

# 2721 - Richmond-Surrey Crescent Flood Protection and Living Shoreline

## Application Details

Funding Opportunity:	2336-Virginia Community Flood Preparedness Fund - Project Grants - CY24 Round 5
Funding Opportunity Due Date:	Jan 24, 2025 11:59 PM
Program Area:	Virginia Community Flood Preparedness Fund
Status:	Under Review
Stage:	Final Application
Initial Submit Date:	Jan 24, 2025 1:26 PM
Initially Submitted By:	Justin Shafer
Last Submit Date:	
Last Submitted By:	

## Contact Information

### Primary Contact Information

Active User*:	Yes
Type:	External User
Name*:	Mr. Justin Shafer Salutation First Name Last Name
Title:	Project Manager, Water Quality and Green Infrastructure
Email*:	justin.shafer@norfolk.gov
Address*:	2223 McKann Avenue

Norfolk Virginia 23505  
City State/Province Postal Code/Zip

Phone*:	(757) 823-4048 Ext.
	Phone
	###-###-####
Fax:	###-###-####

Comments:

### Organization Information

Status*:	Approved
Name*:	NORFOLK, CITY OF
Organization Type*:	Local Government
Tax ID*:	546001455
Unique Entity Identifier (UEI)*:	RS6DCM873FA3
Organization Website:	<a href="https://www.norfolk.gov/">https://www.norfolk.gov/</a>

**Address\*:** 810 Union Street  
Suite 1101

Norfolk Virginia 23510-  
City State/Province Postal Code/Zip

**Phone\*:** (757) 282-8383 Ext.  
#### #### ####

**Fax:** #### #### ####

**Benefactor:**

**Vendor ID:**

**Comments:**

## VCFPF Applicant Information

### *Project Description*

**Name of Local Government\*:** City of Norfolk

Your locality's CID number can be found at the following link: [Community Status Book Report](#)

**NFIP/DCR Community Identification Number (CID)\*:** 510104

If a state or federally recognized Indian tribe,

**Name of Tribe:**

**Authorized Individual\*:** Patrick Roberts  
First Name Last Name

**Mailing Address\*:** 810 Union St  
Address Line 1  
Suite 1101  
Address Line 2  
Norfolk Virginia 23510  
City State Zip Code

**Telephone Number\*:** 757-664-4242

**Cell Phone Number\*:** 757-664-4242

**Email\*:** [citymgr@norfolk.gov](mailto:citymgr@norfolk.gov)

Is the contact person different than the authorized individual?

**Contact Person\*:** Yes

**Contact:** Justin Shafer  
First Name Last Name  
501 Boush St  
Address Line 1  
Address Line 2  
Norfolk Virginia 23510  
City State Zip Code

**Telephone Number:** 757-282-8383

**Cell Phone Number:** 757-282-8383

**Email Address:** [justin.shafer@norfolk.gov](mailto:justin.shafer@norfolk.gov)

Enter a description of the project for which you are applying to this funding opportunity

**Project Description\*:**

The Richmond-Surrey Crescent Flood Control & Living Shoreline project will utilize green and grey infrastructure improvements to reduce flooding along a half mile section of Hampton Blvd and adjacent streets, one of the busiest traffic corridors in southeastern Virginia due to facilities

alongside it, such as Naval Station Norfolk, Norfolk International Terminals, and Old Dominion University. A combination of knee walls, berms, backflow valves, living shoreline, and revetment will be installed.

Low-income geographic area means any locality, or community within a locality, that has a median household income that is not greater than 80 percent of the local median household income, or any area in the Commonwealth designated as a qualified opportunity zone by the U.S. Secretary of the Treasury via his delegation of authority to the Internal Revenue Service. A project of any size within a low-income geographic area will be considered.

Is the proposal in this application intended to benefit a low-income geographic area as defined above?

**Benefit a low-income geographic area\*:** No

Information regarding your census block(s) can be found at [census.gov](https://census.gov)

**Census Block(s) Where Project will Occur\*:** Tract 24 - Blocks 1010 - 1012, and 1017 - 1025; Tract 23 Blocks 1004 - 1005, 1020 - 1022, and 1025

**Is Project Located in an NFIP Participating Community?\*** Yes

**Is Project Located in a Special Flood Hazard Area?\*** Yes

**Flood Zone(s) (if applicable):** AE

**Flood Insurance Rate Map Number(s) (if applicable):** 5101040018H

## Eligibility CFPF - Round 4 - Projects

### *Eligibility*

Is the applicant a local government (including counties, cities, towns, municipal corporations, authorities, districts, commissions, or political subdivisions created by the General Assembly or pursuant to the Constitution or laws of the Commonwealth, or any combination of these)?

**Local Government\*:** Yes

Yes - Eligible for consideration

No - Not eligible for consideration

Does the local government have an approved resilience plan and has provided a copy or link to the plan with this application?

**Resilience Plan\*:** Yes

Yes - Eligible for consideration under all categories

No - Eligible for consideration for studies, capacity building, and planning only

If the applicant is not a town, city, or county, are letters of support from all affected local governments included in this application?

**Letters of Support\*:** N/A

Yes - Eligible for consideration

No - Not eligible for consideration

N/A- Not applicable

Has this or any portion of this project been included in any application or program previously funded by the Department?

**Previously Funded\*:** No

Yes - Not eligible for consideration

No - Eligible for consideration

Has the applicant provided evidence of an ability to provide the required matching funds?

**Evidence of Match Funds\*:** Yes

Yes - Eligible for consideration

No - Not eligible for consideration

N/A- Match not required

## Scoring Criteria for Flood Prevention and Protection Projects - Round 4

### *Scoring*

#### **Category Scoring:**

Hold CTRL to select multiple options

#### **Project Category\*:**

All hybrid approaches whose end result is a nature-based solution,Living shorelines and vegetated buffers,Wetland restoration

Is the project area socially vulnerable? (based on [ADAPT Virginia's Social Vulnerability Index Score](#))

**Social Vulnerability Scoring:**

Very High Social Vulnerability (More than 1.5)  
High Social Vulnerability (1.0 to 1.5)  
Moderate Social Vulnerability (0.0 to 1.0)  
Low Social Vulnerability (-1.0 to 0.0)  
Very Low Social Vulnerability (Less than -1.0)

**Socially Vulnerable\*:** Very Low Social Vulnerability (Less than -1.0)

Is the proposed project part of an effort to join or remedy the community's probation or suspension from the NFIP?

**NFIP\*:** No

Is the proposed project in a low-income geographic area as defined below?

"Low-income geographic area" means any locality, or community within a locality, that has a median household income that is not greater than 80 percent of the local median household income, or any area in the Commonwealth designated as a qualified opportunity zone by the U.S. Secretary of the Treasury via his delegation of authority to the Internal Revenue Service. A project of any size within a low-income geographic area will be considered.

**Low-Income Geographic Area\*:** No

Projects eligible for funding may also reduce nutrient and sediment pollution to local waters and the Chesapeake Bay and assist the Commonwealth in achieving local and/or Chesapeake Bay TMDLs. Does the proposed project include implementation of one or more best management practices with a nitrogen, phosphorus, or sediment reduction efficiency established by the Virginia Department of Environmental Quality or the Chesapeake Bay Program Partnership in support of the Chesapeake Bay TMDL Phase III Watershed Implementation Plan?

**Reduction of Nutrient and Sediment Pollution\*:** Yes

Pollution\*:

Does this project provide ?community scale? benefits?

**Community Scale Benefits\*:** More than one census block

Expected Lifespan of Project

**Expected Lifespan of Project\*:** Over 20 Years

**Comments:**

While not in a low-income geographic area, the project will benefit all residents of Norfolk and the region by reducing frequency of flooding on Hampton Blvd, a major thoroughfare connecting regional military, education, port and medical facilities.

## Scope of Work - Projects - Round 4

**Scope of Work**

Upload your Scope of Work

Please refer to Part IV, Section B. of the grant manual for guidance on how to create your scope of work

**Scope of Work\*:** [Richmond-Surrey Crescent Flood Protection and Living Shoreline Scope of Work.docx](#)

**Comments:****Budget Narrative**

**Budget Narrative Attachment\*:** [Richmond-Surrey Crescent Flood Control and Living Shoreline Budget Narrative.docx](#)

**Comments:**

## Scope of Work Supporting Information - Projects

**Supporting Information - Projects**

Provide population data for the local government in which the project is taking place

**Population\*:** 232995.00

Provide information on the flood risk of the project area, including whether the project is in a mapped floodplain, what flood zone it is in, and when it was last mapped. If the property or area around it has been flooded before, share information on the dates of past flood events and the amount of damage sustained

**Historic Flooding data and Hydrologic Studies\*:** [Norfolk Flooding Data and Hydrologic Studies Link.docx](#)

Include studies, data, reports that demonstrate the proposed project minimizes flood vulnerabilities and does not create flooding or increased flooding (adverse impact) to other properties

**No Adverse Impact\*:** [Richmond-Surrey Crescent Flood Control and Living Shoreline - No Adverse Impact Statement.docx](#)

Include supporting documents demonstrating the local government's ability to provide its share of the project costs. This must include an estimate of the total project cost, a description of the source of the funds being used, evidence of the local government's ability to pay for the project in full or quarterly prior to reimbursement, and a signed pledge agreement from each contributing organization

**Ability to Provide Share of Cost\*:** [Application\\_Approval - 2024 DCR CFFP Grant.pdf](#)

A benefit-cost analysis must be submitted with the project application

**Benefit-Cost Analysis\*:** [Benefit Cost Analysis Narrative\\_Richmond Surrey\\_Final.docx](#)

Provide a list of repetitive loss and/or severe repetitive loss properties. Do not provide the addresses for the properties, but include an exact number of repetitive loss and/or severe repetitive loss structures within the project area

**Repetitive Loss and/or Severe Repetitive Loss Properties\*:** [Richmond-Surrey Crescent Flood Control and Living Shoreline - Repetitive Loss Data.docx](#)

Describe the residential and commercial structures impacted by this project, including how they contribute to the community such as historic, economic, or social value. Provide an exact number of residential structures and commercial structures in the project area

**Residential and/or Commercial Structures\*:**

Reduced flooding is assessed in, under, or immediately adjacent to 68 residential and 2 commercial structures in the impacted portion of the Larchmont/Edgewater neighborhood. At least 225 residential or commercial properties directly benefit from the project in terms of flood reduction to the property itself or increased ability to access the property through regularly flooded streets, with hundreds more indirectly benefiting from improved access. While the neighborhood is not a registered historic district, it does date to 1906 and remains an important source of market rate and affordable housing, both owner-occupied and rentals, for the city as a whole, but especially for nearby locations along Hampton Blvd such as Naval Station Norfolk, Old Dominion University, and Sentara Norfolk General Hospitals.

If there are critical facilities/infrastructure within the project area, describe each facility

**Critical Facilities/Infrastructure\*:**

Hampton Blvd is the most important piece of infrastructure supported by the project. Hampton Blvd is a major road running north-south through the eastern portion of Norfolk, connecting Interstates 264 and 664 via the Midtown Tunnel through Portsmouth to the south with Interstate 64 and 564 to the north. It is one of the busiest non-interstate roadways in southeastern Virginia due to the location of important regional assets along its corridor, including Naval Station Norfolk and numerous military facilities associated with the largest naval base in the world, as well as NATO Joint Force Command, Virginia Port Authority's Norfolk International Terminal (and Portsmouth Marine Terminal immediately on the south side of the Midtown Tunnel), Norfolk Southern's Lambert Point Yard, Old Dominion University, Eastern Virginia Medical School, and Sentara Norfolk General Hospital. In terms of regional and national security, commerce, and workforce, Hampton Blvd is one of the most important roadways in southeast Virginia.

A small sewer pump station along Richmond Crescent will also benefit from increased flood resilience, though past measure have reduces some risk already.

Explain the local government's financial and staff resources. How many relevant staff members does the local government have? To what relevant software does the local government have access? What are the local government's capabilities?

**Financial and Staff Resources\*:**

The City of Norfolk has numerous professional and operational staff across multiple departments to provide support for project and grant management. In particular, the Office of Resilience and Public Works Design Division have more than 15 engineers, scientists, and inspectors who focus on design, construction, and monitoring of flood reduction, waterfront structures, water quality projects, and green infrastructure projects, as well as contracting of City projects. Public Works Division of Environmental Storm Water Management has several crews dedicated to maintenance of hard infrastructure, including floodwalls, pipes, outfalls, and valves. Additionally, two crews are dedicated to maintenance of Best Management Practices, including living shorelines. The Department of Public Works has a dedicated Financial Management team who assist with project budget management, including a staff member who focuses on grants. Further high level grant, financial, and internal controls support are provided by dedicated teams in the Departments of Finance and Budget. Additional staff from the Bureau of Environmental Services support project inspection and permit compliance. Staff from the Department of Parks and Recreation support maintenance of open spaces and flood control features such as mowed berms.

The City uses a variety of specialized software to manage all aspects of projects.

Overall project management is through the E-Builder web application. Budgets are managed in the AFMS web application and linked to E-Builder. Grants are managed through the E-Civis web application and other internal software. Contracting is managed through the OpenGov web application. Assets and maintenance work orders are managed in the Lucity application and ArcGIS. Norfolk also regularly develops or partners on tools for internal analysis and resident education of focus areas, such as the TITAN and Waze-integrated Floodmapp tool for real time flood risk awareness.

Identify and describe the goals and objectives of the project. Include a description of the expected results of the completed project and explain the expected benefits of the project. This may include financial benefits, increased awareness, decreased risk, etc.

**Goals and Objectives\*:**

The goals and objectives of the Richmond-Surrey Crescent Flood Protection and Living Shoreline project support final design and construction of a combination of flood protection and environmental enhancement efforts benefitting the critical Hampton Blvd corridor and a portion of the

adjacent Larchmont-Edgewater community.

Goal 1: Reduce flooding along a section of Hampton Blvd and surrounding neighborhood streets, frequently impacted by "sunny day" lunar and wind-driven events, as well small coastal events

Goal 2: Restore wetland and oyster habitats in the Lafayette River

Goals 3: Stabilize a failing concrete bulkhead and eroding banks

Objective 1: Finalize the project design within 1 year of grant agreement signing

Objective 2: Construct project elements within 3 years of the grant agreement signing

Outline a plan of action laying out the scope and detail of how the proposed work will be accomplished with a timeline identifying expected completion dates.

Determine milestones for the project that will be used to track progress. Explain what deliverables can be expected at each milestone, and what the final project deliverables will be. Identify other project partners

**Approach, Milestones, and Deliverables:** [Richmond-Surrey Crescent Flood Control and Living Shoreline - Approach Milestones and Deliverables.docx](#)

Where applicable, briefly describe the relationship between this project and other past, current, or future resilience projects. If the applicant has received or applied for any other grants or loans, please identify those projects, and, if applicable, describe any problems that arose with meeting the obligations of the grant and how the obligations of this project will be met

**Relationship to Other Projects:**

The Richmond-Surrey Crescent Flood Control and Living Shoreline project meets goals of Norfolk's Resilience Strategy, Green Infrastructure Plan, Climate Action Plan, Comprehensive Plan, and TMDL Action Plan. The project will add to, support, and/or work in tandem with a variety of past, ongoing, and planned projects. The City has several projects underway to address various scales of flooding on Hampton Blvd, including the Lafayette Surge Barrier, a planned phase of the Norfolk Coastal Storm Risk Management project, in partnership with the Army Corps of Engineers. Once constructed, the surge barrier at the mouth of the Lafayette River is designed to close ahead of large coastal storm events, preventing catastrophic flooding. To meet regulatory requirements and ensure the long-term environmental health of the large Lafayette River ecosystem, the surge barrier will only close when storm surge inundation is expected to exceed an elevation of 4 ft on the North American Vertical Datum (NAVD). At a smaller scale, the currently under construction, Department of Defense-supported Hampton Blvd Drainage Improvement project will upgrade pipes and outfalls on Hampton Blvd around the Naval Facilities Engineering Systems Command Atlantic compound to reduce tailwater flooding through the storm drains and onto the streets during small "sunny day" tidal or rainfall events, up to approximately elevation 2.5 ft NAVD. While the combined benefits of these projects will address many storm events, a gap remains where a moderate storm could overtop banks of the Lafayette River, flow overland and through storm drains upstream of valves, and flood Hampton Blvd and surrounding neighborhoods. These gaps between small solutions such as valves and large solutions such as floodwalls and surge barrier are found in locations throughout Norfolk and the region, and will expand in time due to sea level rise. The proposed project will provide an intermediate scale solutions to address this gap in flood protection. Living shoreline sections of the proposed project will tie into two previous wetland restoration project, the Myrtle Park project, constructed in 2013 by the City along Richmond Crescent, and the Birdsong Wetland, constructed in 1997 by community organizations behind the Larchmont Library as one of the first living shorelines in Virginia. The connections and increased marsh area will create greater overall benefits. The project will also protect the adjacent Elizabeth River Trail.

For ongoing projects or projects that will require future maintenance, such as infrastructure, flood warning and response systems, signs, websites, or flood risk applications, a maintenance, management, and monitoring plan for the projects must be provided

**Maintenance Plan:**

[Richmond-Surrey Crescent Flood Control and Living Shoreline Maintenance Plan.docx](#)

Describe how the project meets each of the applicable scoring criteria contained in Appendix B. Documentation can be incorporated into the Scope of Work Narrative

**Criteria:**

Eligible Projects: The planned project is a hybrid approach resulting in a nature based solution

Social Vulnerability Index Score: The immediate project area has Very Low SVI, however the project support Norfolk (and the region) as a whole, which has an average SVI score of Moderate.

Community Scale of Benefit: The project provides direct benefits to residents in Tract 24 - Blocks 1010 - 1012, and 1017 - 1025 and Tract 23 Blocks 1004 - 1005, 1020 - 1022, and 1025 and additional benefits city-wide to the many residents and businesses who use Hampton Blvd.

Expected Lifespan of Project: The project is being designed with sea level rise in mind and is expected to provide benefits for more than 20 years. The City also continues to research options to sustain living shoreline assets in the long-term to combat the impacts of sea level rise.

Remedy for NFIP probation or suspension: The City is not in probation or suspension status.

Proposed project part of a low-income geographic area: The project is not in a low-income area. Norfolk as a whole is low-income compared to the state and the project provides significant benefits to all users of Hampton Blvd.

Proposed project implements a Chesapeake Bay TMDL BMP: The project will install living shorelines, which will be tracked as Shoreline Management under the Chesapeake Bay TMDL BMP criteria.

# Budget

## Budget Summary

**Grant Matching Requirement\*:** Projects that will result in hybrid solutions - Fund 60%/Match 40%

Is a match waiver being requested?

**Match Waiver Request** No

Note: only low-income communities are eligible for a match waiver.

\*:

**Total Project Amount (Request + Match)\*:** \$7,196,100.00

\*\*This amount should equal the sum of your request and match figures

**REQUIRED Match Percentage Amount:** \$2,878,440.00

## BUDGET TOTALS

Before submitting your application be sure that you [meet the match requirements](#) for your project type.

**Match Percentage:** 40.00%

Verify that your match percentage matches your required match percentage amount above.

**Total Requested Fund Amount:** \$4,317,660.00

**Total Match Amount:** \$2,878,440.00

**TOTAL:** \$7,196,100.00

### Personnel

Description	Requested Fund Amount	Match Amount	Match Source
No Data for Table			

### Fringe Benefits

Description	Requested Fund Amount	Match Amount	Match Source
No Data for Table			

### Travel

Description	Requested Fund Amount	Match Amount	Match Source
No Data for Table			

### Equipment

Description	Requested Fund Amount	Match Amount	Match Source
No Data for Table			

### Supplies

Description	Requested Fund Amount	Match Amount	Match Source
No Data for Table			

### Construction

Description	Requested Fund Amount	Match Amount	Match Source
Construct Hybrid Flood Protection and Living Shoreline	\$4,197,660.00	\$2,798,440.00	Cash
	<b>\$4,197,660.00</b>	<b>\$2,798,440.00</b>	

#### Contracts

Description	Requested Fund Amount	Match Amount	Match Source
Finalize Design	\$120,000.00	\$80,000.00	Cash
	<b>\$120,000.00</b>	<b>\$80,000.00</b>	

#### Maintenance Costs

Description	Requested Fund Amount	Match Amount	Match Source
No Data for Table			

#### PreAward and Startup Costs

Description	Requested Fund Amount	Match Amount	Match Source
No Data for Table			

#### Other Direct Costs

Description	Requested Fund Amount	Match Amount	Match Source
No Data for Table			

## Long and Short Term Loan Budget - Projects - VCFPF

#### Budget Summary

Are you applying for a short term, long term, or no loan as part of your application?

If you are not applying for a loan, select "not applying for loan" and leave all other fields on this screen blank

**Long or Short Term\*:** Not Applying for Loan

**Total Project Amount:** \$0.00

**Total Requested Fund Amount:** \$0.00

**TOTAL:** \$0.00

#### Salaries

Description	Requested Fund Amount
No Data for Table	

#### Fringe Benefits

Description	Requested Fund Amount
No Data for Table	

#### Travel

Description	Requested Fund Amount
No Data for Table	

No Data for Table

#### Equipment

Description	Requested Fund Amount
No Data for Table	

#### Supplies

Description	Requested Fund Amount
No Data for Table	

#### Construction

Description	Requested Fund Amount
No Data for Table	

#### Contracts

Description	Requested Fund Amount
No Data for Table	

#### Other Direct Costs

Description	Requested Fund Amount
No Data for Table	

## Supporting Documentation

#### Supporting Documentation

Named Attachment	Required	Description	File Name	Type	Size	Upload Date
Detailed map of the project area(s) (Projects/Studies)		A project map showing existing drainage system, proposed flood protection, and area of reduced flooding is attached, along with conceptual overview, typical crossections, and the 65% design file.	Richmond-Surrey Crescent Flood Control and Living Shoreline - Detailed Map and Design Documents.pdf	pdf	61 MB	01/23/2025 05:37 PM
FIRMette of the project area(s) (Projects/Studies)		FIRMette of Project Area	Richmond-Surrey Crescent Flood Control and Living Shoreline - FIRMette.pdf	pdf	752 KB	01/23/2025 03:29 PM
Historic flood damage data and/or images (Projects/Studies)		Photos of flooding along Hampton Blvd and Larchmont/Edgewater neighborhood	Flooding Photos.docx	docx	4 MB	01/24/2025 01:24 PM
Alink to or a copy of the current floodplain ordinance		Norfolk's floodplain ordinance can be found in section 3.9 of Norfolk's zoning ordinance. The link is attached.	Norfolk Floodplain Ordinance.docx	docx	12 KB	01/23/2025 03:37 PM
Maintenance and management plan for project		A summary of maintenance is attached and various SOPs directing inspection and maintenance are included in the Other Relevant Attachments section	Richmond-Surrey Crescent Flood Control and Living Shoreline Maintenance Plan.docx	docx	13 KB	01/23/2025 03:38 PM
Alink to or a copy of the current hazard mitigation plan		Links to the regional Hazard Mitigation Plan and Norfolk-specific annual report are attached	Hazard Mitigation Plan.docx	docx	12 KB	01/23/2025 03:44 PM

A link to or a copy of the current comprehensive plan	A link to Norfolk's Comprehensive Plan is included	Norfolk Comprehensive Plan Link.docx	docx	12	01/23/2025
Social vulnerability index score(s) for the project area	A map and details of social vulnerability index score are attached	Richmond-Surrey Crescent Flood Control and Living Shoreline - Social Vulnerability Index Score.docx	docx	1	01/23/2025
Authorization to request funding from the Fund from governing body or chief executive of the local government	A transmittal form outlining the grant, proposed project, costs, and match, with approval signatures from the City Manager, is attached.	Application_Approval - 2024 DCR CFPF Grant.pdf	pdf	9	01/24/2025
Signed pledge agreement from each contributing organization	A transmittal form outlining the grant, proposed project, costs, and match, with approval signatures from the City Manager, is attached.	Application_Approval - 2024 DCR CFPF Grant.pdf	pdf	9	01/24/2025
Maintenance Plan	Maintenance summary is attached and specific SOPs for inspection and maintenance are included in the Other Relevant Attachments section	Richmond-Surrey Crescent Flood Control and Living Shoreline Maintenance Plan.docx	docx	13	01/23/2025
<i>Benefit-cost analysis must be submitted with project applications over \$2,000,000. in lieu of using the FEMA benefit-cost analysis tool, applicants may submit a narrative to describe in detail the cost benefits and value. The narrative must explicitly indicate the risk reduction benefits of a flood mitigation project and compares those benefits to its cost-effectiveness.</i>					
Benefit Cost Analysis	A benefit cost analysis is attached	Benefit Cost Analysis Narrative_Richmond Surrey_Final.docx	docx	200	01/24/2025
Other Relevant Attachments	SOPs for inspection and maintenance of drainage infrastructure, flood barriers, and BMPs	City of Norfolk Flood Infrastructure SOPs.pdf	pdf	11	01/23/2025
					MB 12:26 PM
					KB 03:41 PM
					MB 04:41 PM

#### Letters of Support

Description	File Name	Type	Size	Upload Date
No files attached.				

## Resilience Plan

#### Resilience Plan

Description	File Name	Type	Size	Upload Date
The attached document includes descriptions and links for all required elements of a resilience plan per CFPF guidelines and was approved by DCR in August 2021.	Resilience Planning Overview for the City of Norfolk - DCR Approved Aug 2021.pdf	pdf	288	01/23/2025
				KB 04:37 PM



Initial  
KWS

1/23/2025 | 2:33 PM EST  
Use for All City Documents Requiring the City Manager's Approval

## DOCUMENT TRANSMITTAL FORM

**\*PLEASE INDICATE IF THERE IS A LEGITIMATE DUE DATE BY WHICH THE CITY MANAGER MUST RESPOND\***

**DUE DATE:** 1/24/25 **RETURN COMPLETED DOCUMENT TO:** JUSTIN SHAFER

<b>DEPARTMENT:</b>	<b>RESILIENCE</b>
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**TO BE COMPLETED FOR CONTRACTS, AGREEMENTS, RFPs, AND GRANTS:**

**TITLE: 2024 COMMUNITY FLOOD PREPAREDNESS FUND GRANT**

<b>PARTY</b> (Company and principal's names with which the City is entering into the agreement.)	Virginia Department of Conservation and Recreation (DCR)
<b>EFFECTIVE DATES</b> (Start & end dates)	May 1, 2025 – May 1, 2028 (estimated based on expected award announcement and agreement dates)
<b>TOTAL DOLLAR VALUE</b>	\$7,196,100 (\$4,317,660 grant award and \$2,878,440 match)
<b>FUNDING SOURCE</b> (Operating or capital budget; budget year; grant or other source. Show account information)	<b>SOURCE: RESILIENCE CIP</b> <b>ACCOUNT: 4000-2-4361-5501-FY24</b>
<b>TYPE OF DOCUMENT:</b> (New or extension)	New

**BRIEF DESCRIPTION: THE VIRGINIA DCR COMMUNITY FLOOD PREPAREDNESS FUND (CFPF) GRANT PROVIDES SUPPORT FOR LOCALITIES TO REDUCE THE IMPACT OF FLOODING THROUGH THE USE OF GREY-INFRASTRUCTURE, GREEN-INFRASTRUCTURE, AND HYBRID CONSTRUCTION PROJECTS, AS WELL AS PLANS AND STUDIES.**

**SUMMARY OF SCOPE OF SERVICE/ PROGRAM: THE CITY'S OFFICE OF RESILIENCE, IN COLLABORATION WITH THE DEPARTMENT OF PUBLIC WORKS, WILL FINALIZE DESIGN AND CONSTRUCT THE RICHMOND-SURREY CRESCENT SHORELINE IMPROVEMENT PROJECT, WHICH WILL CONSTRUCT SHORELINE STABILIZATION, FLOOD CONTROL, AND GREEN INFRASTRUCTURE FEATURES IN THE LARCHMONT NEIGHBORHOOD. THE PROJECT WILL PROVIDE FLOOD PROTECTION FOR SMALL TO MODERATE STORM EVENTS FOR THE NEIGHBORHOOD AND ADJACENT HAMPTON BLVD. IT WILL SUPPORT FLOOD RESILIENCE, WATER QUALITY, AND GREEN INFRASTRUCTURE GOALS, INCLUDING THE CSRM AND TMDL.**

<b>PROCUREMENT METHOD</b> (RFP, Sealed BID, etc.)	RFP
<b>CALL OUTS</b> (Indicate any unique circumstances regarding provisions such as procurement protest pending, emergency purchase or other time sensitivity, so forth, along with any other pertinent information)	



**Certificate of Satisfaction:** I (We) hereby certify that all reasonable due diligence has been performed to sufficiently develop the contents and implications of the attached document in a manner to protect and account to the public. Further, all City policies and procedures have been adhered to and therefore, I (we) recommend the City Manager execute this document.

A handwritten signature in black ink that appears to read "Justin Shuler".

1/23/25

Document Owner

A handwritten signature in black ink that appears to read "Kyle W. Spencer".

1/23/25

Department Head Signature

Date

**Review by DCM** Approve  Disapprove 

A handwritten signature in black ink that appears to read "Douglas J. Beaver".

1/23/2025 | 4:21 PM EST

Deputy City Manager

Date

**Review by CM** Approve  Disapprove 

A handwritten signature in black ink that appears to read "Michael A. Spencer".

1/23/2025 | 1:52 PM PST

E68ETB3EDF5842D...  
City Manager

Date



## MEMORANDUM

TO: Patrick G. Roberts, City Manager

CC TO: Douglas J. Beaver, Deputy City Manager of Critical Infrastructure and Technology

FROM: Kyle Spencer, Chief Resilience Office

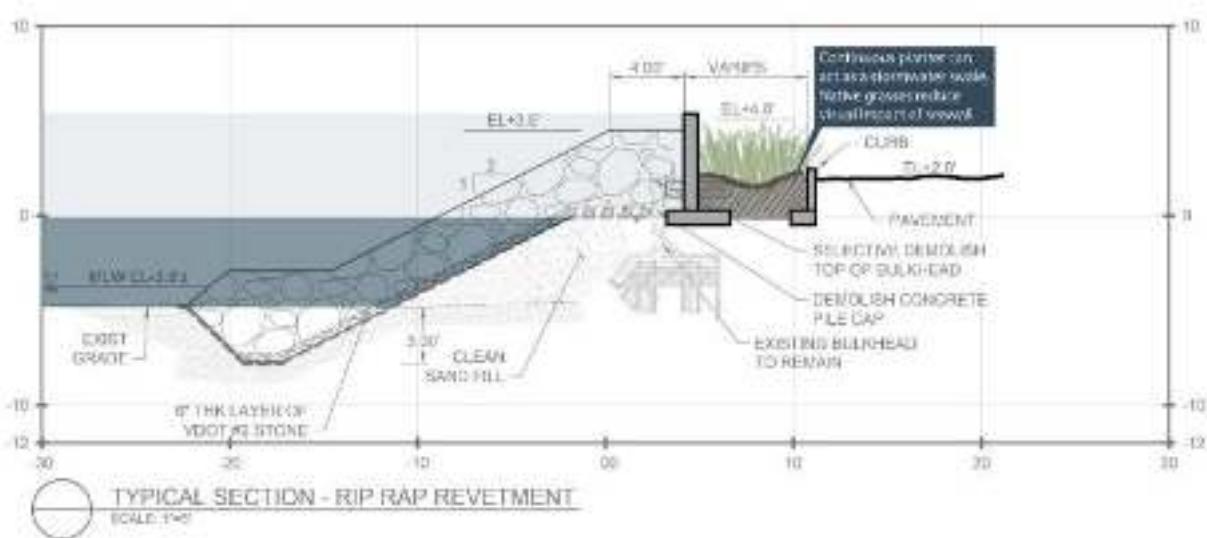
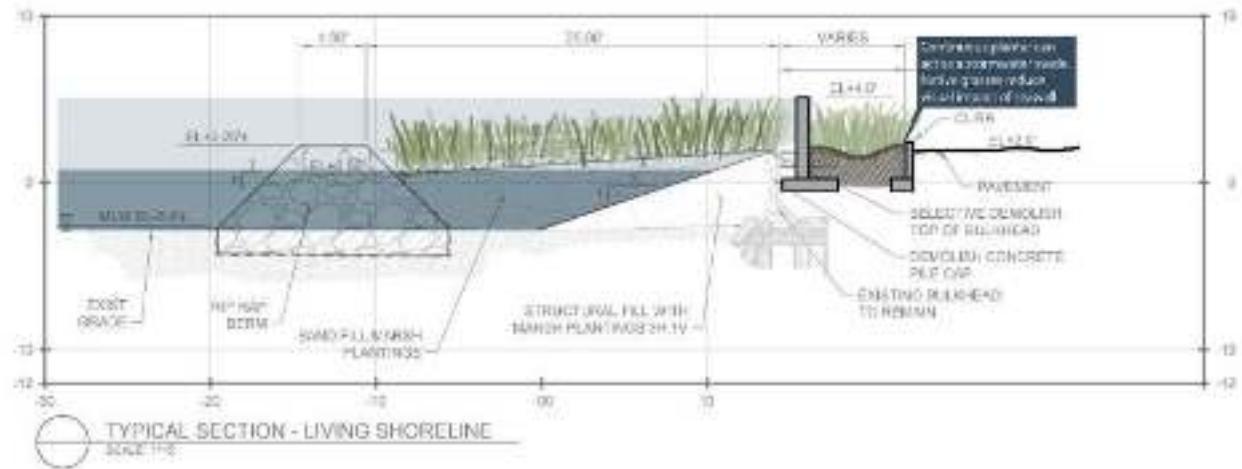
DCR Community Flood Preparedness Fund Application for Richmond-Surrey Crescent  
SUBJECT: Shoreline Improvement Project

DATE: 1/23/25

The section of the Larchmont neighborhood along Richmond Crescent, Surrey Crescent, and adjacent streets has long been a hotspot for tidal flooding, including “nuisance” or “sunny day” flooding, as well as from coastal storm events. While the future construction of the Coastal Storm Risk Management project’s Lafayette Surge Barrier will provide protection during larger coastal events, this low-lying location is an example where intermediate interventions will be required for smaller storms and annual King Tides.

The Richmond-Surrey Crescent Shoreline Improvement project, currently under design by the Department of Public Works, will work to address flooding by installing a low knee wall and berm features, as well as backflow valves, preventing flooding onto neighborhood streets and properties during full moons and moderate storm events. The project will also tie into work currently underway for the DCIP grant-funded Hampton Blvd Drainage Improvement project to provide an even higher level of protection for this important transportation corridor. To address a failing concrete bulkhead along much of Richmond and Surrey Crescent which threatens eventual road collapse, the project will install an offshore combination of living shorelines and rock revetments. The marsh shorelines will tie into past wetland restoration projects at Myrtle Park and the Larchmont Library, and combined with oyster reefs installed on rock revetments, will serve as nature-based features for the Coastal Storm Risk Management project. The features of the project will also provide enhanced water quality and wildlife habitat, meeting goals of the Chesapeake Bay TMDL and Norfolk Green Infrastructure Plan. Attached figures provide additional information based off current design.

The Office of Resilience is proposing to apply for \$4,317,660 in grant funds from the Virginia Department of Conservation and Recreation’s (DCR) Community Flood Preparedness Fund. \$2,878,440 in match funds will be required. The project will meet goals of the CSRM and serve as a portion of the City’s local match. Grant funds would support both flood reduction and green infrastructure portions of the project.





# 2721 - Richmond-Surrey Crescent Flood Protection and Living Shoreline

## Application Details

**Funding Opportunity:** 2336-Virginia Community Flood Preparedness Fund - Project Grants - CY24 Round 5  
**Funding Opportunity Due Date:** Jan 24, 2025 11:59 PM  
**Program Area:** Virginia Community Flood Preparedness Fund  
**Status:** Editing  
**Stage:** Final Application  
  
**Initial Submit Date:**  
**Initially Submitted By:**  
**Last Submit Date:**  
**Last Submitted By:**

## Contact Information

### Primary Contact Information

**Name\*:** Mr. Justin Middle Name Shafer  
 Salutation First Name Last Name  
**Title:** Project Manager, Water Quality and Green Infrastructure  
**Email\*:** justin.shafer@norfolk.gov  
**Address\*:** 2223 McKann Avenue

Norfolk Virginia 23505  
 City State/Province Postal Code/Zip

**Phone\*:** (757) 823-4048 Ext.  
 Phone  
 ##### #####  
**Fax:** ##### #####

### Organization Information

**Name\*:** NORFOLK, CITY OF  
**Organization Type\*:** Local Government  
**Tax ID\*:** 546001455  
**Unique Entity Identifier (UEI)\*:** RS6DCM873FA3  
**Organization Website:** <https://www.norfolk.gov/>  
**Address\*:** 810 Union Street  
 Suite 1101

Norfolk	Virginia	23510-
City	State/Province	Postal Code/Zip

**Phone\*:** (757) 282-8383 Ext.

# # # # #

**Fax:** # # # # #

## VCFPF Applicant Information

### **Project Description**

**Name of Local Government\*:** City of Norfolk

Your locality's CID number can be found at the following link: [Community Status Book Report](#)

**NFIP/DCR Community Identification Number (CID)\*:** 510104

If a state or federally recognized Indian tribe,

**Name of Tribe:**

**Authorized Individual\*:** Patrick Roberts  
First Name Last Name

**Mailing Address\*:** 810 Union St

Address Line 1

Suite 1101

Address Line 2

Norfolk Virginia 23510  
City State Zip Code

**Telephone Number\*:** 757-664-4242

**Cell Phone Number\*:** 757-664-4242

**Email\*:** [citymgr@norfolk.gov](mailto:citymgr@norfolk.gov)

Is the contact person different than the authorized individual?

**Contact Person\*:** Yes

**Contact:** Justin Shafer  
First Name Last Name

501 Boush St

Address Line 1

Address Line 2

Norfolk Virginia 23510  
City State Zip Code

**Telephone Number:** 757-282-8383

**Cell Phone Number:** 757-282-8383

**Email Address:** [justin.shafer@norfolk.gov](mailto:justin.shafer@norfolk.gov)

Enter a description of the project for which you are applying to this funding opportunity

**Project Description\*:**

Low-income geographic area means any locality, or community within a locality, that has a median household income that is not greater than 80 percent of the local median household income, or any area in the Commonwealth designated as a qualified opportunity zone by the U.S. Secretary of the Treasury via his delegation of authority to the Internal Revenue Service. A project of any size within a low-income geographic area will be considered.

Is the proposal in this application intended to benefit a low-income geographic area as defined above?

**Benefit a low-income geographic area\*:** No

Information regarding your census block(s) can be found at [census.gov](#)

**Census Block(s) Where Project will Occur\*:** Tract 24 - Blocks 1010 - 1012, and 1017 - 1025; Tract 23 Blocks 1004 - 1005, 1020 - 1022, and 1025

**Is Project Located in an NFIP Participating Community?\***: Yes

**Is Project Located in a Special Flood Hazard Area?\***: Yes

**Flood Zone(s) (if applicable):** AE

**Flood Insurance Rate Map Number(s) (if applicable):** 5101040018H

## Eligibility CFPF - Round 4 - Projects

### **Eligibility**

Is the applicant a local government (including counties, cities, towns, municipal corporations, authorities, districts, commissions, or political subdivisions created by the General Assembly or pursuant to the Constitution or laws of the Commonwealth, or any combination of these)?

**Local Government?\***: Yes

Yes - Eligible for consideration

No - Not eligible for consideration

Does the local government have an approved resilience plan and has provided a copy or link to the plan with this application?

**Resilience Plan?\***: Yes

Yes - Eligible for consideration under all categories

No - Eligible for consideration for studies, capacity building, and planning only

If the applicant is not a town, city, or county, are letters of support from all affected local governments included in this application?

**Letters of Support?\***: N/A

Yes - Eligible for consideration

No - Not eligible for consideration

N/A- Not applicable

Has this or any portion of this project been included in any application or program previously funded by the Department?

**Previously Funded?\***: No

Yes - Not eligible for consideration

No - Eligible for consideration

Has the applicant provided evidence of an ability to provide the required matching funds?

**Evidence of Match Funds?\***: Yes

Yes - Eligible for consideration

No - Not eligible for consideration

N/A- Match not required

## Scoring Criteria for Flood Prevention and Protection Projects - Round 4

### **Scoring**

#### **Category Scoring:**

Hold CTRL to select multiple options

#### **Project Category?\***:

All hybrid approaches whose end result is a nature-based solution,Living shorelines and vegetated buffers,Wetland restoration

Is the project area socially vulnerable? (based on ADAPT Virginia's Social Vulnerability Index Score)

#### **Social Vulnerability Scoring:**

Very High Social Vulnerability (More than 1.5)

High Social Vulnerability (1.0 to 1.5)

Moderate Social Vulnerability (0.0 to 1.0)

Low Social Vulnerability (-1.0 to 0.0)

Very Low Social Vulnerability (Less than -1.0)

**Socially Vulnerable?\***: Very Low Social Vulnerability (Less than -1.0)

Is the proposed project part of an effort to join or remedy the community's probation or suspension from the NFIP?

**NFIP?\***: No

Is the proposed project in a low-income geographic area as defined below?

"Low-income geographic area" means any locality, or community within a locality, that has a median household income that is not greater than 80 percent of the local median household income, or any area in the Commonwealth designated as a qualified opportunity zone by the U.S. Secretary of the Treasury via his delegation of authority to the Internal Revenue Service. A project of any size within a low-income geographic area will be considered.

**Low-Income Geographic Area\*:** No

Projects eligible for funding may also reduce nutrient and sediment pollution to local waters and the Chesapeake Bay and assist the Commonwealth in achieving local and/or Chesapeake Bay TMDLs. Does the proposed project include implementation of one or more best management practices with a nitrogen, phosphorus, or sediment reduction efficiency established by the Virginia Department of Environmental Quality or the Chesapeake Bay Program Partnership in support of the Chesapeake Bay TMDL Phase III Watershed Implementation Plan?

**Reduction of Nutrient and Sediment Pollution\*:** Yes

**Pollution\*:**

Does this project provide ?community scale? benefits?

**Community Scale Benefits\*:** More than one census block

Expected Lifespan of Project

**Expected Lifespan of Project\*:** Over 20 Years

**Comments:**

While not in a low-income geographic area, the project will benefit all residents of Norfolk and the region by reducing frequency of flooding on Hampton Blvd, a major thoroughfare connecting regional military, education, port and medical facilities.

## Scope of Work - Projects - Round 4

### Scope of Work

**Upload your Scope of Work**

Please refer to Part IV, Section B. of the grant manual for guidance on how to create your scope of work

**Scope of Work\*:** [Richmond-Surrey Crescent Flood Protection and Living Shoreline Scope of Work.docx](#)

**Comments:**

### Budget Narrative

**Budget Narrative Attachment\*:** [Richmond-Surrey Crescent Flood Control and Living Shoreline Budget Narrative.docx](#)

**Comments:**

## Scope of Work Supporting Information - Projects

### Supporting Information - Projects

Provide population data for the local government in which the project is taking place

**Population\*:** 232995.00

Provide information on the flood risk of the project area, including whether the project is in a mapped floodplain, what flood zone it is in, and when it was last mapped. If the property or area around it has been flooded before, share information on the dates of past flood events and the amount of damage sustained

**Historic Flooding data and Hydrologic Studies\*:** [Norfolk Flooding Data and Hydrologic Studies Link.docx](#)

Include studies, data, reports that demonstrate the proposed project minimizes flood vulnerabilities and does not create flooding or increased flooding (adverse impact) to other properties

**No Adverse Impact\*:**

Include supporting documents demonstrating the local government's ability to provide its share of the project costs. This must include an estimate of the total project cost, a description of the source of the funds being used, evidence of the local government's ability to pay for the project in full or quarterly prior to reimbursement, and a signed pledge agreement from each contributing organization

**Ability to Provide Share of Cost\*:** [DCR CFPF 2024 - CM Document Transmittal Form - Signed.pdf](#)

A benefit-cost analysis must be submitted with the project application

**Benefit-Cost Analysis\*:**

Provide a list of repetitive loss and/or severe repetitive loss properties. Do not provide the addresses for the properties, but include an exact number of repetitive loss and/or severe repetitive loss structures within the project area

**Repetitive Loss and/or Severe Repetitive Loss Properties\*:**

Describe the residential and commercial structures impacted by this project, including how they contribute to the community such as historic, economic, or social value. Provide an exact number of residential structures and commercial structures in the project area

#### **Residential and/or Commercial Structures\*:**

Reduced flooding is assessed in, under, or immediately adjacent to 68 residential and 2 commercial structures in the impacted portion of the Larchmont/Edgewater neighborhood. At least 225 residential or commercial properties directly benefit from the project in terms of flood reduction to the property itself or increased ability to access the property through regularly flooded streets, with hundreds more indirectly benefiting from improved access. While the neighborhood is not a registered historic district, it does date to 1906 and remains an important source of market rate and affordable housing, both owner-occupied and rentals, for the city as a whole, but especially for nearby locations along Hampton Blvd such as Naval Station Norfolk, Old Dominion University, and Sentara Norfolk General Hospitals.

If there are critical facilities/infrastructure within the project area, describe each facility

#### **Critical Facilities/Infrastructure\*:**

Hampton Blvd is the most important piece of infrastructure supported by the project. Hampton Blvd is a major road running north-south through the eastern portion of Norfolk, connecting Interstates 264 and 664 via the Midtown Tunnel through Portsmouth to the south with Interstate 64 and 564 to the north. It is one of the busiest non-interstate roadways in southeastern Virginia due to the location of important regional assets along its corridor, including Naval Station Norfolk and numerous military facilities associated with the largest naval base in the world, as well as NATO Joint Force Command, Virginia Port Authority's Norfolk International Terminal (and Portsmouth Marine Terminal immediately on the south side of the Midtown Tunnel), Norfolk Southern's Lambert Point Yard, Old Dominion University, Eastern Virginia Medical School, and Sentara Norfolk General Hospital. In terms of regional and national security, commerce, and workforce, Hampton Blvd is one of the most important roadways in southeast Virginia.

A small sewer pump station along Richmond Crescent will also benefit from increased flood resilience, though past measure have reduces some risk already.

Explain the local government's financial and staff resources. How many relevant staff members does the local government have? To what relevant software does the local government have access? What are the local government's capabilities?

#### **Financial and Staff Resources\*:**

The City of Norfolk has numerous professional and operational staff across multiple departments to provide support for project and grant management. In particular, the Office of Resilience and Public Works Design Division have more than 15 engineers, scientists, and inspectors who focus on design, construction, and monitoring of flood reduction, waterfront structures, water quality projects, and green infrastructure projects, as well as contracting of City projects. Public Works Division of Environmental Storm Water Management has several crews dedicated to maintenance of hard infrastructure, including floodwalls, pipes, outfalls, and valves. Additionally, two crews are dedicated to maintenance of Best Management Practices, including living shorelines. The Department of Public Works has a dedicated Financial Management team who assist with project budget management, including a staff member who focuses on grants. Further high level grant, financial, and internal controls support are provided by dedicated teams in the Departments of Finance and Budget. Additional staff from the Bureau of Environmental Services support project inspection and permit compliance. Staff from the Department of Parks and Recreation support maintenance of open spaces and flood control features such as mowed berms.

The City uses a variety of specialized software to manage all aspects of projects.

Overall project management is through the E-Builder web application. Budgets are managed in the AFMS web application and linked to E-Builder. Grants are managed through the E-Civis web application and other internal software. Contracting is managed through the OpenGov web application. Assets and maintenance work orders are managed in the Lucity application and ArcGIS. Norfolk also regularly develops or partners on tools for internal analysis and resident education of focus areas, such as the TITAN and Waze-integrated Floodmap tool for real time flood risk awareness.

Identify and describe the goals and objectives of the project. Include a description of the expected results of the completed project and explain the expected benefits of the project. This may include financial benefits, increased awareness, decreased risk, etc.

#### **Goals and Objectives\*:**

The goals and objectives of the Richmond-Surrey Crescent Flood Protection and Living Shoreline project support final design and construction of a combination of flood protection and environmental enhancement efforts benefitting the critical Hampton Blvd corridor and a portion of the adjacent Larchmont-Edgewater community.

Goal 1: Reduce flooding along a section of Hampton Blvd and surrounding neighborhood streets, frequently impacted by "sunny day" lunar and wind-driven events, as well small coastal events

Goal 2: Restore wetland and oyster habitats in the Lafayette River

Goals 3: Stabilize a failing concrete bulkhead and eroding banks

Objective 1: Finalize the project design within 1 year of grant agreement signing

Objective 2: Construct project elements within 3 years of the grant agreement signing

Outline a plan of action laying out the scope and detail of how the proposed work will be accomplished with a timeline identifying expected completion dates.

Determine milestones for the project that will be used to track progress. Explain what deliverables can be expected at each milestone, and what the final project deliverables will be. Identify other project partners

**Approach, Milestones, and Deliverables\*:** [Richmond-Surrey Crescent Flood Control and Living Shoreline - Approach Milestones and Deliverables.docx](#)

Where applicable, briefly describe the relationship between this project and other past, current, or future resilience projects. If the applicant has received or applied for any other grants or loans, please identify those projects, and, if applicable, describe any problems that arose with meeting the obligations of the grant and how the obligations of this project will be met

**Relationship to Other Projects\*:**

The Richmond-Surrey Crescent Flood Control and Living Shoreline project meets goals of Norfolk's Resilience Strategy, Green Infrastructure Plan, Climate Action Plan, Comprehensive Plan, and TMDL Action Plan. The project will add to, support, and/or work in tandem with a variety of past, ongoing, and planned projects. The City has several projects underway to address various scales of flooding on Hampton Blvd, including the Lafayette Surge Barrier, a planned phase of the Norfolk Coastal Storm Risk Management project, in partnership with the Army Corps of Engineers. Once constructed, the surge barrier at the mouth of the Lafayette River is designed to close ahead of large coastal storm events, preventing catastrophic flooding. To meet regulatory requirements and ensure the long-term environmental health of the large Lafayette River ecosystem, the surge barrier will only close when storm surge inundation is expected to exceed an elevation of 4 ft on the North American Vertical Datum (NAVD). At a smaller scale, the currently under construction, Department of Defense-supported Hampton Blvd Drainage Improvement project will upgrade pipes and outfalls on Hampton Blvd around the Naval Facilities Engineering Systems Command Atlantic compound to reduce tailwater flooding through the storm drains and onto the streets during small ?sunny day? tidal or rainfall events, up to approximately elevation 2.5 ft NAVD. While the combined benefits of these projects will address many storm events, a gap remains where a moderate storm could overtop banks of the Lafayette River, flow overland and through storm drains upstream of valves, and flood Hampton Blvd and surrounding neighborhoods. These gaps between small solutions such as valves and large solutions such as floodwalls and surge barrier are found in locations throughout Norfolk and the region, and will expand in time due to sea level rise. The proposed project will provide an intermediate scale solutions to address this gap in flood protection. Living shoreline sections of the proposed project will tie into two previous wetland restoration project, the Myrtle Park project, constructed in 2013 by the City along Richmond Crescent, and the Birdsong Wetland, constructed in 1997 by community organizations behind the Larchmont Library as one of the first living shorelines in Virginia. The connections and increased marsh area will create greater overall benefits. The project will also protect the adjacent Elizabeth River Trail.

For ongoing projects or projects that will require future maintenance, such as infrastructure, flood warning and response systems, signs, websites, or flood risk applications, a maintenance, management, and monitoring plan for the projects must be provided

**Maintenance Plan\*:**

[Richmond-Surrey Crescent Flood Control and Living Shoreline Maintenance Plan.docx](#)

Describe how the project meets each of the applicable scoring criteria contained in Appendix B. Documentation can be incorporated into the Scope of Work Narrative

**Criteria\*:**

Eligible Projects: The planned project is a hybrid approach resulting in a nature based solution

Social Vulnerability Index Score: The immediate project area has Very Low SVI, however the project support Norfolk (and the region) as a whole, which has an average SVI score of Moderate.

Community Scale of Benefit: The project provides direct benefits to residents in Tract 24 - Blocks 1010 - 1012, and 1017 - 1025 and Tract 23 Blocks 1004 - 1005, 1020 - 1022, and 1025 and additional benefits city-wide to the many residents and businesses who use Hampton Blvd.

Expected Lifespan of Project: The project is being designed with sea level rise in mind and is expected to provide benefits for more than 20 years. The City also continues to research options to sustain living shoreline assets in the long-term to combat the impacts of sea level rise.

Remedy for NFIP probation or suspension: The City is not in probation or suspension status.

Proposed project part of a low-income geographic area: The project is not in a low-income area. Norfolk as a whole is low-income compared to the state and the project provides significant benefits to all users of Hampton Blvd.

Proposed project implements a Chesapeake Bay TMDL BMP: The project will install living shorelines, which will be tracked as Shoreline Management under the Chesapeake Bay TMDL BMP criteria.

## Budget

### Budget Summary

**Grant Matching Requirement\*:**

Projects that will result in hybrid solutions - Fund 60%/Match 40%

Is a match waiver being requested?

**Match Waiver Request**

No

Note: only low-income communities are eligible for a match waiver.

\*:

<b>Total Project Amount (Request + Match)*:</b>	\$7,196,100.00
	**This amount should equal the sum of your request and match figures
<b>REQUIRED Match Percentage Amount:</b>	\$2,878,440.00

## BUDGET TOTALS

Before submitting your application be sure that you meet the match requirements for your project type.

<b>Match Percentage:</b>	40.00%
	Verify that your match percentage matches your required match percentage amount above.
<b>Total Requested Fund Amount:</b>	\$4,317,660.00
<b>Total Match Amount:</b>	\$2,878,440.00
<b>TOTAL:</b>	\$7,196,100.00

### Personnel

Description	Requested Fund Amount	Match Amount	Match Source
No Data for Table			

### Fringe Benefits

Description	Requested Fund Amount	Match Amount	Match Source
No Data for Table			

### Travel

Description	Requested Fund Amount	Match Amount	Match Source
No Data for Table			

### Equipment

Description	Requested Fund Amount	Match Amount	Match Source
No Data for Table			

### Supplies

Description	Requested Fund Amount	Match Amount	Match Source
No Data for Table			

### Construction

Description	Requested Fund Amount	Match Amount	Match Source
Construct Hybrid Flood Protection and Living Shoreline	\$4,197,660.00	\$2,798,440.00	Cash
	<b>\$4,197,660.00</b>	<b>\$2,798,440.00</b>	

### Contracts

Description	Requested Fund Amount	Match Amount	Match Source
Finalize Design	\$120,000.00	\$80,000.00	Cash
	<b>\$120,000.00</b>	<b>\$80,000.00</b>	

**Maintenance Costs**

Description	Requested Fund Amount	Match Amount	Match Source
No Data for Table			

**PreAward and Startup Costs**

Description	Requested Fund Amount	Match Amount	Match Source
No Data for Table			

**Other Direct Costs**

Description	Requested Fund Amount	Match Amount	Match Source
No Data for Table			

**Long and Short Term Loan Budget - Projects - VCFPF****Budget Summary**

Are you applying for a short term, long term, or no loan as part of your application?

If you are not applying for a loan, select "not applying for loan" and leave all other fields on this screen blank

**Long or Short Term\*:** Not Applying for Loan

**Total Project Amount:** \$0.00

**Total Requested Fund Amount:** \$0.00

**TOTAL:** \$0.00

**Salaries**

Description	Requested Fund Amount
No Data for Table	

**Fringe Benefits**

Description	Requested Fund Amount
No Data for Table	

**Travel**

Description	Requested Fund Amount
No Data for Table	

**Equipment**

Description	Requested Fund Amount
No Data for Table	

**Supplies**

Description	Requested Fund Amount
No Data for Table	

No Data for Table

***Construction***

Description	Requested Fund Amount
-------------	-----------------------

No Data for Table

***Contracts***

Description	Requested Fund Amount
-------------	-----------------------

No Data for Table

***Other Direct Costs***

Description	Requested Fund Amount
-------------	-----------------------

No Data for Table

**Supporting Documentation*****Supporting Documentation***

Named Attachment	Required	Description	File Name	Type	Size	Upload Date
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Detailed map of the project area(s) (Projects/Studies)

FIRMette of the project area(s) (Projects/Studies)

Historic flood damage data and/or images (Projects/Studies)

Alink to or a copy of the current floodplain ordinance

Maintenance and management plan for project

Alink to or a copy of the current hazard mitigation plan

Alink to or a copy of the current comprehensive plan

Social vulnerability index score(s) for the project area

Authorization to request funding from the Fund from governing body or chief executive of the local government

Signed pledge agreement from each contributing organization

Maintenance Plan

*Benefit-cost analysis must be submitted with project applications over \$2,000,000. in lieu of using the FEMA benefit-cost analysis tool, applicants may submit a narrative to describe in detail the cost benefits and value. The narrative must explicitly indicate the risk reduction benefits of a flood mitigation project and compares those benefits to its cost-effectiveness.*

Benefit Cost Analysis

Other Relevant Attachments

***Letters of Support***

Description	File Name	Type	Size	Upload Date
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No files attached.

**Resilience Plan*****Resilience Plan***

Description	File Name	Type	Size	Upload Date
No files attached.				



Initial  
KWS

## DOCUMENT TRANSMITTAL FORM

1/15/2025 | 3:31pm for All City Documents Requiring the City Manager's Approval

**\*PLEASE INDICATE IF THERE IS A LEGITIMATE DUE DATE BY WHICH THE CITY MANAGER MUST RESPOND\***

**DUE DATE:** 1/24/25 **RETURN COMPLETED DOCUMENT TO:** JUSTIN SHAFER

<b>DEPARTMENT:</b>	<b>RESILIENCE</b>
--------------------	-------------------

**TO BE COMPLETED FOR CONTRACTS, AGREEMENTS, RFPs, AND GRANTS:**

**TITLE: 2024 COMMUNITY FLOOD PREPAREDNESS FUND GRANT**

<b>PARTY</b> (Company and principal's names with which the City is entering into the agreement.)	Virginia Department of Conservation and Recreation (DCR)
<b>EFFECTIVE DATES</b> (Start & end dates)	May 1, 2025 – May 1, 2028 (estimated based on expected award announcement and agreement dates)
<b>TOTAL DOLLAR VALUE</b>	\$7,200,000 (\$4,320,000 grant award and \$2,880,000 match)
<b>FUNDING SOURCE</b> (Operating or capital budget; budget year; grant or other source. Show account information)	<b>SOURCE: RESILIENCE CIP</b> <b>ACCOUNT: 4000-2-4361-5501-FY24</b>
<b>TYPE OF DOCUMENT:</b> (New or extension)	New

**BRIEF DESCRIPTION: THE VIRGINIA DCR COMMUNITY FLOOD PREPAREDNESS FUND (CFPF) GRANT PROVIDES SUPPORT FOR LOCALITIES TO REDUCE THE IMPACT OF FLOODING THROUGH THE USE OF GREY-INFRASTRUCTURE, GREEN-INFRASTRUCTURE, AND HYBRID CONSTRUCTION PROJECTS, AS WELL AS PLANS AND STUDIES.**

**SUMMARY OF SCOPE OF SERVICE/ PROGRAM: THE CITY'S OFFICE OF RESILIENCE, IN COLLABORATION WITH THE DEPARTMENT OF PUBLIC WORKS, WILL FINALIZE DESIGN AND CONSTRUCT THE RICHMOND-SURREY CRESCENT SHORELINE IMPROVEMENT PROJECT, WHICH WILL CONSTRUCT SHORELINE STABILIZATION, FLOOD CONTROL, AND GREEN INFRASTRUCTURE FEATURES IN THE LARCHMONT NEIGHBORHOOD. THE PROJECT WILL PROVIDE FLOOD PROTECTION FOR SMALL TO MODERATE STORM EVENTS FOR THE NEIGHBORHOOD AND ADJACENT HAMPTON BLVD. IT WILL SUPPORT FLOOD RESILIENCE, WATER QUALITY, AND GREEN INFRASTRUCTURE GOALS, INCLUDING THE CSRM AND TMDL.**

<b>PROCUREMENT METHOD</b> (RFP, Sealed BID, etc.)	RFP
<b>CALL OUTS</b> (Indicate any unique circumstances regarding provisions such as procurement protest pending, emergency purchase or other time sensitivity, so forth, along with any other pertinent information)	



**Certificate of Satisfaction:** I (We) hereby certify that all reasonable due diligence has been performed to sufficiently develop the contents and implications of the attached document in a manner to protect and account to the public. Further, all City policies and procedures have been adhered to and therefore, I (we) recommend the City Manager execute this document.

