

# CITY OF FAIRFAX

## LARGE-SCALE STORM EVENT STUDY CFPF GRANT APPLICATION PACKAGE

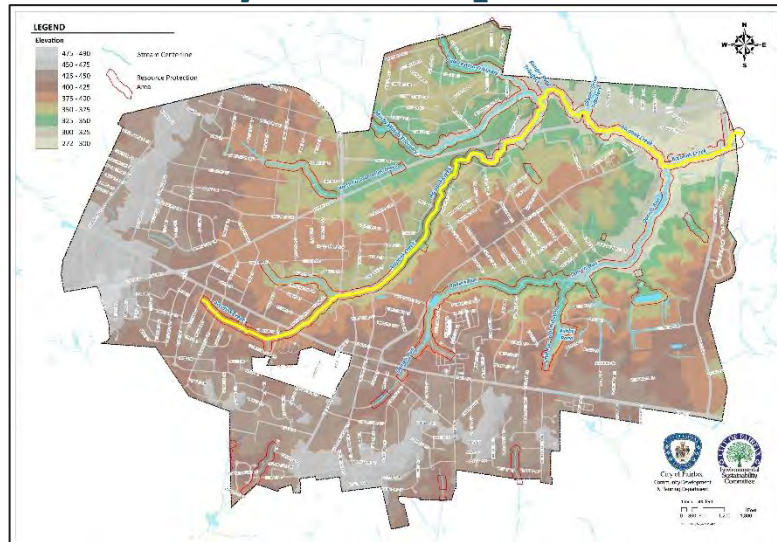
JANUARY 20, 2025

Prepared for:



Prepared by: **Kimley»Horn**

## Community Flood Preparedness Fund Grant Application



# SECTION A – ORGANIZATIONAL DATA

Scope of Work Narrative

Supporting Documentation

Application Form, Study Area Map, and FIRMs

Scope of Services

City of Fairfax Flood Resilience Plan

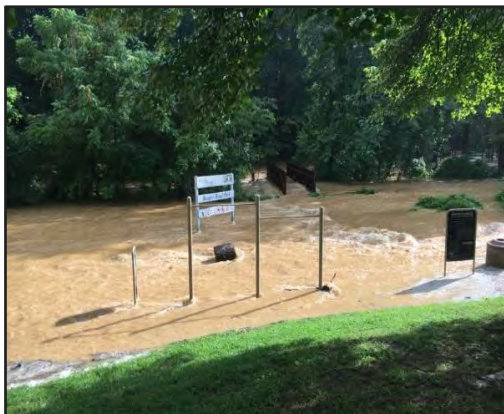
## Scope of Work Narrative

This section includes a summary of the study's background, need, goals, objectives, workplan, evaluation of success, scope of services, and the application form for grant and loan requests for all categories of the CFPF grant.

### Project Background & Need



*Figure 3 – Photo Contributed by Flooding Questionnaire Participant*



*Figure 3 – Ranger Road Park Flooding, Photo Contributed by Flooding Questionnaire Participant*

Hurricane Helene made landfall in 2024 as a Category 4 hurricane and caused widespread, severe, unprecedented flooding with hundreds of fatalities and billions of dollars in property damage, including in Virginia [1]. The City of Fairfax was motivated to conduct this flood study because there is a lack of available flood model data in the City for high recurrence interval storms like Hurricane Helene and the City is unsure of what groups, areas, and infrastructure would be at risk if a similar caliber storm were to hit the City.

As part of developing its Resilience Plan in 2023, the City of Fairfax distributed flooding questionnaires to approximately 1,400 property owners in the FEMA Special Hazard Flood Area (SFHA) and/or Resource Protection Area (RPA) to collect information about flooding in their area. The results from one questionnaire item indicated that 58% of City residents in the SFHA and/or RPA experience adverse flooding every 10+ years. The City's lack of flood model data exceeding the 500-year storm event combined with the responses from residents in the SFHA and/or RPA justifies the need for the study proposed as part of this grant application to better understand the impacts of catastrophic storm events in the City. A photolog containing flooding images from the City's Resilience Plan questionnaire has been included in Section C for reference.

There is inherent risk associated with unknown flooding impacts for high-level storm events, particularly regarding public safety. Without data-driven awareness of flood-prone areas, infrastructure that is inadequate to handle large-scale storm events may go undetected, evacuation strategies may not consider the entirety of high flood risk areas, and emergency response may be delayed if community lifelines are impacted by high-level storm events in unforeseen ways. The results of this study will be utilized by the City to drive design alternatives analysis, create secondary evacuation routes, and implement projects to assist with catastrophic flooding.

A short-term public safety benefit of this flood study will be the ability for the City to use modeled flood inundation boundaries to identify high-risk areas for focused preventative actions

prior to anticipated large storm events. A long-term impact of this proposed study to public safety will be using study results to make informed decisions when prioritizing high impact flood mitigation projects to protect the City's residents, property owners, businesses, and natural areas that lie within the inundation limits of the 1,000-year storm. An ancillary benefit of this study is identifying the riparian areas within the



## LARGE-SCALE STORM EVENT STUDY CFPF GRANT APPLICATION

floodplain corridors that can be utilized to implement floodplain restoration practices that can assist in protecting and conserving natural resources in the City.

Being awarded a CFPF grant would expedite the timeline of this study and would expand the City's budget so additional funds can be concentrated on flood mitigation efforts based on the results of the study. If the City were not to receive funding, the City would still proceed with the study, but the timeline may be delayed and there may not be residual funding for further flood mitigation efforts.

### Goals, Objectives, and Work Plan

Table 1 contains the goals, objectives, and work plan items that have been identified for the proposed study, and additional information for this project can be found in the scope of services included in this section. Assuming Kimley-Horn receives a notice to proceed by May 2, 2025, Kimley-Horn anticipates completion of the scope of work and the items outlined in Table 1 by August 29, 2025.

This study is intended to identify areas vulnerable to catastrophic storms and will be used to drive project selection and emergency planning efforts. As such, a maintenance plan is not applicable to this study at this time.

*Table 1 – Proposed Goals, Objectives, and Work Plan*

Goals/Tasks	Objectives	Responsible Parties/Required Partners	Deliverable(s)
Base Map Creation and Project Due Diligence	<ul style="list-style-type: none"> <li>➤ Identify floodplain characteristics within the City</li> <li>➤ Incorporate critical infrastructure, including but not limited to, buildings, roadways, utilities, and community lifelines</li> <li>➤ Compile pertinent Citywide information from the reports and datasets included in the scope of services</li> </ul>	<ul style="list-style-type: none"> <li>➤ Kimley-Horn</li> <li>➤ City of Fairfax Public Works Department</li> </ul>	<ul style="list-style-type: none"> <li>➤ Geographic Information System (GIS) basemaps</li> <li>➤ Data compilation based on reports and datasets included in the scope of services</li> </ul>
Update City HEC-HMS Model	<ul style="list-style-type: none"> <li>➤ Update FEMA-provided HEC-HMS model</li> <li>➤ Simulate hydrologic stream processes at junctions and specific locations across the City, as shown in the scope of services</li> </ul>	<ul style="list-style-type: none"> <li>➤ Kimley-Horn</li> </ul>	<ul style="list-style-type: none"> <li>➤ Updated HEC-HMS Model</li> </ul>
Hydraulic Study	<ul style="list-style-type: none"> <li>➤ Modify the Accotink Creek FEMA Effective HEC-RAS Model</li> <li>➤ Generate graphical outputs for flood depth, velocity, water surface elevation, and inundation boundaries</li> </ul>	<ul style="list-style-type: none"> <li>➤ Kimley-Horn</li> <li>➤ City of Fairfax Public Works Department</li> </ul>	<ul style="list-style-type: none"> <li>➤ Updated HEC-RAS Model</li> <li>➤ Graphical outputs for flood depth, velocity, water surface elevation, and inundation boundaries</li> </ul>
Results Mapping and Quantification of Storm Impact	<ul style="list-style-type: none"> <li>➤ Overlay graphical outputs over base maps to determine buildings, roads, utilities, and critical facilities impacted</li> </ul>	<ul style="list-style-type: none"> <li>➤ Kimley-Horn</li> </ul>	<ul style="list-style-type: none"> <li>➤ Base maps overlaid with graphical model outputs</li> <li>➤ Tabular and statistical summaries of impacts</li> </ul>
Draft a Study Report	<ul style="list-style-type: none"> <li>➤ Develop study report outlining the modeling and mapping information derived as part of the study</li> <li>➤ Summarize the impact and difference in magnitude of the 1,000-year floodplain compared to the 100 and 500-year storm events</li> </ul>	<ul style="list-style-type: none"> <li>➤ Kimley-Horn</li> </ul>	<ul style="list-style-type: none"> <li>➤ Report outlining model and graphical information derived as part of this study as well as an impact comparison between the 100, 500, and 1,000-year storm events.</li> </ul>

An immediate indicator of success of this task will be updating the FEMA-provided HEC-HMS and HEC-RAS models to simulate the 100, 500, and 1,000-year storms and generate relevant outputs. Data that will be collected from this study includes:

- The cost-effectiveness of this study will be evaluated based on the results being utilized for strategic, high-impact flood mitigation project implementation and updates to emergency response and preparedness procedures to include residents, property owners, businesses, and natural areas that lie within the inundation limits of the 100, 500, and 1,000-year storms.

## Study Supporting Documentation

➤ **The specific type of study proposed including whether the study is new or updates a prior study.**



Kimley-Horn will modify the Accotink Creek FEMA Effective HEC-RAS Model with the flow values derived from the HEC-HMS Model updates. If necessary, the Effective Model channel and cross-sectional geometry will be adjusted with lidar topographic data to account for the anticipated increase in flow, water surface elevations and floodplain top widths to

encumber the effects of the 1,000-year storm within the model geometry. If cross sections are required to be extended Kimley-Horn will also incorporate any pertinent characteristics (obstructions, structures, residences etc.) into the model.

Kimley-Horn will run the updated Effective HEC-RAS model to derive the following tabular and graphical comparison data for the 100-year, 500-year, and 1,000-year storms:

- HEC-RAS Profile Summary Tables
- Floodplain Cross Sectional Data
- Water Surface Profiles
- X-Y-Z Prospective Plots

Kimley-Horn will utilize the RAS-Mapper tool to generate inundation limits spatially and graphically along Accotink Creek within the City. The following graphical outputs will be derived for the 100, 500, and 1,000-year storms:

- Flood Depths
- Velocity
- Water Surface Elevations
- Inundation Boundaries

- **The relationship of the study to the local government's needs for flood prevention and protection, equity, community improvement, identification of nature-based solutions or other priorities contained in this manual.**

The results of the study proposed as part of this grant application package are crucial to understanding flood risk within the City, ensuring preventative and emergency response efforts are equitable, and making informed decisions when prioritizing high impact flood mitigation projects to protect the City's residents, property owners, businesses, and natural areas that lie within the inundation limits of the 1,000-year storm.

- **The qualifications of the individuals or organizations charged with conducting the study or the elements of any request for proposal that define those qualifications. The expected use of the study results in the context of the local resilience plan or, in the case of regional plans, how the study improves any regional approach.**

Kimley-Horn will be conducting the study in collaboration with the City of Fairfax. The Kimley-Horn study team will consist of the following core members, with the following qualifications and roles:

- Jon D'Alessandro, P.E. – Project Manager
- Jared Hodes, P.E., CFM – Modeling Lead
- Michelle Manfrey, EIT – Modeling Analyst
- Chrystal Delius, EIT – Modeling Analyst

In the context of the City's Resilience Plan, this study is particularly relevant to Community Rating System (CRS) Category 1 activities. The CRS definition of Category 1 activities is provided below:

**Category 1 – Floodplain Management** - These activities keep flood problems from getting worse. Examples include floodplain mapping and data, open space preservation, floodplain regulations, erosion setbacks, planning and zoning, stormwater management, drainage system maintenance, and building codes.

As part of the City's Resilience Plan, potential activities were identified that could prevent or reduce the severity of the flooding challenges faced by the City and assist in achieving the City's flood resilience goals. The following potential activities identified in the City's Resilience Plan would benefit from the results of study proposed as part of this grant application package. For additional information on these

potential activities, please refer to the City's Resilience Plan, which has been included as an attachment in this section.

- Floodplain Resilience Model
  - Transportation Network Resilience Assessment and Prioritization
  - Establishment of Flood Control Districts
  - Historic Site Risk Assessment
  - Strategic Buyouts
  - Floodplain Restoration Program
  - Project Impact Optimization
  - Improve City Emergency Preparedness and Response
  - At-Risk Infrastructure Identification and Post-Flood Assessment Program
  - Enhanced Flood Resilience Outreach and Education
- **If applicable, how the study may improve Virginia's flood protection and prevention abilities in a statewide context.**

The City of Fairfax is a highly urban constituency in Northern Virginia and the modeling results generated as part of the proposed study can be shared with organizations such as the Office of Emergency Management and the Northern Virginia Regional Commission to improve flood protection and prevention abilities in a local, regional, and statewide context.

- **Other necessary information to establish project priority.**
- **Repetitive Loss and/or Severe Repetitive Loss Properties**
    - **Do not provide specific addresses but include an exact number of NFIP repetitive loss and/or severe repetitive loss structures within the project area. Work with the local floodplain administrator or emergency manager to find this information. If they do not have a list, the Department can assist them.**
    - **Repetitive loss and severe repetitive loss can occur outside of the SFHA and to properties not captured in NFIP reporting databases. While the Fund requires localities to maintain records according to the Code of Virginia records retention policy (Code of Virginia § 42.1-85), the NFIP requires all records of flooding to be maintained by the participating locality in perpetuity.**

Within the City, there are ninety-six active flood insurance policies through the National Flood Insurance Program with an average premium of approximately \$1,380. There have been forty-nine recorded insurance claims since 1979, with an average claim value of approximately \$18,210. Of the forty-nine insurance claims, thirteen are within or directly adjacent to the FEMA SFHA and/or the City RPA.

There are also four repetitive loss properties within the City, with total paid claims of \$590,686. A repetitive loss property is defined by FEMA as 'any insurable building for which two or more claims of more than \$1,000 were paid by the National Flood Insurance Program within any ten-year period, since 1978.

- **Residential and/or Commercial Structures**
  - **Describe the residential and commercial structures impacted by this project, including how they contribute to the community such as historic, economic, or**

**social value. Provide an exact number of residential structures and commercial structures in the project area.**

The intent of this study is to identify high-risk areas and quantify the scale differences between the 100, 500, and 1,000-year storms with regards to impact to residential and commercial properties. As such, data regarding these impacted structures can be provided in graphical and tabular format upon the completion of the study.

- **Critical Facilities/Infrastructure**

- **Describe any critical facilities/infrastructure within the project area.**

Existing City-wide critical facility and infrastructure information can be found in the City of Fairfax Resilience Plan (2024), which has been included as an attachment in this section.

The intent of this study is to pair critical infrastructure information from the City's Resilience Plan with updated modeling efforts to identify how critical infrastructure within the City is impacted by the 100, 500, and 1,000-year storms. This information will be made available after the completion of the study and can be provided in graphical and tabular format.



# **Application Form, Study Area Map, and FIRMs**

## Appendix A: Application Form for Grant and Loan Requests for All Categories

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

Name of Local Government: City of Fairfax

Category Being Applied for (check one):

☐ Capacity Building/Planning

☐ Project

☒ Study

NFIP/DCR Community Identification Number (CID) 515524

Name of Authorized Official and Title: Melanie Zipp - Acting City Manager

Signature of Authorized Official:  \_\_\_\_\_

Mailing Address (1): 10455 Armstrong St. Room 316

Mailing Address (2): \_\_\_\_\_

City: Fairfax State: VA Zip: 22030

Telephone Number: (703) 385-7850 Cell Phone Number: (\_\_\_\_) \_\_\_\_\_

Email Address: melanie.zipp@fairfaxva.gov

Contact and Title (If different from authorized official): Satoshi Eto  
Public Works Program Manager

Mailing Address (1): 10455 Armstrong St, Room 316

Mailing Address (2): \_\_\_\_\_

City: Fairfax State: VA Zip: 22030

Telephone Number: (703) 273-6073 Cell Phone Number: (\_\_\_\_) \_\_\_\_\_

Email Address: Satoshi.Eto@fairfaxva.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 activities that will be included in the project and used for scoring criterion):**

**Capacity Building and Planning Grants**

- ☐ Floodplain Staff Capacity.
- ☐ Resilience Plan Development
  - ☐ Revisions to existing resilience plans and integration of comprehensive and hazard mitigation plans.
  - ☐ Resource assessments, planning, strategies, and development.
    - ☐ Policy management and/or development.
    - ☐ Stakeholder engagement and strategies.
- ☐ Other: \_\_\_\_\_

**Study Grants (Check All that Apply)**

- ☐ Revising other land use ordinances to incorporate flood protection and mitigation goals, standards, and practices.

- ☒ Conducting hydrologic and hydraulic (H&H) studies of floodplains. *Changes to the base flood, as demonstrated by the H&H must be submitted to FEMA within 6 months of the data becoming available.*
- ☒ 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.
- ☐ Pluvial studies.
- ☐ 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, freeboard, or other higher standards, RiskMAP public noticing requirements, or correcting issues identified in a Corrective Action Plan.

**Project Grants and Loans (Check All that Apply – Hybrid Solutions will include items from both the “Nature-Based” and “Other” categories)**

**Nature-based solutions**

- ☐ 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, and where the flood mitigation benefits will be achieved as a part of the same project as the property acquisition.
- ☐ Wetland restoration.
- ☐ Floodplain restoration.
- ☐ Construction of swales and settling ponds.

- ☐ Living shorelines and vegetated buffers.
  
- ☐ 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, or the acquisition of developed land for future conservation.
  
- ☐ Dam removal.
- ☐ Stream bank restoration or stabilization.
- ☐ Restoration of floodplains to natural and beneficial function.

### Other Projects

- ☐ Developing flood warning and response systems, which may include gauge installation, to notify residents of potential emergency flooding events.
- ☐ Dam restoration.
- ☐ Beneficial reuse of dredge materials for flood mitigation purposes
- ☐ Removal or relocation of structures from flood-prone areas where the land will not be returned to open space.
- ☐ Structural floodwalls, levees, berms, flood gates, structural conveyances.
- ☐ Storm water system upgrades.
- ☐ Medium and large-scale Low Impact Development (LID) in urban areas.
- ☐ 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, and where the flood mitigation benefits will **not be** achieved as a part of the same project as the property acquisition.
- ☐ Other project identified in a DCR-approved Resilience Plan.

**Location of Project or Activity (Include Maps):** City of Fairfax, Map Included

**NFIP Community Identification Number (CID#):** 515524



Is Project Located in an NFIP Participating Community? ☒ Yes ☐ No

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

This is a City-Wide study. As such, certain areas of the proposed study will be in a SFHA.

Flood Zone(s) (If Applicable): Zone AE, Zone X

Flood Insurance Rate Map Number(s) (If Applicable): 5155240001E, 5155240002E, 5155240003E, 5155240004E, 5155240005E, 5155240006E  
(this FIRM is not available through FEMA's Map Service Center and has not been included)

Total Cost of Project: \$45,162.64

Total Amount Requested \$22,581.32

Amount Requested as Grant \$22,581.32

Amount Requested as Project Loan (Long-Term, not including short-term loans for up-front costs)  
N/A

RVRF Loan Amount Requested as Project Match (Not including short-term loans for up-front costs)  
N/A

Amount Requested as Short-Term loan for Up-Front Costs (not to exceed 20% of amount requested as Grant) N/A

For projects, planning, capacity building, and studies in low-income geographic areas: Are you requesting that match be waived? ☐ Yes ☐ No N/A

***For informational purposes only:*** Supplemental information for loan requests may include but are not limited to the following. This information will be collected AFTER a CFPF award is made, prior to the signing of a grant agreement.

- General Obligation
- Lease, Revenue
- Special Fund Revenue
- Moral obligation from other government entity)
- Desired loan term
- Since the date of your latest financial statements, any new debt
- Pending or potential litigation by or against the applicant
- Five years of current audited financial statements (FY18-22) or refer to website if posted
- Capital Improvement Plan
- Financial Policies
- List of the ten largest employers in the jurisdiction.
- List of the ten largest taxpayers in the jurisdiction

***All loan requests are subject to credit review and approval by Virginia Resources Authority.***





DATE  
1/17/2025

DRAWN BY  
CDC

CHECKED BY  
JJD

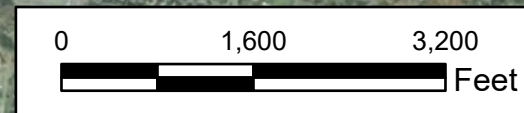
LARGE SCALE STORM EVENTS STUDY - CFPF GRANT  
PROJECT AREA MAP

PREPARED FOR CITY OF FAIRFAX  
PUBLIC WORKS DEPARTMENT

SCALE  
1" = 1,600'

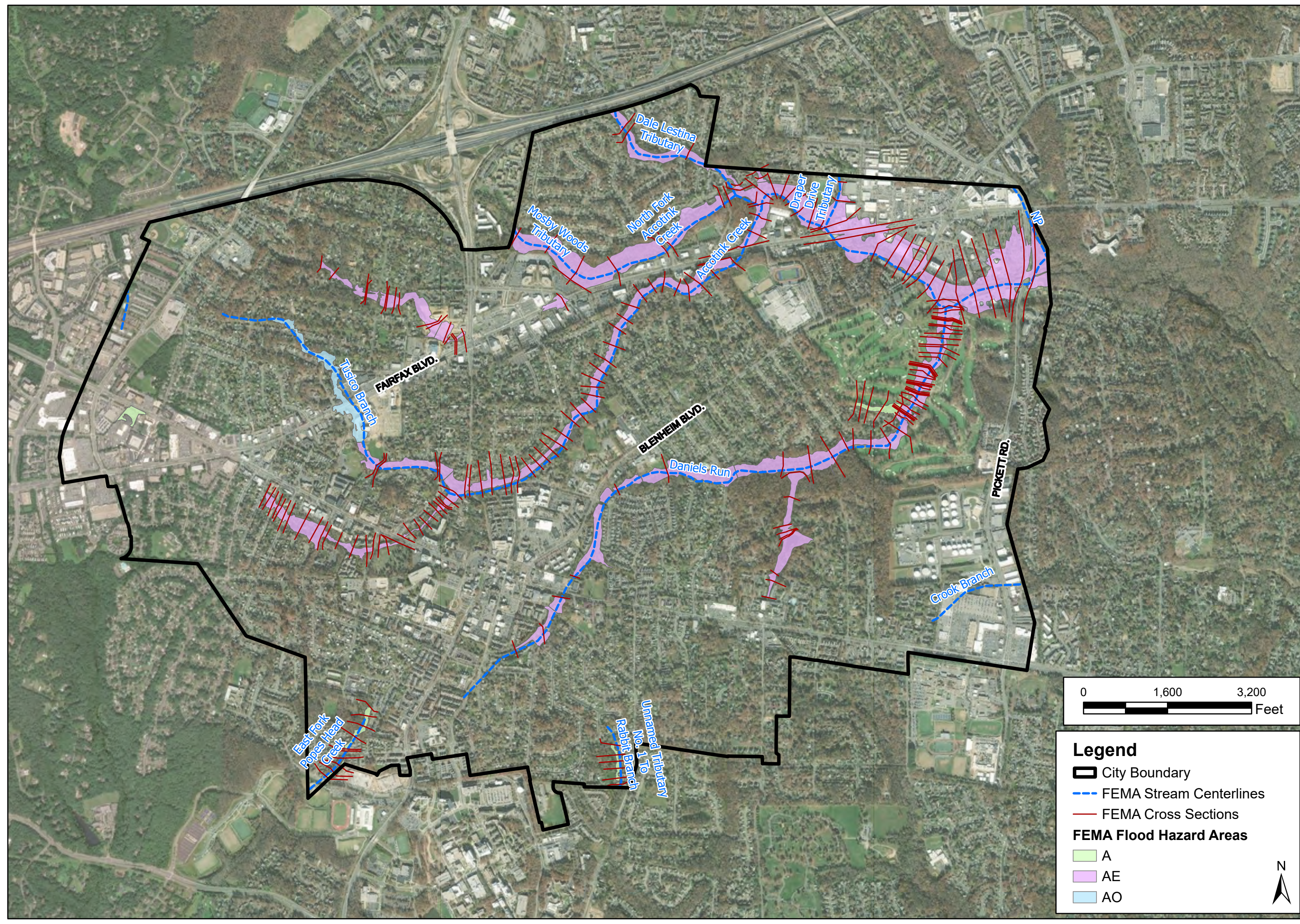
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SHEET NUMBER  
APPENDIX C

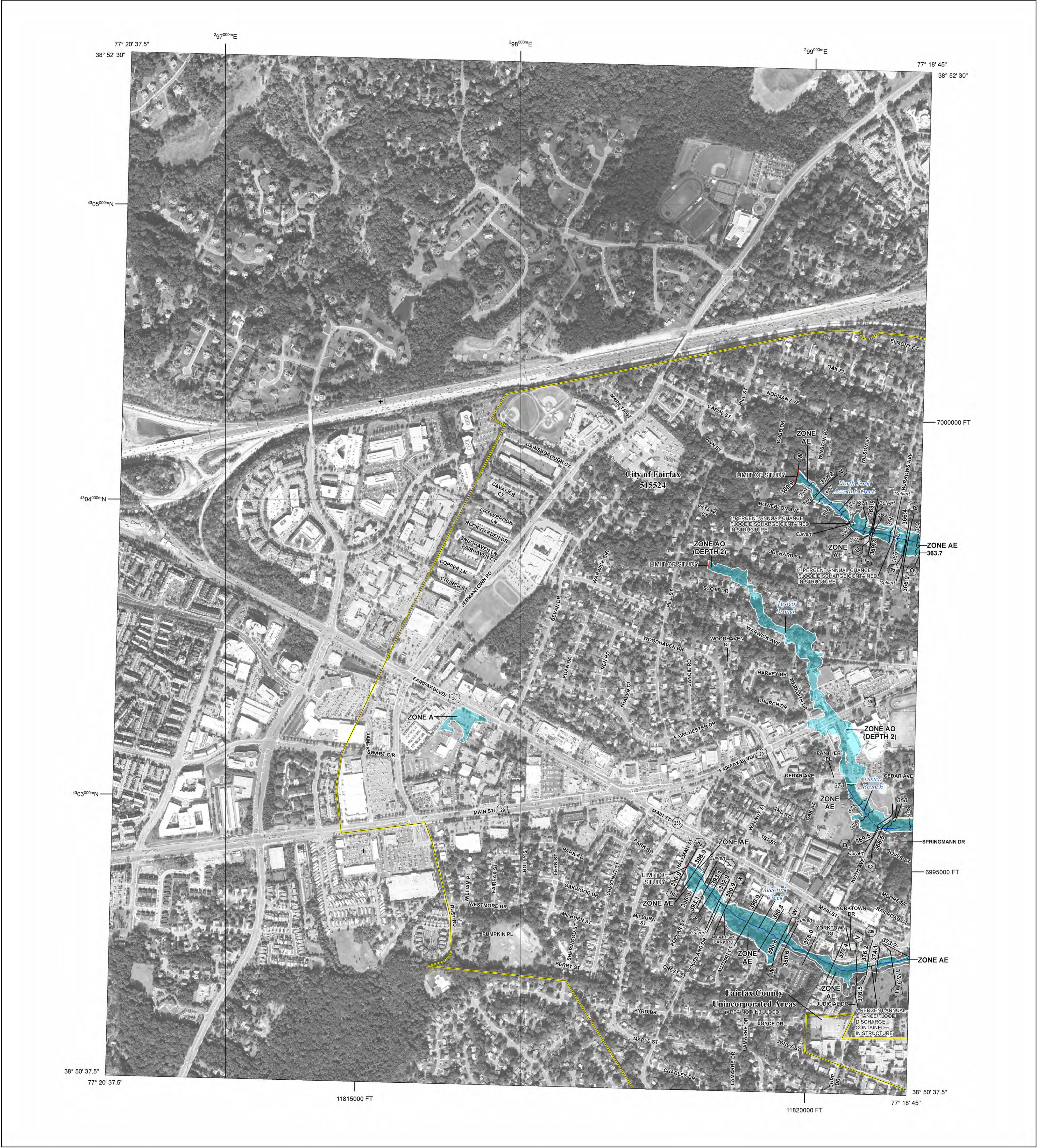


Legend

- City Boundary
- FEMA Stream Centerlines
- FEMA Cross Sections
- FEMA Flood Hazard Areas
  - A
  - AE
  - AO







FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT  
**THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT [HTTPS://MSC.FEMA.GOV](https://msc.fema.gov)**

SPECIAL FLOOD HAZARD AREAS		Without Base Flood Elevation (BFE) Zone A, V, A99
		Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD		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		NO SCREEN Areas of Minimal Flood Hazard Zone X
		Area of Undetermined Flood Hazard Zone D
GENERAL STRUCTURES		Channel, Culvert, or Storm Sewer
		Levee, Dike, or Floodwall
OTHER FEATURES		Cross Sections with 1% Annual Chance Water Surface Elevation
		Coastal Transect
		Coastal Transect Baseline
		Profile Baseline
		Hydrographic Feature
		Base Flood Elevation Line (BFE)
		Limit of Study
		Jurisdiction Boundary

NOTES TO USERS

For information and questions about this Flood Insurance Rate Map (FIRM), available products associated with this FIRM, including historic versions, the current map date for each FIRM panel, how to order products, or the National Flood Insurance Program (NFIP) in general, please call the FEMA Mapping and Insurance eXchange at 1-877-FEMA-MAP (1-877-336-2627) or visit the FEMA Flood Map Service Center website at <https://msc.fema.gov>. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the website.

