



## TO THE RIVER

A Waterfront Design for Harbor Park in Middletown, Connecticut  
Prepared for the Middletown Garden Club and the City of Middletown

## ACKNOWLEDGMENTS

A special thank you to the Susan B. Wasch Riverfront Development Fund for its contribution and commitment to Harbor Park and the City of Middletown. Thank you to Maria Madsen Holzberg and all the dedicated members of the Middletown Garden Club; The Wasch Family; Joseph Samolis, Chief of Staff for the City of Middletown; Christopher Holden, Deputy Director for Middletown Department of Public Works; Manuel Pires, Connecticut Department of Transportation; Marcy Balint, Connecticut Department of Environmental and Energy Protection; Cori Rose, U.S. Army Corps of Engineers New England District; Marc Anthony Gallucci, ADA Coalition of Connecticut; all critics and instructors; the vibrant residents and business owners of Middletown as well as the welcoming staff at the Middletown Senior Center and Russell Library.

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# INTRODUCTION

FATHER AND DAUGHTER BIKING IN HARBOR PARK

In Middletown, Connecticut, students, locals, and visitors fill the streets and travel to downtown for the thriving restaurant and arts scene, or to grab a cup of coffee. Walking through town, the electricity is palpable. It is a college town, a melting pot of different cultures, and the downtown offers live music, comedy shows, and art openings.

The energy of downtown Middletown mirrors the city's dedication to its citizens. Middletown is constantly looking for ways to improve its community spaces, evident in large gestures like the ongoing expansion of the community boathouse, and smaller details, like the recently installed electric car chargers in public parking lots. Middletown is a contemporary version of the riverside shipping and industry

center it once was, a hub of academia, arts, and culture.

However, a visitor on Main Street might wonder, where is the river and how does one get there? Navigating to the river from Main Street is not exactly clear. If a visitor happened to park in the public parking lot next to City Hall, they may see a pavilion with a banner that reads "To The River."

After walking on a narrow sidewalk next to fast moving traffic, one travels down a series of stairs or ramps and begins their journey through the 190 foot tunnel, with harsh lighting and bare concrete walls. One sees Harbor Park literally (and figuratively) as the light at the end of the tunnel. Upon one's arrival on the other side, they see the boardwalk, a pavilion, and expansive views of the

Connecticut River. To the south, they see people fishing, the Canoe Club, and crew teams practicing.

Harbor Park is a beautiful space with immense potential, but it does not reflect the vibrant character of Middletown. The boardwalk pops up in some areas, the railings and fencing along the water's edge varies in aesthetic and structure, paved paths crack and dissolve into lawn, and many trees are in poor health.

Yet, it is clear that people consistently use the space. Annual events as such July 4th Fireworks are held there, and the site is regularly accessed by people fishing, biking, or walking. This drives one to wonder, "why doesn't the park better reflect the needs of the people that use the space?"

Despite Harbor Park's advantageous location on the river, the park sits between the Connecticut River and Route 9. The decision to place a major highway between the riverfront and the vibrant downtown Middletown led to Harbor Park's isolation physically and visually from Main Street and the rest of downtown. Safe pedestrian access is limited to an underground tunnel and along Union Street. Pedestrians have trouble navigating to Harbor Park, which cannot be seen from downtown or Route 9.

Due to these physical and visual access barriers, citizens of Middletown critically under-use

Harbor Park compared to the rest of the downtown area.

This leads to the crux of this project's framing question for Harbor Park: how can access be improved, and how can Harbor Park entice visitors to stay while meeting the ecological needs of the place?

The Project for Public Spaces addressed some of these issues in their 2014 Placemaking report, and created a foundation for riverfront rejuvenation in Middletown.

The Garden Club of Middletown hired the Conway School through establishment of

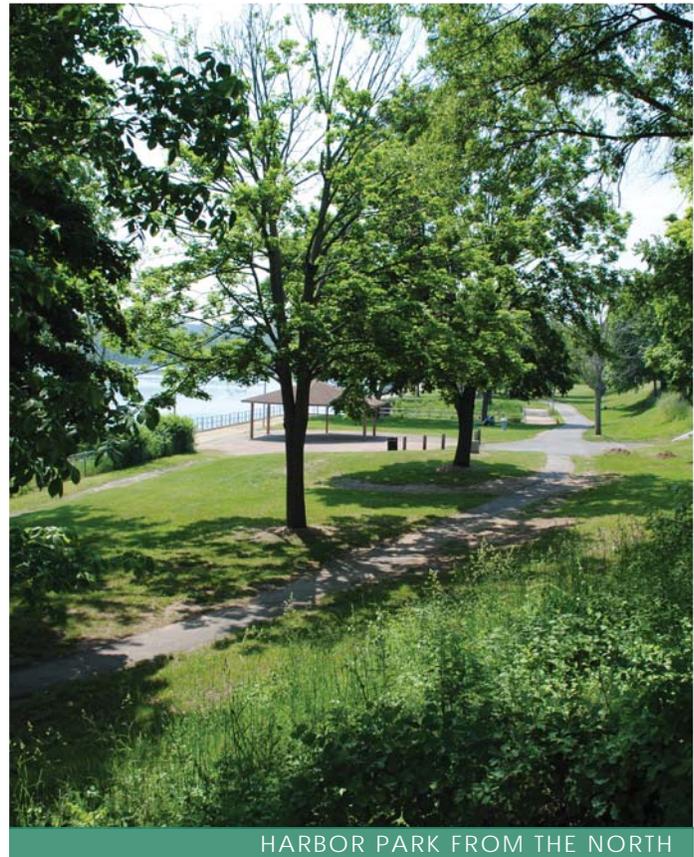
the Susan B. Wasch Riverfront Development Fund and the City of Middletown to produce detailed design proposals for Harbor Park. The Garden Club has been active in improving the landscapes in the city, including the recently installed garden at Russel Library.

The Conway Team hopes to refine the Project for Public Space's report suggestions through public input and site analysis, and create a design that will reconnect Middletown to Harbor Park.

## CLIENT REQUESTS

The Middletown Garden Club and the City of Middletown requested the following of the Harbor Park project.

- Improve user experience
- Enhance opportunities for community events and interaction
- Create distinct spaces for activities
- Integrate stormwater features
- Reintroduce ecological elements and values



Not for construction. Part of a student project and not based on a legal survey.

# HISTORY

Like many riverside cities in the United States, Middletown, Connecticut was once defined by the presence of industry and shipping on its water's edge. The city's unique position at the "big bend" of the Connecticut River shaped its fertile valleys and positioned Middletown as an ideal inland seaport. Despite its location 30 miles upstream from Long Island Sound, the city transformed from an agricultural settlement into the largest seaport in Connecticut.

By the late 1700s, Middletown rivaled Boston and New York as an economic and population center. As maritime trade dwindled and railroad transport became more prevalent, Middletown's economy evolved from shipping to manufacturing. The prevalence of the automobile in the 1950s further shifted distribution methods and

the economy, creating a need for new infrastructure.

In 1943, a report envisioned a "scenic highway along the riverfront" (modern day Route 9), and suggested the extra land between the highway and river be used for a riverfront park. Unfortunately, planners did not anticipate the physical and visual isolation the placement of Route 9 would create for this parcel.

The construction of Route 9 created a barrier between the heart of the city and the Connecticut River. Harbor Park's isolation from downtown by Route 9 has led to the park, a narrow space with aging infrastructure, being underused compared to other public spaces in Middletown. However, the park's existing activities and annual events coupled

with its expansive views of the Connecticut River contribute to Harbor Park's uniqueness compared to other post-industrial sites on the riverfront, and suggests a promising future for the park as the gateway to other riverfront rejuvenation projects.



MIDDLETOWN'S HARBOR 1877



TEN KEY DESTINATIONS FOR MIDDLETOWN'S RIVERFRONT CORRIDOR

The Project for Public Spaces used the "Power of Ten Key Destinations" to identify a "string of pearls" to help reactivate and revitalize Middletown's waterfront. Harbor Park will serve as the gateway to the future riverfront sites, which will be connected by a boardwalk.

Despite its isolation from the riverfront due to the construction of Route 9, Middletown has prioritized a return to the river. Several on-going developments are starting to transform the riverfront in Middletown.

**Decommissioning the Waste Treatment Plant.** Rather than retrofitting the existing plant, Middletown invested \$53 million to divert waste to a facility in Cromwell. The plant is scheduled to be off-line by 2019 and the city plans to open the site to riverfront recreation.

**Purchase of Pederson Oil and OMO Facilities.** These former industrial sites are in the process of remediation and will offer recreational opportunities along the riverfront.

**DOT Route 9 Proposal.** A Connecticut Department of Transportation proposal suggests the elimination of the Route 9 on-ramp that runs parallel to the park and Harbor Drive. This would transform Harbor Drive into

a cul-de-sac while refurbishing pedestrian walkways in the area.

**Proposed Pedestrian Bridge over Route 9.** As part of an effort to improve the visual and physical connection between Main Street and Harbor Park, Middletown is working with the Department of Transportation on a proposed pedestrian bridge over Route 9.

**Proposed Boathouse Renovation.** As part of a \$2.6 million grant from the state of Connecticut, Middletown hired a consulting firm to propose a redesign of the community boathouse south of the Canoe Club.

**Placemaking Report.** The Project for Public Spaces addressed Harbor Park and adjacent parcels in their 2014 report, "A Placemaking Plan for the Middletown Riverfront," and created a foundational document for large-scale riverfront rejuvenation in Middletown.

The report conceptualized a 1.5-mile network of recreational spaces along the Connecticut River, and identified Harbor Park as the critical first-link in this chain of riverfront open spaces. The report proposed ten sites connected by a riverside trail or "riverwalk."

Suggestions for Harbor Park include enhanced wayfinding through directional and informational signage, attractive seating, access to the river with floating docks and temporary barges, centrally located playground, beach themed cove, upgraded restrooms, and an information center. Middletown is highly motivated to fulfill this vision, and the redesign of Harbor Park is a critical first step in the implementation process.

Not for construction. Part of a student project and not based on a legal survey.

# ECOLOGICAL/ REGIONAL CONTEXT

Although the four acre Harbor Park is a relatively small parcel, it occupies a unique position along the Connecticut River and is therefore subject to ecological forces associated with this riparian location.

The Nature Conservancy recognized the lower section of the Connecticut River as one of the 40 "last great places" due to the quality of its wetlands and wildlife. These wetlands and estuaries are also recognized for their international importance by the Ramsar Convention, an international treaty for the conservation and sustainable use of wetlands signed in 1971. Because of the river's unique ecological importance, particularly in the lower stretch

before the Long Island Sound, it is crucial to limit pollution.

A number of threatened and endangered species rely on the river. The wide bend in the river adjacent to Middletown slows the current, providing excellent fish habitat and supporting two endangered fish species (Atlantic and Short-nose sturgeon).

Additionally, the Connecticut River is tidally-influenced. During high tide along the Atlantic coast, the river rises slightly. With climate change likely raising sea levels over the next century, the river will also rise during high tides. Coupled with predictions for more frequent rain events, Harbor Park will flood more frequently and intensely in the future.

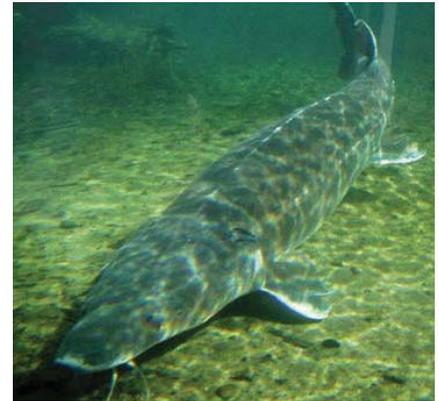
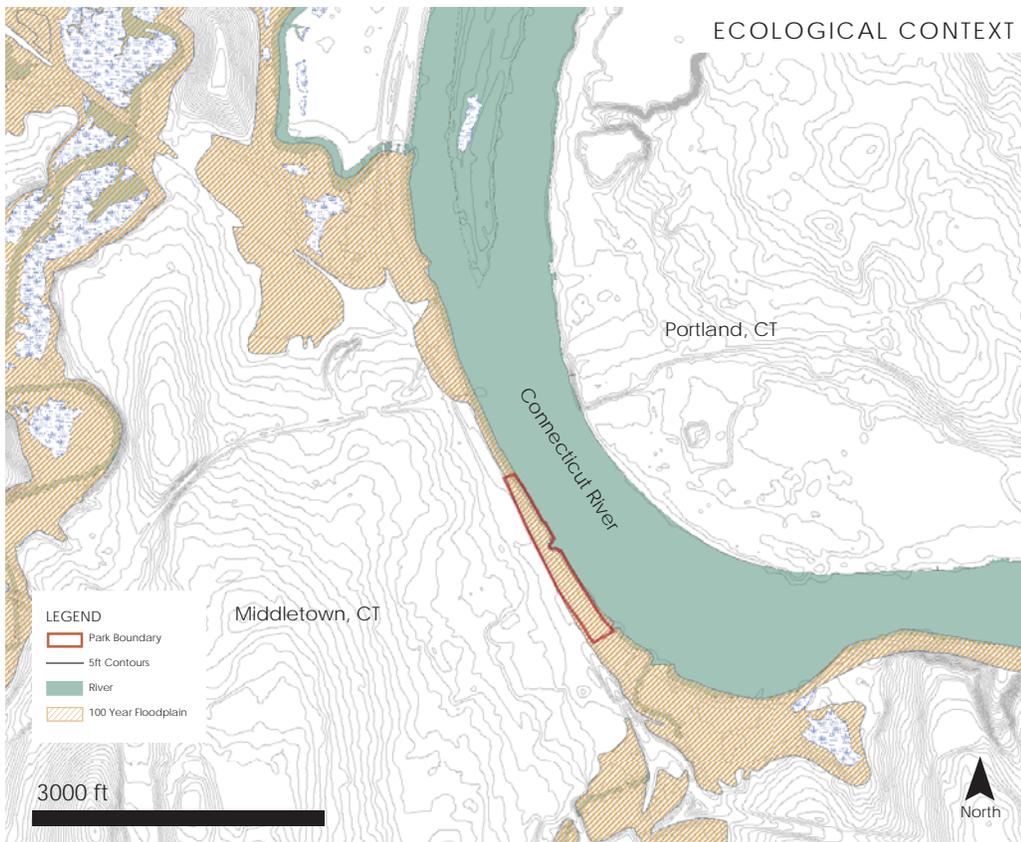


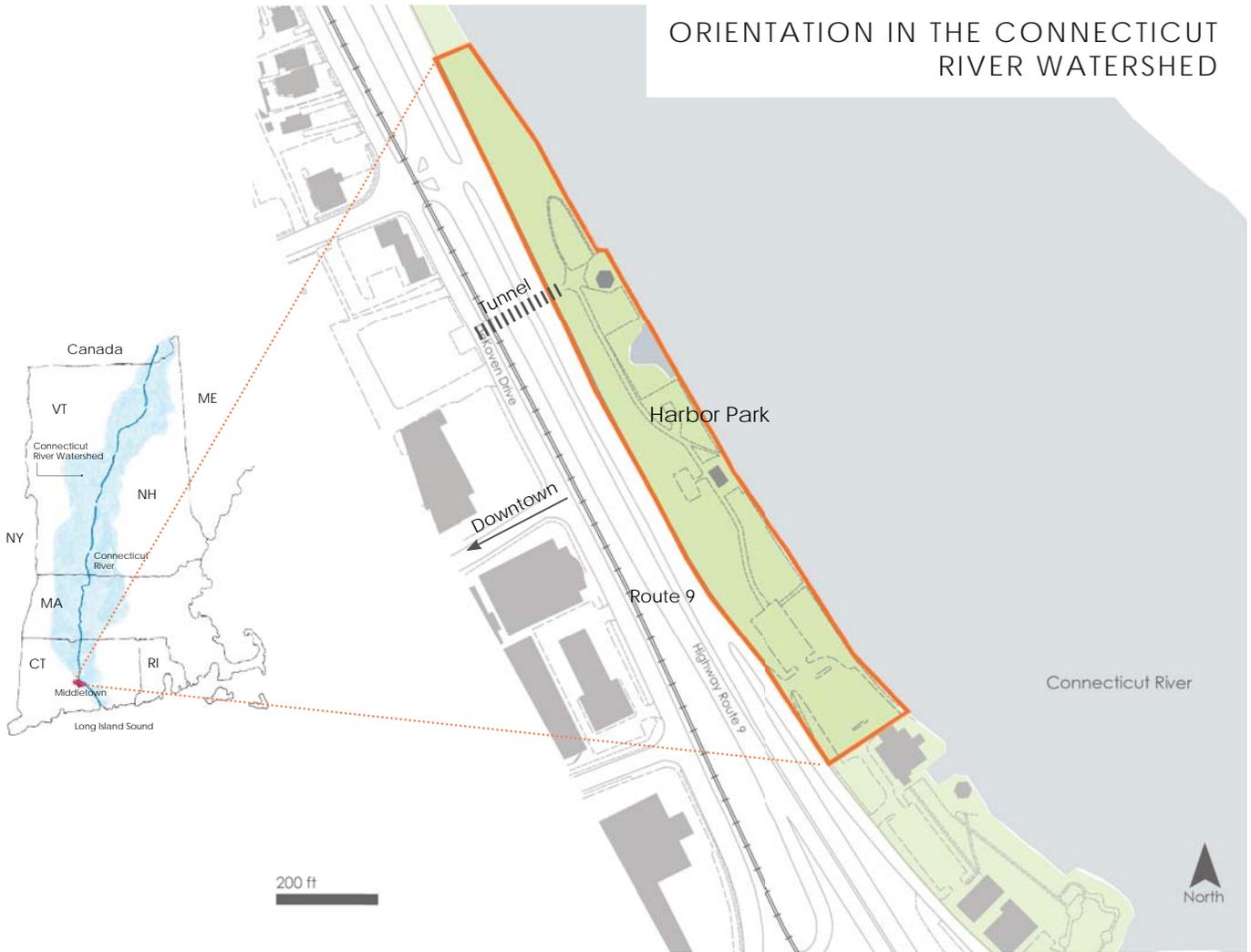
Image Credit: Drake Ds

Short-nosed Sturgeon occupy the lower stretch of the Connecticut River and are threatened by overfishing and pollution.



Middletown is located adjacent to the "big bend" in the Connecticut River.

## ORIENTATION IN THE CONNECTICUT RIVER WATERSHED



Middletown lies at an ecologically important bend in the Connecticut River's path from below the Canadian border to its mouth at the Long Island Sound. The River is tidally influenced it flows south through Middletown up to Hartford.

# FLOODING CONCERNS

Harbor Park is located entirely in the floodplain. Its existence was made possible through filling former industrial piers along the Connecticut River decades ago. From a hydrological and ecological perspective, the site would rather return to a floodplain forest.

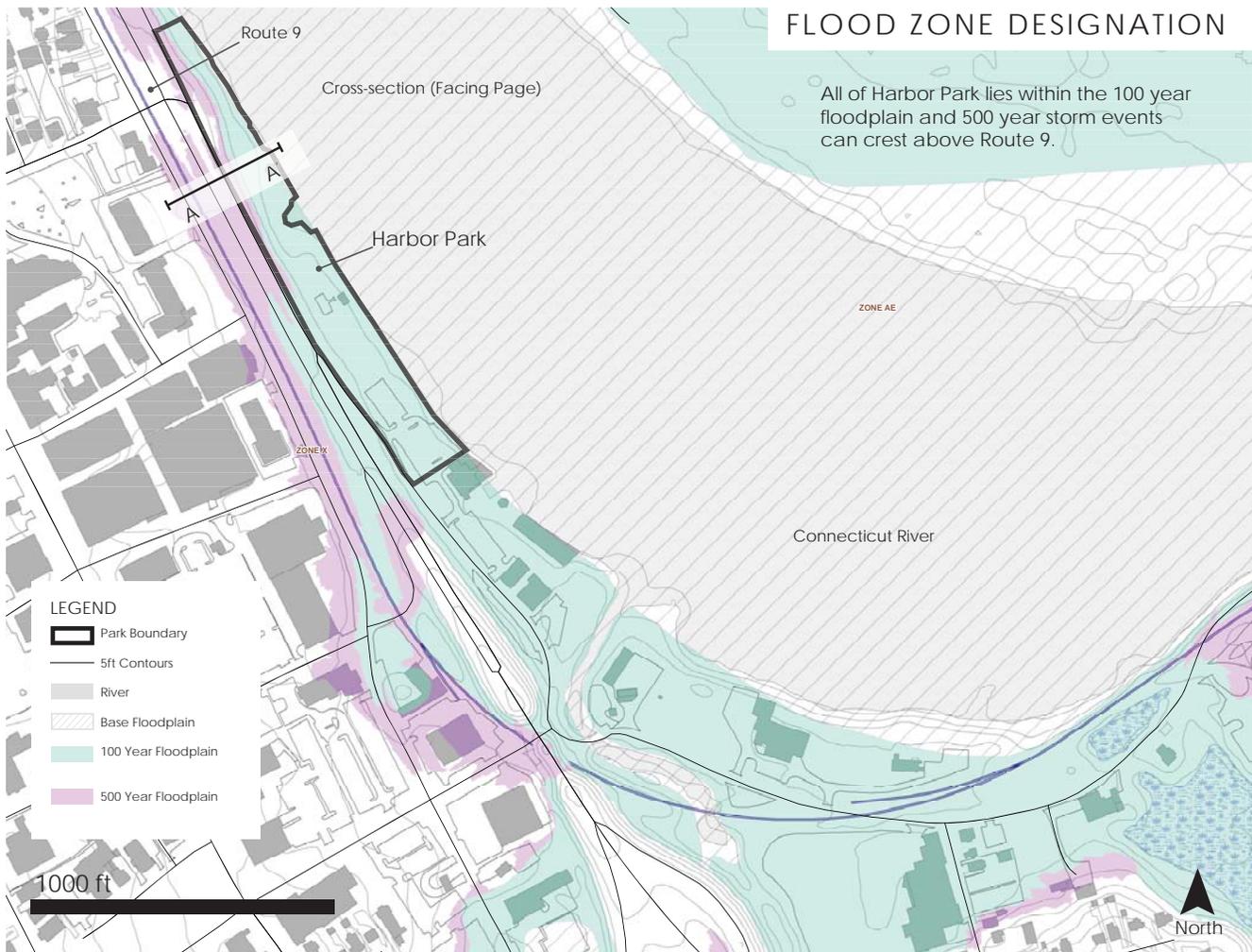
Harbor Park floods in the early spring and fall, and because of the river's tidal nature, water levels rise and fall with the moon cycle and throughout the day, which will have a greater impact on Harbor Park in the face of climate change, sea level rise, and the increased frequency of severe weather events.

Harbor Park's topography also exacerbates flooding effects. The park is mostly flat closest to the river, but is bordered to the west by a steep embankment between the flat portion of the park and Route 9. This structural constraint will trap water instead of spreading and sinking the water over a larger area.

