

WASHINGTON STREET RESILIENCE FRAMEWORK PLAN

EXECUTIVE SUMMARY AND CONCEPTUAL DESIGN
FOR FRANCIS STREET BEACH AND
WASHINGTON STREET CORRIDOR, NANTUCKET

FALL 2022



SCAPE

PROJECT AREA OVERVIEW

The Washington Street corridor is a key transportation route along Nantucket Harbor, connecting Downtown Nantucket to the Creeks salt marsh and the greater island. This 0.25-mile-long stretch of Washington Street, extending from Commercial Street to the north to Francis Street to the south, is also an active waterfront in summer months. The beach along the corridor is a dynamic coastal environment with a diverse range of habitats including coastal dunes, beaches, and stormwater wetlands. Washington

Street hosts essential transportation infrastructure connecting Downtown Nantucket to the rest of the island, including pedestrian, bicycle, transit, and freight connections. While the area is offered some protection from storms due to its location within the relatively sheltered Nantucket Harbor, Washington Street already experiences significant flooding during major storms and Nor'easters. This vulnerability to coastal flooding is anticipated to increase with sea level rise.



DESIGN GOALS

We envision Washington Street as a waterfront that embraces water, allows for the adaptation of coastal habitats over time, and provides access and recreation for people of all ages and abilities. The design is intended to build upon and work seamlessly with the strategies outlined in the *Nantucket Coastal Resilience Plan* (2021).

Five goals guide the overall design of the site:

- Absorb, buffer, embrace water.
- Cultivate the health and resilience of ecosystems.
- Create accessible waterfront experiences for people.
- Reduce risk to critical infrastructure.
- Develop feasible, adaptable, and implementable solutions.



WATER

- Elevate coastal habitats to buffer water
- Pair elevational features with stormwater strategies to absorb, store and convey water
- Maintain use of Washington Street in sunny-day conditions through 2050



HABITAT

- Create dynamic dune landscapes building on existing high points along the coastline
- Expand stormwater habitats on inland parcels at low elevations to manage stormwater runoff
- Establish salt marsh habitats and/or living shorelines north of the Town dock for habitat migration



PEOPLE

- Create an accessible multi-use path for pedestrians and cyclists of all ages and abilities
- Establish recreational landing areas that bookend the site and integrate secondary pathways for beach access



LEGEND

- Potential Connective Water Trail
- - - - Multi-use Connective Coastal Recreational Trail
- Land Bank parcel
- Open Space
- Open Water

WASHINGTON STREET FRAMEWORK PLAN

EXISTING CONDITIONS

The Nantucket Islands Land Bank (NLB) and the Town of Nantucket own more than 25 parcels within the study area, with a mix of Town-owned facilities, residential development, and open space. The shoreline conditions change from a rocky edge at Petrel Landing to the north to a publicly accessible beach that runs along the shoreline to Francis Street Beach, with several revetments and bulkheads for additional protection between 44 and 66 Washington Street.

LEGEND

- Concept Parcels
- Master Plan Extent
- Shoreline Bulkhead
- Sandbags
- ⚡ Outfall
- Private Buildings
- Land Bank/ Town Buildings
- ▨ Land Bank Parcels
- ▨ Town Parcels
- MHW 2008