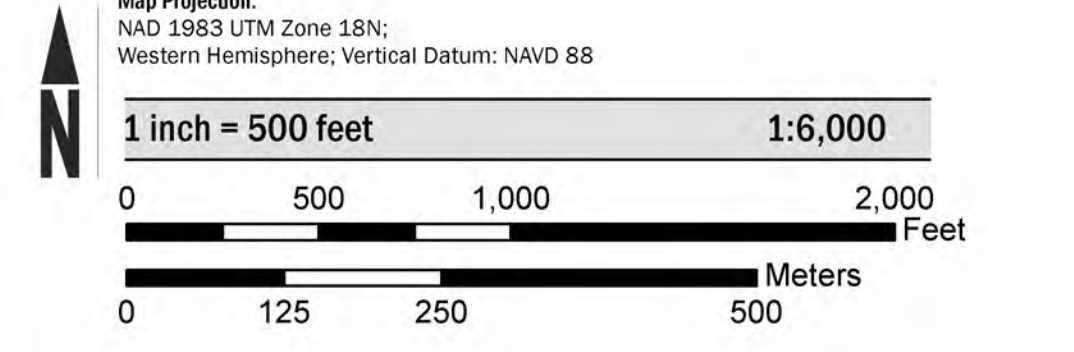
Communities annexing land on adjacent FIRM panels must obtain a current copy of the adjacent panel as well as the current FIRM Index. These may be ordered directly from the Flood Map Service Center at the number listed above.

For community and countywide map dates refer to the Flood Insurance Study Report for this jurisdiction.

To determine if flood insurance is available in this community, contact your Insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

Base map information shown on this FIRM was provided in digital format by the United States Department of Agriculture - Aerial Photography Field Office (USDA - APFO), National Agriculture Imagery Program (NAIP). This information was derived from digital orthophotography at a 2-foot resolution from photography dated 2019.

SCALE



PANEL LOCATOR



**National Flood Insurance Program**

**NATIONAL FLOOD INSURANCE PROGRAM**  
FLOOD INSURANCE RATE MAP

**CITY OF FAIRFAX, VIRGINIA**  
Independent City

PANEL 1 of 6

Panel Contains:

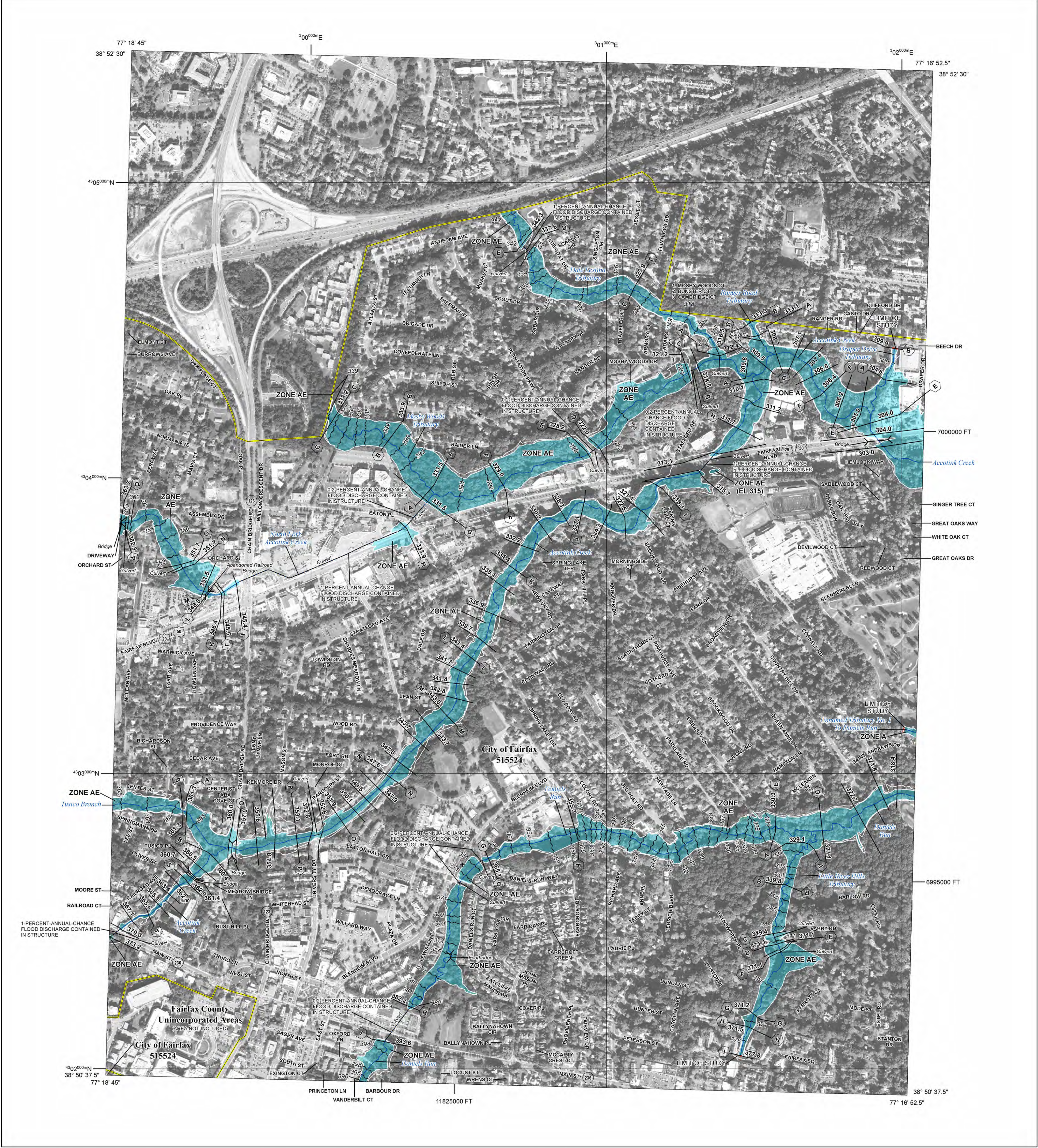
COMMUNITY	NUMBER	PANEL	SUFFIX
FAIRFAX, CITY OF	515524	0001	E

VERSION NUMBER  
2.6.4.6

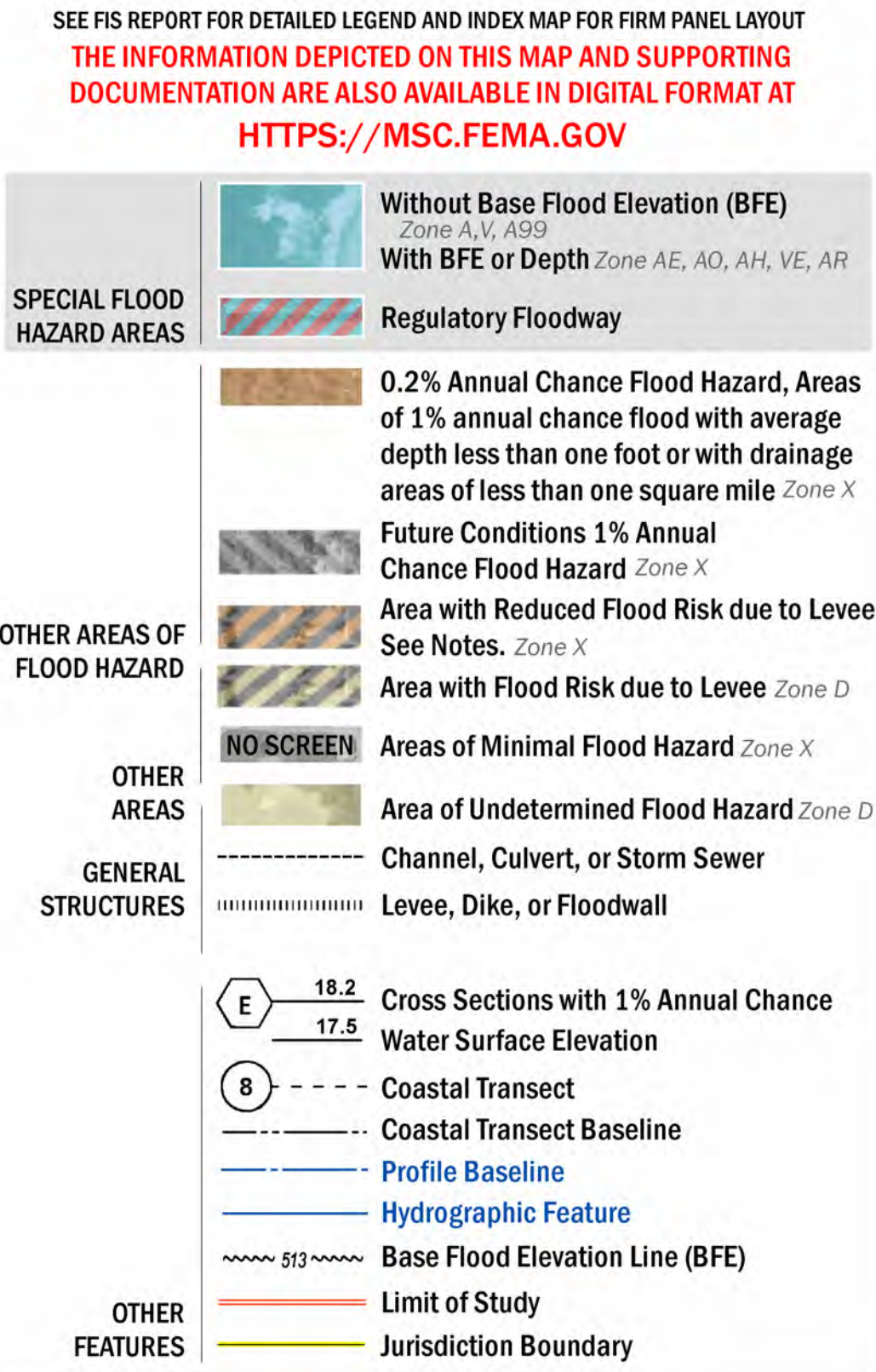
MAP NUMBER  
5155240001E

MAP REVISED  
NOVEMBER 16, 2023





FLOOD HAZARD INFORMATION



NOTES TO USERS

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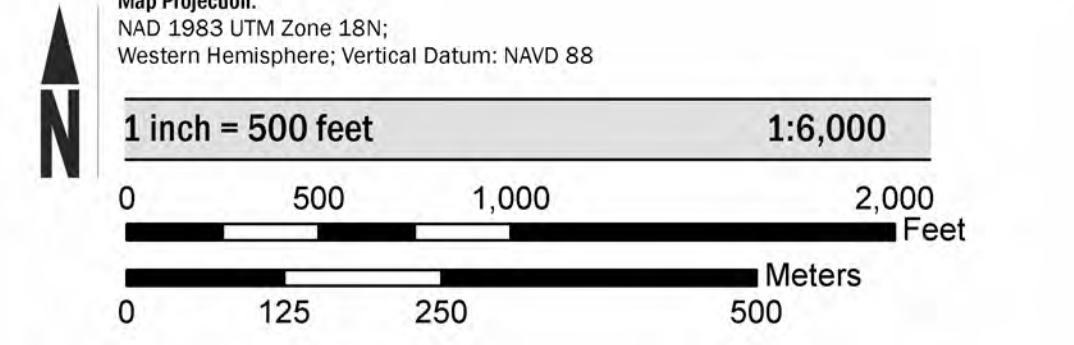
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SCALE



PANEL LOCATOR



**National Flood Insurance Program**

**NATIONAL FLOOD INSURANCE PROGRAM**  
FLOOD INSURANCE RATE MAP

**CITY OF FAIRFAX, VIRGINIA**  
Independent City

PANEL 2 of 6

Panel Contains:

COMMUNITY	NUMBER	PANEL	SUFFIX
FAIRFAX, CITY OF	515524	0002	E

VERSION NUMBER  
2.6.4.6

MAP NUMBER  
5155240002E

MAP REVISED  
NOVEMBER 16, 2023









FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT <a href="https://msc.fema.gov">HTTPS://MSC.FEMA.GOV</a>	
SPECIAL FLOOD HAZARD AREAS	Without Base Flood Elevation (BFE) Zone A,V, A99
	With BFE or Depth Zone AE, AO, AH, VE, AR
OTHER AREAS OF FLOOD HAZARD	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	NO SCREEN Areas of Minimal Flood Hazard Zone X
	Area of Undetermined Flood Hazard Zone D
GENERAL STRUCTURES	Channel, Culvert, or Storm Sewer
	Levee, Dike, or Floodwall
OTHER FEATURES	Cross Sections with 1% Annual Chance Water Surface Elevation
	Coastal Transect
	Coastal Transect Baseline
	Profile Baseline
	Hydrographic Feature
	Base Flood Elevation Line (BFE)
	Limit of Study
	Jurisdiction Boundary

NOTES TO USERS

For information and questions about this Flood Insurance Rate Map (FIRM), available products associated with this FIRM, including historic versions, the current map date for each FIRM panel, how to order products, or the National Flood Insurance Program (NFIP) in general, please call the FEMA Mapping and Insurance eXchange at 1-877-FEMA-MAP (1-877-336-2627) or visit the FEMA Flood Map Service Center website at <https://msc.fema.gov>. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the website.

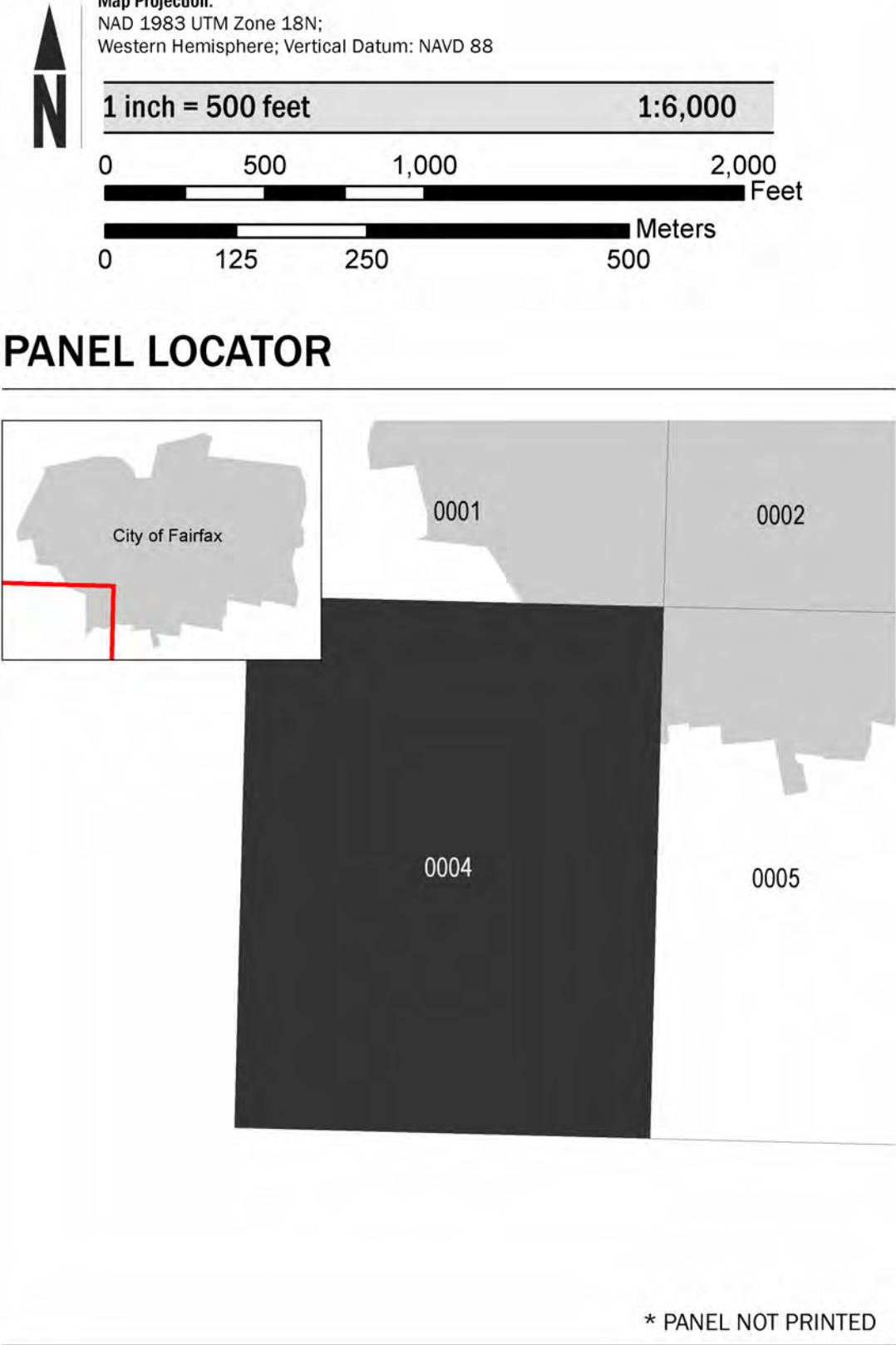
Communities annexing land on adjacent FIRM panels must obtain a current copy of the adjacent panel as well as the current FIRM Index. These may be ordered directly from the Flood Map Service Center at the number listed above.

For community and countywide map dates refer to the Flood Insurance Study Report for this jurisdiction.

To determine if flood insurance is available in this community, contact your Insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

Base map information shown on this FIRM was provided in digital format by the United States Department of Agriculture - Aerial Photography Field Office (USDA - APFO), National Agriculture Imagery Program (NAIP). This information was derived from digital orthophotography at a 2-foot resolution from photography dated 2019.

SCALE



National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM  
FLOOD INSURANCE RATE MAP

CITY OF FAIRFAX, VIRGINIA  
Independent City

PANEL 4 of 6

Panel Contains:

COMMUNITY	NUMBER	PANEL	SUFFIX
FAIRFAX, CITY OF	515524	0004	E

VERSION NUMBER  
2.6.4.6

MAP NUMBER  
5155240004E

MAP REVISED  
NOVEMBER 16, 2023





FLOOD HAZARD INFORMATION

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

THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT [HTTPS://MSC.FEMA.GOV](https://msc.fema.gov)

SPECIAL FLOOD HAZARD AREAS		Without Base Flood Elevation (BFE) Zone A, V, A99
		With BFE or Depth Zone AE, AO, AH, VE, AR
OTHER AREAS OF FLOOD HAZARD		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
OTHER AREAS		Area with Flood Risk due to Levee Zone D
		NO SCREEN Areas of Minimal Flood Hazard Zone X
		Area of Undetermined Flood Hazard Zone D
GENERAL STRUCTURES		Channel, Culvert, or Storm Sewer
		Levee, Dike, or Floodwall
OTHER FEATURES		Cross Sections with 1% Annual Chance Water Surface Elevation
		Coastal Transect
		Coastal Transect Baseline
		Profile Baseline
		Hydrographic Feature
		Base Flood Elevation Line (BFE)
		Limit of Study
		Jurisdiction Boundary

NOTES TO USERS

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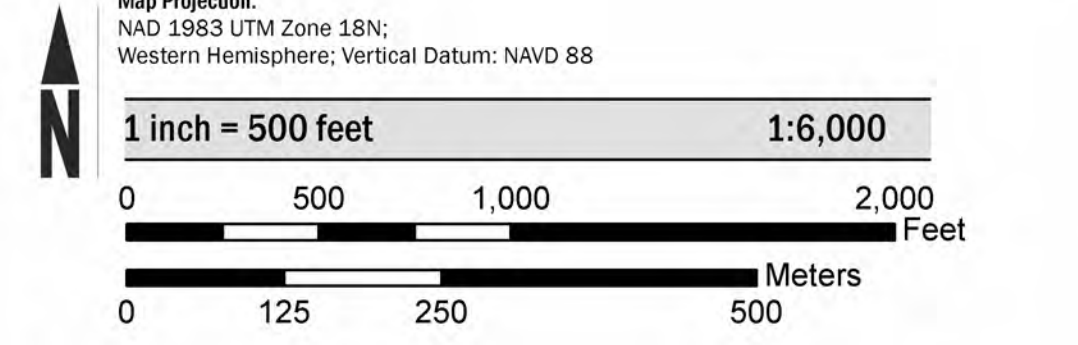
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SCALE



PANEL LOCATOR



**National Flood Insurance Program**

**NATIONAL FLOOD INSURANCE PROGRAM**  
FLOOD INSURANCE RATE MAP

**CITY OF FAIRFAX, VIRGINIA**  
Independent City

PANEL 5 of 6

Panel Contains:

COMMUNITY	NUMBER	PANEL	SUFFIX
FAIRFAX, CITY OF	515524	0005	E

VERSION NUMBER  
2.6.4.6

MAP NUMBER  
5155240005E

MAP REVISED  
NOVEMBER 16, 2023



## Scope of Services



January 17, 2025

Satoshi Eto - Public Works Program Manager  
City of Fairfax, Department of Public Works  
10455 Armstrong Street, Room 200  
Fairfax, Virginia 22030

## **PROPOSAL FOR THE CITY OF FAIRFAX – CITYWIDE FLOODPLAIN EVALUATION FOR A LARGE RECURRENCE INTERVAL (1000-YEAR) STORM**

Dear Mr. Eto:

Kimley-Horn and Associates, Inc. (Kimley-Horn) is pleased to submit this task order proposal to the City of Fairfax (City) to provide professional consulting services related to the development of Hydraulic Study to evaluate the effect of a large recurrence interval storm (1000-year storm) on the Accotink Creek floodplain and ultimately the City's infrastructure, residential and commercial areas, utilities, critical facilities, and FEMA defined City "lifelines". The language outlined below identifies our project understanding, scope of requested services, and accompanying fees related to the overall project.

### **PROJECT UNDERSTANDING**

This proposal summarizes the phases and tasks necessary to prepare a Hydraulic Study to determine the effects of the 1000-year storm on the Accotink Creek floodplain within the City of Fairfax. Development of Citywide modeling, mapping, tabular and graphical results illustrating the effects of the 1000-year storm on City residential and commercial areas, roadways, flood evacuation routes, community lifelines, and other pertinent infrastructure will be derived and compiled into a report format to assist the city with understanding the impacts and aid in planning for catastrophic storms.

### **SCOPE OF SERVICES**

This proposal has been divided into six (6) tasks. Each task is outlined below with a brief summary defining the Scope of Services for each task. A time and materials not-to-exceed cost to perform this work is provided (Attachment 1) and includes Kimley-Horn project management and coordination time.

1. Base Map Creation and Project Due Diligence
2. Update of the City HEC-HMS Model to derive 1000-Year Peak Flows along Accotink Creek
3. Hydraulic Study of the effect of the 1000-Year Storm on the Accotink Creek Floodplain within the City
4. Mapping of Results and Quantification of the impact of the 1000-year storm on the City.
5. Report on the effects of a Large Recurrence Interval (1000-Year) Storm on the City of Fairfax.
6. Meetings & Coordination

### **TASK 100 - BASE MAP CREATION AND PROJECT DUE DILIGENCE**

Kimley-Horn will develop Geographic Information Systems (GIS) base mapping for the entire City. The base mapping will focus on the floodplain characteristics of Accotink Creek, and the areas adjacent to the floodplain, to include buildings, roadways, utilities, critical facilities and community lifelines. Readily available City of Fairfax, Fairfax County, and FEMA GIS shapefile data and aerial imagery will be



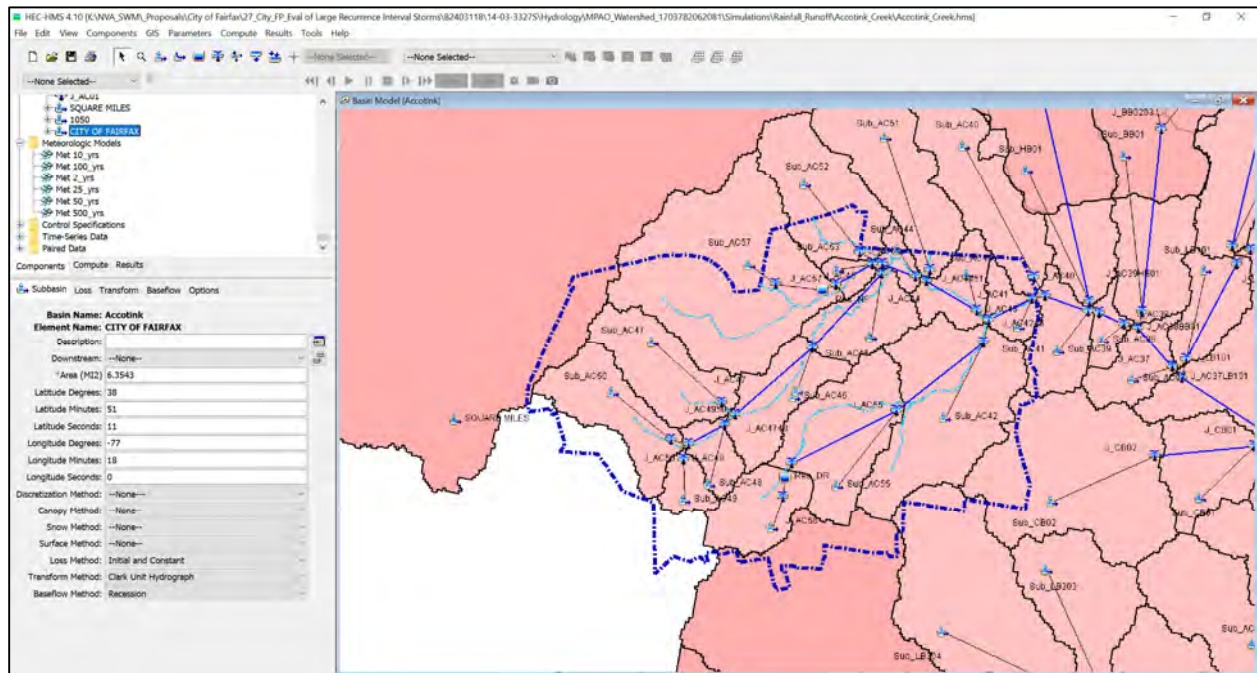
utilized to derive the base mapping. As part of this task, Kimley-Horn will perform project due diligence by compiling pertinent Citywide information from the following reports and data sets:

- TSDN Hydrology Report – Accotink Creek Watershed (Prepared by STARR – FEMA Region III) – December 2019
- City of Fairfax existing HEC-HMS (Hydrologic Models) for Accotink Creek (MPAO\_Watershed\_1703782062081)
- City of Fairfax Effective HEC-RAS (Hydraulic / Floodplain Models) for Accotink Creek (Provided to Kimley-Horn by the City through a FEMA Data Request)
- City of Fairfax DCR Approved – Flood Resilience Plan
- City of Fairfax - Flood Insurance Study (FIS)
- FEMA relevant Flood Insurance Rate Maps (FIRMs)
- Best available FEMA, State, and City GIS Shapefile Data and Aerial Imagery

Kimley-Horn will utilize the site base mapping and background data obtained through this task to supplement all proposed tasks outlined in this Scope of services, including all modeling, mapping, and report development tasks.

## **TASK 200 – UPDATE OF THE CITY HEC-HMS MODEL TO DERIVE 1000-YEAR PEAK FLOWS ALONG ACCOTINK CREEK**

Kimley-Horn will update the FEMA provided Accotink Creek HEC-HMS (Hydrologic Modeling System) Model, shown in Figure 1, to simulate the hydrologic stream processes at junctions and specific locations across the city. Kimley-Horn will create a 1000-year meteorological model and input time series precipitation data in the form of a 1000-year precipitation gage.



**Figure 1. FEMA HEC-HMS for Accotink Creek (City of Fairfax shown with blue outline)**

Kimley-Horn will utilize NOAA Atlas 14 Precipitation Data as the rainfall input data for the precipitation gage. Once the meteorological model and precipitation gage are incorporated into the HEC-HMS model, they will be applied to all City subbasins that drain to Accotink Creek, and a simulation run for the 1000-year event will be created. Runoff peak inflows for Accotink Creek within the City at all modeled junctions for the 1000-yr storm event will be derived and compiled in a tabular format. This data will be utilized in Task 300 as flow data input values for the Accotink Creek Floodplain FEMA Effective HEC-RAS Model. All information derived and modeled in this task will be documented in the Report in Task 500.

### **TASK 300 – HYDRAULIC STUDY OF EFFECT OF THE 1000 YEAR STORM ON THE ACCOTINK CREEK FLOODPLAIN WITHIN THE CITY**

Kimley-Horn will modify the Accotink Creek FEMA Effective HEC-RAS Model with the flow values derived in Task 300. If necessary, the Effective Model channel and cross-sectional geometry will be adjusted with lidar topographic data to account for the anticipated increase in flow, water surface elevations and floodplain top widths in order to encumber the effects of the 1000-year storm within the model geometry. If cross sections are required to be extended Kimley-Horn will also incorporate any pertinent characteristics (obstructions, structures, residences etc.) into the model.

Kimley-Horn will run the updated Effective HEC-RAS model to derive the following tabular and graphical comparison data for the 100-year, 500-year, and 1000-year storms:

- HEC-RAS Profile Summary Tables
- Floodplain Cross Sectional Data
- Water Surface Profiles
- X-Y-Z Prospective Plots

As part of this task, Kimley-Horn will utilize the RAS-Mapper tool to generate inundation limits spatially and graphically along Accotink Creek within the City. The following graphical outputs will be derived for the 100, 500, and 1000-year storms:

- Flood Depths
- Velocity
- Water Surface Elevations
- Inundation Boundaries

The graphical outputs generated will be utilized in Task 400 to compare the scale differences between the 100-, 500-, and 1000-year storms within the City of Fairfax, as well as their respective impact City infrastructure, residential and commercial areas, utilities, critical facilities, and City lifelines.

### **TASK 400 – MAPPING OF RESULTS AND QUANTIFICATION OF THE IMPACT OF THE 1000-YEAR STORM ON THE CITY**

Kimley-Horn will utilize the mapped Hydraulic results derived in Task 300 and overlay them on the base mapping developed in Task 100. Kimley-Horn will utilize GIS processing features to determine the following:

- Buildings impacted by the 100-year, 500-year, and 1000-year events, to include breakdown of residential, commercial, and industrial buildings.
- Roads impacted by the 100-year, 500-year, and 1000-year events, to include evaluation of roads closed by each corresponding event (evacuation routes).
- Utilities impacted by the 100-year, 500-year, and 1000-year events.
- Critical facilities and FEMA defined City “lifelines” impacted by the 100-year, 500-year and 1000-year events.

