



[Virginia Department of Conservation & Recreation](#)



City of Alexandria, Virginia Waterfront Implementation Project

**Virginia Community Flood Preparedness Fund
FY 2021 ROUND 2 GRANT APPLICATION
November 5, 2021**

Appendix A: Application Form for Grant Requests for All Categories

Virginia Department of Conservation and Recreation
Virginia Community Flood Preparedness Fund Grant Program

Name of Local Government: City of Alexandria

Category of Grant Being Applied for (check one):

Capacity Building/Planning

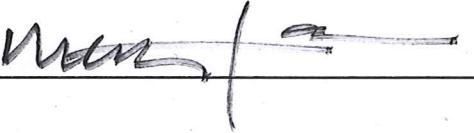
X Project

Study

NFIP/DCR Community Identification Number (CID): 515519

If a state or federally recognized Indian tribe, Name of tribe: N/A

Name of Authorized Official: Mark Jinks

Signature of Authorized Official: 

Mailing Address (1): 301 King Street, City Hall

Mailing Address (2)

City: Alexandria State: VA Zip: 22314

Telephone Number: (703) 746-6499 Cell Phone Number: (571) 414-8237

Email Address: Mark.Jinks@AlexandriaVA.gov

Matthew Jackson Brown
Deputy City Attorney
Approved as to Form

Application Form CFPF| 1-A

Contact Person (If different from authorized official): Matthew Landes

Mailing Address (1):

Mailing Address (2): 301 King Street, S 3200

City: Alexandria State: VA Zip: 22314

Telephone Number: (703) 746 - 4122 Cell Phone Number: (571) 289 - 5634

Email Address: matthew.landes@alexandriava.gov

Is the proposal in this application intended to benefit a low-income geographic area as defined in the Part 1 Definitions? Yes No X

Categories (select applicable project):

Project Grants (Check All that Apply)

- Acquisition of property (or interests therein) and/or structures for purposes of allowing floodwater inundation, strategic retreat of existing land uses from areas vulnerable to flooding; the conservation or enhancement of natural flood resilience resources; or acquisition of structures, provided the acquired property will be protected in perpetuity from further development.
- Wetland restoration.
- Floodplain restoration.
- Construction of swales and settling ponds.
- Living shorelines and vegetated buffers.
- Structural floodwalls, levees, berms, flood gates, structural conveyances.
- Storm water system upgrades.
- Medium and large scale Low Impact Development (LID) in urban areas.
- Permanent conservation of undeveloped lands identified as having flood resilience value by *ConserveVirginia* Floodplain and Flooding Resilience layer or a similar data driven analytic tool.
- Dam restoration or removal.
- Stream bank restoration or stabilization.
- Restoration of floodplains to natural and beneficial function.
- Developing flood warning and response systems, which may include gauge installation, to notify residents of potential emergency flooding events.

Study Grants (Check All that Apply)

- Studies to aid in updating floodplain ordinances to maintain compliance with the NFIP or to incorporate higher standards that may reduce the risk of flood damage. This must include establishing processes for implementing the ordinance, including but not limited to, permitting, record retention, violations, and variances. This may include revising a floodplain ordinance when the community is getting new Flood Insurance Rate Maps (FIRMs), updating a floodplain ordinance to include floodplain setbacks or freeboard, or correcting issues identified in a Corrective Action Plan.
- Revising other land use ordinances to incorporate flood protection and mitigation goals, standards and practices.
- Conducting hydrologic and hydraulic studies of floodplains. Applicants who create new maps must apply for a Letter of Map Revision or a Physical Map Revision through the Federal Emergency Management Agency (FEMA). For example, a local government might conduct a hydrologic and hydraulic study for an area that had not been studied because the watershed is less than one square mile. Modeling the floodplain in an area that has numerous letters of map change that suggest the current map might not be fully accurate or doing a detailed flood study for an A Zone is another example.
- Studies and Data Collection of Statewide and Regional Significance.
- Revisions to existing resilience plans and modifications to existing comprehensive and hazard.
- Other relevant flood prevention and protection project or study.

Capacity Building and Planning Grants

- Floodplain Staff Capacity.
- Resilience Plan Development
 - Revisions to existing resilience plans and modifications to existing comprehensive and hazard mitigation plans.
 - Resource assessments, planning, strategies and development.
 - Policy management and/or development.
 - Stakeholder engagement and strategies.

Location of Project (Include Maps): See Next Page in Grant Application

NFIP Community Identification Number (CID#):(See appendix F): CID515519

Is Project Located in an NFIP Participating Community? Yes No

Is Project Located in a Special Flood Hazard Area? Yes No

Flood Zone(s) (If Applicable): FEMA AE

Flood Insurance Rate Map Number(s) (If Applicable): 5155190041E

Total Cost of Project: \$5,402,000

Total Amount Requested \$3,241,000



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EXECUTIVE SUMMARY

Project Title: City of Alexandria's Waterfront Implementation Project

Category: Flood Prevention and Protection Project (Hybrid Solution)

Project Location: City of Alexandria

Amount of Grant Funding Requested: \$3,241,000

Contact Information: Matthew Landes, (703) 746-4122 or Matthew.Landes@alexandriava.gov

Since Superstorm Sandy in October 2012, coastal cities in the Mid-Atlantic have become more aware of the need for long-term resiliency planning. The waterfront section of the City of Alexandria (City) experiences significant and frequent flooding which affects businesses, residents, and infrastructure along the waterfront. The City experiences an average of one flooding event per month, causing damages and lost revenue to private residences and businesses. The City has built a significant case for the need to floodproof the waterfront area but has historically focused on traditional grey infrastructure solutions. Current resiliency thinking incorporates blue-green infrastructure (BGI), also referred to as "low-impact development" or "green infrastructure", as additional stormwater management solutions for areas challenged by extreme weather caused by climate change. Coastal adaptation includes both site strategies (preventing damage to buildings) and reach strategies (stabilizing land against erosion and tide, mitigating wave forces, blocking flooding, or removing development from vulnerable areas).

As a result of this reoccurring threat to the community, the City created the Waterfront Implementation (WFI) Project. The location of the WFI Project improvements is shown in the Project Area map (*Appendix A*), which focusses on the most vulnerable drainage basins targeted for improvement. This phase of the project currently encompasses engineering services, including multiple consulting design engineers, marine engineers, geotechnical teams, and other specialty disciplines, to develop a sustainable solution to mitigate the reoccurring flood issue. Carollo Engineers was hired by the City of Alexandria to act as an "owners' advisor" to provide additional WFI technical support. As of October 2021, Carollo and the consultant teams are working towards the 15 percent design benchmark with two proposed cost-based, value engineered alternatives, which are similar to the original WFI concept design. These alternatives incorporate a hybrid approach to mitigation incorporating natural, blue-green, and hard infrastructure to stabilize the shorelines, maintain a resilient flood plain, and create a recreational area for the community to enjoy. Improvements to traditional gray infrastructure are proposed as well.

Grant funding is being requested by the City of Alexandria from the 2021 Virginia Community Flood Preparedness Fund (VCFPF Fund) to support the development of the WFI Project from 15 percent design, DB procurement, and 30 percent design documentation. The funded project activities include preparation of the final project scope, Basis of Design Report/15 percent Design, Design-Build procurement documentation and ultimately 30 percent design.



Section 1

SCOPE OF WORK NARRATIVE

1.1 Project Information: Overview

The City of Alexandria's (City's) location along the banks of the Potomac River increases vulnerability to a variety of hazards, most notably flooding. In addition to snowmelt and rain-related river flooding, the City is also subject to tidal and storm surge flooding. As sea levels rise, permanent inundation of low-lying areas is also a concern. Winter weather and high wind events also pose a significant threat to the City. Per the Northern Virginia Hazard Mitigation Plan, based on modeling output, the projected sea level rise scenarios are: 1) low scenario (a sea level rise of 7 to 15 inches) and 2) high scenario (sea level rise of 10 to 23 inches) by 2100 (see Appendix F, [link 1](#)). Based on the Intergovernmental Panel on Climate Change (IPCC) emissions growth scenario and corresponding sea levels expected, it is anticipated that significant portions of the eastern sections of Old Town Alexandria will be at risk of inundation.

The City maintains a historic waterfront district along the Potomac River. This district, Old Town Alexandria, includes historic buildings and destinations, shopping, lively restaurants, recreation, and parks and is a central community hub for the City. The area frequently floods due to a complex combination sunny day flooding events (high tide events, originating from the river that back-up into the storm sewer and overtop low-lying manholes), storm surge flooding events (caused by offshore low pressure, raising the river elevation and exacerbated by high tide which overtop the existing shoreline infrastructure including bulkhead), rainfall flooding events (short-duration, high-intensity storms that quickly overwhelm the City's undersized stormwater infrastructure), and high tide related flooding events (caused by smaller storms, quick snow melts, or high tide events).

Since the City's historic stormwater infrastructure is undersized such that it cannot convey the one-year storm event, and the stormwater outfalls are frequently submerged, any rainfall-runoff induced flooding is further exacerbated by the tidal influence of the Potomac River. The tidal back-up further reduces the stormwater pipes' capacity such that the streets as well as adjacent civic space, residences, and businesses are more vulnerable, and recession of flood water is dependent on tidal fluctuations of the Potomac River.



On average, the City experiences backflow of river outfalls 60 times per year, overtopping of the existing waterfront bulkhead as many as 30 times per year, and inundation of undersized storm sewers as many as 10 times per year. Supplemental photos of flooding are provided in [Appendix B](#).

The most devastating flood events to occur in Alexandria in recent history include Hurricane Agnes in June 1972, Hurricane Isabel in September 2003, a major unnamed storm in June 2006, Tropical Storm Lee in September 2011, and severe unnamed storms in July 2019, July 2020, and September 2020.

Extreme precipitation events have occurred more frequently in the last few years. The City has experienced four major flooding events since 2019, including July 8, 2019, July 23, 2020, September 10, 2020, and most recently August 15, 2021. There were at least three storms in 2018 that reached the 20-yr intensity or greater. On October 21, 2021, Old Town Alexandria was inundated due to flooding associated with the



Potomac River rising into a moderate flood stage. Due to the density of development along the city's waterfront and the aging infrastructure, the storm sewer system is not able to convey the intensity of the rainfall nor discharge the volume of stormwater runoff in these types of extreme events.

Even more recently, Alexandria received more than five inches of rain over two hours on August 15, 2021, resulting in flash flooding. Heavy rainfall over a short amount of time quickly overwhelmed the stormwater system, and debris blockages in a culvert caused a stream to top its banks. In addition to widespread flooding, the storms caused power outages, road closures, stormwater backflow, and displaced manhole covers. Alexandria residents experienced flooding in their homes, yards, and streets. While no one was injured in this recent storm, the Fire Department was required to assist with water rescues. Cleanup began the following day, August 16th, and residents could utilize the City's app, Alex311, to report issues directly to the city departments.

As reported in the City of Alexandria's Rappendi2021 Resilience Plan (see *Appendix R*), all these events are characterized between 50-yr to 100-yr level rainstorm events with the exception of the August 15 of 2021 event, which was recorded by the new gauges with actual accumulation of 5.19-inches in 2 hours. This measurement equates to a 500-yr rain occurrence in accordance with the NOAA Atlas 14 data (*See Appendix C*) and to between a 100-yr and 500-yr level rain when compared to the statistical expectations derived for the City's Intensity-Duration-Frequency (IDF) curves (*See Appendix D*) developed in the 1980's for the City. The City's IDF curves are more conservative than NOAA's predictions for the region, meaning what NOAA would call a 12-hour 25-yr rainfall whereas the City's IDF would call it closer to a 15-yr rainfall.

1.2 Community Impacts Due to Increased Inclement Weather & Climate Change

Flooding is a rising issue in the City of Alexandria (City). Alexandria is one of Virginia's densest cities, and it is important that residents are protected from floods that threaten their life safety, health, and the security of their homes. The City is experiencing more frequent and severe flood events that damage residential and commercial properties, impact critical assets, and cause day-to-day disruptions resulting in economic losses.

As detailed in the Hazard Mitigation Plan (*see Appendix F, link 1*), during the period of 1950 through 2015, 33 flood events have been recorded impacting the City, with 13 attributed to coastal flooding/storm surge, nine attributed to flash floods and 11 as floods. In 2006, rain related flooding resulted in severe disruption of the city's/regional transportation systems from closure of the Washington Metro rail service and closure of numerous roadways. In addition, there was flooding related damage to homes and businesses. In 1996, snowmelt combined with rainfall, resulted in the worst regional flooding in over 10 years. High waters caused millions of dollars in damage, closed roadways, destroyed homes and businesses and forced evacuations. Per the Hazard Mitigation Plan, the City has experienced \$3,762,000 in NFIP payments between 1978-2015 in property with 266 claims and 30 FEMA reported repetitive losses totaling \$1,871,287 (*see Appendix E*). These private business and residential losses are not comprehensively tracked or available and likely far exceed the documented amount, and do not account for business and tourism losses.

Additional hydrologic data can be found in the 2011 report entitled, "Rainfall Frequency and Global Change Model Options for the City of Alexandria, Virginia" by CH2M Hill (*See Appendix F Link 4*). The report used the SimCLIM modeling application to create an IDF curve for the City based on historical rainfall data collected at five local rainfall recording stations. The effects of climate change were simulated through the application by applying twelve daily global circulation models with low, medium, and high greenhouse gas emissions, to predict future rainfall intensity and frequency. Table 1 shows the 10-year, 5-minute storm precipitation intensities for the City IDF curve, NOAA Atlas 14 IDF curve, and SimCLIM Rainfall intensity for the present, 2050, and 2100.



Table 1 Projected Rainfall Intensities due to Climate Change

IDF Curve	Precipitation Intensity (inches / hour) for 10-year, 5-minute storm	Precipitation Intensity (inches / hour) for 100-year, 5-minute storm
City of Alexandria (1989)	9.00	13.80
NOAA Atlas 14	6.83	9.00
SimCLIM (1945-2010)	7.08	9.07
SimCLIM 2050	7.38	9.58
SimCLIM 2100	7.67	10.09

Notes:

(1) Adapted from 2011 Rainfall Frequency and Global Change Model Options for the City of Alexandria, Virginia (CH2M Hill) and 2018 Master Storm Water Management Plan (Stantec).

The 2011 analysis predicts that for both years 2050 and 2100, storms under twelve hours at the ten-year return period will have lower precipitation intensities than the design criteria peak rainfall intensity of 9.00 in/hr.

By selecting a 9.00 in/hr peak rainfall intensity, the City is building in capacity/ protection against future storms that may be of higher intensity and/or frequency. Compared to currently accepted precipitation frequencies, the 10-year storm using City IDF curves is more reflective of the 100-year storm return frequency as shown in the NOAA Atlas 14 numbers. It is also nearly as high as the predicted 100-year storm from the SimCLIM model. In addition, the City's 10-year 5-minute storm far exceeds the SimCLIM predictions for the same storm in the year 2100. This indicates that, assuming no significant changes to the SimCLIM model assumptions (which account for climate change), the current design storm should remain conservative for the expected useful life of the proposed infrastructure.

1.2.1 Threat 1: Sunny Day Flooding

According to the URS Report (2007), "sunny day" flooding in Alexandria typically occurs during high tide events, which are common during new and full moons. This type of flooding can occur without local rainfall and originates from the river. Efforts to validate flooding source and its respective frequency and impact to the project area of downtown (historic, commercial, green space, and tourism districts from Duke Street to Queen Street) are shown in below. Per Figure 1, historical data between 2008-2014 show an average water elevation between 3-4 ft. In Figure 2, some sections and roadways, flooding can occur when elevations are between 2-ft and 4-ft. On average, without adequate backflow prevention, Old Town Alexandria experiences backflow from the storm sewer outfalls up to 60 times per year depending on location.

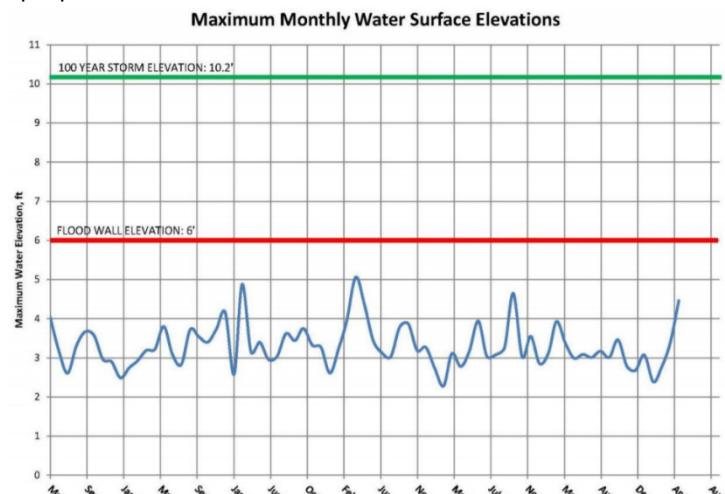


Figure 1 Historical Water Elevations



1.2.2 Threat 2: Storm Surge Flooding

Storm surge flooding typically occurs as a result of offshore low pressure, which raises river surface elevation and is exacerbated by high tide. These can be named storms such as tropical depressions or hurricanes, but in some cases are also from unnamed storms. Validation of the flooding source and its respective frequency with impact to the Project Area revealed the following:

- Verified average low and average high tide conditions are -0.83 ft and +2.18 ft, respectively, per USGS data.
- Confirmed that the existing bulkhead elevation is typically less than the reported El. +4.0-ft across the Project Area and rather the elevation varies from < +2.0-ft to 4.0-ft. Furthermore, it was determined that the **river stage elevation, per USGS, often exceeds the top of bulkhead**, as reported in the Topographic Survey (Stantec 2018) and causes overland flooding.
- Identified two low points, and areas of immediate concern, along the bulkhead - King Street Square and Point Lumley. King Street Square area ranges from El. +1.62-ft to +2.78-ft, whereas Point Lumley ranges from El. +2.56 -ft to +4.07-ft.

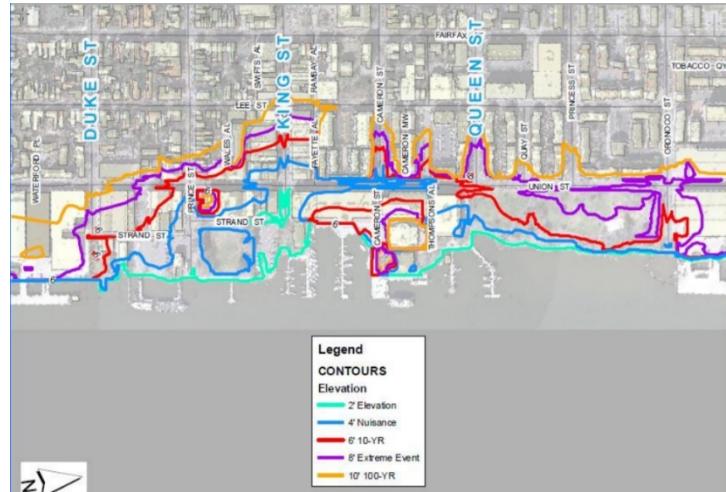


Figure 2 Flooding Map at Various Elevations

Based on this research, it is estimated that Potomac River overtops the existing bulkhead up to 30 times per year, with King Street Square and Point Lumley being two areas that most frequently flood due to storm surge.

1.2.3 Threat 3: Heavy Rainfall Flooding

“Heavy rainfall” flooding occurs under short-duration, intense rainfall events. Project area flooding is heavily impacted by the size of the City’s storm drain system with a majority of runoff entering the storm drain system coming from the uphill area west of Union Street. Using current rainfall data, it is estimated that this type of flooding occurs multiple times per year. Previous reports claim that the “foot of King Street suffers from flooding at least once each month”. It is expected that there will be a shift to more intense individual storms, i.e., intense downpours that will result in increased frequency of heavy rainfall and subsequent flooding. Thus, climate change model projections for rainfall intensity through the year 2100 will have a significant impact on stormwater design and shall be considered, as further described under Section 1.5.

1.3 Population Benefiting from Project

The WFI Project, one of largest projects funded by the City’s capital improvements program, serves to mitigate riverine and stormwater flooding impacts, from a contributing drainage area of 54 acres, thereby protecting residents, visitors, businesses, historic buildings and cultural resources, and infrastructure. Flood mitigation efforts are focused on mitigating impacts to the heart of historic Old Town. In addition to providing direct benefits and amenities to the residents of the City, the Old Town area is also a large tourism site for the Northern Virginia area and is home to over 200 restaurants and shops along with historic museums and events. The Old Town District has been designated a historic neighborhood according to the



National Register of Historic places. This was the third designated historic district in the United States on the National Register of Historic Places, due to the City's storied past as a tobacco trading post, civil war supply center, and former home of George Washington. In addition, there are six historic structures within the project area including the Torpedo Factory, Fitzgerald Warehouse and other properties along King, Strand and Prince Streets.

The specific project area lies completely within the Old Town neighborhood and includes residential housing, commercial buildings, hotels, public infrastructure, shops/restaurants, open spaces, waterfront, as well as six buildings that have been designated as National Historic places. Table 2 summarizes the population benefiting from implementation of the project.

Table 2 **Population Affected** (Provide the number of each type of structure listed in the project area. Include all structures in the project area).

Population Affected (Provide the number of each type of structure listed in the project area. Include all structures in the project area).	
Property Type	Count
Residential Properties	160
Businesses / Commercial Properties	183
Public Properties	7
Schools / Hospitals / Houses of Worship	0
Total	350

According to the Visit Alexandria Annual Report (2018), \$826 million in visitor spending produced \$28 million in tax revenues for the City. Tourism also supports over 6,500 jobs in the City and the WFI Project is projected to add over 700 additional jobs. Frequent and increased flooding events have and will continue to have detrimental impacts on the Old Town area. It is estimated that over the past 20 years, an estimated range of \$80M-132M of lost spending has created a loss of between approximately \$3M-4.5M tax revenue has incurred due to flooding and flood-related impacts and damages. This figure does not account for lost workdays, wages, and jobs.

The Old Town and Waterfront areas also feature approximately 23 acres of parks, including walking and biking trails. The Founders Park Community Association is an active interest group for the maintenance of Founders Park, bordering the Potomac River in the Old Town area. The park is one of many central green spaces in the area that offers a hydraulically favorable, large-scale attenuation space as part of the stormwater management approach.

1.4 Cost Share

The WFI Project, total project cost of approximately \$105M, is one of the top priority flooding mitigation capacity projects in the City's 10-year Capital Improvement Program (CIP). Funding for the WFI Project is currently funded solely through the CIP budget, which currently includes \$102M in funding for the planning, preliminary design, procurement, final design, project administration including owners advisor services, and construction of the WFI Project. The project funding is made up of approximately 80 percent bonds and 20 percent direct revenue sources.

1.5 Local Floodplain Management Regulations

The City of Alexandria's Floodplain Ordinance can be found [Ordinance 4715 \(alexandriava.gov\)](#).



1.6 Need for Assistance

Explain Local Governments Financial and Staff Resources. The oversight and management of the WFI Project will be under the City of Alexandria's Department of Project Implementation (DPI). DPI was created in 2013 and is responsible for the implementation of capital infrastructure projects and serves as the Project Management Organization for the City. The Department has completed over 27 design projects and 51 construction projects totaling over \$162 million over the last 4 years. DPI's Program Manager and Division Chief for the Waterfront Plan Implementation will be responsible for the day-to-day management, oversight, and completion of the WFI Project, with support from Carollo Engineers (Owner's Advisor) as well as with support from various City departments (Code Administration, Dept. of Recreation, Park and Cultural Activities, Dept. of Finance, Dept. of Transportation and Environmental Services, etc). DPI has the demonstrated ability to successfully manage and deliver large, capital infrastructure projects on time and on schedule.

Low Income Geographic Areas in Project Area. Not Applicable.

Social Vulnerability Index Score by Census Tract. The WFI project area includes two census tracts. Social Vulnerability Map and Index Scores for the two tracts are as follows (see Appendix G):

- Census tract 2018.02 (northern section of the project) has a low social vulnerability score of –1.3.
- Census tract 2019 (southern section of the project) has a low social vulnerability score of –2.1

1.7 Waterfront Implementation Project: History and Project Description

The framework for the Waterfront Implementation (WFI) Project can be traced back to an Initial Flooding Assessment Report completed in October 2007 that identified specific flooding problems and offered potential mitigation solutions. Subsequently, the City published a 15 percent Flood Mitigation Concept Design along with a City Council endorsed 2014 Waterfront Implementation Plan, and engaged professional engineering services to advance the concept to a preliminary design (2016 – 2019).

The priority of the WFI Project is to address flood mitigation; however, along with these improvements, the City has committed to improved connectivity to and along the Waterfront as well as general park and amenity improvements. Elements of the project will address both rainfall-runoff induced flooding via stormwater management improvements and Potomac River induced flooding via backflow prevention and overtopping protection.

Design criteria:

- Return Period: 10-year.
- Peak Rainfall Intensity: 9-inch/hour (Source: City of Alexandria IDF Curve).
- Storm Event Volume: 2.53 inches (Source: NOAA Atlas 14 for Washington National AP).
- Time of Concentration for Peak Intensity: 5-minutes.
- Total Duration: 2-hours.

Both the return period and the peak rainfall intensity considered the effects of climate change over the 50-year useful life of the project. **Data confirmed that the 10-year, or El. +6.0ft (NAVD88) is higher and more risk-averse than the CRMP SLR Scenario for 2070 and 2080 which accounts for the design life of the project.** Additionally, the October 2020 released Chesapeake Stormwater Network Report predicted a 2ft sea level rise projection through 2100. **The selected peak rainfall intensity is consistent with the recently completed City of Alexandria Storm Sewer Capacity Analysis and is more conservative than both the NOAA Atlas 14 IDF curves and the 2011 Rainfall Frequency and Global Change Model Options for the City of Alexandria, Virginia report for 2050 and 2100 storms.**



The Project is in the planning/preliminary design phase, such that the criteria for improvements, and therefore, project benefits, have been established. Project Alternatives to achieve these goals are still under evaluation and refinement of project elements under development based on ongoing field investigations and analysis and feedback from community engagement. Each of the Project Alternatives, as outlined above, must be designed to the established design criteria. Therefore, common elements to both Project Alternatives include both stormwater improvements and riverine flood protection.

- Stormwater improvements in the two project alternatives include storm sewer upgrades rated for the design storm, backflow prevention at stormwater outfalls, installation of underground stormwater detention chambers, and construction of new stormwater pumping station(s). All new project elements will manage and provide flood mitigation in the targeted drainage areas. Field investigations will dictate the feasibility of underground stormwater detention chambers. Pump station(s) is (are) responsible for expelling the stormwater runoff to the Potomac River. The above-ground footprint of pump station will be sized to accommodate the screenings room, electrical room, and emergency generator, such that all electrical equipment will be installed above the critical flood elevation (base flood elevation + 1-ft). By incorporating stormwater chambers, the rated capacity of the pumping station and generator can be significantly reduced. Additionally, the peak electrical demand is reduced by increasing reliance on passive, attenuation-based solutions during peak runoff conditions.
- Riverine flood protection includes protection up to an elevation of +6.0ft, by using hard and/or softscape features. Ongoing field investigations will help the Project Team assess whether additional shoreline stabilization efforts are needed beyond the proposed flood mitigation solution.

The project area is mapped within a flood plain, last mapped in October 2020, the FIRMette indicates the project area is in flood zone AE (see Appendix H).

1.8 WFI Proposed Project

The City is currently evaluating two alternatives for the proposed project, both of which include identified stormwater improvements and riverine flood protection and are designed to achieve established goals and design criteria. The City has advanced the Project concept sufficiently such that the design criteria for the proposed mitigation project as well as desired project benefits are established to create a general baseline performance criterion required for any alternative (within the City's affordability).

Both **Project Alternatives address multiple FEMA Community lifelines including safety and security, food/water/shelter, energy and transportation**. Implementation of the project will mitigate flooding within Old Town thereby allowing emergency personnel to respond to emergencies without delays. The Project will install existing utilities underground and relocate transformers in new buildings above the critical elevation to reduce impacts of flooding and associated outages. The Project reduces the likelihood of road closures that currently occur due to excessive, long-standing street flooding.

It is expected that a Project Alternative will be selected and endorsed by City Council in the second quarter of 2022, after which a Basis of Design Report (15 percent Design) (BODR) will follow shortly thereafter. The BODR will be used to develop the scoping documents (Request for Qualifications and Request for Proposal) to solicit a design-build team to finalize design and implement the project.

Project Alternative #1 consists of comprehensive storm sewer improvements from Duke Street to Queen Street. Two stormwater pumping stations (PS) are needed to manage the stormwater runoff along with subsurface detention chambers at Founders Park. By incorporating the subsurface detention chambers, the Project Alternative can reduce the Thompsons Alley PS rated capacity from 85 million gallons per day (MGD,



as per the 2016 – 2019 preliminary design efforts) to 5 MGD. Therefore, while the PS cannot be eliminated from the Project, the addition of underground detention chambers offers an opportunity to reduce peak electrical demand and operating costs. This Project seeks to mitigate river overtopping with innovative, landscape-based solutions, e.g., ha-ha wall, landscape grading, and/or planter boxes, for continuous protection. The Project Schematic Alternative 1 (see *Appendix I*) offer two riverine protection alignments, such that one Option prioritizes continuous protection along the Waterfront whereas the other Option optimizes the grading within park spaces to provide protection closer to Strand Street. Currently, this \$100M solution does not consider any sections of bulkhead and/or shoreline that require immediate stabilization or repair. However, the Project has identified areas where riprap, or other improvements, can be made to stabilize the shoreline in critical areas and field investigations will validate the need and recommend a strategy.

Project Alternative #2 consists of storm sewer improvements in the most vulnerable area of the Waterfront, i.e., from Duke Street to King Street per the Project Alternative 2 Schematic (see *Appendix J*). The Waterfront Park PS is needed to manage the stormwater runoff along with subsurface detention in Waterfront Park. The stormwater chambers reduced the PS rated capacity from 130 million gallons per day (MGD, as per the 2016 – 2019 preliminary design efforts) to 50 MGD. In the Northern Subcatchment, i.e., from Cameron to Queen Street, this Project Alternative seeks to incorporate select flood mitigation elements, such as deployable barriers and/or discrete stormwater piping capacity upgrades, to minimize property flooding. Deployable barriers, e.g., FloodBreak Flood Barrier, are being considered for parking garage entrances along Union Street and/or regrading efforts along Union Street can redirect flow towards Founders Park (overland relief and green/resilient management of water). A preferred solution will be further vetted following topographic survey data (to be complete in fourth quarter of 2021) and confirmation with the stormwater hydraulic model (to be completed shortly thereafter). To date, the team is confident that the extent of street flooding under design storm conditions in the Northern Subcatchment is significantly less and all properties, except for parking garages, do not have any visible flood pathways under design storm conditions. With regards to riverine flood protection, this Project Alternative prioritizes a new bulkhead from Duke to King Street and ties into the existing elevation (El. +7.0ft) at Torpedo Factory to maintain continuous protection along the Waterfront. By providing a new bulkhead, the Project also makes shoreline modifications accomplished by dredging and filling. The completed project will include a new, pedestrian-friendly, waterfront walkway that is consistent in finish materials at Robinson Terminal South. Along the Northern Subcatchment, the existing bulkhead does exhibit elevations below 6.0ft, but again, only parking garages are at risk, which can be protected by a deployable flood barrier.

1.8.1 River Backflow Improvements – Resolution for Threat 1 – Sunny Day Flooding

Previous studies determined that sunny day flooding occurred in the absence of rainfall when the Potomac River would frequently back-up from the various outfalls and cause street flooding. Upon review of the Master Utility Plan, an opportunity for “early impact solutions” has been identified. By employing tide gates at the most critical outfalls, i.e., outfalls that service highly trafficked low-lying manholes, sunny day flooding would be eliminated. Design and implementation of tide gates would not be reliant on all other project elements such as bulkhead and storm sewer infrastructure improvements. Additionally, the WFI Project would eliminate sunny day flooding more broadly in the project area through comprehensive stormwater improvements. Regardless of Project Alternative, the new stormwater outfalls will be equipped with tide gates, e.g., Duke Street outfall, or a check valve vault for pump station outfalls.



1.8.2 Shoreline Bulkhead Improvements – Resolution for Threat 2 – Storm Surge Flooding

Portions of the existing bulkhead along the waterfront are frequently overtopped by the Potomac River during storm surge events. The WFI project, between 15-30 percent design completion, will finalize detailed solutions to mitigate river overtopping, up to an elevation of +6.0ft, by using a combination of hard and softscape features determined at the 15 percent project benchmark, prior to grant funding usage. It will also identify if any immediate shoreline stabilization efforts are needed in case a more inland flood protection strategy, as shown in Project Alternative 1, is employed.

1.8.3 Stormwater Infrastructure Improvements – Resolution for Threat 3 – Heavy Rainfall Flooding

The stormwater improvements will include new and upsized stormwater inlets and piping such that the new infrastructure that can handle the design storm along with stormwater pumping. Each Project Alternative differentiates the extent of stormwater improvements as well as discrete project elements that will help manage runoff. The selected Project Alternative will be decided at the 15 percent benchmark which shall also define the extent of grey stormwater infrastructure as well as green elements, e.g., bio-retention basins and underground stormwater detention chambers. These pumping stations could be used in future for additional stormwater treatment retrofits but currently debris screening and conveyance is the only scope of these pump stations in this project.

1.9 No Action Alternative

Under the no project alternative, the City and the residents and business owners will continue to suffer repetitive and more frequent impacts, disruptions of service, and financial losses. Climate change will bring rising sea levels and increased frequency and intensity of storm events to Alexandria, making flooding an even more common occurrence for the already undersized system. It is projected that sea level rise could be as high as 23 inches by 2100 (HMP). Under these conditions, it is anticipated that significant portions of Old Town will be at risk of frequent inundation. Failure to implement this project will not only lead to continued financial and property losses but also the potential for human loss of life, as storm intensity continue to increase.

1.10 Goals and Objectives

1.10.1 Goals

The primary goal of the WFI Project is to address flood mitigation for multiple sources and types of flooding; however, the City has also committed to improve connectivity to and along the Waterfront as well as general park and amenity improvements (using City funding). Elements of the WFI Project address both rainfall-runoff induced flooding via stormwater management improvements and Potomac River induced flooding via backflow prevention and overtopping protection.

1.10.2 Objectives

The purpose for this FY 2021 grant fund request is to cover the cost of site investigations, environmental assessments, and to advance the project design from the current planning phase to 30 percent design. The objectives are defined in each of the task milestone detailed in Section 1.10 below.

1.11 Approach, Milestones, and Deliverables

In accordance with the schedule detailed in Section 3.1.1, specific deliverables and milestones are identified and detailed in the tasks listed below:

Task 100 - Design Completion 15-30 percent (Design Builder):



- Task schedule: Q1-2022 to Q1-2024 (completion of 30 percent design).
- Milestone: Completion of design package at 30 percent completion.
- Deliverables:
 - 30 percent contract specifications.
 - 30 percent design drawings.
 - Cost estimate and schedule.
- Description of key task activities: Design builder will review basis of design, conduct necessary field investigations to complete 30 percent design, and furnish 30 percent design package. Review and incorporate design builders risk management strategy and risk register from consultant. Engage with operating departments for key components of the project including operational preferences and maintenance. Coordinate with manufacturers and vendors.

Task 200 - Design Builder Oversight (Owners Agent):

- Task schedule: Q4-2021 to Q1-2024 (completion of 30 percent design).
- Milestone:
 - Geotechnical Data Report.
 - Geotechnical Design Memorandum.
 - Phase 1 and 2 Environmental Site Assessment, including an environmental existing conditions summary report and environmental subsurface investigation report.
 - Geoarchaeological report (cultural resources compliance).
 - Selection of final project alternative.
 - Basis of Design Report (BODR)/15 percent completion.
 - execution of design build agreement.
 - 30 percent design review.
- Deliverables:
 - Final flood mitigation alternative mitigations evaluation and selections report.
 - BODR includes preliminary construction estimate, sketches and renderings, determination of appropriate sustainability targets.
 - Project delivery analysis, technical memorandum, and procurement plan.
 - Design builder contract documents, scope of services & specifications.
 - Design builder RFP documents.
 - Design build agreement.
 - Review of 30 percent design documents.
- Description of key task activities:
 - Owner's advisory services for project planning and administration encompass completion of ongoing field activities, public engagement, and cost benefit analysis to select the final project alternative.
 - Owner's advisor will develop a 15 percent basis of design report.
 - Owner's advisor will establish the plan for development of the procurement documents and execution of the procurement process, as well as prepare the documentation and complete the design-build justification process.
 - Perform and oversee completion of field investigations, review design plans, provide on-site support. Consultant will support design builder through coordinate with manufacturers, vendors, city, and design builder. Owner's advisor will review design builders schedule and incorporate into master project schedule and establish baseline. Review monitor and analyze design builders progress schedule on monthly basis.