Francis Street Beach facing Nantucket Harbor



Harbormaster building and Town Dock



View from 71-73 Washington Street, facing Francis Street intersection and beach



Washington Street is a key local transportation corridor

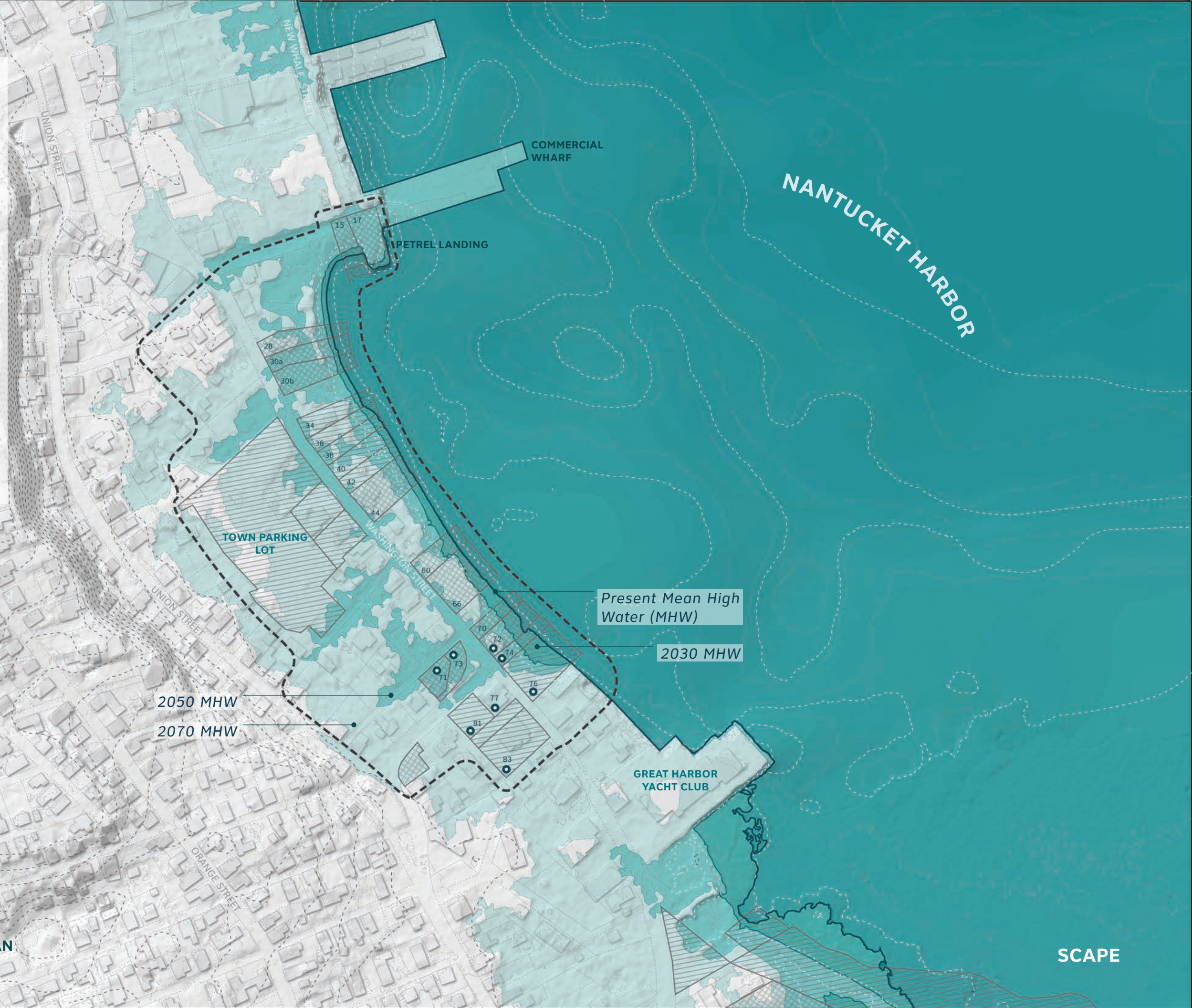
FLOOD RISK

As part of the coastal vulnerability assessment for the Washington Street Corridor, Woods Hole Group developed sea level rise projections based on the Massachusetts Coast Flood Risk Model (MC-FRM). In addition to an increased probability of flooding during a storm, projections indicate that sea-level rise will result in a rising elevation of the daily mean high water (MHW). As high tides increase in elevation, shallow flooding will begin to impact Washington Street daily from multiple flood pathways as soon as 2050. High tide flooding will impact most of the study area as soon as 2070. This Resilience Framework Plan proposes adaptations including dune restoration and coastal flood infrastructure to mitigate sunny day flooding impacts on Washington Street.

LEGEND

- Concept Parcels
- Master Plan Extent
- 2070 MHW
- 2050 MHW
- 2030 MHW
- Present MHW
- Land Bank Parcels
- Town Parcels

Data Source: MC-FRM



ECOSYSTEMS AND HABITATS

The coastline of the Washington Street Corridor is predominantly an unarmored beach with low coastal dunes and vegetation. A wooden bulkheaded lines the Nantucket Islands Land Bank's property at 66 Washington Street and several residential properties south of the study area, including the Great Harbor Yacht Club. South of the Great Harbor Yacht Club, the shoreline transitions to the more natural salt marsh and a barrier beach condition at the Creeks. Eelgrass meadows just offshore provide habitat for a number of endangered species, including the last commercially viable "wild" bay scallop fishery in the U.S. Despite declines of eelgrass habitats in the Harbor, the relatively undeveloped watershed east of the Great Harbor Yacht Club supports healthy eelgrass habitats.

LEGEND

- Concept Parcels
- Master Plan Extent
- Coastal Dune
- Coastal Beach
- Salt Marsh
- Barrier Beach
- Shallow Marsh
- Eelgrass Area
- Shellfish Area
- Land Bank Parcels
- Town Parcels
- MHW 2008

WASHINGTON STREET FRAMEWORK PLAN



SCAPE

TRANSPORTATION, RECREATION, AND ACCESS

Washington Street is a key transportation corridor for the island, serving as the designated route for cars and trucks traveling to and from the ferry terminal. Long-term parking at the town lot crucially supports parking needs for residents and visitors downtown. Washington Street is also a key route for Nantucket Regional Transit Authority Wave shuttles and bicyclists traveling to and from the Creeks and beyond. Water access points along Washington Street include the Town Dock and beach access and kayak launch points such as Francis Street Beach.

