



New Bedford Riverwalk

Planning & Design

City of New Bedford, Massachusetts
Environmental Stewardship

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“The Acushnet River is the largest river, 8.6 miles, flowing into Buzzards Bay in southeastern Massachusetts. The name “Acushnet” comes from the Wampanoag or Algonquian word, “Cushnea”, meaning “as far as the waters”. Along the RiverWalk project area, the River divides New Bedford, on its western bank, from Fairhaven, on its eastern bank, before spilling into Buzzards Bay.”

1.0 Introduction

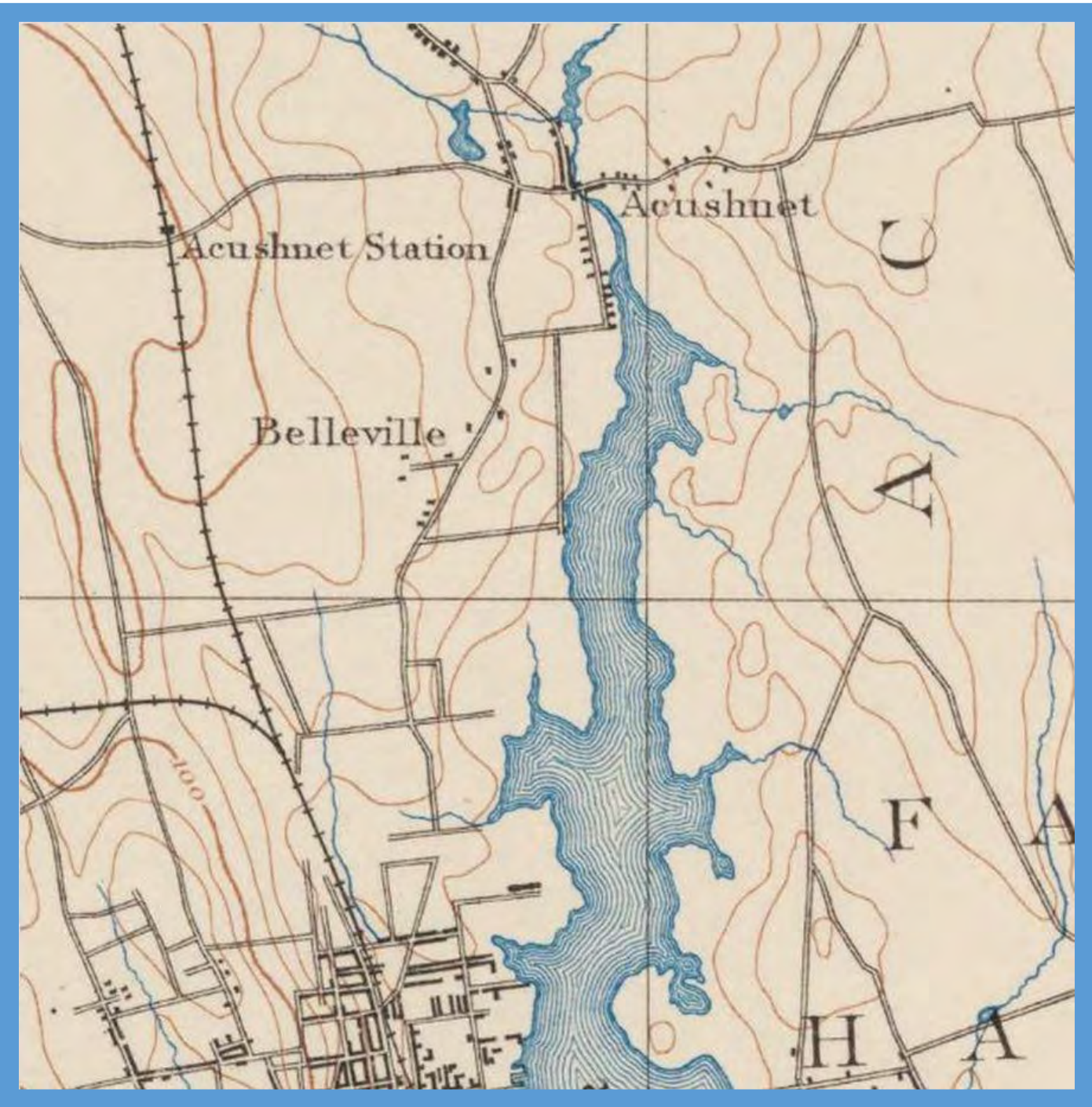


Figure 1 USGS 1885 Image courtesy of UNH DIMOND LIBRARY Documents Department & Data Center Collection

1.1 Project Background

This report provides recommendations for the construction of the proposed New Bedford Riverwalk, a public path and ecological restoration project that will stretch 2.25 miles along the Acushnet River. This pathway will be located on properties adjacent to the Acushnet River shoreline, and will extend from Coggeshall Street to the south to Wood Street to the north. This report sets the alignment of the pathway along with recommendations for materials, furnishings, and plantings.

The City’s vision of a Riverwalk came into focus in 2008 when many City residents participated in the preparation of the Upper Harbor Vision Plan, out of which the idea for a Riverwalk along the Acushnet River was created. Then, in 2011, the New Bedford Harbor Trustee Council agreed to provide \$2.9M for a restoration project that included a path along this two-mile stretch of the Acushnet River. Elements to be included in this restoration project include wetland grasses and plantings along the river, a walking path, an inland buffer with shrubs, trees, and resting/viewing areas for the community to enjoy scenic views.

As background, the New Bedford Harbor Trustee Council was created approximately 25 years ago to lead the restoration of the resources lost to years of PCB releases into Acushnet River and eventually down to the harbor. Since then, the Trustees have been committed to the environmental restoration in New Bedford Harbor and the surrounding environment in order to restore natural resources, including the habitats of living resources, and the ecological benefits that those resources provide; and to restore human appreciation of these natural resources, such as public access to this environment.

A major component of the Riverwalk implementation will be coordination with the EPA as they complete their cleanup of the river which will include portions of the shoreline. Currently, the EPA is working toward an accelerated cleanup of the Acushnet River, and the City is coordinating with EPA to plan Riverwalk construction as EPA completes work in areas adjacent to the pathway alignment. To that end, EPA provided the City with \$100,000 to complete the next step of the project, this New Bedford Riverwalk Planning and Design report. This report outlines the path alignment, identifies design elements, lists permitting requirements and results in a tangible vision that can be designed with specifics, permits, and costs to create a Riverwalk project that showcases the history and heritage of the City and its communities. This project also provides the City with details on the Riverwalk Design elements to meet the requirements for the \$2.9 million in funding from the Trustees.

The City engaged BCS Group and Shadley Associates to build upon previous planning efforts, analyze current conditions, engage public comments and incorporate these findings into the design and development of this Riverwalk project.

1.1.1 Project Intent

Through several past planning efforts, the vision for the Riverwalk project has been refined to encompass many facets of the City’s needs and wishes. This project aims to incorporate past ideas into a Riverwalk and environmental restoration design that builds upon these past planning efforts and acknowledges adjacent commercial uses, on-going industrial operations, and the surrounding residential community, resulting in a dynamic and robust Riverwalk project.

Additionally, with the project area visible from Interstate 195 and with the pathway starting close to an exit from the interstate, the City wants to capitalize on this location to provide a welcoming vista or “gateway” to the Upper Harbor that will encourage private investment and spur economic development while enhancing livability of the local Environmental Justice population. Strategic and deliberate planning proposed herein will ensure that the EPA’s accelerated Harbor Cleanup and the City’s implementation of Riverwalk will provide the critical steps necessary to achieve these objectives.

1.1.2 Past Planning Studies

New Bedford has already laid the foundation for and made substantial progress toward sustainable reuse and redevelopment on the Upper Harbor area of the Acushnet River. In early 2008, the city completed the Upper Harbor Community Vision and Action Plan—a partnership between the City, Mass Development, and

PRIORITIES FOR THE VISION PLAN

Group 1 - Key priorities:

- Create a pilot site for public waterfront access and events behind the Coalition for Buzzards Bay building with appropriate signage and cameras for safety
- Increase signage along key east-west connector streets
- Obtain the easements needed to gain public access to the River at key points and to create a riverwalk
- Create a pilot access point to the River at Howard Avenue
- Provide additional bus service throughout the neighborhood, especially along Acushnet Avenue
- Improve Acushnet Avenue between Coggeshall and Phillips streets with Community Development Block Grant funds for façade improvements, streetscape enhancements, and crosswalks
- Initiate an “eyes on the water” web-cam program to increase safety
- Improve housing
- Strengthen the connection between Brooklawn and Riverside parks

Group 2 - Key priorities:

- Identify and gain easements to create a recreational “loop” around both sides of the river
- Enhance Hathaway Street from Acushnet Avenue to the River, Howard Avenue, and the River’s edge
- Create an educational cluster in the Coffin Avenue area
- Create public facilities, a police sub-station, and an information center at Riverside Park

Group 3 - Key priorities:

- Create a plan for a riverwalk and secure funding
- Secure funding to build a dock at the end of Sawyer Street
- Continue the City’s strong effort to stabilize the area between Sawyer and Nye streets to eventually accommodate a walking loop and streetscape improvements
- Create a safe, structured after school activity for the youth
- Create a map and walking trail that incorporate the history of the neighborhood, the River, a variety of landmarks, and restaurants
- Create a plan for the future use of the Coalition for Buzzards Bay building

Image from the Upper Harbor District Plan

the Garfield Foundation. The first phase of the process was a weekend-long community planning workshop that included various charrettes and in-depth discussions by a broad representation of stakeholders including members of neighborhood associations, the Economic Development Council, City staff, the Buzzards Bay Coalition, and other community members. Over 100 attendees participated in the intensive planning efforts which consistently underscored four main themes:

1. Acushnet Avenue Corridor – Establish a stretch of Acushnet Avenue as a pedestrian-friendly international marketplace to create a gateway experience welcoming residents and visitors to the area;
2. Waterfront Access – Create east/west connections to provide and encourage public pedestrian access to the Acushnet River and create a north-south Riverwalk along the Acushnet River to include boat launches and open recreational space for the community;
3. Marketing – Increase exposure to existing restaurants and shops while promoting further sustainable commercial and visitor-centered development;
4. Neighborhoods – Enhance livability to encourage home ownership and owner occupancy.

The December 2008 The Final District Development Action Plan: Upper Harbor District established a strategy to implement the initiatives generated by the community during the visioning process. (Refer to Figure 2 and Figure 3).

The Upper Harbor vision has been developed around a pedestrian greenway, labeled Riverwalk, to be constructed along the upper harbor of the Acushnet River to provide open space, recreation, and social opportunities to the local EJ community and to all residents of the City. The Riverwalk is shown as a generic red dashed line along the waterfront on Figure 3.

Create the Acushnet Riverwalk for public river access from Coggeshall Street to Tarkiln Hill Road

Work with the City and property owners to establish a continuous Riverwalk:

- Create a wide river promenade and associated amenities – viewing areas, open spaces, natural shoreline plantings, etc.
- Work cooperatively with property owners to provide river access.
- Identify potential early segments – demonstration projects.
- Secure public easements as part of Chapter 91 compliance.
- Identify and secure funding for design and construction.
- Over the long term, work with the Towns of Fairhaven and Acushnet to extend a Riverwalk loop to the other side of the river via Howland Road and Slocum Street.

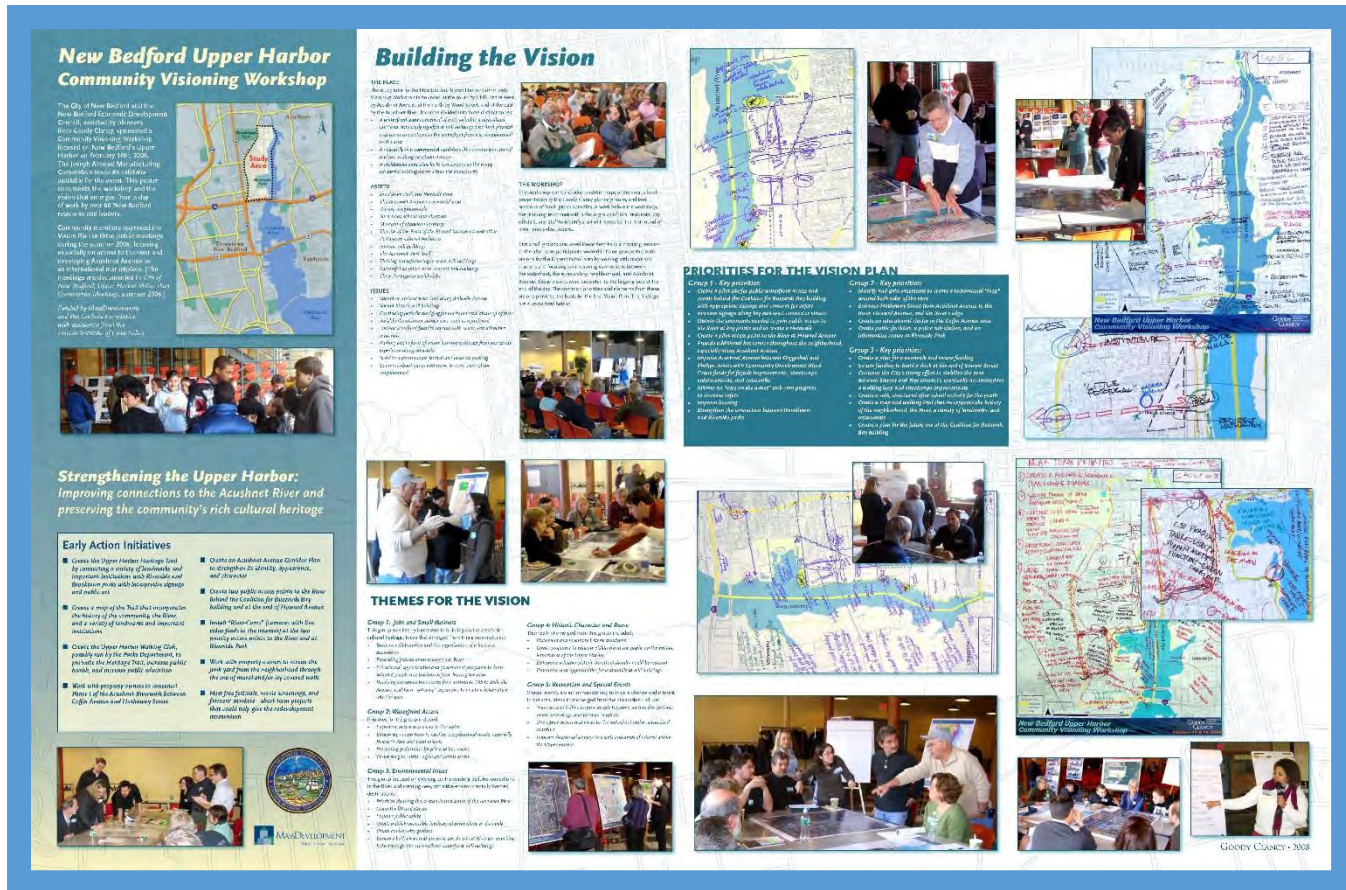


Figure 2 Image courtesy of VHDP



Figure 3 Image courtesy of VHDP

1.1.3 Approach

In 2011 the New Bedford Harbor Trustees Council (NRTC) awarded the City \$2.9 M to design and construct the Riverwalk. One such critical piece is the conceptual-level planning to integrate the greenway with the surrounding land uses. This key element is vital as it will prescribe the form and function necessary for viable project sustainability, and provide a tangible visualization to show potential private partners who can redevelop the greater area. Specifically, EPA funded \$100,000 for the landscape architectural design and engineering of the Riverwalk.

The City prepared the base plans for this Riverwalk Planning and Design report. Specifically, the City's Department of Environmental Stewardship completed the Resource Area Delineation of the project area, the City's Department of Public Infrastructure then surveyed the project area, and Thompson Farland Engineering processed the survey information to provide the base maps for this project.

With this base plan information, as well as the alignment and material recommendations in this report, the City now has the information needed to move into Design Development, Permitting and Final Design to provide construction-level plans and specifications for the implementation of this Riverwalk project.

1.2 Site Analysis

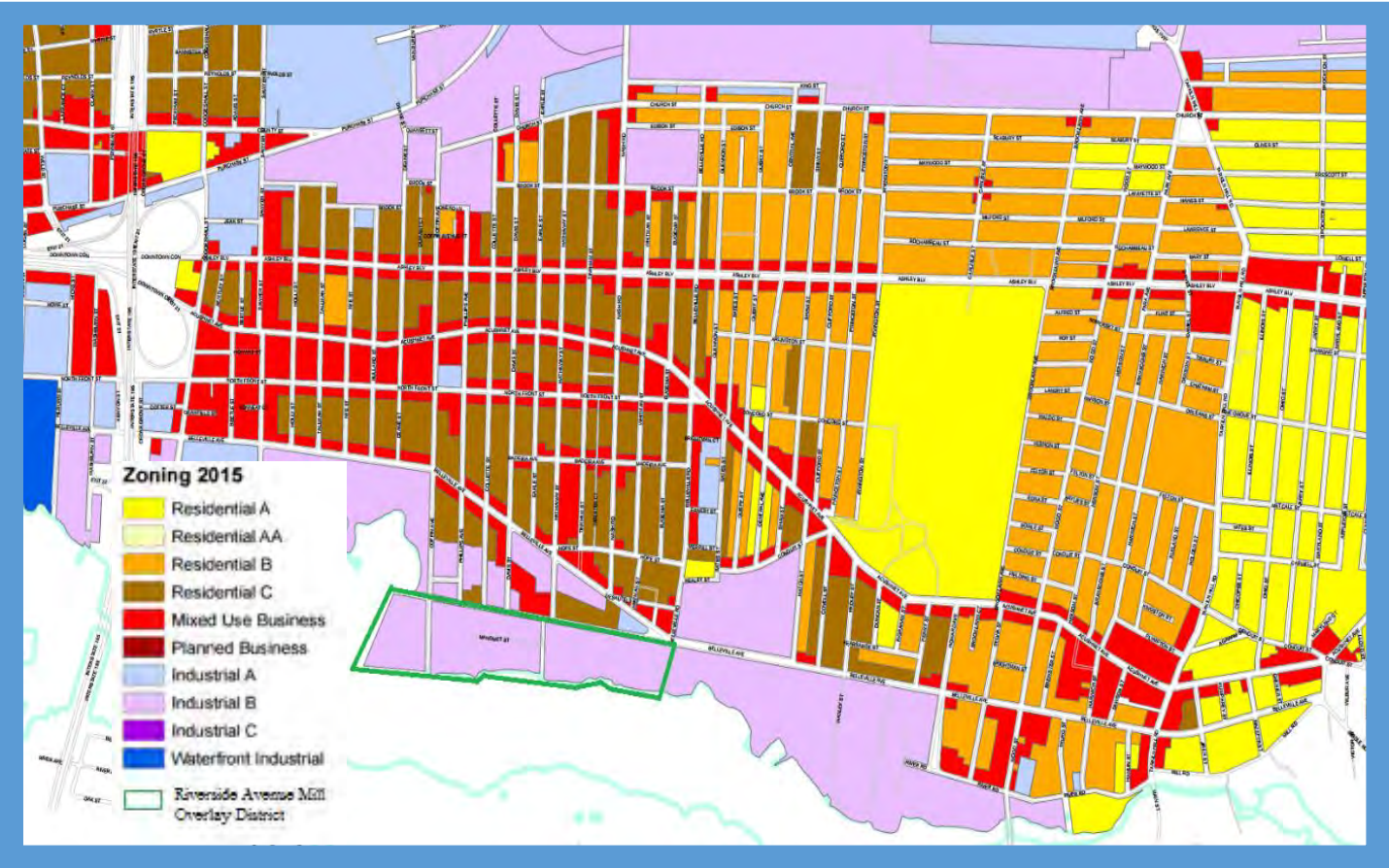
The Riverwalk Planning and Design project started with an analysis of existing conditions to better understand elements within and abutting the project areas that would influence pathway alignment, connections and design elements. This analysis included current and proposed land uses, valuable historic and environmental features, views, vistas, access, utilities and overall character of the area.

1.2.1 Zoning

In planning the Riverwalk alignment it was important to understand abutting conditions including existing and anticipated land uses. In some cases, exiting land uses, mostly residential and industrial, are expected to remain, and the Riverwalk alignment cannot inhibit current operations, but at the same time should enhance residential uses and provide an amenity for workers. In other cases, land uses are expected to change, such as vacant parcels, parking lots or the current EPA staging area. Therefore, the Riverwalk alignment and elements needed to anticipate these changes and respond appropriately. Furthermore, this analysis helped inform how the Riverwalk would interact with adjacent uses and where connections could be made from the Riverwalk to adjacent properties and neighborhoods and vice versa.

