DRAFT

Short Beach

MASTER PLANNING RECOMMENDATIONS

prepared for:

Town of Nahant

April 24, 2012

Stantec

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Executive Summary

Vision

Short Beach is generally considered a local beach and consequently does not offer parking or circulation systems to support the influx of large regional crowds better associated with Long Beach. The goal of the project is to maintain Short Beach as a town recreational facility and to consequently reinforce and improve the local character of the beach and its amenities.

The Town of Nahant desires feasible, sustainable improvements that will enhance the capacities of Short Beach to provide recreation, storm flood protection, and wildlife habitat. All improvements must recognize the dynamic forces that frequently bear upon this area.

The Nahant Life Saving Station is an iconic historic structure, whose distinct architecture, and prominent presence on the road into town, speaks to the uniqueness and spirit of those who live on this small island community.

Process

In May 2011, the Town of Nahant selected Stantec Planning and Landscape Architecture P.C. to lead a two-phase contract involving a site/landscape design for the recently renovated Nahant Life Saving Station, and a master plan for Short Beach.

The process for developing this master plan included meetings and input from an advisory group assembled and chaired by the former Town Administrator. A series of design meetings were convened to review issues and potential solutions. A public informational meeting was held at Town Hall on August 24, 2011 to present the master plan concepts and Nahant Life Saving Station site plan.

The Plan

The Master Plan consists of three separate parts as follows:

- Site improvements for the Nahant Life Saving Station
- Short Beach Restoration & Management Activities
- Auto and Pedestrian Circulation Enhancements

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1.0 Introduction

1.1 BACKGROUND

Short Beach is reportedly one of the more popular beaches in Nahant, averaging well over 100 visitors on a daily basis during the summer season. The Town owns and maintains the beach and dune system. Ongoing management efforts include periodic beach cleaning, mowing, and supplemental dune planting.

Stantec Planning and Landscape Architecture P.C. was selected in 2011 by the Town to lead a two-phase contract involving a site/landscape design for the recently renovated Nahant Life Saving Station, and a master plan for Short Beach.

The first phase of the contract involved the preparation of contract drawings for site improvements to the Nahant Life Saving Station (NLSS). The second phase of the contract was to study Short Beach and to develop this document. Based on the context of the site, the scope of the Master Plan is not strictly limited to Short Beach, but also includes discussion and considerations for Nahant Road, Little Nahant Playground, Doggie Beach, and the Lowlands Park.

1.2 SHORT BEACH ENVIRONS

The project study area consists of Short Beach and adjacent properties as follows:

1.2.1 Short Beach

Short Beach is a 1/2-mile sandy beach facing towards Nahant Bay. The northern half of Short Beach represents the eastern shore of the 1/4-mile barrier beach that connects Big Nahant to Little Nahant. Short Beach consists of sandy beach, vegetated coastal dune, open grassy fields, walking paths, benches, and the Nahant Life Saving Station. Short Beach is the primary focus of this master plan.

1.2.2 Nahant Life Saving Station

The NLSS stands about midway along Short Beach. This 1.6 acre parcel is the former U.S. Life Saving / Coast Guard Station and former Coast Guard family recreational facility. Surrounded by perimeter fence, this historic facility is now owned by the Town of Nahant. Currently leased to the Nahant Preservation Trust, rehabilitation of this facility has been ongoing for several years.

Figure 1-1: Short Beach Images including Little Nahant Playground (top), Doggie Beach (middle left), Short Beach (middle right), Nahant Life Saving Station (bottom)

1.2.3 Lynn Harborside (a.k.a. Doggie Beach)

Located on Broad Sound on the opposite side from Short Beach, this ¼-mile sandy beach makes up the western face of the barrier beach located between Little Nahant and Big Nahant. This narrow sandy beach is adjoined to the south by a rocky coast and Black Rock Beach, and to the north by the steep coast of Little Nahant with its heavy coastal revetment. From Castle Road to Little Nahant, a healthy and growing coastal dune is building towards Nahant Road (as evidenced by the buried fencing and encroaching sand along the road edge). This dune blends to a narrow strip of turf located below the main road between Little Nahant Road and Wilson Road. Notable about this beach is that dogs are allowed on the beach year round, thus giving rise to the beach's nickname. Access to the beach is limited to foot paths, with trail heads located opposite Wilson Road and at Castle Road.

Figure 1-2: Aerial photo - Doggie Beach (looking east).

1.2.4 Little Nahant Playground

Located at the northerly end of Short Beach adjacent to Nahant Road and nearby residences, this small playground includes play equipment, swings, benches, picnic tables, a small shelter, and a half-court basketball pad. The play equipment looks to be relatively new and in good working condition. The basketball court appears underutilized and a small wooden shade structure and table requires replacement.

1.2.5 Nahant Road

The main road into Nahant is a 3.5 mile road that runs from the rotary at Lynn Shore Drive in Lynn, out to southerly end of Nahant, where it intersects with Swallow Cave Road.

The first 1.5 miles of road, from the Lynn Rotary to Wilson Road, is known as Nahant Beach Parkway (also Nahant Beach Boulevard). The remaining 2-mile section is called Nahant Road, and runs from Wilson Road out to its terminus. The section of Nahant Road adjacent to Short Beach is a 2-lane roadway measuring 30-feet in width, within a 50-foot ROW.

1.2.6 Lowlands Park

Lowlands Park is located to the west of Nahant Road, opposite the southern end of Short Beach. This park contains (2) two softball fields; the remnants of a playground; a section of the Heritage Trail; the war memorial with benches, and a parking lot that provides vehicle parking for both the park and Short Beach. A basketball court is located off Spring Road.

The Lowlands is only partially developed for recreational fields, but also consists of wetlands, a central drainage channel, a portion of the Heritage Trail, a composting area for yard waste, leased lobster trap storage, and undeveloped land. The Lowlands occupies former marshland, and as its name implies, the land has some of the lowest elevations within Nahant. Flooding is a common problem throughout this area.

The Lowlands is bounded by Ward Road, Spring Road, Nahant Road and a “paper” street paralleling Fox Hill Road. Only the ball field portion of the Lowlands is visible from Short Beach. The public parking area is well screened by a tall stand of reeds and accessed off Ward Road. The entrance to the town composting area is located off Spring Road.

1.2.7 Short Beach Village

As seen in Figure 1-3, Short Beach Village is a small commercial area located along the west side of Nahant Road at the southern end of Short Beach. Approximately ten building storefronts line the road here at the intersection of Spring Street. Although compact in size, Short Beach Village is the largest and most diverse business district in the town of Nahant. In addition to private lots, public parking is provided in the form of parallel parking on both sides of Nahant Road.

Figure 1-3. Aerial photo - Nahant Business District (looking west).

Nahant Historical Society Postcard Collection

Figure 1-4. Short Beach historic image (Photograph showing uncontrolled access to Nahant Beach prior to Town action to restrict parking from the beach).

1.3 GOALS AND OBJECTIVES

Protection and enhancement of Short Beach is the primary goal of this project. Three major objectives, which are not mutually exclusive, include the following:

- Objective 1 – Preserve the natural systems and resources of Short Beach

As a barrier beach, Short Beach provides a storm buffer for both human and wildlife in the harbor and upland areas behind the barrier. The beach also serves as habitat for a variety of plant and animal life. Protection of the beaches natural systems is both important to the people of Nahant, mandated by Executive Order Number 181 (1980), and overseen by local and state agencies.

- Objective 2 - Improve the flood protection capacities of the barrier beach

As a coastal community, Nahant residents are all too familiar with the potential of coastal flooding. Deference must be given to improving the beaches dynamic ability to move and change while respecting fixed infrastructure and property.

- Objective 3 - Retain and enhance the recreational offerings of the beach

Short Beach is an important bathing beach and open space resource to Town residents. As much as sandy beaches are resilient to use, dune systems are incredibly fragile and must be protected. Enhancement and protection of the natural systems will add to the natural and intrinsic offerings of the site.

Grid = 1,000 Meters
Source: USGS, Lynn Quad
Figure 2-1: Project Locus Map

2.0 Existing Conditions Summary

2.1 BEACH & DUNE

Short Beach is a ½-mile long, 6-acre beach. The beach north of the NLSS is characterized by a wide beach and healthy dunes protected by a variety of plants. From the NLSS to the south end of Short Beach, the beach narrows and the dune is smaller, steeper, with boulder revetment and sparse vegetation.

At high tide the beach can be less than 50-feet in width, but at low tide it becomes quite generous, stretching out in excess of 300-feet. Extreme high tides and storms frequently produce waves that will run-up the paved dune crossings and spill down into Nahant Road. During major weather events, storm surge and violent waves will overtop the dune berm and flood the low lying areas on Castle Road, Ward Road, Fox Hill Road, and Spring Road.

2.1.1 Geologic Development

In geologic terms, Short Beach is a tombolo. A tombolo is defined as: “a barrier beach that connects an island to the mainland or to another island”[1]. A tombolo is a relatively rare landform created by deposition, when a narrow piece of land such as a sand spit or sand bar forms between an island and another land mass. Once attached, the island becomes known as a tied island. There are just over 40 notable tomobolos in the world. In addition to Long and Short Beach, other regional examples include Beavertail Point/Conanicut Island, Rhode Island; Biddeford Pool, Maine; Charles Island, Connecticut; and Chappaquiddick Island, Martha's Vineyard, Massachusetts.

True tombolos are formed by wave refraction. As waves near an island, they are slowed by the shallower waters, and bend or “refract” around the island as they approach. The wave pattern causes a convergence of sediments drifting from opposite sides of the island. Eventually, when enough sediment has built up, the beach shoreline will connect with the mainland or another island, and form a tombolo.

The sediments that make up a tombolo are coarser towards the bottom and finer towards the surface. It is easy to see this pattern when the storm waves wash away finer grained material at the top, revealing coarser sands and cobbles at the base.

2.1.2 Barrier Beach Formation

The tied islands of Nahant create a barrier beach to Lynn Harbor. In fact, Lynn's shoreline is divided in half by the Nahant pennisula, which separates Lynn Harbor to the south from Nahant Bay to the north. Although Lynn harbor opens on to Broad Sound, Nahant’s land mass disrupts

[1] Guidelines for Barrier Beach Management, A Report of the Massachusetts Barrier Beach Task Force, February 1994.

the long shore currents and shelters the area from the ocean waves. The movement of sediments in and out of the harbor is sharply curtailed, and as a result, much of the harbor is filled with tidal flats. Harbor access is only possible where navigation channels are maintained.

The sediment transport in the area of Short Beach is most significantly influenced by the bathymetry of Nahant Bay. Although tidal currents influence the transport of sediment along Nahant and Lynn Beaches, the primary forcing mechanism for sand transport is waves. The character of the local wave field is controlled by various parameters, including the peak wave period, height, and angle of approach relative to the shoreline. A previous study done for the Metropolitan District Commission (Bohlen; 1980), concluded that Nahant Bay's shallow depths protect the shoreline from large wave intrusion from the Atlantic Ocean, while the straight and parallel contours serve to refract the waves into the shore at near normal directions. For Short Beach, wave approach is further limited by the enclosing shorelines of Little and Big Nahant, which confine wave approach to a west-northwest to southwest direction. The combined effect is that the diminished waves strike nearly perpendicular to the shoreline, resulting in relatively small lateral sediment transport along Short Beach.

