HAMPTON ROADS TRANSPORTATION PLANNING ORGANIZATION

CMAQ/RSTP PROJECT SELECTION PROCESS 2020

T21-13

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OCTOBER 2021

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ABSTRACT

This report summarizes the 2020 selection process for projects to be funded under the Congestion Mitigation and Air Quality Improvement Program (CMAQ) and Regional Surface Transportation Program (RSTP). As a result of the 2020 CMAQ/RSTP Project Selection Process, selected projects received allocations of CMAQ or RSTP funds for Fiscal Year 2027.

ACKNOWLEDGMENTS

Prepared in cooperation with the U.S. Department of Transportation (USDOT), Federal Highway Administration (FHWA), and Virginia Department of Transportation (VDOT). The contents of this report reflect the views of the Hampton Roads Transportation Planning Organization (HRTPO). The HRTPO is responsible for the facts and the accuracy of the data presented herein. The contents do not necessarily reflect the official views or policies of the FHWA, VDOT or Hampton Roads Planning District Commission. This report does not constitute a standard, specification, or regulation. FHWA or VDOT acceptance of this report as evidence of fulfillment of the objectives of this planning study does not constitute endorsement/approval of the need for any recommended improvements nor does it constitute approval of their location and design or a commitment to fund any such improvements. Additional project level environmental impact assessments and/or studies of alternatives may be necessary.

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HAMPTON ROADS TRANSPORTATION PLANNING ORGANIZATION
CMAQ/RSTP PROJECT SELECTION PROCESS

2020

This report was included in the Unified Planning Work Program for Fiscal Year 2021, which was approved by the Board of the Hampton Roads Transportation Planning Organization on October 15, 2020.

PREPARED BY:

the heartbeat of HAMPTON ROADS TPO
TRANSPORTATION PLANNING ORGANIZATION

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The CMAQ Project Selection section describes the process by which projects were selected to receive allocations of CMAQ funds.

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Section I
Executive Summary

EXECUTIVE SUMMARY

As the Metropolitan Planning Organization (MPO) for the Hampton Roads area, the Hampton Roads Transportation Planning Organization (HRTPO) is responsible for project selection and allocation of funds under two federal funding programs – the Congestion Mitigation and Air Quality (CMAQ) Improvement Program and the Regional Surface Transportation Program (RSTP). The process used by the HRTPO to select projects to receive funds from these two programs is referred to as the CMAQ/RSTP Project Selection Process. The project selection process is conducted annually, normally beginning in July and running through November.

This report summarizes the work of selecting CMAQ and RSTP projects during the 2020 CMAQ/RSTP Project Selection Process. Selected projects received allocations of CMAQ or RSTP funds for Fiscal Year (FY) 2027.

CMAQ Project Selection and Funding Allocations

During the February 18, 2021 meeting, the HRTPO Board approved the following actions regarding CMAQ funding for FY 2027:

- Five previously approved CMAQ projects were selected to receive a total of $5.2 million in FY 2027 allocations.
- Fifteen new CMAQ projects were selected to receive a total of $9.9 million in FY 2027 allocations.

The approved CMAQ projects are summarized individually below. Map 1 on Page 6 displays the geographic location of the FY 2027 CMAQ allocations where feasible.

Allocations to Previously Approved CMAQ Projects

1. **Traffic Signal System Retiming (UPC 115863) – Portsmouth**
    - The project entails the analysis of existing and development of new signal timings for strategic corridors in the City of Portsmouth.
    - Allocated $120,000 in FY 2027 CMAQ funds.
    - Total FY 2027 and future CMAQ funding request: $240,000.

2. **Citywide Traffic Signal System Upgrade (UPC 115369) – Chesapeake**
    - This project entails additional enhancements to the citywide traffic signal system to include ongoing technology upgrades to share real time data and provide improved operational efficiencies of central system upgrades, Intelligent Transportation System (ITS) elements, and local intersections operations.
    - Allocated $175,000 in FY 2027 CMAQ funds.
    - Total FY 2027 and future CMAQ funding request: $525,000

3. **Pocahontas Trail Multi-Modal Corridor (UPC 102980) – James City County**
    - The project entails upgrading a 1.8 mile segment of Pocahontas Trail (Route 60) with a five-foot sidewalk and a five-foot paved shoulder and to include installation of trees, pedestrian lighting, and bus pull outs.
    - Allocated $4,075,000 in FY 2027 CMAQ funds to fully fund the project.

4. **Signal Timing Improvements (UPC 115519) – Newport News**
    - The project entails traffic signal retiming improvements providing enhanced efficiency and coordination with traffic signals, increased capacity within the existing network, and improved progression during peak hours.
    - Allocated $450,000 in FY 2027 CMAQ funds to fully fund the project.

5. **Chesapeake Signal Timing – All Phases (UPC 115520) – Chesapeake**
    - The proposed project entails the analysis and development of new signal timings for strategic corridors and isolated intersections. To obtain optimized timings, traffic data will be collected and analyzed using the latest version of Synchro software, for which improved signal timings will be developed.
    - Allocated $150,000 in FY 2027 CMAQ funds.
    - Total FY 2027 and future CMAQ funding request: $300,000.

<u>New CMAQ Projects</u>

6. **Chesapeake Signal Timing – Phases 1-4 (ID# CH1A-DCM) – Chesapeake**
    - The project entails the analysis and development of new signal timings for strategic corridors and isolated intersections in the City of Chesapeake.
    - Allocated $150,000 in FY 2027 CMAQ funds.
    - Total FY 2027 and future CMAQ funding request: $600,000.

7. **Citywide Traffic Signal System Upgrade (ID# CH2CM) – Chesapeake**
    - This project entails ongoing enhancements to the Citywide traffic signal system in Chesapeake to maintain internal City operations as well as regional data sharing opportunities.
    - Allocated $250,000 in FY 2027 CMAQ funds.
    - Total FY 2027 and future CMAQ funding request: $1,250,000.

8. **Traffic Signal System Retiming (ID# VB2CM) – Virginia Beach**
    - This project entails retiming 51 intersections along four main arterial streets in the City of Virginia Beach using computerized traffic signal timing optimization software.
    - Allocated $663,000 in FY 2027 CMAQ funds to fully fund the project.

9. **Citywide Traffic Signal System Upgrades (ID# PO1CM) – Portsmouth**
    - This project entails the design and construction of central traffic signal control system upgrades, Intelligent Transportation System (ITS) elements, and local intersection operations/equipment upgrades.
    - Allocated $300,000 in FY 2027 CMAQ funds.
    - Total FY 2027 and future CMAQ funding request: $1,225,000.

10. **Five (5) Bus Purchase Replacement (ID#WT1CM) – Williamsburg Area Transit Authority (WATA)**
    - The project entails the purchase of five (5) ultra-low sulfur diesel buses to replace existing rolling stock reaching the end of its service life.
    - Allocated $3,700,000 in FY 2027 CMAQ funds to fully fund the project.

11. **North Battlefield Boulevard/Bryon Street Traffic Signal (ID# CH3CM) – Chesapeake**
    - This project entails installation of a new traffic signal at the North Battlefield Boulevard/Byron Street/Thrasher Road intersection which will help to divert heavy eastbound volumes at Volvo Parkway south to the new signalized intersection to alleviate congestion and support future area growth.
    - Allocated $150,000 in FY 2027 CMAQ funds.
    - Total FY 2027 and future CMAQ funding request: $675,000

12. **Holland Road Phase II (ID# VB1CM) – Virginia Beach**
    - The project entails median modifications to eliminate left-turn and through movements at five cross streets along the corridor and also modifications to two existing signalized intersections.
    - Allocated $300,516 in FY 2027 CMAQ funds.
    - Total FY 2027 and future CMAQ funding request: $1,058,746.

13. **Deep Creek Elementary School Traffic Signal Improvement (ID# CH4CM) – Chesapeake**
    - The project entails constructing a traffic signal and modifying internal access along Forehand Drive and Margaret Booker Drive to allow safe ingress and egress to Deep Creek Elementary and High schools.
    - Allocated $150,000 in FY 2027 CMAQ funds.
    - Total FY 2027 and future CMAQ funding request: $2,100,000.

14. **Green Operator Program (ID# VP1CM) – Virginia Port Authority**
    - This project entails continuation of the Port's dray truck replacement program and also Transportation Demand Management efforts to incentivize the modal shift more cargo from a single truck to a barge or train.
    - Allocated $1,000,000 in FY 2027 CMAQ funds.
    - Total FY 2027 and future CMAQ funding request: $5,000,000.