Map 1 shows the City Zoning in the Riverwalk area. The underlying zoning consists of mostly Industrial Type B and Mixed Use Businesses. However, in 2002, New Bedford adopted the first of five Mill Overlay districts established to allow mixed use in buildings that were zoned for industrial use only. An overlay district builds on the underlying zoning by establishing another layer of regulations that applies in addition to the base zoning. When considering adaptive reuse of the city’s mills and the encouragement of new business sector development, overlay zoning was the chosen planning tool used to protect the industrial uses existing within the mills while simultaneously promoting mixed-use development. The zoning ordinance allows mixed uses through special permits issued by the Zoning Board of Appeals and the new development must be sensitive to historic fabric. This Mill Overlay District has led to over \$100 million invested in historic mills throughout the City.

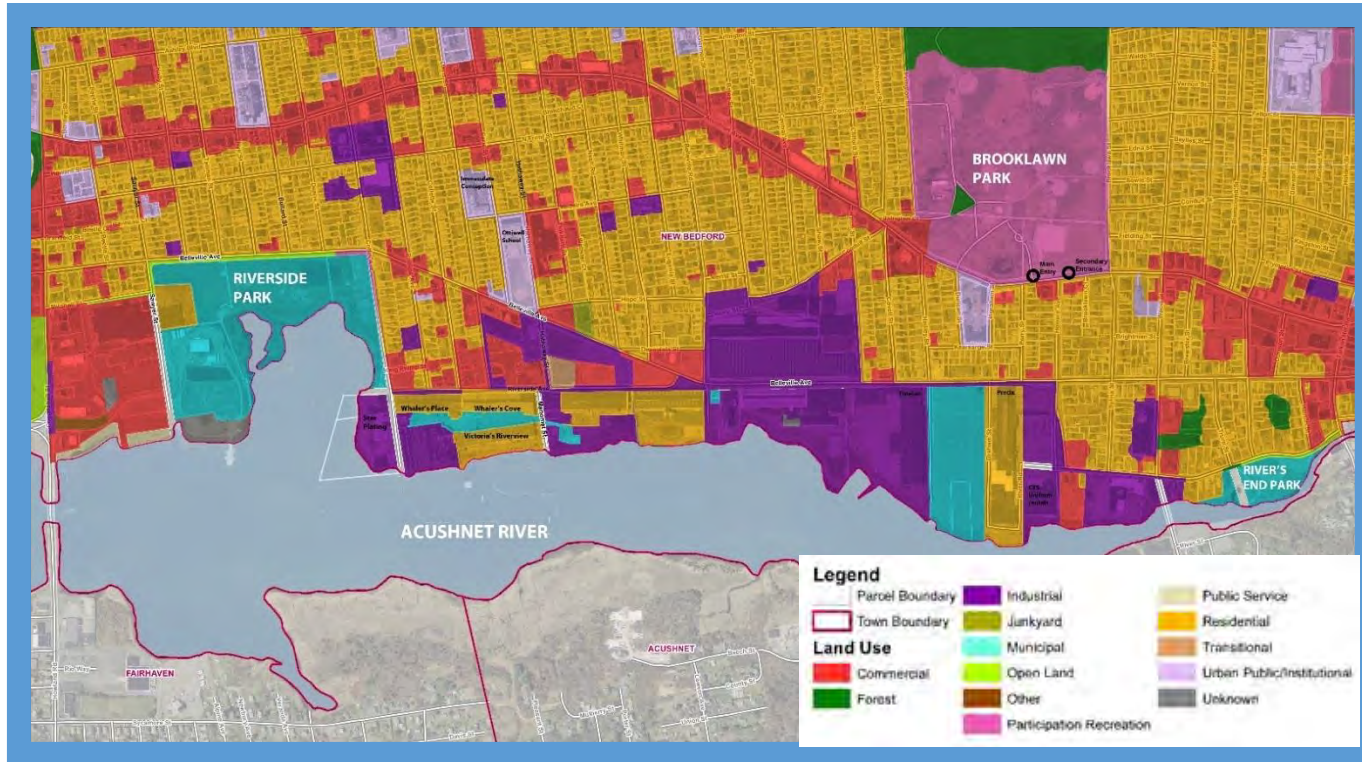
Currently only one Mill Overlay District is located in this project area: Riverside Avenue Mill Overlay District (RAMOD) at Riverside Avenue and Manomet Street. Thanks to this Overlay District zoning, Whaler’s Place and Whaler’s Cove, formerly known as Whitman Mills have been converted to assisted-living residential facilities, and renovations of the historic Victoria Riverside mill are now complete and tenants began occupying units in 2011.



Map 1 New Bedford zoning (map by City of New Bedford, Management Information System June 2015)

1.2.2 Land Use

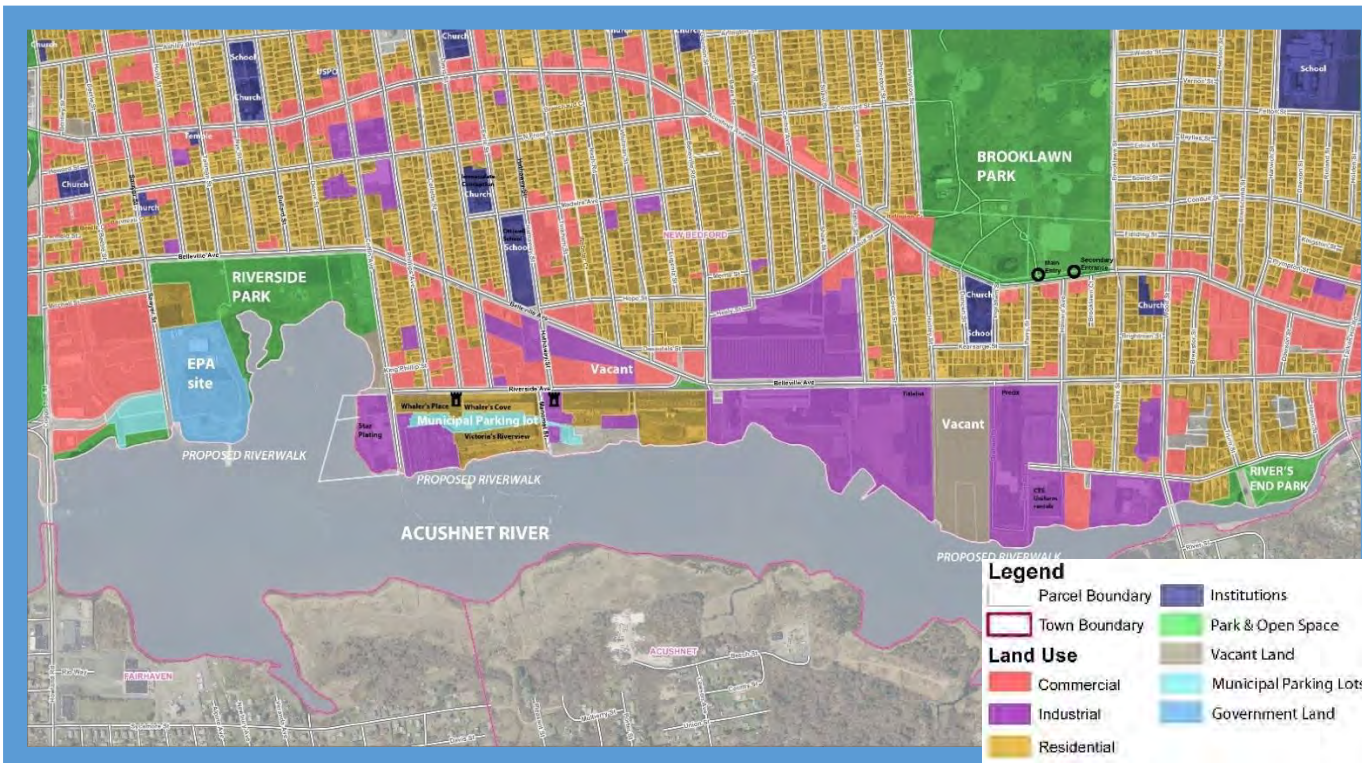
Land use within and adjacent to the project area was assessed using the City’s GIS data, as shown on Map 2, which was then supplemented with actual field observation of land uses. Map 3 illustrates the current (2015) Observed Land Use. This map summarizes and defines recent changes in land use, especially regarding open space and municipal parking lots. Map 3 also gives a more accurate picture of land use along the upper Acushnet River to help establish new/potential land use and other visual and physical connections. Such connections could vary from pedestrian sidewalk /streetscape improvements to other trails, bikeways, and pathways that would lead to parks and open spaces, as well as to other cultural and historically significant resources.



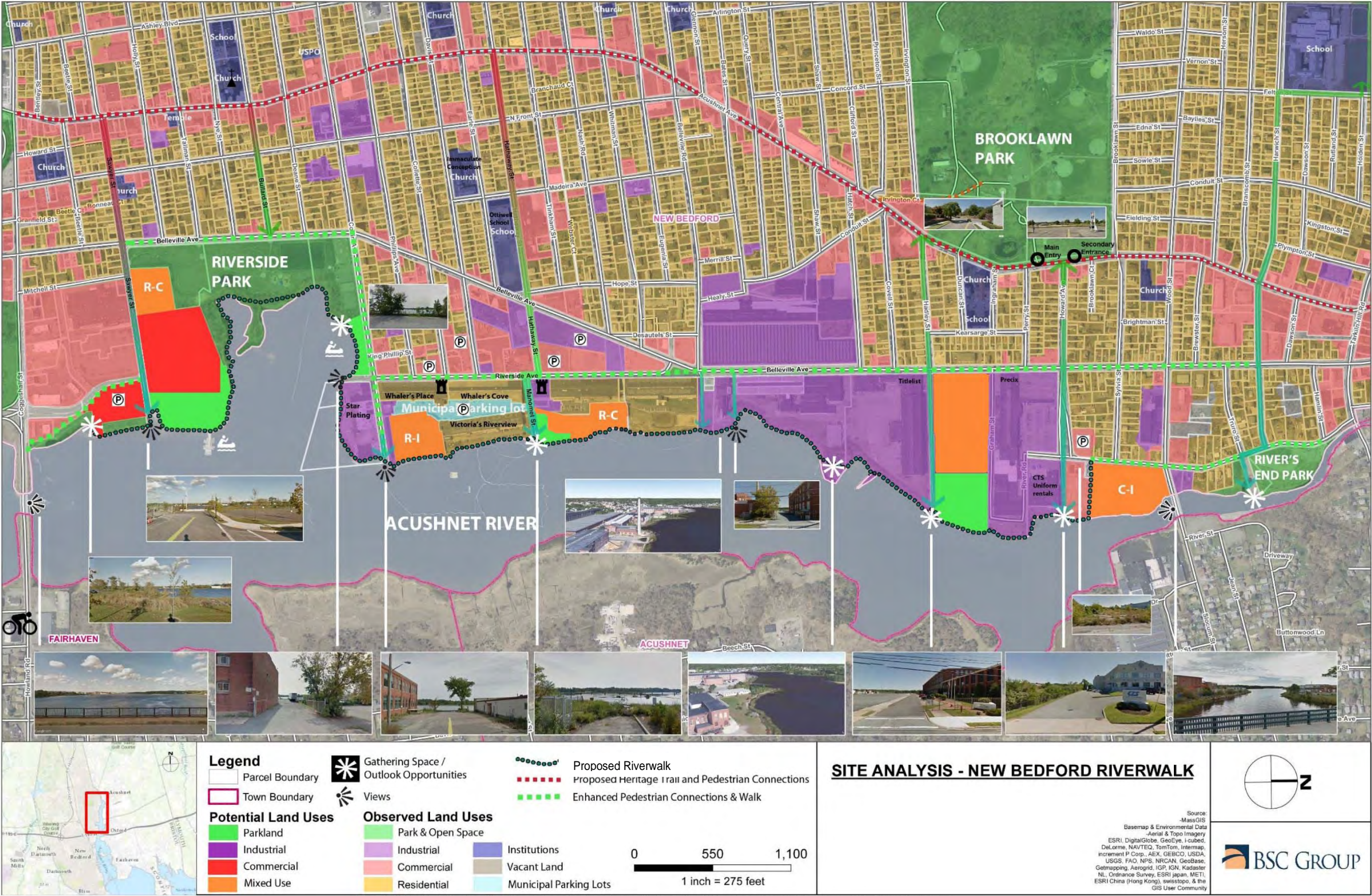
Map 2 Land Use according to Mass GIS

The information from the Current/Observed Land Use Maps were combined with more contextual and access information to create comprehensive Map 4 – Site Analysis. This Map 4, on the following page, depicts information that informed riverwalk alignment and neighborhood connections including:

- Pedestrian or visual connections to important districts, landmarks or open spaces.
- Potential areas for gathering / socializing/ outlook opportunities- views of Acushnet River
- Potential land uses to reuse vacant plots, abandoned mills or underused buildings



Map 3 Current / Observed Land Uses



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Map 4 Potential & Observed Land Uses with Pedestrian Connections



Figure 4 Potential Connections: green arrows to open spaces, red arrows to heritage trails/cultural or historically significant places. White asterisks represent potential areas for gathering/outlook opportunities



Figure 5 Potential Land Use: Red= Commercial, Orange = Mixed use, Green= Parkland, Purple = Industrial

Figure 4 and 5 were extracted from Map 4 to illustrate connections between other open spaces, commercial and industrial districts, cultural and historical landmarks.

Figure 4 shows Potential Pedestrian Connections. These were based on the Upper Harbor Vision Plan community study and were modified according to the needs and restrictions of this Riverwalk design. In general, the East- West pedestrian improvements along certain roads (as shown on Map 4) would encourage users to find and walk to the Riverwalk. By establishing urban green networks, corridors and linkages, such as the planting of street trees, pedestrian comfort would improve, streetscape aesthetics would be better and pleasing landscapes would foster environments where people would want to walk or bike rather than drive. North-South connections would also allow for a connection and integration of activities to the Riverwalk. The green dotted line running N-S along Belleville and Riverside Ave starts to indicate a potential connection of the various parks in the area, from Riverside Park to River's End Park.

Figure 5 indicates future Potential Land Uses. The intent of this diagram is to show potential new uses for parcels that are currently vacant, underutilized, or have temporary uses on them.

- On some lots, new parks and greens will bring a better sense of place and strengthen the community by providing gathering spaces promoting interaction and awareness of the historical and natural context.
- There are many active manufacturing facilities that maintain substantial employment, and most of these are expected to remain. The former Aerovox site may support new Light Industrial use.
- There are a few opportunities for new Commercial use to build upon the recent redevelopment close to Coggeshall Street.
- New residential is anticipated to build upon the successful residentially-repurposed mill redevelopments.

The Riverwalk will provide area employees and residents with open space and recreational opportunities before and after work hours as well as at lunch and break times.

In conclusion, an accessible, diverse, active and cohesively integrated neighborhood will make for a better use of the Riverwalk and vice versa. Furthermore, there have been requests and studies, prior to this design, to introduce a restaurant, a Boathouse, and connected pier that will integrate with the Riverwalk and provide additional parkland and site amenities to view and use the river.

1.2.3 Regulatory – Environmental

The lower 4.4 miles of the Acushnet River system (and Upper New Bedford Harbor) is a tidally influenced estuarine and riverine habitat. As such, there are a number of environmental resources along the river that trigger a number of regulatory requirements associated with protecting these resources.

Map 5 illustrates the environmental conditions of the Upper Acushnet River from the MassGIS database. This includes wetlands, the 25 foot Riverfront Area, FEMA floodplain line, and the Massachusetts Department of Environmental Protection (MADEP) Oil and Hazardous Waste sites.

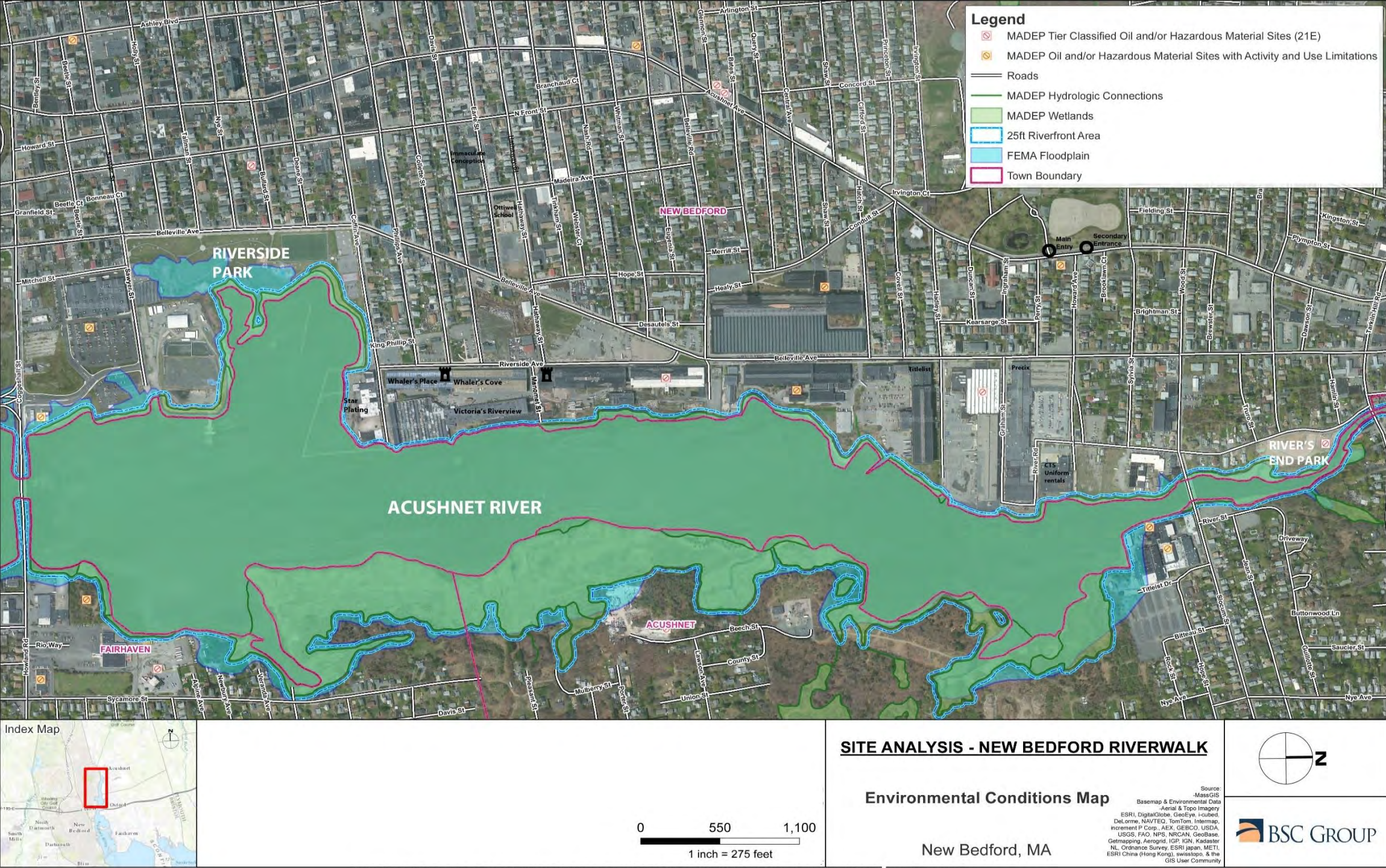
The MADEP Oil and Hazardous Waste sites are either outside the project area or on property close to the Riverwalk corridor but did not influence the Riverwalk alignment.

However, since the Riverwalk will be placed close to the river, there are a number of environmental conditions and regulations that impact the Riverwalk alignment and permitting. In order to be near the water, the walkway will be close to the riverbank and bordering vegetated wetlands, as well as being located within the FEMA floodplain, 25’ Riverfront Area and in some cases bordering vegetated wetlands. Though a number of permits will be required (see Chapter 6) the purpose of the Riverwalk is to provide public access along the river, while also ecologically restoring the 25 foot-wide project area along the river. Therefore, the pathway has been sensitively aligned within or in close proximity to these resource areas for minimal impact, and to allow for ecological restoration as much as possible.

To fully understand critical environmental resource areas, the City’s Department of Environmental Stewardship flagged both the bordering vegetated wetland (BVW) boundary and top of bank (TOB) along the entire project corridor. These lines, as well as the FEMA and Mean High Water lines, were provided to BSC by the City and are shown on Maps 6A and 6B. This information help inform the Riverwalk alignment as shown on the plans and further explained in Chapter 3.



