



# Waterfront Implementation Project

## Waterfront Commission — Project Update

February 15, 2022

Terry Suehr, PE, DBIA, PMP

Department of Project Implementation, Director

Matthew Landes, PLA, CCM, ISA

Department of Project Implementation, Division Chief / Waterfront Program Manager

# Meeting Objectives

- ✓ Baseline Project – Goals of Waterfront Plan
  - ✓ Area of focus and Scope of discussion
  - ✓ Review baseline project priorities
  - ✓ Baseline Project Cost vs Current CIP Funding
- ✓ Share alternative under consideration
  - ✓ Based on current best practices in Resiliency Planning and Low Impact Development
  - ✓ Scoped to project budget
- ✓ **Highlight the input needed from Flood Mitigation Committee & Waterfront Commission**
  - ✓ Preferred prioritization of investment in project areas and project elements
- ✓ Next steps and anticipated timeline

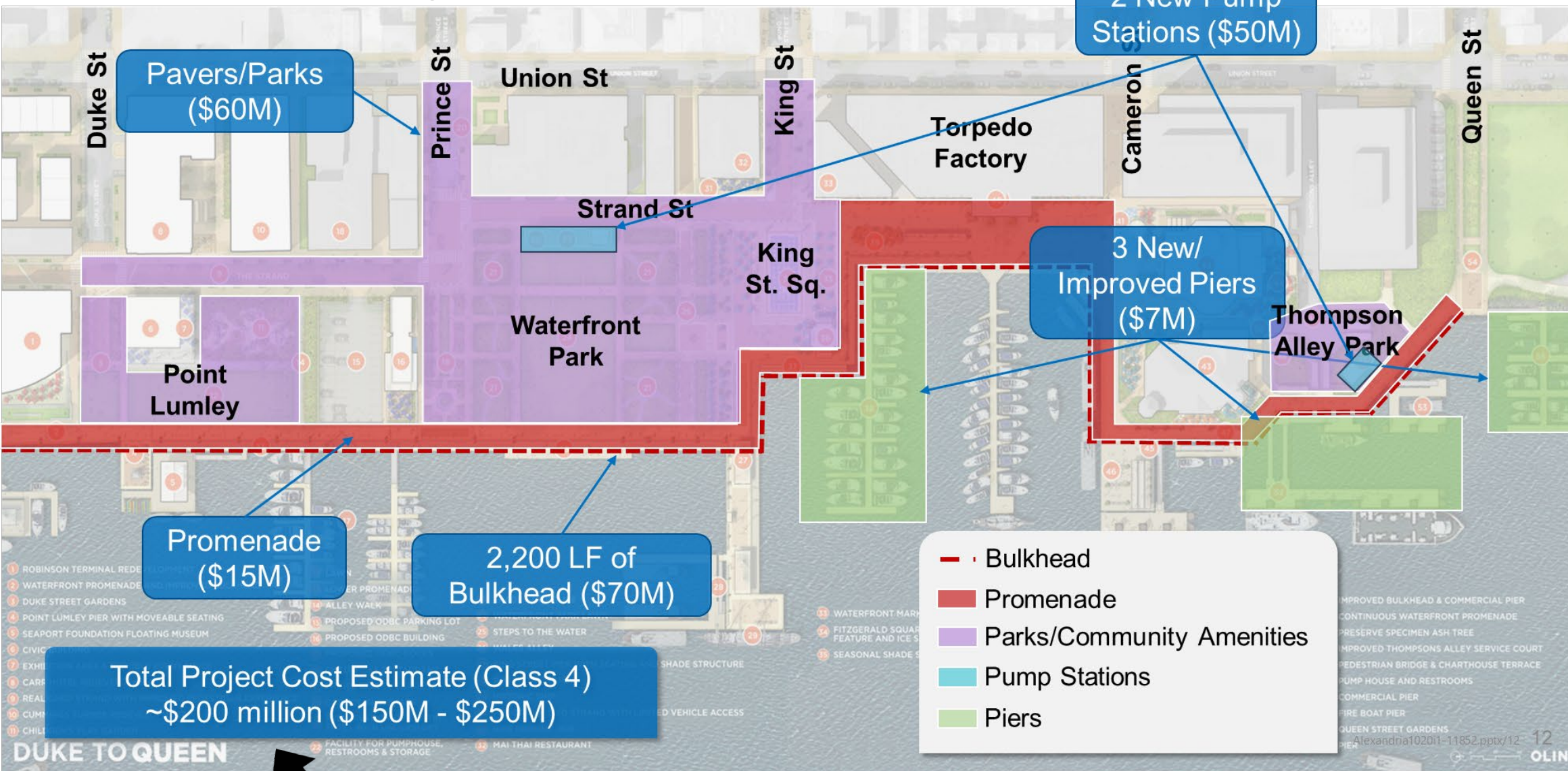
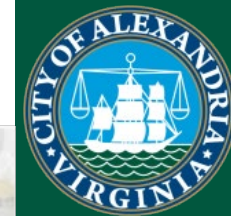


# Schematic Design Endorsed by Waterfront Commission & Council is discussed as the original “Baseline Project”





# // Baseline Project



Current Funding in CIP  
**\$102M**



## Limitations of the Baseline Project

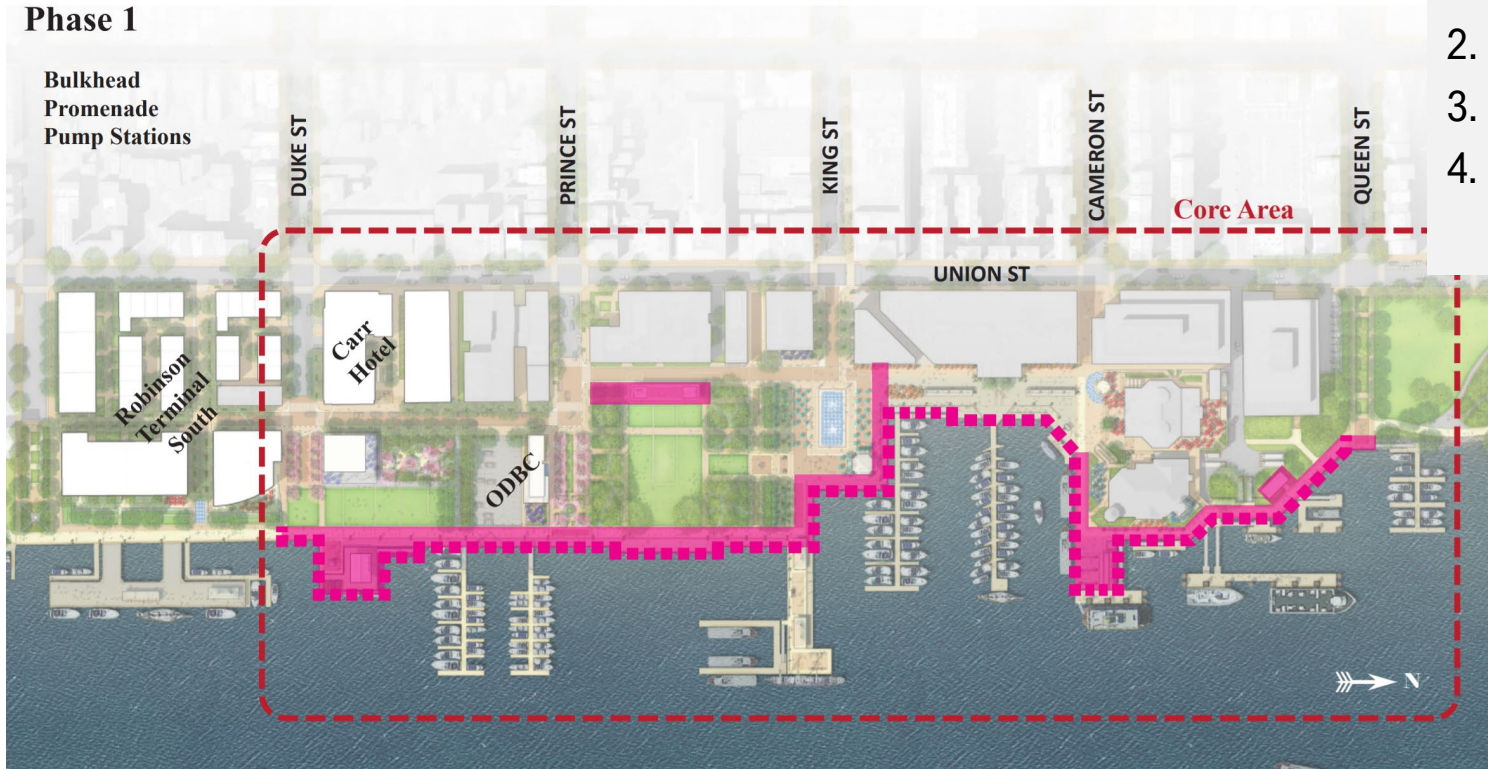
- Concepts developed a decade ago and rely 100% on “grey” infrastructure
- Best practices in resiliency have changed
  - View water as an asset rather than a liability
  - Concentrate on recovering quickly from (rather than completely preventing) extreme conditions/events
- Climate change impacts better defined
  - Storm intensity, frequency, and precipitation volume are increasing.
  - Models predict 1-2 feet of sea level rise in the Chesapeake Bay by 2050.<sup>1</sup>
- **Approach is costly and exceeds current City funding**



<sup>1</sup> Chesapeake Stormwater Network, *Review of Recent Research on Climate Projections for the Chesapeake Bay Watershed*, October 20, 2020.

# Phasing Plan and Budget adopted by Council (2015)

## Phase 1



### Reflects community priorities:

1. Flood mitigation
2. Riverfront promenade
3. Plaza at the foot of King Street
4. Park improvements

## Option A

### Flood Mitigation & Promenade Priority



# Flood Mitigation – Opportunity to consider

- Changing realities of storm intensity and frequency
- Dynamic regulatory environment
  - Approach to permitting
  - Approach to mitigation and related cost-escalation
- Many communities re-evaluating their approach to shoreline management and flood mitigation
- Consider philosophy of flood resilience
- **Cost reduction strategies**
- **Scoping to budget-**
  - **Requesting feedback on prioritization of project areas and project elements**



# Alternatives Development



# Goals and Objectives

- Mitigate stormwater flooding:
  - New civil infrastructure (inlets, pipes, storage, pumps, etc.):
    - Size based on a conservative baseline storm
    - Reasonably account for climate change projections through 2100
    - Eliminate capacity issues
- Eliminate backflow of Potomac River into streets
- Address most frequent overtopping of bulkhead/shoreline
- Policy and Regulatory Compliance
- Deliver on goals of Waterfront Small Area Plan
- Replace aging/failed bulkhead/shoreline (where feasible and affordable)

# Recommended approach for optimizing the Baseline Project included three parallel tracks.

## PROJECT PHASING



**Could the Baseline Project be implemented over a longer time-period, and restrict the first phase to <\$102M?**

## VALUE ENGINEERING



**How might we value engineer the “big ticket” items (bulkhead, pump stations, and parks)?**

## ALTERNATIVE/ GREEN SOLUTIONS



**How might green infrastructure offset the need for a new bulkhead and pump stations?**



# Flood Characterization along the Waterfront

## OVERTOPPING

of Bulkhead



**Address through:**

**Repair and raising of bulkhead or other physical flood barrier(s).**

## BACKFLOW

of River Outfalls



**Address through:**

**Backflow prevention on underground storm sewer system.**

## INUNDATION

of Storm Sewers



**Address through:**

**Larger storm sewer pipes, underground storage, and pumping.**

# Flood Resilience

- New way of thinking about flood disaster mitigation.
- Embracing the philosophy that we should learn to live with floods and to manage flood risk and not seek to avoid it.
- Resilient flood risk strategies aim at reducing flood risk through:
  - Protection
  - Prevention
  - Preparedness / Quick Recovery

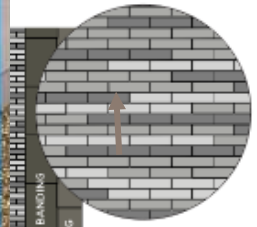


# Flood Barriers

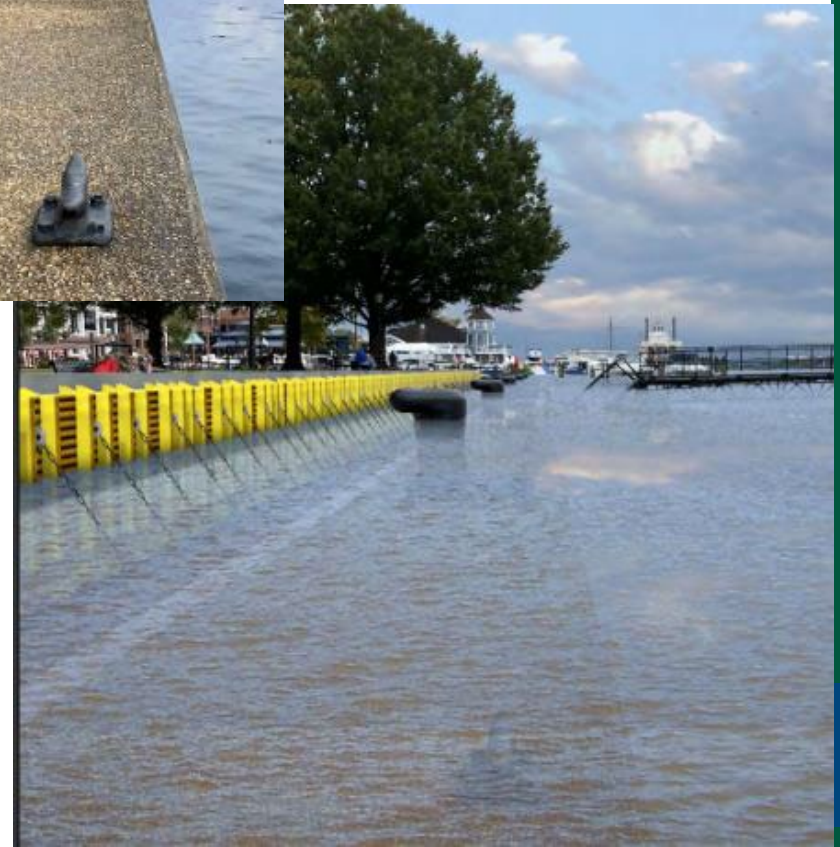


Landscape-Based Flood Protection:

