#### AGENDA

# JAMES CITY COUNTY BOARD OF SUPERVISORS BUSINESS MEETING COUNTY GOVERNMENT CENTER BOARD ROOM 101 MOUNTS BAY ROAD, WILLIAMSBURG, VA 23185

May 28, 2024

1:00 PM

#### A. CALL TO ORDER

B. ROLL CALL

#### C. **PRESENTATION(S)**

- 1. Proclamation Commemorating Juneteenth & Freedom Fest
- 2. Governor's EMS Awards Fire Department

#### **D. CONSENT CALENDAR**

- 1. Contract Award for Adult Special Events/Concert Series Amount Not to Exceed \$200,000 (Combined)
- 2. Contract Award \$184,502 Body Camera Systems and Video Auto-Tagging
- 3. Contract Award \$134,500 Warhill Sports Complex Field Netting
- 4. Designation of Voting Delegate for NACo Annual Conference
- 5. Grant Award \$250,000 Department of Historic Resources Preservation Virginia Rescue Archaeology at Smith's Field Historic Jamestowne
- 6. Grant Award \$48,000 Opioid Abatement Authority Kinship Navigator Program Expansion
- 7. Minutes Adoption

#### E. BOARD DISCUSSIONS

- 1. Police Drone First Responder & AED Delivery Experiment
- 2. Government Center Update

## F. BOARD CONSIDERATION(S)

- 1. Contract Award \$433,677 Upper County Park Playground Replacement
- 2. Contract Award \$3,133,991.06 Architectural Services for the New General Services Headquarters
- 3. Diascund Creek Watershed Management Plan Adoption
- 4. Policy to Address Solar Energy Generating Facilities

## G. BOARD REQUESTS AND DIRECTIVES

## H. REPORTS OF THE COUNTY ADMINISTRATOR

## I. CLOSED SESSION

- 1. Discussion or consideration of the acquisition of real property for a public purpose, or of the disposition of publicly held real property, where discussion in an open meeting would adversely affect the bargaining position or negotiating strategy of the public body, pursuant to Section 2.2-3711 (A)(3) of the Code of Virginia and regarding parcels along Route 60 (Pocahontas Trail) and Route 675 (Grove Heights Avenue).
- 2. Discussion or consideration of the acquisition of real property for a public purpose, or of the disposition of publicly held real property, where discussion in an open meeting would adversely affect the bargaining position or negotiating strategy of the public body pursuant to Section 2.2-3711 (A)(3) of the Code of Virginia and regarding the portion of the property upon which the "Amblers House" is situated.
- 3. Discussion or consideration of the acquisition of real property for a public purpose, or of the disposition of publicly held real property, where discussion in an open meeting would adversely affect the bargaining position or negotiating strategy of the public body, pursuant to Section 2.2-3711 (A)(3) of the Code of Virginia; in particular, property situated at 2054 Jamestown Road
- 4. Discussion or consideration of the acquisition of real property for a public purpose, or of the disposition of publicly held real property, where discussion in an open meeting would adversely affect the bargaining position or negotiating strategy of the public body pursuant to Section 2.2-3711 (A)(3) of the Code of Virginia and regarding the property identified as 110 Nina Lane.
- 5. Discussion of the award of a public contract involving the expenditure of public funds, and discussion of the terms or scope of such contract, where discussion in an open session would adversely affect the bargaining position or negotiating strategy of the public body, pursuant to Section 2.2-3711(A)(29) of the Code of Virginia and pertaining to the contract for the joint operation of schools between the County and the City of Williamsburg.
- 6. Consideration of a personnel matter, the appointment of individuals to County Boards and/or Commissions pursuant to Section 2.2-3711(A)(1) of the Code of Virginia
  - a. Appointment Williamsburg Regional Library Board of Trustees
  - b. Staff Appointment Peninsula Alcohol Safety Action Program
  - c. Appointments Parks and Recreation Advisory Commission
- 7. Certification of Closed Session

## J. ADJOURNMENT

1. Adjourn until 5 pm on June 11, 2024 for the Regular Meeting

#### **MEMORANDUM**

DATE:	May 28, 2024
TO:	The Board of Supervisors
FROM:	Kelley Herbert, Recreation Services Administrator, Parks & Recreation
SUBJECT:	Contract Award for Adult Special Events/Concert Series - Amount Not to Exceed \$200,000 (Combined)

A Request for Proposals (RFP) was solicited from qualified vendors to provide (and/or assist in providing) coordination and implementation of concert series and other adult-focused special events. While the Department continues to offer numerous special events each year that span through the ages, many of the special events offered are family-friendly in nature. Recognizing that the median age in James City County is over 45 years old, it is necessary to focus attention on adult offerings to support tourism goals of drawing additional visitors to the area.

While demand remains high for events, staffing resources to do so remain limited and therefore the Department solicited potential special event vendors that could offer such programming. Funding for these events would be through the James City County Tourism Account.

After a month-long solicitation, two competitive bids were received from:

CultureFix Vinyl 2 Vinyl, LLC (A & B Creative Events)

A staff evaluation team rated the written proposals as well as conducted interviews with the vendors. After evaluating the proposals and presentations, the committee determined that both vendors offered unique potential based on their experience and areas of expertise, with one vendor having more experience and expertise for operating music festivals/events and attracting local residents while one vendor displayed more experience with unique special events and the ability and resource to attract new visitors to the area with the high potential to invest in overnight stays and the local economy.

Contracts would be awarded for an initial one-year term, beginning July 1, 2024, with the potential for renewal if both parties mutually agree and the quality of events meets the County's expectations. Once the contract award is approved, staff will work individually with each vendor to determine the specific offerings for the year, utilizing each vendor for their expertise.

Staff recommends approval of the attached resolution for both vendors and requests authorization for the County Administrator to execute a contract award to CultureFix and Vinyl 2 Vinyl, LLC. Each contract would not exceed \$100,000 per year and will be based on prior approved fiscal year funding.

KH/ap CA-AdEvntCncrtSer-mem

Attachment

## <u>RESOLUTION</u>

#### CONTRACT AWARD FOR CONCERT SERIES AND ADULT SPECIAL EVENTS -

#### AMOUNT NOT TO EXCEED \$100,000 (EACH)

- WHEREAS, the James City County Department of Parks & Recreation solicited competitive bids for coordinating and implementing concert series and adult special events; and
- WHEREAS, James City County received two bids from CultureFix and Vinyl 2 Vinyl, LLC (A & B Creative Events); and
- WHEREAS, funds are available in the James City County Tourism budget for the implementation of programs and events that boost the local economy as well as support tourism initiatives.
- NOW, THEREFORE, BE IT RESOLVED that the Board of Supervisors of James City County, Virginia, hereby authorizes the County Administrator to execute a contract award to CultureFix and Vinyl 2 Vinyl, LLC (A & B Creative Events), for coordinating and implementing select, annual concert series and adult special events determined by the Department, not to exceed \$100,000 each.

	R	cuth M. L. Chair, Boa	arson rd of Sup	pervisors	-
ATTEST:		VOTE	S		
		AYE	NAY	ABSTAIN	ABSENT
	NULL HIPPI F				
Teresa J. Saeed	MCGI ENNON				
Deputy Clerk to the Board	ICENHOUR				
	LARSON				

Adopted by the Board of Supervisors of James City County, Virginia, this 28th day of May, 2024.

CA-AdEvntCncrtSer-res

#### **MEMORANDUM**

DATE:	May 28, 2024
TO:	The Board of Supervisors
FROM:	Mark L. Jamison, Chief of Police
SUBJECT:	Contract Award - \$184,502 - Body Camera Systems and Video Auto-Tagging

James City County Police Department requested and was authorized funds in the County's Fiscal Year 2024 Budget to commence the purchase of some replacement body-worn cameras. The Department is prepared to implement the purchase at this time, with the addition of auto-tagging (automatic video categorization via CAD) for all of its body-worn cameras. The purchase requires the implementation of a contract for a term of three years. The first-year cost to be paid this fiscal year is \$93,162 with the three-year contract amount totaling \$184,502.

The lowest procurement method found by Police and Purchasing staff for this purchase is to use a cooperative purchasing contract issued by the State of Minnesota's Sourcewell Contract #101223-AXN to Axon Enterprises, Inc. as a result of a competitive sealed Invitation for Bid. The Sourcewell contract contains wording allowing other localities to purchase from the Contract.

Cooperative procurement action is authorized by Chapter 1, Section 5 of the James City County Purchasing Policy and the Virginia Public Procurement Act. By participating in the cooperative procurement action, staff believes the County will increase efficiency, reduce administrative expenses, and benefit from an accelerated delivery process.

Adoption of the attached resolution will allow County Administration, in collaboration with the Purchasing Division, to enter into a three-year contract with Axon Enterprises, Inc. for the purchase of 40 Axon Body 4 camera systems, to include docking stations, user licenses, and other accessories. The contract also includes auto-tagging licensing for 100 body cameras (includes other existing units). The first-year expenditure of \$93,162 will provide for one-time purchases of cameras, docking stations, one year of user licensing for cameras, auto-tagging licensing, full warranty coverage, and one-third the cost of the camera systems. The remaining two years paid at \$44,774 and \$46,566 will pay for each year of user licensing, auto-tagging licensing, full warranty coverage, and the remaining prorated cost of the camera systems. First-year funds are available within the Police Department's current budget.

Staff recommends adoption of the attached resolution authorizing the contract award to Axon Enterprises, Inc. in the amount of \$184,502 for the procurement of 40 Axon Body 4 camera systems and 100 auto-tagging licenses for the Police Department.

MLJ/md CA-BdyCamVidAT-mem

Attachment

## <u>RESOLUTION</u>

#### CONTRACT AWARD - \$184,502 - BODY CAMERA SYSTEMS AND

#### VIDEO AUTO-TAGGING

- WHEREAS, funds are available through the Police Department's Fiscal Year 2024 Adopted Budget to commence the purchase of 40 body-worn camera systems and 100 video auto-tagging licenses; and
- WHEREAS, cooperative procurement action is authorized by Chapter 1, Section 5 of the James City County Purchasing Policy and the Virginia Public Procurement Act, and the State of Minnesota issued Sourcewell Cooperative Purchasing Contract #101223-AXN to Axon Enterprises, Inc. as a result of a competitive sealed Invitation for Bid; and
- WHEREAS, the Police Department and Purchasing staff determined the contract specifications meet the County's performance requirements for 40 body-worn camera systems and 100 autotagging licenses at a price of \$184,502 through Axon Enterprises, Inc.
- NOW, THEREFORE, BE IT RESOLVED that the Board of Supervisors of James City County, Virginia, hereby authorizes the County Administrator to execute a Contract with Axon Enterprises, Inc. for 40 body-worn camera systems and 100 auto-tagging licenses for Police personnel in the amount of \$184,502.

Ruth M. Larson Chair, Board of Supervisors

ATTEST:		VOTES			
		AYE	NAY	ABSTAIN	ABSENT
	NULL				
Teresa J. Saeed	- HIPPLE MCGLENNON				
Deputy Clerk to the Board	ICENHOUR				
	LARSON				

Adopted by the Board of Supervisors of James City County, Virginia, this 28th day of May, 2024.

CA-BdyCamVidAT-res

#### **MEMORANDUM**

DATE:	May 28, 2024
TO:	The Board of Supervisors
FROM:	Alister Perkinson, Parks Administrator
SUBJECT:	Contract Award - \$134,500 - Warhill Sports Complex Field Netting

In order to maintain the synthetic turf fields at the Warhill Sports Complex as a premier venue for tournaments in Virginia and the Mid-Atlantic region, and to provide more safety for participants and their families, field netting will be replaced at the Warhill Sports Complex. The netting on Fields 1 and 4 were replaced in 2023. This project will replace the netting on the remaining four turf fields.

An Invitation for Bids was publicly advertised, and one qualified firm submitted a bid to be considered for contract award:

<u>Firm</u>	Amount
Long Fence	\$134,500

Long Fence was determined to be the lowest qualified and responsible bidder. This project will use funds from the Tourism Fund.

Staff recommends approval of the attached resolution authorizing the contract award to Long Fence in the amount of \$134,500.

AP/ap CA-WSCFldNttng-mem

Attachment

#### **RESOLUTION**

#### CONTRACT AWARD - \$134,500 - WARHILL SPORTS COMPLEX FIELD NETTING

- WHEREAS, the Parks & Recreation Department desires to replace the field netting at synthetic turf Fields 2, 3, 5, and 6 at the Warhill Sports Complex; and
- WHEREAS, funds are available in the Tourism Fund; and
- WHEREAS, Long Fence was determined to be the lowest qualified, responsive and responsible bidder.
- NOW, THEREFORE, BE IT RESOLVED that the Board of Supervisors of James City County, Virginia, hereby awards the contract for the field netting at the Warhill Sports Complex to Long Fence in the total amount of \$134,500.

Ruth M. Larson Chair, Board of Supervisors

ATTEST:		VOTES	S		
		AYE	NAY	ABSTAIN	<u>ABSENT</u>
	NULL				
Teresa I Saeed	- HIPPLE MCCLENNON				
Deputy Clerk to the Board	ICENHOUR LABSON				
	LARSON				

Adopted by the Board of Supervisors of James City County, Virginia, this 28th day of May, 2024.

CA-WSCFldNttng-res

### **MEMORANDUM**

DATE:	May 28, 2024
TO:	The Board of Supervisors
FROM:	Teresa J. Saeed, Deputy Clerk
SUBJECT:	Designation of Voting Delegate for NACo Annual Conference

Each year, the National Association of Counties (NACo) holds an Annual Business Meeting during its Annual Conference. As a member county of NACo, James City County is entitled to one voting delegate to cast the County's vote(s) at this meeting.

The NACo Annual Business Meeting will be held on July 15, 2024, during the NACo Annual Conference in Hillsborough County, Florida. At this meeting, NACo members will vote on policy issues, resolutions, and other matters impacting counties nationwide.

Staff recommends that Ruth M. Larson, Chair of the Board of Supervisors, be designated as James City County's voting delegate for the upcoming NACo Annual Business Meeting. Chair Ruth M. Larson has experience representing our County at state and national events and is well-versed in the policy issues to be addressed.

If approved, Chair Ruth M. Larson will be authorized to cast James City County's vote(s) on all matters brought before the NACo Annual Business Meeting. A formal resolution documenting this designation has been prepared for your consideration.

TJS/ap VtngDelNACo-mem

Attachment

## **<u>RESOLUTION</u>**

#### DESIGNATION OF VOTING DELEGATE FOR NACo ANNUAL CONFERENCE

- WHEREAS, James City County is a member of the National Association of Counties (NACo); and
- WHEREAS, NACo's Annual Business Meeting will be held on July 15, 2024, during the NACo Annual Conference in Hillsborough County, Florida; and
- WHEREAS, NACo's policy allows each member county to designate one voting delegate to cast the County's vote(s) at the Annual Business Meeting; and
- WHEREAS, the Chair of the Board of Supervisors, Ruth M. Larson, has been determined to serve as the voting delegate for James City County at the NACo Annual Business Meeting.
- NOW, THEREFORE, BE IT RESOLVED that the Board of Supervisors of James City County, Virginia, hereby designates Ruth M. Larson, Chair of the Board of Supervisors, as the voting delegate for James City County at the NACo Annual Business Meeting to be held on July 15, 2024, in Hillsborough County, Florida.
- BE IT FURTHER RESOLVED that Ruth M. Larson is authorized to cast James City County's vote(s) as required on all matters brought before the NACo Annual Business Meeting.

Ruth M. Larson Chair, Board of Supervisors

ATTEST:		VOTES	S		
		AYE	NAY	ABSTAIN	ABSENT
	NULL				
Teresa I Saeed	. HIPPLE MCCLENNON				
Deputy Clerk to the Board	MCGLENNON				
	LARSON				

Adopted by the Board of Supervisors of James City County, Virginia, this 28th day of May, 2024.

VtngDelNACo-res

### **MEMORANDUM**

DATE:	May 28, 2024
TO:	The Board of Supervisors
FROM:	Paul D. Holt, III, Director of Community Development
SUBJECT:	Grant Award - \$250,000 - Department of Historic Resources - Preservation Virginia Rescue Archaeology at Smith's Field Historic Jamestowne

Funding was appropriated in the 2023/2024 Virginia State Budget to be distributed through the Department of Historic Resources (DHR). Within that appropriation, \$250,000 was awarded to Preservation Virginia for Rescue Archaeology at Smith's Field Historic Jamestowne.

Funds from the grant award will be used to perform rescue archaeology and research, including documentation, cataloguing and conservation of associated artifacts and features. According to Preservation Virginia, the project is necessary because of the frequent flooding and inundation that is occurring on-site. This area of Historic Jamestowne is particularly sensitive and archeological sites and artifacts are incurring damage and loss due to these conditions. The visiting public will be able to see the archaeology in progress and results of the research will be shared in a number of ways, including regular updates on Preservation Virginia's website and social media and more formal research reports.

Because Preservation Virginia is a privately funded organization, the award letter indicates that the funds cannot be provided directly to the Preservation Virginia from the Commonwealth and, instead, must pass through the appropriate local government (in this case, the County). The deadline for the funds to be transferred from the Commonwealth to the County is June 30, 2024; however, the funds will be disbursed by the County to Preservation Virginia as soon as the necessary Memorandum of Understanding (MOU) is executed and written notification to release funds is received from DHR. The County's sole responsibilities will be to: (1) accept the grant funds from the Commonwealth and (2) distribute the grant funds to Preservation Virginia upon receipt of written notification to release funds from DHR. The foregoing limited County responsibilities will be memorialized in a three-party MOU/Grant Agreement executed by the parties following adoption of the attached resolution, subject to approval as to form by the County Attorney's Office.

The County will receive \$250,000 from the Commonwealth and then distribute such funds to the recipient when DHR directs the County to release the funds. As such, no direct impact/cost to the County is anticipated. The term of the MOU is for a period of two years from the effective date and may be extended upon written mutual agreement. Preservation Virginia will be responsible for maintaining accurate records on the use of the grant funds and submitting a final project report to DHR and the County within 30 days of the full expenditure of the grant funds.

Staff recommends acceptance of these grant funds and approval of the attached resolution.

PDH/ap GA-DHR\_PVRA-mem

Attachments:

- 1. Resolution
- 2. Draft MOU
- 3. DHR Award Letter

## **<u>RESOLUTION</u>**

#### **GRANT AWARD - \$250,000 - DEPARTMENT OF HISTORIC RESOURCES -**

#### PRESERVATION VIRGINIA RESCUE ARCHAEOLOGY AT

#### SMITH'S FIELD HISTORIC JAMESTOWNE

- WHEREAS, the Virginia Department of Historic Resources (DHR) has awarded \$250,000 to Preservation Virginia for Rescue Archaeology at Smith's Field Historic Jamestowne; and
- WHEREAS, funds from the appropriation will be used to perform rescue archaeology and research, including documentation, cataloguing and conservation of associated artifacts and features that are at risk of incurring damage and loss due to frequent flooding and inundation that is occurring at Historic Jamestowne; and
- WHEREAS, because Preservation Virginia is a privately funded organization, the award letter indicates that the funds cannot be provided directly to Preservation Virginia from the Commonwealth and, instead, must pass through the appropriate local government (in this case, the County); and
- WHEREAS, the deadline for the funds to be transferred from the Commonwealth to the County is June 30, 2024; however, the funds will be disbursed by the County to Preservation Virginia as soon as the necessary Memorandum of Understanding (MOU) is executed and written notification to release funds is received from DHR; and
- WHEREAS, the County's sole responsibilities will be to: (1) accept the grant funds from the Commonwealth and (2) distribute the grant funds to Preservation Virginia upon receipt of written notification to release funds from DHR; and
- WHEREAS, there is no local match required.
- NOW, THEREFORE, BE IT RESOLVED that the Board of Supervisors of James City County, Virginia, hereby authorizes the acceptance and appropriation of funds to the Special Projects/Grants Fund as follows and also authorizes the County Administrator to enter into a MOU with DHR and Preservation Virginia for the purposes of providing these funds to Preservation Virginia in order to implement these grant funds:

Revenue:

State - DHR Award

\$250,000

**Expenditure:** 

Preservation Virginia Rescue Archaeology<br/>at Smith's Field Historic Jamestown\$250,000

Ruth M. Larson Chair, Board of Supervisors

ATTEST:		VOTES			
		AYE	NAY	ABSTAIN	ABSENT
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Teresa J. Saeed	HIFFLE MCCI ENNON				
Deputy Clerk to the Board	ICENHOUR				
	LARSON				

Adopted by the Board of Supervisors of James City County, Virginia, this 28th day of May, 2024.

GA-DHR\_PVRA-res

## Memorandum of Understanding

## *Among* The Virginia Department of Historic Resources *And* James City County, Virginia *And* Preservation Virginia *For the*

## Administration of the FY 2023-2024 State Grant for Historic Preservation

The Commonwealth of Virginia through the Department of Historic Resources will provide \$250,000 to Preservation Virginia for Rescue Archaeology at Smith's Field Historic Jamestowne ("Project"). This Memorandum of Understanding ("MOU") establishes a partnership among the Virginia Department of Historic Resources ("DHR"), the County of James City, Virginia, a political subdivision of the Commonwealth of Virginia (the "Local Government"), and Preservation Virginia (the "Recipient").

#### I. MISSION

DHR is the State Historic Preservation Office of the Commonwealth. DHR fosters, encourages, and supports the stewardship and use of Virginia's significant architectural, archaeological, and historic resources as valuable assets for the economic, educational, social, and cultural benefit of citizens and communities. A significant responsibility is the administration and review of state and federal historic preservation grant programs for financial and programmatic compliance. DHR is authorized to administer state grants to non-state agencies under the Code of Virginia.

Preservation Virginia has a mission to inspire and engage the public in fostering, supporting and sustaining Virginia's historic places through leadership in advocacy, education, revitalization and stewardship. They envision a future in which people seek a more complete understanding of the past, value the connections between people and place and support the protection of places where history happened.

Together, the Parties enter into this MOU to mutually promote efforts to execute the Project. Accordingly, DHR, the Local Government and the Recipient operating under this MOU agree as follows:

#### II.PURPOSE AND SCOPE

DHR, the Local Government and the Recipient will cooperate to ensure the correct and timely administration of the grant and the appropriate use and disbursement of its funds.

1. The "Partners" are forming a collaboration to comply with the provisions of Chapter 1 of the 2023 Special Session I Acts of Assembly.

2. The collaboration is intended to benefit the citizens of James City County and the Commonwealth.

3.Each organization which is a party to this MOU is responsible for its own expenses related to this MOU.

4. There will be an exchange of funds between the parties for tasks associated with this MOU as outlined below.

## III.RESPONSIBILITIES

Each party will appoint a person to serve as the official contact and coordinate the activities of each organization in carrying out this MOU. The initial appointees of each organization are:

DHR:	Caitlin Sylvester, Grants Coordinator Caitlin.sylvester@dhr.virginia.gov (804)482-6461 2801 Kensington Ave., Richmond, VA 23221
Local Government:	Paul Holt, Director of Community Development Paul.Holt@jamescitycountyva.gov (757) 253-6674 P.O. Box 8784, Williamsburg, VA 23187-8784
Recipient:	Elizabeth Kostelny, CEO and President ekostelny@preservationvirginia.org (804)648-1889 ext. 306 204 West Franklin Street, Richmond, VA 23220

DHR will:

- Transfer award funding in the amount of \$250,000 to the Local Government upon full execution of this MOU, but no later than June 30, 2025;
- Authorize and instruct the Local Government to transfer funds to the Recipient upon full execution of this MOU;
- Instruct the Recipient on the procedures for maintaining the financial records of the grant;

The Local Government will:

• Serve as fiscal conduit for the Project by receiving and transferring the grant funds in full to the Recipient upon full execution of this MOU.

The Recipient will:

- Submit project information form.
- Maintain accurate records for the use of the grant funds and retain the records for a minimum of five (5) years from completion of the Project.
- Submit a final project report (see Exhibit A) to DHR and the Local Government within 30 days of the full expenditure of the grant funds.

## IV.TERMS OF UNDERSTANDING

The term of this MOU is for a period of two years from the effective date of this agreement and may be extended upon written mutual agreement. It shall be reviewed annually to ensure that it is fulfilling its purpose and to make any necessary revisions. Authorization

On behalf of the organization I represent, I agree to the terms set forth in this agreement.

DHR:					
(signature)	(date)				
Julie V. Langan, Director and SHPO					
Local Government:					
(signature)	(date)				
Spott Stovens, County Administrator, Jamos City County					
Scoll Slevens, County Administrator, James City County					
Preservation Virginia:					
(cignoturo)	(data)				
(signature)	(date)				
Elizabeth Kostelny, CEO and President					



**COMMONWEALTH of VIRGINIA** 

## **Department of Historic Resources**

Travis A. Voyles Secretary of Natural and Historic Resources

2801 Kensington Avenue, Richmond, Virginia 23221

Julie V. Langan Director Tel: (804) 482-6446 Fax: (804) 367-2391 www.dhr.virginia.gov

December 15, 2023

Elizabeth Kostelny, CEO Preservation Virginia 204 West Franklin Street Richmond, VA 23220

Via Email To: ekostelny@preservationvirginia.org

Re: 2023/2024 State Grant for Smith's Field at James Fort Archaeology

Dear Ms. Kostelny,

I am writing to notify you that the Commonwealth of Virginia's budget for the 2023/2024 fiscal year includes a \$250,000 appropriation for your project. This grant award is being administered by the Department of Historic Resources (DHR). Before your organization receives the funds, the grant must pass through the local government within which your project is located. The local government will disburse the full amount of the award to your organization.

This grant will be available for disbursement to the locality upon execution of the necessary Memorandum of Understanding (MOU) between the DHR, James City County which will initially receive the funds, and Preservation Virginia.

It is imperative that the funds be disbursed to the County as quickly as possible and no later than June 30, 2024. Any funds not disbursed by that date will be forfeited.

Caitlin Sylvester, DHR's Grant Coordinator, will be the main point of contact for you and for your local government/fiscal agent during the grant period of performance. She may be contacted by email at <u>Caitlin.sylvester@dhr.virginia.gov</u> or by her direct line, 804-482-6461.

The important next steps in awarding you this funding are:

• Return the attached Project Information Form. Once retuned the MOU will be sent to you.

Western Region Office 962 Kime Lane Salem, VA 24153 Tel: (540) 387-5443 Fax: (540) 387-5446 Northern Region Office 5357 Main Street PO Box 519 Stephens City, VA 22655 Tel: (540) 868-7029 Fax: (540) 868-7033 Eastern Region Office 2801 Kensington Avenue Richmond, VA 23221 Tel: (804) 367-2323 Fax: (804) 367-2391

- Review, finalize and execute the MOU between DHR, James City County, and your organization as quickly as possible.
- Transfer the awarded funding from DHR to James City County upon full execution of the MOU.
- Authorize to transfer the awarded funding to Preservation Virginia upon full execution of the MOU.

The Department looks forward to working with you in the coming months to ensure the success of your project. Thank you for your leadership in preserving Virginia's important history.

Sincerely, Julie V. Sangan

Julie V. Langan DHR Director

cc: Stephanie Williams, DHR Deputy Director Caitlin Sylvester, DHR Grants Coordinator Senator McDougle Delegate Green

Attachments: Project Information Form

Administrative Services 10 Courthouse Ave. Petersburg, VA 23803 Tel: (804) 862-6408 Fax: (804) 862-6196 Eastern Region Office 2801 Kensington Avenue Richmond, VA 23221 Tel: (804) 367-2323 Fax: (804) 367-2391 Western Region Office 962 Kime Lane Salem, VA 24153 Tel: (540) 387-5443 Fax: (540) 387-5446 Northern Region Office 5357 Main Street PO Box 519 Stephens City, VA 22655 Tel: (540) 868-7029 Fax: (540) 868-7033

#### **MEMORANDUM**

DATE:	May 28, 2024
TO:	The Board of Supervisors
FROM:	Barbara E. Watson, Director of Social Services
SUBJECT:	Grant Award - \$48,000 - Opioid Abatement Authority - Kinship Navigator Program Expansion

James City County Department of Social Services (JCC DSS) has been chosen as an awardee of the Opioid Abatement Authority (OAA) - Kinship Navigator Program Expansion funds in the amount of \$48,000 by the Virginia OAA and the Virginia Department of Social Services. These 100% reimbursable funds are being made available to expand the current Fiscal Year (FY) 2024 Kinship Navigator Program grant award through September 30, 2024.

Parental substance abuse disorders are often one of the reasons for removing children from their home; in many cases extended family members (kin) or friends (fictive kin) assume guardianship of these children. Kinship Navigators provide support to kin or fictive kin who are acting as guardians or care providers for these children. The Kinship Navigator Program is a regional program that provides assistance to kinship caregivers who are not involved in the foster care system. The Kinship Navigator directly connects kinship caregivers to services to meet the needs of the children they are raising and to promote effective partnerships among public and private agencies to ensure kinship caregiver families are adequately served throughout the catchment area of James City County, the City of Williamsburg, York County, and the City of Poquoson. During the first two quarters of FY24, this program has served nine caregivers and 12 children.

The expansion funds will support caregivers and children who have been specifically impacted by substance use disorder by providing direct supports through caregiver trainings, enrollments into recreation and/or therapeutic activities for the children, and payments for childcare or other respite providers. In addition, the funding will provide the regional Kinship Council the opportunity to host an awareness event during Kinship Care Awareness Month, in partnership with the Historic Triangle Drug Prevention Coalition and the Greater Williamsburg Trauma-Informed Community Network. The funding also provides support for a comprehensive data and evaluation initiative, including opioid and substance use metrics, as well as support for staff professional development and travel expenses.

Staff respectfully requests that the Board accept the allocation in the amount of \$48,000.

BEW/ap GA-OAAKnshpPExp-mem

Attachment

## **<u>RESOLUTION</u>**

#### GRANT AWARD - \$48,000 - OPIOID ABATEMENT AUTHORITY -

#### KINSHIP NAVIGATOR PROGRAM EXPANSION

- WHEREAS, James City County Department of Social Services (JCC DSS) has been chosen as an awardee of the Opioid Abatement Authority (OAA) - Kinship Navigator Program Expansion funds in the amount of \$48,000 by the Virginia OAA and the Virginia Department of Social Services; and
- WHEREAS, these one-time 100% reimbursable funds are being made available to enhance Kinship Navigator programs to expand the current Fiscal Year 2024 Kinship Navigator Program grant award through September 30, 2024, to support caregivers and children who have been specifically impacted by substance use disorder, provide support for community awareness events, a comprehensive data and evaluation initiative, and support for staff professional development and travel expenses.
- NOW, THEREFORE, BE IT RESOLVED that the Board of Supervisors of James City County, Virginia, hereby authorizes the acceptance of the grant award and the following appropriation amendment to the Virginia Public Assistance Fund.

Revenue:

	From the	Commonwealth	\$48,000
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**Expenditure:** 

Administration - Staff and Operations \$48,000

> Ruth M. Larson Chair, Board of Supervisors

ATTEST:		VOTES			
		AYE	NAY	<u>ABSTAIN</u>	<u>ABSENT</u>
	NULL hiddi e				
Teresa J. Saeed	MCGLENNON				
Deputy Clerk to the Board	ICENHOUR				
	LARSON				

Adopted by the Board of Supervisors of James City County, Virginia, this 28th day of May, 2024.

GA-OAAKnshpPExp-res

ATTECT.

#### **MINUTES**

## JAMES CITY COUNTY BOARD OF SUPERVISORS JOINT MEETING WITH WILLIAMSBURG CITY COUNCIL AND WJCC SCHOOL BOARD STRYKER CENTER 412 N BOUNDARY ST WILLIAMSBURG, VA 23185 March 15, 2024

8:30 AM

#### A. CALL TO ORDER

Mrs. Ortego Calls the Joint Meeting to Order for the School Board - The meeting was called to order at 8:30 a.m.

Mayor Pons Calls the Joint Meeting to Order for City Council - The meeting was called to order at 8:31 a.m.

Ms. Larson Calls the Joint Meeting to Order for the Board of Supervisors - The meeting was called to order at 8:32 a.m.

#### B. ROLL CALL

**School Board:** Present were Dr. Daniel Cavazos, Ms. Amy Chen, Mrs. Andrea Donnor, Mr. Michael Hosang, Mrs. Kimberley Hundley (virtually), Mr. Randy Riffle, and Mrs. Sarah Ortego (Chair). Also present were Olwen E. Herron, Ed.D., superintendent; Ms. Beth Allar, clerk of the board, staff, press and the public.

Approval to Allow Mrs. Hundley to Attend Meeting Via Electronic Communication - A motion was made to allow Mrs. Hundley to attend the meeting via Zoom. Mrs. Hundley attended via electronic communication from Mexico, due to her vacation. Motion by Andrea Donnor, second by Daniel Cavazos. Final Resolution: Motion Carries Aye: Daniel Cavazos, Amy Chen, Andrea Donnor, Michael Hosang, Randy Riffle, Sarah Ortego

**City Council:** Present were Mr. W. Pat Dent, Ms. Stacy Kern-Scheerer, Ms. Barbara Ramsey, Mr. Caleb Rogers, and Mr. Douglas Pons (Mayor). Also present were Mr. Andrew Trivette, City Manager; and Ms. Dustie McCay, clerk of council.

**Board of Supervisors:** Present were Mr. Michael Hipple, Mr. James Icenhour, Mr. John McGlennon, Ms. Barbara Null, and Ms. Ruth Larson (Chair). Also present was Mr. Scott Stevens, County Administrator.

#### C. **PRESENTATION(S)**

None.

### D. BOARD DISCUSSIONS / GUIDANCE

1. FY2025 Operating Budget

Highlights from the presentation included:

- o State Code Requirements
- FY 25 Budget Process
- $\circ\,$  Local Composite Index (LCI) As the LCI increases, State funding decreases
- Williamsburg
  - 2020-22 LCI = 0.7459
  - $\circ$  2022-24 LCI = 0.7217
  - $\circ$  2024-26 LCI = 0.7426
- James City County
  - 2020-22 LCI = 0.5553
  - $\circ$  2022-24 LCI = 0.5331
  - $\circ$  2024-26 LCI = 0.5403
- o Local Composite Index Comparison Regional
- o Enrollment History K-12 (Sept. 30 count) Budgeted SY 24-25 at 11,324 students
- Governor's Proposed FY25 Budget
  - State Revenue FY25 Estimated \$68,831,234 (change from FY24 0.2%)
- o Budget Development Goal Explained Mandatory vs Essential Expenditures
- Expenditure Increases
  - o Goal 1: Academic Achievement/College Readiness \$1,318,997
  - o Goal 2: Educational Equity \$876,500
  - o Goal 3: Communication & Engagement \$45,000
  - Goal 4: Safety and Security \$310,395
  - Goal 5: Human Capital & Positive Culture \$5,773,877
  - o Goal 6: Organizational Efficiency & Effectiveness \$1,423,731
- Budget Reductions & Savings (\$1,465,000)
- Operating Expenditures by Function Instruction = 73% of total budget
- Revenue/Expenditure Summary
  - Additional Funds Needed (request from localities): \$8,076,205
- o Revenue/Expenditure Summary Under Consideration
  - o Increasing Bilingual Language Specialist to Full-time
  - Increasing Salaries from 3% to possibly 4-5%
  - Change in Healthcare Cost
  - o Possible Addition of 4 million in State Funding
  - o Additional Funds Needed (request from localities): \$9,321,205-\$10,521,205

Discussion from board and council members included:

- teacher retention as forecasted on recent surveys confirmed that WJCC is currently trending (as in the recent past) in the 85% range
- o reasons for the high rate of teacher retirement
- o the expectation for potential vacancies in every grade level
- the impact of smaller applicant pools on hiring
- transitioning teaching assistants to become qualified teachers
- the impact of compensation to retention and whether other issues are causing departures moving the salary needle for teachers

- retention issues impacting the city and the county health insurance and the financial impact for support staff if they choose certain plans - confirmed about 70% of staff utilize health benefits
- $\circ~$  how to balance without raising taxes too much
- special education funding increases every year noted the need to advocate at the state and federal level to increase funding
- SOQ vs Non-SOQ position funding (state vs locality responsibility)

Comments were made that the budget approved by the General Assembly does recognize the need to make a more significant investment in public education, and that members should take the opportunity to express support for that kind of funding; and, that regarding a county tax rate increase - this is the time for the community to decide how much they value the people who work for James City County and the school system.

## E. CLOSED SESSION

## F. ADJOURNMENT

1. Adjourn until 1 pm on March 26, 2024 for the Business Meeting

**School Board Adjourns** - The Williamsburg-James City County School Board adjourned at 9:36 a.m.

**City Council Adjourns** - At 9:36 a.m., Ms. Ramsey made a motion to adjourn the Williamsburg City Council, and Mr. Rogers gave the second. A roll call vote was taken, and the motion carried 5:0.

**Board of Supervisors Adjourns -** At 9:37 a.m., Mr. McGlennon made a motion to adjourn until 1:00 p.m. on Tuesday, March 26. A roll call vote was taken, and the motion carried 5:0.

#### **MINUTES**

# JAMES CITY COUNTY BOARD OF SUPERVISORS REGULAR MEETING COUNTY GOVERNMENT CENTER BOARD ROOM 101 MOUNTS BAY ROAD, WILLIAMSBURG, VA 23185

April 9, 2024

5:00 PM

#### A. CALL TO ORDER

Ms. Larson called the meeting to order at approximately 5:04 p.m. following the James City Service Authority Board of Directors Regular Meeting.

#### B. ROLL CALL

Barbara E. Null, Stonehouse District Michael J. Hipple, Powhatan District John J. McGlennon, Roberts District James O. Icenhour, Jr., Vice Chair, Jamestown District Ruth M. Larson, Chair, Berkeley District

Scott A. Stevens, County Administrator Adam R. Kinsman, County Attorney

Ms. Larson sought a motion to Amend the Agenda to add the Public Hearing on Proposed Real Property Tax Increase as Item No. 2 under Public Hearing(s). She advised the Public Hearing was advertised in accordance with the Code of Virginia requirements; however, the Public Hearing must be held as a separate Public Hearing from the County's Budget Public Hearing.

A motion to Amend the Agenda was made by Barbara Null, the motion result was Passed. AYES: 5 NAYS: 0 ABSTAIN: 0 ABSENT: 0 Ayes: Hipple, Icenhour Jr, Larson, McGlennon, Null

Ms. Larson introduced the Pledge Leaders Kylie Willard and Davis Welch. She gave highlights of their various interests and activities.

## C. MOMENT OF SILENCE

#### D. PLEDGE OF ALLEGIANCE

1. Pledge Leaders - Davis Welch and Kylie Willard, student council members from Clara Byrd Baker Elementary School

Davis and Kylie led the Board and citizens in the Pledge of Allegiance.

Ms. Larson introduced Ms. Sarah Caputo, Senior Youth Engagement Manager for Y Street, who would give a presentation on the Share the Air Partnership.

#### E. **PRESENTATION(S)**

#### 1. Share the Air Partnership

Ms. Caputo addressed the Board noting she would turn the presentation over to two Y Street local youth members to discuss the Y Street Policy in further detail and the organization's objective.

Ms. Larson requested the youth members to introduce themselves for public record purposes.

Ms. Alisha Mask, Y Street Leadership Team, introduced herself noting she was a Senior at Tabb High School.

Ms. Morgan Morris, Y Street Leadership Team, introduced herself noting she was also a Senior at Tabb High School in Yorktown, Virginia.

Ms. Morris addressed the Board noting Y Street was the Virginia Foundation for Healthy Youth's award-winning volunteer statewide youth initiative launched in 2004 to address two significant issues: tobacco and obesity prevention. She indicated Y Street partnered with numerous high schools across Virginia to train youth on how to be effective advocates to promote healthier communities.

Ms. Mask addressed the Board noting the organization's primary goal was to create 100% tobacco-free and e-cigarette-free outdoor public spaces.

Ms. Morris highlighted the various criteria for implementation of a comprehensive policy on the PowerPoint presentation.

Ms. Mask touched on several reasons to go tobacco-free and e-cigarette-free such as significant litter associated with tobacco products, parklands and recreation centers served as pillars of health and should reflect that to promote healthy communities, and recent events of banning e-cigarette products from store shelves highlight health risks associated with usage.

Ms. Morris stated over a four-year timeframe Share the Air had received substantial support from Virginians with over 7,000 support cards collected to date. She further stated based on the data collected approximately 95% of Virginians believed that cigarettes, empty e-cigarettes, and vaping cartridges were considered a form of litter and toxic to humans and animals. Ms. Morris advised approximately 90% of Virginians believed tobacco litter negatively impacted outdoor experience and 97% of Virginians were in favor of tobacco-free outdoor policies.

Ms. Mask noted localities and park authorities could adopt a voluntary tobacco-free and ecigarette-free outdoor policy. She touched on policy implementation and partner responses in further detail.

Ms. Morris noted the organization had a few questions pertaining to the County's interest in this initiative.

Ms. Larson noted the Board typically did not answer questions during presentations, adding the Board would discuss the subject matter at a later date. She added James City County also had a Parks & Recreation Advisory Commission for additional involvement.

Ms. Morris thanked the Board.

Ms. Larson asked if any Board members had questions.

Mr. McGlennon asked if there were any partners in James City County.

Ms. Morris deferred that question to Ms. Caputo.

Ms. Caputo replied currently no; however, she was more than happy to provide partnership information if interested.

#### F. PUBLIC COMMENT

1. Ms. Peg Boarman, 17 Settlers Lane, addressed the Board to talk trash. She advised the Clean County Commission conducted its annual Great American Cleanup on March 22 and March 23 with a make-up date of March 30 due to heavy rainfall on March 23. Ms. Boarman expressed her thanks to all participants of the event. She indicated the Clean County Commission would hold its 47th Annual County-wide Litter Cleanup on April 27. Ms. Boarman stated the Clean County Commission would also plant a tree at Freedom Park on April 27 at 10:30 a.m. and encouraged the public to attend. She remarked any individuals interested in volunteering at the Annual County-wide Litter Cleanup could sign up on the County's website and/or call 757-259-5375. Ms. Boarman emphasized the importance of working together to keep the community clean. She thanked the Board for its time.

#### G. CONSENT CALENDAR

Ms. Larson asked if any Board member wished to pull an item. As there were no requests, Ms. Larson sought a motion on the Consent Calendar.

1. VPPSA Curbside Recycling Contract Extension

A motion to Approve was made by John McGlennon, the motion result was Passed. AYES: 5 NAYS: 0 ABSTAIN: 0 ABSENT: 0 Ayes: Hipple, Icenhour Jr, Larson, McGlennon, Null

2. Revised Administrative Plan for the Section 8 Housing Choice Voucher Program

A motion to Approve was made by John McGlennon, the motion result was Passed. AYES: 5 NAYS: 0 ABSTAIN: 0 ABSENT: 0 Ayes: Hipple, Icenhour Jr, Larson, McGlennon, Null

Ms. Larson requested members of the audience to please silence cell phones and refrain from clapping for disruption purposes.

#### H. PUBLIC HEARING(S)

#### 1. Fiscal Years 2025-2026 County Budget

Ms. Sharon McCarthy, Director of Financial and Management Services, addressed the Board noting the purpose of this Public Hearing was to allow public comment on the Fiscal Year (FY) 2025-2026 Proposed Budget as well as the FY2025 Proposed Real Estate Tax Rates. She noted she would provide a brief overview prior to the opening of the Public Hearing. Ms. McCarthy further noted FY2025 was the first year of the County's two-year budget and the only year appropriated for spending. She indicated the FY2025 Proposed Budget equated to \$289.3 million. Ms. McCarthy advised the real estate tax rate was proposed to remain at \$0.83 per \$100 of assessed value and no change in the personal property tax rate. She noted the proposed budget included funding for investments in County staff retention and compensation in addition to increased funding for Williamsburg-James City County Schools (WJCC) personnel. She mentioned the proposed budget excluded approximately \$9 million in additional requests. Ms. McCarthy touched on the All Funds Summary on the PowerPoint presentation. She highlighted the General Fund revenue was primarily based on General Property Taxes (the County's main

funding source for ongoing operations) which was approximately 70% of the total County budget and comprised of real estate and personal property taxes. Ms. McCarthy stated this year there was approximately a \$23.2 million increase in revenue projections. She noted the bulk of that was the result of the real estate reassessments which equated to approximately \$21 million as well as overall growth in the County. Ms. McCarthy further noted looking at the County's other local taxes in which the County projected a half a million dollar decrease in that area which included sales tax, meals tax, and lodging tax. She mentioned this was the area where the County suffered most during the COVID-19 pandemic, adding the County was able to recover most of that since the pandemic; however, recent trends exhibited sales and recordation taxes had begun to flatline and reduce which economists predicted. She touched on the County's other sources of revenue which included various fees, charges for services, and revenue received from the state for the Personal Property Tax Relief Program and for the County's Constitutional Officers. Ms. McCarthy advised the County made some adjustments to the Medic Transport Recovery fees, adding this practice was conducted annually as part of the budget process to keep in alignment with the Medicare reimbursement rates. She moved on to discuss the General Fund expenditures which was broken down by the County's various departments. Ms. McCarthy indicated the largest portion of the County's budget continued to be in support of the WJCC School Division for operations and debt service totaling \$110.4 million and/or approximately 43% of the County's budget. She advised the County's second largest portion of the County's budget went to Public Safety, adding that equated to \$36 million and/or 14% of the County's budget. Ms. McCarthy noted that between education and public safety that was approximately 60% of the County's budget and the remaining 40% had to cover all County needs, other departments, capital projects, and debt service obligations. She highlighted the additional revenue allocations displayed on the PowerPoint presentation. Ms. McCarthy touched on the next steps in the budget process with various meeting dates and times. She concluded the presentation and welcomed any questions the Board might have.

Ms. Larson asked if any Board members had questions.

No Board members had questions.

Ms. Larson opened the Public Hearing.

1. Ms. Lisa Ownby, 3328 Sawyer Way, addressed the Board to share a few thoughts regarding the Proposed FY2025 Budget. She expressed her support in increasing County staff wages to keep pace with inflation. She requested that the County fully fund the WJCC School Board's Proposed Budget to allow a 5% wage increase for WJCC Schools personnel. Ms. Ownby expressed her desire for an available copy of the five-year Capital Improvements Program (CIP). She noted her interest in the potential sixth fire station and putting that item back into the existing CIP as it was removed in 2021 due to the COVID-19 pandemic. Ms. Ownby emphasized the significant need for another fire station in the Lightfoot area due to the demand. She thanked the Board for its time.

2. Mr. David Lucas, Jr., 120 Oak Hollow, addressed the Board regarding the Proposed FY2025 Budget. He expressed his lack of support for the significant increase in real estate reassessment taxes. Mr. Lucas recommended a reduced tax rate and touched on zero-based budgeting. He mentioned prioritizing needs versus wants. Mr. Lucas elaborated on his points in further detail.

3. Mr. Travers addressed the Board noting he resided in Ford's Colony; however, he declined to provide his physical address for public record purposes. He noted he was in attendance to speak against the proposed real estate tax increase. Mr. Travers mentioned his agreeance with Mr. Lucas's statements. He questioned the County's cost reduction efforts implemented. Mr. Travers requested Board consideration on a reduced tax rate.

4. Ms. Jessica Anderson, 5515 Pennington Place, addressed the Board to discuss the Proposed FY2025 Budget. She mentioned she was a WJCC School Division parent and employee. She

expressed her gratitude to the County for its contributions to the WJCC Schools Budget for increased salary wages; however, she explained the funds were not sufficient. Ms. Anderson mentioned the rising insurance premium costs, additional funds needed to expand interpreters, employees, and support staff. She highlighted significant turnover from the WJCC School Division. Ms. Anderson remarked the WJCC School Division was at high-risk of ongoing staff turnover, potential loss of accreditation, and decline in rankings on a state and national level. She stated that currently WJCC Schools had 54 employee positions and 26 summer employee positions open and advertised on the WJCC Schools website, adding that did not account for the recent resignations from the WJCC School Division. Ms. Anderson emphasized the importance of quality education and if compromised the effect it could have on local property value, economic growth, and small businesses. She elaborated on that point in further detail. Ms. Anderson stated that current WJCC School Division salary wages were approximately \$5,000-\$6,000 below neighboring districts and nearly \$12,000 below the national average. She further stated the WJCC School Division was not remaining competitive and reiterated the understaffed aspect and employee burnout. Ms. Anderson requested Board consideration on increased funds to meet the WJCC School Division needs.

5. Ms. Rhonda Roby, 124 Theodore Allen Road, did not come to the podium to speak.

6. Mr. Andrew Cason, 3205 Arran Thistle, addressed the Board to discuss the Proposed FY2025 Budget. He mentioned he also worked for the WJCC School Division as a teacher at Jamestown High School and Treasurer of the WJCC Education Association. Mr. Cason thanked the Board and County Administrator for proposing a budget that sought to increase the compensation for WJCC Schools personnel and County staff. He mentioned his attendance at the Berkeley Community Budget Meeting and the discussion on County workforce challenges experienced within the County seemed to be parallel to the challenges exhibited in the WJCC School Division. Mr. Cason touched on the high turnover and the lack of mentoring stability and support for the schoolchildren of the community. He requested Board consideration on increased funds to retain WJCC School Division personnel.

7. Mr. Marco Sardi, 4008 Governors Square, addressed the Board noting he was in attendance to speak as a constituent as well as an employee of the WJCC School Division regarding the Proposed FY2025 Budget. He thanked the Board for its support to the WJCC School Division needs. Mr. Sardi addressed the need for the current part-time translator position transitioned to a full-time translator position. He touched on the dedication and time aspect of this position in addition to growth within the WJCC School Division which had put more strain on those employees. Mr. Sardi asked for the Board's support on the request. He mentioned the concerns with the current healthcare plan offerings and the costs associated with those plans. Mr. Sardi requested the Board's consideration on more competitive benefit packages to aid in the recruitment and retention of WJCC School Division personnel. He thanked the Board for its time.

8. Ms. Evette Conwell, 6448 Yarmouth Run, addressed the Board to discuss the public safety concern regarding the delay of the addition of a sixth fire station. She mentioned she resided in Colonial Heritage, adding last year Colonial Heritage senior living community made approximately 396 calls to the fire station. Ms. Conwell emphasized the significant need for another fire station in the Lightfoot area due to the demand. She requested this item be placed back into the CIP and thanked the Board.

9. Mr. Lenny Berl, 413 Fairfax Way, addressed the Board to speak to the Proposed FY2025 Budget and the challenges regarding the WJCC School Division. He requested consideration on ways to utilize available funds in a cost-effective manner and exercise other opportunities to maximize work power. Mr. Berl requested Board consideration on reducing the real estate tax rate.

10. Ms. Star Gibbs, 44 Camelot Court, Newport News, VA, addressed the Board noting she was

a school counselor for the WJCC School Division. She expressed her desire to address some areas of concern in relation to the School Division. She mentioned teachers were resigning midyear which impacted the continuity and quality of education, the insufficient amount of staff and resources to provide the level of education schoolchildren require, the inability to provide one-on-one professionals for special education needs due to financial restraints. She touched on employee burnout, resignation, and safety concerns. Ms. Gibbs emphasized the importance of School Resource Officers (SRO) on-site for various reasons. She mentioned the SRO position was grant-funded and the SRO ended up resigning mid-year due to more competitive pay elsewhere. Ms. Gibbs thanked the Board for its time.

11. Ms. Pat Evers, 3949 Ethan Lane, addressed the Board to discuss the public safety concern regarding the delay of the addition of a sixth fire station in the Lightfoot area. She mentioned she resided in Colonial Heritage and the response times in Colonial Heritage were already beyond the six-minute requirement. Ms. Evers noted Emergency Medical Services (EMS) were called frequently to the senior living community. She expressed significant concern regarding the postponement of the sixth fire station to 2028 and/or beyond. Ms. Evers mentioned the recent added development of new homes within the Colonial Heritage totaling 1,750 homes within the community. She requested this item be placed back into the CIP and thanked the Board.

12. Mr. Chris Henderson, 101 Keystone, addressed the Board to discuss his concerns in relation to the Proposed FY2025 Budget. He encouraged the Board to prioritize essential County staff positions and services for a cost-effective approach. Mr. Henderson touched on the public safety demand in the Lightfoot area and referenced the City of Williamsburg utilizing an innovative method of stationing EMS units in areas of projected need. He recommended utilizing that practice opposed to building a new fire station and incurring the \$10 million cost. Mr. Henderson mentioned the County's joint arrangement with York County and the recently built fire station off Mooretown Road could aid in the reduction regarding the response time to get to Colonial Heritage. He suggested as a budgetary goal for the County's Public Safety, salary wages be in the top 25 percentile within the region. Mr. Henderson noted as a small business owner he understood the challenges currently faced regarding employee recruitment and retention. He touched on the WJCC School Division concerns and suggested the City of Williamsburg increase its contributions to the WJCC School Division as most of the financial commitment was on James City County taxpayers. He thanked the Board for its consideration.

Ms. Larson closed the Public Hearing.

Ms. Larson expressed her desire to inform the public that all Board meetings were publicly available on the County's website, Board calendar, and/or contact a Board Supervisor for information.

#### 2. Proposed Real Property Tax Increase (*Agenda Amendment Required at Meeting*)

Ms. McCarthy addressed the Board and citizens reiterating there was no proposed change to the real estate tax and/or personal property tax rate in the Proposed FY2025 Budget. She stated FY2025 was a reassessment year and advised the overall increase in the assessment was 18.06%. Ms. McCarthy indicated because the increase exceeded 1% the County was required to provide certain information relative to the tax rate. She highlighted the Lowered Tax Rate, Proposed Tax Rate, and the Effective Tax Rate Increase information displayed on the PowerPoint presentation.

Ms. Larson opened the Public Hearing.

1. Mr. Joe Swanenburg, 3026 The Pointe Drive, addressed the Board to speak against the proposed real estate tax increase. He mentioned he fit the median household in James City County perfectly noting his assessment increased by 23%. Mr. Swanenburg stated he had

conducted an informal survey on Facebook and received 60 responses of assessments that had increased over 35%, several over 70%, and two over 100%. He questioned the feasibility aspect of these substantial increases and how any possible tax reduction could correct this issue. Mr. Swanenburg questioned why the County did not have an implemented program that automatically adjusted the assessments each time a house was sold. He requested the Board to implement in the County Code that no change in the real estate assessment would ever be in the double digits and that the maximum the assessment could go up or down in one year was limited to 9.99%. Mr. Swanenburg recommended a reduced tax rate of \$0.75 per \$100.

2. Mr. Jack Fowler, 109 Wilderness Lane, addressed the Board to speak against the proposed real estate tax increase. He noted he had lived in James City County for approximately 48 years noting a 29% increase in his real estate assessment. Mr. Fowler further noted he was on a fixed income and could not afford the additional taxes.

3. Ms. Susan Tisdale, 209 Governor Edward Nott Court, addressed the Board to request a tax relief plan be developed for County residents whose land was taken and put into the Resource Protection Area (RPA). She stated these taxpayers were paying the same rate and in many cases more as a percentage increase of land that was not in the RPA. Ms. Tisdale further stated she received the real estate reassessment for her primary residence in Powhatan Woods noting her land assessment had increased by 28%. She mentioned she had appealed the increase in the land assessment for the following reasons: the majority of the land was put into the RPA by James City County, a potential buyer could not build or disturb any areas within the RPA, and she currently paid taxes on land that cannot be used at the same rate as neighbors whose property did not lie within the RPA. Ms. Tisdale expressed her belief that landowners who were affected by these circumstances should be taxed at a lower rate. She mentioned a rental property her family owned in Springhill noting properties sold in Springhill had increased at the same percentage rate as Powhatan Woods yet that land assessment increase was much lower in Springhill at 12.6%. Ms. Tisdale stated she had contacted the Real Estate Assessments Office on March 25 and spoke with Mr. Justin Wolf, James City County Real Estate Appraiser, noting he could not speak to other properties outside of his purview. She reiterated her request for the County to develop a tax relief plan for those property owners impacted by environmental regulations.

4. Ms. Linda Hoyle, 215 Buford Road, addressed the Board to discuss the recent real estate reassessments conducted resulting in a 39.7% tax increase. She noted she was 81 years old and still currently working. Ms. Hoyle asked the Board where it expected the money to come from.

Ms. Larson explained during the Public Comment process Board members were unable to answer questions.

Ms. Hoyle continued and expressed her belief that she felt she was being pressured to sell her home at this point. Ms. Hoyle mentioned last year she had applied for the tax relief program; however, she was over the income requirement by \$5,000. She requested the Board make adjustments to the program.

Ms. Larson mentioned modifications had been made this year to the tax relief program. She recommended contact with Mr. Richard Bradshaw, Commissioner of the Revenue.

5. Mr. Travers addressed the Board noting he was pleased to have the second opportunity to speak after listening to many other concerned citizens. He mentioned a large amount of the County's population was on a fixed income and could not afford these substantial tax increases. He referred back to the point of prioritizing needs versus wants. Mr. Travers requested Board consideration on a reduced tax rate.

6. Ms. Rhonda Roby, 124 Theodore Allen Road, did not come to the podium to speak.

7. Mr. Richard Timberlake, 4147 Wiffet Way, addressed the Board to speak against the proposed real estate tax increase. He mentioned the retention factor regarding personnel, services, etc.; however, it was imperative to retain citizens of this County. He asked that the Board not penalize and overcharge the citizens who live here.

8. Mr. Donnie Martin, 7196 Canal Street, addressed the Board to speak against the proposed real estate tax increase. He highlighted inflation on products and services. He mentioned he and his wife were retired noting a 38% increase on his real property tax was absurd. Mr. Martin spoke to prioritizing needs versus wants.

9. Mr. Bob Capowski, 107 Swinley Forest, addressed the Board to speak against the proposed real estate tax increase. He requested Board consideration on a reduced tax rate. Mr. Capowski referenced the California Proposition 13 and discussed that point in greater detail. He mentioned the fixed income component and inflationary costs. Mr. Capowski discussed prioritizing needs versus wants.

10. Mr. Jeffrey Rowe, 109 Hollinwell, did not come to the podium to speak.

11. Ms. Gail Reutter, 112 Killarney, addressed the Board to speak against the proposed real estate tax increase. She noted a 10% increase was fair; however, anything above that was not. Ms. Reutter further noted her real estate tax had increased by 30%. She questioned the negligence factor in relation to reviewing and assessing proper home values in the past. Ms. Reutter mentioned the vast majority of the County's population was on a fixed income. She asked for Board consideration on that point.

12. Mr. Patrick Shaver, 4304 Edward Harrington Road, addressed the Board to discuss the recent real estate reassessments conducted. He mentioned he was a retiree on a fixed income like many other citizens. Mr. Shaver understood costs increased over time. He requested Board consideration on a reduced tax rate for the affordability aspect especially for those citizens on a fixed income.

13. Mr. Jim Rooney, 1307 Queens Crossing, addressed the Board to speak against the proposed real estate tax increase. He noted he was the President of La Fontaine Homeowners Association (HOA). Mr. Rooney further noted there were 160 homeowners within the community, adding 65% of the residents who lived in the community were over 60 years of age. He mentioned La Fontaine was privately owned and highlighted the various components incorporated into the HOA fees. Mr. Rooney stated the community's average tax increase was approximately 32.5%, adding his was 34.7%. He touched on the fixed income component and the affordability aspect.

14. Mr. Lenny Berl, 413 Fairfax Way, addressed the Board to discuss the recent real estate reassessments conducted. He mentioned the City of Williamsburg's real estate tax rate was \$0.59 per \$100 of assessed value. Mr. Berl requested Board consideration on a reduced tax rate. He touched on high assessment tax rates from a consumer standpoint. Mr. Berl spoke to inflation costs and high mortgage rates. He discussed that point in further detail.

15. Ms. Karen Dailey, 2902 John Proctor E, addressed the Board to speak against the proposed real estate tax increase. She mentioned she was from California; however, she had lived here in Virginia for approximately five years. She noted she had never experienced such an astronomical tax increase. Ms. Dailey requested Board consideration on a reduced tax rate.

16. Ms. Ann Kelly, 129 Mahogany Run, addressed the Board to speak against the proposed real estate tax increase. She explained she had left Rhode Island in 2009 due to being tax-ridden. Ms. Kelly mentioned she moved to the County and was rather impressed with the tax rates and structure. She questioned why one part of Ford's Colony seemed to have a significantly lower increase than the other half. Ms. Kelly mentioned her 28% tax increase noting she was located in the Powhatan District, adding the Jamestown District was significantly less. She stated

homeowner insurance premiums would increase based on this assessment. Ms. Kelly mentioned prioritizing needs versus wants. She requested the Board provide a better understanding of how these real estate reassessments were derived.

Ms. Larson requested Ms. Kelly rewrite her email on her Public Speaker form, so someone could contact her regarding her question.

17. Mr. Digby Solomon, 106 Par Drive, addressed the Board to speak against the proposed real estate tax increase. Mr. Solomon expressed his concern was not with the real estate reassessment itself because property values had increased dramatically. He requested Board consideration on a reduced tax rate of \$0.68.

18. Mr. Paul Casanave, 3012 Ridge Drive, addressed the Board to speak against the proposed real estate tax increase. He asked if the goal was to tax citizens out of their homes. Mr. Casanave questioned personal property taxes on property already owned.

19. Ms. Karen Lahive, 1801 Old Woods Court, addressed the Board to speak against the proposed real estate tax increase. She mentioned she had attended the Community Budget Meetings and listened to the County Administrator discuss the ongoing employment challenges as it was a nationwide issue. Ms. Lahive discussed inflation and the astronomical housing market due to supply and demand circumstances. She mentioned running out senior citizens was not ideal as those individuals were not the ones utilizing the schools and/or services. Ms. Lahive understood costs were increasing and that taxes may need to increase; however, she emphasized the importance of compromise. She spoke to that point in further detail.

20. Ms. Laurie Cardenas, 5355 Rockingham Drive, addressed the Board noting she was in attendance to speak more to the Proposed FY2025 Budget in relation to WJCC Schools. She mentioned she was a Speech-Language Pathologist for 26 years and worked for WJCC Schools; for the last 16 years. She mentioned she had seen a lot through her tenure with WJCC Schools; however, she explained the WJCC School Division was in a dire emergency as some schoolchildren were not receiving the services they needed. Ms. Cardenas stated the WJCC School Division was down four Speech-Language Pathologists this year. She noted her caseload was 30 students over the state's caseload limit. Ms. Cardenas further noted she worked nonstop due to the workload. She stated the need was not just for the Speech-Language Pathologists but Occupational Therapists, Physical Therapists, etc. She mentioned it was extremely challenging to retain individuals in these positions. Ms. Cardenas remarked she had exhausted all measures to try and correct the issues and was unsuccessful. She mentioned the WJCC School Division and its lack of competitiveness with surrounding localities. Ms. Cardenas expressed it was imperative to inform the public of these critical circumstances. She thanked the Board.

21. Ms. Betty Brown, 102 Woodbine Court, addressed the Board to discuss the recent real estate reassessments conducted. She mentioned she received a 44.4% tax increase, adding she understood taxes must be paid to fund essential County services. Ms. Brown expressed her astonishment that the County did not offer a methodology to allow for a phased approach to alleviate the tax burden. She asked for Board consideration on that point.

22. Mr. Chris Henderson, 101 Keystone, addressed the Board to discuss the recent real estate reassessments conducted. He mentioned the County was a highly desirable place to live due to the high quality of life component and other various factors. Mr. Henderson expressed his astoundment that Mr. Digby Solomon, the former Editor and Publisher of the *Daily Press* and the *Virginia Gazette*, had addressed the Board and voiced his concerns regarding the increased real estate tax and Proposed FY2025 Budget. He empathized and expressed significant concern for the lower-class workers who were just trying to make ends meet. Mr. Henderson mentioned affordable housing was nonexistent within the County. He questioned what strategies could be implemented for those citizens who were most vulnerable to abate the increase. Mr. Henderson requested Board consideration on that point.

Ms. Larson closed the Public Hearing as there were no additional speakers.

Mr. McGlennon stated from his understanding there were a number of individuals who had indicated they did not have a chance to review the proposed budget in its entirety. He pointed out that the proposed budget was located on the County's website. Mr. McGlennon clarified that the CIP Budget had actually decreased from last year's budget, adding fluctuations were anticipated based on what was being funded for that particular year.

At approximately 7:09 p.m., the Board recessed for a short break.

At approximately 7:17 p.m., the Board reconvened.

3. HW-23-0001. Ford's Village Retirement Center Height Waiver

A motion to Defer until the Board's June 11, 2024, Regular Meeting, was made by Michael Hipple, the motion result was Passed. AYES: 5 NAYS: 0 ABSTAIN: 0 ABSENT: 0 Ayes: Hipple, Icenhour Jr, Larson, McGlennon, Null

Mr. Ben Loppacker, Planner, addressed the Board noting Mr. Christopher Frommell of Frommell Architects, LLC, had applied for a Height Limitation Waiver to permit the construction of a building associated with the previously approved continuing care retirement center at 3889 News Road. He cited the specifics of the Height Limitation Waiver application included in the Agenda Packet. Mr. Loppacker noted a Height Limitation Waiver was required due to the proposed structure exceeding the 60-foot height limitation imposed by the R-4 Zoning District. He further noted staff found that the proposed application met the criteria for height waivers found in Section 24-286 of the Zoning Ordinance and that the proposed conditions would mitigate any impacts to surrounding properties and development. Mr. Loppacker stated staff recommended approval to the Board of Supervisors, subject to the proposed conditions. He welcomed any questions the Board might have, adding the applicant was available as well.

Ms. Larson thanked Mr. Loppacker.

Ms. Larson opened the Public Hearing.

Ms. Larson closed the Public Hearing as there were no speakers.

Mr. Hipple asked if the height limitation was known beforehand.

Ms. Larson asked if Mr. Hipple would like to ask the applicant that question.

Mr. Hipple confirmed yes.

Mr. Graham Corson, Project Manager of AES Consulting Engineers, addressed the Board noting he was not the architect for this project but the site engineer. He stated that the height waiver and limit were known at the design time. Mr. Corson further stated the chimneys on the proposed building were the only part of the structure that exceeded the height limit. He advised a balloon test was performed and was not visible from adjacent properties, or from News Road.

Mr. Hipple asked if these chimneys were artificial or real.

Mr. Corson replied the chimneys were real.

Mr. Hipple replied he saw the balloon test and asked if those trees in that area would remain.

Mr. Corson confirmed yes.

Ms. Larson thanked Mr. Corson.

Mr. Icenhour mentioned he received constituent concern regarding the visual aspect from the particular area of Monticello Woods. He noted everything behind the building would be leveled out and cleared due to residential development. Mr. Icenhour further noted it may not be visible now; however, afterwards was uncertain. He expressed he was reluctant to provide an exception for the known requirements based on visual aesthetics versus the essential component.

Ms. Larson asked Mr. Loppacker if the balloon test was conducted near the Monticello Woods area of News Roads.

Mr. Loppacker replied no, the balloon test was not conducted from that side. He stated it was of staff's opinion that it would not be tall enough to be viewed from Monticello Woods.

Ms. Larson asked Mr. Icenhour if he wanted to postpone action on this item to conduct the balloon test from the Monticello Woods side to validate that point.

Mr. Icenhour replied no.

Mr. Hipple referenced another application on Forge Road regarding a height circumstance. He asked Mr. Stevens if that situation had been rectified.

Mr. Stevens replied he would need to check back with him to verify that information. He noted it was part of a restrictive easement on that particular property and he was uncertain if there was the ability to modify that or not.

Mr. Hipple pointed out the consistency aspect in relation to height waivers.

Mr. Icenhour expressed he was not a fan of height waivers as there was a height limit for a reason unless there was a very compelling reason; however, in this circumstance there was not one. He advised he would not be in support of this application.

Mr. McGlennon mentioned in the past that normally a height waiver would be presented simultaneously with the initial project application. He questioned the justification aspect and the reasoning for this height waiver after-the-fact.

Ms. Larson noted based on Board discussion that there may be an opportunity for the applicant to go back to the architect to obtain the compelling reasoning for the height waiver and then come back before the Board at a later date and/or it could be voted on this evening. She asked Mr. Corson how he would like to proceed.

Mr. Corson requested additional time.

Ms. Larson asked Mr. Kinsman if the Public Hearing should be closed or remain open.

Mr. Kinsman recommended closing the Public Hearing. He informed Ms. Larson that she would need to defer the item to a certain date.

4. Solid Waste Collection

A motion to Approve was made by John McGlennon, the motion result was Passed. AYES: 5 NAYS: 0 ABSTAIN: 0 ABSENT: 0 Ayes: Hipple, Icenhour Jr, Larson, McGlennon, Null Mr. Bob Dittman, Solid Waste Director, addressed the Board noting the timeline for the County's potential solid waste consolidation. He noted the next steps would be to hold a public hearing. Mr. Dittman added even after the public hearing had been conducted it would be at least five years before making a decision on whether or not the County wanted to manage its solid waste. He stated this was the fourth step in the Code of Virginia process that a locality must go through in order to manage its solid waste.

Mr. McGlennon asked if that was the process specifically if the County wanted to take full ownership of the solid waste collection.

Mr. Dittman replied that the way the Code of Virginia was written a locality could not displace private haulers without going through these mandated steps.

Mr. McGlennon questioned if there was an opportunity for County involvement in addition to the private haulers prior to the five-year mark.

Mr. Stevens replied that was believed to be the case after consulting with the County Attorney, adding it would be based on the customer choice aspect. He mentioned a future discussion of possibly offering that service in alternative way.

Mr. Hipple mentioned this discussion was based on starting the five-year clock to determine the potential opportunities and work out the various factors in relation to the subject matter.

Mr. Dittman stated in addition to determining whether the County wanted to provide the service County-wide and/or service just the Primary Service Area.

Mr. Hipple thanked Mr. Dittman.

Ms. Larson opened the Public Hearing.

1. Mr. Tad Phillips, 12022 Pine Bark Lane, Midlothian, VA, addressed the Board noting he represented the Virginia Waste Industries Association (VWIA), a nonprofit organization with a mission to promote the management of solid waste in an environmentally responsible, efficient, profitable, and ethical manner that benefited the public and protected private hauler employees. He noted VWIA's disappointment in proceeding with the process of displacing private haulers prior to consideration of alternative opportunities that may be available. Mr. Phillips further noted VWIA was of the opinion that the County was not satisfying the four finding requirements in Section 15.2-5121 of the Code of Virginia. He stated VWIA requested County consideration on exploring alternative options opposed to the displacement process. Mr. Phillips mentioned four of the largest solid waste and recycling service companies in North America serviced James City County and were affiliated with VWIA. He touched on the high-quality performance of these private haulers and were valuable resources. Mr. Phillips highlighted the significant County costs in creating its own solid waste management. He discussed the beneficial factors of a free market system. Mr. Phillips advised VWIA supported the restriction of displacement for ensuring County residents have the best long-term options for efficient, environmentally safe, and competitive collection. He thanked the Board for its time.

2. Mr. Dan Ciesla, 13802 Turtle Hill Road, Midlothian, VA, addressed the Board noting he was representing Republic Services, Inc., one of the four leading solid waste and recycling service companies serving James City County. He mentioned he was not in support of the County's potential solid waste consolidation. Mr. Ciesla stated that Republic Services, Inc., had been serving the County for over 20 years. He requested Board consideration on all factors regarding this decision such as staffing shortages, breakdowns of waste collection vehicles, large impacts to constituents if private haulers were eliminated, increased costs, employee retention, etc. Mr. Ciesla indicated that in the past four years Republic Services, Inc., had experienced almost a

50% increase in operation costs due to driver labor hours, parts, increased costs in vehicles, staffing challenges, etc. He highlighted the beneficial factors of a free market system. Mr. Ciesla encouraged the Board to allow County citizens to retain the ability to choose.

3. Mr. Chris Henderson, 101 Keystone, addressed the Board noting he supported the free market system and the choice ability. He noted he utilized Republic Services, Inc., for his solid waste disposal and was satisfied with the services provided. Mr. Henderson further noted Ford's Colony at one point negotiated a blanket contract with a private hauler and was able to save residents approximately \$50 per month. He expressed beneficial factors of co-ops to aid in cost reduction, consumer choice, specific pickup requests, etc. Mr. Henderson encouraged the Board to conclude consideration on this matter.

4. Mr. Joshua Palmer, Jr., 138 Ron Springs Drive, addressed the Board noting he was a garbage collector and had served the County for 75 years. He emphasized the importance of consumer choice.

Ms. Larson closed the Public Hearing as there were no additional speakers.

Mr. McGlennon mentioned he was in support of continuing the process to significantly reduce the amount of traffic on County roadways and to improve public health by terminating waste incineration in residential areas. He expressed the importance of consideration on the subject matter and the opportunity to potential cost reduction to County citizens.

Mr. Hipple asked if by continuing this process it would allow all options to be explored and not to indicate the County was taking over solid waste.

Inaudible confirmation to Mr. Hipple's question.

5. Ordinance to Permit Use of Golf Carts on Public Highways in Meadow Lake

A motion to Approve was made by John McGlennon, the motion result was Passed. AYES: 5 NAYS: 0 ABSTAIN: 0 ABSENT: 0 Ayes: Hipple, Icenhour Jr, Larson, McGlennon, Null

Police Chief Mark Jamison addressed the Board stating in 2007, the Board adopted an Ordinance permitting neighborhoods to apply to have public highways in neighborhoods designated for golf cart use. He noted several neighborhoods had roads designated. Chief Jamison further noted Mr. Scott Maye, President of the Meadow Lake HOA submitted an application on behalf of the homeowners in the community requesting that the Board designate streets for golf cart use. He added the HOA had agreed to pay for the appropriate signage on Meadow Lake Drive. Chief Jamison stated following careful consideration of Meadow Lake's request and the results of a subsequent traffic study conducted by the Police Department, staff felt that golf carts may be safely accommodated along the public highways in Meadow Lake. He indicated these roads included Meadow Lake Drive, Thomas Higgs Court, and Oak Lawn Way. Chief Jamison noted staff recommended adoption of the Ordinance designating certain roads in Meadow Lake for golf cart use.

Ms. Larson thanked Chief Jamison.

Ms. Larson opened the Public Hearing.

Ms. Larson closed the Public Hearing as there were no speakers.

6. An Ordinance to Impose a \$50 Penalty for Failure to Comply with a Traffic Light Signal
A motion to Approve was made by Michael Hipple, the motion result was Passed. AYES: 5 NAYS: 0 ABSTAIN: 0 ABSENT: 0 Ayes: Hipple, Icenhour Jr, Larson, McGlennon, Null

Mr. Kinsman addressed the Board noting this was a housekeeping amendment as County Code Section 13-15 lacked an essential element regarding a civil penalty for Failure to Comply with a Traffic Light Signal. He recommended the Board adopt the amendment to set a \$50 civil penalty.

Ms. Larson opened the Public Hearing.

Ms. Larson closed the Public Hearing as there were no speakers.

7. An Ordinance to Impose a \$100 Penalty for Speeding in School Zones

A motion to Approve was made by Michael Hipple, the motion result was Passed. AYES: 5 NAYS: 0 ABSTAIN: 0 ABSENT: 0 Ayes: Hipple, Icenhour Jr, Larson, McGlennon, Null

Mr. Kinsman addressed the Board noting during the 2020 session of the General Assembly a new law was enacted that allowed localities to install photo speed monitoring devices in highway work zones and school zones. He stated at one of its recent meetings the Board requested staff to prepare any necessary revisions to the County Code to allow the County the option to install these devices in school zones. Mr. Kinsman noted the proposed revision to Chapter 13 of the County Code allowed the County to install these devices in school zones and establish a \$100 civil penalty for infractions in those zones. He further noted the County would identify school zones of interest and would contract with a third party to install the photo speed monitoring devices. Mr. Kinsman stated signage advising motorists of these devices traveling at speeds of at least 10 mph over the posted speed limit. He noted these photos would be reviewed by a Police Officer to ensure a speeding violation had occurred. Mr. Kinsman further noted after validation a summons would then be produced and issued to the owner of the vehicle via mail. He elaborated on the subject matter in further detail. Mr. Kinsman recommended adoption of the proposed Ordinance.

Mr. Hipple expressed his support as safety measures in school zones was vital. He mentioned speeding in school zones in the Norge and Toano area. Mr. Hipple expressed concern with some of the existing signage and the visibility aspect. He requested that be looked into.

Mr. Stevens stated he had addressed that concern with the WJCC School Division and that he would follow up to determine the status on that.

Mr. Hipple thanked Mr. Stevens.

Ms. Larson asked Chief Jamison if the Police Department received complaints in relation to speeding in school zones.

Chief Jamison confirmed yes quite frequently. He mentioned speeding was most likely the number one complaint received.

Mr. McGlennon mentioned there was a recent presentation in relation to the level of speeding in County school zones. He asked Chief Jamison to provide an overview of the findings.

Chief Jamison stated two different companies had conducted speed studies within County school zones areas noting several of the schools had motorists traveling 11 mph over the posted speed limit. He remarked that the speed studies indicated significant speeding concerns.

Mr. McGlennon thanked Chief Jamison.

Ms. Larson opened the Public Hearing.

Ms. Larson closed the Public Hearing as there were no speakers.

8. ORD-22-0001. Amendments for Scenic Roadway Protection Comprehensive Plan Amendment: Community Character Corridor and Short-Term Rental Development Standards Revision

A motion to Approve an Indefinite Deferral was made by James Icenhour, the motion result was Passed.

AYES: 5 NAYS: 0 ABSTAIN: 0 ABSENT: 0 Ayes: Hipple, Icenhour Jr, Larson, McGlennon, Null

Mr. Paul Holt, Director of Community Development, addressed the Board noting at its February 27, 2024, meeting, the Board believed these particular changes should be indefinitely deferred while some alternative options may be considered. He advised that staff recommended the Public Hearing on these items be closed and an indefinite deferral.

Ms. Larson thanked Mr. Holt.

Ms. Larson indicated the Public Hearing was open.

1. Mr. Chris Henderson, 101 Keystone, addressed the Board to discuss the Community Character Corridors (CCC) and disagreed with the one size fits all aspect. He mentioned consideration on long-term effects, existing vegetation, and buffer type to achieve the desired vista of these CCCs.

Ms. Larson closed the Public Hearing.

#### I. BOARD CONSIDERATION(S)

None.

#### J. BOARD REQUESTS AND DIRECTIVES

Ms. Null noted she had no comments.

Mr. Hipple expressed his desire to address the subject regarding the need for a sixth fire station. He advised there was a mutual aid agreement for the areas of the County with higher demand. Mr. Hipple mentioned all locations within the County were of equal importance. He discussed the challenges with placing EMS units in areas of projected need due to County and State Code regulations. Mr. Hipple explained the City of Richmond offered that as a private service; however, the City of Richmond had contemplated discontinuing that service as that system was not effectively working. Mr. Hipple elaborated on that point in further detail. He clarified that was a private service and did not reside under the Fire Department service. Mr. Hipple pointed out tax reassessments had been conducted every two years for a very long time. He mentioned the possibility of conducting yearly reassessments to aid in gradual tax increases.

Mr. McGlennon thanked Mr. Hipple for his point on annual tax reassessments as he agreed it may be less impactful to citizens to do it on an annual basis opposed to every two years. He advised for public notification purposes that the County offered a tax relief program for lower income residents who met the eligibility criteria. Mr. McGlennon stated the Board had raised the income limit and level of exemption this year for that program. He noted he attended the Williamsburg Community Foundation's (WCF) Spring Awards Luncheon, adding

approximately two dozen nonprofit organizations were awarded funding from the WCF to provide programs to aid in local needs. Mr. McGlennon expressed his gratitude to County Administration and staff for all efforts in relation to the Community Budget Meetings.

