

Path to a Flood Resilient Spout Run

Flood Resilient Arlington

September 11, 2024



ARLINGTON
VIRGINIA

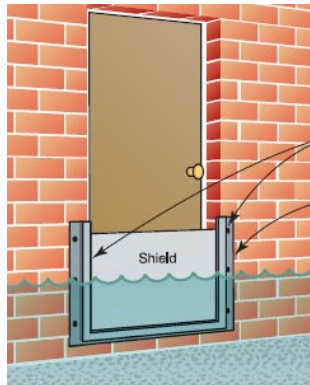


Agenda

- Quick overview of Flood Resilient Arlington and Overland Flow
- RAMP
- Voluntary Property Acquisition Update
 - Status Update
- CIP Funding
- High Water Detection Devices
- Langston Blvd Site Plan projects
 - 3130 LB
 - 4500 LB
 - 1501 LB
- Questions



Key Elements of Flood Resilient Arlington



Analytics and Data Assessment

New Types and Locations for Capacity Projects

Increased Stormwater Requirements


Increased Funding

Voluntary Property Acquisition

Floodproofing Outreach


Mapping Program Investments


Legend


 Watersheds


Storm Water Management Projects


Program / Status


 Capacity Complete / Under Construction

 Capacity / Planned


 Maintenance Capital / Complete


 Maintenance Capital / Planned

 Water Quality / Complete


 Water Quality / Planned


Past Storm Water Management Initiatives

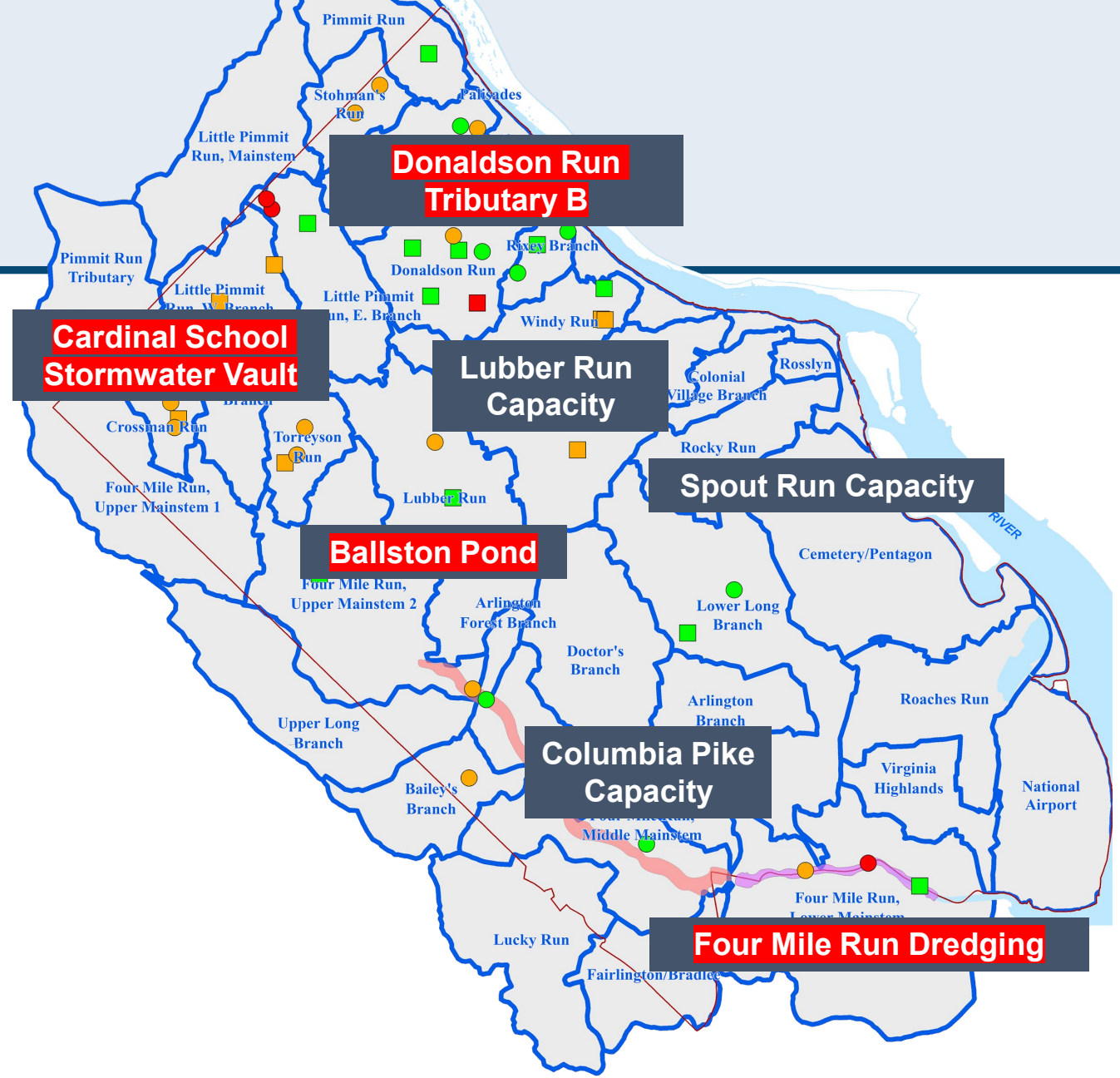
 Flood Control 1984

 Flood Plain Aquisition 60's-70's

Other Map Elements

 County Line

 Potomac River



RAMP (Risk Assessment and Management Plan)

RAMP-ING UP FOR STORMS

RISK ASSESSMENT AND MANAGEMENT PLAN

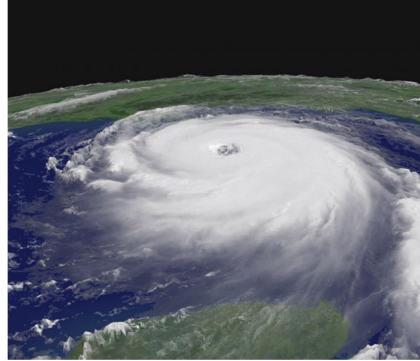
RAMP, the County's Risk Assessment and Management Plan, is a comprehensive framework for modeling, measuring and reducing risk in the face of the increasing frequency and intensity of storms and flood-related impacts influenced or caused by climate change.

The RAMP has updated Arlington's climate projections for flooding, sea level rise and storm surge using 2040, 2070 and 2100 as the climate time horizons. Further, the RAMP has created inundation maps for each of the climate time horizons, identified Critical Government Facilities and completed Vulnerability and Risk Assessments for nine priority watersheds. The Risk Assessments combine economic, environmental and social risk; the latter designed to reflect vulnerability and risk specific to moderate- to high-Social Vulnerability Index communities.

- Prior to the RAMP, flood mitigation planning used ATLAS 14, a common and widely-used NOAA Tool
- ATLAS 14 lags in updates but, critically, uses past and present storm/flood data only (temporal stationarity)
- **The RAMP expands upon past and present data, with climate projections and modeling for 2040, 2070, and 2100**
 - RCP 8.5 with moderate forcing
 - Inland flooding, sea level rise, and storm surge
 - Present and future 2-D flood mapping within the key watersheds identified as flood-vulnerable

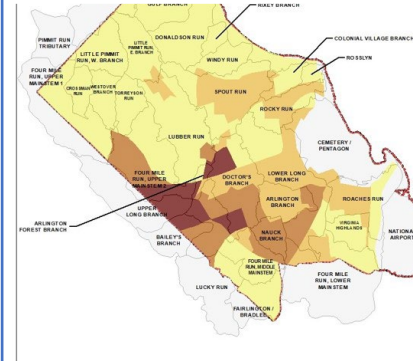
RAMP Resilience Planning Approach

Develop Framework



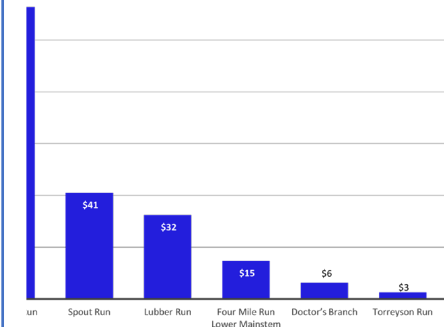
Goals
Climate
Scenarios
Tools

Identify Vulnerabilities



Facility inventory
Flood modeling
Vulnerability
Assessments
Risk Analysis

Adaptation Strategies



Cost benefit
analysis
Programmatic
strategies



Core RAMP Elements

- **Updated Climate Projections**
 - Multiple climate vulnerabilities and climate “horizons” or timeframes
- **Inundation Maps / Updated IDF Curves**
 - modeled on a Watershed-Scale over multiple climate horizons (2040, 2070, and 2100)
- **Vulnerability Assessments**
 - Calculations factoring critical civil/civic assets, environmental impacts, and social vulnerability
- **Risk Assessments**
 - Direct, indirect and cascading impacts based on 1) total loss or replacement, lost revenue, increased costs of O&M, loss of economic activity
- **Capital Projects, Programs and Policies to Mitigate and Manage Flooding in Arlington County**
 - By type and cost-benefit calculations
- **Market Impacts and Analysis**
 - Impacts on bonding/cost of debt, re/i

Updated IDF Curves Allow for Future Ready Design

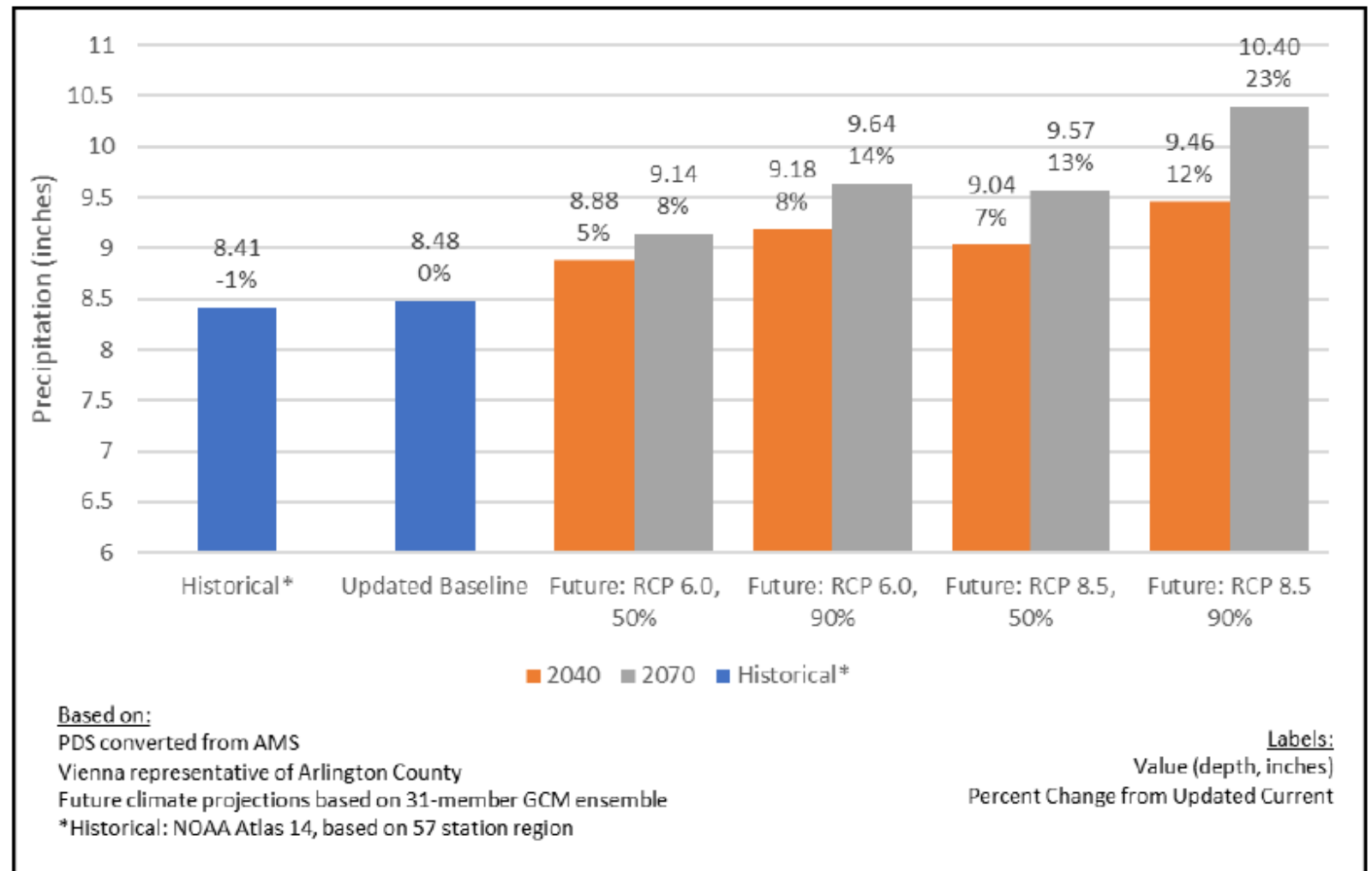


Figure 10. Baseline and Future 100-year 24-Hour Precipitation Depths for Vienna

Engineers use precipitation records, known as intensity, duration, frequency curves (IDF curves) in designing stormwater infrastructure. Arlington’s previous IDF curves were developed by NOAA and had not been updated since 2000. The RAMP provides updated rainfall depths for Arlington County based on different climate scenarios

