

## Arlington County and Flooding

### Arlington County Civic Federation

February 2017

#### Calculating Arlington's Cumulative Flood Risk

The Potomac River forms a natural border stretching from Arlington's northwest corner all the way down to its southeast corner. Thus, it's no surprise that our county is riddled with many seeps, springs, and streams (both above and below ground) that form part of the Potomac's watershed.

In addition to catastrophic flooding in the 1970s, a severe storm in June 2006 overwhelmed the county's stormwater drainage and sewer infrastructure, causing significant flood damage.[1] In 2011, the remnants of Tropical Storm Lee caused flash flooding along Four Mile Run.



Four Mile Run, 2011. Source: YouTube — <https://www.youtube.com/watch?v=rzsJ0B6ERnE> and <https://www.youtube.com/watch?v=ulHUUXQSV9o>

According to the 2010 Northern Virginia Hazard Mitigation Plan (NoVa Hazard Mitigation Plan) Update (adopted in 2012), flooding is the single most costly hazard for Arlington County, with FEMA's HAZUS<sup>MH</sup> estimating the *loss due to flooding alone as more than \$3.5 million* on an annualized basis.[2]

The 2017 update to the NoVa Hazard Mitigation Plan (now in process) states, "Arlington's high population density and its location along the banks of the Potomac River, increase the county's vulnerability to a variety of hazards, most notably flooding." [3]

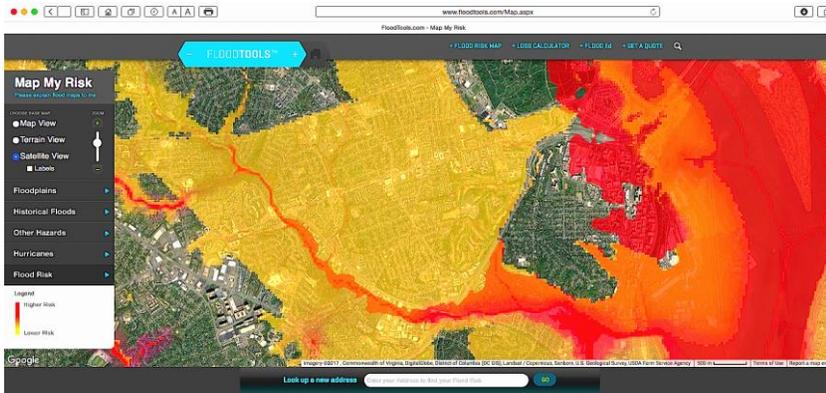
Four Mile Run, Arlington's largest internal watershed, is particularly vulnerable to flooding. In addition to National Airport, a 2012 Northern Virginia Regional Commission Report identifies Arlington's water pollution control plant as being low in elevation and subject to the impact of the Potomac's tidal flows such it is subject to at least "some inundation." [4] In staff's answers to recent questions regarding the plant's vulnerability to flooding, staff simply replied that the plant doesn't lie within the 100-year or 500-year FEMA floodplain.

Though Arlington focuses almost exclusively on federally identified floodplains to determine flood risk, floodwaters do not confine themselves to those areas alone. Beyond Floods (a private company that developed a flood-risk app/tool) analyzed a 2015 flood event in Houston, concluding that the majority of emergency calls to report flooding came from areas outside the recognized floodplains.

Roughly one out of every four U.S. properties subject to flood determination for a loan origination are at risk for flooding even though they lie outside established FEMA floodplains. [5] So you may still need flood insurance even if your property is located outside a FEMA floodplain. Note: Federal flood insurance **DOES NOT COVER BASEMENTS**. The only basement items that will be covered are things like HVAC equipment.

## How Can You Calculate Your Flood Risk?

An online tool called Map My Risk at [www.FloodTools.com](http://www.FloodTools.com) is not "guaranteed," but it provides a reasonable estimate based on a site's elevation and other factors. (Thus, addresses nearby may have a different risk rating from yours.) The map below shows the flood risk for properties in the Four Mile Run watershed in red, orange and yellow:



Source: [www.FloodTools.com](http://www.FloodTools.com)

The flood risk estimate for 2700 South Taylor Street (the county's Trade Center complex south of Four Mile Run), for example, is fairly high because the facility's elevation is just 61 feet, and it is at the bottom of the Four Mile Run valley.

