

ABSTRACT

Title of Thesis: DESIGN STRATEGIES FOR SEA LEVEL
RISE ADAPTATION: A PRACTICAL
APPLICATION IN SECTIONS C AND D,
ANACOSTIA PARK, WASHINGTON, D.C.

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Climate change and sea level rise present some of the most pressing challenges to contemporary urban environments. As global temperatures increase, coastal and riverine cities face mounting risks from flooding, storm surges, and the long-term submergence of low-lying land. These threats are not distant projections; they are shaping the future of urban planning and landscape architecture today. The discipline now stands at the forefront of adaptation, tasked with designing resilient landscapes that can absorb, adapt, and thrive under changing environmental conditions.

This thesis investigates how landscape architecture can serve as a framework for climate adaptation, specifically through the strategic application of accommodate, protect, and retreat principles. It explores how these strategies can be integrated spatially and functionally within the landscape to create adaptive systems that are both performative and socially valuable.

The Anacostia River corridor in Washington, D.C. provides an ideal context for this exploration. Sections C and D of Anacostia Park—low-lying, publicly owned, and historically disconnected from adjacent neighborhoods—present challenges common to many urban waterfronts: recurrent flooding, ecological degradation, and limited social accessibility. The project demonstrates how adaptation strategies can move beyond technical mitigation to become drivers of design, community engagement, and ecological restoration.

The thesis employs Research through Design methodology, in which design functions as both a process of investigation and a mode of synthesis, integrating research, application of theoretical frameworks, site inventory and analysis, and community input. The outcome is a resilient master plan for Anacostia Park Sections C and D that integrates urban design, adaptive infrastructure, connectivity, and community use.

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PRACTICAL APPLICATION IN SECTIONS C AND D, ANACOSTIA PARK,
WASHINGTON, D.C.

by

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List of Abbreviations

ADA	Americans with Disabilities Act
AOC	Architect of the Capitol
AWDZ	Anacostia Watershed Development Zone
AWS	Anacostia Watershed Society
BFE	Base Flood Elevation
BMPs	Stormwater Management Best Practices
CRDC	Climate Ready D.C.
D.C.	District of Columbia
DCIO	Deputy Chief Information Officer
DCL	District of Columbia's Lanham Street Nursery
DDOT	District Department of Transportation
DFE	Design Flood Elevation
DOEE	District Department of Energy and Environment
EPA	U.S. Environmental Protection Agency
FEMA	The Federal Emergency Management Agency
FIRM	Flood Insurance Rate Program
FIS	Flood Insurance Study
HFE	High Flood Elevation
IPCC	Intergovernmental Panel on Climate Change
NBS	Nature-Based Solutions
NACE	National Capital Parks-East
NASA	National Aeronautics and Space Administration
NCPC	National Capital Planning Commission
NOAA	National Oceanic and Atmospheric Administration
NPS	National Park Service
NRS	Naval Receiving Station
PCBs	Polychlorinated biphenyls
SFHA	Special Flood Hazard Area
SLR	Sea Level Rise
SOPARC	System for Observing Play and Recreation in Communities
SVOCs	Semi-Volatile Organic Compounds
SWR _v	Stormwater Retention volume
SWOT	Strengths, Weaknesses, Opportunities, Threats
TMDLs	Toxics Total Maximum Daily Loads
TSB	Tidal Shoreline Buffer
USGCRP	U.S. Global Change Research Program
USPP	U.S. Park Police
VOCs	Volatile Organic Compounds
WQT _v	Water Quality Treatment volume

Chapter 1: Introduction

1.1 Global Context: A Changing Climate and Rising Seas

According to the 2021 article “Coastal Adaptation to Climate Change and Sea-Level Rise” by Gary Griggs and Borja Reguero, shifting weather patterns and melting glaciers are transforming coastlines and reshaping the relationship between cities and water. The steady rise in global temperatures, driven by greenhouse gas emissions from human activities, is accelerating the melting of ice sheets in Greenland and Antarctica, increasing ocean temperatures, and expanding the volume of seawater. Together, these processes are driving a measurable and accelerating rise in global sea levels.

Sea level rise (SLR) is a present and pressing threat, directly risking hundreds of millions of people in coastal cities through flooding, erosion, and saltwater intrusion (Griggs & Reguero, 2021). Its impacts extend beyond the visible effects of flooding on environmental, ecological, and human systems. These include coastal erosion, salinization of freshwater resources, habitat disruption, and mounting risks to housing, transportation, and infrastructure. The consequences are social and economic, disproportionately affecting vulnerable communities and making sea level rise a matter of climate justice and equity.

1.2 Landscape Architecture and Adaptive Design

In response to these challenges, landscape architecture and urban design have developed adaptive strategies that move beyond mere resistance to nature to coexistence with water. The Intergovernmental Panel on Climate Change (IPCC) explains that this adaptive design paradigm

reinterprets flooding as a cyclical part of urban ecology. Using flexible grading and green infrastructure, designers create spaces that can flood safely and recover quickly (IPCC, 2022). Built projects globally demonstrate how waterfronts can be transformed into resilient public spaces that integrate flood control with ecological and community benefits, embracing a spectrum of adaptive design strategies, including accommodation, protection, retreat, and advance.

Globally, numerous design frameworks and built examples demonstrate the effectiveness of this adaptive mindset. Projects such as Buffalo Bayou Park in Houston, Texas, Hunters Point South Park in New York City, and the Wharf in Washington, D.C., integrate flood control with ecological enhancement and community engagement. These projects demonstrate how urban waterfronts can evolve into resilient public spaces, adaptive systems that celebrate water as a defining element of the area.

1.3 Local Context: Sea Level Rise in Washington, D.C.

The District of Columbia, though inland from the open coast, is far from immune to the effects of sea level rise (District Department of Energy and Environment [DOEE], n.d.). Located at the confluence of the Potomac and Anacostia Rivers, the city experiences tidal, riverine, and interior flooding. According to DOEE, sea levels in Washington, D.C. are projected to rise between 1.1 and 1.7 feet by 2050 and between 1.6 and 4.4 feet by 2080, exceeding the global average due to land subsidence and the region's low-lying topography (DOEE, 2024). The combination of rising seas, heavier rainfall, and aging infrastructure creates compounding flood

risks that threaten not only property and infrastructure but also the city's social and ecological resilience.

Among the most vulnerable areas are the Anacostia River waterfronts, particularly in Wards 7 and 8, where communities face both socioeconomic inequities and increasing environmental exposure (DOEE, n.d.). The Anacostia Park, a 1,200-acre public landscape stretching along the river, embodies this dual condition—offering ecological potential and public value, yet highly exposed to 100-year and 500-year floods and projected sea level rise.

Understanding sea level rise and its effects in urban waterfronts is increasingly essential. Therefore, the guiding research question for the study is: **How can landscape architecture strategies be employed to address flooding and projected sea level rise while integrating new development, fostering community input, improving connectivity, and enhancing ecosystem services?**

This thesis adopts a qualitative, design-led research approach that combines empirical observation with theoretical inquiry, intended to identify challenges and opportunities and ensure that design interventions respond to both site-specific conditions and community context. The research and theory will inform the development of a new concept for Anacostia Park Sections C and D, prioritizing solutions that maintain park usability during flood events and incorporating adaptive spaces that treat sea level rise as an opportunity rather than a drawback. To address the research question and inform programming, the methodology is structured around two main components: 1) Literature Review and 2) Applied Design Approach.

Chapter 2: Literature Review

This chapter establishes the theoretical and practical foundations for the design proposal. It reviews existing data across five key domains: 1) Global Changes in Weather Result in Sea-Level Rise, 2) Theoretical Frameworks, 3) Tactics for Transition, Adaptive Strategies for Sea Level Rise, 4) Case Studies Analysis, and 5) Research Objectives and Design Program Key Results.

2.1 Global Changes in Weather Result in Sea-Level Rise

Earth's climate is shifting, leading to the melting of glaciers and ice sheets, rising sea levels, and increased coastal risks. According to the 2021 article "Coastal Adaptation to Climate Change and Sea-Level Rise" by Gary Griggs and Borja Reguero, more than 300 million people reside in coastal regions, including 20 of the world's 33 megacities with populations exceeding 10 million, making these areas particularly vulnerable to the impacts of climate change. Along the U.S. Atlantic coast, many major cities are already facing regular high-tide flooding. As sea levels rise faster through the 21st century and beyond, these floods will become more frequent, deeper, longer-lasting, and widespread.

According to Rebecca Lindsey (2023), people have relied on coal, oil, and gas for over a hundred years to power their lives. This action releases greenhouse gases into the air, which wrap around the Earth like a thickening blanket, trapping heat and steadily warming the planet. This rising heat is having dramatic effects on ice and oceans. The National Aeronautics and Space Administration (NASA) Global Sea Level Change project explains how, as glaciers and massive ice sheets in Greenland, Antarctica, and mountain ranges melt, the water they contain

flows into the ocean, directly contributing to rising sea levels (Global Sea Level Change, n.d.). In 2023, the global sea level was 101.4 mm (3.99 inches) higher than in 1993, the highest since satellite records began. The oceans themselves also absorb approximately 90% of this extra heat. As the water warms, it expands, occupying more space and causing sea levels to rise higher. This thermal expansion accounts for roughly one-third of today’s rising seas. The other two-thirds come from the steady melting of land ice—processes illustrated in Figure 1.

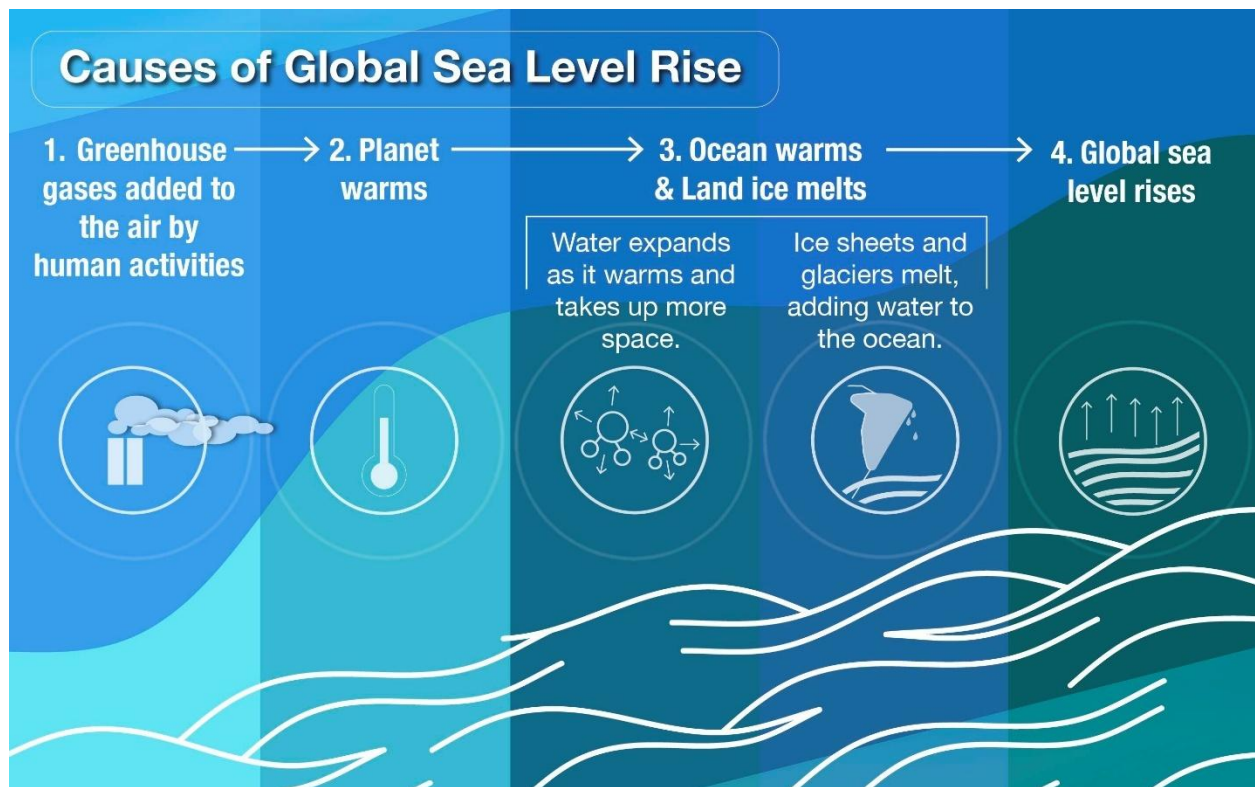


Figure 1: Causes of global sea level rise. Illustration by Allie Braun, NASA JPL. Adapted from Global Sea Level Change (n.d.).

2.1.1 Sea Level Rise in the United States

The article “Status of Mean Sea Level Rise around the USA” explains that rising sea levels pose significant risks to the United States, with important environmental, social, and economic impacts. Existing coastal dangers—such as erosion, storm surges, and flooding—are

expected to intensify as climate change drives sea levels higher, with the pace of this rise accelerating throughout the 21st century and beyond (Watson, 2020).

The U.S. Sea Level Rise and Coastal Flood Hazard Scenarios and Tools Interagency Task Force has released a report titled “Global and Regional Sea Level Rise Scenarios for the United States”, also referred to as “The 2022 Sea Level Rise Technical Report.” The report looks ahead at how sea levels may change along the nation’s coastlines (Sweet et al., 2022). It provides projections of sea level rise through the year 2150, updated every decade, taking into account factors such as vertical land motion. It also includes probabilities of extreme water levels for different coastal heights, with data available in one-degree grids along the U.S. shoreline and in greater detail at the National Oceanic and Atmospheric Administration (NOAA) tide-gauge sites.

From this report, the NOAA’s Office for Coastal Management states four takeaways:

- 1- By 2050, nearly a foot of sea level rise is expected: by 2020, the average rise of sea level in the United States has been 10-12 inches in the past 100 years (NOAA Office for Coastal Management, 2025); (see Figure 2). The exact amount of rise is expected in the next 30 years (see Figure 3).

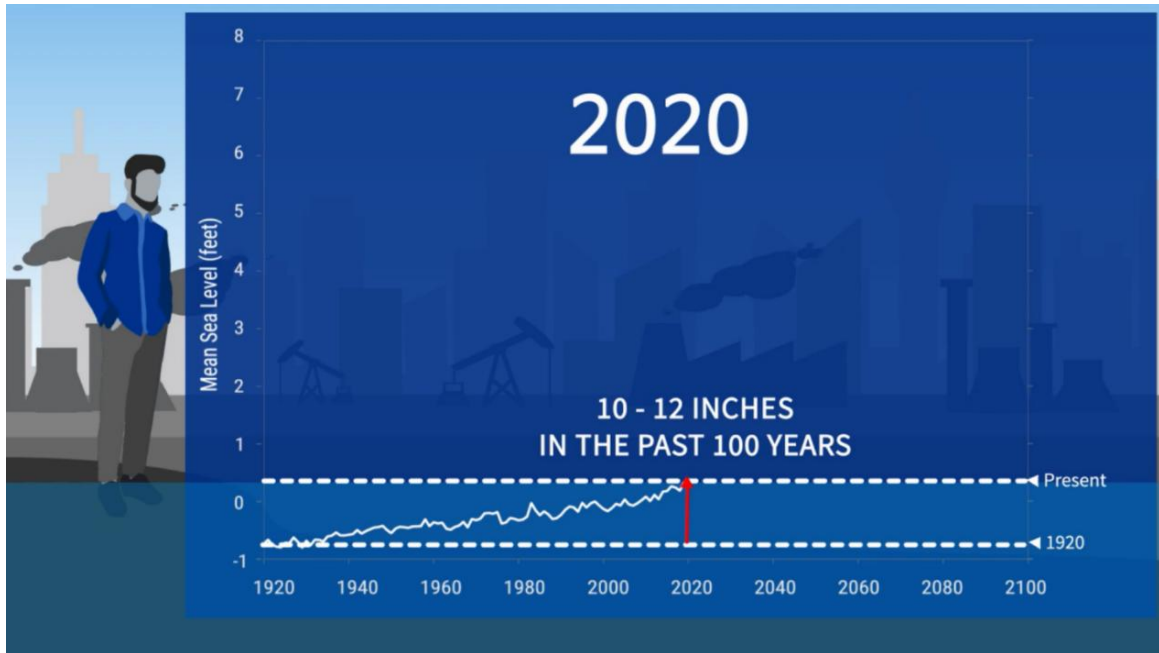


Figure 2: Average sea level rise in the U.S. in the past hundred years. Adapted from *Takeaways from the 2022 Sea Level Rise Technical Report*, NOAA Office for Coastal Management (2025).



Figure 3: Average projected sea level rise in the U.S. by 2050. Adapted from *Takeaways from the 2022 Sea Level Rise Technical Report*, NOAA Office for Coastal Management (2025).

- 2- Coastal flooding will occur more often and cause more damage: normal high tides will cause floods, storm surges will be more damaging, and floods will be pushed further inland (NOAA Office for Coastal Management, 2025). As the report states, “By 2050, damaging moderate flooding is expected to occur, on average, more than ten times as often as it does today” (NOAA Office for Coastal Management, 2025).
- 3- Greenhouse gas emissions and global warming are accelerating sea level rise: if greenhouse gas emissions are not controlled, we could expect a sea level rise of seven feet by 2100 (NOAA Office for Coastal Management, 2025) (see Figure 4).



Figure 4: Effects of greenhouse gas emissions on sea level rise by 2100 if not controlled. Adapted from Takeaways from the 2022 Sea Level Rise Technical Report, NOAA Office for Coastal Management (2025).

- 4- We must plan for continuous sea level rise: the report proposes that communities can refer to low sea level rise scenarios when planning and constructing lower-risk, temporary projects, while higher sea level rise scenarios may be used for planning and

building essential infrastructure intended to last for several decades (NOAA Office for Coastal Management, 2025).

2.1.2 Climate Change and Sea Level Rise Impacts in U.S. Coasts

The United States Environmental Protection Agency (EPA) explains that U.S. coasts line the Atlantic, Pacific, and Arctic oceans, the Gulf of America, the Caribbean Sea, and the Great Lakes. Nearly 40% of Americans—over 129 million people—live in coastal counties (EPA, 2025). These areas support industries, offer recreation, protect against storms, enable global trade, and provide jobs.

- Impacts on Property and Infrastructure: Climate change poses significant challenges to coastal communities, affecting human health and essential services, as well as property and infrastructure (EPA, 2025). Over \$1 trillion in property is situated within 700 feet of the coastline, making these assets vulnerable to extreme weather events, hurricanes, rising sea levels, and high tide flooding. Such hazards have the potential to damage or render properties uninhabitable, which may adversely affect local economies by forcing business closures, reducing tax revenues, and redirecting resources away from public services. The loss of residential or commercial properties can also give rise to mental health concerns, including depression, anxiety, and post-traumatic stress disorder.

In addition to private homes and businesses, critical coastal infrastructure is increasingly at risk. U.S. coastal regions are home to numerous military installations, airports, power plants, oil refineries, and other vital facilities. More than 60,000 miles of roads and bridges are located within coastal floodplains. Heightened flooding incidents can impede transportation networks,

disrupting daily activities such as commuting, accessing food and supplies, and obtaining medical care (EPA, 2025).

- Impacts on Coastal Ecosystems: America's coasts host a variety of vital ecosystems, from estuaries and marshes to mangroves, beaches, deltas, and reefs (EPA, 2025). These areas not only support tourism, fishing, and recreation but also provide habitat for a diverse range of wildlife, improve water quality, and sequester carbon. One growing issue is the spread of "dead zones" — areas of low oxygen caused by nutrient runoff. In these zones, fish, shellfish, corals, and aquatic plants cannot survive, and scientists expect their numbers and sizes to increase as oceans warm and heavy rainfall brings more polluted runoff to coastal waters.

Rising sea levels can cause saltwater to enter freshwater aquifers, contaminating drinking and irrigation supplies (NASA Global Sea Level Change, n.d.). Flooding and saltwater spreading over land lead to soil salinization, damaging croplands and forests through reduced growth and marsh migration.

- Land Loss Impacts: rising sea levels can transform dry land into wetlands or open water, while also putting existing wetlands at risk (EPA, 2025). Louisiana is a striking example—between 1932 and 2016, the state lost more than 2,000 sq. miles of land, much of its wetlands, partly due to sea level rise. The loss of these wetlands has serious consequences. Wetlands provide critical habitats for fish and birds, act as natural buffers against storms, erosion, and flooding, and serve as carbon sinks that absorb carbon dioxide from the atmosphere. Additionally, wetlands are disappearing, and communities lose not only these protections but also an important tool for mitigating climate change.

- Economic Impacts: When coastal areas are damaged by hurricanes or flooding, the economic impacts ripple far beyond local communities (EPA, 2025). Beyond property destruction and cleanup costs, such events can disrupt businesses, public services, energy distribution, and national supply chains. Hurricane Katrina illustrates the scale of these impacts—it remains the costliest hurricane on record, with damages reaching \$182.5 billion (in 2021 dollars). According to an article in the *Stanford Report*, rising sea levels are already impacting the local economy in Annapolis, Maryland (Ryan, 2019). In 2017, high-tide flooding led to approximately 3,000 fewer downtown visits, resulting in an estimated loss of \$86,000 to \$172,000 in revenue for businesses. What used to be a rare nuisance is now a persistent challenge.
- Impacts on Populations: Climate change is likely to worsen existing inequities for socially vulnerable populations living in coastal areas (EPA, 2025). These groups include the elderly in Florida, rural coastal communities, and Indigenous fishing communities in Alaska, among others. Extreme weather events have already highlighted these disparities. Indigenous communities are among the most at-risk coastal populations, spanning the Southeast, the Pacific Islands, the Northwest, and Alaska. Many Tribes are proactively planning adaptation strategies and incorporating traditional knowledge to respond to environmental changes. However, institutional and resource limitations—such as restricted access to ancestral lands in vulnerable locations—make adaptation particularly challenging for these communities.

The U.S. Global Change Research Program (USGCRP) states that rising flood insurance costs are making homes in coastal areas increasingly unaffordable, particularly for heirs and low-

to moderate-income property owners who may struggle to maintain coverage (USGCRP, 2023). Beyond housing affordability, these changes can trigger cascading effects, such as climate gentrification, in which wealthier residents move into safer, lower-risk areas and displace long-standing communities. Combined with workforce shortages, these dynamics threaten the culture, diversity, and economic productivity of coastal regions.

2.1.3 Sea Level Rise and Flooding in the District of Columbia

According to the Washington, DC Silver Jackets and the National Capital Planning Commission (NCPC) (2018), the National Capital Region is highly vulnerable to three types of flooding—riverine, coastal, and interior—and history shows that each has struck the area in the past. Riverine floods occurred in 1889, 1936, 1942, and 1996; coastal floods occurred in 2003 and 2010; and significant interior flooding occurred in 2006. That 2006 event, known as the Federal Triangle flood, revealed just how damaging interior floods can be. Five feet of water filled the basement of the IRS headquarters, destroying vital electrical and mechanical systems, forcing more than 2,000 employees to relocate for nearly six months, and causing millions of dollars in damage. The flood also put priceless collections at the Smithsonian museums, the National Gallery of Art, and the National Archives at serious risk of water damage and power loss. Regional transportation was also affected—the Federal Triangle Metro station had to shut down for four days while the transit authority spent millions repairing and replacing train control and communication equipment. This event underscored how flooding in the District not only threatens people and property but also disrupts critical government operations, infrastructure, and cultural heritage.

For coastal cities like Washington, D.C., situated on the tidal Potomac River, sea level rise is an immediate challenge rather than a distant concern. The District is exposed to multiple, compounding flooding threats that stem from its unique geography and infrastructure.

Coastal (Tidal) Flooding

Washington, D.C. experiences coastal flooding due to rising sea levels, with the Potomac and Anacostia Rivers directly connected to the Chesapeake Bay and the Atlantic Ocean (Overby, 2025). This tidal influence means that higher sea levels can lead to more frequent and severe coastal flooding events (Washington DC Silver Jackets & NCPC, 2018) (see Figure 5). The last major tidal flood occurred in 2003 with Hurricane Isabel (DOEE, n.d.).

Riverine (Fluvial) Flooding

The District also faces riverine flooding because of increasingly intense rainfall events (Washington DC Silver Jackets & NCPC, 2018) (see Figure 6). These storms can generate large volumes of water, overwhelming local stormwater systems. Additionally, rain that falls as far away as West Virginia travels downstream and reaches Washington, D.C. within one to three days via the Potomac River, further contributing to flood risks. The Great Potomac Flood of 1936 is one of the most damaging flood events in the District to date (DOEE, n.d.).

Interior Flooding

Interior flooding from rapid, heavy downpours poses another significant threat (Washington DC Silver Jackets & NCPC, 2018). Such flash events can quickly inundate streets and neighborhoods (see Figure 7). The problem is exacerbated by Washington, D.C.'s combined sewer system, which is designed to carry both stormwater and sewage. During periods of heavy rain, this system can overflow, causing stormwater and sewage to spill into streets and

waterways (see Figure 8). The last major interior flood event occurred at the Federal Triangle in 2006 and at Bloomingdale in 2012 (DOEE, n.d.).

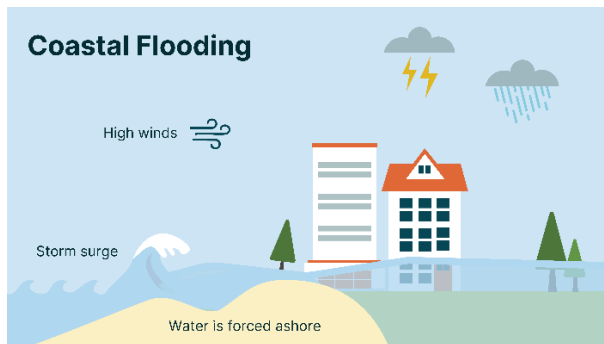


Figure 5: Coastal flooding illustration. Adapted from Halifax Municipal Government (n.d.).

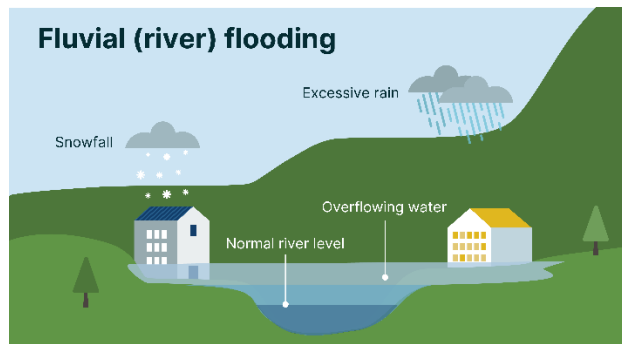


Figure 6: Riverine flooding illustration. Adapted from Halifax Municipal Government (n.d.).



Figure 7: Flash flood in Washington, D.C. Photo by Erik Cox, Shutterstock (2019).



Figure 8: A section of the Tidal Basin east seawall flooded on August 11, 2022. Due to rising Potomac River waters and sinking seawalls. Photo by Caroline Grass, Chesapeake Bay Program (2022).

In 2015, the District of Columbia released its Climate Adaptation Plan, which combined climate change data, an assessment of vulnerable assets, and a prioritized strategy to enhance resilience (DOEE, 2015). Building on that foundation, the updated 2024 report provides agencies with the latest, publicly available climate projections to guide future decision-making (DOEE, 2024). It focuses on key threats, including sea level rise, increased rainfall, and extreme heat. Unlike the earlier plan, which emphasized mid- and late-century horizons (2050s and 2080s), this update adds a nearer-term focus on the 2030s, giving the District time to prepare for more immediate risks while still planning for longer-term challenges.

From the District of Columbia's 2024 Climate Change Projections & Scenario Update Report, the following key takeaways are summarized:

- The frequency and intensity of extreme precipitation events are expected to increase.
More intense storms of shorter duration will add stress to natural, built, and social systems, increasing the likelihood of flooding (DOEE, 2024).
- Sea level rise will accelerate due to global ice sheet melting.
Relative sea level rise projections for the District range from 1.1 to 1.7 feet by 2050 and 1.6 to 4.4 feet by 2080 (DOEE, 2024). While relative sea level rise projections for the District through 2080 included in this report are between 19% and 60% higher than those included in the 2015 report.
- Local sea level rise rates are higher than global rates, in part due to land subsidence.
The District is projected to sink half a foot or more in the next 100 years due to natural and human causes (DOEE, 2024).

The USGCRP has collected data on Earth’s climate system to have a better understanding of what is causing sea levels to change in the District (USGCRP, 2024). According to their *Sea Level Overview for Washington, D.C.* publication, the leading causes of sea level change in the District are sterodynamic, ice melting, and land water storage, as well as vertical land motion (Table 1) (see Figure 9).

Table 1

Causes of Sea Level Change in the District of Columbia according to USGCRP

Cause	Description
Sterodynamic (50%)	Sea level changes are caused by ocean warming and altered density or circulation.
Ice Melt and Land Water Storage (20%)	Ice melting from ice sheets and mountain glaciers, along with a decrease in land water storage, contributes additional water to the ocean and follows identifiable patterns known as fingerprints.
Vertical Land Motion (30%)	Upward or downward displacement of land, which in turn influences changes in relative sea level rise.

Note. Adapted from USGCRP (2024).

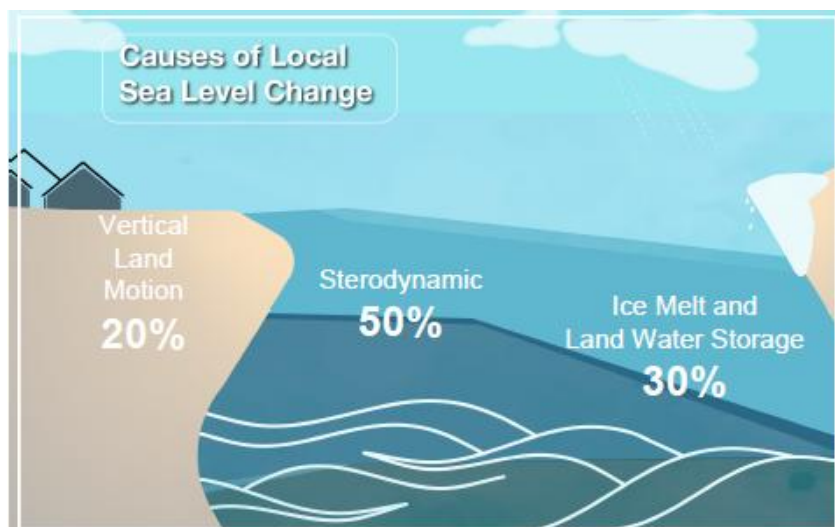


Figure 9: Causes of sea level rise in Washington, D.C., 1993-present. Adapted from USGCRP (2024).

2.1.3.1 Sea Level Rise Scenarios' Storylines in Washington, D.C.

Matthew and Patrick Keys argue that story-based futures are crucial for climate change scenario development, particularly for exploring sea-level rise, as many coastal areas are vulnerable to its acceleration (Keys & Keys, 2022). Unlike other climate change impacts, sea level rise offers a clear basis for scientifically informed future scenarios.

Future sea level rise is closely linked to the extent and speed at which global emissions are reduced (USGCRP, 2024). If current greenhouse gas policies persist, global surface temperatures are projected to rise approximately 3°C above pre-industrial levels. This information enables the development of scenario-based “storylines” illustrating possible future outcomes for each case (see Figure 10) (see Table 2). Each scenario incorporates data regarding potential trajectories for temperature increases and emissions (see Figure 11).

Scenario	2100 (ft)	2150 (ft)
Low	1.9	2.6
Intermediate Low	2.5	3.9
Intermediate	3.9	7.1
Intermediate High	5.2	8.6
High	6.7	11.8

Figure 10: Future sea level rise scenarios for Washington, D.C.: Long Term, 2100-2150. Credit: USGCRP (2024)

Table 2

Storylines for Sea Level Rise Scenarios in the District of Columbia, definitions by the USGCRP

Scenario	Definition
Low	“Low emissions, low warming. Unlikely given our current trajectory.”
Intermediate Low	“Moderate emissions and warming. Given current sea level observations and estimates of future warming, it is a lower bound for the most likely sea level rise by 2100.”
Intermediate	“High emissions scenarios and high warming. Provides an upper bound for the most likely range of sea level rise by 2100.”
Intermediate High	“High emissions and warming with rapid ice sheet loss processes contributing to sea level rise.”
High	“Very high emissions and warming with large potential contributions from rapid ice sheet loss processes. A plausible worst-case scenario.”

Note. Definitions from USGCRP (2024, p. 2).

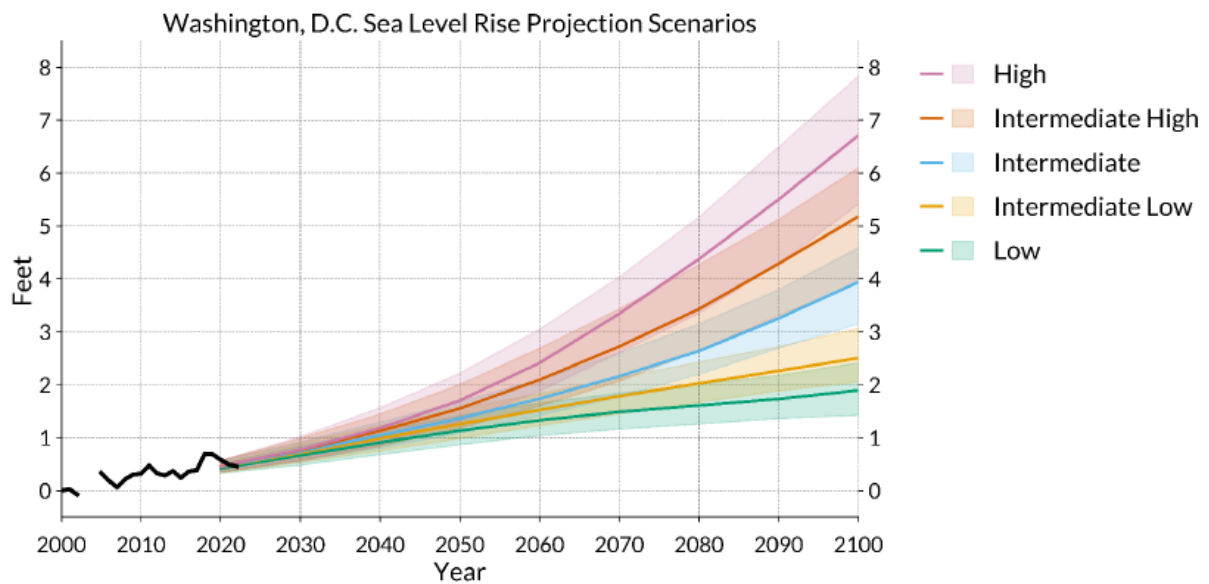


Figure 11: Historical and projected sea level rise scenarios for the District of Columbia: Median estimates (solid line) and 17-83 percentile range (shading). Values from the 2022 Sea Level Rise Technical Report. Credit: DOEE (2024)

2.1.4 The District's Climate Adaptation and Resilience Planning

As mentioned by the DOEE, more than 80 District agencies routinely prepare capital expenditure, operational, and performance plans (DOEE, 2024). To assist these agencies in integrating climate projections into their planning processes, the District and other agencies have released several reports and resources outlining essential climate indices, associated risks, and recommended adaptation strategies (see Table 3).

Table 3

Summary of Existing Climate Adaptation and Resilience Plans, Frameworks, and Rulings in the District of Columbia.

Plan	Objective	Areas Covered	Key Results	Key Takeaway
Climate Change Adaptation Plan for the District of Columbia (2015)	Establish climate projections, assess vulnerabilities, and set adaptation pathways	Temperature, precipitation, sea level rise, storm surge, infrastructure, communities	Projected 0.6–1.9 ft sea level rise by 2050; 0.9–3.8 ft by 2080; intensifying design storm depths; notable rise of 11 in sea level locally since 1924	Provides the foundational climate-data baseline and scenario framework for D.C.'s adaptation planning
Vulnerability & Risk Assessment. Climate Change Adaptation Plan for the District of Columbia (2016)	Identify climate risks and vulnerabilities to infrastructure, communities, and populations	Flooding, heat, infrastructure (energy, transit, water, telecom), community services, vulnerable populations	Found Wards 7 & 8 most at risk; key facilities vulnerable to heat/flooding; surface flooding a significant near-term risk	Social vulnerability + infrastructure fragility make specific neighborhoods disproportionately at risk
Climate Ready DC Plan (CRDC) (2016)	Long-term adaptation and resilience roadmap	Energy, transportation, water, buildings, communities	77 recommended actions to prepare for flooding, heat, and severe weather	Action-oriented framework linking climate science to local adaptation measures

Plan	Objective	Areas Covered	Key Results	Key Takeaway
2019 Sustainable DC 2.0 Plan (2016)	Make Washington, D.C. the healthiest, greenest, most livable city — balancing environment, economy, and social equity	13 topic areas (governance, equity, built environment, climate, energy, water, nature, transportation, waste, health, economy, education, food)	Developed goals, quantitative targets, and actions for each topic; aligned with existing climate and resilience plans; input from over 2,000 residents	It serves as an umbrella sustainability framework, integrating climate goals with broader social and environmental priorities
Resilient DC. A Strategy to Thrive in the Face of Change (2019)	Build resilience across social, economic, and physical systems	Inclusive growth, climate action, equity, safe residents, rivers, tech, and governance	Identified shocks (flooding, heat, cyberattacks) and stresses (inequality, housing); set 68 initiatives	Equity-centered resilience strategy, part of the 100 Resilient Cities initiative
Climate Resilient by 2050: Making Progress Toward a Climate Ready DC (2020)	Update and advance CRDC implementation toward 2050 goals	Buildings, utilities, neighborhoods, governance, policy	Refines and prioritizes actions; tracks progress; focuses on near-term climate risks	Acts as a bridge between plan formulation and execution
Resilient Design Guidelines (2021)	Guide resilient construction and design practices	Buildings, infrastructure projects	Practical design strategies for flood resilience, heat adaptation, and storm readiness	Translate resilience goals into building/urban design standards
Resilience Focus Area Strategy (2023)	Prioritize focus areas for resilience investment	Equity, climate adaptation, infrastructure, ecosystems	Identified resilience “hotspots” and strategies to address them	Centers resilience planning on equity and place-based strategies
Climate Change Projections & Scenario Update (2024)	Update D.C.’s climate projection data and scenarios to reflect the latest science	Temperature, precipitation, sea level rise, extreme events	New projections under multiple emissions paths; refined scenario ranges for future planning	Provides an updated evidence base to inform resilience strategies and policy decisions
DOEE Flood Hazard Rules (2025)	Update floodplain regulations to reduce flood risk	Development in flood hazard areas	Stronger building requirements; updated 100- & 500-year floodplain maps; integrates sea level rise	Regulatory shift from planning to enforceable rules to protect people, property, and infrastructure

Note. Information summarized from reports by the DOEE and the Government of the District of Columbia (2015–2025).

2.2 Theoretical Framework

This project is grounded in three interrelated theoretical lenses: Biophilic Design, Resilience Theory, and Systems Thinking. Together, these frameworks guide the conceptual development of a landscape that is ecologically adaptive, socially inclusive, and future-ready in the face of rising sea levels and increased flooding. By integrating systems thinking, the design approach holistically considers the interconnectedness of ecological, social, and infrastructural elements, ensuring that interventions address immediate site needs while also contributing to long-term sustainability and resilience across the broader urban environment.

2.2.1 Biophilic Design

“Biophilic design is the application of the concept of biophilia to the design of landscapes and the built environment, to foster connections between humans and nature.” (Richardson & Butler, 2021, p. 3). According to Browing, Ryan, and Clancy (2024, p. 4), “biophilic design can reduce stress, improve cognitive function and creativity, improve our well-being, and expedite healing; as the world population continues to urbanize, these qualities are ever more important.” In this project, biophilic principles are used to reconnect people with nature in the built environment. To guide the design process, a set of criteria has been developed (see Table 4).

Table 4

Biophilic criteria for design

Criteria	Description
Access to natural light and airflow	Maximize access to natural light and fresh air.
Green spaces	Incorporate plants, trees, and vegetation to enhance sensory experiences and improve mental health.

Criteria	Description
Water features	Utilize water elements such as ponds, fountains, and other similar features. To create tranquility and support biodiversity.
Visual and sensory variety	Create spaces that mimic the complexity of nature, featuring a range of textures, colors, and sounds.
Views of nature	Ensure sightlines to natural surroundings or integrate interior green walls or atriums.

2.2.2 Resilience Theory

In response to climate change, the fields of planning and landscape architecture have developed a robust framework for climate adaptation. Resilience, in this context, is the capacity of a system to absorb disturbance, reorganize, and retain its essential function, identity, and structure (Morton & Olson, 2014). According to Sanaz Saeedi Mofrad and Mojdeh Baastani (2019), urban resilience is understood as a city's enhanced capacity to respond swiftly and effectively to crises. This is achieved by increasing flexibility and reducing vulnerability in the space's skeletal structure. Resilient landscape design moves beyond rigid, resistant structures (e.g., seawalls) towards flexible, adaptive systems that can coexist with water. To understand the application of resilient design, a set of criteria has been developed (see Table 5).

Table 5

Criteria for resilient design

Criteria	Description
Adaptability and flexibility	Design multi-functional spaces that can adapt to changing conditions, such as rising water levels or urban densification.
Diversity	Incorporate diverse plant species and landscape elements that can perform overlapping functions, providing resilience if one fails.

Criteria	Description
Risk Management	Identify vulnerable areas and develop strategies to reduce the risks posed by natural disasters.
Dynamic Systems	Recognize that landscapes are dynamic and continuously evolving. Design spaces that can grow, shrink, or transform in response to environmental changes.
Community involvement	Respond to the needs, knowledge, and experiences of the people who use and will use the space.

2.2.3 Systems Thinking

Systems thinking focuses on obtaining a better and complete understanding of problems through the study of interactions in the environment where these problems occur (Voulvoulis, 2016). Landscape architecture is unique in its focus on designing outdoor spaces that meet human needs while integrating with built environments. The article “*Systems approach in landscape design: A studio work*” emphasizes the importance of design as a problem-solving process, requiring a structured, interconnected approach (Alpak, Özkan, & Düzenli, 2017).

A system is a set of interrelated components that work together toward a common goal. In design, these components—such as human needs, activities, and spaces—must function harmoniously. The systems approach helps designers organize parts to form a meaningful, balanced whole. It ensures that every design element serves a purpose and contributes to both aesthetic unity and functional effectiveness (Alpak, Özkan, & Düzenli, 2017).

By applying systems thinking, we understand the intrinsic connections between theories to establish relationships, inform programming, and seek design solutions (see Table 6).

Table 6*Biophilic design and resilience theory through systems thinking*

System element	Biophilic contribution	Resilience contribution	Systems thinking insight
Human-Nature connection	Restores mental health, reduces stress	Builds social resilience by allowing engaged, healthy communities	Strong emotional connection to nature motivates stewardship and long-term care of spaces
Green infrastructure	Trees, plants, and vegetation offer beauty, shade, and sensory benefits	Provides flood control, habitat diversity, and urban cooling	Vegetated systems serve both sensory and ecological functions
Dynamic natural processes	Supports seasonal variation and sensory change	Allows space to evolve in response to climate shifts, flooding, and other environmental changes	Design for changing over time rather than fixed outcomes
Diversity	Promotes visual richness, biodiversity, and microhabitats	Increases system redundancy and reduces vulnerability to single-point failures	Stronger systems adapt under stress and self-regulate
Water integration	Water features enhance tranquility and psychological well-being	Stormwater systems manage risk and improve flood resilience	Water systems must be emotional and functional
Community participation	Design reflects people's values, culture, and history, and fosters a sense of place stewardship.	Incorporates local knowledge	Community is part of the system. Social resilience strengthens ecological resilience and vice versa.

To graphically show the connections between theories, I have developed a network map (see Figure 12).

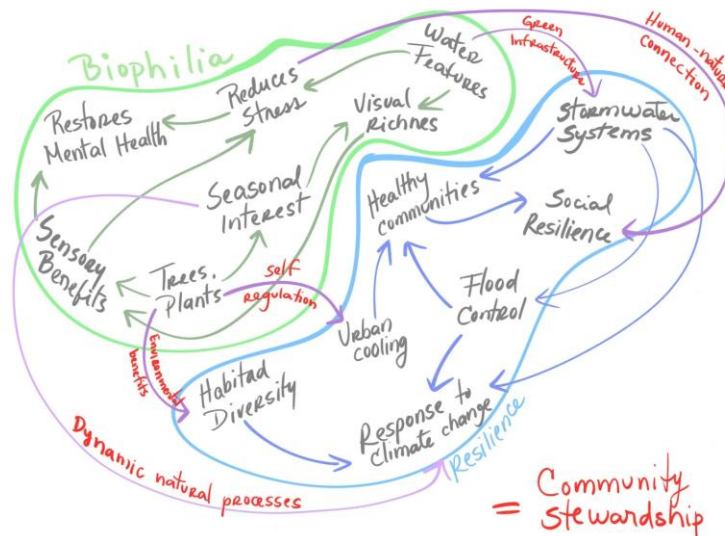


Figure 12: Theories network map. Created by the author.

2.3 Tactics for Transition: Adaptive Landscapes for Sea Level Rise

Building on the principles of resilience, landscape architecture has developed a specific toolkit of adaptive responses to sea level rise. These strategies are often conceptualized through the lens of accommodation, retreat, and protect (Nicholls et al., 2007). The IPCC's, *Climate Change 2022: Impacts, Adaptation, and Vulnerability* report provides an in-depth evaluation of what is currently known about how climate change is affecting the world today, the risks it poses for the future, and the various strategies available to adapt to those impacts (IPCC, 2022). The IPCC classifies adaptation strategies for coastal cities and settlements in terms of **protect**, **accommodate**, **advance**, and **retreat** (see Figure 13). Specific definitions have been prepared for comparison with those used by the IPCC (see Table 7).

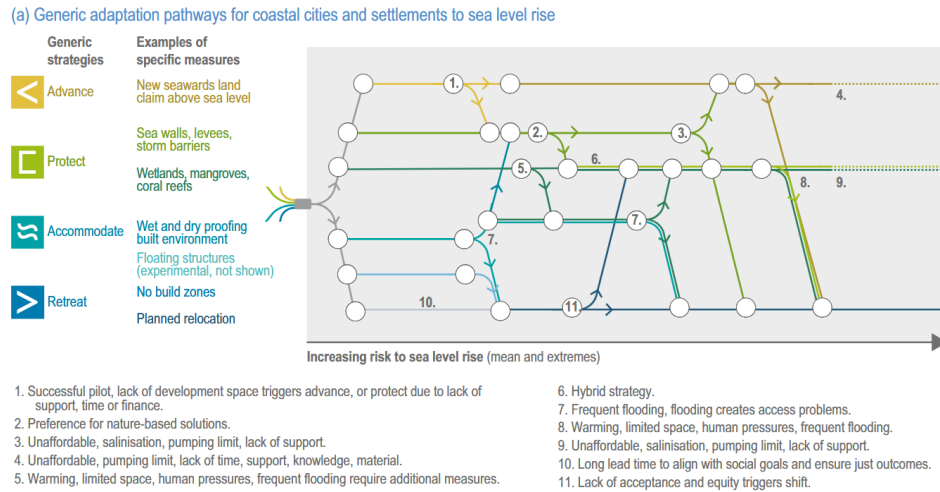


Figure 13: Generic adaptation pathways for coastal cities and settlements to sea level rise. Credit: IPCC, (2022).

