# FROM CONTAINMENT TO CONNECTION

*Designing the Ecotone in a Post-Superfund Landscape*

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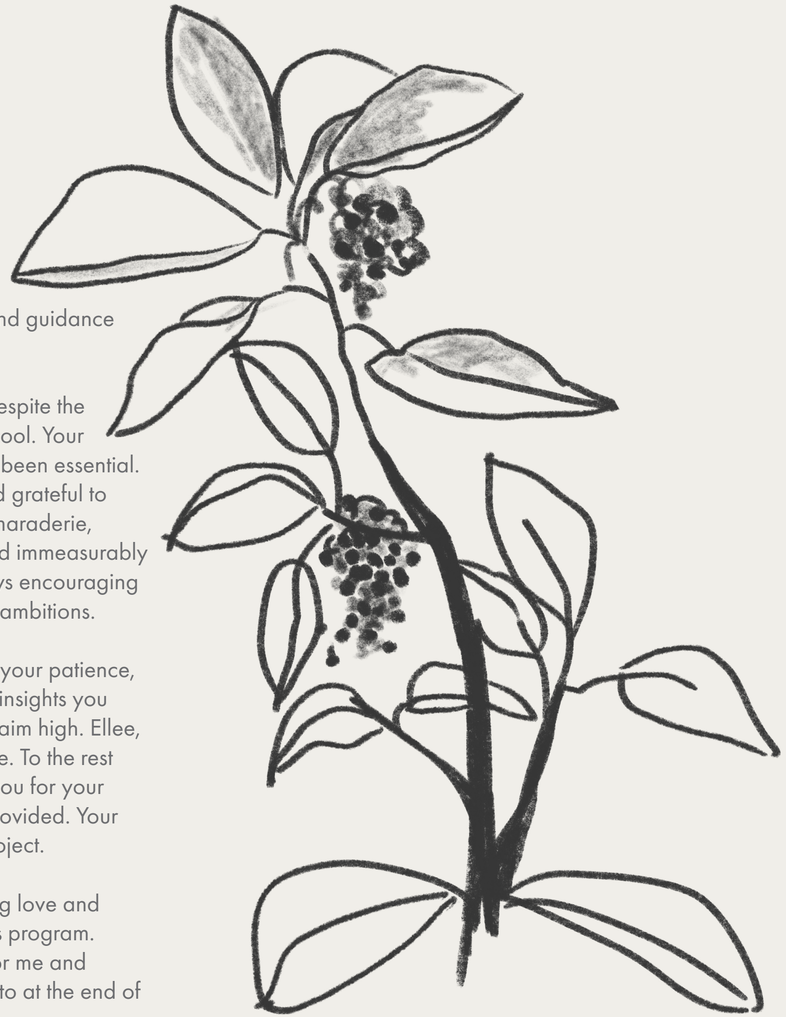
# THANK YOU



This project would not exist without the support and guidance from so many.

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**& the Department of Landscape Architecture community as a whole**

# 01 INTRODUCTION

Project Introduction
Problems, Questions,
Frameworks
Methods & Limitations
Literature Review

INTRODUCTION

# FOREWARD

FROM CONTAINMENT TO CONNECTION: DESIGNING THE ECOTONE IN A POST-SUPERFUND LANDSCAPE

The McCormick & Baxter (M&B) Superfund site is a former wood-treating facility on the east bank of the Willamette River in Portland, Oregon. The site includes 41 acres of land and 23 acres of river sediment. During its operations between 1944 to 1991, the McCormick & Baxter Creosoting Company released wood-treating chemicals into the soil, groundwater, and river sediments as part of their manufacturing process (Parrett & Terada, 2021). The M&B site is located in North Portland, a neighborhood that is known for displacement of Black families and environmental justice issues regarding pollution, park access, infrastructure, and flooding (Stroud, 1999).

The Oregon DEQ began investigations into pollution on the M&B site in the 1980s. In 1991, M&B filed for bankruptcy. Beginning in 1994, the United States EPA added the M&B site to the National Priorities List (NPL) of the Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS). This triggered the clean-up process as required by the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA). This federal legislation is colloquially known as the "Superfund" program. Between 1996 and 2005, long-term site remedies were constructed under the auspices of the EPA and the Oregon Department of Environmental Quality (DEQ). These remedies included demolishing the M&B plant, extracting non-aqueous phase liquids (NAPL), removing contaminated soil, installing a series of permeable and impermeable caps on land and on the river sediment, and building a subgrade barrier wall to stop NAPL-polluted groundwater from reaching the river. The EPA's required five-year monitoring reviews confirm the remedies are working. Monitoring activities include monitoring of surface and groundwater levels for indications of groundwater flow direction change, cap maintenance, and vegetation performance (Parrett & Terada, 2021).

After the EPA remediation was complete, the Oregon DEQ and Portland Bureau of Environmental Services partnered to complete site plantings (native grasses, plants, and trees). These plantings serve to cover bare soil, reduce soil movement and erosion, and provide for riparian habitat such as large woody material, food, and shading. The M&B site was declared "Ready for Reuse" in 2018 (Parrett & Terada, 2021).

On Earth Day 2024, the Portland Botanical Gardens (PBG) submitted a purchase agreement for the M&B site. Their plans include gardens with pavilions, pathways, greenhouses, offices, research collections, and interpretive spaces that culminate in a world-class botanical garden for the 21st century. The mission of the Portland Botanical Garden is to "Bring plants and people together and provide an immersive space for knowledge, community, and collaboration" (Cohen, 2024).

Additionally, the North Portland Greenway, a local nonprofit, has plans to connect a multi-use trail system that links North Portland neighborhoods with the Willamette River. The Greenway Trail alignment has been adopted by Portland City Council, and the University of Portland has recently finished constructing their segment adjacent to the M&B site. During remediation construction, the alignment for the 12-14' wide Greenway Trail through the M&B site was graded along the top of the bank (Parrett & Terada, 2021).

The vision to transform the M&B site into public space is one of many riverfront development projects in Portland. Some of these projects are also Superfund sites, like the various sites that are part of the Portland Harbor. Other non-Superfund riverfront projects on the horizon include a potential Major League Baseball stadium at Zidell Yards in South Portland and a new mixed-use district for the OMSI waterfront in the Central Eastside. Willamette Cove, which is part of the Portland Harbor Superfund and located directly north of the McCormick & Baxter site, is slated to be cleaned-up and turned into a nature park. As a collective, these projects are part of a major urban transformation that is now underway. Portland's industrial waterfront era has seen its heyday. Now, Portland is ready to restore the Willamette River as public space.

As the Portland Botanical Garden completes its due diligence for purchasing the site and begins to plan community engagement efforts, this project contributes a speculative design for the public portion of the M&B site. Whether the M&B site becomes the eventual home of the Portland Botanical Garden — or whether it becomes something else entirely — there is one certain future: a new public beach on the former M&B property. This design project envisions a future where all Portlanders can enjoy and access this landscape, learn about its past, and participate in the stewardship of its future.

**Concepts for an Integrated Edge**

*From Containment to Connection* explores how ecological design can repair and reimagine this historically contaminated urban shoreline. The focus of the design proposal is on the riparian edge, which will remain public regardless of future development, and exploring its potential as an accessible, resilient ecotone.

The concept of the ecotone can be understood as both an ecological threshold and a metaphor for transformation. Working with the site's existing remedy, which includes a series of caps and subgrade barrier walls, the design introduces new moments that gradually transition from the upland to the water. Native vegetation, breakwaters, and armored slopes are used to enhance cap stability and ecological diversity while responding to future climate conditions like seasonal flooding.

Ultimately, *From Containment to Connection* frames AN urban ecotone as a hopeful meeting point between land and water, where design extends beyond the standards of remediation and containment to model public landscapes of long-term recovery in the face of climate change.

"Social justice—and soil remediation—must be built into the foundation of a just city. It's a solution that's as simple as dirt."

— Julie Bargmann

# METHODS AND LIMITATIONS

DESIGN AS RESEARCH

This design project follows a methodology that I have developed through my graduate-level studio experiences, synthesizing cultural and environmental research with precedent analysis. There are four components to my design-research methodology: literature review, precedent study, historical analysis, and site analysis.

The **literature review** situates this project within two key areas of landscape architecture: urban waterfronts and contaminated sites. Within the urban waterfront category, I focus on the evolving role of urban waterfronts and the research that argues that these spaces are not just edges of the city but highly contested zones where ecological, economic, and social interests collide. For contaminated landscapes, my review covers how memory, artifact, and phytotechnology function as design tools. These research threads provide a theoretical framework for the project.

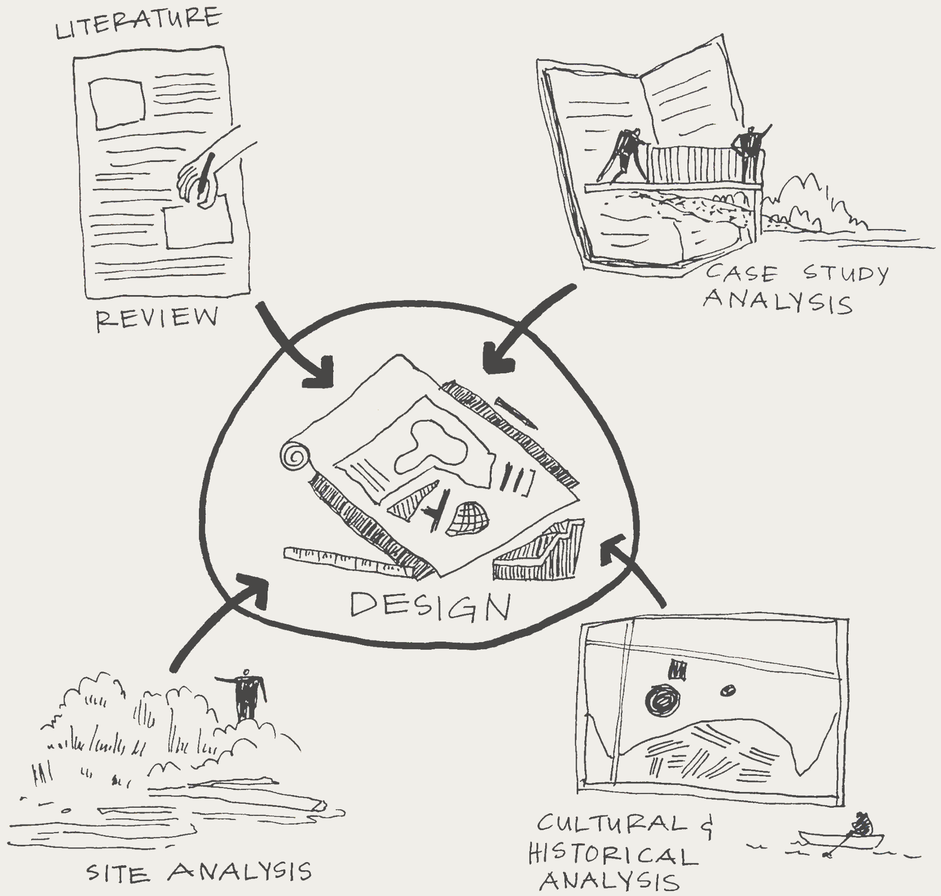
The **precedent study** (see appendix) involves a comparative review of four landscape architecture projects selected for their relevance to this site and design challenge. These sites are all located on urban waterfronts. Some of them also deal with site contamination. All four projects have been recognized for their design significance. The projects are analyzed based on their spatial organization and design elements using available online sources such as project summaries, photographs, and drawings.

The **historical analysis** of the site is based on aerial image interpretation and past planning and engineering documents. This analysis traces the shifting relationship between land and water, including shoreline modifications, spatial organization of the site, sediment deposition, and erosion. Through image interpretation, I identify remnants and extent of past industrial infrastructure, which inform strategies for incorporating memory and artifact into the design. I also analyze vegetation and ecological changes, assessing how natural systems have responded to past contamination and remediation efforts. The changing patterns of spatial organization help me understand accessibility and connectivity, determining how site access has evolved and where key barriers remain.

The **site analysis** portion of my research entails on-site observation through site walks and review of documents such as the EPA Record of Decision, as-built drawings, and maintenance reports. The site analysis is a leading tool in developing my design goals, strategy, and concept. The site analysis is used to identify and inventory existing conditions, including lasting implications of remediation engineering and human-scale opportunities.

The primary limitation of this project is the lack of available community engagement data. My speculative design includes assumptions about community interest in the site, informed by the Portland Botanical Garden's anticipations and Metro's ongoing community engagement at adjacent Willamette Cove. Any future design of the river edge at the M&B site must legally incorporate community engagement. Beyond this requirement, I view community engagement as fundamental to creating thoughtful, just, and effective design. When considering the environmental justice implications of this project, community engagement becomes even more critical.

Another key limitation is the lack of an interdisciplinary design team to explore technical concepts such as site engineering and ecology. A collaborative team, including engineers, ecologists, and other specialists, would provide critical insights into hydrology, habitat restoration, and structural feasibility. Without this expertise, my speculative design remains conceptual and relies on general best practices informed by my precedent study, site analysis, and literature review.



# LITERATURE REVIEW

URBAN WATERFRONTS

**Summary**

The literature on urban waterfronts spans disciplines and scales, from legal frameworks to contemporary design strategies for climate adaptation and economic development. The following section highlights key themes from this body of work that inform the urban design approach at the McCormick & Baxter Superfund Site.

**Urban Waterfronts as Public Space**

Urban waterfronts are fundamental public spaces. Dating back to the Roman Empire, civil laws collectively known as the Public Trust Doctrine have established the public's right to water and land touched by water (Fisher et al., 2004). As the United States industrialized in the 19th century, many cities formed specifically in response to industrial opportunities on the water, privatizing and polluting key cultural and ecological resources. In the mid-20th century, modernist planning principles prioritized automobile access and hard or "gray" infrastructure (Urban Design and Infrastructure in the Modern Era, n.d.).

A stark example of this approach is Robert Moses' transformation of New York City waterfronts, which resulted in the loss of waterfront neighborhoods, inequitable access to public parks and beaches, and mass displacement of communities of color. In response to top-down mid-century planning, activists and academics like Jane Jacobs, Henri Lefebvre, and David Harvey argued for urban residents' right to public space and unscripted urban life. As industrial activity declined and environmental regulations tightened in the mid-to-late 20th century, many urban waterfronts were left derelict, creating new opportunities for development (Fisher et al., 2004).

**Waterfront Development**

In response to these derelict landscapes, planners saw opportunity to stimulate urban economies through waterfront development projects that combine commercial and public space (Lister, 2009). Over the last several decades, waterfront revitalization has dramatically changed the urban fabric across North America. This change reflects shifts in core cultural and economic conditions, such as the movement away from Euclidian zoning, tourism development, transportation changes, and interest in protecting waterways as critical natural areas (Fisher et al., 2004).

While market-driven redevelopment has contributed to economic growth, it has also created new challenges. The transition of urban waterfronts into sites of leisure, tourism, and high-end real estate has often been under the guise of urban renewal. This transformation has in some cases led to gentrification, displacement, and restricted public access (Illes et al., 2024). These issues require a more balanced approach that integrates economic development with ecological sustainability and equitable public access.

**Considering Climate**

With the deepening impacts of climate change, modern waterfronts face increasing risks from rising sea levels, flooding, and environmental degradation. Traditional hard engineering solutions are proving insufficient against these challenges. Redevelopment efforts must integrate climate resiliency strategies, such as wetland restoration, living shorelines, and adaptive infrastructure (Lister, 2009). Two newly canonical projects exemplify this shift: SCAPE's Living Breakwaters and Field Operations' Freshkills Park. Freshkills Park serves as a global precedent for landfill redevelopment. This project transformed 2,200 acres of landfill into public space that includes biking, kayaking, and birdwatching with ecological processes that incorporate native plan restoration, wetland regeneration, and habitat creation, all while capturing methane and treating leachate. Similarly, Living Breakwaters gained notoriety for its massive infrastructure-level scale. Designed in response to Hurricane Sandy, SCAPE proposed a shoreline protection strategy that dissipates wave energy while improving ecological function and habitat creation. These projects illustrate a new paradigm of "ecological design," in which restoration and climate resiliency are not an afterthought but a driving strategy (Lister, 2009).

**The "Edge" and the Ecotone**

In *The Image of the City,* Kevin Lynch explores the spatial organization of cities and how they are perceived as images. Lynch introduces the concept of the "edge" and contrasts it with the "path," saying "Edges are the linear elements not considered as paths: they are usually, but not quite always, the boundaries between two kinds of areas. They act as lateral references." Moreover, these edges can be "uniting seams, rather than isolating barriers." This idea relates specifically to the waterfront as an urban dynamic. The waterfront represents a threshold between city and water. This urban design concept relates closely to the ecological concept of the ecotone. Ecologically, ecotones are a transition zone between two different ecosystems. They are high in biodiversity and crucial for ecological resilience. Approaching waterfront design through an understanding of ecotone can lead to designs that are not simply barriers or destinations, but fluid, adpative landscapes that bridge human and ecological systems.