- integrated into landscape as public amenity

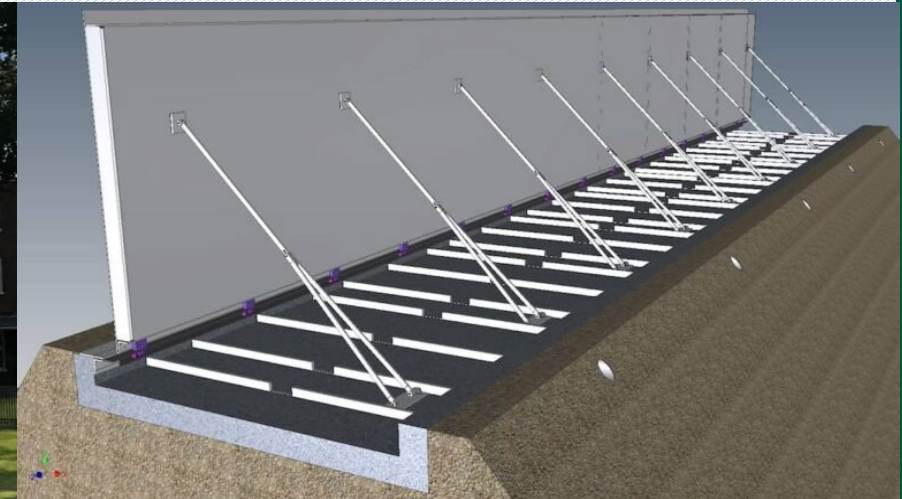
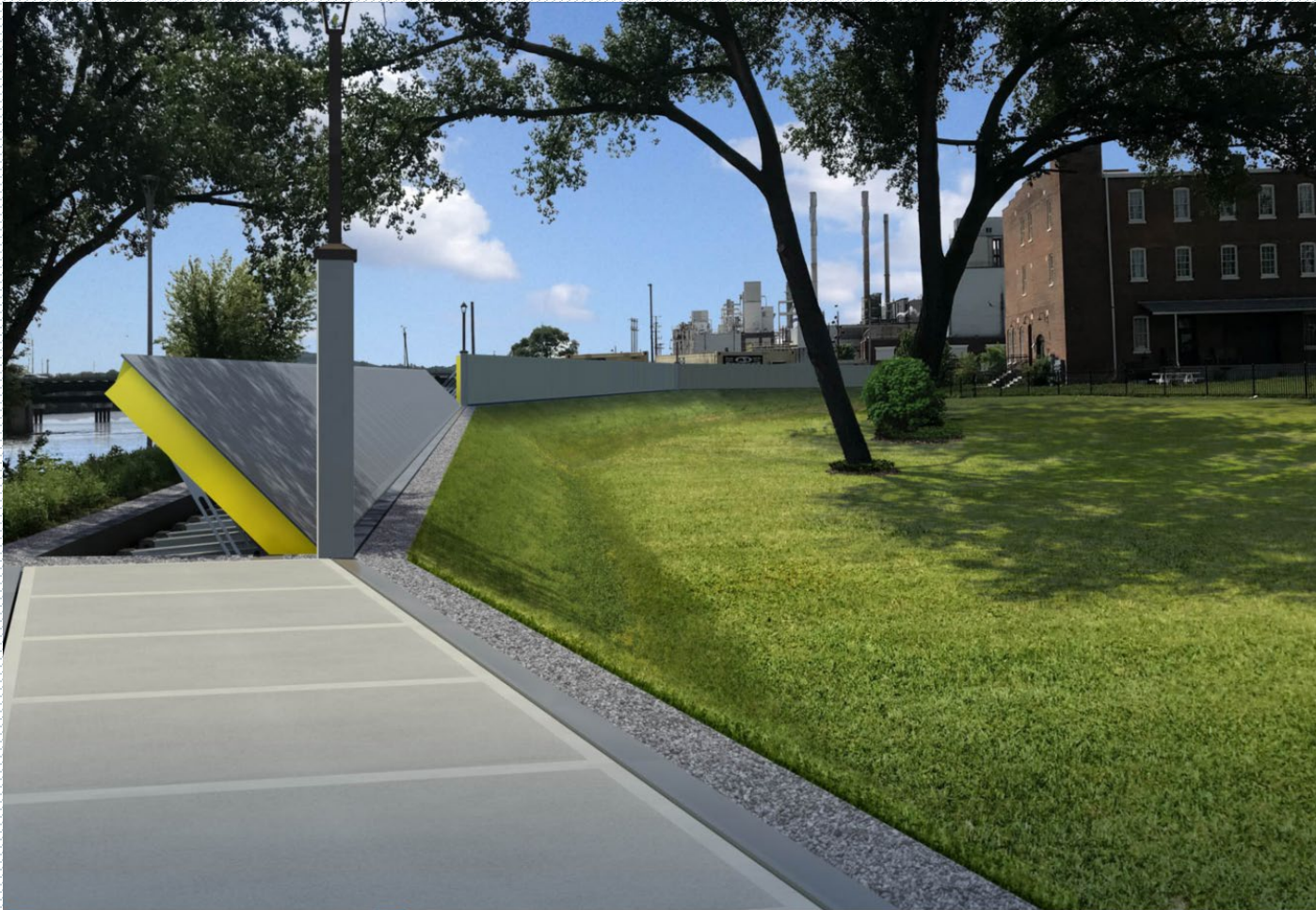


- Hinged barriers
- Self-deploying Barrier
- Embed in promenade





# Flood Gates



To install product along the entire bulkhead, material cost is \$5M with a 3.5-ft self-deploying wall.



# Flood Barriers – Building Floodproofing



## Concealed Deployable Options



Deployed condition

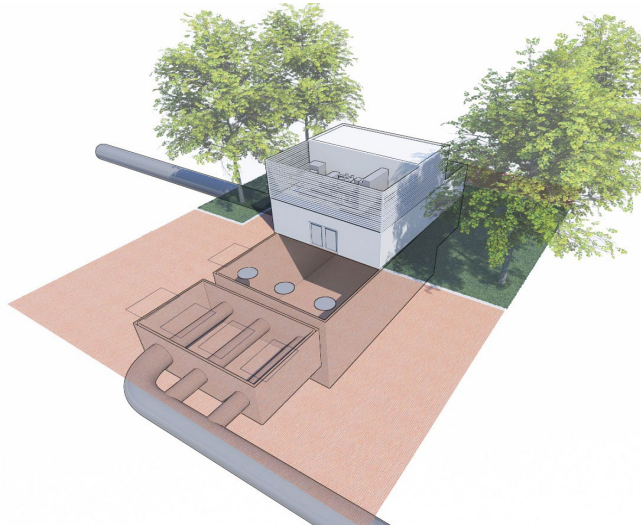
# Current Project Alternatives



# // Project Elements to address:

**BACKFLOW**  
of River Outfalls

**INUNDATION**  
of Storm Sewers



## 2x PUMP STATIONS

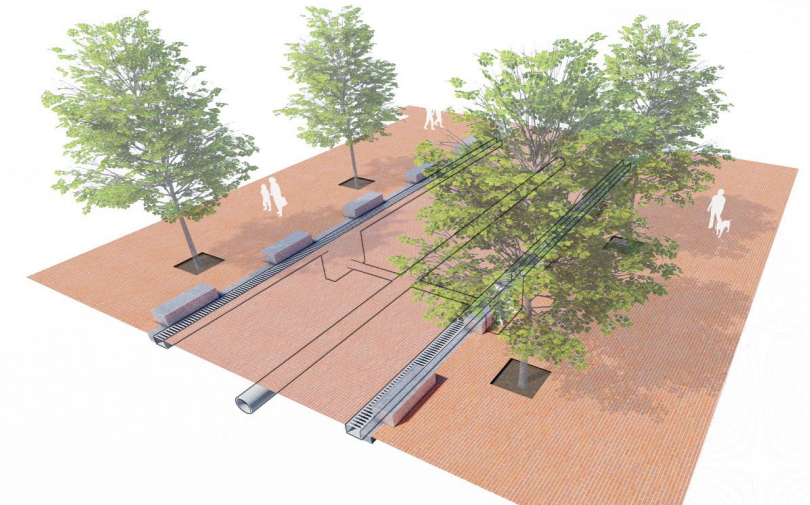
- Utilitarian structure housing stormwater pumps and associated mechanical and electrical equipment
- No city storage or amenity space
- Thompsons Alley PS capacity reduced by 95%



## UNDERGROUND DETENTION

Stormwater storage chambers sited under existing park spaces

Receiving community opposition



## STREETSCAPE AND STORMWATER INFRASTRUCTURE IMPROVEMENTS

- New and upsized stormwater inlets and conveyance pipes
- Common elements paving for streets and promenade de-prioritized by community



# // Project Elements to address: **OVERTOPPING** of Bulkhead



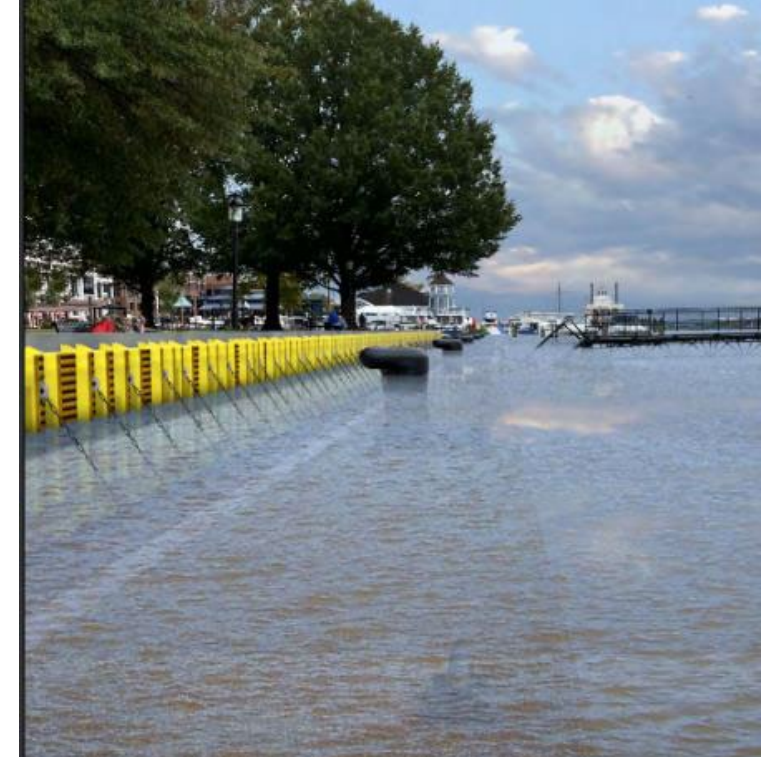
## LANDSCAPE-BASED FLOOD PROTECTION

- Stabilized bulkhead
- Landscape seat walls as flood barriers
- Alternative paving and finish materials likely required based on escalating costs



## DEPLOYABLE BARRIERS CAN BE ADDED IN FUTURE, AS FUNDING IS AVAILABLE

- Hidden when not needed
- Maintains experience and connection to water
- Prevents visual disruption when not needed





# // Phase 1 – Scope to \$100M Budget

## Hybrid Bulkhead & Landscape Based Flood Protection

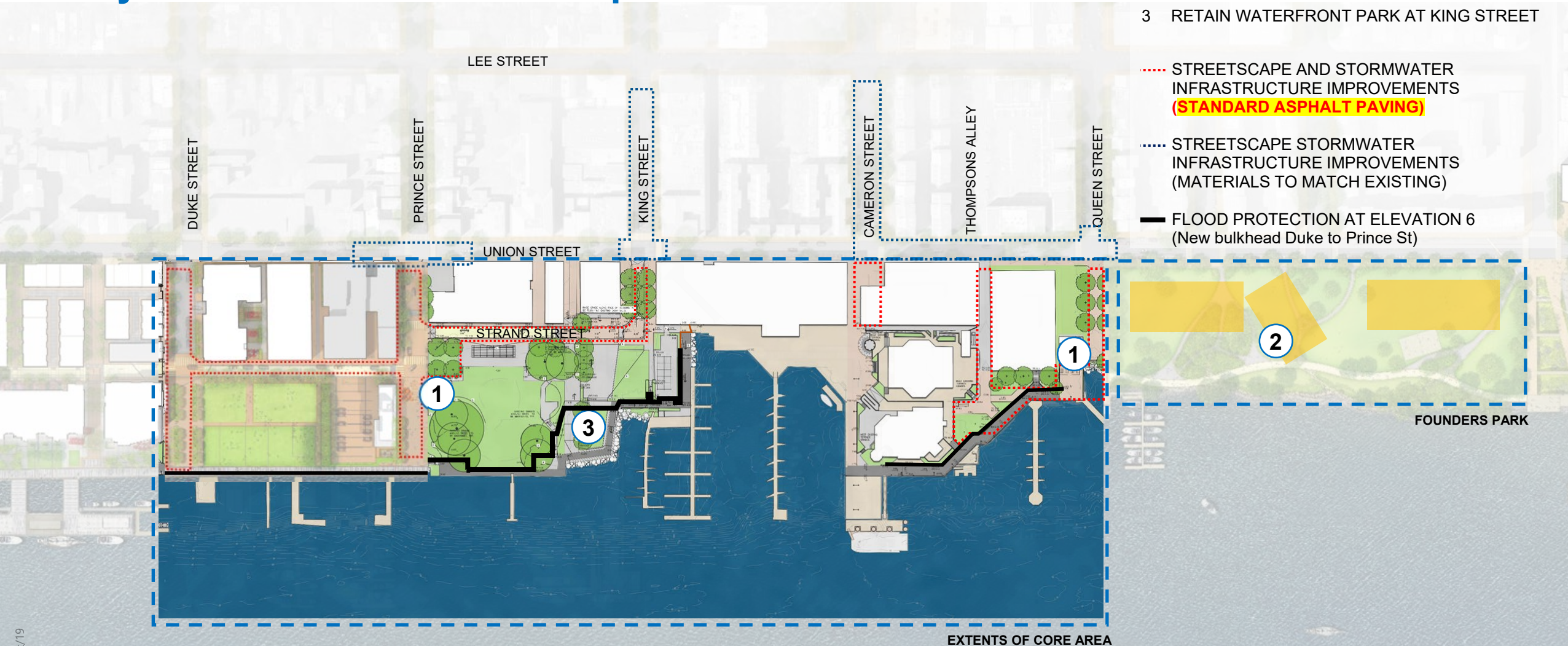
### LEGEND

- 1 PUMP STATION
- 2 UNDERGROUND STORMWATER DETENTION CHAMBERS
- 3 RETAIN WATERFRONT PARK AT KING STREET

..... STREETScape AND STORMWATER INFRASTRUCTURE IMPROVEMENTS  
(**STANDARD ASPHALT PAVING**)

..... STREETScape STORMWATER INFRASTRUCTURE IMPROVEMENTS  
(MATERIALS TO MATCH EXISTING)

— FLOOD PROTECTION AT ELEVATION 6  
(New bulkhead Duke to Prince St)



