



Waverly Hills Flooding - Update

February 16, 2022



ARLINGTON
VIRGINIA

Speakers

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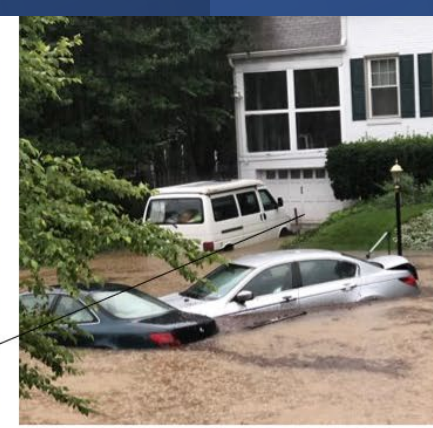
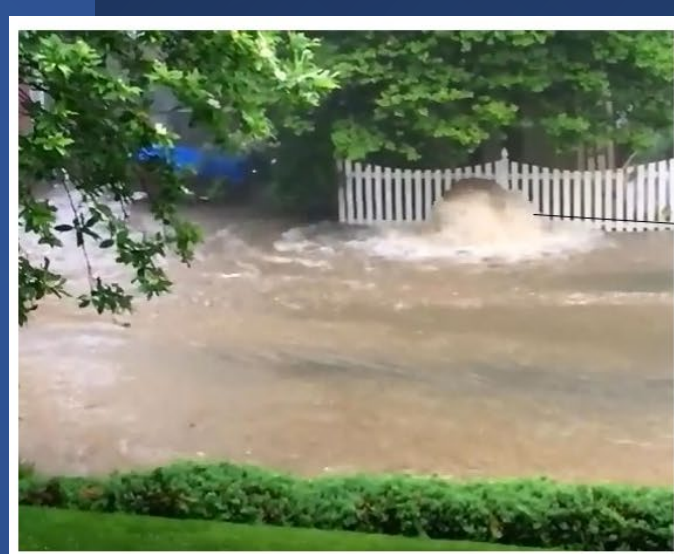
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- History of flooding
- Causes of flooding
- Resilience
- Where we are now
 - Multiple Options explored to address:
 - 10-year v. 100-year for overland relief
 - Climate change
 - Construction impacts
 - Policy challenges
 - Long Term Solution and Overland Relief
 - Policy Considerations
- Conclusions
- Other Considerations
- Discussion/Questions/Next Steps