GIS maps will be derived and paired with tabular and statistical summaries to create report graphics (Task 500) as well as mapping that can help the City understand impact as well as aid in planning for catastrophic storms.

### **TASK 500 – REPORT ON THE EFFECTS OF A LARGE RECURRENCE INTERVAL STORM ON THE CITY OF FAIRFAX**

Kimley-Horn will develop a Study report outlining the information derived in tasks 100 - 400. The report language, graphics, tabular summaries and numerical analyses will focus summarizing the impact and difference in magnitude of the 1000-year floodplain on the city, when compared to the 100 and 500 year storm events.

### **TASK 600 – MEETINGS & COORDINATION**

Kimley-Horn staff will be available for up to two (2) project coordination meetings to discuss the project. In addition, Kimley-Horn staff will participate in calls to discuss the project with City staff. If additional meetings and coordination activities are requested, Kimley-Horn will prepare a separate Scope of Services and cost estimate for client approval prior to proceeding with the additional work.

### **DELIVERABLES**

The following items are anticipated as project deliverables for this Scope of Services.

- HEC-HMS Hydrologic / HEC-RAS Stream Hydraulic Models(s) analyzing the 1000-year storm impact on the City of Fairfax
- GIS Maps to be utilized for Citywide planning and Public Education events relate to catastrophic storm impacts on the City
- One (1) Report on the effects of a large recurrence interval storm on the City of Fairfax.

### **OVERALL PROJECT ASSUMPTIONS**

For the purposes of developing this proposed Scope of Services and the accompanying cost estimate, we have made the following assumptions:

- It is assumed that the City will obtain the topographic surface utilized to derive the model geometry for effective FEMA model referenced in this study.
- The flood studies and analyses proposed in this Scope of Services are intended as a planning level and will not constitute a formal FEMA floodplain study.

- All analyses and studies developed in this Scope of Services will be based on GIS information and unknown survey information utilize to derive the Effective modeling. As such, the information derived throughout this study will be considered “for informational purposes only”
- Accuracy and precision of data and previous studies provided by others is solely on the consulting firm that derived the studies. Kimley-Horn will review all data provided by the City and FEMA with regards to the Study Area but assumes no responsibility for information outlined or derived in the studies developed by others.
- Readily available City of Fairfax and Fairfax County GIS shapefile information will be used to supplement this study, as needed.
- The city will provide all coordination with FEMA and Fairfax County (if needed) with regards to this project.

## **OVERALL PROJECT EXCLUSIONS**

Services that are not currently anticipated as part of this project and are therefore outside the scope of this task order proposal include the following:

- FEMA Coordination and Applications
- Engineering Design
- Construction Drawing Development
- Development/Delivery of Presentations, Board of Supervisors, Committees, or the Public
- Notifications to impacted Property Owners
- All other services not explicitly stated in this Scope of Services

## **SCHEDULE**

The tasks referenced in this scope will be coordinated with City Staff. Meetings, action items, and deliverables will be tracked on a monthly basis and reported to the City with a monthly progress report for documentation of services provided. Assuming Kimley-Horn receives a notice to proceed by May 2, 2025, Kimley-Horn anticipates completion of the scope of work outlined above by August 29, 2025.

## **FEE AND BILLING**

Kimley-Horn will provide the following scope of services under our term contract #23050-A. The following tasks will be provided on a time and materials basis not to exceed a total project cost of **\$45,162.64**. A detailed breakdown (by task) of Kimley-Horn’s fee estimate is provided in Attachment 1 and utilizes the rate schedule as provided for in the City of Fairfax Task Order Contract #23050-A, Year 2. Please note that hourly fees will be invoiced monthly based upon hours expended for services performed and payment will be due within 25 days of receipt of invoices related to this project.

**CLOSURE**

The work described with this proposal will be completed in accordance with the terms and conditions of Contract #23050-A between the City of Fairfax and Kimley-Horn. We appreciate the opportunity to provide these services to you. Please contact me if you have any questions.

Very truly yours,  
KIMLEY-HORN AND ASSOCIATES, INC.

A handwritten signature in blue ink, appearing to read "Jon D'Alessandro".

Jon D'Alessandro, P.E.  
Senior Project Manager

# City of Fairfax Flood Resilience Plan

# CITY OF FAIRFAX

## 2024 FLOOD PREPAREDNESS AND RESILIENCE PLAN

MARCH 15, 2024

Prepared for:



Prepared by: **Kimley»Horn**



## About this Resilience Plan

This resilience plan has been developed in the context of both Community Flood Preparedness Fund (CFPF) and Community Rating System (CRS) requirements. The Virginia Department of Conservation and Recreation (DCR) Community Flood Preparedness Fund was established to provide support for regions and localities across Virginia to reduce the impacts of flooding and is guided by its Commonwealth Resilience Planning Principles. The Community Rating System is a national program developed by the Federal Emergency Management Agency (FEMA), under which flood insurance premiums through the National Flood Insurance Program (NFIP) are discounted for a community's residents and businesses based on their work to reduce and/or manage the impacts of flooding. Because this resilience plan is dualistic in meeting requirements of both CFPF and CRS, the City will be eligible for project funding through CFPF and will be awarded points towards flood insurance premium reductions through CRS and NFIP.

The FEMA Special Flood Hazard Areas (SFHA) and the City of Fairfax Resource Protection Areas (RPA) have been the basis of the flood hazard information gathered, analyzed, referenced, and presented in this resilience plan. FEMA defines a floodplain as any land susceptible to being inundated by floodwaters of any source. A FEMA Special Flood Hazard Area is a floodplain area that will be inundated by the flood event having a one percent chance of occurring or being exceeded in any given year, which is also referred to as the base flood or 100-year flood. The City of Fairfax last adopted its Resource Protection Areas in 2003, which consist of areas adjacent to or within a 100-foot buffer of wetlands or water bodies.

The structure of this resilience plan is based on the phases and steps of the CRS-credited planning process and supplementary information has been included to address additional CFPF requirements and holistically represent the City of Fairfax. The most common technical terms and acronyms used throughout this resilience plan are:

ATSDR	Agency for Toxic Substances and Disease Registry	Floodplain	Any land area susceptible to being inundated by floodwaters from any source.
CDC	Center for Disease Control	Floodway	The channel of a river or watercourse and the adjacent land area reserved to discharge the base flood.
CFPF	Community Flood Preparedness Fund	HAZ-US	Hazards-United States
CRS	Community Rating System	HMP	Hazard Mitigation Plan
EJScreen	Environmental Justice Screening & Mapping Tool	IDF	Intensity Duration Frequency Curve
EOP	Emergency Operations Plan	NFIP	National Flood Insurance Program
ESC	Environmental Sustainability Committee	RPA	Resource Protection Area
FEMA	Federal Emergency Management Agency	SFHA	Special Flood Hazard Area
FIMA	Federal Insurance and Mitigation Administration	VFRIS	Virginia Flood Risk Information System
FIRM	Flood Insurance Rate Map		



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## Helpful Links

Several web-accessible resources have been referenced throughout this resilience plan and have been hyperlinked below:

[City of Fairfax Fact Book](#)

[2035 Comprehensive Plan](#)

[City of Fairfax Annex – Northern Virginia Hazard Mitigation Plan](#)

[Northern Virginia Hazard Mitigation Plan](#)

[Emergency Operations Plan](#)

[Resilience Plan Brochure](#)

[Resilience Plan Webpage – Engage Fairfax](#)

[Resilient Fairfax Climate Projections Report](#)

[Regional Integrated Transportation Information System](#)

[Coastal Virginia CRS Workgroup](#)

[HAZ-US Guidance Manual](#)

[City of Fairfax Zoning Ordinance](#)



## Introduction



*Figure 1 – Accotink Creek at Bankfull, Photo Taken Along Stafford Drive-Fair Woods Parkway Corridor*

The City of Fairfax (the City), Virginia, is an independent city in the Commonwealth of Virginia. The six-square-mile jurisdiction in the heart of Northern Virginia was founded in 1805 and was established in 1961 as an independent city now known as the City of Fairfax.

The City is located at the confluence of four major drainage divides and includes portions of the Accotink Creek, Pohick Creek, Pope's Head Creek, and Difficult Run watersheds, ultimately draining to the Chesapeake Bay watershed. Because the City contains an extensive network of streams, it is more susceptible to flooding and poses a higher risk to its residents and infrastructure.

This plan has been developed to improve the City's resilience to flooding and other flood-related hazards.

By better understanding the root causes and consequences of flooding, the plan aims to propose measures that will help mitigate the impact of future floods and protect the City's infrastructure, residents, and businesses. This plan has been developed through a collaborative process that included input from city residents, federal, state, and local agencies, as well as information from previously developed studies, models, and reports. The plan is has been divided into four phases:

- **Phase 1** provides information about the team that prepared the plan, how City residents were involved in the planning process, and the stakeholders that were contacted to obtain relevant data. This phase represents the data gathering stage that formed the foundation for the plan.
- **Phase 2** focuses on presenting the collected data and providing interpretations of how those results impact the City. By summarizing and interpreting the data, decision-makers can make informed choices about the most effective strategies to improve resilience.
- **Phase 3** outlines the City's goals and proposes possible activities to enhance resilience. This phase identifies specific actions that can be taken to address the identified vulnerabilities. It includes recommendations for land-use planning regulations, flood management and rehabilitation programs, and community engagement initiatives.
- **Phase 4** encompasses the plan adoption process and outlines future methods for evaluation and revisions. It also highlights the importance of regularly evaluating the plan's effectiveness and making necessary revisions as new information becomes available or as the City's needs evolve.



# Phase I – Planning Process

## Step 1. Organize to Prepare the Plan

The first step of this phase was to establish an ‘office’ consisting of people and groups that would be involved in the development of this resilience plan through regularly attending meetings, assisting in coordination, writing or reviewing draft sections of the plan, and ultimately incorporating components of the plan into the rest of the community’s hazard mitigation planning activities. In addition to what was required of office members, the office also contributed knowledge in developing flood control preventative measures, property and natural resources protection strategies, emergency services planning support, and conceptual potential flood control projects included in this plan. The office was established on February 28, 2023, and consists of:

- Satoshi Eto - City of Fairfax Public Works Program Manager
- Patrick Remson - City of Fairfax Public Works Utilities Project Manager
- Juan Campos, P.E. - Kimley-Horn Project Manager and Project Engineer
- Jonathan D'Alessandro, P.E. - Kimley-Horn Project Engineer

## Step 2. Involve the Public

Step 2 of the City’s resilience plan included opportunities for the public to comment on the plan during its development and prior to its approval. The term ‘public’ as used in the development of this resilience plan constitutes City of Fairfax residents, businesses, and property owners. Figure 2 outlines the timeline of the resilience plan development as well as the public input activities that took place. An overview of these public input activities is provided below.

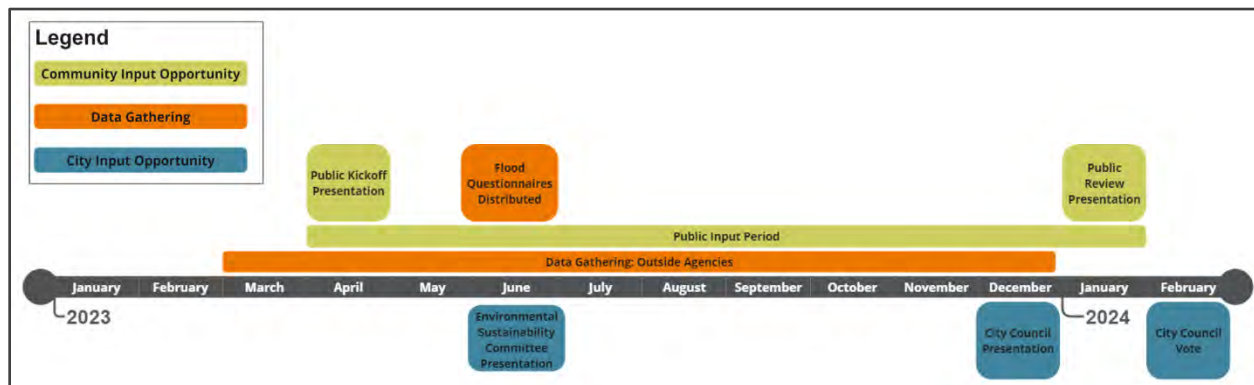


Figure 2 – Resilience Plan Timeline

- **Public Kickoff Presentation** – The first community input event in the development of this resilience plan was a public outreach presentation. The intent of this presentation was to announce the City’s development of a resilience plan, discuss what the intent of the plan would be, what content would be provided within the plan, and how City residents could contribute during its development. The kickoff meeting was announced on the City’s project website and communities that were previously interested in flood resilience were contacted directly. The meeting was held on April 19, 2023 at the Stacy C. Sherwood Community Center. Two suggestions from this presentation were incorporated in the development of this resilience plan. The suggestions are listed below:
  - Property owners within the Resource Protection Area (RPA), not just within the FEMA SFHA, should be included in the flooding questionnaire mailing list. The mailing list was adjusted to include properties within the SFHA and the RPA.
  - Residents outside of the SFHA and RPA should be able to provide feedback on flooding as well. To address this, the City created a webpage for the resilience plan project that enables all residents to provide comments and ask questions throughout the course of the plan’s development.



- **Environmental Sustainability Committee Presentation** – Similarly to the public kickoff presentation, the intent of this presentation was to introduce the resilience plan project, discuss the plan’s anticipated content and goals, and request feedback that could be incorporated into the plan. This presentation took place on June 21, 2023 at City Hall and the following input was collected from the ESC:
  - A recommendation was made to define flooding to the community and request data, site specific information, and photos from the community documenting localized and riverine flooding. Based on this input, the following statement was included as part of the stormwater and flood resilience questionnaire: “For this project, flooding refers to the inundation of urban areas due to excessive accumulation of rainwater thus impacting the ability to use the property or creating water-related hazards.”
  - It was suggested that the City consider addressing the impact of flooding on natural and riverine habitats in future project planning and development.
- **City Council Presentation** – The resilience plan was presented to City Council during a Council work session on February 27, 2024. The presentation included a summary of the report’s findings and highlighted the key strategies and recommendations for building flood resilience in the City. The resilience plan received positive feedback from City Council and no plan adjustments were requested.
- **Public Review Presentation** – A final public outreach meeting was conducted on March 27, 2024, to present the resilience plan’s findings and recommendations to the public. The presentation summarized the resilience plan’s development, showcased the key findings from the data gathered, outlined the City’s recommendations for improving flood resilience, and demonstrated how public feedback was evaluated and incorporated into the resilience plan.
- **City Council Adoption Vote** – The plan will be presented to City Council on May 14, 2024, and it is anticipated that the plan will receive formal adoption, marking its official recognition as a City document and signifying its integration into the City’s official records and policies.

In addition to hosting presentations and in-person meetings, the following mediums were created for public outreach during the development of the resilience plan:

- **Resilience Plan Website** – A webpage was created as part of the City’s Engage Fairfax web portal to share project specific information, provide locations and times of upcoming events, and collect feedback from residents over the duration of the public input period. A link to the resilience plan webpage can be found in the [Helpful Links](#) section of this resilience plan.
- **Stormwater & Flood Resilience Plan Brochure** – A brochure was created and distributed at the public kickoff presentation that outlines the resilience plan project, explains CFPF and CRS opportunities, and provides a QR code to reach the resilience plan website and leave feedback. A copy of this brochure has been included in [Appendix B](#) and a link to the PDF version of this brochure can be found in the [Helpful Links](#) section of this resilience plan.
- **Flood Questionnaire** – A stormwater and flood resilience questionnaire was developed and distributed to approximately 1,400 property owners in the FEMA SFHA and/or RPA to collect information about flooding in their area. The questionnaire covered topics such as roadway impacts during rainfall events, if flooding impacts the ability to utilize property, and if the City’s infrastructure adequately handles rainfall events. More information regarding this questionnaire has been included in [Step 4](#), an analysis of the results gathered from this questionnaire has been included in [Step 5](#), and a sample questionnaire has been included in [Appendix B](#).

### Step 3. Coordinate

**Step 3** of the City's resilience plan development process consisted of contacting agencies and organizations to determine if they have studies, plans, or information beneficial for development or inclusion in the resilience plan. Coordination was initiated by email and all agencies and organizations were offered the opportunity to provide additional input and involvement during the resilience plan development. The email template utilized for agency and organization coordination has been included in [Appendix C. Table 1](#) includes a list of agencies contacted and the date they were contacted.

*Table 1 – Agency Coordination Log*

Agency	Contact Date	Agency	Contact Date
Federal Emergency Management Agency (FEMA)	April 2, 2023	Metropolitan Council of Government (COG)	October 24, 2023
U.S Army Corps of Engineers	April 3, 2023	U.S Fish and Wildlife Service (FWS)	October 24, 2023
Natural Resources Conservation Service (NRCS)	April 6, 2023	Virginia Department of Wildlife Resources (DWR)	October 24, 2023
Virginia Department of Emergency Management (VDEM)	April 16, 2023	U.S Department of the Interior (DOI)	November 27, 2023
National Oceanic and Atmospheric Administration (NOAA)	October 24, 2023	Bureau of Land Management	November 27, 2023
U.S National Geological Survey (USGS)	October 24, 2023	Southern Environmental Law Center	November 27, 2023
Virginia Department of Transportation (VDOT)	October 24, 2023	U.S Department of Agriculture (USDA)	November 27, 2023
Virginia Department of Conservation and Recreation (DCR)	October 24, 2023	Environmental Protection Agency (EPA)	November 27, 2023
Virginia National Flood Insurance Program (NFIP)	October 24, 2023	Federal Housing Authority	November 27, 2023
Virginia Floodplain Management Association (VFMA)	October 24, 2023	Southeast Regional Climate Center	November 27, 2023
Virginia Flood Risk Information System (VFRIS)	October 24, 2023	Federal Highway (FHWA)	November 27, 2023
Northern Virginia Regional Commission (NVRC)	October 24, 2023	National Bridge Inventory	November 27, 2023
Northern Virginia Clean Water Partners (NVCWP)	October 24, 2023	U.S. Coast Guard	November 27, 2023
Fairfax County Department of Public Works and Environmental Services (DPWES)	October 24, 2023	Department of Energy (DOE)	November 27, 2023
Fairfax County Department of Land Development Services	October 24, 2023	National Center for Environmental Information	November 27, 2023
Stafford County Department of Development Services/Environmental Division	October 24, 2023	Maritime Administration	November 27, 2023



**Table 1** includes the thirty-two agencies that were contacted for additional information and resources regarding flood resilience. Of the thirty-two agencies, twelve responded through email and provided contacts and links for useful websites. One virtual meeting was held with two employees of the Northern Virginia Regional Commission on November 8<sup>th</sup>, 2023, in which links were shared to the Regional Integrated Transportation Information System and Coastal Virginia CRS Work Group. These links have been included in the [Helpful Links](#) section of this resilience plan.

## Phase II – Risk Assessment

This phase of the resilience plan development process involved analyzing and summarizing data collected about the natural hazards that the City of Fairfax faces. [Step 4](#) focuses on the sources, frequency, extent, and causes of flooding, while [Step 5](#) addresses the impact of flooding on people, property, infrastructure, the local economy, and natural floodplain functions.

### Step 4. Assess the Hazard

#### Flood Hazard Data

#### Climate and Flooding Overview

The City of Fairfax is located within the Northern Virginia region in the mid-latitudes of the Eastern United States. The City is part of the Köppen-Geiger climate “Cfa” classification, with “C” indicating a temperate climate group, “f” indicating a wet year-round precipitation pattern, and “a” indicating a hot summer temperature pattern [2] [3]. Regional climate averages collected from the climate station at the Washington Dulles International Airport (USW00093738) [4] and their respective data collection timeframes are presented in [Table 2](#).

*Table 2 – Washington Dulles International Airport Climate Station Statistics*

Statistic	Value	Data Collection Timeframe
Average Annual Precipitation	41.66"	1962 - 2022
Average Annual Snowfall	22.22"	1962 - 2022
Average Annual Temperature	57.6° F	2013 - 2023
Average Annual Max Temperature	97.7° F	1962 - 2022
Average Annual Min Temperature	0.13° F	1962 - 2022

The City of Fairfax experiences a range of storm events throughout the year, from snow and ice storms in the winter months to severe thunderstorms. NOAA’s National Center for Environmental Information (NCEI) Storm Events Database indicated that the City has been impacted by 7 tropical storms from 1950-2023. The storms that caused the most damage to the City included Hurricane Floyd (1999), Hurricane Isabel (2003), Hurricane Irene (2011), and Tropical Storm Lee (2011). Based on this data, Fairfax County’s Climate Projections Report [5] estimates a 22% chance of a tropical storm occurrence on any given year. NOAA’s NCEI Storm Events Database has no recorded tornadoes for the City of Fairfax but NOVA’s Hazard Mitigation Plan identified the City as a jurisdiction with a higher risk for tornadoes with a probability of less than 1 event per year.



Flood occurrences resulting from excessive precipitation may be classified into one of two types [6]:

- General Floods – Precipitation over a given river basin for an extended period of time. The primary types of flooding in this category include riverine, coastal, and urban flooding.
  - Riverine flooding is a function of excessive precipitation levels and water runoff volumes within the watershed of a stream or river.
  - Coastal flooding is typically a result of storm surge, wind-driven waves, and heavy rainfall produced by hurricanes, tropical storms, nor'easters, and other large coastal storms.
  - Urban flooding occurs where man-made development has obstructed the natural flow of water and decreased the ability of natural groundcover to absorb and retain surface water runoff.
- Flash Floods – The product of heavy, localized precipitation in a short period of time across a given location. Most flash flooding is caused by slow-moving thunderstorms in a local area or by heavy rains associated with hurricanes and tropical storms. Flash flooding occurs frequently in urbanized areas where much of the ground is covered by impervious surfaces.



*Figure 3 – Residential Flooding, Photo Contributed by Flood Questionnaire Participant*

From 1950 to 2021, the City has had 10 flood events with \$2,500,000 in property damage. Of these 10 events, five were categorized as flash floods and the other 5 were flood events [6]. As global temperatures continue to rise, flooding poses an even greater concern for the City [5]. The effects of climate change on flooding frequency and severity, analyzed in Fairfax County's Climate Projection Report [5], have been outlined below:

- **Increased Rainfall** – With rising global temperatures, precipitation is projected to increase across all seasons, with greater amounts in the spring and summer months. A shift is also predicted from snow to rainfall events, a trend that can already be seen from new data collected in a recently installed climate station in the City of Fairfax (US1VAFXC001).
- **Increased Rainfall Intensity** – From 1895 to 2020, Fairfax County documented a total increase of 2.89 inches in annual precipitation and a reduction of 108 days of precipitation from 1976-2005 [5]. This increased rainfall and fewer total precipitation days signifies an increase in rainfall intensity. With rising global temperatures, the study predicts a reduction of 2 total precipitation days and an increase of 3-4 inches in total annual rainfall by 2050 [4].
- **Increased Frequency and Severity of Extreme Weather Events** – Over the last 50 years, an 18% increase in the heaviest 1% of precipitation events has been observed in the Southeastern United States. This aligns with the understanding that warm air can hold more moisture, allowing for more powerful storms. Consistent with this trend, the study predicts an increase in precipitation for the top 1% of precipitation events from 2.9 inches to 3.1 inches by 2050. The frequency of such events is also predicted to increase.
- **Increased Rainfall Depth** – An increase in rainfall depth is anticipated for the 24-hour 2-year, 10-year, 25-year, 50-year, 100-year, 200-year, and 500-year return periods. These return periods represent storms with a 50%, 10%, 4%, 2%, 1%, 0.5 %, and 0.2% annual chance of occurrence, respectively.



## HAZ-US

FEMA's HAZ-US Program is a nationally standardized risk modeling methodology capable of identifying areas with high risk for natural hazards and estimating physical, economic, and social impacts of earthquakes, hurricanes, floods, and tsunamis. The HAZ-US software uses GIS technologies to perform analyses with inventory data such as building square footage and value, population characteristics, costs of building repair, and basic economic data. For flood hazards, a community's vulnerability is calculated by relating estimated flood depths generated as a result of a selected storm event to the chance of flooding at each depth.

To assess the City of Fairfax's vulnerability to flooding, a HAZ-US flood hazard analysis was conducted as part of Northern Virginia's Hazard Mitigation Plan [6] using a 100-year storm scenario. The model created for this analysis applied a 10-mile threshold to delineate stream reaches and used base HAZ-US inventory data and economic data, provided at the census block level. Base inventory data supplied with HAZ-US included general building stock, essential facilities, high potential loss facilities, user-defined facilities, transportation systems, utility systems, and demographic data. Economic data included the cost per square foot to repair building damage by structural and occupancy type, replacement value by occupancy type, annual gross sales in dollars per square foot, relocation rental costs per month per square foot by occupancy type, monthly rental costs of current homes per occupancy type, monthly income in dollars per square foot by occupancy type, and monthly wages in dollars per square foot by occupancy type. More information regarding inventory data supplied with HAZ-US can be found in the HAZ-US Guidance Manual, which has been included in the [Helpful Links](#) section of this resilience plan.

Results from this analysis, including risk to critical facilities and estimated shelter requirements, can be found in the economic assessment section of [Step 5](#).

## FEMA

The two categories of flood hazard data collected from FEMA utilized in the development of this resilience plan are as follows:

1. Information that was gathered through publicly available FEMA sources.
2. Information that was obtained through a request to the FEMA Region 3 office.

### ➤ Publicly Available FEMA Data

The City's effective and historic Flood Insurance Rate Maps (FIRM) were obtained through FEMA's Map Services Center. The maps were utilized to establish Base Flood Elevations, Flood Hazard Zones, and as part of the Geographic Information Systems (GIS) analyzes conducted throughout this plan.

The National Risk Index (NRI) is a dataset and online tool to help illustrate communities most at risk for various hazards, including flooding. According to the NRI [7], the City is reported to have a relatively moderate ability to prepare for anticipated natural hazards, adapt to changing conditions, and withstand and recover rapidly from disruptions when compared to the rest of the United States.

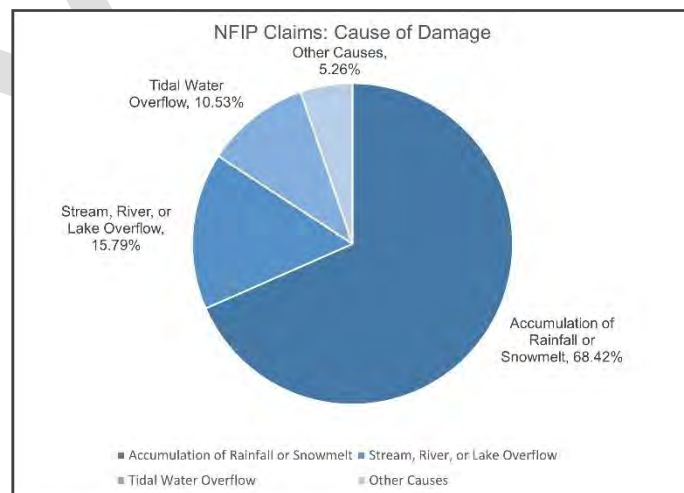


Figure 4 – Cause of Damage in NFIP Claims (VA)

The National Flood Insurance Program (NFIP) has created a repository of publicly available flood insurance data [8]. The following statistics have been sourced from the claims and policy data available in the NFIP repository:

- The average value of buildings covered by the National Flood Insurance Program in the state of Virginia is approximately \$216,000.
- The breakdown of Federal Insurance and Mitigation Administration (FIMA) NFIP claims in the state of Virginia is presented in [Figure 4](#).

To supplement the information found in publicly available FEMA datasets and to aid in floodplain management, disaster recovery, CRS activities, updating flood mitigation plans and applying for flood mitigation grants, the City requested additional National Flood Insurance Program data from the FEMA Region 3 office. The National Flood Insurance Program provides flood insurance to property owners, renters, and businesses within a participating NFIP community, such as the City of Fairfax (Community 515524).

#### ➤ Additional Data Provided by the FEMA Region 3 Office

The NFIP data provided by FEMA includes Personally Identifiable Information (PII) such as the names or addresses of specific properties, whether they are covered by flood insurance, whether they have received flood insurance claims, or the amounts of such claims, and will not be shared in this resilience plan as it is protected by the Privacy Act of 1974. The following aggregated data is current as of September 20th, 2023, does not contain Personally Identifiable Information, and is permitted to be shared as part of this resilience plan.

Within the City, there are ninety-six active flood insurance policies through the National Flood Insurance Program with an average premium of approximately \$1,380. There have been forty-nine recorded insurance claims since 1979, with an average claim value of approximately \$18,210. Of the forty-nine insurance claims, thirteen are within or directly adjacent to the FEMA SFHA and/or the City RPA. There are also four repetitive loss properties within the City, with total paid claims of \$590,686. A repetitive loss property is defined by FEMA as 'any insurable building for which two or more claims of more than \$1,000 were paid by the National Flood Insurance Program within any ten-year period, since 1978'.

### **Stormwater & Flood Resilience Questionnaire**

To gather flood information not captured in formal reports, studies, or models, a stormwater and flood resilience questionnaire was developed and mailed to approximately 1,400 properties within the City's FEMA SFHA and RPA. For the purpose of this questionnaire, flooding was defined as the inundation of urban areas due to excessive accumulation of rainwater thus impacting the ability to use the property or creating water-related hazards. The questionnaire asked if flooding occurs, how often it occurs, if the resident feels that the City's infrastructure has the capacity to handle flooding, if they feel informed about flooding and flood risk, and included an additional section for residents to provide comments or any flooding related pictures. An analysis of the results of the questionnaire has been included in [Step 5](#) of this resilience plan and a copy of the questionnaire has been included in [Appendix B](#).