# Phase 1 – Cost Breakdown of included elements:

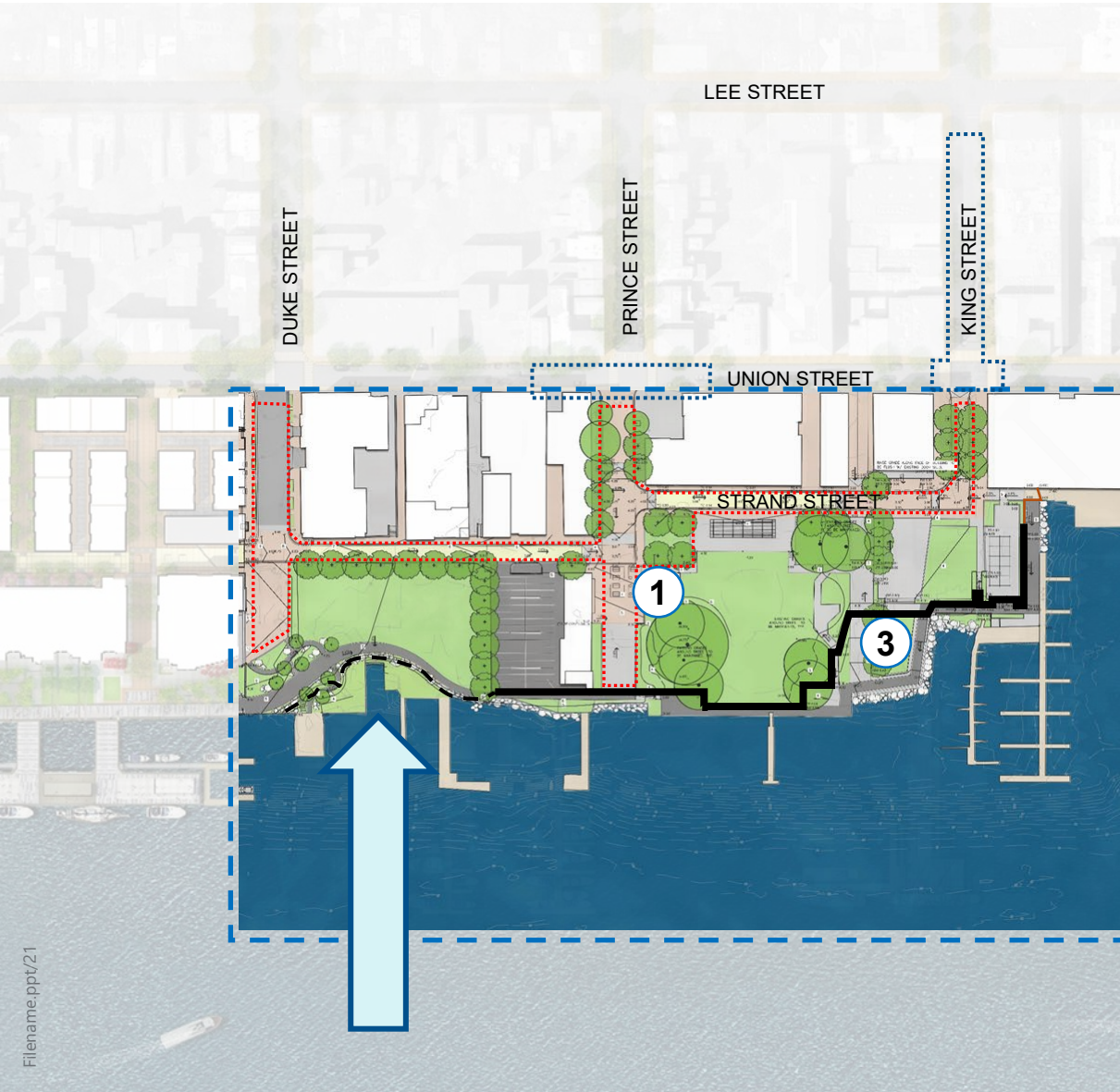
Community Priorities	Estimated Total Cost	Project Elements
Flood Mitigation <ul style="list-style-type: none"> <li>Storm Sewer Upgrades</li> <li>Pump Stations</li> <li>Riverine Protection</li> </ul>	\$20M <b>\$55M</b> \$18M	<ul style="list-style-type: none"> <li>Interim tide gate at King and Prince Street</li> <li>New and upsized inlets and stormwater piping</li> <li>Two stormwater pumping stations</li> <li><b>Underground stormwater detention chambers</b></li> <li>New bulkhead from Duke to Prince; ha-ha wall in Waterfront Park + King St Square and Cameron to Queen St; no upgrades to Torpedo Factory</li> </ul>
Riverfront Promenade	\$2M	<ul style="list-style-type: none"> <li>10-20ft wide <b>promenade from Duke to Queen St with a lower-cost finished material (asphalt, or crushed stone)</b></li> </ul>
Plaza at the foot of King Street	\$2M	<ul style="list-style-type: none"> <li>Material upgrades to make permanent park</li> <li>Actual improvements worth ~\$600K</li> </ul>
Park Improvements	<\$1M \$2M	<ul style="list-style-type: none"> <li>Restore all streets with asphalt pavement</li> <li>Waterfront Park and Founders Park restoration</li> </ul>
<b>Total Estimated Project Cost</b>	<b>\$100M</b>	<b>AACE Cost 4 - Low: \$80M - High: \$120M</b>

## Notes:

1. Subsurface conditions under parks are unknown and ongoing field investigations will inform the Class 3 Cost Estimate at the next iteration.
2. Evaluation, review, and cost estimating for the riverine protection option is contingent upon ongoing field investigations.



# // Phase 1 – Point Lumley Shoreline Alternate Hybrid Shoreline & Landscape Based Flood Protection

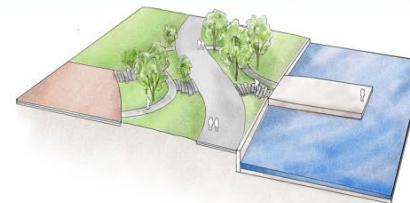
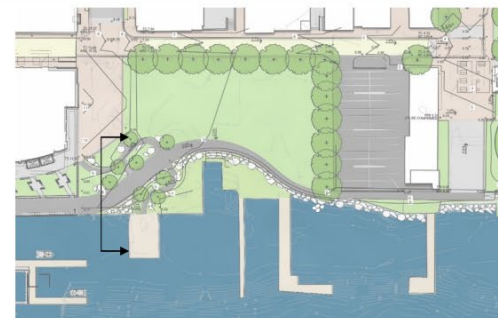


## LEGEND

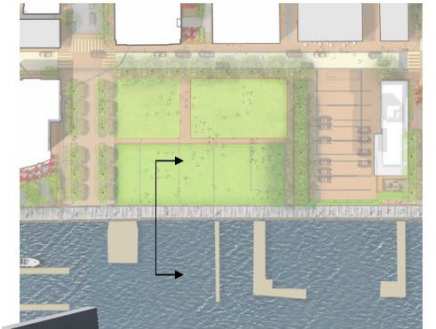
- 1 PUMP STATION
- 2 UNDERGROUND STORMWATER DETENTION CHAMBERS
- 3 RETAIN WATERFRONT PARK AT KING STREET
- ..... STREETScape AND STORMWATER INFRASTRUCTURE IMPROVEMENTS (STANDARD ASPHALT PAVING)
- ..... STREETScape STORMWATER INFRASTRUCTURE IMPROVEMENTS (MATERIALS TO MATCH EXISTING)
- FLOOD PROTECTION AT ELEVATION 6 (Stabilized Shoreline-no bulkhead Duke to Prince St)

## Duke to Prince Strategies – Point Lumley

### LANDSCAPE \$7M



### BULKHEAD \$28M



**Included but not shown:**

- Hardscape + landscape allowances
- Baseline Plan furnishings

# Resiliency and Green Building Approach

- **Hybrid/resiliency elements are critical elements for grant competitiveness**
- Consider water management differently: **prioritize delay and store strategies.**
- **Provide water quality benefits and compliance with local policy on site**
- City recommends evaluation of cost-benefit and alternatives with Design-Build team
- **Less reliance on pumping** at peak of storm
- Pumping at lower rate for a longer duration **reduces peak energy demand**
- Stormwater chambers are **more sustainable and resilient measures for reducing risk and increasing reliability**

**Based on some concerns shared by community about impacts to the parks – Design team will continue to evaluate underground storage and other alternative approaches to meeting intent and requirements of the Green Building Policy and goals for resiliency.**

# Funding Opportunities



# Funding Update

- **\$102M in CIP (City Funding)**
  - For design and construction
  - No additional funding anticipated within 10-year CIP
- **Virginia Community Flood Preparedness Fund (DCR Grant)**
  - \$3.24 million awarded December 27, 2021!
- **BRIC Grant (FEMA)**
  - Grant application submitted for \$50 Million
  - Award notification is expected July 2022
- **USACE Coastal Storm Risk Management Feasibility Study**
  - Potential for 65% Federal – 35% Local funding cost share –
  - May demonstrate eligibility for other small USACE funding opportunities - TBD
- **Rosenbaum Family Bequest**
  - To cover unfunded improvements to Point Lumley
  - Anticipated to be a subsequent phase of design and construction

# Project Element Prioritization



# Scoping to Budget

<b>ITEMS ESTIMATED TO BE WITHIN BUDGET:</b>	<b>\$</b>		<b>ITEMS ESTIMATED TO BE WITHIN BUDGET:</b>	<b>\$</b>
UTILITIES - PUMP STATION #1	\$\$\$\$\$		UTILITIES - PUMP STATION #1	\$\$\$\$
UTILITIES - PUMP STATION #2	\$\$\$\$\$		UTILITIES - PUMP STATION #2	\$\$\$\$
UTILITIES - STORM SEWER	\$\$\$\$		UTILITIES - STORM SEWER	\$\$\$
UTILITIES - DRY	\$\$\$		UTILITIES - DRY	\$\$\$
UTILITIES - WET	\$\$		UTILITIES - WET	\$\$
RESTORATION OF PARKS	\$\$\$		RESTORATION OF PARKS	\$\$\$
RESTORATION OF ROW	\$\$		RESTORATION OF ROW	\$\$
			STRUCTURAL BULKHEAD	\$\$\$
			PROMENADE	\$\$
			KING STREET SQUARE IMPROVEMENTS	\$\$\$
TOTAL DIRECT COSTS	\$\$\$\$\$\$\$			
<b>PRIORITIZED ITEMS NOT CURRENTLY WITHIN BUDGET:</b>	<b>\$</b>			
STRUCTURAL BULKHEAD	\$\$\$\$\$		TOTAL DIRECT COSTS	\$\$\$\$\$\$\$
PROMENADE	\$\$\$			
KING STREET SQUARE IMPROVEMENTS	\$\$\$		<b>PRIORITIZED ITEMS NOT CURRENTLY WITHIN BUDGET:</b>	<b>\$</b>
WATERFRONT PARK IMPROVEMENTS	\$\$		WATERFRONT PARK IMPROVEMENTS	\$\$
MARINA IMPROVEMENTS	\$\$\$		MARINA IMPROVEMENTS	\$\$\$
POINT LUMLEY IMPROVEMENTS	\$\$		POINT LUMLEY IMPROVEMENTS	\$\$
KING STREET PIER	\$\$\$		KING STREET PIER	\$\$\$
ADDITIONAL PIERS	\$\$\$		ADDITIONAL PIERS	\$\$\$
TOTAL ADDITIONAL COST	\$\$\$\$\$\$\$		TOTAL ADDITIONAL COST	\$\$\$\$\$\$\$

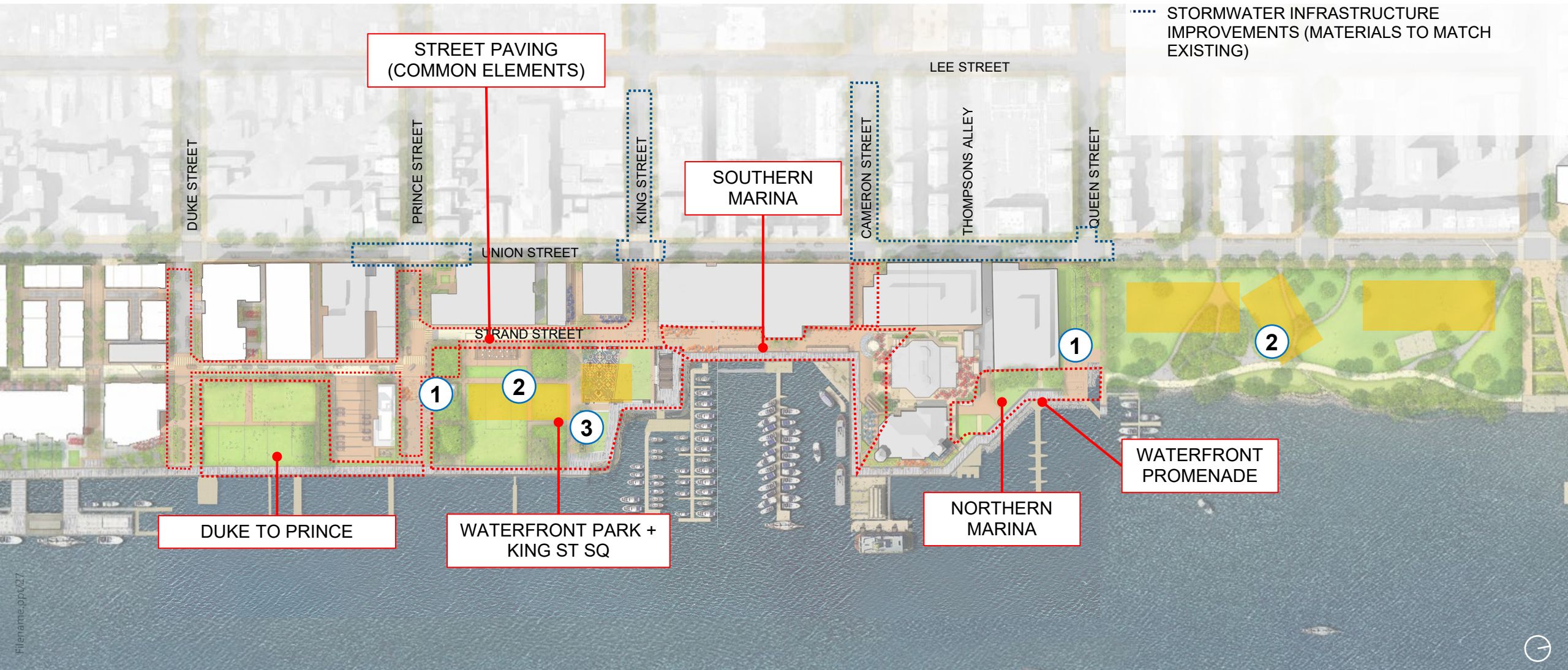
If additional CIP/external funding becomes available or if through Design-Builder innovation, value engineering, cost reduction more scope could be delivered (or cost savings could be realized by taxpayers)

# // Project areas for Prioritization

## LEGEND

- 1 PUMP STATION
- 2 UNDERGROUND STORMWATER DETENTION CHAMBERS
- 3 RETAIN WATERFRONT PARK AT KING STREET

..... STORMWATER INFRASTRUCTURE IMPROVEMENTS (MATERIALS TO MATCH EXISTING)





# // Phase 1

## Hybrid Bulkhead & Landscape Based Flood Protection

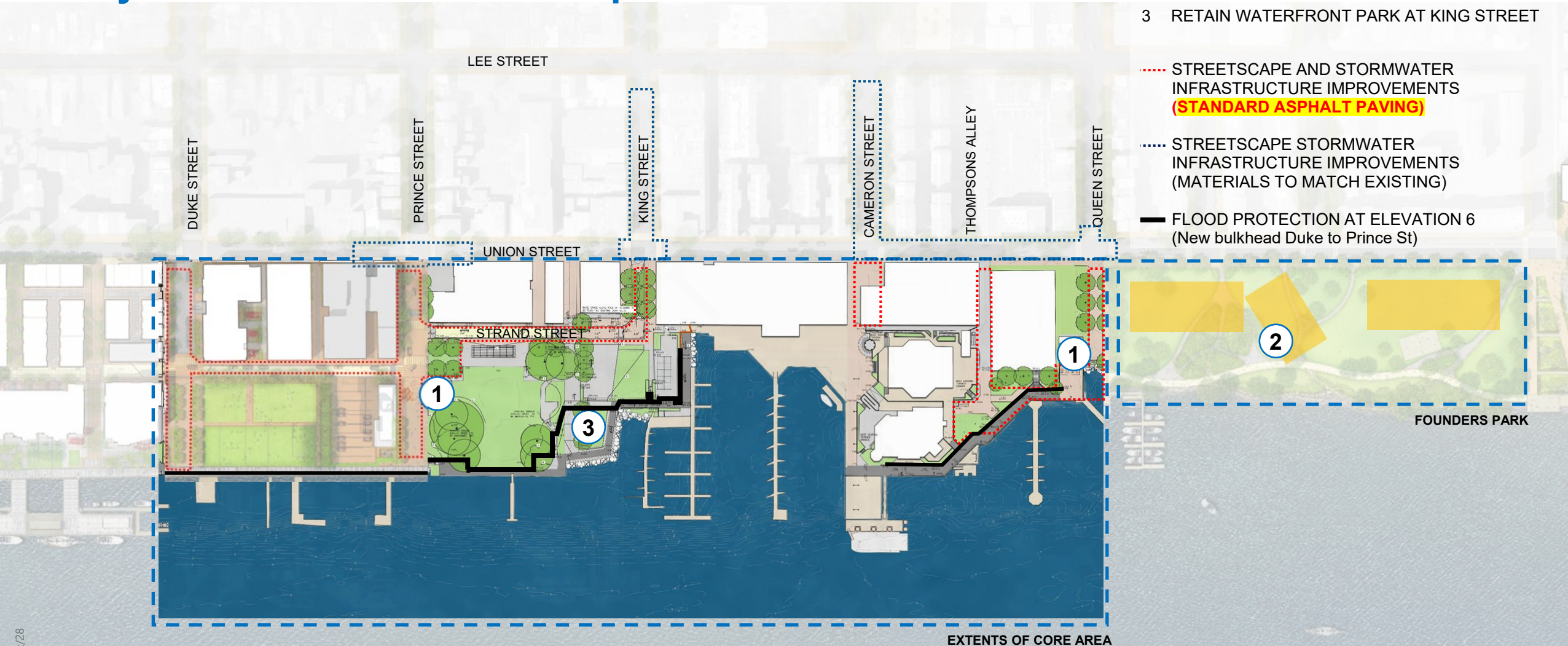
### LEGEND

- 1 PUMP STATION
- 2 UNDERGROUND STORMWATER DETENTION CHAMBERS
- 3 RETAIN WATERFRONT PARK AT KING STREET

..... STREETScape AND STORMWATER INFRASTRUCTURE IMPROVEMENTS  
(**STANDARD ASPHALT PAVING**)