Task 300 - Preliminary Environmental Permitting:

- Task schedule: Q3-2023 to Q1-2024 (completion of 30 percent design).
- Milestone: not applicable.
- Deliverables:
 - Partnering session with City's permitting consultant.
 - Workshops to review preliminary permits and engage regulatory stakeholder feedback.
 - Regulatory compliance plan and permitting schedule.
- Description of key task activities: Design builder will proceed with preliminary environmental permitting and necessary field investigations dictated by permits. Design builder will review historical feature management and update procedures and policies that must be followed. Design builder will coordinate with the City and owner's advisor for regulatory stakeholder outreach and scheduling of workshops.

Task 400. Public/Stakeholder Engagement:

- Task schedule: Q4-2021 to Q1-2024 (completion of 30 percent design).
- Milestone: Community endorsement.
- Deliverables:
 - Stakeholder Registry (living document hosted on the project PMIS).
 - Regular updates meetings or presentations to the Waterfront Commission and its Flood Mitigation Subcommittee, project stakeholders, including City departments, community associations, other interested individuals and/or organizations.
 - Project update meetings with City Council up to 30 percent design.
- Description of key task activities: Owner's advisor will conduct presentation of project updates, total project cost estimate, and schedule to City Council and other internal City departments. Preparation and delivery of technical presentations, project flyers, and other outreach materials. Ongoing updates to project website. Maintain and update Stakeholder Registry, including organizations, individuals, contact information, engagement activities, and feedback received regarding project priorities.

Task 500 - Grant Management and Status Update:

- Task schedule: Q4-2021 to Q1-2024 (completion of 30 percent design).
- Milestone: Close out of grant.
- Deliverables:
 - Final project deliverables as defined in approved scope of work.
 - Invoicing for work completed.
 - Quarterly reporting on project progress.
- Description of key task activities: Owner's advisor to serve as primary point of contact for grant administrator and to perform overall project management activities. Compose updates as requested by grant administrator. Coordinate project inspections with Department to ensure conformance to grant terms. Preparation and submission of final project deliverables defined in the approved scope of work to the department.



1.12 Relationship to Other Projects

1.12.1 Robust Resilience Planning Effort

Since Superstorm Sandy in October 2012, coastal cities in the Mid-Atlantic have become more aware of the need for long-term resiliency planning and standards through formal planning and standards assessment (see *appendix R and S*). The City has built a significant case for the need to protect the waterfront area but has historically focused on traditional grey infrastructure solutions. Current resiliency thinking incorporates blue-green infrastructure (BGI) into development and infrastructure through the [Green Building Policy](#) (see *Appendix F, link 5*) and [Green Stormwater Infrastructure](#) (see *Appendix F, link 6*). The City's Green Building Policy indicates these water quality requirements for nutrient reductions shall be addressed by on-site management of stormwater via green infrastructure. Additionally, in 2019 the City adopted the Environmental Action Plan 2040 and enacted the Green Building Policy which requires that public development "will treat 100 percent 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 and are reflected in the Project Alternatives. The WFI Project a forward step in coastal adaptation includes both site strategies (preventing damage to buildings) and reach strategies (stabilizing land against erosion and tide, mitigating wave forces, blocking flooding, or removing development from vulnerable areas).

The City has integrated flood mitigation and resilience goals across areas of the local government. The City has invested in a robust planning process around climate risk and resilience as detailed in the Hazard Mitigation Plan (see *Appendix F, link 1*) and Alexandria Waterfront Small Area Plan (*Appendix F, link 3*), and this project will advance the priorities identified in these plans. Flood resilience is a priority addressed holistically through master planning, small area planning, and waterfront planning. The City has established development controls in the Transportation and Environmental Services Department is implementing resilient stormwater system upgrades informed by the Storm Sewer Capacity Analysis and making spot improvements to high priority flood risk areas elsewhere in the City (outside of the Project area). Parks and new public landscape features are designed based off the City's new landscape guidelines, which emphasize native species, restoration, and climate resilience features.

1.12.2 Waterfront Improvement Builds on Existing Initiatives

Flood mitigation efforts (sunny day flood mitigation, green infrastructure, and flood storage projects) are a part of a larger flood resilience initiative in Alexandria to protect residents and their property from flood damages as well as a coordinated effort with the [City of Alexandria Storm Sewer Capacity Analysis](#) (see *Appendix F, link 11*). The WFI Project will be designed to meet the standards and recommendations identified in the [Alexandria Landscape Guidelines](#), and will contribute to the goals set forth in the [Urban Forest Masterplan](#). Additionally, the Project will support initiatives identified in the Green Building Policy and Environmental Action Plan 2040.



1.13 Maintenance Plan

Preliminary Maintenance Planning documents have been developed, including preliminary estimates of annual costs, required labor, and a proposed maintenance agreement. The plan (see Appendix K) was based on the preliminary design concepts for the two alternatives and will be used to inform the City's Operation and Maintenance budget. Continued evaluation and costing for future maintenance activities will continue throughout the design development process, with the final maintenance plan to be developed during WFI Project implementation. Implementation of the maintenance plan will be funded by the City's Operation and Maintenance budget. The project team will work with the City to develop an operation and maintenance (O&M) guidelines report including a schedule for major activities to be implemented. The O&M guidelines will include how to care for and maintain vegetation (trees, perennials), pump stations, outfalls, inlet and overflow structures, underground storage structures, as well as trash/debris removal. As applicable, the project team will design green infrastructure elements that are lower maintenance through careful selection of native vegetation appropriate for the sites and by considering the existing maintenance capabilities of the city, including staff, training, schedule, tools and vehicles. Selections of vegetation, soil depth specifications, and other design features will align with the Alexandria Landscape Guidelines. The City of Alexandria Department of Recreation, Parks, and Cultural Activities will continue to support the success and maintenance of this public amenities improved by the project (see Appendix L).



Section 2

TECHNICAL PROPOSAL EVALUATION CRITERIA

This section details the scoring assessment by the City of Alexandria for the WFI project grant proposal with sections corresponding to the scorecard (*see Appendix M*) provided in the grant application documents. The required Scope of Work Narrative Checklist required for grant consideration is also included in the appendix (*see Appendix N*). Authorization and approval for grant application, and budget authority to co-fund the project (using existing CIP funds), was approved by Alexandria's City Council in continued support of this project (*see Appendix T*).

2.1 Acquisition of Land Consistent with Other Planning (Scorecard 6.1a- 50 points)

The WFI Project does not include any direct land acquisition. As part of the shoreline alignment, an estimated area of up to 0.54 acres of shoreline may require jurisdictional change to incorporate the bulkhead and/or riprap, depending on the project alternative selected by the City. The Project team has begun outreach efforts to the Army Corp of Engineers with respect to the construction of a new bulkhead in the Preliminary Jurisdictional Determination (*see Appendix O*). Acquisition of residential, commercial, or other structures are not required or anticipated.

2.2 Type of Project Work (Scorecard 6.1a- 45 points)

The WFI Project Alternative 1, at the 15 percent benchmark, is exploring the need to incorporate riprap or other living shoreline stabilization efforts. This project alternative is seeking to use landscape-based solutions to provide flood protection along with grading improvements to create a greener and more resilient shoreline. Under Project Alternative 2, a new bulkhead is proposed from Duke to Queen Street with subsequent greenspace programming improvements which includes allowances for new vegetation and landscape amenities.

2.3 Nature Based Approach (Scorecard 6.1b- 40 points)

"Nature-based solution" means an approach that reduces the impacts of flood and storm events using environmental processes and natural systems. A nature-based solution may provide additional benefits beyond flood control, including recreational opportunities and improved water quality. This includes a project that reduces these impacts by protecting, restoring, or emulating natural features.

The WFI Project's 15-30 percent project design will incorporate significant recreational opportunities as part of the greenspace created. Both proposed alternatives schematics (*see Appendix I and J*) include park space improvements and achieve a 6.0-ft elevation protection either at the shoreline or along the Waterfront. The use of underground stormwater detention chambers is also consistent between project alternatives. In addition, the shoreline area will have reduced dead zones further reducing stagnant water and debris, improving water quality.

2.4 Hybrid Approach (Scorecard 6.1b- 35 points)

Hybrid Solution means a project that incorporates nature-based and hardened solutions to achieve an outcome that is primarily nature-based. The WFI Project Alternatives 1 and 2 include nature-based management of stormwater and/or riverine flooding. Currently, discrete project elements qualify for the hybrid approach including:



- Creating a linear, landscape-based “green shoreline” of inland flood stage elevation protection with landscape infrastructure above the current bulkhead elevation which would allow for the desired flood protection and additional water infiltration with reduced drainage when river recedes. Traditional bulkhead construction may supplement where boat facilities and technical constraints occur.
- Use of riprap to support a natural shoreline. Options are being investigated to backfill riprap and create a natural shoreline that will allow for improved marine life habitats such as in the Thompson Alley section in Project Alternative 1 schematic (*see Appendix I*).
- Landscape-based resiliency will be achieved through the use of vegetation which can lock in erodible soils with living roots, and do not require the levels of routine maintenance and capital investment as compared to hardscapes and hard infrastructure.
- Incorporation of native plants and trees to create an “urban canopy” and create a natural environment for plants and animals. Trees (preservation of existing and new plantings) will help uptake and manage stormwater.
- Incorporating underground stormwater detention chambers, similar to natural reservoirs, reducing sediment and pollution introduction to the Potomac River and attenuates the peak flow entering the downstream stormwater pumping station.
- Where feasible and practicable, green infrastructure and bioretention will be used to manage and treat stormwater – possibly within the upper reaches of the watershed or within park areas.
- Use of pump stations to better allow screening of debris from stormwater prior to discharge into the river thus contributing to improved river water quality as well as eliminate the tidal influence of flooding in Old Town.

2.5 Other Projects (Scorecard 6.1b- 25 points)

As a part of the WFI Project, both project alternatives seek to integrate other project elements to mitigate flooding and improve natural landscape features, including:

- Relocation of undergrounds utilities and relocation of existing transformers in the new Waterfront Park Pump Station above the critical elevation. This will improve the reliance of existing utilities servicing the Waterfront Area along Prince, King, and Strand Street. Additionally, undergrounning of utilities will reduce damage to existing and new Waterfront Park and Pump Station utilities and reduce emergency responses required. Pump Station(s) are equipped with a standby to ensure continuous operation even during a power outage.
- Design of stormwater pumping stations and underground detention structures to handle the peak flow from their designated drainage basin(s) per the Project Area. Due to limited greenspace and hydraulic conditions, stormwater chambers are only sited in Founders Park and Waterfront Park for Project Alternative 1 and 2, respectively. The chambers operate in tandem with the downstream pumping station(s) and are sized for the peak inflow that cannot be attenuated by the chambers. Collectively, they work together to manage the peak flow under design storm conditions and expel the total volume of runoff in a timely manner.
- Installation of pretreatment devices upstream of the stormwater chambers and/or pumping station(s). While the pretreatment solution has not been finalized, the City is considering hydrodynamic separators, which are VDEQ approved BMP Technology for sediment/nutrient removal as well as a trash and debris separator. Upstream pretreatment will reduce debris runoff into the stormwater piping, chambers, and/or pump stations.



- Installation of backflow prevention at all new stormwater outfalls to prevent sunny day flooding. New stormwater pumping station outfall(s) will be equipped with a check valve vault whereas the new, upsized Duke Street outfall will be equipped with a tide gate to eliminate tidal back-up.

2.6 Socially Vulnerable (Scorecard 7- 15 points)

The WFI project area includes two census tracts (see Appendix G). Census tract 2018.02 in the northern section of the project has a low social vulnerability score of -1.3. Census tract 2019 in the southern section has a low social vulnerability score of -2.1.

2.7 NFIP Project Impact (Scorecard 8- 10 points)

City of Alexandria established a [Floodplain Ordinance](#) through the NFIP Community Rating System, which can be found in the [Floodplain Management Plan](#) (FMP) 2015-2016. In terms of reported losses, there were twelve repetitive loss sites in Alexandria as of 2015, of which six are residential and six are non-residential. These 12 repetitive loss sites have experienced a collective of 30 losses, with a total payment of \$1,871,287 ([Northern Virginia HMP](#), 2017 (p.4-68)). The City is not under any suspension or probation during the grant term scope of work.

2.8 Low Income Geography (Scorecard 9- 10 points)

In both of the census tracts which will be affected by the WFI Project, the areas are not classified as low-income geography. The WFI Project will not have adverse environmental impacts on vulnerable or disadvantaged communities. In January 2021, the City issued Resolution No. 2974, All Alexandria: Committing to Race and Social Equity. The resolution, acknowledging the historical importance of the Potomac River to the Conoy and Powhatan chiefdoms, pledges to incorporate race and social equity into all strategic City planning efforts. *The WFI Project will be developed with the principles of this resolution in mind to ensure that flood mitigation and beautification efforts benefit the entirety of the City as an accessible community gathering place.*

2.9 Nitrogen, Phosphorus, or Sediment Reduction Efficiency (Scorecard 10- 5 points)

Per the [Chesapeake Bay TMDL Phase III Watershed Implementation Plan](#) published in August 2019, stormwater runoff is a significant contributor to added sediment into the waterways. WFI Project does comply with the Best Management Practices (BMP's) outlined in the Watershed Implementation Plan by the following strategies listed below:

- Reduced sediment erosion during sunny day flooding by implementation of new tide gates to eliminate this flooding source.
- Reduced debris in runoff through stormwater piping and pump station infrastructure for improved drainage during heavy rainfall and storm surge flooding, particularly with the use of an Isolator Row – VDEQ approved BMP Technology for the subsurface stormwater detention chambers along with pump station screens. Project Team is also considering upstream pretreatment devices for inlets including VDEQ approved hydrodynamic separators.
- Reduced sediment erosion and debris during storm surges by implementing riverine flood protection at or along the Waterfront.
- Reduced sediment erosion through implementation of “urban canopies” to better retain soil stability
- Reduced runoff during construction will be achieved by following BMP's and state required erosion control strategies and permitting.



2.10 Community Scale Benefits (Scorecard 11- 20 points)

According to this grant funding definition, “Community Scale project” means a project that provides demonstrable flood reduction benefits. The WFI Project, under all the proposed project alternatives at the 15 percent project benchmark, will provide several benefits to the community including the following:

- Creates a usable, resilient, and sustainable public amenity for all of Alexandria through recreational activities, greenspaces, and improved water quality at the waterfront
- Eliminates sunny day flooding
- Preserves historic structures and cultural resources which celebrate the City’s rich history
- Increases economic benefit to the entire City by increasing tourism
- Reduces property loss
- Reduces loss revenue and wages
- Increases tax base, and revenue, which will contribute to the operation, maintenance, and further resiliency planning for the City

Considering a 10-year return period level of protection, the City can expect that regularly flooding events will be eliminated, but that extreme events, e.g., Hurricane Camille with a peak intensity of 3.25 inches per hour on July 22, 1969, would still result in flooding.



Section 3

BUDGET NARRATIVE

3.1 Project Schedule and Phasing

The Waterfront Implementation (WFI) Project is one of the City's top priority capital improvements projects. With the increasing frequency of flood events, which will only be further exacerbated with climate change, and associated costs associated with repetitive flood damage the City is working to implement the WFI Project as soon as possible. The primary purpose of the WFI Project is to address flood mitigation; however the City has also committed to improve connectivity to and along the Waterfront as well as general park, open space and amenity improvements pending funding availability. The total project cost is estimated at \$105M, which scaled back to only include those project elements required to mitigate both riverine and stormwater flooding based on escalating project costs and funding constraints. Public use amenities, park space and other improvements were cutback based on available City funding. The cost of the WFI Project will be borne by the City's rate payers. Funding will also provide additional flexibility in the City's construction contingency to accommodate for quickly escalating costs of construction while allowing for full project implementation within the City budget constraints. The Receipt of federal and/or state funding supports the City in implementing the full WFI project, as described above, and immediately gain the full benefits of flood mitigation. Funding from the Virginia Community Flood Preparedness Fund (VCFPF) for this phase of planning/design will support the City in progressing the project from the two Project Alternatives to a Preferred Alternative which will be developed to 30% design.

Total cost for Project Alternative 1 is \$105M (see *Appendix P*) and Project Alternative 2 is \$122M (see *Appendix Q*). The total project estimated engineering costs for either alternative is similar with a variance of ~\$2.3M, at \$15.7M for Alternative 1 and \$18M for Alternative 2.

For the FY 21 Virginia Community Flood Preparedness Fund funding round, grant funding is requested for activities associated with the development of the 15 percent design, DB procurement, and 30 percent design documentation. The project is currently in the conceptual design phase with one of the two Project Alternatives to be selected at the 15 percent project benchmark. The City continues to advance the project design during this application and pre-award phase. Upon selection of the Project Alternative to carry forward, the City will develop the Project's Basis of Design Report (BODR) (to be submitted in Q2-2022). The BODR which will be used to develop the prioritization of project components and scoping documents to solicit a design-build team to finalize design and implement the project. Table 3 delineates the anticipated schedule for each of the project tasks identified under this grant funding request through DB procurement and 30 percent design.



Table 3 WFI Project Task Schedule

Waterfront Improvement Estimated Project Schedule										
Tasks	2021	2022				2023				2024
	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1
0-30 percent Project Completion & Procurement (all tasks)			★							
City Selection of Project Concept (Milestone)										
Task 100 – Design 15-30 percent										
Task 200-Owners Advisory Services										
Task 300- Preliminary Environmental Permitting										
Task 400-Public/Stakeholder Engagement										
Task 500-Grant Management and Status Update										

The schedule for tasks to be completed outside of the FY 21 Virginia Community Flood Preparedness Fund funding round include the final design of the WFI Project, by the selected design builder which will take between 18 and 24 months, depending on the selected project delivery method (i.e., progressive design build or design build, respectively). Construction will not begin before the fourth quarter of 2024 and is estimated between a 3 to 4-year construction period.

3.2 Budget and Match Funding Request

For the FY 21 Virginia Community Flood Preparedness Fund funding round, grant funding is requested for activities associated with site investigations, the development of the 15 percent design, DB procurement, and 30 percent design documentation with expenses are indicated below. This grant request is being categorized as a Hybrid Solution project with 60 percent/40 percent match criteria, per the Virginia Community Flood Preparedness Fund Grant manual defines this as a “project that incorporates nature-based and hardened solutions to achieve an outcome that is primarily nature-based”. The basis of this project type selection is discussed above in Section 2.



Table 4 WFI Estimated Budget

Project Alternative 1 - Alexandria WFI Project Cost Breakdown (15-30 percent Project Completion)			
Total Est. Construction Cost (CC)			\$ 78,289,000
Total Design Build Costs			\$ 93,947,000
Total Estimated Project Cost			\$ 105,689,000
Task 100 Design - Design Builder Fee Design 15-30 percent	30 percent	of Total DB Cost	\$ 3,523,000
Task 200 Owners Advisory Services ¹	30 percent	of Total of OA Fee	\$ 705,000
Task 300 Preliminary Env. Permitting ²			
Task 400 Public/Stakeholder Engagement	30 percent	of Total Industry Outreach ³	\$ 1,174,200
Task 500 Grant Management and Status Update			
Total Estimated project cost 15-30 percent Completion			\$ 5,402,000
Project Alternative 2 - Alexandria WFI Project Cost Breakdown (15-30 percent Project Completion)			
Total Est. Construction Cost (CC)			\$ 90,338,000
Total Design Build Costs			\$ 108,406,000
Total Estimated Project Cost			\$ 121,957,000
Task 100 Design - Design Builder Fee Design 15-30 percent	30 percent	of Total DB Cost	\$ 4,065,000
Task 200 Owners Advisory Services ¹	30 percent	of Total of OA Fee	\$ 813,000
Task 300 Preliminary Env. Permitting ²			
Task 400 Public/Stakeholder Engagement	30 percent	of Total Industry Outreach ³	\$ 1,355,000
Task 500 Grant Management and Status Update			
Total Estimated project cost 15-30 percent Completion			\$ 6,233,000
<u>Notes:</u>			
1. Owners Advisory Services is inclusive of outstanding <i>Project Planning Tasks</i> , i.e., selection and refinement of project concept and submission of a Basis of Design Report, as well as <i>Procurement</i> and <i>Design Builder Oversight</i> during the 15 to 30 percent design.			
2. This includes any additional field investigations as required by the regulatory agency permit approval process.			
3. Total Industry Outreach Fees is assumed to be 5% of the total estimated construction cost.			



All line items in the budget estimate represent cost incurred during design activities. Due to the nature of a progressive design build delivery method a significant amount of frontloading of public engagement, planning, and field investigations occur during this phase as noted in the lower line-item accounting for 30 percent of the Environmental fees line item listed in the total project alternative costs (see Appendix P and Q).

Table 5 [WFI Match Funds](#)

Source Funding & Grant Matching – Project Alternative 1		
Project Type	Hybrid Solution	
VCFPF Fund Request	\$ 3,241,000	60 percent
City Cost Share	\$ 2,161,000	40 percent
Project Total	\$ 5,402,000	
Source Funding & Grant Matching – Project Alternative 2		
Project Type	Hybrid Solution	
VCFPF Fund Request	\$ 3,740,000	60 percent
City Cost Share	\$ 2,493,000	40 percent
Project Total	\$ 6,233,000	

For the FY 21 Virginia Community Flood Preparedness Fund Grant Round 2 funding, the City is requesting grant funding for activities associated with the development of the 15 percent design, DB procurement, and 30 percent design documentation. The total cost of these activities is \$5,402,000, which is based on the Project Alternative 1. Assuming a 60 percent match requirement, for a hybrid solution, the City is requesting a total of \$3,241,000, with the City providing \$2,161,000 in match funding. The City has available the required funding match for the project.

3.3 Source of Available Funds

Funding for the WFI Project, the City's top priority flood mitigation project, will be provided through the City's Capital Improvement Program (CIP) budget. The City has currently funded the project at \$102M in the CIP. It will be paid for by about 80 percent bonds and 20 percent direct revenue sources. Alexandria, like many other public utilities, continues to pursue Federal and State grants to potentially reduce impacts to its rate payers. Current funding is short of projected need and receipt of State funding will close the gap for the Project to complete key flood mitigation design and implementation. The City has dedicated funding available for co-funding match requirement. Future maintenance costs for this project (post-construction) will be provided from the City's Operation and Maintenance Budget. The City of Alexandria Department of Recreation, Parks, and Cultural Activities has confirmed the budgetary priority to support the success of this project (see Appendix L).



Section 4

CONCLUSION

The City of Alexandria, VA has experienced flooding events with an increase frequency and severity in more recent years due to the impact of climate change, increased rainfall, and tidal influence of the Potomac River which has significantly impaired the historic waterfront area. Currently, on average the City experiences backflow of river outfalls 60 times per year, overtopping of the existing waterfront bulkhead as many as 30 times per year, and inundation of undersized storm sewers as many as 10 times per year. The City has been actively planning for improvements to mitigate this flooding throughout its jurisdiction to respond to the changing environment and threats created to its citizens and building and facilities with unique historical value. The WFI Project will mitigate the waterfront flooding in the project area. Both Project Alternatives, currently under consideration for the WFI Project,, will meet established design criteria and are anticipated to provide similar benefits. Both project alternatives incorporate the City's ongoing planning and implementation of blue-green infrastructure, stormwater conveyance infrastructure improvements, natural environment solutions, making recreational areas more resilient, and implementation hardscape solutions to benefit the community in multiple facets. **The City of Alexandria, and its residents and business owners, are requesting funding support for the advancement of the Waterfront Implementation Project which will be a high-yield investment into the planning process to protect and preserve life, property, and the important history of Alexandria's waterfront from the current and increasing threats from our changing environment and climate.**



Appendix A

PROJECT AREA MAP

DCR GRANT APPLICATION | CITY OF ALEXANDRIA

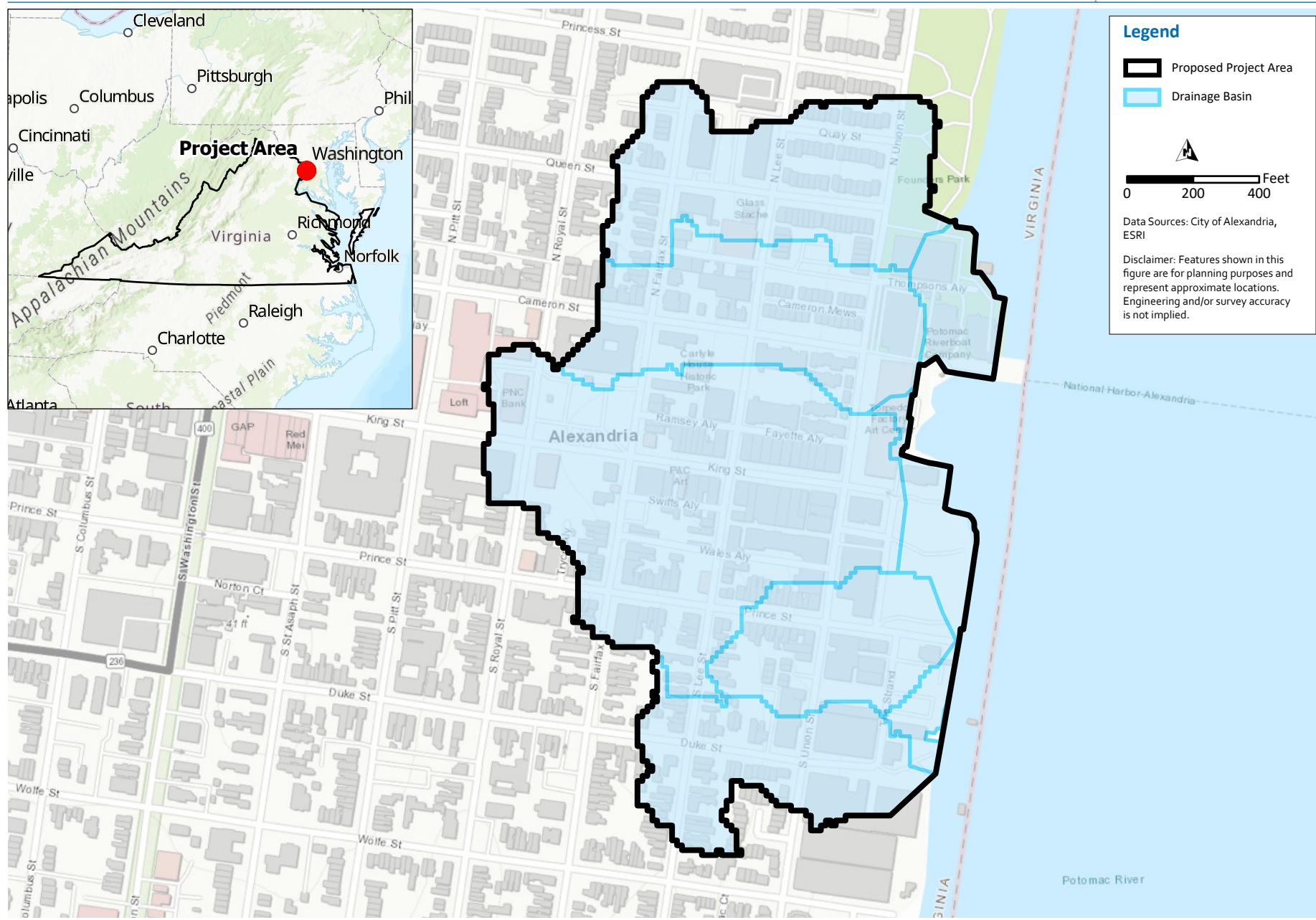


Figure 1 Project Area

DCR GRANT APPLICATION | CITY OF ALEXANDRIA

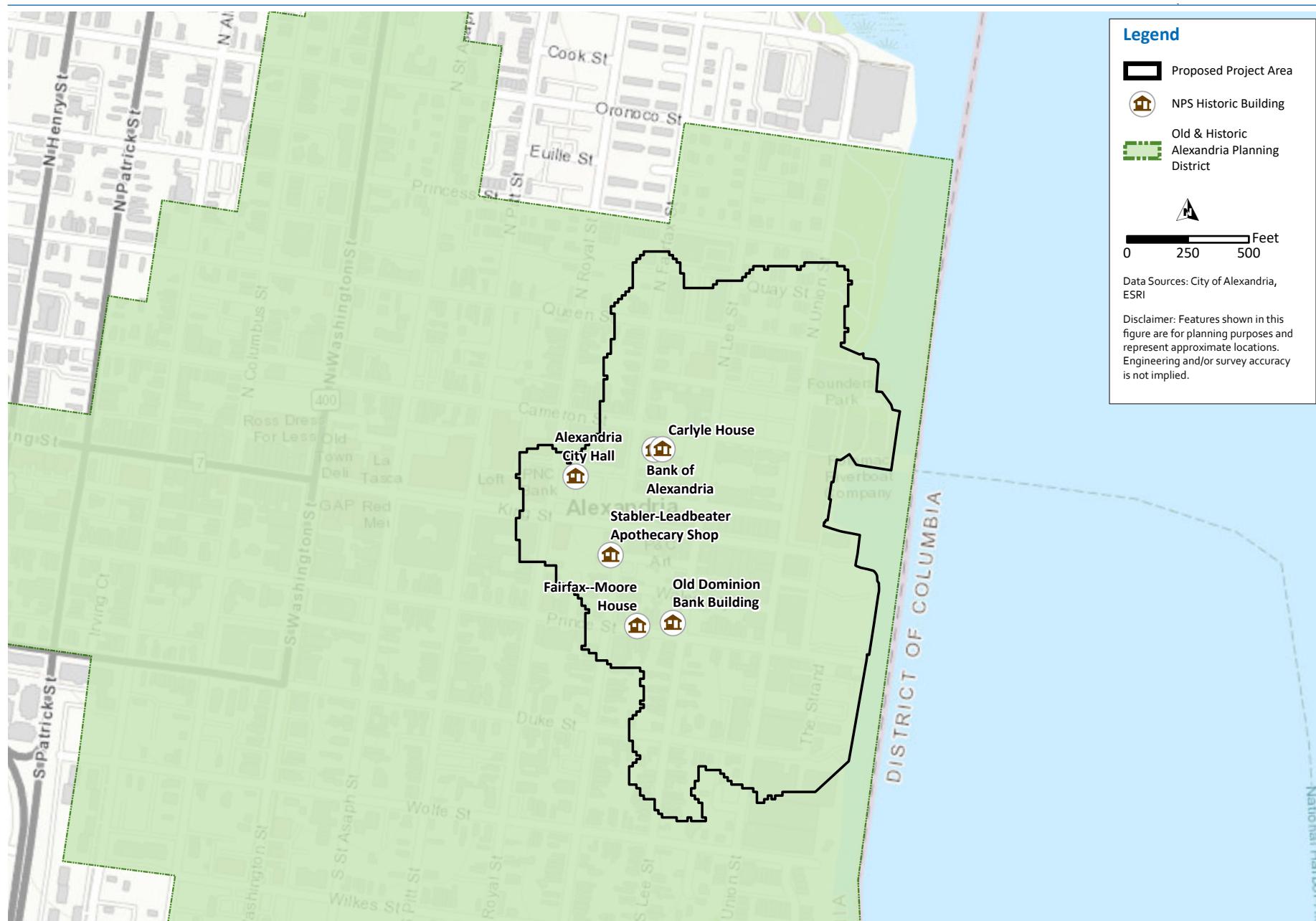


Figure 2 Historic Sites within Project Area



Appendix B

SUPPLEMENTAL PHOTOS OF ALEXANDRIA FLOODING

Waterfront Park

Alexandria, VA

Fri, Oct 29th, 2021 2:29 PM

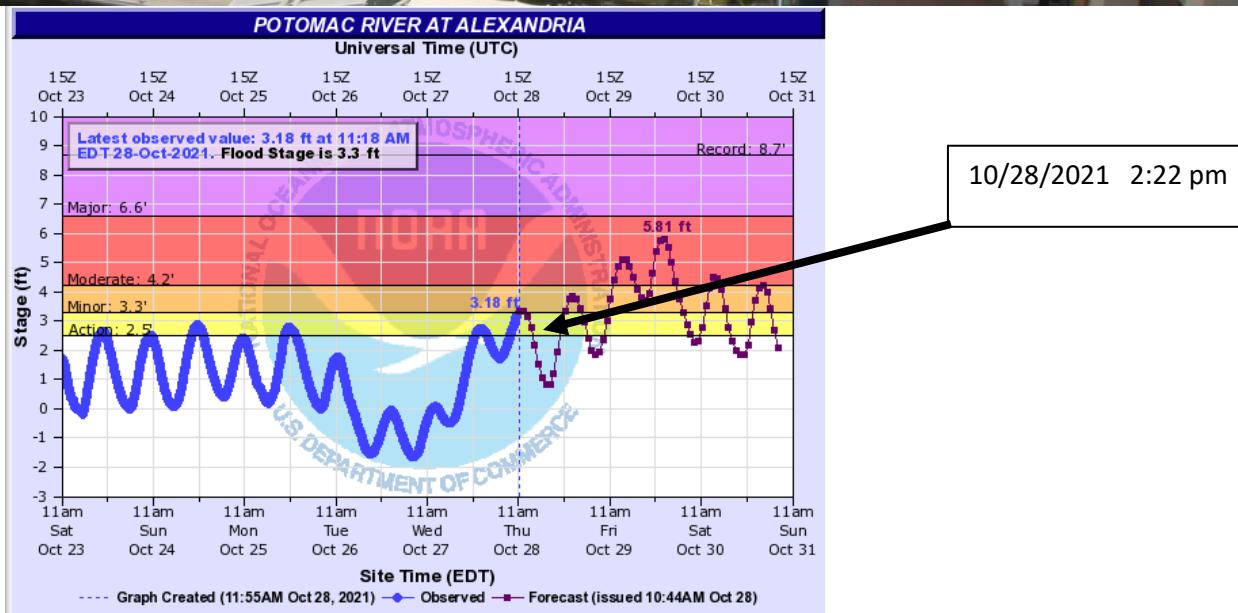
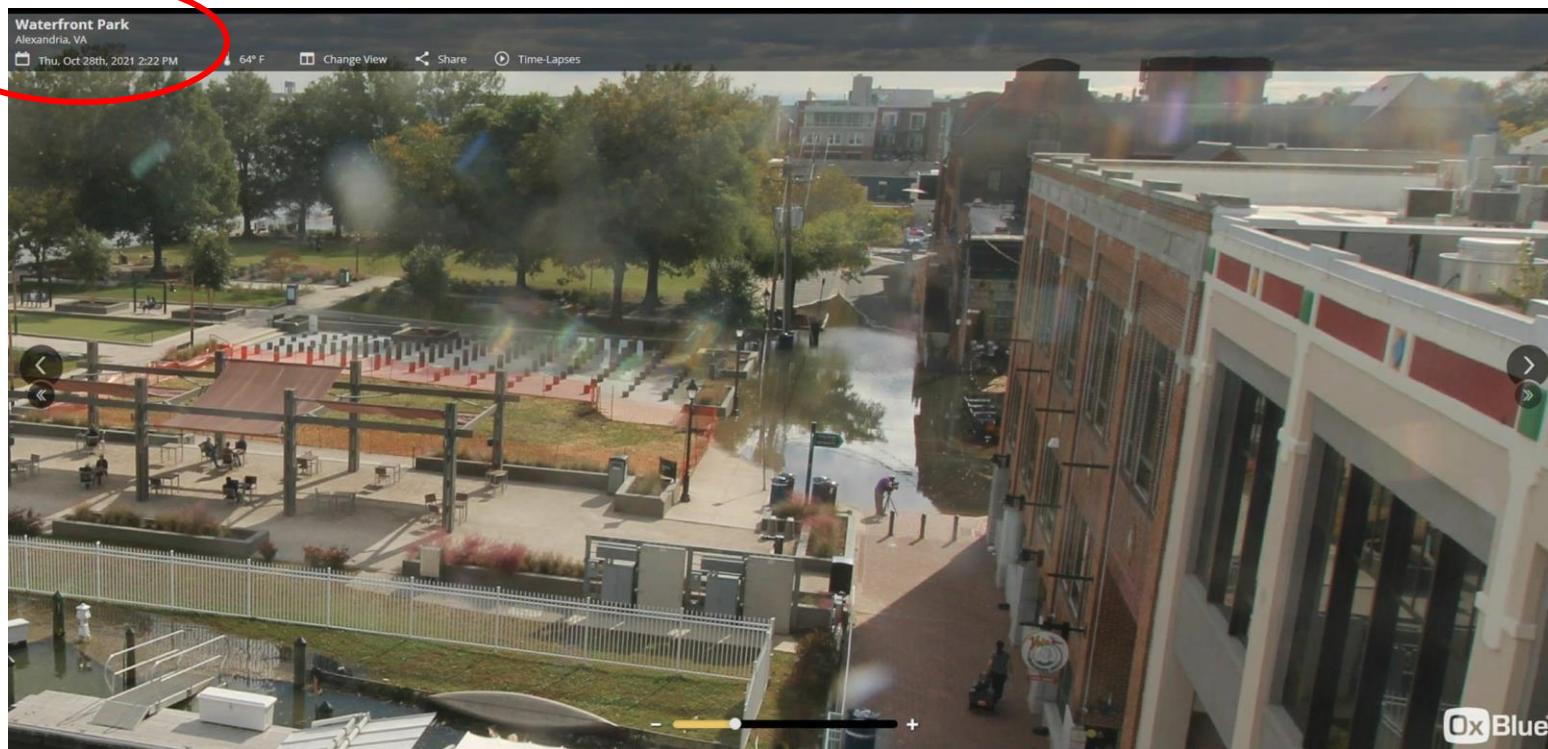
61° F