An ecological and human health concern associated with flooding is the presence of combined sewer overflows (CSOs) along the river. During heavy rain events raw sewage and stormwater in cities such as Hartford and Springfield mix in stormwater pipes and are released into the

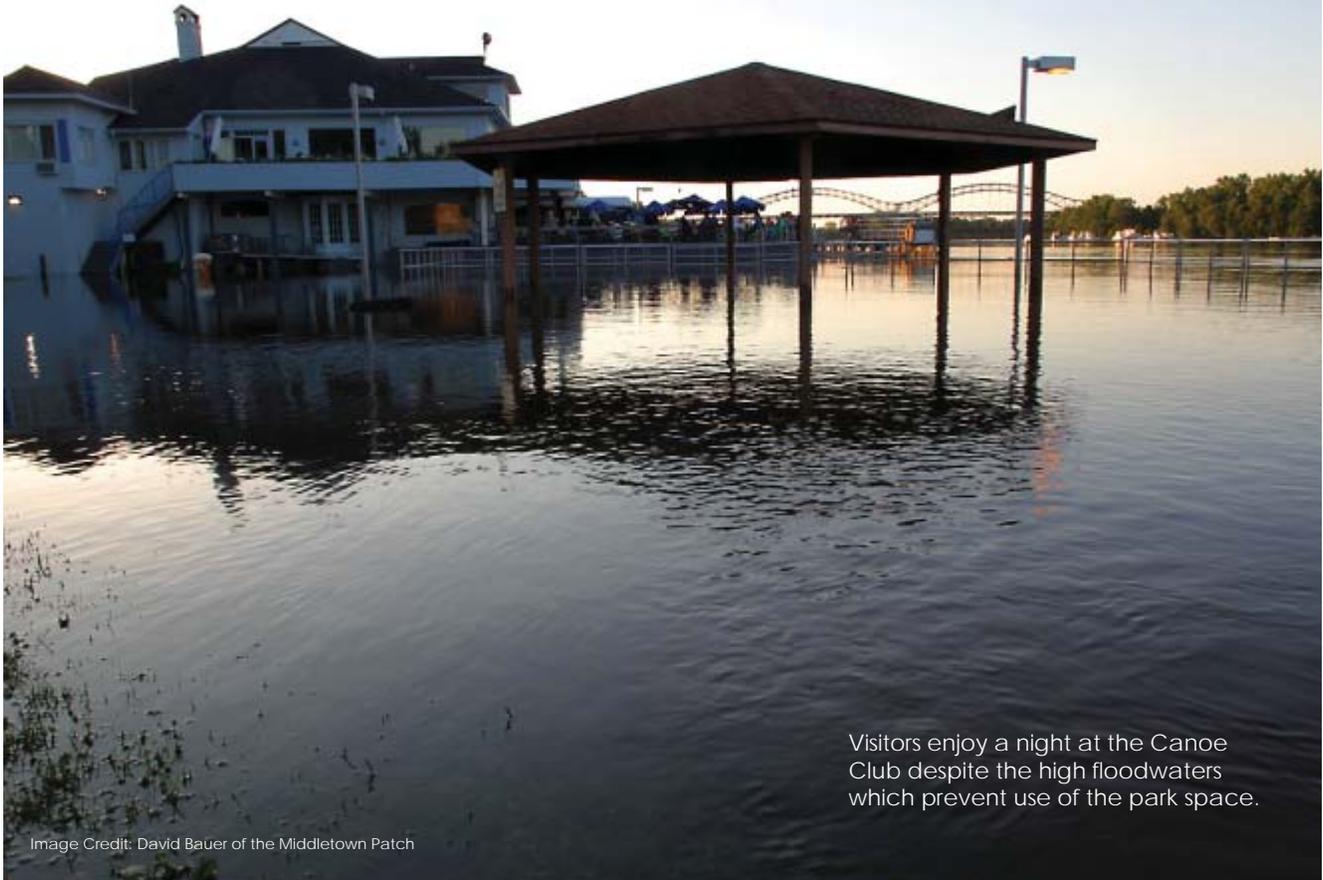
river. Stormwater from these CSO events flows past Middletown making the river dangerous to swim in.

Although water quality in the Connecticut River drastically improved following the implementation of the Clean Water Act in 1972, swimming is not permitted on site. Due to the regular flooding of the site, any infrastructure and designed elements must be simple to maintain, flexible, and flood resistant to meet the client and community desires while remaining ecologically feasible.



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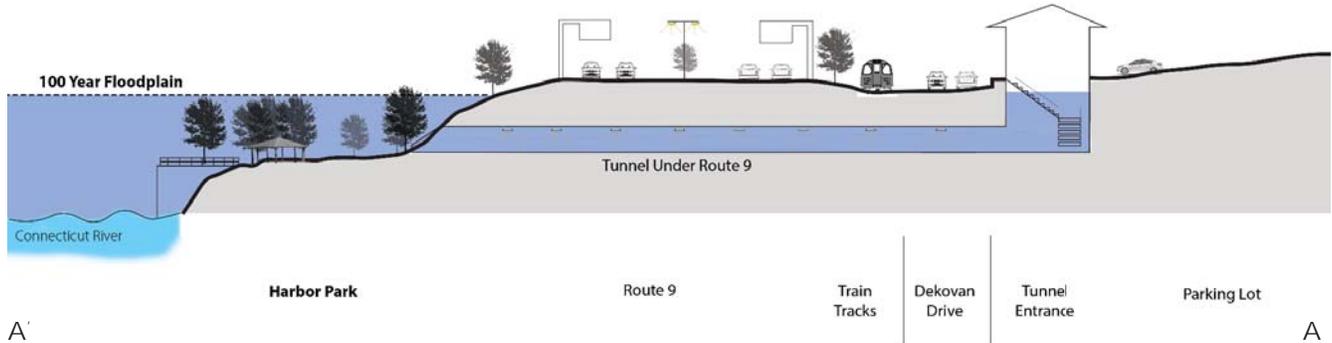
# FLOODING AT HARBOR PARK



Visitors enjoy a night at the Canoe Club despite the high floodwaters which prevent use of the park space.

Image Credit: David Bauer of the Middletown Patch

## SECTION OF FLOODPLAIN AREA



All of Harbor Park lies within the floodplain and the park floods frequently. Although floodwaters rarely reach the 100-year-flood line, annual floods reaching the 8 to 13 foot elevation are not uncommon.

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# CHARACTER ZONES

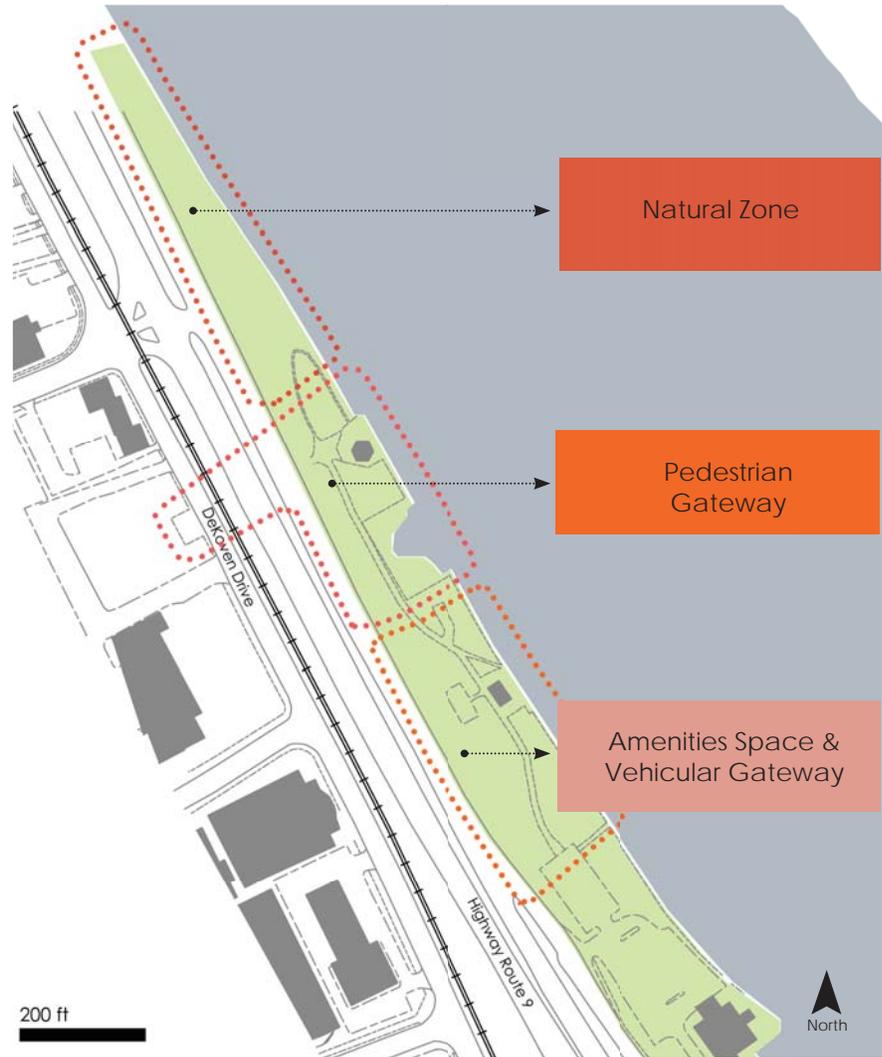
Despite Harbor Park’s long, linear nature, it contains three character zones, the Natural Zone, the Pedestrian Gateway, and the Amenities Space & Vehicular Gateway.

## OBSERVATIONS

The northern end of Harbor Park is largely undeveloped. Use increases to the south of the park, where most of the amenities are concentrated and vehicular access is provided via Union Street. Existing infrastructure is outdated, inconsistent, and does not meet ADA compliance.

## IMPLICATIONS

Harbor Park’s three zones provide spaces for a variety of existing and potential uses. Passive activity is best suited for the undeveloped northern zone, while active recreation and events spaces are ideal for the southern end of the park. The Pedestrian Gateway will best serve as a transition for the passive and active zones of the park.



## LEGEND

- Natural Zone
- The Pedestrian Gateway
- Amenities Space & Vehicular Gateway

The character zones of Harbor Park vary in foot traffic they experience, degree of development, and the current and future uses they may serve.

## Natural Zone



*Top to bottom:* The steep embankment provides views of the park and the river. The Natural Zone is largely undeveloped. The paved path is in need of repair.

### NATURAL ZONE

The northernmost area of the park is isolated, undeveloped, and narrow, bordered by an outdated chain-link fence and invasive species.

## Pedestrian Gateway



*Top to bottom:* The concrete pedestrian tunnel is 190 feet long. The pavilion on-site suffers from exposure to flood water. The silted cove and the path that travels around the cove could serve as an attraction for visitors.

### PEDESTRIAN GATEWAY

This zone serves as the primary pedestrian entrance. Visitors arrive through a bare, concrete tunnel, and upon arrival see expansive views of the Connecticut River, a pavilion, and a cove.

## Amenities Space & Vehicular Gateway



*Top to bottom:* A man fishes from the boardwalk. Trees provide shade on the expansive lawn. The picnic area is located behind the bathrooms. The Canoe Club Restaurant shares the parking lot.

### AMENITIES SPACE

The amenities space hosts the majority of the site's infrastructure and furnishings including bathrooms, utilities, picnic seating, and the boardwalk. Mature trees and ample seating make this space the most inviting for park visitors, while the dock, nearby parking lot, and road access via Union Street make this space the most accessible.

# SLOPES, DRAINAGE, & STORMWATER

Slope and drainage analyses describe how water travels across the park's surfaces. All design alternatives must consider how impervious surfaces negatively impact water quality.

## OBSERVATIONS

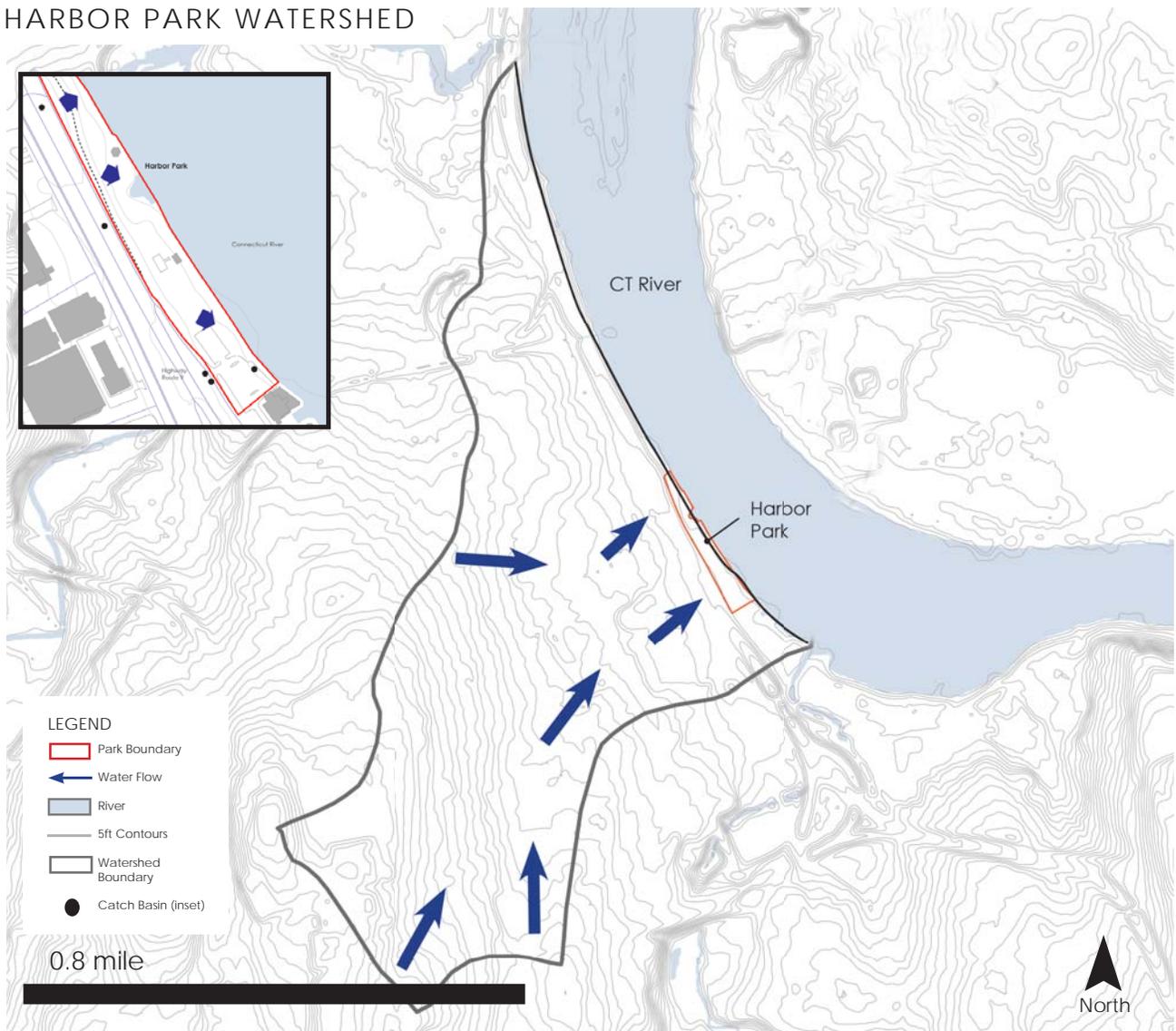
Downtown Middletown and Route 9 create layers of impervious surfaces adjacent to Harbor Park. Stormwater is directed to catch basins along Route 9. Catch basins on-site are located at the Canoe Club towards the southern end of the property.

## IMPLICATIONS

Although stormwater does not flow directly into Harbor Park from nearby surfaces, stormwater features including rain gardens and bioswales will help slow and potentially infiltrate runoff produced from the park's impervious surfaces.

At the park, water flows down the embankment towards the river.

## HARBOR PARK WATERSHED



# REGULATORY BOUNDARIES

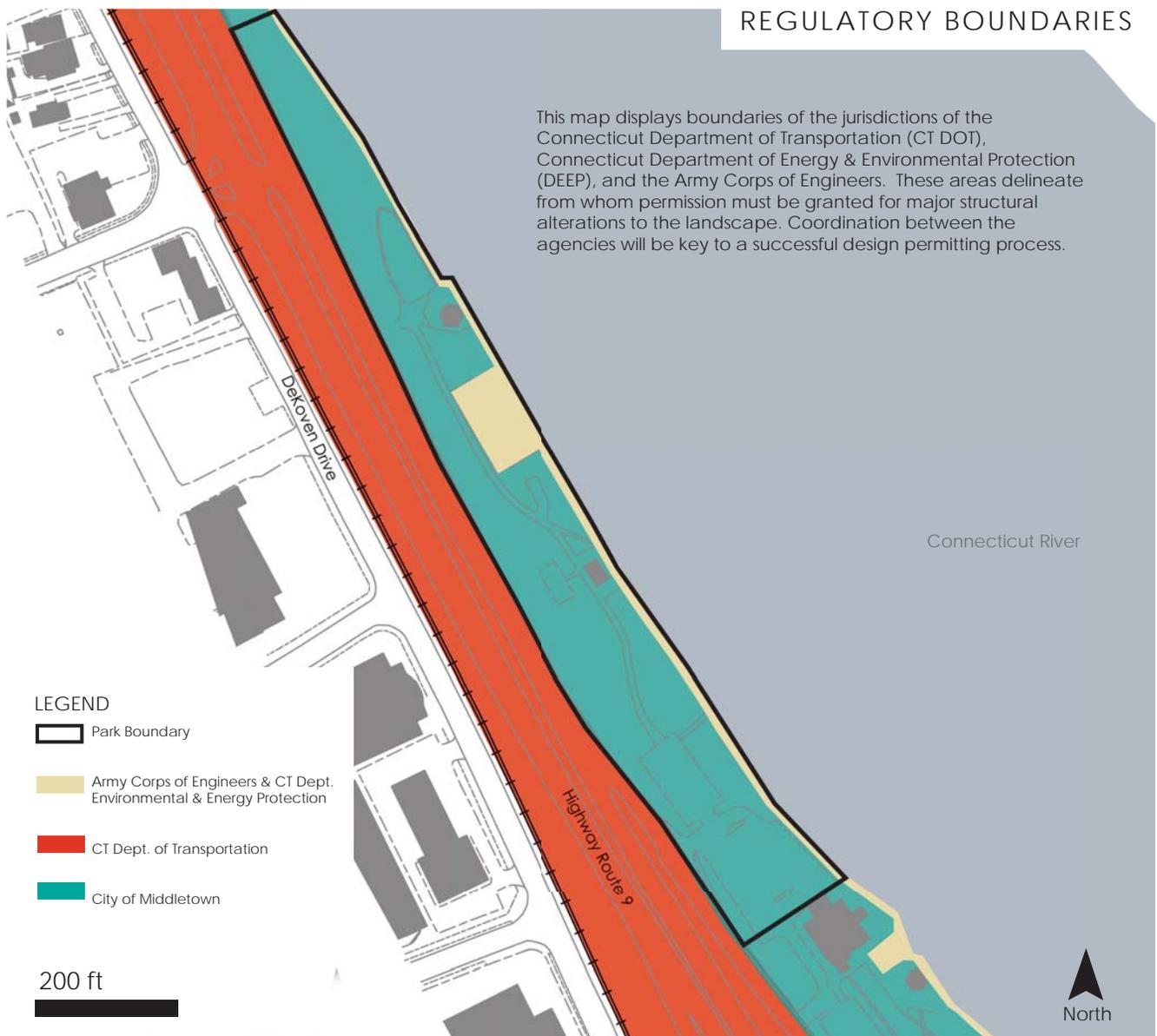
Regulation of floodplain properties is a complex combination of the science behind floodplain delineations and regulatory processes that determine allowed uses. Understanding the jurisdiction of regulatory agencies at Harbor Park will influence the available design opportunities and identify permitting requirements.

## OBSERVATIONS

Several organizations have jurisdiction within Harbor Park, including the Army Corps of Engineers, the Connecticut Department of Energy & Environmental Protection (DEEP), the Connecticut Department of Transportation (CT DOT), and the City of Middletown.

## IMPLICATIONS

The respective agencies for each designated area should be contacted before beginning a project design to best coordinate a multi-layered permitting process and avoid any legal or political complications.



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# CONNECTIVITY & CIRCULATION

Connectivity and circulation describe how people navigate to Harbor Park and how they travel within the park. Understanding connectivity will help improve access and user experience.

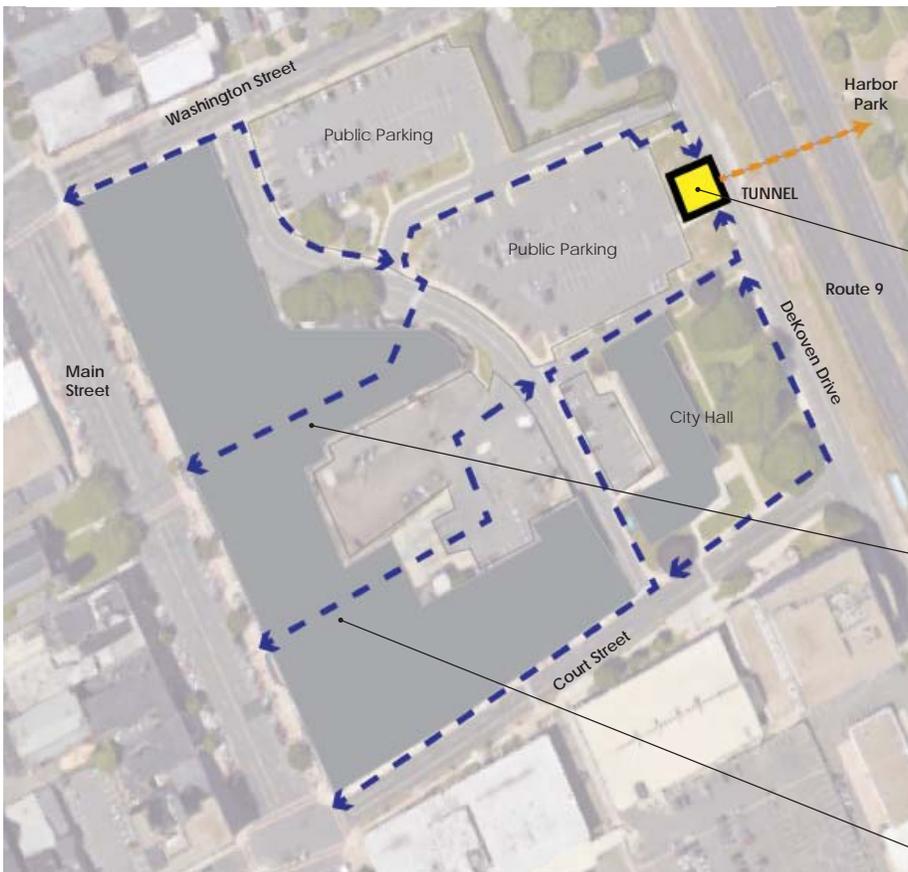
## OBSERVATIONS

Harbor Park's two entryways are within walking distance to downtown's Main Street and even closer to City Hall. Route 9 is a physical and visual barrier to Harbor Park. Within the park circulation is linear, running north to south. The boardwalk ends at the northern end of the park.