Agenda



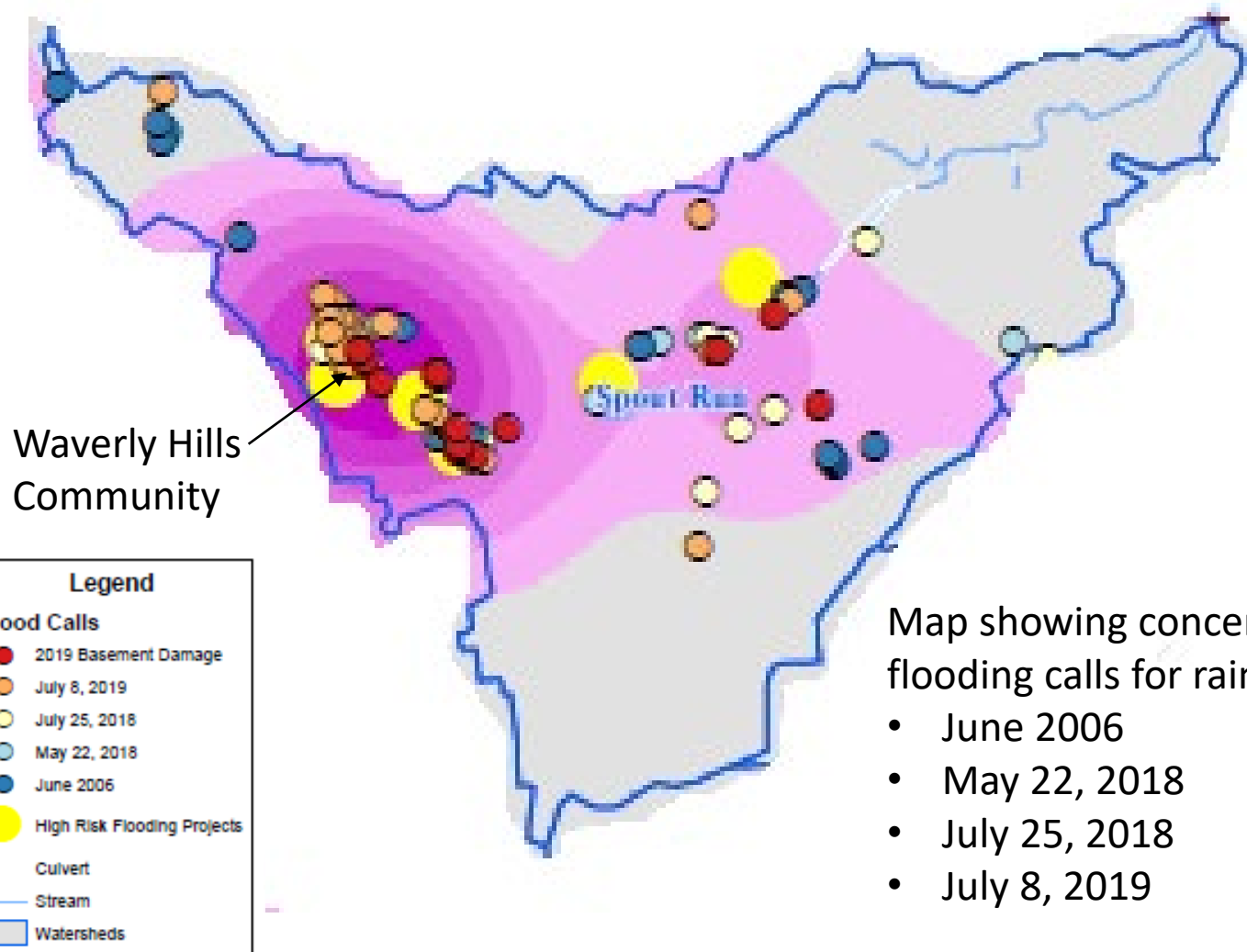
Just a reminder of the severity of the problem in this watershed

Previous Community Meetings:

- June 9, 2021
- September 23, 2020
- February 19, 2020
- July 15, 2019
- March 13, 2019
- February 26, 2018

