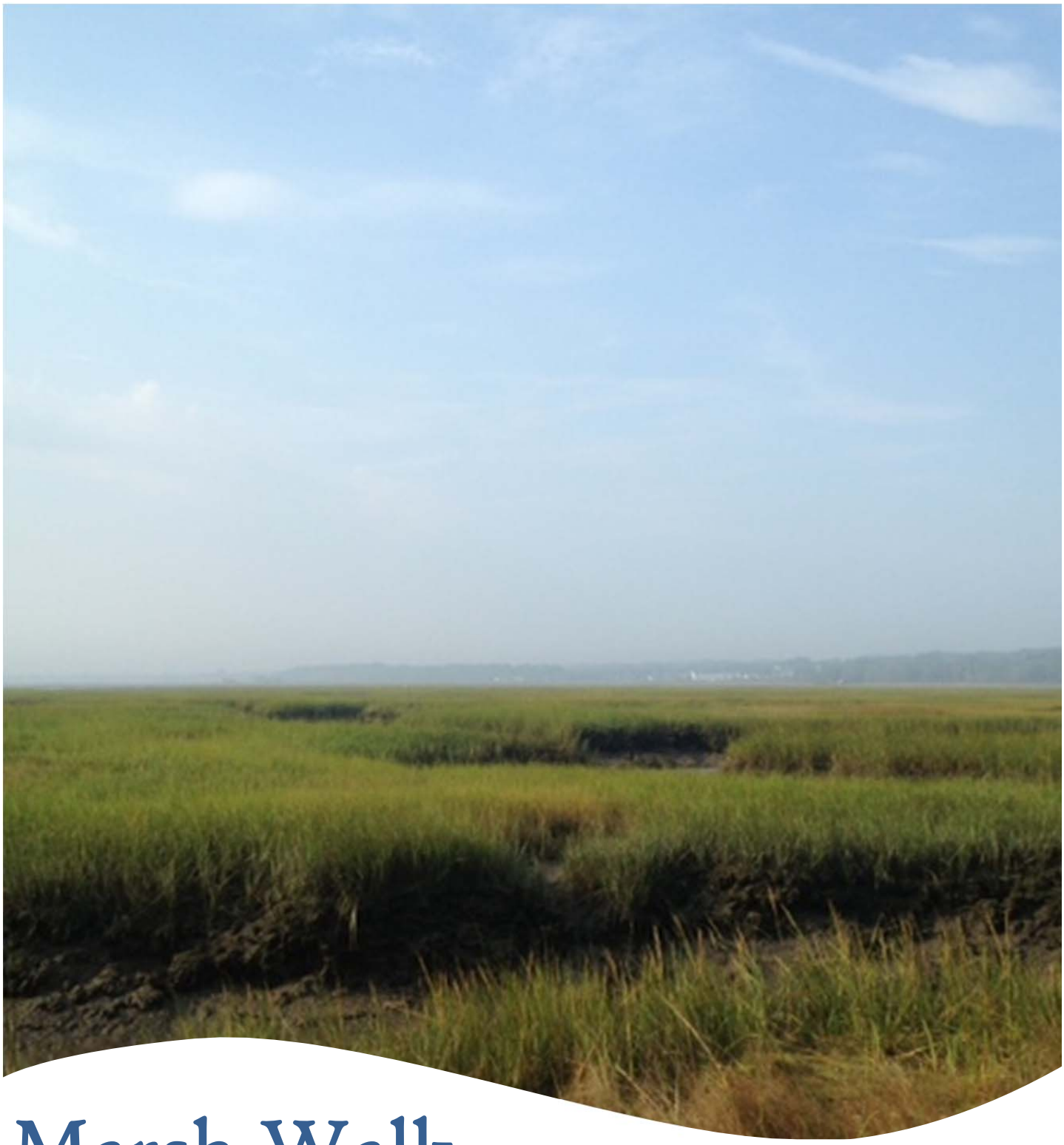

Marsh Walk Feasibility Study

W-P# 12549A October, 2013

Town of Wells, ME

WRIGHT-PIERCE
Engineering a Better Environment

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Introduction

The 2013 Marsh Walk Feasibility Study was developed for the Town of Wells by Wright-Pierce. Funding for this plan was provided by the Town.

Guidance and plan development assistance came from Town Staff, most notably, Jonathan Carter, Town Manager and Chris Mayo, Harbormaster. Ward Feurt, Refuge Manager at the Rachel Carson Wildlife Refuge, and Paul Dest, Director of the Wells Reserve, generously offered valuable insight and guidance.

Consultant team members from Wright-Pierce were Jonathan Edgerton, P.E., Senior Vice President; Jennifer Claster, Landscape Architect; Travis Pryor, Landscape Architect; and Thomas Hamill, GIS Analyst.

GIS data was graciously provided by Michael Livingston, Town Engineer, Shannon Belanger, Town Planning Assistant, and Susan Bickford, GIS/Natural Resource Specialist, Wells National Estuarine Research Reserve.

Thanks go to the citizens and representatives of local organizations, and state environmental regulators who participated in the public outreach efforts and meetings, and who provided input.

The draft plan was presented at a Town Council Workshop on September 10, 2013.

1 History of the Marsh Walk

In 1999, the Town hired a consultant to conduct a feasibility study for a boardwalk across the Webhannet Marsh. The report highlighted four major impediments to building a Marsh Walk at that time:

1) Unwillingness to participate by two private landowners

2) Unwillingness to participate by the Rachel Carson National Wildlife Refuge (Rachel Carson *or* the Refuge), manager of most of the land that would be affected by the proposed boardwalk. According to information compiled by the consultant, the Refuge felt that allowing construction of the boardwalk would be contrary to their mission of preserving wildlife habitat

3) Regulatory restrictions affecting what can be built within the marsh, and most particularly in the tidal zone

4) The boardwalk lengths between access points were felt to be too long (one mile, more or less) and monotonous to appeal to a broad public

In response to these obstacles, the study recommended three possible courses of action:

- Alternative A: Create a shorter, looped walkway near the Wells Sanitary District off Mile Road.
- Alternative B: Develop a shorter Marsh Walk in Webhannet Marsh as the centerpiece of a constellation of bird watching stations to be located within the marsh, outside the original project area.
- Alternative C: Buy a large, unspecified estate in Wells, and create a nature center on the land, while also pursuing Alternatives A and B, above.

A view of the marsh from the beach at Harbor Park

In the intervening thirteen years, the Town has held onto its vision of creating a Marsh Walk centered on Harbor Park. Since the 1999 study was performed, one of the privately owned parcels was acquired by the Town of Wells (2013). In addition, local, State, and Federal regulations have changed and Rachel Carson has developed trails at its headquarters off Port Road that receive upwards of 60,000 users a year.

In 2012, Wright-Pierce was retained to complete a new feasibility study for the Marsh Walk. The project was undertaken in conjunction with an update of the Town's Harbor Management Plan and the feasibility assessment of a cross-harbor pedestrian bridge that would link the easterly and westerly shores of the Webhannet River. The report that follows is the result of that effort.

The initial concept for the Marsh Walk included a boardwalk over the marsh that would connect Harbor Park south to Mile Road and north to Drakes Island Road, and, by doing so, create a coastal walking network in Wells that would eventually link up with other existing paths and trails, such as those at Laudholm Farm. Due to the ecological significance of the Webhannet Marsh and the complexity of land ownership in the vicinity of the planned project, the following stakeholders were involved in an evaluation of Marsh Walk concepts that took place between January and August 2013:

Map of Marsh Walk alternatives reviewed with stakeholders in the summer of 2013

- Town of Wells (represented primarily by the Town Manager and Harbormaster)
- Wells Conservation Commission
- Wells Harbor Commission
- Maine Department of Environmental Protection (Maine DEP)
- Maine Department of Inland Fisheries and Wildlife (IF&W)
- United States Army Corps of Engineers (USACE)
- Rachel Carson National Wildlife Refuge (Rachel Carson *or* the Refuge)/USFWS
- Wells National Estuarine Research Reserve (WNERR)
- Maine Audubon

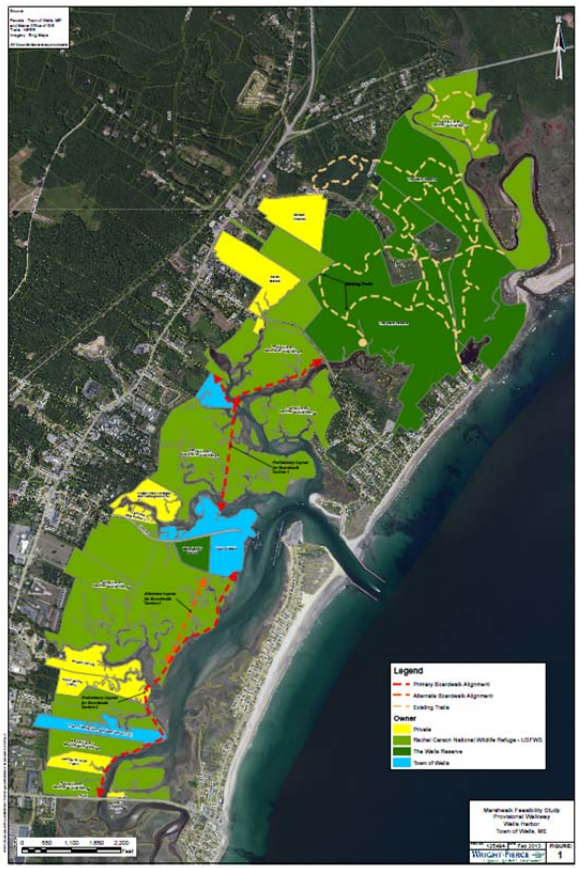
As a result of the site's ecological complexity, and in conformance with the recommendations of key stakeholders, the design was revised to reduce its impact on the marsh.

The figures included in Appendix C document the progression of alternatives that were explored with input from the above-mentioned stakeholders. In August 2013, a final alternative was selected by the Town for the further development of conceptual design and cost estimates. This alternative is described in more detail in the pages that follow.

2 Project Goals

In the Wells Harbor Management Plan Update of 2012, the Harbor Committee developed the following mission statement regarding the management of Wells Harbor:

To manage the use of Wells Harbor by balancing working waterfront interests, local business development, recreational interests, safe Harbor interests, visitor attractions, and community uses within the constraints presented by the natural environment. Recognize the Harbor as a preeminent Maine place for environmental education and ecotourism development.



An early concept plan of the Marsh Walk (in red) crossing the Webhannet Marsh from Drakes Island Road to Harbor Park and south to Mile Road. The tan lines represent existing trails at Laudholm Farm and the Rachel Carson headquarters.

To that end, under the heading of Transportation and Access, the plan listed as a goal "assess[ing] the feasibility of paths and/or boardwalks to connect to Mile Road, Laudholm Farm, and Drake Island and plan for phased implementation of this recommendation."

In the course of conducting this feasibility study, however, it became clear that key stakeholders and regulatory agencies were not supportive of the concept of an elevated Marsh Walk running parallel to the coastline from Drakes Island Road to Mile Road. A primary concern was that the Webhannet Marsh was habitat for the globally rare salt marsh sharp-tailed sparrow, which return faithfully to the same marshes, are declining in number, and need open areas to survive. There was a sense that the boardwalk as proposed might inhibit the movement of the sparrows within the marsh and harm their survival.

The marsh's value as wading bird habitat was also cited as a concern, as was the fact that coastal marshes were threatened by sea level rise and additional stress on the marsh would only make them more vulnerable. It was noted that, as one of the largest unbroken expanses of tidal salt marsh in the State, the continuity and extent of the

Wells Marsh, in and of itself, has important value to wildlife. Finally, it was thought that the boardwalk may have a negative visual impact on the marsh.

A series of case study phone interviews with the managers of wildlife refuge areas containing marsh boardwalks (see April 4, 2013 memo in Appendix B) was conducted to better understand how marsh boardwalks and habitat conservation could potentially coexist. Following these interviews, it was suggested by stakeholders and regulatory agencies that a shorter boardwalk that entered the marsh perpendicular to the shoreline might be preferable to a long boardwalk running parallel to the coast. Another suggestion was to try to set the boardwalk in from the coastline and buffer it with plantings.

Through continuing discussion with the Town, regulatory agencies, and stakeholders, a new concept for the Marsh Walk was developed that would involve following the Harbor Road right-of-way as much as possible and taking advantage of the Town-owned land at Harbor Park, running a pedestrian and bicycle route perpendicular to the coastline along existing infrastructure, and ultimately connecting Harbor Park up to Route One and the Wells Transportation Center.
The goals of the project were clarified and amended to reflect the new concept.

2.1 PROJECT GOALS

The Marsh Walk is currently seen by the Town as promoting the following goals:

- Support eco-tourism and enhance the experience of carless vacationing in Wells by providing a destination for travelers arriving from the Eastern Trail or from the train station at the Wells Transportation Center using public transit or a planned future bicycle pedestrian connection through the Town's school properties and along Harbor Road

The Shoreline Explorer has two signed stops on Harbor Road

- Improve visual access to plant and animal species in a variety of habitats
- Use interpretive signage to educate Marsh Walk users about the ecology of the marsh

- Support and expand research and education about the marsh and its natural communities in partnership with the Wells National Estuarine Research Reserve and Rachel Carson National Wildlife Refuge

- Complement planned improvements to Harbor Park

- Minimize and avoid negative environmental impacts on important wildlife habitats, such as shading of *Spartina alterniflora* grass, and disturbance of shore birds using the marsh

- Construct the project in phases, as funding becomes available

These goals are still consistent with the recommendations of Harbor Management Plan Update, which includes the goal of improving Harbor Park to better serve the community for the next 10-20 years. Improvements would enhance the aesthetics of facilities, improve the quality of materials used, expand activities, and reduce management demands. These improvements would also include changes to the existing parking area to increase the efficiency of its layout, improve aesthetics, and provide stormwater management.

Encouraging use of public transit, bicycling, and walking is another goal of the Harbor Management Plan Update. It recommends designing and constructing sidewalks, bikepaths, and streetscape improvements and providing pedestrian amenities along Harbor Road and within Harbor Park, while minimizing the need to widen impervious surfaces and the existing roadway.