Table 7

Comparative Definitions of Adaptation Strategies

Adaptation strategy	IPCC 2022 definition	Project definition
Accommodate	Involves living with and adapting to water rather than trying to exclude it entirely. Aims to reduce harm without fully resisting or retreating from the hazard.	Implies the use of structural mechanisms and nature-based solutions (NBS) (non-structural mechanisms) to allow water into the space, making the flooded area a new attraction.
Advance	Expanding into formerly unoccupied or submerged zones in a managed way, in harmony with higher water levels.	Reshape or expand coastal areas to anticipate future conditions.
Protect	Building structures or systems that prevent flooding or sea encroachment from reaching vulnerable areas. Seeks to maintain existing land use and prevent inundation rather than relocating or modifying use.	Involves the use of structural mechanisms and NBS (non-structural mechanisms) to protect vulnerable areas and ensure land-use continuity, even for new, proposed, or future land uses.
Retreat	Moving people, assets, or infrastructure away from the hazard zone when protection or accommodation becomes no longer feasible.	Relocation of infrastructure or activities that took place in this space. Accept the space to flood.

Note. Definitions are summarized and adapted from the IPCC (2022).

Based on the new definitions, a set of design criteria for each adaptation strategy has been developed (see Table 8).

Table 8

Design Guiding Principles for Adaptive Strategies

Adaptation strategy	Physical infrastructure	Activities and programming	Ecosystem services	Social and cultural implications
Accommodate	Design spaces that can operate in both dry and flooded conditions, using flexible, adaptive materials and grading strategies.	Allow for seasonal shifts in programming, incorporating floating, stilted, or floodable spaces, ensuring they remain functional across varying water levels.	Enhance natural floodplain processes, support sediment deposition, and integrate vegetation to slow water flow and improve absorption.	Promote public awareness and acceptance of living with water through educational installations, signage, and interactive design elements.
Advance	Creation of new peninsulas, tidal marshes, terraced shorelines, parks, plazas, and infrastructure over water.	Areas are occasionally flooded and have extensive elevated paths and piers. Propose water-based transit and recreation, including community shellfish farms and living shorelines.	Habitat creation and restoration. Wave attenuation and erosion control, as well as carbon sequestration, can be achieved through tidal marshes.	Innovation and living in harmony with water, enhanced public access, a symbol of resilience and optimism, new open land available for tourism, and maritime activities.

Adaptation strategy	Physical infrastructure	Activities and programming	Ecosystem services	Social and cultural implications
Protect	Design spaces with multi-layered flood protection, considering structural reinforcement alongside ecological buffers to absorb and redirect water.	Ensure continuous use of space by integrating resilient programming that remains accessible even as water levels fluctuate, such as elevated public spaces or adaptable markets.	Balance engineered interventions with ecological processes, ensuring protective measures do not disrupt natural hydrology or habitats.	Preserve cultural and economic assets by integrating protection measures with public spaces, ensuring equitable access, and maintaining a connection to the riverfront.
Retreat	Plan for the gradual transition of developed land into naturalized landscapes, ensuring safe and structured withdrawal from high-risk areas.	Redirect human activities away from vulnerable zones and repurpose former built environments into ecological or low-impact recreational spaces.	Restore natural floodplains, wetlands, and upland buffers to accommodate shifting ecosystems and enhance resilience.	Develop relocation strategies that prioritize equity, cultural preservation, and long-term economic stability while fostering new opportunities for public engagement with nature.

Note. Criteria developed by the author based on adaptation frameworks from the IPCC (2022).

As outlined in the definitions of the adaptation strategies, it is necessary to propose a combination of integrated, multi-scalar flood protection measures that encompass structural (see Figure 14), hybrid (see Figure 15), and non-structural (see Figure 16) approaches. Informed by

site evaluations conducted according to established criteria, these mechanisms aim to mitigate the risks posed by flooding and sea-level rise.

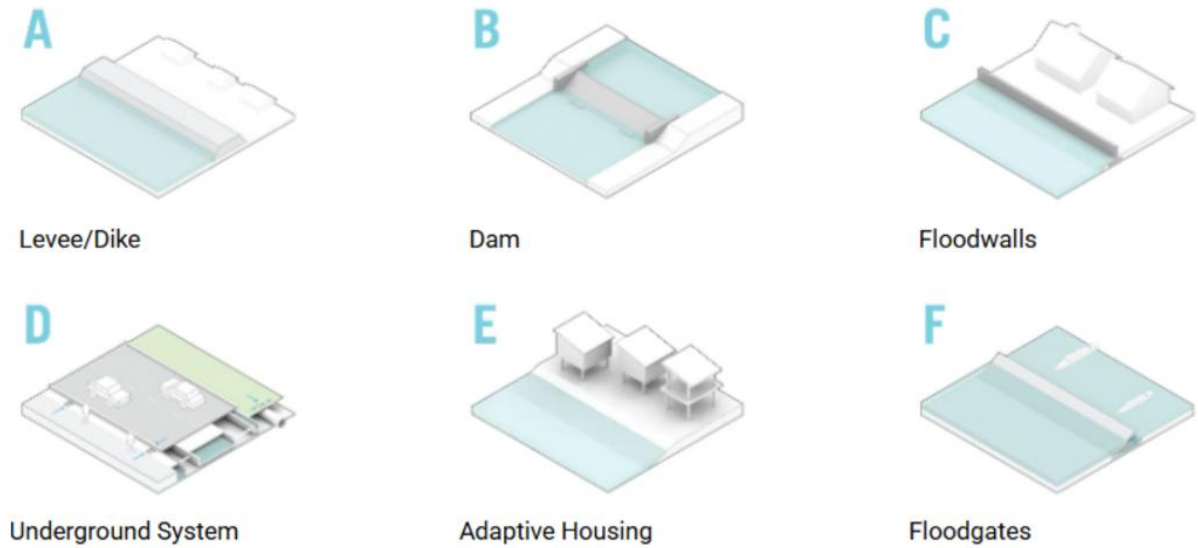


Figure 14: Mechanical mechanisms for sea level rise adaptation. Credit: Newman & Qiao (2022).



Figure 15: Hybrid mechanisms for sea level rise adaptation. Credit: Newman & Qiao (2022).

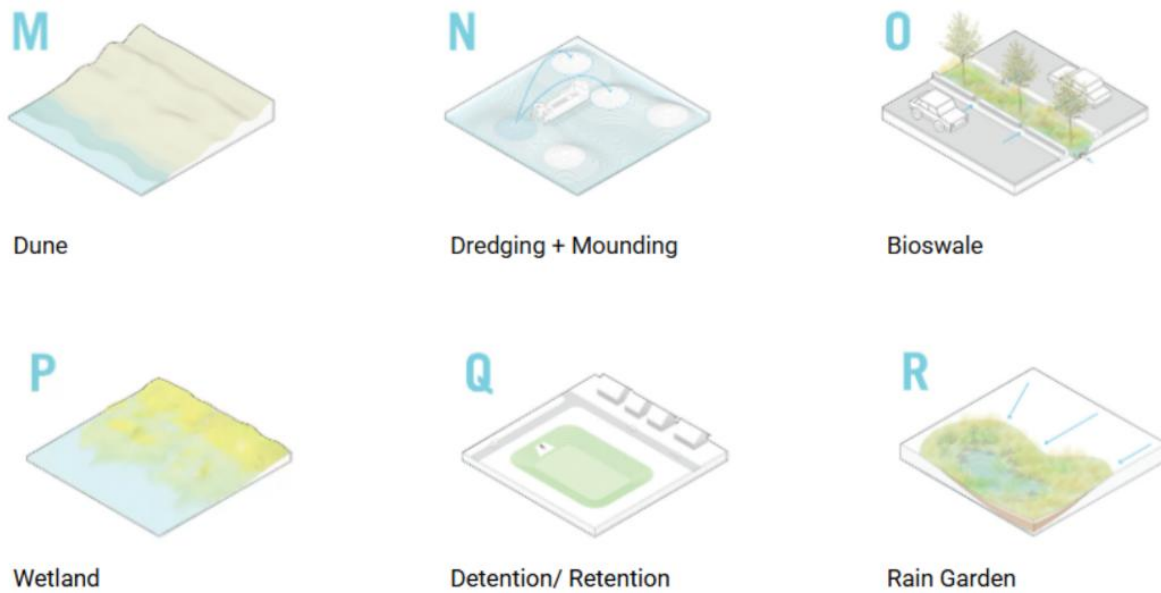


Figure 16: Non-mechanical mechanisms for sea level rise adaptation. Credit: Newman & Qiao (2022).

The following table provides a synthesized summary linking adaptive strategies for sea level rise—accommodate, protect, and retreat—to specific landscape mechanisms, as defined by leading authorities in climate adaptation and engineering (see Table 9). The definitions and categorizations are based on a review of foundational frameworks, technical manuals on coastal protection, and resources on floodplain management. This integrated overview provides a comprehensive description of the practical applications of each mechanism within a broader strategic framework.

Table 9*Landscape Mechanisms for Sea Level Rise and Associated Adaptation Strategies*

Mechanism	Definition	Adaptation strategy
Adaptive Housing	Housing designed to adjust or respond over time to flood risk, inundation, and sea-level rise, rather than fixed defenses alone (Ngo, Thi Kieu, Hoang, & Nguyen, 2020).	Accommodate
Bioswale	A vegetated, shallow, landscaped channel designed to slow, filter, and infiltrate stormwater runoff, often used in urban green infrastructure to reduce peak flows and pollutant loads. In sea-level rise adaptation, bioswales help manage surface water and reduce the stress on drainage systems caused by flooding (EPA, 2018).	Accommodate
Breakwaters	Shore-parallel structures built just offshore to reduce wave energy, protect coastlines, and encourage sediment accumulation that widens beaches (United Nations Climate Technology Centre & Network, n.d.).	Protect
Dam	An artificial barrier, including appurtenant works, constructed for the storage, control, or diversion of water (U.S. Army Corps of Engineers, 2014).	Protect
Detention	Detention: Controlling the peak discharge rate of stormwater from a site (DOEE, 2020).	Accommodate
Dredging + Mounding	The act of removing silt and other material from the bottom of bodies of water (NOAA, 2024). Reuse of sediment excavated to build up coastal land.	Accommodate / Protect
Dune	Ridge or mound of sand (or sediment) formed or maintained by wind, waves, and sediment transport dynamics, often stabilized by vegetation, that functions as a soft buffer protecting the inland area from wave action, storm surge, and coastal erosion (NOAA, 2010).	Protect / Retreat (if left natural)

Mechanism	Definition	Adaptation strategy
Edging	Engineered or vegetated transition boundary between land and water, including toe protections, revetments, living shoreline elements, embankment toes, vegetated buffer strips, or hybrid combinations of hard and soft materials designed to stabilize and protect the shoreline edge from erosion, wave action, or scour (U.S. Federal Emergency Management Agency [FEMA], 2024).	Accommodate
Floodgates	Hydraulic structures that only partly restrict flow, typically utilized in drainage and inundation systems, and are designed to manage water levels during long-lasting flow conditions (Ryszard & Tim, 2019).	Protect
Floodwalls	A designed structural wall constructed adjacent to the shoreline to reduce flooding of property on the landward side of the wall (FEMA, 2019).	Protect
Green Building	Practice of creating environmentally responsible structures and resource-efficient throughout a building's life cycle (EPA, n.d.).	Accommodate
Levee/Dike	An elongated embankment or mound made of earth, rock, or other materials, built to permanently contain, divert, or control water flow and prevent flooding of nearby land (Nassauer & Opdam, 2008).	Protect
Open Ditch	Structure with an open surface that allows water to flow by gravity under atmospheric pressure. Their primary purpose is to safely convey stormwater runoff from a site to retention areas or connected drainage systems without causing damage to nearby properties (Maryland Department of Health, n.d.).	Accommodate
Permeable Paving	Stormwater control method that allows stormwater to infiltrate through the pavement surface into the ground below—a green infrastructure alternative to traditional impervious surfaces (EPA, 2021).	Accommodate

Mechanism	Definition	Adaptation strategy
Rain Garden	Depressed (sunken) landscaped area that captures rainwater from impervious surfaces (roofs, driveways, streets), allowing it to soak into the ground rather than running off (EPA, 2025).	Accommodate
Retention	Keeping a volume of stormwater runoff on-site through infiltration, evapotranspiration, storage for non-potable use, or some combination of these (DOEE, 2020).	Accommodate
Terracing	Creating a series of stepped benches, terraces, or flatter segments on sloped terrain (e.g., upland slopes, coastal transition zones) to slow and reduce overland stormwater runoff velocities, promote infiltration, reduce erosion, and manage staged flow (NOAA, 2010).	Accommodate
Underground Systems	A network of subsurface infrastructure designed to convey, store, and/or infiltrate stormwater (Strang, 1996).	Accommodate / Protect
Wetland	Inundated or saturated areas by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions (US Army Corps of Engineers, n.d.).	Accommodate / Retreat

Note. Definitions compiled from: Ngo et al. (2020); EPA (2018, 2021, 2025); United Nations Climate Technology Centre & Network (n.d.); U.S. Army Corps of Engineers (2014); D.C. DOEE (2020); NOAA (2010, 2024); FEMA (2019, 2024); Ryszard & Tim (2019); Maryland Department of Health (n.d.); Nassauer & Opdam (2008); Strang (1996).

2.4 Case Studies

Case study analysis aims to review existing projects with similar objectives and site conditions as our site. The projects included in the analysis are Buffalo Bayou Park in Houston, Texas; Hunters Point South Park in Long Island City, NY; and The Wharf in Washington, D.C.

The case studies are evaluated using a framework that considers project goals, programming, mechanisms implemented for sea level rise and flooding, and sustainable features. This process is intended to guide design development through key insights derived from each project.

2.4.1 Buffalo Bayou Park, Houston, Texas

Buffalo Bayou Park is an urban green space situated upstream of downtown Houston, Texas, adjacent to Buffalo Bayou, the city's primary drainage system (Aman & Yildirim, 2019). The bayous of Houston have experienced extensive human intervention due to recurrent flooding, necessitating innovative and resilient landscape strategies. Formerly configured as an engineered turf drainage corridor, Buffalo Bayou Park has been redeveloped to restore the natural channel's sinuosity (see Figure 17), eliminate non-native and invasive flora, establish reforestation zones reflective of historical species composition, and reintroduce native meadows characteristic of the original site. The park features over 15 miles of pedestrian and bicycle paths, offering visitors opportunities to experience the regenerated ecology while promoting healthy lifestyles and enhanced connectivity among neighboring communities. Since its opening, the park has withstood three major floods—including Hurricane Harvey (see Figure 18) which deposited 27 trillion gallons of water on metropolitan Houston—serving as a model for resilient

open-space design, planning, and operations in areas vulnerable to flooding and climate change (see Table 10). This rehabilitation project, designed by SWA Group, was completed in 2015.



Figure 17: Buffalo Bayou Park project boundary and floodplain map. Credit: SWA (n.d.).



Figure 18: Buffalo Bayou Park before and after Hurricane Harvey, 2017. Credit: SWA (n.d.).

Table 10*Buffalo Bayou Park Project Facts*

Project goals	Programming	Sustainable features	SLR / flooding mechanisms implemented
• Reconnect residents with the river; mitigate flood damage • Restore ecology • Streamline maintenance • Foster recreation & education • Catalyze economic revitalization	• Trails • Gardens • Event lawns • Skatepark • Cistern • Dog play areas • Overlooks • Nature play area • Water garden restaurant • Picnic pavilions • Bike rental facility • Kayak rental facility • Multiple amphitheaters • Police memorial • Oak grove • Bat colony viewing area	• Native plantings, habitat restoration - Carbon sequestration & stormwater interception (9.19 t C, 84k gal annually); - Educational programming, public art, lighting tied to lunar cycles, cultural features	• Naturalized curve via fluvial geomorphology - Hydrodynamic bridge design - Silt benches for sediment control - Coir lifts and vegetated slopes for erosion control

Note. Information synthesized from Aman and Yildirim (2019) and Urban Land Institute (n.d.).

It is worth highlighting that Buffalo Bayou Park has a maintenance fund that was planned since the design phase. This has led to its success in rapid clean-up after flood events.

Emphasizing the need for maintenance budgeting for project success.

2.4.2 Hunters Point South Park, Long Island City, NY

Hunters Point South Park is a visionary project and a model for sustainable, resilient waterfront design. With 11 acres, the park transforms a once-industrial, contaminated waterfront

into a vibrant public asset (DuRussel, 2018). SWA/Balsley, Weiss/Manfredi, and Arup oversaw the design, adding recreational areas with naturalized landscapes. Wide, gently sloping lawns are perfect for sunbathing and picnics, while a sprawling central green hosts everything from yoga classes to cultural festivals. The park is designed as a protective barrier for the surrounding neighborhood. It incorporates a multi-layered defense system against sea-level rise and storm surges, including elevated topography, resilient landscaping, and deployable flood walls (Buesking, 2014) (see Figure 19) (see Figure 20). The two-mile-long esplanade is a highlight, inviting walkers, runners, and cyclists to enjoy uninterrupted vistas of the East River and the iconic skyline (see Figure 21). The park is a model for resilient open-space design, planning, and operations in areas vulnerable to flooding and climate change (see Table 11).

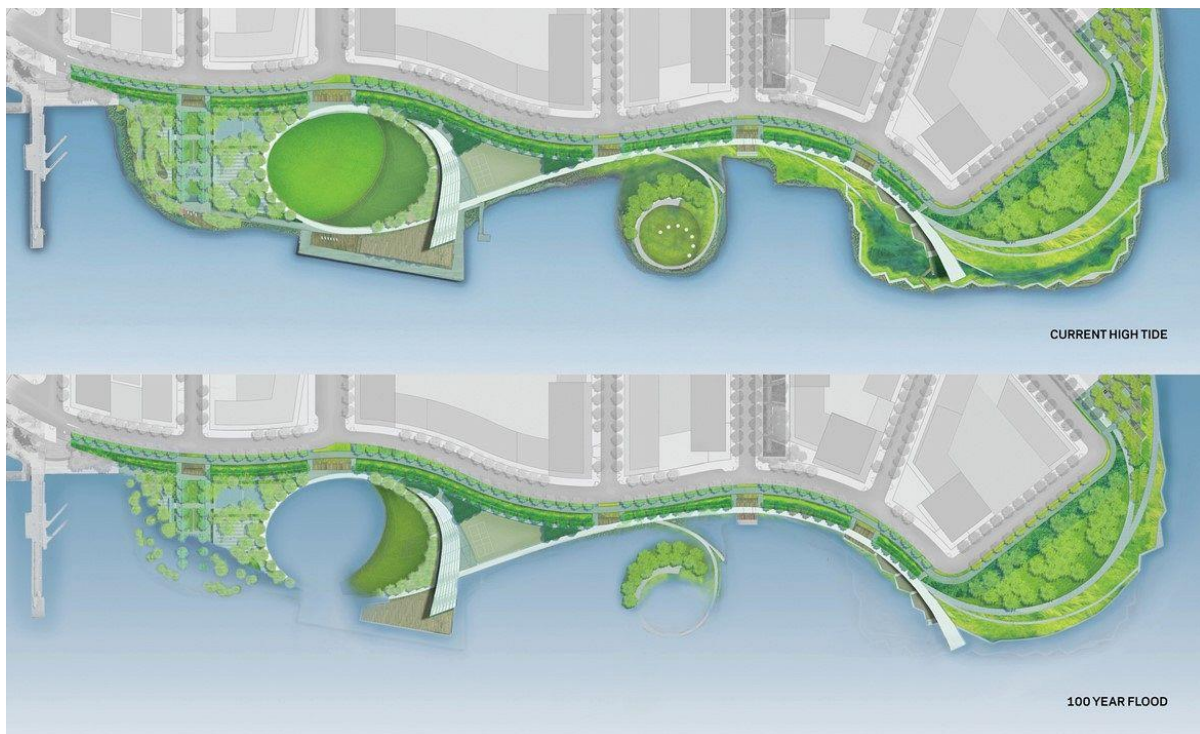


Figure 19: Hunters Point South Park normal park condition vs. inundated condition after 100-year flood. Credit: Weiss/Manfredi (n.d.).



Figure 20: Rock-filled gabions are set in a planted swale along Central Boulevard to interrupt and slow large volumes of rain and storm surge from the neighborhood, as well as filter sediment before it drains. Credit: DuRussel (2018).



Figure 21: View of tidal marsh and dynamic walkways with views of New York City in Hunter's Point South Park. Credit: David Lloyd (n.d.).

Table 11*Hunter's Point South Park Project Facts*

Project goals	Programming	Sustainable features	SLR / flooding mechanisms implemented
To create a model sustainable and resilient waterfront park that provides public open space, restores ecological habitat, protects the adjacent community from coastal flooding, and catalyzes the development of a new, mixed-income neighborhood. It was designed to be a national prototype for climate-adaptive urban design.	• Large open lawns • Playgrounds with water features • Waterfront esplanade • Outdoor concert space • Fixed and movable furniture • Shaded grove • Interpretative signage • Residential and commercial units • Sports courts • Park department offices • Public restrooms	• Phytoremediation: the soil was remediated using plants and microbes that break down contaminants • Constructed wetlands • Native and drought-tolerant plants that don't require active irrigation • Usage of recycled materials	• Elevated topography • Deployable flood barriers • Permeable surfaces • The park is built to drain quickly while keeping certain areas above water • Tidal marshes • Parts of the park are designed to flood

Note. Information synthesized from Kensinger (2018); Hilburg (2019); Buesking (2014); McKnight (2018).

2.4.3 The Wharf, Washington, D.C.

The Wharf is a redeveloped area in Washington, DC, that revitalizes a historic district through modern planning and architecture. With 27 acres of land and 3.2 million sq. ft. of development, the project was developed by Hoffman-Madison Waterfront, a partnership between Hoffman & Associates and Madison Marquette (Perkins Eastman, n.d.). The neighborhood

features commercial, residential, and public spaces, including new piers and promenades for community gatherings and waterfront enjoyment. The project is an example of the movement toward compact, mixed-use urban centers around the US.

The Wharf integrates land and water by extending the city's street grid into the Washington Channel through a series of new piers and floating docks (Perkins Eastman DC, n.d.) (see Figure 22). District Pier, which includes the Dockmaster Building, extends more than 400 feet into the water and is used for concerts and public events. Transit Pier and the Jetty Terminal provide connections via water taxis to locations throughout D.C., Maryland, and Virginia, while Market Pier adds floating barge space to the Municipal Fish Market. The Recreational Pier features swings, an amphitheater, and a sloped wall that skateboarders often use. Another pier, located at the southern end, establishes a waterfront park. These elements contribute to waterfront access and shape the development's architectural design.

In June 2022, The Wharf in Washington, D.C., unveiled a public art installation designed to raise awareness about the city's growing vulnerability to flooding. Titled "High Water Mark," the piece was created by local artist Patrick McDonough as part of Flood Awareness Week and is both playful and provocative in its execution. It shows historical flood marks, as well as 100 and 500-year flood predictions (Fenston, 2022) (see Figure 23).

As stated in the DCist, a digital news platform published by WAMU -American University Radio, the sculpture "has buoys representing the levels of a so-called 100-year flood and a 500-year flood. The 100-year buoy is suspended 6.2 ft. above ground level, while the 500-year buoy is 9.6 ft. above ground" (Fenston, 2022). The article continues to explain that a 100-year flood has a 1% chance of occurring in any given year, while a 500-year flood has a 0.2%

chance (Fenston, 2022). However, these probabilities are increasing; by 2080, an event once considered a 100-year storm may have a 1-in-15 chance each year.

The Wharf is a model for resilient open-space design, planning, and operations in areas vulnerable to flooding and climate change (see Table 12).



Figure 22: The Wharf facilities. Credit: Perkins Eastman (n.d.).



Figure 23: High Water Mark art installation at The Wharf. Credit: District Wharf (n.d.).

Table 12*The Wharf Project Facts*

Project goals	Programming	Sustainable features	SLR / flooding mechanisms implemented
Revitalize Southwest Waterfront into a vibrant, mixed-use public realm that reconnects the city with water, integrates sustainability and resilience, and enhances civic, ecological, and economic value.	• Mixed-use neighborhood • Residential • Retail • Offices • Hotels • Performance venues (The Anthem) • Marina • Public parks • Promenades • Piers • Boating access • Flexible shared streets (“Wharf Street”)	• Green roofs • Permeable paving • Floating wetlands • Planting/maintaining 300 planters, 300 new trees, and preserved oaks • Solar panels • Public-art • Energy-efficiency measures like LED lighting • Multimodal transport infrastructure, including bike racks, EV charging, and water taxi access	• Buildings elevated above 100-year floodplain (1.5 ft above FEMA reqs.) • Piers/marina designed to flood • Setback from the bulkhead • Some historic structures use floodgates • Resilient promenade and pier infrastructure

Note. Information synthesized from Perkins Eastman DC (n.d.); Urban Land Institute (n.d.); Koehler (2019); Congress for the New Urbanism (n.d.).

2.4.4 Key Takeaways

Successful waterfront parks integrate flooding, sustainability, and programming into cohesive systems. These parks are designed to accommodate periodic flooding, with trails, boardwalks, and plantings that are resilient to it. Elevated landscapes, terraced edges, and absorbent wetlands buffer storm surges and provide soft edges for water to move through,

addressing sea level rise. Adaptable infrastructure anticipates water levels and protects development. Sustainability is directly tied to habitat health and flood resilience. Green infrastructure, including bioswales, rain gardens, stormwater treatment systems, and riparian buffers, is integrated into the park designs. Programming draws diverse communities into the space, demonstrating how active use and resilience can coexist. This approach shows how new community-oriented development can maximize economic and cultural activity.

2.5 Research Objectives, Design Program Key Results, and Links Between Objectives

To articulate the study's intent and purpose, a series of research objectives was formulated to establish the theoretical and contextual foundation of the design (see Figure 24). These objectives were then translated into tangible performance indicators, referred to as Design Program Key Results, that measure each objective's contribution to the broader research aims (see Figure 25). Through a systems-thinking approach, the research objectives have been interconnected across dimensions, ensuring that design decisions operate as integrated responses to the site's environmental and community context (see Figure 26).

2.5.1 Research Objectives

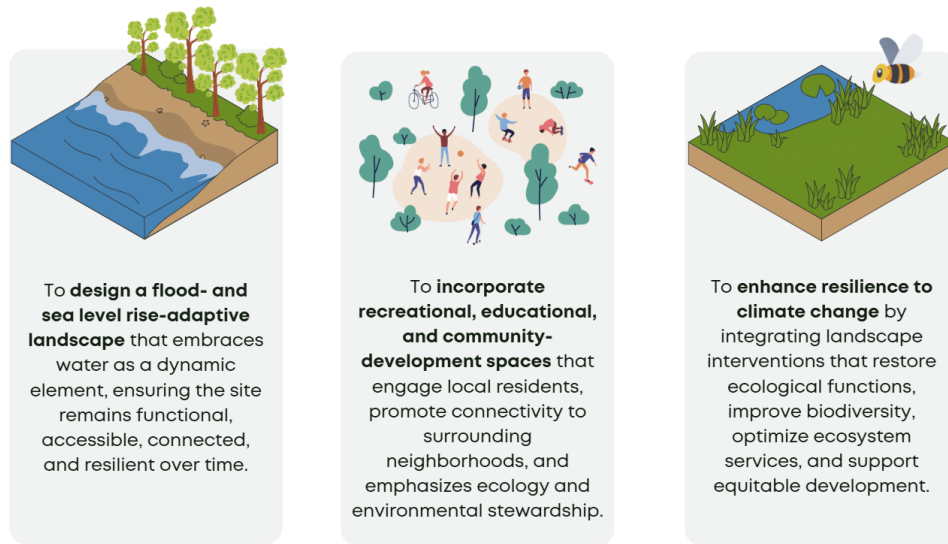


Figure 24: Research objectives. Adapted from Canva (2025), edited by the author.

2.5.2 Design Program Key Results

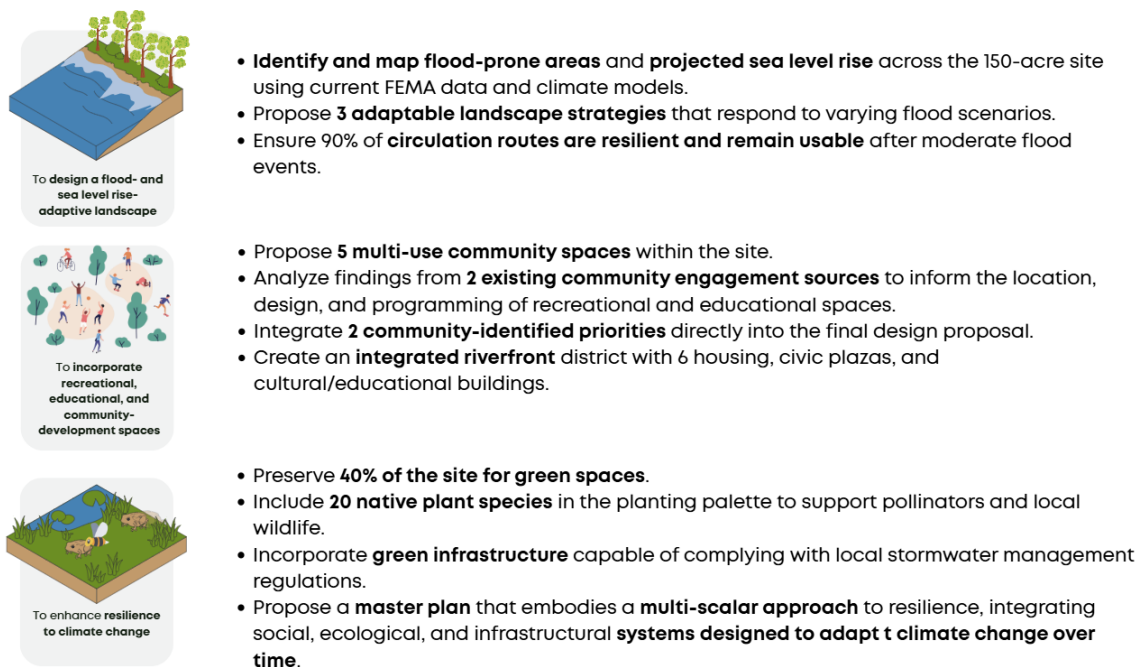


Figure 25: Programming key results. Adapted from Canva (2025), edited by the author.

2.5.3 Links Between Objectives

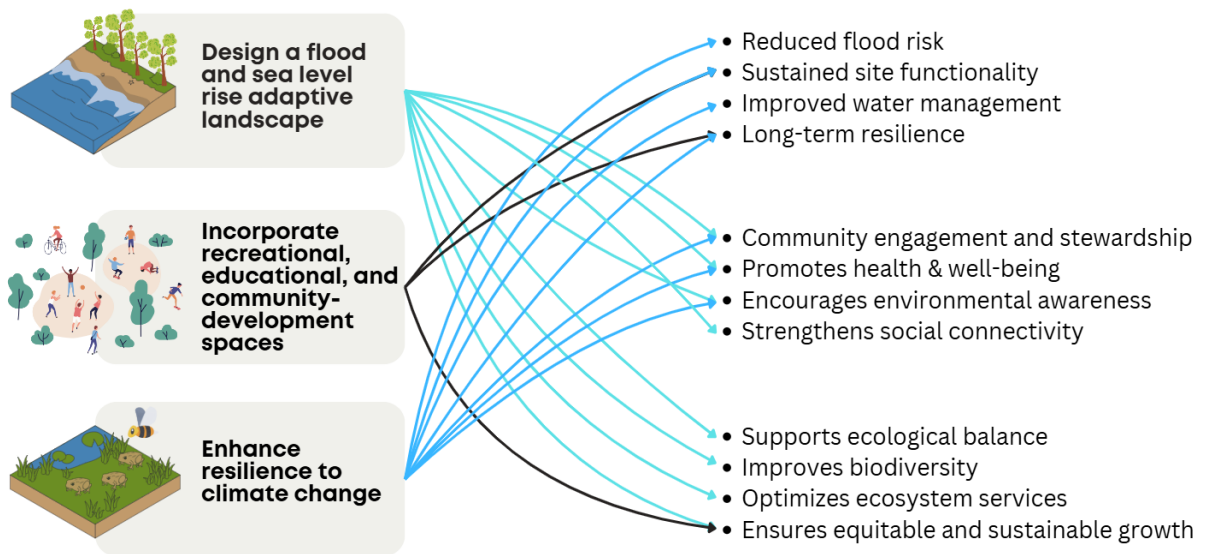


Figure 26: Links between objectives and their co-benefits. Adapted from Canva (2025), edited by the author.

Chapter 3: Applied Design Approach

3.1 History of Urban Waterfront Development in the District

The article “*Waterfronts Are Great for Cities — When They’re Done Right*” explains that urban waterfronts in the United States share a comparable historical path (Ehrenhalt, 2023).

Access to water enabled commerce and development, resulting in the establishment of ports and the subsequent growth of cities. This trend persisted until the mid-20th century, when economic activity shifted from waterways to truck and car transportation. Similarly, in *Battery Park City Politics and Planning on the New York Waterfront*, David Gordon (1997) describes how cities like Washington, D.C. grew around rivers for transportation and industry, turning their banks into centers of production and trade. This often led to the degradation of these ecological corridors, making them polluted, inaccessible, and physically separated from the urban fabric. Mark Davidson (2013) explains that the changing conditions in urban waterfronts led to the abandonment of structures, the use of informal, short-term infrastructure for recreational activities, increased crime, the establishment of trash collection sites, and contamination from old shipping and manufacturing practices. He also notes that adjacent communities face unemployment, economic decline, and growing social challenges.

In the late 20th century, urban waterfronts became a central focus of urban renewal and regeneration. As Davidson (2013) discusses in his article *Urban Geography: Waterfront Development*, waterfronts have political significance, economic, and socio-cultural value.

- **Political Significance:** the high visibility and central location of urban waterfronts make them prime targets for redevelopment (Davidson, 2013). As these spaces became

devalorized through industrial decline, cities saw an opportunity to transform them into symbols of post-industrial renewal. They are visual showcases of economic prosperity, sometimes at the expense of democratic planning and local community interests.

- Economic value: they possess potential for high-return development (Davidson, 2013). Waterfront properties can command premiums 40% to 60% higher than those of similar non-waterfront units. Offering substantial profits to developers and governments. Formerly undesired industrial areas are now among the most expensive real estate globally, leading to gentrification.
- Socio-cultural value: often viewed as cherished public spaces like parks and gardens, waterfronts hold significant socio-cultural value (Davidson, 2013). However, redeveloped waterfronts are often designed with the goal of middle-class consumption and tourism, modifying their sensory and spatial qualities, sometimes at the cost of authentic public use.

The article “*Waterfronts in Post-Industrial Cities*” by Renato Bruttomesso (2021) examines how urban waterfronts have undergone a dramatic transformation over the past century. The late 20th century saw a paradigm shift. Deindustrialization created opportunities to re-envision these spaces. The *urban waterfront renaissance model*, exemplified by projects like Baltimore's Inner Harbor, prioritized mixed-use development, public access, and economic vitality. However, this initial model often focused on aesthetics and commerce, sometimes at the expense of ecological function and social equity, leading to gentrification and the displacement of existing communities (Desfor et al., 2011).

The approach that informs the Anacostia Park project integrates three core values: biophilic design, climate resilience, and systems thinking. Notably, the systems thinking framework recognizes that resilient and equitable redevelopment cannot occur without the meaningful participation of the communities most affected. By inviting community input at every stage—from visioning to implementation—designers and planners ensure that local knowledge, lived experiences, and unique needs shape the project’s priorities and outcomes. In this way, the process not only reconnects the city with its river but also builds social justice by fostering shared ownership, transparency, and trust. The goal is no longer to develop the waterfront, but to create multi-functional spaces that are environmentally sound, socially just, and truly reflective of collective aspirations.

The waterfront in the District of Columbia is defined as those properties located on or in proximity to the Potomac and Anacostia River shorelines (see Figure 27).

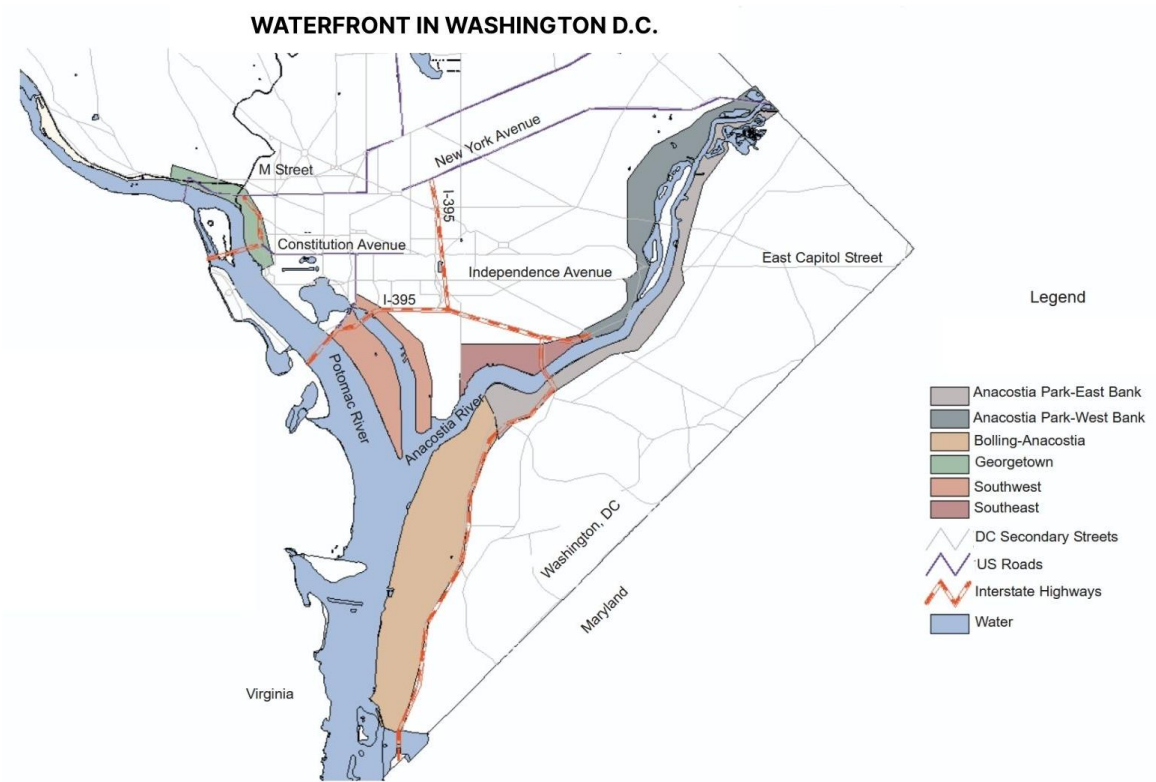


Figure 27: Map of Washington, D.C. waterfront. Credit: NCPC (1999)

According to NPS (2025), thousands of years ago, the earliest inhabitants of today's Washington, D.C.'s waterfront were Native Americans who fished, hunted, and thrived on the land. Since then, there have been three defining waterfront redevelopments in the District, as outlined in the periodical *Public Square* (see Figure 28):

- The Washington Harbor development completion in 1986 marked the first time that public access to the Georgetown riverfront was permitted (Steuteville, 2023).
- The Yards, a fast-growing mixed-use riverfront area, illustrates how waterfronts can drive social and economic revitalization in previously neglected areas (Steuteville, 2023) (see Figure 29) (see Figure 30).

- The Wharf is a multibillion-dollar waterfront development in Southwest Washington, spanning a mile along the Potomac River (Steuteville, 2023). It features restaurants, retail, residences, and businesses with impressive river views.

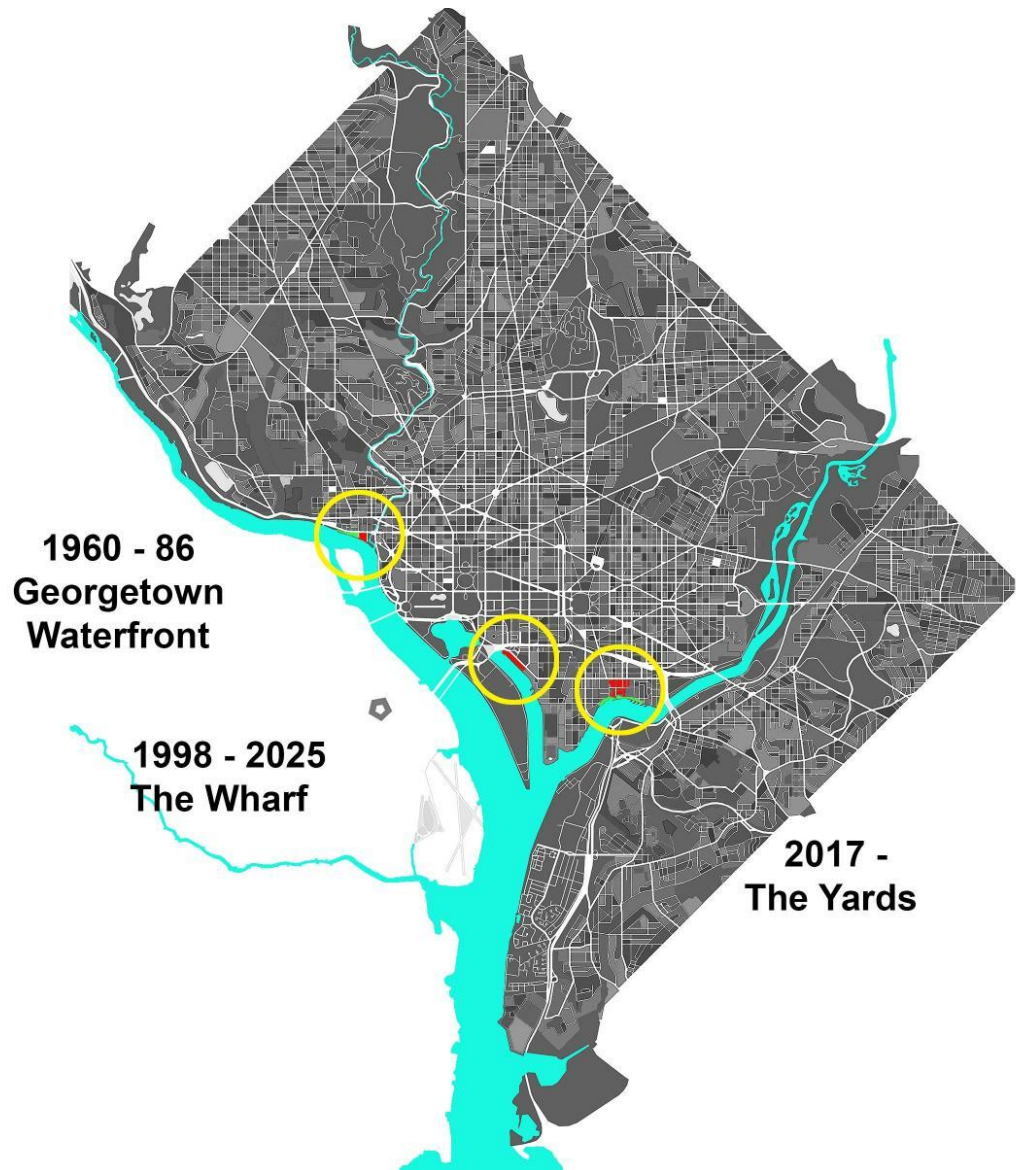


Figure 28: Washington, D.C. Waterfront Development Projects Map. Credit: Graphics by Dhuru Thadani. Published in Public Square (2023).



Figure 29: View of Washington Navy Yard, 1949. Published in the Naval History and Heritage Command (n.d.).



Figure 30: Washington Navy Yard today. Published in the DCist (n.d.).

3.2 Site Selection

The process of selecting a study site for this project involved exploration of Washington, D.C.'s urban parks and waterfront areas. Multiple sites across the city were visited and evaluated, observing how people interacted with the spaces, the condition of infrastructure, and the range of programming available. While many parks offered well-maintained facilities and active programming, one site stood out: Anacostia Park (see Figure 31).

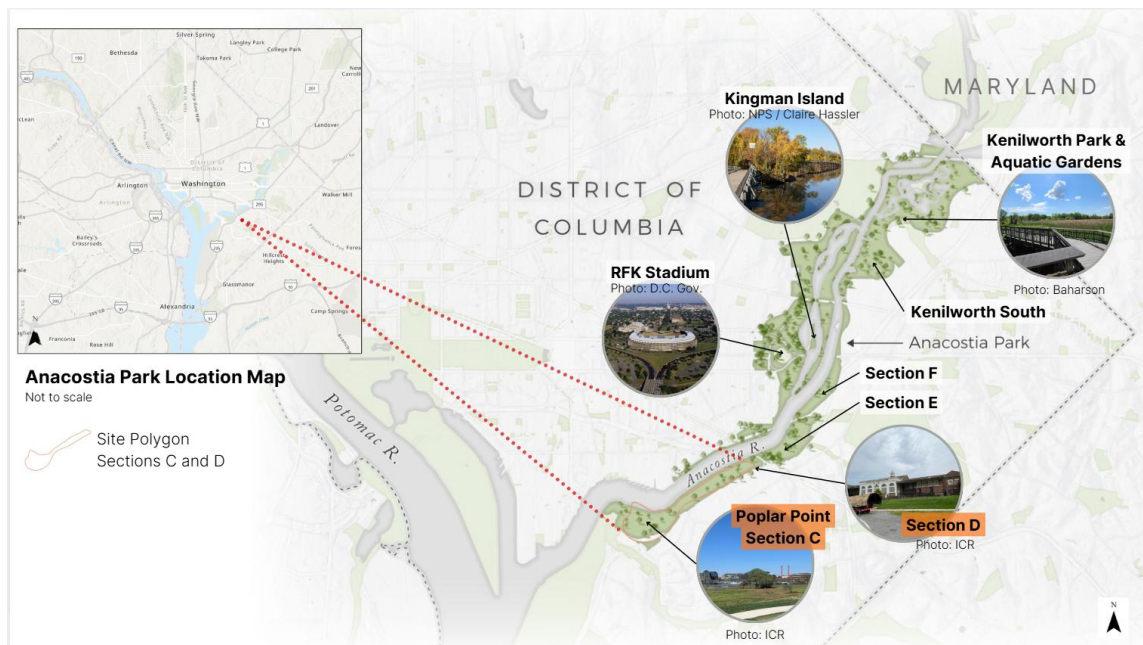


Figure 31: Anacostia Park location map and context. Map by Thomas, Cooper (2019), edited by the author.

What struck most was the park's visitors' vibrant activity despite its limited programming and noticeable neglect in certain areas. Families, joggers, cyclists, and community groups utilize the space daily, creating a lively atmosphere that reflects the community's deep attachment to the park. The setting along the Anacostia River was particularly compelling, offering both scenic value and a unique environmental context for design exploration.

Further research revealed layers of complexity that made Anacostia Park an interesting subject for study. The park holds significant historical and cultural value, reflecting the region's social and racial histories. At the same time, it faces challenges related to social disparities, environmental degradation, and vulnerability to sea level rise and flooding. These factors present both constraints and opportunities, making the site an ideal case for investigating strategies that integrate resilient design and inclusive programming.