LEGEND

- Concept Parcels
- - - Master Plan Extent
- Shoreline Bulkhead
- - - Sandbags
- ⚓ Marina
- ⚓ Boat Access
- 🏖️ Beach Access
- 🚌 Regional Transit/ Bus Stop
- P Long Term Parking
- 🚶 Pedestrian Crossing
- Sidewalk
- ⋯ Bike Route
- ▨ Land Bank Parcels
- ▨ Town Parcels
- 🌊 MHW 2008



FRAMEWORK PLAN TYPOLOGIES



ACTIVE WATERFRONT LANDING



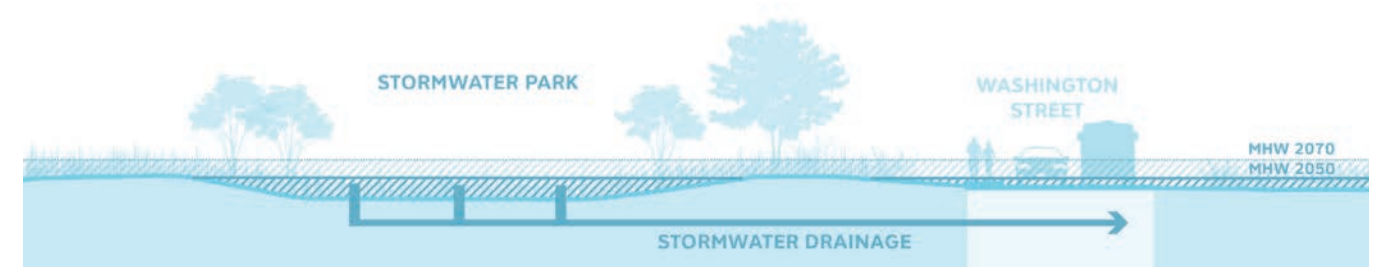
BEACH RECREATION



COASTAL AND DUNE HABITAT



WATER MANAGEMENT



ACTIVE WATERFRONT LANDING

- Parcels located at major pedestrian/ bicycle access points
- Open, porous edges to welcome people from multiple directions
- Clustered seating, shade & spaces for gathering
- Interpretive landscapes and educational opportunities



BEACH RECREATION

- Beach access
- Support recreational activities that engage the water: swimming, nature play, beach volleyball, fishing, kayaking
- Enhance beach access and amenities
- Elevational features to buffer water/waves



COASTAL AND DUNE HABITAT

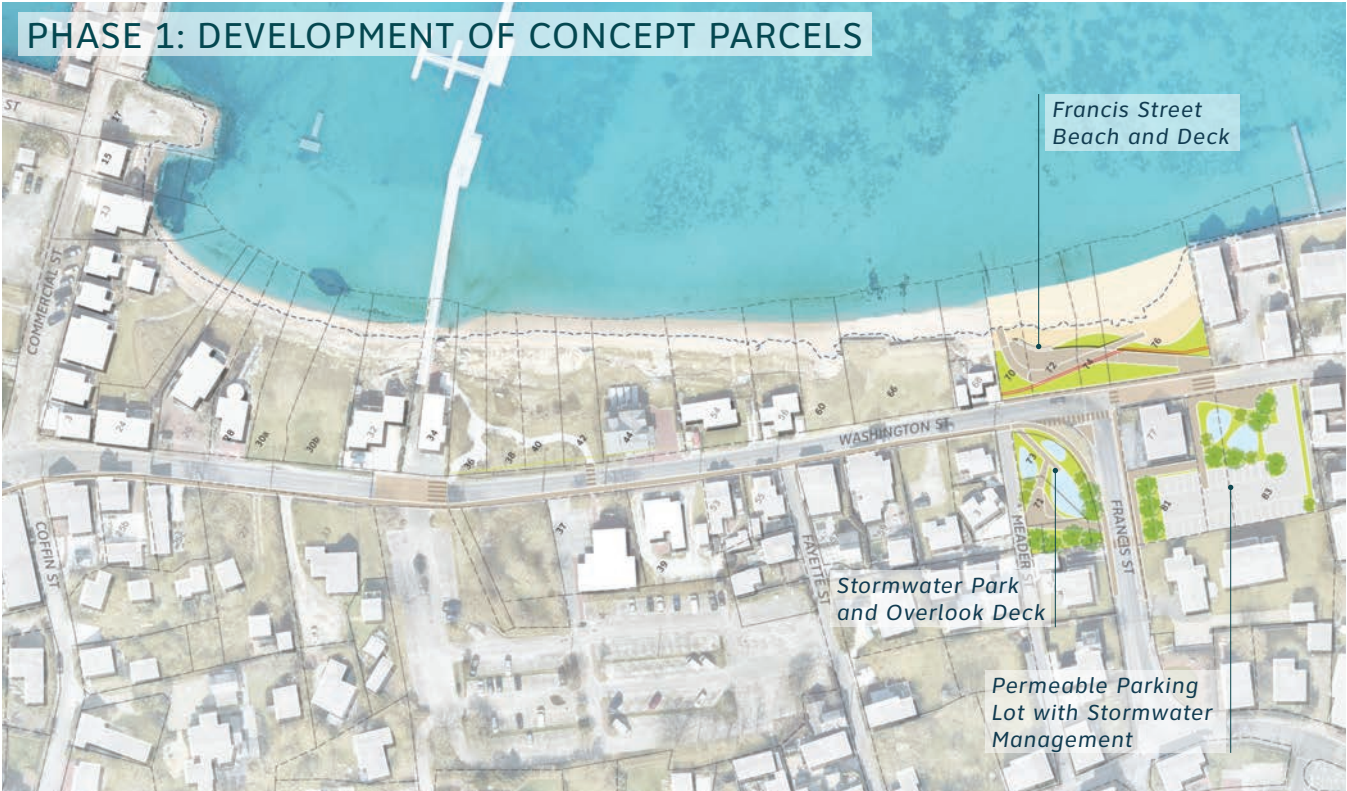
- Coastal sites that experience tidal action
- Focus on supporting habitat creation and ecosystem resilience
- Passive recreation and access and immersive pedestrian experience
- "Pause places" for respite and views
- Elevational features to buffer water/waves



