ADDENDUM

Staff from the Fairfax County (County), Department of Public Works and Environmental Services (DPWES), the Department of Land Development Services (LDS), the Department of Planning and Development (DPD), and the Office of Environmental and Energy Coordination (OEEC) worked together to identify risk reduction strategies. Risk reduction strategies are grouped into three categories: projects, programs, and policies (regulations), that complement each other to reduce flood risk.

1.0 Projects

DPWES leads the County projects to reduce structural flood risk. The County's Resilient Fairfax plan states that climate resilience should be integrated into project prioritization and implementation. Resilient Fairfax projects increased the need for capital projects to address climate vulnerabilities. Project considerations fall into three different categories:

1. **Structural flood risk from coastal flooding.** The County Belle Haven Watershed experiences coastal flooding from storm surge. Current mapping estimates that 330 structures are at risk of flooding from the 100-year storm adjusted for climate change. Current mapping estimates that 108 structures are at risk of flooding from the 25-year storm, without adjustment for climate change. This includes 17 subterranean "J-unit" apartments that are at heightened risk during a storm surge event. As climate changes and the sea levels rise, additional homes and businesses will face increased risk of structural flooding from coastal flooding. In April 2023, the communities of Belle View, New Alexandria, and River Towers rejected the U.S. Army Corps proposed solution to build a floodwall to protect the community from the 100-year storm because the community wanted the wall located on U.S. National Park Services property. The National Park Services rejected this proposal. DPWES has no alternative projects identified for structural flood solutions for this area. Subject to technical feasibility, DPWES recommends issuing a Request for Expressions of Interest to partner with the private sector to identify if there are any feasible structural solutions other than the flood wall identified by the U.S. Army Corps. DPWES also strongly recommends targeted programs in this area to prepare residents to take their own actions minimize risk from coastal flooding, described later in this memo.

2. **Noncoastal, confirmed structural flooding.** DPWES responds to service requests related to flooding, investigates the causes, and documents findings. In 2023, DPWES analyzed more than 30 years of historic service request data to identify confirmed, structural flooding. Through this and other project identification efforts, DPWES estimates there are at least 570 new projects in addition to those already included in the five-year capital improvement project (CIP) list to address existing, confirmed structural flooding at the 100-year storm event adjusted for climate change. Based on past project cost estimates, DPWES estimates $600 million of new project funding needed in addition

to the $95 million included in the current five-year CIP to fund these projects as described in **Attachment B**.

DPWES continues to seek additional funding sources to address flood risk. Since 2020, DPWES has been awarded over $5 million in federal and state grants for the voluntary acquisition of structures that have experienced flooding and over $16 million to fund flood mitigation projects.

At current flood risk reduction CIP appropriation levels, it would be approximately 70 years, or at least until the year 2094, to resolve the approximately $695 million of projects needed to address existing, confirmed structural flooding. Increased stormwater tax and staffing would be required to resolve these known structural flooding problems at the 100-year storm interval level of service sooner.

3. **Noncoastal predicted risk for structural flooding.** DPWES analyzed topography and infrastructure to identify low-lying areas with higher predicted risk of structural flooding from heavy rainfall. Isolated, heavy rain events have led to structural flooding of homes and businesses in low-lying areas or drainage flow paths, also called overland relief paths. DPWES and LDS mapped structures that exist in low-lying areas, called sumps. This analysis shows opportunities for future projects and programs to minimize the risk to some structures. Currently, DPWES recommends pursuing programs instead of projects for structures in this category.

These three project categories all follow the Board of Supervisors (BOS) policy for stormwater capital expenditures established in 1997, reaffirmed in 2006, and updated in 2021, which prioritizes the following categories of projects in this order:

1. Mandated by state or federal regulations and critical/emergency dam safety issues.
2. Alleviating structures from damage by flood water or erosion.
3. Achieving stormwater quality improvement for the Municipal Separate Storm Sewer System permit (MS4 permit).
4. Alleviating severe streambank and channel erosion.
5. Alleviating moderate and minor streambank and channel erosion.
6. Alleviating yard flooding.
7. Alleviating road flooding.