Ultimately, the combination of community use, natural beauty, historical significance, and environmental risk made Anacostia Park a unique and meaningful choice. The decision to focus on this site reflects both a commitment to addressing pressing urban and ecological challenges and an opportunity to envision design interventions that can enhance the park's accessibility, resilience, and cultural relevance.

Within Anacostia Park, I focused on Sections C and D due to their unique combination of historical, social, and environmental significance. These areas are home to key cultural landmarks, including the Anacostia Pool and Recreation Center, which serves as an important community gathering point and reflects the park's long-standing role in public recreation (see Figure 32). Additionally, these sections bear witness to the city's complex social history, including past riots and the legacy of segregation, thereby lending them a historical and cultural significance.

From an environmental perspective, Sections C and D are located along the lower riverfront, making them particularly vulnerable to flooding and future sea level rise. This dual nature—historical and social importance coupled with environmental risk—makes these areas both challenging and engaging as sites for study. By focusing on Sections C and D, the project

can explore how design and programming interventions might address climate resilience while honoring the park’s rich cultural heritage and supporting community use.



Figure 32: Project context map. Sections C and D of Anacostia Park. Base map by DC GIS group (2023) and Esri Inc. (2025).

Edited by the author.

3.3 Anacostia Park Context and History

Anacostia Park’s history is extensive, with more than a century of social, cultural, physical, and environmental change along the river (See Appendix 1: Anacostia Park’s History, A Chronology). Because of the complexity of history, this study will focus specifically on Sections C and D of the Park.

3.3.1 The Anacostia Park, Section C (Poplar Point)

The Poplar Point D.C. Project (n.d.) estates that “The original Poplar Point was the natural delta of 'Stick Foot Creek', a significant tributary of the Anacostia River that drained the hills of what eventually became southeastern D.C.”. The area is delineated by the 11th Street Bridges to the north, the Anacostia Freeway (Interstate 295) and Suitland Parkway to the south, and the Frederick Douglass Memorial Bridge, along with the Anacostia River, to the west.

The Urban Heritage Project / PennPraxis (2021) explains that Section C of Anacostia Park, commonly known as Poplar Point, was initially owned by James Barry. This area spans approximately 110 acres of open grassland, meadows, and wetlands, and includes several buildings and government facilities. The name Poplar Point, dating back to the late 1700s, suggests that the site once featured a grove of native poplar trees (see Figure 33). The areas surrounding Stick Foot Creek and the riparian border of Poplar Point were significant natural wetlands essential to the healthy functioning of the river system (Poplar Point D.C., n.d.). By 1800, portions of this section were likely used for agricultural purposes (Urban Heritage Project / PennPraxis, 2021).



Figure 33: Painting of Poplar Point by George Cooke, 1833. Published in Poplar Point D.C. (n.d.).

According to the Government of the District of Columbia (2024), “Prior to 1882, the area that became known as Poplar Point consisted of tidal marshes associated with the Anacostia River. Between 1882 and 1927, sediment dredged from the Anacostia River was placed into these tidal marshes to create developable land.” (see Figure 34).

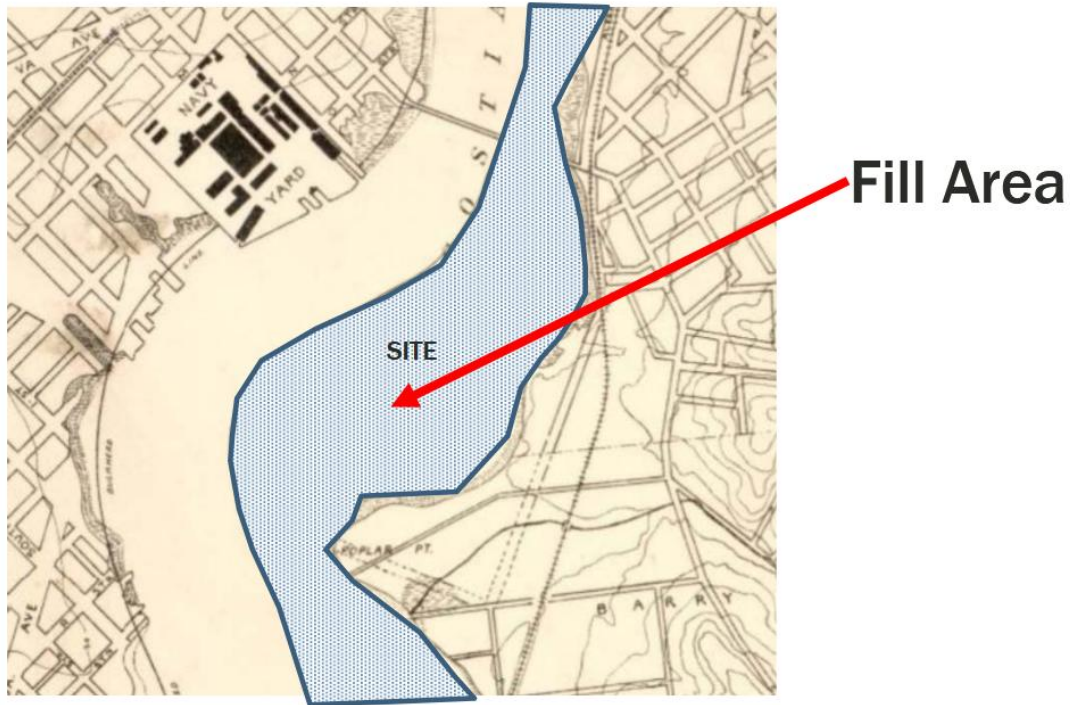


Figure 34: Tidal marshes filled area at Poplar Point. The exact extent is to be determined by soil testing in the field. Credit: DOEE (2021).

The *Conceptual Remedial Investigation Scoping Document* published by NPS (2013) shows the site as it appeared in the mid-1920s. The western portion of the approximately 96-acre Poplar Point Site was divided into two parcels, both of which were used for plant nurseries and greenhouses. One of those parcels was used by the District of Columbia's Lanham Tree Nursery (DCL), and the other by the Architect of the Capitol's (AOC) Botanic Garden Greenhouse and Nursery (AMEC Environment & Infrastructure Inc., 2013). A portion of the site later served as a Naval Receiving Station (NRS) when the Navy established it on the eastern portion of the site (Poplar Point D.C. , 2025) (see Figure 35).

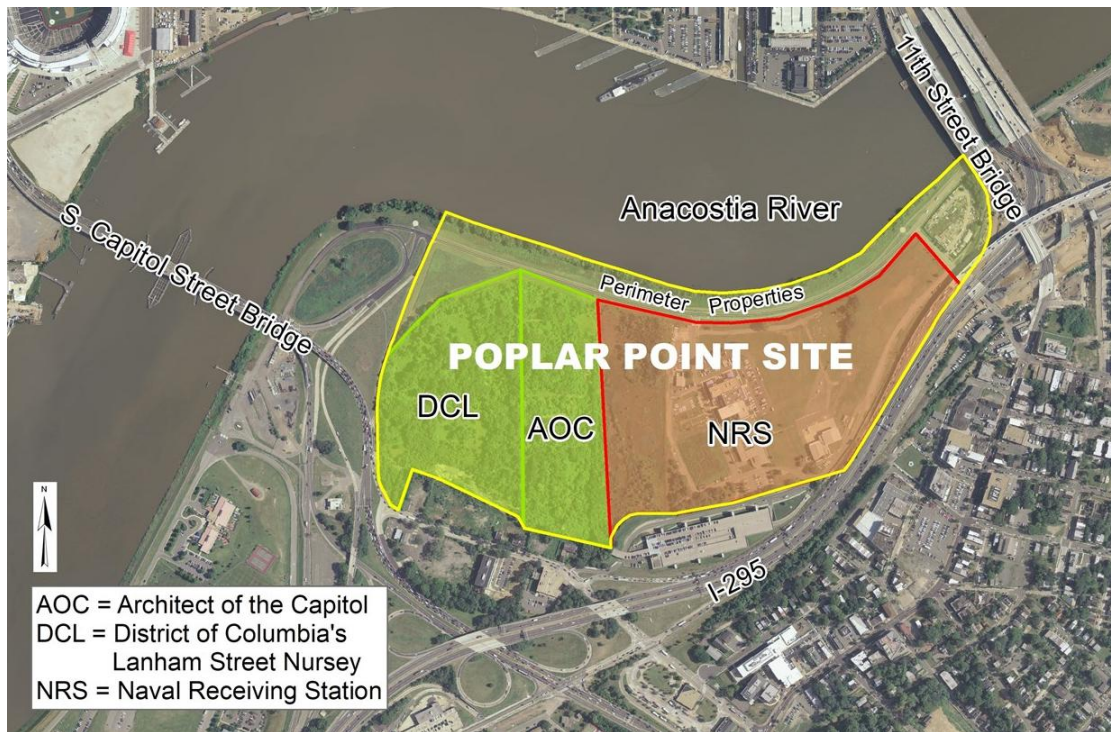


Figure 35: Poplar Point land use from mid. 20th century to 1993. Map published by NPS (2025).

During the Great Depression, the eastern portion of Poplar Point was home to the largest encampment of the “Bonus Army,” thousands of World War I veterans lobbying for early payment of promised bonuses (Poplar Point D.C., n.d.). At Camp Marks, many lived in tents and shanties before marching into Washington on July 28, 1932 (see Figure 36). This event culminated in riots on Pennsylvania Avenue, suppressed by federal troops under orders from President Hoover. The Urban Heritage Project / PennPraxis (2021) explains that during this period, Poplar Point had circulation features such as gridded dirt and mud roads, as well as social trails linking the camp to the surrounding neighborhoods.

The article “*Exploring the History of Poplar Point and the Anacostia Flats*” states that the U.S. Army forcefully and permanently evicted the veterans from their campsite, burning all

structures to the ground (Ghosts of D.C., 2012) (see Figure 37). The eviction resulted in numerous injuries, the arrest of over 100 veterans, and tragic personal consequences, including a miscarriage and the death of a baby caught in a tear gas attack. This event stands as one of the darkest moments in U.S. military and national history, and it occurred in full view of the U.S. Capitol, underscoring the stark tension between citizens' demands and federal authority.



Figure 36: Camp Marks, Washington, D.C., Bonus March, 1932. Published by Naval History and Heritage Command (1932).

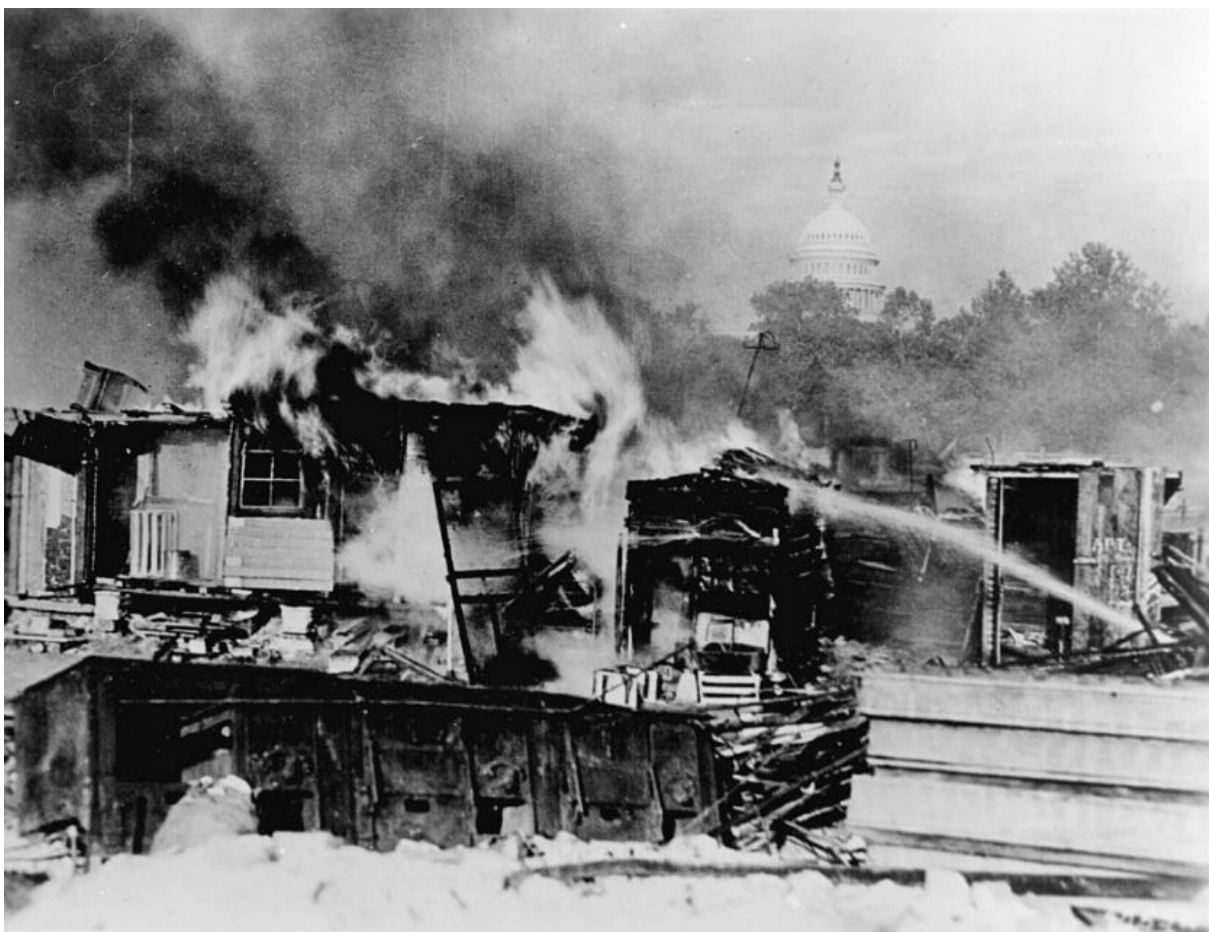
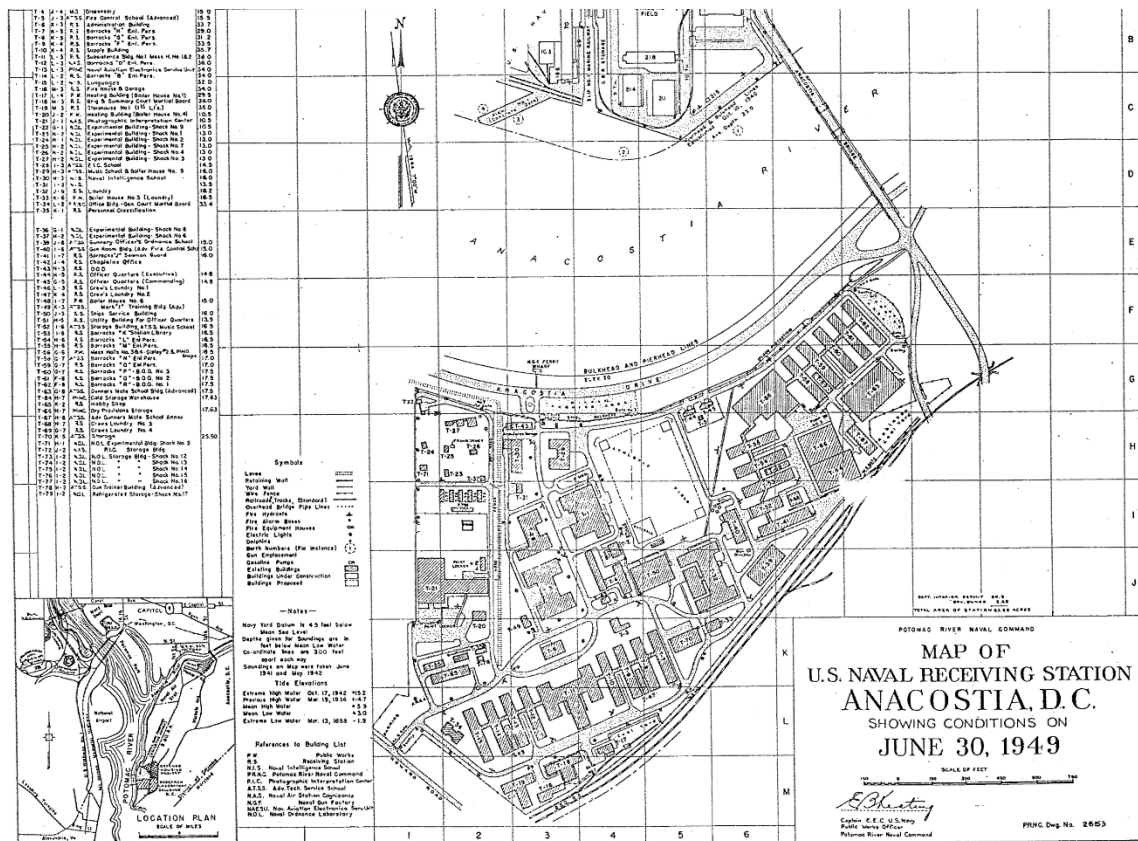


Figure 37: Shacks that members of the Bonus Army erected on the Anacostia Flats are burning after an attack by the regular army. Photo by Signal Corps (1932). Published by the National Archives Catalog (n.d.).

The site later served as a military function during World War II, when the Navy established a Naval Receiving Station on the eastern portion, constructing dozens of buildings to support wartime operations (Poplar Point D.C., n.d.) (see Figure 38). Most of these structures were removed by the 1960s and 1970s, leaving behind traces of the site's layered history.



In the mid- to late-20th century, the Anacostia waterfront underwent significant infrastructural changes that reshaped both its ecological and social character (Poplar Point D.C., n.d.). The Anacostia Freeway, built in the early 1960s, severed the park from adjacent neighborhoods, while Stick Foot Creek was confined to an underground sewer pipe (AMEC Environment & Infrastructure Inc., 2013). The Metro Green Line and Anacostia Station parking garage were added in the late 1980s, and the former U.S. Botanic Garden production facility was abandoned in 1993, leaving derelict buildings now largely overgrown. This vegetated area was allowed to grow naturally and is now an important habitat for diverse plants and animals.

Currently, National Capital Parks-East (NACE) headquarters, the U.S. Park Police (USPP) Anacostia Operations Facility, and the USPP Aviation Unit facilities occupy the portion of the Poplar Point property formerly occupied by the NRS.

3.3.2 The Anacostia Park Section D

Section D of Anacostia Park is located between the 11th Street Bridge and Pennsylvania Avenue, SE. The Anacostia Freeway (Interstate 295) and Suitland Parkway to the south, along the Anacostia River to the west. According to The Urban Heritage Project / PennPraxis (2021), the site was initially under cultivation with the farms and plantations of Dr. John Meekes and another unknown individual. In the 1920s, landscape architects Irving W. Payne and Thomas C. Jeffers designed plans for Anacostia Park, including Section D. Their design featured a central field house, Anacostia River Drive, an earthen amphitheater, and various playing fields (see Figure 39).

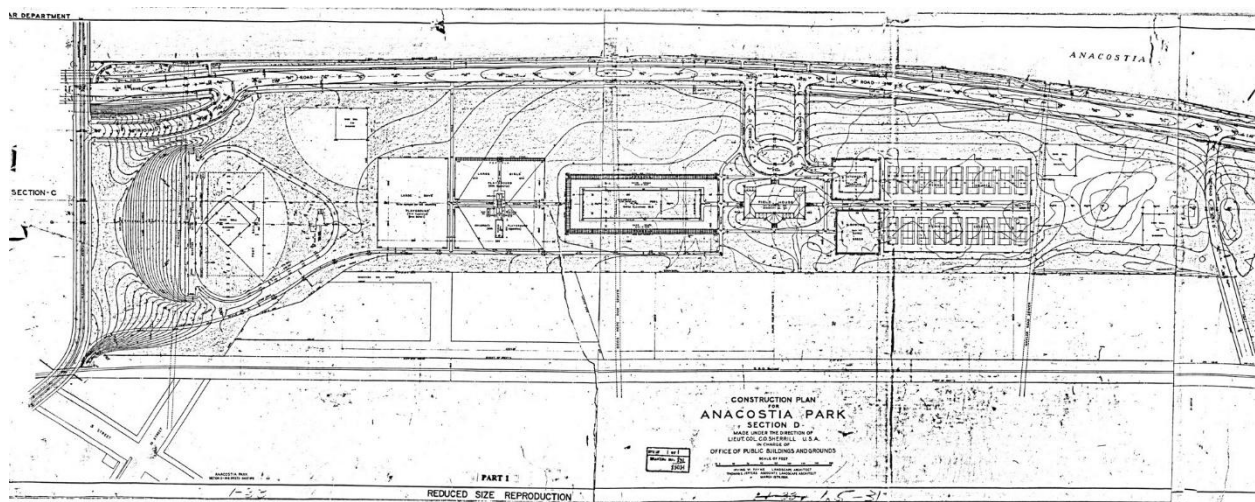


Figure 39: First plan for Anacostia Park in Section D by Irving W. Payne and Thomas C Jeffers. Published by The Urban Heritage Project / PennPraxis (2021).

In this plan, we can see the new concept for open space use. After the 1900-1930 period, the idea of strolling, picnicking, and rowing as leisure activities in America shifted toward more programmed, organized events and spaces. This sparked a movement to create new recreational areas in open spaces, such as baseball fields, golf courses, and tennis courts (Urban Heritage Project / PennPraxis, 2021). Construction of the fieldhouse in the park began in 1925 (see Figure 40). In contrast, Anacostia Drive started construction in 1932. By 1950, parts of Section D were reclaimed for the construction of bridges that connect 11th St SE and Pennsylvania Ave. SE. Altering the composition of the Park and eliminating part of the golf course. The flat land is modified to accommodate new access ramps, and a new pedestrian bridge connecting the Anacostia Neighborhood with Section D is added in 1974.



Figure 40: View of Anacostia Field House, 1931. Published by D.C. History Center: CHS 09985, General Photograph Collection, Historical Society of Washington, D.C. Image retrieved from The Urban Heritage Project / PennPraxis (2021).

3.3.3 Segregation in Anacostia Park

The NPS (n.d.) explains that, in the mid-20th century, racial segregation significantly influenced access to recreational facilities and public spaces in Washington, D.C., including Anacostia Park. The Park reflected the broader societal struggle, where Black and White residents experienced unequal recreational opportunities. Segregated recreation centers, limited access to amenities, and separate programming highlighted the systemic barriers imposed by Jim Crow laws, which remained in place in federal parks into the early 20th century. By 1931, the segregated Section C of Anacostia Park served Black patrons, featuring facilities such as four tennis courts and a baseball diamond. In contrast, Section D was designated for White patrons and included a fieldhouse, a 9-hole golf course, four clay and two concrete tennis courts, four baseball diamonds, three football fields, a playground, and improved infrastructure like underground sewers. Over time, these discriminatory practices were gradually challenged and dismantled. Anacostia Park responded to the elements of this turbulent time, advocating for integration and equality, and reflecting both the injustices of segregation and the incremental progress toward inclusive public space. Despite the extensive expansion of D.C.'s park system during this period, the park's history reminds us that access and opportunity were not equitably shared, shaping the community's social dynamics for decades.

3.3.4 Two Hundred Years of America and the Anacostia Park

By 1976, Anacostia Park had begun to resemble its present-day form (Urban Heritage Project / PennPraxis, 2021). As part of the nation's Bicentennial celebrations, the NPS undertook significant improvements that reshaped Sections D and E. In Section D, south of the

Pennsylvania Avenue, SE bridge, a new park node was created, providing picnic areas and recreational amenities intended for community use. The most extensive changes, however, occurred in Section E. This area was comprehensively redesigned to include new facilities such as a centrally located skating pavilion, athletic fields, tennis courts, basketball courts, and a playground. To support these activities, the plan introduced a new circulation system with a circular drive, service roads, additional parking, sidewalks, ramps, and staircases. The redesign also added new plantings, replacing the open grassy lawns that had previously dominated the area, along with thoughtfully designed small-scale features—benches, water fountains, trash receptacles, bulletin boards, and play sculptures—that enhanced both the park's function and character. By contrast, Section C experienced relatively few changes during this period, maintaining much of its earlier landscape.

Today, numerous efforts are underway to reimagine Sections C and D of Anacostia Park. New residential, commercial, and recreational developments adjacent to Poplar Point offer an opportunity to focus on the section that has been most neglected. By integrating it with the rest of the park and surrounding areas, we can create a cohesive and revitalized space.

3.3.5 Existing Plans and Frameworks for Anacostia Park

Over the past two decades, Anacostia Park and the surrounding river corridor have been the focus of multiple interrelated plans and frameworks developed by federal and District agencies. These planning efforts share a common vision: to transform the Anacostia River from a historically polluted and disconnected landscape into a vibrant, accessible, and ecologically healthy public space.

Each framework approaches the vision from a distinct perspective, reflecting evolving priorities such as connectivity and transportation, environmental restoration, equitable development, and climate adaptation. A comparative analysis of five plans and frameworks relevant to Anacostia Park sections C and D has been prepared to evaluate their goals, expectations, results, and status (see Table 13).

Table 13

Comparative Analysis of Existing Plans and Frameworks for Anacostia Park relevant to Sections C and D

Plan/framework	Goal	Expectation	Result/status
Anacostia Waterfront Initiative (2000)	Serve as an integrated platform to coordinate the implementation of the 2003 Framework Plan. Promote sustainable riverfront development	• Coordinate capital projects, park creation, and restoration efforts. • Maintain stakeholder engagement, accountability, and transparency	• Active projects continue under multiple agencies such as the DOEE, NPS, the District Department of Transportation (DDOT), Office of the Chief Information Officer (DCIO) • Serves as a tracking mechanism rather than a planning tool • Emphasis on climate adaptation and equitable access
Anacostia Waterfront Framework Plan (2003)	Transform the Anacostia waterfront into a vibrant, connected, restored, and accessible riverfront,	• Achieve the fishable and swimmable water quality by 2050 • 20 miles of continuous riverwalk/trail • 1,100+ acres of parks • Promote equitable economic development	• The Anacostia Riverwalk trail is a result of this initiative • River water quality is being restored • Significant new development in the Navy Yard

	linking neighborhoods and economic development	and housing along the corridor	
Anacostia Park Management Plan and Environmental Assessment (2017)	15–20-year framework for managing Anacostia Park’s natural, cultural, and recreational resources	• Create a comprehensive management structure across ~1,100 acres • Balance recreation, conservation, and education • Improve river ecosystem quality and resiliency • Identify management zones	• Provided NPS’ guiding vision for resource protection • Informed later plans • Implementation is constrained by funding and interjurisdictional issues
Reimagine Anacostia Park: A Concept Plan for Sections D and E (2025)	Identify design and improvement opportunities to enhance access, amenities, and resilience in Sections D and E of the Anacostia Park	• Address maintenance issues and flood risk • Improve recreational access and connectivity • Advance goals of the Management Plan • Reflect public feedback and neighborhood culture	• It is a design follow-up of the Management Plan • Provides recommendations for short-term investments • Offers adaptable approaches • Implementation is pending
Poplar Point Plan (2025)	Guide long-term redevelopment of Poplar Point (Section C)	• Integrate mixed-use development, parkland, and ecological restoration • Preserve open spaces • Improve waterfront access and habitat connections to the Park	• Under review by NCPC • Seeking consistency with the Anacostia Waterfront Framework Plan and management goals • Implementation depends on land transfer and environmental review

Note. Information on goals, expectations, and current status is synthesized from the Government of the District of Columbia (2000), District of Columbia, Office of Planning (2003), NPS (2017-2025), and Poplar Point D.C. (2025)

3.4 Site Inventory & Analysis

Site analysis is a critical step in the planning and design process, providing the foundation for sustainable and context-sensitive development. In the book “*Site Analysis: a Contextual Approach to Sustainable Land Planning and Site Design*”, James LaGro (2008) states how site analysis involves careful study of the site’s physical, environmental, cultural, and social characteristics to identify both opportunities and constraints. By understanding these factors, planners and designers can make informed decisions that not only enhance the functionality and aesthetic quality of a project but also protect public health, safety, and welfare. A well-executed site analysis allows development to harmonize with its surroundings, reduce long-term costs, and create resilient environments that respond effectively to natural and human-made challenges

This chapter will be divided into four sections: 1) Regional and Social Context, 2) Physical Inventory, 3) Field Observations, and 4) Natural Inventory.

3.4.1 Regional and Social Context

This section outlines the site's broader setting, including its location within the urban and cultural context, with an emphasis on its connection to its closest neighbors.

District of Columbia Demographics

According to the United States Census Bureau (2023), the District of Columbia has a land area of 61.1 sq. miles and a water area of 7.2 sq. miles, and Maryland and Virginia border it.

The biggest population groups are Black and White, with 285,810 and 273,194 people, respectively (see Figure 41). The median household income is \$108,210, about the same as in the District (see Figure 42).

Age

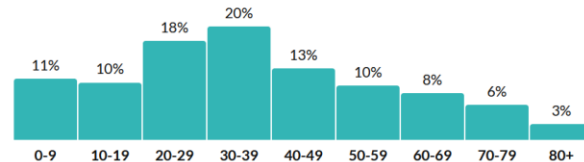
34.9

Median age

about the same as the figure in
District of Columbia: 34.9

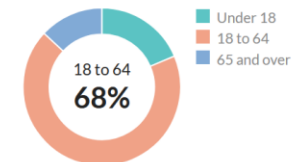
about 90 percent of the figure in
United States: 39.2

Population by age range



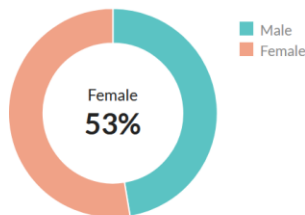
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Population by age category



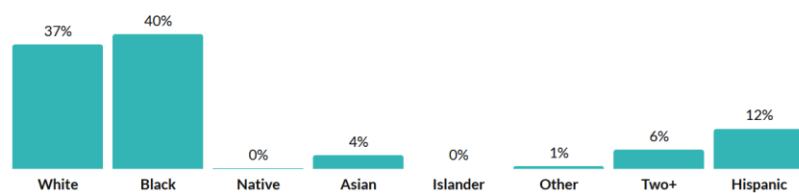
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Sex



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Race & Ethnicity



* Hispanic includes respondents of any race. Other categories are non-Hispanic.

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Figure 41: D.C. Demographics. Data from U.S. Census Bureau (2023). Graphics retrieved from Census Reporter Profile page for District of Columbia, DC <<http://censusreporter.org/profiles/05000US11001-district-of-columbia-dc/>>

Income

\$78,479

Per capita income

about the same as the amount in District of Columbia: \$78,479

nearly double the amount in United States: \$43,313

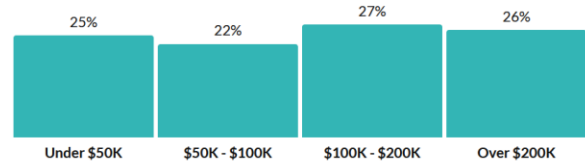
\$108,210

Median household income

about the same as the amount in District of Columbia: \$108,210

about 1.4 times the amount in United States: \$77,719

Household income



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Poverty

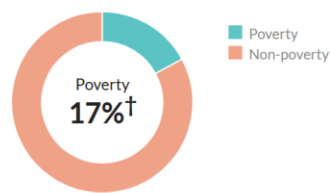
14%

Persons below poverty line

about the same as the rate in District of Columbia: 14%[†]

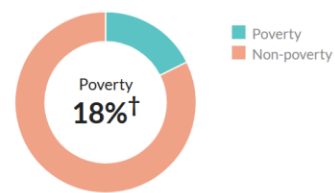
about 10 percent higher than the rate in United States: 12.5%

Children (Under 18)



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Seniors (65 and over)



Show data / Embed

Figure 42: D.C. Economic Data. U.S. Census Bureau (2023). Graphics retrieved from Census Reporter Profile page for District of Columbia, DC <<http://censusreporter.org/profiles/05000US11001-district-of-columbia-dc/>>

Surrounding Neighborhoods: History and Demographics

Four neighborhoods surround Anacostia Park sections C and D. The Navy Yard to the north, Barry Farms and Historic Anacostia, located directly south of these sections of the Park, and the Fairlawn neighborhood to the southeast (see Figure 43).



Figure 43: Project Site Surrounding Neighborhoods. Base map by DC GIS group (2023) and Esri Inc. (2025). Edited by the author.

- The Navy Yard Neighborhood:

It is located North of Anacostia Park, across the Anacostia River, Southeast Washington, D.C., just south of Capitol Hill. According to the Naval History and Heritage Command (2021), the area is named after the historic Washington Navy Yard, the long-standing administrative hub of the U.S. Navy, and it has deep industrial roots. After the War of 1812, its shipbuilding role diminished—river shallows and access issues forced a shift toward ordnance, technology, and

support industries. Over the decades, it became a major employer and industrial anchor in Southeast DC, shaping the housing, local businesses, and social life of adjacent communities. In the post-World War II era, when ordnance production ended, many industrial buildings were repurposed, and the neighborhood began to gentrify, mixing federal offices, museums, and residential redevelopment.

In recent decades, however, it has transformed, evolving into one of the city's most vibrant districts. Today, Navy Yard is known for Nationals Park, its lively nightlife, and a network of waterfront esplanades that draw residents and visitors alike.

Its architectural typologies include industrial buildings, historic gatehouses (see Figure 44), mixed-use projects with modern facades (see Figure 45), or a combination of industrial textures and contemporary applications.

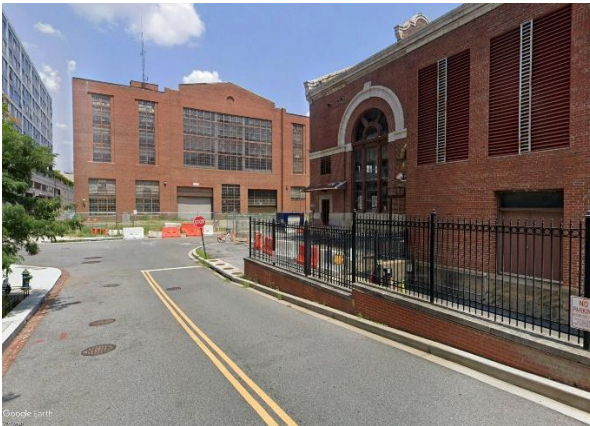


Figure 44: Navy Yard industrial buildings. Image retrieved from Google Earth.



Figure 45: Navy Yard New Development. Image retrieved from Google Earth.

The Navy Yard Neighborhood consists of 2,794 residents and 1,497 households (Statistical Atlas, 2018). The demographics shown below demonstrate the area's transformation. The majority-white, youthful population (see Figure 46) reflects the forces of gentrification that

have reshaped this corner of Southeast D.C., replacing much of its historic fabric with luxury housing, trendy restaurants, active parks, and entertainment venues. We can see that the younger adult population makes up a higher share of the Navy Yard population than of the D.C. population (see Figure 47). Once a working-class, industrial community, it has become a hub for young, highly educated professionals (see Figure 48) drawn to the waterfront’s new apartments and vibrant social life. With household incomes above the Washington, D.C. median (see Figure 49), residents are often connected to occupations that reward advanced degrees and specialized skills.

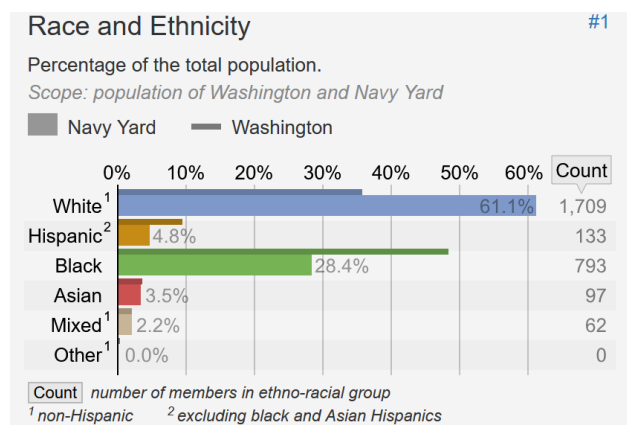


Figure 46: Navy Yard Neighborhood Race and Ethnicity compared to the District of Columbia. Data From the U.S. Census Bureau (2018). Graphic retrieved from the Statistical Atlas profile page for the Navy Yard D.C. Neighborhood <<https://statisticalatlas.com/neighborhood/District-of-Columbia/Washington/Navy-Yard/Race-and-Ethnicity>>

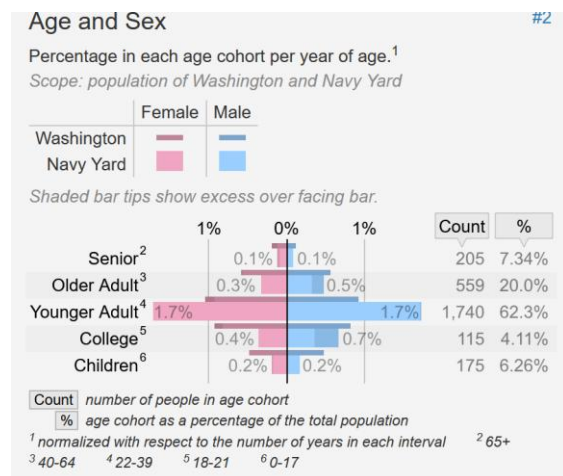


Figure 47: Navy Yard Neighborhood Population Age and Sex compared to the District of Columbia. Data From the U.S. Census Bureau (2018). Graphic retrieved from the Statistical Atlas profile page for the Navy Yard D.C. Neighborhood <<https://statisticalatlas.com/neighborhood/District-of-Columbia/Washington/Navy-Yard/Age-and-Sex>>

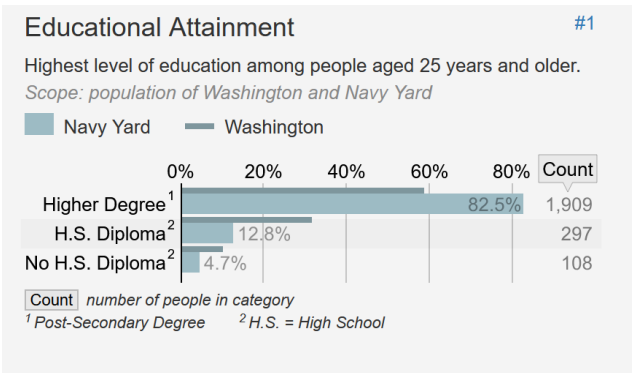


Figure 48: Navy Yard Neighborhood Educational Attainment compared to the District of Columbia. Data From the U.S. Census Bureau (2018). Graphic retrieved from the Statistical Atlas profile page for the Navy Yard D.C. Neighborhood <<https://statisticalatlas.com/neighborhood/District-of-Columbia/Washington/Navy-Yard/Educational-Attainment> >

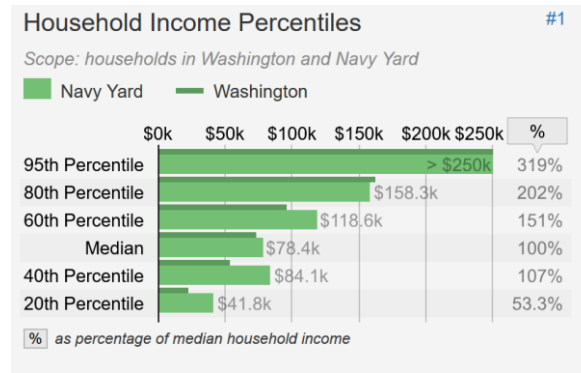


Figure 49: Navy Yard Neighborhood Household Income Percentiles compared to the District of Columbia. Data From the U.S. Census Bureau (2018). Graphic retrieved from the Statistical Atlas profile page for the Navy Yard D.C. Neighborhood <<https://statisticalatlas.com/neighborhood/District-of-Columbia/Washington/Navy-Yard/Household-Income> >

- Barry Farms Neighborhood:

The D.C. Legacy Project (n.d.) explains that Barry Farms was established in 1867. It was first called “Hillsdale” when the federal government purchased land to provide formerly enslaved families with one-acre lots, lumber, and supplies to build homes. It is located directly south of Anacostia Park, on the opposite side of the Anacostia Freeway (I-295). The neighborhood sits between Suitland Parkway to the west and Howard Road SE to the east, making it adjacent to the park but separated by the highway corridor. Though isolated and often neglected by the city, residents built a community with churches, schools, and civic organizations. In the 1940s, part of the neighborhood was redeveloped into the Barry Farm Dwellings (see Figure 50), a public housing complex that became both a home and a hub of activism. Officially incorporated as Hillsdale in 1871, the neighborhood grew into a self-

sufficient community despite isolation and neglect. In the 1940s, part of the land was taken for the Barry Farm Dwellings, a public housing project that became a center of civil rights activism, including the *Bolling v. Sharpe* School Desegregation case. Over the decades, residents organized for better living conditions and cultural expression, giving rise to movements and music groups such as the Junkyard Band.

Today, Barry Farm faces the pressures of redevelopment and displacement, but it remains a powerful symbol of resilience and Black history in D.C. (Shoenfeld, *The history and evolution of Anacostia's Barry Farm*, 2019).

Barry Farms' architecture consists of simple concrete structures with minimal ornamentation, as most of its historical structures have been demolished and replaced with contemporary, mixed-use buildings (see Figure 51).



Figure 50: Former Barry Farm Dwellings. Picture retrieved from Application for Historic Landmark or Historic District Designation Document (2019). <https://planning.dc.gov/sites/default/files/dc/sites/op/publication/attachments/Barry%20Farms%20nomination_2.pdf>



Figure 51: New development in Barry Farm, 2024. Picture retrieved from Preservation of Affordable Housing (2024) <<https://www.poah.org/property/district-columbia/barry-farm>>

With nearly 99.5% of its residents identifying as Black (see Figure 52), 2,307 residents and 890 households, we can say that families are large, with children making up a greater share of the population than in Washington overall (see Figure 53), underscoring Barry Farm’s role as a community of youth and extended households (Statistical Atlas, 2018). Furthermore, while over 60% hold a high school diploma, fewer progress to higher education, and household incomes remain starkly below D.C. averages (see Figure 54). The median income is only about one-fifth that of Washington, and even households in the 95th percentile barely surpass the city's median income (see Figure 55). Gender dynamics add another layer—there are noticeably more male college-age residents but fewer younger and older adult men, suggesting instability or mobility pressures on Black men.

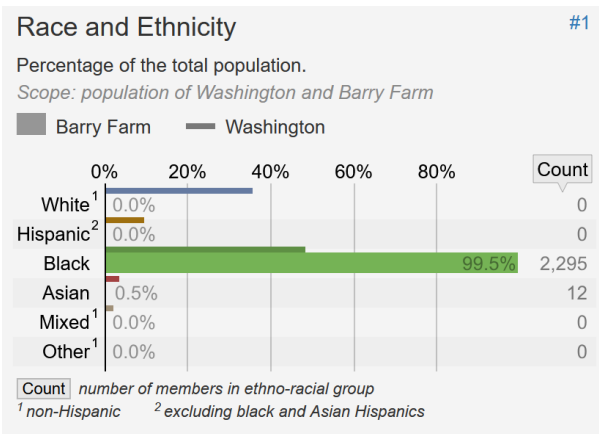


Figure 52: Figure 46: Barry Farm Race and Ethnicity compared to Washington, D.C. Data from the U.S. Census Bureau. Graphic retrieved from the Statistical Atlas profile page for the Barry Farm D.C. Neighborhood
<<https://statisticalatlas.com/neighborhood/District-of-Columbia/Washington/Barry-Farm/Race-and-Ethnicity>>

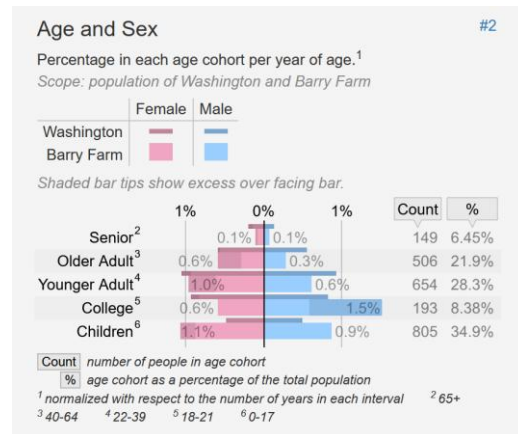


Figure 53: Figure 47: Barry Farm Age and Sex compared to Washington, D.C. Data from the U.S. Census Bureau. Graphic retrieved from the Statistical Atlas profile page for the Barry Farm D.C. Neighborhood
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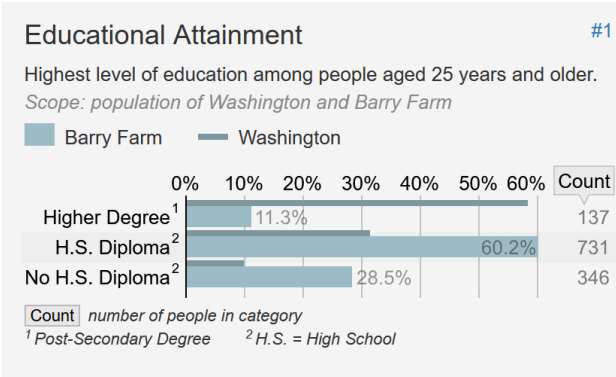


Figure 54: Barry Farm Educational Attainment compared to Washington, D.C. Data from the U.S. Census Bureau. Graphic retrieved from the Statistical Atlas profile page for the Barry Farm D.C. Neighborhood

<<https://statisticalatlas.com/neighborhood/District-of-Columbia/Washington/Barry-Farm/Educational-Attainment>>

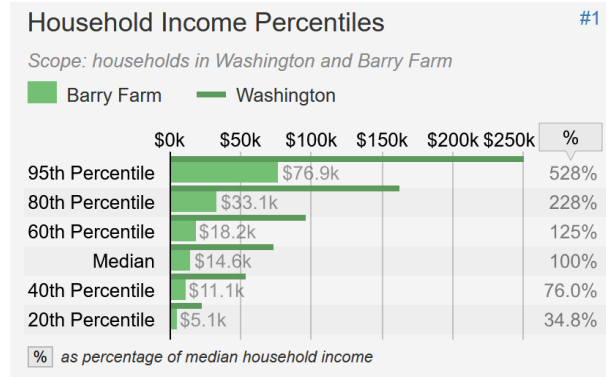


Figure 55: Barry Farm Household Income Percentiles compared to Washington, D.C. Data from the U.S. Census Bureau. Graphic retrieved from the Statistical Atlas profile page for the Barry Farm D.C. Neighborhood

<<https://statisticalatlas.com/neighborhood/District-of-Columbia/Washington/Barry-Farm/Household-Income>>

- Fairlawn Neighborhood

The neighborhood is located directly east and southeast of Anacostia Park Section D. The brochure “*Fairlawn: From the Flats to the Heights*” tells the story of a thriving urban neighborhood that stretches from Native American roots along the Anacostia River to a present-day community (Presbury et al., n.d.). Once fertile land for tobacco plantations, it became home to German farmers and wealthy estates in the 1800s. By the early 1900s, estates had been subdivided into homes, helping to shape a suburban community. Fairlawn witnessed the 1932 Bonus Army encampment, racial struggles at the Anacostia pool, and school integration protests in the 1950s. Through decline, drug epidemics, and renewal, residents organized, forming the

Fairlawn Citizens Association in 1966. Today, Fairlawn embodies resilience—rooted in history yet optimistic about its future.

