

**Virginia Department of Conservation and Recreation Virginia
Community Flood Preparedness Fund – Round 3 Application
Flood Prevention and Protection Project**

**Davis Creek – Channel Dredging and Novel Dredging Spoils
Reuse for Flood Protection**

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Virginia Community Flood Preparedness Fund – Round 3 Application
Flood Prevention and Protection Project**

PROJECT TITLE: Davis Creek - Davis Creek – Channel Dredging and Novel Dredging Spoils Reuse For Flood Protection

Name of Local Government: Middle Peninsula Planning District Commission

Category of Grant Being Applied for (check one):

_____ Capacity Building/Planning X Project _____ Study

NFIP/DCR Community Identification Number (CID): 510096

If a state or federally recognized Indian tribe, Name of tribe: N/A

Name of Authorized Official: Lewis Lawrence, Executive Director

Signature of Authorized Official: _____

Mailing Address (1): PO Box 286

Mailing Address (2): 125 Bowden Street

City: Saluda **State:** VA **Zip:** 23149

Telephone Number: (804) 758-2311

Cell Phone Number: (____) _____

Email Address: llawrence@mppdc.com

Contact Person (If different from authorized official): Jackie Rickards, Senior Planning Project Manager

Mailing Address (1): PO Box 286

Mailing Address (2): 125 Bowden Street

City: Saluda **State:** VA **Zip:** 23149

Telephone Number: (804) 758-2311

Cell Phone Number: (215) 264-6451

Email Address: jrickards@mppdc.com

Is the proposal in this application intended to benefit a low-income geographic area as defined in the Part 1 Definitions? Yes X No _____

Categories (select applicable project): Project Grants Project Grants (Check All that Apply)

- ☒ 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.
- Wetland restoration.
- ☐ Floodplain restoration.
- ☐ Construction of swales and settling ponds.
- ☐ Living shorelines and vegetated buffers.
- ☒ Structural floodwalls, levees, berms, flood gates, structural conveyances.
- ☐ Storm water system upgrades.
- ☐ Medium and large-scale Low Impact Development (LID) in urban areas.
- ☐ 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.
- ☐ Dam restoration or removal.
- ☐ Stream bank restoration or stabilization.
- ☒ Restoration of floodplains to natural and beneficial function.
- ☐ Developing flood warning and response systems, which may include gauge installation, to notify residents of potential emergency flooding events.

Location of Project (Include Maps): Mathews County - Please see the attached corresponding maps for this application.

NFIP Community Identification Number (CID#) (See appendix F): 510096

Is Project Located in an NFIP Participating Community? Yes

Is Project Located in a Special Flood Hazard Area? Yes

Flood Zone(s) (If Applicable): Zones AE and VE

Flood Insurance Rate Map Number(s) (If Applicable): 51115C0130E eff. 12/9/2014

Total Cost of Project: \$2,132,102

Total Amount Requested: \$1,296,967

SCOPE OF WORK NARRATIVE

INTRODUCTION

This proposal requests funding for the dredging of an economically important channel, Davis Creek in Mathews County, which has been shoaled by flood action. Dredging and the upland disposal of the dredged material is vital for the protection and viability of Davis Creek as it serves to be critical infrastructure for County's water-based economic activities. In other words, the project serves to revive and bolster the economic and climate resilience of Mathews County. The project will implement a shovel-ready dredging design developed in 2020 by the Middle Peninsula Planning District Commission (MPPDC) in partnership with the VIMS Shoreline Studies Program. The scope of the proposed project involves three (3) principal tasks:

- selection of a disposal site for dredged material via a cost efficiency analysis,
- acquisition or site preparation for construction of an upland staging area for dredged material which may be mined to provide for future resilience and flood protection activities,
- and dredging of Davis Creek.

As detailed below, the shoaling of Davis Creek has resulted in the US Coast Guard removing aids to navigation (ATONs) from the Creek in October 2017. Since then, Mathews County has taken ownership of three ATONs on Davis Creek to ensure public safety, and in early 2020, several channel markers were reactivated. Three pilings that were removed by the Coast Guard in 2017 were outfitted with signs and lights. The County owned public landing and the Marina at Davis Creek provide critical access for landing, docking, and mooring in close proximity to public and private oyster grounds and public crabbing grounds in Mobjack Bay and the Chesapeake Bay. Maintenance dredging of Davis Creek is necessary to re-establish the authorized navigable depths to provide safe navigation for vessels utilizing the working waterfronts located on the creek.

Risks to natural hazards are increasing. Population growth along coastlines worldwide, in addition to technological and infrastructural development, inherently results in a concomitant increase in places prone to disasters. Modern society relies upon government for effective prevention and protection strategies for continued resilience and sustainability.

Natural hazards are hazards that exist within the natural environment and are considered "acts of God," and consist of atmospheric, geologic, hydrologic, seismic, and biologic agents. Such hazards include flooding, drought, hurricanes, landslides, wildfires, and more. They are thought to be unpreventable and are associated with a perceived lack of control. As a result, the ability to manage risk to natural hazards greatly varies due to differences in background. Therefore, the identification of hazards is the foundation of effectively dealing with and avoiding risks. Because of climate change, many natural hazards are expected to become more frequent and more severe. Reducing the impacts these hazards have on lives, properties, and the economy is

a top priority for the Middle Peninsula PDC and the Middle Peninsula Fight the Flood (FTF) program.

The 2018 United States National Climate Assessment noted that global climate model predictions, though imprecise, suggest an increased frequency of strong hurricanes (Categories 4 and 5) in the Atlantic Basin, including the Caribbean. It also includes a range of sea-level rise predictions with significant impacts, especially together with high tide flooding. Other estimates include more frequent and intense droughts with microburst and deluge events. This is especially the case for the Coastal Plain area of Virginia.

FEMA, the Virginia General Assembly, DCR's Floodplain Management Program, and the Middle Peninsula Planning District Commission (MPPDC) all recognize that natural hazards pose a serious risk to all levels of government including states, localities, tribes and territories and the citizens which reside and work there. These hazards include flooding, drought, hurricanes, landslides, wildfires and more. Because of climate change, many natural hazards are expected to become more frequent and more severe. Reducing the impacts these hazards have on lives, properties and the economy is a top priority for the Middle Peninsula PDC and the Middle Peninsula Fight the Flood (FTF) program (www.FightTheFloodVA.com). To that end, this proposal is a partnership between the MPPDC and Mathews County (see Community Support Letter, **Attachment 1**).

- A link or copy to the approved MPPDC resilience plan: https://fightthefloodva.com/wp-content/uploads/2021/08/Approved-8_19_DCR-packet_letterandplan.pdf
- Middle Peninsula All Hazards Mitigation Plan (2016): https://www.mppdc.com/articles/reports/AHMP_2016_FEMA_Approved_RED.pdf
- Mathews County Comprehensive Plan: <https://www.mathewscountyva.gov/196/Comprehensive-Plan>

This project is consistent with multiple objectives and strategies outlined within the Regional All-Hazards Mitigation Plan. Relevant strategies include the following:

- Objective 1.1: Provide protection for future development to the greatest extent possible.
 - Strategy 1.1.1: Reduce or eliminate flood damage to residential/business structures that are highly vulnerable for continual flood damage.
 - Strategy 1.1.3: Protect public buildings and public infrastructure from flood waters resulting from 100-year flood storm events.
 - Strategy 1.3.1: Mitigation projects that will result in protection of public or private property from natural hazards.

Until recently, most flood risk management involved conventional engineering measures. These measures are sometimes referred to as “hard” engineering or “gray” infrastructure. Examples include building embankments, dams, levees, and channels to control flooding. Recently the

concept of “nature-based solutions”, “ecosystem-based adaptation,” “eco-DRR,” or “green infrastructure” has emerged as a good alternative or complement to traditional gray approaches.

Nature-based solutions make use of natural processes and ecosystem services for functional purposes, such as decreasing flood risk or improving water quality. These interventions can be completely “green” (i.e., consisting of only ecosystem elements) or “hybrid” (i.e., a combination of ecosystem elements and hard engineering approaches). Nature-based solutions can help mitigate flood (the focus of this document), drought, erosion, and landslide. In addition, they may help decrease vulnerability to climate change while also creating multiple benefits to the environment and local communities. These include sustaining livelihoods, improving food security, and sequestering carbon. Such solutions can be applied to river basins (e.g., reforestation and green embankments), coastal zones (e.g., mangroves and wetlands), and cities (e.g., urban parks).

There is increasing momentum for the use of nature-based solutions as part of resilience-building strategies, sustainable adaptation, and disaster risk management portfolios. Awareness of nature-based solutions from communities, donors, and policy- and decision-makers is growing. Further, investors and the insurance industry are increasingly interested in nature-based solutions. From a climate change perspective, ecosystem-based adaptation has been highlighted as a priority investment area as noted in this DCR opportunity.

The intent of the proposed project design is to incorporate flood damage abatement measures which consider and mitigate any potential impacts to neighboring properties. However, the final designs ultimately will require approval by the permit issuing authority (Local Wetland Board on behalf of the VMRC, the Local Chesapeake Bay Preservation Act/Wetland Board on behalf of the VDEQ, and any agencies overseeing the Joint Permit Application process), and we will abide by the final design in the approved permits.

PROJECT INFORMATION

Project Description

Davis Creek is located in Mathews County, Virginia and is a tributary of the Mobjack Bay, in the lower Chesapeake Bay. The creek has a narrow mouth that splits into three prongs. The eastern prong is shortest at 2,200 ft from the mouth, and the western prong is the longest extending about 3,000 ft from the mouth. The County-owned public landing and the Marina on Davis Creek occur on this prong. Land use adjacent to the creek is mostly residential with some agriculture and wooded properties. The headwaters do not have extensive marsh. Instead, the creek terminates soon after the channel narrows at the headwaters. Davis Creek has historically been the location of for some of the greatest levels of seafood industry activity among creeks in the Commonwealth and is an active working waterfront that is threatened immensely by shoaling impacts driven by storm activity and climate change.

Davis Creek is a federal navigation project that was authorized in 1950 with a 1-mile- long channel and turning basin. The original maximum depth was -10 ft MLLW, but more recent documentation by the US Army Corps of Engineers (USACE) lists -8 ft MLLW as the controlling depth. It is 80 ft wide along most of its length and has a turning basin that is 165 ft by 450 ft. The nearshore has sand shoals and submerged aquatic vegetation (SAV). An interior **flood shoal** also existed which reduced the channel depths inside the creek. In 1956, about 244,050 cubic yards (cy) of material was dredged from the channel and placed east of the creek along the shoreline. Maintenance dredging occurred in 1962 with 119,080 cy removed and placed in the same disposal area.

Maintenance dredging occurred again in December 1970/January 1971 with 53,497 cy of material removed. That was the last time that it was dredged as Federal funding for shallow draft dredging maintenance was defunded by Congress beginning around 2010.