Figure 6 Wooded area once upon a time near Coggeshall Street. Image Courtesy of New Bedford Whaling Museum



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Map 5 Environmental Conditions Map





1.2.4 Context – historical, neighborhoods, connections

The historical significance of Acushnet River in New Bedford can be traced back to the Contact Period (1500-1620), when the area at the Head of the River was a portion of the Rhode Island Path, a major native trail between Newport and Plymouth. Mid -18th residential settlement occurred along the northern portion of the river; however the river is best associated to its use related to the manufacturing and fishing industries. This project encompasses an area that included many historical mills of the textile industry and two bridges that connect New Bedford with Acushnet and Fairhaven.

The Acushnet River was first inhabited by the Wampanoag Native Americans. A sect of this tribe was called the Cushena meaning, ‘as far as the waters’. Europeans heard different dialects of this word and eventually settled on the name ‘Acushnet’ for the river. Because of the river’s vitality, European settlements developed within close proximity of the river followed by permanent homes. As the community developed industry followed, including whaling, logging, and textile.

In the early 1800’s New Bedford became the capital for the whaling industry. As the area grew and urbanized other industries migrated there. The Wamsutta Company opened in 1848 on the east shore of the Acushnet, and was the first mill to supplant whaling as the main employer. Then, in 1859 the whaling industry began to wane after crude oil was drilled from Pennsylvania and the use of whale’s oil was eventually supplanted.. The wealthy whaling merchants then decided to invest in textiles, and in the latter half of the 19th century the textile industry doubled in size, which proportionately doubled the population. The location of the Acushnet River supported the placement of the bustling textile industry. The textile mills located along the river to take advantage of water access to coal deliveries, which fueled the steam engines, and the shipping of raw and finished textile goods.

Between 1880-90 seven new textile companies entered New Bedford. Wamsutta had seven mills by 1892 and was the largest cotton weaving plant in the world. Many brick buildings, crowded with power looms, lined the streets including the Acushnet River area. Anne Louro, the Historic Preservation Planner of New Bedford stated to National Public Radio, “There were cotton bits flying everywhere...and [the Mills were] all full of people because there were three shifts running 24/7.”

Due to the available jobs, there was an influx of immigrants to provide skilled labor and meet the demand of the growing industry. In two generations the population of the city quadrupled in size. Immigrants came first from French Canadian Quebec, Ireland, England, and later from Greece, Poland, Cape Verde, and Portugal. There were 41,000 workers, and worker housing was built in close proximity to the mills and ethnic neighborhoods became established seemingly overnight.

Though the textile and industrial base of New Bedford has diminished in recent history, as it has in most of the Northeast, some industry still remains within and adjacent to the project area. Many of the mills still support light manufacturing while others have been repurposed for a diverse range of uses; including housing, business incubating and artist live-work space. The diverse neighborhoods surrounding the mills adjacent to the river have evolved in their demographic composition, but still exist in their vibrancy of churches, social clubs, ethnic shops and cafes.



Figure 7 Coggeshall Bridge looking north, circa 1908 (Courtesy of www.WhalingCity.net)



Fishing on the Coggeshall Bridge, circa 1938. Image courtesy of Spinner Publications.



Coggeshall Bridge, Image courtesy of Spinner Publications



Coggeshall Bridge in 1945, Image courtesy of Spinner Publications

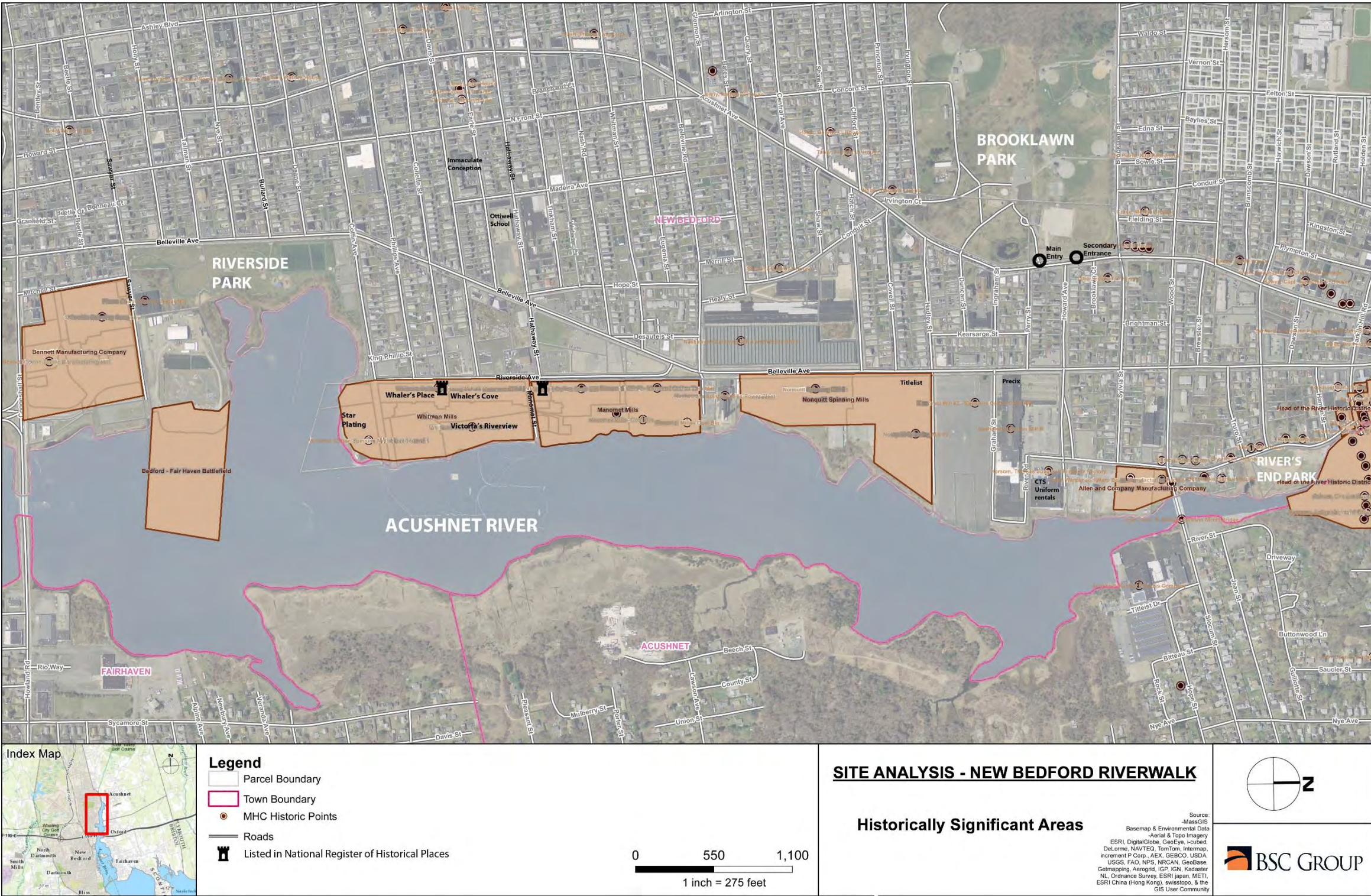


Protesting plans to incinerate toxic waste from cleanup of New Bedford Harbor. Image courtesy of Spinner Publications.



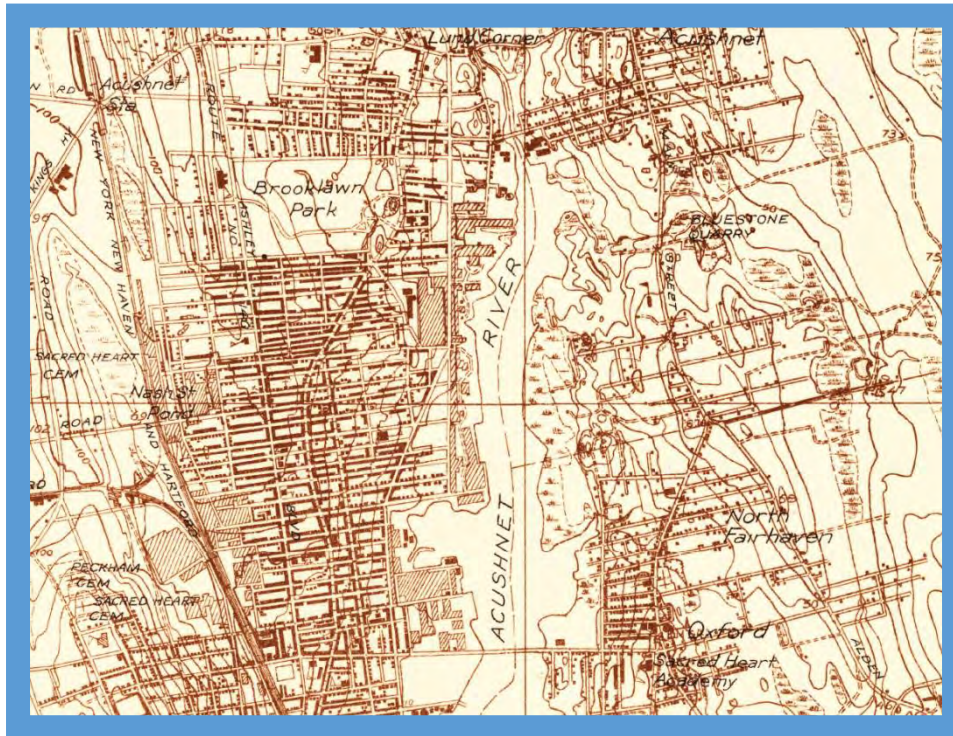
Old Stone Bridge, Acushnet January 13 1889 Image Courtesy of Spinner Publications

Map 7 illustrates the historical noteworthy areas within the site, as defined by Mass GIS. Two buildings are listed on the National Register of Historical Places - Whitman and Manomet Mills. These have been recently renovated for residential use - Whaler's Place, Whaler's Cove, Victoria's Riverview and the Riverbank Lofts residential units.

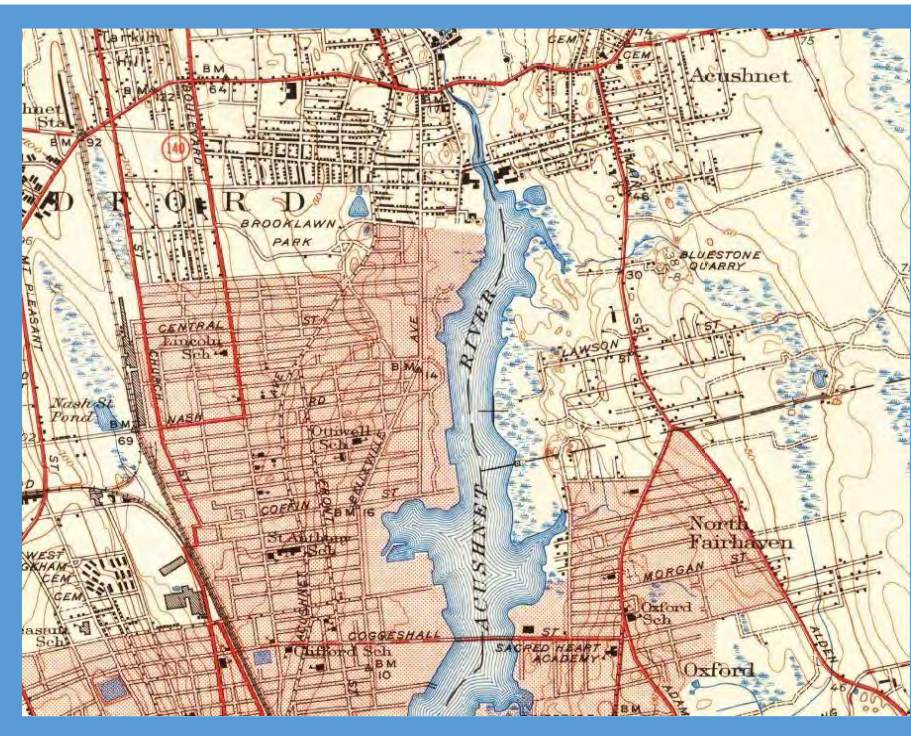


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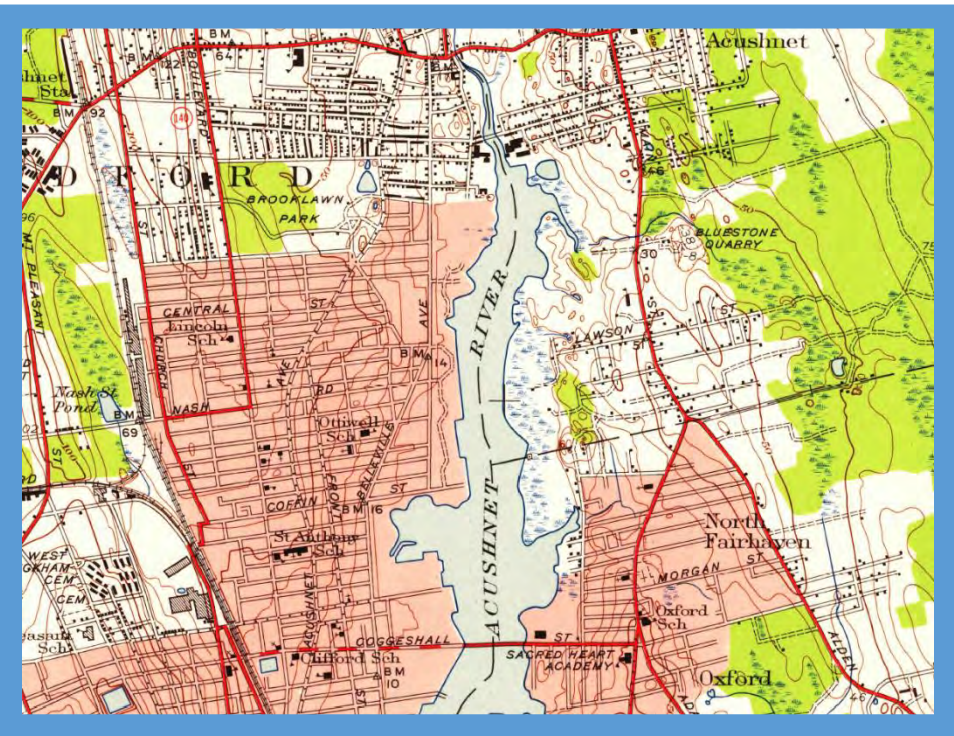
Map 7 Historical Significant Areas



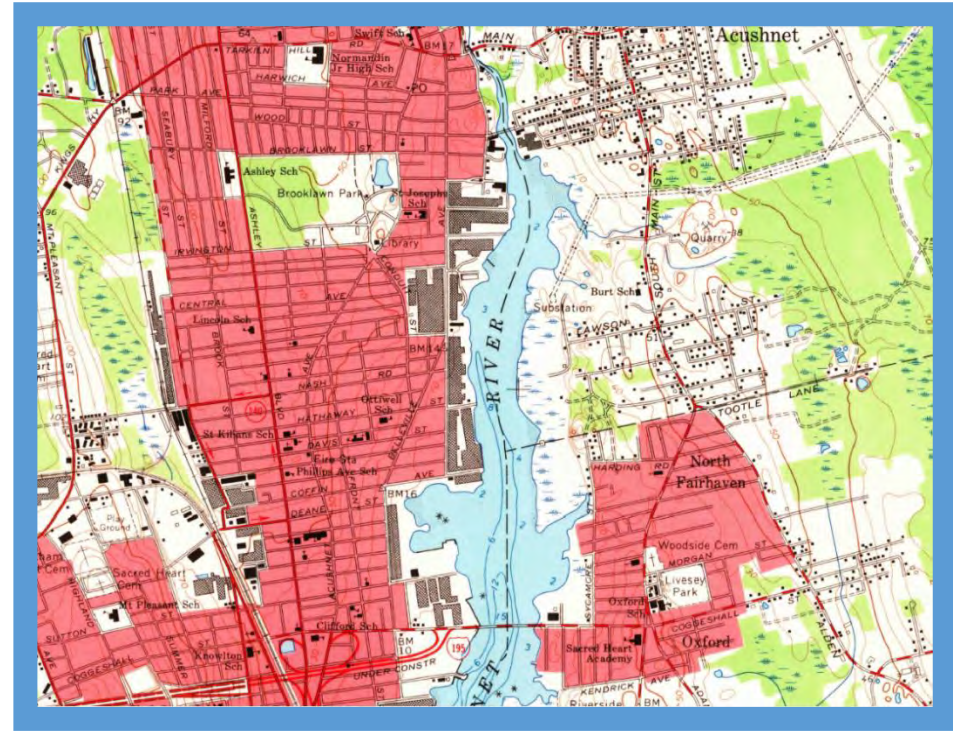
Map 7 1936 USGS map. Image Courtesy of Landmarkhunter.com



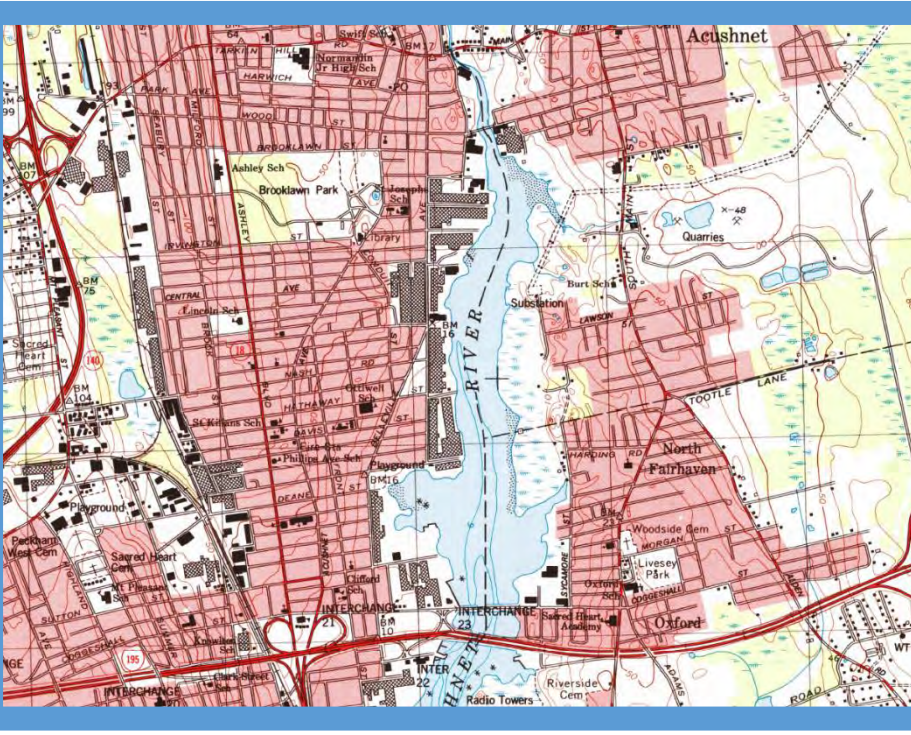
Map 8 1941 USGS map. Image Courtesy of Landmarkhunter.com



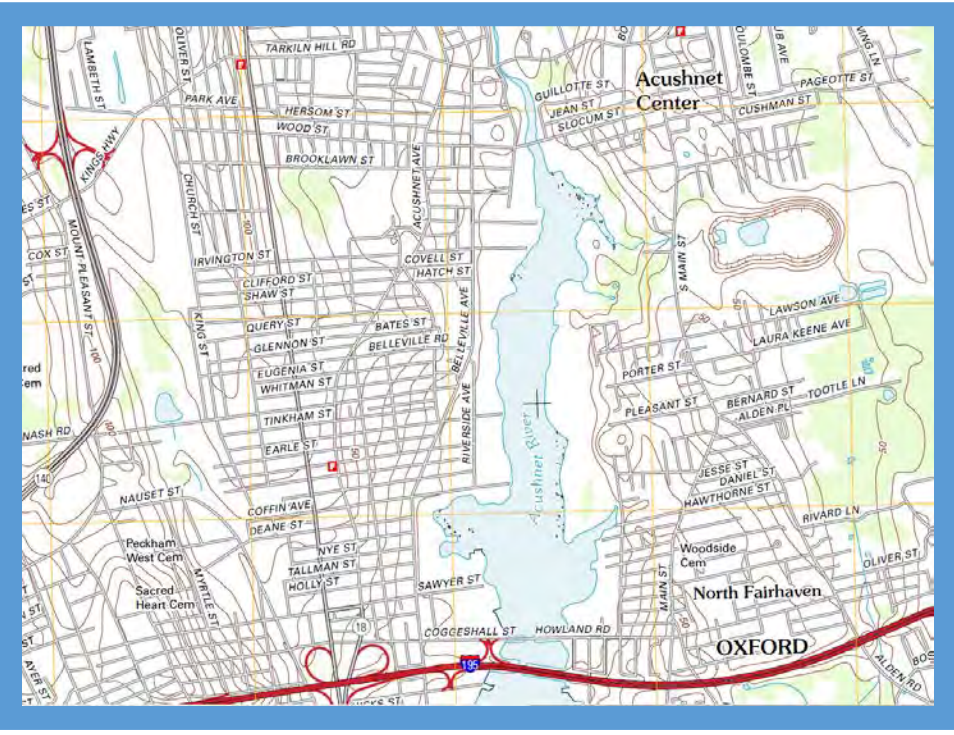
Map 6 1948 USGS map. Image Courtesy of Landmarkhunter.com