**River Culture**

Rivers have always been a place of embarkment and arrival, fishing and communing. Culturally, meaningful connection to the river means more than just proximity. It involves opportunities for people to appreciate the ebb and flow of the river throughout the seasons, observe wildlife, watch the light ripple across the surface of the water, hear the water lap against rocks on the shore, and dip their feet in on a hot day. In many traditions, rivers are seen not just as resources, but as living entities with agency and spirit (Strang, 2020). Contemporary urban riverfronts often struggle to maintain this layered cultural significance, having been reshaped by industrialization and infrastructure. However, re-centering river culture in design means creating spaces where daily rituals like walking, gathering, listening, and touching can restore a sense of belonging and reciprocity between people and water. Design can play a critical role in revealing the intrinsic beauty of the river, heightening awareness and deepening connection to place (Fisher et al., 2004).

"More than any other single element besides trees and gardens, water has the greatest potential to forge an emotional link between man and nature in the city.

— Anne Whiston Spirn

# LITERATURE REVIEW

CONTAMINATED SITES

The body of work on contaminated and post-industrial site design is vast and varied, with innumerable resources ranging from technical topics such as bioremediation and capping strategies, social topics such as environmental justice and community engagement, and the works of archaeologists, historians, and designers on the topic of cultural landscapes. Some approaches to those topics as they relate to the water edge design at the McCormick & Baxter Superfund Site are summarized below.

## Legal Context

In the 1960s and 1970s, environmental activists and scientists pushed federal legislators to begin protecting our air, land, and water through a series of legislative actions including the National Environmental Policy Act (1969), Clean Air Act (1970), Federal Water Pollution Control Act (1972), the Toxic Substances Control Act (1976), and the Resource Conservation and Recovery Act (1976) (Kirkwood, 2003). The RCRA was most relevant to the treatment of contaminated sites as it defined the life of a hazardous or solid waste product from "cradle to grave," expanding the legal definition of toxic substances (Kirkwood, 2003). In particular, the RCRA dealt with hazardous waste storage tanks. Shortly after in 1980, Congress enacted the Comprehensive Environmental Response Compensation and Liability Act (CERCLA), commonly known as the Superfund program, which imposed liability on landowners and operators of "hazardous substances." When the responsible party is not able to pay for remediation, the federal government funds clean-up through the taxation of hazardous substance industries (Kirkwood, 2003).

## Contaminated Site Redevelopment

The degree of contamination and the chemical makeup of contaminants on site guide the treatment or remediation that will occur before site redevelopment. Contaminants can be classified as either organic or inorganic. Organic contaminants include petroleum, chlorinated solvents, explosives, pesticides, and persistent organic pollutants such as DDT. Broadly, these organic pollutants can result from fuel spills, storage tanks, railroads, munition manufacture or storage, agricultural or residential spraying, fertilizers, and embalming fluids. Inorganic pollutants include plant macronutrients such as Nitrogen and Phosphorus, metals such as Arsenic or Zinc, salts, and radioactive isotopes. Inorganic pollutants can result from waste and stormwater, landfill leach, mining, industrial uses, military activity, and energy production (Kennen & Kirkwood, 2015).

The treatment of a contaminated site is a complicated and lengthy process that involves interdisciplinary and often intergovernmental coordination. The liability associated with the ownership, development, and monitoring of these sites is extensive. Often, the burden of compliance can cause a site to sit dormant for many years as local, state, and federal governments, landowners, and communities tease out solutions (Kirkwood, 2003). Because of the lengthy process, contaminated sites often have a unique diversity of "pioneer adaptive urban wildlife, insect, and plant communities," because of the lack of human, industrial, or commercial activity (Hollander, 2010). Designers typically step in once the remediation has been performed on a site (Russ, 2000).

Remediation is typically not a permanent solution that can simply "fix" a site's contamination issue in perpetuity. When a site is redeveloped, continuous monitoring and response is necessary. It is most wise to look toward the future and consider how the design can include continuous engagement with the contamination problem through a perspective of redundancy, resiliency, and innovation.

## Phytotechnology

At the forefront of innovation in the design of contaminated sites is research on phytotechnology. The most comprehensive resource on phytoremediation and phytotechnology for designers is the work of Kate Kennen and Nial Kirkwood. Their book *Phyto: Principles and Resources for Site Remediation and Landscape Design* addresses the use of plants for the "uptake, removal, or mitigation of on-site pollutants" through the review of case studies and summary of the newest scientific research. This work links scientific knowledge with design applications for contaminated sites. Kennen and Kirkwood's definition of phytotechnology is as follows:

"*Phytotechnology is the use of vegetation to remediate, contain, or prevent contaminants in soils, sediments and groundwater, and/or add nutrients, porosity and organic matter. It is also a set of planning, engineering, and design tools and cultural practices that can assist landscape architects, site designers, engineers and environmental planners in working on current and future individual sites, the urban fabric and regional landscapes.*" (Kennen & Kirkwood, 2015).

The use and innovation of phytotechnology on contaminated sites is greatly needed. According to Kennen and Niall, "More than 16% of global land areas, equivalent to about 52 million hectares, are impacted by soil pollution worldwide" (Kennen & Kirkwood, 2015, p. 5). Given the extremely high cost and disruptive nature of traditional remediation strategies, phytoremediation is an optimistic tool. Some of the benefits of phytotechnologies include public acceptance, integration of the technology into other site design elements, and minimal disturbance to the soil. Phytotechnology also provides opportunity for education, habitat creation, and biomass production (Kennen & Kirkwood, 2015). Phytotechnology can contribute to other ecosystem services beyond contamination clean-up. Framing phytotechnology around its contributions to heat mitigation, noise reduction, biodiversity, $CO_2$ sequestration, and aesthetic and social cohesion strengthen its case for use on an already "remedied" site (Guidi Nissim et al., 2023).

## Site Interpretation and Memory

Post-industrial landscapes occupy an important place in cultural memory. In a post-industrial society, the remnants of progress and development are scarred into the landscape. Rather than turn our heads and erase this past, interpretive approaches to design can aid our collective memory and help guide future decisions about land use, waste, and extraction. Famously, Gas Works Park in Seattle, WA, designed by Richard Haag Associates, is one of the earliest examples of the reclamation of an industrial site for public use that both remediated toxic conditions and retained architectural artifacts from the land's industrial era as part of the design (Way, 2013). In architectural scholarship and practice, the reclamation of architectural ruins is referred to as "adaptive reuse." In landscape architecture scholarship and practice, we are often tasked with rendering visible site histories that might not be so easily interpreted as remnant industrial architecture. This practice helps the public make sense of the landscape and develop a stronger sense of place and stewardship. With EPA and superfund sites in particular, both the "cap and cover" and "hog and haul" methods make this particularly challenging, as the essential reconstruction of the landscape "scrubs them of their history," (Bluestone, 2007). Yet it is precisely in these erased or obscured landscapes that the work of landscape architects becomes most critical. The unearthing of these layered histories can help shape narratives that connect people to place.

# 02 BACKGROUND

BACKGROUND

# URBAN CONTEXT

SITE ADJACENCIES

Understanding the context of Portland's waterfront is key to any future design of the M&B site. Historically, low-income and communities of color, especially in North Portland, have borne the greatest environmental burdens from pollution in the Willamette. For many decades, living near the river or having a river view did not signal luxury. Contaminants like PCBs and dioxins have impacted local health, livelihoods, and cultural practices, particularly for those who rely on the river for fishing and recreation (Stroud, 1999). While the EPA's cleanup efforts are ongoing, residents and community groups have been at the forefront, advocating for a more equitable cleanup process and ensuring that local communities have a voice in the ongoing remediation efforts (Scribes & Goodling, 2018).

While these sites present an incredible challenge, Portland has also made strides in creating accessible waterfront parks. The Tom McCall Waterfront Park and the Eastbank Esplanade have transformed the city's downtown riverfront into vibrant public spaces. These parks not only improve access to the river but serve as a symbol of Portland's commitment to reclaiming the river for public use. However, the history of who was allowed to live near the river and who was excluded from these spaces is still a critical factor in understanding the full scope of environmental justice in Portland.

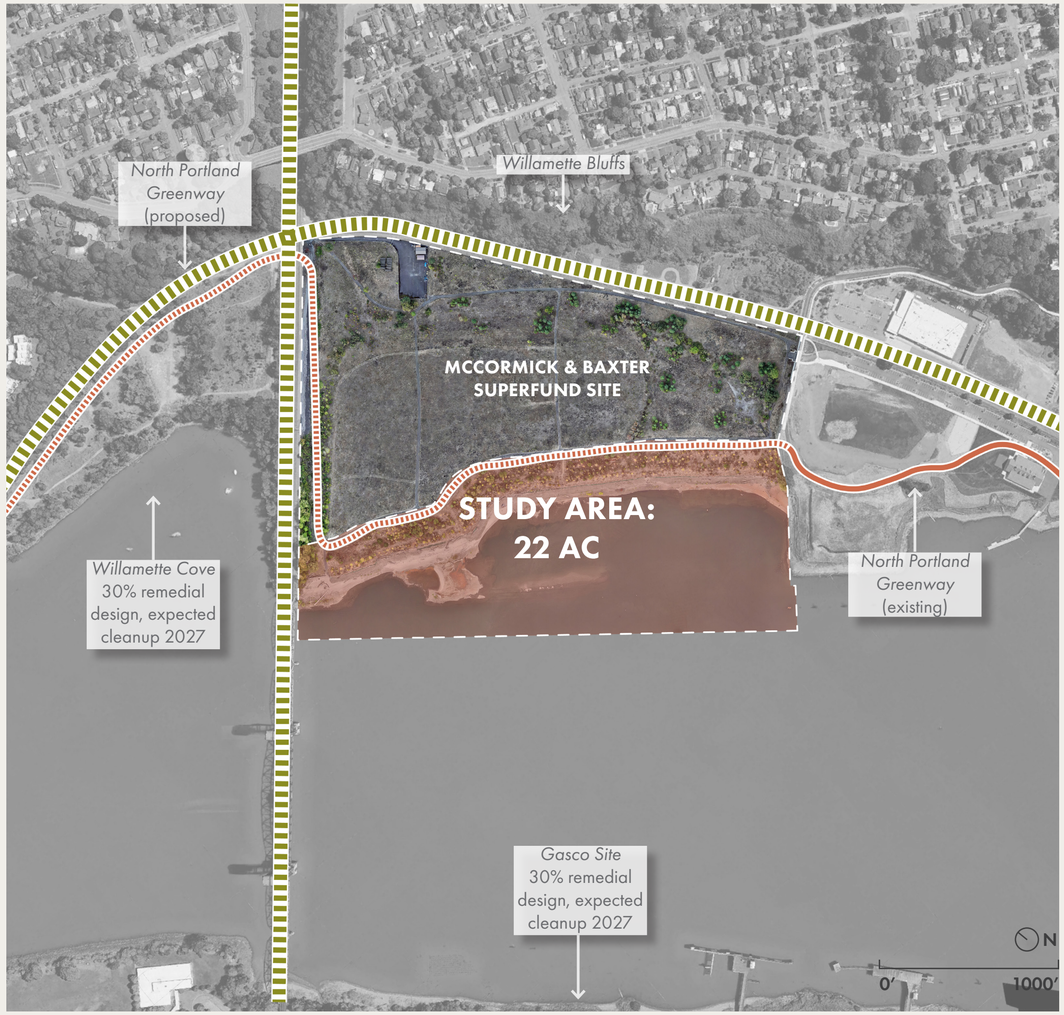
The former McCormick & Baxter wood-treating facility is located on the east bank of the Willamette River. It consists of 40.1 acres of land built upon imported sand fill within the river's historic floodplain. In addition to the upland terrace, the site includes 23 acres of river sediment. Today, the site is mostly vacant. A residential area is located on the other side of Willamette Bluffs, which formed 15,000 years ago as a result of the Missoula Floods.

The M&B site sits directly within the proposed route of the North Portland Greenway. This planned multi-use trail will eventually connect the Eastbank Esplanade to Kelley Point Park, running along the Willamette River and through a number of historically underserved neighborhoods.

At M&B, the greenway is already planned to pass through, making it a critical link in the larger regional network. That existing proposal helped shape my decision to work here because it established the site as future public space, regardless of what other programming or development takes place. The presence of the greenway provides a strong foundation for designing public access, ecological restoration, and community use into the project ("History," n.d.).

Another defining feature of the site is its adjacency to an active rail line and the Burlington Northern Railroad bridge just downstream. The rail line physically separates the site from the bluffs and the residential neighborhood to the east, presenting both a barrier and an opportunity. While it limits access, it also reinforces the need for thoughtful, safe connections like the greenway, potential undercrossings, and waterside access to the site. The presence of the bridge also contributes to the site's layered industrial character, serving as a backdrop that ties the design to the river's working history.

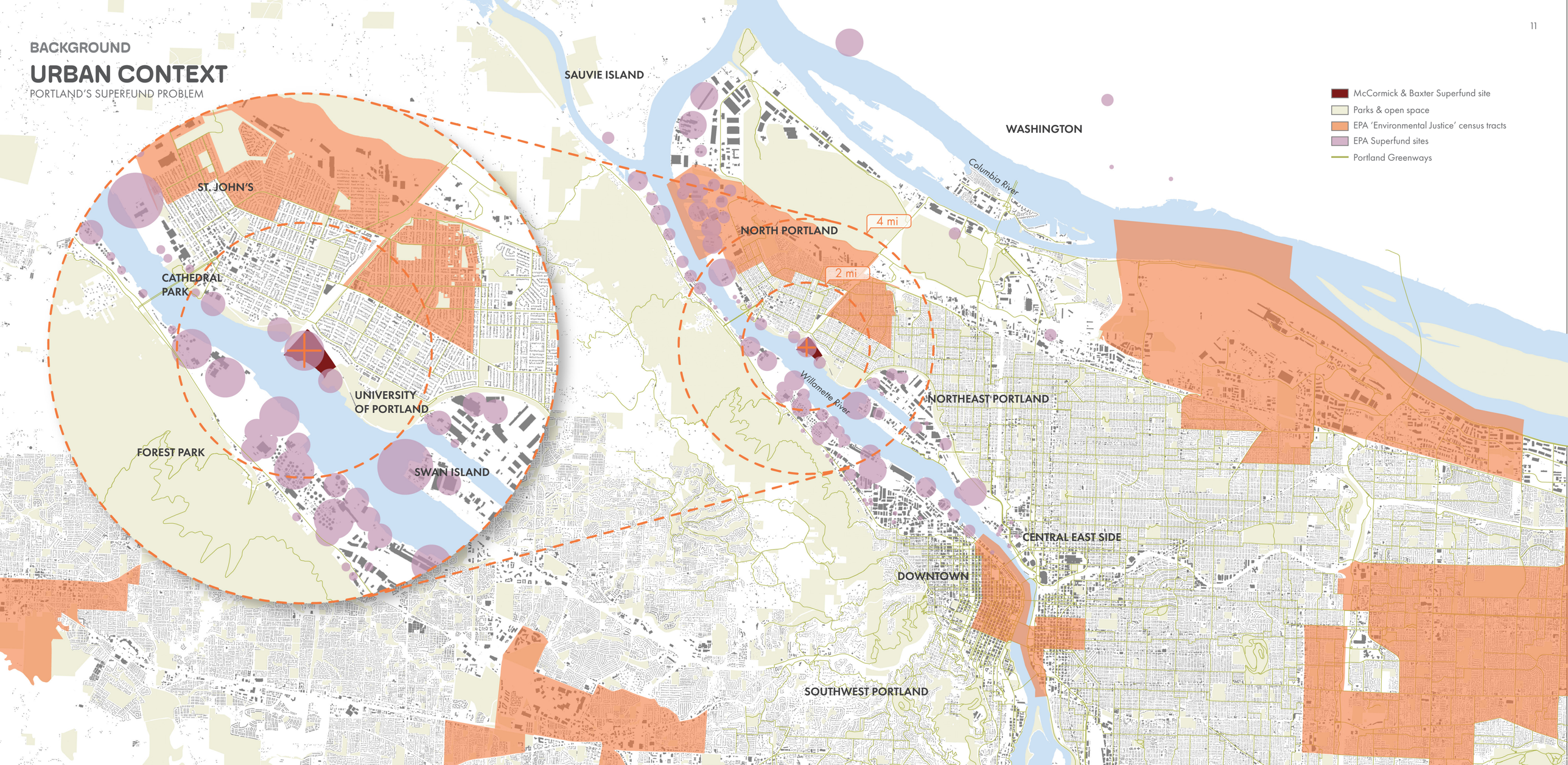
The site is part of a larger landscape of change along this stretch of the lower Willamette. Just downriver are the Willamette Cove and Gasco sites, part of the Portland Harbor Superfund. Both are undergoing major EPA-led cleanup efforts. Willamette Cove in particular has a similar goal of ecological and cultural recovery. The site has been purchased by Oregon Metro and is under design to become a public nature park after remediation has been completed. Directly upriver from the site, the University of Portland is expanding its river campus, adding to the momentum for public access and educational programming along the waterfront. This broader context reinforces the potential for this site to contribute to a connected, restored, activated river system. Given all that's happening on and around the site, I decided to focus my design project on just the river and beach portion of the site. This area is already designated for public access and will remain public regardless of future development outcomes.