History of Flooding

History of Flooding – Spout Run Watershed



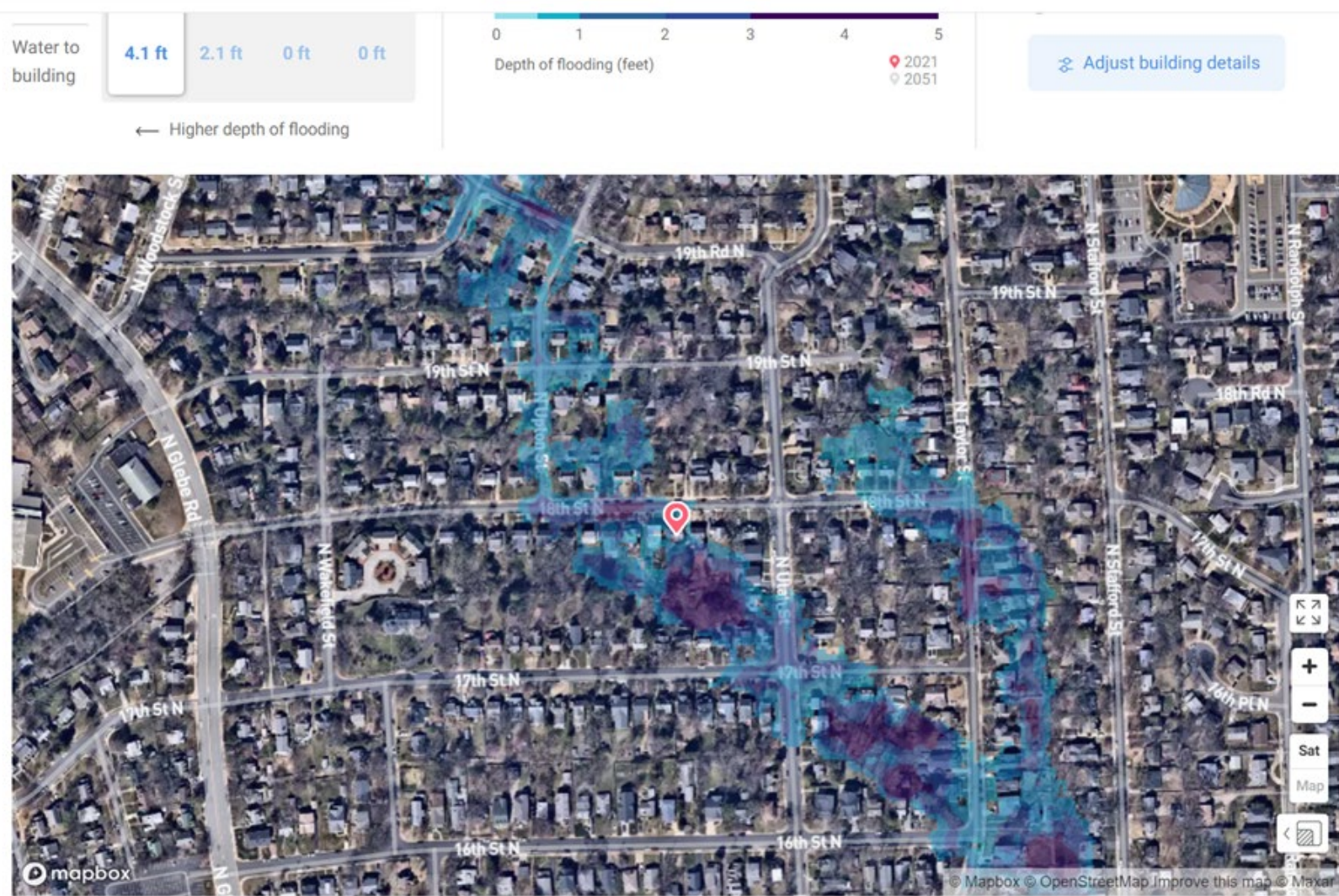
Map showing concentration of flooding calls for rain events from:

- June 2006
- May 22, 2018
- July 25, 2018
- July 8, 2019

Summary of Water Depth in basements from July 8, 2019 County-wide

- 4 Ft. of depth – 18 locations
- 5 Ft. of depth – 18 locations
- 6 Ft. of depth – 16 locations
- 7 Ft. of depth – 3 locations
- 8 Ft. of depth – 4 locations
- 9 Ft. of depth – 1 location
- 10 Ft. of depth – 5 locations
- 11 Ft. of depth – 2 locations