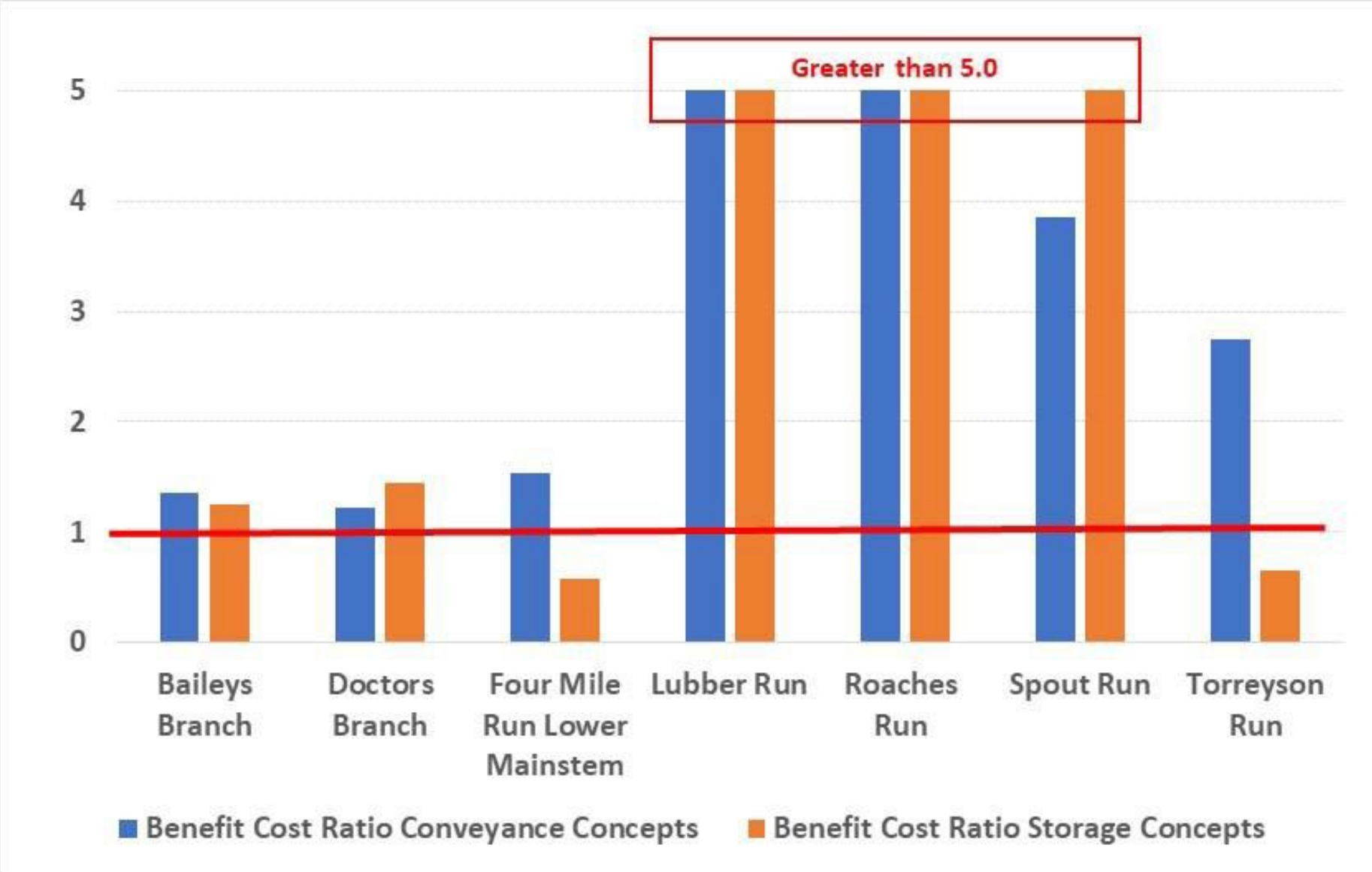
RCP stands for representative concentration pathway and is a prediction of future greenhouse levels/impacts.

Economic Risk by Watershed - "Cost of Inaction"

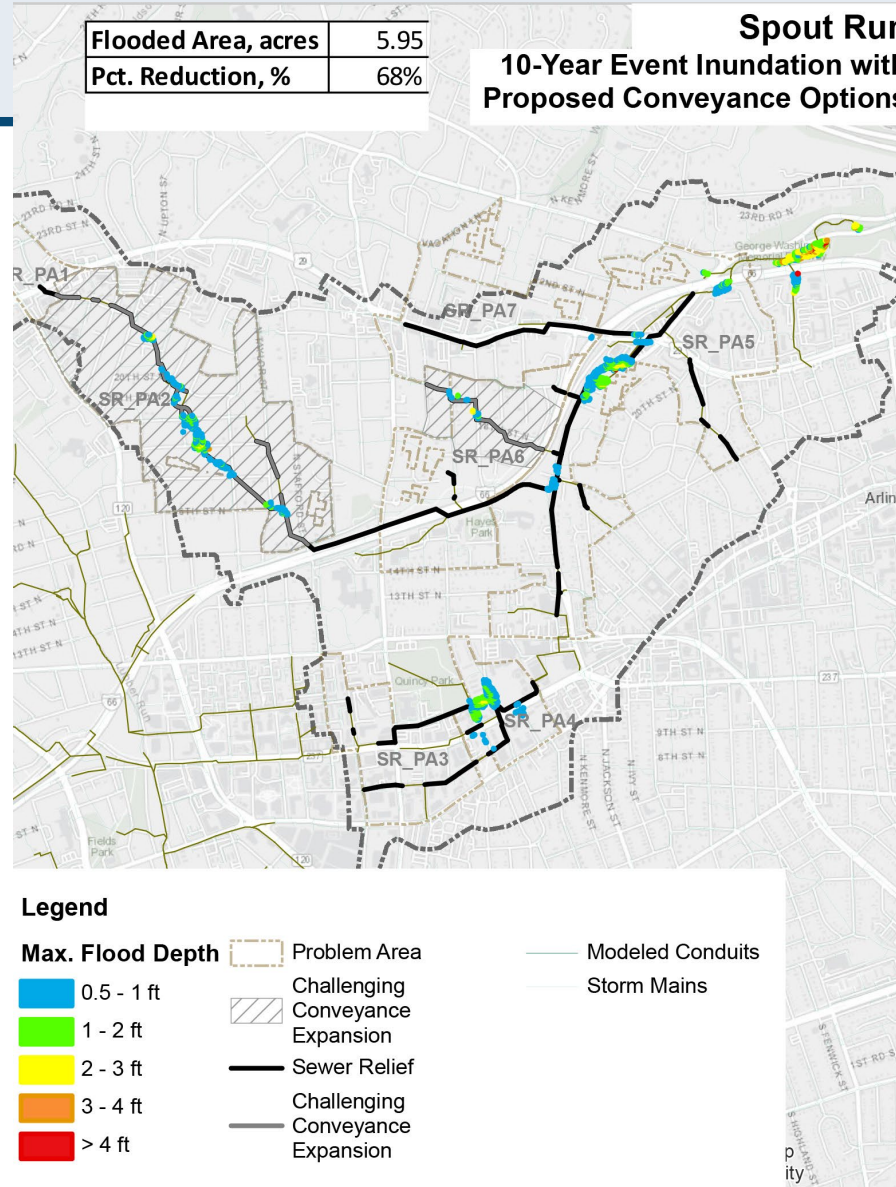
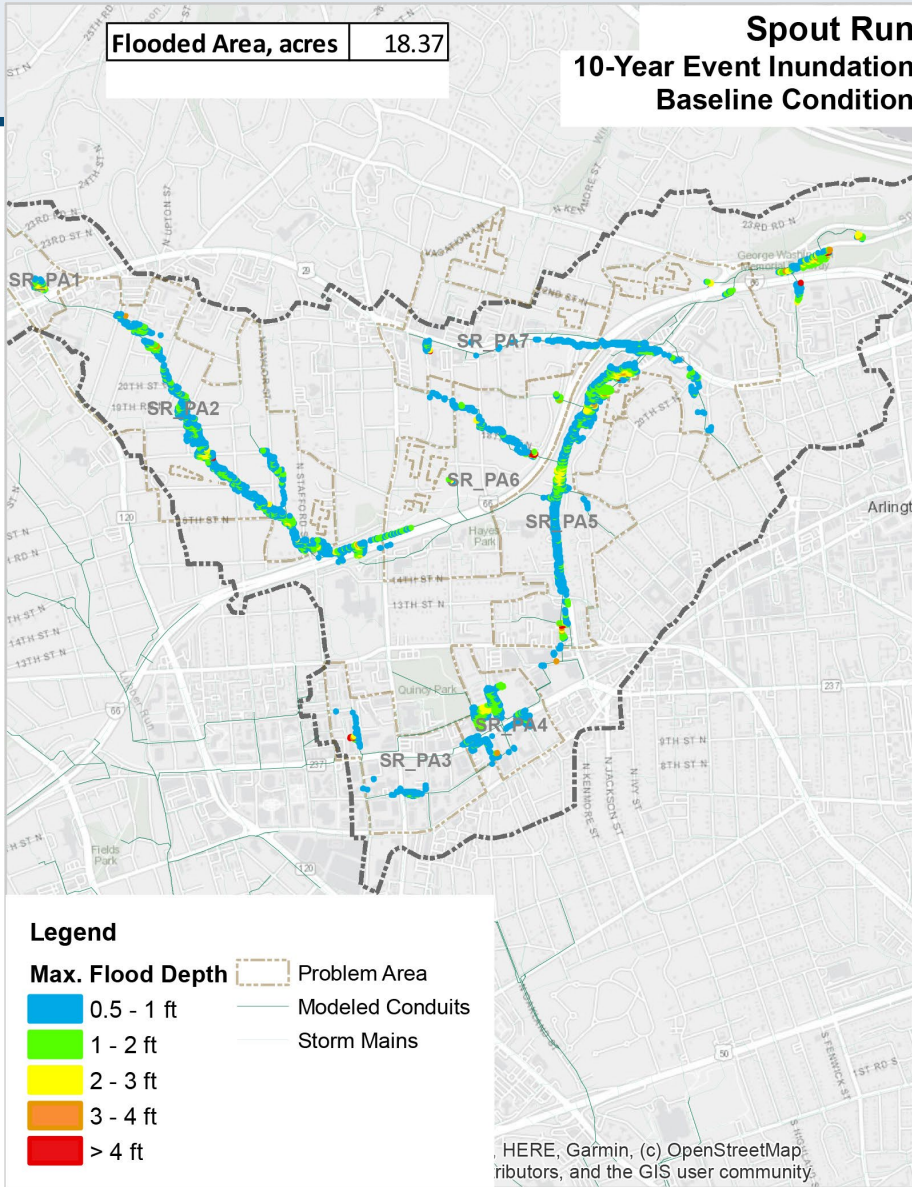
Watershed	Annualized Risk of Losses (millions \$)	Potential Losses for 100-year Storm (millions \$)	
		100-year Storm in 2020: 8.5 Inches in 24 Hours	100-year Storm in 2070: 9.6 Inches in 24 Hours
Roaches Run	112.8	718.9	803.5
Spout Run	41.0	234.4	263.4
Lubber Run	32.4	297.1	344.2
Four Mile Run Lower Mainstem	14.7	109.2	136.8
Doctor's Branch	6.4	39.0	46.1
Torreyson Run	2.6	17.9	19.7
Bailey's Branch	1.0	7.5	n/a