Finally, these goals are consistent with Part 4: Capital Investment Strategy of the Town's 2005 Comprehensive Plan, which lists the following as capital investment needs (Pp. 102-103):

Marsh Walk: *Public interest is strong for some type of coastal walkway along the Webhannet River. However, abutting property owners have resisted the development of such a facility, and community issues would need to be resolved before pursuing the Marsh Walk. The estimated cost of this project is $750,000.*
Priority Rating: Desirable, further study required

Route 1/Elementary School Path: *A need has been identified for a walking path connecting Route 1 to the new Wells Elementary School on Route 109 to help pedestrian access for children. This trail could be built on property owned by the Wells-Ogunquit CSD. Its estimated cost is $40,000.*
Priority Rating: Desirable"

3 Land Ownership and Project Partners

Because the Town of Wells does not have exclusive ownership of the land that would be impacted by the Marsh Walk, it is important to identify the prospective affected land owners and work with them to obtain the easements and permissions needed. Figure 1 illustrates land ownership in the vicinity of the proposed Marsh Walk.

Property and right-of-way boundaries depicted on Figure 1 and referenced in this report are based on mapping provided by the Town and should be considered approximate, for planning purposes only. Any future design development of the Marsh Walk should begin with a boundary survey, to firmly establish ownership and determine precisely where rights and permissions are needed along the proposed Marsh Walk route.

3.1 TOWN OF WELLS

Harbor Park

The Town of Wells owns Harbor Park, as well as much of the land at the eastern terminus of Harbor Road. It is envisioned that Marsh Walk users arriving in cars would use existing Town parking located inside the Park. Alternatively, they could arrive on the Shoreline Explorer bus, which has one stop across from the Fisherman's Catch Restaurant on Harbor Road and another stop at the public restroom in Harbor Park. Marsh Walk users could also arrive on foot or by bicycle using the proposed future connection from the Wells Transportation Center to Harbor Road.

The Town also owns the right-of-way along Harbor Road. This right-of-way abuts land owned by the USFWS, and that is part of the Rachel Carson National Wildlife Refuge (Rachel Carson *or* the Refuge), colored light green on Figure 1.

The Town has fee interest in another parcel adjacent to Harbor Park that is managed by the Wells NERR under a conservation easement held by the Maine Department of Conservation (DOC). The property is labeled "Managed by NERR" and is coded in the NERR color on Figure 1, and is described in more detail below.

3.2 RACHEL CARSON NATIONAL WILDLIFE REFUGE

The U.S. Fish and Wildlife Service (USFWS), manager of the Refuge, owns the vast majority of land in the vicinity of Harbor Road. The currently proposed Marsh Walk alignment very likely encroaches beyond the right-of-way to affect land owned by USFWS, but without a boundary survey it is unclear exactly where and to what extent these impacts occur. This study has assumed that constructing the Marsh Walk will require some degree of cooperation with and permission from USFWS/the Refuge.

A view of the marsh from the trails at the Rachel Carson headquarters on Port Road in Wells

The Town has suggested in the past that it could pay for the Marsh Walk's construction incrementally through the fees it collects from the USFWS every year in lieu of taxes, as a result of the Revenue Sharing Act.

The USFWS has eliminated its internal grant program, and the Refuge's budget is being reduced due to Sequestration. The Refuge, however, has indicated that it would be willing to partner with the Town in identifying and applying jointly for external grants, which can be expected to lead to stronger applications. A joint application that focuses on the public health benefits of the Marsh Walk was suggested as a possible strategy for receiving grant funding.

Regulatory trail signage at the Rachel Carson headquarters

If the Marsh Walk does, in fact, occur partially on USFWS land, the Refuge would want to come to an agreement with the Town about hours of operation and permitted uses, recognizing that the Marsh Walk will function similarly to a public sidewalk where it follows Harbor Road. Typically, the Refuge is only open dawn to dusk, and the Refuge would prohibit motorized vehicles, littering, any activity off the trail, and unleashed pets. USFWS's participation in the boardwalk would be part of a good faith effort that would assume that Harbor Park is not going to undergo significant commercial development. USFWS has indicated that it would be willing to assist with the development of educational materials along the Marsh Walk.

Given the Refuge's current funding outlook, it would want to have a clear understanding of who is maintaining and caring for the boardwalk. Pursuing the project will require staff time, and the Refuge will need to make sure it has the resources required for any future involvement.

According to the Refuge manager, Ward Feurt, there are two different ways the Town could pursue legal permission from the Refuge for the Marsh Walk, if and where it affects USFWS/Rachel Carson land:

- **Obtain a Special Use Permit from USFWS**

  Advantages: Low to no cost and low effort required for application. The Refuge would obtain the permit.

  Disadvantages: A new permit would need to be granted every five years, so the permission would not be permanent.

- **Negotiate a right of way that travels with the deed from the USFWS Division of Realty**

  Advantages: Permanent.

  Disadvantages: The process would be more involved than obtaining a special use permit, both from a legal, and potentially also financial, perspective.

3.3 WELLS NATIONAL ESTUARINE RESEARCH RESERVE

The upland to the left of the photo is managed by the WNERR; the marsh to the right is part of the Rachel Carson Refuge, owned by the USFWS. This photo was taken from the south side of Harbor Road.

While the WNERR does not own land directly affected by the boardwalk, it does manage the approximately 10 Acre piece of land comprising the southern edge of Harbor Park. This land was created from dredge fill, and there has been discussion over the last ten years relative to restoring it to marsh, possibly using it as a demonstration site to evaluate and interpret different marsh restoration techniques. Ten acres of marsh would be restored, which could take up to two years and which would be done at a considerable cost. Because of the potential costs involved, this project is not seen as occurring in the short term. Funding would need to be secured in order for a restoration to move forward.

In the meantime, the land is undergoing natural succession, with areas of open field now giving way to coastal shrublands and early successional forest communities, attracting a wide variety of wildlife within a small geographic area.

The WNERR is also an important project partner in the sense that its educational mission is compatible with that of the Marsh Walk and it could potentially contribute to the development of educational materials along the Marsh Walk. The WNERR's inventory of data relating to the marsh has been helpful in assessing preliminary alignments for the boardwalk.

Source:

Parcels - Town of Wells, ME
and Maine Office of GIS
Imagery - ESRI World Imagery

All boundaries are approximate

N

Rachel Carson
National Wildlife Refuge

Cardinals
Real Estate LLC

Harbor Rd

Managed by
NERR

Town of Wells

Harbor
Park

Rachel Carson
National Wildlife Refuge

Brook Ln

Sanford Rd

1

Post Rd

Main St

Central Ave

Morison Ave

Davis St

South St

Legend

- Proposed Overlook
- Proposed Boardwalk Trail
- Proposed Trail on Grade

Owner

- Private
- Rachel Carson National Wildlife Refuge - USFWS
- The Wells Reserve (NERR)
- Town of Wells

0 150 300
Feet

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Marsh Walk Feasibility Study
Ownership
Harbor Road
Town of Wells, ME

PROJ NO:	DATE:	FIGURE:
12549A	Sep 2013	1

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4 Environmental Conditions

4.1 GENERAL

The Webhannet River is a tidal river that flows northward behind Wells Beach, winding for four miles through extensive tidal marshes to the Atlantic Ocean. It divides Drake's Island Beach to the north from Wells Beach to the south as it enters the Ocean through a dredged channel with stone jetties. The estuary includes about 50 acres of open water, 350 acres of intertidal land (below mean high water), and 810 acres of irregularly flooded (high) salt marsh (USACE EA 2004).

Kayakers on the Webhannet River near the beach at Harbor Park

Wells Harbor supports a wide range of species, including a diverse population of bird species, because of the many habitat types it contains. These include tidal sand, mudflat, low salt marsh, high salt marsh, upland, dune and beach, pannes, and both freshwater and brackish ponds. (USACE EA 2004). The marsh itself, as part of the larger Wells and Oqunguit Marsh Complex, is the second largest salt water marsh in the State and considered a Focus Area of Statewide Ecological Significance, due to its importance in preserving biodiversity. Focus Areas of Statewide Ecological Significance are "landscape scale areas that contain exceptionally rich concentrations of at-risk species and natural communities and high quality common natural communities, significant wildlife habitats, and their intersection with large blocks of undeveloped habitat" (Maine Natural Areas Program http://www.maine.gov/doc/nrimc/mnap/focusarea/).

Harbor Road extends into the Webhannett Marsh, apparently cutting off a channel that appears to have connected prior to the road's development. As part of this project, a culvert reconnecting the two sides of the marsh across Harbor Road has been discussed. This will be addressed more fully in Section 5.

Environmental considerations that pose regulatory and physical constraints to Marsh Walk placement are described in detail below.

4.2 SOILS

Deep, unconsolidated organic soils can pose significant challenges for the construction of anchored boardwalks. Figure 2 illustrates the NRCS soil categories found in the project area.

Marsh soils near proposed Overlook 3

In the project areas adjacent to the marsh, soils are classified as "Sulfihemists, frequently flooded", in Hydrologic Soil Group D. These soils are found in the toe slope of salt marshes. They are deep, and very poorly drained, comprised of mucky peat and muck, with a parent composition of organic material. In theory, these soils could pose a difficulty for boardwalk construction. The piers supporting the boardwalk, however, will most likely be driven into the fill material that was imported for the creation of Harbor Road, or that was brought in as part of the dredge fill that created the land area adjacent to Harbor Park.

Closer to Harbor Park, soils are classified as "Udipsamments – Dune land complex", in Hydrologic Soil Group A. These soils are found on gently to moderately sloping dune fields. They are deep, and excessively drained, comprised of very fine sandy loam, with a parent material of beach sand. These soils are generally amenable to the construction of trails and kiosks.

It is recommended that soil borings be conducted to assess the geotechnical properties of the soils in the areas intended for boardwalk and overlook construction, as a necessary step in design development.

4.3 INTERTIDAL RANGE – CURRENT AND FUTURE PROJECTIONS

The HAT line is used to define a coastal wetland's upland edge. Based on Maine DEP 2012 Levels, accepted for regulatory permitting purposes, the Highest Annual Tide (HAT) for this area is 6.4 feet using NAVD88 vertical datum as a reference. Using LiDAR data from NOAA, this study has created two foot contours for the project area and has mapped the approximate HAT line of 6.4 feet. This information is not based on field surveys and should be regarded as suitable for planning

level study only. As ***Figure 3 illustrates, none of the planned Marsh Walk features appear to fall within the coastal wetland, as defined by the HAT line.***

Chris Mayo, Wells Harbormaster, has noted that the astronomical high tide in the project area is 11', with water reaching an average depth of approximately 6" across the marsh at high tide. This is consistent with the HAT levels based on standard published tide tables (11.4 feet), which reference other nationally recognized vertical datums. Based on this tide information, the Town estimates that keeping boardwalks and overlooks three feet above the level of the marsh should be adequate to protect them from typical current storm surges.

Converting the Harbormaster's information to the datum associated with the planning level mapping completed for this study, it is anticipated that the current Marsh Walk and overlooks would generally be positioned 3'-0" or more above the mapped HAT level of 6.4 feet, with most of the boardwalk portion and overlooks occurring at about 10'-0", rising to 12'-0" in the vicinity of the Fisherman's Catch Restaurant.

Maine DEP
Highest Annual Tide (HAT) Levels for Year 2012
Maine Coast from Eastport to Portsmouth, NH

Location	2012 HAT (Tide Table- ft.)	HAT (NGVD29) (elev. feet)	HAT (NAVD88) (elev. feet)	Ref. Station
Vaill Island	11.7	7.3	6.5	Portland
Long Island	11.9	7.4	6.7	Portland
Cow Island	11.9	7.4	6.7	Portland
Presumpscot River Bridge	12.0	7.4	6.7	Portland
Back Cove	11.6	7.1	6.3	Portland
Great Diamond Island	11.9	7.4	6.7	Portland
Peak Island	11.8	7.4	6.7	Portland
Cushing Island	11.8	7.3	6.6	Portland
PORTLAND	11.9	7.4	6.7	Portland
Fore River	11.9	7.4	6.6	Portland
Portland Head Light	11.6	7.2	6.4	Portland
MAINE, outer coast				
Old Orchard Beach	11.6	7.3	6.5	Portland
Camp Ellis, Saco River Entrance	11.6	7.2	6.4	Portland
Biddeford, Saco River	11.8	7.3	6.6	Portland
Cape Porpoise	11.3	7.0	6.3	Portland
Kennebunkport	11.6	7.2	6.5	Portland
Wells, Webhannet River	11.4	7.1	6.4	Portland
Cape Neddick	11.3	7.0	6.3	Portland
York Harbor	11.3	7.1	6.4	Portland
Fort Point, York Harbor	11.3	7.0	6.3	Portland
Seapoint, Cutts Island	11.4	7.1	6.4	Portland
MAINE and NEW HAMPSHIRE				
Portsmouth Harbor				
Jaffrey Point	11.3	7.0	6.3	Portland
Gerrish Island	11.3	7.0	6.3	Portland
Fort Point	11.2	7.0	6.3	Portland
Kittery Point	11.4	7.1	6.4	Portland
Seavey Island	10.6	6.6	5.9	Portland
Portsmouth	10.3	6.4	5.7	Portland
Piscataqua River				
Atlantic Heights	9.8	6.2	5.4	Portland
Dover Point	8.3	5.3	4.6	Portland
Dover, Cocheco River	9.2	5.8	5.1	Portland
Salmon Falls River	8.9	5.7	5.0	Portland
Squamscott River RR. Bridge	8.9	5.7	5.0	Portland
Gosport Harbor, Isles of Shoals	11.1	7.0	6.2	Portland
Hampton Harbor	10.9	6.7	6.0	Portland

NOTE: The HAT elevations provided in this table may be used to survey locate the upland edge of coastal wetlands for regulatory purposes, under both the Natural Resources Protection Act and the Mandatory Shoreland Zoning Act. If you have any questions related to this document or the data provided, please contact the Department of Environmental Protection, Division of Land Resource Regulation at 287-3901.