### **Social Hazard Data**

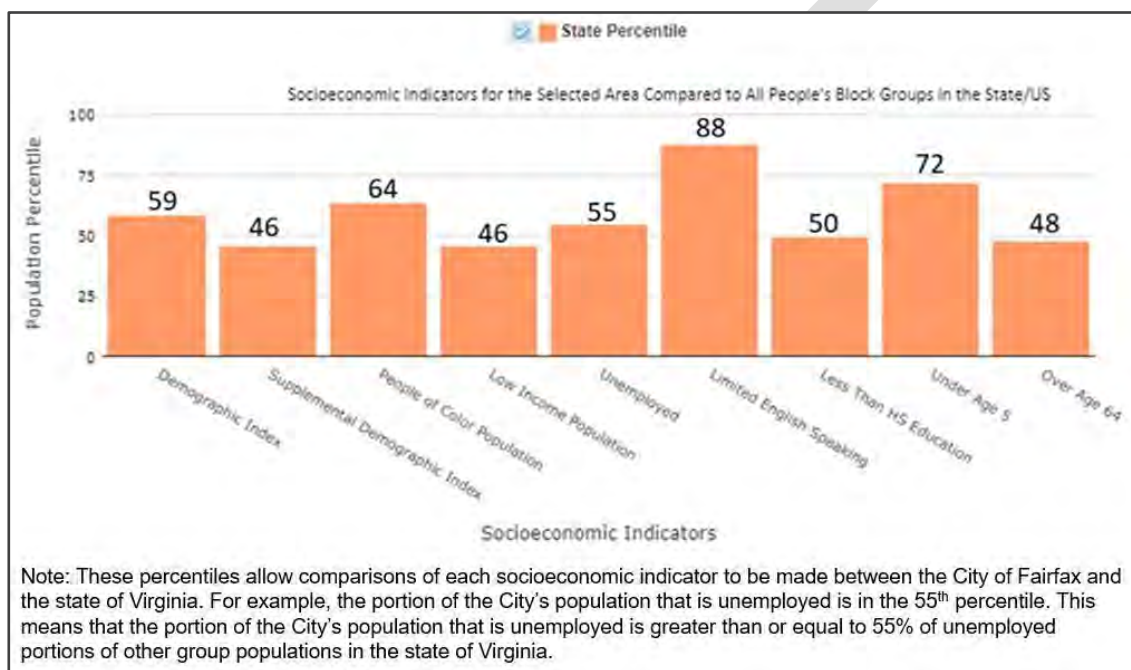
According to the 2021 U.S. Census, the City of Fairfax has a population of 24,276 residents and 9,437 households [9]. Demographically, the City's population is approximately 53.1% White, 5.9% Black, 19.3% Asian, 18.2% Hispanic, and 3.5% Multiracial or Other [9]. 10% of the City's population is categorized as "low income" and the City's median household income is \$128,708 [10], which higher than both the Virginia median household income of \$87,249 [11] and the national median household income of \$75,149 [12]. The following sub-sections will outline additional social characteristics that have been identified within the City



using the Environmental Justice Screening and Mapping Tool (EJScreen), Virginia Flood Risk Information System (VFRIS), and Center for Disease Control (CDC) Agency for Toxic Substances and Disease Registry (ATSDR).

### EJScreen

EJScreen [13] is an EPA-developed environmental justice mapping and screening tool that provides a nationally consistent dataset and approach for combining environmental and demographic socioeconomic indicators which can be used to assist in making environmentally just decisions when developing a flood resilience strategy.



*Figure 5 – City EJScreen Socioeconomic Indicators Relative to the State of Virginia*

**Figure 5** illustrates the City's percentile rankings for the nine socioeconomic indicators analyzed through EJScreen. The EJScreen definitions for each socioeconomic indicator, along with explanations of their respective percentile values, have been provided below:

- **Demographic Index** is based on the average of two socioeconomic indicators; low-income and people of color. The City of Fairfax is in the 59<sup>th</sup> percentile, which indicates that the Demographic Index value of the City is slightly above the median value relative to the state of Virginia.
- **Supplemental Demographic Index** is based on the average of five socioeconomic indicators; low-income, unemployment, limited English, less than high school education, and low life expectancy. The City of Fairfax is in the 46<sup>th</sup> percentile, which indicates that the percentage of the population with low-income, unemployment, limited English, less than high school education, and low life expectancy is slightly below the median value relative to the state of Virginia.
- **People of Color** is the percent of individuals in a block group who list their racial status as a race other than White alone and/or list their ethnicity as Hispanic or Latino. That is, all people other than non-Hispanic White-alone individuals. The word "alone" in this case indicates that the person is of a single race, not multiracial. The percentage of people of color in the City is in the 64<sup>th</sup> percentile, which is above the median value relative to the state of Virginia.



- **Low-Income** is the percent of a block group's population in households where the household income is less than or equal to twice the federal "poverty level." The percent of people with a low-income in the City is in the 46<sup>th</sup> percentile, which is slightly below the median value relative to the state of Virginia.
- **Unemployed** is the percent of a block group's population that did not have a job at all during the reporting period, made at least one specific active effort to find a job during the prior 4 weeks, and were available for work (unless temporarily ill). The percentage of unemployed people in the City is in the 55<sup>th</sup> percentile, which is slightly above the median value relative to the state of Virginia.
- **Limited English Speaking** is the percent of people in a block group living in limited English speaking households. A household in which all members age 14 years and over speak a non-English language and also speak English less than "very well" (have difficulty with English) is limited English speaking. The City of Fairfax is in the 88<sup>th</sup> percentile, which indicates that the percent of the population who speaks limited English is significantly higher than the median value relative to the state of Virginia.
- **Less Than High School Education** is the percent of people age 25 or older in a block group whose education is short of a high school diploma. The percent of people with less than a high school diploma is in the 50<sup>th</sup> percentile, which is approximately the median value relative to the state of Virginia.
- **Under Age 5** is the percent of people in a block group under the age of 5. The percent of the population under the age of 5 is in the 72<sup>nd</sup> percentile, which is significantly higher than the median value relative to the state of Virginia.
- **Over Age 64** is the percent of people in a block group over the age of 64. The City of Fairfax is in the 48<sup>th</sup> percentile, which indicates that the percent of the population over the age of 64 is slightly below the median value relative to the state of Virginia.

## VFRIS

DCR's Virginia Flood Risk Information System (VFRIS) [14] helps communities discern an area's flood risk by referencing information from the Federal Emergency Management Agency, United States Fish and Wildlife Service, ESRI GIS and the Virginia Geographic Information System, allowing users to quickly locate and identify if a property is within the Special Flood Hazard Area, Regulatory Floodway, or other flood risk area. Access to this information can help property owners and buyers understand their flood insurance rate

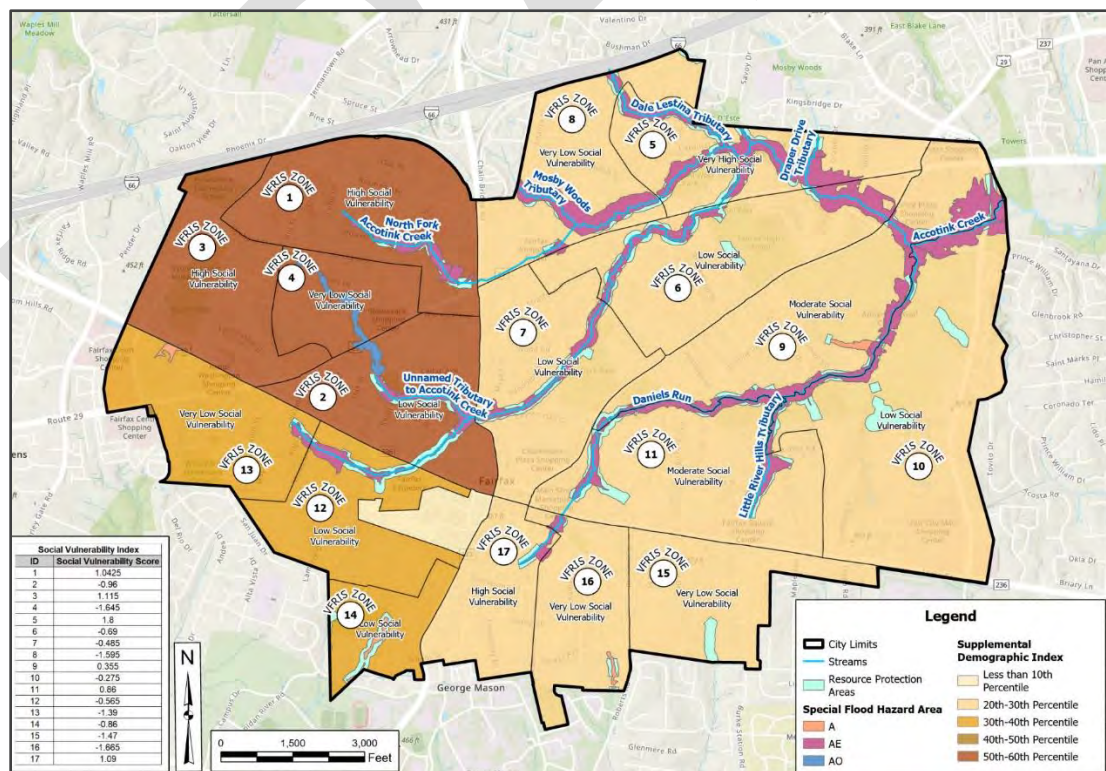
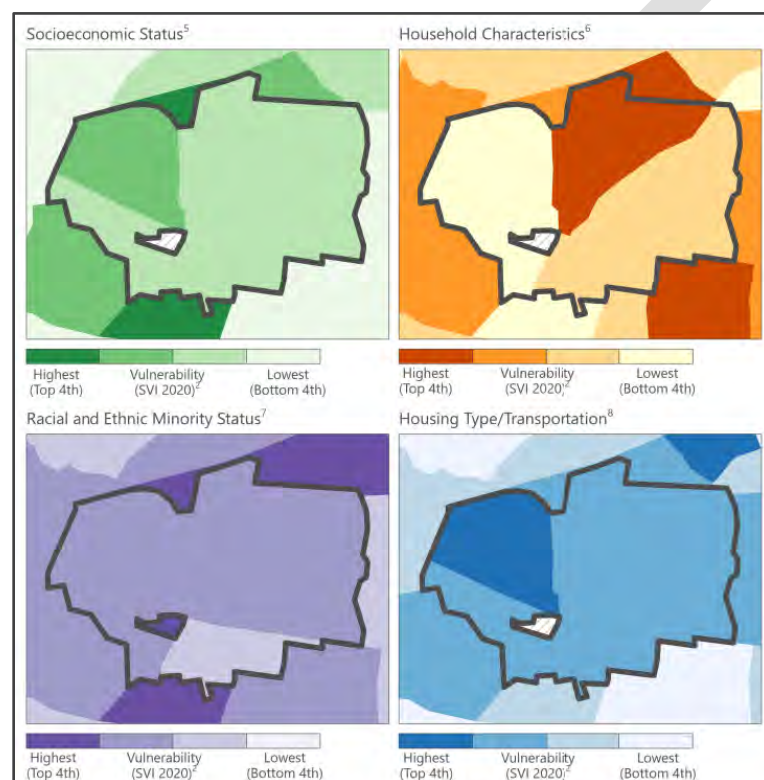


Figure 6 - EJScreen & VFRIS Social Vulnerability Map

and consider flood-proofing options, provide insight on building restrictions and standards, and allow communities to plan where growth should be focused [14]. In addition to viewing flood risk information like Special Flood Hazard Areas or regulatory floodways, VFRIS also allows users to overlay the Virginia Social Vulnerability Index. Social vulnerability refers to the factors that may weaken a community's ability to prevent human suffering and financial loss in a disaster, such as poverty, lack of vehicle access, and crowded housing.

**Figure 6** has been created to compare social vulnerability data collected through VFRIS to the supplemental demographic index information collected from EJSscreen relative to FEMA special flood hazard areas within the City. The City of Fairfax is broken into seventeen Census Tracts according to the VFRIS map tool, four of which are considered to have 'Very High & High Social Vulnerability,' two of which have 'Moderate Social Vulnerability' and eleven of which are considered to have 'Low Social Vulnerability.' The shades of orange shown within the City limits are representative of an average of five socioeconomic factors (Supplemental Demographic Indices) in terms of state percentiles sourced from EJSscreen. The shades of orange get progressively darker with increasing percentiles, indicating higher social vulnerability. The same graphic shown in **Figure 6** has also been included in **Appendix A**.

### CDC ATSDR Social Vulnerability Index



**Figure 7 – CDC ATSDR Social Vulnerability Maps**

social vulnerability accounting for the population living in multi-unit homes, those living in mobile homes, those living in group quarters, crowding levels, and those with no vehicle. Social vulnerability in the context of these four CDC ATSDR themes is important to consider when planning for flood resilience in the City to ensure all strategies are implemented equitable.

The map tiles shown in **Figure 7** are representative of four social vulnerability themes used to calculate VFRIS social vulnerability according to the Center for Disease Control (CDC) Agency for Toxic Substances and Disease Registry (ATSDR) [15]. The Socioeconomic Status map depicts social vulnerability accounting for people with income after taxes equal to or less than 130% of the federal poverty level, the unemployed, those with no high school diploma, those with no health insurance, and by including housing costs-to-income ratio. The Household Characteristics map displays social vulnerability based on the population aged 65 and over, those aged 17 and younger, civilians with disabilities, single-parent households, and based on proficiency in the English language. The Racial and Ethnic Minority Status map presents vulnerability based on different racial-ethnic minority groups. The Housing Type/Transportation map displays

## Community Lifelines



FEMA defines a community lifeline as a resource that enables the continuous operation of critical government and business functions and is essential to human health and safety or economic security. Definitions and community lifelines within the City of Fairfax have been summarized below and included in map form in [Appendix A](#).

- **Safety and Security** – Law Enforcement/Security, Fire Service, Search and Rescue, Government Service, Community Safety

The City of Fairfax EOP [16] establishes a comprehensive framework for the management of major emergencies and disasters within the City, including flooding. The EOP is implemented when it becomes necessary to mobilize resources and groups such as the Police Department, Fire Department, Office of Emergency Management, Health Department, Public Works Department, and Parks & Recreation Department. Safety and security locations within the City include:

- **Fire Station 33** – Fire Station 33 houses Rescue Engine 433, Medic 433, two Swift Water 433 boats, and Utility 433 pick-up. One Captain, one Technician, one Lieutenant, two Fire Medics, and one Firefighter are staffed through this station [17].
- **Fire Station 3** – Fire Station 3 is an operational fire station and is also the administrative headquarters of the fire department. The administrative offices for the Fire Chief, Assistance Chief of Operations, and other staff personnel are located at this station. Battalion Chief 433, Foam Engine 403, Tower Ladder 403, and Medic 403 are housed at this station. One Battalion Chief, one Captain, two Lieutenants, two Technicians, four Fire Medics, two Firefighters, and volunteer personnel are staffed at this station [17].
- **Fairfax City Police Department** - The City of Fairfax Police Department has four Community Policing areas, which consist of a lieutenant and a sergeant who coordinate the efforts of a team of officers within the Patrol Operations Division. Each team is responsible for addressing crime and other quality of life issues in their assigned area [18].

- **Food, Water, Shelter** – Food, Hydration, Shelter, Agriculture

According to the City's EOP, their direct sheltering capabilities for a disaster of such magnitude to necessitate shelter operations for a significant number of people is minimal, so the City has taken measures to identify and enter into an agreement with a facility within City boundaries that can be used as an emergency shelter, if needed. The City will rely on existing agreements with the Fairfax County Department of Family Services and the American Red Cross of the National Capital Region to provide mass care and shelter services. Food commodities are available throughout the City of Fairfax from public retail providers, wholesalers, and contracted services for specific institutions and facilities. Additional contracts may be entered into for post-disaster needs.

- **Health and Medical** – Medical Care, Public Health, Patient Movement, Medical Supply Chain, Fatality Management

There are three primary medical centers within the City of Fairfax: Fairfax Medical Center, Fairfax Surgical Center, Inova Fairfax Hospital



➤ **Energy** – Power Grid, Fuel

Electricity to the City of Fairfax is provided by Dominion Energy, however, there are no major energy facilities within the City boundary.

➤ **Communications** – Infrastructure, Responder Communications, Alerts Warnings and Messages, Finance, 911 and Dispatch

In addition to its police department dispatch center and use of public safety radio, the City of Fairfax maintains an electronic messaging alert system that can distribute notifications and emergency alerts to residents using electronic mail, a text messaging system, pagers, as well as through reverse 9-1-1 phone calls. The City also maintains a social media account and a government access channel known as Cityscreen-12 which can be used for emergency notification purposes. Cityscreen-12 is available on Channel 12 on both the Cox Cable System and Verizon FiOS [16].

➤ **Transportation** – Highway/Roadway/Motor Vehicle, Mass Transit, Railway, Aviation, Maritime

- The intersection of US-50 and US-29 is located within the City of Fairfax, with the two major highways joining to form Fairfax Boulevard for approximately 2.8 miles before separating.
- VA-123 and VA-236 both pass through the City. VA-236 is known as Main Street in the City of Fairfax and then becomes Little River Turnpike once its boundary is crossed upon entrance into Fairfax County.
- I-66 is located along the northern border of the City.

➤ **Hazardous Materials** – Facilities, HAZMAT, Pollutants, Contaminants

The following EPA Regulated facilities were presented on EPA's Environmental Justice Screening and Mapping Tool [13] and are based on information collected by EPA through various databases about facilities or sites subject to environmental regulation. Facilities that directly emit 25,000 metric tons of carbon dioxide equivalent or more per year are required to submit annual reports to EPA. Additionally, suppliers of certain products that would result in greenhouse gas emissions if released, combusted, or oxidized are required to report.

**Oil Storage Facilities** - MOTIVA Enterprises, CITGO, Transmontane

**Air Pollution Sources**

- |   |                                    |
|---|------------------------------------|
| ○ Andrews Organic Cleaners                            | ○ Eleven Oaks Center               |
| ○ Auto Body World Incorporated                        | ○ European Body Works Incorporated |
| ○ Bell Atlantic - Burke                               | ○ Expo Cleaners                    |
| ○ Browns Fairfax Mazda                                | ○ Fair City Auto Body & Paint, Inc |
| ○ Buckeye Terminals, LLC - Fairfax Terminal           | ○ Fair City Cleaners               |
| ○ Caliber Collision Center - Fairfax - Spring St 1728 | ○ Fairfax Auto Body                |
| ○ Capital Auto Body of Fairfax                        | ○ Fairfax Court Cleaners           |
| ○ Citgo Petroleum Corp.                               | ○ Fairfax Custom Cleaners          |
| ○ Collision Specialist of Fairfax Inc.                | ○ Fairfax High School              |
| ○ Colonial Pipeline                                   | ○ Fairfax Plaza Cleaners           |
| ○ Crown Cleaners                                      | ○ Green Acres Center               |
| ○ Custom Cleaners                                     | ○ Jermantown Square Cleaners       |
| ○ Daniels Run Elementary School                       | ○ Jim Mckay Chevrolet Incorporated |
| ○ Darcars Of Fairfax Incorporated                     | ○ Kamp Washington Cleaners         |
| ○ Demaine Funeral Home                                | ○ Kathrine Johnson Middle School   |
| ○ Dominion Autobody                                   | ○ Lord Fairfax Cleaners            |
|   | ○ M And M Collision Corporation    |



- Moore Automotive Incorporated
- Mosby Apartments
- Motiva Enterprises LLC - Fairfax
- National Asphalt Paving Corp - Fairfax
- Northern Virginia Auto Body Inc
- Pickett Road Valet Cleaners
- Popes Auto Body and Paint
- Providence Elementary School
- Quality Auto Body Incorporated
- Qwest Corporation
- Serv-All Cleaners
- Sun Cleaners
- T.L.C. Dry Cleaners Inc
- Ted Britt Ford Sales Inc
- Transmontaigne - Fairfax Terminal
- V-Cleaners
- WT Auto Body

## ➤ **Water Systems** – Potable Water Infrastructure, Wastewater Management

- Potable water is supplied to the City by Fairfax Water.
- The Department of Public Works manages, maintains, and repairs approximately 60 miles of stormwater pipes.
- The City's wastewater system consists of 108 miles of wastewater collection lines and 4 wastewater pumping stations, all of which convey the wastewater to Fairfax County's Noman M. Cole Jr. Pollution Control Plant for treatment and disposal.

The City's Emergency Operations Plan (EOP) and Northern Virginia Hazard Mitigation Plan (HMP) include additional information regarding community lifelines and their role in emergency response procedures, as well as measures and procedures that are in place for an integrated and coordinated local, state, and federal emergency response.

## Environmental Hazard Data

### Parks & Recreation



*Figure 8 – Ranger Road Park Flooding,  
Photo Contributed by Flood  
Questionnaire Participant*

- |                              |                          |                         |
|------------------------------|--------------------------|-------------------------|
| ➤ Ashby Pond Conservatory    | ➤ Fairchester Woods Park | ➤ Stafford Drive Park*  |
| ➤ Cardinal Park              | ➤ Gateway Regional Park  | ➤ Stafford East Park    |
| ➤ Cobbdale Park              | ➤ George T. Snyder Trail | ➤ Ted Greffe Park       |
| ➤ Country Club Hills Commons | ➤ Kutner Park            | ➤ Thaiss Memorial Park  |
| ➤ Dale Lestina Park*         | ➤ Layton Hall Trail      | ➤ University Drive Park |
| ➤ Daniels Run Park*          | ➤ Old Town Square        | ➤ Van Dyck Park*        |
| ➤ Draper Drive Park          | ➤ Pat Radio Park         | ➤ Westmore Park         |
|                              | ➤ Providence Park*       | ➤ Wilcoxon Park         |
|                              | ➤ Ratcliffe Park         |                         |
|                              | ➤ Sager Trail            |                         |
|                              | ➤ School Street Park     |                         |
|                              | ➤ Shiloh Street Park     |                         |

## Review of Threatened & Endangered Species

A review of readily obtainable geographic information system (GIS) data and database information was performed to broadly understand whether known or suspected state or federal threatened or endangered species, or state-listed plants or insects may have been identified within the delineation limits, which were the City of Fairfax limits and a two-mile radius of City limits. Evaluated sources and preliminary findings are summarized in [Table 3](#) below:

*Table 3 – Preliminary Threatened & Endangered Species Findings\**

Source	Findings
Virginia Department of Wildlife Resources (VDWR) Virginia Fish and Wildlife Information Service (VaFWIS)	VDWR's VaFWIS database was reviewed on August 17, 2023. The VDWR VaFWIS Project Review Report did not identify occurrences of federally or state listed species within a three-mile radius of the delineation limits.
VDWR's Northern Long-Eared Bat (NLEB) Winter Habitat and Roost Trees Application	VDWR's NLEB Winter Habitat and Roost Trees Application was reviewed to identify winter habitat within 0.25 mile of the delineation limits or known maternity roost trees within 150 feet of the delineation limits (accessed August 17, 2023). No known NLEB winter hibernaculum or maternity roost trees were identified within the delineation limits, referenced ranges, or two-mile radius.
VDWR's Little Brown Bat (MYLU) and Tri-colored Bat (PESU) Winter Habitat and Roosts Application	VDWR's MYLU and PESU Winter Habitat and Roosts Application was reviewed to identify MYLU and PESU hibernaculum within 0.25 mile of the delineation limits and known roost trees within 150 feet of the delineation limits (accessed August 17, 2023). No known MYLU or PESU winter hibernaculum or maternity roost trees were identified within the delineation limits, referenced ranges, or two-mile radius.
United States Fish and Wildlife Service (USFWS) Information for Planning and Consultation (IPaC) databases	The following species were presented in the IPaC resource list within the City of Fairfax: <ul style="list-style-type: none"> <li>➤ Northern Long-Eared Bat (<i>Myotis septentrionalis</i>) - Federally Endangered**</li> <li>➤ Tricolored Bat (<i>Perimyotis subflavus</i>) – Proposed Endangered</li> <li>➤ Monarch Butterfly (<i>Danaus plexippus</i>) – Candidate Species</li> </ul>
Center for Conservation Biology (CCB) VaEagles Nest Locator	The CCB VaEagles Nest Locator was reviewed (dated August 17, 2023) to identify known active bald eagle's nests within the delineation limits. No nests were identified on the application within 660 feet of the delineation limits.

\*The data shown in this table has been derived from best readily available Federal, State, and Local databases. City specific, detailed environmental, ecological, biological, and historical studies have not been conducted as part of this resilience plan, and as such, the data outlined in this table should be utilized for planning level purposes only.

\*\*Although this species was identified as potentially occurring within the vicinity of the City limits, no known NLEB winter hibernaculum or maternity roost trees were identified within the City limits. The USFWS Northern Long-Eared Bat Rangewide Determination Key (DKey) should be completed to determine what impact a given project may have on the NLEB.

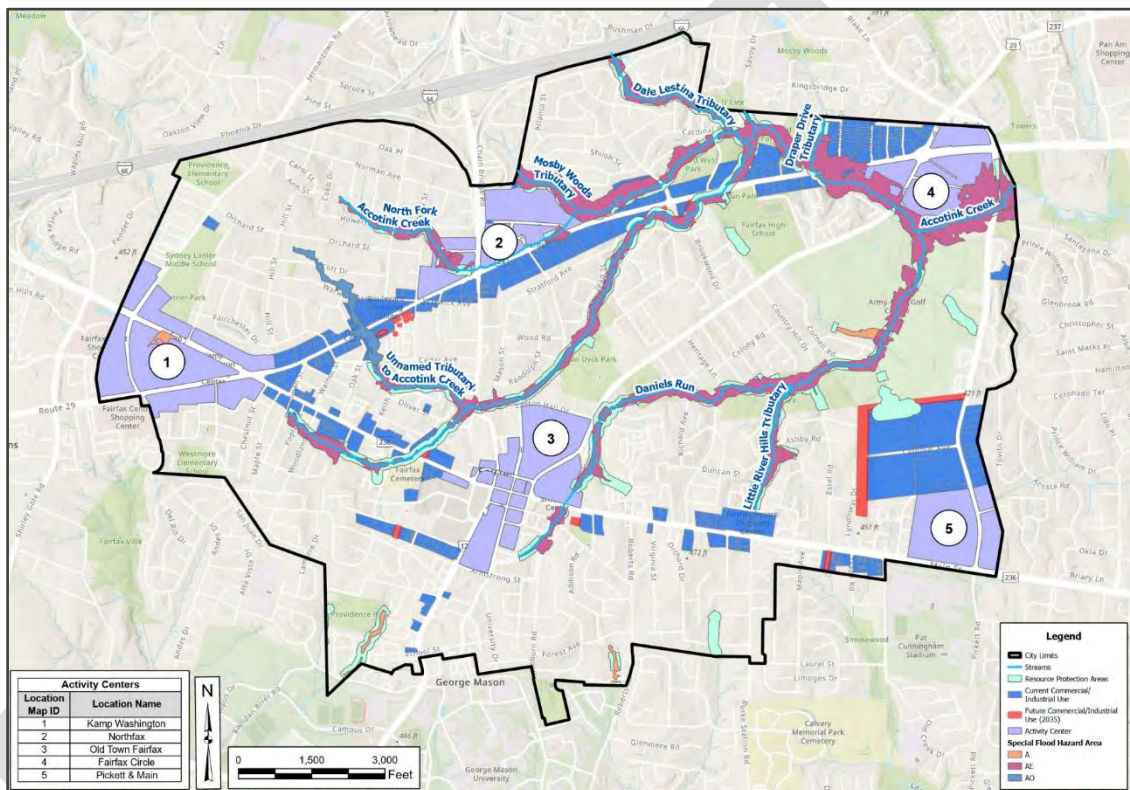


## Wetlands & Waters of the United States

A preliminary evaluation was completed to identify the City's wetlands, floodplains, and ecosystems suitable for permanent protection. The map shown in [Appendix A](#) presents the FEMA SFHAs, Resource Protection Areas, wetlands and waters of the United States, as well as parks and recreational areas mentioned above.

The floodplain extents shown in the map in [Appendix A](#) were downloaded from FEMA's Map Service Center and represent the Effective 1% Annual Chance Flood Hazard Area and 0.2% Annual Chance Flood Hazard Area. The RPA extents were downloaded from the City of Fairfax GeoHub and were created based on Virginia DEQ guidance. A shapefile containing the extents of wetlands, riparian, and deepwater habitats was downloaded from USFWS's National Wetlands Inventory Mapper.

## Economic Hazard Data



*Figure 9 – Economically Significant Areas*

The City of Fairfax has historically been a hub for economic activity within Northern Virginia, with the City having the second-highest amount of retail sales per capita of any Virginia jurisdiction [20]. The City's high concentration of office and retail activity offers residents and visitors varied employment and shopping opportunities and should be considered in the context of flooding due to potential for local and regional economic impact. [Figure 9](#) highlights current and future economically significant areas within the City of Fairfax. Areas shown in blue represent areas currently zoned for commercial and industrial use, areas shown in red represent areas that will be zoned for commercial or industrial use in the future, and areas shown in purple represent Activity Centers. The areas shown in blue, red, and purple in [Figure 9](#) were sourced from the Current Land Use and Future Land Use shapefiles found in the City's Open GIS Data Hub and are based on development plans determined in the City's 2035 Comprehensive Plan, which is linked in the [Helpful Links](#) section of this resilience plan.