BACKGROUND

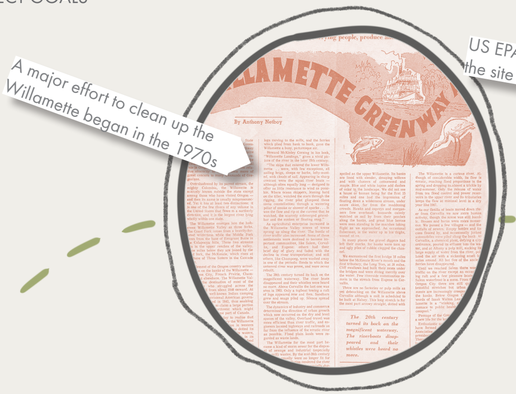
# URBAN CONTEXT

PORTLAND'S SUPERFUND PROBLEM

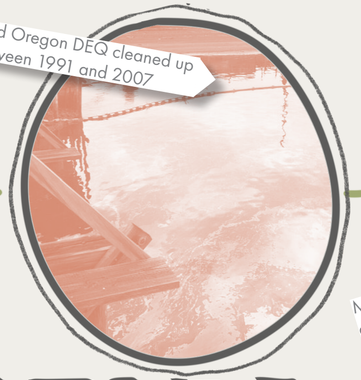


# A VISION FOR A VACANT RIVERFRONT

SITE TRANSFORMATION AND PROJECT GOALS




A major effort to clean up the Willamette began in the 1970s



US EPA and Oregon DEQ cleaned up the site between 1991 and 2007

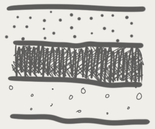

Multiple organizations have expressed interest in developing the upland portion


Creosoting operations 1944-1991 led to the dumping of Polycyclic Aromatic Hydrocarbons (PAHs) into the river and groundwater.

The upland portion of the site will likely be developed. Regardless of that development, the river and beach can and should remain public. How can we bring people to this once toxic site?

IMPROVE CIRCULATION & ACCESS

PROTECT CAP INTEGRITY

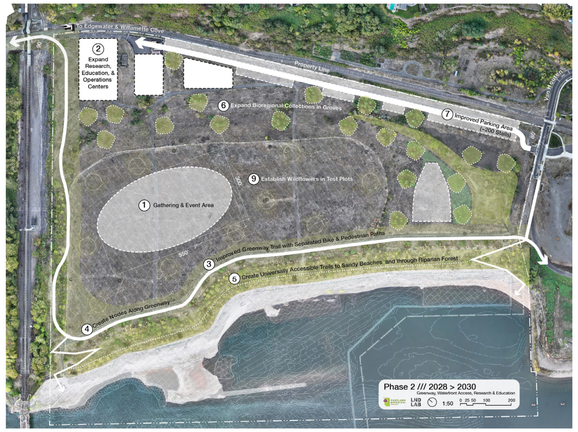


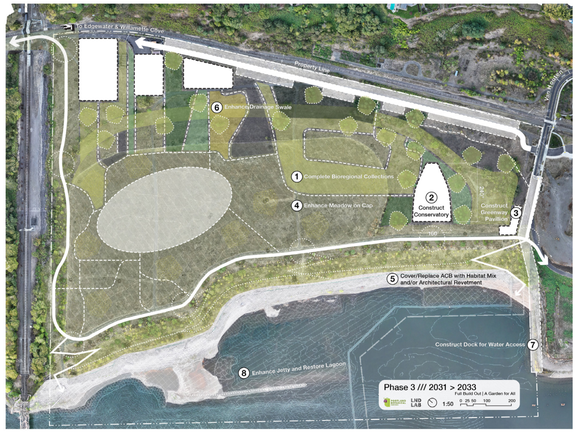
ENHANCE ECOLOGICAL RESILIENCY

CONNECT PEOPLE TO THE RIVER

# CURRENT DEVELOPMENT STATUS

PORTLAND BOTANICAL GARDEN INTEREST IN SITE


## Ready for Reuse

In January 2018, the United States Environmental Protection Agency issued a 'Ready for Reuse' announcement for the M&B site. In 2020, the City of Portland updated its 2035 Comprehensive Master Plan, which changed Site zoning from Heavy Industrial to EG2-General Employment. EG-2 zoning is more flexible and includes parks and open spaces, educational institutions, along with traditional occupational use (Parrett & Terada, 2021).

## Portland Botanical Garden

On Earth Day 2024, the Portland Botanical Gardens (PBG) submitted a purchase agreement for the McCormick & Baxter Superfund site. Their plans include gardens with pavilions, pathways, greenhouses, offices, research collections, and interpretive spaces that culminate in a world-class botanical garden for the 21st century. It will also feature semi-public gathering areas, access to the Willamette River Greenway, and the "longest stretch of clean river beach in the Portland Harbor," (Cohen, 2024). PBG's vision is to "Create a preeminent public garden with Oregon's first conservatory, the state's largest collection of native plants, and its most comprehensive vocational & research program in climate resilience, plant habitats and appropriate horticulture, all within a living laboratory" (Mission, n.d.)

## Involvement and Partnerships

PBG is a non-profit organization. The Board of Directors and staff include botanists, conservationists, horticulturalists, non-profit professionals, and landscape architects. They are currently working with public agencies, Tribal authorities, neighborhood groups, and conservation organizations while receiving due diligence consultation for the purchase of the M&B site. Public agencies are helping guide the stakeholder engagement process and leading relationships with Tribal authorities ("Project Information," n.d.).

## Phasing Plan

As of Spring 2025, PBG has released a set of schematic plans illustrating three phases of development for the site. As it relates to the study area, PBG's phasing plan entails the following:

- Phase 1 (2024-2027): riparian restoration & safety improvements, preliminary beach safety improvements, declare greenway trail, protect signficant views of the river, begin native plant collections along greenway trail.
- Phase 2 (2028-2030): Create universally accessible trails to sandy beaches and through riparian forest, create notes along greenway.
- Phase 3 (2031-2033): Cover/replace ACB with habitat mix and/or architectural revetment, construct dock for water access, enhance jetty and restore lagoon.

These phsaes also include the ongoing development on the upland portion of the site, which will include the botanical gardens, gathering/event areas, education and research operations, and the construction of an observation.

## Vegetation Assessment

In fall 2024, LND LAB and PBG performed a visual assessment of the riparian zone, with special attention to species presence and health. Observations included:

- Riparian canopy coverage is signficantly threatened by increased heat and drought
- Canopy is primarily Oregon Ash, which is at risk due to Emerald Ash Borer
- Oak, Madrone, and Pine are healthy, while most other trees are showing defoliation
- Oaks and Madrones constitute 6% of the riparian planting
- Pines are only along the top of bank
- "The ripaian zone will become savanna if additional trees are not added"

Image sources: *LNDLAB* (2024).

# PROJECT GOALS

GOING BEYOND REMEDIATION TO CREATE AN ECOLOGICAL AND COMMUNITY ASSET

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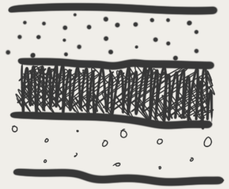

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## IMPROVE CIRCULATION & ACCESS

The North Portland Greenway will follow the top of bank alignment. A network of perpendicular and parallel paths will enhance physical accessibility, especially on the site's steep terrain, connecting people safely and intuitively to key destinations.

## ENHANCE ECOLOGICAL RESILIENCY

While the riverbank cannot return to its pre-industrial state, thoughtful planting strategies can support ecological resilience in the face of climate change. Increased canopy cover will offer shade for visitors, improve thermal comfort, and provide habitat.

## PROTECT CAP INTEGRITY

Maintaining the integrity of the existing environmental cap is paramount. Design must prioritize minimizing soil disturbance, thereby preventing the potential migration of contaminants and ensuring long-term site safety.

## CONNECT PEOPLE TO THE RIVER

This site offers an opportunity to repair the fractured relationship between Portlanders and the Willamette River. Through spaces for recreation, learning, and cultural expression, the design will create meaningful and equitable connections to the water's edge.

→

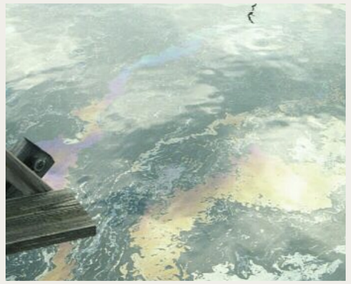
## AN EXAMPLE FOR PORTLAND'S OTHER CONTAMINATED WATERFRONTS

# 03 EXISTING CONDITIONS

Understanding the Past to Design the Future
EPA & DEQ Remediation
Circulation
Vegetation
Dynamic Water Edge
Section Studies
Site Analysis Summary

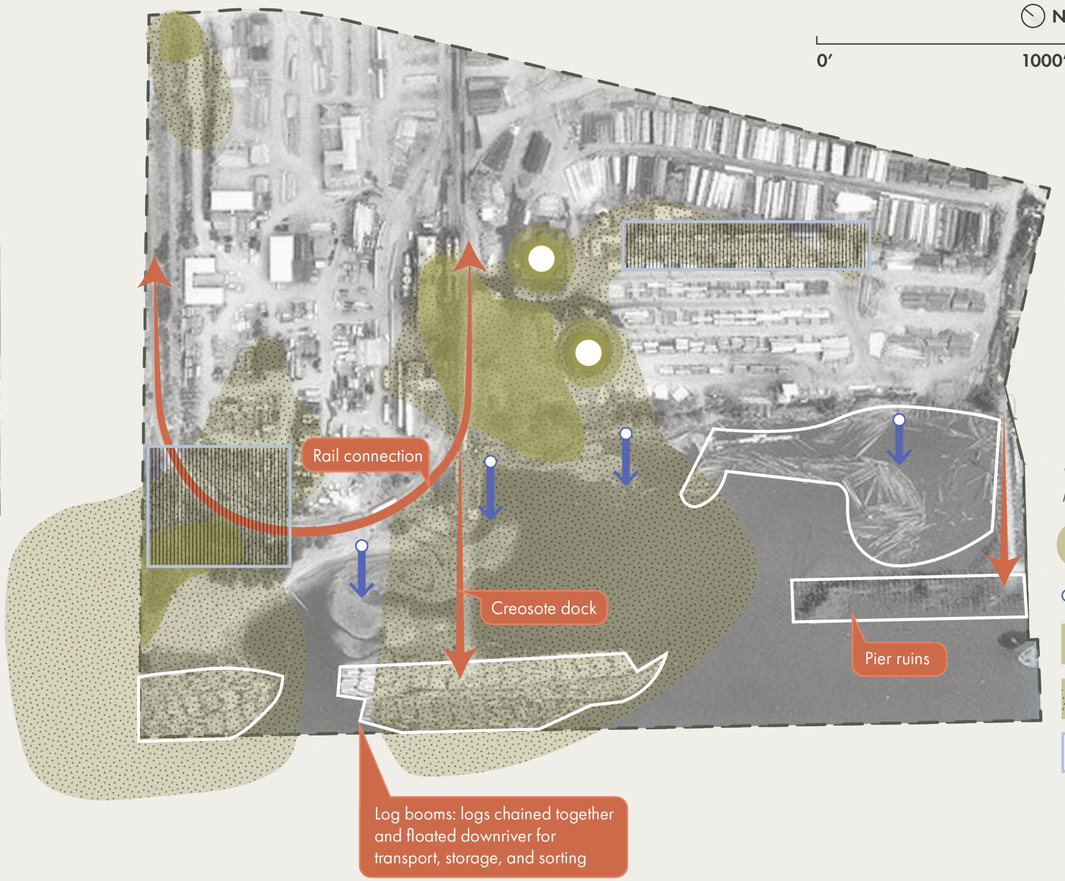
# UNDERSTANDING THE PAST TO DESIGN THE FUTURE

150 YEARS OF RIVER INDUSTRIALIZATION AND URBANIZATION LED TO A SEVERELY POLLUTED RIVER. ACTIVISTS, TRIBES, AND POLICYMAKERS BEGAN STEPS TO CLEAN UP THE RIVER IN THE 1970S.



The M&B site's history is deeply tied to Portland's industrial legacy. The site itself was initially formed in the early 1900s using dredged materials. A sawmill once operated on the southeastern end, but the most significant activity began in 1944, when the McCormick & Baxter Creosoting Company opened a wood treatment facility. The plant produced treated lumber, pilings, and railroad ties in response to needs during during World War II and operated until 1991.
To treat wood, the facility used a range of chemicals, including creosote, PCP, and heavy-metal preservatives like copper arsenate. These were stored in large tanks, and the central processing area housed four high-pressure treatment retorts. Unfortunately, environmental regulations were far less strict at the time. From the 1950s to the 1970s, the site saw regular discharge of contaminated wastewater and chemical-laden runoff directly into the Willamette River. Waste oil was even sprayed on soil to control dust. Major spills occurred in the 1950s, and toxic sludge was disposed of both off-site and on-site in what later became the former waste disposal area on the western edge. In response to growing environmental concerns, some controls were put in place in the 1980s, like fencing off hazardous areas and reinforcing chemical storage with concrete. Still, contamination remained. In 1999, the first phase of soil cleanup began, including removal of stormwater outfalls.

This industrial legacy has left a lasting environmental impact, shaping how the site is viewed today despite the cleanup's success in protecting human health and the environment.




*Polycyclic aromatic hydrocarbons (PAHs) migrating into the lower Willamette through groundwater as Non-aqueous Phase Liquids (NAPLs) at the M&B Creosoting Company.*



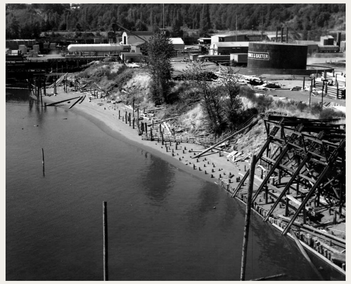



Image sources: *M&B Remedy Implementation General Overview* (2020); Google Earth (2025).

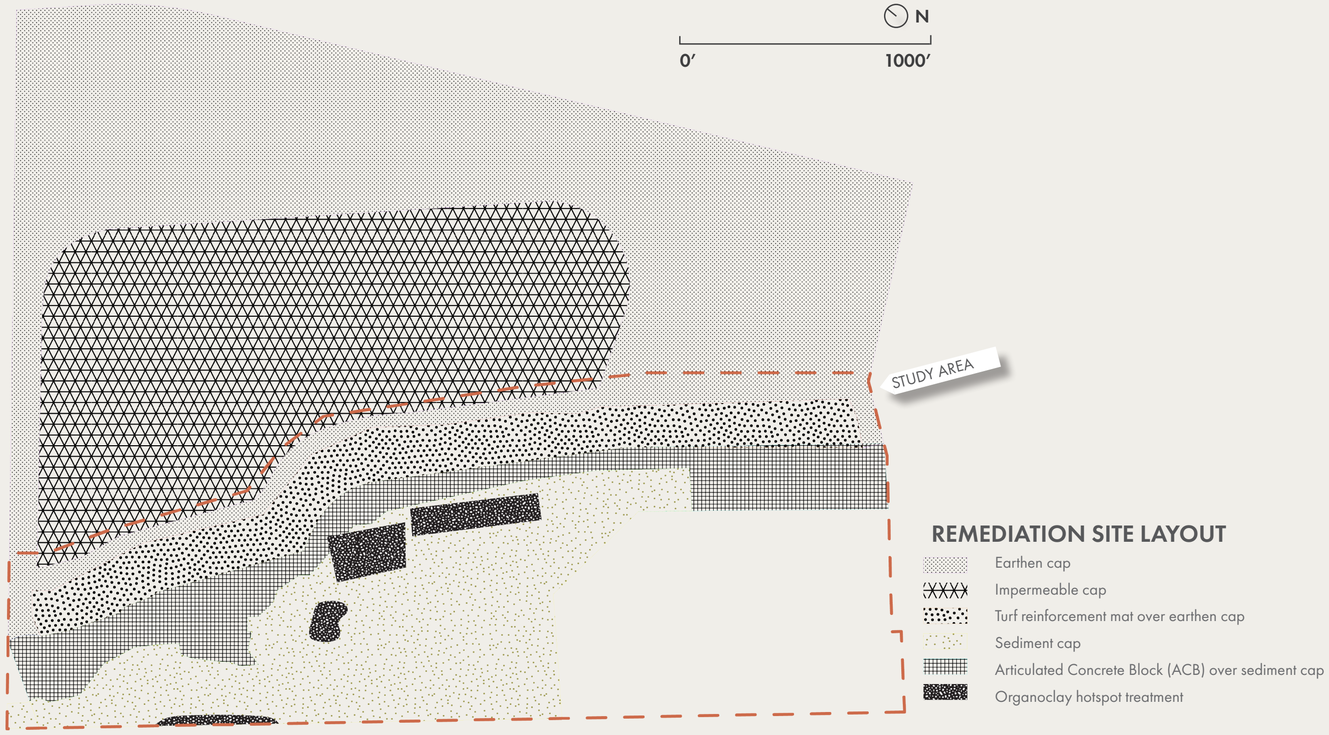
EXISTING CONDITIONS

# EPA & DEQ REMEDIATION

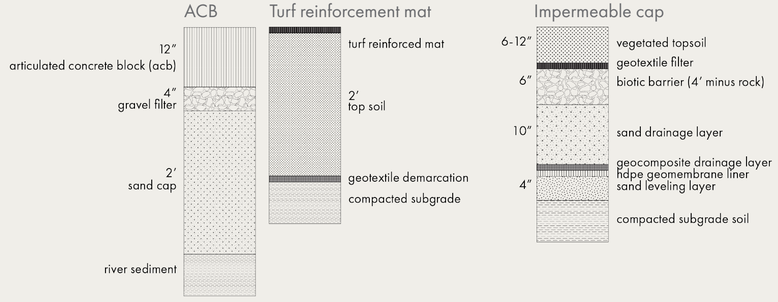
M&B WAS THE FIRST OF PORTLAND'S WATERFRONT SUPERFUND SITES TO RECEIVE EPA REMEDIATION DUE TO ITS STATUS ON THE NATIONAL PRIORITIES LIST