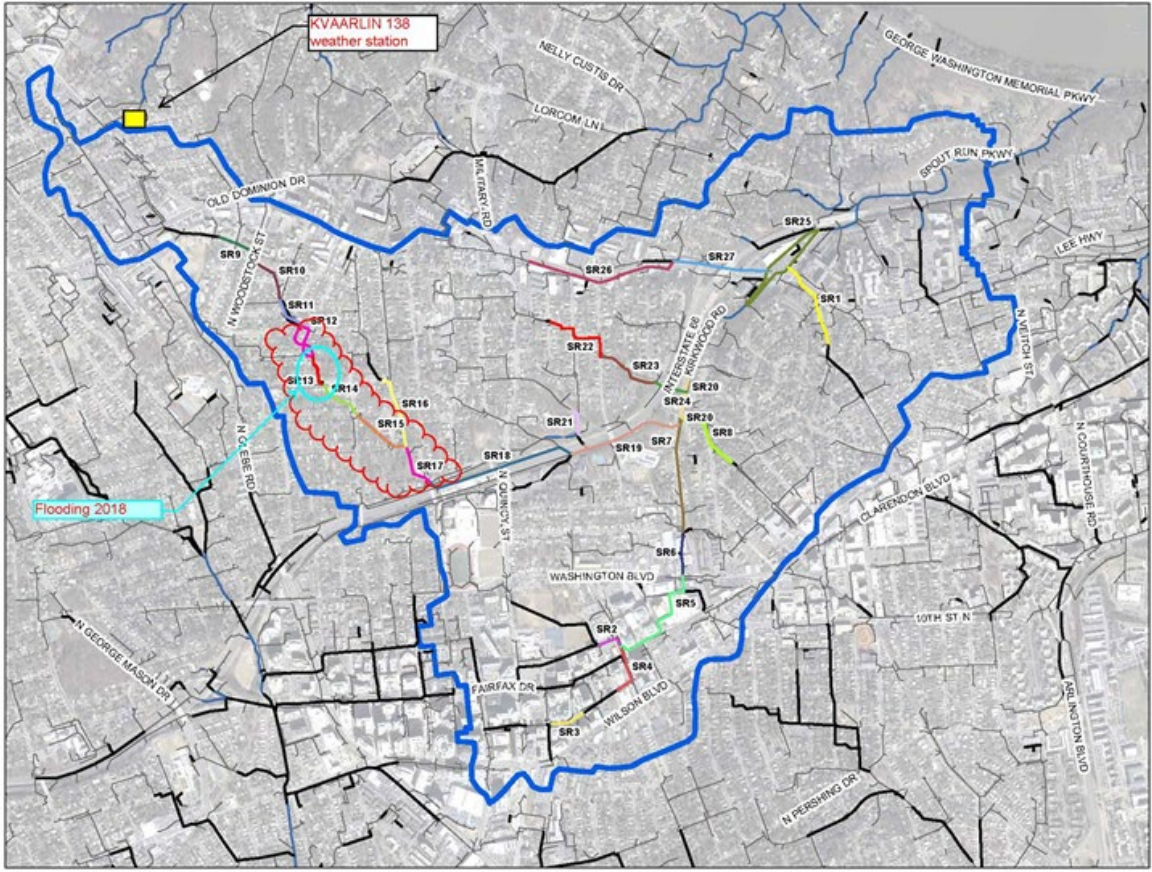
- Storm Sewer System
- Overland Relief



Inundation zone from Floodfactor.com

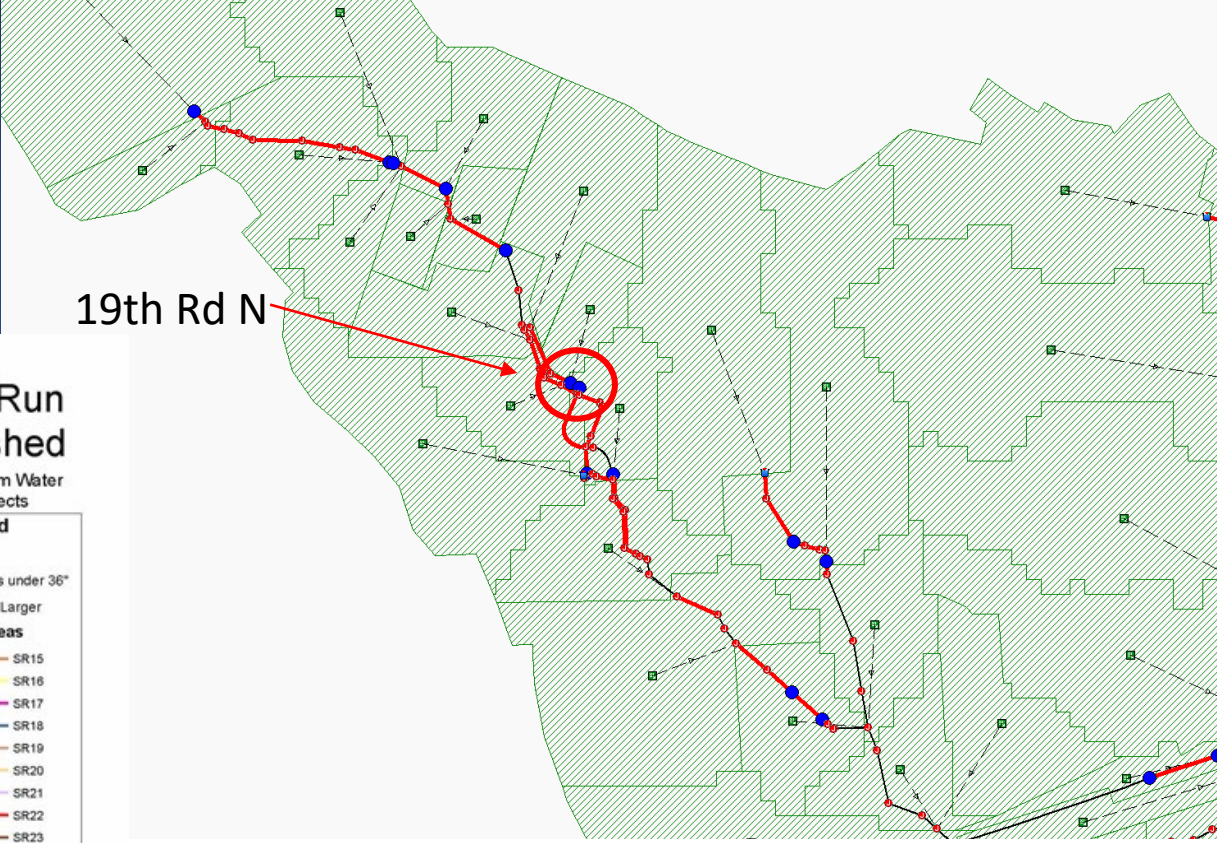
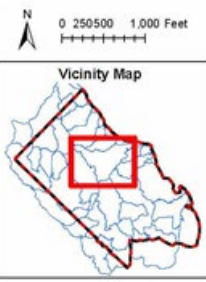
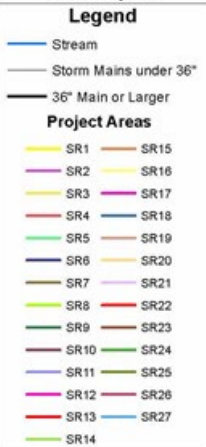
Causes of Flooding