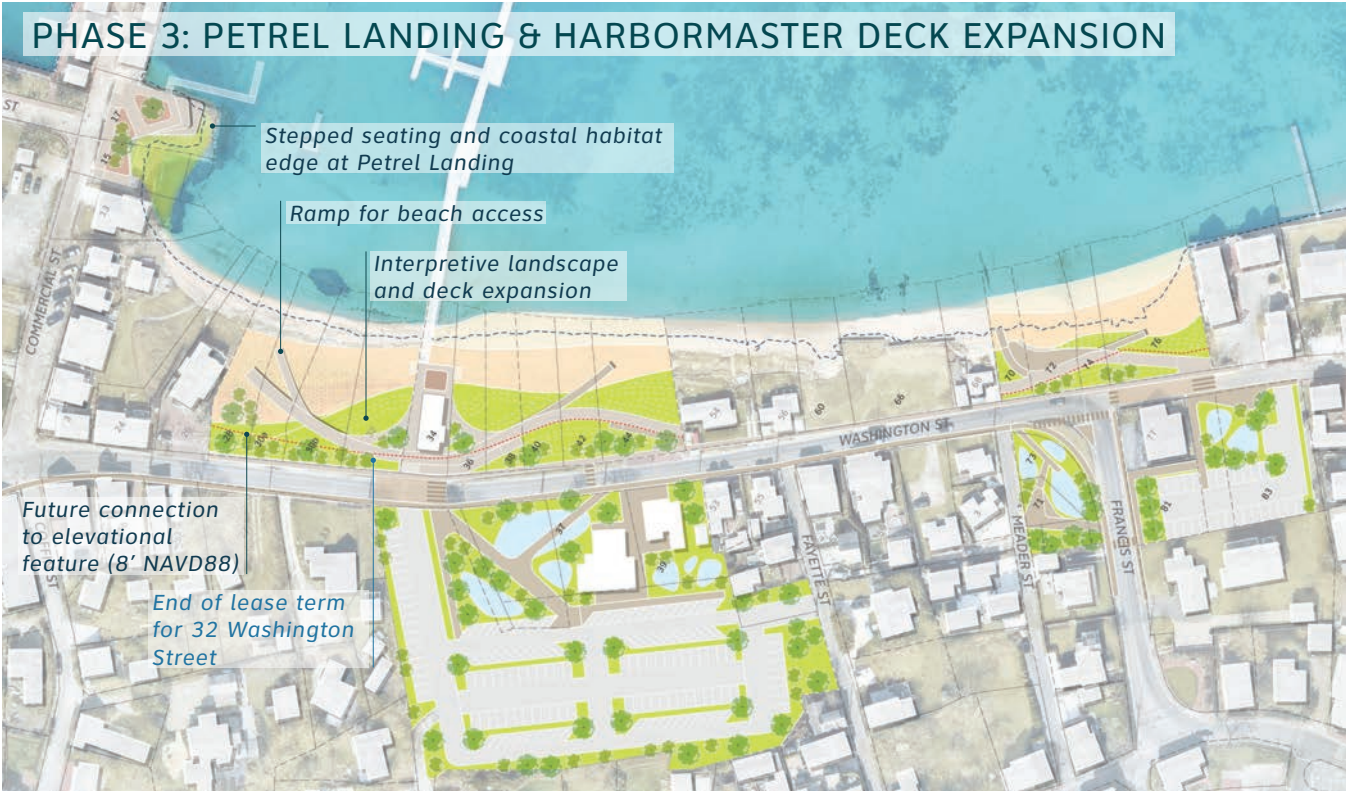
WATER MANAGEMENT

- Low-lying interior parcels
- Design to manage and absorb stormwater water
- Smaller "pause places" for respite and views
- Interpretive landscapes and educational opportunities