Acknowledgements: Stephen M. Dickson, State Marine Geologist, Maine Geological Survey, was instrumental in providing the data necessary to construct this document. The Department appreciates his significant contributions.

2012 Maine DEP HAT chart

It will be necessary to perform topographic survey and to firmly establish the HAT line within the project area based on local benchmarks for this project to advance into permitting. Building permanent structures on or over tidal areas requires a Maine DEP regulated full Natural Resource Protection Act (NRPA) permit and U.S. Army Corps of Engineers State Programmatic General Permit, and it will be important during permitting to demonstrate that the Marsh Walk and associated structures are outside the coastal wetland to the greatest extent possible.

4.4 SEA LEVEL RISE

Sea level rise is caused primarily by two factors. The first is thermal expansion of the sea as the water warms and expands. The second is the melting of glaciers and ice sheets in Antarctica and Greenland. Scientists cannot predict exactly how much the sea level is expected to rise along the Maine coast, but data clearly indicates that the sea has risen in the last hundred years and trends indicate that it will continue to do so.

Since 2004, the State of Maine has used a rate of a 2 foot sea level rise over the next 100 years to plan for changes in the coastal sand dune system, but has not established standards for planning related to sea level rise within any other context. According to more recent projections of sea level rise, 2 feet over 100 years is conservative, with 2008 work by the Natural Resource Council of Maine suggesting a range of 3 feet to 20 feet of static sea level rise in the next 100 years. In the face of this uncertainty, some Maine planners have begun using the 1978 benchmark 100 year storm level of 2 meters of static rise (about 6.5 feet) as a 2100 sea level rise scenario for forecasting purposes.

Sea level rise is considered a threat to the Webhannet marsh

According to analysis by Peter Slovinsky at the Maine Geological Survey, sea level in Maine has been rising at a rate of about 1.8 mm/year between 1912 and 2009. Based on measurements, this has amounted to about a 7" rise along the Southern Maine coast - the fastest increase in sea level rise in Maine in 3000 years ("Adaptation to Sea Level Rise – A Regional Approach in Saco Bay, Maine"). A 2012 study by the Virginia Institute of Marine Science (VIMS) at the College of William and Mary found that sea level rise started accelerating abruptly in 1987 in the northeast United States and its rate is projected to continue to increase. The VIMS study projects a .7 meter +/- .15 meter (2.3 feet +/-.5 feet) change in sea level in Boston by 2050.

Assuming a 3 foot change in static sea level by 2050, the proposed boardwalk portion of the Marsh Walk and the overlooks will remain above sea level, but will be subject to storm surges.

Studies indicate that as the sea level rises, the salt marshes at the WNERR will have a difficult time adapting. Typically, as sea level rises, a marsh would accrete in a landward direction. However, the sharp change in topography between the Webhannet marsh and the adjacent upland will make this landward migration difficult, thus threatening the continued existence of the marsh (WNERR report 18-19). Due to the stresses associated with sea level rise, marsh managers currently regard any additional stresses to be unacceptable.

In an effort to limit the Marsh Walk's impact on the marsh and the species that inhabit it, its alignment has been rotated 90 degrees to eliminate crossing any portion of the marsh. What was originally envisioned as over a mile of elevated boardwalk across open marsh has been

reconsidered as a walkway following an existing public roadway, with modest marsh overlooks at three locations. Where possible, the walkway is intended to take the form of an asphalt or stone dust trail on grade. Where building a trail on grade would require fill to be placed adjacent to the marsh, a boardwalk will be constructed instead, to avoid the potential for granular fill to migrate into the marsh.

The boardwalk will be constructed to marine standards and should be fairly resilient to storm surges.

4.4 WINTER CONDITIONS

Both the Harbormaster and Rachel Carson Refuge personnel have verified that the marsh does freeze in winter. Migrating ice has been cited as a concern for any structure located within the marsh. The Marsh Walk is not anticipated to involve structures within the coastal wetland, and is therefore not anticipated to be subject to damage from ice.

4.5 FLORA

Spartina patens (Salt Marsh Hay) is the predominant plant species in the high marsh. Smaller areas of *Spartina alterniflora* (Smooth Cord Grass) in the low marsh area along the west edge of the Webhannet River channel and *Juncus gerardii* (Salt Marsh Rush) along the upper, northwest edge of the high marsh area are also present. *Spartina* salt marsh is considered a rare and exemplary natural community. To avoid shading marsh grasses, for every foot of boardwalk width, the USACE requires that the lowest part of the boardwalk deck be an equal distance above the marsh vegetation growing beneath it. The current Marsh Walk alignment does not propose constructing elevated structures over the marsh, and thus is not anticipated to impact marsh grasses.

Spartina patens (Salt Marsh Hay) in Webhannet Marsh

4.6 FAUNA

The marsh provides important nesting and feeding grounds for waterfowl, waterbirds, shorebirds, raptors, and passerines (WNERR report 181). Waterfowl primarily use the marsh for wintering and migratory habitat, though a few species also breed in the marsh (WNERR report 181). The

salt marsh and mudflats are habitat for several priority shorebirds. (WNERR report 182). A wide variety of wading birds feed within the tidal salt marshes and rivers. (WNERR report 182). Salt marsh and Nelson sharp-tailed sparrows, of important conservation value, nest in the tidal marshes and interbreed there. (WNERR report 182). Finally, nearby Laudholm Beach is an important breeding area of the state-endangered least tern and federally threatened, state endangered piping plover (WNERR report 183). Laudholm Beach has been designated as essential habitat by the State of Maine, because of the presence of these species. New England Cottontail, a candidate for the federal Endangered Species list, is present in some areas of the upland edge of the marsh.

Salt marsh sharp-tailed sparrow (http://www.fws.gov/refuge/rachel_carson/wildlife_and_habitat/index.html

Much of the marsh is mapped as tidal wading bird/waterfowl habitat and salt marsh sharp-tailed sparrow habitat by the Maine Department of Inland Fisheries and Wildlife (see Figures 4A and 4B). These mapped habitat areas overlap with parts of the planned Marsh Walk alignment. While salt marsh sharp-tailed sparrows are not listed as threatened or endangered, they are of concern to the Refuge, due to their narrow habitat requirements and shrinking habitat. Tidal wading bird/waterfowl habitat in a wetland of over 25 Acres is considered high value and is classified under Maine's Natural Resource Protection Act (NRPA) as a significant wildlife habitat. Any work in the significant wildlife habitat must meet the NRPA general standards of avoidance, minimal alteration, no unreasonable impact, and possibly compensation if the DEP determines that an impact to significant wildlife habitat will cause habitat functions or values to be lost or degraded as identified by the department.

Additionally, an area of shorebird feeding and roosting habitat has been identified near the proposed Marsh Walk alignment (Figure 4A). The mapped area includes a regulatory buffer of 250 feet. The Marsh Walk and associated structures do not fall within the mapped shorebird feeding and roosting area.

At the request of Ward Feurt, manager of the Rachel Carson National Wildlife Refuge, case study interviews were performed with biologists and managers of National Wildlife Refuges where boardwalks have been constructed through tidal marshes (see Appendix B). The request was related to a concern that the boardwalk then proposed would inhibit movement of salt marsh sharp-tailed sparrows. Interviewees were asked how boardwalk design minimized impacts to wildlife, and what observations have been made with regard to the boardwalks' impact on wildlife.

Themes that emerged from the interviews were:

- There is a lack of data demonstrating the effects of human activity on marsh bird behavior
- A boardwalk across the marsh would probably not create a barrier to movement for salt marsh sharp-tailed sparrows
- A boardwalk would reduce the amount of breeding ground in the marsh. Salt marsh sharp-tailed sparrows and other nesting birds will not nest within a certain distance from the boardwalk, due to human and dog activity. The distance is species-specific. Staff members at the Great Bay National Estuarine Research Reserve in New Hampshire have observed salt marsh sharp-tailed sparrows nesting close to an area heavily used by people and dogs.
- A boardwalk would create a perch for predators and would make it easier for them to eat the eggs of nesting birds.
- Because of mapped least tern and wading bird habitat, it would be difficult to permit a boardwalk in the marsh.
- The boardwalks discussed had either been in place for 15+ years, or were sited in areas that had previously been used, formally or informally, as trails. Thus, they were built before permitting became difficult, or were placed in areas where human disturbance had historically occurred.
- Few, if any, of the boardwalks discussed were built in a free-flowing, previously undisturbed salt marsh. The Gordon's Pond and Nisqually boardwalks follow former dikes. The Edwards Environmental Education Center boardwalks are in an area cut off by railroad tracks. Parker River's boardwalk is in an impounded, previously saline marsh.
- Building the boardwalk on Town land and/or as part of a marsh restoration effort seemed like the most viable options, based on the outcome of the interviews.
- Placing a boardwalk on the edge of the marsh would reduce the potential impact on breeding ground, by limiting impact to one side of the boardwalk.

Source:

Parcels - Town of Wells, ME and Maine Office of GIS
Soils - NRCS
Imagery - ESRI World Imagery

All boundaries are approximate

phen Eaton Ln
Brook Ln
Sanford Rd
1
Post Rd
Main St
Central Ave
Morison Ave
Davis St
South St
Rachel Carson National Wildlife Refuge
Cardinals Real Estate LLC
Harbor Rd
Town of Wells
Managed by NERR
Harbor Park
Rachel Carson National Wildlife Refuge
N

Legend

- Proposed Overlook
- Proposed Boardwalk Trail
- Proposed Trail on Grade

NRCS Soil Name

- Adams loamy sand, 0 to 8 percent slopes
- Adams loamy sand, 15 to 40 percent slopes
- Croghan loamy sand, 0 to 8 percent slopes
- Croghan-Urban land complex, 0 to 8 percent slopes
- Lyman-Rock outcrop complex, 8 to 15 percent slopes
- Naumburg sand
- Sulfihemists, frequently flooded
- Udipsamments-Dune land complex
- Urban land
- Water bodies

0 150 300
Feet

Marsh Walk Feasibility Study
Soils
Harbor Road
Town of Wells, ME

PROJ NO: 12549A | DATE: Sep 2013 | FIGURE: 2

WRIGHT-PIERCE
Engineering a Better Environment

Source:

2004 ME Coastline
LiDAR/Contours - NOAA
Parcels - Town of Wells, ME
and Maine Office of GIS
Imagery - ESRI World Imagery

All boundaries are approximate

N

Rachel Carson
National Wildlife Refuge

Cardinals
Real Estate LLC

Harbor Rd

Town of Wells

Managed by
NERR

Harbor
Park

Rachel Carson
National Wildlife Refuge

Stephen Eaton Ln
Brook Ln
Sanford Rd
1
Post Rd
Main St
Central Ave
Morrison Ave
Davis St
South St

Legend

- Proposed Overlook
- Proposed Boardwalk Trail
- Proposed Trail on Grade
- HAT (NAVD88) 6.4 feet
- 2-Ft Contours

0 150 300
Feet

Marsh Walk Feasibility Study
Highest Annual Tide (NAVD88)
Harbor Road
Town of Wells, ME

PROJ NO:	DATE:	FIGURE:
12549A	Sep 2013	3

WRIGHT-PIERCE
Engineering a Better Environment

Source:

Parcels - Town of Wells, ME
and Maine Office of GIS
Habitat Data - Maine DIFW
Imagery - ESRI World Imagery

All boundaries are approximate

N

Rachel Carson
National Wildlife Refuge

Cardinals
Real Estate LLC

Harbor Rd

Town of Wells

Harbor
Park

Managed by
NERR

Rachel Carson
National Wildlife Refuge

Shorebird Feeding & Roosting Habitat

Includes 75' disturbance protection zone around feeding site
Includes 250' disturbance protection zone around roosting site

Tidal Wading Bird & Waterfowl Habitat

Sanford Rd
Brook Ln
Post Rd
Main St
Central Ave
Morrison Ave
Davis St
South St
1

Legend

- Proposed Overlook
- Proposed Boardwalk Trail
- Proposed Trail on Grade
- Tidal Wading Bird/Waterfowl Habitat
- Shorebird Feeding/Roosting Habitat
- Piping Plover and Least Tern Habitat (not in project area)
- Inland Wading Bird/Waterfowl Habitat (not in project area)
- Significant Vernal Pools (not in project area)
- Roseate Tern Habitat (not in project area)
- Seabird Nesting Islands (not in project area)

0 150 300
Feet

Marsh Walk Feasibility Study
Essential Habitat
Harbor Road
Town of Wells, ME

PROJ NO:	DATE:	FIGURE:
12549A	Sep 2013	4A

WRIGHT-PIERCE
Engineering a Better Environment

Source:

Parcels - Town of Wells, ME
and Maine Office of GIS
IFW Rare Animal Polygon Data - Maine DIFW
Imagery - ESRI World Imagery

All boundaries are approximate

N

Rachel Carson
National Wildlife Refuge

Cardinals
Real Estate LLC

Harbor Rd

Town of Wells

Harbor
Park

Managed by
NERR

Saltmarsh
Sharp-Tailed
Sparrow Habitat

Rachel Carson
National Wildlife Refuge

Stephen Eaton Ln
Brook Ln
Sanford Rd
1
Post Rd
Main St
Central Ave
Morrison Ave
Davis St
South St

Legend

- Proposed Overlook
- Proposed Boardwalk Trail
- Proposed Trail on Grade
- Saltmarsh Sharp-tailed Sparrow
- Citrine Forktail (not in project area)
- Harlequin Duck (not in project area)
- Least Tern (not in project area)
- New England Cottontail (not in project area)
- Piping Plover (not in project area)
- Salt Marsh Tiger Beetle (not in project area)

0 150 300
Feet

Marsh Walk Feasibility Study
Essential Habitat
Harbor Road
Town of Wells, ME

PROJ NO:	DATE:	FIGURE:
12549A	Sep 2013	4B

WRIGHT-PIERCE
Engineering a Better Environment

5 Regulatory Requirements

5.1 OVERVIEW

As described in Section 4, the proposed Marsh Walk's adjacency to the Webhannet Marsh makes it subject to regulatory requirements. The regulations that are most relevant to the construction of the Marsh Walk are as follows:

- **Local Regulations**: Town Code Section 116 Floodplain Management, Section 124 Harbor Ordinance, and Section 145 Article V, District Regulations
- **State Regulations:** Maine Natural Resource Protection Act (NRPA) (MaineDEP)
- **Federal Regulations:** Section 404 of the Clean Water Act

Several meetings were held with state and federal regulators and resource managers to review potential Marsh Walk alignments and concepts, including a site walk held on June 24th, 2013. See Appendix B for full meeting notes. Project specific comments are included after the descriptions of applicable regulations in the sections below.

