Paved parking, HSG A
1,337	98	Roofs, HSG A
1,337	98	Weighted Average
1,337		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, direct**
6.0	0	Total, Increased to minimum Tc = 10.0 min			

Summary for Subcatchment 9S: DA-1c(storage shelter roof)

Runoff = 0.04 cfs @ 12.13 hrs, Volume= 0.004 af, Depth> 5.30"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Rainfall=5.80"

Area (sf)	CN	Description
0	98	Paved parking, HSG A
377	98	Roofs, HSG A
377	98	Weighted Average
377		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, direct**
6.0	0	Total, Increased to minimum Tc = 10.0 min			

Summary for Subcatchment 14S: DA-1a (HM building northern half roof)

Runoff = 0.15 cfs @ 12.13 hrs, Volume= 0.014 af, Depth> 5.30"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Rainfall=5.80"

Area (sf)	CN	Description
0	98	Paved parking, HSG A
1,337	98	Roofs, HSG A
1,337	98	Weighted Average
1,337		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, direct**
6.0	0	Total, Increased to minimum Tc = 10.0 min			

Summary for Pond 3P: stone infiltration trench 6'w x 12"d

Inflow Area = 0.031 ac,100.00% Impervious, Inflow Depth > 5.30" for 25 event
Inflow = 0.15 cfs @ 12.13 hrs, Volume= 0.014 af
Outflow = 0.09 cfs @ 12.29 hrs, Volume= 0.014 af, Atten= 42%, Lag= 9.6 min
Discarded = 0.09 cfs @ 12.29 hrs, Volume= 0.014 af

Routing by Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs
Peak Elev= 3.75' @ 12.29 hrs Surf.Area= 420 sf Storage= 41 cf

Plug-Flow detention time= 1.8 min calculated for 0.014 af (100% of inflow)
Center-of-Mass det. time= 1.8 min (723.3 - 721.5)

Volume	Invert	Avail.Storage	Storage Description
#1	3.50'	168 cf	**6.00'W x 35.00'L x 1.00'H Prismatoid** x 2 420 cf Overall x 40.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Discarded	3.50'	**8.270 in/hr Exfiltration over Wetted area**

Discarded OutFlow Max=0.09 cfs @ 12.29 hrs HW=3.75' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.09 cfs)

Summary for Pond 8P: stone infiltration drip strip trench 4'wx12"d

Inflow Area = 0.031 ac,100.00% Impervious, Inflow Depth > 5.30" for 25 event
Inflow = 0.15 cfs @ 12.13 hrs, Volume= 0.014 af
Outflow = 0.07 cfs @ 12.39 hrs, Volume= 0.014 af, Atten= 57%, Lag= 15.2 min
Discarded = 0.07 cfs @ 12.39 hrs, Volume= 0.014 af

Routing by Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs
Peak Elev= 4.41' @ 12.39 hrs Surf.Area= 232 sf Storage= 84 cf

Plug-Flow detention time= 6.2 min calculated for 0.014 af (100% of inflow)
Center-of-Mass det. time= 6.2 min (727.7 - 721.5)

Volume	Invert	Avail.Storage	Storage Description
#1	3.50'	93 cf	**4.00'W x 58.00'L x 1.00'H Prismatoid** 232 cf Overall x 40.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Discarded	3.50'	**8.270 in/hr Exfiltration over Wetted area**

Discarded OutFlow Max=0.07 cfs @ 12.39 hrs HW=4.41' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.07 cfs)

Summary for Pond 10P: stone infiltration drip strip trench12"wx12"d

Inflow Area = 0.009 ac,100.00% Impervious, Inflow Depth > 5.30" for 25 event
Inflow = 0.04 cfs @ 12.13 hrs, Volume= 0.004 af
Outflow = 0.03 cfs @ 12.27 hrs, Volume= 0.004 af, Atten= 37%, Lag= 8.1 min
Discarded = 0.03 cfs @ 12.27 hrs, Volume= 0.004 af

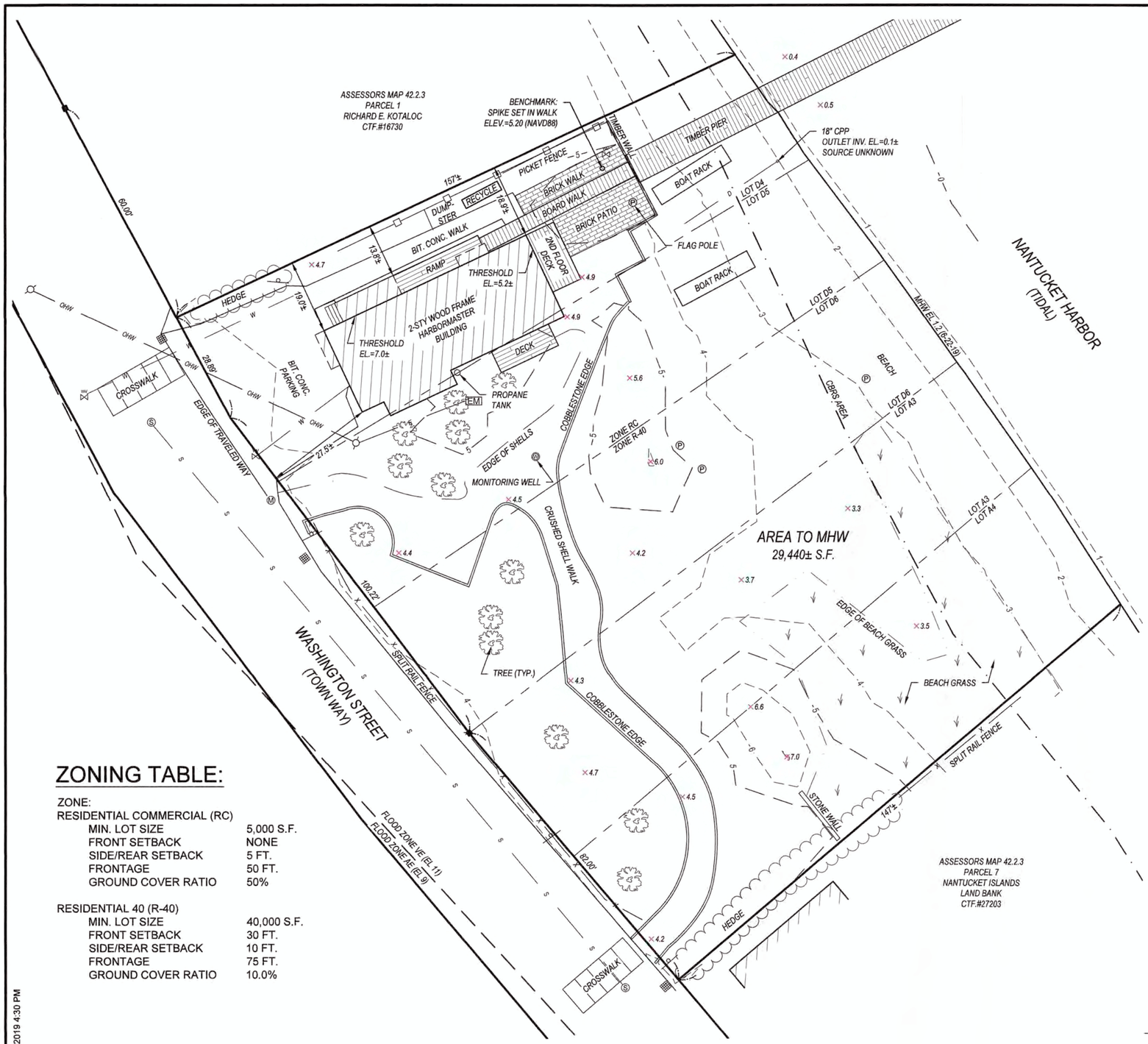
Routing by Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs
Peak Elev= 4.21' @ 12.27 hrs Surf.Area= 58 sf Storage= 17 cf

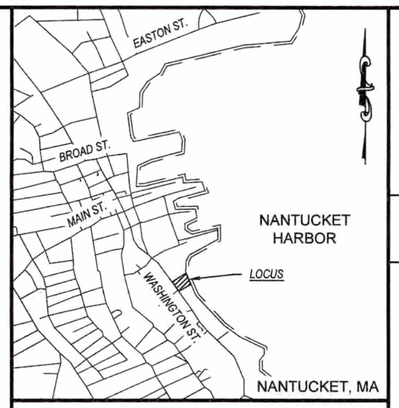
Plug-Flow detention time= 3.3 min calculated for 0.004 af (100% of inflow)
Center-of-Mass det. time= 3.2 min (724.8 - 721.5)

Volume	Invert	Avail.Storage	Storage Description
#1	3.50'	23 cf	**1.00'W x 58.00'L x 1.00'H Prismatoid** 58 cf Overall x 40.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Discarded	3.50'	**8.270 in/hr Exfiltration over Wetted area**

Discarded OutFlow Max=0.03 cfs @ 12.27 hrs HW=4.21' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.03 cfs)





KEY MAP
NO SCALE

REFERENCE:

ASSESSORS MAP 42.2.3,
PARCELS 2 THROUGH 6

CTF. #7858
L.C.PLAN 9434-D
L.C.PLAN 10450-C

ZONING:
RESIDENTIAL COMMERCIAL (RC)
RESIDENTIAL 40 (R-40)
FLOOD HAZARD OVERLAY DISTRICT (FHOD)
TOWN OVERLAY DISTRICT

FLOOD ZONE:

FLOOD ZONE VE (EL 11) AND CBRS AREA (11-16-1990) AS SHOWN ON FEMA FIRM PANEL #25019C0086G EFFECTIVE DATE 6-9-2014. PLEASE NOTE THAT SITE SPECIFIC FLOODPLAIN BOUNDARIES MAY VARY DUE TO DIFFERENT INTERPRETATIONS OF THESE BOUNDARIES. USERS ARE ADVISED TO VERIFY LOCATION OF THESE BOUNDARIES WITH THE DESIGNATED COMMUNITY FLOODPLAIN MANAGERS PRIOR TO SITING ANY PROPOSED STRUCTURES.

DATUM:

ELEVATIONS SHOWN HEREON ARE BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 1988)

ZONING TABLE:

ZONE:

RESIDENTIAL COMMERCIAL (RC)	
MIN. LOT SIZE	5,000 S.F.
FRONT SETBACK	NONE
SIDE/REAR SETBACK	5 FT.
FRONTAGE	50 FT.
GROUND COVER RATIO	50%

RESIDENTIAL 40 (R-40)	
MIN. LOT SIZE	40,000 S.F.
FRONT SETBACK	30 FT.
SIDE/REAR SETBACK	10 FT.
FRONTAGE	75 FT.
GROUND COVER RATIO	10.0%

I HEREBY CERTIFY THAT THE CONDITIONS SHOWN HEREON ARE LOCATED AS THEY EXISTED ON THE GROUND AS OF 6-24-19.

DATE JULY 10, 2019

P.L.S. John McElwee

COMMONWEALTH OF MASSACHUSETTS
JOHN McELWEE
No. 33602
PROFESSIONAL LAND SURVEYOR

LEGEND

■	BOUND	▦	CATCH BASIN
—o—	MISC. SIGN	Ⓓ	DRAIN MANHOLE
—x—x—	FENCE	Ⓦ	MONITORING WELL
—OHW—	OVERHEAD UTILITY LINE	WV	WATER VALVE
—W—	WATER LINE		UTILITY POLE
—D—	DRAIN LINE	EM	ELECTRIC METER
—S—	SEWAGE DISPOSAL	Ⓟ	POST
Ⓢ	SEWER MANHOLE	—5—	CONTOUR
Ⓜ	MANHOLE	X 4.7	SPOT GRADE

PLAN

20 10 0 20 60

1 inch = 20 ft.

COASTAL engineering co.
260 Cranberry Hwy. Orleans, MA 02653
508.255.6511 P 508.255.6700 F

NO.	DATE	REVISION	BY

SEAL

PROJECT
NANTUCKET HARBORMASTER
34 WASHINGTON STREET
NANTUCKET, MA

SHEET TITLE
PLAN SHOWING EXISTING SITE CONDITIONS

SCALE: AS NOTED
DRAWING FILE: C19031-X.dwg
DATE: 7-10-19
DRAWN BY: JLH
CHECKED BY: JDM

C1.2.1

1 OF 1 SHEETS

PROJECT NO. C19031.00

F:\SDSKPROJ\C19000\C19031\C19031-00\C19031-X.dwg 7/10/2019 4:30 PM

VIEW FROM SOUTHEAST

PROGRESS PRINT

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Stephen Kelleher Architects, Inc.
Fairhaven Center for Business
57 Alden Road
Fairhaven, Massachusetts 02719
508-992-2007 Fax 992-2021

Harbormaster Building
34 Washington Street
Nantucket, Massachusetts

RENDERING

Drawn By:	CF
Checked:	SLK
Date:	03-04-2020
Scale:	NOT TO SCALE

--

VIEW FROM NORTHEAST

PROGRESS PRINT

SK
Stephen Kelleher Architects, Inc.
Fairhaven Center for Business
57 Alden Road
Fairhaven, Massachusetts 02719
508-992-2007 Fax 992-2021

Harbormaster Building
34 Washington Street
Nantucket, Massachusetts

RENDERING

Drawn By:	CF
Checked:	SLK
Date:	03-04-2020
Scale:	NOT TO SCALE

--

PROGRESS PRINT

VIEW FROM NORTHWEST

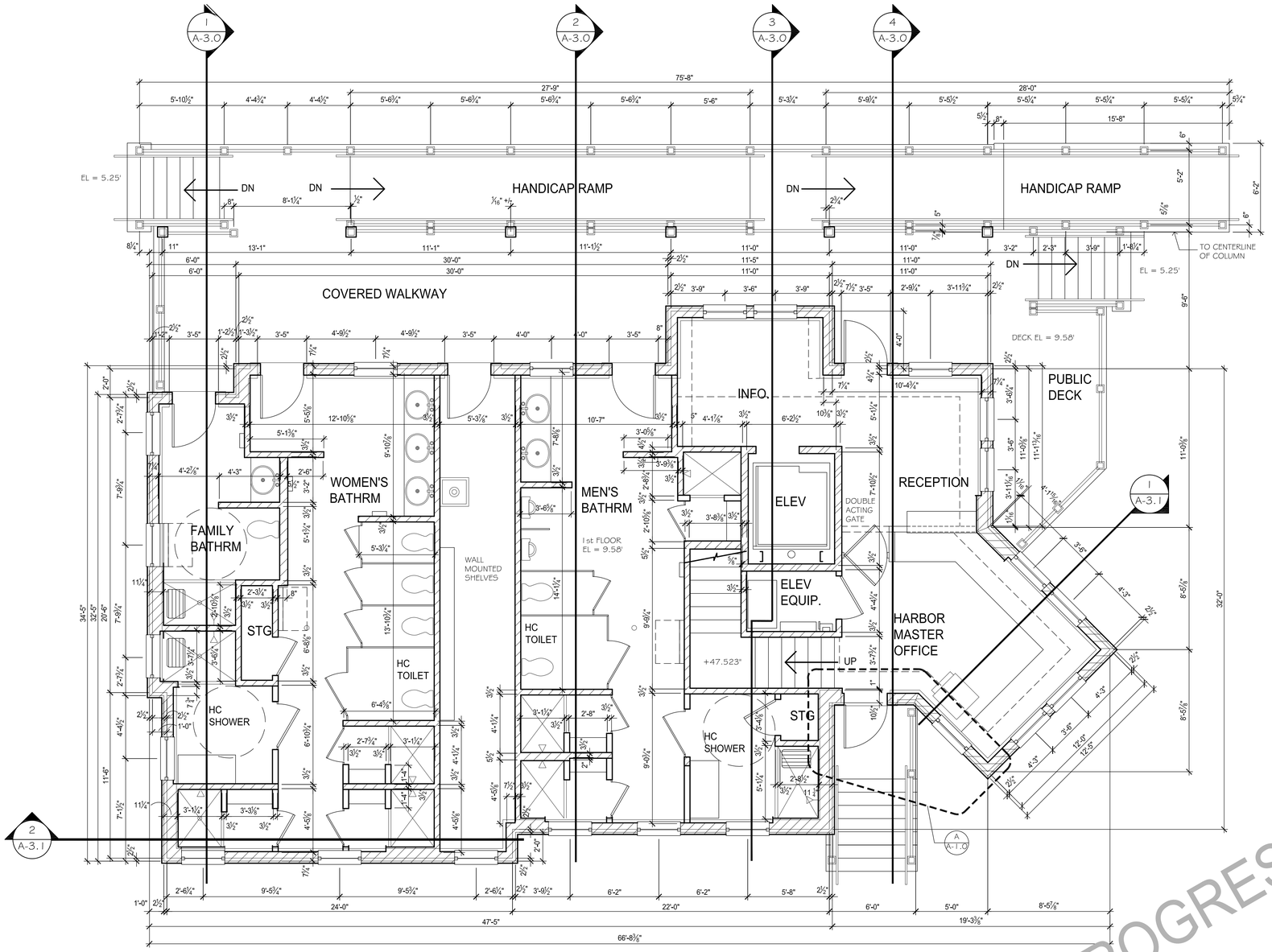
SK
Stephen Kelleher Architects, Inc.
Fairhaven Center for Business
57 Alden Road
Fairhaven, Massachusetts 02719
508-992-2007 Fax 992-2021

Harbormaster Building
34 Washington Street
Nantucket, Massachusetts

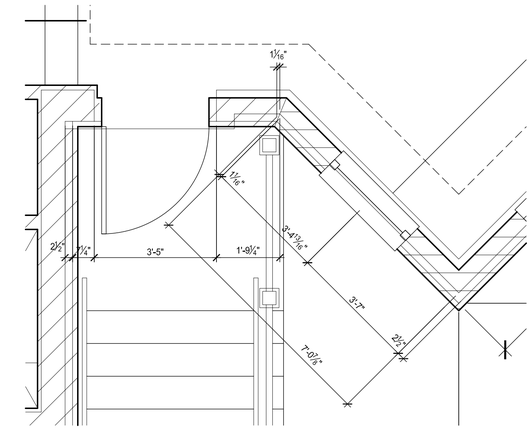
RENDERING

Drawn By:	CF
Checked:	SLK
Date:	03-04-2020
Scale:	NOT TO SCALE

--



1 **1st FLOOR PLAN**
1/4" = 1'-0"



2 **ENLARGED FLOOR PLAN**
1/2" = 1'-0"

ALL DIMENSIONS TO FACE OF STUD, FACE OF CONCRETE, CENTERLINE OF POST OR COLUMN OR TO OUTSIDE OF DECK

PROGRESS PRINT

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Stephen Kelleher Architects, Inc.
Fairhaven Center for Business
57 Alden Road
Fairhaven, Massachusetts 02719
508-992-2007 Fax 992-2021

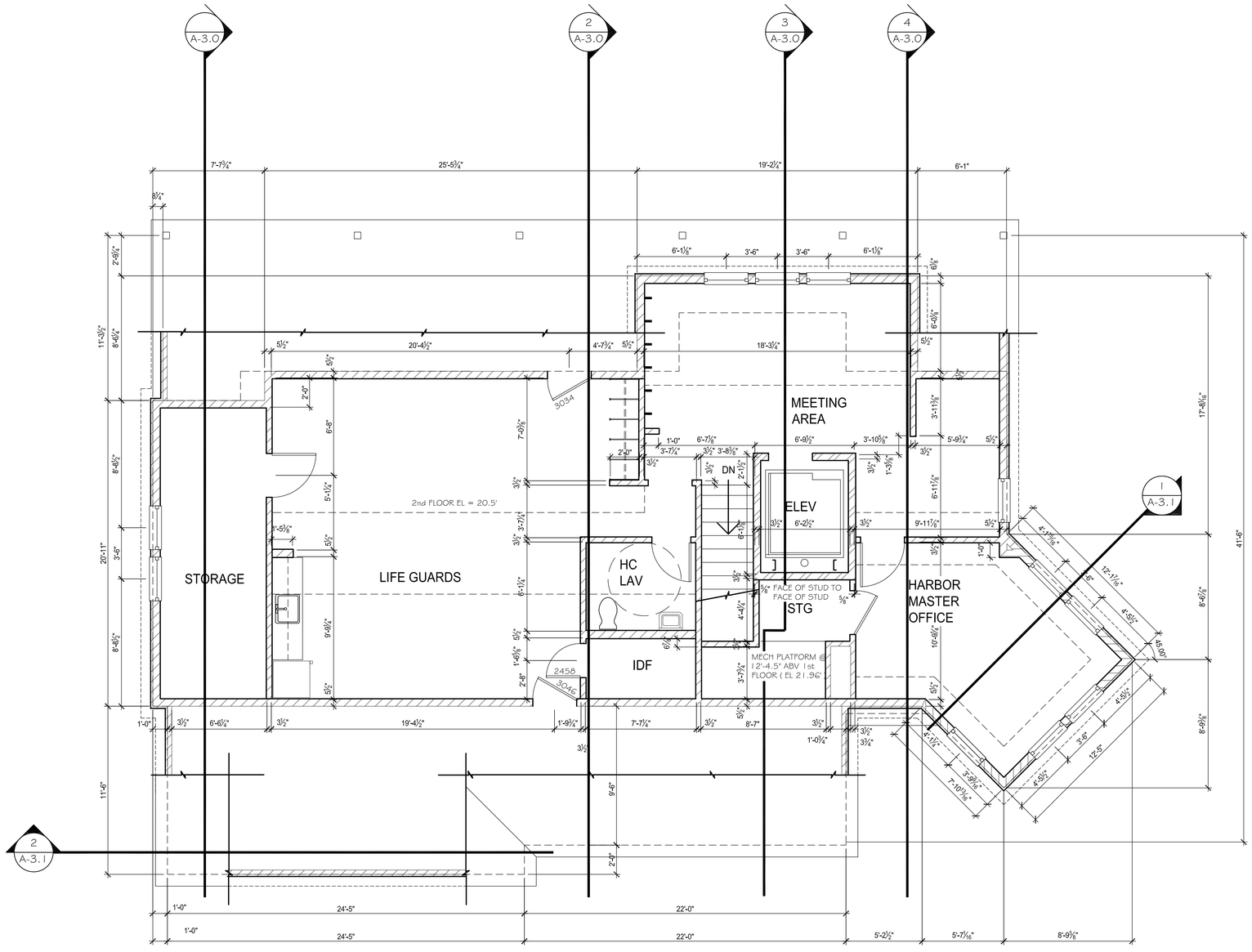
Harbormaster Building
34 Washington Street
Nantucket, Massachusetts

First Floor Plan

Drawn By:	PQ
Checked:	SLK
Date:	03.02.2020
Scale:	AS NOTED

A-1.0

NORTH



PROGRESS PRINT

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Fairhaven Center for Business
57 Alden Road
Fairhaven, Massachusetts 02719
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Harbormaster Building

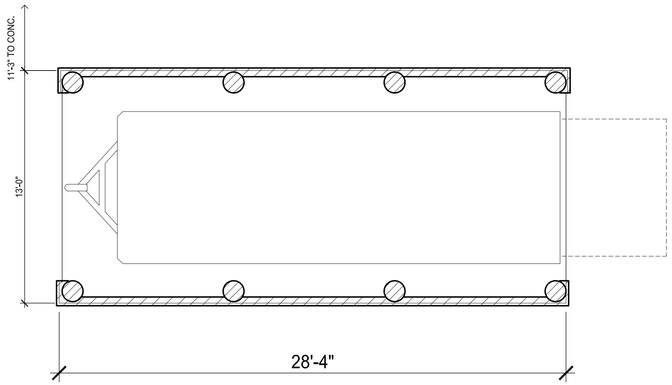
34 Washington Street
Nantucket, Massachusetts

Second Floor Plan

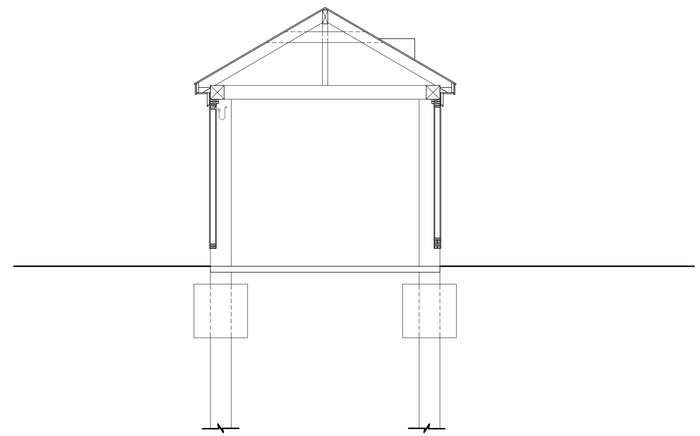
Drawn By:	PQ
Checked:	SLK
Date:	03.02.2020
Scale:	¼" = 1'-0"

A-1.1

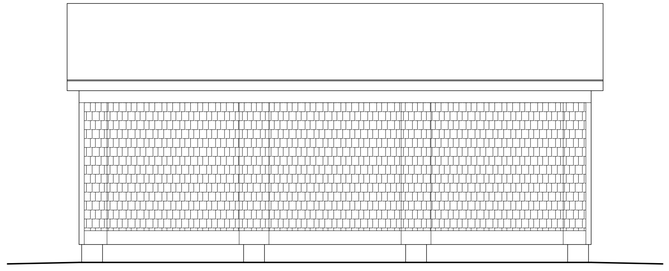
NORTH



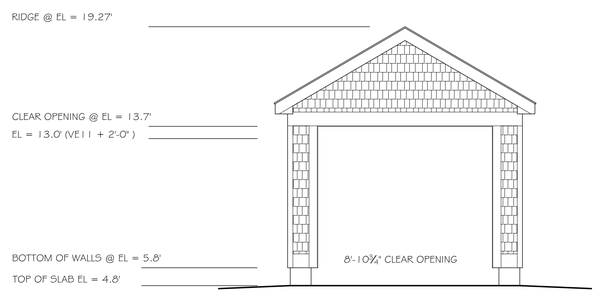
1 **PLAN**
1/4" = 1'-0"



2 **SECTION A**
1/4" = 1'-0"



3 **SOUTH ELEVATION**
1/4" = 1'-0"
NORTH ELEVATION SIMILAR



4 **WEST ELEVATION**
1/4" = 1'-0"
EAST ELEVATION SIMILAR

PROGRESS PRINT

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Fairhaven Center for Business
57 Alden Road
Fairhaven, Massachusetts 02719
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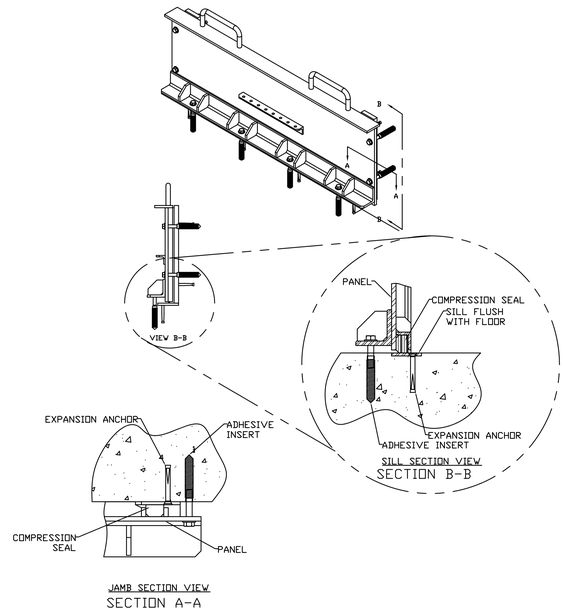
Harbormaster Building
34 Washington Street
Nantucket, Massachusetts

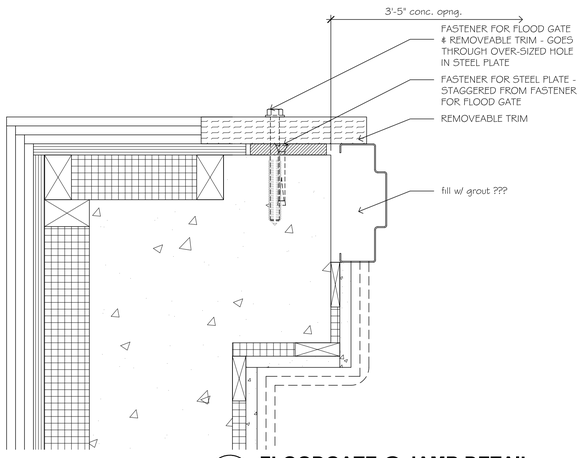
Storage Building

Drawn By:	PQ
Checked:	SLK
Date:	02.25.2020
Scale:	¼" = 1'-0"

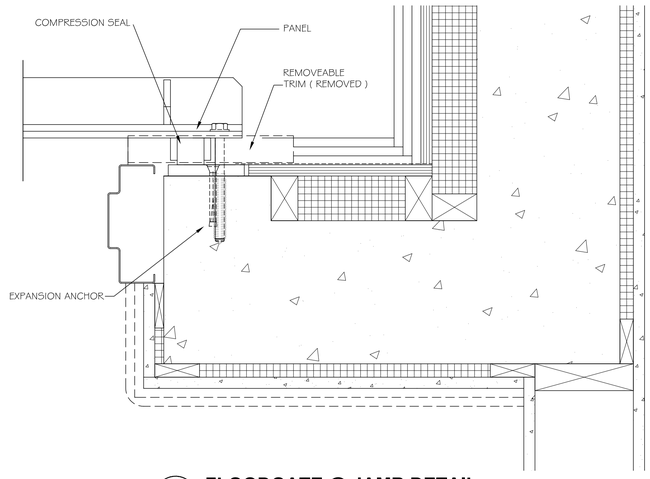
A-1.2



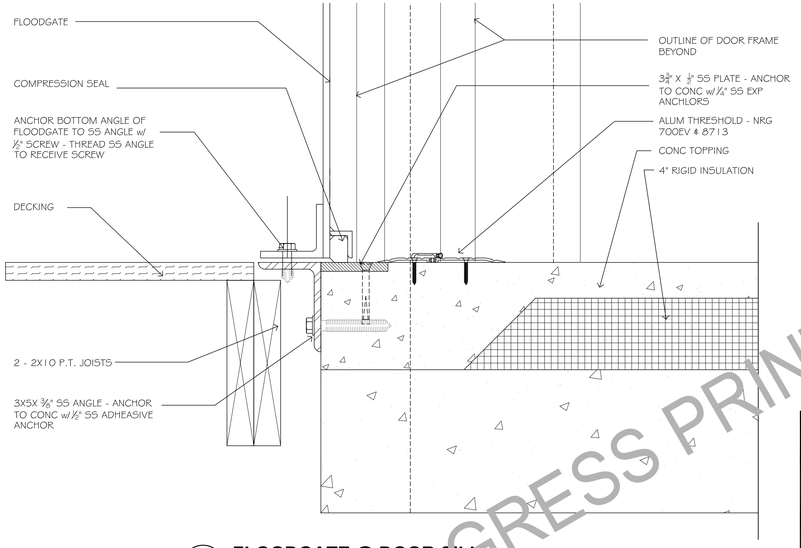
3 **MFGR'S FLOODGATE DETAILS**
NTS



4 **FLOODGATE @ JAMB DETAIL**
3" = 1'-0"



5 **FLOODGATE @ JAMB DETAIL**
3" = 1'-0"



6 **FLOODGATE @ DOOR SILL**
3" = 1'-0"

PROGRESS PRINT

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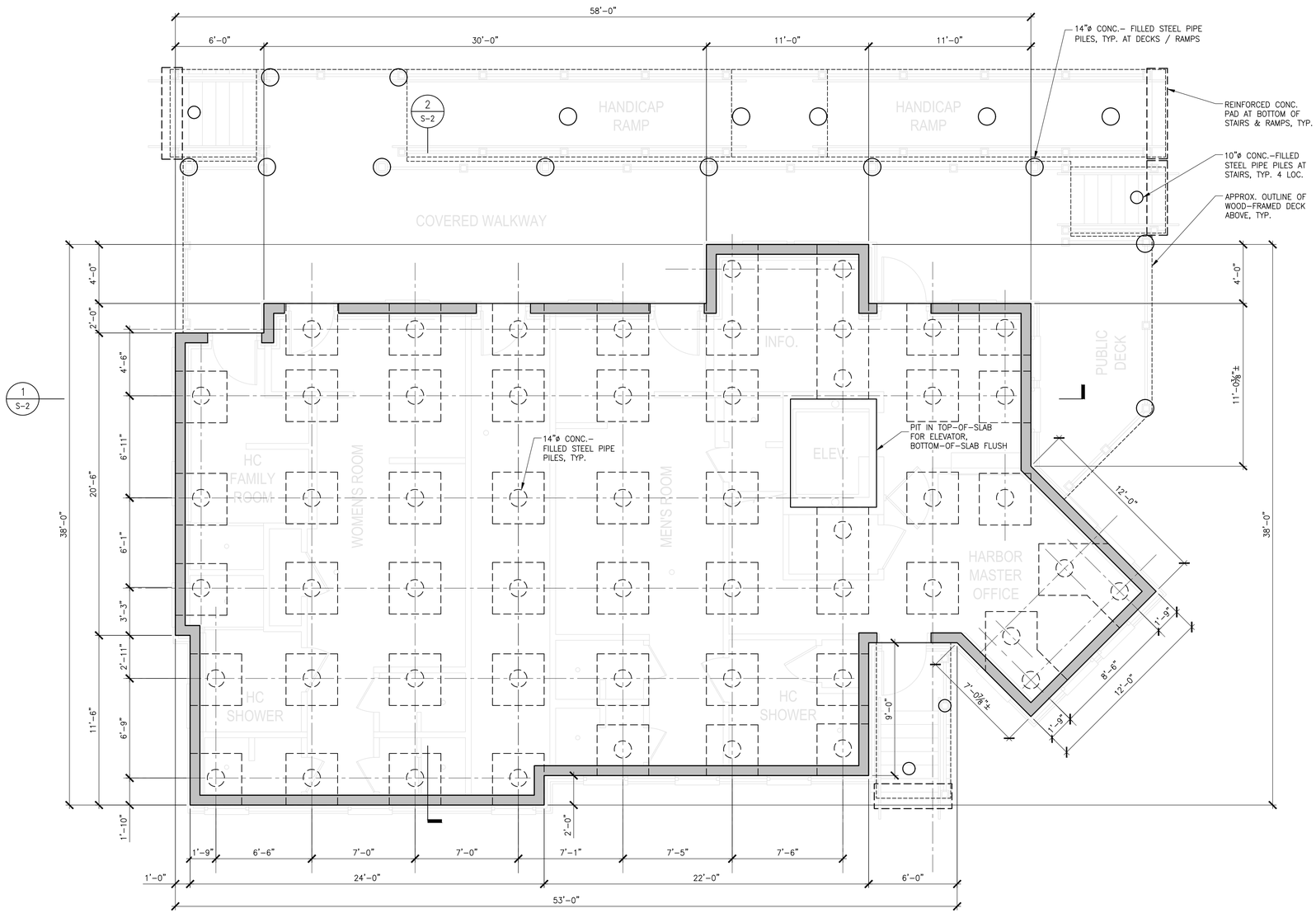
Fairhaven Center for Business
57 Alden Road
Fairhaven, Massachusetts 02719
508-992-2007 Fax 992-2021

Harbormaster Building
34 Washington Street
Nantucket, Massachusetts

Details

Drawn By:	PQ
Checked:	SLK
Date:	02.25.2020
Scale:	AS NOTED

A-5.1



PILE QUANTITIES:

70 – 14"ø STEEL PILES

4 – 10"ø STEEL PILES

FOUNDATION / PILE CAP LOCATION PLAN
1/4" = 1'-0"

NOT FOR CONSTRUCTION

TRIPI ENGINEERING SERVICES, LLC
433 MAIN STREET, SUITE 4
HUDSON, MASSACHUSETTS 01749
www.tripiengineering.com ■ 781-287-0077