Change View

Share

Time-Lapses





Waterfront Park
Alexandria, VA

 Fri, Oct 29th, 2021 2:29 PM

61° F

 Change View

 Share

 Time-Lapses



Waterfront Park

Alexandria, VA

Thu, Sep 23rd, 2021 10:59 AM

64° F

Change View

Share

Time-Lapses



XX

Waterfront Park

Alexandria, VA

 Fri, Aug 20th, 2021 7:38 AM

 75° F

 Change View

 Share

 Time-Lapses





Appendix C

NOAA ATLAS 14 RAINFALL DATA

**NOAA Atlas 14, Volume 2, Version 3****Location name: Alexandria, Virginia, USA*****Latitude: 38.8023°, Longitude: -77.039°****Elevation: -2.43 ft****

* source: ESRI Maps

** source: USGS

**POINT PRECIPITATION FREQUENCY ESTIMATES**

G.M. Bonnin, D. Martin, B. Lin, T. Parzybok, M. Yekta, and D. Riley

NOAA, National Weather Service, Silver Spring, Maryland

[PF tabular](#) | [PF graphical](#) | [Maps & aerials](#)
PF tabular

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.357 (0.324-0.393)	0.429 (0.389-0.471)	0.509 (0.462-0.562)	0.569 (0.514-0.627)	0.645 (0.578-0.711)	0.701 (0.625-0.774)	0.756 (0.671-0.837)	0.810 (0.714-0.901)	0.879 (0.765-0.984)	0.933 (0.806-1.05)
10-min	0.571 (0.518-0.627)	0.686 (0.622-0.753)	0.816 (0.739-0.899)	0.910 (0.822-1.00)	1.03 (0.922-1.13)	1.12 (0.996-1.23)	1.20 (1.07-1.33)	1.28 (1.13-1.43)	1.39 (1.21-1.56)	1.47 (1.27-1.66)
15-min	0.714 (0.648-0.784)	0.862 (0.782-0.947)	1.03 (0.935-1.14)	1.15 (1.04-1.27)	1.30 (1.17-1.44)	1.41 (1.26-1.56)	1.52 (1.35-1.68)	1.62 (1.43-1.80)	1.75 (1.52-1.96)	1.85 (1.59-2.08)
30-min	0.978 (0.888-1.08)	1.19 (1.08-1.31)	1.47 (1.33-1.62)	1.67 (1.51-1.84)	1.93 (1.73-2.13)	2.13 (1.90-2.35)	2.33 (2.06-2.58)	2.52 (2.22-2.80)	2.79 (2.42-3.12)	2.99 (2.58-3.37)
60-min	1.22 (1.11-1.34)	1.49 (1.36-1.64)	1.88 (1.70-2.07)	2.17 (1.96-2.39)	2.57 (2.30-2.83)	2.88 (2.57-3.19)	3.21 (2.84-3.55)	3.54 (3.12-3.93)	4.00 (3.48-4.47)	4.36 (3.77-4.92)
2-hr	1.41 (1.28-1.55)	1.72 (1.56-1.89)	2.17 (1.97-2.39)	2.53 (2.28-2.78)	3.03 (2.72-3.34)	3.44 (3.07-3.79)	3.87 (3.42-4.27)	4.31 (3.79-4.78)	4.95 (4.29-5.53)	5.46 (4.69-6.14)
3-hr	1.50 (1.37-1.67)	1.83 (1.66-2.02)	2.32 (2.09-2.56)	2.71 (2.44-2.99)	3.27 (2.92-3.60)	3.72 (3.31-4.11)	4.21 (3.71-4.65)	4.72 (4.12-5.24)	5.46 (4.70-6.10)	6.07 (5.16-6.82)
6-hr	1.83 (1.67-2.03)	2.22 (2.02-2.46)	2.81 (2.54-3.10)	3.29 (2.96-3.63)	4.00 (3.57-4.42)	4.60 (4.07-5.09)	5.25 (4.60-5.82)	5.96 (5.16-6.63)	7.00 (5.96-7.86)	7.87 (6.60-8.89)
12-hr	2.21 (1.99-2.47)	2.67 (2.40-2.98)	3.39 (3.04-3.79)	4.01 (3.58-4.48)	4.95 (4.38-5.52)	5.77 (5.05-6.45)	6.69 (5.78-7.49)	7.71 (6.56-8.66)	9.26 (7.72-10.5)	10.6 (8.68-12.1)
24-hr	2.56 (2.33-2.85)	3.10 (2.82-3.45)	3.98 (3.62-4.43)	4.76 (4.30-5.28)	5.95 (5.34-6.57)	7.01 (6.24-7.70)	8.21 (7.24-8.98)	9.56 (8.35-10.4)	11.6 (10.0-12.7)	13.5 (11.4-14.6)
2-day	2.97 (2.70-3.30)	3.60 (3.27-4.00)	4.62 (4.20-5.12)	5.49 (4.97-6.08)	6.81 (6.13-7.52)	7.96 (7.11-8.76)	9.24 (8.18-10.2)	10.7 (9.36-11.7)	12.8 (11.1-14.1)	14.7 (12.5-16.1)
3-day	3.15 (2.86-3.49)	3.81 (3.47-4.23)	4.87 (4.43-5.40)	5.79 (5.25-6.41)	7.17 (6.46-7.91)	8.37 (7.49-9.21)	9.70 (8.61-10.7)	11.2 (9.84-12.3)	13.4 (11.6-14.7)	15.3 (13.1-16.8)
4-day	3.32 (3.02-3.68)	4.01 (3.66-4.45)	5.13 (4.67-5.68)	6.09 (5.52-6.73)	7.53 (6.79-8.30)	8.78 (7.87-9.66)	10.2 (9.03-11.2)	11.7 (10.3-12.9)	14.0 (12.2-15.4)	16.0 (13.8-17.6)
7-day	3.84 (3.52-4.23)	4.62 (4.24-5.10)	5.84 (5.35-6.43)	6.89 (6.29-7.57)	8.44 (7.66-9.26)	9.78 (8.83-10.7)	11.3 (10.1-12.3)	12.9 (11.5-14.1)	15.3 (13.4-16.8)	17.4 (15.1-19.1)
10-day	4.39 (4.04-4.81)	5.27 (4.85-5.78)	6.59 (6.05-7.21)	7.68 (7.04-8.40)	9.27 (8.46-10.1)	10.6 (9.62-11.6)	12.0 (10.9-13.1)	13.6 (12.2-14.8)	15.9 (14.1-17.3)	17.8 (15.6-19.4)
20-day	5.93 (5.52-6.40)	7.06 (6.56-7.61)	8.52 (7.92-9.20)	9.72 (9.02-10.5)	11.4 (10.5-12.3)	12.7 (11.7-13.7)	14.1 (12.9-15.2)	15.6 (14.2-16.7)	17.6 (15.9-18.9)	19.2 (17.2-20.7)
30-day	7.30 (6.80-7.84)	8.64 (8.06-9.28)	10.3 (9.57-11.0)	11.6 (10.8-12.4)	13.4 (12.4-14.4)	14.8 (13.7-15.9)	16.3 (15.0-17.5)	17.8 (16.3-19.1)	19.9 (18.1-21.3)	21.5 (19.4-23.1)
45-day	9.17 (8.61-9.75)	10.8 (10.2-11.5)	12.6 (11.9-13.4)	14.0 (13.2-14.9)	15.9 (14.9-16.9)	17.3 (16.2-18.4)	18.7 (17.4-19.8)	20.0 (18.7-21.3)	21.8 (20.2-23.2)	23.1 (21.3-24.6)
60-day	10.9 (10.3-11.6)	12.8 (12.1-13.6)	14.8 (14.0-15.7)	16.3 (15.4-17.3)	18.3 (17.2-19.3)	19.7 (18.5-20.9)	21.1 (19.8-22.3)	22.4 (20.9-23.8)	24.0 (22.4-25.5)	25.2 (23.4-26.8)

¹ Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

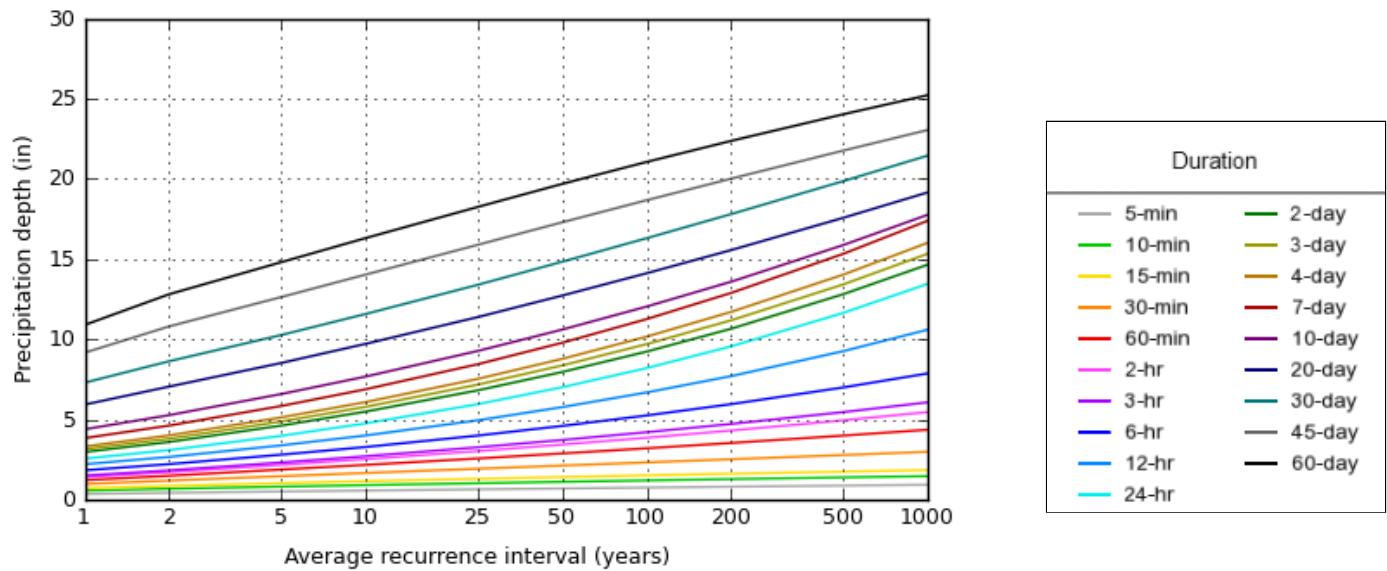
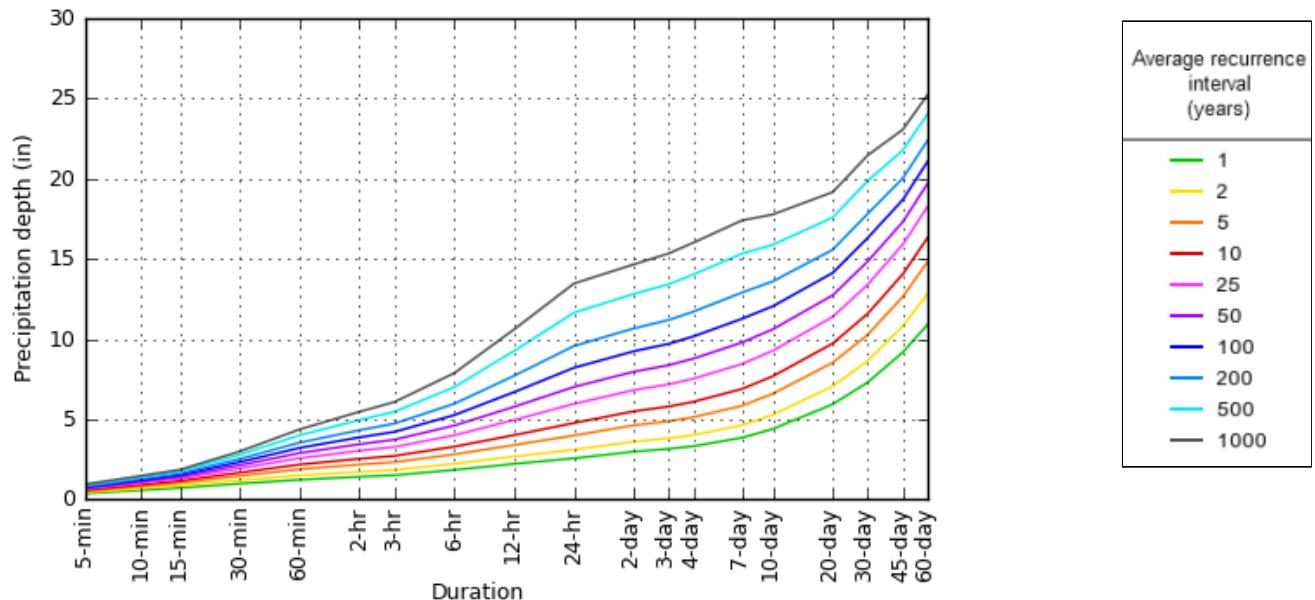
Please refer to NOAA Atlas 14 document for more information.

[Back to Top](#)

PF graphical

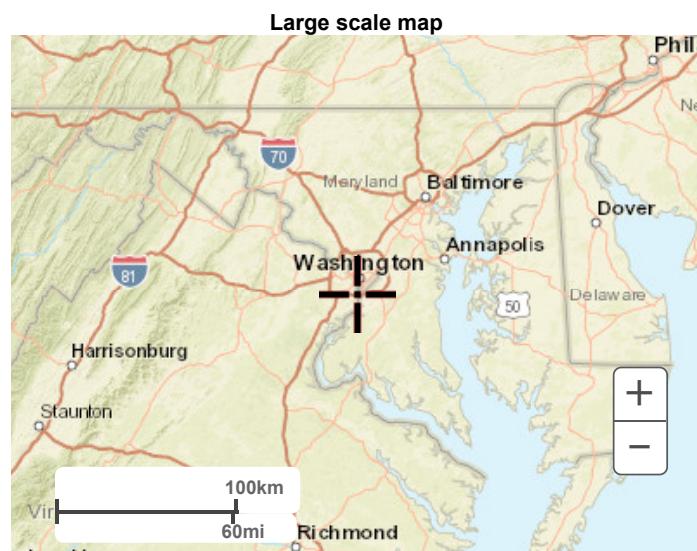
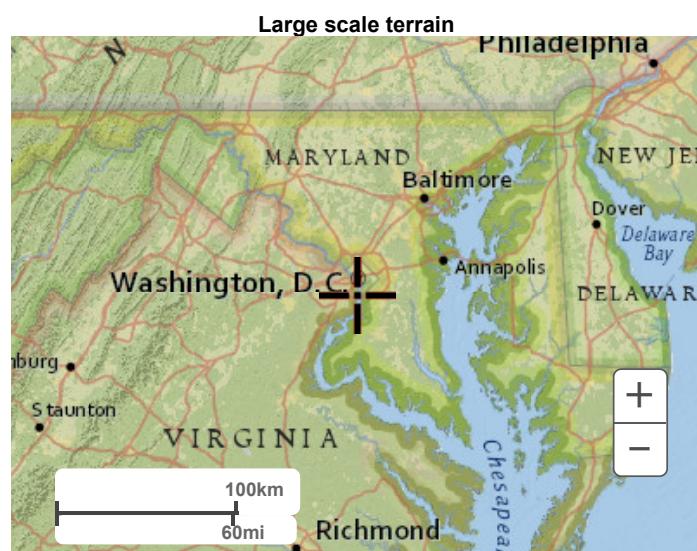
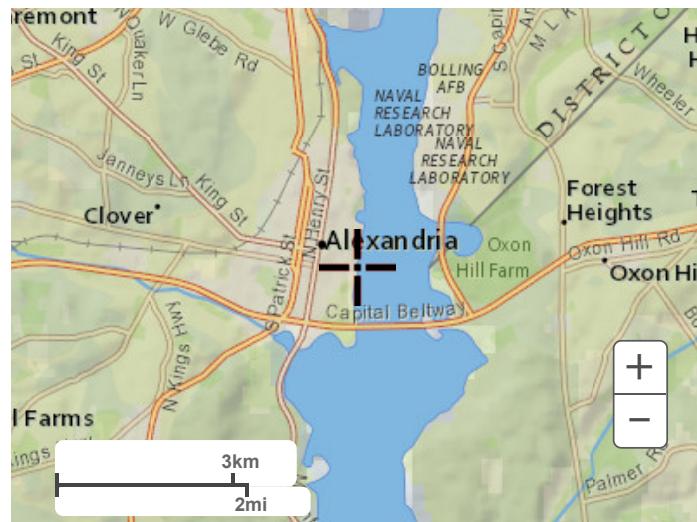
08/15/21
recorded
rainfall
of 5.19"

PDS-based depth-duration-frequency (DDF) curves
Latitude: 38.8023°, Longitude: -77.0390°

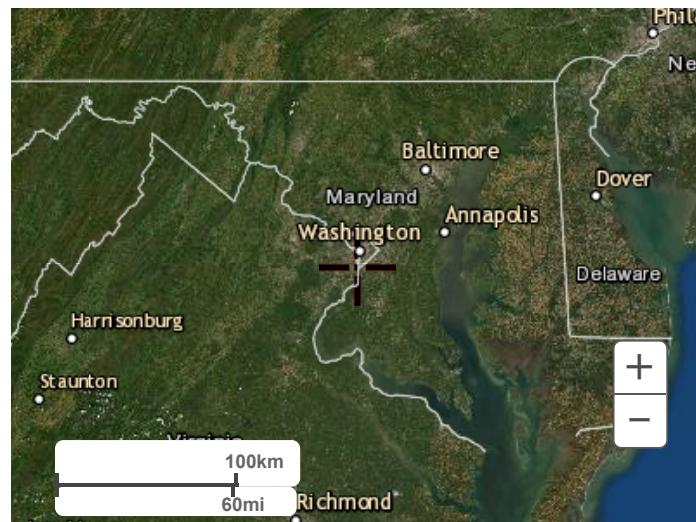


Maps & aerials

[Small scale terrain](#)



Large scale aerial



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[National Oceanic and Atmospheric Administration](#)
[National Weather Service](#)
[National Water Center](#)
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

[Disclaimer](#)



Appendix D

INTENSITY-DURATION-FREQUENCY (IDF) CURVES

Alexandria & Neighboring Jurisdictions
IDF Comparison
1 - 24 Hours
Time of Concentration

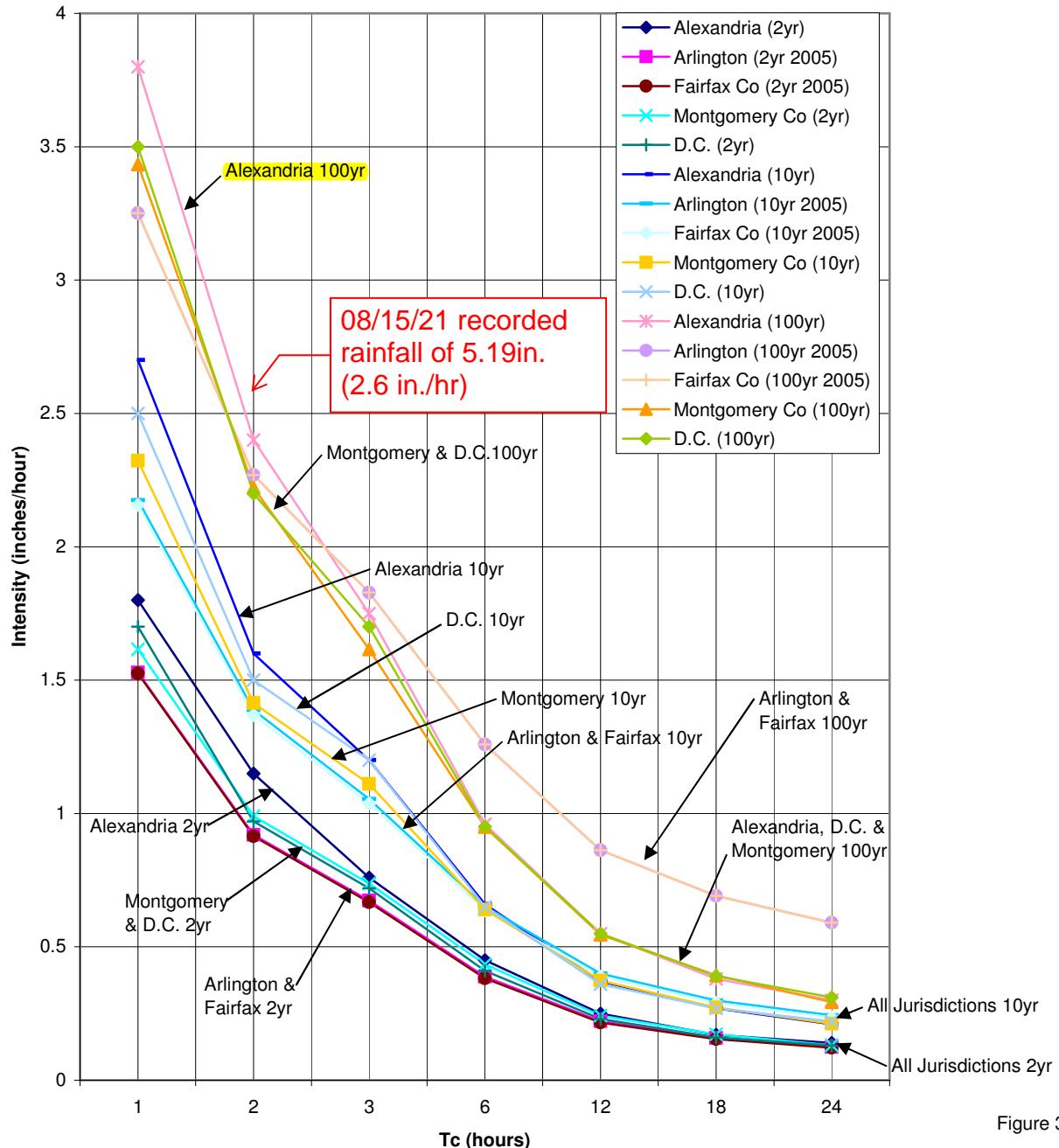


Figure 3

Full Stormwater assessment and IDF curves can be found at the following City webpage:
<https://www.alexandriava.gov/uploadedFiles/tes/Stormwater/1AlexandriaStormDesignCriteria.pdf>



Appendix E

FEMA HISTORICAL LOSSES & NFIP CLAIM STATISTICS

**Table 4.24 Repetitive Loss and Severe Repetitive Loss Properties, as of October 2015.**

Jurisdiction	Number of Repetitive Loss Properties			Total Number of Losses	Total Building Payment	Total Contents Payment	Total Payment
	Residential	Non-Residential	Total				
Arlington County	2	0	2	4	\$102,468	\$16,827	\$119,295
Fairfax County	76	1	77	160	\$3,015,231	\$200,340	\$3,215,571
Town of Herndon	1	0	1	2	\$5,928	\$0	\$5,928
Town of Clifton	1	0	1	2	\$18,983	\$24,750	\$42,733
Loudoun County	13	1	14	46	\$1,097,410	\$336,513	\$1,433,922
Prince William County	17	1	18	61	\$1,478,608	\$285,097	\$1,763,705
City of Alexandria	6	6	12	30	\$1,312,222	\$559,065	\$1,871,287
City of Fairfax	5	0	5	12	\$519,284	\$71,864	\$591,148
City of Falls Church	1	0	1	3	\$166,432	\$13,836	\$180,268
City of Manassas	3	1	4	10	\$46,664	\$23,845	\$70,509
City of Manassas Park	1	0	1	2	\$78,647	\$9,654	\$88,301
TOTAL	125	10	138	332	\$7,841,875	\$1,541,792	\$9,383,667



Table 4.23. NFIP policy and claim statistics.

County	Community Name	Policy Statistics (as of 10/31/2015)		Claim Statistics 1/1/1978 – 10/31/2015	
		Policies In-Force	Premiums Paid	Total Claims	Total Payment
	Town of Round Hill	2	\$872	-	-
	<i>Total</i>	901	\$504,687	137	\$1799,402
Prince William County	Prince William County	1,351	\$856,788	150	\$4,630,540
	Town of Dumfries	16	\$20,703	9	\$34,842
	Town of Haymarket	4	\$1,803	1	\$0
	Town of Occoquan	34	\$57,025	19	\$65,187
	Town of Quantico	4	\$2,364	-	-
	<i>Total</i>	1,409	\$1,877,366	179	\$4,730,569
City of Alexandria	City of Alexandria	1,155	\$1,112,202	266	\$3,762,441
	<i>Total</i>	1,155	\$1,112,202	266	\$3,762,441
City of Fairfax	City of Fairfax	172	\$301,415	50	\$885,955
	<i>Total</i>	172	\$301,415	50	\$885,955
City of Falls Church	City of Falls Church	172	\$181,571	45	\$399.413
	<i>Total</i>	172	\$181,571	45	\$399413
City of Manassas	City of Manassas	90	\$64,445	30	\$215,536
	<i>Total</i>	90	\$64,445	30	\$215,536
City of Manassas Park	City of Manassas Park	20	\$17,927	7	\$94,804
	<i>Total</i>	20	\$17,927	7	\$94,804
NOVA Total:		9,626	\$6,674,187	2,057	\$23,105,494

Floodplain management regulations are the cornerstone of NFIP participation. Communities that participate in the NFIP are expected to adopt and enforce floodplain management regulations. These regulations apply to all types of floodplain development and ensure that development activities will not cause an increase in future flood damages. Buildings are required to be elevated at or above the BFE.



Appendix F

REFERENCE LINKS & OTHER SUPPORTING LINKS

Reference Links Other Supporting Links

References

Link 1: Historical Flood Damage Data - [Northern Virginia Hazard Mitigation Plan \(2017\)](#)

Link 2: [Alexandria Floodplain Ordinance](#)

Link 3: City of Alexandria Comprehensive Plan – [Alexandria Waterfront Small Area Plan](#)

Other Project Support References

Link 4: Climate Change Study & IDF Curves: [Rainfall Frequency and Global Change Model Options for the City of Alexandria, Virginia](#)

Link 5: [City of Alexandria's Green Building Policy \(2019\)](#)

Link 6: [City of Alexandria's Green Stormwater Infrastructure Plan](#)

Link 7: [Alexandria's Waterfront Plan](#)

Link 8: [Flood Action Alexandria](#)

Link 9: [Flood Response Plan](#)

Link 10: [Emergency Operations Plan \(EOP\)](#)

Link 11: [City of Alexandria Storm Sewer Capacity Analysis \(CASSCA, 2016\)](#)

Link 12: Other Sewer Projects: [FY 2022 – FY 2031 Storm Sewer Capacity Projects](#)

Link 13: [FY 2022 - FY 2031 Stormwater Management Utility Ten-Year Plan](#)

Link 14: [Alexandria's Masterplan and Small Area Masterplans](#)

Link 15: [Resilient Alexandria Charter](#)

Link 16: [CRS Community Certification](#)

Link 17: [Eco-City Charter](#)

Link 18: [Eco-City Action Plan 2040](#)

Link 19: [Alexandria Landscape Guidelines](#)

Link 20: [Urban Forest Masterplan](#)

Link 21: [Chesapeake Bay TMDL Phase III Watershed Implementation Plan](#)



Appendix G

SOCIAL VULNERABILITY MAP & INDEX SCORES



October 19, 2021

1:4,514
0 0.0225 0.045 0.09 mi
0 0.035 0.07 0.14 km

Social Vulnerability Classification

- Low Social Vulnerability
- High Social Vulnerability
- Moderate Social Vulnerability
- Moderate Social Vulnerability
- Not Socially Vulnerable
- ☒ Not included in the analysis
- ☒ Not included in the analysis

Social Vulnerability Index Score

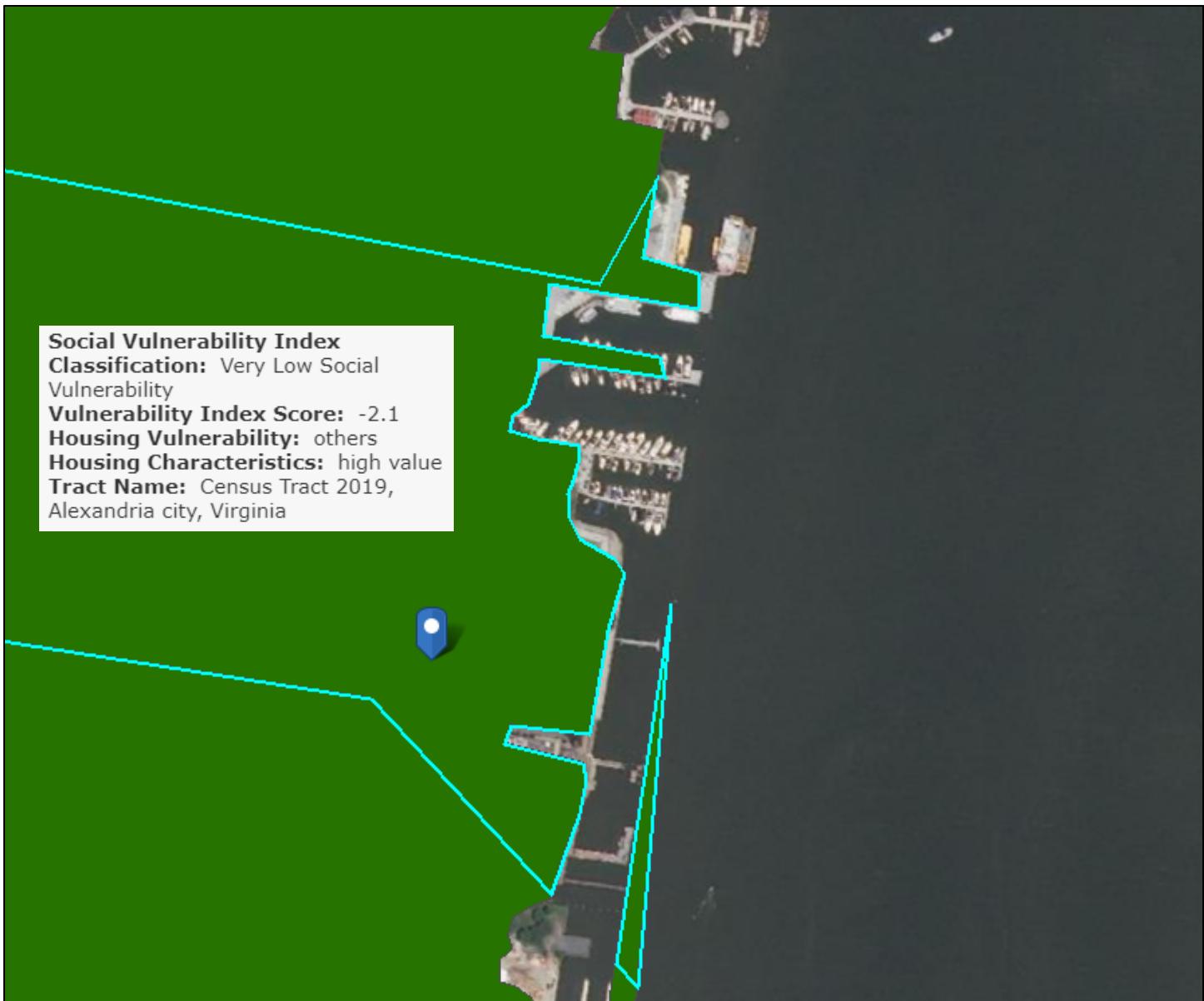
- Very Low Social Vulnerability

Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Created from the Virginia Vulnerability Viewer



ADAPTVA



October 19, 2021

Social Vulnerability Classification

- █ High Social Vulnerability
- █ Moderate Social Vulnerability
- █ Not Socially Vulnerable
- █ Not included in the analysis
- █ Low Social Vulnerability
- █ High Social Vulnerability
- █ Very High Social Vulnerability
- █ Not included in the analysis

Social Vulnerability Index Score

- █ Very Low Social Vulnerability

1:4,514
0 0.0225 0.045 0.09 mi
0 0.035 0.07 0.14 km

Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Created from the Virginia Vulnerability Viewer



ADAPTVA



Appendix H

FEMA FIRMETTE

National Flood Hazard Layer FIRMette



77°2'43"W 38°48'26"N



Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS

Without Base Flood Elevation (BFE) Zone A, V, A99
With BFE or Depth Zone AE, AO, AH, VE, AR
Regulatory Floodway