The architectural typologies include rowhouses, single-family homes, and multifamily buildings (see Figure 56), with a significant portion of the historic rowhouses featuring the bungalow or Colonial Revival style, as well as some ranch houses. Commercial buildings are generally two- to three-story retail storefronts (see Figure 57); new development is mostly office buildings.



Figure 56: Mix of architectural styles in Fairlawn homes.

Picture retrieved from Trulia (n.d.)

<<https://www.trulia.com/n/dc/washington/fairlawn/81950/>>



Figure 57: Good Hope Road SE. Fairlawn. Picture retrieved

from Trulia (n.d.)

<<https://www.trulia.com/n/dc/washington/fairlawn/81950/>>

With 3,134 residents and 1,297 households, 90.7% of residents identify as Black (Statistical Atlas, 2018) (see Figure 58). The community carries forward deep cultural and historical roots east of the Anacostia River. Its population of children, male college-age residents, and older adults is larger than the District's average (see Figure 59). However, the biggest population group is young adults. This indicates a mix of young families and aging long-term residents, anchoring the neighborhood's continuity. Educational attainment shows that

64.6% hold a high school diploma (see Figure 60), but fewer advance beyond this level, which helps explain why the median household income remains about 40% of the District's average (see Figure 61).

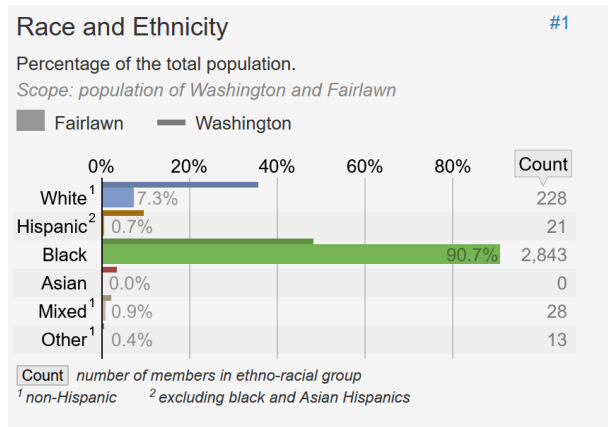


Figure 58: Fairlawn race and ethnicity compared to Washington, D.C. Data from the U.S. Census Bureau. Graphic retrieved from the Statistical Atlas profile page for the Fairlawn D.C. Neighborhood
<https://statisticalatlas.com/neighborhood/District-of-Columbia/Washington/Fairlawn/Race-and-Ethnicity>

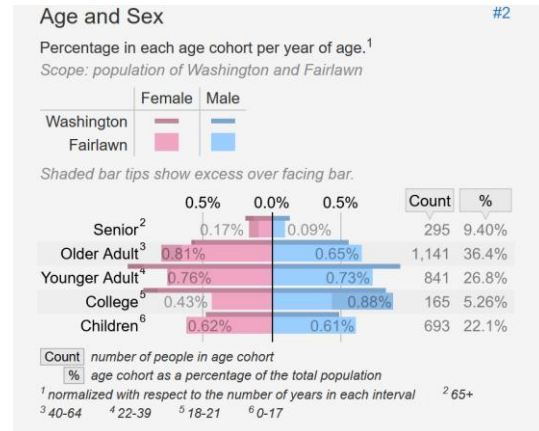


Figure 59: Fairlawn age and sex compared to Washington, D.C. Data from the U.S. Census Bureau. Graphic retrieved from the Statistical Atlas profile page for the Fairlawn D.C. Neighborhood
<https://statisticalatlas.com/neighborhood/District-of-Columbia/Washington/>

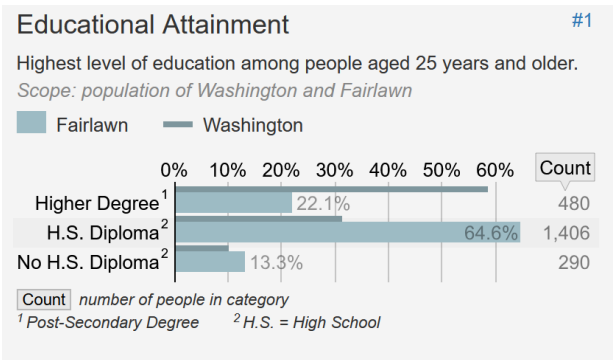


Figure 60: Fairlawn Educational Attainment compared to Washington, D.C. Data from the U.S. Census Bureau. Graphic retrieved from the Statistical Atlas profile page for the Fairlawn D.C. Neighborhood
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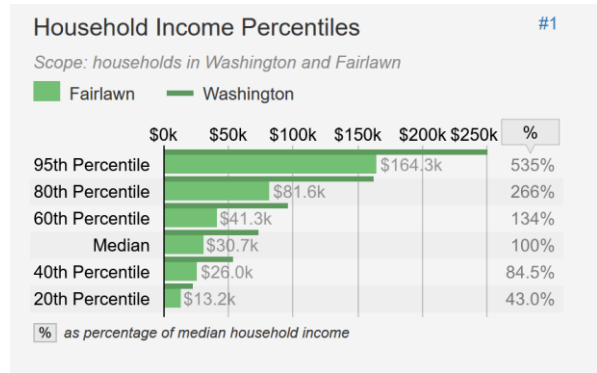


Figure 61: Fairlawn Household Income Percentiles compared to Washington, D.C. Data from the U.S. Census Bureau. Graphic retrieved from the Statistical Atlas profile page for the Fairlawn D.C. Neighborhood
<<https://statisticalatlas.com/neighborhood/District-of-Columbia/Washington/Fairlawn/Household-Income>>

- Historic Anacostia Neighborhood

Tanya Edwards Beauchamp describes in her book “*Anacostia Historic District*” (2007) how Anacostia was first home to the Nacotchtank people, and it later drew European settlers who carved tobacco plantations into the fertile land. By the mid-1800s, the community had been reshaped by the Navy Yard across the river, the creation of Uniontown—a planned suburb for Navy Yard workers—and the establishment of St. Elizabeth's Hospital. The Civil War and emancipation brought Barry’s Farm, where freedmen built homes and established Hillsdale, a strong Black community. Frederick Douglass’s home, Cedar Hill, crowned the ridge, symbolizing resilience and leadership. Despite 20th-century disruptions—such as bridges, highways, and urban renewal—Anacostia endured. Its modest cottages, vibrant churches, and enduring civic life earned designation as a Historic District in 1978, preserving its story as a vital

center of African American heritage and culture. Since its designation as a Historic District, Anacostia has continued to evolve, carrying its legacy of resilience into modern times. The neighborhood faced the economic decline of the late 20th century, when disinvestment, unemployment, and the crack epidemic of the 1980s and 1990s strained its families and businesses. However, community leaders and residents responded by organizing block associations, preserving heritage sites, and advocating for better schools and services. The Anacostia Community Museum, founded in 1967 and expanded in subsequent decades, has become a cultural anchor, telling the stories of everyday Washingtonians. Preservation efforts kept landmarks like Cedar Hill alive, now a National Historic Site, welcoming visitors from around the world.

The architectural typologies observed in this neighborhood are bungalow/colonial revival, cottage-style houses, and row homes (see Figure 62). While commercial buildings are former homes converted to commercial use, small brick buildings also serve this purpose (see Figure 63). Both typologies feature red and brown brick facades.



Figure 62: Houses at 13th Street and W Street, SE in Anacostia Historic District. Picture by Smallbones (2012). Retrieved from <https://commons.wikimedia.org/wiki/File:Anacostia_HD_DC_13th_n_W.JPG>



Figure 63: A Commercial Building in the Anacostia Neighborhood. Picture retrieved from Shop the District (n.d.) <<https://shopinthedistrict.com/neighborhood/anacostia/>>

With 4,876 residents and 1,812 households, 96.8% of the neighborhood identifies as Black, with significantly more children than the District's average (Statistical Atlas, 2018) (see Figure 64) (see Figure 65). That younger profile reflects strong family networks and a new generation growing up in Anacostia. However, it also underscores the importance of quality schools, safe spaces, and opportunities for growth to ensure those children thrive.

While about two-thirds of residents hold a high school diploma (see Figure 66), far fewer have access to higher education compared to the broader District, where advanced degrees are much more common. This educational gap directly affects the community's economic realities. The median income in Anacostia is approximately 35 percent of the District-wide figure (see Figure 67), highlighting the stark economic divide between the city's southeast quadrant and its wealthier areas.

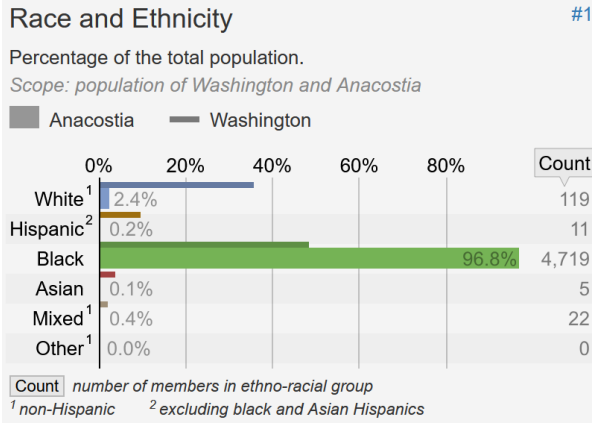


Figure 64: Anacostia Neighborhood Race and Ethnicity compared to Washington, D.C. Data from the U.S. Census Bureau. Graphic retrieved from the Statistical Atlas profile page for the Anacostia D.C. Neighborhood
 <<https://statisticalatlas.com/neighborhood/District-of-Columbia/Washington/Anacostia/Race-and-Ethnicity>>

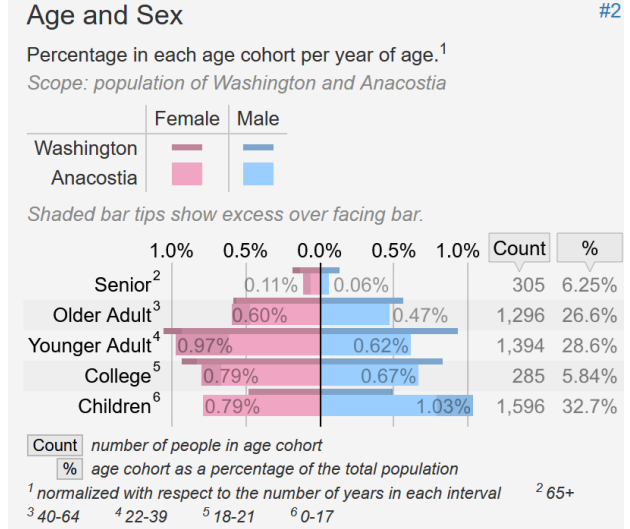


Figure 65: Anacostia Neighborhood Age and Sex compared to Washington, D.C. Data from the U.S. Census Bureau. Graphic retrieved from the Statistical Atlas profile page for the Anacostia D.C. Neighborhood
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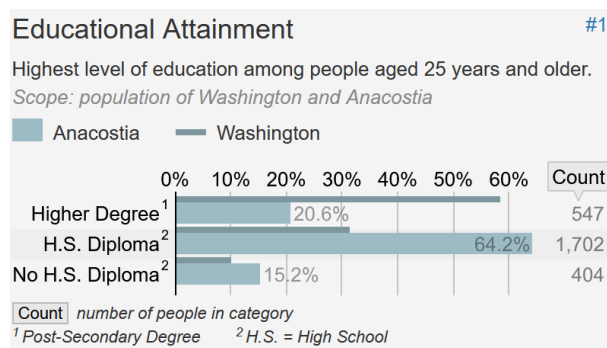


Figure 66: Anacostia Neighborhood Educational Attainment compared to Washington, D.C. Data from the U.S. Census Bureau. Graphic retrieved from the Statistical Atlas profile page for the Anacostia D.C. Neighborhood <<https://statisticalatlas.com/neighborhood/District-of-Columbia/Washington/Anacostia/Educational-Attainment>>

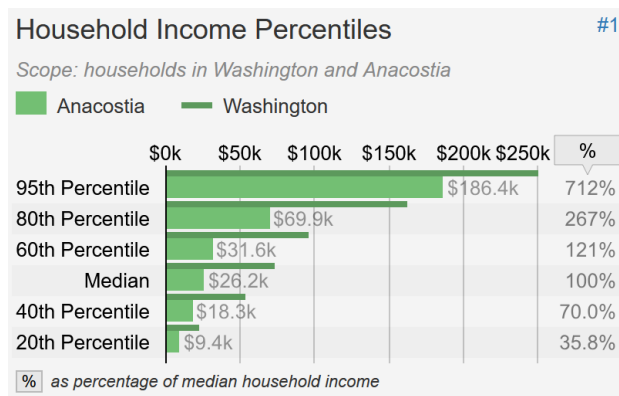


Figure 67: Anacostia Neighborhood Household Income Percentiles compared to Washington, D.C. Data from the U.S. Census Bureau. Graphic retrieved from the Statistical Atlas profile page for the Anacostia D.C. Neighborhood <<https://statisticalatlas.com/neighborhood/District-of-Columbia/Washington/Anacostia/Household-Income>>

Surrounding Neighborhoods Takeaways:

Washington, D.C., is a city of contrast. North of the Anacostia River, the Navy Yard Neighborhood has become a hub for young professionals. More than 60 percent of its residents are White, nearly two-thirds are young adults, and over 80 percent hold higher degrees (Statistical Atlas, 2018). With a median household income of \$78,400, above the citywide average, Navy Yard represents the face of a wealthier, highly educated, and transient D.C.

In contrast, neighborhoods southeast of the Anacostia River—Barry Farms, Fairlawn, and Anacostia—tell another story. These communities are predominantly Black, with populations ranging from 90 to almost 100 percent. Here, children make up a significant share of residents, especially in Barry Farms and Anacostia, where families and youth are at the heart of the neighborhood fabric. However, despite this vitality, opportunities remain limited. In each of

these neighborhoods, the predominant level of educational attainment is a high school diploma—far below the District’s citywide average, where advanced degrees are more prevalent.

The median household income in Anacostia is just \$26,200, in Fairlawn \$30,700, and in Barry Farms, a mere \$14,600 (Statistical Atlas, 2018). Compared to the District’s overall median of nearly \$73,000. These figures underscore the depth of inequality across the city. In these neighborhoods, households often struggle to make ends meet, despite D.C. becoming increasingly affluent.

The data shows that Washington, D.C. can feel like two very different cities. In places like Navy Yard, the community is wealthier, predominantly White, highly educated, and undergoing rapid change with new development. Across the river, in neighborhoods like Anacostia, Fairlawn, and Barry Farms, the story is different. These areas are predominantly Black, home to many families and children, and full of community strength, but they continue to face significant challenges around education and income (see Table 14). These differences are not just numbers; they reveal how race, income, and location influence everyday life in the city.

Table 14

Summary of Demographics of the Navy Yard, Barry Farms, Fairlawn, and Anacostia

Neighborhoods compared to Greater Washington, D.C., 2018

Location	Population	Predominant Race	Predominant Age Cohort	Predominant Educational Attainment	Number of Households	Median Household Income
District of Columbia (City)	659,009	48.3% Black	36.6% Young Adults	58.5% Higher Degree	276,546	\$72.9k
Navy Yard	2,794	61.1% White	62.3% Young Adults	82.5% Higher Degree	1,497	\$78.4k
Barry Farms	2,307	99.5% Black	34.9% Children	60.2% High School Diploma	890	\$14.6k
Fairlawn	3,134	90.7% Black	26.8% Young Adults	64.6% High School Diploma	1,297	\$30.7k
Anacostia	4,876	96.7% Black	32.7% Children	64.2% High School Diploma	1,812	\$26.2k

Note. Data from Statistical Atlas (2018)

3.4.2 Physical Inventory

The physical inventory provides a comprehensive overview of the site’s tangible features and vulnerabilities. It sets the foundation for understanding its current character and use.

This section documents the significant elements that define the site, including its topography, existing facilities, buildings, circulation networks, and points of access, as well as the 100 and 500-year flood and SLR projections. This information serves as the basis for evaluating existing and future conditions and for informing about opportunities and constraints in the design process.

Topography

The site's topography is characterized by a very flat, low-lying riverfront plain. With a minimal slope, elevations throughout most of the park in these sections range from about 3 feet to 10 feet (Government of the District of Columbia, 2008) (see Figure 68). The highest point of elevation in the Park is 14 feet, at the Anacostia Recreation Center and Pool, while the lowest point is at the river's edge, 2 feet. At this point, the topography is a mix of gentle engineered slopes.

According to the *Remedial Investigation Report*, since the area was initially tidal-influenced and had mudflats, the present-day landform is believed to result mainly from this filling and subsequent grading (AMEC Environment & Infrastructure Inc., 2013). In general, the depth of the fill material lines up with the way the site's surface is shaped today. These characteristics make the site highly susceptible to flooding, especially during storm surges and daily tide fluctuations.

The very flat topography means that a slight change in river height can result in a significant horizontal change in the shoreline (see Figure 69) (see Figure 70).

Stormwater runoff direction is shaped not only by the site's topography but also by man-made and natural features (see Figure 71), including storm sewers, drainage swales, an approximately 1,500-foot-long east-west floodwall (see Figure 72), an approximately 1,00 feet long, north-south berm, and the Stick Foot Creek storm sewer (AMEC Environment & Infrastructure Inc., 2013) Additionally, shallow groundwater may emerge in low-lying areas, which likely contributes to the wetland conditions at the site. However, groundwater data for the site is not available.

The Park's flat land allows for slow water movement; however, challenges persist in managing stormwater runoff.

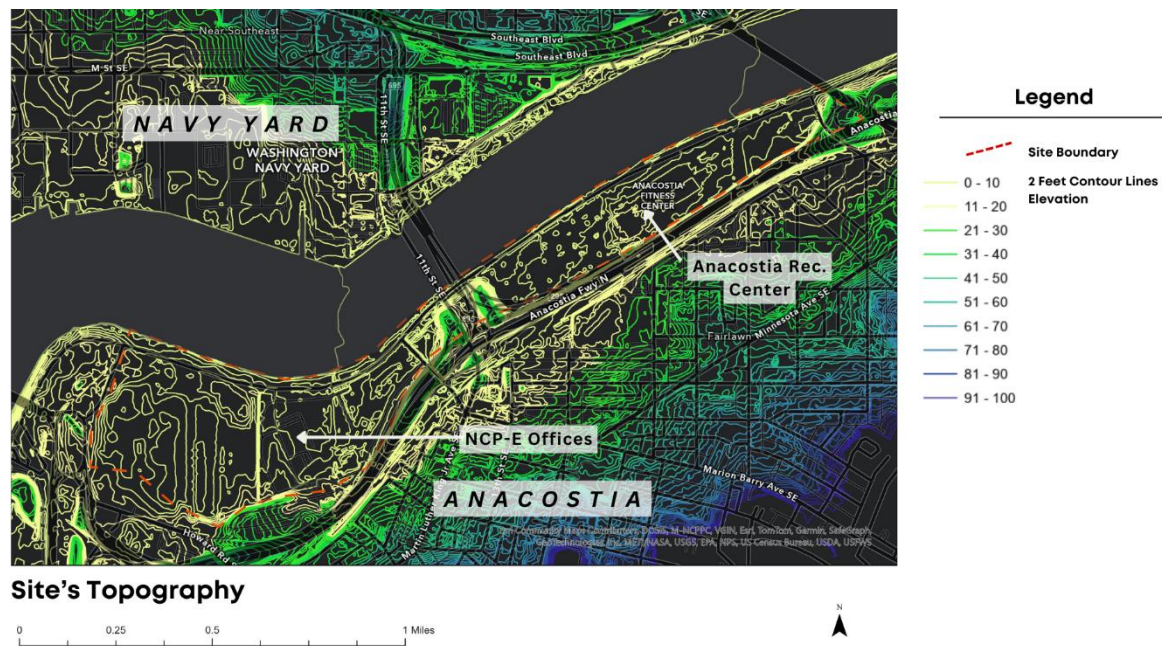


Figure 68: Site's Topography, 2 Feet Contour Lines and Elevations Gradient every 10 Feet. Credit: (Government of the District of Columbia, 2008) (Esri Inc., 2025) (Canva, 2025). Edited by the author.



Figure 69: Minimal Slope in Green Spaces. Credit: the author (2025).



Figure 70: Park's Gentle Slopes. Credit: the author (2025).

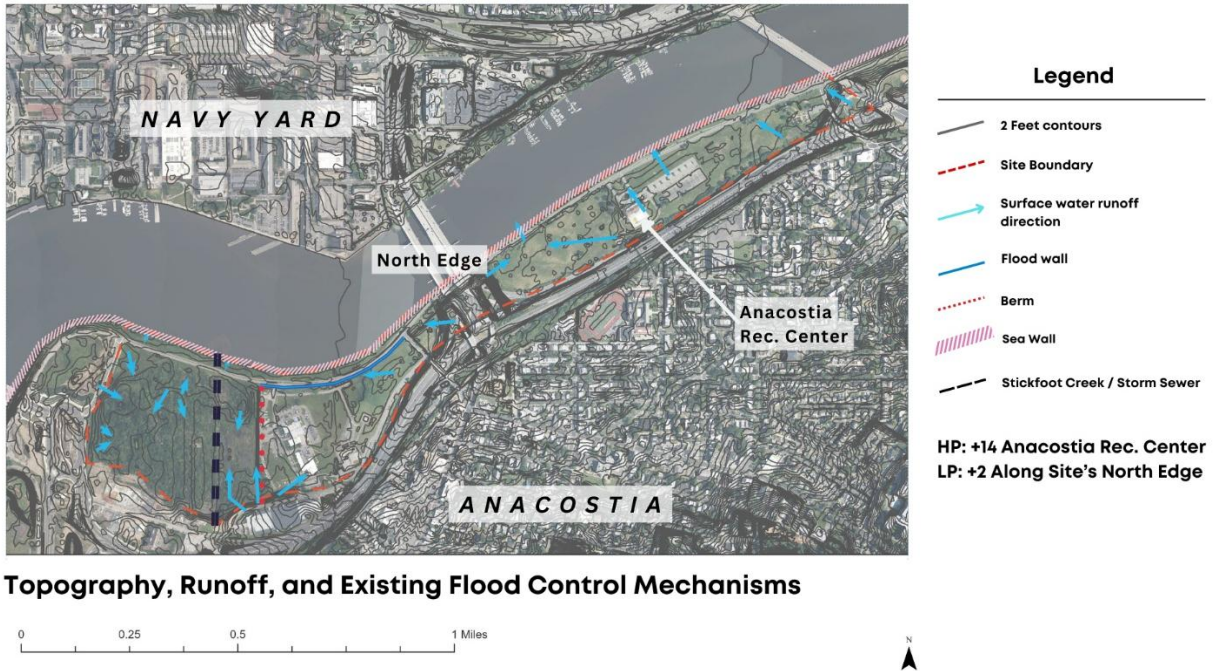


Figure 71: Site's Topography, Surface Water Runoff Direction, and Existing Flood Control Mechanisms. Credit: (DC GIS Group, 2023) (Esri Inc., 2025) (AMEC Environment & Infrastructure Inc., 2013) (Government of the District of Columbia, 2008) (Canva, 2025). Edited by the author.



Figure 72: Section of the Existing Floodwall in Poplar Point. Credit: the author.

Wetland Inventory

The area formerly occupied by the D.C. Lanham Tree Nursery and the Architect of the Capitol Nursery is now heavily vegetated and contains wetlands (see Figure 73) influenced by the existing berm, flood wall, Stick Foot Creek storm sewer, and topography conditions (see Figure 74). The Area where they are located is protected and not accessible to the public (see Figure 75). This area is around 30 acres

As described by NOAA (n.d.). “A wetland is an area of land that is saturated with water.” Water sits on the ground or stays just below the surface, either year-round or at certain times of the year, including the growing season (EPA, n.d.).

Anacostia Park contains an extensive wetland system. Whereas the most popular ones are tidal wetlands located in Kenilworth Park and Kingman Island, the wetlands located in Poplar Point and Section D are forested and non-tidal. They encompass around 11 acres (NPS, n.d.).

The NPS (n.d.) states that “Tidal wetlands are influenced by the rise and fall of tides and are found along our nation's coasts within reach of tides, whereas non-tidal wetlands are made up of freshwater that is not influenced by tides. They are often found near streams, rivers, lakes, and ponds.”

The wetlands in Poplar Point are a significant wildlife habitat, having been abandoned in the early 1990s (NPS, 2017). Formerly mowed lands have evolved into shrub-scrub communities, and wooded areas have matured, creating a diverse mix of habitats that attract a wide range of wildlife. Today, the area provides a critical link between the Potomac River

corridor and the natural features of the upper Anacostia River corridor.

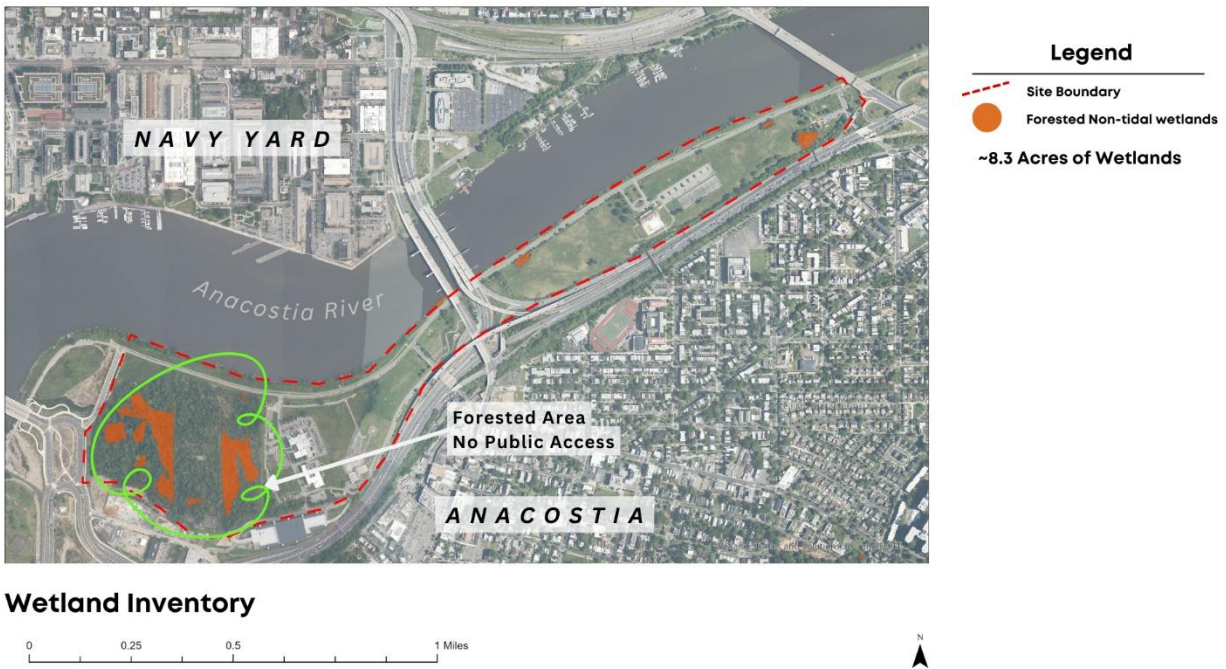


Figure 73: Wetlands Inventory. Credit: (DC GIS Group, 2023), (DOEE, 2025) (Esri Inc., 2025) (Canva, 2025). Edited by the author.



Figure 74: Picture of the Forested Wetland Area. Credit: the author.



Figure 75: Picture of the Entrance to the Forested Area. No Public Access. Credit: the author.

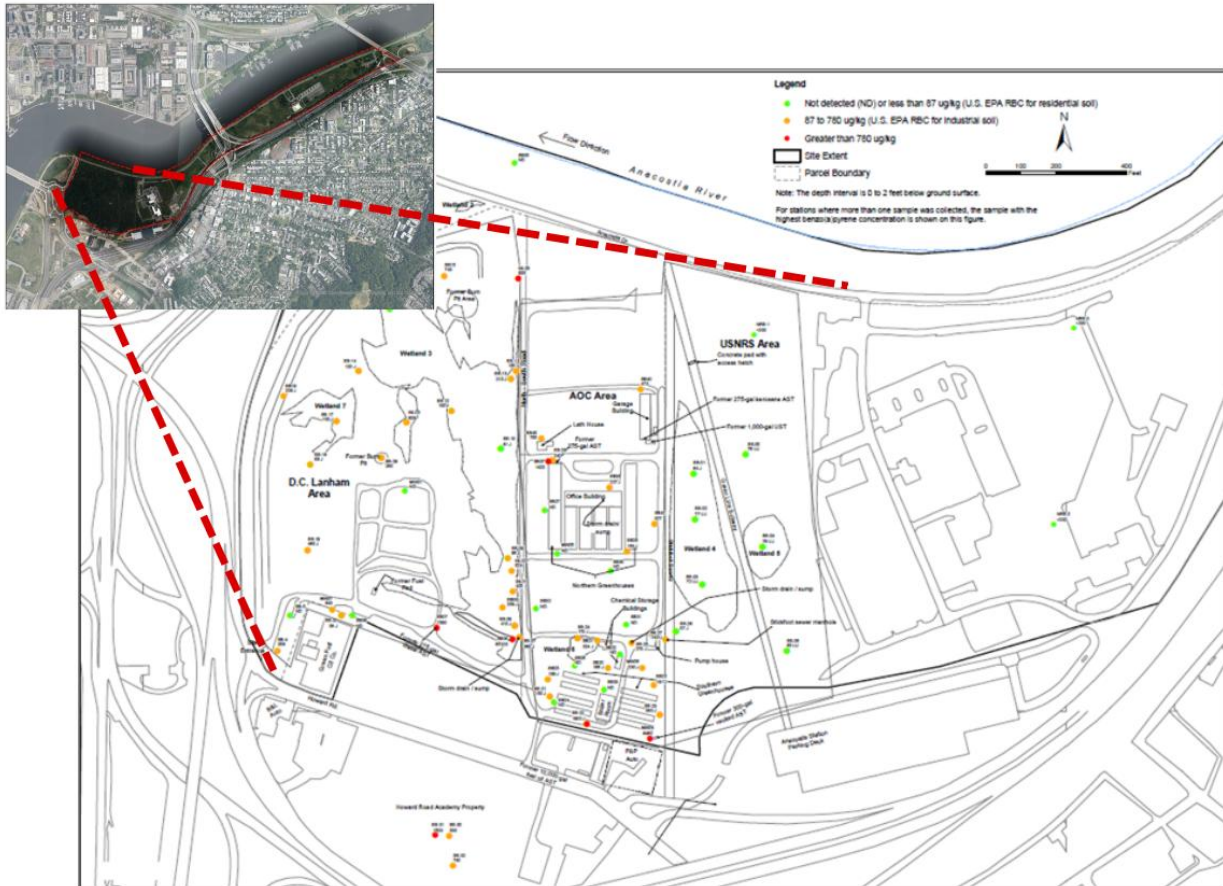
Presence of Contaminants

Since the 1990s, Poplar Point has undergone environmental investigations, with a primary focus on the former nurseries and greenhouses (DOEE, n.d.). These studies identified elevated levels of multiple contaminants, including metals, pesticides, polychlorinated biphenyls (PCBs), petroleum, hydrocarbons, and volatile/semi-volatile organic compounds (VOCs/SVOCs) in soil, sediment, groundwater, and surface water (see Figure 76).

The *Remedial Investigation Scoping Document* provides a comprehensive overview and illustration of the site through a detailed conceptual site model, establishing a shared understanding of current site conditions to support discussions on future investigations, remediation options, potential receptors, and land use planning (AMEC Environment & Infrastructure Inc., 2013).

Most contaminants are confined to the forested wetland area, which is currently off-limits to the public and requires bioremediation before development. The assumption is that present substances can be harmful to people through direct contact, inhalation of contaminated vapors, and consumption of contaminated water or produce from its soils. Proximity to the Anacostia River increases the risk of recreational exposure. Contaminated groundwater continuously discharges into the Anacostia River, and contaminants can also re-enter the site during flood events. Pollutants can cause ecological damage when they accumulate in the food chain, harming fish and wildlife.

The bioremediation of the site is a significant, expensive, and necessary challenge that the District is already considering. My design will avoid these areas to protect both people and nature, ensuring contaminants remain undisturbed.



Pollutants on Site

Figure 76: Benzo(a)pyrene in Surface Soil Locations. Credit: (AMEC Environment & Infrastructure Inc., 2013) (Esri Inc., 2025) (DC GIS Group, 2023) (Canva, 2025). Edited by the author.

Facilities Inventory

The site features a diverse range of facilities that cater to both institutional and community needs (see Figure 77). Scattered between office buildings and agency headquarters, a blend of private and public spaces is found. Key institutional uses include the NPS headquarters and the USPP offices in Section C. Community-oriented amenities that support recreation and gathering are located only in Section D, such as the Anacostia Recreation Center, basketball and

tennis courts, two playgrounds, a horseshoe game area, and a designated grilling and seating area. Supporting these uses are essential infrastructure such as a pedestrian bridge, a surface parking lot, and the only public restrooms.

To reach the public restrooms from Section C takes up to 30 minutes.



Figure 77: Facilities Inventory Map. Credit: (DC GIS Group, 2023) (Esri Inc., 2025) (Canva, 2025). Edited by the author.

The Park's existing facilities support community engagement and activities. Nonetheless, there is a shortage of accessible public restrooms.

Circulation and Access Points

There are several ways to access the site. Each entrance point shares a different experience for car users, micromobility users, public transit users, and pedestrians. These perspectives on traffic at various access points — scale, user volume, and time to reach the park — enable us to classify them as either major or minor (see Figure 78).

Circulation and Access Points

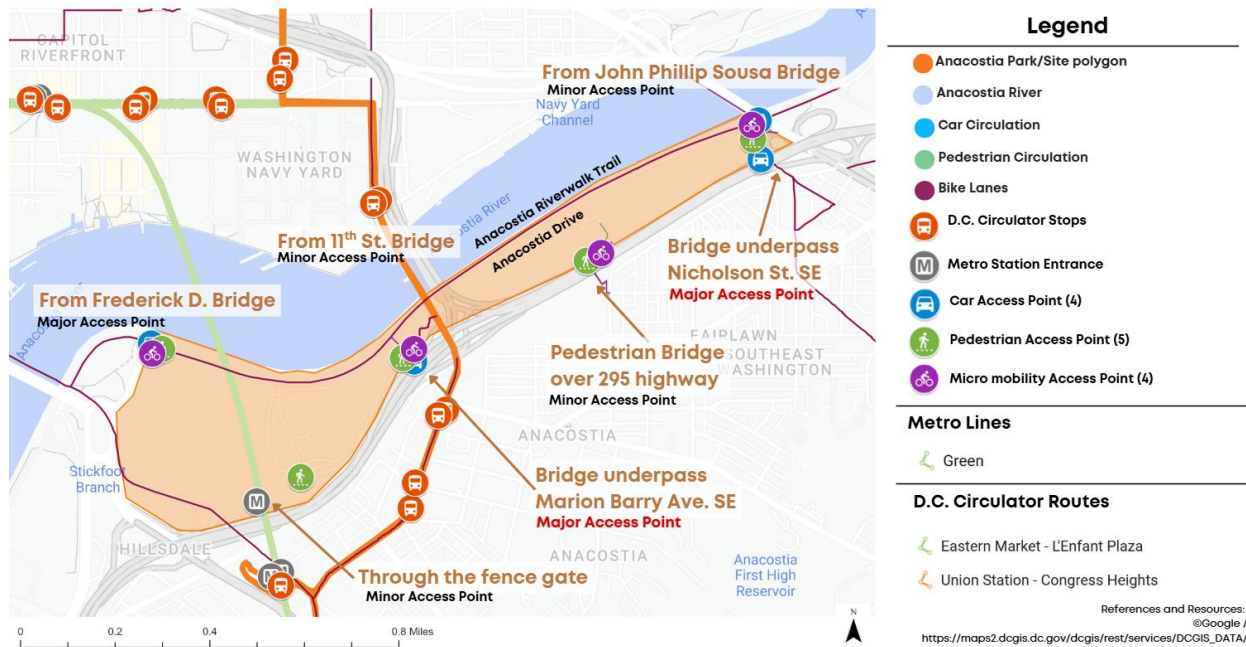


Figure 78: Circulation and Access Points Map. (DC GIS Group, 2023) (DCGIS_DATA/Transportation_Rail_Bus_WebMercator (MapServer), 2022) (Esri Inc., 2025) (Canva, 2025) (Google, 2025). Edited by the author.

Getting to Anacostia Park from the Navy Yard area is straightforward: you can cross the Frederick Douglass Memorial Bridge and arrive by car, on foot, or on a micromobility device (see Figure 79). The bridge provides a direct, well-connected route to the park's western edge.

A key connection between Navy Yard and the park is the 11th Street Bridge, which offers both vehicular and pedestrian access. Drivers can cross the bridge and take Anacostia Drive SE south to reach Sections C and D of the park. For pedestrians and cyclists, the bridge connects directly to the Anacostia Riverwalk Trail, providing a continuous, scenic route over the river and into the park.

If you come across the John Philip Sousa Bridge, which carries Pennsylvania Avenue over the Anacostia River, the experience of reaching Anacostia Park is mixed. On the west side of the

bridge, Section D of the park begins almost immediately along the riverbank. Cyclists and pedestrians can access the park via the bridge's sidewalks, which connect to the Anacostia Riverwalk Trail. Cars must leave Pennsylvania Avenue and enter the Fairlawn neighborhood, then circle through local streets to reach Nicholson Street, SE, which passes under I-295 and connects to the park (see Figure 80).

The picture is quite different for residents of neighborhoods on the opposite side of I-295. The highway (I-295), which acts as a physical barrier, runs along the park's edge, limiting access points and making the park feel cut off from the very communities it borders. For many residents, reaching Anacostia Park requires navigating highway overpasses and underpasses, or taking indirect local streets that are not always designed with pedestrians and cyclists in mind. Transit connections are limited, and the walk can feel unsafe or inconvenient due to heavy traffic, poor lighting, or a lack of continuous sidewalks and bike lanes.

From the Anacostia neighborhood, the Marion Barry Avenue, SE underpass serves as one of the key access routes into the park (see Figure 81). It provides a direct connection beneath I-295, linking the residential and commercial areas of Historic Anacostia with Section C of the park. Although the underpass is functional, it currently features poor lighting, narrow sidewalks, and limited wayfinding, making the experience less inviting for pedestrians and cyclists. Improving this connection is essential for fostering greater physical and social integration between the neighborhood and the park.

The overall pedestrian and micromobility access points are located from the John Phillip Sousa Bridge (see Figure 82) and the 11th St. Bridge (see Figure 83).

If you are taking public transit, there are a couple of options for reaching Anacostia Park:

- Minnesota Ave SE & 22nd St SE: Several bus routes stop here. From the stop, it is about a 10-minute walk along local streets to the Nicholson Street, SE underpass, which leads directly into the park.
- Minnesota Ave SE & 18th St SE: Another nearby stop sits farther west. From here, you can reach the park in about a 15-minute walk using the pedestrian bridge that crosses over I-295 (see Figure 84). This route drops you closer to the Anacostia Riverwalk Trail.

Another way to reach Anacostia Park is through the Anacostia Metro Station (Green Line).

From the station, you can:

- Walk through the station tunnel under I-295: This connects directly to the Metro parking garage, which sits across the street from the park. From there, it is just a short crossing into the park—about a 15-minute trip in total from the platform. However, if you arrive at the station by bus instead of Metrorail, you will need to pay a fare to pass through the faregates to access the tunnel.
- Use the Howard Road SE underpass: take a 15-minute walk along Howard Road SE, which passes under I-295 and takes you out by the Metro parking garage as well. From there, you cross the street into Anacostia Park (see Figure 85).

There is no public transit inside the park's boundaries.

Major Access Points:



Figure 79: Entrance to the Park from Frederick D. Memorial Bridge. Credit: Google Earth.



Figure 80: Nicholson St. Underpass. Credit: Google Earth.

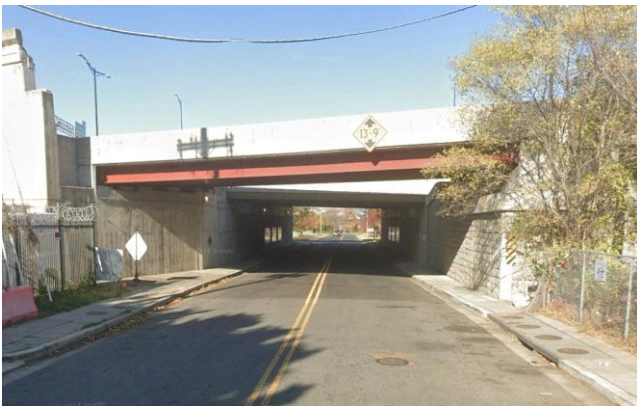


Figure 81: Marion Barry Ave. Underpass. Credit: Google Earth.

Minor Access Points:



Figure 82: Entrance to the Park looking from the John Phillip Sousa Bridge. Credit: Google Earth.



Figure 83: Entrance to the Park Looking from 11th St. Bridge. Credit: Google Earth.



Figure 84: Entrance from the Pedestrian Bridge Above I-295 Highway Looking from the Park. Credit: the author (2024).



Figure 85: Through the Fence Gate Entrance Looking from the Metro Parking Garage. Credit: Google Earth.

Flood and Sea Level Rise Projections for Anacostia Park

The site's low-lying topography, combined with its location along the Anacostia River, makes Sections C and D of Anacostia Park among the most vulnerable areas in Washington, D.C. to coastal flooding, riverine flooding, and permanent inundation from sea level rise.

Using current FEMA Flood Insurance Rate Maps (FIRM) and data from the DC Flood Risk Tool, we mapped the 1985 (see Figure 86) and 2024 flood plain projections (see Figure 87). In the latter, the entirety of the site falls within or immediately adjacent to the 100-year (1% annual chance) flood zone and the 500-year (0.2% annual chance) flood zone (DOEE, n.d.). A comparison with the 1985 FEMA flood data reveals an increase in risk over time.

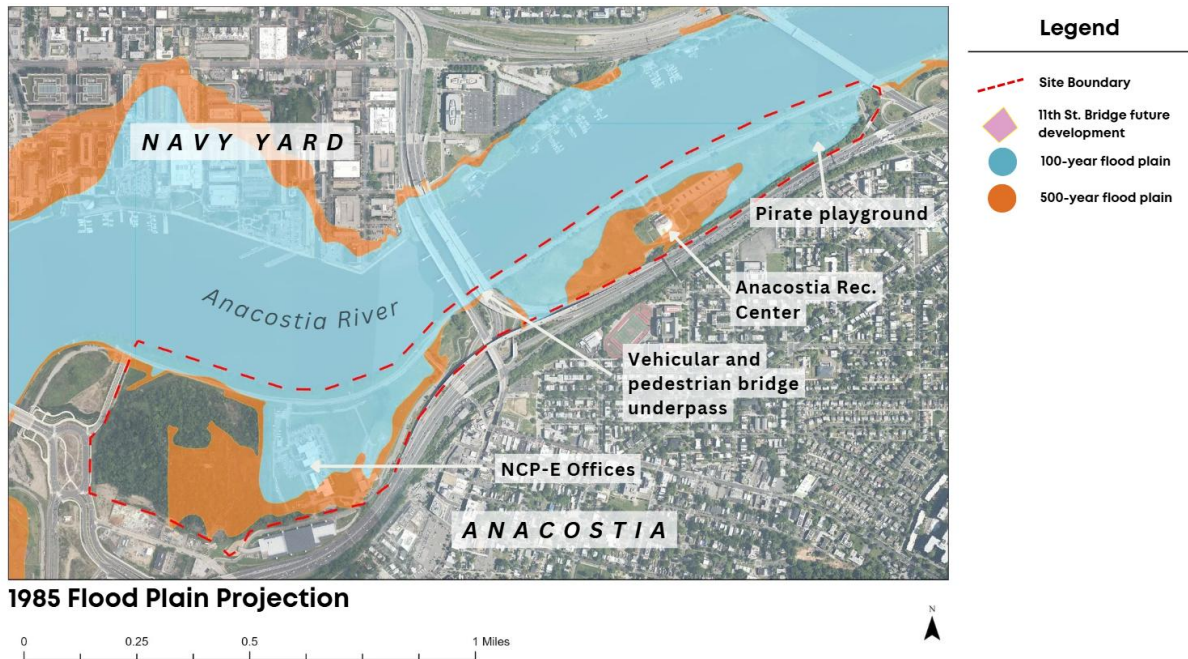


Figure 86: 1985 Flood Plain Projection Over Site. Credit: (DC GIS Group, 2023) (DOEE, n.d.) (Esri Inc., 2025) (Canva, 2025).

Edited by the author.

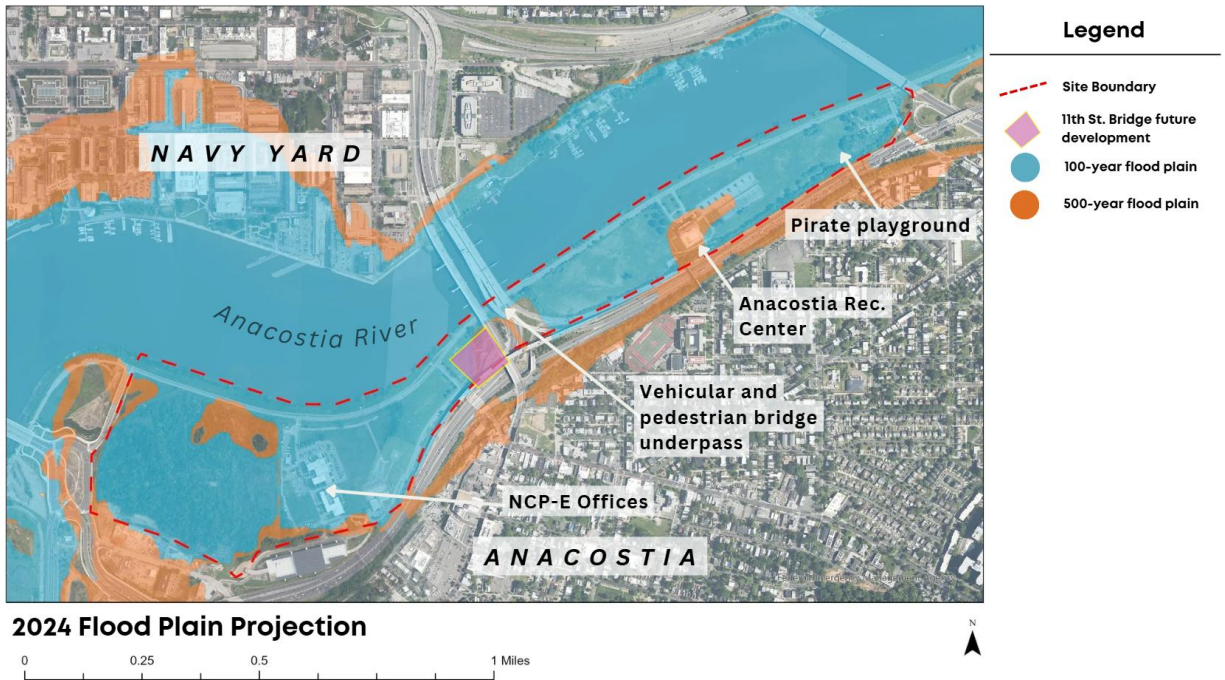


Figure 87: 2024 Flood Plain Projection Over Site. Credit: (DC GIS Group, 2023) (DOEE, n.d.) (Esri Inc., 2025) (Canva, 2025).