Like most barrier beaches, however, Short Beach is prone to natural fluctuations of profile and area as a result of tidal and weather events. In summer when waves are milder, the beach sand can build up, becoming higher and wider. Rising sea level may also contribute to beach accretion, as material is pushed up with higher tides. In the fall, winter and spring; storm waves can cut into the beach and cause it to narrow and flatten.

Due to its unique formation, Short Beach serves as a land bridge, providing the sole access to and from Nahant. This vital circulation route includes a paved roadway and pedestrian path. These fixed features are built upon a dynamic landform. Where incremental changes in shoreline or dune positioning are considered normal for a barrier beach, they can be destructive to roads and buildings. While some perceive these shifting patterns as a cause-effect owing to some new threat, they are typical to this geologic form.

2.1.3 Tides

Short Beach experiences a semi-diurnal tidal variation each day (two high and two low tides occurring during each lunar day over a period of 24 hours 50 minutes). The nearest tide gage to the Short Beach is near Boston, which is maintained by the National Ocean Survey (NOS). Tides measured at the Boston gauge are nearly identical to tides at Nahant. The average difference between high and low water is 9.5 ft., with a maximum water surface variation during spring tides of 10.2 ft.

2.1.4 Flood Conditions & Storm Surge

As shown in the following figure, the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map for the Town of Nahant (Community Panel No. 250095-0004B) shows the entire beach within portions of the 100-year flood (Zone A2 and AO) and areas of the 100-year coastal flood (Zones V2 and V4).

Figure 2-2: FEMA Flood Zones

FEMA defines A-zones as areas of 100-year flooding, and A0-zones as areas of 100-year shallow flooding where depths are between 1-3 feet in depth. The V2-zone is an area of 100-year coastal flooding with velocity (wave action). For each area, FEMA has determined base flood elevations.

Above and beyond high tide, storm surge can cause a substantial increase in the water level. A storm surge is an offshore rise of water associated with a low pressure weather system, typically tropical cyclones and strong extra-tropical cyclones. Storm surges are caused primarily by high winds pushing on the ocean's surface. The wind causes the water to pile up higher than the ordinary sea level.[2] This level is a critical consideration for coastal projects, since most storm damage occurs when large storm waves and/or wave overtopping impact landward properties.

Storm surge elevation also depends on the timing of the peak storm surge in relation to the tide level, as the highest storm surges are generated when the peak of the storm occurs most closely to high tide. Hurricanes and northeasters induce storm surge, with northeasters inducing the highest and most persistent surge relative to Short Beach, as they expose the

[2] http://en.wikipedia.org/wiki/Storm_surge

beach to the greatest wave attack. Hurricanes on the other hand, which typically move up the east coast, are more likely to impact the Broad Sound side of Nahant.

Major storms that have affected the Nahant area in the past 100-years are the December storms of 1909 and 1959, the February storms of 1972 and 1978, and the October 1991 storm. These storms have been responsible for significant coastal damage and flooding in the area surrounding Short Beach.

As an example, the severity of the storm surge associated with the February 1978 storm (i.e. The Blizzard of '78) is evident in Figure 2-3. It shows the surge levels during the storm were approximately 10.4 feet NGVD 1929. This was approximately 5.3 feet above mean high water along the coastline of Nahant, and resulted in severe coastal flooding in the area. The influence of tide on storm surge is also evident in this figure. During the low stages of the tide cycle the level of storm surge is below the elevation of a standard high tide, and thus not likely to cause any coastal flooding over that period. However, if the storm persists or coincides with high tide, the impacts can be severe. Since the storm developed during a new moon, an unusually large high tide occurred, and the storm brought a massive amount of water along coastal communities. The huge storm surge resulted in broken sea walls and massive property loss.

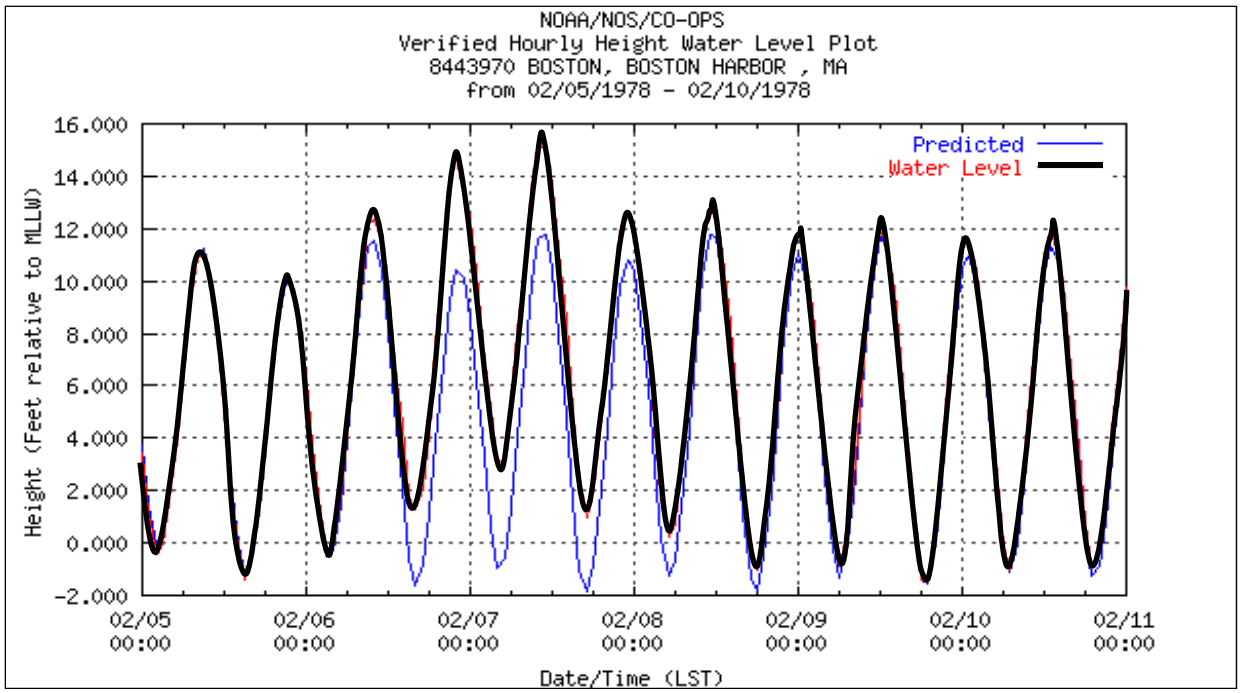

Figure 2-3: Tidal Record at Boston Harbor - February 1978. The thin line shows the predicted (normal) tidal variations in water surface elevations, actual observed water levels are shown as a bold line.[3]

[3] http://tidesandcurrents.noaa.gov/data_menu.shtml?bdate=19780203&edate=19780211&wl_sensor_hist=W2&relative=&datum=2&unit=1&shift=d&stn=8443970+Boston&type=Historic+Tide+Data&format=View+Plot

Statistical return period information regarding storm surge at Nahant Beach is available from the Federal Emergency Management Agency (FEMA) Flood Insurance Study (FIS) for Nahant and the USACE Tidal Flood Profiles for the New England coast. The 100-year storm surge elevation at Nahant is approximately 10.1 feet (USACE) above the still water level (NGVD), which includes effects of tide and historic sea level rise along with storm-induced increases in water level. Table 2-1 shows the computed return period frequency water surface elevations at Nahant Beach. FEMA is currently in the process of updating data.

Return Period	Storm Surge Elevation (ft. NGVD 1929)	
	USACE	FEMA
1-Year	7.3	---
10-Year	9.0	8.5
50-Year	9.9	9.3
100-Year	10.1	9.7
500-Year	---	10.5

Table 2-1: Storm Surge Water Levels for Short Beach[4]

2.1.5 Wind and Wave Data

Adding to storm surge, localized wind and wave action can increase ocean run-up and overwash of the beach. Wind measurements are available from NOAA buoys and from Logan Airport in Boston. It is important to understand wind characteristics at the project site because winds are the primary driving force for wave generation and development of storm conditions. Strong winds blowing from open water generate waves that cause damage to the existing structures and beaches. Water surface elevation increases (storm surge) during a storm as a result of strong winds, atmospheric pressure changes and semi-diurnal tides.

A wind and wave analysis for Nahant Bay was previously conducted for the DCR's Rehabilitation of the seawall along Nahant Beach Parkway by Applied Coastal Research and Engineering, Inc. (ACRE). This study determined that the predominant wind direction of the record is from the west (9.9%), where wind speeds greater than 25 knots occur in 0.8% of the wind data. [5]

A similar study was conducted for the Boston Harbor, which obtained wind data from the National Climatic Data Centre for Logan Airport (*WMO ID* 72509) within the harbor. Data was analyzed in 10 year increments over the period 1975 to 2005, and developed in to the wind rose shown in Figure 2-4. This wind rose shows the predominant winds from the W and SW and the strongest winds operate from both the SW and the NNE. [6]

[4] FEMA Flood Insurance Study
[5] *Coastal Engineering Design Guidance Study for the Nahant Causeway Seawall*, *Nahant, MA*, by Sean W. Kelly, P.E., John S. Ramsey, P.E., Applied Coastal Research and Engineering, Inc., Draft Final Report – March 2004.
[6] The Impact of Natural Waves and Ferry Wakes on Bluff Erosion and Beach Morphology in Boston Harbor, USA. Z.J. Hughes, D.M. FitzGerald, N.C. Howes and P.S. Rosen. *http://www.griffith.edu.au/conference/ics2007/pdf/ICS095.pdf*

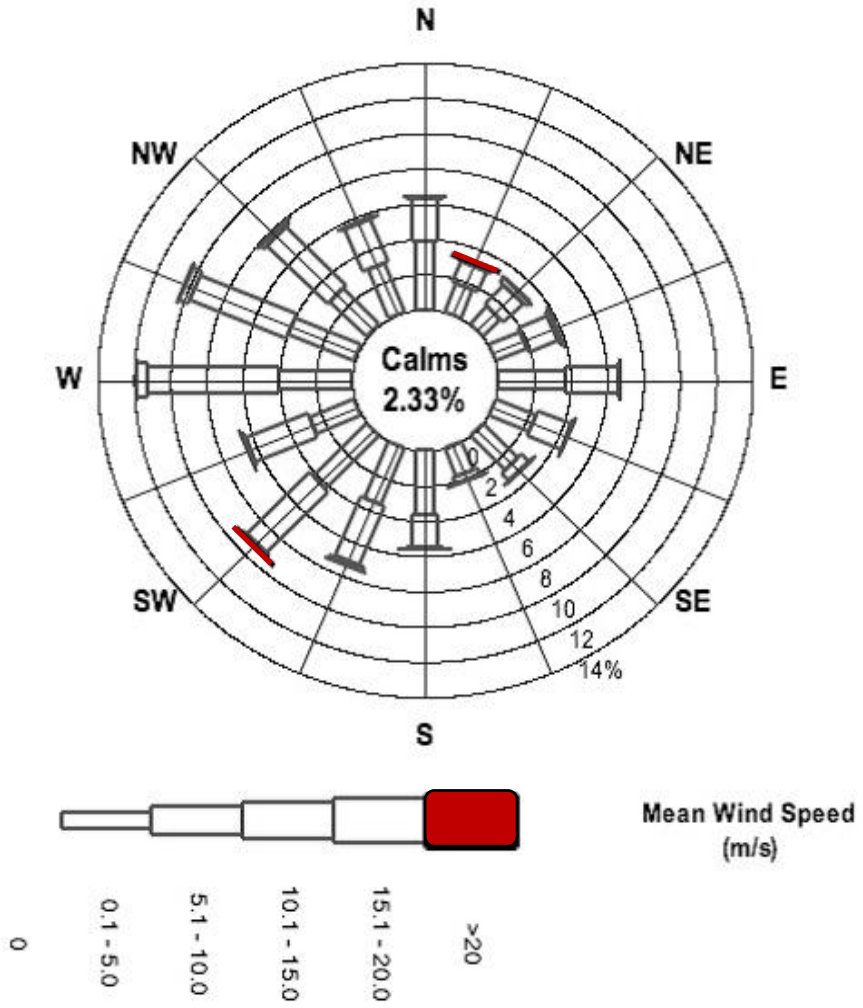

Figure 2-4. Wind Rose for Boston Harbor 1994-2005.