Based on LiDAR data available from NOAA, it appears that none of the proposed marsh walk project lies within the coastal wetland, however, storm surges and future sea level rise will need to be considered where the marsh walk is in close proximity to the marsh. Performing a survey of the site will help to establish the exact location of the marsh's boundary, and will help to make clear the regulatory ramifications of this project. At this time, however, is anticipated that the following conditions will likely necessitate permits to be acquired from the Town and State:

- The project is located near tidal wading bird and waterfowl habitat (considered significant by Maine DEP) and is within salt marsh sharp-tailed sparrow habitat
- Parts of the project are located within the 100 year flood zone
- Parts of the project may be located within 25' of the regulatory boundary of the tidal marsh
- Parts of the project are within 75' of a protected natural resource
- The project is within the Town's Resource Protection and Shoreland Overlay Districts

It is recommended that the approved concept be reviewed with regulators another time after detailed topographic and boundary survey (including a ground-based determination of the HAT line) have been performed and before commencing design development.

5.2 LOCAL REGULATIONS

A. Town Code Section 116 Floodplain Management

The Marsh Walk would follow Harbor Road, taking advantage of breaks in the existing vegetation to provide views into the marsh

As illustrated on the attached FEMA flood zones map, Figure 6, the boardwalk portion of the Marsh Walk and a small portion of the at grade trail lie within an area of special flood hazard, the 100-year floodplain, Zone AE, which means that the area has a 1% chance of flooding and base flood elevations are available. In this case, the base elevation is 10. Newer flood projections place the base elevation at 9. The Marsh Walk is not located in a high velocity area.

Because the Marsh Walk would constitute "development", a flood hazard development permit would be required under the Town's Floodplain Management Ordinance. According to the Ordinance, all development in Zone AE must:

(1) Be designed or modified and adequately anchored to prevent flotation (excluding piers and docks), collapse or lateral movement of the development resulting from hydrodynamic and hydrostatic loads, including the effects of buoyancy;

(2) Use construction materials that are resistant to flood damage;

(3) Use construction methods and practices that will minimize flood damage;

The Town's Code Enforcement Officer had confirmed, based on an earlier design concept, that for the purpose of the ordinance, the boardwalk and overlook portions of the construction would be considered a wharf/pier/dock.

This should be reviewed with the Town's code Enforcement office again, now that a final design concept has been chosen, before advancing into design development.

The ordinance states that wharves, piers and docks are permitted in Zone AE, in and over water and seaward of the mean high tide if the following requirements are met:

(1) Wharves, piers, and docks shall comply with all applicable local, state, and federal regulations; and

(2) For commercial wharves, piers, and docks, a registered professional engineer shall develop or review the structural design, specifications, and plans for the construction.

Additionally, the ordinance states that within coastal floodplains, "all new construction located within Zones AE, A, and VE shall be located landward of the reach of mean high tide".

The proposed Marsh Walk is anticipated to be landward of the mean high tide.

B. Town Code Section 124 Harbor Ordinance

The Harbor Ordinance applies to "all shores of Wells Harbor as described in the definition of "Wells Harbor" in § 124-3, with the addition of the channel to the outer end of the north and south jetties, all of its access roads and lands adjacent thereto, both now and hereafter created by natural or mechanical erosion, including acreage on all public properties" as well as "the jetties, access roads, parking lots and all other public properties adjacent thereto."

Under the Harbor Ordinance, "no dock, floats or any other type of structure shall be erected in Wells Harbor without first obtaining all necessary permits, including from the Board of Selectmen and the Army Corps of Engineers whenever required."

C. Town Code Section 145, Article V District Regulations

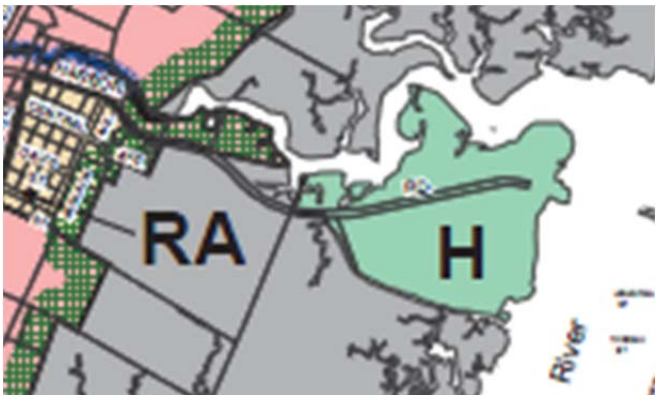
1) Defining the Marsh Walk:

According to the Town's Code Enforcement Officer, the Marsh Walk would fall under the heading of Passive Recreation under the Town's District Regulations. Passive Recreation is defined as "outdoor recreational activities, such as hiking, fishing and hunting, which involve no structural or mechanical components or facilities or no modification of the landform or landscape."

2) Zones and Permitted Uses

The proposed Marsh Walk falls within two zones, Resource Protection (RP) and the Harbor District (H).

a) Harbor District (H): Passive recreation and low-intensity commercial recreation are permitted uses. Estuarine and marine research and educational facility, and municipal facilities are permitted with approval of a site plan and required permits. Setbacks: All structures must be located 6′-0″ from lot lines other than street rights-of-way; 4′-0″ from a lot line abutting any street right-of-way



Excerpt from the Town's official zoning map

b) Resource Protection District (RP): Passive recreation and wildlife habitat management are permitted uses. Municipal facilities and piers, docks, and wharves are permitted with approval of a site plan and required permits. There are no dimensional requirements, except as may be required by the Planning Board for the protection of the public health and safety.

c) Shoreland Overlay District: All structures must be located 75′-0″ from the upland edge of a wetland, which may be reduced to the average of the setbacks of structures within 200′-0″ of the proposed structure on lots abutting the wetlands but shall not be less than 25′-0″. The minimum setback from all other water bodies shall be 75′-0″ from their high-water line. A footpath not to exceed 10 feet in width as measured between tree trunks is permitted, provided that a cleared line of sight to the water through the buffer strip is not created. Clearing of vegetation for development is strictly regulated.

The above requirements may make it difficult to construct the Marsh Walk, unless it is considered to fall under the heading of wharfs, piers, and docks.

§ 145-33 (G.) Piers, docks, wharves, breakwaters, causeways, marinas, bridges and other structures and uses extending over or beyond the high-water line of a water body, stream or within a wetland. In addition to federal or state permits which may be required for such structures and uses, they shall conform to the following:

(1) Shore access shall be developed on soils appropriate for such use and constructed to control erosion.

(2) The location shall not interfere with developed or natural beach areas.

(3) The facility shall be located to minimize adverse effects on fisheries.

(4) The facility shall not be larger in dimension than necessary to carry on the activity and be consistent with existing conditions, use and character of the area.

(5) No new structure shall be built on, over or abutting a pier, wharf, dock or other structure extending beyond the high-water line of a water body or within a wetland unless the structure requires direct access to the water as an operational necessity.

(6) No existing structures built on, over or abutting a pier, dock, wharf or other structure extending beyond the high-water line of a water body or within a wetland shall be converted to residential dwelling units in any district.

(7) Structures built on, over or abutting a pier, wharf, dock or other structure extending beyond the high-water line of a water body or within a wetland shall not exceed 20 feet in height above the pier, wharf, dock or other structure.

5.3 STATE REGULATIONS

A. Natural Resources Protection Act (NRPA)

Maine DEP's Chapter 310 Wetlands and Water Body Protection applies to the alteration of a coastal wetland. Under the act, all coastal wetlands are considered Wetlands of Special Significance. Activities within 75 feet of a protected natural resource, including Wetlands of Special Significance, are regulated under NRPA.

If a project falls within 25-75 feet of a protected natural resource, it can potentially qualify for a NRPA Permit by Rule (PBR), which is a type of approval for an activity that requires a permit under the Natural Resources Protection Act and that will not significantly affect the environment if carried out in accordance with Maine DEP's Chapter 305 Permit by Rule. PBR activities generally have less of an impact on the environment than an activity requiring an individual permit. Obtaining a PBR typically requires less effort than obtaining an individual permit.

If an activity (such as the construction of the Marsh Walk) falls within 25 feet of a protected natural resource, it must typically obtain an individual permit under NRPA. In the case of a coastal wetland, this 25 foot setback must be maintained between the normal high water line or upland edge of a coastal wetland, as defined by the highest annual tide (HAT) line.

Overlook platform # 1 would be located in the vicinity of these existing benches, overlooking shorebird feeding and roosting habitat.

The Marsh Walk project includes activity within 25 feet of the HAT line. Under consideration is the construction of a culvert that is being proposed to reconnect waterways that were disconnected as a result of the construction of Harbor Road, for the purpose of improving wildlife habitat within the marsh. Furthermore, portions of the proposed Marsh Walk boardwalk likely fall within 25 feet of the HAT line. Also, the project will be subject to NRPA because parts of the Marsh Walk fall within mapped tidal wading bird/waterfowl habitat, and are therefore considered to occur in, on, or over significant wildlife habitat. Finally, there is an area of mapped shorebird roosting and feeding habitat near the proposed Marsh Walk whose boundaries will need to be further examined to determine whether the project will be seen as an impact. If the department determines that the activity will not negatively affect the freshwater wetlands or other protected natural resources present, it may qualify for Tier 1 or 2 review.

It is anticipated that this project will require an individual NRPA permit, with or without the proposed culvert.

It will be necessary to perform topographic survey and to firmly establish the HAT line within the project area based on local benchmarks for this project to advance into permitting. Building permanent structures on or over tidal areas requires a NRPA permit, and it will be important during permitting to demonstrate that the Marsh Walk and associated structures are outside the coastal wetland to the greatest extent possible.

A 25 foot setback has been drawn on the Marsh Walk concept plan (Figure 8), and the Marsh Walk in the vicinity of the Fisherman's Catch Restaurant appears to be located within this 25 foot distance from the HAT line, even with the centerline of the roadway adjusted 2 feet to the north to try to minimize impacts. A portion of the proposed boardwalk in the vicinity of the Fisherman's Catch restaurant has been located within the 25' distance from the HAT line because it is necessary to do so while maintaining a geometrically correct Shoreline Explorer stop in accordance with the proposed design.

In addition, some of the overlooks have been positioned within 25' of the HAT line to provide meaningful visual access to the marsh. While it could be possible to eliminate the overlooks or relocate the Shoreline Explorer stop to avoid impacts within 25' of the HAT line, a portion of the Marsh Walk across from the Fisherman's catch restaurant would still fall within this zone, based on the current mapping.

It should be noted, however, that a ground survey of the HAT line will provide a refined location for both the HAT line and the 25 foot buffer that could have different permitting implications for the proposed Marsh Walk concept. Until that survey is performed, impacts are not certain, and are being discussed at a planning level only.

A more detailed description of the requirements of Maine DEP's Chapters 310 Wetlands and Water Body Protection and 335 Significant Wildlife Habitat follows.

B. Maine DEP's Chapters 310 Wetlands and Water Body Protection and 335 Significant Wildlife Habitat

Under "General Standards", for an activity proposed in, on, or over wetlands, a practicable alternative that is less damaging to the environment is considered to exist, unless the activity falls under certain categories, which include water dependent uses and walkways. For these uses, an analysis of alternatives is required. ***An alternatives analysis may be required for the culvert but is not anticipated to be required for the Marsh Walk, which is not in, on, or over the coastal marsh.***

For all proposed activities, "the amount of wetland altered must be kept to the minimum amount necessary."

Single, complete projects comprised of walkways or access structures for educational purposes or to comply with the Americans with Disabilities Act are not required to provide a functional assessment or compensation.

If the project is deemed to have unreasonable impact on the wetland, it will be denied.

For projects in, on, or over wetlands of special significance containing threatened or endangered species, the applicant must demonstrate that the wetland alteration will not disturb the threatened or endangered species and that the overall project will not affect the continued habitation or use of the site by the threatened or endangered species.

Essential habitat describes areas critical to the survival of threatened and endangered species. If the activity is located in essential habitat, IF&W must supply a "certification of review and approval". Nearby Laudholm Beach is an important breeding area of the state-endangered least tern and federally threatened, state endangered piping plover (WNERR report 183), and has been designated as essential habitat by the State of Maine, because of the presence of these species***, but would not be affected by the Marsh Walk.*** Additional piping plover and least tern areas are included in the Maine Department of Inland Fisheries and Wildlife's Rare Animal Polygon dataset***, but do not appear to be affected by the proposed Marsh Walk.***

The marsh is mapped as **salt marsh sharp-tailed sparrow habitat** by the Maine Department of Inland Fisheries and Wildlife, but the salt marsh sharp-tailed sparrow is not listed as threatened or endangered. Habitat of the **New England cottontail**, a candidate for the federal Endangered Species list, is present at the upland edge of the marsh near Upper Landing Road, but this species has not yet been listed***, and it would not be affected by the Marsh Walk.***

A view into the coastal wetland from Harbor Road

The NRPA individual permit will include a review of impacts to **significant wildlife habitat,** which includes seabird nesting islands, significant vernal pool habitat, **high and moderate value waterfowl and wading bird habitat, and shorebird nesting, feeding, and staging areas.** The proposed activities must be determined to have no unreasonable impact on significant wildlife habitat. Activities within 250′ of significant vernal pool habitat are strictly regulated. Activities located in, on or over high or moderate value inland waterfowl and wading bird habitat, **or shorebird nesting, feeding, and staging areas** are strictly regulated and include a 100′ buffer around shorebird feeding areas and a 250′ buffer around shorebird roosting areas. **A high or moderate value tidal habitat "has documented outstanding use by waterfowl or wading birds or use by a rare species of waterfowl or wading birds."**

Much of the marsh is mapped as **tidal wading bird/waterfowl habitat** by the Maine Department of Inland Fisheries and Wildlife (see Figures 4A and 4B). These mapped habitat areas overlap with parts of the planned Marsh Walk alignment. Tidal wading bird/waterfowl habitat in a wetland of over 25 Acres is considered high value and is classified under NRPA as a significant wildlife habitat. Any work in the significant wildlife habitat must meet the NRPA general standards of avoidance, minimal alteration, no unreasonable impact, and possibly compensation if the DEP determines that an impact to significant wildlife habitat will cause habitat functions or values to be lost or degraded as identified by the department.