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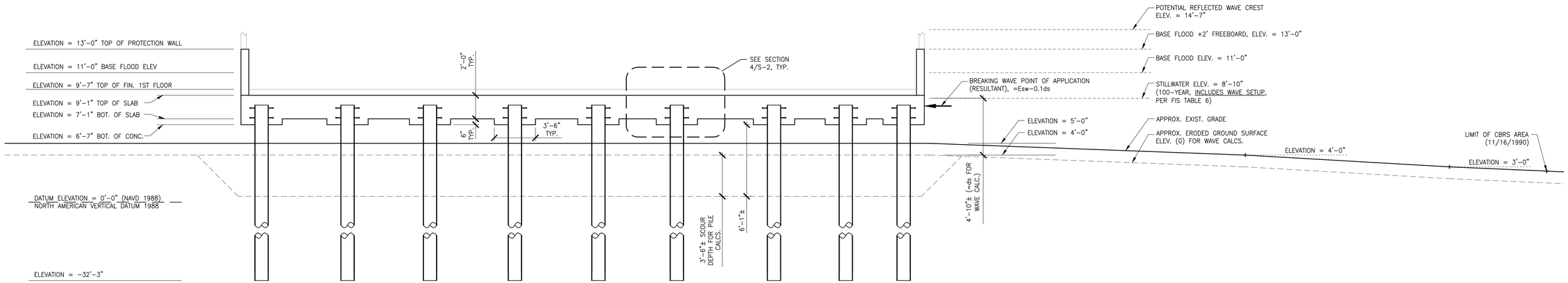
34 Washington Street
Nantucket, Massachusetts

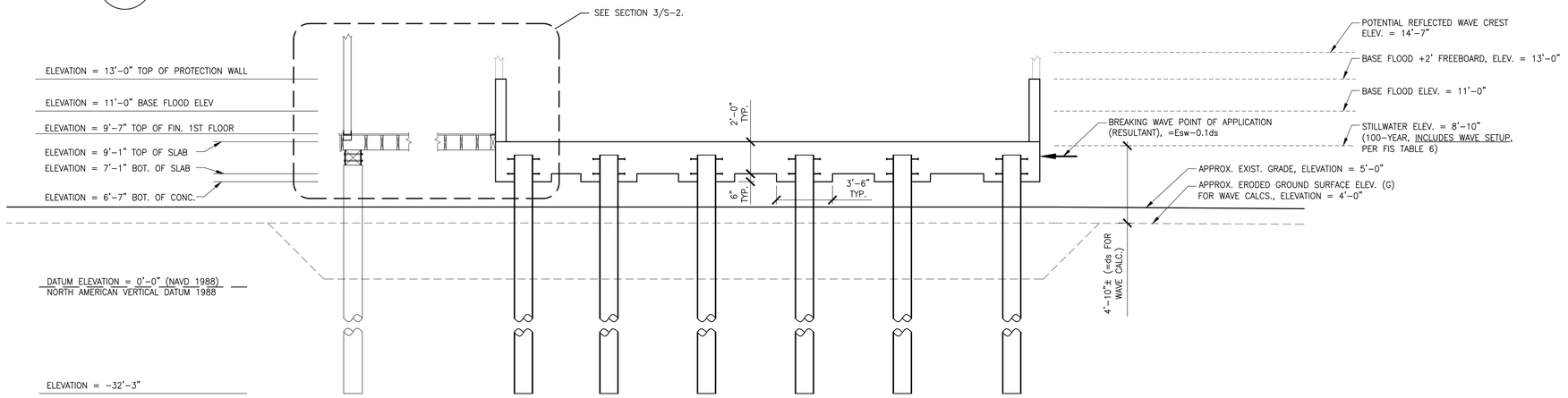
FOUNDATIONS / PILE LOCATION

Drawn By:	SB / JMT
Checked:	JMT
Date:	12 / 04 / 2019
Scale:	AS NOTED

S-1



1 / S-2 LONGITUDINAL SECTION
SCALE: ¼" = 1'-0"



2 / S-2 TRANSVERSE SECTION
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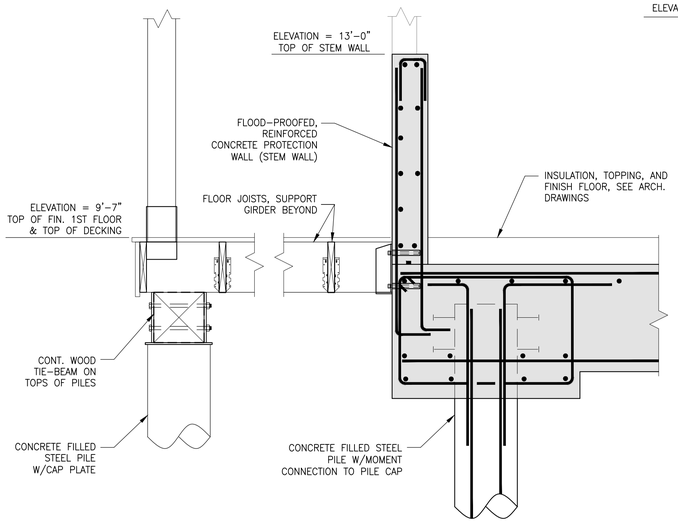
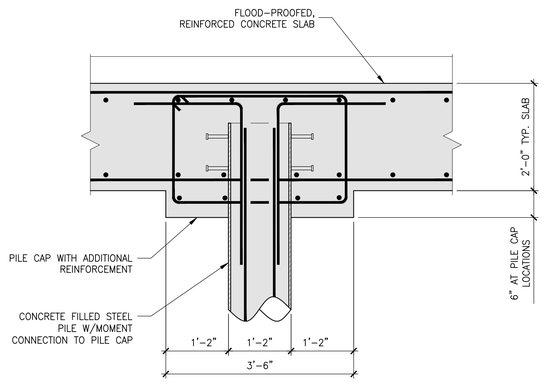


3 / S-2 SECTION THROUGH DECK FLOOR FRAMING
SCALE : NO SCALE



4 / S-2 TYPICAL PILE CAP DETAIL
SCALE : NO SCALE

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Fairhaven, Massachusetts 02719
508-992-2007 Fax 992-2021

Harbormaster Building
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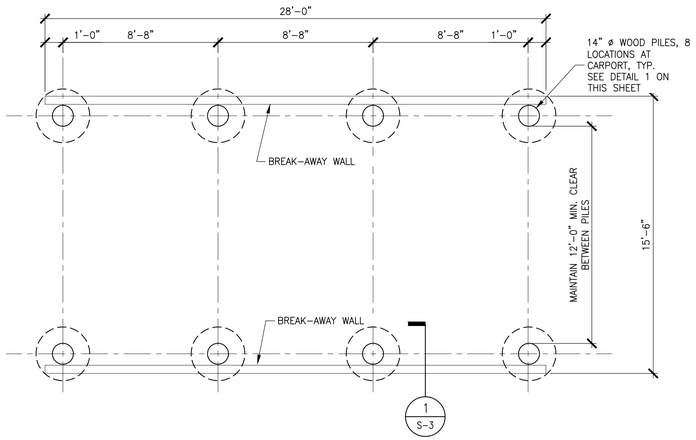
Nantucket, Massachusetts

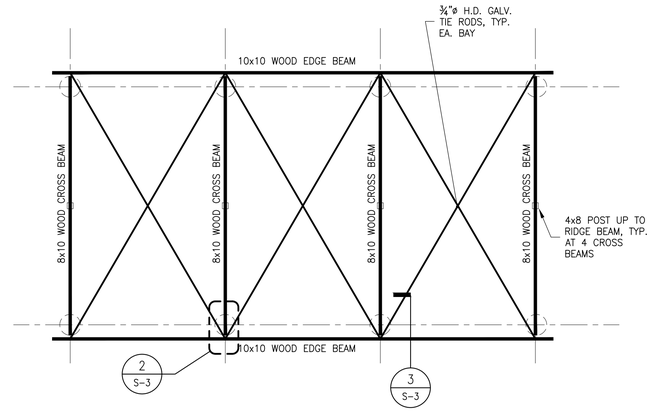
FOUNDATIONS / PILE LOCATION

Drawn By:	SB / JMT
Checked:	JMT
Date:	12 / 04 / 2019
Scale:	AS NOTED

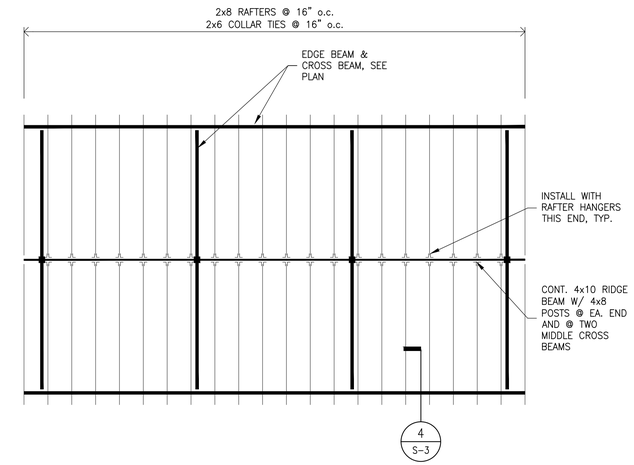
S-2



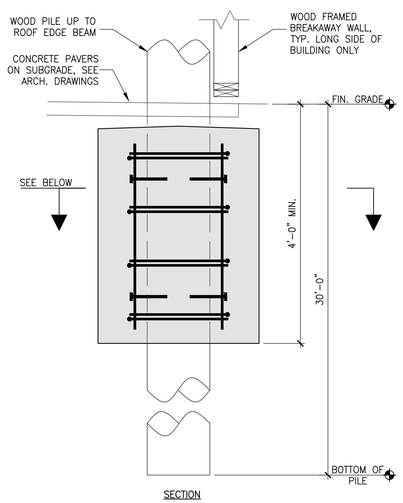
CARPORT PILE LOCATION PLAN
1/4" = 1'-0"



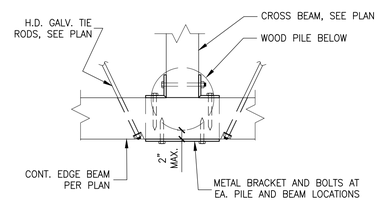
ROOF FRAMING BEAMS
1/4" = 1'-0"



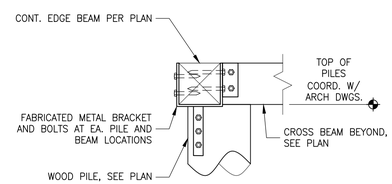
ROOF FRAMING PLAN
1/4" = 1'-0"



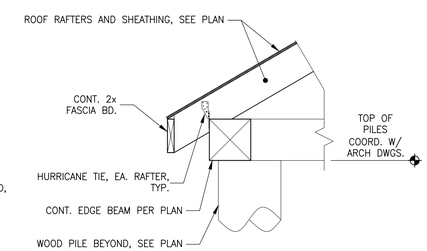
1 S-3 PILE DETAIL
SCALE : NO SCALE



2 S-3 PLAN DETAIL
SCALE : NO SCALE



3 S-3 BEAM TO PILE CONNECTION
SCALE : NO SCALE



4 S-3 TYPICAL RAFTER BEARING DETAIL
SCALE : NO SCALE

NOT FOR CONSTRUCTION

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HUDSON, MASSACHUSETTS 01749
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Fairhaven Center for Business
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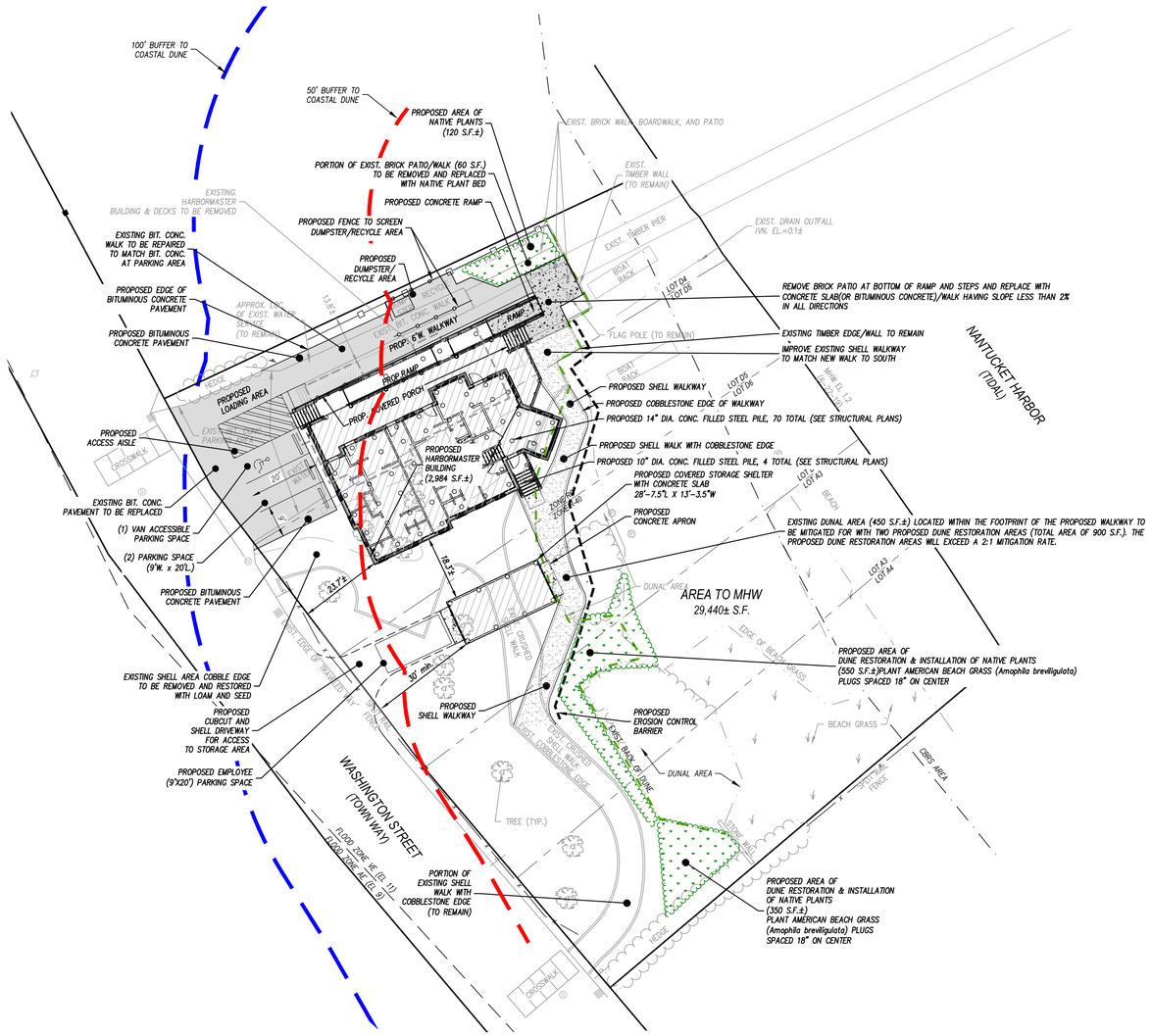
Fairhaven, Massachusetts 02719
508-992-2007 Fax 992-2021

Harbormaster Building
34 Washington Street
Nantucket, Massachusetts

CARPORT PLANS AND DETAILS

Drawn By:	SB / JMT
Checked:	JMT
Date:	12 / 05 / 2019
Scale:	AS NOTED

S-3



PLAN

COVERAGE TABLE

SUBJECT	EXISTING	PROPOSED	CHANGE
BUILDING FOUNDATION AREA* (IMPERVIOUS FOOTPRINT)	1,497± S.F.	453 ± S.F.	1,044± S.F. REDUCTION
HARDSCAPES (PAVEMENT, WALLS, BRICK PATIO)	2,488± S.F.	2,623± S.F.	135± S.F. INCREASE
DECKS & STAIRS	679± S.F.	468± S.F.	211± S.F. REDUCTION
SHELL DRIVEWAY & WALKS (PERVIOUS)	2,809± S.F.	1,866± S.F.	943± S.F. REDUCTION
TOTAL COVERAGE	7,473± S.F.	5,410± S.F.	2,063± S.F. REDUCTION

*EXISTING BUILDING IS ON CONCRETE SLAB; PROPOSED HARBORMASTER BUILDING IS RAISED ABOVE EXISTING GRADE ON 74 PILES, AND PROPOSED STORAGE SHELTER IS ABOVE CONCRETE SLAB FOUNDATION

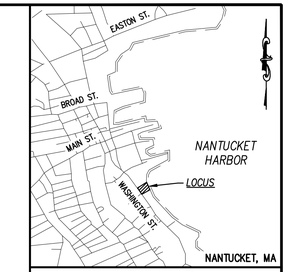
LEGEND

EXISTING

- BOUND
- MISC. SIGN
- FENCE
- OVERHEAD UTILITY LINE
- WATER LINE
- DRAIN LINE
- SEWAGE DISPOSAL
- SEWER MANHOLE
- MANHOLE
- CATCH BASIN
- DRAIN MANHOLE
- MONITORING WELL
- WATER VALVE
- UTILITY POLE
- ELECTRIC METER
- POST

PROPOSED

- DUNE RESTORATION AREA



KEY MAP

NO SCALE

REFERENCE:

ASSESSORS MAP 42.2.3,
PARCELS 2 THROUGH 6

CTF. #7858
L.C.PLAN 9434-D
L.C.PLAN 10450-C

ZONING:
RESIDENTIAL COMMERCIAL (RC)
RESIDENTIAL 40 (R-40)
FLOOD HAZARD OVERLAY DISTRICT (FHOD)
TOWN OVERLAY DISTRICT

FLOOD ZONE:

FLOOD ZONE VE (EL 11) AND CBRS AREA (11-16-1990) AS SHOWN ON FEMA FIRM PANEL #25019C0086G EFFECTIVE DATE 6-9-2014. PLEASE NOTE THAT SITE SPECIFIC FLOODPLAIN BOUNDARIES MAY VARY DUE TO DIFFERENT INTERPRETATIONS OF THESE BOUNDARIES. USERS ARE ADVISED TO VERIFY LOCATION OF THESE BOUNDARIES WITH THE DESIGNATED COMMUNITY FLOODPLAIN MANAGERS PRIOR TO SITING ANY PROPOSED STRUCTURES.

DATUM:

ELEVATIONS SHOWN HEREON ARE BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 1988)

COMMONWEALTH OF MASSACHUSETTS
TARJA L. MCGRAIL
CIVIL
No. 47593
REGISTERED PROFESSIONAL ENGINEER

COASTAL engineering co.
260 Cranberry Hwy, Orleans, MA 02653
508.255.6511 P 508.255.6700 F

Stephen Kelleher Architects, Inc.
Fairhaven Center for Business
57 Alden Road
Fairhaven, Massachusetts 02719
508-992-2007 Fax 992-2021

Harbormaster Building

34 Washington Street
Nantucket, Massachusetts

LAYOUT & MATERIALS PLAN

Drawn By:	MAP
Checked:	TLM
Date:	03-12-2020
Scale:	1"=20

C2.1.1

ISSUED FOR REGULATORY REVIEW 03-12-2020

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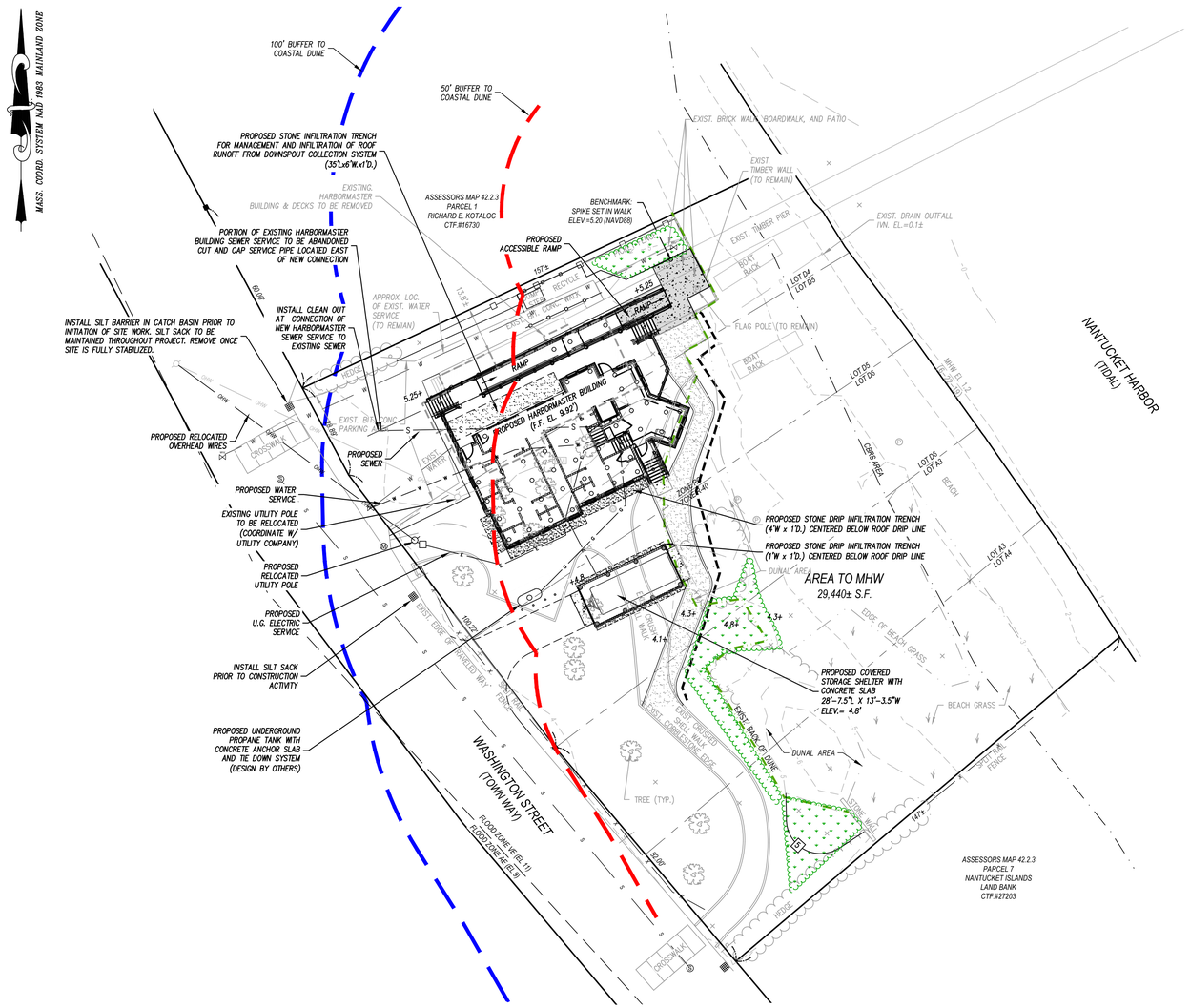


ROOF DOWNSPOUTS TO BE ROUTED VIA 4" DIA SCH 40 PVC PIPE FROM DOWNSPOUT TO PROPOSED STONE INFILTRATION TRENCH

PLAN

20 10 0 20 60

1 inch = 20 ft.

UTILITY NOTE:

UTILITY DISCONNECTS AND NEW SERVICES TO BE INSTALLED IN ACCORDANCE WITH APPLICABLE ELECTRICAL, PLUMBING, AND WATER DEPARTMENT CODES AND REGULATIONS.

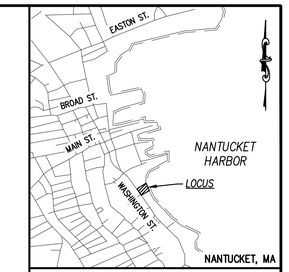
LEGEND

EXISTING

- BOUND
- MISC. SIGN
- FENCE
- OVERHEAD UTILITY LINE
- WATER LINE
- DRAIN LINE
- SEWAGE SERVICE
- SEWER MANHOLE
- MANHOLE
- CATCH BASIN
- DRAIN MANHOLE
- MONITORING WELL
- WATER VALVE
- UTILITY POLE
- ELECTRIC METER
- POST

PROPOSED

- DUNE RESTORATION AREA
- SEWER LINE
- WATER LINE
- UNDERGROUND ELECTRIC
- GAS UNDERGROUND PROPANE SERVICE
- CONTOUR
- 5.25+ SPOT GRADE



KEY MAP

NO SCALE

REFERENCE:

ASSESSORS MAP 42.2.3, PARCELS 2 THROUGH 6

CTF. #7858
L.C.PLAN 9434-D
L.C.PLAN 10450-C

ZONING:
RESIDENTIAL COMMERCIAL (RC)
RESIDENTIAL 40 (R-40)
FLOOD HAZARD OVERLAY DISTRICT (FHOD)
TOWN OVERLAY DISTRICT

FLOOD ZONE:

FLOOD ZONE VE (EL 11) AND CBRS AREA (11-16-1990) AS SHOWN ON FEMA FIRM PANEL #25019C0086G EFFECTIVE DATE 6-9-2014. PLEASE NOTE THAT SITE SPECIFIC FLOODPLAIN BOUNDARIES MAY VARY DUE TO DIFFERENT INTERPRETATIONS OF THESE BOUNDARIES. USERS ARE ADVISED TO VERIFY LOCATION OF THESE BOUNDARIES WITH THE DESIGNATED COMMUNITY FLOODPLAIN MANAGERS PRIOR TO SITING ANY PROPOSED STRUCTURES.

DATUM:

ELEVATIONS SHOWN HEREON ARE BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 1988)

COMMONWEALTH OF MASSACHUSETTS TARJA L. McGRAIL CIVIL No. 47593 REGISTERED PROFESSIONAL ENGINEER

COASTAL engineering co.
260 Cranberry Hwy, Orleans, MA 02653
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Harbormaster Building

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DRAINAGE, GRADING, UTILITY PLAN

ISSUED FOR REGULATORY REVIEW 03-12-2020

Drawn By:	MAP
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Scale:	1"=20

C2.2.1

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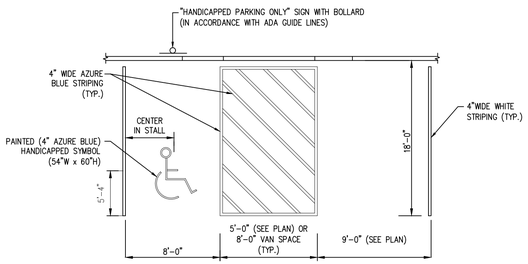
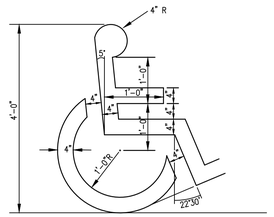
NOTE:
DETAIL IS SHOWN TYPICAL, SEE C2.1.1 FOR EXACT LAYOUT OF PARKING, CURB, RAMP, LOADING AND SIGN PLACEMENT



NOTE:
ALL PAVEMENT STRIPING AND MARKINGS SHALL CONSIST OF CHLORINATED RUBBER PAINT APPLIED TO A DRY SURFACE WHEN THE TEMPERATURE IS GREATER THAN 40°F. PAINT SHALL BE APPLIED AT A MINIMUM OF 0.015" (15 MIL) FILM THICKNESS

ADA ACCESIBLE STALL MARKINGS & PARKING LOT STRIPING DETAIL

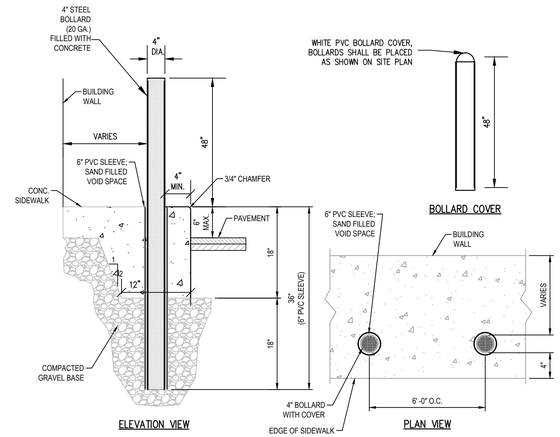
NOT TO SCALE



NOTE: SYMBOL TO BE PAINTED IN ALL HANDICAPPED SPACES.

PAINTED HANDICAP SYMBOL

NOT TO SCALE



BOLLARD DETAILS

NOT TO SCALE

EROSION & SEDIMENTATION CONTROL NOTES:

1. A TEMPORARY CHAN LINK CONSTRUCTION FENCE SHALL BE ERECTED AROUND THE PERIMETER OF THE WORK AREAS.

2. DEMOLITION AND SITEWORK CONTRACTOR TO ASCERTAIN THE LOCATION OF UNDERGROUND UTILITIES AND CONTACT DIG SAFE (AND PRIVATE UTILITY MARK OUT, IF NECESSARY) PRIOR TO EXCAVATION/DEMOLITION.

3. EROSION AND SEDIMENT CONTROL MEASURES TO BE IN COMPLIANCE WITH TOWN OF NANTUCKET REGULATIONS.

4. TO MINIMIZE EROSION ON SITE, TO THE EXTENT PRACTICAL, THE EXISTING PAVEMENT IS TO REMAIN ON SITE DURING DEMOLITION AND REMOVAL OF EXISTING BUILDING, CONCRETE, WALKS, WALLS, AND STEPS NOTED FOR REMOVAL.

5. EROSION CONTROL MEASURES TO BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH MANUFACTURE'S SPECIFICATIONS AND GOOD ENGINEERING PRACTICES.

6. DURING CONSTRUCTION, THE CONTRACTOR SHALL BE RESPONSIBLE FOR EROSION CONTROL AND PROTECTION OF OFF SITE AND ON SITE DRAINAGE STRUCTURES UNTIL COMPLETION OF SITEWORK AND ESTABLISHMENT OF STABILIZED VEGETATIVE GROUND COVER.

7. DURING CONSTRUCTION, CONTRACTOR TO INSTALL EROSION CONTROL BARRIER AS NECESSARY TO MANAGE CONSTRUCTION PERIOD RUNOFF ON-SITE. AS CONSTRUCTION PROGRESSES, THE LOCATIONS OF EROSION CONTROL SHALL BE ADJUSTED AS NECESSARY.

8. THE CONTRACTOR SHALL PRACTICE GOOD HOUSEKEEPING MEASURES DURING THE DAY TO DAY OPERATION AT THE SITE. THE SITE SHOULD BE POLICED DAILY TO REMOVE ANY LITTER OR DEBRIS.

9. TEMPORARY SOIL MATERIAL STOCKPILES SHALL BE SURROUNDED WITH SEDIMENT BARRIER ON THE DOWNGRADIENT SIDE TO PREVENT DISCHARGE OF SEDIMENT FROM SITE. STOCKPILES SHALL BE COVERED OR OTHERWISE PROTECTED TO PREVENT DUST MIGRATION. MATERIAL STOCKPILES THAT ARE IN PLACE FOR AN EXTENDED PERIOD OF TIME SHALL BE STABILIZED WITH VEGETATION, MULCHING, EROSION CONTROL BLANKETS, AND OTHER MEASURES THAT ARE NECESSARY TO PREVENT THE DISCHARGE OF SEDIMENT FROM THE PROJECT SITE.

10. IF SEDIMENT ESCAPES THE CONSTRUCTION SITE, OFF-SITE ACCUMULATIONS OF SEDIMENT MUST BE REMOVED AT A FREQUENCY SUFFICIENT TO MINIMIZE OFF-SITE IMPACTS.

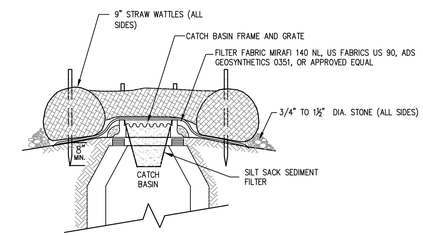
11. LITTER, CONSTRUCTION DEBRIS, AND CONSTRUCTION CHEMICALS THAT COULD BE EXPOSED TO STORM WATER MUST BE PREVENTED FROM BECOMING A POLLUTANT SOURCE.

12. EXCEPT AS PROVIDED BELOW, STABILIZATION MEASURES MUST BE INITIATED AS SOON AS PRACTICABLE IN PORTIONS OF THE SITE WHERE CONSTRUCTION ACTIVITIES HAVE TEMPORARILY CEASED, BUT IN NO CASE MORE THAN 14 DAYS AFTER THE CONSTRUCTION ACTIVITY IN THAT PORTION OF OF THE SITE HAS TEMPORARILY OR PERMANENTLY CEASED.

1. WHERE STABILIZATION BY THE 14TH DAY IS PRECLUDED BY SNOW COVER OR FROZEN GROUND CONDITIONS, STABILIZATION MEASURES MUST BE INITITIATED AS SOON AS PRACTICABLE.

2. WHERE CONSTRUCTION ACTIVITY ON A PORTION OF THE SITE IS TEMPORARILY CEASED, AND EARTH DISTURBING ACTIVITIES WILL BE RESUMED WITHIN 14 DAYS, TEMPORARY STABILIZATION MEASURES DO NOT HAVE TO BE INITIATED ON THAT PORTION OF THE SITE.

13. CONTRACTOR TO PROVIDE CONSERVATION AGENT AND ENGINEER WITH DEWATERING PLAN FOR REVIEW AND APPROVAL PRIOR TO INITIATING DEWATERING ACTIVITIES.



INLET PROTECTION NOTES:

1. ENCLOSE STRUCTURE WITH STRAW BALES OR RICE STRAW ROLLS IMMEDIATELY AFTER CATCH BASIN CONSTRUCTION. MAINTAIN UNTIL PAVING BINDER COURSE IS COMPLETE OR A PERMANENT STAND OF GRASS HAS BEEN ESTABLISHED.

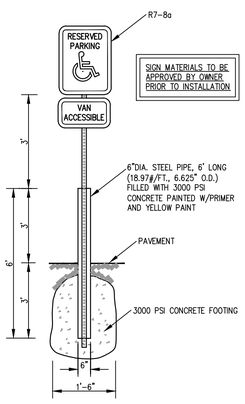
2. IF GRATE IS AGAINST EXISTING CURB THEN STRAW WATTLES ARE TO BE PLACED AROUND THREE SIDES OF GRATE ONLY. GRATE TO BE PLACED OVER FILTER FABRIC .

3. IN PLACES WHERE EXISTING CATCH BASIN IS SURROUNDED BY PAVEMENT, A SILT SACK SEDIMENT FILTER IS TO BE PLACED UNDER CATCH BASIN GRATE.

4. WATTLES SHALL BE INSPECTED PERIODICALLY AND AFTER ALL STORM EVENTS AND REPAIR OR REPLACEMENT SHALL BE PERFORMED PROMPTLY IF NEEDED.

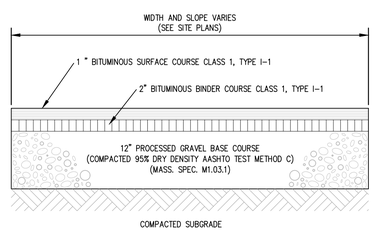
CATCH BASIN INLET PROTECTION DETAIL

NOT TO SCALE



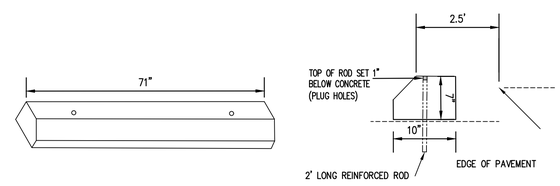
HANDICAP SIGN

NOT TO SCALE



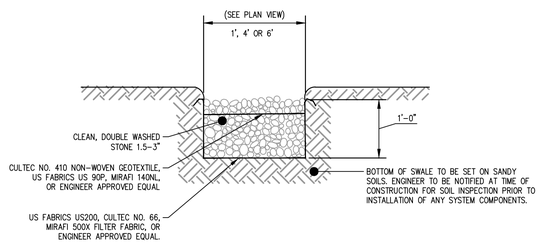
BITUMINOUS CONCRETE PAVEMENT

NOT TO SCALE



CONCRETE WHEEL STOP DETAIL

NOT TO SCALE

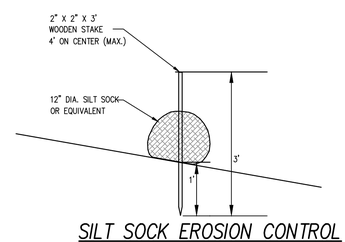


ROOF DRAINAGE INFILTRATION TRENCH/DRIP EDGE

NOT TO SCALE

GENERAL NOTE:

1. DIMENSIONS MAY BE MODIFIED BY ENGINEER TO MEET FIELD CONDITIONS



SILT SOCK EROSION CONTROL BARRIER DETAIL

NOT TO SCALE

ISSUED FOR REGULATORY REVIEW 03-12-2020

COMMONWEALTH OF MASSACHUSETTS
TARJA L. McGRAIL
CIVIL
No. 47593
REGISTERED PROFESSIONAL ENGINEER
3/12/20

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Harbormaster Building
34 Washington Street
Nantucket, Massachusetts

SITE DETAILS

Drawn By:	MAP
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Scale:	1"=20

C2.4.1

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STEPHEN KELLEHER ARCHITECTS, INC.