The ACRE study also reviewed two sources of wave data. The first source of data that was evaluated consisted of direct wave measurements collected by the National Oceanic and Atmospheric Administration (NOAA). NOAA maintains a wave buoy near the middle of the Massachusetts Bay (42.35N 70.69W).[7] This buoy has provided hourly wind and wave data since 1984. The buoy began to report wave direction in 1994. The second source of wave data the study evaluated was the USACE Wave Information Study (WIS), which provides simulated wave data along the US Atlantic Coast (Hubertz et al., 1993).[8] WIS data was obtained from stations 94 and 95, located offshore of the NOAA buoy (42.25N 70.50W and 42.50N 70.50W, respectively). The data contain wave height, period, and direction every three hours for a 40 year period between 1956 and 1995 characterizing extratropical storms but not hurricanes.

[7] http://www.ndbc.noaa.gov/station_page.php?station=44013
[8] http://chl.erdc.usace.army.mil/wis

As shown in figure 2-5, the left rose for WIS Station 94 graphs the variation of wave height in relation to direction and percent occurrence.[9] The wave heights are broken down into shaded bands, with each successive darker band representing a larger wave height. Each band represents a wave direction, and the percent occurrence is represented by the concentric circles. The right rose represents the wave period in relation to direction and percent occurrence. It is displayed in the same format as the wave height rose, but with wave period represented by the darker bands.

The roses show the predominate wave direction is from the east, corresponding to the open fetch out to the Atlantic Ocean. The increased occurrence of larger wave periods seen in the easterly waves is also a result of the open fetch. The influence of northeast storms (Nor'easters) can be seen in the increased wave heights and periods in the northeast and east-northeast direction bands.[10]

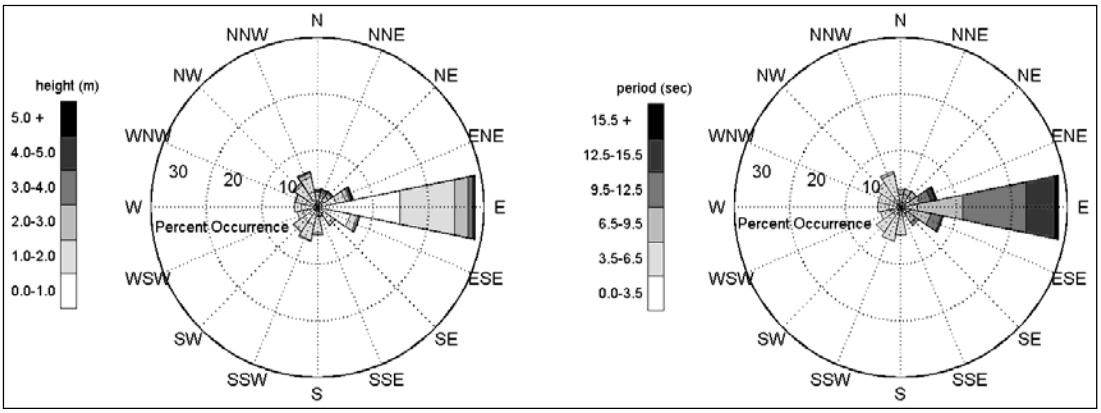

Figure 2-5: Wave and period roses - 1976 to 1995.

2.1.6 Shoreline Change and Sediment Transport

According to an assessment of shoreline change prepared by the USGS, the average net rate of long-term shoreline change for New England was -0.4 meters/year, showing an erosional trend.[11] However, the study also indicates that the New England North Region is slightly less at -0.2 meters/year, or -0.66 feet/year.

Long-term shoreline change rates specific to Short Beach were obtained from the Massachusetts Coastal Zone Management (CZM) shoreline change analysis project. The data from this study is maintained on-line and accessed through an interactive GIS page, shown in figure 2-6.[12] Shoreline positions for the years 1919, 1938, and 1978 are included in the data set. As shown in table 2-2, rates of long-term shoreline change were calculated at normal transects along the shore for the 75-year period from 1919 to 1978.

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[9] *Coastal Engineering Design Guidance Study for the Nahant Causeway Seawall*, *Nahant, MA*, by Sean W. Kelly, P.E., John S. Ramsey, P.E., Applied Coastal Research and Engineering, Inc., Draft Final Report – March 2004.
[10] *Ibid.*
[11] National Assessment of Shoreline Change: Historical Shoreline Change along the New England and Mid-Atlantic Coasts by Cheryl J. Hapke, Emily A. Himmelstoss, Meredith G. Kratzmann, Jeffrey H. List, and E. Robert Thieler, Open-File Report 2010-1118, U.S. Department of the Interior U.S. Geological Survey http://pubs.usgs.gov/of/2010/1118/pdf/of2010-1118.pdf, p. 27.
[12] *The Massachusetts Shoreline Change Project: 1800s to 1994, Technical Report.* September 4, 2001 for the Massachusetts Office of Coastal Zone Management (CZM), and the CZM website (http://maps.massgis.state.ma.us/coastlinechange).

Figure 2-6: CZM website interactive map (Short Beach with shoreline transects).

These long-term rates were calculated using the linear regression method, which determines an average rate based on a best-fit line to the four (4) historic shoreline positions. In addition, incremental rates of shoreline change were calculated between successive shoreline years. The incremental rates at each transect were calculated using the end-point method, which uses the distance over which the shoreline position changed, divided by the number of years during which the change occurred. This method of calculating shoreline change rates is generally preferred, as it provides rates based on actual shoreline positions measured over discrete time intervals.

Despite recent period loses, the general trend in long-term shoreline change for the period 1919 to 1978 for Short Beach indicate that the beach is stable with little erosion or accretion. The highest rates of erosion of -0.3 feet/year occurred towards the north end of the beach. However, a majority of the changes on either end of the beach are less than the shoreline change map accuracy (±0.4 feet per year).

As to sediment transport, barrier beaches in New England are typically small and discontinuous as a result of localized and limited sediment sources and partitioning of the coast by headlands (FitzGerald and others, 1994; van Heteren and others, 1998). Small pocket beaches (like Short Beach), bound by rocky headlands, occur in areas that lack a substantial sediment source and sufficient lowland area to migrate or grow as a barrier spit. Beaches in New England are primarily transgressive, with barrier-spit beaches exhibiting evidence of overwash and peat exposure in the intertidal zone. With no room to transgress, pocket beaches tend to be composed of lag sediments dominated by larger sizes (gravel and larger), as sand tends to be lost from the system during large storms.[13]

[13] http://pubs.usgs.gov/of/2010/1118/pdf/of2010-1118.pdf, p. 25.

Transect	Location	Time Period	Change (feet)	Rate of Change (feet/year)
3789	North End of Beach	1919-1938	-25.8	-1.3
		1938-1978	50.6	1.3
		1978-1994	-84.9	-5.3
			Long Term Rate =	***-0.3***
3793	Northern Beach	1919-1938	-18.4	-1
		1938-1978	89.1	2.2
		1978-1994	-71.7	-4.5
			Long Term Rate =	**0.5**
3798	Nahant Life Saving Station	1919-1938	53.6	2.8
		1938-1978	68.9	1.7
		1978-1994	-113.5	-7.1
			Long Term Rate =	***0.5***
3804	Main Path over to Lowlands	1919-1938	-27.1	-1.4
		1938-1978	53.7	1.3
		1978-1994	-60.3	-3.8
			Long Term Rate =	**0.0**
3809	South end of Beach	1919-1938	36.2	1.9
		1938-1978	2.6	0.1
		1978-1994	-32.4	-2
			Long Term Rate =	***0.1***

Transects have been established at intervals of 40 meters (131 feet), and there are considerably more transects on the beach than shown here.

Table 2-2: Shoreline Changes: Short Beach Select Transects

2.1.7 Drift-Line Zone

The drift-line zone is typically a debris field defining the landward limit of high tide or storm wave uprush. This line is composed of wrack, which is made up of driftwood, seaweed, shells, and other organic or non-organic material. At Short Beach, the wrack line if found at the face of the dune, as well as along the fence seaward of the NLSS. Wrack is important to the beach as it provides a seed source, nutrient source, and foraging habitat for shorebirds.

2.1.8 Sand Quality

With the exception of the northern end where it is impacted by Brown Algae, the sand quality on Short Beach appears adequate. The beach is reportedly one of the most popular beaches in the Town of Nahant.

2.1.9 Water Quality

In 2000, the U.S. Congress enacted the Beaches Environmental Assessment and Coastal Health (BEACH) Act to improve the quality of coastal recreational waters. The BEACH Act seeks to reduce the risk of disease to users of the Nation's marine recreational waters through the identification of high-risk beaches, identification and mitigation of sources of pollution, and notification/risk communication to the public. In late 2001, the Massachusetts Department of Public Health (MDPH) was awarded funding from the United States Environmental Protection Agency (USEPA) that partially support Departmental efforts to develop a bathing beaches inventory and communicate results of beach monitoring to the general public. [14]

Recreational use of water with microbial contamination can pose health risks to swimmers and others. As a result, beach water quality is regulated to protect public health. In Massachusetts, bathing beach water quality is regulated by M.G.L. C.111 and other regulations to establish minimum standards for bathing beaches. Local boards of health (LBH) and the Department of Conservation and Recreation (DCR) conduct the vast majority of beach water sampling in Massachusetts. Most of the marine beach samples collected at public beaches are analyzed at Massachusetts Department of Public Health (MDPH) contracted laboratories, and the cost of analysis is covered by MDPH. Under the beaches acts, MDPH is responsible for ensuring the regulations are adhered to by beach operators and local boards of health and providing technical assistance where needed.

Depending on the beach, the water can be tested anywhere from every day to once per month. The water at marine beaches is tested for the presence of Enterococci. Enterococci are a group of bacterial species within the Streptococcus genus, some of which (e.g. Streptococcus faecalis) are typically found in human and animal intestines and are therefore present in sewage. These tests are also referred to as indicator organisms, which are used to predict the presence of pathogenic, or disease-causing, organisms associated with fecal contamination. While in most cases the indicator organisms themselves are not pathogenic, they have similar life cycles and die-off rates to pathogens and are also found along with pathogens in human and animal waste.

In marine waters, the accepted level of Enterococci for a single sample is 104 colony forming units per 100 milliliters (cfu/100 ml) of bathing water or below. Any sample that comes back with a count greater than 104 cfu/100 ml is viewed in exceedance, and dictates that the beach must then be posted. If a beach is posted, it means recreational use of the water is prohibited. You can still go to the beach to take a walk or enjoy any recreational activities that do not involve contact with the water. The beach will remain posted until the bacterial levels have been shown by laboratory analysis to have dropped back down into the desired range.