15. Battlefield Boulevard/Johnstown Road Intersection Improvements (ID# CH6CM) – Chesapeake

- This project entails the addition of through lanes and modified signal phasing at the Battlefield/Johnstown/Mt. Pleasant intersection and the implementation of an unsignalized continuous green T concept at the intersection of Mt. Pleasant Road and Woodford Drive
- Allocated $555,500 in FY 2027 CMAQ funds.
- Total FY 2027 and future CMAQ funding request: $2,673,656.

16. Centerville Turnpike/ Elbow Road Intersection Improvements – (ID# CH5CM) – Chesapeake

- This project entails widening the southbound approach of the intersection to include an additional through lane and an exclusive right-turn lane as well and widening the westbound approach to include dual left-turn lanes.
- Allocated $308,000 in FY 2027 CMAQ funds.
- Total FY 2027 and future CMAQ funding request: $4,850,000.

17. 460/58/13 Safety Improvements – (ID# CH7CM) – Chesapeake

- The proposed project entails addressing systemic safety concerns along the 460/58/13 corridor by installing a system of Restricted Crossing U-Turns (RCUTs) since the present configuration of the existing roadway has excessive access for a roadway that functions like a freeway.
- Allocated $1,608,800 in FY 2027 CMAQ funds.
- Total FY 2027 and future CMAQ funding request: $14,186,104.

18. Victory Boulevard Shared Use Path – (ID# YC1CM) – York County

- The project entails construction of a 10' wide shared use path on the north side of a portion of Victory Boulevard which will connect previously completed similar improvements at both ends.
- Allocated $256,620 in FY 2027 CMAQ funds.
- Total FY 2027 and future CMAQ funding request: $660,750.

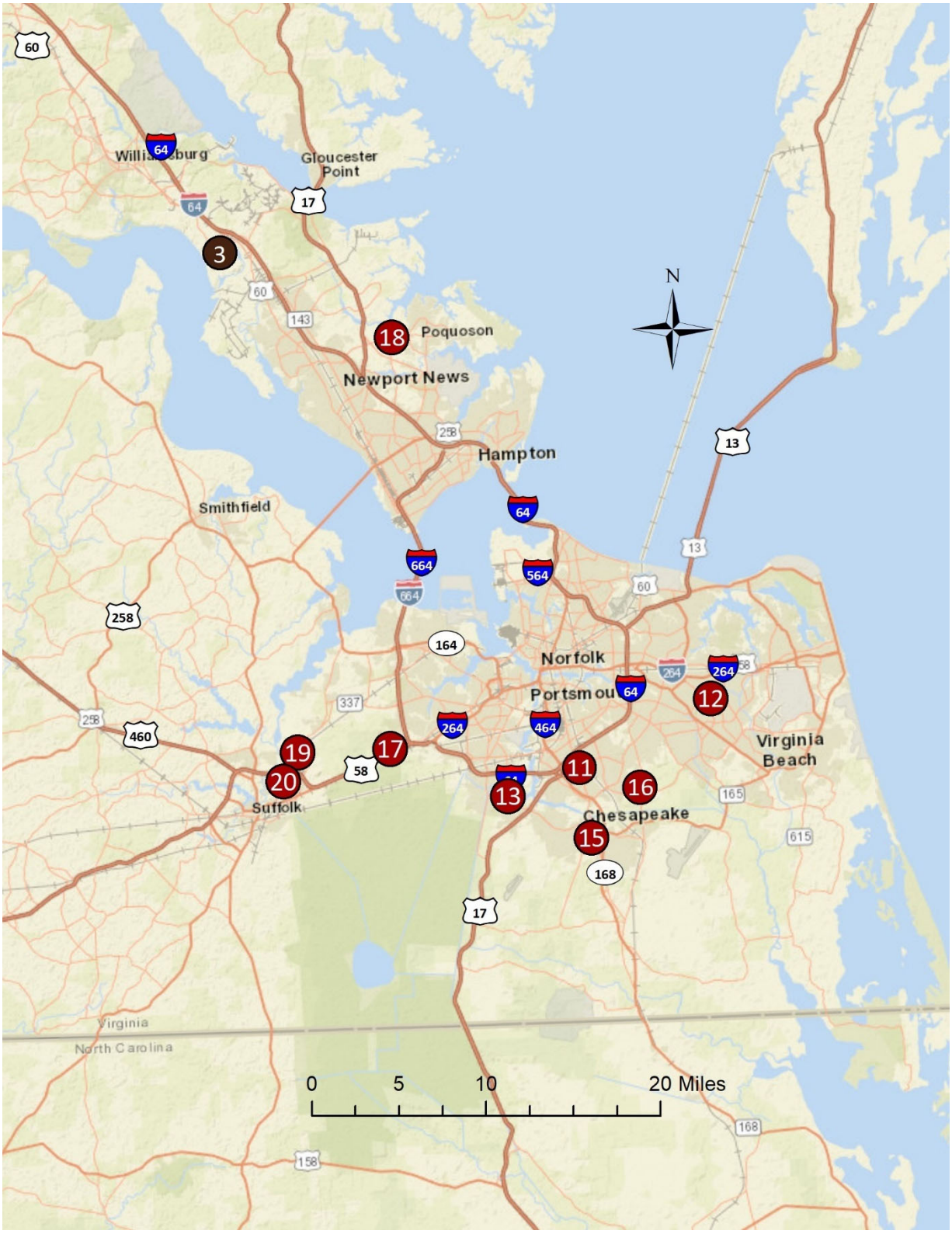
19. Wilroy Road/Progress Road Intersection – (ID# SF3CM) – Suffolk

- This project entails construction of intersection improvements including new signal equipment, turn lane additions, and improvements and retiming the traffic signal.
- Allocated $300,000 in FY 2025 CMAQ funds.
- Total FY 2027 and future CMAQ funding request: $2,500,000.

20. Constance Road/Wilroy Road Intersection– (ID# SF1CM) – Suffolk

- The project entails construction of intersection improvements including new signal equipment, turn lane additions, and improvements and retiming the traffic signal.
- Allocated $300,000 in FY 2027 CMAQ funds.
- Total FY 2027 and future CMAQ funding request: $3,200,000.

Map 1 | Projects Selected for CMAQ Allocations
(See next page for legend)



Projects Selected for CMAQ Allocations

Mapped Projects

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- 11 North Battlefield Blvd/Bryon Street Traffic Signal - Chesapeake
- 12 Holland Road - Phase II - Virginia Beach
- 13 Deep Creek Elementary School Traffic Signal Improvement - Chesapeake
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- 18 Victory Boulevard Shared Use Path - York County
- 19 Wilroy Road/Progress Road Intersection - Suffolk
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- 1 Traffic Signal System Retiming - Portsmouth
- 2 Citywide Traffic Signal System Upgrade - Chesapeake
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- 5 Chesapeake Signal Timing - All Phases - Chesapeake
- 6 Chesapeake Signal Timing Phases 1-4 - Chesapeake
- 7 Citywide Traffic Signal System Upgrade - Chesapeake
- 8 Traffic Signal System Retiming - Virginia Beach
- 9 Citywide Traffic Signal System Upgrades - Portsmouth
- 10 Five (5) Bus Purchase Replacement - WATA
- 14 Green Operator Program - Virginia Port Authority

Project Selection Status

- Previously Approved CMAQ Projects
- New CMAQ Projects

RSTP Project Selection and Funding Allocations

During the February 18, 2021 meeting, the HRTPO Board approved the following actions regarding RSTP funding for FY 2027:

- Seven previously approved RSTP projects were selected to receive a total of $27.4 million in FY 2027 allocations.
- Seven new RSTP projects were selected to receive a total of $9.6 million in FY 2027 allocations.

The approved RSTP projects are summarized individually below. Map 2 on Page 12 displays the geographic location of the FY 2027 RSTP allocations where feasible.

Allocations to Previously Approved RSTP Projects

1. **TRAFFIX (UPC# T14104) – Hampton Roads Transit (HRT)**
    - This project entails the continued funding of the regional Transportation Demand Management (TDM) program.
    - Allocated $1,000,000 in FY 2027 RSTP funds.
    - Total FY 2027 and future RSTP funding request: $5,000,000.