Causes of Flooding – System Capacity



Spout Run Watershed

Proposed Storm Water Main Projects



19th Rd N

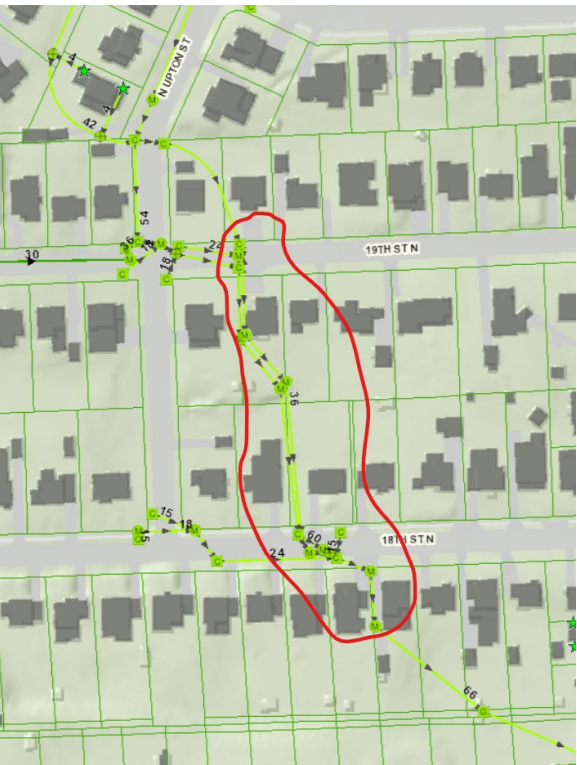
- **Undersized storm sewers**
 - **Designed with no consideration of the future urbanization and climate change**
- **Lack of inlets**