0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X

Future Conditions 1% Annual
Chance Flood Hazard Zone X

Area with Reduced Flood Risk due to
Levee. See Notes. Zone X

Area with Flood Risk due to Levee Zone D

OTHER AREAS OF FLOOD HAZARD

NO SCREEN Area of Minimal Flood Hazard Zone X

Effective LOMRs

Area of Undetermined Flood Hazard Zone D

OTHER AREAS

— Channel, Culvert, or Storm Sewer

||||| Levee, Dike, or Floodwall

20.2 Cross Sections with 1% Annual Chance

17.5 Water Surface Elevation

8 — Coastal Transect

~~~ 513 ~~~ Base Flood Elevation Line (BFE)

Limit of Study

Jurisdiction Boundary

Coastal Transect Baseline

Profile Baseline

Hydrographic Feature

### OTHER FEATURES

Digital Data Available

No Digital Data Available

Unmapped



The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 10/19/2021 at 12:10 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.



Appendix I

## PROJECT ALTERNATIVE #1 SCHEMATIC



# Project Alternative No. 1

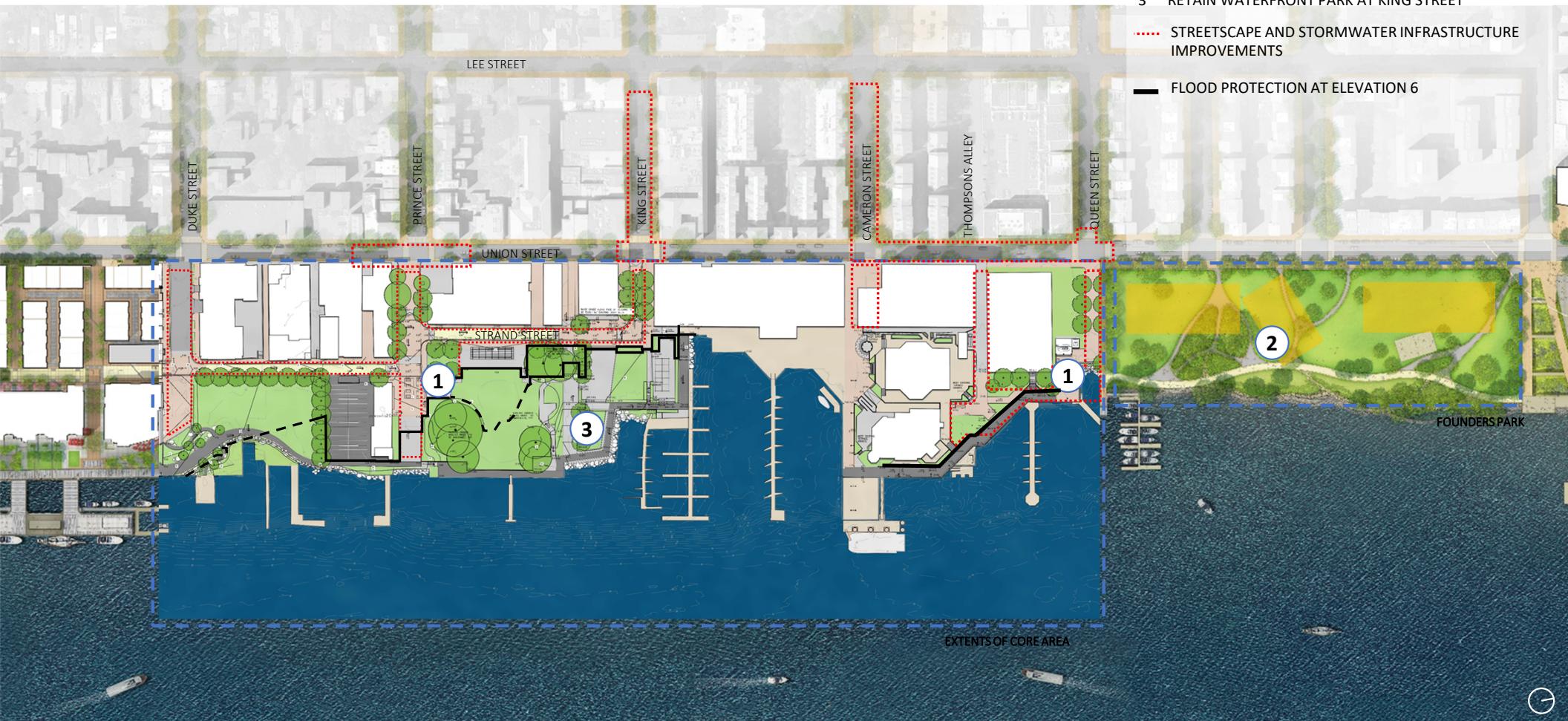
The overall schematic summarizes the key components to this Project Alternative which mitigates against rainfall-runoff induced flooding and tidal back-up with comprehensive storm sewer capacity upgrades, two new stormwater pumping stations, and large-scale stormwater attenuation devices in Founders Park. To protect against riverine flooding, the Project uses mostly softscape solutions to provide protection. Options 1 and 2 differentiate based on the alignment of protection such that one prioritizes Waterfront protection whereas the other offers more inland protection at the park spaces.



# // Overall Schematic Option 1

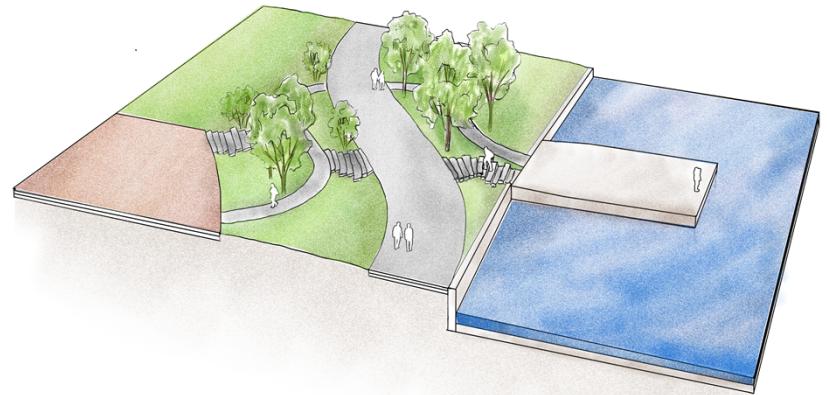
## LEGEND

- 1 PUMP STATION
- 2 UNDERGROUND STORMWATER DETENTION CHAMBERS
- 3 RETAIN WATERFRONT PARK AT KING STREET
- ... STREETSCAPE AND STORMWATER INFRASTRUCTURE IMPROVEMENTS
- FLOOD PROTECTION AT ELEVATION 6



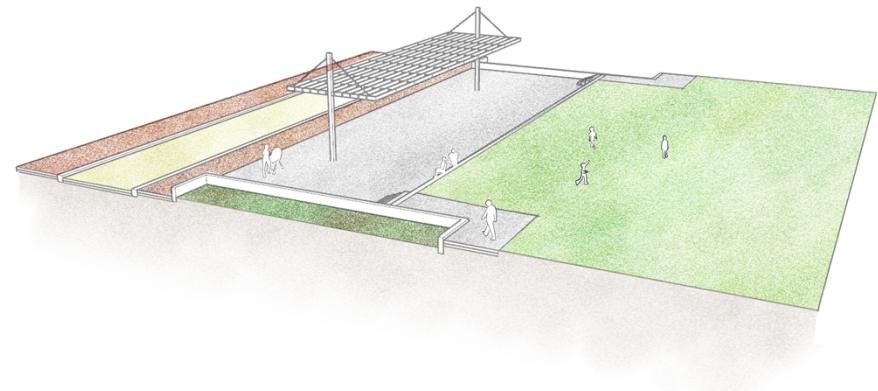


# // Point Lumley – Option 1



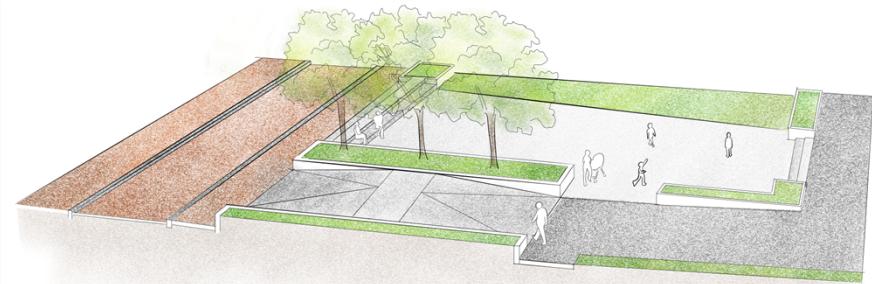


# // Waterfront Park – Option 1



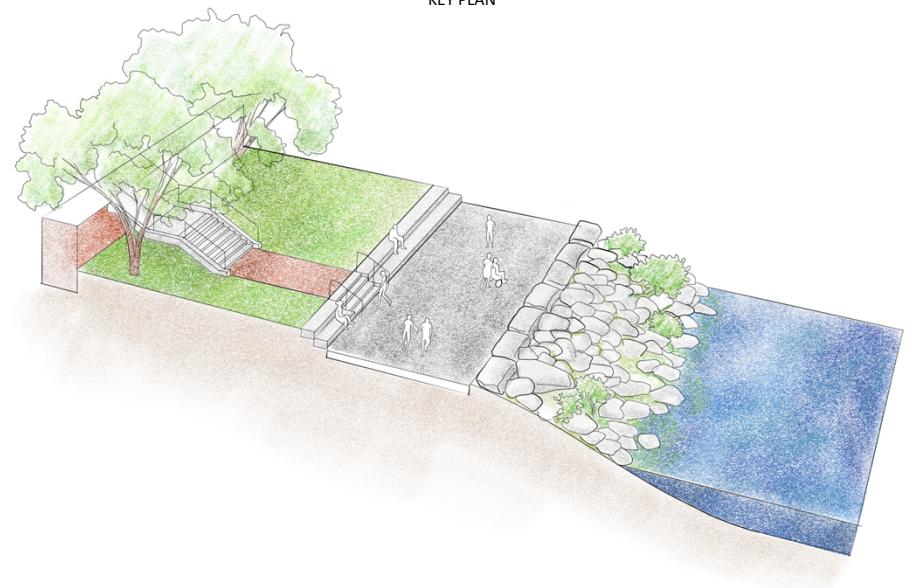
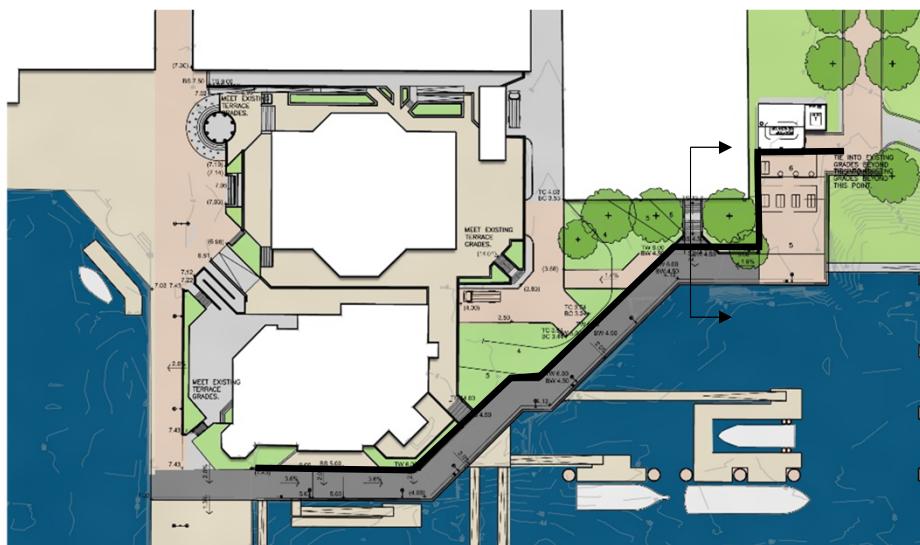


# // King Street Square – Option 1



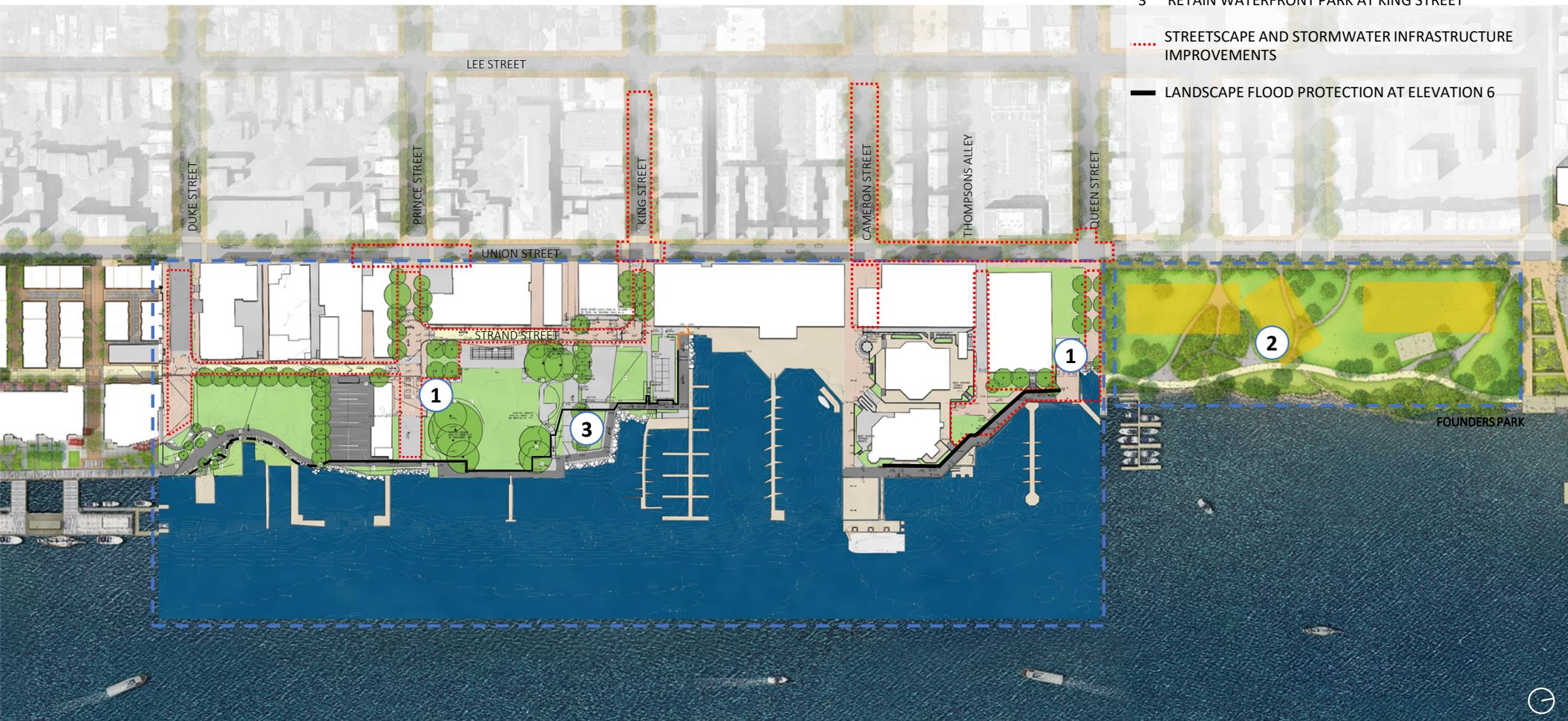


# // Thompsons Alley – Option 1





# // Overall Schematic Option 2

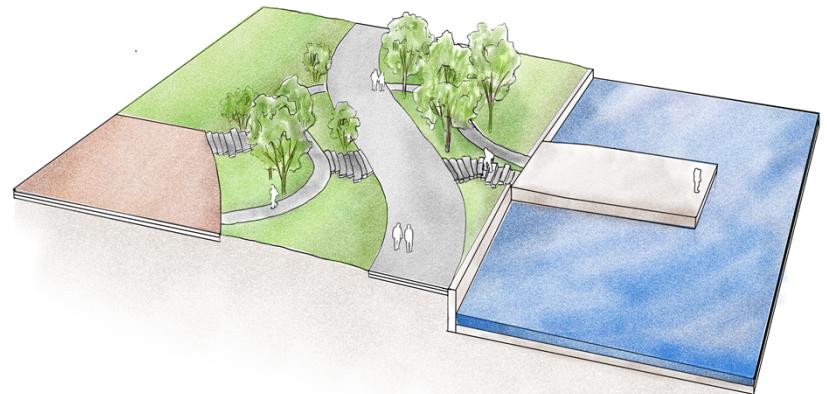


## LEGEND

- 1 PUMP STATION
- 2 UNDERGROUND STORMWATER DETENTION CHAMBERS
- 3 RETAIN WATERFRONT PARK AT KING STREET
- STREETSCAPE AND STORMWATER INFRASTRUCTURE IMPROVEMENTS
- LANDSCAPE FLOOD PROTECTION AT ELEVATION 6

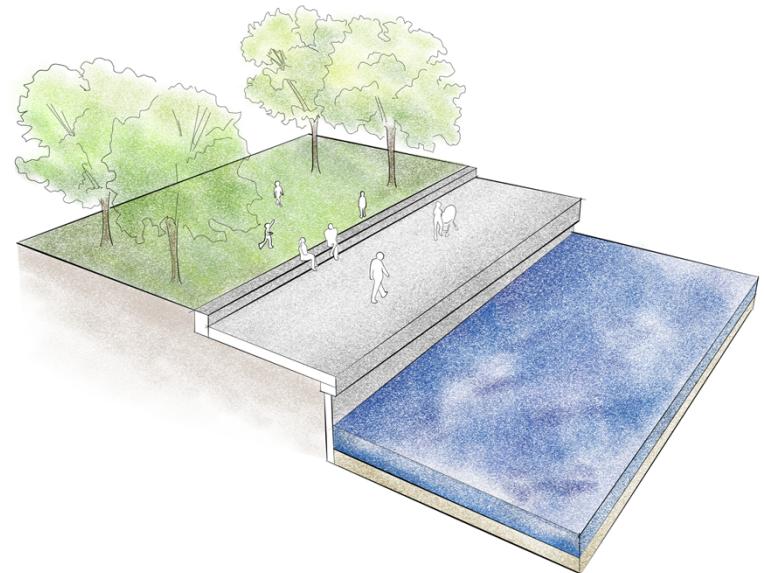
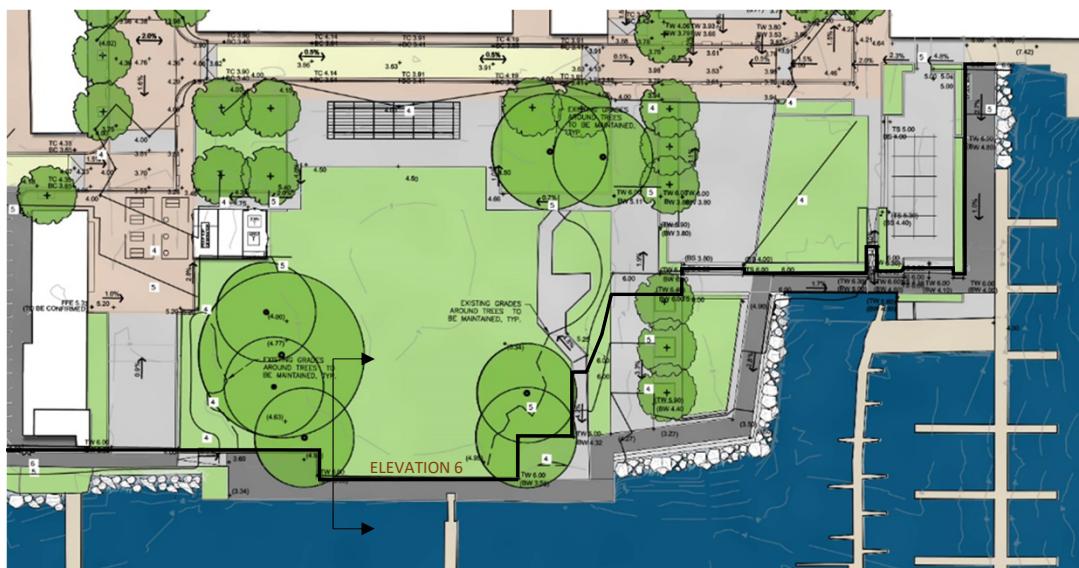


# // Point Lumley - Option 2





# // Waterfront Park and King Street Square – Option 2





Appendix J

## PROJECT ALTERNATIVE #2 SCHEMATIC



# Project Alternative No. 2

The overall schematic summarizes the key components to this Project Alternative which mitigates against all flooding sources using primarily grey infrastructure or hardscape strategies from Duke Street to King Street, also known as the Southern Subcatchment. In this scenario, the Project substitutes comprehensive storm sewer capacity upgrades from King Street to Queen Street for a structural bulkhead and elevated promenade in the Southern Subcatchment which will provide shoreline stabilization, flood protection, and a continuous Waterfront Promenade for an enhanced user experience. Ongoing stormwater hydraulic modeling may offer additional solutions to better mitigate any street flooding along N. Union Street between King and Queen Street through select storm sewer capacity upgrades, street regrading, and/or flood barriers across select vulnerable flood pathways.



# // Overall Schematic

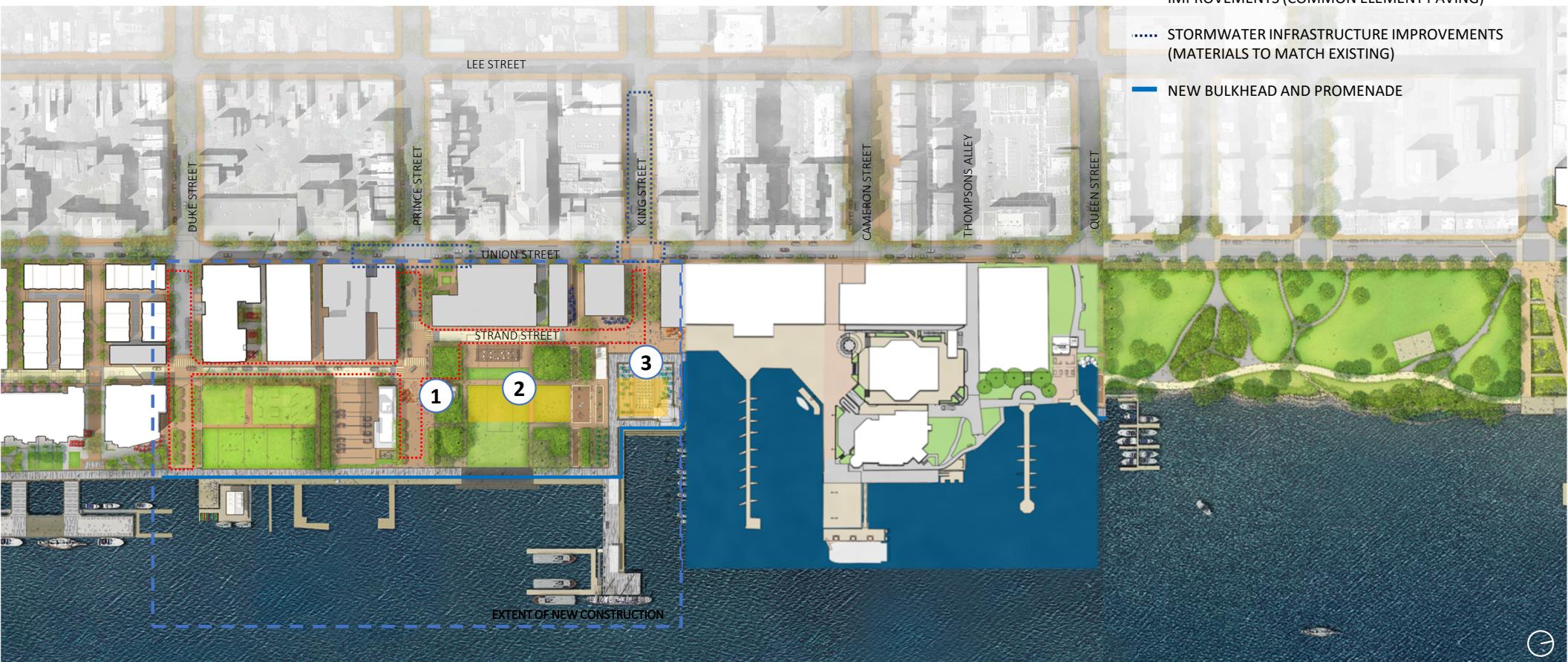
## LEGEND

- 1 PUMP STATION
- 2 UNDERGROUND STORMWATER DETENTION CHAMBERS
- 3 NEW PLAZA AT KING ST SQUARE

..... STREETSCAPE AND STORMWATER INFRASTRUCTURE IMPROVEMENTS (COMMON ELEMENT PAVING)

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

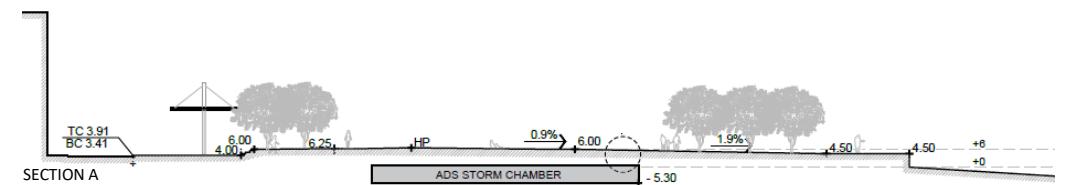
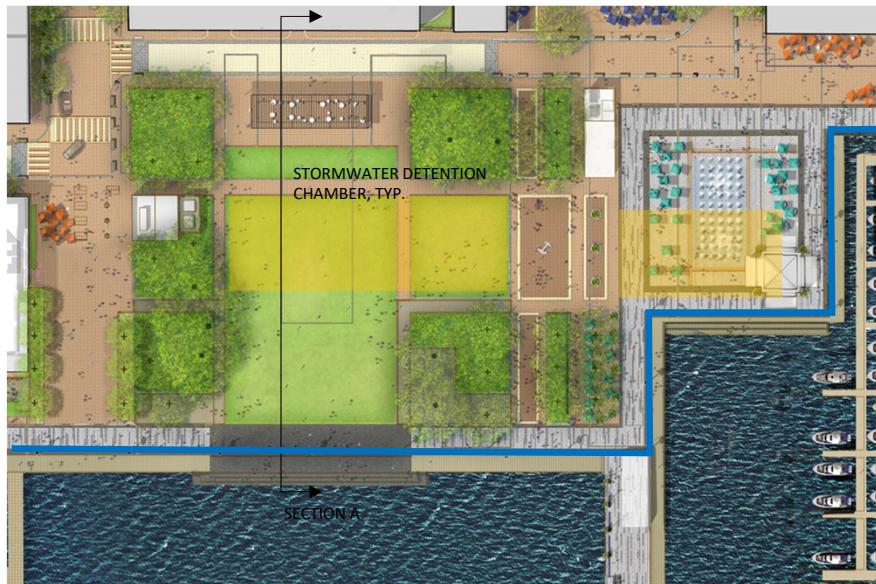
— NEW BULKHEAD AND PROMENADE





# // Waterfront Park and King St Square

- Pump Station at 50% capacity reduction
- New 20-ft wide promenade with pavers
- Concealed stormwater chambers
- New King St Square Plaza



KEY PLAN



Appendix K

## REFERENCE MAINTENANCE & MANAGEMENT PLAN

## 9.4 O&M Estimate

While capital costs for this type of project represent a significant cost over a short period of time, it is just as important to take into consideration the ongoing costs required to properly operate and maintain the implemented improvements. Therefore, as part of the Phase 1 OPCC, Carollo developed an estimate of the anticipated ongoing operations and maintenance (O&M) costs associated with the Waterfront Implementation Project. The primary purpose of the O&M estimate is to help the City understand the ongoing resource needs associated with operating and maintaining the improvements.

### 9.4.1 O&M Estimate Approach

For the purposes of this estimate, a 20-year O&M period was considered. Over this 20-year period, two categories of O&M expenditures were estimated for each Area of the project:

- Regular O&M activities, which are defined as the routine O&M activities required on an annual basis or more frequently (e.g. daily, weekly, monthly, quarterly).
- Intermittent O&M activities, which are defined as the less routine O&M activities required less frequently than annually.

An estimate of O&M needs was developed for each project Area looking at the two categories listed above. All O&M costs are provided in 2020 dollars and do not account for inflation during the 20-year O&M period. Unit costs from prior years were escalated to 2020 dollars using a 3 percent escalation rate.

The analysis herein is intended to convey anticipated costs the City will incur related to this project over a 20-year O&M period. It does not include a net present worth analysis. A net present worth analysis may be conducted for individual areas as part of an alternatives analysis to support decision-making.

### 9.4.2 O&M Estimate Summary

The details of the O&M estimate for each Area are provided in Appendix E. Table 15 provides a summary of the estimated O&M costs by area and in total. The estimated annual cost of regular O&M activities is approximately \$600,000 in 2020 dollars. On average, over a 20-year O&M period, the estimated annual cost of the intermittent O&M activities is approximately \$100,000, although some years individually could see over \$1 million in intermittent O&M costs, while other years will have little to no intermittent O&M activities.

In all cases, the total cost of the regular O&M activities over the 20-year O&M period exceeds the 20-year total cost of intermittent O&M activities, even though those intermittent costs individually tend to be larger costs. In total, the regular O&M activities account for approximately 84 percent of the anticipated 20-year O&M cost. This indicates that the bulk of the resource needs will be associated with those regular O&M activities.

It should also be noted that many of the intermittent O&M activities are likely to be completed by resources from outside the City (e.g. consultants and/or contractors). It may also be possible to outsource some of the regular O&M activities, such as pump station operation and maintenance, if the City does not have the personnel resources required.

Table 15 O&amp;M Costs (2020 \$)

| Area         | Description                      | Annual Cost for Regular O&M Activities <sup>(1,2)</sup> | 20-Year Total of Regular O&M Activities <sup>(1,3)</sup> | 20-Year Total of Intermittent O&M Activities <sup>(1,4)</sup> | Total 20-Year Cost <sup>(1,5)</sup> |
|--------------|----------------------------------|---------------------------------------------------------|----------------------------------------------------------|---------------------------------------------------------------|-------------------------------------|
| 01           | Structural Bulkhead              | \$95,000                                                | \$1,896,000                                              | \$894,000                                                     | \$2,790,000                         |
| 02           | Utilities – Storm Sewer          | \$47,000                                                | \$936,000                                                | \$116,000                                                     | \$1,052,000                         |
| 03           | Utilities – Dry                  | \$19,000                                                | \$384,000                                                | \$0                                                           | \$384,000                           |
| 04           | Utilities – Wet                  | \$0                                                     | \$0                                                      | \$24,000                                                      | \$24,000                            |
| 05           | Promenade                        | \$35,000                                                | \$708,000                                                | \$469,000                                                     | \$1,177,000                         |
| 06           | Street Paving for Utilities      | \$31,000                                                | \$614,000                                                | \$61,000                                                      | \$675,000                           |
| 07           | Point Lumley                     | \$19,000                                                | \$388,000                                                | \$178,000                                                     | \$566,000                           |
| 08           | Waterfront Park                  | \$38,000                                                | \$762,000                                                | \$54,000                                                      | \$816,000                           |
| 09           | Waterfront Park Pump Station     | \$67,000                                                | \$1,342,000                                              | \$22,000                                                      | \$1,364,000                         |
| 10           | King Street Square               | \$102,000                                               | \$2,040,000                                              | \$10,000                                                      | \$2,050,000                         |
| 11           | Torpedo Factory                  | \$21,000                                                | \$420,000                                                | \$51,000                                                      | \$471,000                           |
| 12           | Thompson Alley Park Pump Station | \$63,000                                                | \$1,254,000                                              | \$22,000                                                      | \$1,276,000                         |
| 13           | Thompson Alley Park              | \$20,000                                                | \$390,000                                                | \$32,000                                                      | \$422,000                           |
| 14           | Piers                            | \$15,000                                                | \$294,000                                                | \$336,000                                                     | \$630,000                           |
| <b>TOTAL</b> |                                  | <b>\$572,000</b>                                        | <b>\$11,428,000</b>                                      | <b>\$2,269,000</b>                                            | <b>\$13,697,000</b>                 |

## Notes:

- (1) All costs are in 2020 dollars.
- (2) Annual cost of regular (monthly and annual) maintenance and operations costs.
- (3) Total cost of regular maintenance and operations costs over 20-year life cycle.
- (4) Total cost of intermittent (less frequent than annual) maintenance costs over 20-year life cycle.
- (5) Total operations and maintenance cost, regular and intermittent, over 20-year life cycle.

#### 9.4.3 O&M Estimate Assumptions

In order to provide additional context to the O&M estimate above, this section provides a summary of major assumptions associated with the estimate. The following sections provide key assumptions associated with the regular and intermittent O&M costs, respectively.

##### 9.4.3.1 Assumptions and Drivers - Regular O&M Activities

Key assumptions driving the O&M costs associated with the regular O&M activities by Area or area type are as follow:

- Structural Bulkhead
  - Cleaning of debris is assumed to occur monthly and is assumed to require the use of a boat and at least two crew members. This cost could potentially be mitigated by addition of debris deflectors.

- Utilities (Storm Sewer)
  - Catch basin cleaning is assumed to occur monthly and each of 35 new catch basins are assumed to take a two-person crew 1 hour.
  - 10 percent of stormwater lines are assumed to be inspected/cleaned each year so all lines are cleaned/inspected every 10-years.
- Utilities (Dry)
  - Assumes a two-person crew spends two days per month inspecting the transformers and utility vaults added as part of this project.
- Utilities (Wet)
  - Assumes no regular O&M activities associated with the wet utilities.
- Promenade
  - Paver maintenance is based on the total area to be maintained, using a cost of \$0.35 per square foot annually for labor and material.
  - Assumes Promenade would require approximately 1 day per week of staff time for general maintenance including trash removal, grounds maintenance, etc.
- Street Paving
  - Paver maintenance assumed to be highest annual cost and is based on the total area to be maintained, using a cost of \$0.35 per square foot annually for labor and materials.
- Parks
  - Each park (five including Torpedo Factory) area would require approximately 1 day per week of staff time for general maintenance including trash removal, grounds maintenance, etc.
  - Paver maintenance assumed to be highest annual cost and is based on the total area to be maintained, using a cost of \$0.35 per square foot annually for labor and materials.
  - King Street Square splash pad assumes \$75,000 per year in O&M associated with the splash pad and related appurtenances based on a review of similar amenities in other locations. Annual cost includes chemical costs, energy costs, water sampling, and labor.
- Pump Stations
  - Pumping costs were based on average monthly rainfall data (3.5 inches per month) and include an electrical demand charge was included based on a 1-year storm event. Even though the demand charge is based on a single event, it is applied over a 12-month period on the power bill.
  - Annual pump and screen maintenance is assumed to be 1 percent of the installed cost of major equipment in the pump stations.
- Piers
  - Wood decking is power washed annually.

#### 9.4.3.2 Assumptions and Drivers - Intermittent O&M Activities

Key assumptions driving the O&M costs associated with the intermittent O&M activities by Area or area type are as follow:

- Structural Bulkhead
  - Bulkhead coating and repair will require use of a temporary coffer dam technology to allow coating and repair below the water level. A series of 5 setups assumed to complete entire length of bulkhead.
  - Bulkhead repair and coating will be done by a contractor and an engineering study would be required prior to initiation of repairs.
- Utilities
  - No major intermittent O&M planned. Biggest item would be inspection/cleaning of stormwater lines but a portion of that is expected to be done each year as a regular maintenance item.
- Promenade
  - Assumes wood planks on piers will be replaced every 20 years.
  - Assumes 70 light fixtures will require bulb and ballast replacement at \$800 each approximately every 5 years. Cost includes bulb, ballast, two personnel and use of a truck with lift.
- Street Paving
  - Lighting fixture replacement similar to what is described under Promenade.
- Parks
  - Applying sealer coats to playground equipment every one to two years.
  - Lighting fixture replacement similar to what is described under Promenade.
  - Removal and replacement of wearing base course will occur every 7 years.
- Pump Stations
  - Assumes wet well will need to be cleaned every five years.
- Piers
  - Assumes wood planks at on piers are replaced every 20 years.

Additional details related to the assumptions included herein as well as additional assumptions can be found in the individual Area O&M estimates provided in Appendix E.



Appendix L

**LETTER OF SUPPORT: ALEXANDRIA WATERFRONT  
COMMISSION LETTER  
FY 2021-2032 CIP**



# Alexandria Waterfront Commission

Department of Recreation, Parks and Cultural Activities

1108 Jefferson Street

Alexandria, Virginia 22314

October 26, 2021

To: Mark Jinks, City Manager

Re: FY 2023-FY 2032 Budget and Capital Improvement Planning

Mr. City Manager:

This letter summarizes the Waterfront Commission's fiscal year (FY) 2023 budget priorities.

The Waterfront Commission recognizes the extraordinary fiscal challenges the City faces in light of the continuing impact of the Covid 19 pandemic and all its ramifications. Yet in our efforts on the path to becoming a smarter, more equitable, and greener city, we must recognize the duty to allocate funds to work toward the implementation of those goals. For the Waterfront Commission, charged with overseeing implementation of the Waterfront Small Area Plan, the primary emphasis continues to be analysis, planning and implementation of the capital improvements necessary to implement park improvements and flood mitigation projects, as well as ongoing maintenance and operation of high-quality parks and public spaces along the waterfront. We are mindful that the citizens of Alexandria made clear during the planning process and ongoing implementation period that they supported private development efforts but valued most highly the improvement and maintenance of waterfront public areas controlled by the City.

## **Capital Improvements: Waterfront Flood Mitigation and Park Improvements**

Many of the original decisions regarding public sphere improvements to the waterfront were based on plans and analyses made years ago. With climate change moving at a visibly rapid pace and the amount of flooding observed in recent years along our waterfront, we are concerned that decisions for implementing flood mitigation and park improvements be based on current and realistic estimates of the needs and perils of the waterfront. In addition, improvements should be engineered to be reasonably afforded by the City, including both up-front capital and on-going maintenance and operations costs.

The Waterfront Commission has established a Flood Mitigation Committee to review and advise initial design proposals and will be developing recommendations for consideration by the full Commission. The Commission will provide specific recommendations to City Council in the coming months on this matter and encourages those recommendations to be considered as the City develops its FY 2023 Capital Improvement Program.

While we understand that funding is always a concern, we encourage the City to use federal recovery or infrastructure funds, as available, to invest in a world class waterfront, as stated in the Waterfront Small Area Plan, and further to pursue state and federal discretionary grant funds.

## **Operating and Maintenance Costs**

The City's FY 2023 Operating Budget should sustain funding for priority waterfront operations and maintenance functions, including the marina, parks, policing, security, public restrooms, and debris removal. The budget should also support endeavors such as the Tall Ship Providence and special events – and to commit additional funding for operations and maintenance as public spaces along the waterfront continue to be activated and improved. Increased activity in waterfront areas requires higher standards of attention to effectively manage those spaces.

The Commission continues to encourage the City to find long-term and sustainable ways to fund investment in waterfront infrastructure, maintenance, and management through mechanisms such as a business improvement district, public/private partnerships, bonding, or application of incremental revenue from the waterfront's completed new private development.

## **Conclusions**

In summary, the Waterfront Commission recommends that the City Manager's proposed FY 2023 Capital Improvement Program and Operating Budget reaffirm the City's commitment to funding planned capital expenditures, operations, and maintenance of the waterfront, and consider creative funding to ensure the future and continued success of the implementation of the Waterfront Plan.

We look forward to providing constructive feedback on the City's budget proposals over the coming months.

Sincerely,



Stephen Thayer, Chair  
Alexandria Waterfront Commission

cc      Alexandria Waterfront Commission members  
          Debra Collins, Deputy City Manager  
          Emily Baker, Deputy City Manager  
          James Spengler, Director, Recreation Parks & Cultural Activities  
          Terry Suehr, Director, Department of Project Implementation  
          Jack Browand, Acting Deputy Director, Commission Staff Liaison



## Appendix M

# GRANT APPLICATION SCORECARD

# Scoring Criteria for Flood Prevention and Protection Projects

Virginia Department of Conservation and Recreation  
Virginia Community Flood Preparedness Fund Grant Program

| Applicant Name:                                                                                                                                                                                                                                                                                     |                                                                              | City of Alexandria, VA |                                     |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------|------------------------|-------------------------------------|
| Eligibility Information                                                                                                                                                                                                                                                                             |                                                                              |                        |                                     |
| Criterion                                                                                                                                                                                                                                                                                           | Description                                                                  |                        | Check One                           |
| <b>1. Is the applicant a local government (including counties, cities, towns, municipal corporations, authorities, districts, commissions, or political subdivisions created by the General Assembly or pursuant to the Constitution or laws of the Commonwealth, or any combination of these)?</b> |                                                                              |                        |                                     |
| Yes                                                                                                                                                                                                                                                                                                 | Eligible for consideration                                                   |                        | <input checked="" type="checkbox"/> |
| No                                                                                                                                                                                                                                                                                                  | Not eligible for consideration                                               |                        |                                     |
| <b>2. Does the local government have an approved resilience plan and has provided a copy or link to the plan with this application?</b>                                                                                                                                                             |                                                                              |                        |                                     |
| Yes                                                                                                                                                                                                                                                                                                 | Eligible for consideration under all categories                              |                        | <input checked="" type="checkbox"/> |
| No                                                                                                                                                                                                                                                                                                  | Eligible for consideration for studies, capacity building, and planning only |                        |                                     |
| <b>3. If the applicant is <u>not</u> a town, city, or county, are letters of support from all affected local governments included in this application?</b>                                                                                                                                          |                                                                              |                        |                                     |
| Yes                                                                                                                                                                                                                                                                                                 | Eligible for consideration                                                   |                        |                                     |
| No                                                                                                                                                                                                                                                                                                  | Not eligible for consideration                                               |                        |                                     |
| <b>4. Has this or any portion of this project been included in any application or program previously funded by the Department?</b>                                                                                                                                                                  |                                                                              |                        |                                     |
| Yes                                                                                                                                                                                                                                                                                                 | Not eligible for consideration                                               |                        |                                     |
| No                                                                                                                                                                                                                                                                                                  | Eligible for consideration                                                   |                        | <input checked="" type="checkbox"/> |
| <b>5. Has the applicant provided evidence of an ability to provide the required matching funds?</b>                                                                                                                                                                                                 |                                                                              |                        |                                     |
| Yes                                                                                                                                                                                                                                                                                                 | Eligible for consideration                                                   |                        | <input checked="" type="checkbox"/> |
| No                                                                                                                                                                                                                                                                                                  | Not eligible for consideration                                               |                        |                                     |
| N/A                                                                                                                                                                                                                                                                                                 | Match not required                                                           |                        |                                     |

| Project Eligible for Consideration                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |             | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|-----------------------------------------|-----------------------------|
| Applicant Name:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |             |                                         |                             |
| Scoring Information                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |             |                                         |                             |
| Criterion                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Point Value | Points Awarded                          |                             |
| <b>6. Eligible Projects (Select all that apply)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |             |                                         |                             |
| <p>Projects may have components of both 1.a. and 1.b. below; however, only one category may be chosen. The category chosen must be the primary project in the application.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |             |                                         |                             |
| 1.a. Acquisition of property consistent with an overall comprehensive local or regional plan for purposes of allowing inundation, retreat, or acquisition of structures.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 50          | 0                                       |                             |
| <input type="checkbox"/> Wetland restoration, floodplain restoration<br><input checked="" type="checkbox"/> Living shorelines and vegetated buffers.<br><input type="checkbox"/> Permanent conservation of undeveloped lands identified as having flood resilience value by <i>ConserveVirginia</i> Floodplain and Flooding Resilience layer or a similar data driven analytic tool<br><input type="checkbox"/> Dam removal<br><input type="checkbox"/> Stream bank restoration or stabilization.<br><input type="checkbox"/> Restoration of floodplains to natural and beneficial function.<br><input type="checkbox"/> Developing flood warning and response systems, which may include gauge installation, to notify residents of potential emergency flooding events. | 45          | 45                                      |                             |
| 1.b. any other nature-based approach                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 40          | 40                                      |                             |
| All hybrid approaches whose end result is a nature-based solution                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 35          | 35                                      |                             |
| All other projects                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 25          | 25                                      |                             |
| <b>7. Is the project area socially vulnerable? (Based on <a href="#">ADAPT VA's Social Vulnerability Index Score.</a>)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |             |                                         |                             |
| Very High Social Vulnerability (More than 1.5)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 15          |                                         |                             |
| High Social Vulnerability (1.0 to 1.5)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 12          |                                         |                             |
| Moderate Social Vulnerability (0.0 to 1.0)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 8           |                                         |                             |
| Low Social Vulnerability (-1.0 to 0.0)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 0           |                                         |                             |
| Very Low Social Vulnerability (Less than -1.0)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 0           | 0                                       |                             |
| <b>8. Is the proposed project part of an effort to join or remedy the community's probation or suspension from the NFIP?</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |             |                                         |                             |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |           |            |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|------------|
| Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <b>10</b> |            |
| No                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <b>0</b>  | <b>0</b>   |
| <b>9. Is the proposed project in a low-income geographic area as defined in this manual?</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |           |            |
| Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <b>10</b> |            |
| No                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <b>0</b>  | <b>0</b>   |
| <b>10. Projects eligible for funding may also reduce nutrient and sediment pollution to local waters and the Chesapeake Bay and assist the Commonwealth in achieving local and/or Chesapeake Bay TMDLs. Does the proposed project include implementation of one or more best management practices with a nitrogen, phosphorus, or sediment reduction efficiency established by the Virginia Department of Environmental Quality or the Chesapeake Bay Program Partnership in support of the Chesapeake Bay TMDL Phase III Watershed Implementation Plan?</b> |           |            |
| Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <b>5</b>  | <b>5</b>   |
| No                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <b>0</b>  |            |
| <b>11. Does this project provide “community scale” benefits?</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |           |            |
| Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <b>20</b> | <b>20</b>  |
| No                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <b>0</b>  |            |
| <b>Total Points</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |           | <b>170</b> |

(of 255 possible)



Appendix N

## CHECKLIST FOR SCOPE OF WORK

# Checklist All Categories

Virginia Department of Conservation and Recreation

Community Flood Preparedness Fund Grant Program

---

| Scope of Work Narrative                                                                                                |                                                                                                  |                               |