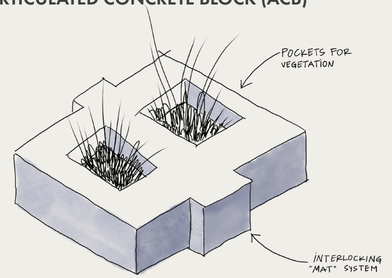
The M&B site was listed on the CERCLA National Priorities List in 1990, which is colloquially known as the "Superfund" program. The cleanup and capping of the M&B site was led by the US EPA with support from the Oregon DEQ. The general strategy on site as it stands today is a combination of an upland cap, sediment cap, and subsurface barrier wall that prevent contaminated groundwater from reaching the Willamette River. The upland or earthen cap aims to eliminate human contact with surface soil contamination. Between 1999 and 2005, over 32,000 tons of contaminated soil were excavated and replaced with clean sand. Areas where contamination remains were capped: a 15-acre impermeable cap inside the barrier wall and a 25-acre earthen cap beyond it. These caps prevent water infiltration and human exposure, respectively. The impermeable cap includes multiple layers, including an HDPE liner and is approximately 7 feet thick. Stormwater is managed through a drainage swale and retention pond system. A perimeter fence, monitoring access roads, and signage were added for long-term site control. In the river, contaminated sediment was capped in 2004 and 2005 over a 22-acre footprint. The cap includes sand, organophilic clay to block oil-like NAPL migration, and rock armoring to prevent erosion. Special structures like articulated concrete block mats and riprap were used in higher-energy areas to prevent erosion of the cap. A 6-acre riparian zone was created and planted with native vegetation to stabilize soils and support habitat. Groundwater remediation focused on removing creosote (a dense, oily NAPL). Since 1989, over 6,500 gallons have been recovered. NAPL monitoring and recovery continued through 2011. Combined with the subsurface barrier wall and caps, these efforts prevent migration of contamination into the river.




**WHAT IS A CAP? it depends!**




**ARTICULATED CONCRETE BLOCK (ACB)**



# CIRCULATION

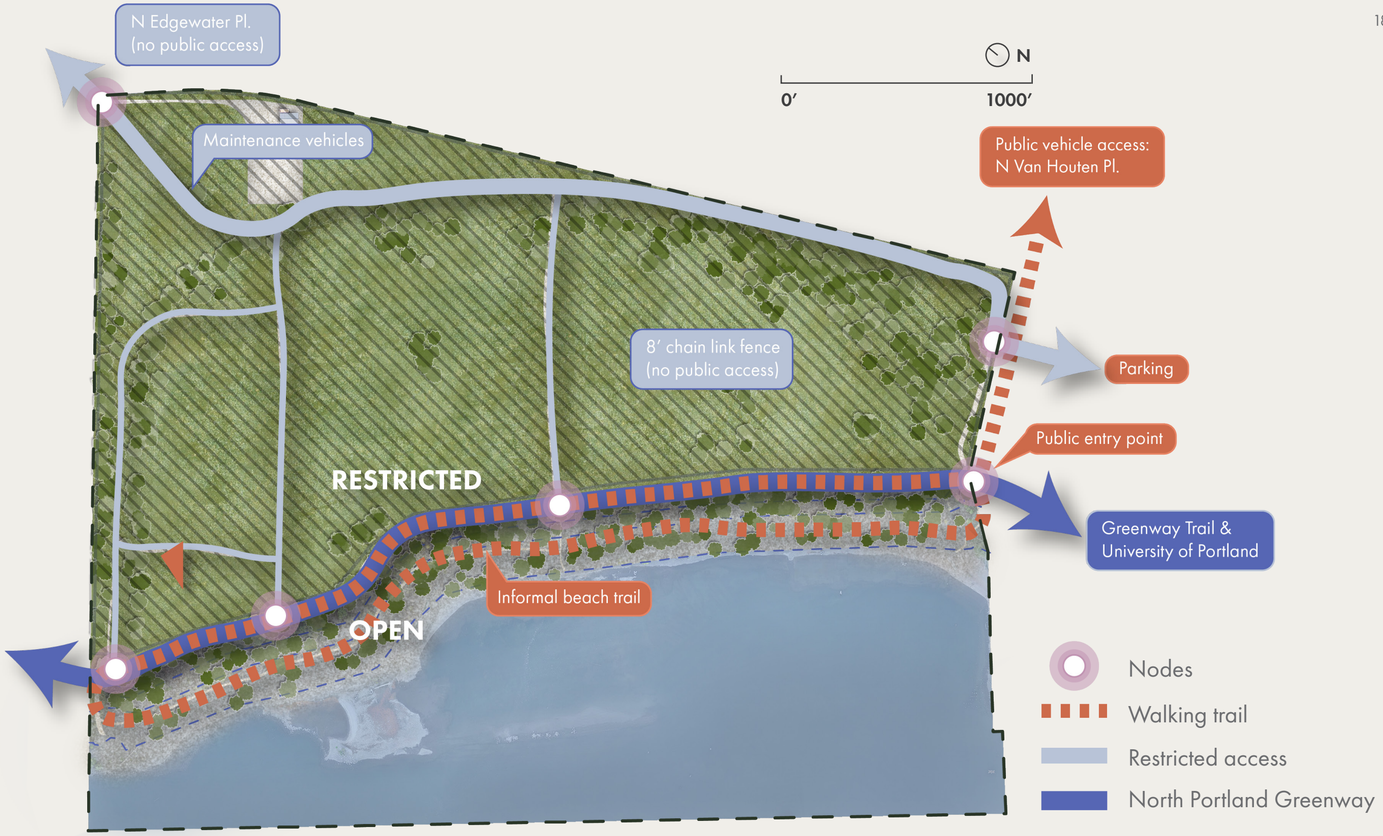
INFORMAL TRAILS AND A SEASONALLY DEPENDENT ACB-BEACH CONSTITUTE THE ENTIRETY OF CIRCULATION OPTIONS ON THE RIVERFRONT

Currently, circulation on the site is limited. There are no legal public pathways, although the beach and riparian area can be accessed on foot by parking at the University of Portland riverfront campus.

The upland portion of the site is restricted by chainlink fence. On the riparian slope, there is a somewhat flat terrace that has turned into a desire trail. Despite restricted access, the site draws informal use from University of Portland students, dog walkers, and fisherpeople who navigate down to the river via unofficial paths. This informal activity suggests a strong desire for access and interaction with the river.

This lack of circulation infrastructure reinforces the site's disconnection from surrounding neighborhoods and the river itself, highlighting the need for a thoughtful design approach that prioritizes safe and engaging options for walkers, runners, and bikers moving through the greenway.

There is significant potential to connect the site to broader networks, including the North Portland Greenway Trail and nearby neighborhood streets, ehnancing regional mobility and recreational use.




*Existing desire paths exist from the adjacent parking lot through the riparian area. The North Portland Greenway path has already been graded in its expected alignment. The upland portion of the site is restricted via chainlink fence.*

# VEGETATION

THREE DISTINCT ZONES WERE PLANTED BY THE PORTLAND BUREAU OF ENVIRONMENTAL SERVICES AND ESTABLISHED OVER THE LAST 15 YEARS

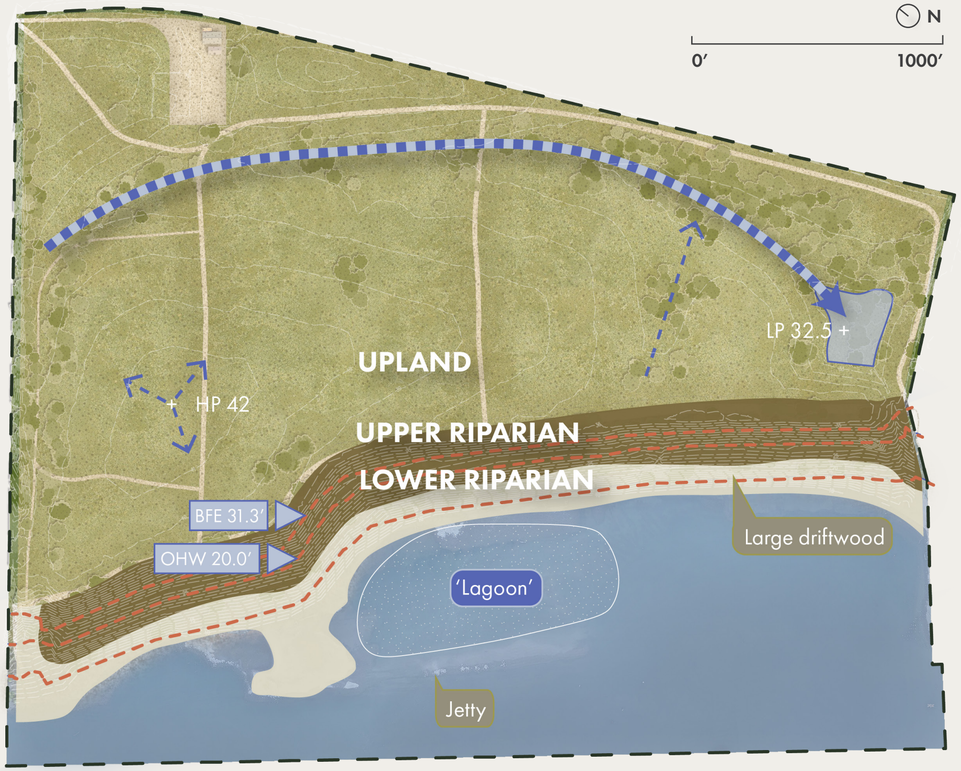
The site's topography gently slopes toward the shoreline, forming a three ecological zones that transition from upland to riparian habitats.

**Upland Zone**
Located at the highest and driest elevations, this zone supports drought-tolerant vegetation. Since much of this zone contains the impermeable cap, shallow-rooting herbaceous species are dominant. Outside of the impermeable cap, tree species like Pacific Madrone and Ponderosa Pine not only thrive in the hot, dry conditions. These areas are disconnected from the river hydrology and study area but play an important role in the overall vegetation context of the site.

**Upper Riparian Zone**
This transitional band experiences periodic soil moisture from rainfall and occasional flooding. It offers opportunities for additional layered shrub and understory plantings, contributing to habitat connectivity.

**Lower Riparian Zone**
Closest to the water, this zone is narrow and constrained by the steep, armored shoreline, which limits soil availability, tree growth, and interaction with the aquatic environment. Under natural conditions, this area would be occupied by riparian forest that shades the water, stabilizes the bank, and provides food and habitat for aquatic species. Although heavily modified, the site's position along the Willamette River makes it valuable for restoration. Increased herbaceous diversity could be introduced to enhance habitat and pollinator use.

Despite the ecological limitations of the constructed shoreline, the site retains significant value as part of the larger urban ecosystem.




*The site is structued into three different vegetation zones based on elevation and water level. The "upland," "upper riaprian," and "lower riparian."*

EXISTING CONDITIONS

# VEGETATION

HEAT, DROUGHT, AND LIMITED SOIL

***Limited soil depth coupled with heat and drought are causing savanna conditions in the riparian zones***



*Thriving madrone (Arbutus menziesii) and oak (Quercus garryana)*


*Struggling ash (Fraxinus latifolia) and maples (Acer macrophyllum)*

Ecologically, the site reflects its industrial past and the artificial creation of new land within the Willamette River. Historically part of the riverbed, the land was filled in over time for industrial use, resulting in heavily altered soils and hydrology. Today, capped soils remain in place to contain contamination, and while revegetation efforts have been largely successful, some trees are struggling due to limited soil depth and exposure to heat and drought. The success of madrones and pines suggests that other heat- and drought-tolerant species from more southern ranges such as California Laurel and California Incense Cedar could be viable choices to fill canopy gaps and increase habitat diversity.

This vegetation assessment developed by LNDLAB indicates limited canopy health in the riparian area.

| TREES | | SHRUBS | | GROUNDCOVER |
|---|---|---|---|---|
| Alnus rubra | 17% | Spiraea douglasii | 25% | Bromus carinatus |
| ~~Fraxinus latifolia~~ | ~~25%~~ | Cornus sericea | 25% | Elynus glaucus |
| Crataegus | 8% | Physocarpus | 10% | Deschampsia elongata |
| suksdorfii | 11% | capitatus | 10% | Hordeum brachyantherum |
| Rhamnus purshiana | 12% | Rosa pisocarpa | 5% | Lupinus albicaulis |
| Sasmbucus spp. | 4% | Lonicera involucraat | 15% | Gilia capitata |

**+ EXPAND PLANT LIST + ADD SOUTHERN RANGE SPECIES**

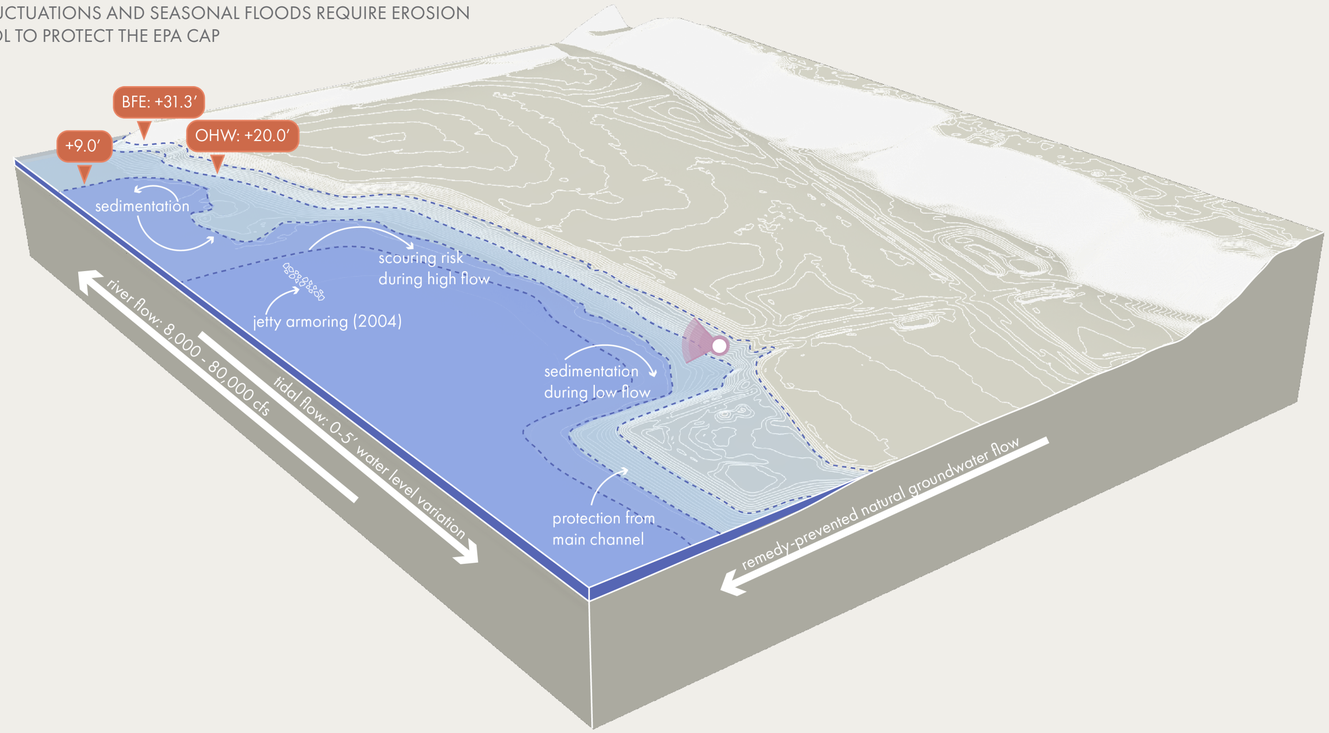
| TREES | | SHRUBS | | GROUNDCOVER |
|---|---|---|---|---|
| Alnus rubra | 17% | Spiraea douglasii | 25% | Bromus carinatus |
| Arbutus menziesii | 15% | Cornus sericea | 25% | Elynus glaucus |
| Quercus garryana | 15% | Physocarpus | 10% | Deschampsia elongata |
| Thuja plicata | 11% | capitatus | 10% | Hordeum brachyantherum |
| Umbellularia californica | 12% | Rosa pisocarpa | 5% | Lupinus albicaulis |
| Crataegus suksdorfii | 15% | Lonicera involucraat | 15% | Gilia capitata |
| Rhamnus purshiana | 4% | | | |
| Sasmbucus spp. | | | | |
| Arbutus menziesii | | | | |