..... STREETScape STORMWATER INFRASTRUCTURE IMPROVEMENTS  
(MATERIALS TO MATCH EXISTING)

— FLOOD PROTECTION AT ELEVATION 6  
(New bulkhead Duke to Prince St)



# Requested Committee input on prioritization of project elements (if or when additional funding becomes available – no guarantee of additional funds)

Priority	Area	Elements	Total Estimated Cost
	King St Sq + Waterfront Park	<ul style="list-style-type: none"> <li>• <b>Restore</b> King St Sq and Waterfront Park</li> <li>• Promenade (alt. material)</li> <li>• Ha-Ha Wall + SS</li> </ul>	\$6M
		<ul style="list-style-type: none"> <li>• <b>Improve</b> King St Sq</li> <li>• <b>Improve</b> Waterfront Park</li> <li>• Promenade</li> <li>• Ha-Ha Wall + SS</li> </ul>	\$17M
	Duke to Prince St	<ul style="list-style-type: none"> <li>• Improve Point Lumley</li> <li>• Promenade (<b>adjusted/inland, alt. material</b>)</li> <li>• <b>Ha-Ha Wall + SS</b></li> </ul>	\$7M
		<ul style="list-style-type: none"> <li>• Improve Point Lumley</li> <li>• Promenade (<b>alignment per Baseline</b>)</li> <li>• <b>New Bulkhead</b></li> </ul>	\$28M
	Northern Marina	<ul style="list-style-type: none"> <li>• Promenade</li> <li>• Ha- Ha Wall (no new bulkhead)</li> <li>• Thompsons Alley Park</li> </ul>	\$5M
	Southern Marina (Torpedo Factory Frontage)	<ul style="list-style-type: none"> <li>• Improve Torpedo Factory</li> <li>• Promenade</li> <li>• New Bulkhead</li> </ul>	\$20M
	Strand St + Street Ends	<ul style="list-style-type: none"> <li>• Street Pavers per Common Elements</li> </ul>	\$18M
	Waterfront	Promenade Paving per Common Elements <ul style="list-style-type: none"> <li>- King Street Sq + Waterfront Park</li> <li>- Duke to Prince St</li> <li>- Northern Marina</li> <li>- Southern Marina</li> </ul>	\$4M \$3M \$3M \$3M

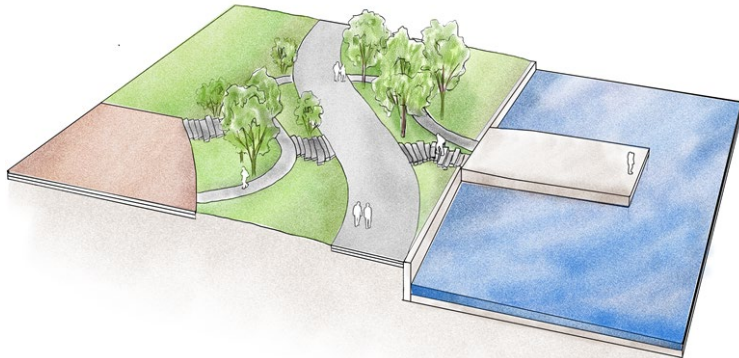
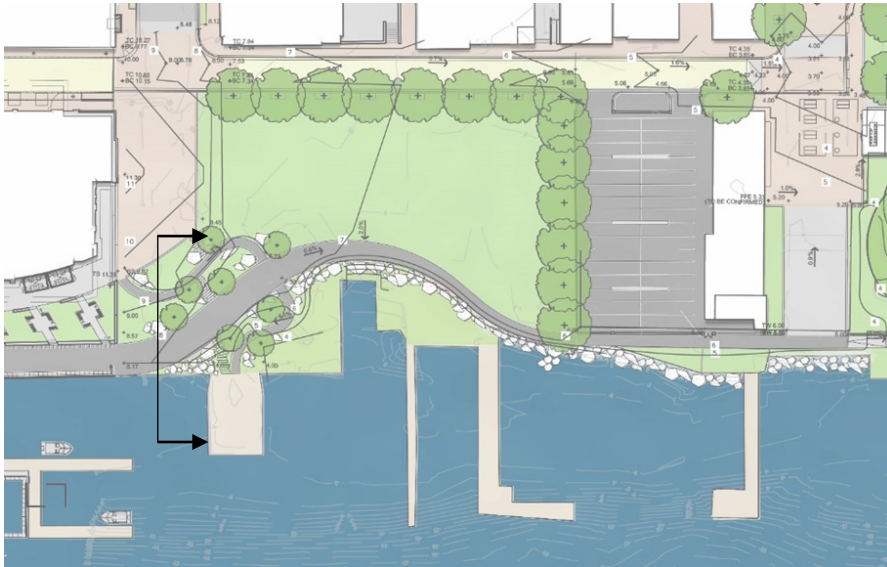
## Notes:

1. Evaluation, review, and cost estimating for two riverine protection options are contingent upon ongoing field investigations.
2. King St Square Improvements are per the Baseline Project except for a splash pad.
3. All costs assume that existing King St Sq shoreline is maintained and stabilized.

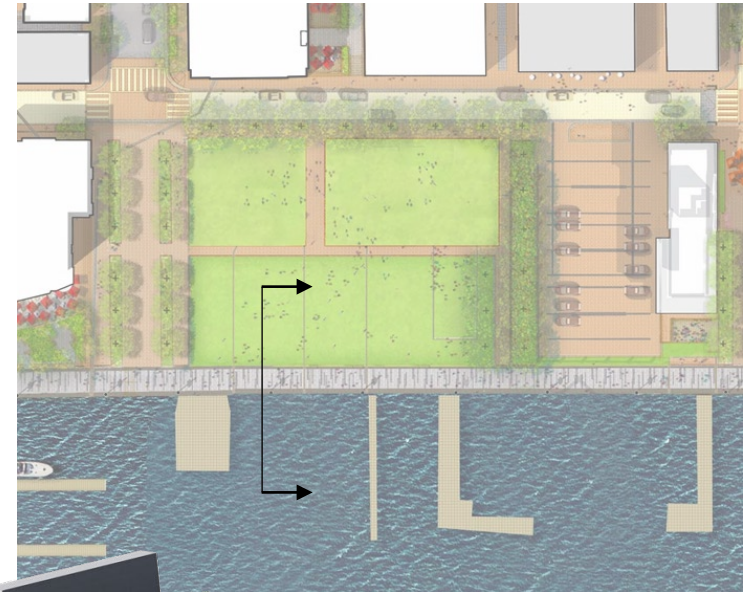


# Duke to Prince Strategies – Point Lumley

## LANDSCAPE \$7M



## BULKHEAD \$28M

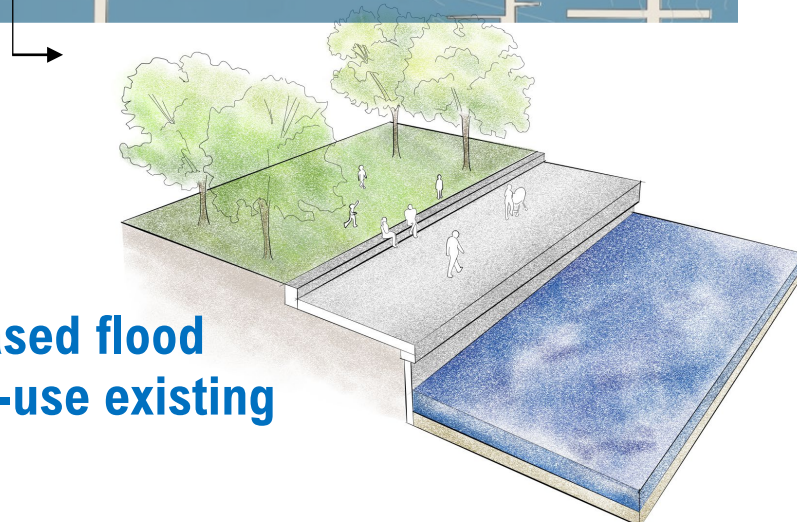
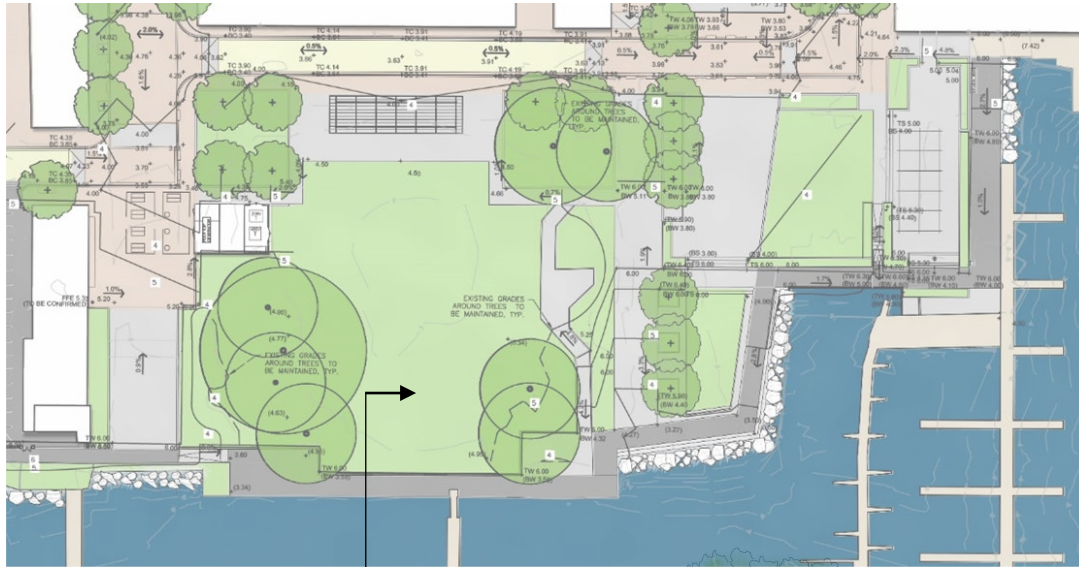


- Included but not shown:**
- Hardscape + landscape allowances
  - Baseline Plan furnishings



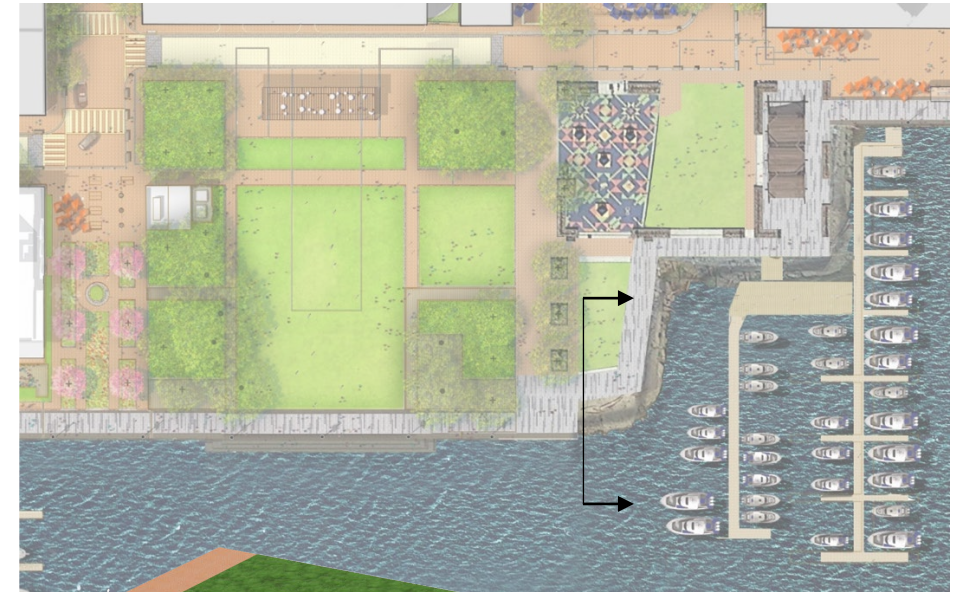
# Prince to King - Waterfront Park & King St Square Strategies

**RESTORE**  
**\$6M**



**Landscape-based flood protection (re-use existing bulkhead)**

**IMPROVE**  
**\$17M**



**Included but not shown:**

- Hardscape + landscape allowances
- Baseline Plan furnishings

RIP RAP STABILIZATION OF PROMENADE EDGE



# Next Steps

- **Field investigations**
  - Survey work completed
  - Geotechnical testing and structural analysis
  - Environmental Site Assess. Ph2 – Field work complete – labs due by March 2022
  - Will inform Refinement of costs, Risk assessments, Contractual requirements, Site and Cost constraints, Prioritization of project elements
- **Focus on Project Prioritization**
  - Community feedback
  - Field investigation data reports and engineering design recommendations
- **External funding opportunities**
  - FEMA – VDEM Building Resilient Infrastructure and Communities (BRIC) Program – Submitted on November 10<sup>th</sup>
  - DCR - Virginia Community Flood Preparedness Fund – Submitted on November 5<sup>th</sup>
- **Next Sub-Committee Meeting – TBD**
- **Council Engagement – February 2022 – May 2022 (budget development / adoption)**
- **Commence development of procurement document package**
- **Advertise Design Build Contract in late Summer 2022**
- **Award contract and start design in late 2023**
- **Design complete late 2024 (could be impacted by regulatory and grantor reviews)**
- **Construction late 2024/early 2025 – likely after City's annual birthday celebration**

# Flood Mitigation Committee: Next Steps

## Waterfront Flood Mitigation Project – Comprehensive Project Update Narrative – February 2022

### Introduction:

Since 2012, the City has continued planning for the funding and implementation of the adopted Waterfront Small Area Plan to deliver on the [Waterfront Plan Goals](#) (link). This project update narrative provides a summary of the continued planning which has occurred since 2015 when City Council provided direction on a phasing and funding plan which set the prioritization for implementing various elements of the project in a phased approach. The document provides a summary of the opportunities and constraints facing the project, summarizes various alternatives developed in light of these opportunities and constraints, and provides an update on the recommended cost-based alternative which is anticipated to fit within currently-available Capital Improvement Project (CIP) funding. The City has been engaging with the community and community liaisons via a Flood Mitigation Committee of the Waterfront Commission. The City is seeking continued community feedback on the prioritization of investment with the various project areas and for various project elements as continued planning for the design phase is underway.

### History:

In 2014 the Waterfront Plan was adopted as a vision for a world-class waterfront.

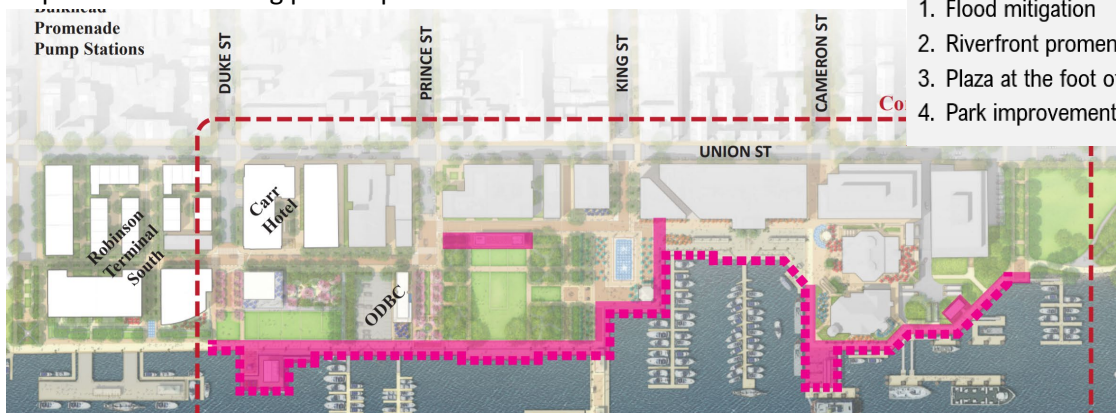


Because of the large cost and complexity of the Waterfront Plan, Alexandria City Council received and adopted "[Option A – Flood Mitigation & Promenade,](#)" (link) on January 27, 2015 to serve as a phasing plan for implementation of the Waterfront public improvements, which provided the following guidance and directive for the preferred order of implementing the various project elements:

- A. Construction of core area utility, roadway and related infrastructure required to support subsequent improvements;
- B. Completion of flood mitigation elements;
- C. Completion of Waterfront Park improvements; and
- D. Completion of remaining park improvements inside the core area.