A handwritten signature in black ink that appears to read "Justin Shuler".

1/15/25

Document Owner

A handwritten signature in black ink that appears to read "Kyle W. Spencer".

1/15/25

Department Head Signature

Date

**Review by DCM** Approve  Disapprove 

Douglas J. Beaver

1/15/2025 | 4:02

Deputy City Manager

Date

**Review by CM** Approve  Disapprove 

A handwritten signature in blue ink that appears to read "Michael S. Spencer".

1/17/2025 | 2:22 PM PST

PM EST  
E08E1B9EDF5642D...  
City Manager

Date

## Richmond-Surrey Crescent Flood Control and Living Shoreline

### Budget Narrative

The City of Norfolk seeks 60% grant funding to support proposed flood control and shoreline restoration efforts benefitting Hampton Blvd and the Larchmont/Edgewater neighborhood. An opinion of probable cost of construction (OPCC), completed by design consultants Moffatt & Nichol at the 65% design milestone, estimates the construction to cost approximately \$7,196,100. This includes a contingency to address unexpected changes during the remainder of design and increasing costs of construction due to nationwide economic conditions. This cost will fund remaining design efforts and all necessary materials, supplies, and labor for a qualified contractor to construct the project after a competitive bid process. The City proposes to fund their 40% match of \$2,878,440 through Capital Improvement Program funds for coastal resilience and waterfront improvements. The table below shows the consultant supplied OPCC. In addition to the direct funding as included match, Norfolk also commits to managing all remaining or necessary aspects of design, permitting, project management, inspection, and public outreach using existing qualified staff. No grant funds are sought for this nor match applied, leaving funds fully available for contracted design and construction work. Funds proposed as match are authorized through existing approved budgets and verified on the attached, signed City Manager Transmittal Form outlining grant and match funds for the current Community Flood Preparedness Fund grant cycle. If awarded grant funds, the City sets up a special revenue account that includes approved match funds and cash funds to cover awarded grant funding until reimbursement is received, allowing Norfolk to move projects forward without delays for reimbursement requests.

Application - City of Norfolk									
Name: Community Flood Preparedness Fund S. Resilient Virginia Rebuilding Loan Fund Detailed Budget Narrative									
Period of Performance: May 15, 2025 Through May 15, 2028 Submission Form: 109-025									
									Grand Total State Funding Request
									\$4,317,880
									Grand Total Local Shared Project
									\$2,878,440
									Federal Funding (if applicable)
									\$0
									Project Grand Total
									\$7,196,100
									Locality Cost Match
									\$0/40
Expenditure Category	Personnel	Travel	Office	Equipment	Supplies	Consultants	Indirect Costs	Other (list)	Total
Received Share (if applicable)									
Total Share						\$2,878,440			\$2,878,440
State Share - CFFF Grant									\$4,317,880
State Share - TIFII Match/Loan									
From Waterfront Master Plan									
Total	\$	\$	\$	\$	\$	\$7,196,100	\$	\$	\$7,196,100



moffatt & nichell

## **OPINION OF PROBABLE COST**

ACTIVITY AND LOCATION		CONSTRUCTION CONTRACT NO.		DATE
City of Norfolk Department of Public Works				15-Jan-25
PROJECT TITLE		ESTIMATED BY		JOB NUMBER
<b>Richmond &amp; Surrey Crescent Shoreline Improvements Community Flood Preparedness Fund</b>		Moffatt & Nichol - WBE / SEL		10390-57
ITEM DESCRIPTION				
<i>Erosion &amp; Sediment Control and Demolition</i>		Unit Cost	Unit	
Mobilization	\$ 400,000.00	LS		Quantity      Price
Safety Fence	\$ 6.00	LF		1 \$ 400,000
Construction Entrance	\$ 4,000.00	LS		2950 \$ 17,700
Temporary Inlet Protection	\$ 400.00	EA		1 \$ 4,000
Tree Protection	\$ 16.00	LF		12 \$ 4,800
Silt Fence	\$ 4.00	LF		290 \$ 4,640
Turbidity Curtain	\$ 22.25	LF		2950 \$ 11,800
Temporary Cofferdam (Porta Dam)	\$ 67,500.00	LS		100 \$ 2,225
Site Restoration and Demobilization	\$ 10,000.00	LS		1 \$ 67,500
			<b>Subtotal:</b>	1 \$ 10,000
				<b>\$ 522,665</b>
<i>Demolition</i>		Unit Cost	Unit	
Timber Dock	\$ 3,000.00	EA		Quantity      Price
Surrey Crescent Bulkhead	\$ 30.00	LF		4 \$ 12,000
Richmond Crescent Bulkhead	\$ 30.00	LF		750 \$ 22,500
Concrete Curb and Gutter	\$ 20.00	LF		1600 \$ 48,000
Asphalt Pavement	\$ 20.00	SF		1620 \$ 32,400
Catch Basin	\$ 1,500.00	EA		1000 \$ 20,000
Outfall pipe	\$ 500.00	EA		3 \$ 4,500
Remove Guardrail	\$ 20.00	LF		4 \$ 2,000
Utility Pole and Overhead Electrical	\$ 1,000.00	EA		30 \$ 600
			<b>Subtotal:</b>	5 \$ 5,000
				<b>\$ 147,000</b>
<i>New Construction</i>		Unit Cost	Unit	
VDOT Class II Riprap	\$ 180.00	TON		Quantity      Price
VDOT #2 Stone	\$ 100.00	TON		6648 \$ 1,196,712
Low Permeability Structural Fill	\$ 50.00	CY		703 \$ 70,290
Geotextile Fabric	\$ 6.00	SY		286 \$ 14,300
Geogrid	\$ 12.00	SY		10420 \$ 62,520
Excavation	\$ 10.00	CY		5050 \$ 60,600
Haul and Disposal of Excavated Material	\$ 55.00	CY		5000 \$ 50,000
Sand Fill	\$ 60.00	CY		5000 \$ 275,000
Coarse Sand Fill	\$ 50.00	CY		4488 \$ 269,280
Low Marsh Plantings	\$ 4.00	EA		1276 \$ 63,800
High Marsh Plants	\$ 4.00	EA		3490 \$ 13,960
Bermuda Sod	\$ 6.00	SF		3520 \$ 14,080
Top Soil	\$ 100.00	CY		6750 \$ 40,500
Goose Exclusion Fence	\$ 3.00	SY		4 \$ 400
Outfall Pipe	\$ 2,000.00	EA		3690 \$ 11,070
Utility Pile and Overhead Electrical	\$ 5,000.00	EA		4 \$ 8,000
Asphalt Pavement	\$ 150.00	TON		5 \$ 25,000
Concrete Curb and Gutter	\$ 50.00	LF		75 \$ 11,250
6" Perforated Drain Pipe	\$ 100.00	LF		1620 \$ 81,000
15" RCP Pipe	\$ 45.00	LF		2350 \$ 235,000
Armorflex® Concrete Block	\$ 15.00	SF		30 \$ 1,350
Sheet Pile Wall	\$ 450.00	LF		6750 \$ 101,250
			<b>Subtotal:</b>	630 \$ 283,500
<b>Concrete Cap for Sheet Pile Wall</b>	<b>\$ 430.00</b>	<b>LF</b>		<b>630 \$ 270,900</b>
<b>Concrete Wall</b>	<b>\$ 700.00</b>	<b>LF</b>		<b>1875 \$ 1,312,500</b>
			<b>Subtotal:</b>	<b>\$ 4,472,262</b>
<b>Sub Total -</b>				
Contingency - 30%				\$ 5,141,927.00
Escalation - 4% for 1.5 Years				\$ 1,542,578.10
Design				\$ 311,580.51
<b>TOTAL -</b>				<b>\$ 7,196,085.61</b>

## **Richmond-Surrey Crescent Flood Control and Living Shoreline Maintenance Plan**

The Richmond-Surrey Crescent Flood Control and Living Shoreline project will include a variety of green and grey infrastructure improvements that will be maintained through standard City of Norfolk policies and procedures. The majority of inspection and maintenance of stormwater infrastructure, flood barriers, and living shorelines is conducted by the Division of Environmental Storm Water Management. When necessary, guidance and more detailed monitoring and maintenance are provided by additional environmental staff from the Office of Resilience and Bureau of Environmental Services. All infrastructure is inspected on a routine basis or when resident concerns about blockages, damage, and other issues are reported through the MyNorfolk system. Pipes and structures, including valves, are inspected at least every five years using visual inspection or remote operated cameras. When needed, valves are cleaned by hand and pipes are cleaned using vacuum trucks. Flood barriers and revetments are inspected annually for signs of deterioration or unintended vegetation growth. Structural repairs are made when necessary and unintended vegetation is removed annually through use of brush mowing and herbicide. Living shorelines are considered Best Management Practices (BMPs) in the City of Norfolk and are inspected and maintained annually. Maintenance of the proposed shoreline will include treatment and removal of invasive species, removal of excessive rack accumulated in the marsh, and removal of sediment accumulated in unintended areas. When needed, replanting of vegetation, addition or grading of sand, and repair of other project elements such as signage or rock sill is conducted. SOPs for each infrastructure type are attached in supporting documentation. All inspections and maintenance work orders are tracked in the City's Lucity work management system, with asset management integration through ArcGIS.



## **Richmond-Surrey Crescent Flood Protection & Living Shoreline**

### **Scope of Work**

#### **Needs and Problems:**

The City of Norfolk seeks support for construction of flood protection, shoreline stabilization, and living shoreline features to increase resilience of Hampton Blvd and adjacent areas of the Larchmont-Edgewater neighborhood.

Hampton Blvd is a major road running north-south through the eastern portion of Norfolk, connecting Interstates 264 and 664 via the Midtown Tunnel through Portsmouth to the south with Interstate 64 and 564 to the north. It is one of the busiest non-interstate roadways in southeastern Virginia due to the location of important regional assets along its corridor, including Naval Station Norfolk and numerous military facilities associated with the largest naval base in the world, as well as NATO Joint Force Command, Virginia Port Authority's Norfolk International Terminal (and Portsmouth Marine Terminal immediately on the south side of the Midtown Tunnel), Norfolk Southern's Lambert Point Yard, Old Dominion University, Eastern Virginia Medical School, and Sentara Norfolk General Hospital. In terms of regional and national security, commerce, and workforce, Hampton Blvd is one of the most important roadways in southeast Virginia.

Unfortunately, as with many roadways in Hampton Roads, portions of Hampton Blvd are prone to flooding. In particular, the section north of Old Dominion University and south of the Lafayette River, adjacent to the Larchmont/Edgewater community and Naval Facilities Engineering Systems Command Atlantic compound, is regularly documented by local, and occasionally national, news as a highly flood prone spot. Approximately a half-mile section of Hampton Blvd is flooded during major coastal storm events, making it impassable. Even during more frequent "sunny day" flooding resulting from seasonal lunar cycles and smaller or offshore storm events, sections of the road become nearly impassable, severely impacting traffic. The City of Norfolk has several projects underway to address various scales of flooding on Hampton Blvd, including the Lafayette Surge Barrier, a planned phase of the Norfolk Coastal Storm Risk Management project, in partnership with the Army Corps of Engineers. Once constructed, the surge barrier at the mouth of the Lafayette River is designed to close ahead of large coastal storm events, preventing catastrophic flooding. To meet regulatory requirements and ensure the long-term environmental health of the large Lafayette River ecosystem, the surge barrier will only close when storm surge inundation is expected to exceed an elevation of 4 ft on the North American Vertical Datum (NAVD). At a smaller scale, the currently under construction, Department of Defense-supported Hampton Blvd Drainage Improvement project will upgrade pipes and outfalls on Hampton Blvd around the Naval Facilities Engineering Systems Command Atlantic compound to reduce tailwater flooding through the storm drains and onto the streets during small "sunny day" events, up to approximately 2.5

ft NAVD. While the combined benefits of these projects will address many storm events, a gap remains where a moderate storm could overtop banks of the Lafayette River, flow overland and through storm drains upstream of valves, and flood Hampton Blvd and surrounding neighborhoods. These gaps between small solutions such as valves and large solutions such as floodwalls and surge barrier are found in locations throughout Norfolk and the region, and will expand in time due to sea level rise.

Intermediate scale solutions to address gaps in flood protection are essential for long term success of the region.

To address flooding along Hampton Blvd and in the adjacent Larchmont-Edgewater neighborhood, the City of Norfolk proposes to utilize a hybrid green-grey infrastructure solution. A 100 year old, failing concrete bulkhead along Richmond Crescent and Surrey Crescent will be partially removed and replaced by a combination of living shoreline and oyster-set riprap revetment, providing wave attenuation. Living shoreline sections of the project will tie into two previous wetland restoration project, the Myrtle Park project, constructed in 2013 by the City along Richmond Crescent, and the Birdsong Wetland, constructed in 1997 by community organizations behind the Larchmont Library as one of the first living shorelines in Virginia. The connections and increased marsh area will create greater overall benefits. Behind the shoreline features, a low knee wall and berm system will be constructed to elevation 4 ft NAVD, with french drain systems to enhance localized ponding from rainfall and minor overtopping of the barriers. Lastly, backflow prevention valves will be placed on any outfalls lacking them. Living shorelines and oyster reefs will support City, State, and Chesapeake Bay water quality and wildlife habitat goals, while also providing wave attenuation to reduce maintenance and adjacent hard infrastructure. The knee wall and valves will reduce tidal flooding from “sunny-day” lunar and wind events, as well as small coastal storms, and in tandem with other ongoing flood reduction efforts such as the Norfolk CSRM Lafayette Surge Barrier and Hampton Blvd Drainage Improvement project, demonstrates Norfolk’s commitment to layered resilience.

While residents of Norfolk and the region as a whole will benefit from flood reduction on Hampton Blvd, the most direct daily benefit from the proposed project will be in Larchmont-Edgewater, a well-established neighborhood located along the Lafayette River on the targeted stretch of Hampton Blvd. Established from agricultural land starting in 1906, the community was eventually annexed into the City of Norfolk in 1923. Consisting of primarily original single-family homes, Larchmont-Edgewater has long provided a mixture of market rate and affordable housing, both owner-occupied and rentals, for major economic drivers along Hampton Blvd. Neighborhood roads are flooded on a monthly basis, leading to access issues and wear and tear on vehicles. Less often, flood waters impact private properties, including structures. At least 225 parcels will see direct flood reduction to the property, including to physical structures in many cases, or to direct driveway access in other cases, with lesser access benefits to other sections of the neighborhood. Larchmont/Edgewater is located in census tracts 23 and 24, both of which have Very Low Social Vulnerability due to the long-established economic strength of nearby commercial and institutional entities. While the immediate neighborhood has low economic stress, the city of Norfolk overall is a low-income community compared to the rest of the state, with a 2022 city-wide median household income of \$56,244 versus a state-wide median household income of \$80,615. Based off the direct project benefits most directly supporting a community with Very Low Social Vulnerability, in this application we have classified our request as a 60%/40% split, but we appreciate consideration of a lesser match based off the overall economic status of Norfolk and the large regional benefit. The

proposed project will strengthen the city and region as a whole by increasing flood resilience of the critical Hampton Blvd corridor, one of the busiest roads in southeast Virginia.

### **Goals and Objectives:**

The goals and objectives of the Richmond-Surrey Crescent Flood Protection and Living Shoreline project support final design and construction of a combination of flood protection and environmental enhancement efforts benefitting the critical Hampton Blvd corridor and a portion of the adjacent Larchmont-Edgewater community.

Goal 1: Reduce flooding along a section of Hampton Blvd and surrounding neighborhood streets, frequently impacted by “sunny day” lunar and wind-driven events, as well small coastal events

Goal 2: Restore wetland and oyster habitats in the Lafayette River

Goals 3: Stabilize a failing concrete bulkhead and eroding banks

Objective 1: Finalize the project design within 1 year of grant agreement signing

Objective 2: Construct project elements within 3 years of the grant agreement signing

### **Work Plan:**

Preliminary design of the Richmond-Surrey Crescent Flood Protection and Living Shoreline project is underway by Moffatt & Nichol, an on-call City consultant, and final design is expected to be completed by Spring 2026. Management of the design is being conducted by staff in the City's Department of Public Works, with support from the Office of Resilience. Once the design is finalized, approved through City site plan review, approved by the Army Corps of Engineers Norfolk District for elements associated with the Norfolk Coastal Storm Risk Management Project, and receives necessary permits, the construction phase will commence. This is anticipated in summer 2026 and will take up to two years. Construction management will be conducted by a combination of City staff from the Department of Public Works (Design Division and the Division of Environmental Storm Water Management), Office of Resilience, and the Bureau of Environmental Services, providing overlapping oversight to ensure a successful project. Overall grant management, reporting, and coordination will be conducted by the Office of Resilience.

Construction of the project will initiate with installation of appropriate erosion and sediment controls, as well as safety fencing, to exclude residents from the work zone along the shoreline right-of-way of Richmond and Surrey Crescent. Partial road closures along the residential streets are anticipated for construction access and laydown. The top third and any large chunks of the failing concrete bulkhead will be removed and properly disposed of. A combination of geotextiles, geogrids, and coarse sand will be replaced over existing subaqueous bottoms offshore of the bulkhead, followed by riprap stones to establish rock sills for living shoreline sections and as designed along revetment sections. Additional

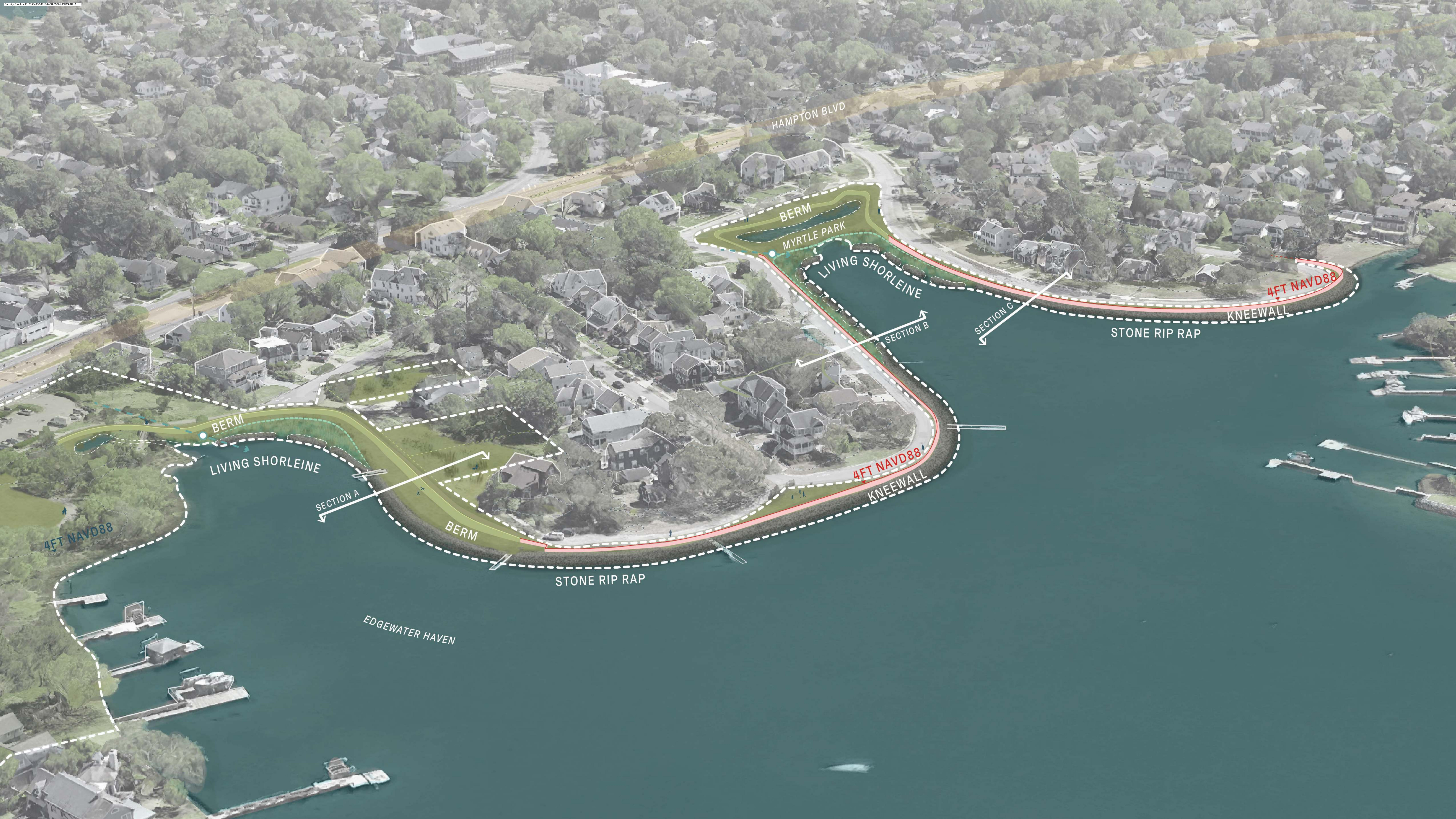
geotextile and marsh-appropriate sand will be placed between the bulkhead and rock sills along living shoreline sections. Care will be taken to avoid damage to the existing, healthy Myrtle Park and Birdsong Wetland projects at tie-in points. The new knee wall structure will be installed using forms over the remaining concrete bulkhead, using the new offshore structures and still-useable belowground portions for support. Behind the knee wall, french drains will be installed in a narrow median to allow localized drainage from rainfall and minor overtopping during storm events. Earthen berms with structural core and vegetated articulating block cover will be established in several sections in lieu of knee wall to better tie into the existing landscape. Where necessary, existing outfalls through the bulkhead will be upgraded, replaced, or consolidated to ensure appropriate drainage. Some outfalls are being addressed by the ongoing, adjacent Hampton Blvd Drainage Improvement projects, but in all cases where backflow prevention valves have not been installed, they will be included in upgrades. Final layers of sand will be added to bring the marsh to design elevation after any settlement. After major structural work and heavy equipment work is complete, replacement or repair of the asphalt roadway through portions of the work zone are anticipated. Lastly, during appropriate seasons, high and low marsh grasses such as *Spartina patens* and *Spartina alterniflora* will be planted on the living shoreline. As with all hard surfaces added in the Lafayette River, rapid colonization by oysters and other benthic organisms is expected on shoreline sills and riprap revetment. Based off past projects of this scale, primary construction is estimated to take up to 16 months, but additional time may be required to address any punch-list items or to allow planting at the correct time of year.

Final Completion of construction will serve as the primary deliverable for the project to meet grant goals. At final completion, the shoreline portion of the project will be entered into the City's asset management system as a Best Management Practice (BMP), initiating annual inspection and maintenance by the Division of Environmental Storm Water Management under their BMP Maintenance SOP and MS4 permit requirement. Shoreline portions associated with the Norfolk Coastal Storm Risk Management System will also be monitored by the Office of Resilience. The knee wall, outfalls, pipes, and valves will be added to the GIS and work management systems in the Department of Public Works for ongoing inspection and maintenance. Staff from Office of Resilience will continue to support Department of Public Works in all aspects of post-construction monitoring, inspection, and maintenance. The City has significant experience with all project elements and maintenance activities will include annual inspection of knee wall and shoreline, routine inspection and cleaning of pipes, valves and outfalls, replanting of marsh vegetation if needed, removal of excessive rack and litter from the marsh, and repair of rock sill or revetment in the event they are damaged. Additionally, the project will include a minimum one-year contractor warranty, under which issues such as vegetation loss or major sand displacement will be addressed. Lastly, over the long term, Norfolk is reviewing options to sustain shoreline projects in place through beneficial re-use of dredge spoils, such as thin-layer placement on existing marshes. The City is dedicated to managing both its green and grey infrastructure for sustained layered resilience.

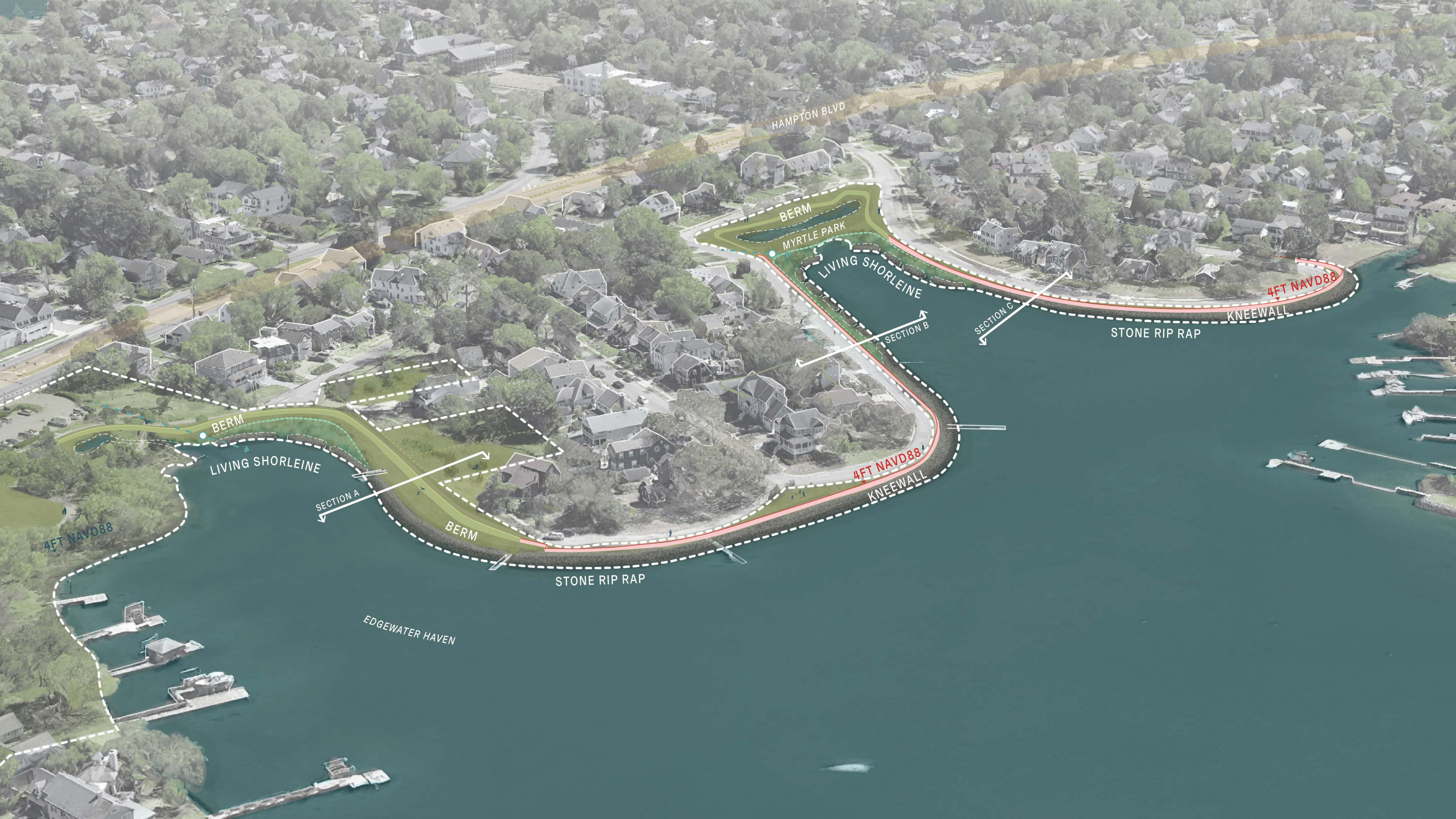
#### **Evaluation:**

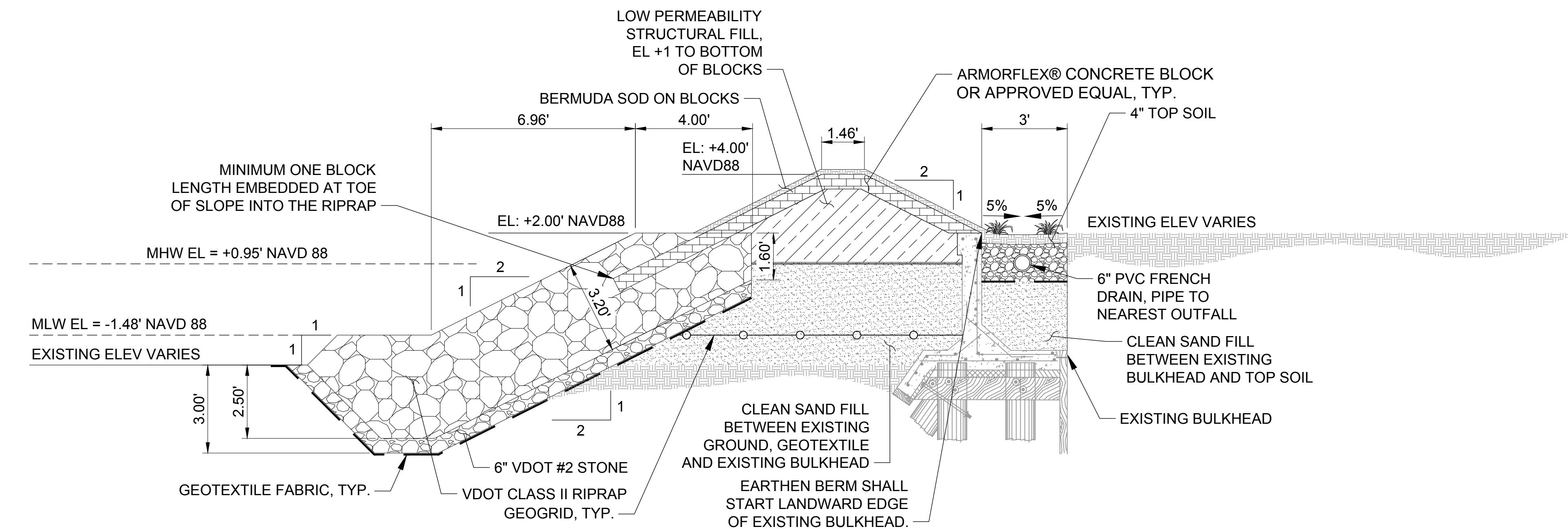
Success of the project will be measured initially be completion of construction to match the engineered design. This will ensure the calculated flood reduction, wave attenuation, water quality improvement, and habitat increase values are met per the effectiveness goals of the project. Meetings between the

project team and inspections prior to construction, throughout construction, prior to plant installation, at Substantial Completion, and at Final Completion will provide numerous opportunities to answer questions, discuss any proposed modifications due to site conditions, and review progress. As-built surveys will be collected to ensure correct structural elevations and marsh grades have been established for successful flood reduction, plant growth and wave attenuation. For a minimum one year after Final Completion, warranty inspections will be conducted by the contractor and City team, allowing plans to be established to address any short-term deficiencies. Monitoring and inspections during and after the warranty period will include visual inspection for major issues, haphazard random plant biomass survey and review of oyster spat set on the rock sill. As with all flood reduction projects, Norfolk will assess the overall performance and benefits during any storm events to continue adding to nationwide research on enhancing hybrid features for these goals.

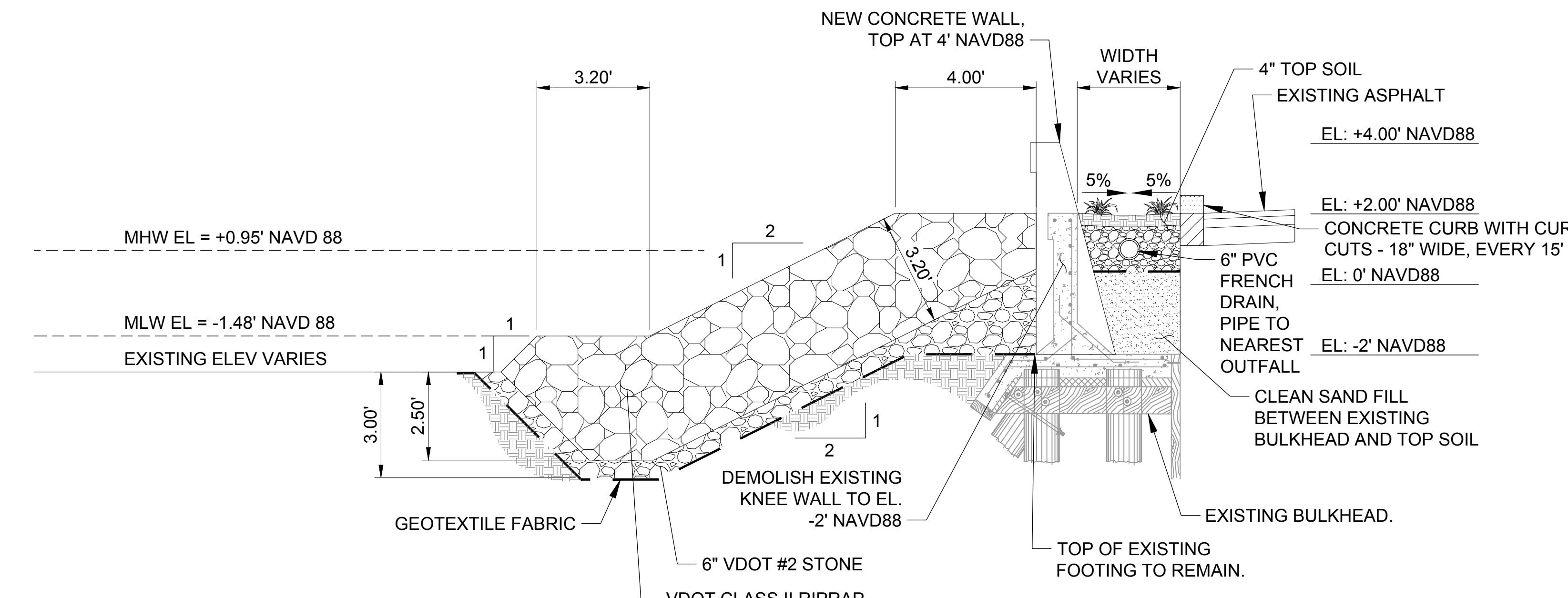
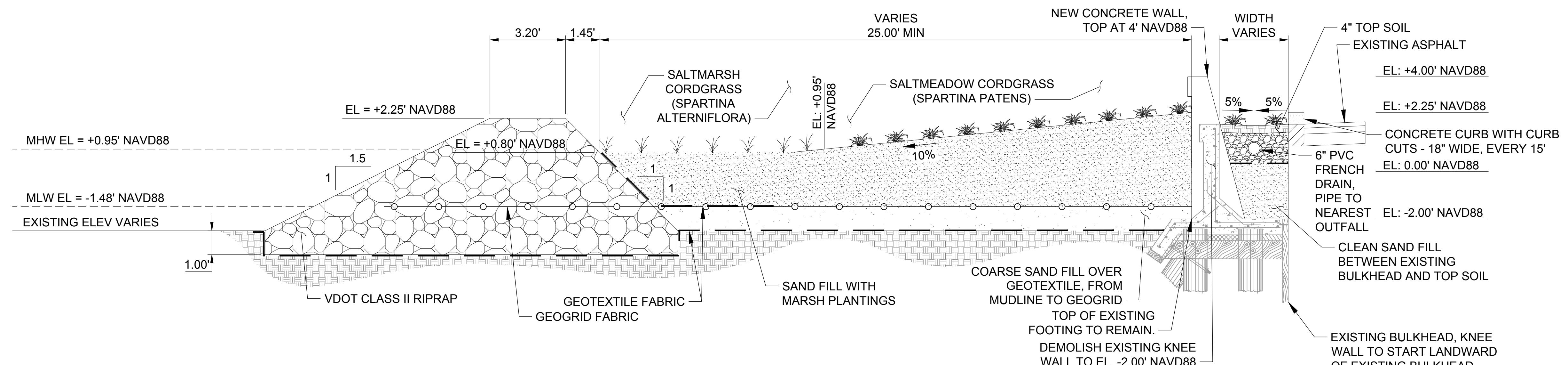








A-A

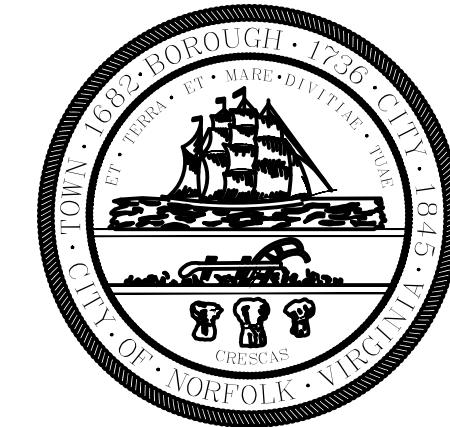




LOCATION MAP  
NTS

# RICHMOND & SURREY CRESCENT SHORELINE IMPROVEMENTS

CITY OF NORFOLK, VIRGINIA  
SITE PLAN



**City of  
Norfolk**  
Department of Public Works

BEFORE YOU DIG,  
CALL  
"MISS UTILITY"  
OF VIRGINIA  
811



**FLOOD ZONE STATEMENT**  
THE SITES WITHIN THIS PROJECT APPEAR  
TO FALL IN FLOODZONES "AE (EL 10.0)", "AE  
(EL 9.0)" AS SHOWN ON PANEL 0018H OF THE  
FLOOD INSURANCE RATE MAPS FOR THE  
CITY OF NORFOLK, COMMUNITY NO.: 510104,  
DATED FEBRUARY 17, 2017.

**RESILIENCE QUOTIENT COMPLIANCE:**  
THIS PROJECT DOES NOT CONTAIN A  
BUILDING ELEMENT AND IS EXEMPT FROM  
THE RESILIENCE QUOTIENT.

## GENERAL NOTES

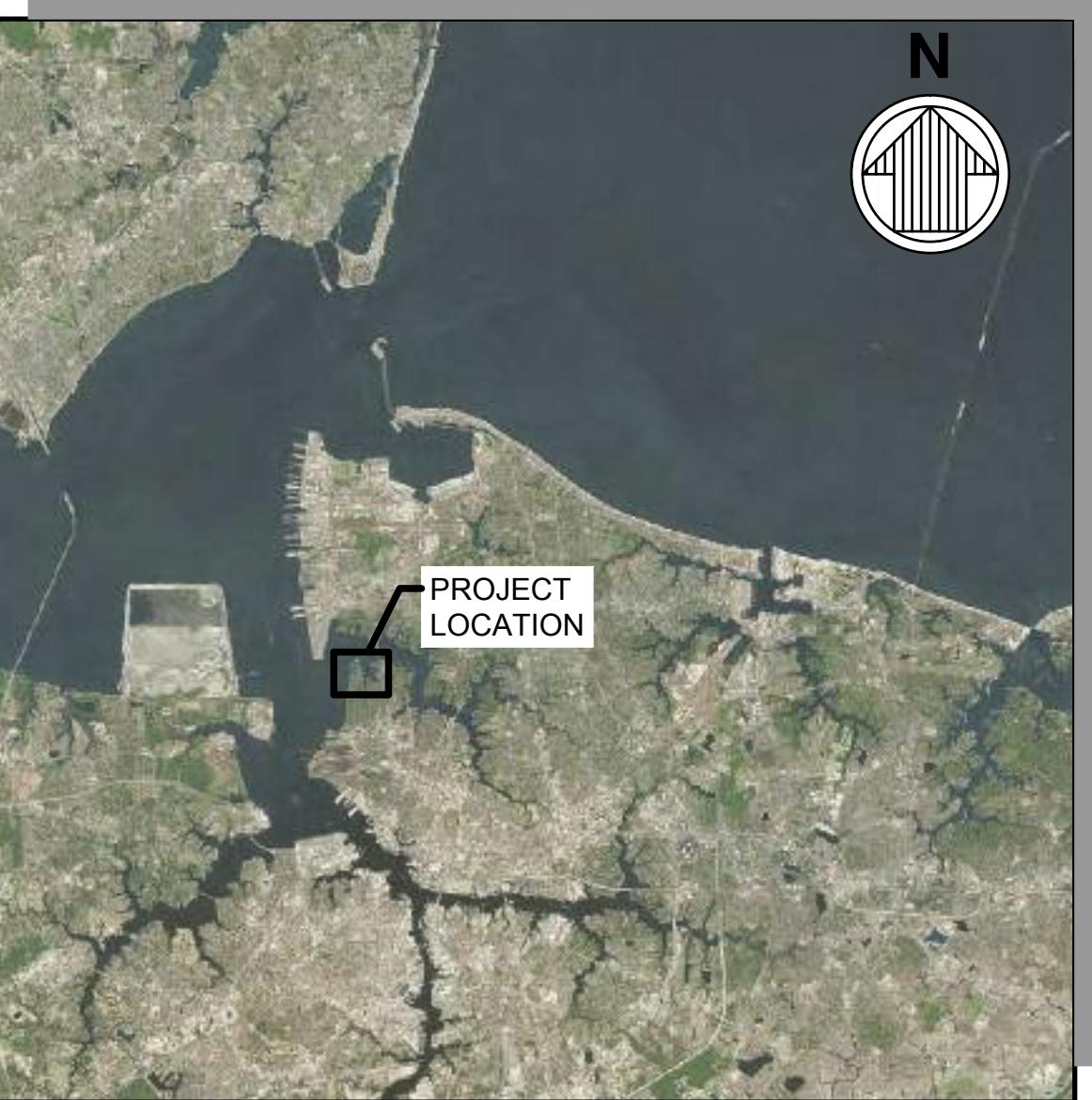
- CONTACT MISS UTILITY AT 811 AT LEAST THREE (3) WORKING DAYS IN ADVANCE OF THE PLANNED WORK.
- CONTRACTOR IS TO INSTALL ALL UTILITIES TO THE TOLERANCE REQUIRED BY THE CITY OF NORFOLK AND AS SHOWN ON THE PLANS SPECIFICALLY:  
  
ALL STORM DRAINAGE SHALL BE INSTALLED WITHIN 0.10' (ONE TENTH OF A FOOT) OF THE ELEVATION SHOWN ON THE PLAN OR AS SPECIFIED IN WRITING BY THE CITY.  
  
MINIMUM STORM SEWER SLOPE SPECIFIED ON THE PLAN ARE ABSOLUTE MINIMUM; LESSER SLOPE WILL NOT BE ACCEPTED UNLESS IN WRITING BY THE CITY.
- CONTRACTOR TO BE RESPONSIBLE FOR ALL CORRECTION COST (I.E> PLAN REVISION, PHYSICAL CORRECTION, ETC.) REQUIRED AS A RESULT OF INSTALLATION NOT MEETING THE TOLERANCE REQUIREMENT.
- CONTRACTOR SHALL CONTACT THE CITY OF NORFOLK ENVIRONMENTAL STORMWATER MANAGEMENT AT (757) 823-4000 (48 HOURS NOTICE) FOR A PRE-CONSTRUCTION CONFERENCE AND INSPECTION REQUIREMENTS WHEN BMP IS PROPOSED AN/OR TIE-IN TO CITY STORM DRAIN SYSTEM.
- THE CONTRACTOR SHALL CONTACT THE CITY OF NORFOLK, BUREAU OF ENVIRONMENTAL SERVICES AT 757-664-4368 AT LEAST 48 HOURS PRIOR TO ANY LAND DISTURBANCE ACTIVITY SO THAT A LAND DISTURBING PERMIT CAN BE ISSUED, AND PRE-CONSTRUCTION CONFERENCE CAN BE SCHEDULED.
- THE CONTRACTOR SHALL CONTACT THE CITY OF NORFOLK, URBAN FORESTER AT 757-823-4037 TO SCHEDULE A MEETING ON SITE TO DISCUSS TREE PROTECTION PRIOR TO ANY LAND DISTURBING ACTIVITY.
- THIS PROPERTY IS LOCATED IN THE CHESAPEAKE BAY PRESERVATION AREA (C.B.P.A.) AND IS SUBJECT TO CERTAIN DEVELOPMENT REQUIREMENTS AND LIMITATIONS. NO TREE REMOVAL, SHRUB REMOVAL, LAND DISTURBANCE OR CONSTRUCTION ACTIVITY CAN BE COMMENCED WITHOUT PRIOR APPROVAL FROM THE CITY OF NORFOLK. PLEASE CONTACT THE BUREAU OF ENVIRONMENTAL SERVICES AT 757-664-4368 FOR FURTHER INFORMATION.
- THE STORMWATER MANAGEMENT/BMP AND ASSOCIATED STORMWATER CONVEYANCE SYSTEM(S) AS PROPOSED FOR THIS PROJECT WILL REQUIRE THE SUBMITTAL, REVIEW AND APPROVAL OF A RECORD DRAWING (AS-BUILT) AND CONSTRUCTION CERTIFICATION PRIOR TO RELEASE OF THE CO. RECORD DRAWING AND CONSTRUCTION CERTIFICATION IS REQUIRED TO BE RECORDED AND CHECK BY A LICENSED SURVEYOR.

## RESPONSIBLE LAND DISTURBER (RLD) DESIGNATION

THE FOLLOWING PERSON XXXXXXXXXXXXXXXXX (PRINT)  
(SIGN) IS IDENTIFIED AS THE  
RESPONSIBLE LAND DISTURBER WHO WILL BE IN CHARGE OF AND  
RESPONSIBLE FOR CARRYING OUT THE LAND DISTURBING ACTIVITY. THIS  
PERSON MEETS THE APPLICABLE REQUIREMENTS OF VIRGINIA CODE SECTION  
10.1-663 AND 10.1-666 BY VIRTUE OF THE FOLLOWING (CHECK THE CATEGORY  
THAT APPLIES):

- RESPONSIBLE LAND DISTURBER CERTIFICATE
- DCR CERTIFICATION FOR COMBINED ADMINISTRATOR,  
ADMINISTRATOR, PLAN REVIEWER, INSPECTOR, OR CONTRACTOR
- VA PROFESSIONAL ENGINEER, LAND SURVEYOR, LANDSCAPE  
ARCHITECT, OR ARCHITECT

UPON AWARD OF THE CONTRACT AND BEFORE ANY LAND DISTURBING  
ACTIVITY CAN BEGIN, THE CONTRACTOR SHALL EXECUTE AND SUBMIT A  
RESPONSIBLE LAND DISTURBER NOTIFICATION FORM TO THE DEPARTMENT OF  
PLANNING, ENVIRONMENTAL SERVICES, ROOM 508, CITY HALL BUILDING, 810  
UNION STREET, NORFOLK VA 23510 TEL: (757) 664-4368 AWARD OF THE  
CONTRACT WILL RELIEVE THE ABOVE SIGNER OF ALL RESPONSIBILITY.



VICINITY MAP  
NTS



E					
D					
C					
B					
A					

<b>RICHMOND &amp; SURREY CRESCENT SHORELINE IMPROVEMENTS</b>	<b>COVER SHEET</b>
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Designed by: IB	Date: 2024-08-12	Rev: 0
Drawn by: JAD	Checked by: HB	Man. Proj. No.: 10393-57
Reviewed by: IRB/RTMAN		Drawing date: 8/26/2024 1:55 PM
Submitted by: moffatt & nichol		Drawing Scale: AS SHOWN 1:1 (D SHEET)
Per scale: moffatt & nichol		Per scale: IRB/RTMAN

<b>moffatt &amp; nichol</b>	<b>PREPARED FOR:</b> CITY OF NORFOLK DEPARTMENT OF PUBLIC WORKS
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<b>Sheet Reference No. G-001</b>
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<b>PROJECT INFORMATION</b>	
EXISTING USE:	EXISTING RIGHT OF WAY
PROPOSED USE:	N/A
GPN NUMBER:	N/A
INSTRUMENT NUMBER:	ZONE: SUBURBAN CHARACTER DISTRICT
ZONE:	CRO (COASTAL RESILIENCE OVERLAY)
CHARACTER DISTRICT:	N/A
OVERLAY DISTRICT:	N/A
GROSS FLOOR AREA:	N/A
BUILDING TYPE:	N/A
BUILDING HEIGHT:	N/A
SEWERSHED: (HRSD/NORFOLK)	N/A
DOMESTIC PEAK WATER DEMAND	N/A
DOMESTIC WATER METER SIZE	N/A
FIRE WATER DEMAND	N/A

<b>VIRGINIA STORMWATER MANAGEMENT PROGRAM</b>	
APPLICABLE DESIGN CRITERIA:	PART II B "SAFE HARBOR" X OTHER (EXEMPTION, EXCEPTION, WAIVER)
<b>SWM PLAN EXEMPTION REQUEST (CODE OF VIRGINIA): NA</b>	
<b>SWM PLAN EXCEPTION REQUEST (ADMINISTRATIVE CODE): N/A</b>	
<b>SWM PLAN LINEAR DEVELOPMENT WAIVER (GUIDANCE MEMO NO. 15-2003):</b>	

SITE AREA	## AC
DISTURBED AREA	## AC
EXISTING IMPERVIOUS AREA	## AC
EXISTING PERVIOUS AREA	## AC
EXISTING OPEN SPACE AREA	## AC
PROPOSED IMPERVIOUS AREA	## AC
PROPOSED PERVIOUS AREA	## AC
PROPOSED OPEN SPACE AREA	## AC
WATERSHED/HUC8	VAH06 ELIZABETH RIVER/02080208

<b>APPROVAL</b>		
APPROVED DEPARTMENT OF PLANNING & COMMUNITY DEVELOPMENT	SIGNATURE	DATE
APPROVED ENGINEERING MANAGER	SIGNATURE	DATE

<b>FOR 65% SUBMITTAL ISSUED: 2024-08-12 NOT TO BE USED FOR CONSTRUCTION</b>
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4	G-004	CITY OF NORFOLK GENERAL NOTES
5	G-005	ROW MANAGEMENT STANDARD SITE PLAN NOTES
6	G-101	OVERALL PLAN
7	CE-101	EXISTING CONDITIONS PLAN (SHEET 1 OF 7)
8	CE-102	EXISTING CONDITIONS PLAN (SHEET 2 OF 7)
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16	CD-103	DEMOLITION AND EROSION CONTROL PLAN (SHEET 3 OF 7)
17	CD-104	DEMOLITION AND EROSION CONTROL PLAN (SHEET 4 OF 7)
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19	CD-106	DEMOLITION AND EROSION CONTROL PLAN (SHEET 6 OF 7)
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30	C-302	SECTIONS (SHEET 2 OF 6)
31	C-303	SECTIONS (SHEET 3 OF 6)
32	C-304	SECTIONS (SHEET 4 OF 6)
33	C-305	SECTIONS (SHEET 5 OF 6)
34	C-306	SECTIONS (SHEET 6 OF 6)
35	R-100	LARCHMONT BULKHEAD 07-1924

E

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C

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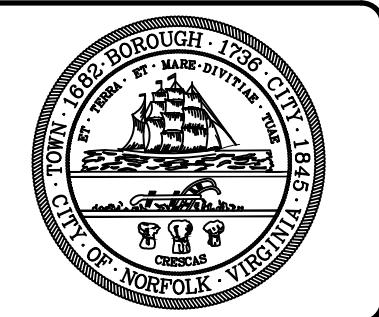
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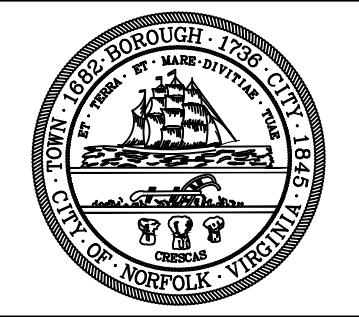
RICHMOND & SURREY CRESCENT SHORELINE IMPROVEMENTS	
SHEET INDEX	
Mark	Date
Description	Approved

Designed by:	IB	Rev:	2024-08-12
Drawn by:	JAD	Checked by:	MAN Project No: 1039-57
Reviewed by:			
Submitted by:	IRB/RTMAN	Drawing date:	
Moffatt & Nichol	101 W MAIN ST, SUITE 3000 NORFOLK, VA 23510 757-628-8222	Drawing Scale: AS SHOWN	1:1 (0 SHEET)
NORFOLK		Per scale:	Moffatt & Nichol

Sheet Reference No.	G-002
File: Q:\NORI\1039-5720\CAO\1\Active_Richmond_Surrey_Crescent Shoreline Improvements\1039-57-G-002_Protected\8/26/2024 1:55 PM by CASTILLO, CRISTIAN_Saved: 8/23/2024 11:36 AM by CASTILLO	INDEX: 2 OF 35