2. **Bus Vehicle Replacement (UPC# T16054) – HRT**
    - The project entails purchasing (29, 35, and 40 foot) buses to replace similar vehicles that have reached the end of their service life. The new buses will have improved fuel economy and performance, lower operating costs, and lower emissions than the buses they will replace.
    - Allocated $1,952,899 in FY 2027 RSTP funds.
    - Total FY 2027 and future RSTP funding request: $46,071,313.

3. **George Washington Memorial Highway (Route 17) Widening – Phase 1 (UPC# 110627) – Gloucester County**
    - This project entails the continuation of the widening of George Washington Memorial Highway (US Route 17) from a 4-lane principal arterial to a 6-lane principle arterial while also providing safe passage for pedestrians. The phase will begin at the intersection of Farmwood Road, where a previous widening project ended, and continue to approximately 1,000 feet north of the intersection of Hook Road/Guinea Road. The total length of this phase is 1.4 miles of the overall larger 10.4-mile long project.
    - Allocated $5,985,265 in FY 2027 RSTP funds to fully fund the project.

4. **Pocahontas Trail Multimodal Corridor (UPC# 102980) – James City County**
    - The project entails upgrading a 1.8-mile segment of Pocahontas Trail (Route 60) with a five-foot sidewalk and a five-foot paved shoulder and to include installation of trees, pedestrian lighting, and bus pull outs.
    - Allocated $2,381,213 in FY 2027 RSTP funds to fully fund the project.

5. **George Washington Highway Widening (UPC# 115423) – Chesapeake**
    - The project entails the expansion of George Washington Highway from an existing three lane undivided roadway to a four lane divided roadway from Yadkin Road to Canal Drive. In addition, the project will provide improvements at three signalized intersections, construct new pedestrian facilities, and address other safety and access management issues along the corridor.
    - Allocated $7,850,000 in FY 2027 RSTP funds.
    - Total FY 2027 and future RSTP funding request: $18,600,000.

6. **Nimmo Parkway Phase VIIB (UPC# 115543) – Virginia Beach**
    - The project entails the construction of a new two lane undivided roadway with shoulders, on road bike lanes, and a single shared use path on the north side from Albuquerque Drive to Sandbridge Road, a distance of approximately 1.7 miles. This project will include a bridge spanning Hell's Point Creek and the adjacent flood plain and wetlands area.
    - Allocated $5,000,000 in FY 2027 RSTP funds.
    - Total FY 2027 and future RSTP funding request: $9,500,000.

7. **Victoria Boulevard Facility Upgrades – Phase 2 (UPC# T22709) – Hampton Roads Transit**
    - The project entails the ongoing rehabilitation of HRT's Victoria Boulevard facility in Hampton which was constructed in 1989 and serves as the primary operating and maintenance location for HRT's Peninsula operations. The program supports the efficient maintenance of vehicles and expansion of bus service by providing sufficient accommodations for bus fleet maintenance and repair including bus surveillance and radio equipment, fareboxes, and other passenger amenities that support safety, comfort, and convenience.
    - Allocated $3,250,000 in FY 2027 RSTP funds to fully fund the project.

New RSTP Projects

8. **Laskin Road Phase III (ID# VB2RS) – Virginia Beach**
    - This project entails widening of Laskin Road between Phillip Avenue to Republic Road from 4 lanes to 6 lanes, removal of service/ feeder roads, addition of pedestrian signals and crossings to all signalized intersections, addition of directional median at Phillip Avenue and Laskin Road intersection, and addition of sidewalk and multi-use path.
    - Allocated $3,669,000 in FY 2027 RSTP funds.
    - Total FY 2027 and future RSTP funding request: $31,503,154.

9. **Route 17 Widening Between Route 630 and Route 173 (ID# YC1RS) – York County**
    - The project entails widen Route 17 (George Washington Memorial Highway) from 4 to 6 lanes between just north of Wolf Trap Road (1.52 miles north of Route 620) and Route 173 (Denbigh Boulevard/Goodwin Neck Road).
    - Allocated $1,500,000 in FY 2027 RSTP funds.
    - Total FY 2027 and future RSTP funding request: $31,503,154.

10. SPSA Flyover – Phase I (ID# SP1RS) – Southeastern Public Service Authority (SPSA)

- The project entails construction of a new flyover at the entrance to the SPSA regional landfill in Suffolk to improve safety for the heavy truck vehicles entering and exiting the facility along the heavily traveled adjacent corridor.
- Allocated $500,000 in FY 2027 RSTP funds.
- Total FY 2027 and future RSTP funding request: $23,036,694.

11. Brambleton Avenue Bridge Rehabilitation (ID# NO1RS) – Norfolk

- The project entails a major rehabilitation of the Brambleton Avenue Bridge across Hauge Creek.
- Allocated $3,000,000 in FY 2027 RSTP funds.
- Total FY 2027 and future RSTP funding request: $4,000,000.

12. York County Roadway Needs Assessment (ID# YC2RS) – York County

- The project entails completing a comprehensive study identifying major deficiencies in the County's roadway network and developing recommended improvement strategies, including pedestrian and bicycle facilities.
- Allocated $300,000 in FY 2027 RSTP funds.
- Total FY 2027 and future RSTP funding request: $600,000.

13. Route 17 Widening Planning Study – Short Lane (SR 615) to Main Street (Business 17) (ID# GC1RS) –Gloucester County

- The project entails evaluating the proposed improvement plans for the corridor including the addition of travel lanes, sidewalk, and a shard use path to the east side and other potential roadway improvements such as access management, intersection design, etc. that may be needed to address current/future congestion and multimodal needs.
- Allocated $250,000 in FY 2027 RSTP funds to fully fund the project.

14. WATA Strategic Plan (ID# WT1RS) – Williamsburg Area Transit Authority (WATA)

- The project entails updating the State required Transit Strategic Plan (TSP) for WATA to help improve the provision of transit services within existing funding structures.
- Allocated $360,000 in FY 2027 RSTP funds to fully fund the project.

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Map 2 | Projects Selected for RSTP Allocations
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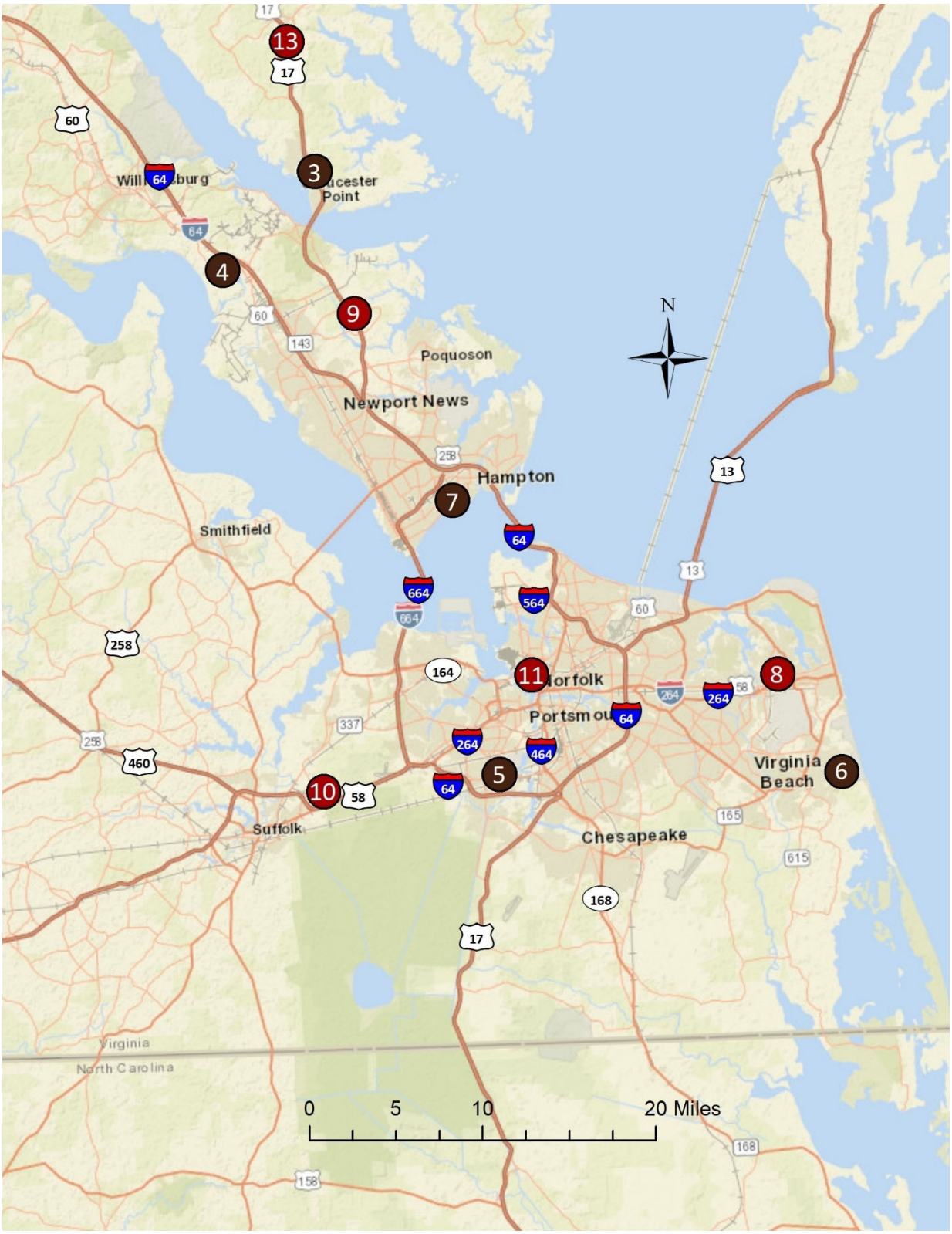