Capital Projects Cost Benefit Analysis

Allows for prioritization of projects and community understanding of investments

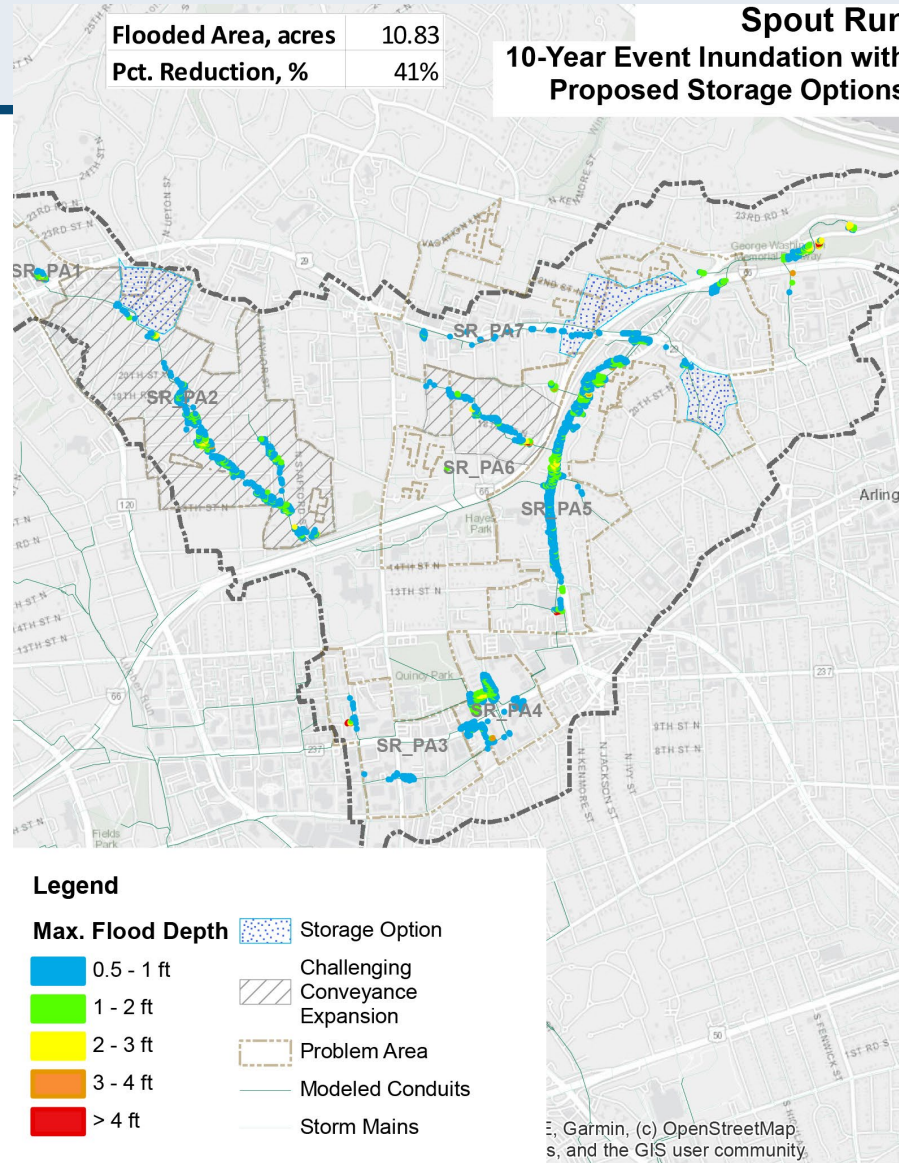
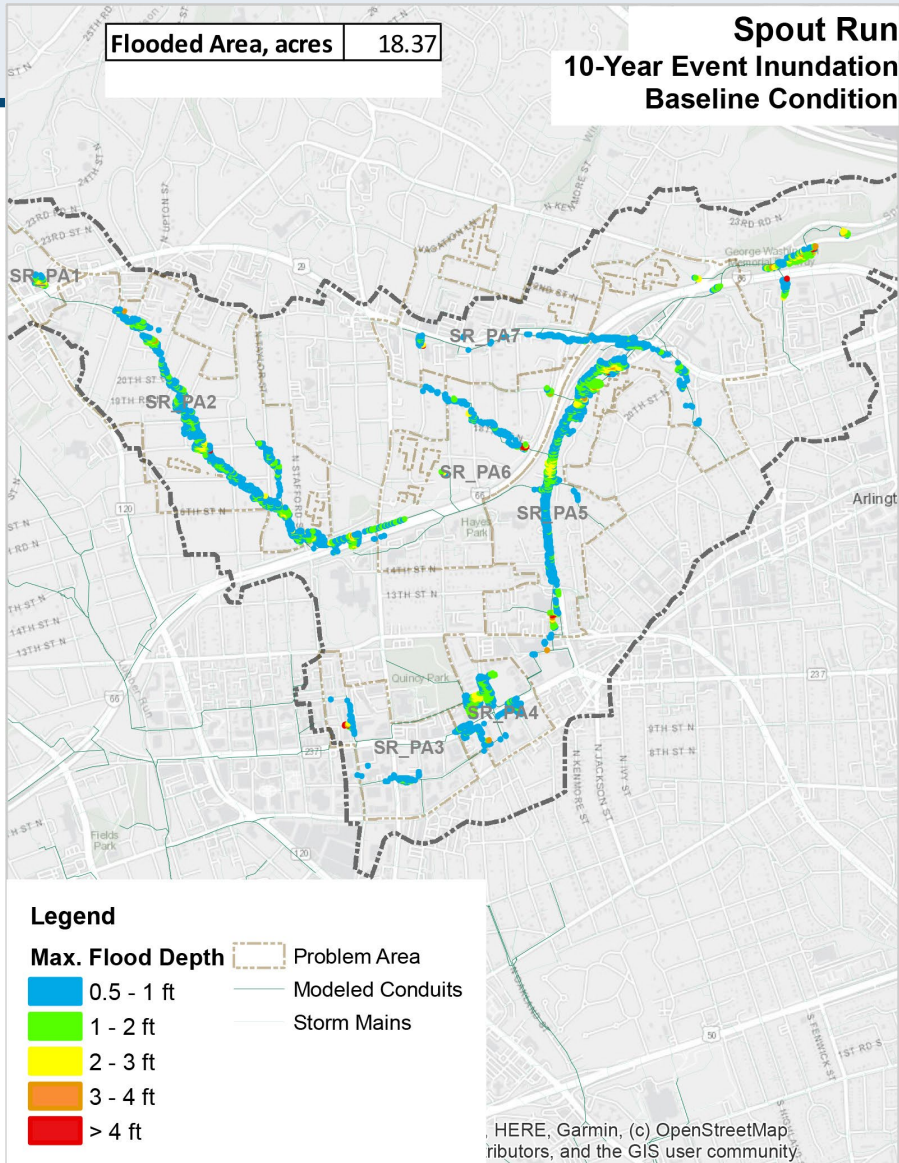


Spout Run 10-year storm at Baseline and with proposed Conveyance Upgrades



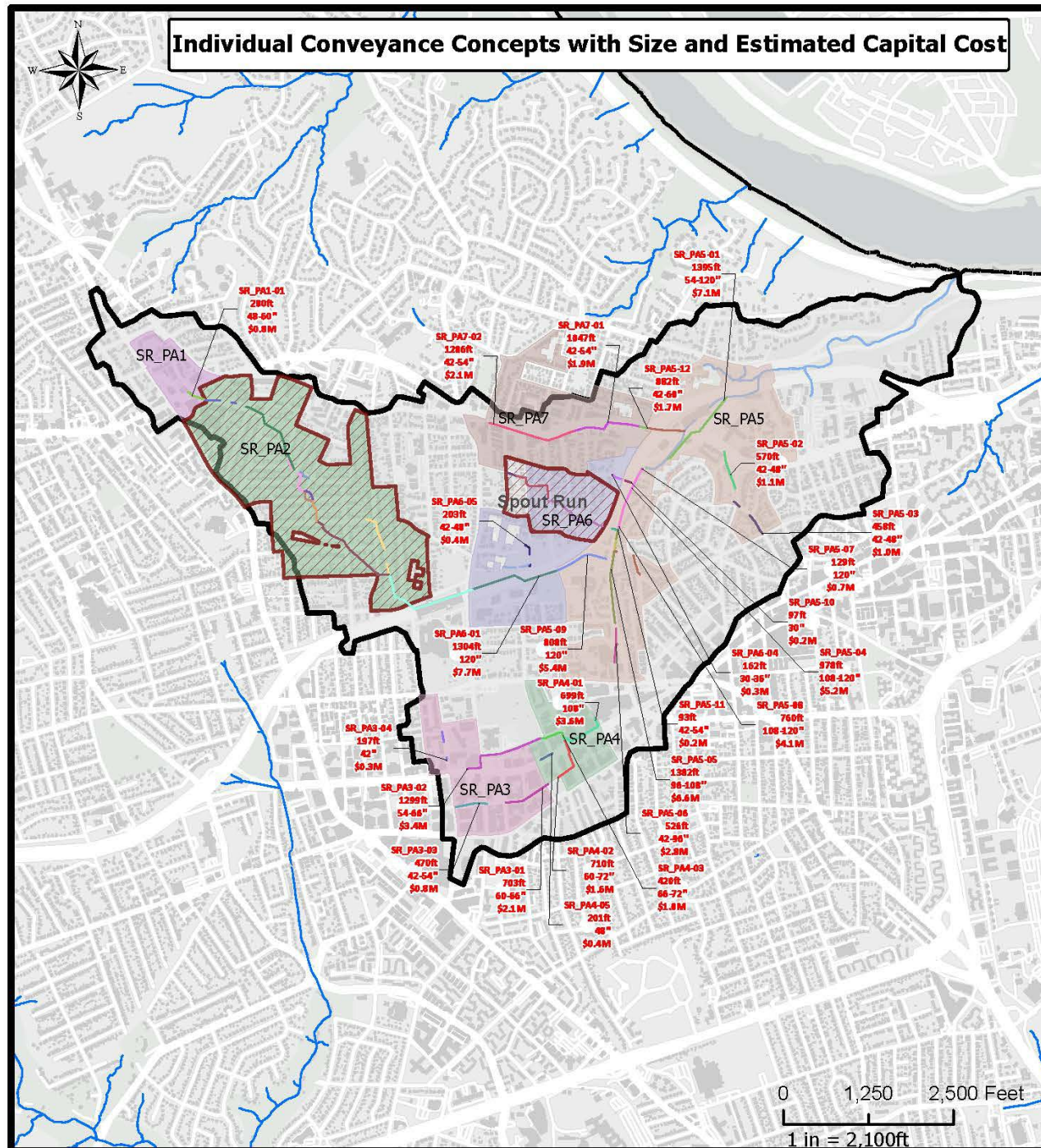
**Percent
reduction in
flooded area
68%**

Spout Run 10-year storm at Baseline and with proposed Storage Upgrades



Percent reduction in flooded area 41%

Spout Run individual conveyance projects with size and estimated cost



Concept ID	Total Length, feet	Pipe Diameter, inches	Capital Cost, \$millions
SR_PA1-01	280	48-60"	\$0.8
SR_PA2-01	1,587	96-108"	\$7.8
SR_PA2-02	1,394	84-113"	\$4.7
SR_PA2-03	319	48-54"	\$0.6
SR_PA2-04	238	72"	\$0.6
SR_PA2-05	219	54"	\$0.4
SR_PA2-06	516	60-72"	\$1.1
SR_PA2-07	172	54-72"	\$0.4
SR_PA2-08	1,278	54-84"	\$3.0
SR_PA2-09	287	48-72"	\$0.6
SR_PA2-10	696	42-54"	\$1.2
SR_PA3-01	703	60-66"	\$2.1
SR_PA3-02	1,299	54-66"	\$3.4
SR_PA3-03	470	42-54"	\$0.8
SR_PA3-04	197	42"	\$0.3
SR_PA4-01	699	108"	\$3.6
SR_PA4-02	710	60-72"	\$1.6
SR_PA4-03	420	66-72"	\$1.0
SR_PA4-05	201	48"	\$0.4
SR_PA5-01	1,395	54-120"	\$7.1
SR_PA5-02	570	42-48"	\$1.1
SR_PA5-03	458	42-48"	\$1.0
SR_PA5-04	978	108-120"	\$5.2
SR_PA5-05	1,382	96-108"	\$6.6
SR_PA5-06	526	42-96"	\$2.8
SR_PA5-07	129	120"	\$0.7
SR_PA5-08	760	108-120"	\$4.1
SR_PA5-09	808	120"	\$5.4
SR_PA5-10	97	30"	\$0.2
SR_PA5-11	93	42-54"	\$0.2
SR_PA5-12	882	42-60"	\$1.7
SR_PA6-01	1,304	120"	\$7.7
SR_PA6-02	948	42-54"	\$1.9
SR_PA6-03	738	42"	\$1.2
SR_PA6-04	162	30-36"	\$0.3
SR_PA6-05	203	42-48"	\$0.4
SR_PA7-01	1,047	42-54"	\$1.9
SR_PA7-02	1,286	42-54"	\$2.1
SR_PA7-03	136	42"	\$0.2

LEGEND

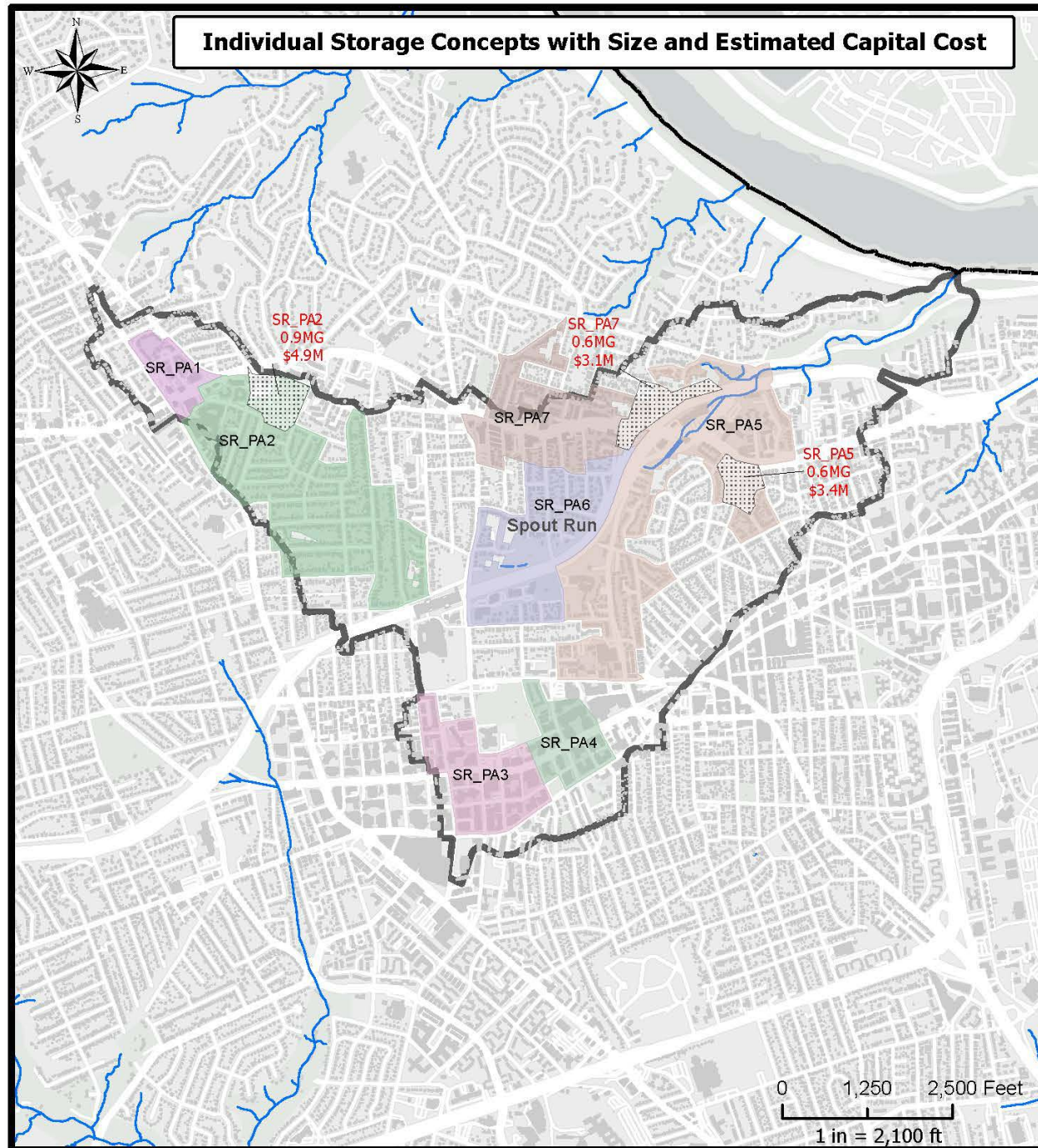
Conveyance Concepts Label: (in the order shown)
 Concept ID
 Pipe Length, feet
 Pipe Diameter, inches
 Capital Cost, \$millions