FOR 65% SUBMITTAL  
ISSUED: 2024-08-12  
NOT TO BE USED FOR CONSTRUCTION

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<p><b>ABBREVIATIONS</b></p> <table> <tbody> <tr><td>A</td><td>AIR, AMPERE or AMMETER</td><td>FH</td><td>FIRE HYDRANT</td><td>PSI</td><td>POUNDS PER SQUARE INCH</td></tr> <tr><td>AB</td><td>ANCHOR BOLT or AGGREGATE BASE</td><td>FIN</td><td>FINISH</td><td>PSIG</td><td>POUNDS PER SQUARE INCH GAGE</td></tr> <tr><td>ABAND</td><td>ABANDONED</td><td>FL</td><td>FLOW LINE</td><td>PT</td><td>POINT or POINT OF TANGENCY</td></tr> <tr><td>ABBR</td><td>ABBREVIATION</td><td>FND</td><td>FLUORESCENT</td><td>P&amp;T</td><td>PAINTED</td></tr> <tr><td>ABUT</td><td>ABUTMENT</td><td>FR</td><td>FOUNDATION</td><td>PV</td><td>PRESSURE AND TEMPERATURE</td></tr> <tr><td>ABV</td><td>ABOVE</td><td>FS</td><td>FUEL RETURN</td><td>PVC</td><td>POLYVINYL CHLORIDE</td></tr> <tr><td>AC</td><td>ASPHALT CONCRETE, AIR COMPRESSOR or ALTERNATING CURRENT</td><td>FT</td><td>FOOT or FEET</td><td>PVMT</td><td>PAVEMENT</td></tr> <tr><td>ACI</td><td>AMERICAN CONCRETE INSTITUTE</td><td>FU</td><td>FUSE</td><td>PWR</td><td>POWER</td></tr> <tr><td>ACP</td><td>ASBESTOS CEMENT PIPE</td><td>G</td><td>GAS</td><td>R</td><td>RADIUS or RIGID</td></tr> <tr><td>AGG</td><td>AGGREGATE</td><td>GA</td><td>GAGE</td><td>RAD</td><td>RADIUS or RADIAL</td></tr> <tr><td>AISC</td><td>AMERICAN INSTITUTE OF STEEL CONSTRUCTION</td><td>GAL</td><td>GALLON</td><td>RCP</td><td>REINFORCED CONCRETE PIPE</td></tr> <tr><td>ALUM</td><td>ALUMINUM</td><td>GALV</td><td>GALVANIZED</td><td>RECEP</td><td>RECEPTACLE</td></tr> <tr><td>AMPS</td><td>AMPERES</td><td>GB</td><td>GRADE BREAK</td><td>RED</td><td>REDUCER</td></tr> <tr><td>APPROX</td><td>APPROXIMATE</td><td>GI</td><td>GROUND FAULT INTERRUPTER</td><td>REINF</td><td>REINFORCING</td></tr> <tr><td>ASME</td><td>AMERICAN SOCIETY OF MECHANICAL ENGINEERS</td><td>GL</td><td>GALVANIZED IRON</td><td>REQD</td><td>REQUIRED</td></tr> <tr><td>ASTM</td><td>AMERICAN SOCIETY FOR TESTING AND MATERIALS</td><td>GND</td><td>GLASS</td><td>RET</td><td>RETAINING</td></tr> <tr><td>AWG</td><td>AMERICAN WIRE GAGE</td><td>GPM</td><td>GROUND</td><td>ROW</td><td>RIGHT OF WAY</td></tr> <tr><td>AWS</td><td>AMERICAN WELDING SOCIETY</td><td>GV</td><td>GALLONS PER MINUTE</td><td>RPM</td><td>ROTATION PER MINUTE</td></tr> <tr><td>AWWA</td><td>AMERICAN WATER WORKS ASSOCIATION</td><td>H</td><td>GATE VALVE</td><td>RT</td><td>RIGHT</td></tr> <tr><td>BAV</td><td>BALL VALVE</td><td>HB</td><td>HOSE BIBB</td><td>RUB</td><td>RUBBER</td></tr> <tr><td>BC</td><td>BEGIN CURVE or BARE COPPER</td><td>HD</td><td>HEAD</td><td>RV</td><td>RELEASE VALVE</td></tr> <tr><td>BCR</td><td>BEGIN CURB RETURN</td><td>HDR</td><td>HOLLOW METAL</td><td>RWL</td><td>RAIN WATER LEADER</td></tr> <tr><td>BF</td><td>BLIND FLANGE</td><td>HORIZ</td><td>HORIZONTAL</td><td>S</td><td>SEWER, SLOPE or SOUTH</td></tr> <tr><td>BFP</td><td>BACKFLOW PREVENTER</td><td>HP</td><td>HORSE POWER or HIGH PRESSURE</td><td>SAN</td><td>SANITARY</td></tr> <tr><td>BFV</td><td>BUTTERFLY VALVE</td><td>HPS</td><td>HIGH PRESSURE SODIUM</td><td>SB</td><td>SWAY BRACE</td></tr> <tr><td>BL</td><td>BASELINE</td><td>HR</td><td>HOUR</td><td>SCH</td><td>SCHEDULE</td></tr> <tr><td>BLDG</td><td>BUILDING</td><td>ID</td><td>INSIDE DIAMETER</td><td>SD</td><td>STORM DRAIN</td></tr> <tr><td>BLKG</td><td>BLOCKOUT</td><td>IN.</td><td>INCHES</td><td>SDR</td><td>STANDARD DIMENSION RATIO</td></tr> <tr><td>BM</td><td>BENCH MARK</td><td>INS</td><td>INSULATOR</td><td>SEC</td><td>SECONDARY</td></tr> <tr><td>BOS</td><td>BOTTOM of STEEL</td><td>INT</td><td>INTERIOR</td><td>SECT</td><td>SECTION</td></tr> <tr><td>BOT</td><td>BOTTOM</td><td>INV</td><td>INVERT</td><td>SF</td><td>SQUARE FOOT or FEET</td></tr> <tr><td>BR</td><td>BRASS</td><td>IPS</td><td>INSIDE PIPE SIZE</td><td>SHLDR</td><td>SHOULDER</td></tr> <tr><td>BTU</td><td>BRITISH THERMAL UNITS</td><td>JB</td><td>JUNCTION BOX</td><td>SHT</td><td>SHEET</td></tr> <tr><td>BW</td><td>BACK of WALK</td><td>JS</td><td>JUNCTION STRUCTURE</td><td>SIM</td><td>SIMILAR</td></tr> <tr><td>C</td><td>CONDUIT or CONTROL</td><td>KT</td><td>JOINT</td><td>SP</td><td>SPARE</td></tr> <tr><td>CA</td><td>CEMENT ASBESTOS or COMPRESSED AIR</td><td>L</td><td>KIPS PER SQUARE INCH</td><td>SPA</td><td>SPACE</td></tr> <tr><td>CAB</td><td>CRUSHED AGGREGATE BASE</td><td>LD</td><td>LOCAL DEPRESSION</td><td>SPEC</td><td>SPECIFICATIONS</td></tr> <tr><td>CB</td><td>CATCH BASIN</td><td>LF</td><td>LINEAR or LINEAL FEET</td><td>SQ</td><td>SQUARE</td></tr> <tr><td>CF</td><td>CUBIC FEET</td><td>LG</td><td>LONG</td><td>SS</td><td>STAINLESS STEEL or SANITARY SEWER</td></tr> <tr><td>C&amp;G</td><td>CURB and GUTTER</td><td>LT</td><td>LIGHT</td><td>STA</td><td>STATION</td></tr> <tr><td>CJ</td><td>CONSTRUCTION JOINT</td><td>LTG</td><td>LIGHTING</td><td>STD</td><td>STANDARD</td></tr> <tr><td>CL</td><td>CENTERLINE</td><td>M</td><td>MOTOR</td><td>STL</td><td>STEEL</td></tr> <tr><td>CLF</td><td>CHAIN LINK FENCE</td><td>MAS</td><td>MASONRY</td><td>STRUCT</td><td>STRUCTURE or STRUCTURAL</td></tr> <tr><td>CLG</td><td>CEILING</td><td>MATL</td><td>MATERIAL</td><td>SYM</td><td>SYMMETRICAL</td></tr> <tr><td>CLR</td><td>CLEAR</td><td>MAX</td><td>MAXIMUM</td><td>T</td><td>TANGENT</td></tr> <tr><td>CMP</td><td>CORRUGATED METAL PIPE</td><td>MECH</td><td>MECHANICAL</td><td>T&amp;B</td><td>TOP AND BOTTOM</td></tr> <tr><td>CMU</td><td>CONCRETE MASONRY UNIT</td><td>MET</td><td>METAL</td><td>TC</td><td>TOP of CURB</td></tr> <tr><td>CO</td><td>CLEANOUT or CONDUIT ONLY</td><td>MFTR</td><td>MANUFACTURE or MANUFACTURER</td><td>TELE</td><td>TELEPHONE</td></tr> <tr><td>COL</td><td>COLUMN</td><td>MH</td><td>MANHOLE</td><td>TEMP</td><td>TEMPERATURE or TEMPORARY</td></tr> <tr><td>CONC</td><td>CONCRETE</td><td>MHW</td><td>MEAN HIGH WATER</td><td>THD</td><td>THREAD</td></tr> <tr><td>COND</td><td>CONDUIT</td><td>MHHW</td><td>MEAN HIGHER HIGH WATER</td><td>THRU</td><td>THROUGH</td></tr> <tr><td>CONN</td><td>CONNECTOR</td><td>MIN</td><td>MINIMUM</td><td>TOS</td><td>TOP of STEEL</td></tr> <tr><td>CONST</td><td>CONSTRUCTION</td><td>MLW</td><td>MEAN LOW WATER</td><td>TOT</td><td>TOTAL</td></tr> <tr><td>CONT</td><td>CONTINUOUS or CONTINUE</td><td>MLLW</td><td>MEAN LOWER LOW WATER</td><td>TRANSV</td><td>TRANSVERSE</td></tr> <tr><td>COORD</td><td>COORDINATE</td><td>MON</td><td>MONUMENT</td><td>TRANSFMR</td><td>TRANSFORMER</td></tr> <tr><td>CT</td><td>COOPER TUBE, CERAMIC TILE or CURRENT TRANSFORMER</td><td>MSL</td><td>MEAN SEA LEVEL</td><td>TV</td><td>TELEVISION</td></tr> <tr><td>CU</td><td>CUBIC or COPPER</td><td>MTD</td><td>_MOUNTED</td><td>TW</td><td>TOP of WALL</td></tr> <tr><td>CV</td><td>CHECK VALVE</td><td>N</td><td>NORTH</td><td>TYP</td><td>TYPICAL</td></tr> <tr><td>D</td><td>DRAIN</td><td>NAVD</td><td>NORTH AMERICAN VERTICAL DATUM</td><td>UON</td><td>UNLESS OTHERWISE NOTED</td></tr> <tr><td>DET</td><td>DETAIL</td><td>NGVD</td><td>NATIONAL GEODETIC VERTICAL DATUM</td><td>UTIL</td><td>UTILITY</td></tr> <tr><td>DI</td><td>DUCTILE IRON</td><td>NIC</td><td>NOT IN CONTRACT</td><td>VAR</td><td>VARIABLE</td></tr> <tr><td>DIA</td><td>DIAMETER</td><td>NO.</td><td>NUMBER</td><td>VCP</td><td>VITRIFIED CLAY PIPE</td></tr> <tr><td>DIP</td><td>DUCTILE IRON PIPE</td><td>NOAA</td><td>NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION</td><td>VERT</td><td>VERTICAL</td></tr> <tr><td>DIM</td><td>DIMENSION</td><td>NPT</td><td>NATIONAL PIPE THREAD</td><td>W</td><td>WATER, WEST, WIDE or WIRE</td></tr> <tr><td>DN</td><td>DOWN</td><td>NTS</td><td>NOT TO SCALE</td><td>WD</td><td>WOOD</td></tr> <tr><td>DO</td><td>DITTO</td><td>OBS</td><td>OBSTRUCTION</td><td>WP</td><td>WEATHERPROOF or WATERPROOF</td></tr> <tr><td>DWGS</td><td>DRAWINGS</td><td>OC</td><td>ON CENTER</td><td>WT</td><td>WEIGHT</td></tr> <tr><td>E</td><td>EAST</td><td>OD</td><td>OUTSIDE DIAMETER</td><td>WWF</td><td>WELDED WIRE FABRIC</td></tr> <tr><td>EA</td><td>EACH</td><td>OG</td><td>ORIGINAL GRADE</td><td></td><td></td></tr> <tr><td>ECR</td><td>END CURB RETURN</td><td>OPNG</td><td>OPENING</td><td></td><td></td></tr> <tr><td>EF</td><td>EACH FACE</td><td>OPP</td><td>OPPOSITE</td><td></td><td></td></tr> <tr><td>EG</td><td>EXISTING GROUND</td><td>OS</td><td>OUTSIDE</td><td></td><td></td></tr> <tr><td>EJ</td><td>EXPANSION JOINT</td><td>P</td><td>POWER, POLE, PUMP or PIPE</td><td></td><td></td></tr> <tr><td>EL</td><td>ELEVATION</td><td>PB</td><td>PULL BOX</td><td></td><td></td></tr> <tr><td>ELECT</td><td>ELECTRICAL</td><td>PC</td><td>PIPE CLAMP, PRECAST CONCRETE or POINT of CURVATURE</td><td></td><td></td></tr> <tr><td>ELEV</td><td>ELEVATION</td><td>PCC</td><td>PORTLAND CEMENT CONCRETE</td><td></td><td></td></tr> <tr><td>ELL</td><td>ELBOW</td><td>PCF</td><td>POUND PER CUBIC FOOT</td><td></td><td></td></tr> <tr><td>EP</td><td>EDGE of PAVEMENT</td><td>PG</td><td>PRESSURE GAUGE</td><td></td><td></td></tr> <tr><td>EPR</td><td>ETHYLENE-PROPYLENE-RUBBER</td><td>PI</td><td>POINT of INTERSECTION</td><td></td><td></td></tr> <tr><td>EQUIP</td><td>EQUIPMENT</td><td>PL</td><td>PLATE or PROPERTY LINE</td><td></td><td></td></tr> <tr><td>ES</td><td>EACH SIDE</td><td>PLAS</td><td>PLASTIC or PLASTER</td><td></td><td></td></tr> <tr><td>EVC</td><td>END VERTICAL CURVE</td><td>PM</td><td>POWER MOUND or METER</td><td></td><td></td></tr> <tr><td>EW</td><td>EACH WAY or EXISTING WATER</td><td>PNL</td><td>PANEL</td><td></td><td></td></tr> <tr><td>EXIST.</td><td>EXISTING</td><td>POC</td><td>POINT of CONNECTION or POINT ON CURVE</td><td></td><td></td></tr> <tr><td>EXP</td><td>EXPANSION</td><td>PRESS</td><td>PRESSURE</td><td></td><td></td></tr> <tr><td>EXT</td><td>EXTERIOR</td><td>PS</td><td>PIPE SUPPORT or PRESSURE SWITCH</td><td></td><td></td></tr> <tr><td>F</td><td>FRAME, FLANGE or FUEL</td><td>PSF</td><td>POUNDS PER SQUARE FOOT</td><td></td><td></td></tr> <tr><td>FDR</td><td>FEEDER</td><td></td><td></td><td></td><td></td></tr> <tr><td>FG</td><td>FINAL GRADE, FINISHED GRADE or FINISHED GROUND</td><td></td><td></td><td></td><td></td></tr> </tbody> </table>						A	AIR, AMPERE or AMMETER	FH	FIRE HYDRANT	PSI	POUNDS PER SQUARE INCH	AB	ANCHOR BOLT or AGGREGATE BASE	FIN	FINISH	PSIG	POUNDS PER SQUARE INCH GAGE	ABAND	ABANDONED	FL	FLOW LINE	PT	POINT or POINT OF TANGENCY	ABBR	ABBREVIATION	FND	FLUORESCENT	P&T	PAINTED	ABUT	ABUTMENT	FR	FOUNDATION	PV	PRESSURE AND TEMPERATURE	ABV	ABOVE	FS	FUEL RETURN	PVC	POLYVINYL CHLORIDE	AC	ASPHALT CONCRETE, AIR COMPRESSOR or ALTERNATING CURRENT	FT	FOOT or FEET	PVMT	PAVEMENT	ACI	AMERICAN CONCRETE INSTITUTE	FU	FUSE	PWR	POWER	ACP	ASBESTOS CEMENT PIPE	G	GAS	R	RADIUS or RIGID	AGG	AGGREGATE	GA	GAGE	RAD	RADIUS or RADIAL	AISC	AMERICAN INSTITUTE OF STEEL CONSTRUCTION	GAL	GALLON	RCP	REINFORCED CONCRETE PIPE	ALUM	ALUMINUM	GALV	GALVANIZED	RECEP	RECEPTACLE	AMPS	AMPERES	GB	GRADE BREAK	RED	REDUCER	APPROX	APPROXIMATE	GI	GROUND FAULT INTERRUPTER	REINF	REINFORCING	ASME	AMERICAN SOCIETY OF MECHANICAL ENGINEERS	GL	GALVANIZED IRON	REQD	REQUIRED	ASTM	AMERICAN SOCIETY FOR TESTING AND MATERIALS	GND	GLASS	RET	RETAINING	AWG	AMERICAN WIRE GAGE	GPM	GROUND	ROW	RIGHT OF WAY	AWS	AMERICAN WELDING SOCIETY	GV	GALLONS PER MINUTE	RPM	ROTATION PER MINUTE	AWWA	AMERICAN WATER WORKS ASSOCIATION	H	GATE VALVE	RT	RIGHT	BAV	BALL VALVE	HB	HOSE BIBB	RUB	RUBBER	BC	BEGIN CURVE or BARE COPPER	HD	HEAD	RV	RELEASE VALVE	BCR	BEGIN CURB RETURN	HDR	HOLLOW METAL	RWL	RAIN WATER LEADER	BF	BLIND FLANGE	HORIZ	HORIZONTAL	S	SEWER, SLOPE or SOUTH	BFP	BACKFLOW PREVENTER	HP	HORSE POWER or HIGH PRESSURE	SAN	SANITARY	BFV	BUTTERFLY VALVE	HPS	HIGH PRESSURE SODIUM	SB	SWAY BRACE	BL	BASELINE	HR	HOUR	SCH	SCHEDULE	BLDG	BUILDING	ID	INSIDE DIAMETER	SD	STORM DRAIN	BLKG	BLOCKOUT	IN.	INCHES	SDR	STANDARD DIMENSION RATIO	BM	BENCH MARK	INS	INSULATOR	SEC	SECONDARY	BOS	BOTTOM of STEEL	INT	INTERIOR	SECT	SECTION	BOT	BOTTOM	INV	INVERT	SF	SQUARE FOOT or FEET	BR	BRASS	IPS	INSIDE PIPE SIZE	SHLDR	SHOULDER	BTU	BRITISH THERMAL UNITS	JB	JUNCTION BOX	SHT	SHEET	BW	BACK of WALK	JS	JUNCTION STRUCTURE	SIM	SIMILAR	C	CONDUIT or CONTROL	KT	JOINT	SP	SPARE	CA	CEMENT ASBESTOS or COMPRESSED AIR	L	KIPS PER SQUARE INCH	SPA	SPACE	CAB	CRUSHED AGGREGATE BASE	LD	LOCAL DEPRESSION	SPEC	SPECIFICATIONS	CB	CATCH BASIN	LF	LINEAR or LINEAL FEET	SQ	SQUARE	CF	CUBIC FEET	LG	LONG	SS	STAINLESS STEEL or SANITARY SEWER	C&G	CURB and GUTTER	LT	LIGHT	STA	STATION	CJ	CONSTRUCTION JOINT	LTG	LIGHTING	STD	STANDARD	CL	CENTERLINE	M	MOTOR	STL	STEEL	CLF	CHAIN LINK FENCE	MAS	MASONRY	STRUCT	STRUCTURE or STRUCTURAL	CLG	CEILING	MATL	MATERIAL	SYM	SYMMETRICAL	CLR	CLEAR	MAX	MAXIMUM	T	TANGENT	CMP	CORRUGATED METAL PIPE	MECH	MECHANICAL	T&B	TOP AND BOTTOM	CMU	CONCRETE MASONRY UNIT	MET	METAL	TC	TOP of CURB	CO	CLEANOUT or CONDUIT ONLY	MFTR	MANUFACTURE or MANUFACTURER	TELE	TELEPHONE	COL	COLUMN	MH	MANHOLE	TEMP	TEMPERATURE or TEMPORARY	CONC	CONCRETE	MHW	MEAN HIGH WATER	THD	THREAD	COND	CONDUIT	MHHW	MEAN HIGHER HIGH WATER	THRU	THROUGH	CONN	CONNECTOR	MIN	MINIMUM	TOS	TOP of STEEL	CONST	CONSTRUCTION	MLW	MEAN LOW WATER	TOT	TOTAL	CONT	CONTINUOUS or CONTINUE	MLLW	MEAN LOWER LOW WATER	TRANSV	TRANSVERSE	COORD	COORDINATE	MON	MONUMENT	TRANSFMR	TRANSFORMER	CT	COOPER TUBE, CERAMIC TILE or CURRENT TRANSFORMER	MSL	MEAN SEA LEVEL	TV	TELEVISION	CU	CUBIC or COPPER	MTD	_MOUNTED	TW	TOP of WALL	CV	CHECK VALVE	N	NORTH	TYP	TYPICAL	D	DRAIN	NAVD	NORTH AMERICAN VERTICAL DATUM	UON	UNLESS OTHERWISE NOTED	DET	DETAIL	NGVD	NATIONAL GEODETIC VERTICAL DATUM	UTIL	UTILITY	DI	DUCTILE IRON	NIC	NOT IN CONTRACT	VAR	VARIABLE	DIA	DIAMETER	NO.	NUMBER	VCP	VITRIFIED CLAY PIPE	DIP	DUCTILE IRON PIPE	NOAA	NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION	VERT	VERTICAL	DIM	DIMENSION	NPT	NATIONAL PIPE THREAD	W	WATER, WEST, WIDE or WIRE	DN	DOWN	NTS	NOT TO SCALE	WD	WOOD	DO	DITTO	OBS	OBSTRUCTION	WP	WEATHERPROOF or WATERPROOF	DWGS	DRAWINGS	OC	ON CENTER	WT	WEIGHT	E	EAST	OD	OUTSIDE DIAMETER	WWF	WELDED WIRE FABRIC	EA	EACH	OG	ORIGINAL GRADE			ECR	END CURB RETURN	OPNG	OPENING			EF	EACH FACE	OPP	OPPOSITE			EG	EXISTING GROUND	OS	OUTSIDE			EJ	EXPANSION JOINT	P	POWER, POLE, PUMP or PIPE			EL	ELEVATION	PB	PULL BOX			ELECT	ELECTRICAL	PC	PIPE CLAMP, PRECAST CONCRETE or POINT of CURVATURE			ELEV	ELEVATION	PCC	PORTLAND CEMENT CONCRETE			ELL	ELBOW	PCF	POUND PER CUBIC FOOT			EP	EDGE of PAVEMENT	PG	PRESSURE GAUGE			EPR	ETHYLENE-PROPYLENE-RUBBER	PI	POINT of INTERSECTION			EQUIP	EQUIPMENT	PL	PLATE or PROPERTY LINE			ES	EACH SIDE	PLAS	PLASTIC or PLASTER			EVC	END VERTICAL CURVE	PM	POWER MOUND or METER			EW	EACH WAY or EXISTING WATER	PNL	PANEL			EXIST.	EXISTING	POC	POINT of CONNECTION or POINT ON CURVE			EXP	EXPANSION	PRESS	PRESSURE			EXT	EXTERIOR	PS	PIPE SUPPORT or PRESSURE SWITCH			F	FRAME, FLANGE or FUEL	PSF	POUNDS PER SQUARE FOOT			FDR	FEEDER					FG	FINAL GRADE, FINISHED GRADE or FINISHED GROUND					<p><b>LEGEND</b></p> <table> <tbody> <tr><td>-----</td><td>EXISTING WETLAND</td></tr> <tr><td>- - - - -</td><td>EXISTING PROPERTY LINE</td></tr> <tr><td>— 0 —</td><td>EXISTING CONTOUR</td></tr> <tr><td>— ST —</td><td>EXISTING STORMWATER CONDUIT</td></tr> <tr><td>— SS —</td><td>PROPOSED STORMWATER CONDUIT</td></tr> <tr><td>— OH —</td><td>EXISTING SANITARY SEWER</td></tr> <tr><td>— UFG —</td><td>EXISTING OVERHEAD ELECTRIC</td></tr> <tr><td>— UGE —</td><td>EXISTING UNDERGROUND ELECTRIC</td></tr> <tr><td>— UG —</td><td>EXISTING UNDERGROUND GAS</td></tr> <tr><td>— UGC —</td><td>EXISTING UNDERGROUND CABLE</td></tr> <tr><td>□</td><td>EXISTING DRAIN INLET</td></tr> <tr><td>□</td><td>EXISTING CATCH BASIN</td></tr> <tr><td>○</td><td>EXISTING YARD DROP INLET</td></tr> <tr><td>□</td><td>EXISTING CURB INLET</td></tr> <tr><td>○</td><td>EXISTING STORMWATER MANHOLE</td></tr> <tr><td>○</td><td>EXISTING SANITARY MANHOLE</td></tr> <tr><td>●</td><td>EXISTING LIGHT POLE</td></tr> <tr><td>○</td><td>EXISTING POWER POLE</td></tr> <tr><td>■</td><td>BRICK</td></tr> <tr><td>■</td><td>ASPHALT</td></tr> <tr><td>■</td><td>CONCRETE</td></tr> <tr><td>■</td><td>WETLAND</td></tr> <tr><td>■</td><td>PROPOSED PLUNGE POOL</td></tr> <tr><td>— 0 —</td><td>PROPOSED CONTOUR</td></tr> <tr><td>STXX</td><td>STORM SEWER STRUCTURE TREE</td></tr> <tr><td>●</td><td>BUSH</td></tr> <tr><td>▶</td><td>WET FLAG</td></tr> </tbody> </table>	-----	EXISTING WETLAND	- - - - -	EXISTING PROPERTY LINE	— 0 —	EXISTING CONTOUR	— ST —	EXISTING STORMWATER CONDUIT	— SS —	PROPOSED STORMWATER CONDUIT	— OH —	EXISTING SANITARY SEWER	— UFG —	EXISTING OVERHEAD ELECTRIC	— UGE —	EXISTING UNDERGROUND ELECTRIC	— UG —	EXISTING UNDERGROUND GAS	— UGC —	EXISTING UNDERGROUND CABLE	□	EXISTING DRAIN INLET	□	EXISTING CATCH BASIN	○	EXISTING YARD DROP INLET	□	EXISTING CURB INLET	○	EXISTING STORMWATER MANHOLE	○	EXISTING SANITARY MANHOLE	●	EXISTING LIGHT POLE	○	EXISTING POWER POLE	■	BRICK	■	ASPHALT	■	CONCRETE	■	WETLAND	■	PROPOSED PLUNGE POOL	— 0 —	PROPOSED CONTOUR	STXX	STORM SEWER STRUCTURE TREE	●	BUSH	▶	WET FLAG	<p><b>DEMOLITION LEGEND</b></p> <table> <tbody> <tr><td>■■■■■</td><td>DEMOLISH PIER</td></tr> <tr><td>■■■■■</td><td>MILL ASPHALT</td></tr> </tbody> </table> <p><b>EROSION AND SEDIMENT CONTROL LEGEND</b></p> <table> <tbody> <tr><td>— LOD —</td><td>LIMIT OF DISTURBANCE</td></tr> <tr><td>— LOW —</td><td>LIMIT OF WORK</td></tr> <tr><td>— SF —</td><td>SILT FENCE (C-PCM-04)</td></tr> <tr><td>(SF)</td><td>OUTLET PROTECTION (C-ECM-15)</td></tr> <tr><td>(CE)</td><td>CONSTRUCTION ENTRANCE (C-SCM-02)</td></tr> <tr><td>(IP)</td><td>INLET PROTECTION (C-SCM-04-5)</td></tr> <tr><td>(DP)</td><td>INLET PROTECTION (C-SCM-04-2)</td></tr> <tr><td>(CD)</td><td>TEMPORARY COFFER DAM</td></tr> <tr><td>(TS)</td><td>TEMPORARY SEEDING</td></tr> <tr><td>(PS)</td><td>PERMANENT SEEDING</td></tr> <tr><td>(TP)</td><td>TREE PROTECTION</td></tr> <tr><td>(MU)</td><td>MULCHING</td></tr> <tr><td>(DS)</td><td>DEWATERING STRUCTURE</td></tr> </tbody> </table>	■■■■■	DEMOLISH PIER	■■■■■	MILL ASPHALT	— LOD —	LIMIT OF DISTURBANCE	— LOW —	LIMIT OF WORK	— SF —	SILT FENCE (C-PCM-04)	(SF)	OUTLET PROTECTION (C-ECM-15)	(CE)	CONSTRUCTION ENTRANCE (C-SCM-02)	(IP)	INLET PROTECTION (C-SCM-04-5)	(DP)	INLET PROTECTION (C-SCM-04-2)	(CD)	TEMPORARY COFFER DAM	(TS)	TEMPORARY SEEDING	(PS)	PERMANENT SEEDING	(TP)	TREE PROTECTION	(MU)	MULCHING	(DS)	DEWATERING STRUCTURE	<p><b>RICHMOND &amp; SURREY CRESCENT SHORELINE IMPROVEMENTS</b></p> <p><b>LEGEND AND ABBREVIATIONS</b></p> <p><b>Sheet Reference No. G-003</b></p> <p><b>File: NOR10390-5720 CAD1_Actual_Castillo_Surrey Shoreline Improvements1039057-G-003.dwg</b></p> <p><b>Project Data:</b></p> <table border="1"> <tr><td>Design by:</td><td>IB</td><td>Date:</td><td>2024-08-12</td></tr> <tr><td>Drawn by:</td><td>JAD</td><td>Rev:</td><td></td></tr> <tr><td>Checked by:</td><td>HB</td><td>MAN Project No.</td><td>1039-57</td></tr> <tr><td>Reviewed by:</td><td></td><td>Drawing date:</td><td></td></tr> <tr><td>Submitted by:</td><td>IBRITHMAN</td><td>Drawing Scale:</td><td>AS SHOWN</td></tr> <tr><td colspan="2">moffatt &amp; nichol</td><td>Plot scale:</td><td>1:1 (D SHEET)</td></tr> <tr><td colspan="2">101 W MAIN ST, SUITE 3000 NORFOLK, VA 23510 757-628-8222</td><td>Prepared for:</td><td>CITY OF NORFOLK DEPARTMENT OF PUBLIC WORKS</td></tr> </table> <p><b>Seal:</b></p> <p><b>FOR 65% SUBMITTAL ISSUED: 2024-08-12 NOT TO BE USED FOR CONSTRUCTION</b></p>	Design by:	IB	Date:	2024-08-12	Drawn by:	JAD	Rev:		Checked by:	HB	MAN Project No.	1039-57	Reviewed by:		Drawing date:		Submitted by:	IBRITHMAN	Drawing Scale:	AS SHOWN	moffatt & nichol		Plot scale:	1:1 (D SHEET)	101 W MAIN ST, SUITE 3000 NORFOLK, VA 23510 757-628-8222		Prepared for:	CITY OF NORFOLK DEPARTMENT OF PUBLIC WORKS
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1622 DOROUGH - 1726 CITY  
THE MARY RIVER  
NORFOLK, VIRGINIA

RICHMOND & SURREY CRESCENT SHORELINE IMPROVEMENTS

DEMOLITION LEGEND

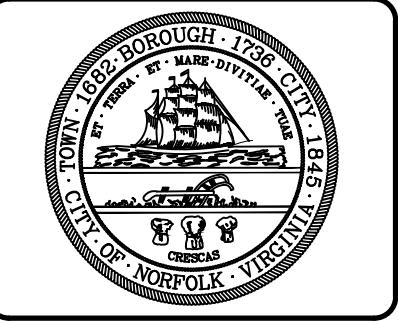
EROSION AND SEDIMENT CONTROL LEGEND

Sheet Reference No. G-003

File: NOR10390-5720 CAD1\_Actual\_Castillo\_Surrey Shoreline Improvements1039057-G-003.dwg

INDEX: 3 OF 35

DRAWING SCALES SHOWN BASED ON 22"x34" DRAWING



## CITY OF NORFOLK GENERAL NOTES

- THE CONTRACTOR IS ENCOURAGED TO VISIT THE SITE PRIOR TO SUBMITTING BID.
- ELEVATIONS ARE BASED ON NAVD-88 (92 ADJUSTED) (NORTH AMERICAN VERTICAL DATUM). BENCHMARK CITY OF NORFOLK CONTROL STATION CN043 (ELEVATION=5.90).
- EXISTING UTILITIES SHOWN ARE BASED ON AVAILABLE RECORDS AND FIELD SURVEYS, AND IS NOT GUARANTEED TO BE EXACT OR COMPLETE. CONTRACTOR SHALL LOCATE ALL EXISTING UTILITIES IN ADVANCE OF CONSTRUCTION.
- CONTRACTOR IS RESPONSIBLE FOR LOCATING ALL HOUSE SERVICE LINES (WATER AND SEWER). CONTRACTOR SHALL NOT DEPEND ON CITY FORCES TO LOCATE SERVICE LINES WHEN IT IS REQUIRED TO RELOCATE WATER METERS, AND SHALL BE RESPONSIBLE FOR ALL TIE-INS OF HOUSE LINES TO NEW METERS.
- STATE LAW MANDATES THE NOTIFICATION OF UTILITY OWNERS 48 HOURS IN ADVANCE OF EXCAVATION. FOR LOCATION OF UTILITIES, CALL "MISS UTILITY" AT 1-800-552-7001 FOR:
  - WATER & SEWER
  - HAMPTON ROADS SANITATION DISTRICT (HRSID)
  - VERIZON TELEPHONE
  - DOMINION ENERGY
  - VA. NATURAL GAS
  - TRAFFIC CONTROLS
  - STORM DRAIN
  - COX CABLE T.V.
- THE CONTRACTOR SHALL BE REQUIRED AND AGREES TO COMPLY WITH ALL THE PROVISIONS OF THE "VIRGINIA UNDERGROUND UTILITY DAMAGE PREVENTION ACT" (SECTION 56-265.14 ET SEQ., CODE OF VIRGINIA, 1950, AS AMENDED) AND HEREBY AGREES TO HOLD THE CITY OF NORFOLK HARMLESS AGAINST ANY LOSS, DAMAGES, OR CLAIMS OF ANY NATURE WHATSOEVER ARISING OUT OF THE CONTRACTOR'S FAILURE TO COMPLY WITH THE REQUIREMENTS OF THIS ACT.
- CONTRACTOR SHALL CONFORM TO THE "OVERHEAD HIGH VOLTAGE ACT" AND SHALL CONTACT THE NECESSARY AUTHORITIES PRIOR TO START OF CONSTRUCTION AND HEREBY AGREES TO HOLD THE CITY OF NORFOLK HARMLESS AGAINST ANY LOSS, DAMAGES, OR CLAIMS OF ANY NATURE WHATSOEVER ARISING OUT OF THE CONTRACTOR'S FAILURE TO COMPLY WITH THE REQUIREMENTS OF THIS ACT.
- CONTRACTOR SHALL TAKE THE NECESSARY PRECAUTIONS TO PROTECT THE EXISTING UTILITIES AND MAINTAIN UNINTERRUPTED SERVICE, ANY DAMAGE DONE TO THE UTILITIES SHALL BE IMMEDIATELY REPAIRED AT CONTRACTOR'S EXPENSE.
- THE CONTRACTOR SHALL NOTE THAT THERE MAY BE OTHER CONSTRUCTION IN THIS AREA. THE CONTRACTOR SHALL COOPERATE WITH THE CITY AND ANY OTHER CONTRACTORS OR UTILITY OWNERS TO PREVENT DELAYS TO EITHER PROJECT. IF THE CONTRACTOR NEEDS TO PERFORM WORK OUT OF SEQUENCE OR ADJUST HIS SCHEDULE TO ACCOMMODATE OTHER WORK IN THE PROJECT AREA, IT SHALL NOT BE THE BASIS OF A CLAIM FOR DELAY AGAINST THE CITY.
- CONTRACTOR SHALL COORDINATE INSTALLATION OF NEW WATER AND SEWER CONNECTIONS WITH THE ABANDONMENT OF EXISTING WATER AND SEWER MAINS. WATER AND SEWER SERVICE SHALL BE MAINTAINED TO ALL RESIDENCES AT ALL TIMES.
- ANY TIE-INS TO EXISTING LINES THAT WILL RESULT IN INTERRUPTION OF SERVICE TO ANY CUSTOMER MUST BE COORDINATED WITH THE CITY OF NORFOLK AS TO ACCEPTABLE TIME AND DURATION OF INTERRUPTION. SCHEDULED INTERRUPTIONS OF SERVICE (TIE-INS, ABANDONMENTS ETC.) REQUIRE 3 DAYS ADVANCE NOTICE FOR A TRIAL SHUTDOWN. AN ADDITIONAL 3 DAYS ADVANCE NOTICE WILL BE REQUIRED FOR THE ACTUAL SHUTDOWN IF THE TRIAL SHUTDOWN IS SUCCESSFUL.
- THE CONTRACTOR SHALL VERIFY TYPE OF MATERIAL, OUTSIDE DIAMETER AND LOCATION OF ALL PIPES BEING CONNECTED TO, TO ENSURE PROPER FITTINGS ARE AVAILABLE AND TO MINIMIZE OUT OF SERVICE TIME FOR CONNECTIONS. ALL NECESSARY FITTINGS NEEDED TO MAKE CONNECTIONS SHALL BE CHECKED BY THE CITY'S INSPECTOR PRIOR TO ANY CONNECTION WORK.
- THE CITY RESERVES THE RIGHT TO EFFECT ANY REQUIRED REPAIRS, AND WARRANT FOR THE COLLECTION FOR ALL ASSOCIATED COSTS, WHERE NECESSITATED BY EMERGENCY CONDITIONS.
- CONTRACTOR SHALL HAVE A SET OF PROJECT PLANS AND SPECIFICATIONS ON SITE AT ALL TIMES. IN ADDITION, THE CONTRACTOR SHALL HAVE IN HIS POSSESSION THE CURRENT EDITION OF THE HRPD SPECIFICATIONS.
- THE CITY RESERVES THE RIGHT TO STOP WORK ON THE PROJECT IF THE SITE IS NOT BEING KEPT CLEAN AND PROPERLY MAINTAINED.
- AN UP TO DATE AS-BUILT AND PROGRESS SCHEDULE SHALL ACCOMPANY THE CONTRACTOR'S MONTHLY APPLICATION FOR PAYMENT. IF THESE ITEMS ARE NOT INCLUDED WITH THE INVOICE, THE INVOICE SHALL BE IMMEDIATELY RETURNED TO THE CONTRACTOR.
- CONTRACTOR'S MONTHLY INVOICES SHALL BE REVIEWED BY THE CITY'S INSPECTOR AND CONTRACTOR'S SUPERINTENDENT PRIOR TO SUBMISSION.
- TIME-ONLY EQUIPMENT WHICH IS BEING USED ON A DAILY BASIS CAN BE INCLUDED ON THE CONTRACTOR'S CLAIM FOR DELAY.

### DEPARTMENT OF UTILITIES

- ALL MATERIALS PURCHASED FOR THIS PROJECT SHALL BE NEW AND HAVE BEEN MANUFACTURED WITHIN THE LAST TWO YEARS OF THE DATE WHEN THE CONTRACT WAS EXECUTED.
- SUBMITTALS ON MATERIALS FOR THIS PROJECT SHALL BE APPROVED BY THE CITY PRIOR TO BEGINNING CONSTRUCTION. CONTRACTOR TO USE APPROVED PRODUCTS LIST WHERE POSSIBLE.
- ALL NIPPLE PIECES BETWEEN WATER MAIN AND FORCE MAIN FITTINGS AND VALVES SHALL BE CLASS 52 DUCTILE IRON.
- ALL PRODUCTS USED IN THE CONSTRUCTION AND MAINTENANCE OF THE WATER SYSTEM SHALL MEET THE DEFINITION OF "LEAD-FREE" AS DESCRIBED IN THE REDUCTION OF LEAD IN DRINKING WATER ACT OF 2011.
- ALL TEES, BENDS, PLUGS AND VALVES SHALL BE PROVIDED WITH MECHANICAL THRUST RESTRAINT AND RESTRAINED TO PROPER LENGTH. PLUGS INSTALLED ON ACTIVE WATER MAINS SHALL BE RESTRAINED. ENDS OF EXISTING LINES TO BE ABANDONED SHALL BE CAPPED WATER-TIGHT.
- MECHANICAL THRUST RESTRAINT SHALL BE USED ON ALL BENDS AND FITTINGS WHEN WATER MAINS ARE OFF-SET. WATER MAINS MAY BE ROLLED UNDER STORM DRAINS WITHOUT FITTINGS WHEN THE VERTICAL GRADE CHANGE IS 2 FEET OR LESS.
- NO PIPE FOLD-INS SHALL BE USED ON WATER MAINS OR SEWER FORCE MAINS. SLEEVES WILL BE USED.
- WHERE WATER MAINS PASS OVER SEWER MAINS, THEY MUST BE 18 INCHES ABOVE, OR THE SEWER MUST BE A 20 FOOT SECTION OF AWWA APPROVED PRESSURE PIPE. WHERE WATER LINES PASS BELOW SEWER, 18 INCHES OF CLEARANCE IS REQUIRED AND SEWER MUST BE CONSTRUCTED OF AWWA APPROVED PRESSURE PIPE (18 FOOT LONG PIECE MINIMUM) CENTERED ON WATER MAIN PIPE SECTION.
- NEOPRENE PADS SHALL BE USED BETWEEN PROPOSED MAIN AND EXISTING UTILITIES AT CROSSINGS WHERE THE VERTICAL CLEARANCE IS LESS THAN 6 INCHES.
- ALL SANITARY SEWER DUCTILE IRON PIPE SHALL BE LINED WITH PROTECTO 401 OR APPROVED EQUAL.

- FLOWABLE FILL IS NOT AN APPROVED MATERIAL FOR USE IN THE CITY OF NORFOLK FOR BACKFILL WITHOUT PRIOR APPROVAL. THE SELECT MATERIAL AND NO. 21A STONE WILL BE IN ACCORDANCE WITH THE 2020 VDOT ROAD AND BRIDGE SPECIFICATIONS. FOR BACKFILL AROUND THE PIPE USE SELECT MATERIAL (SECTION 207) - TYPE I AND 20 CBR COMPACTION. FOR THE SUB BASE MATERIAL USE 6 INCH MIN. VDOT NO. 21A STONE IN ACCORDANCE TO SECTION 208.
- CONTRACTOR TO USE VERTICAL TIGHT SHEETING FOR CUTS FIVE FEET OR DEEPER, UNLESS PERMISSION TO DO OTHERWISE IS GRANTED BY THE ENGINEER. SHEETING SHALL ALSO BE USED FOR CUTS BEHIND CURBS OR SIDEWALKS, AND BESIDE ROADWAYS FOR CUTS FIVE FEET OR LESS, AS REQUIRED BY THE ENGINEER. SHEETING SHALL BE USED TO PROTECT EXISTING UTILITIES OR OTHER STRUCTURES SUCH AS DRAINS, PIERS, POWER AND TELEPHONE POLES, ETC. SHEETING, WHEN USED, WILL BE DRIVEN 15 INCHES OR MORE BELOW PIPE INVERT, AND TOP OF SHEETING CAN NOT BE LESS THAN EXISTING GROUND ELEVATIONS, UNLESS OTHERWISE APPROVED BY THE ENGINEER. SHEETING WILL BE CUT OFF AND LEFT IN PLACE AS THE ENGINEER MAY DIRECT. PAYMENT FOR SHEETING LEFT IN PLACE WILL BE PAID PER VDOT SPECIFICATION SECTION 402 ON A UNIT BASIS OF 1,000 BOARD FEET MEASUREMENT, TO BE CHECKED BY CONTRACTOR AND VERIFIED BY THE ENGINEER. ANY QUANTITY LESS THAN THE UNIT PRICE WILL BE PAID FOR TO THE CLOSEST FULL 100 BOARD FOOT MEASUREMENT.
- IF ABANDONED WATER MAIN IS IN CONFLICT WITH NEW SEWER LATERAL, THE ABANDONED MAIN IS TO BE CUT AND PLUGGED AT NO ADDITIONAL COST TO THE CITY.
- THE TAPPING MACHINE USED FOR TAPPING SLEEVES AND VALVES SHALL BE DISINFECTED PRIOR TO USE ON WATER MAINS.
- SEWER LATERALS SHALL BE EXTENDED TO PROPERTY LINES BY CONTRACTOR WHERE DIRECTED BY THE ENGINEER. NEW PROPERTY LINE CLEANOUTS SHALL BE INSTALLED.
- PRIVATE SERVICE LATERALS BEING REPLACED FROM THE PROPERTY LINE CLEANOUT TO THE BUILDING SHALL COMPLY WITH THE PLUMBING CODE AND BE INSTALLED BY A LICENSED PLUMBING CONTRACTOR APPROVED BY THE CITY.
- SANITARY SEWER LATERAL LOCATIONS SHOWN ON THE PLANS ARE APPROXIMATE ONLY AND ARE NOT GUARANTEED. WHERE LATERAL REPLACEMENTS ARE SHOWN OR REQUIRED BY THE ENGINEER SHALL BE 4-INCH SDR 26 FROM THE SANITARY SEWER MAIN TO THE PROPERTY LINE CLEANOUT FOR SINGLE FAMILY OR DUPLEX DWELLINGS AND 4- OR 6-INCH SDR 26 FOR COMMERCIAL AND MULTIPLE DWELLING UNITS TO BE INSTALLED BY THE CONTRACTOR. IF MAIN IS OTHER THAN SDR 26 PIPE, LATERAL PIPE SHALL MATCH TYPE OF PIPE USED FOR MAIN. 6-INCH LATERALS REQUIRE SQUARE CLEAN OUT BOXES AT THE PROPERTY LINE.
- ALL EXISTING WATER SERVICES WITHIN THE CITY RIGHT OF WAY WHICH ARE CONNECTED TO WATER MAINS ABANDONED UNDER THIS CONTRACT SHALL BE REPLACED. SERVICE REPLACEMENT SHALL BE FROM THE NEW MAIN TO THE EXISTING METER AND SHALL INCLUDE TAPPING SADDLE (4 INCH PVC ONLY), CORPORATION STOP, COPPER TUBING AND METER STOP. IN ADDITION, EMPTY METER BOXES IN FRONT OF BUILDABLE LOTS SHALL BE PROVIDED WITH SERVICE REPLACEMENT. WATER SERVICES TO BE BORED UNLESS DIRECTED BY THE ENGINEER.
- ALL EXISTING WATER METERS ARE ASSUMED TO BE 5/8 INCHES UNLESS OTHERWISE NOTED. CONTRACTOR TO VERIFY METER SIZES BEFORE DISCONNECTING. ALL SERVICE LINE AND METERS NOTED FOR REPLACEMENT SHALL BE REPLACED WITH SAME AS EXISTING SIZE.

### DEPARTMENT OF PLANNING:

- FIELD ENGINEERING INFORMATION: ALL REQUESTS FOR INSPECTIONS, AND FIELD CONSTRUCTION INFORMATION SHOULD BE DIRECTED TO: CHIEF OF CONSTRUCTION OPERATIONS, 664-6565
- A CONSTRUCTION SCHEDULE SHALL BE SUBMITTED TO THE FIELD ENGINEERING OFFICE, PRIOR TO THE SCHEDULING OF THE PRE-CONSTRUCTION CONFERENCE.
- WETLANDS MAY BE INVOLVED WITHIN THE BOUNDARY OF DEVELOPMENT. THE CONTRACTOR MUST COMPLY WITH THE EXACT LIMITS OF CONSTRUCTION PERMITS MAY BE REQUIRED FROM FEDERAL, STATE, AND LOCAL AGENCIES.
- UNLESS OTHERWISE INDICATED, ALL VEGETATIVE AND STRUCTURAL EROSION AND SEDIMENT CONTROL AND TREE PROTECTION PRACTICES SHALL BE CONSTRUCTED AND MAINTAINED ACCORDING TO MINIMUM STANDARDS AND SPECIFICATIONS OF THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK (VESC) AND THE VIRGINIA EROSION AND SEDIMENT CONTROL REGULATIONS (VACG50.30 ET SEQ.), CHAPTER 30 AND APPENDIX E (TREE PLANTING, PRESERVATION AND REPLACEMENT).
- THE CONTRACTOR SHALL EXERCISE EVERY REASONABLE PRECAUTION, INCLUDING THE APPLICATION OF TEMPORARY AND/OR PERMANENT MEASURES DEEMED NECESSARY BEFORE, DURING, AND AFTER CONSTRUCTION TO CONTROL EROSION AND PREVENT OR MINIMIZE SEDIMENT RUNOFF AND PROTECT TREES AND VEGETATION. THE CITY RESERVES THE RIGHT TO REQUIRE OTHER MEASURES NOT SPECIFICALLY DESCRIBED HEREIN TO CORRECT ANY EROSION, SILTATION OR TREE PROTECTION CONDITION.
- ALL EROSION AND SEDIMENT CONTROL AND TREE PROTECTION MEASURES SHALL BE INSTALLED WITH THE FIRST STAGE OF CONSTRUCTION AND WILL REMAIN IN PLACE UNTIL ALL DISTURBED AREAS ARE STABILIZED AND THEIR REMOVAL IS DIRECTED BY THE CITY. ALL DISTURBED AREAS ARE TO DRAIN TO APPROVED SEDIMENT CONTROL MEASURES AT ALL TIMES DURING LAND DISTURBING ACTIVITIES AND DURING SITE DEVELOPMENT UNTIL FINAL STABILIZATION IS ACHIEVED. THE MEASURES SHOWN ON THE PLAN ARE THE MINIMUM NECESSARY. THE ADDITION, DELETION OR MODIFICATION OF EROSION AND SEDIMENT CONTROL AND TREE PROTECTION MEASURES WILL BE AT THE DIRECTION OF THE CITY.

### DEPARTMENT OF PUBLIC WORKS - RIGHT OF WAY MANAGEMENT:

- ALL WORK WITHIN THE RIGHT OF WAY SHALL COMPLY WITH THE CITY OF NORFOLK RIGHT OF WAY EXCAVATION & RESTORATION MANUAL. (ORDINANCE NO. 40,778), DEPT. OF PUBLIC WORKS, DIVISION OF TRANSPORTATION. THE DOCUMENT MAY BE DOWNLOADED AT [HTTP://WWW.NORFOLK.GOV/PUBLICWORKS/ROW](http://WWW.NORFOLK.GOV/PUBLICWORKS/ROW)
- FOR WORK IN THE CITY OF NORFOLK RIGHT OF WAY, CONTACT 48 HOURS IN ADVANCE.
  - DIVISION OF TRANSPORTATION 664-7300
  - DIVISION OF STORM WATER 664-6510
  - DIVISION OF PARKS & URBAN FORESTRY 823-4023
  - CONSTRUCTION OPERATIONS 664-6565
- RIGHT OF WAY EXCAVATION PERMITS ARE REQUIRED TO PERFORM SEWER AND WATER MAIN INSTALLATION AND ALL APPURTENANCES. PLEASE CONTACT THE RIGHT OF WAY PERMIT OFFICE AT 664-7306
- CONTRACTOR TO NOTIFY THE UTILITIES INSPECTOR ON FIRST IDENTIFICATION OF CONFLICT WITH STORMWATER INFRASTRUCTURE.
- ALL TEMPORARY BULK WASTE CONTAINERS PLACED WITHIN THE RIGHT OF WAY REQUIRE A PERMIT FROM THE DIVISION OF RIGHT OF WAY 664-7306 [WWW.NORFOLK.GOV/PUBLICWORKS/ROW](http://WWW.NORFOLK.GOV/PUBLICWORKS/ROW)
- "NO LANE CLOSURES AND/OR WORK IN THE RIGHT OF WAY, INCLUDING GRADING, SIDEWALK CURB AND GUTTER, AND DRIVEWAY APRON INSTALLATION WILL BE ALLOWED WITHOUT A PERMIT FROM THE DIVISION OF RIGHT OF WAY. ALL TRAFFIC CONTROL SHALL COMPLY WITH THE CURRENT EDITION OF THE "MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES" (MUTC), THE "VIRGINIA WORK AREA PROTECTION MANUAL" AND THE CITY OF NORFOLK RIGHT OF WAY EXCAVATION AND RESTORATION MANUAL. ADDITIONAL CHARGES APPLY IF OFF-DUTY OFFICERS ARE REQUIRED. CONTACT RIGHT OF WAY MANAGEMENT FOR A LIST OF PERMIT FEES.
- THE CONTRACTOR WILL BE REQUIRED TO POST CASH, A CHECK, OR A SURETY BOND OR LETTER OF CREDIT TO EXCAVATE IN THE RIGHT OF WAY.

- WHEN THE CONTRACTOR WORK REQUIRES THE SAWCUTTING AND/OR PARTIAL DEMOLITION AND/OR REMOVAL OF ANY SECTION OF AN EXISTING APRON OR SIDEWALK, THE CONTRACTOR WILL BE REQUIRED TO REMOVE SAID APRON OR SIDEWALK AND REPLACE IT WITH A NEW MONOLITHIC APRON OR SIDEWALK DAILY. SIDEWALK SHALL BE REMOVED TO THE NEAREST JOINT. ALL CONCRETE IS TO BE SAW CUT. NO PATCHING WILL BE ALLOWED. COMMERCIAL APRONS SHALL BE REPLACED WITH AN APPROVED COMMERCIAL APRON. RESIDENTIAL APRON SHALL BE REPLACED WITH AN APPROVED RESIDENTIAL APRON(HS-207) SIDEWALKS SHALL BE REPLACED WITH AN APPROVED SIDEWALK DETAIL. CONTACT THE DIVISION OF RIGHT-OF-WAY PERMIT OFFICE FOR APPROVAL 664-7306. (ORDINANCE NO. 40,778)
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR GRADING AND LANDSCAPING AROUND SANITARY SEWER CLEANOUTS WHEN SERVICES ARE INSTALLED. THE CONTRACTOR SHALL BE RESPONSIBLE FOR GRADING AND LANDSCAPING AROUND METER BOXES FOR MAJOR PROJECTS, UNLESS OTHERWISE DIRECTED. WHEN NOTIFIED BY THE CITY OF AN UNSAFE OPENING, THE RESPONSIBLE UTILITY CONTRACTOR SHALL RESPOND AND REPAIR SAID PATCH WITHIN FOUR HOURS.
- WHEN A NEW APRON AND/OR SIDEWALK IS INSTALLED, ALL NEW OR EXISTING UTILITY STRUCTURES SHALL BE MAINTAINED AND/OR RELOCATED OUTSIDE THE AREA OF THE NEW APRON AND/OR SIDEWALK. A PERMIT AND INSPECTION ARE REQUIRED.
- AS PART OF THE CONTRACTOR'S PERMIT APPLICATION TO WORK IN THE RIGHT-OF-WAY, THE CONTRACTOR MUST SUBMIT A MAP IDENTIFYING THE PROJECTS STORAGE AND LAY DOWN AREA. THE CITY DOES NOT ALLOW STORAGE, STAGING OR LAY DOWN AREAS WITHIN THE RIGHT OF WAY. CONTRACTORS ARE ENCOURAGED TO MAKE ARRANGEMENTS TO STORE MATERIALS AND LAY DOWN ON PRIVATE PROPERTY OR THEY MUST BE STORED WITHIN CONSTRUCTION SITE.
- ALL MISS UTILITY MARKINGS IN THE RIGHT-OF-WAY ARE REQUIRED TO BE ERADICATED AT THE COMPLETION OF THE PROJECT.

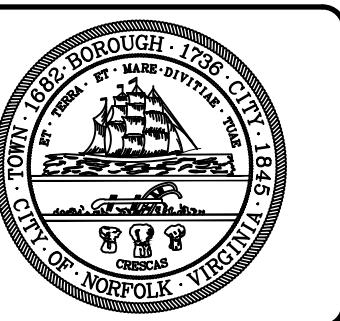
### DEPARTMENT OF PUBLIC WORKS - TRANSPORTATION:

- PRIOR TO THE SCHEDULING OF A PRE-CONSTRUCTION CONFERENCE, THE CONTRACTOR SHALL SUBMIT A PRELIMINARY DETAILED MAINTENANCE OF TRAFFIC (MOT) PLAN WITH THE CONTRACTOR'S PERMIT APPLICATION TO WORK IN THE RIGHT-OF-WAY FOR REVIEW BY THE DIVISION OF TRAFFIC ENGINEERING, DEPARTMENT OF PUBLIC WORKS. THE MOT AS WELL AS ALL TRAFFIC CONTROL DEVICES UTILIZED ON THE PROJECT MUST COMPLY WITH THE "FEDERAL MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES" (MUTC) FOR STREETS AND HIGHWAYS. FOLLOWING APPROVAL OF THE PLAN, A REPRODUCIBLE DRAWING SHALL BE SUBMITTED TO THE FIELD ENGINEERING OFFICE FOR USE AND DISTRIBUTION.
  - a. THE MOT SHALL BE A DRAWING OR AERIAL PHOTO WITH SITE SPECIFIC DETAILS. THESE SHALL INCLUDE BUT ARE NOT LIMITED TO: TRAFFIC SIGNS, DIRECTIONAL SIGNS, DESTINATION SIGNAGE, CHANNELIZING DEVICES, WATER-FILLED BARRIERS, PORTABLE MESSAGE BOARDS WITH MESSAGES TO BE DISPLAYED AND TIMES AND DURATIONS OF DISPLAYED MESSAGES.
  - b. THE MOT SHALL DISPLAY THE EXACT LOCATION OF ALL SIGNS AND/OR DEVICES INCLUDING SPACING FOR EACH SIGN AND/OR DEVICE, SPACING BEING APPROPRIATE FOR THE WORK ZONE LOCATION AND POSTED SPEED LIMITS.
  - c. ALL MOT PLANS SHALL CONFORM TO THE CURRENT ISSUE OF "THE VIRGINIA WORK AREA PROTECTION MANUAL" COPIES OR REPRODUCTIONS OF THE MOT THAT ARE INCLUDED WITH THE PROJECT DRAWINGS AND SPECIFICATIONS WILL NOT BE ACCEPTED WITH THE CONTRACTOR'S PERMIT APPLICATION. CONTRACTORS SHOULD CONSIDER THESE ITEMS WHEN BIDDING PROJECTS FOR CONSTRUCTION.
- THERE MAY BE A C.B.D. TRAFFIC CONTROL SYSTEM IN THIS AREA. FOR PROTECTION OF THIS SYSTEM, PHONE THE PUBLIC WORKS DEPARTMENT BEFORE STARTING WORK: 664-7300
- BEFORE WORK COMMENCES WHERE ANY LOOP DETECTOR IS BURIED IN THE ROADWAY, PLEASE CONTACT CITY TRANSPORTATION ENGINEER 664-7300 FOR LOOP DETECTOR DETAILS AND SPECIFICATIONS. IF LOOP DETECTORS ARE DAMAGED DURING CONSTRUCTION THE CONTRACTOR WILL BE RESPONSIBLE FOR REPAIRS AND RESTORATION OF THE LOOP DETECTORS AND ANY TRAFFIC CONTROL DEVICES.
- THE CONTRACTOR SHALL PROVIDE TEMPORARY DRIVEWAY AND PARKING ACCESS FOR ALL ADJACENT PROPERTY OWNERS DURING PERIODS WHEN CONSTRUCTION IN THE AREA IS NOT IN PROGRESS. THE CONTRACTOR SHALL OBTAIN DRIVEWAY PERMITS FROM THE DEPARTMENT OF PUBLIC WORKS, TRAFFIC ENGINEERING, FOR ALL REQUIRED DRIVEWAY WORK.
- ALL AREAS DISTURBED BY CONSTRUCTION OR MOBILIZATION SHALL BE RESTORED TO THEIR ORIGINAL CONDITION, UNLESS SPECIFIED OTHERWISE. TEMPORARY PAVEMENT CUTS SHALL BE MAINTAINED WITH 6 INCHES OF VDOT NO. 21A STONE OR RECYCLED ASPHALT PAVEMENT (RAP). THE CITY WILL ALLOW THE USE OF CRUSHED CONCRETE IN LIEU OF VDOT NO. 21A OR RAP ON A CASE-BY-CASE BASIS. A GRADATION REPORT IS TO BE PROVIDED AS WELL AS A PROPOSAL FOR REDUCTION IN COST TO THE CITY. FOLLOWING CITY APPROVAL, THE CONTRACTOR CAN MOVE FORWARD WITH THE USE OF CRUSHED CONCRETE. IN THE EVENT THE CITY FINDS MATERIALS IN THE CRUSHED CONCRETE THAT DO NOT COMPLY WITH THE GRADATION REPORT, THE CITY RESERVES THE RIGHT TO REQUIRE NO. 21A FOR THE REMAINDER OF THE PROJECT. ALL MATERIALS DESIGNATED AS TEMPORARY SHALL BE COMPACTED AND WATERED DAILY TO CONTROL DUST.
- THE CONTRACTOR SHALL CONSTRUCT THE PROJECT IN ACCORDANCE TO THE PAVEMENT RESTORATION PLAN. REFERENCE: PAVEMENT RESTORATION DRAWING SHEET.
- ALL ROADWAY CUTS SHALL BE BACKFILLED ONLY WITH SUITABLE SUBBASE MATERIAL, AND MECHANICALLY TAMPED IN NO MORE THAN 6-INCH LIFTS. BACKFILL SHALL BE PLACED AND COMPACTED IN ACCORDANCE WITH SECTION 308 OF THE VDOT ROAD AND BRIDGE SPECIFICATIONS, LATEST EDITION. THE CITY MAY, AT ANY TIME, REQUIRE TESTING TO ENSURE COMPLIANCE WITH THE SPECIFICATIONS OF THIS CONTRACT. ALL TESTS WILL BE CONDUCTED BY A RECOGNIZED TESTING LABORATORY SELECTED BY THE CITY, QUALIFIED IN THE FIELD OF THE MATERIALS TO BE TESTED. ALL TESTS WILL BE CONDUCTED IN ACCORDANCE WITH VDOT'S "MANUAL FOR VIRGINIA TEST METHODS" (CURRENT EDITION AS REVISED). PAYMENT FOR ALL TESTS WILL BE IN ACCORDANCE WITH THE FOLLOWING:
  - a. THE COST OF ALL TESTS FAILING TO MEET THE MINIMUM REQUIREMENTS WILL BE BORNE BY THE CONTRACTOR.
  - b. THE COST OF ALL TESTS THAT EITHER MEET OR EXCEED THE MINIMUM REQUIREMENTS SHALL BE BORNE BY THE CITY.
- ARTERIAL STREETS - AVERAGE DAILY TRAFFIC OVER 15,000 VEHICLES PER DAY. STREETS ARE THOSE IN THE CITY DESIGNATED AS "MAJOR THOROUGHFARES." BEING ESSENTIAL TO THE SAFE MOVEMENT OF THE MAJORITY OF CITIZENS, THESE STREETS REQUIRE STRICKER REGULATIONS TO MAINTAIN THE ORDERLY AND SAFE FLOW OF TRAFFIC. THEREFORE, NO WORK WILL BE PERFORMED ON ARTERIAL STREETS DURING THE PEAK TRAFFIC HOURS OF 6:00 A.M. TO 9:00 A.M. AND 3:30 P.M. TO 6:00 P.M. (MONDAY THROUGH FRIDAY ONLY), EXCEPT EMERGENCY WORK TO RESTORE SERVICES. LANE CLOSURES WILL BE RESTRICTED TO THE WORKING LANE ONLY AND TWO-WAY TRAFFIC WILL BE MAINTAINED AT ALL TIMES, UNLESS OTHERWISE AUTHORIZED BY THE DIRECTOR OF PUBLIC WORKS OR THEIR DESIGNEE.
- ARTERIALS SHALL BE OPENED TO TRAFFIC EACH NIGHT WITH ALL OPENINGS COVERED BY A ROAD PLATE OR A TEMPORARY ASPHALT PATCH BEFORE LEAVING THE SITE. THE PERMANENT ASPHALT PATCH SHALL BE PLACED THE SAME DAY THE WORK IS COMPLETED FOR MINOR PROJECTS AND WITHIN FIFTEEN CALENDAR DAYS OF COMPLETION FOR MAJOR PROJECTS. UNLESS OTHERWISE DIRECTED, WHEN NOTIFIED BY THE CITY OF AN UNSAFE OPENING, THE RESPONSIBLE PARTY SHALL RESPOND AND REPAIR SAID PATCH WITHIN FOUR HOURS.
- COLLECTOR STREETS - AVERAGE DAILY TRAFFIC FROM 5000 TO 15,000 VEHICLES PER DAY: THESE ARE ALL STREETS WHICH CONNECT RESIDENTIAL STREETS TO ARTERIALS (60-FOOT TO 80-FOOT RIGHTS-OF-WAY), WITH TWO LANES OF ALTERNATING TRAFFIC WITH PARKING ON BOTH SIDES OR FOUR LANES OF ALTERNATING TRAFFIC.

- THEREFORE, NO WORK WILL BE PERFORMED ON COLLECTOR STREETS DURING THE PEAK TRAFFIC HOURS, 6:00 A.M. TO 9:00 A.M. AND 3:30 P.M. TO 6:00 P.M. (MONDAY THROUGH FRIDAY ONLY), EXCEPT EMERGENCY WORK TO RESTORE SERVICES. MAIN SUBDIVISION COLLECTORS ARE ESPECIALLY CRITICAL. TWO-WAY TRAFFIC SHALL BE MAINTAINED AT ALL TIMES, UNLESS OTHERWISE AUTHORIZED BY THE DIRECTOR OF PUBLIC WORKS OR THEIR DESIGNEE.
- a. ALL UTILITY CUTS IN COLLECTOR STREETS SHALL BE FILLED EACH NIGHT AND COVERED BY A TEMPORARY ASPHALT PATCH IF COMPLETED TOO LATE FOR A PERMANENT ASPHALT REPAIR. THE REPAIR SHALL RECEIVE A PERMANENT ASPHALT PATCH AS SOON AS POSSIBLE BUT NO LATER THAN FIVE CALENDAR DAYS AFTER WORK COMPLETION FOR MINOR PROJECTS, AND WITHIN FIFTEEN CALENDAR DAYS FOR MAJOR PROJECTS, UNLESS OTHERWISE DIRECTED. WHEN NOTIFIED BY THE CITY OF AN UNSAFE OPENING, THE RESPONSIBLE UTILITY CONTRACTOR SHALL RESPOND AND REPAIR SAID PATCH WITHIN FOUR HOURS.
  - RESIDENTIAL STREETS - AVERAGE DAILY TRAFFIC UNDER 5,000 VEHICLES PER DAY: THESE ARE THOSE STREETS AND CUL-DE-SACS WHICH PROVIDE DIRECT ACCESS TO ADJACENT PROPERTY OR INDIVIDUAL HOMES, NORMALLY TWO ALTERNATING LANES IN A 50-FOOT RIGHT-OF-WAY. CONSTRUCTION HOURS SHALL BE LIMITED TO 7:30 A.M. TO 4:30 P.M. TO BE SENSITIVE TO NOISE IMPACTS ON SURROUNDING PROPERTIES (EMERGENCY WORK TO RESTORE SERVICES EXCLUDED). AT LEAST A SINGLE LANE SHALL BE PROVIDED FOR TWO-WAY TRAFFIC WITH A FLAGMAN AVAILABLE FOR CONTROL, UNLESS OTHERWISE AUTHORIZED BY THE DIRECTOR OF PUBLIC WORKS OR THEIR DESIGNEE.
  - EXCAVATIONS IN RESIDENTIAL STREETS SHALL BE PROTECTED EACH NIGHT; ALL UTILITY CUTS SHALL BE MAINTAINED DAILY WITH 21A STONE, CRUSHED CONCRETE, CRUSHED ASPHALT, COLD MIX, OR PLANT MIX ASPHALT. THE PERMANENT ASPHALT REPAIR SHALL BE MADE AS SOON AS POSSIBLE BUT NO LATER THAN FIVE DAYS AFTER WORK COMPLETION FOR MINOR PROJECTS AND WITHIN THIRTY CALENDAR DAYS FOR MAJOR PROJECTS. WHEN NOTIFIED BY THE CITY OF AN UNSAFE OPENING, THE RESPONSIBLE PARTY SHALL RESPOND AND REPAIR SAID PATCH WITHIN FOUR HOURS.