Edited by the author.

The significant expansion of the current flood plain results from updated modeling, new technologies, increased understanding of hydrology, and the influence of climate change. The historical comparison shows that flood risk is not static and that site vulnerability is increasing.

Using the 2024 DOEE Sea Level Rise Scenarios and NOAA's Sea Level Rise Viewer, I mapped 3- and 5-foot SLR projections at the site (see Figure 88) (see Figure 89). The SLR scenarios, while distinct from fluvial flooding, represent a permanent and escalating risk.

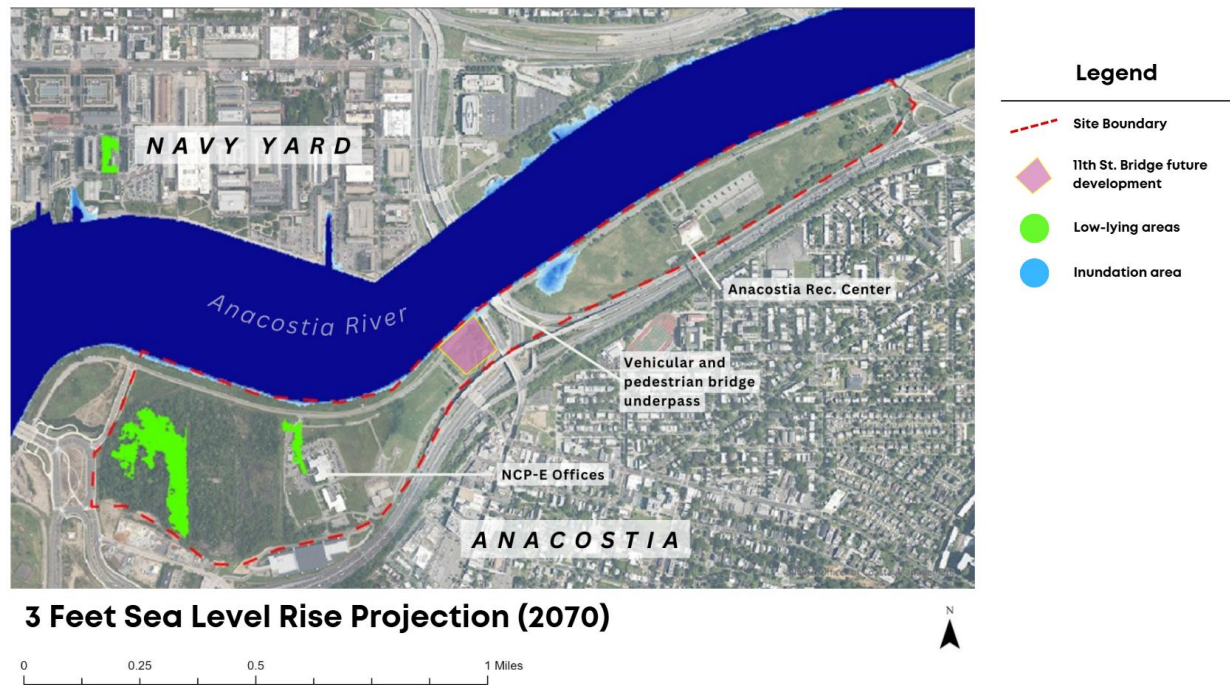


Figure 88: NOAA's 3 Feet Sea Level Rise Projection Over Site. Credit: (DC GIS Group, 2023) (National Oceanic and Atmospheric Administration, 2025) (Esri Inc., 2025) (Canva, 2025). Edited by the author.

Three feet of SLR is projected to occur by 2070. This implies permanent inundation of low-lying shoreline areas and parts of the riverwalk trail in section D. Drainage outfalls and stormwater infrastructure located at the current river grade would likely experience backflow and chronic ponding, impairing functionality.

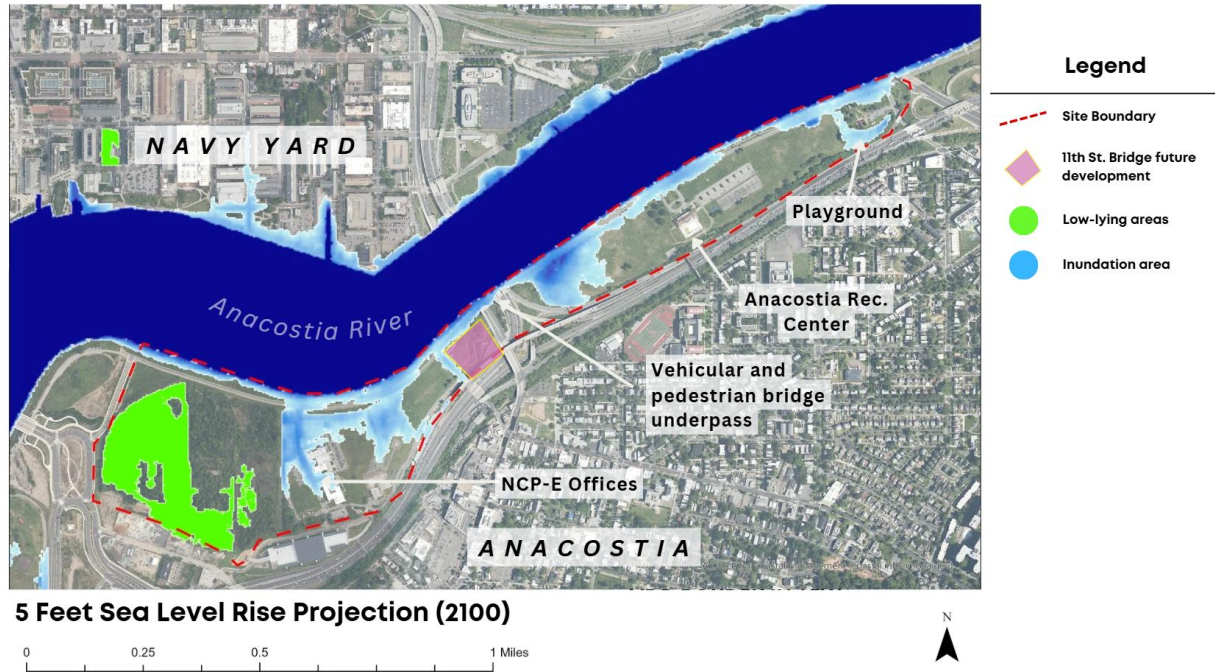


Figure 89: NOAA's 5 feet Sea Level Rise Projection Over Site. Credit: (DC GIS Group, 2023) (National Oceanic and Atmospheric Administration, 2025) (Esri Inc., 2025) (Canva, 2025). Edited by the author.

The five-foot SLR scenario is projected to happen by approximately 2100. In this scenario, large portions of the site transition from intermittently flooded to permanently tidal wetland conditions. In this scenario, critical infrastructure is projected to be affected, such as the National Park Service and Park Police offices, as well as the new Pirate playground equipment.

In both scenarios, we can appreciate that not all affected zones are part of the main inundation footprint; low-lying, disconnected areas west of the site are also impacted. This could mean that interrelated hydrologic mechanisms are at work. After this observation, I cross-referenced data from NOAA's Sea Level Rise Viewer and Climate Central's Coastal Risk Screening Tool (see Figure 90). The analysis reveals different projections for the site's low-lying areas.

NOAA (2022) states, “Low-lying areas, displayed in green, are considered hydrologically “unconnected” areas that may flood. They are determined solely by how well the elevation data capture the area’s hydroconnectivity. A more detailed analysis of these areas is required to determine whether they flood given the chosen sea level rise (SLR) value.” This means that while the areas fall below projected flood elevations (6-8 feet), their actual inundation depends on whether tidal waters can physically reach them. In contrast, Climate Central (2025) clearly states on their tool, “Areas lower than the selected water level and with an unobstructed path to the ocean are shaded red. By default, areas below the water level but that appear to be protected by ridges (and in the U.S., levees) are not shaded.” This model incorporates hydrologic connectivity layers and levee data, showing that the existing berm protects the western area of the site and is thus not shown as inundated.

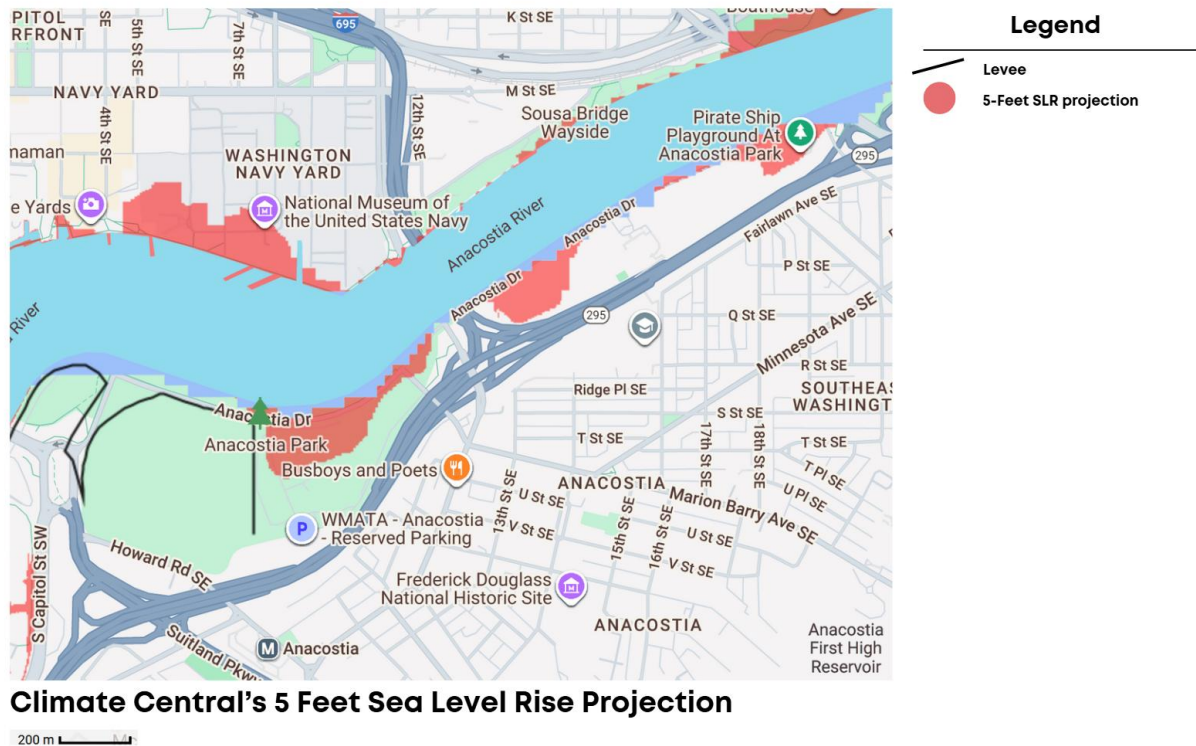


Figure 90: Climate Central's Coastal Risk Screening Tool Projection for 5 feet of Sea Level Rise on Site. Credit: (Climate Central, 2025) (Canva, 2025). Edited by the author.

The analysis of flood plain and SLR projections indicates that the site will experience progressive loss of usable parkland and infrastructure functionality.

3.4.3 Field Observations

Through a series of field observations conducted on August 11, 2024, September 12, 2024, and April 1, 2025, we engaged with the dynamic life of Sections C and D of Anacostia Park. We aimed to document the status of existing facilities, engage with the park's rhythm, map how different behaviors and uses of the space unfold across its landscape using the System for

Observing Play and Recreation in Communities (SOPARC) protocol, and gain insight into users' desires through passive community input research.

This section is divided into three parts: 1) Current Park Conditions, which include photographs that document key features, physical characteristics, and areas of concern. These images illustrate the site's layout, surrounding context, and natural and built elements. 2) People and the space. Analyzing how people use the space and utilizing the SOPARC protocols will help us understand different areas of the park, and 3) Passive Community Input Research, where we summarized the results from previous community engagement events published in Anacostia Park's related plans and frameworks documentation.

Current Park Conditions

The park's office infrastructure and offices are well-maintained. At the same time, public buildings like the Anacostia Recreation Center (see Figure 91) and restrooms (see Figure 92) appear outdated and lack adequate maintenance. Despite this, the public pool at the Recreation Center is in good condition and well-used.



Figure 91: Anacostia Recreation Center Building. Credit: NPS.



Figure 92: Public Restrooms in Section D. Credit: the author.

All outdoor recreational facilities are located in Section D of the Park. We can observe neglect and lack of maintenance in these areas, such as damaged fences (see Figure 93), lack of bicycle and micromobility parking areas (see Figure 94), tennis courts in neglected conditions (see Figure 95), basketball courts are used as parking (see Figure 96), neglected play installations like horseshoe (see Figure 97), inadequate grilling equipment (see Figure 98), and Outdated picnic facilities (see Figure 99). However, the pirate playground and outdoor exercise equipment have recently been updated (see Figure 100).



Figure 93: Damaged fence in tennis courts. Credit: the author.



Figure 94: Lack of bicycle parking areas. Credit: the author.



Figure 95: Tennis Courts in Neglected Conditions. Credit: the author.



Figure 96: Basketball Courts are used as Parking. Credit: the author.



Figure 97: Horseshoe Game Installation in Neglected Conditions. Credit: the author.



Figure 98: Inadequate Grilling Area. Credit: the author.



Figure 99: Outdated Picnic Area. Credit: the author.



Figure 100: Pirate Playground and outdoor exercise equipment. Credit: the author

The open areas consist of grassland, which is primarily maintained. However, benches (see Figure 101) and picnic tables (see Figure 102) in these areas appear neglected and old. The outlook areas are particularly concerning because they are dangerous platforms without railing or

signage (see Figure 103), located on top of storm discharge pipes where trash accumulates (see Figure 104).



Figure 101: Neglected Benches, Overgrown Greenery.
Credit: the author.



Figure 102: Old Picnic Tables Surrounded by Trash. Credit: the author.



Figure 103: Overlook Area with no Signage, Clear Paths, or Railing. Credit: the author.



Figure 104: Overlook Area Over Storm Sewer. Credit: the author.

The park features educational signage and artwork (see Figure 105) that are in good condition. Some signage is damaged (see Figure 106).



Figure 105: Educational Art Installation along Riverwalk Trail. Credit: the author.



Figure 106: Damaged Signage on Site. Credit: the author.

There are multiple trash bins along the sidewalk and bike lanes, and we observed park staff cleaning and taking out the trash (see Figure 107), which is a positive sign. However, trash accumulation is also present in the outlook areas and picnic tables in the grassland. There are no trash bins nearby, and trash is apparent next to the Anacostia Rec. Center (see Figure 108).



Figure 107: Trash Collection. Credit: the author.



Figure 108: Trash Next to Anacostia Recreation Center. Credit: the author.

People and the Space

I annotated the specific activities that occurred in specific areas, from fishing on the riverwalk trail to playing in open fields. The foundation of this data set was established on August 11, 2024, through a systematic SOPARC study, which provided a quantitative snapshot of park users and their activities at that time.

The SOPARC protocol collects direct data on park usage, including users' activity levels, gender, types of activities, estimated age, and ethnicity (McKenzie & Cohen, 2006) (see Table 15). It also evaluates park areas for accessibility, condition, supervision, and organization. I used the protocol to guide the assessment of Park activity, focusing on overall movement rather than specific personal details such as age, ethnicity, or gender. This tool emphasizes physical activity, allowing for clear comparisons of usage across different spaces and times. The site observations aim to gauge how people occupy and energize the park through their presence and movement, regardless of their gender, ethnicity, or age.

Relevant target areas were visited on Sunday, August 11, 2024, from 2:45 pm to 5:45 pm. Each target area was observed for 45 minutes.

I have summarized the results from each SOPARC Observation Form (see Table 16). A total of 140 people were observed engaging in various activities such as active play, cycling, dog walking, fishing, and running in different targeted areas.

Due to time constraints, only one day was available to visit relevant target areas within the Park. For optimal results, this exercise should be practiced throughout the day on various randomly assigned dates (See Appendix 2: SOPARC Scorecards).

Table 15*SOPARC Key*

Ethnicity		Activity Level	
B	Black	S	Sedentary
W	White	W	Walking
H	Hispanic	V	Vigorous
O	Other		

Table 16*SOPARC Results Summary*

TARGET AREA	ACTIVITY	PEOPLE	AGE GROUP				ETHNICITY				ACTIVITY LEVEL		
			Child	Teen	Adult	Senior	B	W	H	O	S	W	V
		Participants											
Pirate Playground	Active Play (Not using)	Female	22	3			25						25
		Male	12	1			12	1					13
		Participants											
Pirate Playground	Active Play (Using Installations)	Female	3				3						3
		Male	3				3						3
		Participants											
Riverwalk Trail	Dog Walking	Female			1		1					1	
		Male			1			1				1	
		Participants											
Pirate Playground	Supervising	Female			1				1		1		
		Male			1			1		1			
		Participants											
Riverwalk Trail	Cycling	Female			1			1					1
		Male		1	7		3	5					8
		Participants											
Riverwalk Trail	Walking	Female			4		2	2				4	
		Male			4		1	3				4	
		Participants											
Riverwalk Trail	Hanging out	Female			1				1		1		
		Male	1	1	4		2	4			6		
		Participants											
Riverwalk Trail	Running	Female			2		1	1					2
		Male			1		1						1
		Participants											
Riverwalk Trail	Fishing	Male			4		4				4		
		Participants											
Tennis Courts	Tennis	Female			1				1				1
		Male			1				1				1
		Participants											
Lawn Areas	Picnicking	Female	4	2	21	3	30				30		
		Male	3	3	19	4	29				29		

The lawn areas were the most popular, with 52 people picnicking. They were using the designated grilling spaces but had to bring their own equipment, chairs, and tables because the facilities were in poor condition. This interaction confirms a strong community desire for social and congregational activities. However, the poor conditions of the park's facilities are forcing people to find alternative solutions, creating a barrier for those who cannot easily transport grills, chairs, tables, and other equipment.

The Pirate Playground was the second most popular area, with 46 people present at the time of the examination. This area was clearly popular with children, who played both on and off the equipment while adults supervised nearby. This interaction indicates that the playground space is functioning as intended and demonstrates that when the facilities receive good maintenance, everyone enjoys them without much burden.

The Riverwalk Trail is popular for various activities, such as fishing, running, dog walking, cycling, and simply enjoying the river, with 33 people using the space. The diverse range of activities observed indicates that the park's flexible, multi-use spaces are crucial. The trail serves a variety of needs, accommodating both transit and lingering, as it is a destination.

There were also two people using the tennis court. This could suggest a lack of demand for tennis. However, the viewing spots and surrounding areas of the courts are in poor condition, which could be a reason for the low demand for them.

Passive Community Input Research

Anacostia Park and its surrounding communities have been the subject of numerous studies, plans, and development frameworks, each involving significant time, funding, and community effort. I have decided to build upon the established record of community engagement

events and input. Allowing for a comprehensive understanding of community-identified priorities and historical concerns within our timeframe and funding limitations. In this way, we ensure the community's voice is heard and the project remains informed by them.

Based on the results of community engagement activities from existing plans and frameworks for Anacostia Park, as well as Google Maps reviews that identified common interests or concerns, I have developed a summary.

Table 17*Community Input Summary*

Input Source	Goal				
	Access and Connectivity	New Development	Community Spaces/ Programming	Climate Resilience	Sea Level Rise Adaptation
Anacostia Waterfront Framework Plan (2003)	public wants safe, multimodal access (walking, biking, transit) across I-295. Support for improved lighting, signage, and ADA accessibility. Split views on vehicle access vs. ecology.	Support for mixed-income and inclusive development. Concerns about displacement and equity. Desire for sustainable, low-impact design sensitive to neighborhood character.	Strong demand for more Parks, open spaces, and continuous public waterfront. Interest in cultural, heritage, and recreational spaces. Desire for activation and better maintenance.	Concern about flooding, runoff, and CSOs. Support for restoring wetlands and riparian buffers. Desire for “green” development to improve river health.	Early recognition of floodplain issues; support for flexible and natural shoreline restoration to manage river fluctuations.
Anacostia Park Concept Plan – Sections D & E (2025)	Public wants safe, multimodal access (walking, biking, transit) across I-295. Support for improved lighting, signage, and ADA accessibility. Split views on vehicle access vs. ecology.	Favor small-scale Park enhancements over large development. Concern about overbuilding and impervious surfaces. Support for restrooms, pavilions, and concessions if low-impact.	Requests for flexible lawns, playgrounds, fitness areas, and event spaces. Strong interest in cultural interpretation and community programming. Emphasis on safety, cleanliness, and inclusivity.	Strong support for nature-based solutions: daylighting streams, restoring wetlands, expanding canopy. Concerns about flooding and stormwater.	Growing awareness of river rise. Support for adaptive design, elevated trails, and preserved wetlands for flood mitigation.
Poplar Point Public Comment Report (2025)	Calls for new, safe pedestrian/bike connections across I-295 and South Capitol Street. Demand for equitable access from Anacostia and Barry Farm. Requests to integrate with Riverwalk Trail and Metro.	Support for inclusive, community-benefiting development (jobs, affordable housing). Concerns about gentrification, privatization, and overcommercialization.	Desire for gathering spaces, playgrounds, art, cultural programming, and flexible event areas. Calls for celebrating Anacostia’s Black heritage. Focus on safety, restrooms, and lighting.	Strong preference for wetland and forest restoration, green infrastructure, and tree canopy. Concern about runoff and ecological impacts from construction.	Recognition of flood risk and rising water levels. Support for natural shoreline restoration, adaptive design, and equitable climate protection for vulnerable communities.
Google Maps Reviews (multiple dates)	The Park feels physically and psychologically disconnected from the rest of the city. While the Riverwalk Trail is a valued asset, the overall connectivity for anyone not in a car is seen as a significant failure.	People are aware of and appreciate new amenities within the Park itself. The rapid development on the opposite bank serves as a constant comparison point, leading to calls for similar investment on the Anacostia side.	The Park suffers from a perception of underuse. There is a clear public appetite for more regular, scheduled activities to bring life and energy to the Park on a daily basis.	The only related comments are about flooding after heavy rains. Some reviewers note that low-lying sections of the Riverwalk Trail or fields can be temporarily submerged or muddy after a storm, impacting usability.	

Note. Information summarized from District of Columbia, Office of Planning (2003), NPS (2025), NCPC (2025), and Google Maps (various dates).

Based on this analysis, I can conclude that the Park’s primary draw is for informal social gatherings and flexible spaces. However, active programming and well-maintained facilities are

crucial for organized sports to take place, and for people to feel comfortable in the space. Another insight is that people evidently value access to the river, trails, and green spaces, and seem willing to overlook some infrastructure deficits because of the Park's natural setting. While long-term resilience or adaptation to climate change is less visible to general users, people are more focused on immediate usability and amenities.

3.4.4 Natural Inventory: Ecological Context of the Anacostia Watershed

The Natural Inventory section establishes the broader ecological context for the design proposal in Anacostia Park, Sections C and D, by examining the dynamics of native and invasive species within the greater Anacostia River Watershed. While the specific site conditions drive the design intervention, the ecological processes and species assemblages do not conform to the Park's administrative boundaries. The health and character of Sites C and D are intrinsically linked to the watershed's overall condition.

This inventory adopts a watershed-scale perspective, acknowledging the site as part of a larger, interconnected system. The species listed are known to be present within the riparian corridor and associated habitats surrounding Sections C and D of Anacostia Park.

The Anacostia Watershed Society (AWS) (2019) has published a guide that provides a comprehensive overview of the plants and animals found in the Anacostia River and its surrounding watershed communities, including native, non-native, invasive, and species in greatest conservation need (see Figure 109). To have a better understanding of this classification, we define the terms as follows:

- Non-native species: plants, animals, or other living organisms that people bring to a place they are not from (DOEE, n.d.).
- Invasive species: plants, animals, or other living organisms that are non-native to the habitat or ecosystem where they are found. And whose introduction causes economic, environmental, or human harm (U.S. Department of Agriculture, n.d.).
- Species of Greatest Conservation Need: plants, animals, or other living organisms that require special attention and conservation actions to ensure their survival and to maintain overall biodiversity (DOEE, 2015).



Figure 109: Anacostia Watershed Species Classification Key. Credit: (AWS, 2019).

The Plants of the Anacostia River Watershed

Perennial Plants

Some perennial plants in the Anacostia River Watershed are non-native species, such as *Cichorium intybus*. There are also invasive plant species, such as *Alliaria petiolata* and *Daucus carota* (see Figure 110).



Rudbeckia hirta

Maddie Koenig



Eupatorium perfoliatum

Maddie Koenig



Alliaria petiolata

Jorge Bogantes Montero



Asclepias syriaca

Maddie Koenig



Claytonia virginica

Jorge Bogantes Montero



Daucus carota

Jorge Bogantes Montero



Lobelia cardinalis

Anacostia Watershed Society



Cichorium intybus

Jorge Bogantes Montero



Solidago

Will Parson



Arisaema triphyllum

Will Parson

Figure 110: Common Wildflower Species in the Anacostia River Watershed. Credit: (AWS, 2019).

Trees and Shrubs

The invasive plant species *Lonicera Maackii* is found in the Anacostia River Watershed (see Figure 111).

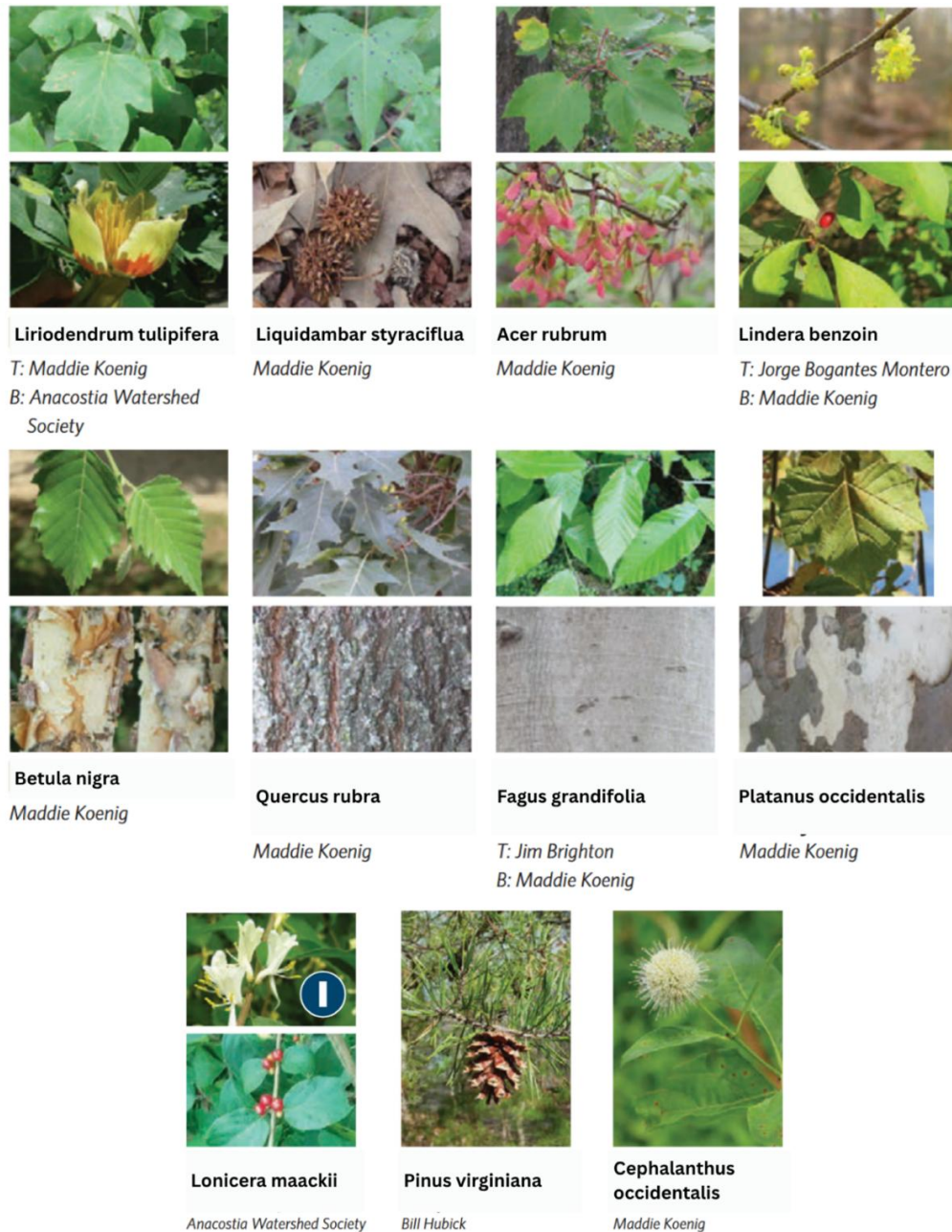


Figure 111: Common Trees and Shrubs found on the Anacostia River Watershed. Credit: (AWS, 2019).

Vines

Most of the vine species found in the Anacostia River Watershed are invasive species, such as *Clematis terniflora*, *Pueraria montana*, *Wisteria*, *Lonicera japonica*, *Persicaria perfoliata*, *Hedera helix*, *Ampelopsis glandulosa* var. *brevipedunculata*, and *Celastrus orbiculatus* (see Figure 112).



Figure 112: Common Vine Species found on the Anacostia River Watershed. Credit: (AWS, 2019).

Fungi

Common fungi species in the Anacostia River Watershed are native species (see Figure 113).

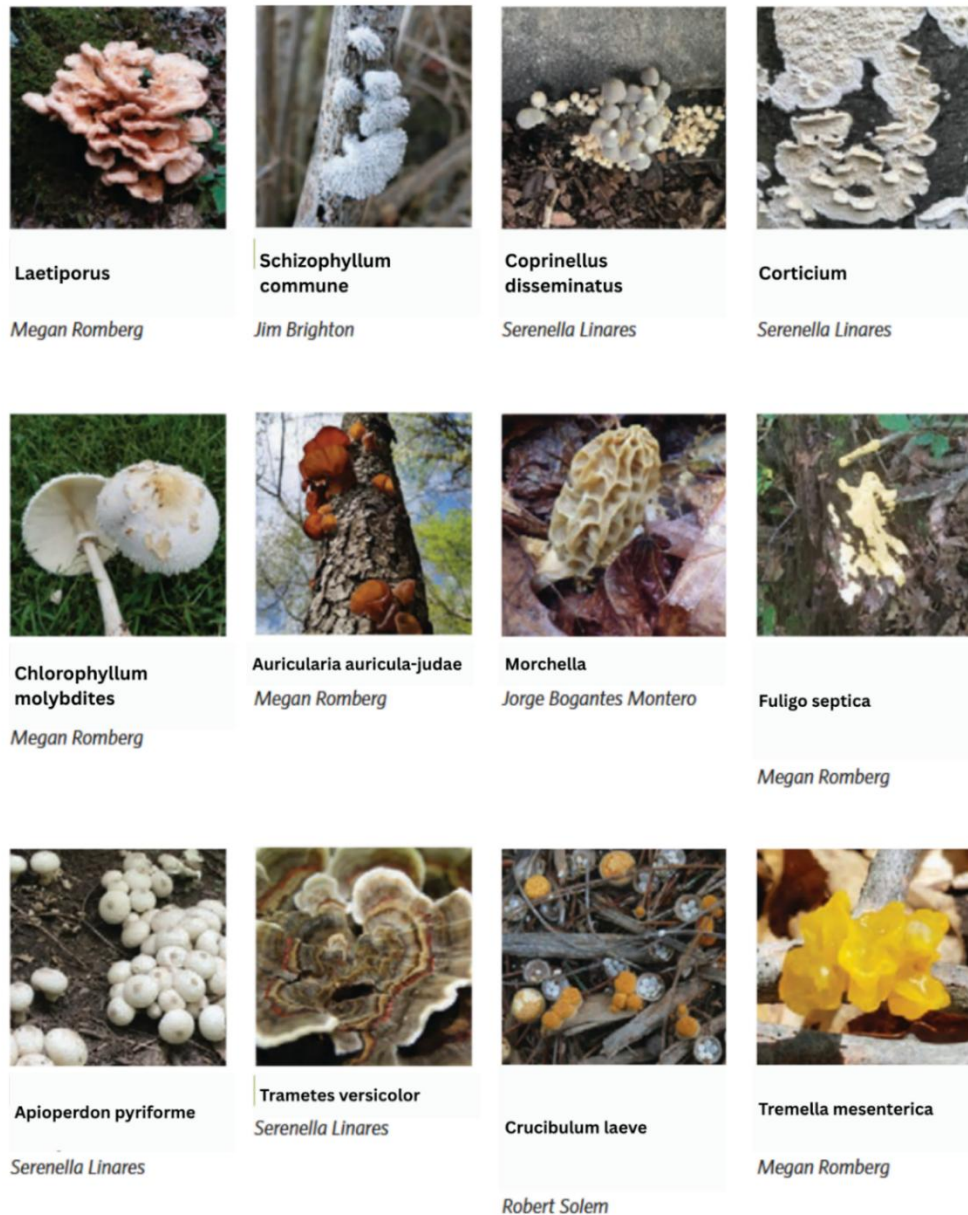


Figure 113: Common Mushrooms and Fungi found on the Anacostia River Watershed. Credit: (AWS, 2019).

Wetland Vegetation (Marshes/Emergent Wetlands)

Wetlands in the Anacostia River Watershed are dominated by herbaceous plants adapted to standing water or saturated soils for much of the growing season. Non-native species, such as *Iris pseudacorus* and the invasive *Phragmites australis*, are found here (see Figure 114).



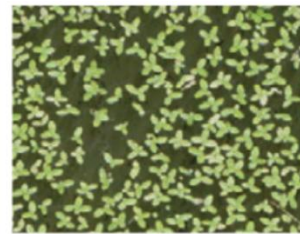
Peltandra virginica

Maddie Koenig



Typha latifolia

Maddie Koenig



Lemnoideae

Maddie Koenig



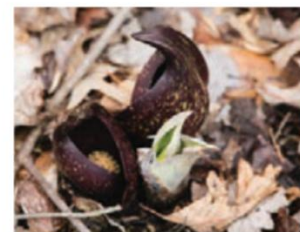
Iris pseudacorus

Anacostia Watershed Society



Phragmites australis

Maddie Koenig



Symplocarpus foetidus

Will Parson



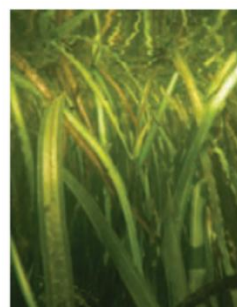
Pontederia cordata

Maddie Koenig



Nuphar advena

Maddie Koenig



Vallisneria americana

Jorge Bogantes Montero



Zizania aquatica

Jenny Glenn

Figure 114: Wetland Plants found on the Anacostia River Watershed. Credit: (AWS, 2019).

Forested Wetlands Vegetation in Poplar Point

Forested wetlands are characterized by the presence of woody trees and shrubs that can tolerate seasonal flooding and saturated soils (see Figure 115). They have a complex canopy, understory, and ground cover structure. In Poplar Point specifically, forested wetland vegetation is invasive primarily with species such as *Phragmites australis*, *Lespedeza cuneata*, *Lonicera japonica*, *Typha latifolia*, and *Microstegium vimineum*. We also found non-native species, including *Pyrus calleryana* and *Schedonorus pratensis*.

The presence of a majority of invasive vegetation species in the Poplar Point forested wetlands suggests a degraded ecosystem, indicating a history of human disturbance that triggered a cycle of biodiversity and habitat changes. Active, managed bioremediation and restoration are required.



Phragmites australis
Chad Merda



Lespedeza cuneata
Chris Evans



Lonicera japonica
Adrienne Legault



Typha latifolia
Bogdan



Microstegium vimineum
Arthur Haines



Pyrus calleryana
Bruce Marlin



Ulmus americana
Marty Aligata



Salix nigra
Bruce Marlin



Acer rubrum
Famartin



Schedonorus pratensis
Barents Flora



Rubus argutus
Forest & Kim Starr



Betula nigra
Roy Wiskar

Figure 115: Plants found on Forested Non-Tidal Wetlands in Sections C and D of Anacostia Park. Credit: (DOEE, 2025). Edited by the author.

Fauna of the Anacostia River Watershed

Fish

Some of the fish species in the Anacostia River Watershed (See Figure 116) are non-native, such as the Asian clam and the Mystery snail. At the same time, other fish species are in greatest conservation need, like the American eel, the Brown bullhead, and the American shad.



☐ **American eel**
MWCOG



☐ **Asian clam**
Jorge Bogantes Montero



☐ **Striped bass**
Jon Cormorant



☐ **Pumpkinseed**
Jorge Bogantes Montero



☐ **Mystery snail**
Maddie Koenig



☐ **White perch**
Jorge Bogantes Montero



Figure 116: Aquatic Animals present on the Anacostia River Watershed. Credit: (AWS, 2019).

Amphibian

All the common amphibian species in the Anacostia River Watershed are under the greatest conservation need (see Figure 117): Eastern American toad, Eastern red-backed salamander, Gray/Cope's gray treefrog, Northern green frog, Southern leopard frog, Northern two-lined salamander, Spotted salamander, Spring peeper, and Wood frog.

The fact that all common amphibian species in the Watershed need special conservation actions clearly indicates that the Watershed's health is severely compromised. It suggests that the amphibian species have been affected by contaminated, toxic water from the Anacostia River for decades. Contamination at Poplar Point could add a layer of complexity, affecting amphibian

reproduction and development. Amphibians can absorb contaminants through their permeable skin, suggesting that their habitat has been disconnected.

Greater restoration efforts are needed; passive conservation measures, such as fencing the area, are insufficient.



Figure 117: Amphibian Species found on the Anacostia River Watershed. Credit: (AWS, 2019).

Reptiles

A common non-native red-eared slider species is found on our site, along with species of greatest conservation need (see Figure 118), such as the Eastern box turtle, Eastern painted turtle, Northern red-bellied turtle, Common five-lined skink, and Eastern garter snake. This could imply a loss or fragmentation of specific habitats for nesting or foraging. Additionally, invasive plants can degrade habitat, making the ecosystem unable to support its native wildlife.



Figure 118: Reptile Species found on the Anacostia River Watershed. Credit: (AWS, 2019).

Birds

Some birds in the Anacostia River Watershed are species of greatest conservation need (see Figure 119), such as the Bald eagle, the Great blue heron, and the Great egret. This could imply a loss of food sources, nesting sites, and habitat fragmentation. Increased development, noise, and light pollution can create a challenging environment for wildlife, while invasive plants degrade habitats by failing to support the food supply of native insects.



Figure 119: Common Bird Species found on the Anacostia River Watershed. Credit: (AWS, 2019).

Mammals

In the Anacostia River Watershed, some mammal species are of greatest conservation need (see Figure 120), including the Big brown bat, the Eastern cottontail, the North American beaver, and the Virginia opossum. These species are small mammals or rodents that play crucial roles in the ecosystem. They are essential for seed dispersal and pest control, requiring a significant, connected habitat that may be broken up by development or other barriers.

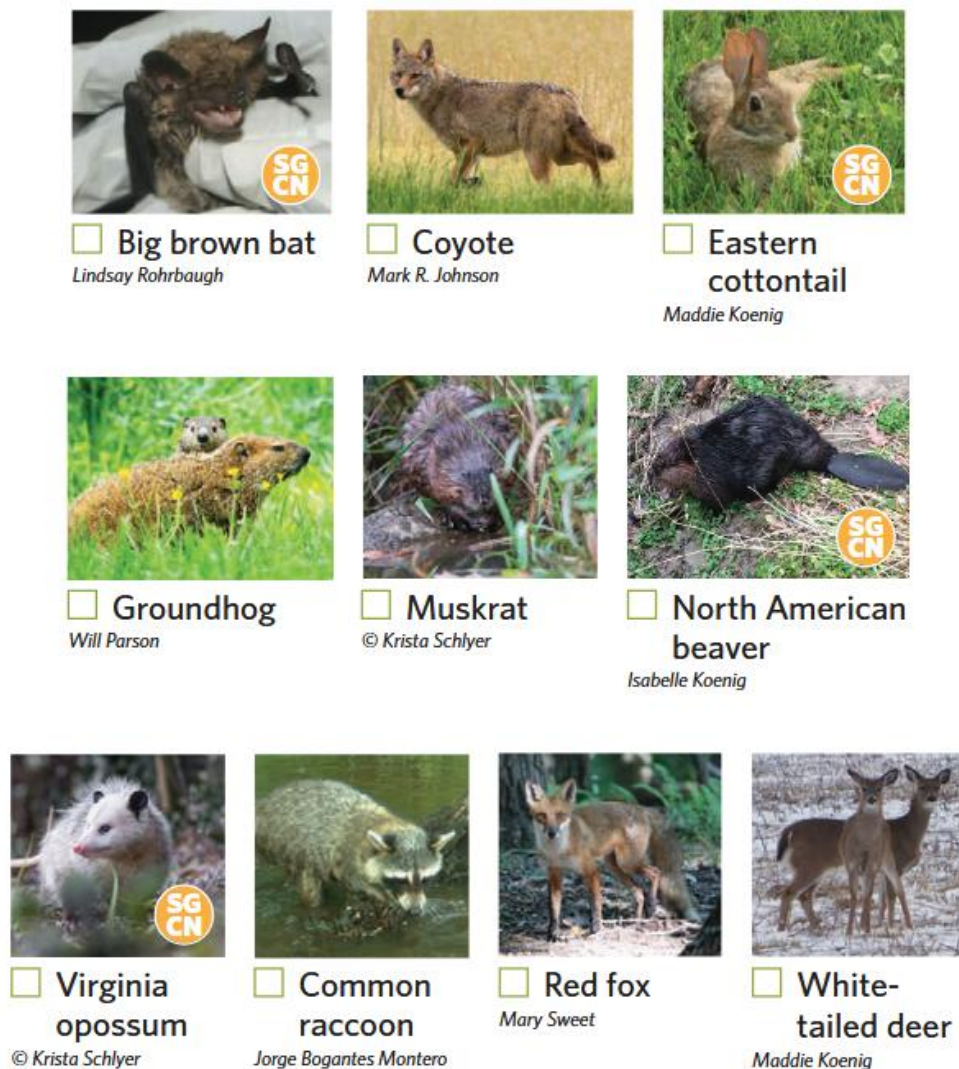


Figure 120: Common Mammal Species found on the Anacostia River Watershed. Credit: (AWS, 2019).

Insects

Multiple insect species coexist in the Anacostia River Watershed (see Figure 121). One common species of invasive insect in the Anacostia River Watershed is the Emerald ash borer. This species is a well-established, serious threat that has killed millions of ash trees across the Midwest and Eastern U.S. (University of Maryland Extension, 2024). The Cary Institute of Ecosystem Studies (2022) states that all of North America's ash trees — ~8 billion — are in danger; in areas with severe infestations, over 99% of ash trees may die. One estimate found that the cost of tree treatment and removal due to Emerald ash borer infestation in U.S. cities totaled \$12.5 billion through 2020. The cost could be up to \$26 million per year by 2050.



☐ **Bumblebee**
© Krista Schlyer



☐ **Common whitetail**
Maddie Koenig



☐ **Eastern tiger swallowtail**
© Krista Schlyer



☐ **Emerald ash borer**
©USGS Bee Lab, Sam Droege



☐ **Fishing spider**
Jenny Glenn



☐ **Periodical cicada**
Emily Stanley



Figure 121: Insects and Kin found on the Anacostia River Watershed. Credit: (AWS, 2019).

The tensions between significant historical and ongoing anthropogenic pressures and the targeted interventions of large-scale restoration have defined the trajectory of the Anacostia River Watershed. It serves as a model for the complexities and necessities of restoring ecological function within an urban matrix.

3.4.5 S.W.O.T. Analysis: Project Scope, Limitations, and Assumptions

The site inventory and analysis portion of this research has shown that the site occupies a vital yet vulnerable position. It is part of an urban ecosystem that bridges the divide between the rapid development of the Navy Yard and historically underserved communities, such as Barry Farms, Anacostia, and Fairlawn.

The site's flat topography, low elevation, and location within both the 100-year and 500-year flood plains, as well as its vulnerability to sea level rise, make it a testing ground for resilient landscape design. At the same time, its history, community dependence, and ecological potential present an opportunity to incorporate climate adaptation and social equity.

The Strengths, Weaknesses, Opportunities, and Threats (SWOT) analysis (see Figure 122) synthesizes the site’s strengths, weaknesses, opportunities, and threats. Considering regulatory guidance as well as the physical, social, and environmental realities observed on site.

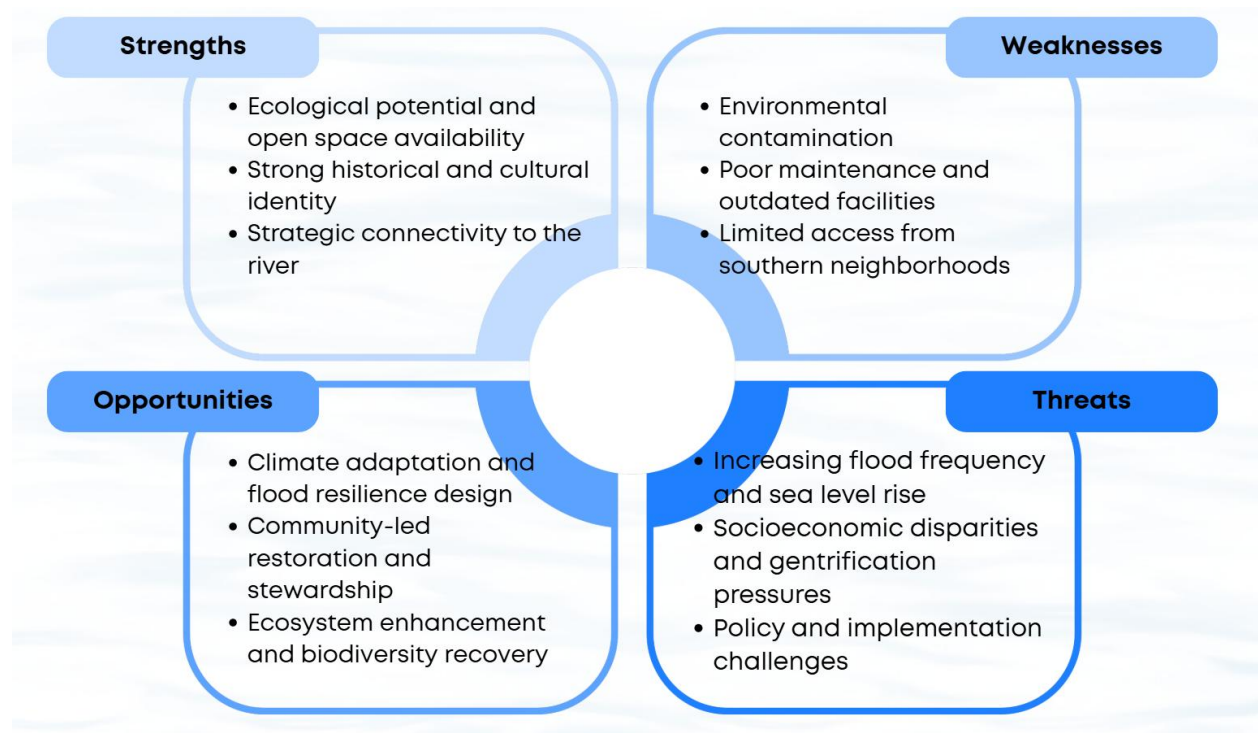


Figure 122: S.W.O.T. Analysis. Credit: (Canva, 2025). Edited by the author.