Additionally, an area of **shorebird feeding and roosting habitat** has been identified near the proposed Marsh Walk alignment (Figure 4A). The mapped area includes a regulatory buffer of 250 feet. The Marsh Walk and associated structures do not fall within the mapped shorebird feeding and roosting area.

Aesthetic impacts of alterations of scenic resources such as and including coastal wetlands are also evaluated as part of the NRPA individual permit. A visual impact assessment may be required if a proposed activity appears to be located within the viewshed of, and has the potential to have an unreasonable adverse impact on, a scenic resource.

A NRPA application for a project of this nature will most likely require the following parts: Alternatives Analysis, Site Characteristics Report, Activity Description, and Additional Information.

C. Take Away Points from Discussions with State Regulators

The Marsh Walk, but not the culvert, has been discussed with Maine DEP and IF&W. Project-specific input from Maine DEP and IF&W has included the following:

- IF&W does not support constructing trails through marshes. They do not support reduction of critical habitat.
- NRPA requires compensation for wetlands impacts. Even if there is no fill, and the boardwalk affects the function and value of the wetland, it will be a problem. DEP considers piers and helical piles to constitute fill, even though helical piles have a small footprint. Shading is considered a wetland alteration. Avoidance and minimization are key considerations.
- Any trail that falls within the footprint of an existing structure or disturbance will be more favorable than a new disturbance. The regulators would consider allowing

boardwalk spurs to observation points within limits. They are concerned with limiting new shadow on previously undisturbed marshland. Any boardwalk spurs would need to be located away from open water to deter fishermen, who are seen as generators of large amounts of litter. The boardwalk design would need to balance drawing people in with minimizing their impact. The regulators liked the idea of incorporating an elevated tower that would allow birders long views over the marsh, but would keep them away from open water.

- In general, alignments following existing roadways, existing trails, or that could be constructed in conjunction with a marsh restoration project were viewed more favorably.
- If the Marsh Walk were advanced into permitting, survey would need to be conducted to determine the exact location of the HAT line (which defines the coastal wetland's upland edge), so that the NRPA application can demonstrate the boardwalk is out of the coastal wetland to the greatest extent possible.
- Any permit will require revegetation of disturbed areas and will require that disturbance be minimized during construction.
- Maintain shrubs and other vegetation within 25 feet of the HAT, but pruning could be allowed to open sight lines.
- Keep proposed work 25 feet from the wetland edge.
- Care will need to be taken in documenting the shorebird roosting and feeding habitat and providing an adequate buffer.
- Provide railings to keep people from stepping into the marsh.
- Consider using spur trails to overlooks, rather than trails that follow the marsh edge for longer stretches.
- Think about maintenance and policing.
- Confine the Marsh Walk to upland areas and provide views into the marsh.
- A photosimulation may be required, depending on the height and length of the boardwalk. The application should include photos from other refuges with boardwalks.
- Construction would need to take place between October 1 and March 1.
- When the scope of work is delineated, the Department of Marine Resource will need to be involved. The project should be reviewed with DMR soon to determine whether there will be any problems with migratory fish. IF&W fisheries will also be involved because of anadramous fish.

- According to Section 480Q, re-constructing any portion of the road in place would fall within exemptions, but any improvement of shoulders or expansion of the roadway into the marsh would not.
- Signage will need to be incorporated near the endpoints of the trail close to overlooks instructing visitors not to walk in the marsh.
- All portions of this project should be permitted at one time, including future phases.
- The width of the boardwalk and Marsh Walk should be justified in terms of ADA, to demonstrate that it is the smallest width allowable.
- If the vegetated strip between the boardwalk and road can be eliminated to minimize impacts, it should be. Otherwise, there will need to be a very clear justification for including it.

Evidence of people walking on the marsh can be seen in the vicinity of proposed overlook platform #3

It will be essential for this project to demonstrate that it is avoiding and minimizing impacts to the coastal wetland and significant wildlife habitat to the greatest extent possible. A clear justification of the Marsh walk's reasons for being within the 25 foot buffer will be key to the permit application. It should be stressed that the project is providing public access to view the resource. As the design progresses, it will be important to establish how far back the overlooks can be placed while still providing effective visual access to the marsh.

5.4 FEDERAL REGULATIONS

A U.S. Army Corps of Engineers (USACE) permit would be required for any structure seaward of the mean high water line or any fill placed seaward of the high tide line, or in any adjacent marsh. ***The proposed culvert would require a Category II General Permit from USACE. It is anticipated that the culvert, or series of culverts, will need to be constructed at a width to satisfy USACE.***

The Marsh Walk, but not the culvert, has been discussed with Jay Clement, USACE. Project-specific input from USACE has included the following:

- A permit would be needed for any structure seaward of the mean high water line or any fill placed seaward of the high tide line, or in any adjacent marsh. **It appears the current Marsh Walk concept would not require a permit from USACE, but it would be a good idea to send them a review copy before proceeding to design development.**
- USACE would prefer that no boardwalk be located over the marsh. If it is, locate the boardwalk such that it hugs the wetland/upland transition – and minimize any portion directly over the marsh
- Elevate the boardwalk and overlooks above the marsh at elevations suitable to allow sunlight to reach grasses and minimize flood damage
- Avoid using CCA and creosote in building materials
- During construction, minimize impacts to the marsh by using low pressure tires or treaded vehicles, or steel/plywood mats under vehicles if traversing the marsh itself
- ACE does not consider pilings to be fill, but DEP does
- Be cognizant of ADA and FEMA flood zone issues

Source:

Parcels, FIRM Layer - Town of Wells, ME
and Maine Office of GIS
2003 Floodway - FEMA
Imagery - ESRI World Imagery

All boundaries are approximate

N

phen Eaton Ln

Brook Ln

1

Sanford Rd

Post Rd

Main St

Central Ave

Morrison Ave

Davis St

South St

Rachel Carson
National Wildlife Refuge

Cardinals
Real Estate LLC

Harbor Rd

Town of Wells

Managed by
NERR

Harbor
Park

Rachel Carson
National Wildlife Refuge

Legend

- Proposed Overlook
- Proposed Boardwalk Trail
- Proposed Trail on Grade
- 2003 FIRM Floodway
- AE: 100-Yr Floodplain
- X500: 500-Yr Floodplain
- X: Outside 500-Yr Floodplain

0 150 300
Feet

Marsh Walk Feasibility Study
FEMA Flood Zones
Harbor Road
Town of Wells, ME

PROJ NO:	DATE:	FIGURE:
12549A	Sep 2013	5

WRIGHT-PIERCE
Engineering a Better Environment

Source:

Parcels - Town of Wells, ME and Maine Office of GIS
Zoning - Town of Wells, ME
Imagery - ESRI World Imagery

All boundaries are approximate

N

Rachel Carson
National Wildlife Refuge

Cardinals
Real Estate LLC

Harbor Rd

Town of Wells

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Harbor
Park

Rachel Carson
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Phen Eaton Ln
Brook Ln
Sanford Rd
1
Post Rd
Main St
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Morison Ave
Davis St
South St

Legend

- Proposed Overlook
- Proposed Boardwalk Trail
- Proposed Trail on Grade
- General Business District
- Harbor District
- Residential A District
- Resource Protection

0 150 300
Feet

Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, U

Marsh Walk Feasibility Study
Zoning
Harbor Road
Town of Wells, ME

PROJ NO:	DATE:	FIGURE:
12549A	Sep 2013	6

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Engineering a Better Environment

6 Connectivity

The Marsh Walk would eventually form part of a larger pedestrian route linking to Route One and Wells Junior High and continuing on to the Wells Transportation Center

In concept, the Marsh Walk would become part of a bicycle and pedestrian connection between the Wells Transportation Center and Wells Beach. As illustrated on the Bicycle and Pedestrian Connectivity Vision figure at the end of this section, the connection would take various forms along the proposed route.

Bicycle and pedestrian upgrades would follow Route 109 from the Wells Transportation Center to the Elementary School. From the Elementary School, a trail would be connected on land owned by the Wells-Ogunquit CSD, becoming a sidewalk and bike route that would connect to Route 1 between the Junior High School and the Public Library. Bicycle and pedestrian upgrades would follow Route 1 and would continue on-road along South Street and Morrison Avenue to Harbor Road. These would link up with the planned sidewalk and 4'-0" bike shoulders on Harbor Road. Across from the Fisherman's Catch Restaurant, at the Shoreline Explorer stop, the Marsh Walk would begin as a boardwalk, changing to an on-grade trail that would continue to the eastern extreme of the Town-owned land on Harbor Road.

A study was being performed at the time of writing to determine the feasibility for a low pedestrian bridge that would connect the east and west sides of the harbor. This would open up further parking options, with an estimated 150 parking spaces at the east side of the harbor, and would create the opportunity for a continuous bicycle and pedestrian connection to Wells Beach from the Wells Transportation Center.

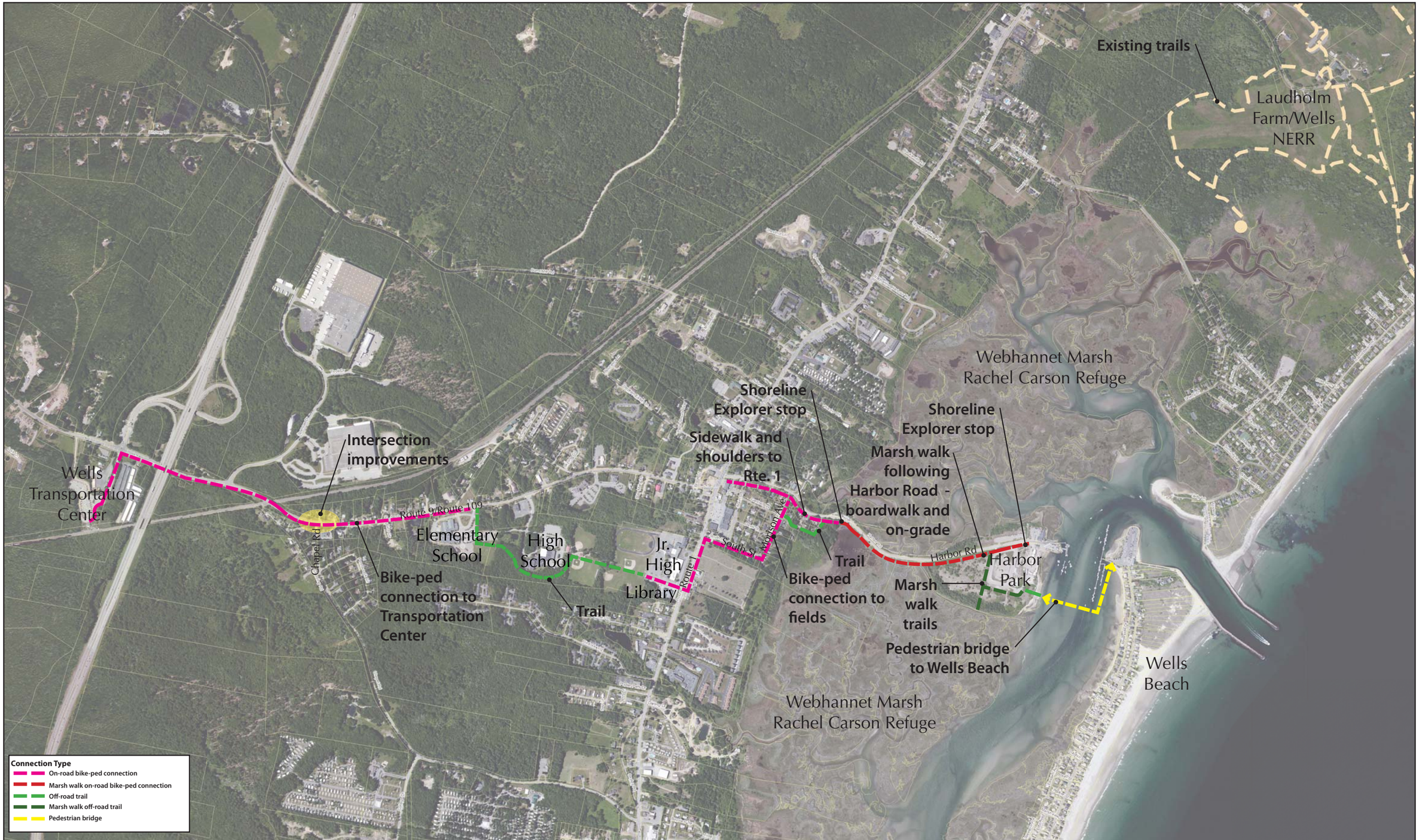
A pedestrian bridge (in yellow) could connect Harbor Park to the parking area at the end of Atlantic Avenue. From there, it would be an easy walk to Wells Beach, pictured at the extreme right of the image.

The Marsh Walk would improve conditions for cyclists and pedestrians along Harbor Road

Also at the time of writing, the Harbor Master was conducting an alternatives analysis for a water taxi that could ferry boaters to their crafts and also shuttle people from one side of the harbor to the other.

Users of the Marsh Walk could arrive without cars via a future connection to the Eastern Trail. From the Wells Transportation Center, they could arrive via the new bicycle and pedestrian connection or on the Shoreline Explorer bus, disembarking across from the Fisherman's Catch Restaurant on Harbor Road or at the public restroom in Harbor Park. Users with cars could take advantage of the 205 parking spaces and 60 spaces for boat trailers, on Town land near Harbor Park.