### DEPARTMENT OF RECREATION, PARKS & OPEN SPACES - PARKS & URBAN FORESTRY

- a. THE CONTRACTOR WILL OBTAIN ALL NECESSARY TREE PERMITS. THE CONTRACTOR SHALL CONFORM TO ALL REQUIREMENTS OF THE "CITY OF NORFOLK TREE ORDINANCE."
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR RESTORING DISTURBED AREAS TO THEIR ORIGINAL CONDITION. ALL WORK ON PRIVATE PROPERTY MUST BE COORDINATED WITH PARKS & URBAN FORESTRY PRIOR TO CONSTRUCTION. TRENCHES FOR PRIVATE PROPERTY SEWERS WILL NOT BE ALLOWED TO BE LEFT OPEN OVERNIGHT. NO EXCEPTIONS.
- ONCE ALL EXISTING AND ACTIVE SEWER AND WATER CONNECTIONS HAVE BEEN LOCATED, THE CONTRACTOR MUST TOUR THE JOB SITE WITH THE ENGINEER, LICENSED PLUMBING CONTRACTOR, AND CITY FORESTER TO DETERMINE THE LOCATION/RELOCATION OF EXISTING SEWER TAPS, LATERAL ALIGNMENTS, METER LOCATIONS, HAND DIG ZONES, AND EQUIPMENT CLEARANCE PRUNING REQUIREMENTS. WHERE IN THE SOLE OPINION OF THE CITY FORESTER, EXCAVATION WITH A TRENCHER, BACKHOE OR OTHER MECHANICAL EQUIPMENT WITHIN THE CRITICAL ROOT ZONE WOULD LIKELY RESULT IN EXCESSIVE ROOT DAMAGE, HAND DIGGING WILL BE REQUIRED. WHERE FEASIBLE, NEW SERVICES WILL BE PLACED IN A LOCATION WHICH WILL LEAST IMPACT TREE ROOTS AND FACILITATE UTILITY INSTALLATION. THERE SHALL NOT BE SANITARY OR WATER SERVICE REPLACEMENTS OR TAP CONNECTIONS PERFORMED AT ANY LOCATION WHERE SERVICE/TAP LOCATIONS HAVE NOT BEEN JOINTLY REVIEWED BY THE ENGINEER, CONTRACTOR, LICENSED PLUMBING CONTRACTOR, AND CITY FORESTER, AND APPROVED BY THE ENGINEER. HAND DIGGING WILL BE PERFORMED AT NO ADDITIONAL COST TO THE CITY.
- ALL AREAS DESIGNATED BY THE CITY FORESTER FOR HAND DIGGING REQUIRE INSPECTION BY PARKS & URBAN FORESTRY PRIOR TO BACKFILLING. TO ASSESS THE



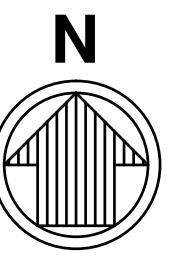
1	2	3	4	5	6
<p><b>RIGHT OF WAY MANAGEMENT STANDARD SITE PLAN NOTES</b></p> <p>1. ALL WORK WITHIN THE RIGHT OF WAY SHALL COMPLY WITH THE CITY OF NORFOLK RIGHT OF WAY EXCAVATION &amp; RESTORATION MANUAL, (ORDINANCE NO. 40,778), DEPARTMENT OF PUBLIC WORKS RIGHT-OF-WAY DIVISION. DOWNLOAD AT <a href="http://WWW.NORFOLK.GOV/DOCUMENTCENTER/VIEW/779">HTTP://WWW.NORFOLK.GOV/DOCUMENTCENTER/VIEW/779</a>. IT IS IMPORTANT THAT CONTRACTORS FAMILIARIZE THEMSELVES WITH THE REQUIREMENTS OUTLINED IN THE MANUAL. FAILURE TO DO SO MAY IMPACT PROJECT COSTS. ALSO SEE "OTHER" IN THIS SECTION. EXCEPTIONS MAY BE PERMITTED. A REVIEW MEETING WITH RIGHT OF WAY IS REQUIRED. PLEASE CONTACT PUBLIC WORKS AT PWROW@NORFOLK.GOV TO SCHEDULE.</p> <p>2. ALL WORK WITHIN THE RIGHT OF WAY SHALL COMPLY WITH THE CITY OF NORFOLK DESIGN STANDARDS: DOWNLOAD AT <a href="http://WWW.NORFOLK.GOV/INDEX.ASPX?NID=819">HTTP://WWW.NORFOLK.GOV/INDEX.ASPX?NID=819</a>. EXCEPTIONS MAY BE PERMITTED. A REVIEW MEETING WITH RIGHT OF WAY IS REQUIRED. PLEASE CONTACT PUBLIC WORKS AT PWROW@NORFOLK.GOV TO SCHEDULE.</p> <p>3. FLOWABLE FILL IS NOT AN APPROVED MATERIAL FOR USE IN THE CITY OF NORFOLK FOR BACKFILL WITHOUT PRIOR APPROVAL. THE SELECT MATERIAL AND 21A STONE WILL BE IN ACCORDANCE WITH THE 2002 VDOT ROAD AND BRIDGE SPECIFICATIONS. FOR BACKFILL AROUND THE PIPE USE SELECT MATERIAL (SECTION 207) - TYPE I AND 20 CBR COMPACTION. FOR THE SUB BASE MATERIAL USE 6" MIN. VDOT 21A STONE IN ACCORDANCE TO SECTION 208."</p> <p>4. NEW DEVELOPMENTS, CONSTRUCTION, AND ADDITIONS REQUIRE NEW SIDEWALK, CURB, GUTTER, AND DRIVEWAYS. EXCEPTIONS MAY BE PERMITTED. A REVIEW MEETING WITH RIGHT OF WAY IS REQUIRED. PLEASE CONTACT PUBLIC WORKS AT PWROW@NORFOLK.GOV TO SCHEDULE.</p> <p>5. IF APPROVED BY RIGHT-OF-WAY, WHEN THE CONTRACTORS WORK REQUIRES THE SAWCUTTING AND/OR PARTIAL DEMOLITION AND/OR REMOVAL OF ANY SECTION OF AN EXISTING APRON OR SIDEWALK. THE CONTRACTOR WILL BE REQUIRED TO REMOVE SAID EXISTING APRON OR SIDEWALK AND REPLACE IT WITH A NEW MONOLITHIC APRON OR SIDEWALK. SIDEWALK SHALL BE REMOVED TO THE NEAREST JOINT. ALL CONCRETE IS TO BE SAW CUT. NO PATCHING WILL BE ALLOWED. COMMERCIAL APRONS SHALL BE REPLACED WITH AN APPROVED COMMERCIAL APRON. RESIDENTIAL APRONS SHALL BE REPLACED WITH AN APPROVED RESIDENTIAL APRON (HS-207). SIDEWALKS SHALL BE REPLACED WITH AN APPROVED SIDEWALK DETAIL. CONTACT THE DIVISION OF RIGHT-OF-WAY FOR APPROVAL AT PWROW@NORFOLK.GOV (ORDINANCE NO: 40,778)"</p> <p>6. UTILITY POLES MUST BE RELOCATED AT YOUR PROJECT'S COST. A COPY OF THE WORK ORDER FOR POLE RELOCATIONS MUST ACCOMPANY RIGHT-OF-WAY PERMITS.</p> <p><b>PERMITS:</b></p> <p>1. A PERMIT AND INSPECTION IS REQUIRED TO PERFORM EXCAVATION AND INSTALLATION WORK OF ANY KIND IN THE RIGHT-OF-WAY. APPLICATIONS: <a href="http://WWW.NORFOLK.GOV/INDEX.ASPX?NID=362">HTTP://WWW.NORFOLK.GOV/INDEX.ASPX?NID=362</a></p> <p>2. A PERMIT AND INSPECTION IS REQUIRED TO SLOW, CLOSE, REDIRECT, DETOUR, OR ALTER VEHICULAR AND PEDESTRIAN TRAFFIC FOR ANY DURATION. APPLICATIONS: <a href="http://WWW.NORFOLK.GOV/INDEX.ASPX?NID=362">HTTP://WWW.NORFOLK.GOV/INDEX.ASPX?NID=362</a></p> <p>3. A PERMIT AND INSPECTION IS REQUIRED FOR LANE OR SIDEWALK CLOSURES FOR WORK WASHING, GRADING, OR INSTALLING ANY ITEM ABOVE OR UNDERGROUND. APPLICATIONS: <a href="http://WWW.NORFOLK.GOV/INDEX.ASPX?NID=362">HTTP://WWW.NORFOLK.GOV/INDEX.ASPX?NID=362</a></p> <p>4. A PERMIT AND INSPECTION IS REQUIRED TO PLACE ANY OBJECT IN THE CITY RIGHT-OF-WAY. APPLICATIONS: <a href="http://WWW.NORFOLK.GOV/INDEX.ASPX?NID=362">HTTP://WWW.NORFOLK.GOV/INDEX.ASPX?NID=362</a></p> <p>5. A PERMIT IS REQUIRED TO HAUL OVERSIZED, OVERWEIGHT, OR OVER HEIGHT LOADS. APPLICATIONS: <a href="http://WWW.NORFOLK.GOV/INDEX.ASPX?NID=362">HTTP://WWW.NORFOLK.GOV/INDEX.ASPX?NID=362</a></p> <p>6. A PERMIT AND INSPECTION ARE REQUIRED WHEN A NEW APRON AND/OR SIDEWALK IS INSTALLED, ALL NEW OR EXISTING UTILITY STRUCTURES SHALL BE INSTALLED AND/OR RELOCATED OUTSIDE THE AREA OF THE NEW APRON AND/OR SIDEWALK. APPLICATION: <a href="http://WWW.NORFOLK.GOV/INDEX.ASPX?NID=362">WWW.NORFOLK.GOV/INDEX.ASPX?NID=362</a></p> <p>7. A PERMIT AND INSPECTION IS REQUIRED FOR TEMPORARY BULK WASTE CONTAINERS PLACED IN THE RIGHT OF WAY. IF THE CONTAINER IS PLACED ON PRIVATE PROPERTY A PERMIT FROM THE HEALTH DEPARTMENT IS REQUIRED.</p> <p><b>FEES:</b></p> <p>1. CURRENT RIGHT OF WAY PERMIT FEES: <a href="http://WWW.NORFOLK.GOV/DOCUMENTCENTER/VIEW/789">HTTP://WWW.NORFOLK.GOV/DOCUMENTCENTER/VIEW/789</a></p> <p>2. EXEMPTION: CONTRACTORS PERFORMING WORK UNDER CONTRACT WITH THE CITY OF NORFOLK ARE EXEMPT FROM PERMIT FEES THROUGH JULY 1, 2014. EFFECTIVE JULY 1, 2014, CONTRACTORS PERFORMING WORK UNDER CONTRACT WITH THE CITY OF NORFOLK MUST PAY STREET, LANE, AND SIDEWALK CLOSURE FEES.</p> <p>3. EXEMPTION: CONTRACTORS PERFORMING WORK UNDER CONTRACT WITH VDOT ARE EXEMPT FROM ALL PERMIT FEES.</p> <p>4. ANY DEVIATION FROM THE CITY'S ROW EXCAVATION &amp; RESTORATION MANUAL THAT IS BEING REQUESTED MUST BE MARKED ON THE PLANS. ALSO, A DETAILED LIST OF THE DEVIATIONS MUST BE PROVIDED AS WELL.</p> <p><b>TRAFFIC CONTROL</b></p> <p>1. ALL TRAFFIC CONTROL SHALL COMPLY WITH THE LATEST EDITION OF THE "MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES (MUTCD)", THE "VIRGINIA WORK AREA PROTECTION MANUAL" AND THE "CITY OF NORFOLK RIGHT OF WAY EXCAVATION AND RESTORATION MANUAL WHETHER IN EFFECT OR NOT AT THE TIME OF BID. ADDITIONAL CHARGES APPLY IF OFF-DUTY OFFICERS ARE REQUIRED. A LIST OF PERMIT FEES IS LOCATED AT <a href="http://WWW.NORFOLK.GOV/INDEX.ASPX?NID=362">WWW.NORFOLK.GOV/INDEX.ASPX?NID=362</a></p> <p>2. FOR CONSTRUCTION IN OR ADJACENT TO ANY ARTERIAL AND/OR COLLECTOR STREETS REQUIRING TEMPORARY LANE OR STREET CLOSURE, THE CONTRACTOR MUST SCHEDULE A MEETING WITH THE CITY'S TRAFFIC MITIGATION TEAM. PLEASE CONTACT PUBLIC WORKS AT PWROW@NORFOLK.GOV TO SCHEDULE.</p> <p>3. THE CONTRACTOR WILL BE REQUIRED TO SUBMIT A DETAILED TRAFFIC CONTROL PLAN (MOT) WITH THE CONTRACTOR'S PERMIT APPLICATION TO WORK IN THE RIGHT-OF-WAY AT LEAST 14 DAYS IN ADVANCE OF THE START DATE. THE MOT SHALL BE A DRAWING OR AERIAL PHOTO WITH SITE SPECIFIC DETAILS. THESE SHALL INCLUDE BUT ARE NOT LIMITED TO: TRAFFIC SIGNS, DIRECTIONAL SIGNS, DESTINATION SIGNAGE, CHANNELIZING DEVICES, WATER-FILLED BARRIERS, PORTABLE MESSAGE BOARDS WITH MESSAGES TO BE DISPLAYED AND TIMES AND DURATIONS OF DISPLAYED MESSAGES. ADDITIONALLY THE MOT SHALL DISPLAY THE EXACT LOCATION OF ALL SIGNS AND/OR DEVICES INCLUDING SPACING FOR EACH SIGN AND/OR DEVICE, SPACING BEING APPROPRIATE FOR THE WORK ZONE LOCATION AND POSTED SPEED LIMITS. ALL MAINTENANCE OF TRAFFIC (MOT) PLANS SHALL CONFORM TO THE CURRENT ISSUE OF "THE VIRGINIA WORK AREA PROTECTION MANUAL" COPIES OR REPRODUCTIONS OF STANDARD VWAPM TTC PLANS MAY NOT BE SUFFICIENT. CONTRACTORS SHOULD CONSIDER THESE ITEMS WHEN BIDDING FOR CONSTRUCTION AS IT MAY AFFECT COSTS.</p> <p>4. NORFOLK POLICE REQUIRES OFF-DUTY OFFICERS FOR TRAFFIC CONTROL IN ANY SIGNALIZED INTERSECTION AND AS REQUIRED BY PERMIT. OFF-DUTY OFFICERS ARE INDEPENDENT CONTRACTORS. THE COST FOR OFF-DUTY OFFICERS IS A CONTRACTOR/OWNER RESPONSIBILITY.</p> <p><b>BONDS:</b></p> <p>1. THE CONTRACTOR, OWNER, OR DEVELOPER WILL BE REQUIRED TO POST A CASH, CHECK, OR SURETY BOND OR LETTER OF CREDIT TO EXCAVATE IN THE RIGHT OF WAY." DOWNLOAD THE FORM: <a href="http://WWW.NORFOLK.GOV/DOCUMENTCENTER/VIEW/1406">HTTP://WWW.NORFOLK.GOV/DOCUMENTCENTER/VIEW/1406</a></p> <p>2. BOND AMOUNT MUST INCLUDE 100% TOTAL COST OF ROW INSTALLATION INCLUDING STREETLIGHTS, WATER, SEWER, STORM, BMPS, ROADWAY, SIDEWALK, CURB, GUTTER AS WELL AS ANY STORM WATER INFRASTRUCTURE WORK BEING DONE ON THE PRIVATE PROPERTY SIDE. AN ADDITIONAL AMOUNT MAY BE SET AT THE DISCRETION OF THE DIRECTOR OF PUBLIC WORKS AND/OR ROW MANAGER.</p> <p>3. BOND WILL BE REDUCED DOWN TO 10% FROM THE DATE OF FINAL INSPECTION FOR A 2 YEAR WARRANTY TERM. A SEPARATE WARRANTY BOND IS ACCEPTABLE IN LIEU OF A BOND REDUCTION. A LETTER REQUESTING RELEASE OR REDUCTION MUST BE SENT TO THE RIGHT OF WAY PERMITS OFFICE VIA E-MAIL AT PWROW@NORFOLK.GOV</p> <p><b>NOTES TO CITY AND SPECIAL UTILITY PROJECT A/E DESIGNERS AND CONTRACTORS:</b></p> <p>4. ALL CITY PROJECTS AND SPECIAL UTILITY PROJECTS (AS DETERMINED BY THE ROW ADMINISTRATOR) CANNOT BE BID UNTIL UTILITIES ARE RELOCATED OR ARRANGEMENTS HAVE BEEN COORDINATED BY THE CITY'S PROJECT MANAGER, A/E, AND RIGHT OF WAY DIVISION. PLEASE PROVIDE A LIST AND DRAWINGS OF ALL UTILITIES NEEDING RELOCATION TO RIGHT-OF-WAY DIVISION AT OR BEFORE 30% SUBMITTAL."</p> <p>5. PROJECT DESIGNERS MUST INCLUDE A DETAILED TRAFFIC CONTROL PLAN FOR UTILITY WORK WITHIN THE RIGHT-OF-WAY IN THE PLANS. FOR CONSTRUCTION IN OR ADJACENT TO ANY ARTERIAL AND/OR COLLECTOR STREETS AS DEFINED IN THE VIRGINIA WORK AREA PROTECTION MANUAL REQUIRING TEMPORARY LANE OR STREET CLOSURE, THE CONTRACTOR MUST SCHEDULE A MEETING WITH THE CITY'S TRAFFIC MITIGATION TEAM. PLEASE CONTACT PUBLIC WORKS AT PWROW@NORFOLK.GOV TO SCHEDULE.</p>					
<p><b>RICHMOND &amp; SURREY CRESCENT SHORELINE IMPROVEMENTS</b></p> <p><b>ROW MANAGEMENT STANDARD SITE PLAN NOTES</b></p> <p>FOR 65% SUBMITTAL ISSUED: 2024-08-12 NOT TO BE USED FOR CONSTRUCTION</p> <p><b>G-005</b></p> <p>Sheet Reference No. File: Q:\NOR\10390-572\20_CADD\Arch\Richmond_Surrey_Crescent Shoreline Improvements\1039058-G-205_Plan.dwg</p> <p>101 W MAIN ST, SUITE 3000 NORFOLK, VA 23510 757-628-8222</p> <p>Prepared for: CITY OF NORFOLK DEPARTMENT OF PUBLIC WORKS</p> <p>Designed by: IB Date: 2024-08-12 Drawn by: JAD Man Project No.: 10390-57</p> <p>Reviewed by: HB Drawing date: Submitted by: IR ARTHMAN MOFFATT &amp; NICHOL</p> <p>Drawing Scale: AS SHOWN 1:1 (D SHEET) Per scale: Drawing date: Submitted by: IR ARTHMAN MOFFATT &amp; NICHOL</p> <p>101 W MAIN ST, SUITE 3000 NORFOLK, VA 23510 757-628-8222</p> <p>Prepared for: CITY OF NORFOLK DEPARTMENT OF PUBLIC WORKS</p> <p>Designed by: IB Date: 2024-08-12 Drawn by: JAD Man Project No.: 10390-57</p> <p>Reviewed by: HB Drawing date: Submitted by: IR ARTHMAN MOFFATT &amp; 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## LEGEND:

- 100-FOOT CBPA (CHESAPEAKE BAY PRESERVATION AREA)
  - 50-FOOT CBPA BUFFER
  - 100-FOOT CBPA BUFFER

**A1**      **OVERALL PLAN**  
G-101      SCALE: 1":120'



AL-BERM			
NUMBER	RADIUS	LENGTH	LINE/CHORD DIRECTION
L1		71.50	S57° 09' 46.84"E
L2		149.97	S40° 48' 33.08"E
C1	22.63	30.11	S78° 55' 45.15"E
L3		2.26	N62° 57' 02.78"E
C2	24.51	31.79	N25° 47' 22.04"E
L4		83.47	N11° 22' 18.71"W
C3	38.33	8.67	N4° 53' 27.86"W
L5		144.37	N1° 35' 22.99"E
C4	36.14	53.02	N40° 26' 39.28"W
L6		53.02	N82° 28' 41.54"W
C5	46.12	21.10	N69° 22' 20.44"W
L7		69.89	N56° 15' 59.33"W

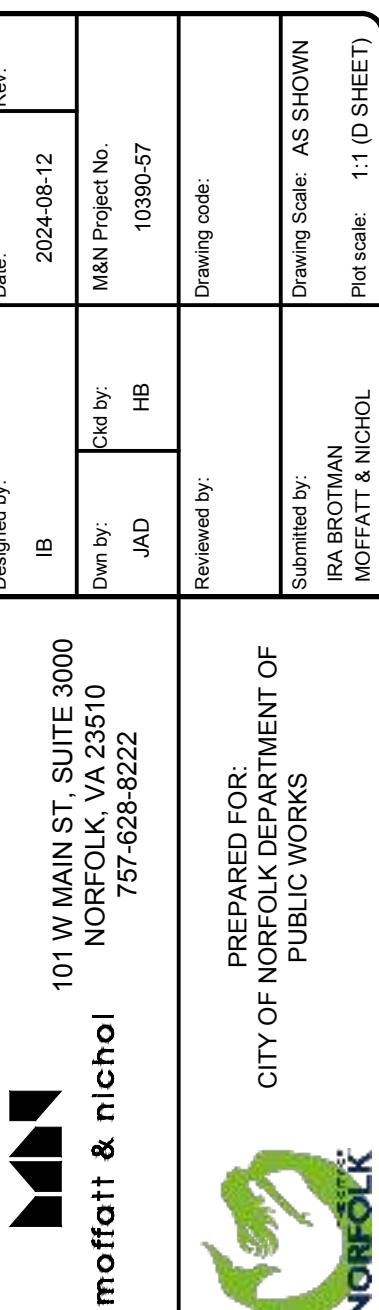
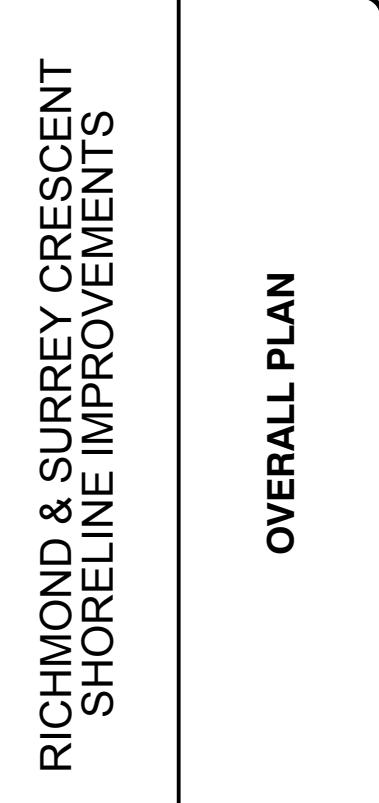
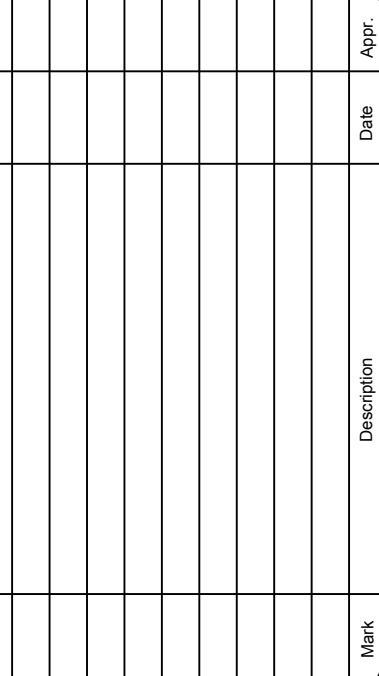
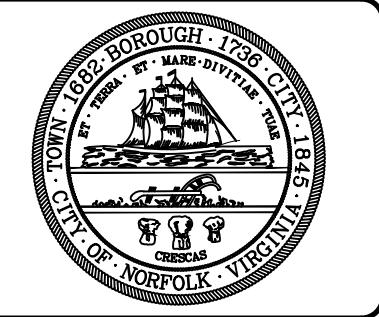
# AL-SHORELINE

NUMBER	RADIUS	LENGTH	LINE/CHORD DIRECTION
L8		54.51	N0° 41' 43.32"W
C6	200.00	44.37	N5° 39' 37.65"E
L9		13.79	N12° 00' 58.61"E
C7	200.00	162.48	N35° 17' 21.42"E
L10		8.49	N58° 33' 44.24"E
C8	200.00	117.83	N75° 26' 22.17"E
L11		47.46	S87° 40' 59.89"E
C9	200.00	23.58	S84° 18' 20.20"E
L12		0.06	S80° 55' 40.50"E
C10	560.00	246.33	S68° 19' 35.44"E
L13		2.07	S55° 43' 30.38"E
C11	40.00	89.55	N60° 08' 14.96"E
L14		80.18	N3° 59' 59.71"W
C12	95.00	86.38	N30° 02' 57.85"W
L15		523.03	N56° 05' 55.99"W
C13	190.00	218.84	N23° 06' 09.73"W
L16		170.52	N9° 53' 36.53"E
C14	160.00	290.00	N61° 49' 05.73"E
L17		253.12	S66° 15' 25.06"E
L18		35.89	N84° 36' 27.25"E
L19		24.33	N39° 26' 10.36"E
L20		25.07	N2° 55' 10.07"E
L21		119.92	N13° 06' 36.27"W



**OR 65% SUBMITTAL**  
ISSUED: 2024-08-12  
**TO BE USED FOR CONSTRUCTION**

Sheet  
Reference No.  
**G-101**  
INDEX: 6 OF 35







1

2

3

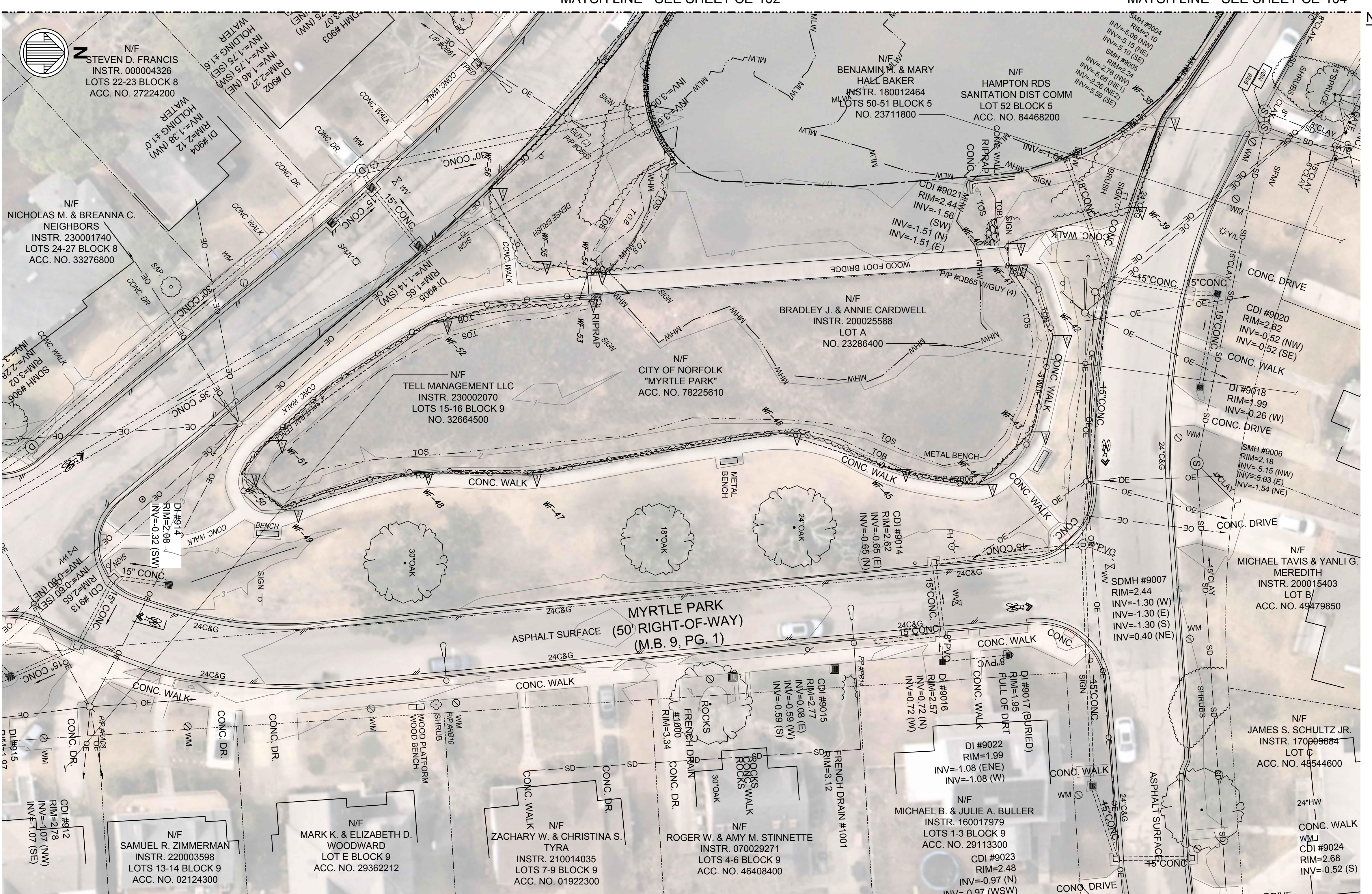
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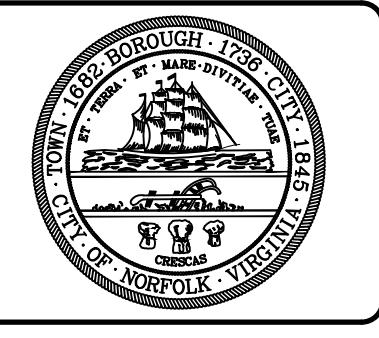
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## MATCH LINE - SEE SHEET CE-102

## MATCH LINE - SEE SHEET CE-104



A1  
CE-103 EXISTING CONDITIONS PLAN (SHEET 3 OF 7)  
SCALE: 1" = 20'



Date	Age

RICHMOND & SURREY CRESCENT  
SHORELINE IMPROVEMENTS

EXISTING CONDITIONS  
PLAN (SHEET 3 OF 7)

Designed by:	Date:	Rev:
IB Moffatt & Nichol	2024-08-12	

Prepared for:	Reviewed by:	Drawing date:
CITY OF NORFOLK DEPARTMENT OF PUBLIC WORKS		

Sheet Reference No.
CE-103

INDEX: 9 OF 35

File: Q:\NOR\1030-5720\CAD\103\CE-103.dwg

FOR 65% SUBMITTAL  
ISSUED: 2024-08-12  
NOT TO BE USED FOR CONSTRUCTION

DRAWING SCALES SHOWN BASED ON 22"x34" DRAWING



1

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6



Z

E

D

C

B

A

A map of the Lafayette River area. The river flows from the bottom right towards the top left. A thick black line outlines the river's course. The word "FLOOD" is written vertically along the upper part of the river's outline, with an arrow pointing downwards. The word "EBB" is written vertically along the lower part of the river's outline, with an arrow pointing upwards. The surrounding land is shaded in various tones of brown and green.

MATCH LINE - SEE SHEET CE-104

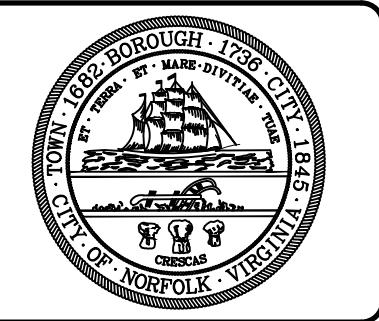
**A1** EXISTING CONDITIONS PLAN (SHEET 5 OF 7)  
CE-105 SCALE: 1" = 20'

CE-105 SCALE: 1" = 20'

## OTES:

- FOR LEGEND AND ABBREVIATIONS, SEE SHEET G-003.

FOR GENERAL NOTES, SEE SHEET G-004.



# RICHMOND & SURREY CRESCENT SHORELINE IMPROVEMENTS

## EXISTING CONDITIONS

Date:	2024-08-12	Rev.
Ck'd by:	M&N Project No.	C

Reviewed by: \_\_\_\_\_

101  
moffatt & nichol

10

A  
SEAL

Ref  
C  
INDEX: 1

Street  
ance No.  
**105**  
OF

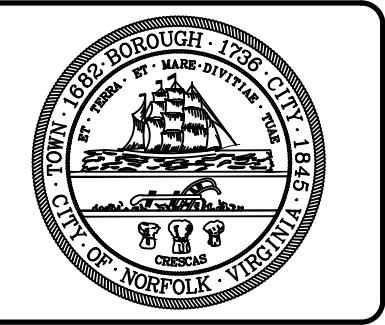
A scale bar at the top shows distances of 0', 20', and 40' along a horizontal line. Below it, the text "SCALE: 1"=20'" is centered. The bottom half of the image contains large, bold text: "FOR 65% SUBMITTAL" on the left, "ISSUED: 2024-08-12" in the center, and "NOT TO BE USED FOR CONSTRUCTION" on the right.

SCALES SHOWN BASED ON 22"X34" DRAWING



MATCH LINE - SEE SHEET CE-105

A1 EXISTING CONDITIONS PLAN (SHEET 6 OF 7)  
E-106 SCALE: 1" = 20'



## NOTES:

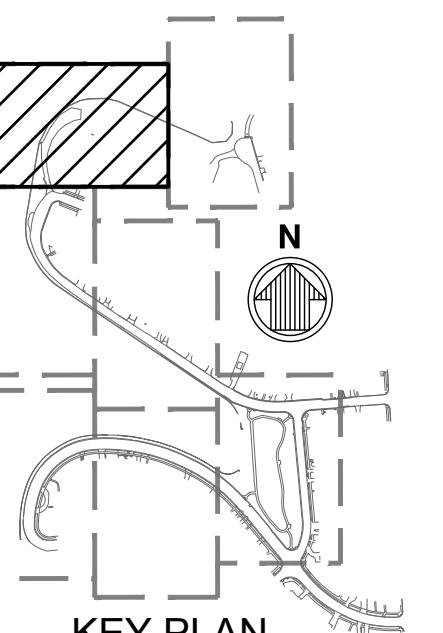
1. FOR LEGEND AND ABBREVIATIONS, SEE SHEET G-003.
  2. FOR GENERAL NOTES, SEE SHEET G-004.

# RICHMOND & SURREY CRESCENT SHORELINE IMPROVEMENTS

## **EXISTING CONDITIONS PLAN (SHEET 6 OF 7)**

Date:	2024-08-12	Rev.
Crkd by:	M&N Project No. HB	10390-57
Drawing code:		
Drawing Scale:	AS SHOWN	Pilot scale: 1:1 (D SHEET)
N	NICHOL	

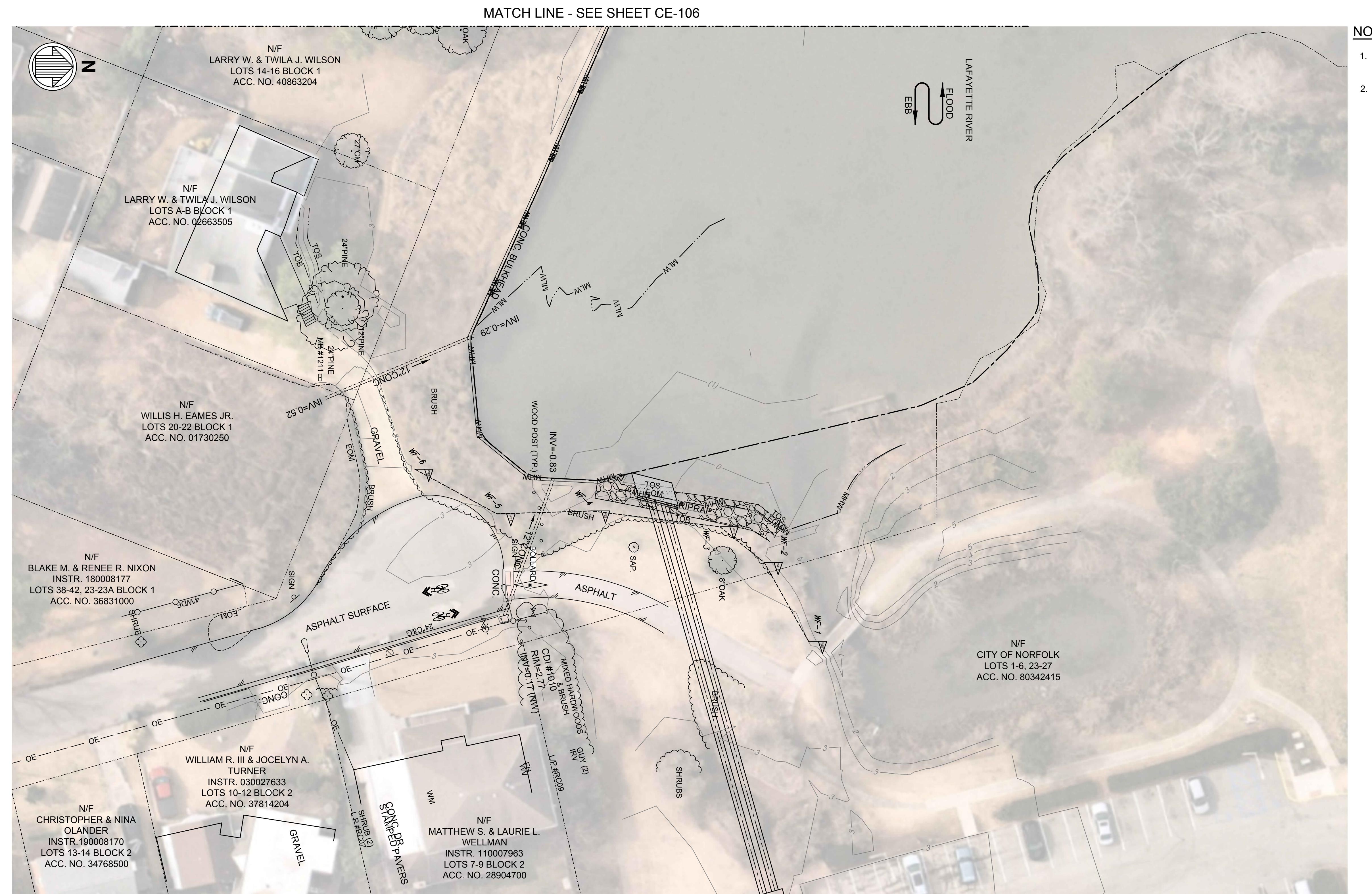
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**FOR 65% SUBMITTAL**  
ISSUED: 2024-08-12  
**NOT TO BE USED FOR CONSTRUCTION**

A large, empty rectangular box with rounded corners, likely a placeholder for a seal or stamp.

Sheet  
Reference No.  
**CE-106**



A1  
CE-107 EXISTING CONDITIONS PLAN (SHEET 7 OF 7)  
SCALE: 1" = 20'

CITY OF NORFOLK, VIRGINIA		CITY OF NORFOLK, VIRGINIA	
101 W MAIN ST, SUITE 3000 NORFOLK, VA 23510 757-628-8222		101 W MAIN ST, SUITE 3000 NORFOLK, VA 23510 757-628-8222	
Designed by: IB	Date: 2024-08-12	Designed by: JAD	Date: 2024-08-12
Drew by: HB	Drawn Project No.: 1039-57	Drew by: HB	Drawn Project No.: 1039-57
Reviewed by: IR BORTMAN MOFFATT & NICHOL		Reviewed by: IR BORTMAN MOFFATT & NICHOL	
Prepared for: CITY OF NORFOLK DEPARTMENT OF PUBLIC WORKS		Prepared for: CITY OF NORFOLK DEPARTMENT OF PUBLIC WORKS	
Drawing Scale: AS SHOWN 1:1 (D SHEET) Drawing date: 8/26/2024 2:00 PM by CASTILLO, CRISTIAN; Saved: 8/26/2024 1:31 AM by CCASTILLO		Drawing Scale: AS SHOWN 1:1 (D SHEET) Drawing date: 8/26/2024 2:00 PM by CASTILLO, CRISTIAN; Saved: 8/26/2024 1:31 AM by CCASTILLO	
<b>RICHMOND &amp; SURREY CRESCENT SHORELINE IMPROVEMENTS</b>		<b>EXISTING CONDITIONS PLAN (SHEET 7 OF 7)</b>	
<b>moffatt &amp; nichol</b> 101 W MAIN ST, SUITE 3000 NORFOLK, VA 23510 757-628-8222		<b>CITY OF NORFOLK</b> PUBLIC WORKS	
<b>KEY PLAN</b> SCALE: 1"=20'		<b>SEAL</b>	
<b>FOR 65% SUBMITTAL</b> ISSUED: 2024-08-12 NOT TO BE USED FOR CONSTRUCTION		<b>Sheet Reference No.</b> <b>CE-107</b> INDEX: 13 OF 35	

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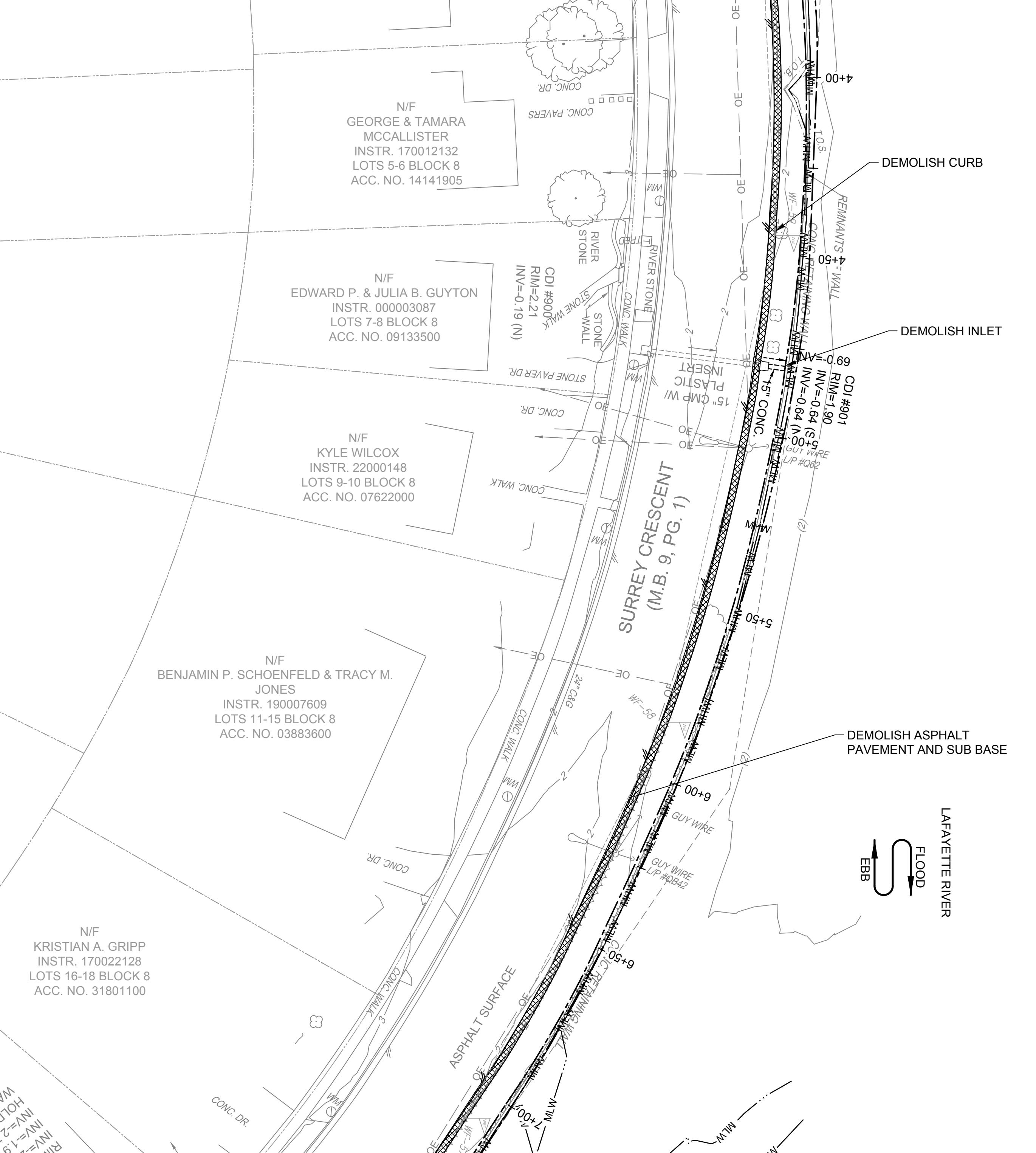
MATCH LINE - SEE SHEET CD-101

A1  
CD-102

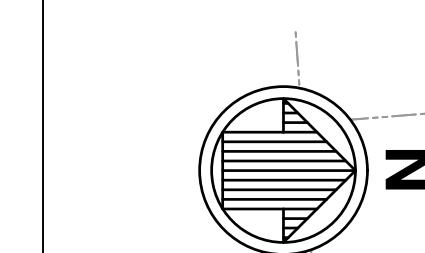
DEMOLITION AND EROSION CONTROL PLAN (SHEET 2 OF 7)

SCALE: 1" = 20'

MATCH LINE - SEE SHEET CD-103



MATCH LINE - SEE SHEET CD-101



E

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C

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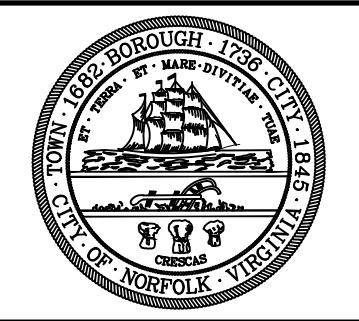
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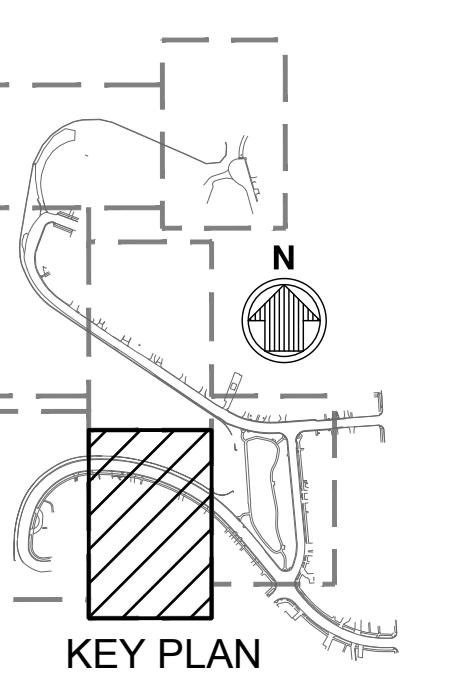
- FOR LEGEND AND ABBREVIATIONS, SEE SHEET G-003.
- FOR GENERAL NOTES, SEE SHEET G-004.

MATCH LINE - SEE SHEET CD-104



Mark	Description	Date	Age

DEMOLITION AND EROSION CONTROL PLAN (SHEET 2 OF 7)			
Designed by: <b>moffatt &amp; nichol</b>	Date: 2024-08-12	Rev:	
Drawn by: 757-628-8222	Check by: JAD	MAN Project No.: 10393-57	
Reviewed by: HB		Drawing date: Drawing Scale: AS SHOWN	
Submitted by: IR BORTMAN	Proj. scale: 1:1 (D SHEET)		



KEY PLAN  
20' 0' 20' 40'  
SCALE: 1"=20'

FOR 65% SUBMITTAL  
ISSUED: 2024-08-12  
NOT TO BE USED FOR CONSTRUCTION

SEAL

Sheet  
Reference No.  
**CD-102**  
INDEX: 15 OF 35

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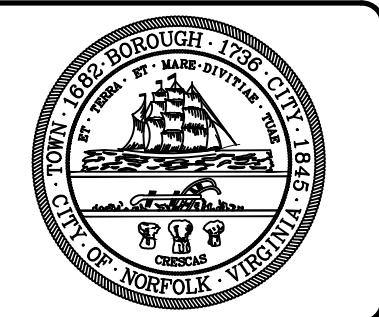
DRAWING SCALES SHOWN BASED ON 22"x34" DRAWING

## MATCH LINE - SEE SHEET CD-102

## MATCH LINE - SEE SHEET CD-104

## NOTES:

- FOR LEGEND AND ABBREVIATIONS, SEE SHEET G-003.
- FOR GENERAL NOTES, SEE SHEET G-004.



Date	Age

DEMOLITION AND EROSION CONTROL PLAN (SHEET 3 OF 7)	
Prepared by: CITY OF NORFOLK DEPARTMENT OF PUBLIC WORKS	Drawn by: AS SHOWN 1:1 (D SHEET) Drawing date: 8/26/2024 2:20 PM by CASTILLO, CRISTIAN; Saved: 8/26/2024 1:45 PM by CASTILLO

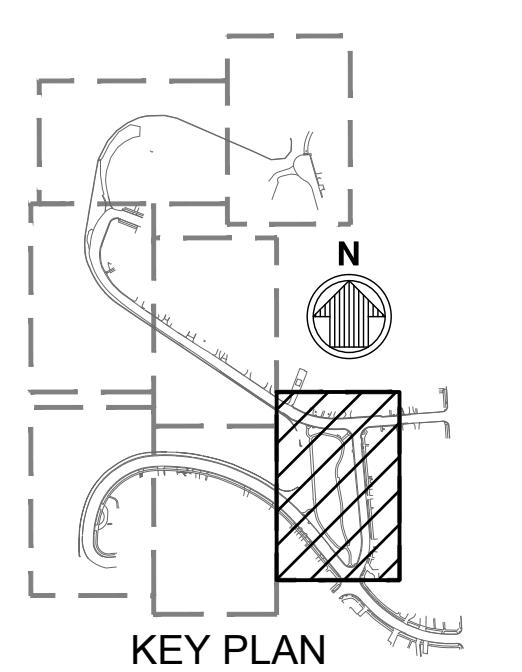
Designed by: moffatt & nichol	Date: 2024-08-12	Rev:
By: JAD	Drawn by: HB	MAN Project No. 1039-57

Reviewed by: IR BORTMAN MOFFATT & NICHOL	Submitted by: IR BORTMAN MOFFATT & NICHOL
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Sheet Reference No. <b>CD-103</b>
INDEX: 16 OF 35

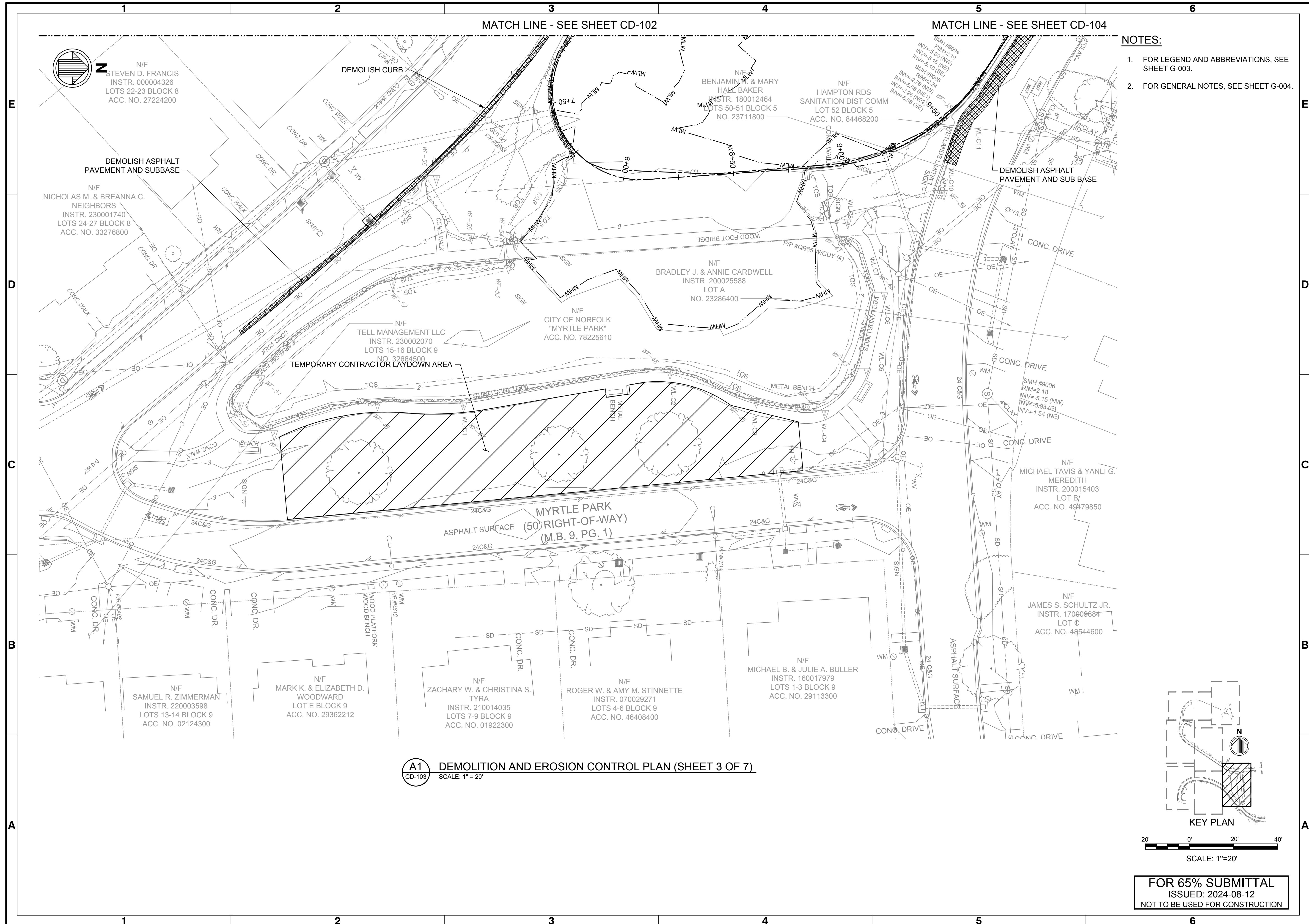
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A1  
CD-103 DEMOLITION AND EROSION CONTROL PLAN (SHEET 3 OF 7)  
SCALE: 1" = 20'



KEY PLAN  
20' 0' 20' 40'  
SCALE: 1"=20'

FOR 65% SUBMITTAL  
ISSUED: 2024-08-12  
NOT TO BE USED FOR CONSTRUCTION



DRAWING SCALES SHOWN BASED ON 22"x34" DRAWING







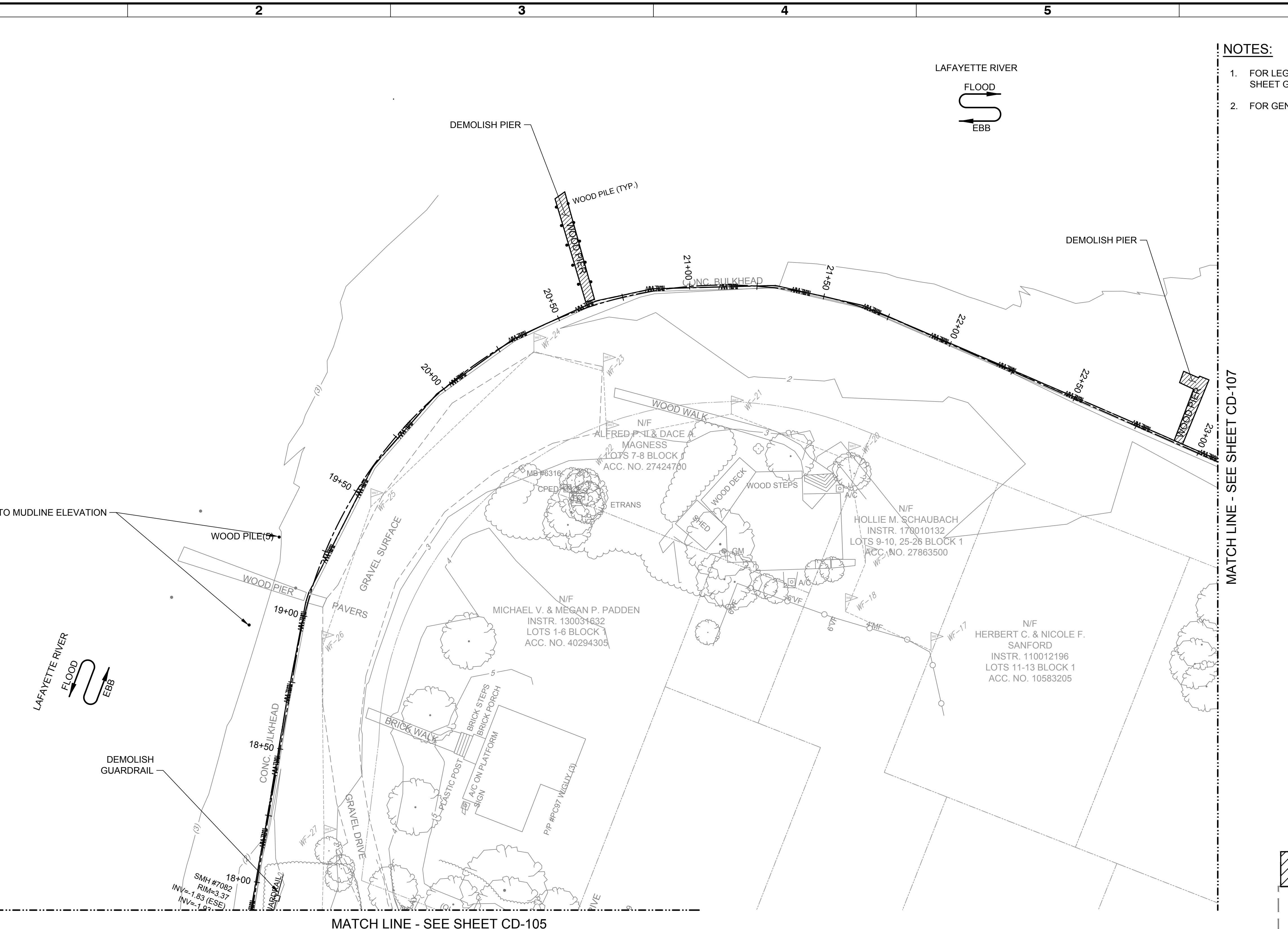
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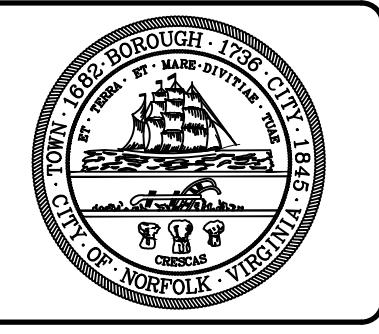
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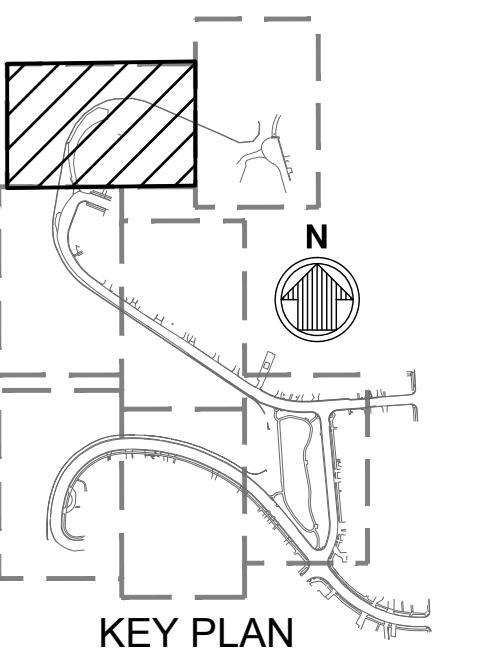
## NOTES:

- FOR LEGEND AND ABBREVIATIONS, SEE SHEET G-003.
- FOR GENERAL NOTES, SEE SHEET G-004.