The following sections outline the project's scope, limitations, and guiding assumptions, establishing the context for the design proposal that follows. By articulating what is included, what is beyond our reach, and the core beliefs that shape our approach, we create a transparent framework for innovation and meaningful impact.

Project Scope:

The project focuses on a conceptual spatial and ecological design for approximately 150 acres of Anacostia Park. Sections C and D. Addressing community needs using publicly available data and case study insights.

Project Limitations:

The following aspects are out of scope of the project:

- Construction documentation, cost estimates, or permit-ready plans.
- Due to time/scope constraints, the study relies on passive community input, and it does not include a full community engagement.
- Water quality and treatment volumes are outside the scope of work due to time constraints.
- Interventions outside of sections C and D of Anacostia Park are excluded. Except for proposed new connections, such as streets, bridges, sidewalks, and micromobility paths.
- The 11th St. Bridge Future project area is out of our design boundary.
- This thesis does not model all possible sea level rise or flooding scenarios.
- This thesis cannot fully solve issues of displacement, systemic inequity, or federal policy.

Project Assumptions:

The project is based on the following foundational conditions:

- Sea Level Rise and tidal flooding will increase according to current projections.
- Adjacent communities will continue to be primarily residential.

- There is community interest in having a better urban green space and reconnecting with the river.
- Ownership of Section C of the Park will change from AOC, DCL, NRS, and NPS to the District of Columbia. (NPS, 2025)
- Nature-based infrastructure is technically feasible and appropriate for this site.
- The proposal will complement existing plans and initiatives like the Bridge District and the 11th Street Bridge Park.
- Frameworks and proposals for Anacostia Park are being written and published while we worked on this thesis.

3.5 Site Design

In this section, the analytical findings of the preceding research are translated from sea level rise projections and regulatory frameworks into historical context and user needs, and a comprehensive site design proposal for Sections C and D of Anacostia Park. The design process is an iterative synthesis that integrates ecological resilience, regulatory parameters, and social equity to form a cohesive master plan.

This chapter will explore the design process, outlining the core principles, the spatial organization, and the specific design strategies that respond to the unique challenges and opportunities of the site in five different parts: 1) Regulatory Framework: Existing Mandated Flood Protection Measures, 2) Adaptive Approach to Sea Level Rise on Site, 3) Site program, 4) Functional and Concept Development, and 5) Master Plan.

3.5.1 Regulatory Framework: Existing Mandated Flood Protection Measures

The District of Columbia's Zoning Code establishes a fundamental principle for its waterfronts: they are a public treasure, and new development must prioritize permanent, physical public access (D.C. Office of Zoning, 2016). The regulations, found in Title 11, Section 711 of the District of Columbia Municipal Regulations (DCMR), are designed to ensure that the relationship between the city and its rivers is not blocked by private development but is instead enhanced by it.

The document states general waterfront requirements applicable to the site:

- A 75-foot waterfront setback is mandatory, measured from the bulkhead or mean high water line (D.C. Office of Zoning, 2016). This setback applies to all buildings, structures, and parking areas.
- A 25-foot-wide public trail must be provided within the setback, reserved along the full water frontage for a continuous pedestrian and bicycle path that must be aligned with trails on adjacent properties (D.C. Office of Zoning, 2016).

We also reviewed the 2020 *D.C. Stormwater Management Regulations*. The document states the following relevant information:

- The Anacostia is designated for "Fish and Wildlife Protection" and "Recreation," meaning the project must maintain and improve water quality to support aquatic life and safe human contact (DOEE, 2020).
- The project must not cause a violation of Water Quality Standards, including strict prohibitions on creating objectionable conditions like oil slicks, nuisances, or elevated toxicity that harm aquatic life (DOEE, 2020).

- Compliance is required with the Anacostia River Toxics Total Maximum Daily Loads (TMDLs), mandating that the project implement measures to prevent the resuspension of contaminated sediments and reduce the load of pollutants like PCBs.
- Inside the Anacostia Watershed Development Zone (AWDZ), projects must retain 100% of the Stormwater Retention Volume (SWRv) on-site unless DOEE grants “relief from extraordinarily difficult site conditions”. The project must also meet the AWDZ Water Quality Treatment Volume (WQTV), unless DOEE grants relief. If relief is approved, the remaining SWRv and WQTV can be covered off-site.

Due to the known presence of harmful contaminants, the regulations stated above, the time-intensive nature of effective bioremediation processes, and the time frame of this research, I have intentionally decided to exclude the forested wetland area from any design interventions.

Disturbance could resuspend toxins into the water, causing more harm than good. Therefore, the most responsible course of action is to preserve this area in its current condition, restricting access to prevent exposure and allow for a future remediation effort.

When planning a site design within the Anacostia waterfront area, compliance with DOEE’s flood hazard regulations is key. Because Sections C and D of Anacostia Park fall within the Special Flood Hazard Area (SFHA) and the Tidal Shoreline Buffer (TSB), the project must demonstrate flood-resilient design and elevation compliance for all new structures, park facilities, and other relevant infrastructure (DOEE, 2025).

Under the June 2025 DOEE Flood Hazard Rules, there are several regulations to follow:

- According to the DOEE (2025), the TSB is a protective zone extending from the tidal shoreline to account for wave action and erosion; the TSB in Anacostia Park extends 5.4 feet inland (see Figure 123). This area is projected to be inundated by 2080.
- New elements of the Park should be established to the Design Flood Elevation (DFE) – defined as the computed elevation to which floodwater is anticipated to rise during a base flood event (DOEE, n.d.). The site’s Base Flood Elevation (BFE) is 11 feet (see Figure 123).
- All projects within a mapped flood hazard area must identify a DFE on their site plans and cross sections. The DFE defines the required protection or elevation height for structures to remain safe during a flood (DOEE, 2025).

Unless otherwise specified, the DFE is set to the higher level of:

The BFE + 2 ft freeboard, or the High Flood Elevation (HFE) from the most current FEMA Flood Insurance Study (FIS) and FIRM adopted by the District (DOEE, 2025).

11 feet (BFE) + 2 feet (freeboard) = 13 feet

The DFE on the site is 13 feet.

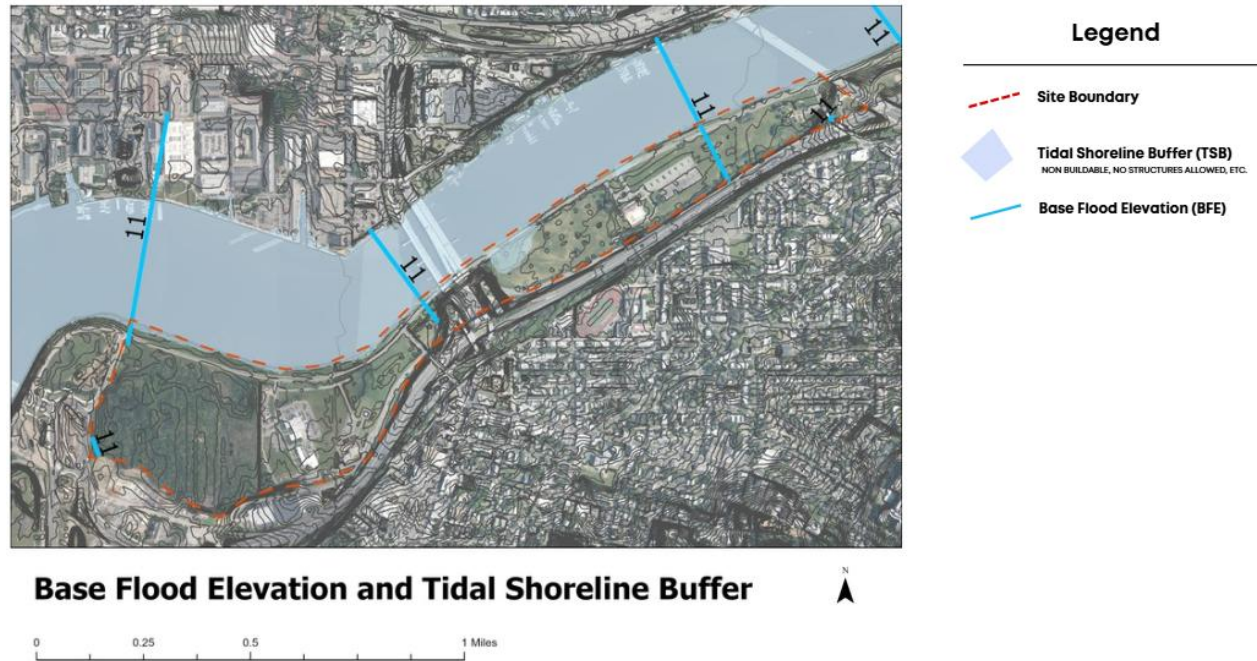


Figure 123: Existing Mandated Flood Control Measures. Credit: (DC GIS Group, 2023) (D.C. GIS) (Esri Inc., 2025) (Canva, 2025) (DOEE, n.d.). Edited by the author.

3.5.2 Adaptive Approach to Sea Level Rise on Site

After completing the physical inventory, analyzing its components, and understanding current regulations, I am confident that one of the core challenges at the site is the site's low-lying topography. Much of the parkland, like extensive playing fields, wetlands, and riparian edges, lies within the 100 and 500-year floodplains. Moreover, projections for SLR indicate that more intense flooding and storm-driven inundation will become the norm rather than the exception. This poses a direct threat to park infrastructure, critical urban infrastructure, and ecological functions. Given that the IPCC emphasizes context-specific and flexible adaptation, the concept of complex engineering, like massive sea walls, permanent flood gates, and the idea of “advance,” is rejected for this site for the following reasons:

- Economic flexibility: sea walls and flood gates, as well as expanding the coastal area into the river, are extremely expensive. It is a one-time investment that locks the area into a single, rigid defense mechanism.
- Ecological and social disconnection: hard edges would worsen the connection between the community and the river, as well as blocking access to areas that provided habitat for local fauna.
- Physical and hydraulic constraints: the Anacostia River is a federally navigable floodway, and the U.S. Army Corps of Engineers strictly regulates any construction or filling that would impact navigation, flood conveyance, and the ecosystem. “Advancing” into the river is likely not allowed.

Moreover, adding fill to the river would constrict its cross-section. During storm events, this would increase flood heights and velocities, bringing flooding upstream for other neighborhoods.

The Anacostia River is currently undergoing a large-scale restoration effort by the District’s government, neighboring jurisdictions, and communities to improve water quality and protect people and the environment. Any efforts to reshape or expand coastal areas will cause more damage than good.

To respond to these threats, I propose a resilient approach that aligns with the IPCC’s three core adaptation strategies (see Table 18):

Table 18*Adaptation Strategies' Problems Identified and Approach on Site*

Adaptation Strategy	Problem Identified on Site	Specific Approach on Site	Why it Works
Retreat	The most vulnerable infrastructure is built within the floodplain. The strategy is to strategically relocate high-maintenance, static infrastructure away from the most dynamic zones.	Identify structures that flood or may flood in the future and propose relocating them to the south edge of the site.	Frees up the space for natural systems to function and reduces maintenance.
Accommodate	The area between the shoreline and the freeway presents an opportunity to work with the water, not against it.	Acknowledging that flooding will occur, design the landscape to absorb, store, and manage water safely and efficiently. Proposing tidal wetlands, sloping banks, landscaped berms, permeable, and elevated surfaces.	Uses natural systems to manage water within the park
Accept	Certain low-lying areas, particularly the north edge of the site, are already connected to the river. It is neither economically nor ecologically sensible to “save” it. Instead, we must accept their transformation.	By accepting these areas to flood, they will become permanently wetter. We can plant them with salt-tolerant, flood-resistant species, facilitating an ecological transition as habitat migration corridors.	Acknowledge the inevitable and work with natural river processes, allowing the ecosystem to migrate landward.

Note. Approaches defined from the IPCC (1999 and 2022) concepts.

With the previous definitions in mind, I have decided to *retreat* all existing infrastructure on the site below the DFE, which means the Park offices and the pirate playground will be relocated—the Anacostia Rec. Center will remain in its existing location because its elevation is 14 feet, one foot above DFE. We also propose to *accommodate* water in the space, transforming it into a future attraction rather than a burden, and creating wetlands as a new ecosystem. The next step is to *accept* specific areas to flood, particularly along the shoreline, where water stays relatively close to the river edge. In this way, the area will become part of the Anacostia River (see Figure 124).

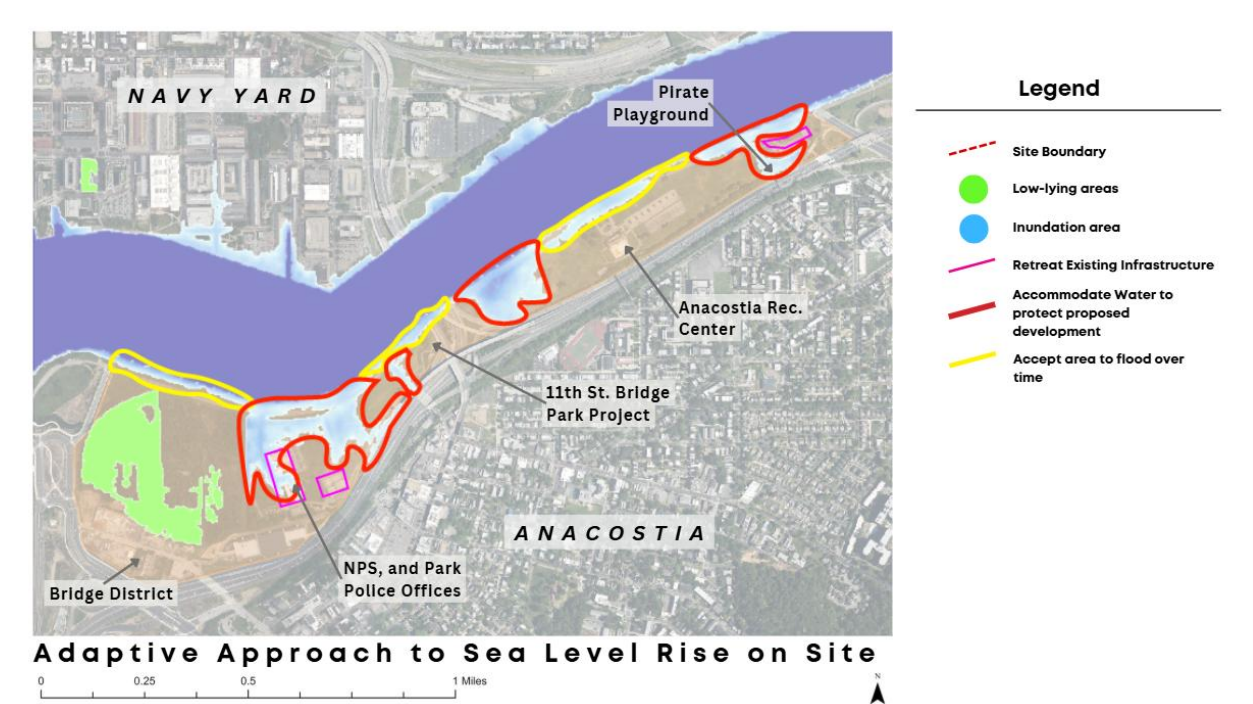


Figure 124: Adaptive Approach to Sea Level Rise on Site: Proposed Areas to Adapt to SLR. Credit: (DC GIS Group, 2023) (Esri Inc., 2025) (Canva, 2025). Edited by the author.

3.5.3 Site Program

A design program was developed to translate research and site analysis into actionable spaces. The spatial and systemic framework in the master plan needs a detailed programming strategy to give it tangible form and function. The proposed design will address the challenges and opportunities identified across four categories: urban design, adaptive infrastructure, community engagement, and connectivity (see Figure 125). These categories double as design goals and are interconnected to function as a system (see Figure 126).

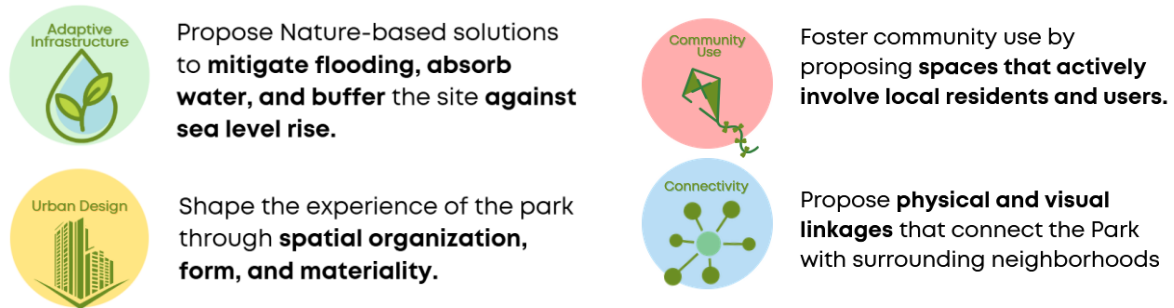


Figure 125: Figure 125: Definitions of Program Categories.

Credit: (Canva, 2025). Edited by the author

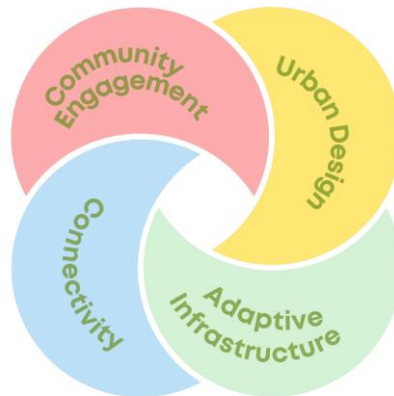


Figure 126: Program categories. Credit: (Canva, 2025). Edited by the author.

3.5.4 Functional and Concept Development

The different organizational and programmatic categories and site functions were mapped to help translate the research into visual language through functional diagramming. In this way, the relationships and performance, how water moves, how people move, and how the landscape absorbs both ecological and social activity are clear.

In the following illustration, I have located new development areas, adaptive infrastructure areas, and new access points and circulation opportunities (see Figure 127). This Functional Diagram serves as the basis for developing sketches to try different possibilities and ideas, including programming elements.

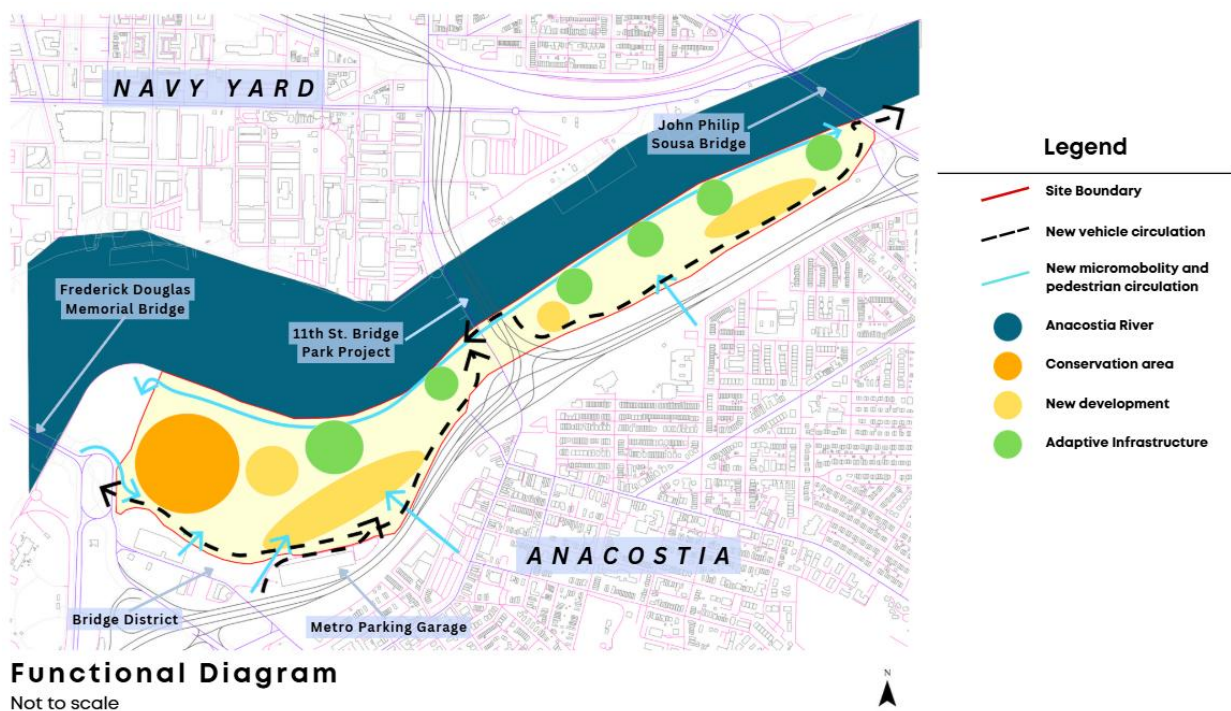


Figure 127: Functional Diagram. Credit: (CAD Mapper, 2025) (Canva, 2025). Edited by the author.

New development areas are located along the south edge of the site, occupying the highest and most stable elevations (13+ feet), which provides the opportunity for the rest of the site to slope gently towards the river. These areas will host community spaces and urban design program elements, including educational centers, cultural pavilions, recreation facilities, and public amenities.

Adaptive infrastructure, such as tidal wetlands, are located along the riverfront, ranging from 2 feet to 10 feet above the river stage. It is dedicated to integrating flood resilience and ecosystem restoration. The waterfront transforms into a dynamic interface between land and water. This area will incorporate tidal freshwater wetlands and planted landform gardens that will transform into living shorelines and wetland areas, designed to accommodate SLR and to provide habitat restoration opportunities for native flora and fauna while improving water quality and ecological connectivity along the river.

One of the most significant functional moves in the diagram is the relocation of Anacostia Drive. The road, which currently runs parallel to the waterfront and acts as a physical barrier between people and the river, is set back toward the southern edge of the site, reducing noise and emissions in ecologically sensitive areas. Freeing the waterfront zone for pedestrian and micromobility use only, ensuring the Anacostia Riverwalk Trail is a safe, car-free public space along the river.

To layer meaning, program, and intention onto the established functional zones, I have developed a concept diagram (see Figure 128). Evolving from the functional framework into a spatial narrative, a graphic expression of the design idea and the experience.

In this project, the concept diagram articulates the transformation of Anacostia Park into a community-driven, resilient landscape through the four programmatic categories.

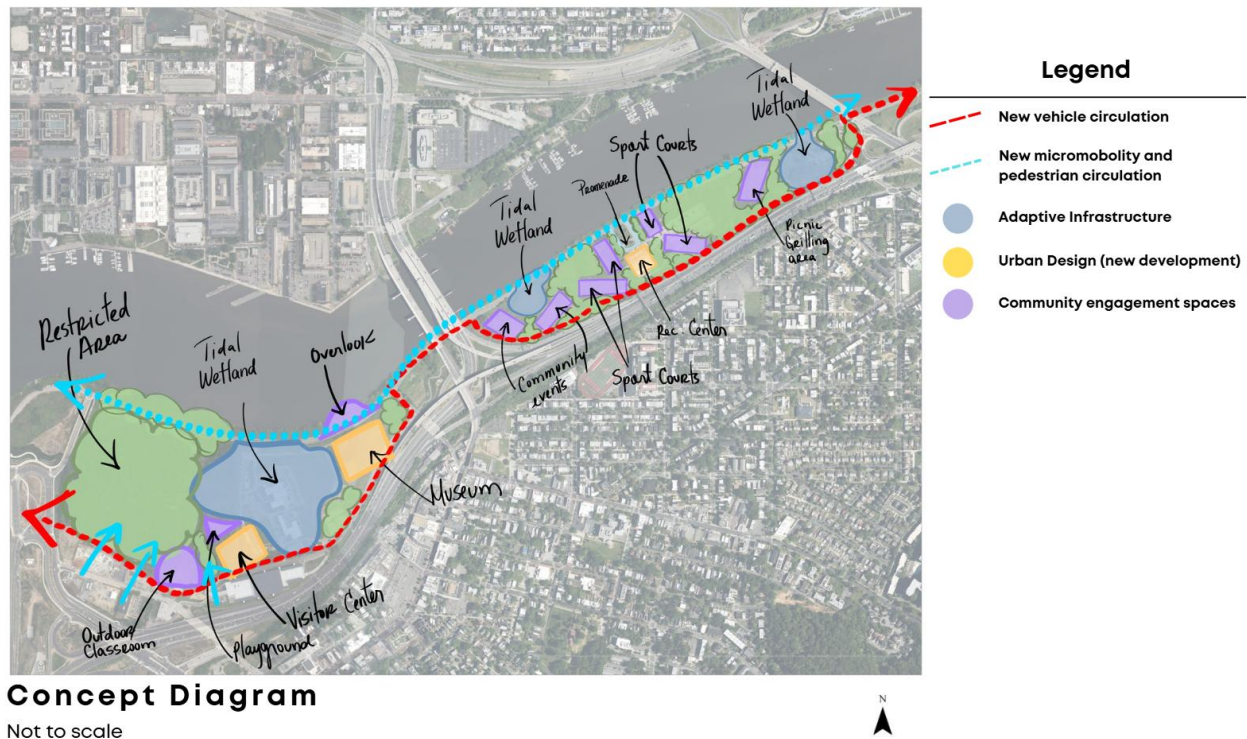


Figure 128: Concept Diagram for Anacostia Park Master Plan Design. Credit: (DC GIS Group, 2023) (Canva, 2025). Edited by the author.

Urban design positions mixed-use and cultural buildings to form a civic frontage, reinforcing neighborhood identity while maintaining architectural continuity with Historic Anacostia. While adaptation infrastructure maps floodable park areas, new tidal wetlands, and water retention systems that demonstrate climate adaptation in action. Community spaces include new gathering areas, recreational nodes, and civic amenities, such as sports courts, outdoor classrooms, overlook areas, and community event spaces. These elements will be linked together through the riverwalk trail, Anacostia Drive, and new paths between spaces.

3.5.5 Master Plan

The master plan for Anacostia Park Sections C and D represents the culmination of the research, site analysis, and functional diagramming (see Figure 129). It integrates urban design, adaptive infrastructure, community engagement, and connectivity into a coherent landscape system. Introducing a sequence of terraces that transitions the space from urban edges to natural systems to an adaptive shoreline. Transforming one of Washington, D.C.'s most vulnerable and socially disconnected parks into an adaptive, inclusive, and ecologically regenerative space, addressing the research goals and questions.



Figure 129: Master Plan Proposal. Credit base map (DC GIS Group, 2023) (Canva, 2025) (Adobe, 2025). Edited by the author.

Urban Design

The urban design layer establishes the park's structural framework, defining how built elements, circulation routes, and open spaces are organized across elevation zones (see Figure 130). As well as giving the park an architectural identity and ensuring long-term resilience.



Figure 130: Urban Design Elements of Master Plan. Credit base map (DC GIS Group, 2023) (Canva, 2025) (Adobe, 2025).

Edited by the author.

Located along the south edge of the site, the new development is a civic, residential, and commercial corridor. With ground elevations reaching fourteen feet, this area is considered a safe zone above the Base Flood Elevation. Includes fourth teen new buildings: a linear one-story restaurant pavilion, Anacostia River Museum (2 stories), Anacostia Park Visitor Center and NPS offices (2 stories), a storage unit for the community garden, a one-story multipurpose space for the outdoor classroom, a floodable kayak and canoe pavilion, locker rooms and public restrooms,

a picnic and grilling pavilion, and six mixed-use buildings with commercial and residential units (4 to 6 stories in height). The first floor is dedicated to retail, with 115 units available at 1,000 sq. ft. An open, flexible community event space is also proposed as a venue for markets, festivals, and other temporary infrastructure.

The architectural expression of the new buildings is proposed to draw inspiration from the Historic Anacostia fabric, blended with more modern styles. Red and brown brick facades on the first floors reference local architecture, while curtain walls introduce modernism. All interconnected by paths, sidewalks, micromobility designated paths, trails, courtyards, and plazas between buildings. The new, reconfigured Anacostia Drive serves these buildings south of the site, as the existing road that currently divides the park from the river is set back to the south.

Between buildings and landscape, a series of transitional zones blends architecture with ecology—permeable plazas, bioswale corridors, and a promenade that goes along and between all the mixed-use buildings (see Figure 131). Tree-lined promenades and rain gardens soften hard edges and encourage social gathering. Creating a continuous visual and experiential gradient, ensuring the spaces are safe, and incorporating low-impact lighting and reflective surfaces.

Three underground parking garages are planned under the mixed-use buildings. They must meet local flood hazard codes for floodproofing and design. About 85,428 cubic yards of excavation will be used to fill specific areas in Section D.



Figure 131: Collage perspective of transitional zones between buildings. Credit: (Canva, 2025) (Adobe, 2025). Edited by the author.

Adaptation Infrastructure

The adaptation infrastructure is the backbone of the master plan (see Figure 132). Together, these strategies reimagine the relationship between the city and the river, transforming Anacostia Park from a filled floodplain into a living, responsive landscape. Across the site, the design integrates natural and engineered systems that collect, filter, and store water before it reaches the Anacostia River. All adaptation infrastructure proposed also doubles as an educational and recreational area.

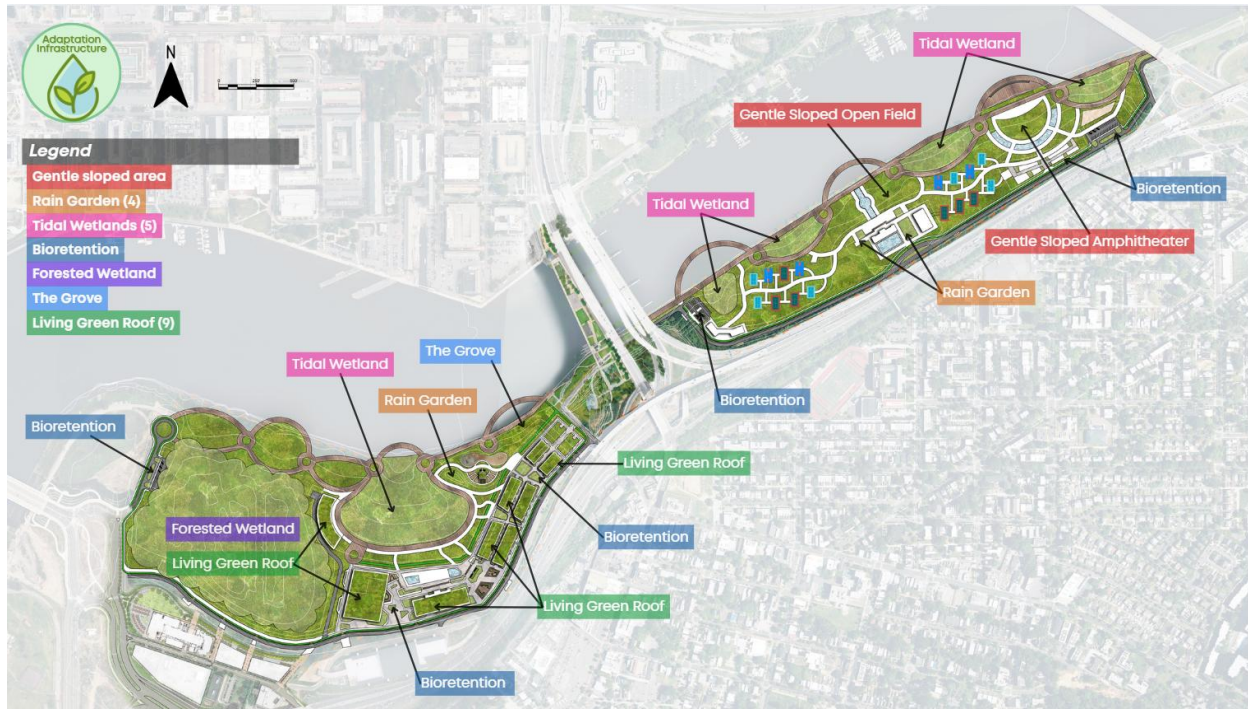


Figure 132: Proposed Adaptation Infrastructure Elements in the Site. Credit base map (DC GIS Group, 2023) (Canva, 2025) (Adobe, 2025). Edited by the author.

Plazas and other pedestrian surfaces utilize permeable materials to allow rainfall to infiltrate on-site, thereby reducing runoff and enhancing groundwater recharge. To ensure that pathways are resilient to flood, all sidewalks under the 13-foot design flood elevation mark will be made of stamped concrete. The entire Riverwalk Trail will be constructed with Board-Formed concrete. These materials can endure submersion and subsequent cleaning. Pedestrian and micromobility circulation surfaces above 13 feet will be permeable pavers, except for tactile paving. Bioswales and raingardens are distributed through streets and open spaces to intercept runoff from higher elevations and non-permeable surfaces, filtering pollutants before they drain into the river. Gentle sloped areas are proposed to mitigate flooding and filter stormwater. The grove area is a dense woodland buffer designed to infiltrate water and protect new development

areas. Beyond the developed areas, the forested wetland remains undisturbed, preserving its existing hydrology and habitat. The surrounding topography and new water management systems will direct runoff toward this area, helping sustain it. Public access is intentionally limited to prevent disturbance and contamination. At the lowest elevations, new floodable areas are designed to capture and temporarily store river water during high tides, storm events, and future sea level rise. These areas will gradually evolve into tidal wetlands, living shorelines that transition from upland to open marsh (see Figure 133). Their design reflects how water, soil, and plants interact over time to form self-sustaining habitats. We proposed 13 plant species for an idealized living shoreline.

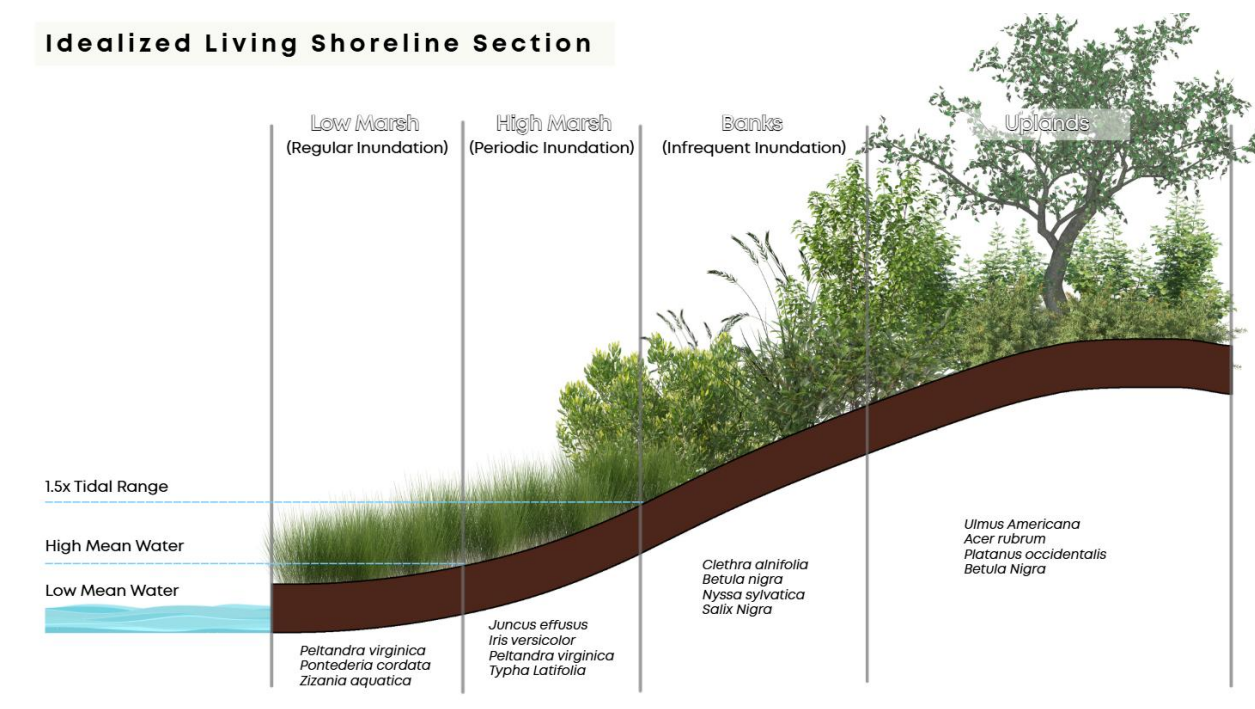


Figure 133: Idealized Living Shoreline Section. Credit: (Canva, 2025). Edited by the author.

Table 19*Living Shoreline Plant List*

Plant type	Botanical name	Common name
Perennials	<i>Peltandra virginica</i>	Arrow arum
	<i>Pontederia cordata</i>	Pickernelweed
	<i>Juncus effusus</i>	Common (Soft) rush
	<i>Iris versicolor</i>	Blue flag iris
	<i>Typha latifolia</i>	Broadleaf cattail
Grasses	<i>Zizania aquatica</i>	Wild rice
Shrubs	<i>Clethra alnifolia</i>	Sweet pepperbush (Summersweet)
Trees	<i>Betula nigra</i>	River birch
	<i>Nyssa sylvatica</i>	Black gum
	<i>Salix nigra</i>	Black willow
	<i>Ulmus americana</i>	American elm
	<i>Acer rubrum</i>	Red maple
	<i>Platanus occidentalis</i>	American sycamore

To illustrate the long-term transformation of the site, the tidal wetland is represented through three complementary isometric drawings: Initial proposed conditions, future conditions assuming 5-foot SLR, and 100-year storm event conditions. Together, they capture the temporal dynamics of the tidal wetlands as they transform from a designed landscape into a self-sustaining ecological system shaped by sea level rise and natural succession.

The initial proposed design conditions for the tidal wetland areas are a constructed landscape composed of engineered soils and distinct hydrologic zones. These zones, low marsh, high marsh, bank, and upland, are organized along the topographic gradient. Representing the site's hydrology before the effects of sea level rise, establishing how the site works under normal day-to-day circumstances (see Figure 134) (see Figure 135). A collage perspective has been prepared to show initial proposed conditions (see Figure 136).

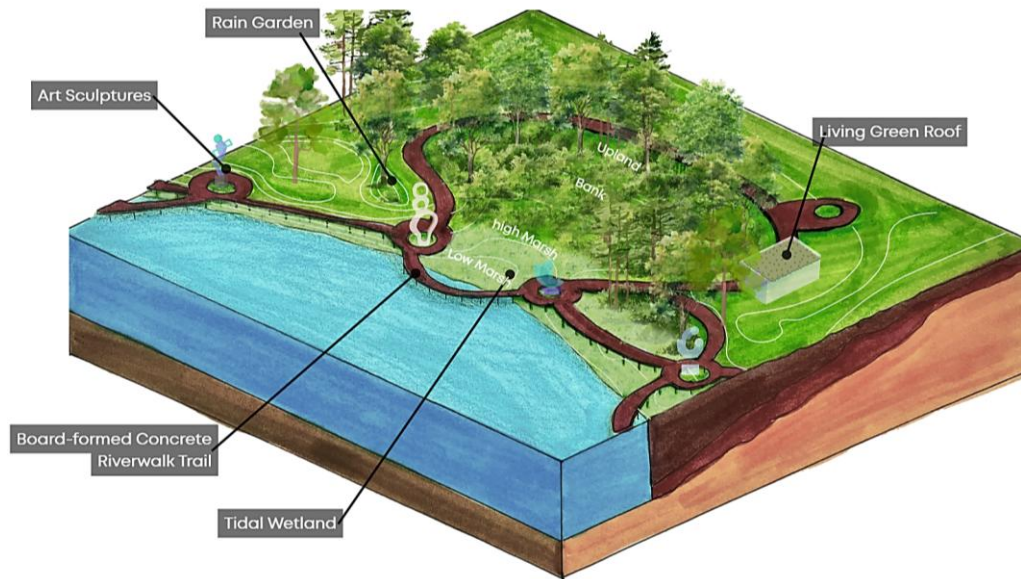


Figure 134: Isometric Drawing Showing Proposed Initial Conditions for Tidal Wetlands (2025) in Section C. Credit: (Canva, 2025). Drawing by the author.

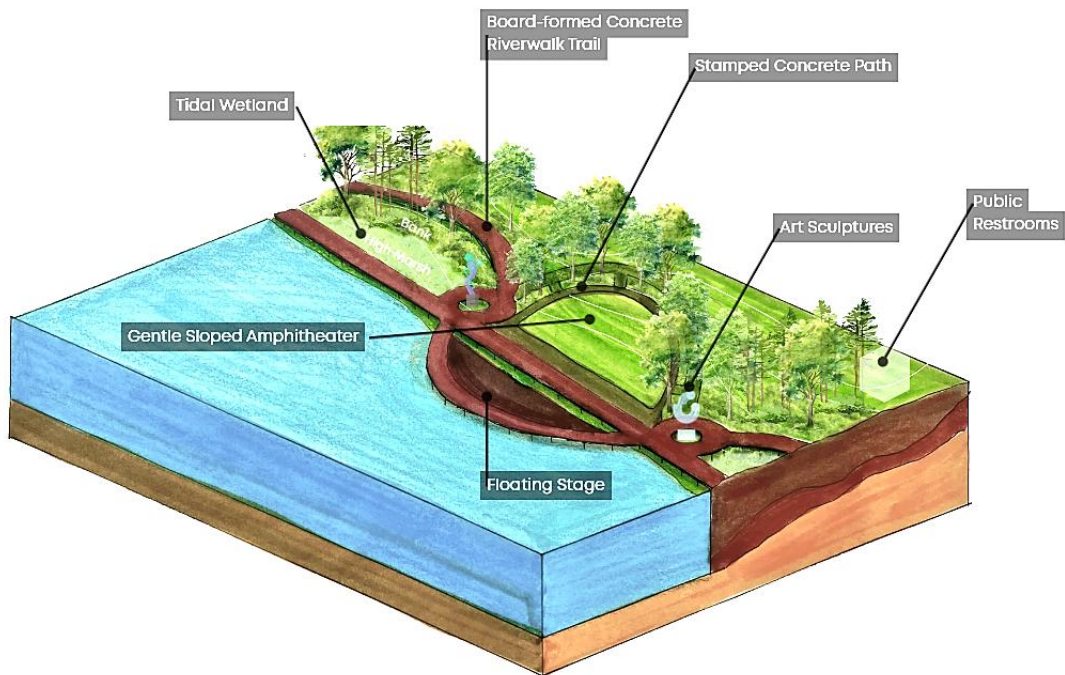


Figure 135: Isometric Drawing Showing Proposed Initial Conditions for Tidal Wetlands (2025) in Section D. Credit: (Canva, 2025). Drawing by the author.



Figure 136: Tidal Wetlands Proposed Initial Conditions (2025). View from Anacostia Riverwalk Trail. Credit: (Adobe, 2025) (Canva, 2025). Edited by the author.

Future conditions show the same landscape in advance, under the influence of 5 feet of SLR and tidal reconnection to the Anacostia River, the rise in water shifts the boundary between land and water, submerging portions of the existing high marsh and transforming them into new low marsh zones (see Figure 137) (see Figure 138). Vegetation responds to these conditions through ecological migration; wetland aquatic plants and vegetation adapted to drier conditions expand inland. The Riverwalk Trail remains usable as designed, as it is at a higher elevation than the projected SLR (see Figure 139).

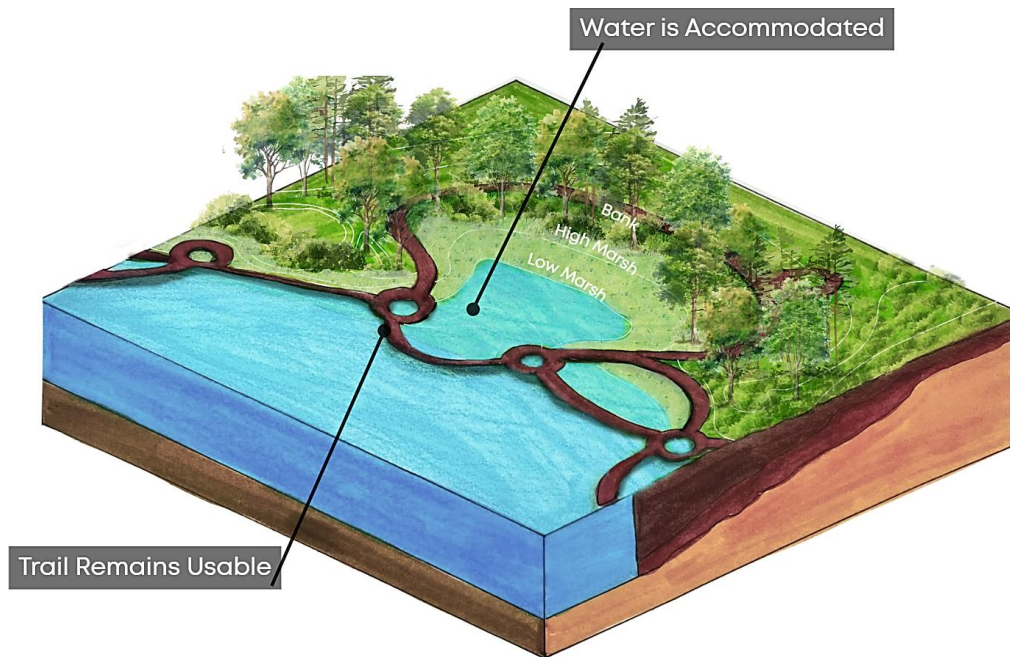


Figure 137: Isometric Showing Future Conditions on Tidal Wetlands (2100) with 5 Feet of SLR, in Section C. Credit: (Canva, 2025). Drawing by the author.