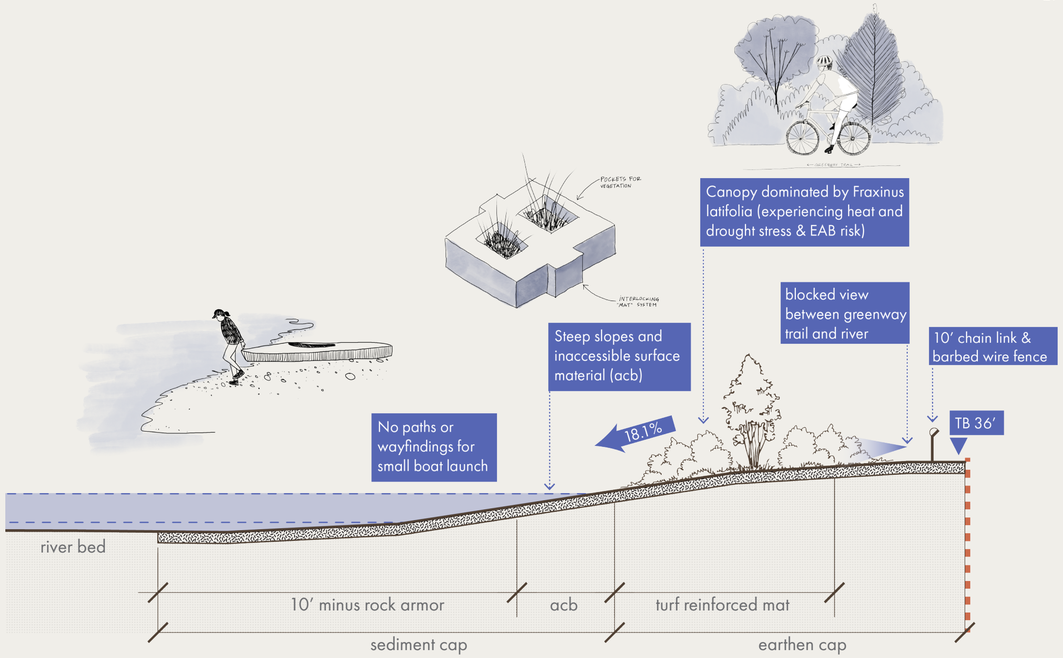
Image sources: *LNDLAB* (2024)

EXISTING CONDITIONS

# DYNAMIC RIVER EDGE

TIDAL FLUCTUATIONS AND SEASONAL FLOODS REQUIRE EROSION CONTROL TO PROTECT THE EPA CAP




## Hydrogeologic Setting

The point of confluence between the Willamette and Columbia Rivers is 11.3 RKm (river kilometers) north of the M&B Site. Because of its proximity to the Columbia, the Willamette River experiences tidal fluctuations between 2′ and 5′. During high river stages in the late winter and early spring, the sandy beach along the site is mostly submerged in water. During low river stages, significant river sediment is exposed. Generally, groundwater is approximately 20 to 25′ below the surface and flows toward the river, except during high water times when the river is higher than the water table. The current EPA remedy prevents groundwater flow from the site toward the river.

Notable features related to water habitat on site include Multnomah Channel at Rkm 5 (migrating spring Chinook salmon), Swan Island at RKm 12 (part of the Portland Harbor Superfund) and Ross Island at RKm 24. The river is critical corridor for anadromous fish (fish that spend part of their lives in the ocean and part of their lives in freshwater) such as white sturgeon, pacific lamprey, Chinook salmon, Sockeye salmon, Coho Salmon, and Steelhead trout (Mebane, 1992).