## IMPLICATIONS

Improved wayfinding strategies, including signs, maps, flags, and banners, will help people navigate to Harbor Park from downtown. An extended boardwalk and a looping path within Harbor Park will improve the pedestrian experience through creating a cyclical, continuous circulation pattern.

## ACCESSING THE TUNNEL FROM MAIN STREET



### LEGEND

- Harbor Park Pedestrian Tunnel Entrance
- Pedestrian Connection Routes
- Tunnel Access

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## CIRCULATION TO AND WITHIN HARBOR PARK

Circulation to Harbor Park is restricted by Route 9. To safely travel to the park on foot, visitors must walk through the pedestrian tunnel from public parking located adjacent to City Hall. Other parking areas are close to the pedestrian tunnel, but far enough to make the trip difficult for families with young children and the elderly. Union Street is the primary vehicle access point for Harbor Park, but is not welcoming for pedestrians with a narrow sidewalk along the Route 9 access ramp and no signage.



- LEGEND**
- Harbor Park Access Routes
  - Private & Public Parking
  - Major Roadways
  - Ideal Walking Routes to the Park 1/4 Mile Radius
  - Boardwalk Circulation

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# SOILS & VEGETATION

Understanding the existing vegetation at the park will guide future planting decisions through identifying plants currently thriving and struggling, as well as determining where there are opportunities to enhance biodiversity.

## OBSERVATIONS

The park is largely a mix of lawn and trees, some of which are in decline or require removal. There are only a few herbaceous perennial plantings and flowering shrubs.

Norway and sugar maple, elm, and cottonwood trees to the north, and linden trees to the south dominate mature vegetation at Harbor Park. The northern area contains pockets of dense trees and large swaths of exposed lawn and compacted soil. The edges of the park show the beginnings of a Japanese knotweed invasion.

The soils on-site have been heavily altered and are composed of compacted, acidic, urban fill. The water table is seasonally high during the spring.

## IMPLICATIONS

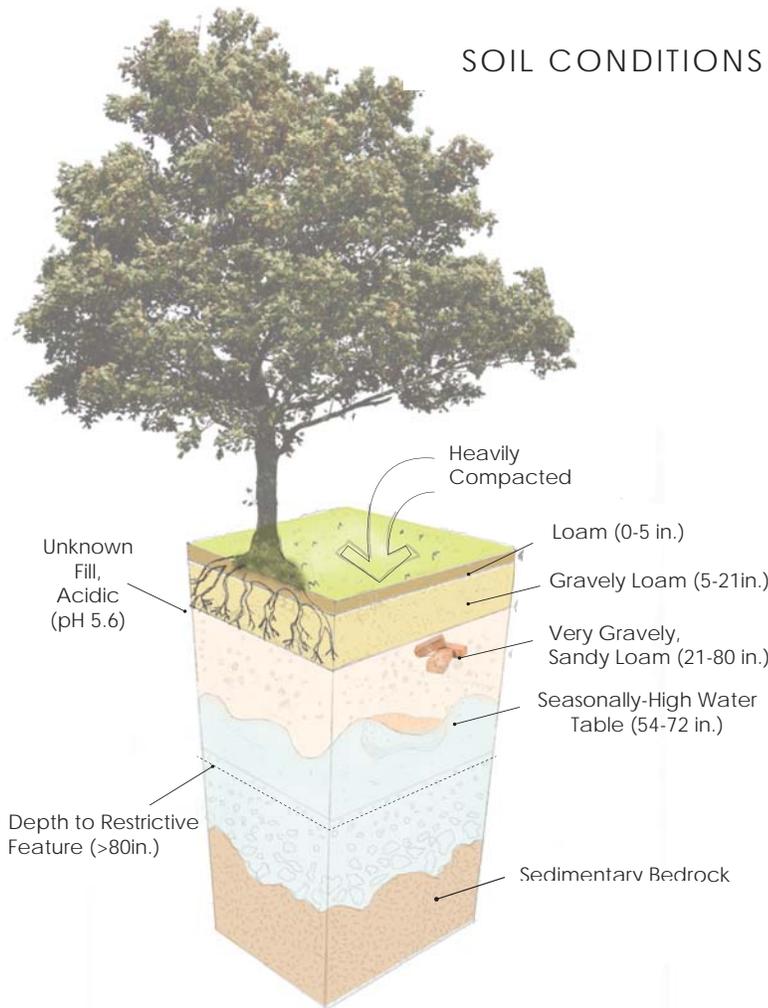
Incorporating diverse floodplain and riparian plant communities can restore ecological processes and attract native plant, insect and animals.

Replacing invasive plant species with plant communities that represent a complete habitat structure (various groundcovers, shrubs, perennials and annuals, and underplantings amongst trees) will reduce the likelihood of invasive plants returning to the site.

Thoughtful perennial plantings can add year-round interest, provide a dynamic visitor experience, and attract native pollinators, birds, and insects.

Before planting, soil percolation should be assessed. Soils draining at less than one inch per hour might require decompaction. A soil chemistry test can determine potential soil amendments. Any plantings should tolerate acidic conditions and fluctuations in soil moisture.

## SOIL CONDITIONS

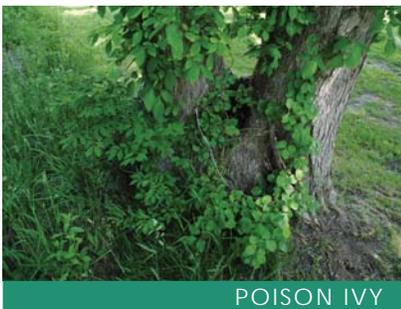


Soil cross section based on the Soil Survey for Middlesex County report from Natural Resources Conservation Service.

# TREE INVENTORY



Vegetation at Harbor Park includes trees and lawn, with few shrubs or herbaceous perennials.



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# ATMOSPHERE

Harbor Park's orientation impacts microclimatic conditions on-site. By responding to wind and sun patterns, the design can make Harbor Park more comfortable and conducive to year-round activities.

## OBSERVATIONS

Traffic noise from Route 9 detracts from an otherwise pleasant summer climate featuring a cool southeast breeze and a solar aspect that supports excellent views of the sunrise and sunset. Strong, uninhibited winds from the north can make the park uncomfortably cold in the winter.

## IMPLICATIONS

Blocking or abating noise from the highway can make the park more peaceful. Orienting shade structures to the west of seating areas can make warm summer days more pleasant. Shielding winter winds can increase comfort in the winter.



Design elements that take advantage of the cool summer breeze, shade afternoon sun and buffer noise from Route 9 can make Harbor Park more pleasant for visitors.

# SUMMARY ANALYSIS

Harbor Park's challenges are outweighed by its current and future assets. Despite annual flooding and its proximity to noisy Route 9, the park is one of the only places residents can enjoy expansive views of, and interact with, the river. While a high-quality landscape design cannot fully address all of the constraints, considering them in the development of design concepts will help determine what can be installed on-site and where it can be placed.

Design elements, particularly pavement and electrical equipment, should be resilient to

annual flooding events. The flood risk also provides educational opportunities related to floodplain function and species.

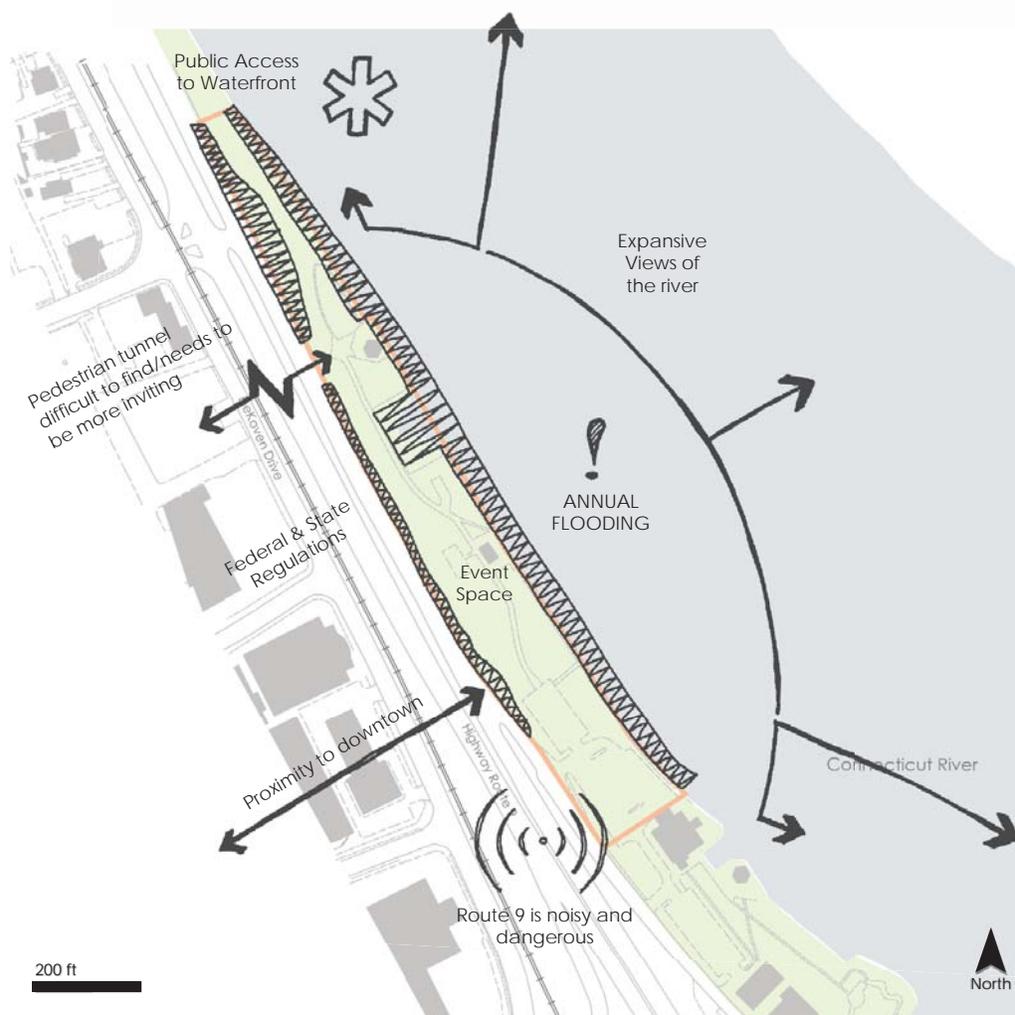
Harbor Park supports a number of annual events which will only expand as the city develops recreational spaces along the river. The future design should permit flexibility for multiple annual events while supporting unorganized activity.

Despite its close proximity to downtown, many visitors find it difficult to navigate to the park. Incorporating attractive wayfinding elements can help

guide people to and within the park.

Noise abatement strategies along Route 9 and noise buffers such as water features within the park should be explored to make the park more peaceful.

Any proposed implementation may require a permit from federal and local regulatory bodies. Providing comprehensive site analysis can better inform permitting decisions and the requirements for permitting requests should be further explored.



Despite being cut off from downtown by the noisy Route 9, Harbor Park has enormous potential to support diverse activities and enhance visitors' relationship with floodplain ecology.

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# COMMUNITY NEEDS ASSESSMENT

To refine the community needs and requests summarized by the Project for Public Spaces, the team facilitated two public meetings, circulated a public survey to local schools, and created an informative poster for the “Feet to the Fire Festival” to raise awareness the project.

## RESULTS

The first public meeting was held on May 5, 2016 at the Middletown Senior Center. The meeting focused on determining assets and barriers to visiting the park and on identifying elements that

could enhance the experience in Harbor Park. The graphic below indicates the results of the public input, which emphasized: improving access, creating spaces for recreation and play, incorporating amenities like food and entertainment, creating refuge in an urban environment, and acknowledging the history and ecology of the place through educational opportunities. All participants agreed the site must be beautiful, and that the design should highlight the site’s unique position on the Connecticut River.

During the second community meeting on June 9, 2016 at Russel Library, 24 participants explored two schematic concept plans and prioritized which components should be integrated into the final plan. The results are indicated on the right (dots represent priority).

Although community outreach yielded valuable input, the needs assessment did not fully reflect Middletown’s diverse community. Future planning along the riverfront should explore creative ways to engage youth, minority groups and young families.

## WHAT WOULD MAKE YOU **EXCITED** TO VISIT HARBOR PARK?

### RECREATION

walk, run, dog walking, fishing, picnic areas, boat launch for kayak and canoes, places to access water

### PLAY

playground, waterslide, waterscape that serves as skating rink in winter

### BEAUTY

native plantings, benches with views of river, clean and ecologically sound

### FOOD

bistro, places for food trucks, coffee shop, beer garden

### ENTERTAINMENT

river cruises, concerts, live entertainment, festivals - and spaces to hold these events

### RELAX

places to sit and picnic/talk, refuge from sun, wind, and noise

### EDUCATION

historical and ecological interpretive signage



INITIAL COMMUNITY MEETING | MAY 5, 2016 | MIDDLETOWN'S SENIOR CENTER

**What aspects of the design are working well?**

- Extended boardwalk to north  
●●●●●●●●●●●●●●●●
- Pedestrian bridge  
●●●●●●●●●●●●●●
- Natural playground  
●●●●●●●●●●●●●●
- Floating docks  
●●●●●●●●●●●●●●
- Wetland bioswale on north end  
●●●●●●●●●●●●●●
- Shade elements  
●●●●●●●●●●●●●●
- Winter ice rink  
●●●●●●●●●●●●●●

**What aspects could be improved?**

**What is missing?**

- Bike racks  
●●●●●●●●●●●●●●
- Mobile food/coffee carts  
●●●●●●●●●●●●●●
- More lighting  
●●●●●●●●●●●●●●
- Incorporate history  
●●●●●●●●●●●●●●

Participants worked in groups to determine aspects of the design they found most effective.



SECOND COMMUNITY MEETING | JUNE 9, 2016

Image Credit: Bill Maune, Middletown Patch

Not for construction. Part of a student project and not based on a legal survey.



# DESIGN DIRECTION

FEET TO THE FIRE FESTIVAL AT HARBOR PARK

The human needs and desires for Harbor Park and the ecological realities of the park's location present contradictions. Despite the park's ecological constraints and physical barriers to access, the site's industrial past coupled with the present existing activities on-site make Harbor Park unique compared to other parks near downtown Middletown. The ecological constraints create an opportunity for integrating environmental awareness and education into the design.

Ecological realities and human activity can work synergistically to inspire ideas that rekindle the reciprocity between people

and place, a design that drives people to the river and gives them a reason to return, and a vision that nurtures community, enhances accessibility, and considers the ecological sensitivity of the site.

The design direction strives to enhance the gateway experience to Harbor Park, encourage placemaking through distinct zones of use, and honor the ecology of the place. Through enhancing the gateway to the park, visitors will find navigating to Harbor Park easy and enjoyable.

Creating distinct zones of use that guide and encourage activities

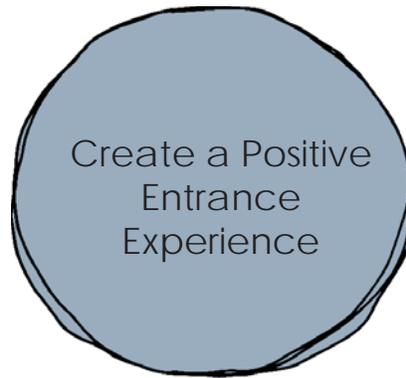
will create opportunities for visitors to engage with the site and spend more time at the park. The design proposal seeks to nurture community interactions, placemaking, and emotional reinvestment in Harbor Park.

Dedicating park space to ecological restoration will honor the ecology of the riverfront, create a quiet and accessible refuge in an urban environment, and incorporate opportunities for education in an area already accessed frequently by local schools and universities.

## DESIGN DIRECTION



- Enhance Resiliency
- Attract Pollinators
- Integrate Floodplain Species
- Improve Human-Ecology Relationship



- Enhance Cohesiveness
- Improve Navigability
- Promote Safety
- Incorporate Inviting Elements



- Maintain Flexibility
- Engage Community
- Attract Diverse Users
- Create Educational Opportunities

## SCHEMATIC DESIGN # 1

# ECOLOGICAL REALITIES

### VISION:

*Ecological Realities* responds to and interacts with the flooding dynamics of the park while minimizing development.

### NATURAL ZONE:

The boardwalk extends through a dense poplar grove over a wetland depression used to educate visitors about floodplain storage and wetland ecology.

### PEDESTRIAN GATEWAY ZONE:

A nature-inspired tunnel and sculpture indicating historic flood

levels guides visitors into the park. The cove is restored through the removal of invasive species and planting of native species.

### AMENITIES ZONE:

The picnic area is moved to permit an open and flexible art garden that sits below an embankment meadow. The bathroom is retrofitted to support game and seating rental. Nooks surrounded by native plantings provide shade and privacy. A rain garden with a curb cut treats stormwater runoff from the parking lot.

### Strengths:

- Enhanced environmental education opportunities
- Visible from road, access from the river.
- Rental facilities and open space allow flexibility for current and future use.

### Considerations:

- Bathroom location remains in low-elevation and blocks views.
- Dense plantings may present a safety risk.
- Limited attractions for diverse user groups.

## BIOSWALE EDUCATION AREA



The rendering indicates the wetland swale education space and poplar grove in the northern portion of the park. The swale features wetland species and demonstrates water storage after large storm events and can be used as an educational tool for teachers and community groups. The main portion of the swale is accessed by an elevated boardwalk.



The cross section indicates the retrofitted restroom/rental facility and the flexible art garden space. Encouraging pop-up activities in the park can draw more frequent visitors.

## SCHEMATIC DESIGN # 2

# THE GATEWAY DESTINATION

### VISION:

The design envisions Harbor Park as a site with frequent and diverse activities that transitions from a zone of high activity to a more passive zone.

### NATURAL ZONE:

The boardwalk extends from the tunnel landing to a passive natural area with a looped trail.

### PEDESTRIAN GATEWAY ZONE:

The tunnel extends into a brownstone seating space. To

the south, a boardwalk bridge extends over the restored cove.

### AMENITIES ZONE:

A proposed pedestrian bridge becomes the primary entrance to the park and incorporates a bathroom. An elevated viewing deck provides a unique perspective of the riverfront and looks over a diverse array of activities. Parking is significantly reduced in response to the parking garage on the other end of the pedestrian bridge, to reduce impervious surface, and open up more space for activity.

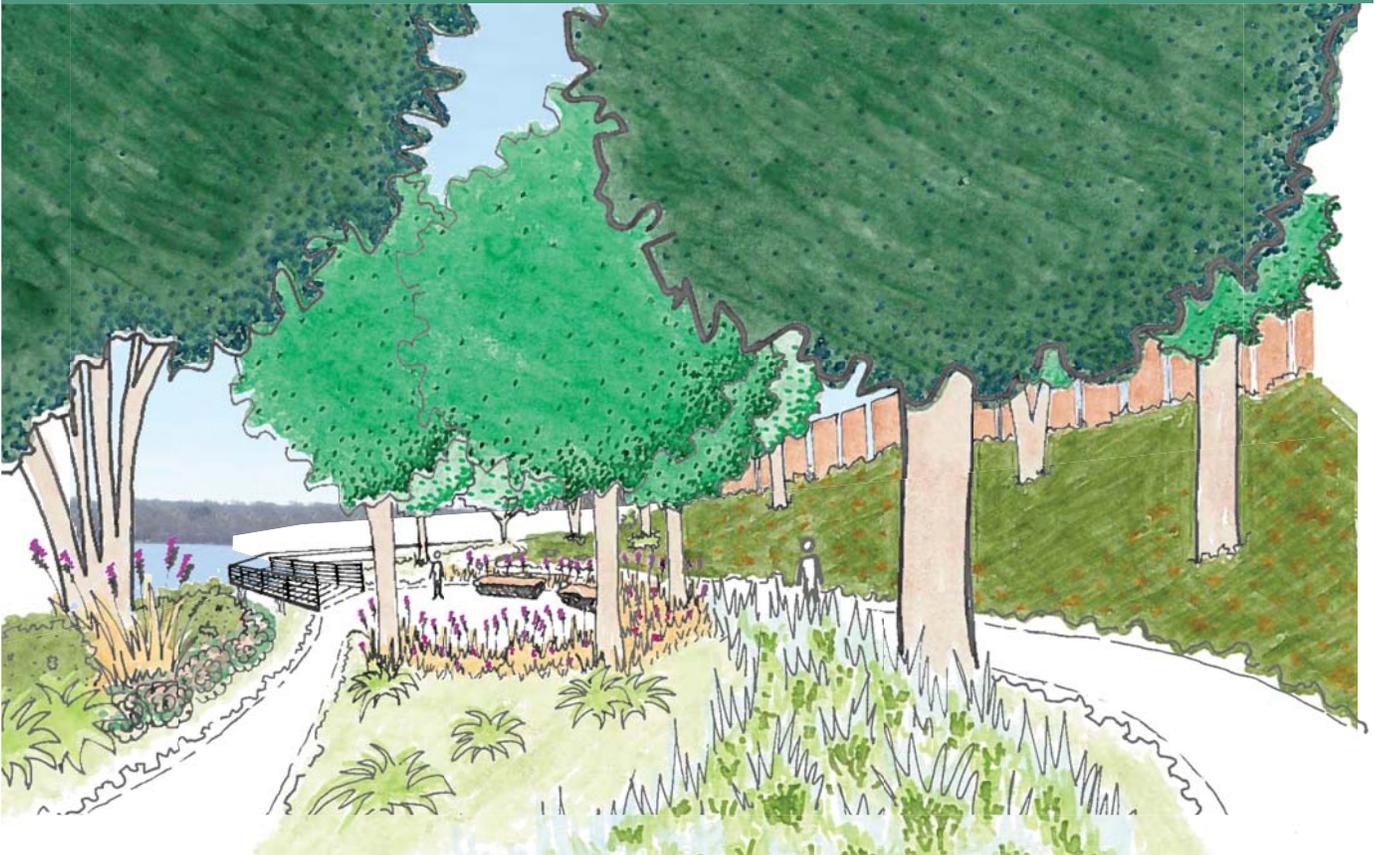
### Strengths:

- Provides new ways to interact with the river
- Caters to a broad range of user groups
- Supports year-round activities