April 24, 2020

Mr. Jeff Carlson, Director
Conservation Commission
Town of Nantucket
2 Bathing Beach Road
Nantucket, MA 02554

RE: **Nantucket Harbormaster Building**
34 Washington Street

Dear Mr Carlson,

I understand that the conservation commission had a few concerns regarding the size of the new Harbormaster Building. Therefore, I am forwarding you the building program that was prepared by Stephen Kelleher Architects during the study phase. Please see the attached. The majority of the first floor is dedicated to public restrooms and showers etc. that are necessary for serving the public and the boats utilizing the pier. The second floor is going to provide much needed office and meeting space for the Harbormaster and personnel.

I also understand that there are a few concerns about the storage carport / shelter. The town wanted a garage to store pumps, hoses, ropes and other equipment. But because the garage would be totally below the flood elevation and a tremendous cost to construct, we added the storage trailer for the equipment. The trailer would be removed from the site in the event of a storm. The carport was added to conceal the trailer, (for historic) The trailer will not store ATV's.

Please contact me should you have any questions or concerns regarding the above.

Sincerely,
Stephen Kelleher Architects

Patrick D. Quinlan, AIA, CSI
Architect

SK Main Office: 57 Alden Road • Fairhaven, MA 02719 • Phone: 508-992-2007 • Fax: 508-992-2021
Studio: P.O. Box 107 • Mattapoisett, MA 02739

STEPHEN KELLEHER ARCHITECTS, INC.

NANTUCKET HARBORMASTER BUILDING PROGRAM

The following program was developed 2014 during the study / existing conditions survey

1.01 The committee discussed the need for flexibility in the design as user needs are different times of the year. Sheila said that during the winter time it was basically just her, while during the summer season staff consisted of three (3) assistant harbormasters, six (6) pump-out workers, ten (10) dock boys, two (2) lifeguard supervisors, and fifty (50) lifeguards (off site).

1.02 The following is a list of boat related entities that the harbormaster building accommodates in the summer season.

- Transient boaters
- Forty (40) live aboard boaters
- One-hundred twenty-five (125) rental moorings, plus twenty-two hundred (2,200) regular moorings.
- One hundred (100) slip marina
- Eight (8) 35' charter sports fishing boats consisting of six (6) people (4 trips per day)
- Fifteen (15) fluke boats
- Forty to fifty (40-50) lobster boats
- Transient commercial boats consisting of 70' trawlers possible from 8-10 storms a year. Primarily off season.

1.03 List of requirements discussed based on existing use of employees and boaters.

- New Men's Room
  - Three (3) regular showers / One (1) handicapped accessible shower
  - One (1) regular toilet / One (1) handicapped accessible toilet / One (1) urinal
  - Four (4) sinks
- New Women's Room
  - Three (3) regular showers / One (1) handicapped accessible shower
  - Three (3) regular toilets / One (1) handicapped accessible toilet
  - Four (4) sinks
- One (1) Handicapped Accessible Family Bathroom with Shower
- One (1) Employee Bathroom (unisex)
- Employee Lunch Room and Storage
- Tourist Information Area and Center
- Upstairs Office larger enough for the harbormaster with views to all sides of the harbor
- Commercial fisherman all load at this pier / facility
- Ice freezer for all types of boaters

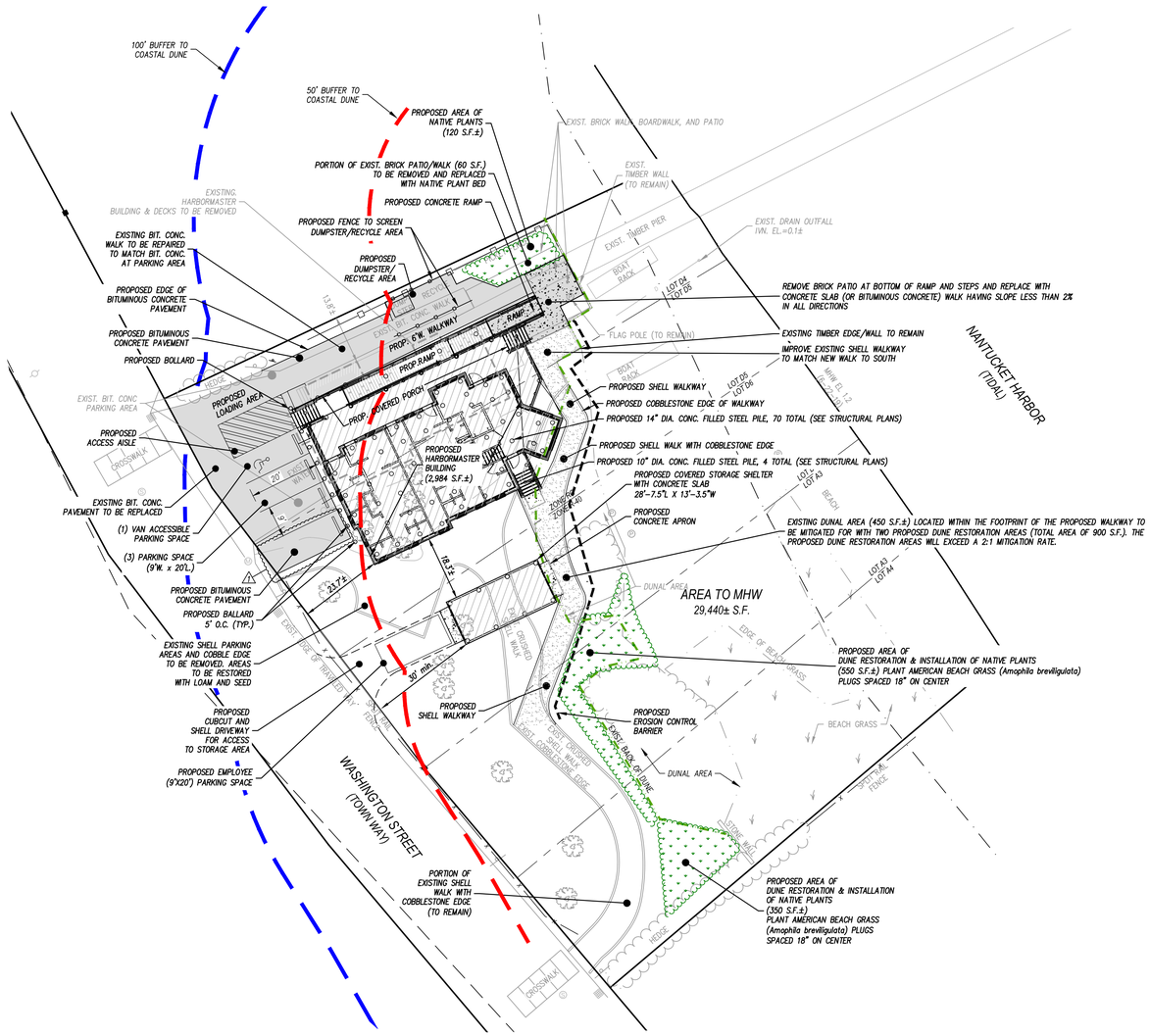
1.04 Town previously approved design criteria

- Handicapped accessibility
- 30' height limit
- 7/12 roof pitch (min)
- One (1) skylight per roof
- Natural white cedar shingle / natural red cedar trim
- True divided light windows

- Architecturally simple building with variance on flood proofing, energy code and glazing.

1.05 General Condition Notes

- Hot water systems need to be upgraded for extensive shower use.
- Materials used for public use should be vandal proof
- Trash and recycling must be adequate for boaters
- Building is on Town water and sewer
- Weather coverage is needed for bathrooms, stairs, and ramps.
- It is important that the building ties in with the park next door as this is the portal to the Town for most boaters, fishermen, and sailors.



PLAN

20 10 0 20 60

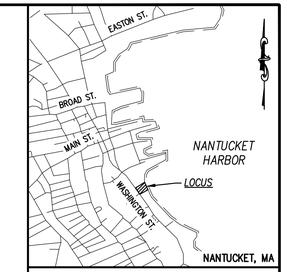
1 inch = 20 ft.

COVERAGE TABLE

SUBJECT	EXISTING	PROPOSED	CHANGE
BUILDING FOUNDATION AREA* (IMPERVIOUS FOOTPRINT)	1,497± S.F.	453 ± S.F.	1,044± S.F. REDUCTION
HARDSCAPES (PAVEMENT, WALLS, BRICK PATIO)	2,488± S.F.	3,021± S.F.	533± S.F. INCREASE
DECKS & STAIRS	679± S.F.	468± S.F.	211± S.F. REDUCTION
SHELL DRIVEWAY & WALKS (PERVIOUS)	2,809± S.F.	1,866± S.F.	943± S.F. REDUCTION
TOTAL COVERAGE	7,473± S.F.	5,808± S.F.	1,665± S.F. REDUCTION

1

*EXISTING BUILDING IS ON CONCRETE SLAB; PROPOSED HARBORMASTER BUILDING IS RAISED ABOVE EXISTING GRADE ON 74 PILES, AND PROPOSED STORAGE SHELTER TO BE SUPPORTED BY PILE FOUNDATION ABOVE A CONCRETE SLAB.



KEY MAP

NO SCALE

REFERENCE:

ASSESSORS MAP 42.2.3,
PARCELS 2 THROUGH 6

CTF. #7858
L.C.PLAN 9434-D
L.C.PLAN 10450-C

ZONING:
RESIDENTIAL COMMERCIAL (RC)
RESIDENTIAL 40 (R-40)
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FLOOD ZONE VE (EL 11) AND CBRS AREA (11-16-1990) AS SHOWN ON FEMA FIRM PANEL #25019C0086G EFFECTIVE DATE 6-9-2014. PLEASE NOTE THAT SITE SPECIFIC FLOODPLAIN BOUNDARIES MAY VARY DUE TO DIFFERENT INTERPRETATIONS OF THESE BOUNDARIES. USERS ARE ADVISED TO VERIFY LOCATION OF THESE BOUNDARIES WITH THE DESIGNATED COMMUNITY FLOODPLAIN MANAGERS PRIOR TO SITING ANY PROPOSED STRUCTURES.

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- MANHOLE
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- DRAIN MANHOLE
- MONITORING WELL
- WATER VALVE
- UTILITY POLE
- ELECTRIC METER
- POST
- TREE

PROPOSED

- DUNE RESTORATION AREA

COMMONWEALTH OF MASSACHUSETTS TARJA L. McGRAIL CIVIL No. 47593 REGISTERED PROFESSIONAL ENGINEER

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1 REV 1 DATE:06/19/2020 :REV. PLAN TO INCLUDE AND IMPROVE EXISTING PARKING SPACE

ISSUED FOR REGULATORY REVIEW 06-19-2020

LAYOUT & MATERIALS PLAN

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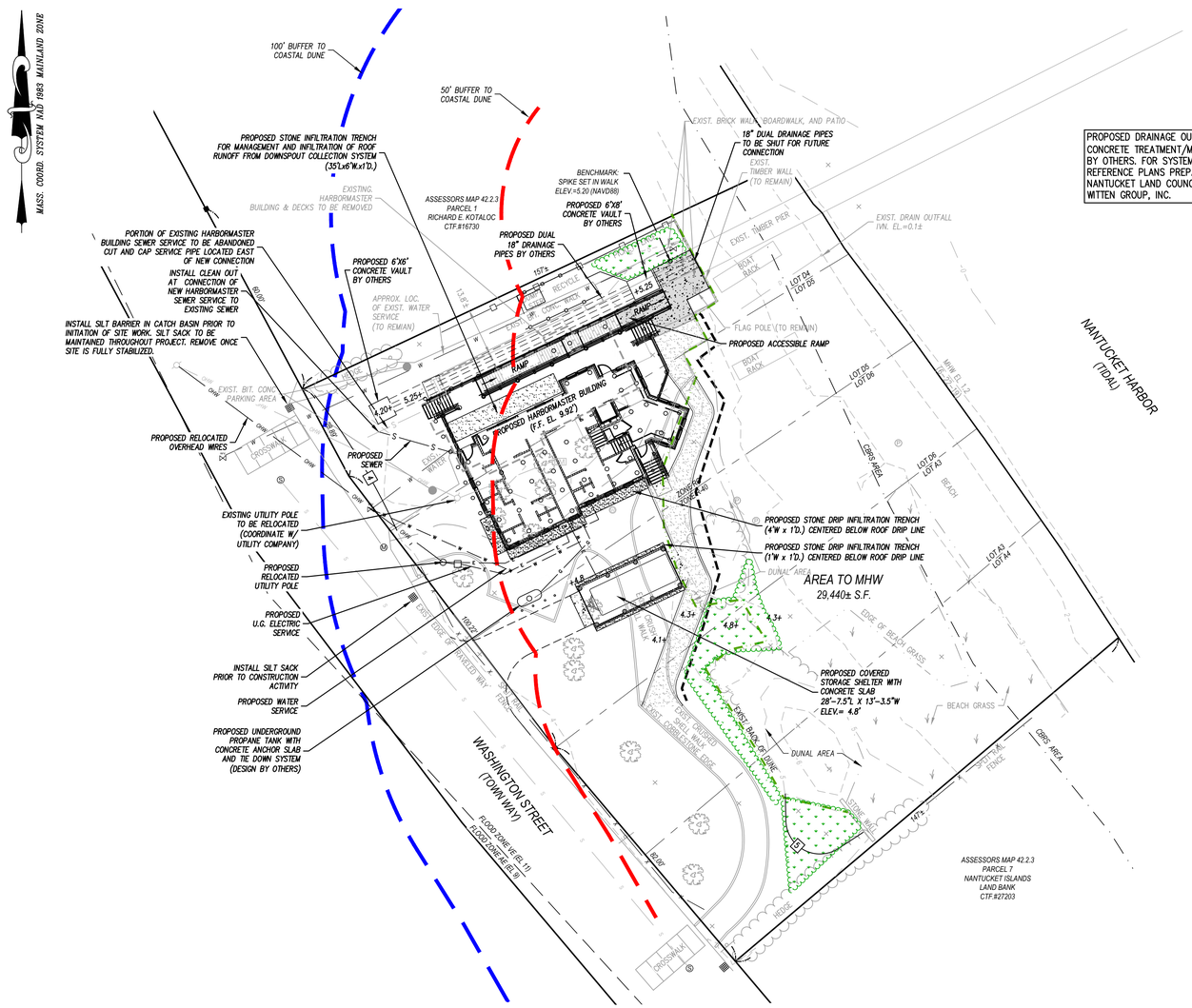

PROPOSED DRAINAGE OUTFALL PIPES AND CONCRETE TREATMENT/MONITORING VAULTS BY OTHERS. FOR SYSTEM DETAILS REFERENCE PLANS PREPARED FOR NANTUCKET LAND COUNCIL BY HORSLEY WITTEN GROUP, INC.

ROOF DOWNSPOUTS TO BE ROUTED VIA 4" DIA SCH 40 PVC PIPE FROM DOWNSPOUT TO PROPOSED STONE INFILTRATION TRENCH

PLAN

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1 inch = 20 ft.

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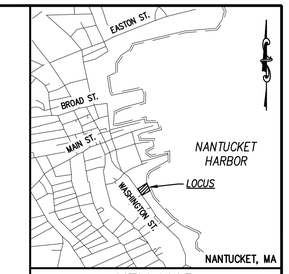

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CTF. #7858
L.C.PLAN 9434-D
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COMMONWEALTH OF MASSACHUSETTS TARJA L. MACGRAIL CIVIL No. 47593 REGISTERED PROFESSIONAL ENGINEER

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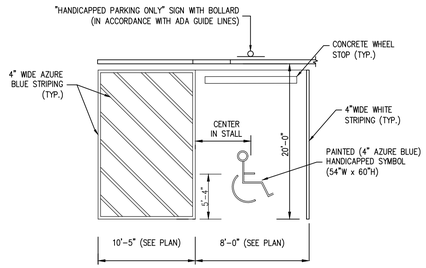
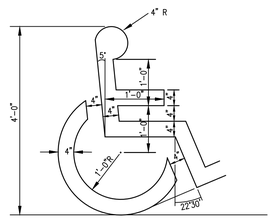
NOTE:
DETAIL IS SHOWN TYPICAL, SEE C2.1.1 FOR EXACT LAYOUT OF PARKING, CURB, RAMP, LOADING AND SIGN PLACEMENT



NOTE:
ALL PAVEMENT STRIPING AND MARKINGS SHALL CONSIST OF CHLORINATED RUBBER PAINT APPLIED TO A DRY SURFACE WHEN THE TEMPERATURE IS GREATER THAN 40°F. PAINT SHALL BE APPLIED AT A MINIMUM OF 0.015" (15 MIL) FILM THICKNESS

ADA ACCESIBLE STALL MARKINGS & PARKING LOT STRIPING DETAIL

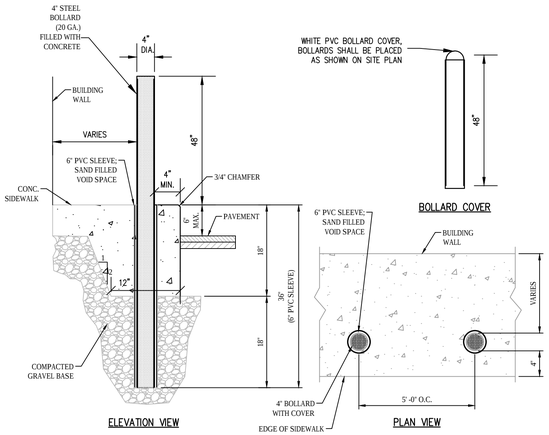
NOT TO SCALE



NOTE: SYMBOL TO BE PAINTED IN ALL HANDICAPPED SPACES.

PAINTED HANDICAP SYMBOL

NOT TO SCALE



BOLLARD DETAILS

NOT TO SCALE

EROSION & SEDIMENTATION CONTROL NOTES:

1. A TEMPORARY CHAN LINK CONSTRUCTION FENCE SHALL BE ERECTED AROUND THE PERIMETER OF THE WORK AREAS.

2. DEMOLITION AND SITEWORK CONTRACTOR TO ASCERTAIN THE LOCATION OF UNDERGROUND UTILITIES AND CONTACT DIG SAFE (AND PRIVATE UTILITY MARK OUT, IF NECESSARY) PRIOR TO EXCAVATION/DEMOLITION.

3. EROSION AND SEDIMENT CONTROL MEASURES TO BE IN COMPLIANCE WITH TOWN OF NANTUCKET REGULATIONS.

4. TO MINIMIZE EROSION ON SITE, TO THE EXTENT PRACTICAL, THE EXISTING PAVEMENT IS TO REMAIN ON SITE DURING DEMOLITION AND REMOVAL OF EXISTING BUILDING, CONCRETE, WALKS, WALLS, AND STEPS NOTED FOR REMOVAL.

5. EROSION CONTROL MEASURES TO BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH MANUFACTURE'S SPECIFICATIONS AND GOOD ENGINEERING PRACTICES.

6. DURING CONSTRUCTION, THE CONTRACTOR SHALL BE RESPONSIBLE FOR EROSION CONTROL AND PROTECTION OF OFF SITE AND ON SITE DRAINAGE STRUCTURES UNTIL COMPLETION OF SITEWORK AND ESTABLISHMENT OF STABILIZED VEGETATIVE GROUND COVER.

7. DURING CONSTRUCTION, CONTRACTOR TO INSTALL EROSION CONTROL BARRIER AS NECESSARY TO MANAGE CONSTRUCTION PERIOD RUNOFF ON-SITE. AS CONSTRUCTION PROGRESSES, THE LOCATIONS OF EROSION CONTROL SHALL BE ADJUSTED AS NECESSARY.

8. THE CONTRACTOR SHALL PRACTICE GOOD HOUSEKEEPING MEASURES DURING THE DAY TO DAY OPERATION AT THE SITE. THE SITE SHOULD BE POLICED DAILY TO REMOVE ANY LITTER OR DEBRIS.

9. TEMPORARY SOIL MATERIAL STOCKPILES SHALL BE SURROUNDED WITH SEDIMENT BARRIER ON THE DOWNGRADIENT SIDE TO PREVENT DISCHARGE OF SEDIMENT FROM SITE. STOCKPILES SHALL BE COVERED OR OTHERWISE PROTECTED TO PREVENT DUST MIGRATION. MATERIAL STOCKPILES THAT ARE IN PLACE FOR AN EXTENDED PERIOD OF TIME SHALL BE STABILIZED WITH VEGETATION, MULCHING, EROSION CONTROL BLANKETS, AND OTHER MEASURES THAT ARE NECESSARY TO PREVENT THE DISCHARGE OF SEDIMENT FROM THE PROJECT SITE.

10. IF SEDIMENT ESCAPES THE CONSTRUCTION SITE, OFF-SITE ACCUMULATIONS OF SEDIMENT MUST BE REMOVED AT A FREQUENCY SUFFICIENT TO MINIMIZE OFF-SITE IMPACTS.

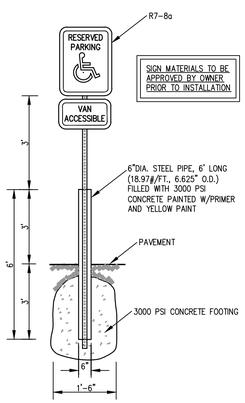
11. LITTER, CONSTRUCTION DEBRIS, AND CONSTRUCTION CHEMICALS THAT COULD BE EXPOSED TO STORM WATER MUST BE PREVENTED FROM BECOMING A POLLUTANT SOURCE.

12. EXCEPT AS PROVIDED BELOW, STABILIZATION MEASURES MUST BE INITIATED AS SOON AS PRACTICABLE IN PORTIONS OF THE SITE WHERE CONSTRUCTION ACTIVITIES HAVE TEMPORARILY CEASED, BUT IN NO CASE MORE THAN 14 DAYS AFTER THE CONSTRUCTION ACTIVITY IN THAT PORTION OF OF THE SITE HAS TEMPORARILY OR PERMANENTLY CEASED.

1. WHERE STABILIZATION BY THE 14TH DAY IS PRECLUDED BY SNOW COVER OR FROZEN GROUND CONDITIONS, STABILIZATION MEASURES MUST BE INITITIATED AS SOON AS PRACTICABLE.

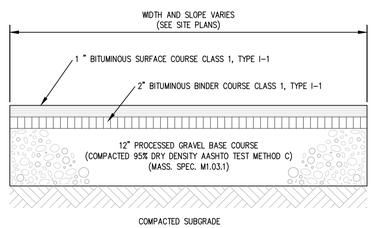
2. WHERE CONSTRUCTION ACTIVITY ON A PORTION OF THE SITE IS TEMPORARILY CEASED, AND EARTH DISTURBING ACTIVITIES WILL BE RESUMED WITHIN 14 DAYS, TEMPORARY STABILIZATION MEASURES DO NOT HAVE TO BE INITIATED ON THAT PORTION OF THE SITE.

13. CONTRACTOR TO PROVIDE CONSERVATION AGENT AND ENGINEER WITH DEWATERING PLAN FOR REVIEW AND APPROVAL PRIOR TO INITIATING DEWATERING ACTIVITIES.



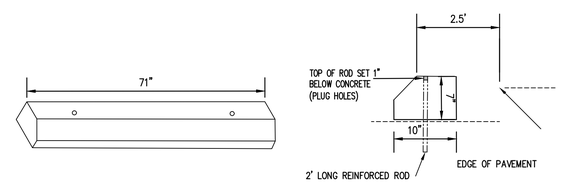
HANDICAP SIGN

NOT TO SCALE



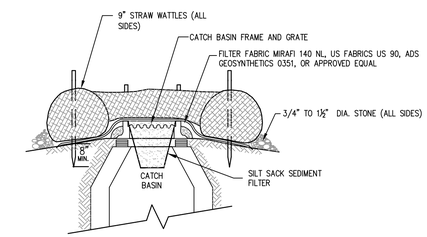
BITUMINOUS CONCRETE PAVEMENT

NOT TO SCALE



CONCRETE WHEEL STOP DETAIL

NOT TO SCALE



INLET PROTECTION NOTES:

1. ENCLOSE STRUCTURE WITH STRAW BALES OR RICE STRAW ROLLS IMMEDIATELY AFTER CATCH BASIN CONSTRUCTION. MAINTAIN UNTIL PAVING BINDER COURSE IS COMPLETE OR A PERMANENT STAND OF GRASS HAS BEEN ESTABLISHED.

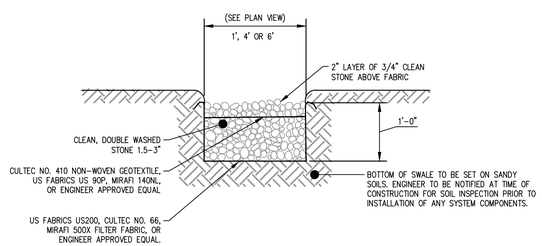
2. IF GRATE IS AGAINST EXISTING CURB THEN STRAW WATTLES ARE TO BE PLACED AROUND THREE SIDES OF GRATE ONLY. GRATE TO BE PLACED OVER FILTER FABRIC .

3. IN PLACES WHERE EXISTING CATCH BASIN IS SURROUNDED BY PAVEMENT, A SILT SACK SEDIMENT FILTER IS TO BE PLACED UNDER CATCH BASIN GRATE.

4. WATTLES SHALL BE INSPECTED PERIODICALLY AND AFTER ALL STORM EVENTS AND REPAIR OR REPLACEMENT SHALL BE PERFORMED PROMPTLY IF NEEDED.

CATCH BASIN INLET PROTECTION DETAIL

NOT TO SCALE

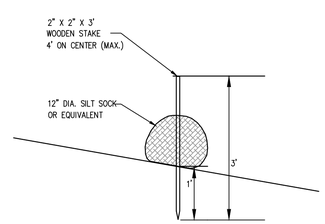


ROOF DRAINAGE INFILTRATION TRENCH/DRIP EDGE

NOT TO SCALE

GENERAL NOTE:

1. DIMENSIONS MAY BE MODIFIED BY ENGINEER TO MEET FIELD CONDITIONS



SILT SOCK EROSION CONTROL BARRIER DETAIL

NOT TO SCALE

ISSUED FOR REGULATORY REVIEW 06-19-2020

COASTAL engineering co.
260 Cranberry Hwy, Orleans, MA 02653
508.255.6511 P 508.255.6700 F

Stephen Kelleher Architects, Inc.
Fairhaven Center for Business
57 Alden Road
Fairhaven, Massachusetts 02719
508-992-2007 Fax 992-2021

Harbormaster Building
34 Washington Street
Nantucket, Massachusetts

SITE DETAILS

Drawn By:	MAP
Checked:	TLM
Date:	~~3-12-2020~~
Scale:	1"=20

C2.4.1

Coastal Engineering Co., Inc. © 2020

F:\SDSK\PROJ\C19000\C19031\C19031-00\C19031-P.dwg Jun 19, 2020 - 9:06am

Nantucket SURVEYORS LLC
One of The TILTON Companies

P.O. Box 3627, Nantucket, Massachusetts 02584-3627
Tel. (508) 228-0240 Fax (508) 228-9856
www.nantucketsurveyors.com
nsllcinfo@nantucketsurveyors.com

N-10933

May 22, 2020

Nantucket Conservation Commission
2 Bathing Beach Road
Nantucket, MA 02554

Re: Request for an Amended Order of Conditions
D.E.P. File # SE48-3098
Applicant: 11 Meadow Lane, LLC
11B Meadow Lane, Map: 41 Parcel: 448.1

Dear Commissioners:

On behalf of the applicant, Nantucket Surveyors LLC is writing to request an Amendment to the Order of Conditions for the above-mentioned project. The project was issued an Order of Conditions on August 8, 2018 for the construction of a dwelling, and pool with associated grading, landscaping and utilities within the buffer zone to a Bordering Vegetated Wetland.

Within this request the applicant is seeking permission to remove invasive vines between the 25' and the 50' setback of a Bordering Vegetated Wetland.

Thank you for your attention to this matter. If you have any questions, please contact our office.

Respectfully,
Nantucket Surveyors LLC

Paul J. Santos, PLS
Agent for the Applicant

Enclosures

- One (1) check payable to the Town of Nantucket for $25.00 (Bylaw Fee)
- One (1) check payable to the Town of Nantucket for $200.00 (Reviewer Fee)
- One (1) check payable to the Inquirer and Mirror for $335.10 (publishing of public notice)

Cc: DEP Southeast Regional Office
11 Meadow Lane, LLC

2018 00002625
Bk: 1663 Pg: 110 Page: 1 of 17
Doc: OOC 09/18/2018 12:58 PM

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

WPA Form 5 – Order of Conditions

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40
And the Town of Nantucket Wetlands Bylaw Chapter 136

Provided by MassDEP:
SE48-3098
MassDEP File #

eDEP Transaction #

Nantucket
City/Town

A. General Information

1. From: Nantucket
Conservation Commission

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

3. To: Applicant:

a. First Name:
b. Last Name:
c. Organization: 11 Meadow Lane, LLC
d. Mailing Address: 12 Okorwaw Avenue
e. City/Town: Nantucket
f. State: MA
g. Zip Code: 02554

4. Property Owner (if different from applicant):

a. First Name: Same As Applicant
b. Last Name:
c. Organization:
d. Mailing Address:
e. City/Town:
f. State:
g. Zip Code:

5. Project Location:

a. Street Address: 11 Meadow Lane
b. City/Town: Nantucket
c. Assessors Map/Plat Number: 41
d. Parcel/Lot Number: 448 (Lot 6B)

Latitude and Longitude, if known: d. Latitude: 41.283495 e. Longitude: -70.111834

FINDINGS and ADDITIONAL CONDITIONS
Massachusetts Wetlands Protection Act (MGL Chapter 131, Section 40)
Town of Nantucket Wetlands Bylaw (Chapter 136)

Address:	11 Meadow Lane
Assessor's Map and Parcel:	41-448 (Lot 6B)
Property Owner:	11 Meadow Lane LLC
Applicant:	11 Meadow Lane LLC
DEP File Number:	SE48-3098
Filing Date:	July 24, 2018
Date Hearing Closed:	August 8, 2018
Date Orders Issued:	August 8, 2018
Plan of Record Information:	Topographic Plan of Land, dated July 20, 2018 and stamped by Paul J. Santos, P.L.S. Landscape Plan, dated June 26, 2018 prepared by Atlantic Landscaping, Inc.

Permit Overview:
This order permits the construction of a dwelling, and pool with associated grading, landscaping and utilities within the buffer zone to a Bordering Vegetated Wetland. Waivers are not required for this project.

Additional Findings:

1. The area falls outside mapped habitat areas and does not require NHESP review.
2. Other site work shown on the plans of records are outside of Commission jurisdiction

In addition to the General Conditions contained elsewhere in this document, the Commission includes the following Special Conditions pursuant to MGLCh131s40 and the Town of Nantucket Wetlands Protection Bylaw, Chapter 136:

18. All work shall be performed in accordance with the Site and Work Description contained within the Notice of Intent and plan notes set out on the plan of record, provided project narratives, and protocols.
19. The pool may not be drained or discharged to an area within Commission jurisdiction. Chemical treatment of the pool shall end three weeks prior to any draining.
20. No work or alteration is permitted inside the 50 foot setback.

WAIVERS UNDER THE NANTUCKET WETLANDS BYLAW/REGULATIONS
Waivers are not required for the project as proposed.

11B Meadow Lane, Nantucket, MA
Applicant: 11 Meadow Lane, LLC

View of invasive vines looking west

View of invasive vines looking north

Nantucket SURVEYORS LLC
One of The TILTON Companies

P.O. Box 3627, Nantucket, Massachusetts 02584-3627
Tel. (508) 228-0240 Fax (508) 228-9856
www.nantucketsurveyors.com
nsllcinfo@nantucketsurveyors.com

N-10933

June 19, 2020

Nantucket Conservation Commission
2 Bathing Beach Road
Nantucket, MA 02554

Re: Request for an Amended Order of Conditions (Supplemental Information)
D.E.P. File # SE48-3098
Applicant: 11 Meadow Lane, LLC
11B Meadow Lane, Map: 41 Parcel: 448.1

Dear Commissioners:

On behalf of the applicant, Nantucket Surveyors LLC is writing to request an Amendment to the Order of Conditions for the above-mentioned project. The project was issued an Order of Conditions on August 8, 2018 for the construction of a dwelling, and pool with associated grading, landscaping and utilities within the buffer zone to a Bordering Vegetated Wetland.

Within this request the applicant is seeking permission to remove approximately 1,000 ± S.F. of harmful invasive vines, specifically oriental bittersweet (*Celastrus orbiculatus*) and multiflora rose (*Rosa multiflora*) between the 25' and the 50' setback of a Bordering Vegetated Wetland.

Thank you for your attention to this matter. If you have any questions, please contact our office.

Respectfully,
Nantucket Surveyors LLC

Chloe Coggins
Agent for the Applicant

Enclosures

- One (1) check payable to the Town of Nantucket for $25.00 (Bylaw Fee)
- One (1) check payable to the Town of Nantucket for $200.00 (Reviewer Fee)
- One (1) check payable to the Inquirer and Mirror for $335.10 (publishing of public notice)

Cc: DEP Southeast Regional Office
11 Meadow Lane, LLC

11B Meadow Lane, Nantucket, MA
Applicant: 11 Meadow Lane, LLC

Updated picture of invasive vines looking west, dated June 18, 2020

REQUEST FOR DETERMINATION OF APPLICABILITY APPLICATION

For Confirmation of Resource Area Boundaries

At

15 Cliff Road
Nantucket, MA

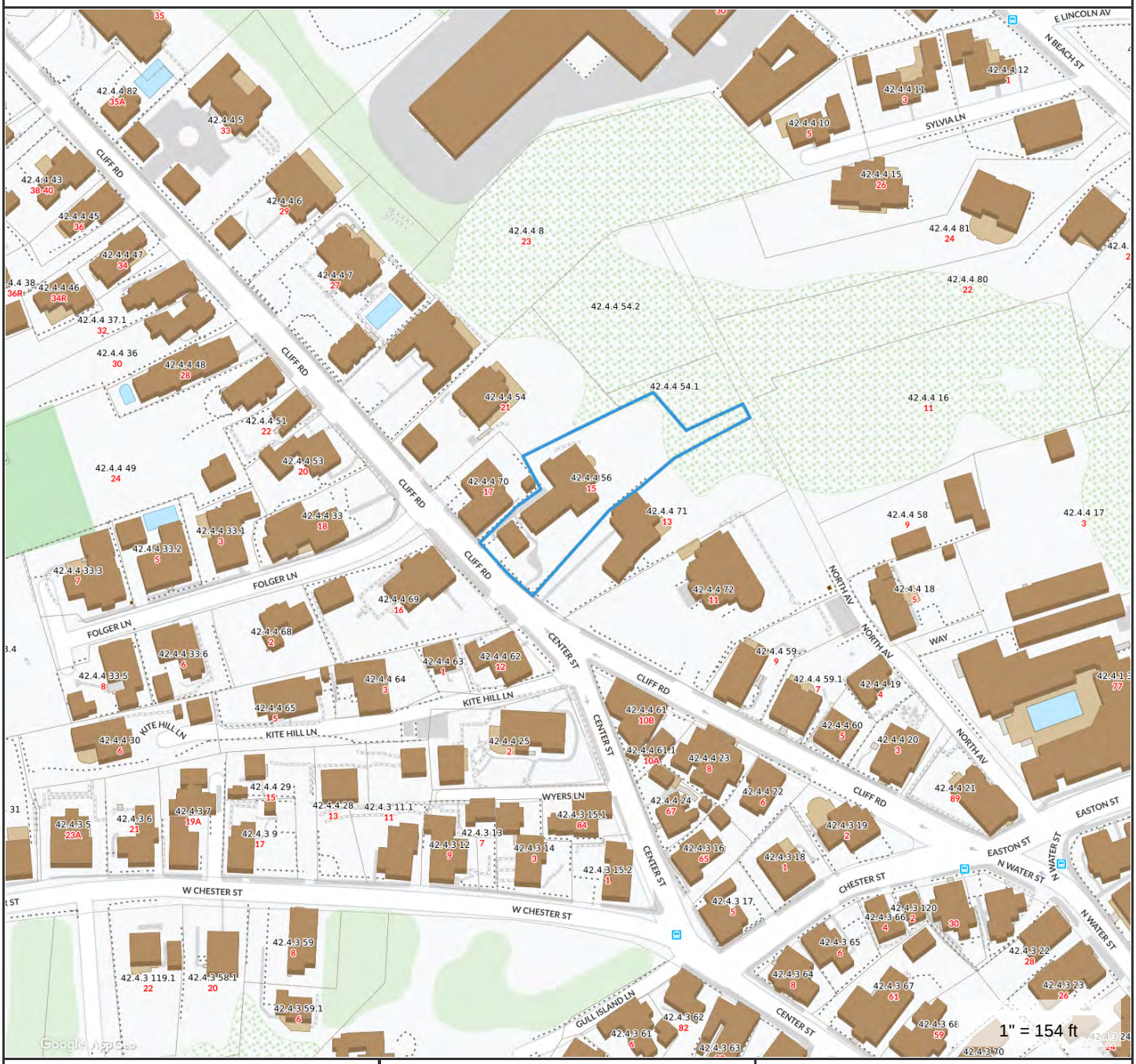
June 2020

Prepared For

15 CLIFF ROAD NANTUCKET LLC

20 Mary Ann Drive • Nantucket, MA 02554
508-825-5053 • www.NantucketEngineer.com

Locus Map



Property Information

Property ID	42.4.4 56
Location	15 CLIFF RD
Owner	JENSEN JULIUS III ETAL TRS

MAP FOR REFERENCE ONLY
NOT A LEGAL DOCUMENT

Town and County of Nantucket, MA makes no claims and no warranties, expressed or implied, concerning the validity or accuracy of the GIS data presented on this map.