Projects Selected for RSTP Allocations

Mapped Projects

- 3 George Washington Memorial Highway (Route 17) Widening - Phase 1 - Gloucester County
- 4 Pocahontas Trail Multimodal Corridor - James City County
- 5 George Washington Highway Widening - Chesapeake
- 6 Nimmo Parkway Phase VIIB - Virginia Beach
- 7 Victoria Boulevard Facility Upgrades - Phase 2 - HRT
- 8 Laskin Road Phase III -Virginia Beach
- 9 Route 17 Widening Between Route 630 and Route 173 - York County
- 10 SPSA Flyover - Phase I
- 11 Brambleton Avenue Bridge Rehabilitation - Norfolk
- 13 Route 17 Widening Planning Study - Short Ln to Main St - Gloucester County

Unmapped Projects

- 1 TRAFFIX Transportation Demand Management Program - HRT
- 2 Bus Vehicle Replacement - HRT
- 12 York County Roadway Needs Assessment - York County
- 14 WATA Strategic Plan

Project Selection Status

- Previously Approved RSTP Projects
- New RSTP Projects

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Section II
Background

INTRODUCTION

The Hampton Roads Transportation Planning Organization (HRTPO) is the Metropolitan Planning Organization (MPO) for the Hampton Roads region of Virginia. As such, it is a federally mandated transportation policy board comprised of representatives from local, state, and federal governments, transit agencies, and other stakeholders and is responsible for transportation planning and programming for the Hampton Roads Metropolitan Planning Area (MPA). The MPA is comprised of the cities of Chesapeake, Hampton, Newport News, Norfolk, Poquoson, Portsmouth, Suffolk, Virginia Beach, and Williamsburg; the counties of Isle of Wight, James City, and York; and a portion of the City of Franklin and Counties of Gloucester and Southampton. Among its functions, the HRTPO is responsible for project selection and allocation of funds under two federal programs – the Congestion Mitigation and Air Quality (CMAQ) Improvement Program and the Regional Surface Transportation Program (RSTP).

The CMAQ program provides federal funding to states and localities for transportation projects and programs that help improve air quality and reduce traffic congestion. This funding is intended for areas designated by the U.S. Environmental Protection Agency (EPA) as nonattainment or maintenance areas with regard to the National Ambient Air Quality Standards (NAAQS).

A *nonattainment area* is one that does not meet the NAAQS for one or more pollutant. A *maintenance area* is one that was originally designated a nonattainment area, but later met the NAAQS. The Hampton Roads region was in "maintenance" for the 1997 NAAQS for ozone and so was subject to transportation conformity rule requirements before the Environmental Protection Agency (EPA) revoked that standard effective April 6, 2015 (Federal Register, Volume 80, Number 44, March 6, 2015.) With that revocation, transportation conformity requirements were no longer applicable for the Hampton Roads region.

On February 16, 2018, the United States Court of Appeals for the District of Columbia Circuit issued its decision in *South Coast Air Quality Mgmt. District v. EPA* ("South Coast II," 882 F.3d1138) and held that transportation conformity determinations must be made in all so-called "orphan" areas nation-wide that were either nonattainment or maintenance for the 1997 ozone NAAQS and attainment for the 2008 ozone NAAQS when the 1997 ozone NAAQS was revoked. The Hampton Roads region met both conditions, and therefore, conformity requirements for the 1997 ozone NAAQS were once again applicable for Hampton Roads.

On April 23, 2018, in response to the South Coast II court decision, FHWA and FTA issued *Interim Guidance on Conformity Requirements for the 1997 Ozone NAAQS*, which specified that any updates and amendments to the Long-Range Transportation Plan (LRTP) and Transportation Improvement Program (TIP) for projects "*not exempt from transportation conformity may not proceed until transportation conformity with the 1997 ozone NAAQS is determined*." In November 2018, EPA issued "*Transportation Conformity Guidance for the South Coast II Court Decision*" that eliminated modeling requirements for orphan areas (given the revocation of the applicable 1997 ozone NAAQS), which substantially streamlined the reinstated conformity requirements for those areas.

During the development of the FY 2021-2024 TIP, it was assessed to ensure that the program of projects meet applicable Federal, State, and Local requirements relating to transportation conformity, based on the November 2018 EPA Guidance.

The Surface Transportation Program (STP) provides federal funding that may be used by states and localities for a wide range of highway and transit projects. Regional Surface Transportation Program (RSTP) funds are STP funds that are apportioned to specific regions within a state.

This report summarizes the work of selecting CMAQ and RSTP projects during the CMAQ/RSTP Project Selection Process of 2020. Projects selected received allocations of CMAQ or RSTP funds for FY 2027.

ELIGIBLE RECIPIENTS

Eligible recipients of CMAQ and RSTP funds in Hampton Roads include the localities within the MPA, Hampton Roads Transit (HRT), the Williamsburg Area Transit Authority (WATA), Suffolk Transit, state transportation agencies, National Park Service, and the HRTPO.

PROJECT SELECTION PROCESS

The process for obtaining CMAQ or RSTP funding for transportation projects is a competitive one. According to the CMAQ/RSTP Project Selection Process that has been approved by the HRTPO Board, all project proposals are analyzed by HRTPO staff using a specific set of evaluation criteria. The proposed projects are then ranked based on the results of the analyses. All proposed projects must be consistent with the current HRTPO Long-Range Transportation Plan (LRTP). The LRTP is a financially-constrained transportation plan for the Hampton Roads MPA with a planning horizon of at least 20 years. The schedule used for the 2020 CMAQ/RSTP project selection process is listed below. Table 1 on the following page details the available funding, current allocations, and reserves for both the CMAQ and RSTP programs under consideration and discussion during the current project selection process.