Map 10 1964 USGS map. Image Courtesy of Landmarkhunter.com



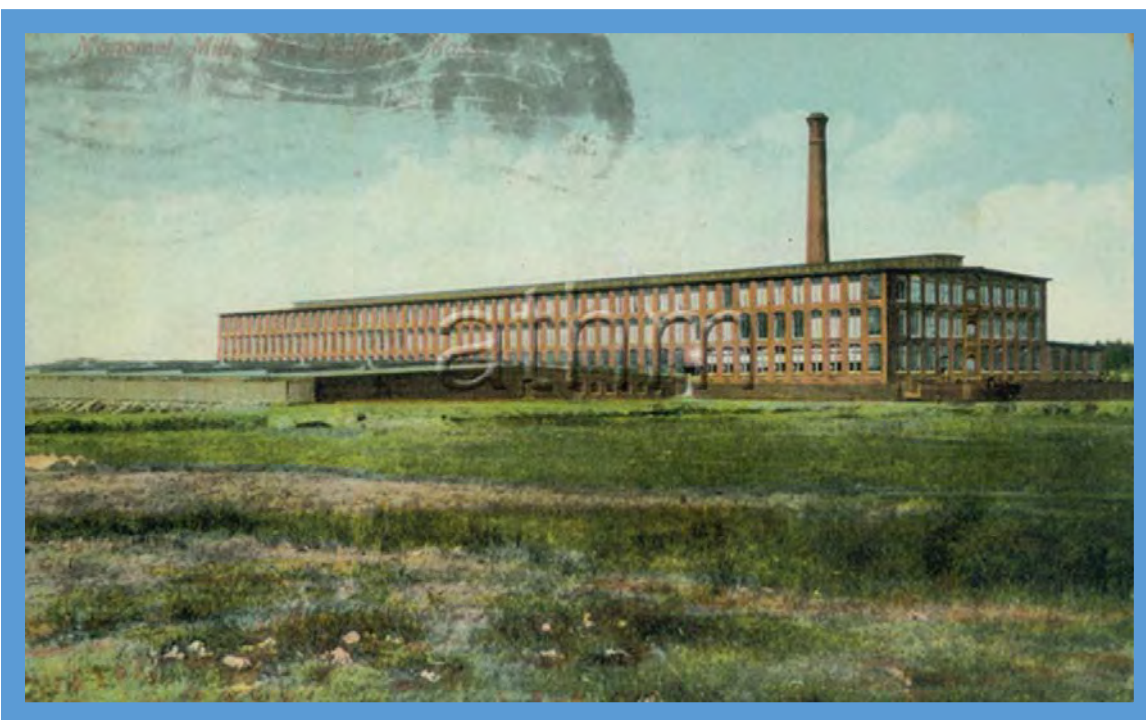
Map 11 1979 USGS map. Image Courtesy of Landmarkhunter.com



Map 12 2012 USGS map. Image Courtesy of Landmarkhunter.com



Whitman Mills interior weave room with stamped message: "Manufacturers of the finest Plain and Fancy Cotton Goods. Also Cotton and Silk Mixtures. 4950 Looms, 16000 Spindles". Image courtesy of American Textile History Museum.



Manomet Mills, New Bedford, Mass. Colorized photo of 3-story brick building with stack. Printed in Germany. Postmarked 1910. 14 x 9 cm. Image courtesy of American Textile History Museum.

The brief history below is typical of the mills in the project area.

The **Whitman Mills** are bounded by Riverside Street, Manomet Street, Coffin Avenue, and the river. It is just one of a group of mill complexes developed by William Whitman in the area around the turn of the 20th century. This particular grouping, including two large mills, an office, and several outbuildings, was built between 1896 and 1917, with most of those original buildings still standing. The mill complex was listed on the National Register of Historic Places in 2003. The mills operated until 1932, when the Whitman Company went bankrupt. The complex was nearly demolished in the 1950s, but has since been subdivided and occupied by a succession of smaller businesses. Renovations at the historic Victoria Riverside mill are now complete (101 total lofts) and tenants began occupying units in the winter of 2011.

The **Manomet Mills** are a historic textile mill complex located between Riverside Avenue and the Acushnet River, north of Manomet Street and the Whitman Mills. The complex consists of three Classical Revival brick buildings, built between 1903 and 1907. The mill complex was the main operating site of the Manomet Mill Company, produced cotton yarn until about 1928. The buildings were sold in that year to the Delaware Rayon Company, which went bankrupt in 1954. Mill No. 2 was then used by the Acushnet Process Company for the manufacture of golf balls, while Mill No. 1 continued to be used for rayon production.



Young workers in Manomet, Nonquitt and Nashawena Mills, circa 1912 (Images courtesy of Library of Congress)



“It is the City’s intent to have this Riverwalk be a catalyst for further waterfront development and the foundation for a commitment to increasing public access along the inner harbor, attracting private investment and many new miles of walkways and public space destinations along the Acushnet River’s edge. This project has a vision of going far beyond its local impact because of its prime views, across to Fairhaven and Acushnet towns. New Bedford Riverwalk planning and design goal is to establish inter-city connections.”

2.0 Design Approach



Figure 8 View near Whaler’s Place, along the Acushnet River, looking north towards Manomet Mills and the smoke stack.

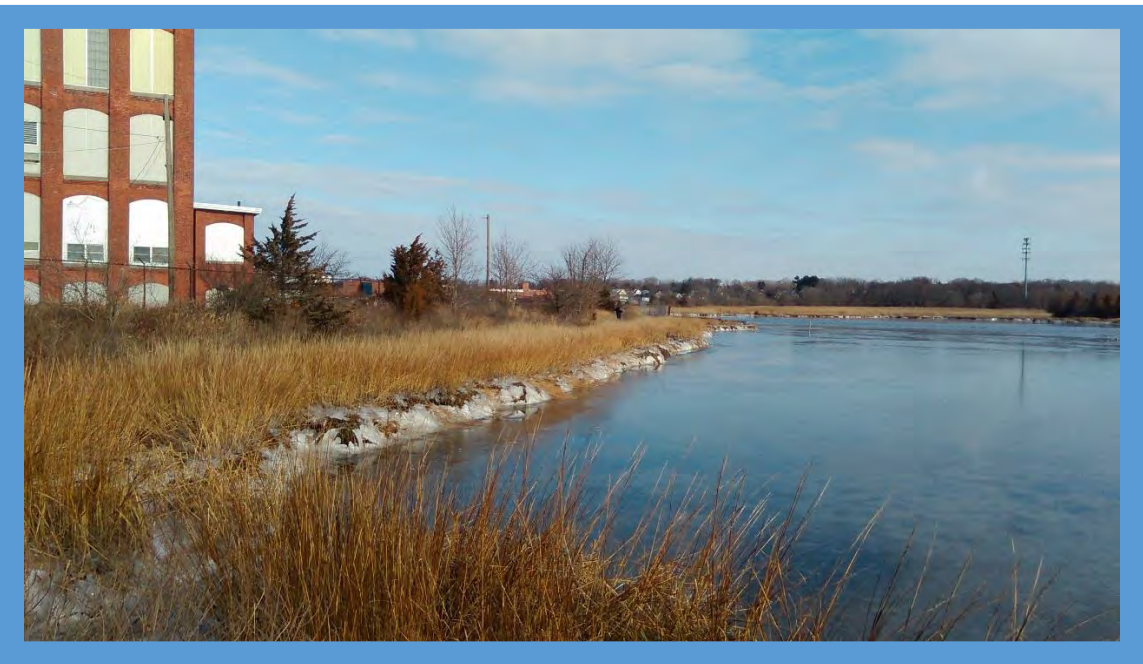


Figure 9 View looking north north towards Titleist

2.1 The Vision: Riverwalk Design Narrative

The purpose of the Riverwalk Project is to design and ultimately construct a pedestrian greenway, labeled “Riverwalk”, along the upper Acushnet River to provide restoration of the 25’ upland riparian zone with native plant species, provide open space / new park land for mostly passive recreation, and opportunities for social interaction among the local community, the residents of the City, and visitors of New Bedford.

BSC and Shadley’s main goals were to achieve a balance between environmental and cultural requirements, while considering the programmatic elements and physical constraints of the site. This continual path along the north-south Acushnet River is to provide access for all (as it is designed to be ADA compliant), connect to abutting neighborhoods, use sustainable and maintainable materials, restore the native vegetation and wildlife habitats, while complying with all local and state regulations.

These environmental and cultural considerations have a rationale based on the combination of historical research, site analysis, sustainable design and the community’s input, culminating in a Preferred Riverwalk Alignment and Design elements.



This Preferred Design consists of **native** vegetation that will provide the following benefits to the site:

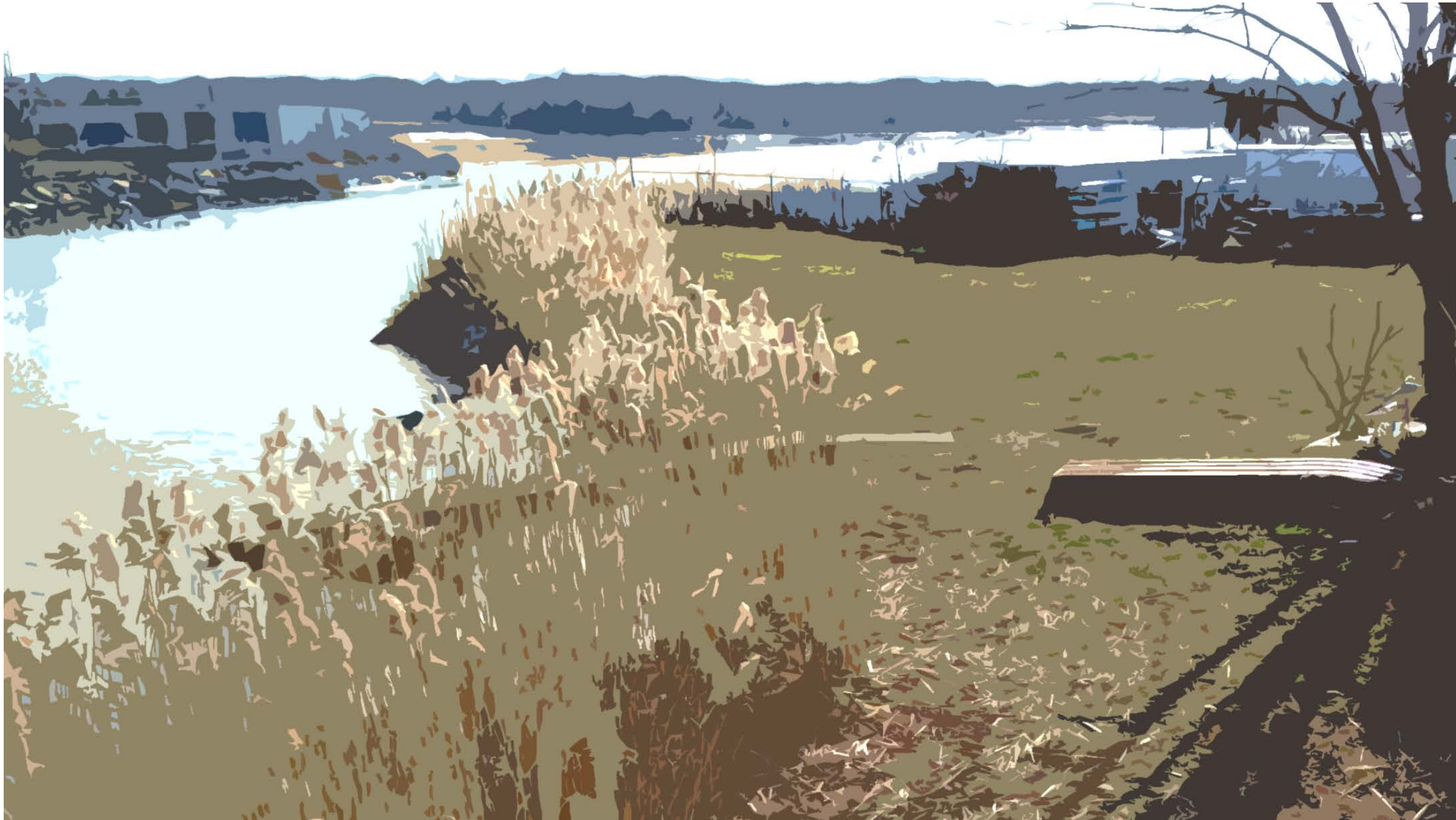
- Stormwater reduction: - runoff water absorbed and filtered by plants and soil. Densely vegetative areas facilitate sediment entrapment by slowing down water flow. They can treat runoff from rooftops, parking lots, roads and other paved impervious areas.
- Stormwater damage and flooding: - trees, shrubs, and smaller plants have root systems that structurally reinforce and support slopes, bind soils, and reduce their susceptibility to erosion from wind or rain. In addition, by taking up the water directly from the ground, absorbing it through their leaves, and breaking the impact of raindrops or wave-splash, plants slow down the rate and quantity of water runoff that can lead to erosion. For example: Larger shrubs, such as bayberry (*Myrica pensylvanica*) and beach plum (*Prunus maritima*), are also good choices for exposed areas of a coastal

bank since they are hardy and tolerant of salt spray and drought. Native trees, such as black cherry (*Prunus serotina*), pitch pine (*Pinus rigida*), and Eastern red cedar (*Juniperus virginiana*), may be beneficial for stability since their root structures are either deep or spreading

- Reduction of pollutants: trash, bacteria, heavy metals, total suspended solids, hydrocarbons, and soil erosion by providing a buffer and filter between impervious surfaces and Acushnet River. (E.g. list plant species that absorb and fix N /other heavy metals/pollutants of river)
- Provides important wildlife habitat: - shelter, nesting areas, and food for wildlife. Native plants also preserve the natural character of the shoreline, and provide privacy. In contrast, extensive lawns do not provide stability against erosion (their roots are relatively shallow) or value for wildlife. In addition, fertilizers and pesticides used on lawns can degrade water quality and may be hazardous to human health and wildlife.
- Sustainable shoreline maintenance:-Native plants are adapted to local conditions, and as a result require less maintenance, watering, fertilizer, and pest control than introduced species. Because certain natives thrive in these water-edge conditions, they may also out compete and control unwanted invasive species.
- Provide separation between industrial abutters and the pedestrian walkway.



Figure 10 River's Edge Park, along the Malden River in Medford, MA



3.0 Preliminary Design

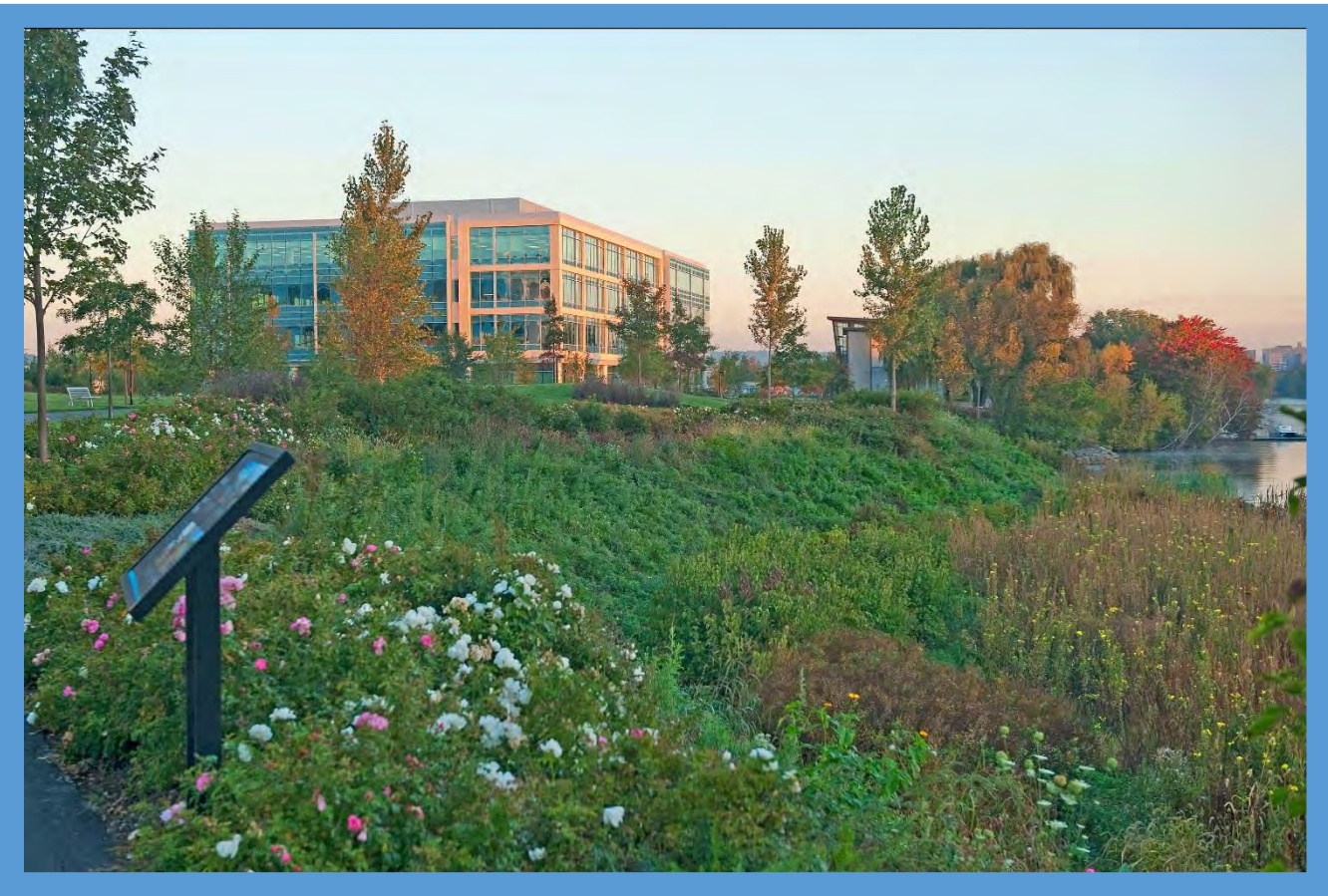


Figure 11 Restored riparian shoreline at River’s Edge Park in Medford, MA

3.1 Design Approach

The New Bedford Riverwalk design approach is the result of balancing the cultural considerations of a recreational and transportation amenity with the environmental requirements of a contaminated site which is, fortunately, undergoing extensive clean-up efforts by the Environmental Protection Agency (EPA). The resulting project is a combination of good planning and design, research, site analysis, and community and City input.

The Riverwalk project poses unique challenges due to its contaminated post-industrial sites, the need for ecological restoration of the riverbank, and the goals for beneficial and positive human

use. The Riverwalk also has enormous potential as a recreational, ecological, and educational resource for New Bedford residents and the extended community.

From a pedestrian perspective, the design strategy is driven by the goals of connecting the Riverwalk with adjacent neighborhoods and parks; establishing viewpoints at important promontories and intersections; locating gathering areas where people may rest and enjoy the river; and creating a destination that brings people to New Bedford’s waterfront. From an ecological perspective, the goals of the Riverwalk are to restore riparian vegetation along the Acushnet River; filter stormwater and neutralize heavy metal contaminants; improve water quality; reduce erosion; and enhance wildlife habitat.

The successful combination of these two perspectives is key to achieving New Bedford’s vision for the Riverwalk and represents the design approach of the BSC Group and Shadley Associates team.

3.2 Riverwalk Alignment

The alignment of the Riverwalk is constrained by regulatory, environmental, constructability, and accessibility concerns. The alignment is primarily within the City’s future acquisition of a 25-foot wide easement along the Acushnet River extending from Coggeshall Street at the south to Wood Street at the north for a distance of approximately 2.2 miles. The outshore limit of the easement is defined as the “top of coastal bank” while the inshore limit is a 25 foot offset from the top of coastal bank.