Mr. Icenhour reminded his fellow Board members that he would be participating remotely for the next Board meeting. He noted he would be unable to attend the last two Community Budget Meetings; however, he requested for Mr. Hipple and Mr. McGlennon to provide an update on those meetings. Mr. Icenhour thanked Ms. McCarthy for her assistance and education on the Proposed FY2025 Budget in relation to Fund Balance particularly the Unassigned Fund Balance for the General Fund. He spoke to that point in further detail. Mr. Icenhour anticipated challenges through the FY2025 Budget process. He mentioned many constituents had made very valid points and there were considerations that the County had to address noting it would be a balancing act.

Ms. Larson requested fellow Board members to be proactive and obtain answers from County staff prior to the Board's April 23, 2023, Business Meeting. She agreed on further Board consideration on potential annual reassessments. Ms. Larson expressed her gratitude for all participants and efforts in relation to the Community Budget Meetings. She elaborated on that point in further detail. Ms. Larson noted she participated in a bench dedication, adding The Historic Rivers Chapter of Virginia Master Naturalists donated 11 benches along the Greensprings Interpretive Trail. She spoke about the positive experience she had during that event. Ms. Larson advised a Community Budget Meeting would be held tomorrow, April 10, 2024, at Lois S. Hornsby Middle School at 6 p.m. She touched on upcoming meetings and events she would be attending.

#### K. REPORTS OF THE COUNTY ADMINISTRATOR

Mr. Stevens extended his thanks to all participants in relation to the Community Budget Meetings. He stated the Citizen Police Academy applications would conclude next week and encouraged those interested in learning more about the County's Police Department to contact 757-253-1800. Mr. Stevens advised the class begins April 24 and ran until July 17, adding the class would be held on Wednesday evenings. He indicated April 16, 2024, was the deadline to submit an application and encouraged public participation.

#### L. CLOSED SESSION

None.

#### M. ADJOURNMENT

1. Adjourn until 6 pm on April 10, 2024, for the Budget Community Meeting at Lois Hornsby Middle School

A motion to Adjourn was made by Barbara Null, the motion result was Passed. AYES: 5 NAYS: 0 ABSTAIN: 0 ABSENT: 0 Ayes: Hipple, Icenhour Jr, Larson, McGlennon, Null

At approximately 8:17 p.m., Ms. Larson adjourned the Board of Supervisors.

#### **MINUTES**

### JAMES CITY COUNTY BOARD OF SUPERVISORS BUSINESS MEETING COUNTY GOVERNMENT CENTER BOARD ROOM 101 MOUNTS BAY ROAD, WILLIAMSBURG, VA 23185 April 23, 2024

1:00 PM

#### A. CALL TO ORDER

Ms. Larson called the meeting to order at approximately 1:02 p.m. following the James City Service Authority (JCSA) Board of Directors Budget Business meeting.

#### B. ROLL CALL

Barbara E. Null, Stonehouse District Michael J. Hipple, Powhatan District John J. McGlennon, Roberts District James O. Icenhour, Vice Chair, Jamestown District (remote) Ruth M. Larson, Chair, Berkeley District

Scott A. Stevens, County Administrator Adam R. Kinsman, County Attorney

Ms. Larson requested a motion to allow Mr. Icenhour to participate in the meeting remotely due to travel out of the country.

A motion to Approve was made by John McGlennon, the motion result was Passed. AYES: 4 NAYS: 0 ABSTAIN: 0 ABSENT: 1 Ayes: Hipple, Larson, McGlennon, Null Absent: Icenhour, Jr

Ms. Null asked Mr. Icenhour for his location.

Mr. Icenhour noted he was in London, England.

Mr. Stevens asked Mr. Icenhour, at the County Attorney's request, to state if his visit was for personal reasons and thus his absence from the Board meeting.

Mr. Icenhour acknowledged it was for personal reasons.

#### C. **PRESENTATION(S)**

Ms. Larson asked Mr. Stevens if there were any presentations.

Mr. Stevens recognized Ms. Teresa Saeed, Deputy Clerk to the Board, and asked her to come forward to the podium. He noted in advance of the 55th Annual Professional Municipal Clerks Week, May 5-11, 2024, he wanted to recognize Ms. Saeed for her support of the Board as elected officials as well as himself as the County Administrator. Mr. Stevens stated Ms. Saeed had served as the President of the Virginia Municipal Clerks Association for the past year. He thanked Ms. Saeed for her service. Mr. Stevens noted Ms. Larson had a proclamation for Ms. Saeed.

Ms. Larson read the proclamation aloud prior to the presentation to Ms. Saeed. She thanked Ms. Saeed for her service.

#### **D. CONSENT CALENDAR**

Ms. Larson asked if any Board member wished to pull any item(s).

1. Acceptance of Funds - \$3,244 - Virginia Forfeited Asset Sharing Program

A motion to Approve was made by John McGlennon, the motion result was Passed. AYES: 5 NAYS: 0 ABSTAIN: 0 ABSENT: 0 Ayes: Hipple, Icenhour Jr, Larson, McGlennon, Null

2. AsserWorks Fleet Management Software

A motion to Approve was made by John McGlennon, the motion result was Passed. AYES: 5 NAYS: 0 ABSTAIN: 0 ABSENT: 0 Ayes: Hipple, Icenhour Jr, Larson, McGlennon, Null

3. Contract Award - \$241,751 - Additional Roll-off Truck

A motion to Approve was made by John McGlennon, the motion result was Passed. AYES: 5 NAYS: 0 ABSTAIN: 0 ABSENT: 0 Ayes: Hipple, Icenhour Jr, Larson, McGlennon, Null

4. Contract Award - \$260,192 - Knuckle Boom Truck Replacement

A motion to Approve was made by John McGlennon, the motion result was Passed. AYES: 5 NAYS: 0 ABSTAIN: 0 ABSENT: 0 Ayes: Hipple, Icenhour Jr, Larson, McGlennon, Null

5. Contract Award - Strategic Plan

A motion to Approve was made by John McGlennon, the motion result was Passed. AYES: 5 NAYS: 0 ABSTAIN: 0 ABSENT: 0 Ayes: Hipple, Icenhour Jr, Larson, McGlennon, Null

6. Contract Renewal Fiber Optic Maintenance Services - Cable Associates, Inc.

A motion to Approve was made by John McGlennon, the motion result was Passed. AYES: 5 NAYS: 0 ABSTAIN: 0 ABSENT: 0 Ayes: Hipple, Icenhour Jr, Larson, McGlennon, Null

7. Minutes Adoption

A motion to Approve was made by John McGlennon, the motion result was Passed. AYES: 5 NAYS: 0 ABSTAIN: 0 ABSENT: 0 Ayes: Hipple, Icenhour Jr, Larson, McGlennon, Null

The Minutes Approved for Adoption included the following meetings:

- o March 12, 2024, Regular Meeting
- o March 26, 2024, Business Meeting
- o April 3, 2024, Budget Community Meeting
- o April 4, 2024, Budget Community Meeting
- o April 8, 2024, Budget Community Meeting
- o April 10, 2024, Budget Community Meeting

#### E. BOARD DISCUSSIONS

#### 1. ARPA Funding Discussion

Ms. Sharon McCarthy, Director of Financial and Management Services (FMS), addressed the Board. She introduced Ms. Stephanie Williams-Ortery, the County's Grants and Special Projects Analyst. Ms. McCarthy noted Ms. Williams-Ortery had been with the County for over 23 years. She added that 21 of those 23 years had been with the County's Police Department and had encompassed various capacities. Ms. McCarthy noted the last two years of Ms. Williams-Ortery's County tenure had been in FMS where she moved to assist with the American Rescue Plan Act (ARPA) funds. She added it was fitting for Ms. Williams-Ortery to provide the ARPA update. Ms. McCarthy noted Ms. Williams-Ortery managed over \$37 million worth of state and federal grants on an annual basis by herself. She added that amount was not comprised of all the County's grants, but it represented a large portion and served as a costsaver to County residents.

Ms. Williams-Ortery addressed the Board and highlighted an ARPA overview in a PowerPoint presentation. She stated James City County (JCC) received \$14.8 million in Coronavirus State and Local Recovery Funds as part of the federal ARPA funding in 2021. Ms. Williams-Ortery noted the ARPA funding was accounted for in a separate fund specifically for it, adding these funds had extensive reporting and audit requirements. She stated four eligible categories were available for spending and provided details on the County's category selection. Ms. Williams-Ortery noted two key dates for funding included the obligated date (December 31, 2024) and the expended date (December 31, 2026). She addressed FMS working with County departments regarding these timelines. Ms. Williams-Ortery noted the United States Treasury provided recent guidance on the movement of funding between projects after the obligation date. She continued the PowerPoint presentation with an overview of the County's ARPA funding projects which included Housing and Neighborhood Development. Ms. Williams-Ortery provided details on the five projects within that category. She noted other areas of funding projects included Community Development Department and transportation, Social Services Department and nonprofit grant programs, and General Services Department with the elimination of bathroom touch points as one of its many projects. Ms. Williams-Ortery stated the Parks & Recreation Department/Tourism Division had several ongoing projects which included work at the Amblers House and the Marina. She noted two new limited-term positions were funded in FMS and various compensation adjustments were made in the Fire, Police, and Animal Control divisions of Public Safety. Ms. Williams-Ortery stated Information Resources Management projects included replacement of the County's telephone system and fiber optic cabling. She added an amount just under \$400,000 of unallocated funding remained in a contingency account.

Mr. Stevens noted Ms. Williams-Ortery's summary was well done. He added the projects highlighted in the presentation were the ones seen at the beginning of the ARPA spreadsheet. Mr. Stevens stated Ms. Williams-Ortery had summarized the current status of that spreadsheet. He noted future discussion with the Board on potential projects regarding the unallocated funding which would be used accordingly, and no funding would be left unencumbered to benefit County citizens. Mr. Stevens stated Ms. Williams-Ortery and Ms. McCarthy were leading the way on that point.

Mr. McGlennon questioned the relative proportion of funding in relation to projects the County would have to complete anyway.

Mr. Stevens responded most of the projects were ones the Board would have approved anyway. He noted some of the positions which started with this funding would likely continue due to need. Mr. Stevens stated that point would be part of ongoing discussion with the Board, adding some positions were possibly started earlier than originally slated due to the funding opportunity. He stated one project that potentially would not have been started was the increase to the nonprofit grant program. Mr. Stevens asked the FMS team if there were any projects it felt would not have been done.

Mr. McGlennon stated these projects were of community importance and this funding allowed an earlier opportunity to move forward on them.

Mr. Stevens confirmed yes.

Mr. Hipple noted he had received questions regarding the project list, and he had reminded people these projects were not funded by the County's General Fund. He noted the ARPA funding allowed projects to be completed without a tax increase to citizens. Mr. Hipple expanded on these points. He noted County staff implemented many cost-saving measures for the citizens. Mr. Hipple asked if the compensation adjustment was one-time or recurring.

Ms. Williams-Ortery stated one-time. She noted the adjustment was funded by the second half of Fiscal Year (FY) 2022 and then the General Fund after that point.

Mr. Hipple noted the adjustment was recurring and started with the ARPA funds, but then moved to the General Fund.

Ms. Williams-Ortery confirmed yes, adding the FY24 General Fund picked up the adjustment. She clarified that the compensation was ongoing, but that the ARPA funding in support had been completed.

Mr. Hipple noted questions would arise on those points. He stated these were costs the County would incur, but the initial costs were covered by the ARPA funding. Mr. Hipple added the compensation adjustments were necessary to retain employees and keep the community safe. He thanked Ms. Williams-Ortery.

Ms. Larson noted Ms. Williams-Ortery had been brought in to assist with the ARPA funds, but additional duties had been incorporated and she would remain in FMS.

Ms. McCarthy nodded her head in confirmation.

Ms. Larson thanked Ms. Williams-Ortery. She addressed Mr. Icenhour.

Mr. Icenhour noted his questions had already been asked by his fellow Board members.

#### 2. Fiscal Year 2025-2026 Budget

Ms. McCarthy stated she was being joined by Ms. Cheryl Holland, Budget Manager, who would guide the Proposed Budget discussion.

Ms. Holland addressed the Board stating she would provide an overview on the budget process and updates. She highlighted the budget timeline and the respective key points in a PowerPoint presentation. Ms. Holland stated FMS provided training to ensure departmental understanding of the entire budget process. She noted the County used a method called zero-based budgeting. Ms. Holland stated zero-based budgeting required departments to start the process with nothing and build requests line-by-line. She added department staff typically prepared the budget with a review by the department director, followed by a review by FMS, Human Resources (HR), and County Administration for further review. Ms. Holland detailed the additional reviews, public hearings, and other process components with the scheduled adoption slated for May.

Mr. McGlennon noted Ms. Holland's reference of the zero-based budget.

Ms. Holland confirmed the use of zero-based budget.

Mr. McGlennon noted that use had been questioned at the public forums. He stated he wanted to clarify the use to justify each department's ongoing expenses.

Ms. Holland confirmed yes. She continued the PowerPoint presentation noting the first year of the FY2025 Proposed Budget was the only year in which spending was appropriated. Ms. Holland stated \$289.3 million was the total Proposed Budget for all funds excluding interfund transfers. She stated the Proposed Budget General Fund at \$254.5 million was the County's main operating fund. Ms. Holland noted no change in the real estate and personal property tax rates were proposed. She added the Proposed Budget also included funding for investments in County staff retention and compensation, and increased funding for the Williamsburg-James City County (WJCC) School Division's request to support teacher and staff pay raises. Ms. Holland noted the Proposed Budget excluded \$9 million in additional requests. She explained FMS, HR, or County Administration reviewed those requests and determined the available resources could not support them. Ms. Holland highlighted the additional revenue allocation differences in the Proposed Budget as compared to the adopted FY24 budget. She noted questions had arisen over these allocations and other points which would be addressed. Ms. Holland stated the Proposed Budget had several uses of the Fund Balance within it, adding the County had policies regarding Fund Balance use and maintaining fiscal liquidity or Unassigned Fund Balance to maintain within the General Fund. She referenced a two-page handout of detailed Fund Balance changes for the Board, adding the first page contained a breakdown of major funds used for the General Fund and the Capital Projects Fund. Ms. Holland provided additional details on the handout's contents. She noted the first page was proposed to be added to Section A of the Adopted Budget.

Ms. McCarthy noted the additional data was based on feedback received regarding the General Fund in particular. She stated the Code of Virginia required adoption of a balanced budget which meant revenues must equal expenditures. Ms. McCarthy explained the new section's starting point was the General Fund's Fund Balance and then subtracted the portion already assigned to other uses. She provided details on the process. Ms. McCarthy also explained the County's Fiscal Policy which mandated 15% of the unallocated funds had to be maintained as a Reserve Fund. She noted Fund Balance was not typically used for recurring expenditures, but if it was used, FMS recommended it be used for Capital Projects or other one-time needs. Ms. McCarthy stated the first page of the handout reflected the amount available for spending.

Ms. Holland noted the second page addressed the major changes in the non-detailed fund which included debt services, Social Services, Housing, and other funds. She explained the difference between a major and non-major fund was dependent on the size of the fund's budget, adding General Fund was always a major fund. Ms. Holland noted the Capital Projects Fund was also presented as a major fund. She provided additional details on the second page data.

Ms. McCarthy stated the information as previously presented was in accordance with the Government Finance Officers Association (GFOA) and the requirements from the technical authority regarding disclosures. She noted the handout information provided additional detail, adding the aggregate number was shown with a breakdown by fund and which funds used Fund Balance. Ms. McCarthy further noted some funds used no Fund Balance while others did significantly and the rationale behind those recommendations. She noted Fund Balance typically was not spent unless necessary such as a deliberate use for a one-time expenditure. Ms. McCarthy stated the breakdown indicated the proposed areas to use the Fund Balance and the purpose of its use.

Ms. Holland continued the PowerPoint presentation addressing the proposed real estate tax rate. She provided details on the reassessment, adding Real Estate taxes were not the County's only source of General Fund revenue. Ms. Holland noted Mr. Stevens would address potential budget reductions.

Mr. Stevens noted every one cent on the tax rate equaled approximately \$1.3 million in revenue to the County. He stated he believed the items on the list were necessary and sought input from the Board.

Mr. Hipple addressed the Fund Balance and the 15% reserve requirement.

Ms. Holland referenced the handout noting \$113.5 million which reflected the total Fund Balance for the General Fund followed by the \$34.3 million reflected any non-spendable assigned items. She noted the \$79.2 million was the Unassigned Fund Balance.

Mr. Hipple asked if the \$44.4 million amount reflected the 15% reserve.

Ms. Holland confirmed yes.

Mr. Hipple questioned if the remaining \$34 million was for the Unassigned Fund Balance.

Ms. Holland confirmed yes. She noted the \$34.7 million was currently unallocated to other funds. Ms. Holland further noted the proposed use for those funds was undetermined and therefore slated for FY25 and FY26.

Mr. Hipple asked how much of the \$34.7 million was going to be used.

Ms. McCarthy noted it was approximately \$22 million in the five-year Capital Improvements Program (CIP) Plan. She referenced the handout and movement of approximately \$12.7 million in FY2025, followed by approximately \$2.6 million in FY2026 as well as the ensuing three years.

Mr. Hipple stated on the current trend the amount would equal approximately \$12 million.

Ms. McCarthy confirmed yes. She noted surplus funds could be added to that number.

Mr. Hipple noted that \$12 million equated to approximately 10 cents on the tax base.

Ms. McCarthy confirmed yes.

Mr. Hipple stated citizens wanted to maintain their quality of life in the County without raising taxes. He noted various challenges while maintaining the reserve. Mr. Hipple provided more detail to those points. Mr. Hipple noted CIP school projects and maintaining reserve funding. He further noted the importance of identifying necessary projects versus repairs. He referenced the City of Williamsburg-JCC School contract. Mr. Hipple addressed different school projects and potential savings. He provided additional details on that point.

Ms. Larson noted several Board members had questioned the HVAC system at Matthew Whaley Elementary School (MWES). She referenced the uncertainty between the County and the City of Williamsburg and that impact on business. Ms. Larson cited the need for more discussion.

Mr. Stevens noted support of that discussion. He expressed concern regarding funding delays until all decisions were made. Mr. Stevens addressed that point in more detail. He noted joint investments from both groups and referenced the \$4 million from the City of Williamsburg for

the Pre-K project and the impact from each group for funding commitments. Mr. Stevens noted expectations regarding funding should a separation occur.

Ms. Larson noted discussion prior to the budget's approval. She cited the County's investment of \$3.7 million in comparison to the City of Williamsburg's \$428,000 for the Matoaka Elementary School project in 2026 if funded.

Mr. Stevens noted that amount was significant.

Ms. Larson confirmed yes. She noted the need for discussion prior to the budget approval.

Mr. McGlennon asked when the School Division would be seeking bids on that particular project. He noted his hope the City of Williamsburg would reach a decision close to the end of the fiscal year this year and a decision could be made. Mr. McGlennon further noted his reluctance to pull the project from the CIP now.

Ms. Larson stated the City of Williamsburg had seen the CIP list. She noted the City of Williamsburg was aware of the cost of the three projects and the impact to the County. Ms. Larson further noted the City of Williamsburg had to be considering some of these same points.

Mr. Stevens noted he and the City of Williamsburg Manager, Mr. Andrew Trivette, had held a conversation but no agreement was reached at that point. He stated recouping funds if invested in the CIP projects and the validity of further discussion. Mr. Stevens noted direction from the Board and his concern of a multi-year impact.

Mr. Hipple referenced the \$4 million from the City of Williamsburg. He noted the CIP projects in the budget which would then be paid for by the City of Williamsburg with those funds. Mr. Hipple further noted then the County could use the Pre-K funding of \$4 million, adding that would eliminate a back-and-forth payment to each party. He addressed additional details to that point. Mr. Hipple stated he would not vote in favor of a CIP with funding toward the City of Williamsburg without assurance that funding was reciprocated. He stressed the County should spend the \$4 million in James City County and let the City of Williamsburg spend its \$4 million there. Mr. Hipple noted he was not asking for removal from the CIP, but rather retain as a placeholder and not be spent.

Mr. McGlennon stated he was not in favor of escalating the issue. He noted if the preschool funding was the first priority, he was agreeable once the decision was made by the City of Williamsburg.

Ms. Larson noted the need for discussion. She referenced the School Study meeting and the indication that MWES was possibly going to be slightly overcrowded due to Pre-K to fifth grade. Ms. Larson further noted the need to confirm that the City of Williamsburg was in agreement with the County regarding Bright Beginnings. She provided further details on the timeline and other points.

Mr. Icenhour echoed some of the earlier concerns. He noted the three projects in the CIP for FY2025: HVAC system at MWES, roof at Berkeley Middle School, and turf at Cooley Field. Mr. Icenhour further noted those projects were approximately \$4.5 million in County funding with approximately \$500,000 in funding from the City of Williamsburg. He stated the City of Williamsburg could be having similar concerns with funding for school projects at Laurel Lane, Norge, and J. Blaine Blayton Elementary Schools, Lois S. Hornsby Middle School, and specifically the Pre-K project. Mr. Icenhour noted the City of Williamsburg funding would primarily be for schools in JCC and the County's funding for the three schools in the City of Williamsburg. He further noted approximately \$3.5 million net funding would still come from the County as opposed to the City of Williamsburg's approximately \$500,000 portion. Mr. Icenhour provided additional details to this point. He noted his reluctance to a budget

commitment with so many unanswered questions, adding more discussion and information were needed.

Mr. Stevens asked the Board if it would consider moving some CIP projects from FY26 to FY25 to create a better balance regarding County schools. He noted his concern regarding an agreement with the City of Williamsburg in three to four weeks, adding he did not want the budget process to stop. Mr. Stevens further noted once the operating budget was approved, those funds were obligated to send as the School Division made its requests. He added that the CIP historically allowed the County to have more control on those projects moving forward without automatically sending the funding to the School Division. Mr. Stevens stated the budget could be approved with projects switched and if on July 2 there were changes, the Board could switch the projects.

Ms. McCarthy noted the School Division used the County's Procurement Division. She further noted the County was aware earlier in the process when the School Division was considering particular projects. Ms. McCarthy stated that information could then be conveyed to the Board.

Ms. Larson noted the Board could approve the Operating Budget at the May 14, 2024, Regular Meeting with the CIP approval moved to the following meeting.

Ms. McCarthy noted the difficulty arose with the transfer from the Operating Budget to the CIP. She added the number would change based on project allocation.

Mr. McGlennon stated a budget amendment could be made on the adopted budget.

Ms. McCarthy noted another public hearing could be required depending on the extent of the amendment.

Ms. Larson asked Ms. Null if she had any comments.

Ms. Null questioned some expenditures listed on page D-5 of the CIP.

Mr. McGlennon clarified the amount was from the previous year's CIP.

Ms. Larson expressed concern about moving projects forward as she was worried about the answers regarding the HVAC system. She added she was uncomfortable until some agreement was in place.

Ms. McCarthy noted the ability to approve a dollar amount for school-related projects could be an option. She further noted between current time and June 30, that list of projects could be determined. Ms. McCarthy stated that was an option to be explored.

Ms. Larson thanked Ms. McCarthy.

Mr. McGlennon questioned the school funding dedicated in the Operating Budget and if it was based on the legislative initial budget or the Honorable Governor Glenn Youngkin's budget.

Ms. Holland noted the County had an agreement with the School Division in which the School Division developed requests based on the anticipated federal funding. She added then a locality need was presented to both the County and the City of Williamsburg. Ms. Holland noted the annual enrollment as of September 30 was also provided. She further noted the annual enrollment was reviewed to garner the numbers for a pure count for both the County and the City of Williamsburg. Ms. Holland explained the calculation process and results, adding those calculations were compared to the Virginia Department of Education's (VDOE) Standards of Quality.

Ms. McCarthy noted the original funding requested by the School Division was based on the Honorable Governor Glenn Youngkin's budget released in December. She added updates had been provided. Ms. McCarthy stated the latest numbers were based on the most recent Virginia General Assembly approved budget. She added the process was ongoing as the state had yet to adopt its budget so changes could be forthcoming.

Mr. McGlennon noted the \$350 million difference from the legislature's approved budget and the Honorable Governor Glenn Youngkin's proposed budget and where the difference would land. He questioned if the amount the School Division was requesting was needed.

Ms. McCarthy stated the School Division received a calculation tool from the VDOE based on the Virginia General Assembly's budget in March which provided approximately \$4 million in additional funding. She added that change prompted a request revision to the County. Ms. McCarthy noted there were pending bills and numbers could potentially change.

Mr. McGlennon stated he anticipated the number to be on the high side, but added the Virginia General Assembly would reconvene on May 13, 2024. He noted his support of the budget's priority list. Mr. McGlennon further noted his support of the 83 cents tax rate was necessary, but he questioned the possibility of a one-time rebate to offset some of the tax bill for the coming fiscal year from some undesignated Fund Balance. He stated the one-time rebate in consideration of people's concerns regarding the high rate of increase. Mr. McGlennon questioned if that was a viable option and if negative consequences would result.

Ms. McCarthy noted conversation with Mr. Kinsman. She further noted the County had some ability to do that, but an Ordinance was required to give the Board the authority for that action. Ms. McCarthy stated some localities had done that and it was typically in the form of a credit opposed to a rebate. She noted rebate equaled checks whereas a credit was better administratively, and citizens received the discount sooner. Ms. McCarthy provided details on such a program.

Mr. McGlennon thanked Ms. McCarthy. He noted he wanted to present that option for the Board to consider.

Ms. Null referenced the School Board's initial request for a 3% raise, which was then increased to 4.5%. She asked Ms. McCarthy if that included the 2% increase from the state.

Ms. McCarthy stated the 4.5% was all-inclusive.

Ms. Larson noted the School Superintendent's 3% proposal followed by a larger request from the School Board to assist with staff retainment. She spoke to other related points.

Mr. Stevens clarified an approximate \$600,000 shortage in school funding in the production of the Proposed Budget. He noted that addressed additional healthcare and dependent care costs. Mr. Stevens added that an additional request was made during the time of the publishing.

Ms. McCarthy noted at the time of the revised request for the County's Proposed Budget, \$4 million was the amount used which represented state funding the School Division would receive. She noted the \$4 million was a rough estimate and upon receipt of the VDOE calculation tool, the amount was \$3.6 million or a \$400,000 difference. Ms. McCarthy added additional funds of \$550,000 were requested by the School Division for health insurance contribution and conversion of a part-time to full-time Bilingual Specialist. She noted those items were not included in the County's number.

Ms. Larson referenced a list of requested items the County Administrator had chosen not to fund. She added she had previously requested a list from the School Division but questioned if it had been received.

Ms. McCarthy noted she had not received anything official. She further noted her understanding was there had been a recent briefing from the School Division to the School Board on that list. Ms. McCarthy stated that information should be available to the County sometime during the current week.

Ms. Larson noted one request specifically addressed healthcare. She added that request was for a monetary amount but was not necessarily for healthcare. Ms. Larson added as a point of clarification that where that money was allocated was dependent on the School Board's decision.

Ms. McCarthy confirmed yes.

Ms. Larson asked Mr. Icenhour if he had any questions or comments.

Mr. Icenhour referenced a Board handout that highlighted potential budget reduction points. He noted six to eight items with a total cost of approximately \$2.8 million. Mr. Icenhour asked Mr. Stevens if those items were priority with his recommendation for reductions.

Mr. Stevens confirmed yes.

Mr. Icenhour noted a reduction of approximately \$1.3 million with regards to the Compensation Study if implementation was delayed until October 1. He further noted the \$2.94 million in the next line item which addressed a transfer to Capital Projects Funds. Mr. Icenhour stated that would be a transfer from the General Operating Budget to the Capital Projects Fund and questioned where the reductions would occur in the CIP.

Mr. Stevens stated that amount was relative to the County's 5% policy to transfer money to the CIP. He noted if the policy was not followed then a reduction in the CIP would impact the General Fund. Mr. Stevens further noted that amount was based on the new General Fund Budget, adding if the General Fund Budget was reduced then the 5% transfer would be reduced. He stated he had compiled a CIP project list with a total of approximately \$6 million in reduction but there was no real impact there to the operating, ongoing costs for County revenue. Mr. Stevens noted those reductions were not particularly helpful dollar for dollar.

Mr. Icenhour agreed. He referenced the list and spoke to possible reductions to that point in more detail. Mr. Icenhour asked Ms. McCarthy for clarification as he questioned if any surplus held in the General Fund from previous years could be used for a rebate.

Ms. McCarthy noted it was based on a known surplus. She added since the County was still in FY2024, that number was currently unknown as several more months remained in the fiscal year. Ms. McCarthy noted the FY2023 surplus was known and was approximately \$13 million. She added that \$13 million would be available as a credit.

Mr. Icenhour noted he had received constituent communication regarding concerns for the 83 cents tax rate. He further noted the possibility of lowering that rate several cents, but he favored relief via the credit for the next fiscal year. Mr. Icenhour stated a one-time credit as Mr. McGlennon had previously indicated. He noted a combination of these two considerations could potentially offer a four to five cents tax relief to citizens for this year. Mr. Icenhour asked the Board to consider reviewing those points.

Mr. Hipple referenced an earlier point regarding instruction for students who neither resided in the County or the City of Williamsburg.

Ms. Holland noted there was a student group which was neither County nor the City of Williamsburg in the count determination for allocation. She further noted the support

encompassed students from neighboring localities or transient situations such as hotels.

Mr. Hipple asked if the hotel location where the student resided could be determined as James City County or the City of Williamsburg. He questioned if that information was considered in the calculation.

Ms. McCarthy noted that information was detailed in the contract and addressed certain exclusions. She further noted that information was included in the School Division's total enrollment number, but removed from the calculation when the split was determined. Ms. McCarthy stated her understanding was due to the frequent moving, these students were excluded. She noted at the Board's discretion changes could be made during contract negotiations regarding that point.

Ms. Larson stated some students were protected under federal law. She explained if a homeless student had been enrolled in WJCC Schools and then moved to the City of Newport News then that student still had the ability to return to WJCC Schools to receive their education.

Ms. McCarthy noted there were some students who resided in neither locality as they were a student of either a teacher or an employee.

Mr. Hipple noted the County's maintenance regarding healthcare costs and questioned the School Division's costs. He questioned if the County's practices could assist the School Division with cost reduction.

Mr. Stevens noted the County was self-insured with consultant assistance. He spoke to that point in more detail.

Ms. McCarthy noted the key point was the County was self-insured. She further noted the County could adjust in real time with claim information from consultants. Ms. McCarthy stated she was engaged in conversation with the City of Williamsburg and the School Division regarding the Local Choice Program. She added that program was the state's insured program. Ms. McCarthy noted they would probably use the same consultant the County used. She further noted demographics were outside both groups' control, adding school division demographics greatly differed from a local government's demographic. Ms. McCarthy stated school division demographics were traditionally female-oriented with a tendency toward higher costs. She noted she had previously done research on this topic while working with another locality. Ms. McCarthy addressed that point in more detail, adding it could be 12 to 18 months to move from fully insured to self-insured due to claim backlogs. She stated the implementation of a Health Maintenance Organization (HMO) program with the School Division, adding the HMO plan was trending better than the previously used plan.

Ms. Larson noted the topic was discussed at the School Liaison meeting.

Mr. Hipple stated that would be an option to consider if the County and the City of Williamsburg split the school system. He provided additional details to that point.

Mr. McGlennon asked if the health insurance component requested by the School Division for funding was designed for cost reduction to the employee share.

Ms. McCarthy noted that was her understanding.

Ms. Larson thanked everyone who had worked on the budget. She noted the importance of the employee compensation component and its competitiveness. Ms. Larson further noted she felt the same way regarding the School Division. She stated the volume of assessment feedback received. Ms. Larson noted the County's two-year assessment and questioned what was involved to do a yearly assessment.

Mr. Stevens noted citizens with higher assessments were concerned with the yearly schedule so the change to every two years was implemented. He further noted the County's 20% increase was average for the region. Mr. Stevens stated the City of Williamsburg assessed annually, York County assessed every two years, and the City of Hampton assessed annually. He noted annual citizen discussion regardless of the assessment schedule as parts of the community would have higher assessments with increased value. Mr. Stevens addressed reviewing the mechanics of the process and the timeline and presenting the information to the Board at a later date.

Ms. Larson noted a citizen comment from a Community Budget meeting regarding recycling and other fees which would not be passed on. She stated the citizen was not a recycling participant, adding the citizen questioned the benefit if there was no increase to those who recycled versus those who did not. Ms. Larson asked about the impact of recycling in reference to the budget.

Mr. Stevens noted the recycling impact was several hundred thousand dollars. He added the Proposed Budget did not reflect Parks & Recreation Department's recommended \$500,000 in various fees for its programs. Mr. Stevens noted those fees and the recycling fees could be incorporated and passed along with a monthly increase of approximately \$7 per month to \$9 per month. He further noted those items could be added back into the budget if the Board chose that route. Mr. Stevens referenced another locality that had lowered its tax rate by three cents was receiving much criticism. He noted the rate reduction signaled acknowledgment by the Board, but it was not equivalent to substantial money on a median home. He addressed the rate reduction and credit options in more detail.

Ms. Larson requested the Parks & Recreation Department fee breakdown.

Mr. Stevens noted he had that breakdown.

Mr. Hipple referenced \$1 million for Cooley Field in the CIP. He noted the Energy Study on current County buildings and potential savings there as plans for the new Government Center unfolded.

Ms. McCarthy noted the Energy Study Mr. Hipple referenced on page D-15 was on the list of projects already in the approved budget prior to next year. She further noted the Energy Study was the one conducted several years ago. Ms. McCarthy stated page D-15 showed projects approved up to the current time and not in the next five years.

Mr. Stevens noted an Energy Study would not be conducted on buildings anticipated to not be occupied in five years. He further noted he would confirm that with the General Services Department.

Mr. Hipple questioned the \$700,000 playground replacement project in FY2025 listed on page D-16.

Ms. McCarthy noted carryforward projects listed on pages D-14-D-16 were projects approved in previous budgets, but not completed. She further noted those projects were already funded and not part of the approval for the next five years.

Mr. Hipple questioned the Williamsburg Regional Library project, the playground, and other points.

Ms. McCarthy noted it was only the library which resided in James City County. She added the playground was funded by the Friends of the Library and was an outside funding source.

Mr. Hipple thanked Ms. McCarthy.

Ms. Larson asked Mr. Icenhour if he had additional questions.

Mr. Icenhour recommended a nominal reduction in the tax rate of two to three cents. He noted an additional two to three cents one-time credit for the next fiscal year. Mr. Icenhour asked if that could be compiled for review. He noted the need for a stronger sense of necessary projects versus deferred projects regarding the schools particularly pending the decision on the schools. Mr. Icenhour reiterated the need for better information prior to decision-making. He noted no placeholder for the possible building of a new middle school in the five-year CIP which would require a complete review. Mr. Icenhour stated with no school decision the budget process was difficult.

Ms. Null noted her attendance at the five Community Budget meetings where she heard repeatedly about the need to reduce the tax rate. She referenced Mr. Stevens' list of possible reductions and highlighted the \$4.161 million. Ms. Null noted the possible reduction in CIP projects of \$6.255 million. She further noted when these numbers were added and divided by \$1.3 million, an eight-cent reduction occurred with a 75 cents tax rate.

Mr. Stevens noted the CIP challenge was that it would not reduce the impact on the General Fund. He further noted it was being funded with Fund Balance or the 5% policy of the General Fund allocated to the CIP. Mr. Stevens added that reducing the CIP did not really reduce the ongoing revenue.

Ms. Null stated \$4 million was already reduced in the budget which equaled three cents.

Mr. Stevens confirmed yes. He added that part of the \$4 million impacted the pay study implementation as it would be reduced and delayed. Mr. Stevens addressed the revenue cycle and potential impacts. He noted removal of the \$1.3 million reduced the County's competitiveness. Mr. Stevens further noted it was an improvement, but the County would still lag behind neighboring localities, adding those were his thoughts.

Ms. Larson stated she was not interested in the reduction.

Mr. McGlennon agreed to that point. He addressed the delay of the compensation plan implementation, but added the full cost of that implementation would be felt the next year. Mr. McGlennon noted his reluctance for a tax rate reduction based on that point. He referenced citizen comments, adding most comments reflected on the difficulty of dealing with the tax rate at one time. Mr. McGlennon spoke in favor of a taxpayer credit for the coming year rather than a significant tax rate reduction. He spoke to that point in more detail.

Mr. Icenhour agreed with the noted reductions, but to retain the compensation study. He noted the importance of pay raises, compensation, and the schools were important and necessary components. Mr. Icenhour further noted the credit benefit and some other assistance that would not create significant impact to next year's budget.

Mr. Hipple noted his concern for citizens who were on fixed incomes. He further noted employee benefits and raises should not be touched, adding holding to the teacher raises as well. Mr. Hipple emphasized that to maintain the quality of life, cuts could not continue. He addressed the approximately \$12 million remaining in the Fund Balance added to the \$3 million for a total of \$15 million. Mr. Hipple suggested using that money to lower the tax rate near 77 cents over the next two years in time for the next assessment and reevaluation. He provided additional details on that point. Mr. Hipple stressed the importance of the County employees.

Ms. Larson thanked Mr. Hipple. She addressed Mr. Stevens on providing various scenarios with the full impact for the Board to review.

Mr. Stevens stated the Board meeting to review those materials prior to the May 14, 2024, Regular Meeting. He noted approximately a week to gather the information and then determine a date to meet.

Ms. Larson noted that was an expectation during this time of the year.

Mr. Kinsman noted any rebate would require an Ordinance amendment, so he had placed the advertisement to that point. He further noted the Board would see that advertisement for its Public Hearing, adding it could be canceled if the Board chose not to do that. Mr. Kinsman stated to meet advertising requirements, he had to submit the notice.

Ms. Larson asked if the Public Hearing would occur before or on May 14.

Mr. Kinsman confirmed it would occur on May 14. He noted it would occur separately as part of the budget, but he had advertised it for the May 14, 2024, Regular Meeting.

Mr. McGlennon asked if that action allowed the Board to do the Ordinance amendment if desired.

Mr. Kinsman confirmed yes that it gave the Board the option.

Mr. Hipple questioned the wording of the advertisement.

Mr. Kinsman noted the specific wording with the option for the rebate.

Mr. Hipple thanked Mr. Kinsman.

Ms. Larson thanked Ms. Holland and Ms. McCarthy. She also extended her thanks to Mr. Stevens.

3. SUP-20-0010. 9537 Barnes Road. Hertzler Clearing and Grading - Progress Update

Ms. Christy Parrish, Zoning Administrator, addressed the Board and provided historical details on Special Use Permit (SUP)-20-0010. 9537 Barnes Road Hertzler Clearing and Grading. She stated two property inspections were completed in compliance with the SUP conditions with one conducted on January 19, 2024, and the latter one conducted on April 3, 2024. Ms. Parrish stated inspection details and notes were provided in the Board's Agenda Packet. She noted she would highlight specific areas in the PowerPoint presentation as well as provide an update on the owners' progress. Ms. Parrish further noted the timeline of the site plan with regard to both Planning and Zoning. She continued the update from the Building Safety and Permits aspect which included seven buildings identified as being constructed without building permits and other issues. Ms. Parrish provided the Fire Marshal's Office update which included combustible liquid tanks on-site, unapproved electrical conditions, and other factors. She noted the Stormwater and Resource Protection Division's update focused on concern with the survival of existing mitigation plantings, adding surety was expected as a requirement of plant replacements prior to the site plan approval. Ms. Parrish continued the presentation highlighting owner progress and responsiveness. She added that Mr. and Ms. Hertzler were not in attendance due to schedule conflicts, but that they were working to address any issues. Ms. Parrish noted she was joined by representatives from the various divisions of Planning, Building Safety and Permits, and Stormwater and Resource Protection, and the Fire Marshal's Office for any questions from the Board.

Ms. Larson asked Ms. Parrish if the Zoning Division would return to the Hertzler's property.

Ms. Parrish confirmed yes, adding she had the owners working on dates for completion. She noted she received an email prior to the meeting to that effect. Ms. Parrish stated Building Safety and Permits Division would follow up on the building inspections and Ms. Hertzler would contact the Fire Department regarding the stockpiles. Ms. Parrish provided additional details regarding the follow-up.

Ms. Larson noted she had a question for the Fire Marshal.

Mr. Joseph Davis, Assistant Fire Marshal, came to the podium.

Ms. Larson noted a large fire several months previously involving a woodpile.

Mr. Hipple and Ms. Null noted it was Hankins.

Ms. Larson thanked them. She asked Mr. Davis if the Hertzler property stockpiles was similar to the Hankins property stockpiles.

Mr. Davis noted he was not present at the Hankins fire. He stated Assistant Fire Marshal Jared Randall had visited both sites and was present to answer questions.

Mr. Randall addressed the Board noting the stockpiles were not similar. He noted one condition in the SUP requested the Fire Department's assistance regarding the stockpile height from solid ground. Mr. Randall stated that point was not seen at the Hankins fire which was a contributing factor to difficulty controlling that fire. He addressed that point in more detail.

Ms. Larson referenced the unpaved road and fire truck accessibility.

Mr. Randall noted there would be some equipment limitations as not every piece of fire apparatus could access the road. He further noted some of that equipment might not be needed at the location. Mr. Randall stated the availability of brush trucks and hoses. He noted the roads needed a better foundation, so washout was not a possibility. Mr. Randall added that heavy trucks were currently used on the roads. He noted the Fire Department was able to access the stockpiles in their current locations.

Ms. Larson thanked Mr. Randall.

Mr. Hipple noted he had gone to the Hankins fire. He further noted the proximity of the Hertzler property to Interstate 64, which was even closer than the Hankins property. He questioned the cost to the County for its part in dealing with the Hankins fire as multiple jurisdictions were involved. Mr. Hipple addressed potential problems to that point and the guidelines applied to this SUP for safety and other factors.

Ms. Null asked the distance between the stockpiles to avoid one catching fire while the other did not.

Mr. Randall noted there could be differences between the State Code, County Ordinances, and SUP conditions. He further noted the SUP conditions were followed.

Ms. Null stated she was unsure if that distance was included in the SUP.

Mr. Randall noted the distance was reviewed for safety. He further noted the Hertzler property basically had one stockpile in comparison to the Hankins property.

Ms. Null expressed concern for the space.

Discussion ensued.

Mr. Randall stated he felt confident the space would accommodate the fire equipment.

Ms. Larson thanked Mr. Randall. She noted Ms. Parrish had supplied a progress update but questioned if any Board action was needed.

Ms. Parrish confirmed no action was needed unless the Board had specific actions for staff to present at a later date.

Ms. Larson acknowledged Ms. Parrish and staff were monitoring the situation.

Ms. Parrish noted safety was the top priority.

Ms. Larson agreed. She asked Ms. Parrish to pass the safety message along.

Ms. Parrish confirmed yes.

Mr. Hipple asked when the remaining items would be completed.

Ms. Parrish replied June 15 for the fire and electrical issues. She noted that was the date in the email she received earlier in the day. Ms. Parrish stated she specifically requested a date and summary from the owners, adding staff would assist the owners in compliance with the safety issues.

Mr. Hipple questioned some dates that had been received previously.

Ms. Parrish noted April 10 was the deadline for the first inspection. She added that date was to get everything into compliance, adding those issues were being continually identified and to work with the owners. Ms. Parrish noted if the compliance stopped and the required progress abated, staff could present that action as a violation to the Board or to the next level as an SUP violation. She detailed other steps in the process if progress ceased or additional violations ensued.

Ms. Null asked about the inspections.

Ms. Parrish noted one was in January with the other in April.

Discussion ensued on compliance points and dates.

Mr. McGlennon asked how much staff resource was consumed by this SUP holder.

Ms. Parrish stated more than most but that was due to coordination of the many groups reviewing the property. She noted at the first meeting there were tankers and large trucks to ensure maneuverability. Ms. Parrish further noted putting the compliance issues back to the owners so inspections could occur.

Mr. McGlennon asked if there were any other cases Ms. Parrish knew of that required this level of attention.

Ms. Parrish replied not many, adding each situation had different zoning perspectives. She noted both she and the Deputy Zoning Administrator had been actively involved in this SUP as it had a 20-year history. Ms. Parrish stated this situation had a variety of issues to address for compliance and the involvement of different departmental staff in the review.

Mr. McGlennon thanked Ms. Parrish.

Ms. Larson asked Mr. Icenhour if he had any comments.

Mr. Icenhour replied no.

Ms. Null questioned if the owners had addressed the retaining pond built on their property.

Ms. Parrish noted the retaining pond was there, but she was unsure if the owners had anything to address regarding the retaining pond unless it was to be used as a water source for any form of fire suppression.

Ms. Null asked if permission was required to build a retaining pond. She referenced a Best Management Practice (BMP).

Mr. John Risinger, Senior Planner, noted one of the conditions required the pond be made into a Level II wet pond. He stated the site plan would require the details to the stormwater point.

Ms. Null expressed her concern if the pond was being addressed. She thanked staff for the input.

Mr. Risinger referenced Ms. Null's earlier question regarding the separation distance between the stockpiles. He noted a 50-foot separation requirement was in place should the owners move forward with separate stockpiles.

Ms. Larson thanked everyone for their efforts.

#### 4. Virginia Opioid Abatement Authority

Ms. Barbara Watson, Director of Social Services, addressed the Board and introduced Ms. Denise Kirschbaum, Chief of Services for the County's Social Services Department. Ms. Watson stated Ms. Kirschbaum had been working with other localities and community members regarding a regional initiative regarding the use of the opioid funding.

Ms. Kirschbaum provided historical details from 2020 regarding the collaborative regional effort to apply for the Virginia Opioid Abatement Authority (OAA) grant. She noted regional members met in 2022 and 2023 to review potential projects for the grant funding. Ms. Kirschbaum noted the overall grant requested budget was approximately \$600,000, adding the chosen programs were based on inclusion with the support of the local partners over future fiscal years regardless of OAA distributions. She cited the three components of the OAA requirements with the first two dedicated to prevention and awareness to enhance current initiatives. Ms. Kirschbaum noted the third component was a new effort dedicated to individuals with substance use disorders who were involved in the criminal justice system. She listed the specific projects included in the funding. Ms. Kirschbaum noted James City County had agreed to be the fiscal agent with an application submission to OAA on April 1, 2024. She further noted working with the other localities to receive matching funds to the grant funds, adding the amount was approximately \$150,000. Ms. Kirschbaum stated both she and Ms. Williams-Ortery were available if the Board had any questions.

Ms. Larson thanked Ms. Kirschbaum for the update.

#### 5. Government Center Update

Mr. Stevens noted he would provide the update as Mr. Brad Rinehimer, Assistant County Administrator, was on another assignment. He stated Mr. Rinehimer continued to meet with the builder and the architect on programming phases. Mr. Stevens added that point contributed to consolidation and reduction of overall space while coordinating departmental proximity. He noted the current square footage was approximately 180,000 with 160,000 square feet listed in the initial proposal. Mr. Stevens stated Mr. Rinehimer met with Mr. Daniel Keever, Assistant Superintendent for WJCC Schools, regarding scheduled meetings with the School Division and the architects about the potential School Administration building on-site. He noted a tour of the Cities of Virginia Beach and Suffolk was scheduled for Thursday, April 25. Mr. Stevens further noted Mr. Hipple and Mr. McGlennon were slated for that tour. He welcomed any other Board members to join the tour, but noted this meeting would need to be continued if a third Board member was in attendance. Mr. Stevens indicated the tour would be a full day.

Mr. McGlennon noted he had contacted Mr. Rinehimer as he would be unable to attend.

Mr. Stevens stated an employee input session was slated for May 7, from 8 a.m.-12 p.m. He noted the session would be held in the Board Room for any employee to engage in discussion on the Government Center. Mr. Stevens stated the architect was pushing for a visit to a Minneapolis facility with a tentative travel date of June 5 and 6. He noted if any Board member wished to attend then contact Mr. Rinehimer to coordinate it. Mr. Stevens stated the first community stakeholder group meeting was being held on May 15 in the glass Conference Room, Building D. He welcomed the Board members to attend, adding if three or more members were present then a public meeting notification would be made. He added that meeting was at 4 p.m.

#### F. BOARD CONSIDERATION(S)

None.

#### G. BOARD REQUESTS AND DIRECTIVES

Ms. Null noted she met with The Junkluggers of Williamsburg in Toano. She provided additional details on the newly opened business.

Mr. Hipple noted he had nothing to report.

Mr. McGlennon thanked Mr. Stevens, Mr. Doug Powell, General Manager of JCSA, and County staff for a great job with the Employee Service Award event at Busch Gardens Williamsburg. He noted he and Mr. Hipple were recognized for their tenure with the County as well as County staff. Mr. McGlennon stated his attendance on April 22 at a session sponsored by the Village Initiative which featured the 6th Annual Report on Equity in the WJCC School system. He spoke to that point in more detail.

Ms. Larson asked if that report would be shared.

Mr. McGlennon noted a link was provided in the email invitation that had been sent.

Ms. Larson thanked Mr. McGlennon.

Ms. Larson noted the Employee Service Award event was great. She extended her congratulations to the three people recognized for their service.

Mr. McGlennon noted Mr. Stevens was also recognized for his tenure.

Ms. Larson expressed her appreciation of all the effort to make the Employee Service Award ceremony a great event. She thanked Mr. Jason Purse, Assistant County Administrator, for his participation at a community meeting with her. Ms. Larson noted approximately 60 people attended the meeting, adding her thanks to that neighborhood for its participation. She stated

she threw out the first pitch at the Williamsburg Youth Baseball League (WYBL) opening day event. Ms. Larson noted WYBL had over 700 athletes and 58 teams. She commented the ballfields at Warhill Sports Complex were 25 years old this year and they were beautiful. Ms. Larson gave a shoutout to the Parks & Recreation staff as well as the parent volunteers for their work there. She noted a particular shoutout to Mr. Keith Cobb of the WYBL Board. Ms. Larson thanked Mr. Rinehimer for his help on his assignment. She also extended appreciation to the citizens who spoke at the Community Budget meetings. Ms. Larson noted for citizens unable to attend meetings, Board members could be reached by phone calls and emails. She addressed a personal connection to investment in the community and provided more insight to that point.

Mr. Icenhour asked if Mr. Stevens could contact Glo Fiber, the internet service provider, for the connection status in various neighborhoods. He noted Indigo Park was one where a constituent had questions on the process and its progress. Mr. Icenhour further noted he would be unable to join the Thursday tour due to his travel schedule.

Ms. Larson noted some issues with Glo Fiber which included gas line damage which impacted local traffic on Jamestown Road.

Mr. Stevens noted he would look into both of those requests.

#### H. REPORTS OF THE COUNTY ADMINISTRATOR

Mr. Stevens noted the Drug Take Back Day was slated for April 27 at the Law Enforcement Center, 10 a.m.-2 p.m. He provided details on the event. Mr. Stevens stated New Town Tunes, in partnership with the New Town Commercial Association, JCC Parks & Recreation Department, and CultureFix VA, would begin May 1. He noted the events would be on Wednesdays and run through June 12 behind Legacy Hall at Sullivan Square and weatherpermitting.

#### I. CLOSED SESSION

A motion to Enter a Closed Session was made by John McGlennon, the motion result was Passed.

AYES: 5 NAYS: 0 ABSTAIN: 0 ABSENT: 0 Ayes: Hipple, Icenhour Jr, Larson, McGlennon, Null

At approximately 3:21 p.m., the Board of Supervisors entered a Closed Session.

At approximately 3:26 p.m., the Board re-entered Open Session.

A motion to Certify the Board only spoke about those matters indicated that it would speak about in Closed Session was made by John McGlennon, the motion result was Passed. AYES: 5 NAYS: 0 ABSTAIN: 0 ABSENT: 0 Ayes: Hipple, Icenhour Jr, Larson, McGlennon, Null

1. Discussion or consideration of the acquisition of real property for a public purpose, where discussion in an open meeting would adversely affect the bargaining position or negotiating strategy of the public body pursuant to Section 2.2-3711(A)(3) of the Code of Virginia, and specifically regarding 7402 Richmond Road.

#### J. ADJOURNMENT

1. Adjourn until 5 pm on May 14, 2024 for the Regular Meeting

Ms. Larson noted a caveat that the Board could meet earlier than May 14, but proper notice would be given.

A motion to Adjourn was made by Barbara Null, the motion result was Passed. AYES: 5 NAYS: 0 ABSTAIN: 0 ABSENT: 0 Ayes: Hipple, Icenhour Jr, Larson, McGlennon, Null

At approximately 3:27 p.m., Ms. Larson adjourned the Board of Supervisors.

#### **MINUTES**

### JAMES CITY COUNTY BOARD OF SUPERVISORS SPECIAL MEETING COUNTY GOVERNMENT CENTER BOARD ROOM 101 MOUNTS BAY ROAD, WILLIAMSBURG, VA 23185

May 7, 2024

4:00 PM

#### A. CALL TO ORDER

#### B. ROLL CALL

Barbara E. Null, Stonehouse District Michael J. Hipple, Powhatan District John J. McGlennon, Roberts District James O. Icenhour, Jr., Vice Chair, Jamestown District Ruth M. Larson, Chair, Berkeley District

Scott A. Stevens, County Administrator Adam R. Kinsman, County Attorney

#### C. BOARD DISCUSSIONS / GUIDANCE

#### 1. Proposed FY 2025-2026 Budget

Ms. Cheryl Holland, Budget Manager, addressed the Board noting the purpose of this meeting was to continue discussion on the Fiscal Year (FY) 2025-2026 Proposed Budget. She remarked she would provide a brief budget overview on the PowerPoint presentation and then would turn the discussion over to the County Administrator Scott Stevens to address raised topics and questions. Ms. Holland highlighted the budget timeline on the PowerPoint presentation. She noted FY2025 was the first year of the County's two-year budget and the only year appropriated for spending. Ms. Holland further noted the FY2025 Proposed Budget equated to \$289.3 million. She indicated the FY2025 Proposed Budget reflected no change in the real estate and personal property taxes. Ms. Holland mentioned the FY2025 Proposed Budget excluded approximately \$9 million in additional requests. She highlighted the additional revenue allocations displayed on the PowerPoint presentation. Ms. Holland turned the discussion over to Mr. Stevens.

Mr. Stevens addressed the Board noting he wanted to mention the Williamsburg-James City County (WJCC) School Division requested an additional \$5.2 million to its proposed budget to aid with employee health insurance premiums. He noted that figure was approximately \$500,000 less than the desired amount. Mr. Stevens noted he was asked by the School Division Superintendent to mention the additional fund request, adding he was not advocating on the subject matter. He touched on other revenue considerations that were not included in the FY2025 Proposed Budget such as Parks & Recreation and Curbside Recycling potential fee increases. Mr. Stevens spoke to that point in further detail. He stated Parks & Recreation fees would increase in FY2026; however, there were no changes to the Curbside Recycling fee for FY2025 or FY2026. Mr. Stevens asked if any Board members had questions before continuing the discussion.

Mr. Hipple questioned the additional funds to the School Division based on the state's allocation.

Mr. Stevens mentioned the School Division was not aware of the final number in relation to the state's allocation until after the budget had been finalized. He noted the estimated allocation was based on the City of Richmond's latest calculation tool for School Division staff. Mr. Stevens stated the School Division's Proposed Budget included a 4.5% salary increase for School Division staff and the additional funds would help alleviate increased health insurance premiums.

Mr. Hipple asked if the state's contribution was higher would that allow the County some financial flexibility.

Mr. Stevens confirmed. He explained the School Division had to issue teacher contracts and without providing a generous allocation to the School Division it could create some significant impacts. Mr. Stevens noted if the County allocated additional funds to the School Division and the state had increased its allocation then a budget amendment could be done before the end of the year to receive those funds back.

Mr. McGlennon asked if the additional funds were to aid with the costs of the health insurance premiums or was that incorporated with the 4.5% salary increase for School Division staff.

Mr. Stevens mentioned from his understanding the School Division requested a 4.5% salary increase and the School Division would pay the increased costs for the dependent healthcare coverage. He noted another option would be to lessen those employee healthcare costs and the School Division would offer a 4% salary increase for School Division staff.

Mr. McGlennon questioned the affordability and beneficial aspect of healthcare coverage for lower-paid salary workers who would receive salary increases. He mentioned he understood some employees did not utilize the offered healthcare coverage options.

Mr. Stevens noted the School Division had a number of plans to choose from. He mentioned some employees chose healthcare coverage elsewhere. Mr. Stevens elaborated on that point in further detail.

Mr. Hipple asked if School Division staff received a 7% salary increase last year.

Mr. Stevens replied correct.

Mr. Hipple stated and a 4.5% salary increase this year. He remarked that he felt that was equitable compensation.

Ms. Larson expressed her disappointment in the lack of reevaluation in relation to the School Division's Proposed Budget. She mentioned her concerns with raising curbside recycling fees. Ms. Larson pointed out a recent CBS exposé regarding corporate recycling and whether or not plastic waste was actually being recycled. She asked if Ms. Grace Boone, Director of General Services, could come to the podium and address that point.

Ms. Boone addressed the Board noting she was not aware of the recent study Ms. Larson was referring to; however, she mentioned the County worked closely with the Virginia Peninsulas Public Service Authority (VPPSA) to ensure the recyclables go to their designated location. She advised a report was received to validate recycled collection percentages. Ms. Boone emphasized the importance of education on recycling and highlighted the pros of the recycling program. She touched on various challenges such as inflation costs, drivers, staff turnover, etc.

Ms. Boone mentioned the glass recycling partnership with O-I Glass.

Ms. Larson asked if the County had a good overall rate for recycling based on the VPPSA reports.

Ms. Boone replied the County offered one of the cleanest programs out there. She expressed her belief that education was a huge component of the program's success.

Ms. Larson thanked Ms. Boone.

Mr. McGlennon mentioned he paid his recycling fees annually. He asked the process for those customers who paid on an annual basis opposed to monthly if the rates were to increase.

Ms. Holland stated advanced payments were recorded as a liability and were applied to future bills.

Mr. McGlennon asked if the recycling fees changed would that shorten the timeframe that payment would cover.

Ms. Holland confirmed yes.

Mr. Hipple mentioned if County citizens did not participate in the Curbside Recycling Program and wanted to drop-off recyclables could they visit one of County's Convenience Centers at no charge.

Ms. Boone replied correct.

Mr. Hipple spoke to constituent concern in relation to the subsidized recycling component.

Ms. Larson agreed to Mr. Hipple's point. She mentioned the possibility of putting an investment towards less landfill use by recycling. Ms. Larson questioned absorbing the fee in its entirety. She asked Mr. Stevens if the rate would increase again next year.

Mr. Stevens stated the County's contract was a five-year contract, adding it was recently rebid. He mentioned his thoughts were to incorporate a fee as time moved forward toward the Solid Waste discussion. Mr. Stevens noted this was simply an option to present to the Board for self-recovery purposes. He asked Ms. Boone to speak to the contract.

Ms. Boone explained with the vast majority of County contracts incorporated Consumer Price Index (CPI) and negotiation and flexibility opportunities annually.

Mr. Stevens noted he would come back to these topics at the end of discussion to determine the Board's input on direction.

Mr. McGlennon mentioned he preferred to see increased rental costs for County facilities such as Legacy Hall. He noted he was not in support of increasing fees for the REC Connect Before and After School Program.

Ms. Larson asked if the Parks & Recreation Department offered income-based programs.

Mr. Stevens expressed he believed so; however, he would need to verify that point. He mentioned REC Connect had some income-based approach opportunities and County employees received discounts based on annual salary.

Ms. Larson mentioned her desire to increase fees for the REC Connect Before and After School Program to aid in the additional revenue component. She requested the impacts it would have

on the program.

Mr. Stevens confirmed.

Mr. Hipple agreed to Mr. McGlennon's point of increased rental costs for County facilities; however, he was not in support of raising fees for the REC Connect Before and After School Program.

Mr. Stevens explained most of the fee increases would be approximately \$5-\$10 noting some of those fees were per week, per month, per rental, etc. He mentioned postponement of increased fees would then make for a more drastic increase as time moved forward. Mr. Stevens noted based on the Board's desire it could postpone any increased fees in the REC Connect Before and After School Program until FY2026.

Ms. Larson pointed out the County was paying higher salaries for Parks & Recreation staff. She expressed her desire to still receive the requested information on impacts to the program if the fees were increased.

Ms. McCarthy, Director of Financial and Management Services, addressed the Board noting annual operation costs for the REC Connect Before and After School Program was approximately \$85,000.

Ms. Larson asked Mr. Stevens for the current rates for the program and what increased costs would look like.

Mr. Stevens stated fees for before school only were currently \$50 and would increase to \$60 per week, after school only from \$60 to \$65 per week, and then before and after school from \$75 to \$80 per week.

Ms. Larson expressed her support of increasing the REC Connect Program fees this year.

Mr. Icenhour mentioned he had a question regarding WJCC Schools. He asked if the additional \$500,000 could be put into a contingency plan based on determination of the state's allocation to the School Division.

Mr. Stevens confirmed that could be done; however, that would still add an additional \$500,000 to the budget and would need to determine where to cut costs. He commented that this year the state's budget seemed to be more certain than it did this time last year. Mr. Stevens reiterated his earlier point in relation to a budget amendment as another option.

Mr. Hipple agreed to Ms. Larson's point that the School Division should reevaluate its budget.

Mr. Stevens highlighted potential real estate tax rate reductions on the PowerPoint presentation. He explained each cent reduction and what that would mean in terms of reductions, funding shifts, postponements, removal of new positions, etc.

Ms. Larson asked if the removal of new positions would create further challenges regarding approval timelines, research efforts, etc.

Mr. Stevens stated his first priority was to retain current County employees and fill current vacancies. He emphasized the importance of making the necessary accommodations based on the Bolton Compensation Study conducted. Mr. Stevens mentioned challenges such as recruiting and retaining, experience level, population growth, workload, etc. were many factors County departments faced. He expressed his belief that adding additional positions while experiencing the inability to fill current vacancies was counterproductive. Mr. Stevens elaborated on his point in further detail.

Mr. Hipple spoke about potentially utilizing approximately \$13 million from the Unassigned Fund Balance in a two-year increment to reduce the real estate tax rate to \$0.77 per \$100 of assessed value. He noted after further research there would be significant impacts to the County's AAA Bond Rating. Mr. Hipple explained that point in further detail. He asked Mr. Stevens if the County could utilize the Unassigned Fund Balance for County projects.

Mr. Stevens confirmed yes; however, he expressed his belief that a broader discussion needed to occur. He recommended a time outside of the budget period to continue discussion on that point. Mr. Stevens spoke to the Fund Balance Policy which required a minimum Unassigned Fund Balance equal to 15%. He touched on that point in greater detail.

Discussion ensued.

Mr. Stevens discussed and displayed tax credit opportunities on the PowerPoint presentation. He elaborated on the potential cent reduction credits and the methodology if implemented.

Mr. McGlennon remarked commercial real estate did not appreciate in value nearly at the rate that residential did.

Ms. McCarthy replied correct, adding it was approximately a 2% increase for commercial real estate.

Mr. McGlennon inquired about potential implementation of an additional rate on commercial real estate. He expressed that he was uncertain on the legislation to that point.

Mr. Stevens replied he would look into that, adding he was uncertain on that point. He noted the State Code section in relation to tax refunds/credits was relatively new and currently there was not a known way to segregate credits at this time. Mr. Stevens further noted the credits would apply to both residential and commercial real estate. He provided the Board various tax credit options up to a \$0.10 tax rate reduction. Mr. Stevens stated each \$0.01 reduction as a credit equated to \$1.3 million. He recommended a reduction in the Capital Improvements Program (CIP) proposals by a similar amount as well. Mr. Stevens displayed a list of potential reduction opportunities in relation to the Capital Projects Fund on the PowerPoint presentation. He spoke to that point in further detail.

Mr. Icenhour referenced the Tax Credit slide on the PowerPoint presentation. He asked Mr. Stevens if those figures were inclusive of commercial real estate in addition to residential real estate.

Mr. Stevens confirmed yes.

Discussion ensued.

Mr. Icenhour asked Ms. McCarthy what the ballpark figure of the assessed value of residential real estate versus commercial real estate.

Ms. McCarthy stated she did not have the raw data; however, the residential real estate made up approximately 80% of the overall total. She further stated in theory a tax credit would ultimately be returning last year's surplus and commercial real estate contributed to that surplus. She expressed her belief that was the reason the State Code was written that way.

Mr. Icenhour suggested a reduced tax rate of \$0.04 in FY2025 and a reduced tax rate of \$0.02 in FY2026 which would equate to approximately \$7.8 million.

Mr. Stevens confirmed yes.

Mr. Icenhour asked if the County would offset those costs by reducing CIP projects.

Mr. Stevens confirmed that was the recommended course of action but not required.

Discussion ensued.

Mr. Stevens asked the Board if there were questions pertaining to Fund Balance.

Ms. Larson requested discussion on Fund Balance.

Ms. McCarthy moved onto discuss the Fund Balance component. She displayed a Fund Balance slide on the PowerPoint presentation to illustrate where the County was financially at the beginning of the budget versus where the County would be in different scenarios. She stated at the end of last fiscal year the Unassigned Fund Balance was \$79.2 million and total governmental expenditures were \$296 million, adding 15% of that figure was set aside which left an excess total of approximately \$34 million. She recommended looking at one-time expenditures, specifically capital, if adjustments were made. Ms. McCarthy highlighted and displayed various scenarios and associated figures on the PowerPoint presentation. She discussed utilization of the Unassigned Fund Balance for ongoing needs and reasons credit rating agencies unfavored that practice. Ms. McCarthy mentioned to Mr. Hipple's point that because of the County's AAA Bond Rating the County received significantly lower interest rates on debt and increased negotiating power for business opportunities.

Mr. Stevens looked to the Board for input on the real estate tax rate, credit issuance, etc. He noted a clear consensus on Parks & Recreation and Curbside Recycling fees and utilization of Fund Balance for County vehicles.

Mr. Icenhour expressed his appreciation to Mr. Stevens for all his efforts. He recommended a \$0.02 real estate tax reduction noting further reduction passed that point would conflict with priority needs.

Mr. Stevens mentioned if the Board chose to increase fees it would allow an additional \$1 million and flexibility in relation to a higher tax reduction.

Ms. McCarthy noted \$500,000 of that \$1 million was factored into the FY2026 budget in relation to increased Parks & Recreation fees.

Mr. Icenhour reiterated his recommendation of a \$0.02 reduction in the real estate tax rate. He expressed his support for a tax credit preferably a higher credit issuance in FY2025 in addition to a lower issuance in FY2026. Mr. Icenhour noted he looked to his fellow Board members for further consideration on those points.

Mr. McGlennon expressed that he preferred to keep the real estate tax rate at the current rate of \$0.83 and focus on a tax credit for this year instead. He noted that the tax rate was not the issue but more so the real estate reassessment. Mr. McGlennon further noted efforts were being made to accommodate some tax relief. He felt reluctant with additional reductions in the real estate tax rate based on future uncertainty. Mr. McGlennon elaborated on his point in further detail. He indicated his support of a more cautious approach.

Mr. Hipple expressed this was a challenging circumstance. He recommended a \$0.05 tax credit and keep the real estate tax rate as is.

Ms. Larson asked Mr. McGlennon if he had a specific amount for a tax credit.

Mr. McGlennon replied he was in support of either a \$0.03 or \$0.04 tax credit. He expressed his

reluctance to support a \$0.05 tax credit unless there were stipulations for a tax credit in FY2026. He asked Ms. McCarthy if this circumstance may jeopardize the potential need for a new middle school and the real estate tax rate.

Ms. McCarthy replied correct noting the CIP may need to be reevaluated.

Mr. Hipple noted a decline in County debt through FY2027.

Ms. McCarthy stated the County had a new borrowing program this year for the Pre-K space and for the new General Services Building equating to approximately \$74 million. She advised the County's next borrowing would be in FY2026 for the new Government Center.

Mr. Hipple elaborated on County debt figures for future fiscal years and opportunities as that debt was paid down.

Ms. McCarthy replied some County debt would come off in FY2026 which would allow additional debt capacity. She noted if the County was required to build a new middle school then the CIP in its entirety would need to be revisited. She mentioned various tools and measures utilized in reviewing the overall budget process.

Mr. Hipple thanked Ms. McCarthy.

Ms. Null asked if there was any consideration on a personal property tax rate reduction. She mentioned her attendance at a Virginia Association of Counties (VACo) Conference where numerous localities offered a 0.5 tax rate reduction or higher. Ms. Null expressed her concerns with rebates and/or credits as she felt it was not impactful. She mentioned her attendance at the Community Budget Meetings and heard the concerns of many County citizens on a fixed income. She expressed her support of lowering the real estate tax rate to \$0.75; however, she understood that was not feasible. Ms. Null suggested lowering the tax rate under \$0.80 and no tax credits. She reiterated a potential reduction in the personal property tax rate as well.

Mr. Stevens noted the personal property tax rate had not changed and remained the same for some time. He explained budget process challenges with reductions in tax rates and ensuring expenses were reduced by the same amount. Mr. Stevens advised the County would not issue a rebate but a credit. He noted the credit would be reflected on the bill and would essentially have the same effect as a tax rate reduction. He expressed his skepticism and worry on a \$0.05 or higher tax rate reduction as he felt that would put the County in a very unpleasant position in relation to serving the community.

Mr. McGlennon mentioned the Board had implemented a reduced assessment ratio of 75% of value in relation to personal property tax approximately two years ago. He indicated that equated to approximately \$9 million in savings to County taxpayers. Mr. McGlennon asked Ms. McCarthy if the personal property tax rate changed would that impact state funding.

Ms. McCarthy replied no, adding the program had been redeveloped as a block grant to include a fixed amount.

Ms. Larson mentioned this was a tough situation. She empathized with County citizens in relation to taxes. She also understood the County needs and priorities. Ms. Larson expressed her concern with changing the County's revenue outlook. She pointed out that localities were now responsible for many things that used to be the state's responsibility. Ms. Larson further noted her support of a \$0.05 tax credit with stipulations in FY2026. She looked to the Board for guidance on the additional \$500,000 that the School Division was requesting.

Mr. Stevens informed Mr. Icenhour that a contingency plan could be implemented for the additional \$500,000.

Mr. Hipple mentioned he was not in support of the additional \$500,000. He suggested the School Division reevaluate its budget. Mr. Hipple noted after the state's allocation was finalized the Board could potentially revisit the additional funds request.

Discussion ensued.

Ms. Larson recommended a decision be made at the next Board meeting regarding the additional \$500,000 allocation to the School Division.

Ms. McCarthy mentioned she could find out how the School Division was trending this year in terms of a surplus.

Mr. Hipple stated if the Board felt it was important to allocate the additional \$500,000 a budget amendment was another option.

Mr. Icenhour stated he wanted to ensure whether it was a tax rate reduction and/or tax credit that the amount be the same. He reiterated his support for \$0.05 and to reduce the CIP. He emphasized the importance of tax relief for County citizens.

Ms. Larson asked Mr. Stevens if he had the necessary direction from the Board to move forward.

Mr. Stevens replied he believed so. He looked to Ms. Holland and Ms. McCarthy for any additional questions.

Ms. McCarthy declined.

Mr. Icenhour asked if there should be further discussion on a determination for Curbside Recycling fees.

Ms. Larson expressed she believed Mr. Stevens had a clear directive moving forward.

Mr. Stevens noted recycling would be self-supported. He further noted the Board would revisit the subject matter as part of the Solid Waste discussion and make those adjustments during that time. Mr. Stevens asked the Board if it was in agreement.

The Board agreed.

Ms. Larson expressed angst on the subject matter as she did not want County citizens to not recycle due to a financial obligation.

Mr. Hipple stated the program in its entirety would be reevaluated in a year or two.

Ms. Larson asked if the Board had any further discussion.

Mr. McGlennon noted the economy was improving, the stock market was on a positive trend, social security benefits had increased substantially in the last two years. He questioned what constituted the fixed income aspect versus families trying to make ends meet. Mr. McGlennon mentioned for public notification purposes that the Board had raised the income limit and level of exemption this year for the County's tax relief programs for lower-income residents and disabled veterans who met the eligibility criteria.

#### **D. CLOSED SESSION**

None.

#### E. ADJOURNMENT

1. Adjourn until 5 pm on May 14, 2024, for the Regular Meeting

A motion to Adjourn was made by Barbara Null, the motion result was Passed. AYES: 5 NAYS: 0 ABSTAIN: 0 ABSENT: 0 Ayes: Hipple, Icenhour Jr, Larson, McGlennon, Null

At approximately 5:35 p.m., Ms. Larson adjourned the Board of Supervisors.



# Police Department

Drone First Responder Program and AED Delivery Experiment

# JCCPD Drone Program

- Currently have 7 drones, 5 piloted and 2 tethered.
- 9 certified and licensed drone pilots.
- Primary uses are search and rescue and tactical support.
- Also used for accident documentation.
- Drone team members are officers and most work patrol. They are called out to events where a drone is needed.

## Drone First Responder Program

- Would allow the Police Department to fly drones to any public safety calls within a designated area.
- Enhance public safety response.
- Enhance officer safety.
- Improve efficiency (send the right resources to calls).
- Requires extensive FAA review and approval.
- Ensures drones are consistently available during the program operating hours.

### Partnership with Duke and VCU

- Duke received a grant from American Heart Association to study the possible delivery of AEDs via drone.
- We were asked to participate in this experiment via VCU.
- To participate they will assist us in the DFR approval process.
- Expenses related to achieving DFR status and the experiment will be covered by the AHA grant.
# Benefits to James City County

- Establishes a Drone First Responder program in JCC.
- Enhanced response to public safety calls for service in the designated area.
- Improved officer safety.
- Improved efficiency.
- Assistance with the complex regulatory approval.
- Equipment and training we would not otherwise have.

# Costs to James City County

- Staff time working with VCU and Duke on their experiment would be reimbursed to the County.
- Equipment, software, and other necessary purchases would be reimbursed to the County.
- Once the grant is concluded the DFR program will operate as staffing and budget allow.





## "Developing and Testing Drone-Delivered AEDs for Cardiac Arrests In Rural America

This Study Site Agreement (the "**Agreement**") is entered into as of the date of the last signature hereon, (the "**Effective Date**") by and between Duke University, a tax-exempt research and educational institution located in Durham, North Carolina, acting for and on behalf of its Duke Clinical Research Institute ("**Duke**") and James City County, Virginia, a political subdivision of the Commonwealth of Virginia, for its Police Department, located at 4600 Opportunity Way, Williamsburg, VA 23188 ("**Study Site**"). Duke and Study Site may be referred to herein each as a "Party" and collectively the "Parties".

WHEREAS, Duke, with Monique Starks, M.D., a full time Faculty Member at Duke acting as "Sponsor-Investigator", desires to coordinate the clinical research Study entitled "Developing and Testing Drone-Delivered AEDs for Cardiac Arrests In Rural America (RESTORE CARE)" (the "Study"),

**WHEREAS**, Duke has received a grant from the American Heart Association, having a principal office at 7272 Greenville Avenue, Dallas, Texas 75231 ("**AHA**"), to provide funding support for the Study;

**WHEREAS**, the Protocol shall be approved by Sponsor-Investigator, Duke, Study Site and an appropriate Institutional Review Board ("**IRB**");

WHEREAS, Duke wishes to engage the Study Site to participate in the Study; and

**WHEREAS**, Study Site desires to participate in the Study with Anthony G. Dallman, an employee of the Study Site, acting as and hereinafter referred to as "**Participating Investigator**," on behalf of Study Site.

**NOW, THEREFORE**, in consideration of the mutual promises herein contained and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the Parties agree as follows:

- 1. Performance of Study:
  - 1.1 Study Site agrees to conduct this Study in strict accordance with the protocol described in **EXHIBITA** ("**Protocol**"), which is incorporated by reference herein, (as it may be amended from time to time by the Sponsor-Investigator), all applicable guidelines relevant to the conduct of clinical protocols, including, but not limited to the Federal Food, Drug and Cosmetic Act and regulations of the FDA, HIPAA, conditions imposed by the Study Site's IRB and the written instructions of Duke relative to the administration of the Protocol. The Parties agree to comply with and to conduct the Study in accordance with all applicable federal, state and local laws and regulations. Study Site shall comply with all documents referenced in this Agreement, including without limitation AHA policies and regulations. All such documents are incorporated by reference in this Agreement and can be found at https://professional.heart.org/researchpolicies.on the AHA's website.
- 2. Participating Investigator and Third Party Institutions:

The Study Site represents that the Participating Investigator shall be responsible for performing the Study at Study Site and for supervising all personnel performing portions of the Study. In the event that the Participating Investigator is not an employee of Study Site, either the Participating Investigator himself or his employer shall be a Party hereto and execute this Agreement. In the event the Participating Investigator becomes unable to perform any of the activities in the Study or complete the Study for any reason, Duke and Study Site may mutually agree to a substitute Participating Investigator, who shall be an employee of Study Site and approved by AHA, in which event this Agreement shall continue in full force and effect. If Duke and Study Site cannot agree on a substitute Participating Investigator, Duke may terminate this Agreement as provided herein.

Study Site agrees not to engage the services or use the facilities of any third party (each, a "**Third Party Institution**"), including, but not limited to, sub-investigators and study coordinators, in conducting any Study-related services under this Agreement unless and until Study Site has (i) executed a separate written agreement with such Third Party Institution to govern these services, whose terms are consistent with the terms hereunder; and (ii) obtained Duke's prior written consent to use such Third Party Institution in connection with the Study. Study Site shall be responsible for ensuring the compliance of any Third Party Institutions with the terms of this Agreement and shall be liable for any breach of the Agreement by any Third Party Institutions. Study Site shall bear sole responsibility for any payments owed to each Third Party Institution in connection with its services. The Study shall otherwise be conducted solely at Study Site's facilities.

- 3. Payment/Funds Availability/Reimbursement:
  - 3.1 In consideration of the work to be performed under this Agreement, Duke will provide financial support for the Study as set forth in the Budget and Payment Schedule in **Exhibit B** for the purpose of paying all compensation due Study Site. Duke will administer such funds and shall make all payments to Study Site in accordance with the payment schedule included in Exhibit B. Payments will be made to the payee set forth in **Exhibit C**.
  - 3.2 Funds Availability and Reimbursement:

All funds to support Study Site's performance of the Study will be paid by Duke. These amounts, which are inclusive of overhead and all applicable taxes, represent the fair market value of the covered costs associated with the Study and have not been determined in a manner that takes into account the volume or value of any referrals or business. Study Site agrees that: (a) all claims that the Study Site submits for reimbursement to any federal healthcare program or third party payor for any procedure that involves any materials (including, but not limited to, any drug) provided by or on behalf of Duke at no cost to Study Site will accurately reflect the provision of those materials by or on behalf of Duke; and (b) Study Site shall not seek reimbursement from any federal healthcare program or third party payor for any of the amounts paid by Duke.

For all payment queries and to submit invoices, please contact:

Invoices and inquiries: <u>Site-Payments@dm.duke.edu</u> Subject: EPM 8569 RESTORe CARE James City County

4. IRB Approval / Informed Consent/HIPAA Authorization:

Study Site shall ensure that the Participating Investigator(s) obtains the approval of the Protocol and related informed consent form ("ICF") from the IRB or similar committee formally designated by the Study Site to review biomedical research, in conformance with 21 CFR Part 56. The Study Site shall ensure that each subject enrolling in the Study shall give his/her informed consent to such

participation by signing the ICF in accordance with the Study Site's informed consent policies and in conformance with 21 CFR Part 50, and that a copy of the written ICF be given to each Study subject or the subject's legal representative. The Study Site shall provide Duke with a copy of the Protocol and ICF approved by the IRB. No change to the Protocol and/or the ICF will be made without prior written approval by Sponsor-Investigator, Duke and the IRB except when such change is necessary to eliminate apparent immediate hazard to Study subjects, or to comply with applicable local, state or federal law, in which case Study Site agrees to notify Duke and the IRB immediately.

The Study Site shall further ensure that each subject enrolling in the Study shall execute an ICF approved by Duke and the IRB in advance, permitting the use and disclosure of the subject's personally identifiable information ("**PII**") as contemplated under the Study. The Parties agree to treat all PII in accordance with any ICF form signed by Study subject.