**Address (change) :**  
**2700 South Taylor Street**  
**Arlington, VA 22206**

**Elevation: 61 ft**

**Your Flood Risk is:**

LOWER  HIGHER

How is my risk calculated?

<b>Flood Losses</b> In Your County:*	<b>Flood Claims</b> In Your County:*
<b>\$372,316</b>	<b>130</b>
<b>Average Claim</b> In Your County:*	<b>Active Policies</b> In Your County:
<b>\$2,864</b>	<b>649</b>

\*In the past 10 years

[Get a Flood Risk Report PDF](#)

[What do I have to lose?](#)

[Get a Flood Insurance Quote](#)

Source: [www.FloodTools.com](http://www.FloodTools.com)

If you enter addresses near Jenny Dean Park — for example 2701 South Nelson Street or 2654 South Oakland Street (with elevations well under 60 feet) — you'll see that they, too, have a very high flood risk.

## Is Our Flood Risk Growing?

That's the million-dollar question. The county has a plan to increase storm sewer capacity, but it has been only partially implemented. Stormwater management retrofits are designed to improve water quality but are not designed as flood-control mechanisms.[6]

Flood risk results from a combination of many factors, including land-use and zoning changes (development), changes in weather patterns and climate, rising sea levels (the Mid-Atlantic coast is particularly vulnerable) and higher tides and topography.[7]

Weather data increasingly documents that heavy rain events are now more frequent and more intense.[8] But even discounting the impact of climate change and sea-level rise, many cities are still at great risk of flooding.[9]

Why? Because urbanization increases man-made “impervious cover” and reduces the tree canopy and vegetative cover (aka “green space”). As impervious cover grows and the number of mature trees decreases, the amount of stormwater runoff increases. These conditions can also decrease stormwater transit time and increase peak flow, which can exacerbate flooding.[10]

Tree canopy loss and impervious cover increases also frequently occur on public parkland and in or near Chesapeake Bay resource (also called riparian in some cases) protection areas (RPAs). The county takes advantage of very large loopholes available in the state code to encroach on these sensitive areas and degrade them. A good example is the removal of trees and addition of 130 sq ft of impervious surfaces (a concrete ramp and stairway) in the RPA near N. Montague Street adjacent to Ashlawn Elementary School.[11]

Some may recall that APS cut down approximately 100 trees at Ashlawn Elementary School — a number far higher than allowed under the original use permit.[12] The subsequent leveling/regrading of this area resulted in ongoing flooding and runoff from the site that continues to the present, even after repeated installations of landscaping and stormwater management infrastructure.



7/27/15 flooding, erosion and runoff on the Ashlawn site

Between 2007 and 2016, Arlington’s percentage of impervious cover grew from 40% to 42%.[13] This increase occurred in spite of lot-coverage restrictions for single-family properties. [Note: There is no corresponding lot coverage restriction for multifamily properties.]

Arlington’s ongoing tree canopy loss is well documented. The 2004 Urban Forestry Master Plan contains satellite data revealing the increasing loss of canopy in images from 1973, 1985 and 1997.[14] More recent assessments show similar ongoing canopy loss. Over the three-year period from 2008 to 2011, Alcova Heights lost 9% of its tree canopy; Cherry Valley Nature Area lost 10%.[15] Looking at the same data by watershed for the same period, Pimmit Run Tributary lost 15% of its tree canopy and Virginia Highlands lost 11%.[16]

Even though protection of Arlington’s remaining mature tree canopy and minimizing or reducing impervious cover in Arlington’s parks represent some of the most cost-effective ways to prevent an increase in stormwater runoff, most park planning projects include the removal of mature trees, an increase impervious

cover and drainage of sensitive lands with or near seeps, springs and streams. Recent examples include park projects for Benjamin Banneker Park, Jennie Dean Park, Bluemont Park, and Gunston Park.[17]

In December, the County Board voted to strip the height restrictions and setback requirements for school buildings constructed in S-3A zoning districts (the zoning category for most park and school properties), and county staff signaled its intent to remove these restrictions for **all** structures built in public parks.[18]

The underlying and unanswered question is how much more tree canopy loss and how much more impervious-cover increase we can sustain — essentially stripping the land’s natural ability to absorb and retain storm waters — before we reach the tipping point and trigger flooding in areas that have a long history of being vulnerable to floods?