Basemap:
 Watershed
 County Boundary
 Buildings
 Hydrology

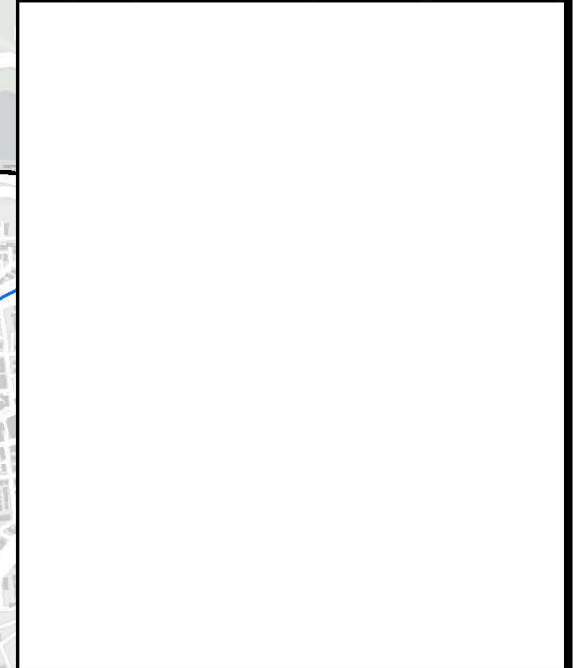
Data:
 Problem Areas
 Conveyance Concept Pipes
 Challenging Conveyance Expansion

Conveyance Concepts: Spout Run

Spout Run individual storage projects with size and estimated cost



Concept ID	Storage Volume, million gallons	Ownership	Capital Cost, \$ millions
SR_PA2	0.9	Mixed	4.9
SR_PA7	0.6	Mixed	3.1
SR_PA5	0.6	Mixed	3.4



LEGEND

Storage Concepts Label: (in the order shown)
 Concept ID
 Storage Volume, million gallons
 Capital Cost, \$ millions

Basemap:
 Watershed
 County Boundary
 Buildings
 Hydrology

Data:
 Problem Areas
 General Area for Storage Concept

Storage Concepts: Spout Run

A Multi-prong approach is proposed. There may be construction projects to improve and maintain our stormwater system depending on when and where right of way is acquired via the Voluntary property acquisition program.



CIP Funding for Spout Run

Adopted FY 25 – FY 34 CIP

Cost Center	Program Name	Phase	Project Name	FY 2025	FY 2026	FY 2027	FY 2028	FY 2029	FY 2030	FY 2031	FY 2032	FY 2033	FY 2034	10 Year Total
47222	System Expansion/ Capacity	Land Acquisition	Spout Run Watershed Capacity Improvements	5,250	5,400	5,820	5,450	4,990	4,990	4,105	4,075	2,875	2,950	45,905
47222	System Expansion/ Capacity	Design	Spout Run Watershed Capacity Improvements	150	155	160	165	165	170	170	175	175	175	1,660
47222	System Expansion/ Capacity	Construction	Spout Run Watershed Capacity Improvements	2,500	2,575	2,650	2,725	2,475	2,645	2,645	1,565	1,440	1,180	22,400
				7,900	8,130	8,630	8,340	7,630	7,805	6,920	5,815	4,490	4,305	69,965
	12. Spout Run Watershed Capacity Improvements			7,900	8,130	8,630	8,340	7,630	7,805	6,920	5,815	4,490	4,305	69,965

NOTE: Proposed funding is NOT for improvements in the Langston Blvd. Planning corridor, but is for downstream flooding mitigation.

* Property Acquisition will be phased and prioritized over multiple CIP cycles. There is some flexibility in project design, acquisition and construction categories.

Note: The proposed level of funding for this projects begins to approach the funding levels for stormwater that sister jurisdictions already provide.

Voluntary Property Acquisition Program

- None of the solutions evaluated for Spout Run can manage the updated 10-year storm.
- Designing for a 10-year storm event is only appropriate where overland relief is available for larger storm events.
- In Spout Run, there is not sufficient available space within existing rights-of-way to maintain the infrastructure, make resilient system upgrades, or to provide overland relief.
- **There is no long-term solution to reduce flood risk in Spout Run without adding overland relief.**
- **Phased Property Acquisition is a necessary component of a resilient stormwater improvement program to provide overland relief and reduce flood risk to the community.**

Voluntary Property Acquisition Update

- Letters sent out in Fall 2022
- Overall, six properties have been acquired (four in Spout Run). Details regarding Spout Run properties shall follow.
- Several additional properties are in various stages of the process
- We understand that there is a lot of community interest in the status and plans for the properties. The program is in the early stages and we appreciate your patience.
- Note that we still need to respect the privacy of people involved in the program.

Program update

Demo Completed



Demo Fall/Winter 2024



What is the plan for acquired properties?

- Re-establishing overland relief flow paths for water during large storm events for flood mitigation.
- Provide access to existing stormwater infrastructure to conduct necessary maintenance or upgrades
- Location of future stormwater infrastructure
- Construction of stormwater detention facilities
- Potential for co-locating water quality and stormwater capacity projects

Reminder - FAQs Available Online

How do I know if the County is interested in purchasing my property? *The County's real estate team will contact homeowners about potential property acquisitions by letter. Properties will be considered based on the degree that they can be used by the County for the purposes noted above and the flood risk present in specific areas of the watershed based on historic development patterns, topography, etc.*

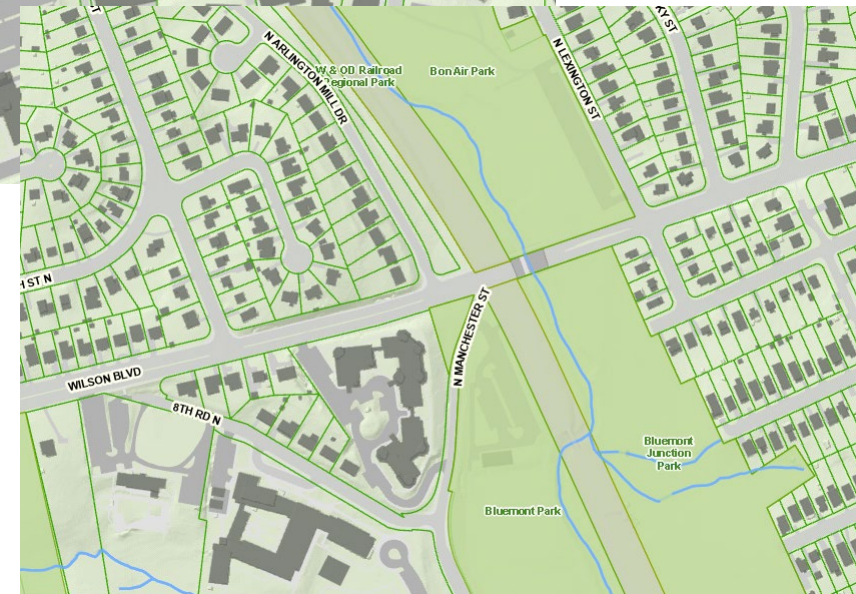
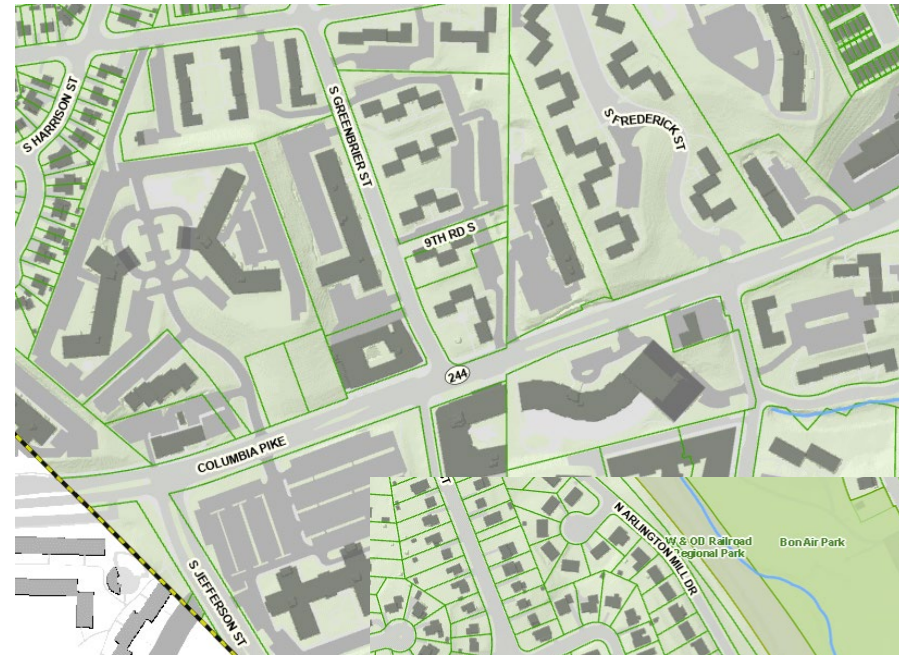
What will the purchased properties be used for? *Properties acquired through voluntary acquisitions will be used to:*

- *re-establish overland relief flow paths for water during large storm events for flood mitigation,*
- *provide access to existing stormwater infrastructure to conduct necessary maintenance or upgrades,*
- *locate future stormwater infrastructure stormwater detention facilities and/or water quality facilities*

[Property Acquisition FAQs](#)

High Water Detection Sensors

- Currently installed at two locations:
 - Columbia Pike at Greenbrier
 - Wilson Boulevard at Bon Aire Park
- Third location in Spout Run – plans approved, anticipated installation early 2025
 - Kirkwood and Langston
- Warning lights engaged when water level reaches approximately 6 inches



High Water Detection Sensors

Spout Run Watershed at Intersection of Kirkwood Rd. & Langston Blvd.

Procurement is underway.



Flasher location

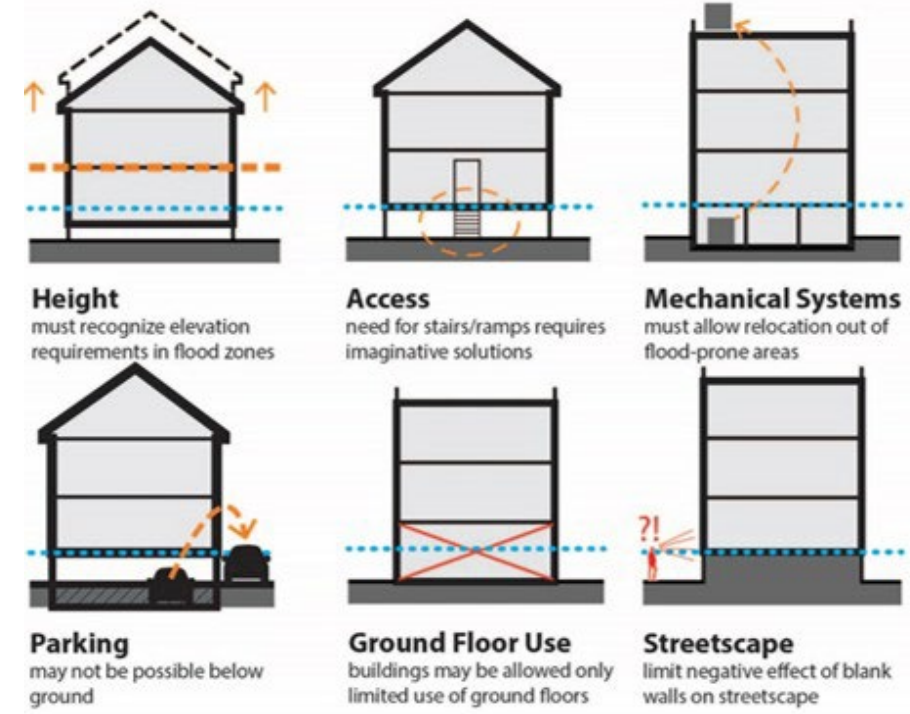
Sensor Location



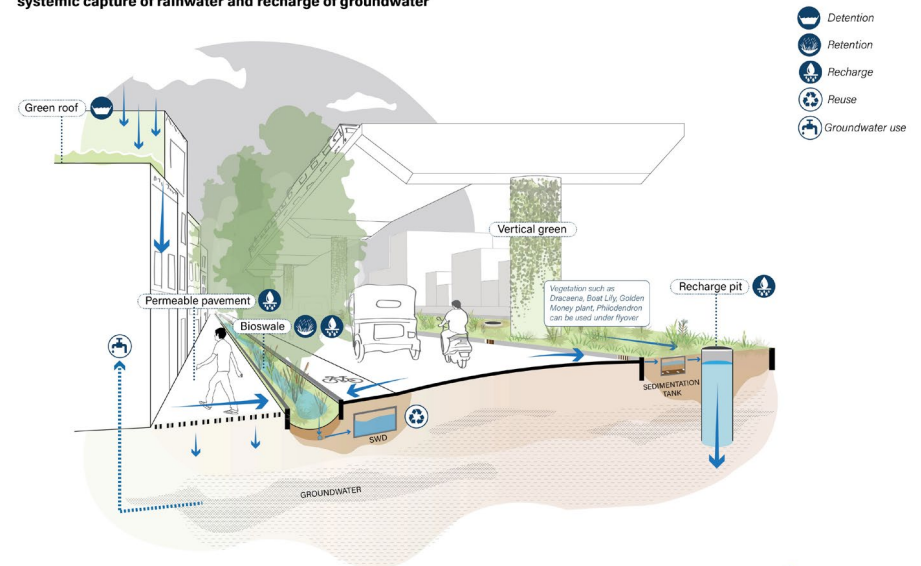
Coming Design/Construct Guidelines and Blended Infrastructure Support