#### 5. Confidentiality:

- 5.1 Study Site acknowledges and agrees that all information, clinical or technical, including the Protocol and any forms or reports relating to this Study is Duke's confidential information ("**Confidential Information**") and shall not be disclosed to any third parties or used for any purpose other than the conduct of the Study, except as and to the extent required by law. All Confidential Information disclosed pursuant to this Agreement will be identified in writing as "Confidential" at the time of disclosure to the extent reasonably practicable. However, information which is orally or visually disclosed, or written information that is not marked as "Confidential" shall be considered confidential if it would be apparent to a reasonable person, familiar with clinical research that such information is of a confidential or proprietary nature. This obligation will continue for five (5) years following the close of the Study.
- 5.2 Specifically excepted from Confidential Information is all information that: (a) was previously known by the Study Site as evidenced by its competent prior written records; (b) is publicly disclosed except by breach of this Agreement either prior to or subsequent to the Study Site's receipt of such information; (c) is rightfully received by the Study Site from a third party without an express obligation of confidentiality; or (d) is independently developed by personnel of the Study Site without use of or reliance upon the Confidential Information as evidenced by competent prior written records;
- 5.3 Nothing set forth herein shall operate to prohibit or prevent Study Site from disclosing Confidential Information pursuant to any judicial or government request, requirement or order, including but not limited to, the Virginia Freedom of Information Act; provided that, Study Site takes reasonable steps to provide Duke with sufficient prior notice in order to allow Duke to contest such request, requirement or order.
- 6. Record-Keeping/Retention:

Study Site agrees to maintain complete and up-to-date Study records during the Study including without limitation, if applicable, case report forms ("**CRFs**"), and the Study Site file, which includes all Study-related correspondence.

- 6.1 Study Site shall contact Duke prior to the destruction of records, the removal of records to another location, or in the event of accidental loss or destruction of any Study records. Study Site shall destroy records according to its own record retention policy; provided that prior notification to Duke has occurred and the timelines in section 6.3 have been met.
- 6.2 Study Site shall:(a) keep Duke informed of the Study status; and

- (b) maintain and promptly provide, upon request, to Duke or its designee (i) complete and accurate records of the Study as required by the Protocol, and (ii) completed CRFs in the form specified by Duke; and
- 6.3 Study Site shall retain all Study records for the longer of:
  - (a) Two (2) years following completion of the Study; or
  - (b) The period required by local, state and federal laws..

#### 7. Audits:

- 7.1 Personnel from Duke (or its representatives) may visit Study Site periodically at mutually agreed, reasonably convenient times, to monitor and/or audit the Study. Study Site agrees to make all Study documents and, if applicable, Study subjects' medical records available for comparison. Study Site also agrees to cooperate with representatives of the FDA or any other regulatory agency in the event of an inspection of this Study, and will provide the regulatory agency representatives access to the above-described records. In the event Participating Investigator or Study Site becomes aware that a regulatory agency desires to audit the Participating Investigator or the Study Site for matters relating to the Study, or the Study, the Party having such knowledge shall notify Duke promptly by telephone and in writing.
- 7.2 During and for a period of at least two (2) years after the completion of the Study, Duke shall promptly, which should not exceed thirty (30) days, report to Study Site and Participating Investigator any information that it becomes aware of that could directly affect the health or safety of past or current Study subjects or influence the conduct of the Study, including but not limited to the Study results and information in site monitoring reports and data safety monitoring committee reports as required by the Protocol.
- 8. Indemnification/Liability:
  - 8.1 Each Party agrees to be solely responsible for its own acts or omissions in the performance of its activities hereunder and further shall be financially and legally responsible for all liabilities, costs, damages, expenses and attorney fees resulting from or attributable to its negligent acts or omissions or willful misconduct; provided, however, that a Party shall not be responsible to the extent of the other Party's negligence or willful misconduct.
  - 8.2 AHA is not responsible for any claim, judgment, award, damages, settlement, negligence or malpractice arising from the Study.
- 9. Insurance:

Study Site represents and warrants that it has a sufficient general and professional liability insurance program, to fully cover its and the Participating Investigator's responsibilities within this Agreement. The Parties agree that such insurance coverage is not less than \$3,000,000 per occurrence, \$5,000,000 annual aggregate for each of general and professional liability. Study Site agrees to provide Duke with evidence of the amounts of such coverage upon request. If Study Site's insurance coverage is reduced below the aforementioned limits or canceled during the Study, Study Site shall promptly notify Duke in writing, pursuant to Section 22 (Notices) of this Agreement.

10. Debarment Certification:

The Study Site certifies that (i) neither it nor any of its employees conducting research in connection with this Agreement, including the Participating Investigator, is presently: (a) debarred pursuant to provisions of the Generic Drug Enforcement Act of 1992 (the "Act") or any other applicable law, rule or regulation of any authority having jurisdiction over the Study; or (b) listed on the FDA debarment list found at

http://www.fda.gov/ICECI/EnforcementActions/FDADebarmentList/default.htm , or the Office of Inspector General's List of Excluded Individuals/Entities at http://oig.hhs.gov/exclusions/exclusions\_list.asp , and (ii) it will not use in any capacity, in connection with the work to be performed under this Agreement, any individual who has been debarred, excluded or disqualified by any regulatory agency. If at any time after execution of this Agreement, the Study Site, the Participating Investigator or any other Study staff is debarred, excluded or disqualified or receives a notice of initiation of disqualification, the Study Site will promptly notify Duke in writing, pursuant to Section 22 (Notices) of this Agreement.

- 11. Intellectual Property:
  - 11.1 It is recognized and understood that certain pre-existing inventions and technologies are the separate property of Duke or Study Site and are not affected by this Agreement, and neither Party shall have any claims to or rights in such separate inventions and technologies. Intellectual property, including inventions, conceived or reduced to practice in the performance or as a result of this Agreement will be subject to the AHA IP Policy, in effect at the time the Agreement is signed (Exhibit D); provided, however that the last sentence of Section V.D. of the AHA IP Policy for this Agreement shall be replaced with the following language: "In no event shall the application of the foregoing result in either AHA or Study Site receiving less than 20% of Net Income". The Study Site acknowledges and agrees that AHA has the right to participate in revenue generated from the commercialization of intellectual property as set forth in the AHA IP Policy, regardless of whether the intellectual property is patented or copyrighted. Study Site agrees to meet all reporting requirements set out in the AHA IP Policy relative to any intellectual property.
- 12. Press Releases and Public Notices:

Study Site agrees that it shall not issue, nor allow their employees or agents to issue, any press release, nor initiate any communication of information regarding the Study, written or oral, to the communications media without the prior written consent of Duke. Any written or video or other communications material regarding the Study provided to the Participating Investigator and/or Study Site by Duke shall not be disseminated to the communications media by the Participating Investigator or Study Site without the prior written consent of Duke.

- 13. Academic Publications:
  - 13.1 Study Site acknowledges that the Study has been designed as a multicenter Study and that the Study data generated from Study Site's evaluation may not be sufficient to draw meaningful conclusions. For these reasons, Study Site shall not first individually publish, present or otherwise publicly disclose the results of the Study, but rather shall participate in a joint, multicenter publication of the Study results coordinated by Duke. However, at the earlier of publication of such joint publication, or if such joint publication is not submitted for publication within one year (12 months) of Study completion or termination at all sites, Study Site has the right to individually produce and submit a proposed publication, based on Study Site's Study results, subject to the prior review of Duke as described below.

Study Site shall submit to Duke for its review a copy of any proposed publication or presentation resulting from the Study at least thirty (30) days prior to the date of submission for publication or presentation, and Duke shall promptly notify AHA of such proposed publication, and if no response is received within said thirty (30) days, it will be conclusively presumed that the publication or presentation may proceed without delay. Study Site agrees to remove any Confidential Information at the request of Duke,

provided, however, nothing in this Agreement shall prohibit Study Site from the publication of all information necessary for the accurate interpretation and presentation of said results and scientific data. If Duke determines that the proposed publication or presentation contains patentable subject matter which requires protection, Duke may require the delay of the publication or presentation for a further period of time not to exceed sixty (60) days for the purpose of filing patent applications.

- 13.2 Authorship and other matters relating to publications shall be determined in accordance with the Uniform Requirements for Manuscripts Submitted to Biomedical Journals (http://www.icmje.org/). All publications shall comply with the AHA Public Access Policy which includes submission to the digital archive PubMed Central (PMC) within twelve (12) months of publication and shall acknowledge AHA support in all presentations (including oral or poster presentations, news releases, interviews with reporters and all other communications) and publications resulting from work carried out during this Agreement. To enable the accurate evaluation of outcomes from AHA research investments, it is critical that acknowledgements mention AHA as the funding organization, as well as the specific grant ID number and the names of each author supported by each AHA Award. The recommended format follows: "THIS WORK WAS SUPPORTED BY AMERICAN HEART ASSOCIATION GRANT # 23HERNPRH1150361 [Author Name]." If more than one AHA Grant supported the published research, then each Grant should be cited separately with the grant ID and name(s) of supported authors. Where registration is required for publication of the results in International Committee of Medical Journal Editors ("ICMJE") journals, or if otherwise required to be registered by law or regulation, Duke shall insure that the Study is registered with either www.clinicaltrials.gov, or another registry meeting the requirements of the ICMJE in effect at the time the Study is initiated.
- 13.3 Study Site shall cooperate with Duke, including meeting applicable timelines and requirements for submission of reports and in the development of a summary of the findings of the Study the general public.
- 14. Use of Name:

Neither Party shall, without the prior written consent of the other Party, or AHA as applicable, use in advertising, publicity or otherwise, the name, trademark, logo, symbol or other image of the other Party or AHA, except for internal reporting requirements or as otherwise permitted in this Section 14. Study Site shall disclose AHA's financial support of the Study as may be required by academic journals and funding agencies and Study Site shall include and identify the AHA as a funder/benefactor on any and all reports, either public or private, that detail the Study Site's list of donors. AHA shall have the right to use the name of Study Site and other Study Site information any AHA web content including its research portal, publications, programs, promotional, advocacy and fundraising efforts and further to place their information into the Health Research Alliance's (www.healthra.org), online database of privately funded grants.

15. Termination of Agreement/Participation:

Study Site may terminate this Agreement due to the breach or default of Duke by giving thirty (30) days written notice to Duke pursuant to Section 22 (Notices) of this Agreement, provided, however, that such termination shall not take effect if Duke cures such breach or default during the thirty (30) day notice period. Either Party has the right to terminate this Agreement upon thirty (30) days prior written notice to the other Party if the Participating Investigator is unable to complete the Study and the Parties are unable to agree upon a successor. Duke may terminate this Agreement upon thirty (30) days written notice to the Study Site for any reason. Study Site may terminate this Agreement upon thirty (30) days written notice if it determines, after good

faith negotiation between the Parties, that the budget in Exhibit B no longer provides sufficient reimbursement. Upon termination, Study Site shall promptly deliver all Study data identified as a deliverable in the Protocol to Duke. In the event of such premature termination, other than due to Study Site's breach of this Agreement, Study Site will be compensated pursuant to Exhibit B herein for all activities properly completed in accordance with the Protocol through the date of termination.

16. Subject Injury Compensation:

Neither Duke nor AHA shall have any obligation to provide any reimbursement or payment for any Study related injury costs. Study Site shall insure that any informed consent form signed by its Study subjects shall inform the Study subjects that there is no provision for reimbursement or payment of Study related injury costs from Duke or AHA.

17. Relationship of Parties:

Study Site is operating as an independent contractor under this Agreement and not as an agent or employee of Duke.

18. Conflict of Interest:

Study Site, by signing below, warrants and represents that neither it nor the Participating Investigator nor any of the Participating Investigator's immediate family (defined as spouse and children) have any real or perceived conflict of interest in the execution of this Study (e.g., stock or other equity in companies which manufacture agents being tested in this Study) and that participation herein does not conflict with any other obligation to third parties.

19. Assignment:

This Agreement may not be assigned by Study Site or without the prior written consent of Duke.

20. Effective Date and Term:

This Agreement shall become effective upon the Effective Date and shall remain in full force and effect until June 30, 2027 ("**Award Period**") unless earlier terminated as set forth below.

- 21. General Provisions:
  - 21.1 Entire Agreement. This Agreement together with the Exhibits, which are incorporated by reference herein, constitutes the entire understanding between the Parties with respect to the subject matter and supersedes any prior negotiations, representations, agreements and understandings regarding the subject matter. In the event of a conflict between the terms of this Agreement and the Protocol, the terms of this Agreement shall control with regard to business and financial matters, and the Protocol shall control with regard to subject medical/safety/treatment matters.
  - 21.2 Modifications. This Agreement may not be amended, supplemented or otherwise modified except by an instrument in writing signed by the Parties.
  - 21.3 No Waiver. The failure of any Party hereto to insist upon strict performance of any provision of this Agreement or to exercise any right hereunder shall not constitute a waiver of that provision or right under this Agreement or of any other provision or right under this Agreement.
  - 21.4 Severability. If any provision of this Agreement is declared invalid, illegal or unenforceable, such provision shall be severed and all remaining provisions shall continue in full force and effect.

- 21.5 Governing Law. The Parties agree to remain silent.
- 21.6 Due Authorization. The persons executing this Agreement represent that they have the full power and authority to enter into this Agreement on behalf of the entities that they represent.
- 21.7 Force Majeure. If either Party hereto shall be delayed or hindered in, or prevented from, the performance of any act required hereunder for any reason beyond such Party's direct control, including but not limited to, strike, lockouts, labor troubles, governmental or judicial actions or orders, riots, insurrections, war, acts of God, inclement weather or other reason beyond the Party's control (a "Disability") then such Party's performance shall be excused for the period of the Disability. Any Study timelines affected by a Disability shall be extended for a period equal to the delay. The Party affected by the Disability shall notify the other Party of such Disability as provided for herein.
- 21.8 Counterparts and Electronic Signature. This Agreement may be executed in two or more counterparts, each of which will be deemed an original, but all of which together will constitute one and the same Agreement. Delivery of an executed signature page to the Agreement by facsimile transmission or PDF will be as effective as delivery of a manually signed counterpart.
- 21.9 Survival. Any terms which, by their intent or meaning are intended to survive, will survive termination or expiration of this Agreement. No termination hereunder will constitute a waiver of any rights or causes of action that either Party may have based upon events occurring prior to the termination date.
- 21.10 Conflict of Terms. In the event of any conflict between the terms and conditions of this Agreement and the Protocol or between this Agreement and any of its Exhibits, the terms and conditions of the Protocol shall control with respect to matters of the clinical conduct of the Study, and the terms of this Agreement shall control with respect to all other matters.
- 22. Notices:

Any notices to be given hereunder shall be given by personal delivery, by certified mail, return receipt requested, or by recognized express courier. Notice shall be deemed to have been given upon receipt if personally delivered or upon three (3) days if delivered certified or express mail. Notice shall be given to the respective Party at the addresses listed below.

To Duke:

Office of Research Administration 2200 W. Main Street, Suite 1000 Durham, NC 27705 Attn: Director

With a copy to:

Duke Clinical Research Institute Attention: DCRI Contracts Management- 8569- RESTORe CARE 300 West Morgan St, Suite 800 Durham, NC 27701 Phone: (919) 668-8300 To Study Site:

James City County Police Department, 4600 Opportunity Way, P.O. Box 8784, Williamsburg VA, 23187-8784 Phone: (757)259-5145 Fax: (757)229-8729

To Participating Investigator:

Anthony G. Dallman 4600 Opportunity Way, P.O. Box 8784, Williamsburg, VA, 23187-8784 Phone: (757)259-5145 Fax: (757)229-8729

(signature page follows)

The Parties have consented to the terms of this Agreement by signing below.

JAMES CITY COUNTY By my signature below I attest that I am authorized to represent the Study Site in legally binding contracts.	Duke University:
By	By
Name: Scott Stevens	Name:
Title: County Administrator	Title:
Date:	Date:

## **EXHIBIT A: PROTOCOL**

(Previously provided to the Parties and incorporated herein by reference)

TABLE 1 –One-Time Study Payment Schedule				
Payment	Description	Payment After contract execution &		Amount
Set-up Drone & Operations Base 1	Costs of drones, AEDs, and drone safety technology for 1 drone bases	Contract Received and site activated year 1	\$	58,900.00
Travel to Sweden	Travel to Sweden to learn about Sweden Drone AED operations (representatives from EMS/911 and Law Enforcement)	Invoice from study site in Year 1	\$	10,000.00
Set-up Drone & Operations Bases 2- 3	Costs of drones, AEDs, and drone safety technology for 2- 3 drone bases	Invoice from Study Site in Year 2	\$	117,800.00
Simulation Study	Payments to purchase Rescusci Anne Manikin and SimPAD PLUS recorder	Invoice from Study Site Year 3	\$	6,898.00
Total Table 1 not to exceed \$ 193,598.00				

<b>Exhibit B: Budget and Pa</b>	yment Schedule
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Table 2 Annual Payn	nent Schedule				
Payment	Description	Payment After contract execution &	Individual Amount	ļ	Site Total
Active Live911 software	One Annual License Fee	Annual Invoice from Study Site (Years 2 - 4)	\$ 12,000.00	\$	36,000.00
Annual Site leader payment	Annual Leadership Payments for EMS, 9-1-1 Director, and Law Enforcement	Invoice from Study Site Annually (Years 1 - 4)	\$ 15,000.00	\$	60,000.00
DFR Remote Pilot software	Software to allow navigation of AED drones and collision avoidance for years 2 through year 4	Invoice from Study Site Annually (Years 2 - 4)	\$ 30,000.00	\$	90,000.00
Drone Pilots	Payments to Offset Drone Pilot Costs. 4 drone pilots years 2 through year 4	Invoice from Study Site Annually (Years 2 - 4)	\$ 40,000.00	\$	120,000.00
Table 2 Total not to exceed			\$	306,000.00	
		Year 1 Te exceed	otal not to	\$	83,900.00
	Year 2 Total not to		\$	214,800.00	
Year 3 Total not to exceed		otal not to	\$	103,898.00	
Year 4 Total not to exceed			otal not to	\$	97,000.00
Site Project Total years 1-4				\$	499,598.00

#### **Study Payments**

- 1. <u>Qualified Study Subject</u> Payment shall only be made for milestones completed in connection with subjects that meet the enrollment criteria outlined in the Protocol. Payment will be made to the payee listed below in Exhibit B.
- 2. <u>Premature Termination</u> In the event a subject terminates or is terminated early from the Study, the Study Site will be paid for milestones completed in accordance with the milestone payment schedule set forth in Exhibit B.

In the event of premature termination of this Study, Study Site will be paid for milestones completed in accordance with the milestone payment schedule outlined in this Exhibit B.

- 3. <u>Payment Schedule</u> Duke shall make payments to the Study Site in accordance with the milestone payment schedule set forth above by the 30th day of each calendar month for activities completed in the prior calendar month or upon receipt of funds from AHA at Duke's discretion.
- 4. <u>Protocol Deviation</u> If the Study is terminated at the site because of deviation from the Protocol, payment will only be made for activities completed in accordance with the Protocol prior to the date of such deviation.
- 5. Any funds that have been advanced by Duke but have not been earned by the Study Site under the terms of this Agreement shall be returned to Duke at the conclusion or termination of the Study.
- 6. <u>Subject Stipends</u>: Any payment(s) of stipends to subjects shall be made by the Study Site directly to the subject(s).

(End of Exhibit B)

# EXHIBIT C

### **Payee Information**

**Payee Name** – Entity to whom payment will be made (maximum 35 characters - one line)

Response: James City County

Attention – Person or Department to whom payments will be mailed (maximum 35 characters – one line)

Response: Treasurer's Office

#### Address (maximum 35 characters – one line)

Response: P.O. Box 8784

City, State, Zip Code

Response: Williamsburg, VA 23187

Federal Tax ID#

Response: 546001365



# Request for Taxpayer Identification Number and Certification

Give form to the requester. Do not

Departi	artment of the Treasury nal Revenue Service Go to www.irs.gov/FormW9 for instructions and the latest information.			send to the IRS.				
Befor	store you begin. For guidance related to the purpose of Form W-9, see Purpose of Form, below.							
	<ol> <li>Name of entity/i entity's name of</li> </ol>	ndividual. An entry is required. (For a sole propr I line 2.)	ietor or disregarded entity, enter the o	wner's name on line	1, and enter	r the busin	ess/disr	egarded
	James City Co	unty						
	2 Business name/	disregarded entity name, if different from above	ι.					
on page 3.	3a Check the approved only one of the Individual/s	opriate box for federal tax classification of the er following seven boxes. Die proprietor C corporation S	ntity/individual whose name is entered	I on line 1. Check	4 Exempti certain e see inst	ions (code entities, no ructions o	s apply ot indivic n page 3	only to Juals; 3):
e.	LLC. Enter 1	he tax classification (C = C corporation, S = S c	corporation, P = Partnership)		Exempt pa	yee code (	if any)	3
t or typ structio	Note: Chec classificatio box for the	k the "LLC" box above and, in the entry space, e n of the LLC, unless it is a disregarded entity. A lax classification of its owner.	enter the appropriate code (C, S, or P) disregarded entity should instead cheo	for the tax ck the appropriate	Exemption Complianc	from Fore	aign Acc TCA) rep	ount Tax
rins Ins	✓ Other (see i	nstructions) PO	litical Subdivision		code (if an	y)	С	
F Specific	3b If on line 3a you and you are pro this box if you h	checked "Partnership" or "Trust/estate," or che widing this form to a partnership, trust, or esta ave any foreign partners, owners, or beneficiaria	cked "LLC" and entered "P" as its tax ate in which you have an ownership i as. See instructions	classification, interest, check	(Applies outsic	to accour de the Unit	ts main ted State	tained es.)
8	5 Address (number	r, street, and apt. or suite no.). See instructions		Requester's name a	and address	(optional)		
· · ·	PO Box 8784							
	6 City, state, and	ZIP code						
	Williamsburg, \	/A 23187-8784						
	I List account hui	nber(s) here (optional)						
Par		er Identification Number (TIN)						
Entor	your TIN in the apr	propriate box. The TIN provided must mat	ch the name given on line 1 to av	oid Social sec	curity numb	er		
backup withholding. For individuals, this is generally your social security number (SSN). However, for a resident alien, sole proprietor, or disregarded entity, see the instructions for Part I, later. For other entities, it is your employer identification number (EIN). If you do not have a number, see <i>How to get a</i>								
TIN, la	iter.			Employer	identificati	on numbe	ər	
Note: Numb	If the account is in er To Give the Rec	more than one name, see the instruction uester for guidelines on whose number to	s for line 1. See also What Name o enter.	and 5 4 -	6 0	0 1	3 6	5
Par	Certification	ation						
Under	penalties of perju	y, I certify that:						
1. The 2. I an Ser no I	number shown or n not subject to ba vice (IRS) that I am onger subject to b	I this form is my correct taxpayer identific ckup withholding because (a) I am exemp subject to backup withholding as a resul ackup withholding; and	ation number (or I am waiting for t from backup withholding, or (b) t of a failure to report all interest o	a number to be iss I have not been no or dividends, or (c)	sued to me otified by to the IRS ha	e); and he Intern as notifie	al Reve d me th	nue nat I am
3. I an	n a U.S. citizen or	other U.S. person (defined below); and						
4. The	FATCA code(s) er	ntered on this form (if any) indicating that I	am exempt from FATCA reportin	ig is correct.				
Certification instructions. You must cross out item 2 above if you have been notified by the IRS that you are currently subject to backup withholding because you have failed to report all interest and dividends on your tax return. For real estate transactions, item 2 does not apply. For mortgage interest paid, acquisition or abandonment of secured property, cancellation of debt, contributions to an individual retirement arrangement (IRA), and, generally, payments other than interest and dividends, you are not required to sign the certification, but you must provide your correct TIN. See the instructions for Part II, later.								
Sign Here	Signature of U.S. person	Linda L. Terrell	ally signed by Linda L. Terrell 2024.04.09 13:26:51 -04'00'	4-9-2024				
Gei	neral Instr	uctions	New line 3b has b	een added to this	form. A flo	w-throug	h entit	y is
Sectio noted.	n references are to	the Internal Revenue Code unless other	vise foreign partners, ow to another flow-throu	ners, or beneficiari ugh entity in which	it has an (	provides	s the Fo	orm W-9
Future developments. For the latest information about developments related to Form W-9 and its instructions, such as legislation enacted after they were published, go to www.lrs.gov/FormW9.								
Wha	at's New		partners may be req Partnership Instructi	uired to complete ons for Schedules	Schedules	K-2 and	K-3. S	ee the

#### What's New

Line 3a has been modified to clarify how a disregarded entity completes this line. An LLC that is a disregarded entity should check the appropriate box for the tax classification of its owner. Otherwise, it should check the "LLC" box and enter its appropriate tax classification.

# Purpose of Form

An individual or entity (Form W-9 requester) who is required to file an information return with the IRS is giving you this form because they

Cat. No. 10231X

Form W-9 (Rev. 3-2024)

### Exhibit D AHA IP Policy

#### American Heart Association Intellectual Property Policy for Research Funding

#### Effective Date: Oct. 28, 2021

The primary purpose of the American Heart Association, Inc. ("AHA") in funding scientifically meritorious research is to advance its mission. The AHA recognizes that inventions having public health, scientific, business or commercial application or value may be made in the course of research supported by the AHA. The AHA desires that such inventions be administered in a manner that they are brought into public use at the earliest possible time. The AHA recognizes that this may be best accomplished through patenting, copyrighting, and/or licensing of such inventions. The AHA has implemented this Intellectual Property Policy for Research Funding ("Policy") to be applicable to all AHA research funding awards except as described herein.

For the purposes of this Policy, these definitions are provided:

#### I. DEFINITIONS

These defined terms are used in this Policy:

"Award" is the American Heart Association funding mechanism and accompanying financial support given to a specific institution to support the research of a specific investigator(s).

"Award Agreement" means an agreement outlining the terms and conditions through which the AHA disburses research funding for an Award.

Income

"Gross Income" means all revenue and other consideration (including distributions on equity) received related to commercialization of Intellectual Property resulting, in whole or in part, from an Award.

"Net Income" means all Gross Income received related to commercialization of Intellectual Property resulting, in whole or in part, from an Award, less out-of-pocket expenses related directly to patent costs associated with the Intellectual Property. All other costs, including Unrecovered Indirect Costs and Internal Distributions, are not deductible when calculating Net Income.

"Indirect Costs" means costs incurred by an Institution that are not directly attributed to Intellectual Property, including but not limited to overhead costs and general and administrative costs. Actual Indirect Costs may or may not exceed an Institution's published or official "Indirect Cost Rate."

"Internal Distributions" means an Institution's internal distributions to inventors, investigators, divisions, departments or others within the Institution.

"Unrecovered Indirect Costs" means any Indirect Costs incurred by an Institution that exceed the Indirect Costs allowed under an Award.

"Institution" is the entity (e.g., university, medical center, hospital, research institute) in which the research supported by an Award will be or was conducted as shown on an Award Agreement.

"Inventor(s)" is the investigator, author or other person working under an Award who, according to applicable law, created Intellectual Property.

"Intellectual Property" is any tangible or intangible discovery, composition of matter, method, idea, design, process, trade secret, concept, product, program, software, know-how, original work of authorship, or other intellectual property right, whether or not patented or patentable or copyrighted or copyrightable, that is conceived or reduced to practice in the performance or as a result of an Award and has an application of value such that its use, licensing, lease or sale can generate revenue or other consideration.

#### II. APPLICABILITY

This Policy applies to any Award Agreement through which the AHA disburses funding for research, EXCEPT:

- Subawards of entirely federal research grant funds when such subawards contain conflicting provisions on intellectual property rights such as those imposed by federal law or the primary award terms;
- Contracts for research and development services to AHA on behalf of other entities;
- Agreements to create predefined "works for hire" deliverables under a contract with the AHA;
- Unique research awards with substantial or complex funding arrangements or designed by AHA for significant impact on a particular topic, in each case when other intellectual property rights terms are described in the notice of funding availability or equivalent invitation; and
- Any other Award specifically excluded from this Policy at AHA's sole discretion.

Acceptance of any Award constitutes express agreement to the terms of this Policy. Except as otherwise noted herein, the terms of this Policy control in the event of a conflict between this Policy and an Institution's or Inventor's policy. The American Heart Association is unable to negotiate the terms of this Policy or any Award Agreement with any individual Institution or Inventor.

#### III. GENERAL POLICY

- . If an Institution receiving or disbursing AHA research funds has an established and applicable patent, intellectual property or technology transfer policy and procedure for administering intellectual property, the AHA will defer to that policy for title to intellectual property.
- A. If an Institution has no established and applicable patent, intellectual property or technology transfer policy or procedure for administering intellectual property, title to any Intellectual Property shall reside in the Institution or Inventor(s) as agreed by them. Title to any copyrightable work shall reside in the author unless and except to the extent the author has transferred ownership rights to the Institution prior to creation of the copyrightable work as allowed by applicable law.
- B. If Intellectual Property is conceived or reduced to practice from the performance of research funded by the joint support of the AHA and an agency or department of the United States Government, the AHA will defer to the patent, intellectual property or technology transfer policy of the United States Government.

C. An Institution shall license, lease or sell Intellectual Property in accordance with its own patent and intellectual property policies.

#### IV. NOTICES AND OTHER OBLIGATIONS

- All Intellectual Property shall be reported in writing to the AHA within 60 days of the date when the Intellectual Property is disclosed to the Institution where the work was performed, and prior to any public disclosure. The report to AHA should include the Institution's initial invention disclosure form related to the Intellectual Property and any subsequent versions that have substantive changes or additional information.
- A. Institution and Inventor(s) shall promptly determine whether they desire to seek patent or other statutory protection for Intellectual Property and shall notify the AHA in writing within 60 days after the decision to seek (or not seek) such protection. Institution and Inventor(s) shall also notify the AHA in writing (i) within 60 days after a patent application being filed and any patent subsequently being issued, and/or (ii) prior to the execution of a license, lease, sale or revenue generating agreement concerning Intellectual Property. No patent or patent application shall be abandoned without prior notification by the Institution or Inventor(s) to the AHA and offering to assign to AHA all right, title and interest to the Intellectual Property to the extent permitted by law.
- B. When an Institution or other titleholder licenses Intellectual Property to another party for commercialization, it shall (i) include provisions in the license agreement obligating the licensee to commercialize the Intellectual Property in a diligent manner and meet appropriate diligence requirements and concrete development milestones to avoid the license terminating, and (ii) monitor performance of the licensee relative to these requirements and milestones. The Institution or other titleholder, or its designee, or licensee shall take commercially reasonable steps to bring the Intellectual Property to practical or commercial application in a reasonable time period (based on type of Intellectual Property) after issuance of a patent or other clear determination of commercial value. If the Institution or other titleholder, or its designee, or licensee, has not taken commercially reasonable steps and cannot show reasonable cause why it should retain title to and all rights in the administration of the Intellectual Property for a further period of time, then, if no other parties have superior legal rights, the Institution or other titleholder and the AHA shall determine a course of action including but not limited to:
  - the Institution or other titleholder's renegotiation of milestones with the current licensee or termination of the current license and licensing of the Intellectual Property to another licensee;
  - a non-exclusive right to the Institution or other titleholder to practice the Intellectual Property for any non-commercial purpose;
  - a global, exclusive or non-exclusive, non-revertible, royalty-free license to the AHA;
  - the provision to the AHA of any additional materials necessary for regulatory filing and the technology's enablement that might be in the possession or control of the Institution or other titleholder, except for intellectual property that was not generated as a result of the AHA's Award; or
  - any other action appropriate in the circumstances.

C. Institution, Inventor, and AHA shall promptly notify the other of any suspected infringement, misappropriation, misuse, theft or breach of confidence regarding any intellectual property rights related to any Intellectual Property when detected and shall cooperate in good faith to determine the appropriate action needed.

#### V. ECONOMIC RIGHTS AND APPORTIONMENT

- . Notwithstanding any other provision of this Policy, the AHA shall participate in the income derived from Intellectual Property as set forth below.
- A. The Institution's technology transfer officer (or equivalent) shall provide AHA with an annual report for each Award, including Intellectual Property. The annual report is due by January 31 of each calendar year after an Award has been accepted by the Institution. The annual reports shall continue for three (3) years after the expiration and/or termination of the Award. The annual report shall include a listing or description of the following information about Intellectual Property for each Award:
  - All issued patents and pending patent applications;
  - All licenses, leases, sales or other revenue generating agreements;
  - All Gross Income and Net Income for each preceding calendar year;
  - The filing, publication and issuance or grant of any application for a patent or other statutory right for Intellectual Property; and
  - The latest stage of development of any product arising from Intellectual Property.
- B. Institution shall pay all costs and expenses incidental to all applications for patents or other statutory rights and all patents and other statutory rights that issue thereon.
- C. Institution shall pay the AHA annually a percentage of the Net Income derived from Intellectual Property conceived or reduced to practice in the performance or as a result of an Award, regardless of the amount of Net Income actually received, equal to AHA's portion of support (expressed as a percentage) for the work or research giving rise to the Intellectual Property. In no event shall the application of the foregoing result in either AHA or Institution receiving less than 10% of Net Income.
- D. Payments under Section V.D. shall be made on an annual basis by January 31 of the year after the calendar year that Net Income was derived. If the Institution is unable to make payment by January 31 for any calendar year in which Net Income was derived, Institution shall inform the AHA at least seven (7) days prior to missing a payment. If such prior notification is made timely, Institution shall have a grace period of 90 days to make the missed payment. Failure to make payment after the 90-day grace period will be deemed a breach of the applicable Award Agreement. The AHA shall have the right to audit, at the AHA's expense, the Institution's books and records related to any Award annually upon reasonable advance notice.

#### (End of Exhibit D)

#### Developing and Testing Drone-Delivered AEDs for Cardiac Arrests In Rural America Grant Duration: 7/1/2023-6/30/2027 AHA Grant Number: 23HERNPRH1150361 Duke IRB Protocol Number: Pro00113925

#### 27 March 2024 V1.3

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# 1. Background and Significance

The greatest chance for OHCA survival occurs when the event is witnessed, the initial heart rhythm is "shockable" (i.e., ventricular fibrillation or pulseless ventricular tachycardia), and a defibrillation shock is provided rapidly by a rescuer. Studies in airplanes and casinos, where AEDs can be applied within 4 minutes of an arrest, have shown survival rates of 40-53% for those with an initial rhythm of ventricular fibrillation.<sup>1,2</sup> Unfortunately, every minute that elapses after OHCA onset decreases the odds of survival by 10%.<sup>3</sup> Despite the clear effectiveness of early AED use, they are applied by bystanders in only 0.7-4.5% of cases.<sup>4,5</sup> By the time first responders and/or EMS personnel arrive (median 8 minutes), over 80% of OHCA patients have already sustained so much anoxic brain and other organ damage that they are extremely unlikely to benefit from any resuscitation attempts. This problem is compounded in rural communities where the median response time for the first arriving unit to the curb is 14 minutes, with several more minutes likely required to reach the patient and initiate treatment.<sup>6</sup>

There have only been a handful of studies examining treatment and outcomes of OHCA in rural regions in the US.<sup>6-9</sup> Rural areas generally have longer response time intervals and lower survival to discharge rates for OHCA compared with urban areas.<sup>8,9</sup> Rural counties are also associated with less CPR training compared with urban counties.<sup>10</sup> The largest study to date used Cardiac Arrest Registry Data to Enhance Survival (CARES) registry data on over 325,000 adult OHCAs from 2013 to 2019 to examine this issue in various geographic area types using Rural-Urban Commuting Area (RUCA) codes (i.e., urban, suburban, large rural town, small town, or rural).<sup>6</sup> The investigators found that median EMS arrival times were twice as long in rural areas compared to urban areas (14.0 vs. 7.1 minutes), and survival rates were lower (6.1% vs. 8.1%). Despite longer response times and lower survival, rural areas also reported higher rates of witnessed arrest (52.7% vs. 42.8%) and shockable rhythm upon EMS arrival (24.2% vs. 20.9%). However, these rates are likely artificially inflated because OHCAs in which victims are declared dead on EMS arrival are excluded from the CARES registry- a scenario more likely in rural regions. AED application (2.3% vs. 2.4%) was comparable in urban and rural regions.

Without the ability to get an AED to the scene for faster intervention, survival is not likely to change substantially. Using drones has great potential to rapidly increase the delivery of AEDs to bystanders in an OHCA. A growing base of evidence from mathematical models and simulations demonstrates the promise of this technology.<sup>5,11-15</sup> One recent case demonstrated real-world evidence of successful bystander defibrillation of an OHCA victim with resultant neurologically-intact survival using a drone-delivered AED before EMS arrival.<sup>16</sup> Several simulation studies have demonstrated drones' ability to arrive ahead of EMS. In 2017, Claessen and colleagues reported a median AED arrival time of 5.4 minutes for drones and 22.0 minutes for EMS based on 18 drone deployment runs to locations of historical OHCAs, representing a 16.6-minute improvement in median AED arrival. <sup>17</sup> Swedish investigators recently reported the arrival of drones to the scene ahead of EMS in 64% of cases.<sup>18</sup> Interviews with research participants involved in simulated drone AED delivery have demonstrated a willingness to accept and use drone technology.<sup>19,20</sup>

Despite intense commercial interest in drone technology, no efforts exist beyond small-scale pilot programs in the US because of complex FAA regulations that have limited beyond visual line of sight (BVLOS) operations needed for most proposed drone programs. <sup>21</sup> **Outside of the complex restrictions on the commercial and civilian use of drones in BVLOS operations, the FAA has streamlined regulations for public safety institutions to operate drones.** A public safety entity can be approved to operate under a set of rules called Public Aircraft Operation (PAO). Under PAO rules, government entities can operate drones in the national airspace without complying with the same regulations and requirements as civilian drone operators under 14 CFR Part 107 (Part 107). To subsequently become a DFR program, a series of authorization requests are submitted to FAA for approval that will allow first responders to operate BVLOS and over people or vehicles within the entire county. Given the complexity of the regulations, currently, only 11 programs in the US have

# approvals for DFR program status. **Expanding the infrastructure of these established programs** to deliver life-saving treatments in a healthcare crisis, such as OHCA, is the next step.

To our knowledge, routine drone delivery of AEDs to OHCA has never occurred in the US despite ongoing commercial investment in this concept. The work proposed in this application will allow the first US-based use of drone systems to deliver AEDs to the scene of OHCA rapidly enough to improve the likelihood of successful resuscitation. This proof-of-concept work can shift the national conversation from "should we" to "how can we" build emergency healthcare drone systems that can

deploy life-saving therapies to people in medical crisis, particularly in vulnerable communities such as rural residents. Our project will provide additional evidence to lead the development of such systems in diverse geographical areas in partnership with federal, regional, and local government stakeholders. We will also gain critical information from bystanders who interact with our systems that can be used to refine and improve design concepts and operations. See Figure 1 for overview of DFR-AED Program.





# 2. Hypothesis and Objectives

The overall goal of this project is to design, develop, and pilot test an emergency healthcare drone delivery system suitable for rural communities that can deliver AEDs to OHCA locations more rapidly than can be achieved with current first responder and EMS systems. Our goal is to determine whether this method of AED delivery can be achieved rapidly enough to justify a future clinical trial directly testing its ability to improve OHCA survival. To achieve this goal, we will address three Specific Aims.

**Specific Aim 1:** Define options for emergency healthcare drone station configurations best suited for rural communities and use these findings to help design future drone AED delivery programs in rural communities.

<u>Subaim 1a.</u> Define current treatment patterns and outcomes of OHCA in rural versus urban regions.

<u>Subaim 1b.</u> Develop an optimization model to examine the effectiveness of different options for placement of both static (public) and dynamic (drone delivered) AEDs in rural communities.

**Specific Aim 2:** Building upon Federal Aviation Administration (FAA) approved drone-as-first responder (DFR) programs in two urban United States (US) regions, we will develop procedural and operational infrastructure for drone AED delivery that can be adapted to rural communities.

**Specific Aim 3:** Pilot test the safety and effectiveness of emergency drone AED delivery models in 2 urban and 4 rural communities in Forsyth County, NC and James City County, VA.

<u>Subaim 3a</u>. Test the ability of the DFR-AED program to travel to the location of suspected OHCAs and arrive ahead of EMS.

<u>Subaim 3b.</u> Test the ability of the DFR-AED program to deliver AEDs (without interrupting bystanders) to sites of suspected OHCA.

<u>Subaim 3c.</u> Building upon subaims 3a and 3b, test the ability of DFR-AED program to deliver an AED and treat an OHCA patient suspected cardiac arrests.

<u>Subaim 3d.</u> Given the sparse populations in rural areas and the low number of OHCAs per year, we will also carry out simulated OHCA alerts and test the ability of the DFR-AED program to deliver AEDs to a simulated OHCA scene ahead of EMS or first responders.

# 3. Study Plan

### 3.1 Aim 1 – Subaim 1a

Aim 1: Define options for emergency healthcare drone station configurations best suited for rural communities and use these findings to help design future drone AED delivery programs in rural communities.

<u>Subaim 1a.</u> Define current treatment patterns and outcomes of OHCA in rural versus urban regions.

#### 3.1.2 Study Population

The CARES data for United States is maintained by Emory University. Our study population will include all OHCAs from the CARES registry over a 11-year period (2012-2022) with an OHCA treated by emergency medical professionals.

#### 3.1.3 Data Sources

The CARES registry is a voluntary, prospective *quality improvement* registry of patients with cardiac arrest in the U.S., established by the Centers for Disease Control and Prevention and Emory University for public health surveillance and continuous quality improvement.[1,2] It is the major national registry of unselected patients with cardiac arrest in the U.S. All adult patients with a confirmed non-traumatic cardiac arrest (defined as not breathing and unresponsive), even those with termination of resuscitation before hospital arrival, are included in the registry. Data are collected from 911-dispatch centers, EMS agencies, and receiving hospitals, and are entered into the database. Standardized international Utstein definitions for defining clinical variables and outcomes are used to ensure uniformity. The CARES program includes 30 state-based registries and the District of Columbia, with community sites in 16 additional states. CARES represents a catchment area of more than 170 million people or approximately 51% of the US population. To date, the registry has captured over 820,000 records, with more than 2,300 EMS agencies and over 2,500 hospitals participating nationwide.

Table 1. CARES Data Elements

CARES Data Variables for AHA HERN Grant	
Run ID	Response and Treatment Times
Latitude (NC data only)	Time call received at dispatch center
Longitude (NC data only)	Time First Responder dispatched
Age	Time First Responder en route
Gender	Time First Responder arrived at scene
Race/Ethnicity	Time Ambulance dispatched
Medical History	Time Ambulance en route
EMS Agency	Time Ambulance arrived at scene
EMS Agency ID	Time EMS arrived at patient side
Year of Arrest	Time Ambulance left scene
Date of Arrest	Time Ambulance arrived at ED
Fire/First Responder	Census Variables
Destination Hospital ID (randomized)	Tract ID (random, but consistent through data transfers)
Location Type	Median Household Income
Arrest Witness Status	Median age- male
Presumed Cardiac Arrest Etiology	Median age- female
Resuscitation Attempted by 911 Responder	Percent male
Who Initiated CPR	Population 25 years and over
Type of Bystander CPR Provided	High School Diploma or higher
Were Dispatcher CPR Instructions Provided	Average household size
Was an AED Applied Prior to EMS Arrival	Unemployment rate
Who First Applied the AFD	Percent below poverty level
Who First Defibrillated the Patient	Population density (per square mile)
Did 911 Responder Perform CPR	Primary Rural Urban Continuum Code
First Arrest Rhythm of Patient	Secondary Rural Urban Continuum Code
Sustained ROSC	Land Area (so miles)
Was Hypothermia Care Provided in the Field	Total Population Linhan/Rural
End of Event	Lirban- Inside Lirbanized areas
When Did Sustained ROSC First Occur	Urban- Inside urban clusters
Estimated time of arrest	Rural
Time of 1st CPR	Hispanic Ethnicity
Time of 1st defibrillatory shock	Race
Time of sustained ROSC	White
Time resuscitation terminated	Black
Mechanical CPR device used	American Indian and Alacka Native
Automated CDR feedback device used	
Advanced ainway successfully placed in the field	Native Hawaiian and Other Pacific Islander
TD used	Some other race
Were drugs administered	
Vascular access	Other Variables outside of 2022 CARES Data Dictionary
Vasculai access	Arrest after Arrival of 011
	When was hungthermia care initiated
STEIVII ER Outcome	STEMU location
Was hungthermin care/TTM initiated or continued in the bestite!	Original Emergency Ream
Was hypothermia care/ i fivi initiated of continued in the hospital	Transfer to Hernital ID
Discharge from the Versitel	Harrital Section Status
Neurological Outcome at Discharge from Hespital	Transferred Hernital Section
Why was hypothermia care/TTM not initiated as continued in the beselted	Suprived to Hernital Discharge
winy was nypothermid care/ r nin not initiated or continued in the nospital	Dationst made DNR Outcome
Was the final diagnesis pauto museositiat infantian	
Coronany Angiography performed	
Coronary Angiography performed	
was a carolac stent placed	
CABO performed	
was an ICD placed and/or scheduled	

#### 3.1.4 Study Design

We will use the *de-identified* national CARES registry of all non-traumatic OHCAs from 2012-2022 to examine EMS agency treatment and performance in rural versus urban regions across the US. We will define rural according to the Office of Management and Budget definition, with any county with a metro area or urban core of 50,000 or more people defined as urban; both micro rural areas (population 10,000-50,000) and counties outside of metro or micro rural areas will be defined as rural. For the analysis, we will divide counties into metro (urban), micro rural, and rural counties. We will use hierarchical regression models where OHCAs are nested within EMS agencies to examine the association of rurality with OHCA outcomes. We will examine the relative contribution of demographics and OHCA characteristics, bystander CPR and AED application, first responder and EMS treatments, and county demographic makeup towards variability in treatment and outcomes across the urban-rural continuum.

#### 3.1.5 Study Endpoints and Data Generated

#### A. Bystander Treatment

- a. Bystander CPR
- b. Bystander AED Application
- c. Bystander Defibrillation
- B. First Responder Treatment
  - a. First Responder CPR
  - b. First Responder AED Application
  - c. First Responder Response Times
- C. EMS Response Times
- D. Survival to Hospital Discharge

#### 3.1.6 Study Locations

N/A - CARES registry data includes consecutive cardiac arrest data from more than 30 states and 16 communities in the US.

#### 3.1.7 Study Procedures

*Inclusion:* All patients 18 years of age or older who suffer cardiac arrest before arrival of a 911responder of non-traumatic cause, including patients who receive an AED shock by a bystander prior to the arrival of 911 responders.

Exclusion: Patients in the CARES registry who have a traumatic cause of cardiac arrest.

#### 3.1.8 Subject Recruitment and Screening

Subaim 1a involves secondary data set from the CARES registry. No recruitment will take place.

#### 3.1.9 Data Analysis

See Study Design section above

#### **Ethical Considerations**

#### Study Procedures, Materials, and Risk

There are no major risks for this observational research in Subaim 1. Data are considered deidentified, although dates of OHCA admission and discharge are included in this registry. Any confidentiality risk will be mitigated by requesting the minimum necessary identifiable data elements to conduct our research. Researchers are requesting a waiver of informed consent and waiver of HIPAA authorization. Rationales for this include: 1) CARES registry is a quality improvement registry with waiver of HIPAA authorization and informed consent for its data collection. Registry data are kept on a secure server behind a firewall and all analytic output will be saved to a protected DCRI shared drive folder and firewall R:\RESTORe-CARE.8569.

#### Protections against risk

All data will be saved to the DCRI firewall protected shared drive. All analyses will take place at the Duke Clinical Research Institute with data saved to the DCRI protected drive.

#### Benefits to Society

There will be no direct benefit to subjects, but the study is likely to yield generalizable knowledge about rural care of OHCA in the United States.

#### CARES Data Transfer Process

Given there is no directly identifiable date for Aim 1a, the standard process is for the Emory Team to prepare an aggregated CARES dataset and to send this dataset directly to the Duke Clinical Research Institute. The national dataset has more than 1,000,000 records since 2012. The maximum number of patient records is expected to be 1,000,000. The data dictionary and dataset will be sent through Duke Box. Additionally, the excel file is password protected.

#### 3.2 Aim 1 – Subaim 1b

<u>Subaim 1b</u>. Develop an optimization model to examine the effectiveness of different options for placement of both static (public) and dynamic (drone delivered) AEDs in rural communities.

#### 3.2.1 Study Population

The CARES data for United States is maintained by Emory University. Our study population will include OHCAs between 2012-22 from participating EMS agencies in North Carolina.

#### 3.2.2 Data Sources

<u>NC CARES Registry</u>- We will use identifiable locations (latitude and longitude) for each cardiac arrest in a participating county in North Carolina from 2012-22. All variables in Table 1 will be provided, along with additional variables of latitude and longitudinal coordinates for each cardiac arrest.

<u>Candidate drone stations</u>- We will use the USGS National Structures Dataset to identify all fire stations and ambulance stations 911 facilities, hospitals, and colleges/universities in NC.<sup>22</sup> Candidate location addresses will be geocoded and assigned a latitude and longitude coordinate. These data will be obtained and geocoded for use in our analysis. These data include a drone's expected vertical and horizontal acceleration and deceleration, maximum flying height and speed, take-off and landing time intervals. *EMS performance intervals* will be obtained from the CARES registry and include EMS and first responder dispatch times, arrival times to the curb at the call's location, first responder (police and fire), and EMS defibrillation times. *Cardiac arrest locations* will be determined from the CARES registry and will be geocoded along with candidate drone station data.

<u>Data Axel Business Dataset for North Carolina</u>- Database of businesses throughout NC. Rich registry that provides address, type of business, employee size, etc. This database will be used to geocode all businesses to consider prospective candidates for drone bases (coffee shops, large consumer businesses, industrial companies, grocery stores in community, post-offices, etc).

<u>North Carolina Office of EMS AED Registry-</u> Reporting of AEDs to this office by AED distributors is required in the state of North Carolina.

#### 3.2.3 Study Design

We will use the *identifiable* North Carolina State CARES registry of all non-traumatic OHCAs from 2013-22 to examine EMS agency treatment and performance in rural versus urban regions across the US. We will adapt previously validated drone optimization methodology developed by Chan and

colleagues<sup>11</sup> and used in our NC drone AED optimization study (under review), as well as prior static AED optimization modeling,<sup>25 26</sup> to create new drone-AED models designed to improve 7-minute AED arrival coverage to greater than 50% in rural regions. We target 7-minute AED arrival to close the gap between historical rural and urban response times, as historical median AED arrival is 7 minutes in urban areas.<sup>8</sup> Importantly, our models will also incorporate static AED placement to treat both OHCAs occurring in public and private rural settings, such as through public access AEDs in temperature-controlled boxes that are prominently placed in densely populated rural developments or outside of public establishments (e.g., churches, popular retail or service businesses) for quick retrieval by bystanders or first responders. Prior research has demonstrated that OHCAs occurring within 1.5 miles of a fire station have improved survival to discharge following first responder defibrillation compared with EMS defibrillation.<sup>27</sup> As a result, we will develop optimization models that do not require constraining drone bases to placement at public safety entities (i.e., fire, EMS) when drone AED delivery is unlikely to further improve response times.<sup>8</sup>

We will integrate the Maximal Coverage Location Program (MCLP) for static AEDs<sup>28 29</sup> with our previous models that optimized drone locations to maximize the likelihood of AED arrival within 7 minutes for nearby OHCAs. We will compare integrated optimization models with independent interventions (optimized static AED placement, optimized drone placement) and conduct sensitivity analyses on the number of AEDs or drones placed as well as varied targeted response times (e.g., 5 vs. 7 minutes).

Our models will use the NC CARES registry data, as described earlier.<sup>30</sup> All cases are geocoded to determine exact location of OHCA. To receive *identifiable* CARES data to Duke, we are required to receive approval from each NC EMS agency (n=52). We have experience with this process and will pursue approvals prior to a funding decision to allow time needed for multilevel county reviews. Second, we will obtain location data on all businesses across NC from the Data Axel database, a national registry of US businesses that maintains business characteristics, address and contact information, and business size/operations. Third, we will obtain available data on known static AEDs from the NC Office of EMS, as vendors are required to report AED purchases to the State.

These analyses will be conducted by investigators at the University of Toronto. Given sensitive data, we will utilize the Duke Protected Analytic Computing Environment, allowing them to access identifiable data stored behind a Duke firewall. This approach will minimize risks associated with using identifiable data for our research.

#### 3.2.4 Study Endpoints and Data Generated

- A. Number and locations of drone stations
- B. Number of drones within candidate drone station needed for coverage across NC.
- C. Median Response Time, mins of historical versus drone + FR intervention
- D. Response Times < 5 mins, %, historical versus drone + FR intervention
- E. OHCAs with Improved Response Time After Intervention 1, %, historical versus drone + FR intervention
- F. Median # of drones placed, n, historical versus drone + FR intervention.

#### 3.2.5 Study Locations

N/A-NC CARES Registry Data will include 54 counties. See Table 2 for list of counties.

Table 2: EMS Agencies Participating in the Drone AED Study, Arranged by RACE-CARS Assignment and Rural Urban Determination

RACE-CARS Intervention	RACE-CARS Control	Other Counties
Counties	Counties	Other Counties
1) Buncombe (urban)	27) Anson ( (rural)	45) Alleghany (rural)
2) Cabarrus (urban)	28) Brunswick (rural)	46) Ashe (rural)
3) Chatham (First Health) (urban)	29) Caldwell (urban)	47) Bladen (rural)
4) Cleveland (rural)	30) Craven (urban)	48) Catawba (urban)
5) Cumberland (urban)	31) Davie (urban)	49) Dare (rural)
6) Currituck (rural)	32) Durham (urban)	50) Harnett (rural)
7) Davidson (urban)	33) Guilford (rural)	51) Henderson (urban)
8) Forsyth (urban)	34) Iredell (urban)	52) Johnston (urban)
9) Franklin (rural)	35) Lenoir (rural)	53) Watauga (rural)
10) Lincoln (rural)	36) New Hanover (rural)	54) Wilkes (rural)
11) Madison (rural)	37) Pasquotank (rural)	
12) McDowell (rural)	38) Pitt (urban)	
13) Mecklenburg (urban)	39) Randolph (rural)	
14) Mitchell (rural)	40) Sampson (rural)	
15) Montgomery (First Health)	41) Stokes (urban)	
16) Moore (rural)	42) Surry (rural)	
17) Nash (urban)	43) Union (rural)	
18) Onslow (urban)	44) Wake (Urban)	
19) Orange (urban)		
20) Person (rural)		
21) Richmond (First Health) (rural)		
22) Robeson (rural)		
23) Rowan (rural)		
24) Scotland (rural)		
25) Stanly (rural)		
26) Warren (rural)		

#### 3.2.6 Study Procedures

*Inclusion:* All patients 18 years of age or older who suffer cardiac arrest before arrival of a 911responder of non-traumatic cause, including patients who receive an AED shock by a bystander before the arrival of 911 responders.

*Exclusion:* Patients in the CARES registry who have a traumatic cause of cardiac arrest.

#### 3.2.7 Subject Recruitment and Screening

Subaim 1b involves secondary data set from the CARES registry. No recruitment will take place.

#### 3.2.8 Data Analysis

See Study Design section above.

#### 3.2.9 Ethical Considerations

#### Study Procedures, Materials, and Risk

Aim 1 will combine several datasets, including an out-of-hospital cardiac arrest patient registry (CARES), drone performance data, and several non-patient datasets (AED registry, etc) as described above. We will use a statistical model to create a drone-automated external defibrillator network in North Carolina. The study will determine the number of drone stations and number of drones at each station to treat historical cardiac arrests based on location of arrest and first responder/EMS response time intervals. Cardiac arrest data from the CARES registry will be utilized to calculate estimated drone lift out and lower times as well as flight times from a base to each cardiac arrest site.

There are no major risks for this observational research in Aims 1. The main risks include privacy and loss of confidentiality at the EMS and individual patient level given data will include geographic information (geographic latitude and longitudinal coordinates and address of cardiac arrest if information can't be geocoded). Risk will be mitigated by requesting the minimum necessary identifiable data elements for our research. Researchers are requesting a waiver of informed consent and a waiver of HIPAA authorization. The rationale for this is that 1) the CARES registry is a quality improvement registry with a waiver of HIPAA authorization and informed consent for its data collection, and 2) without this waiver our research would not be possible.

#### Informed Consent and HIPAA Authorization

For this study, we will use the CARES registry and other non-patient data sources (Census, USGS data). Currently, the state of NC participates in the Cardiac Arrest Registry to Enhance Survival (CARES). The CARES registry is a quality improvement registry of patients with cardiac arrest in the US, established by the Centers for Disease Control and Prevention and Emory University for public health surveillance and continuous quality improvement.<sup>31,32</sup> For each cardiac arrest event, 911 call center data, EMS data, and hospital system data are collected and entered into a secure, confidential database, in accordance with HIPAA standards.<sup>33</sup> In addition to these treatment variables, we will obtain geocoded data to geospatially map cardiac arrests and determine drone flight times to historical arrest locations. As mentioned above, we have requested a waiver of HIPAA authorization and informed consent to utilize CARES registry data. Without these waivers, our research would not be possible.

#### Risks

Risk is limited to a potential breach of confidentiality for CARES data. Risk will be mitigated by requesting the minimum necessary identifiable data elements for our research. Registry data are kept on a secure server behind a firewall, all data analyses will be saved to a protected DCRI shared drive folder and firewall (\\plutonium.dcri.duke.net\D4N) (p:) and \\tungsten\projects (T):D4N DDAN OPTIMIZE). All analyses with the University of Toronto will be conducted in the PACE environment, which is described below. For the preparation and geocoding of data, analyses were conducted in ArcGIS and stored behind the DCRI firewall.

#### Protections against risk

The main risks include the potential loss of confidentiality given that data will include geographic information (geographic latitude and longitudinal coordinates). To deal with this risk, we will obtain data use agreements from each county to utilize a limited CARES dataset (which includes these limited identifiers). The linked CARES dataset will be stored behind a secure firewall at the DCRI. All data will be saved to the DCRI firewall-protected shared drive (R:\RESTORe-CARE.8569). There are

specially assigned laptops designated for Dr. Starks to handle the preparation of geocoded data for this project securely. Dr. Chan and his team will conduct analyses in the PACE environment.

PACE is a highly protected virtual network space that serves as a marketplace where approved users can work with identifiable protected health information. PACE simplifies the effort of obtaining EHR (Electronic Health Record) data from Duke Health enterprise data warehouse and Duke's Maestro Care (Epic) EHR system, while supporting collaborators worldwide with approved NetIDs. The marketplace offers a rich set of tools, services, and resources required by research and quality initiatives. Within the protected enclave, PACE users are provided the ability to select operating systems, analytic tools (e.g., R, SAS, Python), services (e.g. an Honest Broker or Transfer Agent service to release data outside of PACE securely), compute and data sources (e.g. Microsoft Azure, Exadata, OIT GPU, DEDUCE).

#### Benefits to Society

There will be no direct benefit to subjects, but the study is likely to yield generalizable knowledge about drone delivery of AEDs that could save lives in the future for EMS systems adopted this approach.

#### 3.2.10 CARES Data Transfer Process

Emory will send fully audited and geocoded datasets to DCRI as formal analytic datasets. The data will be identifiable and will include geocoded coordinates (latitude and longitude). Name and DOB will be removed from the data and only the statistical team will have access to the identifiable dataset. The data dictionary and dataset will be sent through Duke Box. Data Use Agreements (DUAs) will be signed with each county to include language that allows the county-level audited data to be sent directly to DCRI from Emory. The DUAs will list all the variables that will be sent from Emory to DCRI, only the variables listed in the DUA will be sent to DCRI. The maximum number of patient records for the NC county-level data is expected to be 100,000. Duke investigators will use the data to conduct research analyses to the development of a drone network in North Carolina. Data from analyses will be published in aggregate and will not identify patients or EMS agencies.

#### 3.3 Aim 2

<u>Aim 2</u>: Building upon Federal Aviation Administration (FAA) approved drone-as-first responder (DFR) programs in two urban United States (US) regions, we will develop procedural and operational infrastructure for drone AED delivery that can be adapted to rural communities.

#### 3.3.1 Study Plan

The primary objective of this work will be to demonstrate that drone AED delivery can be integrated effectively into existing FAA-approved drone-as-first responder programs. There are currently estimated to be 11 DFR programs in the US that have received FAA approval to fly drones beyond visual line of sight for public health emergencies. One of these programs, located in Forsyth County, NC is participating in our research program. Another program in James City County, VA is pursuing FAA approval to formalize its DFR program. We will build upon these existing DFR programs to design and develop a working drone AED delivery system. We will implement programs in one urban and two rural towns in each county (n=6). Working with public safety, EMS leadership, and community leadership in these counties, we expect an iterative design process that may involve some adaptations and updating of the optimization modeling work from Specific Aim 1. In years 1-2, we will develop and test key components of drone AED delivery integrated into current first responder and EMS systems. In years 2-4, we will pilot test these rural drone AED delivery systems (Specific Aim 3). For Specific Aim 2, we will develop policies and procedures for the integration of drone operations into the 911-dispatch OHCA response process.

Process Development Participants:

- EMS Leadership
- Sheriff and Police Leadership
- Emergency Communications (911 dispatch)
- Community Leaders
- Federal Aviation Administration
- Drone Pilots
- EMS paramedics
- Community Members

#### Participating Counties

- Forsyth County, NC: We have received public safety leadership approval to integrate AED delivery for OHCA into their established DFR program. Forsyth County is the first FAA-approved DFR program in NC. In October 2022, the 9-1-1 drone responder program was established in Clemmons, a suburb of Forsyth County. The Sheriff's Department has invested over \$570,000 through local government and non-profit funding to establish the Forsyth DFR program and its operations. The pilot DFR program currently has six drone pilots and operates from 8 am-5 pm five days a week. To date, the program has had over 300 successful missions (96% success) to calls needing immediate attention.<sup>34</sup> The median time to drone arrival in their DFR program is 3 minutes or less, and their drones have arrived at the mission scenes ahead of police or fire in 100% of cases. With sheriff and EMS leadership, we will explore additional placement of two drone bases for combined public safety use and AED delivery within the following rural regions in Forsyth County: Belews Creek (124 pop/sq mi, 93.3% rural pop); Walker-Town (152.7 pop/sq mi, 85.5% rural pop), Old Richmond (207.5 pop/sq mi, 66.5% rural pop), and Broadbay (306 pop/sq mi, 53% rural pop).
- James City County, VA: Police and fire departments have established an FAA-approved, police-piloted drone surveillance program. County police and fire/EMS leaders have enthusiastically committed to taking the next regulatory step by working with HoveCon and our Duke/VCU research team to gain FAA approval for upgrading their system to DFR status and add drone AED delivery once necessary FAA certifications are in place. HoveCon anticipates FAA approval can be achieved in 3-6 months.

#### 3.3.2 Study Design

#### Drone AED Integration into First Responder/EMS Systems

For this integration work, we will develop and test key policies for 1) 9-1-1 dispatch-drone pilot communication and alert for dispatch, 2) optimal communication on drone AED arrival 3) efficient mechanism for drone AED delivery at OHCA scene, 4) bystander-drone-AED interactions, 5) AED retrieval and return to service, and 6) prioritization policies for OHCA calls.

1. 9-1-1 Dispatch, Drone Pilot Dispatch Alert, and Drone Deployment. DFR programs utilize software that allows for more rapid dispatch compared with traditional OHCA response. In Forsyth County, the DFR programs use LIVE911 software, allowing its DFR pilots to hear 9-1-1 calls as the dispatcher receives them. This real-time information allows for dispatch before a formal alert because the software automatically displays the geographical coordinates and location of the caller. This feature allows current DFR programs to consistently arrive at a scene ahead of traditional first responder response. This feature is particularly relevant for rural communities where 9-1-1 is known to take up to 2 minutes to dispatch for OCHA, well beyond recommendations for a 60-second cardiac arrest dispatch goal. We will educate drone pilots on the identification of cardiac arrest and immediate dispatch. The AHA and National Academy of Emergency Dispatch recommend a two-question format for telecommunicators in deciding to initiate Telecommunicator CPR (T-CPR): *Is the person conscious? Is the person* 

*breathing normally*?<sup>35</sup> This will alert drone pilots to identify a suspected cardiac arrest on a 9-1-1 call and launch the AED drone immediately.

- 2. Communication Procedures on Drone AED Arrival. We will conduct listening sessions with public safety leadership (sheriff, drone pilots, 911-dispatch) to adapt previously developed procedures for drone AED communication between drone pilots and 9-1-1 dispatch (see protocols in appendix), including confirmation of successful AED lowering to the ground (drone will descend from 400 ft to under 125 ft, then deliver the AED by a winch to the ground and release it as the bystander is instructed to wait to approach AED until directed by the 9-1-1 dispatcher).<sup>36</sup>
- 3. Efficient Drone AED Delivery Options. We will test two approaches to delivering an AED after a drone has arrived at an OHCA site drone landing or AED delivery by winch (described above) to determine the time required to use each system and which system best minimizes risk to the public, drone, and AED. In previous simulation studies, we landed drones and found that bystanders could safely approach drones and retrieve an AED when supervised by a 9-1-1 telecommunicator. Other studies have also confirmed that this approach is safe.<sup>17,37</sup> Swedish studies have demonstrated the successful ability to use a winching system from an altitude of 100 feet.<sup>18</sup> For this pilot program, we will work with multiple vendors to determine which drone will be suitable to fly up to 60 miles per hour and carry a payload of up to 25lbs. Battery life and flight range will also be considered. The drone must be manufactured in the US. Due to national security concerns, federally funded entities are prohibited from using drones from adversarial nations.
- 4. Bystander, Drone, AED Interaction. We will adapt previously developed procedures for communication between 9-1-1 dispatch and bystanders for maintaining CPR while the AED is enroute, safe AED retrieval, and AED use. The 9-1-1 dispatcher and drone pilot will be integral to ensuring safety of the bystander and safe AED retrieval. High-quality continuous video streaming allows visualization of bystander approach and AED deployment.
- 5. Drone Return to Service and AED Retrieval/Maintenance. After a drone delivers the AED, it will autonomously return to its base, where it undergoes preparation for service return. The drone battery will be replaced upon service return to prepare for its next mission. Across several studies, battery consumption for drone missions ranges from 15-80% for 1.0-8.9 km of travel.<sup>16,17</sup> The AED will be left at the scene for bystander use. We will determine the best approach for AED retrieval and return to service via routine engagement of EMS and public safety leadership in the two counties. We will purchase two AEDs per drone site (n=12 total) to maximize drone availability for OHCA calls.

#### 3.3.3 Data Analysis

This phase of the study will involve intensive implementation research conducted by Drs. Hayden Bosworth and Audrey Blewer. They will utilize a combination of listening sessions, interviews and focus groups to explore effective design and implementation of the drone AED delivery program. Specifically, use a RE-AIM-informed process evaluation using multi-methods to examine implementation barriers and facilitators. They will administer a needs assessment, guided by the Consolidated Framework for Implementation Research (CFIR), to stakeholders (Process Development Participants) in participating counties. As part of this process evaluation, note adaptations will be made throughout implementation. They will use the Stirman et al framework for classifying intervention modifications.<sup>38,39</sup> Adaptations data will help inform the development of the interview guestions asked during the gualitative interviews conducted with leadership and staff of 9-1-1 dispatch operations, police and fire departments, and EMS. Qualitative interviews will be conducted with community members. FAA officials will be interviewed pre- and post-program implementation. We will use rapid qualitative analysis procedures to collect and analyze all qualitative data. Interviews will be conducted by a trained research assistant and will include a note-taker using a structured template. Following each interview, the interviewer and note-taker will debrief to discuss data and emerging concepts. Interviews will be recorded. We will conduct thematic analysis<sup>40</sup> using NVivo (QSR International Pty Ltd) to identify and group related codes. Then, we will use the matrix method
to visualize themes by respondent, and compare and contrast findings.<sup>41,42</sup> After three interviews, we will begin preliminary analyses to refine questions in each interview guide, which will enhance future data collection.<sup>43</sup> Development of codes and themes will be guided *a priori* RE-AIM, domains. Findings will be examined in the context of patient/stakeholder impressions of the intervention and general thoughts on disseminating the intervention. We will assure the validity and reliability of findings and the iterative generation of codes by working closely with the research team.<sup>44</sup>

#### 3.3.4 Ethical Considerations

#### Informed Consent and HIPAA Authorization

We will seek a waiver of informed consent to interview public safety professionals, community leaders, and government officials as discussions will occur in the context of routine and standard practice of care. There is no incrementally increased risk with the process development. Protections against risk

All data will be saved to the DCRI firewall protected shared drive. All analyses will take place at the Duke Clinical Research Institute with data saved to the DCRI protected drive.

#### Benefits to Society

The process of developing procedures to integrate drone AED delivery into standard care procedures for OHCA stand to have tremendous benefit to society. Such a program could potentially reduce the time to defibrillation and improve survival.

#### 3.4 Aim 3

Specific Aim 3: Pilot test the safety and effectiveness of emergency drone AED delivery models in 2 urban and 4 rural communities in Forsyth County, NC and James City County, VA.

Subaims 3a-3c: OHCAs that occur within 2-3 mile radius of each drone base in our 6 test sites in Forsyth County, NC and James City, VA.

Subaim 3d: Community members recruited by research participants to treat a mock cardiac in rural areas in Forsyth County, NC and James City, VA.

#### 3.4.1 Data Sources

- 1. CARES Registry Data (Subaim 3a-3c)
- 2. DFR Drone Software Program (Subaims 3a-3d)
- 3. Simulation Manikin (Subaim 3d)
- 4. RedCap Data Entry for Drone Pilots (All Subaims)
- 5. 911-Dispatch recordings (All Subaims)

We will incrementally collect data on the drone AED delivery process related to drone pilot notification. drone launch, travel, and delivery of AED (All sub aims). These data will be provided by downloading the data from the Drone DFR software (see Table 3). We will link all drone operational data to CARES data on OHCA to examine the impact of the drone AED program on treatment and outcomes (Subaim 3c). Simulation Study (Aim 3d) We will download data from a simulation recorder in Excel format on CPR quality for bystanders (sub aim 3d).

#### 3.4.2 Study Design

Subaim 3a. Test the ability of the DFR-AED program to travel to the location of suspected OHCAs and arrive ahead of EMS. We will test the safety and effectiveness of a fully operational DFR-AED program in rural (n=4) and urban (n=2) regions of Forsyth County, NC and James City County, VA. Starting in the first quarter of year 2, we will test the program in phased experiments. Over a 60-day period, we will test the ability of the DFR-AED program to travel to the location of suspected OHCAs and arrive ahead of EMS. We expect an estimated 12-15 OHCAs across the 6 testing sites during this testing period. Table 1 describes data to be collected. The primary outcome for this sub aim is the

time interval between 9-1-1 law/fire/EMS dispatch of drone arrival versus law/fire/EMS arrival to the OHCA curb.<sup>18</sup> Secondary outcomes include the proportion of cases with drone arrival ahead of EMS. All 9-1-1 computers, drone, AEDs, and manual defibrillators are synchronized to the atomic clock automatically by the hardware and software in the devices. Data elements in Table 1 will be recorded in the CARES registry and drone DFR software (weather and drone time stamps).

Subaim 3b. Test the ability of the DFR-AED program to deliver AEDs (without interrupting bystanders) to sites of suspected OHCA. After 2 successful runs by each drone base from subaim 3a, we will start deploying AEDs using the technique determined to be best suited from Specific Aim 2, and for an additional 10-12 real-time OHCA runs among the 6 sites. We will test the ability of the AED to deploy near the site of the OHCA safely. We will collect data on the proportion of times the AED was successfully deployed, the time from drone arrival on-scene to AED delivery on the ground, and the drone's altitude at the time of AED deployment. We will adapt what we learn from Sub aims 3a and 3b to test the fully functional systems in urban and rural areas in the next phase.

Sub aim 3c. Building upon subaims 3a and 3b, test the ability of DFR-AED program to deliver an AED and treat OHCA patients. Over a 12-month period, we will test fully functional DFR-AED programs at our 6 drone sites. During this time period, we expect up to 70 OHCAs across all the communities. As described in Specific Aim 2, the command center in each county can control up to 3 drones in geographically distinct regions in the county (Figure 1). The primary outcome will be the time interval difference between AED arrival of drones versus law/fire/EMS. Secondary outcomes are as listed in subaim 3a.

Sub aim 3d. Given the sparse populations in rural areas and the low number of OHCAs per year, we will also carry out simulated OHCA alerts and test the ability of the DFR-AED program to deliver AEDs to a simulated OHCA scene ahead of EMS or first responders. We will perform 40 simulations (10 per rural site) during the study period described in Sub aim 3c. We will recruit participants through community and church events, local/social media, and healthcare facilities. Each community member will be compensated \$50 upon completing a cardiac arrest scenario.

Table 3: Data Collection for 911-Drone First Responder and AED Program

OHCA	Drone Operations	Responder
<ul> <li>Date</li> <li>Location of OHCA</li> <li>Demographics of OHCA patient (age, sex, race)</li> <li>Witnessed event</li> <li>Initial rhythm</li> <li>Survival to discharge</li> <li>Survival to discharge with good neurologic function (CPC 1 or 2)</li> </ul>	<ul> <li>Drone flight distance- direct route</li> <li>Drone flight distance- actual route</li> <li>Wind speed</li> <li>Outside temperature and weather conditions</li> <li>Height of drone at time of AED deployment to ground</li> <li>Distance from AED drop to patient/building entrance</li> <li>Time of AED arrival on ground</li> <li>Time of drone AED drop</li> <li>AED drop speed</li> <li>Drone battery power at take-off and at return to base</li> </ul>	<ul> <li>Who first performed CPR</li> <li>Time of AED application</li> <li>Who applied the AED</li> <li>Defibrillation</li> <li>Who defibrillated</li> <li>Demographics of bystander (age, sex, race)</li> </ul>
<u>Dispatch</u>	Simulations Only	<u>Other</u>
<ul> <li>Time of law dispatch and arrival</li> <li>Time of fire dispatch and arrival</li> <li>Time of EMS dispatch and arrival</li> <li>Time of drone dispatch and arrival</li> </ul>	Chest compression rate, depth, fraction, and recoil	<ul> <li>Number of confirmed OHCA</li> <li>Number of 911 deployments during study period</li> <li>Number of cases with 911 and OHCA needed simultaneously</li> <li>Decision when two drone dispatches needed</li> </ul>

#### Planned Enrollment:

Subaim 3a- maximum of 15 OHCAs across 6 sites Subaim 3b- maximum of 15 OHCAs across 6 sites Subaim 3c- minimum of 58 OHCAs across 6 sites Subaim 3d- minimum of 40 simulated OHCAs across 4 rural sites

#### 3.4.3 Data Analysis

Based on expected response time intervals of 8±2 minutes for law/fire/EMS versus 4 minutes for drones, 10 OHCAs are needed to have 90% power to detect at least a 4-minute difference in AED arrival time between drone and traditional first responders or EMS. Secondary outcomes include rates of bystander AED application. We expect bystander AED application to increase from 3% to 30%, and 58 OHCAs (26 with drone-delivered AEDs and 26 with law/fire/EMS AEDs) will be needed to have 80% power to detect this difference. To estimate bystander AED application, we will compare data from OHCAs that occur within the DFR-AED program (operations from 8 am-5 pm) to OHCAs that occur when the DFR-AED program is not active (5pm-8am and on weekends). As a secondary analysis of bystander AED application, we will compare rates historically (2022-2023) to observed rates of bystander AED application during the study period. We will also report on the proportions of initial shockable rhythm, bystander defibrillation, and first responder defibrillation. During this aim, the implementation team will conduct semi-structured phone interviews of bystanders who interacted with the drone and applied the AED, with the goal of interviewing 75% of bystanders.

#### 3.4.4 Ethical Considerations

#### Study Procedures, Materials, and Risk

Subaims 3a and 3b involve drone missions during OHCA, but there is no interaction with OHCA patients, and thus no risk to the victim is posed. All drone flights will occur as a part of the FAAapproved drone first responder UAS program. For Subaim 3c, we will pursue a waiver from informed consent as our study involves no more than minimal risk and could not be practicably carried out without a waiver (as OHCA patients cannot provide consent before the intervention). More importantly, our study is occurring in routine public safety and health operations where first responder surveillance programs have been granted rigorous certifications to fly drones beyond line of sight as specified with the FAA-approved DFR program. Public safety teams routinely operate drones to live stream videos of dangerous situations to increase situational awareness and informed response methods. Additionally, AEDs are routinely used by first responders and bystanders to treat OHCA and are being used according to FDA-approved indications. Our intervention will combine these two public safety interventions to deliver an AED to a site of OHCA to allow bystanders to treat an OHCA. Finally, national and international 9-1-1 protocols require dispatchers to provide "hands only" CPR instructions to a bystander for an OHCA victim while rescuers are enroute. In addition, bystanders are asked if an AED is nearby and, if so, to retrieve it and return to the victim guickly. Once at the victim's side, the 9-1-1 dispatcher provides the bystander step-by-step instructions on using the AED. Thus, there is no incremental risk to our intervention. For Specific Aim 3d involving simulated OHCA alerts, we will consent community participants at the time of enrollment in the study. For the implementation study, we will request the alteration of informed consent to allow verbal telephone consent for interviews and focus groups.

#### Informed Consent and HIPAA Authorization

<u>Aims 3a-3c-</u> As above, we will seek a waiver from informed consent and HIPAA authorization for CARES data collection. The intervention (drone AED delivery) will occur in the context of routine emergency response care, and no OHCA patient will be deprived of the standard of care for the intervention counties. All data collection for OHCA will be reported to CARES, the quality improvement registry, as described above. Drone data will be downloaded from drone programs and linked to CARES registry data.

<u>Aim 3d-</u> We will obtain informed consent for research participants recruited to participate in our drone simulation studies. Benefits and risks will be described (see consent form), and research participants will be offered \$50 to compensate for time.

Risks

Risks associated with our study include anxiety, minor muscle discomfort, financial risks, potential loss of confidentiality, and serious injury from the drone. There is minimal risk associated with performing calling 911, performing CPR, and applying an AED as a part of our research study. Research participants may experience some minor discomfort associated with performing CPR on a manikin. Research participants may also experience some anxiety with performance during the research.

Public safety officials are trained and experts at flying drones for public safety missions. Experienced drone pilots will navigate the drone. The drone will not land, but will use a winch system to deliver the AED from more than 100 ft air. The 9-1-1 operators will not instruct research participants to retrieve the AED until the drone has delivered the AED. It is not expected that any research participant will have any direct interaction with a drone, and thus risk is minimized. In event of drone failure, a parachute is attached that mitigates any injury to people or objects on the ground.

#### Protections Against Risk

*Drone Protections:* Our research program will be embedded within the FAA approved Drone-As-First Responder program. As such, each county will have FAA-certified drone pilots who will operate drones over people and objects, and beyond visual line of sight. To mitigate risk, drones will deliver AEDs by a winch system (from 125 ft in the air). The drone will also be outfitted with a parachute to protect from injury to people and objects on the ground. As such, there will be no drone-human interactions throughout the study.

Loss of Confidentiality Protection: There is the potential risk of loss of confidentiality. The research information will only be viewed by the study personnel and will be stored behind our university's secure firewall and kept only for a specified period of time.

Discomfort or Anxiety: Our research scene and questions may cause anxiety or discomfort. We will ensure research participants understand that research is voluntary and that they can stop participation in the study at any time.

Financial Protection: To offset the time and financial burden of participating in our research, we will reimburse participants for their time. Reimbursement will include a \$50 Duke Clincard.