Master Plan projects showing needed capacity improvements
Existing Storm conveyance system does not handle current 10-year design storms

Causes of Flooding – No Overland Relief



- There is no overland relief
- Topography – structures/dwellings within the overland flow path
- Homes built right up to storm system with limited room for upgrades



System Layout corresponds to inundations zones and areas with system capacity limitations

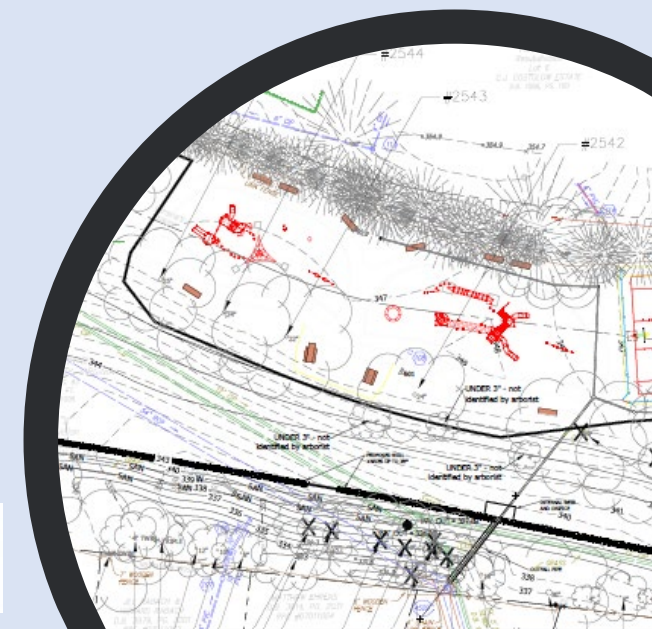
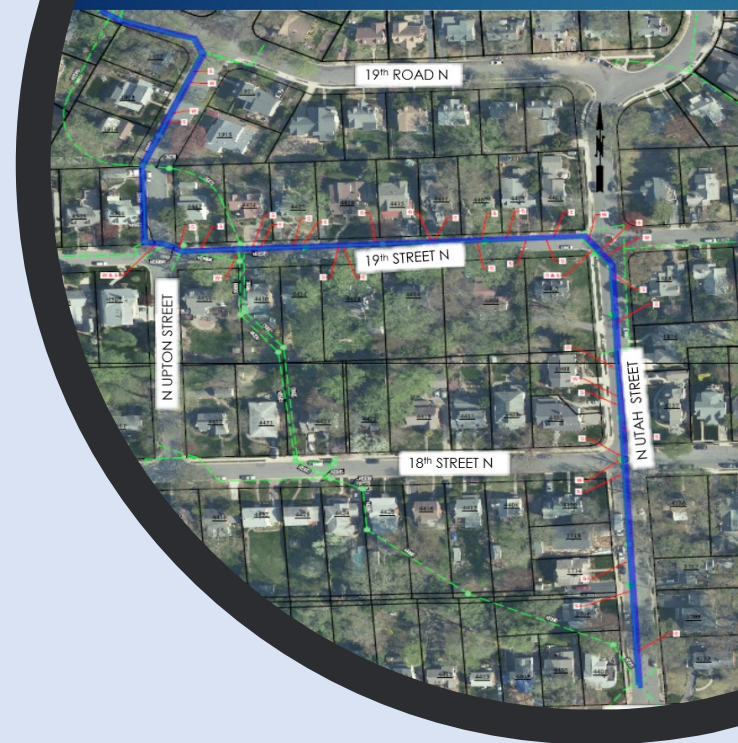


RAMP inundation zone

Flood Resilient Arlington

Key Concepts for Design and Policy Options





Where are we Now?