2.0 Programs

Staff recommends developing programs to empower residents and owners with knowledge of their individual flood risk, services available to them, and strategies they can initiate to protect themselves and their property, in accordance with the County's Resilient Fairfax plan.

2.1 Existing Programs

County staff and the Northern Virginia Soil and Water Conservation District (NVSWCD) currently administer the following programs:

- **Technical assistance for private property owners.** The NVSWCD provides technical assistance to owners to advise on drainage issues on private property. See https://www.fairfaxCounty.gov/soil-water-conservation/drainage-problem.

- **Flood Risk Outreach.** Staff analyzed and published information about low-lying areas (sumps) and modeled floodplains, both FEMA and non-FEMA.

  As one example of providing knowledge of flood risk, LDS published this Flood Risk Awareness Tool, available at this link. Staff anticipates that heightened outreach to make residents aware of their risk will lead to questions to the Board district offices and to staff. This will require increased staff effort to assist residents in understanding their risk and how they can minimize that risk.

  Staff anticipates property owner concern on publishing flood risk as it may relate to property values. Nonetheless, staff believes the need for all residents to be aware of their risk outweighs property owners' concerns for property values.

- **Coastal Flooding Outreach.** Staff worked with Belle Haven community leaders in 2023 to advise residents of their risk, including mailing flood risk information to residents. Staff recommend furthering these efforts by partnering with a nonprofit organization or consultant to make residents aware of their existing flood risk, advise them of flood insurance options for their homes and its contents, practice communications on Riverwatch, and practice evacuation routes and procedures. Staff also recommend implementing a voluntary property acquisitions program with targeted outreach for those properties with the highest risk of potential loss of life during a coastal storm surge event.

- **Continued efforts with the National Flood Insurance Program.** Since 1993, Fairfax County has worked with the Community Rating System (CRS) and is one of five Class 6 jurisdictions in the Commonwealth of Virginia. A Class 6 CRS rating allows property owners in the County to obtain a 20% reduction in flood insurance premiums. See more at Flood Information | Public Works and Environmental Services (fairfaxCounty.gov).

- **County Grant Programs.** The Board has approved grant programs for:
  - Flood mitigation assistance to residents. Slated to begin July 1, 2024.
  - Stormwater facility maintenance where residents bear private maintenance burden. Slated to begin by July 1, 2024.
  - Conservation Assistance Program. Focuses on water quality and has been in place since 2017, see Virginia and Fairfax County Conservation Assistance Programs | Northern Virginia Soil and Water Conservation District.

  As these grant programs progress, staff recommends reassessing funding levels to meet community needs.

2.2 Proposed Programs

Staff recommends developing the following programs:

- **Future grant programs.** Additional grant programs should focus on erosion prevention and control for channels threatening private or common interest properties and areaway protection and disconnect from sanitary sewer to prevent flooding.

- **Easement program.** Identify where the County should obtain additional storm drainage easements and assume maintenance responsibility. This will require staff and funding.

- **Enhanced Countywide Floodplain Modeling Efforts Considering Climate Change.** Staff recommends updating the County floodplain mapping to identify risk from rainfall adjusted for climate change and sea level rise from climate change, coupled with ultimate buildout conditions that are already used in County floodplain mapping. Updated mapping would help identify if there are additional structures at risk of flooding.

- **Targeted Community Outreach to Vulnerable Communities.** Of residential structures at risk, approximately 18% occur in neighborhoods with vulnerability index scores of high or very high as shown in **Attachment C**. Staff recommends increased outreach which will focus on the availability of programs and targeted outreach for these vulnerable communities. Staff recommends that the County engage with a nonprofit organization or consultant to assist in developing communications that will target these communities to enhance their understanding of flooding risk, applying for grant programs and assistance with navigating the land development process. To date, staff have implemented:
  - Analyses identify communities scoring in the high or very high vulnerability indices that also fall in areas at risk of flooding.
  - Updated outreach materials, with full translation via the County website, such as DPWES door hangers and communications information.

- Vulnerable community engagement partnering between DPWES, OEEC, Neighborhood and Community Services, Department of Emergency Management and Security, Department of Family Services, and Department of Housing and Community Development. **Attachment C** has additional information.