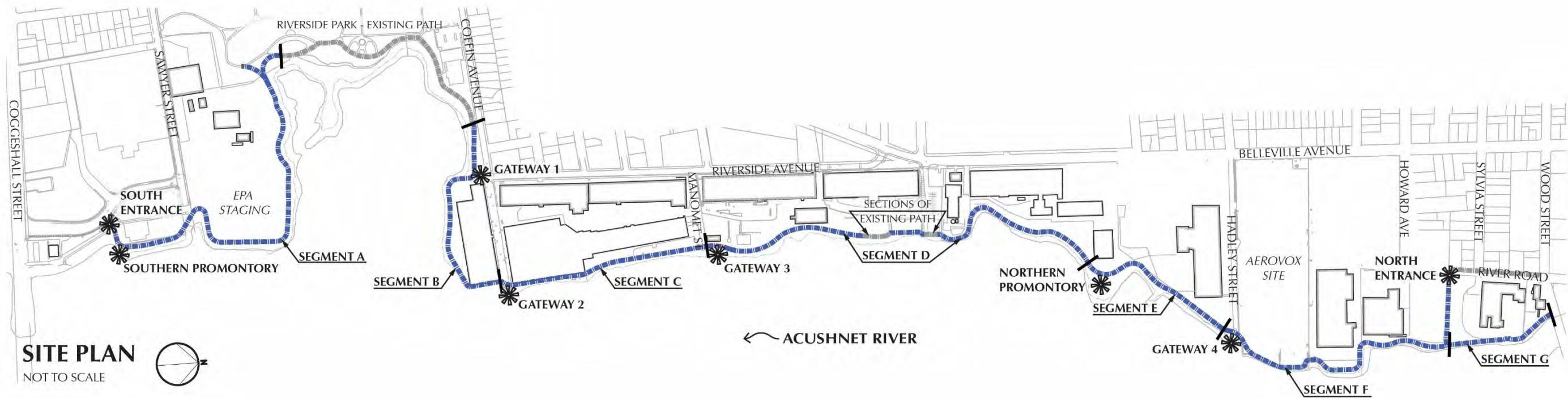
While the boundaries of this easement guide the general project limits, other constraints necessitate adjustments to the Riverwalk alignment. For instance, the Riverwalk must be ADA accessible to encourage its use by people of all abilities. As a result, where existing slopes would result in a walkway exceeding a running slope of 5 percent or cross slope of 2 percent, which are the maximums according to ADA and the Massachusetts Architectural Access Board (MAAB), the Riverwalk alignment is shifted inshore to achieve compliance with ADA. Other existing conditions, such as existing structures or drainage swales, require an adjustment to the Riverwalk alignment which at times results in portions of the Riverwalk located inshore or outshore of the easement zone.

Beyond accommodating the many site constraints that affect it, the alignment takes on a meandering nature that mimics the natural flow of the adjacent Acushnet River. The alignment responds to the form of the

riverbank, following changes in grade and natural undulations. Echoing the natural form of the riverbank creates a more interesting pedestrian experience as resting areas, gateways, and views are gradually revealed around the bend. It is intended to contrast with the rigid architectural façades and geometric orientation of the industrial buildings dotting New Bedford’s waterfront. This makes for an intriguing juxtaposition of the organic forms of nature with the orderly constructs of human intervention.

The proposed width of the Riverwalk is 6-feet wide which comfortably accommodates pedestrian travel in both directions and exceeds the minimum requirements of ADA and MAAB. The overall length of the Riverwalk from the south entrance to the north entrance is approximately 11,540 linear feet and includes approximately 1,585 linear feet of existing walkways where the new Riverwalk ties into existing walkways at Riverside Park and Riverbank Lofts. While 71.4 percent of the proposed Riverwalk is within the 25-foot wide easement area, 23.4 percent is located inshore of the easement area and another 5.2 percent located outshore of the top of coastal bank.

Key to the alignment of the Riverwalk is the placement of access points and entrance gateways. The southern access to the Riverwalk begins at Coggeshall Street and continues along the existing sidewalk on the east side of Veterans Memorial Way. The south entrance on to the Riverwalk is located on the east side of Veterans Memorial Way where the street begins to bend toward the west. Here, the Riverwalk departs the public street and begins its route along the shoreline. Meandering along a natural promontory, the Riverwalk continues northward toward Sawyer Street where it once again intersects with the public roadway. From Sawyer Street, the Riverwalk follows along the top of the coastal bank around a new piece of land constructed as a result of the EPA’s clean-up of the Acushnet River. While the future of this site is not yet known, the City envisions its use as a public recreational space. From here, the Riverwalk continues to the west along the river where it connects to the existing walkway at Riverside Park. The existing park walkway continues to the north where it then follows along Coffin Avenue. The proposed Riverwalk meanders between the river and Coffin Avenue heading east where it skirts around the Star Plating property that is located on a promontory at the southeast end of Coffin Avenue. At this location, the existing conditions necessitate a structure intervention to support the Riverwalk while still maintaining vehicular access to the south side of the adjacent Star Plating building.



The east end of the Star Plating building serves as the existing edge of the river (see Figure 12). The preliminary Riverwalk design envisions a retaining wall with guardrail constructed outshore of the building at this location where it will support the Riverwalk along the building face.



Figure 12 The east end of the Star Plating property abutting the Acushnet River

From Coffin Avenue, the Riverwalk continues in a northerly route between the river and several mill buildings which serve a multitude of commercial and residential purposes. Along the route, the Riverwalk intersects with several public streets including Manomet Street, Hadley Street, and Howard Avenue. Due to the narrowness of existing land between the parking lot at Victoria Riverside and the river, the preliminary design proposes replacing the outshore row of parking spaces with the proposed Riverwalk as well as a vegetated buffer between the parking lot and the walkway. The lost parking would be replaced along the building face by extending the existing row of parking to the south. This proposed work results in a net loss of three parking spaces but increases the extent of the riparian buffer restoration along the parking lot. The Aerovox site, located north of Hadley Street, poses another constraint to the alignment of the walkway. This site is the major source of the contamination of the Acushnet River and is currently

capped with asphalt pavement, cordoned off with a chain link fence and divided from the river with sheet piling driven into the ground (see Figure 13).



Figure 13 View along the outshore end of the Aerovox site looking north

The preliminary design proposes the Riverwalk follow between the existing chain link fence and the metal sheet piling in order to minimally disturb this site. While future recreational uses are envisioned for a portion of the Aerovox site, a re-development timeline is not yet known and therefore the design team’s approach to the Riverwalk alignment at this location is minimal. North of Howard Avenue, the Riverwalk turns away from the river and continues west to River Road where the north entrance is proposed. From here, the Riverwalk follows the existing sidewalk on the west side of River Road to Wood Street. The sidewalk north of Wood Street provides a continuous pedestrian connection to River’s End Park. While it is recommended the City of New Bedford assess, repair and/or reconstruct the sidewalk along River Road in the future, this work is not included in this preliminary design.

3.3 Design of the Gateways and Seating Areas

The preliminary design includes eight gateways and seating areas along the Riverwalk that are purposefully located to encourage access to the river, maximize views, offer resting areas periodically along the Riverwalk, and provide visual connections to other points along the Riverwalk route.

3.3.1 South Entrance

The south entrance is located on the east side of Veterans Memorial Way where the street begins to bend toward the west. This location is strategic for two reasons. First, the outshore land expands at this location, conveniently accommodating a larger gateway entrance to the Riverwalk. Second, the focal point of the entrance gateway is a kiosk or small-sized vertical feature which, due to the bend in the roadway, places this vertical feature in direct view from Coggeshall Street. This visibility is important because it serves a wayfinding purpose for visitors by having a strong visual presence to draw people. The entrance gateway is framed by a semicircular seatwall. The seatwall may serve as a venue for signage announcing the Riverwalk while also acting as a threshold between the roadway and the riverfront. The paved space at the entrance includes bicycle parking posts to encourage arrival by bicycle, and also to encourage people to park and lock their bicycles to enjoy the Riverwalk on foot. Litter bins are located at the entrances to the Riverwalk allowing for easy access by the City’s trash removal service. Lastly, the space is defined by shrub and perennial planting and deciduous shade trees.



Figure 14 South Entrance at River Road



3.3.2 Southern Promontory

The southern promontory comprises a proposed seating area at a location that projects out into the river just east of the south entrance. This location offers views across the river to Fairhaven, views of the bridge at Coggeshall Street, and views along the Riverwalk to the north, including the northern promontory. Away from the busy roadways and commercial properties, this promontory has the potential to engage visitors with the river and enhance wildlife habitat. The proposed seating area is pulled outshore of the Riverwalk to draw visitors closer to the river while still maintaining a continuous and unobstructed Riverwalk. The seating area is divided from the walkway by a seatwall and is anchored by a large vertical feature that will be visible from several locations along the Riverwalk as well as areas beyond the Riverwalk. This visual presence is an important tool for raising awareness of the Riverwalk and is key to attracting users. Proposed benches oriented according to the natural outline of the promontory offer alternative views of the river. An interpretive panel at this location can provide an educational component to the space. The pavement design incorporates swirls which evoke movement and surround the large vertical feature. This whimsical pavement design is reminiscent of the pattern of water currents and also guides pedestrians from the main walkway to the seating area. This pavement design is repeated throughout each of the gateways and seating areas.

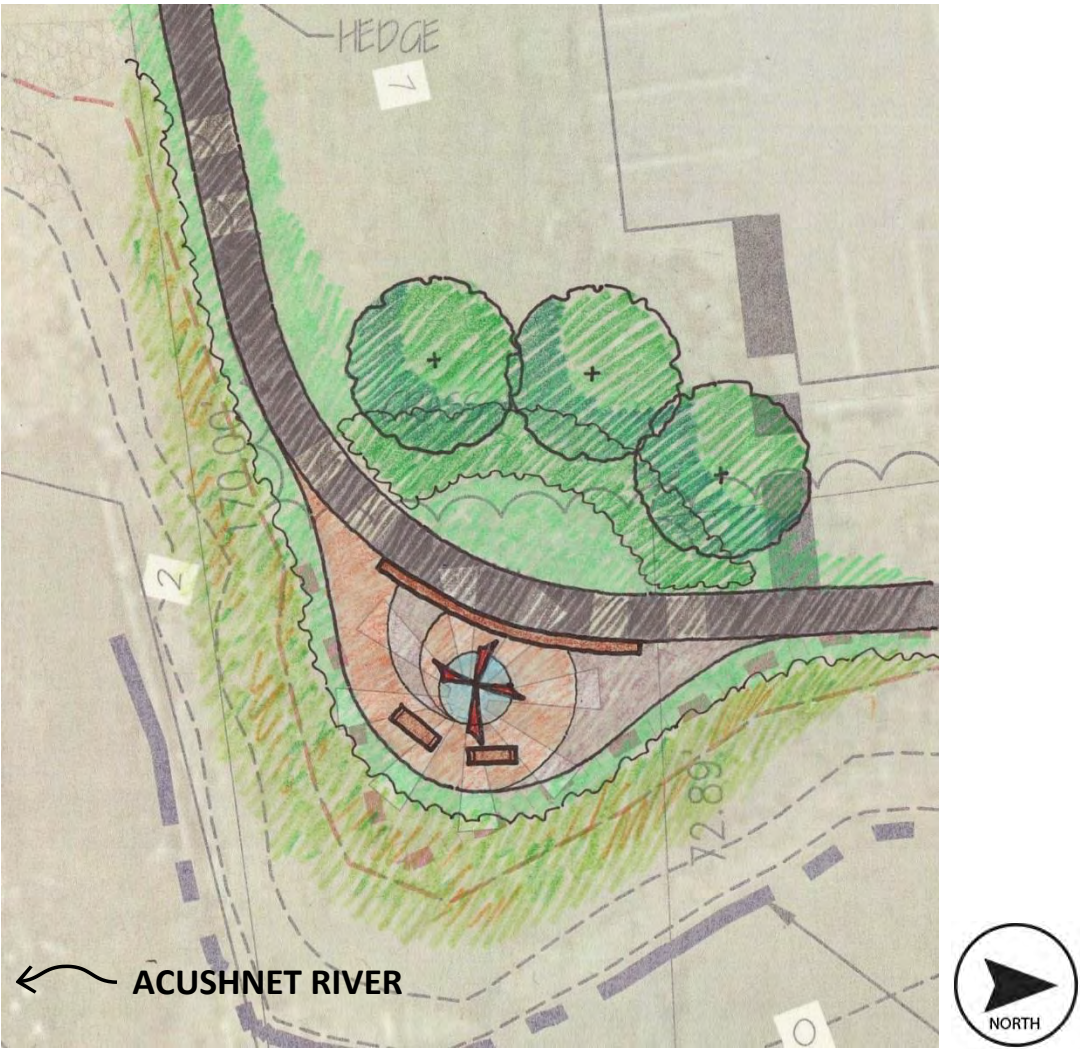
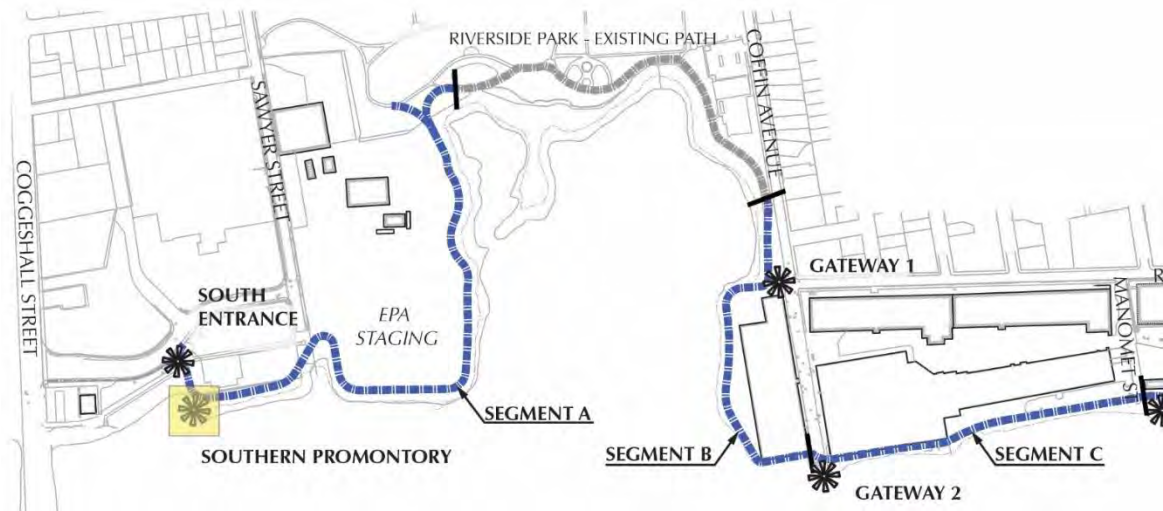


Figure 15 Southern Promontory

3.3.3 Gateways

There are four proposed gateway locations along the Riverwalk, in addition to the south and north entrance gateways, which provide direct access to the Riverwalk from adjacent commercial and residential properties and nearby neighborhoods. While the historic commercial development along the Acushnet River brought prosperity to the region during the nineteenth century, it also divided the neighborhood from its river. Since the overarching goal of the Riverwalk is to draw the public back to New Bedford’s waterfront, the significance of the gateways is immense. The proposed gateways are strategically located where existing streets connect with the waterfront. These streets – Riverside Avenue, Coffin Avenue, Manomet Street and Hadley Street – are linear connections from the adjacent neighborhoods and commercial blocks to the waterfront. These gateways occur at roughly equal intervals along the Riverwalk, making them logical access points. Vertical features are key elements in the Riverwalk design because they contribute to the character of the Riverwalk, act as wayfinding tools and function as landmark features.

The southernmost gateway, Gateway 1, is located at the intersection of Riverside Avenue and Coffin Avenue and includes a paved seating area with seatwall, benches and bicycle parking. The seatwall is oriented between the seating area and the street, serving as a threshold between the public roadway and the Riverwalk. The focal point of the gateway is a medium-sized vertical feature which is visible along Riverside Avenue and Coffin Avenue as well as from the Riverwalk to the south. Similar gateways are located at the east end of Coffin Avenue and the end of Hadley Street with visibility along these long, linear urban streets and neighborhoods to the west.

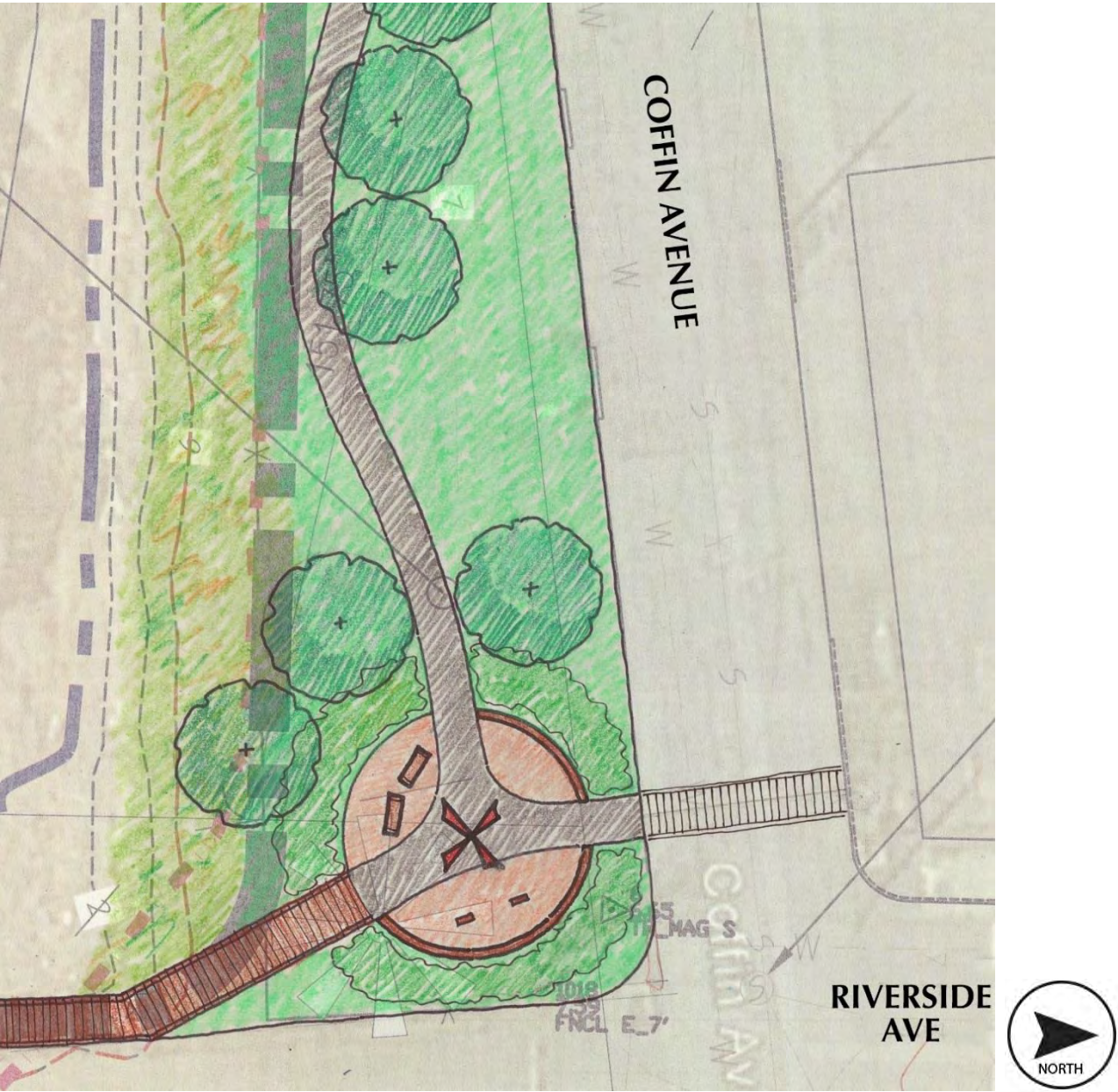
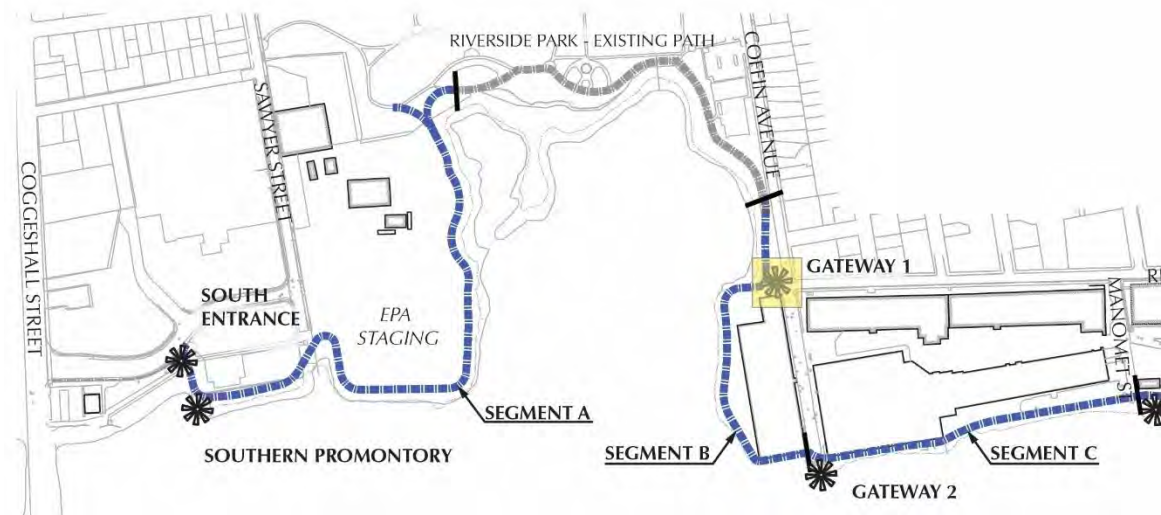


Figure 16 Gateway at Riverside Avenue and Coffin Avenue

The gateway at the end of Coffin Avenue, Gateway 2, includes a kiosk or small-sized vertical feature centered on colored concrete pavement in a spiral pattern. A curved seatwall separates the seating area from the street which includes benches and low planting.