Geometry updated 11/13/2018
Data updated 11/19/2018

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

Nantucket
City/Town

WPA Form 1- Request for Determination of Applicability

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

A. General Information

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

1. Applicant:

15 Cliff Road Nantucket LLC Name	N/A E-Mail Address
15 Cliff Road Mailing Address	
Nantucket City/Town	MA State / 02554 Zip Code
N/A Phone Number	N/A Fax Number (if applicable)

2. Representative (if any):

Nantucket Engineering and Survey, P.C. Firm	
Arthur Gasbarro Contact Name	art @nantucketengineer.com E-Mail Address
20 Mary Ann Drive Mailing Address	
Nantucket City/Town	MA State / 02554 Zip Code
508-825-5053 Phone Number	N/A Fax Number (if applicable)

B. Determinations

1. I request the Nantucket (Conservation Commission) make the following determination(s). Check any that apply:

☐ a. whether the **area** depicted on plan(s) and/or map(s) referenced below is an area subject to jurisdiction of the Wetlands Protection Act.

☒ b. whether the **boundaries** of resource area(s) depicted on plan(s) and/or map(s) referenced below are accurately delineated.

☐ c. whether the **work** depicted on plan(s) referenced below is subject to the Wetlands Protection Act.

☐ d. whether the area and/or work depicted on plan(s) referenced below is subject to the jurisdiction of any **municipal wetlands ordinance** or **bylaw** of:

Nantucket
Name of Municipality

☐ e. whether the following **scope of alternatives** is adequate for work in the Riverfront Area as depicted on referenced plan(s).

C. Project Description

1. a. Project Location (use maps and plans to identify the location of the area subject to this request):

15 Cliff Road	Nantucket
Street Address	City/Town
42.4.4	56
Assessors Map/Plat Number	Parcel/Lot Number

b. Area Description (use additional paper, if necessary):

The subject property and resource areas are located in a relatively densely developed residential area. The wetland resource areas on-site are a coastal bank, vegetated wetland and land subject to coastal storm flowage. The bank has a slope greater than 4:1 and the 100 year flood zone/land subject to coastal storm flowage at elevation 7 (NAVD88) intersects this slope. The vegetated wetland is at the base of the coastal bank.

c. Plan and/or Map Reference(s):

Site Plan of Land in Nantucket MA to Accompany Request for Determination of Applicability	May 12, 2020
Title	Date
Title	Date

2. a. Work Description (use additional paper and/or provide plan(s) of work, if necessary):

No work is proposed at this time.

C. Project Description (cont.)

b. Identify provisions of the Wetlands Protection Act or regulations which may exempt the applicant from having to file a Notice of Intent for all or part of the described work (use additional paper, if necessary).

No work is proposed at this time.

3. a. If this application is a Request for Determination of Scope of Alternatives for work in the Riverfront Area, indicate the one classification below that best describes the project.

- ☐ Single family house on a lot recorded on or before 8/1/96
- ☐ Single family house on a lot recorded after 8/1/96
- ☐ Expansion of an existing structure on a lot recorded after 8/1/96
- ☐ Project, other than a single family house or public project, where the applicant owned the lot before 8/7/96
- ☐ New agriculture or aquaculture project
- ☐ Public project where funds were appropriated prior to 8/7/96
- ☐ Project on a lot shown on an approved, definitive subdivision plan where there is a recorded deed restriction limiting total alteration of the Riverfront Area for the entire subdivision
- ☐ Residential subdivision; institutional, industrial, or commercial project
- ☐ Municipal project
- ☐ District, county, state, or federal government project
- ☐ Project required to evaluate off-site alternatives in more than one municipality in an Environmental Impact Report under MEPA or in an alternatives analysis pursuant to an application for a 404 permit from the U.S. Army Corps of Engineers or 401 Water Quality Certification from the Department of Environmental Protection.

b. Provide evidence (e.g., record of date subdivision lot was recorded) supporting the classification above (use additional paper and/or attach appropriate documents, if necessary.)

D. Signatures and Submittal Requirements

I hereby certify under the penalties of perjury that the foregoing Request for Determination of Applicability and accompanying plans, documents, and supporting data are true and complete to the best of my knowledge.

I further certify that the property owner, if different from the applicant, and the appropriate DEP Regional Office were sent a complete copy of this Request (including all appropriate documentation) simultaneously with the submittal of this Request to the Conservation Commission.

Failure by the applicant to send copies in a timely manner may result in dismissal of the Request for Determination of Applicability.

Name and address of the property owner:

15 Cliff Road Nantucket LLC
Name

15 Cliff Road
Mailing Address

Nantucket
City/Town

MA — State
02554 — Zip Code

Signatures:

I also understand that notification of this Request will be placed in a local newspaper at my expense in accordance with Section 10.05(3)(b)(1) of the Wetlands Protection Act regulations.

Arthur D. Sabano Agent — Signature of Applicant
6/4/20 — Date

Arthur D. Sabano — Signature of Representative (if any)
6/4/20 — Date

2019 Aerial

Property Information

Property ID	42.4.4 56
Location	15 CLIFF RD
Owner	JENSEN JULIUS III ETAL TRS

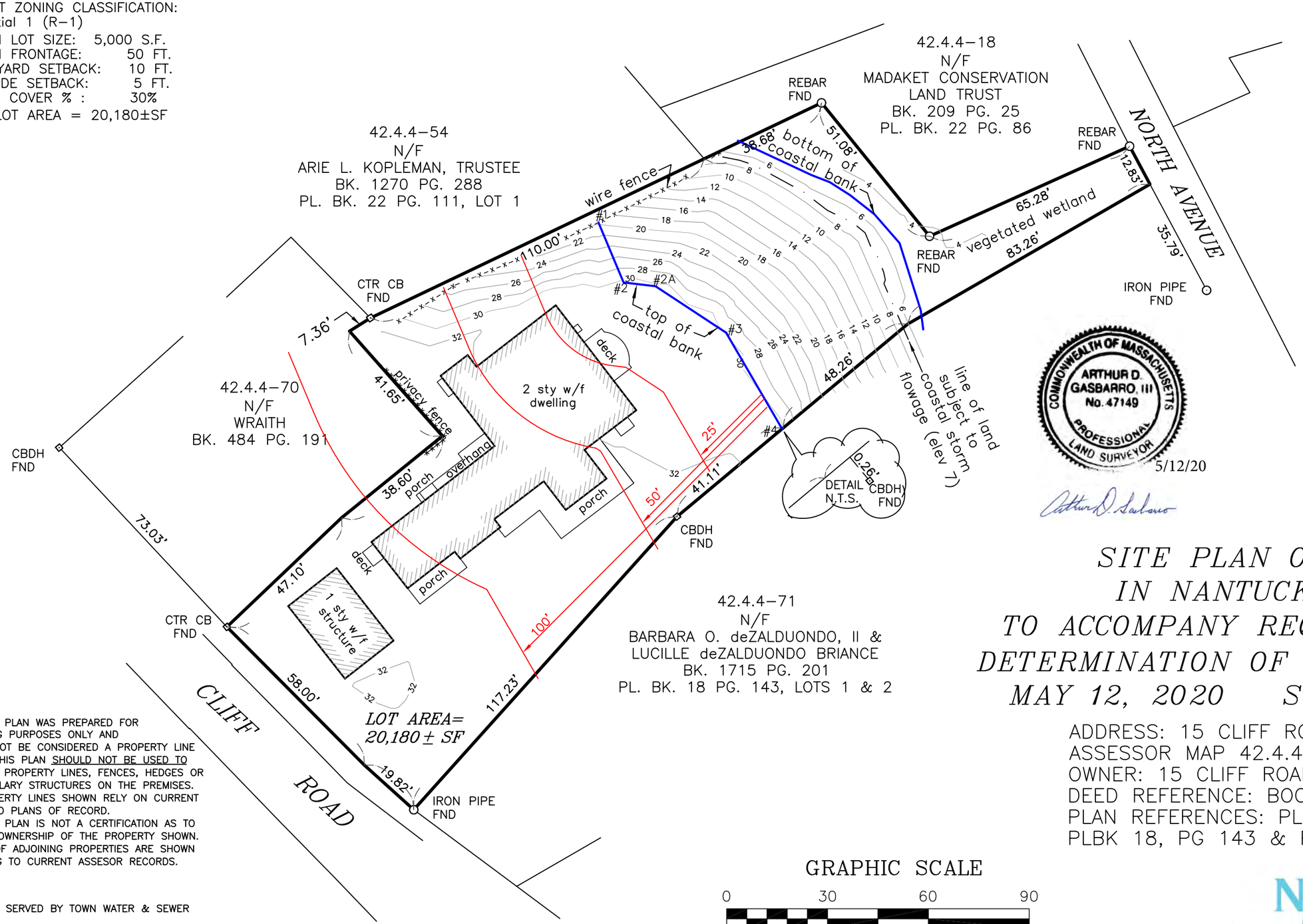
MAP FOR REFERENCE ONLY
NOT A LEGAL DOCUMENT

Town and County of Nantucket, MA makes no claims and no warranties, expressed or implied, concerning the validity or accuracy of the GIS data presented on this map.

Geometry updated 11/13/2018
Data updated 11/19/2018

CURRENT ZONING CLASSIFICATION:
Residential 1 (R-1)

MINIMUM LOT SIZE: 5,000 S.F.
MINIMUM FRONTAGE: 50 FT.
FRONT YARD SETBACK: 10 FT.
REAR/SIDE SETBACK: 5 FT.
GROUND COVER % : 30%
TOTAL LOT AREA = 20,180±SF



MASSACHUSETTS COORDINATE SYSTEM
ISLAND ZONE

COMMONWEALTH OF MASSACHUSETTS
ARTHUR D. GASBARRO, III
No. 47149
PROFESSIONAL LAND SURVEYOR

5/12/20

SITE PLAN OF LAND IN NANTUCKET, MA TO ACCOMPANY REQUEST FOR DETERMINATION OF APPLICABILITY

MAY 12, 2020 SCALE: 1"=30'

ADDRESS: 15 CLIFF ROAD
ASSESSOR MAP 42.4.4 PARCEL 56
OWNER: 15 CLIFF ROAD NANTUCKET LLC
DEED REFERENCE: BOOK 1725, PG 233
PLAN REFERENCES: PLBK 4, PG 20
PLBK 18, PG 143 & PLBK 22, PG 111

THIS PLOT PLAN WAS PREPARED FOR PERMITTING PURPOSES ONLY AND SHOULD NOT BE CONSIDERED A PROPERTY LINE SURVEY. THIS PLAN SHOULD NOT BE USED TO ESTABLISH PROPERTY LINES, FENCES, HEDGES OR ANY ANCILLARY STRUCTURES ON THE PREMISES. THE PROPERTY LINES SHOWN RELY ON CURRENT DEEDS AND PLANS OF RECORD.
THIS PLOT PLAN IS NOT A CERTIFICATION AS TO TITLE OR OWNERSHIP OF THE PROPERTY SHOWN. OWNERS OF ADJOINING PROPERTIES ARE SHOWN ACCORDING TO CURRENT ASSESOR RECORDS.

NOTES:

LOCUS IS SERVED BY TOWN WATER & SEWER

LOCUS IS WITHIN LAND SUBJECT TO COASTAL STORM FLOWAGE AND FEMA ZONE AE7

WETLAND RESOURCE AREA BOUNDARIES SHOWN ARE SUBJECT TO THE REVIEW AND APPROVAL OF THE NANTUCKET CONSERVATION COMMISSION

GRAPHIC SCALE

0 30 60 90

(IN FEET)
1 inch = 30 ft.

NANTUCKET ENGINEERING & SURVEY, PC
20 Mary Ann Drive Nantucket, MA 02554
NantucketEngineer.com 508-825-5053

June 19, 2020

Ms. Ashley Erisman, Chair
Nantucket Conservation Commission
2 Bathing Beach Road
Nantucket, MA 02554

Re: Minor Modification
65 Squam Road
SE48-3233

Dear Ms. Erisman:

The purpose of this letter is to request the issuance of a Minor Modification for the referenced project. The Applicant seeks approval for two sets of two steps to access the house. One set of steps will be under an approved cantilevered balcony, while the represents additional footprint of approximately twelve square feet. Attached is a sketch plan of a bracket system to support the steps without any connection to the ground. Further, there will be spacing between the deck boards to allow water to pass through. Both of these features will avoid any adverse impacts to the resource areas. Please note that the steps are within existing lawn area.

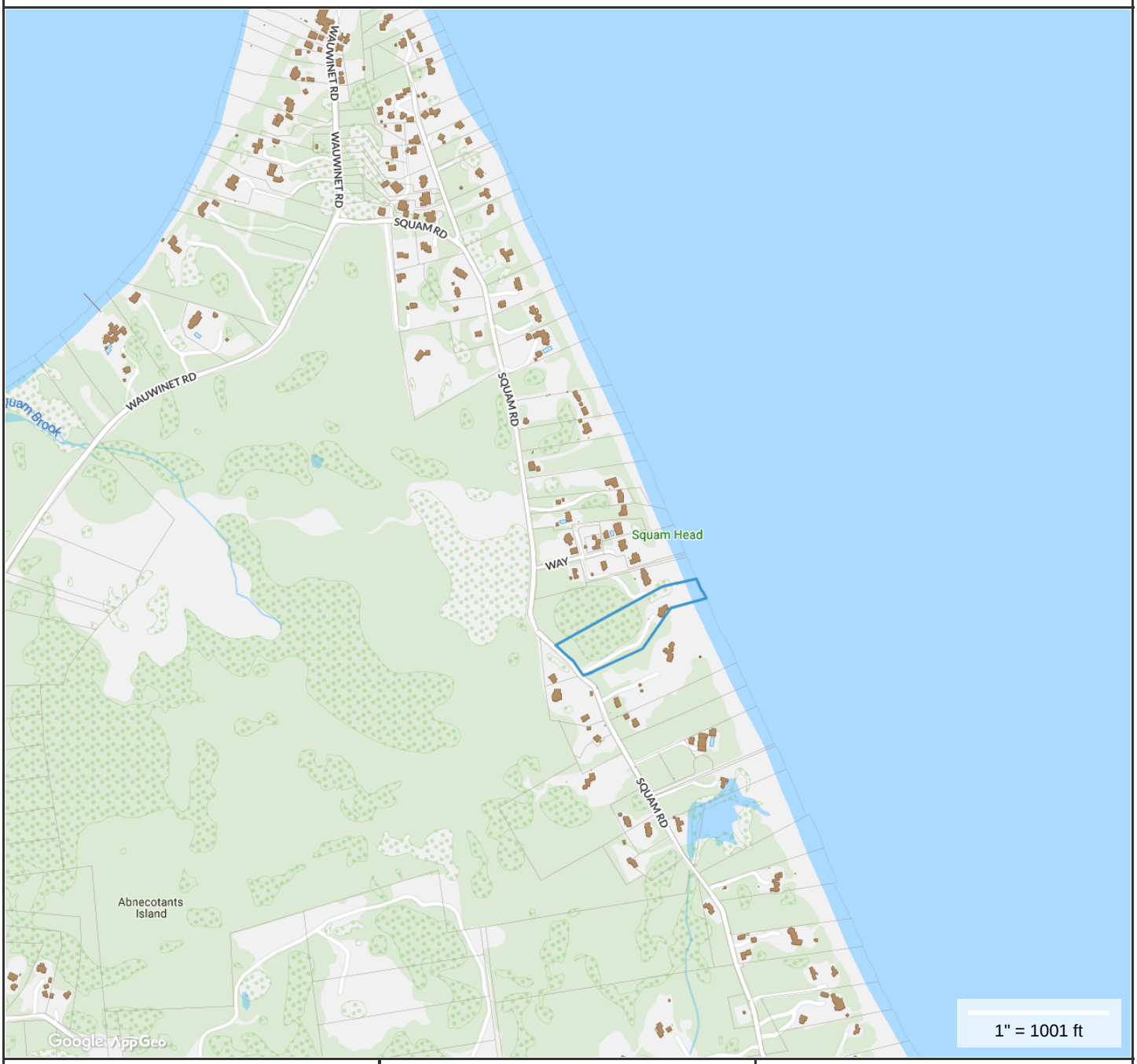
I plan to attend your next hearing to review this material and address any questions.

Sincerely,

Arthur D. Gasbarro, PE, PLS

20 Mary Ann Drive • Nantucket, MA 02554
508-825-5053 • www.NantucketEngineer.com

Locus Map



Property Information

Property ID	13 15
Location	65 SQUAM RD
Owner	LESCHLY LOTTE TRUSTEE ETAL

MAP FOR REFERENCE ONLY
NOT A LEGAL DOCUMENT

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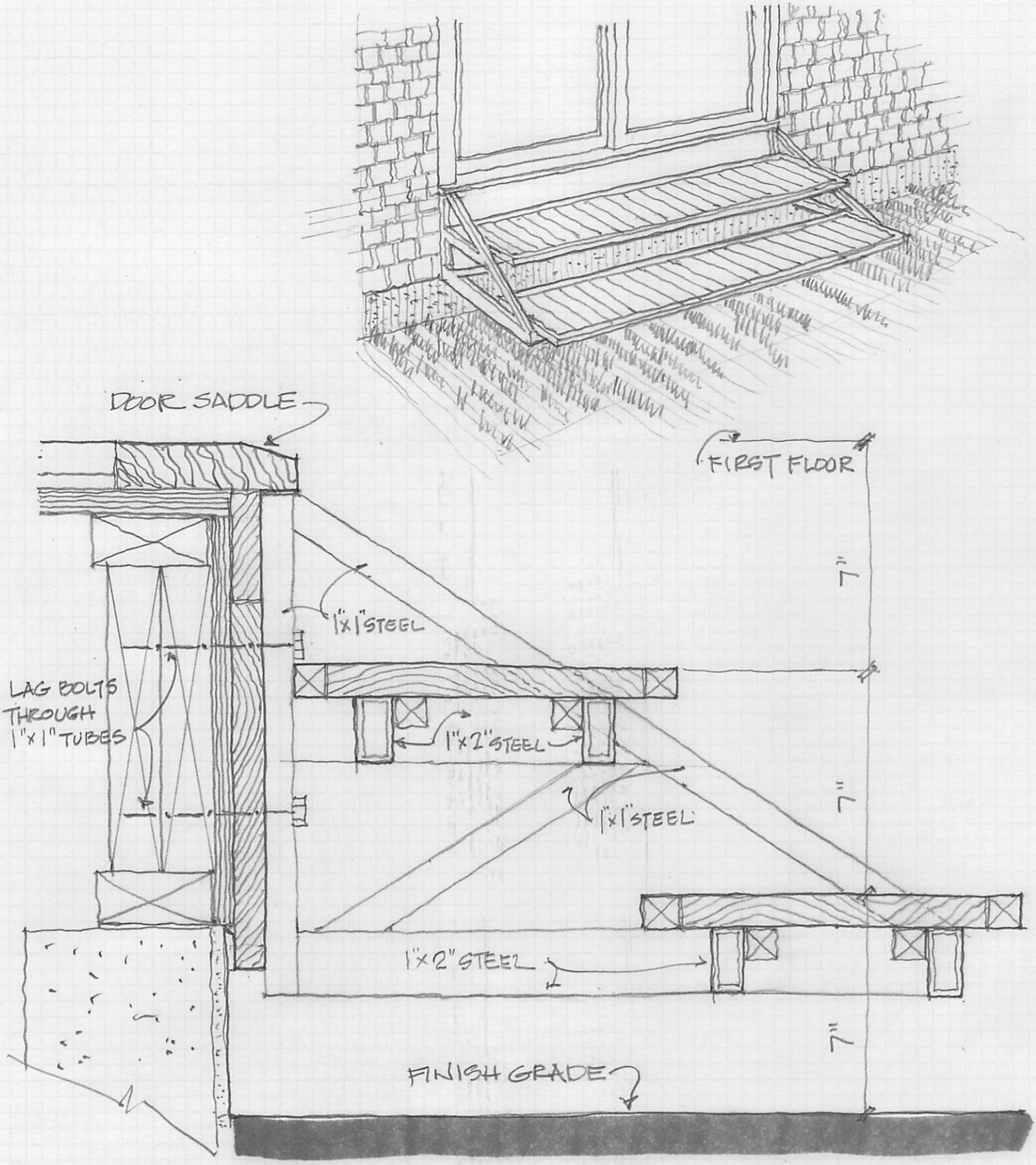
Geometry updated 11/13/2018
Data updated 11/19/2018


DOOR SADDLE
FIRST FLOOR
1"x1" STEEL
LAG BOLTS THROUGH 1"x1" TUBES
1"x2" STEEL
1"x1" STEEL
1"x2" STEEL
FINISH GRADE

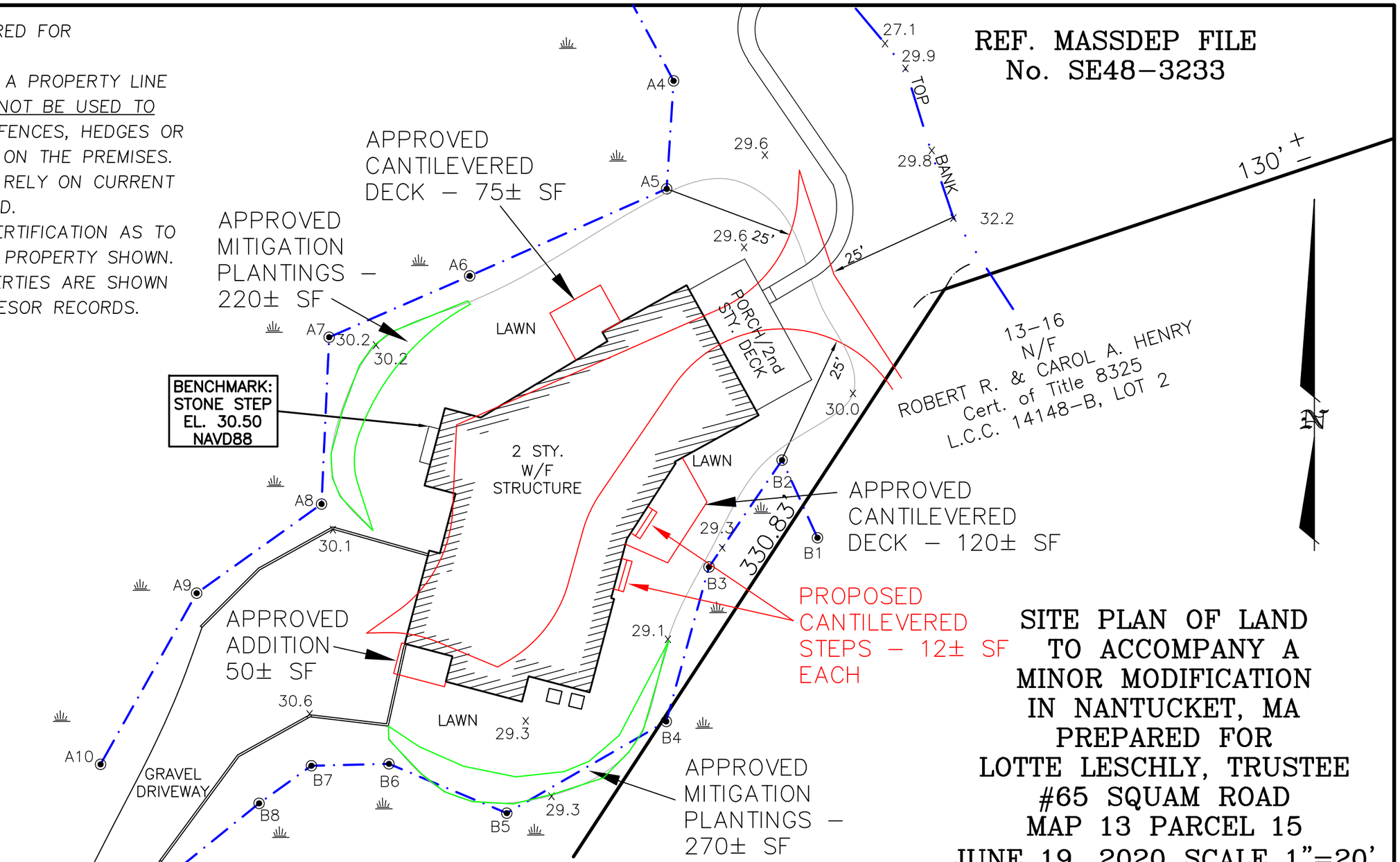
THIS PLOT PLAN WAS PREPARED FOR PERMITTING PURPOSES ONLY
SHOULD NOT BE CONSIDERED A PROPERTY LINE SURVEY. THIS PLAN SHOULD NOT BE USED TO ESTABLISH PROPERTY LINES, FENCES, HEDGES OR ANY ANCILLARY STRUCTURES ON THE PREMISES. THE PROPERTY LINES SHOWN RELY ON CURRENT DEEDS AND PLANS OF RECORD.
THIS PLOT PLAN IS NOT A CERTIFICATION AS TO TITLE OR OWNERSHIP OF THE PROPERTY SHOWN. OWNERS OF ADJOINING PROPERTIES ARE SHOWN ACCORDING TO CURRENT ASSESOR RECORDS.

COMMONWEALTH OF MASSACHUSETTS
ARTHUR D. GASBARRO, III
No. 47149
PROFESSIONAL LAND SURVEYOR

6/19/20

Arthur D. Gasbarro

REF. MASSDEP FILE
No. SE48-3233



SITE PLAN OF LAND
TO ACCOMPANY A
MINOR MODIFICATION
IN NANTUCKET, MA
PREPARED FOR
LOTTE LESCHLY, TRUSTEE
#65 SQUAM ROAD
MAP 13 PARCEL 15
JUNE 19, 2020 SCALE 1"=20'

OWNER INFORMATION

OWNER: LOTTE LESCHLY,
TRUSTEE OF LOTTE LESCHLY QPRT
& TRUSTEE OF JAN LESCHLY QPRT
CERT. 23930
L.C.C. 14902-I, LOT 5

NANTUCKET ENGINEERING & SURVEY, PC
20 Mary Ann Drive Nantucket, MA 02554
NantucketEngineer.com 508-825-5053

FRONT ELEVATION - DEVELOPED

1 | 1/4" = 1'-0"

LEFT SIDE ELEVATION

3 | 1/4" = 1'-0"

DOCUMENT HISTORY:

REV.#	DATE	PURPOSE
	10-1-19	Issued for Permit
2	11-10-19	Addendum 1

studiohillier
architecture | urban planning | design

studiohillier
190 Witherspoon Street
Princeton, NJ 08542

T 609.688.9999
F 609.688.9990

www.studiohillier.com

Signature, Date and Seal

J. Robert Hillier - Architect **Lic. No. 2643**

Key Plan

PERMIT SET

Project

LESCHLY RESIDENCE RENOVATION

65 SQUAM ROAD
NANTUCKET, MA 02554

Sheet Title

EXTERIOR ELEVATIONS

SCALE: 1/4" = 1'-0"
DRAWN BY: DB
REVIEWED BY: JRH
PROJECT NO: 0454

SHEET NO:
A200

6/8/2020 3:15:29 PM

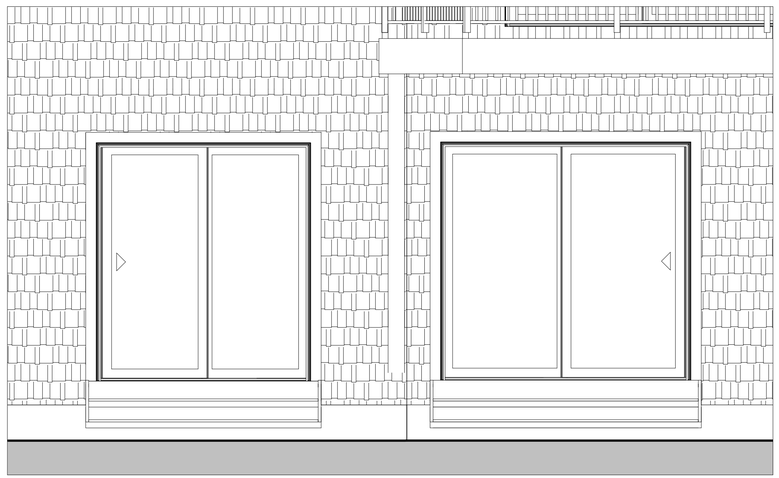
© studiohillier 2019. ALL RIGHTS RESERVED

REAR ELEVATION - DEVELOPED

1 | 1/4" = 1'-0"

RIGHT SIDE ELEVATION

2 | 1/4" = 1'-0"



CANTILEVERED EXTERIOR STAIRS - BLOWUP

6 | 1/2" = 1'-0"

DOCUMENT HISTORY:

REV.#	DATE	PURPOSE
	10-1-19	Issued for Permit
2	11-10-19	Addendum 1
5	1-10-20	Addendum 4

studiohillier
architecture | urban planning | design

studiohillier
190 Witherspoon Street
Princeton, NJ 08542

T 609.688.9999
F 609.688.9990

www.studiohillier.com

Signature, Date and Seal

J. Robert Hillier - Architect Lic. No. 2643

Key Plan

PERMIT SET

Project

LESCHLY RESIDENCE RENOVATION

65 SQUAM ROAD
NANTUCKET, MA 02554

Sheet Title

EXTERIOR ELEVATIONS 2

SCALE: As indicated
DRAWN BY: DB
REVIEWED BY: JRH
PROJECT NO: 0454

SHEET NO:
A201

6/8/2020 3:15:36 PM

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2019 00162781
Cert: 23930 Doc: OOC
Registered: 08/30/2019 11:50 AM

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

WPA Form 5 – Order of Conditions

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40
And the Town of Nantucket Wetlands Bylaw Chapter 136

Provided by MassDEP:
SE48-3233
MassDEP File #

eDEP Transaction #

Nantucket
City/Town

A. General Information

1. From: Nantucket
Conservation Commission

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

3. To: Applicant:

Lotte Leschly, Trustee of
a. First Name b. Last Name

Lotte Leschly QPRT & Jan Leschly QPRT
c. Organization

777 South Flagler Drive, Suite 800
d. Mailing Address

West Palm Beach | FL | 33401
e. City/Town | f. State | g. Zip Code

4. Property Owner (if different from applicant):

Same as Applicant
a. First Name b. Last Name

c. Organization

d. Mailing Address

e. City/Town f. State g. Zip Code

5. Project Location:

65 Squam Road | Nantucket
a. Street Address | b. City/Town

13 | 15
c. Assessors Map/Plat Number | d. Parcel/Lot Number

Latitude and Longitude, if known: 41d 19' 04" N (d. Latitude) 69d 59' 14" W (e. Longitude)

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

WPA Form 5 – Order of Conditions

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40
And the Town of Nantucket Wetlands Bylaw Chapter 136

Provided by MassDEP:
SE48-3233
MassDEP File #

eDEP Transaction #

Nantucket
City/Town

A. General Information (cont.)

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

Nantucket	23930
a. County	b. Certificate Number (if registered land)
c. Book	d. Page

7. Dates:

07/12/2019	08/28/2019	08/28/2019
a. Date Notice of Intent Filed	b. Date Public Hearing Closed	c. Date of Issuance

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

Site Plan of Land to Accompany a Notice of Intent
a. Plan Title

Nantucket Engineering & Survey, PC	Arthur D. Gasbarro III PLS
b. Prepared By	c. Signed and Stamped by
08/22/2019	1" = 30'
d. Final Revision Date	e. Scale

f. Additional Plan or Document Title	g. Date

B. Findings

1. Findings pursuant to the Massachusetts Wetlands Protection Act:

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

a. ☒ Public Water Supply
b. ☒ Land Containing Shellfish
c. ☒ Prevention of Pollution
d. ☒ Private Water Supply
e. ☒ Fisheries
f. ☒ Protection of Wildlife Habitat
g. ☒ Groundwater Supply
h. ☒ Storm Damage Prevention
i. ☒ Flood Control
j. ☒ Wetland Scenic Views (bylaw)
k. ☒ Recreation (Bylaw)

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

Approved subject to:

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

June 12, 2020

Jeff Carlson, Administrator
Nantucket Conservation Commission
2 Bathing Beach Road
Nantucket, MA 02554

RE: Certificates of Compliance
10 Bassett Road
Map 26 Parcel 39
MassDEP File No. SE48-2299 & 2427

Dear Jeff:

I am writing to request Certificates of Compliance for the referenced projects. Attached are a Locus Map, Aerial Photo, Site Plan, WPA Forms 8A, $50 filing fee, front-page copies of the Orders recorded at the Nantucket Registry of Deeds and photos of existing conditions.

With respect to SE48-2299, the Order permitted after-the-fact work issued to the previous property owner in 2010.

With respect to SE48-2427, the work did not commence. There has been some maintenance of vegetation in the buffer zone and establishment of a tall grass meadow. The areas beyond the existing lawn which previously existed will no longer be maintained.

I plan to attend the public hearing on this matter, though please feel free to contact me should you have any questions or concerns with this request in the meantime.