- **Proactive County Project Participation.** DPWES recommends that all County projects evaluate stormwater management options to reduce downstream flows. This would require that DPWES, FCDOT, VDOT, HCD, and FCPS consider using innovative approaches to addressing stormwater in the most cost-effective manner.

3.0 Regulations

Staff recommend updating regulations and design standards relating to stormwater and flood risk reduction to better ensure flood-resilient and climate-ready communities, in alignment with the Resilient Fairfax plan.

Stormwater and floodplain regulations are established in several adopted Ordinances and regulations:

- The Fairfax County Zoning Ordinance Section 5105 establishes floodplain regulations, including defining which uses may be permitted in the floodplain, and those that need approval of a Special Exception (SE), as well as limitations that all uses must meet. One such use limitation is any new residential dwellings constructed since 1978 require 18 inches of freeboard, and unless a SE is approved, a 15-foot setback.
- The Public Facilities Manual (PFM), adopted by the Board of Supervisors, was developed in the 1960s from policies for the preparation of site and subdivision plans and has since evolved to include a wide range of stormwater related requirements. The PFM provides engineering standards and details – the "how" of demonstrating compliance with the stormwater and floodplain regulations located in various Ordinances.
- The Stormwater Management Ordinance, Chapter 124, was first adopted in 2014 as result of significant state mandates and specifies the current level of stormwater quality and quantity control. It is a compilation of various existing requirements. For example, the water quality control requirements were previously contained in Chapter 118, Chesapeake Bay Protection Ordinance but moved in the SWMO.
- LDS has incorporated the following new policies to reduce flood risk:
  - Effective September 5, 2022, Land Development Services issued Technical Bulletin 22-06 that established the Localized Flooding Mitigation Policy for Residential Infill Development – Detention Requirements. The policy established the criteria and methodology to mitigate the impacts of the increase in stormwater runoff from the increase in impervious surfaces associated with residential infill development that are

located upstream of outfalls with known erosion of capacity problems. The policy created a simplified methodology for developments to comply by providing onsite detention equal to 2.56 inches of rainfall from the net increase in impervious area.

- For all development that will disturb more than 2,500 sq ft, LDS requires developers and owners to demonstrate adequate conveyance of surface water leaving the development site. On July 31, 2023, LDS released updates to the GIS-based Flood Risk Analysis Tool to make available the Potential Sump Conditions layer and the Overland Relief Flow Accumulation layer. These layers provide design professionals with additional information to better address potential flooding of low-lying areas and flow paths. This information has allowed developers and owners to better consider the drainage impacts of their development without adding expense by making data available.
- DPWES maintains a database of service requests submitted from property owners related to potential drainage issues. MSMD investigates the service requests to determine relevance. DPWES has provided LDS with access to the data since as early as 2005, and later in a GIS-based application. Information related to known or suspected drainage issues informs plan review decisions related to the adequacy of streams and stormwater conveyance systems.
- Effective October 21, 2020, the PFM was amended to require basement floor elevations of residential structures to be set above the seasonal groundwater table. This amendment prevents problems such as groundwater flooding of the basement or continuously running sump pumps which can cause damage to the building and create hardship and financial loss for existing and future homeowners. Frequent cycling of sump pumps, due to the extended presence of groundwater, can also result in concentrated and sustained discharge, yard flooding, potential road right-of-way hazards, and impacts to adjacent properties.

- LDS is in the process of updating the Chapter 118 regulations to comply with state requirements for incorporating sea level rise into analyses supporting proposed development in resource protection areas (RPA).

  The proposed amendments to the Chesapeake Bay Preservation Ordinance (CBPO) will incorporate provisions for the preservation of mature trees and coastal resilience and adaptation to climate change. The amendments are mandated by changes to the Chesapeake Bay Preservation Area Designation and Management Regulations adopted by the State Water Control Board, which were promulgated in response to 2020 legislation. The new provision will require proposed projects within the Resource Protection Area to assess and adapt to the increase in sea level and storm surge. This will

increase resilience of projects on the properties located along the tidal Potomac River and tidal tributaries.