Although one of the initial project goals was stated as connecting existing paths and trails to create a coastal walking network in Wells, the WNERR has indicated that it is unlikely to connect its trail network to the trails at the Rachel Carson headquarters, and the initial concept of a Marsh Walk connecting from Drakes Island Road to Mile Road is no longer being pursued because of regulatory difficulty.



Sources:
Imagery - Bing Maps Approximate Property Lines - Town of Wells GIS Tax Map

WRIGHT-PIERCE
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0' 275' 550'
Scale: 1"=550'

BICYCLE AND PEDESTRIAN CONNECTIVITY VISION

August, 2013 Town of Wells, Maine

7 Marsh Walk Concept Plan

7.1 EXISTING CONDITIONS

The concept plan used field observations and available GIS data as base information and is not based on actual survey data. Contours are not tied to a benchmark.

It appears that travel lanes are generally 10'-6" to 11'-0" on Harbor Road. Gravel shoulders are generally 6'-0" wide on the south side of the road, where the Marsh Walk is proposed, but can be as wide as 10'-0" in some places.

Two Shoreline Explorer bus stops are located on the south side of Harbor Road.

Harbor Road in the vicinity of the proposed boardwalk. Note narrow travel lanes, existing gravel shoulder, benches, utility poles across the road, and the Fisherman's Catch restaurant in the background

Utility poles are present along the roadway, and it appears the project can be designed such that they are not disturbed.

In the process of finishing this plan, it came to light that the Town possesses existing conditions plans for a portion of Harbor Park that indicate the property line between the Town-owned land and the adjacent land managed by WNERR, as well as locations of existing trails and other basic site features. The existing survey for this area could be built upon to establish a base map for this area, and should be examined for contours, existing vegetation, etc. It is recommended that shrub masses and individual tree locations, species, and diameter at breast height (DBH) for trees that might be affected by trail improvements and overlook construction be added to the survey, as well as any other needed information.

7.2 PROPOSED CONCEPT PLAN

The Marsh Walk concept plan, with typical sections, is included at the end of this section. The following considerations apply:

- The design proposes shifting the road centerline 2'-0" to the north in some places. The red centerline on the concept plan indicates a shifted centerline.
- The design assumes an 11'-0" travel lane and 4'-0" shoulder in each direction from Harbor Park to Route 1.
- Because a curb is not being used along the Marsh Walk, overland drainage is assumed.

A. Future Curbed Sidewalk to Route One

The future curbed sidewalk would extend from the existing Harbor Road sidewalk near the Route 1 intersection, pictured above

The curbed sidewalk and 4'-0" shoulder between the Fisherman's Catch and Route 1 are considered a future phase of roadway improvements and are not considered part of the Marsh Walk project. Nonetheless, they are important to keep in mind, in the interest of providing connectivity for bicyclists and pedestrians. In the event that the slopes and curves on the west end of Harbor Road make it difficult to construct a 4'-0" shoulder for the length of the project, the Town could consider narrowing the shoulders and providing Shared Lane Markings (SLM's) and signage that indicate that cyclists may use the vehicular travel lanes.

B. Future Trail and Pedestrian Bridge

A discussed trail connection to Morrison Avenue and the pedestrian bridge to Wells Beach are also considered future improvements outside the scope of this project.

C. Marsh Walk - Boardwalk Trail

A 5'-0" wide boardwalk is proposed between the Fisherman's Catch restaurant and the land managed by Wells NERR. At the Shoreline Explorer stop across from the Fisherman's Catch Restaurant, the sidewalk and a standard ADA compliant 8'-0" landing area adjacent to the bus turn out would also be constructed as a boardwalk. It is in this area, close to the proposed crosswalk, that the upland edge of the salt marsh appears to be closest to the roadway and to the proposed improvements. A boardwalk is proposed in this area for several reasons:

- The existing shoulder is narrower here, where the roadway has been constructed through the marsh, and the existing grade drops off toward the marsh at about a 10% grade beyond the shoulder. To construct a sidewalk on grade, fill would need to be imported. Due to the sensitivity of the marsh and the fact that some of the proposed work may be occurring within 25' of the marsh boundary, fill will need to be strictly limited in this area.

A low boardwalk at the Rachel Carson headquarters

- The potential for storm surges and for impacts due to projected sea level rise are greatest along this section of the Marsh Walk. Building the Marsh Walk as a boardwalk through this area will make it more resilient to impacts resulting from future environmental changes.
- Proximity to the marsh along this stretch provides good wildlife viewing opportunities and also creates a temptation, as evidence of current use suggests, for people to enter the marsh. The grade separation provided by the boardwalk, reinforced by the proposed 42" railing, will deter people from entering the marsh itself, while providing an aesthetic experience that heightens the sensation of being in a special ecological setting.

D. Marsh Walk - Trail on Grade

A stone dust trail at the Rachel Carson headquarters

The at-grade portions of the Marsh Walk will take the form of a 5'-0" wide compacted stone dust or asphalt trail. A 3'-0" esplanade with a timber guardrail will create a separation between pedestrians and traffic on Harbor Road. The esplanade will require periodic maintenance and trimming. Where the pedestrian way is too close to the roadway to permit the use of an esplanade, such as at the Shoreline Explorer stops, granite bollards could be used to further delineate pedestrian space.

Where the trail is adjacent to the parking lot in Harbor Park, a minimum 10'-0" planted buffer with a split rail fence is proposed, to provide separation from cars and focus attention on the natural areas of the park. A 2'-0" to 3'-0" strip is recommended to be mown on both sides of the trail, to reduce exposure to ticks and provide an area for site amenities such as benches and trash receptacles. Plants would be comprised of shrub and grass species native to the park, such as Switchgrass, Virginia Rose, and Bayberry.

A path around the marsh-facing edge of the NERR-managed land has not been proposed, due to the fact that it would be set at least 25' back from the edge of the woods and would not seem to avoid and/or minimize impacts for permitting purposes. However, a path connecting to the beach path at Harbor Park from the new Marsh Walk is proposed as part of this project, to improve pedestrian connectivity within the park.

E. Marsh Walk - Plazas

Two small plazas are proposed, one at the bathroom and one at the trail kiosk. The Town should consider using pavers or other higher quality materials in these areas. At a minimum, kiosks with signage about the bus system, the trails, and Harbor Park are proposed. Site amenities, such as benches, trash receptacles, plantings, and bicycle racks are also recommended in the plaza areas.

Small plazas could use higher quality materials and incorporate kiosks and site furnishings

F. Marsh Walk – Overlook Platforms

Proposed overlooks would be similar in size to the platforms at the Rachel Carson headquarters

Three cantilevered overlook platforms are proposed. Each platform is intended to provide a unique experience of the marsh.

- The longer, narrower platform (#1) overlooks the prime birding area near the Fisherman's Catch Restaurant.
- A smaller platform (#2) is located near the NERR managed land in a

location that provides a peek around the woodlands to a beautiful view of the channels, and could be partially blinded to provide better wildlife viewing opportunities.

- The third platform (#3) emerges from the forest to a more isolated location on the marsh, away from the roadway. It has been noted that the remote location of this platform will necessitate some form of community policing.

G. Proposed Culvert

A culvert is being considered just west of overlook platform #2 to reconnect waterways that were disconnected as a result of the construction of Harbor Road, for the purpose of improving wildlife habitat within the marsh. This culvert is not needed because of flooding, and is solely being considered for the purpose of providing compensation and improving marsh ecology. It should be noted that no need for compensation has been identified at this time, and the culvert is strictly being proposed as a good faith effort by the Town. That does not preclude the possibility that a need for compensation will be identified as part of the permitting process.

In the location of the proposed culvert, as generally indicated on the Marsh Walk concept plan, Harbor Road is acting as a dike. This location has been suggested by the Rachel Carson Refuge, with the caveat that more study and discussion with the Refuge and the marsh ecologists at USFWS would be needed to ensure that the culvert will have a positive effect on the marsh before embarking on such a costly project. A full feasibility study of this culvert is beyond the scope of this report, however, we have been able to make some cost assumptions based on similar projects elsewhere in the state. As noted in Section 5, there are considerable permitting requirements associated with a culvert of this nature.

H. Impacts to Abutters

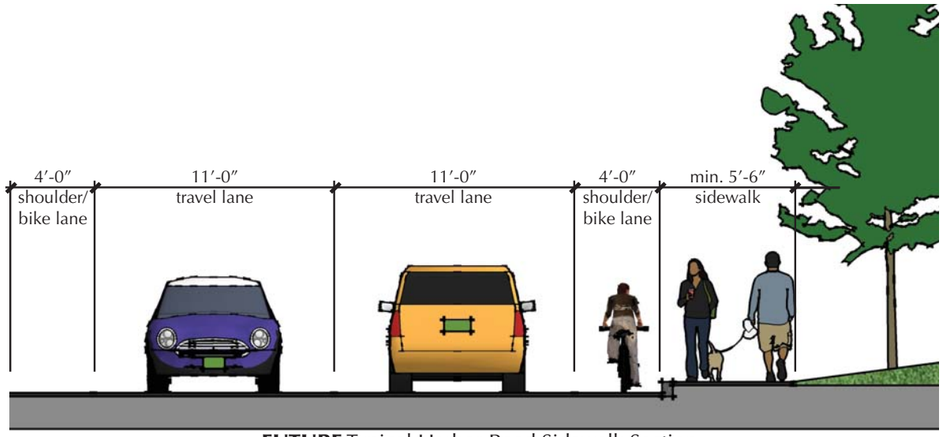
At the Fisherman's Catch restaurant, the depth of the area available for pull in parking will be reduced by at least 4'-0" feet. There would still, however, be at least 20'-0" to the face of the building, which should still accommodate perpendicular pull-in parking. The Town should consider encouraging the restaurant to shift to angled parking in front of the building, which is more

The parking lot at the Fisherman's Catch restaurant could potentially be reconfigured as angled parking to create more room for bicycle and pedestrian facilities

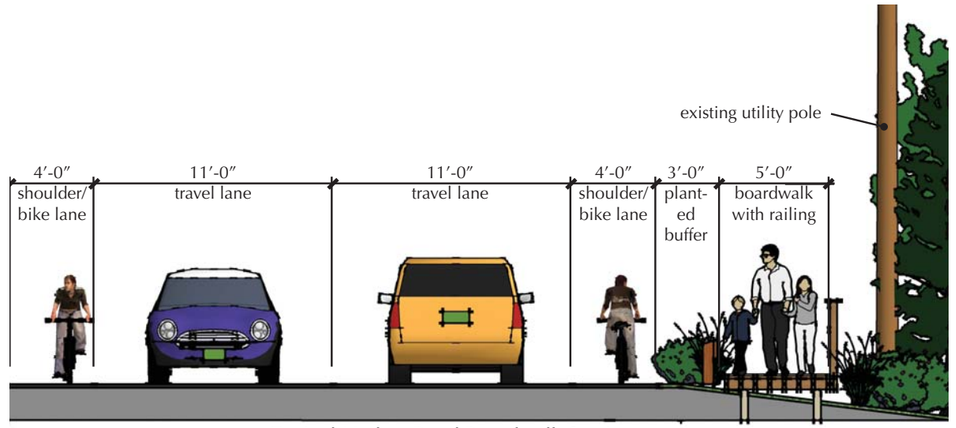
compatible with backing into the public roadway and would require less depth. Back-in angled parking has been used with mixed success in other Maine communities, where a bike lane is proposed adjacent to pull-in parking, which has some advantages for cyclists and pedestrians, and could also be discussed with the owners of the restaurant. As it is now, visitors to the restaurant appear to walk in the street to reach their cars.

The Rachel Carson National Wildlife Refuge abuts the Harbor Road right-of-way

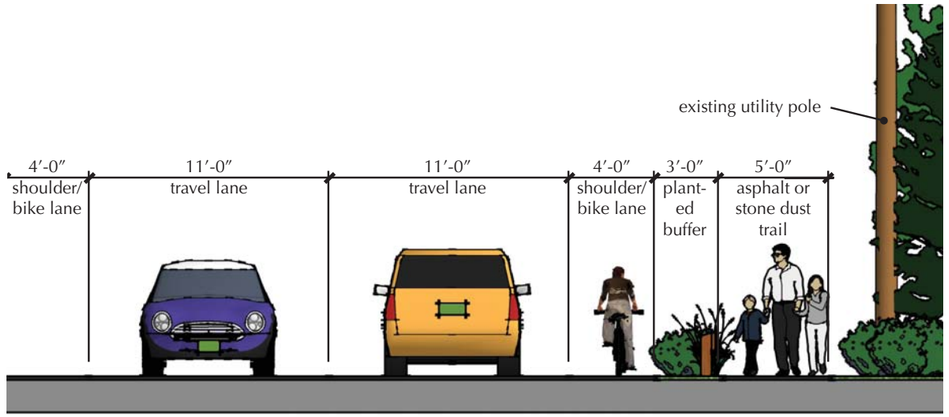
As has been discussed elsewhere in this report, sections of the Marsh Walk and some of the proposed overlook platforms may be partially or wholly located on Rachel Carson land in some locations, depending on the exact location of the right-of-way (to be determined). At the time of writing, the Refuge was seemingly still open to the proposal described in this plan, as long as the concerns expressed in Section 3 were able be addressed to their satisfaction.