[14] http://www.nahant.org/recreation/beachs_watertests.shtml

According to the North Shore Coastal Watersheds 2002 Water Quality Assessment Report, Short beach was tested weekly during the summers of 2002, 2003, and 2004 with no postings reported for any of these years. Likewise, Black Rock Beach, based on weekly *Enterococci* bacteria testing, was not posted in 2002, 2003, or 2004 (MA DPH 2003, MA DPH 2004, and MA DPH 2005b).[15]

Test results are also available online through the Massachusetts Department of Public Health's website. The following graph shows the sampling results for Short Beach, from June 2003 through august 2011. On only 5 occasions between June 2005 and August 2011, did the beach test above the set bacterial levels. Three of these events were related to storms, which are known to temporarily increase bacterial levels.

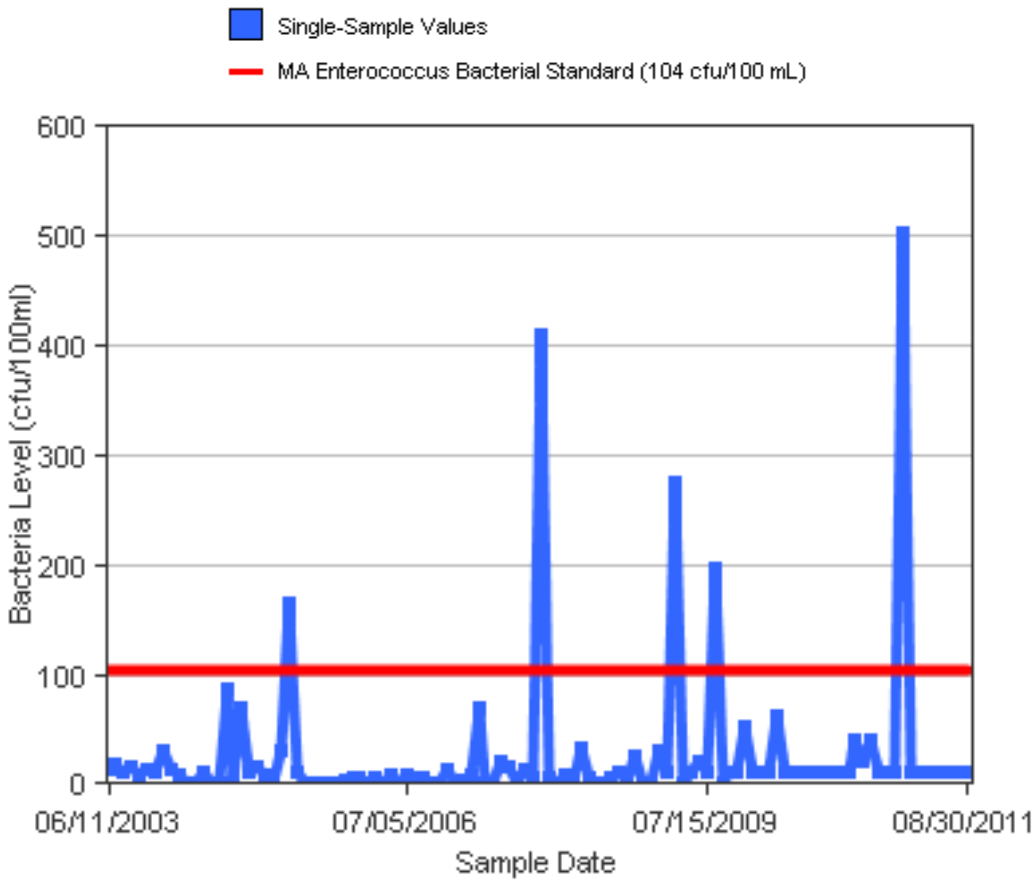

Figure 2-7: Short Beach Water Sampling Results - 6/2003 to 8/2011 [16]

For the same time period (6/03 to 8/11), similar records are available for Doggie Beach, which show a total of 13 days above the recommended level.

[15] North Shore Coastal Watersheds 2002 Water Quality Assessment Report, Massachusetts Department of Environmental Protection, Division of Watershed Management, March 2007, http://www.mass.gov/dep/water/resources/93wqar06.pdf
[16] Commonwealth of Massachusetts, Department of Public Health, Bureau of Environmental Health, http://mass.digitalhealthdepartment.com/public_21/beaches.cfm?bID=12499&func=details

2.1.10 Brown Algae

The brown algae (Pilayella littoralis) found at Short Beach is quite unique to Nahant Bay and Broad Sound. This mutant algae is known to grow in only a few places throughout the world. No one is entirely sure why *Pilayella littoralis* occurs in such large quantities or why locally it is mostly limited to Nahant Bay and Broad Sound. The species has reportedly been in Nahant since at least 1902.

Figure 2-8: Pilayella littoralis [17]

The plant begins as an attached form on rocks. Fragmentation of individual plants can lead to new ball shaped free-floating individuals. Under ideal growing conditions it can double its weight in 6-10 days. It is transported toward the shore and ultimately on to the beach by prevailing winds, currents, tides, and waves. [18]

Brown algae can frequently cover the northern end of Short Beach from high to low tide. During the hot summer months, the decaying algae can be quite unpleasant smelling as a result of sulfide generation due to the anaerobic decay of the algae. Field sampling conducted in September 1974 showed hydrogen sulfide concentrations in beachfront interstitial water varying from less than 1ppm to slightly more than 5ppm (Cortell, 1975).

However, despite its objectionable qualities, Pilayella is not toxic or dangerous to humans or animals. Nor does Brown algae itself indicate poor water quality. [19] In fact, the algae may actually be a contributing factor in regard to the bay's attractiveness to shorebirds and Bonaparte's Gulls. Drift algae has a large appetite for nitrogen compounds, and provides habitat for smaller marine animals. The smaller marine animals provide food to other organisms like fish and birds.

2.1.11 Existing Vegetation

Existing vegetation varies widely across the study area. The coastal dunes consist chiefly of grasses and herbaceous plants, with interspersed native or planted trees. Areas along Nahant Road and at the Lowlands ball fields are mown turf. Those areas adjacent to the Lowlands parking are dominated by large stands of Phragmites. For those interested, an extensive listing of plants is provided in the Town's 2008 Open Space Report, and as such is not repeated here (see http://www.nahant.org/townhall/documents/2009/Nahant_Open_Space_Plan_2008_Reduced.pdf).

[17] http://european-marine-life.org/62/photo-pilayella-littoralis-wb01.php
[18] http://www.mass.gov/dcr/parks/metroboston/pilayella_brochure.pdf
[19] http://www.mass.gov/dcr/parks/metroboston/pilayella_brochure.pdf

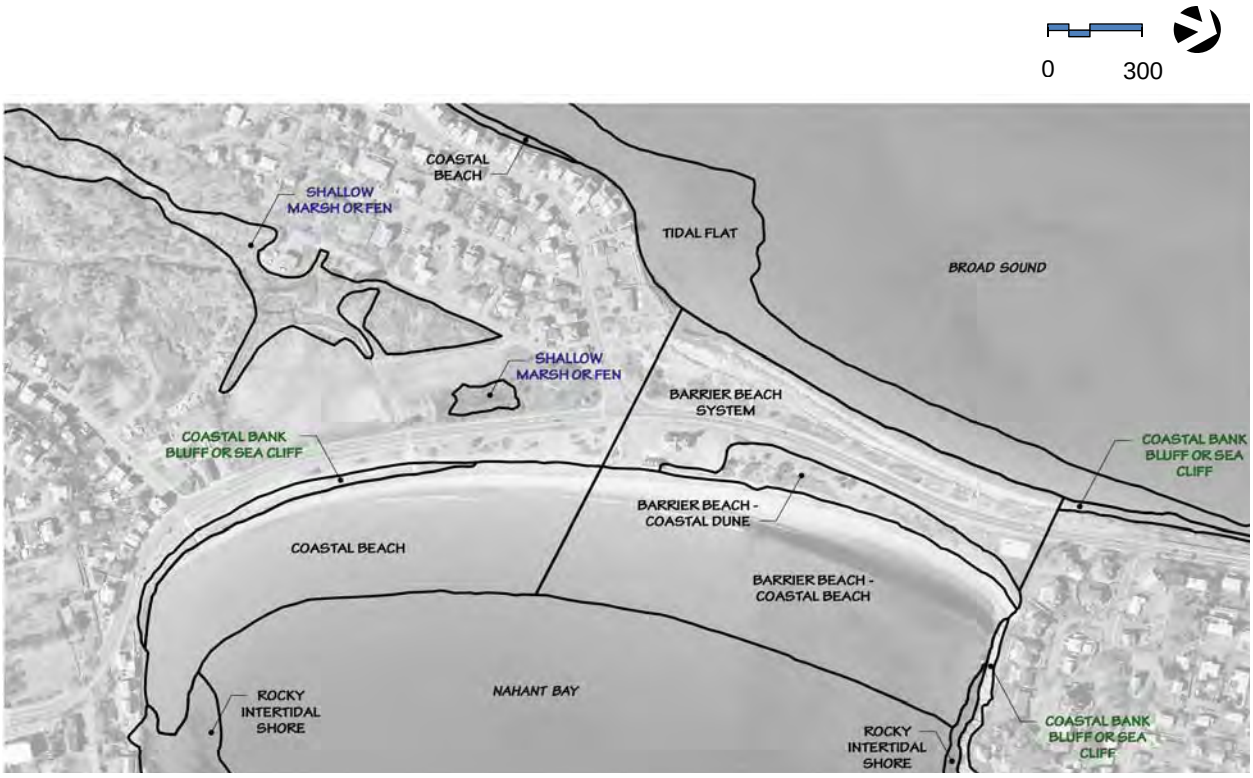

Figure 2-9 Listed Resource areas

2.2 REGULATED RESOURCE AREAS

2.2.1 Coastal Beach

A coastal beach is defined in 310 CMR 10.27(2) as “unconsolidated sediment subject to wave, tidal, and coastal storm action which forms the gently sloping shore of a body of salt water and includes tidal flats. Coastal beaches extend from the mean low waterline landward to the dune line, coastal bank, or the seaward edge of existing man-made structures, when these structures replace one of the above lines, whichever is closest to the ocean”. This resource area is presumed to be significant to storm damage prevention, flood control and the protection of wildlife. The tidal flats are nearly flat parts of a coastal beach that extend from the mean low waterline to the more steeply sloping face of the coastal beach and are presumed to be significant to the protection of marine fisheries and wildlife habitat.

2.2.2 Barrier Beach

Short Beach is identified by the Massachusetts Coastal Zone Management as Barrier Beach Nh-2. Barrier beaches are defined at 310 CMR 29(2) as “a narrow low-lying strip of land generally consisting of coastal beaches and coastal dunes extending roughly parallel to the trend of the coast. It is separated from the mainland by a narrow body of fresh, brackish or saline water or marsh system. A barrier beach may be joined to the mainland at one or both ends”. Barrier beaches are significant to storm damage prevention and flood control and are

likely to be significant to the protection of marine fisheries and wildlife habitat and, where there are shellfish, the protection of land containing shellfish.