- LDS, DPWES, DPD, and OEEC recommend the following future policies.
  - In cases where owners are not making substantial improvements to homes, consider a streamlined process for individual residences in floodplain in exchange for the owner agreeing to comply with certain standards that reduce flood risk. Currently, owners must request a special exception, which is expensive and requires additional calendar time compared to development without a special exception. A streamlined process will also discourage residents from "incremental improvements," where they split projects up to avoid triggering a special exception requirement. Staff would like to encourage owners to improve homes, which should include reducing their risk from flooding. Creating a by-right path in exchange for enhanced standards encourages both outcomes.
  - Currently in the SWMO, there is a limited exemption from both storm water quantity and quality control for land disturbing activities greater than 2,500 sq. ft. but less than one acre for the construction of single-family detached residential structures where the total impervious area is less than 2,500 sq. ft. or 18% of lot area whichever is greater, or where the total lot area is ½ acre or less and no more than 500 sq. ft. of new impervious area will be added. Due to changes by the state to the Virginia Erosion and Stormwater Management Law, the County must amend the SWMO to eliminate the stormwater quantity exemption for such projects. The amendment to the SWMO is scheduled to be adopted and effective by July 1, 2024. The required stormwater quantity control for these projects will reduce the peak discharge, and thereby slightly reduce the flood risk for downstream properties.
  - County contracted engineering consultants to conduct a Proof of Concept flood risk reduction study to consider regulatory and policy changes to mitigate existing and future structural flood risk.
  - The scope of the first phase of the study examined three concepts: 1) the impacts of adjusting the rainfall IDF curves in the PFM to account for climate change on detention and conveyance system requirements for larger developments ; 2) the implications of using climate adjusted rainfall on overland relief computations; and 3) the impacts of using climate adjusted rainfall on detention requirements, as well as increasing the requirement from the 10-year storm to the 100-year storm event, for typically sized developments. The impacts also included the cost/benefit estimates of the contemplated changes.
- County contractor's analysis of the impacts of adjusting the rainfall curves in the PFM and overland relief did not yield the expected results. Generally, the amount of

stormwater a development site must detain as part of the design is based on the increase in rainfall runoff for the design storm generated by the proposed development, which is calculated, in large part, based on the difference (usually increase) in the amount of impervious surface that existed before development. However, by adjusting the rainfall for the design storm for climate change, then both the pre-development runoff as well as the post-development runoff, is adjusted, thereby nullifying any increase due to climate change in the amount of detention that is required. In other words, both the start and finish lines are moved the same amount, but the length of the race remains the same. For a stormwater detention system built today to be designed to effectively capture and detain both the increase in runoff from the development's increase in impervious surfaces and the additional runoff from increase in rainfall due to climate change, then only the post-development requirements should be adjusted. This will be analyzed in Phase II.

Phase I of the study also evaluated the impact of additional rainfall on overland relief requirements. The term "overland relief" represents where the water flows when all the storm drains and channels are full. That is, engineers calculate the theoretical flow path, depth and width if the storm sewer system is full, clogged or otherwise inoperable during the "100-year" storm (i.e., one-percent annual chance event). The Phase I study results indicate that the amount of increase from adjusting for climate change would not significantly increase the depth or width of area that would be inundated with localized flooding during the event.

The Phase I study also examined the impact of increasing the detention requirements for the typical size developments (I.e., primarily INF lots, and smaller subdivision and site plans). The study did not consider areas with additional stormwater goals in the comprehensive plan, such as Tysons PTC. When adjusting for climate change in the 10-year storm event, the additional detention volume required ranged from none (i.e., the facility was already large enough) to approximately 28% volume increase. When controlling the 100-year storm event, required volumes approximately doubled. The consultant examined costs for only the 10-year scenario. In the examination, the cost burden for INF projects (i.e., sing-family detached homes), increased for on-site detention facilities from $2,000 to $8,000. The cost for the subdivision project increased approximately $130,000, and the site project increased approximately $8,000. The consultant concluded, however, that the benefits of requiring additional detention was not cost-effective.