Procurement underway

- Flood Resilient Design and Construction Guidelines Manual
- Future-Facing Natural Infrastructure Manual – *urban heat mitigation*



Interlinking transit corridors, building roofs, and neighbouring unused urban spaces for systemic capture of rainwater and recharge of groundwater



Source: WRI India. Illustration created by Sindhuja Janakiraman

Langston Blvd Site Plans

- 4500 Langston Blvd – Conceptual Plan Submitted (Donaldson Run watershed)
- 1501 Langston Blvd – Conceptual Plan Submitted (Colonial Village Branch watershed)
- 3130 Langston Blvd – Preliminary Plan submitted

Questions can always be sent to the following email address. The address is monitored and the appropriate staff members are notified of the questions and need for a response:

Community Planning, Housing & Development
2100 Clarendon Blvd, Suite 700 Arlington, VA 22201
703-228-3525
cphd@arlingtonva.us

Cphd@arlingtonva.us

Site Plan Process

- *Optional* – Conceptual Site Plan
- Preliminary Site Plan Application
- Active Site Plan Application Accepted
- Community Engagement
- Planning, and others as appropriate, Commissions Hearing
- County Board Hearing

[Site Plan Review Process – Official Website of Arlington County Virginia Government \(arlingtonva.us\)](http://arlingtonva.us)

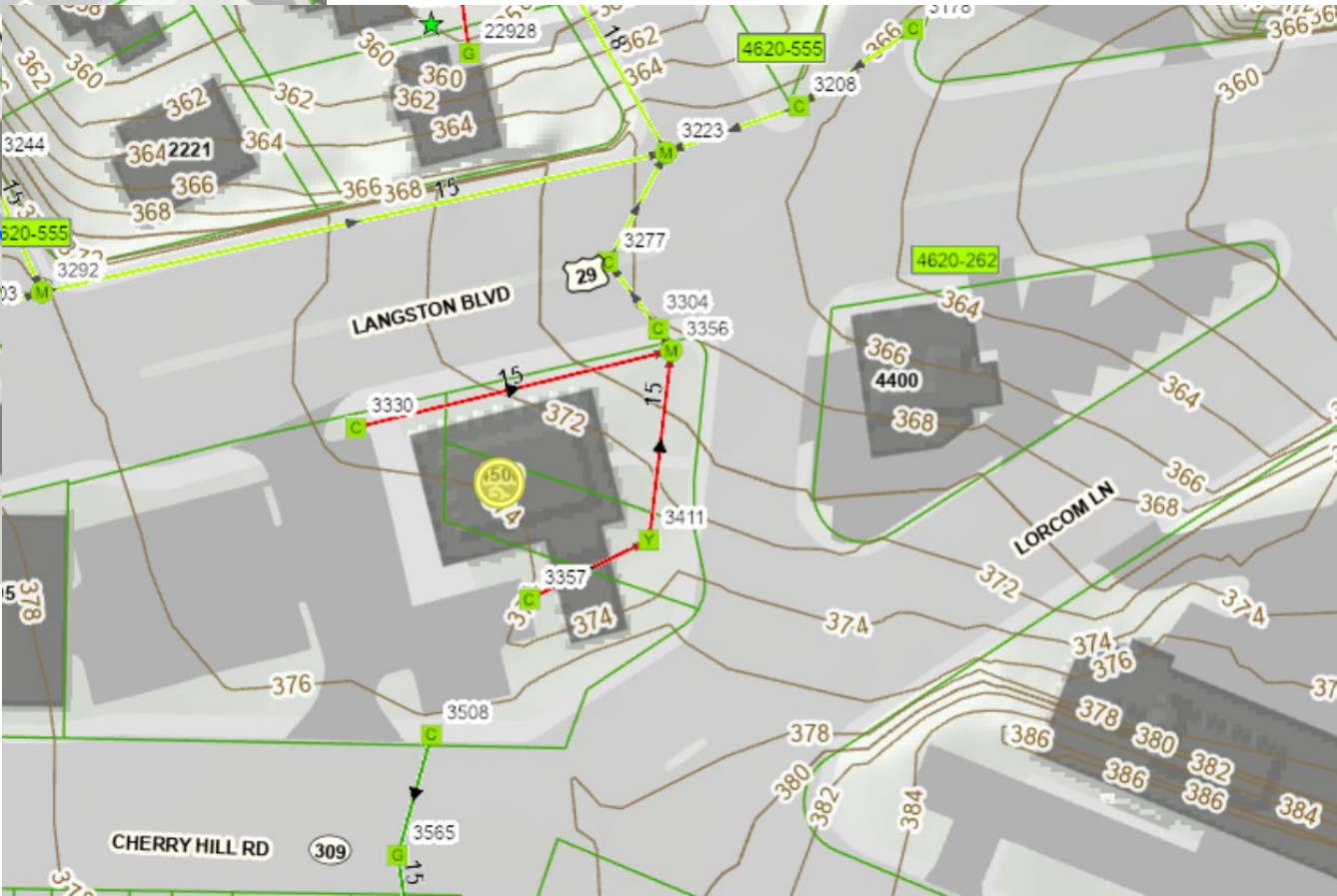
Langston Blvd Site Plan Updates

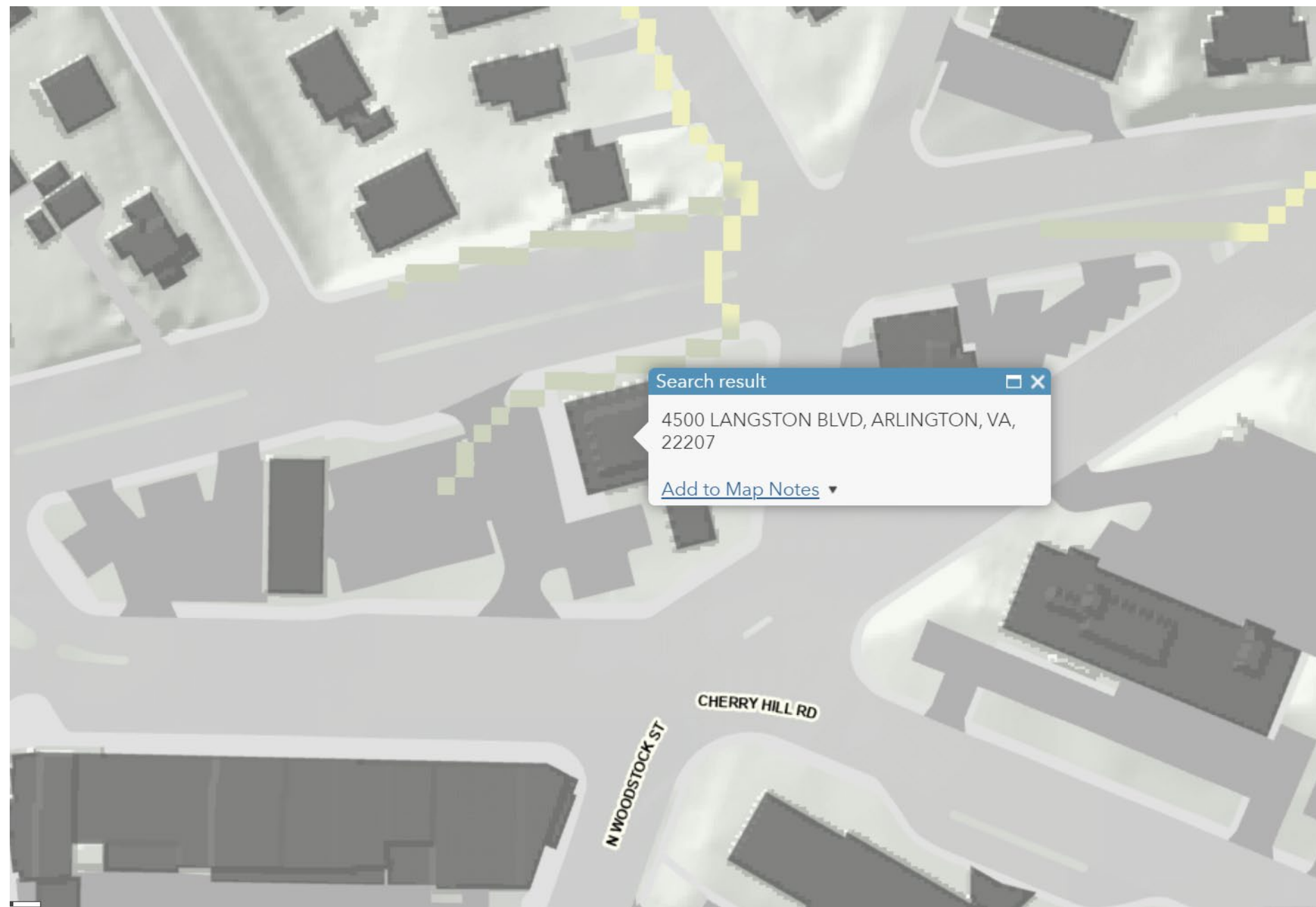
4500 Langston Blvd

- Only a **Concept Plan** was submitted.
- Site does not drain into Spout Run Watershed, but into **Donaldson Run** Watershed
- Site is at very top of watershed with small drainage area compared to watershed and generates relatively little runoff compared to overall watershed.
- Preliminary Site Plan Application has **not** been made
- Final Site Plan Application has **not** been made
- Concept Plans must be requested via FOIA



Site is at very top of Donaldson Run Watershed with a small contributing drainage area – see flow accumulation layer on next slide.