Plans for Necessary Medical or Professional Intervention: If a medical emergency occurs during the study, emergency medical services will be on-site and will assess the medical problem and may determine that a research participant needs to be taken to the nearest emergency room. Research participants will be advised to contact the Principal Investigators, emergency study contact, or his/her medical provider should an injury occur.

We will advise that medical care is available at the nearest medical facilities, but there is no commitment to provide monetary compensation or free medical care due to a study-related injury.

#### Potential Benefits

Our research may encourage research participants learn about cardiac arrest and CPR. Research participants may be able to treat cardiac arrest after participation in our study adequately. We will minimize the chance of significant physical injury. Additionally, the risks of performing CPR and applying an AED are no greater than the risks expected with the performance of CPR in real life. Thus, the benefits of our study are reasonable in relation to the risk.

#### Costs to Subject

No cost beyond time investment

#### Subject Privacy and Confidentiality

#### Privacy and Confidentiality

Mock Cardiac Arrest Codes- Mock cardiac arrest codes will occur in the community. As such, privacy cannot be protected as research will occur in the context of the community and everyday life. While we cannot ensure that research participants will not be recognized, we will protect any names or other PHI collected on research participants who are a part of our mock cardiac arrest codes. Records and data include, for example, informed consent documents, case report forms or study flow sheets, survey instruments, database or spreadsheets, screening logs or telephone eligibility sheets, web based information gathering tools, audio/video/photo recordings of subjects, labeled specimens, data about subjects, and subject identifiers. Research data of video recordings be kept on DCRI outcomes secure directory.

#### Importance of Knowledge to Be Gained-

Knowledge gained from this research will help us to more accurately estimate the time saved by delivering an AED with a drone compared current emergency responder times in distinct communities.

### 4. Study Limitations

Implementing a drone AED delivery program requires navigating a complex set of regulatory approvals at several levels of government. We have the leadership approvals to integrate drone AED delivery into Forsyth County, NC, and they have funding through government and non-profit support to expand the pilot program throughout Forsyth County. We still have to gain full FAA approval for the DFR in James City County, VA. It may take 3-6 months for necessary approvals, but our timeline allows for up to 9 months. We have two additional NC (Richmond and Stokes) counties on stand-by if James City, VA cannot be a part of the study.

Another potential difficulty is the training required to ensure all six drone sites are collecting time stamps and that data entry into the CARES registry and is complete. We will develop training modules on data collection and reporting, and we will conduct regular data audits to ensure completeness and accuracy. Research coordinators in each state will work with DFR programs to quickly resolve any data issues.

Because of the cost and regulatory approvals needed to establish a drone program, the selection of sites for this study is limited to programs with some infrastructure already in place and regulatory approvals that have been initiated. The generalizability of our study will be limited to communities with the resources to implement and maintain a DFR program. However, as larger numbers of programs throughout the country gain regulatory approval, our project will provide needed evidence that the drone delivery strategy will save lives. As healthcare delivery drones are adapted to respond to other medical emergencies (e.g., anaphylaxis to deliver an EpiPen; Stop-the-Bleed kits for mass casualties/shootings) and technologies improve, we expect economies of scale will lead to decreased costs.

Drone operations will be impacted by weather. Wind gusts of 30 mph or more will prohibit drone travel. However, review of weather patterns over the past 3 years highlights that this is uncommon in the geographic regions we are considering. Further, the Forsyth County DFR program has conducted drone operations in rain and cold weather conditions. We estimate that 10-15% of drone operations may be impacted by weather conditions and have the flexibility to extend enrollment from 12 months to 15 months if needed.

## 5. Safety Monitoring

There will be no Data Safety Monitoring Board (DSMB) for this study. Aims 1 and 2 involve observational data analyses. For Aim 3 we will follow the risk protections as outlined in section 3.4.4.

## 6. Additional Considerations

### 6.1.1 Protocol Amendment History

Affected Section(s)	Summary of Revisions Made	Rationale
3.1.3	Updated Table 1. CARES Data Elements	This list reflects all CARES variables that will be received
3.2.10	Updated CARES data transfer process	Accurately reflects process that will be used to obtain CARES data
3.3.2	Updated this section to include we will work with multiple vendors to determine the exact drone for the study	Drone type will be determined after working with multiple vendors
3.3.3	Included additional description of implementation study	Implementation study to be included in this protocol, rather than a separate protocol
3.3.4	Removed statement regarding separate IRB application Included additional description for implementation study	Implementation study to be included in this protocol, rather than a separate protocol
3.4.3	Added a secondary analysis	To include historic rates to observed rates of bystander AED application

#### Summary of Changes from Previous Version:

#### 6.1.2 Abbreviations

AED	Automated external defibrillator
BVLOS	beyond visual line of sight
CARES	Cardiac Arrest Registry Data to Enhance Survival
CDC	Centers for Disease Control
CPR	cardiopulmonary resuscitation
DFR	Drone First Responder
DSMB	Data Safety Monitoring Board
DUA	Data Use Agreement
EMS	Emergency Medical Services
FAA	Federal Aviation Agency
FR	First Responder
HIPAA	Health Insurance Portability & Accountability Act
MCLP	Maximal Coverage Location Program

OHCA	Out of hospital cardiac arrest
PACE	Protected Analytics Computing Environment
PAO	Public Aircraft Operation
RUCA	Rural-Urban Commuting Area
US	United States
USGS	United States Geological Survey

## 7. References

- 1. Valenzuela TD, Roe DJ, Nichol G, Clark LL, Spaite DW, Hardman RG. Outcomes of rapid defibrillation by security officers after cardiac arrest in casinos. N Engl J Med. Oct 26 2000;343(17):1206-9. doi:10.1056/NEJM200010263431701
- 2. Page RL, Joglar JA, Kowal RC, et al. Use of automated external defibrillators by a U.S. airline. N Engl J Med. Oct 26 2000;343(17):1210-6. doi:10.1056/NEJM200010263431702
- 3. Valenzuela TD, Roe DJ, Cretin S, Spaite DW, Larsen MP. Estimating effectiveness of cardiac arrest interventions: a logistic regression survival model. Circulation. Nov 18 1997;96(10):3308-13. doi:10.1161/01.cir.96.10.3308
- 4. Starks MA, Schmicker RH, Peterson ED, et al. Association of Neighborhood Demographics With Out-of-Hospital Cardiac Arrest Treatment and Outcomes: Where You Live May Matter. JAMA Cardiol. Oct 1 2017;2(10):1110-1118. doi:10.1001/jamacardio.2017.2671
- 5. Pulver A, Wei R, Mann C. Locating AED Enabled Medical Drones to Enhance Cardiac Arrest Response Times. Prehosp Emerg Care. May-Jun 2016;20(3):378-89. doi:10.3109/10903127.2015.1115932
- 6. Grubic N, Peng YP, Walker M, Brooks SC. Bystander-initiated cardiopulmonary resuscitation and automated external defibrillator use after out-of-hospital cardiac arrest: Uncovering disparities in care and survival across the urban-rural spectrum. Resuscitation. Jun 2022;175:150-158. doi:10.1016/j.resuscitation.2022.04.014
- 7. Smith A, Masters S, Ball S, Finn J. The incidence and outcomes of out-of-hospital cardiac arrest in metropolitan versus rural locations: A systematic review and meta-analysis. Resuscitation. Dec 8 2022:109655. doi:10.1016/j.resuscitation.2022.11.021
- 8. Kragholm K, Hansen CM, Dupre ME, et al. Care and outcomes of urban and non-urban out-ofhospital cardiac arrest patients during the HeartRescue Project in Washington state and North Carolina. Resuscitation. Jul 2020;152:5-15. doi:10.1016/j.resuscitation.2020.04.030
- 9. Peters GA, Ordoobadi AJ, Panchal AR, Cash RE. Differences in Out-of-Hospital Cardiac Arrest Management and Outcomes across Urban, Suburban, and Rural Settings. Prehosp Emerg Care. Jan 25 2022:1-8. doi:10.1080/10903127.2021.2018076
- 10. Anderson ML, Cox M, Al-Khatib SM, et al. Rates of cardiopulmonary resuscitation training in the United States. JAMA Intern Med. Feb 1 2014;174(2):194-201. doi:10.1001/jamainternmed.2013.11320
- 11. Boutilier JJ, Brooks SC, Janmohamed A, et al. Optimizing a Drone Network to Deliver Automated External Defibrillators. Circulation. Jun 20 2017;135(25):2454-2465. doi:10.1161/circulationaha.116.026318
- Rees N, Howitt J, Breyley N, Geoghegan P, Powel C. A simulation study of drone delivery of Automated External Defibrillator (AED) in Out of Hospital Cardiac Arrest (OHCA) in the UK. PLoS One. 2021;16(11):e0259555. doi:10.1371/journal.pone.0259555
- 13. Baumgarten MC, Röper J, Hahnenkamp K, Thies KC. Drones delivering automated external defibrillators-Integrating unmanned aerial systems into the chain of survival: A simulation study in rural Germany. Resuscitation. Mar 2022;172:139-145. doi:10.1016/j.resuscitation.2021.12.025
- 14. Rosamond ŴD, Johnson AM, Bogle BM, et al. Drone Delivery of an Automated External Defibrillator. N Engl J Med. Sep 17 2020;383(12):1186-1188. doi:10.1056/NEJMc1915956

- 15. Schierbeck S, Nord A, Svensson L, et al. National coverage of out-of-hospital cardiac arrests using automated external defibrillator-equipped drones A geographical information system analysis. Resuscitation. Jun 2021;163:136-145. doi:10.1016/j.resuscitation.2021.02.040
- Schierbeck S, Svensson L, Claesson A. Use of a Drone-Delivered Automated External Defibrillator in an Out-of-Hospital Cardiac Arrest. N Engl J Med. May 19 2022;386(20):1953-1954. doi:10.1056/NEJMc2200833
- 17. Claesson A, Bäckman A, Ringh M, et al. Time to Delivery of an Automated External Defibrillator Using a Drone for Simulated Out-of-Hospital Cardiac Arrests vs vs. Emergency Medical Services. JAMA. Jun 13 2017;317(22):2332-2334. doi:10.1001/jama.2017.3957
- Schierbeck S, Hollenberg J, Nord A, et al. Automated external defibrillators delivered by drones to patients with suspected out-of-hospital cardiac arrest. Eur Heart J. Aug 26 2021;doi:10.1093/eurheartj/ehab498
- Zègre-Hemsey JK, Grewe ME, Johnson AM, et al. Delivery of Automated External Defibrillators via Drones in Simulated Cardiac Arrest: Users' Experiences and the Human-Drone Interaction. Resuscitation. Dec 2020;157:83-88. doi:10.1016/j.resuscitation.2020.10.006
- 20. Sanfridsson J, Sparrevik J, Hollenberg J, et al. Drone delivery of an automated external defibrillator - a mixed method simulation study of bystander experience. Scand J Trauma Resusc Emerg Med. Apr 8 2019;27(1):40. doi:10.1186/s13049-019-0622-6
- 21. Department of Transportation FAA. Operation and Certification of Small Unmanned Aircraft Systems. Federal Register. Fed Regist. June 28, 2016 2016;Vol. 81, No. 124(14 CFR Parts 21, 43, 45, 47, 61, 91, 101, 107, and 183)
- 22. U.S. Geological Survey Dotl. USGS National Structures Dataset USGS National Map Downloadable Data Collection. https://catalogdatagov/harvest/usgs-national-structuresdataset-nsd-downloadable-data-collection. October 17, 2014;Accessed September 1, 2019.
- 23. U.S. Businesses Database. Accessed 9 November 2021.
- 24. Emergency treatment using automated external defibrillator; immunity. In: Assembly NCG, editor. North Carolina General Statute 90-21152007.
- 25. Sun CLF, Karlsson L, Torp-Pedersen C, et al. In Silico Trial of Optimized Versus Actual Public Defibrillator Locations. J Am Coll Cardiol. Sep 24 2019;74(12):1557-1567. doi:10.1016/j.jacc.2019.06.075
- 26. Chan TC, Li H, Lebovic G, et al. Identifying locations for public access defibrillators using mathematical optimization. Circulation. Apr 30 2013;127(17):1801-9. doi:10.1161/CIRCULATIONAHA.113.001953
- Hansen SM, Hansen CM, Fordyce CB, et al. Association Between Driving Distance From Nearest Fire Station and Survival of Out-of-Hospital Cardiac Arrest. J Am Heart Assoc. Nov 6 2018;7(21):e008771. doi:10.1161/jaha.118.008771
- 28. Church R, ReVelle C. The maximal covering location problem. Springer-Verlag Berlin/Heidelberg; 1974:101-118.
- 29. Chan TC, Li H, Lebovic G, et al. Identifying locations for public access defibrillators using mathematical optimization. Circulation. 2013;127(17):1801-1809.
- 30. McNally B, Stokes A, Crouch A, Kellermann AL, Group CS. CARES: Cardiac Arrest Registry to Enhance Survival. Ann Emerg Med. Nov 2009;54(5):674-683 e2. doi:10.1016/j.annemergmed.2009.03.018
- McNally B, Robb R, Mehta M, et al. Out-of-hospital cardiac arrest surveillance --- Cardiac Arrest Registry to Enhance Survival (CARES), United States, October 1, 2005--December 31, 2010. MMWR Surveill Summ. Jul 29 2011;60(8):1-19. doi:ss6008a1 [pii]
- 32. McNally B, Stokes A, Crouch A, Kellermann AL. CARES: Cardiac Arrest Registry to Enhance Survival. Ann Emerg Med. Nov 2009;54(5):674-683 e2. doi:S0196-0644(09)00280-7 [pii]
- 33. 10.1016/j.annemergmed.2009.03.018
- 34. Girotra S, van Diepen S, Nallamothu BK, et al. Regional Variation in Out-of-Hospital Cardiac Arrest Survival in the United States. Circulation. May 31 2016;133(22):2159-68. doi:10.1161/CIRCULATIONAHA.115.018175

- 35. Messinger S, Warner D, Knight C, et al. The distribution of emergency police dispatch call incident types and priority levels within the police priority dispatch system. Annals of Emergency Dispatch & Response. 2013;1(2):12-17.
- 36. Kurz MC, Bobrow BJ, Buckingham J, et al. Telecommunicator Cardiopulmonary Resuscitation: A Policy Statement From the American Heart Association. Circulation. Mar 24 2020;141(12):e686-e700. doi:10.1161/cir.000000000000744
- 37. Starks MA, Blewer AL, Sharpe E, et al. BYSTANDER PERFORMANCE DURING SIMULATED DRONE DELIVERY OF AN AED FOR MOCK OUT-OF-HOSPITAL CARDIAC ARREST. Conference Abstract. Journal of the American College of Cardiology. 2020;75(11):303. doi:10.1016/S0735-1097(20)30930-X
- Cheskes S, McLeod SL, Nolan M, et al. Improving Access to Automated External Defibrillators in Rural and Remote Settings: A Drone Delivery Feasibility Study. J Am Heart Assoc. Jul 21 2020;9(14):e016687. doi:10.1161/jaha.120.016687
- 39. Stirman SW, Miller CJ, Toder K, Calloway A. Development of a framework and coding system for modifications and adaptations of evidence-based interventions. Implement Sci. Jun 10 2013;8:65. doi:10.1186/1748-5908-8-65
- 40. Zullig LL, McCant F, Silberberg M, Johnson F, Granger BB, Bosworth HB. Changing CHANGE: adaptations of an evidence-based telehealth cardiovascular disease risk reduction intervention. Transl Behav Med. Mar 1 2018;8(2):225-232. doi:10.1093/tbm/ibx030
- 41. Fereday J, Muir-Cochrane E. Demonstrating rigor using thematic analysis: A hybrid approach of inductive and deductive coding and theme development. International journal of qualitative methods. 2006;5(1):80-92.
- 42. Averill JB. Matrix analysis as a complementary analytic strategy in qualitative inquiry. Qual Health Res. 2002;12(6):855-866.
- 43. Gale NK, Heath G, Cameron E, Rashid S, Redwood S. Using the framework method for the analysis of qualitative data in multi-disciplinary health research. BMC Med Res Methodol. 2013;13(1):1-8.
- 44. Sandelowski MJRin, health. Qualitative analysis: What it is and how to begin. 1995;18(4):371-375.
- 45. Creswell JW, Clark VLP. Designing and conducting mixed methods research. Sage publications; 2017.

#### **MEMORANDUM**

DATE:	May 28, 2024
TO:	The Board of Supervisors
FROM:	Alister Perkinson, Parks Administrator
SUBJECT:	Contract Award - \$433,677 - Upper County Park Playground Replacement

A Request for Proposals (RFP) was solicited from qualified firms to provide a turn-key project for furnishing, installing, and site work related to replacing the playground at Upper County Park. The current playground and surfacing require replacement due to the age of equipment and use.

The following qualified firms submitted proposals to be considered for contract award, in these proposals each firm described their past experience, qualifications, project approach and timeline, playground concepts, and cost of total project.

<u>Firms</u>

- 1. All Recreation
- 2. Bliss Products
- 3. Cunningham Recreation
- 4. Kompan
- 5. Miracle Recreation
- 6. Playground Specialists
- 7. Sparks at Play

A Team of staff members from the Parks & Recreation and General Services Departments evaluated each of the proposals and selected one firm, Cunningham Recreation.

Staff recommends approval of the attached resolution awarding a contract to Cunningham Recreation.

AP/ap CA-UCPPlayRpl-mem

Attachments:

- 1. Resolution
- 2. Playground Equipment Layout

#### **<u>RESOLUTION</u>**

#### CONTRACT AWARD - \$433,677 - UPPER COUNTY PARK PLAYGROUND REPLACEMENT

- WHEREAS, a Request for Proposals (RFP) has been advertised and evaluated to replace the playground at Upper County Park; and
- WHEREAS, seven firms submitted proposals and Cunningham Recreation was determined to be the most fully qualified firm that best met James City County Parks & Recreation's needs as defined in the RFP; and
- WHEREAS, previously authorized Capital Improvements Program budget funds are available to fund this project.
- NOW, THEREFORE, BE IT RESOLVED that the Board of Supervisors of James City County, Virginia, hereby authorizes the contract award in the amount of \$433,677 to Cunningham Recreation for the playground replacement at Upper County Park.

Ruth M. Larson Chair, Board of Supervisors

Adopted by the Board of Supervisors of James City County, Virginia, this 28th day of May, 2024.

CA-UCPPlayRpl-res

#### **MEMORANDUM**

DATE:	May 28, 2024
TO:	The Board of Supervisors
FROM:	Shawn A. Gordon, Chief Civil Engineer, Capital Projects
SUBJECT:	Contract Award - \$3,133,991.06 - Architectural Services for the New General Services Headquarters

A Request for Proposals (RFP) was solicited from qualified design firms for Architectural Services for a new General Services Headquarters Building and all associated site improvements. The facility will be designed to accommodate future departmental growth for staffing and support space needs. Consultant services for this proposal include production of detailed designs, construction drawings, specifications, and contract documents to obtain the necessary regulatory approvals for the construction of a new General Services complex on Stadium Road of the Warhill Tract. The delivery method for this project will be the Construction Manager at Risk in accordance with the Virginia Public Procurement Act.

The following 10 design firms submitted sealed RFPs for qualification consideration of contract award:

Firm Name Associated Space Design, Inc. (dba ASD|SKY) Upton and Associates t/a Ballou Justice Upton Architects HBA Architecture & Interior Design, Inc. Moseley Architects, P.C. Perkins&Will, Inc. RRMM Architects, P.C. Stantec Architecture, Inc. Strang, Inc. Tymoff+Moss Architects, P.C. VIA design architects, pc

Three firms were shortlisted based on the evaluation criteria scoring results. These three firms were provided additional project information to develop a proposal based on project understanding with a presentation that included conceptual plans, project team members, experience, and Leadership in Energy and Environmental Design (LEED) experience. The evaluation panel interviewed these firms and VIA design architects, pc was selected as the most responsive and responsible firm to partner with on the new General Services Headquarters project. A Best and Final Offer for these project services was requested from VIA design architects, pc. A base amount of \$2,759,868.91 with a not to exceed amount of \$374,122.15 for additional services was received. The total contract amount for these project services is \$3,133,991.06. The Board approved the funding for these project services in the Fiscal Years 2023 and 2024 Capital budgets.

Staff recommends approval of the attached resolution authorizing the contract award to VIA design architects, pc.

SAG/ap CA-GSHArchSvcs-mem

Attachment

#### <u>RESOLUTION</u>

#### CONTRACT AWARD - \$3,133,991.06 - ARCHITECTURAL SERVICES

#### FOR THE NEW GENERAL SERVICES HEADQUARTERS

- WHEREAS, a Request for Proposals (RFP) was solicited from qualified design firms for the Architectural Services for a new General Services Headquarters Building and all associated site improvements; and
- WHEREAS, ten design firms submitted sealed RFPs for qualification consideration of contract award; and
- WHEREAS, three firms were shortlisted to develop a proposal based on project understanding with a presentation that included conceptual plans, project team members, experience, and Leadership in Energy and Environmental Design (LEED) experience; and
- WHEREAS, the evaluation panel interviewed these firms and VIA design architects, pc was selected as the most responsive and responsible firm to partner with on the new General Services Headquarters project; and
- WHEREAS, the Board approved the funding for these project services in the Fiscal Years 2023 and 2024 Capital budgets.
- NOW, THEREFORE, BE IT RESOLVED that the Board of Supervisors of James City County, Virginia, hereby awards the contract for Architectural Services for a new General Services Headquarters project to VIA design architects, pc and the total contract amount for these project services is \$3,133,991.06

	Ruth M. Larson Chair, Board of Supervisors				_
ATTEST:		VOTE	5		
		AYE	NAY	<u>ABSTAIN</u>	<b>ABSENT</b>
	NULL HIDDI F				
Teresa J. Saeed	MCGI ENNON				
Deputy Clerk to the Board	ICENHOUR				
	LARSON				

Adopted by the Board of Supervisors of James City County, Virginia, this 28th day of May, 2024.

#### CA-GSHArchSvcs-res

#### **MEMORANDUM**

DATE:	May 28, 2024
TO:	The Board of Supervisors
FROM:	Toni E. Small, Director of Stormwater and Resource Protection Division Michael D. Woolson, Section Chief, Stormwater and Resource Protection Division
SUBJECT:	Diascund Creek Watershed Management Plan - Board Adoption

In 1998, James City County began watershed management efforts in response to concerns about rapid development within the County. In James City County, the watershed planning process identifies environmentally sensitive areas and develops specific protection, restoration, and infrastructure retrofit recommendations. This information guides development within the watersheds and identifies prioritized capital projects for the County's Capital Improvement and Maintenance Programs.

Plans for Powhatan (2002, updated 2023), Yarmouth (2003, updated 2023), Mill (2011), Gordon (2011), Ware (2016), and Skimino (2020) Creeks are complete and have been adopted by the Board of Supervisors. Since 1998, staff have continued to work with consultants to update older plans and develop new plans for the remaining watersheds within the County. The Diascund Creek Watershed Management Plan is ready for the Board's consideration and adoption at its May 28, 2024, Business Meeting.

The Diascund Creek Watershed Management Plan is similar to other watershed management plans in that it encourages improved management of the County's resources through development and private property owner incentives. Staff started work on this new plan in 2022, held stakeholder meetings in August 2023 and March 2024, provided an online survey in August and September 2023, a Planning Commission update in April 2024, provided a 30-day public comment period in March and April 2024, and the final plan has been prepared. Diascund Creek has unique challenges and opportunities, and this is reflected in the resulting watershed goals and strategies.

Staff recommends adoption of the attached resolution.

TES/MDW/ap DiascndWMP-mem

Attachment

#### **<u>RESOLUTION</u>**

#### DIASCUND CREEK WATERSHED MANAGEMENT PLAN - BOARD ADOPTION

- WHEREAS, the Diascund Creek is a resource of local and regional significance; and
- WHEREAS, the Board authorized staff to prepare management plans to help the County and landowners protect and restore the watersheds and their natural resources; and
- WHEREAS, stakeholders, staff, and consultants have met over a period of 18 months to share information, set goals, and develop the watershed management plan.
- NOW, THEREFORE, BE IT RESOLVED that the Board of Supervisors of James City County, Virginia, hereby adopts the updated Diascund Creek Watershed Management Plan dated May 2024.

Ruth M. Larson Chair, Board of Supervisors

ATTEST:		VOTES			
		AYE	NAY	ABSTAIN	ABSENT
	NULL				
Teresa I. Saeed	- HIPPLE MCCLENNION				
Deputy Clerk to the Board	MCGLENNON				
Deputy clerk to the Dourd	LARSON				
	LAKSON				

Adopted by the Board of Supervisors of James City County, Virginia, this 28th day of May, 2024.

DiascndWMP-res

## **EXECUTIVE SUMMARY**

### INTRODUCTION

James City County (JCC, "the County") is surrounded on three sides by the James, Chickahominy, and York Rivers. There are several watersheds within the County, which are areas that all drain to a common point of confluence to the surrounding rivers. The Diascund Creek Watershed is located in the northern portion of James City County and is lightly developed, maintaining a large portion in forested and rural conditions. The portion of the Diascund Creek Watershed located within James City County drains west towards Diascund Creek itself, which drains south to the Chickahominy River, then continues to drain south to the James River. The Diascund Creek Watershed limits within James City County stretch from Forge Road to the south and across the I-64 corridor to the north, and spans between the Diascund Creek mainstem to the west and Route 30 & Route 60 to the east.

Unlike many other watersheds within JCC, there is no existing Watershed Management Plan for Diascund Creek. While this makes it more difficult to see trends in development from past to present to future, it is understood that the Diascund Creek Watershed has seen some increased development and associated impacts to the watershed in recent years, but not nearly to the same degree as those closer to Williamsburg, such as the Powhatan Creek Watershed. Development has largely occurred along the Route 60 corridor. This Plan should be considered a foundation and framework for planning and management purposes, with the flexibility to take new information and add, subtract, change, and generally improve the plan and direction as appropriate.

This Executive Summary attempts to distill the Plan into a high-level overview. For detailed information, full-sized graphics, data tables, and more thorough analysis, please see the main body of the Watershed Management Plan report. Sections 1 and 2 cover much of the background, purpose, and findings associated with the desktop and field-level reviews. Sections 3, 4, and 5 describe various recommended actions on how the goals of the Plan could be better achieved and an implementation strategy for future activities. Section 6 summarizes the results and recommendations at the subwatershed-scale.

## PURPOSE AND PROGRESS

The Diascund Creek Watershed has seen some increased development to accommodate a growing population, and the associated impacts of that development on the natural environment. To help balance those impacts, a better understanding of the science behind the interactions between the built environment and natural environments is needed to identify better management techniques and baseline requirements for mitigation and protection. The process of identifying current conditions and the factors that influence them, establishing or revising goals for future conditions, and developing plans and actions to get from the former to the latter is a dynamic process. This Watershed Management Plan is part of that process.

This Plan is meant to work in tandem with other conservation efforts already in progress. The Virginia Stormwater Management Program has evolved and improved, establishing new standards for stormwater



capture and management to protect downstream waterways. The Chesapeake Bay Program has directly and indirectly brought about programs and projects that affect watershed management in the County broadly, and several local and independent initiatives and efforts have been developed in concert with or parallel to these.

Among the drivers for these conservation, preservation, and restoration efforts are:

- Water quality impairments (formal declarations of problems requiring mitigation).
- Environmental impacts from increased urbanization, including the potential for adverse effects to stream habitat quality, fragmentation and development within natural habitat cores and corridors, and associated threats to wildlife (including rare, threatened, and endangered species) and human-wildlife conflicts.
- Increased flood risk due to combination of more intense rainfall events and increased runoff from urbanized lands, and the associated risks with service interruptions, and direct safety risks for residents.
- An established regulatory threshold for bacteria in streams which has been exceeded in several streams within the County. This threshold, a Total Maximum Daily Load (TMDL), is a primary driver for various programs which will be detailed later, but including septic system maintenance programs, pet and wild goose waste management practices, and others.
- Similar regional-scale TMDL thresholds for sediment and nutrient pollution for the entirety of the Chesapeake Bay Watershed, which applies to Diascund Creek.

The ultimate goals of the County are to protect, preserve, and restore to the degree possible, the health of the waterways and natural areas, and to bring its waterways into regulatory compliance with standards set for various pollutants. It is possible not only to minimize or eliminate the negative effects of development of the built environment, but also to reverse some of the damage already done. Viewed holistically, these efforts are not quick, easy, or inexpensive, but they are worthwhile for the health of our community. There are still a wide variety of natural ecosystems throughout the Watershed that both host abundant wildlife and provide much potential recreational value to the residents of the County. Offsetting the negative impacts to these ecosystems can preserve their presence for future generations. This Watershed Management Plan is a complementary report to others aimed at achieving the same and other similar goals.

### **METHODS AND RESULTS**

The methods for developing this Watershed Management Plan included review of earlier material, review of JCC data and efforts in recent years, research on best methods and approaches, and some additional research and data reviews based on professional experience and judgment – all part of the desktop analyses. Based upon the desktop analyses, field reconnaissance was performed. Each of the components of the watershed assessment are summarized below, each contributing to a high-level understanding of the conditions throughout the Watershed and informing recommendations in terms of subwatershed focus areas and specific actions that could be taken.



While a watershed can and should be viewed holistically, for many analytical purposes, it serves to divide the watershed into subwatersheds, each with their own character and potentially their own receiving stream point. Just as the Diascund Creek Watershed is a useful division of the Chickahominy and James River Watersheds, and in turn the James River Watershed a useful division of the Chesapeake Bay Watershed, so are the subwatersheds within the Diascund Creek Watershed. Most analyses are done by subwatershed for the purposes of this report, as shown in Figure 1 in Section 1.1.

#### **Impervious Cover Model**

The initial desktop assessment included reviewing land cover data from JCC to determine current amounts and proportions of impervious cover—surfaces from which stormwater runs off without infiltrating—and comparing those to the framework established within the Impervious Cover Model (ICM). The development of the ICM involved broad data review across watersheds throughout the country and found that the more impervious cover is in a watershed, the lower the habitat quality of the streams within that watershed will be. There is some range and variability based on many nuanced factors, but generally, more impervious cover means worse stream health.

A review of present and future predicted impervious cover was performed using the ICM, associated with data from 2022 and projected future cover conditions. General assumptions for future buildout conditions in the Diascund Creek Watershed were conservative to a degree, assuming the development of any currently undeveloped lands in zoning areas where additional buildout is allowed, as well as other known potential re-development activities as identified through preliminary plans submitted to the County. While the ICM helps identify generalized trends, the extent of actual impacts to the receiving stream habitat quality is not clearly defined by this analysis alone, requiring additional desktop and field-level corroboration.

The ICM has four "zones" or categories of stream habitat quality based on impervious cover percentage, Sensitive (0-10%), Impacted (10-25%), Non-Supporting (25-60%), and Urban Drainage above 60%. The trend for all subwatersheds is increasing impervious cover, though most subwatersheds are expected to stay largely undeveloped. Those subwatersheds along Route 60 are expected to see enough increased development to have a potential adverse impact on downstream habitat quality. In 2022, all subwatersheds were characterized as Sensitive, with the Lower Mainstem Subwatershed in the transition zone to Impacted. Future buildout projections suggest Subwatershed 102 could become Impacted, while the rest of the subwatersheds are expected to remain as Sensitive (Subwatershed 103 and the Upper Mainstem Subwatershed would move into the transition zone to Impacted, and the Lower Mainstem Subwatershed would remain in the transition zone to Impacted). The extensive undeveloped conditions in the other subwatersheds help to balance the existing and future development in the subwatersheds along Rt. 60 and Old Stage Road (Rt. 30), resulting in a Sensitive classification for the overall Watershed (3.6% impervious) in existing conditions, and remaining Sensitive but in the transition zone to Impacted (7.5%) under future full buildout projections. See Section 1.2.6 for additional discussion on these trends.

#### Watershed Treatment Model

The Watershed Treatment Model (WTM) was used for a more granular look at the pollutant loading, both current and future, for bacteria, total nitrogen (TN), total phosphorus (TP), and total suspended solids (TSS). The WTM provides a more precise look at the subwatersheds' current and expected future conditions than the high-level view provided by the Impervious Cover Model (ICM). Each has its strengths



and weaknesses, and both are models offering insight but not necessarily accurately representing true conditions and processes.

TN, TP, and TSS are the pollutants of concern for the Chesapeake Bay TMDL and its tributaries since they cause low dissolved oxygen, algal blooms, and other aquatic life concerns. Each land use, such as open water, forest, medium-density residential, commercial, and several others, have associated loading rates—essentially how much of each particular pollutant is released per acre of land per year. In addition, other factors such as failing septic systems, stormwater treatment best management practices (BMP) and the land areas they treat, and programmatic best practices such as proper lawn care and pet waste education affect the overall pollutant loads and loading rates accounted for in the WTM. Like any model, the WTM has its limitations and built-in assumptions, but it can be an excellent high-level tool for analysis, improving on some of the limitations of the ICM.

Tables 10-12 and Figures 18-21 offer a distilled view of the results of the WTM review, comparing existing load estimates against future predictions. Figures 14-17 provide a look at the efficiency of existing BMPs in the Watershed. The effects of existing BMPs on existing pollutant loads is minimal due to the low number of practices and generally small treatment areas. Additionally, much of the historical development in the Watershed predated stormwater regulations and do not have BMPs. For the future predictions, BMPs were incorporated into the future development estimates to represent the degree of stormwater treatment that may be required by stormwater regulations. However, since the WTM assumes long-term BMP performance could decrease over time, a modest increase in pollutant loading rates is still depicted in the results for the subwatersheds with the greatest future development potential.

Existing pollutant loads are generally low across the Watershed, but the highest loads occur in Subwatershed 103 due to its size and proximity to existing development. The most significant increases to pollutant loading rates with future buildout conditions are anticipated in Subwatersheds 102 and 103 (and to a lesser extent, the Lower Mainstem and Upper Mainstem Subwatersheds), with the rest of the Watershed depicting little to no change to pollutant loading in future buildout conditions. While the undeveloped subwatersheds help to balance the proposed future development elsewhere, some downstream decrease in in-stream water quality conditions in Subwatershed 101 would also be anticipated due to the drainage patterns of Subwatersheds 102 and 103.

#### **Field Assessments**

To help corroborate the desktop analyses and identify other observed conditions affecting the watershed health, field reviews were also performed of both the receiving channels and upland sources of pollution.

#### Stream and Riparian Areas

Stream assessments were conducted on approximately 36 miles of stream channels. This work involved visual inspection and/or measurement of stream health indicators, floodplain connectivity, stream bank and geomorphic stability, and adjacent land and habitat conditions. All of this was to inform a complete picture of stream habitat quality and constitution, based on observed conditions and the potential likelihood of change.

The Environmental Protection Agency's Rapid Bioassessment Protocol (EPA RBP) was used to assign a habitat condition rating to each reach. A total of 97 stream reaches (or discrete portions of a stream channel with similar conditions) were evaluated: 24% scored as Optimal, 67% as Suboptimal, 9% as



Marginal, and 0% as Poor. Optimal ratings correspond to high habitat value and ideal stream conditions, with the next step down being Suboptimal. Marginal ratings suggested past or active degradation.

Streams were potentially considered for management activities to provide ecological uplift to the stream system – either enhancement or restoration. Streams with all types of habitat condition ratings were considered for management activities, even Optimal streams, since more localized issues requiring rehabilitation may not affect enough of a given reach to give it a Marginal or Poor rating. Stream enhancement includes targeted changes in stream morphology and vegetation to uplift existing ecological and/or hydraulic functions within a reach, whereas stream restoration is a full reconstruction of a reach's morphology to reset the foundation and baseline for hydraulic and ecological function.

#### Upland Areas

Further review of upland areas included several assessments, one being the Center for Watershed Protection's (CWP) Neighborhood Source Assessment (NSA). This protocol is a method for determining likely pollutant loading character of developed areas based on several characteristics including condition, construction styles and methods, stormwater management features or lack thereof, and examining likely pollution sources at the residential neighborhood scale. The NSA evaluated yards and lawns, driveways, sidewalks, and curbs, rooftop surfaces and disconnection, and common areas, which of the four 'Pollution Severity Index' categories—Low, Moderate, High, and Severe—resulted in scores of either Moderate or High for all neighborhoods assessed. Overall, 38% of the assessed area scored Moderate and 62% scored High, with the highest NSA score being 7 out of 13. See Section 2.3.2.3.1 for more detail (including Table 15 for subwatershed breakdown) and map of areas evaluated (Figure 31).

Another assessment method used was the CWP Hot Spot Investigation (HSI) method for determining whether isolated locations may be causing pollution. These are often commercial properties, dump sites, or similar locations where a higher concentration of pollutants might be found. The HSI from the major commercial and industrial areas within the watershed identified nine Potential Hot Spots and zero Confirmed Hot Spots. A Confirmed Hot Spot involves a specific instance of an observed polluting activity and/or 11 to 15 potential pollutant sources identified, as defined by the protocol. A Potential Hot Spot involves no observed polluting activity, but five to 10 potential pollutant sources still identified. For additional details, see Table 16 and Figure 32 in Section 2.3.2.3.2.

Both the NSA and HSI methods of assessment and scoring, and all definitions referenced such as 'Confirmed' versus 'Potential' Hot Spots and the 'Pollution Severity Index' scoring, are taken from the CWP Unified Subwatershed and Site Reconnaissance (USSR).

During the field assessment of upland areas, a majority of the existing BMPs within the watershed were visited, inspected, and evaluated for retrofit potential to increase water quality treatment (pollutant removal) or water quantity controls (reduction of downstream flows, runoff volumes, and channel erosion). This assessment looked at factors such as current condition of the BMP, potential for retrofit to provide additional treatment, and site constraints that could affect such improvements. In some areas, site visits included assessment of the potential for new stormwater BMPs where none currently exist.

# Conservation Areas, Habitat Cores, Corridors, and Rare/Threatened/Endangered Species

In addition to the water quality-focused assessments described above, other factors were also considered to gain a more comprehensive understanding of the watershed health. A thorough review was conducted



of available data to assess potential Conservation Areas, Habitat Cores, and Wildlife/Habitat Corridors connecting these to each other. Materials reviewed included the 2022 JCC Natural & Cultural Assets Plan and the James City County 2045 Comprehensive Plan, and several databases of the US Fish and Wildlife Service (USFWS), Virginia Department of Wildlife Resources (DWR), Virginia Department of Conservation and Recreation (DCR), and the Center for Conservation Biology (CCB) to ascertain presence and potential threats to rare, threatened, and endangered (RTE) species. This review helps identify opportunities for direct conservation of valuable habitat and protection of wildlife. The analysis showed numerous RTE species within the Diascund Creek Watershed, including but not limited to the sensitive joint-vetch and small whorled pogonia, as well as the bald eagle. Some of the species likely present may be or have the potential to be present throughout the watershed, and others are likely localized to specific areas. Figure 11 in Section 2.2.2.1 shows the complex map of potential conservation areas, habitat cores, and corridors.

No prior conservation area priority scoring is available for the Diascund Creek Watershed, so the prioritization scoring rubric utilized for prior watershed plans developed by the County was used for this Watershed Management Plan. Table 7 in Section 2.2.2.2 provides the conservation area priority scoring. Further details are provided in Section 2.2.2.2.

#### Flood Risk Study

A flood risk analysis was also conducted, which addresses a significant concern for the entire Tidewater region due to recurrent flooding associated with low elevations and the extent of both frontal and coastal storm systems that affect the region. Development within and immediately adjacent to the floodplains increases risks of both property damage and public safety. While Section 2.2.4 discusses the methods in greater detail, a review of the existing regulated Federal Emergency Management Agency (FEMA) floodplain was conducted to help understand existing flood risks throughout the Watershed. These include critical public infrastructure that may be affected, the extents of existing private homes or businesses within the floodplain, and the overtopping of roadways that could isolate different areas during a major storm event. The analysis identified 21 structures within the existing floodplain, 19 of those being residential, one public building, and one mobile home. Two critical infrastructure facilities were located within the existing floodplain, both pump stations at Diascund Creek Reservoir.

Potential future scenarios were also reviewed, to see how the effect of increased rainfall amounts and sea level rise could result in additional risks to features outside of the existing FEMA floodplain. The analysis identified 11 additional structures, all residential and most of which are located at the south end of Hicks Island Rd, which would potentially be affected by flood waters. No additional critical infrastructure would be affected.

In addition to structures directly located within a floodplain, dam break inundation risks were also reviewed due to the presence of Diascund Creek Reservoir, a high hazard dam. 126 buildings are identified in the Emergency Action Plan for Diascund Dam, with additional structures that may also be located downstream of the dam that could be potentially affected, warranting further investigation and coordination with the dam owner. Further details are provided in Section 2.2.4.4.



## GOALS, ACTIONS, RECOMMENDATIONS

Listed below are the six overarching goals to be supported by the Strategic Actions. These goals were created with the help of stakeholder input during the process of creating this Plan.

- 1. Maintain and build natural resources, wildlife habitat, and critical areas of undeveloped land within the watershed, as identified within the conservation priorities of this Plan, the County's Natural & Cultural Assets Plan, and other relevant Virginia data sets.
- 2. Identify opportunities for improved management of agricultural and silvicultural practices or other opportunities for water quality improvements.
- 3. Refine the County stormwater and land use planning requirements to prioritize protection of the Diascund Creek Watershed with participation and collaboration from residents and local stakeholders.
- 4. Promote watershed awareness and active stewardship among residents and local stakeholders through educational programs, recreational opportunities, and participatory watershed activities.
- 5. Maintain and improve water quality in Diascund Creek to satisfy Local Bacteria TMDLs and prevent impairments.
- 6. Identify and prioritize potential flood risks and hazards within the Diascund Creek Watershed with consideration to establishing future programming.

To address the goals of the Plan, the proposed Strategic Actions are many and various, but have all been categorized into the following five categories. Brief explanatory examples for each are also provided below. More detail on the various recommended actions can be found within Sections 3 and 4, with Section 5 presenting a Strategic Action Plan that includes a timeline and approach to implementing the recommendations.

- 1. **Programmatic** Examples include Land Conservation/Purchase of Development Rights, wildlife management programs, and continued septic system inspections and clean-out and repair support programs. (Section 3.1)
- Regulatory/Enforcement Examples include expanding Special Stormwater Criteria for New Development and Redevelopment, similar ordinance changes, and maintaining the current 20-acre minimum lot size requirement for any future development of parcels zoned A-1. (Section 3.2)
- Floodplain Management Examples may include increased coordination with Newport News Waterworks regarding potential hazards downstream of Diascund Creek Reservoir and encouraging private residences to elevate homes and/or employ other floodproofing measures. (Section 3.3)
- Education/Awareness Examples include pet waste disposal and litter prevention campaigns, and public education on the presence and protection of rare, threatened, and endangered species. (Section 3.4)
- 5. Watershed Restoration Projects Examples include the following subcategories. Section 4.5 provides the scoring and ranking rubric used to prioritize the different project options, described in detail in Appendix C. (Section 3.5, Section 4, and by subwatershed in Section 6)



<u>Streams</u> – A total of 2,302 linear feet (0.44 miles) of stream channels were identified across 7 reaches which have the potential for enhancement (3 reaches), restoration (3 reaches), or possibly both (1 reach). Table 17 in Section 4.1.1 provides a full list.

<u>Retrofit of Existing BMPs</u> – These include four types: bioretention (1 location), outfall enhancement (1 location), rehabilitation or upgrade (8 locations), and retrofit to constructed wetland or wet pond (3 locations). A full list of retrofit opportunities is in Table 18 in Section 4.2.1.

<u>New BMPs</u> – These include three types: constructed wetlands (2 locations), retention or detention (2 locations), and wet/dry swales (6 locations). Table 19 in Section 4.3 provides a full list.

### CONCLUSION

Based on the assessments contained within this Watershed Management Plan, some minor issues are present with pollutants of concern and stream habitat quality within the Diascund Creek Watershed, mainly within the eastern subwatersheds with past development stretching down the Route 60 and Route 30 corridors from Anderson's Corner. However, most of the Watershed is very healthy, and there is significant opportunity to conserve and preserve the current watershed conditions. If current and future development is undertaken with great care and intent, additional land conservation efforts expanded in the more pristine subwatersheds, and other strategic actions are executed in a purposeful and coordinated manner, the goals of this Plan can be better achieved.

While this Plan provides a complementary approach to watershed protection and restoration through a variety of methods described above to produce the most effective results, the existing undeveloped nature of the Watershed leads to more emphasis on preservation and increased controls on new development instead of mitigation and restoration. It is assumed that the programmatic actions proposed in this Plan would not require as much effort as other more developed Watersheds in the County due to the existing conditions of the Watershed, but a good plan involves the most current and ever-evolving practices and approaches to achieve the desired results. Goals for watershed protection and management ideally are SMART – Specific, Measurable, Achievable, Relevant, and Time-bound. To a degree, all of these factors are dynamic, especially the S(pecific) and T(ime-bound). For this reason, it is important to continually revisit both this Plan and the efforts undertaken following this Plan to make any necessary course corrections, and add, revise, remove, or otherwise evolve the framework behind the goals.



May 2024

# Diascund Creek Watershed Management Plan



Photo Credit: James City County – Diascund Reservoir Park

Prepared by:



Contract Number: 20221086



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## **EXECUTIVE SUMMARY**

### INTRODUCTION

James City County (JCC, "the County") is surrounded on three sides by the James, Chickahominy, and York Rivers. There are several watersheds within the County, which are areas that all drain to a common point of confluence to the surrounding rivers. The Diascund Creek Watershed is located in the northern portion of James City County and is lightly developed, maintaining a large portion in forested and rural conditions. The portion of the Diascund Creek Watershed located within James City County drains west towards Diascund Creek itself, which drains south to the Chickahominy River, then continues to drain south to the James River. The Diascund Creek Watershed limits within James City County stretch from Forge Road to the south and across the I-64 corridor to the north, and spans between the Diascund Creek mainstem to the west and Route 30 & Route 60 to the east.

Unlike many other watersheds within JCC, there is no existing Watershed Management Plan for Diascund Creek. While this makes it more difficult to see trends in development from past to present to future, it is understood that the Diascund Creek Watershed has seen some increased development and associated impacts to the watershed in recent years, but not nearly to the same degree as those closer to Williamsburg, such as the Powhatan Creek Watershed. Development has largely occurred along the Route 60 corridor. This Plan should be considered a foundation and framework for planning and management purposes, with the flexibility to take new information and add, subtract, change, and generally improve the plan and direction as appropriate.

This Executive Summary attempts to distill the Plan into a high-level overview. For detailed information, full-sized graphics, data tables, and more thorough analysis, please see the main body of the Watershed Management Plan report. Sections 1 and 2 cover much of the background, purpose, and findings associated with the desktop and field-level reviews. Sections 3, 4, and 5 describe various recommended actions on how the goals of the Plan could be better achieved and an implementation strategy for future activities. Section 6 summarizes the results and recommendations at the subwatershed-scale.

## PURPOSE AND PROGRESS

The Diascund Creek Watershed has seen some increased development to accommodate a growing population, and the associated impacts of that development on the natural environment. To help balance those impacts, a better understanding of the science behind the interactions between the built environment and natural environments is needed to identify better management techniques and baseline requirements for mitigation and protection. The process of identifying current conditions and the factors that influence them, establishing or revising goals for future conditions, and developing plans and actions to get from the former to the latter is a dynamic process. This Watershed Management Plan is part of that process.

This Plan is meant to work in tandem with other conservation efforts already in progress. The Virginia Stormwater Management Program has evolved and improved, establishing new standards for stormwater



capture and management to protect downstream waterways. The Chesapeake Bay Program has directly and indirectly brought about programs and projects that affect watershed management in the County broadly, and several local and independent initiatives and efforts have been developed in concert with or parallel to these.

Among the drivers for these conservation, preservation, and restoration efforts are:

- Water quality impairments (formal declarations of problems requiring mitigation).
- Environmental impacts from increased urbanization, including the potential for adverse effects to stream habitat quality, fragmentation and development within natural habitat cores and corridors, and associated threats to wildlife (including rare, threatened, and endangered species) and human-wildlife conflicts.
- Increased flood risk due to combination of more intense rainfall events and increased runoff from urbanized lands, and the associated risks with service interruptions, and direct safety risks for residents.
- An established regulatory threshold for bacteria in streams which has been exceeded in several streams within the County. This threshold, a Total Maximum Daily Load (TMDL), is a primary driver for various programs which will be detailed later, but including septic system maintenance programs, pet and wild goose waste management practices, and others.
- Similar regional-scale TMDL thresholds for sediment and nutrient pollution for the entirety of the Chesapeake Bay Watershed, which applies to Diascund Creek.

The ultimate goals of the County are to protect, preserve, and restore to the degree possible, the health of the waterways and natural areas, and to bring its waterways into regulatory compliance with standards set for various pollutants. It is possible not only to minimize or eliminate the negative effects of development of the built environment, but also to reverse some of the damage already done. Viewed holistically, these efforts are not quick, easy, or inexpensive, but they are worthwhile for the health of our community. There are still a wide variety of natural ecosystems throughout the Watershed that both host abundant wildlife and provide much potential recreational value to the residents of the County. Offsetting the negative impacts to these ecosystems can preserve their presence for future generations. This Watershed Management Plan is a complementary report to others aimed at achieving the same and other similar goals.

### **METHODS AND RESULTS**

The methods for developing this Watershed Management Plan included review of earlier material, review of JCC data and efforts in recent years, research on best methods and approaches, and some additional research and data reviews based on professional experience and judgment – all part of the desktop analyses. Based upon the desktop analyses, field reconnaissance was performed. Each of the components of the watershed assessment are summarized below, each contributing to a high-level understanding of the conditions throughout the Watershed and informing recommendations in terms of subwatershed focus areas and specific actions that could be taken.



While a watershed can and should be viewed holistically, for many analytical purposes, it serves to divide the watershed into subwatersheds, each with their own character and potentially their own receiving stream point. Just as the Diascund Creek Watershed is a useful division of the Chickahominy and James River Watersheds, and in turn the James River Watershed a useful division of the Chesapeake Bay Watershed, so are the subwatersheds within the Diascund Creek Watershed. Most analyses are done by subwatershed for the purposes of this report, as shown in Figure 1 in Section 1.1.

#### **Impervious Cover Model**

The initial desktop assessment included reviewing land cover data from JCC to determine current amounts and proportions of impervious cover—surfaces from which stormwater runs off without infiltrating—and comparing those to the framework established within the Impervious Cover Model (ICM). The development of the ICM involved broad data review across watersheds throughout the country and found that the more impervious cover is in a watershed, the lower the habitat quality of the streams within that watershed will be. There is some range and variability based on many nuanced factors, but generally, more impervious cover means worse stream health.

A review of present and future predicted impervious cover was performed using the ICM, associated with data from 2022 and projected future cover conditions. General assumptions for future buildout conditions in the Diascund Creek Watershed were conservative to a degree, assuming the development of any currently undeveloped lands in zoning areas where additional buildout is allowed, as well as other known potential re-development activities as identified through preliminary plans submitted to the County. While the ICM helps identify generalized trends, the extent of actual impacts to the receiving stream habitat quality is not clearly defined by this analysis alone, requiring additional desktop and field-level corroboration.

The ICM has four "zones" or categories of stream habitat quality based on impervious cover percentage, Sensitive (0-10%), Impacted (10-25%), Non-Supporting (25-60%), and Urban Drainage above 60%. The trend for all subwatersheds is increasing impervious cover, though most subwatersheds are expected to stay largely undeveloped. Those subwatersheds along Route 60 are expected to see enough increased development to have a potential adverse impact on downstream habitat quality. In 2022, all subwatersheds were characterized as Sensitive, with the Lower Mainstem Subwatershed in the transition zone to Impacted. Future buildout projections suggest Subwatershed 102 could become Impacted, while the rest of the subwatersheds are expected to remain as Sensitive (Subwatershed 103 and the Upper Mainstem Subwatershed would move into the transition zone to Impacted, and the Lower Mainstem Subwatershed would remain in the transition zone to Impacted). The extensive undeveloped conditions in the other subwatersheds help to balance the existing and future development in the subwatersheds along Rt. 60 and Old Stage Road (Rt. 30), resulting in a Sensitive classification for the overall Watershed (3.6% impervious) in existing conditions, and remaining Sensitive but in the transition zone to Impacted (7.5%) under future full buildout projections. See Section 1.2.6 for additional discussion on these trends.

#### Watershed Treatment Model

The Watershed Treatment Model (WTM) was used for a more granular look at the pollutant loading, both current and future, for bacteria, total nitrogen (TN), total phosphorus (TP), and total suspended solids (TSS). The WTM provides a more precise look at the subwatersheds' current and expected future conditions than the high-level view provided by the Impervious Cover Model (ICM). Each has its strengths



and weaknesses, and both are models offering insight but not necessarily accurately representing true conditions and processes.

TN, TP, and TSS are the pollutants of concern for the Chesapeake Bay TMDL and its tributaries since they cause low dissolved oxygen, algal blooms, and other aquatic life concerns. Each land use, such as open water, forest, medium-density residential, commercial, and several others, have associated loading rates—essentially how much of each particular pollutant is released per acre of land per year. In addition, other factors such as failing septic systems, stormwater treatment best management practices (BMP) and the land areas they treat, and programmatic best practices such as proper lawn care and pet waste education affect the overall pollutant loads and loading rates accounted for in the WTM. Like any model, the WTM has its limitations and built-in assumptions, but it can be an excellent high-level tool for analysis, improving on some of the limitations of the ICM.

Tables 10-12 and Figures 18-21 offer a distilled view of the results of the WTM review, comparing existing load estimates against future predictions. Figures 14-17 provide a look at the efficiency of existing BMPs in the Watershed. The effects of existing BMPs on existing pollutant loads is minimal due to the low number of practices and generally small treatment areas. Additionally, much of the historical development in the Watershed predated stormwater regulations and do not have BMPs. For the future predictions, BMPs were incorporated into the future development estimates to represent the degree of stormwater treatment that may be required by stormwater regulations. However, since the WTM assumes long-term BMP performance could decrease over time, a modest increase in pollutant loading rates is still depicted in the results for the subwatersheds with the greatest future development potential.

Existing pollutant loads are generally low across the Watershed, but the highest loads occur in Subwatershed 103 due to its size and proximity to existing development. The most significant increases to pollutant loading rates with future buildout conditions are anticipated in Subwatersheds 102 and 103 (and to a lesser extent, the Lower Mainstem and Upper Mainstem Subwatersheds), with the rest of the Watershed depicting little to no change to pollutant loading in future buildout conditions. While the undeveloped subwatersheds help to balance the proposed future development elsewhere, some downstream decrease in in-stream water quality conditions in Subwatershed 101 would also be anticipated due to the drainage patterns of Subwatersheds 102 and 103.

#### **Field Assessments**

To help corroborate the desktop analyses and identify other observed conditions affecting the watershed health, field reviews were also performed of both the receiving channels and upland sources of pollution.

#### Stream and Riparian Areas

Stream assessments were conducted on approximately 36 miles of stream channels. This work involved visual inspection and/or measurement of stream health indicators, floodplain connectivity, stream bank and geomorphic stability, and adjacent land and habitat conditions. All of this was to inform a complete picture of stream habitat quality and constitution, based on observed conditions and the potential likelihood of change.

The Environmental Protection Agency's Rapid Bioassessment Protocol (EPA RBP) was used to assign a habitat condition rating to each reach. A total of 97 stream reaches (or discrete portions of a stream channel with similar conditions) were evaluated: 24% scored as Optimal, 67% as Suboptimal, 9% as



Marginal, and 0% as Poor. Optimal ratings correspond to high habitat value and ideal stream conditions, with the next step down being Suboptimal. Marginal ratings suggested past or active degradation.

Streams were potentially considered for management activities to provide ecological uplift to the stream system – either enhancement or restoration. Streams with all types of habitat condition ratings were considered for management activities, even Optimal streams, since more localized issues requiring rehabilitation may not affect enough of a given reach to give it a Marginal or Poor rating. Stream enhancement includes targeted changes in stream morphology and vegetation to uplift existing ecological and/or hydraulic functions within a reach, whereas stream restoration is a full reconstruction of a reach's morphology to reset the foundation and baseline for hydraulic and ecological function.

#### Upland Areas

Further review of upland areas included several assessments, one being the Center for Watershed Protection's (CWP) Neighborhood Source Assessment (NSA). This protocol is a method for determining likely pollutant loading character of developed areas based on several characteristics including condition, construction styles and methods, stormwater management features or lack thereof, and examining likely pollution sources at the residential neighborhood scale. The NSA evaluated yards and lawns, driveways, sidewalks, and curbs, rooftop surfaces and disconnection, and common areas, which of the four 'Pollution Severity Index' categories—Low, Moderate, High, and Severe—resulted in scores of either Moderate or High for all neighborhoods assessed. Overall, 38% of the assessed area scored Moderate and 62% scored High, with the highest NSA score being 7 out of 13. See Section 2.3.2.3.1 for more detail (including Table 15 for subwatershed breakdown) and map of areas evaluated (Figure 31).

Another assessment method used was the CWP Hot Spot Investigation (HSI) method for determining whether isolated locations may be causing pollution. These are often commercial properties, dump sites, or similar locations where a higher concentration of pollutants might be found. The HSI from the major commercial and industrial areas within the watershed identified nine Potential Hot Spots and zero Confirmed Hot Spots. A Confirmed Hot Spot involves a specific instance of an observed polluting activity and/or 11 to 15 potential pollutant sources identified, as defined by the protocol. A Potential Hot Spot involves no observed polluting activity, but five to 10 potential pollutant sources still identified. For additional details, see Table 16 and Figure 32 in Section 2.3.2.3.2.

Both the NSA and HSI methods of assessment and scoring, and all definitions referenced such as 'Confirmed' versus 'Potential' Hot Spots and the 'Pollution Severity Index' scoring, are taken from the CWP Unified Subwatershed and Site Reconnaissance (USSR).

During the field assessment of upland areas, a majority of the existing BMPs within the watershed were visited, inspected, and evaluated for retrofit potential to increase water quality treatment (pollutant removal) or water quantity controls (reduction of downstream flows, runoff volumes, and channel erosion). This assessment looked at factors such as current condition of the BMP, potential for retrofit to provide additional treatment, and site constraints that could affect such improvements. In some areas, site visits included assessment of the potential for new stormwater BMPs where none currently exist.

# Conservation Areas, Habitat Cores, Corridors, and Rare/Threatened/Endangered Species

In addition to the water quality-focused assessments described above, other factors were also considered to gain a more comprehensive understanding of the watershed health. A thorough review was conducted



of available data to assess potential Conservation Areas, Habitat Cores, and Wildlife/Habitat Corridors connecting these to each other. Materials reviewed included the 2022 JCC Natural & Cultural Assets Plan and the James City County 2045 Comprehensive Plan, and several databases of the US Fish and Wildlife Service (USFWS), Virginia Department of Wildlife Resources (DWR), Virginia Department of Conservation and Recreation (DCR), and the Center for Conservation Biology (CCB) to ascertain presence and potential threats to rare, threatened, and endangered (RTE) species. This review helps identify opportunities for direct conservation of valuable habitat and protection of wildlife. The analysis showed numerous RTE species within the Diascund Creek Watershed, including but not limited to the sensitive joint-vetch and small whorled pogonia, as well as the bald eagle. Some of the species likely present may be or have the potential to be present throughout the watershed, and others are likely localized to specific areas. Figure 11 in Section 2.2.2.1 shows the complex map of potential conservation areas, habitat cores, and corridors.

No prior conservation area priority scoring is available for the Diascund Creek Watershed, so the prioritization scoring rubric utilized for prior watershed plans developed by the County was used for this Watershed Management Plan. Table 7 in Section 2.2.2.2 provides the conservation area priority scoring. Further details are provided in Section 2.2.2.2.

#### Flood Risk Study

A flood risk analysis was also conducted, which addresses a significant concern for the entire Tidewater region due to recurrent flooding associated with low elevations and the extent of both frontal and coastal storm systems that affect the region. Development within and immediately adjacent to the floodplains increases risks of both property damage and public safety. While Section 2.2.4 discusses the methods in greater detail, a review of the existing regulated Federal Emergency Management Agency (FEMA) floodplain was conducted to help understand existing flood risks throughout the Watershed. These include critical public infrastructure that may be affected, the extents of existing private homes or businesses within the floodplain, and the overtopping of roadways that could isolate different areas during a major storm event. The analysis identified 21 structures within the existing floodplain, 19 of those being residential, one public building, and one mobile home. Two critical infrastructure facilities were located within the existing floodplain, both pump stations at Diascund Creek Reservoir.

Potential future scenarios were also reviewed, to see how the effect of increased rainfall amounts and sea level rise could result in additional risks to features outside of the existing FEMA floodplain. The analysis identified 11 additional structures, all residential and most of which are located at the south end of Hicks Island Rd, which would potentially be affected by flood waters. No additional critical infrastructure would be affected.

In addition to structures directly located within a floodplain, dam break inundation risks were also reviewed due to the presence of Diascund Creek Reservoir, a high hazard dam. 126 buildings are identified in the Emergency Action Plan for Diascund Dam, with additional structures that may also be located downstream of the dam that could be potentially affected, warranting further investigation and coordination with the dam owner. Further details are provided in Section 2.2.4.4.


### GOALS, ACTIONS, RECOMMENDATIONS

Listed below are the six overarching goals to be supported by the Strategic Actions. These goals were created with the help of stakeholder input during the process of creating this Plan.

- 1. Maintain and build natural resources, wildlife habitat, and critical areas of undeveloped land within the watershed, as identified within the conservation priorities of this Plan, the County's Natural & Cultural Assets Plan, and other relevant Virginia data sets.
- 2. Identify opportunities for improved management of agricultural and silvicultural practices or other opportunities for water quality improvements.
- 3. Refine the County stormwater and land use planning requirements to prioritize protection of the Diascund Creek Watershed with participation and collaboration from residents and local stakeholders.
- 4. Promote watershed awareness and active stewardship among residents and local stakeholders through educational programs, recreational opportunities, and participatory watershed activities.
- 5. Maintain and improve water quality in Diascund Creek to satisfy Local Bacteria TMDLs and prevent impairments.
- 6. Identify and prioritize potential flood risks and hazards within the Diascund Creek Watershed with consideration to establishing future programming.

To address the goals of the Plan, the proposed Strategic Actions are many and various, but have all been categorized into the following five categories. Brief explanatory examples for each are also provided below. More detail on the various recommended actions can be found within Sections 3 and 4, with Section 5 presenting a Strategic Action Plan that includes a timeline and approach to implementing the recommendations.

- 1. **Programmatic** Examples include Land Conservation/Purchase of Development Rights, wildlife management programs, and continued septic system inspections and clean-out and repair support programs. (Section 3.1)
- Regulatory/Enforcement Examples include expanding Special Stormwater Criteria for New Development and Redevelopment, similar ordinance changes, and maintaining the current 20-acre minimum lot size requirement for any future development of parcels zoned A-1. (Section 3.2)
- Floodplain Management Examples may include increased coordination with Newport News Waterworks regarding potential hazards downstream of Diascund Creek Reservoir and encouraging private residences to elevate homes and/or employ other floodproofing measures. (Section 3.3)
- Education/Awareness Examples include pet waste disposal and litter prevention campaigns, and public education on the presence and protection of rare, threatened, and endangered species. (Section 3.4)
- 5. Watershed Restoration Projects Examples include the following subcategories. Section 4.5 provides the scoring and ranking rubric used to prioritize the different project options, described in detail in Appendix C. (Section 3.5, Section 4, and by subwatershed in Section 6)



<u>Streams</u> – A total of 2,302 linear feet (0.44 miles) of stream channels were identified across 7 reaches which have the potential for enhancement (3 reaches), restoration (3 reaches), or possibly both (1 reach). Table 17 in Section 4.1.1 provides a full list.

<u>Retrofit of Existing BMPs</u> – These include four types: bioretention (1 location), outfall enhancement (1 location), rehabilitation or upgrade (8 locations), and retrofit to constructed wetland or wet pond (3 locations). A full list of retrofit opportunities is in Table 18 in Section 4.2.1.

<u>New BMPs</u> – These include three types: constructed wetlands (2 locations), retention or detention (2 locations), and wet/dry swales (6 locations). Table 19 in Section 4.3 provides a full list.

### CONCLUSION

Based on the assessments contained within this Watershed Management Plan, some minor issues are present with pollutants of concern and stream habitat quality within the Diascund Creek Watershed, mainly within the eastern subwatersheds with past development stretching down the Route 60 and Route 30 corridors from Anderson's Corner. However, most of the Watershed is very healthy, and there is significant opportunity to conserve and preserve the current watershed conditions. If current and future development is undertaken with great care and intent, additional land conservation efforts expanded in the more pristine subwatersheds, and other strategic actions are executed in a purposeful and coordinated manner, the goals of this Plan can be better achieved.

While this Plan provides a complementary approach to watershed protection and restoration through a variety of methods described above to produce the most effective results, the existing undeveloped nature of the Watershed leads to more emphasis on preservation and increased controls on new development instead of mitigation and restoration. It is assumed that the programmatic actions proposed in this Plan would not require as much effort as other more developed Watersheds in the County due to the existing conditions of the Watershed, but a good plan involves the most current and ever-evolving practices and approaches to achieve the desired results. Goals for watershed protection and management ideally are SMART – Specific, Measurable, Achievable, Relevant, and Time-bound. To a degree, all of these factors are dynamic, especially the S(pecific) and T(ime-bound). For this reason, it is important to continually revisit both this Plan and the efforts undertaken following this Plan to make any necessary course corrections, and add, revise, remove, or otherwise evolve the framework behind the goals.



## 1 INTRODUCTION

This document is a Watershed Management Plan ("Plan") developed for the Diascund Creek Watershed ("Watershed") to guide James City County ("JCC") and stakeholders on the current status of different characteristics of the Watershed, past conditions, trends, future estimates and the actions that can be taken moving forward to both protect as well as enhance and restore the Watershed to the extent possible. Assessment and analytical information, and subsequent recommendations, are provided both at the entire Watershed-scale but also at Subwatershed scales (Figure 1) to support successful implementation of actions. After this introductory section the remainder of this management plan is broken into the following sections:

- Section 2 Watershed Assessment | Summarizes both desktop and field analyses of current conditions within the Watershed.
- Section 3 Watershed Goals and Strategic Actions | Describes the steps taken to develop current Watershed Goals and the associated recommended Strategic Actions.
- Section 4 Watershed Restoration Projects | Details the methods used to identify the various types of site-specific stormwater treatment or stream restoration projects across the Watershed.
- Section 5 Strategic Action Plan | A plan for the implementation of proposed Strategic Actions with prioritization and estimated costs and project timelines.
- Section 6 Subwatershed Management Plans | Smaller scale exhibits of findings and recommended actions for each subwatershed serving as easy reference for sub regions of the larger Watershed.

### 1.1 Watershed Overview

The Diascund Creek Watershed is mostly located in James City County, Virginia (JCC), extending from Toano to Barhamsville, generally bordered by Forge Road to the south, Route 30 to the east, and the Diascund Creek mainstem to the west. The drainage area for Diascund Creek located within JCC is approximately 11,616 acres, the majority of which is classified as forested (~41%) or rural (~48%). This Plan only covers the areas that drain from James City County (Figure 1), while areas in New Kent County upstream of the reservoir are also within the Watershed.

The mainstem subwatershed of Diascund Creek is divided into three segments – Upper Mainstem, Middle Mainstem, and Lower Mainstem. The transition from Upper Mainstem to Middle Mainstem occurs just south of Route 60. The transition from Middle Mainstem to Lower Mainstem occurs south of Arlington Island Rd.







Oak

### 1.2 The Need for Watershed Management and Goals

The Diascund Creek Watershed is largely undeveloped, with commercial and residential areas located along primary arterial roadways (e.g. Rt. 60 and Rt. 30 corridors) and other residential areas scattered throughout the watershed surrounded by forest, wetlands, and agriculture. JCC's 2045 Comprehensive Plan shows the potential for future development across the Watershed, mainly extending from the existing developed areas near Anderson's Corner along Rt. 60 and Rt. 30. Pressures of future land development and increasing population density are correlated with downstream water quality impacts, which can often lead to designated impairments and other ecosystem degradation.

Unlike other watersheds in JCC, there is not an existing Watershed Plan to learn from or compare for the creation of this new Plan. This underlines the need for a baseline to be established and for goals to be set so that future development can be properly managed. The Diascund Creek Watershed is generally in good condition, but it is important to prepare for potential negative impacts of projected development such as water quality impairments, decline of stream habitat quality, and other environmental effects of increased urbanization.

### 1.2.1 WATER QUALITY IMPAIRMENTS

The Diascund Creek Watershed borders and contributes flows to the Diascund Creek Reservoir, which then flows down the mainstem Diascund Creek to the Chickahominy River, and ultimately the James River and Chesapeake Bay. Bacterial and dissolved oxygen (DO) impairments are present in the Lower Chickahominy River (Figure 2). The Bacterial Total Maximum Daily Load (TMDL) for the Lower Chickahominy River and associated tributary waterbodies (such as Diascund Creek) was developed in 2017. The dissolved oxygen impairment is related to eutrophication and pertains to the Chesapeake Bay TMDL, most recently updated in December 2010. The Chesapeake Bay TMDL governs large-scale implementation plans to reduce loading of total nitrogen (TN), total phosphorus (TP), and total suspended solids (TSS), collectively "pollutants of concern" (POC), often simplified as "nutrients (TN and TP) and sediment (TSS)."

The Lower Chickahominy has significant inflow from Diascund Creek, and therefore the TMDL plans to address the Chickahominy impairments that apply to the Diascund Creek watershed. There are currently no specific Implementation Plans (IPs) for Diascund Creek, though the general approach taken in the JCC TMDL Action Plans for Powhatan Creek, Yarmouth Creek, Mill Creek, and Skiffes Creek will share foundations with TMDL action plans developed for the watersheds and subwatersheds yet to be addressed.





### Title Figure 2 - Diascund Creek Watershed Boundary, TMDL Impairments, and Monitoring Station Locations

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Chickah	ominy Bacteria TM	IDL Boundary	
Chickah	ominy River Tidal	Impairment	
Major C	reek/Stream		
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. Orthoimagery © ESRI			
		James	
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		Jamestown 1607	

Table 1 shows the waterbodies within the Diascund Creek watershed and downstream of it, but upstream of the James River, that are impaired or not assessed but possibly unofficially impaired. The small or unsegmented rivers and streams (Assessment Unit ID: VAP-G08R\_ZZZ01B14) are unassessed. Given that the Diascund Creek mainstem (Assessment Unit ID: VAP-G08E\_DSC01A00) is impaired, but the upstream Diascund Creek Reservoir (Assessment Unit ID: VAP-G09L\_DSC01A00) does not have the same impairment, suggests that the impairment originates in the tributary streams or possibly tidal influences from the Chickahominy River. However, one monitoring location where an exceedance was measured in 2014 indicated a bacterial impairment in the Diascund Creek just below the reservoir dam. The monitoring details regarding impairments for the reservoir refer to E. coli data with no exceeding measurements, but the impairment explanation for the Diascund Creek refer to Enterococcus measurements immediately below the dam and at Hicks Island (midway down mainstem), which raises question as to the tributary areas driving this particular impairment. With different methods, a direct comparison is not substantive. See Section 3.1.1 for more detail on the proposed programmatic actions to locate and address bacterial impairments.

Waterbody Name	Assessment Unit ID	Туре	Length (mi) / Area (sq mi)	Impaired	303(d) list	Impairment Type	Notes
Unsegmented rivers in G08	VAP-G08R_ZZZ01B14	River	40.42 mi	No	No	Not assessed	
Mill Creek (nontidal)	VAP- G08R_MCR01A04	River	4.82 mi	Yes	No	E. coli	North of Richmond Rd. to West of Diascund Rd. (tidal/ nontidal transition)
Unsegmented estuaries in G08	VAP-G08E_ZZZ01B14	Estuary	0.16 sq mi	Yes	No	Dissolved oxygen	Includes tidal/estuarine branches of Diascund Creek and downstream portion of Mill Creek
Disascund Creek (mainstem, tidal)	VAP- G08E_DSC01A00	Estuary	0.27 sq mi	Yes	No	Enterococcus, Dissolved oxygen	Entire mainstem Diascund Creek from reservoir to Chickahominy
Chickahominy River	VAP- G08E_CHK02A00	Estuary	5.4 sq mi	Yes	Yes	Enterococci bacteria, Dissolved oxygen	From Diascund River confluence to James River. Excludes ~0.5 miles upstream and downstream of station 2CCHK002.40. CHKOH
Chickahominy River	VAP- G08E_CHK02B18	Estuary	0.45 sq mi	Yes	Yes	Enterococci bacteria, Dissolved oxygen	Near/at confluence of Gordon Creek. ~0.5 miles upstream and downstream of station 2CCHK002.40. CHKOH

#### Table 1 – Impaired Waterbodies Related to the Diascund Creek Watershed



### 1.2.2 ENVIRONMENTAL EFFECTS OF INCREASED URBANIZATION

Historically, the Diascund Creek Watershed has been lightly developed. However, no prior land use data was available in order to assess past impervious cover estimates. Instead, existing impervious data and future impervious projections were used to evaluate the health of a given subwatershed as classified by the Impervious Cover Model (ICM). Decades of research led to the development of the ICM which serves as a categorization schema for aquatic ecosystem health based on an upstream watershed's level of development along a continuum of urbanization and the impact of its resultant increase in impervious surfaces (Klein, 1979, Jones and Clark, 1987, Schueler, 1994, Arnold and Gibbons, 1996, Gergel, et al., 2002, CWP, 2003, Schueler, et al., 2009, Arfan and Sutjiningsih, 2018). Most recently, the ICM approach has been revised in the past several years (Schueler, et al., 2009) to address limitations of the original ICM. For example, transition zones like those in Figure 3 below were adopted as opposed to distinct thresholds found within the original ICM, where each ICM category is described in more detail below:

- <u>Sensitive</u>: Waterways that have upstream drainage areas with impervious cover totaling 10 percent or less. These are often higher quality streams with more stable channels, appropriate habitat structure, and good to excellent water quality with diverse communities of fish and aquatic insects. Watersheds of these streams are not considered urbanized.
- <u>Impacted</u>: Having a drainage area with a percent impervious cover greater than 10% up to 25% there are usually clear signs of habitat loss and physical and chemical degradation of the stream ecosystem.
- <u>Non-Supporting</u>: When watersheds have 25% or more of its area covered in impervious surfaces waterways tend to have minimal stable habitat and aquatic biodiversity and are more apt to be serving as stormwater conveyances for upstream development rather than a natural stream ecosystem. Streams above 60% were considered "Urban Drainage" channels with poor stream ecosystem functions. For purposes of this study, both poorer categories have been grouped together.

Many developed areas in the Watershed were constructed before current stormwater regulations were implemented. More recent development has been required to meet stormwater management requirements over time—starting first in 1988 with the Chesapeake Bay Preservation Act encoded in Virginia Law, then increasingly in 1998 when the Virginia Stormwater Management Program (VSMP) was passed at the state-level, finally to the current VSMP regulations that began in 2011— however, there is still expected to be downstream impacts caused by development, especially those that pre-date 1998.





Figure 3 – Revised Impervious Cover Model (source: Schueler, et al., 2009)

Characteristics and age of the stormwater infrastructure as well as age of stormwater management measures also play an important role in the treatment and conveyance of stormwater from these impervious surfaces. They can lessen, or increase, impacts on the downstream aquatic habitats into which they drain. This plan endeavors to identify locations and ways to improve the stormwater infrastructure system including BMPs to minimize and decrease downstream impacts thus providing opportunity for functional uplift of the aquatic ecosystems across the Watershed. The degrees to which various stormwater and other water quality measures are implemented and successful has a significant impact on how much influence impervious surfaces and development have on receiving waters, thereby moving the "needle" on watershed health up and down at any given impervious cover proportion. The intent of implementing good preservation, conservation, and restoration efforts is to mitigate or eliminate negative impacts of inevitable development, and perhaps limit how much occurs.

According to current impervious estimations, all eight subwatersheds are classified as "Sensitive," with Lower Mainstem as the only subwatershed that is in the transition phase between "Sensitive" and "Impacted." Table 2 and Figure 4 below provide the existing percent impervious surface area for each subwatershed and the classification of each subwatershed based on the ICM categories. See Section 1.2.7 for discussion on future projections and trends.



Subwatarabad	Acros	Percent (%) Impervious Surface Area			
Subwatersneu	Acies	2022			
101	1714	2.6			
102	1698	4.2			
103	3098	3.9			
201	1644	4.2			
301	1722	2.8			
Lower Mainstem	314	5.7			
Middle Mainstem	1128	3.2			
Upper Mainstem	297	4.7			
Total	11616	3.6			
Total	11616	3.6			

#### Table 2 – Existing Percent Impervious Cover by Subwatershed

Impervious Model	Sensitive	8				
	Impacted	-				
00001 20110	Non-Supporting	_				



Figure 4 – Percent Impervious Cover Analysis by Subwatershed



### 1.2.3 EXISTING STORMWATER INFRASTRUCTURE AND WATERSHED CONDITIONS

There is a limited number of existing BMPs in the Watershed, in part due to the undeveloped nature of much of the watershed, but also because much of the historical development in the Watershed predated stormwater regulations and do not have BMPs.

Over the past few decades, increasingly effective stormwater management regulations have theoretically improved the effectiveness of stormwater treatment for the most recent development. However, even with recent regulations, developed areas can still be delivering an increased volume of runoff, erosive flows, and pollutants suspended in water flows (e.g., bacteria, sediment, nutrients) downstream of the stormwater infrastructure as it discharges directly into the natural aquatic ecosystems of the Watershed. This can occur because: (1) the original design of the stormwater infrastructure does not meet the current needs; (2) that the infrastructure has failed or has not been maintained appropriately over time; and/or (3) that the original design standards were not conducive to the most effective stormwater management systems. Currently there are 16 active stormwater BMPs within the Watershed – a combination of dry ponds, wet ponds, constructed wetlands, grass swales, and infiltration practices (Figure 5).





### Figure 5 - Existing Stormwater Best Management Practice (BMP) Locations

Client/Project James City County Diascund Creek WSMP 203408987 Prepared by MGS on 2023-07-19 TR by JMH on 2023-08-17 IR by DP on 2023-08-31 Project Location James City County, Virginia Ν 3,000 6,000 Feet (At original document size of 11x17) 1:36,000 Field Inspected Existing Stormwater BMP Existing Stormwater BMP  $\triangle$ 5-1 Diascund Creek Watershed Municipal Boundary 27 20 Notes 1. Coordinate System: NAD 1983 StatePlane Virginia South FIPS 4502 Feet 2. Data Sources: ESRI, James City County, Stantec 3. Orthoimagery © ESRI





### 1.2.4 Water Quality Summary

Water quality (WQ) monitoring in the Diascund Creek watershed has occurred since at least 1978, though the water monitoring consisted of infrequent and inconsistent sampling – most of the monitoring stations established were used either once or with large gaps of time between readings. The monitoring stations shown previously in Figure 2 are the monitoring stations within the portion of the Diascund Creek watershed which is in James City County. These monitoring stations have at least some data from within the last 10 years and meet the following criteria:

- Measure surface water as opposed to groundwater
- Contain bacterial, nutrient, sediment, and/or dissolved oxygen data
- Based on their location are at least potentially indicative of JCC Diascund Creek watershed conditions
- Have multiple samples, potentially covering at least a small contiguous time range

Table 3 below shows the monitoring stations with recent and relevant data, though as mentioned, the dearth of data precludes any conclusions being drawn about trends over time on the scale of interest in watershed planning and management.