The Phase I study also found that the increased rainfall volumes did not result in a significant change in floodplain boundaries:

- Floodplain average width difference was 14.5-22.1 ft (7-11 ft on either side of the boundary)
- Depth increases of 0.36-0.55'

In summary, the limited analysis of Phase I showed limited value in adjusting the design criteria associated with rainfall volumes to account for future changes in rainfall amount. Additional analysis to be considered during the second phase of study will examine alternatives and other concepts to reduce existing and future flood risk with lot-by-lot development. Separately from any changes to design criteria, recent state regulation changes will require the County to remove stormwater detention requirements for regulated single family home construction (greater than 2,500 square feet of land disturbance). While not quantified in consultant study, this will work to mitigate flood risk associated with future single family home development.

- For the Proof-of-Concept Phase II, the consultant will:
  - Complete remaining two tasks from July 2022 NIP:
    - Identify opportunities to protect life and property at the development site.
    - Identify opportunities to mitigate downstream impacts of the development.
  - The Phase II task order will develop a roadmap to evaluate the effectiveness of our current SWM and floodplain regulations:
    - Evaluate if neighborhoods built to current standards flood under the existing level of service and under proposed level of service.
    - Consider and evaluate adjustments to post-development requirements so that stormwater detention systems built today effectively capture and detain both the increase in runoff from the development's increase in impervious surfaces and the additional runoff from increase in rainfall due to climate change.
  - Better understand the impacts of infill development and redevelopment on reducing flood risk.

These are complex questions that will take time to answer, and meanwhile projects and programs continue to move forward.

Regardless, if the Board wishes that new development regulations have a meaningful impact on existing drainage and flooding issues, new regulations are needed to shift the burden of existing impervious cover to new development. Aside from the limited cost-benefit effectiveness described in the consultant study, another relevant consideration is the pace of development within the county to effect a meaningful downstream change. Certainly, larger development sites can produce a more significant impact than smaller ones. With direction from the Board, staff can study this further.

Attachment A: Definition of the 100-Year Storm Adjusted for Climate Change

In February 2022, OEEC published the Resilient Fairfax Climate Projections Report, available at Resilient Fairfax Climate Projections Report 2022 (fairfaxCounty.gov), which predicts the increased rainfall anticipated in Fairfax County due to climate change. As used in this analysis, terms are defined as:

Floodplain – Those land areas in and adjacent to streams and watercourses subject to continuous or periodic inundation from flood events with a one percent chance of occurrence in any given year (i.e., the 100-year flood frequency event also known as the base flood) and having a drainage area greater than 70 acres. For the purpose of administering Section of the Zoning Ordinance (Floodplain Regulations), minor floodplains are those floodplains which have a drainage area greater than 70 acres, but less than 360 acres and major floodplains are those floodplains which have a drainage area equal to or greater than 360 acres.

Localized flooding – Areas that may be inundated during storm events but from other sources than streams with a drainage area greater than 70 acres.

Adjusted for Climate Change – The process of increasing the anticipated rainfall used in the stormwater and floodplain calculations to include increases in rainfall intensity-duration-frequencies (IDF) curves, based on projections from the NOAA-funded research program of the Mid-Atlantic Region Integrated Sciences and Assessments (MARISA). Two scenarios were considered: the Representative Concentration Pathway (RCP) 4.5 and RCP 8.5. (RCPs are scenarios of trajectory of future greenhouse gas concentrations from global climate change prediction models.)

Attachment B: Projects for the DPWES Capital Improvement Program (CIP)

DPWES has identified flood risk from mapped floodplain, historic reporting, and a risk prediction tool. The County's website describes traditionally mapped floodplain at Flood Information | Public Works and Environmental Services (fairfaxCounty.gov). With climate change increasing flooding outside of mapped floodplain, staff identified risk trends for properties in addition to those already mapped.