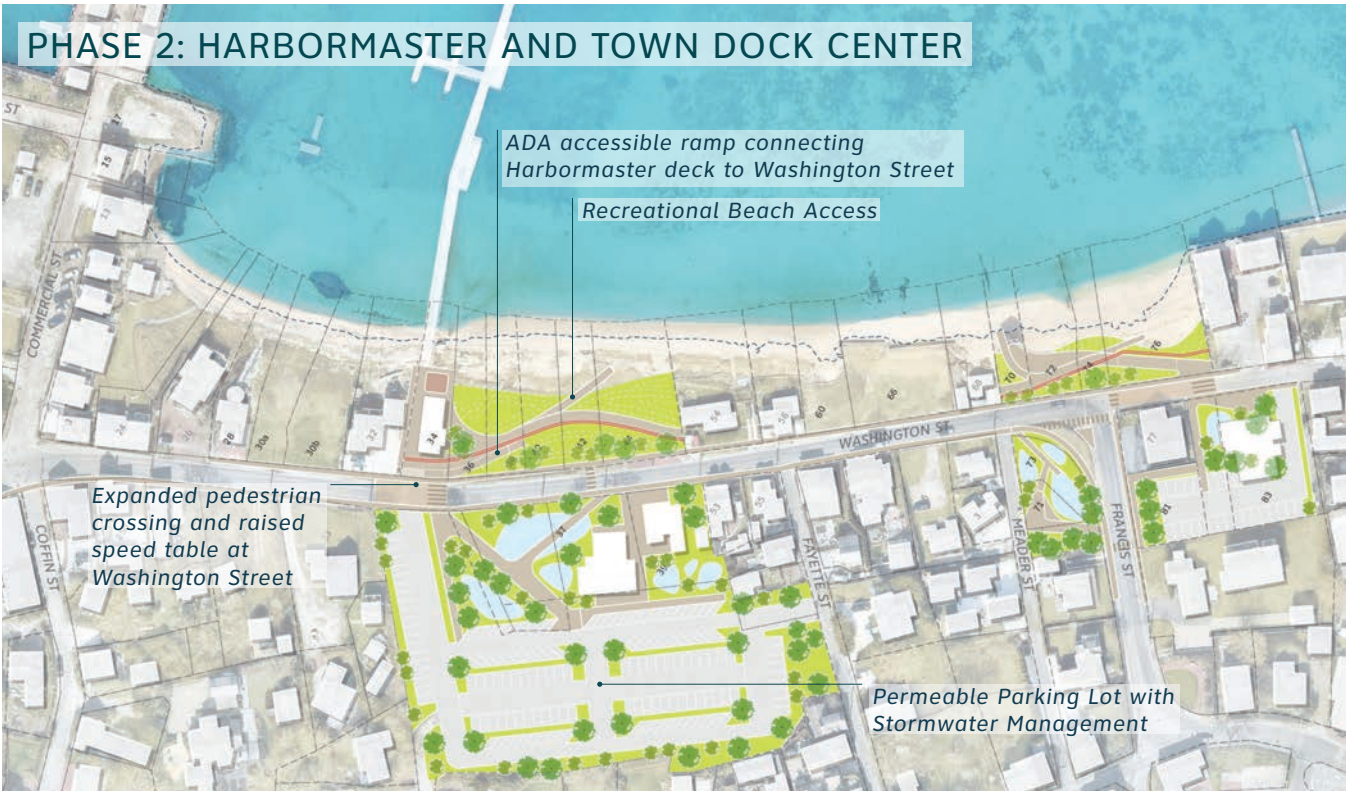
FRAMEWORK PLAN PHASING



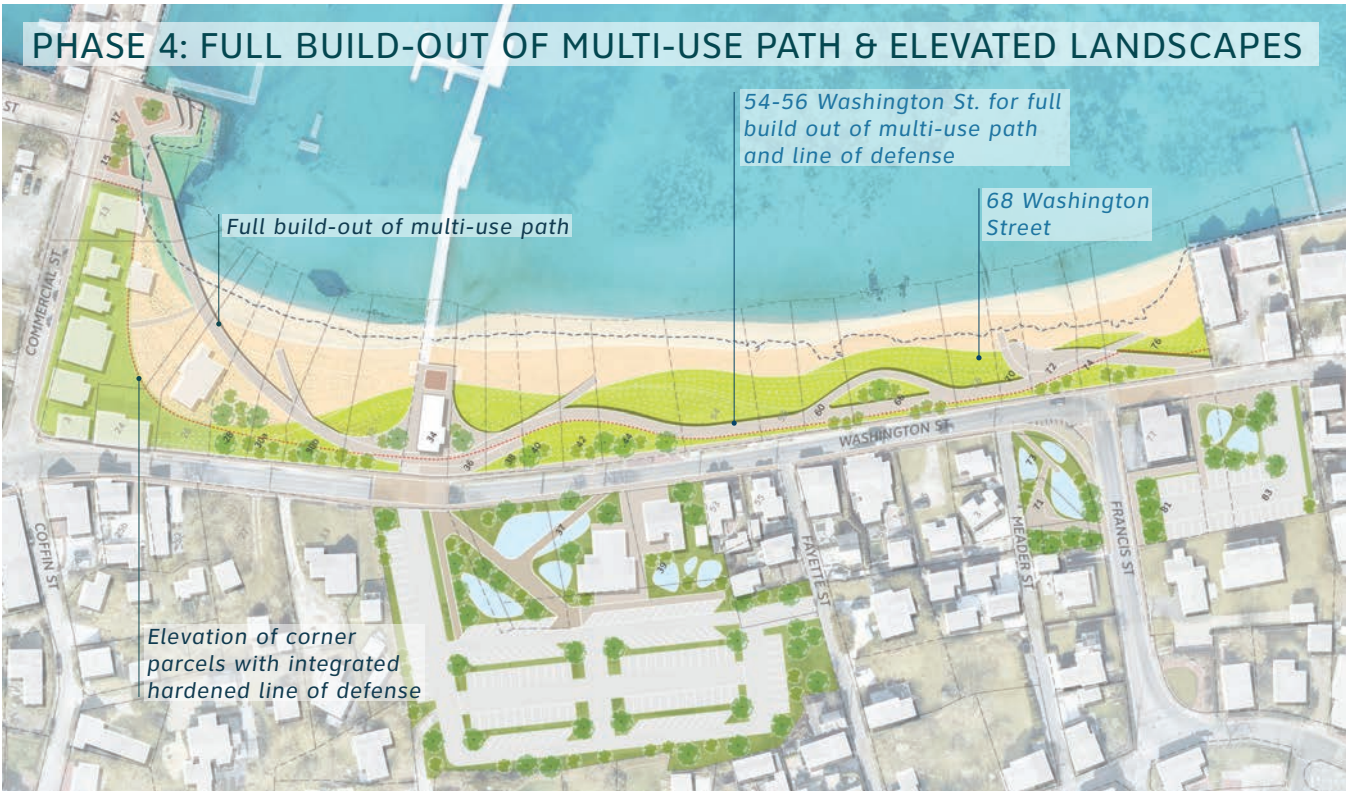
The first phase of implementation of the Framework Plan will encompass the Francis Street Beach parcels on the harbor side (70, 72, 74, and 76 Washington Street) and the adjacent inland parcels including 71, 73, 81, and 83 Washington. The first phase will include a beachfront viewing deck, stormwater gardens, and a stormwater parking area.



Phase 3 will expand the Harbormaster deck and waterfront access to the north across 28, 30a, 30b, and 32 Washington Street. At Petrel Landing (15 and 17 Commercial Street), a new water's edge destination park will include gathering spaces, terraced seating, and a living shoreline.



Phase 2 will introduce a raised deck at the harbormaster building, and a raised trail and recreational beach access along the waterside parcels from 34-44 Washington. On the inland side, the plan envisions a series of stormwater gardens surrounding the existing town facilities and a renovated stormwater parking lot.



Phase 4 assumes the need for collaboration with owners of parcels not currently controlled by the Nantucket Land Bank or the Town of Nantucket. In this phase, both a 12' wide multi-use path and a continuous hardened elevational feature reaching at least elevation 8' NAVD88 would extend from Francis Street Beach to Petrel Landing.

FRAMEWORK PLAN

The Resilience Framework Plan for Washington Street creates an accessible waterfront park welcoming Nantucket's residents and visitors of all ages and abilities. Coastal flood risk reduction and stormwater management are integrally linked in the design, with parcels waterside

of Washington Street buffering rising tides and inland parcels managing stormwater to mitigate localized flooding. A main feature of the park is a continuous 12' wide accessible multi-use path for pedestrians and cyclists. The path provides a safe and scenic connection

along Washington Street, stretching from Commercial Wharf to Francis Street Beach and beyond towards the Goose Pond Path at Consue Spring. The path also integrates a flood protection feature, which is seamlessly embedded in a landscape of coastal dunes. The

sinuous path includes multiple overlooks oriented to views of the Harbor and access points to the water's edge. Inland of Washington Street, stormwater parks and parking lots slow and treat stormwater while offering moments of respite along the corridor.