At Davis Creek today, the nearshore has sand shoals and submerged aquatic vegetation (SAV). A **flood shoal** occurs just inside the creek. The narrow mouth, though, has widened over time. In 1937, the mouth was 147 ft wide, but in 2017, it was 255 ft wide. East of the creek, where the material was placed in the nearshore along the adjacent shoreline in 1956, new land has been created. The 2017 shoreline in this area is about 900 ft in front of the 1937 shoreline. The center part of the disposal is relatively high, and several houses have since been constructed on it. On either end, extensive marshes have been created. However, the natural trend along this shoreline is very low to low erosion (0 to -2 ft/yr).

Since then, the creek has experienced shoaling to the point that on October 10, 2017, the US Coast Guard removed aids to navigation (ATONs) from Davis Creek. The Corps considered the channel unstable and therefore discontinued the federal aids, and mariners were cautioned to proceed at their own risk due to shallow water depths.

Mathews County has taken ownership of three ATONs on Davis Creek. Early in 2020, several channel markers were reactivated. Three pilings that were removed by the Coast Guard in 2017 were outfitted with signs and lights. Much of the shoaling in the channel occurs in the approach to Davis Creek where the sand shoals are compromising the channel. The Marina at Davis Creek provides seasonally critical access for landing, docking, and mooring in close proximity to public and private oyster grounds and public crabbing grounds in Mobjack Bay. Maintenance dredging of Davis Creek is necessary to re-establish the authorized navigable depths to provide safe navigation for vessels utilizing the working waterfront located on the creek.

The rate of channel sedimentation from the initial dredging in 1956 to the first maintenance dredging in 1962 (119,080 cy) over 6 years is about 20,000 cy/yr. Between 1962 and 1971 (53,497 cy), the rate of infilling was 6,000 cy/yr. The actual depth to which the channel was dredged is not known. Because the volumes for the dredging amounts and the calculated infilling rates are very different, we can speculate that the channel was dredged to 10 ft the first two times but only to 8 ft the third time. Post

dredging sedimentation may occur in the same manner as the historic infilling. The alongshore and nearshore sands will continue to fill in the creek mouth, outbound channel, and **flood shoal**. The inside channel may get fines brought in by tidal flow and the contribution from upland sources. The interior channel remains relatively deep, about -9 ft MLLW which seems to indicate that not many fines are being input to the creek from upland sources or they are being transported into Mobjack Bay. The VIMS Shoreline Studies surveys conducted during 2020 determined that the material to be dredged from Davis Creek is too fine to be utilized for placement along shorelines and upland reuse is the optimal alternative.

Simply put, navigation and recreational and economic activity at Davis Creek and its working waterfronts have been impacted by **flooding** causing the channel to shoal, and impacts must be abated and continuously mitigated to preserve the integrity and resilience of the community.

Principal project tasks will include analyzing several upland staging areas nearby where the dredged materials may be placed in Geotubes®. The analysis will consider the nearby Dutchman Point property owned by the Middle Peninsula Chesapeake Bay Public Access Authority (MPCBPAA) (see **Figure 4**) as well as other nearby land currently for sale. It is known that the MPCBPAA Dutchman Point property contains some wetland areas, so a qualified engineer will be contracted to delineate wetlands on the property. Once a delineation is complete, the site will be assessed to see if the placement of Geotubes® at the site is an option and if not, then the costs of wetland mitigation credit purchases will be calculated. Concurrently, nearby properties currently for sale without wetland areas will be identified and a comparison of costs between identified property alternatives will be conducted to identify the most cost-effective approach.

For the selected site, the staging area consist of Geotubes® that are 5 ft tall with a 25 ft circumference and a 10 ft filled width can be stacked along the perimeter of the site to create the dike (see **Approach, Milestones, and Deliverables section**). Once the material is staged at the site, the material may be mined and used for resilience and flood mitigation purposes. Beginning in 2021, the MPPDC, MPCBPAA, and VA Sea Grant have partnered on a project to advance innovative resilience solutions for rural coastal Virginia through the private sector. The endeavor involved a series of business competitions for research and development of innovative technologies which may be applied in rural coastal areas. The proposed project will utilize some of the strategies arising from the business competitions involving the beneficial reuse of dredged material. Specifically, the material dredged from Davis Creek may be reused to create concrete which can be used for a variety of different flood purposes including shoreline protection structures, impermeable pavements, etc. The dredged material concrete has the potential of being produced on site via either cast concrete process or 3-D printing. Once the material from the initial dredging of Davis Creek is used up, additional material can be placed inside the dike from subsequent rounds of dredging. In essence, the upland staging area will serve as a resilience hub for advancing resilience solutions throughout the watershed and beyond.

Project Location Information

The Middle Peninsula is the second of three large peninsulas on the western shore of Chesapeake Bay in Virginia as seen in **Figure 1**. It lies between the Northern Neck and the Virginia Peninsula. The region is predominantly rural, with large, scattered farms and forested tracts; close-knit waterfront communities; an active regional arts association; broad-based civic involvement; and an excellent transportation infrastructure that provides easy access to urban markets. The area contains 3.2% of Virginia's land mass but only 1.1% of the Commonwealth's total population of approximately 93,000 as seen in **Figure 2**.

Figure 1. Middle Peninsula Geographic Area



Figure 2. Middle Peninsula Population

CID #	US Census 2020 Population	2020 Total
510048 (Tapp 510049)	Essex (Includes Town of Tappahannock)	10,599
510071	Gloucester	38,711
510082	King and Queen	6,608
510304 (West Point 510083)	King William (Includes Town of West Point)	17,810
510096	Mathews	8,533
510098 (Urbanna 510292)	Middlesex (Includes Town of Urbanna)	10,625
	MPPDC Total	92,886

This project proposes to dredge Davis Creek and stage dredged material in an upland area adjacent to the creek so that it may be used to drive further resilience and shoreline protection

solutions via innovative and beneficial reuses as shown in **Figures 3 and 4**.

Figure 3. County Map of Project Location



Figure 4. Parcel Map of Project Location



Population Information

Mathews County is located at Virginia’s Middle Peninsula and is an agriculture, forestry, and water-based economy. The County is comprised of 86 square miles of land 166 miles of shorelines. Based on 2020 Census Data, Mathews County’s population totals 8,533 which makes it the largest Middle Peninsula locality. According to DCR guidelines, a portion of the County is considered a low-income geographic area.

In **Figure 5**, the green areas qualified as low-income “community” areas meeting the 80% Household limits based on US census household income data¹ or are qualified Opportunity Zones.

¹ Based upon 2015-2019 U.S. Census American Community Survey data available on January 4, 2022, when CFPP Round 3 opened; 2016-2020 ACS data was not released until March 17, 2022.

Figure 5. Map of Middle Peninsula Low Income Qualifying Geographic Areas

Each county had its 'Eligible Household Income' calculated by multiplying the County's median Household income by .8. This resulted in the following numbers:

	Essex	Middlesex	Mathews	King William	King & Queen	Gloucester
Median household Income (in 2019 dollars), 2015-2019	\$51,954	\$57,438	\$64,237	\$66,987	\$63,982	\$70,537
Eligible Household Income	\$41,563	\$45,950	\$51,389	\$53,590	\$51,186	\$56,430

Note: Per 7/15/2021 DCR Webinar, comparing state Household income to locality is permissible to determine if the entire locality is LMI.

The following is an overview of the Regional Eligibility map. Green areas are qualified low-income "community" areas meeting the 80% Household limits based on US census household income data or are qualified Opportunity Zones.



Please see **Figure 6** for a zoomed in map of the project location and the green low- income area overlay. This shows that the project location is within the low-income area.

Figure 6. Map of the Project Location within the Green Low-Income Area



According to the VDAPT Virginia's Social Vulnerability Index Score, this project location has a moderate social vulnerability score as seen in **Figure 7**.

Figure 7. Virginia's Social Vulnerability Index Score Map of the Project Location

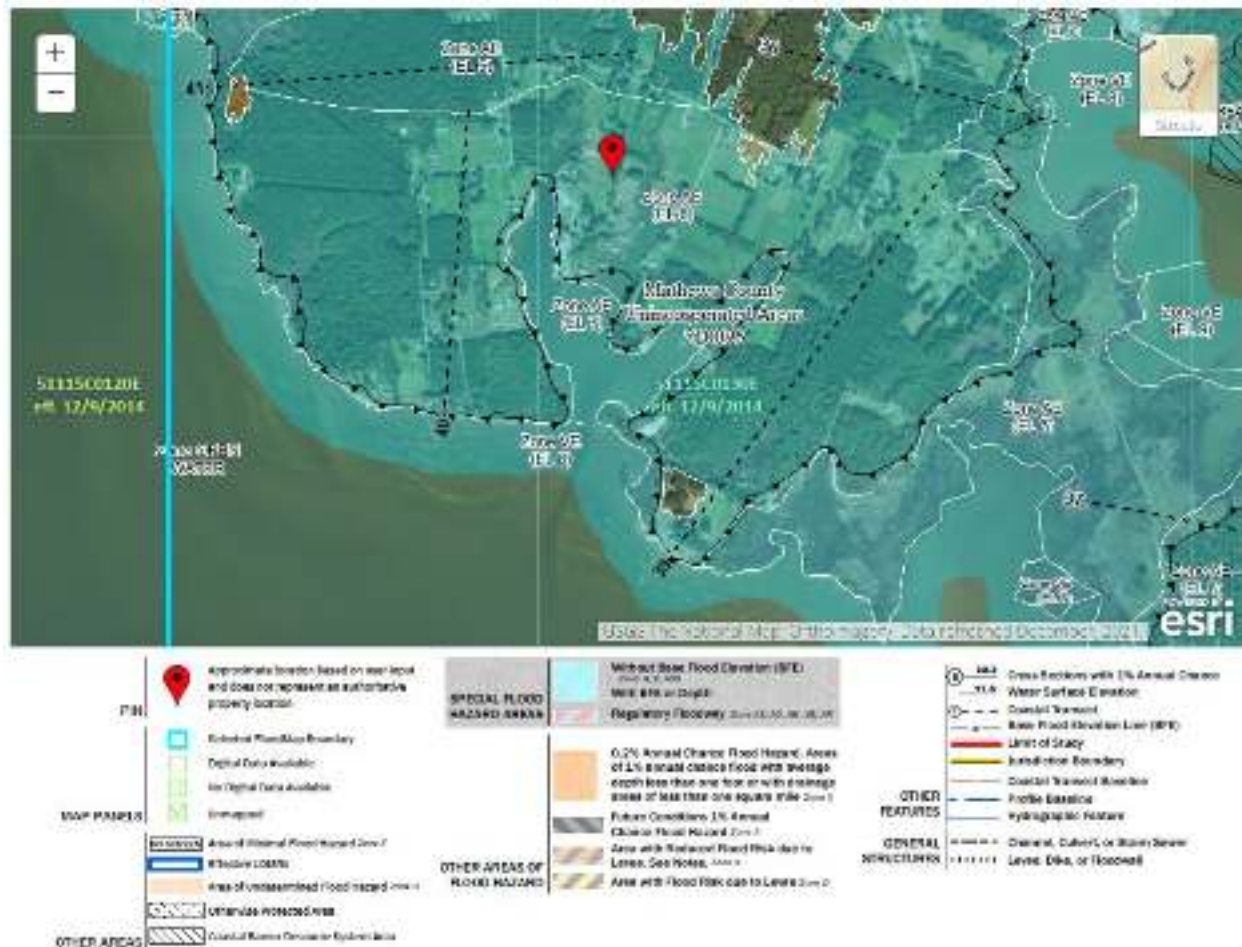


Flood Risk Information

The project is generally located at the Davis Creek Marina at 346 Davis Creek Rd, Port Haywood Virginia 23138 (37.332835057172844, -76.29944371765536), and the entirety of the site is located within a mapped floodplain, with portions located within FEMA Flood Zones AE and VE (**Figure 8**). Mathews County's Planning and Zoning Department administers the requirements of the NFIP program, and the County's Floodplain Management Ordinance may be accessed at the following link: <https://www.co.Mathews.va.us/DocumentCenter/View/422/Floodplain-Management-PDF?bidId=>