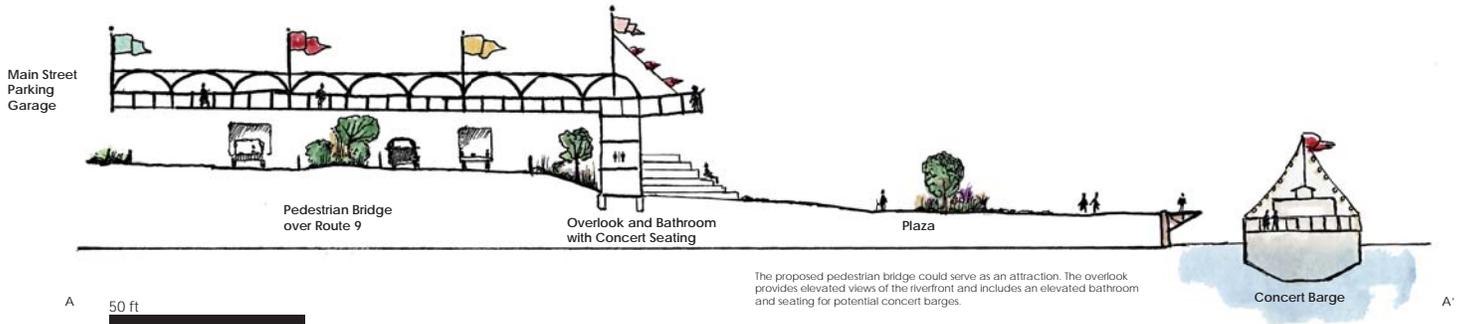
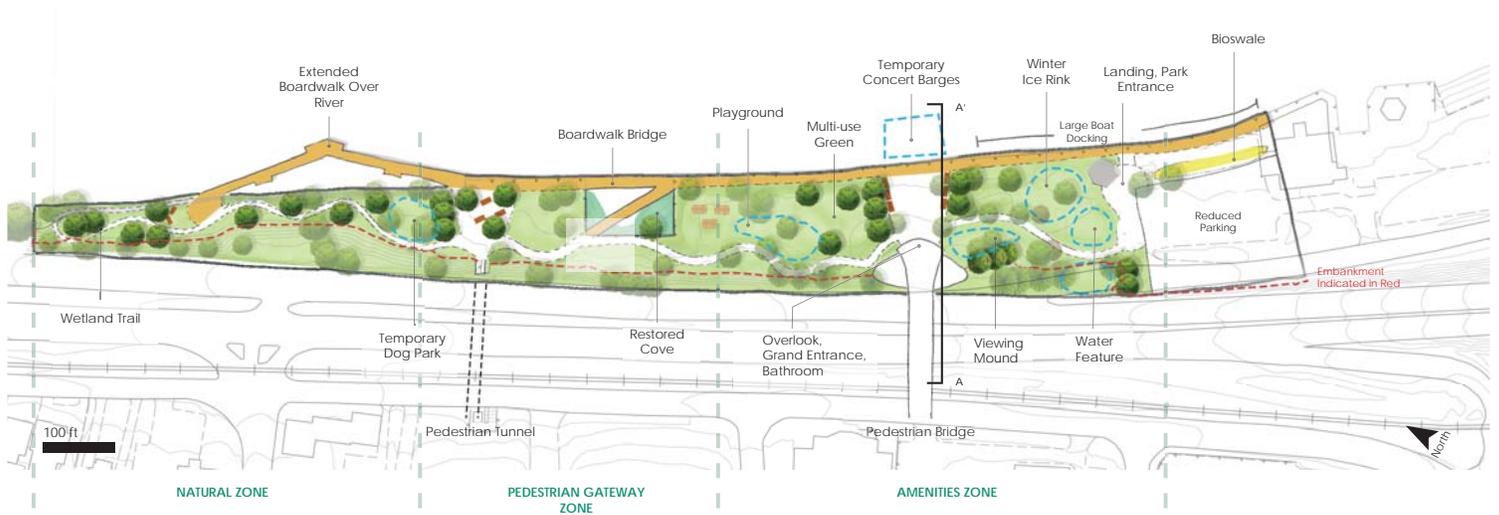
### Considerations:

- High cost and disturbance
- Loss of some parking on-site
- No access for small boats

## WETLAND TRAIL



A rendering of the looped wetland trail in the northern portion of the park featuring the landing for the extended boardwalk, native trees, and brownstone seating.



# FINAL DESIGN

## VISION

The design envisions Harbor Park as a site with frequent and diverse activities that also provides habitat for local ecology and educational opportunities.

## NATURAL ZONE

To the north, a narrow, extended boardwalk meanders through a native poplar grove along an educational wetland depression. The trail loop follows the bottom of the embankment.

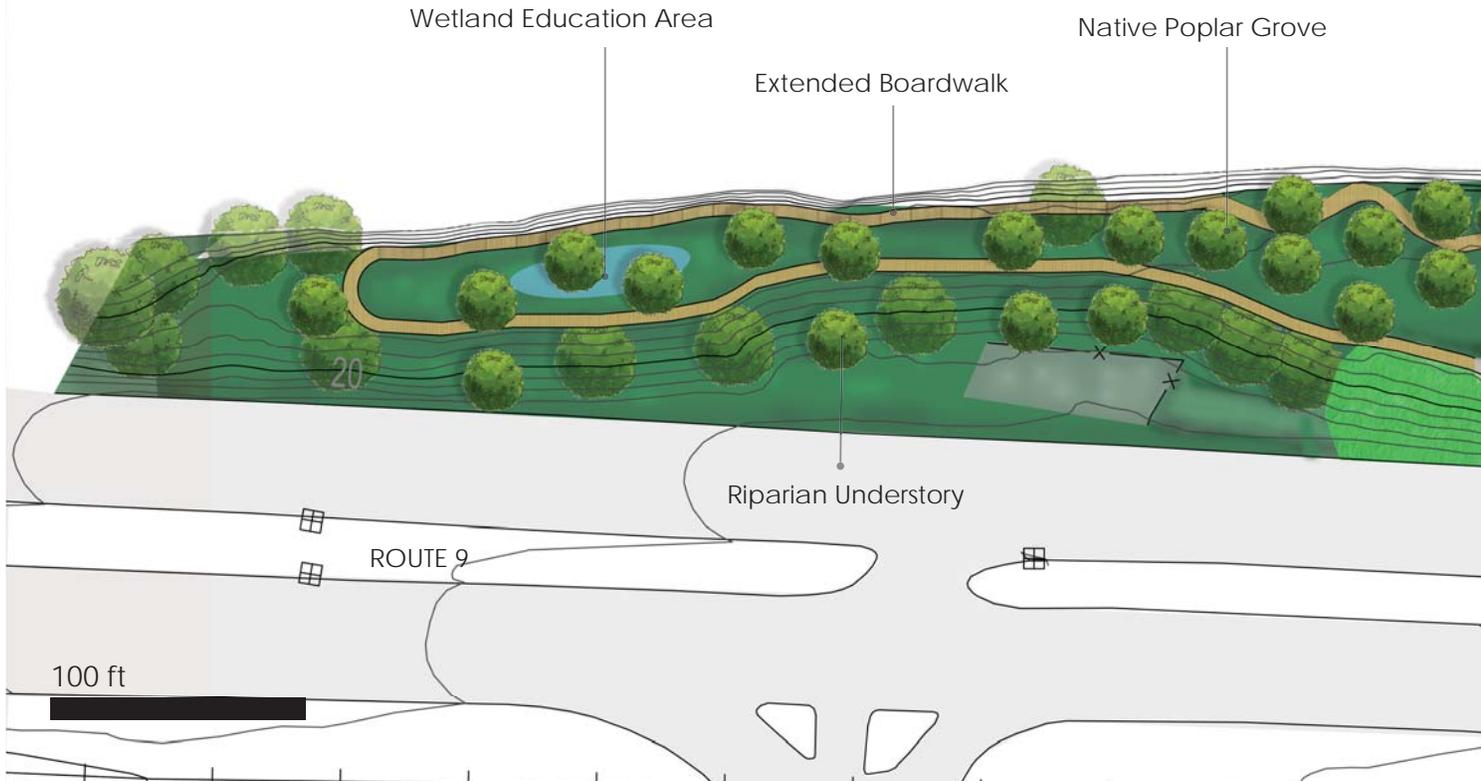
## GATEWAY ENTRANCE

Visitors entering through the tunnel are guided into the park by a staggered set of three boardwalk landings featuring stone seating around pockets of native plants, and shade trees. At the waters edge, a floating

dock provides opportunities to interact with the water and docking for small boats.

South of the tunnel, a perforated bridge extends over a restored cove to provide new ways to experience and learn about floodplain ecosystems while permitting light penetration for aquatic species.

The boardwalk is removed around the cove and replaced with a mixture of native grasses and perennials with a narrow



path leading through it. The plant swath continues up the slope of the embankment as an unmowed area providing a seasonal visual buffer from Route 9.

**AMENITIES**

The asphalt access path is moved west toward the embankment to open more flexible space for events and unorganized activity. The path leads into a hardscape picnic area featuring a new, set-back bathroom and equipment rental such as mobile seating, hammocks and games to be used in the open space. Black

locust arbors with vines extend over the patio providing seasonal shade.

North of the picnic plaza is a natural playground featuring grass mounds, rocks, stepping logs, willow stem tunnels and a sand box. The playground flows into an interactive water feature surrounded by seating.

At the vehicular entrance, parking is reversed to provide space for temporary food truck parking and also host an ice rink in the winter. Along the boardwalk, parking is removed to separate pedestrians

from vehicles and replaced with a bioswale to infiltrate stormwater from the parking lot.

Along the entrance landing mounded areas provide informal seating for events and are accented with native plants. Signs placed at each entrance orient visitors. Limited development occurs at the proposed pedestrian bridge landing area. Temporary concert barges are recommended for large events. The design recommends replacing the boardwalk and railing.

**FEATURES:**

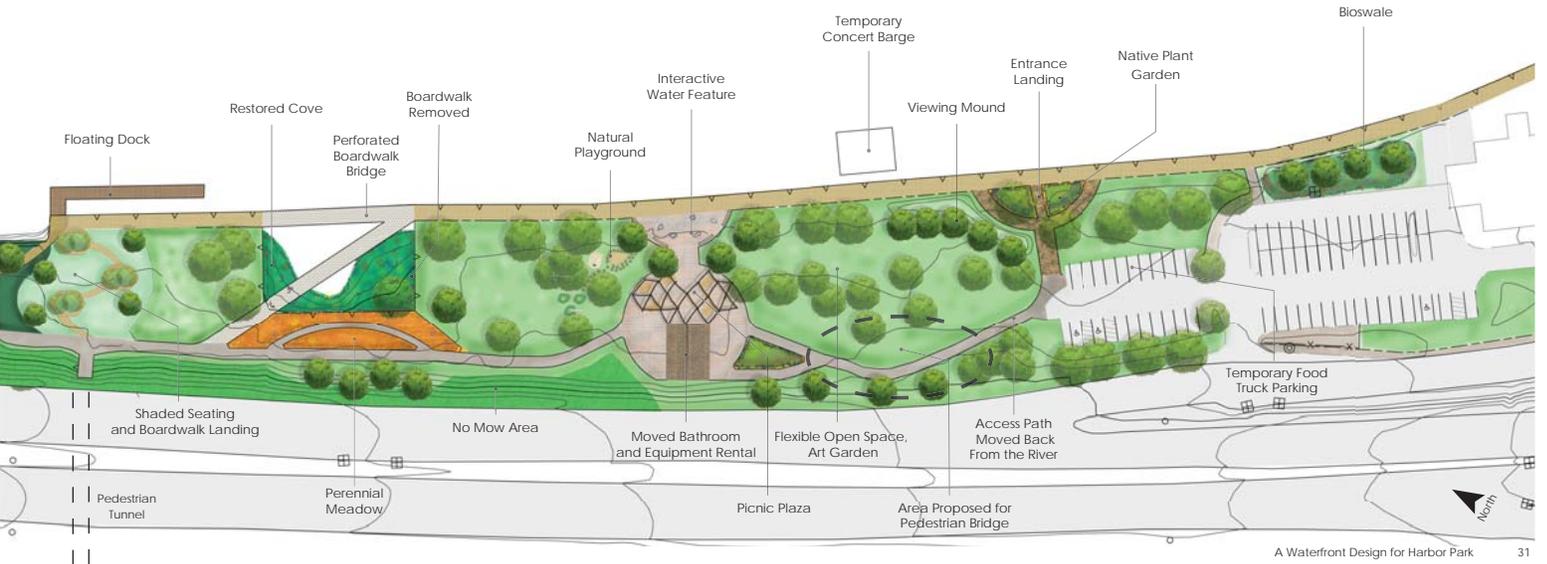
- . Tunnel opens to Boardwalk
- . Extended, Looped Boardwalk Trail
- . Wetland Bioswale Education Area
- . Restored Cove with Bridge
- . Bathroom Moved Back
- . Natural Playground
- . Seasonal Ice Rink in Parking Lot
- . Interactive Water Feature
- . Concert Barge Docking
- . Food Truck Parking
- . Access Path Moved Toward Embankment

**STRENGTHS:**

- . Expanded flexible space supports year-round activities
- . Boardwalk bridge, extension and floating dock provide new ways to interact with the river
- . Floodplain species support local ecology
- . Diverse activity opportunities cater to a broad range of user groups

**CONSIDERATIONS:**

- . Relocation of bathroom, paths and replacement of the boardwalk incur high costs
- . Loss of some parking on-site

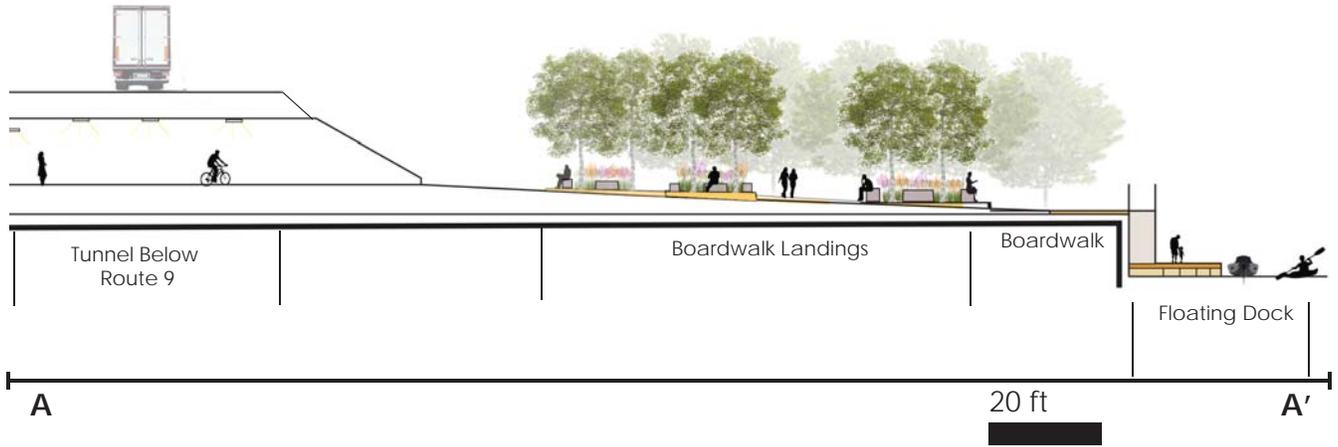


A Waterfront Design for Harbor Park

Not for construction. Part of a larger project. Images based on a typical day.

# SECTIONS & RENDERINGS

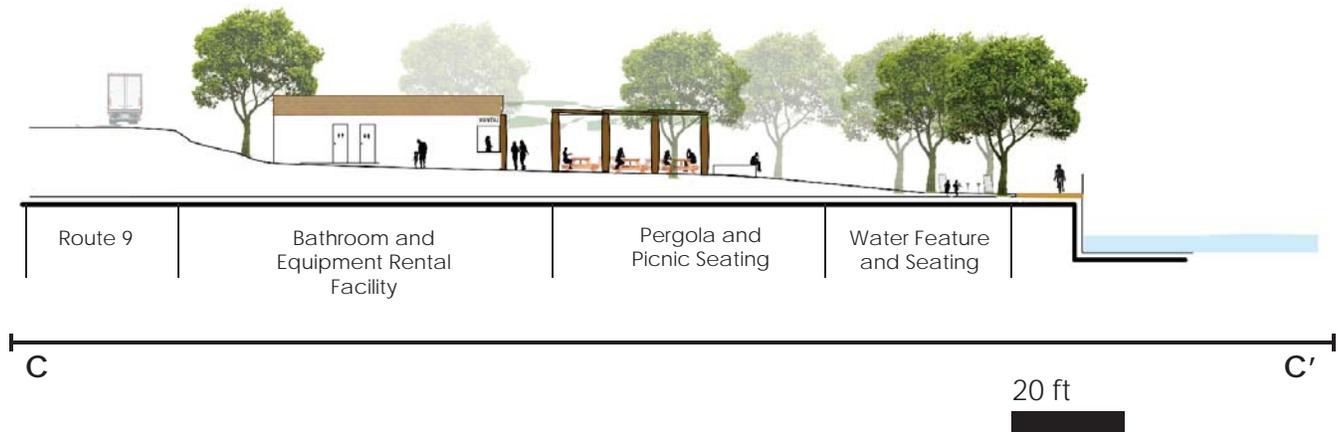
## BOARDWALK LANDINGS A-A<sup>1</sup>



## RESTORED COVE B-B<sup>1</sup>



## PICNIC PLAZA C-C1



Not for construction. Part of a student project and not based on a legal survey.



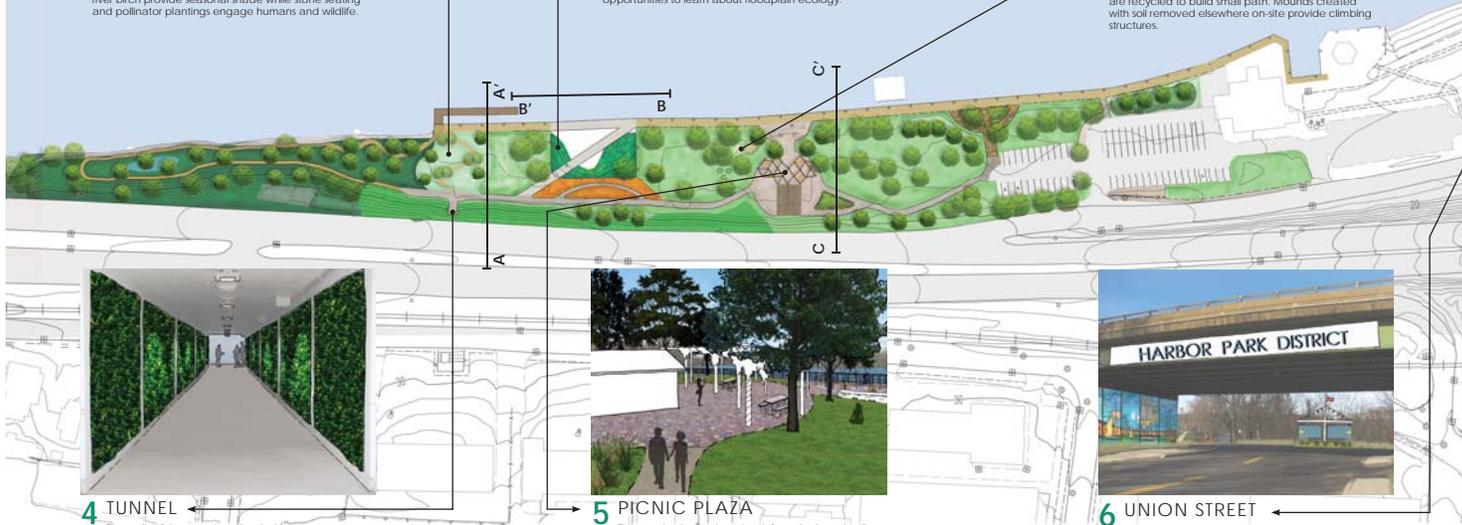
**1 BOARDWALK LANDINGS**  
A set of three boardwalk landings and an artistic sign invite visitors entering from the tunnel. Multistemmed river birch provide seasonal shade while stone seating and pollinator plantings engage humans and wildlife.



**2 RESTORED COVE**  
A perforated bridge hangs above the restored cove providing a dynamic experience for visitors and opportunities to learn about floodplain ecology.



**3 NATURAL PLAYGROUND**  
A natural playground supports year-round unorganized activity for youth. Trees removed on-site are recycled to build small paths. Mounds created with soil removed elsewhere on-site provide climbing structures.



**4 TUNNEL**  
The walls of the tunnel are lined with greenery, facilitating the transition from a heavily-paved urban space to Harbor Park.



**5 PICNIC PLAZA**  
The new bathroom is set back from the boardwalk to open views of the river. A shaded picnic space nearby creates a space parents can enjoy the view and supervise their children. Visitors can rent activities to play in the open, flexible space. The water feature provides a buffer to Route 9 traffic noise.



**6 UNION STREET**  
Paths, signage, and a mural support an attractive entrance to Harbor Park and other planned riverfront destinations.

100 ft

# PLANTING PLANS

Plants were chosen based on three main criteria including wildlife benefits, degree of maintenance, and aesthetic value. To the north are low-maintenance riparian plantings which are naturally found in a floodplain. At the perennial meadow, low-maintenance grasses and flowers provide a colorful aesthetic spring through fall. More frequently maintained pollinator beds at the entrances help create an inviting entrance.

## PERENNIAL MEADOW



Top row (left to right): *Agertina altissima*, *Asclepias syriaca*, *Asclepia tuberosa*, *Andropogon virginicus*, *Echinacea purpea*, *Eutrociium maculatum*. Bottom row (left to right): *Helloopsis helianthoides*, *Monarda didyma*, *Panicum virgatum*, *Rudbeckia hirta*, *Solidago rugosa*, *Symphotricum novae-angliae*

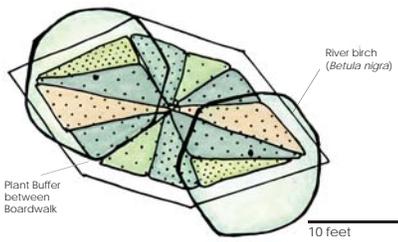
## NATURAL ZONE



Top row (left to right): *Acer pensylvanica*, *Clethra alnifolia*, *Ceanothus americanus*, *Cornus amomum*, *Cephalanthus occidentalis*, *Rhododendron canadense*. Bottom row (left to right): *Rubus odoratus*, *Kalmia latifolia*, *Magnolia acuminata*, *Viburnum acerfolium*, *Hydrangea aboescens*, *Salix discolor*



Top row (left to right): *Actaea rubra*, *Eurybia divaricata*, *Carex pensylvanica*, *Houstonia caerulea*, *Mitchella repens*, *Podophyllum pelatum*. Bottom row (left to right): *Dryopteris intermedia*, *Tiarella cordifolia*, *Trillium grandiflora*, *Sanguinaria canadensis*, *Osmunda claytoniana*, *Sedum ternatum*

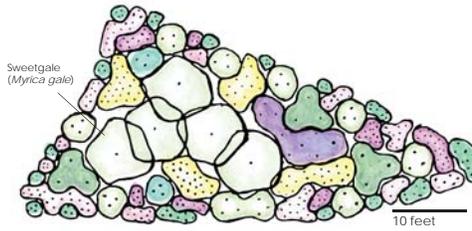


### 1 BOARDWALK LANDINGS

River birch trees provide shade and the exfoliating bark adds interest during the winter months. Underplanting the trees with native evergreen ferns, grasses, and Solomon's seal creates variety in structure and texture year-round.