Activity Centers are defined in the 2035 Comprehensive Plan as areas where mixed-use development is strongly encouraged and will contribute to the local economy. Small Area Plans for each Activity Center are



in progress and provide specific recommendations for land uses, street networks, public amenities, and other related elements. A summary of each Small Area Plan has been included below:

- The **Old Town Fairfax Small Area Plan** was approved by City Council at their June 23, 2020, meeting and expands upon its unique historical downtown and cultural assets, making recommendations to expand its appeal as a cultural destination, adding color to highlight unique buildings, and introducing an arts walk. Improving the pedestrian experience through Old Town is another key focus, as is encouraging a balanced mix of uses and connecting pedestrians and bicyclists to both George Mason University and Northfax via a trail to be implemented along University Drive.
- The **Northfax Small Area Plan** was approved by City Council at their June 23, 2020, meeting and seeks to establish a new identity for the Activity Center that relates to both the nearby woods and Accotink Creek and boasts a balanced mix of uses. Connections both within Northfax and to surrounding neighborhoods will be strengthened by improving existing connections and the development of a linear park that crosses Chain Bridge Road, as well as developing a pedestrian and bicycle link to both George Mason University and Old Town via University Drive.
- The **Kamp Washington Small Area Plan** was approved by City Council at their October 25, 2022 meeting and aims to provide an opportunity for the Activity Center to create memorable places through urban design, pedestrian oriented transportation infrastructure and open space. The plan emphasizes increased connectivity and high quality transitions from the commercial corridor to neighborhoods which will prioritize multimodal transportation and public open space. Proposed land uses will evolve in a way that allows for flexibility and resiliency to meet the needs of the next generation.
- The **Fairfax Circle Small Area Plan** is the fourth Small Area Plan undertaken by the City. Work on this Small Area Plan began in early 2023 and is slated to be finalized in July 2024.
- The **Pickett & Main Small Area Plan** is the fifth and final Small Area Plan to be developed for the City's Activity Centers. Until the Small Area Plan for this area has been developed and adopted, the general guidance found in the 2035 Comprehensive Plan applies.

Ensuring that the City remains an economic hub for the region through maintaining existing commercial infrastructure and preparing future commercial infrastructure has emerged as a priority for the City in its 2035 Comprehensive Plan. The goal of this resilience plan is to help the City anticipate, prepare for, respond to, and recover from flood hazards, which will inherently benefit the City's current and future economic and commercial infrastructure.

## Historic Hazard Data

A preliminary review of known resources listed by the Virginia Department of Historic Resources (VDHR) on the Virginia Cultural Resources Information System (V-CRIS) was performed to broadly understand the presence of architectural and archaeological resources within the City of Fairfax. There are approximately 698 architectural and approximately 69 archaeological resources within the City's limits, with approximately 50 architectural and 14 archaeological resources being within the SFHA and/or RPA. A map showing the boundaries of V-CRIS architectural and archaeological resources and their proximity to the SFHA has been included in **Appendix A**. The resources shown in this map has been derived from readily available data, and as such should be utilized for planning level purposes only. The City of Fairfax Historic District was named on the National Register of Historic Places in 1987 and contains the historical sites listed in **Table 4 [21]**.



Table 4 – City Historic District Sites

Site	Address
Historic Fairfax Elementary School	10209 Main Street, Fairfax VA 22030
Farr Homeplace	10230 Main Street, Fairfax VA 22030
Draper House	10364 Main Street, Fairfax VA 22030
Ratcliffe-Allison-Pozer House	10386 Main Street, Fairfax VA 22030
Old Town Hall	3999 University Drive, Fairfax VA 22030
Herald and Print Shop	10400 Main Street, Fairfax VA 22030
Ralston's Store	10412 Main Street, Fairfax VA 22030
Nickell's Hardware Store	10414 Main Street, Fairfax VA 22030
Fairfax Hay and Grain Store	10416 Main Street, Fairfax VA 22030
Ford Building	3977 Chain Bridge Road, Fairfax VA 22030
Moore House	3950 Chain Bridge Road, Fairfax VA 22030
Dr. William Gunnell House	10520 Main Street, Fairfax VA 22030
Old Fairfax Jail	10475 Main Street, Fairfax VA 22030
Fairfax Court House	4000 Chain Bridge Road, Fairfax VA 22030
Joshua Gunnell's House	4023 Chain Bridge Road, Fairfax VA 22030

## Step 5. Assess the Problem



Figure 10 – Photo Contributed by Flood Questionnaire Participant

### Flood Hazard Assessment

The Climate and Flooding Overview section of [Step 4](#) provided general information about the City's climate and flooding, projections based on the effects of climate change, HAZ-US and FEMA flood data, and the data collected from the stormwater and flood resilience questionnaire distributed to City residents within the FEMA SFHA or the City RPA.

Based on Fairfax County climate projections, it is anticipated that the City will experience increased rainfall, increased rainfall intensity, increased frequency and severity of extreme weather events, and increased rainfall depth. These anticipated rainfall increases could have potential effects including, but not limited to, damage and/or closure to roadways, property and infrastructure damage, risks to resident, visitor, or responder safety, loss of deliverable services, and loss of revenue.

Results from the HAZ-US software analysis conducted as part of the Northern Virginia's Hazard Mitigation Plan [6] concluded that a 100-year flood event in the City of Fairfax would not place any critical facilities at risk of flooding. In addition, it found that no short-term sheltering for displaced people would be required as a result of flooding. However,

a 100-year flood hazard scenario was modeled utilizing available inventory and economic data in the HAZ-US software to calculate the total economic loss associated with this flood hazard event. The results of this model scenario have been included in the [Economic Hazard Assessment](#) section.

Publicly available FEMA data indicates that the two largest contributors to damage resulting in NFIP claims are precipitation accumulation and waterway capacity deficiencies. The additional data provided by FEMA indicates that the City has four repetitive loss properties and forty-nine flood insurance claims across twenty-five properties with an average claim value of approximately \$18,210. Broken down by decade, one claim was received in the 1970s, two claims were received in the 1980s, three claims were received in the 1990s, fourteen claims were received in the 2000s, twenty-seven claims were received in the 2010s, and two claims have been received in the 2020s to date. Of these twenty-five properties that have filed a flood insurance claim between 1979 and 2023, thirteen properties are within proximity of the SFHA and/or RPA and the remaining twelve properties are not within proximity of the SFHA or RPA.

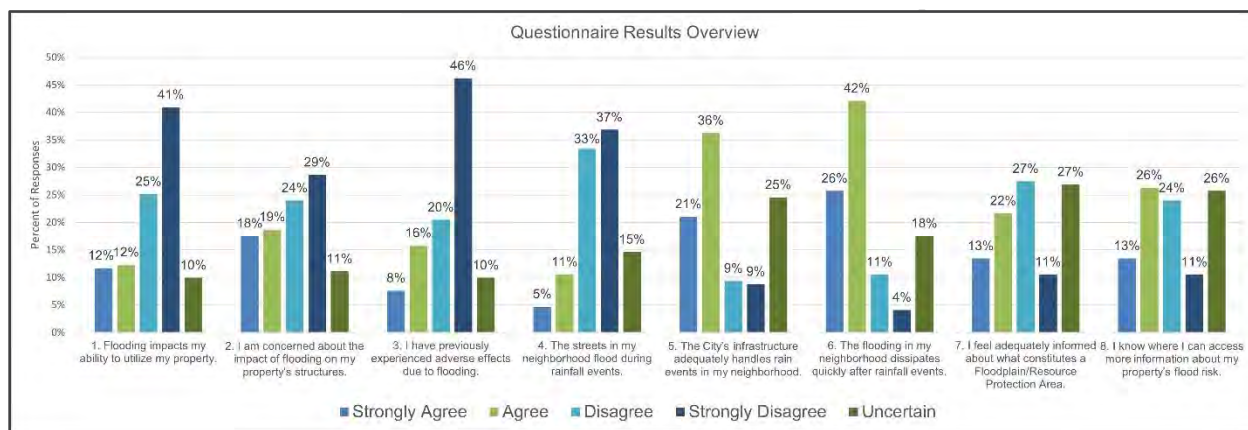


Figure 11 – Questionnaire Results Overview

The findings from the stormwater and flood questionnaire described in [Step 4](#) offered insight into the level of understanding and impact of flooding in the City in addition to the data collected from previous research, HAZ-US, and FEMA. [Figure 11](#) displays the results to the questions asked on the questionnaire. In this portion of the questionnaire, most people indicated that flooding does not impact their ability to utilize their property, they are not concerned about flooding impacting their property's structures, there have not been adverse effects from flooding on their property, and their streets do not flood during a rainfall event. With regards to City storm sewer and drainage infrastructure, those who were polled agreed with the opinion that the City's systems are adequate to handle rainfall events, and that flooding dissipates quickly from neighborhoods. When polled constituents were asked if they felt adequately informed about what constitutes a floodplain and if they know where to access more information, they were evenly split between agree, disagree, and being uncertain. This particular data indicates that it may be beneficial to implement additional outreach and education regarding flooding, floodplains, and flood risk within the City.

[Figure 12](#) illustrates the results to the questionnaire section regarding flood frequency. The majority of those polled responded that they experience flooding every 5-10 years, however, 10% of people experience flooding every six months and 8% of people experience flooding every month or less. It was found that there is a concentration of residents in Cambridge Station experiencing more frequent adverse flooding.

In addition to answering the resilience questions that have been summarized in this section, constituents were given the opportunity to leave comments as part of their questionnaire. Some recurring comments were as follows:

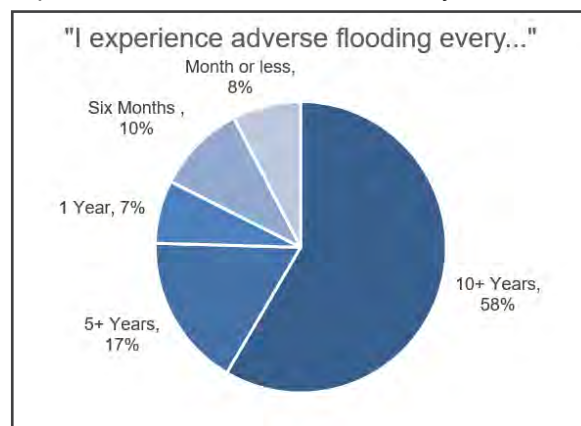


Figure 12 – Flooding Frequency Responses

- Water levels exceed the height of banks and flood, specifically in Cambridge Station Park, Ranger Road Park, as well as along Accotink Creek.
- Continued development throughout the City has increased water levels and will continue to do so and cause more flooding.
- There is inadequate stormwater infrastructure to handle the increased rain events and extreme weather caused by climate change.

### Social Hazard Assessment

Understanding and addressing social vulnerability in the context of flooding will enable the City to develop comprehensive strategies that enhance its preparedness and response capability and ensure that those strategies are being implemented equitably. The Social Hazard Data section of [Step 4](#) of this resilience plan included data collected from EJ Screen, VFRIS, CDC ATSDR, as well as information about the City's community lifelines, and this section will discuss the meaning of that data with regards to flooding.

Based on EJ Screen, VFRIS, and CDC ATSDR data, there is a potential correlation between social vulnerability and supplemental demographic index, which is an average of low-income, limited English speaking, less than high school education, and low life expectancy. The western portion of the City shows a trend of higher supplemental demographic index rankings relative to the state of Virginia with social vulnerability indicators ranging from very low to high. The SFHA and RPA intersect fourteen of the seventeen census tracts within the City and there does not appear to be a correlation between the presence of SFHA and/or RPA and social vulnerability, however it can be noted that there have been four properties and two repetitive loss areas in one of the most socially vulnerable area within the City. This socially vulnerable area is within the proximity of the North Fork of Accotink Creek, Dale Lestina Tributary, Ranger Road Tributary, Accotink Creek, and Draper Drive Tributary. The City is currently working to complete the Mosby Woods Flood Study that explores potential flood relief options in this area. See the Additional Resilience Efforts section for more information on this study.

The potential impact of flooding on the community lifelines discussed in [Step 4](#) is significant. A map showing FEMA lifelines relative to the FEMA SFHAs and RPA has been included in [Appendix A](#). Arterial roads, schools, stormwater and sanitary infrastructure, bridges, hazardous waste generators, and a hospital all intersect with a SFHA and/or RPA, and in the event of a flood, could be impacted. Because City residents depend on uninterrupted access to power, water, communications, transportation, healthcare, safety, and security, the City EOP has stated that the expected objective in an emergency is to stabilize all lifelines.

The City of Fairfax Emergency Operations Plan (EOP) is a multi-disciplined, all-hazards plan that establishes a single, comprehensive framework for the management of major emergencies and disasters within the City, including flooding. The 'Special Considerations' section of the EOP relates to social vulnerability and discusses hallmark tenets of nondiscrimination laws as they pertain to emergency response including, but not limited to:

- Equal Opportunity – People with disabilities must have the same opportunities to benefit from emergency programs, services, and activities as people without disabilities. Emergency recovery services and programs should be designed to provide equivalent choices for people with disabilities as they do for people without disabilities.
- Inclusion – People with disabilities and traditionally underrepresented groups have the right to participate in and receive the benefits of emergency programs, services, and activities provided by governments, private businesses, and nonprofit organizations. Inclusion of people with various types of disabilities in planning, training, and evaluation of programs and services will ensure that all people are given appropriate consideration.
- Equal Access – People with disabilities and traditionally underrepresented groups must be able to access and benefit from emergency programs, services, and activities equal to the general population. Equal access applies to emergency preparedness, notification of emergencies,



evacuation, transportation, communication, shelter, distribution of supplies, food, first aid, medical care, housing, and application for and distribution of benefits.

### Environmental Hazard Assessment

The Environmental Hazard Data section of **Step 4** of this resilience plan included information about the City's parks and recreational areas, threatened and endangered species, and wetlands. Most City parks and natural areas are situated in low-lying areas and in close proximity to floodplain, making them more susceptible to flooding during heavy rainfall or when water levels in nearby water bodies rise.

City parks currently experience a mixed impact of rising water levels and flooding during rainfall events, demonstrated by the following parks:



*Figure 13 – Ranger Road Park Flooding, Photo Contributed by Flood Questionnaire Participant*

- Dale Lestina Park and Daniels Run Park have primarily been left as natural areas and experience minor impacts from higher event storms.
- Van Dyck Park and Providence Park have been designed to account for flood risk and have most of their amenities located outside the floodplain. These amenities experience minor effects from higher event storms.
- Ranger Road Park and Stafford Park contain basketball courts, playground equipment, picnic areas, and other amenities within the floodplain extents, creating opportunities for flood damage during higher event storms.

If parks have been designed with flood resilience in mind, occasional flooding may present benefits such as slowing floodwaters and reducing the risk of downstream flooding, depositing nutrients and enriching soil, as well as supporting habitats and enhancing biodiversity. Incorporation of flood resilience strategies in future park planning and design, and existing park redevelopment projects could provide economic, natural, and maintenance-based benefits for the City.

Flooding within the City not only affects the built environment but can also have significant repercussion for its wildlife. The preliminary review of threatened and endangered species outlined in **Step 4** identified the northern long-eared bat, tricolored bat, and monarch butterfly as potentially occurring within City limits. It is important to note that this data was derived from readily available Federal, State, and Local databases but is not sufficient to draw a definitive conclusion about the presence or absence of these or other species. Further site-specific studies and assessments are necessary to gather more data and determine the status of these species as well as the impact of flooding and other natural hazards on these species.

The desktop analyses conducted in **Step 4** identified approximately 7.5 acres of wetlands throughout the City, most of which are located in proximity of waterways and floodplains. With increasing frequency and intensity of high rainfall events, wetlands located within floodplains may experience more severe flooding.

A qualified professional should be consulted prior to any activity that could directly impact wetlands or their contributing water source.

### Economic Hazard Assessment

The economic hazard data section of [Step 4](#) included information about the City's economically significant areas and the City's Small Area Plans for the City's proposed Activity Centers. Economic data was also generated as part of the HAZ-US analysis introduced in the flood hazard data section of [Step 4](#).

Analysis of the City's economically significant areas showed that 16.8% of the City's area is currently zoned for commercial and industrial uses, and of that area, 27.7% overlaps the SFHA and/or RPA. The City's Comprehensive Plan estimates that in 2035, 23.4% of the City's area will be zoned for commercial and industrial uses, of which 30% overlaps the current SFHA and RPA. This includes a portion of four out of five Activity Centers. While the expansion of these commercial and industrial areas will positively contribute to the City's economy, it will also alter the percentage of the City's impervious surfaces which can increase urban runoff into existing natural or manmade drainage systems. Understanding the location of these Activity Centers relative to the SFHA and RPA as well as related stormwater infrastructure requirements is an important component of flood resilience, and the Small Area Plans for each Activity Center should be consulted for additional information regarding their development.

The HAZ-US results generated for a 100-year flood hazard scenario utilizing available inventory and economic data in the HAZ-US software predicted a total economic loss of \$174,975,900 for the City in that scenario. [Table 5](#) displays these economic losses, presented by general occupancy type. These results are preliminary in nature due to the use of base inventory data and should be interpreted with caution because of the limitations associated with default input values.

*Table 5 - Direct Economic Losses for Buildings Within City of Fairfax, 100-Year Flood Scenario\**

	Capital Stock Losses			Income Losses				
General Occupancy	Building Loss	Contents Loss	Inventory Loss	Relocation Loss	Income Loss	Rental Income Loss	Wage Loss	Total Loss
<b>Residential</b>	\$18,135,000	\$9,967,000	\$0	\$4,546,000	\$521,000	\$2,520,000	\$1,240,000	\$36,929,000
<b>Commercial</b>	\$7,086,000	\$21,666,000	\$4,702,000	\$5,613,000	\$20,592,000	\$4,115,000	\$21,213,000	\$84,987,000
<b>Industrial</b>	\$909,000	\$1,674,000	\$258,000	\$41,000	\$59,000	\$5,000	\$94,000	\$3,040,000
<b>Agriculture</b>	\$30,000	\$79,000	\$88,000	\$2,000	\$21,000	\$0	\$6,000	\$226,000
<b>Religious/ Non-Profit</b>	\$10,500	\$75,900	\$0	\$6,900	\$26,800	\$400	\$64,400	\$184,900
<b>Government</b>	\$405,000	\$2,500,000	\$0	\$518,000	\$243,000	\$134,000	\$28,889,000	\$32,689,000
<b>Education</b>	\$891,000	\$5,507,000	\$0	\$1,357,000	\$2,714,000	\$63,000	\$6,388,000	\$16,920,000
<b>Total</b>	\$27,466,500	\$41,468,900	\$5,048,000	\$12,176,900	\$24,176,800	\$6,837,400	\$57,894,400	\$174,975,900

\*This analysis utilized base information available in the HAZ-US software and should be used for planning-level purposes only.



### Historic Hazard Assessment

The City's history began in the 1700s when farmers settled in the area. It has played a crucial role in significant historical events, including being the site of the first land engagement during the American Civil War. As time progressed, the City transformed itself into a bustling center of commerce in the late nineteenth century. After World War II, it further evolved from a rural community into a thriving suburban area. Finally, in 1961, the City achieved independence thus becoming its own distinct entity.[22]. Known historical resources associated with the City's rich history have been discussed in the [Historic Hazard Data](#) section of [Step 4](#) and included in the map in [Appendix A](#).

Fifty of the City's six-hundred ninety-eight architectural resources, fourteen of its sixty-nine archaeological resources, and two of its fifteen historic district sites are located within or adjacent to a Special Flood Hazard Area. It was not possible to determine the level of risk or impact that the floodplain poses for each individual resource based on the preliminary study that was conducted, but managing the City's flood resilience is an important component of protecting these historical resources that are a valuable part of the City's history.

## Phase III – Mitigation Strategy

Phase I and Phase II of this resilience plan included Steps 1 – 5 of the CRS program. This phase translates the information collected in Phase I and Phase II into actionable goals and strategies that the City can implement to mitigate flood impact.

### Step 6. Set Goals

This step outlines the City's overarching flood resilience goals to address the vulnerabilities to flooding discussed in previous steps of this resilience plan. Activities to help the City achieve these goals have been included in [Step 7](#). The following City flood resilience goals are as follows:

- Obtain a better understanding of the City's assets and their exposure to flood risk.
- Ensure City staff are well versed on flood risk and have the necessary knowledge, skills, and protocols to effectively respond to and manage flood incidents.
- Increase public awareness about flood risk and ensure City constituents know where they can obtain more information.
- Aim to bundle multidisciplinary projects and take advantage of opportunities to increase the City's resilience to flooding when possible.
- Identify potential programs that could assist the City in managing its floodplains.

### Step 7. Review Possible Activities

Based on the information gathered in the planning process and risk assessment phases of this resilience plan, the City has developed possible activities that could prevent or reduce the severity of the flood challenges the City faces and achieve the flood resilience goals outlined in [Step 6](#). These possible activities have been broken down in accordance with the Community Rating System (CRS) category requirements:

**Category 1 – Floodplain Management** - These activities keep flood problems from getting worse. Examples include floodplain mapping and data, open space preservation, floodplain regulations, erosion setbacks, planning and zoning, stormwater management, drainage system maintenance, and building codes.



**Category 2 - Property Protection** - These activities are usually undertaken by property owners on a building-by-building or parcel basis. Examples include relocation, acquisition, building elevation, retrofitting, sewer backup prevention, and insurance.

**Category 3 - Natural Resource Protection** - These activities preserve or restore natural areas or the natural functions of floodplain and watershed areas. Examples include wetlands protection, erosion and sediment control, natural area preservation, water quality improvement, environmental corridors, and natural functions protection.

**Category 4 - Emergency Services** - These activities involve measures taken during an emergency to minimize its impact. Examples include hazard threat recognition, hazard warning, hazard response operations, critical facilities protection, health and safety maintenance, and post-disaster mitigation actions.

**Category 5 - Structural Practices** - These activities keep flood waters away from an area with a levee, reservoir, or other control measure. Examples include reservoirs, levees/floodwalls, diversions, channel modifications, and storm drain improvements.

**Category 6 - Public Information** - These activities advise property owners, potential property owners, and visitors about the hazards, ways to protect people and property from the hazards, and the natural and beneficial functions of location floodplains. Examples include map information, outreach projects, real estate disclosure, library, technical assistance, and environmental education.

The City's possible flood mitigation activities and their respective CRS categories, opportunities, and constraints have been outlined below:

- **Floodplain Resilience Model** (Category 1) – Utilize updated IDF precipitation curves and future rainfall intensity data to develop City-wide flooding model that can forecast flooding limits 10, 25, and 50 years into the future. The NOAA Atlas 14 (Volume 2) IDF curves that are used for the region including Virginia were developed based on pre-2000 rain gauge data and do not account for current or future effects of climate change on the intensity and depth of storms. Updating the City's IDF curves would provide the City with current data to better understand the potential impacts of climate change on precipitation intensities and depths, which can be incorporated into future flood modeling of the City. Understanding the predicted future floodplain extents will allow the City to make informed decisions for future development and resilience planning. Potential constraints of this initiative include the cost involved in developing updated curves and associated models, the variation in floodplain limits over time, and the level of uncertainty associated with predictive models.
- **Transportation Network Resiliency Assessment and Prioritization** (Category 1 & 5) – Assess the frequency and duration of overtopping and determine the criticality of the City's bridges and culverts at stream and/or road crossings. This initiative would enable the City to determine which stream crossings are the most vulnerable to riverine flooding and help prioritize capacity building projects as funding sources become available. A potential constraint of this activity is that these efforts would likely only include stream crossings that are located within FEMA SFHAs. To expand this analysis beyond the FEMA stream crossings would add significant time and cost to the analysis.
- **Establishment of Flood Control Districts** (Category 1) – Establish districts in areas of higher flood risk within the City through governmental action to promote flood resilience efforts beyond the minimum standards. A constraint of this initiative is the likely increase in cost for development in these flood control districts, which may discourage developers.



- **Historic Site Risk Assessment** (Category 1 & 2) – Conduct an evaluation of the historic properties at risk for current and projected flooding. This activity could be completed in tandem with the creation of an inventory of historical and archaeological resources, a goal in the City's 2035 Comprehensive Plan, and would create a better understanding of the flood risk associated with the City's historic assets. The current evaluation conducted with this plan simply identifies historic parcels that overlap with the FEMA floodplain but does not evaluate if the historic asset is at actual risk from being flooded. A potential constraint of this activity is the modeling and data collection involved to accurately predict flood impacts to historic and archaeological resources in the City.
- **Strategic Buyouts** (Category 2) – The potential purchase of at-risk properties that experience flooding during high rainfall events and their redevelopment to increase compatibility with floodplain use. Strategically purchasing properties reduces risk for floodplain impact to residents and creates the ability to develop the land for a use that is compatible with its expected inundation level. Potential constraint of this activity include the associated cost and potentially setting a precedent for claiming private property. The City is aware of the option to purchase at-risk properties but currently does not intend on doing so.
- **Floodplain Restoration Program** (Category 3) – Establish a floodplain restoration and rehabilitation program that will aim to restore natural vegetation, ecosystem functions, and biodiversity to flood-prone areas and reduce the risk of future flooding. This program would rehabilitate portions of the City's stream ecosystems through actions such as removing invasive species, replanting native species, and performing wetland restorations. A potential constraint of this activity would be the environmental permitting associated with the proposed impacts to the RPA and the balance between floodplain restoration and maintaining the integrity of the existing floodplain.
- **Project Impact Optimization** (Category 3 & 5) – The City of Fairfax Annex of the Northern Virginia Hazard Mitigation Plan includes a goal of combining stormwater and floodplain management plans across divisions. This activity would expand on that goal to include stormwater, floodplain management, utility repairs, and/or water quality and quantity improvements. Bundling multidisciplinary projects maximizes the City's benefits per cost and creates opportunities to increase the City's resilience to flooding. Potential constraints for this initiative include the level of interdepartmental communication required, coordination of timing and funding, and assignment of sub-tasks and coordination between contractors during the design process.
- **Improve City Emergency Preparedness and Response** (Category 4) – Create clear, concise, and citizen action-based strategies for constituent response in emergency situations. Completing this activity would ensure that City residents are able to quickly respond during emergency situations and that equitable procedures are presented in the emergency response plan. A potential constraint of this activity is the associated cost and time required to thoroughly evaluate emergency scenarios and develop equitable solutions.
- **At-Risk Infrastructure Identification and Post-Flood Assessment Program** (Category 4 & 5)– Create a program for the City to identify its at-risk infrastructure and conduct assessments of vulnerable infrastructure directly after heavy rainfall events to rapidly identify issues. Actions toward this goal have been included in the City of Fairfax Annex of the Northern Virginia Hazard Mitigation Plan (see Attachment 3: projects 2010-11, 2010-12, 2017-4, 2017-7, 2017-10, 2022-3). A potential constraint of this activity is the potential modeling required to determine at-risk infrastructure outside of the SFHA and RPA as well as the allocation of funding and time for on-call staff to perform in-field evaluations after heavy rainfall events.
- **Capacity Building Efforts** (Category 6) – Supplement the City's existing capabilities outlined in the City of Fairfax Annex of the Northern Virginia Hazard Mitigation Plan through activities such as encouraging City staff to participate in flood related classes and training programs. The City of Fairfax Annex presents some actions toward this goal including the integration of a hazard



mitigation and notification system training into existing employee training and providing training and technical assistance to increase the number of hazard mitigation projects. Opportunities of this initiative include strengthening the City's skills relative to flood resilience and constraints include increasing staff capacity for City staff and funding required for training.

- **Enhanced Flood Resilience Outreach and Education** (Category 6) – Promote outreach in addition to what is currently included in the City of Fairfax Annex of the Northern Virginia Hazard Mitigation Plan to better inform citizens about floodplains, impacts of flooding, and where to access additional information about flooding on City platforms. Outreach included in the Hazard Mitigation Plan includes annual outreach to FEMA-listed repetitive loss property owners to provide information on mitigation programs and offering user-friendly hazard-data for mitigation to private citizens. The Hazard Mitigation Plan also includes actions of providing outreach in multiple languages and for the deaf and hard-of-hearing community. Supplementing the outreach outlined in the Hazard Mitigation Plan will create a better-informed public that will be able to respond more efficiently in an emergency situation and will better understand the different flood-related challenges facing the City. A constraint of this activity will be optimizing communications to ensure the City's message is received during an emergency.
- **NFIP Insurance Claims Study** (Category 1 & 2) – Conduct a study to determine the cause of recorded NFIP insurance claims and repetitive loss properties within the City. Additional focus could be given to properties that have filed flood insurance claims while not being in an active floodplain. This activity, which requires property owner cooperation, would directly address constituent concerns regarding flooding and could potentially identify correlations between flooding instances in the City. A potential constraint for this activity is the level of coordination involved to ensure proper outreach with City residents and the associated costs of that outreach.

## Step 8. Draft an Action Plan

The activities listed in [Step 7](#) were considered through a comprehensive assessment process that accounted for the City's current needs, priorities, and available resources. Of the twelve possible flood resilience activities presented in [Step 7](#), the following five activities have been recommended for implementation by the City at this time:

1. Historic Site Risk Assessment
2. Project Impact Optimization
3. Capacity Building Efforts
4. Enhanced Flood Resilience Outreach and Education
5. NFIP Insurance Claims Study

These activities have been selected based on their potential to help the City make progress towards their flood resilience goals as well as the City's ability to implement them. The timeline for the chosen flood resilience activities will be dependent upon the City becoming a CRS eligible community and will be incorporated as part of future resilience plan updates. Over time, the City's flood resilience goals may change, along with their needs for flood resilience activities. This resilience plan aims to be flexible and adaptable to the City's evolving needs, and as such, the activities that were not initially selected as part of this resilience plan may be reconsidered in the future.

## Phase IV – Plan Maintenance

### Step 9. Adopt the Plan

The resilience plan was presented to City Council during a work session on February 27, 2024. This session provided an opportunity for City Council members to review the plan and provide feedback prior to the finalization of the document. The final public outreach meeting was conducted on March 27, 2024 to present the findings of the resilience plan to the public in accordance with CRS requirements. Following the public meeting, a City Council vote on the resilience plan was scheduled for May 14, 2024 marking the formal adoption of this document.

### Step 10. Implement, Evaluate, and Revise

The goal of this step is to implement the activities discussed in [Step 8](#), evaluate the City's progress in achieving its current flood resilience goals outlined in [Step 6](#), and revise the plan and activities as necessary. It is important to note that this plan and its contained flood resilience data, goals, activities, and recommendations is intended to reflect the City's current flood resilience needs and is expected to change over time.