FRAMEWORK PLAN: FULL BUILD OUT

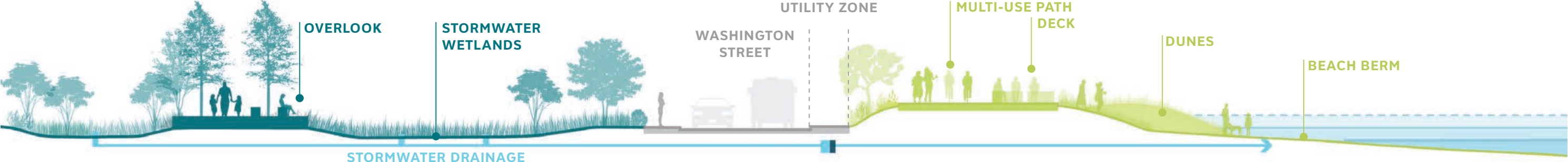
The full build-out of the Framework Plan for Washington Street envisions the corner parcels between 24 Washington Street and 3 Commercial Street as a gateway connecting Downtown Nantucket to the water's edge. An elevated plaza at this corner supports small gatherings and seating oriented to Harbor views. Additional pathways connect the area to

the multi-use path, Petrel Landing, and the Harbormaster deck. Over time, the low-lying shoreline will transition into a salt marsh, extending the living shoreline and marsh habitat proposed at Petrel Landing. A transitional marsh buffers the plaza gathering spaces and provides space for marsh migration as sea levels rise.

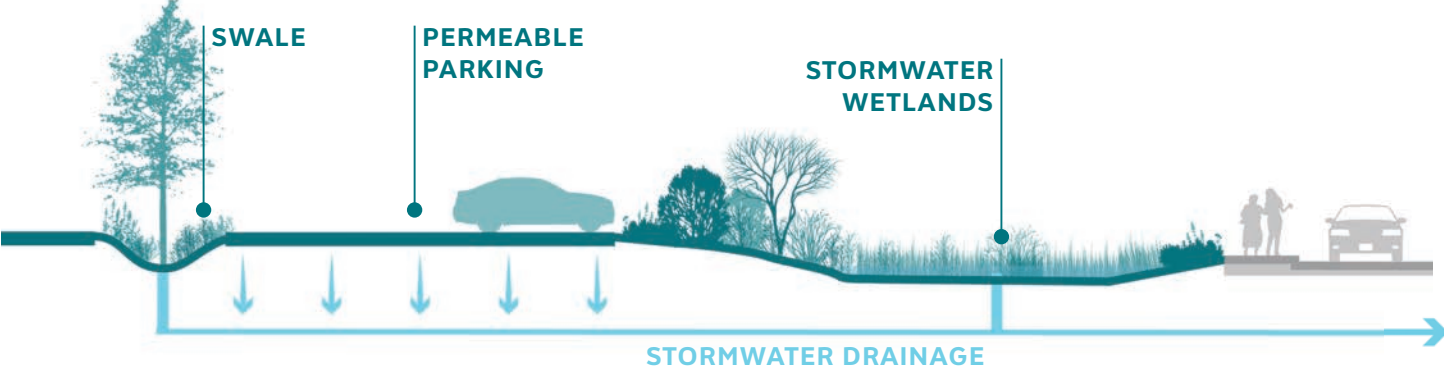


COASTAL HABITAT CROSS-SECTION

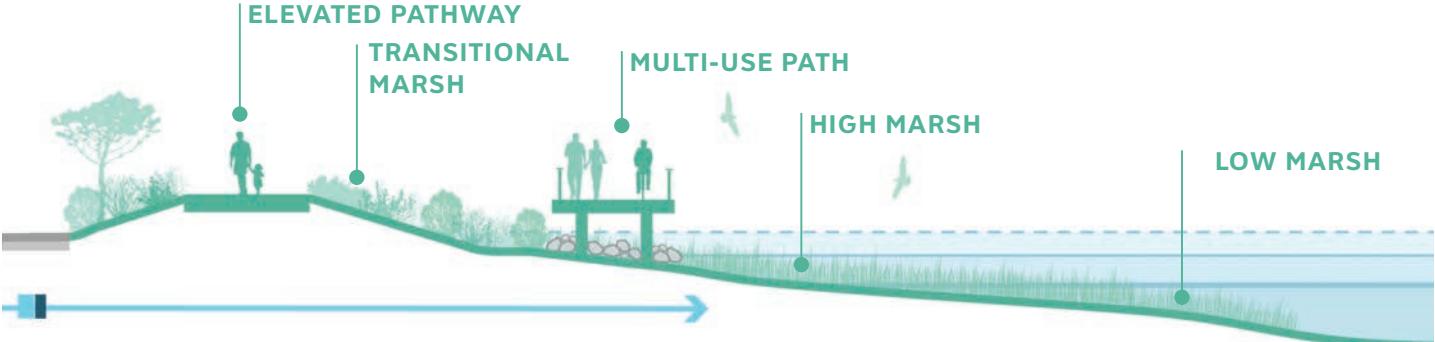
STORMWATER WETLANDS & DUNES



STORMWATER PARKING



MARSH BOARDWALK



STORMWATER WETLANDS

Constructed stormwater wetlands temporarily store runoff in shallow pools that support conditions suitable for the growth of wetland plants including grasses, shrubs and trees.

DUNES

Beachgrass and other native plants can stabilize sandy soils to help build dunes, providing storm-damage protection and buffering.

TRANSITIONAL MARSH

At the upper edges of a salt marsh, a more diverse plant palette emerges. More shrubby plant material can be found in this habitat zone.