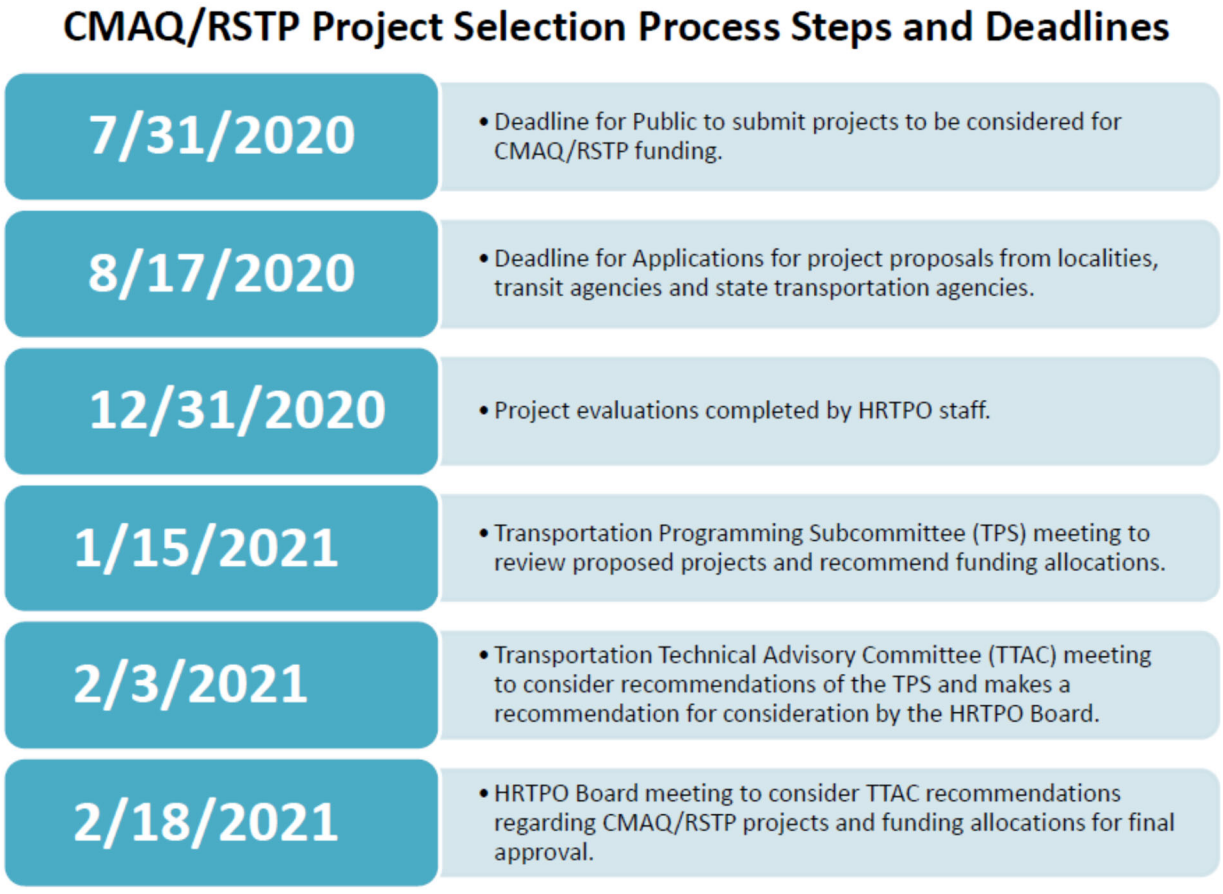

Table 1 | FY 2021-2027 CMAQ and RSTP Funding: Available Funding, Current Allocations, and Reserves

Table 1: FY 2020 - FY 2026 CMAQ and RSTP Funding
Available Funding, Current Allocations, and Reserves

CMAQ	Previous	FY - 21	FY - 22	FY - 23	FY - 24	FY - 25	FY - 26	FY - 27
Marks	$0	$14,243,448	$14,243,448	$14,243,448	$15,080,199	$15,361,905	$15,361,905	$15,361,905
Allocations	$0	$14,243,448	$13,937,656	$13,661,828	$14,561,525	$15,096,103	$13,937,500	$15,143,879
Available	$0	$0	$305,792	$581,620	$518,674	$265,802	$1,424,405	$218,026
							Total	$3,314,319

RSTP	Previous	FY - 21	FY - 22	FY - 23	FY - 24	FY - 25	FY - 26	FY - 27
Marks	$0	$34,383,730	$35,040,488	$35,708,410	$36,387,688	$37,078,513	$37,078,513	$37,078,513
Allocations	$0	$34,383,730	$35,040,488	$35,708,410	$36,283,810	$35,289,001	$36,763,786	$36,998,377
Available	$0	$0	$0	$0	$103,878	$1,789,512	$314,727	$80,136
Franklin and Southampton County Set-aside	$864,433	$1,014,433						
							Total	$2,288,253

Prepared by HRTPO staff (August 5, 2021)

PUBLIC PARTICIPATION

The HRTPO is fully committed to involving and collaborating with Hampton Roads citizens in a public involvement process that is grounded in community partnership, mutual problem solving and understanding. In other words, a process whereby citizens feel a sense of ownership and satisfaction in knowing their voice has been legitimately heard and their thoughts, ideas, and opinions have the potential to impact future HRTPO decisions. In Hampton Roads, the cost of needed improvements to the transportation system far exceeds the funding available to address those needs and difficult decisions must be made regarding the use of scarce transportation dollars. For each project that is chosen for construction, many others will not be able to be built. The long term effect that such decisions can have on so many lives makes it critical that the public be provided with ongoing, dynamic opportunities to participate in the planning and programming processes associated with the complex system of roads, mass transit, rail, waterways, pedestrian and bicycle facilities, and related infrastructure that make up the transportation system.

The HRTPO understands "the public" to mean all of those who have the potential to affect or be affected by the Hampton Roads transportation system. From bicyclists to motorists, public transportation users to freight haulers, social to environmental activists – Hampton Roads residents have a stake in the future of our transportation system. Equally important, the HRTPO recognizes that not all communities and community members have enjoyed the same level of access or representation in transportation and other decisions made by public agencies. Therefore, as part of its public involvement strategy, the HRTPO takes special steps and measures to understand and consider the wants, needs, and aspirations of minority, low-income, and other under-served groups in Hampton Roads.

The HRTPO believes that the regional transportation planning and programming process benefits from public input. The public has valuable knowledge and insight regarding the problems and needs of our communities. The HRTPO also recognizes that it is a responsibility to provide as many opportunities as possible for the community to be informed and aware of the decisions that will affect the future of this region. As such, the public was invited and encouraged to participate in the CMAQ/RSTP Project Selection Process.

In addition to the invitation for public involvement at the beginning of the process, all meetings associated with the CMAQ/RSTP Project Selection Process – meetings of the Transportation Programming Subcommittee (TPS), Transportation Technical Advisory Committee (TTAC), and HRTPO Board – were public meetings that included an opportunity for public comment at the start of each meeting. No public comments regarding the project selection process were received, orally or in writing, during these meetings.

A public notice soliciting CMAQ and RSTP project ideas from the public was posted to the HRTPO website in July of 2020. In addition, a CMAQ/RSTP Project Idea Form was provided for use by the public with a deadline for submission of project ideas of July 31, 2020. Project ideas submitted by the public are reviewed by HRTPO staff and then forwarded to the appropriate locality or agency for consideration as a possible project proposal. No project ideas were received from the public this cycle as a result of this invitation (see Appendix C).

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Section III
CMAQ Project Selection

CMAQ PROJECT SELECTION

In Hampton Roads, projects are selected for funding with CMAQ Improvement Program funds based on the amount of air quality improvement expected per dollar spent. This is analyzed in terms of a reduction in the emissions of Volatile Organic Compounds (VOCs) and Nitrogen Oxides (NOx), which are precursors of ozone depletion. The air quality aspect of the CMAQ analysis allows all types of CMAQ projects to be compared against one another.

The original analysis policies and procedures were developed in December 1992 after the passage of the Intermodal Surface Transportation Efficiency Act (ISTEA). Over the years the policies and procedures have been reviewed and revised. Details on the policies, procedures, and analysis methodologies used for CMAQ project selection are included in the ***Guide to the HRTPO CMAQ and RSTP Project Selection Process***, which may be accessed on the HRTPO website at http://www.hrtpo.org/page/cmaq-and-rstp.

To help insure that all of the necessary information is included with each project proposal, and to provide uniformity to the way that project information is submitted, the HRTPO staff developed application forms to be utilized for submission of CMAQ project proposals. The various ***CMAQ Candidate Project Application Forms*** may be accessed on the HRTPO website at http://www.hrtpo.org/page/cmaq-and-rstp.

Prior to considering new projects to receive CMAQ allocations, the status of previously approved projects is reviewed to determine whether additional funding is required to allow for the completion of a project or project phase. The review of previously approved projects also includes determining whether those projects are progressing on schedule or whether funds should be:

1. Reallocated to correspond with updated phase schedules, or
2. Reallocated to other projects.

During the 2020 Project Selection Process, 5 requests were made for additional funding for previously approved CMAQ projects. The total request for FY 2027 funding was $5.2 million.

Table 2 shows all new projects proposed for CMAQ funding during the project selection process of 2020. As shown in the table, 24 candidate projects, with a total request of over $111.3 million, were submitted. The total request for FY 2027 funding was $14.6 million.