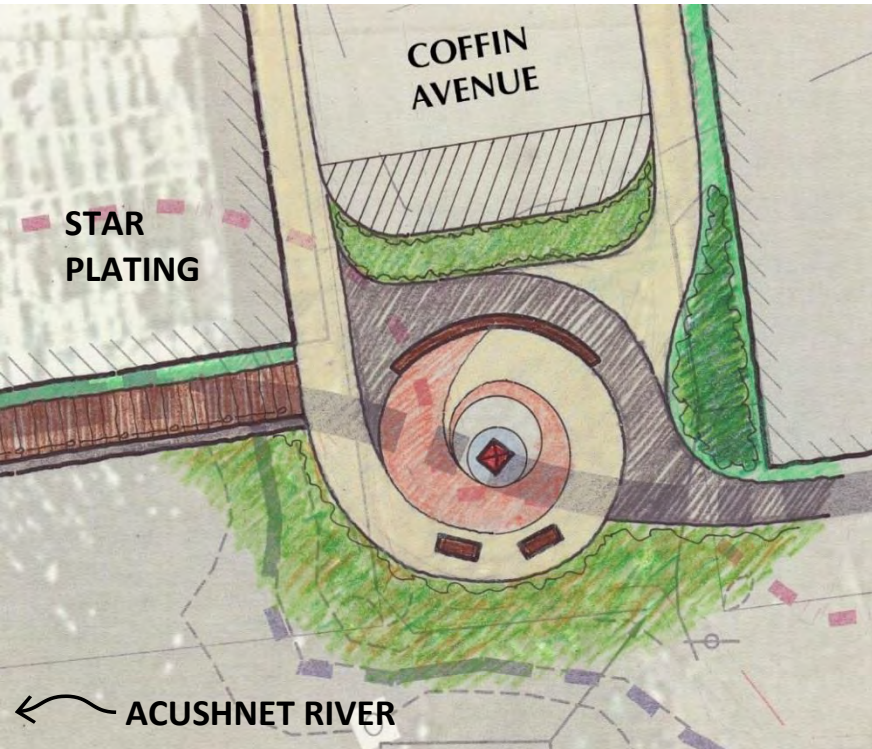


Figure 17 Gateway 2

The gateway at Manomet Street, Gateway 3, is a larger seating area with seatwalls, benches, litter bin, medium-sized vertical feature, and planting. This location is important because of its adjacency to mill buildings recently converted to residential units. It will provide Riverwalk access and offer a main, central seating area or resting spot.

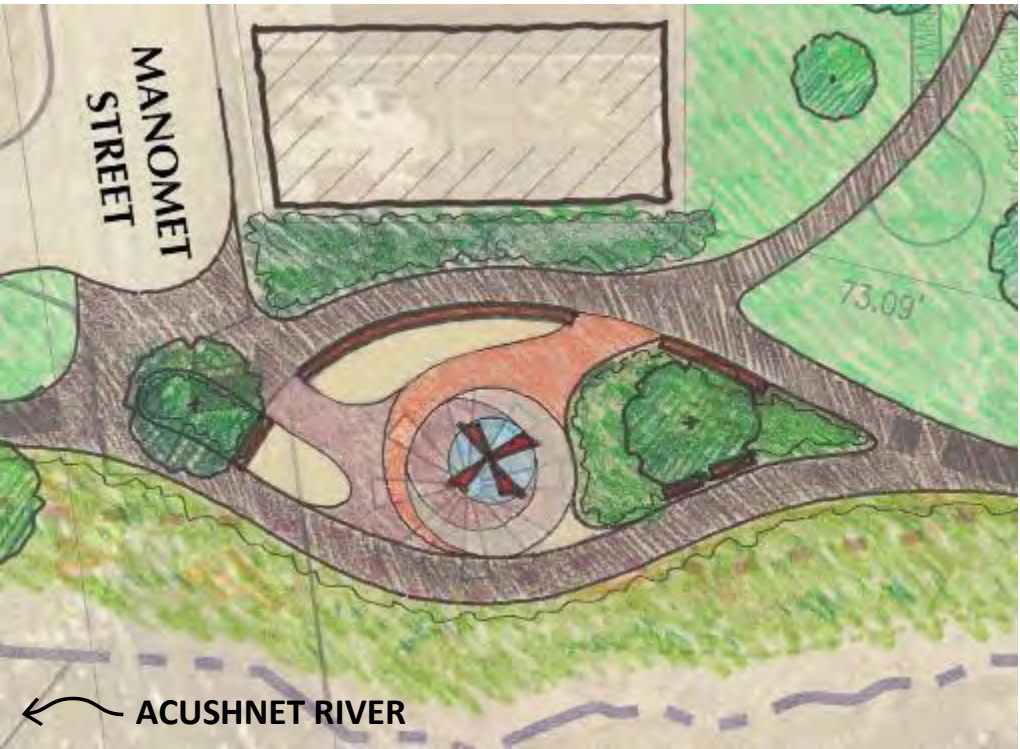


Figure 18 Gateway 3

The gateway at the end of Hadley Street, Gateway 4, is located adjacent to the Aerovox site and includes a kiosk or small-sized vertical feature centered on colored concrete pavement in a spiral pattern with curved seatwall.

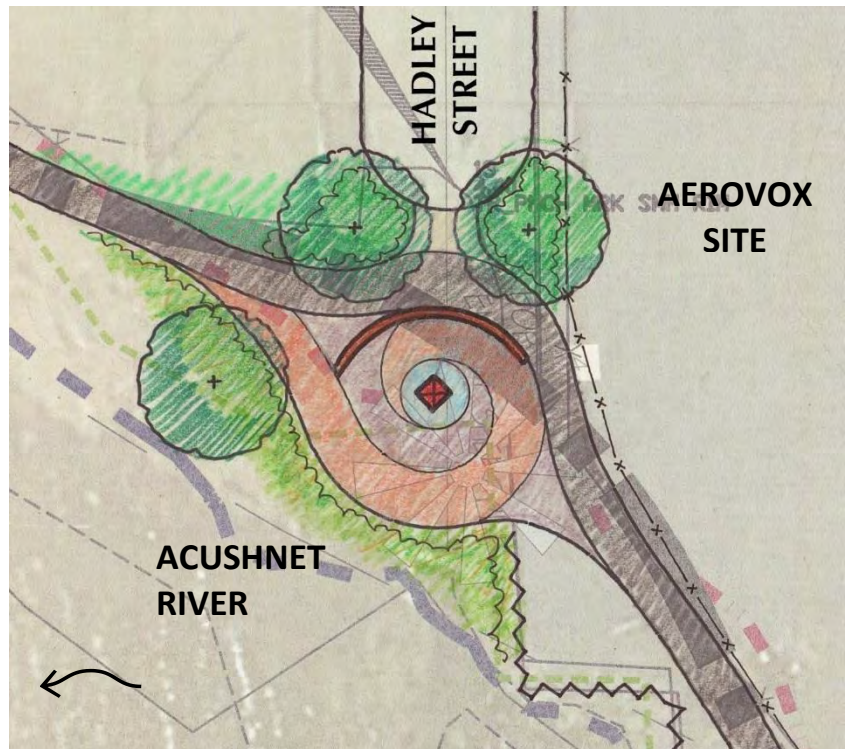
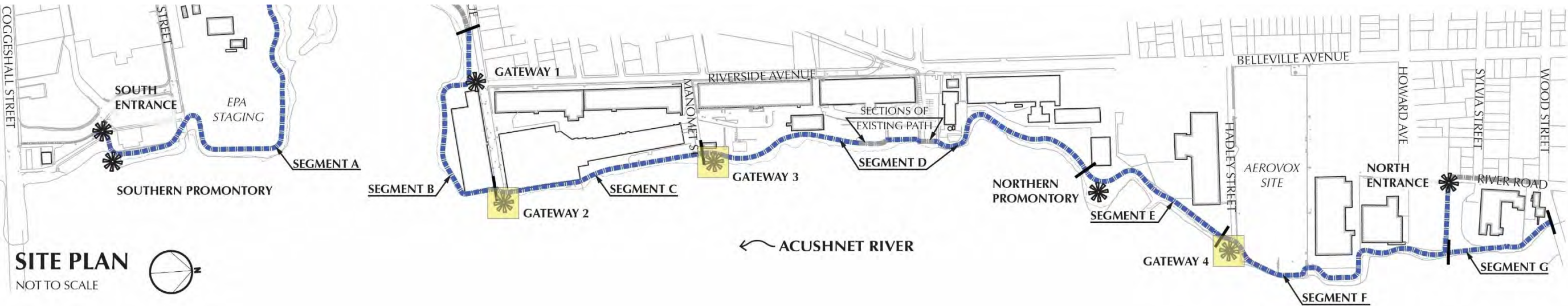


Figure 19 Gateway 4



3.3.4 Northern Promontory

Similar to the southern promontory, the northern promontory is located on a natural spit of land projecting into the river with visibility both up and downriver. This seating area is anchored by a large vertical feature and could, perhaps, include a shade shelter to accommodate City events or organized activities. The visibility of vertical features is again key to attracting visitors. Benches and an interpretive panel are oriented according to the form of the natural shoreline and offer alternative views. Again, the seating area is pulled outshore of the Riverwalk and is divided with a seatwall. This relatively large area of land around this seating area affords additional riparian planting to enhance wildlife habitat. Furthermore, this location is among the most naturally existing vegetated area within the limits of this project. As a result, the engagement of visitors with wildlife and the riverfront is an important aspect of this site.

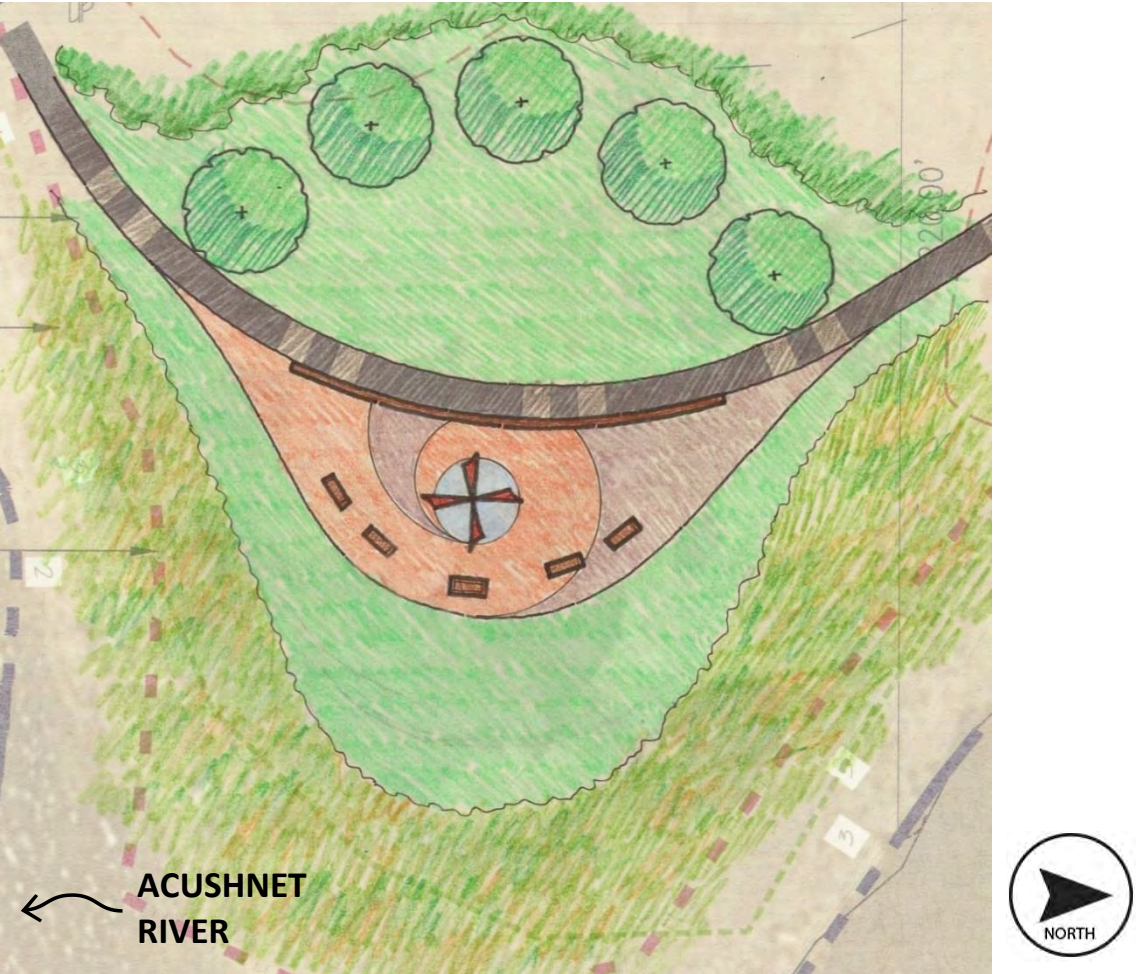


Figure 18 Northern Promontory

3.3.5 North Entrance

The north entrance is located on the east side of River Road, just south of Wood Street and its design mimics that of the south entrance where a kiosk or small-sized vertical kinetic sculpture anchors the paved space which also includes a semicircular seatwall with entrance signage, bicycle parking posts, litter bin and gateway planting.

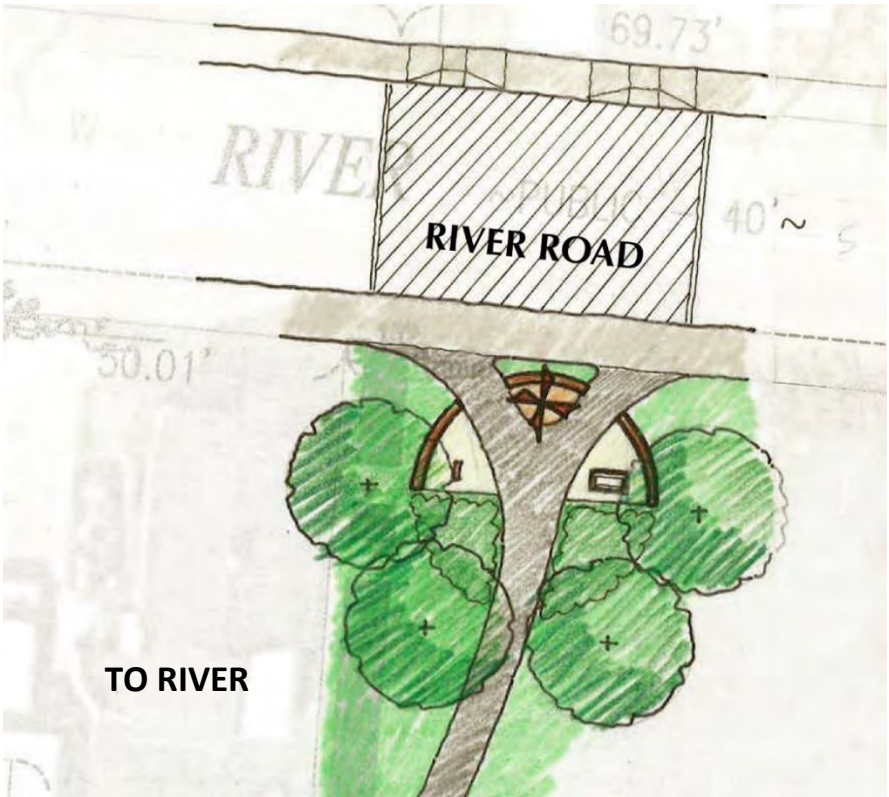
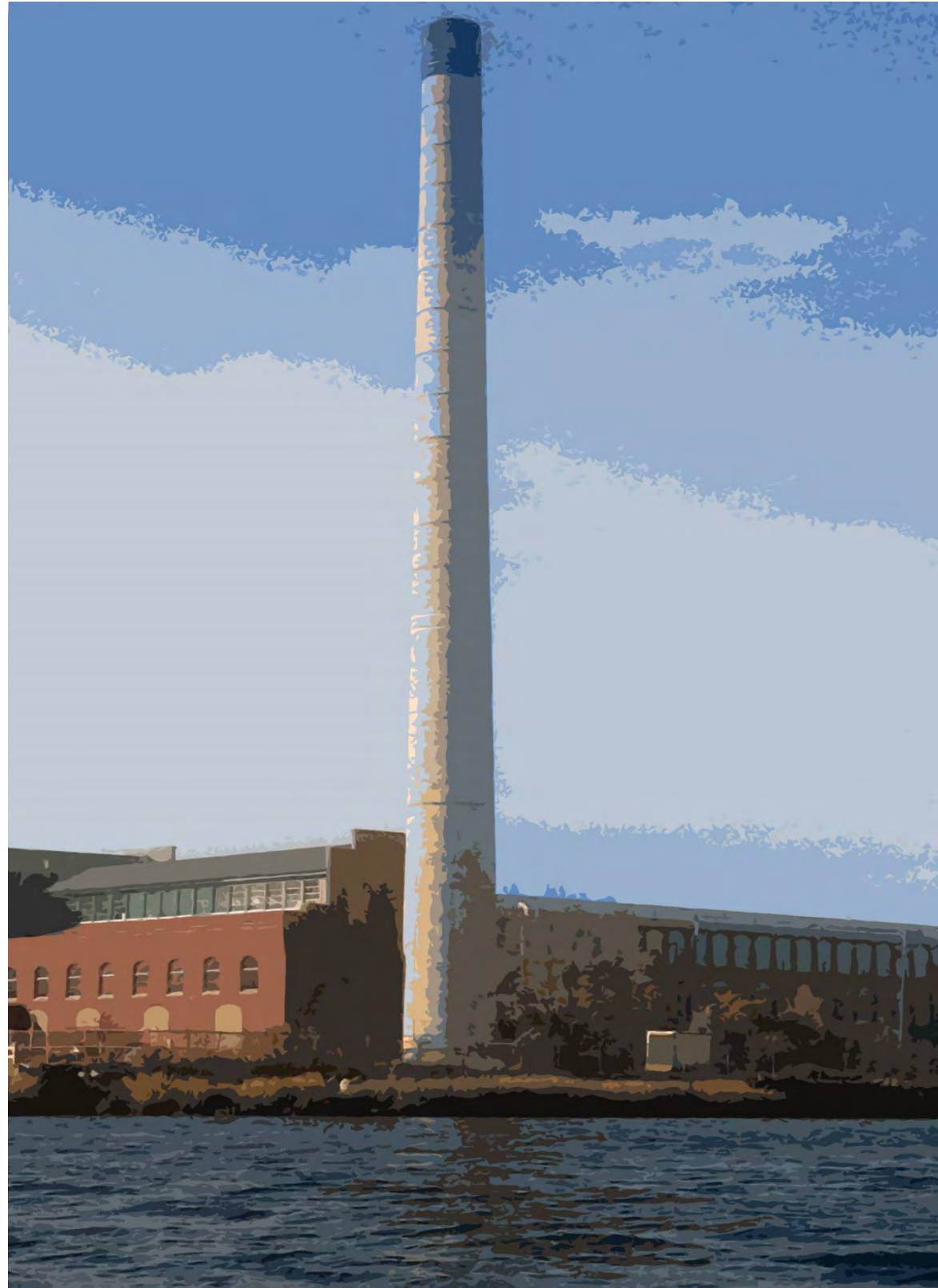


Figure 19 North Entrance at River Road





“The textile industry brought great wealth and physically reshaped the city; however the location of back to back mills along the upper Acushnet River created a horizontal red brick wall that blocked generations of residents from this important resource.”