Historic reporting. DPWES identified nearly 1,600 incidents of reported structural flooding using all historic records available, which date back to 1986:

- 1600 incidents include some repeat flooding at individual residences.
- Approximate number of residences with structural flooding from coastal events such as hurricanes: **200.**
- Approximate number of remaining residences with confirmed structural flooding, outside the coastal-at-risk communities: **570**
- Approximate number of residences with structural flooding likely from private causes such as sump pump failures or private plumbing failures: **500**
- Approximate number of residences with structural flooding risk alleviated by projects, such as a levee, drainage infrastructure, and other projects: **400.**
- Staff published additional information on the analysis of historic data augmented by GIS and modern data at: https://storymaps.arcgis.com/collections/9adf4f9877fe49bba9df9c28b0f40a09?item=20

Sump Conditions. DPWES and LDS staff created a Potential Sump Conditions layer in GIS to identify depressions or bowls where there is insufficient drainage for the water to get out of the depression. In some cases, storm drain inlets exist in the sump, but the inlets are overwhelmed by intense rain. This analysis identified more than 10,000 residential structures at risk based on the flood risk map, described in detail at: https://storymaps.arcgis.com/collections/9adf4f9877fe49bba9df9c28b0f40a09?item=27

Universe of Identified Risk. Table B-1 below identifies the universe of identified risk. No structure experiences zero risk of flooding, as plumbing failures or building alterations can change flood risk. However, the table identifies the reasonably expected universe of flood risk in Fairfax County. This is also described at https://storymaps.arcgis.com/collections/9adf4f9877fe49bba9df9c28b0f40a09?item=27.

Table B-1: Universe of Identified Risk

Scenario	Number of Structures	Potential Projects	Potential Programs
Confirmed, reported flooding, resolved	300	Completed	Include with outreach to general population.
At risk of coastal flooding	330	No structural solution because the community rejected any floodwall unless it is on the east side of the George Washington Memorial Parkway, which is National Park Service Property. The NPS rejected placing a floodwall on NPS property. There is no other structural solution.	Advise residents of their risk. Partner with a nonprofit to make residents aware of their insurance options. Practice communications on Riverwatch, practice evacuation routes and procedures. Implement a voluntary acquisition program.
Confirmed, reported flooding, unresolved	570	**Fairfax County estimates 70 years to identify projects and solutions for the remaining 570 structures with confirmed flooding based on current staffing. Potential projects include grading to provide adequate overland relief, stormwater infrastructure upgrades, and flood proofing of structures.**	Outreach and education on risk and flood insurance options. Provide guidance on common causes of flooding such as overland relief being blocked by fences or other obstructions. Grant Opportunities
Structure intersects floodplain	2,770	• Unless structural flooding is confirmed and staff have determined that a project is necessary, no current projects are identified for these structures.	• Outreach and education with an emphasis on equity • Publish flood risk. • Grant opportunities
Structure within sump condition	6,019		
Structure in path of overland relief with drainage area exceeding 10 acres	1,075		

Note: it is not valid to sum the total number of structures, as there is overlap. For example, one structure could be in a floodplain, also in a slump, and also in the path of overland relief.

- Using FEMA and CFPF grants to voluntarily acquire properties with a history of repetitive flooding (Woodacre, Swinks Mill Drive, Barrett Road)
- Realizing the gap in funding for flood mitigation projects, staff applied for and were successful recipients of over $15M in Virginia Community Flood Preparedness Fund (CFPF) Grants in 2023. In addition, staff recently applied for an additional $6.2M in funding for the most recent CPFP Grant cycle, which we expect to hear back in early 2024.
- Expanding partnerships to provide enhanced SWM on County projects to help mitigate downstream flows (CAP, FCDOT, VDOT, HCD, FCPS) while using innovative approaches to addressing stormwater in the most cost-effective manner.
- Ravenwood Park study
- We will need additional funding/staff to move towards a proactive and resilient program.
- Staff and funding for neighborhood stormwater improvement projects

Table B-2 below lists the current CIP flood projects. DPWES currently estimates ten years to complete these projects at current staffing and funding levels.