Sincerely,
Nantucket Engineering & Survey, P.C.
By: Arthur D. Gasbarro, PE, PLS

Cc: Amy & Michael McGowan
Steven L. Cohen

20 Mary Ann Drive • Nantucket, MA 02554
508-825-5053 • www.NantucketEngineer.com

Locus Map

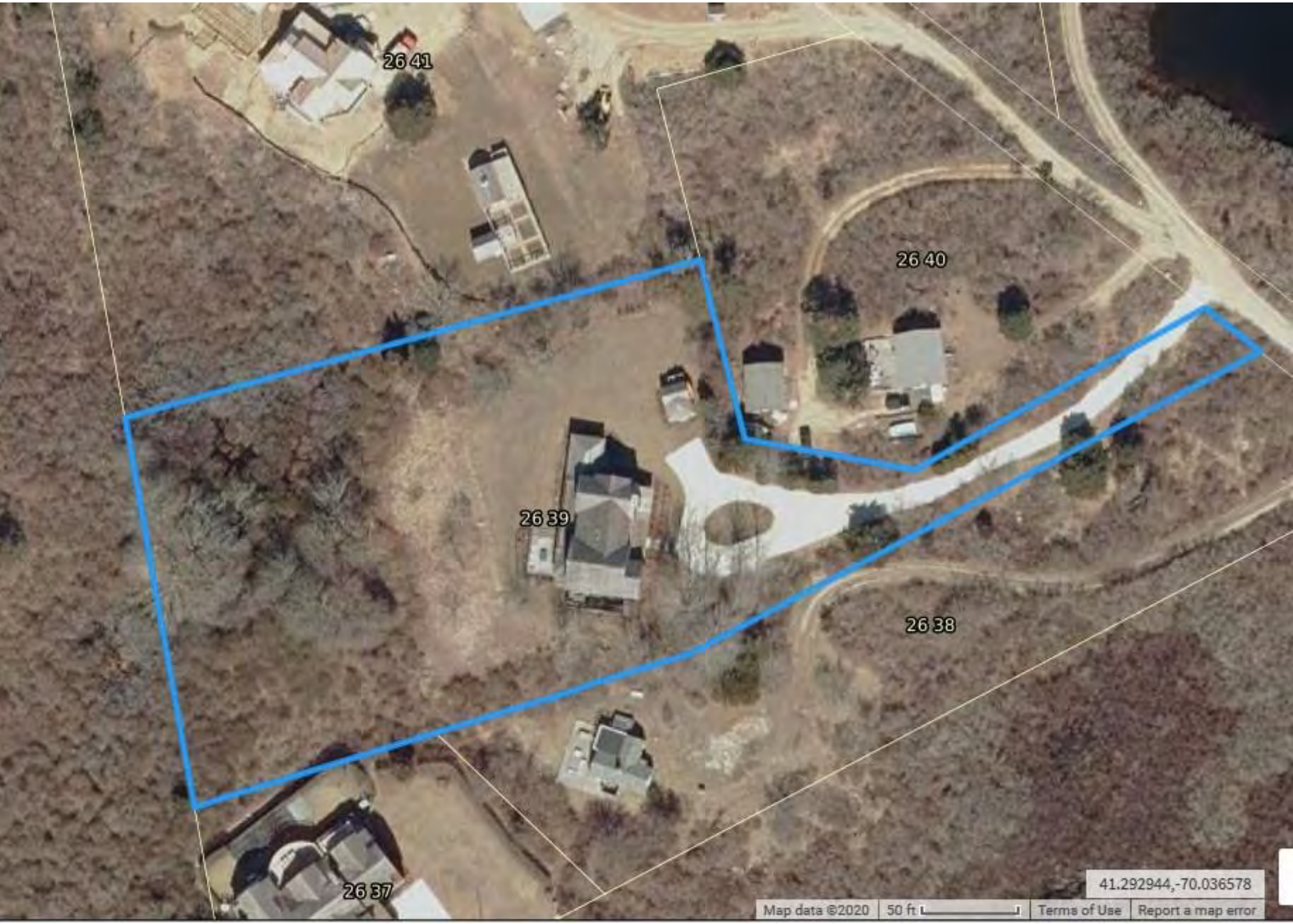
Property Information

Property ID	26 39
Location	10 BASSETT RD
Owner	MCGOWAN MICHAEL J & AMY C

MAP FOR REFERENCE ONLY
NOT A LEGAL DOCUMENT

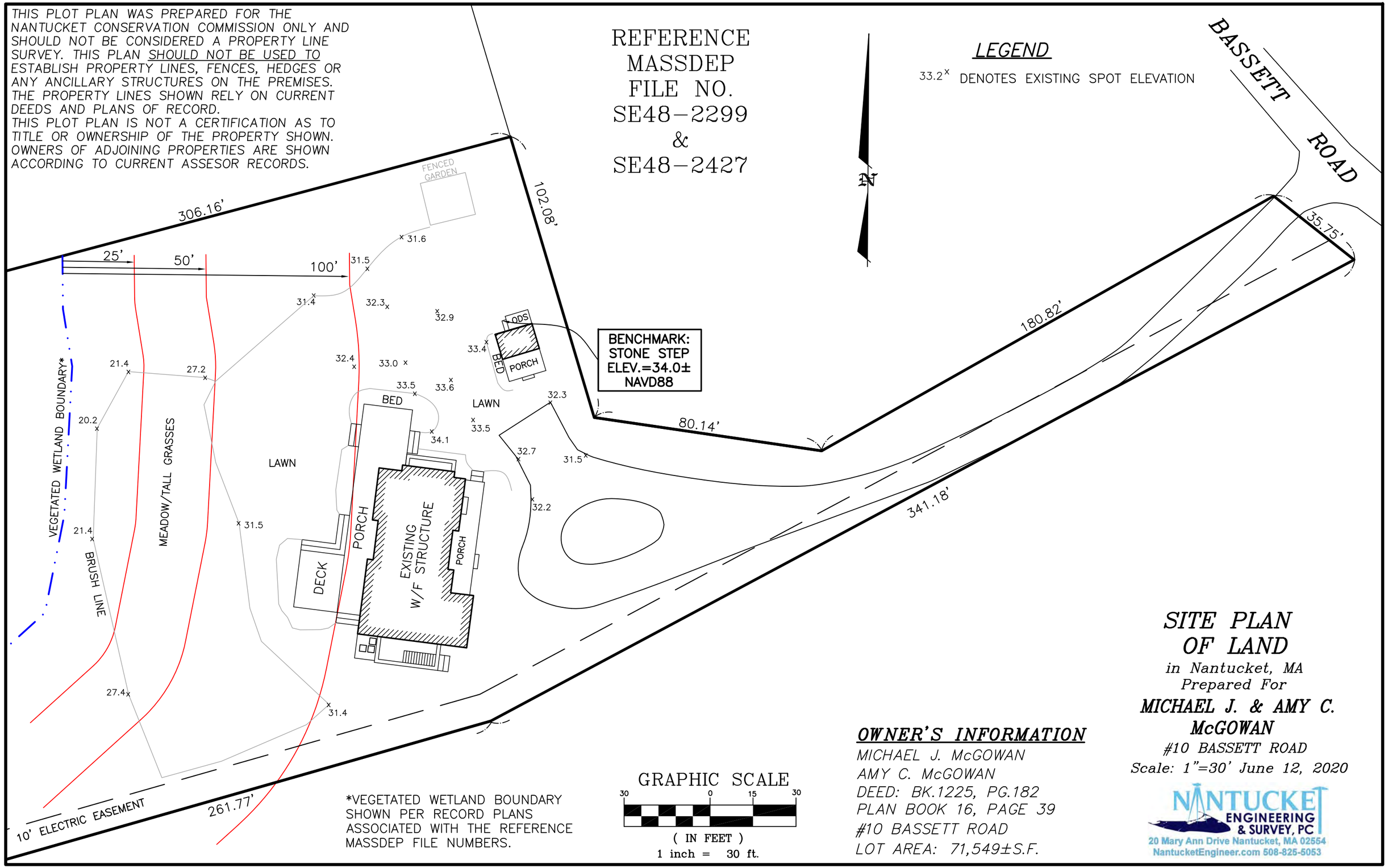
Town and County of Nantucket, MA makes no claims and no warranties, expressed or implied, concerning the validity or accuracy of the GIS data presented on this map.

Geometry updated 11/13/2018
Data updated 11/19/2018


26 41
26 40
26 39
26 38
26 37
41.292944,-70.036578
Map data ©2020
50 ft
Terms of Use
Report a map error

THIS PLOT PLAN WAS PREPARED FOR THE NANTUCKET CONSERVATION COMMISSION ONLY AND SHOULD NOT BE CONSIDERED A PROPERTY LINE SURVEY. THIS PLAN SHOULD NOT BE USED TO ESTABLISH PROPERTY LINES, FENCES, HEDGES OR ANY ANCILLARY STRUCTURES ON THE PREMISES. THE PROPERTY LINES SHOWN RELY ON CURRENT DEEDS AND PLANS OF RECORD.
THIS PLOT PLAN IS NOT A CERTIFICATION AS TO TITLE OR OWNERSHIP OF THE PROPERTY SHOWN. OWNERS OF ADJOINING PROPERTIES ARE SHOWN ACCORDING TO CURRENT ASSESOR RECORDS.

REFERENCE
MASSDEP
FILE NO.
SE48-2299
&
SE48-2427



*VEGETATED WETLAND BOUNDARY SHOWN PER RECORD PLANS ASSOCIATED WITH THE REFERENCE MASSDEP FILE NUMBERS.

GRAPHIC SCALE

30 0 15 30

(IN FEET)
1 inch = 30 ft.

OWNER'S INFORMATION

MICHAEL J. McGOWAN
AMY C. McGOWAN
DEED: BK.1225, PG.182
PLAN BOOK 16, PAGE 39
#10 BASSETT ROAD
LOT AREA: 71,549±S.F.

SITE PLAN OF LAND

in Nantucket, MA
Prepared For

MICHAEL J. & AMY C. McGOWAN

#10 BASSETT ROAD
Scale: 1"=30' June 12, 2020

NANTUCKET ENGINEERING & SURVEY, PC
20 Mary Ann Drive Nantucket, MA 02554
NantucketEngineer.com 508-825-5053

June 9, 2020 Buffer Zone

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

WPA Form 8A – Request for Certificate of Compliance

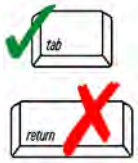
Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

DEP File Number:

SE48-2299
Provided by DEP

A. Project Information

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



1. This request is being made by:

Amy & Michael McGowan
Name

1533 Oak St
Mailing Address

Sarasota | FL | 34236
City/Town | State | Zip Code

Phone Number

2. This request is in reference to work regulated by a final Order of Conditions issued to:

3 MBF, LLC - James Fuller, Manager
Applicant

4/16/10 | SE48-2299
Dated | DEP File Number

Upon completion of the work authorized in an Order of Conditions, the property owner must request a Certificate of Compliance from the issuing authority stating that the work or portion of the work has been satisfactorily completed.

3. The project site is located at:

10 Bassett Road | Nantucket
Street Address | City/Town

26 | 39
Assessors Map/Plat Number | Parcel/Lot Number

4. The final Order of Conditions was recorded at the Registry of Deeds for:

3 MBF, LLC - James Fuller, Manager
Property Owner (if different)

Nantucket | 1237 | 123
County | Book | Page

Certificate (if registered land)

5. This request is for certification that (check one):

☒ the work regulated by the above-referenced Order of Conditions has been satisfactorily completed.

☐ the following portions of the work regulated by the above-referenced Order of Conditions have been satisfactorily completed (use additional paper if necessary).

☐ the above-referenced Order of Conditions has lapsed and is therefore no longer valid, and the work regulated by it was never started.

A. Project Information (cont.)

6. Did the Order of Conditions for this project, or the portion of the project subject to this request, contain an approval of any plans stamped by a registered professional engineer, architect, landscape architect, or land surveyor?

☒ Yes — If yes, attach a written statement by such a professional certifying substantial compliance with the plans and describing what deviation, if any, exists from the plans approved in the Order.

☐ No

B. Submittal Requirements

Requests for Certificates of Compliance should be directed to the issuing authority that issued the final Order of Conditions (OOC). If the project received an OOC from the Conservation Commission, submit this request to that Commission. If the project was issued a Superseding Order of Conditions or was the subject of an Adjudicatory Hearing Final Decision, submit this request to the appropriate DEP Regional Office (see http://www.mass.gov/eea/agencies/massdep/about/contacts/find-the-massdep-regional-office-for-your-city-or-town.html).

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

WPA Form 5 – Order of Conditions

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40 and
The Town of Nantucket Wetlands Protection Bylaw Chapter 136

3 MBF, LLC

SE48-2299
MassDEP File Number

Nantucket
City/Town

A. General Information

1. From: Nantucket
Conservation Commission

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

3. To: Applicant:

James — a. First Name
Fuller, Manager — b. Last Name
3 MBF, LLC — c. Organization
673 Central Avenue — d. Mailing Address
Needham — e. City/Town
MA — f. State
02494 — g. Zip Code

4. Property Owner (if different from applicant):

Same — a. First Name
b. Last Name
c. Organization
d. Mailing Address
e. City/Town
f. State
g. Zip Code

5. Project Location:

10 Bassett Road — a. Street Address
Nantucket — b. City/Town
26 — c. Assessors Map/Plat Number
39 — d. Parcel/Lot Number

Latitude and Longitude, if known:
e. Latitude
f. Longitude

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

Nantucket — a. County
b. Certificate Number (if registered land)
1032 — c. Book
98 — d. Page

7. Dates:
March 26, 2010 — a. Date Notice of Intent Filed
April 14, 2010 — b. Date Public Hearing Closed
April 16, 2010 — c. Date of Issuance

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

Existing Conditions Plan — a. Plan Title
Site Design Engineering, LLC — b. Prepared By
Joseph E. Marcklinger — c. Signed and Stamped by
03/26/2010 — d. Final Revision Date
1"=30' — e. Scale
f. Additional Plan or Document Title
g. Date

2010 00001761
Bk: 1237 Pg: 123 Page: 1 of 15
Doc: OOC 07/09/2010 12:38 PM

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

WPA Form 5 – Order of Conditions

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40 and
The Town of Nantucket Wetlands Protection Bylaw Chapter 136

3 MBF, LLC

SE48-22 99
MassDEP File Number

Nantucket
City/Town

B. Findings

1. Findings pursuant to the Massachusetts Wetlands Protection Act:

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

a. ☒ Public Water Supply
b. ☒ Land Containing Shellfish
c. ☒ Prevention of Pollution
d. ☒ Private Water Supply
e. ☒ Fisheries
f. ☒ Protection of Wildlife Habitat
g. ☒ Groundwater Supply
h. ☒ Storm Damage Prevention
i. ☒ Flood Control
k. ☒ Recreation
l. ☒ Wetland Scenic Views
m. ☒ Public Safety

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

Approved subject to:

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

Denied because:

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

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

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

3. ☐ Buffer Zone Impacts: Shortest distance between limit of project disturbance and Bank or Bordering Vegetated Wetland boundary (if available) _____ a. linear feet

Resource Area	Proposed Alteration	Permitted Alteration	Proposed Replacement	Permitted Replacement
4. ☐ Bank	a. linear feet	b. linear feet	c. linear feet	d. linear feet
5. ☐ Bordering Vegetated Wetland	a. square feet	b. square feet	c. square feet	d. square feet
6. ☐ Land Under Waterbodies and Waterways	a. square feet	b. square feet	c. square feet	d. square feet
	e. c/y dredged	f. c/y dredged		

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

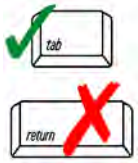
WPA Form 8A – Request for Certificate of Compliance

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

DEP File Number:
SE48-2427
Provided by DEP

A. Project Information

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



1. This request is being made by:

Amy C. & Michael J. McGowan
Name

1533 Oak St
Mailing Address

Sarasota | FL | 34236
City/Town | State | Zip Code

Phone Number

2. This request is in reference to work regulated by a final Order of Conditions issued to:

Amy C. & Michael J. McGowan
Applicant

12/20/2017 | SE48-2427
Dated | DEP File Number

Upon completion of the work authorized in an Order of Conditions, the property owner must request a Certificate of Compliance from the issuing authority stating that the work or portion of the work has been satisfactorily completed.

3. The project site is located at:

10 Bassett Road | Nantucket
Street Address | City/Town

26 | 39
Assessors Map/Plat Number | Parcel/Lot Number

4. The final Order of Conditions was recorded at the Registry of Deeds for:

Amy C. & Michael J. McGowan
Property Owner (if different)

Nantucket | 1310 | 184
County | Book | Page

Certificate (if registered land)

5. This request is for certification that (check one):

☐ the work regulated by the above-referenced Order of Conditions has been satisfactorily completed.

☐ the following portions of the work regulated by the above-referenced Order of Conditions have been satisfactorily completed (use additional paper if necessary).

☒ the above-referenced Order of Conditions has lapsed and is therefore no longer valid, and the work regulated by it was never started.

A. Project Information (cont.)

6. Did the Order of Conditions for this project, or the portion of the project subject to this request, contain an approval of any plans stamped by a registered professional engineer, architect, landscape architect, or land surveyor?

☒ Yes — If yes, attach a written statement by such a professional certifying substantial compliance with the plans and describing what deviation, if any, exists from the plans approved in the Order.

☐ No

B. Submittal Requirements

Requests for Certificates of Compliance should be directed to the issuing authority that issued the final Order of Conditions (OOC). If the project received an OOC from the Conservation Commission, submit this request to that Commission. If the project was issued a Superseding Order of Conditions or was the subject of an Adjudicatory Hearing Final Decision, submit this request to the appropriate DEP Regional Office (see http://www.mass.gov/eea/agencies/massdep/about/contacts/find-the-massdep-regional-office-for-your-city-or-town.html).

2012 00000180
Bk: 1310 Pg: 183 Page: 1 of 15
Doc: OOC 01/23/2012 01:49 PM

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

WPA Form 5 – Order of Conditions

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40
And the Town of Nantucket Wetlands Bylaw Chapter 136

Provided by MassDEP:
SE48- 2427
MassDEP File #

eDEP Transaction #

Nantucket
City/Town

A. General Information

1. From: Nantucket
Conservation Commission

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

3. To: Applicant:

Michael J. & Amy C. — a. First Name
McGowan — b. Last Name
c. Organization
8 Charles Davis Drive — d. Mailing Address
Wenham — e. City/Town
MA — f. State
01984 — g. Zip Code

4. Property Owner (if different from applicant):

a. First Name
b. Last Name
c. Organization
d. Mailing Address
e. City/Town
f. State
g. Zip Code

5. Project Location:

10 Bassett Road — a. Street Address
Nantucket — b. City/Town
26 — c. Assessors Map/Plat Number
39 — d. Parcel/Lot Number

Latitude and Longitude, if known: d m s — d. Latitude; d m s — e. Longitude

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

WPA Form 5 – Order of Conditions

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40
And the Town of Nantucket Wetlands Bylaw Chapter 136

Provided by MassDEP:
SE48- 2427
MassDEP File #

eDEP Transaction #

Nantucket
City/Town

A. General Information (cont.)

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

Nantucket
a. County

b. Certificate Number (if registered land)

1225
c. Book

182
d. Page

7. Dates: 10/21/2011 a. Date Notice of Intent Filed; 12/21/2011 b. Date Public Hearing Closed; 1/6/2012 c. Date of Issuance

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

Site Plan of Land to Accompany a Notice of Intent
a. Plan Title

Blackwell & Associates, Inc.
b. Prepared By

Arthur D. Gasbarro, P.E.
c. Signed and Stamped by

12/9/2011
d. Final Revision Date

1"=20'
e. Scale

McGowan Residence
f. Additional Plan or Document Title

12/8/2011
g. Date

B. Findings

1. Findings pursuant to the Massachusetts Wetlands Protection Act:

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

a. ☒ Public Water Supply
b. ☒ Land Containing Shellfish
c. ☒ Prevention of Pollution
d. ☒ Private Water Supply
e. ☒ Fisheries
f. ☒ Protection of Wildlife Habitat
g. ☒ Groundwater Supply
h. ☒ Storm Damage Prevention
i. ☒ Flood Control
j. ☒ Wetland Scenic Views (bylaw)
k. ☒ Recreation (Bylaw)

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

Approved subject to:

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

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

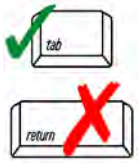
WPA Form 8A – Request for Certificate of Compliance

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

DEP File Number:
SE48-2427
Provided by DEP

A. Project Information

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



1. This request is being made by:

Amy C. & Michael J. McGowan
Name

1533 Oak St
Mailing Address

Sarasota | FL | 34236
City/Town | State | Zip Code

Phone Number

2. This request is in reference to work regulated by a final Order of Conditions issued to:

Amy C. & Michael J. McGowan
Applicant

12/20/2017 | SE48-2427
Dated | DEP File Number

Upon completion of the work authorized in an Order of Conditions, the property owner must request a Certificate of Compliance from the issuing authority stating that the work or portion of the work has been satisfactorily completed.

3. The project site is located at:

10 Bassett Road | Nantucket
Street Address | City/Town

26 | 39
Assessors Map/Plat Number | Parcel/Lot Number

4. The final Order of Conditions was recorded at the Registry of Deeds for:

Amy C. & Michael J. McGowan
Property Owner (if different)

Nantucket | 1310 | 184
County | Book | Page

Certificate (if registered land)

5. This request is for certification that (check one):

☐ the work regulated by the above-referenced Order of Conditions has been satisfactorily completed.

☐ the following portions of the work regulated by the above-referenced Order of Conditions have been satisfactorily completed (use additional paper if necessary).

☒ the above-referenced Order of Conditions has lapsed and is therefore no longer valid, and the work regulated by it was never started.

A. Project Information (cont.)

6. Did the Order of Conditions for this project, or the portion of the project subject to this request, contain an approval of any plans stamped by a registered professional engineer, architect, landscape architect, or land surveyor?

☒ Yes — If yes, attach a written statement by such a professional certifying substantial compliance with the plans and describing what deviation, if any, exists from the plans approved in the Order.

☐ No

B. Submittal Requirements

Requests for Certificates of Compliance should be directed to the issuing authority that issued the final Order of Conditions (OOC). If the project received an OOC from the Conservation Commission, submit this request to that Commission. If the project was issued a Superseding Order of Conditions or was the subject of an Adjudicatory Hearing Final Decision, submit this request to the appropriate DEP Regional Office (see http://www.mass.gov/eea/agencies/massdep/about/contacts/find-the-massdep-regional-office-for-your-city-or-town.html).

2012 00000180
Bk: 1310 Pg: 183 Page: 1 of 15
Doc: OOC 01/23/2012 01:49 PM

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

WPA Form 5 – Order of Conditions

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40
And the Town of Nantucket Wetlands Bylaw Chapter 136

Provided by MassDEP:
SE48- 2427
MassDEP File #

eDEP Transaction #

Nantucket
City/Town

A. General Information

1. From: Nantucket
Conservation Commission

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

3. To: Applicant:

Michael J. & Amy C. — a. First Name
McGowan — b. Last Name
c. Organization
8 Charles Davis Drive — d. Mailing Address
Wenham — e. City/Town
MA — f. State
01984 — g. Zip Code

4. Property Owner (if different from applicant):

a. First Name
b. Last Name
c. Organization
d. Mailing Address
e. City/Town
f. State
g. Zip Code

5. Project Location:

10 Bassett Road — a. Street Address
Nantucket — b. City/Town
26 — c. Assessors Map/Plat Number
39 — d. Parcel/Lot Number

Latitude and Longitude, if known: d m s — d. Latitude; d m s — e. Longitude

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

WPA Form 5 – Order of Conditions

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40
And the Town of Nantucket Wetlands Bylaw Chapter 136

Provided by MassDEP:
SE48- 2427
MassDEP File #

eDEP Transaction #

Nantucket
City/Town

A. General Information (cont.)

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

Nantucket
a. County

b. Certificate Number (if registered land)

1225
c. Book

182
d. Page

7. Dates: 10/21/2011 a. Date Notice of Intent Filed; 12/21/2011 b. Date Public Hearing Closed; 1/6/2012 c. Date of Issuance

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

Site Plan of Land to Accompany a Notice of Intent
a. Plan Title

Blackwell & Associates, Inc.
b. Prepared By

Arthur D. Gasbarro, P.E.
c. Signed and Stamped by

12/9/2011
d. Final Revision Date

1"=20'
e. Scale

McGowan Residence
f. Additional Plan or Document Title

12/8/2011
g. Date

B. Findings

1. Findings pursuant to the Massachusetts Wetlands Protection Act:

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

a. ☒ Public Water Supply
b. ☒ Land Containing Shellfish
c. ☒ Prevention of Pollution
d. ☒ Private Water Supply
e. ☒ Fisheries
f. ☒ Protection of Wildlife Habitat
g. ☒ Groundwater Supply
h. ☒ Storm Damage Prevention
i. ☒ Flood Control
j. ☒ Wetland Scenic Views (bylaw)
k. ☒ Recreation (Bylaw)

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

Approved subject to:

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

June 12, 2020

Ms. Ashley Erisman, Chair
Nantucket Conservation Commission
2 Bathing Beach Road
Nantucket, MA 02554

Re: 20 Fulling Mill Road
Map 27 Parcel 23.1
MassDEP File No. SE48-3191
Certificate of Compliance

Dear Ms. Erisman:

I am writing to request a Certificate of Compliance for the referenced project. The work was completed in substantial compliance with the Order of Conditions. Attached are a Site Plan, WPA Form 8A, Septic System (Health Dept.) Certificate of Compliance, $25 filing fee, front-page copy of the Order recorded at the Nantucket Registry of Deeds.

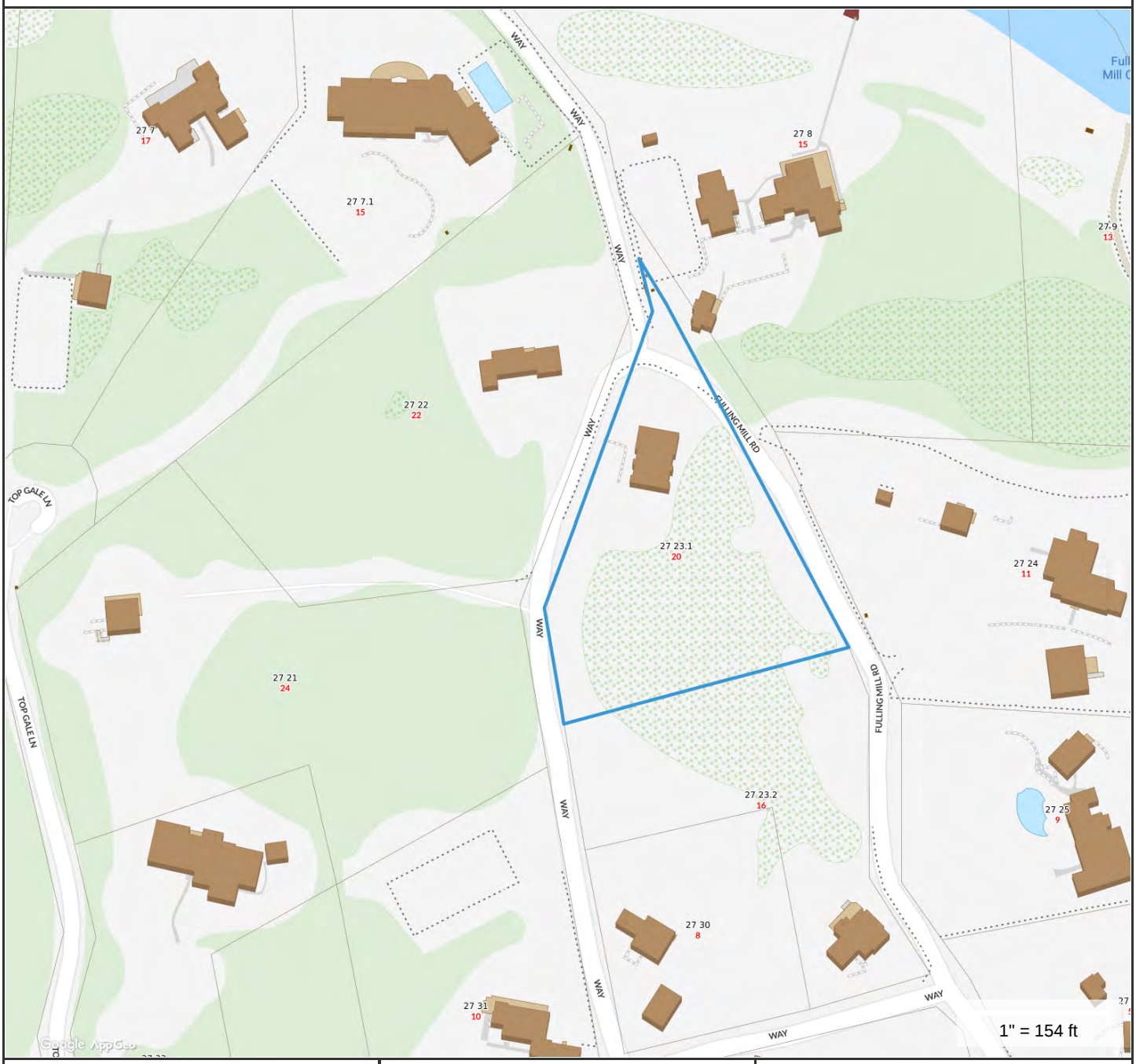
I plan to attend the public hearing on this matter, though please feel free to contact me should you have any questions or concerns with this request in the meantime.

Sincerely,

Nantucket Engineering & Survey, P.C.
By: Arthur D. Gasbarro, PE, PLS

20 Mary Ann Drive • Nantucket, MA 02554
508-825-5053 • www.NantucketEngineer.com

Locus Map



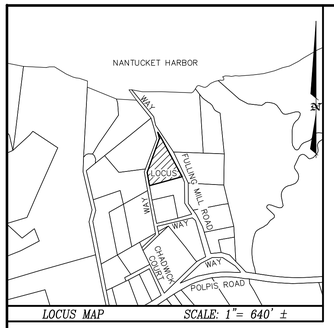
Property Information

Property ID	27 23.1
Location	20 FULLING MILL RD
Owner	DOUGLASS DAVID L TR

MAP FOR REFERENCE ONLY
NOT A LEGAL DOCUMENT

Town and County of Nantucket, MA makes no claims and no warranties, expressed or implied, concerning the validity or accuracy of the GIS data presented on this map.

Geometry updated 11/13/2018
Data updated 11/19/2018



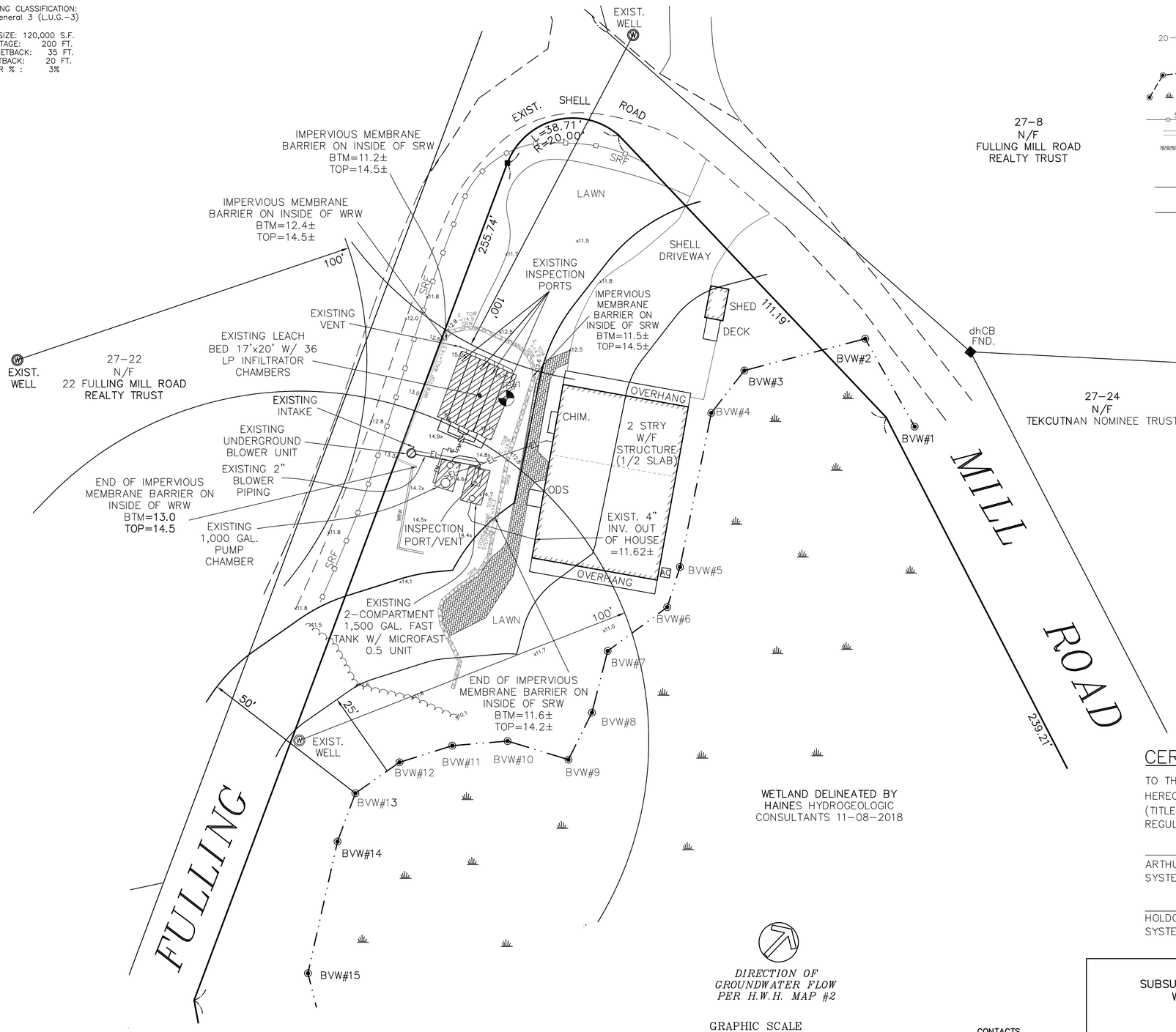
LOCUS MAP SCALE: 1"= 640' ±

CURRENT ZONING CLASSIFICATION:
Limited Use General 3 (L.U.G.-3)

MINIMUM LOT SIZE: 120,000 S.F.
MINIMUM FRONTAGE: 200 FT.
FRONT YARD SETBACK: 35 FT.
REAR/SIDE SETBACK: 20 FT.
GROUND COVER % : 3%

I/A NOTES:
- THE RECORD PROPERTY OWNER IS TO FILE A DEED NOTICE OF ALTERNATIVE SEWAGE DISPOSAL SYSTEM WITH THE NANTUCKET COUNTY REGISTRY OF DEEDS PRIOR TO THE ISSUANCE OF A CERTIFICATE OF COMPLIANCE.
- THE HOMEOWNER IS TO ESTABLISH AN OPERATION AND MAINTENANCE AGREEMENT WITH A QUALIFIED SYSTEM OPERATOR CERTIFIED BY THE COMPANY FOR THE ALTERNATIVE TECHNOLOGY INSTALLED. ALL SYSTEM TESTING, MONITORING & REPORTING TO BE CONDUCTED IN ACCORDANCE WITH THE MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION (MassDEP) USE PERMITS.

COMMONWEALTH OF MASSACHUSETTS
ARTHUR D. GASBARRO
CIVIL
No. 45951
REGISTERED PROFESSIONAL ENGINEER
5/30/20
SEPTIC ONLY



WETLAND DELINEATED BY HAINES HYDROGEOLOGIC CONSULTANTS 11-08-2018

DIRECTION OF GROUNDWATER FLOW PER H.W.H. MAP #2

GRAPHIC SCALE
15 0 8 15 30 60
(IN FEET)
1 inch = 15 ft.

LOT AREA= 65,650 S.F.±
LOT CREATED: FEBRUARY 24, 1978

LEGEND

dhCB ■	DENOTES CONCRETE BOUND WITH DRILLHOLE FOUND
20	DENOTES EXISTING GRADE CONTOUR LINE
x22.6	DENOTES EXISTING GRADE SPOT ELEVATION
	DENOTES EXISTING WETLAND DELINEATION
SRF	DENOTES EXISTING SPLIT RAIL FENCE
WRW	DENOTES EXISTING WOOD RETAINING WALL
SRW	DENOTES EXISTING STONE RETAINING WALL
TP	DENOTES EXISTING SOIL TEST PIT
EL	DENOTES EXISTING ELECTRICAL AND ALARM SERVICE
FM	DENOTES EXISTING FORCE MAIN

SEPTIC AS-BUILT SCHEDULE OF ELEVATIONS
06/14/19
INSTALLED BY: HOLDGATE PARTNERS

INV. AT HOUSE	11.62
INV. INTO MicroFAST	11.00
INV. OUT OF MicroFAST	10.82
INV. INTO PUMP	10.66
INV. OUT OF PUMP	10.62
INV. INTO D-BOX	13.93
AVG. INV. OUT OF D-BOX	13.72
AVG. INV. INTO BED	13.65
BOTTOM OF BED	13.29
EST. SEASONAL HIGH G.W. (REDOX OBS)	=8.2
MIN G.W. SEPARATION DISTANCE	5.09'

CERTIFICATION

TO THE BEST OF MY KNOWLEDGE, THE SEPTIC SYSTEM DEPICTED HEREON WAS INSTALLED IN ACCORDANCE WITH 310 CMR 15.000 (TITLE 5) AND THE TOWN OF NANTUCKET BOARD OF HEALTH REGULATIONS.

ARTHUR D. GASBARRO, PE, PLS
SYSTEM DESIGNER

HOLDGATE PARTNERS
SYSTEM INSTALLER

NOTE:
SEPTIC SYSTEM AND WELL LOCATIONS SHOWN HEREON OTHER THAN LOCUS ARE BASED UPON RECORD FILES AT THE NANTUCKET HEALTH DEPARTMENT.

OWNER INFORMATION

DAVID L. DOUGLASS TRUST
Cert No: 26040
L.C.C. 14311-I, LOT 37
ASSESSOR'S MAP 27, PARCEL 23.1
#20 FULLING MILL ROAD

LOCAL UPGRADE APPROVALS GRANTED

TITLE 5: 310 CMR 15.405(1)(a): REDUCTION OF SETBACKS TO PROPERTY LINES. 6' PROVIDED
TITLE 5: 310 CMR 15.405(1)(b): REDUCTION OF S.A.S. SETBACKS TO FOUNDATION. 13' PROVIDED
TITLE 5: 310 CMR 15.405(1)(c): 25% REDUCTION OF S.A.S. SIZE. 5% REDUCTION TAKEN.