#### LEGEND

- Pennsylvania sedge (*Carex pensylvanica*)
- Northern sea oats (*Chasmanthium latifolium*)
- Evergreen woodfern (*Dryopteris intermedia*)
- Solomon's seal (*Polygonatum biflorum*)
- Christmas fern (*Polystichum acrostichoides*)

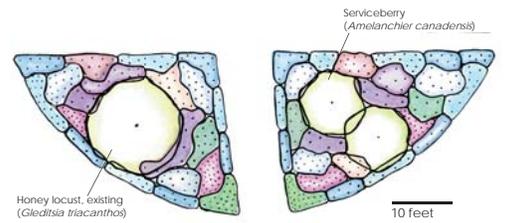


### 2 PLAZA PATH

This planted area by the bathrooms and picnic area is designed for drier conditions. Sweetgale and sweetfern are woody perennial shrubs with fragrant foliage. Both are often found close to wetland areas. Swaths of wildflowers and grasses will add color throughout the growing season.

#### LEGEND

- Nodding onion (*Allium cernuum*)
- Sweetfern (*Comptonia peregrina*)
- Blazing star (*Liatris spicata*)
- Wild bergamot (*Monarda fistulosa*)
- Mountain mint (*Pycnanthemum incanum*)
- Black-eyed Susan (*Rudbeckia hirta*)
- Mountain stonecrop (*Sedum ternatum*)
- Prairie dropseed (*Sporobolus heterolepis*)

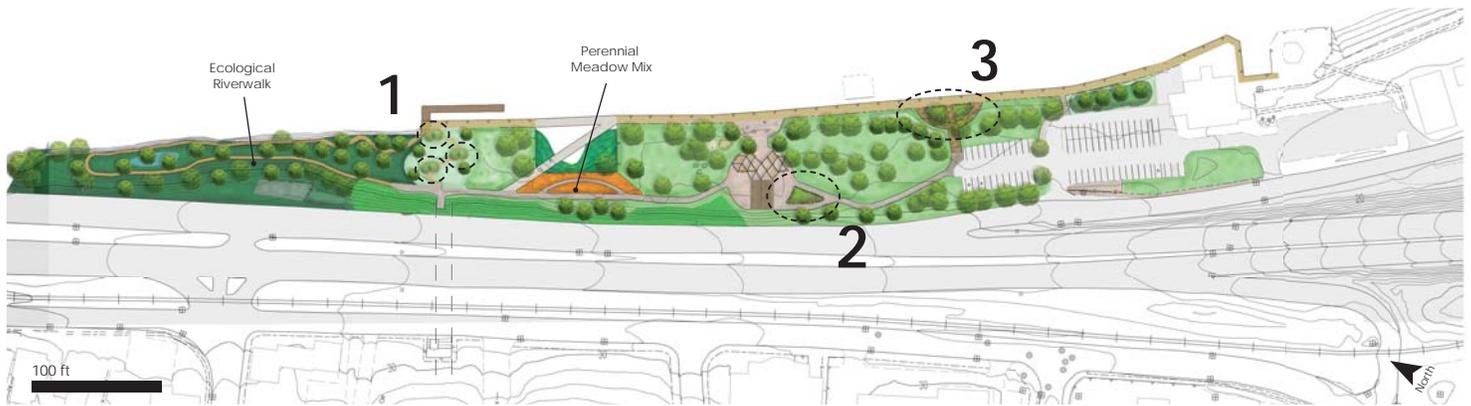


### 3 POLLINATOR GARDEN

Two multi-stemmed serviceberry trees will blossom early spring and balance the existing honey locust. A pollinator garden incorporates a variety of native wildflowers and select cultivars to create an attractive planting that is pleasing to humans and wildlife year-round.

#### LEGEND

- New England aster (*Aster novae-angliae*)
- New England aster 'Vibrant Dome' (*A. novae-angliae* var. 'Vibrant Dome')
- Blue star (*Amsonia tabernaemontana*)
- Purple coneflower (*Echinacea purpurea*)
- Blazing star (*Liatris spicata*)
- Wild bergamot (*Monarda fistulosa*)
- Catmint (*Nepeta x faassenii* 'Select Blue')
- Mountain mint (*Pycnanthemum incanum*)
- May Night salvia (*Salvia x sylvestris* 'Mairnacht')
- Mountain stonecrop (*Sedum ternatum*)



# INVASIVE PLANT SPECIES

## WHAT ARE INVASIVE PLANTS?

As a result of globalization, many plants have been introduced into environments where they would have never existed naturally. When non-native plants are introduced into an ecosystem, they have the potential to thrive due to the absence of their natural population controls (animals, insects, or disease).

The introduction of invasive species can occur intentionally when they are planted for their desirable characteristics (i.e. their beauty or performance), or accidentally as a result of international travel and trade. When invasive plant populations grow out of control, they can displace local plant and animal communities, potentially causing

extreme environmental and economic damage.

For this reason, many states outlaw specific species and have funded removal efforts to prevent the spread of particularly persistent species.

## WHY USE NATIVE PLANTS?

Using native plants is considered a good environmental practice because they provide valuable services to birds, insects, and animals that share their ecosystem. Examples of these services include nectar, food, and shelter. Plants typically receive valuable services in return, including pollination and seed dispersal. When native species are removed by human activity or displaced by non-native and/or invasive plant

species, this reciprocity between the plant and animal community is compromised.

Although there is still some debate about the ecological performance of “cultivars” (abbreviation for cultivated varieties bred to bare more favorable characteristics for economical, agricultural, or aesthetic purposes), thoughtful use of native plant cultivars in a landscape can create a space that flourishes in its natural environment, serves the ecology of the area, and looks beautiful year-round.



Examples of local invasive plant species. 1. Oriental bittersweet (*Celastrus obicatus*) 2. Winged euonymus (*Euonymus alatus*) 3. Multiflora rose (*Rosa multiflora*) 4. Norway maple (*Acer platanoides*) 5. Shrub-like honey suckle (*Lonicera morrowii*, *L. x bella*, *L. maaki*, *L. tartica*) 6. Glossy buckthorn (*Frangula alnus*) 7. Gout weed or bishop's weed (*Aegopodium podagraria*) 8. Yellow flag iris (*Iris pseudacorus*) 9. Blunt leaved privet (*Ligustrum obtusifolium*) 10. Autumn olive (*Elaeagnus umbellata*)

# INVASIVE SPECIES OF CONCERN

Although there are several invasive plant species present at Harbor Park, two species, Japanese knotweed (*Fallopia japonica*) and Oriental bittersweet (*Celastrus orbiculatus*), are particularly aggressive and could jeopardize the ecological integrity of the park and nearby parks and natural areas.

## JAPANESE KNOTWEED (*Fallopia japonica*)

Japanese knotweed is an herbaceous perennial that is pervasive in riparian areas. The plant is often thought to be bamboo due to its hollow stems and raised nodes, but the plant is actually in the buckwheat family. Japanese knotweed most often spreads through seeds that travel through waterways, but once established, can colonize an area quickly through rhizomes. It prefers disturbed soils and can grow 10-13 feet in height, shading out other riparian plants. The shallow root system of knotweed does not provide adequate slope stabilization, contributing to erosion in ecologically sensitive areas.

The best defense against knotweed is to ensure a riparian area has a population of native plants already established, preferably with mat-forming grasses, sedges, and rushes that prevent invasive plants from establishing. Removing any small plants that in-seed before colonization is also a good preventative approach to control knotweed populations. Of course, if invasive species have already invaded, removal is necessary.

Repeatedly cutting Japanese knotweed eventually depletes the rhizomes by starving the plant of sunlight. Glyphosate, the active ingredient in RoundUp, has proven effective through cut and dab application, a technique where the stem is cut 3-4 feet from the ground and herbicide is dripped directly to the hollow stem of the plant. Injection has also proven to have a 96% success rate. Applying foliar spray in the fall when plants are flowering can also be effective and is considerably less labor intensive than cut and dab or injection. However, this greatly increases the risk of drift, or the herbicide spray traveling by air to other plants or areas where the herbicide is not needed or could cause harm. Given the ecological sensitivity of this area, the most effective approach is direct application of glyphosate herbicide formulated for riparian areas by a certified professional.



Japanese knotweed has formed thick colonies in the northern end of Harbor Park, which will require mechanical and/or chemical removal.



Oriental bittersweet can be found along fences, trees, and unmowed areas in Harbor Park. Vines start off small, but can eventually take down large trees.

## ORIENTAL BITTERSWEET (*Celastrus orbiculatus*)

Oriental bittersweet is a vine that grows rapidly and can overtake forest stands and small shrubs. There is concern that bittersweet is hybridizing with American bittersweet, which could genetically eliminate the native species. Bittersweet spreads by seed via birds that feed on the deciduous vine's berries, or underground by roots.

Cutting bittersweet's roots as close to the ground as possible and removing the vine from trees is an effective management solution, while removing the plant entirely is an even better approach. Any berries should be bagged and disposed of to avoid spreading the plant by seed. For large vines that are difficult to remove mechanically by hand, weed wrenches (a tool that helps pull plants with strong roots) can be used to create leverage and remove large root systems. Glyphosate application is also a successful management approach for removing entire plants when applied to a cut stem by a certified professional.

# ECOLOGICAL RESTORATION

Harbor Park has a small cove that is heavily sedimented and lined with rocks, and a northern area that is undeveloped and harboring invasive plant species. It is recommended to restore the cove with native plants to reduce erosion, promote ecological resilience, and create educational opportunities. For the same reasons, restoring the northernmost area with riparian species is strongly recommended. Consultation with ecologists and restoration specialists led to the following recommendations.

## RATIONALE

Riparian vegetation is limited to the uppermost areas of the cove due to fluctuating water levels, which vary seasonally and intraseasonally. Water levels are highest in the spring, but can rise and fall rapidly during the rest of the year due to large storm events. The portion of the Connecticut River in Middletown is also tidally influenced, which causes slight fluctuations throughout the day and moon cycle. Although there are plants that can tolerate moist and dry conditions, there are very few that can tolerate extreme, frequent moisture fluctuations. The cove is also located on the cut bank of the river, which is characterized by high rates of erosion.

For this reason, restoring the cove should be concentrated above the average high water line (3-5 ft.), and focused to where existing vegetation already exists. Species composition should be concentrated to trees, shrubs, and herbaceous plants that have the ability to spread through rhizomes for effective colonization and seed to enhance genetic diversity amongst the plant community.

The northernmost space covers a larger area, and variety of trees species planted in masses and underplanted with fern species will create a simple but appropriate restoration approach for this site.

## PLANTING APPROACH

Small trees grown in conelike pots, or "tubelings," should be used in all restoration projects across the site, instead of whips and live stakes. Tubelings are allowed to develop a large root system in proportion to the plant, which increases the success rate of the planting. Because the plantable area is so small, plugs will be a good choice for cove restoration.

In the northernmost area, live stakes will be appropriate for stream banks. Red-osier dogwood (*Cornus sericea*), silky dogwood (*Cornus amomum*), willow (*Salix discolor*), and black

cottonwood (*Populus deltoides*) are regarded as highly successful live stake species. This approach is particularly valuable in stream bank restoration, where plants can be inserted at an angle and used to stabilize geo-fabric and other bioengineering material.

Before planting, the area must be prepared by decompacting the soil and creating more interstitial space to create spaces for trees and shrubs between any large rocks below the soil.

It is suggested that soil be amended with compost and a mycorrhizal solution, which will provide adequate nutrients and inoculate the soil with essential microbiota. This has been shown to dramatically increase growth in the first year compared to untreated plants. The mycorrhizal supplement comes in a powder and can be applied in a slurry to the planting pocket or hole, or directly to the plant's root system. As long as the root system is in contact with the slurry, both of these approaches are viable.

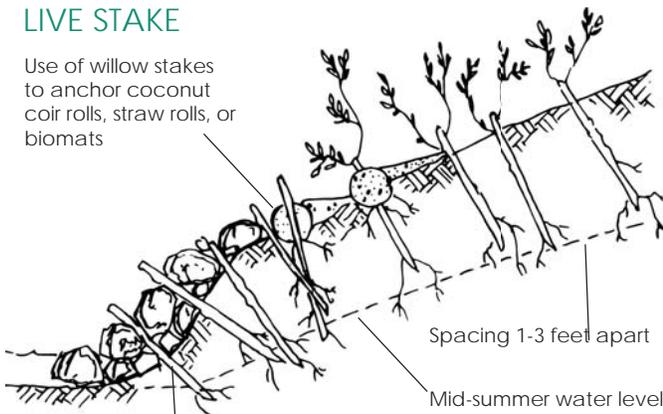
Details for installing livestakes and tubelings, and approaches to stream bank stabilization, are included on the adjacent page.



# RESTORATION TECHNIQUES

## LIVE STAKE

Use of willow stakes to anchor coconut coir rolls, straw rolls, or biomats



Drive or plant willow stakes through holes in riprap or geotextile fabric

Live stakes are dormant woody cuttings from a species that has high level of natural hormone, like willow (*Salix spp.*). The high levels of growth hormone help plants establish quickly.

Notes:

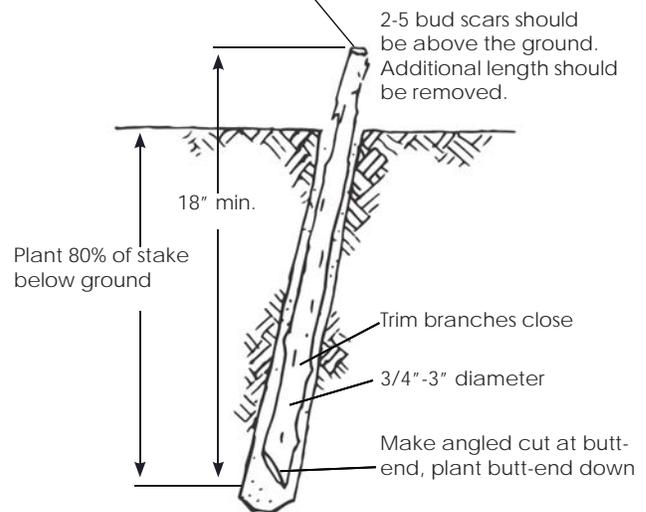
1. Harvest and plant stakes during dormancy.
2. Use healthy, straight and live wood at least 1 year old
3. Make clean cuts and do not damage stakes or split ends during installation, use a pilot bar in firm soils
4. Soak cuttings for 24 hours (min.) prior to installation
5. Tamp the soil around the stake

## TUBELINGS

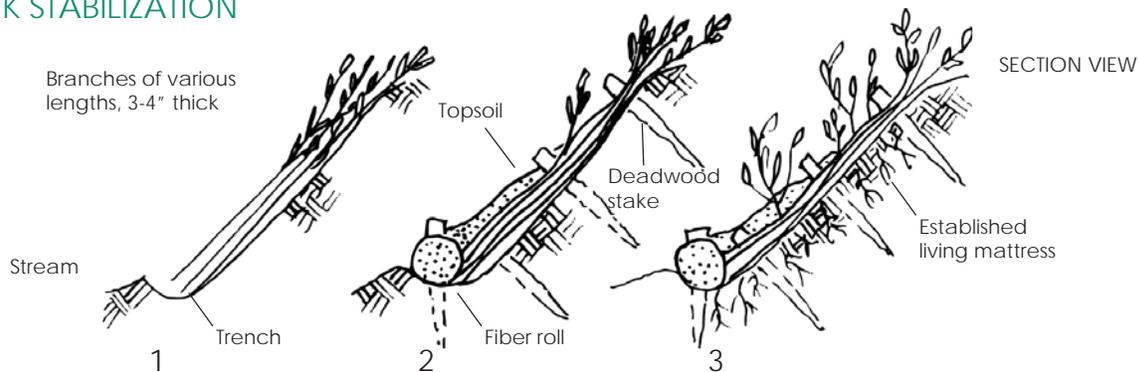
Tubelings have a higher rate of success than live stakes due to their developed root system, which is often large in proportion to the above-ground plant. Tubelings come in plastic tubes or cone-shaped containers.



Cut top of stake square



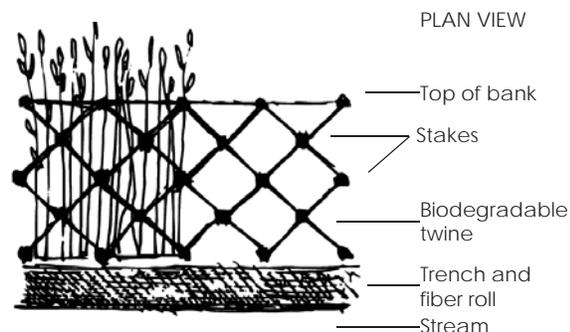
## BANK STABILIZATION



Brush mattresses are created using living branches criss-crossed against a bank surface. This approach to bank stabilization traps sediment and reinforces the stream bank.

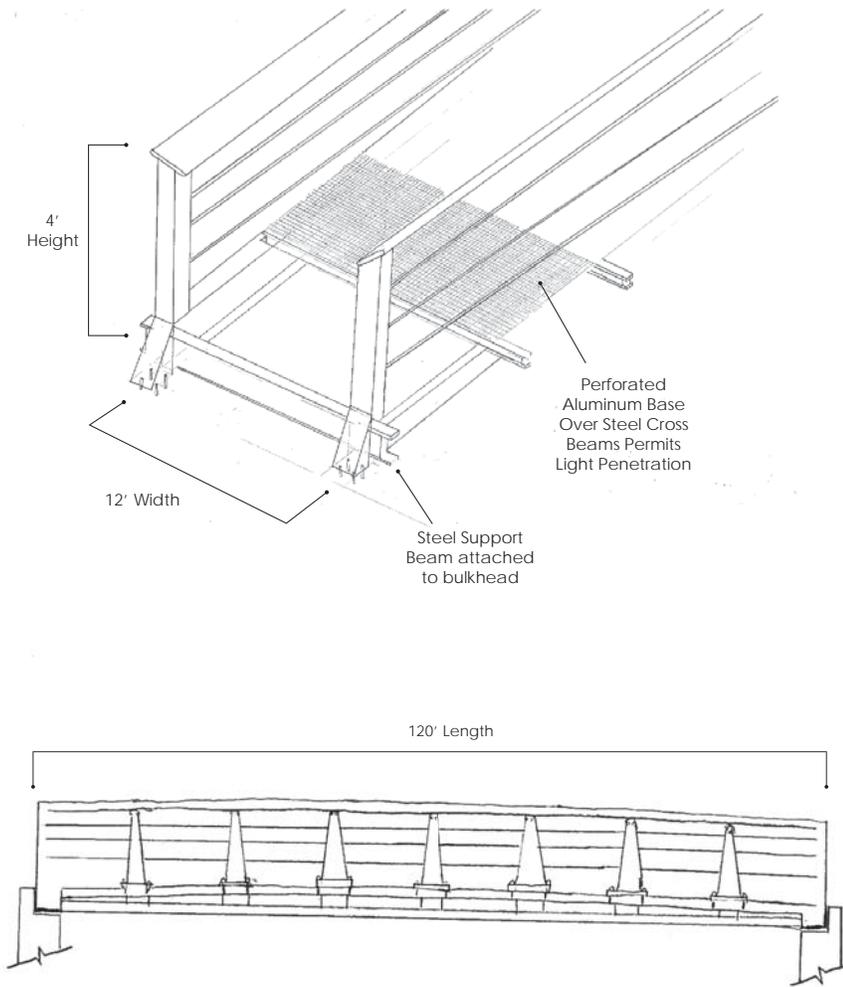
Notes:

1. Place 3/8" to 3" diameter branches 2 to 4" thick with the basal end down-slope
2. Secure branches with stakes and biodegradable twine
3. A thick layer of soil over the entire mattress and irrigation will help encourage sprouting



# DESIGN DETAILS

## COVE BRIDGE



### COVE BRIDGE

To limit damage to eel grass populations at the end of the cove, the proposed bridge will need to permit light to penetrate via a perforated aluminum boardwalk and limit disturbance of the river bottom. A structural engineer should be consulted to determine options for the architecture of the bridge.

### BOARDWALK & RAILING

The railing and boardwalk should not only be attractive, but also compliant with ADA standards. Both elements should be resilient to inundation. The precedent on the right promotes open views of the water while providing visitors something comfortable to lean on.

### FLOATING DOCK

The floating dock should be able to be removed and stored in the winter or before major floods and must be accessible. The absence of piers or posts allows the floating dock to rise and fall with the water level and requires little to no disturbance to the local habitat.

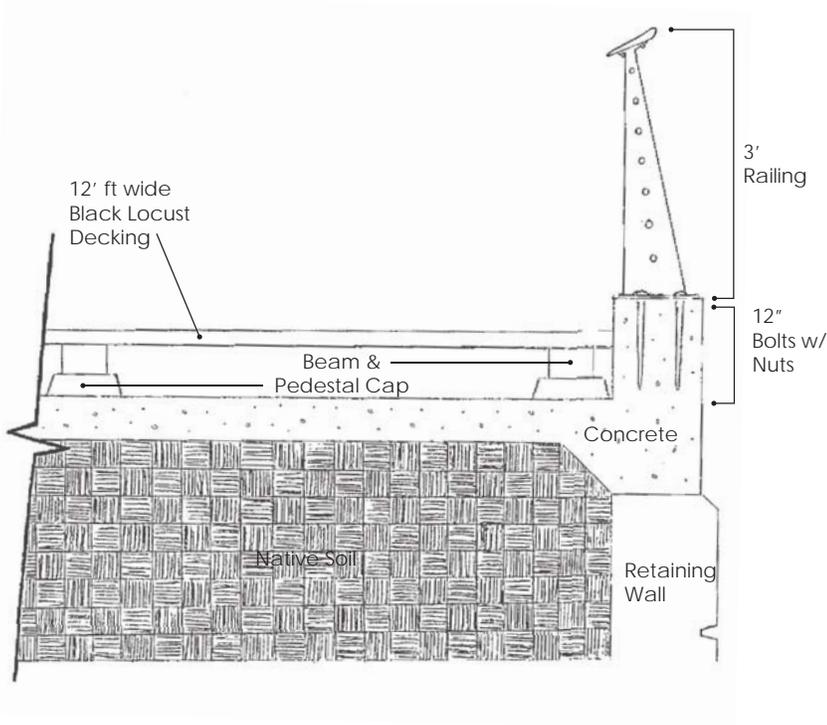


Image Credit: James F. Heidt Structural Engineering

A pedestrian bridge over a creek in Thiensville, Wisconsin.