2.2.3 Coastal Dunes

Coastal dunes are defined in 310 CMR 10.28(2) as “any natural hill, mound or ridge of sediment landward of a coastal beach deposited by wind action or storm overwash. Coastal dune also means sediment deposited by artificial means and serving the purpose of storm damage prevention or flood control”. Coastal dunes are likely to be significant to storm damage prevention and flood control, and all coastal dunes on barrier beaches and the coastal dune closest to the coastal beach are significant to storm damage prevention and flood control. Coastal dunes can also be significant to the protection of wildlife habitat.

There is a significant amount of land area within Short Beach that consists of sediments meeting the definition for coastal dune. There are also a portions of the area developed with pavement, drainage structures, and coastal-engineered structures. These surface conditions as presently configured do not qualify as coastal dune but are part of the resource areas of coastal bank, land subject to tidal action and land subject to coastal storm flowage.

2.2.4 Rocky Intertidal Shore

Rocky intertidal shore is defined at 310 CMR 10.31(2) as “naturally occurring rock areas, such as bedrock or boulder-strewn areas between the mean high water line and the mean low water line”. This resource is present on either end of Short Beach, where the sandy beach meets the rocky coast. This resource is likely to be significant to storm damage prevention, flood control, protection of marine fisheries and wildlife habitat and where there are shellfish, protection of land containing shellfish.

2.2.5 Land Containing Shellfish

Land Containing Shellfish is defined at 310 CMR 10.33(2) as “land under the ocean, tidal flats, rocky intertidal shores, salt marshes and land under salt ponds when any such land contains shellfish”. Shellfish are further defined in the regulations, and limited to specific species. This master plan did not include any study of shellfish.

2.2.6 Land Subject to Tidal Action

As defined at 310 CMR 10.04, land subject to tidal action means land subject to the periodic rise and fall of a coastal water body, including spring tides. NOAA identifies the spring high tide for Lynn Harbor as 10.7 feet in elevation and for Nahant Bay as 10.4 feet in elevation. Nahant Beach experiences a semi-diurnal (two high and two low tides occurring during each lunar day (24 hours 50 minutes) tidal variation water levels each day. The average difference between high and low water is 9.5 ft. With the maximum water surface variation during spring tides of 10.2 ft. The nearest tide gage to the Nahant Beach is near Boston, which is maintained by the National Ocean Survey (NOS). Tides measured at the Boston gauge are nearly identical to tides at the Nahant Beach.

2.2.7 Land Subject to Coastal Storm Flowage

As defined at 310 CMR 10.04, land subject to coastal storm flowage is 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. There are no performance standards for this resource area.

2.2.8 100-foot Buffer Zone

In accordance with 310 CMR 10.02(2)(b), land located within 100 feet of the coastal beach, dune, and bank is designated as buffer zone. Much of the proposed work is thus within the 100-foot buffer zone to one or more of these resources.

2.2.9 Bordering Vegetated Wetlands

In accordance with 310 CMR 10.55(2)(a), Bordering Vegetated Wetlands (BVW) are freshwater wetlands which border on creeks, rivers, streams, ponds and lakes. The types of freshwater wetlands are wet meadows, marshes, swamps, and bogs. BVWs are areas where the soils are saturated and/or inundated such that they support a predominance of wetland indicator plants. There are at least two areas within the Lowlands that are likely shallow marshes. These include a small rectangular area located between Nahant Road and the Lowlands Parking, and a much larger area located just beyond the outfield area of the playing fields. Any proposed improvements shall not destroy or impair these areas.

2.2.10 Estimated Habitat of Rare Wildlife or Priority Habitat of Rare Species

According to the NHESP, there are no mapped Estimated Habitats of Rare Wildlife or Priority Habitat of Rare Species within the study area.

2.2.11 Important Bird Area

In 2002, Nahant was designated an Important Bird Area (IBA) by the Massachusetts Audubon Society under a statewide initiative to identify and protect sites that contain essential habitat for birds. An IBA is a site providing essential habitat to one or more species of breeding, wintering, and/or migrating birds. According to the Mass Audubon website, “The Nahant Bay area contains diverse habitat, including sandy beaches, mudflats, mussel beds, a large shallow bay, rocky shorelines, brushland, and thickets. These attract a wide array of bird species including several that occur as migrants and are considered endangered, threatened, or of special concern.” [20]

Out of five possible categories, Nahant qualifies as an Important Bird Area based on meeting the following three criteria:

- **Category 1:** Land Birds: The site is an important migratory stopover or seasonal concentration site for migratory land birds (e.g., warblers). Sites may also qualify on the basis of supporting exceptionally high densities of breeding species as shown from point counts or other surveys or if they represent "migrant traps" relative to surrounding areas. Strong consideration will be given to areas with consistently high overall species diversity.

[20] http://www.massaudubon.org/Birds_and_Birding/IBAs/site_summary.php?getsite=61

- **Category 2:** Waterfowl: The site regularly supports 500 or more waterfowl at any one time. The designation "waterfowl" includes birds such as loons, grebes, cormorants, geese, ducks, coots, and moorhens.
- **Category 3:** Sites where birds concentrate in significant numbers in the breeding season, in winter, or during migration.

Figure 2-10: Important Bird Areas - Nahant

2.3 HISTORIC LISTINGS

2.3.1 Nahant Life Saving Station

Designed by architect Victor Mendleheff of the U.S. Lifesaving Service, the NLSS is a unique design among the over 150 stations constructed along the East Coast and Great Lakes during the mid-19th and early 20th centuries. The Station was built over 110 years ago, in response to the loss of eight souls in the 1898 wreck of the three-masted coal schooner *Charles Briggs* on

Short Beach. The NLSS was the only station ever built of "double-edged" architecture, as it is set up to launch surfboats to Nahant Bay, or across what is today Nahant Road, to the waters of Broad Sound.

The Station served in the finest traditions of sea-rescue for some three generations, even as the U.S. Life-Saving Service was merged into the Coast Guard, and until the Coast Guard began to consolidate stations with the advent of more capable rescue boats. The station then served another generation as a Coast Guard Recreational Facility and care taker residence, and was deeded back to the Town of Nahant in 2000. [21]

Figure 2-11: Postcard of U.S. Life Saving Station circa 1905. [22]

The NLSS ("U.S. Coast Guard Life Saving Station") and the adjacent U.S. Coast Guard Station Boathouse are both listed in the Massachusetts Cultural Resource Information System (MACRIS) as NAH 130 and NAH 168, respectively. The NLSS is managed by the Nahant Preservation Trust whose mission is to "*preserve open spaces, historically significant properties, and our conservation lands for public and community benefit*."

[21] http://www.nahantpreservationtrust.org/ourprojects/lifesavingstation.html

[22] http://www.ebay.com/itm/US-Life-Saving-Station-Nahant-MA-Postcard-/330619403015?pt=LH_DefaultDomain_0&hash=item4cfa73bb07

The Coast Guard Life Saving Station is one of four properties in Nahant that falls under a preservation restriction. All properties for which preservation restrictions have been recorded under the state statute are automatically listed in the State Register.

2.3.2 Nahant Beach Parkway

Nahant Beach Parkway is the first 1.5-mile section of access road from the Lynn Rotary to Wilson Road in Little Nahant. This 4-lane section of road is listed as Nahant Beach Boulevard on the National Historic Register as part of the Metropolitan Park System Multiple Property Submission (#03000747). All National Register listings are automatically included in the State Register as well.

The Metropolitan Park System of Greater Boston is a system of reservations, parks, parkways and roads under the control of the Massachusetts Department of Conservation and Recreation (DCR) in and around Boston that has been in existence for over a century. The park system consists of coastal reservations and beaches including Revere Beach, river reservations along the three major rivers in the area, such as the Charles River Reservation, and woodland reservations exemplified by Blue Hills Reservation south of the city. The DCR also manages a system of parkways which serve to connect the urban public to the open spaces; among these are busy streets such as Jamaicaway in Boston as well as secluded park roadways in uninhabited areas such as the Blue Hills Reservation Parkways.

Nahant Beach Parkway is listed as historically significant under the category of architecture and engineering, owing primarily to its association with the larger network of metropolitan parkways. Design of the overall system includes the involvement of the historically important Charles Eliot, a landscape architect who is generally credited with conceiving and promoting Boston's system of interconnected parks.

2.4 ACCESS, CIRCULATION, AND PARKING

2.4.1 Vehicular Access

Nahant Road is a two lane roadway that provides the only means of vehicular access to and from the Town of Nahant. Nahant Road connects to the Lynnway and Lynn Shore Drive via the 4-lane Nahant Beach Parkway.

The posted speed limit of Nahant Road along Short Beach is 30 MPH, although vehicles often drive faster.

Nahant has a population of approximately 3,700 and the MAPC projections of growth indicate only limited expansion, with a projected total population of 3,780 by the year 2030. Traffic volumes along the Parkway were previously recorded by Stantec as part of the DCR's Rehabilitation of the Nahant Beach Parkway.

2.4.1.1 Traffic Volumes and Distribution

Both Off-season and Peak-season weekday and weekend traffic volumes were obtained by Stantec in March 2002 for the DCR's Rehabilitation of Nahant Beach Parkway. The offseason traffic volumes are considered most relevant to this study, as they do not include the seasonal peak traffic that is generally associated with the DCR's Long Beach Parking Lot. While the counts were performed in 2002, there has been no significant change in the population or land-use within Nahant that would be cause for any significant change in traffic volumes or patterns. The counts are thus considered to be valid for analysis.

As detailed in the Expanded ENF for Rehabilitation of Nahant Beach, off-season peak hour traffic volumes on Nahant Beach Parkway range between 165-528 vehicles per direction. In general, one travel lane can accommodate 1,800 passenger cars per hour (PCPH) without making adjustments to the flow rate for such items as lane width, shoulder width, heavy vehicles, and grade. With little change in population anticipated, the current 2-lane roadway section should be adequate to serve future needs.

2.4.1.2 Castle Road Intersection

The Intersection of Nahant Road and Castle Road is a gateway that provides access to the southwest end of Nahant, which includes Bass Point and Bailey's Hill. As shown in figure 2-12, the intersection is a standard T-intersection with channelized turning movements. The NLSS driveway is located directly across from this intersection.

Southbound traffic on Nahant Road is afforded a right turning roadway on to Castle Road, and the geometry here allows cars to navigate this turn without slowing down. This can be problematic for motorists or pedestrians who happen to be around the curve.

Figure 2-12 Castle Road Intersection

2.4.1.3 Spring Road Intersection

Spring Road intersects with Nahant Road at a standard T-Intersection. Traffic flow is controlled by a stop sign on Spring Road. Sight lines at the intersection are restricted by the adjacent buildings on either corner. No issues were reported at this location.

2.4.2 Parking

2.4.2.1 Lowlands Parking

The Town of Nahant has limited beach parking. Only residents who have a valid parking sticker or others that have permission from the town or Police Department can park within the town limits. Parking at the Lowlands accommodates approximately 100 cars, although the irregular space often leads to inefficient parking.

2.4.2.2 Business District Parking

Parallel parking is permitted along both sides of Nahant Road at the business district, approximately from Spring Road to Kennedy Court. Although spaces are not individually striped, there appears to be roughly 25 spaces along each side. Parking signs allow for 30-minute parking.

2.4.2.3 Ward Avenue Parking

Ward Avenue experiences overflow parking for two reasons. First, it is the next best option once the Lowlands lot fills up. Second, although it is signed “No Parking”, vehicles reportedly park here without being ticketed.