This resilience plan will enable the City to progress towards becoming an eligible participating community in the CRS program and earn points towards flood insurance premium reductions. Updating the City's flood resilience goals and activities is required in the form of annual evaluations and five-year updates by the CRS program. Submitting these annual resilience plan evaluations and five-year updates will serve as an opportunity to ensure that the City's flood risk mitigation efforts are continuously improving and aligning with its evolving goals and resilience objectives.

## Additional Resilience Efforts

### Current City Initiatives

- **National Flood Insurance Program (NFIP) Involvement** – One of the City's most prominent current resilience initiatives is participating in the Federal Emergency Management Agency's (FEMA) National Flood Insurance Program. As a participating community, City property owners can purchase insurance to protect against losses from flooding. A primary goal of this resilience plan, in addition to mitigating the adverse impacts of flooding in the City, is to apply to join the Community Rating System (CRS) program and progress towards discounted flood insurance premium rates for the City's constituents.
- **Engage Fairfax** – Engage Fairfax is a publicly accessible web platform created for City residents to keep up to date on projects within the City, engage in discussions, share ideas, and voice concerns about community matters. Numerous City projects relating to flood resilience are included on the Engage Fairfax website, and constituents are encouraged to access project information and provide feedback or commentary throughout the duration of each project. In the context of flood resilience, using Engage Fairfax to facilitate a deeper understanding of community concerns and needs related to flooding will allow City officials and project teams to respond effectively with tailored solutions.
- **Stormwater Utility** – The City of Fairfax recently implemented a Stormwater Utility for providing stormwater management services to its residents. Rate payers are charged a fee based on the stormwater runoff impact their respective properties generate, using impervious surface as the measurement of that impact. This Stormwater Utility provides a dedicated funding source for existing stormwater management services and new capital projects.



- **City Floodplain Ordinance & Floodplain Application** – The City of Fairfax Floodplain Zoning Ordinance (Chapter 110 Article 4) designates the Zoning Administrator as the Floodplain Administrator. One of the duties and responsibilities of the Floodplain Administrator is to review applications to determine whether proposed activities will be reasonably safe from flooding and require new construction and substantial improvements to meet the requirements of regulations. The City additionally defines requirements for development within the Approximated Floodplain Districts to include the establishment of the 100-Year water surface elevation (WSE) via verified hydrologic and hydraulic techniques that must be reviewed and approved by the City.

The City requires that any work that qualifies as a Substantial Improvement within the SFHA must have its lowest floor elevation, including basement, at least 2 feet above the BFE. The City also has requirements for any portion of new construction or Substantial Improvement that is below 2 feet above the BFE (not used for a dwelling, built entirely of flood damage resistant materials, and others).

The City's ordinance also specifies that new construction or Substantial Improvements within Zone AO SFHAs set the lowest floor, including basement, elevated above the highest adjacent grade at least as high as the depth number specified in feet on the FIRM plus 2 feet. If no flood depth number is specified, the lowest floor, including basement, shall be elevated no less than 4 feet above the highest adjacent grade.

The City's decision to set lowest floor elevation rules for new development or Substantial Improvements 2 feet above the BFE (higher than FEMA's requirements and higher than VA DCR's recommendation of 18 inches) and elevated standards for Zone AO SFHAs shows its commitment to resilience, public safety, and helps citizens and businesses have access to Post-FIRM flood insurance rate coverage.

- **Hazard Mitigation Plan & Public Survey** – The Federal Disaster Mitigation Act of 2000 requires communities to update their hazard mitigation plan every five years to maintain eligibility for FEMA's Hazard Mitigation Assistance (HMA) grant programs. A draft Hazard Mitigation Plan for the City of Fairfax (Annex 3) was published in July 2022 and was made available for public comments via a survey made available on the Engage Fairfax website through October 8, 2022.
- **Emergency Operations Plan (EOP)** – The EOP includes a detailed three-phase process for conducting response operations comprised of increased readiness, immediate response, and sustained response actions. It also contains information about the city's Emergency Operations Center (EOC), including its functions and organization, and the overall support roles of regional, state, and federal organizations in emergency situations.
- **2035 Comprehensive Plan** – This is an official policy guide for future development-related decisions. The document highlights various goals, including the provision of electricity, water, natural gas, and communication services during times of stress through collaboration with utility companies and actions to move above-ground utility lines underground to minimize risk of failure and prevent obstruction of roadways during storm events. The plan also outlines actions to develop an inventory of current infrastructure conditions to provide needed maintenance and rehabilitation.
- **Stormwater Best Management Practices (BMP) Website** – The website highlights BMPs throughout the City, many of which are aimed at reducing stormwater runoff. The City further operates a Virginia Stormwater Management Program (VSMP) to ensure BMPs comply with state regulations and maintain their function over time. To reduce stormwater runoff, their Comprehensive Plan additionally includes measures to retain and acquire riparian areas as open space or parkland.

To better engage the community in flood resilience strategies and create a knowledgeable network of community leaders, the City has further included actions in their Comprehensive Plan to continue education programs focused on establishing survivable spaces and promoting emergency preparedness. As part of these actions, the City maintains an Emergency Management website. This website contains tools for creating disaster readiness toolkits, important emergency contacts, winter weather information, a list of City disaster plans, preparedness training information, and other resources



to keep citizens informed. The City also maintains a Community Flood Resilience Planning website to receive input from the community and keep them informed on the development of this resilience plan. In addition, during the preparation of the 2022 NOVA Hazard Mitigation Plan, the City made a draft of the plan publicly available through their website and posted a survey to retrieve direct input from citizens.

- **Debris Management** – The City’s debris management strategy is multifaceted and can be described in three scenarios:
  - Preemptive Debris Management – The City has taken the initiative to collect data on Accotink Creek and its tributaries, as well as stormwater management infrastructure contained within City limits. A major part of data collection within the City is to identify large scale debris that poses a risk for flooding, whether that be within stream corridors, manholes, or inlets.
  - Routine Debris Management – The City maintains a robust street sweeping, storm inlet, catch basin, debris and sediment removal program. The City collects leaves twice per year as part of its residential refuse collection service which prevents leaves from entering stormwater management infrastructure and potentially creating blockages or reduced flow capacity. They also collect yard waste and brush, including cut grass, plant and shrub clippings, twigs, limbs, branches, tree trunks, acorns, and flower and garden vegetation from general yard maintenance.
  - Emergency Debris Management – The City of Fairfax has published a Debris Management Plan that provides a framework for City government and other entities to clear and remove debris generated during a public emergency within the City of Fairfax city limits.
- **Fairfax City Resolve** – A website and application maintained by the City to allow citizens to report problems and request services such as blocked storm drains, illegal dumping, missing manhole covers, and leaf collection, among others. Issues may be reported by including an exact location on Google Maps. Based on the information provided in the form, recent nearby or duplicate reports can also be seen.

## City Resilience Projects

The City currently allocates funds for stormwater operations and maintenance of existing infrastructure using their stormwater utility, which charges property owners a fee based on the stormwater runoff created by their properties. Funds have been allocated for several stormwater projects since the utility’s inception on July 1, 2022. Projects contained in the 2024 budget include the Ashby Pond retrofit, stream evaluation and restoration projects, Mosby Road drainage improvements, and Roberts Road and Forest Avenue drainage improvements, among others. A list of such projects, along with other projects funded by the city are listed below.

### Current City Projects

- **Mosby Woods Flood Study** – This study was initiated by the City of Fairfax Public Works Department to explore potential flood relief options near the Mosby Woods Condominium neighborhood. This neighborhood is located within and adjacent to the floodplain associated with the North Fork of Accotink Creek, just upstream of the Stafford Drive stream crossing. The Stafford Drive stream crossing is currently a dual concrete box culvert with each barrel having a 9’ wide x 8’ height configuration. This area has historically experienced flooding conditions in extreme storm events, such as Tropical Storm Lee in September 2011. This study focuses on potential options and alternative configurations at the Stafford Drive stream crossing.
- **Accotink Creek Stream Stability Assessment and Prioritization Plan** – The intent of this project is to capture the scale and extent of stream bank erosion in Accotink Creek and its tributaries located within the City limits, and then develop a 10-year project prioritization and budgeting plan for future restoration activities based upon observed conditions and restoration opportunities.



- **Stormwater Infrastructure Data Collection** – An ongoing effort through the City's Public Works department is building a repository of data for stormwater infrastructure. Teams are systematically deployed to log information and complete condition assessments for the City's stormwater inlets, manholes, and outfalls within the online data collection platform. This data-driven approach facilitates identifying critical maintenance needs, planning infrastructure improvements, and designing effective flood control strategies.
- **Stafford Drive Stream Restoration** – This project will restore nearly 2,300 linear feet of the North Fork of Accotink Creek between Fair Woods Parkway and Ranger Road Park, known locally as the Stafford Drive stream. Natural Channel Design principles will be used to stabilize the stream to prevent further erosion and reconnect the stream to the floodplain. Reconnecting the stream to the floodplain will allow the floodplain to be enacted during larger storm events and will assist with flood control.
- **Ashby Pond Retrofit** – This project consists of the maintenance, enhancement, and retrofit of the stormwater management pond located at 9817 Ashby Road. Approximately 135.85 acres of urban area drains to the proposed location. The proposed project includes the installation of two forebays at the main inflow locations, the installation of aquatic plantings and benches, the restoration of one inflow channel, the stabilization of one inflow channel, and a full legacy sediment removal from the pond at the time of restoration.
- **Outfall Restorations** – The City of Fairfax has completed three outfall restoration projects at Shiloh Street, Lion Run, and Pickett Road. These projects mitigate flood risks by increasing capacity, improving conveyance, and creating natural flood plain storage post rainfall events. The City has plans to do six more outfall projects at Old Robin Street, Heritage Lane, Providence Park, Van Dyck Park, Farrcroft Drive and Snug Haven Lane.
- **City Hall Pond** – This project consists of the enhancement and retrofit of the stormwater management pond located at 10455 Armstrong Street (City Hall Pond). The pond drains approximately 3.49 acres from George Mason Boulevard and adjacent neighborhoods. The pond retrofit project includes installation of a sediment forebay as well as increase in pond pollutant treatment volume through grading activities. As part of the design, a vegetative bench has been included and sinuosity has been added to the pond floor to increase stormwater hydraulic residence time.
- **Tusico Branch Stream Restoration, Phase 2** – This project restored 1,000 feet of stream between Keith Avenue and Springmann Drive by regrading eroded banks, reinforcing existing rock walls, and installing cross-vanes to reduce flow velocity and create improved aquatic habitat. The project also removed invasive bamboo where authorized by property owners and installed native vegetation to slow the spread of bamboo in the future.

### Future City Projects

- **Virginia Street & Dwight Avenue** – A large drainage area south of Dwight Avenue creates large volumes of concentrated flow during intense storm events. Two properties at the southwest corner of Virginia Street and Dwight Avenue are impacted by these flows. Public Works has installed asphalt curb to better direct flows to existing inlets, however a permanent engineered solution is in development ahead of the proposed Dwight Avenue road/sidewalk improvements.
- **Orchard Street & Howerton Avenue** – Orchard Street and Howerton Avenue have very limited drainage infrastructure. Most of the drainage in this area is controlled by roadside ditch and swales through properties. City of Fairfax Public Works installed



*Figure 14 – Parklane Road  
Drainage Improvement Project  
Area*

an asphalt ditch on private property, along a driveway in Orchard Street, to address a drainage concern. This directs more concentrated flow towards the area of concern. The back yard of two properties on Howerton Avenue are steeply graded and heavily wooded. There is a gully in the backyard that conveys stormwater from surrounding properties to the concrete V-ditch on Howerton Avenue. Howerton has grade from west to east but Orchard Street is very flat in this area. Front yards are lower than the roadway and residents have complained about standing water in their yards and runoff from the road. Berming of the private property side of the roadside ditch has been an option to separate road runoff from private properties, however this pushes the issue to another property. The City does not have drainage easements or infrastructure between Orchard Street and Howerton Avenue in this area, however residents are willing to provide it.

- **Parklane Road** – A property reported large volumes of water flowing through the backyard. All surrounding streets have curb/gutter and runoff appears to be coming only from the surrounding private properties. The Old Lee Hills subdivision plans show generally that lot drainage is along the rear property lines in this area. No property damage has been reported. Public Works would like to explore whether installing storm sewer and inlets along the rear property lines would be feasible and beneficial to these property owners.
- **Evergreen Drive Cul-de-Sac** – Resident reports that runoff will pool at the edge of the cul-de-sac before flowing to the storm sewer inlet at the entrance to the cul-de-sac. Videos and photos provided indicate that this is not a hazard to property and gutter appears to be functioning as intended. Public Works has also visited this owner to provide guidance to control runoff on private property. Public Works would like to explore the possibility of installing a curb inlet in the cul-de-sac and connecting to the existing storm sewer. If done, the resident intends to connect to the new structure with PVC pipe to relieve drainage issues on their private property.
- **Norman Avenue & Cobb Drive** – This project will entail small-scale grading to bring runoff around the Norman Avenue/Cobb Drive corner and prevent roadway runoff from entering private property. At this time, this project can be done in-house or with an on-call contractor and the City does not intend to pursue an engineered solution.



*Figure 15 – Evergreen Drive  
Drainage Improvement Project  
Area*

# APPENDIX A

## FLOOD HAZARD ASSESSMENT MAPS







DATE  
2/14/2024

DRAWN BY  
MNP

CHECKED BY  
MJM

CITY OF FAIRFAX  
FLOOD RESILIENCE PLAN BASE MAP  
SOCIAL CHARACTERISTICS  
EJSCREEN & VFRIS

SCALE

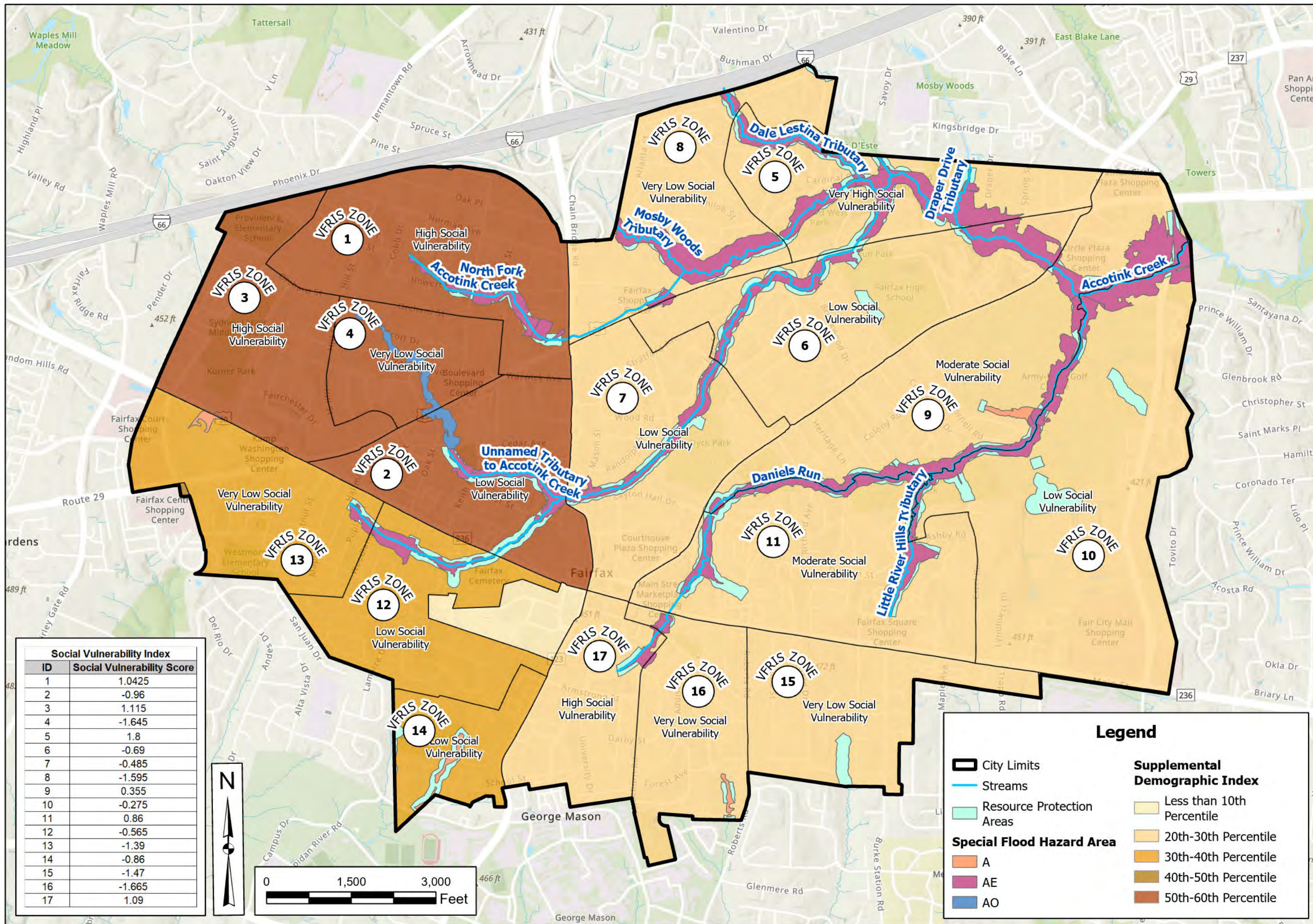
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PROJECT NUMBER

110557026

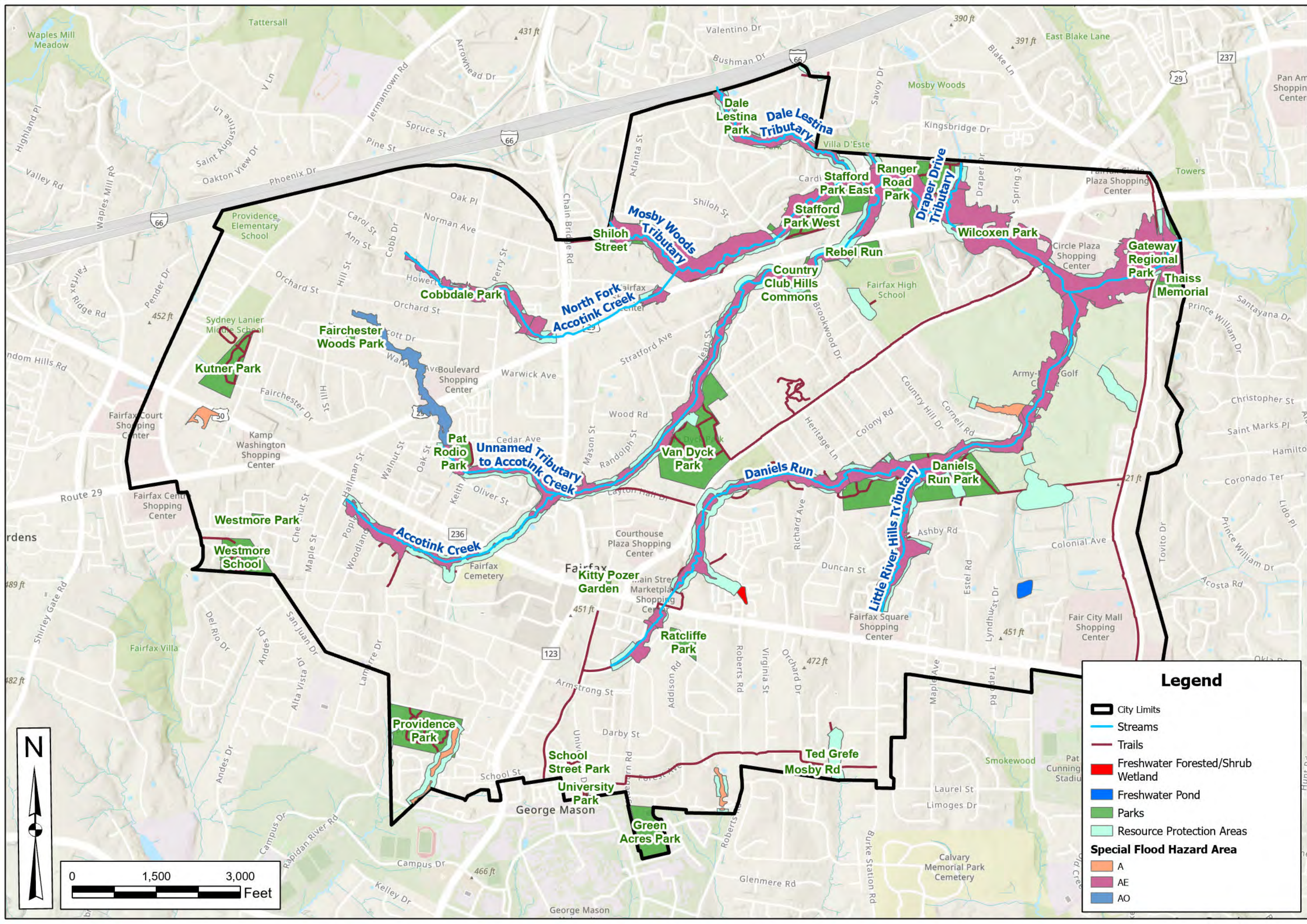
SHEET NUMBER

APPENDIX A



Social Vulnerability Index	
ID	Social Vulnerability Score
1	1.0425
2	-0.96
3	1.115
4	-1.645
5	1.8
6	-0.69
7	-0.485
8	-1.595
9	0.355
10	-0.275
11	0.86
12	-0.565
13	-1.39
14	-0.86
15	-1.47
16	-1.665
17	1.09





DATE 2/14/2024	
DRAWN BY CDC	
CHECKED BY MJM	

CITY OF FAIRFAX FLOOD RESILIENCE PLAN BASE MAP	
ENVIRONMENTAL CHARACTERISTICS	

**Legend**

City Limits

Streams

Trails

Freshwater Forested/Shrub Wetland

Freshwater Pond

Parks

Resource Protection Areas

**Special Flood Hazard Area**

A

AE

AO

SCALE 1" = 1,500'
PROJECT NUMBER 110557026
SHEET NUMBER APPENDIX A





DATE  
2/14/2024

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CDC

CHECKED BY  
MJM

CITY OF FAIRFAX  
FLOOD RESILIENCE PLAN BASE MAP  
HISTORIC RESOURCES OVERVIEW

SCALE

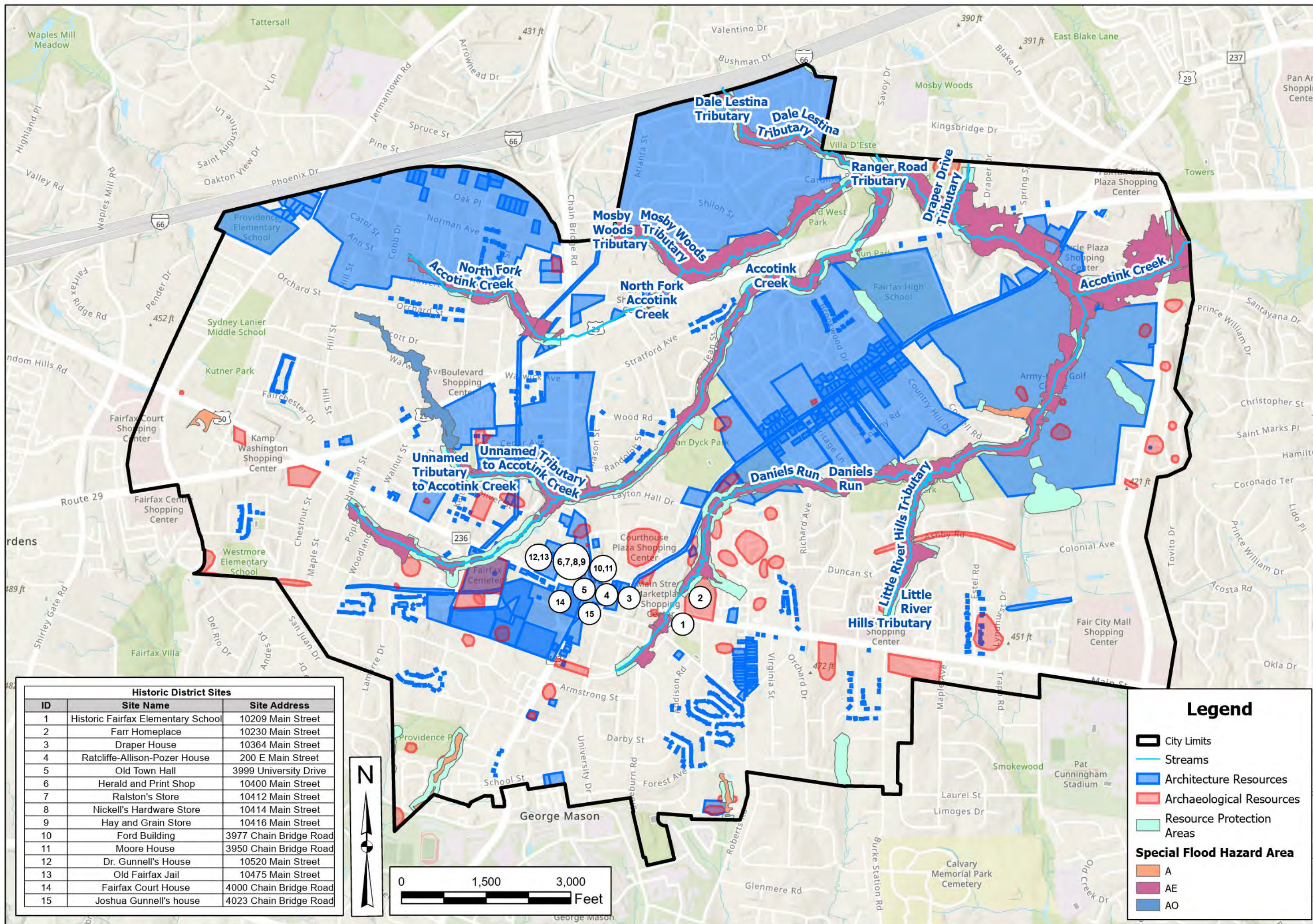
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PROJECT NUMBER

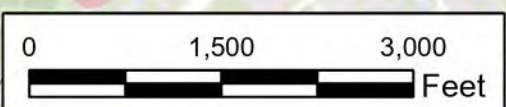
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SHEET NUMBER

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Historic District Sites		
ID	Site Name	Site Address
1	Historic Fairfax Elementary School	10209 Main Street
2	Farr Homeplace	10230 Main Street
3	Draper House	10364 Main Street
4	Ratcliffe-Allison-Pozer House	200 E Main Street
5	Old Town Hall	3999 University Drive
6	Herald and Print Shop	10400 Main Street
7	Ralston's Store	10412 Main Street
8	Nickell's Hardware Store	10414 Main Street
9	Hay and Grain Store	10416 Main Street
10	Ford Building	3977 Chain Bridge Road
11	Moore House	3950 Chain Bridge Road
12	Dr. Gunnell's House	10520 Main Street
13	Old Fairfax Jail	10475 Main Street
14	Fairfax Court House	4000 Chain Bridge Road
15	Joshua Gunnell's house	4023 Chain Bridge Road



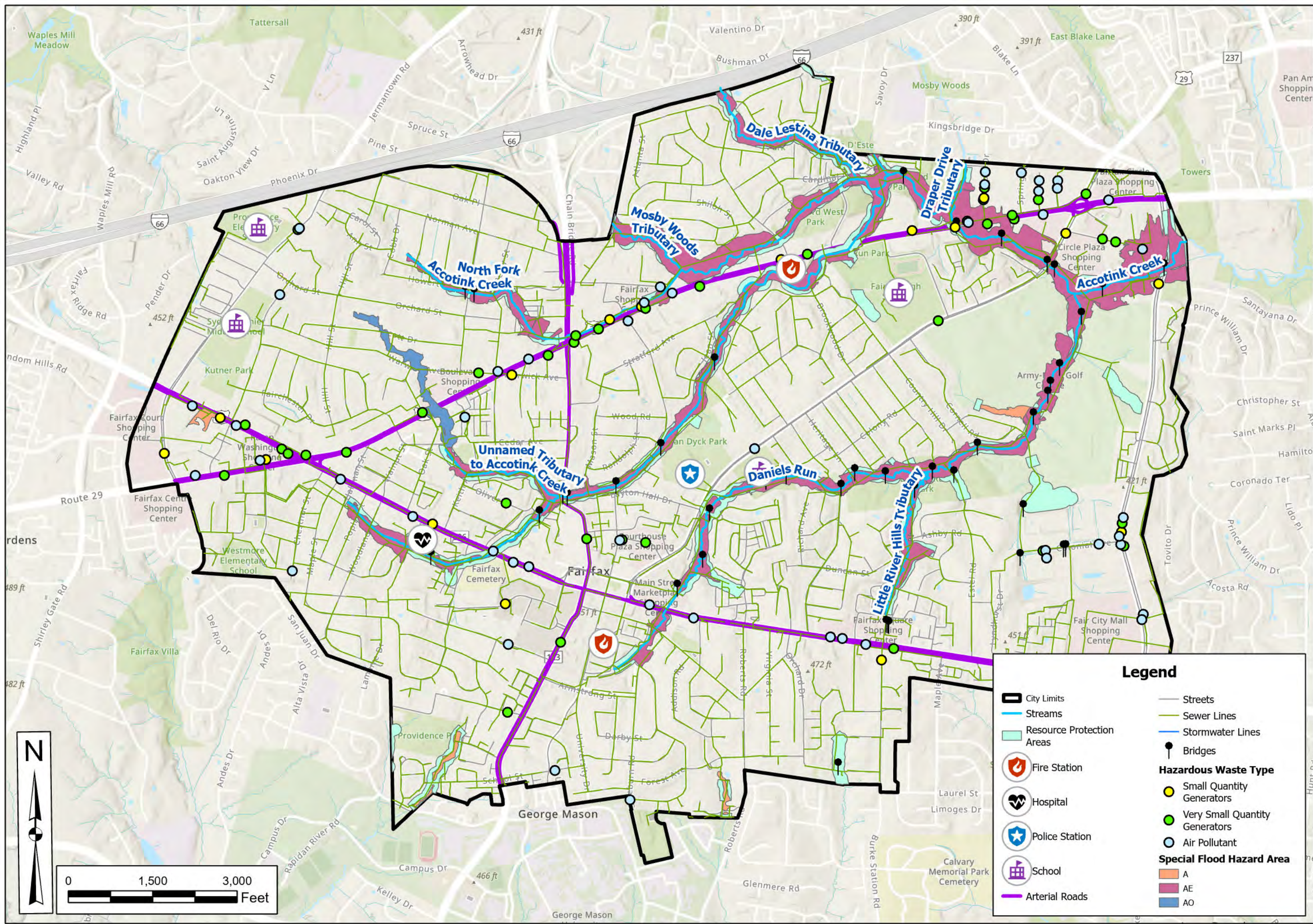
**Legend**

- City Limits
- Streams
- Architecture Resources
- Archaeological Resources
- Resource Protection Areas