Not for construction. Part of a student project and not based on a legal survey.

## BOARDWALK & RAILING



Aluminum Railing

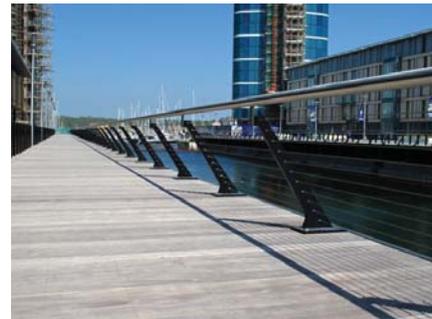
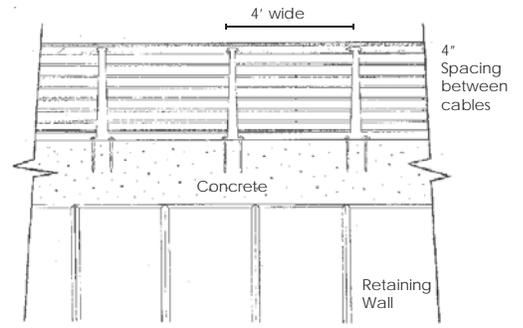


Image Credit: Bollin Rigging Company

## FLOATING DOCK

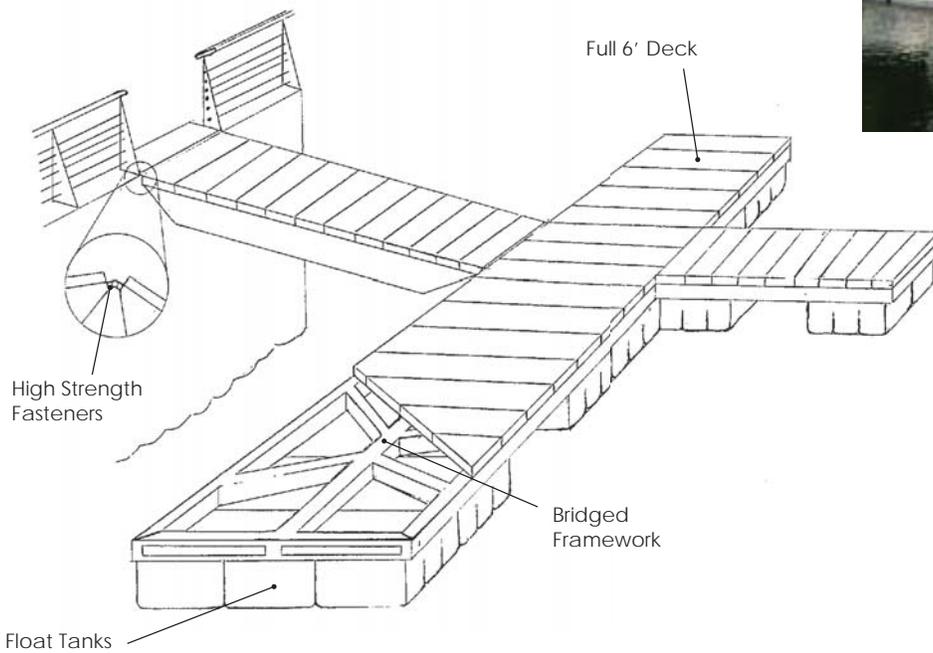


Image Credit: Accu Dock

Not for construction. Part of a student project and not based on a legal survey.

# DESIGN DETAILS

## PERGOIA & PAVERS

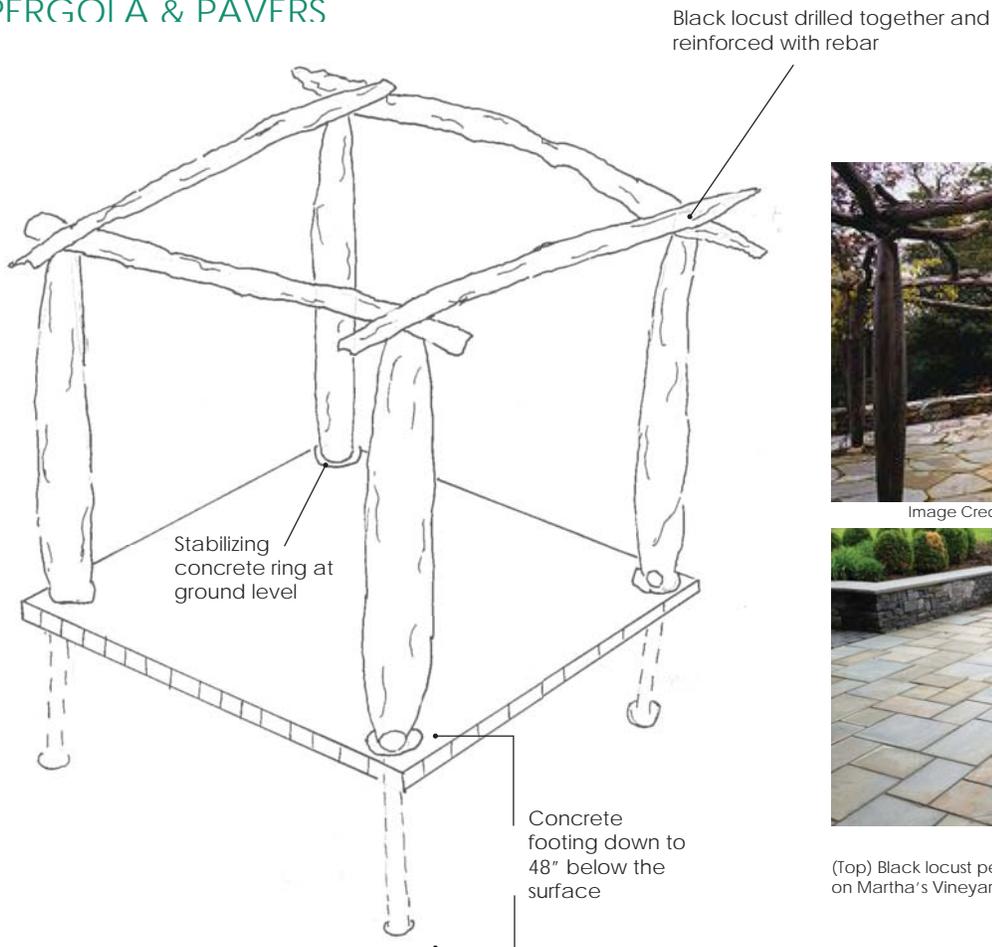
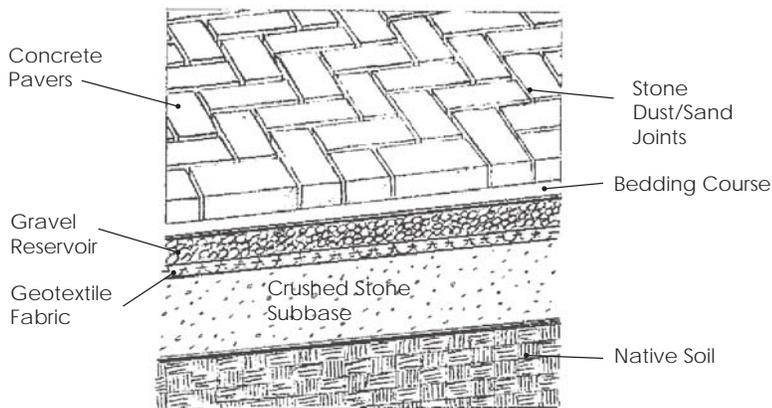


Image Credit: Chuck Choi Architectural Photography



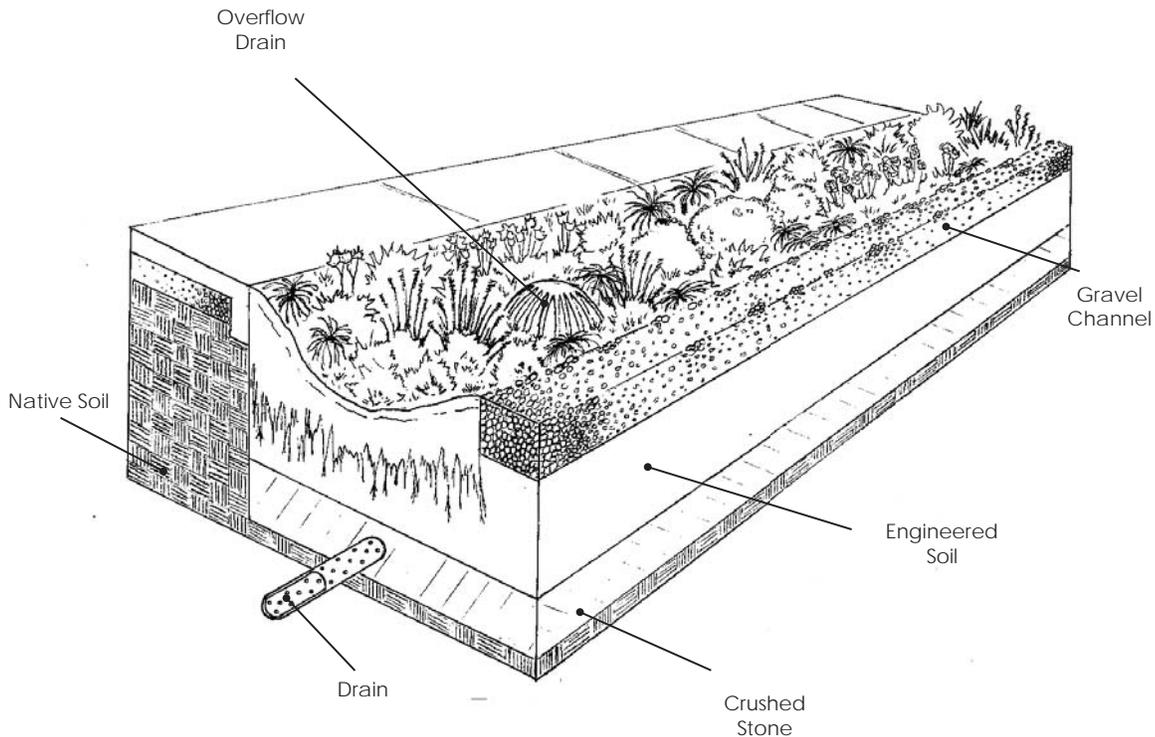
Image Credit: Landscapinggallery.net

(Top) Black locust pergola structure at Polly Hill Arboretum on Martha's Vineyard. (Above) Bluestone paver patio.



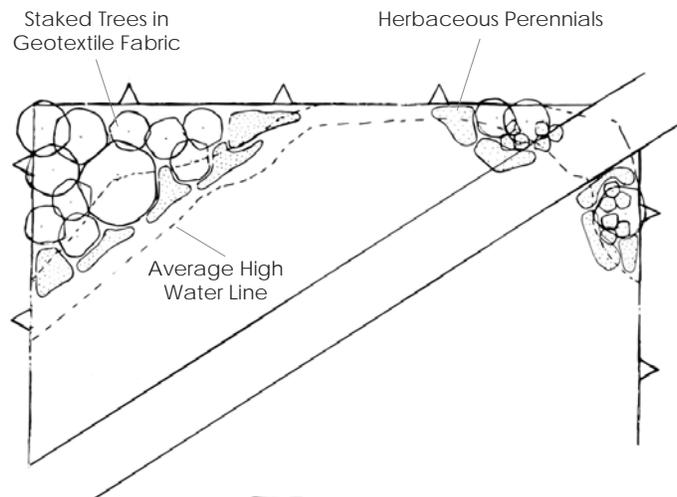
The pergola structure should provide summer shade and be made of resilient materials. Standing poles should be reinforced with a concrete base below the frost line and cross beams should help support the structure. Below the pergola, pavers should have a sturdy base to hold up to flooding events while supporting vehicle traffic for special events.

## PLANTING SECTIONS: Bioswale and Cove



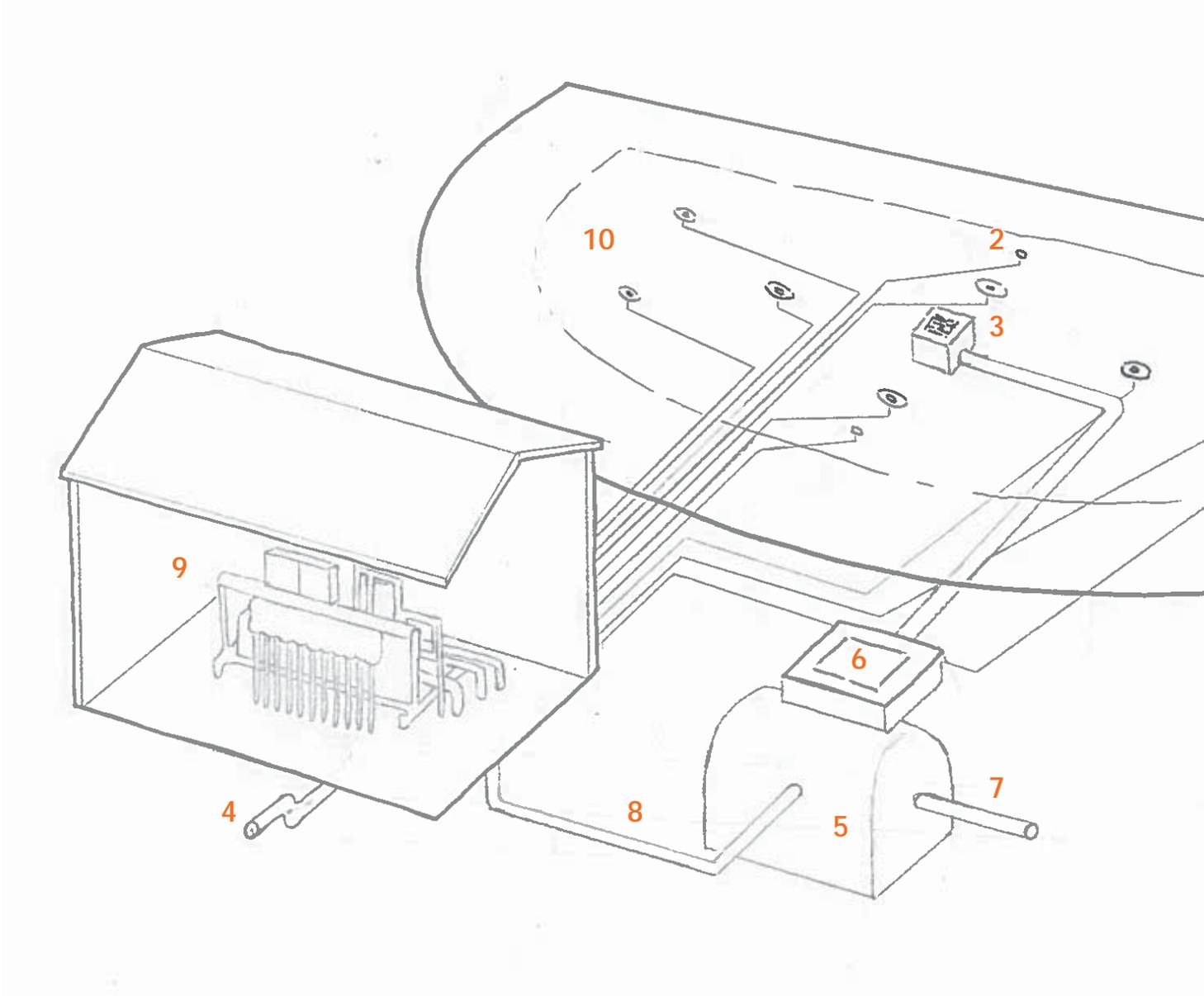
Water from the parking lot should be directed into the bioswale (top). Layers of gravel, engineered soil and crushed stone promote stormwater infiltration. Plantings provide water treatment. The overflow drain will need to be cleaned out after major flood events, and should be constructed for easy access.

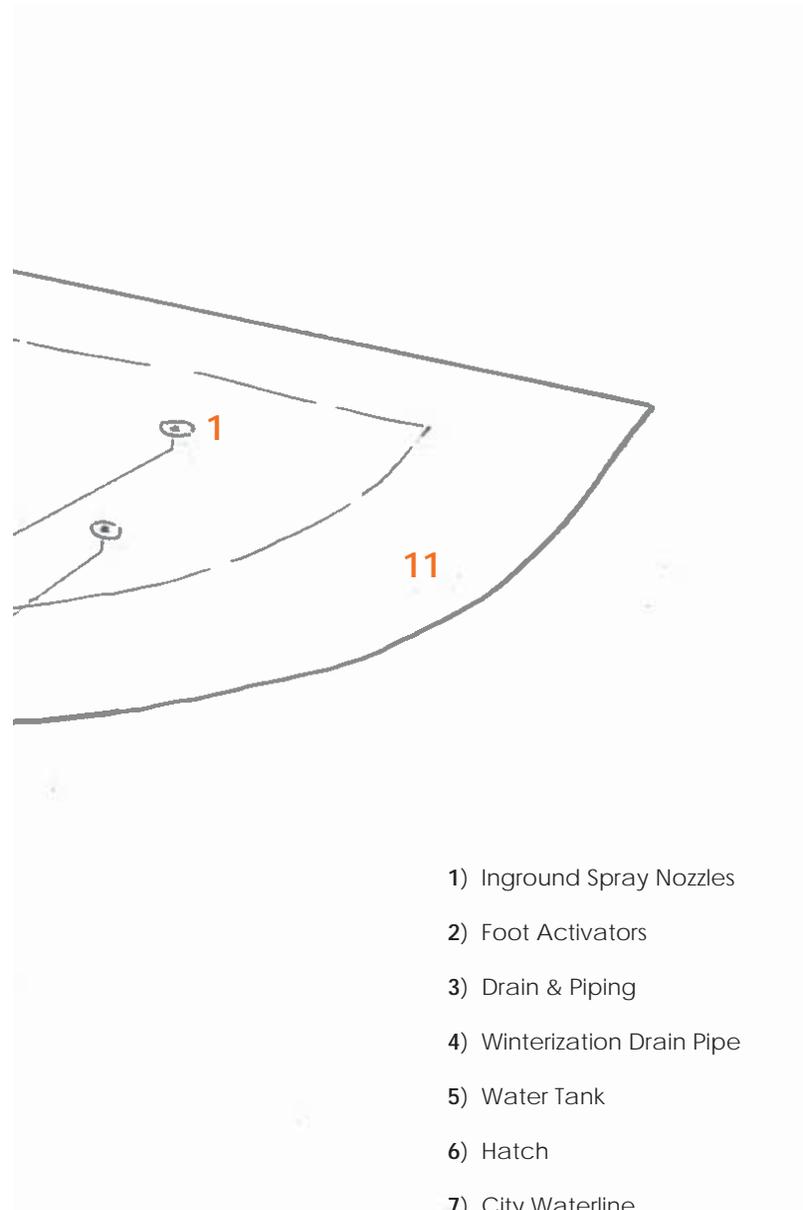
The design recommends restoring the cove (right) up to the average high water line (3-5 ft.). Interstitial space between existing rip rap should be opened and planted with live stakes or tublings of trees, shrubs and herbaceous perennials.



# DESIGN DETAILS

## WATER FOUNTAIN





- 1) Inground Spray Nozzles
- 2) Foot Activators
- 3) Drain & Piping
- 4) Winterization Drain Pipe
- 5) Water Tank
- 6) Hatch
- 7) City Waterline
- 8) Plumbing
- 9) Equipment Room
- 10) Spray Park Surface
- 11) Over Spray Zone

The interactive water fountain should be a recycled water system which uses city water. The fountain should engage youth and visitors providing entertainment during the hot-weather days in addition to supplying pleasant white noise within the park.

The beautiful appearance of the spray fountain in the foreground of the Connecticut River would come with a high cost, ranging from \$145K - \$250k. In a floodplain, the operating equipment requires sheltered protection from flood waters. High maintenance costs would be due to enforcing sanitary standards, ensuring the system is kept clear of trash and debris and weatherizing the system.

Selected features of the water system must be elevated and protected from flooding (as shown in the image below), which include:

- Touch Panel Controller
- Manifold to distribute water the spray nozzles
- Water Treatment System (filters, UV disinfection system, chemical controller and chemical storage tanks)
- Pump Starter



Image Credit: The Kincardine Record

# CONSTRUCTION PHASING

## Estimated Project Cost of \$3.1 M

### PHASE I

Excavation is conducted to create a depression for the wetland trail. After the earthwork is completed a looped boardwalk trail is built, along with the planting of ferns and poplar and birch trees.

Demolition	\$	7,800
Site Preparation	\$	42,470
Hardscape	\$	93,960
Landscaping	\$	28,207
Site Amenities	\$	3,600
Utilities & Stormwater	\$	0
Management over 3 yrs	\$	0
Other Soft Costs	\$	114,265
<b>TOTAL PHASE I COST</b>	<b>\$</b>	<b>290,302</b>



#### Boardwalk (P I & P II)



**Material:** Black Locust Boards  
**Price:** \$2.95 per Board Foot  
**Benefits:** Durable & Natural Hardwood Local Material  
**Concerns:** Weatherized Stains

#### Seating (P III)



**Material:** Granite Block  
**Price:** \$300-500 estimate  
**Benefits:** Durable & Natural Waterproof  
**Concerns:** Material Shipping Cost

#### Floating Dock (P II)



**Material:** Wood/Aluminum  
**Price:** \$40,500 estimate  
**Benefits:** Access to/from the River ADA Compliance  
**Concerns:** Shipping Cost

#### Cove Bridge (P II)



**Material:** Aluminum Grates  
**Price:** \$90,000 estimate  
**Benefits:** Lightweight & Durable Sunlight under the Bridge  
**Concerns:** High Cost

## PHASE II

The installation of the bridge over the restored cove occurs with the removed pavilion to create an inviting entrance for the tunnel. A new 12' wide boardwalk, light posts, light bollards and an emergency call box are also constructed.

Demolition	\$ 43,380
Site Preparation	\$ 43,325
Hardscape	\$ 604,146
Landscaping	\$ 28,854
Site Amenities	\$ 6,900
Utilities & Stormwater	\$ 51,480
Management over 3 yrs	\$ 0
Other Soft Costs	\$ 501,809
<b>TOTAL PHASE II COST</b>	<b>\$ 1,274,894</b>

## PHASE III

In preparation, the electrical lines, sewer and water pipes are extended to accommodate the relocated bathroom. A natural playground, water feature, picnic plaza with shaded pergola, bioswale, and landscaping mounds are also constructed.