2.4.3 Bus

Nahant is a member of the Massachusetts Bay Transportation Authority (MBTA). Bus service to Nahant is provided by MBTA via the Route 439 bus (Central Square, Lynn, Bass Point, and Nahant) from 6:00 AM to 6:00 PM during the weekday. There is no weekend service. Commuter rail service is accessible on the Rockport Line from Lynn Station with travel time from North Station to Lynn Station averaging approximately 22-24 minutes. Alternative service is available via the MBTA Blue Line Subway, accessible at Wonderland Station. The MBTA also provides paratransit service, known as THE RIDE, for the elderly and disabled.

2.4.4 Pedestrian Circulation

2.4.4.1 Beach Path

A 5’ wide paved path runs along the entire length of Short Beach on the eastern side of Nahant Road. This path is located curb side at either end of the beach, and offset through the middle. The path is crossed only by the driveway entrance to the NLSS.

2.4.4.2 Heritage Trail

The Nahant Open Space Committee has developed a continuous trail on town-owned land from the Causeway through the Lowlands Flash Road, and from there on to Bailey's Hill. This trail provides a continuous pedestrian path away from roads and affords opportunities to enjoy natural areas and historic landmarks along the way.

A portion of this trail routes along the beach path at Short Beach, from Little Nahant to the Lowlands. Simple wooden posts with markers designate the route.

2.4.4.3 ADA/AAB Compliance

The beach path running adjacent to Nahant Road is relatively flat and provides an accessible route the length of Short Beach. Unfortunately, the four existing access points to the beach range from 12% at the NLSS, and greater. All of these are well in excess of typical ADA requirements for a ramp (less than 8% gradient).

2.5 UTILITIES

2.5.1 Storm Drainage

There is a closed drainage system in Nahant Road that discharges to ditches in the Lowlands. No other storm drainage is located in Short Beach.

2.5.2 Water

Water to Nahant is supplied and provided by the MWRA. A 14-inch diameter water main runs the length of the causeway and along Nahant Road.

2.5.3 Sewer

All sewerage generated in Nahant is collected and delivered to the City of Lynn for treatment and disposal. An 18-inch diameter ductile iron force main serving the Town of Nahant runs the length of the causeway.

2.5.4 Electric

National Grid electric runs the length of Long Beach underground. This utility goes overhead on the western side of Nahant Road near Wilson Road, and then once again underground just past Little Nahant Road.

2.5.5 Telephone

Verizon phone runs the length of Long Beach underground. Similar to the electric, the line goes overhead on the western side of Nahant Road near Wilson Road, and then once again underground just past Little Nahant Road.

2.5.6 Natural Gas

An 8-inch diameter natural gas main operated by National Grid runs along under Nahant Road. There is a small brick utility building housing a gas regulator located at the intersection of Nahant Road and Castle Road related to this line.

2.5.7 Cable/Fiber Optics

Media One has a fiber optic system that runs the entire length of the reservation and into Nahant. The installation is reported to consist of four, 4-inch conduits. Similar to the electric and phone, these lines go overhead for a brief stretch on the western side of Nahant Road.

3.0 NEEDS ASSESSMENT

3.1 OVERVIEW

The Town of Nahant seeks comprehensive recommendations that will address current concerns associated with the overall management, protection, and use of Short Beach. The scope of this master plan included study and review of the following areas of concern:

- NLSS site
- Beach and Dune Erosion
- Vegetation
- Access & Circulation
- Maintenance

3.2 AREAS OF CONCERN

This section discusses major areas of concern within the study area, as well as potential solutions that were reviewed. Figure 3-2 illustrates existing conditions and issues.

3.2.1 Nahant Life Saving Station Site Improvements

Recent upgrades to the NLSS have given the 110 year old structure a new lease on life. The Town now requires improvements to the site to support current building use.

The NLSS is located on Barrier Beach within an area that is also considered Coastal Dune and Land Subject to Coastal Storm Flowage. Even though it no longer retains many of the more obvious qualities of Coastal Dune (e.g., dune topography, vegetation, substrate), the parcel is still characterized under the Massachusetts Wetlands Protection Act (WPA) as Coastal Dune concerning which, certain activities may be subject to review by the Local Conservation Commission and DEP.

The NLSS is owned by the Town of Nahant and leased to the Nahant Preservation Trust (NPT), which is responsible for the preservation and rehabilitation efforts along with the management of the facility. Now that the reconstruction of the interior of the NLSS is complete, the NPT manages the building and site to accommodate a combination of occupancy by the Nahant Veterans Association, rental for social functions, and educational and interpretive activities. Plans are underway for an interpretive exhibit on the history of the station and of the Lifesaving Service. The second floor will be leased as a residential apartment. The garage was recently rehabilitated and includes two restrooms for Short Beach users.

3.2.2 Beach Erosion and Dune restoration

The Town is interested in determining whether human modifications along Short Beach may have exacerbated the loss and degradation of sand and dune over the years, and what recommendations might lead to the restoration of the dune on and along Short Beach.

Figure 3-1: Postcard of Life Saving Station (Short Beach at the Nahant Life Saving Station prior to construction of the 4-bay garage in 1938. Note the sandy beach and distinct cobble berm of the dune).[23]

3.2.2.1 Beach Nourishment

Beach nourishment was reviewed as a means to improving the overall size and quality of Short Beach. Although beach nourishment (using clean sediment of a grain size compatible with that of the existing beach) may be permitted, there appears no compelling reason for it.

Despite a general perception that the rocky dune demonstrates a system wide loss of sand, it is quite likely that the cobble and stone berm represents the natural condition of the dune. As discussed in section 2.1.6, Short Beach is a small pocket beach that is sheltered by enclosing rocky coasts. By all accounts, there appears to be limited sediment movement into or out of this area. Although there may be some coastal bank erosion on the southern end, the beach and dune in figure 3-1 appears much as it does today, albeit minus the recent vegetation plantings.

On the other hand, sediment transport along the western shore (Doggie Beach) appears to be more pronounced and recent dune growth is noticeable along the shore line and at the edge of Nahant Road. Some speculate that recent sand deposition may be the result of beach nourishment migrating from Revere Beach.

[23] http://www.ebay.com/itm/MA-NAHANT-LIFE-SAVING-STATION-BEACH-VERY-EARLY-T82005-/360370830692?pt=LH_DefaultDomain_0&hash=item53e7c67d64

KEY

1. Broken Pavement / Walks
2. Poor Alignment to Crosswalk
3. Parking / Fencing Impacts Path / Shoulder
4. Unrestricted Access Impacts
5. Basketball Infringes on Dune
6. Little Nahant Playground
7. Overhead Wire Clutter
8. Steel W-Beam Rail
9. Cobra Head Lighting
10. No Passenger Drop-off
11. Inefficient Parking Layout
12. Former Lowlands Playground
13. Poor Walk Alignment
14. Missing Crosswalk
15. Sparse Vegetation
16. No Parking Demarcation

Figure No. 3-2

SHORT BEACH, NAHANT :
EXISTING CONDITIONS

Stantec

3.2.2.2 Sand Fencing

Although the use of sand fencing is an acceptable method of dune building for barrier beaches, there appears to be little need for this measure. Recent successes in dune planting appear to offer a preferred means of trapping the limited sand sources on site.

3.2.2.3 Brown Algae Removal

Despite intensive research conducted by organizations such as Northeastern University Marine Science Center, the National Park Service, Massachusetts Institute of Technology, and the University of Rhode Island, the exact origin of Pilayella littoralis remains a mystery. Scientists working for the National Park Service have suggested that this form of algae may arise on the rocky bottom of the northern New England shoreline and is then transported south by the Gulf of Maine currents. As a result of prevailing winds, tides, waves and optimal geologic features; the algae is trapped and eventually deposited on the beaches surrounding Nahant Bay, Broad Sound, the Cape, and Rhode Island. This region of coastline apparently contains the ideal growing conditions like temperature, light, depth, and level of nutrients that promotes the vigorous growth of this algae. [24]

While eliminating the ocean born algae has not proven feasible, current methods of clearing the algae from the beach include the use of front end loaders and beach rakes. The regular clean-ups have been successful in reducing the odor and decreasing the overall algal growth in the surf zone. With the ongoing support of state, municipal, and federal agencies; the Algae Task Force continues to investigate possible re-uses or more environmentally sound disposal methods for Pilayella littoralis.

Mechanical removal of the algae is further discussed under beach cleaning in Section 4.3.5. Identifying the times of year, the means of beach access, and the designated disposal area are all important considerations.

3.2.3 Vegetation

Efforts by the Town over the past decade have resulted in the establishment of significant plantings along the beach. These plantings consist of American beach grass, Japanese black pine, Bay berry, Rugosa rose, and Beach plum.

3.2.3.1 Dune Planting Success

These initial efforts appear to be successful, particularly towards the northern sections of the dune where there is less foot traffic. At this location, pine trees appear well established and large stands of beach grass, and woody shrubs are apparent. Smaller successes have been achieved at the southern end, although these are compromised by foot paths, bench placement at the crest of the dune, and mowing.

3.2.3.2 Mowing Impacts

[24] http://www.nahant.org/swim/eel_grass_detail.html

Several locations were noted where mowing has impacted young stands of rose and bay berry. Clearly, there needs to be a priority given to native plant growth over mowing.

3.2.4 Vehicle and Pedestrian Traffic and Circulation

The Town has requested an evaluation of the effectiveness of the current vehicle and pedestrian traffic patterns in and around the Short Beach area, with a focus on existing patterns of dune crossings, vehicle drop off areas, walkways and parking lot configuration. In particular the four main areas requested included:

- The Business District
- Lowlands Parking Lot
- Castle Road
- Little Nahant

The Town seeks recommendations on proposed changes to the current vehicle and pedestrian parking and circulation patterns to better preserve and protect the dune and improve public safety issues. In particular, the Town is interested in installing drop off areas in high traffic and congested areas to improve access to the beach.

3.2.4.1 Nahant Road

Study options were reviewed for potential improvements to the section of Nahant Road from Wilson Road to Spring Road. The general consensus was that Nahant Road is an attractive road with parkway-like qualities that works reasonably well with few traffic issues. All other improvements should be weighed against impacts they may have on the function and aesthetics of this important access route. Potential enhancements might include new lighting, removal of remaining overhead wires, and bike lanes.

3.2.4.2 Castle Road Intersection

A number of study options were explored for the Castle Road intersection. As a major node within the study area, there is a desire to improve the safety and function of this intersection, especially at it relates to pedestrian crossings. As discussed in section 2.4.1.2, the free right movement from Nahant Road to Castle Road allows unchecked speeds, and creates a safety hazard. Signalization of the intersection was reviewed and dismissed as existing traffic volumes do not meet the standard signal warrant, and a signal alone would do little to slow the free right on to Castle Road.

Several reconfiguration options were explored to eliminate the intersections unusual configuration, including the following:

- Standard T-intersection: Essentially, this would remove the free right, requiring all cars turning right on to Castle Road to slow there speed to negotiate the turn.

- Modern Roundabout: A roundabout is a type of circular intersection, a junction in which road traffic flows in one direction around a central island. The term “modern” is used to differentiate a roundabout from older rotaries, which generally are larger and allow traffic to move at a faster speed. In a roundabout, entering traffic must always yield to traffic already in the circle, and roundabouts use geometry to slow traffic entering the circle.