Mark	Description	Date	Age

RICHMOND & SURREY CRESCENT SHORELINE IMPROVEMENTS			
DEMOLITION AND EROSION CONTROL PLAN (SHEET 6 OF 7)			
Designed by: IB	Date: 2024-08-12	Rev:	
Drawn by: JAD	Checked by: HB	MAN Project No. 1039-57	
Reviewed by: IR BORTMAN MORFATT & NICHOL		Drawing date: Drawing scale: 1:1 (D SHEET) 1:1000 1:1000	
Prepared for: CITY OF NORFOLK DEPARTMENT OF PUBLIC WORKS	Submitted by: IR BORTMAN MORFATT & NICHOL	Drawing Scale: AS SHOWN 1:1000	



20'  
0'  
20'  
40'

SCALE: 1"=20'

FOR 65% SUBMITTAL  
ISSUED: 2024-08-12  
NOT TO BE USED FOR CONSTRUCTION

Sheet Reference No.	CD-106
INDEX: 19 OF 35	

MATCH LINE - SEE SHEET CD-106

N/F  
LARRY W. & TWILA J. WILSON  
LOTS 14-16 BLOCK 1  
ACC. NO. 40863204

N/F  
LARRY W. & TWILA J. WILSON  
LOTS A-B BLOCK 1  
ACC. NO. 02663505

N/F  
WILLIS H. EAMES JR.  
LOTS 20-22 BLOCK 1  
ACC. NO. 01730250

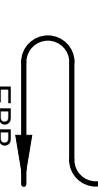
N/F  
BLAKE M. & RENEE R. NIXON  
INSTR. 180008177  
LOTS 38-42, 23-23A BLOCK 1  
ACC. NO. 36831000

N/F  
WILLIAM R. III & JOCELYN A.  
TURNER  
INSTR. 030027633  
LOTS 10-12 BLOCK 2  
ACC. NO. 37814204

N/F  
CHRISTOPHER & NINA  
OLANDER  
INSTR. 190008170  
LOTS 13-14 BLOCK 2  
ACC. NO. 34768500

N/F  
MATTHEW S. & LAURIE L.  
WELLMAN  
INSTR. 110007963  
LOTS 7-9 BLOCK 2  
ACC. NO. 28904700

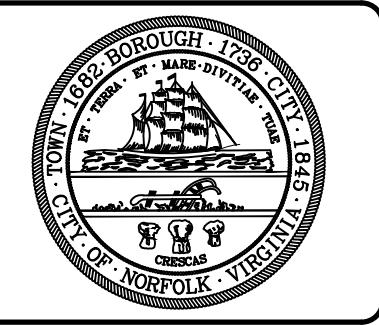
LAFAYETTE RIVER



A1  
CD-107 DEMOLITION AND EROSION CONTROL PLAN (SHEET 7 OF 7)  
SCALE: 1" = 20'

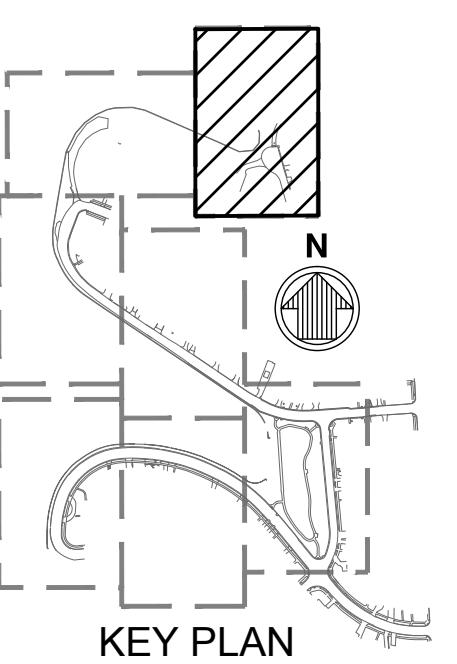
NOTES:

- FOR LEGEND AND ABBREVIATIONS, SEE SHEET G-003.
- FOR GENERAL NOTES, SEE SHEET G-004.



Mark	Description	Date	Age

DEMOLITION AND EROSION CONTROL PLAN (SHEET 7 OF 7)			
RICHMOND & SURREY CRESCENT SHORELINE IMPROVEMENTS			
Prepared by: <b>moffatt &amp; nichol</b>	Designed by: IB Drew by: JAD	Reviewed by:   	Date: 2024-08-12 Man Project No.: 10393-57
Submitted by: IR BORTMAN MOFFATT & NICHOL	Drawn date:   	Drawing Scale: AS SHOWN 1:1 (SHEET)	Proj scale:   



KEY PLAN  
20' 0' 20' 40'  
SCALE: 1"=20'

FOR 65% SUBMITTAL  
ISSUED: 2024-08-12  
NOT TO BE USED FOR CONSTRUCTION  
Sheet Reference No.  
**CD-107**

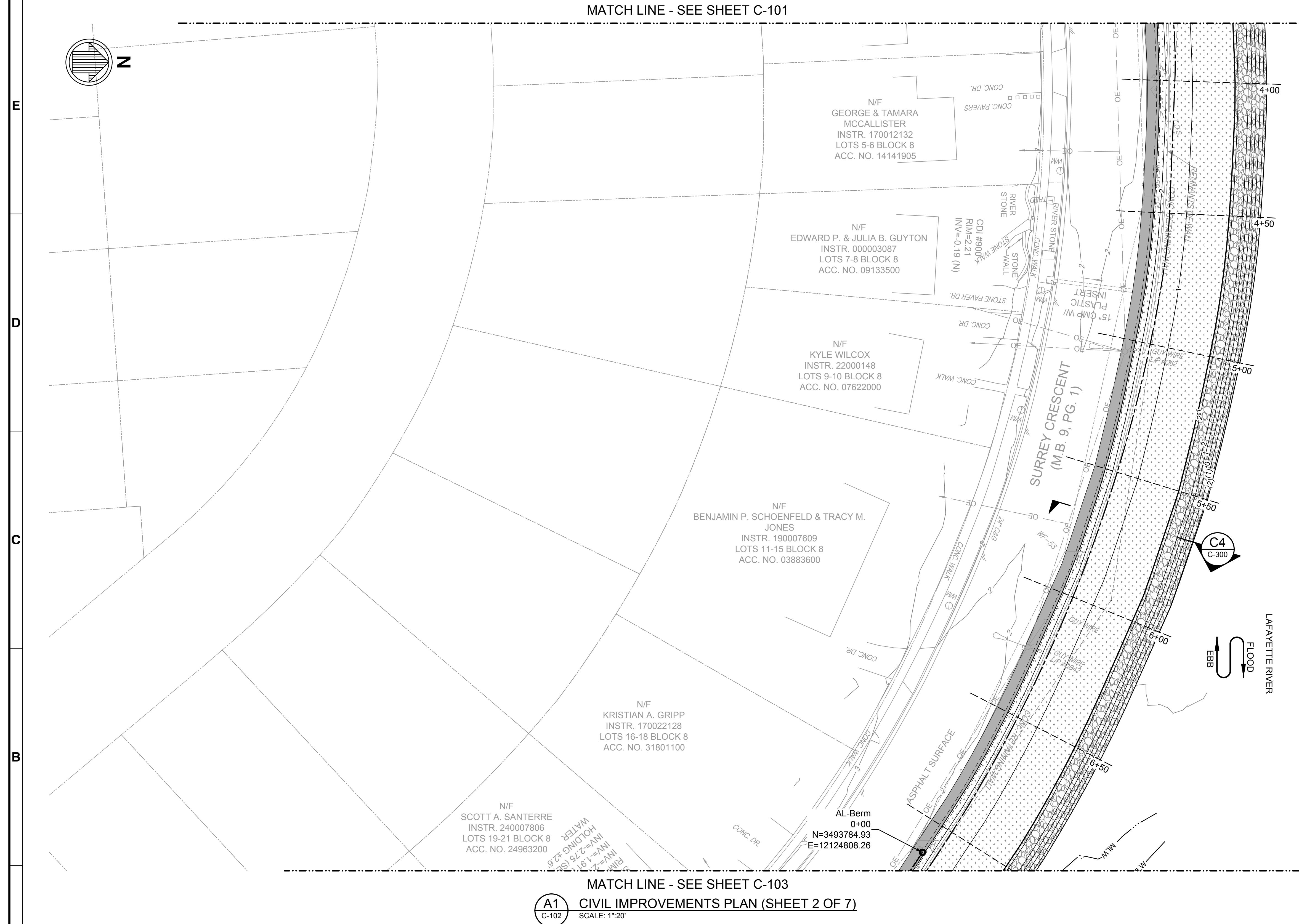
INDEX: 20 OF 35

File: Q:\NOR\10393-57\20\CAD\1\_Actual\_Richmond\_Surrey\_Crescent Shoreline Improvements\10393-57\20\CD-107.dwg

DRAWING SCALES SHOWN BASED ON 22"x34" DRAWING



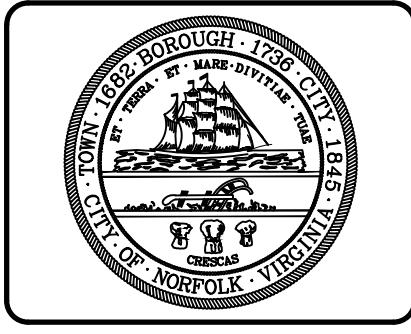
MATCH LINE - SEE SHEET C-101



MATCH LINE - SEE SHEET C-103

A1  
C-102  
CIVIL IMPROVEMENTS PLAN (SHEET 2 OF 7)  
SCALE: 1'-20'

FOR 65% SUBMITTAL  
ISSUED: 2024-08-12  
NOT TO BE USED FOR CONSTRUCTION



1	2	3	4	5	6

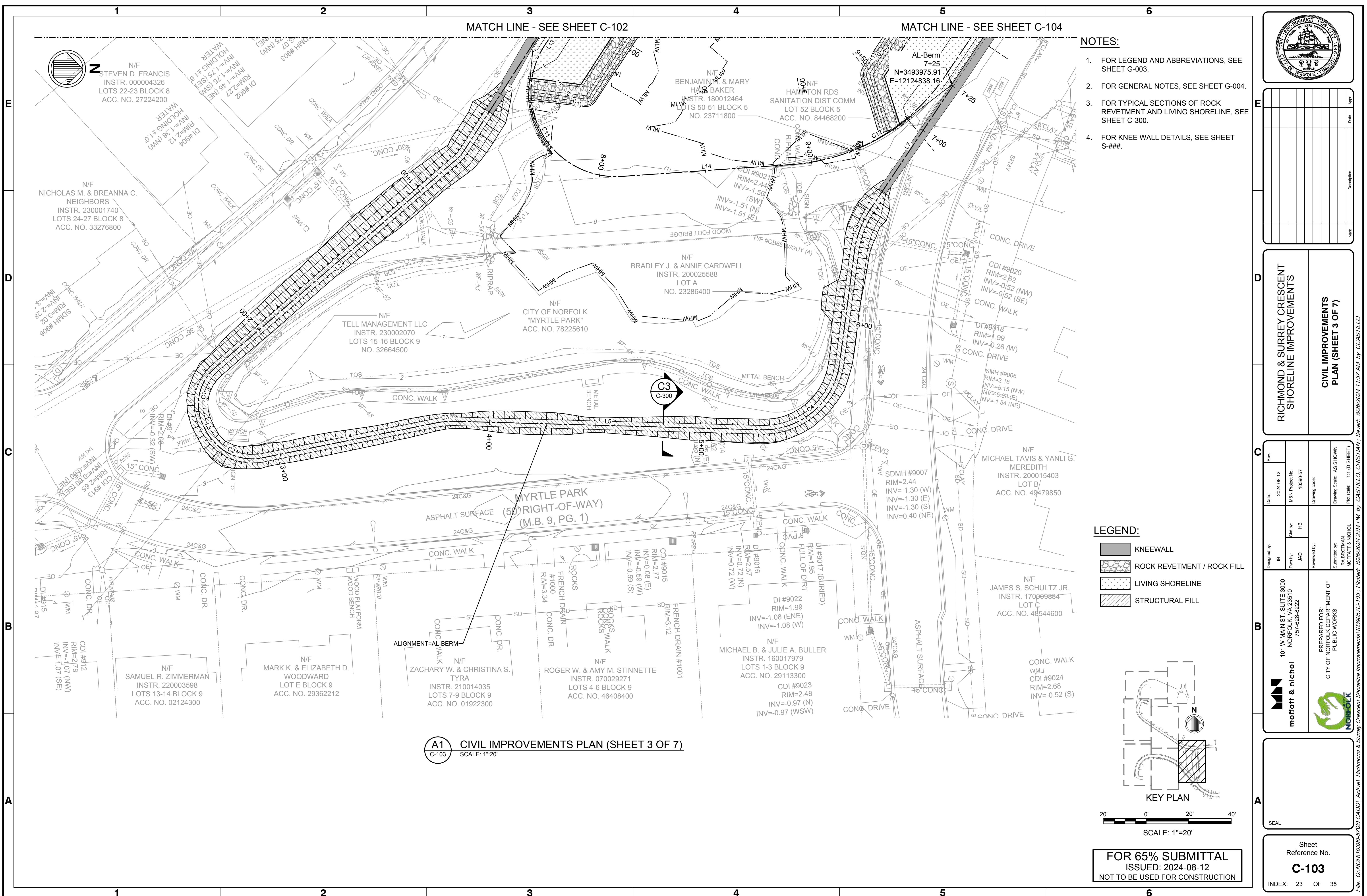
RICHMOND & SURREY CRESCENT SHORELINE IMPROVEMENTS

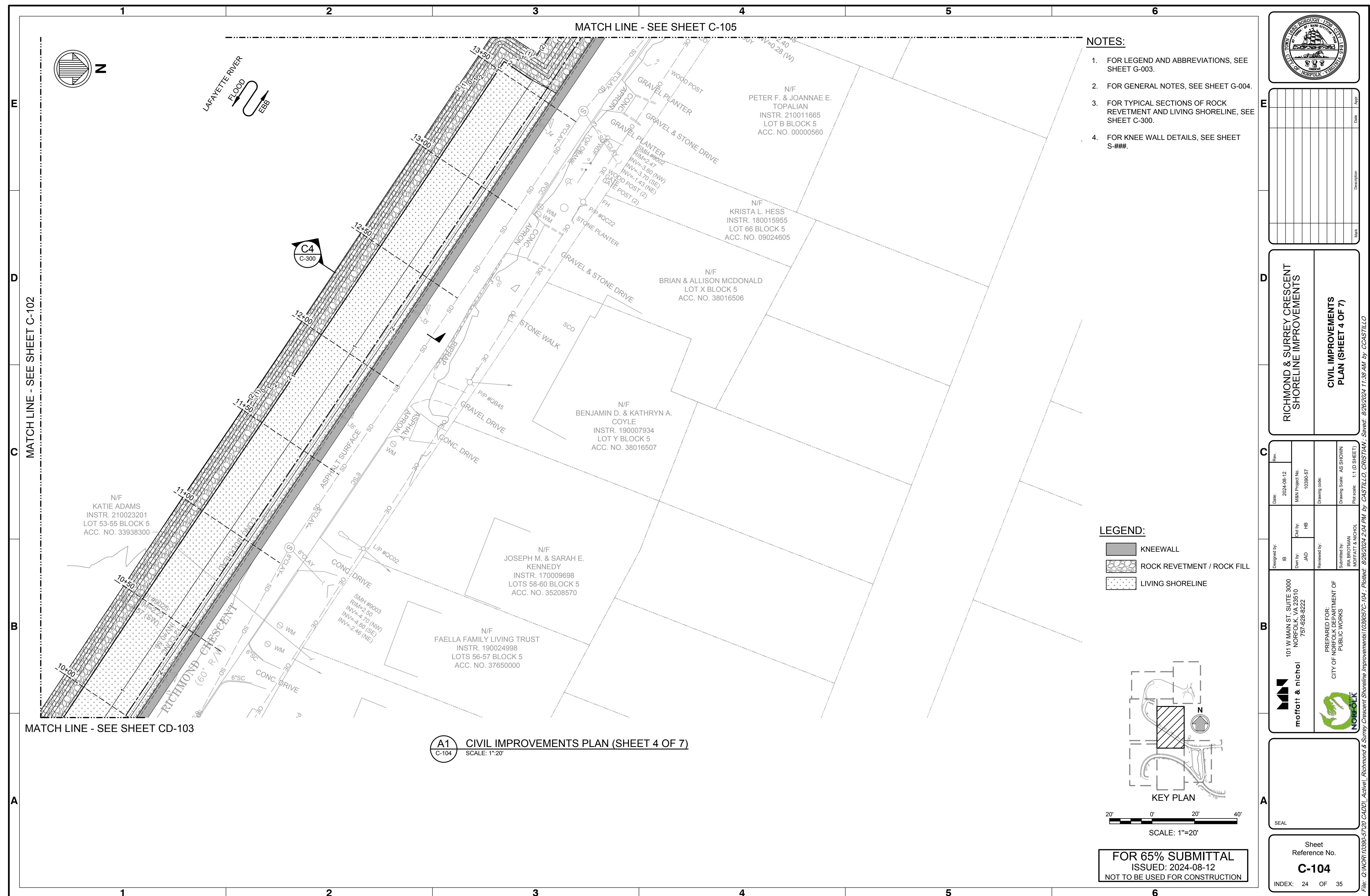
CIVIL IMPROVEMENTS PLAN (SHEET 2 OF 7)

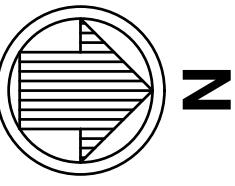
1	2	3	4	5	6

	101 W MAIN ST, SUITE 3000 NORFOLK, VA 23510 757-628-8222	Designed by: IB	Date: 2024-08-12
		Drawn by: JAD	Checked by: HB
PREPARED FOR: CITY OF NORFOLK DEPARTMENT OF PUBLIC WORKS	MAN Project No. 10393-57	Reviewed by: 	Drawing date: 
		Submitted by: IRB/RTMAN moffatt & nichol	Drawing Scale: AS SHOWN 1:1 (0 SHEET) Drawing Scale: 1:200 Drawing Scale: 1:100 Drawing Scale: 1:50 Drawing Scale: 1:25 Drawing Scale: 1:10 Drawing Scale: 1:5 Drawing Scale: 1:2 Drawing Scale: 1:1
	Drawing Scale: 1:20 Drawing Scale: 1:10 Drawing Scale: 1:5 Drawing Scale: 1:2 Drawing Scale: 1:1	Key Plan	Scale: 1"-20'
		SEAL	Scale: 1"-20'

Sheet  
Reference No.  
**C-102**  
INDEX: 22 OF 35







z

E

D

C

B

A

**CIVIL IMPROVEMENTS PLAN (SHEET 5 OF 7)**

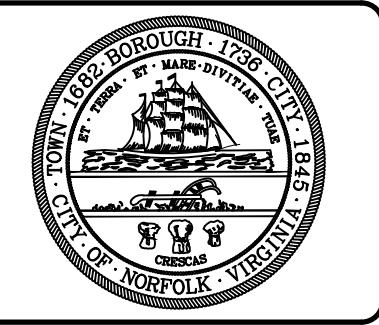
## OTES:

- FOR LEGEND AND ABBREVIATIONS, SEE SHEET G-003.

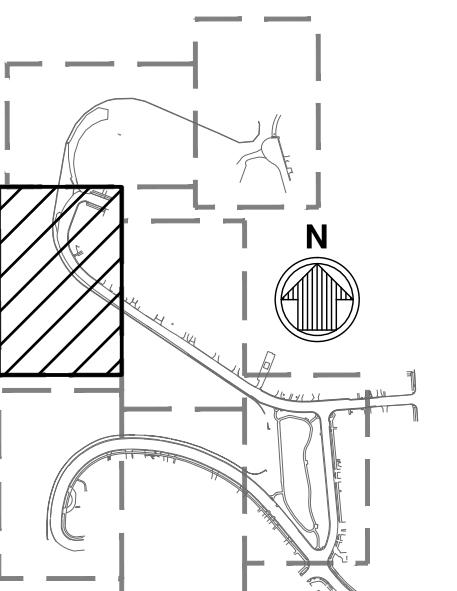
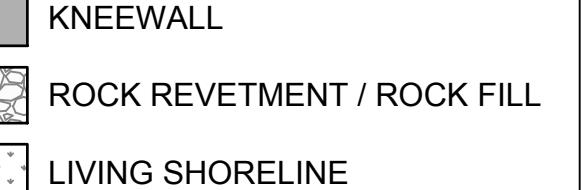
FOR GENERAL NOTES, SEE SHEET G-004.

FOR TYPICAL SECTIONS OF ROCK REVETMENT AND LIVING SHORELINE, SEE SHEET C-300.

FOR KNEE WALL DETAILS, SEE SHEET S-###.



| FGND:

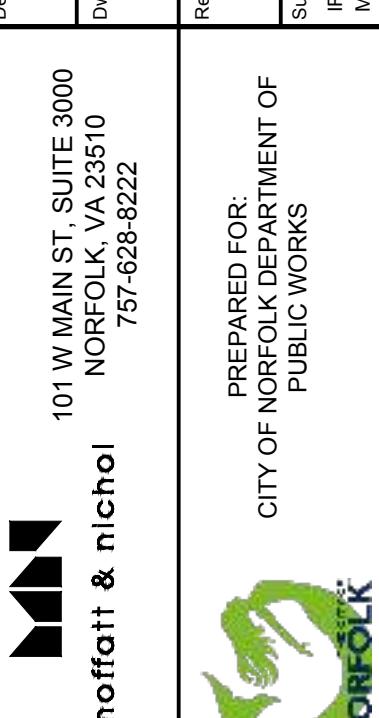


A scale bar diagram consisting of a horizontal line with tick marks. The left end is labeled '20''. The first tick mark is at '0''. The next tick mark is at '20''. The right end is labeled '40''. Below the line, the text 'SCALE: 1''=20'' is centered.

**RICHMOND & SURREY CRESCENT  
SHORELINE IMPROVEMENTS**

**CIVIL IMPROVEMENTS  
PLAN (SHEET 5 OF 7)**

C		Designed by: IB	Date: 2024-08-12	Rev.
Drawn by: JAD	Ckd by: HB	M&N Project No. 10390-57	Drawing code:	Drawing Scale: AS SHOWN Plot scale: 1:1 (D SHEET)
Reviewed by: RA BROTMAN NOFFATT & NICHOL		Submitted by:		



The diagram consists of two nested rectangles. The outer rectangle is black and labeled with a large white letter 'A' at its bottom-left corner. Inside it is a smaller, solid green rectangle labeled with a large white letter 'B' at its bottom-left corner. The entire diagram is set against a white background.

Sheet  
Reference No.  
**C-105**

1 2 3 4 5 6

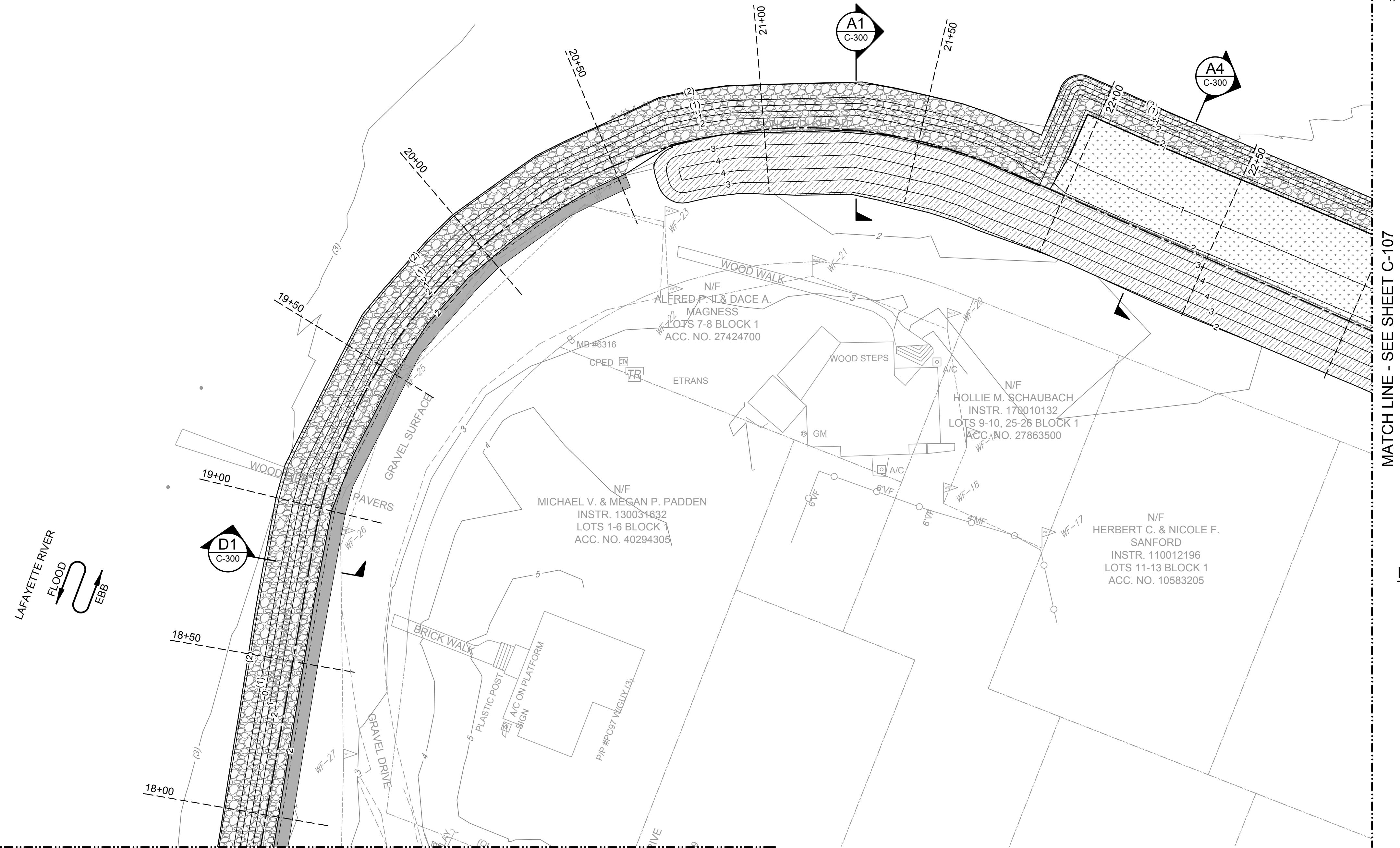
E

D

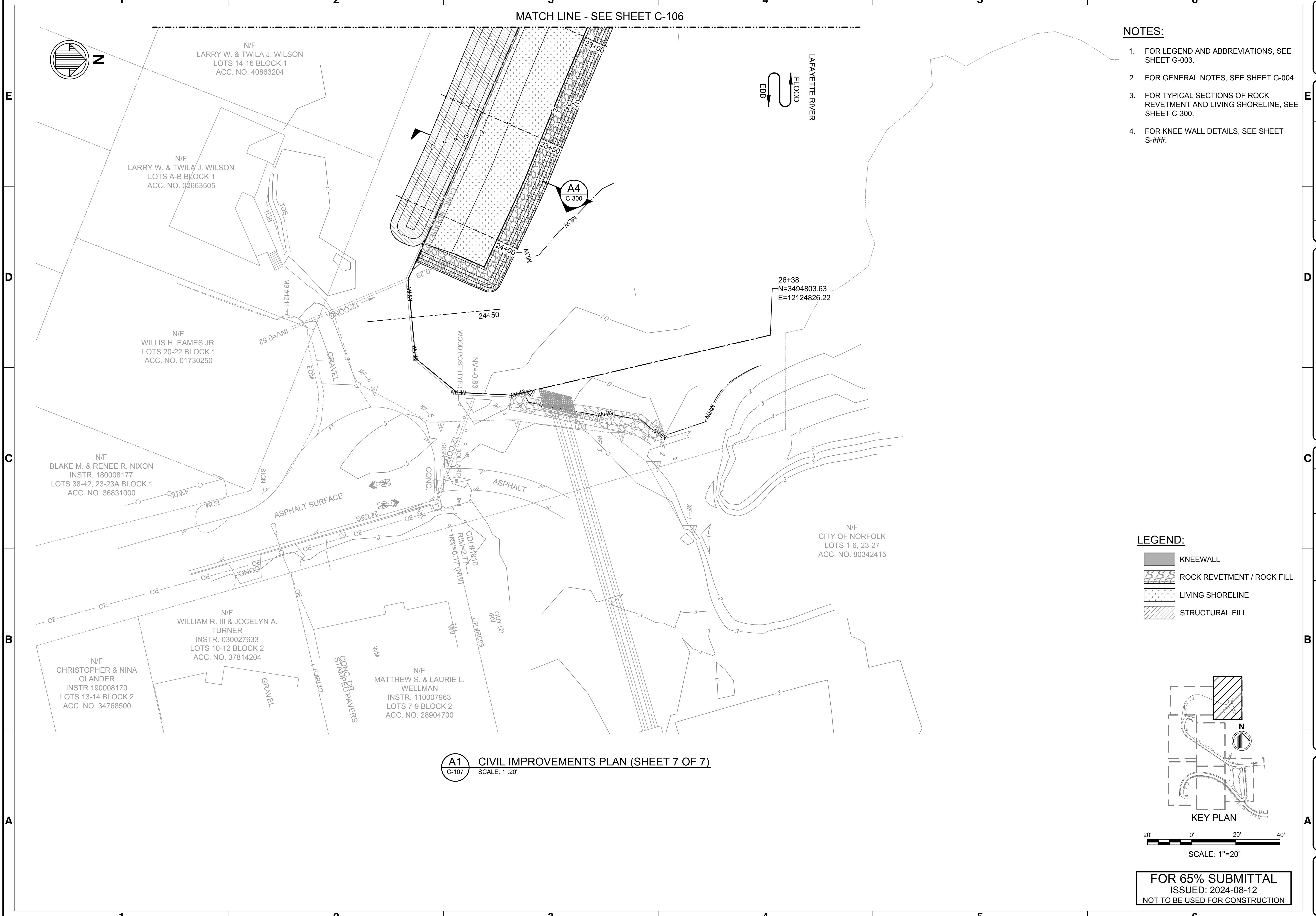
C

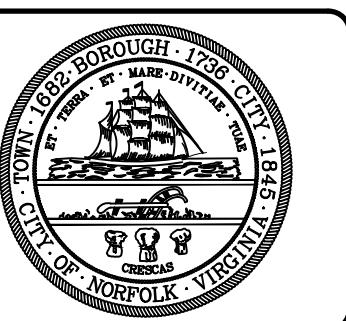
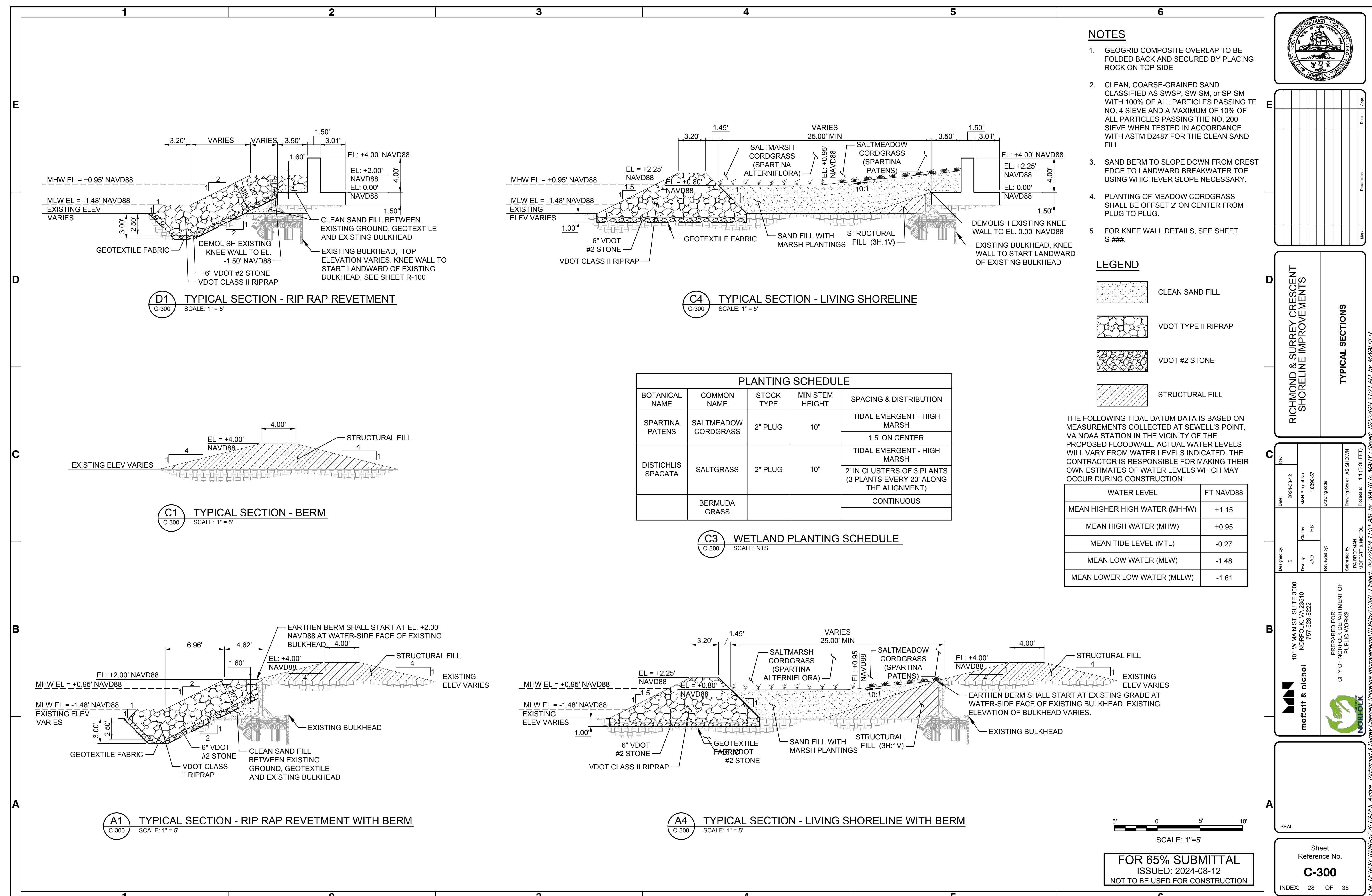
B

A



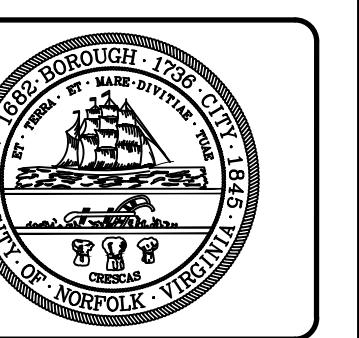
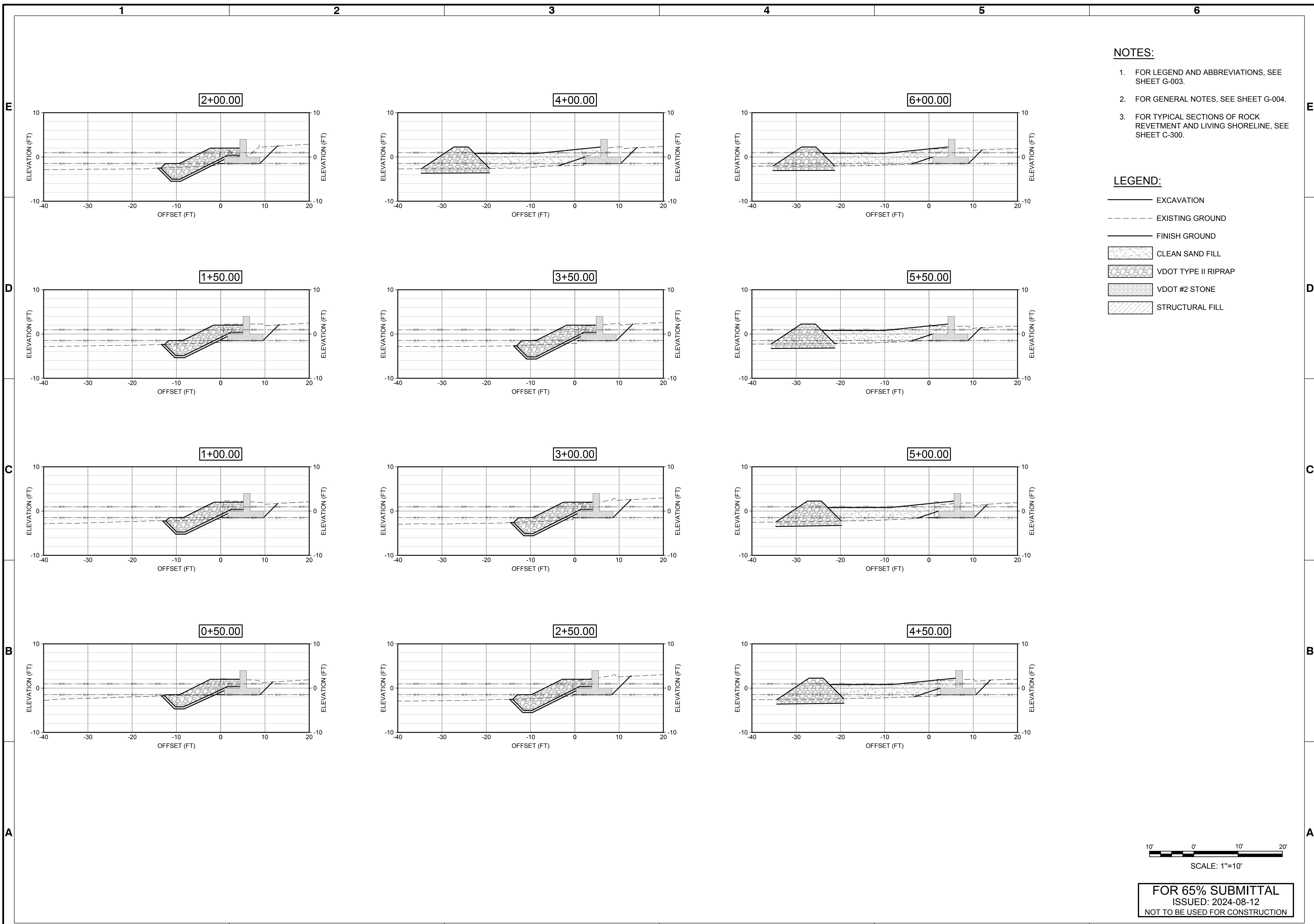
MATCH LINE - SEE SHEET C-106





Date	As per
Description	
Mark	

File: Q:\NOR\10390572\CAD\C-300.dwg ; Printed: 8/27/2024 11:21 AM by WALKER, MARY ; Saved: 8/27/2024 11:31 AM by WALKER, MARY



## OTES:

- FOR LEGEND AND ABBREVIATIONS, SEE SHEET G-003.

FOR GENERAL NOTES, SEE SHEET G-004.

FOR TYPICAL SECTIONS OF ROCK REVETMENT AND LIVING SHORELINE, SEE SHEET C-300.

## LEGEND:

- EXCAVATION
- EXISTING GROUND
- FINISH GROUND
-  CLEAN SAND FILL
-  VDOT TYPE II RIPRAP
-  VDOT #2 STONE
-  STRUCTURAL FILL

1

ED FOF

1

Next

301

OF

Reviewed by:	Drawing code:
 <b>PREPARED FOR:</b> <b>Sheet</b> <b>Reference No.</b> <b>301</b> <b>OF</b>	

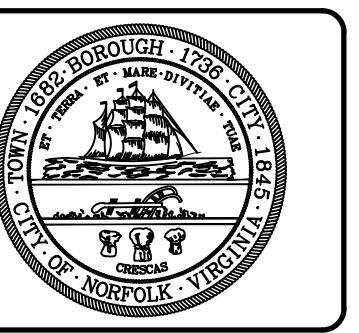
The diagram shows a horizontal bar representing a gene. The bar is divided into three segments: a short black segment on the left, a longer white segment in the middle, and a final black segment on the right. Above the bar, the text "COMTE (4 kb)" is centered. To the left of the first black segment is the label "0'". To the right of the middle white segment is the label "10'". To the right of the final black segment is the label "20'".

**OR 65% SUBMITTAL**  
ISSUED: 2024-08-12  
TO BE USED FOR CONSTRUCTION

6

**SALES SHOWN BASED ON 22" x 34" DRAWING**





**NOTES:**

1. FOR LEGEND AND ABBREVIATIONS, SEE SHEET G-003.
2. FOR GENERAL NOTES, SEE SHEET G-004.
3. FOR TYPICAL SECTIONS OF ROCK REVETMENT AND LIVING SHORELINE, SEE SHEET C-300.

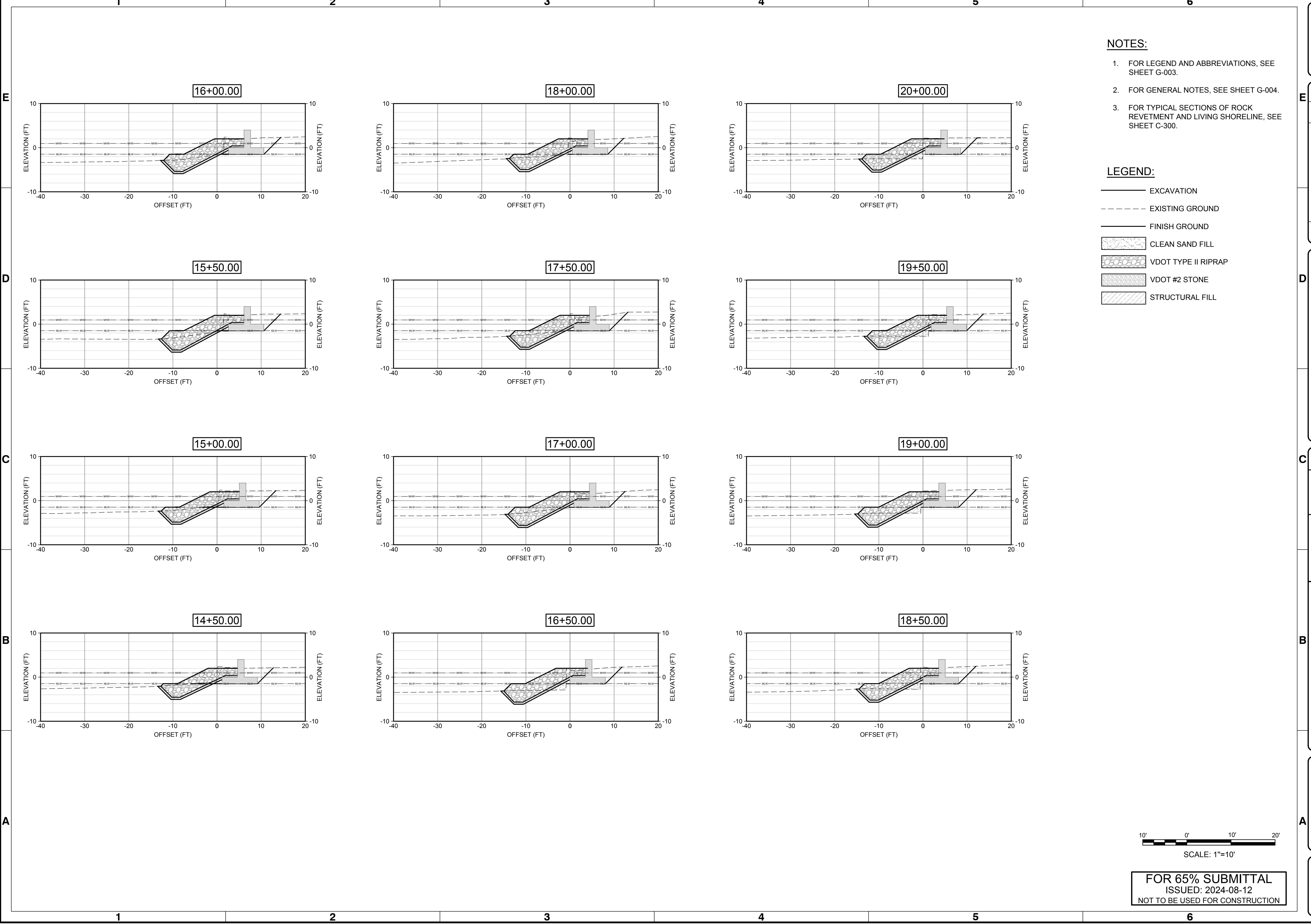
**LEGEND:**

—	EXCAVATION
- - -	EXISTING GROUND
—	FINISH GROUND
[Dotted Pattern]	CLEAN SAND FILL
[Rippled Pattern]	VDOT TYPE II RIPRAP
[Cross-hatched Pattern]	VDOT #2 STONE
[Solid Hatched Pattern]	STRUCTURAL FILL

**RICHMOND & SURREY CRESCENT SHORELINE IMPROVEMENTS**

SECTIONS (SHEET 3 OF 6)

File: Q:\NOR\10390-5720\CAD\Active\_Richmond\_Surrey\_Crescent Shoreline Improvements\103905720.CAD\1\_Active\_C-303.dwg ; Plotter: 8/27/2024 11:31 AM by WALKER, MARY ; Saved: 8/27/2024 11:40 AM by WALKER, MARY







Section	Description	Date	As per
1			
2			
3			
4			
5			
6			

**RICHMOND & SURREY CRESCENT SHORELINE IMPROVEMENTS**

**SECTIONS (SHEET 5 OF 6)**

Designed by:	IB	Rev.
Date:	2024-08-12	
Drawn by:	JAD	Sig by:
Project No.:	1039-57	

Prepared by:	IR ARTHMAN	Drawing date:
Submitted by:	MORFATT & NICHOL	Drawing Scale: AS SHOWN
For scale:	1:1 (SHEET)	

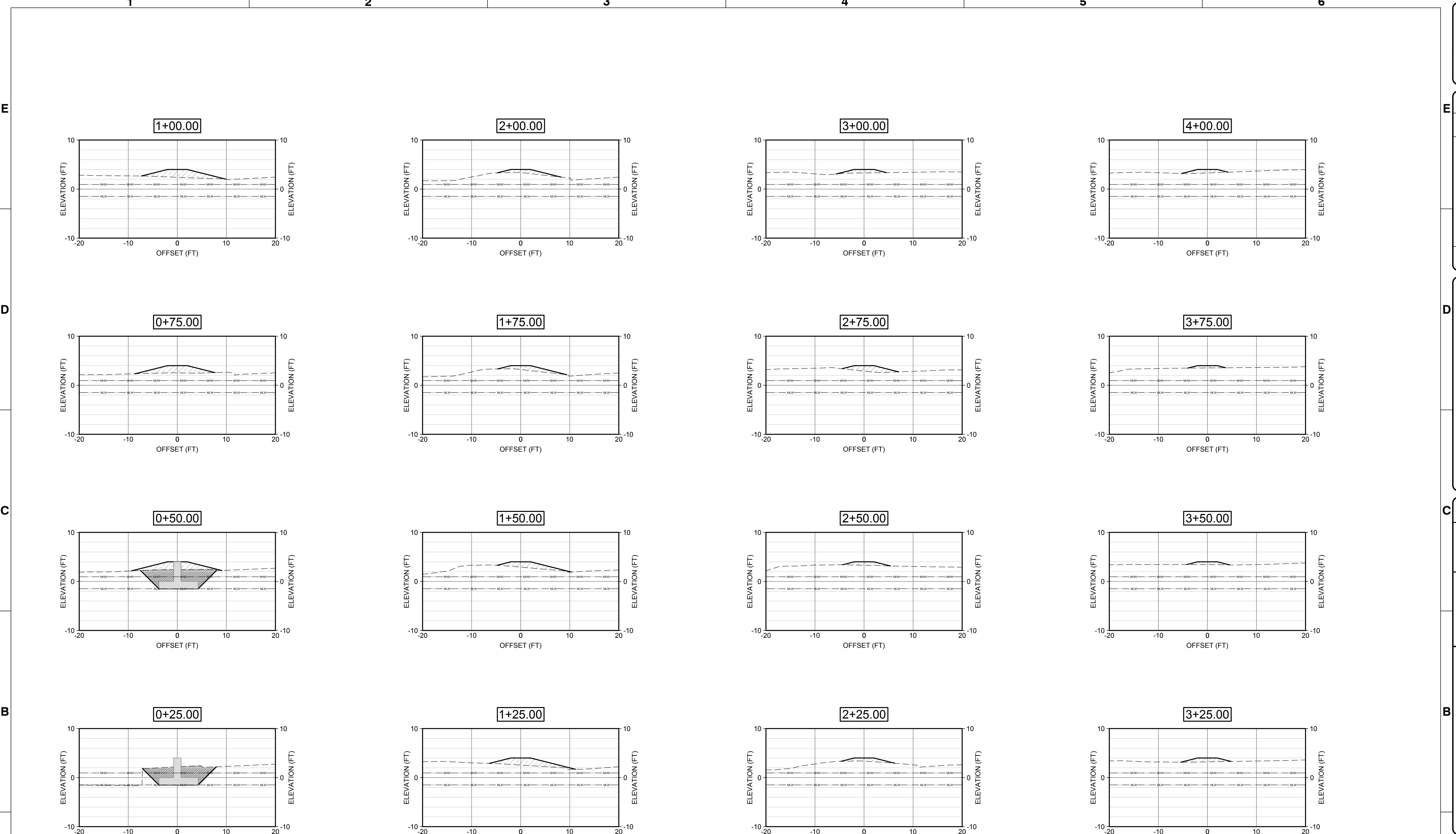
**moffatt & nichol**  
101 W MAIN ST, SUITE 3000  
NORFOLK, VA 23510  
757-628-8222

**CITY OF NORFOLK DEPARTMENT OF PUBLIC WORKS**

**FOR 65% SUBMITTAL**  
**ISSUED: 2024-08-12**  
**NOT TO BE USED FOR CONSTRUCTION**

Sheet Reference No. **C-305**  
INDEX: 33 OF 35

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**NOTES:**

- FOR LEGEND AND ABBREVIATIONS, SEE SHEET G-003.
- FOR GENERAL NOTES, SEE SHEET G-004.
- FOR TYPICAL SECTIONS OF ROCK REVETMENT AND LIVING SHORELINE, SEE SHEET C-300.

**LEGEND:**

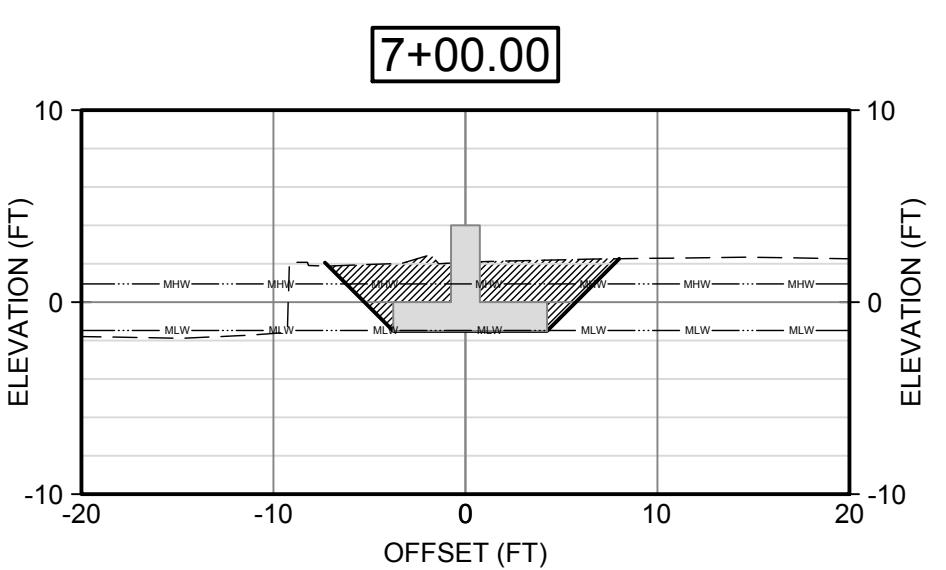
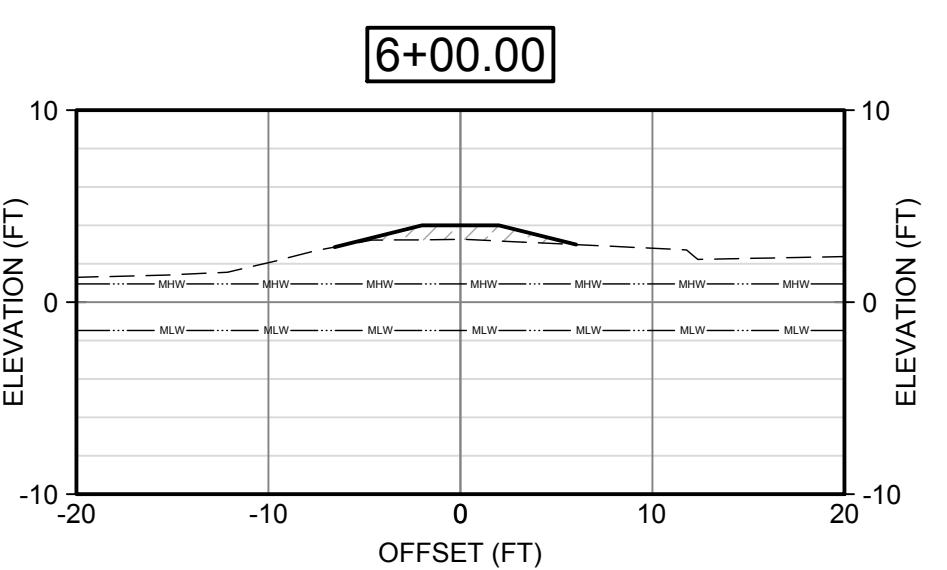
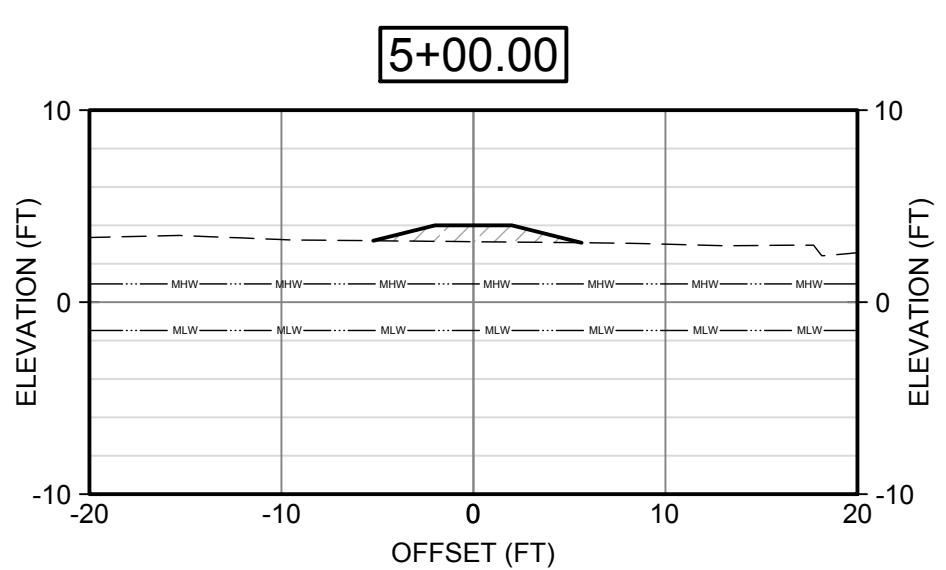
- |                       |                         |                     |
|-----------------------|-------------------------|---------------------|
| — EXCAVATION          | [Hatched pattern]       | CLEAN SAND FILL     |
| - - - EXISTING GROUND | [Dashed pattern]        | VDOT TYPE II RIPRAP |
| — FINISH GROUND       | [Solid pattern]         | VDOT #2 STONE       |
|                       | [Cross-hatched pattern] | STRUCTURAL FILL     |

10'  
0'  
10'  
20'  
SCALE: 1"=10'

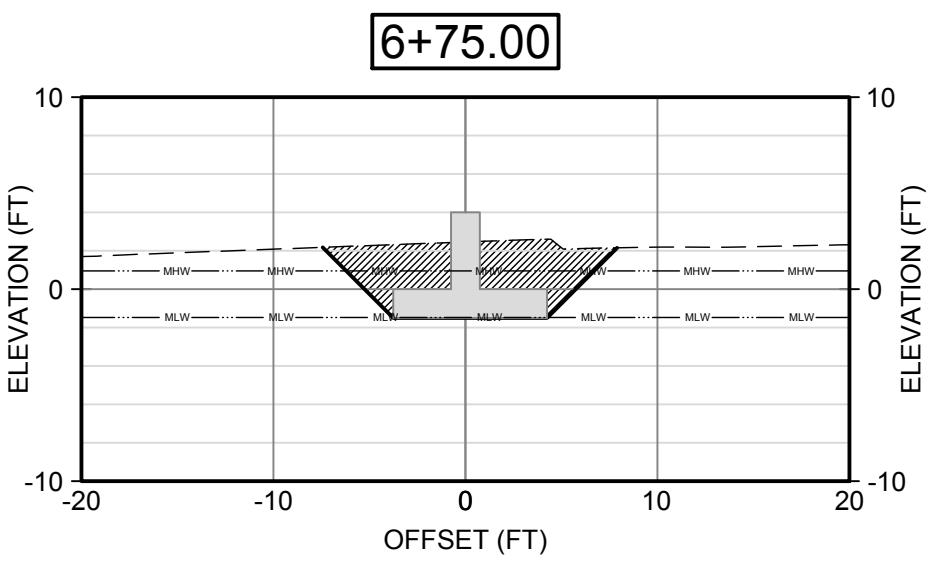
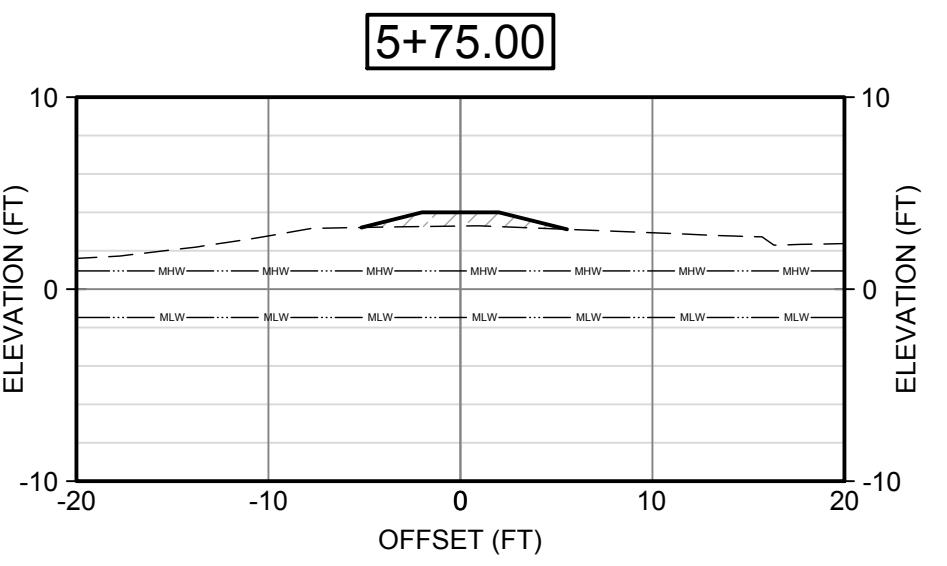
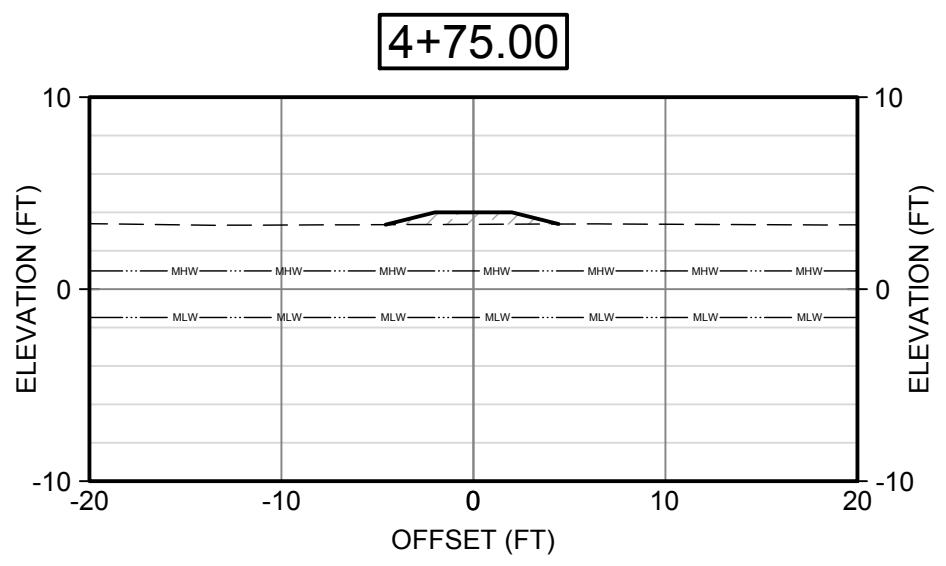
SEAL  
FOR 65% SUBMITTAL  
ISSUED: 2024-08-12  
NOT TO BE USED FOR CONSTRUCTION