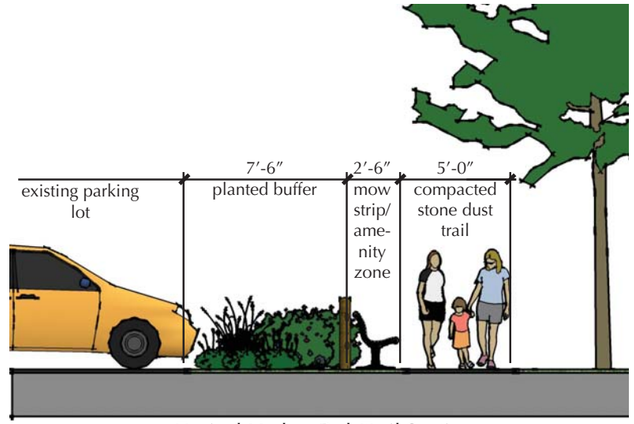
FUTURE Typical Harbor Road Sidewalk Section
Not to Scale



Typical Harbor Road Boardwalk Section
Not to Scale



Typical Harbor Road Trail Section
Not to Scale



Typical Harbor Park Trail Section
Not to Scale

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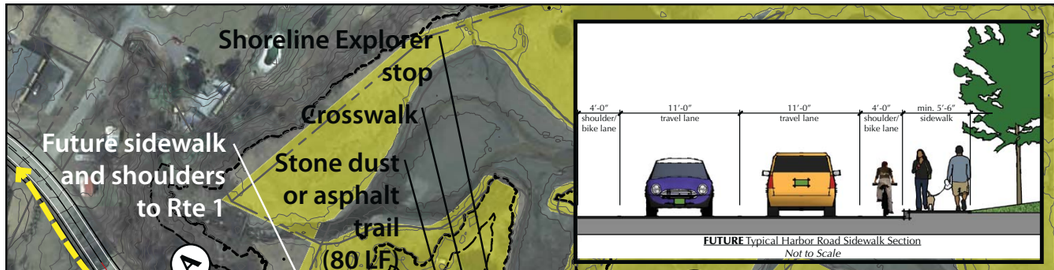
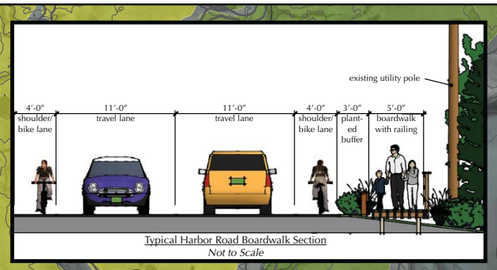
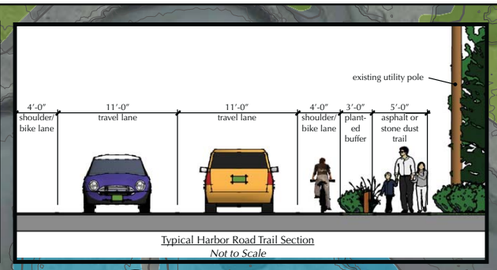
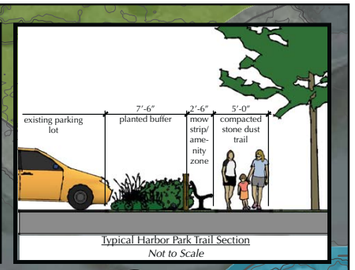
TYPICAL SECTIONS - MARSH WALK FEASIBILITY STUDY

12549A September, 2013 Town of Wells, Maine









Shoreline Explorer stop

Crosswalk

Future sidewalk and shoulders to Rte 1

Stone dust or asphalt trail (80 LF)

Section A

Section B

Section C

Section D

Fisherman's Catch Restaurant

Potential future trail to Morrison Ave

Webhannet Marsh

Plaza with kiosk and site amenities (1,700 SF)

Shoreline Explorer stop

Lord's Harborside Restaurant

Public Restroom

Harbor Road

Harbor Park

Play Equipment

Existing trail and platform

Potential future pedestrian bridge to Wells Beach

Boardwalk (1,200 LF)

Centerline offset 2' to the north

Stone dust or asphalt trail along Harbor Road (1,220 LF)

Stone dust or asphalt trail along parking lot (910 LF)

Appx. 2 ft. contour lines, based on LiDAR

Appx. HAT line at 6.4', based on LiDAR

Appx. location of 50' right-of-way

Overlook platform #1 (5' x 24')

25 foot buffer from appx. HAT line

Potential culvert location

Overlook platform #2 (10' x 14', possibly with partial blind)

Webhannet Marsh

Plaza with kiosk and site amenities (2,400 SF)

Stone dust trail in field and woods (310 LF)

Overlook platform #3 (14' x 10')

Owner
- Private
- Rachel Carson National Wildlife Refuge - USFWS
- Owned by Town of Wells, Managed by Wells NERR
- Town of Wells

Walkway Type
- Boardwalk
- Stone dust or asphalt trail on grade
- Future pedestrian connection

Sources:
Imagery - Bing Maps *2004 ME Coastline LiDAR/Approximate 2' Contours - NOAA* *Approximate Property Lines - Town of Wells GIS Tax Map*

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0' 50' 100'
Scale: 1"=100'

CONCEPT PLAN AND SECTIONS - MARSH WALK FEASIBILITY STUDY

12549A September, 2013 Town of Wells, Maine

8 Materials Selection and Preliminary Construction Details

Materials are illustrated in the figure at the end of this section.

8.1 PLANTED BUFFER ZONE – HARBOR ROAD

- Cedar or pressure treated southern yellow pine guardrail 2'-0"above finish grade; posts spaced 8'-0" on center
- 3'-0" buffer zone to be seeded with native forbs (wildflowers) and grasses and mown or "weed whacked" at least 2x/year

8.2 PLANTED BUFFER ZONE – HARBOR PARK PARKING LOT

- Cedar split rail fence 3'-0" above finish grade; 6" dia. posts spaced 8'-0"to 10'-0" on center
- 10'-0" buffer zone to be planted with a mix of shrub and grass species native to the park, such as Switchgrass, Virginia Rose, and Bayberry
- Municipal grade benches and trash receptacles

An existing split rail fence in Harbor Park

8.3 BOARDWALK

- Precast 8" dia. concrete piers to be formed in sonotubes and treated with a chloride ion screen to resist salt damage
- Framing to be ACQ – no CCA or creosote are to be used on this project
- Decking to be composite (i.e. Trex) or pressure treated southern yellow pine wooden planking
- 42"tall cedar or composite railing to be used at overlook locations to provide a support for interpretive signage, discourage people from walking into the marsh, and provide a bumper for wheelchairs

- Interpretive and regulatory signs to be mounted on railings or railing posts
- Boardwalk to be wider at the westernmost Shoreline Explorer stop to provide an adequate (8'-0" min. for ADA compliance) loading and unloading zone

8.4 MARSH WALK – OVERLOOK PLATFORMS

Overlook materials will be similar to those used to construct the boardwalk. A schematic of the 5' x 24' overlook platform is included on the materials illustrations. Photographs of an overlook on the Carson Trail at the Wells Headquarters of the Refuge have also been provided for reference. The Carson Trail overlooks utilize timber framing with composite decking and railings.

Composite decking and railings at the Rachel Carson headquarters

8.5 TRAIL ON GRADE

Stone dust and asphalt are proposed as surfacing materials for the at-grade portions of the Marsh Walk.

While stone dust has a lower installation cost, it is prone to erosion from surface runoff; requires annual maintenance in terms of re-grading, compaction, and weed control; and may be more suitable for the trails within Harbor Park than it is along the Harbor Road right-of-way.

Where the trail is adjacent to and subject to surface runoff from Harbor Road, asphalt should be considered. Asphalt is more expensive than stone dust, but is also more durable, is easier to plow, and requires less routine maintenance. The cost estimates in the next section reflect these recommendations.

8.6 PLAZAS

An existing kiosk in Harbor Park will be replaced and situated within a small plaza

The Town should consider using granite or brick pavers in the plaza areas. Kiosks with signage describing the bus system and the trails within Harbor Park are proposed, and could range from very simple and utilitarian to quite elaborate in style. Two kiosk examples are provided on the accompanying materials illustrations. Benches and trash receptacles with wood or composite slats on cast aluminum supporting members are recommended.

Loop-type bicycle racks are preferred over other options due to ease of use by cyclists.

8.7 PROPOSED CULVERT

Materials and dimensions for the culvert have not been closely considered as part of this study.

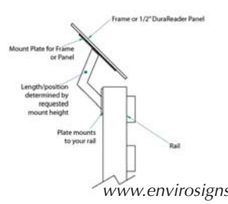
Trash Receptacle and Bench

Bicycle Rack

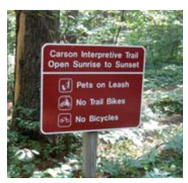
Granite Bollards

Kiosks

Site Amenities

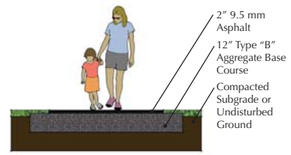


Interpretive Signage

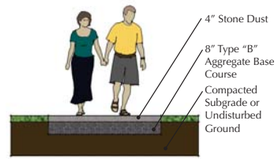


Regulatory Signage

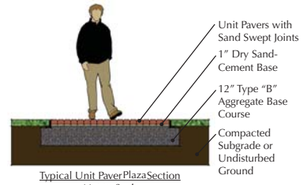
Signage



Typical Asphalt Trail Section
Not to Scale



Typical Stone Dust Trail Section
Not to Scale



Typical Unit Paver Plaza Section
Not to Scale

Asphalt

Stone Dust

Pavers

Paving

Overlook Platform on the Carson Trail
Appx. 10′ x 14′

Proposed Boardwalk with 5′ x 24′ Overlook Platform

Overlook Platforms and Boardwalks

Timber Guardrail

Split Rail Fence

Fences and Guardrails

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MATERIALS & PRELIMINARY DETAILS - MARSH WALK FEASIBILITY STUDY

12549A September, 2013 Town of Wells, Maine

9 Cost Estimates and Phasing

9.1 MARSH WALK COST ESTIMATES BY PHASED SECTION

The costs below have been broken into segments by construction type and location, with an eye toward phasing the construction of the various pieces involved, should it be necessary to construct the project in pieces over time.

Wells Marsh Walk

Cost Estimates by Segment

Section 1 - 5' wide asphalt trail and crosswalk to Fisherman's Catch Restaurant

DESCRIPTION	QTY	UNIT	UNIT COST	COST
5' Asphalt Trail and 3' Esplanade/Planted Buffer	80	LF	40	3200
Timber Guardrail	80	LF	$40.00	$3,200.00
Curb Ramp Detectable Warning	32	SF	75	2400
Painted Crosswalk - 24" Lines	64	LF	$4.00	$256.00
			Subtotal:	$9,056.00
30% Permitting, Engineering, and Materials Contingency:				$2,716.80
			Total	$11,772.80

Section 2 - 5' wide boardwalk, boardwalk bus turn out, and overlook platforms #1 and #2

DESCRIPTION	QTY	UNIT	UNIT COST	COST
5' Boardwalk and 3' Esplanade/Planted Buffer	1,200	LF	$340.00	$408,000.00
Timber Guardrail	1,200	LF	$40.00	$48,000.00
Additional Boardwalk Width at Turn Out	50	LF	$205.00	$10,250.00
Overlook Platform #1	24	LF	$340.00	$8,160.00
Overlook Platform #2	1	LS	$10,000.00	$10,000.00
Interpretive Signage	3	EA	$4,000.00	$12,000.00
Regulatory signage	1	EA	$500.00	$500.00
			Subtotal:	$496,910.00
30% Permitting, Engineering, and Materials Contingency:				$149,073.00
			Total	$645,983.00

Section 3 - 5' wide asphalt trail along Harbor Road and plaza at public restroom

DESCRIPTION	QTY	UNIT	UNIT COST	COST
5' Asphalt Sidewalk and 3' Esplanade/Planted Buffer	1,220	LF	$40.00	$48,800.00
Timber Guardrail	1,220	LF	$40.00	$48,800.00
Plaza Surfacing	190	SY	$100.00	$19,000.00
Kiosk and Interpretive Signage	1	EA	$7,000.00	$7,000.00
Regulatory signage	1	EA	$500.00	$500.00
Granite Bollards	6	EA	$600.00	$3,600.00
Site Amenities (2 trash receptacles, 2 benches, 5 bike loops)	1	LS	$5,000.00	$5,000.00
Plantings at Plaza	1	LS	$5,000.00	$5,000.00
			Subtotal:	$137,700.00
30% Permitting, Engineering, and Materials Contingency:				$41,310.00
			Total	$179,010.00

Section 4 - 5' wide stone dust trail along Harbor Park parking lot and plaza at trail junction

DESCRIPTION	QTY	UNIT	UNIT COST	COST
5' Stone Dust Trail	910	LF	$25.00	$22,750.00
Split Rail Fence	950	LF	$35.00	$33,250.00
Planted Buffer	190	LF	$20.00	$3,800.00
Plaza Surfacing	270	SY	$100.00	$27,000.00
Kiosk and Interpretive Signage	1	EA	$7,000.00	$7,000.00
Regulatory signage	1	EA	$500.00	$500.00
Granite Bollards	4	EA	$600.00	$2,400.00
Site Amenities (1 trash receptacle, 8 benches, 3 bike loops)	1	LS	$11,000.00	$11,000.00
Plantings at Plaza	1	LS	$5,000.00	$5,000.00
			Subtotal:	$112,700.00
			30% Permitting, Engineering, and Materials Contingency:	$33,810.00
			Total	$146,510.00

Section 5 - 5' wide stone dust trail in Harbor Park and overlook platform #3

DESCRIPTION	QTY	UNIT	UNIT COST	COST
Clearing	1	LS	$5,000.00	$5,000.00
5' Stone Dust Trail	530	LF	$25.00	$13,250.00
Overlook Platform #3	1	LS	$10,000.00	$10,000.00
Interpretive Signage	1	EA	$4,000.00	$4,000.00
			Subtotal:	$32,250.00
			30% Permitting, Engineering, and Materials Contingency:	$9,675.00
			Total	$41,925.00

Section 6 - Roadway improvements including repaving roadway, paving asphalt shoulders and striping

DESCRIPTION	QTY	UNIT	UNIT COST	COST
Grind Existing Pavement	7,000	SY	$15.00	$105,000.00
Asphalt Binder Course (2")	960	TONS	$110.00	$105,600.00
Asphalt Surface Course (1.5")	720	TONS	$125.00	$90,000.00
4" Striping	5,200	LF	$0.50	$2,600.00
			Subtotal:	$303,200.00
			30% Permitting, Engineering, and Materials Contingency:	$90,960.00
			Total	$394,160.00

Section 7 - Culvert

DESCRIPTION	QTY	UNIT	UNIT COST	COST
Culvert	1	LS	$100,000.00	$100,000.00
			Total (Includes 30% Permitting, Engineering, and Materials Contingency):	$100,000.00

GRAND TOTAL

DESCRIPTION	COST
Section 1 - 5' wide asphalt trail and crosswalk to Fisherman's Catch Restaurant	$11,772.80
Section 2 - 5' wide boardwalk, boardwalk bus turn out, and overlook platforms #1 and #2	$645,983.00
Section 3 - 5' wide asphalt trail along Harbor Road and plaza at public restroom	$179,010.00
Section 4 - 5' wide stone dust trail along Harbor Park parking lot and plaza at trail junction	$146,510.00
Section 5 - 5' wide stone dust trail in Harbor Park and overlook platform #3	$41,925.00
Section 6 - Roadway improvements including repaving roadway, paving asphalt shoulders and striping	$394,160.00
Section 7 - Culvert	$100,000.00
Survey	$20,000.00
Grand Total :	$1,539,360.80

Section 1 and section 2 would probably be constructed together as one project, completing the approach to the boardwalk, the crossing from the Fisherman's Catch Restaurant, the boardwalk, and overlook platforms #1 and #2 at the same time.