#### Reflects community priorities:

- 1. Flood mitigation
- 2. Riverfront promenade
- 3. Plaza at the foot of King Street
- 4. Park improvements





## WATERFRONT FLOOD MITIGATION - PROJECT UPDATE

FEBRUARY 2022

The alternative options developed and presented to council for consideration prior to adoption available [here](#).

Preliminary engineering design efforts resulting from the 2015 City Council adopted Phasing Plan achieved the following:

- a. Would largely solve flooding as a result of rainfall events, storm surge and tidal river back-up with the use of grey infrastructure.
- b. Provided a new continuous riverfront promenade, a new plaza at foot of King Street and created/upgraded public spaces at Point Lumley, Waterfront Park and Thompsons Alley.

**The project prioritization established by Council remains appropriate to address flooding and to provide for public amenities per the goals of the Waterfront Plan.**

### **Project Constraints:**

**Since 2015, the City has identified many new and additional constraints and challenges which need to be considered and incorporated into the project and required that the City to re-evaluate our approach and priorities based on several key factors, in summary:**

#### **Sustainability:**

In 2019 the City adopted the [Environmental Action Plan 2040](#) and enacted [the Green Building Policy](#) which requires that public development **“will treat 100% of the required stormwater treatment through green infrastructure.”** These policies and plans build and strive towards implementation of the vision laid out in the 2008 Eco-City Charter.

### **WATER RESOURCES**

Alexandria's past, present, and future are indelibly linked to the Potomac River and the quality of life the river sustains. Water quality in Alexandria will be managed in a sustainable manner consistent with good stewardship of the local streams, the Potomac River and the Chesapeake Bay for the public health, ecological and recreational benefits of current and future generations. The City will:

- Promote public health by continuing to ensure safe and reliable drinking water.
- Use environmentally responsible flood management, stormwater control, and wastewater treatment to protect the public's health and property.
- Promote - through sustainable practices - safe, swimmable, and fishable waterways for its citizens and visitors, and enhance the ecological integrity of its downstream waters, by minimizing stormwater runoff and pollutants draining to the Potomac River and Chesapeake Bay.

#### **Regulatory Compliance:**

Since 2015 new local and state regulatory requirements have been established that need to be addressed by the project (primarily state and local stormwater quality compliance requirements) which were not included in the Baseline project in 2015 or early cost estimates. The City's [2019 Green Building Policy](#) indicates **these water quality requirements for nutrient reductions shall be addressed by on-site management of stormwater via green infrastructure**. Accordingly, **the City must use practices approved by Virginia Department of Environmental Quality in order to comply (such as the proposed [Isolator Row](#) in underground storage chambers).**

## **WATERFRONT FLOOD MITIGATION - PROJECT UPDATE**

FEBRUARY 2022

### **Resiliency:**

Storms of increasing intensity and frequency have been hitting our region, and City, causing localized flooding and subsequent damages to property and businesses. This is a trend observed around our country, and around the globe. Accordingly, City and project team have re-evaluated the recommended size and intensity of “design storm” we use as a critical measure to inform the design and required performance requirements for our stormwater and flood mitigation infrastructure. This will make us more resilient to handle the storms of today and tomorrow, without dramatically increasing costs to the project.

### **Anticipated Costs vs Available Funding:**

Anticipated costs of implementing the project have increased dramatically and are not within current CIP funding levels approved by Council. Costs of regulatory and policy compliance have also continued to increase. Projected costs for the adopted “baseline project” in 2021 dollars were anticipated to be on the magnitude of \$200 million whereas the City has approximately \$102 million dollars in the Capital Improvement Program (CIP) budget. Due to an increase in the amount of competing CIP projects, and the continued escalation of their related costs, it is currently not anticipated that the CIP budget can provide additional funding within the 10-year CIP. Therefore, the City has aggressively pursued 1) more cost-effective alternatives that achieve the goals of the Waterfront Plan and 2) alternative funding sources that help achieve the flood mitigation and public amenity goals without additional burden on the City’s CIP and debt service.

### **Project Delivery Method:**

In 2019, the City made a decision to move from a [traditional project delivery method](#), referred to as Design-Bid-Build, to a more collaborative delivery method called [Progressive Design-Build \(PDB\)](#). The key outcomes and benefits to the City will be a more collaborative owner-builder relationship and greater flexibility to scope to a budget while maximizing innovation and value for the City’s investment. The Progressive Design-Build team will provide market-based pricing based on the contractor’s actual plan for sequencing and prosecuting the work which will reduce the risk of designing and bidding something the City cannot ultimately afford to construct.

The City procured an Owner-Advisor team, Carollo Engineers, to facilitate the creation of a Progressive Design-Build contract and to establish the City’s priorities, desired approach, and critical performance requirements in order to confirm the PDB team most qualified to design and build the project are procured.

Before the owner-advisor team moved forward with developing the project documents, the team laid out a process to confirm the City’s priorities, identify value engineering options and project alternatives to address the opportunities and constraints described above and to evaluate the dynamic risks associated with changing climate with the best practices and innovations available today.

### **Project Alternatives:**

In order to meet the goals and objectives of the Waterfront Small Area Plan and the intent of prioritization under the Waterfront Option A – Flood Mitigation & Promenade (2015) within the context of these opportunities and constraints, the City has been actively developing and evaluating a series of alternative options that can help us deliver on the community’s flood mitigation priorities, as affirmed by Council, while also:



## **WATERFRONT FLOOD MITIGATION - PROJECT UPDATE**

FEBRUARY 2022

- Addressing the design storm (which considers current climate change models),
- Mitigating the sources of the most frequently occurring flooding,
- Incorporating today's resiliency and stormwater management best practices to help achieve water quality compliance requirements.

From March 2021 to January 2022 the City and project team have researched, compiled, and analyzed various approaches to value engineering, phasing, and alternatives and presented them to a Flood Mitigation committee of the Waterfront Commission. The breadth of ideas and options considered are well documented within the presentation materials and recordings of the meetings which are available for reference [here](#).

### **The project team developed two categories of options for the City – Performance-Based Solutions and Cost-Based Solutions:**

#### **Performance-Based Solutions:**

A set of alternatives to the 2015 Baseline Project were developed that helped reduce the overall cost of the project while achieving the performance requirements of the plan but which were not limited to the current CIP funding of \$102 million. The goal and intent of the process was to incorporate resiliency, sustainability, regulatory compliance, and value engineering while reducing overall costs in order to have the best overall plan to address priorities within the Core Area (Waterfront section running from Duke Street to Queen Street) should the City be successful in obtaining additional (CIP) or alternative funding (grants, etc.).

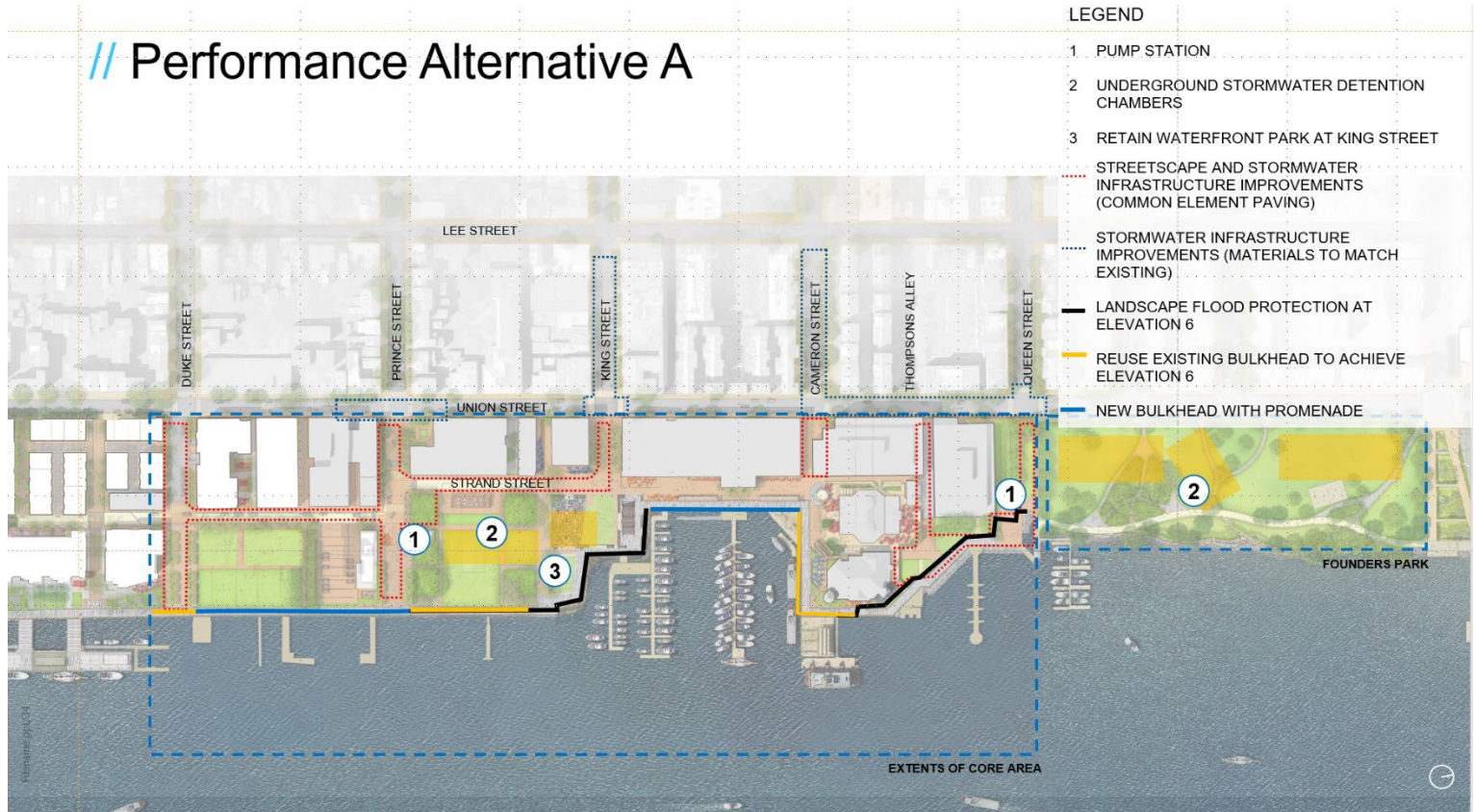
The Performance-Based Solutions looked to integrate state-of-the-art resilient characteristics including:

- Creation of green features, e.g., streetscape green infrastructure and bioretention in park spaces.
- Attenuation with stormwater chambers rather than evacuation to reduce reliance on grey infrastructure, and thus, reduce the rated pumping capacity and simplify pump station operations.
- Improvements to the stormwater system design due to capacity/conveyance optimization efforts.
- An immediate solution to eliminate tidal back-up at the foot of King Street and Prince Street.

# WATERFRONT FLOOD MITIGATION - PROJECT UPDATE

FEBRUARY 2022

## Performance Option A



Community Priority	Estimated Total Cost <sup>1,2</sup>	Project Elements
Flood Mitigation	\$120M	<ul style="list-style-type: none"> <li>Interim Tide Gate at King and Prince Street</li> <li>Storm Sewer Improvements</li> <li>Wet and Dry Utilities</li> <li>Two Stormwater Pumping Stations</li> <li>Underground Stormwater Chambers at Waterfront Park and Founders Park</li> <li>Combined landscape and hardscape (new bulkhead) protection along Waterfront</li> </ul>
Riverfront Promenade	\$15M	New promenade with Common Element Pavers, however, the alignment of the shoreline is only modified from Duke to Prince St; remaining Core Area length utilizes the existing alignment
Plaza at Foot of King Street	\$2M	<ul style="list-style-type: none"> <li>Material upgrades to make IFS a permanent park</li> <li>Actual improvements worth ~\$800k</li> </ul>
Street, Park and Marina Improvements	\$33M	<ul style="list-style-type: none"> <li>Street Pavers per Common Elements along Strand and Street Ends</li> <li>Expansion of greenspace at Point Lumley Park and Thompsons Alley Park with some improvements<sup>3</sup></li> </ul>



## WATERFRONT FLOOD MITIGATION - PROJECT UPDATE

FEBRUARY 2022

- Duke, Prince and Queen St End Gardens
- Waterfront Park restoration with some improvements<sup>3</sup>
- Torpedo Factory restoration with some improvements<sup>4</sup>
- Founders Park restoration, but not improvements

<b>Total</b>	<b>Low: \$140M</b> <b>High: \$210M</b>
--------------	---

Notes:

1. Total costs are reported at an AACE Level 4, or a -15% to +25% accuracy.
2. Subsurface conditions under parks are unknown and ongoing field investigations will inform the Class 3 Cost Estimate at the next phase of the project.
3. Park improvements refers to hardscape and landscape allowances as well as new bike racks, trash receptacles, lighting, and benches
4. Torpedo Factory improvements refer to restoration of the gazebo as well as new brick + concrete paving, bike racks, trash receptacles, lighting, benches, and drinking water fountains