Station Name	Location	Monitoring Entity	Station Identifier	Years active*	Notes			
Mill Creek at Rt. 603	Mill Creek at Diascund Rd.	Department of Environmental Quality (DEQ)	21VASWCB-2- MCR002.38	2001-2019	Sparse/inconsistent sampling, very little recent data			
Diascund Cr off Rt 601, private dock	Hicks Island on Diascund Creek	Department of Environmental Quality (DEQ)	21VASWCB-2- DSC003.19 2003-2020		Very sparse data collection			
Diascund Creek, RT. 622 Above RT. 60	Diascund Creek, just downstream of reservoir and north of Stewarts Rd.	Department of Environmental Quality (DEQ)	21VASWCB-2- DSC005.38	1994-2014	Single sample in 1994, and monthly samples through 2014.			
Diascund Reservoir off dam	See station name	Department of Environmental Quality (DEQ)	21VASWCB-2- DSC005.91	2002-2022	Very sparse relevant water quality data. Location is also not very indicative of Diascund Creek Watershed in James City County.			
*Range of years active may include significant gaps. For example, active date range of 2010-2020 may include only two sets of measurements, one in 2010 and one in 2020.								
Gray, italicized row is on the Diascund Creek Reservoir, not necessarily representative of any conditions in the Diascund Creek Watershed								

#### Table 3 – Water Quality Monitoring Stations within Diascund Creek Watershed (in JCC)

Gray, italicized row is on the Diascund Creek Reservoir, not necessarily representative of any conditions in the Diascund Creek Watershed within James City County.

While there is monitoring data, there is not consistent, long-term, and recent data. This generally applies to all pollutants of interest for the James City County watershed management planning purposes. The most recent data from within the Diascund Watershed that is not from the reservoir (largely fed by New Kent County drainage) is a single sampling in July 2020 at Hicks Island on Diascund Creek, which provided samples for Nitrogen, Phosphorus (as particulate organic), Enterococcus, and Fecal Coliform. Nitrogen and Phosphorus were both sampled 10 times during 2019 at Mill Creek at Diascund Road, but no apparent trend exists, and there is too little data for analysis.



The Diascund Creek Reservoir has more data that has been collected more recently. Consistent with the lack of impairments listed for that waterbody, only a single point collected in May 2021 has a fecal coliform count that exceeds specifications/limits. Dissolved oxygen (DO) results typically show acceptable numbers (~7-9 mg/L) in the higher stratum and low DO concentrations (< 1 mg/L) in the deeper stratum. The Diascund Creek Reservoir metrics are not a good indicator for the condition or management success of the JCC portion of the Diascund Creek Watershed.

All other monitoring data are too old, too sparse, or are samples of groundwater. Consistent, regular monitoring over the span of a few years, in coordination with DEQ, would allow JCC to better understand the true magnitude of the water quality impairments, and is recommended before significant efforts are implemented to address the TMDLs.

A robust monitoring scheme may offer valuable insights into probable successful management strategies. This might involve consistently (monthly, and ideally before and after significant rainfall events for comparison) monitoring nutrients (TN and TP), sediment (TSS), bacteria, dissolved oxygen, and biochemical oxygen demand (BOD), or ideally carbonaceous biochemical oxygen demand (CBOD) for specificity. It is also encouraged to sample at multiple locations if feasible. Minimally, bacteria and DO would provide enough data to draw better conclusions about plans and effectiveness of efforts.

### 1.2.5 TMDL ACTION/IMPLEMENTATION PLANS

There is no current watershed implementation plan (WIP) for the Diascund Creek Watershed in James City County. WIPs are prepared by DEQ to address findings from TMDL studies in a given watershed and are therefore specific to certain areas. They typically include measures such as BMPs in specific locations, and general actions that apply perhaps in one watershed but not another. For the types of actions and strategies that will benefit the Diascund Creek watershed goals, the Powhatan Creek Implementation Plan (IP) is a good resource. However, it is important to remember that the two watersheds are very different in makeup (land use and land cover) with Powhatan being much more heavily developed. For the upcoming five-year Chesapeake Bay TMDL permit cycle, and other TMDL efforts, developing an IP specific to the Diascund Creek watershed will be important. Elements one might see therein would include:

- Septic system upgrade/improvement plans
- Stormwater management programs (general)
- Stormwater best management practices (BMPs) for water quality treatment
- Ecosystem restoration/environmental uplift efforts
- Land use management programs
- Agricultural and forestry best practices
- Wildlife management programs
- Pet waste programs



### 1.2.6 THREATS TO OTHER UTILITIES AND INFRASTRUCTURE

Stream and drainage channel erosion (both the bed and banks) is often the source of threats to utilities and infrastructure in the Watershed. When channels go through changes in response to more powerful storm runoff events, the bed (bottom) of channels can incise rapidly, exposing any infrastructure that was once thought safely deep enough under the channel. Lateral erosion to the stream banks can also expose utilities and/or infrastructure that runs proximal or parallel to the channel. Additionally, these migrations of stream banks to the sides of a channel can begin to threaten other infrastructure like buildings and roadways.

### 1.2.7 FUTURE TRENDS AND CONSIDERATIONS

For this report, existing impervious cover (2022) was provided by the JCC GIS staff. This layer was reviewed and appeared to be accurate and current relative to most recently available aerial imagery. Therefore, no changes were made to impervious surfaces data provided by JCC.

For the future impervious cover estimates, a zoning-based estimate was utilized to predict future build out using best professional judgement aided by information from the county's Comprehensive Plan, satellite imagery, as well as email communications from the JCC Planning Division. An area representative of each land use category was used to derive an average impervious cover assumption to be used for future, full build out projections (Table 4 and Figure 6). These assumptions derived from representative areas were applied to those areas where land use changes were expected, and the future impervious projections were again evaluated using the ICM zone categories. The percent impervious surface area for A-1 parcels was estimated using a 3-acre minimum lot size. It is important to note that the percent impervious associated with existing A-1 parcels that have been developed. This is considered conservative, since JCC has restricted the allowable development of A-1 parcels to a 20-acre minimum lot size vs. the previous 3-acre minimum associated with past development.



Figure 6 – Representative Sample, Existing Impervious Surface Area (Purple Area)



Land Cover	Estimated Percent (%) Impervious Surface Area
Roadway	68.3
Commercial	64.8
Industrial	51.7
Medium Density Residential	15.7
Low Density Residential	8.2
Rural	3.8
Forest	0.0
Open Water	0.0

#### Table 4 – Impervious Cover Estimates by Land Cover

Based on projected Future, Full Build Out estimates, Subwatershed 102 would move out of the transition zone and become "Impacted." The rest of the subwatersheds would remain as "Sensitive." Of those remaining "Sensitive," three of the subwatersheds (103, Lower Mainstem, and Upper Mainstem) would move into the transition zone between "Sensitive" and "Impacted."

When evaluating the Comprehensive Plan and future projections described above, Subwatersheds 102 and 103 show the greatest potential for increased impervious cover from 2022 to 2045 and beyond. A summary is shown below in Table 5 and Figure 7, comparing the 2022 impervious cover estimates to the Future, Full Build Out estimate.

Final development plans, types of development, and how stormwater runoff is treated is important to consider for each action recommended, with more detail on these characteristics in following sections. Also, it is important to note that since approximately one half of recent development was required to comply with the Virginia Stormwater Management Program (VSMP) regulations due to the timing of the land disturbing activities, the effects on downstream resources may not be as significant as the ICM may suggest.



Subwatarabad	Acros	Percent (%) Impervious Surface Area				
Subwatersneu	Acres	2022	Future Buildout			
101	1714	2.6	2.6			
102	1698	4.2	19.5			
103	3098	3.9	9.5			
201 1644		4.2	4.4			
301	1722	2.8	2.8			
Lower Mainstem	314	5.7	7.1			
Middle Mainstem	1128	3.4	3.4			
Upper Mainstem 297		4.7	5.8			
Total	11616	3.6	7.5			

# Table 5 – Impervious Cover Estimates by Subwatershed (Current and Future, Full Build Out)

Impervious Model	Sensitive	8	7
	Impacted	-	1
	Non-Supporting	-	-



## Figure 7 – Percent Impervious Cover by Subwatershed (Current and Future, Full Build Out)





#### Title Figure 8 - Subwatershed ICM Impervious Cover Zones



### 1.3 Overarching Watershed Goals

JCC has created the following goals to address challenges to the Watershed:

- 1. Maintain and build natural resources, wildlife habitat, and critical areas of undeveloped land within the watershed, as identified within the conservation priorities of this Plan, the County's Natural & Cultural Assets Plan, and other relevant Virginia data sets.
- 2. Identify opportunities for improved management of agricultural and silvicultural practices or other opportunities for water quality improvements.
- 3. Refine the County stormwater and land use planning requirements to prioritize protection of the Diascund Creek Watershed with participation and collaboration from residents and local stakeholders.
- 4. Promote watershed awareness and active stewardship among residents and local stakeholders through educational programs, recreational opportunities, and participatory watershed activities.
- 5. Maintain and improve water quality in Diascund Creek to satisfy Local Bacteria TMDLs and prevent impairments.
- 6. Identify and prioritize potential flood risks and hazards within the Diascund Creek Watershed with consideration to establishing future programming.

Many stakeholders were contacted and engaged during the process of developing this Watershed Management Plan. The goals above will require continuous engagement from stakeholders, JCC, and other organizations to ensure that strategic actions are initiated and completed.

### 1.4 Realizing Watershed Goals Through Strategic Actions

The achievement of watershed goals to address the different challenges for the Diascund Creek Watershed will involve five (5) general types of Strategic Actions. The recommended actions found within this management plan can be grouped into these categories:

- <u>Programmatic</u> Efforts such as Land Conservation/Purchase of Development Rights, wildlife management (e.g. goose exclusion from ponds), development of an incentivized public stewardship program, and continued septic system inspections/clean-out/repair support programs.
- <u>Regulatory/Enforcement</u> For example, expand Special Stormwater Criteria for new development and re-development, increase stormwater controls for infill development, restrict inter-watershed nutrient credit trading, and maintaining the current 20-acre minimum lot size requirement for any future development of parcels zoned A-1.
- Floodplain Management Consider an enhanced flood modeling effort, coordinating on Dam Break Inundation Zone planning, drainage upgrades, and elevating road crossings.
- <u>Education/Awareness</u>- Increasing engagement with local residents, additional public events, public waste disposal and litter prevention campaigns, and small-scale runoff reduction education and encouragement.



 <u>Watershed Restoration Projects</u> – Explore the retrofitting of existing Stormwater Best Management Practices (BMPs) to increase treatment effectiveness of stormwater runoff, construction of new BMPs in areas that are currently not served by existing BMPs, and stream enhancement and/or restoration projects.

The remainder of this management plan is broken into the following Sections:

- Section 2 Watershed Assessment
  - Summarizes both desktop and field analyses of current conditions within the Watershed.
- Section 3 Watershed Goals and Strategic Actions
  - Describes the steps taken to develop current Watershed Goals and the associated recommended Strategic Actions.
- Section 4 Watershed Restoration Projects
  - Details the methods used to identify the various types of site-specific stormwater treatment or stream restoration projects across the Watershed.
- Section 5 Strategic Action Plan
  - A plan for the implementation for realizing the success of proposed Strategic Actions with prioritization and estimated costs and project timelines.
- o Section 6 Subwatershed Management Plans
  - Smaller scale exhibits of findings and recommended actions for each subwatershed serving as easy reference for sub regions of the larger Watershed.



### 2 WATERSHED ASSESSMENT

This section details the desktop and field analyses that were performed to better understand the historic and current trends of conditions in both upland and aquatic environments and how upland area analyses can inform next steps.

### 2.1 Subwatershed Designations and Limits of The Assessment

As seen in previous figures and tables, the Diascund Creek Watershed has been divided into smaller planning-level geographic units based on contributing drainage area boundaries. See Figure 12 below for an overview of the Watershed and the subwatershed boundaries.





#### Title Figure 9 - Subwatershed Boundaries used for **Assessments and Recommendations**



### 2.2 Desktop Assessments

### 2.2.1 LAND USE AND IMPERVIOUSNESS

Land Use composition across a contributing drainage area is one of the biggest drivers of the downstream waterways' health. Exposure of soil under certain land uses can increase the amount of wind and rain erosion of sediment, along with the pollutants that can be attached to the soils eroded (e.g., nutrients, metals, bacteria). Additionally, some land uses may not have large areas of exposed soil, but they do have large areas of impervious surface—areas where rainwater cannot infiltrate into the ground. Increased impervious area can lead to concentrated flows that are routed quickly and in larger amounts to downstream waterways via surface ditches or underground via pipes. The change in the timing (faster) and amount of surface water running off (runoff) to downstream waterways can disturb and damage natural aquatic and riparian ecosystems. Additionally, pollutants in suspension in the runoff (e.g., metals, nutrients, sediment) are delivered to the downstream ecosystems leading to biogeochemical issues in the habitats.

A data layer of Existing Land Use and Land Cover was created using JCC parcel data in GIS for subsequent input into the Watershed Treatment Model (WTM) discussed further below in Section 2.2.3. Residential areas were assigned WTM Land Use/Cover Types using each parcel's approximate number of dwelling units per acre. Existing parcel data was used to determine the remaining areas of commercial, roadway, industrial, rural, forest, open water, and vacant land use types as defined by CWP for use in the WTM. For each land use type, the impervious coverage percentage was provided in the WTM and used to calculate the approximate acreage of impervious area. The land cover and impervious composition of the Diascund Creek Watershed is presented in Table 6 and a map of the land cover in Figure 10.

	Existing	Land Use	Impervious Area			
WTM Land Use Type	Area	Percentage	Area	Percentage		
	(ac)	(%)	(ac)	(%)		
Low Density Residential	279	2.4%	31	11.0%		
Medium Density Residential	34	0.3%	7	21.0%		
High Density Residential	-	0.0%	-	33.0%		
Commercial	42	0.4%	30	72.0%		
Industrial	9	0.1%	5	53.0%		
Roadway	498	4.3%	398	80.0%		
Forest	4, 768	41.1%	48	1.0%		
Rural	5,619	48.4%	281	5.0%		
Open Water	337	2.9%	337	100.0%		
Vacant Lots	29	0.3%	1	5.0%		
Total	11,616		1,138	9.8%		

#### Table 6 – Existing Land Use and Land Cover WTM Inputs - Overall Summary







### 2.2.2 CONSERVATION AREAS

To assess areas for conservation planning within the Diascund Creek watershed, several documents were consulted. These include the *James City County Natural & Cultural Assets Plan* and the *James City County 2045 Comprehensive Plan*.

Using the *James City County Natural & Cultural Assets Plan,* sixteen conservation areas were identified. The sixteen conservation areas identified totaled 5,353 acres. The *James City County 2045 Comprehensive Plan* was used to evaluate development pressure on the conservation areas. Scoring parameters used in the *Powhatan Creek Conservation Area Report* were applied in combination with various desktop analyses to prioritize conservation areas within the Diascund Creek Watershed (shown in Figure 11 below).

The following sections focus on the methods used to evaluate the potential presence of RTE species within the Diascund Creek Watershed, and also issue a proposed ranking of the sixteen conservation areas identified in the *James City County Natural & Cultural Assets Plan*.

### 2.2.2.1 RTE and Conservation Review Methods

Online database searches for federal and state listed RTE species were completed with specific attention to the sixteen conservation areas. The purpose of conducting these searches was to generate a current list of species with the highest need of conservation planning and management and, to the extent possible, correlate the location of any documented RTE species to the conservation areas for evaluation. The databases searched included the following:

- U.S. Fish & Wildlife (USFWS) Information, Planning, and Conservation (IPaC) Trust Resource List and Official Species List
- The Virginia Department of Wildlife Resources (DWR) Virginia Fish and Wildlife Information Service (VAFWIS) Database
- Virginia DWR Wildlife Environmental Review Map Service (WERMS)
- Virginia DWR Northern Long-eared Bat (NLEB) Winter Habitat and Roost Trees Map
- Virginia DWR Little Brown Bat (MYLU) and Tri-colored Bat (PESU) Winter Habitat and Roosts Application
- Virginia Department of Conservation and Recreation (DCR) Natural Heritage Data Explorer (NHDE)
- Center for Conservation Biology (CCB) Bald Eagle Nest Locator for Virginia

In addition to generating a list of RTE species, the seven scoring parameters used in the *Powhatan Creek Conservation Area Report* were evaluated for each of the sixteen conservation areas. A review of available online imagery was also conducted to evaluate the extent to which the observable changes to land use may have impacted any of the priority conservation areas. The scoring parameters with brief descriptions are shown below. Scores were assigned for each parameter, with a lower number assigned for areas with less value for that particular parameter and a higher number assigned for high-value areas. For example, an area with no known RTE species and low potential for future habitat may be assigned a 0 for the RTE Species parameter, while an area with a significant known RTE species population may be



assigned a 10 for the same parameter. A total score was computed for each conservation area as a sum of each of the seven parameters.

- Environmental Significance/Environmental importance of the area/Presence of RTE species, mature contiguous forest, blue heron rookeries
  - High (12-15)
  - Medium (7-11)
  - Low (<7)
- Development Pressure
  - Very recent development or expected in the near future (9-10)
  - Future development (6-8)
  - Possibility (3-6)
- Resource Protection Area (RPA) Protection
  - No potential for RPA protection (8-10)
  - Some potential for RPA protection (5-7)
  - Sufficient protection by RPA (0-4)
- RTE Species
  - Presence of RTE species (8-10)
  - High potential for RTE species (5-8)
  - Low potential for RTE species (0-4)
- Invasive Species Potential
  - High potential for invasive species due to extensive disturbance (8-10)
  - Medium potential (5-7)
  - Low potential (0-4)
- Stormwater Hydrology
  - Significant current or future hydrology changes i.e., increased flooding, increased stream erosion (9-10)
  - Medium potential for hydrology changes (5-8)
  - Low potential for hydrology changes (0-4)
- Land Ownership
  - Owned or under easement by county, land trust or public institution (8-10)
  - Private ownership in relatively large tracts (5-7)
  - Private ownership slated for development (0-4)

Stantec also utilized the Virginia Natural Landscape Assessment, developed by the Virginia Natural Heritage Program (VNHP) in the Department of Conservation and Recreation (DCR), as well as the Virginia Department of Forestry (VDOF) Forest Conservation Tool to review Ecological Cores and Forest Conservation Values (FCV) within the conservation areas. Ecological Cores consider a variety of attributes including habitat, diversity, and water quality benefits. The FCV model is designed to strategically identify the highest priority forestland for conservation in Virginia. These models provide ecological integrity and conservation value categories which allow planners to identify and prioritize conservation efforts on the most significant, high quality ecological communities. For the purposes of this evaluation, Stantec reviewed the categories shown within the conservation areas primarily to inform the Environmental Significance parameter.

The review of each of the conservation areas, including the evaluation of the scoring parameters, aerial imagery, ecological cores, FCV models, and RTE list, allows for an informed preliminary ordering of the sixteen conservation areas. It should be noted that no fieldwork has been conducted in support of this effort. Rather, all assessments have been conducted using available online resources and desktop analysis methods.





### **Figure 11 - Location of Conservation Areas, and** Habitat Cores and Corridors

Client/Project 203408987 James City County Diascund Creek WSMP Prepared by MGS on 2023-07-20 TR by JMH on 2023-08-17 IR by DP on 2023-08-31 Project Location James City County, Virginia Ν 6,000 3.000 Feet (At original document size of 11x17) 1:36,000 Diascund Creek Watershed Boundary Corridor Type Local connection - Small road or train track Route Route requiring tunnel/bridge Tunnel/Bridge Habitat Core Ranking Priority Heightened Priority Habitat Core 777 Habitat Core Priority Conservation Areas Conservation Areas Identified by JCC Already Conserved



Notes 1. Coordinate System: NAD 1983 StatePlane Virginia South FIPS 4502 Feet 2. Data Sources: ESRI, James City County, Stantec 3. Orthoimagery © ESRI





### 2.2.2.2 Results of RTE and Conservation Review

While the Ecological Cores and FCV models show a range of ecological integrity and conservation value categories within the conservation areas, the majority are Moderate and High. There is very little development within the conservation areas. The results of the online database searches for RTE indicate numerous rare, threatened, and endangered species may be present within the Diascund Creek Watershed. Some species have the potential to be present throughout the watershed while the potential for others, such as sensitive joint-vetch and small whorled pogonia, appears to be localized to specific conservations areas. Four bald eagle nests are documented in conservation areas along the Diascund Creek mainstem. Three are in conservation area D12 and one is in D10. These conservation areas are generally located in the Lower Mainstem and Middle Mainstem Subwatersheds, stretching into Subwatershed 101.

A review of the conservation areas in tandem with the scoring parameters has yielded a variety of observations leading to a preliminary ordering. Some of these observations include:

- Proposed development/land disturbance will diminish the natural value of some conservation areas and will eliminate the opportunity for additional conservation.
- RTE species have the potential to occur within the conservation areas.
- Several conservation areas are almost entirely within an RPA and are adequately protected under local, state, and federal regulation.
- Some conservation areas are mostly protected by RPAs but may have land acquisition or conservation potential for adjacent uplands outside of RPA buffers.
- Based upon a review of the recorded easements, portions of several conservation areas are protected through the conservation easements.

Landowner stewardship, additional conservation, or land acquisition were other management recommendations for several conservation areas. Based upon a review of the recorded easements, portions of several conservation areas are protected through the conservation easements. Table 7 presents the Diascund Creek Watershed conservation area priority scoring as well as a brief summary of key elements and protection status used to inform scoring.

While the focus of this Plan has been the sixteen priority conservation areas, a variety of tools for evaluating and managing conservation areas are available and recommended in the *James City County 2045 Comprehensive Plan* and the *James City County Natural & Cultural Assets Plan*. These tools can be applied within the habitat cores and throughout the watershed. All of the habitat corridors as depicted in the *Natural & Cultural Assets Plan* are shown in Figure 11 and should be considered as priority conservation potential inclusive with the adjacent conservation areas.



Rank	Conservation Areas ID	Description of Key Elements	Current Protection Status	Environmental Significance (1-15, high)	Development Pressure (0-10, high)	Protection (0-10)	RTE (0-10)	Invasive Species Potential (0-10)	Stormwater Hydrology Threats (0-10, high)	Land Ownership (0-10)	Total Score
1	D5	Large contiguous forest situated on non- tidal wetlands and streams in Edwards Swamp drainage basin. Limited potential for RPA expansion along non-tidal streams and wetlands. RTE species include northern long-eared bat, tricolored bat, Monarch butterfly, and small whorled pogonia. More than half of this CA is zoned for "Economic Opportunity."	RPA present per JCC (35% of CA). Ownership is private with no recorded conservation easements.	12	9	7	7	8	8	5	56
2	D13	Primarily a mix of mature and immature forest situated along the upper limits of the freshwater tidal portion of Mill Creek as well as non-tidal wetlands and streams. An ecological core with high integrity is located within the conservation area. Limited opportunity for RPA expansion. RTE species include northern long-eared bat, tricolored bat, Monarch butterfly, and sensitive joint- vetch.	RPA present per JCC (45% of CA). Ownership is private with no recorded conservation easements.	14	6	7	8	7	5	6	53
3	D2	Large contiguous forest situated on non- tidal wetlands. RTE potential along non- tidal wetlands. Potential RTE species include northern long-eared bat, tricolored bat, and Monarch butterfly.	RPA present per JCC (46% of CA). Ownership is predominately private with no recorded conservation easements. One parcel within the CA is owned by a public utility.	12	5	6	6	7	8	8	52



Rank	Conservation Areas ID	Description of Key Elements	Current Protection Status	Environmental Significance (1-15, high)	Development Pressure (0-10, high)	Protection (0-10)	RTE (0-10)	Invasive Species Potential (0-10)	Stormwater Hydrology Threats (0-10, high)	Land Ownership (0-10)	Total Score
4	D8	Mature and semi-mature contiguous forest situated along Mill Creek. Little potential for RPA expansion along non- tidal streams and wetlands. RTE species include northern long-eared bat, tricolored bat, Monarch butterfly, and small whorled pogonia. A small portion of this CA is designated "Economic Opportunity" by the Comprehensive Plan, but has not yet been rezoned to a business or mixed use district.	RPA resent per JCC (47 % of CA). Ownership is private with approximately 1.7% of the CA in greenspace/purchase of development rights (PDR) easements.	11	7	6	6	8	7	7	52
5	D4	Large area of contiguous forest with some silvicultural activity. An ecological core with high integrity is within the conservation area. RPA expansion potential along non-tidal streams and wetlands. Potential RTE species include northern long-eared bat, tricolored bat, and Monarch butterfly.	RPA present per JCC (32% of CA). Ownership is predominately private with <0.01% of the CA in recorded conservation easements.	13	5	7	6	8	5	7	51
6	D1	Contiguous forest situated on non-tidal wetlands and streams. Land use is primarily silviculture. RTE potential along non-tidal wetlands. Potential RTE species include northern long-eared bat, tricolored bat, and Monarch butterfly.	RPA present per JCC (24% of CA). Ownership is private with no recorded conservation easements.	11	5	7	5	9	8	6	51
7	D10	Contiguous forest situated with non-tidal wetlands and streams as well as approximately 25% consisting of freshwater tidal wetlands and waters. Limited potential for RPA expansion. Potential RTE species include northern long-eared bat, tricolored bat, Monarch butterfly, and sensitive joint vetch. A bald eagle nest is present (checked 2021).	RPA present per JCC (51% of CA). Ownership is private with approximately 12.4% of the CA in purchase of development rights (PDR) easements.	14	4	7	8	4	4	7	48
8	D11	Contiguous forest situated on non-tidal wetlands and streams of Mill Creek. Limited potential for RPA expansion. RTE species include northern long-eared bat, tricolored bat, and Monarch butterfly.	RPA present per JCC (47% of CA). Ownership is private approximately 11.9% of the CA in purchase of development rights (PDR) easements.	12	5	7	7	5	4	6	46



Rank	Conservation Areas ID	Description of Key Elements	Current Protection Status	Environmental Significance (1-15, high)	Development Pressure (0-10, high)	Protection (0-10)	RTE (0-10)	Invasive Species Potential (0-10)	Stormwater Hydrology Threats (0-10, high)	Land Ownership (0-10)	Total Score
9	D7	Mature and semi-mature contiguous forest situated along Edwards Swamp and headwaters of Mill Creek. Limited potential for RPA expansion. RTE species include northern long-eared bat, tricolored bat, and Monarch butterfly.	RPA present per JCC (36% of CA). Ownership is private with no recorded conservations easements.	12	4	7	6	6	4	7	46
10	D15	Contiguous forest situated along non- tidal wetlands, streams and freshwater pond. Limited potential for RPA expansion. Potential RTE species include northern long-eared bat, tricolored bat, Monarch butterfly, small whorled pogonia.	RPA present per JCC (37% of CA). Ownership is private and no conservation easements.	11	5	6	8	5	4	7	46
11	D14	Contiguous forest situated at the headwaters of a tributary to Mill Creek. Areas of forest with a high conservation value are dispersed throughout the CA. Limited potential for RPA expansion. RTE species include northern long-eared bat, tricolored bat, and Monarch butterfly.	RPA present per JCC (41% of CA). Ownership is private with no recorded conservation easements.	11	5	6	5	7	5	7	46
12	D3	Mature contiguous forest situated on non-tidal wetlands. RPA expansion potential along stream tributaries and non-tidal wetlands. Potential RTE species include northern long-eared bat, tricolored bat, and Monarch butterfly.	RPA present per JCC (36% of CA). Ownership is predominately private with no conservation easements recorded. Two parcels within the CA are owned by a public utility.	12	4	7	6	6	4	7	46
13	D12	CA consists almost entirely of freshwater tidal wetlands. Limited potential for RPA expansion. There are three bald eagle nests. There is potential for RTE species along the non-tidal wetlands and within the ecological core with high integrity. RTE species include northern long-eared bat, tricolored bat, Monarch butterfly, and sensitive joint-vetch.	RPA present per JCC (90% of CA). Ownership is all private with no recorded conservation easements.	14	3	5	8	5	4	6	45



Rank	Conservation Areas ID	Description of Key Elements	Current Protection Status	Environmental Significance (1-15, high)	Development Pressure (0-10, high)	Protection (0-10)	RTE (0-10)	Invasive Species Potential (0-10)	Stormwater Hydrology Threats (0-10, high)	Land Ownership (0-10)	Total Score
14	D16	Smaller area of contiguous forest with significant wetlands associated with Diascund Creek. Approximately 60% of the CA consists of RPA resources or is within RPA buffers. There is limited potential for RPA expansion. Approximately 30% of the CA already has conservation easements. RTE species include northern long-eared bat, tricolored bat, Monarch butterfly, and sensitive joint-vetch.	RPA present per JCC (60% of CA). Ownership is private with approximately 30% of the CA in conservation easements and approximately 30% in purchase of development rights (PDR) easements.	13	3	5	8	6	4	5	44
15	D6	Smaller area of contiguous forest situated in headwaters. Little potential for RPA expansion. RTE species include northern long-eared bat, tricolored bat, and Monarch butterfly.	RPA present per JCC (26% of CA). Ownership is private with no recorded conservation easements.	11	5	7	4	6	4	6	43
16	D9	Predominately freshwater tidal wetlands and waters with mature contiguous forest. RTE species include northern long- eared bat, tricolored bat, Monarch butterfly, sensitive joint-vetch. Conservation area contains small blocks of forest with high conservation value.	RPA present per JCC (91% of CA). Ownership is private with no recorded conservation easements.	14	3	4	7	4	4	5	41



### 2.2.2.3 Conclusions of Conservation and RTE Review

Findings and recommendations from our Conservation and RTE review have resulted in an initial prioritization of conservation areas to be considered moving forward. Further discussion of how these recommendations will be incorporated with other Watershed Restoration Efforts can be found in Sections 3 and 5.

### 2.2.3 Pollutant Load Modeling

As a part of desktop assessment efforts for the Watershed, Stantec modeled pollutant loads and existing stormwater practices using the most current version of the Watershed Treatment Model (WTM, 2013) created by the Center for Watershed Protection (CWP). The WTM is a relatively simple, Excel-based approach to rapidly assess and quantify various watershed pollutant loading and treatment options (CWP, 2013). These results are meant to provide a closer look at pollutant loading by subwatershed, guiding JCC's planning efforts.

All inputs for the WTM were created using JCC-sourced GIS data. JCC's stormwater BMP locations along with attributes were obtained from publicly available GIS data downloaded from JCC's ESRI Data Hub. In a few cases, adjustments were made for input into the WTM using best professional judgement.

Pollutant loading was calculated for existing and future land use scenarios with BMP load reductions included. Changes expected under future buildout (future conditions land use) were created by Stantec using future development plans and other information provided by JCC. Other future changes were assumed using best professional judgement. See Section 2.2.3.2 for WTM outputs for all Subwatersheds.

#### 2.2.3.1 WTM Inputs

#### 2.2.3.1.1 Primary Sources of Pollutants

The WTM calculates pollutant loading by considering the areas and imperviousness of different land use and land cover types across a given watershed. Land use inputs were created using JCC parcel data in GIS. Residential areas were assigned WTM Land Use Types using each parcel's approximate number of dwelling units per acre. Existing parcel data were used to determine the remaining areas of commercial, roadway, industrial, rural, forest, open water, and vacant land use types. Default impervious cover percentages come with the model preset for each land use type.

After assigning existing WTM land use types to JCC parcels, the Future Land Use assignments were developed to depict future development potential within the watershed. JCC parcel data included information on potential future land use types as part of the Comp Plan, which was used to select the proper future land use assignments. Other supplementary information provided by JCC included future development plans for areas within the watershed. These specific areas were identified and assigned to a more highly developed land use type for future pollutant load calculations. The Comp Plan and future development plan information was used to upgrade land types from existing to future when the future land use type has a higher percent of impervious cover to create the most conservative pollutant loading estimates, e.g. changing Forest to Low Density Residential. Existing roadway parcels were supplemented by VDOT ROW boundaries to create more consistent roadway areas.



Table 8 provides a breakdown of land use type totals under each land use scenario. Figure 12 provides a spatial view of the existing and future land use scenario inputs.

	Existing	and Use	Future L	and Use	Existing to Future	
WTM Land Use Type	Area	Percentage	Area	Percentage	Estimates - Percent	
	(ac)	(%)	(ac)	(%)	Change (%)	
Low Density Residential	279	2.4%	427	3.7%	52.9	
Medium Density Residential	34	0.3%	64	0.5%	85.8	
High Density Residential	-	0.0%	-	0.0%	-	
Commercial	42	0.4%	635	5.5%	1428.5	
Industrial	9	0.1%	89	0.8%	904.7	
Roadway	498	4.3%	495	4.3%	-0.5	
Forest	4, 768	41.1%	4,335	37.3%	-9.1	
Rural	5,619	48.4%	5,234	45.1%	-6.9	
Open Water	337	2.9%	337	2.9%	0.0	
Vacant Lots	29	0.3%	-	0.0%	-100.0	
Total	11,616		11,616			

#### Table 8 – WTM Land Use Inputs Overall Summary

Note: the darker the red shading, the higher the increase in impervious area.

It should be noted that a significant amount of the Watershed is classified as Rural land use type (~48%). The primary sources of pollutants for rural lands vary from other urban development types, and most notably include pollutants from agriculture/livestock areas that are grouped into the Rural land use type. The WTM Model makes assumptions associated with the nature of these lands, and typical pollutant loadings are applied accordingly.





### Figure 12 - Land Use Inputs for WTM Scenario Runs

Client/Project James City County		203408987					
Diascund Creek WS	SMP						
Project Location		Prepared by MGS on 2023-07-20 TR by JMH on 2023-08-17					
James City County, Virginia		IR by DP on 2023-08-31					
Ν							
	0 1,000	0 2,000					
	(At original docum 1:72	nent size of 11x17) 000					
WTM Model	Subwatershed B	oundary					
WTM Inputs - Land C	over/Use						
Open Water							
Forest							
Rural							
Vacant Lots							
Low Density	Residential						
Medium Dens	Medium Density Residential						
High Density	Residential						
Commercial							
Industrial							
Roadway							



 Notes

 1. Coordinate System: NAD 1983 StatePlane Virginia South FIPS 4502 Feet

 2. Data Sources: ESRI, James City County, Stantec

 3. Orthoimagery © ESRI





### 2.2.3.1.2 Secondary Sources of Pollutants

Other pollutant loading in a watershed can come from sources not driven by land use. The WTM considers multiple secondary sources when estimating a final pollutant load. Secondary source loads considered as part of the Diascund Creek WTM are septic tank failures, illicit connections, subsurface runoff from lawns, and runoff from vacant lots. Inputs used for these WTM secondary sources were developed using JCC-sourced GIS data.

Secondary pollutant loading from septic tank failures is calculated using the number of septic tanks in each watershed. The WTM uses a default 30% failure rate and default effluent rates for TN, TP, TSS, and Fecal Coliform bacteria to calculate specific pollutant loading rates. Table 9 below shows the percentage of total pollutant loading that comes from septic tank failures in each watershed. Figure 13 shows the locations of all septic tanks within the Watershed. Due to the large number of septic tanks in the Watershed (1004 septic tanks, accounting for roughly 20% of all septic tanks in JCC), this source of pollution is predicted to be a relatively large portion of the total pollutant loading, especially for Total Nitrogen (27.4% of total TN loading for the Watershed). See Section 3.1.1 for discussion on recommended strategic actions to specifically address pollution sources from septic tanks.


Culture to a band	TN (lbs/year)			Culture to a to a	TP (lbs/year)		
subwatersneu	Existing Load from Septic Loads Failure		%	subwatersned	Existing Loads	Load from Septic Failure	%
DC-101	6,779	1,044	15.4%	DC-101	764	13	1.7%
DC-102	7,262	1,427	19.7%	DC-102	890	18	2.0%
DC-103	13,695	3,651	26.7%	DC-103	1,774	46	2.6%
DC-201	7,216	3,294	45.7%	DC-201	878	41	4.7%
DC-301	7,690	1,071	13.9%	DC-301	890	13	1.5%
DC-Lower	1,546	930	60.1%	DC-Lower	203	12	5.8%
DC-Middle	5,752	1,839	32.0%	DC-Middle	604	23	3.8%
DC-Upper	1,436	632	44.0%	DC-Upper	185	8	4.3%
Watershed Totals	51,377	13,889	27.0%	Watershed Totals	6,188	174	2.8%
TSS (lbs/year)							
Subwatershed	1	rss (Ibs/year)		Subwatershed	Fecal Co	liform Bacter cfu/year)	ia (10^9
Subwatershed	Existing Loads	rss (lbs/year) Load from Septic Failure	%	Subwatershed	Fecal Co Existing Loads	liform Bacter cfu/year) Load from Septic Failure	ia (10^9 %
Subwatershed DC-101	Existing Loads 182,321	ISS (lbs/year) Load from Septic Failure 524	%	Subwatershed DC-101	Fecal Co Existing Loads 57,955	liform Bacter cfu/year) Load from Septic Failure 1,190	<b>ia (10^9</b> % 2.1%
Subwatershed DC-101 DC-102	Existing Loads 182,321 204,035	Load from Septic Failure 524 717	% 0.3% 0.4%	Subwatershed DC-101 DC-102	Fecal Co Existing Loads 57,955 120,418	liform Bacter cfu/year) Load from Septic Failure 1,190 1,627	ia (10^9 % 2.1% 1.4%
Subwatershed DC-101 DC-102 DC-103	Existing Loads 182,321 204,035 348,384	Load from Septic Failure 524 717 1,833	% 0.3% 0.4% 0.5%	Subwatershed DC-101 DC-102 DC-103	Fecal Co Existing Loads 57,955 120,418 179,085	Load from Septic Failure 1,190 1,627 4,161	ia (10^9 % 2.1% 1.4% 2.3%
Subwatershed DC-101 DC-102 DC-103 DC-201	Existing Loads 182,321 204,035 348,384 182,190	Load from Septic Failure 524 717 1,833 1,654	% 0.3% 0.4% 0.5% 0.9%	Subwatershed DC-101 DC-102 DC-103 DC-201	Fecal Co Existing Loads 57,955 120,418 179,085 113,786	Load from Septic Failure 1,190 1,627 4,161 3,754	ia (10^9 % 2.1% 1.4% 2.3% 3.3%
Subwatershed DC-101 DC-102 DC-103 DC-201 DC-301	Existing Loads 182,321 204,035 348,384 182,190 217,293	Load from Septic Failure 524 717 1,833 1,654 538	% 0.3% 0.4% 0.5% 0.9% 0.2%	Subwatershed DC-101 DC-102 DC-103 DC-201 DC-301	Fecal Co Existing Loads 57,955 120,418 179,085 113,786 133,540	Load from Septic Failure 1,190 1,627 4,161 3,754 1,221	ia (10^9 % 2.1% 1.4% 2.3% 3.3% 0.9%
Subwatershed DC-101 DC-102 DC-103 DC-201 DC-301 DC-Lower	Existing Loads 182,321 204,035 348,384 182,190 217,293 35,326	Load from Septic Failure 524 717 1,833 1,654 538 467	% 0.3% 0.4% 0.5% 0.9% 0.2% 1.3%	Subwatershed DC-101 DC-102 DC-103 DC-201 DC-301 DC-Lower	Fecal Co Existing Loads 57,955 120,418 179,085 113,786 133,540 23,256	Load from Septic Failure 1,190 1,627 4,161 3,754 1,221 1,060	ia (10^9 % 2.1% 1.4% 2.3% 3.3% 0.9% 4.6%
Subwatershed DC-101 DC-102 DC-103 DC-201 DC-301 DC-Lower DC-Middle	Existing Loads 182,321 204,035 348,384 182,190 217,293 35,326 126,531	Load from Septic Failure 524 717 1,833 1,654 538 467 923	% 0.3% 0.4% 0.5% 0.9% 0.2% 1.3% 0.7%	Subwatershed DC-101 DC-102 DC-103 DC-201 DC-201 DC-301 DC-Lower DC-Middle	Fecal Co Existing Loads 57,955 120,418 179,085 113,786 133,540 23,256 46,484	Load from Septic Failure 1,190 1,627 4,161 3,754 1,221 1,060 2,096	ia (10^9 % 2.1% 1.4% 2.3% 3.3% 0.9% 4.6% 4.5%
Subwatershed DC-101 DC-102 DC-103 DC-201 DC-301 DC-Lower DC-Middle DC-Upper	Existing Loads 182,321 204,035 348,384 182,190 217,293 35,326 126,531 35,975	Load from Septic Failure 524 717 1,833 1,654 538 467 923 317	% 0.3% 0.4% 0.5% 0.9% 0.2% 1.3% 0.7% 0.9%	Subwatershed DC-101 DC-102 DC-103 DC-201 DC-201 DC-301 DC-Lower DC-Middle DC-Upper	Fecal Co Existing Loads 57,955 120,418 179,085 113,786 133,540 23,256 46,484 22,699	Load from Septic Failure 1,190 1,627 4,161 3,754 1,221 1,060 2,096 720	ia (10^9 % 2.1% 1.4% 2.3% 3.3% 0.9% 4.6% 4.5% 3.2%

### Table 9 – WTM Septic Failure Pollutant Loading

### 2.2.3.1.3 Existing Stormwater Management Practices

Programs and practices used to control pollutant loading are included in the WTM as existing management practices. The WTM quantifies the effectiveness of pollution prevention programs such as pet waste education and residential lawn care education. Information on JCC pollution prevention programs was used to choose the factor of effectiveness. Structural stormwater practices (BMPs) are also considered in the WTM through the impervious acreage treated by each type of practice. Since the WTM calculates a different impervious acreage of a subwatershed using default zoning percentages, the total impervious acreage calculated by WTM can be higher than the sum of impervious acreage treated by all BMPs in a subwatershed. In these cases, the difference must be subtracted from the BMP inputs for the WTM to calculate pollutant load reduction. BMPs in the Diascund Creek Watershed were shown above in Figure 5.



### 2.2.3.1.4 Future Development Stormwater Management Practices

For any land use changes from future development, the WTM assumes that new stormwater management practices will be built to address water quality in accordance with Virginia Stormwater Management Program (VSMP) standards. To best emulate these standards, nutrient load reductions from a combination of BMP types were calculated for future development land use and included in the Future scenarios. The mix of BMPs applied to future development was 40% Dry Extended Detention, 40% Wet Ponds, 10% Constructed Wetlands, and 10% Infiltration Practices. A corroborative check using the Virginia Runoff Reduction Method (VRRM) computations spreadsheet associated with the current VSMP standards showed such a mix of BMPs would meet water quality regulatory requirements for an example watershed. Discount factors are applied to these reductions based on the selected Program Option per the WTM documentation, accounting for the potential for less BMP performance over time versus design assumptions due to lack of maintenance and other factors. Program Option 3 was selected as it best represented the design and maintenance standards of new development BMPs, and it also requires that net stormwater load is reduced to pre-development levels. These requirements result in a higher discount factor for the proposed future development BMPs.





### Title Figure 13 - Other Spatial Data Used to Derive WTM Inputs

Client/Project James City County Diascund Creek WSMP 203408987 Prepared by MGS on 2023-08-16 TR by JMH on 2023-08-17 IR by DP on 2023-08-31 Project Location James City County, Virginia Ν 3 000 6,000 Feet (At original document size of 11x17) 1:36,000 Septic Tank Parcel Centroid Subwatershed Boundary Municipal Boundary とう Notes 1. Coordinate System: NAD 1983 StatePlane Virginia South FIPS 4502 Feet 2. Data Sources: ESRI, James City County, Stantec 3. Orthoimagery © ESRI **Stantec** 

### 2.2.3.2 WTM Outputs

The WTM provides pollutant loading estimates for Total Nitrogen (TN), Total Phosphorus (TP), Total Suspended Solids (TSS), and Fecal Coliform Bacteria (FC). Pollutant loading rates per acre for each land use type were given for primary sources in the WTM. Pollutant loading rates for secondary sources were also given in the WTM, but final pollutant loads include more than those determined by land use area inputs (i.e., septic systems as point inputs in a given watershed). Pollutant reduction rates by BMP type were provided by WTM and used to calculate overall pollutant load reductions based on impervious treatment areas. Reductions from other existing management practices were calculated in the WTM using pre-defined factors based on the existence and effectiveness of certain pollution prevention programs and infrastructure. Please refer to the CWP Model Documentation for further details and assumptions on how the WTM estimates these four pollutants' dynamics and loading (CWP, 2013).

The WTM is a great tool for watershed managers and other interested parties but there are limitations Stantec identified during review of modeling outputs. The model assumes a total sediment load for a given drainage area based on watershed size only—not accounting for the composition of Land Use and Land Cover (LULC) types. When TSS loads from primary sources (LULC) change (i.e., increase) into the future the total assumed sediment load from the drainage area does not increase but simply shifts some load from primary sources (upland loading) to secondary sources (channel erosion). This amounts to a "Zero-Sum" effect where expected TSS from a drainage area does not increase regardless of how developed the drainage area happens to be. Because of this model characteristic only upland loading (i.e., Primary Source Loads) of TSS output estimates is included below.

Table 10 provides total pollutant load estimates for each subwatershed, from just that subwatershed, within the Diascund Creek Watershed for the existing and future land use scenarios. Table 11 provides cumulative (total) pollutant load estimates expected at the outlet of each subwatershed for existing and future land use scenarios. These cumulative loads can be used to identify if and where surface water loads might exceed certain thresholds for water quality standards or goals. Table 12 provides annual loading rate per acre of land per subwatershed (shown on Figures 18-21). Note that Table 10 provides annual load estimates, and Tables 11 and 12 provide annual loading rates per acre of land. The cumulative loading rates provided in Table 11 are shown as stream lines with their associated colors in Figures 18-21 to visually present the cumulative effects of upstream pollutant loads on downstream waterways.



Subwatershed	TN (lbs/year)			Subwatershed	TP (lbs/year)		
	Existing Future		% Change		Existing Loads	Future Loads	% Change
DC-101	6,779	6,781	0.0%	DC-101	764	765	0.1%
DC-102	7,262	11,023	51.8%	DC-102	890	1,319	48.2%
DC-103	13,695	15,825	15.5%	DC-103	1,774	1,973	11.2%
DC-201	7,216	7,249	0.4%	DC-201	878	883	0.5%
DC-301	7,690	7,699	0.1%	DC-301	890	892	0.3%
DC-Lower	1,546	1,603	3.7%	DC-Lower	203	209	2.9%
DC-Middle	5,752	5,752	0.0%	DC-Middle	604	604	0.0%
DC-Upper	1,436	1,460	1.7%	DC-Upper	185	188	1.3%
Watershed Totals	51,377	57,392	11.7%	Watershed Totals	6,188	6,832	10.4%
Subwatershed	1	rss (Ibs/year)		Subwatershed	Fecal Co	liform Bacter cfu/year)	ia (10^9
Subwatershed	Existing Loads	FSS (Ibs/year) Future Loads	) % Change	Subwatershed	Fecal Co Existing Loads	liform Bacter cfu/year) Future Loads	ia (10^9 % Change
Subwatershed	Existing Loads 182,321	FSS (Ibs/year) Future Loads 182,321	) % Change 0.0%	Subwatershed DC-101	Fecal Co Existing Loads 57,955	liform Bacter cfu/year) Future Loads 57,983	ia (10^9 % Change 0.0%
Subwatershed DC-101 DC-102	Existing Loads 182,321 204,035	Future Loads 182,321 248,505	% Change 0.0% 21.8%	Subwatershed DC-101 DC-102	Fecal Co Existing Loads 57,955 120,418	liform Bacter cfu/year) Future Loads 57,983 221,242	ia (10^9 % Change 0.0% 83.7%
Subwatershed DC-101 DC-102 DC-103	Existing Loads 182,321 204,035 348,384	<b>Future</b> Loads 182,321 248,505 372,834	% Change 0.0% 21.8% 7.0%	Subwatershed DC-101 DC-102 DC-103	Fecal Co Existing Loads 57,955 120,418 179,085	liform Bacter cfu/year) Future Loads 57,983 221,242 229,660	ia (10^9 % Change 0.0% 83.7% 28.2%
Subwatershed DC-101 DC-102 DC-103 DC-201	Existing Loads 182,321 204,035 348,384 182,190	<b>Future</b> Loads 182,321 248,505 372,834 182,632	% Change 0.0% 21.8% 7.0% 0.2%	Subwatershed DC-101 DC-102 DC-103 DC-201	Fecal Co Existing Loads 57,955 120,418 179,085 113,786	liform Bacter cfu/year) Future Loads 57,983 221,242 229,660 115,084	ia (10^9 % Change 0.0% 83.7% 28.2% 1.1%
Subwatershed DC-101 DC-102 DC-103 DC-201 DC-301	Existing Loads 182,321 204,035 348,384 182,190 217,293	Future Loads 182,321 248,505 372,834 182,632 217,332	% Change 0.0% 21.8% 7.0% 0.2% 0.0%	Subwatershed DC-101 DC-102 DC-103 DC-201 DC-301	Fecal Co Existing Loads 57,955 120,418 179,085 113,786 133,540	liform Bacter cfu/year) Future Loads 57,983 221,242 229,660 115,084 133,671	ia (10^9 % Change 0.0% 83.7% 28.2% 1.1% 0.1%
Subwatershed           DC-101           DC-102           DC-103           DC-201           DC-301           DC-Lower	Existing Loads 182,321 204,035 348,384 182,190 217,293 35,326	<b>Future</b> Loads 182,321 248,505 372,834 182,632 217,332 35,326	% Change 0.0% 21.8% 7.0% 0.2% 0.0% 0.0%	Subwatershed DC-101 DC-102 DC-103 DC-201 DC-301 DC-Lower	Fecal Co Existing Loads 57,955 120,418 179,085 113,786 133,540 23,256	liform Bacter cfu/year) Future Loads 57,983 221,242 229,660 115,084 133,671 25,508	ia (10^9 % Change 0.0% 83.7% 28.2% 1.1% 0.1% 9.7%
Subwatershed DC-101 DC-102 DC-103 DC-201 DC-201 DC-301 DC-Lower DC-Middle	Existing Loads 182,321 204,035 348,384 182,190 217,293 35,326 126,531	<b>Future</b> Loads 182,321 248,505 372,834 182,632 217,332 35,326 126,531	% Change 0.0% 21.8% 7.0% 0.2% 0.0% 0.0%	Subwatershed DC-101 DC-102 DC-103 DC-201 DC-201 DC-301 DC-Lower DC-Lower	Fecal Co Existing Loads 57,955 120,418 179,085 113,786 133,540 23,256 46,484	liform Bacter cfu/year) Future Loads 57,983 221,242 229,660 115,084 133,671 25,508 46,486	ia (10^9 % Change 0.0% 83.7% 28.2% 1.1% 0.1% 9.7% 0.0%
Subwatershed DC-101 DC-102 DC-103 DC-201 DC-201 DC-301 DC-Lower DC-Middle DC-Upper	Existing Loads 182,321 204,035 348,384 182,190 217,293 35,326 126,531 35,975	<b>Future</b> Loads 182,321 248,505 372,834 182,632 217,332 35,326 126,531 36,471	% Change           0.0%           21.8%           7.0%           0.2%           0.0%           0.0%           0.0%           1.4%	Subwatershed DC-101 DC-102 DC-103 DC-201 DC-201 DC-301 DC-Lower DC-Lower DC-Middle DC-Upper	Fecal Co Existing Loads 57,955 120,418 179,085 113,786 133,540 23,256 46,484 22,699	liform Bacter cfu/year) Future Loads 221,242 229,660 115,084 133,671 25,508 46,486 23,775	ia (10^9 % Change 0.0% 83.7% 28.2% 1.1% 0.1% 9.7% 0.0% 4.7%

Table 10 – WTM Pollutant Load Estimates Summary



Subwatershed	TN (lbs/ac/year)			Subwatershed	TP (lbs/ac/year)		
	Existing Future 9 Loads Loads		% Change	6 Change		Future Loads	% Change
DC-101	4.26	5.17	21.2%	DC-101	0.53	0.62	18.3%
DC-102	4.28	6,49	51.8%	DC-102	0.52	0.78	48.2%
DC-103	4.42	5.11	15.5%	DC-103	0.57	0.64	11.2%
DC-201	4.39	4.41	0.4%	DC-201	0.53	0.54	0.5%
DC-301	4.47	4.47	0.1%	DC-301	0.52	0.52	0.3%
DC-Lower	4.92	5.10	3.7%	DC-Lower	0.64	0.66	2.9%
DC-Middle	5.10	5.10	0.0%	DC-Middle	0.54	0.54	0.0%
DC-Upper	4.83	4.91	1.7%	DC-Upper	0.62	0.63	1.3%
Watershed Totals	1.03	1.09	5.8%	Watershed Totals	0.09	0.10	15.6%
	TSS (lbs/ac/year)						
Subwatershed	TS	is (Ibs/ac/yea	ır)	Subwatershed	Fecal Co	liform Bacter cfu/ac/year)	ia (10^9
Subwatershed	TS Existing Loads	S (lbs/ac/yea Future Loads	ır) % Change	Subwatershed	Fecal Co Existing Loads	liform Bacter cfu/ac/year) Future Loads	ia (10^9 % Change
Subwatershed DC-101	TS Existing Loads 113	is (lbs/ac/yea Future Loads 123	ır) % Change 9.4%	Subwatershed	Fecal Co Existing Loads 54.91	liform Bacter cfu/ac/year) Future Loads 78.17	ia (10^9 % Change 42.4%
Subwatershed DC-101 DC-102	TS Existing Loads 113 120	S (Ibs/ac/yea Future Loads 123 146	rr) % Change 9.4% 21.8%	Subwatershed DC-101 DC-102	Fecal Co Existing Loads 54.91 70.92	liform Bacter cfu/ac/year) Future Loads 78.17 130.30	ia (10^9 % Change 42.4% 83.7%
Subwatershed DC-101 DC-102 DC-103	Existing Loads 113 120 112	S (Ibs/ac/yea Future Loads 123 146 120	rr) % Change 9.4% 21.8% 7.0%	Subwatershed DC-101 DC-102 DC-103	Fecal Co Existing Loads 54.91 70.92 57.80	liform Bacter cfu/ac/year) Future Loads 78.17 130.30 74.12	ia (10^9 % Change 42.4% 83.7% 28.2%
Subwatershed DC-101 DC-102 DC-103 DC-201	Existing Loads 113 120 112 111	S (Ibs/ac/yea Future Loads 123 146 120 111	rr) % Change 9.4% 21.8% 7.0% 0.2%	Subwatershed DC-101 DC-102 DC-103 DC-201	Fecal Co Existing Loads 54.91 70.92 57.80 69.22	liform Bacter cfu/ac/year) Future Loads 78.17 130.30 74.12 70.01	ia (10^9 % Change 42.4% 83.7% 28.2% 1.1%
Subwatershed DC-101 DC-102 DC-103 DC-201 DC-301	TS Existing Loads 113 120 112 111 126	S (Ibs/ac/yea Future Loads 123 146 120 111 126	rr) % Change 9.4% 21.8% 7.0% 0.2% 0.0%	Subwatershed DC-101 DC-102 DC-103 DC-201 DC-201 DC-301	Fecal Co Existing Loads 54.91 70.92 57.80 69.22 77.54	liform Bacter cfu/ac/year) Future Loads 78.17 130.30 74.12 70.01 77.62	ia (10^9 % Change 42.4% 83.7% 28.2% 1.1% 0.1%
Subwatershed DC-101 DC-102 DC-103 DC-201 DC-301 DC-Lower	TS Existing Loads 113 120 112 111 126 112	S (lbs/ac/yea Future Loads 123 146 120 111 126 112	<pre>vir) % Change 9.4% 21.8% 7.0% 0.2% 0.0% 0.0%</pre>	Subwatershed DC-101 DC-102 DC-103 DC-201 DC-201 DC-301 DC-Lower	Fecal Co Existing Loads 54.91 70.92 57.80 69.22 77.54 73.98	liform Bacter cfu/ac/year) Future Loads 78.17 130.30 74.12 70.01 77.62 81.14	ia (10^9 % Change 42.4% 83.7% 28.2% 1.1% 0.1% 9.7%
Subwatershed DC-101 DC-102 DC-103 DC-201 DC-201 DC-301 DC-Lower DC-Middle	<b>Existing</b> Loads 113 120 112 111 126 112 112	S (lbs/ac/yea Future Loads 123 146 120 111 126 112 112	<pre>vir) % Change 9.4% 21.8% 7.0% 0.2% 0.0% 0.0% 0.0%</pre>	Subwatershed DC-101 DC-102 DC-103 DC-201 DC-201 DC-301 DC-Lower DC-Middle	Fecal Co Existing Loads 54.91 70.92 57.80 69.22 77.54 73.98 41.20	liform Bacter cfu/ac/year) Future Loads 78.17 130.30 74.12 70.01 77.62 81.14 41.21	ia (10^9 % Change 42.4% 83.7% 28.2% 1.1% 0.1% 9.7% 0.0%
Subwatershed DC-101 DC-102 DC-103 DC-201 DC-201 DC-301 DC-Lower DC-Middle DC-Upper	Existing Loads 113 120 112 111 126 112 112 112 112	S (Ibs/ac/yea Future Loads 123 146 120 111 126 112 112 123	<pre>xr) % Change 9.4% 21.8% 7.0% 0.2% 0.0% 0.0% 0.0% 1.4%</pre>	Subwatershed DC-101 DC-102 DC-103 DC-201 DC-201 DC-301 DC-Lower DC-Lower DC-Middle DC-Upper	Fecal Co Existing Loads 54.91 70.92 57.80 69.22 77.54 73.98 41.20 76.39	liform Bacter cfu/ac/year) Future Loads 78.17 130.30 74.12 70.01 77.62 81.14 81.14 80.01	ia (10^9 % Change 42.4% 83.7% 28.2% 1.1% 0.1% 9.7% 0.0% 4.7%

### Table 11 – Cumulative WTM Pollutant Load Rate Estimates Summary

Note: The color scheme of this table is the same seen in Figures 14 – 17 as well as Figures 18 - 21; individually scaled for each pollutant but with all scenarios grouped together.



Subwatershed	TN (lbs/ac/year)			Subwatershed	TP (lbs/ac/year)		
	Existing Future % Change		% Change		Existing Loads	Future Loads	% Change
DC-101	3.96	3.96	0.0%	DC-101	0.45	0.45	0.1%
DC-102	4.28	6,49	51.8%	DC-102	0.52	0.78	48.2%
DC-103	4.42	5.11	15.5%	DC-103	0.57	0.64	11.2%
DC-201	4.39	4,41	0.4%	DC-201	0.53	0.54	0.5%
DC-301	4.47	4.47	0.1%	DC-301	0.52	0.52	0.3%
DC-Lower	4.92	5.10	3.7%	DC-Lower	0.64	0.66	2.9%
DC-Middle	5.10	5.10	0.0%	DC-Middle	0.54	0.54	0.0%
DC-Upper	4.83	4.91	1.7%	DC-Upper	0.62	0.63	1.3%
Watershed Totals	4.42	4.94	11.7%	Watershed Totals	0.53	0.59	10.4%
	TSS (lbs/ac/year)						
Subwatershed	TS	is (Ibs/ac/yea	ır)	Subwatershed	Fecal Co	liform Bacter cfu/ac/year)	ia (10^9
Subwatershed	TS Existing Loads	iS (lbs/ac/yea Future Loads	ır) % Change	Subwatershed	Fecal Co Existing Loads	liform Bacter cfu/ac/year) Future Loads	ia (10^9 % Change
Subwatershed	TS Existing Loads 106	iS (lbs/ac/yea Future Loads 106	rr) % Change 0.0%	Subwatershed DC-101	Fecal Co Existing Loads 33.82	liform Bacter cfu/ac/year) Future Loads 33.83	ia (10^9 % Change 0.0%
Subwatershed DC-101 DC-102	TS Existing Loads 106 120	S (lbs/ac/yea Future Loads 106 146	rr) % Change 0.0% 21.8%	Subwatershed DC-101 DC-102	Fecal Co Existing Loads 33.82 70.92	liform Bacter cfu/ac/year) Future Loads 33.83 130.30	ia (10^9 % Change 0.0% 83.7%
Subwatershed DC-101 DC-102 DC-103	Existing Loads 106 120 112	S (Ibs/ac/yea Future Loads 106 146 120	r <b>)</b> % Change 0.0% 21.8% 7.0%	Subwatershed DC-101 DC-102 DC-103	Fecal Co Existing Loads 33.82 70.92 57.80	liform Bacter cfu/ac/year) Future Loads 33.83 130.30 74.12	ia (10^9 % Change 0.0% 83.7% 28.2%
Subwatershed DC-101 DC-102 DC-103 DC-201	TS Existing Loads 106 120 112 111	S (lbs/ac/yea Future Loads 106 146 120 111	rr) % Change 0.0% 21.8% 7.0% 0.2%	Subwatershed DC-101 DC-102 DC-103 DC-201	Fecal Co Existing Loads 33.82 70.92 57.80 69.22	liform Bacter cfu/ac/year) Future Loads 33.83 130.30 74.12 70.01	ia (10^9 % Change 0.0% 83.7% 28.2% 1.1%
Subwatershed DC-101 DC-102 DC-103 DC-201 DC-301	T S Existing Loads 106 120 112 111 126	S (lbs/ac/yea Future Loads 106 146 120 111 126	<pre>// Change // Change // 0.0% // 21.8% // 0.2% // 0.2% // 0.0%</pre>	Subwatershed DC-101 DC-102 DC-103 DC-201 DC-301	Fecal Co Existing Loads 33.82 70.92 57.80 69.22 77.54	liform Bacter cfu/ac/year) Future Loads 33,83 130,30 74,12 70,01 77,62	ia (10^9 % Change 0.0% 83.7% 28.2% 1.1% 0.1%
Subwatershed DC-101 DC-102 DC-103 DC-201 DC-301 DC-Lower	TS Existing Loads 106 120 122 111 126 112	58 (lbs/ac/yea Future Loads 106 146 120 111 126 112	<pre>/* Change</pre>	Subwatershed DC-101 DC-102 DC-103 DC-201 DC-201 DC-301 DC-Lower	Fecal Co Existing Loads 33.82 70.92 57.80 69.22 77.54 73.98	liform Bacter cfu/ac/year) Future Loads 33.83 130.30 74.12 70.01 77.62 81.14	ia (10^9 % Change 0.0% 83.7% 28.2% 1.1% 0.1% 9.7%
Subwatershed DC-101 DC-102 DC-103 DC-201 DC-201 DC-301 DC-Lower DC-Middle	TS Existing Loads 106 120 112 111 126 112	S (Ibs/ac/yea Future Loads 106 146 120 111 126 112 112	<pre>r) % Change 0.0% 21.8% 7.0% 0.2% 0.0% 0.0% 0.0% 0.0%</pre>	Subwatershed DC-101 DC-102 DC-103 DC-201 DC-201 DC-301 DC-Lower DC-Lower	Fecal Co Existing Loads 33.82 70.92 57.80 69.22 77.54 69.23 77.54 41.20	liform Bacter cfu/ac/year) Future Loads 33.83 130.30 74.12 70.01 77.62 81.14 41.21	ia (10^9 % Change 0.0% 83.7% 28.2% 1.1% 0.1% 9.7% 0.0%
Subwatershed DC-101 DC-102 DC-103 DC-201 DC-201 DC-301 DC-Lower DC-Lower DC-Middle DC-Upper	Existing Loads 106 120 112 111 126 112 112 112 112	S (Ibs/ac/yea Future Loads 106 146 120 111 126 112 112 123	r) % Change 0.0% 21.8% 7.0% 0.2% 0.0% 0.0% 0.0% 0.0% 1.4%	Subwatershed DC-101 DC-102 DC-103 DC-201 DC-201 DC-301 DC-Lower DC-Lower DC-Middle DC-Upper	Fecal Co Existing Loads 33.82 70.92 57.80 69.22 77.54 69.22 77.54 73.98 41.20 76.39	liform Bacter cfu/ac/year) Future Loads 33.83 130.30 74.12 70.01 77.62 81.14 41.21 80.01	ia (10^9 % Change 0.0% 83.7% 28.2% 1.1% 0.1% 9.7% 0.0% 4.7%

### Table 12 – Individual WTM Pollutant Load Rate Estimates Summary

Note: The color scheme of this table is the same seen in Figures 14 – 17 as well as Figures 18 - 21; individually scaled for each pollutant but with all scenarios grouped together.





# Figure 14 - WTM Total Nitrogen Loading Rates – Existing Conditions Comparison



















## Figure 18 - WTM Total Nitrogen Loading Rates – Future Conditions Comparison











 Notes

 1. Coordinate System: NAD 1983 StatePlane Virginia South FIPS 4502 Feet

 2. Data Sources: ESRI, James City County, Stantec

 3. Orthoimagery © ESRI









### <sup>Title</sup> Figure 20 - WTM Total Suspended Solids Loading Rates – Future Conditions Comparison





### <sup>Title</sup> Figure 21 - WTM Fecal Coliform Bacterial Loading Rates – Future Conditions Comparison



**Stantec** 

Generally, trends observed from the WTM outputs show an increase for all 4 modeled pollutants in several subwatersheds, but primarily in Subwatersheds 102 and 103 — with a correlation with existing developable land that is forecasted to be developed into the future. Subwatersheds 102 and 103 are already the most developed within the Watershed, but are still expected to see increases in pollutant loads. Subwatershed 101 and the Middle Mainstem Subwatershed do not see any future development, and therefore do not show any increase in pollutant loads. Subwatershed 301, the Lower Mainstem Subwatershed, and the Upper Mainstem Subwatershed did not have large areas of future development, leading to relatively small increases in loading rates in the future scenario. Subwatershed 301 and the Lower Mainstem Subwatershed show small increases in TN, TP, and Bacteria loading rates due to land use changes in the future projection, but TSS loading rates associated with those land use changes stay the same due to the selected land use types having similar TSS loading rates in the WTM.

Cumulative downstream effects of future land use changes are only present in Subwatershed 101 due to the natural confluences of Diascund Creek and its tributaries. All other subwatersheds do not experience cumulative pollutant loading effects. While Subwatershed 101 does not show any individual pollutant load changes, it does experience some cumulative effects of upstream future development in Subwatersheds 102 and 103. These cumulative effects were taking into consideration when developing goals and recommended actions for each subwatershed.

These WTM loading estimates provided can be used to assist future pollutant load management efforts. The relatively low number of existing BMPs in the Watershed could lead to issues addressing future development. To prevent increases in future pollutant loading, new stormwater management practices can be constructed to account for loading differences, or existing practices can be retrofitted in areas where new BMP construction is not feasible. This information was used to inform Watershed Restoration Projects and their prioritization detailed in Sections 5 and 6.

# 2.2.4 FLOOD RISK STUDY

Flooding events that affect our infrastructure, homes, and lives are becoming increasingly noticeable and so any Watershed Management Plan should incorporate some level of flood risk analysis to cover this important topic. Therefore, flood preparedness has become one of the goals for the Diascund Creek Watershed Management effort.

To understand the various flood risks that are present in the Diascund Creek Watershed, a review of existing floodplain conditions associated with the regulated floodplain defined by the Federal Emergency Management Agency (FEMA) was performed. At-risk areas have been identified within the FEMA floodplain to help guide floodplain management efforts JCC may want to pursue. Additionally, potential increased risks associated with future increased flooding predictions were also performed.

Since no hydrologic or hydraulic models were available, the evaluation herein is limited to an overlay of the base floodplain mapping. The base floodplain limits were derived from the FEMA Flood Insurance Rate Maps (FIRM) for JCC. The 100-year regulated FEMA floodplain was used for this evaluation, representing the storm conditions with 1% chance of occurrence each year.



# 2.2.4.1 Evaluation of Projected Sea Level Rise

In October 2018, the Hampton Roads Planning District Commission (HRPDC) approved a resolution that encourages the region to consider incorporating Sea Level Rise (SLR) into engineering and planning decisions. This resulted in the Sea Level Rise Planning Policy and Approach. Figure 22 displays the projected sea level change, specifically at Sewell's Point, Virginia, located at the mouth of the James River, which indicates a projected sea level rise between 2 feet and 11 feet by the year 2100. The figure also denotes the recommended sea level rise to assume in making decisions based on near term, midterm, and long-term planning purposes. Specifically:

- 1.5 ft above the current mean high water for near term projects (2018-2050)
- 3 ft above the current mean high water for mid-term projects (2050-2080)
- 4.5 ft above current mean high water for long-term projects (2080-2100)



### Figure 22 – Projected Relative Sea Level Change at Sewell's Point, Virginia - 2000-2100

Source: Hampton Roads Planning District Commission - Policy Guidance, Regional Sea Level Rise Policy

A range of options exist on how SLR can be incorporated into a flood risk analysis. A few things to consider are:

- 1) The hazard level associated with the infrastructure at risk (i.e., potential loss of life versus cost of damages) with respect to the probability of exceedance;
- The projected time period between completion of the Watershed Management Plan and when a future update would be anticipated – the time frame of SLR may not need to greatly exceed the time in which an update would be expected, allowing for adaptive management in future updates;
- 3) The industry approaches being taken by others in the region and potential consistency with other activities.



In the Virginia Beach Design Standards Manual update, they elected to adopt design requirements consistent with the HRPDC guidance, assuming future sea level rises of 1.5 feet and 3 feet over the tidal base flood elevations for the design of non-critical and critical infrastructure, respectively.

### 2.2.4.2 Future Floodplain

The FEMA FIRM indicates that the tidal base flood elevation in the Chickahominy River along the limits of the Diascund Creek Watershed study area is 7 feet (NAVD 88). For future potential flood elevations reflective of sea level rise, two scenarios were considered: an increase in water surface elevation by 1.5 feet and 3.0 feet. This is consistent with the aforementioned HRPDC guidance and recent design changes used by the City of Virginia Beach to assume a 1.5-foot and a 3.0-foot increase in tidal base flood elevations to measure the future effects on non-critical and critical infrastructure, respectively. It should be noted that the future flood limits shown herein are approximate in nature and do not account for discrete variations and potential changes to increased wave action that could occur in some locations. Details of the FEMA base flood elevations can be found in the James City County, Virginia and Independent City of Williamsburg Flood Insurance Study, Revised 2015.

### 2.2.4.3 Inundation Mapping and Results

To best visualize the extents of the flooding for Diascund Creek, the FEMA FIRM was imported into a Geographic Information System (GIS) environment. The water surface elevations were overlaid on a digital elevation model (DEM) of the terrain of the entire watershed. The DEM was obtained from the Virginia Geographic Information Network (VGIN) Geospatial Data Services with elevations referencing the NAVD 88 Datum, the same datum referenced in the flood hazard map.

The impacts of rising sea levels on existing infrastructure were assessed by including shapefiles of existing buildings and critical infrastructure within the Diascund Creek Watershed. Location of existing buildings was obtained from statewide buildings shapefile provided by VGIN. Only primary buildings within the Diascund Creek watershed were considered. Critical infrastructure describes the physical and cyber systems and assets that are so vital to the community that their incapacity or destruction would have a debilitating impact on the physical or economic security or public health or safety. They include assets, systems, networks, and functions (physical or virtual) vital to the County. Information regarding critical infrastructure was compiled and provided by James City County.

In this analysis, structures were considered "impacted" by the floodwaters if any part of the structures came in contact with the floodwater. Any flood mitigation measures, or elevated structure conditions were not known, so have not been considered. A roadway or bridge was considered impacted if the road was shown to be overtopped at any point. Depths and water velocities were not considered. Figure 26 shows the overall inundation extents of the Diascund Creek watershed for the existing and future conditions. Existing conditions assume no increases to sea level. Impacted critical infrastructure and structures that were found to be impacted in future conditions, but not in the existing conditions, are highlighted in the figures. The following subsection further summarizes the results of this analysis for existing and future conditions.





# Title Figure 23 - Overall Inundation Extents for Existing and Future Conditions

Client/Project James City County Diascund Creek WSMP 203408987 Prepared by MGS on 2023-08-15 TR by JMH on 2023-08-17 IR by DP on 2023-08-31 Project Location James City County, Virginia Ν 6,000 3 000 Feet (At original document size of 11x17) 1:36,000 Critical Infrastructure New Structure in the Future Floodzone Diascund Creek Watershed Existing Building Existing Floodzone Future Floodzone (20% Rainfall Increase) Future Floodzone (3 ft SLR)

Base Tidal Level elevations were obtained from the FEMA Flood Insurance Rate Maps. This map measures potential future impacts in the tidal region with assumed increases to those sea level elevations by 1.5 feet and 3.0 feet for non-critical and critical infrastructure.

All elevations reference the NAVD 88 Vertical Datum.



Notes 1. Coordinate System: NAD 1983 StatePlane Virginia South FIPS 4502 Feet 2. Data Sources: ESRI, James City County, Stantec 3. Orthoimagery © ESRI





# 2.2.4.3.1 Existing Conditions

The analysis identified 21 structures within the existing floodplain. Most of these structures are residential (19), 1 is a public building, and 1 is a mobile home. Two critical infrastructures are located within the Diascund Creek existing floodplain, both pump stations at Diascund Creek Resevoir.

There were two identified neighborhoods and one additional isolated residence that showed to be affected due to access roads into the neighborhood being inundated, potentially obstructing vehicular access in or out of those areas. Where these dead-end conditions were observed by the floodwaters are listed below:

- 1. Residences located off of Arlington Island Rd were isolated due to Arlington Island Rd and Forest Lake Rd overtopping. See Figure 24.
- 2. A significant number of residences located off of Hicks Island Rd were isolated due to overtopping. See Figure 25.
- 3. One residence located off of River Dr was isolated due to overtopping of the intersection of River Dr, Cedar Dr, and its private driveway. See Figure 26.

Finally, it was observed that Route 60 is shown to overtop at the Diascund Creek crossing (Figure 27). This may be significant due to the high volume of traffic in this roadway, and because this is a major evacuation route for the community. However, there could still be adequate access in either direction, pending further review outside of the watershed limits.







Base Tidal Level elevations were obtained from the FEMA Flood Insurance Rate Maps. This map measures potential future impacts in the tidal region with assumed increases to those sea level elevations by 1.5 feet and 3.0 feet for non-critical and critical infrastructure.

All elevations reference the NAVD 88 Vertical Datum.



Notes 1. Cordinate System: NAD 1983 StatePlane Virginia South FIPS 4502 Feet 2. Data Sources: ESRI, James City County, Stantec 3. Orthoimagery © ESRI









### Title Figure 25 - Hicks Island Rd Inundation Extents, Critical Infrastructure

Client/Project James City County Diascund Creek WSMP 203408987 Prepared by MGS on 2023-08-15 TR by JMH on 2023-08-17 IR by DP on 2023-08-31 Project Location James City County, Virginia Ν 400 800 Feet (At original document size of 11x17) 1:4,800 Critical Infrastructure New Structure in the Future Floodzone  $\mathbf{O}$ Existing Building Future Floodzone (3 ft SLR) Future Floodzone (1.5 ft SLR) Existing Floodzone Diascund Creek Watershed Major Creek/Stream

Base Tidal Level elevations were obtained from the FEMA Flood Insurance Rate Maps. This map measures potential future impacts in the tidal region with assumed increases to those sea level elevations by 1.5 feet and 3.0 feet for non-critical and critical infrastructure.

All elevations reference the NAVD 88 Vertical Datum.



# Notes 1. Coordinate System: NAD 1983 StatePlane Virginia South FIPS 4502 Feet 2. Data Sources: ESRI, James City County, Stantec 3. Orthoimagery © ESRI











Base Tidal Level elevations were obtained from the FEMA Flood Insurance Rate Maps. This map measures potential future impacts in the tidal region with assumed increases to those sea level elevations by 1.5 feet and 3.0 feet for non-critical and critical infrastructure.

All elevations reference the NAVD 88 Vertical Datum.



 Notes

 1. Coordinate System: NAD 1983 StatePlane Virginia South FIPS 4502 Feet

 2. Data Sources: ESRI, James City County, Stantec

 3. Orthoimagery © ESRI







<sup>Title</sup> Figu Infra	re 27 - Rout structure	te 60 Inundation E	xtents, Critical
Client/Proj Jame: Diasc	ect s City County und Creek WSM	ИР	203408987
Project Lo	cation	Pr	epared by MGS on 2023-08-15 TR by JMH on 2023-08-17
James C	ty County, Virginia		IR by DP on 2023-08-31
		500	1,000 Feet
	У	(At original document size of 1 1:6,000	1x17)
•	Critical Infrastr	ucture	
•	New Structure	in the Future Floodzone	
	Existing Buildir	ng	
	Future Floodzo	one (3 ft SLR)	
	Future Floodzo	one (1.5 ft SLR)	
	Existing Floodz	zone	
55	Diascund Cree	k Watershed	

Base Tidal Level elevations were obtained from the FEMA Flood Insurance Rate Maps. This map measures potential future impacts in the tidal region with assumed increases to those sea level elevations by 1.5 feet and 3.0 feet for non-critical and critical infrastructure.

All elevations reference the NAVD 88 Vertical Datum.



Notes 1. Coordinate System: NAD 1983 StatePlane Virginia South FIPS 4502 Feet 2. Data Sources: ESRI, James City County, Stantec 3. Orthoimagery © ESRI





# 2.2.4.3.2 Future Conditions

In general, the effects of sea level rise were limited to areas along the Diascund Creek mainstem. The analysis identified 11 additional structures predicted to be within a flood zone that are not currently considered to be within the floodplain and no additional critical infrastructure. Each of those structures are identified as residential buildings, most of which were located at the south end of Hicks Island Rd. No additional neighborhoods were isolated due to a road overtopping.

### 2.2.4.4 Dam Break Flooding Potential

In addition to flood risks associated with tidal flooding, increased risks may be present in the watershed due in part to the presence of high hazard dams. Depending on the conditions, dam failures can result in a larger downstream inundation zone than the 100-year floodplain, which may result in the potential for other infrastructure to be affected. Specifically, the effects of Diascund Creek Reservoir, a high hazard dam, have been reviewed here.

Dam break scenarios were created using the City of Newport News Waterworks (NNWW) Emergency Action Plan (EAP) for the Diascund Dam (2012). As is consistent with high hazard dams, the inundation maps within the EAP showing the probable maximum flood (PMF), the largest flood that could reasonably occur in this area, with dam failure were used for this analysis. Adjustments were made to the existing maps to account for the different map projections. The Diascund Dam inundation map is limited to just north of the southern edge of the watershed. It should be noted that dam breach inundation maps typically end when either the breach and non-breach scenarios converge to within 1 foot or when there are no further impacts to structures or property. For this analysis, the mapping of flooded areas is approximate as the EAP inundation maps were not adjusted for sea level rise.

The EAP identified 126 parcels impacted within the Diascund Dam break scenario. Upon further review of information contained in the Diascund EAP, there may be many additional affected properties not noted in the EAP and the potential for additional dwellings within the previously identified affected properties. Note that these additional properties may be a result of new construction or an assumption made when the EAP was developed in which some impacted buildings may not be inhabited. The inundation extents were not modified from those in the EAPs for this analysis. These inundation maps are expected to be updated by the dam owners on a routine basis as required by Virginia DCR. Below is a description of structures which may be impacted by a Diascund Dam breach:

- Property on Hicks Island Rd- Identified as an affected parcels in the EAP. Two buildings have relatively new construction dates which may not have been in the structures database utilized by NNWW at the time of the EAP development. Additional buildings may be present that weren't accounted for in the EAP structure numbers, pending confirmation of current usage and building types.
- Property on Diascund Rd Identified as an affected property in the EAP. One building has a
  relatively new construction date which may not have been in the structures database utilized by
  NNWW at the time of the EAP development. Additional properties may be present that weren't
  accounted for in the EAP parcel numbers, pending confirmation of current usage and building
  types.