4.0 Site Amenities & Materials Recommendations

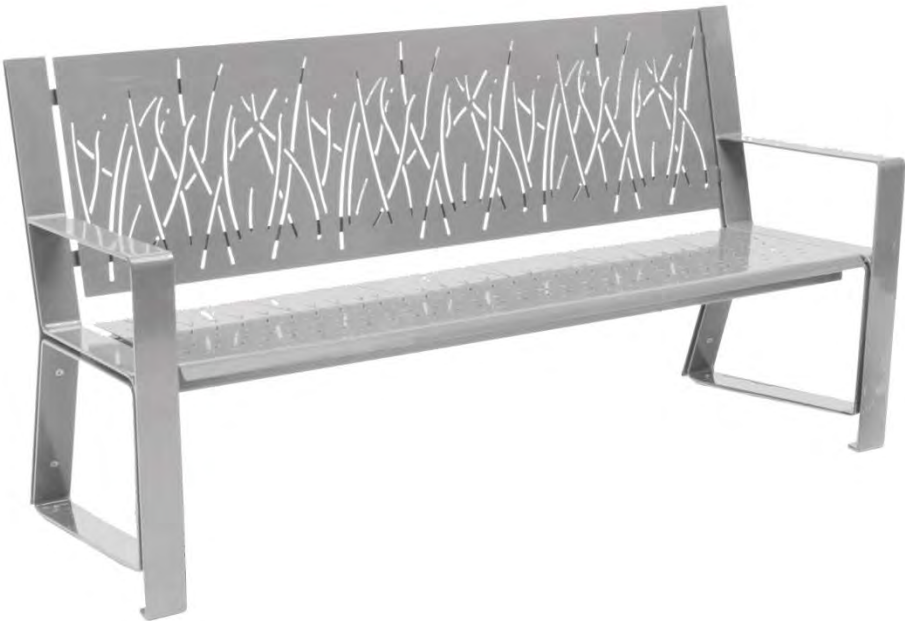
4.1 Site Furnishings

Site amenities are an important part of creating the character of a public space, encouraging use by visitors, and addressing site security and safety. Benches will offer places of rest for visitors while litter bins and bicycle parking posts located at the gateways encourage orderly use of the Riverwalk. Responsibly and carefully sited pedestrian lighting and regulatory signage increase safety and site security. The placement of these amenities builds visual consistency along the Riverwalk. The proposed site furnishings are intended to add a whimsical flavor in coordination with the pavement design, while also respecting the location of the site at the intersection of a natural environment and dense urban development. The neutral color palette will allow the site furnishings to fade to the background while allowing the restored riparian shoreline and habitat to take center stage. The following identifies the proposed site furnishings:

4.1.1 Bench with Back

Benches with backs shall be 6’-0” long (nom.) constructed with steel supports and end arms and plasma- or laser-cut steel seat / back panels with grass design.

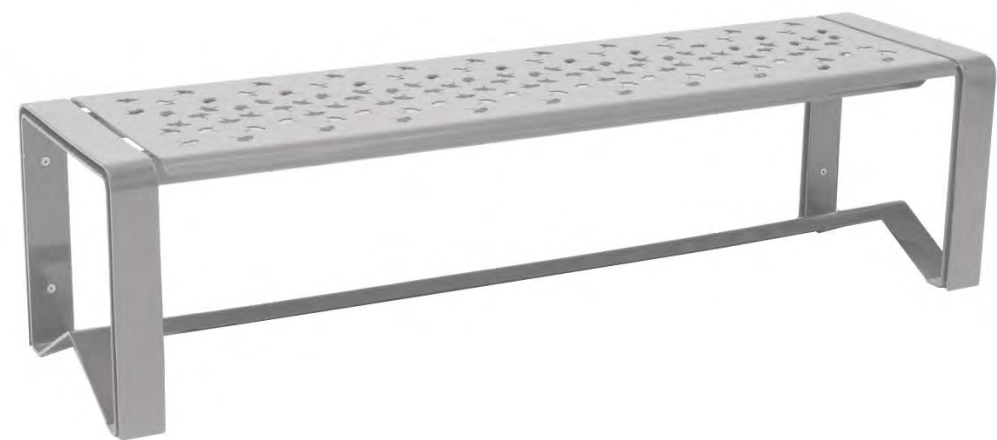
Product:	Lakeside Grass Backed Bench
Manufacturer:	Landscape Forms
	431 Lawndale Avenue
	Kalamazoo, MI 49048
	www.landscapeforms.com
Color:	Silver (powdercoat finish)



4.1.2 Backless Bench

Backless benches shall be 6’-0” long (nom.) constructed with steel supports and plasma- or laser-cut steel seat panel with leaf design.

Product: Lakeside Leaf Backless Bench
Manufacturer: Landscape Forms
431 Lawndale Avenue
Kalamazoo, MI 49048
www.landscapeforms.com
Color: Silver (powdercoat finish)



4.1.3 Litter Bin

Litter bins shall be side-opening receptacles, 30 gallon capacity, constructed from plasma- or laser-cut steel with grass design and removable black polyethylene liner.

Product: Lakeside Grass Side-Opening Litter Bin
Manufacturer: Landscape Forms
431 Lawndale Avenue
Kalamazoo, MI 49048
www.landscapeforms.com
Color: Silver (powdercoat finish)



4.1.4 Bicycle Parking Post

Bicycle parking posts shall be arch-style loop constructed from 1-1/2” diameter Schedule 40 steel pipe with custom, laser-cut center medallion.

Product: Custom Laser-Cut Bike Rack
Manufacturer: CycleSafe, Inc.
5211 Cascade Road SE, Suite 210
Grand Rapids, MI 49546
www.cyclesafe.com
Color: Metallic Silver (powdercoat finish)



4.1.5 Pedestrian Light

Pedestrian lights shall be single post-top mounted luminaires on fluted pole, 16’-0” overall height, Type 3 light distribution, 3500K LED. Pole and luminaire shall be aluminum. Lights are spaced approximately 60 – 70 feet on center along the walkway in order to maintain a minimum illumination level of 0.5 foot candles.

Product: Alcott
Manufacturer: Landscape Forms
431 Lawndale Avenue
Kalamazoo, MI 49048
www.landscapeforms.com
Color: Silver (powdercoat finish)



4.2 Materials and Pavements

The following identifies additional proposed materials that are custom-designed items (versus catalog items) as well as the proposed pavements:

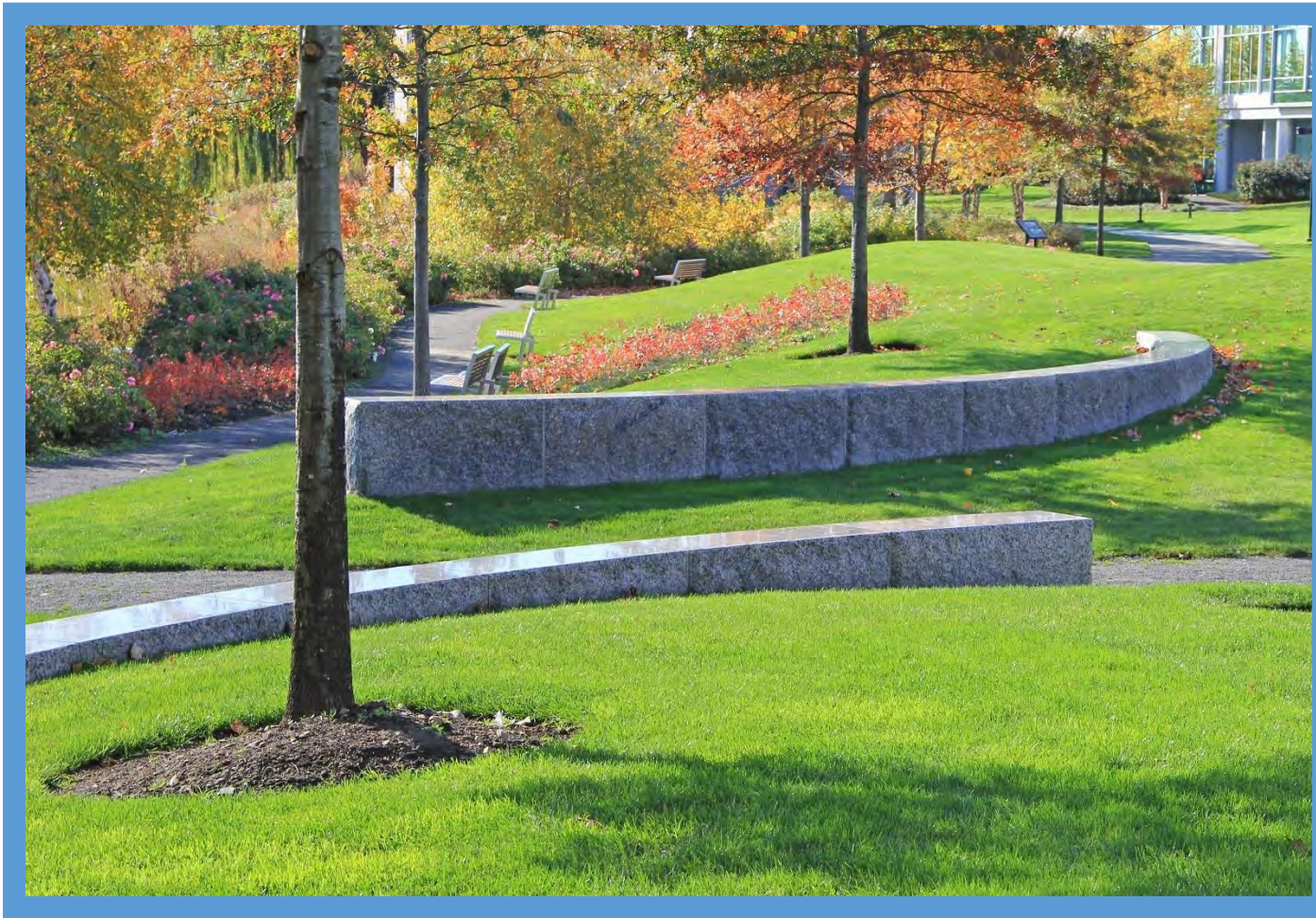
4.2.1 **Guardrail**

Guardrails shall be used where required by code and are intended to be sleek and inconspicuous in design. Guardrails shall be 3’-6” tall and consist of vertical aluminum posts, aluminum top rail, and welded wire fabric between posts with maximum 4” openings. Aluminum finish shall be anodized. There is only a small number of locations where a guardrail may be needed for public safety.



4.2.2 **Seatwall**

Seatwalls shall be monolithic granite blocks approximately 18 inches wide with a constant top of wall elevation approximately 18 inches above finished grade. Seatwalls shall have split face sides and ends with thermal finish top. Granite shall be a local New England granite primarily gray in color with black and white veining and flecks.



4.2.3 Vertical Feature

Vertical features are intended to act as gateway elements, wayfinding tools, or landmarks. Vertical features could be a standard catalog 3-sided kiosk with metal roof or a custom-designed tall kinetic sculpture. Kiosks located at gateways or Riverwalk entrances can provide information about the Riverwalk, include a map, and offer information about community events. Kinetic art is a three-dimensional medium that typically consists of movable parts that are naturally operated by wind. Tall kinetic sculptures act as landmarks that can draw attention to the Riverwalk as well as act as wayfinding tools. Additionally, kinetic sculptures are whimsical features that could take advantage of the prevailing breezes near the water to draw the eye with movement and color. Metallic silver kinetic sculptures would blend with the neutral color palette of the site furnishings and would be suitable for reflecting light from the sun and playing off the reflections of the river.

Product (for kiosk): KSK 3-8
Manufacturer: Poligon Shelters
4240 136th Avenue
Holland, MI 49424
www.poligon.com
Color: Ash Gray (frames, powdercoat finish)
Patina Green (roof, powdercoat finish)



Custom Kinetic Sculpture

4.2.4 Interpretive Panel

Interpretive panel construction shall consist of a digital high-pressure laminate (dHPL) panel set in a steel frame with steel posts and black powdercoat finish. Panels shall contain high-resolution artwork and text. Panels shall be approximately 1’-6” by 5’-0” and angled at approximately 25 degrees for viewing from above. Possible topics for the interpretive panels include: ecological history of the Acushnet River, industrialization of the Acushnet River shoreline, history of the mills and workers, contamination and clean-up of the Acushnet River, or native flora and fauna of the Acushnet River.



4.2.5 Pavements

The proposed Riverwalk is a 6-foot wide bituminous concrete (asphalt) walkway. Pavements at the entrances, gateways and seating areas are colored, stamped concrete pavements laid out in spiral patterns. Colored, stamped concrete shall consist of three different colors while the stamping pattern shall be a natural stone surface texture.



5.0 Planting Palette

The main goal of the planting concept is to restore the upland riparian zone to native coastal riparian shrub and meadow habitat typical of the Buzzards Bay watershed area. Restoration planting is intended to increase the diversity of wildlife while providing an important source of food and nesting habitat. The planting in this project only includes the area inshore of the top of coastal bank. Planting outshore of top of coastal bank will be installed separate from this project.

The alignment of the Riverwalk is located along the inshore side of the 25-foot wide easement as much as possible in order to accommodate as much shoreline planting as possible. The outshore limit of the planting is the top of coastal bank delineation. Between the outshore limit and the Riverwalk, the planting primarily consists of native grasses, forbs and perennials that would be installed by hydroseeding method to stabilize and colonize the riverbank which are important initial steps in the restoration process. Where the Riverwalk meanders away from the shoreline, masses of native coastal shrubs interspersed among the shoreline grasses will encourage species and habitat diversity while also offering visual diversity for the pedestrian experience. Shrub masses and strategically located deciduous and evergreen trees alternating along the outshore and inshore sides of the Riverwalk can frame particular views of interest, mask less desirable views, accommodate additional habitat opportunities and offer periodic shade for pedestrians. Inshore of the walkway, the planting palette consists primarily of lawn and tree planting. Masses of shrubs would be located particularly adjacent to industrial and commercial properties. The inshore limit of planting is either the inshore limit of the 25-foot wide easement or within the limit of construction disturbance necessary to install the walkway (approximately 8 feet inshore of the walkway). The proposed planting at the entrances, gateways and seating areas is intended to be more formalized and ornamental in nature to contrast with the typical naturalistic shoreline planting. Plant beds would include perennials and low shrubs as well as deciduous shade trees.

The proposed planting palette offers seasonal interest through spring and summer blooming, fall foliage color, and fall and winter fruiting. All proposed plants are native to New England, well suited to coastal environments, and offer valuable ecologically benefits to both wildlife and shoreline restoration and stabilization. The following is the proposed plant palette:

PLANT LIST		
SHORELINE PLANTING: Grasses		
Botanical Name	Common Name	Benefits to Wildlife
<i>Andropogon gerardii</i>	Big Bluestem	Seeds are food source for songbirds, small mammals and waterfowl. Provide cover and rest area for small mammals, birds and insects.
<i>Bouteloua curtipendula</i>	Side Oats Grama	
<i>Eragrostis trichodes</i>	Sand Lovegrass	
<i>Panicum virgatum</i>	Switchgrass	
<i>Sorghastrum nutans</i>	Indian Grass	
SHORELINE PLANTING: Perennials and Groundcover		
Botanical Name	Common Name	Benefits to Wildlife
<i>Achillea millefolium</i>	Yarrow	Seed heads are food source for songbirds in the fall; source of nectar for butterflies and other insects; berries (Bearberry) are food source for birds and mammals; leaves provide cover.
<i>Arctostaphylos uva-ursi</i>	Bearberry	
<i>Coreopsis lanceolata</i>	Lance-leaved Coreopsis	
<i>Lathyrus japonicus</i>	Beach Pea	
<i>Liatris spicata</i>	Blazing Star	
<i>Solidago sempervirens</i>	Seaside Goldenrod	
SHORELINE & UPLAND PLANTING: Shrubs		
Botanical Name	Common Name	Benefits to Wildlife
<i>Aronia melanocarpa</i>	Black Chokeberry	Berries are food source for birds; shelter, resting and nesting sites for songbirds and small mammals; source of nectar for insects during flowering season (Beach Plum, Virginia Rose).
<i>Baccharis halimifolia</i>	Groundsell	
<i>Clethra alnifolia</i>	Summersweet Clethra	
<i>Gaylussacia baccata</i>	Huckleberry	
<i>Ilex glabra</i>	Inkberry	
<i>Ilex verticillata</i>	Winterberry	
<i>Myrica pensylvanica</i>	Bayberry	
<i>Prunus maritima</i>	Beach Plum	
<i>Rosa virginiana</i>	Virginia Rose	
<i>Vaccinium angustifolium</i>	Lowbush Blueberry	
UPLAND PLANTING: Trees		
Botanical Name	Common Name	Benefits to Wildlife
<i>Acer rubrum</i>	Red Maple	Berries are food source for birds; shelter, resting and nesting site for songbirds; protection for birds and small mammals.
<i>Amelanchier canadensis</i>	Shadbush	
<i>Betula populifolia</i>	Gray Birch	
<i>Ilex opaca</i>	American Holly	
<i>Juniperus virginiana</i>	Eastern Red Cedar	
<i>Nyssa sylvatica</i>	Black Gum	
<i>Quercus alba</i>	White Oak	

SHORELINE PLANTING

GRASSES



Andropogon gerardii
Big Bluestem



Bouteloua curtipendula
Side Oats Grama



Sorghastrum nutans
Indian Grass



Panicum virgatum
Switchgrass



Fragrostis trichodes
Sand Lovegrass

PERENNIALS & GROUNDCOVER



Achillea millefolium
Yarrow



Arctostaphylos uva-ursi
Bearberry



Coreopsis lanceolata
Lance-leaved Coreopsis



Lathyrus japonicus
Beach Pea



Hiatris spicata
Blazing Star



Solidago sempervirens
Seaside Goldenrod

UPLAND PLANTING

TREES



Acer rubrum
Red Maple



Amelanchier canadensis
Shadbush



Betula populifolia
Gray Birch



Juniperus virginiana
Eastern Red Cedar



Nyssa sylvatica
Black Gum



Quercus alba
White Oak

SHORELINE & UPLAND PLANTING

SHRUBS



Aronia melanocarpa
Black Chokeberry



Baccharis halimifolia
Groundsell



Clethra alnifolia
Summersweet Clethra



Ilex glabra
Inkberry



Ilex verticillata
Winterberry



Myrica pensylvanica
Bayberry



Prunus maritima
Beach Plum



Rosa virginiana
Virginia Rose



6.0 Cost Estimate

6.1 Cost Estimate Summary

6.1.1 Approach and Assumptions

The goal of a preliminary design cost estimate is to provide a tool for budgeting, fundraising, and phasing the construction of the Riverwalk.

For cost estimating and possible phasing, the Riverwalk project is divided into seven segments, two entrances, four gateways, and two promontories. This approach makes the 2.2-mile site a more manageable scale for determining estimated construction costs and can also be used to assess possible phasing. Dividing the cost estimate into specific segments also allows for proposed site improvements to be more easily identified along the Riverwalk. Additionally, unique existing conditions that might impact construction or alignment of the Riverwalk are more easily identified and understood.

The following are notes and assumptions describing the cost estimate:

- Unit prices appearing in the cost estimate are based on 2015 dollars with no escalation. As with any phased construction project, costs are subject to change and should be reassessed as construction phases are identified for implementation.
- The cost estimate includes a 20% contingency for contractor general conditions and a budget for construction work that is not able to be seen at a preliminary design level.
- Changes to the existing conditions prior to implementation of the Riverwalk may require future adjustments to the cost estimate.
- The outshore limit of work is defined as the “top of coastal bank” as delineated by the City of New Bedford and documented on the survey prepared by Thompson Farland Inc.
- The planting in this project only includes the area inshore of the top of coastal bank. Planting outshore of top of coastal bank will be installed by others separate from this project.
- A grading plan has not been developed at the preliminary design phase. The estimated construction costs include excavation and offsite disposal of contaminated material (assumed) which is based on

the depth of proposed pavements. An additional earthwork budget for grading to comply with ADA accessibility is included for each segment, gateway and entrance.

- Allowances for a small amount of drainage and utility work are included at each segment and gateway. It is assumed that the Riverwalk will pitch toward the river with sheet drainage entering the planted shoreline for filtration.
- A planting plan has not been developed at the preliminary design phase. All quantities for planting are assumed and may be adjusted in the future. The method for calculating plant quantities is further described later in this report.
- Due to existing conditions, some areas along the proposed Riverwalk require structural reinforcement. Budgets for this type of work are included where appropriate. Budgets and assumptions for structural reinforcement are assumptions only and will need to be reviewed by a structural engineer as construction documents are developed.
- The estimate does not include work on the existing roadways or sidewalks at Veterans Memorial Way or River Road.
- This estimate does not include possible costs for securing easements or rights-of-way.

6.1.2 Commonalities

Although the cost estimate is divided into specific Riverwalk areas, commonalities exist among the segments, entrances, gateways, and promontories. The seven segments are the backbone of the cost estimate, as they encompass the Riverwalk walkway, pedestrian lighting, and shoreline restoration planting along the entire length of the Riverwalk. The one exception is Segment G which only includes shoreline restoration planting. This project assumes the shoreline embankment will be restored by the EPA as part of their clean-up project of the Acushnet River.