Sections 3 (trail on grade along Harbor Road), 4 (trail through Harbor Park along parking lot), and 5 (trail from parking lot to marsh and overlook) could be completed as discrete projects, or as part of more comprehensive improvements to Harbor Park.

Section 4 would include improvements in the vicinity of the existing kiosk and new trails connecting Harbor Road, the parking area within the park, and formalized trails to the beach and overlook platform #3.

Section 6 (roadway improvements) and 7 (culvert) would probably be completed at the same time, but it is not yet certain that the culvert is necessary to benefit the marsh ecosystem, and it may not be pursued in the long term. Section 6 could be completed simultaneously with any of the improvements in sections 1 through 5.

9.2 DESIGN, ENGINEERING AND PERMITTING COSTS

Given the nature of the project's environmental context, design and engineering for the structure will need to both optimize construction to limit disturbance of the wetland and tidal areas to the maximum extent possible and manage costs for construction. In addition, as noted above, the project will require significant local, state and federal coordination and permitting.

The Marsh Walk's proximity to the coastal wetland is both a design opportunity and a permitting challenge

Approximately $20,000 should be allocated for topographic survey, boundary survey, utility survey, and coastal wetland delineation (HAT), which will provide greater clarity regarding costs for permitting and right-of-way acquisition.

The 30% addition to the construction cost estimates by segment, above, includes the following assumptions. Typical design and permitting costs for a project of this nature can be expected to run on the order of 8%-12% of the projected construction cost. Construction phase engineering assistance can

be expected to run between 8%-12% of the projected construction cost. A 10% materials contingency has been included.

Permitting costs will depend somewhat on the nature of project funding, as the use of federally originating funds will require the project to obtain clearance under the National Environmental Policy Act (NEPA) which can be expected to increase the level of effort required above local, state, and federal permits as described in Section 5.

The costs associated with acquiring rights or use agreements from the USFWS/Rachel Carson refuge are expected to vary depending upon whether a 5-year special use permit (lower cost) or permanent right-of-way acquisition (cost unknown – but could include legal fees, and purchase fee) is sought.

Other unknown costs which should be accounted for in the overall project budget would include: potential additional legal fees, local administrative costs, and miscellaneous fees.

9.3 OPERATION AND MAINTENANCE BUDGET

Municipal managers are often keenly attuned to the fiscal impact of operations and maintenance costs associated with new infrastructure on existing departments and budgets. It is important, therefore, that the Town include consideration of these costs when considering whether to proceed with the initiative.

Regular annual operations and maintenance components are likely to include the following:

- winter maintenance (snow removal),
- maintenance and periodic replacement of boardwalk and overlook framing and decking,
- maintenance and periodic replacement of timber guardrail,
- trash removal,
- removal of graffiti from signs and refreshing of informational materials at kiosks,
- maintenance of the culvert to keep it clear of debris and monitor its performance,

Informational materials at the Harbor Park Shoreline Explorer stop

- policing of project components, particularly in remote areas, such as at overlook platform #3, and
- landscape maintenance, such as periodic weeding of 10' landscaped buffer areas through establishment and beyond, and periodic trimming (at least 2x/year) of seeded 3'esplanade buffer areas.

Over the long-term, the facility will require periodic inspection and replacement of materials. The life expectancy of the various components of the bridge will invariably depend on final material selection, with added investment "up front" in more durable materials tending to reduce the need for future investment in maintenance or replacement.

We would suggest an annual budget for operations and maintenance on the order of $3,000 to $4,000 per year for the initial 20 years. After that time, the Town can expect to see an increase due to a higher level of repairs to aging materials.

9.4 OVERALL PROJECT BUDGET SUMMARY

Based on the figures discussed above, but without costs associated with right-of-way acquisition or maintenance, the full project could cost on the order of **$1,500,000 to $2,000,000**.

It is important to note that the costs expressed herein are budgetary figures based on a planning level assessment into the feasibility of constructing the Marsh Walk. In the event the community has a strong interest in implementing such a project, we recommend that further effort be expended to better define the likely magnitude of permitting and right-of-way acquisition costs.

10 Funding and Implementation

10.1 NEXT STEPS

The following next steps to continue the project effort are suggested for the Town's consideration:

1) Secure funding for survey, design engineering, and permitting

2) Perform a ground survey of the HAT line/coastal wetland boundary, topographic survey, utility survey, and boundary survey

3) Overlay the concept plans with the existing conditions survey to see whether the implications for permitting and design have changed. Make revisions as necessary.

4) Review the revised concept plans with Town, State and federal regulators and stakeholders including the Town's Code Officer, Maine DEP, Maine IF&W, Maine Department of Marine Resources, the USACE, the USFWS/Rachel Carson, the Wells NERR, the Wells Conservation Commission, the Wells Harbor Commission, Maine Audubon, and the Fisherman's Catch Restaurant. The review would have two purposes – to verify permitting and partnership requirements in light of better existing conditions information (including ownership) and to confirm buy-in and receive comments prior to design development. It will be critical to confirm with the Town's Code Officer that the project is in conformance with local codes. It will also be important to define the terms and costs of the use agreement between the Town and USFWS.

5) Hold a public meeting to receive additional comments on and continue to verify support for the project

6) Prepare 90% plans for permitting purposes, including sections and details. The NRPA permit alone has a 120 day review period, so it will be a major factor in the timing of construction.

7) Finalize plans, specifications, and cost estimates

8) Secure construction funding

9) Solicit bids for the portions of the project that are selected for construction and select a contractor.

10.2 POTENTIAL FUNDING SOURCES

All of Maine's municipalities struggle with the realities of the costs associated with investing in public improvements. For trail and recreation efforts, there are a number of traditional approaches to funding that many Maine communities have employed to see their plans through to implementation.

Most of the funding programs traditionally used to fund trails originate from federal sources and are administered by the State. These funding sources in recent years are also subject to fluctuation in the level of funding provided from year to year. The information provided here on various programs is the most current available, but program details such as availability, deadlines, and requirements may change, and communities should contact the appropriate agencies to ensure they have the best information about a funding program.

The following is a partial list of potential funding sources for this Marsh Walk project:

- **Town Funds (TIF, CIP budget, discretionary, in-kind, etc.):** The primary need for local funding will come from the need to provide match funds for most grant sources. Many grants allow for a certain amount of in-kind match such as the use of city labor or resources or other donated services from within the community. However, the Town should consider the strategic use of local funds such as from TIF or CIP budgets to construct smaller projects or take advantage of public-private partnerships that can result in trail implementation. For example, in implementing the crosswalk to the Fisherman's Catch Restaurant, there could be opportunities to match private funds with local funds to develop the crossing.

The Town raises revenue from parking fees collected at Wells Beach

  As many of the grants used by Maine communities to develop trails become less available and more competitive, many communities look to dedicating funds such as from impact fees or other development fees to secure funding. The Town has previously indicated that it could allocate resources for the Marsh Walk's construction incrementally through the fees

it collects from the USFWS every year in lieu of taxes, as a result of the **Revenue Sharing Act.**

Also, while local bonds can be less favorable politically, they could be a practical and financially feasible opportunity to fund recreation and conservation efforts.

- **Private Foundations:** Although USFWS no longer has an internal grant program, Rachel Carson is willing to jointly apply for private grants with the Town and can help to identify appropriate sources of funding. Applying for grants with a public health focus has initially been identified as a potential direction to pursue.

- **Maine Department of Transportation (MaineDOT):** Funded through the federal Transportation Alternatives Program (TAP), formerly known as Transportation Enhancement (TE), MaineDOT's Quality Community Program is reduced from previous years and may no longer be a reliable source of funding for sidewalk and trail projects. Projects with complex ownership and permitting needs are less likely to receive funding priority than simple projects within the public right-of-way. In addition, Maine's program has been unable to guarantee funding for project's submitted within the last funding cycle.

Rental fees for of the shelters within Harbor Park are another local source of revenue

The Quality Community Program typically requires separate applications for the design and the construction phases. Projects must have their design phase complete and approved by MaineDOT before applying for construction funds. There is no stated limit to the funds for each project, however, MaineDOT typically has approximately $8 million each funding round, and project awards typically vary from $200,000 to $1 million. The Town should monitor the program and coordinate with the MaineDOT Bicycle, Pedestrian, and Quality Community Program Manager for questions or to coordinate potential applications.

For more information: http://www.maine.gov/mdot/pga/qcp

The Transportation, Community, and System Preservation (TCSP) program has largely been overlooked as a source for pedestrian/bicycle facilities funding, but may be a possible funding source. This is an annually funded federal program. For more information, the Town should contact MaineDOT.Web sources for the TCCP Program: *http://www.fhwa.dot.gov/tcsp/* and *http://www.fhwa.dot.gov/discretionary/tcsp2012info.htm*

In addition to this program, the Town may wish to explore other MaineDOT funding, such as discretionary grants and federal programs, or funding through the Biennial Capital Work Plan, however, however, the need for MaineDOT funding for other city road and transportation projects may push many trail projects down on the list of funding priorities (http://www.maine.gov/mdot/planningdocs/bcwp2012-2013).

- **Maine Department of Conservation (DOC):** Funding through the Maine Department of Conservation offers another potential pool of funds for trail and park facility-related implementation, including Shore and Harbor grants, the Recreational Trails Program, and the Land & Water Conservation Fund.

An existing dirt trail would be upgraded to an ADA compliant stone dust surface as part of improvements associated with Section 5

The Recreational Trails Program (RTP) was contacted in August of 2013 regarding this project. The program funding is on an 80%/20% basis. The federal share of a project may be up to 80% of a project's total cost or the maximum grant amount of $35,000 for non-motorized trails and $5,000 for education. All of the trails in this project would potentially be eligible for funding. Education could include signage related to environmental protection with regard to trail use. The sponsor's match may consist of cash or the value of donated services and/or materials. The program is administered through the Bureau of Parks and Lands.

A site walk for this project was conducted with the grant program manager in September, 2013. Under consideration was the portion of the project described in the previous section as Section 5, including approximately .1 miles of stone dust trail in Harbor Park and overlook platform #3. During the site visit, birders were encountered at the site of proposed overlook platform #3, and the project elicited favorable comment from the administrator. Describing the project as part of a larger bike and pedestrian connectivity plan will help with scoring. It was suggested that competition in the non-motorized category is high, and that allowing several user groups to use the trail would place it in a less competitive category, but the Town was not interested in pursuing this route.

Because survey had not yet been conducted to help identify the level of permitting and right-of-way acquisition that would be required for this project, it was decided to delay applying for this grant until that information can be assembled. At issue is the fact that there are several parts of the project that will require a NRPA permit, and rather than permit it in several smaller pieces, the Town would like to apply for one overarching

permit, as has been suggested by Maine DEP. Once the design is advanced for the entire project and permitting is more in hand, the Town will be in a better position to apply for DOC funds for a portion of the Marsh Walk.

A photograph from the location of proposed overlook platform #3, taken on the day of the site walk with the RTP administrator

In general, with regard to the RTP grant, eligible **projects include:**

- Development and rehabilitation of trailside and trailhead facilities and linkages for recreational trails;
- Construction of new recreation trails;
- Acquisition of easements and fee simple title to property for trail purposes from a willing landowner/seller;
- Funding of educational programs to promote safety and environmental education and protection as they relate to the use of recreational trails.

Projects not eligible include:

- Feasibility Studies;
- Law Enforcement – Routine law enforcement is not permitted in the RTP legislation;
- Planning – Trail planning is not a permissible use of RTP funds;
- Road construction, sidewalks, gardening/landscaping, parks or park equipment, sprinklers or campgrounds;
- Routine trail maintenance;
- Construction/improvements within a federal, state, county, or town road right-of-way;
- Funding of staff/intern positions not related to a specific RTP-funded project/program.

For more information:
http://www.state.me.us/doc/parks/programs/community/trailsfund.html

The Land and Water Conservation Fund funds the development of public outdoor recreation facilities. Projects must be in accordance with the current (2009-2014) State Comprehensive Outdoor Recreation Plan (SCORP) (http://www.maine.gov/doc/parks/programs/SCORP/index.html).

Projects should have significant impact to a community, region or the State of Maine in general, including but not limited to:

- Acquisition of property to prevent loss of an existing public outdoor recreation facility;
- Acquisition of land to protect critical natural areas and/or wetlands;

- Development of public outdoor recreation facilities to meet established, documented needs in a community or region;
- Development of public outdoor recreation facilities that serve a broad range of users including special needs populations;
- Renovation of existing public outdoor recreation facilities that serve an established, documented need.

The program is administered through the Bureau of Parks and Lands. A 50% cash or in-kind match is required, with up to $200,000 for eligible acquisition and/or development projects. A pre-application inspection/meeting must be scheduled with BPL staff, and the deadline for 2013 applications has passed.

For more information:
http://www.maine.gov/doc/parks/programs/community/lwgrants.html

- The York-based southern Maine **Healthy Maine Partnership**, Choose to be Healthy, (dir. Deborah Erisckson-Irons (207) 439-6504) may be able to help identify funding sources for sections of the Marsh Walk, under the aegis of public health.

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