**Special Flood Hazard Area**

- A
- AE
- AO





**DATE**  
2/14/2024

**DRAWN BY**  
CDC

**CHECKED BY**  
MJM

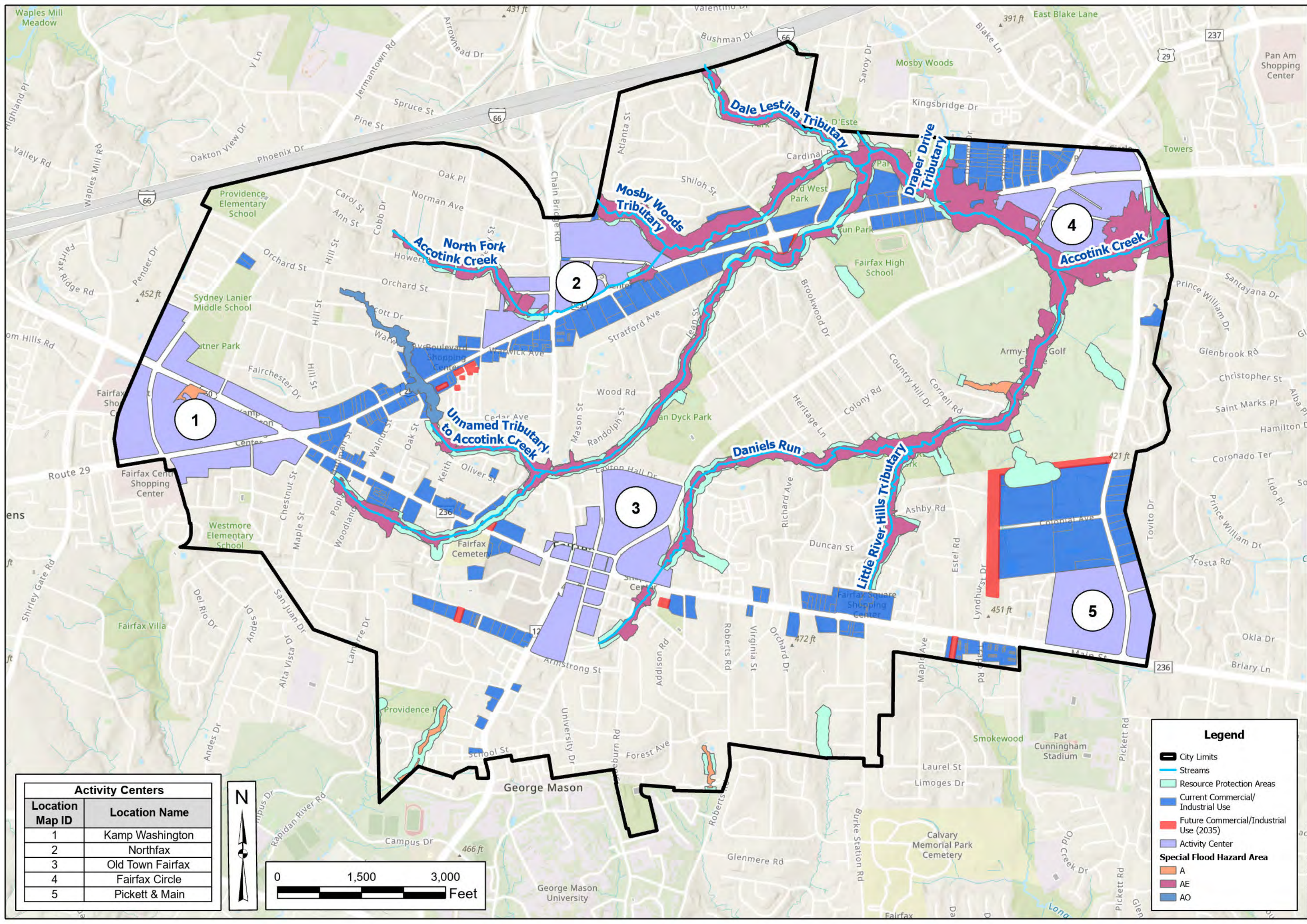
**CITY OF FAIRFAX**  
**FLOOD RESILIENCE PLAN BASE MAP**  
**COMMUNITY LIFELINES**

**SCALE**  
1" = 1,500'  
**PROJECT NUMBER**  
110557026  
**SHEET NUMBER**  
APPENDIX A

**Legend**

City Limits	Streets
Streams	Sewer Lines
Resource Protection Areas	Stormwater Lines
Fire Station	Bridges
Hospital	<b>Hazardous Waste Type</b>
Police Station	Small Quantity Generators
School	Very Small Quantity Generators
Arterial Roads	Air Pollutant
	<b>Special Flood Hazard Area</b>
	A
	AE
	AO





DATE  
2/14/2024

DRAWN BY  
CDC

CHECKED BY  
MJM

CITY OF FAIRFAX  
FLOOD RESILIENCE PLAN BASE MAP  
ECONOMICALLY SIGNIFICANT AREA

SCALE  
1" = 1,500'

PROJECT NUMBER  
110557026

SHEET NUMBER  
APPENDIX A





DATE  
2/14/2024

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MNP

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MJM

CITY OF FAIRFAX  
FLOOD RESILIENCE PLAN BASE MAP  
STORMWATER PROJECT LOCATIONS

SCALE

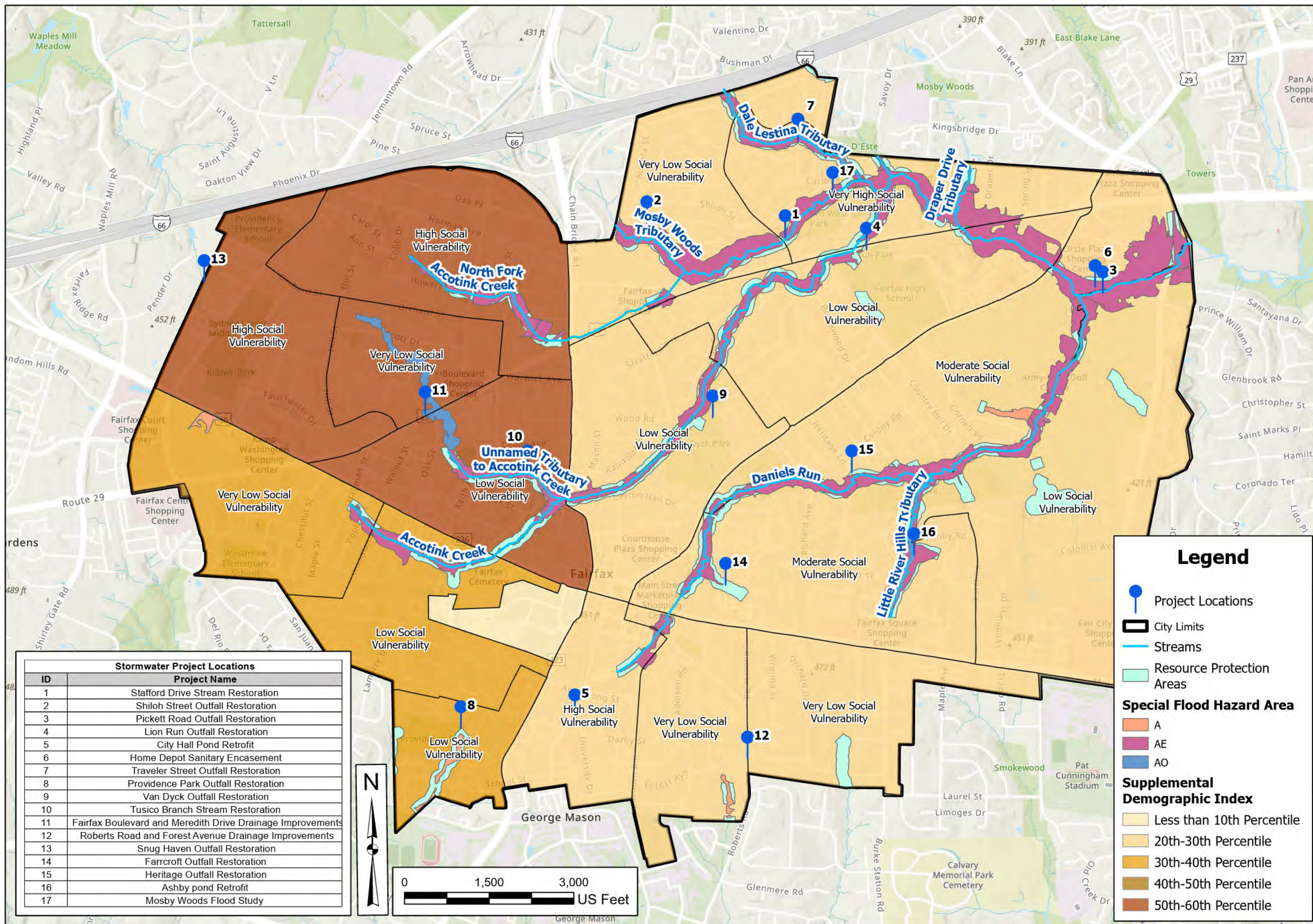
1" = 1,500'

PROJECT NUMBER

110557026

SHEET NUMBER

APPENDIX A



Stormwater Project Locations	
ID	Project Name
1	Stafford Drive Stream Restoration
2	Shiloh Street Outfall Restoration
3	Pickett Road Outfall Restoration
4	Lion Run Outfall Restoration
5	City Hall Pond Retrofit
6	Home Depot Sanitary Encasement
7	Traveler Street Outfall Restoration
8	Providence Park Outfall Restoration
9	Van Dyck Outfall Restoration
10	Tusico Branch Stream Restoration
11	Fairfax Boulevard and Meredith Drive Drainage Improvements
12	Roberts Road and Forest Avenue Drainage Improvements
13	Snug Haven Outfall Restoration
14	Farrcroft Outfall Restoration
15	Heritage Outfall Restoration
16	Ashby pond Retrofit
17	Mosby Woods Flood Study



# APPENDIX B

## STORMWATER & FLOOD RESILIENCE QUESTIONNAIRE AND BROCHURE





## Stormwater & Flood Resilience Questionnaire

The City of Fairfax is developing a **stormwater & flood resilience plan** to provide the community with an analysis of the most vulnerable areas and an overview of the opportunities to address flooding. For this project, flooding refers to the inundation of urban areas due to excessive accumulation of rainwater thus impacting the ability to use the property or creating water-related hazards. The plan will provide the City with points toward ranking in **FEMA's Community Rating System**, a program which can provide discounts on flood insurance premiums in jurisdictions that exceed FEMA's minimum standards for floodplain management. You have received this questionnaire due to your property's location within the **FEMA Zone AE/X floodplain** or the **City of Fairfax Resource Protection Area (RPA)**. Your feedback is greatly appreciated!



*Scan the QR code to access an online version of this questionnaire.*

<b>Property Address:</b>		<b>Tax Map Number:</b>			
{Property Address}		{Property Tax Map Number}			
	Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree
1. Flooding impacts my ability to utilize my property.					
2. I am concerned about the impact of flooding on my property's structures.					
3. I have previously experienced adverse effects due to flooding.					
4. The streets in my neighborhood flood during rainfall events.					
5. The City's infrastructure adequately handles rain events in my neighborhood.					
6. The flooding in my neighborhood dissipates quickly after rainfall events.					
7. I feel adequately informed about what constitutes a floodplain/Resource Protection Area.					
8. I know where I can access more information about my property's flood risk.					
9. I experience adverse flooding every: (Circle best available response)	Month or less	Six Months	Year	5+ Years	10+ Years

Additional Comments:

Please return the completed questionnaire to the City of Fairfax Department of Public Works at **10455 Armstrong St, Fairfax, VA 22030** or email to [PW-Stormwater@fairfaxva.gov](mailto:PW-Stormwater@fairfaxva.gov).

To provide pictures or additional documentation, please utilize the QR code at the top of the questionnaire.

Learn more about the City's resilience efforts on the Engage Fairfax project page: <https://engage.fairfaxva.gov>



## COMMUNITY FLOOD PREPAREDNESS FUND (CFPF)

The Community Flood Preparedness Fund (CFPF) was established to provide support for regions and localities across Virginia. The fund empowers communities to complete vulnerability assessments and implement action-oriented approaches to bolster flood preparedness and resilience.

The City applied for and received a grant for the development of the Resilience Plan in 2022. The grant will cover 75% of the plan development cost. The City's goal is to continue to utilize CFPF grant funding to address project implementation in future years.



## COMMUNITY RATING SYSTEM (CRS)

The Community Rating System (CRS) is a voluntary incentive program that recognizes and encourages community floodplain management practices that exceed the minimum requirements of the FEMA National Flood Insurance Program (NFIP). In CRS communities, flood insurance premium rates are discounted to reflect the reduced flood risk resulting from the community's efforts.

The Resilience Plan is the City's first step toward joining the Community Rating System. This project will provide points toward the City's score under the CRS rating system. The points from this project, combined with points gained from other initiatives such as requiring floodplain permits and making floodplain information publicly available, will qualify the City to apply for the CRS Program.

## CONTACT

### *City of Fairfax*

Satoshi Eto

*Public Works Program Manager*

[satoshi.eto@fairfaxva.gov](mailto:satoshi.eto@fairfaxva.gov)

### *Kimley-Horn*

Juan Campos, P.E.

*Project Manager*

[juan.campos@kimley-horn.com](mailto:juan.campos@kimley-horn.com)



# Kimley»Horn



# City of Fairfax

## STORMWATER & FLOODING RESILIENCE PLAN



*Scan for more information!*



To request this information in an alternate format, call 703.385.7810, TTY 711.



.....

## THE RESILIENCE PLAN MAXIMIZES VIRGINIA DEPARTMENT OF CONSERVATION GRANT FUNDING THROUGH CREATION OF A MULTIPURPOSE DOCUMENT.

.....

## STORMWATER & FLOODING RESILIENCE PLAN

The Resilience Plan will be a community-wide floodplain management document that is intended to assist the City in outlining flood reduction methodologies to reduce impact on properties and community assets. The plan will look at how flooding and other natural disasters affect the following:

1. Life Safety
2. Public Health
3. Critical Facilities and Infrastructure
4. Community Economic Centers
5. City Infrastructure

The Resilience Plan will be utilized as a guiding document for the City in the Community Flood Preparedness Fund (CFPF) and as part of the Community Rating System (CRS) program.

.....

## PROJECT WEBSITE

A project website on Engage Fairfax can be found at the link below or by scanning the QR code on the front of the brochure. There you can find project updates, timelines, and meeting schedules.

<https://engage.fairfaxva.gov/community-flood-resilience-planning>



CITY OF FAIRFAX  
STORMWATER  
MANAGEMENT

.....

## COMMUNITY INPUT

Community input is a key component of the planning process. The Engage Fairfax project page will be available for public input throughout the planning process. Public milestone meetings will be held prior to the planning process commencing and once the draft Stormwater & Flooding Resilience Plan has been completed.

Residents are encouraged to utilize the project website to comment and provide their feedback on flooding issues that may be relevant. Final dates, times and locations for all events will be published on the Engage Fairfax project website.

.....

## PLANNING TIMELINE

1. Public Kickoff Presentation *April 2023*
2. Engage Fairfax Input Period *April - Dec. 2023*
3. Data Gathering With Outside Agencies *March - May 2023*
4. Questionnaire to Affected Properties *June 2023*
5. Environmental Sustainability Committee Presentation *June 2023*
6. Additional Public Outreach Activity *TBD*
7. Stormwater & Flooding Resilience Public Review Presentation *Nov. 2023*
8. Stormwater & Flooding Resilience City Council Presentation *Dec. 2023*

*\* Schedule current as of April 2023.  
Schedule updates will be posted on Engage Fairfax.*



# APPENDIX C

## AGENCY OUTREACH EMAIL TEMPLATE







## Agency Coordination Email Template

Subject: City of Fairfax Flooding & Stormwater Resilience Outreach

Good [morning/afternoon],

My name is [Insert Name] and our team has been contracted to assist the City of Fairfax in the development of a Flooding & Stormwater Resilience Plan. The City applied for and received funding for the development of the Resilience Plan through the Virginia Community Flood Preparedness Fund (CFPF) grant. The City also intends to utilize this document as a component of its Community Rating System (CRS) program. As part of the planning process, it is encouraged that we reach out to agencies and organizations that may be able to provide pertinent information.

We are reaching out to you because [.....]. We were wondering if you would be able to provide us with any information or direct us to where we could find information related to the City's flooding & stormwater resilience. Examples of items we believe would be useful are:

1. [xxxxxxxxxx]
2. [xxxxxxxxxx]
3. [xxxxxxxxxx]

Thank you for your help and if you would like to schedule a call to go over or provide any further information, we would be happy to set something up. Please do not hesitate to reach out with any questions or comments.

Thanks,

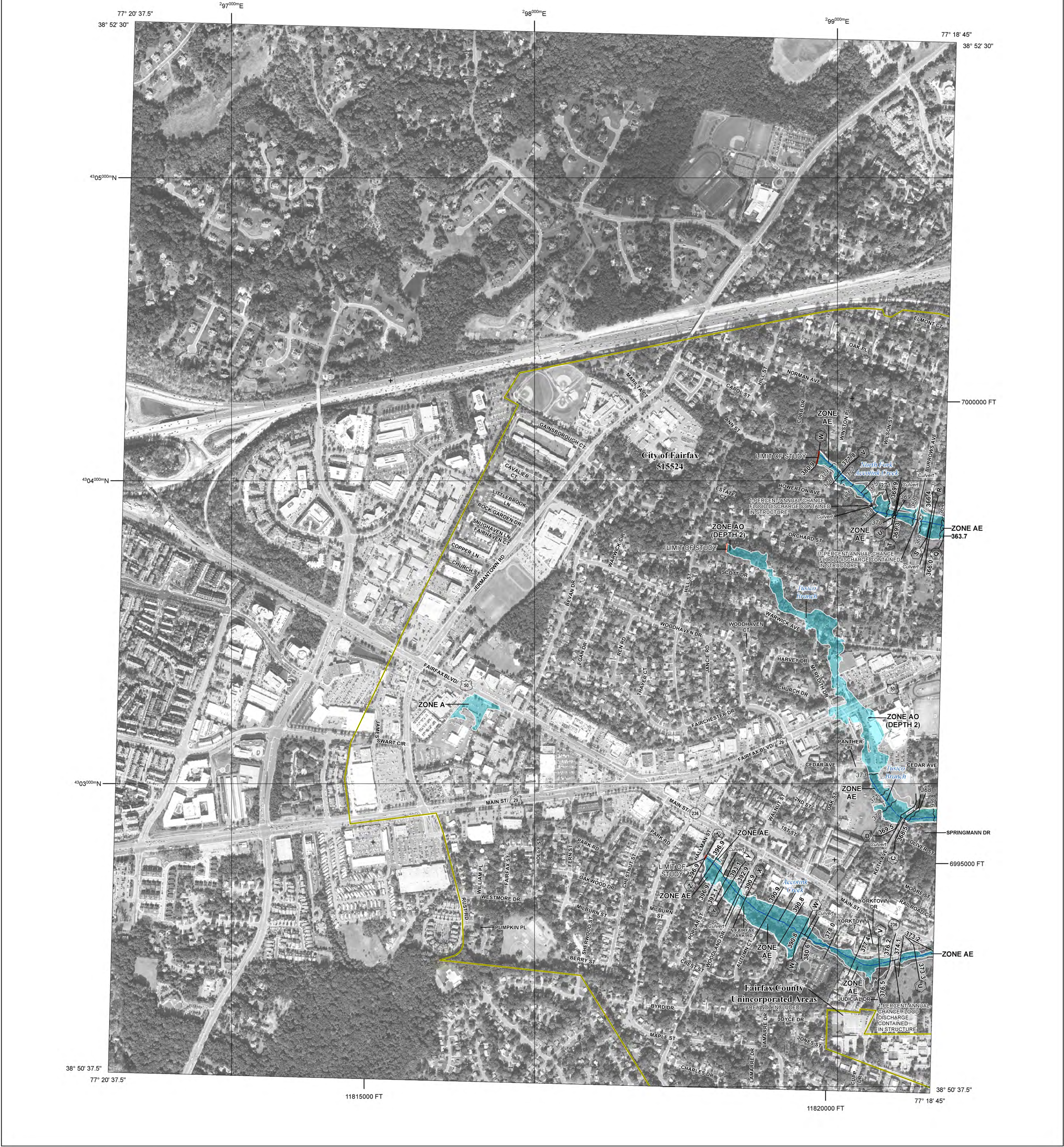


# APPENDIX D

## FEMA FIRM Panels







FLOOD HAZARD INFORMATION

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

**THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT [HTTPS://MSC.FEMA.GOV](https://msc.fema.gov)**

SPECIAL FLOOD HAZARD AREAS		Without Base Flood Elevation (BFE) Zone A,V, A99
		Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD		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		Areas of Minimal Flood Hazard Zone X
		Area of Undetermined Flood Hazard Zone D
GENERAL STRUCTURES		Channel, Culvert, or Storm Sewer
		Levee, Dike, or Floodwall
OTHER FEATURES		Cross Sections with 1% Annual Chance Water Surface Elevation
		Coastal Transect
		Profile Baseline
		Hydrographic Feature
		Base Flood Elevation Line (BFE)
		Limit of Study
		Jurisdiction Boundary

NOTES TO USERS

For information and questions about this Flood Insurance Rate Map (FIRM), available products associated with this FIRM, including historic versions, the current map date for each FIRM panel, how to order products, or the National Flood Insurance Program (NFIP) in general, please call the FEMA Mapping and Insurance eXchange at 1-877-FEMA-MAP (1-877-336-2627) or visit the FEMA Flood Map Service Center website at <https://msc.fema.gov>. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the website.

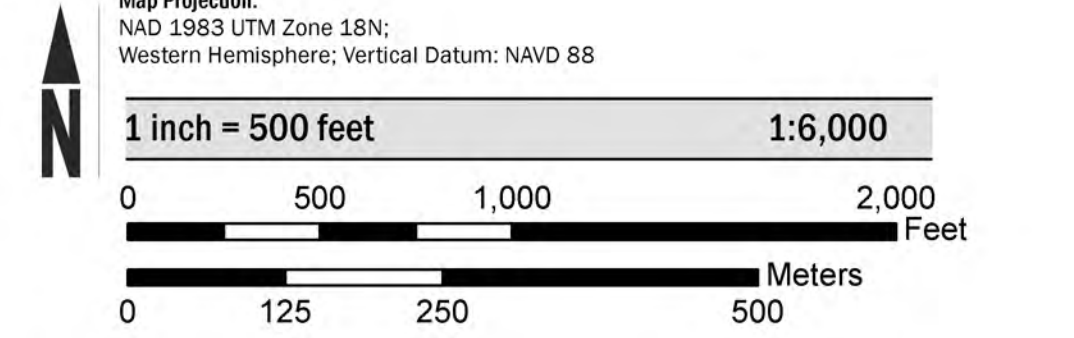
Communities annexing land on adjacent FIRM panels must obtain a current copy of the adjacent panel as well as the current FIRM Index. These may be ordered directly from the Flood Map Service Center at the number listed above.

For community and countywide map dates refer to the Flood Insurance Study Report for this jurisdiction.

To determine if flood insurance is available in this community, contact your Insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

Base map information shown on this FIRM was provided in digital format by the United States Department of Agriculture - Aerial Photography Field Office (USDA - APFO), National Agriculture Imagery Program (NAIP). This information was derived from digital orthophotography at a 2-foot resolution from photography dated 2019.

SCALE



PANEL LOCATOR



**National Flood Insurance Program**

**NATIONAL FLOOD INSURANCE PROGRAM**  
FLOOD INSURANCE RATE MAP

**CITY OF FAIRFAX, VIRGINIA**  
Independent City

PANEL 1 of 6

Panel Contains:

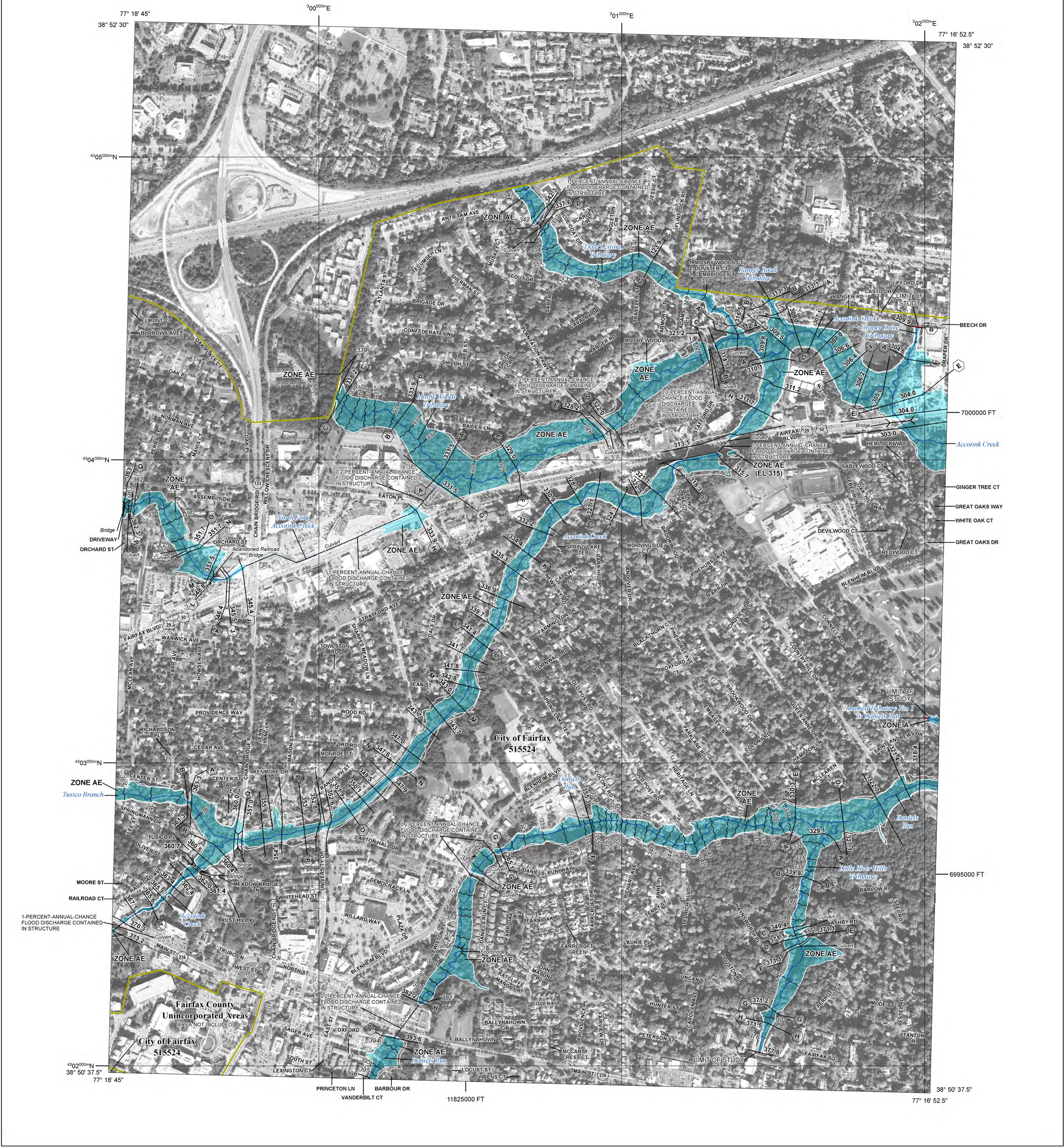
COMMUNITY	NUMBER	PANEL	SUFFIX
FAIRFAX, CITY OF	515524	0001	E