The estimate includes a strategy for quantifying the shoreline restoration planting and upland planting. The estimate assumes the shoreline restoration will consist of hydroseeding with a mix of grasses and perennials identified in the Planting Palette section of this report. Hydroseeding will occur between the “top of coastal bank” and the outshore side of the Riverwalk at an assumed rate of 1 lb per 2,500 square feet. This method of planting the shoreline is common throughout the entire length of the Riverwalk.

Beyond shoreline restoration hydroseeding, masses of shrub planting are assumed where there is greater distance between the top of coastal bank delineation and the outshore edge of the walkway, where slopes are more gentle, and, where possible, adjacent to existing stands of vegetation. These locations are chosen for their suitability for wildlife habitat improvement and shoreline plant diversity. Planting of shoreline shrubs is assumed at a spacing of 6-feet on center. A combination of deciduous shade trees and evergreen trees are assumed in each segment and are intended to frame views, mask undesirable views, offer further ecological benefits, and provide shade for pedestrians. Site visibility is important for maintaining site security so tree planting is intended to be minimal and intentional rather than dense reforestation. Trees are primarily located inshore of the Riverwalk. No planting is assumed outshore of the “top of coastal bank” delineation.

Common along the length of the Riverwalk is a minimum five foot wide band of lawn on the upland side of the walkway, which accommodates additional passing room for Riverwalk users, prevents encroachment of upland planting into the walkway, and offers additional space for public activities.

Other commonalities shared between the segments and entrances, gateways, and promontories include costs for demolition and site preparation, earthwork, and drainage and utilities. For instance, each segment includes a cost for removal of invasive species, which is based on the length of shoreline in the segment. Erosion control is also quantified for each segment similar to the approach for quantifying invasive species removal. Each segment also includes allowances or lump sum budgets for clearing and grubbing, and for miscellaneous demolition.

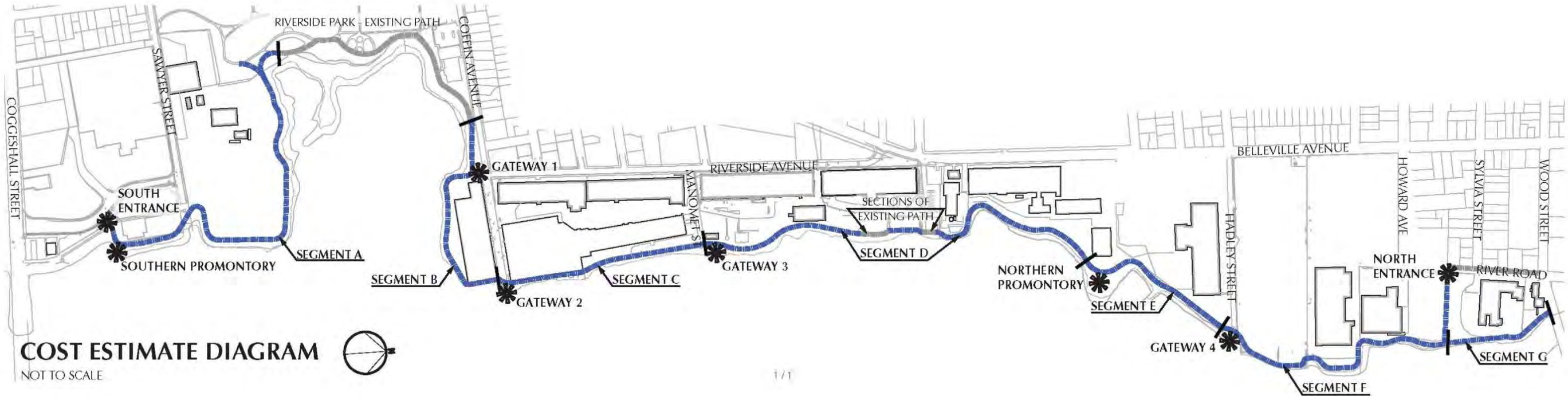
It is assumed that contaminated soils exist throughout much of the site and minimizing excavation of existing soil is desired. In this spirit, it is assumed that all shoreline areas outshore of the walkway will be raked and then a 1” layer of new loam installed over the existing soil in preparation for hydroseeding. Inshore of the walkway, a 2” layer of new loam will be installed over the existing soil for new lawn. This cost estimate assumes that installation of shrubs and trees will include spot excavation at each tree and shrub location with excavated material to be legally disposed of off-site. Planting soil for each tree and shrub is assumed to be incidental to the cost of the tree or shrub installation. Where excavation of existing soil is required for new pavement areas, legal off-site disposal of contaminated soils is assumed in the cost estimate. Legal off-site disposal of excavated existing soil is assumed for the bituminous concrete walkway (at a depth of 15 inches: 1” top course, 2” binder course, 4” crushed stone, 8” gravel borrow) and for concrete pavement at entrances, gateways, and promontories (at a depth of 13 inches: 5” cast-in-place concrete, 8” gravel borrow).

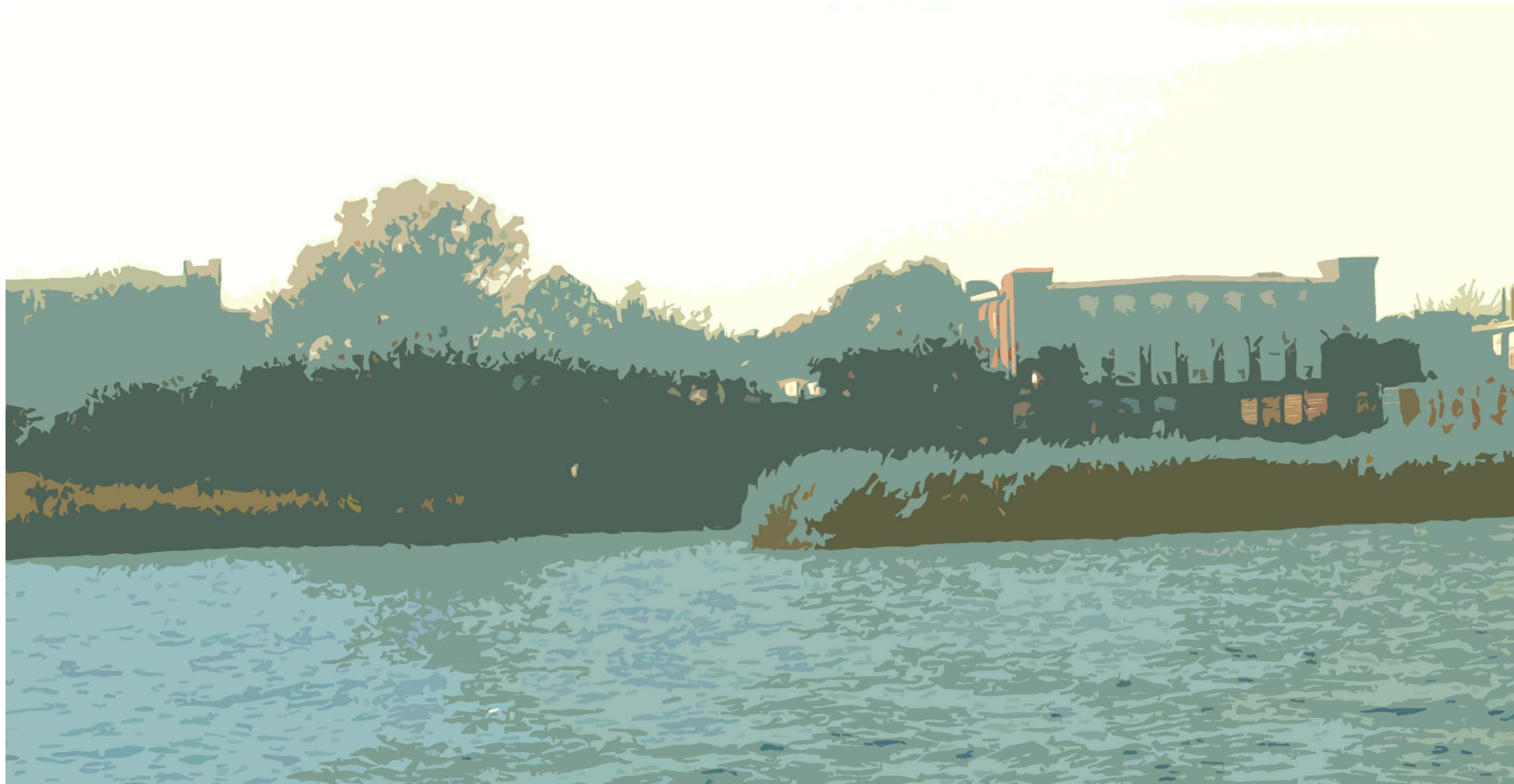
Additionally, existing conditions and challenges pertaining to drainage and utilities are typically unknown at this preliminary design stage, with a few specific exceptions which are noted elsewhere in this report. Due to unknown challenges and existing conditions, each project area includes a lump sum budget for miscellaneous drainage and utilities.

The separation of the segments from the gateways is important to note because construction of all segments will result in a continuous, complete Riverwalk and shoreline restoration. Gateways, including entrances and promontories, are intended to enhance the pedestrian experience of the Riverwalk and could be constructed over time. The gateway construction costs include concrete pavements, seatwalls, site furnishings, vertical features, and supplemental planting as well as earthwork, drainage and utilities that are specific to each gateway location.

ESTIMATE SUMMARY																	
	SHORELINE PLANTING AND RIVERWALK								RIVERWALK GATEWAYS								
	Segment A	Segment B	Segment C	Segment D	Segment E	Segment F	Segment G	TOTALS	South Entrance: Veterans Memorial Way	Southern Promontory	Gateway 1: Riverside Avenue	Gateway 2: Coffin Avenue	Gateway 3: Manomet Street	Northern Promontory	Gateway 4: Hadley Street	North Entrance: River Road	TOTALS
RIVERWALK LENGTH (LF)	2,473	1,236	1,494	2,103	902	1,747		9,955 LF									
Demolition and Site Preparation	\$95,120.00	\$61,440.00	\$70,988.00	\$82,465.00	\$35,645.00	\$63,775.00	\$31,110.00	\$440,543.00	\$13,000.00	\$13,000.00	\$23,136.00	\$10,690.00	\$17,020.00	\$13,000.00	\$8,955.00	\$17,420.00	\$116,221.00
Earthwork	\$213,530.00	\$82,450.00	\$188,570.00	\$170,160.00	\$70,880.00	\$114,170.00	\$8,620.00	\$848,380.00	\$8,630.00	\$9,430.00	\$11,000.00	\$15,200.00	\$32,400.00	\$29,940.00	\$10,200.00	\$11,270.00	\$128,070.00
Paving - Bituminous Concrete Walkway Pavement	\$66,000.00	\$36,960.00	\$29,600.00	\$58,580.00	\$23,000.00	\$47,800.00	N/A	\$261,940.00	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	\$0.00
Paving and Curbing - Special Concrete, Concrete Sidewalk, Vehicular Pavement, Granite Curb	N/A	N/A	\$96,825.00	N/A	N/A	N/A	N/A	\$96,825.00	\$6,045.00	\$11,310.00	\$29,715.00	\$24,105.00	\$33,205.00	\$32,825.00	\$15,650.00	\$19,440.00	\$172,295.00
Drainage and Utilities	\$15,000.00	\$15,000.00	\$8,000.00	\$5,000.00	\$18,000.00	\$8,000.00	N/A	\$69,000.00	\$5,000.00	\$4,000.00	\$5,000.00	\$7,000.00	\$10,000.00	\$4,000.00	\$8,000.00	\$2,000.00	\$45,000.00
Site Improvements - Structures, Signage, Site Furnishings, Railings, Seatwalls, etc.	N/A	\$180,000.00	\$10,000.00	\$157,500.00	\$44,750.00	\$174,250.00	N/A	\$566,500.00	\$45,300.00	\$78,100.00	\$34,500.00	\$42,450.00	\$67,250.00	\$122,900.00	\$24,750.00	\$36,850.00	\$452,100.00
Shoreline Landscaping - Trees, Shrubs, Shoreline Seeding	\$71,235.00	\$17,310.00	\$19,875.00	\$31,950.00	\$26,772.50	\$14,127.50	\$16,830.00	\$198,100.00	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	\$0.00
Upland Landscaping - Trees, Shrubs, Perennials/Groundcover, Lawn	N/A	N/A	N/A	N/A	N/A	N/A	N/A	\$0.00	\$12,500.00	\$6,775.00	\$10,812.50	\$7,150.00	\$16,625.00	\$19,500.00	\$7,850.00	\$9,860.00	\$91,072.50
Electrical - Lights, Conduit, Wiring, Control Boxes, Security Cameras	\$341,100.00	\$161,350.00	\$197,900.00	\$291,150.00	\$157,350.00	\$240,000.00	NA	\$1,388,850.00	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	\$0.00
SUBTOTAL	\$801,985.00	\$554,510.00	\$621,758.00	\$796,805.00	\$376,397.50	\$662,122.50	\$56,560.00	\$3,870,138.00	\$90,475.00	\$122,615.00	\$114,163.50	\$106,595.00	\$176,500.00	\$222,165.00	\$75,405.00	\$96,840.00	\$1,004,758.50
Contingency (20%)*	\$160,397.00	\$110,902.00	\$124,351.60	\$159,361.00	\$75,279.50	\$132,424.50	\$11,312.00	\$774,027.60	\$18,095.00	\$24,523.00	\$22,832.70	\$21,319.00	\$35,300.00	\$44,433.00	\$15,081.00	\$19,368.00	\$200,951.70
TOTALS	\$962,382.00	\$665,412.00	\$746,109.60	\$956,166.00	\$451,677.00	\$794,547.00	\$67,872.00	\$4,644,165.60	\$108,570.00	\$147,138.00	\$136,996.20	\$127,914.00	\$211,800.00	\$266,598.00	\$90,486.00	\$116,208.00	\$1,205,710.20
TOTAL ESTIMATED CONSTRUCTION COST FOR SHORELINE PLANTING AND RIVERWALK								\$4,644,165.60	TOTAL ESTIMATED CONSTRUCTION COST FOR RIVERWALK GATEWAYS								\$1,205,710.20
									TOTAL ESTIMATED CONSTRUCTION COST								\$5,849,875.80

* Contingency includes General Conditions and budgets for construction work that is not visible at a Conceptual Design level of development.





“Historically, the banks of the Acushnet River were home to many mills, especially on the New Bedford side of the river. The river's mouth, which forms a small but well-sheltered harbor, has long served as the home port for New Bedford's commercial fishermen. It is also the birthplace of New Bedford's whaling industry, and the Dartmouth, the first ship whose keel was laid in New Bedford, first set sail on this river.”

7.0 Regulatory Requirements

7.1 Regulatory permits and strategy

As described in Chapter 1, there are a number of valuable environmental and ecological conditions within the project area, which is to be expected being along the Acushnet River. These sensitive and valuable conditions mean that the project will be required to obtain a number of regulatory permits prior to construction. The following is a list of anticipated New Bedford Riverwalk Permit Requirements.

1. New Bedford Conservation Commission and Department of Environmental Protection (DEP) Wetlands Division – The project proponent will need to file a Notice of Intent application with the New Bedford Conservation Commission and Massachusetts Department of Environmental Protection (DEP) Wetlands Division. This application will need to include an Alternatives Analysis for work within the 25-foot Riverfront Area. The Conservation Commission and DEP Wetlands Division have jurisdiction for all work completed within a Resource Area or 100 feet from the edge of the Resource Area (area known as Buffer Zone). Once approved, the New Bedford Conservation Commission will issue an Order of Conditions which will outline any required design changes, mitigation actions and construction controls. Note: Land Subject to Coastal Storm Flowage and Riverfront Area do not have buffer zones.
2. DEP Waterways Division – The project will require a Chapter 91 Permit/License for a work/structure within filed tidelands. This includes all work seaward of the Mean High Water (MHW) line or within previously filled tidelands. A Chapter 91 permit will be required for any fill placed within an area subject to jurisdiction (seaward of MHW or within filled tidelands). A Chapter 91 License would be required for any structure placed within an area subject to jurisdiction.
3. Executive Office of Environmental Affairs (EOEA) – A filing under the Massachusetts Environmental Policy Act (MEPA) review may be required if triggers are met. This will depend on how much work is completed within the resource areas and/or overall acreage of impacted areas as well as project funding and land transfers and if more than 2 acres of disturbance are proposed within an area designated at Priority Habitat of Endangered or Threatened Species. A MEPA review would also be required if the project is appealed. If a MEPA review is required the project may need an Environmental Notification Form (ENF) or Environmental Impact Report (EIR), based on the Jurisdictional Determination obtained from the EOEA. This would be determined during the review

process. If a filing is required, it will need to address the entire project, as segmented filings and approvals based on project phases is not allowed.

4. Review by Massachusetts Historical Committee. This is required to verify the project will not impact any areas listed at Historic by the Commonwealth of Massachusetts.
5. Review by Wampanoag Tribes of Gayhead Aquinnah and Mashpee. This is required to verify the project will not impact any areas listed as historic by the local Indian Tribes.
6. Review by Massachusetts Board of Underwater Archeological Resources (if work is seaward of the High Tide Line). This is required to verify the project will not impact any areas listed as historic by the Commonwealth of Massachusetts for underwater projects.
7. Army Corps of Engineers – General Permit – Filing for General Permit will be required for any work seaward of the High Tide Line. Work requiring an Individual Permit (based on impacts) with the Corps of Engineers would also trigger review by Coastal Zone Management.
8. EPA – Filing of a Notice of Intent for a Construction General Permit will be required for a project that includes over an acre of disturbed area. This would also require creating a Stormwater Pollution Prevention Plan for the project construction and onsite monitoring for erosion.

The project could be phased to permit the areas only within Conservation Jurisdiction as Phase 1 and the remaining areas as Phase 2. This would allow the Phase 1 portion of the project to start moving forward while the Phase 2 portion continues to be permitted. However, the EPA and MEPA applications do not allow for phasing and require filing at the start of the project.

Permitting Phase 1 could be completed in approximately 3 months while Phase 2 is expected to take 6-9 months. Keep in mind this is estimating current backlog with the various permitting authorities. The Notice of Intent application would be filed first, with the remaining permits filled simultaneously following the Order of Conditions appeal period.



8.0 Next Steps

This report provides the information necessary for the City to move forward with final design of the Riverwalk project. From the beginning of this project, it has been understood that the project will be built in phases. Phasing will allow Riverwalk construction to be done immediately after EPA clean-up activities in the same area, or concurrent with EPA activities if those activities do not overlap with City Riverwalk construction.

8.1 Coordinate with EPA

The first step should be for the City to sit with the EPA so that Riverwalk construction can occur in a coordinated manner with EPA’s Acushnet River clean-up efforts. Since the EPA clean-up of the Acushnet is now in an accelerated schedule, portions of the river, and more importantly the riverbank, will be addressed by EPA between 2015 and 2020. The City needs to phase its construction activities to immediately follow EPA cleanup, or in some cases the two project may be able to run simultaneously if there is no overlap in clean-up/construction activities.

To date, the EPA has been very cooperative in discussing its clean-up schedule with the City, and trying to advance clean-up in certain areas so Riverwalk construction can begin sooner than later. For example, the City wishes to construct the first segment of the Riverwalk, the Southern Entrance, Southern Promontory and a portion of Segment A from Veterans Memorial Way to Sawyer Street. EPA has agreed to accelerate their clean-up actions in this area also.

8.2 Phased Development/Construction

Once there is a better understanding of how construction of the Riverwalk will be phased to coordinate with EPA activities, the City can finalize a phasing plan, and then proceed to Design Development for construction

documents for the appropriate Phase 1 project. The design should be advanced to include the necessary construction information, quantities and details required for the submission of the applications for the various permits which will be required for Phase 1 construction.

It is understood that the \$2.9 million grant from the New Bedford Harbor Trustee Council will fund portions of the proposed Riverwalk elements, and the City will have to identify other funding sources to supplement the Trustee funds.

The Phase 1 project should be for the first area of EPA clean-up which is in the portion of the Riverwalk that includes the Southern Entrance, Southern Promontory and a portion of Segment A from Veterans Memorial Way to Sawyer Street. The permitting process for this initial portion will then help identify any specific design elements to be incorporated into future phases to meet regulatory agency requirements. In addition, focusing on this initial segment will limit the amount of additional funding the City will need to add to the Trustee funds to complete construction. Furthermore, as the EPA completes additional clean-up activities north of this initial segment, any of the EPA activities that may impact the shoreline and Riverwalk area can be identified, quantified and incorporated into the construction documents for future phases.

8.3 Final Design

Final design can be completed after permits are issued for each phase of the project in order to incorporate are requirement form the various permitting agencies. This is more applicable to the initial Phase 1 project, but since each segment has its own unique characteristics, there may specific permitting requirements for each phase.