LOW - HIGH MARSH

Plants in the low marsh grow between the mean low water line and the mean high tide line. Between mean high tide and spring high tide, plants such as *Spartina patens* dominate this habitat zone.



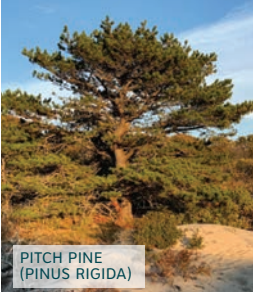
BLACK GRASS (JUNCUS GERARDII)



RED MAPLE (ACER RUBRUM)



HIGHBUSH BLUEBERRY (VACCINIUM CORYMBOSUM)



PITCH PINE (PINUS RIGIDA)



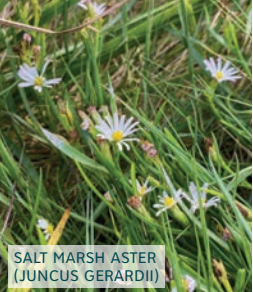
SEASIDE GOLDENROD (SOLIDAGO SEMPIVIRENS)



MARSH ELDER (IVA FRUTESCENS)



SMOOTH COORDGRASS (SPARTINA ALTERNIFLORA)



SALT MARSH ASTER (JUNCUS GERARDII)



BLACK CHOKEBERRY (ARONIA MELANOCARPA)



AMERICAN BEACHGRASS (AMMOPHILA BREVILIGULATA)



GROUNDSEL TREE (BACCHARIS HALIMIFOLIA)



SALTMARSH HAY (SPARTINA PATENS)

CATALYTIC PROJECT: FRANCIS STREET BEACH

The catalytic project for the Framework Plan builds on the dynamic coastal landscape at Francis Street Beach to create resilient waterfront recreational amenities. A microcosm of the Framework Plan as a whole, this first phase demonstrates the critical relationship between coastal flood risk reduction and inland stormwater management. Waterside, the design includes a flood protection structure embedded beneath an elevated multi-use path and coastal dunes. A universally accessible deck with terraced seating orients to Harbor views and provides beach access. Inland of Washington Street, a stormwater wetland park helps to mitigate inland flooding and creates spaces of refuge and pause near the busy Washington Street and Francis Street intersection.



LEGEND

--- CONCEPT STUDY AREA

..... MHW 2030 +2.9' NAVD88

ALL ELEVATIONS LISTED IN NAVD88

WASHINGTON STREET FRAMEWORK PLAN

SCAPE

BEACH ACCESS AND RECREATION

Embracing the dynamic coastal landscape at Francis Street Beach, the deck is designed to withstand sea level rise and reduce coastal flood risk while providing beach access for people of all ages and abilities. An ADA-accessible path ramps up from Washington Street to connect pedestrians and cyclists to an elevated deck oriented to views of Nantucket Harbor. Terraced seating steps down to the beach, supporting informal gatherings.

Buried beneath the deck is a flood protection feature reaching elevation 8 NAVD88, designed to mitigate flooding up to the anticipated 2070 annual 1% chance storm (elevation 7.8 NAVD88) once all phases of the Framework Plan are complete. The structural components of the project are designed to withstand inundation from anticipated storm events and can be adapted over time to meet future water elevations.

Supporting habitat migration with sea level rise is an important component of the design. The plan introduces a beach berm at elevation 4-5' NAVD88 to extend the life of the beach and provide stability for restored dunes. The boardwalk and deck are carefully situated within these habitats and create a sensory experience for people moving through the site to access the beach and kayak launch area.





ADA ACCESSIBLE
RAMP

DUNE PLANTINGS

Rosa rugosa

Pitch pine

BEACH DECK WITH SEATING
(Elevation 8 NAVD88)

American Beachgrass

STORMWATER MANAGEMENT LANDSCAPES

In the future, elevated ocean levels will limit the functionality of piped infrastructure during combined precipitation and coastal storm surge events. The Framework Plan includes stormwater parks and parking lots to slow and infiltrate the stormwater that cannot drain. These retention areas are located at low points where stormwater collects and groundwater will gradually rise. Tide gates will need to be added to existing outfalls within the project area to prevent tidal backflow from causing stormwater surcharge in low-lying areas. At the busy intersection of Francis Street and Washington Street, a stormwater park will provide a scenic refuge for visitors and residents.





Red Maple

Sassafras

Red Maple

FRESHWATER WETLAND PLANTING

Snowy Egret

Black Chokeberry

TRANSITIONAL SHRUBS

Black Grass

Highbush Blueberry

ADA ACCESSIBLE BOARDWALK

OBSERVATION DECK



STORMWATER WETLANDS
& PARKING

STORMWATER WETLANDS
& BOARDWALK

BEACH DECK
AND SEATING

ELEVATED DUNE
HABITATS

ADA ACCESSIBLE
RAMP

KAYAK LAUNCH
AREA