Losses in Mathews County are spread throughout the county with pockets of higher loss in the northern one-third of the county. Approximately \$210,000 US Dollars (or 45%) of estimated annualized damages can be attributed to the northern one-third of the County; versus approximately \$145,000 US Dollars (or 31%) in the center and \$109,000 US Dollars (or 24%) in the southern one-third.

Figure 8: Map of FEMA Flood Zones of Project Location



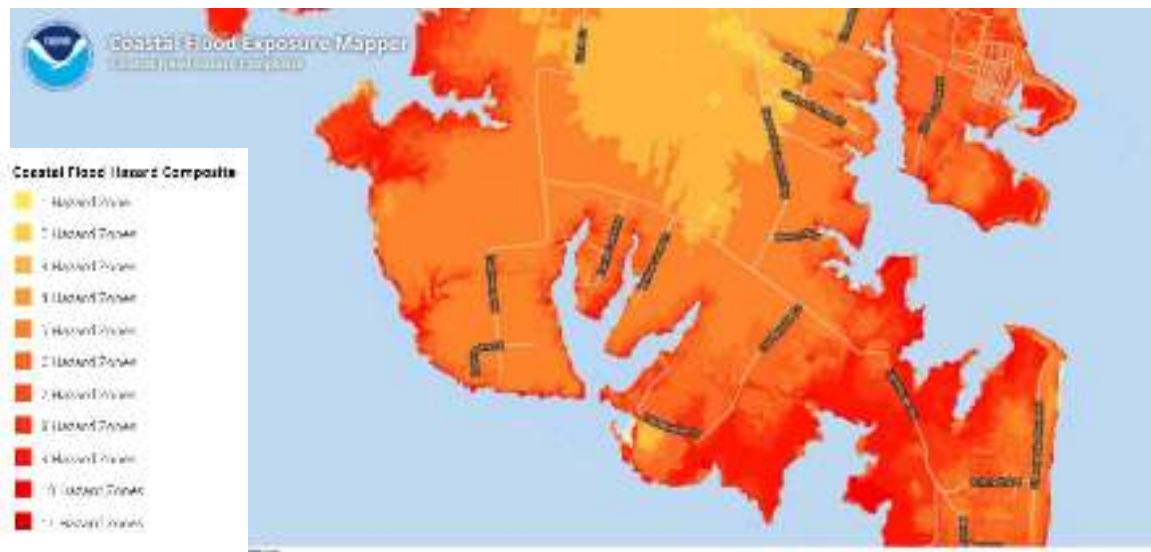
Due to the project site's proximity to the water and relatively low elevation, the site has an extensive history of experiencing flooding events that have resulted in significant impacts to infrastructure and the environment. Based on the historical shoreline data from the Virginia Institute of Marine Science Shoreline Studies Program, **Figure 9** shows the 1937 and the 2017 shorelines. From the figure one can see the change in the shoreline at the project location and the approximate loss of square feet of shoreline, with roughly 60 ft of erosion at some points. The project location has and continues to be impacted by tropical, sub-tropical, and nor'easter events. **Appendix 4** lists 79 storm events and provides a map with the project location. Without the dredging measures proposed to abate the consequences of flooding on the channel, the land and maritime infrastructure will be compromised, resulting in degradation of the environment and revenue loss to the local tax base. Furthermore, the innovative reuse of dredged material for shoreline and flood protection is anticipated to advance solutions for the observed extreme erosion occurring in the vicinity of Davis Creek.

Figure 9. Project Location and Map of the Shoreline Change between 1937 (purple) and 2017



Finally, according to NOAA's Coastal Flood Mapper, this project is at the highest risk of coastal flooding as seen in **Figure 10**.

Figure 10. Map of Project Location and Risk of Coastal Flooding (NOAA, 2021)



NEED FOR ASSISTANCE

The Middle Peninsula Planning District Commission (MPPDC) is a political subdivision of the Commonwealth of Virginia formed under VA Code §15.2-4203 to provide solutions to problems of greater than local significance and cost-savings through economies of scale. The MPPDC serves nine localities of the Middle Peninsula including Essex, Gloucester, King & Queen, King William, Mathews, and Middlesex counties, as well as the Towns of Tappahannock, West Point, and Urbanna.

MPPDC is staffed using multiple methods including co-operative procurement, hourly, and burdened FTE staff. MPPDC staff consists of an Executive Director, Deputy Director, Chief Financial Officer, Senior Project Planner, and clerical support staff; a Director of Planning, General Planner, Certified Flood Plain Manager, Transportation Planner, and Emergency Planner are co-operative procured; Housing, Community Development Planner and Public Relations staff are hourly.

The Planning District staffing team assists localities with long-term and/or regional planning efforts. The MPPDC Executive Director, Deputy Director, and Chief Financial Officer have decades of experience in managing and administering project grants at multiple scales - from grants in excess of \$1,000,000 to small grants. MPPDC is an entrepreneurial-based government agency with an annual operating budget ranging from \$750,000 to more than \$1,000,000. Annually, the MPPDC manages 25-30 concurrent federal and state grants utilizing industry standard Grants Management Software and other software (e.g., GIS, Microsoft Office) as required and/or necessitated by different grants. The MPPDC operates service centers in the topical areas of coastal zone management, emergency planning, housing, transportation planning and transportation demand management, economic development, social assistance, small business development, general planning and technical assistance, as well as other areas determined by the Commission. MPPDC has more than 25 years of experience managing multiple revolving loan programs. In the 25 years that the Executive Director has been employed by the Commission, no audit findings have occurred.

The need for assistance is two-fold. First, Mathews County is along the Chesapeake Bay and numerous tidal rivers that contribute to the area's high risk to coastal flooding, sea-level rise, and storm surge. Based on tidal gauge data from the Virginia Institute of Marine Science (VIMS), relative sea-level rise rates ranging from 0.11-0.23 in./yr. (2.9-5.8 mm/yr.; period: 1976-2007; 10 stations) within the Chesapeake Bay region, which are the highest rates reported along the U.S. Atlantic coast (Boon et. al., 2010). In addition to sea-level rise, Mathews County has a history of being impacted by hurricanes and tropical storms. As storms pass over or near the coast, the atmospheric pressure drops, causing a large volume of sea water to build up, eventually being pushed ashore by the storm's winds as storm surge. When a storm makes landfall at high tide, the storm surge and the added water from the tidal fluctuation combine to create a "storm tide".

Nor'easters, like hurricanes and tropical storms, can dump heavy amounts of rain and sediment, and produce hurricane-force winds that push large amounts of seawater inland. A strong indicator that Mathews County is experiencing the impact of coastal hazards (i.e., flooding, hurricanes, sea-level rise, and storm surge) is the number of repetitive loss and severe repetitive loss claims submitted by residents and businesses to FEMA. As of 2015, Mathews County had over 1,000 NFIP claims with claims topping \$20.5 Million. The County has implemented several preventative measures, property protection policies, public information activities, and emergency service measures to decrease impacts on its communities. This project will therefore build on local efforts moving toward a more resilient community.

Second, this project location is primed for co-benefits derived from dredging and beneficial reuse activities. The proposed upland staging for innovative reuse via the production of concrete for shoreline protection or other resilience measures will facilitate multiple, simultaneous activities that will contribute to economic growth in the area while fostering innovation.

Business Development

As explained previously, Davis Creek represents a key economic engine for Mathews County. The dredging activities will greatly benefit the commercial and recreational industries that have been severely threatened by the hazardous navigability conditions present in the creek. Additionally, the reuse of the material staged in the upland area will represent new economic activity with the potential to bring additional business and jobs to the County.

Community Scale Benefits

As explained in previous sections, the proposed activities represent a coordinated effort to address accelerating climate impacts altering and accelerating sediment migration patterns driven by storm surge and wave energy. The MPPDC and Mathews County will work together to protect the highly vulnerable water-based marine and recreational economies and properties along Davis Creek. The activities will have direct benefit to the general public in the form of navigability for the recreational and commercial boating activities occurring on these creeks as well as new and improved public access to the water from land, which is currently restricted in the vicinity. Additionally, and most importantly, the shoaled conditions of the creek and flood vulnerabilities of the properties adjacent to the creeks represent an immediate and dire public safety issue desperately in need of DCR Flood Fund assistance. Due to the multitude of public investment for shoreline protection and flood research and innovation, we believe this site meets the test of "Priority shall be given to projects that implement community-scale hazard mitigation activities that use nature-based solutions to reduce flood risk." The Davis Creek project serves as one of the Commonwealth's best chances to innovate shoreline resilience projects in "live time" so that all of coastal Virginia can benefit. This creek has provided critical community scale benefits for generations, and it is essential that action be taken now to ensure that the site can continue to provide similar benefit to the citizens, businesses, and visitors of Mathews County and the Commonwealth.

ALTERNATIVES

The submission of alternatives is not applicable in this application. Nature-based and hybrid solutions are anticipated, and the project cost is less than \$3 million.

GOALS AND OBJECTIVES

The focused goals and objectives of this project are as follows:

Goal 1: Improve coastal resiliency within the community and the Commonwealth.

- Objective A: Increase economic and flood resiliency by abating current flood damage and developing a system for mitigating recurrent, repetitive, and future flood shoaling within the project area using a hybrid design approach.
- Objective B: Stabilize the shoreline to ensure that the County's tax base does not erode and reduce the overall erosion rate within the project area using a hybrid design approach.

Goal 2: Improve water quality for the Chesapeake Bay area.