Table B-2: CIP for Flood

Project Name	Project Phase*	Total Project Cost
Little Pimmit Run Trib at Woodland Terrace	Under Final Design and Permitting	$4,718,000
Dead Run Drive Stormwater Improvements	95% Design	$1,200,000
Forest Villa Lane Area Stormwater Improvements	Concept Design	$1,900,000
Kent Garden Neighborhood Stormwater Improvements	Concept Design, with Land Acquisition Division for easements	$10,400,000
Potomac Hills Stormwater Improvements	Under Site Assessment and Preliminary Design	$5,200,000
Valley Avenue Neighborhood Stormwater Improvements	Concept Design	$1,810,000
Weaver Avenue/Dillon Avenue Stormwater Improvements	Concept Design	$8,126,000
Woodacre Drive Area Stormwater Improvements	Under Site Assessment and Preliminary Design	$2,800,000
Broad Branch Court Stormwater Improvements	Under Site Assessment and Preliminary Design	$2,150,000
Kings Manor Stormwater Improvements	Under Site Assessment and Preliminary Design	$6,250,000
Sunset Hills Drainage Improvements	Under Site Assessment and Preliminary Design	$14,600,000

Project Name	Project Phase*	Total Project Cost
Chowan Avenue Flood Mitigation	Under Site Assessment and Preliminary Design	$2,000,000
Tripps Run at Barrett Road Flood Mitigation	Under Site Assessment and Preliminary Design Voluntary Acquisition Expected to be Complete by March 1, 2024	$12,836,000
Hollin Hall/Wellington Neighborhood Stormwater Improvements Study	Proposed (not budgeted or initiated)	$300,000
Ravenwood Park Neighborhood Stormwater Improvements Study	Under Site Assessment and Preliminary Design	$150,000
Tucker Avenue Flood Mitigation	Construction Bid Phase	$12,800,000
MSMD Individual Flood Mitigation (Ridgecrest Dr *MVCCA, Rippling Pond, Huntsman Blvd, Roxbury, Ballantrae Farm, Cobbs Rd, Hunting Ridge, Bridle Path, McLean CC, Lily Dhu Ln)	10 Projects Constructed/Under Construction post July 2022	$1,370,000
MSMD Individual Flood Mitigation (Kings Park, White & Colmac, Gordon Ave, Springfield Village, Westmoreland *MVCCA, Sunny Fields, Elder Ave, Anderson Rd, Lawrence Dr)	9 Projects Under Final Design and Permitting	$3,560,000
MSMD Individual Flood Mitigation (Briar Ridge Ct, Summerday, Spring Vale, Winter Wren, Bellamy Ave, Lakewood, Laughlin Ave, Westlawn)	8 Projects Under Site Assessment and Preliminary Design	$3,135,000
Total		**$95,305,000**