|------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------|
| Supporting Documentation                                                                                               | Included                                                                                         |                               |
| Detailed map of the project area(s) (Projects/Studies)                                                                 | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | See Appendix A                |
| FIRMette of the project area(s) (Projects/Studies)                                                                     | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | See Appendix H                |
| Historic flood damage data and/or images (Projects/Studies)                                                            | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | See Appendix E                |
| A link to or a copy of the current floodplain ordinance                                                                | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | See Appendix F<br>Hyperlink 2 |
| Non-Fund financed maintenance and management plan for project extending a minimum of 5 years from project close        | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | See Appendix K                |
| A link to or a copy of the current hazard mitigation plan                                                              | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | See Appendix F<br>Hyperlink 1 |
| A link to or a copy of the current comprehensive plan                                                                  | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | See Appendix F<br>Hyperlink 3 |
| Social vulnerability index score(s) for the project area from <a href="#">ADAPT VA's Virginia Vulnerability Viewer</a> | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | See Appendix G                |
| If applicant is not a town, city, or county, letters of support from affected communities                              | <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A |                               |
| Completed Scoring Criteria Sheet in Appendix B, C, or D                                                                | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | See Appendix M                |
| Budget Narrative                                                                                                       |                                                                                                  |                               |
| Supporting Documentation                                                                                               | Included                                                                                         |                               |
| Authorization to request funding from the Fund from governing body or chief executive of the local government          | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | See Appendix T                |
| Signed pledge agreement from each contributing organization                                                            | <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A |                               |



## Appendix O

# PRELIMINARY JURISDICTIONAL DETERMINATION



DEPARTMENT OF THE ARMY  
US ARMY CORPS OF ENGINEERS  
NORFOLK DISTRICT  
FORT NORFOLK  
803 FRONT STREET  
NORFOLK VA 23510-1011

October 13, 2016

**PRELIMINARY JURISDICTIONAL DETERMINATION**

Northern Virginia Regulatory Section  
NAO-2016-01833 (Potomac River - Alexandria Waterfront)

City of Alexandria  
Attn: Tony Gammon  
301 King Street  
Alexandria, Virginia 22314

Dear Mr. Gammon:

This letter is in regard to your request for a preliminary jurisdictional determination for waters of the U.S. (including wetlands) on property known as the Alexandria Waterfront, located on an approximately 25.95 acre parcel along the Potomac River, east of Lee Street, south of Quay Street, and north of Wolfe Street in the City of Alexandria, Virginia.

The maps entitled "City of Alexandria Waterfront", by Stantec dated April 12, 2016 (copies enclosed) provides the location of waters and/or wetlands on the property listed above. The basis for this delineation includes the presence of an ordinary high water mark.

Discharges of dredged or fill material, including those associated with mechanized landclearing, into waters and/or wetlands on this site may require a Department of the Army permit and authorization by state and local authorities including a Virginia Water Protection Permit from the Virginia Department of Environmental Quality (DEQ), a permit from the Virginia Marine Resources Commission (VMRC) and/or a permit from your local wetlands board. This letter is a confirmation of the Corps preliminary jurisdiction for the waters and/or wetlands on the subject property and does not authorize any work in these areas. Please obtain all required permits before starting work in the delineated waters/wetland areas.

This is a preliminary jurisdictional determination and is therefore not a legally binding determination regarding whether Corps jurisdiction applies to the waters or wetlands in question. Accordingly, you may either consent to jurisdiction as set out in this preliminary jurisdictional determination and the attachments hereto if you agree with the determination, or you may request and obtain an approved jurisdictional determination. "This preliminary jurisdictional determination and associated wetland delineation map may be submitted with a permit application."

Enclosed is a copy of the "Preliminary Jurisdictional Determination Form". Please review the document, sign, and return one copy to Ms. Theresita Crockett-Augustine either via email ([theresita.m.crockett-augustine@usace.army.mil](mailto:theresita.m.crockett-augustine@usace.army.mil)) or via standard mail to US Army Corps of Engineers, Northern Virginia Field Office at 18139 Triangle Plaza, Suite 213, Dumfries, Virginia 22026 within 30 days of receipt and keep one for your records. This delineation of waters and/or wetlands is valid for a period of five years from the date of this letter unless new information warrants revision prior to the expiration date.

If you have any questions, please contact Ms. Theresita Crockett-Augustine at (703) 221-9736 or [theresita.m.crockett-augustine@usace.army.mil](mailto:theresita.m.crockett-augustine@usace.army.mil).

Sincerely,

A handwritten signature in blue ink, appearing to read "Theresita Crockett-Augustine".

Theresita Crockett-Augustine  
Environmental Scientist  
Northern Virginia Regulatory Section

Enclosures

# PRELIMINARY JURISDICTIONAL DETERMINATION FORM

## BACKGROUND INFORMATION:

**A. REPORT COMPLETION DATE FOR PRELIMINARY JURISDICTIONAL DETERMINATION (JD):** Thursday, October 13, 2016

**B. NAME AND ADDRESS OF PERSON REQUESTING PRELIMINARY JD:**

City of Alexandria  
Attn: Tony Gammon  
301 King Street  
Alexandria, Virginia 22314

**C. DISTRICT OFFICE: Norfolk District (CENAO-REG)**

**FILE NAME:** Potomac River - Alexandria Waterfront

**FILE NUMBER:** NAO-2016-01833

**D. PROJECT LOCATION(S) AND BACKGROUND INFORMATION:**

(USE THE ATTACHED TABLE TO DOCUMENT MULTIPLE WATERBODIES AT DIFFERENT SITES)

State: **VIRGINIA** County/parish/borough: City: Alexandria

Center coordinates of site (lat/long in degree decimal format):

Latitude: 384816 ° N Longitude: 770223 ° W

Universal Transverse Mercator:

Name of nearest waterbody: Potomac River

Identify (estimate) amount of waters in the review area:

Non-wetland waters: linear feet; width (ft); and/or 0.54 acres.

Cowardin Class: Riverine

Stream Flow:

Wetlands: acres

Cowardin Class:

Name of any water bodies on the site that have been identified as Section 10 waters:

Tidal: Potomac River

Non-Tidal:

**E. REVIEW PERFORMED FOR SITE EVALUATION (CHECK ALL THAT APPLY):**

Office (Desk) Determination. Date: September 28, 2016

Field Determination. Date(s):

1. The Corps of Engineers believes that there may be jurisdictional waters of the United States on the subject site, and the permit applicant or other affected party who requested this preliminary JD is hereby advised of his or her option to request and obtain an approved jurisdictional determination (JD) for that site. Nevertheless, the permit applicant or other person who requested this preliminary JD has declined to exercise the option to obtain an approved JD in this instance and at this time.
2. In any circumstance where a permit applicant obtains an individual permit, or a Nationwide General Permit (NWP) or other general permit verification requiring "pre-construction notification" (PCN), or requests verification for a non-reporting NWP or other general permit, and the permit applicant has not requested an approved JD for the activity, the permit applicant is hereby made aware of the following: (1) the permit applicant has elected to seek a permit authorization based on a preliminary JD, which does not make an official determination of jurisdictional waters; (2) that the applicant has the option to request an approved JD before accepting the terms and conditions of the permit authorization, and that basing a permit authorization on an approved JD could possibly result in less compensatory mitigation being required or different special conditions; (3) that the applicant has the right to request an individual permit rather than accepting the terms and conditions of the NWP or other general permit authorization; (4) that the applicant can accept a permit authorization and thereby agree to comply with all the terms and conditions of that permit, including whatever mitigation requirements the Corps has determined to be necessary; (5) that undertaking any activity in reliance upon the subject permit authorization without requesting an approved JD constitutes the applicant's acceptance of the use of the preliminary JD, but that either form of JD will be processed as soon as is practicable; (6) accepting a permit authorization (e.g., signing a proffered individual permit) or undertaking any activity in reliance on any form of Corps permit authorization based on a preliminary JD constitutes agreement that all wetlands and other water bodies on the site affected in any way by that activity are jurisdictional waters of the United States, and precludes any challenge to such jurisdiction in any administrative or judicial compliance or enforcement action, or in any administrative appeal or in any Federal court; and (7) whether the applicant elects to use either an approved JD or a preliminary JD, that JD will be processed as soon as is practicable. Further, an approved JD, a proffered individual permit (and all terms and conditions contained therein), or individual permit denial can be administratively appealed pursuant to 33 C.F.R. Part 331, and that in any administrative appeal, jurisdictional issues can be raised (see 33 C.F.R. 331.5(a)(2)). If, during that administrative appeal, it becomes necessary to make an official determination whether CWA jurisdiction exists over a site, or to provide an official delineation of jurisdictional waters on the site, the Corps will provide an approved JD to accomplish that result, as soon as is practicable.
3. This preliminary JD finds that there "*may be*" waters of the United States on the subject project site, and identifies all aquatic features on the site that could be affected by the proposed activity, based on the following information:

#### **SUPPORTING DATA:**

**Data reviewed for preliminary JD (check all that apply)** - checked items should be included in case file and, where checked and requested, appropriately reference sources below.

Maps, plans, plots or plat submitted by or on behalf of the applicant/consultant:

- Data sheets prepared/submitted by or on behalf of the applicant/consultant.
    - Office concurs with data sheets/delineation report.
    - Office does not concur with data sheets/delineation report.
  - Data sheets prepared by the Corps:
    - Corps navigable waters' study:
    - U.S. Geological Survey Hydrologic Atlas:
      - USGS NHD data.
      - USGS 8 and 12 digit HUC maps.
  - U.S. Geological Survey map(s). Cite scale & quad name:
  - USDA Natural Resources Conservation Service Soil Survey.
- Citation:
- National wetlands inventory map(s). Cite name:
  - State/Local wetland inventory map(s):
  - FEMA/FIRM maps:
  - 100-year Floodplain Elevation: (National Geodetic Vertical Datum of 1929)
- Photographs:  Aerial (Name & Date):  
or  Other (Name & Date):
- Previous determination(s):  
File no. and date of response letter:  
 Other information (please specify):

**IMPORTANT NOTE: The information recorded on this form has not necessarily been verified by the Corps and should not be relied upon for later jurisdictional determinations.**

---

Signature  
Regulatory Project Manager  
(REQUIRED)

2016-10-13

---

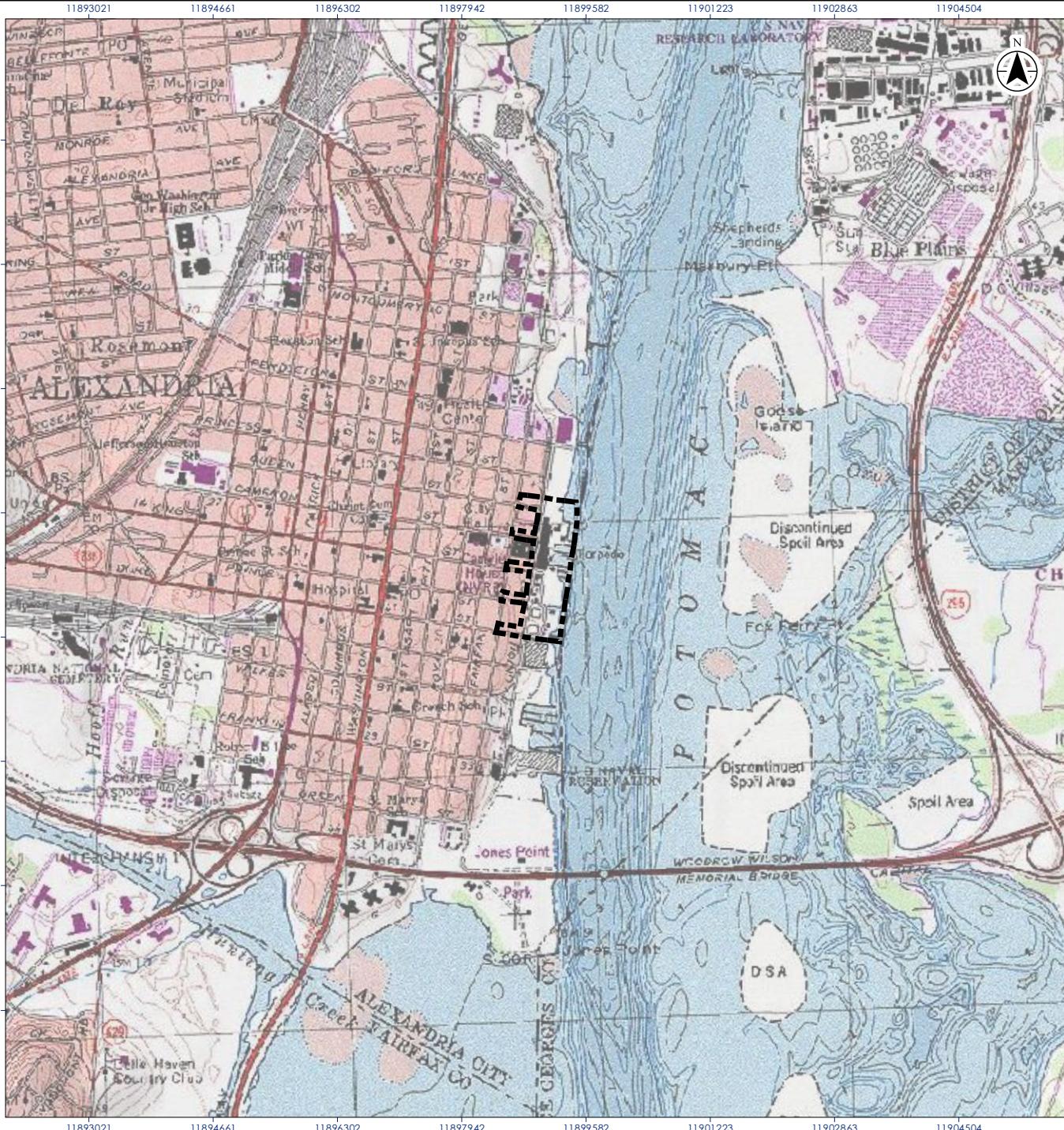
Date

---

Signature of person requesting  
Preliminary JD  
(REQUIRED, unless obtaining the signature is impracticable)

---

Date



## Legend



0 1,000 2,000  
Feet  
1:24,000 (at original document size of 8.5x11)



Project Location

2029041842

City of Alexandria, VA

Prepared by ECL on 2016-03-16

Technical Review by IPS on 2016-04-12

Independent Review by LC on 2016-04-12

Client/Project  
City of Alexandria  
Alexandria Waterfront

Figure No.

2

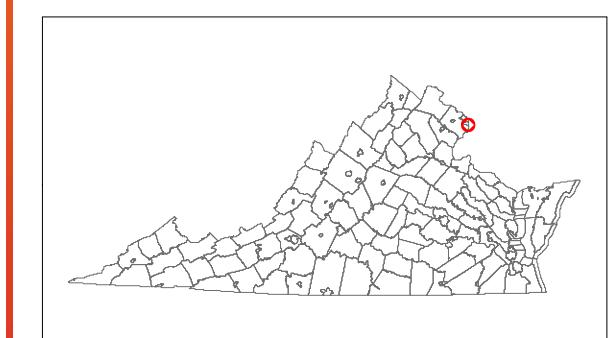
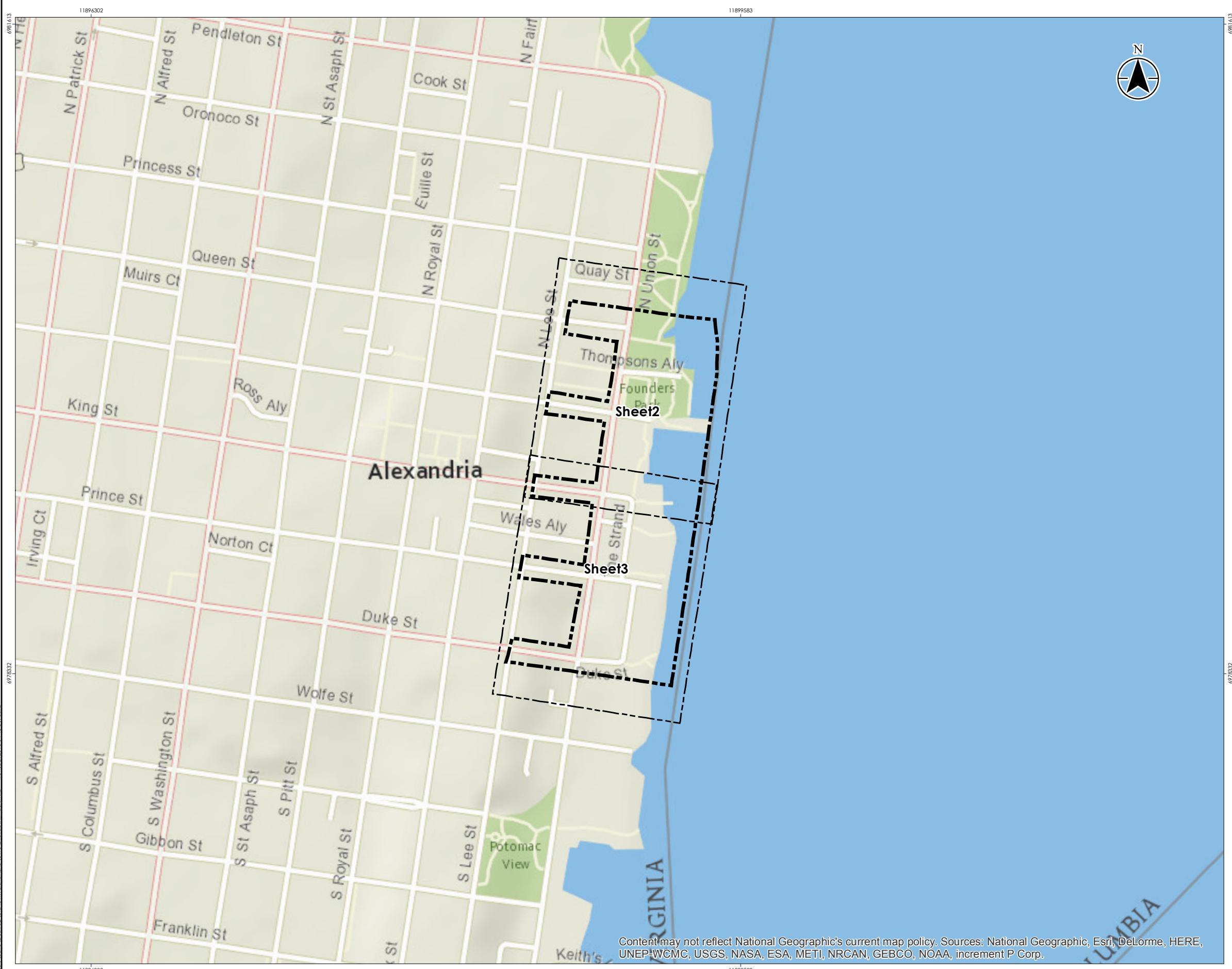
Title

Location Map

## Notes

1. Coordinate System: NAD 1983 StatePlane Virginia North FIPS 4501 Feet
2. Topographic map © USGS 7.5 Minute Series Topographic Map

Disclaimer: Stantec assumes no responsibility for data supplied in electronic format. The recipient accepts full responsibility for verifying the accuracy and completeness of the data. The recipient releases Stantec, its officers, employees, consultants and agents, from any and all claims arising in any way from the content or provision of the data.



Notes

- Coordinate System: NAD 1983 StatePlane Virginia North FIPS 4501 Feet
- Orthoimagery © Bing Maps
- Microsoft product screen shot(s) reprinted with permission from Microsoft Corporation
- The approximate limits of waters of the U.S., including wetlands, have not been field survey located and are for planning purposes only
- Topography provided by City of Alexandria GIS 2015



Figure No.

1

Title

## Delineation Map

Client/Project  
City of Alexandria  
Alexandria Flood Mitigation Project

Project Location

City of Alexandria, Virginia

2029041842

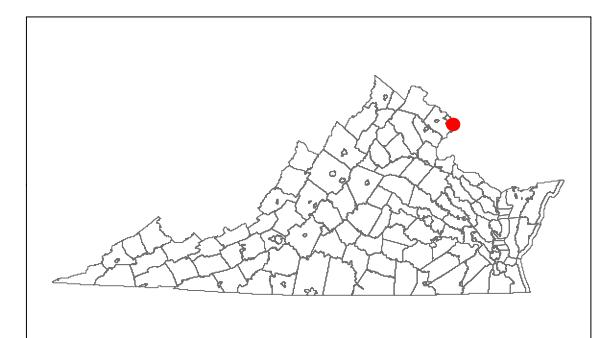
Prepared by ECL on 2016-03-16  
Technical Review by TPS on 2016-04-12  
Independent Review by LC on 2016-04-12

0 110 220 Feet  
1:1,302 (At original document size of 11x17)

① Data Point Location

② Photo Location

③ Approximate Tidal Waters Limits  
Project Limits  
2-Foot Contours



Notes

- Coordinate System: NAD 1983 StatePlane Virginia North FIPS 4501 Feet
- Orthoimagery © Bing Maps
- Microsoft product screen shot(s) reprinted with permission from Microsoft Corporation
- The approximate limits of waters of the U.S., including wetlands, have not been field survey located and are for planning purposes only
- Topography provided by City of Alexandria GIS 2015



Figure No.

1

Title

## Delineation Map

Client/Project  
City of Alexandria  
Alexandria Flood Mitigation Project

Project Location

City of Alexandria, Virginia

2029041842

Prepared by ECL on 2016-03-16  
Technical Review by TPS on 2016-04-12  
Independent Review by LC on 2016-04-12

0 110 220  
Feet  
1:1,302 (At original document size of 11x17)

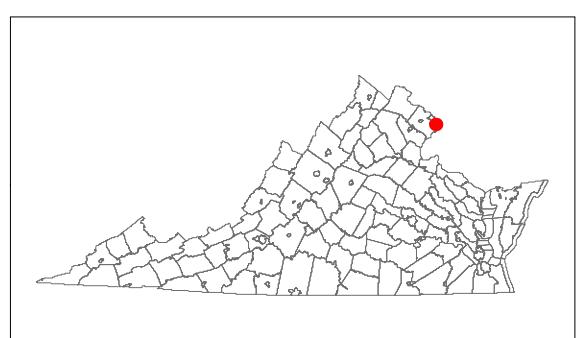
1 ● Data Point Location

2 → Photo Location

3 ■ Approximate Tidal Waters Limits

4 □ Project Limits

5 - 2-Foot Contours



### Notes

- Coordinate System: NAD 1983 StatePlane Virginia North FIPS 4501 Feet
- Orthoimagery © Bing Maps
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- The approximate limits of waters of the U.S., including wetlands, have not been field survey located and are for planning purposes only
- Topography provided by City of Alexandria GIS 2015



DEPARTMENT OF THE ARMY  
US ARMY CORPS OF ENGINEERS  
NORFOLK DISTRICT  
FORT NORFOLK  
803 FRONT STREET  
NORFOLK VIRGINIA 23510-1011

OCTOBER 13, 2016

**Supplemental Preapplication Information**

Project Number: NAO-2016-01833 (Potomac River – Alexandria Waterfront)

Applicant: City of Alexandria

Project Location: Alexandria, Virginia

1. A search of the Virginia Department of Historic Resources data revealed the following:

- No known historic properties are located on the property.
- The following known architectural resources are located on the property:
- The following known archaeological resources are located on the property:
- The following known historic resources are located in the vicinity of the property (potential for effects to these resources from future development):

**NOTE:**

- 1) *The information above is for planning purposes only. In most cases, the property has not been surveyed for historic resources. Undiscovered historic resources may be located on the subject property or adjacent properties and this supplemental information is not intended to satisfy the Corps' requirements under Section 106 of the National Historic Preservation Act (NHPA).*
  - 2) *Prospective permittees should be aware that Section 110k of the NHPA (16 U.S.C. 470h-2(k)) prevents the Corps from granting a permit or other assistance to an applicant who, with intent to avoid the requirements of Section 106 of the NHPA, has intentionally significantly adversely affected a historic property to which the permit would relate, or having legal power to prevent it, allowed such significant adverse effect to occur, unless the Corps, after consultation with the Advisory Council on Historic Preservation (ACHP), determines that circumstances justify granting such assistance despite the adverse effect created or permitted by the applicant.*
2. A search of the data supplied by the U.S. Fish & Wildlife Service, the Virginia Department of Conservation and Recreation and the Virginia Department of Game and Inland Fisheries revealed the following:
- No known populations of threatened or endangered species are located on or within the vicinity of the subject property.
  - The following federally-listed species may occur within the vicinity of the subject property.
  - The following state-listed (or other) species may occur within the vicinity of the subject property:

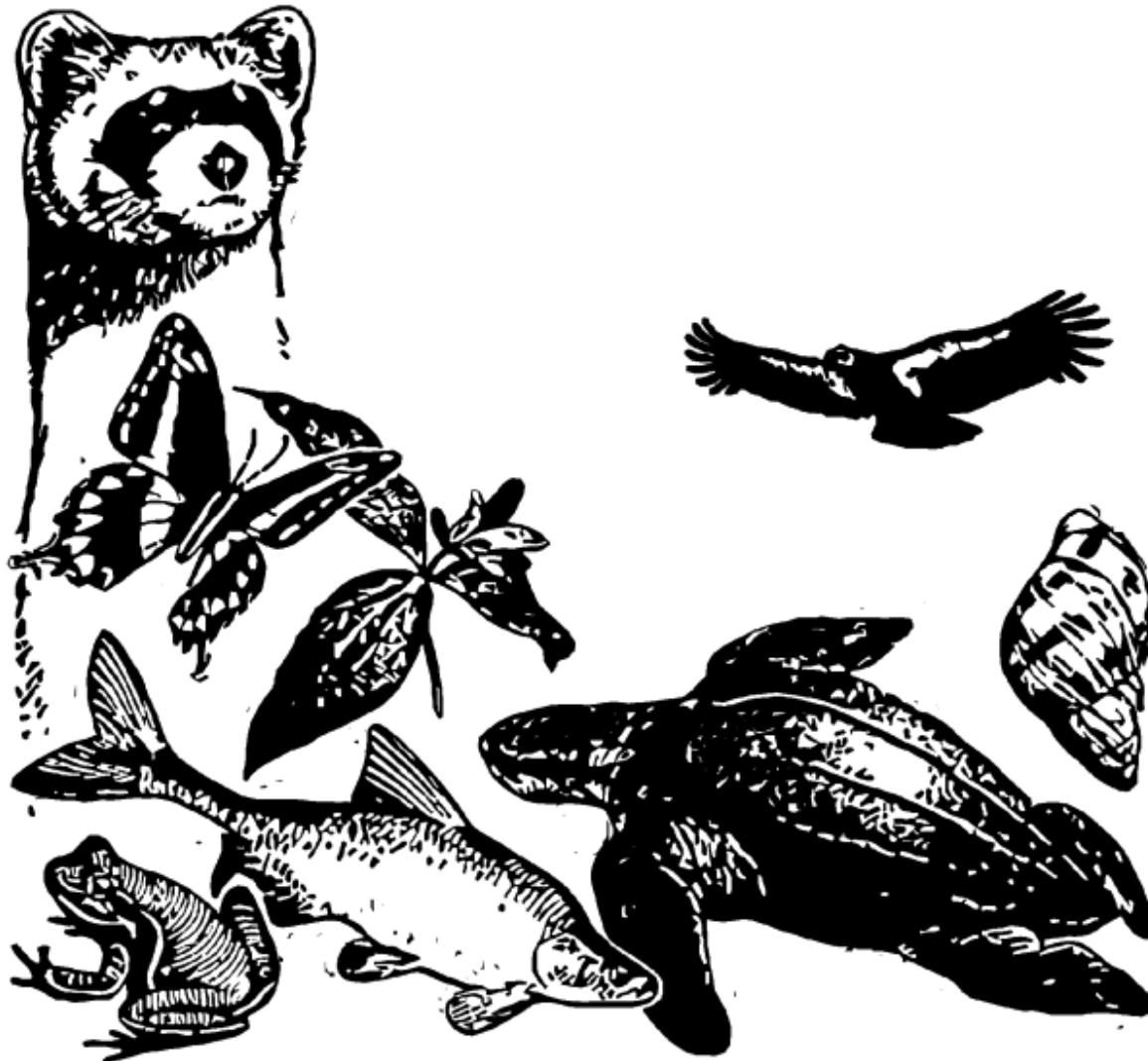
Submerged Aquatic Vegetation  
Anadromous Fish

***Please note this information is being provided to you based on the preliminary data you submitted to the Corps relative to project boundaries and project plans. Consequently, these findings and recommendations are subject to change if the project scope changes or new information becomes available and the accuracy of the data.***

# *IPaC Trust Resources Report*

Generated October 11, 2016 04:00 PM MDT, IPaC v3.0.9

This report is for informational purposes only and should not be used for planning or analyzing project level impacts. For project reviews that require U.S. Fish & Wildlife Service review or concurrence, please return to the IPaC website and request an official species list from the Regulatory Documents page.



# Table of Contents

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| Refuges & Hatcheries .....        | <u>6</u> |
| Wetlands .....                    | <u>7</u> |

U.S. Fish & Wildlife Service

# IPaC Trust Resources Report

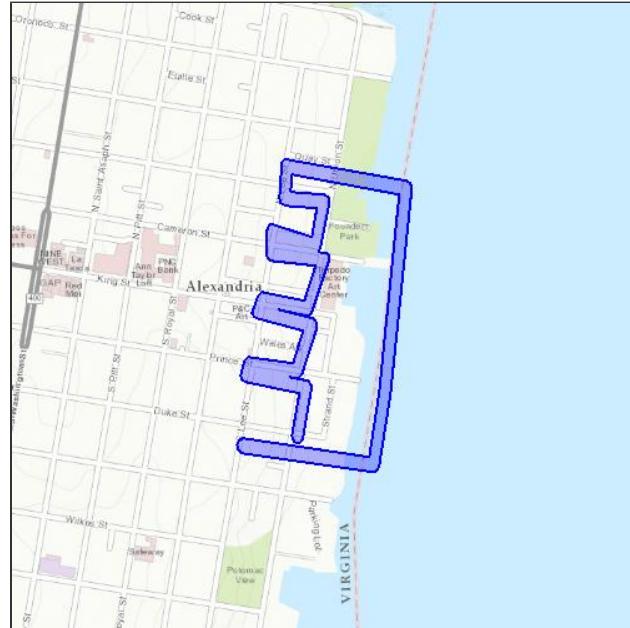


## LOCATION

District of Columbia and Virginia

## IPAC LINK

[https://ecos.fws.gov/ipac/project/  
SI4BG-VKT3R-A3RDX-PVIAS-XTIGFE](https://ecos.fws.gov/ipac/project/SI4BG-VKT3R-A3RDX-PVIAS-XTIGFE)



## U.S. Fish & Wildlife Service Contact Information

Trust resources in this location are managed by:

### **Chesapeake Bay Ecological Services Field Office**

177 Admiral Cochrane Drive

Annapolis, MD 21401-7307

(410) 573-4599

### **Virginia Ecological Services Field Office**

6669 Short Lane

Gloucester, VA 23061-4410

(804) 693-6694

## Endangered Species

Proposed, candidate, threatened, and endangered species are managed by the [Endangered Species Program](#) of the U.S. Fish & Wildlife Service.

**This USFWS trust resource report is for informational purposes only and should not be used for planning or analyzing project level impacts.**

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list from the Regulatory Documents section.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency.

**A letter from the local office and a species list which fulfills this requirement can only be obtained by requesting an official species list either from the Regulatory Documents section in IPaC or from the local field office directly.**

**There are no endangered species in this location**

## Critical Habitats

**There are no critical habitats in this location**

## Migratory Birds

Birds are protected by the [Migratory Bird Treaty Act](#) and the [Bald and Golden Eagle Protection Act](#).

Any activity that results in the take of migratory birds or eagles is prohibited unless authorized by the U.S. Fish & Wildlife Service.<sup>[1]</sup> There are no provisions for allowing the take of migratory birds that are unintentionally killed or injured.

Any person or organization who plans or conducts activities that may result in the take of migratory birds is responsible for complying with the appropriate regulations and implementing appropriate conservation measures.

---

1. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

Additional information can be found using the following links:

- Birds of Conservation Concern  
[http://www.fws.gov/birds/management/managed-species/  
birds-of-conservation-concern.php](http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php)
- Conservation measures for birds  
[http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/  
conservation-measures.php](http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php)
- Year-round bird occurrence data  
<http://www.birdscanada.org/birdmon/default/datasummaries.jsp>

The following species of migratory birds could potentially be affected by activities in this location:

|                                                                                                                                                                   |                              |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>American Oystercatcher</b> Haematopus palliatus                                                                                                                | Bird of conservation concern |
| Season: Year-round                                                                                                                                                |                              |
| <a href="http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0G8">http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0G8</a> |                              |
| <b>American Bittern</b> Botaurus lentiginosus                                                                                                                     | Bird of conservation concern |
| Season: Wintering                                                                                                                                                 |                              |
| <a href="http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0F3">http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0F3</a> |                              |
| <b>Bald Eagle</b> Haliaeetus leucocephalus                                                                                                                        | Bird of conservation concern |
| Season: Year-round                                                                                                                                                |                              |
| <a href="http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B008">http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B008</a> |                              |
| <b>Black-billed Cuckoo</b> Coccyzus erythrophthalmus                                                                                                              | Bird of conservation concern |
| Season: Breeding                                                                                                                                                  |                              |
| <a href="http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0H1">http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0H1</a> |                              |

|                                                                                                                                                                   |                              |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>Blue-winged Warbler</b> <i>Vermivora pinus</i>                                                                                                                 | Bird of conservation concern |
| Season: Breeding                                                                                                                                                  |                              |
| <b>Cerulean Warbler</b> <i>Dendroica cerulea</i>                                                                                                                  | Bird of conservation concern |
| Season: Breeding                                                                                                                                                  |                              |
| <a href="http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B09I">http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B09I</a> |                              |
| <b>Fox Sparrow</b> <i>Passerella iliaca</i>                                                                                                                       | Bird of conservation concern |
| Season: Wintering                                                                                                                                                 |                              |
| <b>Gull-billed Tern</b> <i>Larus philippinus</i>                                                                                                                  | Bird of conservation concern |
| Season: Breeding                                                                                                                                                  |                              |
| <a href="http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0JV">http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0JV</a> |                              |
| <b>Kentucky Warbler</b> <i>Oporornis formosus</i>                                                                                                                 | Bird of conservation concern |
| Season: Breeding                                                                                                                                                  |                              |
| <b>Least Bittern</b> <i>Ixobrychus exilis</i>                                                                                                                     |                              |
| Season: Breeding                                                                                                                                                  |                              |
| <a href="http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B092">http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B092</a> |                              |
| <b>Peregrine Falcon</b> <i>Falco peregrinus</i>                                                                                                                   | Bird of conservation concern |
| Season: Wintering                                                                                                                                                 |                              |
| <a href="http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0FU">http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0FU</a> |                              |
| <b>Pied-billed Grebe</b> <i>Podilymbus podiceps</i>                                                                                                               | Bird of conservation concern |
| Season: Breeding                                                                                                                                                  |                              |
| <b>Prairie Warbler</b> <i>Dendroica discolor</i>                                                                                                                  | Bird of conservation concern |
| Season: Breeding                                                                                                                                                  |                              |
| <b>Prothonotary Warbler</b> <i>Protonotaria citrea</i>                                                                                                            | Bird of conservation concern |
| Season: Breeding                                                                                                                                                  |                              |
| <b>Purple Sandpiper</b> <i>Calidris maritima</i>                                                                                                                  | Bird of conservation concern |
| Season: Wintering                                                                                                                                                 |                              |
| <b>Red Knot</b> <i>Calidris canutus rufa</i>                                                                                                                      | Bird of conservation concern |
| Season: Wintering                                                                                                                                                 |                              |
| <a href="http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0DM">http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0DM</a> |                              |
| <b>Red-headed Woodpecker</b> <i>Melanerpes erythrocephalus</i>                                                                                                    | Bird of conservation concern |
| Season: Year-round                                                                                                                                                |                              |
| <b>Rusty Blackbird</b> <i>Euphagus carolinus</i>                                                                                                                  | Bird of conservation concern |
| Season: Wintering                                                                                                                                                 |                              |
| <b>Saltmarsh Sparrow</b> <i>Ammodramus caudacutus</i>                                                                                                             | Bird of conservation concern |
| Season: Year-round                                                                                                                                                |                              |
| <b>Short-eared Owl</b> <i>Asio flammeus</i>                                                                                                                       | Bird of conservation concern |
| Season: Wintering                                                                                                                                                 |                              |
| <a href="http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0HD">http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0HD</a> |                              |
| <b>Snowy Egret</b> <i>Egretta thula</i>                                                                                                                           | Bird of conservation concern |
| Season: Breeding                                                                                                                                                  |                              |

|                                                                                                                                                                   |                              |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>Willow Flycatcher</b> <i>Empidonax traillii</i>                                                                                                                | Bird of conservation concern |
| Season: Breeding                                                                                                                                                  |                              |
| <a href="http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0F6">http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0F6</a> |                              |
| <b>Wood Thrush</b> <i>Hylocichla mustelina</i>                                                                                                                    | Bird of conservation concern |
| Season: Breeding                                                                                                                                                  |                              |
| <b>Worm Eating Warbler</b> <i>Helmitheros vermivorum</i>                                                                                                          | Bird of conservation concern |
| Season: Breeding                                                                                                                                                  |                              |

## Wildlife refuges and fish hatcheries

**There are no refuges or fish hatcheries in this location**

# Wetlands in the National Wetlands Inventory

Impacts to [NWI wetlands](#) and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local [U.S. Army Corps of Engineers District](#).

## DATA LIMITATIONS

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

## DATA EXCLUSIONS

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tubercid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

## DATA PRECAUTIONS

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

This location overlaps all or part of the following wetlands:

## Riverine

[R1UBV](#)

A full description for each wetland code can be found at the National Wetlands Inventory website: <http://107.20.228.18/decoders/wetlands.aspx>



Stantec Consulting Services Inc.  
150 Riverside Parkway, Suite 301, Fredericksburg VA 22406-1094

April 12, 2016  
File: 2029041842

**Attention: Ms. Theresita Crockett-Augustine**

U.S. Army Corps of Engineers  
Northern Virginia Field Office  
18139 Triangle Plaza, Suite 213  
Dumfries, VA 22026

Dear Ms. Crockett-Augustine,

**Reference: Request for Preliminary Jurisdictional Determination, Alexandria Waterfront, City of Alexandria, Virginia**

Stantec Consulting Services Inc. (Stantec) has been retained by the City of Alexandria to conduct a detailed investigation of waters of the U.S., including wetlands, on the above-referenced project. The site is located within the Potomac River drainage basin in the City of Alexandria, Virginia. The project site is situated along the Potomac River, east of Lee Street, south of Quay Street, north of Wolfe Street, and can be accessed via the terminus of Queen Street, Cameron Street, King Street, Prince Street, and/or Duke Street (Figures 1& 2). A copy of the Pre-Application and/or Jurisdictional Waters Determination Request Form is provided in Appendix A.