Multiple Options Have Been Explored

Woodstock Park Vault has significant Challenges:

- Technical:
 - Pumps
 - Deep excavation
 - Need for Intrusive Construction Methods
 - Cost (including future maintenance costs)
 - Park and Tree Impacts
 - Construction impacts to neighborhood
 - Limitations on flood risk mitigation
- Policy:
 - Climate Change
 - Design criteria
 - Budgets (CIP and Operating)
 - Property Acquisition for overland relief
- County has been evaluating each challenge and examining options to address
- Process is incomplete at this time
- Expected completion is in May integrated with release of CIP information

Where are We Now?

There is no long-term solution to flooding in this neighborhood without provision of overland relief.

- A detention vault alone cannot provide relief for storms greater than the 10-year storm, and costs are very high.
- There is an inverse relationship between disruption to park and risk reduction.
 - Less park disruption results in less detained volume = higher flood risk
 - More park disruption results in more detained volume = lower flood risk
 - However, no amount of park disruption eliminates the need for overland relief
- Within existing easements and rights-of-way, there is very little available space to make necessary system upgrades without acquiring property.
- Providing protection for the 100-year storm will require creating an overland relief pathway

Major Policy Issues have been raised as a result of the multiple analyses

- Implications for other neighborhoods/watersheds (similar problems in other locations)
- Design Criteria
 - Return Period (10 year / 100 year)
 - Accounting for climate change
- How to establish overland relief paths – very challenging
- How to protect overland relief pathways from development

Policy Considerations

Prevent

Reduce flood risk by creating localized flood zones with flood resilience building requirements.

Apply within flood-vulnerability areas & contributing drainage areas

Based on inundation areas for 100-year storm events

Include climate projections?

- Very **effective** long term – less effective short term (It takes time for measure to be adopted by individuals)
- Mandatory Measures may seem heavy handed and unacceptable to many in the community
- Localized Flood Zones would be very effective but may be unacceptable to the community

Rebuild

Private floodproofing. Property owners take action to floodproof their own properties.

Does not address community impacts or risks to public safety from flooding

Longer time frame as properties are redeveloped or renovated.

Protect

Provide system capacity for 10-year storm. Properties within the overland relief pathway undertake voluntary flood resilience measures for storm events larger than the 10 year storm.

Effectiveness has limitations because:

1. Properties in overland relief pathway are still at risk
2. Cost of improvements are high

Restore

Design storm minimum is 10 year with overland relief provided. Design storm increases to the 100 year when overland relief is not provided

Provide space for drainage improvements and overland relief and consider property acquisition in areas identified by Engineering Studies

Ensure Property owners understand true flood risk or vulnerability

What if someone does not desire to participate in the project?

Acquisition of property for system capacity and overland relief is very challenging

Extremely high effectiveness and resiliency

Involuntary measures are generally unfavorable.

- Use of the 10 Year Design storm is only appropriate where overland relief for larger storm events is available.
- Overland relief is currently not available for this watershed (and several others)
- Acquisition of easements and/or properties in the 100-year inundation zone may be considered
- Phasing and timing of project elements is challenging

Conclusions

Costs for all options are substantial – budget processes will be critical:

There are no low-cost options

There are no easy solutions

Multiple watersheds have similar challenges

All options have multiple complexities and are time consuming

Other Considerations

Cardinal School Vault is located under a **treeless**, mostly **flat field** with **minimal infrastructure**

Efficiencies: Procurement vehicle already in place (APS school redevelopment)
A contractor was already on site

The site is located upstream of a very crucial community asset that had experienced severe flooding

The Cardinal site is large enough to permit construction of a large gravity vault (no pumping required) with almost **no tree impacts**

The Vault in Woodstock Park would entail substantial disruption to the park and trees.

Differences between Woodstock Park Vault and Cardinal School Vault

Future Meetings:

- March: meeting with Spout Run Civic Associations
- May: integrated with CIP budget process

Questions? Next Steps