### **Join Us To Learn More**

To learn more about what the county is doing to calculate and mitigate Arlington’s flood risk, the ACCF has invited Arlington County staff from the DES Office of Sustainability and Environmental Management. They will present information about FEMA floodplains, Chesapeake Bay Protection Act resource protection areas, stormwater management and flood risk management at its February 7 meeting:

- Elizabeth L. Thurber, P.E., Stormwater Infrastructure, FEMA Floodplains
- Christin Jolicoeur, Watershed Planner, Resource Protection Areas
- Aileen Winquist, Watershed Outreach Program Manager, Stormwater Management

### **End Notes**

[1] 11/27/07 County Board Report

[http://arlington.granicus.com/MetaViewer.php?view\\_id=2&clip\\_id=384&meta\\_id=38534](http://arlington.granicus.com/MetaViewer.php?view_id=2&clip_id=384&meta_id=38534)

[2] 12/27/11 County Board Report, Table 7.8, p. 310 of the attached mitigation plan

[http://arlington.granicus.com/MetaViewer.php?view\\_id=2&clip\\_id=2272&meta\\_id=98087](http://arlington.granicus.com/MetaViewer.php?view_id=2&clip_id=2272&meta_id=98087)

[3] 2017 Northern Virginia Hazard Mitigation Plan Update (out for comment) p. 3-3

[http://www.fairfaxcounty.gov/oem/mitigation/draft\\_hazard\\_mitigation\\_plan-reduced.pdf](http://www.fairfaxcounty.gov/oem/mitigation/draft_hazard_mitigation_plan-reduced.pdf)

[4] 2012 Sustainable Shorelines Community Management in Northern Virginia, pp. 12–14

<https://www.novaregion.org/DocumentCenter/View/10840>

[5] "Do We Need Flood Insurance for FEMA’s ‘Low Risk’ Areas?" <https://medium.com/living-beyond-floods/do-we-need-flood-insurance-for-fema-s-low-risk-areas-5e5827e0afcc#.ptovdybm1>

[6] Stormwater Master Plan Public Comments Summary, p. 6, <https://arlingtonva.s3.amazonaws.com/wp-content/uploads/sites/31/2014/05/DES-Stormwater-Master-Plan-Public-Comments-Summary.pdf>

[7] “Secret is Out! Urbanization and Runoff Explain Increased Urban Flood Risk in Southern Ontario”

<http://www.cityfloodmap.com/2016/08/urbanization-and-runoff-explain.html> and “Floods: The Consequences of Urbanization” <http://geol105naturalhazards.voices.wooster.edu/floods-the-consequences-of-urbanization/>

and “Rising Tides, Sinking Coastlines” <http://www.via.vt.edu/winter13/Rising-Tides-Sinking-Coast.pdf>

[8] See “Outdated FEMA Flood Maps Don’t Account For Climate Change”

<http://www.npr.org/2016/09/15/492260099/outdated-fema-flood-maps-dont-account-for-climate-change>

[9] Science Daily press release <https://www.sciencedaily.com/releases/2015/03/150305125140.htm>

[10] Learn NC <http://www.learnnc.org/lp/editions/mudcreek/6394> and “Give Me the Numbers: How trees and urban forest systems really affect stormwater runoff” <http://foresternetwork.com/stormwater-magazine/sw-water/sw-stormwater/give-me-the-numbers/>

[11] 9/8/15 Ashlawn Pedestrian Improvements – Montague St. Ramp/Stair presentation [http://aps-legacy.materiell.com/cms/lib2/VA01000586/Centricity/Domain/105/090815%20Montague%20Community%20Presentation\\_FINAL.pdf](http://aps-legacy.materiell.com/cms/lib2/VA01000586/Centricity/Domain/105/090815%20Montague%20Community%20Presentation_FINAL.pdf)

[12] APS Wants Nearly 100 Trees Removed For Ashlawn Addition (2014)

<https://www.arlnow.com/2014/03/12/nearly-100-trees-to-be-removed-for-ashlawn-addition/>

[13] 2/27/07 Stormwater Management Work Session presentation slides, slide 5 (not publicly accessible online) and Arlington County “Stormwater & Watersheds” web page, accessed 1/27/17,

<https://environment.arlingtonva.us/stormwater-watersheds/>

[14] 2004 Urban Forestry Master Plan, pp. 9–11 (see also Appendix I for canopy statistics on p. 26), file downloaded at <https://urbanforestrysouth.org/resources/management-plans/arlington-va-urban-forest-master-plan/?searchterm=Arlington%20County>