- 3. Property on Diascund Reservoir Rd- Both the EAP and current review identified 1 affected home.
- 4. Property on Arlington Island Rd- Both the EAP and current review identified 7 affected homes.
- 5. Property on Forest Lake Rd- Identified as an affected property in the EAP. Additional properties may be present that weren't accounted for in the EAP parcel numbers, pending confirmation of current usage and building types.
- 6. Property on Hockaday Rd- Current review identified 1 affected home, pending confirmation of current usage and building type.
- 7. Property on Drewry Ln- EAP review identified 3 affected homes, pending confirmation of current usage and building type.
- 8. Property on Crossover Rd- Identified as an affected parcel in the EAP. Additional buildings may be present that weren't accounted for in the EAP parcel numbers, pending confirmation of current usage and building types.
- Property on Richmond Rd- Identified as an affected property in the EAP. Additional properties may be present that weren't accounted for in the EAP parcel numbers, pending confirmation of current usage and building types.
- 10. Property on River Rd Identified as an affected property in the analysis. The current review identifies one affected property that contains two residential buildings.
- 11. Property on Riverside Rd Identified as affected properties in the analysis, with no impacted structures. Confirmation of current usage and building types is needed.
- 12. Property on Stewarts Rd Identified as affected properties in the analysis, with no impacted structures. Confirmation of current usage and building types is needed.

Additional properties outside of the Diascund Creek Watershed will also be impacted in a dam break scenario.

### 2.2.4.5 Exclusions and Limitations of this Study

As JCC's floodplain management efforts continue, it is recommended that the general flood risk study results summarized herein continue to be refined with further coordination, modeling, and analysis to address some of the notable limitations listed below.

The purpose of this flood risk analysis was to gain a general understanding of the potential impacts to existing infrastructure within the Diascund Creek watershed due to potential increases to the 100-year floodplain elevation and projected sea level rise estimates, as well as to consider other risks associated with potential dam failures. However, limitations to the methods used in this analysis should be understood such as:

• The mapping procedures identify impacted structures in the floodplain of Diascund Creek and its tributaries due to sea level rise. Increases to rainfall intensity were not considered but may cause further impacts that are not captured in this analysis.



- Additional interior drainage issues or flash flooding may be present within the watershed, but not captured herein due to lack of existing models.
- The effects of erosion are not measurable in this analysis. During large storm events, erosion in the floodplain is likely to occur which may worsen impacts to adjacent structures.

### 2.2.4.6 Flood Risk Study Conclusions & Recommendations

Due to the results of the floodplain analysis for the Diascund Creek Watershed, the following are recommended next steps:

- Coordinate with Newport News Waterworks (NNWW) regarding the buildings located within the dam break inundation zone to ensure EAP activities capture all affected properties, including recently constructed homes and/or the potential additions noted herein.
- Consider potential flood mitigation or other access to neighborhoods which may become inaccessible to traffic due to large flooding events or buried utilities, with specific emphasis on Arlington Island Road. Cooperation with emergency management personnel will be imperative to identify how these areas may be addressed or prioritized in an emergency. Further evaluation in these locations may be warranted to determine the projected flood depth and flow velocity to determine if these areas really are inaccessible.
- It is our understanding that VDOT is already implementing some improvements to Hicks Island Rd that may help alleviate some or all of the flood risks identified herein. Coordination with VDOT is recommended so that the improvements can be reviewed and any other flood mitigation needs identified.
- Further evaluate the culvert capacity at the Route 60 crossing with respect to projected future conditions to identify upgrade needs over time. As this crossing is a major roadway and part of the evacuation route, standing water on the roadway during a major storm event may obstruct potential evacuees. Furthermore, the FEMA floodplain mapping at this crossing depicts inundation for the 100-year event. If this road is considered to be critical infrastructure, a higher design event should be considered in the evaluation.
- Encourage private residences within the floodplain to raise the elevation of their homes and/or employ other floodproofing measures.
- Perform hydrologic and hydraulic modeling to better understand riverine flood risks outside of the tidal areas.
- Identify areas susceptible to flash flooding which are outside of the floodplains. These areas may
  become more susceptible to flooding due to insufficient size of the existing infrastructure and/or
  limited maintenance efforts. Additional information on the location and elevation of stormwater
  infrastructure assets throughout the watershed would be required. A two-dimensional modeling
  platform should be considered in order to better integrate the riverine flooding with the interior
  stormwater infrastructure systems and overland flow conditions.



# 2.3 Field Assessments

Description of the work performed for both the stream inventory and assessment as well as the assessment of existing stormwater management practices and upland watershed conditions are provided on the following pages.

# 2.3.1 STREAM INVENTORY AND ASSESSMENT

In February of 2023, Stantec performed a field assessment in the Diascund Creek Watershed to quantify and classify the condition of each stream. Stantec assessed streams as identified through the desktop analyses using GIS and in consultation with JCC. As part of the field surveys, each representative stream segment was designated a unique reach ID, scored using the EPA's Rapid Bioassessment Protocol (RBP) (Barbour et. al., 1999), and a Rosgen Natural Stream Classification channel type (Rosgen, 1994) based on visual observations (Figure 28). This information was used to help identify stream reaches that may require some degree of proactive management—restoration or enhancement—to stabilize active erosion, headcutting, or degradation, reconnect channels to their floodplains, increase in-stream and floodplain habitat, and/or protect exposed utilities.



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Figure 28 – Rosgen Classification Approach



### 2.3.1.1 Rosgen Stream Classification and the Stream Evolution Model

The majority of streams assessed in the Diascund Creek watershed appear to be well connected to the floodplain, exhibit in-stream habitat, and typically are in good condition. A total of 97 stream reaches totaling approximately 35 miles were assessed across the entire watershed and are classified as the following Rosgen stream types:

Stream Type	G	В	E	С	D	D <sub>A</sub>
Reaches Assessed	11	15	3	54	11	3
Miles Assessed	3.6	4.1	0.3	22.8	3.5	1.2

Table 13 – Stream Reach Assessment Summary

The Rosgen stream classifications were based solely on visual inspection and professional judgement, qualitatively classified without collecting detailed survey or geomorphic data. These reaches were further classified by using the Stream Evolution Model (Cluer and Thorne, 2013)—a model which recognizes that streams may naturally be multi-threaded prior to disturbance and represents stream evolution as a cyclical, rather than linear phenomenon. This model recognizes an evolutionary cycle within which streams advance through the common sequence, skip some stages entirely, recover to a previous stage or even repeat parts of the cycle (Figure 29). This Stream Evolution Model helps to inform whether a particular stream is trending towards stability or degradation based on hydrologic, hydraulic, morphological, and/or vegetative attributes of a particular reach.





Figure 29 – Stream Evolution Model Diagram



**Photo 1 –** View of stable C type channel. Subwatershed 102

Overall, C-type channels dominated the channel types. C-type channels are slightly entrenched with channel slopes that vary between 0.01-2.00%. These channels typically have bend pools with steeper outer banks and point bars. C-type channels are dynamic in nature and will remain stable with an adequate buffer and good vegetative bank protection. However, these channels are especially susceptible to destabilization and over-widening as a result of upstream development and concentrated inputs. Stable C-type channels will typically be found in Stages 1, 2, 3, 6, and 7.



G-type channels are typically found in Stage 3 or 4 Stream Evolution Model. G-type channels are deeply incised with little access to the floodplain due to downcutting, resulting from unattenuated stormwater, inadequately designed infrastructure or lack of stabilizing riparian vegetation. Typical G-type channels in the Watershed are disconnected from the adjacent floodplain and experience heavy degradation from concentrated flows within the channel. This results in very limited benthic habitat embeddedness of available benthic habitat. G-stream types represent two of the seven reaches that are recommended for restoration or enhancement (See Section 4).



**Photo 2 –** Incised G-type channel. Subwatershed Middle Mainstem

### 2.3.1.2 In-Stream, Riparian, and Floodplain Habitat

As part of the stream assessment, Stantec utilized the Environmental Protection Agency's Rapid Bioassessment Protocol (EPA RBP) index to quantify the quality of local in-stream benthic and riparian habitat for each representative reach. The RBP individually scores several individual metrics into condition categories, which are then summed to produce an overall habitat score (optimal, suboptimal, marginal, and poor) to classify the reach overall habitat score. The EPA RBP Habitat Assessment for Low Gradient Streams metrics are as follows:

- Epifaunal Substrate (available cover)
- Pool Substrate Characterization
- Pool Variability
- Channel Flow Status
- Channel Alteration
- Channel Sinuosity
- Bank Stability
- Bank Vegetative Protection
- Riparian Vegetative Zone Width

In general, a majority of the streams assessed with the RBP Low Gradient methodology exhibited suboptimal to optimal scores (67% of all reaches were assessed as Suboptimal and 24% as Optimal condition). These Optimal and Suboptimal streams would typically be found in Stage 0, 1, 2, or 6 of the Stream Evolution Model, and generally classified as stable B, Bc, C, D, or E Rosgen stream types. The remaining 9% of assessed streams were all scored as Marginal with 0% as Poor. Streams that were observed to have good connection to an adjacent floodplain, relatively wide mature riparian buffers, and exhibited Stream Evolution Model stages trending towards stability generally scored as Optimal to Suboptimal habitat scores. Overall, the Watershed appears to be in good and stable stream habitat health (See Section 1.2.2 for more details).

# 2.3.1.3 Outfalls, Utilities, And Other Point Impacts

No major impacts from outfalls or utilities were present due to the stable natural conditions and overall rural conditions of the Watershed. Any relevant impacts are identified for the proposed stream reach recommendations (See Section 4.1).



# 2.3.2 UPLAND WATERSHED AREAS ASSESSMENT

### 2.3.2.1 Existing Stormwater Management Facilities

As previously mentioned, many developed areas (impervious surfaces) in the Watershed were constructed before current stormwater regulations were implemented. These areas were prioritized for field review efforts since they would likely present the best opportunities for new stormwater treatment or retrofit of older BMPs to more efficient conditions. Newer development areas have stricter standards of on-site treatment, but in addition to the older development areas they also may have opportunities to protect and restore downstream aquatic ecosystems through new BMPs, retrofitting of existing BMPs, and in some cases in conjunction with stream restoration or enhancement projects.

As of the publication of this report, JCC's BMP inventory had 16 active BMPs within the Watershed. "Active" BMPs excludes BMPs that have been marked as retired by JCC and BMPs that are still considered under "Developer Control." Table 14 presents the characteristics and composition of existing BMPs tracked by JCC within the Watershed.

BMP Type	Treatment Provided	Number of BMPs	Impervious Treatment Area (ac)
Constructed Wetland	Quantity and Quality	2	1
Dry Pond	Quantity	7	10
Infiltration Basin	Quantity and Quality	1	1
Infiltration Trench	Quality	2	8
Wet Pond	Quantity and Quality	4	22
Gran	nd Total	16	42

### Table 14 – Stormwater Best Management Practices in Diascund Creek Watershed

Figure 30 provides a map with all BMPs shown spatially across the Watershed. Active BMPs were visited in the field (if accessible) and considered for possible retrofit or rehabilitation.





### Title Figure 30 - Existing Stormwater Best Management Practice (BMP) Locations

Client/Project James City County Diascund Creek WSMP 203408987 Prepared by MGS on 2023-07-19 TR by JMH on 2023-08-17 IR by DP on 2023-08-31 Project Location James City County, Virginia Ν 3,000 6,000 Feet (At original document size of 11x17) 1:36,000 Field Inspected Existing Stormwater BMP Existing Stormwater BMP  $\triangle$ 5-1 Diascund Creek Watershed Municipal Boundary 27 20 Notes 1. Coordinate System: NAD 1983 StatePlane Virginia South FIPS 4502 Feet 2. Data Sources: ESRI, James City County, Stantec 3. Orthoimagery © ESRI





# 2.3.2.2 Field Assessment Findings

Stantec visited the BMPs identified in Figure 30 with an eye towards how it might benefit from retrofitting to meet the local drainage area needs and that of the Diascund Creek Watershed as a whole. For each BMP visited in the field there were several considerations as they were assessed for potential retrofit opportunities. These were:

- Area available for retrofit actions within BMP footprint and its surrounding areas.
- Adjacent land use in surrounding areas.
- Construction access to the BMP.
- Potential utility conflicts for permanent expansion of BMP footprint as well as for temporary construction access requirements.
- Permitting factors that may make the retrofit less efficient and costly for a given BMP location.

This information and data from the field assessments played an integral role in deciding if, how, and where recommendations for BMP retrofits were made. Section 4.2 below details these next steps and the list of recommended BMP retrofit locations and types.

### 2.3.2.3 Upland Area Reconnaissance

Stantec leveraged two of the CWP's Unified Subwatershed and Site Reconnaissance (USSR) for field exploration of possible pollutant sources within the Watershed. The Neighborhood Source Assessment (NSA) is used to evaluate residential developments and the Hot Spot Investigation (HSI) for commercial and industrial areas of development. These surveys were performed across most or all of an area of interest and provided an indicator of the pollution potential throughout various locations in the Watershed.

### 2.3.2.3.1 Neighborhood Source Assessment (NSA)

The NSA was performed at most of the residential developments within the Watershed to identify land uses and land management practices by residences or homeowners' associations (HOAs) or their contractors that might lead to pollution or degradation of downstream aquatic habitats. NSAs are generally focused on four specific source types that might be found in most neighborhoods:

- Yards/Lawns Rated on condition, maintenance levels, and general upkeep.
- Driveways, Sidewalks, and Curbs Rated on condition, drainage, staining, and debris or litter.
- Rooftop Surfaces Estimate amount of runoff directly connected to storm drains/infrastructure.
- **Common Areas** Investigated for evidence of possible pet waste management, and other resident stewardship, signage, or activities, e.g., stormwater inlet stenciling, pollinator habitat, etc.

There are several individual neighborhood characteristics under these four types that get totaled up to an NSA "Pollution Severity Index". Based on field observations from the NSA, sites get classified into one of four categories of Pollution Source Potential (Table 15):

- Low No NSA characteristics observed.
- Moderate Between 1 and 4 NSA characteristics observed.
- High Between 5 and 10 NSA characteristics observed.
- Severe 11 or more NSA characteristics observed.



	Neighborhood Source Assessment Results						
Subs	Total Assessed	Percent with Moderate	Percent with High	Highest NSA Score			
	Area (Acres)	NSA Scoring	NSA Scoring	(12 is max possible)			
101	243	0%	100%	6			
102	181	45%	55%	7			
103	348	45%	55%	6			
201	396	60%	40%	6			
301	96	0%	100%	7			
Lower Mainstem	228	37%	63%	6			
Middle Mainstem	53	20%	80%	5			
Upper Mainstem	0	-	_	-			
Watershed	1679	38%	62%	7			

### Table 15 – Neighborhood Source Assessment (NSA) Field Assessment Summary

Based on the NSA results, it is noticeable that 100% of the assessed acreage scores as "High" for Subwatersheds 101 and 301, and that other percentages are also high. This is largely driven by more spread-out residential development with no noticeable stormwater infrastructure and a low percentage of residential parcels compared to forest and rural land uses in a given subwatershed. Most residential areas consist of older development with sparse or non-existent stormwater infrastructure and a high percentage of residences with septic tanks. None of the reviewed neighborhoods scored as "Severe," suggesting that the existing residential development within the Diascund Creek Watershed does not cause major downstream impacts.

One area of note is the Lower Mainstem Subwatershed. The 228 acres of assessed neighborhood parcels account for over 70% of the 312 total acres in the subwatershed, which is a much higher ratio than other subwatersheds. When considering potential upgrades to stormwater and sanitary infrastructure or programmatic actions that affect residential areas, those changes will most greatly impact the Lower Mainstem Subwatershed.





### Title Figure 31 - Neighborhood Source Assessment (NSA) Field Assessment Results


#### 2.3.2.3.2 Hot Spot Investigation (HSI)

Stantec performed a Hot Spot Investigation (HSI) on major commercial and industrial areas within the Watershed, as well as some other areas with the potential for large point source contribution of pollutants. Specific activities are investigated such as vehicle operations and/or storage, other outdoor materials storage, trash/grease/waste management, building and parking lot conditions, turf and landscaping if present, visible private stormwater infrastructure from buildings, parking lots, etc. and into downstream conveyances. Observed polluting activities as well as potential sources of pollution are both noted for recommendation development. Based on field observations from the HSI, sites are classified into one of four categories:

- Not a hot spot no observed pollution, 1 to 4 potential pollutant sources identified.
- Potential hot spot no observed pollution, 5 to 10 potential pollutant sources identified. Potential hot spot was also assigned if conditions are uncertain and warrant further investigation.
- Confirmed hot spot pollution observed, 11 to 15 potential pollutant sources identified.
- Severe hot spot Multiple polluting activities directly observed.

Field HSI assessment effort results are presented in Table **16** and Figure 32. Subwatersheds 102 and 103 were the only subwatersheds with potential hot spots. This is an expected result as these subwatersheds include a higher concentration of commercial development, specifically along the Rt. 60 corridor closest to Anderson's Corner. No private property was assessed as part of the HSI field work.

#### Table 16 – Hot Spot Investigation (HSI) Field Assessment Summary

		Hot Spot Investigation	Results
Subs	Count of Confirmed	<b>Count of Potential</b>	Highest Hot Spot Score
	Hot Spots	Hot Spots	(28 is max possible)
101	0	0	0
102	0	2	7
103	0	7	9
201	0	0	0
301	0	0	0
Lower	0	0	0
Middle	0	0	0
Upper	0	0	0
Watershed	0	9	9



Generally, potential or confirmed hot spots would benefit from management such as:

- Increased review and inspection of materials storage at outdoor facilities. They pose a potential pollutant source, such that proper housekeeping practices and pollution prevention practices could be employed in these areas.
- Review of vehicle storage at facilities across the watershed. Vehicles stored outdoors without cover are present at multiple HSI locations across the watershed, which could be of particular concern in high concentrations or with older vehicles/farm equipment.
- Review of dumpster status and locations. Dumpsters that are left open or leaking pose a pollution threat, especially when dumpsters are not located within designated areas where tainted runoff is captured and treated separately.
- Review of areas with high concentration of livestock to determine if better waste management or other controls could be warranted.







# **3 WATERSHED GOALS AND STRATEGIC ACTIONS**

#### 3.0.1 Watershed Goals

As previously noted, the following six Goals have been created with help from stakeholder engagement performed as part of this Watershed Management Plan and Stantec's best professional judgement. The categories of Strategic Actions which will help support and achieve these Goals are all interrelated to some degree and in various ways. For example, Education and Awareness supports all other Action categories. The Goals, and the supporting Strategic Action categories (see below, and Section 5) most closely associated with them are:

1. Maintain and build natural resources, wildlife habitat, and critical areas of undeveloped land within the watershed, as identified within the conservation priorities of this Plan, the County's Natural & Cultural Assets Plan, and other relevant Virginia data sets.

This Goal can be achieved primarily through Programmatic actions.

2. Identify opportunities for improved management of agricultural and silvicultural practices or other opportunities for water quality improvements.

This is in the Programmatic and Regulatory/Enforcement categories primarily.

3. Refine the County stormwater and land use planning requirements to prioritize protection of the Diascund Creek Watershed with participation and collaboration from residents and local stakeholders.

Strategic Actions to implement this lie within the Regulatory/Enforcement category.

4. Promote watershed awareness and active stewardship among residents and local stakeholders through educational programs, recreational opportunities, and participatory watershed activities.

This is the stated goal of the Education/Awareness category.

5. Maintain and improve water quality in Diascund Creek to satisfy Local Bacteria TMDLs and prevent impairments.

All of the Strategic Action categories (see below) support this Goal to varying degrees, with particular focus on Watershed Restoration Projects for improvement, while the others more meaningfully support preservation of existing quality.

6. Identify and prioritize potential flood risks and hazards within the Diascund Creek Watershed with consideration to establishing future programming.

This is supported by comprehensive Floodplain Management efforts.

Many stakeholders were contacted and engaged during the process of developing this Watershed Management Plan. The goals above will require continuous engagement from these and other stakeholders, JCC, and other organizations to ensure that strategic actions are initiated and completed. Strategic actions for the Diascund Creek Watershed follow the same approach as previous JCC



Watershed Management Plans (most recently for the Skimino Creek Watershed, located near the Diascund Creek Watershed) where the identified strategic actions will:

- Be cost-effective and capable of being readily executed by JCC Staff,
- Encourage responsible land development, or discourage land development where that is the most responsible course,
- Promote transparent interactions between JCC and stakeholders fostering a sense of community and shared responsibility in the stewardship of the Watershed, and
- Address known problem areas with effective and long-term solutions.

## 3.0.2 Strategic Actions

The recommended Strategic Actions have been grouped into the following five categories to more specifically address the challenges encountered within the Diascund Creek Watershed and the public input received. Descriptions and details of these categories can be found in Section 5 - Strategic Action Plan.

- 1. Programmatic
- 2. Regulatory/Enforcement
- 3. Floodplain Management
- 4. Education/Awareness
- 5. Watershed Restoration Projects

# 3.1 Programmatic Actions

#### 3.1.1 TARGETED BACTERIAL REDUCTIONS

With bacteria being the primary designated impairment of the Watershed, it is important to identify achievable actions to help bring the waterbodies back into compliance with state standards.

Recommended Strategic Actions:

- Septic Systems
  - Continue existing septic inspection requirements through JCC's Septic Smart program and seek ways to refine its activities in coordination with the Virginia Department of Health.
  - Analyze number of failed septic systems over time, date of install, and project potential future failures that may be anticipated.
  - Review and revise JCC septic tank database as necessary to properly identify areas of concern.
  - Expand existing Pump-out Grant Program to also help subsidize the cost of replacing failed drainfields.



- Consider requiring any new infill development within vacant lots without access to sanitary sewer service to employ enhanced septic designs to higher-than-base level effluent treatment, including Alternative Onsite Sewage Systems (AOSS).
  - If full coverage of such a requirement is not desired, this could be reduced to defined high priority areas such as those areas within close proximity to surface receiving waters, very low elevations, or other known very high/shallow groundwater.
- Water Quality Monitoring
  - Part of the "targeted bacterial reductions" is targeting the sources. While knowing the sources of bacterial contamination allows for focus on those sources and areas, it is also valuable to know where the actual pollution/contamination is, since unknown sources and unknown mitigating factors (such as natural biological treatment in wetland) contribute to the condition of the waterbodies. We recommend, to the extent practical, setting up a monitoring program for any pollutants of concern, but particularly those causally related to the specific impairments in the watershed, such as bacteria.

Components of a robust monitoring program may include:

- <u>Locations</u>: Monitoring locations at various points in the Watershed. The locations which have the potential to tell the most useful and informative story following data analysis are just upstream of confluences of streams (or farther upstream of confluences but downstream of probable loading sources like developments), thus capturing the stream above with better resolution. Note that this offers a more reliable picture in nontidal streams than tidal/estuarine streams and waterbodies.
- <u>Technology</u>: To narrow down possible sources of bacteria, genetic testing of bacteria samples can be performed to determine if pollutants are coming from human sources or other animal sources such as livestock or pet waste.
- <u>Timeline</u>: Monitor for as long as possible, but at least one year, to capture one full cycle of the seasons and the relative change in impacts across those seasons.
- Timing: Monitor frequently, but ideally monthly or more, weekly even better. Timing of specific sampling would be best to try to capture rainfall events and any anticipated flooding events in particular. Before, during, and after a storm with runoff potential may provide a lot of insight, but particularly if monitoring occurs in well-distributed locations. The same thing applies for any event where some localized flooding occurs, since this type of event may circumvent many of the BMPs and give insight into watershed or subwatershed efforts that are more programmatic than structural.
- Livestock/Poultry
  - For agricultural properties in the Watershed, collaborate with the Colonial Soil & Water Conservation District to work with landowners to employ best practices to limit pollution.
  - In areas with larger concentrations of livestock, work with landowners to evaluate installation of waste composters or sufficiently sized refuse containers and proper management procedures.



- Explore Zoning Ordinance amendments that would incorporate recommendations of the Colonial Soil and Water Conservation District as it pertains to equine and other animal stocking rates.
- Employ similar landowner education materials to the current "scoop the poop" program that is more focused on smaller scale agricultural activities such as hobby livestock or poultry (including but not limited to backyard chickens).
- Pet Waste Program
  - Identify neighborhoods that have not currently installed the pet waste stations that JCC provides for free to close any gaps in overall coverage across the Watershed.
  - Evaluate locations of pet waste stations in public spaces, namely Upper County Park, to identify where large gaps between stations may be present and install additional stations as warranted.
  - Increase landowner awareness that they should "scoop the poop" in their own yards too, and not just along public spaces like the general sentiment appears to be. Similarly, increase awareness of the desired frequency with respect to anticipated rainfall, etc.
    - Provide pet waste composters for individual use or information on pick-up services.

## 3.1.2 EVALUATE WILDLIFE MANAGEMENT NEEDS

Wildlife populations are a well-documented source of bacterial contamination of surface waters across the nation. Understanding the scope of these populations and magnitude of the issue is another way that the bacteria pollution can be addressed. In addition to bacterial loading, geese also eat and damage vegetative cover which results in greater erosion and sedimentation.

#### Recommended Strategic Actions:

- Further coordinate with the James River Association (JRA) and Hampton Roads Sanitation District (HRSD) on the potential to extend their ongoing bacteria source tracking into the Diascund Creek Watershed to better pinpoint specific sources of bacteria pollution, species involved, and refine the recommended actions contained herein based upon the findings.
- Perform appropriate wildlife surveys to understand size and health of existing wildlife populations (including but not limited to deer). Assess if new game management activities could be warranted to reduce population size to healthier levels.
  - If surveys suggest additional population control is warranted, explore increased access to affected public or private land for hunting purposes. This could be grouped with other land conservation efforts (see later recommendations).
  - Coordinate with DWR to assess whether feral swine population spread is or is becoming a contemporary issue.
- Identify locations and size of permanent/resident geese populations and develop goose exclusion and/or removal measures to reduce amount of concentration in or around local and downstream waterways.



- Implement passive controls such as do-not-feed geese signs and buffer plantings between turf areas and edge of water.
- Within regulatory constraints, possibly evaluate and implement depredation measures.

# 3.1.3 JAMES CITY SERVICE AUTHORITY (JCSA) BACTERIAL REDUCTIONS

James City Service Authority (JCSA) was created in the late 1960's with the objective of providing safe, reliable, and affordable water and wastewater services. It is a legally separate entity from James City County (JCC) and is self-supporting and receives no share of any local or property taxes. Extreme weather events can lead to localized or larger, riverine flooding which can create conditions where untreated sewer water is released into the environment before being treated.

#### Recommended Strategic Actions:

 Collaborate with JCSA and the Hampton Roads Sanitation District (HRSD) to track status of the ongoing Regional Wet Weather Management Plan implementation and advocate for prioritization of projects within the Diascund Creek Watershed.

# 3.1.4 LAND CONSERVATION

As detailed in Section 2.2.2, there are several designated Conservation Areas, and much of the County's land area is covered by functional contiguous habitat cores. The following programmatic action recommendations and options pertain to preserving what is there, conserving to the extent practicable where full preservation is not feasible, and mitigating any unavoidable damages.

#### Recommended Strategic Actions:

- Continue to pursue and explore additional methods for expansion of the County's Purchase Development Rights (PDR) Program, as well as permanent or long-term fee simple land or easement acquisition in conservation areas and cores/corridors by the County or other organizations. Funding streams may include (but not be limited to) the Capital Improvement Fund, General Fund, grant programs, and independent land trusts.
- For designated/specified corridors and perhaps additional areas where a roadway crosses through a habitat core, evaluate options for wildlife crossings which would reduce or eliminate vehicle conflicts.
- Since the habitat cores from the *Natural & Cultural Assets Plan* shown herein were generated from a point-in-time, a broad analysis, and can change over time, consider future fieldwork or study to identify additional habitat corridors that may be important for the integrity of a species that should be conserved as well.

# 3.1.5 CLEAN WATER HERITAGE

JCC has already established the Clean Water Heritage Program to help fund water quality improvements within areas of existing development. With much of the historical development in the Diascund Creek Watershed predating stormwater regulations and lacking BMPs, these areas could benefit from stormwater improvements funded through this program.



#### Recommended Strategic Actions:

• Continue the efforts of the Clean Water Heritage Program and contact Homeowner Associations within the Watershed to explore water quality improvement potential (i.e. implementing new BMPs or addressing some of the deficiencies identified in the NSA scoring).

# 3.2 Regulatory/Enforcement Actions

#### 3.2.1 SPECIAL STORMWATER CRITERIA

The JCC Board of Supervisors first approved (by resolution) a Special Stormwater Criteria (SSC) on December 14, 2004, and revised it most recently on July 1, 2014. The original intention of the SSC had two primary goals; (1) Preserve pre-development hydrology for high quality streams, and (2) Provide enhanced water quality treatment of stormwater runoff.

Objectives of the SSC are as follows:

- Protection of specific stream reaches from accelerated channel erosion events due to changes in stormwater runoff amounts and intensity.
- Protection of conservation areas from the impacts of stormwater runoff.
- Protection of high-quality wetlands from the effects of altered water level fluctuations.
- Development of more effective criteria and locations for stormwater practices for new development in watersheds.
- Retrofit actions of existing facilities and to treat areas with uncontrolled runoff in the watershed to improve water quality.

Many of these same objectives of the SSC are addressed by standard stormwater compliance through the most recent VSMP regulations and improved VRRM method for water quality and quantity controls. However, based on the conditions of the watershed and continued need for heightened treatment to reach water quality goals, reliance on VSMP compliance alone is considered inadequate. Refinements to the SSC have been considered herein to reconcile redundancy between the previous SSC and what is inherently provided under the VRRM, as well as provide opportunities to improve overall watershed conditions beyond minimum compliance.

#### Recommended Strategic Actions:

- Expand the SSC to apply to the entirety of all County watersheds for any new development and redevelopment (not limited to select types, as is currently the case).
- Consolidate the SSC into a more simplified number of options that supplement the current VRRM requirements. All projects shall comply with VRRM minimum standards, then employ one or more of the following options as determined by the size of the development like presently included in the SSC.



- Water Quality SSC
  - When the VRRM baseline compliance accommodates a Level 1 BMP, increase the BMP design to Level 2, or the runoff reduction volume requirement to some yet-to-be-determined percentage above the VRRM requirement.
  - Restoration of existing eroded channels onsite and downstream of proposed outfalls.
  - Implementation of at least one of the recommended Watershed Restoration Project recommendations from the WSMP.
- Water Quantity SSC
  - Instead of 10-yr attenuation of post-development flows to pre-development flows for baseline flood control compliance, increase the level of attenuation to an established percentage below existing flows.
  - Require new development quantity calculations to use NOAA MARISA-adjustments of a preset time horizon and emissions level for all post-development numbers but keep with existing Atlas 14 for pre-development numbers/targets. Re-evaluate after Atlas 15 and/or other industry guidance is established.
- Instead of refining the SSC as noted above, consider an alternative overall shift in the focus of the SSC to establish an Offsite Contribution Program as described below:
  - Require new development to still comply with minimum VSMP standards onsite, but also contribute funds towards offsite improvements to be implemented elsewhere in the Watershed at a unit cost per volume of runoff or per acre of impervious cover.
  - For example, a One-for-One program where for every acre of new development, one acre of historical development is also offset through JCC-implemented retrofits paid for by the offsite contributions.
  - Alternatively, such an Offsite Contribution Program could be woven into the SSC as another water quality criteria option above if complete replacement of the SSC framework is not preferred by JCC.

## 3.2.2 OTHER COUNTY ORDINANCE CHANGES

In addition to JCC's SSC there are other opportunities to improve how ordinances can minimize impacts of stormwater runoff on downstream ecosystems, and continue to maintain and even improve existing conservation areas, habitat cores, and corridors. The following recommendations are targeted to do this for the Diascund Creek Watershed.

#### Recommended Strategic Actions:

 Continue existing and explore additional zoning and subdivision ordinance tools to require or encourage preservation of potential Conservation Areas and Habitat Cores/Corridors (CA/HC/C). Specifically, where practical:



- o Limit additional development within potential Conservation Areas.
- Increase focus on Low Impact Development (LID) and Better Site Design (BSD) in potential development areas immediately upstream or adjacent to CA/HC/C.
- If a roadway crosses through CA/HC/C, examine options for wildlife-safe crossings, with particular focus on those rare, threatened, and endangered (RTE) species.
- The current VSMP regulations allow for the use of offsite nutrient credit purchases in lieu of onsite water quality treatment for some or all required treatment depending on development size. This could result in declining local water quality within the watershed if the offsite practices associated with the nutrient credits are located in a different watershed. To avoid the effects this could have on Diascund Creek, restrict the use of offsite nutrient credits to only those credits/banks within the watershed and do not allow outside-of-watershed nutrient banks. Similar restrictions could be employed across the entire county for all watersheds:
  - Review statewide nutrient trading laws and regulations (including <u>9VAC25-900-91</u> and <u>DEQ</u> <u>Guidance Memo No. GM21-2007</u>) to confirm such an ordinance change is acceptable and refine language accordingly. Most notably ensuring that such a restriction is justified in the content of a documented TMDL study or impairment.
  - Review similar action by the City of Harrisonburg (<u>harrisonburgva.gov</u>) and/or others to refine ordinance language before adoption.
- Smaller-scale, single-home renovations and infill development often results in less disturbance than would be required to trigger VSMP compliance. Whereas isolated cases of this would not be a concern, collective untreated single-home development activities across multiple sites could result in a significant increase in pollutant loading or flows. To help avoid such a scenario, establish requirements for any building permit, regardless of disturbance size, to offset any increases in runoff volume from existing conditions. This could help avoid some of the issues that other urbanized communities have experienced when older, smaller homes are purchased and replaced with new homes that have much larger footprints, resulting in downstream conveyance system flooding since the existing drainage infrastructure was sized for the previous less intense development.
  - Compare with the new DEQ "agreement in-lieu of plan" language to ensure acceptable local regulation approach (i.e., heightened stormwater ordinance versus Special Use Permit (SUP) or building permit requirement).
- Develop County policy and/or ordinance regarding stormwater management needs specific to solar development activities.

# 3.2.3 REZONING AND SPECIAL USE PERMIT REVIEWS

It is acknowledged that Watershed Management Plan considerations have been part of legislative case (rezoning or SUP) review for other Watersheds, and they have helped County staff work with applicants to achieve adjustments in development design and/or the provision of enhanced environmental protection measures by the developer. Continuation of this process would be beneficial.



#### Recommended Strategic Actions:

- Consult the additional assessment results and recommendations contained herein when future rezoning and SUP decisions are made.
- Use proffers or SUP conditions to exceed minimum requirements in areas of concern to better protect the watershed health.
- Maintain the current 20-acre minimum lot size requirement for any future development of parcels zoned A-1, to limit the future impervious cover and pollutant loading potential.

# 3.2.4 ILLICIT DISCHARGE DETECTION AND ELIMINATION (IDDE)

An illicit discharge is an illegal discharge of any substance (liquid or solid) other than stormwater. It can be as simple as a direct connection of a washing machine to the stormwater system, discharge from unauthorized activities not having a permit to do so, disposal of grass clippings or leaf litter, and include accidental discharge characterized as such. The County has an illicit discharge reporting program where concerned residents can communicate observations or concerns related to a potential illicit discharge for review by JCC. The number of illicit discharges tracked by JCC is limited by the number of reports received. Further refinements to this program could include the following.

#### Recommended Strategic Action:

- Targeted, proactive IDDE inspections in older developments to identify potential cross-connections that would need to be separated.
- Periodic follow-up inspections at previously reported illicit discharge locations to determine if the concerns continue to be addressed or if repeat incidents are occurring that could require additional education, improvements, or ultimately enforcement action.
- Additional review of potential or confirmed hot spots noted in the Watershed Management Plan to better understand conditions and engage property owners on the appropriate actions needed to reduce pollution potential.

# 3.3 Floodplain Management Recommendations

Localized flooding, larger-scale riverine flooding, and tidally-driven flooding have all become more of an issue over time. While it is a complex challenge to people and infrastructure within the watershed, there is an increasing public-awareness of the issue and what it will take to plan ahead for these events.

#### Recommended Strategic Actions:

- Coordinate with Newport News Waterworks (NNWW) regarding the buildings located within the dam break inundation zone to ensure EAP activities capture all affected properties, including recently constructed homes and/or the potential additions noted herein.
- Consider potential flood mitigation or other access to neighborhoods which may become inaccessible to traffic due to large flooding events or buried utilities, with specific emphasis on Arlington Island Road. Cooperation with emergency management personnel will be imperative to identify how these



areas may be addressed or prioritized in an emergency. Further evaluation in these locations may be warranted to determine the projected flood depth and flow velocity to determine if these areas really are inaccessible.

- It is our understanding that VDOT is already implementing some improvements to Hicks Island Rd that may help alleviate some or all of the flood risks identified herein. Coordination with VDOT is recommended so that the improvements can be reviewed and any other flood mitigation needs identified.
- Further evaluate the culvert capacity at the Route 60 crossing with respect to projected future conditions to identify upgrade needs over time. As this crossing is a major roadway and part of the Emergency Evacuation Route, standing water on the roadway during a major storm event may obstruct potential evacuees. Furthermore, the FEMA floodplain mapping at this crossing depicts inundation for the 100 year event. If this road is considered to be critical infrastructure, a higher design event should be considered in the evaluation.
- Encourage private residences within the floodplain to raise the elevation of their homes and/or employ other floodproofing measures.
- Perform hydrologic and hydraulic modeling to better understand riverine flood risks outside of the tidal areas.
- Identify areas susceptible to flash flooding which are outside of the floodplains. These areas may
  become more susceptible to flooding due to insufficient size of the existing infrastructure and/or
  limited maintenance efforts. Additional information on the location and elevation of stormwater
  infrastructure assets throughout the watershed would be required. A two-dimensional modeling
  platform should be considered in order to better integrate the riverine flooding with the interior
  stormwater infrastructure systems and overland flow conditions.

# 3.4 Education & Awareness

# 3.4.1 CONTINUED COMMUNITY ENGAGEMENT AND PARTICIPATION

JCC has an excellent track record with community participation and engagement to encourage and facilitate citizen engagement and feedback. Continuing this effort to promote the actions described in this WSMP ensures successful implementation of recommended actions. These actions are mentioned elsewhere in this section but are related to Education and Awareness and bear repeating here.

While there are no JCC public schools located within the Diascund Creek Watershed, student engagement within the local school system is also an important action, incorporating introductions to science, outdoor activity and field trips, and the first exposures to environmentalism and awareness.

#### Recommended Strategic Actions:

- Support the conservation and protection priorities of the Lower Chickahominy Watershed through membership in the Lower Chickahominy Watershed Collaborative. Recommendations:
  - Communicate and coordinate with other members of the collaborative regarding land conservation, land protection and economic opportunity issues important to James City County.



- Actively participate in the steering committee and work groups to improve physical recreational infrastructure; support sustainable economic development; enhance river advocacy, education, and marketing; promote land conservation and landowner education; ensure protection of sites and traditions that are sacred and historic to the tribes; and increase ecological restoration and stewardship in the watershed.
- Find, engage, and support local watershed stewardship organizations. These may be watershed- and county- specific, or they may be focused more broadly on the Chesapeake Bay. There may be participants of a broader Chesapeake Bay group, or an unrelated volunteer environmental organization, from which a locally focused branch may spring, or locally focused efforts may be established.
- Pet waste program education is most successful when it is much more than simply fact-based. Look to public relations and marketing campaigns that have met great success for examples in how messaging can be most effective. Seattle, WA and surrounding counties have seen tremendous success and garnered national recognition over that success. Simply telling people that they should also scoop poop within their own yards may be an easily defensible action, but not a particularly effective one.
- With respect to the conservation areas, and habitat cores and corridors, adding opportunities to
  educate the public on the presence of the rare, threatened, and endangered species present in the
  watershed and neighboring watersheds, and how to minimize human impacts on natural spaces and
  processes can be a broadly effective measure, though impossible to measure.
- Septic system maintenance involves more than merely pumping tanks periodically, and repairing or replacing once failure occurs. Consider public information campaign with regular outreach regarding such maintenance and care activities and factors such as:
  - Garbage disposals in kitchen sinks, utility sinks, outdoor wash areas connected to septic drains, and other sources of undigestible solids can clog and permanently incapacitate drainfield lines. Inexpensive (~\$50) sediment screens installed (perhaps \$100-150 not including location and any necessary excavation of access port) in the effluent line of septic tank, cleaned annually, can prevent expensive failure. Consider establishing a discounted annual service contract arrangement taking advantage of the economy of scale, where homeowners provide the filter/screen at their cost and have either free or discounted service for installation from a plumbing or septic maintenance contractor. Initial setup for this might be a significant effort, given locations and depths of existing septic systems. Any new development employing onsite sewage treatment should include strong recommendation for effluent sediment screens where applicable.
  - Not all household chemicals and products are safe for onsite septic systems. What to, and not to, flush is important knowledge for residents.

# 3.5 Watershed Restoration Projects

Methodologies for the identification and subsequent ranking of project candidates to address stormwater and general ecosystem health across the Watershed are discussed in the next section, Section 4, Watershed Restoration Projects, with a subset of projects within each Subwatershed and additional subwatershed-scale detailed information in Section 6, Subwatershed Management Plans.



#### Recommended Strategic Actions:

- Continue investigating the current best practices in conjunction with the ongoing refinement and reevaluation of the County's priorities. For example, for areas where bacterial impairments are the top priority, consider incorporation of biochar into stormwater retention practices, and evaluate the best plant communities and design parameters for constructed wetlands to maximize bacterial reductions.
- Review and revise as necessary the JCC BMP database. Good, accurate data is crucial to help better inform other actions. Also, treated area (total and impervious) is very good information, but where practical, adding probable treatment volume of the practice better informs performance evaluation.
- Conduct a more refined value assessment on restoration projects in target areas. A concept-level design and brief investigation into certain projects, or all of those within certain high-priority areas, will allow cost estimates (currently very high-level) to be better accounted for in cost/benefit analyses.



# **4** WATERSHED RESTORATION PROJECTS

The projects detailed in this Section were identified and prioritized in such a way as to restore functions lost or diminished across the Watershed. They are important but are not the only actions that should be taken to bring the Diascund Creek Watershed to a more functioning, resilient, and healthy watershed ecosystem with thriving aquatic, riparian, and upland habitats.

A combination of all types of actions and projects, from programmatic actions to regulatory structures to stormwater practices and stream restorations, is typically the most effective big-picture approach to watershed protection and restoration. Given the existing undeveloped nature of the Watershed, more emphasis will be placed on the more broadly-reaching programmatic actions to help address future development, but structural stormwater practices and stream restorations still provide existing and future relief from the effects of increased development, especially when targeted in areas with greater future impervious projections. A combination of upland stormwater treatment practices and stream restoration projects is very strongly recommended to address specific areas of concern. While the streams surveyed in the Watershed are generally in good health, if the conditions that caused any prior degradation of a stream are not addressed before, or in concert with a stream restoration, the newly restored stream will be much less likely to stay in good condition. Therefore, it is highly recommended to look at stormwater BMPs and stream projects in a holistic way, as components of a program, rather than as distinct and discrete projects. If undertaking a particular stream restoration project, it is advisable to heighten the priority or adjust the schedule earlier for upland BMPs in the contributing drainage area, and to evaluate priorities such as water quantity and flow attenuation versus water quality and pollutant removal in the greater context.

Field data collected during both stream and stormwater field assessments informed each recommended action or project and, in some cases, informed one another when appropriate. The following sections describe the results of the field assessment efforts with a prioritization effort following the field assessment results. Figure 33 provides an overall view of the types and locations of different Watershed Restoration Projects recommended in the following pages. Descriptions of these project types are provided below.

- Stream Project Types:
  - Enhancement Targeted changes in stream morphology and vegetation to uplift existing functions within a reach.
    - 3 recommended locations, 1300 linear feet
  - **Restoration** A full reconstruction of a reach's morphology to 'reset' conditions.
    - 3 recommended locations, 802 linear feet
  - Enhancement/Restoration Suitable for either Enhancement or Restoration.
    - 1 recommended location, 200 linear feet
- Stormwater BMP Retrofit Types:
  - Bioretention A basin designed to capture runoff, constructed with special soil media and appropriate native plants to allow some of that runoff to infiltrate into the surrounding



soils and be taken up by the plants, reducing the overall runoff passing through. Where feasible (pending onsite investigation and analysis), these can be incorporated into other detention practices offering additional water quality and hydrologic benefits.

- 1 recommended location
- Outfall Enhancement Outlet structures can be modified to improve extended detention for water quantity and/or water quality benefits.
  - 1 recommended location
- Rehabilitate/Upgrade In some cases it is a repair or long-term maintenance issue that needs to be addressed (rehabilitate – berm erosion/failure, outlet structure failing). Most of the actions recommended have to do with optimizing the existing BMP for some combination of water quality treatment and outflow attenuation for flood mitigation and channel protection (upgrade).
  - 8 recommended locations
- Retrofit Constructed Wetland, or Wet Pond Existing BMPs that could be reconfigured to become either a constructed wetland or wet pond providing increased pollutant load removal opportunities. In some cases, these are originally dry detention ponds that have very wet conditions. Additional investigations are needed to determine if a constructed wetland versus a wet pond is feasible or appropriate for each location, since each has unique constraints and benefits/applications.
  - 3 recommended locations
- New Stormwater BMP Types:
  - Constructed Wetland (CW) A wetland with pools and a sinuous main channel or multiple channels, which serves as water quality and quantity treatment feature. Several configuration options exist.
    - 2 recommended locations
  - Re/Detention A basin to capture and at least temporarily hold runoff address water quality issues, but also so that more natural hydrologic responses (timing and amount) of runoff events are attained. <u>Detention refers to a wet or dry pond to capture surface water</u> runoff. <u>Re</u>tention refers to practices such as bioretention and infiltration basins which also allow more runoff to soak into the soil, further reducing outflow.
    - 2 recommended locations
  - Swale A drainage conveyance approach that attempts to slow runoff timing and lower downstream volumes while at the same time provides potential pollutant removal action. Dry swales are akin to linear bioretention, and wet swales are essentially ditches which have some similar function to wet ponds in terms of water quality.
    - 7 recommended locations

Further details about the recommended projects are provided by Subwatershed in Section 6, Subwatershed Management Plans, at subwatershed-scales.





#### Title Figure 33 - Recommended Projects for the Diascund Creek Watershed





#### Notes 1. Coordinate System: NAD 1983 StatePlane Virginia South FIPS 4502 Feet 2. Data Sources: ESRI, James City County, Stantec





# 4.1 Stream Restoration Assessment

# 4.1.1 Methodology for Identifying Candidate Projects: Stream Assessment Reaches

During stream assessment field work, reaches marked to be considered for restoration or enhancement were chosen for a variety of reasons. First, the habitat scores were assessed for each reach (see Section 2.3.1 for explanation/breakdown). There were no reaches that rated Poor in the Diascund Creek Watershed. Reaches with Marginal, Suboptimal, and even Optimal ratings may still have received recommendations for restoration or enhancement due to exposed utilities and/or specific areas of downcutting. In the table below, explanations are presented for each reach describing why "Poor" reaches may not have been recommended and why some reaches that scored "Marginal" or "Suboptimal" were included as recommendations.

Of the 97 reaches, totaling about 36 miles, there were 7 reaches (totaling approximately 2,300 linear feet) that stood to benefit from some degree of active management. Details of these reaches, their habitat quality scores, and field notes are provided in Table **17**, and shown spatially in Section 6, Subwatershed Management Plans.

Sub	Reach ID	Stream Type (Rosgen)	Habitat Condition Rating	Recommended Action	Notes
DC-101	ST2-02-G	G	Marginal	Restoration	Channel has areas of downcutting and bank erosion along the entire length.
DC-102	ST4-13-B	В	Marginal	Enhancement	Channel has some outer bend erosion and is slightly incising at the top of the reach.
DC-102	ST4-18-B	В	Marginal	Restoration/ Enhancement	Channel is heavily eroded and undercut banks at the top of the reach causing heavy sediment deposition downstream.
DC-103	ST4-60-C	С	Optimal	Enhancement	Restoration/Enhancement potential at top of reach. Reach is located near tracks and CSX coordination may be needed.
DC-201	ST4-39-C	С	Suboptimal	Enhancement	Channel has shown over-widening and undercutting of banks downstream of the box culvert as well as various points along the reach.
DC-301	ST4-57-G	G	Suboptimal	Restoration	Channel is eroded with undercut banks at the top of the reach.

Table 17 – Field-Assessed Stream Reaches Receiving Recommended Actions



Sub	Reach ID	Stream Type (Rosgen)	Habitat Condition Rating	Recommended Action	Notes
DC-Upper	ST4-31-C	С	Suboptimal	Restoration	Exposed utility pipe through streambed with bank erosion.

# 4.2 Stormwater Retrofit Opportunity Assessment

#### 4.2.1 Methodology for Identifying Stormwater Retrofits: Field Assessment

Stantec staff visited the BMPs shown in Figure 30 (in Section 2.3.2.1 above) indicated as 'Field Inspected' with the objective of determining how each might benefit from retrofit or rehabilitation to meet the needs of the Diascund Creek Watershed. Due to access restrictions and other constraints, not all existing BMPs in the watershed were visited. For each BMP visited in the field there were several considerations as they were assessed for potential retrofit opportunities. These are:

- Area available for retrofit actions within and adjacent to BMP footprint.
- Adjacent land use in surrounding areas.
- Vehicle/equipment access to the BMP for construction and maintenance purposes.
- Potential utility conflicts for permanent expansion of BMP footprint as well as for temporary construction access requirements.
- Permitting and property ownership factors that may make the retrofit less efficient or costeffective for a given BMP location.

Figure 18 provides distilled field notes and recommendations for retrofit or rehabilitation of 13 of the 16 existing BMPs that were assessed. For those without recommendations, they appeared to offer no significant opportunity for improvement in terms of stormwater treatment, and no perceptible need for repair/rehab. The following recommendations do not constitute an exhaustive list and should not limit any BMP investigation and retrofit efforts moving forward. Further details about the recommendations for these BMPs are provided by Subwatershed in Section 6, Subwatershed Management Plans.



				Drainage	
			Facility	Area	Proposed
Sub	BMP ID	Facility Name	Туре	(acres)	Treatment
DC - 103	BMP-DC001	Stonehouse Community Church	Dry Extended Detention Ponds	1.8	Rehabilitate/ Upgrade
DC - 103	BMP-DC003	Hirsh Ceramic Shop	Dry Extended Detention Ponds	0.3	Bioretention
DC - 102	BMP-DC004	Upper County Park Timber Walls	Erosion and Sediment Control Level 1	5.2	Retrofit - CW/ Wet Pond
DC - 103	BMP-DC007	Pinelands Nursery BMP # 1	Constructed Wetland	1.8	Rehabilitate/ Upgrade
DC - 103	BMP-DC008	Pinelands Nursery BMP # 2	Constructed Wetland	1.3	Rehabilitate/ Upgrade
DC - 201	BMP-DC009	Williamsburg Christian Retreat	Dry Extended Detention Ponds	8.1	Rehabilitate/ Upgrade
DC - 102	BMP-DC010	Hazelwood Earth Dam & Rec Pond	Wet Pond	103.5	Rehabilitate/ Upgrade
DC - 102	BMP-DC012	Meadow Lakes Section 2	Wet Pond	114.8	Outfall Enhancement
DC - 103	BMP-DC013	Toano Business Center BMP # 1	Dry Extended Detention Ponds	11.8	Retrofit - CW/ Wet Pond
DC - 103	BMP-DC015	Toano Business Center BMP 2	Infiltration Trench	11.8	Rehabilitate/ Upgrade
DC - 103	BMP-DC018	Anderson's Corner Animal Hospital	Infiltration Trench	1.0	Rehabilitate/ Upgrade
DC - 103	BMP-DC019	Nick's Lawn Care	Infiltration Basin	2.2	Retrofit - CW/ Wet Pond
DC - 103	BMP-WC004	Wright Signs Dry Pond	Dry Extended Detention Ponds	1.0	Rehabilitate/ Upgrade

 Table 18 – Recommended Retrofit Opportunities of Existing Stormwater BMPs



# 4.3 New Stormwater BMP Opportunity Identification

While field personnel were performing the CWP's Neighborhood Source Assessments (NSA) and Hot Spot Investigations (HSI) throughout the Watershed (See Section 2.3.2.2 for more details), opportunities for new BMPs were observed and noted, whether in concert with existing BMPs (e.g., outfall enhancement) or simply as a new stand-alone BMP.

Similar to retrofit opportunities, many factors are considered when evaluating and recommending new BMPs, with a lot of crossover between new and retrofit. These newly identified locations can offer great opportunities to capture stormwater flows for quantity and/or quality treatments. The two regional constructed wetland location options were identified from desktop assessment alone, based on location of the streams and confluences above them in the watershed. There were 10 different opportunities identified where a new BMP has potential for success. The list is provided in Table 19 and displayed in maps by Subwatershed in Section 6, Subwatershed Management Plans.

Sub	New BMP ID	Proposed Treatment	Notes
DC - 201	OPP-DC201-01	Swale	Roadside ditches around cul de sac may be converted to water quality swales.
DC - 103	OPP-DC103-02	Re/Detention	Drainage to cul de sac may be diverted to new re/detention basin, or possibly linear feature (swale).
DC - 103	OPP-DC103-03	Swale	Concrete conveyance channel along cul de sac, and possibly through woods along drainage easement, may be replaced with water quality swale.
DC - 103	OPP-DC103-04	Re/Detention	Drainage from farms to channel through woods. Opportunity to include re/detention basin, or linear feature.
DC - 103	OPP-DC103-05	Swale	Roadside ditches around cul de sac may be converted to water quality swales.
DC - 201	OPP-DC201-06	Swale	Roadside ditches may be converted to water quality swales.
DC - 201	OPP-DC201-07	Swale	Roadside ditches may be converted to water quality swales.
DC - 201	OPP-DC201-08	Swale	Roadside ditches may be converted to water quality swales. Possible outfall stabilization or enhancement.
DC - 103	OPP-DC103-RP01	Constructed Wetland	Expansion of existing wetland system.
DC - 101	OPP-DC101-RP02	Constructed Wetland	Expansion of existing wetland system.

#### Table 19 – New BMP Opportunity Recommendations



# 4.4 Prioritizing Candidate Watershed Enhancement Projects

With the large number of recommended or possible projects presented in the preceding four categories/sections, prioritization is necessary. Using the same approach as in other JCC Watershed Plans (detailed in Appendix C), each recommended project within the four major categories was scored using the following criteria, grouped by Prioritization Factors (in favor) and Possible Conflicts (against).

#### **Prioritization Factors**

- Water Quality / Runoff Quantity
- Restore Floodplain Connectivity
- Aquatic Habitat
- Sedimentation
- Environmental Awareness
- Project Size / Scope
- Channel Condition
- Condition of Contributing Watershed

#### Possible Conflicts to Consider

- Utility Conflicts
- Construction Access
- Neighborhood Impact
- Physical Feasibility
- Level of Design
- Private Property
- Permitting Issues
- Negative Environmental Impacts

These considerations help to identify which recommended projects might best meet one or more of the Watershed Goals detailed in previous sections. Tables 20-22 on the following pages provide the scoring and ranking of the projects within each of the four aforementioned project type categories. As projects progress from feasibility considerations into conceptual design, and potential implementation, it is important to note that some of the scoring may be altered over time. Additionally, high-level preliminary cost estimates were based on best professional judgement, but further site investigations and considerations will need to be explored to refine these preliminary cost estimates. Cost estimates (ranges) are to be considered 'order-of-magnitude', with the heavy qualifier that many project recommendations provide for a wide range options or approaches, which leaves a very wide range of possible costs accordingly.



## Table 20 – Selected and Prioritized Stream Reach Projects

										Prio	ritizati	on Fac	tors				Possible Conflicts										
Subwatershed	Reach ID	Stream Type (Rosgen)	Length (feet)	Total Habitat Score	Habitat Condition Rating	Recommended Action	Estimated Cost Range*	Water Quality / Runoff Quantity	Restore Floodplain Connectivity	Restore Aquatic Habitat	Reduce Sedimentation	Project Size / Scope	Channel Condition	Condition of Contributing Watershed	Increase Environmental Awareness	RANKING: Level of Benefit	Conflicts with Existing Utilities	Construction Access	Neighborhood Impact	Physical Feasibility	Level of Design	Private Property	Possible Permitting Factors	Negative Environmental Impacts	RANKING: Conflicts	Net Score	Watershed-Wide Rank
102	ST4-18-B	В	200	75	Marginal	Restoration/ Enhancement	\$100-250k	5	3	2	4	3	2	2	0	21	0	2	2	1	2	3	3	0	13	8	1 of 7
301	ST4-57-G	G	252	133	Suboptimal	Restoration	\$100-250k	3	5	2	2	1	2	0	2	17	0	2	2	1	4	3	0	0	12	5	2 of 7
101	ST2-02-G	G	500	108	Marginal	Restoration	\$250-500k	5	5	0	2	3	2	0	0	17	0	0	0	1	4	3	5	0	13	4	3 of 7
201	ST4-39-C	С	1,000	114	Suboptimal	Enhancement	> \$500k	3	3	4	2	3	2	0	0	17	0	2	2	1	2	3	3	0	13	4	3 of 7
103	ST4-60-C	С	100	163	Optimal	Enhancement	\$100-250k	3	3	4	2	1	2	2	2	19	5	2	0	3	2	0	3	0	15	4	3 of 7
Upper	ST4-31-C	С	50	131	Suboptimal	Restoration	< \$100,000	0	3	0	0	1	2	0	2	8	0	2	2	1	0	3	0	0	8	0	6 of 7
102	ST4-13-B	В	200	104	Marginal	Enhancement	\$100-250k	3	3	2	2	2	2	2	0	16	3	2	2	1	2	3	5	0	18	-2	7 of 7

Note: Where scoring rubric returns the same score for multiple projects, their ranking will be tied, and not sequential.



#### Table 21 – Selected and Prioritized Stormwater BMP Retrofit Projects

							Prioritization Factors						Possib	ole Co	nflicts										
Subwatershed	BMP ID	Facility Name	Facility Type	Drainage Area (acres)	Proposed Treatment	Notes	Cost Range	Water Quality / Runoff Quantity	Restore Floodplain Connectivity	Reduce Sedimentation	Project Size / Scope	Channel Condition	Condition of Contributing Watershed	Increase Environmental Awareness	RANKING: Level of Benefit	Conflicts with Existing Utilities	Construction Access	Neighborhood Impact	Physical Feasibility	Level of Design	Possible Permitting Factors	Negative Environmental Impacts	RANKING: Conflicts	Net Score	Watershed-Wide Rank
DC - 103	BMP-DC013	Toano Business Center BMP # 1	Dry Extended Detention Ponds	11.79	Retrofit - CW/ Wet Pond	Currently functioning as a wet pond. Could be properly converted to wet pond or constructed wetland.	\$100- 250k	5	3	5	2	2	2	2	21	0	0	0	1	2	3	0	6	15	1 of 13
DC - 102	BMP-DC004	Upper County Park Timber Walls	Erosion and Sediment Control Level 1	5.2	Retrofit - CW/ Wet Pond	Construct/convert to some combination of detention and water quality treatment. May be sized to accommodate the proposed community gym at Upper County Park as well.	\$100- 250k	5	3	5	1	2	2	3	21	0	2	0	1	4	3	0	10	11	2 of 13
DC - 103	BMP-DC019	Nick's Lawn Care	Infiltration Basin	2.205	Retrofit - CW/ Wet Pond	Appears to not be infiltrating. High water level and vegetation indicators. Possible expansion of footprint and conversion to wetland or wet pond.	\$50- 100k	5	3	5	1	2	2	1	19	0	2	0	1	2	3	0	8	11	2 of 13
DC - 103	BMP-DC003	Hirsh Ceramic Shop	Dry Extended Detention Ponds	0.3	Bioretention	Detritus in pond. Very slow drawdown. Convert to wet pond or constructed wetland, possibly expand footprint.	\$50- 100k	3	3	3	1	2	2	1	15	0	0	0	1	4	0	0	5	10	4 of 13
DC - 103	BMP-DC018	Anderson's Corner Animal Hospital	Infiltration Trench	1.04	Rehabilitate/ Upgrade	No clear or obvious infiltration area. Small section of what appears to be permeable pavement. Check designs/as- builts and function, rehab as needed.	\$50- 100k	3	0	3	1	2	2	2	13	0	2	0	1	0	0	0	3	10	4 of 13



									Ρ	rioritiz	zation	Factor	s					Possib	ole Cor	nflicts		1			
Subwatershed	BMP ID	Facility Name	Facility	Drainage Area (acres)	Proposed	Notes	Cost Range	Water Quality / Runoff Quantity	Restore Floodplain Connectivity	Reduce Sedimentation	Project Size / Scope	Channel Condition	Condition of Contributing Watershed	Increase Environmental Awareness	RANKING: Level of Benefit	Conflicts with Existing Utilities	<b>Construction Access</b>	Neighborhood Impact	Physical Feasibility	Level of Design	Possible Permitting Factors	Negative Environmental Impacts	RANKING: Conflicts	Net Score	Watershed-Wide Rank
DC - 102	BMP-DC012	Meadow Lakes Section 2	Wet Pond	114.82	Outfall Enhancement	Potential for polishing filter/treatment, or linear treatment practice below outfall. Possible dredging to expand/restore capacity.	\$100- 250k	3	0	3	3	2	2	1	14	0	2	0	1	0	3	0	6	8	6 of 13
DC - 103	BMP-DC015	Toano Business Center BMP 2	Infiltration Trench	11.75	Rehabilitate/ Upgrade	Address erosion issue at inlet. Confirm presence of infiltration trench. If none present, evaluate potential to install bioretention or infiltration trench, connecting underdrain/overdrain to adjacent storm drain below.	< \$50k	3	0	3	2	2	2	2	14	3	0	2	1	0	0	0	6	8	6 of 13
DC - 103	BMP-DC001	Stonehouse Community Church	Dry Extended Detention Ponds	1.8	Rehabilitate/ Upgrade	Expand footprint, eliminate short-circuiting, potentially add non-turf vegetation. Avoid utility conflicts.	\$50- 100k	3	0	5	1	2	2	3	16	3	0	0	1	2	3	0	9	7	8 of 13
DC - 103	BMP-DC008	Pinelands Nursery BMP # 2	Constructed Wetland	1.31	Rehabilitate/ Upgrade	Possible footprint expansion. Modification to help combat algae growth.	\$50- 100k	3	0	3	1	2	2	1	12	0	2	0	1	2	0	0	5	7	8 of 13
DC - 103	BMP-DC007	Pinelands Nursery BMP # 1	Constructed Wetland	1.83	Rehabilitate/ Upgrade	Possible footprint expansion.	\$50- 100k	3	0	3	1	2	2	1	12	0	2	0	1	2	3	0	8	4	10 of 13
DC - 201	BMP-DC009	Williamsburg Christian Retreat	Dry Extended Detention Ponds	8.1	Rehabilitate/ Upgrade	Potential upgrade to outlet structure to increase extended detention. Also retrofit potential near outlet structure for water quality benefit, such as bioretention or infiltration.	\$100- 250k	3	0	3	1	0	0	2	9	0	2	0	1	2	0	0	5	4	10 of 13



									Р	rioritiz	zation	Factor	rs					Possik	ole Cor	nflicts					
Subwatershed	BMP ID	Facility Name	Facility Type	Drainage Area (acres)	Proposed Treatment	Notes	Cost Range	Water Quality / Runoff Quantity	Restore Floodplain Connectivity	Reduce Sedimentation	Project Size / Scope	Channel Condition	Condition of Contributing Watershed	Increase Environmental Awareness	RANKING: Level of Benefit	Conflicts with Existing Utilities	<b>Construction Access</b>	Neighborhood Impact	Physical Feasibility	Level of Design	Possible Permitting Factors	Negative Environmental Impacts	RANKING: Conflicts	Net Score	Watershed-Wide Rank
DC-102	BMP-DC002	John's Used Auto Parts	Wet pond	1.7	Rehabilitate/ Upgrade	Possible footprint expansion. Overgrown vegetation.	\$50k- 100k	3	0	3	3	2	2	1	14	3	0	0	1	1	5	0	10	4	10 of 13
DC - 103	BMP-WC004	Wright Signs Dry Pond	Dry Extended Detention Ponds	1	Rehabilitate/ Upgrade	Two adjacent ditches/trenches could be combined into larger feature with more volume.	\$100- 250k	3	0	3	1	2	2	1	12	3	0	0	1	2	3	0	9	3	13 of 13

Note: Where scoring rubric returns the same score for multiple projects, their ranking will be tied, and not sequential.



## Table 22 – Selected and Prioritized New Stormwater BMP Projects

							F	Prioriti	zation	Factor	rs			Possible Conflicts									
Sub	New BMP ID	Proposed Treatment	Notes	Possible Constraints	Cost Range	Water Quality / Runoff Quantity	Restore Floodplain Connectivity	Reduce Sedimentation	Project Size / Scope	Channel Condition	Condition of Contributing Watershed	Increase Environmental Awareness	RANKING: Level of Benefit	Conflicts with Existing Utilities	<b>Construction Access</b>	Neighborhood Impact	Physical Feasibility	Level of Design	Possible Permitting Factors	Negative Environmental Impacts	RANKING: Conflicts	Net Score	Watershed-Wide Rank
DC - 103	OPP-DC103- 04	Re/Detention	Drainage from farms to channel through woods. Opportunity to include re/detention basin, or linear feature.	Property ownership, trees.	\$100- 250k	3	3	2	1	2	2	1	14	0	0	0	1	2	3	0	6	8	1 of 11
DC - 103	OPP-DC103- 03	Swale	Concrete conveyance channel along cul de sac, and possibly through woods along drainage easement, may be replaced with water quality swale.	Along cul de sac, likely none. Through woods along drainage easement,	\$100- 250k	3	3	0	1	2	2	2	13	0	2	0	1	2	3	0	8	5	2 of 11
DC - 103	OPP-DC103- 05	Swale	Roadside ditches around cul de sac may be converted to water quality swales.	Property ownership.	\$100- 250k	3	3	0	2	2	2	1	13	3	0	2	1	2	0	0	8	5	2 of 11
DC - 201	OPP-DC201- 01	Swale	Roadside ditches around cul de sac may be converted to water quality swales.	Available head to storm drain system.	\$100- 250k	3	3	0	2	0	0	1	9	0	0	2	1	2	0	0	5	4	4 of 11
DC-201	OPP-DC201- 09	Swale	Stormwater conveyance/outfall stabilization along WCC entrance road.	Tree clearing, utility conflicts.	\$100- 250k	3	3	2	1	2	0	2	13	0	2	0	0	2	3	2	9	4	4 of 11
DC - 103	OPP-DC103- RP01	Constructed Wetland	Expansion of existing wetland system.	Property ownership, trees.	\$250- 500k	5	3	2	1	0	2	1	14	0	0	2	1	4	3	0	10	4	4 of 11
DC - 201	OPP-DC201- 07	Swale	Roadside ditches may be converted to water quality swales.	Available head to storm drain system. Utility conflicts.	\$100- 250k	3	3	0	1	0	0	1	8	0	0	2	1	2	0	0	5	3	7 of 11
DC - 103	OPP-DC103- 02	Re/Detention	Drainage to cul de sac may be diverted to new re/detention basin, or possibly linear feature (swale).	Property ownership, trees.	\$100- 250k	3	3	2	1	2	2	1	14	3	0	2	2	2	3	0	12	2	8 of 11
DC - 101	OPP-DC101- RP02	Constructed Wetland	Expansion of existing wetland system.	Property ownership, trees, adjacent railway.	\$250- 500k	5	3	2	1	0	0	1	12	0	0	2	1	4	3	0	10	2	8 of 11



							F	Prioritiz	ation	Factor	s					Possi	ble Co	nflicts					
6.h	New BMP	Proposed		Possible	Cost	Water Quality / Runoff Quantity	Restore Floodplain Connectivity	Reduce Sedimentation	Project Size / Scope	Channel Condition	ondition of Contributing Watershed	Increase Environmental Awareness	RANKING: Level of Benefit	Conflicts with Existing Utilities	Construction Access	Neighborhood Impact	Physical Feasibility	Level of Design	Possible Permitting Factors	Negative Environmental Impacts	RANKING: Conflicts	Net Score	Watershed-Wide Rank
Sub	ID	Treatment	Notes	Constraints	Range						Ŭ											<b> </b>	<u> </u>
DC - 201	OPP-DC201- 08	Swale	Roadside ditches may be converted to water quality swales. Possible outfall stabilization or enhancement.	Available head to storm drain system. Tree clearing if improving outfall.	\$100- 250k	3	3	0	1	0	0	1	8	0	2	2	1	2	0	0	7	1	10 of 11
DC - 201	OPP-DC201- 06	Swale	Roadside ditches may be converted to water quality swales.	Available head to storm drain system. Utility conflicts.	\$100- 250k	3	3	0	1	0	0	1	8	0	0	2	1	2	3	0	8	0	11 of 11

Note: Where scoring rubric returns the same score for multiple projects, their ranking will be tied, and not sequential.



# 5 Strategic Action Plan

As detailed earlier in previous sections, the achievement of watershed goals for the Diascund Creek Watershed will involve five (5) general types of Strategic Actions. The recommended actions can be grouped into these categories:

- <u>Programmatic</u> Efforts such as Land Conservation/Purchase of Development Rights, wildlife management (e.g. goose exclusion from ponds), development of an incentivized public stewardship program, and continued septic system inspections/clean-out/repair support programs.
- <u>Regulatory/Enforcement</u> For example, expand Special Stormwater Criteria for new development and re-development, increase stormwater controls for infill development, restrict inter-watershed nutrient credit trading, and maintain the current 20-acre minimum lot size requirement for any future development of parcels zoned A-1.
- 3. <u>Floodplain Management</u> Consider an enhanced flood modeling effort, coordinating on Dam Break Inundation Zone planning, drainage upgrades, and elevating road crossings.
- <u>Education/Awareness</u>- Increasing engagement with local groups, additional public events, public waste disposal and litter prevention campaigns, and small-scale runoff reduction education and encouragement.
- <u>Watershed Restoration Projects</u> Explore the retrofitting of existing Stormwater Best Management Practices (BMPs) to increase treatment effectiveness of stormwater runoff, construction of new BMPs in areas that are currently not served by existing BMPs, and stream enhancement and/or restoration projects.

A draft Strategic Action Plan is provided to JCC in the following tables broken down by recurring annual activities (Table 23), short-term recommended actions (Table 24), medium-term (Table 25), and longer-term (Table 26). Short-term will generally involve establishing new annual activities that are not already instituted by JCC, advancing follow-up studies or investigations, drafting ordinance changes, and choosing those high-priority Watershed Restoration Project recommendations as identified within this Watershed Management Plan. Medium-term will leverage analyses that may have been completed short-term such as more detailed flood risk modeling and failing septic system assessments, and continued implementation of the next Watershed Restoration Projects in priority. Longer-term will be similar with the exception that the 10-year implementation plan (and project priority list upon which it is based) needs review (annually) to ensure implementation is occurring at a rate to meet desired goals.



## Table 23 – Strategic Action Plan for Recurring Annual Activities

Strategic Action Category (Annual)	Action Detail or Evaluation Measure	Level of County Effort and Expense	Funding Stream
Special Stormwater Criteria	Monitor success of changes in SSC after BOS approval.	SMALL: -Coordinate review with Stormwater Program Advisory Committee	Within realm of current staff responsibi become a source of funding for other ad
Land Conservation	Reassess any opportunities for land and easement acquisition.	SMALL	Within realm of current staff responsibi
Other Ordinance Changes to County Stormwater Requirements	Monitor success of changes in other ordinances.	SMALL: -Coordinate review with Stormwater Program Advisory Committee, Planning Department, and Planning Commission	Within realm of current staff responsibi be a source of funding for other activitie
	Hold a certain number of events to educate residents about the importance of pet waste, wildlife, and livestock waste management, including in their backyards.	SMALL to MODERATE: - public notices - development and distribution of printed materials - administrative actions	General Fund.
	Find, engage, and support the efforts of relevant stewardship and volunteer groups. This may include groups focused on watershed scales ranging from Diascund Creek (local), to Chickahominy River (regional), to James or York Rivers (state), to Chesapeake Bay (national-regional).	SMALL	General Fund.
Targeted Bacterial Reductions	Consider employing similar landowner education materials to the current "scoop the poop" program that is more focused on small scale agricultural activities such as hobby livestock or poultry (including but not limited to backyard chickens).	SMALL	Within realm of current staff responsibi
	Continue existing septic inspection requirements through the County's Septic Smart program and seek ways to refine its activities in coordination with the Virginia Department of Health.	SMALL	Within realm of current staff responsibi
	Annually, following initial setup of program: Monitor at new and existing water quality sampling/monitoring stations for better tracking and data analysis. Revise and refine any informative influence on other efforts and programs.	SMALL to MODERATE	Coordinate with James River Association local and Chesapeake Bay-focused orga This may be entirely external, internal o combination thereof.
Illicit Discharge Detection and Elimination (IDDE)	Continue IDDE program and inspections.	SMALL to MODERATE	Within realm of current staff responsibi



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Strategic Action Category (Annual)	Action Detail or Evaluation Measure	Level of County Effort and Expense	Funding Stream	Estimated Cost
James City Service Authority (JCSA) Bacterial Reductions	At least once a year, communicate with JCSA and the Hampton Roads Sanitation District (HRSD) to track status of the Regional Wet Weather Management Plan implementation and advocate for prioritization of projects within target areas.	SMALL	Within realm of current staff responsibilities.	-
Evaluate Wildlife Management Needs (in cooperation with Department of Wildlife Resources, DWR)	Perform annual meso-mammal and large mammal surveys to understand the size and distribution of existing wildlife populations (not limited to deer) to assess if new game management activities may be warranted.	SMALL to MODERATE - explore academic and volunteer input from consulting community, and DWR	Potentially within realm of current staff responsibilities. Possible DWR involvement.	-
	Identify and monitor locations and size of permanent geese populations and develop or maintain goose exclusion measures to reduce amount of concentration in or near sensitive resources. Implement passive controls such as do-not-feed geese signs and buffer plantings between turf areas and edge of water.	SMALL to MODERATE - explore academic and volunteer input from community and DWR	Potentially within realm of current staff responsibilities. Possible DWR involvement.	-
	Check if any additional/new wild or feral animal population concerns have developed (beyond wild meso-mammal and geese). Coordinate with DWR as necessary.	SMALL	Within realm of current staff responsibilities.	-
Site-Specific Stormwater Treatment Practices	Continue BMP Inspections annually to determine undersized, disrepair, or retrofit opportunities.	SMALL	Within realm of current staff responsibilities.	-
	Check and update County BMP database.	SMALL	Within realm of current staff responsibilities.	-
Agriculture and Forestry Management	Continue to coordinate with Colonial Soil and Water Conservation District to assess and adjust as necessary the agricultural and silvicultural practices in the County.	SMALL	Within realm of current staff responsibilities.	-
Clean Water Heritage Program	Contact Homeowner Associations within the Watershed to explore water quality improvement potential (i.e. implementing new BMPs or addressing some of the deficiencies identified in the NSA scoring).	SMALL to MODERATE	Within realm of current staff responsibilities.	-



# Table 24 – Strategic Action Plan for Short-Term

Strategic Action (Short-Term)	Strategic Action Detail or Evaluation Measure	Level of County Effort and Expense	Funding Stream
Special Stormwater Criteria	Expand the SSC to apply to the entire watershed for any new development and re-development and not limited to SUP applications only. Revise SSC content based on alternate considerations.	SMALL: - Coordinate with Stormwater Program Advisory Committee	Within realm of current staff responsibili become a source of funding for other act
Land Conservation	Identify potential additional funding sources for land and easement acquisition toward conserving and preserving Conservation Areas, Habitat Cores, and Corridors.	SMALL to MODERATE	Potentially within realm of current staff responsibilities.
Other Ordinance Changes to County Stormwater Requirements	Other Ordinance Changes.	SMALL: - Coordinate with Stormwater Program Advisory Committee and JCC Planning Department, and Planning Commission	Within realm of current staff responsibili be a source of funding for other activities
	Analyze number of failed septic systems over time, date of install, and project potential future failures that may be anticipated.	SMALL	Potentially within realm of current staff responsibilities.
	Expand existing Pump-out Grant Program to also help subsidize the cost of replacing failed drain fields.	SMALL to MODERATE	Within realm of current staff responsibili General fund, grant applications. Can ap DEQ funding through EPA.
	Evaluate locations and conditions of pet waste stations at Upper County Park to identify if additional stations are warranted.	SMALL	Within realm of current staff responsibilition for new pet waste stations not included budget.
Targeted Bacterial Reductions	Consider how to incorporate Biochar into select BMP retrofits or areas of high bacteria concentration potential such as off leash area at Upper County Park or areas with larger concentrations of livestock. Set up pre- and post-implementation scientific study to determine local effectiveness. This may involve initial design considerations.	SMALL to MODERATE: - Explore academic and volunteer input from community	Within realm of current staff responsibili support from Academia could be recruite
	Coordinate with James River Association and Hampton Roads Sanitation District on potential bacteria source tracking within the Watershed.	SMALL to MODERATE	Within realm of current staff responsibili
	Locate and evaluate opportunities to reduce bacteria impacts from existing detention ponds or other BMPs that host geese populations.	SMALL	Within realm of current staff responsibili
	Coordinate with Department of Environmental Quality (DEQ) on impairment statuses and strategies, with focus and intent on setting up monitoring program.	SMALL to MODERATE	Within realm of current staff responsibili



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Strategic Action (Short-Term)	Strategic Action Detail or Evaluation Measure	Level of County Effort and Expense	Funding Stream	Estimated Cost
Flood Risk Items	Perform more quantitative flood modeling to better understand interior drainage flash flooding and riverine risks outside of just the tidal surge flooding. Develop a countywide resilience plan to expand the review across watershed boundaries and build off of the analysis performed herein.	MODERATE to HIGH	Develop a RFQ/RFP to solicit proposals to perform this work. Consider CFPF grants or other grant opportunities for flood risk resiliency planning.	\$100,000
	Collaborate with dam owners (such as Newport News Waterworks, Diascund Reservoir dam) in order to ensure dams meet Virginia Dam Safety regulations. In addition to regulated safety requirement, if feasible, and sufficient funding is available - Consider downstream risks in storms below the Spillway Design Flood (i.e. avoid 10-yr to 100-yr storm increases). - Evaluate potential to incorporate low-flow orifice for water quality and channel protection benefits into any modification/rehabilitation design. - Assess other retrofit potential at the impoundment (including but not limited to forebays, aeration, and polishing treatment).	SMALL to MODERATE	Within realm of current staff responsibilities. Funding for compliance from owners. Funding for improvements from grant programs.	-
	Share flood risk findings with County Emergency Management and Hampton Roads Planning District Commission (HRPDC), compare to their action plans, and identify if any adjustments are needed to their evacuation zone prioritization and/or emergency access routes.	SMALL to MODERATE	Within realm of current staff responsibilities.	-
Site-Specific Stormwater Treatment Practices	Finalize prioritization of recommended projects to select the highest priority projects for implementation in Year 1 and into Year 2. Begin 1-2 Stream Reach projects, 2-4 Retrofit BMP opportunities, and 1-2 New BMP opportunities, depending on scale and funds.	SMALL to MODERATE - explore academic and volunteer input from community	Within realm of current staff responsibilities.	Prioritization: < \$40k Design/Permitting: > \$50k Construction: > \$500,000
	Evaluate feasibility (land/easement availability, primarily) and potential water quality benefits for regional wetland opportunities. Perform concept design and engineering cost estimates, and cost/benefit analysis. (Relates to Targeted Bacterial Reductions as well.)	SMALL to MODERATE	Within realm of current staff responsibilities.	\$10,000 - 15,000



## Table 25 – Strategic Action Plan for Medium-Term

Strategic Action (Medium-Term)	Strategic Action Detail or Evaluation Measure	Level of County Effort and Expense	Funding Stream	Estimated Cost
Targeted Bacterial Reductions	Use results from Year 1 analysis estimating number of failed septic systems over time, date of install, and project potential future failures that may be anticipated to plan a 5-year full implementation of actions.	MODERATE	Within realm of current staff responsibilities.	-
	Continue existing Pump-out Grant Program to also help subsidize the cost of replacing failed drain fields.	SMALL to MODERATE	Within realm of current staff responsibilities. General fund, grant applications.	\$10,000
	Reassess biochar applications after interpretation of past monitoring results of performance.	SMALL to MODERATE: - Explore academic and volunteer input from community	Within realm of current staff responsibilities but support from Academia could be recruited.	-
	Set up water quality monitoring program and begin monitoring.	SMALL to MODERATE: - Explore academic and volunteer input from community	Partner organizations, grant funds. Coordinate with James River Association and other local and Chesapeake Bay-focused organizations (EPA, CBPO). This may be entirely external, internal, or some combination thereof.	-
Flood Risk Items	Conduct assessment of Hick's Island Road access to residences in floodplain of Diascund Creek. Evaluate whether the approaches to the bridge are sufficient, or need to be elevated to ensure ability to evacuate and/or get emergency access into the area during a storm.	SMALL to MODERATE	Within realm of current staff responsibilities.	-
Land Conservation	Put as much land under conservation easements as feasible given timing and funds. Target priority areas, cores, and corridors. Consider new fieldwork or study to identify additional habitat corridors that may be important for the integrity of a species that should be conserved as well.	MODERATE to HIGH	Within realm of current staff responsibilities. General fund, grants, independent conservation land trusts.	> \$1,000,000
Evaluate Wildlife Management Needs	Evaluate success of prior and ongoing wildlife management efforts. Refine as appropriate.	SMALL to MODERATE: - Explore academic and volunteer input from community	Within realm of current staff responsibilities.	-
Site-Specific Stormwater Treatment Practices	Continue implementation of first round of projects. Reassess prioritization and incorporate any lessons learned from first round.	MODERATE to HIGH	Within realm of current staff responsibilities.	-
	If preliminary studies indicate need and/or good benefit-to-cost ratio, begin engineering design, permitting, and land or land rights acquisition processes for one or more large-scale/regional BMPs.	MODERATE to HIGH	Within realm of current staff responsibilities.	\$100,000



## Table 26 – Strategic Action Plan for Longer-Term

Strategic Action (Longer-Term)	Strategic Action Detail or Evaluation Measure	Level of County Effort and Expense	Funding Stream	Estimated Cost
Other Ordinance Changes to County Stormwater Requirements	Evaluate successes/failures of previously implemented ordinance changes, and begin revision process if warranted.	MODERATE	Within realm of current staff responsibilities.	-
Land Conservation	Aim for 50% of Corridors, 25% of Conservation Areas, and as much of the existing of Habitat Core as possible to be under some form of measurable and enforceable protection.	MODERATE to HIGH	Within realm of current staff responsibilities. General fund, grants, independent conservation land trusts.	-
Targeted Bacterial Reductions	Continue existing Pump-out Grant Program to also help subsidize the cost of replacing failed drain fields.	SMALL to MODERATE	Within realm of current staff responsibilities. General fund, grant applications.	\$10,000
	Continue inclusion of Biochar into select BMP retrofits or areas of high bacteria concentration potential and scientific studies to determine effectiveness. If issues persist, consider hookups to sanitary system or switching to alternative system.	SMALL to MODERATE: - Explore academic and volunteer input from community	Within realm of current staff responsibilities but support from Academia could be recruited.	\$50,000
Site-Specific Stormwater Treatment Practices	Continue or conclude implementation of any BMPs under design and construction. Reevaluate goals and progress to determine if additional restoration and retrofit efforts are warranted.	MODERATE to HIGH	Within realm of current staff responsibilities.	> \$500,000


# 6 Subwatershed Management Plans

This section provides a more detailed or higher resolution look at all the characteristics, findings, analyses, and recommendations for each subwatershed individually. However, a high-level summary of all subwatersheds is provided here to put each in context of the overall Diascund Creek Watershed. **Figure 34** below shows the geographic layout of the subwatersheds within the Watershed. For a larger version of this map with greater geographic extents, refer to Figure 1 in Section 1.1.