**Off-site Evaluation** – Prior to conducting fieldwork, Stantec consulted the U.S. Geological Survey (USGS) 7.5-minute Topographical Quadrangle Map (quad map) for Alexandria, Virginia (created 1998), the National Wetlands Inventory Interactive Mapper (NWI), administered by the U.S. Fish and Wildlife Service, and the Web Soil Survey, administered by the Natural Resources Conservation Service (NRCS). The USGS quad map shows a level site comprised of developed land. The NWI map (Appendix B) depicts the tidal Potomac River within the project boundaries, with no wetland features present. Additionally, the soil survey (Appendix C) indicates that the site is underlain primarily by Urban land – Grist Mill and Grist Mill sandy loam, both of which are classified as non-hydric by the NRCS in the City of Alexandria.

**On-site Evaluation** – Fieldwork was conducted during March 2016 using the Routine Determination Method as outlined in the 1987 *Corps of Engineers Wetland Delineation Manual* and methods described in the 2010 *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plain Region (Version 2.0)*. The data sheets (Appendix D) used in this investigation are included, along with representative site photos (Appendix E) and the Delineation Map (Appendix F) showing the limits of wetlands and other water features, as well as data point locations.



April 12, 2016  
Ms. Theresita Crockett-Augustine  
Page 2 of 2

**Reference: Request for Preliminary Jurisdictional Determination, Alexandria Waterfront, City of Alexandria, Virginia**

**Site Description** – The only jurisdictional feature identified by Stantec within the project limits is the Potomac River. The jurisdictional limits identified in the field correspond to the approximate mean high tide elevation associated with the river. The majority of the waterfront is developed, with jurisdictional limits occurring along existing bulkheads and stabilized shoreline. Non-developed areas within the project consist of park land comprised of maintained open area, bounded by bulkheads and/or stabilized shoreline.

On behalf of our client, Stantec respectfully requests that the Corps confirm our delineation. We would appreciate the opportunity to meet with you on-site to present our fieldwork. Please call to set up a meeting date or to discuss any questions regarding our investigation.

Thank you for your cooperation in this matter.

Regards,

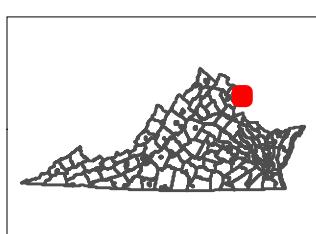
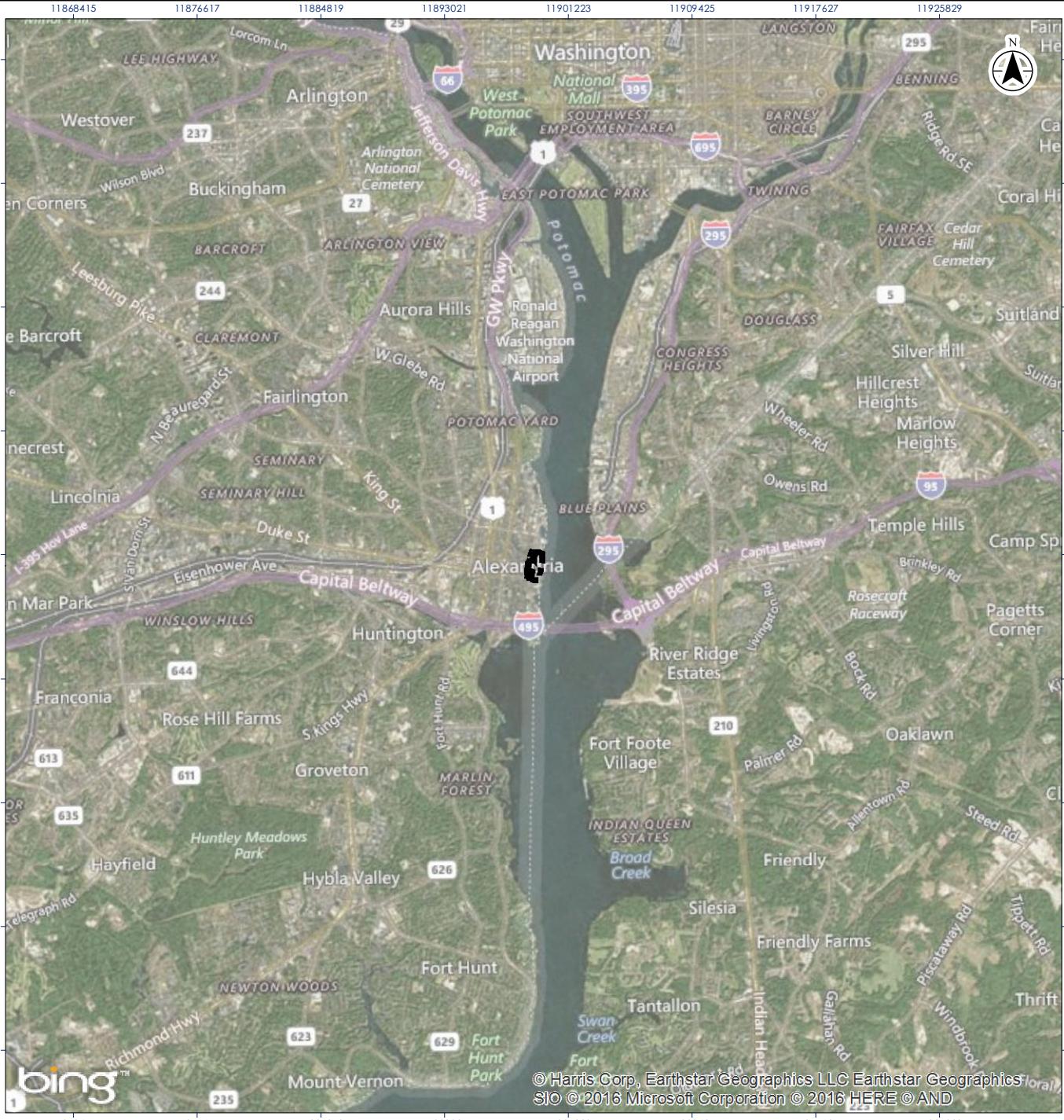
**STANTEC CONSULTING SERVICES INC.**

A handwritten signature in black ink, appearing to read "J. M. Mann".

Jason Mann  
Senior Ecologist  
Phone: (540) 785-5544  
Fax: (540) 785-1742  
[jason.mann@stantec.com](mailto:jason.mann@stantec.com)

Attachment: Figures 1, 2 and Appendices A, B, C, D, E & F

- c. Loretta Cummings, Ph.D. – Stantec
- Jeffrey Lohr, PE – Stantec



0 5,000 10,000  
1:120,000 (at original document size of 8.5x11)

 Stantec

Project Location 2029041842

City of Alexandria, VA

Prepared by ECL on 2016-03-16

Technical Review by IPS on 2016-04-12

Independent Review by LC on 2016-04-12

Client/Project

City of Alexandria

Alexandria Waterfront

Figure No.

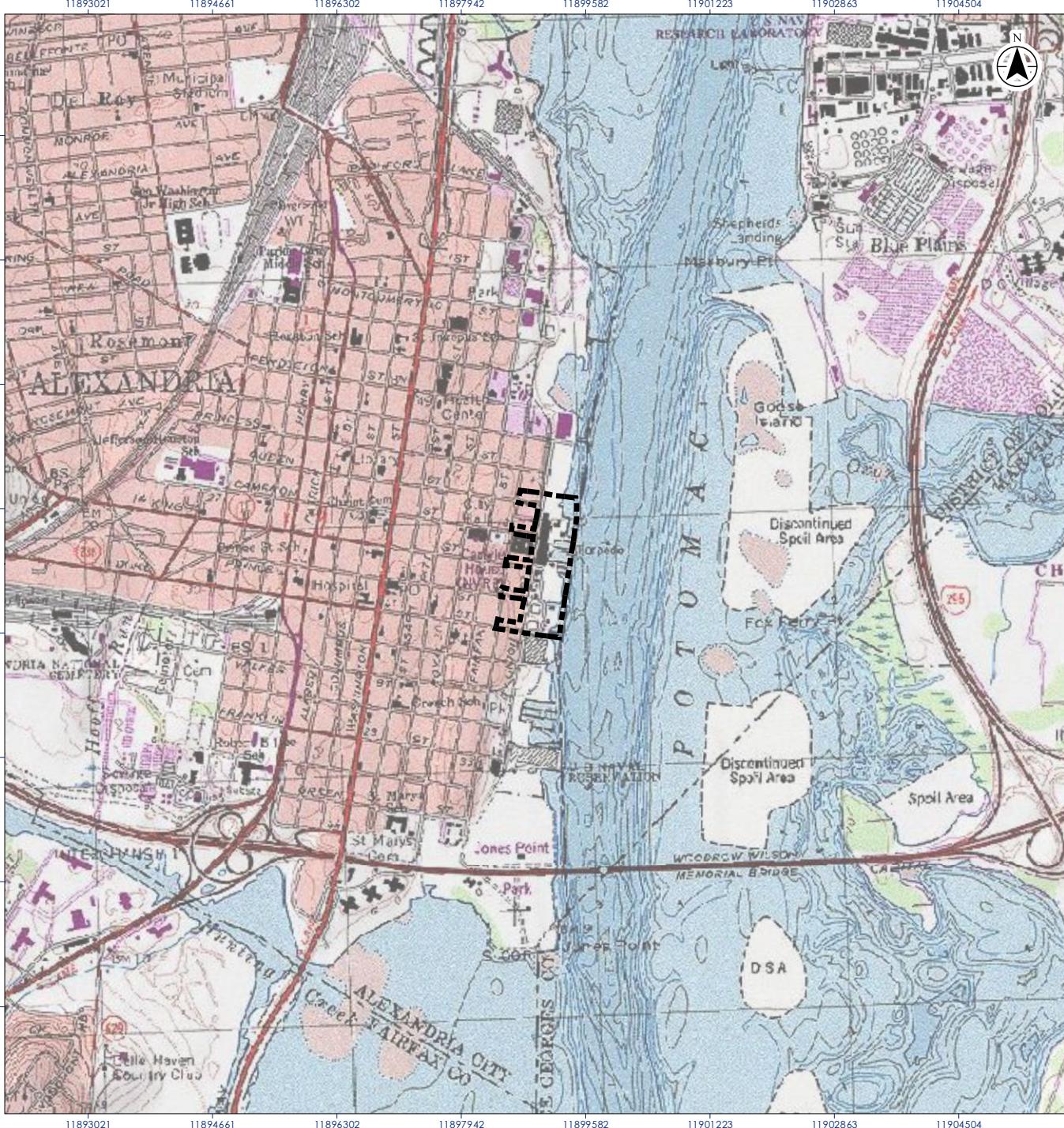
1

Title Vicinity Map

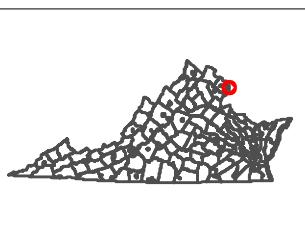
Notes

1. Coordinate System: NAD 1983 StatePlane Virginia North FIPS 4501 Feet
2. Orthoimagery © Bing Maps
3. Microsoft product screen shot(s) reprinted with permission from Microsoft Corporation

Disclaimer: Stantec assumes no responsibility for data supplied in electronic format. The recipient accepts full responsibility for verifying the accuracy and completeness of the data. The recipient releases Stantec, its officers, employees, consultants and agents, from any and all claims arising in any way from the content or provision of the data.



## Legend



0 1,000 2,000  
Feet  
1:24,000 (at original document size of 8.5x11)



Project Location

2029041842

City of Alexandria, VA

Prepared by ECL on 2016-03-16

Technical Review by IPS on 2016-04-12

Independent Review by LC on 2016-04-12

Client/Project  
City of Alexandria  
Alexandria Waterfront

Figure No.

2

Title

**Location Map**

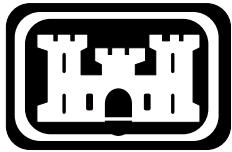
## Notes

1. Coordinate System: NAD 1983 StatePlane Virginia North FIPS 4501 Feet
2. Topographic map © USGS 7.5 Minute Series Topographic Map

Disclaimer: Stantec assumes no responsibility for data supplied in electronic format. The recipient accepts full responsibility for verifying the accuracy and completeness of the data. The recipient releases Stantec, its officers, employees, consultants and agents, from any and all claims arising in any way from the content or provision of the data.

## **Appendix A**

### Pre-Application and JD Request Form



## NORFOLK DISTRICT REGULATORY OFFICE PRE-APPLICATION AND/OR JURISDICTIONAL WATERS DETERMINATION REQUEST FORM

This form is used when you want to determine if areas on your property fall under regulatory requirements of the U.S. Army Corps of Engineers (USACE). Please supply the following information and supporting documents described below. This form can be filled out online and/or printed and then mailed, faxed, or e-mailed to the Norfolk District. Submitting this request authorizes the US Army Corps of Engineers to field inspect the property site, if necessary, to help in the determination process. **THIS FORM MUST BE SIGNED BY THE PROPERTY OWNER TO BE CONSIDERED A FORMAL REQUEST.**

The printed form and supporting documents should be mailed to:

U.S. Army Corps of Engineers, Norfolk District  
Regulatory Office  
803 Front Street  
Norfolk, Virginia 23510-1096

Or faxed to (757) 201-7678

Or sent via e-mail to: [CENAO.REG\\_ROD@usace.army.mil](mailto:CENAO.REG_ROD@usace.army.mil)

Additional information on the Regulatory Program is available on our website at:  
<http://www.nao.usace.army.mil/>  
Please contact us at 757-201-7652 if you need any assistance with filling out this form.

---

### **Location and Information about Property to be subject to a Jurisdictional Determination:**

1. Date of Request: April 12, 2016
2. Project Name: Alexandria Waterfront
3. City or County where property located: City of Alexandria
4. Address of property and directions (attach a map of the property location and a copy of the property plat):  
The approximate 25.95-acre site is located within the Potomac River drainage basin in the City of Alexandria, Virginia. The project site is situated along the Potomac River, east of Lee Street, south of Quay Street, north of Wolfe Street, and can be accessed via the terminus of Queen Street, Cameron Street, King Street, Prince Street, and/or Duke Street.
5. Coordinates of property (if known): 38°48'16.93"N    77°02'23.68"W
6. Size of property in acres: 25.95
7. Tax Parcel Number / GPIN (if available):
8. Name of Nearest Waterway: Potomac River
9. Brief Description of Proposed Activity, Reason for Preapplication Request, and/or Reason for Jurisdictional Waters Determination Request: Flood mitigation

10. Has a wetland delineation/determination been completed by a consultant or the Corps on the property previously?  YES  NO  UNKNOWN,

If yes, please provide the name of the consultant and/or Corps staff and Corps permit number, if available:

**Property Owner Contact Information:**

Property Owner Name: City of Alexandria    ATTN: Tony Gammon  
Mailing Address: 301 King Street  
City: State: Zip: Alexandria, VA 22314  
Daytime Telephone: 703-746-4155  
E-mail Address: anthony.gammon@alexandria.gov

If the person requesting the Jurisdictional Determination is **NOT** the Property Owner, please also supply the Requestor's contact information here:

Requestor Name: Jason Mann, Stantec  
Mailing Address: 150 Riverside Parkway, Suite 301  
City: State: Zip: Fredericksburg, VA 22406  
Daytime Telephone: 540-785-5544  
E-mail Address: jason.mann@stantec.com

Additionally, if you have any of the following information, please include it with your request: wetland delineation map, other relevant maps, drain tile survey, topographic survey, and/or site photographs.

CERTIFICATION: I am hereby requesting a preapplication consultation or jurisdictional waters and/or wetlands determination from the U.S. Army Corps of Engineers, for the property(ies) I have described herein. I agree to allow the duly authorized representatives of the Norfolk District Corps of Engineers and other regulatory or advisory agencies to enter upon the premises of the project site at reasonable times to evaluate inspect and photograph site conditions. This consent to enter the property is superior to, takes precedence over, and waives any communication to the contrary. For example, if the property is posted as "no trespassing" this consent specifically supercedes and waives that prohibition and grants permission to enter the property despite such posting. I hereby certify that the information contained in the Request for a Jurisdictional Determination is accurate and complete:

---

Property Owner's Signature

---

Date



Appendix P

## PROJECT TOTAL COST ALTERNATIVE #1



Engineers...Working Wonders With Water®

## PROJECT SUMMARY

**Project:** Waterfront Implementation Project  
**Client:** City of Alexandria, VA  
**Location:** Alexandria, VA  
**Zip Code:** 22314

|                         |               |
|-------------------------|---------------|
| Construction Mid-Point: | 2024          |
| Escalation:             | 3%            |
| Estimate Class:         | 4             |
| PIC:                    | MM            |
| PM:                     | JM            |
| Date:                   | June 29, 2021 |
| By:                     | PP            |

Carollo Job # 11852A.60

Reviewed:

| NO.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | DESCRIPTION                 | TOTAL                |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|----------------------|
| 01                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Structural Bulkhead         | \$500,000            |
| 02                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Utilities - Storm Sewer     | \$5,257,000          |
| 03                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Utilities - Dry             | \$2,324,000          |
| 04                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Utilities - Wet             | \$1,394,000          |
| 05                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Promenade                   | \$0                  |
| 06                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Street Paving for Utilities | \$8,312,000          |
| 07                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Point Lumley                | \$0                  |
| 08                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Waterfront Park             | \$0                  |
| 09                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Waterfront Park Pump St     | \$6,548,000          |
| 10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | King St Sq                  | \$0                  |
| 11                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Torpedo Factory             | \$0                  |
| 12                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Thompson Alley Park Pump St | \$4,217,000          |
| 13                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Thompson Alley Park         | \$0                  |
| 14                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Piers                       | \$0                  |
| 15                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Waterfront Park detention   | \$0                  |
| 16                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Founders Park detention     | \$14,329,000         |
| 19                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Tide Gates                  | \$111,000            |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                             | \$0                  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                             | \$0                  |
| <b>TOTAL DIRECT COST</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                             | <b>\$42,992,000</b>  |
| General Conditions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 12.0%                       | \$5,159,000          |
| Subtotal                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                             | <b>\$48,151,000</b>  |
| Sales Tax (Applied to 65% of total direct cost and GCs)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 6.0%                        | \$1,878,000          |
| Subtotal                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                             | <b>\$50,029,000</b>  |
| General Contractor Home Office Overhead, Profit & Risk                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 17.0%                       | \$8,505,000          |
| Subtotal                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                             | <b>\$58,534,000</b>  |
| Escalation to Mid-Point (2024)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 9.3%                        | \$5,428,000          |
| Subtotal                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                             | <b>\$63,962,000</b>  |
| Design Development Contingency                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 20.0%                       | \$12,792,000         |
| Subtotal                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                             | <b>\$76,754,000</b>  |
| Pricing Contingency                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 0.0%                        | \$0                  |
| Subtotal                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                             | <b>\$76,754,000</b>  |
| Bonds and Insurance                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 2.0%                        | \$1,535,000          |
| <b>TOTAL ESTIMATED CONSTRUCTION COST</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                             | <b>\$78,289,000</b>  |
| Engineering Design                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 20.0%                       | <b>\$15,658,000</b>  |
| <b>TOTAL ESTIMATED DESIGN-BUILD COST</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                             | <b>\$93,947,000</b>  |
| Owner's Reserve for Change Orders                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 5.0%                        | \$3,914,000          |
| Legal and Administrative Fees                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 5.0%                        | \$3,914,000          |
| Env. Documentation, Public Involvement, Funding Mgt.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 5.0%                        | \$3,914,000          |
| <b>TOTAL ESTIMATED PROJECT COST</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                             | <b>\$105,689,000</b> |
| <p><small>The cost estimate herein is based on our perception of current conditions at the project location. This estimate reflects our professional opinion of accurate costs at this time and is subject to change as the project design matures. Carollo Engineers have no control over variances in the cost of labor, materials, equipment; nor services provided by others, contractor's means and methods of executing the work or of determining prices, competitive bidding or market conditions, practices or bidding strategies. Carollo Engineers cannot and does not warrant or guarantee that proposals, bids or actual construction costs will not vary from the costs presented as shown.</small></p> |                             |                      |



Appendix Q

## PROJECT TOTAL COST ALTERNATIVE #2

### PROJECT SUMMARY

**Project:** Waterfront Implementation Project  
**Client:** City of Alexandria, VA  
**Location:** Alexandria, VA  
**Zip Code:** 22314

|                                |               |
|--------------------------------|---------------|
| <b>Construction Mid-Point:</b> | 2024          |
| <b>Escalation:</b>             | 3%            |
| <b>Estimate Class:</b>         | 4             |
| <b>PIC:</b>                    | MM            |
| <b>PM:</b>                     | JM            |
| <b>Date:</b>                   | June 29, 2021 |
| <b>By:</b>                     | PP            |

Carollo Job # 11852A.60

Reviewed:

| NO.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | DESCRIPTION                 | TOTAL                |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|----------------------|
| 01                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Structural Bulkhead         | \$16,399,000         |
| 02                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Utilities - Storm Sewer     | \$3,681,000          |
| 03                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Utilities - Dry             | \$2,324,000          |
| 04                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Utilities - Wet             | \$1,394,000          |
| 05                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Promenade                   | \$5,597,000          |
| 06                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Street Paving for Utilities | \$8,312,000          |
| 07                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Point Lumley                | \$0                  |
| 08                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Waterfront Park             | \$0                  |
| 09                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Waterfront Park Pump St     | \$6,548,000          |
| 10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | King St Sq                  | \$0                  |
| 11                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Torpedo Factory             | \$0                  |
| 12                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Thompson Alley Park Pump St | \$0                  |
| 13                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Thompson Alley Park         | \$0                  |
| 14                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Piers                       | \$0                  |
| 15                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Waterfront Park detention   | \$5,243,000          |
| 16                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Founders Park detention     | \$0                  |
| 19                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Tide Gates                  | \$111,000            |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                             | \$0                  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                             | \$0                  |
| <b>TOTAL DIRECT COST</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                             | <b>\$49,609,000</b>  |
| General Conditions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 12.0%                       | \$5,953,000          |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Subtotal                    | <b>\$55,562,000</b>  |
| Sales Tax (Applied to 65% of total direct cost and GCs)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 6.0%                        | \$2,167,000          |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Subtotal                    | <b>\$57,729,000</b>  |
| General Contractor Home Office Overhead, Profit & Risk                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 17.0%                       | \$9,814,000          |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Subtotal                    | <b>\$67,543,000</b>  |
| Escalation to Mid-Point (2024)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 9.3%                        | \$6,263,000          |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Subtotal                    | <b>\$73,806,000</b>  |
| Design Development Contingency                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 20.0%                       | \$14,761,000         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Subtotal                    | <b>\$88,567,000</b>  |
| Pricing Contingency                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 0.0%                        | \$0                  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Subtotal                    | <b>\$88,567,000</b>  |
| Bonds and Insurance                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 2.0%                        | \$1,771,000          |
| <b>TOTAL ESTIMATED CONSTRUCTION COST</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                             | <b>\$90,338,000</b>  |
| Engineering                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 20.0%                       | \$18,068,000         |
| <b>TOTAL ESTIMATED DESIGN-BUILD COST</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                             | <b>\$108,406,000</b> |
| Owner's Reserve for Change Orders                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 5.0%                        | \$4,517,000          |
| Legal and Administrative Fees                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 5.0%                        | \$4,517,000          |
| Env. Documentation, Public Involvement, Funding Mgt.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 5.0%                        | \$4,517,000          |
| <b>TOTAL ESTIMATED PROJECT COST</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                             | <b>\$121,957,000</b> |
| <i>The cost estimate herein is based on our perception of current conditions at the project location. This estimate reflects our professional opinion of accurate costs at this time and is subject to change as the project design matures. Carollo Engineers have no control over variances in the cost of labor, materials, equipment; nor services provided by others, contractor's means and methods of executing the work or of determining prices, competitive bidding or market conditions, practices or bidding strategies. Carollo Engineers cannot and does not warrant or guarantee that proposals, bids or actual construction costs will not vary from the costs presented as shown.</i> |                             |                      |



## Appendix R

# RESILIENCE PLAN

## City of Alexandria Resilience Plan | September 2021

In response to the resilience planning requirements of the **Community Flood Preparedness Fund** (“the CFPF” or “Fund”) outlined within the [2021 CFPF Grant Manual](#) (Appendix G: Elements of Resilience Plans), the City of Alexandria (“the City”) prepared the following Resilience Planning Overview of formal and relevant plans used to prioritize potential projects, and to assist the City in securing funding for critical resilience plans, studies, and projects.

The **Elements of Resilience Plans** in Appendix G of the 2021 CFPF Grant Manual lists elements that should be included in resilience plans for communities applying for CFPF grant funding. These elements include:

1. *It is project-based with projects focused on flood control and resilience.*
2. *It incorporates nature-based infrastructure to the maximum extent possible.*
3. *It includes considerations of all parts of a locality regardless of socioeconomic or race.*
4. *It includes coordination with other local and inter-jurisdictional projects, plans, and activities and has a clearly articulated timeline or phasing for plan implementation.*
5. *It is based on the best available science, and incorporates climate change, sea level rise, storm surge(where appropriate), and current flood maps.*

Alexandria’s resilience planning elements are not currently contained within an adopted “stand alone” plan; however, the City has previously dedicated funding to this effort and is in the process of procuring consulting services to develop a ‘stand alone’ plan that incorporates the above elements and others germane to the City. This Resilience Planning Overview identifies how various resilience planning documents of the City of Alexandria satisfy all the CFPF Resilience Plan elements.

The following plans and studies for the City of Alexandria each have components which satisfy elements of the Resilience Plan requirements. Together they form a Resilience Plan. *Specific excerpts from each plan that satisfy the requirements outlined in Appendix G: Elements of Resilience Plans is found on page 12 of this document.*

- [Northern Virginia Hazard Mitigation Plan \(2017\)](#)
- [City of Alexandria Storm Sewer Capacity Analysis \(CASSCA, 2016\)](#)
- [FY 2022 – FY 2031 Storm Sewer Capacity Projects](#)
- [FY 2022 - FY 2031 Stormwater Management Utility Ten-Year Plan](#)
- [Four Mile Run Restoration Master Plan](#)
- [Alexandria's Waterfront Plan](#)
- [Alexandria Floodplain Ordinance](#)
- [Emergency Operations Plan \(EOP\)](#)
- [Flood Action Alexandria](#)
- [Alexandria's Masterplan and Small Area Masterplans](#)
- [Alexandria's Housing Masterplan](#)

- [Resilient Alexandria Charter](#)
- [CRS Community Certification](#)
- [Eco-City Charter](#)
- [Eco-City Action Plan 2040](#)
- [Flood Response Plan](#)

Appendix G of the 2021 first round CFPF Grant Manual also includes examples of elements of plans that would be “appropriate for inclusion in a submission.” These elements are listed in bold below. Below each element, the City has identified a corresponding Plan and specific plan section that addresses that item, thereby fulfilling the Resilience Plan requirement.

#### **Equity based strategic policies for local government-wide flood protection and prevention.**

[Northern Virginia Hazard Mitigation Plan \(2017\), Section 9.7.1 Alexandria Mitigation and Action Plan](#) prioritizes actions across local government departments including the Department of Transportation, Environmental Services, and Emergency Management. The actions range from compliance with FEMA’s NFIP and participation in the Community Rating System, to nature-based solutions, infrastructure upgrades, and building protections to enhance the resilience of residents.

[Alexandria's Floodplain Ordinance No.4715](#) ensures that future development and major retrofits comply with flood-resilient building standards, which protect residents living in the floodplain.

#### **Proposed projects that enable communities to adapt to and thrive through natural or human hazards.**

[Northern Virginia Hazard Mitigation Plan \(2017\), Section 9.7.1. Alexandria Mitigation and Action Plan](#) prioritizes protection against natural and human hazards through the range of actions described above.

[The Four Mile Run Restoration Masterplan and Tidal Restoration Demonstration Project](#) advance the resilience of the Four Mile Run sub-basin through restoration of the streambank, the creation of a new recreation and green space, and enhancement of the riverine floodplain to better handle future floods.

Additionally, The City launched [Flood Action Alexandria](#) in Spring 2021 to expedite infrastructure improvements, including [11 high-priority Storm Sewer Capacity capital improvement projects](#) and additional neighborhood [Spot Improvement projects](#). The program also expands flood early warning systems and signage; implements a [Flood Mitigation Pilot Grant Program](#) to provide matching grants to property owners who install flood-proofing measures; increases [maintenance capacity](#); and enhances community outreach and engagement, including monthly newsletters. In May 2022, City Council approved the FY 2022 – FY 2031 Stormwater Management Utility Ten-Year Plan that included a new doubling of the [Stormwater Utility Fee](#) to increase operating and capital funding to implement Flood Action Alexandria elements, including a new \$197 million 10-year stormwater capacity and spot improvement capital program (with \$136 million planned for the next five years).

The recently-launched Flood Mitigation Grant Program for property owners impacted by a recent flood event. A brief description of the grant program announcement is included below.

"The City of Alexandria will now begin accepting applications for its new [Flood Mitigation Pilot Grant Program](#) on Monday, August 30. The program offers matching reimbursement grants to property owners who have installed flood mitigation measures on properties impacted by recent flash flooding events dating back to July 2019. Property owners may receive up to 50% reimbursement for completed project costs, up to a maximum of \$5,000, for implementing [eligible flood-proofing measures](#) on their property. Applications will be accepted on an ongoing basis."

[Flood Action Alexandria](#) is an initiative to protect residents citywide from the impacts of flooding through the following programs and actions:

- Storm Sewer Capacity Projects – The [2016 Storm Sewer Capacity Analysis \(CASSCA\)](#) included a modeling effort that identified 90 \*problem areas\* in the City where the model found potential capacity and flooding concerns. The top 11 capacity projects from CASSCA were prioritized based on planning-level cost-benefit analysis and identified capacity issues. These projects, which are funded in the City's Capital Improvement Program, are intended to mitigate flooding for the greatest number of ratepayers, direct investment to areas where the most significant property damage is occurring and provide the greatest overall system benefit. Design of the top three projects begins in FY 2022.
- [Spot improvement projects](#) - Small capital projects managed by the Transportation & Environmental Services Stormwater Management Division (T&ES SWM) to help address localized flooding and drainage issues.
- [Storm & Sanitary Sewer Section](#) – This effort informs residents, business owners, and citizen groups of best practices to avoid sewer backups, and defines responsibilities of the City and the homeowner related to sewer connections. The ultimate goal is to reduce flooding by decreasing mainline blockages, minimizing the infiltration and inflow of storm water in the sanitary system, and evaluating the structural integrity of the entire sewer system.
- [Public Outreach](#) - The City provides information and updates on the progress of the flood mitigation program on the [Flood Action Alexandria website](#) and via subscription to the Flood Action Alexandria e-Newsletter. Residents can subscribe to receive information about how to help flood mitigation efforts, participate in community meetings, engage neighbors in the process, and provide feedback on the implementation of the program. Residents have been invited to log into [Alexandria eNews](#) and opt-in to "Flood Action Alexandria" to subscribe to this e-Newsletter.
- [Early Warning and Emergency Response](#) - The City of Alexandria [Emergency Operations Plan](#) (EOP) is a multi-discipline, all-hazards plan that establishes a single, comprehensive framework for the management of major emergencies and disasters within the city. The EOP is implemented when it becomes necessary to mobilize identified resources to save lives and protect property and infrastructure.
- [Ad Hoc Stormwater Utility and Flood Mitigation Advisory Group](#) – The Advisory Group's responsibilities include: Reviewing and advising in regards to flood mitigation activities, monitoring and measuring progress of the City's proposed flood mitigation efforts, serving as a general body for receipt and dissemination of information for the City's flood mitigation implementation efforts, and reviewing and providing recommendations on proposed

Stormwater Utility operating and capital budgets

**Documentation of existing social, economic, natural, and other conditions present in the local government.**

[Alexandria's Masterplan and Small Area Masterplans](#) for each of its neighborhoods provides comprehensive demographic data and a contextual overview of the population, land use and development, and open space and recreation.

**Review of the vulnerabilities and stressors, both natural and social in the local government.**

[Alexandria's Masterplan and Small Area Masterplans](#) address vulnerabilities and stressors within the economy including small business, the environment, and community. Each plan involved extensive community engagement to identify the neighborhoods' priorities.

[Alexandria Storm Sewer Capacity Analysis](#) assessed and addressed natural stressors to the city's infrastructure which contribute to repetitive flooding.

[Alexandria's Housing Masterplan](#) addresses inequities in housing. As a result of sharply increasing real estate costs and regional development pressures over the past decade, the City faces a severe shortage of affordable housing. Since 2000, there have been dramatic declines in [market affordable rental units](#) (more than 15,500 units have been lost between 2000 and 2018) and in opportunities for affordable homeownership for low- and moderate-income individuals and families. As the growth in housing costs continues to outpace the growth in incomes, Alexandrians are increasingly becoming housing cost burdened (defined as paying 30% or more of household income on housing-related costs).

Resilient ALX focuses on utilizing Alexandria's Citizen Corps Council (CCC) to advise the City on how to enhance community resilience. The project will include creating a Charter, and Assessment and Report. The Charter offers an overarching vision to supplement the goal of Alexandria's Strategic Plan in the area of creating a Safe and Resilient Community. Charter The CCC Charter will utilize the FEMA Lifelines to categorize data from the study. The results of which will inform the Focus Areas of the Assessment and Report. CCC will work collaboratively with related advisory bodies to create a sound and unifying vision for the City.



**Forward-looking goals, actionable strategies, and priorities as seen through an equity-based lens.**

Under the direction of the City's first Race and Social Equity Officer, Jacqueline Tucker, City departments and an interdepartmental work group are building a framework (in collaboration with City employees, community members, and other stakeholders) to ensure policy decisions advance race and social equity for all Alexandria residents.

[Resolution 2974 All Alexandria: Committing to Race and Social Equity](#) commits to:

- 1) Ensure that race and social equity is incorporated and centered in all planning, including:
  - a. Center race and equity throughout the forthcoming FY 2022-FY 2027 Strategic Plan and departmental strategic planning processes;
  - b. Establish specific, measurable, attainable, relevant time-based (SMART) goals race and social equity action plans for City departments;
  - c. Incorporate race and social equity into all staff and leadership talent management programs;
  - d. Establish, strengthen and maintain key partnerships with the Alexandria City Public Schools, other public entities serving our community, community based, non-profit, and faith-based organizations, and businesses in Alexandria to advance racial equity.
- 2) Implement and sustain structures and systems to advance race and social equity, including:
  - a. Adopt and promote practices and policies centered on creating and ensuring racial and social equity through the use of a racial equity tool;
  - b. Conduct race and social equity trainings for City Council, City staff and City boards and commissions;
  - c. Create authentic community engagement best practices for use in evaluating City actions from creation to implementation;
  - d. Maintain membership and active participation in the Government Alliance on Race and Equity (GARE) and Metropolitan Washington Council of Governments (MWCOG) Racial Equity Work Group and newly established Chief Equity Officers Committee.
- 3) Align and implement policy efforts designed to advance race and social equity goals, including:
  - a. Incorporate greatly expanded language access into more City of Alexandria communications and platforms;
  - b. Reduce and eliminate racial and social inequities in the allocation of City resources through the use of a budget equity tool which may entail the adjustment of budgets and funding reallocation;
  - c. Present City Council with a Racial and Social Equity Action Plan, consisting of specific policy initiatives to advance the City's racial equity goals, informed by additional community engagement.
- 4) Ensure accountability mechanisms related to the progression and transparency of work to advance race and social equity, including:
  - a. Develop equity data mechanisms, including equity indicators, equity mapping, and dashboards to transparently monitor, share, view and inform policy decisions that purposefully work toward reducing and eliminating disparities;
  - b. Develop quarterly listen and learn sessions, under the direction of the Race and Social Equity

Officer, to establish ongoing conversation with the community to understand their most pressing issues and to normalize the key concepts of race, social equity and government through collective learning opportunities.