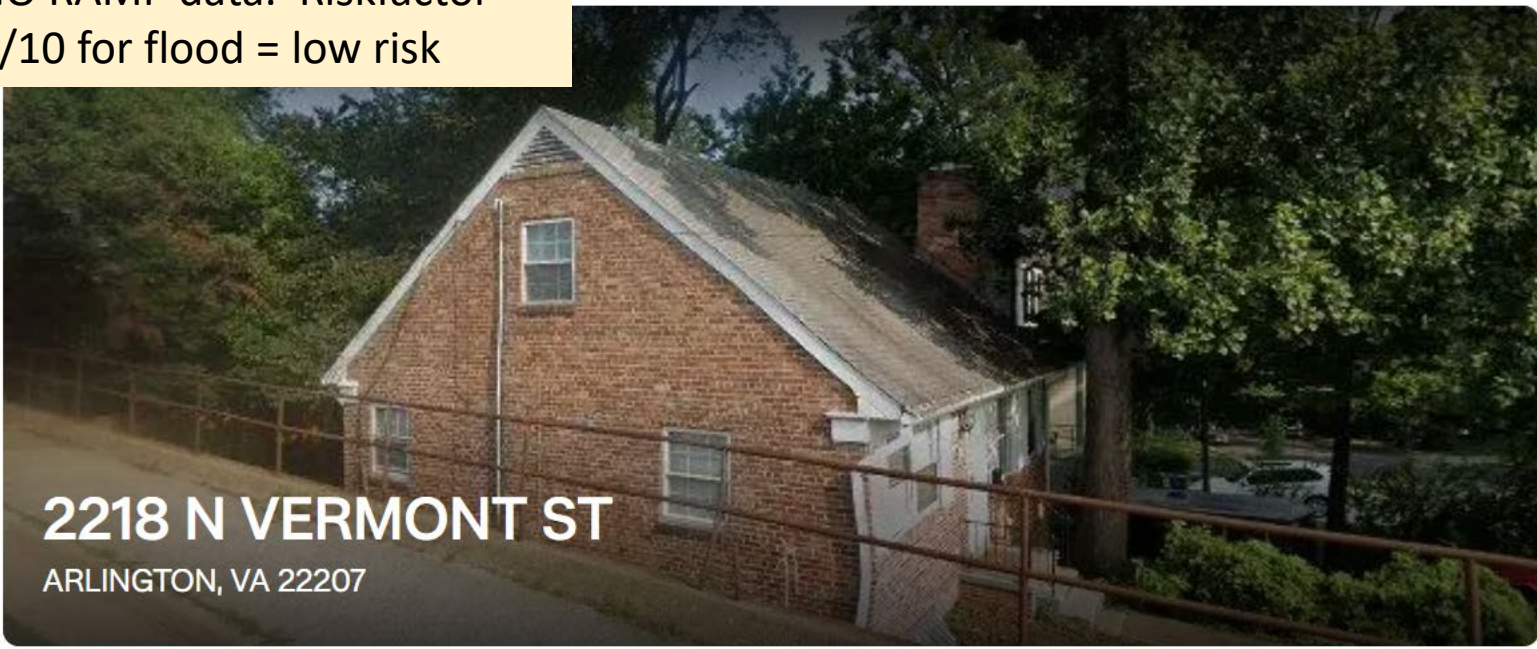
Legend

Stormwater Flow Accumulation

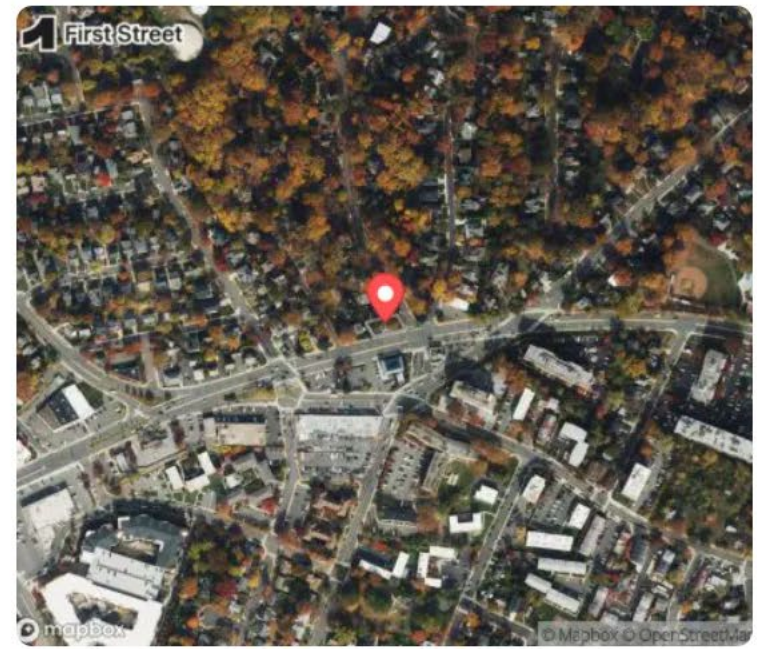
- 100+
- 75 to 100
- 30 to 75
- 10 to 30
- 5 to 10
- 1.5 to 5
- 0.7 to 1.5
- 0.1 to 0.7
- 0.01 to 0.1
- 0 to 0.01

Small Contributing Drainage Area due to being at top of watershed

NO RAMP data. Riskfactor – 1/10 for flood = low risk



2218 N VERMONT ST
ARLINGTON, VA 22207



1/10 Flood Factor 1/10 Fire Factor 4/10 Wind Factor 3/10 Air Factor

Valley Gutter keeps flow in Langston Blvd

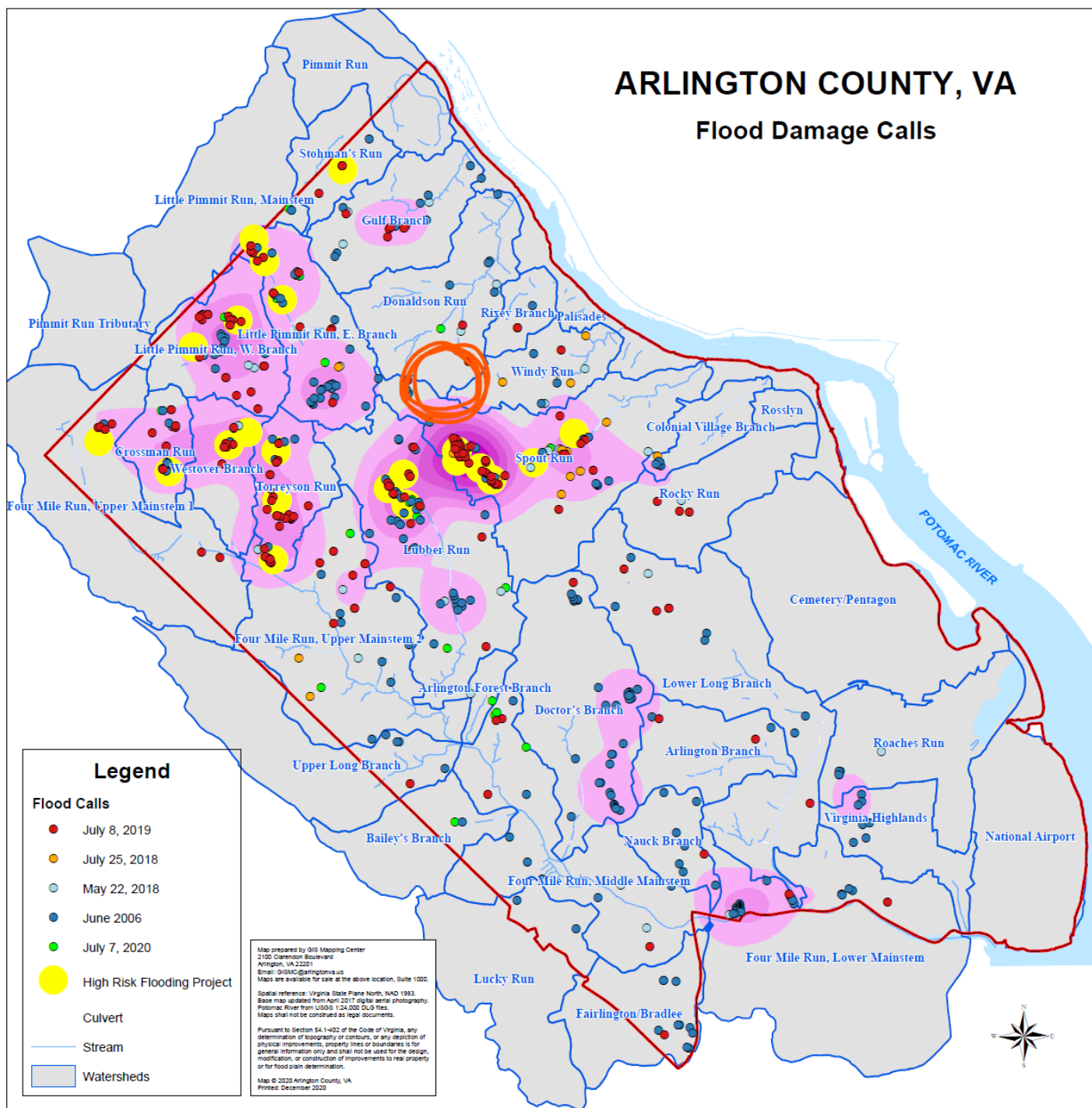
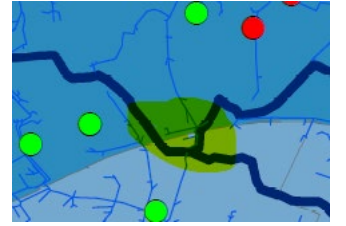


Notice low wall will prevent flow from flowing onto property across the street.



ARLINGTON COUNTY, VA

Flood Damage Calls



Legend

Flood Calls

- July 8, 2019
- July 25, 2018
- May 22, 2018
- June 2006
- July 7, 2020
- High Risk Flooding Project

Culvert

Stream

Watersheds

Map prepared by GIS Mapping Center
 2100 Clarendon Boulevard
 Arlington, VA 22201
 Email: GIS@AC@arlingtonva.us
 Maps are available for sale at the above location, Suite 1000.

Spatial reference: Virginia State Plane North, NAD 1983.
 Base map updated from April 2017 digital aerial photography.
 Potomac River from USGS 1:24,000 scale files.
 Maps shall not be construed as legal documents.

Pursuant to Section 64-1-402 of the Code of Virginia, any determination of topography or contours, or any depiction of physical improvements, property lines or boundaries is for general information only and shall not be used for the design, modification, or construction of improvements to real property or for flood plain determination.

Map © 2020 Arlington County, VA
 Printed: December 2020

No flood calls – no records of high priority flooding (any flooding was not in homes and would therefore be lower priority).

Langston Blvd Site Plan Updates

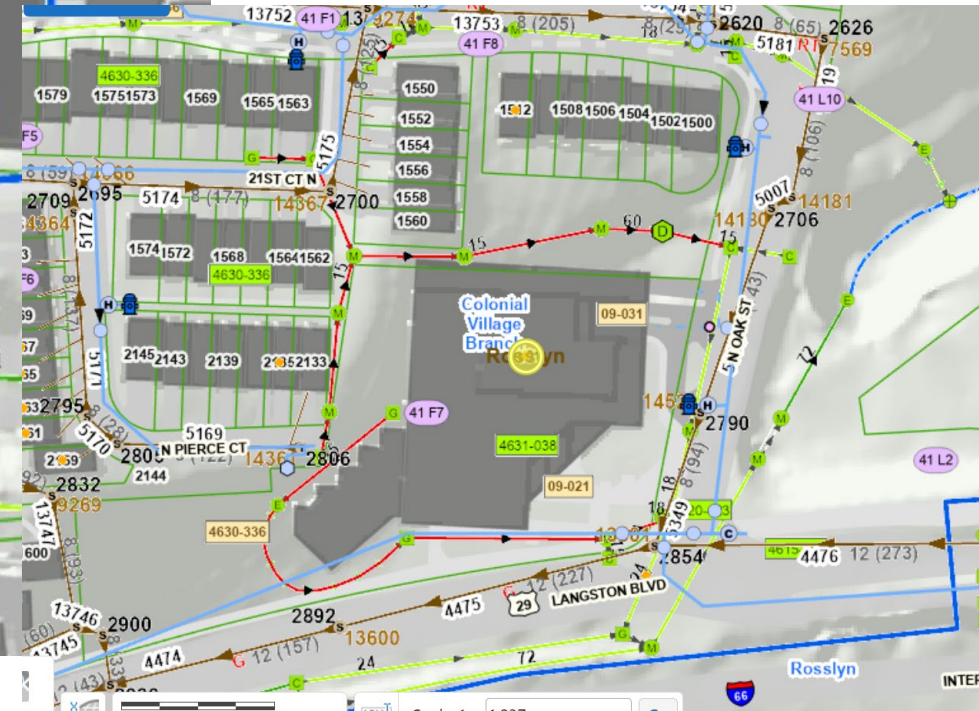
1501 Langston Blvd

- Only a **Concept Plan** was submitted.
- Site does not drain into Spout Run Watershed, but into **Colonial Village Branch** Watershed
- Site is at very top of watershed with small drainage area compared to watershed and generates relatively little runoff compared to overall watershed.
- Site drains into an unimproved channel
- Preliminary Site Plan Application has **not** been made
- Final Site Plan Application has **not** been made
- Concept Plans must be requested via FOIA

1501 Langston Blvd

Area is not in floodplain. Not studied in the RAMP. No flooding history.