*As of February 1, 2024

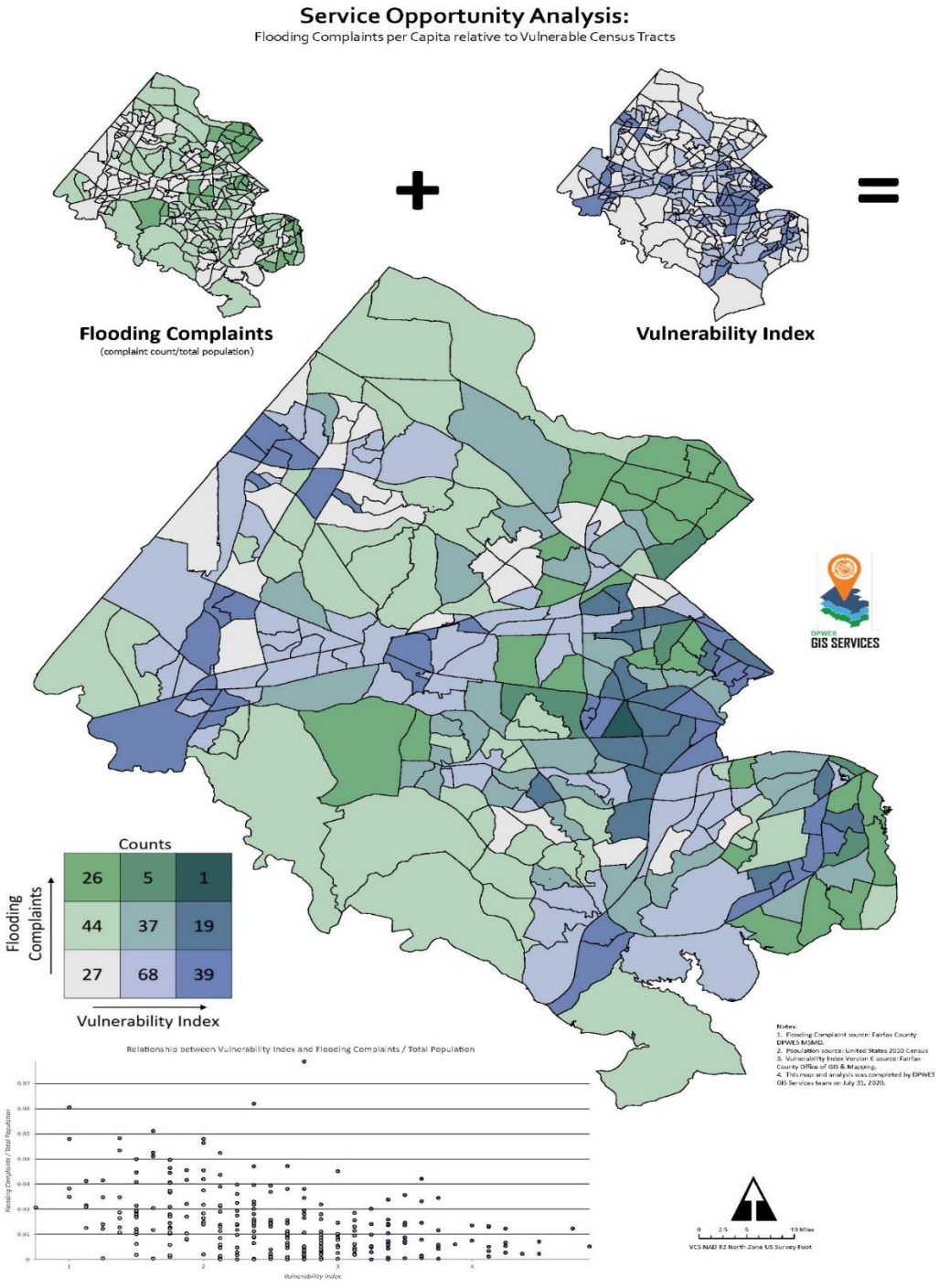
ATTACHMENT C: Vulnerable Communities at Risk of Flooding

DPWES used available data to evaluate the County's trends in flooding versus vulnerable communities. DPWES mapped where drainage complaints had historically been reported compared to the County's vulnerability layer. This analysis sought to answer the question: do areas with high/very high vulnerability have higher levels of reported flooding? Figure C-1 below shows the results of the mapping exercise.
DPWES concludes the following:

- Our data on historic drainage complaints may be limited. We have limited data on flood complaints for multifamily units at risk such as below grade basement apartments and condos. Renters may report issues to landlords who may not report them to the County.
- The County's early adoption of floodplain regulations (1967) protected the community and didn't allow for a lot of buildings within the floodplain.
- Floodplain policies resulted in minimal amounts of vulnerable communities co-located in the floodplain.
- There are exceptions such as Harmony Place that are vulnerable and co-located in the floodplain.
- DPWES will pursue further efforts related to drainage and flooding in vulnerable areas.

DPWES began a pilot community engagement project with Neighborhood and Community Services in the Culmore neighborhood of the Mason District. When DPWES visited the Culmore neighborhood, we identified several isolated areas at risk of flooding, but they were not a high priority nor major concern for the community. As of the date of this memorandum, the pilot project continues with the Culmore neighborhood to determine how DPWES can assist the community.

Figure C-1


Service Opportunity Analysis:
Flooding Complaints per Capita relative to Vulnerable Census Tracts
Flooding Complaints
(complaint count/total population)
Vulnerability Index
DPWES
GIS SERVICES
Counts
Flooding Complaints
26
5
1
44
37
19
27
68
39
Vulnerability Index
Relationship between Vulnerability Index and Flooding Complaints / Total Population
Notes:
1. Flooding Complaint source: Fairfax County DPWES MSMD.
2. Population source: United States 2010 Census
3. Vulnerability Index Version 6 source: Fairfax County Office of GIS & Mapping.
4. This map and analysis was completed by DPWES GIS Services team on July 31, 2020.
0 2.5 5 10 Miles
VCS NAD 83 North Zone US Survey Foot