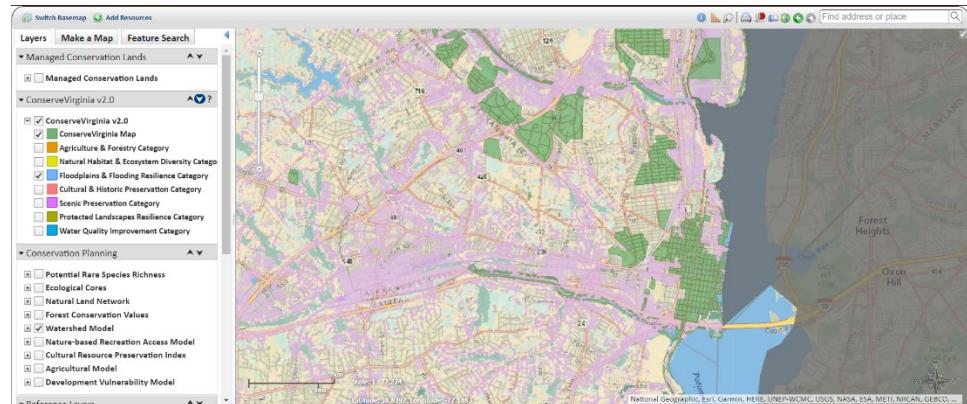
Strategies that guide growth and development away from high-risk locations that may include strategies in comprehensive plans or other land use plans or ordinances or other studies, plans or strategies adopted by a local government.

[Alexandria's Floodplain Ordinance No.4715](#) ensures that future development and major retrofits comply with flood-resilient building standards, which protect residents citywide living in the floodplain. This ordinance also ensures that development is directed away from Special Flood Hazard Areas.

Additionally, [Alexandria's Masterplan and Small Area Masterplans](#) and [Alexandria's Waterfront Plan](#), Chapter 2 – Section: A “Plan for Development” addresses properties along Alexandria's waterbodies and within its floodplains.

Proposed acquisition of land or conservation easements or identification of areas suitable for conservation particularly areas identified as having high flood attenuation benefit by *ConserveVirginia* or similar data driven tools.

Alexandria is mapped within the ConserveVirginia tool. Additionally, Alexandria's Floodplain Ordinance addresses areas to restrict future development due to increased flood risk.



#### Identification of areas suitable for property buyouts in frequently flooded areas.

The City continues to identify areas suitable for property buyouts in frequently flooded areas as needed.

Identification of critical facilities and their vulnerability throughout the local government such as water and sewer or other types identified as “lifelines” by FEMA.

Alexandria has identified and analyzed the vulnerabilities of its infrastructure system through the [Alexandria Storm Sewer Capacity Analysis](#).

Alexandria's drinking water system through Virginia American Water has completed the EPA's requirement for a Risk and Resilience Assessment and Emergency Response Plan.

Identified ecosystems/wetlands/floodplains suitable for permanent protection.

Relevant work includes:

- [Four Mile Run Restoration Master Plan](#)
- Waterfront Masterplan
- [Waterfront Schematic Landscape and Flood Mitigation Design](#)
- [Waterfront Flood Mitigation and Promenade Project](#)

Identified incentives for restoring riparian and wetland vegetation.

Relevant work includes:

- [Four Mile Run Restoration Master Plan](#)
- [City of Alexandria Landscape Guidelines](#)

A framework for implementation, capacity building and community engagement.

The [All Alexandria](#) Initiative focuses specifically on community engagement and outreach to build equity across the city and local government actions.

**Strategies for creating knowledgeable, inclusive community leaders and networks.**

Through All Alexandria, the city is using the [GARE](#) framework to empower community leaders and networks to elevate their voices in local government, and create more inclusive outcomes.

The City's racial and social equity initiative grew from the efforts of an interdepartmental Race and Social Equity Working Group, formed in 2018. These City employees developed and piloted social and racial equity programming in four City departments. The programming was based on the work of the [Government Alliance on Race and Equity](#) (GARE), a national network of governments working to achieve racial equity and advance opportunities for all. The City became a member of GARE in 2019, developing its inaugural Racial Equity Learning as part of the Metropolitan Washington Council of Governments' year-long [Advancing Racial Equity Cohort](#).

**A community dam safety inventory and risk assessment posed by the location and condition of dams.**

Extensive studies of the Alexandria dam were conducted after a major flood event. The components of these studies, flood mapping, and action plans can be found below.

- [2008 Lake Barcroft Inundation Study update](#)
- [2008 Lake Barcroft Probable Maximum Flood Inundation Mapping](#)
- [Presentation from June 24, 2009 Public Meeting](#)
- [Draft Flood Operations Plan](#)
- [Flood Trigger Action Matrix](#)

A characterization of the community including population, economics, cultural and historic resources, dependence on the built environment and infrastructure and the risks posed to such infrastructure and characteristics by flooding from climate change, sea level rise, tidal events or storm surges or other weather.

Alexandria is a city with a population of 159,467 (U.S. Census Bureau, 2020). The medium household income in Alexandria in 2019 was \$100,939. Of the thirty-eight census tracts in Alexandria, ten are below 80% of the median income, as shown in the map below. The census tract in which the green infrastructure pilot projects are located (201204), is not 80% below the median income. However, tract 201204 does have a diversity index score of 81, indicating a high-level of diversity. A diversity index score is measured from 0-100, where a higher diversity index score denotes a high-level of diversity; in other words, a community statistic representing the likeliness of two people chosen at random belong to different race or ethnic groups (ESRI, 2021). Median disposable income, as listed in the table below, is defined as the amount of money that an individual or household has available to save or spend on non-essentials.

Alexandria is located in Northern Virginia south across the Potomac River from Washington D.C. The city encompasses 15.75 square miles at an average elevation of 30 feet above sea level. On August 12, 2021, the U.S. Census Bureau released the first local level results from the 2020 Census. Data received indicates that the City of Alexandria's 2020 population is 159,467, an increase of 19,501 residents over the past decade. Alexandria, founded in 1749, has a fascinating history, and many of its historic buildings are still preserved today. During its long history, Alexandria was a tobacco trading post, one of the ten busiest ports in America, a part of the District of Columbia, home to both the largest slave-trading firm in the country and a large free-black community, a Civil War supply center for Union troops, and a street-car suburb for Federal workers. Alexandria was also the hometown of George Washington, Robert E. Lee, Jim Morrison and "Mama" Cass Elliot.

There are only a few other communities in the United States that have as many existing examples of Georgian and Federal period architecture. Old and Historic District, designated in 1946, was the third historic district in the United States, after Charleston and New Orleans. The historic African American community known as Uptown was designated as the Parker-Gray Historic District in 1984, and in 2008 was approved for listing on the Virginia Landmarks Register. Several 20th century neighborhoods have also been recognized for their historic and architectural significance, which are listed below. It is important to note that these older neighborhoods have had significant impacts from flooding from these recent severe storm events. A list of the neighborhoods the City is engaging with who have experienced severe impacts from recent flash flood events is available online at: <https://www.alexandriava.gov/122388>.

- Del Ray and the Town of Potomac. St. Elmo and Del Ray, two subdivisions platted in 1894, were joined together in 1908 to form the incorporated town of Potomac.
- Fairlington. Fairlington is on the National Register of Historic Places, as a notable example of community planning and publicly financed housing built for defense workers and their families during World War II. Learn more about this history of this community, from the Fairlington Historical Society.
- Parkfairfax. Parkfairfax was built during 1941 to 1943 to help alleviate the acute housing shortages resulting from the depression and World War II.
- Rosemont, located northwest of the Old and Historic District of Alexandria, adjacent to Alexandria's Union Station, is an unusually intact example of an early-twentieth century middle-class trolley suburb.

National Historic Landmarks are buildings, sites, districts, structures, and objects that have been determined by the Secretary of the Interior to be nationally significant in American history and culture. This program is administered by the National Park Service In Alexandria. The Alexandria Historic District, Gadsby's Tavern, the Stabler-Leadbeater Apothecary Shop, Christ Church and the Gerald R. Ford, Jr. House have been designated as National Historic Landmarks.

More than 40 Alexandria districts, sites, buildings and structures and six Historic Districts are listed on the National Register of Historic Places, the United States of America's official list of historic properties worthy of preservation.

The City of Alexandria is experiencing more frequent and severe flood events that damage residential and commercial properties, impact critical assets, and cause day-to-day disruptions and economic losses. Extreme precipitation events have occurred more frequently in the last few years. The City has experienced four major flooding events since 2019, including July 8, 2019, July 23, 2020, September 10, 2020, and most recently August 15, 2021. All of these events are characterized between 50 to 100-yr level rainstorm events. Except for August 15 of this year, which was recorded by our new gauges, with actual accumulation of 5.19-inches in 2 hours, to be between 100 and 500-yr level rain when compared to the statistical expectations derived for the city's Intensity-Duration-Frequency (IDF) curves developed in the 1980's for the City, which actually is more conservative than NOAA's predictions for the region.

The Northern Virginia Hazard Mitigation Plan identified flooding as one of Alexandria's predominant hazards due to riverine, precipitation, tidal, and storm surge flooding. The HMP ranked natural hazards for Alexandria using historical weather-related events based on the Storm Event Database by NOAA's NCDC1. Hazards were ranked using a semi-quantitative scoring system that involved grouping the data values (normalized to account for inflation) based on statistical methods. This method prioritizes hazard risk based on a blend of quantitative factors extracted from NCDC and other available data sources. The parameters considered include:

- Historical occurrences;
- Vulnerability of population in the hazard area; and
- Historical impact, in terms of human lives and property and crop damage.

Alexandria's watersheds have a significant percentage of impervious surfaces. 43 percent of the City's surface area is comprised of roads, buildings, parking lots, and sidewalks. Impervious surface contributes to the accumulation of stormwater because water is not able to convey and recharge. This type of flooding threatens the continuous operation of roads, emergency access, and property during precipitation events.

Strategies to address other natural hazards that would cause, affect or result from flooding events including: Earthquakes, Storage of hazardous materials, Landslides/mud/debris flow/rock falls, Prevention of wildfires that would result in denuded lands causing flooding, mudslides or similar events more likely, Preparations for severe weather events including tropical storms or other severe storms, including winter storms.

The [Northern Virginia Hazard Mitigation Plan \(2017\)](#) uses a multi-hazard approach to address the hazards listed above. Additionally, this plan provided a hazard profile for Alexandria using both historical data and a statistical analysis to understand the level of future risk caused by each of these threats, summarized in the following table.

| Table 7.1: Hazard Ranking for Alexandria |       |      |         |                |          |            |           |          |         |  |
|------------------------------------------|-------|------|---------|----------------|----------|------------|-----------|----------|---------|--|
| Hazard                                   | Flood | Wind | Tornado | Winter Weather | Drought  | Earthquake | Landslide | Wildfire | Karst   |  |
| Ranking                                  | High  | High | High    | High           | Med-High | Med        | Low       | Med-Low  | Med-Low |  |

## Specific Excerpts Utilized from Each Contributing Plan and Elements 1 – 5

- 1) It is project-based with projects focused on flood control and resilience.

Projects specific to the City of Alexandria focusing on flood control and resilience are indicated in the [Northern Virginia Hazard Mitigation Plan \(2017\)](#) in Chapter 7.I, specifically, in the table on pages 7-3 through 7-6. The 2017 Plan is currently undergoing revisions and does not yet include the specific projects outlined within the City's FY 2022 – FY 2031 Capital Improvement Program.

Page vii of the 2016 City of Alexandria Storm Sewer Capacity Analysis (CASSCA) [Executive Summary](#) report – a multi-year study that can be found on the City's website posted in separate sections [here](#) – provides a summary of priority “problem areas” for projects. These 90 “problem areas” on page vii and the associated projects to remediate the “problems” through a mix of capacity, storage, and green infrastructure practices. These projects are identified in each of the City's local watersheds across the City and will help reduce flooding and increase resilience.

Page 15.15 identifies for funding in the [City's FY 2022 – FY 2031 Stormwater Management Utility Ten-Year Plan, Capital Improvement Program \(CIP\) for the top 11 prioritized capacity projects](#) are currently. An overview of these projects per local watershed is indicated in Figure 1 (Table 6-1 in the CASSCA Report). [PDF page 65](#) of the Four Mile Run Fact Sheet in the [CASSCA Executive Summary](#) shows the top two priority projects that are denoted as problem area #101 and #102 in the Four

| TABLE 6-1<br>Watershed-wide Alternatives Scoring and Prioritization Results<br><i>City of Alexandria Storm Sewer Capacity Analysis</i> |                         |                                  |                     |                      |                            |                                     |                       |
|----------------------------------------------------------------------------------------------------------------------------------------|-------------------------|----------------------------------|---------------------|----------------------|----------------------------|-------------------------------------|-----------------------|
| Watershed                                                                                                                              | Number of Problem Areas | Total Capital Cost (\$ Millions) | Total Benefit Score | Overall Benefit/Cost | Total Flood Reduction (MG) | Cost of Flood Reduction (\$/Gallon) | Preferred Alternative |
| Hooffs Run*                                                                                                                            | 23                      | \$18.26                          | 978                 | 54                   | 7.36                       | \$2.48                              | 3                     |
| Four Mile Run                                                                                                                          | 23                      | \$24.46                          | 939                 | 38                   | 11.53                      | \$2.12                              | 3                     |
| Holmes Run                                                                                                                             | 9                       | \$5.76                           | 433                 | 75                   | 2.78                       | \$2.07                              | 2                     |
| Taylor Run                                                                                                                             | 12                      | \$4.89                           | 516                 | 106                  | 4.43                       | \$1.10                              | 2                     |
| Cameron Run                                                                                                                            | 8                       | \$3.65                           | 360                 | 99                   | 2.27                       | \$1.61                              | 1                     |
| Strawberry Run                                                                                                                         | 3                       | \$0.27                           | 88                  | 322                  | 0.05                       | \$5.77                              | 3                     |
| Backlick Run                                                                                                                           | 5                       | \$3.96                           | 229                 | 58                   | 1.39                       | \$2.86                              | 3                     |
| Potomac River                                                                                                                          | 7                       | n/a                              | n/a                 | n/a                  | n/a                        | n/a                                 | n/a                   |
| <b>TOTAL</b>                                                                                                                           | <b>90</b>               | <b>\$61.29</b>                   | <b>3543</b>         | <b>58</b>            | <b>29.81</b>               | <b>\$2.06</b>                       | <b>n/a</b>            |

MG = million gallons  
Total existing volume of flooding in the problem areas (not including Potomac River) is 46.02 MG.

Figure 1. CASSCA Project Overview

Mile Run East local watershed.

The map on page 2-5 of the [“4.2 Problem and Solution Identification and Prioritization for Four Mile Run, Alexandria, Virginia”](#) shows problem areas 101 and 102, and subsequent pages speak to potential solutions and cost-benefit for these projects.

The [Stormwater Management Utility Ten-Year Plan](#) includes the Capital Projects slated for Utility Funding. This includes the [Capacity Improvement Projects](#), as well as funding for GI, and other flood control and resilience measures, such as the [Four Mile Run dredge project](#), across the City on [page](#)

#### 4.

[Alexandria Waterfront Small Area Plan \(2012\)](#) provides the roadmap on the redevelopment of the Alexandria's waterfront area in Old Town, including projects focused on nature-based solutions (i.e., Windmill Hill Park) and has lead into the larger [Waterfront Plan Implementation](#) – a 20-30 year vision for the City's historic waterfront, which includes [Flood Mitigation Implementation](#). This plan is one of a 18 Small Area Plans and has a large flood mitigation component due to it's nexus with the Potomac River. The [Alexandria Master Plan](#) is made up of 18 Small Area Plans covering neighborhoods throughout the city, as well as topical chapters of citywide relevancy, such as Historic Preservation, Urban Design, Transportation, and Open Space. The Alexandria Master Plan was adopted by the City Council on June 13, 1992, and chapters are added or updated on an ongoing basis as needed through Master Plan Amendments. The City's re-development is guided through the Master Plan and Small Area Planning process as well as the [Housing Master Plan](#). Small Areas Plans that are more recent incorporate the goals of the [Environmental Action Plan 2040](#) as well as the [City's 2019 Green Building Policy](#) which requires green infrastructure for stormwater treatment, thereby increasing the City's overall resilience.

#### 2) It incorporates nature-based infrastructure to the maximum extent possible.

The [2016 City of Alexandria Storm Sewer Capacity Analysis \(CASSCA\)](#) report identifies 90 "problem areas" and the associated projects to remediate the "problems" by capacity and storage activities. This report also identifies areas that could be served by nature-based infrastructure. Specifically, under "Task 4", for each watershed, Appendix D includes the "Green Infrastructure Concept Plans" per watershed. Figure 2 (Task 4, GI Program Concept Plan Locations for Hoofts Run) provides an example of what this looks like in the report. The report goes into further details about each of the concept locations for GI.

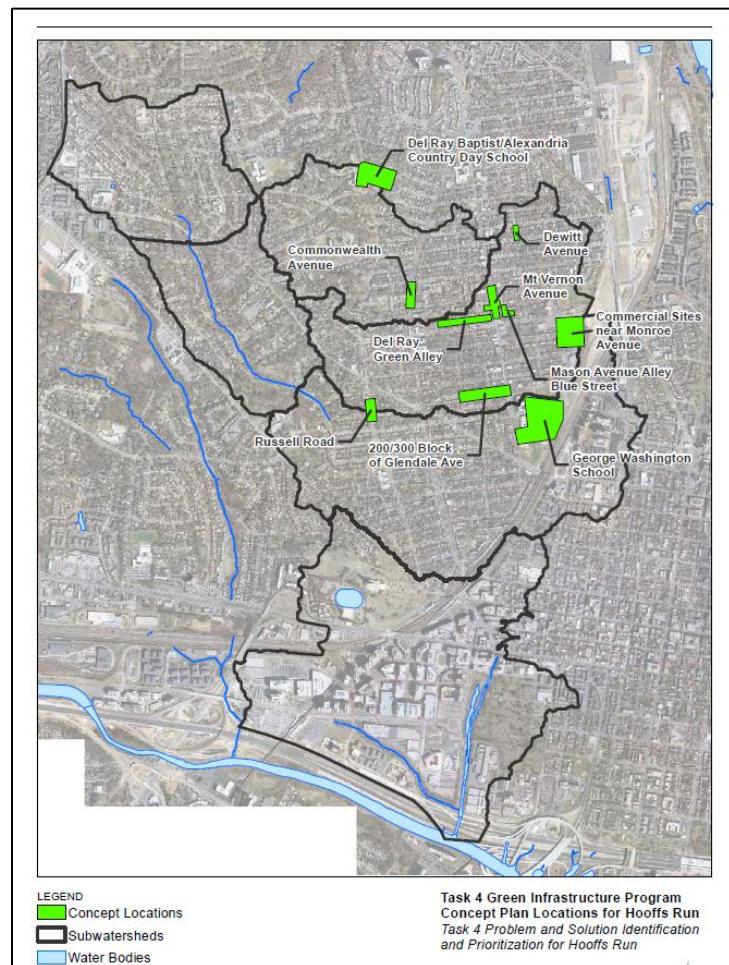


Figure 2. CASSCA Hooft's Run GI Concept Plan

3) It includes considerations of all parts of a locality regardless of socioeconomics or race.

The City recently launched [ALL Alexandria – Achieving Racial and Social Equity](#) to ensure that all parts of a locality are considered in the planning process regardless of socioeconomics or race.

Eco-City Alexandria is a collaborative strategic effort to achieve sustainability throughout the City of Alexandria. Eco-Cities work to harmonize their natural resources and environmental assets with existing policies, regional realities, and economic and business markets while engaging the community in a collaborative and transparent decision making process.

Alexandria City Council adopted the [Eco-City Charter](#) in June 2008 and was the first Environmental Charter adopted in the Commonwealth of Virginia. The Charter defined Alexandria's commitment to ecological, economic, and social sustainability:

"Use environmentally responsible flood management, stormwater control, and wastewater treatment to protect the public's health and property." – Eco-City Charter, 2008

The core values and ten guiding principles formed the basis for the City's first Environmental Action Plan (EAP) in 2009 and the updated [Environmental Action Plan \(EAP\) 2040](#). The EAP 2040 incorporates ten topic sections with an average of two goals and four to six actions in each goal.



Figure 3. Flood Action Logo

The City's [Flood Action](#) initiative was launched in early 2021 in response to the severe flood events that impacted the City in 2019 and 2020. This initiative includes an education and outreach component aimed to reach all residents of Alexandria impacted by flooding, via a new eNews channel and an eNewsletter. Figure 3 is the Flood Action Logo.

The City of Alexandria's FY 2017 to FY 2022 Strategic Plan highlights the importance of a Safe and Resilient Community. Alexandria's Citizen Corps Council (CCC) is designed to advise the City on how to enhance community resilience. The project will include creating a [Resilient ALX Charter](#), and Assessment and Report. The Charter offers an overarching vision to supplement the goal of Alexandria's Strategic Plan in the area of creating a Safe and Resilient Community. Anticipated Resilient ALX project outcomes include:

- Clearer vision for preparedness planning in the City.
- Reduced impact of disasters and emergencies to individuals, households, businesses, nonprofit organizations, and local government agencies.
- Improved individual preparedness to reduce strain on public safety groups (such as Alexandria's first responders and volunteer organizations) during a disaster.
- Faster recovery from disasters across factors including: 1) physical; 2) financial and economic; 3) psycho-social and 4) governmental.

- 4) It includes coordination with other local and inter-jurisdictional projects, plans, and activities and has a clearly articulated timeline or phasing for plan implementation.

Coordination with other localities is prevalent in the [Northern Virginia Hazard Mitigation Plan \(2017\)](#), which is further described under #1. The 2017 is currently undergoing the 5-year review and revision. The updated plan will list 'capacity projects' to mitigate flooding, which right now it is more general.

The [Four Mile Run Master Plan](#) was developed and coordinated by Arlington and Alexandria to restore Four Mile Run and does include a large flood mitigation component as administered and approved by USACE. Arlington and Alexandria currently are working together to maintain the channel through dredging in 2021/2022. Visit the Four Mile Run Dredge Project [website](#) to learn more.

"The flood control channel, constructed during the 1970s and early 1980s, has safely conveyed the high storm flows through the two jurisdictions. When the channelization project was conceived in the 1960s, the sole objective of the project was flood protection and, in this respect, the project has been a success; no floods have breached the banks along the 2.3-mile channel since its construction. Although successful in flood control, however, the channelized portion of Four Mile Run leaves much to be desired in terms of aesthetic and environmental attributes. The maintenance requirements for the channel include yearly thinning of vegetation and periodic excavation of the sediment that deposits on the channel bed."

[City of Alexandria Emergency Operations Plan \(2021\)](#) includes emergency operations relating to the "...City's vulnerability to a variety of hazards, most notably flooding." The EOP includes inter-jurisdictional planning efforts. Specifically, the City's [Flood Response Plan](#) outlines the response from five departments within the City as well as several support agencies. The Plan provides an overview of responsibilities and response activities.

- 5) It is based on the best available science, and incorporates climate change, sea level rise, storm surge (where appropriate), and current flood maps.

The [2009 Sea Level Rise Potential report](#) was incorporated into the CASSCA modeling. **CASSCA, Task 1 documents** review rainfall data and the City's stormwater design criteria, develop projections for rainfall and tidal boundary conditions based on climate change, and propose potential revisions as appropriate

[Waterfront Flood Mitigation](#) plan includes flood level evaluations (Figure 5) for planning purposes in Old Town (see Figure 4).



**Figure 5: Flood Level Elevations**

Figure 4. Waterfront Flood Mitigation Plan Flood Level Elevations (Figure 5 in the Plan)

[Floodplain District Ordinance No. 4715](#) outlines the City's Zoning Ordinance as required by FEMA, the City's Flood Map [webpage](#) includes a comprehensive overview of the City's FEMA FIRMs. The City's FIRMs were recently updated by FEMA and are currently under review by the City and its residents. The City is a [Verified Class 6 CRS Community](#).

The City currently is revising the [Energy and Climate Change Action Plan](#) with the latest climate change, sea level rise, storm surge, and current flood maps. This plan was previously completed in 2012. The new Action Plan is being guided by a 13-member Task Force and continues to incorporate racial and social equity into the plan in addition to the latest science. The plan is anticipated to be launched in 2022.



## Appendix S

# RESILIENCE PLAN STANDARDS

ORDINANCE NO. 4715

AN ORDINANCE to amend and reordain Section 6-300 (FLOODPLAIN DISTRICT) of Article VI (SPECIAL AND OVERLAY ZONES) of the City of Alexandria Zoning Ordinance, in accordance with the text amendment heretofore approved by city council as Text Amendment No. 2011-0004.

WHEREAS, the City Council finds and determines that:

1. In Text Amendment No. 2011-0004, the planning commission, having found that the public necessity, convenience, general welfare and good zoning practice so require, recommended approval to the City Council on March 1, 2011 of a text amendment to the Zoning Ordinance to adopt revised floodplain regulations, which recommendation was approved by the City Council at public hearing on March 12, 2011;
2. The City Council in adopting this ordinance expressly adopts, ratifies, affirms and concurs in the finding and action of the Planning Commission above stated;
3. All requirements of law precedent to the adoption of this ordinance have been complied with; now, therefore,

THE CITY COUNCIL OF ALEXANDRIA HEREBY ORDAINS:

Section 1. That Section 6-300 of the Zoning Ordinance be, and the same hereby is, amended by deleting the current section in its entirety and inserting new language, as shown:

**Sec. 6-300     Floodplain district.**

*6-301     Purpose and Intent.*

- (A) This ordinance is adopted pursuant to the authority granted to all localities by Va. Code § 15.2 – 2280, as well as the authority specifically granted to the City in its Charter. The purpose of these provisions is to prevent: the loss of life and property, the creation of health and safety hazards, the disruption of commerce and governmental services, the extraordinary and unnecessary expenditure of public funds for flood protection and relief, and the impairment of the tax base by:
- (1) regulating uses, activities, and development which, alone or in combination with other existing or future uses, activities, and development, will cause unacceptable increases in flood heights, velocities, and frequencies;
  - (2) restricting or prohibiting certain uses, activities, and development from locating within districts subject to flooding;

- (3) requiring all those uses, activities, and developments that do occur in flood-prone districts to be protected and/or flood-proofed against flooding and flood damage; and,
- (4) protecting individuals from buying land and structures which are unsuited for intended purposes because of flood hazards.

*6-302 Applicability.*

- (A) These provisions shall apply to all privately and publicly owned lands within the jurisdiction of the City of Alexandria and identified as being in a floodplain as designated in the Flood Insurance Study and as shown on the Flood Insurance Rate Maps prepared by the Federal Emergency Management Agency (FEMA) dated June 16, 2011.
- (B) The floodplain district regulations in Section 6-300 are adopted in compliance with floodplain management criteria set forth in regulations promulgated by FEMA.
- (C) This section shall be applicable to all applicants for building permits in the floodplain area.
- (D) All buildings for which a building permit shall have been duly and regularly issued by the director of building and mechanical inspections on or before May 24, 1977, which permit has not expired, may be completed without the necessity of complying with the floodplain district regulations in Section 6-300, but after completion, any such building or structure and the land on which it is situated shall be subject to all the provisions of said section.
- (E) All preliminary site plans which have been duly and regularly approved on or before May 24, 1977, and which have not expired, may be completed without the necessity of complying with the floodplain district regulations in Section 6-300, but after completion, any building or structure on said site plan together with the land included in said site plan shall be subject to all the provisions of said section
- (F) All final site plans which have been duly and regularly approved and released on or before May 24, 1977, and which have not expired may be completed without the necessity of complying with the floodplain district regulations in Section 6-300, but after completion, any building or structure on said site plan together with the land included in said site plan shall be subject to all the provisions of said section.

- (G) Any building or structure which is in existence on or before June 15, 2011, or for which a preliminary or combination site plan, building permit or subdivision approved on or before June 15, 2011, continues in force and effect shall not be deemed a nonconforming use provided, that any such building or structure which, following June 15, 2011, is the subject of substantial improvement shall comply with the floodplain regulations in effect at the time of such improvement.

6-303 *Definitions.* For the purposes of this Section 6-300 the following terms and phrases shall have the meaning ascribed as follows below. Should any uncertainty occur with respect to the definition of any word, term or phrase used in this section, the applicable definitions set out in 44 CFR 59.1, as amended, shall apply.

- (A) *A Zone.* An area of the one hundred (100)-year flood as shown on the Flood Insurance Rate Map. This zone is also referred to as the Approximated Floodplain District.
- (B) *AE Zone.* An area shown of the 100-year flood on the Flood Insurance Rate Map for which corresponding base flood elevations have been provided. This zone is also referred to as the Special Floodplain District.
- (C) *Base flood.* The flood having a one percent chance of being equaled or exceeded in any given year. May also be referred to as the 100-year flood.
- (D) *Base flood elevation (BFE).* The FEMA designated 100-year water surface elevation as shown on the Flood Insurance Rate Map that corresponds to the base flood.
- (E) *Basement.* Any area of a building (including parking) having its floor subgrade (below ground level) on all sides.
- (F) *Development.* Any man-made change to improved or unimproved real estate, including, but not limited to, the construction of buildings or other structures, the placement of manufactured homes, the construction of streets, the installation of utilities and other activities or operations involving paving, filling, grading, excavating, mining, dredging or drilling, the storage of equipment or materials.
- (G) *Existing manufactured home park or subdivision.* A manufactured home park or subdivision for which the construction of facilities for servicing the lots on which the manufactured homes are to be affixed (including, at a minimum, the installation of utilities, the construction of streets, and either final site grading or the pouring of concrete pads) is completed before the effective date of the floodplain management regulations adopted by a community.

- (H) *Flood/flooding.*
- (1) A general and temporary condition of partial or complete inundation of normally dry land areas from:
- (a) the overflow of inland or tidal waters;
- (b) the unusual and rapid accumulation or runoff of surface waters from any source; or,
- (c) mudflows which are proximately caused by flooding as defined in paragraph (1)(b) of this definition and are akin to a river of liquid and flowing mud on the surfaces of normally dry land areas, as when earth is carried by a current of water and deposited along the path of the current.
- (2) The collapse or subsistence of land along the shore of a lake or other body of water as a result of erosion or undermining caused by waves or currents of water exceeding anticipated cyclical levels or suddenly caused by an unusually high water level in a natural body of water, accompanied by a severe storm, or by an unanticipated force of nature such as flash flood or an abnormal tidal surge, or by some similarly unusual and unforeseeable event which results in flooding as defined in paragraph (1)(a) of this definition.
- (I) *Flood Insurance Rate Map (FIRM).* An official map of a community, on which the FEMA Federal Insurance Administrator has delineated both the special flood hazard areas and the risk premium zones applicable to the community. A Flood Insurance Rate Map that has been made available digitally is called a Digital Flood Insurance Rate Map (DFIRM). The official Flood Insurance Rate Map for the City of Alexandria shall be the in the digital format prepared by FEMA, Federal Insurance Administration, dated June 16, 2011, as amended.
- (J) *Flood Insurance Study (FIS).* An examination, evaluation and determination of flood hazards and, if appropriate, corresponding water surface elevations, or an examination, evaluation and determination of mudflow and/or flood-related erosion hazards. The official Flood Insurance Study for the City of Alexandria shall be the Flood Insurance Study prepared by FEMA, Federal Insurance Administration, dated June 16, 2011, as amended.
- (K) *Floodplain.* A relatively flat or low land area adjoining a river, stream or other watercourse which is subject to partial or complete inundation by water from such watercourse, or a land area which is subject to the unusual and rapid accumulation or runoff of surface waters from any source.

- (L) *Floodplain district.* The areas encompassed by the 100-year floodplain as shown on the Flood Insurance Rate Map.
- (M) *Flood-prone area.* Any land area susceptible to being inundated by water from any source more often than once in a 100-year period.
- (N) *Floodproofing.* Any combination of structural and non-structural additions, changes, or adjustments to structures which reduce or eliminate flood damage to real estate or improved real property, water and sanitary facilities, structures and their contents.