[15] "Arlington County TREE CANOPY Coverage by Civic Association" (2008–2011) <https://arlingtonva.s3.amazonaws.com/wp-content/uploads/sites/13/2013/09/Tree-canopy-analysis-2011-36-36.pdf>

[16] Stormwater Master Plan (adopted 2014), p. 51, [https://arlingtonva.s3.dualstack.us-east-1.amazonaws.com/wp-content/uploads/sites/31/2014/05/SWMP\\_FINAL\\_Sept2014.pdf](https://arlingtonva.s3.dualstack.us-east-1.amazonaws.com/wp-content/uploads/sites/31/2014/05/SWMP_FINAL_Sept2014.pdf)

[17] Benjamin Banneker Park: 11/14/16 Benjamin Banneker Park Project Meeting presentation, slides 22, 25–35, [https://arlingtonva.s3.dualstack.us-east-1.amazonaws.com/wp-content/uploads/sites/31/2016/11/Benjamin-Banneker-Presentation\\_Meeting.pdf](https://arlingtonva.s3.dualstack.us-east-1.amazonaws.com/wp-content/uploads/sites/31/2016/11/Benjamin-Banneker-Presentation_Meeting.pdf).

Jennie Dean Park: "Analysis of Potential Arlington County Site Options for Neighborhood Elementary Schools" (2015), p. 11, [https://www.apsva.us/wp-content/uploads/2016/07/APS-South-Arlington-Site-Analysis-8-24-15\\_web.pdf](https://www.apsva.us/wp-content/uploads/2016/07/APS-South-Arlington-Site-Analysis-8-24-15_web.pdf) and "Four Mile Run Valley Parks Master Plan: Scenarios" (2016) <https://arlingtonva.s3.dualstack.us-east-1.amazonaws.com/wp-content/uploads/sites/31/2017/01/4MRC-Parks-Master-Plan-Scenarios-Jan-18-2017.pdf>.

Bluemont Park: FEMA Flood Map Service Center (you must click the "View Map" button and then click the "Zoom In" button to enlarge the map to see the floodplain, Zone X and RPA boundaries) <https://msc.fema.gov/portal/search?AddressQuery=Bluemont%20Park%20Arlington%20VA#searchresultsanchor>; baseball diamond renovation plans and trail improvements at <https://projects.arlingtonva.us/projects/bluemont-park-field-renovations-trail-connection/>; parking lot and tennis court replacement/expansion — although staff denied that other projects were being planned for this section of Bluemont Park at the 10/5/16 public meeting, a 10/11/16 e-mail from Asst. County Manager Bryna Helfer describes additional plans for "maintenance" projects: "Additional Bluemont Projects on the Horizon..... The Maintenance Capital project is for design only for replacement of the tennis courts, parking lot, court and parking lot lighting, restroom/ storage, picnic shelter, adjoining section of Four Mile Run trail, site circulation, site furnishings, drainage/storm water, and landscaping."

Gunston Park: "Analysis of Potential Arlington County Site Options for Neighborhood Elementary Schools" (2015), p. 8, [https://www.apsva.us/wp-content/uploads/2016/07/APS-South-Arlington-Site-Analysis-8-24-15\\_web.pdf](https://www.apsva.us/wp-content/uploads/2016/07/APS-South-Arlington-Site-Analysis-8-24-15_web.pdf); 11/9/16 "Gunston Park Diamond Field Renovation" presentation <https://arlingtonva.s3.dualstack.us-east-1.amazonaws.com/wp-content/uploads/sites/31/2016/11/Gunston-Park-Field-Renovation-2016-1109-presentation.pdf>

[18] 12/2/16 County Board Report [http://arlington.granicus.com/Viewer.php?view\\_id=2&clip\\_id=3261&meta\\_id=153639](http://arlington.granicus.com/Viewer.php?view_id=2&clip_id=3261&meta_id=153639) and 10/27/16 County Board Request to Advertise Report, pp. 7–9, [http://arlington.granicus.com/Viewer.php?view\\_id=2&event\\_id=915&meta\\_id=151264](http://arlington.granicus.com/Viewer.php?view_id=2&event_id=915&meta_id=151264) and "Peter's Take: Is Arlington Ready for a Major Flood?" <https://www.arlnow.com/2016/12/08/peters-take-is-arlington-ready-for-a-major-flood/>