1 2 3 4 5 6

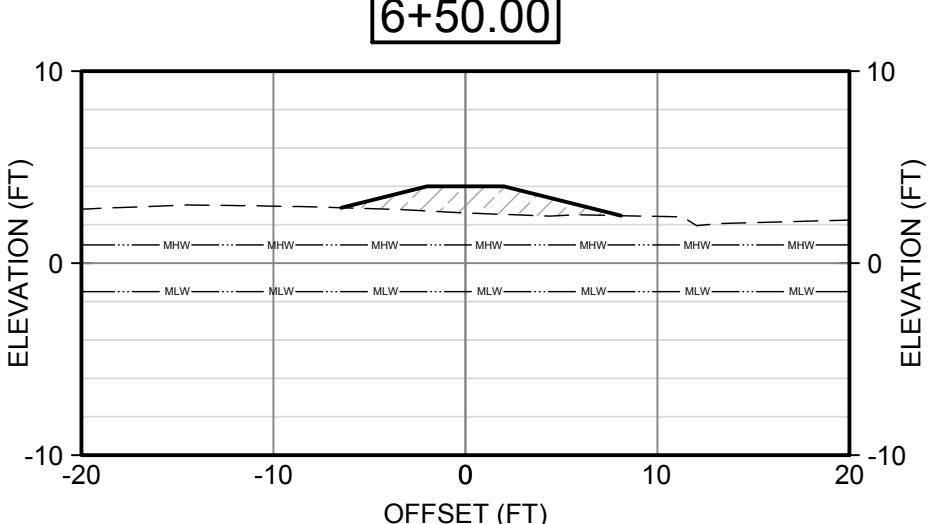
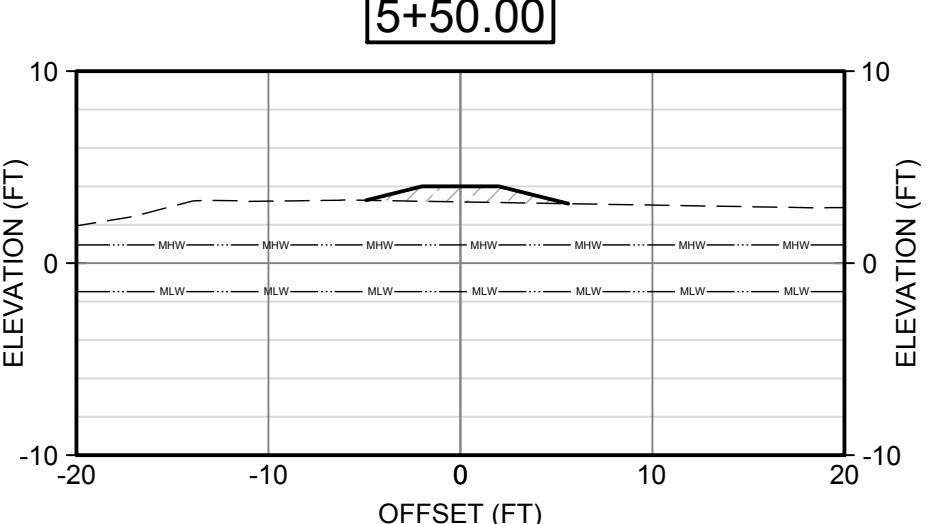
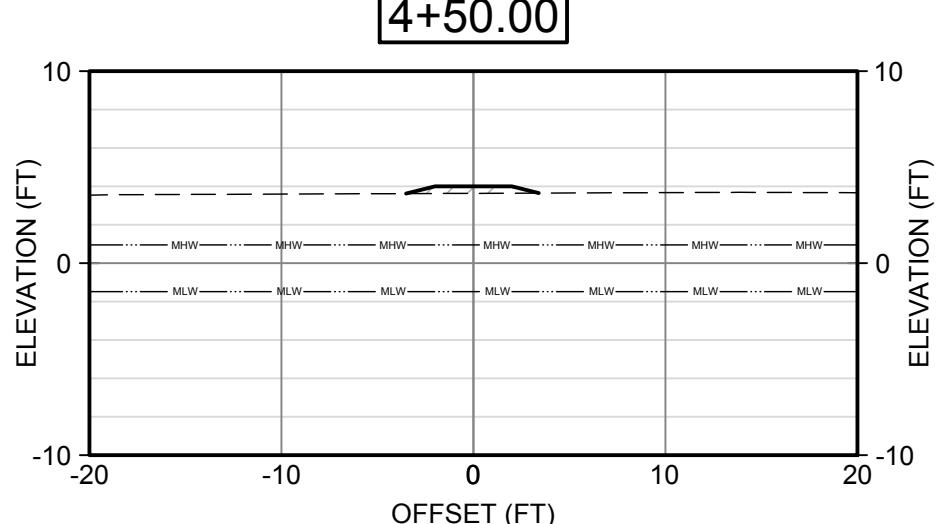
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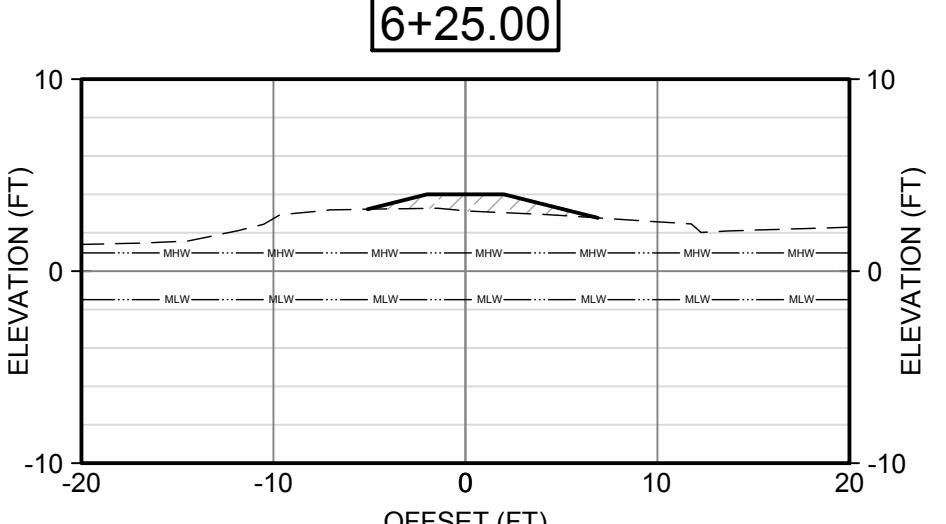
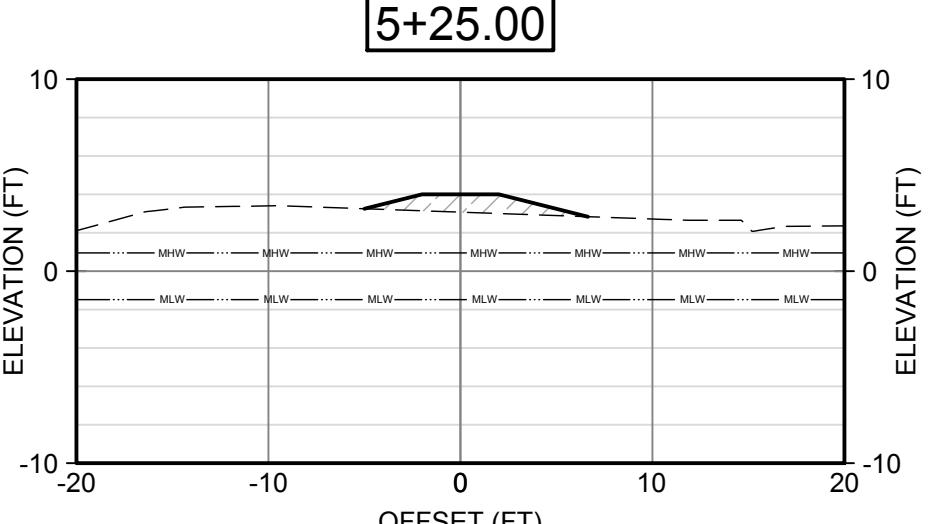
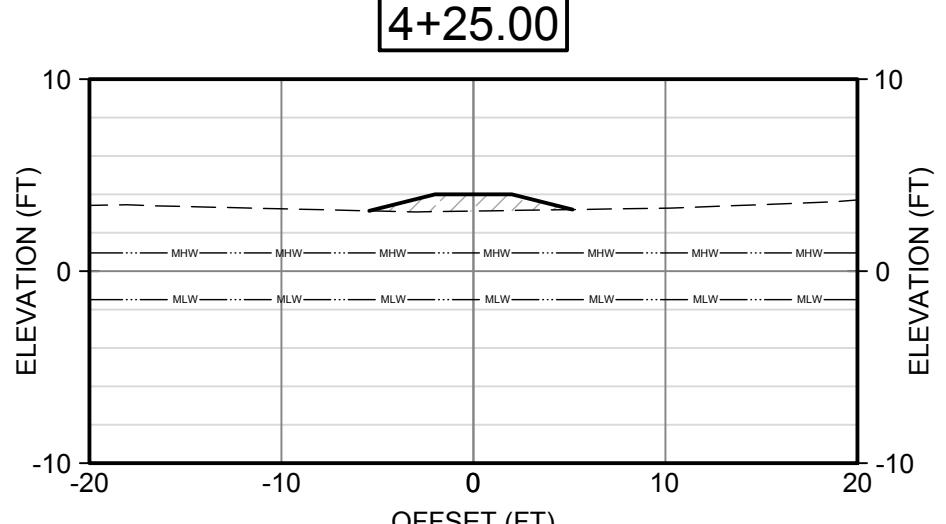
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C



B



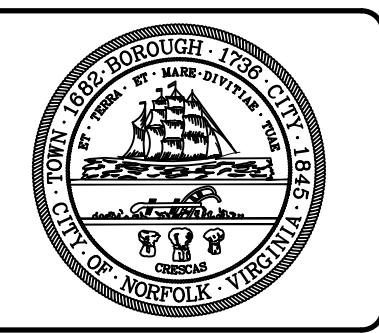
A

NOTES:

- FOR LEGEND AND ABBREVIATIONS, SEE SHEET G-003.
- FOR GENERAL NOTES, SEE SHEET G-004.
- FOR TYPICAL SECTIONS OF ROCK REVETMENT AND LIVING SHORELINE, SEE SHEET C-300.

LEGEND:

- EXCAVATION
- EXISTING GROUND
- FINISH GROUND
- CLEAN SAND FILL
- VDOT TYPE II RIPRAP
- VDOT #2 STONE
- STRUCTURAL FILL

**RICHMOND & SURREY CRESCENT SHORELINE IMPROVEMENTS****SECTIONS (SHEET 6 OF 6)**

Date	Age

Mark	Description

Designed by: IB	Date: 2024-08-12
Drawn by: JAD	Rev. 1
Checked by: HB	MAN Project No. 10393-57
Reviewed by:	
Submitted by: IR ARTHMAN	Drawing code: 1:1 (SHEET)
MORFATT & NICHOL	Drawing Scale: AS SHOWN
CITY OF NORFOLK DEPARTMENT OF PUBLIC WORKS	Proj Scale: 1:1000

	101 W MAIN ST, SUITE 3000 NORFOLK, VA 23510 757-628-8222
PREPARED FOR: CITY OF NORFOLK	Reviewed by: Drawing code: Drawing Scale: AS SHOWN
Sheet Reference No. <b>C-306</b>	Submitted by: IR ARTHMAN MORFATT & NICHOL



10'  
0'  
10'  
20'

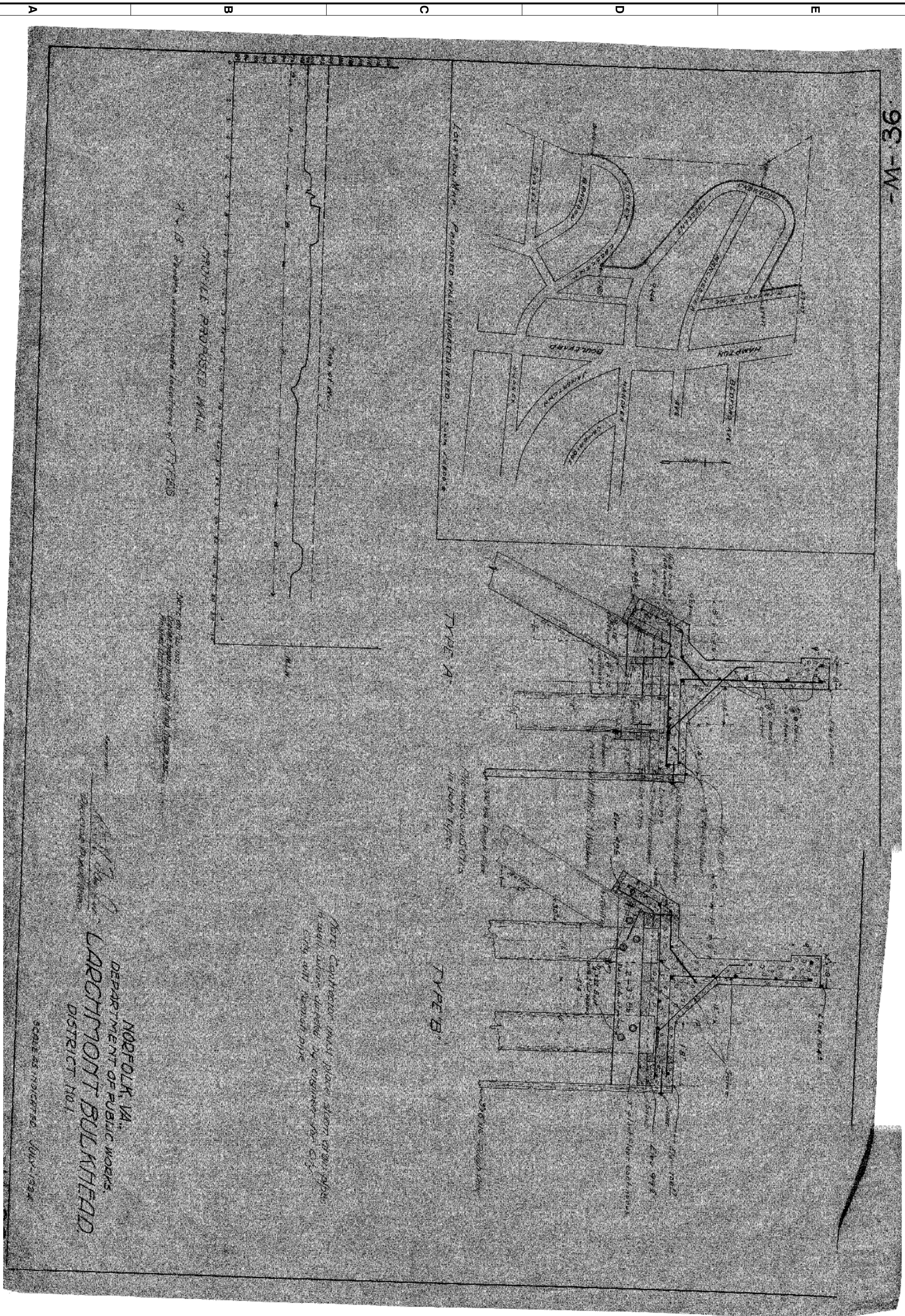
SCALE: 1"=10'

**FOR 65% SUBMITTAL**  
ISSUED: 2024-08-12  
NOT TO BE USED FOR CONSTRUCTION

INDEX: 34 OF 35

1 2 3 4 5 6

DRAWING SCALES SHOWN BASED ON 22"x34" DRAWING



**FOR 65% SUBMITTAL**  
**ISSUED: 2024-08-12**  
**NOT TO BE USED FOR CONSTRUCTION**

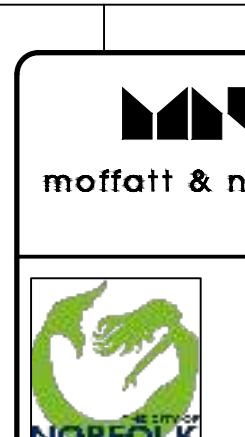
**FOR 65% SUBMITTAL**  
**ISSUED: 2024-08-12**  
**NOT TO BE USED FOR CONSTRUCTION**

1

SEAL

Sheet Reference

R-100



101 W MAIN ST, SUITE 3000  
NORFOLK, VA 23510  
757-628-8222

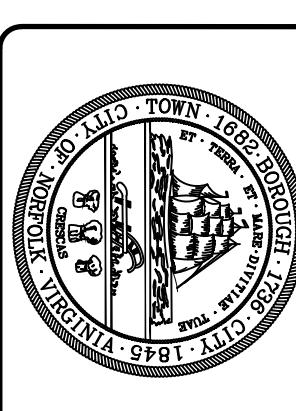
PREPARED FOR:  
CITY OF NORFOLK DEPARTMENT OF  
PUBLIC WORKS

Designed by: IRA		Date: 2024-08-12	Rev.
Dwn by: JAD	Ckd by: HB	M&N Project No. 10390-57	
Reviewed by:		Drawing code:	
Submitted by: IRA BROTMAN MOFFATT & NICHOL		Drawing Scale: AS SHOWN Plot scale: 1:1 / D SHEET	

## RICHMOND & SURREY CRESCENT SHORELINE IMPROVEMENTS

---

LARCHMONT BULKHEAD  
ST. 1001





Initial  
KWS

1/23/2025 | 2:23 PM EST  
Use for All City Documents Requiring the City Manager's Approval

## DOCUMENT TRANSMITTAL FORM

**\*PLEASE INDICATE IF THERE IS A LEGITIMATE DUE DATE BY WHICH THE CITY MANAGER MUST RESPOND\***

**DUE DATE:** 1/24/25 **RETURN COMPLETED DOCUMENT TO:** JUSTIN SHAFER

<b>DEPARTMENT:</b>	<b>RESILIENCE</b>
--------------------	-------------------

**TO BE COMPLETED FOR CONTRACTS, AGREEMENTS, RFPs, AND GRANTS:**

**TITLE: 2024 COMMUNITY FLOOD PREPAREDNESS FUND GRANT**

<b>PARTY</b> (Company and principal's names with which the City is entering into the agreement.)	Virginia Department of Conservation and Recreation (DCR)
<b>EFFECTIVE DATES</b> (Start & end dates)	May 1, 2025 – May 1, 2028 (estimated based on expected award announcement and agreement dates)
<b>TOTAL DOLLAR VALUE</b>	\$7,196,100 (\$4,317,660 grant award and \$2,878,440 match)
<b>FUNDING SOURCE</b> (Operating or capital budget; budget year; grant or other source. Show account information)	<b>SOURCE: RESILIENCE CIP</b> <b>ACCOUNT: 4000-2-4361-5501-FY24</b>
<b>TYPE OF DOCUMENT:</b> (New or extension)	New

**BRIEF DESCRIPTION: THE VIRGINIA DCR COMMUNITY FLOOD PREPAREDNESS FUND (CFPF) GRANT PROVIDES SUPPORT FOR LOCALITIES TO REDUCE THE IMPACT OF FLOODING THROUGH THE USE OF GREY-INFRASTRUCTURE, GREEN-INFRASTRUCTURE, AND HYBRID CONSTRUCTION PROJECTS, AS WELL AS PLANS AND STUDIES.**

**SUMMARY OF SCOPE OF SERVICE/ PROGRAM: THE CITY'S OFFICE OF RESILIENCE, IN COLLABORATION WITH THE DEPARTMENT OF PUBLIC WORKS, WILL FINALIZE DESIGN AND CONSTRUCT THE RICHMOND-SURREY CRESCENT SHORELINE IMPROVEMENT PROJECT, WHICH WILL CONSTRUCT SHORELINE STABILIZATION, FLOOD CONTROL, AND GREEN INFRASTRUCTURE FEATURES IN THE LARCHMONT NEIGHBORHOOD. THE PROJECT WILL PROVIDE FLOOD PROTECTION FOR SMALL TO MODERATE STORM EVENTS FOR THE NEIGHBORHOOD AND ADJACENT HAMPTON BLVD. IT WILL SUPPORT FLOOD RESILIENCE, WATER QUALITY, AND GREEN INFRASTRUCTURE GOALS, INCLUDING THE CSRM AND TMDL.**

<b>PROCUREMENT METHOD</b> (RFP, Sealed BID, etc.)	RFP
<b>CALL OUTS</b> (Indicate any unique circumstances regarding provisions such as procurement protest pending, emergency purchase or other time sensitivity, so forth, along with any other pertinent information)	



**Certificate of Satisfaction:** I (We) hereby certify that all reasonable due diligence has been performed to sufficiently develop the contents and implications of the attached document in a manner to protect and account to the public. Further, all City policies and procedures have been adhered to and therefore, I (we) recommend the City Manager execute this document.

A handwritten signature in black ink that appears to read "Justin Shuler".

1/23/25

Document Owner

A handwritten signature in black ink that appears to read "Kyle W. Spencer".

1/23/25

Department Head Signature

Date

**Review by DCM** Approve  Disapprove 

A handwritten signature in black ink that appears to read "Douglas J. Beaver".

1/23/2025 | 4:21 PM EST

Deputy City Manager

Date

**Review by CM** Approve  Disapprove 

A handwritten signature in black ink that appears to read "Michael A. Hickey".

1/23/2025 | 1:52 PM PST

E68ETB3EDF5842D...  
City Manager

Date



## MEMORANDUM

TO: Patrick G. Roberts, City Manager

CC TO: Douglas J. Beaver, Deputy City Manager of Critical Infrastructure and Technology

FROM: Kyle Spencer, Chief Resilience Office

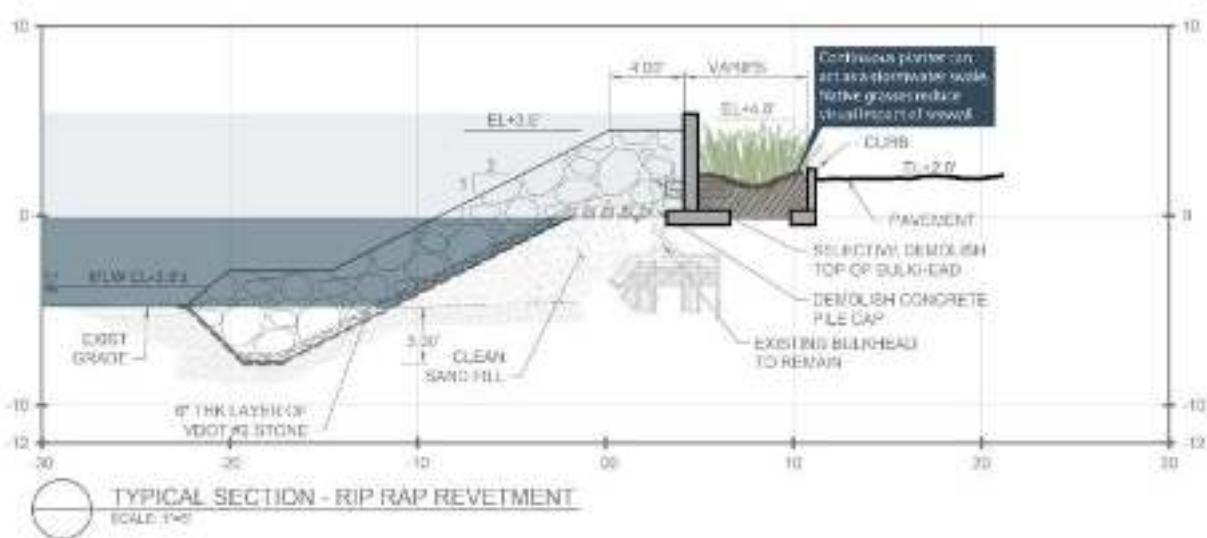
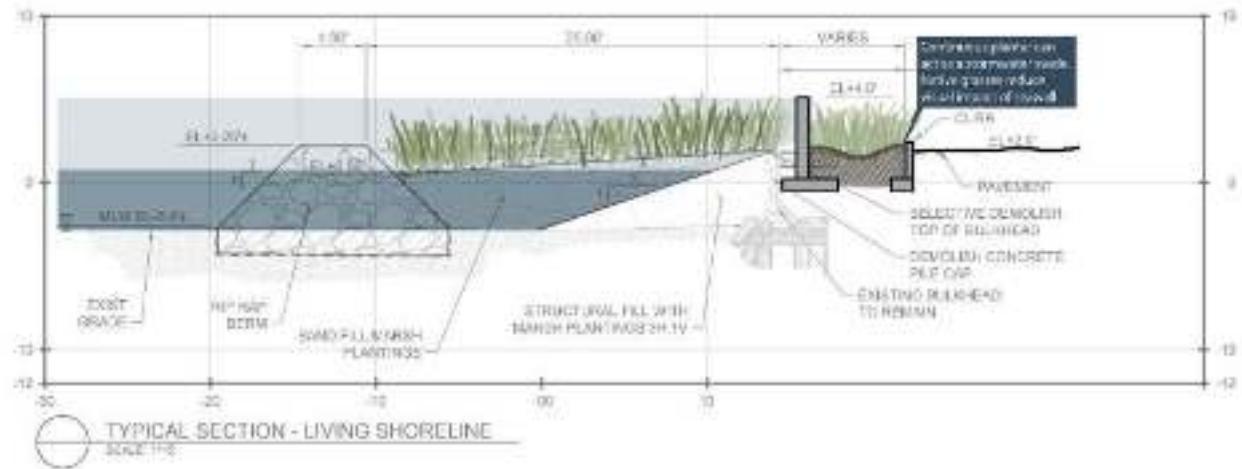
DCR Community Flood Preparedness Fund Application for Richmond-Surrey Crescent  
SUBJECT: Shoreline Improvement Project

DATE: 1/23/25

The section of the Larchmont neighborhood along Richmond Crescent, Surrey Crescent, and adjacent streets has long been a hotspot for tidal flooding, including “nuisance” or “sunny day” flooding, as well as from coastal storm events. While the future construction of the Coastal Storm Risk Management project’s Lafayette Surge Barrier will provide protection during larger coastal events, this low-lying location is an example where intermediate interventions will be required for smaller storms and annual King Tides.

The Richmond-Surrey Crescent Shoreline Improvement project, currently under design by the Department of Public Works, will work to address flooding by installing a low knee wall and berm features, as well as backflow valves, preventing flooding onto neighborhood streets and properties during full moons and moderate storm events. The project will also tie into work currently underway for the DCIP grant-funded Hampton Blvd Drainage Improvement project to provide an even higher level of protection for this important transportation corridor. To address a failing concrete bulkhead along much of Richmond and Surrey Crescent which threatens eventual road collapse, the project will install an offshore combination of living shorelines and rock revetments. The marsh shorelines will tie into past wetland restoration projects at Myrtle Park and the Larchmont Library, and combined with oyster reefs installed on rock revetments, will serve as nature-based features for the Coastal Storm Risk Management project. The features of the project will also provide enhanced water quality and wildlife habitat, meeting goals of the Chesapeake Bay TMDL and Norfolk Green Infrastructure Plan. Attached figures provide additional information based off current design.

The Office of Resilience is proposing to apply for \$4,317,660 in grant funds from the Virginia Department of Conservation and Recreation’s (DCR) Community Flood Preparedness Fund. \$2,878,440 in match funds will be required. The project will meet goals of the CSRM and serve as a portion of the City’s local match. Grant funds would support both flood reduction and green infrastructure portions of the project.





# 2721 - Richmond-Surrey Crescent Flood Protection and Living Shoreline

## Application Details

**Funding Opportunity:** 2336-Virginia Community Flood Preparedness Fund - Project Grants - CY24 Round 5  
**Funding Opportunity Due Date:** Jan 24, 2025 11:59 PM  
**Program Area:** Virginia Community Flood Preparedness Fund  
**Status:** Editing  
**Stage:** Final Application  
  
**Initial Submit Date:**  
**Initially Submitted By:**  
**Last Submit Date:**  
**Last Submitted By:**

## Contact Information

### Primary Contact Information

**Name\*:** Mr. Justin Middle Name Shafer  
 Salutation First Name Last Name  
**Title:** Project Manager, Water Quality and Green Infrastructure  
**Email\*:** justin.shafer@norfolk.gov  
**Address\*:** 2223 McKann Avenue

Norfolk Virginia 23505  
 City State/Province Postal Code/Zip

**Phone\*:** (757) 823-4048 Ext.  
 Phone  
 ##### #####  
**Fax:** ##### #####

### Organization Information

**Name\*:** NORFOLK, CITY OF  
**Organization Type\*:** Local Government  
**Tax ID\*:** 546001455  
**Unique Entity Identifier (UEI)\*:** RS6DCM873FA3  
**Organization Website:** <https://www.norfolk.gov/>  
**Address\*:** 810 Union Street  
 Suite 1101

Norfolk	Virginia	23510-
City	State/Province	Postal Code/Zip

**Phone\*:** (757) 282-8383 Ext.

# # # # #

**Fax:** # # # # #

## VCFPF Applicant Information

### **Project Description**

**Name of Local Government\*:** City of Norfolk

Your locality's CID number can be found at the following link: [Community Status Book Report](#)

**NFIP/DCR Community Identification Number (CID)\*:** 510104

If a state or federally recognized Indian tribe,

**Name of Tribe:**

**Authorized Individual\*:** Patrick Roberts  
First Name Last Name

**Mailing Address\*:** 810 Union St  
Address Line 1

Suite 1101  
Address Line 2

Norfolk Virginia 23510  
City State Zip Code

**Telephone Number\*:** 757-664-4242

**Cell Phone Number\*:** 757-664-4242

**Email\*:** [citymgr@norfolk.gov](mailto:citymgr@norfolk.gov)

Is the contact person different than the authorized individual?

**Contact Person\*:** Yes

**Contact:** Justin Shafer  
First Name Last Name

501 Boush St  
Address Line 1  
Address Line 2

Norfolk Virginia 23510  
City State Zip Code

**Telephone Number:** 757-282-8383

**Cell Phone Number:** 757-282-8383

**Email Address:** [justin.shafer@norfolk.gov](mailto:justin.shafer@norfolk.gov)

Enter a description of the project for which you are applying to this funding opportunity

**Project Description\*:**

Low-income geographic area means any locality, or community within a locality, that has a median household income that is not greater than 80 percent of the local median household income, or any area in the Commonwealth designated as a qualified opportunity zone by the U.S. Secretary of the Treasury via his delegation of authority to the Internal Revenue Service. A project of any size within a low-income geographic area will be considered.

Is the proposal in this application intended to benefit a low-income geographic area as defined above?

**Benefit a low-income geographic area\*:** No

Information regarding your census block(s) can be found at [census.gov](#)

**Census Block(s) Where Project will Occur\*:** Tract 24 - Blocks 1010 - 1012, and 1017 - 1025; Tract 23 Blocks 1004 - 1005, 1020 - 1022, and 1025

**Is Project Located in an NFIP Participating Community?\***: Yes

**Is Project Located in a Special Flood Hazard Area?\***: Yes

**Flood Zone(s) (if applicable):** AE

**Flood Insurance Rate Map Number(s) (if applicable):** 5101040018H

## Eligibility CFPF - Round 4 - Projects

### **Eligibility**

Is the applicant a local government (including counties, cities, towns, municipal corporations, authorities, districts, commissions, or political subdivisions created by the General Assembly or pursuant to the Constitution or laws of the Commonwealth, or any combination of these)?

**Local Government?\***: Yes

Yes - Eligible for consideration

No - Not eligible for consideration

Does the local government have an approved resilience plan and has provided a copy or link to the plan with this application?

**Resilience Plan?\***: Yes

Yes - Eligible for consideration under all categories

No - Eligible for consideration for studies, capacity building, and planning only

If the applicant is not a town, city, or county, are letters of support from all affected local governments included in this application?

**Letters of Support?\***: N/A

Yes - Eligible for consideration

No - Not eligible for consideration

N/A- Not applicable

Has this or any portion of this project been included in any application or program previously funded by the Department?

**Previously Funded?\***: No

Yes - Not eligible for consideration

No - Eligible for consideration

Has the applicant provided evidence of an ability to provide the required matching funds?

**Evidence of Match Funds?\***: Yes

Yes - Eligible for consideration

No - Not eligible for consideration

N/A- Match not required

## Scoring Criteria for Flood Prevention and Protection Projects - Round 4

### **Scoring**

#### **Category Scoring:**

Hold CTRL to select multiple options

#### **Project Category?\***:

All hybrid approaches whose end result is a nature-based solution,Living shorelines and vegetated buffers,Wetland restoration

Is the project area socially vulnerable? (based on ADAPT Virginia's Social Vulnerability Index Score)

#### **Social Vulnerability Scoring:**

Very High Social Vulnerability (More than 1.5)

High Social Vulnerability (1.0 to 1.5)

Moderate Social Vulnerability (0.0 to 1.0)

Low Social Vulnerability (-1.0 to 0.0)

Very Low Social Vulnerability (Less than -1.0)

**Socially Vulnerable?\***: Very Low Social Vulnerability (Less than -1.0)

Is the proposed project part of an effort to join or remedy the community's probation or suspension from the NFIP?

**NFIP?\***: No

Is the proposed project in a low-income geographic area as defined below?

"Low-income geographic area" means any locality, or community within a locality, that has a median household income that is not greater than 80 percent of the local median household income, or any area in the Commonwealth designated as a qualified opportunity zone by the U.S. Secretary of the Treasury via his delegation of authority to the Internal Revenue Service. A project of any size within a low-income geographic area will be considered.

**Low-Income Geographic Area\*:** No

Projects eligible for funding may also reduce nutrient and sediment pollution to local waters and the Chesapeake Bay and assist the Commonwealth in achieving local and/or Chesapeake Bay TMDLs. Does the proposed project include implementation of one or more best management practices with a nitrogen, phosphorus, or sediment reduction efficiency established by the Virginia Department of Environmental Quality or the Chesapeake Bay Program Partnership in support of the Chesapeake Bay TMDL Phase III Watershed Implementation Plan?

**Reduction of Nutrient and Sediment Pollution\*:** Yes

**Pollution\*:**

Does this project provide ?community scale? benefits?

**Community Scale Benefits\*:** More than one census block

Expected Lifespan of Project

**Expected Lifespan of Project\*:** Over 20 Years

**Comments:**

While not in a low-income geographic area, the project will benefit all residents of Norfolk and the region by reducing frequency of flooding on Hampton Blvd, a major thoroughfare connecting regional military, education, port and medical facilities.

## Scope of Work - Projects - Round 4

### Scope of Work

**Upload your Scope of Work**

Please refer to Part IV, Section B. of the grant manual for guidance on how to create your scope of work

**Scope of Work\*:** [Richmond-Surrey Crescent Flood Protection and Living Shoreline Scope of Work.docx](#)

**Comments:**

### Budget Narrative

**Budget Narrative Attachment\*:** [Richmond-Surrey Crescent Flood Control and Living Shoreline Budget Narrative.docx](#)

**Comments:**

## Scope of Work Supporting Information - Projects

### Supporting Information - Projects

Provide population data for the local government in which the project is taking place

**Population\*:** 232995.00

Provide information on the flood risk of the project area, including whether the project is in a mapped floodplain, what flood zone it is in, and when it was last mapped. If the property or area around it has been flooded before, share information on the dates of past flood events and the amount of damage sustained

**Historic Flooding data and Hydrologic Studies\*:** [Norfolk Flooding Data and Hydrologic Studies Link.docx](#)

Include studies, data, reports that demonstrate the proposed project minimizes flood vulnerabilities and does not create flooding or increased flooding (adverse impact) to other properties

**No Adverse Impact\*:**

Include supporting documents demonstrating the local government's ability to provide its share of the project costs. This must include an estimate of the total project cost, a description of the source of the funds being used, evidence of the local government's ability to pay for the project in full or quarterly prior to reimbursement, and a signed pledge agreement from each contributing organization

**Ability to Provide Share of Cost\*:** [DCR CFPF 2024 - CM Document Transmittal Form - Signed.pdf](#)

A benefit-cost analysis must be submitted with the project application

**Benefit-Cost Analysis\*:**

Provide a list of repetitive loss and/or severe repetitive loss properties. Do not provide the addresses for the properties, but include an exact number of repetitive loss and/or severe repetitive loss structures within the project area

**Repetitive Loss and/or Severe Repetitive Loss Properties\*:**

Describe the residential and commercial structures impacted by this project, including how they contribute to the community such as historic, economic, or social value. Provide an exact number of residential structures and commercial structures in the project area

#### **Residential and/or Commercial Structures\*:**

Reduced flooding is assessed in, under, or immediately adjacent to 68 residential and 2 commercial structures in the impacted portion of the Larchmont/Edgewater neighborhood. At least 225 residential or commercial properties directly benefit from the project in terms of flood reduction to the property itself or increased ability to access the property through regularly flooded streets, with hundreds more indirectly benefiting from improved access. While the neighborhood is not a registered historic district, it does date to 1906 and remains an important source of market rate and affordable housing, both owner-occupied and rentals, for the city as a whole, but especially for nearby locations along Hampton Blvd such as Naval Station Norfolk, Old Dominion University, and Sentara Norfolk General Hospitals.

If there are critical facilities/infrastructure within the project area, describe each facility

#### **Critical Facilities/Infrastructure\*:**

Hampton Blvd is the most important piece of infrastructure supported by the project. Hampton Blvd is a major road running north-south through the eastern portion of Norfolk, connecting Interstates 264 and 664 via the Midtown Tunnel through Portsmouth to the south with Interstate 64 and 564 to the north. It is one of the busiest non-interstate roadways in southeastern Virginia due to the location of important regional assets along its corridor, including Naval Station Norfolk and numerous military facilities associated with the largest naval base in the world, as well as NATO Joint Force Command, Virginia Port Authority's Norfolk International Terminal (and Portsmouth Marine Terminal immediately on the south side of the Midtown Tunnel), Norfolk Southern's Lambert Point Yard, Old Dominion University, Eastern Virginia Medical School, and Sentara Norfolk General Hospital. In terms of regional and national security, commerce, and workforce, Hampton Blvd is one of the most important roadways in southeast Virginia.

A small sewer pump station along Richmond Crescent will also benefit from increased flood resilience, though past measure have reduces some risk already.

Explain the local government's financial and staff resources. How many relevant staff members does the local government have? To what relevant software does the local government have access? What are the local government's capabilities?

#### **Financial and Staff Resources\*:**

The City of Norfolk has numerous professional and operational staff across multiple departments to provide support for project and grant management. In particular, the Office of Resilience and Public Works Design Division have more than 15 engineers, scientists, and inspectors who focus on design, construction, and monitoring of flood reduction, waterfront structures, water quality projects, and green infrastructure projects, as well as contracting of City projects. Public Works Division of Environmental Storm Water Management has several crews dedicated to maintenance of hard infrastructure, including floodwalls, pipes, outfalls, and valves. Additionally, two crews are dedicated to maintenance of Best Management Practices, including living shorelines. The Department of Public Works has a dedicated Financial Management team who assist with project budget management, including a staff member who focuses on grants. Further high level grant, financial, and internal controls support are provided by dedicated teams in the Departments of Finance and Budget. Additional staff from the Bureau of Environmental Services support project inspection and permit compliance. Staff from the Department of Parks and Recreation support maintenance of open spaces and flood control features such as mowed berms.

The City uses a variety of specialized software to manage all aspects of projects.

Overall project management is through the E-Builder web application. Budgets are managed in the AFMS web application and linked to E-Builder. Grants are managed through the E-Civis web application and other internal software. Contracting is managed through the OpenGov web application. Assets and maintenance work orders are managed in the Lucity application and ArcGIS. Norfolk also regularly develops or partners on tools for internal analysis and resident education of focus areas, such as the TITAN and Waze-integrated Floodmap tool for real time flood risk awareness.

Identify and describe the goals and objectives of the project. Include a description of the expected results of the completed project and explain the expected benefits of the project. This may include financial benefits, increased awareness, decreased risk, etc.

#### **Goals and Objectives\*:**

The goals and objectives of the Richmond-Surrey Crescent Flood Protection and Living Shoreline project support final design and construction of a combination of flood protection and environmental enhancement efforts benefitting the critical Hampton Blvd corridor and a portion of the adjacent Larchmont-Edgewater community.

Goal 1: Reduce flooding along a section of Hampton Blvd and surrounding neighborhood streets, frequently impacted by "sunny day" lunar and wind-driven events, as well small coastal events

Goal 2: Restore wetland and oyster habitats in the Lafayette River

Goals 3: Stabilize a failing concrete bulkhead and eroding banks

Objective 1: Finalize the project design within 1 year of grant agreement signing

Objective 2: Construct project elements within 3 years of the grant agreement signing

Outline a plan of action laying out the scope and detail of how the proposed work will be accomplished with a timeline identifying expected completion dates.

Determine milestones for the project that will be used to track progress. Explain what deliverables can be expected at each milestone, and what the final project deliverables will be. Identify other project partners

**Approach, Milestones, and Deliverables\*:** [Richmond-Surrey Crescent Flood Control and Living Shoreline - Approach Milestones and Deliverables.docx](#)

Where applicable, briefly describe the relationship between this project and other past, current, or future resilience projects. If the applicant has received or applied for any other grants or loans, please identify those projects, and, if applicable, describe any problems that arose with meeting the obligations of the grant and how the obligations of this project will be met

**Relationship to Other Projects\*:**

The Richmond-Surrey Crescent Flood Control and Living Shoreline project meets goals of Norfolk's Resilience Strategy, Green Infrastructure Plan, Climate Action Plan, Comprehensive Plan, and TMDL Action Plan. The project will add to, support, and/or work in tandem with a variety of past, ongoing, and planned projects. The City has several projects underway to address various scales of flooding on Hampton Blvd, including the Lafayette Surge Barrier, a planned phase of the Norfolk Coastal Storm Risk Management project, in partnership with the Army Corps of Engineers. Once constructed, the surge barrier at the mouth of the Lafayette River is designed to close ahead of large coastal storm events, preventing catastrophic flooding. To meet regulatory requirements and ensure the long-term environmental health of the large Lafayette River ecosystem, the surge barrier will only close when storm surge inundation is expected to exceed an elevation of 4 ft on the North American Vertical Datum (NAVD). At a smaller scale, the currently under construction, Department of Defense-supported Hampton Blvd Drainage Improvement project will upgrade pipes and outfalls on Hampton Blvd around the Naval Facilities Engineering Systems Command Atlantic compound to reduce tailwater flooding through the storm drains and onto the streets during small ?sunny day? tidal or rainfall events, up to approximately elevation 2.5 ft NAVD. While the combined benefits of these projects will address many storm events, a gap remains where a moderate storm could overtop banks of the Lafayette River, flow overland and through storm drains upstream of valves, and flood Hampton Blvd and surrounding neighborhoods. These gaps between small solutions such as valves and large solutions such as floodwalls and surge barrier are found in locations throughout Norfolk and the region, and will expand in time due to sea level rise. The proposed project will provide an intermediate scale solutions to address this gap in flood protection. Living shoreline sections of the proposed project will tie into two previous wetland restoration project, the Myrtle Park project, constructed in 2013 by the City along Richmond Crescent, and the Birdsong Wetland, constructed in 1997 by community organizations behind the Larchmont Library as one of the first living shorelines in Virginia. The connections and increased marsh area will create greater overall benefits. The project will also protect the adjacent Elizabeth River Trail.

For ongoing projects or projects that will require future maintenance, such as infrastructure, flood warning and response systems, signs, websites, or flood risk applications, a maintenance, management, and monitoring plan for the projects must be provided

**Maintenance Plan\*:**

[Richmond-Surrey Crescent Flood Control and Living Shoreline Maintenance Plan.docx](#)

Describe how the project meets each of the applicable scoring criteria contained in Appendix B. Documentation can be incorporated into the Scope of Work Narrative

**Criteria\*:**

Eligible Projects: The planned project is a hybrid approach resulting in a nature based solution

Social Vulnerability Index Score: The immediate project area has Very Low SVI, however the project support Norfolk (and the region) as a whole, which has an average SVI score of Moderate.

Community Scale of Benefit: The project provides direct benefits to residents in Tract 24 - Blocks 1010 - 1012, and 1017 - 1025 and Tract 23 Blocks 1004 - 1005, 1020 - 1022, and 1025 and additional benefits city-wide to the many residents and businesses who use Hampton Blvd.

Expected Lifespan of Project: The project is being designed with sea level rise in mind and is expected to provide benefits for more than 20 years. The City also continues to research options to sustain living shoreline assets in the long-term to combat the impacts of sea level rise.

Remedy for NFIP probation or suspension: The City is not in probation or suspension status.

Proposed project part of a low-income geographic area: The project is not in a low-income area. Norfolk as a whole is low-income compared to the state and the project provides significant benefits to all users of Hampton Blvd.

Proposed project implements a Chesapeake Bay TMDL BMP: The project will install living shorelines, which will be tracked as Shoreline Management under the Chesapeake Bay TMDL BMP criteria.

## Budget

### Budget Summary

**Grant Matching Requirement\*:**

Projects that will result in hybrid solutions - Fund 60%/Match 40%

Is a match waiver being requested?

**Match Waiver Request**

No

Note: only low-income communities are eligible for a match waiver.

\*:

<b>Total Project Amount (Request + Match)*:</b>	\$7,196,100.00
	**This amount should equal the sum of your request and match figures
<b>REQUIRED Match Percentage Amount:</b>	\$2,878,440.00

## BUDGET TOTALS

Before submitting your application be sure that you meet the match requirements for your project type.

<b>Match Percentage:</b>	40.00%
	Verify that your match percentage matches your required match percentage amount above.
<b>Total Requested Fund Amount:</b>	\$4,317,660.00
<b>Total Match Amount:</b>	\$2,878,440.00
<b>TOTAL:</b>	\$7,196,100.00

### Personnel

Description	Requested Fund Amount	Match Amount	Match Source
No Data for Table			

### Fringe Benefits

Description	Requested Fund Amount	Match Amount	Match Source
No Data for Table			

### Travel

Description	Requested Fund Amount	Match Amount	Match Source
No Data for Table			

### Equipment

Description	Requested Fund Amount	Match Amount	Match Source
No Data for Table			

### Supplies

Description	Requested Fund Amount	Match Amount	Match Source
No Data for Table			

### Construction

Description	Requested Fund Amount	Match Amount	Match Source
Construct Hybrid Flood Protection and Living Shoreline	\$4,197,660.00	\$2,798,440.00	Cash
	<b>\$4,197,660.00</b>	<b>\$2,798,440.00</b>	

### Contracts

Description	Requested Fund Amount	Match Amount	Match Source
Finalize Design	\$120,000.00	\$80,000.00	Cash
	<b>\$120,000.00</b>	<b>\$80,000.00</b>	

**Maintenance Costs**

Description	Requested Fund Amount	Match Amount	Match Source
No Data for Table			

**PreAward and Startup Costs**

Description	Requested Fund Amount	Match Amount	Match Source
No Data for Table			

**Other Direct Costs**

Description	Requested Fund Amount	Match Amount	Match Source
No Data for Table			

**Long and Short Term Loan Budget - Projects - VCFPF****Budget Summary**

Are you applying for a short term, long term, or no loan as part of your application?

If you are not applying for a loan, select "not applying for loan" and leave all other fields on this screen blank

**Long or Short Term\*:** Not Applying for Loan

**Total Project Amount:** \$0.00

**Total Requested Fund Amount:** \$0.00

**TOTAL:** \$0.00

**Salaries**

Description	Requested Fund Amount
No Data for Table	

**Fringe Benefits**

Description	Requested Fund Amount
No Data for Table	

**Travel**

Description	Requested Fund Amount
No Data for Table	

**Equipment**

Description	Requested Fund Amount
No Data for Table	

**Supplies**

Description	Requested Fund Amount
No Data for Table	

No Data for Table

***Construction***

Description	Requested Fund Amount
-------------	-----------------------

No Data for Table

***Contracts***

Description	Requested Fund Amount
-------------	-----------------------

No Data for Table

***Other Direct Costs***

Description	Requested Fund Amount
-------------	-----------------------

No Data for Table

**Supporting Documentation*****Supporting Documentation***

Named Attachment	Required	Description	File Name	Type	Size	Upload Date
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Detailed map of the project area(s) (Projects/Studies)

FIRMette of the project area(s) (Projects/Studies)

Historic flood damage data and/or images (Projects/Studies)

Alink to or a copy of the current floodplain ordinance

Maintenance and management plan for project

Alink to or a copy of the current hazard mitigation plan

Alink to or a copy of the current comprehensive plan

Social vulnerability index score(s) for the project area

Authorization to request funding from the Fund from governing body or chief executive of the local government

Signed pledge agreement from each contributing organization

Maintenance Plan

*Benefit-cost analysis must be submitted with project applications over \$2,000,000. in lieu of using the FEMA benefit-cost analysis tool, applicants may submit a narrative to describe in detail the cost benefits and value. The narrative must explicitly indicate the risk reduction benefits of a flood mitigation project and compares those benefits to its cost-effectiveness.*

Benefit Cost Analysis

Other Relevant Attachments

***Letters of Support***

Description	File Name	Type	Size	Upload Date
-------------	-----------	------	------	-------------

No files attached.

**Resilience Plan*****Resilience Plan***

Description	File Name	Type	Size	Upload Date
No files attached.				



Initial  
KWS

## DOCUMENT TRANSMITTAL FORM

1/15/2025 | 3:31pm for All City Documents Requiring the City Manager's Approval

**\*PLEASE INDICATE IF THERE IS A LEGITIMATE DUE DATE BY WHICH THE CITY MANAGER MUST RESPOND\***

**DUE DATE:** 1/24/25 **RETURN COMPLETED DOCUMENT TO:** JUSTIN SHAFER

<b>DEPARTMENT:</b>	<b>RESILIENCE</b>
--------------------	-------------------

**TO BE COMPLETED FOR CONTRACTS, AGREEMENTS, RFPs, AND GRANTS:**

**TITLE: 2024 COMMUNITY FLOOD PREPAREDNESS FUND GRANT**

<b>PARTY</b> (Company and principal's names with which the City is entering into the agreement.)	Virginia Department of Conservation and Recreation (DCR)
<b>EFFECTIVE DATES</b> (Start & end dates)	May 1, 2025 – May 1, 2028 (estimated based on expected award announcement and agreement dates)
<b>TOTAL DOLLAR VALUE</b>	\$7,200,000 (\$4,320,000 grant award and \$2,880,000 match)
<b>FUNDING SOURCE</b> (Operating or capital budget; budget year; grant or other source. Show account information)	<b>SOURCE: RESILIENCE CIP</b> <b>ACCOUNT: 4000-2-4361-5501-FY24</b>
<b>TYPE OF DOCUMENT:</b> (New or extension)	New

**BRIEF DESCRIPTION: THE VIRGINIA DCR COMMUNITY FLOOD PREPAREDNESS FUND (CFPF) GRANT PROVIDES SUPPORT FOR LOCALITIES TO REDUCE THE IMPACT OF FLOODING THROUGH THE USE OF GREY-INFRASTRUCTURE, GREEN-INFRASTRUCTURE, AND HYBRID CONSTRUCTION PROJECTS, AS WELL AS PLANS AND STUDIES.**

**SUMMARY OF SCOPE OF SERVICE/ PROGRAM: THE CITY'S OFFICE OF RESILIENCE, IN COLLABORATION WITH THE DEPARTMENT OF PUBLIC WORKS, WILL FINALIZE DESIGN AND CONSTRUCT THE RICHMOND-SURREY CRESCENT SHORELINE IMPROVEMENT PROJECT, WHICH WILL CONSTRUCT SHORELINE STABILIZATION, FLOOD CONTROL, AND GREEN INFRASTRUCTURE FEATURES IN THE LARCHMONT NEIGHBORHOOD. THE PROJECT WILL PROVIDE FLOOD PROTECTION FOR SMALL TO MODERATE STORM EVENTS FOR THE NEIGHBORHOOD AND ADJACENT HAMPTON BLVD. IT WILL SUPPORT FLOOD RESILIENCE, WATER QUALITY, AND GREEN INFRASTRUCTURE GOALS, INCLUDING THE CSRM AND TMDL.**

<b>PROCUREMENT METHOD</b> (RFP, Sealed BID, etc.)	RFP
<b>CALL OUTS</b> (Indicate any unique circumstances regarding provisions such as procurement protest pending, emergency purchase or other time sensitivity, so forth, along with any other pertinent information)	



**Certificate of Satisfaction:** I (We) hereby certify that all reasonable due diligence has been performed to sufficiently develop the contents and implications of the attached document in a manner to protect and account to the public. Further, all City policies and procedures have been adhered to and therefore, I (we) recommend the City Manager execute this document.

A handwritten signature in black ink that appears to read "Justin Shuler".

1/15/25

Document Owner

A handwritten signature in black ink that appears to read "Kyle W. Spencer".

1/15/25

Department Head Signature

Date

**Review by DCM** Approve  Disapprove 

Douglas J. Beaver

1/15/2025 | 4:02

Deputy City Manager

Date

**Review by CM** Approve  Disapprove 

A handwritten signature in blue ink that appears to read "Michael S. Spencer".

1/17/2025 | 2:22 PM PST

PM EST  
E08E1B9EDF5642D...

City Manager

Date

# **Richmond-Surrey Crescent Flood Control and Living Shoreline**

## **Budget Narrative**

The City of Norfolk seeks 60% grant funding to support proposed flood control and shoreline restoration efforts benefitting Hampton Blvd and the Larchmont/Edgewater neighborhood. An opinion of probable cost of construction (OPCC), completed by design consultants Moffatt & Nichol at the 65% design milestone, estimates the construction to cost approximately \$7,196,100. This includes a contingency to address unexpected changes during the remainder of design and increasing costs of construction due to nationwide economic conditions. This cost will fund remaining design efforts and all necessary materials, supplies, and labor for a qualified contractor to construct the project after a competitive bid process. The City proposes to fund their 40% match of \$2,878,440 through Capital Improvement Program funds for coastal resilience and waterfront improvements. The table below shows the consultant supplied OPCC. In addition to the direct funding as included match, Norfolk also commits to managing all remaining or necessary aspects of design, permitting, project management, inspection, and public outreach using existing qualified staff. No grant funds are sought for this nor match applied, leaving funds fully available for contracted design and construction work. Funds proposed as match are authorized through existing approved budgets and verified on the attached, signed City Manager Transmittal Form outlining grant and match funds for the current Community Flood Preparedness Fund grant cycle. If awarded grant funds, the City sets up a special revenue account that includes approved match funds and cash funds to cover awarded grant funding until reimbursement is received, allowing Norfolk to move projects forward without delays for reimbursement requests.

Applicant - City of Norfolk								
Name - Community Plan								
Prepared by Fund 5								
Resident Virginia								
Teaching Loan Fund								
Detailed Budget Narrative								
Financial Performance: May 15, 2025 through May 15, 2026								
Submission Form: 104-05								
Grand Total State Funding Request								
\$4,217,440								
Grand Total Local Share of Project								
\$4,217,440								
Federal Financing (if applicable)								
\$0								
Project Grand Total								
\$7,195,420								
Local/City Cost Match								
\$0								
Expenditure Code Type	Personnel	Travel	Equipment	Supplies	Consultants	Indirect Costs	Other Costs	Total
Federal Grant (P- available)								
Total Share					\$2,878,440			\$2,878,440
State Share - CFF Grant						\$4,317,680		\$4,317,680
State Share - TLF Match/loan								
Fire-Work/Planning Maintenance								
Total	\$	\$	\$	\$	\$	\$ 7,195,420	\$	\$ 7,195,420



moffatt & nichell

## **OPINION OF PROBABLE COST**

ACTIVITY AND LOCATION		CONSTRUCTION CONTRACT NO.		DATE
City of Norfolk Department of Public Works				15-Jan-25
PROJECT TITLE		ESTIMATED BY		JOB NUMBER
<b>Richmond &amp; Surrey Crescent Shoreline Improvements Community Flood Preparedness Fund</b>		Moffatt & Nichol - WBE / SEL		10390-57
ITEM DESCRIPTION				
<i>Erosion &amp; Sediment Control and Demolition</i>		Unit Cost	Unit	
Mobilization	\$ 400,000.00	LS		Quantity      Price
Safety Fence	\$ 6.00	LF		1      \$ 400,000
Construction Entrance	\$ 4,000.00	LS		2950      \$ 17,700
Temporary Inlet Protection	\$ 400.00	EA		1      \$ 4,000
Tree Protection	\$ 16.00	LF		12      \$ 4,800
Silt Fence	\$ 4.00	LF		290      \$ 4,640
Turbidity Curtain	\$ 22.25	LF		2950      \$ 11,800
Temporary Cofferdam (Porta Dam)	\$ 67,500.00	LS		100      \$ 2,225
Site Restoration and Demobilization	\$ 10,000.00	LS		1      \$ 67,500
			<b>Subtotal:</b>	1      \$ 10,000
<i>Demolition</i>		Unit Cost	Unit	
Timber Dock	\$ 3,000.00	EA		4      \$ 12,000
Surrey Crescent Bulkhead	\$ 30.00	LF		750      \$ 22,500
Richmond Crescent Bulkhead	\$ 30.00	LF		1600      \$ 48,000
Concrete Curb and Gutter	\$ 20.00	LF		1620      \$ 32,400
Asphalt Pavement	\$ 20.00	SF		1000      \$ 20,000
Catch Basin	\$ 1,500.00	EA		3      \$ 4,500
Outfall pipe	\$ 500.00	EA		4      \$ 2,000
Remove Guardrail	\$ 20.00	LF		30      \$ 600
Utility Pole and Overhead Electrical	\$ 1,000.00	EA		5      \$ 5,000
			<b>Subtotal:</b>	
<i>New Construction</i>		Unit Cost	Unit	
VDOT Class II Riprap	\$ 180.00	TON		6648      \$ 1,196,712
VDOT #2 Stone	\$ 100.00	TON		703      \$ 70,290
Low Permeability Structural Fill	\$ 50.00	CY		286      \$ 14,300
Geotextile Fabric	\$ 6.00	SY		10420      \$ 62,520
Geogrid	\$ 12.00	SY		5050      \$ 60,600
Excavation	\$ 10.00	CY		5000      \$ 50,000
Haul and Disposal of Excavated Material	\$ 55.00	CY		5000      \$ 275,000
Sand Fill	\$ 60.00	CY		4488      \$ 269,280
Coarse Sand Fill	\$ 50.00	CY		1276      \$ 63,800
Low Marsh Plantings	\$ 4.00	EA		3490      \$ 13,960
High Marsh Plants	\$ 4.00	EA		3520      \$ 14,080
Bermuda Sod	\$ 6.00	SF		6750      \$ 40,500
Top Soil	\$ 100.00	CY		4      \$ 400
Goose Exclusion Fence	\$ 3.00	SY		3690      \$ 11,070
Outfall Pipe	\$ 2,000.00	EA		4      \$ 8,000
Utility Pile and Overhead Electrical	\$ 5,000.00	EA		5      \$ 25,000
Asphalt Pavement	\$ 150.00	TON		75      \$ 11,250
Concrete Curb and Gutter	\$ 50.00	LF		1620      \$ 81,000
6" Perforated Drain Pipe	\$ 100.00	LF		2350      \$ 235,000
15" RCP Pipe	\$ 45.00	LF		30      \$ 1,350
Armorflex® Concrete Block	\$ 15.00	SF		6750      \$ 101,250
Sheet Pile Wall	\$ 450.00	LF		630      \$ 283,500
Concrete Cap for Sheet Pile Wall	\$ 430.00	LF		630      \$ 270,900
Concrete Wall	\$ 700.00	LF		1875      \$ 1,312,500
			<b>Subtotal:</b>	
Sub Total -				
Contingency - 30%				\$ 5,141,927.00
Escalation - 4% for 1.5 Years				\$ 1,542,578.10
Design				\$ 311,580.51
<b>TOTAL -</b>				<b>\$ 7,196,085.61</b>

## **Richmond-Surrey Crescent Flood Control and Living Shoreline Maintenance Plan**

The Richmond-Surrey Crescent Flood Control and Living Shoreline project will include a variety of green and grey infrastructure improvements that will be maintained through standard City of Norfolk policies and procedures. The majority of inspection and maintenance of stormwater infrastructure, flood barriers, and living shorelines is conducted by the Division of Environmental Storm Water Management. When necessary, guidance and more detailed monitoring and maintenance are provided by additional environmental staff from the Office of Resilience and Bureau of Environmental Services. All infrastructure is inspected on a routine basis or when resident concerns about blockages, damage, and other issues are reported through the MyNorfolk system. Pipes and structures, including valves, are inspected at least every five years using visual inspection or remote operated cameras. When needed, valves are cleaned by hand and pipes are cleaned using vacuum trucks. Flood barriers and revetments are inspected annually for signs of deterioration or unintended vegetation growth. Structural repairs are made when necessary and unintended vegetation is removed annually through use of brush mowing and herbicide. Living shorelines are considered Best Management Practices (BMPs) in the City of Norfolk and are inspected and maintained annually. Maintenance of the proposed shoreline will include treatment and removal of invasive species, removal of excessive rack accumulated in the marsh, and removal of sediment accumulated in unintended areas. When needed, replanting of vegetation, addition or grading of sand, and repair of other project elements such as signage or rock sill is conducted. SOPs for each infrastructure type are attached in supporting documentation. All inspections and maintenance work orders are tracked in the City's Lucity work management system, with asset management integration through ArcGIS.