- (O) *Floodway.* The designated area of a floodplain required to carry and discharge flood waters of a given magnitude. For purposes of this Section 6-300, a floodway must be capable of accommodating a flood of the 100-year magnitude.
- (P) *Freeboard.* A factor of safety usually expressed in feet above a specified flood level for purposes of floodplain management. "Freeboard" tends to compensate for the many unknown factors that could contribute to flood heights greater than the height calculated for a selected size flood and floodway conditions, such as wave action, bridge openings, and the hydrological effect of urbanization in the watershed.
- (Q) *Highest adjacent grade.* The highest natural elevation of the ground surface prior to construction next to the proposed walls of a structure.
- (R) *Historic structure.* Any structure that is:
  - (1) listed individually in the National Register of Historic Places (a listing maintained by the Department of Interior) or preliminarily determined by the Secretary of the Interior as meeting the requirements for individual listing on the National Register;
  - (2) certified or preliminarily determined by the Secretary of the Interior as contributing to the historical significance of a registered historic district or a district preliminarily determined by the Secretary to qualify as a registered historic district;
  - (3) individually listed on a state inventory of historic places in states with historic preservation programs which have been approved by the Secretary of the Interior; or,

- (4) individually listed on a local inventory of historic places in communities with historic preservation programs that have been certified either by an approved state program as determined by the Secretary of the Interior or directly by the Secretary of the Interior in states without approved programs.
- (S) *Lowest floor.* The lowest floor of the lowest enclosed area (including basement). A parking structure that is below grade on all sides is considered a basement and therefore the lowest floor. An unfinished or flood resistant enclosure, usable solely for parking of vehicles, building access or storage, in an area other than a basement area (the enclosure is not below grade on all sides) is not considered a building's lowest floor; provided, that such enclosure is not built so as to render the structure in violation of the applicable floodproofing non-elevation design requirements of this Section 6-300.
- (T) *Manufactured home.* A structure, transportable in one or more sections, which is built on a permanent chassis and is designed to be used as a single-family dwelling, with or without permanent foundation, when connected to the required facilities, and which includes the plumbing, heating, air conditioning and electrical systems contained in the structure. A manufactured home shall include park trailers and other similar vehicles when placed on a site for greater than 180 days.
- (U) *Mixed-use building.* Any building or structure that is used or intended for use for a mixture of nonresidential and residential uses in the same building or structure. For floodplain management purposes, a mixed-use building is subject to the same rules and conditions as a residential building unless all of the provisions set forth more specifically herein are met.
- (V) *New construction.* Buildings and structures as to which the start of construction occurred on or after May 24, 1977, including any subsequent improvements to such buildings or structures. For floodplain management purposes, new construction means structures for which the start of construction commenced on or after the effective date of a floodplain management regulation adopted by a community and includes any subsequent improvements to such structures.
- (W) *Nonresidential building.* Any building or structure which is not a residential building or a mixed-use building.

- (X) *Recreational vehicle.* A vehicle which is
- (1) built on a single chassis;
  - (2) 400 square feet or less when measured at the largest horizontal projection;
  - (3) designed to be self-propelled or permanently towable by a light duty truck; and,
  - (4) designed primarily not for use as a permanent dwelling but as temporary living quarters for recreational camping, travel, or seasonal use.
- (Y) *Residential building.* Any single-family dwelling, two-family dwelling, row or townhouse dwelling, or multi-family dwelling, and any accessory building or structure.
- (Z) *Shallow flooding area.* A special flood hazard area with base flood depths from one to three feet where a clearly defined channel does not exist, where the path of flooding is unpredictable and indeterminate, and where velocity flow may be evident. Such flooding is characterized by ponding or sheet flow.
- (AA) *Special Flood Hazard Area (SFHA).* The land in the floodplain subject to a one percent or greater chance of being flooded in any given year as designated on the official Flood Insurance Rate Map for the City of Alexandria.
- (BB) *Start of construction.* The date a building permit is issued, provided that the actual start of construction begins within 180 days of the permit issuance date. For new construction, the actual start of construction means the initial placement of permanent construction of a structure on the site, such as the pouring of footings or a slab, the installation of piles, the construction of columns or any work beyond the state of excavation, or the placement of a manufactured home on a foundation. Permanent construction does not include land preparation, such as clearing, grading and filling, or the installation of streets or walkways, or excavation for a basement or for footings, piers or foundations, or the erection of temporary forms, or the installation of accessory buildings, such as garages or sheds not occupied as dwelling units and not part of the main structure. For substantial improvements, the actual start of construction means the first alteration of any wall, ceiling, floor or other structural part of a building, whether or not the alteration affects the external dimensions of the buildings.

(CC) *Structure.* For flood plain management purposes, a walled and roofed building, including a gas or liquid storage tank, that is principally above ground, as well as a manufactured home. "Structure" for insurance coverage purposes, means:

- (1) A building with two or more outside rigid walls and a fully secured roof, that is affixed to a permanent site;
- (2) A manufactured home (also known as a mobile home), is a structure: built on a permanent chassis, transported to its site in one or more sections, and affixed to a permanent foundation; or
- (3) A travel trailer without wheels, built on a chassis and affixed to a permanent foundation, that is regulated under the community's floodplain management and building ordinances or laws.

For the latter purpose, "structure" does not mean a recreational vehicle or a park trailer or other similar vehicle, except as described in paragraph (3) of this definition, or a gas or liquid storage tank.

(DD) *Substantial damage.* Damage of any origin sustained by a building or structure whereby the cost of restoring the building or structure to its before damaged condition would equal or exceed 50 percent of the market value of the building or structure before the damage occurred.

(EE) *Substantial improvement.* Any repair, reconstruction, rehabilitation, addition or other improvement of a building or structure, the cost of which equals or exceeds 50 percent of the market value of the building or structure immediately before construction of the improvement is commenced, or any restoration of a building or structure which has incurred substantial damage; provided, that the term does not include:

- (1) Any improvement of a building or structure that is necessary to correct existing violations of state or local health, sanitary or safety code specifications which have been identified by appropriate officials of the state or city and which are the minimum necessary to assure safe living conditions; or
- (2) Any improvement of a "historic structure," as defined in this section, so long as the improvement does not preclude the structure's continued designation as a "historic structure."

(FF) *Violation.* The failure of a structure or other development to be fully compliant with the City of Alexandria's floodplain management regulations. A structure or other development without the elevation certificate, other certifications, or other evidence of compliance required in 44 CFR Sec. 60.3(b)(5), (c)(4), (c)(10), (d)(3), (e)(2), (e)(4), or (e)(5) is

presumed to be in violation until such time as that documentation is provided.

*6-304 Description of Floodplain Districts.*

- (A) The various floodplain districts shall include the Special Flood Hazard Areas described below. The basis for the delineation of these districts shall be the Flood Insurance Study and the Flood Insurance Rate Maps for the City of Alexandria prepared by FEMA, Federal Insurance Administration, dated June 16, 2011, and any subsequent revisions and amendments thereto.
  - (1) The Special Floodplain District shall include those areas identified as an AE Zone on the Flood Insurance Rate Map for which 100-year base flood elevations have been provided.
  - (2) The Approximated Floodplain District shall include those areas identified as an A Zone on the Flood Insurance Rate Map. In these zones, no detailed flood profiles or elevations are provided, but the 100-year floodplain boundary has been approximated. For these areas, the 100-year flood elevations and floodway information from federal, state, and other acceptable sources shall be used, when available. Where the specific 100-year flood elevation cannot be determined for this area using other sources of data, such as the U.S. Army Corps of Engineers Flood Plain Information Reports, U.S. Geological Survey Flood-prone Quadrangles, etc., then the applicant for the proposed use, development and/or activity shall determine this elevation in accordance with FEMA-approved hydrologic and hydraulic engineering techniques. Hydrologic and hydraulic analyses shall be undertaken only by professional engineers or others of demonstrated qualifications, who shall certify that the technical methods used correctly reflect currently-accepted technical concepts. Studies, analyses, computations, etc., shall be submitted in sufficient detail to allow a thorough review by the Director of Transportation and Environmental Services.
- (B) The delineation of any of the floodplain districts may be revised by the City of Alexandria where natural or man-made changes have occurred and/or where more detailed studies have been conducted or undertaken by the U.S. Army Corps of Engineers or other qualified agency, or an individual documents the need for such change. Updates to the delineation of the floodplain districts require approval from both the City of Alexandria and the FEMA Federal Insurance Administration.
- (C) Any uncertainty on the floodplain district map, or Flood Insurance Rate Map, with respect to the boundary of any floodplain district, either A or

AE Zone, shall be determined by the Director of Transportation and Environmental Services by scaling and computation from the map or by land survey information.

*6-305 Administration.*

- (A) The Director of Transportation and Environmental Services shall be responsible for the administration of the floodplain management regulations set forth in this Section 6-300. He or she shall be responsible for the review of all proposed uses and development to determine whether the land on which the proposed use or development is located is in a floodplain, and that the site is reasonably safe from flooding.
- (B) An applicant must apply for a permit and issuance of the permit is required prior to the start of any development within the Special Flood Hazard Area.
- (C) No site plan, subdivision plat or building permit application which proposes to construct or make substantial improvements within any floodplain district shall be approved by any agency of the City of Alexandria without certification by the Director of Transportation and Environmental Services that the plan, plat or permit application meets the requirements of this Section 6-300. The Director of Transportation and Environmental Services shall insure that all other required permits related to development in the floodplain from state or federal governmental agencies have been obtained.
- (D) All applications for new construction or substantial improvement within any floodplain district, and all building permits issued for the floodplain shall incorporate the following information:
  - (1) the base flood elevation at the site;
  - (2) the elevation of the lowest floor (including basement);
  - (3) for structures to be floodproofed (nonresidential only), the elevation to which the structure will be floodproofed; and,
  - (4) topographic information showing existing and proposed ground elevations.
- (E) The Director of Transportation and Environmental Services may require information from the applicant, including, but not limited to, an engineering study of the floodplain. Upon a determination that the land on which the proposed use or development is located in a floodplain, the Director of Transportation and Environmental Services shall determine whether such use or development may be permitted in accordance with the

provisions of Section 6-306 through 6-308 or requires the approval of a variance as set forth in Section 6-311.

- (F) The Director of Transportation and Environmental Services shall be responsible for the collection and maintenance of records necessary for the City's participation in the National Flood Insurance Program. Base flood elevations may increase or decrease resulting from physical changes affecting flooding conditions. As soon as practicable, but not later than six months after the date such information becomes available, the Director of Transportation and Environmental Services shall notify or require the applicant to notify the FEMA Federal Insurance Administrator of any change in base flood elevation or the boundaries of any Special Flood Hazard Area depicted on the City's Flood Insurance Rate Map by submitting technical and scientific data to FEMA for a Letter of Map Revision.

*6-306 Special Regulations.*

Within the boundaries of any A or AE Zones in any floodplain district as shown on the Flood Insurance Rate Map, buildings or structures and their extensions and accessory buildings or structures maybe be constructed or substantially improved only in accordance with the following requirements of this Section 6-300 and all other applicable provisions of law.

- (A) The elevation of the lowest floor, including the basement, for any new residential building or any extension to a residential building shall be at least one foot above the base flood elevation.
- (B) The elevation of the lowest floor, including the basement for any new nonresidential building or structure and any extension or accessory to a nonresidential building shall be at least one foot above the base flood elevation. Nonresidential buildings located in all A or AE zones may be floodproofed in lieu of being elevated provided that all areas of the building components below the elevation corresponding to the base flood elevation plus one foot are watertight with walls substantially impermeable to the passage of water, and use structural components having the capability of resisting hydrostatic and hydrodynamic loads and the effect of buoyancy. In no event shall any floor below at least one foot above the base flood elevation be used for human or animal habitation, food storage or food preparation.
- (C) All new and replacement public utilities, water mains and sanitary sewers shall be designed to minimize or eliminate infiltration and exfiltration and to insure their structural integrity under flood conditions to the satisfaction of the Director of Transportation and Environmental Services.

- (D) Water heaters, furnaces, electrical distribution panels and other critical mechanical or electrical installations shall not be installed below the base flood elevation. Separate electrical circuits shall serve areas below the base flood elevation and shall be dropped from above.
- (E) Any proposed use of land, development and any new construction or substantial improvement of a building or structure within an A or AE zone, in conjunction with all other uses, existing or possessing a valid permit for construction, shall not increase the water-surface elevation of the 100-year flood by more than 0.5 foot. Any party proposing a land use or development or such construction or improvement within an A or AE Zone shall furnish specific engineering data and information as to the effect of the proposed action on future flood heights and obtain approval from the Director of Transportation and Environmental Services prior to undertaking the action.
- (F) No building permit shall be issued for the construction or substantial improvement of a building or structure unless the applicant submits to the Department of Code Administration a certification from a duly registered architect or engineer that the proposed construction (including prefabricated homes) or improvement meets the following requirements:
  - (1) the construction shall be protected against flood damage;
  - (2) the construction shall be designed (or modified) and anchored to prevent flotation, collapse or lateral movement of the building and structure;
  - (3) the construction shall be built using materials and utility equipment that are resistant to flood damage; and,
  - (4) the construction shall be built using methods and practices that will minimize flood damage. The certification required by Section 6-306(F)(1) and (2) shall be based on the 100-year flood level as noted on the Flood Insurance Rate Map.
- (G) No building permit for the substantial improvement of an existing nonresidential building shall be issued unless the building, together with attendant utility and sanitary facilities, has the lowest floor (including the basement) elevated at least one foot above the base flood elevation. Should this not be feasible, no such permit shall be issued unless the existing structure is watertight floodproofed as described in Section 6-306 in all areas below the base flood elevation to the classification designated by the Director of Transportation and Environmental Services.

- (H) No building permit for the substantial improvement of an existing residential building shall be issued unless the building has the lowest floor (including the basement) elevated at least one foot above the base flood elevation.
- (I) Wherever floodproofing is utilized within the scope of this Section 6-300, such floodproofing shall be done by approved methods. A registered professional engineer or architect shall certify the adequacy of the floodproofing design to withstand the stresses of the base flood and such plan shall cite the elevation to which the structure is floodproofed. Such certification shall be provided on Federal Emergency Management Agency, National Flood Insurance Program, elevation certificate and/or floodproofing certificate as applicable. Designs meeting the requirements of the W-1 and W-2 without human intervention technique as outlined in floodproofing regulations of the Office of the Chief of Engineers, U.S. Army, December 15, 1995, shall be deemed to comply with this requirement. The building or code official shall maintain a file of such certifications, including the elevation of the lowest floor for structures that are elevated in lieu of watertight floodproofing.
- (J) For all new construction or substantially improved structures, fully enclosed areas below the lowest floor (other than a basement) which are below the base flood elevation shall:
  - (1) only be used for the parking of vehicles, building access, or limited storage of maintenance equipment used in connection with the premises and shall not be designed or used for human habitation. Access to the enclosed area shall be the minimum necessary to allow for parking of vehicles (garage door) or limited storage of maintenance equipment (standard exterior door), or the entry to the living area (stairway or elevator);
  - (2) be constructed entirely of flood resistant materials below the base flood elevation; and,
  - (3) include, in A and AE Zones, measures to automatically equalize hydrostatic flood forces on walls by allowing for the entry and exit of floodwaters. To meet this requirement, the openings must be certified by a professional engineer or architect or meet the minimum design criteria:
    - (a) provide a minimum of two openings on different sides of each enclosed area subject to flooding;
    - (b) the total net area of all openings must be at least one square inch for each square foot of enclosed area subject to flooding;

- (c) if a building has more than one enclosed area, each area must have openings to allow floodwaters to automatically enter and exit;
  - (d) the bottom of all required openings shall be no higher than one foot above the adjacent grade;
  - (e) openings may be equipped with screens, louvers, or other opening coverings or devices, provided they permit the automatic flow of floodwaters in both directions; and,
  - (f) foundation enclosures made of flexible skirting are not considered enclosures for regulatory purposes, and, therefore, do not require openings. Masonry or wood underpinning, regardless of structural status, is considered an enclosure and requires openings as outlined above.
- (K) Any mixed-use building may be considered a nonresidential building for purposes of this Section 6-306 if all of the following conditions are met; otherwise, the building shall be considered a residential building:
- (1) no more than twenty percent of the development site is within the boundaries of any A or AE Zones in any floodplain district as shown on the Flood Insurance Rate Map;
  - (2) at least 20,000 square feet of finished floor area of the proposed mixed-use building is devoted to nonresidential use;
  - (3) basement areas (including below grade parking) must be located outside the boundaries of any A or AE Zones in any floodplain district; and,
  - (4) all floodproofing requirements specified in this Section 6-300 and as specified in FEMA Technical Bulletin 3-93 Non-Residential Floodproofing – Requirements and Certification must be met.

*6-307 Other Conditions.*

- (A) No filling of any kind shall be allowed within the boundaries of any A or AE Zone except where such filling, when considered in conjunction with all other uses, existing and proposed, will not increase the base flood elevation more than 0.5 foot. Persons proposing such filling shall furnish specific engineering data and information as to the effect of their proposed action on future flood heights and shall obtain approval from the Director of Transportation and Environmental Services prior to any filling.

- (B) All uses, activities and development occurring within any floodplain district shall only be undertaken in strict compliance with the Virginia Uniform Statewide Building Code (VA USBC).
- (C) No wall, fence or other outdoor obstruction shall be constructed in any floodplain district unless such structure is approved by the Director of Transportation and Environmental Services; provided that open mesh wire fences of not less than No. 9 wire, with mesh openings of not less than six inches times six inches, whose supports shall be securely anchored in concrete and whose wire shall be securely fastened to the supports, may be erected without any review by or approval of the Director of Transportation and Environmental Services under this Section 6-300.
- (D) The provisions of this Section 6-300 shall not be construed to prevent the remodeling (not amounting to substantial improvement), maintenance or floodproofing of buildings and structures now existing, or prevent the surfacing or resurfacing of existing streets or parking lots within two inches of the existing grade.

*6-308 Subdivision Requirements.*

- (A) Subdivision proposals which are located in A or AE Zones must comply with the provisions of Section 6-300 and shall:
  - (1) be consistent with the need to minimize flood damage;
  - (2) have public utilities and facilities such as sewer, gas, electrical and water systems located and constructed to minimize flood damage;
  - (3) have adequate drainage provided to reduce exposure to flood hazards; and,
  - (4) include base flood elevation data.

*6-309 Trailer Camps, Manufactured Homes, Mobile Homes, Recreational Vehicles and Septic Tank Systems.*

- (A) Trailer camps, manufactured homes and mobile homes are not permitted in any floodplain district.
- (B) All recreational vehicles in the floodplain must be on the site for fewer than 180 consecutive days and be fully licensed and ready for highway use.
- (C) Installation of septic tank systems in any floodplain district is prohibited.

*6-310 Flood Prevention Projects.*

Nothing in Section 6-304 through Section 6-308 shall be construed to prohibit the City of Alexandria or any person from undertaking lawful filling, draining, construction, realignment or relocation of stream channels or any other improvement that is intended to eliminate or reduce the danger of flooding, provided:

- (A) the improvement is in accord with the City of Alexandria's flood improvement plan for the floodplain district involved and the Director of Transportation and Environmental Services has issued a certificate to that effect;
- (B) the improvement is under the general supervision of the Director of Transportation and Environmental Services;
- (C) the realignment or relocation of any stream channel is designed and constructed so that there will be no reduction in the natural valley storage capacity of the area with respect to the 100-year flood, unless such relocation or realignment is designed to contain the 100-year flood within the banks of the channel;
- (D) notification, in riverine situations, is provided to adjacent communities, Virginia Department of Conservation and Recreation, FEMA, and other required agencies prior to any alteration or relocation of a watercourse; and,
- (E) the requirements of Section 6-306 (E) and Section 6-307(A) must be met.

*6-311 Variances*

- (A) The City Council may, for good and sufficient cause, permit less than full compliance with or waive the provisions of Section 6-304 through Section 6-310, provided:
  - (1) written application is made stating the hardship which will occur if the variance is not granted;
  - (2) a public hearing is held;
  - (3) the decision is made by a majority vote of the entire membership of City Council upon finding that the variance is the minimum necessary, considering the flood hazard, to afford relief;
  - (4) the Director of Transportation and Environmental Services states in writing that the variance will not result in unacceptable or

- prohibited increases in flood heights, additional threats to public safety, extraordinary public expense; and will not create nuisances, cause fraud or victimization of the public, or conflict with local laws and ordinances; and,
- (5) the Director of Transportation and Environmental Services notifies the applicant in writing that the issuance of a variance to construct a structure below the base flood elevation will result in increased insurance premium rates for flood insurance and that such construction will increase the risks to life and property.
- (B) In evaluating applications for variances, the Director of Transportation and Environmental Services shall satisfy all relevant factors and procedures specified in other sections of the City's ordinance and consider the following additional factors:
- (1) the danger to life and property due to increased flood heights or velocities caused by encroachments;
  - (2) the danger that materials may be swept onto other lands or downstream to the injury of others;
  - (3) the susceptibility of the proposed facility and its contents to flood damage and the effect of such damage on the individual owners;
  - (4) the importance of the services provided by the proposed facility to the community.
  - (5) the requirements of the facility for a waterfront location;
  - (6) the availability of alternative locations not subject to flooding for the proposed use;
  - (7) the compatibility of the proposed use with existing development and development anticipated in the foreseeable future;
  - (8) the relationship of the proposed use to the comprehensive plan and floodplain management program for the area;
  - (9) the safety of access by ordinary and emergency vehicles to the property in time of flood;
  - (10) the expected heights, velocity, duration, rate of rise, and sediment transport of the flood waters expected at the site; and,
  - (11) such other factors which are relevant to the purposes of this ordinance.

- (C) The Director of Transportation and Environmental Services may refer any application and accompanying documentation pertaining to any request for a variance to any engineer or other qualified person or agency for technical assistance in evaluating the proposed project in relation to flood heights and velocities, and the adequacy of the plans for flood protection and other related matters.
- (D) A record shall be maintained of the above notification as well as all variance actions, including justification for the issuance of the variances. Any variances that are issued shall be noted in the annual or biennial report submitted to the FEMA Federal Insurance Administrator.
- (E) Variances may be issued by a community for new construction and substantial improvements and for other development necessary for the conduct of a functionally dependent use.

*6-312 Compliance, Liability, Severability and Penalties.*

- (A) No land shall hereafter be developed and no structure shall be located, relocated, constructed, reconstructed, enlarged or structurally altered except in full compliance with the terms and provisions of this Section 6-300 and any other applicable ordinances and regulations which apply to uses within the jurisdiction of these floodplain district regulations.
- (B) The degree of flood protection required by these floodplain district regulations and all other applicable local, state and federal regulations is considered reasonable for regulatory purposes. Larger floods may occur on rare occasions or flood heights may be increased by man-made or natural causes. Therefore, the regulations set forth in this Section 6-300 do not imply that areas outside the floodplain districts, or land uses permitted within such districts, will be free from flooding and flood damages under all conditions. Additionally, the granting of a permit or approval of a development in an identified floodplain district shall not constitute a representation, guarantee, or warranty of any kind by any official or employee of the City of Alexandria of the practicability or safety of the proposed use, and shall create no liability upon the City of Alexandria, its officials or employees.
- (C) If any section, subsection, paragraph, sentence, clause or phrase of this Section 6-300 shall be declared invalid for any reason by a court of competent jurisdiction, such decision shall not affect the remaining portions of this Section 6-300. The remaining portions shall remain in full force and effect; and for this purpose, the provisions of Section this 6-300 are hereby declared to be severable.

- (D) Any person who shall engage in new construction, substantial improvement or development without a building permit as required by VA USBC and these floodplain management regulations shall be subject to the penalties provided in Section 11-200 of the Zoning Ordinance.

*6-313 Appeals.*

Any person aggrieved by a decision of the Director of Transportation and Environmental Services under this Section 6-300 may appeal that decision to City Council; provided, that the appeal shall be filed in writing with the City Clerk within fifteen (15) days of the decision being appealed and shall describe the decision being appealed and the reasons why the person believes the decision to be invalid.

*6-314 Annual Report.*

It shall be the City Manager's duty to submit any reports to FEMA and the floodplain coordinator at the Virginia Department of Conservation and Recreation that may be required regarding the City of Alexandria's compliance with flood management regulations.

Section 2. That the director of planning and zoning be, and hereby is, directed to record the foregoing text amendment.

Section 3. That Section 6-300, as amended pursuant to Section 1 of this ordinance, be, and the same hereby is, reordained as part of the City of Alexandria Zoning Ordinance.

Section 4. That this ordinance shall become effective on the date and at the time of its final passage, and shall apply to all applications for land use, land development or subdivision approval provided for under the City of Alexandria Zoning Ordinance which may be filed after such date, and shall apply to all other facts and circumstances subject to the provisions of the City of Alexandria Zoning Ordinance, except as may be provided in Article XII of the Zoning Ordinance.

WILLIAM D. EUILLE  
Mayor

Final Passage: April 16, 2011



Appendix T

## COUNCIL GRANT PURSUIT APPROVAL FY 2021 RESOLUTION 3028

## **RESOLUTION NO. 3028**

### **A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF ALEXANDRIA, VIRGINIA AUTHORIZING AN APPLICATION TO THE VIRGINIA DEPARTMENT OF CONSERVATION AND RECREATION TO THE VIRGINIA RESOURCES AUTHORITY FOR A VIRGINIA COMMUNITY FLOOD PREPAREDNESS FUND GRANT PURSUANT TO THE CLEAN ENERGY AND COMMUNITY FLOOD PREPAREDNESS ACT FOR THE WATERFRONT IMPLEMENTATION PROJECT**

**WHEREAS**, the Virginia Department of Conservation and Recreation (“DCR”) in cooperation with the Virginia Resources Authority (“VRA”) is accepting applications for projects that reduce the impacts of flooding to communities through activities including completing vulnerability assessments and the development and implementation of action-oriented approaches to bolster flood preparedness and resilience under the Virginia Community Flood Preparedness Fund Grant (“Fund”); and

**WHEREAS**, the City of Alexandria (City’s) Waterfront Flood Mitigation Project (“Project”) is eligible for the grant funding pursuant to the Clean Energy and Community Flood Preparedness Act’s (Act’s) guidelines and Fund published eligibility guidelines; and

**WHEREAS**, the City Council (“Council”) of the City of Alexandria wishes to authorize the development and submission of a grant application pursuant to Fund Grant Program requirements for the Project for a grant request and potential award of up to \$10 Million for the FY 2021 funding opportunity announcement; and,

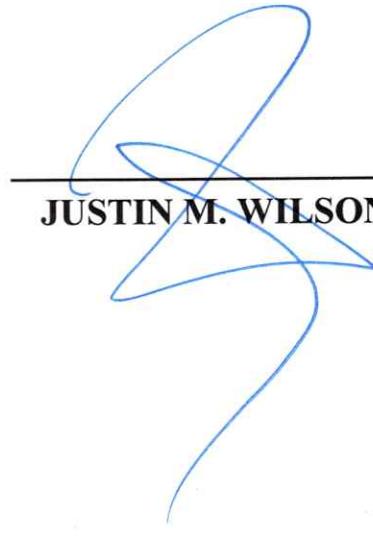
**WHEREAS**, the DCR and the VRA requires a grant applicant to provide a resolution adopted by the applicant’s governing body designating an authorized representative to submit a grant application and execute and agreement with the VRA for a grant (the “Grant Agreement”); and

**WHEREAS**, this Council wishes to authorize the City Manager of the City to file the application with the Department and to sign such Grant Agreement with the DCR and the VRA, and any amendment thereto and other required documents, on behalf of the City; and

### **NOW, THEREFORE, BE IT RESOLVED BY THE CITY COUNCIL OF ALEXANDRIA, VIRGINIA, as follows**

1. The City Council of the City of Alexandria hereby authorizes and directs the City Manager (the “Authorized Representative”) or designee to develop, sign and submit on behalf of the City, a grant application for the FY 2021 Virginia Fund for planning and design activities associated with the Project; and
2. Authorizes the City Manager, or designee, to provide the assurances, certifications, and commitments required for the grant application including executing a grant agreement with the DCR and the VRA and any amendments or changes thereto; and
3. Authorizes the City Manager, or designee, to represent the City in carrying out the City’s responsibilities under the grant agreement, including certifying disbursement requests on behalf of the organization and in compliance with applicable state and federal laws; and
4. Commits to fund its local share of engineering and planning costs (as eligible and applicable) and to fund the remaining costs of the Project to complete planning and design activities covered under the grant award.
5. Approves this Authorizing Resolution as required by the DCR and VRA.

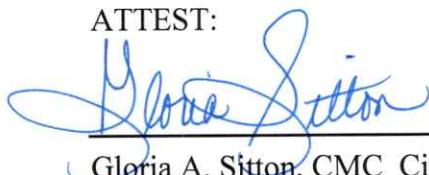
Adopted: October 26, 2021



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**JUSTIN M. WILSON MAYOR**

ATTEST:



Gloria A. Sitton, CMC City Clerk