- Objective A: Improve nitrogen, phosphorus, and sediment using a hybrid design approach. Although some SAV may be temporarily impacted, water quality within Davis Creek may improve with deeper channel access.

Goal 3: Transferability to other communities.

- Objective A: Improve the implementation of Fight the Flood projects and project as an example program to be replicated in other communities within the region or the Commonwealth.

The MPPDC expects the following results and benefits of the completed project:

- 1. Foster economic growth in the area over the useful life of site infrastructure and most likely, beyond.** Enabling public access to this creek which represents a major county asset while ensuring its sustainability will protect and enhance the area's recreational economies and has the potential to positively impact related commercial endeavors.
- 2. Prevent loss of property without cementing an alternative.** Building resilient structures and facilities at the project site as outlined will help prevent loss of property and property value, while capitalizing on the useful life of the site as much as possible.

The proposed project was confirmed for the MPPDC by Matthew C. Burnette PG, PH, CFM or Holly White AICP, CFM.

- 3. Provide ecosystem services to the community toward increased quality of life.** Increased public access to recreational, educational, and cultural opportunities leverage

the provisioning and cultural services associated with the site's natural resources, services that provide benefits to safety, health, and well-being for all visitors.

APPROACH, MILESTONES, AND DELIVERABLES

The proposed project is to create a -6 ft MLLW channel and 1 ft of over depth (Total dredge depth -7 ft MLLW), hydraulically dredging approximately 24,150 cy of material that will then be pumped to an upland disposal site where it will be staged in geotubes and within a geotube walled area (see **Figure 11**). Once the material is staged it may be mined for beneficial reuse activities.

Additionally, the applicant and the property owner recognize the importance to do no harm to land owned by the Commonwealth nor the adjacent property owners as result of the construction elements of this project. The proposed project will be implemented under the auspices of experienced contractors who understand that adverse impacts must be avoided and considered in the implementation of the project. The proposed project will work with the permitting agency, designers, and contractors to ensure that the project is built to and functions at the level of the design specifications to ensure that no adverse impacts will occur.

Upon receiving notification of an award to proceed, the Middle Peninsula PDC will commence work in moving forward with the project in partnership with Mathews County.

The proposed project includes three principal phases of activities over the course of a nine-month period.

The anticipated timeline for the proposed project could be quicker than 9 months but will be completed well in advance of the maximum three-year limit required per the DCR Grant Manual. The timeline range is due to the potential delays in project initiation, contractor availability, and permitting.

The principal project tasks are described in detail below.

Project Milestone Schedule

TASK 1 - Selection of a staging site for dredged material via a cost efficiency analysis (2 months)

MPPDC staff will work with the MPCBPAA, and Mathews County conduct a cost efficiency analysis of the available property alternatives discussed previously to select the most suitable and effective site for the staging of dredged material.

Once the site has been selected for award, Mathews County will submit the Joint Permit Application developed by VIMS during 2020 to dredge Davis Creek and pump the material for upland staging at the identified optimal property, where it may be used beneficially for

resilience or other use.

TASK 2 – Acquisition and/or site preparation for construction of an upland disposal area (2 months)

After a property is selected for staging the dredged material, MPPDC staff will work with the MPCBPAA and the County to prepare the property for the desired activities.

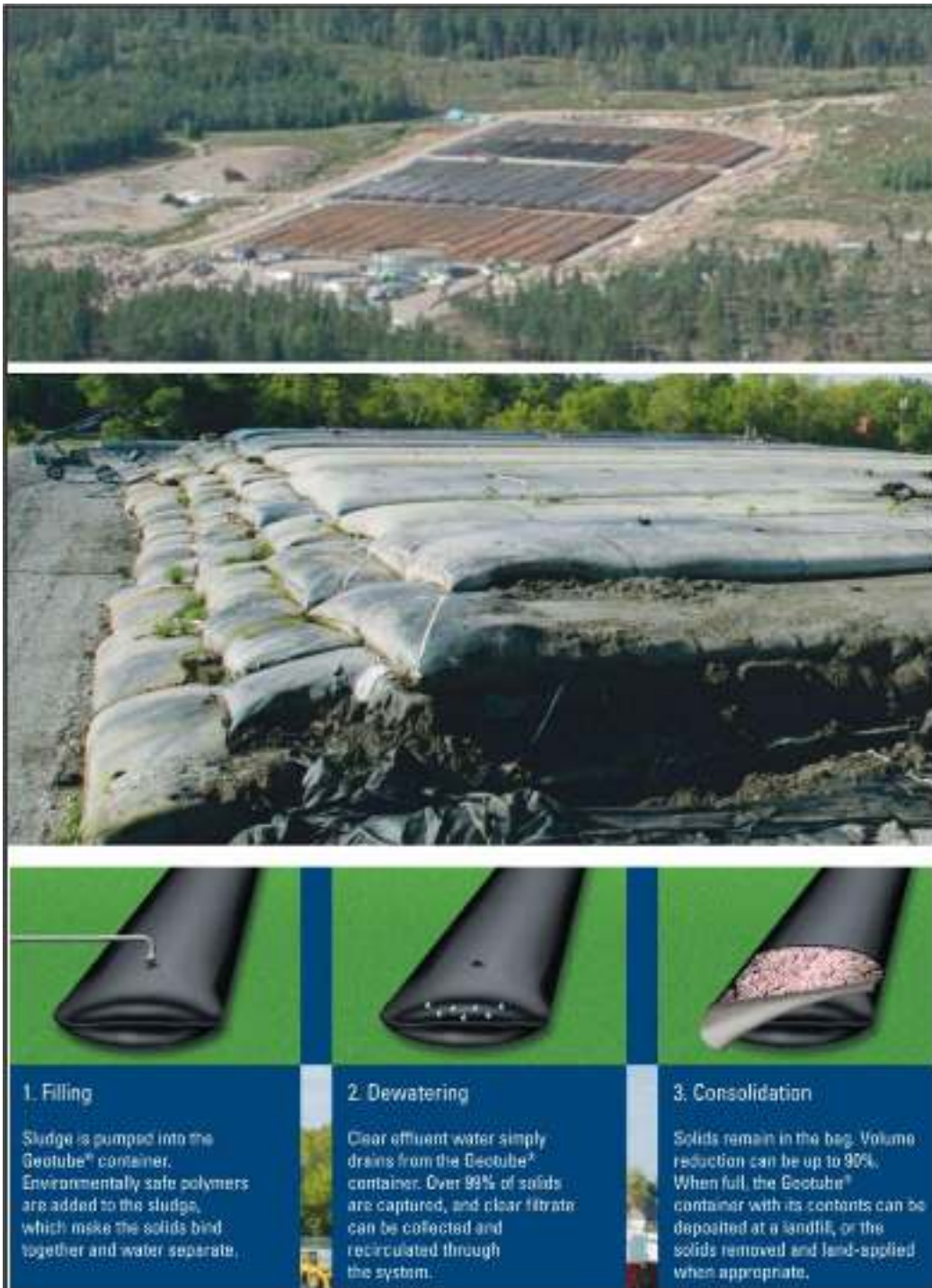
If it is found that the MPCBPAA Dutchman Point property is the optimal alternative, then the property will first be transferred to County ownership in accordance of MPCBPAA policy adopted during June 2021, where any MPCBPAA properties to be utilized for dredged material disposal areas will be returned to the County wherein the property is located and said County will assume ownership and maintenance responsibilities of the activity from that point forward. For the Dutchman Property, funding is requested to prepare the site as necessary per the permit terms and conditions. The County will oversee any required erosion and sediment control and enforcement actions that may be required by permitting agencies for this alternative.

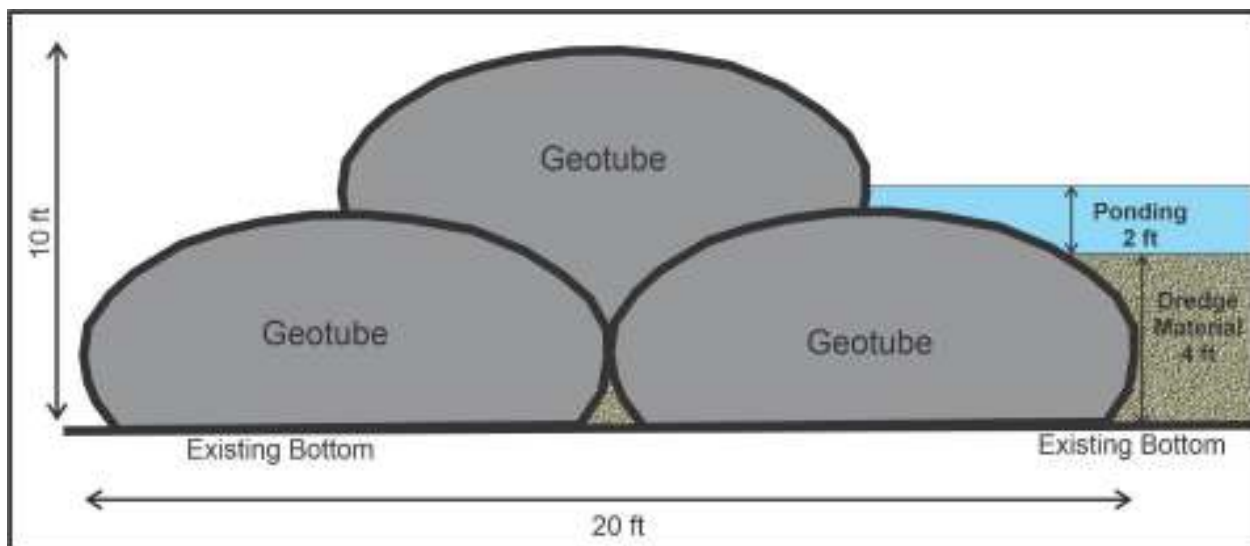
If it is found that it is more cost effective to acquire a new property near Davis Creek, then all efforts will be made to identify a nearby property with sufficient elevation and lack of wetland areas to support the desired activities without any regulatory or permitting issues. The US Army Corps of Engineers has been working for years to identify a property owner willing to partner with the Corps to construct a disposal alternative to no avail. The Corps' efforts are severely restricted because they cannot use their federal allocations for property acquisition which necessitates a different approach. Therefore, the local solutions posed here for property acquisition represent the most likely alternative for ever getting Davis Creek dredged. A recent online search of such properties turned up multiple suitable options of properties for sale with most being priced near the \$100,000 level and all suitable properties for sale being below the \$200,000 level. Funding will be utilized for the County to purchase, close, and prepare the site should it be necessary. The County will oversee any required erosion and sediment control and enforcement actions that may be required by permitting agencies for this alternative as well.