BEACH AT LOW WATER

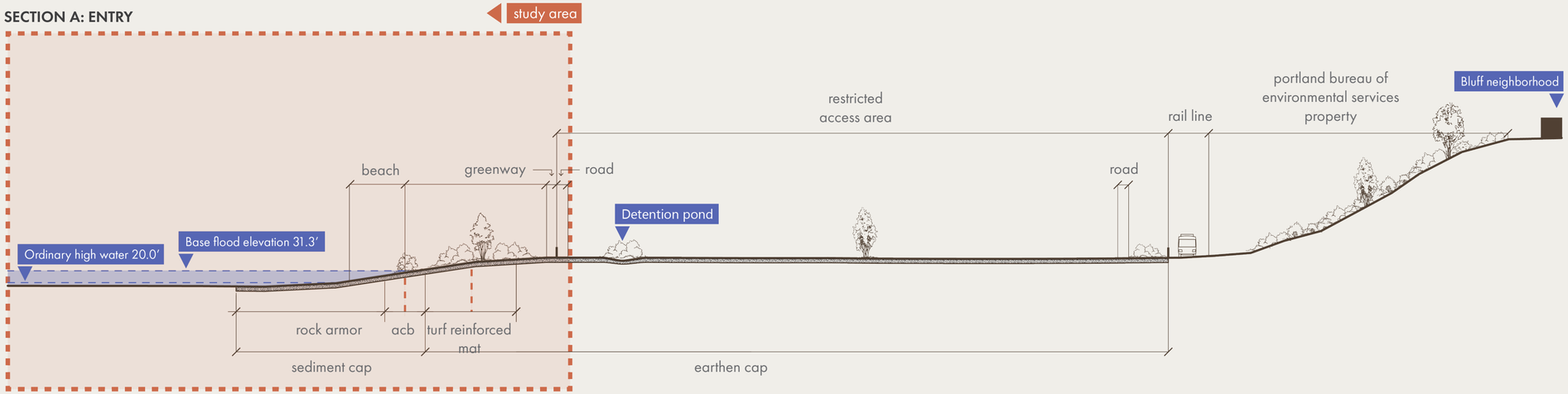
BEACH AT MEAN HIGH WATER

EXISTING CONDITIONS

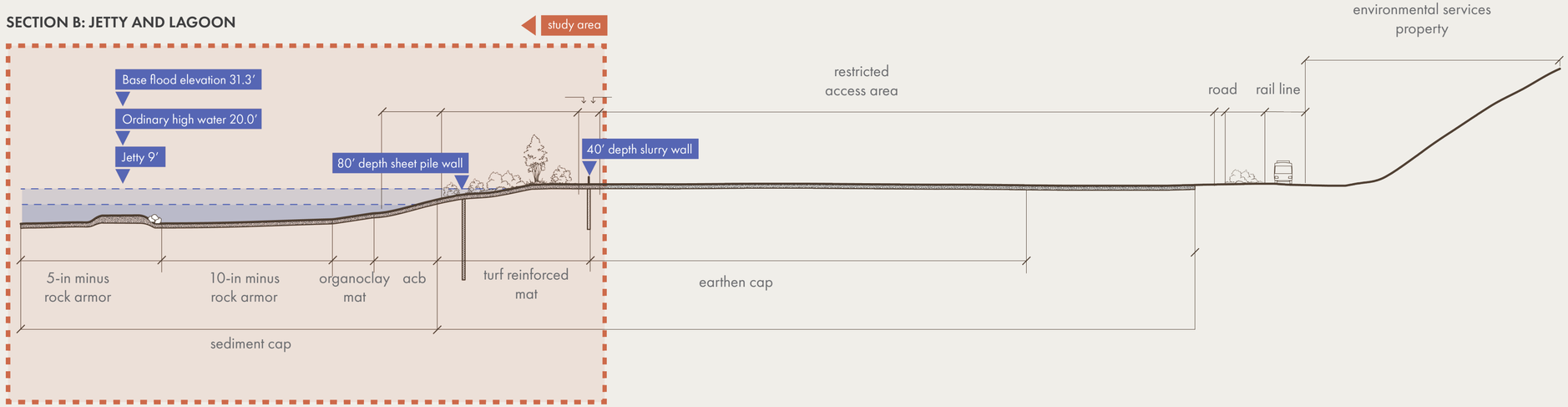
# SECTION STUDIES

COMPLEX SUBGRADE CAP ASSEMBLIES DEFINE THE RIVER EDGE

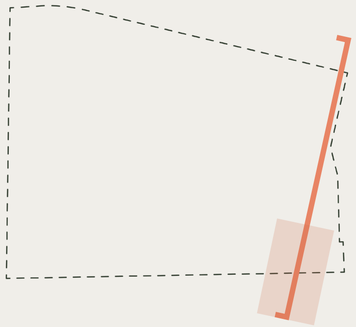
## SECTION A: ENTRY



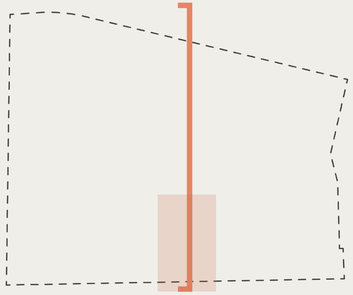

## SECTION B: JETTY AND LAGOON




## SECTION A: ENTRY



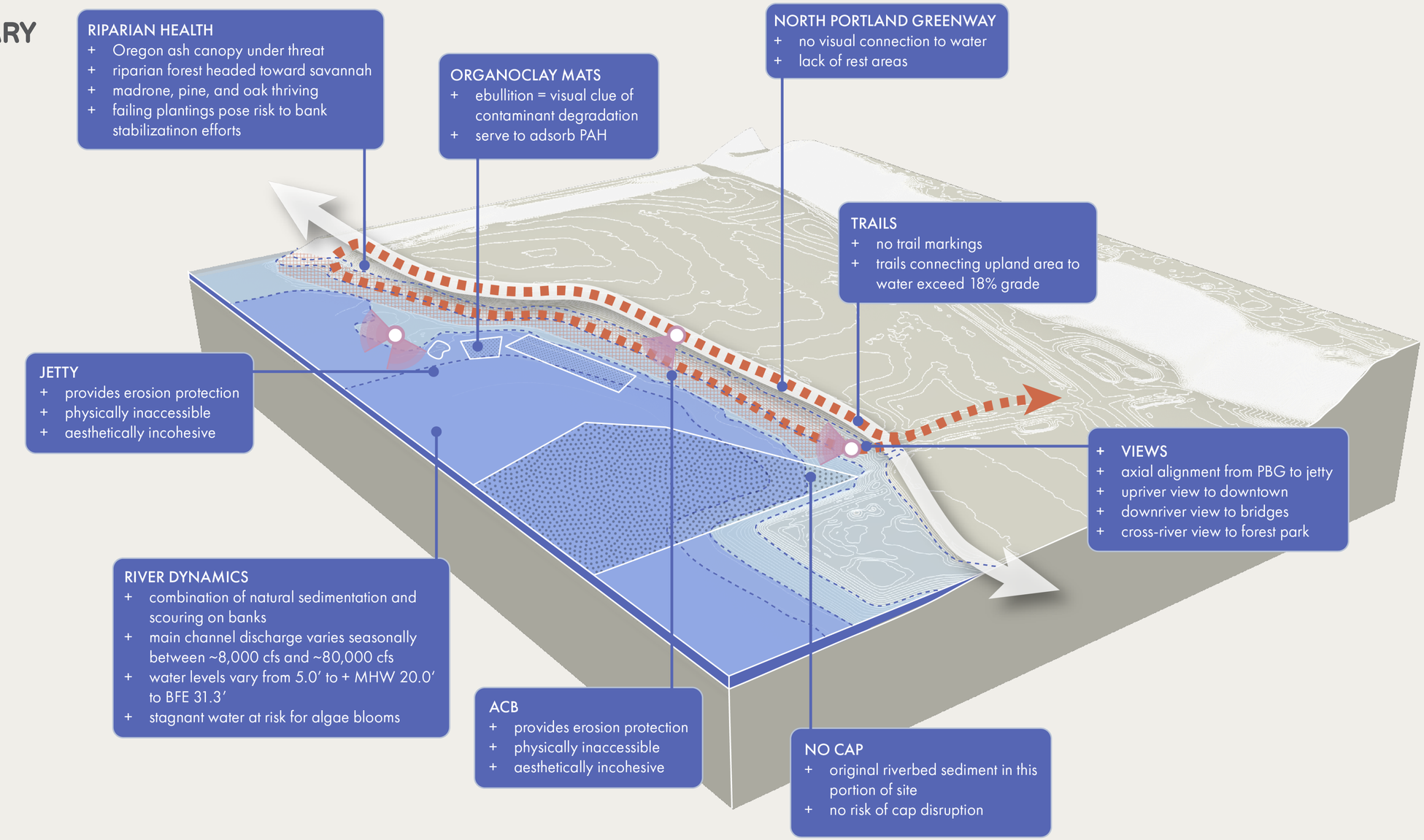
## SECTION B: JETTY AND LAGOON



EXISTING CONDITIONS

# SITE ANALYSIS SUMMARY

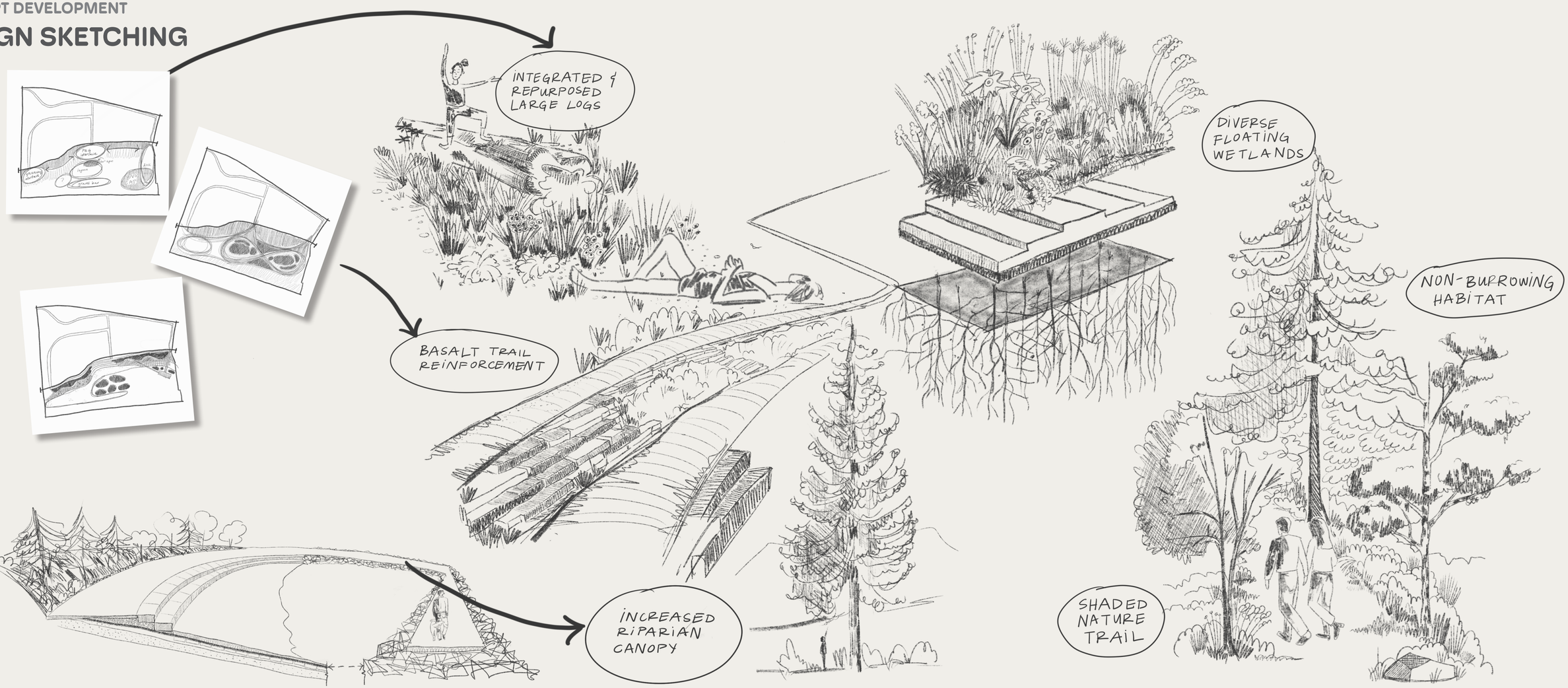
CONSIDERATIONS FOR DESIGN



# 04 CONCEPT DEVELOPMENT

CONCEPT DEVELOPMENT

# DESIGN SKETCHING

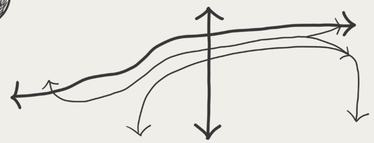


CONCEPT DEVELOPMENT

# DESIGN GOALS AND STRATEGIES

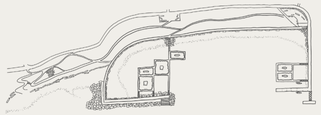
SPATIALIZING DESIGN GOALS

**IMPROVE CIRCULATION & ACCESS**
perpendicular and parallel connections;
hierarchy and variation

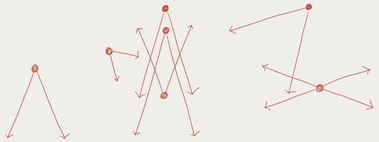


**ENHANCE ECOLOGICAL RESILIENCY**
heat and drought resilient riparian plantings;
aquatic & wetland biodiversity

**PROTECT CAP INTEGRITY**
dynamic and protective edges



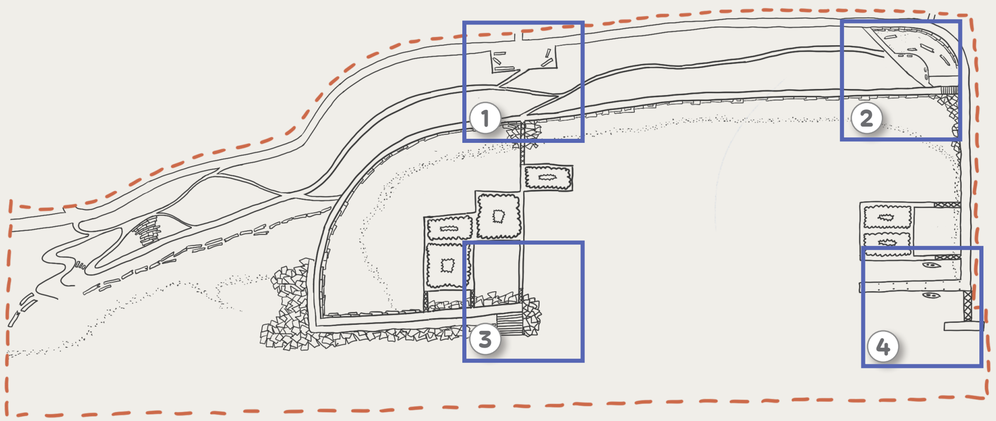
**CONNECT TO PEOPLE TO THE RIVER**
views; material reuse; site history interpretation



CONCEPT DEVELOPMENT

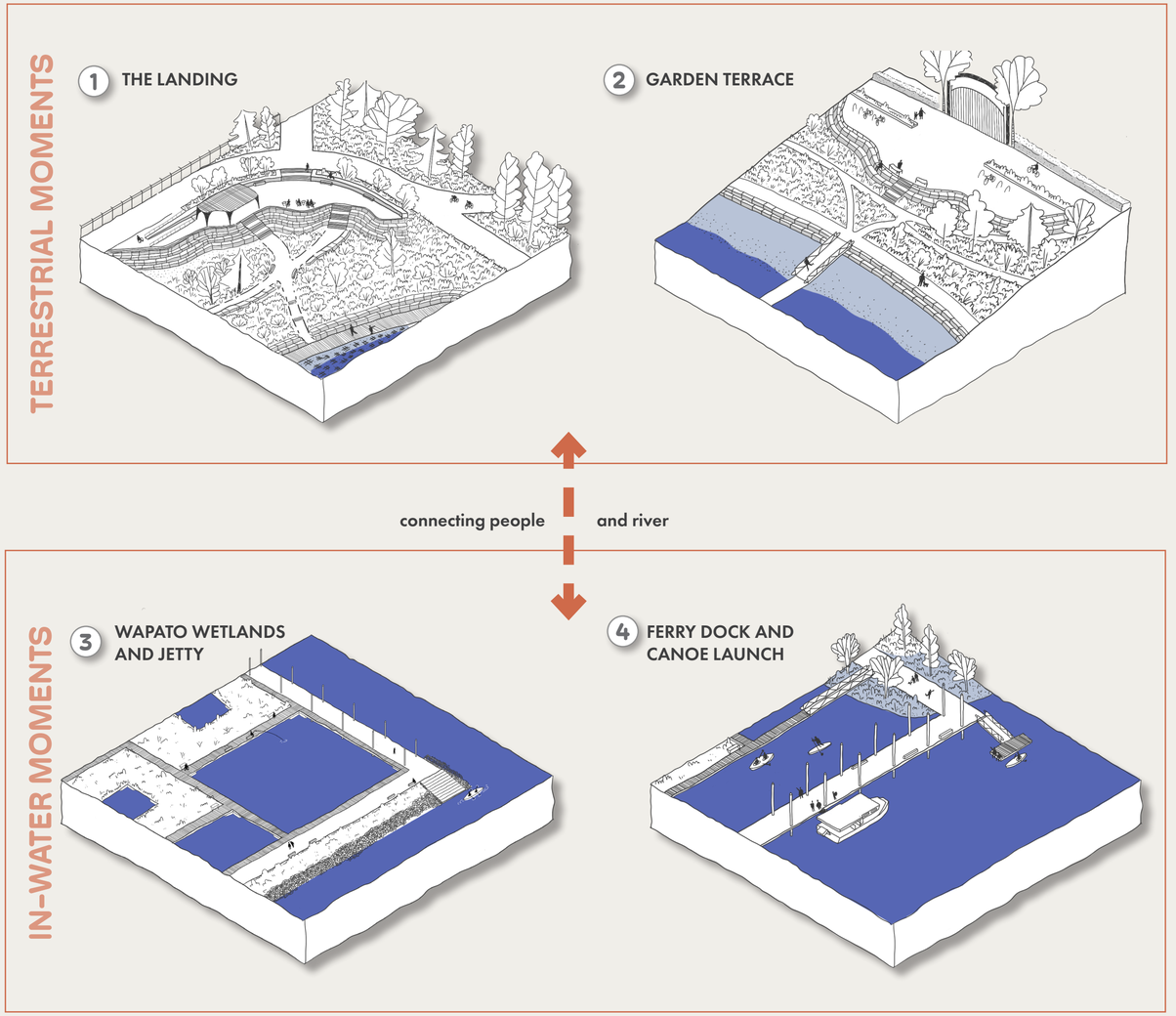
# MOVING THROUGH THE ECOTONE

CONNECTING LAND AND WATER THROUGH MOMENTS FOR RECREATION AND RESTORATION




These four nodes respond to the design goals, enhancing ecological function and leading to a more immersive and educational social space that encourages movement between land and water. They act as transitional zones where ecological and remediation processes are made visible and accesible. Each of these nodes serves multifunctional purposes that contribute to the design's main goals:

(1) Enhance ecological resiliency
(2) Connect people to river
(3) Improve access and circulation
(4) Protect cap integrity



CONCEPT DEVELOPMENT

# IN-WATER MOMENTS

PROTECTING THE CAP WHILE SUPPORTING AQUATIC HABITAT FUNCTIONS AND RECREATION

## FERRY DOCK AND CANOE LAUNCH

**GOALS**


**STRATEGIES**

+ create recreational **small boat** launch
+ align dock with main entry and **parking area** for direct access
+ provide opportunity for **panoramic views** upriver (downtown) and downriver (st. john's)
+ create Frog Ferry terminal, a pilot **transit option** for Portland commuters and **botanical garden visitors**

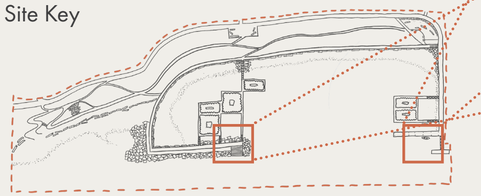
## WAPATO WETLANDS AND JETTY

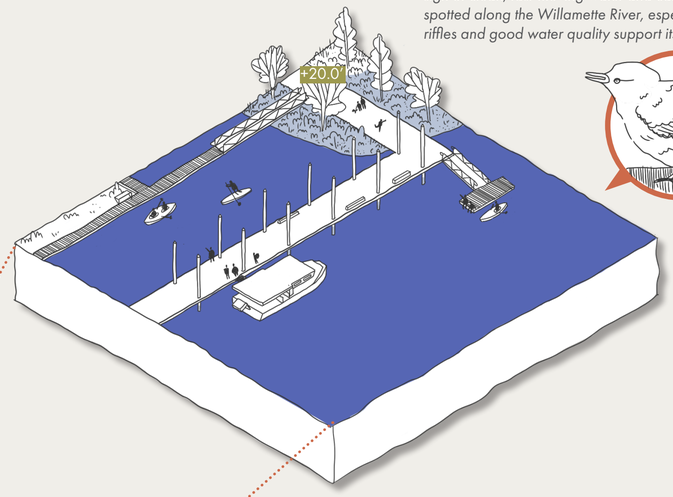
**GOALS**


**STRATEGIES**

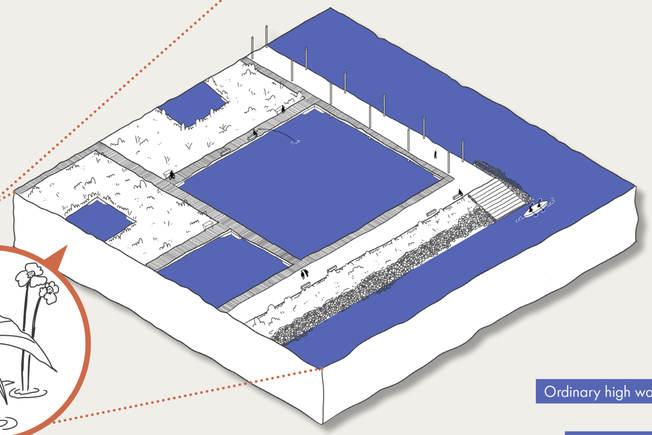
+ absorb **excess nutrients** like nitrogen and phosphorus from the Willamette via gas transformation and plant growth harvesting, **reducing risk of algae bloom**
+ provide fish and bird refuge
+ increase **biodiversity**
+ provide redundancy and support for remnant **PAH microbial degradation** (organoclay mats)
+ support **environmental education** opportunities for botanical garden

Site Key

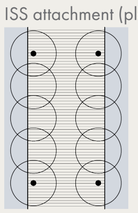





The American Dipper, *a small, aquatic songbird, is a sign of clean, fast-moving water and can sometimes be spotted along the Willamette River, especially where rocky riffles and good water quality support its foraging habits.*



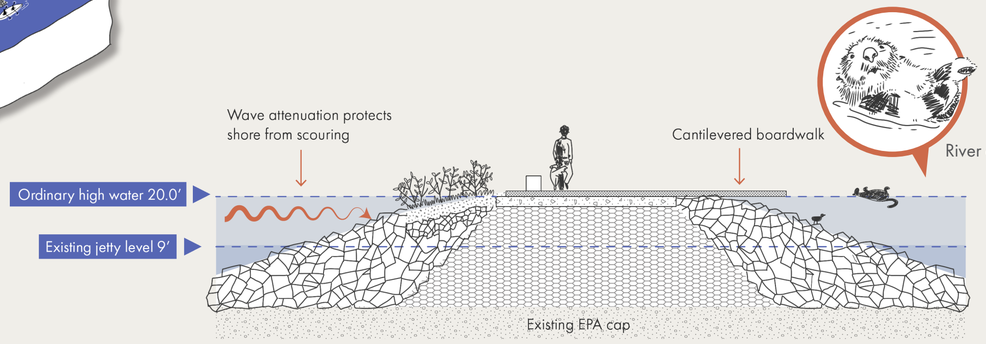
Wapato, *once abundant in dense wetlands along the lower Columbia, was a key food and trade resource for Native peoples before carp were introduced in 1893.*







IN-SITU STABILIZATION AND SOLIDIFICATION (ISS)*
*treatment option currently in design for gasco superfund site



CONCEPT DEVELOPMENT

# IN-WATER MOMENTS

WAPATO WETALNDS


Wapato (*Sagittaria latifolia*) is a cultural and ecologically significant plant in the Pacific Northwest. The tuberous, aquatic plant thrives in extensive wetland fields and was a crucial food and trade commodity for Native peoples in the Pacific Northwest. **Its tubers, known in Chinook Wawa as "Wapato" are highly valued for their nutritional content.** The plant's tubers form on the ends of long white rhizomes, typically developing their starches by September. They are often considered comparable in taste and texture to white potatoes and can even be consumed raw. Wapato requires standing water, full sun, and up to 12 inches of nutritious, fertile soil (Wapato, n.d.; "Wapato for the People," 2025).

**Historically, large wapato wetlands were prevalent along the lower Columbia River and the Willamette Valley**, described by early Euro-American explorers as "the great water gardens of the Indians." **In addition to providing sustenance, they also support a diverse range of wildlife**, especially waterfowl. Hummingbirds, bees, and butterflies feed on the pollen, while leaves work as a larval food source. Wapato wetlands have declined greatly since the introduce of carp to the region in the 19th century, but some recent restoration efforts have taken place ("Wapato for the People," 2025).

Sauvie Island, historically known as "Wapato Island," is directly downriver of the M&B site. Before Euro-American settlement, the island was home to hundreds of people and was known for its abundant resources, including wapato (Sauvie Island and the Hudson's Bay Company (U.S. National Park Service), n.d.).

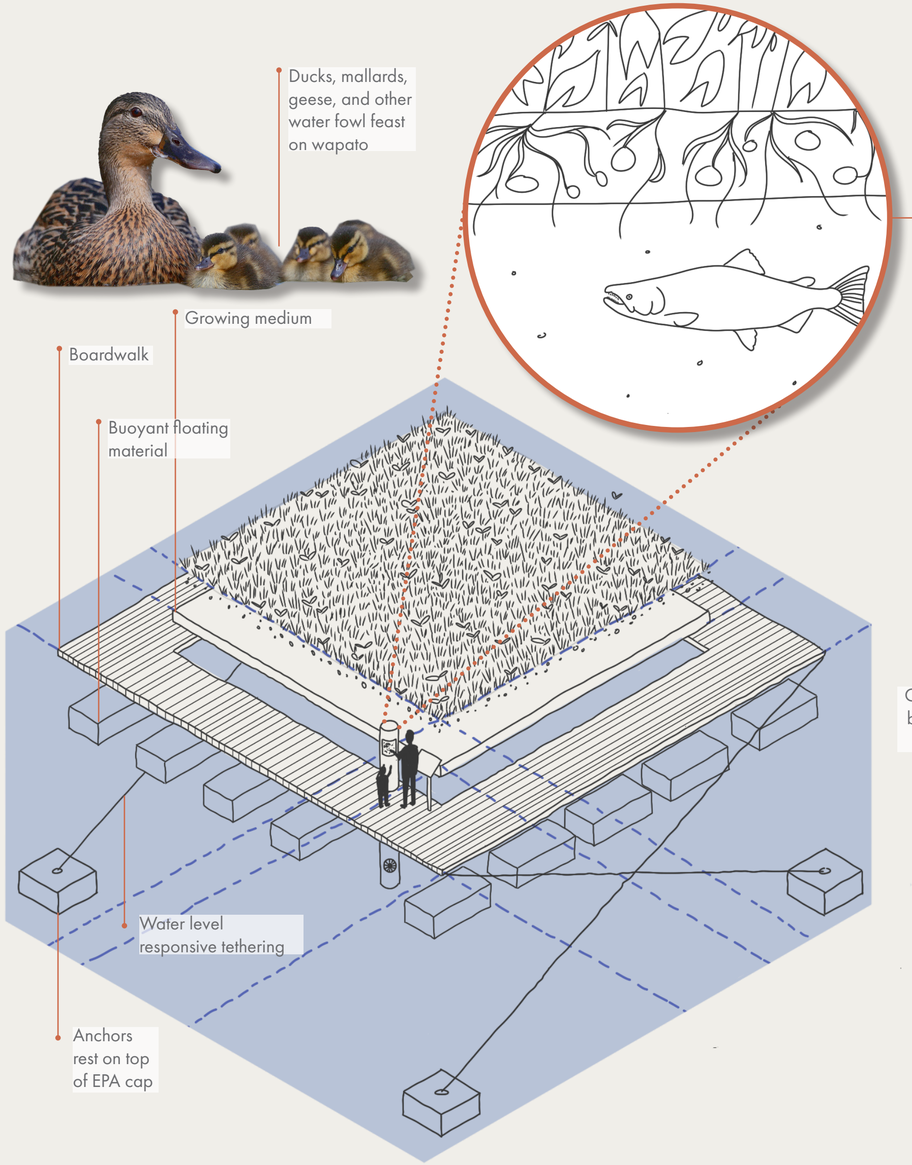



Image sources: *Kew Royal Botanical Gardens* (2025); stock.adobe.com (2025)

CONCEPT DEVELOPMENT

# IN-WATER MOMENTS

DESIGN CONCEPT

## FERRY DOCK AND CANOE LAUNCH

The ferry dock and canoe launch are designed as key access points that reconnect people to the Willamette River while reinforcing the integrity of the sediment cap. The in-situ stabilization method, in design right now at the nearby Gasco Site, provides low-impact infrasructure for water access. The ferry dock can serve as a terminal for the proposed Frog Ferry, which will eventually connect commuters between North Portland and downtown. The canoe dock can also serve as a landing point for recreational paddling, fishing, and even educational kayak tours for the botanical garden.