Figure 34 – Diascund Creek Subwatersheds

Combining all the desktop analyses and field assessments—the Impervious Cover Model (ICM) analyses, Watershed Treatment Model (WTM) pollutant load modeling, best management practice (BMP) inventory and review of areas treated, and the stream and upland field work results (stream reach habitat scores, Hot Spot Investigation, Neighborhood Source Assessment, BMP retrofit and new opportunity assessment)—offers the high-level picture.



Regarding the variable capitalization of "subwatershed" versus "Subwatershed," we aimed to follow the general rules differentiating between noun (lowercase) and proper noun (uppercase).

The Diascund Creek Watershed's distance from Williamsburg has resulted in a lower level of development relative to the watersheds closer to Williamsburg (such as Powhatan, Mill, Yarmouth, and Skiffes Creeks). Those Diascund Creek subwatersheds closer to primary roadways (Route 60 and Route 30) have been built out to a much greater degree than those closer to the Chickahominy River. As such, both the pressures of development and the environmentally beneficial responses to those development pressures are much more significant in these areas. Specifically, Subwatershed 102 has the most existing urbanization. Based on several high-level metrics such as existing and estimated future impervious cover percentages, percentage of assessed stream reach length that is of marginal or suboptimal quality, number of potential hot spots, WTM loading estimates, and more, the most impacted Subwatershed is 102, closely followed by Subwatershed 103. The Lower Mainstem and Upper Mainstem Subwatersheds are also expected to see impacts, but to a lesser extent.

It is also worth mentioning that the Impervious Cover Model (ICM) and Watershed Treatment Model (WTM) can be set up to view changes with a designated area, whether it is a single Subwatershed, or a larger view. The limitations of any model like this is that it is theoretically possible to completely mitigate upstream impacts, upstream. Specifically, in the Diascund Creek Watershed, Subwatersheds 102 and 103 have an impact on the Subwatershed 101, even though there is no proposed future development in Subwatershed 101. However, larger BMPs built in Subwatersheds 102 and 103 could be built to mitigate those downstream impacts in Subwatershed 101 while also treating runoff within 102 and 103. The same would apply (with smaller drainage areas) for the potential new constructed wetland BMPs at locations designated OPP-[Subwatershed]-RP0x in the BMP recommendations in Section 4.3 and upcoming subwatershed-specific subsections.



# 6.1 Subwatershed 101

# 6.1.1 General Description

Subwatershed 101 is moderately sized at 1714 acres, accounting for about 15% of the overall Watershed. It is minimally developed, and not expected to have any significant development in the future buildout scenario. However, it receives drainage from Subwatershed 102 and Subwatershed 103 before reaching Diascund Creek, so some impacts from future development are still anticipated.

# 6.1.2 Soils

The USDA SSURGO geospatial data set provided by JCC is provided below in Table 27. The Map Unit Symbol is the short-form alphanumeric code for that soil series in the maps. The hydrologic soil group (HSG) is a general indicator for how well the soil drains or infiltrates water, with A being the best, and D being the worst.

Map Unit Symbol	Soil Series Description	Hydrologic Soil Group (HSG)	Percentage of Subwatershed Area
1	Altavista fine sandy loam	С	0.1
7	Bojac sandy loam	В	0.9
11C	Craven-Uchee complex, 6 to 10 percent slopes	C/A	20.6
10B	Craven fine sandy loam, 2 to 6 percent slopes	С	0.4
13	Dragston fine sandy loam	С	0.6
15D	Emporia complex, 10 to 15 percent slopes	С	0.0
15E	Emporia complex, 15 to 25 percent slopes	С	22.4
15F	Emporia complex, 25 to 50 percent slopes	С	5.7
14B	Emporia fine sandy loam, 2 to 6 percent slopes	С	0.6
14C	Emporia fine sandy loam, 6 to 10 percent slopes	С	0.3
16	Izagora loam	С	1.9
17	Johnston complex	D	7.4
19B	Kempsville-Emporia fine sandy loams, 2 to 6 percent slopes	B/C	3.9
18B	Kempsville fine sandy loam, 2 to 6 percent slopes	В	0.6
21	Levy silty clay	D	2.7
23	Newflat silt loam	D	4.9
24	Nimmo fine sandy loam	D	0.1
25B	Norfolk fine sandy loam, 2 to 6 percent slopes	В	0.5
27	Peawick silt loam	D	10.2
28	Seabrook loamy fine sand	С	1.0
29A	Slagle fine sandy loam, 0 to 2 percent slopes	С	1.3
29B	Slagle fine sandy loam, 2 to 6 percent slopes	С	7.2
31B	Suffolk fine sandy loam, 2 to 6 percent slopes	В	4.3
34B	Uchee loamy fine sand, 2 to 6 percent slopes	А	0.2
35	Udorthents, loamy	N/A	0.1
W	Water	N/A	1.9

# Table 27 – Composition of Soils: Subwatershed 101



# 6.1.3 Land Use and Impervious Area

Subwatershed 101 is lightly developed, with primarily rural and forest land use types. There are sparse residential areas in the northern and southern portions, and a centrally located golf course area that is out of commission.

# 6.1.3.1 Existing Conditions

Total existing impervious cover in the subwatershed is approximately 44 acres, accounting for 2.5% of the subwatershed area and 10.4% of the overall Diascund Creek Watershed impervious area. Table 28 provides the distribution of land uses/covers within the subwatershed, and the imperviousness associated with each.

Land Use/ Cover	Land Use/ Area Percent of Cover (acres) Subwatershed (%)		Impervious Area (acres)	Percent Imperviousness in Land Use/ Cover
Forest	901.7	52.6%	2.7	0.3%
Open Water	67.1	3.9%	0.1	0.1%
Roadway	24.9	1.5%	7.9	31.9%
Rural	720.0	42.0%	32.8	4.6%

Table 28 – Existing Land Use and Land Cover Composition: Subwatershed 101

# 6.1.3.2 Future Conditions

A small amount of additional residential or rural development may occur. No significant buildout is anticipated. Current and future conditions are essentially the same.

# 6.1.4 Pollutant Loads

# 6.1.4.1 Existing Conditions

Estimated existing pollutant loads from various potential sources are provided in Table 29, as computed from the WTM modeling. Illicit connections are any discharge to the municipal separate storm sewer system (MS4) that are not composed entirely of stormwater and can include, but are not limited to, unpermitted floor drain connections from homes or businesses, failing septic systems, illegal dumping, and improper disposal of sewage.



		Existing Loads					
Modeled Pollutant Source	Area	TN	ТР	TSS	Fecal Coliform		
	(acres)	lb/year	lb/year	lb/year	billion/year		
URBAN SOURCES							
Urban Land	25	350	45	9,722	16,080		
Illicit Connections	-	4	1	26	2,973		
Vacant Lots	0	0	0	1	0		
RURAL SOURCES							
Rural Land	720	3,312	504	72,003	28,081		
Forest	902	2,254	180	90,172	10,821		
Open Water	67	859	34	10,397	0		
TOTAL LOAD	1,714	6,779	764	182,321	57,955		
Storm Load	-	3,133	525	155,680	54,982		
Non-Storm Load	-	3,646	240	26,640	2,973		

#### Table 30 – Estimated Load Reductions from Existing Treatment: Subwatershed 101

Treatment Type	TN (lbs/year)	TP (lbs/year)	TSS (Ibs/year)	Bacteria (billion/year)
Lawn Care Education	0.0	0.0	0.0	0.0
Pet Waste Education	3.7	0.5	0.0	32.0
Structural Stormwater Management Practices	0.0	0.0	0.0	0.0
Total Reduction	3.7	0.5	0.0	32.0

# 6.1.4.2 Future Conditions

Estimated future loads with assumed reductions from treatment included are provided in Table 31. The row for vacant lots is not included since the conservative assumption for future buildout is that no developable lots will remain vacant.



#### Table 31 – Estimated Pollutant Loading for Future Conditions: Subwatershed 101

	Future Loads						
Modeled Pollutant Source	Area	TN	ТР	TSS	Fecal Coliform		
	(acres)	lb/year	lb/year	lb/year	billion/year		
URBAN SOURCES							
Urban Land	926	347	45	9,619	16,068		
Illicit Connections	-	4	1	26	2,973		
RURAL SOURCES	RURAL SOURCES						
Rural Land	67	3,317	505	72,106	28,121		
Forest	721	2,254	180	90,172	10,821		
Open Water	67	859	34	10,397	0		
TOTAL LOAD	1,714	6,781	765	182,321	5,7983		
Storm Load	-	3,133	525	155,671	55,010		
Non-Storm Load	-	3,648	240	26,651	2,973		

# 6.1.5 Field Assessments

See Figure 35 for a map of all assessment locations, findings, and recommended projects within the subwatershed, including Neighborhood Source Assessment (NSA) areas, Hot Spot Investigations, stream reaches, and new opportunities.

# 6.1.5.1 Stormwater Management

There are no existing stormwater management best management practices (BMPs) currently treating runoff within this subwatershed.

# 6.1.5.2 Stream Assessment

Approximately 22,700 linear feet of streams were assessed in Subwatershed 101 (Figure 35). 60% of reaches scored as Optimal, 31% scored as Suboptimal, and 9% scored as Marginal.

# 6.1.5.3 Upland Reconnaissance

Of the 243 acres of neighborhoods assessed within this subwatershed, 99% scored at High pollution potential while the remaining 1% scored at Medium pollution potential using CWP's NSA scoring rubric. No areas were evaluated as potential or confirmed hot spots.

# 6.1.6 Opportunities for Improvements

There is one reach recommended for stream restoration and one potential location for a new stormwater BMP. See the following tables and Figure 35 for details.

Management activities for this subwatershed should consist of maintaining programmatic efforts noted herein, with special attention to tracking septic system performance, pump out efforts, resolving any failures, and preventive maintenance education. Land conservation efforts are advised to maintain the portions of Conservation Areas D6, D7, D10, D11, D12, D13, and their associated habitat cores that are present within Subwatershed 101 (See Table 7 in Section 2.2.2).



#### Table 32 – Candidate Projects for Stream Reach Recommendations: Subwatershed 101

Reach ID	Length (feet)	Total Habitat Score	Habitat Condition Rating	Recommended Action	Notes	Estimated Cost Range*	Watershed- Wide Rank
ST2-02-G	500	108	Marginal	Restoration	Channel has areas of downcutting and bank erosion along the entire length.	\$250-500k	3 of 7

\*Includes design, engineering, and construction

#### Table 33 – Candidate Projects for New Stormwater BMPs: Subwatershed 101

New BMP ID	Proposed Treatment	Notes	Possible Constraints	Cost Range	Watershed- Wide Rank
OPP-DC101-RP02	Constructed Wetland	Expansion of existing wetland system.	Property ownership, trees, adjacent railway.	\$250-500k	8 of 11







# <sup>Title</sup> Figure 35 - Subwatershed 101 Results and Recommendations

Client/Project James City County Diascund Creek WSMP	203408987
Project Location	Prepared by MGS on 2023-06-22 TR by PC on 2023-06-23
James City County, Virginia	IR by DP on 2026-06-23
N	
	1,000 2,000
(At original	document size of 11x17) 1:18,000
Diascund Creek Watershed	Field Inspected Existing Stormwater BMP
Diascund Creek	<ul> <li>Not Inspected</li> </ul>
Localized Project	Inspected
Stream Habitat Rating	Retrofit of Existing BMPs
Optimal	A Bioretention
Suboptimal	Outfall Enhancement
	🛆 Rehabilitate/ Upgrade
Poor	A Retrofit - CW/ Wet Pond
	HSI Score
Not Evaluated	Not a hotspot
New BMP Opportunities	Potential hotspot
	Recommended Action
Re/Detention	Enhancement
Swale	Restoration
	Restoration/ Enhancement
	NSA Score
	High
	Moderate



<u>Notes</u> 1. Coordinate System: NAD 1983 StatePlane Virginia South FIPS 4502 Feet 2. Data Sources: ESRI, James City County, Stantec





# 6.2 Subwatershed 102

# 6.2.1 General Description

Subwatershed 102 is a midsized subwatershed that stretches from Route 60 to Interstate 64 on the eastern half of the Watershed. It has a total area of 1698 acres, approximately 15% of the total Watershed. About 90% of the existing land use type is either forested or rural.

# 6.2.2 Soils

The USDA SSURGO geospatial data set provided by JCC is provided below in Table 34. The Map Unit Symbol is the short-form alphanumeric code for that soil series in the maps. The hydrologic soil group (HSG) is a general indicator for how well the soil drains or infiltrates water, with A being the best, and D being the worst.

Map Unit Symbol	Soil Series Description	Hydrologic Soil Group (HSG)	Percentage of Subwatershed Area
11B	Craven-Uchee complex, 2 to 6 percent slopes	C/A	0.2
11C	Craven-Uchee complex, 6 to 10 percent slopes	C/A	27.1
10B	Craven fine sandy loam, 2 to 6 percent slopes	С	0.3
15D	Emporia complex, 10 to 15 percent slopes	С	1.4
15E	Emporia complex, 15 to 25 percent slopes	С	12.4
15F	Emporia complex, 25 to 50 percent slopes	С	18.5
14B	Emporia fine sandy loam, 2 to 6 percent slopes	С	1.6
17	Johnston complex	D	5.1
19B	Kempsville-Emporia fine sandy loams, 2 to 6 percent slopes	B/C	22.2
18B	Kempsville fine sandy loam, 2 to 6 percent slopes	В	2.1
25B	Norfolk fine sandy loam, 2 to 6 percent slopes	В	0.9
27	Peawick silt loam	D	0.1
29A	Slagle fine sandy loam, 0 to 2 percent slopes	С	0.4
29B	Slagle fine sandy loam, 2 to 6 percent slopes	С	1.1
31B	Suffolk fine sandy loam, 2 to 6 percent slopes	В	2.8
34B	Uchee loamy fine sand, 2 to 6 percent slopes	A	1.5
35	Udorthents, loamy	N/A	2.1
W	Water	N/A	0.2

# Table 34 – Composition of Soils: Subwatershed 102

# 6.2.3 Land Use and Impervious Area

Subwatershed 102 consists of mostly forest and rural land cover. Minimal commercial and residential areas are present along Route 60 and Route 30. See Table 35 below for additional details.



# 6.2.3.1 Existing Conditions

Total existing impervious cover in the subwatershed is 71 acres, accounting for 4.2% of the subwatershed area and 17.0% of the overall Diascund Creek Watershed impervious area. Table 35 provides the distribution of land uses/covers within the subwatershed, and the imperviousness associated with each.

Land Use/ Area Cover (acres)		Percent of Impervious Area Subwatershed (%) (acres)		Percent Imperviousness in Land Use/ Cover	
Commercial	15.8	0.9%	1.8	11.3%	
Forest	873.5	51.4%	6.6	0.8%	
LDR	3.0	0.2%	0.3	9.0%	
Open Water	10.4	0.6%	0.0	0.0%	
Roadway	117.4	6.9%	32.8	27.9%	
Rural	677.8	39.9%	29.6	4.4%	

Table 35 – Existing Land Use and Land Cover Composition: Subwatershed 102

# 6.2.3.2 Future Conditions

Large areas of forest and rural land are projected to undergo future development in Subwatershed 102. It is estimated that the percent impervious area in this subwatershed could reach as much as 19.5%, nearing the ICM transition zone from Impacted to Non-Supporting. The exact pattern, location, and type of future development in this future, full build-out estimation is not known but it is expected to consist of mostly Commercial development resulting in as much as 260 additional impervious acres. This would be the highest percent change in imperviousness among all subwatersheds and could lead to significant deterioration of downstream aquatic ecosystems.

# 6.2.4 Pollutant Loads

# 6.2.4.1 Existing Conditions

Estimated existing pollutant loads from various potential sources are provided in Table 36, as computed from the WTM modeling. Illicit connections are any discharge to the municipal separate storm sewer system (MS4) that are not composed entirely of stormwater and can include, but are not limited to, unpermitted floor drain connections from homes or businesses, failing septic systems, illegal dumping, and improper disposal of sewage.



	Existing Loads					
Modeled Pollutant Source	Area	TN	ТР	TSS	Fecal Coliform	
	(acres)	lb/year	lb/year	lb/year	billion/year	
URBAN SOURCES						
Urban Land	136	1,814	230	47,169	78,903	
Illicit Connections	-	13	6	112	4,597	
Vacant Lots	0	0	0	0	0	
RURAL SOURCES						
Rural Land	678	3,118	474	67,783	26,435	
Forest	874	2,184	175	87,354	10,482	
Open Water	10	134	5	1,618	0	
TOTAL LOAD	1,698	7,262	890	204,035	120,418	
Storm Load	-	4,456	684	186,762	115,821	
Non-Storm Load	-	2,806	206	17,273	4,597	

#### Table 36 – Estimated Pollutant Loading for Existing Conditions: Subwatershed 102

# Table 36 – Estimated Load Reductions from Existing Treatment: Subwatershed 102

Treatment Type	TN (Ibs/year)	TP (lbs/year)	TSS (lbs/year)	Bacteria (billion/year)
Lawn Care Education	1.4	0.0	0.0	0.0
Pet Waste Education	4.4	0.6	0.0	37.8
Structural Stormwater Management Practices	69.6	14.3	4,604.6	6,741.7
Total Reduction	75.4	14.9	4,604.6	6,779.5

# 6.2.4.2 Future Conditions

Estimated future loads with assumed reductions from treatment included are provided in Table 37.



#### Table 37 – Estimated Pollutant Loading for Future Conditions: Subwatershed 102

	Future Loads					
Modeled Pollutant Source	Area	TN	ТР	TSS	Fecal Coliform	
	(acres)	lb/year	lb/year	lb/year	billion/year	
URBAN SOURCES						
Urban Land	1,090	6,746	779	131,732	186,719	
Illicit Connections	-	13	6	112	4,597	
RURAL SOURCES						
Rural Land	10	2,746	418	59,706	23,285	
Forest	597	1,383	111	55,338	6,641	
Open Water	10	134	5	1618	0	
TOTAL LOAD	1,698	11,023	1,319	248,505	221,242	
Storm Load	-	7887	1,081	235,241	216,645	
Non-Storm Load	-	3,136	238	13,264	4,597	

# 6.2.5 Field Assessments

See Figure 36 for a map of all assessment locations, findings, and recommended projects within the subwatershed, including Neighborhood Source Assessment (NSA) areas, Hot Spot Investigations, stream reaches, existing stormwater BMPs and new opportunities.

# 6.2.5.1 Stormwater Management

There are three (3) existing stormwater management best management practices currently treating runoff within this subwatershed. Table 38 provides the number of BMPs of each type or category, and the total area and impervious area treated by them. The areas in Table 38 are based on the data entered into the County BMP database. See Figure 36 for BMP locations and types.

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ВМР Туре	Count	Impervious Area Treated (Acres)*	Total Area Treated (Acres)*
Bioretention			
Constructed Wetland			
Dry Pond	1	2.3	5.2
Dry Swale			
Infiltration			
Permeable Pavement			
Urban Infiltration Practices			
Urban stream restoration			
Water Quality Inlet			
Wet Pond	2	20.3	218.4
Wet Swale			
Grand Total	3	22.6	223.6

\*Areas treated by BMPs are based on County database information and may be incomplete or have overlaps.



# 6.2.5.2 Stream Assessment

Approximately 31,500 linear feet of streams were assessed in this subwatershed (Figure 36). 70% of the reaches scored as Suboptimal, 28% scored as Optimal, and the remaining 2% scored as Marginal, with 0% scoring as Poor.

# 6.2.5.3 Upland Reconnaissance

Multiple neighborhoods spanning approximately 181 acres were assessed within this subwatershed. 45% of the area scored as Moderate pollution potential, and the remaining 55% scored as High pollution potential. Two areas were investigated for Hot Spots of pollution and classified as Potential Hot Spots (see Figure 36).

# 6.2.6 Opportunities for Improvements

Recommended projects for further investigation include two stream projects and three BMP retrofit opportunities. See the following tables and Figure 36 for details.

Management activities for this subwatershed should consist of maintaining programmatic efforts noted herein, with special attention to tracking septic system performance, pump out efforts, resolving any failures, and preventive maintenance education. Land conservation efforts are advised to maintain the portions of Conservation Areas D5, D7, and D11, and their associated habitat cores that are present within Subwatershed 102 (See Table 7 in Section 2.2.2).



#### Total Habitat Length Recommended Estimated Watershed-Habitat Condition **Reach ID** Notes Cost Range\* (feet) Action Wide Rank Score Rating Channel is heavily eroded and undercut banks at the top of the reach causing Restoration/ \$100-250k ST4-18-B 200 75 Marginal 1 of 7 Enhancement heavy sediment deposition downstream. Channel has some outer bend erosion ST4-13-B 200 104 Marginal Enhancement and is slightly incising at the top of the \$100-250k 7 of 7 reach.

#### Table 39 – Candidate Projects for Stream Reach Recommendations: Subwatershed 102

\*Includes design, engineering, and construction



# Table 40 – Candidate Projects for Retrofits of Existing BMPs: Subwatershed 102

BMP ID	Facility Name	Facility Type	Drainage Area (acres)	Proposed Treatment	Notes	Cost Range	Watershed- Wide Rank
BMP- DC004	Upper County Park Timber Walls	Erosion and Sediment Control Level 1	5.2	Retrofit - CW/ Wet Pond	Construct/convert to some combination of detention and water quality treatment. May be sized to accommodate the proposed community gym at Upper County Park as well.	\$100- 250k	2 of 13
BMP- DC012	Meadow Lakes Section 2	Wet Pond	114.8	Outfall Enhancement	Potential for polishing filter/treatment, or linear treatment practice below outfall. Possible dredging to expand/restore capacity.	\$100- 250k	6 of 13
BMP- DC002	John's Used Auto Parts	Wet Pond	1.7	Rehabilitate/ Upgrade	Possible footprint expansion. Overgrown vegetation.	\$50-100k	10 of 13

Note: Where scoring rubric returns the same score for multiple projects, their ranking will be tied, and not sequential.





<sup>Client/Project</sup> James City County Diascund Creek WSMP	203408987
Project Location James City County, Virginia	Prepared by MGS on 2023-06-22 TR by PC on 2023-06-23 IR by DP on 2026-06-23
N 0	1,000 2,000
(At origin	al document size of 11x17) 1:18,000
Diascund Creek Watershed	Field Inspected Existing Stormwater BMP
Diascund Creek	Not Inspected
Localized Project	Inspected
Stream Habitat Rating	Retrofit of Existing BMPs
Optimal	A Bioretention
Suboptimal	Outfall Enhancement
Marginal	A Rehabilitate/ Upgrade
Poor	A Retrofit - CW/ Wet Pond
Not Evaluated	HSI Score
New BMP Opportunities	Not a hotspot
Constructed Wetland	Potential hotspot
Re/Detention	<b>Recommended Action</b>
	Enhancement
Swale	Restoration
	Restoration/ Enhancement
	NSA Score
	High
	Moderate



Notes 1. Coordinate System: NAD 1983 StatePlane Virginia South FIPS 4502 Feet 2. Data Sources: ESRI, James City County, Stantec





# 6.3 Subwatershed 103

# 6.3.1 General Description

Subwatershed 103 is a large subwatershed with a variety of land use types. Located in the southwestern portion of the Watershed, it is largely comprised of rural and forest land use types, but also contains the highest quantities of existing commercial and industrial land use of all the Diascund Creek Subwatersheds due to its proximity to Route 60 and Anderson's Corner. It has a total area of 3098 acres, approximately 27% of the total Watershed.

# 6.3.2 Soils

The USDA SSURGO geospatial data set provided by JCC is provided below in Table 41. The Map Unit Symbol is the short-form alphanumeric code for that soil series in the maps. The hydrologic soil group (HSG) is a general indicator for how well the soil drains or infiltrates water, with A being the best, and D being the worst.

Мар		Hydrologic	Percentage of
Unit	Soil Series Description	Soll Group	Subwatershed
Symbol		(HSG)	Area
11B	Craven-Uchee complex, 2 to 6 percent slopes	C/A	0.1
11C	Craven-Uchee complex, 6 to 10 percent slopes	C/A	26.8
15D	Emporia complex, 10 to 15 percent slopes	С	0.2
15E	Emporia complex, 15 to 25 percent slopes	С	22.5
15F	Emporia complex, 25 to 50 percent slopes	С	5.4
14B	Emporia fine sandy loam, 2 to 6 percent slopes	С	1.3
17	Johnston complex	D	4.7
19B	Kempsville-Emporia fine sandy loams, 2 to 6 percent slopes	B/C	19.2
18B	Kempsville fine sandy loam, 2 to 6 percent slopes	В	1.9
20B	Kenansville loamy fine sand, 2 to 6 percent slopes	А	0.1
25B	Norfolk fine sandy loam, 2 to 6 percent slopes	В	0.8
27	Peawick silt loam	D	0.2
28	Seabrook loamy fine sand	С	0.0
29A	Slagle fine sandy loam, 0 to 2 percent slopes	С	1.1
29B	Slagle fine sandy loam, 2 to 6 percent slopes	С	2.4
31B	Suffolk fine sandy loam, 2 to 6 percent slopes	В	11.0
34B	Uchee loamy fine sand, 2 to 6 percent slopes	A	1.3
W	Water	N/A	0.9

# Table 41 – Composition of Soils: Subwatershed 103

# 6.3.3 Land Use and Impervious Area

While most of the land use is forest and rural, Subwatershed 103 contains pockets of commercial and industrial development, as well as low density and medium density residential areas.



# 6.3.3.1 Existing Conditions

Total existing impervious cover in the subwatershed is approximately 120 acres, accounting for 3.9% of the subwatershed area and 28.7% of the overall Diascund Creek Watershed impervious area. Table 42 provides the distribution of land uses/covers within the subwatershed, and the imperviousness associated with each.

Land Use/ Cover	Area (acres)	Percent of Subwatershed (%)	Impervious Area (acres)	Percent Imperviousness in Land Use/ Cover
Commercial	25.8	0.8%	5.9	23.0%
Forest	1052.0	34.0%	5.4	0.5%
Industrial	8.9	0.3%	4.7	52.7%
LDR	23.7	0.8%	3.4	14.5%
MDR	4.7	0.2%	1.3	28.1%
Open Water	51.9	1.7%	0.0	0.0%
Roadway	99.3	3.2%	35.1	35.3%
Rural	1832.2	59.1%	63.9	3.5%
Vacant	0.0	0.0%	0.0	0.0%

Table 42 – Existing Land Use and Land Cover Composition: Subwatershed 103

# 6.3.3.2 Future Conditions

It is estimated that the percent impervious area in this subwatershed may increase from 3.9% to 9.5% with continued commercial, industrial, and residential development – the second highest future impervious projection of all subwatersheds. Per the ICM, this would put Subwatershed 103 in the transition zone from Sensitive to Impacted. Due to the relative size and projected increase in future development, it is important to focus efforts on this subwatershed to reduce the impacts of any eventual urbanization.

# 6.3.4 Pollutant Loads

# 6.3.4.1 Existing Conditions

Estimated existing pollutant loads from various potential sources are provided in Table 43, as computed from the WTM modeling. Illicit connections are any discharge to the municipal separate storm sewer system (MS4) that are not composed entirely of stormwater and can include, but are not limited to, unpermitted floor drain connections from homes or businesses, failing septic systems, illegal dumping, and improper disposal of sewage.



#### Table 43 – Estimated Pollutant Loading for Existing Conditions: Subwatershed 103

		Loads				
Modeled Pollutant Source	Area	TN	ТР	TSS	Fecal Coliform	
	(acres)	lb/year	lb/year	lb/year	billion/year	
URBAN SOURCES						
Urban Land	162	1,943	242	51,668	84,531	
Illicit Connections	-	30	13	249	10,475	
Vacant Lots	0	0	0	1	0	
RURAL SOURCES						
Rural Land	1,832	8,428	1,283	183,217	71,455	
Forest	1,052	2,630	210	105,203	12,624	
Open Water	52	664	26	8,046	0	
TOTAL LOAD	3,098	13,695	1,774	348,384	179,085	
Storm Load	-	7,398	1,286	311,010	168,610	
Non-Storm Load	-	6,297	488	37,374	10,475	

# Table 44 – Estimated Load Reductions from Existing Treatment: Subwatershed 103

Treatment Type	TN (Ibs/year)	TP (lbs/year)	TSS (lbs/year)	Bacteria (billion/year)
Lawn Care Education	13.2	0.3	0.0	0.0
Pet Waste Education	10.0	1.3	0.0	87.2
Structural Stormwater Management Practices	31.7	6.4	1,593.7	2,695.9
Total Reduction	54.9	7.9	1,593.7	2,783.0



# 6.3.4.2 Future Conditions

Estimated future loads with assumed reductions from treatment included are provided in Table 45.

	Future Loads						
Modeled Pollutant Source	Area	TN	ТР	TSS	Fecal Coliform		
	(acres)	lb/year	lb/year	lb/year	billion/year		
URBAN SOURCES	URBAN SOURCES						
Urban Land	1,520	5,741	676	117,161	148,297		
Illicit Connections	-	30	13	249	10,475		
RURAL SOURCES	RURAL SOURCES						
Rural Land	1,526	7,020	1,068	152,605	59,516		
Forest	948	2,369	190	94,774	11,373		
Open Water	52	664	26	8,046	0		
TOTAL LOAD	3,098	15,825	1,973	372,834	229,660		
Storm Load	-	9,422	1,486	339,566	219,186		
Non-Storm Load	-	6,403	487	33,270	10,475		

Table 45 – Estimated Pollutant Loading for Future Conditions: Subwatershed 103

# 6.3.5 Field Assessments

See Figure 37 for a map of all assessment locations, findings, and recommended projects within the subwatershed, including Neighborhood Source Assessment (NSA) areas, Hot Spot Investigations, stream reaches, existing stormwater BMPs and new opportunities.

# 6.3.5.1 Stormwater Management

There are 11 existing stormwater management best management practices currently treating runoff within this subwatershed. Table 46 provides the number of BMPs of each type or category, and the total area and impervious area treated by them. Treatment areas for existing BMPs were taken from the County BMP database.



ВМР Туре	Count	Impervious Area Treated (Acres)*	Total Area Treated (Acres)*
Bioretention			
Constructed Wetland	2	0.8	3.1
Dry Pond	4	6.1	14.9
Dry Swale			
Infiltration	3	8.4	15.0
Permeable Pavement			
Urban Infiltration Practices			
Urban stream restoration			
Water Quality Inlet			
Wet Pond	2	1.7	19.3
Wet Swale			
Grand Total	11	17.0	52.3

#### Table 46 – Existing Stormwater BMPs: Subwatershed 103

\*Areas treated by BMPs are based on County database information and may be incomplete or have overlaps.

#### 6.3.5.2 Stream Assessment

Approximately 35,000 linear feet of streams were assessed in this subwatershed. 53% of assessed reaches scored as Suboptimal, 38% scored as Optimal, and the remaining 9% scored as Marginal. No stream reaches assessed were scored Poor.

#### 6.3.5.3 Upland Reconnaissance

Of 482 acres of neighborhoods assessed in the subwatershed, 45% scored as Moderate for pollution risk and 55% as High per the NSA method. Seven Hot Spot areas were investigated and scored as Potential Hot Spots based on the HSI method.

# 6.3.6 Opportunities for Improvements

One stream reach is recommended for enhancement, nine existing stormwater BMPs are recommended for retrofits, and five locations are recommended for a potential new stormwater BMP. See the following tables and Figure 37 for details.

Management activities for this subwatershed should consist of maintaining programmatic efforts noted herein, with special attention to tracking septic system performance, pump out efforts, resolving any failures, and preventive maintenance education. Land conservation efforts are advised to maintain the portions of Conservation Areas D7, D8, D11, D14, D15, D16, and their associated habitat cores that are present within Subwatershed 103 (See Table 7 in Section 2.2.2). Most of Conservation Area D16 is already conserved.



# Table 47 – Candidate Projects for Stream Reach Recommendations: Subwatershed 103

Reach ID	Length (feet)	Total Habitat Score	Habitat Condition Rating	Recommended Action	Notes	Estimated Cost Range*	Watershed- Wide Rank
ST4-60-C	100	163	Optimal	Enhancement	Restoration/Enhancement potential at top of reach. Reach is located near tracks and CSX coordination may be needed.	\$100-250k	3 of 7

\*Includes design, engineering, and construction

#### Table 48 – Candidate Projects for Retrofit of Existing BMPs: Subwatershed 103

BMP ID	Facility Name	Facility Type	Drainage Area (acres)	Proposed Treatment	Notes	Cost Range	Watershed- Wide Rank
BMP- DC013	Toano Business Center BMP # 1	Dry Extended Detention Ponds	11.79	Retrofit - CW/ Wet Pond	Currently functioning as a wet pond. Could be properly converted to wet pond or constructed wetland.	\$100- 250k	1 of 13
BMP- DC019	Nick's Lawn Care	Infiltration Basin	2.205	2.205 Retrofit - CW/ Appears to not be infiltration Wet Pond Possible expansion of footp conversion to wetland or w		\$50- 100k	2 of 13
BMP- DC003	Hirsh Ceramic Shop	Dry Extended Detention Ponds	0.3	Bioretention	ention Detritus in pond. Very slow drawdown. Convert to wet pond or constructed wetland, possibly expand footprint.		4 of 13



BMP ID	Facility Name	Facility Type	Drainage Area (acres)	Proposed Treatment	Notes	Cost Range	Watershed- Wide Rank
BMP- DC018	Anderson's Corner Animal Hospital	Infiltration Trench	1.04	Rehabilitate/ Upgrade	No clear or obvious infiltration area. Small section of what appears to be permeable pavement. Check designs/as-builts and function, rehab as needed.	\$50- 100k	4 of 13
BMP- DC015	Toano Business Center BMP 2	Infiltration Trench	11.75	Rehabilitate/ Upgrade	Address erosion issue at inlet. Confirm presence of infiltration trench. If none present, evaluate potential to install bioretention or infiltration trench, connecting underdrain/overdrain to adjacent storm drain below.		6 of 13
BMP- DC001	Stonehouse Community Church	Dry Extended Detention Ponds	1.8	Rehabilitate/ Upgrade	Expand footprint, eliminate short- circuiting, potentially add non-turf vegetation. Avoid utility conflicts.	\$50- 100k	8 of 13
BMP- DC008	Pinelands Nursery BMP # 2	Constructed Wetland	1.31	Rehabilitate/ Upgrade	Possible footprint expansion. Modification to help combat algae growth.	\$50- 100k	8 of 13
BMP- DC007	Pinelands Nursery BMP # 1	Constructed Wetland	1.83	Rehabilitate/ Upgrade	Possible footprint expansion.	\$50- 100k	10 of 13
BMP- WC004	Wright Signs Dry Pond	Dry Extended Detention Ponds	1	Rehabilitate/ Upgrade	Two adjacent ditches/trenches could be combined into larger feature with more volume.	\$100- 250k	12 of 13

Note: Where scoring rubric returns the same score for multiple projects, their ranking will be tied, and not sequential.



Table 49 – Candidate Projects for New Stormwater BMPs: Subwa	atershed 103
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New BMP ID	Proposed Treatment	Notes	Possible Constraints	Cost Range	Watershed- Wide Rank
OPP-DC103-04	Re/Detention	Drainage from farms to channel through woods. Opportunity to include re/detention basin, or linear feature.	Property ownership, trees.	\$100- 250k	1 of 11
OPP-DC103-03	Swale	Concrete conveyance channel along cul de sac, and possibly through woods along drainage easement, may be replaced with water quality swale.	Along cul de sac, likely none. Through woods along drainage easement	\$100- 250k	2 of 11
OPP-DC103-05	Swale	Roadside ditches around cul de sac may be converted to water quality swales.	Property ownership.	\$100- 250k	2 of 11
OPP-DC103- RP01	Constructed Wetland	Expansion of existing wetland system.	Property ownership, trees.	\$250- 500k	4 of 11
OPP-DC103-02	Re/Detention	Drainage to cul de sac may be diverted to new re/detention basin, or possibly linear feature (swale).	Property ownership, trees.	\$100- 250k	8 of 11

Note: Where scoring rubric returns the same score for multiple projects, their ranking will be tied, and not sequential.





Client/Proje	ct City Coupty		203408987
Diascu	nd Creek WSMP		
Project Loc James City	ation <sup>,</sup> County, Virginia		Prepared by MGS on 2023-06-22 TR by PC on 2023-06-23 IR by DP on 2026-06-23
N			
		1,000	2,000
	(At origina	al document 1:18,000	size of 11x17)
<b>בבי</b> ג	Diascund Creek Watershed	Field I Storm	nspected Existing water BMP
	Diascund Creek	٠	Not Inspected
`		•	Inspected
Stream H	labitat Rating	Retrof	it of Existing BMPs
(		$\triangle$	Bioretention
9	Suboptimal		Outfall Enhancement
	Marginal	$\land$	Rehabilitate/ Upgrade
	Door		Retrofit - CW/ Wet Pond
r		HSI So	core
	Not Evaluated		Not a hotspot
			Potential hotspot
		Recon	nmended Action
			Enhancement
<u> </u>	Swale		Restoration
			Restoration/ Enhancement
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		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	
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	Upper Mainstem 201 کرے	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	$\langle$
	Kunt	رر 102 (	h
	Middle Mainstem		
	۲۵۲ 101	10	13
	Lower Mainstem	1	

Notes 1. Coordinate System: NAD 1983 StatePlane Virginia South FIPS 4502 Feet 2. Data Sources: ESRI, James City County, Stantec





# 6.4 Subwatershed 201

# 6.4.1 General Description

Subwatershed 201 is a midsized subwatershed with a total area of 1644 acres, approximately 14% of the total Watershed. While it is mostly undeveloped forest and rural land use, Subwatershed 201 has the most residential area of all subwatersheds by far, with 241 acres of low density residential covering about 15% of the subwatershed area but accounting for about 77% of all residential areas within the entire Watershed.

# 6.4.2 Soils

The USDA SSURGO geospatial data set provided by JCC is provided below in Table 50. The Map Unit Symbol is the short-form alphanumeric code for that soil series in the maps. The hydrologic soil group (HSG) is a general indicator for how well the soil drains or infiltrates water, with A being the best, and D being the worst.

Map Unit	Soil Series Description	Hydrologic Soil Group	Percentage of Subwatershed
Symbol		(HSG)	Area
7	Bojac sandy loam	В	0.7
8B	Caroline fine sandy loam, 2 to 6 percent slopes	C	0.2
11C	Craven-Uchee complex, 6 to 10 percent slopes	C/A	21.6
10B	Craven fine sandy loam, 2 to 6 percent slopes	С	0.5
10C	Craven fine sandy loam, 6 to 10 percent slopes	С	2.2
13	Dragston fine sandy loam	С	0.1
15D	Emporia complex, 10 to 15 percent slopes	C	0.9
15E	Emporia complex, 15 to 25 percent slopes	С	25.1
15F	Emporia complex, 25 to 50 percent slopes	С	12.8
14B	Emporia fine sandy loam, 2 to 6 percent slopes	С	4.9
14C	Emporia fine sandy loam, 6 to 10 percent slopes	C	1.1
17	Johnston complex	D	8.1
19B	Kempsville-Emporia fine sandy loams, 2 to 6 percent slopes	B/C	9.9
18B	Kempsville fine sandy loam, 2 to 6 percent slopes	В	2.2
25B	Norfolk fine sandy loam, 2 to 6 percent slopes	В	0.7
27	Peawick silt loam	D	2.3
28	Seabrook loamy fine sand	C	0.1
29A	Slagle fine sandy loam, 0 to 2 percent slopes	C	0.8
29B	Slagle fine sandy loam, 2 to 6 percent slopes	С	1.5
31B	Suffolk fine sandy loam, 2 to 6 percent slopes	В	3.4
33	Tomotley fine sandy loam	B/D	0.6
34B	Uchee loamy fine sand, 2 to 6 percent slopes	A	0.2

# Table 50 – Composition of Soils: Subwatershed 201



# 6.4.3 Land Use and Impervious Area

Subwatershed 201 is approximately 15% developed by low density residential areas. No existing commercial or industrial areas are present.

# 6.4.3.1 Existing Conditions

Total existing impervious cover in the subwatershed is just over 68 acres, accounting for 4.2% of the subwatershed area and 16.4% of the overall Diascund Creek Watershed impervious area. This classifies it as Sensitive in the Impervious Cover Model (ICM), but nearly into the transitional zone towards Impacted. Table 51 provides the distribution of land uses/covers within the subwatershed, and the imperviousness associated with each.

Land Use/ Cover	Area (acres)	Percent of Subwatershed (%)	Impervious Area (acres)	Percent Imperviousness in Land Use/ Cover	
Forest	525.9	32.0%	2.9	0.6%	
LDR	241.4	14.7%	17.9	7.4%	
Open Water	10.6	0.6%	0.0	0.0%	
Roadway	59.0	3.6%	23.1	39.2%	
Rural	806.9	49.1%	24.5	3.0%	

Table 51 – Existing Land Use and Land Cover Composition: Subwatershed 201

# 6.4.3.2 Future Conditions

No significant buildout is anticipated in the future scenario. Current and future conditions are essentially the same outside of a small amount of commercial development shown in the 2045 Comprehensive Plan.

# 6.4.4 Pollutant Loads

# 6.4.4.1 Existing Conditions

Estimated existing pollutant loads from various potential sources are provided in Table 52, as computed from the WTM modeling. Illicit connections are any discharge to the municipal separate storm sewer system (MS4) that are not composed entirely of stormwater and can include, but are not limited to, unpermitted floor drain connections from homes or businesses, failing septic systems, illegal dumping, and improper disposal of sewage.



# Table 52 – Estimated Pollutant Loading for Existing Conditions: Subwatershed 201

	Existing Loads					
Modeled Pollutant Source	Area	TN	ТР	TSS	Fecal Coliform	
	(acres)	lb/year	lb/year	lb/year	billion/year	
URBAN SOURCES						
Urban Land	300	2,044	201	47,191	68,339	
Illicit Connections	-	10	2	68	7,666	
Vacant Lots	0	0	0	0	0	
RURAL SOURCES						
Rural Land	807	3,712	565	80,693	31,470	
Forest	526	1,315	105	52,590	6,311	
Open Water	11	136	5	1,648	0	
TOTAL LOAD	1,644	7,216	878	182,190	113,786	
Storm Load	-	3,961	662	164,732	106,120	
Non-Storm Load	-	3,255	217	17,458	7,666	

# Table 53 – Estimated Load Reductions from Existing Treatment: Subwatershed 201

Treatment Type	TN (Ibs/year)	TP (lbs/year)	TSS (lbs/year)	Bacteria (billion/year)
Lawn Care Education	114.4	2.3	0.0	0.0
Pet Waste Education	9.5	1.2	0.0	82.4
Structural Stormwater Management Practices	0.8	0.4	14.9	75.9
Total Reduction	124.6	3.9	14.9	158.3



# 6.4.4.2 Future Conditions

Estimated future loads with assumed reductions from treatment included are provided in Table 54.

	Future Loads					
Modeled Pollutant Source	Area	TN	ТР	TSS	Fecal Coliform	
	(acres)	lb/year	lb/year	lb/year	billion/year	
URBAN SOURCES						
Urban Land	826	2,088	207	48,130	69,696	
Illicit Connections	-	10	2	68	7,666	
RURAL SOURCES						
Rural Land	11	3,712	565	80,693	31,470	
Forest	807	1,302	104	52,093	6,251	
Open Water	11	136	5	1,648	0	
TOTAL LOAD	1,644	7,249	883	182,632	115,084	
Storm Load	-	3,998	666	165,224	107,418	
Non-Storm Load	-	3,251	217	17,408	7,666	

Table 54 – Estimated Pollutant Loading for Future Conditions: Subwatershed 201

# 6.4.5 Field Assessments

See Figure 38 for a map of all assessment locations, findings, and recommended projects within the subwatershed, including Neighborhood Source Assessment (NSA) areas, Hot Spot Investigations, stream reaches, existing stormwater BMPs and new opportunities.

#### 6.4.5.1 Stormwater Management

There are two (2) existing stormwater management best management practices currently treating runoff within this subwatershed. Table 55 provides the number of BMPs of each type or category, and the total area and impervious area treated by them. The information shown in Table 55 is based on the data entered into the County BMP database.



#### Table 55 – Existing Stormwater BMPs: Subwatershed 201

ВМР Туре	Count	Impervious Area Treated (Acres)*	Total Area Treated (Acres)*	
Bioretention				
Constructed Wetland				
Dry Pond	2	1.8	8.1	
Dry Swale				
Infiltration				
Permeable Pavement				
Urban Infiltration Practices				
Urban stream restoration				
Water Quality Inlet				
Wet Pond				
Wet Swale				
Grand Total	2	1.8	8.1	

\*Areas treated by BMPs are based on County database information and may be incomplete or have overlaps.

#### 6.4.5.2 Stream Assessment

Approximately 41,100 linear feet of streams were assessed in this subwatershed. 79% of the assessed streams were classified as Suboptimal, 17% as Optimal, and the remaining 4% as Marginal.

#### 6.4.5.3 Upland Reconnaissance

The assessed area totals approximately 396 acres with 60% scoring Moderate and 40% scoring as High on the Neighborhood Source Assessment (NSA) for pollution risk. Due to the lack of developed area besides the previously assessed residential, no areas were investigated for potential or confirmed Hot Spots.

# 6.4.6 Opportunities for Improvements

One reach was recommended for stream reach enhancement, one existing stormwater BMP was recommended for potential retrofit, and five locations were identified for potential new stormwater BMPs. See the following tables and Figure 38 for details.

Management activities for this subwatershed should consist of maintaining programmatic efforts noted herein, with special attention to tracking septic system performance, pump out efforts, resolving any failures, and preventive maintenance education. Land conservation efforts are advised to maintain the portions of Conservation Areas D2, D4, D5, and their associated habitat cores that are present within Subwatershed 201 (See Table 7 in Section 2.2.2).



#### Table 56 – Candidate Projects for Stream Reach Recommendations: Subwatershed 201

Reach ID	Length (feet)	Total Habitat Score	Habitat Condition Rating	Recommended Action	Notes	Estimated Cost Range*	Watershed- Wide Rank
ST4-39-C	1,000	114	Suboptimal	Enhancement	Channel has shown over-widening and undercutting of banks downstream of the box culvert as well as various points along the reach.	> \$500k	3 of 7

\* - Includes design, engineering, and construction

#### Table 57 – Candidate Projects for Retrofit of Existing BMPs: Subwatershed 201

BMP ID	Facility Name	Facility Type	Drainage Area (acres)	Proposed Treatment	Notes	Cost Range	Watershed- Wide Rank
BMP- DC009	Williamsburg Christian Retreat	Dry Extended Detention Ponds	8.1	Rehabilitate/ Upgrade	Potential upgrade to outlet structure to increase extended detention. Also retrofit potential near outlet structure for water quality benefit, such as bioretention or infiltration.	\$100- 250k	10 of 13

Note: Where scoring rubric returns the same score for multiple projects, their ranking will be tied, and not sequential.



New BMP ID	Proposed Treatment	Notes	Possible Constraints	Cost Range	Watershed- Wide Rank
OPP-DC201-01	Swale	Roadside ditches around cul de sac may be converted to water quality swales.	Available head to storm drain system.	\$100- 250k	4 of 11
OPP-DC201-09	Swale	Stormwater conveyance/outfall stabilization along WCC entrance road.	Tree clearing, utility conflicts.	\$100k- 250k	4 of 11
OPP-DC201-07	Swale	Roadside ditches may be converted to water quality swales.	Available head to storm drain system. Utility conflicts.	\$100- 250k	7 of 11
OPP-DC201-08	Swale	Roadside ditches may be converted to water quality swales. Possible outfall stabilization or enhancement.	Available head to storm drain system. Tree clearing if improving outfall.	\$100- 250k	10 of 11
OPP-DC201-06	Swale	Roadside ditches may be converted to water quality swales.	Available head to storm drain system. Utility conflicts.	\$100- 250k	11 of 11

## Table 58 – Candidate Projects for New Stormwater BMPs: Subwatershed 201

Note: Where scoring rubric returns the same score for multiple projects, their ranking will be tied, and not sequential.





# <sup>Title</sup> Figure 38 - Subwatershed 201 Results and Recommendations

epared by MGS on 2023-06-22 TR by PC on 2023-06-23 IR by DP on 2026-06-23 2,000 Feet 1x17) ted Existing BMP
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epared by MGS on 2023-06-2; TR by PC on 2023-06-2; IR by DP on 2026-06-2; 2,000 Feet 1x17) ted Existing BMP
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Notes 1. Coordinate System: NAD 1983 StatePlane Virginia South FIPS 4502 Feet 2. Data Sources: ESRI, James City County, Stantec





# 6.5 Subwatershed 301

# 6.5.1 General Description

Subwatershed 301 is a midsized subwatershed located in the most northern area of JCC with minimal development and mostly forest or rural land cover. It has a total area of 1722 acres, approximately 15% of the total Watershed.

# 6.5.2 Soils

The USDA SSURGO geospatial data set provided by JCC is provided below in Table 59. The Map Unit Symbol is the short-form alphanumeric code for that soil series in the maps. The hydrologic soil group (HSG) is a general indicator for how well the soil drains or infiltrates water, with A being the best, and D being the worst.

Map Unit	Soil Series Description	Hydrologic Soil Group	Percentage of Subwatershed
	Caroling fine candy loam 2 to 6 percent slopes		0.1
11B	Craven-Uchee complex 2 to 6 percent slopes		0.1
110	Craven-Uchee complex, 2 to 0 percent slopes	C/A	28.0
108	Craven fine candy loam 2 to 6 percent slopes		1.2
100	Craven fine sandy loam 6 to 10 percent slopes	C C	1.2
100	Craven line salidy loan, 6 to 10 percent slopes	C C	0.8
150	Emporia complex, 10 to 15 percent slopes	C	0.8
15E	Emporia complex, 15 to 25 percent slopes	C	10.9
15F	Emporia complex, 25 to 50 percent slopes	C	26.5
14B	Emporia fine sandy loam, 2 to 6 percent slopes	С	6.8
17	Johnston complex	D	3.7
19B	Kempsville-Emporia fine sandy loams, 2 to 6 percent slopes	B/C	7.2
18B	Kempsville fine sandy loam, 2 to 6 percent slopes	В	2.4
25B	Norfolk fine sandy loam, 2 to 6 percent slopes	В	0.3
27	Peawick silt loam	D	0.6
29A	Slagle fine sandy loam, 0 to 2 percent slopes	С	0.5
29B	Slagle fine sandy loam, 2 to 6 percent slopes	С	3.5
31B	Suffolk fine sandy loam, 2 to 6 percent slopes	В	2.2
34B	Uchee loamy fine sand, 2 to 6 percent slopes	A	0.2
35	Udorthents, loamy	N/A	0.2
W	Water	N/A	2.4

# Table 59 – Composition of Soils: Subwatershed 301



# 6.5.3 Land Use and Impervious Area

Nearly all of the existing land use is classified as forest (55%) or rural (34%). The only development present in the subwatershed is approximately 11 acres of low density residential area which accounts for less than 1% of the subwatershed area.

# 6.5.3.1 Existing Conditions

Total existing impervious cover in the subwatershed is 47.4 acres, accounting for 2.8% of the subwatershed area and 11.4% of the overall Diascund Creek Watershed impervious area. This classifies it as Sensitive in the Impervious Cover Model (ICM). Table 60 provides the distribution of land uses/covers within the subwatershed, and the imperviousness associated with each.

Land Use/ Cover	Area (acres)	Percent of Subwatershed (%)	Impervious Area (acres)	Percent Imperviousness in Land Use/ Cover
Forest	946.4	55.0%	3.6	0.4%
LDR	11.2	0.7%	1.7	14.9%
Open Water	41.3	2.4%	0.0	0.0%
Roadway	147.0	8.5%	23.5	16.0%
Rural	576.2	33.5%	18.6	3.2%

Table 60 – Existing Land Use and Land Cover Composition: Subwatershed 301

# 6.5.3.2 Future Conditions

A small amount of additional residential or rural development may occur in future scenarios, but no significant buildout is anticipated. Current and future conditions are essentially the same.

# 6.5.4 Pollutant Loads

# 6.5.4.1 Existing Conditions

Estimated existing pollutant loads from various potential sources are provided in Table 61, as computed from the WTM modeling. Illicit connections are any discharge to the municipal separate storm sewer system (MS4) that are not composed entirely of stormwater and can include, but are not limited to, unpermitted floor drain connections from homes or businesses, failing septic systems, illegal dumping, and improper disposal of sewage.



	Existing Loads						
Modeled Pollutant Source	Area	TN	ТР	TSS	Fecal Coliform		
	(acres)	lb/year	lb/year	lb/year	billion/year		
URBAN SOURCES							
Urban Land	158	2,141	276	58,603	96,635		
Illicit Connections	-	4	1	27	3,077		
Vacant Lots	0	0	0	0	0		
RURAL SOURCES							
Rural Land	576	2,650	403	57,618	22,471		
Forest	946	2,366	189	94,642	11,357		
Open Water	41	529	21	6,404	0		
TOTAL LOAD	1,722	7,690	890	217,293	133,540		
Storm Load	-	4,623	690	195,524	130,463		
Non-Storm Load	-	3,067	200	21,769	3,077		

# Table 61 – Estimated Pollutant Loading for Existing Conditions: Subwatershed 301

## Table 62 – Estimated Load Reductions from Existing Treatment: Subwatershed 301

Treatment Type	TN (Ibs/year)	TP (lbs/year)	TSS (lbs/year)	Bacteria (billion/year)
Lawn Care Education	5.3	0.1	0.0	0.0
Pet Waste Education	3.8	0.5	0.0	33.1
Structural Stormwater Management Practices	0.0	0.0	0.0	0.0
Total Reduction	9.1	0.6	0.0	33.1


#### 6.5.4.2 Future Conditions

Estimated future loads with assumed reductions from treatment included are provided in Table 63.

	Future Loads					
Modeled Pollutant Source	Area	TN	ТР	TSS	Fecal Coliform	
	(acres)	lb/year	lb/year	lb/year	billion/year	
URBAN SOURCES						
Urban Land	1,100	2,137	275	58,561	96,625	
Illicit Connections	-	4	1	27	3,077	
RURAL SOURCES						
Rural Land	41	2,673	407	58,104	22,660	
Forest	581	2,356	188	94,236	11,308	
Open Water	41	529	21	6,404	0	
TOTAL LOAD	1,722	7,699	892	217,332	133,671	
Storm Load	-	4,628	692	195,555	130,594	
Non-Storm Load	-	3,071	200	21,777	3,077	

Table 63 – Estimated Pollutant Loading for Future Conditions: Subwatershed 301

#### 6.5.5 Field Assessments

See Figure 39 for a map of all assessment locations, findings, and recommended projects within the subwatershed, including Neighborhood Source Assessment (NSA) areas, Hot Spot Investigations, stream reaches, existing stormwater BMPs and new opportunities.

#### 6.5.5.1 Stormwater Management

There are no existing stormwater management best management practices (BMPs) currently treating runoff within this subwatershed, nor any opportunities identified during field assessment. This does not mean there are no opportunities, but between the overall quality of the subwatershed and increased focus on others, none were identified.



#### 6.5.5.2 Stream Assessment

Approximately 27,100 linear feet of streams were assessed in this subwatershed, with 18% rated as Optimal and the other 82% rated as Suboptimal.

#### 6.5.5.3 Upland Reconnaissance

The assessed area totals approximately 96 acres, all scoring High on the Neighborhood Source Assessment (NSA) for pollution risk. Due to the lack of developed area besides the previously assessed residential, no areas were investigated for potential or confirmed Hot Spots.

#### 6.5.6 Opportunities for Improvements

One assessed reach was recommended for stream reach restoration activities. No existing BMPs are located in Subwatershed 301, and no new locations are currently proposed for new BMP opportunities. See Table 64 and Figure 39 below for details on the proposed stream restoration.

Management activities for this subwatershed should consist of maintaining programmatic efforts noted herein, with special attention to tracking septic system performance, pump out efforts, resolving any failures, and preventive maintenance education. Subwatershed 301 contains the most identified conservation area (1131 acres) of all subwatersheds. Land conservation efforts are advised to maintain the portions of Conservation Areas D1, D2, D3, D4, and their associated habitat cores (See Table 7 in Section 2.2.2).



Reach ID	Length (feet)	Total Habitat Score	Habitat Condition Rating	Recommended Action	Notes	Estimated Cost Range*	Watershed- Wide Rank
ST4-57-G	252	133	Suboptimal	Restoration	Channel is eroded with undercut banks at the top of the reach.	\$100-250k	2 of 7

#### Table 64 – Candidate Projects for Stream Reach Recommendations: Subwatershed 301

\* - Includes design, engineering, and construction





Client/Project		20340898
James City County		200-0000
Diascultu Cleek WSWF		
Project Location James City County, Virginia		Prepared by MGS on 2023-06-2 TR by PC on 2023-06-2 IR by DP on 2026-06-2
N		in the prior 2020 00 2
	1,600	3,200
(At origin	al document 1:19,200	size of 11x17)
Diascund Creek Watershed	Field I Storm	nspected Existing water BMP
Diascund Creek	٠	Not Inspected
Localized Project	•	Inspected
Stream Habitat Rating	Retrof	it of Existing BMPs
Optimal	$\triangle$	Bioretention
Suboptimal		Outfall Enhancement
Marginal	$\land$	Rehabilitate/ Upgrade
Poor		Retrofit - CW/ Wet Pond
Not Evoluated	HSI Sc	core
Not Evaluated		Not a hotspot
		Potential hotspot
	Recon	nmended Action
Re/Detention		Enhancement
Swale		Restoration
		Restoration/ Enhancement
	NSA S	core
		High
		Moderate



Notes 1. Coordinate System: NAD 1983 StatePlane Virginia South FIPS 4502 Feet 2. Data Sources: ESRI, James City County, Stantec





# 6.6 Lower Mainstem Subwatershed

### 6.6.1 General Description

The Lower Mainstem Subwatershed is one of the smallest subwatersheds in the Diascund Creek Watershed with an area of 314 acres, approximately 3% of the total Watershed. It is located in the most south-west corner of the Watershed, draining directly into the mainstem of Diascund Creek.

#### 6.6.2 Soils

The USDA SSURGO geospatial data set provided by JCC is provided below in Table 65. The Map Unit Symbol is the short-form alphanumeric code for that soil series in the maps. The hydrologic soil group (HSG) is a general indicator for how well the soil drains or infiltrates water, with A being the best, and D being the worst.

Map Unit Symbol	Soil Series Description	Hydrologic Soil Group (HSG)	Percentage of Subwatershed Area
1	Altavista fine sandy loam	С	0.4
9	Chickahominy silt loam	D	9.6
11C	Craven-Uchee complex, 6 to 10 percent slopes	C/A	21.6
15E	Emporia complex, 15 to 25 percent slopes	С	19.6
15F	Emporia complex, 25 to 50 percent slopes	С	0.8
17	Johnston complex	D	0.7
21	Levy silty clay	D	10.3
23	Newflat silt loam	D	5.7
24	Nimmo fine sandy loam	D	1.0
27	Peawick silt loam	D	30.0
W	Water	N/A	0.4

#### Table 65 – Composition of Soils: Lower Mainstem Subwatershed

#### 6.6.3 Land Use and Impervious Area

The Lower Mainstem Subwatershed is mostly rural cover, while also containing a significant portion of medium density residential area and vacant lots.

#### 6.6.3.1 Existing Conditions

Existing impervious land cover is 5.7% (totaling 17.7 acres), with the most coming from the large amount of rural land cover despite a lower percentage of impervious cover for the rural land use type.



Land Use/ Cover	Area (acres)	Percent of Subwatershed (%)	Impervious Area (acres)	Percent Imperviousness in Land Use/ Cover
Forest	15.7	5.0%	0.6	3.7%
MDR	29.1	9.2%	4.0	13.9%
Open Water	10.7	3.4%	0.0	0.1%
Roadway	9.1	2.9%	3.9	42.2%
Rural	220.5	70.1%	8.9	4.0%
Vacant	29.3	9.3%	0.3	0.9%

# Table 66 – Existing Land Use and Land Cover Composition: Lower Mainstem Subwatershed

#### 6.6.3.2 Future Conditions

Future projections show that the Lower Mainstem Subwatershed could reach 7.1% impervious. This increase from 5.7% would not result in ICM stream habitat reclassification, as it would still fall in the transition zone between Sensitive and Impacted.

#### 6.6.4 Pollutant Loads

#### 6.6.4.1 Existing Conditions

Estimated existing pollutant loads from various potential sources are provided in Table 67, as computed from the WTM modeling. Illicit connections are any discharge to the municipal separate storm sewer system (MS4) that are not composed entirely of stormwater and can include, but are not limited to, unpermitted floor drain connections from homes or businesses, failing septic systems, illegal dumping, and improper disposal of sewage.



#### Table 67 – Estimated Pollutant Loading for Existing Conditions: Lower Mainstem Subwatershed

	Existing Loads					
Modeled Pollutant Source	Area	TN	ТР	TSS	Fecal Coliform	
	(acres)	lb/year	lb/year	lb/year	billion/year	
URBAN SOURCES						
Urban Land	38	280	33	7,102	11,745	
Illicit Connections	-	3	1	21	2,373	
Vacant Lots	73	73	6	2,929	352	
RURAL SOURCES						
Rural Land	220	1,014	154	22,048	8,599	
Forest	16	39	3	1,568	188	
Open Water	11	137	5	1,658	0	
TOTAL LOAD	314	1,546	203	35,326	23,256	
Storm Load	-	846	149	31,285	20,883	
Non-Storm Load	-	700	54	4,041	2,373	

#### Table 68 – Estimated Load Reductions from Existing Treatment: Lower Mainstem Subwatershed

Treatment Type	TN (Ibs/year)	TP (lbs/year)	TSS (lbs/year)	Bacteria (billion/year)
Lawn Care Education	12.2	0.2	0.0	0.0
Pet Waste Education	2.9	0.4	0.0	25.5
Structural Stormwater Management Practices	0.0	0.0	0.0	0.0
Total Reduction	15.2	0.6	0.0	25.5

#### 6.6.4.2 Future Conditions

Estimated future loads with assumed reductions from treatment included are provided in Table 69.



#### Table 69 – Estimated Pollutant Loading for Future Conditions: Lower Mainstem Subwatershed

	Future Loads					
Modeled Pollutant Source	Area	TN	ТР	TSS	Fecal Coliform	
	(acres)	lb/year	lb/year	lb/year	billion/year	
URBAN SOURCES						
Urban Land	83	410	45	10,031	14,348	
Illicit Connections	-	3	1	21	2,373	
RURAL SOURCES						
Rural Land	11	1,014	154	22,048	8,599	
Forest	220	39	3	1,568	188	
Open Water	11	137	5	1,658	0	
TOTAL LOAD	314	1,603	209	35,326	25,508	
Storm Load	-	943	160	34,214	23,486	
Non-Storm Load	-	734	54	4,041	2,373	

#### 6.6.5 Field Assessments

See Figure 40 for a map of all assessment locations, findings, and recommended projects within the subwatershed, including Neighborhood Source Assessment (NSA) areas, Hot Spot Investigations, stream reaches, existing stormwater BMPs and new opportunities.

#### 6.6.5.1 Stormwater Management

There are no existing stormwater management best management practices within this subwatershed.

#### 6.6.5.2 Stream Assessment

Approximately 2,000 linear feet of streams were assessed in this subwatershed, all scoring as Optimal. See Figure 40 for a map of all stream reaches assessed and the habitat score ratings.

#### 6.6.5.3 Upland Reconnaissance

The assessed area totals approximately 228 acres, with 37% scoring Moderate and 63% scoring High on the Neighborhood Source Assessment (NSA) for pollution risk. Due to the lack of developed area besides the previously assessed residential, no areas were investigated for potential or confirmed Hot Spots.

#### 6.6.6 Opportunities for Improvements

No BMPs exist for retrofitting, no streams were in condition that warranted action, and no sites were sought or found for new BMPs. If development is slated to occur (beyond the current Master Plan stage), this subwatershed can and should be revisited.

If significant development of the Lower Mainstem Subwatershed occurs, management activities should include maintaining programmatic efforts noted herein, with special attention to tracking septic system performance, pump out efforts, resolving any failures, and particularly preventive maintenance education.



Newly installed septic systems offer the best opportunity for installing physical measures such as effluent sediment screens. Additionally, land conservation efforts are advised to maintain the portion of Conservation Area D12 within the subwatershed and their associated habitat cores (See Table 7 in Section 2.2.2).





#### <sup>Title</sup> Figure 42 - Lower Mainstem Subwatershed Results and Recommendations

Client/Project	2034089
James City County	2004003
Project Location James City County, Virginia	Prepared by MGS on 2023-06- TR by PC on 2023-06- IR by DP on 2026-06-
N	
	600 1,200
(At origina	al document size of 11x17) 1:7.200
Uiascund Creek Watershed	Field Inspected Existing Stormwater BMP
Diascund Creek Subwatershed	Not Inspected
<ul> <li>Localized Project</li> </ul>	Inspected
Stream Habitat Rating	Retrofit of Existing BMPs
Optimal	A Bioretention
Suboptimal	Outfall Enhancement
. Marginal	A Rehabilitate/ Upgrade
Poor	🛕 Retrofit - CW/ Wet Pon
Not Evoluated	HSI Score
Now PMD Opportunition	Not a hotspot
	Potential hotspot
	<b>Recommended Action</b>
Re/Detention	Enhancement
Swale	Restoration
	Restoration/
	NSA Score
	High
	Moderate
Г	
	301
Unner Mainster	in h
201	
Kungt	102
Middle Mainstem	
101	103
Lower Mainstem	
	$\sim$
Notes 1. Coordinate System: NAD 1983 StatePlane Virgii 2. Data Sources: ESPL James City County State	nia South FIPS 4502 Feet
- Sata Gources, Lord, James Oity County, Stante	~
_	Iames 🕨 🔪
Ctanta -	City County
	Jamestown 1607

# 6.7 Middle Mainstem Subwatershed

## 6.7.1 General Description

The Middle Mainstem Subwatershed is moderately sized with an area of 1,128 acres, approximately 10% of the total Watershed. Located in the western part of the Watershed and draining directly to the Diascund Creek Mainstem, there is minimal existing development spread throughout.

#### 6.7.2 Soils

The USDA SSURGO geospatial data set provided by JCC is provided below in Table 70. The Map Unit Symbol is the short-form alphanumeric code for that soil series in the maps. The hydrologic soil group (HSG) is a general indicator for how well the soil drains or infiltrates water, with A being the best, and D being the worst.

Map Unit Symbol	Soil Series Description	Hydrologic Soil Group (HSG)	Percentage of Subwatershed Area
1	Altavista fine sandy loam	C	0.8
7	Bojac sandy loam	В	10.1
9	Chickahominy silt loam	D	0.6
11C	Craven-Uchee complex, 6 to 10 percent slopes	C/A	13.2
10C	Craven fine sandy loam, 6 to 10 percent slopes	С	2.1
13	Dragston fine sandy loam	С	0.7
15D	Emporia complex, 10 to 15 percent slopes	С	2.8
15E	Emporia complex, 15 to 25 percent slopes	С	20.2
15F	Emporia complex, 25 to 50 percent slopes	С	0.2
14B	Emporia fine sandy loam, 2 to 6 percent slopes	С	2.7
14C	Emporia fine sandy loam, 6 to 10 percent slopes	С	0.2
17	Johnston complex	D	8.8
19B	Kempsville-Emporia fine sandy loams, 2 to 6 percent slopes	B/C	1.5
18B	Kempsville fine sandy loam, 2 to 6 percent slopes	В	0.7
21	Levy silty clay	D	5.5
23	Newflat silt loam	D	1.5
25B	Norfolk fine sandy loam, 2 to 6 percent slopes	В	0.2
27	Peawick silt loam	D	7.4
28	Seabrook loamy fine sand	С	3.3
29A	Slagle fine sandy loam, 0 to 2 percent slopes	С	2.7
29B	Slagle fine sandy loam, 2 to 6 percent slopes	С	6.6
31B	Suffolk fine sandy loam, 2 to 6 percent slopes	В	0.1
33	Tomotley fine sandy loam	B/D	0.6
35	Udorthents, loamy	N/A	0.7
W	Water	N/A	6.6

#### Table 70 – Composition of Soils: Middle Mainstem Subwatershed



#### 6.7.3 Land Use and Impervious Area

The Middle Mainstem Subwatershed is currently defined by mostly forest and rural land use types. This subwatershed also contains open water spanning about 12% of the area. There is minimal existing development.

#### 6.7.3.1 Existing Conditions

Total existing impervious cover in the subwatershed is around 36 acres, accounting for 3.2% of the subwatershed area and 8.5% of the overall Diascund Creek Watershed impervious area. Table 71 provides the distribution of land uses/covers within the subwatershed, and the imperviousness associated with each.

#### Table 71 – Existing Land Use and Land Cover Composition: Middle Mainstem Subwatershed

Land Use/ Cover	Area (acres)	Percent of Subwatershed (%)	Impervious Area (acres)	Percent Imperviousness in Land Use/ Cover
Forest	364.6	32.3%	1.3	0.4%
MDR	0.4	0.0%	0.1	26.0%
Open Water	137.2	12.2%	0.2	0.2%
Roadway	21.0	1.9%	8.3	39.2%
Rural	604.9	53.6%	25.7	4.2%

#### 6.7.3.2 Future Conditions

A small amount of additional residential or rural development may occur in future scenarios, but no significant buildout is anticipated. Current and future conditions are functionally the same.

#### 6.7.4 Pollutant Loads

#### 6.7.4.1 Existing Conditions

Estimated existing pollutant loads from various potential sources are provided in Table 72 as computed from the WTM modeling. Illicit connections are any discharge to the municipal separate storm sewer system (MS4) that are not composed entirely of stormwater and can include, but are not limited to, unpermitted floor drain connections from homes or businesses, failing septic systems, illegal dumping, and improper disposal of sewage.



#### Table 72 – Estimated Pollutant Loading for Existing Conditions: Middle Mainstem Subwatershed

	Existing Loads					
Modeled Pollutant Source	Area	TN	ТР	TSS	Fecal Coliform	
	(acres)	lb/year	lb/year	lb/year	billion/year	
URBAN SOURCES						
Urban Land	21	296	38	8,279	13,668	
Illicit Connections	-	6	1	43	4,850	
Vacant Lots	0	0	0	0	0	
RURAL SOURCES						
Rural Land	605	2,782	423	60,486	23,590	
Forest	365	912	73	36,463	4,376	
Open Water	137	1,756	69	21,260	0	
TOTAL LOAD	1,128	5,752	604	126,531	46,484	
Storm Load	-	2,142	386	95,533	41,634	
Non-Storm Load	-	3,610	219	30,998	4,850	

#### Table 73 – Estimated Load Reductions from Existing Treatment: Little Creek Subwatershed

Treatment Type	TN (lbs/year)	TP (lbs/year)	TSS (Ibs/year)	Bacteria (billion/year)
Lawn Care Education	0.2	0.0	0.0	0.0
Pet Waste Education	6.0	0.8	0.0	52.1
Structural Stormwater Management Practices	0.0	0.0	0.0	0.0
Total Reduction	6.2	0.8	0.0	52.1

#### 6.7.4.2 Future Conditions

Estimated future loads with assumed reductions from treatment included are provided in Table 74.



#### Table 74 – Estimated Pollutant Loading for Future Conditions: Middle Mainstem Subwatershed

	Future Loads					
Modeled Pollutant Source	Area	TN	ТР	TSS	Fecal Coliform	
	(acres)	lb/year	lb/year	lb/year	billion/year	
URBAN SOURCES						
Urban Land	386	296	38	8,270	13,667	
Illicit Connections	-	6	1	43	4,850	
RURAL SOURCES	RURAL SOURCES					
Rural Land	137	2,783	423	60,496	23,593	
Forest	605	912	73	36,463	4,376	
Open Water	137	1,756	69	21,260	0	
TOTAL LOAD	1,128	5,752	604	126,531	46,486	
Storm Load	-	2,142	386	95,532	41,636	
Non-Storm Load	-	3,610	219	30,998	4,850	

#### 6.7.5 Field Assessments

See Figure 41 for a map of all assessment locations, findings, and recommended projects within the subwatershed, including Neighborhood Source Assessment (NSA) areas, Hot Spot Investigations, stream reaches, and new BMP opportunities.

#### 6.7.5.1 Stormwater Management

There are no existing stormwater management best management practices (BMPs) currently treating runoff within this subwatershed, nor any opportunities identified during field assessment. This does not mean there are no opportunities, but between the overall quality of the subwatershed and increased focus on others, none were identified.

#### 6.7.5.2 Stream Assessment

Approximately 10,900 linear feet of streams were assessed in this subwatershed. 40% scored as Optimal, and the other 60% scored as Suboptimal. See Figure 41 for a map of all stream reaches assessed and the habitat score ratings.

#### 6.7.5.3 Upland Reconnaissance

Of the approximately 53 acres of neighborhoods assessed, 20% rated as a Medium pollution potential and 80% rated as High pollution potential per the Neighborhood Source Assessment method. Due to the lack of developed area, no areas were investigated for potential or confirmed Hot Spots.

#### 6.7.6 Opportunities for Improvements

No BMPs exist for retrofitting, no streams were in condition that warranted action, and no sites were sought or found for new BMPs. If development is slated to occur (beyond the current Master Plan stage), this subwatershed can and should be revisited.



Management activities for this subwatershed should consist of maintaining programmatic efforts noted herein, with special attention to tracking septic system performance, pump out efforts, resolving any failures, and preventive maintenance education. The Middle Mainstem Subwatershed also intersects with 6 different conservation areas (See Table 7 in Section 2.2.2). Land conservation efforts are advised to maintain the portions of Conservation Areas D4, D6, D9, D10, D11, D12, and D16 within the subwatershed and their associated habitat cores. Most of Conservation Area D16 is already conserved.











Notes 1. Coordinate System: NAD 1983 StatePlane Virginia South FIPS 4502 Feet 2. Data Sources: ESRI, James City County, Stantec





# 6.8 Upper Mainstem Subwatershed

## 6.8.1 General Description

The Upper Mainstem Subwatershed is the smallest subwatershed in the Diascund Creek Watershed with an area of 297 acres, accounting for approximately 3% of the total Watershed. It is located in the most north-west corner of the Watershed, draining directly into the mainstem of Diascund Creek just downstream of the Diascund Creek Reservoir.

#### 6.8.2 Soils

The USDA SSURGO geospatial data set provided by JCC is provided below in Table 75. The Map Unit Symbol is the short-form alphanumeric code for that soil series in the maps. The hydrologic soil group (HSG) is a general indicator for how well the soil drains or infiltrates water, with A being the best, and D being the worst.

Map Unit Symbol	Soil Series Description	Hydrologic Soil Group (HSG)	Percentage of Subwatershed Area
7	Bojac sandy loam	В	0.2
11C	Craven-Uchee complex, 6 to 10 percent slopes	C/A	16.4
15E	Emporia complex, 15 to 25 percent slopes	С	14.2
15F	Emporia complex, 25 to 50 percent slopes	С	15.4
14B	Emporia fine sandy loam, 2 to 6 percent slopes	С	10.0
17	Johnston complex	D	22.6
19B	Kempsville-Emporia fine sandy loams, 2 to 6 percent slopes	B/C	1.0
27	Peawick silt loam	D	16.4
28	Seabrook loamy fine sand	С	1.2
29A	Slagle fine sandy loam, 0 to 2 percent slopes	С	2.1
35	Udorthents, loamy	N/A	0.3

#### Table 75 – Composition of Soils: Upper Mainstem Subwatershed

#### 6.8.3 Land Use and Impervious Area

The Upper Mainstem Subwatershed is very lightly developed currently, consisting almost entirely of rural and forested land cover. Some residential areas are present, but are not dense enough to even classify as low density residential – these areas are usually considered rural.

#### 6.8.3.1 Existing Conditions

Total existing impervious cover in the subwatershed is approximately 14 acres, accounting for 4.7% of the subwatershed area and 3.4% of the overall Diascund Creek Watershed impervious area. Table 76 provides the distribution of land uses/covers within the subwatershed, and the imperviousness associated with each.