LOCAL BOARD OF HEALTH REGULATION VARIANCE GRANTED

TON REGULATION: 52.02(A): SEPTIC SYSTEM INSTALLATION WITHIN 100 FOOT WETLAND BUFFER ZONE.

CONTACTS

Dig-Safe	1-888-344-7233
On-Target	1-800-598-0628
Health Department	508-228-7200
National Grid	1-800-322-3223
Public Works	228-7244
Water, Wannacomet	228-0022
Building Dept	325-7587
Conservation Comm	228-7230
Police, EMERGENCY	---911---
Environmental Police	257-6932
State Police	228-0706

SHEET 1 OF 1

RECORD PLAN OF A 4BR
SUBSURFACE SEWAGE TREATMENT & DISPOSAL SYSTEM
WITH INNOVATIVE/ALTERNATIVE TECHNOLOGY
PREPARED FOR
DAVID L. DOUGLASS TRUST

#20 FULLING MILL ROAD
MAP: 27, PARCEL: 23.1
NANTUCKET, MA

CHECKED BY: ADG/JLB	MAP: 27 PARCEL: 23.1				
DESIGNED BY: ADG/CLR	DRAWN BY: CLR	DATE: 05/23/2020			
SCALE: AS NOTED	JOB NO.: B4099	SHEET: 1 OF 1			

BLACKWELL & ASSOCIATES, INC.
20 TEASDALE CIRCLE - NANTUCKET, MA 02554
(508)228-9026 FAX (508)228-5292

B4099

T:\JEFF26 JOB 9
V:\DRAWFILES\B4099\AB SEPTIC.dwg 5/23/2020 4:33:27 PM EDT

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

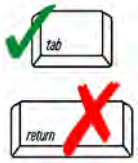
WPA Form 8A – Request for Certificate of Compliance

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

DEP File Number:
SE48-3191
Provided by DEP

A. Project Information

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



1. This request is being made by:

David L. Douglass Trust
Name
18 Redberry Ridge
Mailing Address
Portola Valley | CA | 94028
City/Town | State | Zip Code
508-825-5053
Phone Number

2. This request is in reference to work regulated by a final Order of Conditions issued to:

David L. Douglass Trust
Applicant
4/10/19 | SE48-3191
Dated | DEP File Number

Upon completion of the work authorized in an Order of Conditions, the property owner must request a Certificate of Compliance from the issuing authority stating that the work or portion of the work has been satisfactorily completed.

3. The project site is located at:

20 Fulling Mill Rd | Nantucket
Street Address | City/Town
27 | 23.1
Assessors Map/Plat Number | Parcel/Lot Number

4. The final Order of Conditions was recorded at the Registry of Deeds for:

Property Owner (if different)
Nantucket
County | Book | Page
26,040
Certificate (if registered land)

5. This request is for certification that (check one):

☒ the work regulated by the above-referenced Order of Conditions has been satisfactorily completed.

☐ the following portions of the work regulated by the above-referenced Order of Conditions have been satisfactorily completed (use additional paper if necessary).

☐ the above-referenced Order of Conditions has lapsed and is therefore no longer valid, and the work regulated by it was never started.

A. Project Information (cont.)

6. Did the Order of Conditions for this project, or the portion of the project subject to this request, contain an approval of any plans stamped by a registered professional engineer, architect, landscape architect, or land surveyor?

☒ Yes — If yes, attach a written statement by such a professional certifying substantial compliance with the plans and describing what deviation, if any, exists from the plans approved in the Order.

☐ No

B. Submittal Requirements

Requests for Certificates of Compliance should be directed to the issuing authority that issued the final Order of Conditions (OOC). If the project received an OOC from the Conservation Commission, submit this request to that Commission. If the project was issued a Superseding Order of Conditions or was the subject of an Adjudicatory Hearing Final Decision, submit this request to the appropriate DEP Regional Office (see http://www.mass.gov/eea/agencies/massdep/about/contacts/find-the-massdep-regional-office-for-your-city-or-town.html).

2019 00161465
Cert: 26040 Doc: OOC
Registered: 04/12/2019 10:20 AM

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

WPA Form 5 – Order of Conditions

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40
And the Town of Nantucket Wetlands Bylaw Chapter 136

Provided by MassDEP:
SE48-3191
MassDEP File #

eDEP Transaction #

Nantucket
City/Town

A. General Information

1. From: Nantucket
Conservation Commission

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

3. To: Applicant:

David L. — a. First Name
Douglass, Trustee — b. Last Name
David L. Douglass Trust — c. Organization
18 Redberry Ridge — d. Mailing Address
Portola Valley — e. City/Town
CA — f. State
94028 — g. Zip Code

4. Property Owner (if different from applicant):

Same as Applicant — a. First Name
b. Last Name
c. Organization
d. Mailing Address
e. City/Town
f. State
g. Zip Code

5. Project Location:

20 Fulling Mill Road — a. Street Address
Nantucket — b. City/Town
27 — c. Assessors Map/Plat Number
23.1 — d. Parcel/Lot Number

Latitude and Longitude, if known: 41d 17'31.65"N — d. Latitude; 70d 02'46.81" — e. Longitude

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

WPA Form 5 – Order of Conditions

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40
And the Town of Nantucket Wetlands Bylaw Chapter 136

Provided by MassDEP:
SE48-3191
MassDEP File #

eDEP Transaction #

Nantucket
City/Town

A. General Information (cont.)

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

Nantucket	26,040
a. County	b. Certificate Number (if registered land)
c. Book	d. Page

7. Dates:

03/22/2019	04/10/2019	04/10/2019
a. Date Notice of Intent Filed	b. Date Public Hearing Closed	c. Date of Issuance

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

Proposed Upgrade of a 4br subsurface sewage treatment & disposal system
a. Plan Title

Blackwell & Associates, Inc	Arthur D. Gasbarro P.E
b. Prepared By	c. Signed and Stamped by
04/01/19	1" = 15'
d. Final Revision Date	e. Scale
f. Additional Plan or Document Title	g. Date

B. Findings

1. Findings pursuant to the Massachusetts Wetlands Protection Act:

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

a. ☒ Public Water Supply
b. ☒ Land Containing Shellfish
c. ☒ Prevention of Pollution
d. ☒ Private Water Supply
e. ☒ Fisheries
f. ☒ Protection of Wildlife Habitat
g. ☒ Groundwater Supply
h. ☒ Storm Damage Prevention
i. ☒ Flood Control
j. ☒ Wetland Scenic Views (bylaw)
k. ☒ Recreation (Bylaw)

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

Approved subject to:

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

44-19

Commonwealth of Massachusetts
Board of Health
Town of Nantucket

Map-Block-Lot
2723.1

Permit No
BHP-2019-0576

FEE
$750.00

P.I. _____
F.I. _____

DISPOSAL WORKS CONSTRUCTION PERMIT

Permission is hereby granted Holdgate Partners

to (Upgrade) an Individual Sewage Disposal System.

at No 20 FULLING MILL RD

as shown on the application for Disposal Works Construction Permit No. BHP-2019-057 Dated April 09, 2019

Issued On: Apr-09-2019 Expires 4/9/21

Board of Health

Commonwealth of Massachusetts
Board of Health
Town of Nantucket

Map-Block-Lot
2723.1

CERTIFICATE OF COMPLIANCE

THIS IS TO CERTIFY, That the Individual Sewage Disposal System (Upgrade)

by Holdgate Partners
Installer

at No 20 FULLING MILL RD

has been installed in accordance with the provisions of TITLE 5 of the State Environmental Code as described in the application for Disposal Works Construction Permit No. BHP-2019-057 Dated April 09, 2019

Printed On: Apr-11-2019

Board of Health

relocated leach Bed as far from wetland as possible.

Agreement:

(1) The undersigned agrees to install the aforedescribed Individual Sewage Disposal System in accordance with the provisions of new Title 5 of the State Sanitary Code.

(2) A representative of the Nantucket Board of Health shall be present at all percolation tests whenever possible. The undersigned agrees to notify a representative of the Nantucket Board of Health no less than 24 hours prior to performing the percolation test.

(3) A representative of the Nantucket Board of Health shall inspect the Individual Sewage Disposal System prior to covering. The undersigned agrees to notify a representative of the Nantucket Board of Health no less than 24 hours prior to covering the system.

(4) The undersigned further agrees not to place the system in operation until a Certificate of Compliance has been issued by the Board of Health.

Signed _____ 3-14-19
Date

Application Approved By _____ 4/9/19
Date

Application Disapproved for the following reasons: _____

Nantucket SURVEYORS LLC
One of The TILTON Companies

P.O. Box 3627, Nantucket, Massachusetts 02584-3627
Tel. (508) 228-0240 Fax (508) 228-9856
www.nantucketsurveyors.com
nsllcinfo@nantucketsurveyors.com

NS10799

June 19, 2020

Nantucket Conservation Commission
2 Bathing Beach Road
Nantucket, MA 02554

Re: Certificate of Compliance Request SE48-3202
Applicant: Robert C. and Welby C. Kuratek
312 Polpis Road Map: 20 Parcel: 46.2
Nantucket, MA 02554

Dear Commissioners:

I am writing on behalf of Robert C. and Welby C. Kuratek to request a Certificate of Compliance for the above referenced project. The lot is subject to an Order of Conditions recorded as L.C. Doc #161933, DEP File No. SE48-3202, issued on May 22, 2019. The Order of Conditions permitted the upgrade of an existing septic system to an I/A septic system with associated grading, landscaping and utility installation within the buffer zone to a Bordering Vegetated Wetland.

The work outlined in the Order of Conditions has been completed within substantial compliance of the order.

Thank you for your attention to this matter.

Sincerely,

Paul J. Santos, PLS
Nantucket Surveyors, LLC

Enclosures

- Sewage Disposal System I/A Upgrade at #312 Polpis Road in Nantucket, MA, Dated 12/10/18, Revised 11/27/19 As-Built
- Board of Health Certificate of Compliance Issued 1/19/2020
- One (1) filing fee check to Town of Nantucket for $25.00

Cc: Robert C. and Welby C. Kuratek

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

WPA Form 8A – Request for Certificate of Compliance

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

DEP File Number:

Provided by DEP

A. Project Information

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

Upon completion of the work authorized in an Order of Conditions, the property owner must request a Certificate of Compliance from the issuing authority stating that the work or portion of the work has been satisfactorily completed.

1. This request is being made by:

Robert C. and Welby C. Kuratek
Name

312 Polpis Road
Mailing Address

Nantucket — City/Town
MA — State
02554 — Zip Code

508-560-1976
Phone Number

2. This request is in reference to work regulated by a final Order of Conditions issued to:

Robert C. and Welby C. Kuratek
Applicant

5/22/2019 — Dated
SE48-3202 — DEP File Number

3. The project site is located at:

312 Polpis Road — Street Address
Nantucket — City/Town
MA — Assessors Map/Plat Number
20/46.2 — Parcel/Lot Number

4. The final Order of Conditions was recorded at the Registry of Deeds for:

Same As Applicant
Property Owner (if different)

Nantucket — County
Book
Page

22605
Certificate (if registered land)

5. This request is for certification that (check one):

☒ the work regulated by the above-referenced Order of Conditions has been satisfactorily completed.

☐ the following portions of the work regulated by the above-referenced Order of Conditions have been satisfactorily completed (use additional paper if necessary).

☐ the above-referenced Order of Conditions has lapsed and is therefore no longer valid, and the work regulated by it was never started.

A. Project Information (cont.)

6. Did the Order of Conditions for this project, or the portion of the project subject to this request, contain an approval of any plans stamped by a registered professional engineer, architect, landscape architect, or land surveyor?

   ☒ Yes — If yes, attach a written statement by such a professional certifying substantial compliance with the plans and describing what deviation, if any, exists from the plans approved in the Order.

   ☐ No

B. Submittal Requirements

Requests for Certificates of Compliance should be directed to the issuing authority that issued the final Order of Conditions (OOC). If the project received an OOC from the Conservation Commission, submit this request to that Commission. If the project was issued a Superseding Order of Conditions or was the subject of an Adjudicatory Hearing Final Decision, submit this request to the appropriate DEP Regional Office (see http://www.mass.gov/eea/agencies/massdep/about/contacts/find-the-massdep-regional-office-for-your-city-or-town.html).

161933

2019 00161933
Cert: 22605 Doc: OOC
Registered: 06/05/2019 10:24 AM

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

WPA Form 5 – Order of Conditions

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40
And the Town of Nantucket Wetlands Bylaw Chapter 136

Provided by MassDEP:
SE48-3202
MassDEP File #

eDEP Transaction #

Nantucket
City/Town

A. General Information

1. From: Nantucket
Conservation Commission

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

3. To: Applicant:

Robert C. and Welby C. — a. First Name
Kuratek — b. Last Name
c. Organization
312 Polpis Road — d. Mailing Address
Nantucket — e. City/Town
MA — f. State
02554 — g. Zip Code

4. Property Owner (if different from applicant):

Same as Applicant — a. First Name
b. Last Name
c. Organization
d. Mailing Address
e. City/Town
f. State
g. Zip Code

5. Project Location:

312 Polpis Road — a. Street Address
Nantucket — b. City/Town
20 — c. Assessors Map/Plat Number
46.2 — d. Parcel/Lot Number

Latitude and Longitude, if known: 41.301100 N — d. Latitude; 70.00061W — e. Longitude

FINDINGS and ADDITIONAL CONDITIONS

Massachusetts Wetlands Protection Act (MGL Chapter 131, Section 40)
Town of Nantucket Wetlands Bylaw (Chapter 136)

Address:	312 Polpis Road
Assessor's Map and Parcel:	20-46.2
Property Owner:	Robert C. and Welby C. Kuratek
Applicant:	Robert C. and Welby C. Kuratek
DEP File Number:	SE48-3202
Filing Date:	May 3, 2019
Date Hearing Closed:	May 22, 2019
Date Orders Issued:	May 22, 2019
Plan of Record Information:	Sewage Disposal System I/A Upgrade, dated December 10, 2018 and stamped by Dale MacKinnon, P.E.

Permit Overview:
This order permits the upgrade of an existing septic system to an I/A septic system with associated grading, landscaping and utilities within the buffer zone to bordering vegetated wetlands. Waivers are required for this project.

Additional Findings:

1. The area falls outside mapped habitat areas and does not require NHESP review.

In addition to the General Conditions contained elsewhere in this document, the Commission includes the following Special Conditions pursuant to MGLCh131s40 and the Town of Nantucket Wetlands Protection Bylaw, Chapter 136:

18. All work shall be performed in accordance with the Site and Work Description contained within the Notice of Intent and plan notes set out on the plan of record, provided project narratives, and protocols.
19. The Commission shall be provided copies of any reports on the system required by the Board of Health.
20. All non-vegetated slopes shall stabilized with biodegradable erosion fabric until vegetation establishes. All plantings associated with this project shall be native with no cultivars allowed.

WAIVERS UNDER THE NANTUCKET WETLANDS BYLAW/REGULATIONS
Waivers are required to Section 3.02 (B)(1) that proposed projects that are not water dependent shall maintain at least a 25-foot natural undisturbed area adjacent to vegetated wetlands and all structures which are not water dependent shall be at least 50 feet from a vegetated wetland and maintain an undisturbed two-foot separation to high groundwater. The Commission finds that given the current and historic site conditions that the project as proposed will provide a long-term net benefit to the resource area. Therefore the Commission grants a waiver under Section 1.03(F)(3)(c) of the Town of Nantucket Wetland Protection Regulations.

312 Polpis Road, Nantucket, MA
Applicant: Robert C. and Welby C. Kuratek

View of septic system looking west

View of septic system looking north

144-18

Commonwealth of Massachusetts
Board of Health
Town of Nantucket

Map-Block-Lot
2046.2

Permit No
BHP-2019-0364

FEE
$250.00

P.I. _____
F.I. _____

DISPOSAL WORKS CONSTRUCTION PERMIT

Permission is hereby granted ~~Holdgate Partners~~ T.C.E

to (Upgrade) an Individual Sewage Disposal System.

at No 312 POLPIS RD

as shown on the application for Disposal Works Construction Permit No. BHP-2019-036 Dated December 12, 2018

Issued On: Dec-12-2018 Expires 6/14/19

A.B. Crowley
Board of Health

14478

Commonwealth of Massachusetts
Board of Health
Town of Nantucket

Map-Block-Lot
2046.2

CERTIFICATE OF COMPLIANCE

THIS IS TO CERTIFY, That the Individual Sewage Disposal System (Upgrade)

by T.C.E. LLC
Installer

at No 312 POLPIS RD

has been installed in accordance with the provisions of TITLE 5 of the State Environmental Code as described in the application for Disposal Works Construction Permit No. BHP-2019-0364 Dated December 12, 2018

Printed On: Jan-09-2020

A.B. Crowley 1/9/2020
Board of Health

Agreement:

(1) The undersigned agrees to install the aforedescribed Individual Sewage Disposal System in accordance with the provisions of Title 5 of the State Sanitary Code.
(2) A representative of the Nantucket Board of Health shall be present at all percolation tests whenever possible. The undersigned agrees to notify a representative of the Nantucket Board of Health no less than 24 hours prior to performing the percolation test.
(3) A representative of the Nantucket Board of Health shall inspect the Individual Sewage Disposal System prior to covering. The undersigned agrees to notify a representative of the Nantucket Board of Health no less than 24 hours prior to covering the system.
(4) The undersigned further agrees not to place the system in operation until a Certificate of Compliance has been issued by the Board of Health.

Signed _____ 12/12/18
Date

Application Approved By A.B. Crowley 12/12/18
Date

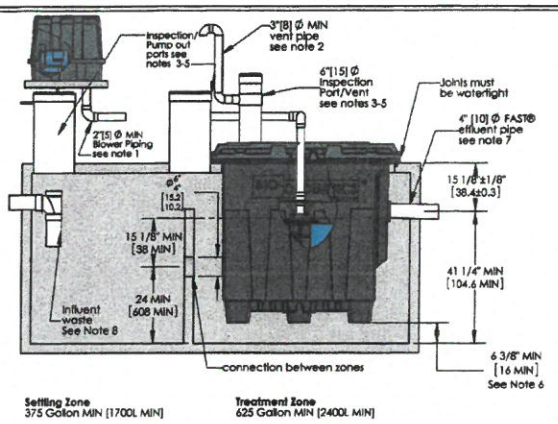
Application Disapproved for the following reasons: _____

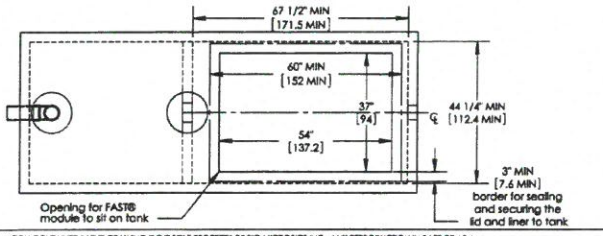
NOTES:

Issued 12/12/18
Date

Permit Expires 6/14/19

MicroFAST 0.5 TREATMENT UNIT TO REPLACE SEPTIC TANK





NOTES

1. Airline piping to FAST® may not exceed 100 FT [30m] total length and have a maximum of 4 elbows in the piping system. For distances greater than 100 FT [30m] consult factory. Blower must be located above flood levels on a concrete base 26" X 20" X 2" [65 X 50 X 5cm] min.
2. Vent to desired location and cover opening with a vent grate with at least 7 sq in.[45 sq. cm] open surface area. Secure with stainless steel screws. Vent piping must not allow condensate build up or create back pressure. Vent must be above finished grade or higher (see sheet 4 of 4).
3. All appurtenances to FAST® (e.g. tanks, access ports, electrical, etc.) must conform to all applicable country, state, province, and local plumbing and electrical codes. Pump out access shall be adequate to thoroughly clean out both zones.
4. All inspection, viewing and pump out ports must be secured to prevent accidental or unauthorized access.
5. Tank, piping, conduit, etc. are provided by others. Blower control system by Bio-Microbics, Inc. See Installation Manual.
6. If less than the specified minimums are considered necessary, consult factory for guidance.
7. All piping and ancillary equipment installed after FAST must not impede or restrict free flow of effluent.
8. The tank(s) shall be designed to prevent air passage between the settling zone/tank and the treatment zone and preventing an air lock. Examples include a baffle wall sealed to the lid or treatment zone inlet line with a pipe cap. Consult factory for guidance.
9. Installations using a FAST® system lid are capable of withstanding AASHTO H-10 equivalent loads. Any installation in which a FAST lid is buried deeper than 3 feet, or where additional loading conditions may occur, a professional engineer should be consulted. FAST® with feet option should be considered. Refer to installation Manual for more details.
10. Specialized treatment levels may require specific features to be incorporated into the design. Consult factory for guidance.

DO NOT SCALE
UNLESS NOTED DIMENSIONS ARE IN INCHES [CENTIMETERS] TOLERANCES ± 0.02 IN/IN [± 0.05 CM/CM]

BIO MICROBICS — BETTER WATER. BETTER WORLD.

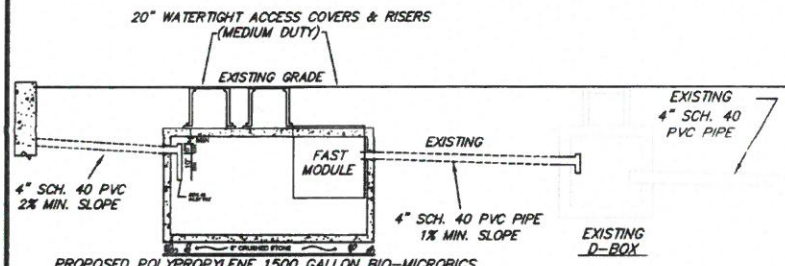
MicroFAST 0.5 FAST Unit

WEIGHT	lb	SIZE	DRAWING NUMBER	
		A	MicroFAST® 0.5 with lid	SHEET 1 OF 4
REVISED 7/18/2013		REV. INI-07-D		

	NAME	DATE
DRAWN	CTC	12/18/2006
CHECKED	PF	7/18/2013

THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF BIO-MICROBICS INC. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF BIO-MICROBICS INC. IS PROHIBITED. DESIGN AND INVENTION RIGHTS ARE RESERVED. IN THE INTEREST OF TECHNOLOGICAL ADVANCEMENT, ALL PRODUCTS ARE SUBJECT TO DESIGN AND OR MATERIAL CHANGE WITHOUT NOTICE.
BIO-MICROBICS © 2013

SEWERAGE SYSTEM PROFILE (not to scale)



AS-BUILT (NAVD 88) SCHEDULE OF ELEVATIONS

INVERT AT HOUSE	
INVERT INTO PROCESSOR TANK	21.94
INVERT EXIT PROCESSOR TANK	21.69
INVERT INTO D-BOX	21.45
INVERT EXIT D-BOX	21.35

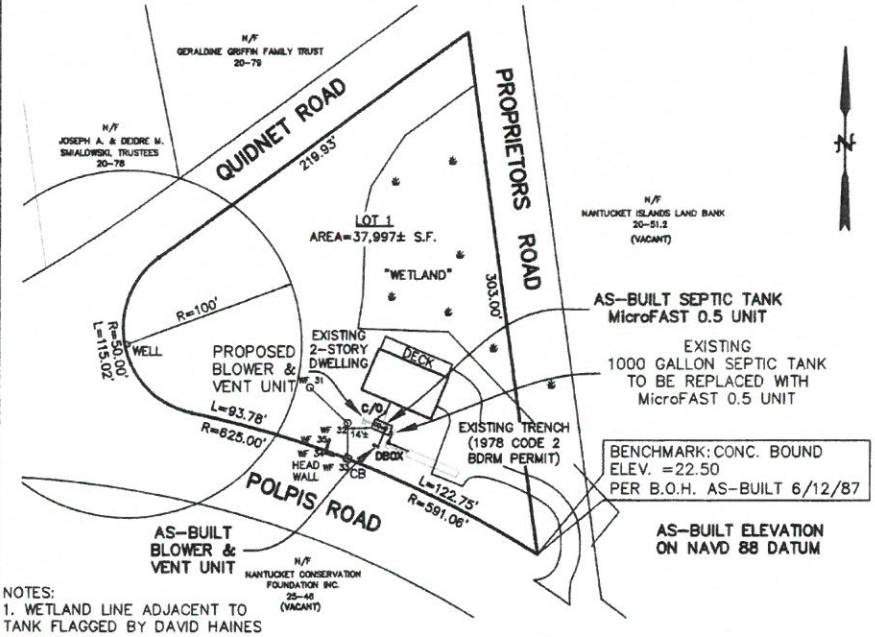
EXISTING SCHEDULE OF ELEVATIONS

INVERT AT HOUSE	23.63
INVERT INTO SEPTIC TANK	23.48
INVERT EXIT SEPTIC TANK	23.14
INVERT INTO D-BOX	23.12

NOTES

1. UPGRADE PURSUANT TO LOCAL REGULATION 64.03.B AND 64.04.F.2. SITE LOCATED IN NANTUCKET HARBOR WATERSHED PROTECTION DISTRICT, ZONE B.
2. ALL WORK SHALL COMPLY WITH THE MASSACHUSETTS ENVIRONMENTAL CODE TITLE 5 AND TOWN OF NANTUCKET BOARD OF HEALTH REGULATIONS.
3. PROCESSOR UNIT ACCESS COVERS SHALL BE BROUGHT TO GRADE USING APPROPRIATE RISER SECTIONS AND MANHOLE FRAMES WITH COVERS.
4. THE PROPOSED SEWAGE DISPOSAL SYSTEM HAS NOT BEEN DESIGNED TO ACCOMMODATE A KITCHEN GARBAGE GRINDER IN THE CONNECTED DWELLING.
5. MEASUREMENTS FOR RECORD PLANS (AS-BUILT) ARE REQUIRED BY THE NANTUCKET BOARD OF HEALTH. CONTRACTOR SHALL CALL NANTUCKET SURVEYORS,INC. AT 228-0240 BEFORE COVERING INSTALLED SYSTEM COMPONENTS.
6. CONTRACTOR SHALL CONTACT DIG-SAFE (1-800-344-7233) AT LEAST THREE WORKING DAYS PRIOR TO THE START OF CONSTRUCTION.
7. WORK REQUIRES A FILING WITH THE NANTUCKET CONSERVATION COMMISSION.
8. WETLAND RESOURCE AREA TO BE FLAGGED.

AS-BUILT ON-SITE SEWAGE DISPOSAL PLAN



NOTES:
1. WETLAND LINE ADJACENT TO TANK FLAGGED BY DAVID HAINES ON 12/19/18.
2. SEE ORDER OF CONDITIONS SE48-3202 LC DOC. #161933.
3. INSTALLER: T.C.E. LLC CONTRACTORS

LOT AREA=37,997±S.F.
SCALE: 1"=50'

ALTERNATIVE SEWAGE DISPOSAL SYSTEM

TRADE NAME OF TECHNOLOGY: MicroFAST TREATMENT SYSTEM
MANUFACTURER NAME: BIO-MICROBICS, INC.
MODEL NUMBER(S): MicroFAST 0.5
APPROVAL/CERTIFICATION DATE: FEBRUARY 12, 2013
MassDEP TRANSMITTAL NUMBER: X236074

COMMONWEALTH OF MASSACHUSETTS — PAUL J. SANTOS No. 36124 — PROFESSIONAL LAND SURVEYOR

11/27/19

SEWAGE DISPOSAL SYSTEM I/A UPGRADE

312 POLPIS ROAD

NANTUCKET, MASSACHUSETTS
(ASSESSOR'S 20, PARCEL 46.2)

PREPARED FOR:
ROBERT C. & WELBY C. KURATEK

DATE: DECEMBER 10, 2018 SCALE: AS NOTED
REVISED: MAY 15, 2019 WETLAND LINE ADDED
REVISED: NOVEMBER 27, 2019 AS-BUILT

NANTUCKET SURVEYORS, LLC
5 WINDY WAY, NANTUCKET, MA 02554

© 2018, NANTUCKET SURVEYORS, LLC | SHEET 1 OF 1 | N-10799

MAIN OFFICE:
49 Herring Pond Road
Buzzards Bay, MA 02532
TEL: (508) 833-0070
FAX: (508) 833-2282

BRACKEN ENGINEERING, INC.

NANTUCKET OFFICE:
19 Old South Road
Nantucket, MA 02554
TEL: (508) 325-0044
www.brackeneng.com

June 17, 2020

EMAIL & Hand Delivery

Nantucket Conservation Commission
2 Bathing Beach Road
Nantucket, MA 02554

Re: Certificate of Compliance Request
36 North Liberty Street
Map 41, Parcel 265
NAN-113

Dear Commission Members:

On behalf of the Applicant, Liberty Realty Trust, Janice C. Burke, TR enclosed with this letter is the WPA Form 8A, recorded OOC pages, Conservation As-Built plan dated 6/10/2020 and a check for $25.00 for the Bylaw filing fee.

The Order of Conditions issued on 10/30/2013 and extended to 10/30/2019 allowed for the construction of two additions on an existing dwelling, the construction of a porch, installation of a bulkhead and associated landscaping with the buffer zone to a vegetated wetland.

The only work completed was the removal of a portion of the house and deck. Also, a temporary stoop and stairs were added to the back of the house A new Notice of Intent will be filed to complete the original project. If you have any further questions, please do not hesitate to contact me at 508-325-0044 or don@brackeneng.com.

Sincerely,

Bracken Engineering, Inc.

Donald F. Bracken, Jr., P.E
President

Enclosures

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

WPA Form 8A – Request for Certificate of Compliance

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40 &
The Town of Nantucket Wetlands Bylaw Chapter 136

DEP File Number:

NAN-113
Provided by Nantucket

A. Project Information

1. This request is being made by:(current Title holder):

Liberty Realty Trust, Janice C. Burke, TR
Name

1 Lakewood Road
Mailing Address

Natick | MA | 01760
City/Town | State | Zip Code

508-325-0044 (Agent)
Phone Number

2. This request is in reference to work regulated by a final Order of Conditions issued to:

Janice Burke, Trustee, Liberty Realty Trust
Applicant

10/30/2013 | NAN-113
Dated | Nantucket File Number

Upon completion of the work authorized in an Order of Conditions, the property owner must request a Certificate of Compliance from the issuing authority stating that the work or portion of the work has been satisfactorily completed.

3. The project site is located at:

36 North Liberty Street | Nantucket
Street Address | City/Town

41 | 265
Assessors Map/Plat Number | Parcel/Lot Number

4. The final Order of Conditions was recorded at the Registry of Deeds for : (name on Order)

Liberty Street Realty Trust, Janice Burke
Property Owner (if different)

Nantucket | 1414 | 98
County | Book | Page

Certificate (if registered land)

5. This request is for certification that (check one):

☐ the work regulated by the above-referenced Order of Conditions has been satisfactorily completed.

☒ the following portions of the work regulated by the above-referenced Order of Conditions have been satisfactorily completed (use additional paper if necessary).

The only work completed was the removal of a portion of the house and deck. A temporary stoop and stairs were added to the back of the house

☐ the above-referenced Order of Conditions has lapsed and is therefore no longer valid, and the work regulated by it was never started.

A. Project Information (cont.)

6. Did the Order of Conditions for this project, or the portion of the project subject to this request, contain an approval of any plans stamped by a registered professional engineer, architect, landscape architect, or land surveyor?

☒ Yes — If yes, attach a written statement by such a professional certifying substantial compliance with the plans and describing what deviation, if any, exists from the plans approved in the Order.

☐ No

B. Submittal Requirements

Requests for Certificates of Compliance should be directed to the issuing authority that issued the final Order of Conditions (OOC). If the project received an OOC from the Conservation Commission, submit this request to that Commission. If the project was issued a Superseding Order of Conditions or was the subject of an Adjudicatory Hearing Final Decision, submit this request to the appropriate DEP Regional Office (see http://www.mass.gov/eea/agencies/massdep/about/contacts/find-the-massdep-regional-office-for-your-city-or-town.html).

2013 00003680
Bk: 1414 Pg: 98 Page: 1 of 15
Doc: OOC 11/21/2013 12:30 PM

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

WPA Form 5 – Order of Conditions

And the Town of Nantucket Wetlands Bylaw Chapter 136

Provided by MassDEP:
NAN-113
MassDEP File #

eDEP Transaction #

Nantucket
City/Town

A. General Information

1. From: Nantucket
Conservation Commission

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

3. To: Applicant:

Janice
a. First Name

Burke, Trustee
b. Last Name

Liberty Realty Trust
c. Organization

1 Lakewood Road
d. Mailing Address

Natick
e. City/Town

MA
f. State

01760
g. Zip Code

4. Property Owner (if different from applicant):

Same as applicant
a. First Name

b. Last Name

c. Organization

d. Mailing Address

e. City/Town

f. State

g. Zip Code

5. Project Location:

36 North Liberty Street
a. Street Address

Nantucket
b. City/Town

41
c. Assessors Map/Plat Number

265
d. Parcel/Lot Number

Latitude and Longitude, if known: d m s
d. Latitude

d m s
e. Longitude

FINDINGS and ADDITIONAL CONDITIONS

Town of Nantucket Wetlands Bylaw (Chapter 136)

Address:	36 North Liberty Street
Assessor's Map and Parcel:	41-265
Property Owner:	Liberty Realty Trust
Applicant:	Liberty Realty Trust
DEP File Number:	NAN-113
Filing Date:	September 25, 2013
Date Hearing Closed:	October 16, 2013
Date Orders Issued:	October 30, 2013
Plan of Record Information:	Proposed Site Plan, dated 9/25/2013, stamped by Donald F. Bracken, Jr., P.E.

Permit Overview:
This order permits two additions on an existing dwelling, the construction of a porch, installation of a bulkhead and associated landscaping within the buffer zone to a vegetated wetland. Waivers are required for this project.

Additional Findings:

1. The area falls outside mapped habitat areas and does not require NHESP review.
2. The commission finds that this project is only within local jurisdiction.

In addition to the General Conditions contained elsewhere in this document, the Commission includes the following Special Conditions pursuant to MGLCh131s40 and the Town of Nantucket Wetlands Protection Bylaw, Chapter 136:

18. All work shall be performed in accordance with the Site and Work Description contained within the Notice of Intent and plan notes set out on the plan of record, provided project narratives, waiver requests and protocols.
19. No permanent dewatering is allowed by this Order.

WAIVERS UNDER THE NANTUCKET WETLANDS BYLAW/REGULATIONS

Waivers are required from Section 3.02(B)(1) that all structures shall maintain an undisturbed two-foot separation to high groundwater. The Commission finds that the project as designed and the provided soils information that the project as proposed will not adversely impact the resource areas in question. The Commission also finds that there are no reasonable alternatives that allow the project to go forward. Therefore, the Commission grants a waiver under Section 1.03(F)(3)(a) of the Nantucket Wetland Protection Regulations.