Table 3 shows the scoring and ranking of the 24 candidate projects. As shown in the table, each project was scored and ranked based on its cost-effectiveness at reducing VOC and NOx emissions. The ranks for VOC and NOx reduction were summed to produce the composite ranking. The detailed evaluation and scoring worksheets for each of the CMAQ candidate projects are included in **Appendix A.**

Table 4 shows the new and previously approved projects that were ultimately approved by the HRTPO Board on February 18, 2021 to receive CMAQ allocations in FY 2027. It should be noted that the total CMAQ funding expected to be available for FY 2027, including the 20 percent state match, is approximately $15.4 million.

Table 2 | 2020 CMAQ New Candidate Projects

Number	Code	Applicant	Project Name	Total Cost	Total CMAQ Request	Total FY-27 Request
1	CH1A-1DCM	Chesapeake	Chesapeake Signal Timing - Phases 1-4	$ 600,000	$ 600,000	$ 150,000
2	CH2CM	Chesapeake	Citywide Traffic Signal System Upgrade	$ 1,250,000	$ 1,250,000	$ 250,000
3	CH3CM	Chesapeake	N Battlefield/Byron St Traffic Signal	$ 675,000	$ 675,000	$ 150,000
4	CH4CM	Chesapeake	Deep Creek Elementary School Traffic Signal Improvement	$ 2,100,000	$ 2,100,000	$ 150,000
5	CH5CM	Chesapeake	Centerville Turnpike/Elbow Rd Intersection Improvements	$ 4,850,000	$ 4,850,000	$ 308,000
6	CH6CM	Chesapeake	Battlefield Blvd/Johnstown Rd Intersection Improvements	$ 2,673,656	$ 2,673,656	$ 555,500
7	CH7CM	Chesapeake	460/58/13 Safety Improvements	$ 14,186,104	$ 14,186,104	$ 1,608,800
8	CH8CM	Chesapeake	Deep Creek Trail	$ 2,975,152	$ 2,975,152	$ 100,000
9	HA1CM	Hampton	Buckroe Ave Pedestrian Improvements - Phase 2	$ 1,770,000	$ 1,770,000	$ 1,770,000
10	PO1CM	Portsmouth	Citywide Traffic Signal System Upgrades	$ 1,225,000	$ 1,225,000	$ 300,000
11	PO2CM	Portsmouith	Complete High Street	$ 5,300,000	$ 3,250,000	$ 350,000
12	SF1CM	Suffolk	Constance Rd/Wilroy Rd Intersection	$ 3,200,000	$ 3,200,000	$ 300,000
13	SF2CM	Suffolk	Washington St/Whitemarsh Rd Intersection	$ 3,200,000	$ 3,200,000	$ 300,000
14	SF3CM	Suffolk	Wilroy Rd/Progress Rd Intersection	$ 2,500,000	$ 2,500,000	$ 300,000
15	SF4CM	Suffolk	Holland Rd (Route 58) Corridor Improvements	$ 37,000,000	$ 37,000,000	$ 1,000,000
16	SF5CM	Suffolk	Downtown Suffolk Bike Trail	$ 800,000	$ 800,000	$ 200,000
17	SF6CM	Suffolk	Carolina Road Bike Trail	$ 4,300,000	$ 4,300,000	$ 300,000
18	SF7CM	Suffolk	Holland Rd Bike Trail	$ 10,300,000	$ 10,300,000	$ 300,000
19	SF8CM	Suffolk	Downtown Suffolk Bike Trail Crossing	$ 1,300,000	$ 1,300,000	$ 300,000
20	VB1CM	Virginia Beach	Holland Rd Phase II	$ 1,058,746	$ 1,058,746	$ 300,516
21	VB2CM	Virginia Beach	Traffic Signal System Retiming	$ 663,000	$ 663,000	$ 663,000
22	VP1CM	Virginia Port Authority	Green Operator Program	$ 5,000,000	$ 5,000,000	$ 1,000,000
23	WT1CM	WATA	Five (5) Bus Purchase Replacement	$ 3,700,000	$ 3,700,000	$ 3,700,000
24	YC1CM	York County	Victory Boulevard Shared Use Path	$ 660,750	$ 660,750	$ 256,620
TOTAL				$ 111,287,408	$ 109,237,408	$ 14,612,436

Table 3 | 2020 CMAQ New Candidate Projects in Ranked Order

ID	Jurisdiction	Project Description	Rank	Total Cost	Total Request	FY 27 Request	Cost-Effectiveness		Score		
New Candidate Projects							VOC	NOx	VOC	NOx	Composite[1]
CH1A-1DCM	*Chesapeake*	Chesapeake Signal Timing - Phases 1-4	1	$600,000	$600,000	$150,000	$14,962	$15,961	1	1	2
CH2CM	*Chesapeake*	Citywide Traffic Signal System Upgrade	2	$1,250,000	$1,250,000	$250,000	$24,439	$26,071	2	2	4
VB2CM	*Virginia Beach*	Traffic Signal System Retiming	3	$663,000	$663,000	$663,000	$35,939	$38,339	3	3	6
PO1CM	*Portsmouth*	Citywide Traffic Signal System Upgrades	4	$1,225,000	$1,225,000	$300,000	$41,387	$44,151	4	4	8
WT1CM	*WATA*	Five (5) Bus Purchase Replacement	5	$3,700,000	$3,700,000	$3,700,000	$112,163	$54,439	5	5	10
CH3CM	*Chesapeake*	N Battlefield/Byron St Traffic Signal	6	$675,000	$675,000	$150,000	$413,010	$440,591	6	6	12
VB1CM	*Virginia Beach*	Holland Rd Phase II	6	$1,058,746	$1,058,746	$300,516	$2,520,654	$581,689	8	7	15
CH4CM	*Chesapeake*	Deep Creek Elementary School Traffic Signal Improvement	8	$2,100,000	$2,100,000	$150,000	$955,847	$1,019,679	7	8	15
VP1CM	*Virginia Port Authority*	Green Operator Program	9	$5,000,000	$5,000,000	$1,000,000	$3,422,754	$3,651,328	9	9	18
CH6CM	*Chesapeake*	Battlefield Blvd/Johnstown Rd Intersection Improvements	10	$2,673,656	$2,673,656	$555,500	$4,992,835	$5,326,261	10	10	20
CH5CM	*Chesapeake*	Centerville Turnpike/Elbow Rd Intersection Improvements	11	$4,850,000	$4,850,000	$308,000	$12,859,287	$13,718,041	11	13	24
CH7CM	*Chesapeake*	460/58/13 Safety Improvements	12	$14,186,104	$14,186,104	$1,608,800	$23,741,654	$5,478,843	14	11	25
YC1CM	*York County*	Victory Boulevard Shared Use Path	12	$660,750	$660,750	$256,620	$35,831,914	$11,597,769	15	12	27
SF3CM	*Suffolk*	Wilroy Rd/Progress Rd Intersection	14	$2,500,000	$2,500,000	$300,000	$17,134,338	$18,278,583	12	15	27
SF1CM	*Suffolk*	Constance Rd/Wilroy Rd Intersection	14	$3,200,000	$3,200,000	$300,000	$21,723,076	$23,173,761	13	16	29
HA1CM	*Hampton*	Buckroe Ave Pedestrian Improvements - Phase 2	16	$1,770,000	$1,770,000	$1,770,000	$47,371,258	$15,332,726	16	14	30
SF6CM	*Suffolk*	Carolina Road Bike Trail	17	$4,300,000	$4,300,000	$300,000	$93,766,298	$30,349,478	17	17	34
PO2CM	*Portsmouith*	Complete High Street	18	$5,300,000	$3,250,000	$350,000	$124,821,467	$40,401,151	19	18	37
CH8CM	*Chesapeake*	Deep Creek Trail	19	$2,975,152	$2,975,152	$100,000	$188,585,685	$61,039,811	20	19	39
SF2CM	*Suffolk*	Washington St/Whitemarsh Rd Intersection	20	$3,200,000	$3,200,000	$300,000	$101,826,920	$108,627,006	18	21	39
SF7CM	*Suffolk*	Holland Rd Bike Trail	21	$10,300,000	$10,300,000	$300,000	$202,303,797	$65,479,973	21	20	41
SF4CM	*Suffolk*	Holland Rd (Route 58) Corridor Improvements	22	$37,000,000	$37,000,000	$1,000,000	$619,640,846	$142,994,041	22	22	44
SF5CM	*Suffolk*	Downtown Suffolk Bike Trail	23	$800,000	$800,000	$200,000	$760,294,767	$246,085,746	23	23	46
SF8CM	*Suffolk*	Downtown Suffolk Bike Trail Crossing	24	$1,300,000	$1,300,000	$300,000	$1,281,064,658	$414,644,116	24	24	48
Totals				$111,287,408	$109,237,408	$14,612,436					

[1]The Composite Score is computed as follows:
First, projects are evaluated for their estimated impacts on the reduction of VOC's and NOx.
Second, projects are sorted in ascending order based on the Cost/Benefit for VOC reduction and numbered sequentially. Lower numbers are better.
Third, projects are sorted in ascending order based on the Cost/Benefit for NOx reduction and numbered sequentially. Lower numbers are better.
Finally, the sequential numbers for VOC reduction and NOx reduction are added together to produce the Composite Score. Lower numbers are better.
The Cost-Effectiveness figures represent $/ton of pollutants (NOx, VOC) removed based on the annualized cost of the project.