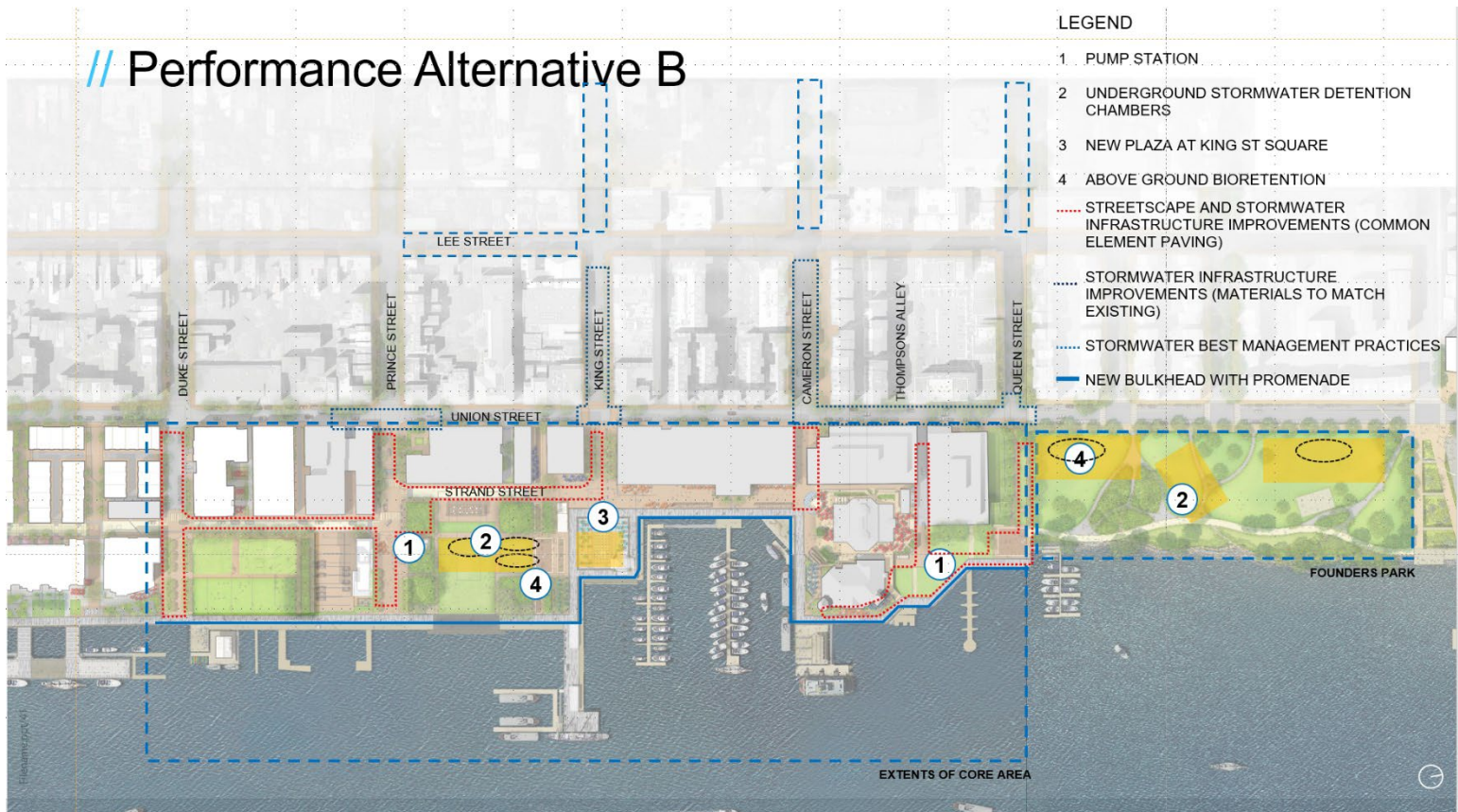
- Does not allocate funds to the following in comparison to the Baseline Project:
  - i. Complete realignment of the shoreline for a new 2,200 LF bulkhead
  - ii. Implementation of King St Square with interactive fountain, overlook structure, etc.
  - iii. Piers at Torpedo Factory and Queen St; commercial pier by Chart House
- Reduced scope of amenities in street, parks, and/or marina in comparison to the Baseline Project:
  - i. Point Lumley: Reduced hardscape and landscape allowances collectively by 85% and eliminated playground sculptural elements
  - ii. Waterfront Park: Reduced hardscape and landscape allowances collectively by 80% and removed public art infrastructure allowance
  - iii. Torpedo Factory: Removed allowance for site specific art and removed water fountain feature from renovated gazebo

## WATERFRONT FLOOD MITIGATION - PROJECT UPDATE

FEBRUARY 2022

### Performance Option B

Performance Option B allocates funds to all Baseline Project elements while ALSO adding green features including streetscape green infrastructure, bioretention in park spaces, and subsurface stormwater detention.



Community Priority	Estimated Total Cost <sup>1,2</sup>	Project Elements
Flood Mitigation	\$150M	<ul style="list-style-type: none"> <li>Interim Tide Gate at King and Prince Street</li> <li>Storm Sewer Improvements</li> <li>Wet and Dry Utilities</li> <li>Two Stormwater Pumping Stations</li> <li>Underground Stormwater Chambers at Waterfront Park and Founders Park</li> <li>Streetscape – permeable pavements – along select streets</li> <li>Bioretention in Waterfront and Founders Park</li> <li>New 2,200 LF Bulkhead from Duke to Queen St</li> </ul>
Riverfront Promenade	\$13M	New promenade with Common Element Pavers
Plaza at Foot of King Street	\$6M	<ul style="list-style-type: none"> <li>Allowances for hardscape, landscape and site-specific art</li> </ul>



## WATERFRONT FLOOD MITIGATION - PROJECT UPDATE

FEBRUARY 2022

		<ul style="list-style-type: none"><li>• Interactive water fountain with new kiosk building</li><li>• New furnishings and new lighting</li></ul>
Street, Park and Marina Improvements	\$45M	<ul style="list-style-type: none"><li>• Street Pavers per Common Elements along Strand and Street Ends</li><li>• New pier at Torpedo Factory and Queen St; new commercial pier by Chart House</li><li>• New amenities and programming spaces per Baseline Project at Point Lumley, Waterfront Park, and Thompsons Alley Park</li></ul>
<b>Total</b>		<b>Low: \$180M High: \$265M</b>
<u>Notes:</u>		
1. Total costs are reported at an AACE Level 4, or a -15% to +25% accuracy.		
2. Subsurface conditions under parks are unknown and ongoing field investigations will inform the Class 3 Cost Estimate at the next phase of the project.		

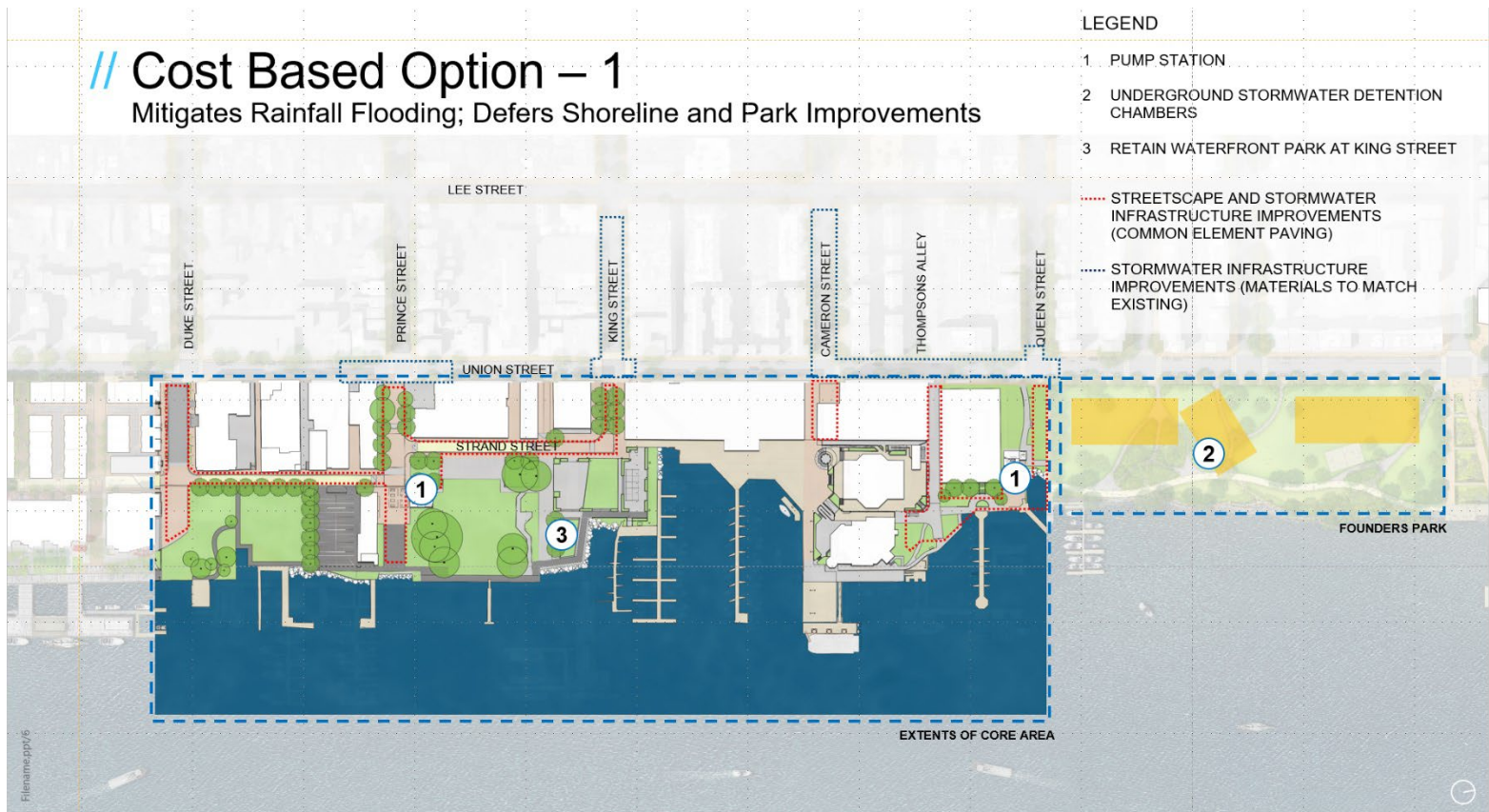
The results of Performance Option B demonstrated that there is opportunity to strengthen the Baseline Project, optimize the stormwater system design, and create a more resilient project without increasing cost compared to the Baseline (approx. \$200M).

**However, these comprehensive options approaches are not feasible within current CIP funding, so the team is focusing on the Cost-Based Solutions for advancing the project within the City's current budget; however, development of these options informed the various project elements within the Cost-Based Solutions and will help with continued prioritization of project elements and additional investment(s) should additional funding become available as these options provide a roadmap for value-centric and resiliency-oriented solutions if the scope can be expanded.**

## Cost-Based Solutions:

### Cost-Based Option 1

In order to be able to move forward with the project to address the key priorities Waterfront Plan within the current CIP funding of \$102 million, the project team developed **Cost Based Option 1** which **prioritized flood mitigation resulting from stormwater and pedestrian connectivity to the river** in alignment with the 2015 prioritization of phasing and funding from City Council.



In this alternative, the project continues to prioritize stormwater management, riverine flood mitigation, connectivity to and along the waterfront, and engaging public spaces but does not allocate funds to high-end material finishes or comprehensive community/park space improvements as previously envisioned in the Waterfront Plan. This alternative includes potential options to provide underground stormwater storage in both Waterfront and Founders Park (additional information below).

## WATERFRONT FLOOD MITIGATION - PROJECT UPDATE

FEBRUARY 2022

The anticipated level of investment with associated project expectations by category are as follows:

Community Priority	Estimated Total Cost <sup>1,2</sup>	Project Elements
Flood Mitigation <sup>3</sup>	\$55M	<ul style="list-style-type: none"><li>Interim Tide Gate at King and Prince Street</li><li>Storm Sewer Improvements</li><li>Wet and Dry Utilities</li><li>Two Stormwater Pumping Stations</li><li>Underground Stormwater Chambers in Founders Park</li></ul>
Riverfront Promenade	-	
Plaza at Foot of King Street	\$2M	<ul style="list-style-type: none"><li>Material upgrades to make IFS a permanent park</li><li>Actual improvements worth ~\$800k</li></ul>
Street, Park and Marina Improvements	\$20M	<ul style="list-style-type: none"><li>Street Pavers</li><li>Waterfront Park and Founders Park restoration, but not improvements</li></ul>
<b>Total</b>	<b>Low: \$80M High: \$120M</b>	

Notes:

1. Total costs are reported at an AACE Level 4, or a -15% to +25% accuracy.
2. Subsurface conditions under parks are unknown and ongoing field investigations will inform the Class 3 Cost Estimate at the next phase of the project.
3. Flood Mitigation efforts assume a small allowance (~ 1% of total project costs) for shoreline stabilization efforts. Results from field investigation work will refine this estimate.

- Does not allocate funds to the following:
  - River overtopping protection: However, landscape-based flood protection options may be feasible/affordable, depending on further development of design and associated costs by the Design Builder. Alternatively, overtopping protection could be phased in at a later date with additional funding.
  - Repairing and/or replacing segments of the existing bulkhead that are in poor condition
  - Changes to existing promenade condition and/or alignment
  - Waterfront Park, Torpedo Factory, Thompsons Alley, or Point Lumley improvements
  - Piers/Marina improvements

### Resiliency, Water Quality, and Best Management Practices – Underground Storage Option:

One potential project alternative that has been identified as potentially feasible within the Performance Based Solutions and the Cost-Based Option 1, and which addresses sustainability, resiliency, and regulatory compliance, is the concept of underground storage of stormwater. This approach would help the City manage stormwater and mitigate flooding in a more sustainable and resilient manner consistent with commonly used industry best practices and technology to manage stormwater and add value by also meeting the project's water quality compliance requirements with this approach.

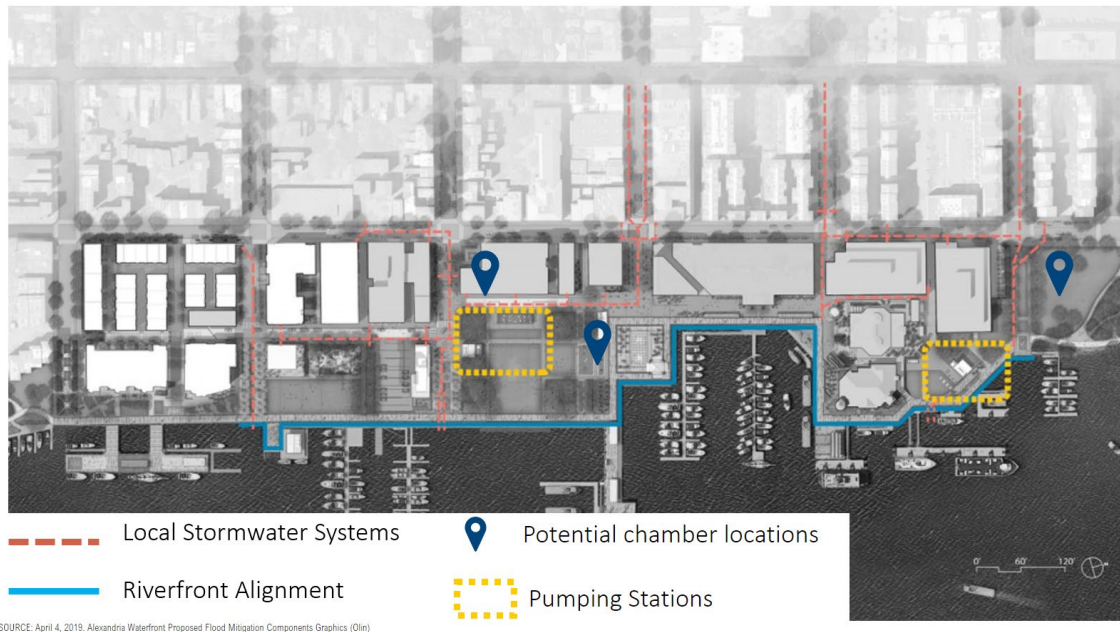
The stormwater underground storage operates by intercepting the storm sewer line such that stormwater is routed to the chamber – for temporary storage – rather than sent directly to the



## WATERFRONT FLOOD MITIGATION - PROJECT UPDATE

FEBRUARY 2022

stormwater pumping station. In this manner, the configuration of stormwater chambers can reduce the rate and volume of stormwater entering the pump station during a rainfall event, and thus, reduce the reliance on stormwater pumping to manage flooding. The potential location of chambers was thoroughly analyzed to assess hydraulically feasible areas, i.e., along the current route of proposed stormwater piping upgrades, as well as open, accessible space for installation; typical locations for underground stormwater chambers are parks or parking lots with potential chamber location shown below.



The parking structure at 110 Strand St (intersection of Prince/Strand St) is private property and not available for use to the Project. Therefore, only Waterfront Park and Founders Park – as City-owned property – were viable options when considering the extent of stormwater improvements and the two proposed stormwater pumping stations. While there are other open spaces within the general vicinity of the Project this would significantly expand the impact of the project, by creating additional piping to convey stormwater to the alternate locations, as well as necessitate additional stormwater pumping stations; therefore, any other locations were deemed not feasible or practicable.