# Table 76 – Existing Land Use and Land Cover Composition: Upper Mainstem Subwatershed

Land Use/ Cover	Area (acres)	Percent of Subwatershed (%)	Impervious Area (acres)	Percent Imperviousness in Land Use/ Cover
Forest	88.6	29.8%	0.4	0.4%
Open Water	7.6	2.5%	0.0	0.1%
Roadway	20.0	6.7%	7.1	35.4%
Rural	181.0	60.9%	6.5	3.6%

#### 6.8.3.2 Future Conditions

A small amount of commercial development is anticipated in the future full buildout scenario. However, all other areas will remain the same.

#### 6.8.4 Pollutant Loads

#### 6.8.4.1 Existing Conditions

Estimated existing pollutant loads from various potential sources are provided in Table 77, as computed from the WTM modeling. Illicit connections are any discharge to the municipal separate storm sewer system (MS4) that are not composed entirely of stormwater and can include, but are not limited to, unpermitted floor drain connections from homes or businesses, failing septic systems, illegal dumping, and improper disposal of sewage.



#### Table 77 – Estimated Pollutant Loading for Existing Conditions: Upper Mainstem Subwatershed

	Existing Loads					
Modeled Pollutant Source	Area	TN	ТР	TSS	Fecal Coliform	
	(acres)	lb/year	lb/year	lb/year	billion/year	
URBAN SOURCES						
Urban Land	20	283	37	7,831	12,961	
Illicit Connections	-	2	0	14	1,617	
Vacant Lots	0	0	0	0	0	
RURAL SOURCES						
Rural Land	181	833	127	18,099	7,058	
Forest	89	221	18	8,857	1,063	
Open Water	8	97	4	1,174	0	
TOTAL LOAD	297	1,436	185	35,975	22,699	
Storm Load	-	810	138	32,091	21,082	
Non-Storm Load	-	626	47	3,884	1,617	

#### Table 78 – Estimated Load Reductions from Existing Treatment: Upper Mainstem Subwatershed

Treatment Type	TN (Ibs/year)	TP (lbs/year)	TSS (lbs/year)	Bacteria (billion/year)
Lawn Care Education	0.0	0.0	0.0	0.0
Pet Waste Education	2.0	0.3	0.0	17.4
Structural Stormwater Management Practices	0.0	0.0	0.0	0.0
Total Reduction	2.0	0.3	0.0	17.4

#### 6.8.4.2 Future Conditions

Estimated future loads with assumed reductions from treatment included are provided in Table 79.



	Future Loads					
Modeled Pollutant Source	Area	TN	ТР	TSS	Fecal Coliform	
	(acres)	lb/year	lb/year	lb/year	billion/year	
URBAN SOURCES						
Urban Land	114	329	43	8,774	14,223	
Illicit Connections	-	2	0	14	1,617	
RURAL SOURCES						
Rural Land	8	810	123	17,607	6,867	
Forest	176	223	18	8,902	1,068	
Open Water	8	97	4	1,174	0	
TOTAL LOAD	297	1,460	188	36,471	23,775	
Storm Load	-	845	141	32,631	22,158	
Non-Storm Load	-	615	46	3,839	1,617	

#### Table 79 – Estimated Pollutant Loading for Future Conditions: Upper Mainstem Subwatershed

#### 6.8.5 Field Assessments

See Figure 42 for a map of all assessment locations, findings, and recommended projects within the subwatershed, including stream reaches and existing stormwater BMPs (if applicable).

#### 6.8.5.1 Stormwater Management

There are no existing stormwater management best management practices (BMPs) currently treating runoff within this subwatershed.

#### 6.8.5.2 Stream Assessment

Approximately 12,700 linear feet of streams were assessed in this subwatershed. 10% scored as Optimal, and the remaining 90% scored as Suboptimal.

#### 6.8.5.3 Upland Reconnaissance

Due to the lack of dense residential areas, no Neighborhood Source Assessments were performed. No Hot Spot Investigation was performed due to lack of other development.

#### 6.8.6 Opportunities for Improvements

One reach was recommended for stream reach restoration activities. No existing BMPs were recommended for retrofits, and no locations were recommended for potential new BMPs. See Table 80 below for details, and Figure 42 for locations.

Management activities for this subwatershed should consist of maintaining programmatic efforts noted herein, with special attention to tracking septic system performance, pump out efforts, resolving any failures, and preventive maintenance education. The Upper Mainstem Subwatershed also intersects with



3 different conservation areas (See Table 7 in Section 2.2.2). Land conservation efforts are advised to maintain the portions of Conservation Areas D3, D4, and D16 within the subwatershed and their associated habitat cores. Most of Conservation Area D16 is already conserved.



Reach ID	Length (feet)	Total Habitat Score	Habitat Condition Rating	Recommended Action	Notes	Estimated Cost Range*	Watershed- Wide Rank
ST4-31-C	50	131	Suboptimal	Restoration	Exposed utility pipe through streambed with bank erosion.	< \$100,000	6 of 7

#### Table 80 – Candidate Projects for Stream Reach Recommendations: Upper Mainstem Subwatershed

\* - Includes design, engineering, and construction





# Title Figure 40 - Upper Mainstem Subwatershed Results and Recommendations

Client/Project	203408987
James City County	
Project Location	Prepared by MGS on 2023-06-22 TR by PC on 2023-06-23
James City County, Virginia	IR by DP on 2026-06-23
N	
	500 1,000 Feet
(At origina	al document size of 11x17) 1:6,000
	Field Inspected Existing
Watershed	Stormwater BMP
Diascund Creek	Not Inspected
Localized Project	Inspected
Stream Habitat Rating	Retrofit of Existing BMPs
Optimal	A Bioretention
Suboptimal	Outfall Enhancement
	🛕 Rehabilitate/ Upgrade
Poor	Retrofit - CW/ Wet Pond
Net Evoluted	HSI Score
New BMP Opportunities	Not a hotspot
Constructed Wetland	Potential hotspot
	<b>Recommended Action</b>
Re/Detention	Enhancement
Swale	Restoration
	Restoration/
	NSA Score
	High
	High
	Moderate



Notes 1. Coordinate System: NAD 1983 StatePlane Virginia South FIPS 4502 Feet 2. Data Sources: ESRI, James City County, Stantec





# 7 References

- Arfan, Y. and D. Sutjiningsih. 2018. Development of correlation-regression model between land use change and water quality indices in Ciliwung watershed. MATEC Web Conf. 192 02047 (2018). DOI: 10.1051/matecconf/201819202047
- Arnold, C. and J Gibbons. 1996. Impervious Surface Coverage: The Emergence of a Key Environmental Indicator. Journal of the American Planning Association, 62:243-258.
- Barbour, M.T., J. Gerritsen, B.D. Snyder, and J.B. Stribling. 1999. Rapid Bioassessment Protocols for Use in Streams and Wadable Rivers: Periphyton, Benthic Macroinvertebrates and Fish, Second Edition. EPA 841-B-99-002. U.S. Environmental Protection Agency; Office of Water; Washington, DC. Center for Watershed Protection (CWP). 2001. Powhatan Creek Watershed Management Report, November 2001, FINAL.
- Center for Watershed Protection (CWP). 2003. Impacts of Impervious Cover on Aquatic Ecosystems. Watershed Protection Research Monograph Number 1.
- Clark, K.H. 1993. Conservation Planning for the Natural Areas of the Lower Peninsula of Virginia. Natural Heritage Technical Report # 93-4. Virginia Department of Conservation and Recreation, Division of Natural Heritage. 8 March 1993. 193 pp.
- Dhir, B. 2020. Effective control of waterborne pathogens by aquatic plants. Waterborne Pathogens, 339– 361. https://doi.org/10.1016/B978-0-12-818783-8.00017-7
- Gergel, S.E., et. Al. 2002. Landscape Indicators of Human Impacts to Riverine Systems. Aquatic Sci. 64:118-128.
- JCC. 2022. Strategies for Conserving James City County's Natural and Cultural Assets. Report to James City County. GIC. Inc.
- Jones, R. and C. Clark. 1987. Impact on Watershed Urbanization on Stream Insect Communities. American Water Resources Association. Water Resources Bulletin. Kennen, J.G. 1998. Relation of benthic macroinvertebrate community impairment to basin characteristics in New Jersey streams: U.S. Geological Survey Fact Sheet FS-057- 98, 6p.



Rosgen, D.L. 1994. A classification of Natural Rivers. Catena, Vol 22: 169-199.Klein, R. 1979. Urbanization and Stream Quality Impairment. American Water Resources Association. Water Resources Bulletin 15(4).

Schueler, T.R. 1994. The Importance of Imperviousness. Watershed Protection Techniques 1(3):100-111.

- Schueler, T.R., et al. 2009. Is Impervious Cover Still Important? Review of Recent Research. Journal of Hydrologic Engineering J HYDROL ENG. 14. 10.1061/(ASCE)1084-0699(2009)14:4(309).
- Schumm, S.A., Harvey, M.D. and Watson, C.C., 1984. Incised Channels: Morphology, Dynamics and Control, Water Resources Publications, Littleton, Colorado, USA.
- United States Environmental Protection Agency (EPA). 1993. Constructed Wetlands for Wastewater Treatment and Wildlife Habitat.



# Appendix A Field Photographs – Stream & Riparian Areas





Client:	James City County	Project:	203408987
Site Name:	JCC WSMP - Diascund Creek Watershed	Site Location:	James City County
Photograph ID: 1			
Survey Date: 2/21/2023			
Reach Name: ST2-1-C			
Stream Condition: Marginal			
Photograph ID: 2			
Survey Date: 2/21/2023			
Reach Name: ST2-1-C			
Stream Condition: Marginal			



Client:	James City County	Project:	203408987
Site Name:	JCC WSMP - Diascund Creek Watershed	Site Location:	James City County
Photograph ID: 3	and shares		MARK WAR EXCEPTION
Survey Date: 2/21/2023			
Reach Name: ST2-2-G			
Stream Condition: Marginal			
Photograph ID: 4		A Reading	
Survey Date: 2/21/2023			
Reach Name: ST2-2-G			
Stream Condition: Marginal			



Client:	James City County	Project:	203408987
Site Name:	JCC WSMP - Diascund Creek Watershed	Site Location:	James City County
Photograph ID: 5			
Survey Date: 2/21/2023	A STANDARD		
<b>Reach Name:</b> ST2-3-G			
Stream Condition: Suboptimal			
Photograph ID: 6			
Survey Date: 2/21/2023			
<b>Reach Name:</b> ST2-3-G			
Stream Condition: Suboptimal			



Client:	James City County	Project:	203408987
Site Name:	JCC WSMP - Diascund Creek Watershed	Site Location:	James City County
Photograph ID: 7			
Survey Date: 2/21/2023		TALKE?	
Reach Name: ST2-4-C			
Stream Condition: Optimal			
Photograph ID: 8			
Survey Date: 2/21/2023			
Reach Name: ST2-4-C			
Stream Condition: Optimal			



Client:	James City County	Project:	203408987
Site Name:	JCC WSMP - Diascund Creek Watershed	Site Location:	James City County
Photograph ID: 9			
Survey Date: 2/21/2023			
<b>Reach Name:</b> ST2-5-G			E Willie
Stream Condition: Optimal			
Photograph ID: 10			
Survey Date: 2/21/2023			
Reach Name: ST2-5-G			
Stream Condition: Optimal			



Client:	James City County	Project:	203408987
Site Name:	JCC WSMP - Diascund Creek Watershed	Site Location:	James City County
Photograph ID: 11			
Survey Date: 2/21/2023			
Reach Name: ST2-6-C	XY		
Stream Condition: Suboptimal			
Photograph ID: 12			
Survey Date: 2/21/2023			
Reach Name: ST2-6-C	The second second	-/ Der	
Stream Condition: Suboptimal			



Client:	James City County	Project:	203408987
Site Name:	JCC WSMP - Diascund Creek Watershed	Site Location:	James City County
Photograph ID: 13			
Survey Date: 2/22/2023			
Reach Name: ST2-7-D		件。这些儿	
Stream Condition: Optimal			
Photograph ID: 14		I'M N	
Survey Date: 2/22/2023			
Reach Name: ST2-7-D			
Stream Condition: Optimal			



Client:	James City County	Project:	203408987
Site Name:	JCC WSMP - Diascund Creek Watershed	Site Location:	James City County
Photograph ID: 15	A HALL		
Survey Date: 2/22/2023			MY the Vice
Reach Name: ST2-8-D			NS CON
Stream Condition: Optimal			
Photograph ID: 16			
Survey Date: 2/22/2023			MAXA TX
Reach Name: ST2-8-D			
Stream Condition: Optimal			



Client:	James City County	Project:	203408987
Site Name:	JCC WSMP - Diascund Creek Watershed	Site Location:	James City County
Photograph ID: 17		224	
Survey Date: 2/22/2023		MP A	
Reach Name: ST2-9-B		- + A	
Stream Condition: Optimal			
Photograph ID: 18			
Survey Date: 2/22/2023			
Reach Name: ST2-9-B			
Stream Condition: Optimal			



Client:	James City County	Project:	203408987
Site Name:	JCC WSMP - Diascund Creek Watershed	Site Location:	James City County
Photograph ID: 19			A A A A A A A A A A A A A A A A A A A
Survey Date: 2/22/2023			
Reach Name: ST2-10-B			HT T
Stream Condition: Optimal			
Photograph ID: 20		X E A	
Survey Date: 2/22/2023		SHIPH H	42
Reach Name: ST2-10-B			RAND
Stream Condition: Optimal			


Client:	James City County	Project:	203408987
Site Name:	JCC WSMP - Diascund Creek Watershed	Site Location:	James City County
Photograph ID: 21		PHE VI	
Survey Date: 2/22/2023		1 A	
Reach Name: ST2-11-D		KIA	AAAA
Stream Condition: Optimal			
Photograph ID: 22		MARK MARK	
Survey Date: 2/22/2023			
Reach Name: ST2-11-D			
Stream Condition: Optimal			



Client:	James City County	Project:	203408987
Site Name:	JCC WSMP - Diascund Creek Watershed	Site Location:	James City County
Photograph ID: 23		AAAAAAA	
Survey Date: 2/22/2023			SALLA SALA
Reach Name: ST2-12-C	and the second sec	The state	
Stream Condition: Suboptimal			THE
Photograph ID: 24			
Survey Date: 2/22/2023			
Reach Name: ST2-12-C			
Stream Condition: Suboptimal			



Client:	James City County	Project:	203408987
Site Name:	JCC WSMP - Diascund Creek Watershed	Site Location:	James City County
Photograph ID: 25			
Survey Date: 2/22/2023			
Reach Name: ST2-13-C			
Stream Condition: Optimal			
Photograph ID: 26			
Survey Date: 2/22/2023			
Reach Name: ST2-13-C			
Stream Condition: Optimal			



Client:	James City County	Project:	203408987
Site Name:	JCC WSMP - Diascund Creek Watershed	Site Location:	James City County
Photograph ID: 27			
Survey Date: 2/22/2023			NY MARKA
Reach Name: ST2-14-B			
Stream Condition: Marginal			
Photograph ID: 28			
Survey Date: 2/22/2023	A VAM	化内午科	
Reach Name: ST2-14-B			
Stream Condition: Marginal			



Client:	James City County	Project:	203408987
Site Name:	JCC WSMP - Diascund Creek Watershed	Site Location:	James City County
Photograph ID: 29			
Survey Date: 2/23/2023			
Reach Name: ST2-15-B			
Stream Condition: Suboptimal			
Photograph ID: 30			N. I I
Survey Date: 2/23/2023			
Reach Name: ST2-15-B			
Stream Condition: Suboptimal			



Client:	James City County	Project:	203408987
Site Name:	JCC WSMP - Diascund Creek Watershed	Site Location:	James City County
Photograph ID: 31			
Survey Date: 2/23/2023	A THE MARK		
Reach Name: ST2-16-G			
Stream Condition: Suboptimal			
Photograph ID: 32			
<b>Survey Date:</b> 2/23/2023		E AL	JAN TAL
Reach Name: ST2-16-G			
Stream Condition: Suboptimal			



Client:	James City County	Project:	203408987
Site Name:	JCC WSMP - Diascund Creek Watershed	Site Location:	James City County
Photograph ID: 33			
Survey Date: 2/23/2023			
Reach Name: ST2-17-C		P Sala	Concert of the
Stream Condition: Optimal			
Photograph ID: 34		S NO P	119 E
Survey Date: 2/23/2023	Ref A		
Reach Name: ST2-17-C			
Stream Condition: Optimal			



Client:	James City County	Project:	203408987
Site Name:	JCC WSMP - Diascund Creek Watershed	Site Location:	James City County
Photograph ID: 35			
Survey Date: 2/23/2023			
Reach Name: ST2-18-C			
Stream Condition: Suboptimal			
Photograph ID: 36			
Survey Date: 2/23/2023			
Reach Name: ST2-18-C			
Stream Condition: Suboptimal			



Client:	James City County	Project:	203408987
Site Name:	JCC WSMP - Diascund Creek Watershed	Site Location:	James City County
Photograph ID: 37		NV NA BANK	
Survey Date: 2/24/2023			
Reach Name: ST2-19-B			
Stream Condition: Suboptimal			
Photograph ID: 38			
Survey Date: 2/24/2023			
Reach Name: ST2-19-B			
Stream Condition: Suboptimal			



Client:	James City County	Project:	203408987
Site Name:	JCC WSMP - Diascund Creek Watershed	Site Location:	James City County
Photograph ID: 39			
Survey Date: 2/24/2023		1 Seller	
Reach Name: ST2-20-C			
Stream Condition: Suboptimal			
Photograph ID: 40		- NAME	
Survey Date: 2/24/2023		No.	
Reach Name: ST2-20-C			
Stream Condition: Suboptimal			



Client:	James City County	Project:	203408987
Site Name:	JCC WSMP - Diascund Creek Watershed	Site Location:	James City County
Photograph ID: 41		CONTRACTOR OF	TO ALL AND AVANTA
Survey Date: 2/24/2023			A AND A A A A A A A A A A A A A A A A A
Reach Name: ST2-21-B			AN CAL
Stream Condition: Optimal			
Photograph ID: 42			
Survey Date: 2/24/2023			
Reach Name: ST2-21-B			
Stream Condition: Optimal			



Client:	James City County	Project:	203408987
Site Name:	JCC WSMP - Diascund Creek Watershed	Site Location:	James City County
Photograph ID: 43			
Survey Date: 2/27/2023			C Contraction
Reach Name: ST2-22-G	a la	-	
Stream Condition: Optimal			
Photograph ID: 44		A CASA	
Survey Date: 2/27/2023			A A A A A
Reach Name: ST2-22-G			
Stream Condition: Optimal			



Client:	James City County	Project:	203408987
Site Name:	JCC WSMP - Diascund Creek Watershed	Site Location:	James City County
Photograph ID: 45			A Stand of the
Survey Date: 2/27/2023			
Reach Name: ST2-23-C	Card Contract		
Stream Condition: Suboptimal			
Photograph ID: 46			
Survey Date: 2/27/2023			
Reach Name: ST2-23-C			
Stream Condition: Suboptimal			



Client:	James City County	Project:	203408987
Site Name:	JCC WSMP - Diascund Creek Watershed	Site Location:	James City County
Photograph ID: 47			
Survey Date: 2/27/2023	A ANAL		
<b>Reach Name:</b> ST2-24-G			
Stream Condition: Optimal			
Photograph ID: 48			
Survey Date: 2/27/2023		L. DEFIL	
Reach Name: ST2-24-G			
Stream Condition: Optimal			



Client:	James City County	Project:	203408987
Site Name:	JCC WSMP - Diascund Creek Watershed	Site Location:	James City County
Photograph ID: 49			
Survey Date: 2/27/2023	A CONTRACT	A PART	十十日 位 经
Reach Name: ST2-25-C			
Stream Condition: Marginal			
Photograph ID: 50			
Survey Date: 2/27/2023			
Reach Name: ST2-25-C			
Stream Condition: Marginal			



Client:	James City County	Project:	203408987
Site Name:	JCC WSMP - Diascund Creek Watershed	Site Location:	James City County
Photograph ID: 51			AV/EXECTED BY
Survey Date: 2/27/2023	1 C C	sta -	
Reach Name: ST2-26-B	and the second second		AN AN AG
Stream Condition: Suboptimal			
Photograph ID: 52	- pres		
Survey Date: 2/27/2023			
Reach Name: ST2-26-B			X
Stream Condition: Suboptimal			



Client:	James City County	Project:	203408987
Site Name:	JCC WSMP - Diascund Creek Watershed	Site Location:	James City County
Photograph ID: 53			
Survey Date: 2/27/2023			
Reach Name: ST2-27-C			
Stream Condition: Suboptimal			
Photograph ID: 54			
Survey Date: 2/27/2023		WARRAN	
Reach Name: ST2-27-C			
Stream Condition: Suboptimal			



Client:	James City County	Project:	203408987
Site Name:	JCC WSMP - Diascund Creek Watershed	Site Location:	James City County
Photograph ID: 55			
<b>Survey Date:</b> 3/1/2023			A Second
Reach Name: ST2-28-C		THE	
Stream Condition: Marginal			
Photograph ID: 56			
Survey Date: 3/1/2023			
Reach Name: ST2-28-C			ALMAN LES
Stream Condition: Marginal			



Client:	James City County	Project:	203408987
Site Name:	JCC WSMP - Diascund Creek Watershed	Site Location:	James City County
Photograph ID: 57			
<b>Survey Date:</b> 3/1/2023			
Reach Name: ST2-29-C			
Stream Condition: Suboptimal			
Photograph ID: 58			
Survey Date: 3/1/2023			ATTREE TO A
Reach Name: ST2-29-C		A/S	
Stream Condition: Suboptimal			



Client:	James City County	Project:	203408987
Site Name:	JCC WSMP - Diascund Creek Watershed	Site Location:	James City County
Photograph ID: 59			
<b>Survey Date:</b> 3/1/2023		HANY	
Reach Name: ST2-30-C			
Stream Condition: Suboptimal			
Photograph ID: 60			
<b>Survey Date:</b> 3/1/2023			
Reach Name: ST2-30-C			
Stream Condition: Suboptimal			



Client:	James City County	Project:	203408987
Site Name:	JCC WSMP - Diascund Creek Watershed	Site Location:	James City County
Photograph ID: 61		ALC DE	
<b>Survey Date:</b> 3/2/2023			
Reach Name: ST2-31-B			
Stream Condition: Suboptimal			
Photograph ID: 62			
<b>Survey Date:</b> 3/2/2023			
Reach Name: ST2-31-B			
Stream Condition: Suboptimal			



Client:	James City County	Project:	203408987
Site Name:	JCC WSMP - Diascund Creek Watershed	Site Location:	James City County
Photograph ID: 63			
Survey Date: 3/2/2023			
Reach Name: ST2-32-C			
Stream Condition: Optimal			
Photograph ID: 64			
Survey Date: 3/2/2023	THUT DE		
Reach Name: ST2-32-C			
Stream Condition: Optimal			



Client:	James City County	Project:	203408987
Site Name:	JCC WSMP - Diascund Creek Watershed	Site Location:	James City County
Photograph ID: 65			化合本 全部 7 九上
<b>Survey Date:</b> 3/2/2023	A CON		
Reach Name: ST2-33-C			
Stream Condition: Suboptimal			
Photograph ID: 66		A ANK	
Survey Date: 3/2/2023	A A HA	A M	MARTER B
Reach Name: ST2-33-C		ANG SOC	
Stream Condition: Suboptimal			



Client:	James City County	Project:	203408987
Site Name:	JCC WSMP - Diascund Creek Watershed	Site Location:	James City County
Photograph ID: 67			
<b>Survey Date:</b> 3/2/2023			
Reach Name: ST2-34-B		Contract for	
Stream Condition: Suboptimal			
Photograph ID: 68			AN MARKED
<b>Survey Date:</b> 3/2/2023			
Reach Name: ST2-34-B		SA IN STEE	
Stream Condition: Suboptimal			



Client:	James City County	Project:	203408987
Site Name:	JCC WSMP - Diascund Creek Watershed	Site Location:	James City County
Photograph ID: 69			
<b>Survey Date:</b> 3/3/2023			
Reach Name: ST2-35-C		1000 C	
Stream Condition: Suboptimal			
Photograph ID: 70			
<b>Survey Date:</b> 3/3/2023	N MARCINE AND		A CAR
Reach Name: ST2-35-C		MT.	W/4 Band
Stream Condition: Suboptimal			



Client:	James City County	Project:	203408987
Site Name:	JCC WSMP - Diascund Creek Watershed	Site Location:	James City County
Photograph ID: 71			
Survey Date: 3/3/2023			
Reach Name: ST2-36-C			
Stream Condition: Optimal			
Photograph ID: 72			
<b>Survey Date:</b> 3/3/2023			
Reach Name: ST2-36-C			
Stream Condition: Optimal			



Client:	James City County	Project:	203408987
Site Name:	JCC WSMP - Diascund Creek Watershed	Site Location:	James City County
Photograph ID: 73	A CARLON AND DA		
Survey Date: 2/21/2023			
<b>Reach Name:</b> ST4-1-C			
Stream Condition: Suboptimal			
Photograph ID: 74			
Survey Date: 2/21/2023	And Andrew Market		
Reach Name: ST4-1-C			
Stream Condition: Suboptimal			



Client:	James City County	Project:	203408987
Site Name:	JCC WSMP - Diascund Creek Watershed	Site Location:	James City County
Photograph ID: 75			
Survey Date: 2/21/2023		小时日本	12 Marson
<b>Reach Name:</b> ST4-2-E	A State of the second second		
Stream Condition: Suboptimal			
Photograph ID: 76			MANY ASSIN
Survey Date: 2/21/2023			
<b>Reach Name:</b> ST4-2-E			
Stream Condition: Suboptimal			



Client:	James City County	Project:	203408987
Site Name:	JCC WSMP - Diascund Creek Watershed	Site Location:	James City County
Photograph ID: 77			
Survey Date: 2/21/2023			
Reach Name: ST4-3-C			
Stream Condition: Suboptimal			
Photograph ID: 78			Such and States (1984)
Survey Date: 2/21/2023			
Reach Name: ST4-3-C			
Stream Condition: Suboptimal			



Client:	James City County	Project:	203408987
Site Name:	JCC WSMP - Diascund Creek Watershed	Site Location:	James City County
Photograph ID: 79			
Survey Date: 2/21/2023			
<b>Reach Name:</b> ST4-4-C			
Stream Condition: Suboptimal			
Photograph ID: 80		國民權利用	
Survey Date: 2/21/2023			与王的国际和国际
Reach Name: ST4-4-C			
Stream Condition: Suboptimal			



Client:	James City County	Project:	203408987
Site Name:	JCC WSMP - Diascund Creek Watershed	Site Location:	James City County
Photograph ID: 81			, Alexander (Prostale)
Survey Date: 2/21/2023			
<b>Reach Name:</b> ST4-5-B			
Stream Condition: Suboptimal			
Photograph ID: 82		K. ASME	
Survey Date: 2/21/2023			
<b>Reach Name:</b> ST4-5-B			
Stream Condition: Suboptimal			



Client:	James City County	Project:	203408987
Site Name:	JCC WSMP - Diascund Creek Watershed	Site Location:	James City County
Photograph ID: 83			
Survey Date: 2/21/2023		The second	
<b>Reach Name:</b> ST4-6-G			
Stream Condition: Suboptimal			
Photograph ID: 84			
Survey Date: 2/21/2023		I ANT	
<b>Reach Name:</b> ST4-6-G			CHE SAN
Stream Condition: Suboptimal			



Client:	James City County	Project:	203408987
Site Name:	JCC WSMP - Diascund Creek Watershed	Site Location:	James City County
Photograph ID: 85			
Survey Date: 2/21/2023			育到为 <u>化之</u> 些
<b>Reach Name:</b> ST4-7-B			中于理论家
Stream Condition: Suboptimal			
Photograph ID: 86			NAVER
Survey Date: 2/21/2023			
<b>Reach Name:</b> ST4-7-B		X has	
Stream Condition: Suboptimal			



Client:	James City County	Project:	203408987
Site Name:	JCC WSMP - Diascund Creek Watershed	Site Location:	James City County
Photograph ID: 87			<b>医子宫的 医</b> 有关的 化
Survey Date: 2/21/2023			
<b>Reach Name:</b> ST4-8-E			
Stream Condition: Suboptimal			
Photograph ID: 88			
Survey Date: 2/21/2023		The second second	
Reach Name: ST4-8-E	Contraction of the second		
Stream Condition: Suboptimal			



Client:	James City County	Project:	203408987
Site Name:	JCC WSMP - Diascund Creek Watershed	Site Location:	James City County
Photograph ID: 89			
Survey Date: 2/21/2023		T	
Reach Name: ST4-9-C			
Stream Condition: Suboptimal			
Photograph ID: 90			
Survey Date: 2/21/2023			
Reach Name: ST4-9-C			NH K /
Stream Condition: Suboptimal			



Client:	James City County	Project:	203408987
Site Name:	JCC WSMP - Diascund Creek Watershed	Site Location:	James City County
Photograph ID: 91	1 A A A A	XII LAT	
Survey Date: 2/21/2023	The state of the s		
Reach Name: ST4-10-E			
Stream Condition: Suboptimal			
Photograph ID: 92			TO THE WAR IN
Survey Date: 2/21/2023			TO A CONTRACT
Reach Name: ST4-10-E	N #1//		XIIIN
Stream Condition: Suboptimal			


Client:	James City County	Project:	203408987
Site Name:	JCC WSMP - Diascund Creek Watershed	Site Location:	James City County
Photograph ID: 93			
Survey Date: 2/21/2023	A strate with		
Reach Name: ST4-11-C			
Stream Condition: Suboptimal			
Photograph ID: 94			
Survey Date: 2/21/2023			
Reach Name: ST4-11-C			
Stream Condition: Suboptimal			



Client:	James City County	Project:	203408987
Site Name:	JCC WSMP - Diascund Creek Watershed	Site Location:	James City County
Photograph ID: 95			
Survey Date: 2/21/2023			
Reach Name: ST4-12-C			
Stream Condition: Suboptimal			
Photograph ID: 96		N. Salar N.	T-PAL 282 SEA
Survey Date: 2/21/2023			
Reach Name: ST4-12-C		KIL I	
Stream Condition: Suboptimal			



Client:	James City County	Project:	203408987
Site Name:	JCC WSMP - Diascund Creek Watershed	Site Location:	James City County
Photograph ID: 97			
Survey Date: 2/21/2023			Carlo Carlo
Reach Name: ST4-13-B			
Stream Condition: Marginal			
Photograph ID: 98			
Survey Date: 2/21/2023			
Reach Name: ST4-13-B			
Stream Condition: Marginal			



Client:	James City County	Project:	203408987
Site Name:	JCC WSMP - Diascund Creek Watershed	Site Location:	James City County
Photograph ID: 99			
Survey Date: 2/22/2023		對相對	
Reach Name: ST4-14-C	State - Law		
Stream Condition: Suboptimal			
Photograph ID: 100			
Survey Date: 2/22/2023		ZAA	
Reach Name: ST4-14-C		Mar An	The second se
Stream Condition: Suboptimal			



Client:	James City County	Project:	203408987
Site Name:	JCC WSMP - Diascund Creek Watershed	Site Location:	James City County
Photograph ID: 101		TONA DE LO	
Survey Date: 2/22/2023		N/ AN	
<b>Reach Name:</b> ST4-15-C			A MARIN
Stream Condition: Suboptimal			
Photograph ID: 102		A State of	
Survey Date: 2/22/2023		Y Z V	
Reach Name: ST4-15-C			
Stream Condition: Suboptimal			



Client:	James City County	Project:	203408987
Site Name:	JCC WSMP - Diascund Creek Watershed	Site Location:	James City County
Photograph ID: 103		2 . A. A. A.	
Survey Date: 2/22/2023			经11月1日——————————————————————————————————
Reach Name: ST4-16-B			
Stream Condition: Subtopimal			
Photograph ID: 104			
Survey Date: 2/22/2023			
Reach Name: ST4-16-B			
Stream Condition: Suboptimal			



Client:	James City County	Project:	203408987
Site Name:	JCC WSMP - Diascund Creek Watershed	Site Location:	James City County
Photograph ID: 105		Without Reserves	P. A.M.
Survey Date: 2/22/2023		M. K. K.	<b>A</b>
<b>Reach Name:</b> ST4-17-D			
Stream Condition: Optimal			
Photograph ID: 106			
Survey Date: 2/22/2023			
Reach Name: ST4-17-D			
Stream Condition: Optimal			



Client:	James City County	Project:	203408987
Site Name:	JCC WSMP - Diascund Creek Watershed	Site Location:	James City County
Photograph ID: 107			
Survey Date: 2/22/2023			
Reach Name: ST4-18-B			
Stream Condition: Marginal			
Photograph ID: 108			
Survey Date: 2/22/2023		N/ W I K	I SHARENT I
Reach Name: ST4-18-B	A Landar		- Andrew Control of the
Stream Condition: Marginal			



Client:	James City County	Project:	203408987
Site Name:	JCC WSMP - Diascund Creek Watershed	Site Location:	James City County
Photograph ID: 109			A CONTRACT OF
Survey Date: 2/22/2023			
Reach Name: ST4-19-B		Ser la	The last
Stream Condition: Suboptimal			
Photograph ID: 110			
Survey Date: 2/22/2023		<b>北</b> 福、神	
Reach Name: ST4-19-B			
Stream Condition: Suboptimal			



Client:	James City County	Project:	203408987
Site Name:	JCC WSMP - Diascund Creek Watershed	Site Location:	James City County
Photograph ID: 111	SCARSAIN	IF IN THE REAL	
Survey Date: 2/22/2023			The Alexander
Reach Name: ST4-20-C			
Stream Condition: Suboptimal			
		100 St.	
Photograph ID: 112			
Survey Date: 2/22/2023	11-133 中国		
Reach Name: ST4-20-C			
Stream Condition: Suboptimal			



Client:	James City County	Project:	203408987
Site Name:	JCC WSMP - Diascund Creek Watershed	Site Location:	James City County
Photograph ID: 113			
Survey Date: 2/22/2023		1372	
Reach Name: ST4-21-G			
Stream Condition: Suboptimal			
Photograph ID: 114		STE BLUELL	
Survey Date: 2/22/2023	The second		
Reach Name: ST4-21-G			
Stream Condition: Suboptimal			



Client:	James City County	Project:	203408987
Site Name:	JCC WSMP - Diascund Creek Watershed	Site Location:	James City County
Photograph ID: 115			
Survey Date: 2/22/2023			
Reach Name: ST4-22-C			AN TRA
Stream Condition: Suboptimal			
Photograph ID: 116			
Survey Date: 2/22/2023			
Reach Name: ST4-22-C			
Stream Condition: Suboptimal			



Client:	James City County	Project:	203408987
Site Name:	JCC WSMP - Diascund Creek Watershed	Site Location:	James City County
Photograph ID: 117			
Survey Date: 2/22/2023			
Reach Name: ST4-23-D			
Stream Condition: Optimal			
Photograph ID: 118			THE AND A
Survey Date: 2/22/2023			
Reach Name: ST4-23-D		SFE II	N ANA
Stream Condition: Optimal			



Client:	James City County	Project:	203408987
Site Name:	JCC WSMP - Diascund Creek Watershed	Site Location:	James City County
Photograph ID: 119			
Survey Date: 2/22/2023		Frank I	
Reach Name: ST4-24-C			
Stream Condition: Suboptimal			
Photograph ID: 120			
Survey Date: 2/22/2023			
Reach Name: ST4-24-C			
Stream Condition: Suboptimal			



Client:	James City County	Project:	203408987
Site Name:	JCC WSMP - Diascund Creek Watershed	Site Location:	James City County
Photograph ID: 121			STATIS A CHAINE OF
Survey Date: 2/23/2023			
<b>Reach Name:</b> ST4-25-Da		NPL 67	
Stream Condition: Suboptimal			
Photograph ID: 122			
Survey Date: 2/23/2023		1 MAR	
<b>Reach Name:</b> ST4-25-Da		Paul	EL ANT
Stream Condition: Suboptimal			



Client:	James City County	Project:	203408987
Site Name:	JCC WSMP - Diascund Creek Watershed	Site Location:	James City County
Photograph ID: 123			
Survey Date: 2/23/2023			
Reach Name: ST4-26-C			
Stream Condition: Suboptimal			
Photograph ID: 124	NO AN		新世代的" <b>大</b> "(1)
Survey Date: 2/23/2023			
Reach Name: ST4-26-C			
Stream Condition: Suboptimal			



Client:	James City County	Project:	203408987
Site Name:	JCC WSMP - Diascund Creek Watershed	Site Location:	James City County
Photograph ID: 125			
Survey Date: 2/23/2023			
Reach Name: ST4-27-C			
Stream Condition: Suboptimal			
Photograph ID: 126			All States
Survey Date: 2/23/2023			
Reach Name: ST4-28-D			
Stream Condition: Optimal			



Client:	James City County	Project:	203408987
Site Name:	JCC WSMP - Diascund Creek Watershed	Site Location:	James City County
Photograph ID: 127			
Survey Date: 2/23/2023			
Reach Name: ST4-28-D			
Stream Condition: Optimal			
Photograph ID: 128			
Survey Date: 2/23/2023			
Reach Name: ST4-30-C			
Stream Condition: Suboptimal			



Client:	James City County	Project:	203408987
Site Name:	JCC WSMP - Diascund Creek Watershed	Site Location:	James City County
Photograph ID: 129			
Survey Date: 2/23/2023			
Reach Name: ST4-30-C			
Stream Condition: Suboptimal			
Photograph ID: 130			
Survey Date: 2/23/2023			
Reach Name: ST4-31-C			
Stream Condition: Suboptimal			



Client:	James City County	Project:	203408987
Site Name:	JCC WSMP - Diascund Creek Watershed	Site Location:	James City County
Photograph ID: 131			
Survey Date: 2/23/2023			
Reach Name: ST4-31-C		and when the	
Stream Condition: Suboptimal			
Photograph ID: 132			
Survey Date: 2/23/2023	A A A A		
Reach Name: ST4-32-D			
Stream Condition: Optimal			



Client:	James City County	Project:	203408987
Site Name:	JCC WSMP - Diascund Creek Watershed	Site Location:	James City County
Photograph ID: 133			
Survey Date: 2/23/2023		PORT A	<b>一一派</b> [[][[]]
Reach Name: ST4-32-D			
Stream Condition: Optimal			
Photograph ID: 134			
Survey Date: 2/23/2023			
Reach Name: ST4-34-C		A CARACTER AND	
Stream Condition: Suboptimal			



Client:	James City County	Project:	203408987
Site Name:	JCC WSMP - Diascund Creek Watershed	Site Location:	James City County
Photograph ID: 135			
Survey Date: 2/23/2023		个国际自	相關人子子別
<b>Reach Name:</b> ST4-34-C			
Stream Condition: Suboptimal			
Photograph ID: 136		A STATE	
Survey Date: 2/23/2023			
Reach Name: ST4-35-C			
Stream Condition: Suboptimal			



Client:	James City County	Project:	203408987
Site Name:	JCC WSMP - Diascund Creek Watershed	Site Location:	James City County
Photograph ID: 137			
Survey Date: 2/23/2023		一种产力	
Reach Name: ST4-35-C			
Stream Condition: Suboptimal			
Photograph ID: 138			
Survey Date: 2/24/2023			
Reach Name: ST4-36-C			
Stream Condition: Suboptimal			



Client:	James City County	Project:	203408987
Site Name:	JCC WSMP - Diascund Creek Watershed	Site Location:	James City County
Photograph ID: 139	COLOR - ANALA		
Survey Date: 2/24/2023			C BERK
Reach Name: ST4-26-C	A CONTRACTOR		
Stream Condition: Suboptimal			
Photograph ID: 140			A TEANER AND
Survey Date: 2/24/2023			
Reach Name: ST4-37-D			
Stream Condition: Optimal			



Client:	James City County	Project:	203408987
Site Name:	JCC WSMP - Diascund Creek Watershed	Site Location:	James City County
Photograph ID: 141			
Survey Date: 2/24/2023			AL PART
<b>Reach Name:</b> ST4-37-D			
Stream Condition: Optimal			
Photograph ID: 142			
Survey Date: 2/24/2023	And a Raisson		
Reach Name: ST4-38-C			
Stream Condition: Suboptimal			



Client:	James City County	Project:	203408987
Site Name:	JCC WSMP - Diascund Creek Watershed	Site Location:	James City County
Photograph ID: 143			
Survey Date: 2/24/2023			和"小市正有比"。
<b>Reach Name:</b> ST4-38-C	人口的学们		
Stream Condition: Suboptimal			
Photograph ID: 144			
Survey Date: 2/24/2023			
Reach Name: ST4-39-C			and and the second
Stream Condition: Suboptimal			



Client:	James City County	Project:	203408987
Site Name:	JCC WSMP - Diascund Creek Watershed	Site Location:	James City County
Photograph ID: 145			
Survey Date: 2/24/2023			
Reach Name: ST4-39-C		- H	
Stream Condition: Suboptimal			
Photograph ID: 146			The the
Survey Date: 2/27/2023			
Reach Name: ST4-40-C			
Stream Condition: Suboptimal			



Client:	James City County	Project:	203408987
Site Name:	JCC WSMP - Diascund Creek Watershed	Site Location:	James City County
Photograph ID: 147			
Survey Date: 2/27/2023		4444	
Reach Name: ST4-40-C			
Stream Condition: Suboptimal			
Photograph ID: 148		WELL KREIN	
Survey Date: 2/27/2023	ALE		
Reach Name: ST4-41-C	A CONTRACT		
Stream Condition: Suboptimal			



Client:	James City County	Project:	203408987
Site Name:	JCC WSMP - Diascund Creek Watershed	Site Location:	James City County
Photograph ID: 149			
Survey Date: 2/27/2023			
Reach Name: ST4-41-C		745	
Stream Condition: Suboptimal			
Photograph ID: 150			
Survey Date: 2/27/2023		TEN	Mal A
<b>Reach Name:</b> ST4-42-G	and -		
Stream Condition: Marginal			



Client:	James City County	Project:	203408987
Site Name:	JCC WSMP - Diascund Creek Watershed	Site Location:	James City County
Photograph ID: 151			TS
Survey Date: 2/27/2023			
Reach Name: ST4-42-G	A Contraction		
Stream Condition: Marginal			
Photograph ID: 152			
Survey Date: 2/27/2023			
Reach Name: ST4-43-C	Provide Trail		
Stream Condition: Suboptimal			



Client:	James City County	Project:	203408987
Site Name:	JCC WSMP - Diascund Creek Watershed	Site Location:	James City County
Photograph ID: 153		A ALAN AND SHE SHE	
Survey Date: 2/27/2023		XX	
Reach Name: ST4-43-C			
Stream Condition: Suboptimal			
Photograph ID: 154			A A APPE
Survey Date: 2/27/2023			
Reach Name: ST4-44-C			and the second second
Stream Condition: Suboptimal			



Client:	James City County	Project:	203408987
Site Name:	JCC WSMP - Diascund Creek Watershed	Site Location:	James City County
Photograph ID: 155		and the second s	
Survey Date: 2/27/2023		Je Ver	
Reach Name: ST4-44-C		1 the part	
Stream Condition: Suboptimal			
Photograph ID: 156		AND A	NAME AND N
Survey Date: 2/27/2023			
Reach Name: ST4-45-C	X W Z	Ser 1	
Stream Condition: Optimal			



Client:	James City County	Project:	203408987
Site Name:	JCC WSMP - Diascund Creek Watershed	Site Location:	James City County
Photograph ID: 157			
Survey Date: 2/27/2023			
<b>Reach Name:</b> ST4-45-C			
Stream Condition: Optimal		and the second second	
		· AN	
Photograph ID: 158			aller Mr
Survey Date: 2/27/2023			Ville Ferrer
Reach Name: ST4-46-D			
Stream Condition: Optimal			



Client:	James City County	Project:	203408987
Site Name:	JCC WSMP - Diascund Creek Watershed	Site Location:	James City County
Photograph ID: 159			
Survey Date: 2/27/2023			
Reach Name: ST4-46-D			
Stream Condition: Optimal			
Photograph ID: 160	A COMPANY		
Survey Date: 2/28/2023			
Reach Name: ST4-47-C	- 50 · · ·		
Stream Condition: Suboptimal			



Client:	James City County	Project:	203408987
Site Name:	JCC WSMP - Diascund Creek Watershed	Site Location:	James City County
Photograph ID: 161		N AN A SAME AND A SAME	TRADER
Survey Date: 2/28/2023			THE ALL
Reach Name: ST4-47-C		大月夏	
Stream Condition: Suboptimal		Marine Marine	
Photograph ID: 162			
Survey Date: 2/28/2023		A AN	
Reach Name: ST4-48-C			
Stream Condition: Suboptimal			



Client:	James City County	Project:	203408987
Site Name:	JCC WSMP - Diascund Creek Watershed	Site Location:	James City County
Photograph ID: 163			
<b>Survey Date:</b> 2/28/2023	and a state of	ANT AND	
Reach Name: ST4-48-C			
Stream Condition: Suboptimal			
Photograph ID: 164			
Survey Date: 2/28/2023			
Reach Name: ST4-49-C		- Company	
Stream Condition: Suboptimal			


Client:	James City County	Project:	203408987
Site Name:	JCC WSMP - Diascund Creek Watershed	Site Location:	James City County
Photograph ID: 165			
Survey Date: 2/28/2023			CHANNE T
Reach Name: ST4-49-C			
Stream Condition: Suboptimal			
Photograph ID: 166			
Survey Date: 2/28/2023	( A A A A A A A A A A A A A A A A A A A		<u>ALAR</u>
Reach Name: ST4-50-C			and the second
Stream Condition: Suboptimal			



Client:	James City County	Project:	203408987
Site Name:	JCC WSMP - Diascund Creek Watershed	Site Location:	James City County
Photograph ID: 167			
Survey Date: 2/28/2023			
Reach Name: ST4-50-C			
Stream Condition: Suboptimal			
Photograph ID: 168			
<b>Survey Date:</b> 3/1/2023			
Reach Name: ST4-51-C			
Stream Condition: Suboptimal			



Client:	James City County	Project:	203408987
Site Name:	JCC WSMP - Diascund Creek Watershed	Site Location:	James City County
Photograph ID: 169			
<b>Survey Date:</b> 3/1/2023			
Reach Name: ST4-51-C			
Stream Condition: Suboptimal			
Photograph ID: 170			
<b>Survey Date:</b> 3/1/2023			MALANC.
<b>Reach Name:</b> ST4-52-G			
Stream Condition: Suboptimal			



Client:	James City County	Project:	203408987
Site Name:	JCC WSMP - Diascund Creek Watershed	Site Location:	James City County
Photograph ID: 171			
<b>Survey Date:</b> 3/1/2023			A 7/4/1 4
<b>Reach Name:</b> ST4-52-G			N- A
Stream Condition: Suboptimal			
Photograph ID: 172			
<b>Survey Date:</b> 3/1/2023			
Reach Name: ST4-53-C		Tursday	
Stream Condition: Suboptimal			



Client:	James City County	Project:	203408987
Site Name:	JCC WSMP - Diascund Creek Watershed	Site Location:	James City County
Photograph ID: 173			
<b>Survey Date:</b> 3/1/2023			
Reach Name: ST4-53-C			
Stream Condition: Suboptimal			
Photograph ID: 174			
Survey Date: 3/2/2023			
Reach Name: ST4-54-C		A PART	
Stream Condition: Suboptimal			



Client:	James City County	Project:	203408987
Site Name:	JCC WSMP - Diascund Creek Watershed	Site Location:	James City County
Photograph ID: 175			
<b>Survey Date:</b> 3/2/2023			
Reach Name: ST4-54-C			
Stream Condition: Suboptimal			
Photograph ID: 176			
Survey Date: 3/2/2023			the stand and
Reach Name: ST4-55-D	and the second sec		A CARACTER AND
Stream Condition: Optimal			



Client:	James City County	Project:	203408987
Site Name:	JCC WSMP - Diascund Creek Watershed	Site Location:	James City County
Photograph ID: 177	HAT STATES		
<b>Survey Date:</b> 3/2/2023			
Reach Name: ST4-55-D			
Stream Condition: Optimal			
Photograph ID: 178		and the second second	
<b>Survey Date:</b> 3/2/2023		Los The water	
Reach Name: ST4-56-C		A THE	
Stream Condition: Suboptimal			



Client:	James City County	Project:	203408987
Site Name:	JCC WSMP - Diascund Creek Watershed	Site Location:	James City County
Photograph ID: 179			
<b>Survey Date:</b> 3/2/2023			ANL VE
Reach Name: ST4-56-C			
Stream Condition: Suboptimal			
Photograph ID: 180			
<b>Survey Date:</b> 3/2/2023		, et - salt	
<b>Reach Name:</b> ST4-57-G			
Stream Condition: Marginal			



Client:	James City County	Project:	203408987
Site Name:	JCC WSMP - Diascund Creek Watershed	Site Location:	James City County
Photograph ID: 181			
<b>Survey Date:</b> 3/2/2023		THE	
<b>Reach Name:</b> ST4-57-G			THE ALL
Stream Condition: Marginal			
Photograph ID: 182			
<b>Survey Date:</b> 3/2/2023			
Reach Name: ST4-58-C		Deces -	
Stream Condition: Suboptimal			



Client:	James City County	Project:	203408987
Site Name:	JCC WSMP - Diascund Creek Watershed	Site Location:	James City County
Photograph ID: 183			
<b>Survey Date:</b> 3/2/2023			
Reach Name: ST4-58-C			
Stream Condition: Suboptimal			
Photograph ID: 184		11.20 加速制度	
<b>Survey Date:</b> 3/2/2023			
Reach Name: ST4-59-C			
Stream Condition: Suboptimal			



Client:	James City County	Project:	203408987
Site Name:	JCC WSMP - Diascund Creek Watershed	Site Location:	James City County
Photograph ID: 185			
<b>Survey Date:</b> 3/2/2023			ANT APP
Reach Name: ST4-59-C			司益加以是
Stream Condition: Suboptimal			
Photograph ID: 186			V/V/ Con
<b>Survey Date:</b> 3/2/2023			
Reach Name: ST4-60-C			
Stream Condition: Optimal			
	To and the second		



Client:	James City County	Project:	203408987
Site Name:	JCC WSMP - Diascund Creek Watershed	Site Location:	James City County
Photograph ID: 187		New Martin	
<b>Survey Date:</b> 3/2/2023			
Reach Name: ST4-60-C			
Stream Condition: Optimal			
Photograph ID: 188		A STATE AND	
<b>Survey Date:</b> 3/3/2023			AMP2 - C
Reach Name: ST4-61-C			
Stream Condition: Suboptimal			



Client:	James City County	Project:	203408987
Site Name:	JCC WSMP - Diascund Creek Watershed	Site Location:	James City County
Photograph ID: 189			
<b>Survey Date:</b> 3/3/2023			
Reach Name: ST4-61-C			
Stream Condition: Suboptimal			

# Appendix B Field Photographs – Upland Areas









































































BMP-WC004
























**BMP-OPP6** 





**BMP-OPP7** 



## James City County Watershed Management Planning Services Diascund Creek Watershed Management Plan



**BMP-OPP8** 



## Appendix C Decision Support System





# Appendix C: The Decision Support System from Skimino WSMP

## Introduction

An essential component of any Watershed Management Plan and/or Stormwater Management Plan is the ability to identify, rank and prioritize potential retrofit and restoration opportunities. The goals of creating and using a DSS include:

Provide an objective, yet technically accurate method of prioritizing projects. Provide a consistent ranking procedure for potential projects. Help to guide County Planning.

Various factors are taken into consideration with the development of a DSS, including the goals of the municipality in reference to stormwater control, water quality improvements, flooding issues, land use planning and regulatory requirements. The development of this tool, while informed by actual field data from JCC, can be tailored to meet the needs of any municipality depending on the goals of their management plans and the intrinsic environmental conditions at their location. Any DSS should be created with specific input from the personnel within the municipality that are intimately familiar with watershed and stormwater management activities and that will use the resulting DSS to prioritize and implement projects.

## **Decision Support System**

By definition, a DSS is an information system that supports organizational decision-making activities. A well designed DSS allows decision makers to compile data, technical knowledge and other useful information to identify and solve problems and/or make decisions. For the purposes of this DSS, VHB has created a spreadsheet matrix that will allow JCC to rank and prioritize stormwater retrofit and stream restoration and enhancement / channel stabilization



opportunities within the County's watersheds. The ultimate goal is to improve water quality throughout the County by addressing areas that are currently impacted through development as well as those that will be developed in the future.

Various examples of DSSs used in other municipalities were compiled and analyzed to determine what type of DSS structure would best suit the needs of JCC. In addition to the previously developed examples, VHB conferred with JCC on their specific goals in using such a system to rank and prioritize possible projects throughout the County.

## **Project Identification**

Potential project sites may be identified through a variety of channels of information. Potential sources of project identifications may include:

- Citizen Requests
- Master Planning of County
- Regulatory Requirements (i.e. TMDL Implementation Plan)
- Results of Watershed Assessments
- Inspections of Facilities by County Personnel

The County may elect to use the existing Capital Improvement Project (CIP) Request Form, or create a form that is specific to the ranking criteria within the DSS.

## **Project Prioritization**

The ability to identify potential water quality/stormwater improvement projects is an important aspect of a Watershed Management Assessment Program. Once potential project areas are identified, they must then be stratified using results of analyses of the field data collected by the specified methodology during an assessment. This stratification allows for the projects with the most potential for retrofit and/or restoration to be identified. Following stratification, the sites may then be ranked for funding and implementation. The criteria used in such a ranking procedure should be representative of the goals of the County and may be adjusted over time as new issues arise or priorities change. A DSS is the logical tool to use for the purposes of this final ranking. The benefits of having a dynamic DSS tailored for the County or even a specific (sub) watershed include the ability to address management issues that may be indicative of particular land use(s), pollutant(s) of concern, inadequate infrastructure and other sources of water quality degradation.

Consistency of ranking criteria allows for comparison between sites and determination as to which projects will provide the most improvement and should be implemented first. For the purpose of the JCC DSS, the possible benefits associated with the projects were derived from the goals for the Watershed Plans as well as the field data collected during the watershed

assessment(s). These benefits are then assigned a numerical score according to the degree of improvement offered by the chosen treatment method on a particular site or stream reach. The degree of improvement is assessed as having either primary, secondary, supplemental or no benefit. Each project area that is included in the DSS is attributed values for eight (8) Prioritization Factors and eight (8) Possible Conflicts. The DSS spreadsheet located in Appendix A is designed such that project sites are prioritized based on the highest to lowest scores afforded by the sum of the Prioritization Factor scores (Ranking: Level of Benefit) minus the sum of the Possible Conflict scores (Ranking: Degree of Complexity).

For JCC, opportunities for watershed restoration activities were broken into two general categories:

- 1. Stream Restoration and/or Channel Stabilization
- 2. Stormwater Management Treatment Opportunities

## **Prioritization Factors**

Prioritization Factors for both categories are scored based on the Prioritization Factor Weighting Table (Appendix A), though the methodology for how the scores are derived differs between the two types of watershed restoration activities. These methodologies are discussed below in relation to the watershed activity.

## Stream Restoration and/or Channel Stabilization

The Prioritization Factors (i.e., potential watershed benefits) for Stream Restoration and/or Channel Stabilization opportunities include:

- Water Quality/Runoff Quantity:
  - Significant Improvements Indicates a significant reduction in pollutant loading, and/or quantity of runoff entering the reach during storm events; may possibly aid in meeting TMDL pollutant reduction requirements (5 points)
  - Minimal Creates a minor reduction in pollutant loading and/or runoff quantity (3 points)
  - None Creates no reduction in pollutant loading and/or runoff (0 points)
- Restore Floodplain Connectivity
  - Significantly increase connectivity restoration efforts provide for access to a floodplain (either historical or newly created) at bankfull and greater flow events (5 points)
  - Maintain Existing minimal access to a floodplain at bankfull events, more access during higher flow events (3 points)
  - No increase in connectivity no increase in floodplain access within the reach (0 points)



- Restore Aquatic Habitat
  - Significant Improvement Improvements in aquatic habitat as measured by increased diversity in aquatic organism population (4 points)
  - Minimal Improvement Minimal improvement of aquatic habitat due to slight reductions in pollutant loading and/or physical channel instability (2 points)
  - Maintain Maintain existing quality of aquatic habitat (0 points)
- Reduce Sedimentation
  - Significantly Reduce Significantly reduce amount of sediment entering watershed through streambank erosion and/or poor Erosion & Sedimentation Control (E&S) practices related to land disturbing activities within the watershed (4 points)
  - Slight Reduction Minimal reduction in sedimentation due to little improvement to existing channel instability and/or lack of improvement of poor E&S practices within the watershed (2 points)
  - Maintain No change in sedimentation within project reach (0 points)
- Project Size/Scope
  - Significant Proposed project length would provide for maximum water quality benefit; several adjacent project stream reaches may be restored as one larger project (3 points)
  - Moderate Project length is moderate and/or adjacent to unstable stream reaches not to be restored (2 points)
  - Minimal Project length is minimal and/or adjacent unstable stream reaches not to be restored (1 point)
- Channel Condition
  - Project reach is severely incised and has eroding stream banks (4 points)
  - Project reach is moderately incised and has some eroding stream banks (2 points)
  - Minimal incision present with little to no eroding stream banks (0 points)
- Condition of Contributing Watershed Three factors are taken into consideration for this ranking factor: Total Impervious Area (TIA), Pollution Severity Index (PSI; average of Neighborhood Source Assessment [NSA] sites), and Hotspot Site Investigation (HIS; average of sites)
  - Developed watershed (4 points):
    - TIA >25%
    - PSI Any severe
    - HIS Any severe
  - Developing watershed (2 points):
    - TIA 10% 25%
    - PSI Any high
    - HIS Any confirmed
  - Undeveloped watershed (0 points):
    - TIA <10%
    - PSI All others
    - HIS All others



- Increase Environmental Awareness
  - High Significant public involvement (associated with project location and/or community involvement; (3 points)
  - o Medium Project provides educational opportunities (2 points)
  - Low Nearby residents may be aware of project/benefits (0 points)

Of the Prioritization Factors noted above, scores for Water Quality/Runoff Quantity, Restore Floodplain Connectivity, Restore Aquatic Habitat, Reduce Sedimentation, Project Size/Scope and Channel Condition can be informed largely by field data collected during stream and floodplain assessment activities. Field efforts associated with the DSS, as well as a detailed discussion of the Stream Restoration and/or Channel Stabilization Prioritization Factor evaluation, weighting scheme and calculation are provided as Appendix C.

#### .....

## Stormwater Management Treatment Opportunities

The Prioritization Factors (i.e., potential watershed benefits) for Stormwater Management Treatment Opportunities include:

- Water Quality/Runoff Quantity: Improving water quality and decreasing runoff quantity (this ranking is determined by the total removal percentage of the stormwater management facility):
  - Significant Improvements (5 points) Indicates a significant reduction in pollutant loading, and/or quantity of runoff entering the reach during storm events; may possibly aid in meeting TMDL pollutant reduction requirements; quantified as:
    - TSS >80%
    - TN<sup>2</sup> >50%
    - TP<sup>1</sup> >50%
    - NO<sub>3</sub> >40%
    - Runoff Volume<sup>1</sup> > 50%
  - Minimal (3 points) Creates a minor reduction in pollutant loading and/or runoff quantity; quantified as:
    - TSS 0% 80%
    - TN<sup>2</sup> 0% 50%
    - TP<sup>1</sup>0% 50%
    - NO<sub>3</sub> 0% 40%
    - Runoff Volume<sup>1</sup>0% 50%

<sup>&</sup>lt;sup>1</sup> Percentages from Table 2, TM: Runoff Reduction Method, April 2008

<sup>&</sup>lt;sup>2</sup> Percentages from Table 3, TM: Runoff Reduction Method, April 2008

<sup>&</sup>lt;sup>3</sup> CWP, National Pollutant Removal Performance Database, version 3, September 2007



- None (0 points) Creates no reduction in pollutant loading and/or runoff quantity; quantified as:
  - TSS 0%
  - TN<sup>2</sup>0%
  - TP<sup>1</sup>0%
  - NO<sub>3</sub> 0%
  - Runoff Volume<sup>1</sup> 0%
- Restore Floodplain Connectivity
  - Decrease stormflow stormflow entering the receiving waterbody is reduced by 70 to 100% (5 points)
  - Maintain Existing stormflow is decreased by 40-70% (3 points)
  - Increase stormflow stormflow entering the waterbody is decreased by less than 40% (0 points)
- Restore Aquatic Habitat This topic is not applicable to the Stormwater Management Treatment Opportunities
- Reduce Sedimentation
  - Reduce (4 points) Significantly reduce amount of sediment entering watershed through streambank erosion and/or poor Erosion & Sedimentation Control (E&S) practices related to land disturbing activities within the watershed; quantified for the stormwater treatment options as a percent of the Total Volume (Tv) captured:
    - 70% 100%
  - Maintain (2 points) Percentage of Tv capture required to maintain the existing condition:
    - 40% 70%
  - Increase (0 points) Sedimentation is assumed to increase if the Tv is <40%
- Project Size/Scope
  - Significant (3 points) The percentage of the sub-watershed that is included in the drainage being treated is >20%
  - Moderate (2 points) The percentage of the sub-watershed that is included in the drainage being treated is 1% - 20%
  - Minimal (1 point) The percentage of the sub-watershed that is included in the drainage being treated is <1%
- Channel Condition
  - Downstream of stormwater facility is severely incised and has eroding stream banks (4 points)
  - Downstream of stormwater facility is moderately incised and has some eroding stream banks (2 points)
  - Downstream of stormwater facility has minimal eroding stream banks (0 points)

<sup>&</sup>lt;sup>1</sup> Percentages from Table 2, TM: Runoff Reduction Method, April 2008

<sup>&</sup>lt;sup>2</sup> Percentages from Table 3, TM: Runoff Reduction Method, April 2008

<sup>&</sup>lt;sup>3</sup> CWP, National Pollutant Removal Performance Database, version 3, September 2007



- Condition of Contributing Watershed: (Same as for stream projects)
  - Developed watershed (4 points):
    - TIA >25%

0

- PSI Any severe
- HIS Any severe
- Developing watershed (2 points):
  - TIA 10% 25%
  - PSI Any high
  - HIS Any confirmed
- Undeveloped watershed (0 points):
  - TIA <10%
  - PSI All others
  - HIS All others
- Increase Environmental Awareness
  - High (3 points) Significant public involvement (associated with project location and/or community involvement); In close proximity to a school, community center or other educational opportunity
  - Medium (2 points) Project provides educational opportunities; In close proximity to parks or pedestrian routes with potential for signage
  - Low (1 point) Nearby residents may be aware of project/benefits; near commercial or industrial area with limited visibility

## **Possible Conflicts**

Once the potential benefits associated with improving a particular stream reach or stormwater facility through one of the Proposed Treatments are defined and ranked appropriately for a given site, the constraints or conflicts are then taken into consideration. The constraints that are included in the JCC DSS were derived from the Retrofit Reconnaissance Inventory (RRI) data forms used by the CWP and are applicable to Stream Restoration and/or Channel Stabilization as well as the various Stormwater Management Treatment Opportunities.

The Possible Conflicts include:

- Conflicts with Existing Utilities
  - Significant (5 points) Utilities will greatly impact project design and may require expensive relocation
  - Minimal (3 points) Utilities are present in the project area and may constrain project design
  - None (0 points) Utilities not present in the project area
- Construction Access
  - Major Restrictions (5 points) Construction access will require creating roads with impacts to sensitive areas; no stockpile areas near site



- Minimal Restrictions (2 points) Some impact to landscaped areas will be required; limited stockpile areas
- No Restrictions (0 points) Site is open/there is access with paved surface; stockpile areas are available near the project site
- Neighborhood Impact
  - Dense Development (4 points) Residential areas adjacent to site with easy access; Potential for standing water, mosquitoes, or safety issues
  - Some Development (2 points) Residential areas at some distance/site can be fenced; shallow water with safety bench, gentle slopes, fenced
  - Open Space (0 points) Site is either in open space or commercial or industrial land use with no nearby residential area; Project will not result in standing water
- Physical Feasibility
  - Poor (3 points) Site constraints limit feasibility of project
  - Fair (2 points) Some limitation, but project is feasible
  - Good (1 point) Little to no limitations on site
- Level of Design
  - Major (4 points) Significant level of effort required for project design
  - o Moderate (2 points) Reasonable level of effort required
  - Minor (0 points) Minimal level of effort required
- Private Property
  - No Interest (5 points) Site is entirely on private property and owners have no interest in project
  - Moderate Interest (3 points) Site is either on private property with some owner interest or site is on publicly owned land currently in other uses
  - High interest (0 points) Site is either on private property with actively interested owners or site is on publicly-owned land available for the project
- Possible Permitting Factors
  - Major (5 points) Wetland, Forest, and/or Waters of the U.S. impacts will be incurred and permits will be required
  - Moderate (3 points) Wetlands are present but there will be no impacts associated with construction; Some tree removal will be necessary, and tree replacement will be required
  - Minor (0 points) No impacts will be incurred resulting in additional permits being required
- Negative Environmental Impacts
  - Major (4 points) Implementation of the proposed treatment for a particular project reach would have significant negative environmental impacts
  - Moderate (2 points) Implementation of the proposed treatment for a particular project reach would have minimal negative environmental impacts
  - Minor (0 points) Implementation of the proposed treatment for a particular project reach would not have negative environmental impacts



## Implementation

The County may use the DSS to prioritize projects identified through watershed assessments as well as other methods. Following this ranking of potential retrofit and/or restoration sites, the County may elect to implement the highest ranked project(s) based on available funds. Issues, other than funding, that should be considered include:

- Relevancy of a project to a larger County or watershed goal, such as implementation of the TMDL plan.
- Coordination of a particular project with other on-going projects such as stream restoration work adjacent to a culvert replacement.
- Limits of project boundaries need to be clearly defined to avoid redundancy and overlap.
- Project sequencing should be considered to maximize potential benefits and not jeopardize previously completed sites.
- Coordination between projects and County Departments should result in potential cost reduction, minimization of environmental and social impacts, and streamlining of the project implementation process.

While the DSS was carefully developed to act as a universal tool and not be watershed-specific, the values assigned to each category of benefit and constraint may be amended somewhat according to the feedback gleaned from initial prioritization efforts.

## M E M O R A N D U M

DATE:	May 28, 2024
TO:	The Board of Supervisors
FROM:	Jose R. Ribeiro, Senior Planner II/Landscape Planner Thomas P. Wysong, Principal Planner
SUBJECT:	Policy to Address Solar Energy Generating Facilities

#### History

At the March 14, 2023, Board of Supervisors' meeting, Board members expressed concern that its consideration of future solar farm applications would occur without the benefit of the completion of the three solar-farm-related goals (the "Goals") set forth in the Natural & Cultural Assets Plan (the "Assets Plan") adopted by the Board of Supervisors on October 25, 2022.

Subsequently, at the April 11, 2023, meeting, the Board adopted a resolution directing staff to analyze the manpower, financial assets, and the recommended work timeline required to conduct an analysis of the Goals listed in the Assets Plan (Attachment No. 2). The following updates were provided to the Board throughout this process:

- On July 25, 2023, the Board discussed initial policy and scope of work with consultant, The Berkley Group.
- On September 12, 2023, staff and consultant presented draft policy and Zoning Ordinance amendment language.
- On October 24, 2023, the Board reviewed revisions and approved a motion to finalize the policy and Zoning Ordinance amendment language based upon the content provided.

At the March 6, 2024, Planning Commission meeting, staff presented an Initiating Resolution for the consideration of amendments to the Zoning Ordinance regarding solar energy generating facilities, and accompanying policy and Ordinance amendments for the Planning Commission's consideration. After discussion, the Planning Commission voted 6 to 1 to deny the Initiating Resolution regarding solar energy generating facilities thus pausing the policy and Ordinance amendments to be presented. In consideration of the materials presented to the Planning Commission, on March 12, 2024, the Board of Supervisors asked staff to produce a more concise version of the policy without an accompanying Ordinance.

## **Policy Highlights**

The proposed Board policy is intended to apply to solar facility cases that come before the Planning Commission and Board of Supervisors seeking legislative approval through the Special Use Permit (SUP) process. It will set expectations for solar facility plan applicants, establish parameters to evaluate the solar facilities and their impacts to their surroundings, and provide guidance regarding appropriate mitigation of these impacts through conditions and other measures.

Below is a list of some of the issues that this policy seeks to address:

- Location and size relative to the Primary Service Area and zoning districts;
- Proximity to natural and cultural resources, other land uses, and other solar facilities;
- Impacts on viewsheds, open space, and stormwater conditions;

Policy to Address Solar Energy Generating Facilities May 28, 2024 Page 2

- Impacts on agricultural lands, the mobility of wildlife, and natural resources, especially in undeveloped areas;
- Impacts on the electric grid and transmission network within the County;
- Impacts created by noise and traffic on adjacent and nearby properties, particularly residential properties; and
- Encouragement for colocation and expectation for economic analyses.

To add further clarity and specificity in evaluating applications and providing staff recommendations to the Board, the following items have also been included within the Policy:

- Solar Facilities Definitions and Categories consistent with current industry terminology.
- Numerical standards for site layout and character guidance, including buffering requirements, and distances between facilities.
- Provisions for siting agreements.
- Expectation that solar panels will be evaluated as impervious cover.

Staff intends to develop accompanying departmental guidance to provide further explanation and details on the policy's provisions as needed. However, since the complementary Zoning Ordinances will not be moving forward at this time, staff will continue to rely on SUP conditions to address project-specific impacts (i.e., setbacks, native pollinators, enhanced landscaping, etc.).

Accessory solar facilities would remain as permitted by-right uses under the accessory uses definition, as per previous zoning interpretations.

## RECOMMENDATION

Staff looks forward to discussing the attached Policy with the Board.

JRR/TPW/md SolEnrgyGenFacPol-mem

Attachments:

- 1. Board of Supervisors Solar Facilities Policy
- 2. Board of Supervisors Initiating Resolution, dated April 11, 2023

## <u>**RESOLUTION**</u>

#### SOLAR FACILITIES POLICY

- WHEREAS, James City County has recently considered a number of Special Use Permit ("SUP") applications for solar facilities: and
- WHEREAS, these applications generated concerns that such facilities may adversely affect the County; and
- WHEREAS, the James City County Natural & Cultural Assets Plan identifies specific goals, objectives, and recommendations concerning the evaluation and development of solar facilities within the County; and
- WHEREAS, the James City County Board of Supervisors (the "Board") adopted a resolution on April 11, 2023, directing staff to assess solar facilities, and identify best practices with regard to policies and regulations; and
- WHEREAS, the Board further directed the development of a comprehensive Board policy for solar facilities based on this assessment; and
- WHEREAS, on July 25, 2023, September 12, 2023, and October 4, 2023, the Board was presented with an assessment, research, and best practices concerning solar facilities.
- NOW, THEREFORE, BE IT RESOLVED that the Board of Supervisors hereby establishes the following Solar Facilities Policy (the "Policy").
  - 1. <u>Solar Facility Definitions</u>:
    - a. Solar energy generating facility (solar facility). Solar facilities may include, but are not limited to, solar energy generating devices, inverters, a substation, ancillary equipment, buildings, security fencing, access roads, stormwater control measures, and screening on the site. Solar energy generating devices utilize sunlight as an energy source to heat or cool buildings, heat or cool water, or produce mechanical power by means of any combination of collecting, transferring, or converting solar generated energy and applies to, but is not limited to, solar photovoltaic systems, solar thermal systems, and solar hot water systems.
    - b. Community solar facilities provide electricity and/or utility bill reductions through net metering to multiple owners or subscribers and generate 5 megawatts ("MW") alternating current or less. In James City County, community solar facilities should be less than 1 MW.
    - c. Utility-scale solar facilities provide electricity for commercial distribution.
      - i. Small utility-scale facilities generate less than 1 MW.
      - ii. Large utility-scale facilities generate 1 MW or greater.

#### 2. *Location Guidance*:

- a. Community solar facilities should be located on less than 20 acres of total fenced area and may be located inside and outside the Primary Service Area ("PSA").
- b. Small utility-scale solar facilities should be located on less than 20 acres of total fenced area and may be located inside and outside the PSA.
- c. Large utility-scale solar facilities should be located on 20 acres or more of total fenced area. They should be located outside the PSA in the General Agricultural (A-1), Rural Residential (R-8), or Public Land (PL) zoning districts. Total project area should not exceed 300 acres.
- 3. Land use applications for solar facilities should be developed consistent with this policy. Conditions may be imposed upon individual SUPs for solar facilities to ensure consistency with this policy and to mitigate any negative impacts associated with a facility.
- 4. Solar facilities should not be located within 400 feet of dwellings or within 250 feet of historic, cultural, recreational, special flood hazard areas, and environmentally sensitive areas and resources. Solar facilities should incorporate appropriate setbacks, buffers, and screening to address proximity to the above-named areas. For the purpose of this policy, the recommended distances shall be measured from the fenced area of the solar facilities.
- 5. Solar facilities, including fencing and support equipment, should be fully screened from ground-level view by vegetated buffers at least 50 feet in width from adjacent properties and at least 100 feet in width from public rights-of-way.
- 6. There should be a minimum distance of one mile between fenced areas of separate solar facilities; however, consideration may be made for a closer distance based upon the size, scale, and design of a solar facility and the overall suitability of a given site. For the purpose of this policy, the recommended distances shall be measured from the fenced area of the solar facilities.
- 7. If a solar facility consists of multiple parcels, solar panels included as part of the same solar facility should be sited on contiguous parcels to limit project fragmentation and viewshed impacts.
- 8. The number and size of solar facilities in the County should be limited to preserve open space and adequately mitigate stormwater runoff.
- 9. Solar facilities should be designed to conserve and protect habitat cores, blocks, and corridors connecting habitat areas. Any disturbance of these areas should be adequately mitigated, and disturbance of more than 20 acres of these areas is discouraged.
- 10. Solar facilities should avoid, to the maximum extent possible, the use of land identified as prime farmland by the United States Department of Agriculture. Any disturbance of these areas should be adequately mitigated, and disturbance of more than 50 acres is discouraged.

- 11. Solar facilities should include corridors to allow for the movement of wildlife across the solar facility , and the latest guidance from state environmental agencies should be considered.
- 12. The closest point of any solar facility should be located within two miles of an existing transmission line within the County or an adjoining locality. Any generation lead lines or electrical lines to connect noncontiguous portions of a solar facility and/or leading to a solar facility's substation or point of interconnection should be located underground. For the purpose of this policy, the recommended distances shall be measured from the fenced area of the solar facilities.
- 13. Applications for solar facilities should identify existing electric distribution or transmission infrastructure that may need to be upgraded for the solar facility.
- 14. Solar facilities are encouraged to allow for the continued residential, agricultural, commercial, industrial, or recreational uses within project sites.
- 15. Applicants for solar facilities should provide mitigation strategies for noise and traffic impacts which should include general traffic plans and designated hours for construction and delivery of materials.
- 16. Solar facilities should have principal access from roads meeting Virginia Department of Transportation ("VDOT") standards. While collector or arterial roads are preferred, access from local roads may be considered. Principal access from roads not meeting VDOT standards, local roads through neighborhoods or platted subdivisions, or across railroad tracks are not acceptable, and secondary or construction access from these roads and across railroad tracks is discouraged.
- 17. Solar facilities should provide for economic returns beyond those which could otherwise be anticipated for a given site.
- 18. Solar facility applicants should discuss and negotiate a siting agreement with the County.
- 19. To help address the impacts of any proposed solar facility, the SUP application should include the following:
  - a. A construction management plan outlining, at a minimum, the anticipated construction schedule, phasing plan, hours of construction, noise mitigation measures, parking, and traffic control plans.
  - b. Plans for addressing erosion and sedimentation, grading, and stormwater management. Solar panels are to be considered unconnected impervious areas when performing post-development water quality and quantity calculations.
  - c. A landscape plan outlining existing vegetation and the limits of proposed clearing, buffers, screening, and plant materials and species. It should also include a report describing and addressing the viewshed impacts of the facility.
  - d. A report inventorying wetlands, Resource Protection Areas, streams, floodplains, forested areas, and agricultural soils on the proposed facility site.

Ruth M. Larson Chair, Board of Supervisors

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Adopted by the Board of Supervisors of James City County, Virginia, this 28th day of May, 2024.

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## **RESOLUTION**

#### LARGE-SCALE SOLAR FARM APPLICATIONS

- WHEREAS, the James City County Code (the "County Code") permits any property owner, contract purchaser with the owner's written consent, or the owner's agent to apply to amend, supplement, or change by Ordinance the boundaries of zoning districts or the regulations established in the James City County Zoning Ordinance (the "Zoning Ordinance"), including zoning map amendments (collectively, "Owner Applications"); and
- WHEREAS, Owner Applications are regularly submitted for consideration by the Board of Supervisors (the "Board"), all of which are given thorough consideration by staff and the James City County Planning Commission (the "Commission") prior to transmittal to the Board; and
- WHEREAS, major factors for the consideration of any amendment to the Zoning Ordinance, including Owner Applications, include whether staff, the Commission, and the Board believe that the proposed amendment is consistent with the James City County Comprehensive Plan (the "Comprehensive Plan"), the James City County Code (the "County Code") and any other adopted plans and policies; and
- WHEREAS, at its meeting on October 25, 2022, the Board of Supervisors adopted the Natural & Cultural Assets Plan (the "Assets Plan"); and
- WHEREAS, Goal No. 1.1 of the Assets Plan calls for the development of "zoning tools and guidance for siting large-scale solar sites to avoid or minimize disturbance of habitats or cultural resources"; and
- WHEREAS, Goal No. 2.A of the Assets Plan calls for the inclusion of "high-value agriculture soils maps in County Geographic Information System layers and property information and recommend minimal disturbance of those soils during development (especially for utility solar sites)"; and
- WHEREAS, Goal No. 3.D of the Assets Plan calls for the prevention of "stormwater impacts from utility-scale solar projects by adopting stormwater standards as required by the Virginia Department of Environmental Quality"; and
- WHEREAS, at the March 14, 2023, Board meeting, members of the Board expressed concern that its consideration of any Owner Applications involving solar farms would be done so without the benefit of the completion of the three solar-farm-related goals (the "Goals") set forth in the Assets Plan; and
- WHEREAS, the Board finds that it promotes the health, safety, and welfare of the citizens of the County and good zoning practice to ensure that all Owner Applications involving large-scale solar farms are considered with analysis set forth in the Goals.
- NOW, THEREFORE, BE IT RESOLVED the Board does hereby direct staff to analyze the manpower, financial assets, and the recommended work timeline that will be required to conduct the analysis of the goals listed in the Assets Plan and to present that information to the Board at its July 25, 2023, Business Meeting so that the Board can determine the most effective way to proceed with meeting these goals.

- BE IT FURTHER RESOLVED the Board does hereby direct staff to retain an outside consultant to assist both staff and the Board in devising a comprehensive Board Policy on Large-Scale Solar Farm projects and present a draft policy document to the Board at its September 12, 2023, Regular Meeting.
- BE IT FURTHER RESOLVED the Board does hereby direct staff to not place any large-scale solar farm application on the Board's Calendar until its first meeting in December 2023, or at such earlier time as the Board may determine.

BE IT FURTHER RESOLVED that any Owner Application for a large-scale solar farm associated with a conceptual plan submitted to the County on or prior to April 10, 2023 may be placed on the Board's Calendar following consideration by the Planning Commission.

lichael J. Hipple

Chairman, Board of Supervisors

ATTEST:

Teresa J. Saeed

Deputy Clerk to the Board

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Adopted by the Board of Supervisors of James City County, Virginia, this 11th day of April, 2023.

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