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

WPA Form 7 – Extension Permit for Orders of Conditions

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

DEP File Number: NAN-113
Provided by DEP

A. General Information

2018 00003506
Bk: 1674 Pg: 63 Page: 1 of 2
Doc: EP 12/06/2018 02:26 PM

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

1. Applicant:

Janice C. Burke, Trustee - Liberty Realty Trust
Name

1 Lakewood Road
Mailing Address

Natick | MA | 01760
City/Town | State | Zip Code

2. Property Owner (if different):

Same As Applicant
Name

Mailing Address

City/Town | State | Zip Code

B. Authorization

The Order of Conditions (or Extension Permit) issued to the applicant or property owner listed above on:

10/30/2013 (Date) Issued by: Nantucket Conservation Commission

for work at: 36 North Liberty Street (Street Address) | 41 (Assessor's Map/Plat Number) | 265 (Parcel/Lot Number)

recorded at the Registry of Deeds for:

Nantucket (County) | 1414 (Book) | 98 (Page)

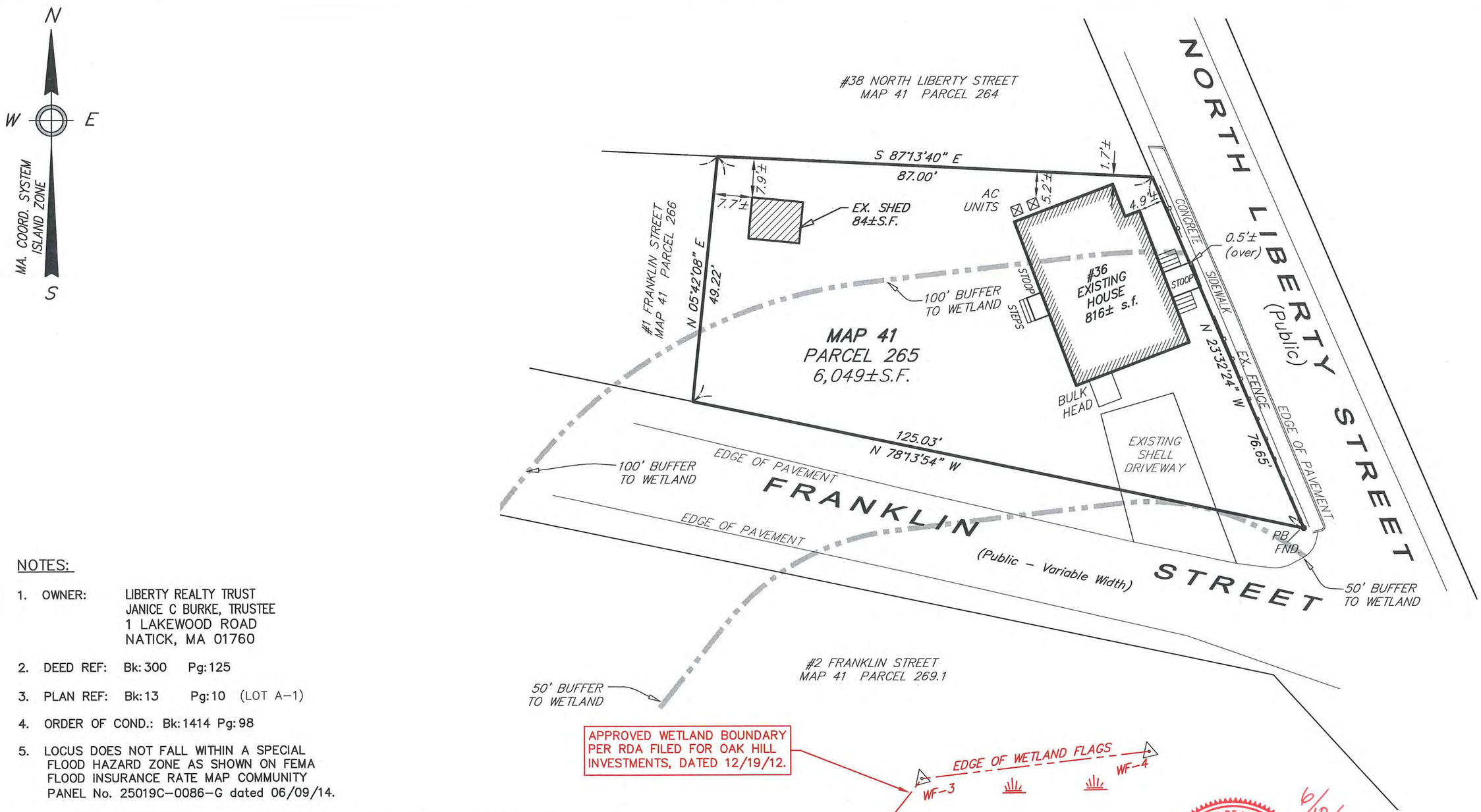
Certificate (if registered land)

is hereby extended until: 10/30/2019 (Date) | 8/9/2017 (Bk 1605, Pg 224) (Date the Order was last extended (if applicable))

This date can be no more than 3 years from the expiration date of the Order of Conditions or the latest extension. Only unexpired Orders of Conditions or Extension may be extended.

This Extension Permit must be signed by a majority of the Conservation Commission and a copy sent to the applicant and the appropriate DEP Regional Office (http://www.mass.gov/dep/about/region/findyour.htm)

Signatures: | Date: 11/07/2018



NOTES:

1. OWNER: LIBERTY REALTY TRUST
   JANICE C BURKE, TRUSTEE
   1 LAKEWOOD ROAD
   NATICK, MA 01760
2. DEED REF: Bk: 300 Pg: 125
3. PLAN REF: Bk: 13 Pg: 10 (LOT A–1)
4. ORDER OF COND.: Bk: 1414 Pg: 98
5. LOCUS DOES NOT FALL WITHIN A SPECIAL FLOOD HAZARD ZONE AS SHOWN ON FEMA FLOOD INSURANCE RATE MAP COMMUNITY PANEL No. 25019C–0086–G dated 06/09/14.

PLAN SCALE

0 4 8 12 16 20 30 40 60

1 inch = 20 feet

COMMONWEALTH OF MASSACHUSETTS
ALAN M GRADY
No. 37732
PROFESSIONAL LAND SURVEYOR

6/10/20

BRACKEN ENGINEERING, INC.

49 HERRING POND ROAD
BUZZARDS BAY, MA 02532
(tel) 508.833.0070
(fax) 508.833.2282

19 OLD SOUTH ROAD
NANTUCKET, MA 02554
(tel) 508.325.0044
www.brackeneng.com

CONSERVATION FINAL AS–BUILT PLAN

IN NANTUCKET, MA

Prepared for:

LIBERTY REALTY TRUST

#36 NORTH LIBERTY STREET
MAP 41 PARCEL 265

Date:	Drawn:	Checked:
JUNE 10, 2020	ERC/BEI	AMG/DFB

S:\Autocad Drawings\Nantucket\North Liberty Street\36 North Liberty Street\36 North Liberty– FAB ConCom.dwg

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

WPA Form 8A – Request for Certificate of Compliance

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

DEP File Number:
SE48-3121
Provided by DEP

A. Project Information

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

1. This request is being made by:(current Title holder):

Silver Fox Partners Real Estate, LLC
Name

191 Fairfield Beach Road
Mailing Address

Fairfield | CT | 06824
City/Town | State | Zip Code

Phone Number

2. This request is in reference to work regulated by a final Order of Conditions issued to:

Dan Morris & Karen Smith
Applicant

10/19/2018 | SE48-3121
Dated | DEP File Number

Upon completion of the work authorized in an Order of Conditions, the property owner must request a Certificate of Compliance from the issuing authority stating that the work or portion of the work has been satisfactorily completed.

3. The project site is located at:

235 Madaket Road | Nantucket
Street Address | City/Town

59.4 | 364
Assessors Map/Plat Number | Parcel/Lot Number

4. The final Order of Conditions was recorded at the Registry of Deeds for : (name on Order)

same
Property Owner (if different)

Nantucket | 1
County | Page

Certificate (if registered land)

5. This request is for certification that (check one):

X☐ the work regulated by the above-referenced Order of Conditions has been satisfactorily completed.

☐ the following portions of the work regulated by the above-referenced Order of Conditions have been satisfactorily completed (use additional paper if necessary).

☐ the above-referenced Order of Conditions has lapsed and is therefore no longer valid, and the work regulated by it was never started.

A. Project Information (cont.)

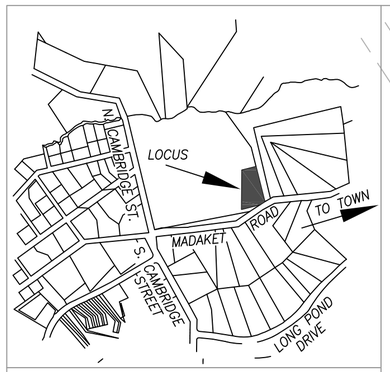
6. Did the Order of Conditions for this project, or the portion of the project subject to this request, contain an approval of any plans stamped by a registered professional engineer, architect, landscape architect, or land surveyor?

   X☐ Yes If yes, attach a written statement by such a professional certifying substantial compliance with the plans and describing what deviation, if any, exists from the plans approved in the Order.

   ☐ No

B. Submittal Requirements

Requests for Certificates of Compliance should be directed to the issuing authority that issued the final Order of Conditions (OOC). If the project received an OOC from the Conservation Commission, submit this request to that Commission. If the project was issued a Superseding Order of Conditions or was the subject of an Adjudicatory Hearing Final Decision, submit this request to the appropriate DEP Regional Office (see http://www.mass.gov/eea/agencies/massdep/about/contacts/find-the-massdep-regional-office-for-your-city-or-town.html).

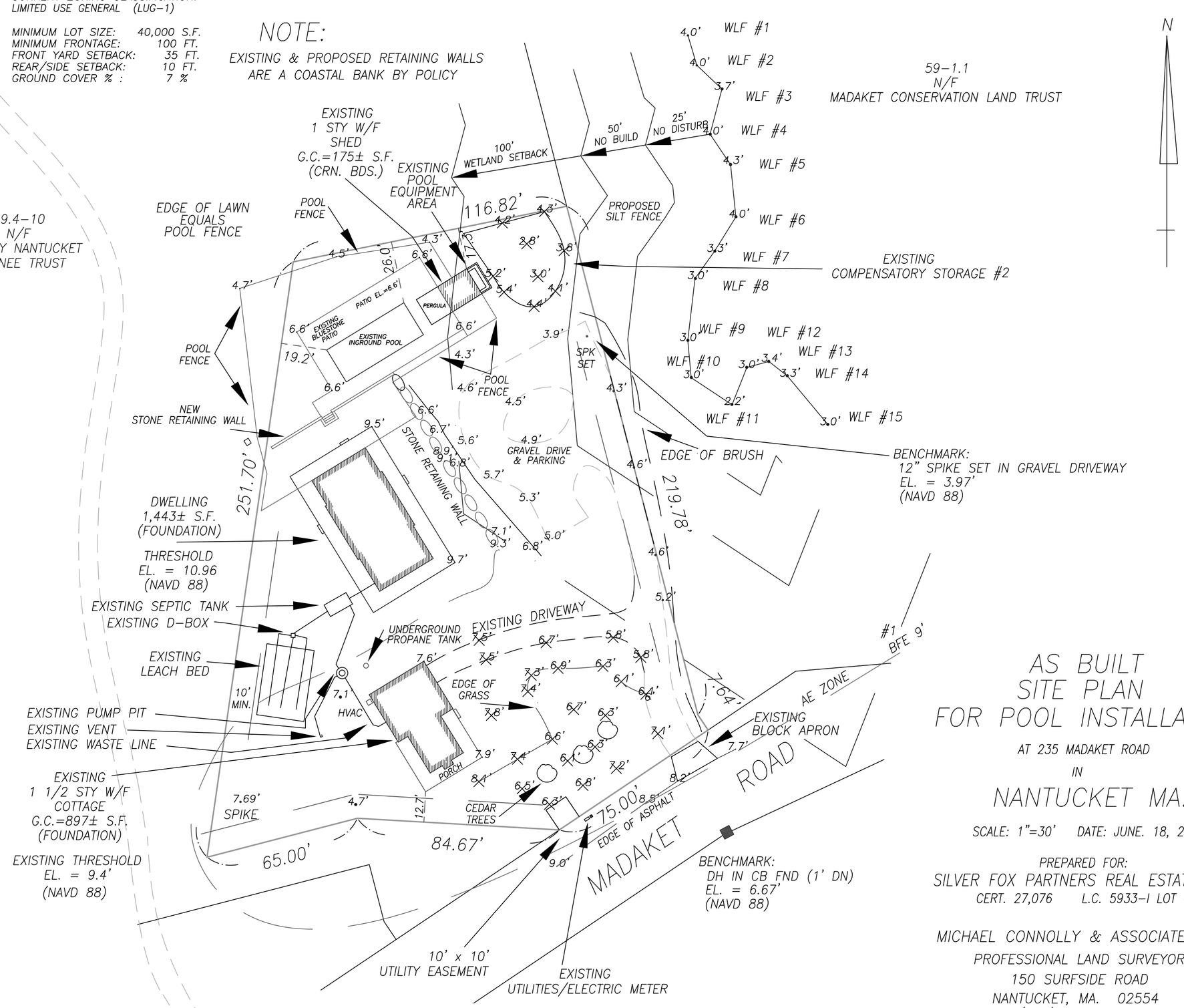


LOCUS MAP SCALE: 1" = 800'±

CURRENT ZONING CLASSIFICATION:
LIMITED USE GENERAL (LUG-1)

MINIMUM LOT SIZE:	40,000 S.F.
MINIMUM FRONTAGE:	100 FT.
FRONT YARD SETBACK:	35 FT.
REAR/SIDE SETBACK:	10 FT.
GROUND COVER % :	7 %

NOTE:
EXISTING & PROPOSED RETAINING WALLS ARE A COASTAL BANK BY POLICY



ALL ELEVATIONS ARE NAVD 88 DATUM

ALL ELEVATIONS ARE EXISTING ELEVATIONS

PROPOSED CONSTRUCTION IS IN FEMA ZONE AE, BFE 9'

JULY 1, 2015
EXISTING SCHEDULE OF ELEVATIONS (NAVD 88)

INVERT EXIT FOUNDATION: 6.63
INVERT INTO PUMP PIT: 5.44
INVERT EXIT PUMP PIT: 5.56 (2" PRESSURE LINE)
INVERT INTO SIDE SEPTIC TANK: 7.24 (4" AFTER COUPLING)

WETLAND DELINIATION
BY
HAINES HYDROGEOLOGIC CONSULTING

AS BUILT SITE PLAN FOR POOL INSTALLATION

AT 235 MADAKET ROAD
IN
NANTUCKET MA.

SCALE: 1"=30' DATE: JUNE. 18, 2020

PREPARED FOR:
SILVER FOX PARTNERS REAL ESTATE, LLC
CERT. 27,076 L.C. 5933-I LOT 4

MICHAEL CONNOLLY & ASSOCIATES, INC.
PROFESSIONAL LAND SURVEYORS
150 SURFSIDE ROAD
NANTUCKET, MA. 02554
(508) 228-8910

GRAPHIC SCALE
30 0 15 30 60 120
(IN FEET)
1 inch = 30 ft.

ASSESSOR MAP 59.4 PARCEL 364

C-7823

CONSERVATION COMMISSION
PUBLIC MEETING

2 Bathing Beach Road
Nantucket, Massachusetts 02554
www.nantucket-ma.gov
Thursday, June 11, 2020 – 5:00 p.m.

This meeting was held via remote participation using ZOOM and YouTube,
Pursuant to Governor Baker's March 12, 2020 Order Regarding Open Meeting Law

Commissioners: Ashley Erisman (Chair), Ian Golding (Vice Chair), David LaFleur, Joe Topham, Seth Engelbourg, Maureen Phillips, and Mark Beale

Called to order at 5:00 p.m. by Ms. Erisman
Staff in attendance: Jeff Carlson, Natural Resources Director; Joanne Dodd, Natural Resources Coordinator
Attending Members: Erisman, Golding, LaFleur, Topham, Engelbourg, Phillips, Beale
Absent Members: None
Late Arrivals: None
Earlier Departure: None
Agenda adopted by unanimous consent

*Matter has not been heard

I. PUBLIC MEETING
A. Announcements
B. Public Comment – None

II. PUBLIC HEARING
A. Notice of Intent
1. Chuckrow Nominee Trust – 25 Quaise Road (26-12) SE48-3241

Sitting: Erisman, Golding, LaFleur, Topham, Engelbourg, Phillips, Beale
Documentation: Site and topographical plans, photos, requisite departmental reports and correspondence.
Representative: Art Gasbarro, Nantucket Engineering & Survey
Steven Cohen, Cohen & Cohen Law P.C.
Public: R.J. Turcott, Nantucket Land Council, Inc.
Rick Atherton

Discussion (5:06) **Gasbarro** – This is for the repair/installation of a sheet bulkhead in front of a failing timber bulkhead. Reviewed supplemental information addressing questions and concerns: will agree to a time-of-year restriction on work between April 1 and Aug 31; Chapter 91 requiring maintenance of a licensed structure; steel piles will disturb beach and bank less than anchors and tiebacks. Explained why this couldn't support a living shoreline. speaking about why this is the best project here. Doesn't think the proposed will have an adverse impact on the protected area. There is a pile of rock on the Quaise Road layout and we think the extension is limited in size and will prevent flanking at that end. This proposal is not atypical to other approved projects; we expect to be held to a similar set of standards and conditions.

Engelbourg – The presentation hits on items of discussion. He didn't see the analysis of the option to relocate the structure.

Gasbarro – There are other structures, septic systems, and wells on a limited-sized property; there isn't much alternative for relocating the structure.

Engelbourg – Another thing he'd hope would be considered is since we are at the easterly end of a structure; instead of replacing the bulkhead in the current location, moving it back and installing a hybrid project in front. Explained the benefits of such a hybrid project.

Gasbarro – It goes back to the same alternatives we've looked at. There is the chance we'd destabilize the bulkhead to the west. Moving back would mean moving the top of the bank back toward the structure, which is only about 36 feet away and is a pre-1978 structure. There is a bordering vegetated wetland to the west on the property line. We have a license and a permit for the structure in its current location.

Golding – He's sympathetic to Mr. Engelbourg's argument. The high tide is lapping 2 feet up the bulkhead. He doesn't think the Chapter 91 license is valid; it was predicated on this being beyond the high-tide line. He wants Town Counsel's opinion on that. Easy Street is not a good comparison; this is a different situation.

Erisman – She appreciates the alternative analysis. We need to look at living shorelines and hybrids more seriously. These projects are changing the banks. Since this was installed, the bank's retreat has been impeded. With this next to Nantucket Islands Land Bank property, it's the best place for a living shoreline. She can't see permitting the extension, which is new construction not covered in the Chapter 91 license.

Topham – He went through the math for the required pitch for a living shoreline; it would obliterate the wetland. Any restoration of the wetland would then cut into Land Bank property. There is no way but to walk in front of the house. He has issues with the extension except that it would be access to the path easement.

PROPOSED

He sees an issue with denying this and the impact on Easy Street and Hulbert Avenue. We have a problem coming; the shoreline is linked, and we have to come up with a standard.

Golding – The consistency should be protecting what we're charged to protect, which is the beach. He really wants an opinion form Town Counsel regarding the limitation of the Chapter 91 license.

Beale – He's concerned with the end scouring on Land Bank property; with a rebuild and rising water it will get worse. Asked if there is a way to mitigate that.

Gasbarro – We are dealing in an environment of low wave-energy. You are seeing the retreat of the unprotected shoreline. Wherever you stop a stabilized bank, there will be a point of end scour. Doesn't think that impact will be worse than a naturally retreating shoreline. Feels installing a fiber-roll array would cause greater disturbance.

Engelbourg – He respects the point about consistency; however, it is in our regulations to consider a more environmentally friendly project as these applications come in. Regarding the extension, he can't see how it's permittable. The representative's point is that it creates a stop on the property they have control over; without that, he wonders if the bulkhead will function as intended; therefore, he questions if the entire project is permissible.

Gasbarro – We have to do something. If we don't, the timber bulkhead will fail and fall apart, causing debris.

Phillips – This is difficult; she tried to make a list of pros and cons. It's difficult; there is the feasibility of doing this in a narrow space and building something new could be very difficult to do. Also taking it out has concerns in how that would be done. If we approve this, this is not to be looked upon as a precedent. Appreciates the alternative analyses. If we were to approve this, it would have to be noted as an exception and make it clear we require robust alternative analyses.

Beale – It's not clear to him from the photo and plans what specifically is the extension.

Gasbarro – It's about 37 feet long from the current terminus. The easement requires that stabilized access point.

Golding – He's absolutely opposed to the extension, which requires a waiver; would like to see a soft solution for that. Reiterated that he wants Town Counsel's opinion on this.

Carlson – He can file for Town Counsel's opinion if that is what the Commission wants.

Erisman – We have many agreements for that. She also doesn't think we can grant the extension and a softer solution would be best for that.

Cohen – The idea that the Chapter 91 is no long valid doesn't make sense to him; but he's okay for a continuance to seek a legal opinion on that. The commission's vigilance on ensuring replacements are environmentally friendly is good but that might not work here. The solution has to be practical. You could approve the extension as a water-dependent use that doesn't require a waiver; you have three examples of that. Asked for a 2-week continuance to allow Mr. Gasbarro time to research requests and for Town Counsel to provide an opinion.

Engelbourg – He'd like the living shoreline

Turcott – This is a significant return not covered under grandfather laws.

R.Atherton – It seems there ought to be a way to integrate concerns about the extension and what the Town is doing at the end of Quaise Road. There could be shared responsibility to minimize scouring.

Motion — Continued to June 23rd.

Roll-call Vote — N/A

2. *Croquet Pitch, LLC – 24 West Chester Street (42.4.3-57) SE48- 3305

Sitting — Erisman, Golding, LaFleur, Topham, Engelbourg, Phillips, Beale

Documentation — Site and topographical plans, photos, requisite departmental reports and correspondence.

Representative — Art Gasbarro, Nantucket Engineering & Survey

Public — None

Discussion (5:54) — **Gasbarro** – Seeking to construct an addition and extend a porch within the buffers to bordering vegetated wetland and isolated vegetated wetland. The addition is designed to avoid the 50-foot buffer. On the back of the smaller structure, there's an existing covered porch they want to enclose; that's within the 50-foot buffer. There's no expansion of footprint but he's requested a waiver. He has a revised plan in response in concerns expressed by an abutter; would move the dewatering area to the west side of the property: hay bales with silt fence. Will create a raingarden to uptake some water. Another aspect of the project is the waiver from 2-foot separation from groundwater; went to shallow footing, which will sit on gravel. Shared the revised plan on screen.

Engelbourg – In relation to the waiver request; he thinks it should be amended to include the raingarden work within the 25-foot buffer. Asked if helical piers rather than slab were considered.

Gasbarro – For sites that have helical piers supporting living space, a slab is poured on top of that the piers. In this case if you go to the piers or pilings, your joists would be right at grade and the piers would go into the groundwater as well.

Erisman – This property was redeveloped about 5 years ago. Wonders if the Commission needs an analysis of the change between the 25- and 50-foot buffers. There is already extensive development between three wetlands, and it is continuing. She doesn't think it should be further developed.

Carlson – He vaguely recalls if a reassessment was done; would have to pull the permit; he can get that information.

PROPOSED

Topham – Maps said the original structure was built in 1967 but extensive revisions were more recently done.
Phillips – Her concern is the groundwater issue; the case seems to be cramming additional structures on this last bit on this site.
Golding – He wonders if the GIS card is accurate.
LaFleur – He'd also like to see what was done most recently. Appreciates Mr. Gasbarro's plan to minimize the foundation impact on the groundwater.
Topham – Also appreciates the foundation design. He feels they are squeezing the last out this lot and giving nothing back. The resource area will be under extreme stress.
Gasbarro – The driveway, lawn, and edge of disturbance hasn't changed since 2003. There is some infill but asked the owners to consider since it is being balanced to respect the 50-foot buffer. The project has been designed to meet ConCom regulations.
Phillips – Asked about the patio material in front of the porch that will be covered. Asked if the patio material could be changed to something more permeable.
Gasbarro – It is dry-laid bluestone
Topham – We have about 1000 square feet (SF) in the 25- to 50-buffers; going forward we are putting a lot of impact on the resource areas within and adjacent to this property. We should get something back.
Gasbarro – He will get more information. Asked for a 2-week continuance.

Motion: Continued to June 23rd.
Roll-call Vote: N/A

3. Nantucket Point of View, LLC – 9 Lincoln Avenue (30-137) SE48-3278 **(Cont. 06/25/2020)**
4. *62 Cliff Road Realty Trust – 62 Cliff Road (41-20) SE48-3306

Sitting: Erisman, Golding, LaFleur, Topham, Engelbourg, Phillips, Beale
Documentation: Site and topographical plans, photos, requisite departmental reports and correspondence.
Representative: Brian Madden, LEC Environmental
Public: None
Discussion (6:14): **Madden** – This involves an addition replacing an existing deck within the 50-foot buffer and largely within the 25-foot buffer. Access will occur within the 25-foot buffer on existing lawn area. Requested a waiver. We are proposing helical pier support for the 233-SF addition. Best management practices will be incorporated and erosion control barriers on the back lawn. We are working within the existing footprint.
Erisman – Asked if water can flow through the decking as it is currently constructed.
Madden – The boards are very tight.
Erisman – She doesn't like transitioning open decks to closed living space; given where it's located, she can't allow this.
Other commissioners agree with Ms. Erisman.
Madden – Asked for specific concerns relative to adverse impact; asked Staff if it is general practice when working within an existing footprint.
Erisman – Walls bring windows closer to the wetland; as a deck, there is some run through and the roof causes a different runoff pattern.
Topham – Agrees with Ms. Erisman. This would be problematic for this wetland.
Golding – This is an example of classic mission creep.
Carlson – The Commission has allowed for structural conversion; however, they must still meet performance standards and waiver. Part of the existing wetland is in lawn; the wetland is partially developed with a fence running through it.
Madden – Asked for a 2-week continuance.

Motion: Continued to June 23rd
Roll-call Vote: N/A

5. Kim Glowacki – 46 Easton Street (42.4.1-22) SE48-3285 **(Cont. 06/25/2020)**

PROPOSED

B. **Amended Order of Conditions**

1. 11 Meadow Lane, LLC – 11 Meadow Lane (41-448.1) SE48-3093

Sitting Erisman, Golding, LaFleur, Topham, Engelbourg, Phillips, Beale
Documentation Site and topographical plans, photos, requisite departmental reports and correspondence.
Representative Paul Santos, Nantucket Surveyors
Public None
Discussion (6:23) **Santos** – This is to remove invasive vines between 25- and 50-foot buffer to a bordering vegetated wetland. Agreed to a condition to no work or alteration within the 50-foot setback; we'll treat is as no disturb zone. Vines will be hand-pruned and removed.
Engelbourg – Asked the species of the invasive vine and the estimated acreage of area to be removed.
Santos – He has no answer; there are two clumps – one about 20-foot square and the other a little large engulfing cedar trees.
Engelbourg – He's all for removing invasive vines but wants to ensure they are truly invasive rather than a aggressive native plant.
Carlson – He hasn't been to the site; he can go look.
LaFleur – We would want to know what's going to be cut and a measured area.
Santos – We're in the early stages of landscaping. He can provide the species type and measure the area. Asked for a 2-week continuance
Motion Continued to June 23rd.
Roll-call Vote N/A

III. PUBLIC MEETING

C. Certificates of Compliance

1. The Constance K. Cheever Revocable Trust – 23 Monomoy Road (54-205) SE48-3061

Sitting Erisman, Golding, LaFleur, Topham, Engelbourg, Phillips, Beale
Staff No comments
Discussion (6:29) **Don Bracken**, Bracken Engineering – There were questions about the roof plan; we removed the roof infiltration plan. Submitted as-built plan, everything is in compliance. All roof runoff will be absorbed with none going toward the wetland. Described how runoff would be contained.
Erisman – She still has concerns about there being no underground drainage. Any runoff into the driveway will pick up chemicals off the cars. She doesn't want to count on the Town catch basin at the end of the driveway.
Bracken – He thinks 90% will be absorbed by the driveway since the roof area is very small. He sees no sense in changing the style of the structure by adding gutters.
Topham – If you put in a downspout, it concentrates the water, which can also be problematic.
Motion **Motion to Issue.** (made by: Topham) (seconded)
Roll-call Vote Carried unanimously//Beale, Engelbourg, Erisman, Golding, LaFleur, Phillips, and Topham-aye

2. 46 Shimmo Pond Road Nominee Trust – 46 Shimmo Pond Road (43-77) SE48-3037

Sitting Erisman, Golding, LaFleur, Topham, Engelbourg, Phillips, Beale
Staff We check this site regularly; recommend the cert be issued with on-going conditions 19, 20, 21, 22, 23, & 25.
Discussion (6:35) **Art Gasbarro**, Nantucket Engineering & Survey – This was a residential redevelopment; work is in substantial compliance.
Motion **Motion to Issue with on-going conditions as recommended.** (made by: LaFleur) (seconded)
Roll-call Vote Carried unanimously//Beale, Engelbourg, Erisman, Golding, LaFleur, Phillips, and Topham-aye

D. Minor Modifications

1. Hannah Gardner House, LLC – 6 Gull Island Lane (42.4.3-61) SE48-3236

Sitting Erisman, Golding, LaFleur, Topham, Engelbourg, Phillips, Beale
Documentation Site and topographical plans, photos, requisite departmental reports and correspondence.
Representative Jeff Blackwell, Blackwell & Assoc.
Discussion (6:39) **Jeff Blackwell**, Blackwell & Assoc. – Reviewed the Notice of Intent. This is to add 63 SF to the previous footprint, no closer than 60+ feet to the wetland.
Staff Recommend issue
Motion **Motion to Issue as a minor modification.** (made by: Beale) (seconded)
Roll-call Vote Carried unanimously//Beale, Engelbourg, Erisman, Golding, LaFleur, Phillips, and Topham-aye

E. Orders of Condition

1. None closed

F. Extension Requests

1. 43 West Chester Street Realty Trust – 43 West Chester Street (41-231) SE48-2987

Sitting Erisman, Golding, LaFleur, Topham, Engelbourg, Phillips, Beale
Documentation Draft Order of Conditions
Staff They haven't started work; seeking three 1-year extensions
Discussion (6:43) None
Motion **Motion to Issue the three 1-year extensions.** (made by: LaFleur) (seconded)
Roll-call Vote Carried unanimously//Beale, Engelbourg, Erisman, Golding, LaFleur, Phillips, and Topham-aye

PROPOSED

2. Town of Nantucket – 8 Sesachacha Road (21-20) SE48-2967

Sitting Erisman, Golding, LaFleur, Topham, Engelbourg, Phillips, Beale
Documentation Draft Order of Conditions
Staff They completed some work but have to do more to keep monitoring components going. Asking for three 1-year extension
Discussion (6:44) None
Motion **Motion to Issue the three 1-year extensions.** (made by: Topham) (seconded)
Roll-call Vote Carried unanimously//Beale, Engelbourg, Erisman, Golding, LaFleur, Phillips, and Topham-aye

3. Lisa & Simon J. Van Den Born – 135 Wauwinet Road (11-12) SE48-2961

Sitting Erisman, Golding, LaFleur, Topham, Engelbourg, Phillips, Beale
Documentation Draft Order of Conditions
Staff Asking for a 1-year extension. Mostly done and the permit expires in July.
Discussion (6:45) None
Motion **Motion to Issue the 1-year extension.** (made by: Beale) (seconded)
Roll-call Vote Carried unanimously//Beale, Engelbourg, Erisman, Golding, LaFleur, Phillips, and Topham-aye

G. Other Business

1. Approval of Minutes 5/28/2020:

Motion **Motion to Approve as drafted.** (made by: Phillips) (seconded)
Roll-call Vote Carried unanimously//Beale, Engelbourg, Erisman, Golding, LaFleur, Phillips, and Topham-aye

2. Enforcement Order: 8 Sesachacha Road

Sitting Erisman, Golding, LaFleur, Topham, Engelbourg, Phillips, Beale
Representative Sarah Alger, Sarah F. Alger P.C. for 45 Quidnet Road
Discussion (6:49) **Carlson** – The abutter to the improved property at 8 Sesachacha did work and plantings on Town Land; that work was not covered by a permit and wouldn't be permissible. We would like to allow work to be fixed under the existing permit and issue the Enforcement Order to the person who did the work and watering.

Alger – Her client is really upset this happened; the property restoration was their $12,000 gift to the Town with bamboo and other invasive species eradication and appropriate planting, and it was doing great. Then someone, who is a Town employee, went in and destroyed all the work to include removing at least one mature tree. The police we called, and they issued a citation. After that criminal citation, the person continued to water and plant, erected a fence, and added a bench. We've had someone provide an estimate on the repair work, $18,500. Her client would like some restitution to be required.

Golding – Asked why Ms. Alger's client didn't file a case of criminal trespass with triple damages.

Alger – She was told that since the property is Town land, criminal charges fall with the Town and her client has no standing.

Carlson – We inquired how to pursue the matter; he's waiting to hear back. Wants the enforcement issued to the person who did the work. Will do a certified mailing and hand deliver a Cease and Desist stating we are seeking damage on behalf of the Town.

Erisman – We need that property owner to come before us.

Engelbourg – This is an egregious violation. The Cease and Desist is a good start. Would like to know what additional fines the Town could impose and to follow with criminal proceedings. There was a wetland violation here and we need to issue fines.

Carlson – We have the police report against a specific individual; that helps document the violations.

Topham – He'd like to issue a bill for the repairs. He's frustrated someone would do this.

Erisman – This speaks to wide-spread trespass; people don't check their property boundaries and assume it is theirs; however, this person went knowingly into property that wasn't theirs.

Carlson – The Town told that individual that what was permitted was going in. The work was done to improve the person's view.

Phillips – Asked who is the Town employee did the work.

Carlson – Charles Johnson did the work; he resides at 8 Sesachacha Road.

Golding – This leads into our discussion on how to increase the fines. It would help if this were front-page news.

Consensus agrees with Mr. Golding.

Alger – Once the police told him it was criminal vandalism, he didn't stop but continued work.

Motion **Motion to Issue the Enforcement Order to Charles Johnson at 8 Sesachacha Road.** (made by: LaFleur) (seconded)
Roll-call Vote Carried unanimously//Beale, Engelbourg, Erisman, Golding, LaFleur, Phillips, and Topham-aye

PROPOSED

3. Discussion of SBPF – 87-105 Baxter Road (48-Various) SE48-2824- Template Maintenance

Sitting Erisman, Golding, LaFleur, Topham, Engelbourg, Phillips, Beale
SBPF Reps Dwight Dunk, Epsilon Associates Inc.
Steven Cohen, Cohen & Cohen Law P.C.
Public None
Discussion (7:03) **Carlson** – They had commenced the cleanup at 85 Baxter Road to bring the area into a greater level of compliance. The 1st step was to regrade with existing material; 2nd step clean up; 3rd step was to deliver Polpis Harbor dredge material. We inspected the delivery area at 85 Baxter and debris was removed. There will probably more debris will free from the bank and it is being monitored. Recommend allowing the Polpis Harbor dredging to be delivered. Regarding future nourishment, we need to put the criteria as an agenda item; we need to ensure material is in compliance.

Dunk – Nothing to add.

Carlson – You made a motion to allow them to go forward at the last meeting. This was just an update and no additional action is necessary.

Motion No Action necessary
Roll-call Vote N/A

4. Discussion of SBPF – 77-122 Baxter Road SE 48-1659; SBPF – 65-67 Baxter Road SE48-1602

Sitting Erisman, Golding, LaFleur, Topham, Engelbourg, Phillips, Beale
SBPF Reps Dwight Dunk, Epsilon Associates Inc.
Steven Cohen, Cohen & Cohen Law P.C.
NETCO Rep Dave Lager, NETCO
Public Burton Balkind
Discussion (7:09) **Carlson** – During the whole sand delivery, there was concern that debris made it down to the project to the south through the shared delivery point. Mr. Lager is on the phone to understand the sensitivity of the area and Commission concerns.

Erisman – We have NETCO who did the dumping and SBPF who holds the permit.

Lager – In the past 20 years, we've only used sand from Toscana and Holdgate. We've never had issues with that sand; the certificates are on file. We will be extremely diligent to ensure no debris makes it down the beach to the other property.

Topham – He's surprised no one was on site at that time from the company to say the sand was incompatible. This is the 3rd infraction in three years. You need to have someone on site full time to see what's going on and to stop the truck from delivering if the sand is not compatible. The last NETCO project was unpermitted for 4X4 along the bank; you know we're here. You need to take control of this; get the knowledge from SBPF. He's appalled this keeps happening from your company.

Golding – Asked what enforcement options are available.

Carlson – The issue is the older permits don't have the same level of reporting as current permits. This started because the delivery area became a hodge-podge of material that was being moved around with no reporting. Material was getting moved from 85 Baxter to the north and to the south. We lumped in all the projects using that common delivery site.

Golding – He doesn't understand why we can't level the same enforcement on NETCO as we on SBPF. He feels the original permitting didn't say they could dump polluted sand. Also, he's very disturbed that in our meeting of December 11, 2019, Mr. Dunk and Mr. Steven Cohen, Cohen & Cohen Law P.C. as the permit holder, sidestepped the issue of NETCO. He wants to charge NETCO so we can be more exacting.

Carlson – The permits are held by SBPF and are related to the property owners, not NETCO. The second issue is the coir logs are mostly uncovered, which has occurred during the season. That material needs to go back.

Erisman – We need to figure out the fining potential. Moving forward, NETCO is going to have to follow the template sand protocol we come up with. Given their track record we can't give them the go-ahead to deliver sand.