To protect the cap and avoid disturbance, the structural attaching of the dock will use in-situ stabilization rather than deep anchoring. This entails augering cores into the sediment, creating a hardened mix of sedimant and cement that can serve as a stable foundation.

FLoating dock components will be used for both the ferry and canoe access, allowing them to rise and fall with river levels. Access ramps and gangways are designed with consideration for ADA compliance, ensuring safe year-round accessibility.

## WAPATO WETLANDS

This concept draws inspiration from historic Wapato Wetlands, which were once a vital ecological and cultural resource in the region. It reimagines them through a contemporary lens as floating wetlands that reduce general pollutants while creating new opportunities for engagement and integration with the botanical garden.

The wetlands are anchored on top of the sediment cap and designed to rise and fall with the river's changing levels. Each module uses a PET growing medium and buoyant structure. As river water flows through the plant roots, pollutants such as nitrogen and phosphorus are absorbed, reducing the risk of harmful algae blooms that have been occurring nearby. Additional shading from the plants helps cool the water, creating refuge for aquatic animals. Design elements like underwater cameras and interpretive signage provide educational opportunities for tours and exhibitions from the botanical garden.

These wetlands will be a living classroom, evoking the cultural memory historic wapato wetlands while engaging visitors.

## THE JETTY

The jetty design draws inspiration from innovative shoreline infrastructure like the Living Breakwaters project in New York, which combines coastal protection with habitat creation and public engagement. Similarly, this jetty reduces wave energy and bank erosion by dissipating wave forces before they reach the shore, protecting both the site and the underlying EPA cap. This is a critical need if the articulate concrete block is covered with sand for a more accessible beach.

Building on this functional core, a cantilevered boardwalk creates a space for people to engage with the river—offering dramatic views both upriver and downriver, and new opportunities for sitting, strolling, and observing wildlife. Just like the Living Breakwaters, this jetty is designed to support biodiversity. Gaps in the structure and strategically placed stones and vegetation create refuge for species like river otters and birds, while enhancing ecological complexity.

Building on models like the Billion Oyster Project, which integrates ecological restoration with hands-on education, this jetty could support similar programs through signage, student partnerships, or botanical garden programming. It transforms a formerly contaminated edge into a place of resilience, learning, and connection—with benefits for both people and wildlife.

CONCEPT DEVELOPMENT

# TERRESTRIAL MOMENTS

TRAILS, TERRACES, LANDINGS, AND VIEWS INVITE VISITORS TO EXPLORE

## GARDEN TERRACE

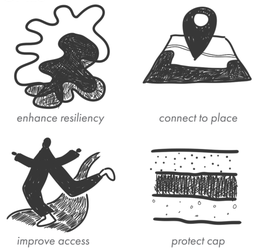
**GOALS**


**STRATEGIES**

+ draw b**otanical garden visitors** out to the water via views aligned on central axis
+ provide **resting point** for North Portland Greenway users
+ protect cap with stone terrace steps and seating, replacing ACB

## THE LANDING

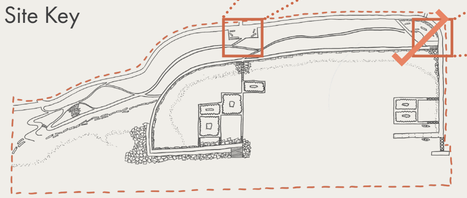
**GOALS**

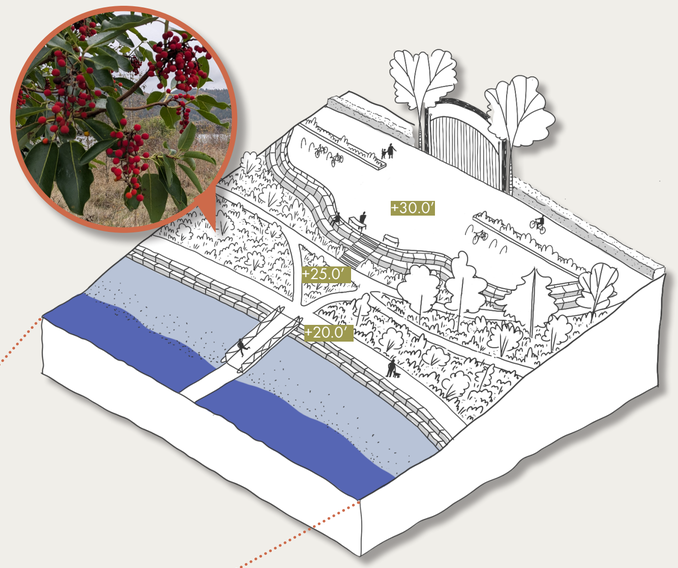


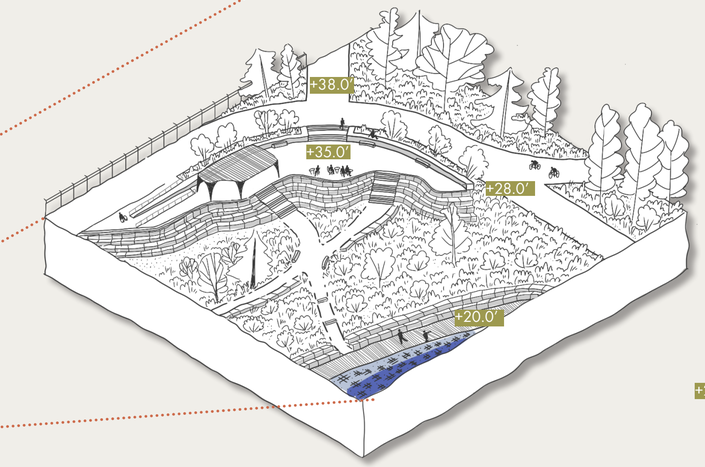

**STRATEGIES**

+ create entry point with **open vistas, seating, and shade**
+ **replace ACB** with terraced stone revetment
+ **connect** interpretive nature trail, North Portland Greenway, and The Docks and refuge
+ replace struggling upland riparian trees with **drought and heat tolerant** natives

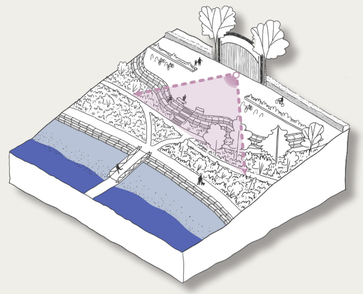
Site Key



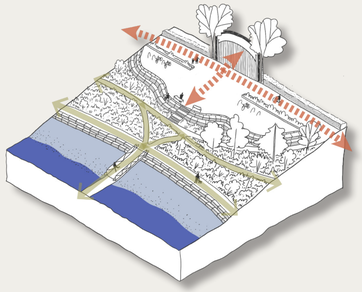


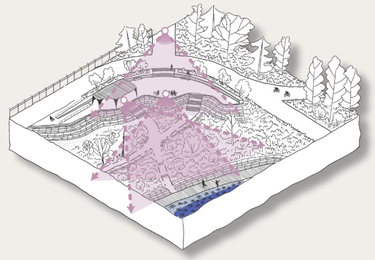



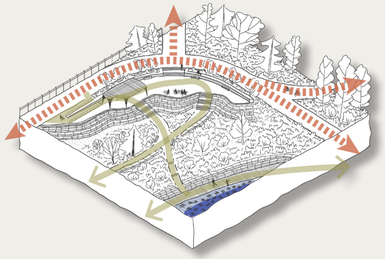

VIEWS



CIRCULATION







CONCEPT DEVELOPMENT

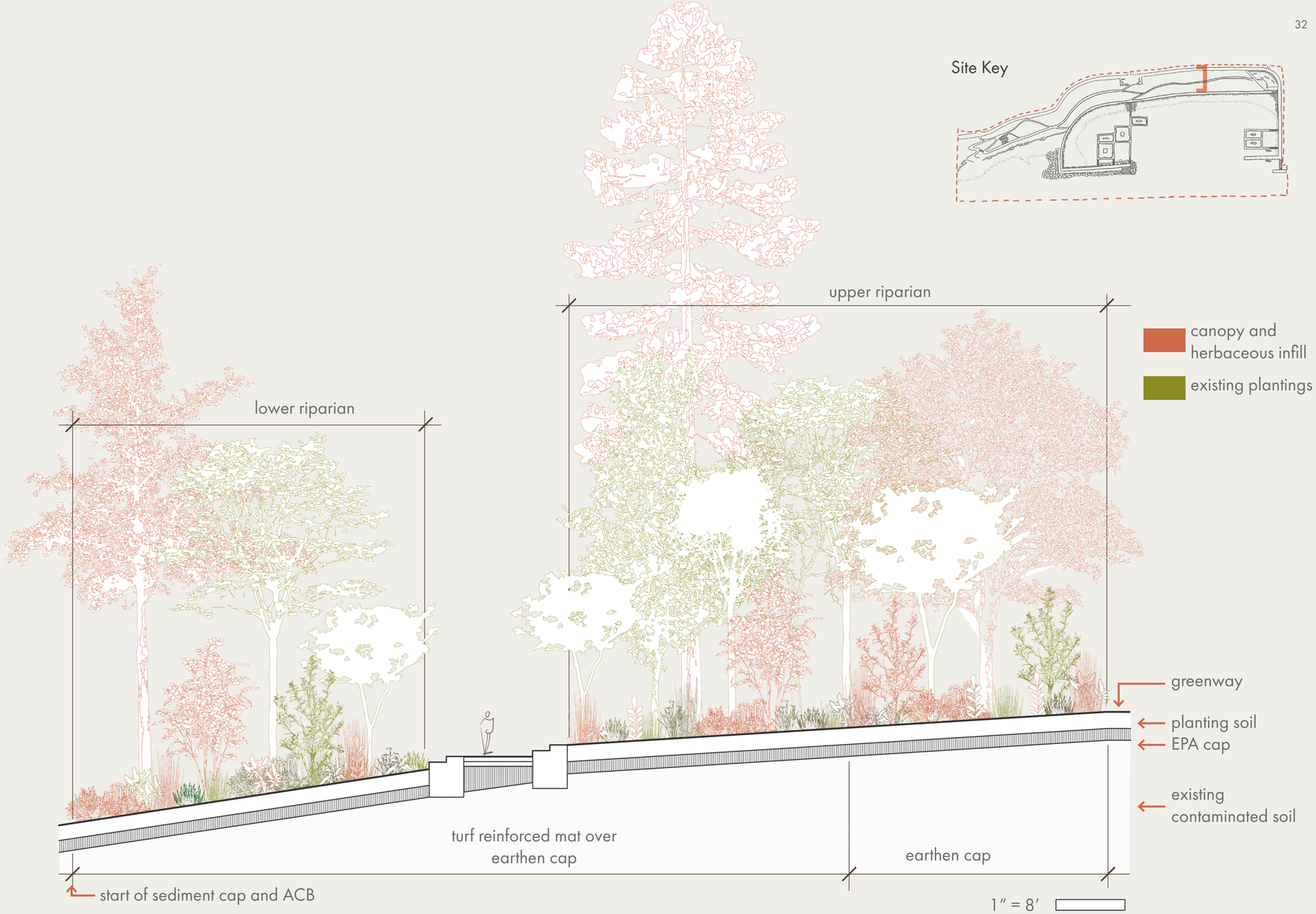
# TERRESTRIAL MOMENTS

RIPARIAN PLANTING STRATEGY

This section illustrates planting strategies along the restored riparian edge, integrating habitat support with engineered revetment treatments. Herbaceous layer infill is used to strengthen the diversity of the understory, filling vertical gaps with sedges, rushes, and forbs. These additions enhance erosion control and increase biodiversity, supporting a greater range of pollinators and birds.

In the canopy layer, the addition of evergreen species like Western Red Cedar (*Thuja plicata*) and California Bay Laurel (*Umbellularia californica*) balances the existing dominance of deciduous trees. These evergreen will provide year-round cover and contribute to thermal regulation for the exposed edge. Infill of additional species that are currently thriving on site such as Ponderosa Pine (*Pinus Ponderosa)* and Pacific Madrone (*Arbutus menziesii)* will continue to promote increased canopy cover and shading.

| EXISTING | INFILL |
|---|---|
| *SHRUBS AND TREES* | *SHURBS AND TREES* |
| *Alnus rubra* | *Arbutus unedo* |
| ~~*Fraxinus latifolia*~~ | *Arbutus menziesii* |
| ~~*Acer macrophyllum*~~ | *Pinus ponderosa var. willametensis* |
| *Crataegus suksdorfii* | *Thuja plicata* |
| *Rhamnus purshiana* | *Quercus garryana* |
| *Spiraea douglasii* | *Quercus kellogii* |
| *Sasmbucus spp.* | *Umellularia californica* |
| *Salix spp.* | |
| *Mahonia aquifolium* | *HERBACEOUS* |
| *Lonicera involucrata* | *Danthonia californica* |
| | *Grindelia integrifolia* |
| *HERBACEOUS* | *Madia elegans* |
| *Bromus carinatus* | *Clarkia amoena* |
| *Elynus glaucus* | *Epilobium ciliatum* |
| *Deschampsia elongata* | *Sidalcea hendersonii* |
| *Hordeum brachyantherum* | |
| *Lupinus albicaulis* | |



CONCEPT DEVELOPMENT

# TERRESTRIAL MOMENTS

DESIGN CONCEPT

## GARDEN TERRACE

The Garden Terrace serves as a designed pause within the broader greenway experience. It is an intentional moment of orientation, rest, and reconnection with the river. Visitors are invited to engage with the riverfront through framed views and purposeful circulation. Oriented along a central visual axis, this area draws botanical garden visitors down to the water's edge, offering a quiet resting point that supports walkers, bikers, and casual visitors using the North Portland Greenway.

The design replaces the existing articulated concrete block (ACB) with a more naturalized terraced stone system, which protects the cap while also serving as informal seating and offering a more tactile and human-scale interface
This multifunctional terrace not only enhances access and comfort but also contributes to ecological resilience by stabilizing the slope and integrating with native plantings.

The paving pattern at the Garden Terrace subtly references historical log jams, honoring the site's industrial legacy and the dynamic relationship between industrial wood, water, and time.

## THE LANDING

The Landing marks a key threshold where most visitors will enter the site and see the river up close for the first time. Strategically located to function as a southern entry point into the site, this areas offers wide vistas, ample seating, and a covered gathering area for community groups or small events.

The Landing links the interpretive madrone trail with the North Portland Greenway and nearby nodes on site such as the ferry terminal and canoe launch. As Greenway users pass through, the Landing encourages them to stop and explore the riverfront.

Circulation at the Landing is designed to be fluid and intuitive, with wide paths, terraced seating and shaded rest areas that support both high-mobility users and those seeking slower-paced exploration and requiring ramps to navigate the grade.

Ecologically, this area is transformed through the replacement of struggling riparian trees like ash and maple with drought and heat-tolerant native species, anticipating future climate conditions and improving habitat resilience. Socially, The Landing represents a cultural reorientation: from exclusion and degradation to inclusion, access, and stewardship. By providing space for gathering, education, and reflection, it repositions the riverfront as a shared civic asset. welcoming a diversity of users while honoring the site's unique environmental and cultural context.

## MADRONE TRAIL

The Madrone Trail is envisioned as a shaded refuge and immersive nature path that contrasts with the site's more exposed areas. It aligns closely with the current desire trail through the riparian area, but with strategic curves that hide and reveal key moments. Flowing gently through restored upland vegetation, the trail invites a slower, more contemplative pace compared to the Greenway. It more easily accommodates walkers, birders, and casual visitors seeking a sensory connection to the landscape. Strategic openings in the tree canopy provide framed views toward the river, balancing enclosure with orientation. Benches and stepped seating areas, integrated into the terraced stone revetment, offer rest points along the trail and protect the sediment cap below. These interventions are not only functional but reinforce a layered spatial experience—moving from the denser riparian edge up toward meadow upland and greenway zones. Ecologically, the trail sits atop a carefully engineered section of the site, where planting soil, sediment cap, and underlying contaminated layers are held in place by a durable stone revetment system. This structure mitigates erosion and wear from foot traffic while supporting diverse native planting.