TASK 3 – Dredge Davis Creek and stage dredged material at upland site (5 months)

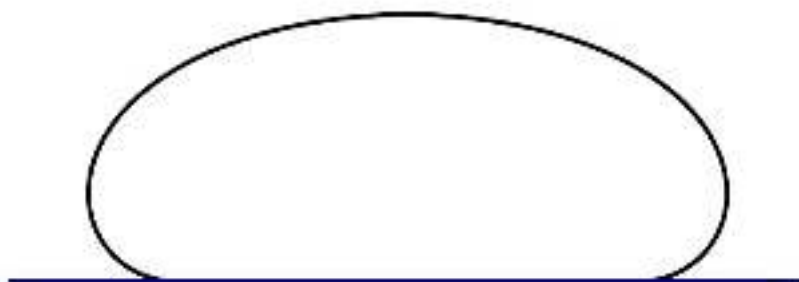
MPPDC and Mathews County will work with legal counsel to create a bid packet to procure a contractor to dredge Davis Creek. Once a contractor is selected, they will dredge the channel based on the design, terms and conditions included in the approved the JPA. MPPDC and Mathews County will work with the selected contractor to stage the material on the site selected under Tasks 1 and 2. Once the material is on site and dewatered, MPPDC staff will engage Mathews County and the suite of MPPDC Fight the Flood businesses to consider and advance reuse solutions involving the staged material.

Figure 11. Geotube Disposal Method





Geotube® Simulator Cross Section



11/12/20	Project:	Davis Creek UDF Geotube® Perimeter Dike
Units:	English	
Water Level:	Fully Emerged	
Geotube® Height (H) =	7.5	ft
Geotube® Circumference (C) =	45	ft
Relative Density of Fill Material =	1.8	kg
Geotube® Fabric Type:	GT1300MOLAP	
Geotube® Fabric Type:	Rigid Mechanical	
Circumferential Tensile Force (T) =	175.12	lb/ft
Geotube® Base Contact Width (B) =	11.58	ft
Geotube® Tides Width (W) =	15.12	ft
Geotube® Cross Section Area (A) =	101.96	sq ft
Geotube® Volume Per Unit of Length (V) =	3.78	cu yd/ft
TS of Circumferential Failure =	6.5	TS
Axial Direction FS (AFS) =	7.1	FS
TS of Fill Rot Failure =	6.1	TS

The equations used in the Geotube® Simulator are based on the paper "Two-dimensional analysis of geogrid reinforced tubes" by R. H. Plaut and R. Suberstein, *Acta Mechanica*, Volume 125, 1996, pages 207-218, and on further research by Professor Raymond H. Plaut. The software was developed by Benjamin Z. Ozyurt. The work was performed at Virginia Tech.

RELATIONSHIP TO OTHER PROJECTS

As explained previously, the proposed project represents the culmination and nexus for multiple MPPDC endeavors.

For over 40 years the Middle Peninsula PDC and its participating localities have worked diligently on topics associated with the land water interface, including coastal use conflicts and policies, sea level rise, stormwater flooding, roadside ditch flooding, erosion, living shorelines, coastal storm hazards (i.e., hurricanes, tropical storms), riverine and coastal flooding, and coastal resiliency.

The proposed project is a priority project generated from the Middle Peninsula Regional Flood Resilience Plan, which was approved by DCR in August of 2021. This Flood Resiliency Plan serves as the MPPDC's guiding document for its flood resiliency programs and is comprised of two primary MPPDC-approved policy documents. These documents frame the foundation and implementation of the Middle Peninsula flood protection approach and are indirectly and directly supported by specific regional planning documents each approved by federal, regional, and/or local partners as required by statute.

Other plans and resources integral to the implementation of the Flood Resiliency Plan include:

Long Term Planning

- Middle Peninsula All Hazard Mitigation Plan - FEMA and Middle Peninsula locality, approved 2016 (MPPDC Website)
 - This overarching project provides updates every five years on the hazards within the region; it identifies the top hazards within the region and provides a HAZUS assessment that analyzes flooding (riverine and coastal), sea-level rise and hurricane storm surge impacts in the region. Additionally, this plan lists strategies and objectives that guide member localities to mitigate for these strategies.
- Middle Peninsula Comprehensive Economic Development Strategy – MPPDC, approved March 2021
- Middle Peninsula VDOT Rural Long Range Transportation Plan – MPPDC, approved annually

Short Term Implementation

- Middle Peninsula Planning District Commission Fight the Flood Program Design - MPPDC Commission, approved June 2020; Chairman approved update 8/6/21
- Middle Peninsula Planning District Commission Living Shoreline Resiliency Incentive Funding Program - Virginia Revolving Loan Fund Program Design and Guidelines, approved 2015

The MPPDC has a history of continuous work on flooding and coastal resiliency topics, as described in **Attachment 5**. These projects have built upon each other to establish within the

MPPDC a solid foundation of regional expertise in flooding and coastal resiliency. Now, given this history of accumulated information and knowledge, the MPPDC can move beyond research and studies to begin implementing projects on the ground. One such effort, launched in 2020 following the Commission's authorization, was developed in response to emerging flood challenges. This effort, the **Middle Peninsula Fight the Flood (FTF) Program**, leverages state and federal funding to deliver flood mitigation solutions directly to constituents, for both the built and natural environments with an emphasis on nature-based flood mitigation solutions. The Middle Peninsula **FTF** program helps property owners gain access to programs and services to better manage challenges posed by flood water. MPPDC staff have partnered with private property owners registered for the FTF program to assist them in finding funding for their shoreline.

Finally, the Flood Resiliency Plan and associated programs strive to carry out the guiding principles and goals set forth in the Virginia Coastal Resilience Master Planning Framework established in 2020. The proposed activities are proposed in accordance with the guiding principles and with the intent that their outcomes will help the Commonwealth meet the goals set forth in the planning framework.

MAINTENANCE PLAN

It is important to ensure that the public investment of DCR CFPF funding be protected should the project not withstand future conditions. As such, MPPDC staff will work with legal counsel to develop an agreement to be signed by each party which outlines the terms necessary to ensure the public investment is maintained over the duration of the project. Additionally, during the 2022 session the Virginia General Assembly appropriated \$5M to support the launch of a municipal dredging program for the Middle Peninsula. MPPDC staff are currently working with the VA Port Authority which was tasked by the General Assembly to administer the funding, the Middle Peninsula Chesapeake Bay Public Access authority which will be the government body to host the dredging program, and member jurisdictions to establish the operating and maintenance agreements to support the establishment of the program. It is anticipated that the municipal dredging program will be operational by the time subsequent maintenance dredging for Davis Creek will be needed.

CRITERIA

*Describe how the project meets each of the applicable scoring criteria contained in **Appendix B** and provide the required documentation where necessary. Documentation can be incorporated into the Scope of Work Narrative or included as attachments to the application. **Appendix B must be completed and submitted with the application.***

For local governments that are not towns, cities, or counties, the documentation provided for the criteria below should be based on the local government or local governments in which the project is located and/or directly impacts.

1. **Is the applicant a local government (including counties, cities, towns, municipal**

corporations, authorities, districts, commissions, or political subdivisions created by the General Assembly or pursuant to the Constitution or laws of the Commonwealth, or any combination of these or a recognized state or federal Indian tribe?

- Yes; the applicant is a regional planning district commission.
2. **Does the local government have an approved resilience plan meeting the criteria as established by this grant manual? Has it been attached or a link provided?**
 - Yes; the MPPDC's DCR-approved resilience plan may be accessed at the following link: https://fightthefloodva.com/wp-content/uploads/2021/08/Approved-8_19_DCR-packet_letterandplan.pdf
 3. **For local governments that are not towns, cities, or counties, have letters of support been provided from affected local governments?**
 - Yes; please see **Attachment 1**
 4. **Has the applicant provided evidence of an ability to provide the required match funds?**
 - Yes; please see **Attachment 1**
 5. **Has the applicant demonstrated to the extent possible, the positive impacts of the project or study on prevention of flooding?**
 - Yes

BUDGET NARRATIVE

ESTIMATED TOTAL PROJECT COST

Based upon the identified scope of work, as well as the Davis Creek Dredge Channel Data Report prepared by VIMS which included cost estimates from private sector dredging operators, the total estimated project cost is \$2,132,102. This total estimate is based upon the following estimated cost breakdowns:

- Upland Staging Area Cost Efficiency Analysis: \$5,000
- Upland Staging Area Site Preparation/Site Acquisition: \$200,000
- Bid Document and Procurement Preparation and Oversight: \$20,000
- Dredging Project including mobilization and demobilization of dredging equipment and geotube staging equipment, all installation of pipe, all costs for other associated work that is necessary to advance the actual dredging operations, dewatering and polymer for geotubes, and purchase of the needed eight geotube units per design specs: \$1,558,000

MPPDC staff will manage and administer this project. Thus, personnel time is needed to ensure that project deliverables are completed within the project timeline. Along with personnel expenses, MPPDC fringe is needed. This includes health insurance, retirement, group life insurance, workman's comp, and unemployment insurance. MPPDC fringe rate for FY23 is

26.21% and comprised of: Health Insurance – 48.58%, Retirement – 18.06%, Workers Comp – 0.28%, Social Security – 28.55%, Life Insurance – 4.39%, Unemployment – 0.14%. Direct charges are costs associated with overall projects costs consistent with general accounting principles. MPPDC also prepares an indirect cost (IDC) plan annually per 2 CFR 200 Appendix VII. Following annual audit, the plan is submitted to NOAA for acceptance. MPPDC's IDC rate has a basis of Modified Total Direct Costs (MTDC), with a planned rate of 27.92%. IDC is only applied to the first \$25,000 of each contract. IDC calculated on MTDC (modified total direct cost)-Personnel, supplies, travel, and first \$25,000 of each subcontract, etc.; excludes equipment.

Davis Creek – Channel Dredging and Novel Dredging Spoils Reuse for Flood Protection and Economic Development of Mathews County Aquatic Recreation and Maritime Industries							
Personnel Salaries/Wages	DCR %	Match %	Annual Salary	DCR	County	Total	
Staff		0.00%	0.00%	\$0	\$137,741	\$74,168	\$211,909
Personnel	<i>Leslie's Cheat Sheet</i>			DCR	Owner		
		Total	65%	35%			
26.21% salaries		\$1,783,000	1,158,950.00	624,050.00	\$36,102	\$19,439	\$55,541
	15%	267,450.00	173,842.50	93,607.50			
Total Personnel		2,050,450.00	1,332,792.50	717,657.50	\$173,543	\$93,607	\$267,150
SubAward/SubContract Agreements				66%	34%		
Upland Disposal Cost Efficiency Analysis				\$5,000	\$3,250	\$1,750	\$5,000
Upland Disposal Site Preparation/ Site Acquisition				\$200,000	\$120,000	\$80,000	\$200,000
Legal Bid Documents and Procurement Preparation and Oversight				\$20,000	\$12,000	\$8,000	\$20,000
Dredging Project				\$1,558,000	\$934,800	\$623,200	\$1,558,000
				\$1,783,000			
SUBTOTAL: Direct Costs					\$1,243,593	\$806,557	\$2,050,150
Indirect/IDC/Facilities & Administrative Costs			27.92%	\$81,652	\$53,074	\$28,578	\$81,652
Total					\$1,296,667	\$835,135	\$2,132,102
Other Match:							
Source of Match					\$0	\$0	\$0
GRAND TOTAL					\$1,296,667	\$835,135	\$2,132,102

AMOUNT OF FUNDS REQUESTED

The total amount of requested grant assistance is \$1,296,967 or 65% of total project costs, as the project is located in and serves a low-income geographic area and the project results in hybrid solutions. These funds, combined with local match, would be used for the services identified above.