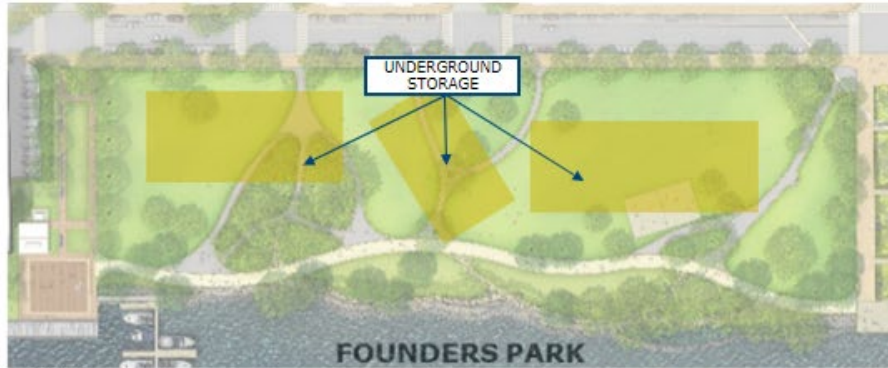
Installation of underground storage chambers would specifically impact Founders Park to a larger extent than was originally anticipated and would require additional archaeological restoration of any excavated areas where additional storage would be created. **The City is fully committed to fully restoring any impacts to parks and public ROW.**

Based on initial coordination with Alexandria Archaeology, **there is potential for historic and cultural resources within the area of potential affect if the underground storage was implemented. This would require additional research, documentation, and possible preservation strategies and/or mitigation of cultural resource impacts.** An environmental site assessment (currently underway) will determine if there are any risks or mitigation requirements because of site contamination which is likely based on historic land use. The configuration below offers one way to maximize underground storage

## WATERFRONT FLOOD MITIGATION - PROJECT UPDATE

FEBRUARY 2022

within Founders Park in order to reduce the downstream pumping station to the maximum extent possible; while the images below are only a schematic in nature, the intent is to tailor the solutions to the site, maximizing storage capacity while preserving mature trees to within the park to the maximum extent possible.



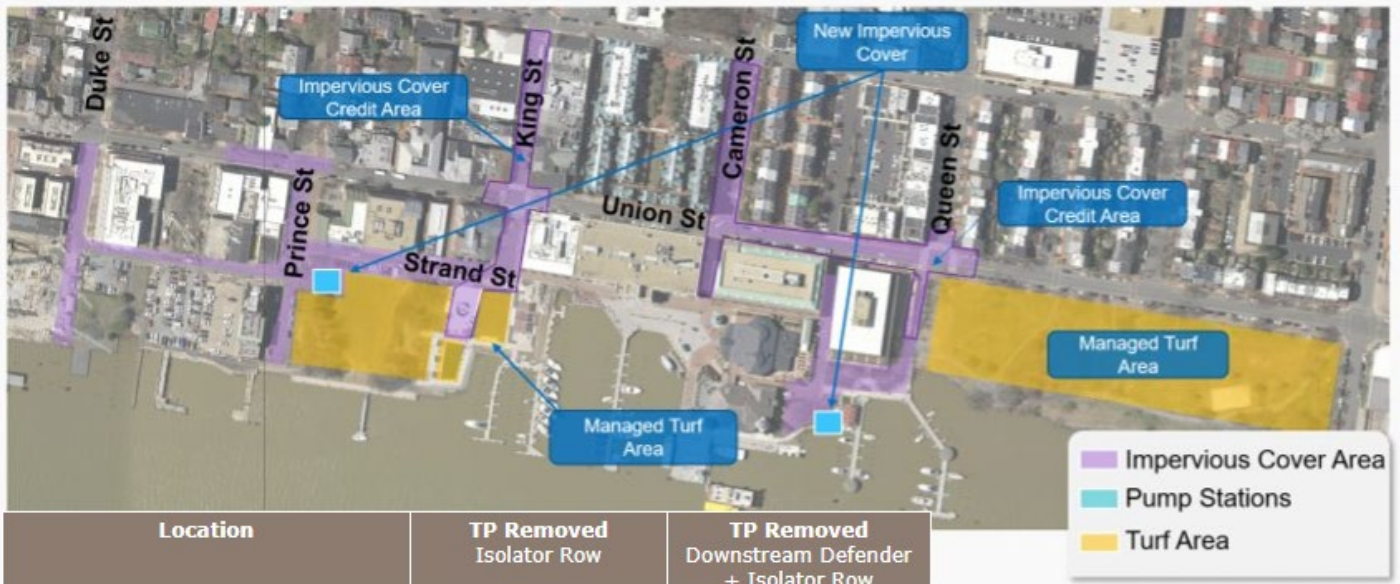
Sources:  
<https://www.youtube.com/watch?v=-PZ9P2NyD44>  
<https://www.triumphgeo.com/product/3-stormtech-treatment-systems/>

An investment in stormwater storage capacity is an investment in more resilient infrastructure. This is because by intercepting the stormwater and attenuating the peak flow, there is less reliance on pumping during peak times with a more flexible operating schedule. This is important because (1) mechanical equipment and moving components are always vulnerable for failure, and (2) this strategy minimizes potential failure mechanisms and number of failure points. Chambers would operate by filling during the storm, and then, emptying following the storm event; therefore, the pumps would experience less stress (and less flow) during the storm and the peak energy demand is reduced accordingly. Finally, the Isolator Row add-on for the underground stormwater chambers is a VDEQ approved filtration technology for TP removal. Preliminary calculations, using the Virginia Runoff Reduction Method calculator tool, suggest that the Isolator Row can help the project meet and/or exceed water quality goals depending on the extent of site disturbance and the VDEQ technology (or technologies) employed.



## WATERFRONT FLOOD MITIGATION - PROJECT UPDATE

FEBRUARY 2022



The **underground storage approach** is an option the City will continue to evaluate with the **Design-Build Team** in order to deliver the best value and best performance to the City. This will involve a more detailed study and assessment of the tradeoffs of the capital investment (up front construction costs) with the overall Lifecycle costs of the project and the associated sustainability and resiliency benefits associated. Continued efforts will be made to limit unnecessary costs and impacts to parks and to evaluate alternative approaches to resiliency and water quality compliance in a dynamic regulatory environment.

While there are many potential benefits, additional assessment and outreach is required before a final decision is made on this option. The recommended cost-based option is feasible with or without the underground storage; however, if eliminated alternative means of addressing some of the projects goals and regulatory requirements for resiliency, water quality, and compliance with state and local stormwater management will need to be determined in collaboration with the PDB team.

### Feedback Received:

**While no formal viewpoint or position has yet been adopted by the Waterfront Flood Mitigation Committee for consideration by the Waterfront Commission**, discussion with the Flood Mitigation Committee of the Waterfront Commission and members of the community provided four primary categories of initial feedback related to Cost-Based 1 via public engagement and outreach in very brief summary:



## **WATERFRONT FLOOD MITIGATION - PROJECT UPDATE**

FEBRUARY 2022

- 1) A request that the project team consider other approaches to deliver more on the public amenity goals of the Waterfront Plan.
- 2) Concerns were shared associated with underground storage because of the potential impacts to Founders Park and its cultivated landscape, concern for the time required to re-establish mature trees and landscaping.
- 3) Several members of the committee stated a strong preference that other public amenity and flood mitigation elements be delivered ahead of the common elements paving materials indicated for Strand Street.
- 4) Several members of the committee were frustrated that Project Alternatives that excluded underground storage – particularly in Founders Park – were not presented for consideration; however, the project team noted that the team can proceed with traditional pump stations without underground storage – though alternatives to water quality compliance and resilience will need to be evaluated.

### **Cost-Based Option 2**

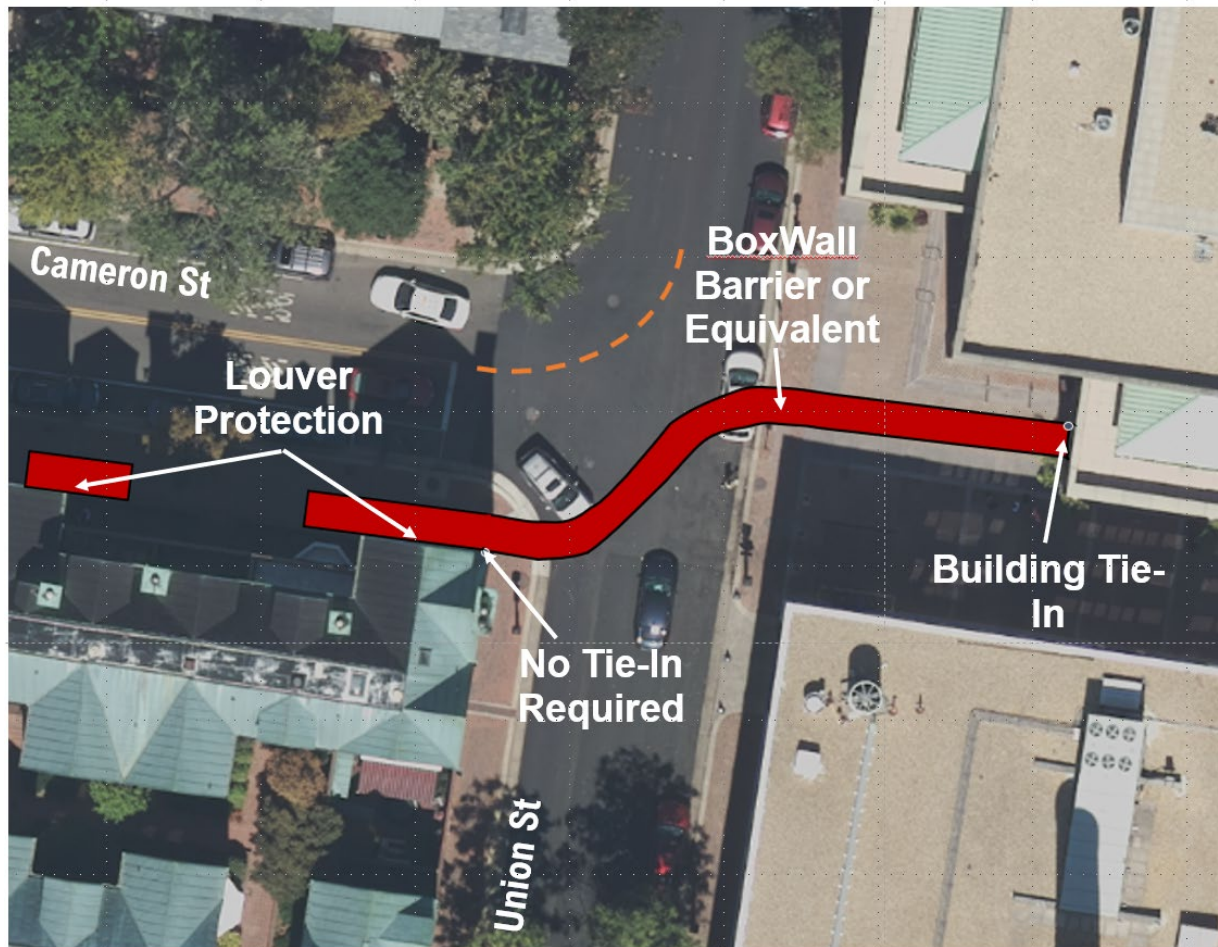
To consider other alternatives and phasing options within the current project funding, **Cost-Based Option 2** was developed to evaluate the flood mitigation performance and costs associated with constructing only the southern half of the Core Area (Duke to King Street) to focus initial investment on the southern stormwater improvements (pump station and sewer infrastructure) and deliver the promenade, bulkhead (a flood mitigation element required to build the promenade as conceived), and other park improvements and common elements as conceived in the 2014 plan. This conceptual approach deferred all Core Area elements from King to Queen Street (marina improvements, new bulkhead, northern pump station, and northern segments of the promenade) to a later phase.

Several key conditions would be required for this approach to be tenable and feasible:

- 1) The stormwater and flood mitigation performance would be acceptable for the level of investment being made (e.g. the alternatives would need to manage our selected design storm).
- 2) No unacceptable new risks would be created.
- 3) Guaranteed additional investment would be made available within the 10-year CIP to fund a subsequent phase of the project to deliver the remaining critical stormwater and flood mitigation infrastructure deferred from the Cost-Based 2 first phase so as not to make a temporary deployable barrier a permanent operational requirement.

The project team modeled this option to evaluate performance under the design storm and discovered that the large volume of unmanaged water from the northern watershed (which would be managed by the northern pump station as proposed in the Baseline and Cost-Based Option 1) causes unacceptable levels of flooding at King and Union and King and Strand Street despite the large investment in stormwater management infrastructure in this approach.

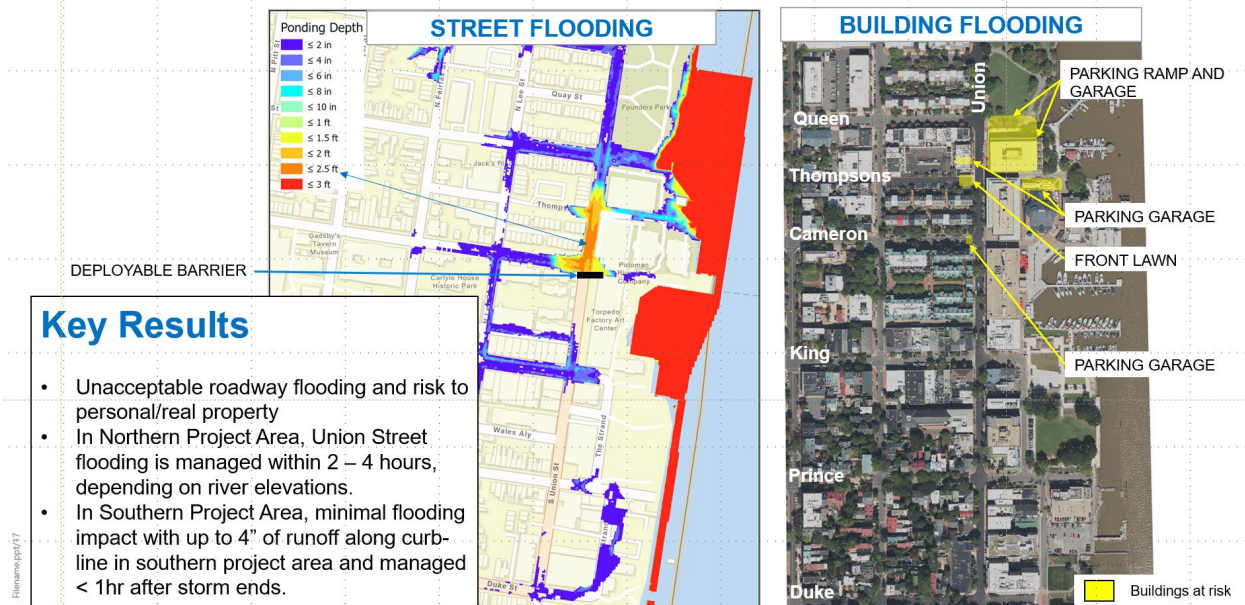
A variant of Cost-Based 2 was then modeled to see if a deployable temporary flood barrier on Union Street, just south of Cameron Street intersection, would be able to manage the stormwater to prevent spillover to the southern section of the core area without increasing risk to the northern section of the core area.



In this scenario a deployable barrier, e.g., BoxWall Barrier, is oriented across Union Street from the Torpedo Factory Residences – north end of parking lot along Cameron St - to the Torpedo Factory (at 201 N. Union St). The BoxWall would be deployed in advance of a storm event to protect the King Street Corridor as well as the Torpedo Factory Parking Garage, as indicated with the louver protection. This configuration would impede pedestrian and vehicular traffic along Union Street while deployed, but would maintain emergency vehicular access to the Marina via Union Street traveling north from King St as well as the right turning radius from Union St to Cameron St.

Results indicate that the presence of a flood barrier exacerbates the flooding along Union Street between Cameron and Thompsons Alley such that flooding is up to 2.5ft above grade. In doing so, a number of buildings/properties are at risk of flooding. Therefore, Cost-Based 2 with a deployable introduces unacceptable new risks and impacts to personal and real property in the Northern Area while sufficiently protecting the Southern Area from flooding.

## Design Storm Resultant Flooding with Cameron / Union Deployable



Additionally, staff evaluated the City's ability to increase funding for the project within the 10-year CIP budget to deliver subsequent phases of the project within the City's current revenue projections and policies on borrowing limits. Based on the continually increasing annual CIP with many competing priorities, the City is unable to afford additional construction funding for a second phase within the 10-year CIP.