Of the options reviewed, the roundabout concept offered several positive benefits including traffic calming, greater safety to traffic and pedestrians, reverse direction capability, and the potential for adding landscape improvements in the center of the circle. Perhaps the greatest improvement offered would be that cars entering the roundabout from Castle Road during rush hour would have access into the circle before Nahant Road traffic. This would effectively eliminate any delays on Castle Road created by the current stop condition.

However, this improvement is considered outside the focus of this study, and further analysis and public input regarding benefits and costs of any scheme is recommended before adoption of such a significant improvement.

3.2.4.3 Beach Goer Drop-Off

With the exception of the gated parking at the NLSS, there are no vehicular accommodations at the beach on Nahant Road. In an effort to unload passengers as close to the beach as possible, cars and sometimes busses (as shown in figure 3-3) stop in the road to discharge or load passengers. This creates safety concerns and can back up traffic during the summer.

Figure 3-3. Bus stopped along Nahant Road (to discharge students).

At the request of the Town, a number of study options for drop-off were developed and reviewed. These included the following

- Nahant Road – East Side Drop-off
- Nahant Road – West Side Drop-off
- Ward Road Drop-off

Of these options, the Ward Road option was preferred. The others were viewed as having to much impact on the road, the pedestrian path, and the coastal dune.

3.2.5 Pedestrian Circulation

Generally, pedestrian circulation throughout the beach is well conceived. Beach access points generally align with the major desire lines at street intersections and the Lowlands Parking area.

3.2.5.1 Beach Access

There are several issues with the existing beach access ramps. The concrete ramps exacerbate wave run-up as they allow incoming waters to speed up. They are also much too steep for typical ADA accommodations.

The federal Access Board issued "Draft Final Accessibility Guidelines for Outdoor Developed Areas" on 10/19/2009. These currently apply only to federal outdoor recreational Facilities (for example the U.S. Forest Service), or to those that are developed by state, local, or private entities on behalf of a federal agency. Although not yet enforceable or applicable to most Massachusetts development, the draft guidelines provide excellent guidance for designing accessible outdoor recreational facilities, including beaches.

There are a number of issues related to the amount of maintenance that may be required for accessible routes at ocean beaches and the impact on budgets and staffing. Appropriate non-structural systems require routes to be temporarily moved or stored during storm surges, extreme tides, beach maintenance and replenishment efforts. Most route systems stop short at the high water mark, although this point is not fixed and fluctuates due to a number of environmental factors.

Under the pending ADA updates, an entity is required to provide at least one beach access route for each ½ mile of shoreline managed by the entity. The beach access route is required to coincide with or be located in the same area as pedestrian access points to the beach. An exception limits the number of beach access routes required to not exceed the number of pedestrian access points provided by the entity to the beach.

Within the revised regulations, there is provision to allow a running slope of up to 1:10 (10%) for a total of 30 feet, with resting intervals at either end. Even with this provision, the current beach ramps would be non-compliant. As the dune face is roughly in the 12%-20% range, conformance to the regulations would likely require modification of the dune, which is contrary to barrier beach standards . Under the Forest Service Outdoor Recreation Accessibility Guidelines

(FSORAG), there are four conditions for departure from the regulations. These departures include the following:

- Where compliance would cause substantial harm to cultural, historic, religious, or significant natural features or characteristics.
- Where compliance would substantially change the nature of the setting or the purpose or a portion of a facility or would not be consistent with the applicable land management plan.
- Where compliance would require construction methods or materials that are prohibited by federal, state, or local law.
- Where compliance would be impractical due to terrain or prevailing construction practices.

At this juncture, no improvements are proposed.

Figure 3-4. Dune plants impacted by mowing (photo showing plantings of Rosa rugosa and American Beach grass on Town -owned dune. Note how portion of rose clump has been topped by unnecessary mowing).

3.2.6 Best Management Practices

There is a clear need to coordinate ongoing management activities at the beach, as several contradicting activities were noted. Figure 3-4 shows one consequence of mowing to close to dune plantings. Another example is represented by the benches located atop the dune berm.

The Town seeks to develop guidelines consisting of Best Management Practices for the continued management and maintenance of Short Beach. This management plan should address the following:

- Access control fencing
- Mowing protocols
- Beach cleaning protocols
- Indigenous planting

4.0 RECOMMENDATIONS

4.1 INTRODUCTION

The Master Plan shown in figure 4-1, is divided into three separate parts as follows:

- Nahant Life Saving Station Site Improvements
- Short Beach Restoration & Management Activities
- Auto and Pedestrian Circulation Enhancements

4.2 NAHANT LIFE SAVING STATION (NLSS) SITE IMPROVEMENTS

The purpose of the proposed work is to rehabilitate the NLSS facility to meet the following goals:

- Provide improvements to site and parking facilities;
- Improve and enhance the site's relationship to beach and dune;
- Improve and enhance the site's relationship to Nahant Road; and
- Improve overall quality of site landscaping, walks, and lighting.

The proposed project provides elements necessary to support and enhance facility uses while protecting adjacent natural resources and restoring a portion of previously developed dune within the project site. The following sections describe each major element of the proposed work.

4.2.1 Parking Area

The existing paved parking will be improved by removing the broken asphalt and replacing it with a pavement acceptable to CZM/DEP. Access to this parking lot will continue to be gate controlled, using the existing leaf gate. A stone infiltration trench will be used to comply with DEP Best Management Practices as they relate to storm water treatment and infiltration.

4.2.2 Pedestrian Walks

The existing site walks consist of varying ages of concrete. Many of the older walks are crumbling and in need of maintenance or replacement. All walk replacements should balance the site's sensitive environmental setting, with a need to provide the most firm and stable surface possible for handicap accessibility. The front walks will be replaced nearly in-kind, mimicking the dual entrance of the old station. The existing concrete walk to the beach near the garage will be left in place to maintain access to the beach as well as a door on the north side of the garage.

4.2.3 Perimeter Fence

The existing, rusted chain link fence along the north side of the property should be removed and replaced with a timber, post and rail fence to match adjacent fencing. The existing fence along the east side of the parcel will be left in place and the missing gate leaf will be replaced to allow control of pedestrian traffic to and from the beach.

4.3 SHORT BEACH RESTORATION & MANAGEMENT ACTIVITIES

Under the Massachusetts Wetlands Protection Act, two of the three most important functions of a barrier beach are storm damage prevention and flood control. Barrier beaches deflect the force of onshore waves, and function as energy absorbers during coastal storms. Healthy dunes on a barrier beach reduce flooding, therefore dune plants should not be mowed, foot traffic should be reduced and construction limited.

Improvements at Short Beach are geared towards the following:

- Dune stability
- Public recreation and beach access
- Wildlife protection

In addition to the master plan recommendations, certain management protocols should adopted to support the overall project goals. These are shown in figure 4-2.

Healthy dunes reduce erosion of the foreshore during storms by acting as sediment supply. Dunes and beaches can be further improved through the implementation of dune plantings. The Town's efforts to promote beach grass and native plants will be enhanced through the use of access control fencing, which is intended to reduce the harmful effects of foot traffic upon the dune.

4.3.1 Basketball Court Removal

The half-court basketball court at Little Nahant Playground is rarely used, and intrudes into the dune area. As a best management practice, this court is proposed to be removed and the area fenced and protected as dune.

4.3.2 Bench Relocation

Benches located along the dune crest contribute to foot damage to plants, and are in harms way of storm waves. All of these benches should be relocated to other areas outside fragile resource areas.

4.3.3 Access Control Fencing

Short Beach is vulnerable to foot traffic, which damages vegetation and accelerates erosion. The use of fencing should be employed to restrict pedestrian traffic to designated paths. A combination of fences is required to provide the proper protection.

KEY

1. NLSS Site
2. Path Realignment to Crosswalk
3. Retain Existing Fence & Path
4. Access Control Fencing
5. Half Court Basketball Removal
6. Playground Perimeter Modifications
7. Overhead Utility Burial
8. Steel-Backed Timber Rail
9. 1907 Std. Light Fixture
10. New Entry with Drop-off
11. Reconfigured Parking with Stormwater Garden
12. Wetland Impact Mitigation
13. Reconfigured Pedestrian Walks
14. Additional Crosswalk
15. Dune Planting / Tree Buffer
16. Parallel Parking Demarcation

Figure No. 4-1

SHORT BEACH, NAHANT : MASTER PLAN

Stantec

MOWING REGIME

- Zone A - No Mowing (No Access)
- Zone B - Annual Mowing
- Zone C - Weekly Mowing

BEACH CLEANING

- No Restrictions
- Seasonal Restrictions (Migratory Birds)
- Wrack / Algae & Stone / Overwash Placement
- Maintenance Vehicle Access

—MHW— Mean High Water

—MLW— Mean Low Water

Figure No. 4-2

SHORT BEACH, NAHANT :
MANAGEMENT PLAN

Stantec

Figure 4-3: Example of Post & Rail Fence

4.3.3.1 Wood Post & Rail Fencing

The use of wood post & rail fence, as shown in figure 4-3, is recommended along the landward side of the dune (i.e. back dune). This fencing should be installed and maintained to eliminate destructive foot traffic cutting across dunes. This fence will act as a deterrent to foot traffic, will not affect winds or restrict wildlife, and provides an appropriate visual character for the beach.

Figure 4-4. Example of Post & Rope fence

4.3.3.2 Post & Rope Fencing

The use of post & rope fence, as shown in figure 4-4, is recommended along the beach face of the dune. This fence should be installed and maintained to deter foot traffic across dunes from the beach side.

Post & rope fencing is intended as a reminder to beach patrons to stay off dunes. The light weight design of this fence is intended to allow the free passage of wildlife and wave run-up. If necessary, this fence can be pulled up prior to large storms, or reset if dislodged. The rope also helps restrain posts that may be knocked down from being washed away.

4.3.4 Dune Planting

In combination with access control fencing, additional dune planting is encouraged throughout Short Beach as efforts to date have shown promising results. Areas of focus include the following:

- The southern end of Short Beach
- Adjacent to Little Nahant Playground
- 20-foot-wide area of previously disturbed Coastal Dune located inside of the existing chain link fence along the eastern edge of the NLSS parcel

Each of these areas should utilize plugs of "Cape" American beachgrass (*Ammophila breviligulata*) and other native beach community plants. An excellent source of dune plants is provided on Massachusetts Coastal Zone Management's site at the following link: http://www.mass.gov/czm/coastal_landscaping/dune.htm.

Japanese black pine was used in recent efforts, but should be avoided as it is not indigenous to Short Beach. Rugosa rose was also used, and although native in some locations, it should be used with caution as it can out-compete other valuable species

4.3.5 Beach Cleaning

A Management Plan for beach cleaning should be weighted towards maintaining barrier beach health. Beach cleaning (or grooming) is known to have at least three negative sides effects including destruction of beach grass seedlings; aeration of wet sand (making it prone to wind), and heavy equipment impacts on shore-birds, invertebrates, and terrestrial insects. However, it is also recognized that not all beach deposits are organic, and heavy accumulations of wrack, particularly in combination with brown algae can make the beach intolerable.

4.3.5.1 Wrack Removal

Wrack is important to prevent beach erosion and contributes sand and seeds for dune plants establishing the frontal dune. It also provides nourishment for birds and other dune wildlife. The following protocols should be used in developing a town wide policy for Short Beach:

- Wrack removal should be the exception rather than the rule.
- Whenever possible, chose manual litter removal over equipment use.
- When deemed necessary, move the wrack to the fore dune area. Equal distribution along the beach is important.
- Do not remove organic material from the beach. Sufficient wrack should be left on the beach in order to provide a seed source, nutrient source, and foraging habitat for shorebirds.