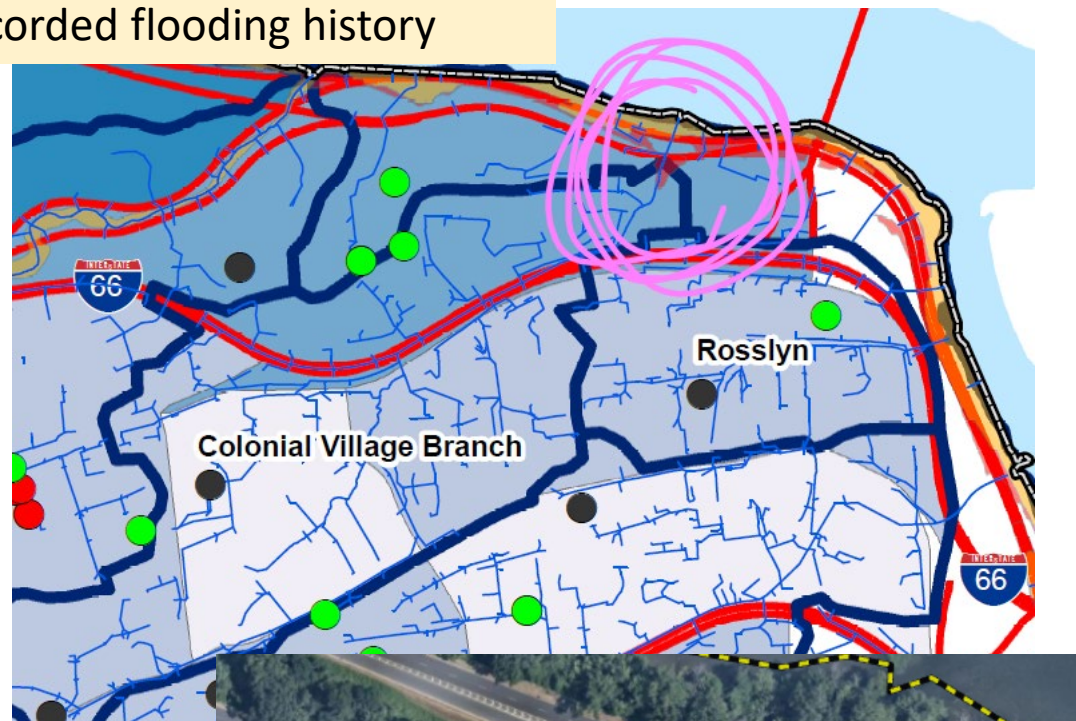
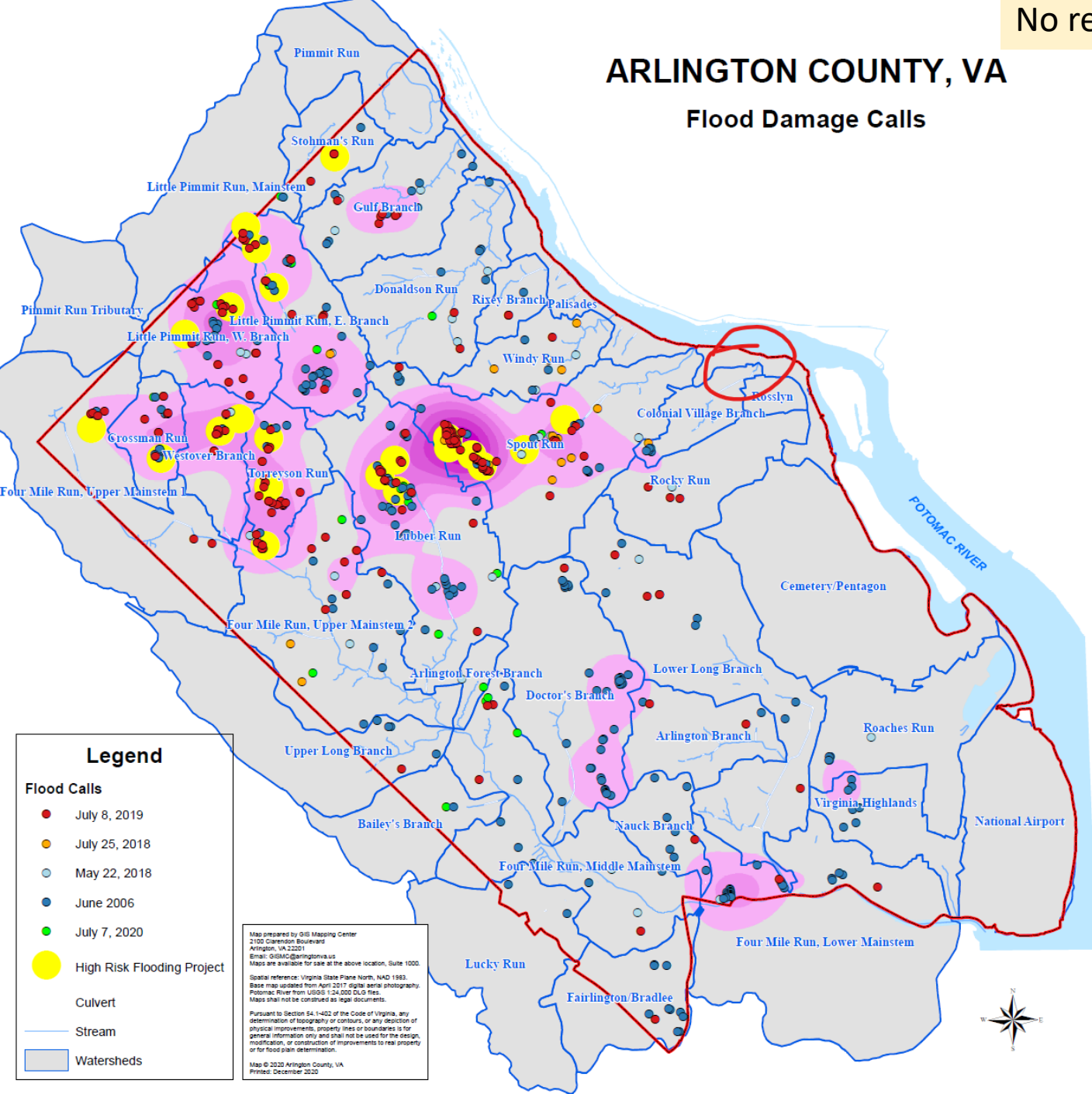
Site is in Colonial Village Branch

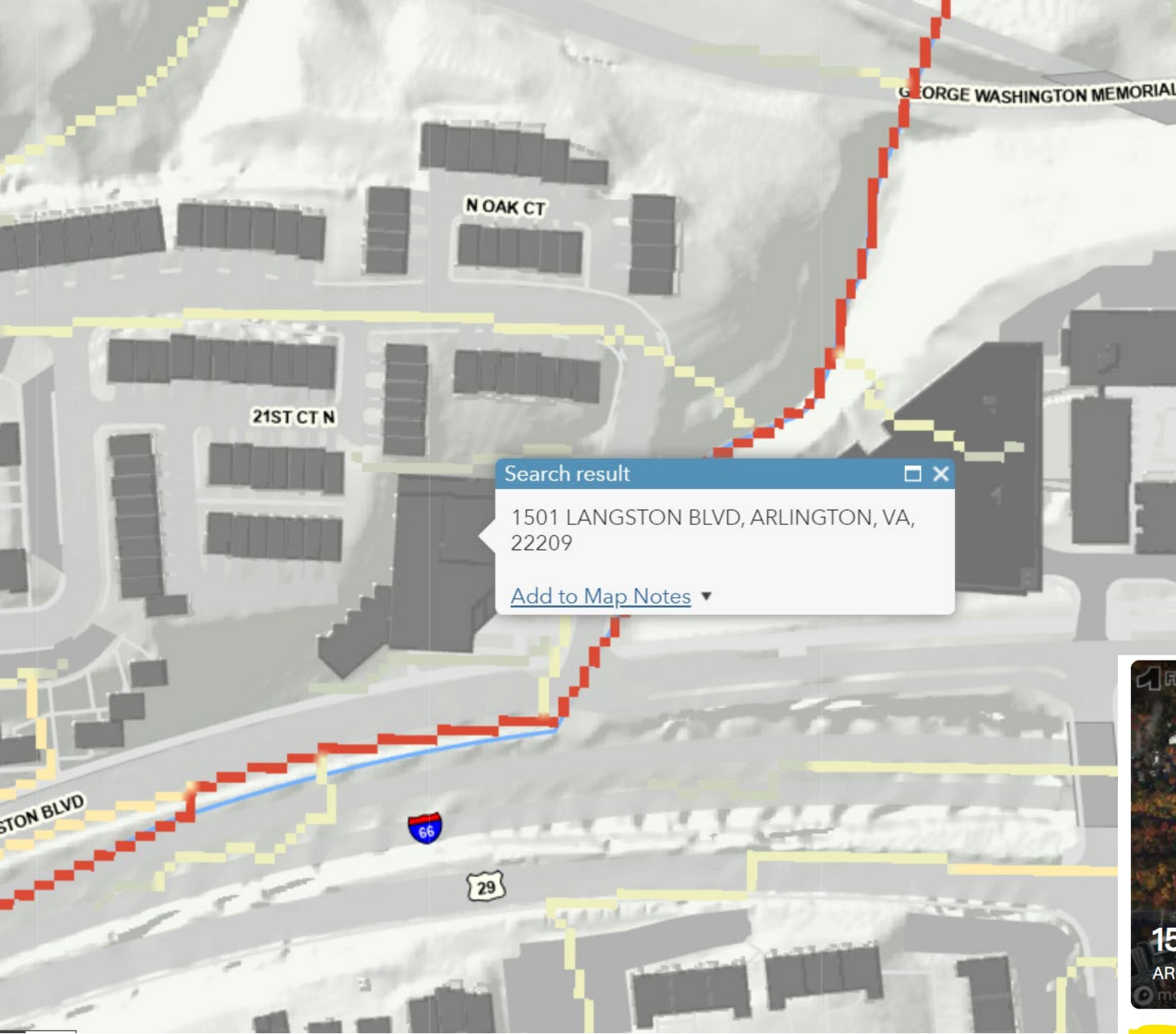


No recorded flooding history

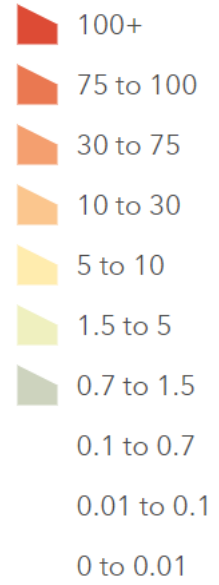
ARLINGTON COUNTY, VA

Flood Damage Calls

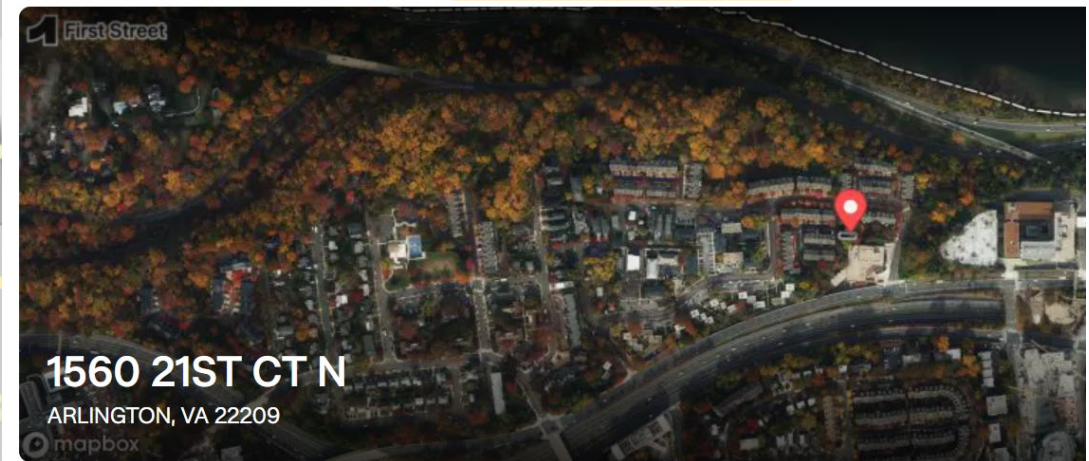




Stormwater Flow Accumulation



Low Flood Risk



1/10 Flood Factor 1/10 Fire Factor 4/10 Wind Factor 3/10 Air Factor 7/10 Heat Factor

Langston Blvd Site Plan Updates

3130 Langston Blvd

- Amend the site's GLUP designation to "Medium" Office-Apartment-Hotel
- Rezone the site to C-O-2.5
- Demolish the existing Walgreens retail building
- Construct a new 12-story building containing 276 residential units and approx. 5,300 sf of ground floor retail GFA
- Modifications requested including: additional density, density exclusions, loading, compact parking ratio, and other modifications

This Preliminary Plan is still under staff review. Plans are available here:

[Private Development – Official Website of Arlington County Virginia Government \(arlingtonva.us\)](https://www.arlingtonva.us)

(Expand the Preliminary Site Plan tab)

Preliminary site plans are in the earliest stages of the site plan process. [Learn more.](#)

Project Webpage, Address, Application Materials	Anticipated CPHD Acceptance Date	Description	Applicant	Staff*	Project Chair**
Shirlington House 4201 31st Street S. (Shirlington) SPLN24-00001	September 2024	New Site Plan: <ul style="list-style-type: none"> Retain existing by-right 436-unit residential building Construct a new seven-story multifamily building containing 59 units and seven liner duplexes for a total of 73 units. Proposed zoning modifications include additional density, density exclusions, parking ratio, loading, and other modifications to achieve the proposed development plan. 	Shirlington House, LLC (c/o Snell Construction Corporation) Matthew J. Allman (attorney/agent)	TBA	TBA
Clarendon Square 3033 Wilson Blvd., 1209 N. Highland Street, and 1418 N. Garfield Street (Clarendon) SPLN24-00003	September 2024	Rezoning and New Site Plan: <ul style="list-style-type: none"> Rezone Parcel 15-067-036 from C-3 and R-5 to C-3 Demolish existing office building on site Construct a new eight-story residential building 312 units and approximately 6,700 sf of ground floor retail GFA Proposed zoning modifications for additional density, density exclusions, use mix, required setbacks, and other modifications necessary to achieve the proposed development. 	Clarendon Square Associates Limited Partnership (c/o Carr Properties) Matthew Weinstein (attorney/agent)	TBA	TBA
Melwood 750 23rd Street S. (Aurora Highlands) SPLN24-00002	September 2024	GLUP Amendment, Rezoning, New Site Plan, and Use Permit: <ul style="list-style-type: none"> GLUP Amendment from "Public" to "Low-Medium" Residential Rezoning of Parcels A & B from C-1 and R-6 to RA8-18 Demolish existing Melwood Horticultural Training Center building Construct a five-story, 60-foot tall residential building containing 105 units and approximately 18,100 sf of community service uses. Use Permit for community services uses in RA8-18. 	Melwood Horticultural Training Center, Inc. 23rd Redevelopment Owner LLC (c/o Wesley Housing Development Corporation of Northern Virginia) Cathy Puskar (attorney/agent)	TBA	TBA
Walgreen's Site 3130 Langston Boulevard (Lyon Village) SPLN24-00004	October 2024	GLUP Amendment, Rezoning and New Site Plan: <ul style="list-style-type: none"> Amend the site's GLUP designation to "Medium" Office-Apartment-Hotel Rezone the site to C-O-2.5 Demolish the existing Walgreens retail building Construct a new 12-story building containing 276 residential units and approx. 5,300 sf of ground floor retail GFA Modifications requested including: additional density, density exclusions, loading, compact parking ratio, and other modifications 	RP Langston I LLC (c/o Rooney Properties, LLC) Zachary G. Williams (attorney/agent)	TBA	TBA