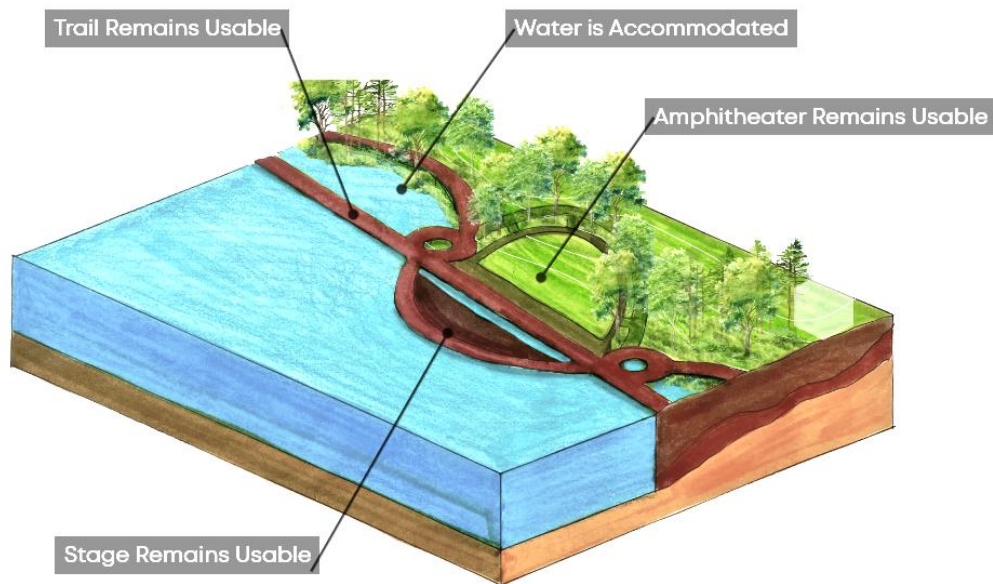


Figure 138: Isometric Showing Future Conditions on Tidal Wetlands (2100) with 5 Feet of SLR, in Section D. Credit: (Canva, 2025). Drawing by the author

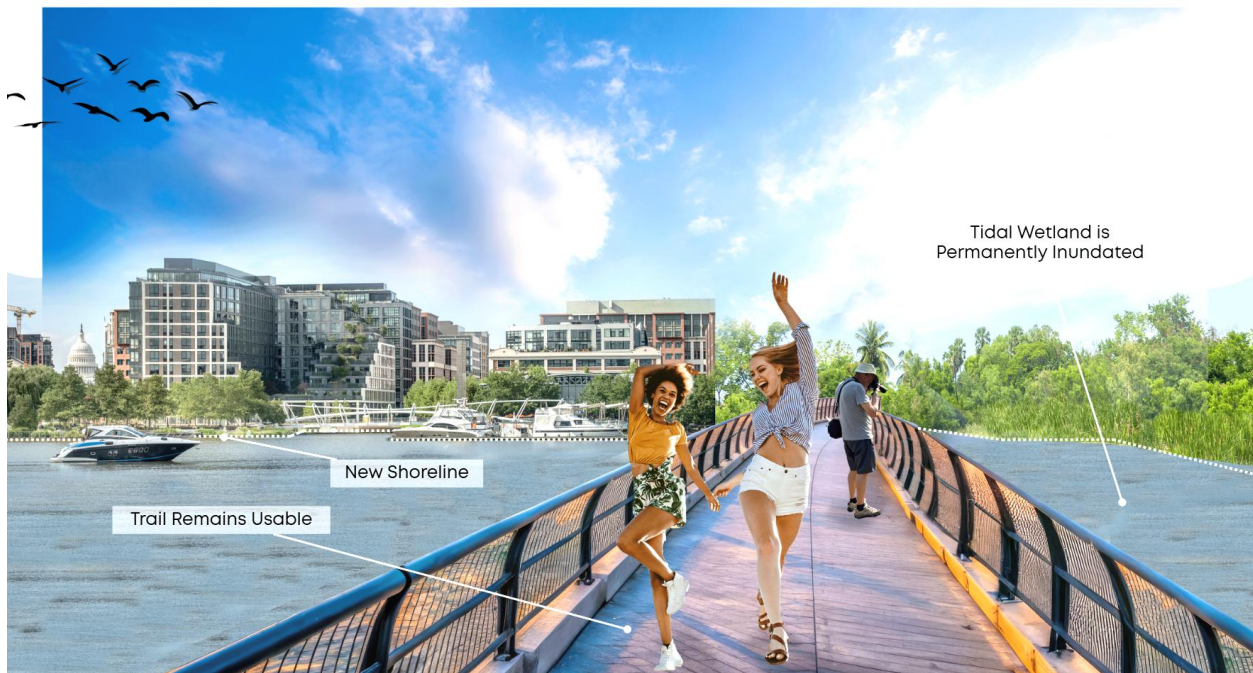


Figure 139: Tidal Wetlands Future Conditions After 5 Feet Sea Level Rise (year 2100). View from Anacostia Riverwalk. Credit: (Adobe, 2025) (Canva, 2025). Edited by the author.

Isometrics also illustrate the flood conditions associated with a 100-year storm event (see Figure 140) (see Figure 141). This scenario is a short-term event that has a 1% chance of occurring in any given year. The drawing shows the water pathways on site and how resilient measures were intended to protect critical areas. All major infrastructure is located above DFE, complying with DC’s flood hazard rules. Infrastructure in the flooded area is designed with materials that can withstand this kind of event and facilitate maintenance and cleanup afterward.

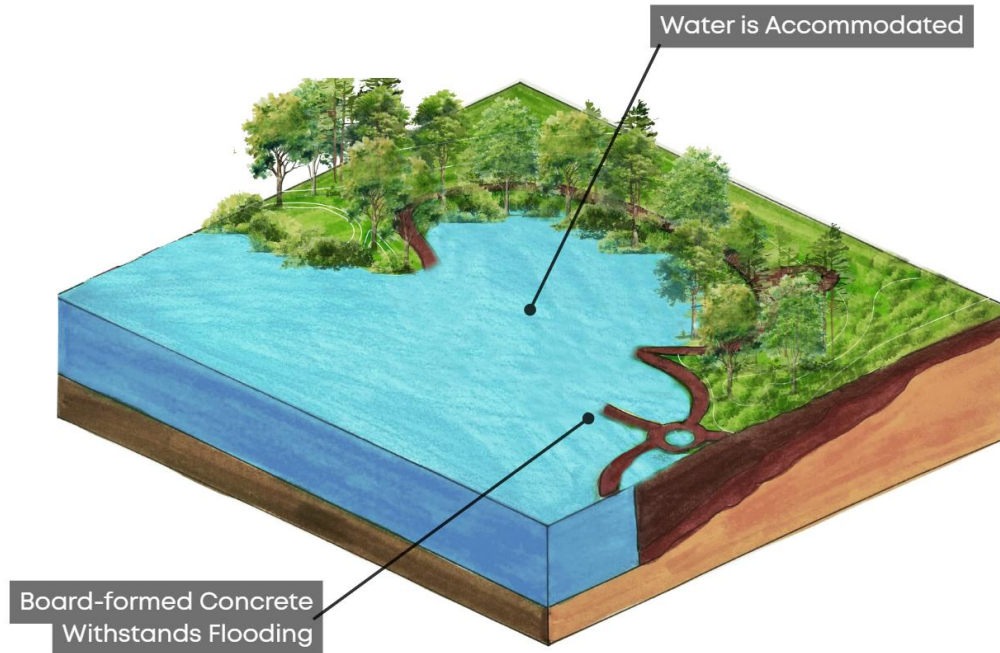


Figure 140: Isometric Drawing Showing 100-year Storm Flood Event in Section C. Credit: the author.

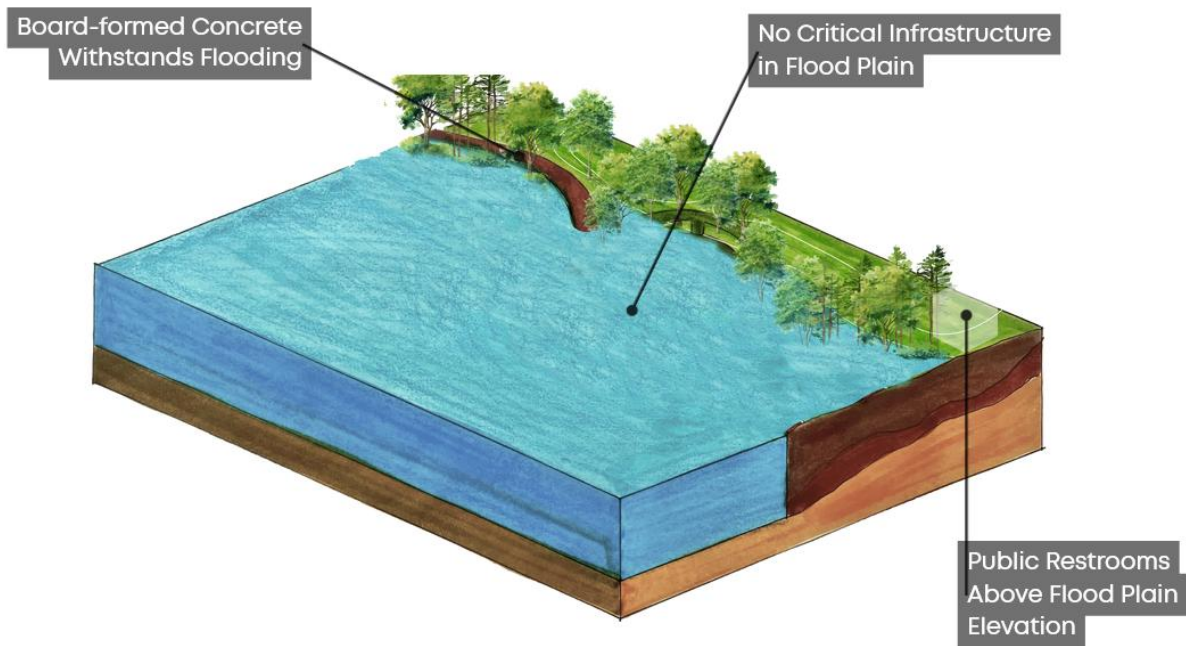


Figure 141: Isometric Drawing Showing 100-year Storm Flood Event in Section D. Credit: the author.

As part of the commitment to climate resilience and adaptation, all new development (except for the kayak pavilion) within the project should incorporate living green roofs as an ecological and architectural feature (see Figure 142). As defined by Leonard J. Hopper (2007, p. 399), a living green roof is “a thin profile system where the growing medium is less than eight inches and where the primary use is to effectively satisfy stormwater management requirements in lieu of conventional stormwater engineered methods.” These structures total 227,170.95 sq. ft., or approximately 5.22 acres, and serve solely to manage stormwater; they will not be open to the public.

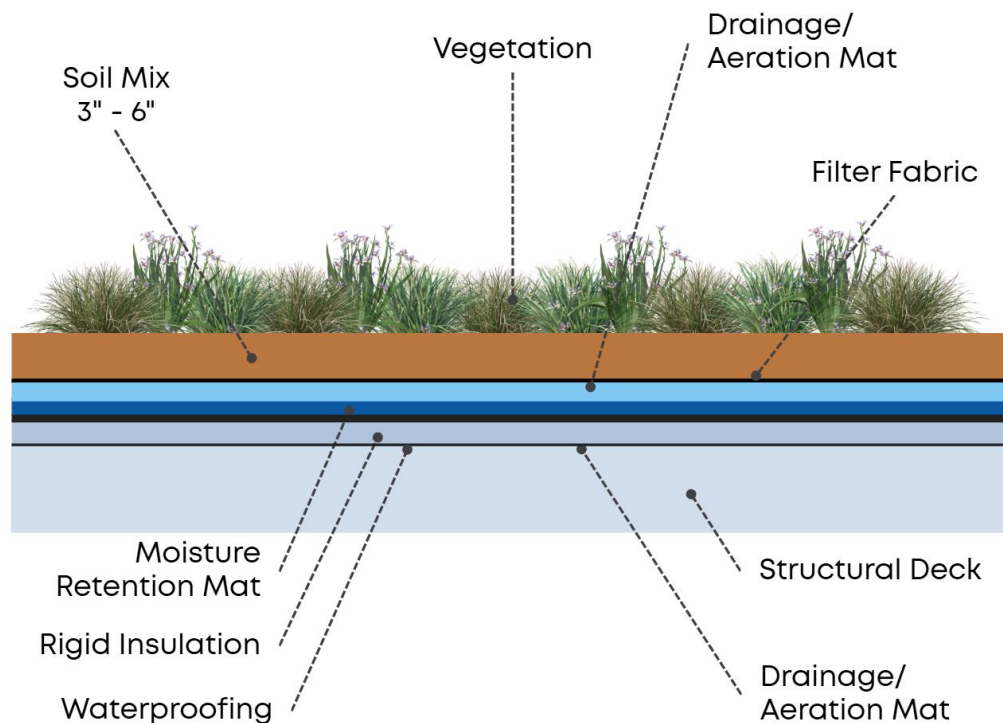


Figure 142: Idealized Living Green Roof Section. Credit: (Hopper, 2007) (Canva, 2025). Edited by the author.

Living green roofs typically do not use irrigation. For this reason, I propose 10 different plant species that thrive in shallow soils and harsh, dry conditions (see Table 20). These plants are good at storing water.

Table 20

Living Green Roof Native Plant List

Plant type	Botanical name	Common name
Grasses	<i>Danthonia spicata</i>	Poverty oatgrass
	<i>Eragrostis spectabilis</i>	Purple lovegrass
Perennials	<i>Asclepias syriaca</i>	Common milkweed
	<i>Aster ericoides</i>	White heath aster
	<i>Aster oblongifolius</i>	Aromatic aster
	<i>Baptisia tinctoria</i>	Wild indigo
	<i>Eupatorium hyssopifolium</i>	Hyssopleaf thoroughwort
	<i>Tradescantia ohimensis</i>	Ohio spiderwort
	<i>Allium cernuum</i>	Nodding onion
	<i>Sedum</i>	Stonecrop

Stormwater Management Calculations

To calculate stormwater storage volumes, I considered the entire site instead of drainage areas, using the following surface areas:

Table 21

Site's Surface Areas

Surface Area	Total Area (sq. ft.)
Impervious Cover Area	1,011,151.69
Compacted Cover Area	2,954,392.35
Natural Cover Area	2,831,400
Green Roof Area	224,334
Bioretention Area	201,029.65
Permeable Pavers Area	494,835.69

From the *D.C. Stormwater Management Guidebook*, I calculated the Stormwater retention volume using the following equation (see Figure 143):

2.3 Stormwater Retention Volume (SWRv)

The SWRv is the volume of stormwater runoff that is required to be retained. It is calculated as shown in Equation 2.1 for the entire site and for each site drainage area (SDA).

Equation 2.1 Stormwater Retention Volume

$$SWRv = \frac{P \times [(Rv_I \times I) + (Rv_C \times C) + (Rv_N \times N)] \times 7.48}{12}$$

where:

$SWRv$ = volume required to be retained (gal)
 P = variable percentile rainfall event for the District dependent on regulatory trigger:

- 90th percentile (1.2 inches) for major land-disturbing activity,
- 85th percentile (1.0 inch) for major substantial improvement activity in the AWDZ and governed by the Anacostia Waterfront Environmental Standards Amendment Act of 2012,
- 80th percentile (0.8 inch) for other major substantial improvement activities

Rv_I = 0.95 (runoff coefficient for impervious cover and BMP cover)
 I = impervious cover surface area (ft²)
 Rv_C = 0.25 (runoff coefficient for compacted cover)
 C = compacted cover surface area (ft²)
 Rv_N = 0.00 (runoff coefficient for natural cover)
 N = natural cover surface area (ft²)
 7.48 = conversion factor, converting cubic feet to gallons
 12 = conversion factor, converting inches to feet

Figure 143: Stormwater Retention Volume Equation. (DOEE, 2020).

Considering the 85th percentile (1.0 inch) for major improvement activity in the AWDZ.

$$\begin{aligned}
 SWRV &= \frac{P \times [(R_{vI} + I) + (R_{vC} \times C) + (R_{vN} \times N)] \times 7.48}{12} \\
 &= \frac{1.0 \text{ in} \times [(0.95 \times 1,011,515.69) + (0.25 \times 2,954,392.35) + (0.00 \times 2,831,400)] \times 7.48}{12} \\
 &= \frac{1.0 \text{ in} \times [(960,939.91) + (738,598.09) + (0)] \times 7.48}{12} \\
 &= \frac{1.0 \text{ in} \times (1,699,538) \times 7.48}{12} = \frac{127,135,44.24}{12} \\
 SWRV &= \boxed{10,593,78.687} \text{ gal} \quad 100\% \text{ treatment required}
 \end{aligned}$$

The required Stormwater Retention Volume for the site is **1,059,378.687 gallons**.

The DOEE requires **100% of stormwater to be treated on-site** for projects inside the AWDZ boundary.

The Best Management Practices (BMPs) proposed in this project (bioretention, green roofs, and permeable pavement) are all approved retention and treatment BMPs in the *DC Stormwater Management Guidebook* because they retain, filter, and treat stormwater to remove pollutants before it enters the Anacostia River or the combined sewer system (DOEE, 2020).

I calculated the retention volume of each of them using the formulas provided by the DOEE (see Figure 144) (see Figure 145) (see Figure 146) (see Table 22).

Equation 3.5 Bioretention Storage Volume

$$S_v = SA_{bottom} \times [(d_{media} \times \eta_{media}) + (d_{gravel} \times \eta_{gravel})] + (SA_{average} \times d_{ponding})$$

where:

S_v	= total storage volume of bioretention (ft ³)
SA_{bottom}	= bottom surface area of bioretention (ft ²)
d_{media}	= depth of the filter media, including mulch layer (ft)
η_{media}	= effective porosity of the filter media (typically 0.25)
d_{gravel}	= depth of the underdrain and underground storage gravel layer, including choker stone (ft)
η_{gravel}	= effective porosity of the gravel layer (typically 0.4)
$SA_{average}$	= average surface area of bioretention (ft ²) typically, where SA_{top} is the top surface area of bioretention, $SA_{average} = \frac{SA_{bottom} + SA_{top}}{2}$
$d_{ponding}$	= maximum ponding depth of bioretention (ft)

Figure 144: Bioretention Storage Volume Equation. (DOEE, 2020).

Assuming the following material specifications from the Guidebook:

Ponding depth: 12" 12" = 1 ft.

Filter media: 18" 18" = 1.5 ft.

Mulch: 3" 3" = 0.25 ft.

Top soil: 3" 3" = 0.25 ft.

$$SA_{average} = \frac{SA_{bottom} + SA_{top}}{2}$$

$$SA = \frac{201,029.65 + 201,029.65}{2}$$

$$SA = 201,029.65 \text{ ft}^2$$

Average surface area of bioretention: 201,029.65 sq. ft.

$$S_v = 201,029.65 \times [(1.75 \times 0.25) + (0.5 \times 0.4)] + (201,029.65 \times 1)$$

$$S_v = 201,029.65 \times [(0.4375) + (0.2)] + (201,029.65)$$

$$S_v = 201,029.65 \times 201,030.29$$

$$S_v = 4,04 \text{ ft}^3 = 30 \text{ gal.}$$

Bioretention storage volume is **30 gallons**.

Equation 3.1 Storage Volume for Green Roofs

$$S_v = \frac{SA \times [(d \times MWR_1) + (DL \times MWR_2)]}{12} \times IF$$

where:

- S_v = green roof storage volume (ft³)
 SA = green roof area (ft²)
 d = media depth (in.) (minimum 3 in.)
 MWR_1 = verified media maximum water retention (use 0.10 as a baseline default in the absence of verification data)
 DL = drainage layer depth (in.) (if the drainage layer is combined with the media layer, then this value is 0)
 MWR_2 = verified drainage layer maximum water retention (use 0.0 as a baseline default in the absence of verification data)
 IF = irrigation factor (0.5 for irrigated green roofs, 1.0 for unirrigated green roofs)

Figure 145: Green Roofs Retention Volume. (DOEE, 2020).

Assuming the following material specifications from the Guidebook:

Media depth:	4"
MWR1:	0.10
Drainage layer depth:	0
MWR2:	0.0
Irrigation factor for unirrigated green roofs:	1.0

$$\begin{aligned}
 S_v &= \frac{SA \times [(d \times MWR_1) + (DL \times MWR_2)]}{12} \times IF \quad \boxed{\text{Green roof Retention}} \\
 S_v &= \frac{227,170.95 \times [(4 \text{ in} \times 0.10) + (0 \times 0.0)]}{12} \times 1.0 \\
 S_v &= \frac{227,170.95 \times (.40)}{12} \times 1 = \frac{90,868.38}{12} \times 1 \\
 &= 7,572.36 \text{ ft}^3 \\
 S_v &= \boxed{56,645.19 \text{ gal}}
 \end{aligned}$$

Green roofs retain **56,645.19 gallons** of stormwater.

Equation 3.4 Permeable Pavement Storage Volume

$$Sv = A_p[(d_p \times \eta_r) + K_{sat} \times t_f]$$

where:

- Sv = storage volume (ft³)
- d_p = depth of the reservoir layer (ft)
- η_r = 0.4 (effective porosity for the reservoir layer)
- A_p = permeable pavement surface area (ft²)
- K_{sat} = field-verified saturated hydraulic conductivity for the subgrade soils (ft/day).
If an impermeable liner is used in the design, then $K_{sat} = 0$.
- t_f = time to fill the reservoir layer (days) (assume 2 hours or 0.083 days)

Figure 146: Permeable Pavement Storage Volume Equation. (DOEE, 2020).

Assuming the following material specifications from the Guidebook:

Depth of reservoir layer	16" = 1.333 ft
Nr	0.4
Ksat	0
Tf	0.083 days

$$\begin{aligned} Sv &= 494,835.69 [1.333 \times 0.4 + 0 \times 0.083] \\ &= 494,835.69 (0.533) \\ &= 263,747.41 \text{ ft}^3 \\ &= 162,871.63 \text{ gal.} \end{aligned}$$

Permeable pavers store **162,871.63 gallons**

Table 22*Summary of Stormwater Management Storage Volumes*

Input	Storage volume (gallons)
Storage volume required on-site	1,059,378.687
Bioretention storage volume	30
Green Roofs storage volume	56,645.19
Permeable pavement storage volume	162,871.63
Total of stormwater stored by BMPs	219,546.82

The design stores only 20% of the volume required by stormwater management regulations.

Community Use

The community use layer brings social vitality and inclusivity to the master plan (see Figure 147). It creates accessible, flexible, and culturally meaningful spaces that reflect the identity of nearby neighborhoods.

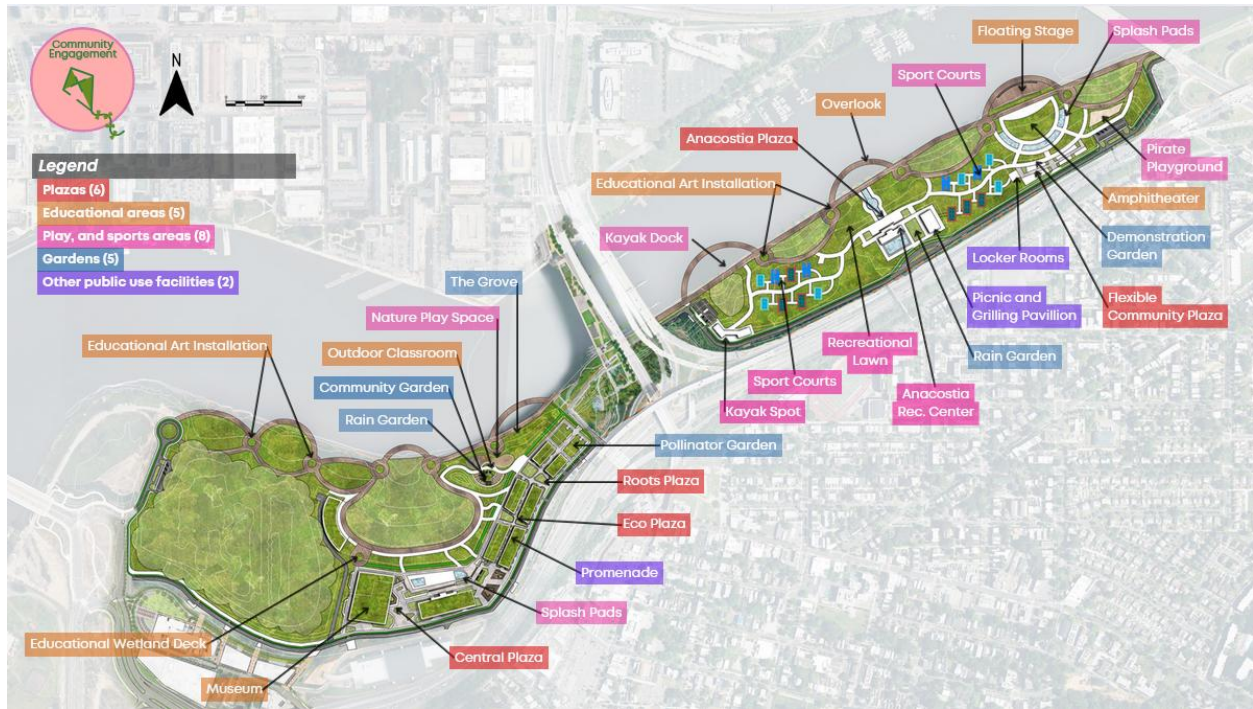


Figure 147: Community Engagement Elements of the Master Plan. Credit base map (DC GIS Group, 2023) (Canva, 2025) (Adobe, 2025). Edited by the author.

The Park's recreational network is envisioned as a flexible system of outdoor spaces that can safely accommodate people, water, and changing conditions. These areas are located and designed to tolerate periodic inundation, allowing them to recover quickly after storm events. Surfaces are durable, drainage is integrated, and furnishings can be removed or secured when needed. Recreation spaces and play zones include sports fields, playgrounds, picnic areas, the kayak spot, kayak dock, floating stage, amphitheater, as well as flexible community spaces for non-permanent infrastructure like markets, food trucks, and local fairs, which can tolerate occasional inundation and are designed for a quick move out in case of unexpected floods and other natural conditions. The much-loved pirate playground is now situated at an elevation of 13 feet, ensuring it remains usable even after flood events.

Learning areas, such as a 25-person outdoor classroom and observation decks overlooking the tidal wetlands, promote awareness of ecology and climate adaptation. While storytelling art installations anchor the Riverwalk Trail, celebrating the Anacostia River, Anacostia Park, and the surrounding neighborhoods' history and culture.

Pavilions, tree canopies, and permeable seating zones ensure year-round usability and thermal comfort.

Connectivity

The connectivity system redefines movement across and within the park, emphasizing both community and river access and enhancing multimodal mobility. It responds to decades of disconnection caused by infrastructure barriers, restoring physical, visual, and ecological links between neighborhoods and the Anacostia River.

The proposed design introduces a network of new access points, pedestrian bridges, multimodal streets, and internal transit routes (see Figure 148).

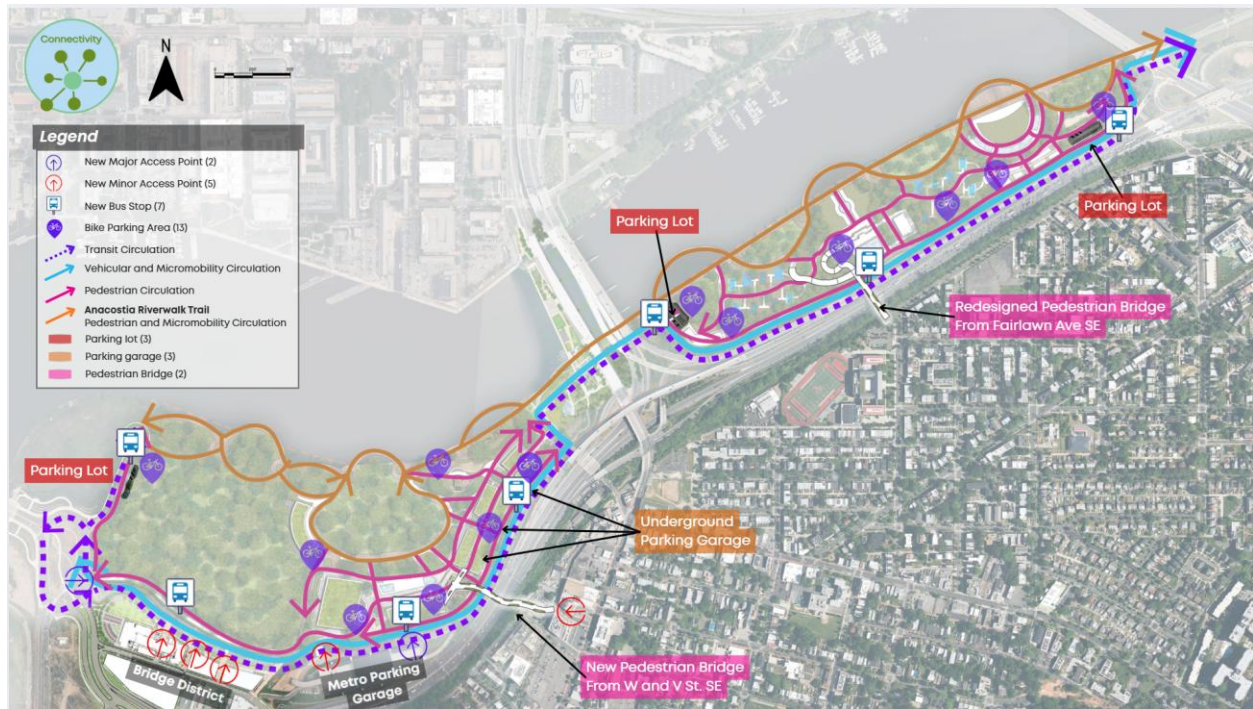


Figure 148: New Circulation Diagram. Credit base map (DC GIS Group, 2023) (Canva, 2025) (Adobe, 2025). Edited by the author.

New access points:

Responding to one of the users' main concerns, two new major access points are proposed: 1) from the Frederick Douglass Memorial Bridge, the Park entrance is reconfigured. The existing entrance is transformed into a one-way traffic circle, providing access to a new parking lot and improving vehicular flow by eliminating vehicular access to Anacostia Drive from this point to the south edge of the park, between the Bridge district and the forested wetlands area. Pedestrians and cyclists have direct access to the Riverwalk trail from this point. 2) From the Anacostia Metro Parking Garage, a new vehicular, micromobility, and pedestrian entrance is proposed. This improves access for transit users and creates a clear, welcoming arrival sequence for visitors and residents.

Three minor access points are located in the Bridge District area, and new direct links are proposed from their future promenade to the park. Adopting the Bridge District's promenade as a continuous part of the park. Another minor access point is located directly in front of the Metro Parking Garage pedestrian entrance, facilitating the transition from the metro facilities to the park.

Pedestrian Bridges:

A new feature of the master plan is the introduction of one elevated pedestrian bridge and the reconfiguration of the existing pedestrian bridge. Both bridges will not only connect neighborhoods to the park but also function as parks themselves, immersive, green, public spaces suspended above the I-295 highway, making connectivity experimental and extending the park into the communities they connect.

The Sky Garden Bridge extends from W and V Streets, SE, crossing I-295 to link the Historic Anacostia Neighborhood directly with the park. It lands on the rooftop of the proposed visitor center and the third story of the adjacent mixed-use building, providing a dramatic and welcoming entrance to the park. The curved bridge spans 500 feet and includes planting beds and shaded areas. Transforming the infrastructure into an elevated linear park and an attraction. Visitors can enjoy panoramic views of the Anacostia River, Frederick D. Memorial Bridge, and Navy Yard skyline before descending via elevator or sculptural steps into the park's main landscape in Section C.

Anacostia Gateway Bridge expands upon the existing crossing in Section D, introducing a meandering ramp system that gently descends toward the Anacostia Recreation Center and

sport courts. Designed with native plantings, rest platforms, and integrated lighting, the bridge offers an accessible and experiential route.

Realignment of Anacostia Drive:

A key move in the connectivity strategy is the realignment of Anacostia Drive, relocating it southward away from the riverfront. This shift prioritizes waterfront access for pedestrian and micromobility users only, creating a car-free linear park along the river's edge. Vehicular access to Anacostia Drive is maintained through a new route access that starts at the Frederick Douglass Bridge traffic circle. A secondary vehicular entrance is placed from the metro parking garage. Ensuring efficient vehicular circulation without compromising the pedestrian experience.

The new Anacostia Drive section adheres to a Complete Street framework, utilizing the D.C. Office of Planning's *Public Realm Manual* to ensure a balance between mobility, ecology, and recreation (see Figure 149).

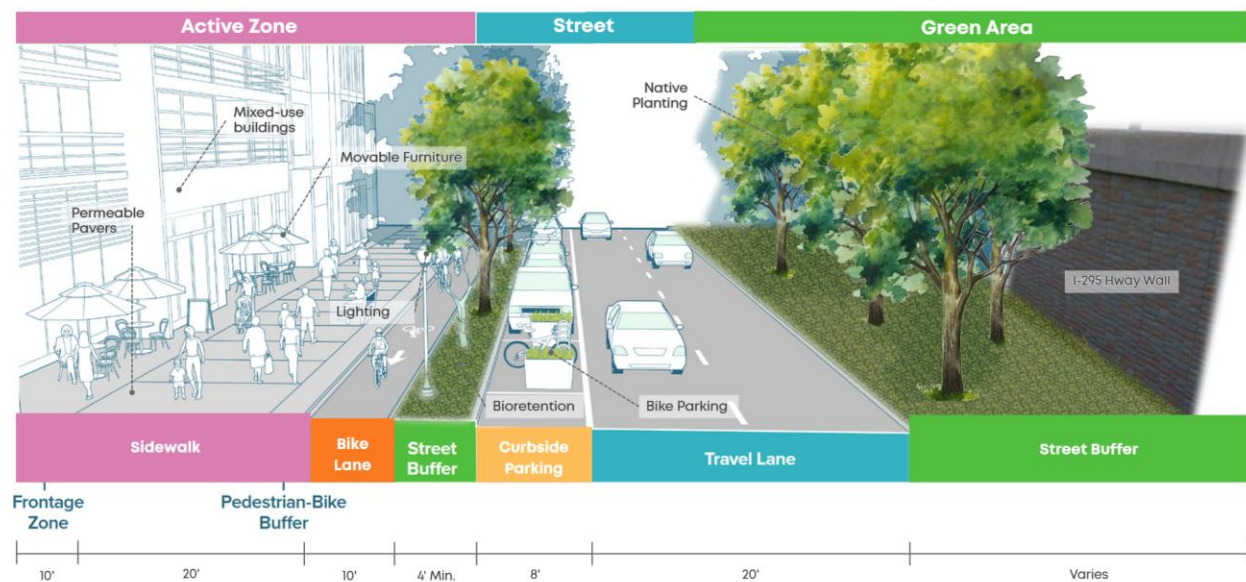


Figure 149: New Anacostia Drive Complete Green Street Section. Credit: base image (Montgomery County, Maryland. Department of Transportation, 2024). Edited by the author.

The Anacostia Drive section includes a 20-foot vehicular two-lane road, with a minimum of 4 feet wide of continuous bioretention systems, with plants that capture and treat stormwater runoff, a 10-foot dedicated micromobility lane for bicycles and e-scooters, a wide 20-foot pedestrian sidewalk shaded by native trees, and a 10-foot activity zone with seating, lighting, and planting areas that extend into adjacent park spaces. This multifunctional corridor integrates ecological performance with social use, providing a safe, resilient, and active edge that connects the park to surrounding communities.

According to the Public Realm Design Manual, street trees should create a continuous street edge, maintain sight lines, and be planted 30 to 40 feet apart from each other. The following species are recommended (see Table 23).

Table 23

Recommended Street Trees List

Botanical name	Common name
<i>Betula nigra</i>	River birch
<i>Gleditsia triacanthos</i> var. <i>inermis</i>	Thornless honeylocust
<i>Amelanchier canadensis</i>	Canadian serviceberry
<i>Taxodium distichum</i>	Bald cypress

Anacostia Riverwalk Trail

The Anacostia Riverwalk Trail is proposed as a continuous public space that evolves in form as it goes through changing elevations, hydrological conditions, and ecological zones. Extending for three miles along the river’s edge, the new Riverwalk serves as both a connective infrastructure and an interpretive landscape, guiding visitors through recreational areas. Its path is a waving, board-formed concrete walkway that mirrors the river’s motion. This material

decision was made based on its performance in micromobility and pedestrian high-traffic areas, as well as its durability during and ease of cleanup after storm and flood events. The platform's elevation changes over the three miles, ensuring it remains usable even as sea levels rise. This elevation also offers users different experiences throughout the walk.

The 35-foot-wide Riverwalk trail provides a direct connection to the river, serving as a multipurpose space where people can exercise, fish, sit, relax, and take in the natural surroundings.

Internal Transit:

To enhance mobility and accessibility throughout the park, the plan introduces a new metro shuttle or bus route that connects surrounding neighborhoods through the park and beyond, linking together other destinations along the Anacostia Park. The proposed route includes seven strategically located bus stops distributed across the 150-acre site, each positioned to serve central activity nodes, including community spaces, recreational areas, and adjacent parking lots. This internal circulation enhances accessibility for all visitors, particularly families, seniors, and individuals with limited mobility, while reducing car dependence, supporting car-free recreation, and promoting equitable access. It enables residents from nearby neighborhoods to explore the entire park and ensures multimodal transitions for visitors arriving by car, bike, or foot.

In addition to three parking lots, the master plan proposes three underground parking facilities to serve residents and the public. Several micromobility parking spaces have been designated within the site to ensure users have easy access to all facilities.

Gateways, Wayfinding, and Accessibility:

The entire site complies with the Americans with Disabilities Act (ADA), ensuring universal accessibility for all visitors. Continuous paths, ramps with slopes no greater than 5%, handrails, and accessible seating and viewing areas guarantee equitable use across all elevations. Tactile paving, floor patterning, and strategic lighting guide visitors through the space, enhancing safety, orientation, and comfort while maintaining the park's visual coherence.

The gateway and wayfinding strategy establishes a clear and welcoming identity for Anacostia Park, reinforcing orientation, legibility, and a sense of place throughout the site. Each entry and internal sign contributes to a cohesive visual language that unites the park's diverse spaces under a recognizable identity while celebrating its ecological and cultural richness.

Existing signage (see Figure 50) is proposed to be replaced with a monumental, colorful sign that welcomes visitors to the Park (see Figure 151). Existing entrances (see Figure 152) would benefit from new features, a gateway element that marks the Park's thresholds with wayfinding signage, identity markers, and interpretive art (see Figure 153). These gateways serve as both orientation tools and expressions of community pride, establishing a cohesive visual language throughout the park and reinforcing the relationship between people, place, and history.



Figure 150: Existing Anacostia Park Welcome Sign. Credit: Google Earth.



Figure 151: Example of New Entrance Sign for Anacostia Park. Credit: (Canva, 2025). Edited by the author.



Figure 152: Current Through the Fence Gate Entrance to the Park. Credit: Google Earth.



Figure 153: Example of New Gateway for Entrance from the Metro Parking Garage. Credit: the author.

Throughout the site, additional wayfinding and interpretive elements help visitors navigate and learn (see Figure 154). Area identification signage with names of spaces, such as the Wetlands Overlook, Visitor Center Plaza, Outdoor Classroom, and Community Garden (see Figure 155) (see Figure 156). Botanical and ecological signage identifies native plant species, stormwater management systems, and restored habitats, illustrating how the park performs as living infrastructure (see Figure 157). Educational art installations celebrate local history, culture, and community narratives, transforming the landscape into a place of discovery, curiosity, and stewardship.



Figure 154: Example of Wayfinding Tower and Floor Patterns. Credit: (Hitti, 2020).



Figure 155: Example of Sign for Different Areas in the Park. Credit: (Curchack & Hoffman, 2014).



Figure 156: Example of Signage for Areas in Park. Credit: (Baltimore Fishbowl, 2021).



Figure 157: Example of Educational Signage. Credit: (Krieger, n.d.).

Chapter 4: Discussion

The redesign of Anacostia Park Sections C and D demonstrates how landscape architecture strategies can address flooding and projected sea level rise while simultaneously integrating new development, fostering community input, improving connectivity, and enhancing ecosystem services through the use of adaptive infrastructure, nature-based solutions, and community-oriented design. The master plan positions the Anacostia Waterfront as both a protective system and a cultural landscape.

The design approach treats water dynamics as a design element rather than a constraint. Flood-prone zones are intentionally programmed as adaptive landscapes that absorb and filter stormwater. At the same time, higher-elevation areas accommodate civic and recreational uses, ensuring the site remains functional, accessible, and resilient over time.

4.1 Response to the Research Goals

1. To design a flood- and sea level rise-adaptive landscape that embraces water as a dynamic element, ensuring the site remains functional, accessible, connected, and resilient over time.

The design achieves this goal through multiple strategies (see Table 24), by applying elevation-based zoning and hydrological layering, derived from the DOEE Flood Hazard Rules, the D.C. Stormwater Management Guidebook, the IPCC's Strategies for Adaptation to Sea Level Rise (accommodate, protect, retreat), and nature-based solutions.

The master plan proposes tidal wetlands, bioretention systems, and rain gardens that absorb, detain, filter, and gradually release floodwaters. Critical infrastructure and public amenities are positioned above 13 feet, 2+ feet above DFE, as stated in the Flood Hazard Rules. Designated floodable zones near the river's edge double as wetlands and recreational spaces, allowing for periodic inundation without damage.

All these strategies make the park usable over time and after a 100-year storm event.

Table 24

Response to the Program Key Results of Objective One

Initial Program Key Result	Design Approach
Identify and map flood-prone areas and projected sea level rise across the 150-acre site using current FEMA data and climate models.	Completed using FEMA Flood Insurance Rate Maps (FIRM) and DC Flood Risk Tool. This allowed us to identify areas that could accommodate water from sea-level rise, areas to retreat from, and accept areas that would flood.
Propose three adaptable landscape strategies that respond to varying flood scenarios.	Implemented: (1) New tidal wetlands, (2) Floodable green areas, (3) The Grove

	woodlands, 4) Bioswales, 5) Raingardens, 6) Living Green Roofs, and 7) Permeable Surfaces
Ensure 90% of circulation routes are resilient post-flood	Achieved through raised, permeable pathways, the design maintains access continuity even after moderate floods (verification via hydrological modeling is needed). All pedestrian and micromobility pathways under the design flood elevation are proposed to be constructed with stamped or board-formed concrete. Enduring submersion and facilitating maintenance

2. To incorporate recreational, educational, and community-development spaces that engage local residents, promote connectivity to surrounding neighborhoods, and emphasizes ecology and environmental stewardship.

The master plan proposes multiple approaches to this goal (see Table 25). Community nodes like outdoor classroom, flexible plazas, performance spaces, community garden, and picnic areas, to promote recreation and education. In addition to all the adaptation infrastructure that also serves as educational and recreational spaces. These areas were informed by four existing community input sources, including DOEE's Anacostia Waterfront Framework Plan, NPS's Reimagine Anacostia Park, the Poplar Point Plan, and Google Reviews of the park. Identifying community priorities — such as programming, access, and connectivity — and concerns — including new development and climate resilience — and recognizing that space flexibility is one of the park's core aspects.

The proposed design also considers connectivity, accessibility, and wayfinding elements, reconnecting people to the park physically and socially, and improving comfort and navigation.

The new elements foster ownership, interaction, and collaboration among residents and visitors. Encouraging ongoing cultural, educational, and recreational events.

Table 25

Response to Program Key Results of Objective Two

Initial Program Key Result	Design Approach
Propose five multi-use community spaces within the site.	Achieved: we have proposed nine multipurpose areas , including Eco Plaza, amphitheater, educational wetland deck, outdoor classroom, Roots Plaza, Central Plaza, floating stage, recreational lawn, and flexible community pavilion.
Analyze findings from two existing community engagement sources to inform the location, design, and programming of recreational and educational spaces.	Integrated insights from four sources : DOEE's Anacostia Waterfront Framework Plan, NPS's Reimagine Anacostia Park, the Poplar Point Plan, and Google Reviews of the park.
Integrate two community-identified priorities directly into the final design proposal.	Reflected in the design focus on new community programming elements and flexible spaces. Reflected in design focus on accessibility and connectivity (five new minor access points, relocation of Anacostia Drive, and redesign of vehicle entrance from Metro Parking Garage) and river access (expanded waterfront promenade and relocation of Anacostia Drive). Reflected in the design focus on fostering new developments . Reflected in the design focus on climate adaptation .
Create an integrated riverfront district with six housing, civic plazas, and cultural/educational buildings.	Included six new mixed-use buildings , new Park Police and NPS offices, a new museum, seven new plazas, and eleven flexible, multipurpose spaces.

3. To enhance resilience to climate change by integrating landscape interventions that restore ecological functions, improve biodiversity, optimize ecosystem services, and support equitable development.

This project integrates multiple layers of climate adaptation and ecological performance (see Table 26), including the preservation of the existing forested wetland ecosystem and the maintenance of its natural hydrological inputs, thereby ensuring the wetlands continue to receive and store water from their primary sources. As well as ~65 acres of green or semi-natural areas. Green infrastructure systems and new tidal wetland areas. Native plant species restore habitat corridors, promoting biodiversity and ecological continuity.

Access to green spaces, community facilities, and mixed-use developments enhances social and economic resilience by supporting small businesses, attracting a diverse range of users, promoting year-round activity, and improving overall quality of life.

Table 26

Results to Program Key Results of Objective Three

Initial Program Key Result	Design Approach
Preserve 40% of the site for green spaces.	Achieved. Area calculations estimate ~65 acres of natural or restored, protected, or green spaces of the 150-acre site. Resulting in 43.3%
Include 20 native plant species in the planting palette to support pollinators and local wildlife.	We have proposed 27 native plant species for the tidal wetlands, living green roofs, and streets.
Incorporate green infrastructure capable of complying with local stormwater management regulations.	Not achieved. The stormwater storage volume required on-site is 1,059,378.687 gallons. Using the BMPs proposed (bioretention, green roofs, and permeable pavement), the design only stores 20% of the volume required.

	The volume of water quality treatment was not calculated.
Propose a master plan that embodies a multi-scalar approach to resilience, integrating social, ecological, and infrastructural systems designed to adapt to climate change over time.	Fully realized through multiple-scalar layering: urban design, adaptive infrastructure, community engagement, and connectivity.

To comply with stormwater management regulations, further evaluation of expanding the current BMP system and additional BMPs, such as cisterns is recommended. If the requirement is still not met, a memo detailing site constraints and proposing off-site retention and treatment should be submitted to the DOEE, to obtain “relief from extraordinarily difficult site conditions.”

I also recommend calculating the water quality treatment volume for each BMP.

The master plan elements were informed by interconnected dimensions, guided by the frameworks of biophilia, resilience theory, and systems thinking (see Table 27).

Table 27

Application of the Theoretical Framework in the Design

<i>Biophilia</i>	The proposed master plan offers a connection to nature through the tidal wetlands, the grove, the new trail, and other green spaces. These spaces offer sensory experiences with views, sounds, and palpable connections. Outdoor classrooms, observation decks, art installations, and gardens foster a connection between residents, neighbors, and users with nature and the urban environment.
<i>Resilience Theory</i>	Change is not resisted but embraced. Disturbance is an opportunity to create multi-purpose recreational and educational spaces. The tidal wetlands, adaptive topography, and floodable open spaces form a dynamic system that adapts and recovers from stress, transforming adaptive infrastructure and flood mitigation into a regenerative process. This supports biodiversity, habitat creation, and health, ensuring the park remains usable in the long term.

<i>Systems Thinking</i>	Understanding the feedback loops guided the organization of the site, with a set of interdependent processes rather than isolated elements. Infrastructure, hydrology, ecology, and the social aspects of the design are integrated into a network that spans multiple scales.
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While centered on Anacostia Park, the framework presented here is intended to inform real-world applications. Its principles can be translated to other riverfronts, coastal parks, and urban floodplains worldwide. Future research could expand on material resilience, the monitoring of constructed wetlands, and the governance models necessary to sustain such adaptive systems over time. Collaboration between designers, engineers, and community advocates will be essential to move from concept to implementation.

It is worth mentioning that for an adaptive landscape to remain economically and physically sustainable over time, it is necessary to establish a maintenance plan. The plan should indicate the budget and responsible parties for clean-up after storm or flood events. In addition to comprehensive technical documentation on the materials used, and documentation on recommended materials in case replacement is necessary.

To ensure the park reaches its full potential, community programming must be intentional and ongoing. The flexibility built into these spaces only becomes meaningful when people are encouraged and supported to use them. Establishing a clear framework for organizing, scheduling, and promoting community events will empower residents to take ownership of the park and activate it year-round.