Demolition	\$ 64,500
Site Preparation	\$ 184,475
Hardscape	\$ 282,590
Landscaping	\$ 53,935
Site Amenities	\$ 91,060
Utilities & Stormwater	\$ 298,820
Management over 3 yrs	\$ 1,500
Other Soft Costs	\$ 633,119
<b>TOTAL PHASE III COST</b>	<b>\$ 1,608,499</b>



### Seating Walls (P III)



Material: Sterling Tan Stone  
Price: \$8-14 per Sq. Face Feet  
Benefits:  
 Durable & Natural  
 Waterproof  
Concerns:  
 Material Cost

### Pathways (P II & P III)



Material: Asphalt  
Price: \$6 per Square Foot  
Benefits:  
 Durable & Snow Removal  
 High Load Capacity  
Concerns:  
 Heat Island Effect

### Pavers (P III)



Material: Concrete  
Price: \$3-5 per Square Feet  
Benefits:  
 Low Maintenance Costs  
 Permeable Options  
Concerns:  
 Maintenance

### Railings (P II)



Material: Aluminum or Steel  
Price: \$140 -275 per Linear Feet  
Benefits:  
 Durable  
 Waterproof  
Concerns:  
 Material Cost

# COST ESTIMATION

## Waterfront Design at Harbor Park Middletown, Connecticut

### Item

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#### Demolition

- 1 Clear and Grub Vegetation
- 2 Boardwalk Removal
- 3 Asphalt & Materials Removal
- 4 Fencing & Railing Removal
- 5 Pavillion Removal
- 6 Bathroom Removal
- 7 Dumpster, Hauling & Disposal

#### Site Preparation/ Earthwork

- 1 Cove Restoration
- 2 Excavation / Rough Grading
- 3 Tree Removal & Pruning
- 4 Tree Protection
- 5 Erosion Control Barrier with Silt Socks
- 6 Trenching (24" depth)
- 7 Fine Grading
- 8 Topsoil
- 9 Erosion Blanket (embankment)
- 10 Strip and Stockpile Topsoil (12" in)

#### Hardscape

- 1 Asphalt Paving & Curbing
- 2 Wood Decking (Boardwalk & trail)  
*landscape fabric*  
*base course*
- 3 ADA Floating Docks
- 4 Cove Bridge
- 5 Pavers
- 6 Railing
- 7 Seating Wall
- 8 Water/ Spray Fountain

#### Landscaping

- 1 Hydroseed
- 2 Large Trees
- 3 Fern Groundcover
- 4 Meadow Seeding
- 5 Mulch
- 6 Perennials (see sheet 3 for details)
- 7 Structural Soil
- 8 Soil Amendment

\* **Soft Costs** includes construction administration/project management, design and permitting services.

\*\* **Additional Costs not included:** construction survey (1-3% of the soft cost), environment site assessments and remediation, soil testing, Union Street and tunnel renovations and construction of the new bathroom and rental center.

Unit	Quantity	Unit Price	Phase I	Phase II	Phase III	Total
acre	0.4	\$ 8,000.00	\$ -	\$ -	\$ 3,200.00	\$ 3,200.00
linear ft	1230	\$ 10.00	\$ -	\$ 12,300.00	\$ -	\$ 12,300.00
square ft	19100	\$ 3.00	\$ 2,700.00	\$ 10,500.00	\$ 44,100.00	\$ 57,300.00
linear ft	1880	\$ 6.00	\$ 3,900.00	\$ 7,380.00	\$ -	\$ 11,280.00
lump sum	1	\$ 12,000.00	\$ -	\$ 12,000.00	\$ -	\$ 12,000.00
lump sum	1	\$ 16,000.00	\$ -	\$ -	\$ 16,000.00	\$ 16,000.00
3-4 days	6	\$ 600.00	\$ 1,200.00	\$ 1,200.00	\$ 1,200.00	\$ 3,600.00
		Subtotal	\$ 7,800.00	\$ 43,380.00	\$ 64,500.00	\$ 115,680.00
lump sum	1	\$ 10,000.00	\$ -	\$ 10,000.00	\$ -	\$ 10,000.00
cubic yd	710	\$ 30.00	\$ 4,500.00	\$ -	\$ 16,800.00	\$ 21,300.00
each	9	\$ 500.00	\$ 1,000.00	\$ 1,000.00	\$ 2,500.00	\$ 4,500.00
lump sum	1	\$ 1,750.00	\$ 350.00	\$ 350.00	\$ 1,050.00	\$ 1,750.00
acre	4	\$ 5,000.00	\$ 5,000.00	\$ 5,000.00	\$ 10,000.00	\$ 20,000.00
cubic yd	140	\$ 25.00	\$ -	\$ 975.00	\$ 2,525.00	\$ 3,500.00
square ft	11600	\$ 0.40	\$ -	\$ -	\$ 4,640.00	\$ 4,640.00
cubic yd	1933	\$ 60.00	\$ -	\$ -	\$ 115,980.00	\$ 115,980.00
lump sum	1	\$ 78,000.00	\$ 26,000.00	\$ 26,000.00	\$ 26,000.00	\$ 78,000.00
cubic yd	530	\$ 20.00	\$ 5,620.00	\$ -	\$ 4,980.00	\$ 10,600.00
		Subtotal	\$ 42,470.00	\$ 43,325.00	\$ 184,475.00	\$ 270,270.00
square ft	6000	\$ 6.00	\$ -	\$ 12,600.00	\$ 23,400.00	\$ 36,000.00
linear ft	2676	\$ 55.00	\$ 63,800.00	\$ 83,380.00	\$ -	\$ 147,180.00
linear ft	2676	\$ 16.00	\$ 18,560.00	\$ 24,256.00	\$ -	\$ 42,816.00
linear ft	2676	\$ 10.00	\$ 11,600.00	\$ 15,160.00	\$ -	\$ 26,760.00
each	1	\$ 40,500.00	\$ -	\$ 40,500.00	\$ -	\$ 40,500.00
lump sum	1	\$ 90,000.00	\$ -	\$ 90,000.00	\$ -	\$ 90,000.00
square ft	9290	\$ 5.00	\$ -	\$ -	\$ 46,450.00	\$ 46,450.00
linear ft	1230	\$ 275.00	\$ -	\$ 338,250.00	\$ -	\$ 338,250.00
sq. face ft	260	\$ 49.00	\$ -	\$ -	\$ 12,740.00	\$ 12,740.00
lump sum	1	\$ 200,000.00	\$ -	\$ -	\$ 200,000.00	\$ 200,000.00
		Subtotal	\$ 93,960.00	\$ 604,146.00	\$ 282,590.00	\$ 980,696.00
square ft	65742	\$ 0.15	\$ -	\$ 2,281.35	\$ 7,579.95	\$ 9,861.30
each	54	\$ 800.00	\$ 16,800.00	\$ 16,000.00	\$ 15,200.00	\$ 43,200.00
lump sum	1	\$ 11,407.00	\$ 11,407.00	\$ -	\$ -	\$ 11,407.00
acre	0.25	\$ 5,000.00	\$ -	\$ 1,250.00	\$ -	\$ 1,250.00
cubic yd	17	\$ 55.00	\$ -	\$ -	\$ 935.00	\$ 935.00
lump sum	1	\$ 8,218.00	\$ -	\$ 4,322.50	\$ 3,895.50	\$ 8,218.00
cubic yd	403	\$ 55.00	\$ -	\$ -	\$ 22,165.00	\$ 22,165.00
cubic yd	52	\$ 80.00	\$ -	\$ -	\$ 4,160.00	\$ 4,160.00
		Subtotal	\$ 28,207.00	\$ 23,853.85	\$ 53,935.45	\$ 101,196.30

Not for construction. Part of a student project and not based on a legal survey.

# COST ESTIMATION

## Site Amenities

- 1 Brownstone Slabs
- 2 Natural Play Structure: *Logs for Play*  
Natural Play Structure: *Sand*  
Natural Play Structure: *Boulders*
- 3 Relocate Existing Picnic Tables
- 4 Relocate Existing Swings
- 5 Small Patio Set
- 6 Benches
- 7 Signage (Interpretive/Trail)
- 8 Signage (Trail/ Directional)
- 9 Signage (Entry)
- 10 Shade Pergola/ Black Locust Logs
- 11 Bike Racks
- 12 Adirondack Chairs
- 13 Trash Receptacles
- 14 Concert Barge Rental

## Utilities & Stormwater Management

- 1 Sewer Pipe (36" inch)
- 2 Water Main (8" inch)
- 3 Wiring
- 4 Lightpoles
- 5 Light Bollards
- 6 Drinking Fountains
- 7 Emergency Call Boxes

## Property Management

- 1 Invasive Management Year 1
- 2 Invasive Management Year 2
- 3 Invasive Management Year 3

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## Construction Costs

**Taxes @ 8.4%**

**Soft Costs\***

**Mobilization**

**Contingency @ 15%**

each	24	\$	400.00	\$	1,600.00	\$	2,400.00	\$	5,600.00	\$	9,600.00
each	7	\$	300.00	\$	-	\$	-	\$	2,100.00	\$	2,100.00
square ft	120	\$	8.00	\$	-	\$	-	\$	960.00	\$	960.00
each	8	\$	700.00	\$	-	\$	-	\$	5,600.00	\$	5,600.00
lump sum	1	\$	3,000.00	\$	-	\$	-	\$	3,000.00	\$	3,000.00
lump sum	1	\$	6,000.00	\$	-	\$	-	\$	6,000.00	\$	6,000.00
each	15	\$	140.00	\$	-	\$	-	\$	2,100.00	\$	2,100.00
each	12	\$	1,500.00	\$	-	\$	-	\$	18,000.00	\$	18,000.00
each	3	\$	600.00	\$	-	\$	-	\$	1,800.00	\$	1,800.00
each	5	\$	150.00	\$	-	\$	-	\$	750.00	\$	750.00
each	2	\$	800.00	\$	-	\$	-	\$	1,600.00	\$	1,600.00
each	57	\$	300.00	\$	-	\$	-	\$	17,100.00	\$	17,100.00
each	2	\$	1,500.00	\$	-	\$	1,500.00	\$	1,500.00	\$	3,000.00
each	15	\$	130.00	\$	-	\$	-	\$	1,950.00	\$	1,950.00
each	10	\$	1,000.00	\$	2,000.00	\$	3,000.00	\$	5,000.00	\$	10,000.00
monthly	6	\$	3,000.00	\$	-	\$	-	\$	18,000.00	\$	18,000.00
			Subtotal	\$	3,600.00	\$	6,900.00	\$	91,060.00	\$	101,560.00
linear ft	90	\$	1,190.00	\$	-	\$	-	\$	107,100.00	\$	107,100.00
linear ft	90	\$	273.00	\$	-	\$	-	\$	24,570.00	\$	24,570.00
linear ft	1210	\$	133.00	\$	-	\$	34,580.00	\$	126,350.00	\$	160,930.00
each	9	\$	2,800.00	\$	-	\$	8,400.00	\$	16,800.00	\$	25,200.00
each	23	\$	500.00	\$	-	\$	-	\$	11,500.00	\$	11,500.00
each	1	\$	4,000.00	\$	-	\$	-	\$	4,000.00	\$	4,000.00
each	2	\$	8,500.00	\$	-	\$	8,500.00	\$	8,500.00	\$	17,000.00
			Subtotal	\$	-	\$	51,480.00	\$	298,820.00	\$	350,300.00
lump sum	1	\$	500.00	\$	-	\$	-	\$	500.00	\$	500.00
lump sum	1	\$	500.00	\$	-	\$	-	\$	500.00	\$	500.00
lump sum	1	\$	500.00	\$	-	\$	-	\$	500.00	\$	500.00
			Subtotal	\$	-	\$	-	\$	1,500.00	\$	1,500.00
<b>Construction Costs Total</b>				\$	<b>176,037.00</b>	\$	<b>773,084.85</b>	\$	<b>975,380.45</b>	\$	<b>1,921,202.30</b>

\$	<b>176,037.00</b>	\$	<b>773,084.85</b>	\$	<b>975,380.45</b>	\$	<b>1,921,202.30</b>
\$	<b>14,787.11</b>	\$	<b>64,939.13</b>	\$	<b>81,931.96</b>	\$	<b>161,380.99</b>
\$	<b>52,811.10</b>	\$	<b>231,925.46</b>	\$	<b>292,614.14</b>	\$	<b>576,360.69</b>
\$	<b>8,801.85</b>	\$	<b>38,654.24</b>	\$	<b>48,769.02</b>	\$	<b>96,060.12</b>
\$	<b>37,865.56</b>	\$	<b>166,290.55</b>	\$	<b>209,804.33</b>	\$	<b>413,250.61</b>

<b>PROJECT COST**</b>	<b>\$ 290,302.62</b>	<b>\$ 1,274,894.23</b>	<b>\$ 1,608,499.90</b>	<b>\$ 3,168,254.71</b>
	PHASE I	PHASE II	PHASE III	TOTAL

Not for construction. Part of a student project and not based on a legal survey.

# RECOMMENDATIONS

## TUNNEL EXPERIENCE



The pedestrian tunnel is the safest route to Harbor Park for visitors traveling from downtown. Despite improvements to the tunnels including the addition of music, motion activated lighting, and security cameras, participants suggest the tunnel's current state is uninviting.

A wall mural could transform the tunnel into an attraction for visitors, and depending on the content, could serve as a historical or environmental education opportunity. Replacing the current harsh, fluorescent lighting with softer, LED lights will improve the atmosphere and add more flexibility with the tunnel's lighting, as LED lights can be changed in strength and color.

## MARKETING & BRANDING



Harbor Park hosts an array of destinations, including a park, the Canoe Club, and the boathouse. Although this variety of existing services at Harbor Park creates year-round traffic to the site, they are positioned on-site in a piecemeal fashion. Harbor Park is on track to become the gateway location to the proposed riverwalk per the Project for Public Spaces proposal, which makes creating a sense of place even more critical.

Creating a brand to unify Harbor Park's various destinations and the future riverwalk will help create a sense of place and make the riverfront a destination. Examples of marketing and branding include identifying Harbor Park as a district using logos and slogans, advertising park events, and creating a narrative for the Middletown's riverfront to communicate the destination's identity.

## WAYFINDING MEASURES



In order to enjoy Harbor Park, visitors need to know how to get there. Finding the pedestrian tunnel and Union Street access points is difficult, and downtown Middletown currently lacks wayfinding that connects users to Harbor Park.

Highlighting the pedestrian tunnel pavilion located in the public parking lot across from City Hall is an important component of the pedestrian wayfinding experience. Techniques to improve wayfinding include interpretive signage, maps, and banners to help citizens navigate to the park and to attract park visitors.

## PARK MANAGEMENT



Many locals love Harbor Park and visit frequently, but the park is in need of some attention. Many aspects of the park have fallen out of code, including the railings and boardwalk. Invasive plant species have begun to move into untended areas along the embankment and riverbank, and many trees are in poor health.

Establishing a park management regime using a combination of city staff and local volunteers will help alleviate the onset of progressive, inevitable maintenance issues public spaces like Harbor Park experience. A quarterly meeting regarding Harbor Park's status could help inform the community about ongoing projects and programming at the park, and create a public venue to generate park funding. Creating a friend's group for Harbor Park could generate community investment in the park's livelihood, generate a sense of community, and ultimately help maintain the park for public enjoyment.

## UNION STREET ENTRANCE



Union Street is another commonly used access point for Harbor Park. Unfortunately, Union Street lacks effective wayfinding strategies to help visitors traveling by vehicle navigate to Harbor Park.

Highlighting Union Street as a main access point for Harbor Park will make finding the park easier for out of town visitors, and could spark interest in the park amongst commuters and other citizens. A few suggestions to improve the Union Street entrance include adding signage and murals to the Route 9 overpass and underpass, directive signage along Union Street, and flags and banners to highlight the route to Harbor Park.

## PROGRAMMING/EVENTS



Harbor Park hosts annual events including the 4th of July fireworks, Feet to the Fire Festival, and regular crew regattas and fishing derbies. Beyond these events, Harbor Park lacks frequent event programming for the general public, missing an important opportunity to further encourage locals and tourists to visit Harbor Park.

Creating partnerships with downtown organizations will create programming for Harbor Park and strengthen the Middletown community. Partnerships with local YMCA to enhance programming and education for school-aged children in Middletown, and the environmental education features create ample programming opportunities. Expanded partnerships with Wesleyan University could promote interest and investment in the park. Pop-up activities like rentable games, seating, and traveling mobile activities like food trucks, beer gardens, and balloon darts, will help increase

# APPENDIX



# PLANTING LISTS

## BOARDWALK LANDINGS

botanical name	common name	zone	height (in.)	spread (in.)	spacing (in.) from center	pond/stream edges	sandy soils	low slopes and low areas	upper slopes
<i>Betula nigra</i>	river birch	4-9	40-70	40-60	20		x	x	
<i>Carex pensylvanica</i>	Pennsylvania sedge	3-8	0.5-1	0.5-1	0.5		x	x	x
<i>Chasmanthium latifolium</i>	northern sea oats	3-8	2-5	1-2.5	2			x	
<i>Dryopteris intermedia</i>	evergreen wood fern	3-8	1.5-2	1.5-2	1.5			x	
<i>Polygonatum</i>	Solomon's seal	3-7	2-3	3-4	2	x	x	x	
<i>Polystichum acrostichoides</i>	Christmas fern	3-9	1-2	1-2	1		x	x	x

## PLAZA PATH

botanical name	common name	zone	height (ft.)	spread (ft.)	spacing (ft.) from center	pond/stream edges	sandy soils	low slopes and low areas	upper slopes
<i>Allium cernuum</i>	nodding onion	4-8	1-1.5	25-50	.5		x	x	x
<i>Comptonia peregrina</i>	sweetfern	2-6	2-5	4-8	2.5-3		x		x
<i>Liatris spicata</i>	blazing star	3-8	1-2	0.5-1	1.5	x	x	x	
<i>Monarda didyma</i>	wild bergamot/bee balm	3-9	3-4	3	2-3		x	x	x
<i>Myrica gale</i>	sweetgale	3-7	2-4	5	5	x	x	x	
<i>Pycnanthemum incanum</i>	Mountain mint	4-8	2-3	2-3	3		x	x	x
<i>Rudbeckia hirta</i>	black-eyed Susan	3-7	2-3	1-2	2			x	x
<i>Sedum ternatum</i>	mountain stonecrop	4-8	0.25-0.5	0.5-0.75	0.5		x	x	x
<i>Sporobolus heterolepis</i>	prairie dropseed	3-9	2-3	2-3	3		x	x	x

## POLLINATOR GARDEN

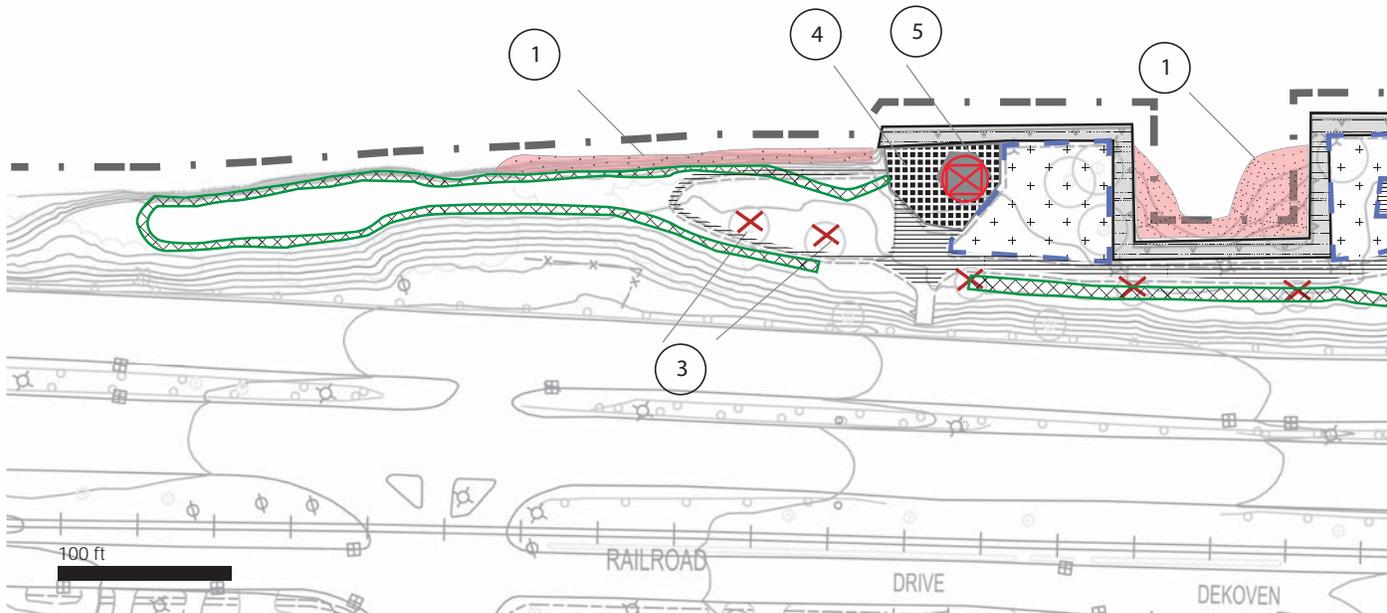
botanical name	common name	zone	height (ft.)	spread (ft.)	spacing (ft.) from center	pond/stream edges	sandy soils	low slopes and low areas	upper slopes
<i>Aster novae-angliae</i>	New England aster	3-8	3-6	3-4	2	x		x	
<i>Aster novae-angliae</i> 'Vibrant Dome'	Vibrant Dome' New England aster	3-8	1-1.5	2.5	2	x		x	
<i>Amelchier canadensis</i>	serviceberry	4-8	25-30	10-15	15			x	
<i>Amsonia tabernaemontana</i>	blue star	3-9	2-3	2-3	3		x	x	x
<i>Echinacea purpurea</i>	echinacea, cone flower	4-8	2	1-1.5	1.5-2			x	
<i>Liatris spicata</i>	blazing star	3-8	2-4	0.75-1.5	1.5	x	x	x	
<i>Monarda fistulosa</i>	wild bergamot/bee balm	3-9	3-4	3	2-3		x	x	x
<i>Nepeta x faassenii</i> 'Select Blue'	catmint	3-9	1-1.5	1-2	3		x	x	
<i>Pycnanthemum incanum</i>	mountain mint	4-8	2-3	2-3	3		x	x	x
<i>Salvia x sylvestris</i> 'Mainacht'	May night salvia	4-9	1-1.5	1-1.5	1		x	x	x
<i>Schizachyrium scoparium</i>	little bluestem	3-9	1-3	1-3	3		x	x	x
<i>Sedum ternatum</i>	mountain stonecrop	4-8	0.25-0.5	0.5-0.75	0.5			x	x