# 05 DESIGN

DESIGN

# EDGEWATER COMMONS PARK


1. north portland greenway
2. raised floodable path
3. ecological jetty
4. wapato wetlands
5. garden terrace
6. tide line path
7. madrone trail
8. the landing
9. canoe launch
10. ferry dock

# GARDEN TERRACE

DESIGN

# WAPATO WETLANDS

DESIGN

# MADRONE TRAIL

DESIGN

# PROJECT SUMMARY

CONCLUSIONS AND THOUGHTS ON THE FUTURE

Urban waterfronts are among the most contested and dynamic spaces in the city. They are simultaneously cultural commons, ecological thresholds, and often areas of capital investment. Portland, like many post-industrial North American cities, has much work to do to restore its river. This project has explored how remediated riverfronts can move beyond binary frameworks of access versus protection and instead embrace complexity. By understanding the waterfront as both a spatial edge and an ecological transition zone, this project envisions a new landscape on the former McCormick & Baxter Creosoting facility that is resilient, accessible, and hopeful. As climate pressures and urban social ills intensify, there is both urgency and opportunity to reimagine these industrial river sites not just as infrastructure, but as opportunities for reciprocity between land and water, people and place, memory and future.

The impact of this project is
Working on this project has deepened my understanding of the complexities of design, especially those that have the ambition to engage with both complex ecological and infrastructural systems and social history. As someone with a background in community engagement, I've often thought about public space in terms of who uses it and who is left out. This project pushed me to think more expansively not just about access, but also about the care and stewardship of a designed space. Although I don't have any answers within my design about those topics, this project has shaped the questions I will carry with me as I move into professional practice.

# 06 APPENDIX

Precedent Study Summary
Precedent Scale Study
Precedent Design Elements
Precedent Spatial Organization

APPENDIX

# PRECEDENT STUDY

SUMMARY

## DIAMOND TEAGUE PARK, WASHINGTON, DC

Designed by MKSK, Diamond Teague Park is a waterfront park in Southeast Washington, DC. The design enhances public access to the Anacostia River and works in harmony with the EPA cap that sits below the site. The design connects previously disparate sections of the Anacostia Riverwalk Trail, creating a continuous and engaging waterfront experience through a network of piers, docks, and promenades.

### Spatial Organization and Design Elements

The park's layout strategically balances access, ecology, and recreation, with three primary spatial components:

- A combination of at-grade and elevated walkways, provide seamless pedestrian connectivity while minimizing disturbance to the capped riverbank.
- Modular and flexible floating docks and piers serve as boat launches for small, human-powered watercraft, including canoes and kayaks and public gathering spaces offering views of the Anacostia River and surrounding urban fabric.
- A floating island system supports aquatic habitat and filter pollutants from the water.

These design elements are responsive to the tide and adpt to fluctuating water levels, ensuring year-round access and function. Stewardship is a critical component of this project, as the planting was installed and is maintained by the volunteers from the Earth Conservation Corps. This partnership fosters ongoing public engagement and environmental education, ensuring the site remains a living, evolving landscape rather than a static public space.

## WILD MILE, CHICAGO, IL

The Wild Mile is a 17-acre urban revitalization project transforming the North Branch Canal of the Chicago Rivee. The design directly addresses the challenges of a heavily modified industrial waterway characterized by constructed edges of sheet pile, timber, riprap, and concrete. Unlike natural riverbanks, these hard edges create a stark divide between aquatic and terrestrial habitats, eliminating a riparian transition zone.

### Spatial Organization and Design Elements

The design introduces floating habitats that integrate ecological restoration, public access, and environmental education, while avoiding major structural modifications to the industrial riverbanks. The Wild Mile is organized into three key spatial elements:

- Floating wetlands: modular floating platforms support a variety of native wetland plant species, providing habitat for fish, birds, and invertebrates. The wetlands improve water quality by filtering pollutants and reducing urban runoff impacts.
- Observation decks and seating: these are integrated into the floating system, providing gathering spaces for education and recreation.

The floating structures are designed to minimize intervention in the riverbed, making them a model for adaptive reuse of industrial waterways. By creating floating habitats instead of modifying the riverbank, the design is successful in connecting people to the water, enhancing biodiversity, and improving water quality.

## HARBOR WETLAND, BALTIMORE, MD

Ayers Saint Gross's work at the National Aquarium in Baltimore, MD takes an innovative approach to urban waterfront design, integrating floating wetlands as a key ecological and educational intervention. Their research aims to restore aquatic health in the harbor by improving water quality, promoting biodiversity, and fostering public stewardship through a "living laboratory."

### Spatial Organization and Design Elements

The floating wetlands are strategically placed along the Inner Harbor's edge, creating a dynamic interface between land and water. The wetlands are modular units. Their spatial arrangement mimics natural tidal ecosystems, providing critical habitat for fish, birds, and aquatic organisms. They also serve to **soften the urban waterfront**, introducing a vegetated buffer that contrasts with the surrounding hard infrastructure. Their position adjacent to the National Aquarium facilitates **access and visibility**.
The design process required extensive testing to refine the wetlands' buoyancy, materiality, and habitat quality. The final design incorporates lightweight, durable floating platforms with planted vegetation, engineered to withstand urban waterfront conditions while supporting native aquatic life. Beyond their ecological function, the floating wetlands serve as an interactive educational space. Key design elements include:

- Water quality sensors that allow visitors to monitor real-time environmental data.
- An outdoor classroom where aquarium staff lead tours and hands-on learning sessions.

## BROOKLYN BRIDGE PARK, BROOKLYN, NY

Brooklyn Bridge Park is regarded as a benchmar for waterfront development due to its success in responding to climate change, reusing site materials, enhancing habitat, and providing diverse public spaces. Designed by Michael Van Valkenburgh Associates (MVVA), the park transformed Brooklyn's former industrial waterfront into the gem of the city.

### Spatial Organization and Design Elements

The park's design is structured around a complex and varied waterfront edge, offering multiple ways for people to engage with the water while accommodating ecological and climate-responsive strategies. Key spatial elements include:

- Piers: the piers make up the main organization of the park by reusing former shipping piers as recreational spaces with a variety of programming
- Tidal inlets: these provide soft edges and allow for dynamic aquatic habitat
- Sandy beaches: these allow people to get down to the water and experience a naturalistic landscape in the middle of the city
- Rip-rap armored slopes: strategically-placed revetment mitigates wave energy, reduces erosion, and supports intertidal habitat.

Brooklyn Bridge Park is large and complex, but the integration of social and ecological infrastructure on the waterfront can be scaled to smaller sites, too.

APPENDIX

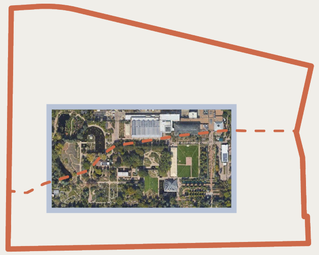
# PRECEDENT STUDY

SCALE STUDY

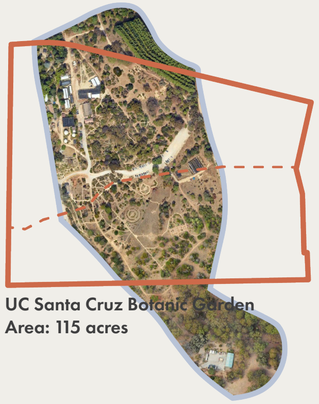
PBG SITE / BOTANICAL GARDENS
1″=600′

Houston Botanic Garden
Area: 132 acres

Brooklyn Botanic Garden
Area: 52 acres

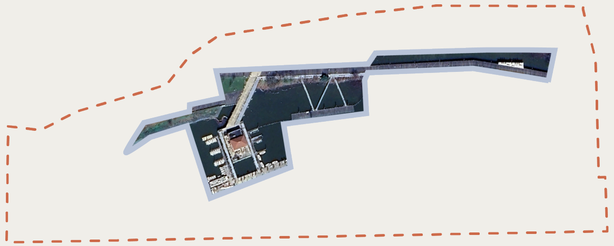


Denver Botanic Garden
Area: 24 acres

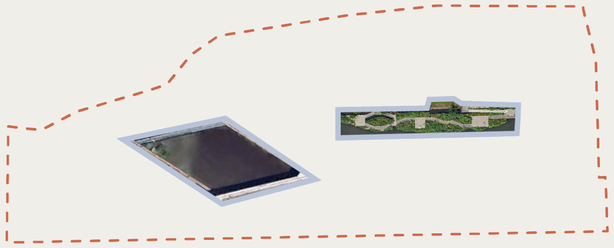


UC Santa Cruz Botanic Garden
Area: 115 acres

STUDY AREA / WATERFRONTS
1″=300′



Diamond Teague Park
Area: 39,000 sq. ft.



Harbor Wetland
Area: 0.25 acre

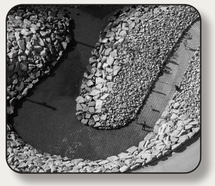
Wild Mile
Area: 0.25 acre

Brooklyn Bridge Park Piers 2 & 3
Area: 19 acres

APPENDIX

# PRECEDENT STUDY

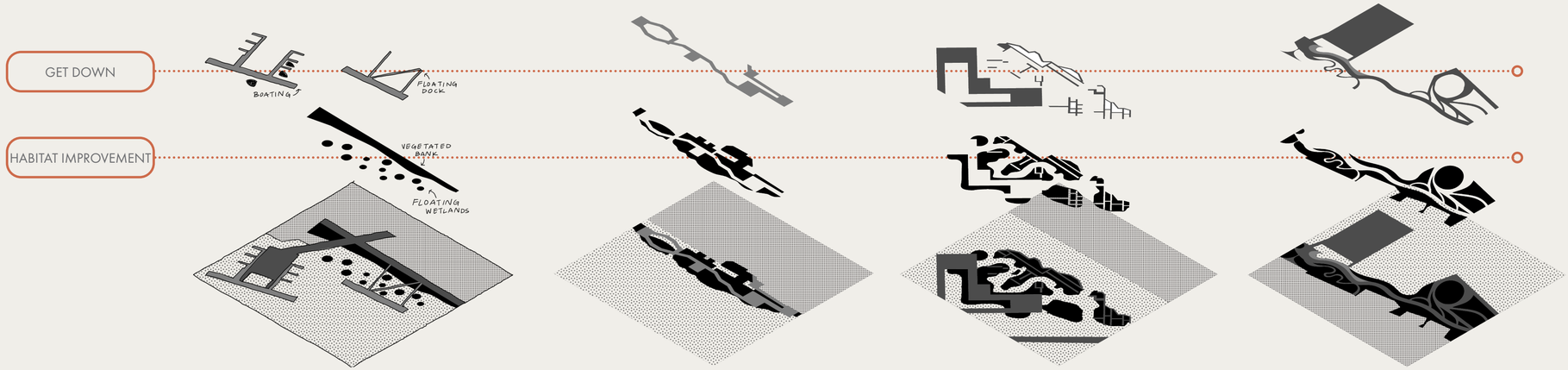
DESIGN ELEMENTS

| | WATER RECREATION | VIEW | INDUSTRIAL MEMENTOS | PHYTOTECHNOLOGY | HABITAT IMPROVEMENT | EDUCATION/RESEARCH | GET DOWN |
|---|---|---|---|---|---|---|---|
| DIAMOND TEAGUE PARK |  |  |  |  |  | |  |
| WILD MILE |  |  | |  |  |  |  |
| HARBOR WETLAND | | | |  |  |  |  |
| BROOKLYN BRIDGE PARK |  |  |  | |  | |  |

APPENDIX

# PRECEDENT STUDY

SPATIAL ORGANIZATION




DIAMOND TEAGUE PARK

WILD MILE

HARBOR WETLAND

BROOKLYN BRIDGE PARK
PIER X

# GLOSSARY

**SUPERFUND**
Superfund is the colloquial term for sites listed on the Comprehensive Environmental Response Compensation and Liability System (CERCLIS) as part of the Comprehensive Environmental Response and Liability Act (CERCLA) of 1980, which ranked contaminated sites and mandated their cleanup.

**BROWNFIELD**
Abandoned or underutilized industrial and commercial properties where environmental contamination complicates redevelopment. Estimates suggest there may be 400,000 such sites across the United States (US EPA, 2015).

**CONTAMINANT**
Contaminants are physical or chemical substances that pose harmful risks in the environment. There are two types of contaminants: organic and inroganic. Organics are compounds that "typically contain bonds of carbon, oxygen, and nitrogen," such as petroleum hydrocarbons and pesticides. Inorganics are naturally occurring elements such as Nitrogen, Phosphorus, and Zinc (Kennen & Kirkwood, 2015).

**CREOSOTE**
Creosote is a sticky black material that typically comes from the processing of coal and is used as wood preservative. Creosote was used to process railroad ties and telephone poles at the McCormick & Baxter Company. Creosote contains PAH.

**PAH**
Polycyclic Aromatic Hydrocarbons (PAHs) are a classification of chemicals that form from incomplete combustion and degradation of organic molecules. PAHs are carcinogenic and are a priority pollutant.

**NAPL AND DNAPL**
Non-Aqueous Phase Liquids (NAPLs) and Dense Non-Aqueous Phase Liquids (DNAPLs) are a type of liquid that exists separately from water and can move through the hydraulic gradient in plumes. PAHs on site exist as NAPLs and DNAPLs.

**REMEDIATION**
"Environmental "cleanup" and "remediation" are terms used interchangeably by recipients to refer to actions taken to respond to a hazardous material release or threat of a release that could affect human health and the environment (e.g., removal of pollution or contaminants from soil, groundwater, sediment or surface water)" (US EPA, 2015).

**REMEDY**
A specific method designed by the EPA to clean up or remediate a site.

**SOIL AND SEDIMENT "CAPS"**
A "cap" is a general term used to describe a range of contaminant containment strategies that hold soil or sediment in place. Some caps are fully impermeable and some are semi-permeable, restricting the flow of water and the spreading of contamination. Caps do not remove contamination, but hold it in place.

**GEOTEXTILE**
This thin, fibrous material was layered under the ACB and 10in-minus layers of the M&B cap to prevent sand migration downward through the armoring.

**REVETMENT**
Revetment, or armoring, protects against erosion. On a shoreline, revetment absorbs the energy of incoming water. Different revetment strategies were employed across the M&B site to protect the sediment cap. Revetment options were chosen based on potential currents and wave and erosion energy.

**EBULLITION**
Degredation of organic material within the organophylic clay periodically releases gases (methane)that appear as bubbles on the surface of the water. This is an indication that the anearobic conditions in the clay mats are leading to microbial PAH degradation.

**SEDIMENT CAP**
A layer or multiple layers of uncontaminated material placed over contaminated sediment to isolate it from the water column and reduce exposure to humans and animals.

**ACCESS / ACCESSIBILITY**
Access refers to the ability to physically and visually reach the waterfront. This includes the design of paths, connections, landings, views from both afar and within physical reach of the water. Accessibility refers to the assurance that all people, regardless of their abilities or identities, can enjoy access to the waterfront. This includes physicaly features like lighting and seating and more abstract design choices that make a space feel safe and usable for diverse interests.

**GREENWAY**
A shared-use path (pedestrians, runners, bicycles, scooters, etc.) The North Portland Greenway is a vision to connect the East Bank Esplanade with the Columbia River. The plan dates back to the 1967 Oregon Legislature establishment of the Willamette River Greenway, which sets aside park and conservation area between Eugene and Portland.

**SENSE OF PLACE**
The design of a physical environment that is unique, memorable, and with spirit — or Genius Loci. Sense of place is developed when a design is integrated with cultural, historical, and ecological context. Designing for sense of place helps people feel attached to place, welcomed in a place, and even politicized or engaged with the care of the place.

**RIPARIAN**
Ecological zone between land and river. These zones typically provide erosion control, habitat, and water quality benefits.

**HABITAT**
The natural environment in which an organism lives. Habitat procides food, shelter, and other conditions necessary for survival.

**PHYTOTECHNOLOGY**
"Phytotechnology is the use of vegetation to remediate, contain or prevent contaminants in soils, sediments and groundwater, and/or add nutrients, porosity and organic matter.
It is also a set of planning, engineering and design tools and cultural practices that can assist landscape architects, site designers, engineers and environmental planners in working on current and future individual sites, the urban fabric and regional landscapes" (Kennen & Kirkwood, 2015).

**ECOLOGICAL DESIGN**
Ecological design can be understood as a discpline, principle, process, or tool depending on its application. It spans many disciplines and includes "Any form of design that minimizes environmentally destructive impacts by integrating itself with living processes (Gültekın, 2009)."

**RESILIENCE / RESILIENCY**
"Resilience determines the persistence of relationships within a system and is a measure of the ability of these systems to absorb changes of state variables, driving variables, and parameters, and still persist."(Holling, 1973)

SOURCES

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