AMOUNT OF CASH FUNDS AVAILABLE

Mathews County will appropriate the requisite 35% or \$835,135 in required local match funds, to be combined with the \$1,296,967 in grant assistance to equal the total estimated project cost. The County's match commitment letter is included as **Attachment 1**.

AUTHORIZATION TO REQUEST FUNDING

The authorization to request funding is included as **Attachment 1**.

Appendix B: Scoring Criteria for Flood Prevention and Protection Projects

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

Applicant Name:	Middle Peninsula Planning District Commission	
Eligibility Information		
Criterion	Description	Check One
Is the applicant a local government (including counties, cities, towns, municipal corporations, authorities, districts, commissions, or political subdivisions created by the General Assembly or pursuant to the Constitution or laws of the Commonwealth, or any combination of these)?		
Yes	Eligible for consideration	X
No	Not eligible for consideration	
Does the local government have an approved resilience plan and has provided a copy or link to the plan with this application?		
Yes	Eligible for consideration under all categories	X
No	Eligible for consideration for studies, capacity building, and planning only	
If the applicant is <u>not a town, city, or county</u>, are letters of support from all affected local governments included in this application?		
Yes	Eligible for consideration	X
No	Not eligible for consideration	
Has this or any portion of this project been included in any application or program previously funded by the Department?		
Yes	Not eligible for consideration	
No	Eligible for consideration	X
5. Has the applicant provided evidence of an ability to provide the required matching funds?		
Yes	Eligible for consideration	X
No	Not eligible for consideration	
N/A	Match not required	

Project Eligible for Consideration		Yes <input type="checkbox"/> No
Applicant Name:	Middle Peninsula Planning District Commission	
Scoring Information		
Criterion	Point Value	Points Awarded
6. Eligible Projects (Select all that apply)		
Projects may have components of both 1.a. and 1.b. below; however, only one category may be chosen. The category chosen must be the primary project in the application.		
1.a. Acquisition of property consistent with an overall comprehensive local or regional plan for purposes of allowing inundation, retreat, or acquisition of structures.	50	
Wetland restoration, floodplain restoration Living shorelines and vegetated buffers. Permanent conservation of undeveloped lands identified as having flood resilience value by <i>ConserveVirginia</i> Floodplain and Flooding Resilience layer or a similar data driven analytic tool Dam removal Stream bank restoration or stabilization. Restoration of floodplains to natural and beneficial function. Developing flood warning and response systems, which may include gauge installation, to notify residents of potential emergency flooding events.	45	
1.b. any other nature-based approach	40	
All hybrid approaches whose end result is a nature-based solution	35	35
All other projects	25	
7. Is the project area socially vulnerable? (Based on ADAPT VA's Social Vulnerability Index Score.)		
Very High Social Vulnerability (More than 1.5)	15	
High Social Vulnerability (1.0 to 1.5)	12	
Moderate Social Vulnerability (0.0 to 1.0)	8	8
Low Social Vulnerability (-1.0 to 0.0)	0	
Very Low Social Vulnerability (Less than -1.0)	0	
8. Is the proposed project part of an effort to join or remedy the community's probation or suspension		

from the NFIP?		
Yes	10	
No	0	0
9. Is the proposed project in a low-income geographic area as defined in this manual?		
Yes	10	10
No	0	
Projects eligible for funding may also reduce nutrient and sediment pollution to local waters and the Chesapeake Bay and assist the Commonwealth in achieving local and/or Chesapeake Bay TMDLs. Does the proposed project include implementation of one or more best management practices with a nitrogen, phosphorus, or sediment reduction efficiency established by the Virginia Department of Environmental Quality or the Chesapeake Bay Program Partnership in support of the Chesapeake Bay TMDL Phase III Watershed Implementation Plan?		
Yes	5	5
No	0	
11. Does this project provide “community scale” benefits?		
Yes	20	20
No	0	
Total Points		78

Appendix D: Checklist All Categories

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

Scope of Work Narrative	
Supporting Documentation	Included
Detailed map of the project area(s) (Projects/Studies)	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
FIRMette of the project area(s) (Projects/Studies)	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
Historic flood damage data and/or images (Projects/Studies)	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
A link to or a copy of the current floodplain ordinance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
Non-Fund financed maintenance and management plan for project extending a minimum of 5 years from project close	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
A link to or a copy of the current hazard mitigation plan	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
A link to or a copy of the current comprehensive plan	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
Social vulnerability index score(s) for the project area from ADAPT VA's Virginia Vulnerability Viewer	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
If applicant is not a town, city, or county, letters of support from affected communities	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
Completed Scoring Criteria Sheet in Appendix B, C, or D	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
Budget Narrative	
Supporting Documentation	Included
Authorization to request funding from the Fund from governing body or chief executive of the local government	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
Signed pledge agreement from each contributing organization	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A

Attachment 1: Community Support/Match Commitment/Authorization Letter

County Administration



March 21, 2022

Lewis Lawrence, Executive Director
Middle Peninsula Planning District Commission
P.O. Box 286
Saluda, VA 23149

RE: Support Letter for Whites Creek Landing, East River Boat Yard, and Davis Creek Dredging Proposals

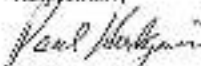
Dear Mr. Lawrence,

Mathews County supports the three proposals for Whites Creek landing easement, East River Boat Yard easement, and Davis Creek dredging for VDOT Community Flood Preparedness Funding.

If any or all of the projects are funded by the VDOT, the County plans to provide the required matching funds.

Should you have any questions concerning our support for this project, please contact the County Administration office at (804) 725-7173.

Respectfully,


Paul Haskins

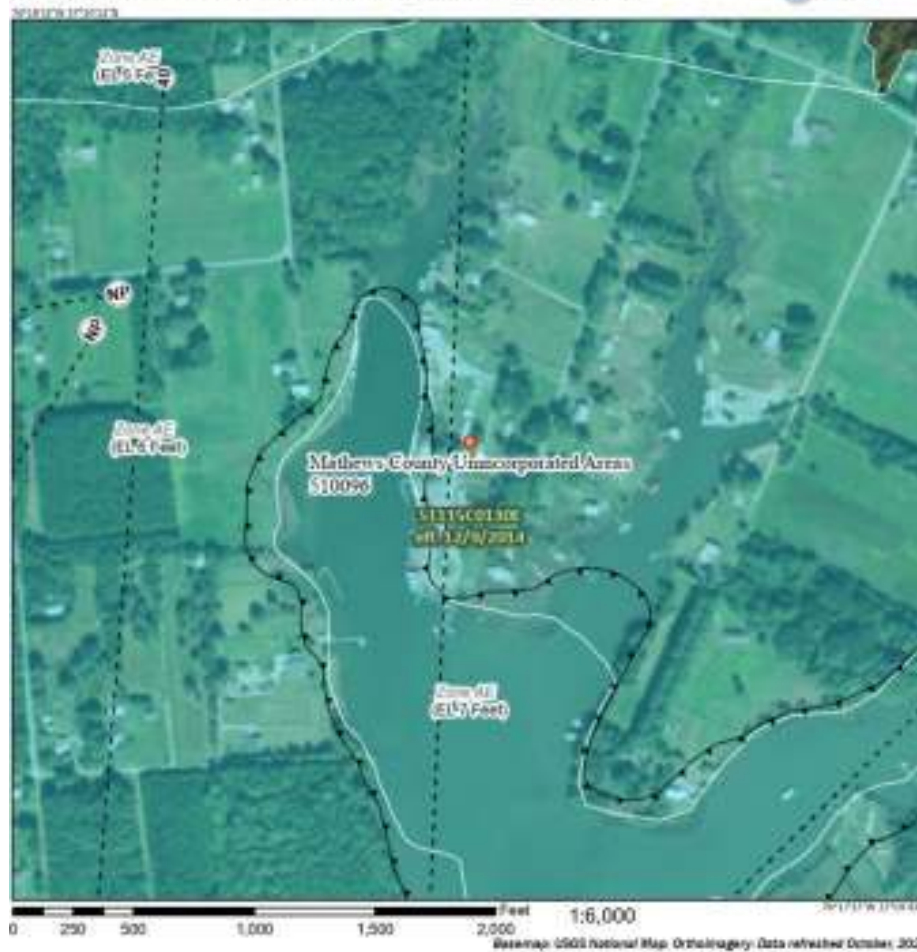
Chairman, Mathews County Board of Supervisors

(804) 725-7173 office
(804) 725-7005 fax
info@mathewscounty.gov
500 Rye Hill Road | P.O. Box 226 | Mathews, VA 22969