- As Short Beach is an important staging area to migratory birds, wrack removal should be prohibited from April 1 to September 15. As this is also prime beach season, this restriction should be implemented on the more remote northern half of the beach.

4.3.5.2 Brown Algae

Similar to wrack removal, brown algae raking should be limited to the worst times during the summer months. An important consideration is to avoid routine cleaning, which might produce a sterile beach environment.

4.3.5.3 Stone and Cobble Overwash

During major coastal storms, stone and cobble are washed up on to the dunes, across pavements, and into lawn areas. The Blizzard of ’78 deposited several feet of material onto Nahant Road. Stone and cobbles are natural by-products of glacial erosion. Eroding beaches with low volumes of incoming up-drift sediment generally contain sizable volumes of cobbles in the near-surface substrate. Cobble on a beach provides for substrate which helps provide elevation to the beach profile or berm. A high sandy or cobble berm provides storm damage prevention and flood control for landward areas.

The practice of stone and cobble removal from beaches is generally inconsistent with the performance standards under the Massachusetts Wetlands Protection Act. Continued removal of overwash material from the barrier beach may have the long term impact of narrowing the barrier by starving it of needed sediment.

The preferred management option for removal of overwash materials from roads and parking lots is to place the overwash material back onto the pre-storm location, or if possible, slightly landward of this location.[25] A likely location for depositing such material would be in the area between the dune crest and the beach path. Further coordination with the Conservation Commission and/or DEP is recommended to develop a detailed protocol for placement of overwash material.

4.3.6 Mowing Management Regime

As noted in section 3.2.3.2, current mowing practices are limiting the free growth of plants. A plan to reduce the area mowed would allow native plants already present to flourish. This would increase the dunes for a healthier coastal bank and would reduce the cost of purchasing and planting more of the same plants. The following mow zones are proposed:

- Zone A - A narrow area of turf bordering the sidewalk should be routinely mowed to a height of 4 inches.

[25] Guidelines for Barrier Beach Management, A Report of the Massachusetts Barrier Beach Task Force, February 1994

- Zone B - The turf beyond that should be mowed once a year in September to a height of 4- 6 inches. This would promote healthy ground cover and biodiversity as well as the natural beauty of wildflowers.
- Zone C – Area within the fenced limits of dune. This area is never mowed.

4.3.7 Important Bird Area

Recreational beach use is a constant disturbance to roosting and foraging gulls and shorebirds. Fortunately, the largest concentration of birds is typically where the most algae accumulates, deterring the general public from those areas. It would be very beneficial for roosting shorebirds if even a small portion of the beach where the algae most often accumulates could be roped off seasonally as a no-entry area. Unleashed dogs are a frequent problem and often chase roosting or foraging birds.

4.4 AUTO AND PEDESTRIAN CIRCULATION ENHANCEMENTS

4.4.1 Public Drop-off

Short Beach is generally considered a local beach and consequently does not offer parking or circulation systems to support the influx of large regional crowds. The goal of the project is to maintain Short Beach as a local recreational facility and to consequently reinforce and improve the local character of the beach and its amenities.

The lack of adequate passenger drop-off adjacent to the beach was identified as a deficiency in the existing infrastructure. In order to improve traffic safety along Nahant Road, the master plan recommends an improved entrance drive and drop-off at the Lowland Parking area off of Ward Road. This location was selected for the following reasons:

- Improves traffic flow and access to parking area and park,
- Provides passenger drop-off away from traffic along Nahant Road,
- Avoids additional curb cuts along Nahant Road

4.4.2 Parking Improvements

Reconfiguration of the parking to a one-way circulation is recommended in conjunction with the proposed entry and drop-off. Approximately 100 designated parking stalls and a one-way circulation would allow for safer and more efficient operations. One-way operation also allows a reduction in lane width, and would provide room for two full-bay of parking and storm water treatment.

4.4.3 Wetland Mitigation

For potential disturbance of adjacent wetland in around the parking area, the master plan recommends a wetland restoration element. This is proposed at the site of the former playground area, which appears to be wet and too close to Nahant Road.

4.4.4 Walkway Reconfiguration

Reconfiguration of the pedestrian walkways at the corner of Lowlands Park is proposed to provide functional and efficient access from the new drop-off to the crosswalk at the intersection of Nahant and Castle Road. This new configuration integrates and improves the visibility of the existing war memorial.

4.4.5 Crosswalk Improvements

Continued seasonal repainting of cross-walks is recommended in order to maintain their visually acuity. The continued use of marker pylons in the center of the road during peak beach season is also recommended as a safety practice. These pylons serve as a wake up to drivers that are not focused on the pedestrian crossing.

The master plan also includes the addition of three crosswalks at the following locations:

- Nahant Road near the Little Nahant Playground: This would support safe access from the beach path over to the walking path on the western side of Nahant Road. This also provides access from Little Nahant to Doggie Beach.
- Ward Road: crosswalk missing despite existing sidewalk network.
- Castle Road: This would support safe access from the Lowlands parking over the Doggie Beach.

4.4.6 Burial of Overhead Wires

The Town has expressed an interest in burying the remaining section of overhead lines along Nahant Road (from Wilson Road to Little Nahant Road). Removal of this short section of wires and poles would create a 2-mile free stretch of road from the Nahant Business District all the way to the Lynn Rotary. This would significantly enhance the scenic character of the Town's gateway. Although not without expense, removal of these overhead wires would place these vital utilities away from the threat of ice and wind storms.

4.4.7 Decorative Street Light Fixtures

The timing of the master plan improvements following the State's restoration of Nahant Beach Parkway presents a rare opportunity for the Town. The replacement of the existing cobra head light fixtures with the DCR's 1907 light standard is recommended. This light fixture is the same unit that will be used along the 1.5-mile section of the Nahant Beach Parkway reconstruction project. As one of the few vertical elements along this stretch of coastal road, the consistent use of the 1907 standard (regardless of road ownership) will visually unite Nahant's main entrance road in its entirety from the Lynn Rotary to the Nahant business district.

4.4.8 Steel-backed Timber Guard Rail

Further building on the Nahant Beach Parkway reconstruction, the replacement of steel guard rail from Wilson Road to Little Nahant Road with the same steel backed timber rail will further unify the road corridor.

4.4.9 Bike Shoulders

Nahant Road measures as a 30’-32’ wide roadway. This is currently configured as two travels lanes and no shoulders. The master plan recommends consideration of restriping the road as two 12’ wide lanes and 4’ minimum shoulders. Although not the full 5’ width of a bike lane, this reconfiguration will allow use of the shoulders by bikes.

5.0 COSTS & FUNDING

5.1 ESTIMATED COSTS

5.1.1 Probable Cost Estimate

The following is provided as an order of magnitude cost for the recommended improvements.

Item #	Item/Remarks	Total	Unit	Unit Cost	Cost	Subtotal
00001	**NAHANT LIFE SAVING STATION**					***$37,275.00***
1	Parking Improvements	1	LS	$18,000.00	$18,000.00	
2	Stone Infiltration Trench	85	LF	$15.00	$1,275.00	
3	Fencing Improvements	1	LS	$9,000.00	$9,000.00	
4	Walkway Improvements	1	LS	$9,000.00	$9,000.00	
					$37,275.00	

Item #	Item/Remarks	Total	Unit	Unit Cost	Cost	Subtotal
00002	**SHORT BEACH RESTORATION & MANAGEMENT**					***$270,054.00***
1	Basketball Court Removal	230	SY	$15.00	$3,450.00	
2	Wood Post & Rail Fencing	2,700	LF	$12.00	$32,400.00	
3	Post & Rope Fencing	2,700	LF	$4.00	$10,800.00	
4	Dune Planting - Area 1	1,343	SF	$3.00	$4,029.00	
5	Dune Planting - Area 2	20,250	SF	$3.00	$60,750.00	
6	Dune Planting - Area 3	25,600	SF	$3.00	$76,800.00	
7	Dune Planting - Area 4	27,275	SF	$3.00	$81,825.00	
					$270,054.00	

Item #	Item/Remarks	Total	Unit	Unit Cost	Cost	Subtotal
00003	**AUTO AND PEDESTRIAN CIRCULATION AND ENHANCEMENTS**					***$641,400.00***
1	Drop-off Area	1	LS	$39,000.00	$39,000.00	
2	Parking Area Reconfiguration	1	LS	$15,000.00	$15,000.00	
3	Crosswalk	6	EA	$150.00	$900.00	
4	Burial of Overhead Wires	620	LF	$500.00	$310,000.00	
5	Street Light Fixtures	20	EA	$10,000.00	$200,000.00	
6	Steel Backed Timber Guard Rail	620	LF	$75.00	$46,500.00	
7	Wetland Mitigation Area	6000	SF	$5.00	$30,000.00	
					$641,400.00	

Table 5-1: Probable estimates of costs.

6.0 RECOMMENDED ADDITIONAL STUDY

Figure 6-1: Aerial Photo – North Lowlands (image of the northern lowlands including public parking, ball fields, compost area, and marshland with hiking trail).

6.1 NORTH LOWLANDS MASTER PLAN

The entire Lowland area including the golf course, stretches from Short Beach to Bailey's Hill, and totals some 59.3-acres. The northern Lowlands, situated between Nahant Road and Flash Road, is comprised of four major spaces totaling 30.9-acres. These areas include the 0.5-acre Lowlands Playground, the 4-acre Lowlands Ball Field, the 1.4 acre Spring Road basketball court, and almost 25-acres of open space that consists of compost area, lobster trap storage, drainage channels, trails, wetlands, and tangled woods.

Much of this area exhibits historic disturbance, and is replete with stagnant channels, invasive species, clutter and debris. Despite all of these negatives, this area represents the single largest open space in the town, and truly represents a diamond in the rough. Akin to Boston's Back Bay Fens, the proper restoration and enhancement of this area could significantly improve the areas function for flood storage, natural habitat, scenic and recreational open space, as well as town utility for composting and as a lobster trap storage area.

Important elements of the study would include the following:

- Hydrology: Major drainage ditches for surrounding low lying residential neighborhoods tie into the Lowlands. High water from Short Beach storm surge (or from Broad Sound) runs to this area. An understanding of the areas hydrology is required for informed decision making.
- Water Quality & Habitat: Stagnant and eutrophic conditions appear present. Improvements should consider various methods of improving and diversifying water habitat.
- Wetlands: delineation and quantification of wetland resource areas is required.

- Town Compost and lobster storage: Improved layout of this area is required to delineate areas from adjacent natural resources
- Management Plan: The Development of a management plan for the entire area is needed to address wetland and flooding protection, protect wildlife habitat, improve recreational offerings, facilitate safe and efficient access, and to underscore the workings of the compost and storage areas. The management plan would also outline department responsibilities and jurisdiction.

7.0 ACKNOWLEDGEMENTS

This master plan has been prepared through a collaborative effort that involved the following individuals:

Town of Nahant

Mark Cullinan, Former Town Administrator

Town Administrator's Advisory Group:

Cal Hastings, Planning Board
Linda Pivacek, Open Space Committee
Michael Rauworth, Nahant Preservation Trust
Lynne Spencer, Community Preservation Committee
Ellen Steeves, Conservation Commission

Stantec Planning and Landscape Architecture, P.C.

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Chris Fee, Landscape Architect

End of Document