# DEMOLITION PLAN

## LEGEND

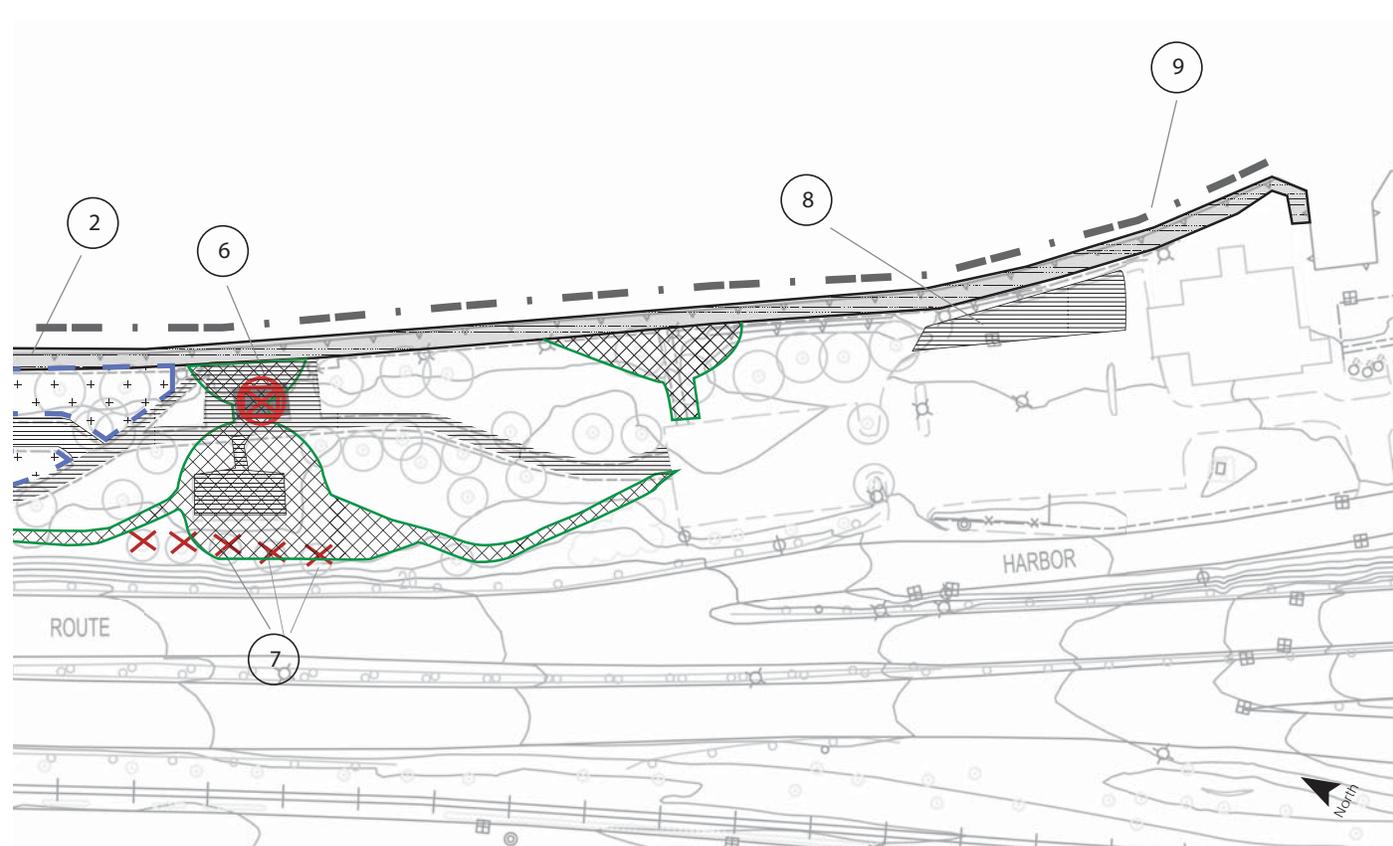
-  Remove Concrete Pavers
-  Demo Structure
-  Area of Low Disturbance
-  Remove Invasive Species
-  Clearing and Grubbing
-  Remove Boardwalk
-  Remove Asphalt Path, Landing and Parking Down to Subgrade
-  Remove Tree



Not for construction. Part of a student project and not based on a legal survey.

- 1 Remove invasive species, including Japanese knotweed and bittersweet. Replant area immediately as per planting plan
- 2 Remove damaged boardwalk boards and boardwalk railing including any compromised footings.
- 3 Remove unhealthy Norway maple trees, reuse logs for the natural playground.
- 4 Remove concrete pavers down to subgrade, fill with soil.
- 5 Remove pavilion and footings, dispose off-site.
- 6 Remove bathroom, salvage any possible materials, dispose off-site.
- 7 Remove conifer trees, dispose off-site.
- 8 Remove concrete parking row down to subgrade and maintain existing storm drain.
- 9 Boardwalk and retaining wall to remain undisturbed.

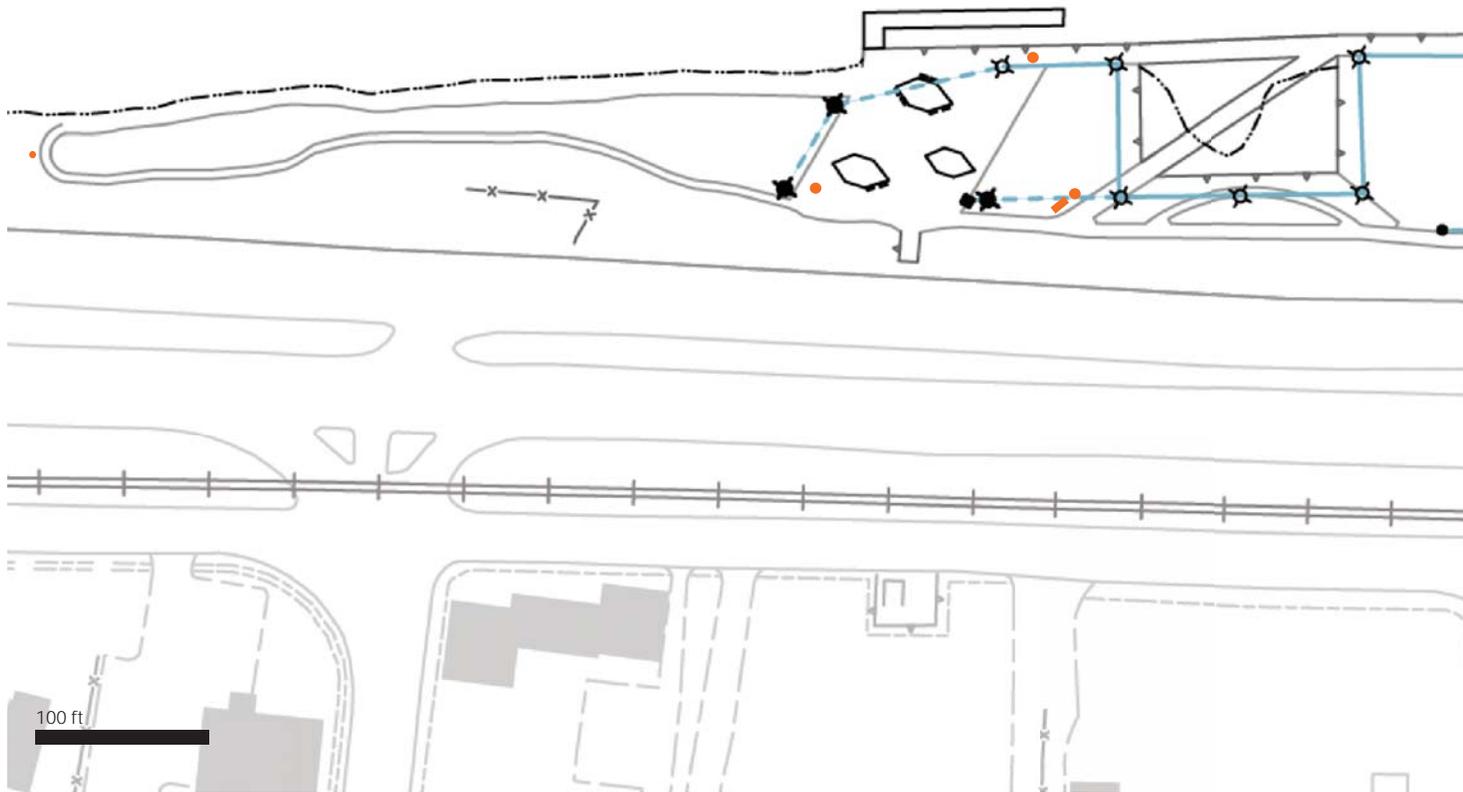
**Note: No disturbance to retaining wall adjacent to the boardwalk or to the embankment for Route 9**



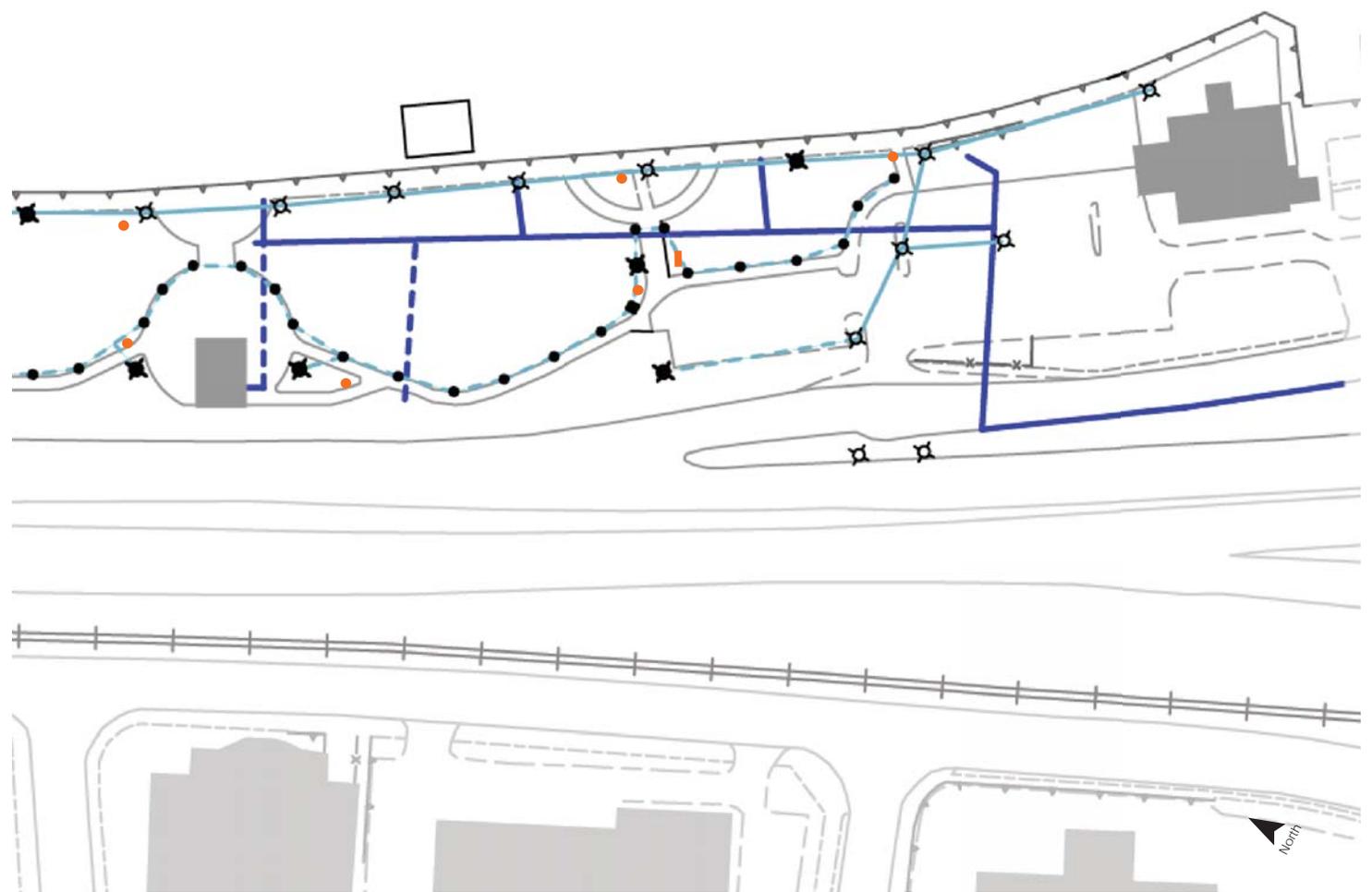
# UTILITIES & SITE AMENITIES

## LEGEND

-  Existing Water Piping
-  New Water Piping
-  Existing Electric Wiring
-  New Electric Wiring
-  Existing Light Poles
-  New Light Poles & Ballards
-  New Emergency Call Boxes
-  Interpretive and Directional Signage
-  Bike Racks



Not for construction. Part of a student project and not based on a legal survey.



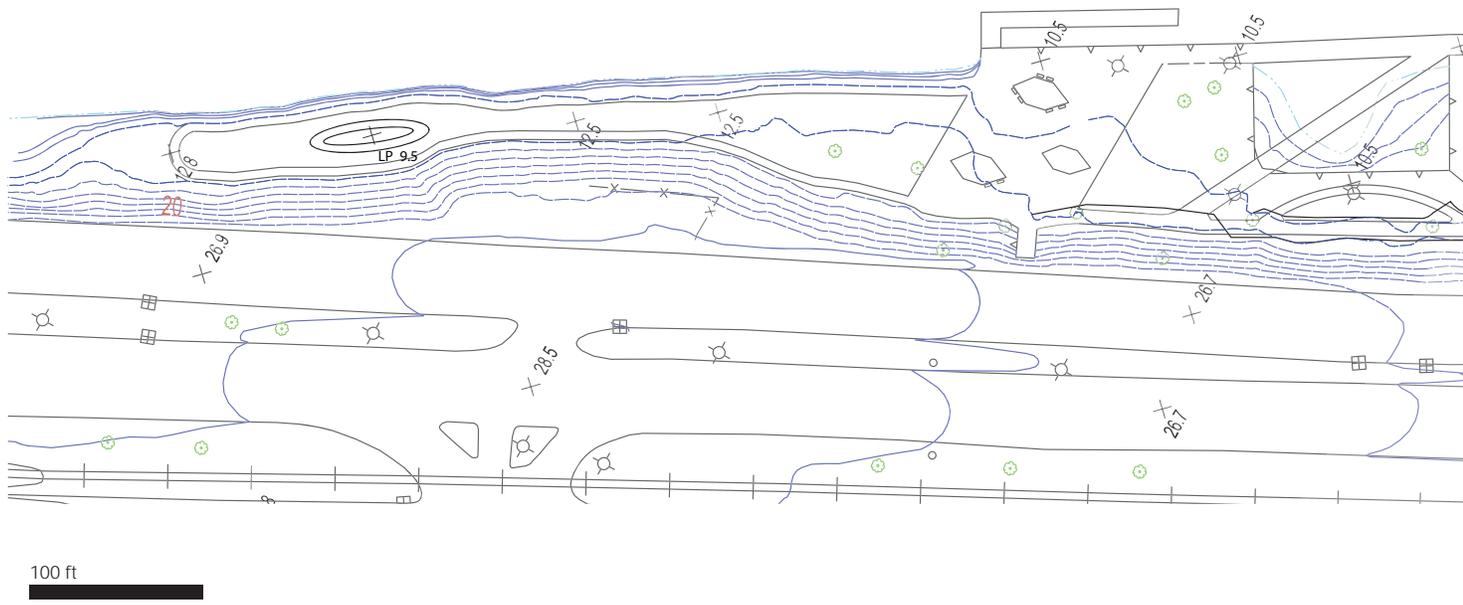
Not for construction. Part of a student project and not based on a legal survey.

# GRADING PLAN

In order to meet compensatory floodplain storage requirements indicated in Middletown's zoning requirements, any removal of soil must be balanced with addition. Soil will need to be removed to construct the bioswale, the wetland education space, and the patio. Removed soil should be used to create viewing mounds along the boardwalk and for the natural playground and to fill the area near the tunnel entrance where pavers are removed.

## LEGEND

- - - Existing Contours
- Proposed Contours
- ☒ Catchment Basin

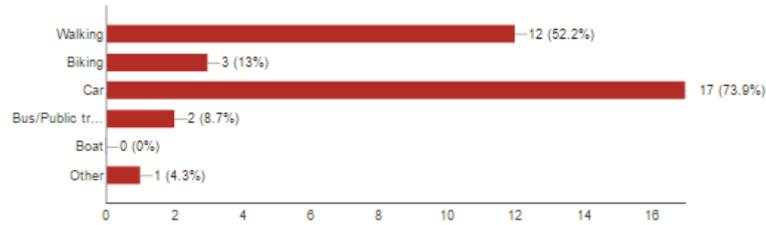


Not for construction. Part of a student project and not based on a legal survey.

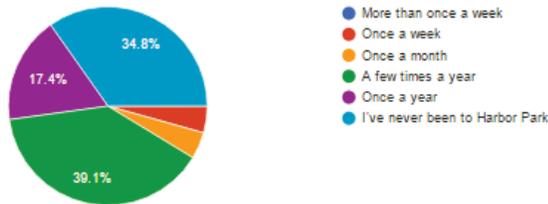


# COMMUNITY SURVEY RESULTS

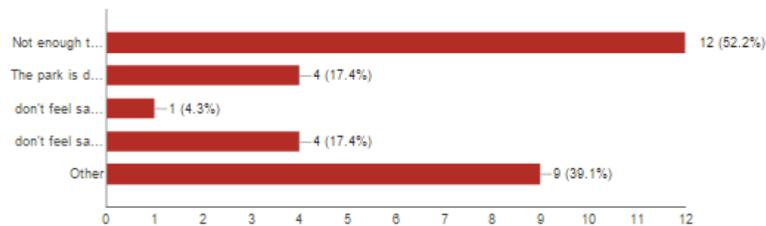
How do you get to Harbor Park? (23 responses)



How often do you visit Harbor Park? (23 responses)

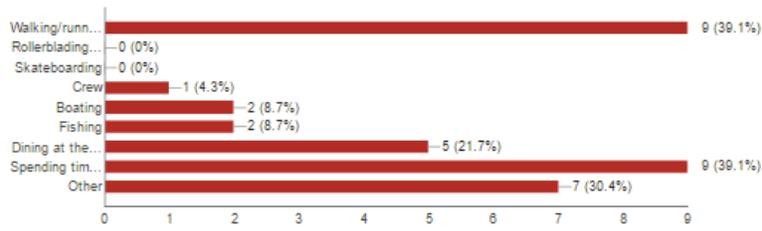


If you have not been to Harbor Park, what has prevented you from visiting? Select all that apply. (23 responses)

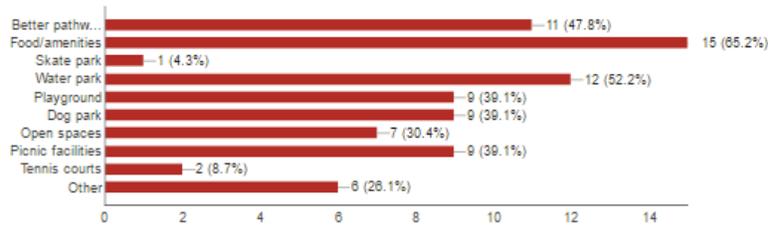


If you've visited Harbor Park, what best describes your use of the park? Select all that apply.

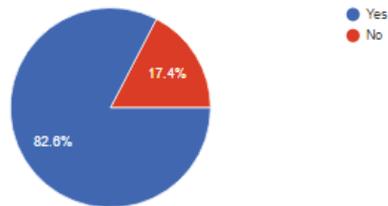
(23 responses)



What would make you want to use Harbor Park more? (23 responses)



Do you feel safe at Harbor Park? (23 responses)

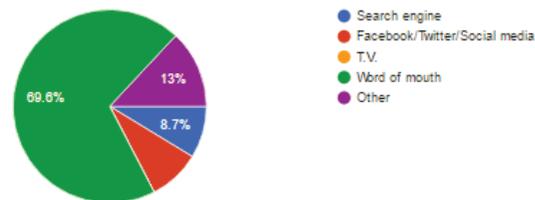


If you answered "no," what would make you feel more safe when visiting Harbor Park?

(3 responses)

- Never Been
- better lighting, having more people around
- Need to do something about the tunnel or at the least the reputation of it.

How do you receive information about Harbor Park? (23 responses)



# PROJECT CONTACTS

## MIDDLETOWN GARDEN CLUB

Maria Maden Holzberg, President

## CITY OF MIDDLETOWN, CT

Joseph Samolis, Chief of Staff

## DEPARTMENT OF PUBLIC WORKS

Christopher Holden, Deputy Director

## URBAN FOREST COMMISSION

Jane Harris, Member

## COMMISSION ON THE ARTS

Lee Godburn, Member

## ARMY CORPS OF ENGINEERS

Cori Rose, Senior Project Manager/ Regulatory

## CONNECTICUT DEPARTMENT OF TRANSPORTATION

Erik Jarboe, Project Manager  
Manuel Pires, Project Designer

*Route 9 & 17 Project #82-309*

## CONNECTICUT DEPARTMENT OF ENERGY & ENVIRONMENTAL PROTECTION

Marcy Balint, Water Resource & Land Use  
Christa Romero, Permits  
Chris Stone, Water Quality Grants

Potential Funding for Water Quality Improvement section 319 grant at Ct. gov.

## AMERICAN RIVERS

Potential Funding Opportunities at [www.americanrivers.org](http://www.americanrivers.org)

Connecting Communities to Rivers Grant Program

## U.S. FISH AND WILDLIFE

Potential Funding Opportunities at [www.fws.gov/grants/programs.html](http://www.fws.gov/grants/programs.html)

## US ENVIRONMENTAL PROTECTION AGENCY

Potential Funding Opportunities at [www.epa.gov/grants](http://www.epa.gov/grants)

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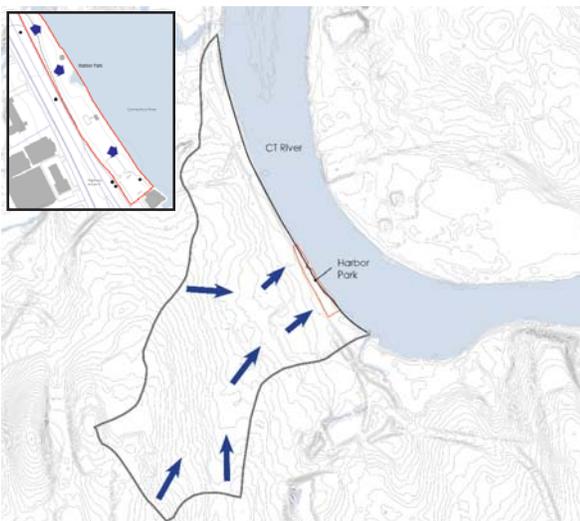
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Sam Norton. "Boathouse talks launch Middletown's vision for Connecticut River waterfront." *The Middletown Press* [Middletown] 02 March 2016: Web Access. 18 April 2016.



## Harbor Park Watershed

Slopes, Stormwater, and Drainage, page 14

Data Sources:

MAGIC Connecticut GIS

- Connecticut Drainage Basins
- Lidar Contours



## Flood Zone Designation

Flooding Context, page 10

Data Sources:

MAGIC Connecticut GIS

- FEMA Floodzone map
- Lidar Contours