## **Richmond-Surrey Crescent Flood Protection & Living Shoreline**

### **Scope of Work**

#### **Needs and Problems:**

The City of Norfolk seeks support for construction of flood protection, shoreline stabilization, and living shoreline features to increase resilience of Hampton Blvd and adjacent areas of the Larchmont-Edgewater neighborhood.

Hampton Blvd is a major road running north-south through the eastern portion of Norfolk, connecting Interstates 264 and 664 via the Midtown Tunnel through Portsmouth to the south with Interstate 64 and 564 to the north. It is one of the busiest non-interstate roadways in southeastern Virginia due to the location of important regional assets along its corridor, including Naval Station Norfolk and numerous military facilities associated with the largest naval base in the world, as well as NATO Joint Force Command, Virginia Port Authority's Norfolk International Terminal (and Portsmouth Marine Terminal immediately on the south side of the Midtown Tunnel), Norfolk Southern's Lambert Point Yard, Old Dominion University, Eastern Virginia Medical School, and Sentara Norfolk General Hospital. In terms of regional and national security, commerce, and workforce, Hampton Blvd is one of the most important roadways in southeast Virginia.

Unfortunately, as with many roadways in Hampton Roads, portions of Hampton Blvd are prone to flooding. In particular, the section north of Old Dominion University and south of the Lafayette River, adjacent to the Larchmont/Edgewater community and Naval Facilities Engineering Systems Command Atlantic compound, is regularly documented by local, and occasionally national, news as a highly flood prone spot. Approximately a half-mile section of Hampton Blvd is flooded during major coastal storm events, making it impassable. Even during more frequent "sunny day" flooding resulting from seasonal lunar cycles and smaller or offshore storm events, sections of the road become nearly impassable, severely impacting traffic. The City of Norfolk has several projects underway to address various scales of flooding on Hampton Blvd, including the Lafayette Surge Barrier, a planned phase of the Norfolk Coastal Storm Risk Management project, in partnership with the Army Corps of Engineers. Once constructed, the surge barrier at the mouth of the Lafayette River is designed to close ahead of large coastal storm events, preventing catastrophic flooding. To meet regulatory requirements and ensure the long-term environmental health of the large Lafayette River ecosystem, the surge barrier will only close when storm surge inundation is expected to exceed an elevation of 4 ft on the North American Vertical Datum (NAVD). At a smaller scale, the currently under construction, Department of Defense-supported Hampton Blvd Drainage Improvement project will upgrade pipes and outfalls on Hampton Blvd around the Naval Facilities Engineering Systems Command Atlantic compound to reduce tailwater flooding through the storm drains and onto the streets during small "sunny day" events, up to approximately 2.5

ft NAVD. While the combined benefits of these projects will address many storm events, a gap remains where a moderate storm could overtop banks of the Lafayette River, flow overland and through storm drains upstream of valves, and flood Hampton Blvd and surrounding neighborhoods. These gaps between small solutions such as valves and large solutions such as floodwalls and surge barrier are found in locations throughout Norfolk and the region, and will expand in time due to sea level rise.

Intermediate scale solutions to address gaps in flood protection are essential for long term success of the region.

To address flooding along Hampton Blvd and in the adjacent Larchmont-Edgewater neighborhood, the City of Norfolk proposes to utilize a hybrid green-grey infrastructure solution. A 100 year old, failing concrete bulkhead along Richmond Crescent and Surrey Crescent will be partially removed and replaced by a combination of living shoreline and oyster-set riprap revetment, providing wave attenuation. Living shoreline sections of the project will tie into two previous wetland restoration project, the Myrtle Park project, constructed in 2013 by the City along Richmond Crescent, and the Birdsong Wetland, constructed in 1997 by community organizations behind the Larchmont Library as one of the first living shorelines in Virginia. The connections and increased marsh area will create greater overall benefits. Behind the shoreline features, a low knee wall and berm system will be constructed to elevation 4 ft NAVD, with french drain systems to enhance localized ponding from rainfall and minor overtopping of the barriers. Lastly, backflow prevention valves will be placed on any outfalls lacking them. Living shorelines and oyster reefs will support City, State, and Chesapeake Bay water quality and wildlife habitat goals, while also providing wave attenuation to reduce maintenance and adjacent hard infrastructure. The knee wall and valves will reduce tidal flooding from “sunny-day” lunar and wind events, as well as small coastal storms, and in tandem with other ongoing flood reduction efforts such as the Norfolk CSRM Lafayette Surge Barrier and Hampton Blvd Drainage Improvement project, demonstrates Norfolk’s commitment to layered resilience.

While residents of Norfolk and the region as a whole will benefit from flood reduction on Hampton Blvd, the most direct daily benefit from the proposed project will be in Larchmont-Edgewater, a well-established neighborhood located along the Lafayette River on the targeted stretch of Hampton Blvd. Established from agricultural land starting in 1906, the community was eventually annexed into the City of Norfolk in 1923. Consisting of primarily original single-family homes, Larchmont-Edgewater has long provided a mixture of market rate and affordable housing, both owner-occupied and rentals, for major economic drivers along Hampton Blvd. Neighborhood roads are flooded on a monthly basis, leading to access issues and wear and tear on vehicles. Less often, flood waters impact private properties, including structures. At least 225 parcels will see direct flood reduction to the property, including to physical structures in many cases, or to direct driveway access in other cases, with lesser access benefits to other sections of the neighborhood. Larchmont/Edgewater is located in census tracts 23 and 24, both of which have Very Low Social Vulnerability due to the long-established economic strength of nearby commercial and institutional entities. While the immediate neighborhood has low economic stress, the city of Norfolk overall is a low-income community compared to the rest of the state, with a 2022 city-wide median household income of \$56,244 versus a state-wide median household income of \$80,615. Based off the direct project benefits most directly supporting a community with Very Low Social Vulnerability, in this application we have classified our request as a 60%/40% split, but we appreciate consideration of a lesser match based off the overall economic status of Norfolk and the large regional benefit. The

proposed project will strengthen the city and region as a whole by increasing flood resilience of the critical Hampton Blvd corridor, one of the busiest roads in southeast Virginia.

### **Goals and Objectives:**

The goals and objectives of the Richmond-Surrey Crescent Flood Protection and Living Shoreline project support final design and construction of a combination of flood protection and environmental enhancement efforts benefitting the critical Hampton Blvd corridor and a portion of the adjacent Larchmont-Edgewater community.

Goal 1: Reduce flooding along a section of Hampton Blvd and surrounding neighborhood streets, frequently impacted by “sunny day” lunar and wind-driven events, as well small coastal events

Goal 2: Restore wetland and oyster habitats in the Lafayette River

Goals 3: Stabilize a failing concrete bulkhead and eroding banks

Objective 1: Finalize the project design within 1 year of grant agreement signing

Objective 2: Construct project elements within 3 years of the grant agreement signing

### **Work Plan:**

Preliminary design of the Richmond-Surrey Crescent Flood Protection and Living Shoreline project is underway by Moffatt & Nichol, an on-call City consultant, and final design is expected to be completed by Spring 2026. Management of the design is being conducted by staff in the City's Department of Public Works, with support from the Office of Resilience. Once the design is finalized, approved through City site plan review, approved by the Army Corps of Engineers Norfolk District for elements associated with the Norfolk Coastal Storm Risk Management Project, and receives necessary permits, the construction phase will commence. This is anticipated in summer 2026 and will take up to two years. Construction management will be conducted by a combination of City staff from the Department of Public Works (Design Division and the Division of Environmental Storm Water Management), Office of Resilience, and the Bureau of Environmental Services, providing overlapping oversight to ensure a successful project. Overall grant management, reporting, and coordination will be conducted by the Office of Resilience.

Construction of the project will initiate with installation of appropriate erosion and sediment controls, as well as safety fencing, to exclude residents from the work zone along the shoreline right-of-way of Richmond and Surrey Crescent. Partial road closures along the residential streets are anticipated for construction access and laydown. The top third and any large chunks of the failing concrete bulkhead will be removed and properly disposed of. A combination of geotextiles, geogrids, and coarse sand will be replaced over existing subaqueous bottoms offshore of the bulkhead, followed by riprap stones to establish rock sills for living shoreline sections and as designed along revetment sections. Additional

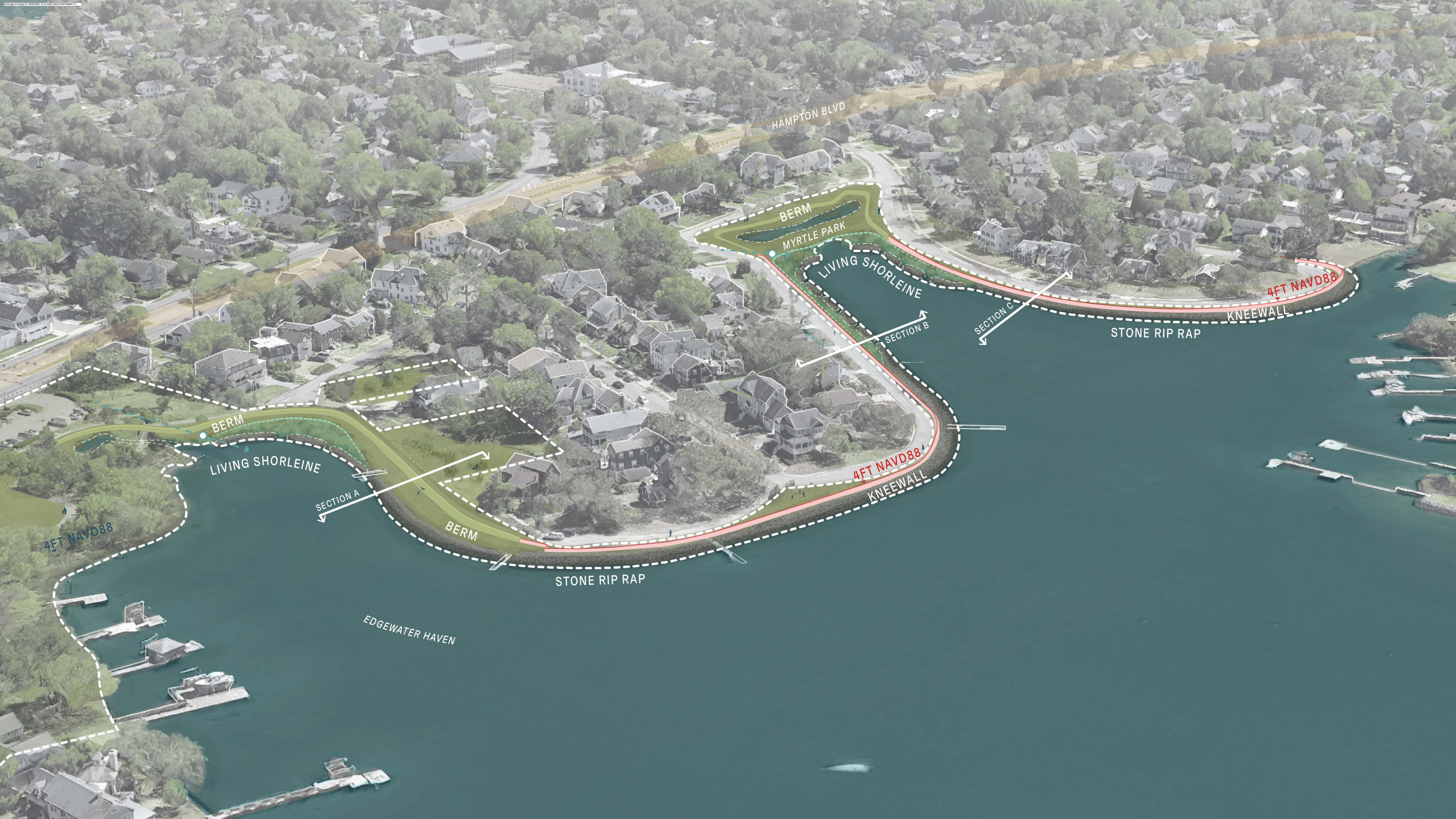
geotextile and marsh-appropriate sand will be placed between the bulkhead and rock sills along living shoreline sections. Care will be taken to avoid damage to the existing, healthy Myrtle Park and Birdsong Wetland projects at tie-in points. The new knee wall structure will be installed using forms over the remaining concrete bulkhead, using the new offshore structures and still-useable belowground portions for support. Behind the knee wall, french drains will be installed in a narrow median to allow localized drainage from rainfall and minor overtopping during storm events. Earthen berms with structural core and vegetated articulating block cover will be established in several sections in lieu of knee wall to better tie into the existing landscape. Where necessary, existing outfalls through the bulkhead will be upgraded, replaced, or consolidated to ensure appropriate drainage. Some outfalls are being addressed by the ongoing, adjacent Hampton Blvd Drainage Improvement projects, but in all cases where backflow prevention valves have not been installed, they will be included in upgrades. Final layers of sand will be added to bring the marsh to design elevation after any settlement. After major structural work and heavy equipment work is complete, replacement or repair of the asphalt roadway through portions of the work zone are anticipated. Lastly, during appropriate seasons, high and low marsh grasses such as *Spartina patens* and *Spartina alterniflora* will be planted on the living shoreline. As with all hard surfaces added in the Lafayette River, rapid colonization by oysters and other benthic organisms is expected on shoreline sills and riprap revetment. Based off past projects of this scale, primary construction is estimated to take up to 16 months, but additional time may be required to address any punch-list items or to allow planting at the correct time of year.

Final Completion of construction will serve as the primary deliverable for the project to meet grant goals. At final completion, the shoreline portion of the project will be entered into the City's asset management system as a Best Management Practice (BMP), initiating annual inspection and maintenance by the Division of Environmental Storm Water Management under their BMP Maintenance SOP and MS4 permit requirement. Shoreline portions associated with the Norfolk Coastal Storm Risk Management System will also be monitored by the Office of Resilience. The knee wall, outfalls, pipes, and valves will be added to the GIS and work management systems in the Department of Public Works for ongoing inspection and maintenance. Staff from Office of Resilience will continue to support Department of Public Works in all aspects of post-construction monitoring, inspection, and maintenance. The City has significant experience with all project elements and maintenance activities will include annual inspection of knee wall and shoreline, routine inspection and cleaning of pipes, valves and outfalls, replanting of marsh vegetation if needed, removal of excessive rack and litter from the marsh, and repair of rock sill or revetment in the event they are damaged. Additionally, the project will include a minimum one-year contractor warranty, under which issues such as vegetation loss or major sand displacement will be addressed. Lastly, over the long term, Norfolk is reviewing options to sustain shoreline projects in place through beneficial re-use of dredge spoils, such as thin-layer placement on existing marshes. The City is dedicated to managing both its green and grey infrastructure for sustained layered resilience.

#### **Evaluation:**

Success of the project will be measured initially be completion of construction to match the engineered design. This will ensure the calculated flood reduction, wave attenuation, water quality improvement, and habitat increase values are met per the effectiveness goals of the project. Meetings between the

project team and inspections prior to construction, throughout construction, prior to plant installation, at Substantial Completion, and at Final Completion will provide numerous opportunities to answer questions, discuss any proposed modifications due to site conditions, and review progress. As-built surveys will be collected to ensure correct structural elevations and marsh grades have been established for successful flood reduction, plant growth and wave attenuation. For a minimum one year after Final Completion, warranty inspections will be conducted by the contractor and City team, allowing plans to be established to address any short-term deficiencies. Monitoring and inspections during and after the warranty period will include visual inspection for major issues, haphazard random plant biomass survey and review of oyster spat set on the rock sill. As with all flood reduction projects, Norfolk will assess the overall performance and benefits during any storm events to continue adding to nationwide research on enhancing hybrid features for these goals.





Initial  
KWS

1/23/2025 | 2:33 PM EST  
Use for All City Documents Requiring the City Manager's Approval

## DOCUMENT TRANSMITTAL FORM

**\*PLEASE INDICATE IF THERE IS A LEGITIMATE DUE DATE BY WHICH THE CITY MANAGER MUST RESPOND\***

**DUE DATE:** 1/24/25 **RETURN COMPLETED DOCUMENT TO:** JUSTIN SHAFER

DEPARTMENT:	<b>RESILIENCE</b>
-------------	-------------------

**TO BE COMPLETED FOR CONTRACTS, AGREEMENTS, RFPs, AND GRANTS:**

**TITLE: 2024 COMMUNITY FLOOD PREPAREDNESS FUND GRANT**

PARTY (Company and principal's names with which the City is entering into the agreement.)	Virginia Department of Conservation and Recreation (DCR)
EFFECTIVE DATES (Start & end dates)	May 1, 2025 – May 1, 2028 (estimated based on expected award announcement and agreement dates)
TOTAL DOLLAR VALUE	\$7,196,100 (\$4,317,660 grant award and \$2,878,440 match)
FUNDING SOURCE (Operating or capital budget; budget year; grant or other source. Show account information)	<b>SOURCE: RESILIENCE CIP</b> <b>ACCOUNT: 4000-2-4361-5501-FY24</b>
TYPE OF DOCUMENT: (New or extension)	New

**BRIEF DESCRIPTION: THE VIRGINIA DCR COMMUNITY FLOOD PREPAREDNESS FUND (CFPF) GRANT PROVIDES SUPPORT FOR LOCALITIES TO REDUCE THE IMPACT OF FLOODING THROUGH THE USE OF GREY-INFRASTRUCTURE, GREEN-INFRASTRUCTURE, AND HYBRID CONSTRUCTION PROJECTS, AS WELL AS PLANS AND STUDIES.**

**SUMMARY OF SCOPE OF SERVICE/ PROGRAM: THE CITY'S OFFICE OF RESILIENCE, IN COLLABORATION WITH THE DEPARTMENT OF PUBLIC WORKS, WILL FINALIZE DESIGN AND CONSTRUCT THE RICHMOND-SURREY CRESCENT SHORELINE IMPROVEMENT PROJECT, WHICH WILL CONSTRUCT SHORELINE STABILIZATION, FLOOD CONTROL, AND GREEN INFRASTRUCTURE FEATURES IN THE LARCHMONT NEIGHBORHOOD. THE PROJECT WILL PROVIDE FLOOD PROTECTION FOR SMALL TO MODERATE STORM EVENTS FOR THE NEIGHBORHOOD AND ADJACENT HAMPTON BLVD. IT WILL SUPPORT FLOOD RESILIENCE, WATER QUALITY, AND GREEN INFRASTRUCTURE GOALS, INCLUDING THE CSRM AND TMDL.**

PROCUREMENT METHOD (RFP, Sealed BID, etc.)	RFP
CALL OUTS (Indicate any unique circumstances regarding provisions such as procurement protest pending, emergency purchase or other time sensitivity, so forth, along with any other pertinent information)	



**Certificate of Satisfaction:** I (We) hereby certify that all reasonable due diligence has been performed to sufficiently develop the contents and implications of the attached document in a manner to protect and account to the public. Further, all City policies and procedures have been adhered to and therefore, I (we) recommend the City Manager execute this document.

A handwritten signature in black ink that appears to read "Justin Shuler".

1/23/25

Document Owner

A handwritten signature in black ink that appears to read "Kyle W. Spencer".

1/23/25

Department Head Signature

Date

**Review by DCM** Approve  Disapprove 

A handwritten signature in black ink that appears to read "Douglas J. Beaver".

1/23/2025 | 4:21 PM EST

Deputy City Manager

Date

**Review by CM** Approve  Disapprove 

A handwritten signature in black ink that appears to read "Michael A. Spencer".

1/23/2025 | 1:52 PM PST

E68ETB3EDF5842D...  
City Manager

Date



## MEMORANDUM

TO: Patrick G. Roberts, City Manager

CC TO: Douglas J. Beaver, Deputy City Manager of Critical Infrastructure and Technology

FROM: Kyle Spencer, Chief Resilience Office

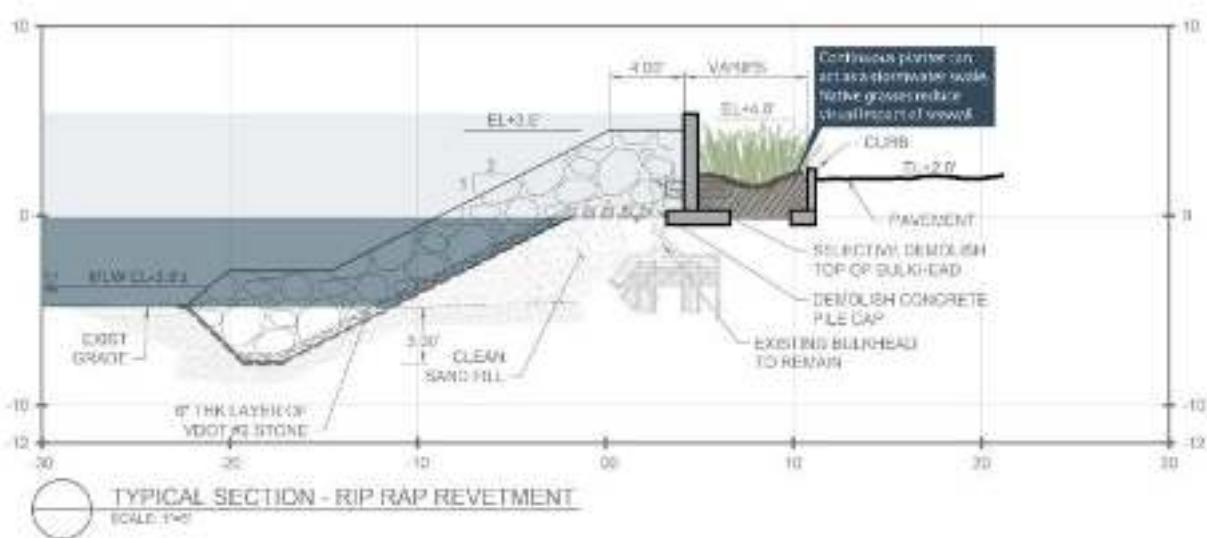
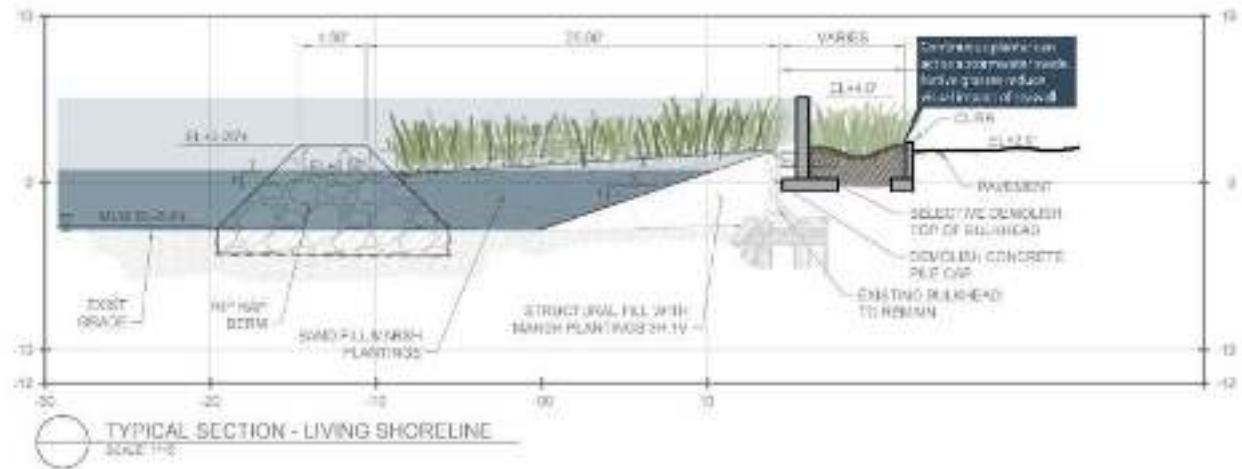
DCR Community Flood Preparedness Fund Application for Richmond-Surrey Crescent  
SUBJECT: Shoreline Improvement Project

DATE: 1/23/25

The section of the Larchmont neighborhood along Richmond Crescent, Surrey Crescent, and adjacent streets has long been a hotspot for tidal flooding, including “nuisance” or “sunny day” flooding, as well as from coastal storm events. While the future construction of the Coastal Storm Risk Management project’s Lafayette Surge Barrier will provide protection during larger coastal events, this low-lying location is an example where intermediate interventions will be required for smaller storms and annual King Tides.

The Richmond-Surrey Crescent Shoreline Improvement project, currently under design by the Department of Public Works, will work to address flooding by installing a low knee wall and berm features, as well as backflow valves, preventing flooding onto neighborhood streets and properties during full moons and moderate storm events. The project will also tie into work currently underway for the DCIP grant-funded Hampton Blvd Drainage Improvement project to provide an even higher level of protection for this important transportation corridor. To address a failing concrete bulkhead along much of Richmond and Surrey Crescent which threatens eventual road collapse, the project will install an offshore combination of living shorelines and rock revetments. The marsh shorelines will tie into past wetland restoration projects at Myrtle Park and the Larchmont Library, and combined with oyster reefs installed on rock revetments, will serve as nature-based features for the Coastal Storm Risk Management project. The features of the project will also provide enhanced water quality and wildlife habitat, meeting goals of the Chesapeake Bay TMDL and Norfolk Green Infrastructure Plan. Attached figures provide additional information based off current design.

The Office of Resilience is proposing to apply for \$4,317,660 in grant funds from the Virginia Department of Conservation and Recreation’s (DCR) Community Flood Preparedness Fund. \$2,878,440 in match funds will be required. The project will meet goals of the CSRM and serve as a portion of the City’s local match. Grant funds would support both flood reduction and green infrastructure portions of the project.





# 2721 - Richmond-Surrey Crescent Flood Protection and Living Shoreline

## Application Details

**Funding Opportunity:** 2336-Virginia Community Flood Preparedness Fund - Project Grants - CY24 Round 5  
**Funding Opportunity Due Date:** Jan 24, 2025 11:59 PM  
**Program Area:** Virginia Community Flood Preparedness Fund  
**Status:** Editing  
**Stage:** Final Application  
  
**Initial Submit Date:**  
**Initially Submitted By:**  
**Last Submit Date:**  
**Last Submitted By:**

## Contact Information

### Primary Contact Information

**Name\*:** Mr. Justin Middle Name Shafer  
 Salutation First Name Last Name  
**Title:** Project Manager, Water Quality and Green Infrastructure  
**Email\*:** justin.shafer@norfolk.gov  
**Address\*:** 2223 McKann Avenue

Norfolk Virginia 23505  
 City State/Province Postal Code/Zip

**Phone\*:** (757) 823-4048 Ext.  
 Phone  
 ##### #####  
**Fax:** ##### #####

### Organization Information

**Name\*:** NORFOLK, CITY OF  
**Organization Type\*:** Local Government  
**Tax ID\*:** 546001455  
**Unique Entity Identifier (UEI)\*:** RS6DCM873FA3  
**Organization Website:** <https://www.norfolk.gov/>  
**Address\*:** 810 Union Street  
 Suite 1101

Norfolk	Virginia	23510-
City	State/Province	Postal Code/Zip

**Phone\*:** (757) 282-8383 Ext.

# # # # #

**Fax:** # # # # #

## VCFPF Applicant Information

### **Project Description**

**Name of Local Government\*:** City of Norfolk

Your locality's CID number can be found at the following link: [Community Status Book Report](#)

**NFIP/DCR Community Identification Number (CID)\*:** 510104

If a state or federally recognized Indian tribe,

**Name of Tribe:**

**Authorized Individual\*:** Patrick Roberts  
First Name Last Name

**Mailing Address\*:** 810 Union St  
Address Line 1  
Suite 1101  
Address Line 2  
Norfolk Virginia 23510  
City State Zip Code

**Telephone Number\*:** 757-664-4242

**Cell Phone Number\*:** 757-664-4242

**Email\*:** [citymgr@norfolk.gov](mailto:citymgr@norfolk.gov)

Is the contact person different than the authorized individual?

**Contact Person\*:** Yes

**Contact:** Justin Shafer  
First Name Last Name  
501 Boush St  
Address Line 1  
Address Line 2  
Norfolk Virginia 23510  
City State Zip Code

**Telephone Number:** 757-282-8383

**Cell Phone Number:** 757-282-8383

**Email Address:** [justin.shafer@norfolk.gov](mailto:justin.shafer@norfolk.gov)

Enter a description of the project for which you are applying to this funding opportunity

### **Project Description\*:**

Low-income geographic area means any locality, or community within a locality, that has a median household income that is not greater than 80 percent of the local median household income, or any area in the Commonwealth designated as a qualified opportunity zone by the U.S. Secretary of the Treasury via his delegation of authority to the Internal Revenue Service. A project of any size within a low-income geographic area will be considered.

Is the proposal in this application intended to benefit a low-income geographic area as defined above?

**Benefit a low-income geographic area\*:** No

Information regarding your census block(s) can be found at [census.gov](#)

**Census Block(s) Where Project will Occur\*:** Tract 24 - Blocks 1010 - 1012, and 1017 - 1025; Tract 23 Blocks 1004 - 1005, 1020 - 1022, and 1025

**Is Project Located in an NFIP Participating Community?\***: Yes

**Is Project Located in a Special Flood Hazard Area?\***: Yes

**Flood Zone(s) (if applicable):** AE

**Flood Insurance Rate Map Number(s) (if applicable):** 5101040018H

## Eligibility CFPF - Round 4 - Projects

### **Eligibility**

Is the applicant a local government (including counties, cities, towns, municipal corporations, authorities, districts, commissions, or political subdivisions created by the General Assembly or pursuant to the Constitution or laws of the Commonwealth, or any combination of these)?

**Local Government?\***: Yes

Yes - Eligible for consideration

No - Not eligible for consideration

Does the local government have an approved resilience plan and has provided a copy or link to the plan with this application?

**Resilience Plan?\***: Yes

Yes - Eligible for consideration under all categories

No - Eligible for consideration for studies, capacity building, and planning only

If the applicant is not a town, city, or county, are letters of support from all affected local governments included in this application?

**Letters of Support?\***: N/A

Yes - Eligible for consideration

No - Not eligible for consideration

N/A- Not applicable

Has this or any portion of this project been included in any application or program previously funded by the Department?

**Previously Funded?\***: No

Yes - Not eligible for consideration

No - Eligible for consideration

Has the applicant provided evidence of an ability to provide the required matching funds?

**Evidence of Match Funds?\***: Yes

Yes - Eligible for consideration

No - Not eligible for consideration

N/A- Match not required

## Scoring Criteria for Flood Prevention and Protection Projects - Round 4

### **Scoring**

#### **Category Scoring:**

Hold CTRL to select multiple options

#### **Project Category?\***:

All hybrid approaches whose end result is a nature-based solution,Living shorelines and vegetated buffers,Wetland restoration

Is the project area socially vulnerable? (based on ADAPT Virginia's Social Vulnerability Index Score)

#### **Social Vulnerability Scoring:**

Very High Social Vulnerability (More than 1.5)

High Social Vulnerability (1.0 to 1.5)

Moderate Social Vulnerability (0.0 to 1.0)

Low Social Vulnerability (-1.0 to 0.0)

Very Low Social Vulnerability (Less than -1.0)

**Socially Vulnerable?\***: Very Low Social Vulnerability (Less than -1.0)

Is the proposed project part of an effort to join or remedy the community's probation or suspension from the NFIP?

**NFIP?\***: No

Is the proposed project in a low-income geographic area as defined below?

"Low-income geographic area" means any locality, or community within a locality, that has a median household income that is not greater than 80 percent of the local median household income, or any area in the Commonwealth designated as a qualified opportunity zone by the U.S. Secretary of the Treasury via his delegation of authority to the Internal Revenue Service. A project of any size within a low-income geographic area will be considered.

**Low-Income Geographic Area\*:** No

Projects eligible for funding may also reduce nutrient and sediment pollution to local waters and the Chesapeake Bay and assist the Commonwealth in achieving local and/or Chesapeake Bay TMDLs. Does the proposed project include implementation of one or more best management practices with a nitrogen, phosphorus, or sediment reduction efficiency established by the Virginia Department of Environmental Quality or the Chesapeake Bay Program Partnership in support of the Chesapeake Bay TMDL Phase III Watershed Implementation Plan?

**Reduction of Nutrient and Sediment Pollution\*:** Yes

**Pollution\*:**

Does this project provide ?community scale? benefits?

**Community Scale Benefits\*:** More than one census block

Expected Lifespan of Project

**Expected Lifespan of Project\*:** Over 20 Years

**Comments:**

While not in a low-income geographic area, the project will benefit all residents of Norfolk and the region by reducing frequency of flooding on Hampton Blvd, a major thoroughfare connecting regional military, education, port and medical facilities.

## Scope of Work - Projects - Round 4

### Scope of Work

**Upload your Scope of Work**

Please refer to Part IV, Section B. of the grant manual for guidance on how to create your scope of work

**Scope of Work\*:** [Richmond-Surrey Crescent Flood Protection and Living Shoreline Scope of Work.docx](#)

**Comments:**

### Budget Narrative

**Budget Narrative Attachment\*:** [Richmond-Surrey Crescent Flood Control and Living Shoreline Budget Narrative.docx](#)

**Comments:**

## Scope of Work Supporting Information - Projects

### Supporting Information - Projects

Provide population data for the local government in which the project is taking place

**Population\*:** 232995.00

Provide information on the flood risk of the project area, including whether the project is in a mapped floodplain, what flood zone it is in, and when it was last mapped. If the property or area around it has been flooded before, share information on the dates of past flood events and the amount of damage sustained

**Historic Flooding data and Hydrologic Studies\*:** [Norfolk Flooding Data and Hydrologic Studies Link.docx](#)

Include studies, data, reports that demonstrate the proposed project minimizes flood vulnerabilities and does not create flooding or increased flooding (adverse impact) to other properties

**No Adverse Impact\*:**

Include supporting documents demonstrating the local government's ability to provide its share of the project costs. This must include an estimate of the total project cost, a description of the source of the funds being used, evidence of the local government's ability to pay for the project in full or quarterly prior to reimbursement, and a signed pledge agreement from each contributing organization

**Ability to Provide Share of Cost\*:** [DCR CFPF 2024 - CM Document Transmittal Form - Signed.pdf](#)

A benefit-cost analysis must be submitted with the project application

**Benefit-Cost Analysis\*:**

Provide a list of repetitive loss and/or severe repetitive loss properties. Do not provide the addresses for the properties, but include an exact number of repetitive loss and/or severe repetitive loss structures within the project area

**Repetitive Loss and/or Severe Repetitive Loss Properties\*:**

Describe the residential and commercial structures impacted by this project, including how they contribute to the community such as historic, economic, or social value. Provide an exact number of residential structures and commercial structures in the project area

#### **Residential and/or Commercial Structures\*:**

Reduced flooding is assessed in, under, or immediately adjacent to 68 residential and 2 commercial structures in the impacted portion of the Larchmont/Edgewater neighborhood. At least 225 residential or commercial properties directly benefit from the project in terms of flood reduction to the property itself or increased ability to access the property through regularly flooded streets, with hundreds more indirectly benefiting from improved access. While the neighborhood is not a registered historic district, it does date to 1906 and remains an important source of market rate and affordable housing, both owner-occupied and rentals, for the city as a whole, but especially for nearby locations along Hampton Blvd such as Naval Station Norfolk, Old Dominion University, and Sentara Norfolk General Hospitals.

If there are critical facilities/infrastructure within the project area, describe each facility

#### **Critical Facilities/Infrastructure\*:**

Hampton Blvd is the most important piece of infrastructure supported by the project. Hampton Blvd is a major road running north-south through the eastern portion of Norfolk, connecting Interstates 264 and 664 via the Midtown Tunnel through Portsmouth to the south with Interstate 64 and 564 to the north. It is one of the busiest non-interstate roadways in southeastern Virginia due to the location of important regional assets along its corridor, including Naval Station Norfolk and numerous military facilities associated with the largest naval base in the world, as well as NATO Joint Force Command, Virginia Port Authority's Norfolk International Terminal (and Portsmouth Marine Terminal immediately on the south side of the Midtown Tunnel), Norfolk Southern's Lambert Point Yard, Old Dominion University, Eastern Virginia Medical School, and Sentara Norfolk General Hospital. In terms of regional and national security, commerce, and workforce, Hampton Blvd is one of the most important roadways in southeast Virginia.

A small sewer pump station along Richmond Crescent will also benefit from increased flood resilience, though past measure have reduces some risk already.

Explain the local government's financial and staff resources. How many relevant staff members does the local government have? To what relevant software does the local government have access? What are the local government's capabilities?

#### **Financial and Staff Resources\*:**

The City of Norfolk has numerous professional and operational staff across multiple departments to provide support for project and grant management. In particular, the Office of Resilience and Public Works Design Division have more than 15 engineers, scientists, and inspectors who focus on design, construction, and monitoring of flood reduction, waterfront structures, water quality projects, and green infrastructure projects, as well as contracting of City projects. Public Works Division of Environmental Storm Water Management has several crews dedicated to maintenance of hard infrastructure, including floodwalls, pipes, outfalls, and valves. Additionally, two crews are dedicated to maintenance of Best Management Practices, including living shorelines. The Department of Public Works has a dedicated Financial Management team who assist with project budget management, including a staff member who focuses on grants. Further high level grant, financial, and internal controls support are provided by dedicated teams in the Departments of Finance and Budget. Additional staff from the Bureau of Environmental Services support project inspection and permit compliance. Staff from the Department of Parks and Recreation support maintenance of open spaces and flood control features such as mowed berms.

The City uses a variety of specialized software to manage all aspects of projects.

Overall project management is through the E-Builder web application. Budgets are managed in the AFMS web application and linked to E-Builder. Grants are managed through the E-Civis web application and other internal software. Contracting is managed through the OpenGov web application. Assets and maintenance work orders are managed in the Lucity application and ArcGIS. Norfolk also regularly develops or partners on tools for internal analysis and resident education of focus areas, such as the TITAN and Waze-integrated Floodmap tool for real time flood risk awareness.

Identify and describe the goals and objectives of the project. Include a description of the expected results of the completed project and explain the expected benefits of the project. This may include financial benefits, increased awareness, decreased risk, etc.

#### **Goals and Objectives\*:**

The goals and objectives of the Richmond-Surrey Crescent Flood Protection and Living Shoreline project support final design and construction of a combination of flood protection and environmental enhancement efforts benefitting the critical Hampton Blvd corridor and a portion of the adjacent Larchmont-Edgewater community.

Goal 1: Reduce flooding along a section of Hampton Blvd and surrounding neighborhood streets, frequently impacted by "sunny day" lunar and wind-driven events, as well small coastal events

Goal 2: Restore wetland and oyster habitats in the Lafayette River

Goals 3: Stabilize a failing concrete bulkhead and eroding banks

Objective 1: Finalize the project design within 1 year of grant agreement signing

Objective 2: Construct project elements within 3 years of the grant agreement signing

Outline a plan of action laying out the scope and detail of how the proposed work will be accomplished with a timeline identifying expected completion dates.

Determine milestones for the project that will be used to track progress. Explain what deliverables can be expected at each milestone, and what the final project deliverables will be. Identify other project partners

**Approach, Milestones, and Deliverables\*:** [Richmond-Surrey Crescent Flood Control and Living Shoreline - Approach Milestones and Deliverables.docx](#)

Where applicable, briefly describe the relationship between this project and other past, current, or future resilience projects. If the applicant has received or applied for any other grants or loans, please identify those projects, and, if applicable, describe any problems that arose with meeting the obligations of the grant and how the obligations of this project will be met

**Relationship to Other Projects\*:**

The Richmond-Surrey Crescent Flood Control and Living Shoreline project meets goals of Norfolk's Resilience Strategy, Green Infrastructure Plan, Climate Action Plan, Comprehensive Plan, and TMDL Action Plan. The project will add to, support, and/or work in tandem with a variety of past, ongoing, and planned projects. The City has several projects underway to address various scales of flooding on Hampton Blvd, including the Lafayette Surge Barrier, a planned phase of the Norfolk Coastal Storm Risk Management project, in partnership with the Army Corps of Engineers. Once constructed, the surge barrier at the mouth of the Lafayette River is designed to close ahead of large coastal storm events, preventing catastrophic flooding. To meet regulatory requirements and ensure the long-term environmental health of the large Lafayette River ecosystem, the surge barrier will only close when storm surge inundation is expected to exceed an elevation of 4 ft on the North American Vertical Datum (NAVD). At a smaller scale, the currently under construction, Department of Defense-supported Hampton Blvd Drainage Improvement project will upgrade pipes and outfalls on Hampton Blvd around the Naval Facilities Engineering Systems Command Atlantic compound to reduce tailwater flooding through the storm drains and onto the streets during small ?sunny day? tidal or rainfall events, up to approximately elevation 2.5 ft NAVD. While the combined benefits of these projects will address many storm events, a gap remains where a moderate storm could overtop banks of the Lafayette River, flow overland and through storm drains upstream of valves, and flood Hampton Blvd and surrounding neighborhoods. These gaps between small solutions such as valves and large solutions such as floodwalls and surge barrier are found in locations throughout Norfolk and the region, and will expand in time due to sea level rise. The proposed project will provide an intermediate scale solutions to address this gap in flood protection. Living shoreline sections of the proposed project will tie into two previous wetland restoration project, the Myrtle Park project, constructed in 2013 by the City along Richmond Crescent, and the Birdsong Wetland, constructed in 1997 by community organizations behind the Larchmont Library as one of the first living shorelines in Virginia. The connections and increased marsh area will create greater overall benefits. The project will also protect the adjacent Elizabeth River Trail.

For ongoing projects or projects that will require future maintenance, such as infrastructure, flood warning and response systems, signs, websites, or flood risk applications, a maintenance, management, and monitoring plan for the projects must be provided

**Maintenance Plan\*:**

[Richmond-Surrey Crescent Flood Control and Living Shoreline Maintenance Plan.docx](#)

Describe how the project meets each of the applicable scoring criteria contained in Appendix B. Documentation can be incorporated into the Scope of Work Narrative

**Criteria\*:**

Eligible Projects: The planned project is a hybrid approach resulting in a nature based solution

Social Vulnerability Index Score: The immediate project area has Very Low SVI, however the project support Norfolk (and the region) as a whole, which has an average SVI score of Moderate.

Community Scale of Benefit: The project provides direct benefits to residents in Tract 24 - Blocks 1010 - 1012, and 1017 - 1025 and Tract 23 Blocks 1004 - 1005, 1020 - 1022, and 1025 and additional benefits city-wide to the many residents and businesses who use Hampton Blvd.

Expected Lifespan of Project: The project is being designed with sea level rise in mind and is expected to provide benefits for more than 20 years. The City also continues to research options to sustain living shoreline assets in the long-term to combat the impacts of sea level rise.

Remedy for NFIP probation or suspension: The City is not in probation or suspension status.

Proposed project part of a low-income geographic area: The project is not in a low-income area. Norfolk as a whole is low-income compared to the state and the project provides significant benefits to all users of Hampton Blvd.

Proposed project implements a Chesapeake Bay TMDL BMP: The project will install living shorelines, which will be tracked as Shoreline Management under the Chesapeake Bay TMDL BMP criteria.

## Budget

### Budget Summary

**Grant Matching Requirement\*:**

Projects that will result in hybrid solutions - Fund 60%/Match 40%

Is a match waiver being requested?

**Match Waiver Request**

No

Note: only low-income communities are eligible for a match waiver.

\*:

<b>Total Project Amount (Request + Match)*:</b>	\$7,196,100.00
	**This amount should equal the sum of your request and match figures
<b>REQUIRED Match Percentage Amount:</b>	\$2,878,440.00

## BUDGET TOTALS

Before submitting your application be sure that you meet the match requirements for your project type.

<b>Match Percentage:</b>	40.00%
	Verify that your match percentage matches your required match percentage amount above.
<b>Total Requested Fund Amount:</b>	\$4,317,660.00
<b>Total Match Amount:</b>	\$2,878,440.00
<b>TOTAL:</b>	\$7,196,100.00

### Personnel

Description	Requested Fund Amount	Match Amount	Match Source
No Data for Table			

### Fringe Benefits

Description	Requested Fund Amount	Match Amount	Match Source
No Data for Table			

### Travel

Description	Requested Fund Amount	Match Amount	Match Source
No Data for Table			

### Equipment

Description	Requested Fund Amount	Match Amount	Match Source
No Data for Table			

### Supplies

Description	Requested Fund Amount	Match Amount	Match Source
No Data for Table			

### Construction

Description	Requested Fund Amount	Match Amount	Match Source
Construct Hybrid Flood Protection and Living Shoreline	\$4,197,660.00	\$2,798,440.00	Cash
	<b>\$4,197,660.00</b>	<b>\$2,798,440.00</b>	

### Contracts

Description	Requested Fund Amount	Match Amount	Match Source
Finalize Design	\$120,000.00	\$80,000.00	Cash
	<b>\$120,000.00</b>	<b>\$80,000.00</b>	

**Maintenance Costs**

Description	Requested Fund Amount	Match Amount	Match Source
No Data for Table			

**PreAward and Startup Costs**

Description	Requested Fund Amount	Match Amount	Match Source
No Data for Table			

**Other Direct Costs**

Description	Requested Fund Amount	Match Amount	Match Source
No Data for Table			

**Long and Short Term Loan Budget - Projects - VCFPF****Budget Summary**

Are you applying for a short term, long term, or no loan as part of your application?

If you are not applying for a loan, select "not applying for loan" and leave all other fields on this screen blank

**Long or Short Term\*:** Not Applying for Loan

**Total Project Amount:** \$0.00

**Total Requested Fund Amount:** \$0.00

**TOTAL:** \$0.00

**Salaries**

Description	Requested Fund Amount
No Data for Table	

**Fringe Benefits**

Description	Requested Fund Amount
No Data for Table	

**Travel**

Description	Requested Fund Amount
No Data for Table	

**Equipment**

Description	Requested Fund Amount
No Data for Table	

**Supplies**

Description	Requested Fund Amount
No Data for Table	

No Data for Table

***Construction***

Description	Requested Fund Amount
-------------	-----------------------

No Data for Table

***Contracts***

Description	Requested Fund Amount
-------------	-----------------------

No Data for Table

***Other Direct Costs***

Description	Requested Fund Amount
-------------	-----------------------

No Data for Table

**Supporting Documentation*****Supporting Documentation***

Named Attachment	Required	Description	File Name	Type	Size	Upload Date
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Detailed map of the project area(s) (Projects/Studies)

FIRMette of the project area(s) (Projects/Studies)

Historic flood damage data and/or images (Projects/Studies)

Alink to or a copy of the current floodplain ordinance

Maintenance and management plan for project

Alink to or a copy of the current hazard mitigation plan

Alink to or a copy of the current comprehensive plan

Social vulnerability index score(s) for the project area

Authorization to request funding from the Fund from governing body or chief executive of the local government

Signed pledge agreement from each contributing organization

Maintenance Plan

*Benefit-cost analysis must be submitted with project applications over \$2,000,000. in lieu of using the FEMA benefit-cost analysis tool, applicants may submit a narrative to describe in detail the cost benefits and value. The narrative must explicitly indicate the risk reduction benefits of a flood mitigation project and compares those benefits to its cost-effectiveness.*

Benefit Cost Analysis

Other Relevant Attachments

***Letters of Support***

Description	File Name	Type	Size	Upload Date
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No files attached.

**Resilience Plan*****Resilience Plan***

Description	File Name	Type	Size	Upload Date
No files attached.				



Initial  
KWS

## DOCUMENT TRANSMITTAL FORM

1/15/2025 | 3:31pm for All City Documents Requiring the City Manager's Approval

**\*PLEASE INDICATE IF THERE IS A LEGITIMATE DUE DATE BY WHICH THE CITY MANAGER MUST RESPOND\***

**DUE DATE:** 1/24/25 **RETURN COMPLETED DOCUMENT TO:** JUSTIN SHAFER

<b>DEPARTMENT:</b>	<b>RESILIENCE</b>
--------------------	-------------------

**TO BE COMPLETED FOR CONTRACTS, AGREEMENTS, RFPs, AND GRANTS:**

**TITLE: 2024 COMMUNITY FLOOD PREPAREDNESS FUND GRANT**

<b>PARTY</b> (Company and principal's names with which the City is entering into the agreement.)	Virginia Department of Conservation and Recreation (DCR)
<b>EFFECTIVE DATES</b> (Start & end dates)	May 1, 2025 – May 1, 2028 (estimated based on expected award announcement and agreement dates)
<b>TOTAL DOLLAR VALUE</b>	\$7,200,000 (\$4,320,000 grant award and \$2,880,000 match)
<b>FUNDING SOURCE</b> (Operating or capital budget; budget year; grant or other source. Show account information)	<b>SOURCE: RESILIENCE CIP</b> <b>ACCOUNT: 4000-2-4361-5501-FY24</b>
<b>TYPE OF DOCUMENT:</b> (New or extension)	New

**BRIEF DESCRIPTION: THE VIRGINIA DCR COMMUNITY FLOOD PREPAREDNESS FUND (CFPF) GRANT PROVIDES SUPPORT FOR LOCALITIES TO REDUCE THE IMPACT OF FLOODING THROUGH THE USE OF GREY-INFRASTRUCTURE, GREEN-INFRASTRUCTURE, AND HYBRID CONSTRUCTION PROJECTS, AS WELL AS PLANS AND STUDIES.**

**SUMMARY OF SCOPE OF SERVICE/ PROGRAM: THE CITY'S OFFICE OF RESILIENCE, IN COLLABORATION WITH THE DEPARTMENT OF PUBLIC WORKS, WILL FINALIZE DESIGN AND CONSTRUCT THE RICHMOND-SURREY CRESCENT SHORELINE IMPROVEMENT PROJECT, WHICH WILL CONSTRUCT SHORELINE STABILIZATION, FLOOD CONTROL, AND GREEN INFRASTRUCTURE FEATURES IN THE LARCHMONT NEIGHBORHOOD. THE PROJECT WILL PROVIDE FLOOD PROTECTION FOR SMALL TO MODERATE STORM EVENTS FOR THE NEIGHBORHOOD AND ADJACENT HAMPTON BLVD. IT WILL SUPPORT FLOOD RESILIENCE, WATER QUALITY, AND GREEN INFRASTRUCTURE GOALS, INCLUDING THE CSRM AND TMDL.**

<b>PROCUREMENT METHOD</b> (RFP, Sealed BID, etc.)	RFP
<b>CALL OUTS</b> (Indicate any unique circumstances regarding provisions such as procurement protest pending, emergency purchase or other time sensitivity, so forth, along with any other pertinent information)	



**Certificate of Satisfaction:** I (We) hereby certify that all reasonable due diligence has been performed to sufficiently develop the contents and implications of the attached document in a manner to protect and account to the public. Further, all City policies and procedures have been adhered to and therefore, I (we) recommend the City Manager execute this document.

A handwritten signature in black ink that appears to read "Justin Shuler".

1/15/25

Document Owner

A handwritten signature in black ink that appears to read "Kyle W. Spencer".

1/15/25

Department Head Signature

Date

**Review by DCM** Approve  Disapprove 

Douglas J. Beaver

1/15/2025 | 4:02

Deputy City Manager

Date

**Review by CM** Approve  Disapprove 

A handwritten signature in blue ink that appears to read "Michael S. Spencer".

1/17/2025 | 2:22 PM PST

PM EST  
E08E1B9EDF5642D...  
City Manager

Date

## Richmond-Surrey Crescent Flood Control and Living Shoreline

### Budget Narrative

The City of Norfolk seeks 60% grant funding to support proposed flood control and shoreline restoration efforts benefitting Hampton Blvd and the Larchmont/Edgewater neighborhood. An opinion of probable cost of construction (OPCC), completed by design consultants Moffatt & Nichol at the 65% design milestone, estimates the construction to cost approximately \$7,196,100. This includes a contingency to address unexpected changes during the remainder of design and increasing costs of construction due to nationwide economic conditions. This cost will fund remaining design efforts and all necessary materials, supplies, and labor for a qualified contractor to construct the project after a competitive bid process. The City proposes to fund their 40% match of \$2,878,440 through Capital Improvement Program funds for coastal resilience and waterfront improvements. The table below shows the consultant supplied OPCC. In addition to the direct funding as included match, Norfolk also commits to managing all remaining or necessary aspects of design, permitting, project management, inspection, and public outreach using existing qualified staff. No grant funds are sought for this nor match applied, leaving funds fully available for contracted design and construction work. Funds proposed as match are authorized through existing approved budgets and verified on the attached, signed City Manager Transmittal Form outlining grant and match funds for the current Community Flood Preparedness Fund grant cycle. If awarded grant funds, the City sets up a special revenue account that includes approved match funds and cash funds to cover awarded grant funding until reimbursement is received, allowing Norfolk to move projects forward without delays for reimbursement requests.

Application - City of Norfolk									
Name: Community Flood Preparedness Fund S. Resilient Virginia Rebuilding Loan Fund Detailed Budget Narrative									
Period of Performance: May 15, 2025 Through May 15, 2028 Submission Form: 109-025									
									Grand Total State Funding Request
									\$4,317,880
									Grand Total Local Shared Project
									\$2,878,440
									Federal Funding (if applicable)
									\$0
									Project Grand Total
									\$7,196,100
									Locality Cost Match
									\$0/40
Expenditure Category	Personnel	Travel	Office	Equipment	Supplies	Consultants	Indirect Costs	Other (list)	Total
Received Share (if applicable)									
Total Share						\$2,878,440			\$2,878,440
State Share - CFFF Grant									\$4,317,880
State Share - TIFII Match/Loan									
Flood-Waterfront/Mitigation									
Interest	\$	\$	\$	\$	\$	\$7,196,100	\$	\$	\$7,196,100



moffatt & nichel

## **OPINION OF PROBABLE COST**

ACTIVITY AND LOCATION			CONSTRUCTION CONTRACT NO.		DATE
City of Norfolk Department of Public Works			ESTIMATED BY Moffatt & Nichol - WBE / SEL		15-Jan-25
PROJECT TITLE					JOB NUMBER
<b>Richmond &amp; Surrey Crescent Shoreline Improvements Community Flood Preparedness Fund</b>					10390-57
ITEM DESCRIPTION					
<i>Erosion &amp; Sediment Control and Demolition</i>			Unit Cost	Unit	
Mobilization	\$ 400,000.00	LS			Quantity      Price
Safety Fence	\$ 6.00	LF	1	\$ 400,000	
Construction Entrance	\$ 4,000.00	LS	2950	\$ 17,700	
Temporary Inlet Protection	\$ 400.00	EA	1	\$ 4,000	
Tree Protection	\$ 16.00	LF	12	\$ 4,800	
Silt Fence	\$ 4.00	LF	290	\$ 4,640	
Turbidity Curtain	\$ 22.25	LF	2950	\$ 11,800	
Temporary Cofferdam (Porta Dam)	\$ 67,500.00	LS	100	\$ 2,225	
Site Restoration and Demobilization	\$ 10,000.00	LS	1	\$ 67,500	
			1	\$ 10,000	
				\$ 522,665	
<i>Demolition</i>			<b>Subtotal:</b>		
Timber Dock	\$ 3,000.00	EA	4	\$ 12,000	
Surrey Crescent Bulkhead	\$ 30.00	LF	750	\$ 22,500	
Richmond Crescent Bulkhead	\$ 30.00	LF	1600	\$ 48,000	
Concrete Curb and Gutter	\$ 20.00	LF	1620	\$ 32,400	
Asphalt Pavement	\$ 20.00	SF	1000	\$ 20,000	
Catch Basin	\$ 1,500.00	EA	3	\$ 4,500	
Outfall pipe	\$ 500.00	EA	4	\$ 2,000	
Remove Guardrail	\$ 20.00	LF	30	\$ 600	
Utility Pole and Overhead Electrical	\$ 1,000.00	EA	5	\$ 5,000	
				\$ 147,000	
<i>New Construction</i>			Unit Cost	Unit	
VDOT Class II Riprap	\$ 180.00	TON	6648	\$ 1,196,712	
VDOT #2 Stone	\$ 100.00	TON	703	\$ 70,290	
Low Permeability Structural Fill	\$ 50.00	CY	286	\$ 14,300	
Geotextile Fabric	\$ 6.00	SY	10420	\$ 62,520	
Geogrid	\$ 12.00	SY	5050	\$ 60,600	
Excavation	\$ 10.00	CY	5000	\$ 50,000	
Haul and Disposal of Excavated Material	\$ 55.00	CY	5000	\$ 275,000	
Sand Fill	\$ 60.00	CY	4488	\$ 269,280	
Coarse Sand Fill	\$ 50.00	CY	1276	\$ 63,800	
Low Marsh Plantings	\$ 4.00	EA	3490	\$ 13,960	
High Marsh Plants	\$ 4.00	EA	3520	\$ 14,080	
Bermuda Sod	\$ 6.00	SF	6750	\$ 40,500	
Top Soil	\$ 100.00	CY	4	\$ 400	
Goose Exclusion Fence	\$ 3.00	SY	3690	\$ 11,070	
Outfall Pipe	\$ 2,000.00	EA	4	\$ 8,000	
Utility Pile and Overhead Electrical	\$ 5,000.00	EA	5	\$ 25,000	
Asphalt Pavement	\$ 150.00	TON	75	\$ 11,250	
Concrete Curb and Gutter	\$ 50.00	LF	1620	\$ 81,000	
6" Perforated Drain Pipe	\$ 100.00	LF	2350	\$ 235,000	
15" RCP Pipe	\$ 45.00	LF	30	\$ 1,350	
Armorflex® Concrete Block	\$ 15.00	SF	6750	\$ 101,250	
Sheet Pile Wall	\$ 450.00	LF	630	\$ 283,500	
<i>Concrete Cap for Sheet Pile Wall</i>			\$ 430.00	LF	630 \$ 270,900
<i>Concrete Wall</i>			\$ 700.00	LF	1875 \$ 1,312,500
					\$ 4,472,262
<i>Sub Total -</i>					
<i>Contingency - 30%</i>					\$ 5,141,927.00
<i>Escalation - 4% for 1.5 Years</i>					\$ 1,542,578.10
<i>Design</i>					\$ 311,580.51
<i>TOTAL -</i>					\$ 200,000.00
					\$ 7,196,085.61

## **Richmond-Surrey Crescent Flood Control and Living Shoreline Maintenance Plan**

The Richmond-Surrey Crescent Flood Control and Living Shoreline project will include a variety of green and grey infrastructure improvements that will be maintained through standard City of Norfolk policies and procedures. The majority of inspection and maintenance of stormwater infrastructure, flood barriers, and living shorelines is conducted by the Division of Environmental Storm Water Management. When necessary, guidance and more detailed monitoring and maintenance are provided by additional environmental staff from the Office of Resilience and Bureau of Environmental Services. All infrastructure is inspected on a routine basis or when resident concerns about blockages, damage, and other issues are reported through the MyNorfolk system. Pipes and structures, including valves, are inspected at least every five years using visual inspection or remote operated cameras. When needed, valves are cleaned by hand and pipes are cleaned using vacuum trucks. Flood barriers and revetments are inspected annually for signs of deterioration or unintended vegetation growth. Structural repairs are made when necessary and unintended vegetation is removed annually through use of brush mowing and herbicide. Living shorelines are considered Best Management Practices (BMPs) in the City of Norfolk and are inspected and maintained annually. Maintenance of the proposed shoreline will include treatment and removal of invasive species, removal of excessive rack accumulated in the marsh, and removal of sediment accumulated in unintended areas. When needed, replanting of vegetation, addition or grading of sand, and repair of other project elements such as signage or rock sill is conducted. SOPs for each infrastructure type are attached in supporting documentation. All inspections and maintenance work orders are tracked in the City's Lucity work management system, with asset management integration through ArcGIS.