Attachment 2: Project Location FIRMette

National Flood Hazard Layer FIRMette



Legend

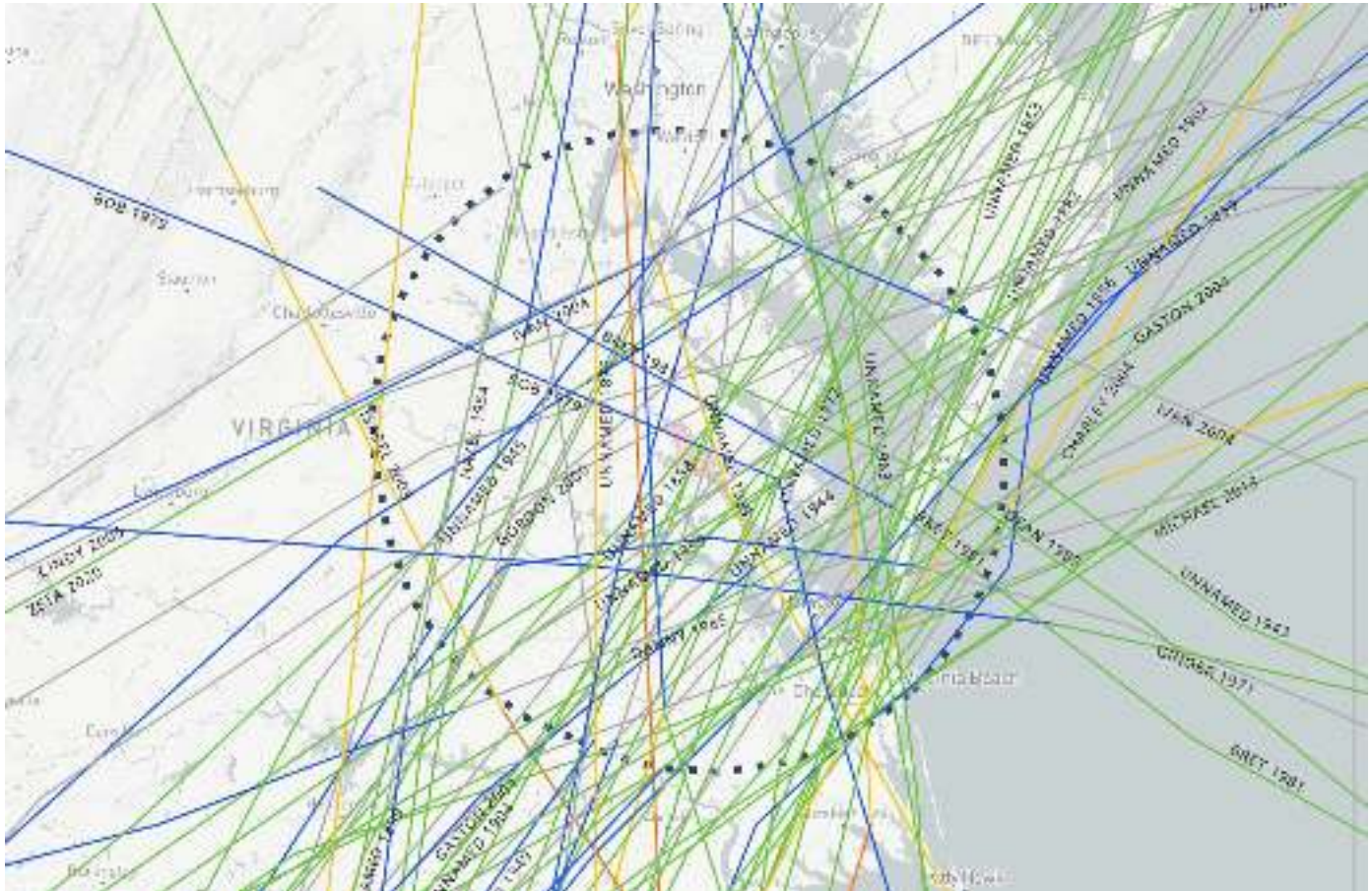
SPECIAL FLOOD HAZARD AREAS	
Without Base Flood Elevation (BFE)	Zone A, Zone B, Zone C
With BFE or Depth	Zone A, Zone B, Zone C, Zone D, Zone E, Zone F, Zone G, Zone H, Zone I, Zone J, Zone K, Zone L, Zone M, Zone N, Zone O, Zone P, Zone Q, Zone R, Zone S, Zone T, Zone U, Zone V, Zone W, Zone X, Zone Y, Zone Z
Regulatory Boundary	Regulatory Boundary
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	0.2% Annual Chance Flood Hazard
Public Conditional 2% Annual Chance Flood Hazard	Public Conditional 2% Annual Chance Flood Hazard
Area with Increased Flood Risk due to Lower New Rules, 2% or 1%	Area with Increased Flood Risk due to Lower New Rules, 2% or 1%
Area with Flood Risk due to Lower 2% or 1%	Area with Flood Risk due to Lower 2% or 1%
Area of Minimal Flood Hazard	Area of Minimal Flood Hazard
Channel, Culvert, or Marine Vessel	Channel, Culvert, or Marine Vessel
Area of Undetermined Flood Hazard	Area of Undetermined Flood Hazard
GENERAL FEATURES	
Channel, Culvert, or Marine Vessel	Channel, Culvert, or Marine Vessel
Lower, Old, or Flooded	Lower, Old, or Flooded
Cross Sections with 1% Annual Chance	Cross Sections with 1% Annual Chance
Water Surface Elevation	Water Surface Elevation
Coastal Truncation	Coastal Truncation
Base Flood Elevation Line (BFE)	Base Flood Elevation Line (BFE)
Limit of Study	Limit of Study
Anticipation Boundary	Anticipation Boundary
Coastal Truncation Boundary	Coastal Truncation Boundary
Profile Boundary	Profile Boundary
Hydrographic Feature	Hydrographic Feature
OTHER FEATURES	
Digital Data Available	Digital Data Available
No Digital Data Available	No Digital Data Available
Unmapped	Unmapped
MAP SYMBOLS	
The point displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.	

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards.

The flood hazard information is derived directly from the authoritative NFHL, with corrections provided by FEMA. This map was republished 5/14/2022 at 9:50 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map should be void if the use or reuse of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identification, FIRM panel number, and FIRM effective date. Map images for unapproved and unauthorized areas cannot be used for regulatory purposes.

Attachment 3: List of historic hurricanes impacting the project area 1851 to present per NOAA.



Location: 23181

Categories: H5, H4, H3, H2, H1, TS, TD, ET

Months: ALL Years: ALL

El Niño-Southern Oscillation (ENSO): ALL Minimum Pressure (mb) below: 1150 Include Unknown

Pressure Rating: TRUE Buffer Distance: 60

Buffer Unit: Nautical Miles

<u>STORM NAME</u>	<u>DATE RANGE</u>	<u>MAX WIND SPEED</u>	<u>MIN PRESSURE</u>	<u>MAX CATEGORY</u>
<u>ZETA 2020</u>	Oct 24, 2020 to Oct 30, 2020	100	970	H3
<u>ISAIAS 2020</u>	Jul 28, 2020 to Aug 05, 2020	80	986	H1
<u>NESTOR 2019</u>	Oct 17, 2019 to Oct 21, 2019	50	996	TS

<u>MICHAEL 2018</u>	Oct 06, 2018 to Oct 15, 2018	140	919	H5
<u>ANA 2015</u>	May 06, 2015 to May 12, 2015	50	998	TS
<u>ANDREA 2013</u>	Jun 05, 2013 to Jun 08, 2013	55	992	TS
<u>HANNA 2008</u>	Aug 28, 2008 to Sep 08, 2008	75	977	H1
<u>ERNESTO 2006</u>	Aug 24, 2006 to Sep 04, 2006	65	985	H1
<u>CINDY 2005</u>	Jul 03, 2005 to Jul 11, 2005	65	991	H1
<u>JEANNE 2004</u>	Sep 13, 2004 to Sep 29, 2004	105	950	H3
<u>IVAN 2004</u>	Sep 02, 2004 to Sep 24, 2004	145	910	H5
<u>GASTON 2004</u>	Aug 27, 2004 to Sep 03, 2004	65	985	H1
<u>CHARLEY 2004</u>	Aug 09, 2004 to Aug 15, 2004	130	941	H4
<u>ISABEL 2003</u>	Sep 06, 2003 to Sep 20, 2003	145	915	H5
<u>ALLISON 2001</u>	Jun 05, 2001 to Jun 19, 2001	50	1000	TS
<u>GORDON 2000</u>	Sep 14, 2000 to Sep 21, 2000	70	981	H1
<u>FLOYD 1999</u>	Sep 07, 1999 to Sep 19, 1999	135	921	H4
<u>BERTHA 1996</u>	Jul 05, 1996 to Jul 17, 1996	100	960	H3
<u>DANNY 1985</u>	Aug 12, 1985 to Aug 20, 1985	80	987	H1
<u>DEAN 1983</u>	Sep 26, 1983 to Sep 30, 1983	55	999	TS
<u>BRET 1981</u>	Jun 29, 1981 to Jul 01, 1981	60	996	TS
<u>BOB 1979</u>	Jul 09, 1979 to Jul 16, 1979	65	986	H1
<u>UNNAMED 1976</u>	Sep 13, 1976 to Sep 17, 1976	40	1011	TS
<u>GINGER 1971</u>	Sep 06, 1971 to Oct 05, 1971	95	959	H2
<u>DORIA 1971</u>	Aug 20, 1971 to Aug 29, 1971	55	989	TS
<u>ALMA 1970</u>	May 17, 1970 to May 27, 1970	65	993	H1
<u>CAMILLE 1969</u>	Aug 14, 1969 to Aug 22, 1969	150	900	H5
<u>UNNAMED 1963</u>	Jun 01, 1963 to Jun 04, 1963	50	1000	TS
<u>UNNAMED 1961</u>	Sep 12, 1961 to Sep 15, 1961	55	995	TS
<u>BRENDA 1960</u>	Jul 27, 1960 to Aug 07, 1960	60	976	TS

<u>CINDY 1959</u>	Jul 04, 1959 to Jul 12, 1959	65	995	H1
<u>CONNIE 1955</u>	Aug 03, 1955 to Aug 15, 1955	120	944	H4
<u>HAZEL 1954</u>	Oct 05, 1954 to Oct 18, 1954	115	938	H4
<u>UNNAMED 1949</u>	Sep 11, 1949 to Sep 14, 1949	45	-1	TS
<u>UNNAMED 1945</u>	Sep 12, 1945 to Sep 20, 1945	115	949	H4
<u>UNNAMED 1944</u>	Oct 12, 1944 to Oct 24, 1944	125	937	H4
<u>UNNAMED 1944</u>	Jul 30, 1944 to Aug 04, 1944	70	985	H1
<u>UNNAMED 1943</u>	Sep 28, 1943 to Oct 02, 1943	55	997	TS
<u>UNNAMED 1935</u>	Aug 29, 1935 to Sep 10, 1935	160	892	H5
<u>UNNAMED 1934</u>	Sep 01, 1934 to Sep 04, 1934	45	-1	TS
<u>UNNAMED 1933</u>	Aug 13, 1933 to Aug 28, 1933	120	948	H4
<u>UNNAMED 1929</u>	Sep 19, 1929 to Oct 05, 1929	135	924	H4
<u>UNNAMED 1928</u>	Sep 06, 1928 to Sep 21, 1928	140	929	H5
<u>UNNAMED 1928</u>	Aug 03, 1928 to Aug 13, 1928	90	971	H2
<u>UNNAMED 1924</u>	Sep 27, 1924 to Oct 01, 1924	55	999	TS
<u>UNNAMED 1916</u>	Sep 04, 1916 to Sep 07, 1916	45	-1	TS
<u>UNNAMED 1916</u>	May 13, 1916 to May 18, 1916	40	990	TS
<u>UNNAMED 1905</u>	Oct 05, 1905 to Oct 11, 1905	45	-1	TS
<u>UNNAMED 1904</u>	Sep 08, 1904 to Sep 15, 1904	70	-1	H1
<u>UNNAMED 1902</u>	Oct 03, 1902 to Oct 13, 1902	90	970	H2
<u>UNNAMED 1902</u>	Jun 12, 1902 to Jun 17, 1902	50	-1	TS
<u>UNNAMED 1899</u>	Oct 26, 1899 to Nov 04, 1899	95	-1	H2
<u>UNNAMED 1894</u>	Oct 01, 1894 to Oct 12, 1894	105	-1	H3
<u>UNNAMED 1893</u>	Sep 25, 1893 to Oct 15, 1893	105	955	H3
<u>UNNAMED 1889</u>	Sep 12, 1889 to Sep 26, 1889	95	-1	H2
<u>UNNAMED 1888</u>	Sep 06, 1888 to Sep 13, 1888	50	999	TS
<u>UNNAMED 1886</u>	Jun 27, 1886 to Jul 02, 1886	85	-1	H2