Table 4 | FY-2027 Allocations to Previously Approved and New CMAQ Projects

#	ID/UPC #	Jurisdiction	Project Description	Proposed Allocations FY - 27
Previously Approved Projects				
1	115863	*Portsmouth*	Traffic Signal System Retiming	$120,000
2	115369	*Chesapeake*	Citywide Traffic Signal System Upgrade	$175,000
3	102980	*James City County*	Pocahontas Trail Multimodal Corridor	* $4,256,443
4	115519	*Newport News*	Signal Timing Improvements	* $450,000
5	115520	*Chesapeake*	Chesapeake Signal Timing -- All Phases	$150,000
New CMAQ Projects with FY 2027 Allocations				
6	CH1A-DCM	*Chesapeake*	Chesapeake Signal Timing	$150,000
7	CH2CN	*Chesapeake*	Citywide Traffic Signal System Upgrade	$250,000
8	VB2CM	*Virginia Beach*	Traffic Signal System Retiming	* $663,000
9	PO1CM	*Portsmouth*	Citywide Traffic Signal System Upgrade	$300,000
10	WT1CM	*WATA*	Five (5) Bus Purchase Replacement	* $3,700,000
11	CH3CM	*Chesapeake*	N Battlefield/Bryon St Traffic Signal	$150,000
12	VB1CM	*Virginia Beach*	Holland Road Phase II	$300,516
13	CH4CM	*Chesapeake*	Deep Creek Elementary School Traffic Signal Improvement	$150,000
14	VP1CM	*Virginia Port Authority*	Green Operator Program	$1,000,000
15	CH6CM	*Chesapeake*	Battlefield Blvd/Johnstown Rd Intersection Improvements	$555,500
16	CH5CM	*Chesapeake*	Centerville Trpk/Elbow Rd Intersection Improvements	$308,000
17	CH7CM	*Chesapeake*	460/58/13 Safety Improvements	$1,608,800
18	YC1CM	*York County*	Victory Blvd Shared Use Path	$256,620
19	SF3CM	*Suffolk*	Wilroy Rd/Progress Rd Intersection	$300,000
20	SF1CM	*Suffolk*	Constance Rd/Wilroy Rd Intersection	$300,000
			FY-27 Mark	$15,361,905
			Total FY-27 Allocations	$15,143,879
			Total Balance Left in Reserve	$218,026

*** Project is fully funded with the proposed FY 2027 allocation.**

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Section IV
RSTP Project Selection

RSTP PROJECT SELECTION

Projects selected for funding with Regional Surface Transportation Program (RSTP) funds must meet certain criteria originally developed in 1992 and subsequently reviewed and revised. Details on the policies, procedures, and analysis methodologies used for RSTP project selection are included in the ***Guide to the HRTPO CMAQ and RSTP Project Selection Process***, which may be accessed on the HRTPO website at http://www.hrtpo.org/page/cmaq-and-rstp.

To help insure that all of the necessary information is included with each project proposal, and to provide uniformity to the way that project information is submitted, HRTPO staff developed application forms to be utilized for submission of RSTP project proposals. The various ***RSTP Candidate Project Application Forms*** may be accessed on the HRTPO website at http://www.hrtpo.org/page/cmaq-and-rstp.

Prior to considering new projects to receive RSTP allocations, the status of previously approved projects is reviewed to determine whether additional funding is required to allow for the completion of a project or project phase. The review of previously approved projects also includes determining whether those projects are progressing on schedule or whether funds should be:

1. Reallocated to correspond with updated phase schedules, or
2. Reallocated to other projects.

After addressing the needs of previously approved RSTP projects, new candidate projects to receive available RSTP funding were considered. **Table 5** shows all new projects proposed for RSTP funding during the project selection process in 2020. As shown in the table, 24 candidate projects, with a total request of $480.6 million, were submitted.

The analysis of RSTP project proposals is more qualitative in nature than the CMAQ analysis. Unlike the CMAQ analysis, RSTP projects must be placed into categories and only projects within the same category can be compared against one another. For this reason, a predetermination must be made with regard to the proportions of available funds that will be allocated to highway versus non-highway projects.

In an effort to continually improve the quantitative nature of the HRTPO CMAQ and RSTP Project Selection Process, the Transportation Technical Advisory Committee (TTAC) recommended during the meeting of March 2, 2016 that the HRTPO Project Prioritization Tool be used to evaluate highway-type RSTP projects and to continue to use the previous RSTP methodologies to evaluate non-highway RSTP projects since the HRTPO Prioritization Tool is not currently capable of evaluating most non-highway type projects. The HRTPO Board approved this change to the Project Selection Process on March 17, 2016. The HRTPO Project Prioritization Tool is being further enhanced to be able to evaluate nearly all RSTP project applications.

The Tool does not currently apply the Economic Vitality component for some project types and, therefore, the scores for such projects cannot be directly compared to the scores for the other projects. **Table 6** shows the scoring and ranking of the 24 candidate projects. The detailed evaluation and scoring worksheets for each of the newly submitted RSTP projects are included in **Appendix B.**

Table 7 shows the seven new projects and seven previously approved projects that were ultimately approved by the HRTPO Board on February 18, 2021 to receive RSTP funding allocations in FY 2027. The total RSTP funding expected to be available for FY 2027, including the 20 percent state match, is approximately $37.1 million.