## **Richmond-Surrey Crescent Flood Protection & Living Shoreline**

### **Scope of Work**

#### **Needs and Problems:**

The City of Norfolk seeks support for construction of flood protection, shoreline stabilization, and living shoreline features to increase resilience of Hampton Blvd and adjacent areas of the Larchmont-Edgewater neighborhood.

Hampton Blvd is a major road running north-south through the eastern portion of Norfolk, connecting Interstates 264 and 664 via the Midtown Tunnel through Portsmouth to the south with Interstate 64 and 564 to the north. It is one of the busiest non-interstate roadways in southeastern Virginia due to the location of important regional assets along its corridor, including Naval Station Norfolk and numerous military facilities associated with the largest naval base in the world, as well as NATO Joint Force Command, Virginia Port Authority's Norfolk International Terminal (and Portsmouth Marine Terminal immediately on the south side of the Midtown Tunnel), Norfolk Southern's Lambert Point Yard, Old Dominion University, Eastern Virginia Medical School, and Sentara Norfolk General Hospital. In terms of regional and national security, commerce, and workforce, Hampton Blvd is one of the most important roadways in southeast Virginia.

Unfortunately, as with many roadways in Hampton Roads, portions of Hampton Blvd are prone to flooding. In particular, the section north of Old Dominion University and south of the Lafayette River, adjacent to the Larchmont/Edgewater community and Naval Facilities Engineering Systems Command Atlantic compound, is regularly documented by local, and occasionally national, news as a highly flood prone spot. Approximately a half-mile section of Hampton Blvd is flooded during major coastal storm events, making it impassable. Even during more frequent "sunny day" flooding resulting from seasonal lunar cycles and smaller or offshore storm events, sections of the road become nearly impassable, severely impacting traffic. The City of Norfolk has several projects underway to address various scales of flooding on Hampton Blvd, including the Lafayette Surge Barrier, a planned phase of the Norfolk Coastal Storm Risk Management project, in partnership with the Army Corps of Engineers. Once constructed, the surge barrier at the mouth of the Lafayette River is designed to close ahead of large coastal storm events, preventing catastrophic flooding. To meet regulatory requirements and ensure the long-term environmental health of the large Lafayette River ecosystem, the surge barrier will only close when storm surge inundation is expected to exceed an elevation of 4 ft on the North American Vertical Datum (NAVD). At a smaller scale, the currently under construction, Department of Defense-supported Hampton Blvd Drainage Improvement project will upgrade pipes and outfalls on Hampton Blvd around the Naval Facilities Engineering Systems Command Atlantic compound to reduce tailwater flooding through the storm drains and onto the streets during small "sunny day" events, up to approximately 2.5

ft NAVD. While the combined benefits of these projects will address many storm events, a gap remains where a moderate storm could overtop banks of the Lafayette River, flow overland and through storm drains upstream of valves, and flood Hampton Blvd and surrounding neighborhoods. These gaps between small solutions such as valves and large solutions such as floodwalls and surge barrier are found in locations throughout Norfolk and the region, and will expand in time due to sea level rise.

Intermediate scale solutions to address gaps in flood protection are essential for long term success of the region.

To address flooding along Hampton Blvd and in the adjacent Larchmont-Edgewater neighborhood, the City of Norfolk proposes to utilize a hybrid green-grey infrastructure solution. A 100 year old, failing concrete bulkhead along Richmond Crescent and Surrey Crescent will be partially removed and replaced by a combination of living shoreline and oyster-set riprap revetment, providing wave attenuation. Living shoreline sections of the project will tie into two previous wetland restoration project, the Myrtle Park project, constructed in 2013 by the City along Richmond Crescent, and the Birdsong Wetland, constructed in 1997 by community organizations behind the Larchmont Library as one of the first living shorelines in Virginia. The connections and increased marsh area will create greater overall benefits. Behind the shoreline features, a low knee wall and berm system will be constructed to elevation 4 ft NAVD, with french drain systems to enhance localized ponding from rainfall and minor overtopping of the barriers. Lastly, backflow prevention valves will be placed on any outfalls lacking them. Living shorelines and oyster reefs will support City, State, and Chesapeake Bay water quality and wildlife habitat goals, while also providing wave attenuation to reduce maintenance and adjacent hard infrastructure. The knee wall and valves will reduce tidal flooding from “sunny-day” lunar and wind events, as well as small coastal storms, and in tandem with other ongoing flood reduction efforts such as the Norfolk CSRM Lafayette Surge Barrier and Hampton Blvd Drainage Improvement project, demonstrates Norfolk’s commitment to layered resilience.

While residents of Norfolk and the region as a whole will benefit from flood reduction on Hampton Blvd, the most direct daily benefit from the proposed project will be in Larchmont-Edgewater, a well-established neighborhood located along the Lafayette River on the targeted stretch of Hampton Blvd. Established from agricultural land starting in 1906, the community was eventually annexed into the City of Norfolk in 1923. Consisting of primarily original single-family homes, Larchmont-Edgewater has long provided a mixture of market rate and affordable housing, both owner-occupied and rentals, for major economic drivers along Hampton Blvd. Neighborhood roads are flooded on a monthly basis, leading to access issues and wear and tear on vehicles. Less often, flood waters impact private properties, including structures. At least 225 parcels will see direct flood reduction to the property, including to physical structures in many cases, or to direct driveway access in other cases, with lesser access benefits to other sections of the neighborhood. Larchmont/Edgewater is located in census tracts 23 and 24, both of which have Very Low Social Vulnerability due to the long-established economic strength of nearby commercial and institutional entities. While the immediate neighborhood has low economic stress, the city of Norfolk overall is a low-income community compared to the rest of the state, with a 2022 city-wide median household income of \$56,244 versus a state-wide median household income of \$80,615. Based off the direct project benefits most directly supporting a community with Very Low Social Vulnerability, in this application we have classified our request as a 60%/40% split, but we appreciate consideration of a lesser match based off the overall economic status of Norfolk and the large regional benefit. The

proposed project will strengthen the city and region as a whole by increasing flood resilience of the critical Hampton Blvd corridor, one of the busiest roads in southeast Virginia.

### **Goals and Objectives:**

The goals and objectives of the Richmond-Surrey Crescent Flood Protection and Living Shoreline project support final design and construction of a combination of flood protection and environmental enhancement efforts benefitting the critical Hampton Blvd corridor and a portion of the adjacent Larchmont-Edgewater community.

Goal 1: Reduce flooding along a section of Hampton Blvd and surrounding neighborhood streets, frequently impacted by “sunny day” lunar and wind-driven events, as well small coastal events

Goal 2: Restore wetland and oyster habitats in the Lafayette River

Goals 3: Stabilize a failing concrete bulkhead and eroding banks

Objective 1: Finalize the project design within 1 year of grant agreement signing

Objective 2: Construct project elements within 3 years of the grant agreement signing

### **Work Plan:**

Preliminary design of the Richmond-Surrey Crescent Flood Protection and Living Shoreline project is underway by Moffatt & Nichol, an on-call City consultant, and final design is expected to be completed by Spring 2026. Management of the design is being conducted by staff in the City's Department of Public Works, with support from the Office of Resilience. Once the design is finalized, approved through City site plan review, approved by the Army Corps of Engineers Norfolk District for elements associated with the Norfolk Coastal Storm Risk Management Project, and receives necessary permits, the construction phase will commence. This is anticipated in summer 2026 and will take up to two years. Construction management will be conducted by a combination of City staff from the Department of Public Works (Design Division and the Division of Environmental Storm Water Management), Office of Resilience, and the Bureau of Environmental Services, providing overlapping oversight to ensure a successful project. Overall grant management, reporting, and coordination will be conducted by the Office of Resilience.

Construction of the project will initiate with installation of appropriate erosion and sediment controls, as well as safety fencing, to exclude residents from the work zone along the shoreline right-of-way of Richmond and Surrey Crescent. Partial road closures along the residential streets are anticipated for construction access and laydown. The top third and any large chunks of the failing concrete bulkhead will be removed and properly disposed of. A combination of geotextiles, geogrids, and coarse sand will be replaced over existing subaqueous bottoms offshore of the bulkhead, followed by riprap stones to establish rock sills for living shoreline sections and as designed along revetment sections. Additional

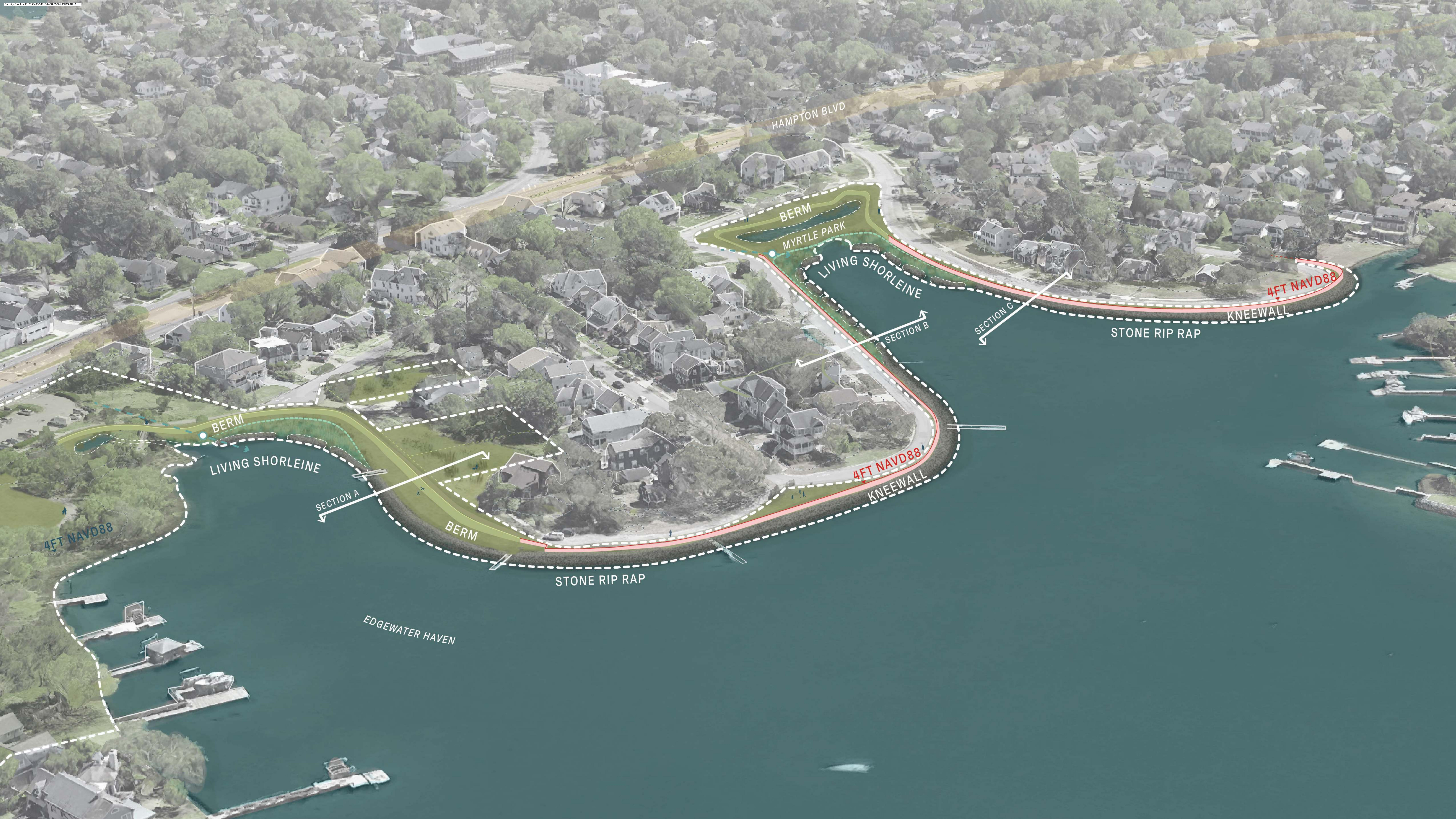
geotextile and marsh-appropriate sand will be placed between the bulkhead and rock sills along living shoreline sections. Care will be taken to avoid damage to the existing, healthy Myrtle Park and Birdsong Wetland projects at tie-in points. The new knee wall structure will be installed using forms over the remaining concrete bulkhead, using the new offshore structures and still-useable belowground portions for support. Behind the knee wall, french drains will be installed in a narrow median to allow localized drainage from rainfall and minor overtopping during storm events. Earthen berms with structural core and vegetated articulating block cover will be established in several sections in lieu of knee wall to better tie into the existing landscape. Where necessary, existing outfalls through the bulkhead will be upgraded, replaced, or consolidated to ensure appropriate drainage. Some outfalls are being addressed by the ongoing, adjacent Hampton Blvd Drainage Improvement projects, but in all cases where backflow prevention valves have not been installed, they will be included in upgrades. Final layers of sand will be added to bring the marsh to design elevation after any settlement. After major structural work and heavy equipment work is complete, replacement or repair of the asphalt roadway through portions of the work zone are anticipated. Lastly, during appropriate seasons, high and low marsh grasses such as *Spartina patens* and *Spartina alterniflora* will be planted on the living shoreline. As with all hard surfaces added in the Lafayette River, rapid colonization by oysters and other benthic organisms is expected on shoreline sills and riprap revetment. Based off past projects of this scale, primary construction is estimated to take up to 16 months, but additional time may be required to address any punch-list items or to allow planting at the correct time of year.

Final Completion of construction will serve as the primary deliverable for the project to meet grant goals. At final completion, the shoreline portion of the project will be entered into the City's asset management system as a Best Management Practice (BMP), initiating annual inspection and maintenance by the Division of Environmental Storm Water Management under their BMP Maintenance SOP and MS4 permit requirement. Shoreline portions associated with the Norfolk Coastal Storm Risk Management System will also be monitored by the Office of Resilience. The knee wall, outfalls, pipes, and valves will be added to the GIS and work management systems in the Department of Public Works for ongoing inspection and maintenance. Staff from Office of Resilience will continue to support Department of Public Works in all aspects of post-construction monitoring, inspection, and maintenance. The City has significant experience with all project elements and maintenance activities will include annual inspection of knee wall and shoreline, routine inspection and cleaning of pipes, valves and outfalls, replanting of marsh vegetation if needed, removal of excessive rack and litter from the marsh, and repair of rock sill or revetment in the event they are damaged. Additionally, the project will include a minimum one-year contractor warranty, under which issues such as vegetation loss or major sand displacement will be addressed. Lastly, over the long term, Norfolk is reviewing options to sustain shoreline projects in place through beneficial re-use of dredge spoils, such as thin-layer placement on existing marshes. The City is dedicated to managing both its green and grey infrastructure for sustained layered resilience.

#### **Evaluation:**

Success of the project will be measured initially be completion of construction to match the engineered design. This will ensure the calculated flood reduction, wave attenuation, water quality improvement, and habitat increase values are met per the effectiveness goals of the project. Meetings between the

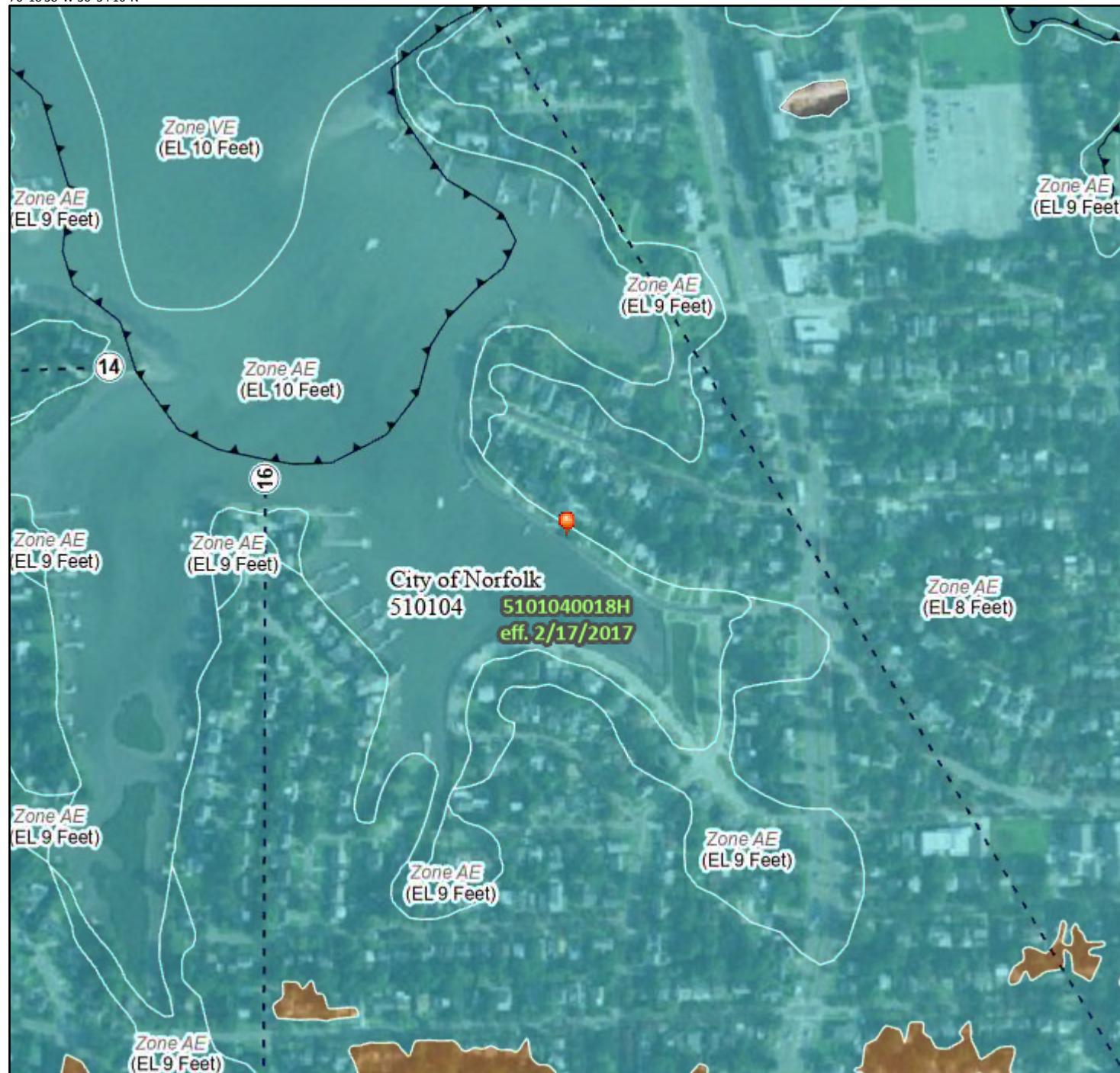
project team and inspections prior to construction, throughout construction, prior to plant installation, at Substantial Completion, and at Final Completion will provide numerous opportunities to answer questions, discuss any proposed modifications due to site conditions, and review progress. As-built surveys will be collected to ensure correct structural elevations and marsh grades have been established for successful flood reduction, plant growth and wave attenuation. For a minimum one year after Final Completion, warranty inspections will be conducted by the contractor and City team, allowing plans to be established to address any short-term deficiencies. Monitoring and inspections during and after the warranty period will include visual inspection for major issues, haphazard random plant biomass survey and review of oyster spat set on the rock sill. As with all flood reduction projects, Norfolk will assess the overall performance and benefits during any storm events to continue adding to nationwide research on enhancing hybrid features for these goals.



# National Flood Hazard Layer FIRMette



76°18'38"W 36°54'10"N



## Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

### SPECIAL FLOOD HAZARD AREAS

- Without Base Flood Elevation (BFE)  
Zone A, V, A99
- With BFE or Depth Zone AE, AO, AH, VE, AR
- Regulatory Floodway

- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
- Future Conditions 1% Annual Chance Flood Hazard Zone X
- Area with Reduced Flood Risk due to Levee. See Notes. Zone X
- Area with Flood Risk due to Levee Zone D

- NO SCREEN Area of Minimal Flood Hazard Zone X
- Effective LOMRs

- Area of Undetermined Flood Hazard Zone D

- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

- B 20.2 Cross Sections with 1% Annual Chance
- 17.5 Water Surface Elevation
- 8 Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- - - Profile Baseline
- Hydrographic Feature

- Digital Data Available
- No Digital Data Available
- Unmapped



The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

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

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 1/23/2025 at 8:26 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.



**DEPARTMENT OF PUBLIC WORKS  
DIVISION OF ENVIRONMENTAL  
STORM WATER MANAGEMENT  
WORK REQUEST FLOW**

**DATE WRITTEN:**

May 8, 2024

**DATE REVISED:****PREPARED BY:**

June Whitehurst, Storm Water Engineer

**REVIEWED BY:**

Joshua Hines, III, Storm Water Operations Manager; Kevin Smith, Storm Water Assistant Superintendent; Daniel Decker, Business Manager

**FILE PATH:****REFERENCE:****DISTRIBUTION:**

Management Services; Division Personnel

**PURPOSE / OBJECTIVE:**

The goal of this SOP is to define the guidelines and protocols used to respond to a work request.

**RESPONSIBILITIES:**

**Administrative (Admin) Staff** monitors LucyCity at least twice per day to look for work requests that may have been added, assigns work requests to Supervisors, reviews LucyCity for completion, and troubleshoots issues with data collection or tracking. Admin staff will also filter emails from the PW-StormWaterInvestigation email group, creating work requests for Supervisors, and contacting them for emergency situations.

**Supervisor** oversees the response and tracking of work requests and work completed, monitors the LucyCity Work Management system for requested job assignments, documents the work completed, and oversees the Crew.

**Storm Water Operations Manager** oversees the operations of general system maintenance and repair.

**Crew Leader** leads the crews in the daily maintenance routine, and monitors and tracks the work in LucyCity.

**PROCEDURES:**

1. Work Requests (WR) may come to the Division from several sources including MyNorfolk, LucyCity, other City entities via e-mail, or direct requests to the Division via phone or e-mail. Requests that come from MyNorfolk will automatically have a WR generated in LucyCity. Requests that come phone or e-mail must be entered into LucyCity as a WR by Administrative staff.
2. Admin staff will assign the WR to a Supervisor based on the complaint. If there are multiple WR's the Admin staff will look to see if a Work Order (WO) has already been generated. If one has already been generated, the Admin person will link that WR to the existing WO. If one has not yet been created, the WR will be assigned to the Supervisor via LucyCity.
3. Supervisor will review what WR's have been assigned to them daily. Supervisor will investigate the WR to identify if there is work that needs to be completed. Supervisor will create WO (if necessary), take pictures (if necessary), identify the potential asset, and take any special notes such as if special materials, tools, etc. that will be needed for the job. Supervisor will prioritize the work High, Medium, Low.
  - a. High Work Orders – Safety Concerns, Council, City Manager, or Director requests; Old work orders > 60 days
  - b. Medium
  - c. Low – PM, Non-safety issues, minor issues, newest requests
4. Supervisor will make sure that work is assigned to specified crew leaders 10-14 days in advance. The LucyCity mapping tool may be used to group work orders for Crew Leaders to make work efficient. If Miss Utilities must be called, the Supervisor will make sure all Miss



## DEPARTMENT OF PUBLIC WORKS DIVISION OF ENVIRONMENTAL STORM WATER MANAGEMENT WORK REQUEST FLOW

Utilities requests are called in so that the ticket has been addressed prior to work beginning. Supervisor will also make sure all supplies that are needed for those jobs are available to the crew.

5. Crew Leaders will base their daily and/or weekly work off the 10-14 days schedule established by the Supervisor in Lucy. If one job is done early in the day, the Crew Leader will notify their Supervisor and let them know what job they are moving to next. Keep in mind that Crew Leaders may need to consider tidal inundation when they are scheduling work.
6. Crew Leaders will take pictures during and after work has been completed and attach them to the work order in Lucy. Crew Leaders will enter assets, staff time, equipment, and notes associated with the job, then they will change the status of the work order to "Close in Field".
7. If additional work needs to be done by another crew, the Supervisor will notify the other crew via Lucy and/or e-mail. WO should not be closed out until an additional WO has been created and attached to the WR to avoid closing out the job until it has been thoroughly completed. For example: If Utility Cut work needs to be done following a system repair, the Utility Cut WO will need to be created for S&B and linked to the existing WR prior to closing out the Storm Water WO. If you close the WO prior to creating a new WO, the WR will close, and the resident will receive a notification that the work has been completed when it has not been 100% finalized on the repair.
8. Supervisors will inspect the job site via pictures and/or job site inspections. Supervisors will review Lucy data entry to confirm that the work is completed and all data entry has been entered correctly and completely. Once completed, the Supervisor will change the status of the work order to 'Complete'.
9. Administrative staff will monitor other Lucy plug-ins to ensure work orders are not marked "Complete" without appropriate assets attached. If they find any work orders marked "Complete" without assets attached, they will re-open the work order and notify the Supervisor to attach the appropriate assets and resubmit as "Complete". If there work completed was not on any Storm Water asset, the status will be changed "Non-Asset Work Complete".

Approved:

Juno Whitehurst

Juno Whitehurst  
Storm Water Engineer



**DEPARTMENT OF PUBLIC WORKS  
DIVISION OF ENVIRONMENTAL  
STORM WATER MANAGEMENT  
STORM WATER INFRASTRUCTURE  
INSPECTION PROGRAM**

**DATE WRITTEN:**

May 8, 2017

**DATE REVISED:**

September 17, 2018; November 25, 2019; February 10, 2020; April 19, 2024

**PREPARED BY:**

June Whitehurst, Storm Water Engineer; Kyle Quick, Project Manager; Casey Magruder, Environmental Programs Manager

**REVIEWED BY:**

June Whitehurst, Storm Water Engineer

**FILE PATH:**

K:\0850 - Storm Water\Administrative\SOP's\Active\SOP 657 SW Infrastructure Inspection Program\SOP 657 SW Infrastructure Inspection Program-2024 Revision.doc

**REFERENCE:**

MS4 Permit; City Ordinances

**DISTRIBUTION:**

Management Services; Operations

**PURPOSE/OBJECTIVE:**

To define guidelines, protocols, and procedures for the Storm Water Infrastructure Inspection Program. The purpose of this program is to identify and control pollutants in storm water discharges.

**BACKGROUND:**

The City of Norfolk is mandated by federal and state law, as well as the City's MS4 VPDES Permit, VA0088650, to monitor and control pollutants in storm water discharges from the City storm water conveyances. One component of the program is the detection and elimination of illicit discharges into the City's MS4 system.

Prior to 2017, the storm water maintenance program was predominately complaint based. In 2017, the City initiated a strategic preventative inspection program to identify system maintenance problems, identify and eliminate illicit discharges through system inspection, and update the GIS mapping system.

**DEFINITIONS:**

**Illicit Discharge** Discharge to the storm water system that is not comprised entirely of rainwater or an authorized discharge. Illicit discharges are often, but not limited to, petroleum products (i.e., motor oil, antifreeze, hydraulic oil, transmission fluid, etc.), paint and solid waste.

**MS4 VPDES Permit** – Municipal Separate Storm Sewer System Virginia Pollution Discharge Elimination System is a permit issued to the City of Norfolk by the state of Virginia authorizing, under prescribed conditions, the potential or actual discharge of pollutants from a point source to surface waters. Best management practices and good housekeeping practices must be implemented and maintained to the maximum extent practicable to reduce the pollutants from discharging to natural waterways of the U.S.

**RESPONSIBILITIES:**

**Division** – The Department of Public Works, Division of Environmental Storm Water Management is the administrator of the MS4 VPDES Permit, VA0088650. Environmental staff ensures compliance with the VPDES permit associated with illicit discharges to the storm water system.

**Storm Water Engineering Technician Staff** implement the inspection program.



DEPARTMENT OF PUBLIC WORKS  
DIVISION OF ENVIRONMENTAL  
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INSPECTION PROGRAM

**Storm Water Operational Staff** complete any necessary maintenance work on the storm water infrastructure including system cleaning and system repair.

**Storm Water GIS Technician** staff update the storm water GIS mapping system.

**PROCEDURES:**

1) **Prioritized Inspection Schedule:**

The inspection program was developed based on (1) the 90 City Planning Districts, (2) high-risk commercial and industrial sites identified in SOP#652, and (3) system cleaning work zones. These three criteria were overlaid in the GIS mapping system to assist with establishing a strategic storm water inspection program that not only addressed maintenance, but also permit compliance as well.

As part of the Commercial and Industrial Outfall Inspection Program for permit compliance, the inspection areas have been prioritized utilizing the high-risk commercial and industrial sites as the highest priority. Inspections will be completed for the industrial high-risk outfall tie-in prior to any other structure inspections. Inspection documentation will be recorded in the tracking database system and provided for the MS4 annual report.

Identifying and scheduling preventative maintenance is secondary to the inspection program. Therefore, where scheduling will allow, the prioritization rotated between the three system cleaning zones to evenly distribute the work load among the three maintenance crews.

Upon completion of the industrial high-risk outfall tie-in structures, the inspector will perform additional inspections on storm water structures within the planning district outlined on the Inspection Schedule.

Attachment A is a map of the high-priority commercial and industrial distribution by planning district. Attachment B is the Inspection schedule.

2) **Storm Water Inspection Criteria:**

The inspections are tracked in a database system. This program consists of visual inspections of the storm water infrastructure including catch basins, manholes or drop inlets.

**Background Data** - The background data includes the date and time of the inspection and structure identification based on the City's GIS nomenclature.

**GIS Database Update** - If the GIS information is incorrect, the technician will obtain field verified information for each structure including structure type, material, dimensions, etc. The field inspector will report any discrepancies to the GIS Technician.

**Dry Weather** - The field inspector will document if flow is present. If dry weather flow is present, the inspector will coordinate with the Environmental Staff, where necessary, to complete field monitoring analysis to identify the source of any potential illicit discharges. Generally, flow should not be present 72-hours following a rain event. However, in Norfolk, tidal flow may be



**DEPARTMENT OF PUBLIC WORKS  
DIVISION OF ENVIRONMENTAL  
STORM WATER MANAGEMENT  
STORM WATER INFRASTRUCTURE  
INSPECTION PROGRAM**

present since approximately 60% of the City's storm water system is inundated with tidal waters during a normal cycle.

**Physical Indicators** – The physical indicators are field tests that are performed on flowing water within the storm water system, where no flow should be occurring, to identify and eliminate potential illicit discharges. Those tests are simple field analysis utilizing visual indicators and simple chemical analysis. The inspector will document any field analysis or other physical indicators that may assist in identifying the source.

**Inspection for Structure Maintenance** – The inspector will also identify maintenance problems with the structure. These inspections are primarily based on what the inspector can see from the street level. The inspector is not authorized to enter a basin or other confined space to inspect the system without prior authorization, proper training, and proper equipment. A pole camera or CCTV camera may be utilized, when available, for advanced inspection of pipes. If the inspector identifies structural damage or cleaning requirements, he will submit a service request for the Operational crews to complete the maintenance work. Pictures will be taken, when necessary, to clearly identify the maintenance problems.

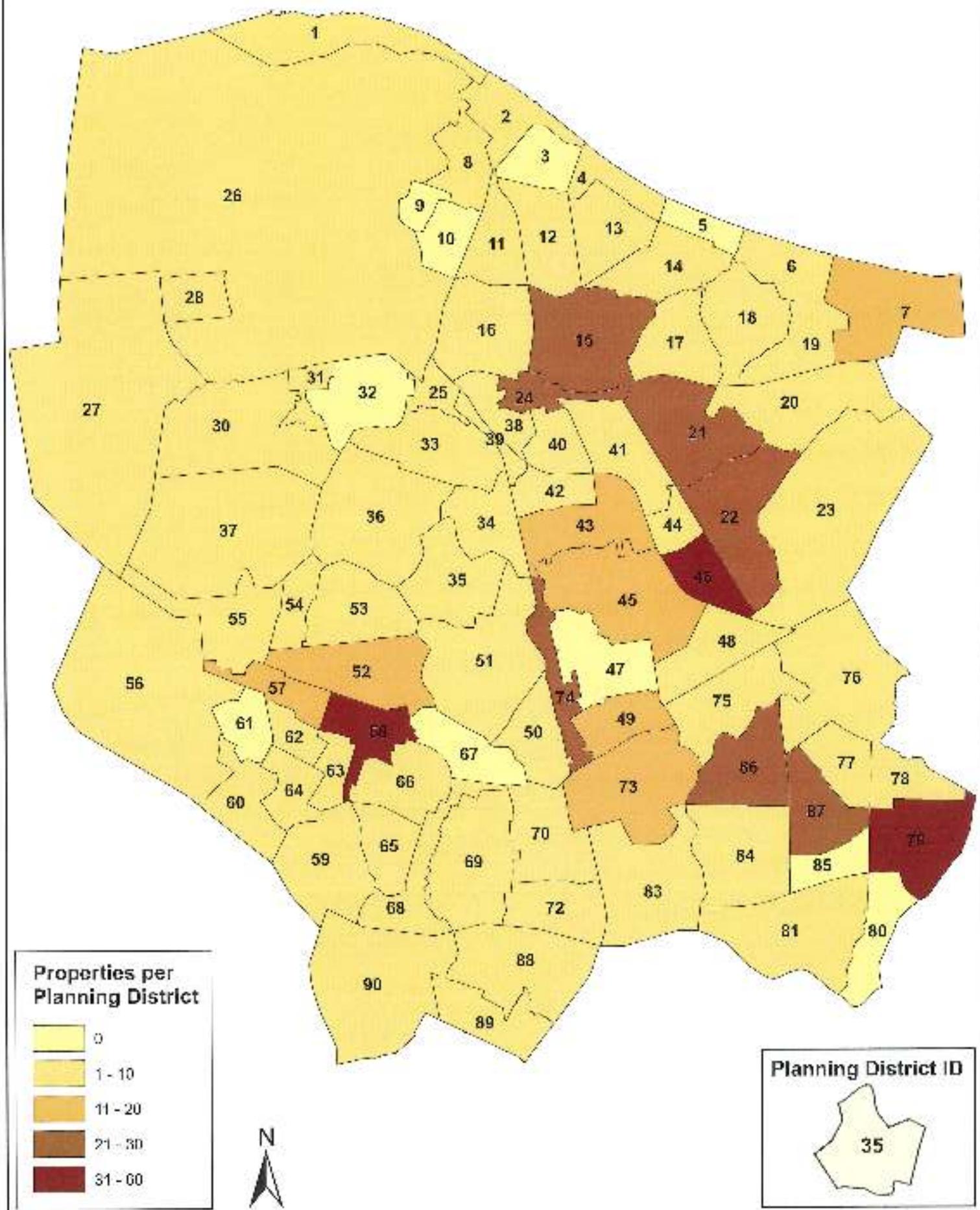
APPROVED:

A handwritten signature in blue ink that reads "June Whitehurst".

June Whitehurst  
Storm Water Engineer  
Public Works, Division of Environmental Storm Water Management

Attachment A – High-Priority Commercial and Industrial Facility Distribution Map  
Attachment B – Storm Water Infrastructure Prioritization Schedule

## High Priority Commercial and Industrial Facility Distribution



## Storm Water Infrastructure Inspection Schedule

Schedule	Year	Zone	Priority	PD#	PD Name	Structure	Pipe (miles)
Apr	2022	2	High	79	Kempsville	504	7.46
May	2022	1	High	58	East 21st Street - Monticello	454	6.66
May	2022	3	Low	25	Wards Corner	109	1.83
Jun	2022	3	Med	73	Industrial Park	697	8.9
Jul	2022	2	High	86	Crown Point	419	5.58
Jul	2022	1	Med	57	West 21st Street	152	2.83
Aug	2022	3	High	15	North Chesapeake Blvd	556	8.16
Sep	2022	3	High	24	Southern Shopping Center	248	4.97
Sep	2022	3	High	74	Cromwell Road Industrial	290	3.26
Oct	2022	2	Med	49	Coleman Place	748	5.81
Nov	2022	3	High	21	Larrymore	378	6.7
Nov	2022	2	High	46	Norvella	268	3.69
Dec	2022	3	High	22	Azalea	376	5.03
Dec	2022	3	Low	72	Chesterfield	193	2.36
Jan	2023	2	Med	45	Norview	727	8.83
Feb	2023	1	Low	69	Brambleton	1116	15.75
Mar	2023	1	Low	69	Brambleton		
Apr	2023	2	Low	35	Lake Wood	104	1.27
Apr	2023	2	High	87	Janaf (Military Circle)	458	7.11
May	2023	3	Med	7	Shore Drive	558	8.99
Jun	2023	1	Med	52	Park Place	475	7.15
Jun	2023	3	Low	14	Snug Harbor	139	1.82
Jul	2023	1	Low	56	Lamberts Point Industrial	70	2.37
Jul	2023	1	Low	55	Lamberts Point - ODU	498	7.51
Jul	2023	3	Low	19	North Camellia	125	2.58
Aug	2023	3	Low	4	Oceanview	109	1.96
Aug	2023	3	Low	20	South Camellia	453	5.61
Sep	2023	2	Low	81	River Forrest	707	4.08
Oct	2023	2	Low	88	Campostella Heights	312	4.44
Oct	2023	3	Low	33	Suburban	247	3.79
Nov	2023	1	Low	89	Campostella	216	3.64
Nov	2023	3	Med	43	Sewells Gardens	364	5.86
Dec	2023	1	Low	89	Campostella	691	10.79
Jan	2024	3	Low	8	Pamilico	214	3.72
Jan	2024	3	Low	2	West Ocean View	401	6.65
Feb	2024	1	Low	64	Ghent	346	4.85
Feb	2024	1	Low	68	Tidewater Drive Industrial	237	4.39

Schedule	Year	Zone	Priority	PD#	PD Name	Structure	Pipe (miles)
Mar	2024	2	Low	83	Ingleside	399	3.94
Mar	2024	2	Low	78	Maple Hall - Hollywood	169	2.84
Apr	2024	1	Low	60	Medical Center	274	4.3
Apr	2024	1	Low	63	East Ghent	276	4.47
May	2024	1	Low	66	Huntersville	552	7.65
Jun	2024	1	Low	90	Berkley	428	6.59
Jun	2024	1	Low	54	North Colley	80	1.15
Jul	2024	2	Low	76	Lake Taylor	464	6.97
Jul	2024	3	Low	31	Titus town	95	1.48
Aug	2024	1	Low	37	Edgewater - Larchmont	360	5.25
Aug	2024	2	Low	50	Ballentine Park	180	2.45
Sep	2024	3	Low	28	Glenwood Park	200	3.23
Sep	2024	3	Low	30	North Shore	324	5.24
Oct	2024	3	Low	26	Naval Base	319	6.04
Oct	2024	3	Low	36	Talbot Park	274	3.77
Nov	2024	2	Low	75	River Oaks	523	4.97
Nov	2024	3	Low	39	Naval Base Road	31	0.42
Dec	2024	2	Low	48	Foxhall	485	7.84
Dec	2024	3	Low	34	Roland Park	78	1.03
Jan	2025	1	Low	65	Tidewater- Young Park	346	3.89
Jan	2025	3	Low	1	Willoughby	224	3.49
Feb	2025	1	Low	59	Downtown	1506	15.78
Mar	2025	1	Low	59	Downtown		
Apr	2025	2	Low	51	Lafayette	438	4.09
May	2025	3	Low	40	Chesapeake Manor	142	2.55
May	2025	3	Low	44	East Norview	151	2.41
May	2025	3	Low	11	Northside	263	3.77
Jun	2025	1	Low	53	Colonial Place	241	2.83
Jun	2025	3	Low	12	Ocean Air	327	5.34
Jul	2025	2	Low	84	Poplar Halls	432	5.68
Jul	2025	3	Low	38	Denby Park	126	2.16
Aug	2025	3	Low	23	International Airport	109	1.37
Aug	2025	3	Low	16	Oakdale Farms	262	4.12
Aug	2025	3	Low	42	Coronado	178	2.72
Sep	2025	2	Low	77	Lake Terrace	211	2.16
Sep	2025	1	Low	62	North Ghent	152	2.52
Sep	2025	3	Low	6	Pretty Lake	136	2.59
Oct	2025	3	Low	41	Rosemont	523	10.34
Oct	2025	3	Low	18	Roosevelt Gardens	108	1.75

Schedule	Year	Zone	Priority	PD#	PD Name	Structure	Pipe (miles)
Nov	2025	3	Low	17	Bel-Aire	256	3.15
Nov	2025	3	Low	13	Willow Terrace	254	4.82
Dec	2025	3	Low	70	Liberty Roberts Park	477	7.97
Jan	2026	2	Last	47	Estabrook	506	4.53
Jan	2026	3	Last	9	Merrimac Park	60	1.03
Feb	2026	2	Last	80	Easton	246	2.3
Mar	2026	2	Last	85	Glenrock	607	3.11
Apr	2026	3	Last	5	Cap View	51	1.06
Apr	2026	1	Last	61	West Ghent	132	2.23
Apr	2026	3	Last	3	Pinewell	185	3.45
May	2026	3	Last	10	Commodore Park	75	0.96
May	2026	2	Last	67	Lindenwood	152	2.54
May	2026	3	Last	32	Sussex	185	2.88



**DEPARTMENT OF PUBLIC WORKS  
DIVISION OF ENVIRONMENTAL  
STORM WATER MANAGEMENT  
STORM WATER BMP INSPECTIONS**

**DATE WRITTEN:**

March 6, 2005

**DATE REVISED:**

June 28, 2017; September 18, 2018; November 25, 2019; February 10, 2020; April 19, 2024

**PREPARED BY:**

Kyle Quick, Program Manager; June Whitehurst, Storm Water Engineer

**REVIEWED BY:**

Juno Whitehurst, Storm Water Engineer

**FILE PATH:**

K:\0650 - Storm Water\Administrative\SOP's\Active\SOP 654 Storm Water BMP Inspections\SOP 624 Storm Water Best Management Practice Inspections-2024 Revision.docx

**DISTRIBUTION:**

Operations Personnel

**PURPOSE / OBJECTIVE:**

To define guidelines for the inspection and enforcement for the installation and maintenance of all private and city-owned storm water structural best management practices (BMPs). BMPs reduce unwanted contaminants and/or the volume of storm water entering the City MS4 system and local waterways. BMPs are regularly inspected to ensure they are working as designed and maintained in such a manner to not cause flooding, become a nuisance, or impose a threat to health and safety.

**RESPONSIBILITIES:**

**Division** – The Department of Public Works, Division of Environmental Storm Water Management is the administrator of the MS4 VPDES Permit VA0088650. Environmental staff ensures compliance with the VPDES permit associated with BMP inspections to the storm water system. State law requires BMPs to be inspected once every 5-years. The City's MS4 permit requires city-owned BMPs be inspected and maintained once per year.

**Environmental Staff** develop and maintain a list of BMPs within the geographic boundary of the City of Norfolk. This list is routinely updated following site plan review. Environmental staff conduct routine inspections of both private and public storm water BMPs.

**OTHER:**

BMPs are used to reduce pollution in and/or volume of storm water runoff, thereby protecting area waterways. Some examples of structural storm water BMPs include infiltration trenches, grass swales, detention basins, retention ponds, oil/grit separators, bioretention basins, manufactured BMPs, etc.

**REQUIREMENTS:**

1. BMPs are approved for installation after an extensive site plan review by a designated storm water engineer. All pertinent information pertaining to the BMPs are entered into the current BMP tracking database.
2. As part of the site plan approval process, a Declaration of Covenants for Storm and Surface Water Facility and System Maintenance (BMP Maintenance Agreement) should be signed and notarized by the owner or responsible party of the private property being developed to maintain the BMP after construction. That party will remain responsible for all maintenance until the property is sold at which time the new owner is responsible for maintaining the BMP. A copy of the agreement is filed with the clerk of the court by the owner or responsible party. A copy of the agreement is also maintained in the site plan file at the Division.
3. Storm water management (SWM) facilities or BMPs are required to be installed in accordance with the approved plans, and manufacturers' specifications where applicable. The City of Norfolk Planning Department, Building Safety Bureau will inspect the installation of onsite stormwater



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piping and structures. The Department of Public Works Environmental Storm Water Management staff will inspect the installation of BMPs. Additionally, they also inspect stormwater piping and structures within the City Right-of-Way and piping that ties into the City's MS4 system. During construction, environmental staff will have completed the following procedures:

- a. A pre-construction meeting will be scheduled to go over expectations. Pre-construction meetings will be documented.
  - b. Follow up inspections with the contractor will occur throughout the construction process to verify that the BMPs are installed in accordance with the approved plans. These inspections should take place before any backfilling occurs and should include pictures for documentation. If there is a tie in to the city system, a storm water inspector will inspect the tie-in. All inspections are entered into the City's work management system.
  - c. A construction record drawing ('As-built' submission) signed and sealed by a professional registered in Virginia will be reviewed by a storm water engineer or their designee to verify the SWM facilities have been installed per the approved plan.
  - d. A final inspection will be performed by the environmental staff to ensure that the BMP and contributing drainage areas are stabilized. The inspector will also ensure that the site is free of excessive litter or debris, sediment build up, or erosion, and no deviations from the approved construction record drawing.
  - e. Upon approval of the construction record drawing and the final inspection, the environmental staff will approve the release of the Certificate of Occupancy (if required) and approval to terminate bonds for stormwater improvements.
4. All privately owned and city-owned BMP inspections are tracked in the current BMP tracking database. The database enables the Division to maintain inspection data and to ensure inspections are completed on a routine schedule.
  5. When an inspection is conducted, the following items are checked to ensure that the BMP will consistently perform its water quality improvement and/or runoff reduction functions.
    - a. *Sediment Buildup:* Sediment buildup can reduce the effectiveness of the BMP by blocking inlets and outlets, reducing infiltration rates, and reducing effectiveness of pretreatment practices.
    - b. *Erosion:* Erosion can lead to reduced volume of the BMP and/or structural failure. Erosion is a common problem around inlets and outlets of BMPs, and may also be caused by roots of woody vegetation and animal burrows.
    - c. *Debris and Litter Removal:* Regular removal of litter and debris is essential to ensure the BMP is working properly. The BMP must be free from debris and litter in or around the BMP structure.
    - d. *Vegetation:* Vegetation must be established and maintained to guard against erosion and sediment buildup, and to maintain designed pollutant removal rates where applicable. Excessive vegetation clippings must be removed from the BMP and disposed of properly.
    - e. *Deviation from the Construction Record Drawing:* Verify a property owner, tenant, or other responsible party has not modified a post-construction BMP without written



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approval from the City of Norfolk Department of Public Works storm water engineer, or their designee.

- f. **Manufactured BMPs:** The owner or responsible party are required to maintain manufactured BMPs in accordance with the manufacturer's specifications, and to provide evidence of continued maintenance by copies of maintenance records and/or photographic proof.
  - g. **Other Maintenance Concerns:** Refer to the Virginia Department of Environmental Quality Stormwater Design Specifications for other BMP maintenance concerns.
6. The environmental staff will complete an inspection report and track inspections in the current BMP tracking database. The responsible party will either be sent an email or a letter that lists the BMP maintenance discrepancies and includes a copy of the inspection report, if necessary. The responsible party will have a specified time-period to complete the maintenance after the report has been sent. A re-inspection will occur after the allotted time-period to ensure all corrections have been made. If the inspector has had no contact from the property owner, if letters have been returned, or if the discrepancies have not been addressed a Notice of Violation (NOV) may be sent or issued. If no progress occurs after the NOV has been issued, further legal actions should be taken. The City also holds the right to conduct the corrections after proper warning, and then charge the responsible party for any financial obligations. If the BMP is working properly and does not appear to have any maintenance discrepancies, a note will be made in the file and no report will be sent to the responsible party.
7. Routine maintenance for any City-owned BMP is conducted by the Division which is submitted in a work order and put into the work management tracking system. The City-owned BMPs must also follow all the guidelines established above.
8. The Norfolk Public Schools BMPs are inspected by the environmental staff, however, the school board facilities manager is the main point of contact for any discrepancies regarding BMP maintenance at school facilities. The school board is responsible for maintaining the BMPs and if major work is required beyond the capabilities of facilities personnel, then they will hire a contractor.

Approved:

June Whitehurst  
Storm Water Engineer  
Public Works, Division of Environmental Storm Water Management

## Resilience Planning Overview for the City of Norfolk

In response to the resilience planning requirements of the **Community Flood Preparedness Fund** (“the CFPF” or “Fund”) outlined within the [2021 CFPF Grant Manual](#) (Appendix G: Elements of Resilience Plans), the City of Norfolk (“the City”) has prepared the following Resilience Planning Overview of formal and relevant plans utilized for resilience planning efforts by the City to prioritize potential projects and to assist the City in its efforts to secure funding for such critical resilience plans, studies and projects.

The **Elements of Resilience Plans** taken from Appendix G of the 2021 CFPF Grant Manual, from which communities are expected to highlight the stated resilience planning contents as they related to CFPF grant applications, are as follows:

1. *It is project-based with projects focused on flood control and resilience.*
2. *It incorporates nature-based infrastructure to the maximum extent possible.*
3. *It includes considerations of all parts of a locality regardless of socioeconomics or race.*
4. *It includes coordination with other local and inter-jurisdictional projects, plans, and activities and has a clearly articulated timeline or phasing for plan implementation.*
5. *Is based on the best available science, and incorporates climate change, sea level rise, storm surge (where appropriate), and current flood maps.*

Norfolk’s resilience planning elements are not contained within an adopted “stand alone” plan. However, Norfolk’s utilizes various plans within a resilience repertoire, which altogether serve multiple needs for various audiences; from technical to public-facing to operational. This Resilience Planning Overview will expressly identify to the grant reviewer, and to the public, how various resilience planning documents of the City of Norfolk satisfy all the CFPF Resilience Plan elements.

The following plans for the City of Norfolk will contribute to this Resilience Planning Overview:

- [plaNorfolk2030](#) (2013, as amended)
- [Vision2100](#) (2016)
- [Hampton Roads Hazard Mitigation Plan](#) (2017)
- [Combined Coastal and Precipitation Flooding Master Plan](#) (2017)
  - Appendix A: [Norfolk Preliminary City-wide Coastal Flooding Mitigation Concept Evaluation and Master Plan Development](#) (Fugro Atlantic)
  - Appendix B: [City-wide Drainage and Watershed Master Plan](#) (Timmons Group)
- [A Green Infrastructure Plan for Norfolk](#) (2018, as amended)
- [USACE Coastal Storm Risk Management \(CSRM\) Feasibility Study and Environmental Impact Statement](#) (2019)
- [Zoning Ordinance of the City of Norfolk](#) (2018, as amended)

Responses are provided below in red based on the various Norfolk plans for the following example resilience elements outlined in Appendix G of the 2021 CFPF Grant Manual:

- **Equity based strategic policies for local government-wide flood protection and prevention.**  
The [Hampton Roads Hazard Mitigation Plan](#) recommends the highest priority of protection to be reserved towards protection projects for severe repetitive loss areas (Mitigation Actions 8 &

11) in Norfolk. Research in Norfolk has shown that these areas are often places where the most vulnerable residents are housed.

Additionally, Mitigation Action 12 recommends Norfolk begin risk/hazard mitigation efforts equitably by first implementing a major flood control project within the historically black community of Chesterfield Heights; implementation of a \$112M HUD project awarded through the National Disaster Resilience Competition (construction currently underway).

- **Proposed projects that enables communities to adapt to and thrive through natural or human hazards.**

The [Combined Coastal and Precipitation Flooding Master Plan](#) (Norfolk's "Flooding Master Plan") is based on a major multi-year study effort supported by technical analyses and recommendations from Fugro Atlantic within the [Norfolk Preliminary City-wide Coastal Flooding Mitigation Concept Evaluation and Master Plan Development](#) (the "Fugro report"). The Flooding Master Plan is also supporting by a thorough analysis and priority ranking technical guide of the City's drainage conveyance system, [City-wide Drainage and Watershed Master Plan](#) by Timmons Group.

Together, with this technical supporting documentation, the [Flooding Master Plan](#) provides the framework for Norfolk to intelligently review and prioritize flood protections project to enable Norfolk to adapt and thrive to current and future flood threats.

- **Documentation of existing social, economic, natural, and other conditions present in the local government.**

The [USACE Coastal Storm Risk Management \(CSRM\) Feasibility Study and Environmental Impact Statement](#) presents a robust analysis of the best recommendations for City-wide flood protection measures for the City of Norfolk. This report includes 10% engineered designs for the various flood protection measures recommended throughout the entire community, and a preliminary Environmental Impact Statement is included outlining the existing social, economic, natural conditions, vulnerabilities and stressors within the natural and social environment, as well as proposed impacts. See the various CSRM appendices for these detailed conditions and impact reports.

- **Review of the vulnerabilities and stressors, both natural and social in the local government.**  
See CSRM comment above. Additional overview of the vulnerabilities and stressors can be found in the [Hampton Roads Hazard Mitigation Plan](#).

- **Forward-looking goals, actionable strategies, and priorities through as seen through an equity-based lens.**

Norfolk remains committed to presenting all action plans through an equity-based lens, as found within the actionable strategies of [A Green Infrastructure Plan for Norfolk](#) and the [Hampton Roads Hazard Mitigation Plan](#). Both plans are tactical, and recommendation are based on a 5-year forward-looking outlay. Recommendations of the Fugro report are based on a 50-year outlay, and recommendations of [Vision2100](#) geared towards the year 2100.

- Strategies that guides growth and development away from high-risk locations that may include strategies in comprehensive plans or other land use plans or ordinances or other studies, plans or strategies adopted by a local government.

[Vision2100](#) is serves a land use guide for the City. The plan divides Norfolk up into four main areas by which the City will focus new investments and make necessary steps to prepare for a changing environment:

- ✓ Purple: Low Flood Risk / Low Degree of Civic Assets: Establishing Neighborhoods of the Future
- ✓ Green: Low Flood Risk / High Degree of Civic Assets: Designing New Urban Centers
- ✓ Yellow: High Flood Risk / Low Degree of Civic Assets: Adapting to Rising Waters
- ✓ Red: High Flood Risk / High Degree of Civic Assets: Enhancing Economic Engines (protect!)

- Proposed acquisition of land or conservation easements or identification of areas suitable for conservation particularly areas identified as having high flood attenuation benefit by [ConserveVirginia](#) or similar data driven tools.

[Vision2100](#) provides the framework for selecting the areas suitable for conservation easements. The [Norfolk Zoning Ordinance](#) provides the mechanism for purchasing land conservation easement credits from the [Coastal Resilience Overlay](#) through transferring [Resilient Quotient points](#) to the [Upland Resilience Overlay](#) (requires extinguishment of a density unit – developable dwelling unit). The conservation easement, while recorded on the deed and kept on file with the Planning Department, can be held by the property owner, the Zoning Ordinance also permits it to be placed in a land trust.

- Identification of areas suitable for property buyouts in frequently flooded areas.

See [Vision2100](#) “Yellow” areas (High Flood Risk / Low Degree of Civic Assets: Adapting to Rising Waters) and Coastal Resilient Overlay areas on the [Norfolk Zoning Map](#).

- Identification of critical facilities and their vulnerability throughout the local government such as water and sewer or other types identified as “lifelines” by FEMA.

A list of all critical facilities is contained within the [Norfolk Emergency Operations Manual](#) (2020). See Mitigation Action 5 from [Hampton Roads Hazard Mitigation Plan](#): “Purchase and install generators or other continuous power sources for critical facilities and infrastructure. This action may include, but is not limited to pump stations, EOC (Emergency Operations Center), shelters, underpasses and important traffic signals.” The critical facilities list is available upon request.

- Identified ecosystems/wetlands/floodplains suitable for permanent protection.

See [A Green Infrastructure Plan for Norfolk](#), this includes an [Action Plan Appendix for Threatened and Endangered Species](#) within critical floodplain habitats, as well as a detailed ecological inventory with recommendations for floodplain protection measures within an connected open space corridor network.

- Identified incentives for restoring riparian and wetland vegetation.
  - The City's Public Works Division of Stormwater Management offers the [Stormwater Fee Reduction Program](#) for homeowners and businesses who opt to implement water quality improvements on their private property including riparian buffer and shoreline management improvement.
  - [Environmental Conservation Consulting](#) – Norfolk annually funds a contract to coordinate with residential property owners for implementation of water quality improvements on their private property including riparian buffer and shoreline management improvement through a cost-share program. Property owners get a percentage of the project paid through the contractor via the Environmental Conservation Consulting services contract.
  - Norfolk regularly applies for grants to partner with community organizations for implementation of green infrastructure of public lands – projects are reviewed by the **Watershed Management Task Force** to ensure that projects are furthering the goals and objectives of the adopted [Green Infrastructure Plan for Norfolk](#).
- A framework for implementation, capacity building and community engagement.  
The **Watershed Management Task Force** and the recently created Program for Public Information committee are two groups made up of joint staff/citizen/technical expert members, which collectively drive the City's ongoing programing for green infrastructure projects and flood mitigation messaging. Capital Improvement Project funding recommendations from the [Green Infrastructure Plan for Norfolk](#) are also reviewed monthly by the Watershed Management Task Force.
- Strategies for creating knowledgeable, inclusive community leaders and networks.  
The 12-member Norfolk Coastal Management Review Board (CMRB) provides recommendations to the 7-member Erosion Advisory Commission, which is partially comprised of members of the CMRB. The CMRB is made up of elected leaders, civic league presidents/community leaders and technical experts from the Virginia Institute of Marine Science, Virginia Marine Resources Commission, Army Corp of Engineers, Old Dominion University Department of Ocean, Earth and Atmospheric Sciences, and city technical staff, providing workshops, seminars and project assessments of coastal mitigation and erosion projects; specifically intended to build grassroots technical capabilities and citizen champions within the community. The Norfolk CMRB and Erosion Advisory Commission is established by [City Code](#) and guided by the City's adopted [Sand Management Plan](#).
- A community dam safety inventory and risk assessment posed by the location and condition of dams.  
Not applicable in Norfolk – not at dam risk.

- A characterization of the community including population, economics, cultural and historic resources, dependence on the built environment and infrastructure and the risks posed to such infrastructure and characteristics by flooding from climate change, sea level rise, tidal events or storm surges or other weather.

This general characterization is well documented within the general/comprehensive plan for the City of Norfolk – [\*plaNorfolk2030\*](#). This includes dozens of resiliency recommendations for flood risk reduction and communication.

- Strategies to address other natural hazards that would cause, affect or result from flooding events including:
  - Earthquakes.
  - Storage of hazardous materials
  - Landslides/mud/debris flow/rock falls.
  - Prevention of wildfires that would result in denuded lands making flooding, mudslides or similar events more likely.
  - Preparations for severe weather events including tropical storms or other severe storms, including winter storms.

The [\*Hampton Roads Hazard Mitigation Plan\*](#) is a FEMA-accredited all-hazards plan.