<u>UNNAMED 1886</u>	Jun 17, 1886 to Jun 24, 1886	85	-1	H2
<u>UNNAMED 1883</u>	Sep 04, 1883 to Sep 13, 1883	110	-1	H3
<u>UNNAMED 1882</u>	Sep 21, 1882 to Sep 24, 1882	50	1005	TS
<u>UNNAMED 1882</u>	Sep 02, 1882 to Sep 13, 1882	110	949	H3
<u>UNNAMED 1881</u>	Sep 07, 1881 to Sep 11, 1881	90	975	H2
<u>UNNAMED 1878</u>	Oct 18, 1878 to Oct 25, 1878	90	963	H2
<u>UNNAMED 1877</u>	Sep 21, 1877 to Oct 05, 1877	100	-1	H3
<u>UNNAMED 1876</u>	Sep 12, 1876 to Sep 19, 1876	100	980	H3
<u>UNNAMED 1874</u>	Sep 25, 1874 to Oct 01, 1874	80	980	H1
<u>UNNAMED 1872</u>	Oct 22, 1872 to Oct 28, 1872	70	-1	H1
<u>UNNAMED 1867</u>	Aug 10, 1867 to Aug 18, 1867	45	-1	TS
<u>UNNAMED 1864</u>	Jul 23, 1864 to Jul 26, 1864	35	-1	TS
<u>UNNAMED 1863</u>	Sep 16, 1863 to Sep 19, 1863	60	-1	TS
<u>UNNAMED 1861</u>	Oct 31, 1861 to Nov 03, 1861	60	992	TS
<u>UNNAMED 1861</u>	Sep 27, 1861 to Sep 28, 1861	70	-1	H1
<u>UNNAMED 1861</u>	Sep 22, 1861 to Sep 29, 1861	70	989	H1
<u>UNNAMED 1859</u>	Sep 15, 1859 to Sep 18, 1859	70	-1	H1
<u>UNNAMED 1856</u>	Aug 19, 1856 to Aug 21, 1856	50	-1	TS
<u>UNNAMED 1854</u>	Sep 10, 1854 to Sep 14, 1854	65	-1	H1
<u>UNNAMED 1854</u>	Sep 07, 1854 to Sep 12, 1854	110	938	H3
<u>UNNAMED 1852</u>	Aug 28, 1852 to Aug 31, 1852	50	-1	TS

Attachment 4: Additional Site Images



Source: dailypress.com

Attachment 5: Flood Prevention Project and its Relevance to Other Projects

MPPDC staff have worked throughout the years to understand the policy, research and impacts of flooding (i.e., stormwater, coastal, riverine, sea level rise) and coastal resiliency to the region. Below is a list of projects that have built upon each other over the year that have contributed to our understanding.

Climate Change & Sea Level Rise (2009 to 2012): The MPPDC was funded for a 3 Phase project through the Virginia Coastal Zone Management Program to assess the impacts of climate and sea level rise throughout the region. With over 1,000 miles of linear shoreline, the Middle Peninsula has a substantial amount of coast under direct threat of accelerated climate change and more specifically sea-level. In Phase 1, MPPDC staff assessed the potential anthropogenic and ecological impacts of climate change. Phase 2 focused on the facilitating presentations and develop educational materials about sea level rise and climate change for the public and local elected officials. Finally Phase 3 focused on developing adaptation public policies in response to the assessments.

Phase 1: Middle Peninsula Climate Change Adaptation: Facilitation of Presentations and Discussions of Climate Change Issues with Local Elected Officials and the General Public

Phase 2: Climate Change III: Initiating Adaptation Public Policy Development

Phase 3: Phase 3 Climate Change: Initiating Adaptation Public Policy Development

Emergency Management - Hazard Mitigation Planning (2009 to Present): Since 2009, the Middle Peninsula Planning District Commission has assisted regional localities in meeting the federal mandate to have an adopted local hazard plan. *The Regional All Hazards Mitigation Plan addresses the natural hazards prone to the region, including hurricanes, winter storms, tornadoes, coastal flooding, coastal/shoreline erosion, sea level rise, winter storms, wildfire, riverine flooding, wind, dam failures, drought, lightning, and earthquakes. This plan also consists of a HAZUS assessment of hurricane wind, sea level rise (i.e., Mean High Higher Water and the NOAA 2060 intermediate-high scenario), and flooding (coastal and riverine flooding) that estimates losses from each hazard.* The Middle Peninsula All-Hazard Mitigation Plan Update 2021 is currently being updated. The 2021 All Hazards Mitigation Plan builds off and updates previous mitigation plans.

Land and Water Quality Protection (2014): In light of changing Federal and State regulations associated with Bay clean up-nutrient loading, nutrient goals, clean water, OSDS management, storm water management, TMDLs, etc., staff from the Middle Peninsula Planning District Commission (MPPDC) will develop a rural pilot project which aims to identify pressing coastal issue(s) of local concern related to Bay clean up and new federal and state legislation which ultimately will necessitate local action and local policy development. Staff has identified many cumulative and secondary impacts that have not been researched or discussed within a local public policy venue. Year 1-3 will include the identification of key concerns related to coastal

land use management/water quality and Onsite Sewage Disposal System (OSDS) and community system deployment. Staff will focus on solution based approaches, such as the establishment of a regional sanitary sewer district to manage the temporal deployment of nutrient replacement technology for installed OSDS systems, assessment of land use classifications and taxation implications associated with new state regulations which make all coastal lands developable regardless of environmental conditions; use of aquaculture and other innovative approaches such as nutrient loading offset strategies and economic development drivers.

Department of Conservation and Recreation Stormwater Management (2014): The Virginia General Assembly created a statewide, comprehensive stormwater management program related to construction and post-construction activities (HB1065 - Stormwater Integration). The Virginia Department of Conservation and Recreation requires stormwater management for projects with land disturbances of one acre or more. This new state mandate requires all Virginia communities to adopt and implement stormwater management programs by July 1, 2014, in conjunction with existing erosion and sediment control programs.

Additionally, the communities within the MPPDC are required to address stormwater quality as stipulated by the Chesapeake Bay TMDL Phase II Watershed Implementation Plan and the Virginia Stormwater Regulations. The MPPDC Stormwater Program helped localities develop tools specific to the region necessary to respond to the state mandate requirement for the development of successful stormwater programs.

Stormwater Management-Phase II (2014): MPPDC staff and Draper Aden Associates worked with localities (i.e., Middlesex, King William, and Mathews Counties and the Town of West Point) interested in participating in a Regional Stormwater Management Program. While each locality sought different services from the regional program, this project coordinated efforts, developed regional policies and procedures, and the proper tools to implement a regional VSMP.

Mathews County Rural Ditch Enhancement Study (2015): In contract with Draper Aden Associates, a comprehensive engineering study was developed to provide recommendations and conceptual opinions of probable costs to improve the conveyance of stormwater and water quality through the ditches in Mathews County.

Drainage and Roadside Ditching Authority (2015): This report explored the enabling mechanism in which a Regional Drainage and Roadside Ditching Authority could be developed. An Authority would be responsible for prioritizing ditch improvement needs, partnering with Virginia Department of Transportation (VDOT) to leverage available funding, and ultimately working toward improving the functionality of the region's stormwater conveyance system.

Living Shoreline Incentive Program (2016 to present)

In 2011 Virginia legislation was passed designating living shorelines as the preferred alternative for stabilizing Virginia tidal floodplain shorelines. The Virginia Marine Resources Commission, in

cooperation with the Virginia Department of Conservation and Recreation and with technical assistance from the Virginia Institute of Marine Science (VIMS), established and implemented a general permit regulation that authorizes and encourages the use of living shorelines however, no financial incentives were put in place to encourage consumers to choose living shorelines over traditional hardening projects in the Commonwealth. To fill this, need the MPPDC developed the MPPDC Living Shoreline Incentives Program to offer loans and/or grants to private property owners interested in installing living shorelines to stabilize their shoreline. Currently, loans are available to assist homeowners to install living shorelines on suitable properties. Loans up to \$10,000 can be financed for up to 5 years (60 months). Loans over \$10,000 can be financed for up to 10 years (120 months). Interest is at the published Wall Street Journal Prime rate on the date of loan closing - currently at 5.25% (11/29/18). Minimum loan amount is \$1,000. Maximum determined by income and ability to repay the loan. Finally, there are currently no grants available in this program. Since 2016 under the MPPDC Living Shoreline Revolving Loan program, 8 living shorelines have been financed and built to date encumbering ~\$500,000 in VRA loan funding and ~\$400,000 in NFWF grant funding. Living Shoreline construction cost to date range per job \$14,000- \$180,000. MPPDC oversees all aspects (planning, financing, construction, and loan servicing) of these projects from cradle to grave.

Mathews County Ditch Project - VCPC White Papers (2017): This report investigated the challenges presented by the current issues surrounding the drainage ditch network of Mathews County. The study summarized research conducted in the field; examined the law and problems surrounding the drainage ditches; and proposed some next steps and possible solutions.

Mathews County Ditch Mapping and Database Final Report (2017): This project investigated roadside ditch issues in Mathews County through mapping and research of property deeds to document ownership of ditches and outfalls. This aided in understanding the needed maintenance of failing ditches and the design of a framework for a database to house information on failing ditches to assist in the prioritization of maintenance needs.

Virginia Stormwater Nuisance Law Guidance (2018): This report was developed by the Virginia Coastal Policy Center to understand the ability of a downstream recipient of stormwater flooding to bring a claim under Virginia law against an upstream party, particularly a nuisance claim. The report summarizes how Virginia courts determine stormwater flooding liability between two private parties.

Oyster Bag Sill Construction and Monitoring at Two Sites in Chesapeake Bay (2018): VIMS Shoreline Studies Program worked with the PAA to (1) install oyster bag sills as shore protection at two PAA sites with the goal of determining effective construction techniques and placement guidelines for Chesapeake Bay shorelines and (2) assess the effectiveness for shore protection with oyster bags on private property through time.

Fight the Flood Program (2020): The Fight the Flood was launched in 2020 to connect property owners to contractors who can help them protect their property from rising flood waters. FTF

also offers a variety of financial tools to fund these projects including but limited to the Septic Repair revolving loan program, Living Shoreline incentives revolving loan fund program, and plant insurance for living shorelines.