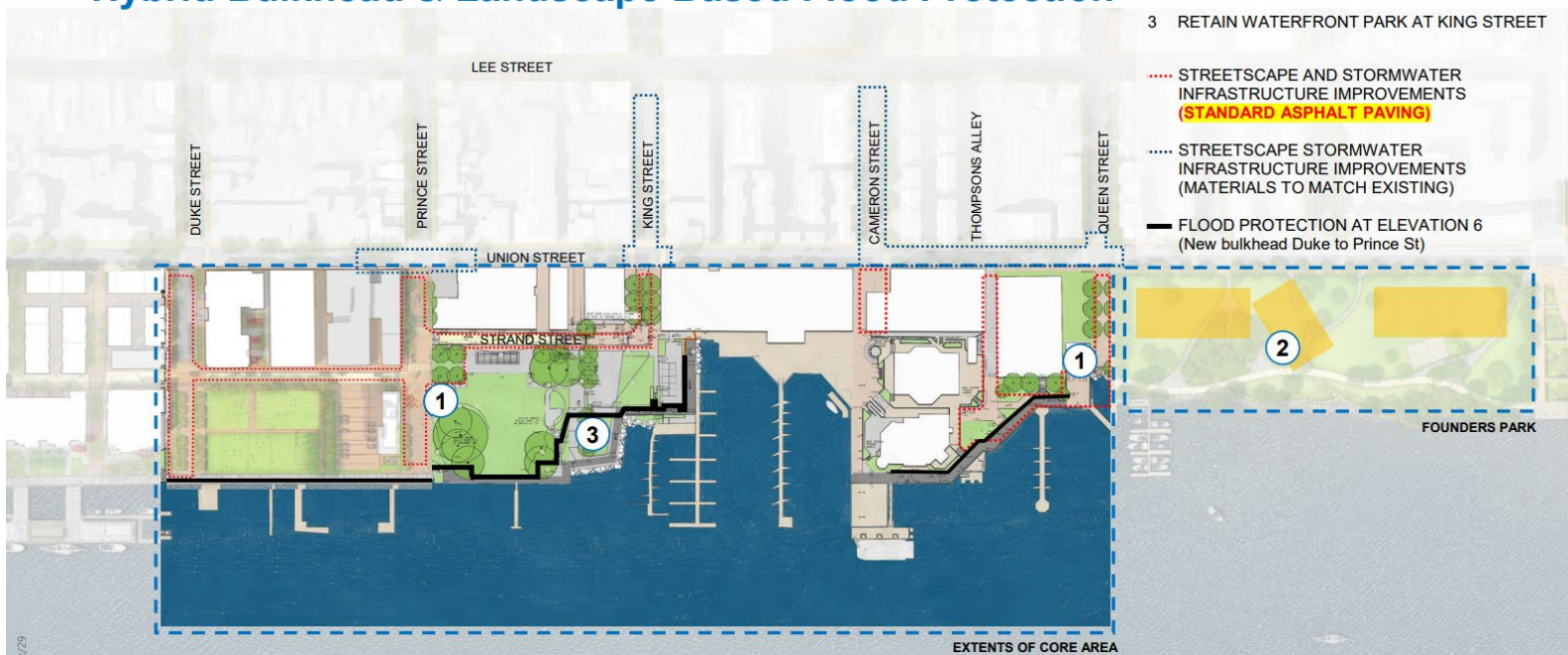


## **Recommended Cost-Based Alternative (as of February 2022)**

Based on initial discussion with the community and the Flood Mitigation Committee of the Waterfront Commission, the project team has further refined prior cost based options (full details for the initial Cost-Based Option 1 are included herein and in the [October presentation here](#)) to create the current recommended alternative to deliver the project within current funding (refer to full presentation of recommended alternative in [January presentation, here](#)).

With the community feedback received thus far and understanding of prioritization of (1) flood mitigation and (2) riverfront promenade, the Project Team developed the following *recommended cost-based alternative*.

### **// Phase 1** **Hybrid Bulkhead & Landscape Based Flood Protection**



The projected level of investment with associated project expectations are as follows:

Community Priority	Estimated Total Cost <sup>1,2</sup>	Project Elements
Flood Mitigation <sup>3</sup>	\$93M	<ul style="list-style-type: none"> <li>Interim Tide Gate at King and Prince Street</li> <li>Storm Sewer Improvements</li> <li>Wet and Dry Utilities</li> <li>Two Stormwater Pumping Stations</li> <li>Underground Stormwater Chambers in Founders Park</li> </ul>

## WATERFRONT FLOOD MITIGATION - PROJECT UPDATE

FEBRUARY 2022

		<ul style="list-style-type: none"> <li>New bulkhead from Duke to Prince; ha-ha wall in Waterfront Park + King St Square and Cameron to Queen St; no upgrades to Torpedo Factory</li> </ul>
Riverfront Promenade	\$2M	10-20ft wide promenade from Duke to Queen St with a lower-cost finished material (asphalt or crushed stone)
Plaza at Foot of King Street	\$2M	<ul style="list-style-type: none"> <li>Material upgrades to make IFS a permanent park</li> <li>Actual improvements worth ~\$800k</li> </ul>
Street, Park and Marina Improvements	\$3M	<ul style="list-style-type: none"> <li>Restore all streets with asphalt pavement</li> <li>Restore<sup>4</sup> Waterfront Park and Founders Park</li> <li>Expansion of greenspace and some improvements at Point Lumley<sup>5</sup></li> </ul>
<b>Total</b>	<b>Low: \$80M High: \$120M</b>	

Notes:

1. Total costs are reported at an AACE Level 4, or a -15% to +25% accuracy.
2. Subsurface conditions under parks are unknown and ongoing field investigations will inform the Class 3 Cost Estimate at the next phase of the project.
3. Results from field investigation work will refine estimate for flood mitigation, and in particular, with regards to the riverine flood protection hybrid solution.
4. Restoration efforts refer to import of new soil to backfill, regrade, and reseed the park area.
5. Park improvements refers to hardscape and landscape allowances as well as new bike racks, trash receptacles, lighting, and benches

○ **Does not allocate funds to the following:**

- New shoreline alignment from Prince Street to Queen Street. This scenario assumes that the bulkhead and shoreline conditions from Waterfront Park (at Prince Street) to Queen Street does not require immediate repair and/or rebuild; however, this infrastructure is nearing the end of its useful life and will need to be replaced in the future.
- Street Pavers per the Common Elements Plan to the Strand St and Street Ends
- Promenade Pavers per the Common Elements Plan
- Waterfront Park, Torpedo Factory, or Thompsons Alley Park Improvements per the Baseline Plan (or Performance Option B).
- Extent of Point Lumley Improvements per the Baseline Project (or Performance Option B).
- New Plaza at King Street Square per the Baseline Project (or Performance Option B).
- Piers/Marina improvements

Essentially, the *recommended cost-based alternative* reallocated funding from the Street Pavers (as identified in Cost-Option 1) to enhancing the riverfront protection and experience. However, there is still potential flexibility in how to “Scope to Budget”, so the Project outlined options for investment with respect to various project areas. Again, *restoration* efforts would not ultimately change the look, feel, or experience of the area following construction; in contrast, *improvement* efforts are in accordance with the Waterfront Plan vision as described and budgeted under the Baseline Project.

## WATERFRONT FLOOD MITIGATION - PROJECT UPDATE

FEBRUARY 2022

### This approach prioritizes:

- 1) Management and flood mitigation of stormwater runoff (that falls on roofs, sidewalks, streets, etc.) and backflow prevention - which will address the most frequent types of flooding. (via new and larger stormwater conveyance improvements, pump stations, etc.)
- 2) Protection from the Potomac River overtopping the shoreline (via new bulkhead and landscape-based flood mitigation elements)
- 3) Restoring parks and providing connectivity along and to the Waterfront via a promenade with

**The City is seeking continued community feedback on the prioritization of investment with the various project areas and for various project elements** as continued planning for the design phase is underway. In this way, community members could help prioritize various areas of investment for the Project as well as understand the relative cost for different investments:

Priority	Area	Elements	Total Estimated Cost
	King St Sq + Waterfront Park	<ul style="list-style-type: none"> <li>• <b>Restore</b> King St Sq and Waterfront Park</li> <li>• Promenade (alt. material)</li> <li>• Ha-Ha Wall + SS</li> </ul>	\$6M
		<ul style="list-style-type: none"> <li>• <b>Improve</b> King St Sq</li> <li>• <b>Improve</b> Waterfront Park</li> <li>• Promenade</li> <li>• Ha-Ha Wall + SS</li> </ul>	\$17M
	Duke to Prince St	<ul style="list-style-type: none"> <li>• Improve Point Lumley</li> <li>• Promenade (<b>adjusted/inland, alt. material</b>)</li> <li>• <b>Ha-Ha Wall + SS</b></li> </ul>	\$7M
		<ul style="list-style-type: none"> <li>• Improve Point Lumley</li> <li>• Promenade (<b>alignment per Baseline</b>)</li> <li>• <b>New Bulkhead</b></li> </ul>	\$28M
	Northern Marina	<ul style="list-style-type: none"> <li>• Promenade</li> <li>• Ha- Ha Wall (no new bulkhead)</li> <li>• Thompsons Alley Park</li> </ul>	\$5M
	Southern Marina (Torpedo Factory Frontage)	<ul style="list-style-type: none"> <li>• Improve Torpedo Factory</li> <li>• Promenade</li> <li>• New Bulkhead</li> </ul>	\$20M
	Strand St + Street Ends	<ul style="list-style-type: none"> <li>• Street Pavers per Common Elements</li> </ul>	\$18M
	Waterfront	Promenade Paving per Common Elements	
		- King Street Sq + Waterfront Park	\$4M
		- Duke to Prince St	\$3M
		- Northern Marina	\$3M
		- Southern Marina	\$3M

Preliminary discussion within the Waterfront Commission Flood Mitigation Committee was positive for an alternative shoreline and promenade alignment concept that could reduce potential costs and regulatory impacts from Duke to Prince Street. Specifically, while the *recommended cost-based solution* shown above prioritized a new bulkhead from Duke to Prince with some Point Lumley Park

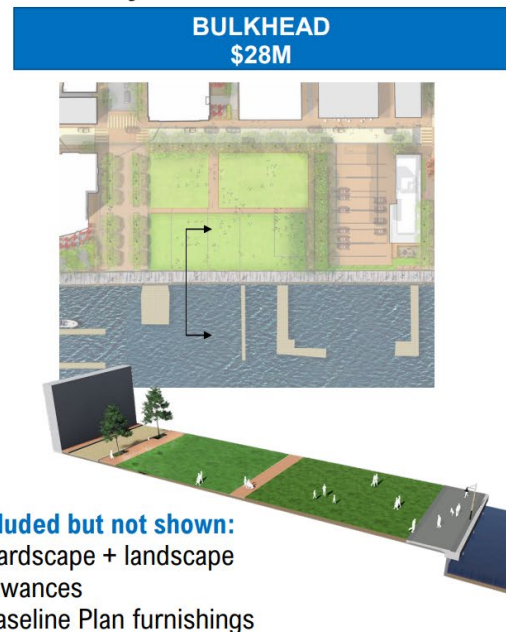
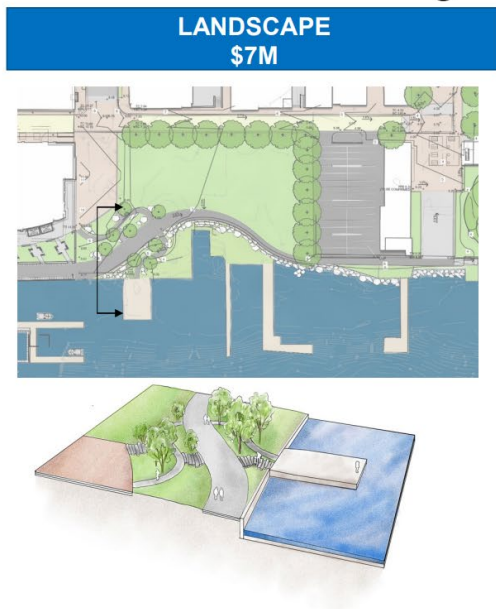


## WATERFRONT FLOOD MITIGATION - PROJECT UPDATE

FEBRUARY 2022

improvements, members were more receptive to an investment in landscape-based solution coupled with park improvements. In this way, the promenade from Duke to Prince would maintain a finished material, as it does today, and utilize a more meandering pathway consistent with the existing shoreline alignment along with some grading changes along the promenade to provide riverine protection. The remaining investment could be realized in Waterfront Park and King Street Square. The \$17M estimate refers to the Total Project Cost for this area and is comprised of Waterfront Park and King Street Square Improvements, e.g, hardscape, landscape, public art, and/or furnishings and new promenade pavers – both of which were presented in the Baseline Project – as well as a new ha-ha (or seat wall) coupled with some slight grading changes to provide riverine protection. This \$17M estimate does not account for a new shoreline at King Street Square or an interactive fountain per the Baseline Project.

### Duke to Prince Strategies – Point Lumley





### **Next Steps:**

While the breakdown of area investments does present some opportunity for the community to dictate project priorities, the results of the ongoing field investigations may supersede community recommendations, as needed. Geotechnical investigations included a comprehensive study of subsurface conditions to characterize the soils and identify environmental and/or geo-archaeological risks, along with an above-grade visual assessment of the bulkhead and existing shoreline. Collectively these findings will help the project –

1. Define project priorities with respect to shoreline investments. It will help dictate where immediate investments in shoreline stabilization, bulkhead repair, and/or rebuild efforts are necessary – which is not currently reflected or accounted for in the *recommended project alternative*. Additionally, it will validate segments of the waterfront that are suitable for landscape-based solutions as previously proposed in the *recommend project alternative* and/or suggested by community members.
2. Evaluate alternative construction materials, methods, and/or design with respect to a new bulkhead. This will help identify potential cost savings with respect to the current bulkhead design and associated cost.
3. Identify project risks with respect to new construction – particularly, by assessing the feasibility of underground storage chambers in Founders Park with respect to the subsurface condition.

Results from the field investigations will dictate refinements to the *recommended project alternative* with respect to cost and scope, which will be shared as the information becomes available.

### **Additional Funding Opportunities:**

The City has applied for several state and federal grants and will continue to evaluate additional alternative and external funding opportunities for the project which may help deliver more of the desired project elements than can be afforded within the current budget constraints and CIP funding. The team will structure our PDB contract in such a way that will allow us to scope the project the final amount of total funding.

A summary of external funding opportunities and their respective status is below:

<b>Funding Opportunity</b>	<b>Award Amount</b>	<b>Status</b>	<b>Next Steps</b>
Virginia Community Flood Preparedness Fund Grant (DCR)			
<i>FY 2021 Round 2</i>	\$3.2M	Received a preliminary award on December 27, 2021	Awaiting the grant terms and agreement
<i>FY 2022 Round 3 or 4</i>	TBD ≤\$5M	Evaluating competitiveness to submit for additional Design Phase funding	Finalize funding strategy and proceed with application development
FEMA Building Resilient Infrastructure and Communities	\$50M	Application submitted to FEMA as of 1/28	Awaiting preliminary award decision which is expected in July 2022

The Project Planning and Preliminary Design efforts to date have reaffirmed that Progressive Design Build is the most appropriate project delivery method for the Waterfront Implementation Project. This alternative delivery method best lends to a “Scope of Budget” approach in which the Project lives and will continue to live in a dynamic regulatory, community stakeholder, and funding environment. A PDB method will benefit the City by maximizing creativity, innovation, and partnership to deliver a world class waterfront within our project funding constraints.

**The project team continues to seek feedback and guidance on the community’s highest priorities for additional infrastructure improvements and public amenities should the project be awarded any additional funding. The Flood Mitigation Committee, and broader Waterfront Commission, will continue to be a venue for ongoing civic engagement and outreach efforts where feedback is requested on the prioritization of the various project areas and project elements.**