This proposed design is presented as an academic exploration intended to examine the implications of sea level rise, flooding, and site elevation challenges in a real-world context. While the project draws from current data, regulations, and climate projections, and given the

complex existing elevations, any attempt to raise and stabilize the land would require extensive filling and significant financial investment—factors that make development both technically difficult and economically impractical. We recommend further planning that takes into account the 500-year floodplain, limiting high-impact development, and adopting a natural approach to parkland.

Furthermore, sea level rise is a continuing and uncertain process. The scenario presented here reflects conditions based on the best available data; however, projections suggest that, if greenhouse gas emissions are not effectively controlled, we could experience an additional 2 feet of sea level rise by 2100, beyond current estimates. Therefore, while this design explores adaptive possibilities and resilience strategies, it ultimately underscores the recommendation that no new development occur on this site, emphasizing the need for long-term retreat, conservation, or adaptive reuse.

Chapter 5: Conclusion

This research emerges at a critical connection for our cities and the professions dedicated to shaping them. The challenges facing the Anacostia Park are not unique; urban riverfronts worldwide are struggling with the pressures of climate change and historical inequity, making this study a vital case with far-reaching implications. For the profession of landscape architecture, this thesis argues for the field's essential role as the central integrator, demonstrating how design can transform a threat like sea level rise from a problem into a creative catalyst. It moves beyond traditional concepts of park-making to position the landscape itself as active, resilient infrastructure, showcasing how to intercept flood mitigation, ecological

restoration, and social life into a single, cohesive system. This approach provides a replicable framework for practitioners seeking to build adaptability and multi-functionality into the vulnerable edges of our cities, proving that resilience does not need to be an engineered barrier but can be a beautiful, integrated, and community-serving space.

The narrative of Anacostia Park, shaped by a highway that severed a community from its natural heritage, is a story repeated in countless other cities. Therefore, this project underscores its importance in the realms of urban planning and social justice by illustrating how strategic landscape interventions can heal historical wounds, literally and figuratively reconnecting neighborhoods to their waterfronts, and ensuring that new development and climate adaptation benefits are directed toward existing communities rather than displacing them. This provides urban planners and policymakers with a powerful, evidence-based precedent for advocating and funding projects that prioritize long-term equity and ecological health over short-term gains.

Furthermore, this academic exploration serves as a bridge between theory and practice for environmental science and civil engineering. The study advocates for a shift from rigid, gray infrastructure to dynamic, green, and hybrid systems, providing engineers and climate adaptation specialists with viable, multi-beneficial alternatives. Ultimately, this thesis is important because it transcends its specific site to address a universal urban dilemma, elevating the potential of interdisciplinary collaboration to create spaces that are not only safe from a changing climate but are also ecologically thriving and deeply valued by the communities they serve.

The research process itself underscores the value of design as a mode of inquiry, and how, through the combined application of biophilia, resilience theory, and systems thinking, the Anacostia Park Master Plan moves beyond aesthetics or single-purpose design. It demonstrates

how theoretical principles can be translated into tangible spatial strategies that support both ecological function and human well-being. Through iterative modeling, ecological mapping, and temporal representation, the thesis demonstrates how drawing and spatial thinking can generate new knowledge about adaptation. The use of speculative isometrics, section studies, and phasing strategies allowed the project to visualize time as a design material — revealing how landscapes evolve and adapt rather than remain fixed. This process-based approach positions landscape architecture not only as a creative discipline but also as a research methodology capable of producing actionable climate strategies.

Appendices

Appendix 1: Anacostia Park's History, A Chronology

By the Urban Heritage Project / PennPraxis. Graduate Program in Historic Preservation. Stuart

Weitzman School of Design -University of Pennsylvania, 2019.

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Chronology

Start Year	Start Era	End Year	End Era	Major Event	Major Event Description
9500	BCE	8000	BCE	Inhabited	Paleo-Indian peoples hunt in the Coastal Plain along the Potomac and Anacostia Rivers.
8000	BCE	2200	BCE	Inhabited	Archaic-Indian peoples hunt, fish, and seasonally camp along the Potomac and Anacostia Rivers.
2200	BCE	1608	CE	Farmed/Harvested	Native Americans, including the Nacotchtank people of the Algonquin Indian tribe, cultivate crops and establish villages along the Anacostia and Potomac Rivers.
1608	CE	1608	CE	Explored	Captain John Smith is the first Englishman to explore and map the Potomac River and its Eastern Branch (later named the Anacostia River).
1612	CE	1612	CE	Platted	Captain John Smith draws a map that charts his explorations along the Chesapeake Bay, Potomac River, and its Eastern Branch.
1624	CE	1624	CE	Memorialized	Smith publishes <i>The General Historie of Virginia</i> , describing the area around Anacostia and his encounter with the Nacotchtank people.
1632	CE	1632	CE	Explored	English trader Henry Fleet visits the site of Anacostia, naming the indigenous peoples "Nacostines."
1632	CE	1632	CE	Land Transfer	King Charles I conveys the land east of the Anacostia River to George Calvert, the first Lord Baltimore.
1634	CE	1634	CE	Settled	Maryland is settled by Englishmen sent by Cecilius Calvert, the second Lord Baltimore.
1658	CE	1658	CE	Established	Lord Baltimore establishes the County of Maryland, which includes the land east of the Anacostia River.
1663	CE	1663	CE	Land Transfer	Dr. John Meeks is awarded the Chichester tract by Lord Baltimore for escorting colonists to Maryland. Portions of this tract later become Sections C and D of Anacostia Park.
1668	CE	1668	CE	Colonized	By 1668, the Native American tribes living along the Eastern Branch were largely killed or driven from the area by English colonizers.

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1700	CE	1700	CE	Land Transfer	Thomas Addison purchases the Chichester tract from the heirs of Dr. John Meeks.
1703	CE	1703	CE	Colonized	The land grant of Beall's Adventure to Colonel Ninian Beall includes hundreds of acres along the east side of the Eastern Branch. This land grant included parts of Section F and G in modern Anacostia Park.
1790	CE	1791	CE	Established	The Residence Act of 1790 establishes the District of Columbia. Maryland and Virginia cede the area within a 100-square-mile diamond, laid out by Andrew Ellicott and Benjamin Banneker, to the federal government.
1791	CE	1791	CE	Planned	Pierre L'Enfant lays out the new federal city of the District of Columbia, sited between the Potomac and Anacostia Rivers, and includes the land east of the Anacostia River as a buffer for military purposes.
1791	CE	1791	CE	Purchased/Sold	President George Washington signs an agreement on March 30, 1791, that establishes the District of Columbia on land from fifteen property owners and two different states (Virginia and Maryland). This formally included land on the west bank of the Anacostia River, outside the boundaries of the cultural landscape.
1792	CE	1792	CE	Planned	After L'Enfant is dismissed from his position, Andrew Ellicott is retained to reproduce a city plan based on L'Enfant's original plan. This plan simply labels the land that would become Anacostia Park as, "Part of the Land within the Territory of Columbia."
1791	CE	1889	CE	Eroded	As the District of Columbia develops around the Anacostia River, the waterway remains a tidal (but not saline) flow. As urban development increases, however, runoff and deforestation begin to clog its flow with sediment and waste.
1793	CE	1793	CE	Platted	Ellicott inscribes the name "Eastern Branch or Annakostia" on his 1793 map of Washington, D.C. after consulting with Thomas Jefferson. This is the first official use of the name Anacostia.
1795	CE	1795	CE	Established	The Maryland Legislature charters a wooden toll bridge at Pennsylvania Avenue. The new bridge is not built until 1804.

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1799	CE	1800	CE	Established	The Washington Navy Yard is chartered in 1799 and established in 1800 on the Anacostia River, across from the future Anacostia Park cultural landscape.
1800	CE	1800	CE	Moved	The federal government officially moves from Philadelphia to Washington.
1800	CE	1800	CE	Land Transfer	James Barry purchases the St. Elizabeth tract, located south of the Chichester Tract (which includes the northern half of Section C and much of Section D). Portions of this land later become Section C of Anacostia Park.
1801	CE	1802	CE	Land Transfer	The 1801 Organic Act places the District of Columbia under the control of the U.S. Congress and organizes the unincorporated area north and east of the Potomac River and its Eastern Branch into Washington County. Maryland's Montgomery County and Prince George's County transfer jurisdiction of Washington County to the federal government. This area includes all land east of the Anacostia River, including the cultural landscape.
1804	CE	1804	CE	Built	The Navy Yard Bridge, chartered in 1795, is built in Section D to the south of the modern-day Pennsylvania Avenue SE bridge, becoming the first bridge to cross the Anacostia River at that site. It is a wooden toll bridge operated by the Eastern Branch Bridge Company. This is the first bridge across the Anacostia River at Pennsylvania Avenue.
1808	CE	1808	CE	Land Transfer	William Marbury purchases the Chichester Tract from the Addison family. Portions of this tract would later become Sections C and D of Anacostia Park.
1814	CE	1814	CE	Destroyed	The Pennsylvania Avenue SE bridge is burned by American forces during the War of 1812, as a protective measure against the invading British forces. American forces also burn the Navy Yard on the Anacostia River to prevent the capture of Naval stores by the British.
1815	CE	1815	CE	Built	The Eastern Branch Bridge Company sues Congress for the destruction of its bridge in the War of 1812. Hoping to settle the suit, Congress appropriates \$20,000 for the construction of a new bridge. The company builds a wooden truss bridge and operates it as a toll bridge, near the present-day 11 th Street SE bridge, between Sections C and D of the cultural landscape.

1820	CE	1820	CE	Built	The Pennsylvania Avenue SE bridge is re-built between Sections D and E.
1845	CE	1845	CE	Destroyed	The 1815 section of the Pennsylvania Avenue SE bridge is burned to the waterline a second time after sparks from a steamship funnel cause a fire. It is not rebuilt until 1890.
1849	CE	1849	CE	Land Transfer	The United States Congress creates the Department of the Interior, charging it with control over the nation's internal affairs. The department consolidates the role of the General Land Office, the Patent Office, the Indian Affairs Office, and the military pension office. The Department of the Interior was tasked with the care and management of all federal property, including public parks in the city of Washington.
1854	CE	1854	CE	Established	John Van Hook, John Fox, and John Dobler found the Union Land Association, creating the Uniontown community southeast of the Navy Yard Bridge. It was among the first suburban communities in Washington, D.C.
1861	CE	1865	CE	Urbanized	The population of Washington, D.C. more than triples over the course of the Civil War, heightening demand for new construction and green space.
1867	CE	1867	CE	Land Transfer	The Bureau of Refugees, Freedmen, and Abandoned Lands secretly purchases land for the creation of a free Black settlement to house 40,000 refugees of slavery. The land is purchased from the heirs of enslaver James Barry, and the settlement is named Barry Farm or Barry's Farm. Portions of Barry Farm would later become Section C of Anacostia Park, which is located in the southernmost portion of the cultural landscape.
1871	CE	1871	CE	Land Transfer	Washington County, Georgetown, and Washington City become a federal territory called the District of Columbia.
1875	CE	1875	CE	Built	Congress approves funding for and builds a new iron and masonry bridge across the Anacostia River at 11 th Street SE, between Sections C and D of the cultural landscape.
1874	CE	1874	CE	Land Transfer	Territorial rule is abolished in the District of Columbia. D.C. is now run by commissioners.

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1875	CE	1875	CE	Established	The Anacostia and Potomac River Street Railroad Company is organized. The company begins operations the following year as the first streetcar to serve the Anacostia region east of the river. The line ran across the 11 th Street SE bridge.
1890	CE	1890	CE	Built	A new Pennsylvania Avenue SE bridge is dedicated and opened amid much fanfare, including a concert by John Philip Sousa and the Marine Band. The new bridge replaces the previous bridge that burned to the waterline after sparks from a steamship ignited it in 1845.
1890	CE	1890	CE	Engineered	As part of the Rivers and Harbors Act, Congress appropriates \$20,000 for improving the Anacostia River between its mouth at Giesboro Point (also spelled Giesborough) to the Navy Yard (this includes Section C of Anacostia Park). Engineers also recommend that the portion of the Anacostia River from the 11 th Street SE bridge to Benning Bridge (including Sections D and E) be improved at a later date. This appropriation marks the beginning of improvements to the Anacostia River and foreshadows future reclamation efforts, including dredging and the construction of seawalls. The report suggests that the reclaimed land could lend itself well to "for instance, a park."
1898	CE	1898	CE	Platted	Congress appropriates \$2,000 for a comprehensive survey and plan for the improvement of the Anacostia River and the reclamation of its flats. This report includes the estimated cost of acquiring private land for reclamation purposes.
1898	CE	1898	CE	Altered	The horse-car line across the Navy Yard Bridge is electrified and replaced with electric trolley cars, providing easy access to the Anacostia area and spurring real estate development. This new electric line replaces the streetcar line installed at 11 th Street SE in 1875.

					The McMillan Plan calls for an "Anacostia Water Park" along the Anacostia River, endorsing the 1898 plan for the reclamation of the Anacostia flats. Congress appropriates \$150,000 for the reclamation of the Anacostia flats below the Navy Yard Bridge to Giesboro Point (encompassing present-day Section C, within the cultural landscape boundaries, and Joint-Base Anacostia Bolling, south of the cultural landscape). Congress also appropriates \$5,000 for the survey and mapping of land from the District boundary to the mouth of the Anacostia River. The McMillan Plan recommends the improvement of the Anacostia River below the Benning Bridge for commercial purposes (this is the portion along the cultural landscape) and the land above Benning Bridge for park purposes.
1902	CE	1902	CE	Engineered	
1907	CE	1907	CE	Built	A new 11 th Street SE bridge is built, replacing the previous bridge that was built in 1875.
					The first use of the term "park" in conjunction with the Anacostia flats is used in a District of Columbia Appropriations Act, which authorizes the condemnation of private land for "highway or park purposes" along both sides of the Anacostia River from the Anacostia Bridge [11 th Street SE bridge] to the northern District Line. This encompasses the portion of the river that comprises the cultural landscape boundaries.
1913	CE	1914	CE	Engineered	
					The 1914 report of the Chief of Engineers recommends, for the first time, using the reclaimed land below the 11 th Street SE bridge for park purposes until a commercial use is needed. At this time, reclamation was underway from the Stickfoot Branch to the 11 th Street SE bridge (Section C, within the cultural landscape boundaries) and had been completed from Giesboro Point to the Stickfoot Branch (Sections A and B or Joint-Base Anacostia Bolling, south of the cultural landscape).
1914	CE	1914	CE	Engineered	

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1915	CE	1915	CE	Designed	The Commission of Fine Arts (CFA) authorizes plans for an "Anacostia Water Park," in keeping with the recommendations of the McMillan Plan and the advice and plans of CFA member Frederick Law Olmsted Jr.
1917	CE	1918	CE	Land Transfer	In 1917, the Chief of Engineers turns over management of a portion of the Anacostia flats in Sections A and B (south of the cultural landscape boundaries) to the Army Signal Corps for use as an airplane field. The War Department in turn authorizes the Navy to occupy a portion of the same land. The following year, the name Bolling Field is given to these sections occupied by the military.
1918	CE	1918	CE	Established	Anacostia Park is officially named and established under an act of Congress. The District of Columbia Appropriations Act for FY 1919 places the entire area from the mouth of the Anacostia River to the northern District Line into the park system for recreation purposes. This includes the cultural landscape and marks the first time that the entire length of the Anacostia River is to be used for park purposes.
1918	CE	1918	CE	Farmed/Harvested	250 gardeners begin cultivating government land along the Anacostia River in Sections C and D (the southern and central sections of the cultural landscape) as individual vegetable gardens (also known as Victory Gardens) for the World War I effort. The Office of Public Buildings and Grounds agrees to allow the Department of Agriculture to supervise the use of the land as gardens until the land is needed for park purposes. Under this agreement, the land is kept free of weeds and other refuse that would accumulate if the land were not used.
1920	CE	1920	CE	Land Transfer	Congress establishes the Naval Air Station, later Bolling Field, in Anacostia Park Sections A and B (south of the cultural landscape). This permanently excludes Sections A and B from the park, and establishes the southernmost boundary of Anacostia Park as Section C at Poplar Point. This boundary is generally consistent with the southernmost boundary of the cultural landscape (a few changes were made in later years for the construction of the S. Capitol Street Bridge).

Anacostia Park Cultural Landscape
National Capital Parks - East

1920	CE	1920	CE	Built	According to research conducted for the draft National Register nomination (2010), the Engineer's Building is constructed on Poplar Point in Anacostia Park.
1922	CE	1922	CE	Farmed/Harvested	200 gardeners from the Anacostia flats Garden Club cultivate the land between the 11 th Street SE and Pennsylvania Avenue SE bridges in Section D (the central section of the cultural landscape), under an agreement with the Department of Agriculture.
1922	CE	1923	CE	Designed	Landscape architect Irwin W. Payne designs plans for the new Anacostia Park, including a "large and artistic central clubhouse which will contain sitting and rest rooms, locker spaces, porches, and other appointments for the comfort and pleasure of patrons of the park." The plans call for a parkway along the eastern bank of the Anacostia River from Bolling Field to the northern District Line (passing through the cultural landscape). The planned parkway will be 40 feet wide and known as Anacostia Park Boulevard. The plans also call for a bandstand, large amphitheater, permanent grandstand for 6,500 persons, three baseball fields, a football gridiron, an athletic track, tennis courts, playgrounds, two boathouses, a cricket field, a hockey field, a bowling green, roque courts, a swimming pool, and picnic grounds.
1922	CE	1922	CE	Engineered	The United States Army Corps of Engineers (USACE) announces the improvements to the Anacostia River Flats are halfway done.
1923	CE	1923	CE	Established	The Office of Public Buildings and Grounds and the Anacostia Citizens Association break ground to much fanfare for Anacostia Park in an official ceremony. Anacostia Park is formally dedicated on August 2. By this time, only Sections C and D of Anacostia Park were ready for development, having been reclaimed for park purposes by the USACE.

Anacostia Park Cultural Landscape

National Capital Parks - East

1924	CE	1924	CE	Land Transfer	The United States Army Corps of Engineers transfers jurisdiction of Anacostia Park Section D (the central section of the cultural landscape) to the Office of Public Buildings and Grounds (OPBG) for improvement and maintenance as a recreation park. This is the first section of Anacostia Park to be transferred for development.
1924	CE	1924	CE	Built	Construction begins on a large natural amphitheater in Section D to seat 10,000. It is located on the southwestern end of Section D, within the cultural landscape boundaries.
1924	CE	1924	CE	Built	Pipes for draining the park are laid and the land is graded and seeded. Six tennis courts and four baseball diamonds are built in Section D (the central section of the cultural landscape). Two of these tennis courts are made of concrete. Construction in Section D gradually begins to displace gardeners.
1925	CE	1925	CE	Land Transfer	The Office of Public Buildings and Public Parks (OPBPP) assumes responsibilities for the management of public reservations from the Office of Public Buildings and Grounds (OPBG).
1924	CE	1924	CE	Established	Congress establishes the National Capital Park Commission to acquire public parkland in the nation's capital and to develop a comprehensive plan for park, parkway, and playground development in the District.
1925	CE	1925	CE	Land Transfer	The U.S. Army Corps of Engineers transfers Section E, north of Pennsylvania Avenue and below the railroad bridge, to the Office of Public Buildings and Public Parks. This section comprises the northern portion of the cultural landscape. By this time, reclamation and engineering work has been completed below the railroad bridge near Pennsylvania Avenue SE. Work is underway in Sections F and G, between the railroad bridge and the Benning Road bridge; these sections are located north of the cultural landscape.
1925	CE	1925	CE	Built	Construction begins on the field house in Section D of Anacostia Park, in the central section of the cultural landscape. The concrete foundations are laid, and brickwork is begun.

Anacostia Park Cultural Landscape
National Capital Parks - East

1926	CE	1926	CE	Land Transfer	Congress authorizes two tree nurseries in Anacostia Park Section C for the Commissioners of the District of Columbia and the United States Botanic Garden, respectively. The land was previously used as individual vegetable plots as part of the war effort.
1927	CE	1927	CE	Land Transfer	The remaining portions of Section C (those not used for tree nurseries) are transferred to the Office of Public Buildings and Public Parks for development as part of Anacostia Park. This completes the southern portion of the cultural landscape.
1926	CE	1926	CE	Established	Congress establishes the National Capital Park and Planning Commission (NCPPC) to replace the National Capital Park Commission (NCPC), and gives it the authority to plan a park system for the Washington, D.C. region. Unlike the NCPC, the NCPPC's duties are expanded beyond park planning to include city and regional planning, including land use, transportation, recreation, mass transportation, and community facilities. The NCPPC is also granted the authority to acquire land on behalf of the U.S. government.
1929	CE	1929	CE	Built	By this time, Anacostia Park includes 4 clay and 2 cement tennis courts, 4 baseball diamonds, 3 football grids, and a playground in Section D, totaling 60 acres. Section D is built for White patrons, while Section C is proposed for use by Black patrons; both sections are included within the cultural landscape boundaries.
1929	CE	1929	CE	Planted	60 acres of Section C in Anacostia Park (the southern portion of the cultural landscape) are seeded for the first time.

Anacostia Park Cultural Landscape

National Capital Parks - East

					The National Capital Park & Planning Commission proposes a "possible temporary golf course for colored persons" in Section C, on the site of the present-day U.S. Park Police and National Capital Parks-East Headquarters, within the cultural landscape. Ultimately, the site is not selected because it is too geographically constrained for future growth, and is not located close enough to a predominantly Black neighborhood. (The proposed course would later be built in Section G as Langston Golf Course, north of the cultural landscape.)
1929	CE	1929	CE	Designed	
					Irving W. Payne, landscape architect for the Office of Public Buildings and Public Parks, calls for the planting of crepe myrtle, several varieties of magnolia, and numerous crab apple trees along the Anacostia River from the District nursery to the Pennsylvania Avenue SE bridge. The quantity and location of trees planted is unknown, but Payne's focus area is within the cultural landscape.
1929	CE	1929	CE	Planted	
					The Office of Public Buildings and Public Parks begins construction on the Anacostia Golf Course's first nine holes in Sections D and E, on either side of the Pennsylvania Avenue SE bridge and within the cultural landscape boundaries. Three holes are located in Section D and six holes are located in Section E, replacing public gardens planted during World War I. After the public gardens are cleared, grass seed is sown for the first time in Section E.
1930	CE	1930	CE	Built	
					A baseball diamond, removed for the construction of the Anacostia Golf Course in Section D, is rebuilt near Naylor Road and Railroad Avenue SE, close to the Anacostia Field House in the central section of the cultural landscape.
1931	CE	1931	CE	Moved	
					100 crab apple trees are added to the existing grove in Anacostia Park, which now totals approximately 1,000 crab apple trees. The Office of Public Buildings and Public Parks also proposes planting 25 magnolia trees immediately. The specific locations of these trees are unknown, but they are most likely planted in Sections C and D within the cultural landscape.
1931	CE	1931	CE	Planted	

1931	CE	1931	CE	Moved	The Office of Public Buildings and Public Parks relocates one large Southern magnolia and one Soule magnolia from McPherson Square to Anacostia Park as part of a modernization effort of McPherson Square. Their new locations in Anacostia Park are unknown, but are most likely in Section D, within the cultural landscape.
1932	CE	1932	CE	Inhabited	During the Great Depression, a large portion of the Bonus Expeditionary Force (BEF), or Bonus Army, occupies the Anacostia flats in Section C, between the tree nurseries and the 11th Street SE bridge in the southern portion of the cultural landscape. By some accounts, as the BEF camp grew in size, it spilled over into Section D (the central section of the cultural landscape). This group is made up of thousands of veterans and their families seeking early payment of funds that would otherwise be due to them in 1945, for their service during WWI. Using scrap materials, veterans construct a sprawling camp of tents, shanties, occupied automobiles, and other creative shelters. The camp includes mess halls, streets, officers' quarters, and other features. In July, United States military forces attack Bonus Army camps throughout D.C. and set fire to the Anacostia camp, forcing the veterans and their families to abandon Sections C and D.
1932	CE	1932	CE	Restored	Under the auspices of the New Deal employment programs, 100 unemployed men restore Anacostia Park to its condition prior to the BEF occupation, using emergency funding from the District Commissioners. Workers clear burned debris and garbage, and reseed the area, totaling 50 acres.
1932	CE	1932	CE	Built	Construction begins on Anacostia Drive along the shoreline where the Bonus Army encampment was located only a few months prior, in Section C. Workers lay out the stone base of the road in preparation for paving at a later date. At the time, only 0.407 miles of Anacostia Drive is macadamized in Section D of the cultural landscape.

Anacostia Park Cultural Landscape
National Capital Parks - East

1932	CE	1932	CE	Rehabilitated	Anacostia Field House is significantly remodeled. The specific scope of this remodel is unknown. By this time, the OPBPP has constructed a baseball diamond, quoit court, and croquet court in Section D, the central section of the cultural landscape.
1932	CE	1933	CE	Built	An additional 9 holes are added to the Anacostia Golf Course, making it a full 18-hole golf course as of 1932. The new holes are located near the Pennsylvania Avenue Railroad bridge in between Section D and Section E, replacing land formerly occupied by public gardens. The full extent of the golf course is located within the boundaries of the cultural landscape. The new golf course is dedicated in a ceremony on May 5, 1933, and the first tournament is held on the course in August 1933.
1933	CE	1933	CE	Planted	The Office of Public Buildings and Public Parks plants 100 weeping willow trees in Anacostia Park along the Anacostia River in Sections C, D, and E. This new "border grove" is designed to resemble a similar grove in West Potomac Park.
1933	CE	1933	CE	Land Transfer	The Secretary of War and the Office of Public Buildings and Public Parks transfers jurisdiction of federal reservations back to the Department of the Interior, under the management of the National Park Service (NPS). This includes Anacostia Park.
1933	CE	1934	CE	Altered	As part of the New Deal employment programs, the Civil Works Administration employs 1,000 men at Anacostia Park to clean up the area for future parkland. This work includes building levees, filling in earth behind seawalls, smoothing down beaches, and grading the riverbanks. The specific location of the work is unclear, but a photograph of the project indicates it was likely within the cultural landscape.
1934	CE	1934	CE	Altered	300 "regulation standard park benches" benches and 100 "rustic type" tables are installed in parks across D.C., including in Anacostia Park. The exact quantity and location of features installed in Anacostia Park is unknown.

					The Anacostia Pool is constructed using monies from the Public Works Administration's (PWA) fund for local park improvements in Washington, D.C. A large river flood in 1936 causes significant delays in the construction of the pool, resulting in a delayed opening in 1937. The PWA-funded project also includes funding for renovations to the field house for the installation of bath houses for the new public pool. The National Park Service also expands the existing recreation center (i.e. the sports facilities located around the field house) to accommodate the new pool behind the Anacostia Field House. The Civilian Conservation Corps (CCC) also undertakes work in this same section of the park, building three tennis courts, landscaping around the renovated field house building, and grading the existing golf course on the lawns near the recreation center, in Section D of the cultural landscape.
1935	CE	1935	CE	Altered	
1935	CE	1935	CE	Moved	An unknown number of holly trees are moved from Dupont Park to the front of the Anacostia Field House in Section D.
1935	CE	1935	CE	Built	By this time, Anacostia Drive is complete between Poplar Point and the Pennsylvania Avenue SE bridge, extending through two-thirds of the cultural landscape. The drive remains incomplete in the northernmost section of the cultural landscape.
1937	CE	1937	CE	Built	An unknown quantity of lights is added to Anacostia Park. The locations of these lights are unknown.
1937	CE	1937	CE	Built	An earthen levee system is constructed by Works Progress Administration (WPA) workers beginning at Giesboro Point and running to the northern edge of the District nursery, before sharply turning south and running to a high point along Howland Road, along the eastern edge of the tree nursery. Portions of this earthen levee are located along the northern and eastern boundaries of the tree nurseries in Section C.
1937	CE	1937	CE	Planted	150 crab apple trees are planted along Anacostia Drive between the 11th Street and Pennsylvania Avenue SE bridges, in the central section of the cultural landscape.

Anacostia Park Cultural Landscape
National Capital Parks - East

1938	CE	1938	CE	Built	Parks employees build a field hockey field and soccer field in Anacostia Park Section D, in the central portion of the cultural landscape; the exact locations for these new features are unspecified.
1938	CE	1938	CE	Land Transfer	Concessionaire S. G. Loeffler assumes control of the Anacostia Golf Course in Section D, which was previously managed by D.C.'s Welfare and Recreation Association. The D.C. Welfare and Recreation Association maintains control over all other recreational facilities in the cultural landscape.
1939	CE	1940	CE	Built	A new steel plate girder bridge replaces the narrow iron girder bridge at Pennsylvania Avenue SE. The bridge is renamed the John Philip Sousa Bridge. Construction of exit ramps for the bridge require the seizure of portions of Anacostia Park between Sections D and E, establishing the current boundaries of these sections in relation to the bridge.
1939	CE	1939	CE	Altered	The Anacostia Golf Course temporarily closes in January, in order to install two new greens and one tee, replacing those displaced for the rebuilding of the Pennsylvania Avenue SE bridge (formally known as the John Philip Sousa Bridge). The CCC completes these improvements and also installs 70 feet of drain tile for the golf course and grades two acres of soil near the recreation center in Section D, at the center of the cultural landscape.
1939	CE	1939	CE	Altered	S.G. Loeffler improves the field house by enlarging the lobby and rearranging the locker rooms to separate pool and golf uses. It is likely that the CCC also carried out these renovations.
1939	CE	1939	CE	Destroyed	The Pennsylvania Avenue Railroad freight bridge, which ran along the northern edge of Section E, burns down.
1939	CE	1939	CE	Designed	S. G. Loeffler proposes creating an 18-hole course to link Anacostia Park Section E with Fort Dupont Park to the east. This plan was not realized.

1941	CE	1941	CE	Built	The first army recreation camp for Black soldiers opens in Section C at Anacostia Park, near the 11 th Street SE bridge, at the southern end of the cultural landscape. The area is used as overnight lodging for Black soldiers on leave and is equipped with softball diamonds, tennis courts, a golf course, and other indoor recreation facilities for 500 Black soldiers. The camp also has 88 tents for housing and administration, heated by stoves in the winter. The camp is built by the CCC as a temporary facility for Black military personnel on leave.
1942	CE	1942	CE	Damaged	A fire burns down the canteen in the army recreation camp in Section C.
1942	CE	1942	CE	Established	Under an agreement with the Secretary of the Interior, the Navy establishes the U.S. Naval Receiving Station (NRS) in Anacostia Park Section C, between the tree nurseries and the 11 th Street SE bridge, south of Anacostia Drive in Section C of the cultural landscape. The land was previously used as recreation camp for Black soldiers. The Secretary of the Interior grants the NRS use of 50 acres of NPS land, with the understanding that the NRS would vacate the parcel after the war. The NRS begins construction of several buildings, including a barracks, officers' quarters, mess hall, recreational facilities, and a dry-cleaning plant.
1942	CE	1942	CE	Damaged	A naval scout observation plane lands on its nose in Anacostia Park, damaging trees at an unknown area of Section D, in the center of the cultural landscape.
1942	CE	1943	CE	Damaged	A massive river flood causes major damage to the Anacostia Golf Course in the fall of 1943, prompting the closure of the course until spring of the next year.
1943	CE	1943	CE	Neglected	Due to a materials shortage during World War II, the greens on the Anacostia Golf Course fall into disrepair, forcing the course to be closed for several months.
1944	CE	1944	CE	Land Transfer	The Department of the Interior agrees to permit the NRS to use an additional 11.5 acres of its land. With this agreement, the NRS now uses 61.5 acres of Anacostia Park. The location of the additional land is unspecified.

Anacostia Park Cultural Landscape
National Capital Parks - East

1945	CE	1945	CE	Damaged	A Navy attack bomber crashes on the first green of the Anacostia Golf Course, 250 feet from the field house, destroying several trees and damaging the green. The plane was attempting to land at the Anacostia Naval Air Station when one of its engines died.
1948	CE	1948	CE	Built	S. G. Loeffler builds an 18-hole miniature golf course in Section D, on the southeastern edge of the circular drive of the field house. Construction of the course costs roughly \$25,000.
1949	CE	1949	CE	Built	The South Capitol Street bridge is built on the southwestern edge of the cultural landscape. This bridge is the first built at this location. Construction of bridge off-ramps necessitates the seizure of small portions of Section C; these land transfers define the present-day southwestern edge of the cultural landscape.
1949	CE	1949	CE	Altered	Secretary of the Interior Julius A. Krug asks the District Recreation Board to operate public tennis courts on a non-segregated basis. Previously, the District Recreation Board operated all nine tennis courts in Anacostia Park as White-only.
1949	CE	1949	CE	Altered	S. G. Loeffler uses a ditch-digging machine to drain and improve the Anacostia Golf Course, which floods frequently.
1949	CE	1949	CE	Altered	Local Black children attempt to swim in the pool at the Anacostia Field House. Although the Department of the Interior has a policy of non-segregation, the Anacostia Park pool operated to this point as a "Whites only" facility. In response to the incident with the Black children attempting to swim at the pool, the Secretary of the Interior orders the pool to be closed, citing fear of further conflict between Black and White youth.
1953	CE	1953	CE	Land Transfer	Legislation identifies the National Capital Parks as part of the National Park System.
1957	CE	1957	CE	Built	The Anacostia Freeway (I-295) begins construction, defining the eastern boundary of Anacostia Park. Staging during its construction occupies a portion of parkland in Sections C and D. Construction of the freeway permanently claims portions of the cultural landscape and defines its eastern edge.

1958	CE	1958	CE	Abandoned	As construction of the Anacostia Freeway complicates access to the park, the Anacostia Golf Course is forced to close due to a lack of patronage. National Park Service officials remain optimistic, however, that the course will reopen after the completion of the highway.
1959	CE	1959	CE	Moved	Changes to the John Philip Sousa Bridge footprint (at Pennsylvania Avenue SE) cause park officials to relocate greens and putting tees north and south several yards in either direction, steering clear of the new exit ramps that connect the bridge with the Anacostia Freeway.
1959	CE	1980	CE	Demolished	The Naval Receiving Station begins relocating various divisions to other locations around D.C. The move, which begins in 1959, is prompted in part by the construction of the Anacostia Freeway. By this time, the NRS included over 95 buildings and structures. When the NRS relocates, the bulk of the buildings are demolished or transferred to the National Park Service.
1958	CE	1961	CE	Built	S. G. Loeffler and the Division of Design and Construction of the National Capital Parks-East create new designs for an Anacostia Golf Center in Section E; as designed, the center will include an 18-hole golf course, a driving range, a golf center, a club house, new parking lots, a utility building, a miniature golf course, and a landscape plan for Section E of Anacostia Park. Only the golf concession building is built at the northern end of Section E in 1961; it comprises a portion of the present-day Aquatic Resources Education Center. The rest of the design is never realized.
1964	CE	1964	CE	Built	The Anacostia Freeway (I-295) is completed and opened, creating a physical barrier between Anacostia Park and the surrounding neighborhoods and permanently altering the eastern boundary of the cultural landscape.
1966	CE	1966	CE	Designed	A development plan study of Section E proposes expanding the existing golf course beyond the railroad bridge into Section F, north of the cultural landscape. However, the study is never realized.

Anacostia Park Cultural Landscape

National Capital Parks - East

1967	CE	1970	CE	Built	At the request of First Lady Claudia Alta "Lady Bird" Johnson, Lawrence Halprin & Associates creates a master plan for the future of Anacostia Park. Lady Bird Johnson believes that Halprin will lend a more serious professional element to her beautification program, which was underway at this time in the District of Columbia and around the country. Halprin's plans call for an amusement park, swimming lake, monorail, and other extravagant designs. Halprin's plans are never realized due to a lack of funding.
1967	CE	1967	CE	Designed	The National Park Service invites industrial designer Russel Wright to Washington, D.C. to design a new initiative for community parks. Wright's proposal results in the <i>Summer in the Parks</i> program, a multi-million dollar initiative to program community parks and reimagine the design of Anacostia Park.
1968	CE	1976	CE	Established	The National Park Service operates the <i>Summer in the Parks</i> program, with Anacostia Park as the setting for many of its large-scale events.
1971	CE	1980	CE	Abandoned	S.G. Loeffler permanently closes the miniature golf course in Section D; it is demolished by 1980. The course is replaced with a grass lawn, several trees, and a picnic area.
1971	CE	1971	CE	Designed	By 1971, the 18-hole golf course is gone (according to a plan of the park's baseball diamonds). In its place are two existing ballfields and a new rugby field. The golf center is converted into a United States Park Police substation, and the driving range is moved to the northern half of Section E, north of the former golf center.

					The Anacostia Park Pavilion (later the skating center) is built as part of the Bicentennial Commemoration in the District of Columbia. It is designed by local architects Keyes Condon Florance on a lawn that was previously used for rock concerts. The pavilion is primarily used as a skating rink, but can accommodate concerts, act as an auditorium, or serve as a basketball or tennis court. The landscape around the pavilion includes four lighted basketball courts, two softball diamonds, two soccer fields, a playground, shuffleboard, and horseshoe pits. Modern landscaping is also added around the pavilion at this time, featuring species such as willow Oaks (<i>Quercus phellos</i>), littleleaf linden (<i>Tilia cordata</i>), and flowering crab (<i>Malus floribunda</i>). The architects' design features "nodes" that include comfort stations and areas of activity. One of these nodes is installed on the north end of Section D and features small picnic pavilions, a playground, and comfort stations.
1974	CE	1976	CE	Built	
1980	CE	1980	CE	Designed	Two baseball and two softball diamonds are planned and built south of the skating rink and court areas in Section E.
1987	CE	1987	CE	Designed	Several plans propose the relocation of the public boat launch facility to other areas of Anacostia Park. However, the plans remain unrealized and the boat ramp remains in Section E.
2010	CE	2010	CE	Built	As part of a project known as the "Anacostia Park Node Rehabilitation," the National Park Service renovates existing playground, restroom, and recreation facilities near the Pennsylvania Avenue Se bridge. NPS officials install new benches, pavement, and a pirate ship playground.

Appendix 2: SOPARC Scorecards

Sunday *Picnic area*
 DATE *08/11/04* PARK NAME *Arrowhead Park* OBSERVER Init. _____ PERIOD: ? 2:00 ? 2:30 ? 3:00 ? 3:30 ? 4:00 ? 4:30 ? 5:00 ? 5:30
 TARGET AREA *Green area* START TIME *2:45*
 Subtarget Area # of Total Subtarget areas _____
 CONDITIONS OF TARGET AREA
 Accessible (e.g., not locked or rented to others) ? Yes ? No
 Usable (e.g., is not excessively wet or windy) ? Yes ? No
 Equipped (e.g., removable balls available) ? Yes ? No
 Supervised (e.g., not locked or rented to others) ? Yes ? No
 Organized (e.g., team sporting event) ? Yes ? No
 Dark (e.g., insufficiently lit) ? Yes ? No
 Empty (i.e., scan area is empty) ? Yes ? No
 Comments: *It looked like all of them were part of the same group.*

This is a reliability check ☐

PEOPLE	ACTIVITY	AGE GROUP			ETHNICITY			ACTIVITY LEVEL					
		Child	Teen	Adult	Senior	B	W	H	O	S	W	V	
Participants	Primary Activity												
Female	<i>Picnicking</i>	4	2	21	3	30							
Male	<i>Picnicking</i>	3	3	19	4	27							
Participants	Secondary Activity												
Female	<i>Running around</i>	15	3	75									✓
Male	<i>Running</i>	10	1	10									✓
Spectators	Organized Activity												
Female													
Male													

Fitness Related Codes:
 aerobics (dance/step aerobics)
 fitness stations
 jogging/running
 strengthening exercises (pull ups)

Sport Related Codes:
 baseball
 basketball
 cheer leading
 dance
 handball
 horseshoes
 soccer
 tennis/racquet

Active Game Related Codes:
 climbing/sliding
 jumping (rope, hop scotch)
 manipulatives/racquet
 tag/chasing games

Sedentary Related Codes:
 chess/checkers/cards
 lying down
 picnic (food involved)
 reading

Sunday
 DATE 08/11/04 PARK NAME Arroyo Viejo OBSERVER Init. _____ PERIOD: ? 2:00 ? 2:30 ? 3:00 ? 3:30 ? 4:00 ? 4:30 ? 5:00 ? 5:30
 TARGET AREA Green space Subtarget Area # of Total Subtarget areas _____ START TIME 3:30

Subtarget Area # of Total Subtarget areas

CONDITIONS OF TARGET AREA

Accessible (e.g., not locked or rented to others) ? Yes ? No
Usable (e.g., is not excessively wet or windy) ? Yes ? No
Equipped (e.g., removable balls available) ? Yes ? No
Supervised (e.g., not locked or rented to others) ? Yes ? No
Organized (e.g., team sporting event) ? Yes ? No

Dark (e.g., insufficiently lit) ? Yes ? No
Empty (i.e., scan area is empty) ? Yes ? No

Comments: *Tennis courts in bad shape*

This is a reliability check ☐

PEOPLE	ACTIVITY	AGE GROUP			ETHNICITY				ACTIVITY LEVEL			
		Child	Teen	Adult	Senior	B	W	H	O	S	W	V
Participants	Primary Activity											
Female	<i>None</i>											
Male	<i>Fishing</i>			4		4				4		
Participants	Secondary Activity											
Female	<i>Tennis</i>			1								1
Male	<i>Tennis</i>			1								1
Spectators	Organized Activity											
Female												
Male												

Fitness Related Codes:
 aerobics (dance/step aerobics) _____
 fitness stations _____
 jogging/running _____
 strengthening exercises (pull ups) _____

Sport Related Codes:
 baseball _____
 basketball _____
 cheer leading _____
 dance _____

Active Game Related Codes:
 climbing/sliding _____
 jumping (rope, hop scotch) _____
 manipulative/racquet _____
 tag/chasing games _____

Sedentary Related Codes:
 chess/checkers/cards _____
 lying down _____
 picnic (food involved) _____
 reading _____

Sunday
 DATE 08/11/24 PARK NAME Amelia Park OBSERVER Init. _____ PERIOD: ? 2:00 ? 2:30 ? 3:00 ? 3:30 ? 4:00 ? 4:30 ? 5:00 ? 5:30
 TARGET AREA Playground START TIME 4:15
 Subtarget Area # of Total Subtarget areas

CONDITIONS OF TARGET AREA
 Target Area # _____
 Accessible (e.g., not locked or rented to others) ? Yes ? No
 Usable (e.g., is not excessively wet or windy) ? Yes ? No
 Equipped (e.g., removable balls available) ? Yes ? No
 Supervised (e.g., not locked or rented to others) ? Yes ? No
 Organized (e.g., team sporting event) ? Yes ? No
 1 male black adult using work out equipment
 1 male white adult using work out equipment
 1 male black adult using work out equipment
 1 male white adult using work out equipment

PEOPLE	ACTIVITY	AGE GROUP	ETHNICITY	ACTIVITY LEVEL
Participants	Primary Activity	Child	Senior	
Female	active play	3		3
Male	active play	2	1	2
Participants	Secondary Activity			
Female	active play	7		7
Male	active play	3	3	3
Spectators	Organized Activity			
Female	Supervising			
Male	Supervising			

Fitness Related Codes:
 aerobics (dance/step aerobics) chess/checkers/cards
 fitness stations jumping (rope, hop scotch)
 jogging/running manipulative/racquet
 strengthening exercises (pull ups) tag/chasing games

Sport Related Codes:
 baseball handball
 basketball horseshoes
 cheer leading soccer
 dance tennis/racquet

Active Game Related Codes:
 climbing/sliding
 jumping (rope, hop scotch)
 manipulative/racquet
 tag/chasing games

Sedentary Related Codes:
 chess/checkers/cards
 lying down
 picnic (food involved)
 reading

This is a reliability check ☐

1 adult black woman with dog
 1 adult white male walking dog.

S - sedentary
 W - walking
 V - vigorous

DATE 08/11/24 PARK NAME Riverside Park OBSERVER Init. CR PERIOD: ? 2:00 ? 2:30 ? 3:00 ? 3:30 ? 4:00 ? 4:30 ? 5:00 ? 5:30
 TARGET AREA Riverside Runway START TIME 5:00 PM

Subtarget Area # of Total Subtarget areas

CONDITIONS OF TARGET AREA

Accessible (e.g., not locked or rented to others) ? Yes ? No
Usable (e.g., is not excessively wet or windy) ? Yes ? No
Equipped (e.g., removable balls available) ? Yes ? No
Supervised (e.g., not locked or rented to others) ? Yes ? No
Organized (e.g., team sporting event) ? Yes ? No

Dark (e.g., insufficiently lit) ? Yes ? No
Empty (i.e., scan area is empty) ? Yes ? No

Comments: the area is permanently equipped w/ paved sidewalk and other equipment available is owned by users: chairs, fishing

This is a reliability check

PEOPLE	ACTIVITY	AGE GROUP				ETHNICITY				ACTIVITY LEVEL			
		Child	Teen	Adult	Senior	B	W	H	O	S	W	V	
Participants	Primary Activity												
Female	hanging out			1				1		1			
Male	"	1	1	4		2		4		6			
Participants	Secondary Activity												
Female	running					1	1					2	
Male	running			1		1						1	
Spectators	Organized Activity												
Female													
Male													

Fitness Related Codes:
 aerobics (dance/step aerobics) baseball basketball cheer leading dance
 fitness stations jogging/running strengthening exercises (pull ups)

Sport Related Codes:
 baseball basketball cheer leading dance

Active Game Related Codes:
 climbing/sliding jumping (rope, hop scotch) manipulative/racquet tag/chasing games

Sedentary Related Codes:
 chess/checkers/cards lying down picnic (food involved) reading

Riverside comments: people hanging out and fishing are in the grass, there are no other...

Sunday
DATE 08/11/04
PARK NAME Anacostia
TARGET AREA Downside
OBSERVER Init. KP
PERIOD: ? 2:00 ? 2:30 ? 3:00 ? 3:30 ? 4:00 ? 4:30 ? 5:00 ? 5:30
START TIME 5:45 pm

Subtarget Area # of Total Subtarget areas

CONDITIONS OF TARGET AREA

Accessible (e.g., not locked or rented to others)
Usable (e.g., is not excessively wet or windy)
Equipped (e.g., removable balls available)
Supervised (e.g., not locked or rented to others)
Organized (e.g., team sporting event)

? Yes ? No
? Yes ? No
? Yes ? No
? Yes ? No
? Yes ? No

Dark (e.g., insufficiently lit) ? Yes ? No
Empty (i.e., scan area is empty) ? Yes ? No

Comments: Bike line, No side walk

This is a reliability check ☐

PEOPLE	ACTIVITY	AGE GROUP			ETHNICITY				ACTIVITY LEVEL			
		Child	Teen	Adult	Senior	B	W	H	O	S	W	V
Participants	Primary Activity											
Female	Cycling			1								1
Male	Cycling		1	7		3	5					8
Participants	Secondary Activity											
Female	Walking			4		2	2				4	
Male	Walking			4		1	3				4	
Spectators	Organized Activity											
Female												
Male												

Fitness Related Codes:

aerobics (dance/step aerobics)

fitness stations

jogging/running

strengthening exercises (pull ups)

Sport Related Codes:

baseball

basketball

cheer leading

dance

Active Game Related Codes:

climbing/sliding

jumping (rope, hop scotch)

manipulatives/racquet

tag/chasing games

Sedentary Related Codes:

chess/checkers/cards

lying down

picnic (food involved)

reading

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