Engelbourg – In the older permits, there is still the requirement for clean fill. Asked to enforce on the basis of that.

Carlson – Current conditions and documentation is that the material was being shared; we could easily document debris on the geotubes because it was on top of the tubes. At the same time, material that went south has washed away so we don't have that information.

Lager – The normal nourishment timeframe is April to June; most property owners don't want sand placed in the winter due to the heavy storms. At this point in time, asked the specific instances where debris was found in the area south of the geotubes.

Carlson – We did an inspection late last year and recovered debris in the project area and along the route-of-travel south from the delivery area. He will get the photos of the debris to everyone.

Topham – If the sand is gone and the tubes are exposed, sand needs to go on them; it is what the beach needs and the littoral system needs. It is not up to the property owners when sand goes on the tubes. Mr. Lager is working under a different set of rules.

PROPOSED

Lager – The basis of the permit 15-20 years ago was that the sand nourishment would equal average annual erosion. As he understands it, the amount of sand the owners are required to place is equal to erosion as established by the Coastal Zone Management Council. He can't do work not approved by the owners.
Carlson – SE48-1669 requires them to place 5,000 cubic yards (CY) per year.
Dunk – In June 2019, there was a report of material being delivered. Mr. Carlson met with Jamie Feeley and there were no deliveries after Feb 19, 2019; they resumed in Autumn 2019.
Golding – Read into the record, comments made on December 11, 2019 regarding responsibility for sand delivery and sand source. Asked why Mr. Dunk and Mr. Cohen didn't say they were the primary permit holders and that NETCO was responsible to them
Cohen – At the time we didn't know the permit was issued in SBPF's name. The legally responsible party is the person who owns the real estate, not the name on the permit. SBPF has no contractual obligation with NETCO. On the geotube project, SBPF is responsible on behalf of the Town and property other owners.
Erisman – Asked if Mr. Cohen saw the information in the packet; there is a life agreement between SBPF and the Town which indicates SBPF is responsible for these permits.
Engelbourg – The permit states how much sand must be provided; if they don't do that, they are not in compliance. The applicant agreed to the conditions regardless the cost. Asked if there is a seasonality to sand mitigation requirement.
Carlson – The only restriction is time-of-year from April to Labor Day for nesting shorebirds; that can be overcome with permission or notification from a shoreline biologist.
Engelbourg – Thinks ConCom should ensure the shoreline biologist is in place.
Topham – His client came to us; we gave them permission; they haven't met the requirements. He's happy with SBPF's response in what's going on with NETCO. NETCO needs to sit down with Mr. Carlson to find out what's going wrong and how to correct it. He's really infuriated at NETCO's attitude that they don't want to do that. If they go into failure criteria, the project will have to be removed.
Golding – Asked Mr. Carlson to get an opinion from Town Counsel on Mr. Cohen's response; it is a question of holding NETCO responsible for their behavior.
Engelbourg – He disagrees with Mr. Cohen's opinion that SBPF isn't responsible.
Phillips – Her question is who is responsible. She disagrees with Mr. Cohen; SBPF as the applicant and in the license agreement, SBPF is the responsible party. She also believes NETCO is an agent of SBPF; it is SBPF's responsibility to ensure they do the job right. We should not just focus on NETCO, we need to be clear with Mr. Cohen and Mr. Dunk that SBPF has been the leading and known party.
Lager – SBPF has been around since the late 1990s and Epsilon has been involved most of that time. SBPF was the permitting entity for almost all properties along Baxter Road. Our role is we are agents of the property owners and SBPF. He didn't recall the 5,000 cubic yards but he will tell the property owners it is a requirement. There have been multiple sources for sand, and it is unfair to accuse NETCO of all the debris. Argues that sand delivery has been in excess of 5,000 cubic yards and he has the receipts to support that.
Erisman – We aren't saying NETCO is the reason for the debris; we've been at SBPF for several months about that. This is your first meeting with us and Mr. Lager
Topham – He doesn't see the ConCom process any different from any other regulatory board; the foreman should have the approval to ensure everything is being done according to the permit. For him, it's infuriating what is being done to Nantucket and the coastal bank and the littoral system; he's frustrated Mr. Lager shows up and doesn't know what is required.
Erisman – We need to focus on the wetland resource and how to make it better. We need to get to the root of who has the permit and who is doing the work and move forward to make it better.
Cohen – SBPF is 100% on board with the work to ensure all the debris and contaminants were removed and working with NETCO to ensure meeting the standards. The ability to clean up the site has been done.
Balkind – In June when he brought the debris samples to the Commissioner, there was wire, plastic, and construction debris all in the sand. Another point is it wasn't just Toscana or Holgate; it was Valero truck that delivered the sand. There needs to be a chain of custody. We documented the extent of the soil dropped off in June. Everyone needs to see what we were talking about.
Atherton – He appreciates Mr. Lager's refreshing approach. There's an easy way to move forward. All parties agree new standards are needed. All parties involved should have a good clear record of deliveries and chain of custody, so we don't have to speculate. Staff could have asked for that information months ago; for some reason it didn't happen.
Erisman – We should get tickets on all coastal projects.
Carlson – He wants ConCom to get to a point where we have a level playing field for everyone to put an end to finger pointing. We are relying on random inspections and citizen reports. We have 3,306 NOIs on Nantucket for which we are responsible. In an ideal world, it would all come from the same sand source, but that isn't realistic given the quantity of material required. We need to work toward consistent standards for nourishment projects; it isn't as simple as a permit holder but requires a regulatory change. It will take time to get that done.
Engelbourg – On the logistical side, asked if there is an additional level of oversight to ensure the sand delivered meets requirements.
Carlson – They still have to meet the standards set out in the Order of Conditions.

PROPOSED

Lager – He has sand delivery and coir repair scheduled for Mr. Posner and the Darby residents.
Golding – There is a moratorium on sand delivery; he sees no reason to let NETCO go forward.
Balkind – He'd like a shoreline biologist present for any sand delivery since Piping Plovers are nesting.
Carlson – The nests are far enough away; once the fledglings hatch, the distance increases. From D Anne Atherton, if SBPF won't take responsibility for the south tubes, the Town should be notified.
Erisman – Agrees the Town should be brought up to date with what's going on.
Atherton – He hopes we don't leave the meeting with a minimal expectation. It would be helpful to have delivery information from NETCO and SBPF before the next meeting.
Phillips – Mr. Atherton's idea is good. We're short of facts which are not in dispute and on dates of deliveries and who is involved. We don't have a clear idea of who is responsible; Mr. Pucci should look into that.
Erisman – Mr. Pucci should be present at the next discussion of this.
Topham – He'd like to see the handwritten delivery reports from the delivery truck drivers.
Golding – We've only been getting tickets for the project for which SBPF claims responsibility.
Lager – He can provide delivery tickets from Toscana and Holgate.
Carlson – Once we get the tickets, we can put it into a spreadsheet. We should keep this active since we are looking for Town Counsel's opinion. If necessary, we can change the title of the discussion.
Golding – We should hold NETCO to the same level of supervision as we do SBPF. If we are allowing, they should have the same protocol that every delivery is examined.
Erisman – Agrees with Mr. Golding: the name of who will be on site and who we should call if there is a complaint.
Carlson – He'd appreciate that for all site, not just these two.
Discussion about who and how to inspect sand deliveries.

Motion Continued to June 23rd.
Roll-call Vote N/A

5. Reports:
   a. None
6. Commissioners Comment
   a. **Phillips** – Annual Town Meeting is scheduled for 5 p.m. June 25th.
      Carlson – There is consensus for a 1 pm meeting.
   b. **Golding** – Wants to discuss legal opinions on enforcement fines and ticketing and getting an enforcement officer. He'd like ConCom to write a letter to the Select Board requesting a full-time enforcement officer.
      Topham – It would be great to get enforcement fines in order.
      Engelbourg – The Wetlands Protection Act states a violator would be fined $2500.
      Carlson – We keep a list of enforcements; he'll send that off to the commissioners. It is up to a police officer to issue a criminal complaint. Tracking enforcement is a Town-wide issue; other departments have the same problem as Natural Resources. He will draft a letter for the Board's review. That ticket for $2500 comes from the State.
7. Administrator/Staff Reports
   a. Town elections are on June 16th.

H. Adjournment

Motion **Motion to Adjourn at 8:35 p.m.** (made by: Phillips) (seconded)
Roll-call Vote Carried unanimously//Beale, Engelbourg, Erisman, Golding, LaFleur, Phillips, and Topham-aye

Submitted by:
Terry L. Norton

PROPOSED

Joanne Dodd

From: danneatherton@comcast.net
Sent: Tuesday, June 2, 2020 8:28 AM
To: Joanne Dodd; Jeff Carlson
Subject: COMMENTS RE ORDERS OF CONDITIONS SE48-1659 AND SE48-1602
Attachments: Response to ConCom 5.28.20 Meeting w-attachments.pdf

TO: MEMBERS OF THE CONSERVATION COMMISSION, ADMINISTRATOR CARLSON

FROM: D. ANNE ATHERTON/NCC COORDINATING COMMITTEE

RE: COMMENTS RE ORDERS OF CONDITIONS SE48-1659 AND SE48-1602 (PERMITS FOR SOFT INSTALLATIONS ON PUBLIC BEACH BELOW THE BLUFF)

RESPONSE RE ASSERTIONS MADE BY SBPF ATTORNEY AT MAY 28, 2020 MEETING

Please see attached letter with attachments.

We would like to submit this document (14 pages) as part of the official record.

We respectfully request that this communication and attachment be forwarded to members of the Commission right away, as it contains information that may be helpful for consultation with Town Counsel.

We also ask that it be made part of the submission regarding this matter that has been continued until the June 11 regular meeting.

We would appreciate receiving an acknowledgement that this message and attachment have been received and forwarded directly to members of the Commission.

Thank you, Jo and Jeff.

D. Anne
for the
NCC Team

ATTACHMENT: PDF DOCUMENT/14 PP

This email was scanned by Bitdefender

NANTUCKET COASTAL CONSERVANCY | to preserve and protect nantucket's natural beaches

June 1, 2020

Dear Chair Erisman, Members of the Commission, and Administrator Carlson:

We thank you for addressing matters related to the Orders of Conditions SE48-1659 and SE48-1602 issued to The Siasconset Beach Preservation Fund (SBPF) originally in 2004 and 2007 respectively. By our rough calculations, the erosion projects (terracing comprised of sand-filled fabric bags and vegetation) permitted by these Orders are currently installed on about 1500 linear feet of the public beach below the bluff in Sconset (south of the geotubes). **The June 2019 delivery of unclean sediment to the beach for these projects is, and continues to be, of great concern to many citizens**.

Of even greater concern are the statements made during the meeting on May 28 by attorney Steven Cohen for SBPF in regard to his client's responsibility as the holders of these permits. As even a cursory review of contemporary press accounts and the record indicate, Mr. Cohen's assertions were **factually incorrect**. **They cannot be allowed to stand**.

Despite the fact that the orders and all subsequent amended orders and extensions were issued to SBPF, Mr. Cohen claimed that "these are not SBPF permits." He stated that his client's role was simply one of an "organizing tool" for the individual property owners. His statements that, "None of this work has ever been done by SBPF. SBPF has never contracted with, and doesn't currently contract with NETCO, or it doesn't supervise any of it," were flat-out wrong.

We support your consulting with Town Counsel, as you intend to do. Perhaps the following information will be helpful to him as well as to you.

· SBPF TOOK PUBLIC RESPONSIBILITY FOR TERRACING PROJECTS AS EARLY AS 2006

There is evidence in the record as early as 2006 that SBPF took full responsibility for the terracing installations and in fact directly contracted with NETCO for services. [See attached, "Tougher conditions set for Sconset bluff work," The Nantucket Inquirer and Mirror, April 27, 2006.] To quote from the letter sent to the Commission by then SBPF Executive Director Cheryl Bartlett in response to an apparent violation (as reported in the paper):

> Once notified of this situation [illegal work being performed on the terracing project] SBPF did an internal evaluation of the situation and discovered that our independent contractor [NETCO] for these activities was operating outside the directions from the organization [SBPF] to ensure compliance with all permitting requirements. It appears workers were left unsupervised and continued to work with out an adequate supply of sand for nourishment and terrace work, she wrote. "**On behalf of the [SBPF] board, please accept my sincere regrets for this violation**," Bartlett concluded. [Emphasis added.]

The article went on to list new conditions for which SBPF was to be responsible.

· CONCOM IMPOSED MORE STRINGENT CONDITIONS ON THE TERRACING PROJECTS FOLLOWING STORM EVENTS IN SPRING OF 2007, PROVIDING FURTHER EVIDENCE OF SBPF'S TAKING RESPONSIBILITY FOR THE INSTALLATIONS

Following a series of severe weather events in the spring of 2007, including the infamous "Patriots Day Storm," the **terracing projects in Sconset collapsed**, causing 4x4 posts and jute bags to wash up on beaches around the island and thus creating public-safety issues and marine hazards. There was a huge public outcry.

The ConCom, questioning the "safety and effectiveness of [the] bluff terracing," imposed a number of more stringent conditions on the project. [See attached article, "ConCom questions safety and effectiveness of bluff terracing," The Nantucket Inquirer and Mirror, June 14, 2007.] To quote the article: "As part of the Order of Conditions for the extended permit, SBPF will be **heat-branding the initials 'SBPF' on all pieces of wood and branding all the jute fabric with orange stitching running through it as it can be easily identified**."

In addition, SBPF representatives attorney Bill Hunter and Epsilon Associates consultant Mark Rits appeared before the Commission and reported that to avoid having such a collapse happen in the future the project had been modified in a number of ways.

· LICENSE NEGOTIATED BETWEEN THE TOWN AND SBPF IN DECEMBER, 2008 FULLY DOCUMENTS SBPF RESPONSIBILITIES FOR THE TERRACING PROJECTS

Apparently, the Town and SBPF negotiated a new (or revised) license for the use of the Town-owned beach land below the bluff for the terracing projects. **The terms of the license (dated December 30, 2008) clearly stated the expectations of the licensor (the Town, the property owner) and the extent of the obligations the licensee (SBPF) agreed to in exchange for the use of the Town property.** [See attached for copy of the license relating property "seaward" from 77 to 122 Baxter Road. There is a second license pertaining to property "seaward" from 65 to 75 Baxter Road that is essentially the same.]

Note that the first provision of the license agreement states: The Licensor hereby grants to the Licensee a non-exclusive license to enter upon the Land and **to erect, install and maintain the herein described Work/Construction Activities upon the Land**, subject to the following specified terms and conditions. [Emphasis added.] This document makes clear the expectation that SBPF would be responsible for all "Work/Construction Activities" associated with the projects. (The Amended Order of Conditions 1659 and 1602 are attached to the license, providing additional detail of the "Work/Construction Activities.")

In provision #4, SBPF also agreed to accept "complete liability for the actions or omissions of [the] Licensee [SBPF], its contractors, agents, representatives, employees and assignees while present on the Land in connection with the license granted hereby." In addition, SBPF agreed to maintain public liability insurance with comprehensive coverage during the installation and maintenance of the Work/Construction.

And finally, a letter dated December 12, 2008 from Attorney Hunter to the then Board of Selectmen further outlined the "tasks and obligations" SBPF agreed to undertake in entering into the license agreement. Those tasks and obligations include: revisions to the terracing projects, most notably limitations on the use of wood that caused such danger when the project collapsed; the removal of the defunct beach de-watering project; securing an easement from the owner of 65 Baxter Road to formalize public access and egress from the Bluff Walk to Baxter Road; and, finally, the payment of $7500. to the Town to defray the legal costs of reviewing "the License matters."

IN CLOSING

Attorney Cohen's statements to the Commission that "these [Orders of Conditions 1659 and 1602] are not SBPF permits" and that his client's role in the terracing projects was simply one of an "organizing tool" are blatantly contradicted by the facts. Such assertions should be unacceptable to the Commission and should be noted as such in the record of these proceedings.

We agree that the contractor (NETCO) should be held accountable for the delivery (and use) of unclean material in violation of the Orders of Conditions that require that only clean fill be used. However, as the holder of the permits, SBPF should also be held responsible for any and all actions that are in violation of these Orders of Conditions (including the use of unclean fill).[1] **SBPF has clear primary responsibility**.

Further, we believe that the **Commission should inform the Town**, as the main property owner and licensor, of what has transpired in this matter: namely, that SBPF, through its attorney, has claimed it has no responsibility for these terracing projects, in apparent violation not only of the Orders of Conditions, but also of the License Agreements, which, it should be noted, expired on December 22, 2010, ten years ago.

Sincerely,

D. Anne R. Atherton
for the
NCC Coordinating Team

ATTACHMENTS (4)

I&M Article, "Tougher conditions set for Sconset bluff work," April 27, 2006.

I&M Article, "ConCom questions safety and effectiveness of bluff terracing," June 14, 2007, 2pp.

License Agreement, Town of Nantucket and SBPF, 77 to 122 Baxter Road, December 30, 2008.

Letter from William F. Hunter, Esq. to the Board of Selectmen, December 12, 2008, 2 pp.

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[1] A close review of the conditions contained in the Orders of Condition may reveal that there are additional violations (non-compliance with reporting requirements, non-compliance with stipulating a responsible party, etc.) that should also be addressed by the Commission.

Tougher conditions set for Sconset bluff work

By Joshua Balling and Joel Silverstein
I&M Staff Writers

Citing activities outside the approved scope of its project, Nantucket Conservation Commission administrator Dirk Roggeveen earlier this month ordered the Sconset Beach Preservation Fund to stop anti-erosion work on the bluff in Sconset.

On April 5, the ConCom allowed the project to move forward, but only if the SBPF agreed to even stricter conditions than were previously set.

"They came into the commission meeting on Wednesday. They apologized, explained what had happened, the commission discussed it, and put a whole bunch of conditions on the project so it could move forward. The agreement now represents what the commission ordered them to do," Roggeveen said after the meeting. "It's operational again, but with new conditions."

According to ConCom technical consultant Peggy Fantozzi, she, Roggeveen and a commission member recently observed workers stockpiling beach sand and using it to fill bags they were using to build a terrace to buttress the bluff below Baxter Road on the east end of the island.

"Of course," Fantozzi said, "that violates their order (of conditions). It was supposed to be sand that was brought in from an approved off-site source."

Roggeveen agreed.

"It's really more supervision than anything. I'm not sure the workers were being properly communicated to. Many of them don't speak English. They have to understand they are not allowed to take sand from the beach."

The ConCom approved the project in February 2004.

In a letter to Roggeveen dated March 30, SBPF executive director Cheryl Bartlett attributed the illegal work to workers being left unsupervised.

"Once notified of this situation, SBPF did an internal evaluation of the situation and discovered that our independent contractor for these activities was operating outside the directions from the organization to ensure compliance with all permitting requirements. It appears workers were left unsupervised and continued to work without an adequate supply of sand for nourishment and terrace work," she wrote.

"On behalf of the board, please accept my sincere regrets for this violation," Bartlett concluded.

SBPF has communicated with David Lager, president of NETCo, the company responsible for the violation, and expressed its concern, Bartlett said.

Among other things, the new conditions stipulate that:

- The SBPF must open 90 bags filled with beach sand used to buttress the base of the coastal bank and replace the sand on the beach below.
- SBPF "shall create a document drafted in both Spanish and English that recites the various rules, regulations and obligations under which employees of SBPF, or its agents and/or contractors, must conduct themselves when performing work allowed under the Orders."
- SPBF "shall ensure that a bilingual foreman is on the beach, or close by at the top of the coastal bank, at all times employees are performing work allowed under the orders. Work shall cease if the foreman is not available and shall not commence until such time as the foreman is present to oversee the work."
- "In an effort to guarantee a sufficient supply of contributed sand to the beach, SBPF shall increase its standing order for delivery of sand from a frequency of every two weeks to every 10 days."

ConCom questions safety and effectiveness of bluff terracing

By Margaret Carroll-Bergman
I&M Staff Writer

With more than 30 percent of the anti-erosion wood terracing along the face of Sconset Bluff washed away during the April 16 "Patriot's Day" storm, Nantucket Conservation Commission members are questioning the safety and the effectiveness of the beach preservation project in the wake of not one, but two nor'easters since March.

"Wouldn't this be called a failure where 30 percent was removed?" asked commissioner Sarah Oktay.

The permits for the bluff-terracing project, which is a crude forerunner to the larger Sconset Beach Preservation Fund (SBPF) plan to mine 2.6 million cubic yards of sand off Sankaty Head and dump it along a three-mile stretch of beach, were extended for another 18 months in February with the caveat that as the sandbags made out of coir fiber — the husks of coconut shells — give out, that they be replaced by larger jute bags which are stitched together and anchored by steel cables and posts in the sand.

> ***"Wouldn't this be called a failure when 30 percent was removed?"***
>
> *Sarah Oktay*
> *ConCom*

"One of my concerns is that we've put a lot of material into the near-shore environment and it is not sufficient in protecting the homes," said Oktay, the director of the UMass-Boston Nantucket Field Station in Quincy.

Oktay also [illegible] that the data provided by SBPF engineers was insufficient to determine whether the terracing had protected the bluff and beach against storm events.

Mark Ritz, SBPF project scientist from Epsilon Associates, said 863,000 linear feet of coir fabric and 250 to 325 wooden posts were washed out to sea.

"That amount is quite significant," said Oktay. "How much of that did you physically recover?"

Ritz was unable to give a linear amount of fabric and

EROSION, PAGE 9A

Erosion

(Continued from page 1A)

the number of posts, saying that he could give the amount of the debris in truckloads or weight.

As part of the Order of Conditions for the extended permit, SBPF will be heat-branding the initials "SBPF" on all pieces of wood and branding all the jute fabric with orange stitching running through it so it can be easily identified.

Ritz said the engineers are implementing a new reporting system to recover what had been lost, including measuring pieces of fabric as the jute is recovered.

Sconset Beach Preservation Fund officials submitted a post-storm report on May 17, 2007, as required, and filed a second report addressing Conservation Commission questions.

ConCom chair woman Virginia Andrews expressed concern that large chunks of the bluff fell off during the April storm and questioned if that was due to water collecting within the terracing.

"We don't think the rainfall in the April storm caused the slumping. The sand in the terraces is beach sand and water percolates through it," said Ritz. "Prior to the March storm, the wooden boards on the side of the terracing were removed, leaving only the front boards."

William Hunter, attorney for SBPF, said the new design, which was permitted in February, has 25 to 30 percent less wood and 70 percent less fabric.

"We are hoping, based on the new design, less material will be broadcast into the system," said Hunter.

The wood and the jute from the April 16 storm traveled around the island with debris being reported on Coatue, Hummock Pond, Great Point, and the bulk of it washing up in Sconset and Codfish Park.

Edith Ray, an island bird expert, said that as the rice bags unraveled in the ocean, they wrapped around other marine debris, such as roping, fishing lines and deck chairs, creating big balls of material which either floated around in the water or washed up on the beach.

"One of my concerns is often it (the debris) gets buried before it can be found and is uncovered during another storm," said Andrews.

Conservation Commission Administrator Dirk Roggeveen reminded commissioners that their enforcement powers did not extend into public safety.

"Conservation commissions are not public-safety agencies," said Roggeveen. "We are focused on protecting the natural environment."

Oktay said, "We can't permit a project that is harmful to human life. We would not voluntarily permit something that could be dangerous."

The SBPF will be coming before the Conservation Commission in the next couple of weeks to discuss the amended Order of Conditions for the extended permit and was asked to provide more detailed information about the terracing project and how it has stemmed or contributed to the erosion along the beach.

LICENSE AGREEMENT

THIS LICENSE AGREEMENT, dated the 30th day of December, 2008, by and between TOWN AND COUNTY OF NANTUCKET, a political subdivision of The Commonwealth of Massachusetts, having its principal office at 16 Broad Street, Nantucket, Massachusetts 02554 (the "Licensor") and the SIASCONSET BEACH PRESERVATION FUND, INC., a duly organized Massachusetts not-for-profit corporation with a mailing address of Post Office Box 966, Siasconset, Massachusetts 02564 (the "Licensee").

WITNESSETH

WHEREAS, the Licensor is the owner of record of a certain parcels of land located seaward of Baxter Road, Siasconset, Nantucket Town and County, Massachusetts ("Sankaty Beach") between 77 Baxter Road and 122 Baxter Road and more particularly described on Exhibit "A" attached hereto (hereafter referred to as the "Land");

WHEREAS, the Licensee has constructed and desires to maintain coastal bank toe protection on Sankaty Beach, requiring landscaping activities that include filling and placing of jute bags against the toe of a coastal bank and beach/bank sand nourishment and associated Beach/Bank nourishment activities upon the Land ("Work/Construction Activities"), such activities conducted pursuant to the provisions of WPA Form 5-Amended Order of Conditions SE 48-1659 issued by the Nantucket Conservation Commission, as amended and extended as more particularly described in Paragraph 6(e), below;

WHEREAS, the general location of the herein described Work/Construction Activities is depicted on Exhibit "B" attached hereto (the "Land"); and

WHEREAS, the Licensor desires to grant to the Licensee a revocable license in accordance with the terms hereof.

NOW, THEREFORE, in consideration of the mutual covenants contained herein, and the payment of other consideration, the receipt and sufficiency of which is hereby acknowledged, the parties hereby enter into a license agreement upon the terms and conditions set forth herein.

1. Grant of License. The Licensor hereby grants to the Licensee a non-exclusive license to enter upon the Land and to erect, install and maintain the herein described Work/Construction Activities upon the Land, subject to the following specified terms and conditions. The parties expressly agree that this License granted to the Licensee shall be revocable by the Licensor at will; provided, however, that in any event this License shall terminate no later than February 13, 2010.

2. Permitted Use. The rights of this License shall be exercised by the Licensee or its designee solely for the erection, installation, maintenance, repair and reconstruction of the herein described Work/Construction Activities (the "Purpose") upon the Land, subject to the terms and conditions hereof.

3. License Fees. In consideration for the use of this License, the Licensee agrees to pay the Licensor a one-time License Fee of One Dollar ($1.00).

4. Indemnification; Bond. The exercise of this License shall constitute the Licensee's acceptance of complete liability for the actions or omissions of Licensee, its contractors, agents, representatives, employees and assignees while present on the Land in connection with the license granted hereby.

SBPF shall maintain public liability insurance with coverage for bodily injury, wrongful death and property damage during the installation and maintenance of the Work/Construction Activities as described herein in the amount of one million ($1,000,000.00) dollars per occurrence and two million ($2,000,000.00) dollars cumulative and shall deposit a certificate of insurance with the Town of Nantucket prior to the exercise of this License by the Licensee.

5. The Licensee shall defend, indemnify and hold harmless the Licensor and its officers, employees and agents from and against any and all claims or costs whatsoever arising from or related to exercise by Licensee of its rights under the License granted hereby including, without limitation, any damage caused by, or related to, the products of the Work/Construction Activities, whether on not related to the Licensee's negligence in the construction, maintenance or repair thereof.

6. The Licensee further expressly agrees not to make any claims against the Licensor and its officers, employees and agents for any injury, loss or damage to person (including bodily injury and death) or property arising out of or in connection with the activities undertaken or omissions to act by the Licensee, its contractors, agents, representatives, employees, assignees and invitees, as hereby licensed.

7. The Licensor acknowledges that the Licensee has previously established an escrow deposit in the amount of at least $40,000.00 accessible by the Nantucket Conservation Commission and/or the Licensor as security for the Licensee's obligations hereunder and to further guarantee all of the Licensee's performance and obligations, including removal of the licensee's property as provided in Paragraph 9.

8. Conduct

a. Entry and use under this License by the Licensee and its contractors, agents, representatives, employees and assignees, shall, at all times, be subject to review and control by the Licensor and its duly designated agents and representatives.

b. During the exercise of rights hereby granted, Licensee shall at all times conduct itself so as not to interfere with activities of the Licensor within or upon the Land.

c. The Licensor shall have the right, at all reasonable times, to enter onto and inspect the Land.

d. The Licensee shall observe and obey all applicable laws, statutes, ordinances, regulations and permitting or license requirements and comply with all the conditions of the underlying Order of Conditions.

e. The Licensee shall not undertake any construction, reconstruction, rehabilitation or refurbishment upon the Land without first having received the written approval of the Licensor or its authorized representative; provided, however, that, by executing this License Agreement, the Licensor hereby consents to the hereinabove described Work/Construction Activities as more particularly described in WPA Form 5-Amended Order of Conditions SE 48-1659, issued by the Nantucket Conservation Commission on February 13, 2004, as amended, and reissued January 12, 2007 and further Extended by Extension Permit for Order of Conditions signed January 24, 2007, copies of which are attached hereto as Exhibits "C".

f. The Licensee shall provide the Nantucket Town Manager with copies of any and all reports that may required to be submitted by the Licensee to the Nantucket Conservation Commission pursuant to the terms and conditions of the Orders, Permits and Extensions hereto attached as Exhibits "C".

g. The Licensee shall have right of access and egress to the Land from Hoicks Hollow Road.

h. The Licensor and Licensee agree to hold a review of this License Agreement in May, 2009 to confirm that the Work/Construction Activities and conduct of the Licensee are in compliance with the requirements of this License Agreement and the underlying Order of Conditions.

i. The Licensor and Licensee agree that the issuance of this License is further predicated upon the Licensee's diligent and good faith attempts at implementing the tasks and obligations outlined in the letter attached hereto as Exhibit "D".

9. Termination; Ownership of Improvements. Upon any termination of this License Agreement, the improvements made by the Licensee to the Land shall, at the option of the Licensor, either (i) become and remain the property of the Licensor and the Licensee shall not be obligated to return the Land to its original condition or (ii) shall be promptly removed by the Licensee with the approval of and pursuant to an appropriate Order of the Nantucket

Conservation Commission. If improvements are so removed by the Licensee, the Licensee shall be entitled to the return of the funds maintained in escrow pursuant to Paragraph 7, above. If the Licensee fails to remove the improvements as contemplated herein within forty-five (45) days of the Licensor's request, Licensor shall have the right, but not the obligation, to cause such improvements to be removed and the Land to be restored at the Licensee's expense and shall have the right to draw against the escrowed funds therefore and to make claims against the Licensee in the amount of any shortfall.

10. Modification; Assignment. Any modification or amendment to this License must be in writing. This License is not transferable and no privilege contained herein may be sublet or assigned to any other person or organization without the express written consent of the Licensor.

11. Licensor's Right to Enter and Maintain. Notwithstanding any provisions or agreement to the contrary, the Licensor maintains its right to enter the Land at any time and from time to time to perform any maintenance or repair work that the Licensor, in its sole judgment, shall deem necessary.

12. No Warranty or Representation. The Licensee accepts the Land "as is" and the Licensor makes no warranty or representation, expressed or implied, related to said Land.

13. Successors in Interest and Assignment. The terms and conditions of this instrument shall be binding upon and inure to the benefit of the respective heirs, successors and assigns of the parties hereto. Notwithstanding the foregoing, the Licensee agrees that any right and license granted to the Licensee by this License Agreement may not be assigned or transferred without the prior written consent of the Licensor.

14. Notice. All notices, demands, requests, consents, approvals and other instruments required or permitted to be given pursuant to the terms hereof, shall be in writing and shall be deemed to have been properly given when addressed to the addresses listed above and deposited in registered or certified mail, postage prepaid, return receipt requested. The Licensee and the Licensor may at any time and from time to time, specify as its proper address for purposes of this License Agreement any other address(es) pursuant to the terms of this section.

15. Waiver. Notwithstanding anything herein to the contrary, no provision of this License, no entry upon, travel over or other use of the affected Land by the Licensor, nor the Licensor's granting of any rights or assumption of any obligations hereunder shall not waive, bar, diminish or in any way affect: (i) any legal or equitable right of the Licensor to regulate or issue any order with respect to the affected premises; (ii) waive any limitations on liability afforded a body politic of the Commonwealth of Massachusetts; or (iii) pursue any other claim, action, suit, damages or demand related thereto.

16. Severability. If any court determines any provision of this License to be invalid or unenforceable, the remainder of this instrument shall not be affected and each provision of this License Agreement shall be valid and enforceable to the fullest extent permitted by law.

17. Miscellaneous. This License Agreement: (i) may be signed in multiple counterparts; (ii) shall become effective only when fully signed by the Licensee and duly authorized representatives of the Licensor; and (iii) shall be governed by the laws of the Commonwealth of Massachusetts.

18. Merger. It is understood and agreed that (i) all contemporaneous or prior representations, statements, understandings and agreements, oral or written, between the parties are merged in this License Agreement, which alone fully and completely expresses the agreement of the parties, and (ii) that neither party is relying on any statement or representation made by the other which is not embodied in the Agreement. Further, all previous license agreements or leases between the parties are hereby terminated and superseded by this License Agreement.

19. Survival of Terms and Provisions. All appropriate terms and provisions hereof shall survive the termination or revocation of this License.

[SIGNATURES FOLLOW ON NEXT PAGE]

IN WITNESS HEREOF, the parties hereto have caused this License Agreement to be executed as a sealed instrument the day and year first written above.

TOWN AND COUNTY OF NANTUCKET,
LICENSOR

C. Elizabeth Gibson

Date: 12/30/08

C. Elizabeth Gibson
Town Administrator, duly authorized

SIASCONSET BEACH PRESERVATION FUND, INC.,
LICENSEE

By: C. E. Roosevelt

Date: 12/22/08

Kermit Roosevelt, duly authorized
Its President

EXHIBIT "D"

VAUGHAN, DALE, HUNTER, STETINA AND BEAUDETTE
PROFESSIONAL CORPORATION
ATTORNEYS AT LAW
WHALER'S LANE
P.O. BOX 659
NANTUCKET, MASSACHUSETTS 02554

TEL: (508) 228-4455
FAX: (508) 228-3070

EDWARD FOLEY VAUGHAN
KEVIN F. DALE
WILLIAM F. HUNTER
MARTIN JEFFREY STETINA
RICHARD P. BEAUDETTE

December 12, 2008

BY HAND DELIVERY
Michael Kopko, Chairman
Nantucket Board of Selectmen
Broad Street, 1st Floor
Nantucket, Massachusetts 02554

RE: Baxter Road Toe Protection Licenses;
Orders of Conditions SE48-1659 and 1602;
77-122 Baxter Road, 65-75 Baxter Road

Dear Michael:

Further to last night's meeting of the Nantucket Board of Selectmen and its deliberations in the captioned matter, Siasconset Beach Preservation Fund (SBPF) agrees to undertake the following tasks and obligations:

1. SBPF agrees that it shall not undertake so-called coastal bank terracing above the jute bag coastal bank toe protection as was previously permitted in the above captioned Orders of Conditions; to be clear, no wooden terracing shall be constructed along the project length described in the Orders and proposed Licenses, it being SBPF's intention to eliminate all wooden elements from its construction methodology under said Orders of Conditions;

2. In this regard, SBPF shall immediately remove the wooden "vertical fence post line", weather permitting, currently existing seaward of the installed jute bag coastal bank toe protection along the project length;

3. SBPF shall work to remove the remaining elements of the dewatering system currently installed at "Light House Beach South" and "Light House Beach South, South"; it being the intention of SBPF to submit a Notice of Intent to the Nantucket Conservation Commission on or before December 31, 2008 for an Order of Conditions permitting said beach work. The Board of Selectmen, acknowledging that an Order of Conditions from the Nantucket Conservation Commission is required to accomplish this task, shall cooperate with SBPF in the filing of said Notice of Intent to the extent reasonably necessary. Should the Conservation Commission issue an Order of Conditions permitting the removal of the dewatering system elements the Board of Selectmen shall cooperate with SBPF to the extent reasonably necessary in allowing it to carry out the work permitted under said Order. In order to accomplish this work, SBPF plans to draw on the escrow account set up with the Town of Nantucket through its Conservation Commission for this purpose.

4. SBPF shall work diligently and in good faith with the property owner of 67 Baxter Road, Siasconset, and Nantucket Town Council to formalize an access and egress path through landscaping and appropriate signage, providing egress from the 'Sconset Bluff Walk to Baxter Road;

5. SBPF, acknowledging that the Board of Selectmen has incurred legal fees in having Town Counsel review these License matters, shall contribute $7500.00 to the Town to defray said costs.

Thank you for your ongoing attention to this matter. I look forward to appearing before the Board of Selectmen next Wednesday, December 10, 2008 and, hopefully, having the License requests acted favorably upon by the Board. Please feel free to call me with any questions or comments that either you or Board members may have.

Sincerely,

William F. Hunter

WFH/