VERSION NUMBER  
2.6.4.6

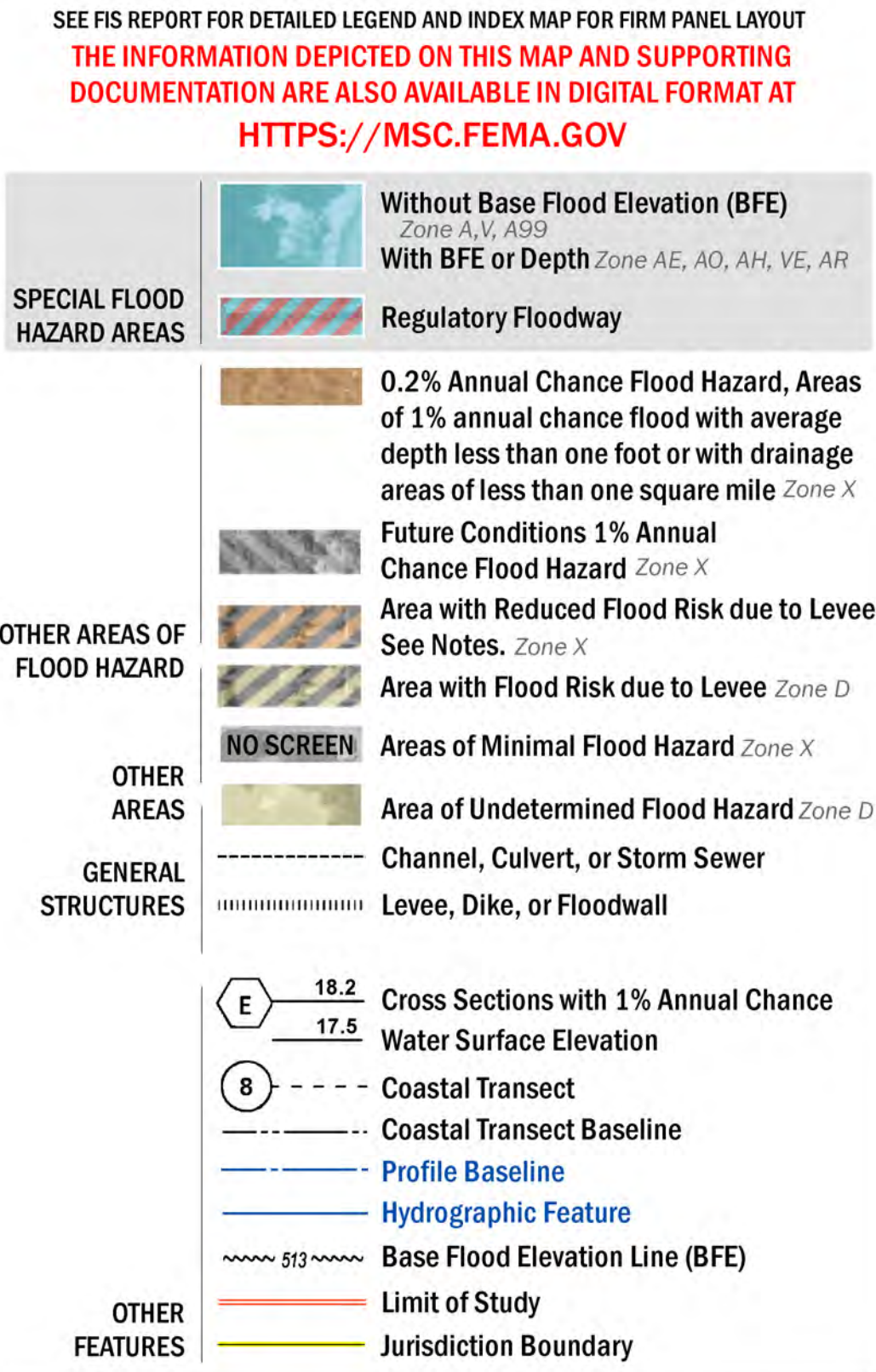
MAP NUMBER  
5155240001E

MAP REVISED  
NOVEMBER 16, 2023





FLOOD HAZARD INFORMATION



NOTES TO USERS

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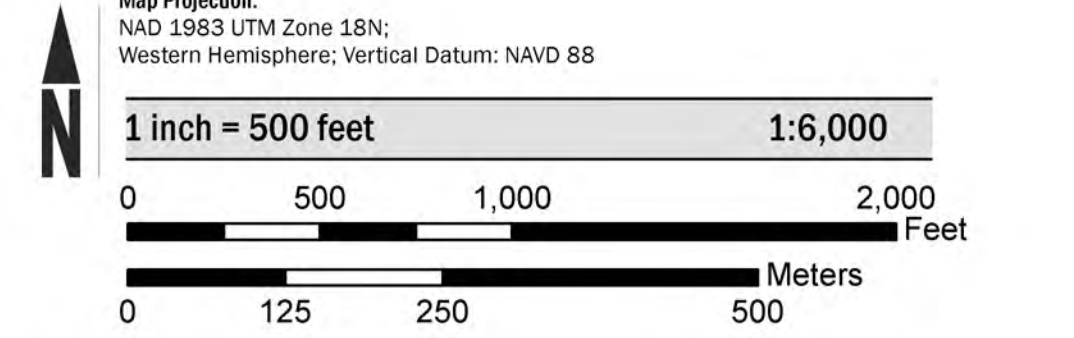
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SCALE



PANEL LOCATOR



**FEMA**  
National Flood Insurance Program

**NATIONAL FLOOD INSURANCE PROGRAM**  
FLOOD INSURANCE RATE MAP

**CITY OF FAIRFAX, VIRGINIA**  
Independent City

PANEL 2 of 6

Panel Contains:

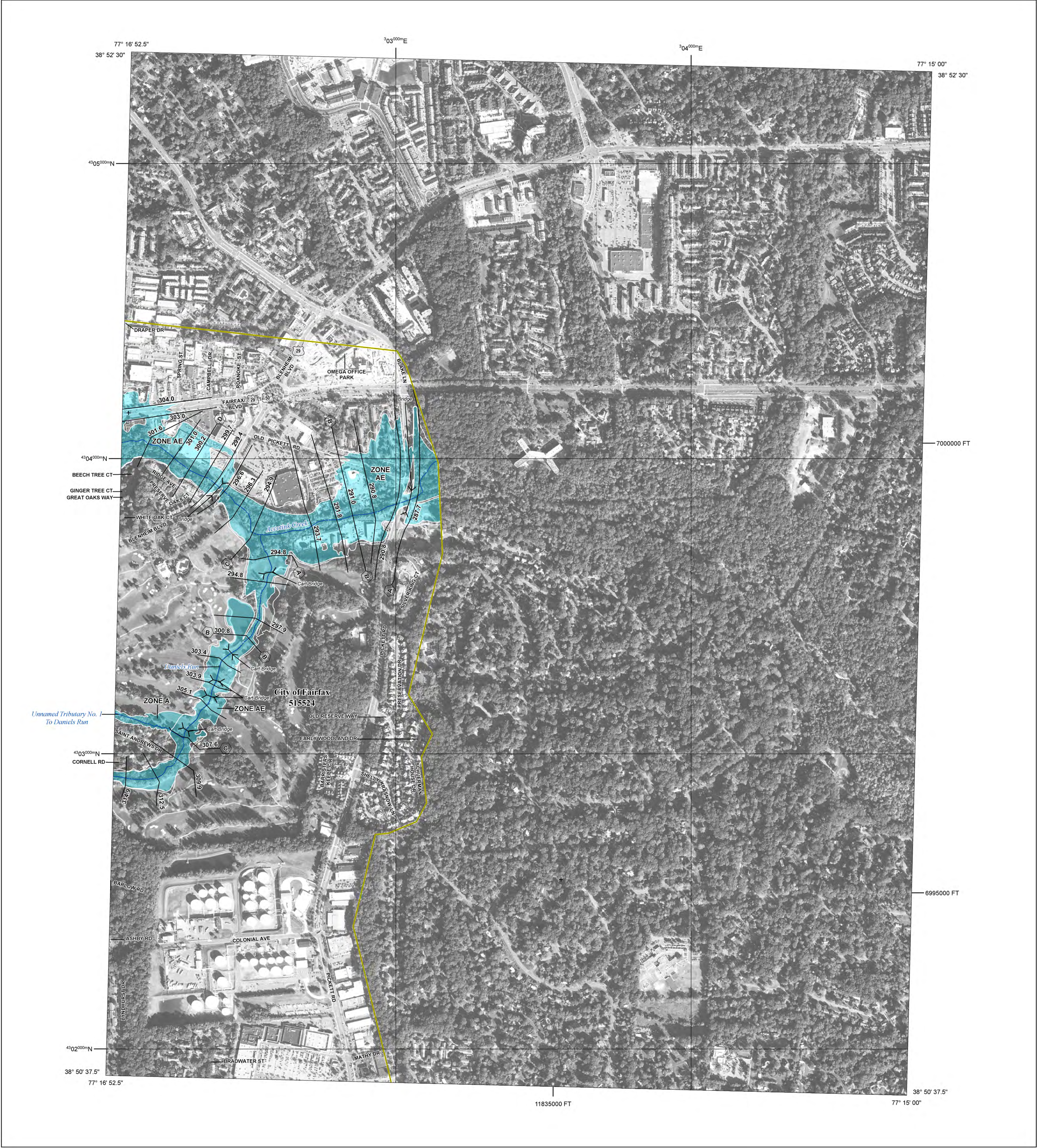
COMMUNITY	NUMBER	PANEL	SUFFIX
FAIRFAX, CITY OF	515524	0002	E

VERSION NUMBER  
2.6.4.6

MAP NUMBER  
5155240002E

MAP REVISED  
NOVEMBER 16, 2023





FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT  
**THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT [HTTPS://MSC.FEMA.GOV](https://MSC.FEMA.GOV)**

SPECIAL FLOOD HAZARD AREAS		Without Base Flood Elevation (BFE) Zone A,V, A99
		Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD		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		Areas of Minimal Flood Hazard Zone X
		Area of Undetermined Flood Hazard Zone D
GENERAL STRUCTURES		Channel, Culvert, or Storm Sewer
		Levee, Dike, or Floodwall
OTHER FEATURES		Cross Sections with 1% Annual Chance Water Surface Elevation
		Coastal Transect
		Coastal Transect Baseline
		Profile Baseline
		Hydrographic Feature
		Base Flood Elevation Line (BFE)
		Limit of Study
		Jurisdiction Boundary

NOTES TO USERS

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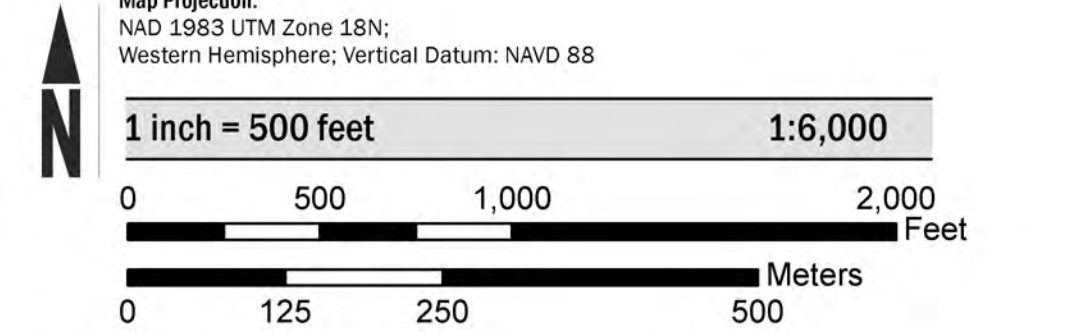
Communities annexing land on adjacent FIRM panels must obtain a current copy of the adjacent panel as well as the current FIRM Index. These may be ordered directly from the Flood Map Service Center at the number listed above.

For community and countywide map dates refer to the Flood Insurance Study Report for this jurisdiction.

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SCALE



PANEL LOCATOR



**National Flood Insurance Program**

**NATIONAL FLOOD INSURANCE PROGRAM**  
FLOOD INSURANCE RATE MAP

**CITY OF FAIRFAX, VIRGINIA**  
Independent City

PANEL 3 of 6

Panel Contains:

COMMUNITY	NUMBER	PANEL	SUFFIX
FAIRFAX, CITY OF	515524	0003	E

VERSION NUMBER  
2.6.4.6

MAP NUMBER  
5155240003E

MAP REVISED  
NOVEMBER 16, 2023





FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT  
**THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT [HTTPS://MSC.FEMA.GOV](https://msc.fema.gov)**

SPECIAL FLOOD HAZARD AREAS		Without Base Flood Elevation (BFE) Zone A,V, A99
		Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD		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		Areas of Minimal Flood Hazard Zone X
		Area of Undetermined Flood Hazard Zone D
GENERAL STRUCTURES		Channel, Culvert, or Storm Sewer
		Levee, Dike, or Floodwall
OTHER FEATURES		Cross Sections with 1% Annual Chance Water Surface Elevation
		Coastal Transect
		Profile Baseline
		Hydrographic Feature
		Base Flood Elevation Line (BFE)
		Limit of Study
		Jurisdiction Boundary

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For community and countywide map dates refer to the Flood Insurance Study Report for this jurisdiction.

To determine if flood insurance is available in this community, contact your Insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

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SCALE

Map Projection:  
NAD 1983 UTM Zone 18N;  
Western Hemisphere; Vertical Datum: NAVD 88

1 inch = 500 feet 1:6,000

0 500 1,000 2,000 Feet

0 125 250 500 Meters

PANEL LOCATOR

\* PANEL NOT PRINTED

**FEMA**  
National Flood Insurance Program

**NATIONAL FLOOD INSURANCE PROGRAM**  
FLOOD INSURANCE RATE MAP

**CITY OF FAIRFAX, VIRGINIA**  
Independent City

PANEL 4 of 6

Panel Contains:

COMMUNITY	NUMBER	PANEL	SUFFIX
FAIRFAX, CITY OF	515524	0004	E

VERSION NUMBER  
2.6.4.6

MAP NUMBER  
5155240004E

MAP REVISED  
NOVEMBER 16, 2023







## SECTION B – BUDGET DATA

**Project Budget Narrative**

**Budget Narrative Template**

**Funding Request Authorization**

**Available Funding Documentation**



## Project Budget Narrative

A budget overview is included below and contains the required information outlined in the 2024 Funding Manual for the Virginia Community Flood Preparedness Fund. For additional information, please see the Kimley-Horn Scope of Services in Section A.

*Table 2 – Project Budget Overview*

Required Information		Additional Information
Estimated Total Project Cost	<b>\$45,162.64</b>	This amount reflects the total cost of bringing the study to completion. For additional information, please see the Scope of Services included as part of this grant application package.
Amount of Funds Requested from the Fund	<b>\$22,581.32</b>	This is the total amount of any grant assistance sought from the Fund.
Indirect Costs Not Eligible for Funding	N/A	N/A
Amount of Funds Available	<b>\$45,162.64</b>	The amount of funds available through this project's funding source is greater than the estimated total project cost of <b>\$45,162.64</b>  The Flood Mitigation Planning & Resiliency page of the <a href="#">City's FY2025 Adopted Budget</a> has been included in this section as available funding documentation.
RVRF Match Loans	N/A	N/A

## Authorization to Request Funding

A signed statement from Melanie Zipp, Acting City Manager, authorizing the request for funding for this project has been included in this section.





# Budget Narrative Template



## Appendix B: Budget Narrative Template

Applicant Name: City of Fairfax

Community Flood Preparedness Fund & Resilient Virginia Revolving Loan Fund Detailed Budget Narrative

Period of Performance: 36 months following the issuance of a signed agreement between the applicant and VRA on behalf of the Department.

Submission Date: 1/23/2025

Grand Total State Funding Request									\$ 22,581.32
Grand Total Local Share of Project									\$ 22,581.32
Federal Funding (if applicable)									\$N/A
Project Grand Total									\$45,162.64
Locality Cost Match									%50
Breakout By Cost Type	Personnel	Fringe	Travel	Equipment	Supplies	Contracts	Indirect Costs	Other Costs	Total
Federal Share (if applicable)					N/A				
Local Share						\$22,581.32			\$22,581.32
State Share – CFPF Grant						\$22,581.32			\$22,581.32
State Share – RVRF Match Loan					N/A				
Pre-Award/Startup					N/A				
Maintenance					N/A				
Total	\$	\$	\$	\$	\$	\$45,162.64	\$	\$	\$ 45,162.64



# Funding Request Authorization



LARGE-SCALE STORM EVENT STUDY  
CFPF GRANT APPLICATION

I, Melanie Zipp, City of Fairfax – Acting City Manager, authorize the City of Fairfax Department of Public Works to request funding from the 2025 Funding Round of the Virginia Community Flood Preparedness Fund for the development of a study to evaluate the effects of large-scale storm events greater than the 500-year storm on pertinent City residential and commercial properties, critical infrastructure, and community lifelines.

Signed: \_\_\_\_\_



Date: \_\_\_\_\_





## **Available Funding Documentation**



PROJECT INFORMATION								
Name: <b>Flood Mitigation Planning &amp; Resiliency</b>					Project # <b>555-438130-580523</b>			
2035 Comprehensive Plan Reference: <b>NE2.1 pg 108</b>		2035 Comprehensive Plan Timeframe: <b>Long Term</b>						
Comprehensive Plan Element								
Land Use		✓		Environment and Sustainability				
Multimodal Transportation				Economic Vitality				
Community Services				Other City Plan/Policy				
<b>Statement of Need:</b> This project supports flood mitigation initiatives. A flood mitigation study of the Accotink Creek watershed from Fairfax Blvd to Pickett Rd will be conducted is proposed for FY25. Stormwater runoff from the majority of the city's land area flows through this part of the Accotink Creek. The floodplain in this area impacts numerous properties, including 23% of the 76 acres (105 out of 336 parcels) within the Fairfax Circle activity center. Because of the floodplain's influence, stormwater management is identified as a key component of the Fairfax Circle Small Area Plan. This study is intended to provide the city with recommendations for feasible options to reduce the floodplain impacts in this area. The city intends to apply for Community Flood Preparedness Fund grants for this study which can, if approved, provide up to 50% funding for the flood mitigation study. The floodplain improvements will be considered along with restoration of the Accotink Creek and lining/rehabilitation of the sanitary trunk sewer that is parallel to the creek. All grant opportunities will be explored.				<b>Picture:</b> 				
Funding Allocation		FY 2024	FY 2025	FY 2026	FY 2027	FY 2028	FY 2029	Totals
Feasibility/Planning/Design/Engineering		-	200,000	-	-	-	-	200,000
<b>Total Costs</b>		\$ -	<b>\$ 200,000</b>	\$ -	\$ -	\$ -	\$ -	<b>\$ 200,000</b>
Funding Sources		FY 2024	FY 2025	FY 2026	FY 2027	FY 2028	FY 2029	Totals
Grant		-	100,000	-	-	-	-	100,000
Stormwater Utility Fund		-	100,000	-	-	-	-	100,000
<b>Total Funding</b>		\$ -	<b>\$ 200,000</b>	\$ -	\$ -	\$ -	\$ -	<b>\$ 200,000</b>
Estimated Project Timeline		New Project		Responsible Department(s):				
Project Origination Date		02/01/22		✓	Cable TV	PW Admin		
Project Design Start Date		07/01/25			CD&P	PW Environment		
Construction Start Date					City Manager	PW Fleet		
Project Completion Date		06/30/26			Finance	PW Operations		
				Fire	PW Signs/Signal			
				Historic	PW Stormwater	✓		
				Human Svc	PW Streets			
				IT	PW Transport			
				Parks & Rec	PW Wastewater			
				Police	Schools			
Financial Impacts								
Annual Revenue Generated:		\$ -						
Annual Cost Savings:		\$ -						
Annual Increase in Operating Costs:		\$ -						
Projected Future Savings:		\$ -						



## SECTION C – ADDITIONAL CHECKLIST REQUIREMENTS

This section includes the following checklist requirements not addressed by Section A and Section B:

**Completed 2024 CFPF Funding Manual Checklist**

**Historic Flooding Documentation**

**Copy of the City of Fairfax Floodplain Ordinance**

**City of Fairfax Comprehensive Plan**

**Social Vulnerability Index Score(s) for the Project Area**



# **Completed 2024 CFPF Funding Manual Checklist**



## Appendix C: Checklist All Categories

(Benefit-cost analysis must be included if the proposed Project is over \$2 million.)

Virginia Department of Conservation and Recreation

Community Flood Preparedness Fund Grant Program

---

- ☒ Detailed map of the project area(s) (Projects/Studies)
- ☐ ~~FIRMette of the project area(s) (Projects/Studies)~~ Because this is a City-wide study, FIRMs have been included instead of FIRMettes. FIRMs have been included with the Application Form in Section A.
- ☒ Historic flood damage data and/or images (Projects/Studies)
- ☒ A link to or a copy of the current floodplain ordinance
- ☐ ~~Non-Fund financed maintenance and management plan for project extending a minimum of 10 years from project close~~ N/A
- ☒ A link to or a copy of the current comprehensive plan
- ☒ Social vulnerability index score(s) for the project area from VFRIS SVI Layer
- ☐ ~~If applicant is not a town, city, or county, letters of support from affected localities~~ N/A
- ☐ ~~Letter of support from impacted stakeholders~~ N/A
- ☒ Budget Narrative
- ☐ ~~Supporting Documentation, including the Benefit-Cost Analysis tool or narrative (for projects over \$2 million)~~ N/A
- ☒ Authorization to request funding from the Fund and/or RVRF Match loan from governing body or chief executive of the local government
- ☐ ~~Signed pledge agreement from each contributing organization~~
- ☒ Detailed budget and narrative for all costs



# Historic Flooding Documentation



## Historic Flooding Documentation

To gather flood information not captured in formal reports, studies, or models, a stormwater and flood resilience questionnaire was developed and mailed to approximately 1,400 properties within the City's FEMA SFHA and RPA as part of its Resilience Plan efforts. The questionnaire asked residents if flooding occurs in their area, how often it occurs, if the resident feels that the City's infrastructure has the capacity to handle flooding, if they feel informed about flooding and flood risk, and included an additional section for residents to provide comments or any flooding related pictures. The following images have been sourced from the City's flood resilience questionnaire and serve as documentation of flooding throughout the City. Personally Identifiable Information, such as names and addresses of residents who have submitted questionnaire data, has not been included as part of this grant application.



Ranger Road Park Flooding



Ranger Road Park Flooding



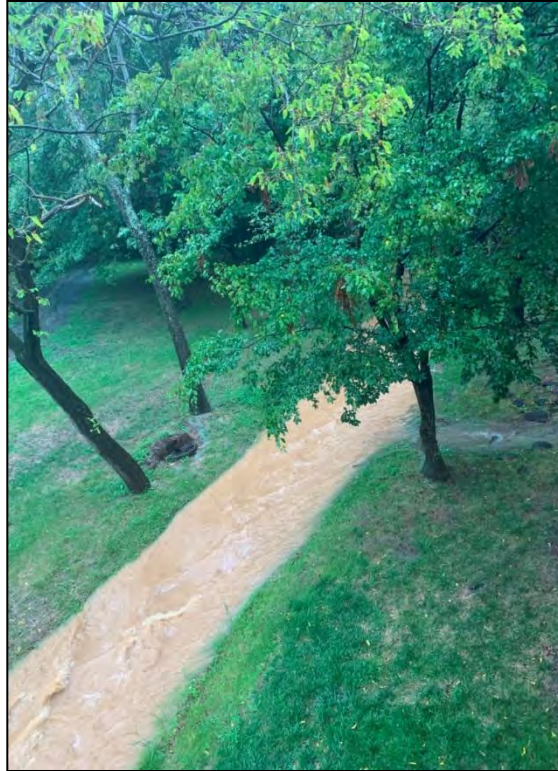


Residential Flooding



Stream at Bankfull, Approaching Private Property





Residential Flooding



Residential and Street Flooding





Residential Flooding



Residential Flooding



# **Copy of the City of Fairfax Floodplain Ordinance**



## Link to the City of Fairfax Floodplain Ordinance

<https://www.fairfaxva.gov/home/showpublisheddocument/7887/638088692666370000>

The screenshot displays the City of Fairfax Virginia website. The header includes the city logo, navigation links (Home, Jobs, City Alert, Contact Us, About Us, Translate), and a search bar. The main navigation menu lists Services, Residents, Businesses, Government (highlighted), and How Do I... The left sidebar contains a tree view of the Government menu, with 'Stormwater and Floodplain Management' expanded to show 'Floodplain Information'. The main content area features a map of Fairfax County with a red outline of the city and blue lines representing floodplains. Below the map is the 'Floodplain Information' section, which includes a breadcrumb trail (Government » Public Works » Stormwater and Floodplain Management »), a title, and links for Print, Feedback, Share & Bookmark, and Font Size. A prominent link 'Click to View New Flood Hazard Map' is displayed. The 'Resources' section lists the 'City of Fairfax Floodplain Ordinance' and 'Floodplain Permit Application'. The 'FEMA Flood Plain' section states that the city participates in the Federal Emergency Management Agency's program. On the right, a contact box for Satoshi Eto, Program Manager, provides his phone number (703-273-6073), email (Satoshi.Eto@fairfaxva.gov), and address (Public Works Dept, 10455 Armstrong St, Room 200A, Fairfax, VA 22030).

**CITY OF FAIRFAX Virginia**

Home Jobs City Alert Contact Us About Us Translate

Search...

Services Residents Businesses **Government** How Do I...

Stormwater and Floodplain Management

+ Stormwater Information

Municipal Separate Storm Sewer System (MS4)

Stream Restoration FAQ

Floodplain Information

Watershed Management Planning

+ Protecting Water Resources

Reporting Illicit Discharges

Chesapeake Bay Ordinance

BMP and Stormwater Management Inspection Program

Virginia Stormwater Management Program (VSMP)

Government » Public Works » Stormwater and Floodplain Management »

### Floodplain Information

Print Feedback Share & Bookmark Font Size: + -

[Click to View New Flood Hazard Map](#)

### Resources

- [City of Fairfax Floodplain Ordinance](#)
- [Floodplain Permit Application](#)

### FEMA Flood Plain

The City of Fairfax participates in the Federal Emergency

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# City of Fairfax Comprehensive Plan



## Link to the City of Fairfax 2019 Comprehensive Plan

<https://www.fairfaxva.gov/government/community-development-planning/planning/comprehensive-plan>





## **Social Vulnerability Score(s) for the Project Area**





DATE  
1/17/2025

DRAWN BY  
CDC

CHECKED BY  
JJD

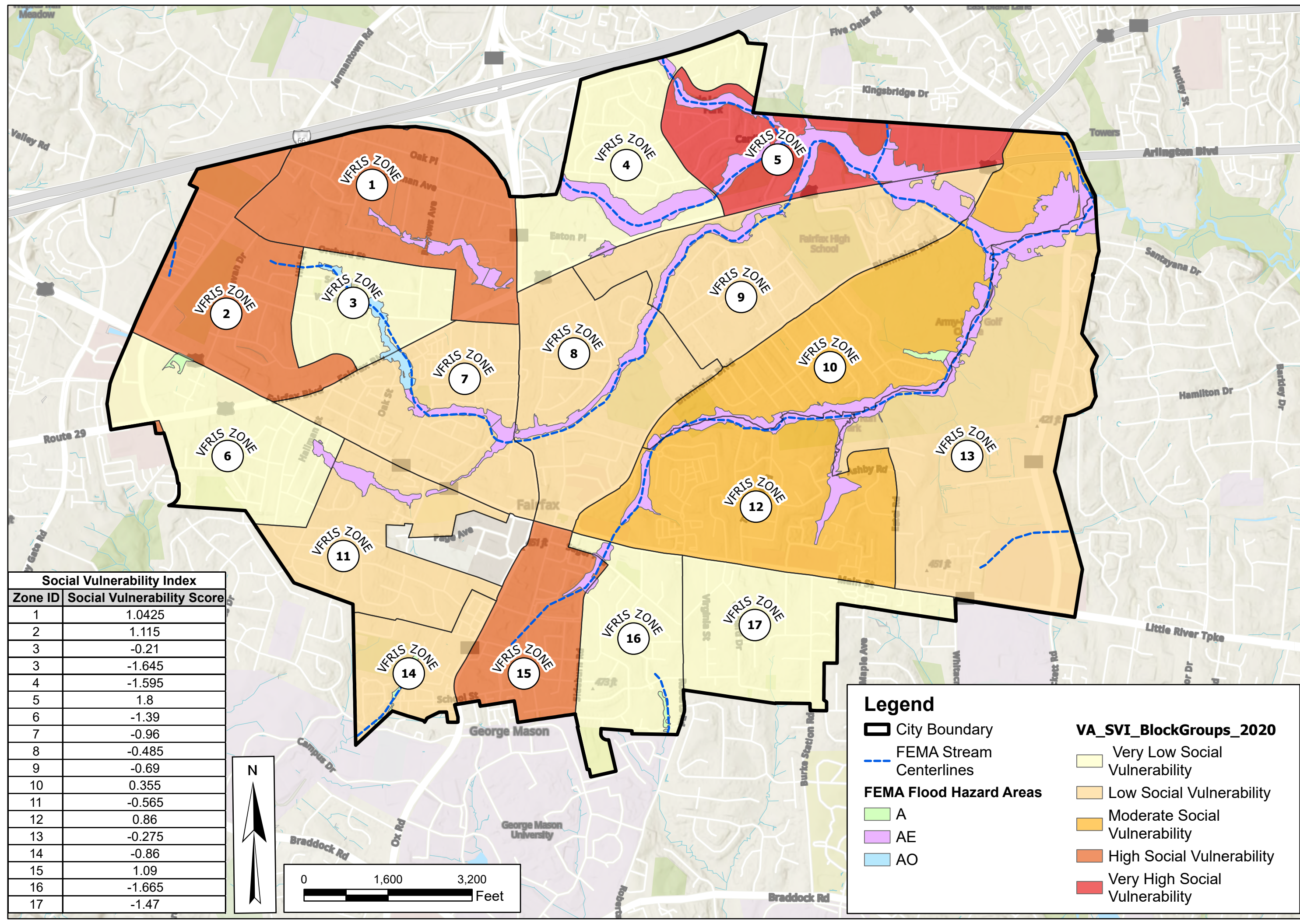
LARGE SCALE STORM EVENTS STUDY - CFPF GRANT  
SVI MAP

PREPARED FOR CITY OF FAIRFAX  
PUBLIC WORKS DEPARTMENT

SCALE  
1" = 1,600'

PROJECT NUMBER  
N/A

SHEET NUMBER  
APPENDIX C



Social Vulnerability Index	
Zone ID	Social Vulnerability Score
1	1.0425
2	1.115
3	-0.21
3	-1.645
4	-1.595
5	1.8
6	-1.39
7	-0.96
8	-0.485
9	-0.69
10	0.355
11	-0.565
12	0.86
13	-0.275
14	-0.86
15	1.09
16	-1.665
17	-1.47

**Legend**

- City Boundary
- FEMA Stream Centerlines
- FEMA Flood Hazard Areas**
  - A
  - AE
  - AO

**VA\_SVI\_BlockGroups\_2020**

- Very Low Social Vulnerability
- Low Social Vulnerability
- Moderate Social Vulnerability
- High Social Vulnerability
- Very High Social Vulnerability



## References

- [1] "Tropical Storm Helene: September 26-27, 2024," National Weather Service, [Online]. Available: <https://www.weather.gov/ilm/Helene2024>.
- [2] "Accotink Creek Watershed," Fairfax County, [Online]. Available: <https://www.fairfaxcounty.gov/publicworks/stormwater/accotink-creek-watershed>.