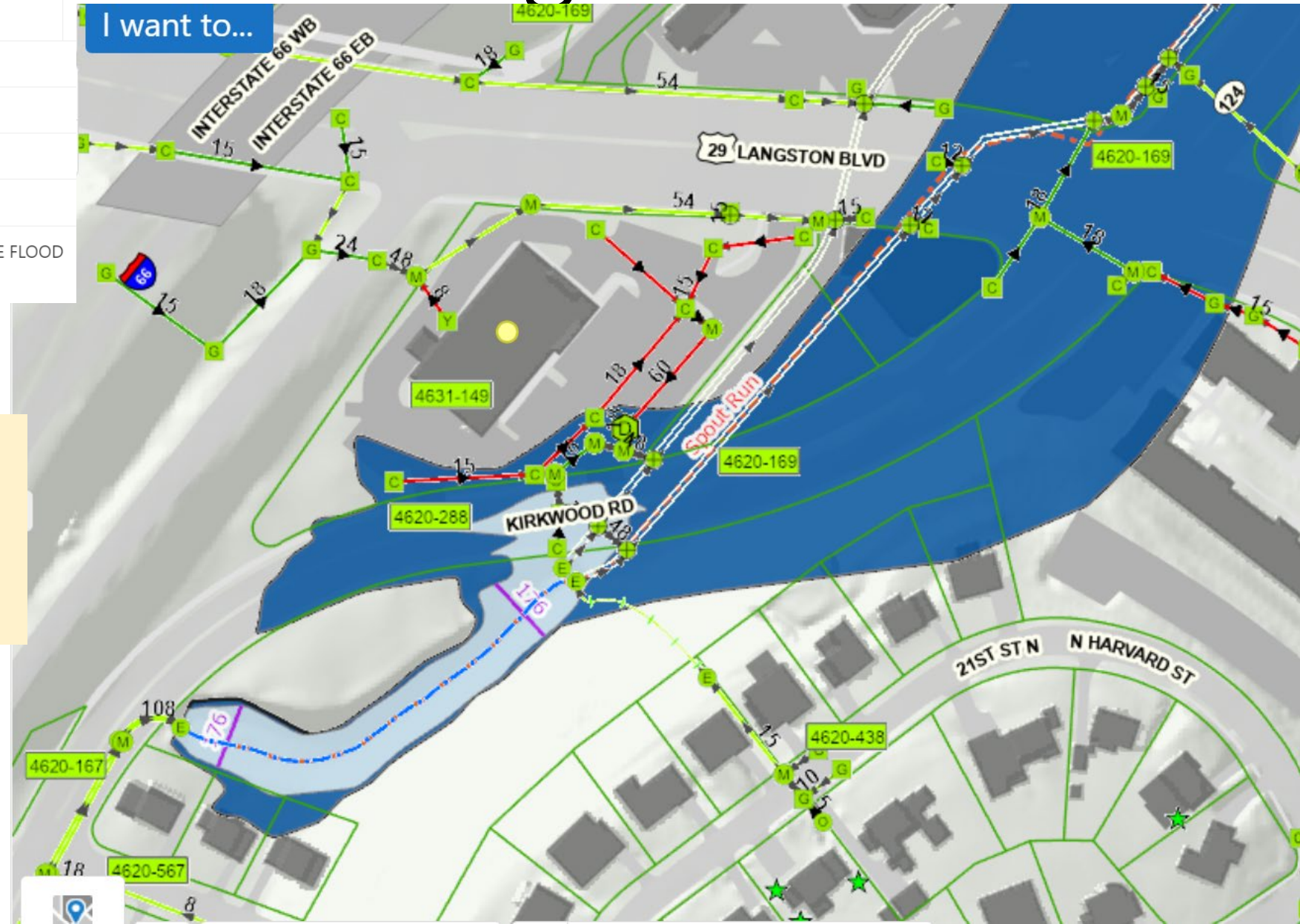
3130 Langston Blvd. Preliminary Plan

Process Step	Description
<i>Optional: Conceptual Site Plan</i>	<ul style="list-style-type: none"> Prior to submission of a preliminary site plan application, prospective applicants are encouraged to submit a conceptual site plan. Discussion of the conceptual site plan allows applicants to receive guidance from County staff.
Preliminary Site Plan Application	<ul style="list-style-type: none"> An interdepartmental staff team will complete an early technical review to determine compliance with submission criteria. All fees are collected. The Site Plan Review Committee (SPRC) Chair appoints a Planning Commissioner to lead the SPRC review. Applicants make revisions as needed and prepare an active site plan application.
Active Site Plan Application	<ul style="list-style-type: none"> County staff begin an interdepartmental review of the active site plan application, establish a project webpage, and post application and background materials. A Site Plan Review Committee is formed with membership specific to the application: Planning Commissioners, representatives of other advisory groups and commissions, civic association members, and neighborhood representatives. A community engagement schedule is established, posted to the project webpage, and publicized. Applicants are encouraged to conduct outreach to affected communities.

3130 Langston Blvd

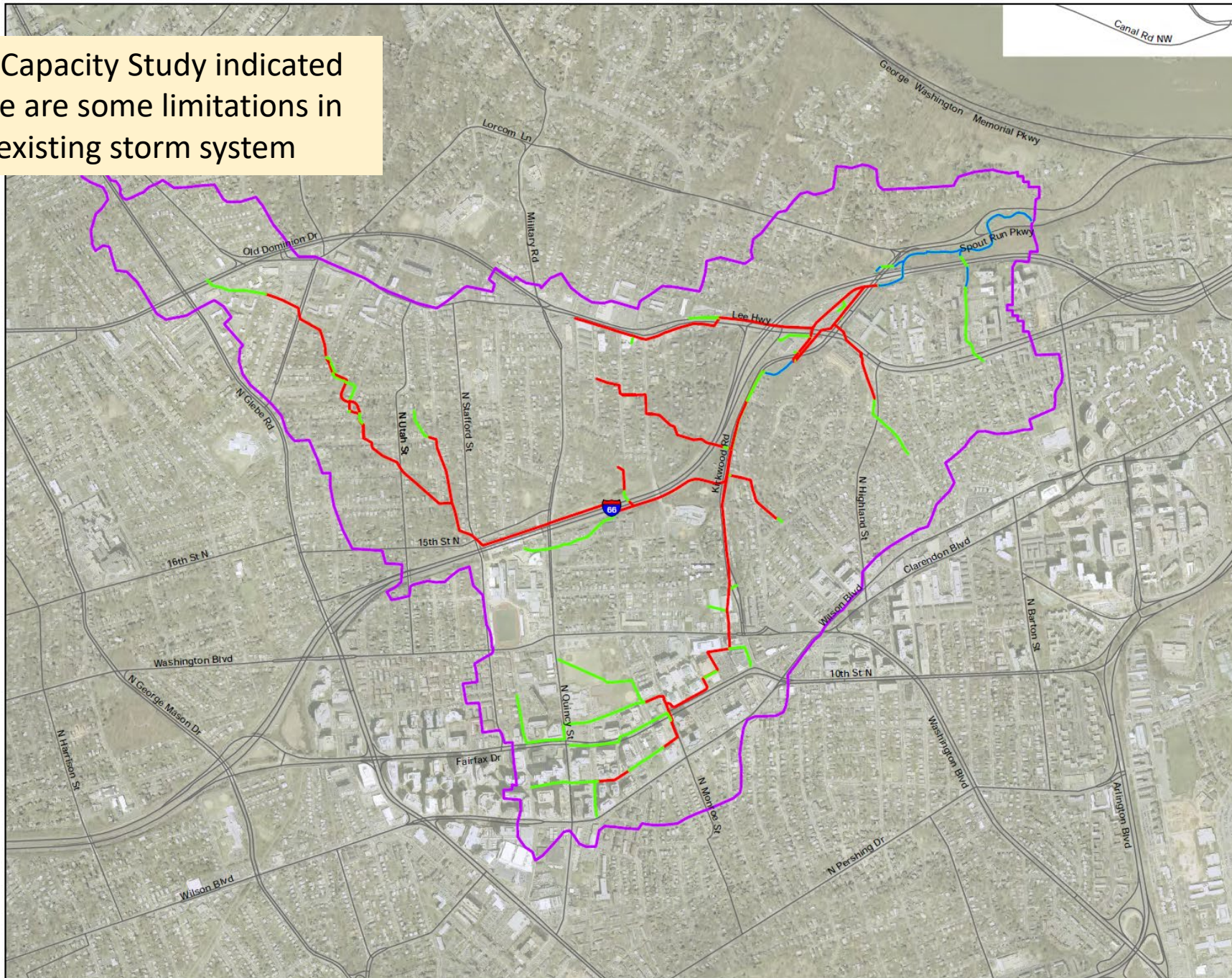
Effective Flood Zones

- A,
- AE,
- AE,FLOODWAY
- D,
- X,0.2 PCT ANNUAL CHANCE FLOOD HAZARD



Site is not in the 100 year floodplain
Portions of the site are in the 500 year floodplain

The Capacity Study indicated there are some limitations in the existing storm system



Legend

- Modeled Stormwater Mains with Recommended Additional Capacity
- Modeled Stormwater Mains with Sufficient Existing Capacity
- Streams
- Roads
- Modeled (Revised) Watershed Boundary

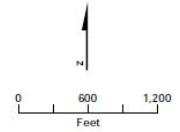
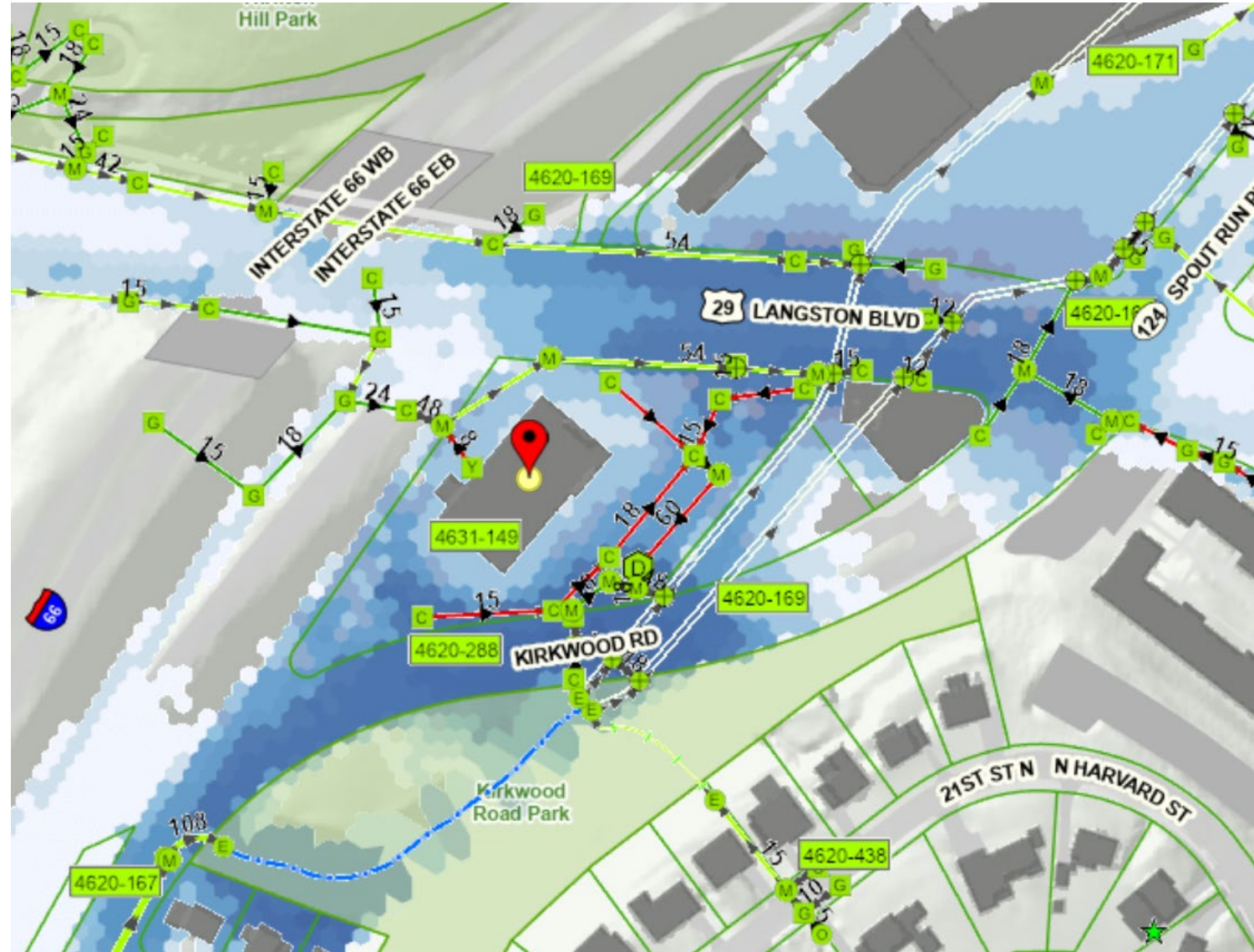


FIGURE 20
Recommended Additional Capacity
for the 10-yr, 24-hr Storm
Spout Run Watershed
Arlington County Storm Capacity Analysis

RAMP inundation areas



Year 2040 100yr Freq

< .33 ft

.33ft - 1ft

1ft - 2ft

2ft - 3ft

3ft+

Questions?

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Department of Environmental Services

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