Table 5 | 2020 RSTP New Candidate Projects

Number	Code	Applicant	Project Name (HRTPO Prioritization Tool ID)	Total Cost	Total RSTP Request	Total FY-27 Request
Highway: Utilizing HRTPO Prioritization Tool						
Roadway Widening, New Facilities, HOV Lanes, Intersection Improvements						
1	CH3RS	Chesapeake	Green Tree Road Extended	$ 12,096,521	$ 12,096,521	$ 1,977,146
2	CH4ARS	Chesapeake	Centerville Turnpike Widening (Segment 1)	$ 48,850,000	$ 48,850,000	$ 3,300,000
3	CH4BRS	Chesapeake	Centerville Turnpike Widening (Segment 2)	$ 17,500,000	$ 17,500,000	$ 1,500,000
4	CH4CRS	Chesapeake	Centerville Turnpike Widening (Segment 3)	$ 126,000,000	$ 126,000,000	$ 8,500,000
5	CH5RS	Chesapeake	NB Rt 168/Rt 17 to WB I-64 Ramp Improvements	$ 7,491,133	$ 7,491,133	$ 1,765,248
6	CH6RS	Chesapeake	Battlefield Blvd and Johnston Rd Intersection Improvements	$ 2,673,656	$ 2,673,656	$ 555,500
7	CH7ARS	Chesapeake	Mt Pleasant Widening Phase I	$ 30,000,000	$ 30,000,000	$ 3,700,000
8	CH7BRS	Chesapeake	Mt Pleasant Widening Phase II	$ 16,150,000	$ 16,150,000	$ 1,250,000
9	CH7CRS	Chesapeake	Mt Pleasant Widening Phase III	$ 24,600,000	$ 24,600,000	$ 1,900,000
10	CH7DRS	Chesapeake	Mt Pleasant Widening Phase IV	$ 19,000,000	$ 19,000,000	$ 1,500,000
11	CH1RS	Chesapeake	Western Branch Rails to Trails Phase 2	$ 1,893,650	$ 1,893,650	$ 431,594
12	SP1RS	SPSA	SPSA Flyover - Phase I	$ 23,036,694	$ 23,036,694	$ 1,500,000
13	VB1RS	Virginia Beach	Laskin Rd Phase I-B	$ 32,200,000	$ 29,921,019	$ 1,280,800
14	VB2RS	Virginia Beach	Laskin Rd Phase III	$ 31,503,154	$ 31,503,154	$ 3,669,000
15	YC1RS	York County	Route 17 Widening Between Route 630 and Route 173	$ 23,906,101	$ 5,600,000	$ 5,600,000
Highway: Utilizing RSTP Scoring Process						
Corridor Operational Improvements						
16	CH2RS	Chesapeake	460/58/13 Safety Improvements	$ 14,186,104	$ 14,186,104	$ 1,608,800
17	HA1RS	Hampton	Phoebus/Downtown LED Light Replacement	$ 730,000	$ 730,000	$ 730,000
Bridge Rehabilitation						
18	NO1RS	Norfolk	Brambleton Ave Bridge Rehabilitation	$ 4,000,000	$ 4,000,000	$ 4,000,000
19	NO2RS	Norfolk	Shore Dr Bridge Rehabilitation	$ 3,000,000	$ 3,000,000	$ 3,000,000
Alternatives Analysis and Feasiblilty Studies						
20	GC1RS	Gloucester County	Rt 17 Widening -- Short Ln (SR 615) to Main St (Business 17)	$ 175,000	$ 175,000	$ 175,000
21	YC2RS	York County	York County Roadway Needs Assessment	$ 600,000	$ 600,000	$ 600,000
Intelligent Transportation Systems Projects						
Intermodal Transportation Projects						
22	SF1RS	Suffolk	Holland Rd Intermodal Corridor Project	$ 37,000,000	$ 37,000,000	$ 1,000,000
Non-Highway:						
New or Expanded Service, Passenger Facilities, HS/intercity/& light rail, Station Development, Vehicle Upgrades etc.						
Vehicle Replacement/Purchase						
23	WT2RS	WATA	Five (5) Bus Purchase Replacement	$ 3,700,000	$ 3,700,000	$ 3,700,000
Planning Studies						
24	WT1RS	WATA	Transit Strategic Plan (TSP) Major Update	$ 360,000	$ 360,000	$ 360,000
Alternatives Analysis and Feasiblilty Studies						
TOTAL				**$ 480,652,013**	**$ 460,066,931**	**$ 53,603,088**

Table 6 | 2020 RSTP Candidate Projects in Ranked Order

Code	Applicant	Project Name	Score
New Applications: Utilizing HRTPO Prioritization Tool			**Score (Max =300)**
VB2RS	*Virginia Beach*	Laskin Rd Phase III	**146.0**
VB1RS	*Virginia Beach*	Laskin Rd Phase I-B	**139.0**
YC1RS	*York County*	Route 17 Widening Between Route 630 and Route 173	**137.0**
CH5RS	*Chesapeake*	NB Rt 168/Rt 17 to WB I-64 Ramp Improvements	**122.0**
CH4ARS	*Chesapeake*	Centerville Turnpike Widening (Segment 1)	**118.0**
CH4BRS	*Chesapeake*	Centerville Turnpike Widening (Segment 2)	**118.0**
CH4CRS	*Chesapeake*	Centerville Turnpike Widening (Segment 3)	**118.0**
CH7ARS	*Chesapeake*	Mt Pleasant Widening Phase I	**96.0**
CH6RS	*Chesapeake*	Battlefield Blvd and Johnston Rd Intersection Improvements	**94.0**
CH7BRS	*Chesapeake*	Mt Pleasant Widening Phase II	**89.0**
CH7CRS	*Chesapeake*	Mt Pleasant Widening Phase III	**89.0**
CH7DRS	*Chesapeake*	Mt Pleasant Widening Phase IV	**89.0**
SP1RS	*SPSA*	SPSA Flyover - Phase I	**87.0**
CH3RS	*Chesapeake*	Green Tree Road Extended	**80.0**
CH1RS	*Chesapeake*	Western Branch Rails to Trails Phase 2	**21.0**
New Applications: Utilizing RSTP Scoring Process			**Score (Max =100)**
NO1RS	*Norfolk*	Brambleton Ave Bridge Rehabilitation	**67.0**
YC2RS	*York County*	York County Roadway Needs Assessment	**66.0**
NO2RS	*Norfolk*	Shore Dr Bridge Rehabilitation	**66.0**
GC1RS	*Gloucester County*	Rt 17 Widening -- Short Ln (SR 615) to Main St (Business 17)	**59.0**
CH2RS	*Chesapeake*	460/58/13 Safety Improvements	**48.0**
SF1RS	*Suffolk*	Holland Rd Intermodal Corridor Project	**47.0**
HA1RS	*Hampton*	Phoebus/Downtown LED Light Replacement	**31.0**
Non-Highway New Applications: Utilizing RSTP Scoring Process			
WT1RS	*WATA*	Transit Strategic Plan (TSP) Major Update	**75.0**
WT2RS	*WATA*	Five (5) Bus Purchase Replacement	**64.0**

Table 7 | FY 2027 Allocations to New and Previously Approved RSTP Projects

#	ID/UPC #	Jurisdiction	Project Description	Proposed Allocations FY - 27
Previously Approved Projects				
1	T14104	*HRT*	TRAFFIX Program	$1,000,000
2	T16054	*HRT*	Bus Vehicle Replacement	$1,952,899
3	110627	*Gloucester County*	George Washington Memorial Highway (Route 17) Widening Phase 1	$5,985,265
4	102980	*James City County*	Pocahontas Trail Multimodal Corridor	* $2,381,213
5	115423	*Chesapeake*	George Washington Highway Widening	$7,850,000
6	114154	*Virginia Beach*	Nimmo Parkway Phase VIIB	$5,000,000
7	T22709	*HRT*	Victoria Boulevard Facility Upgrades - Phase 2	* $3,250,000
New RSTP Projects with FY 2027 Allocations				
8	VB2RS	*Virginia Beach*	Laskin Road Phase III	$3,669,000
9	YC1RS	*York County*	Route 17 Widening between Route 630 and Route 173	$1,500,000
10	SP1RS	*SPSA*	SPSA Flyover - Phase 1	$500,000
11	NO1RS	*Norfolk*	Brambleton Avenue Bridge Rehabilitation	$3,000,000
12	YC2RS	*York County*	York County Roadway Needs Assessment	$300,000
13	GC1RS	*Gloucester County*	Rote 17 Widening - Short Ln (SR 615) to Main St (Business 17)	* $250,000
14	WT1RS	*WATA*	Transit Strategic Plan (TSP) Major Update	* $360,000
			FY-27 Mark	$37,078,513
			Total FY-27 Allocations	$36,998,377
			Total Balance Left in Reserve	$80,136

*** Project is fully funded with the proposed FY 2027 allocation.**

Section V
Appendices

APPENDIX A

CMAQ Project Evaluation Worksheets

CONGESTION MITIGATION AND AIR QUALITY
BICYCLE AND PEDESTRIAN PROJECTS

JURISDICTION: City of Chesapeake
PROJECT NAME: **Deep Creek**
LOCATION:
Project is located in the Deep Creek section of Chesapeake. Please see attached map for project location.
DESCRIPTION: This project would construct a 10' wide multi-use facility connecting the existing network at Deep Creek Park to the sidewalik facility located along Moses Grandy/Old Mill Rd.

DATE: 8/16/2020 (on application)
PROJECT COST: $2,975,151

1- ESTIMATES OF VMT REDUCTIONS:

Ground counts for reasonableness check re: CMAQ Post Evaluation study [12]:

Bikeway	Bicycle Counts			Pedestrian Counts		
Sampled Bikeway	Weekday Counts	Weekend Counts	Avg. Day Estimate [1]	Weekday Counts	Weekend Counts	Avg. Day Estimate [1]
Goodwin Neck	2	4	3	0	0	0
Warwick Blvd	13	31	18	11	10	11
Col. Pkwy Conn.	34	81	47	7	5	6
Average:	16	39	**23**	6	5	**6**

Demand estimation for proposed facility re: NCHRP Report 552:

Local Bicycle Commute Share (C): 0.3% [2]
Facility Length (L): 1.30 mi. [13]

Buffer, Distance from Project	TAZ [13]	2009 Density (D), persons/ sq.mi.
0.00-0.25 mi.	653	865
	656	2,447
	657	1,043
	649	2
	652	1,141
	655	1,774
	Average:	1,212
0.25-0.50 mi.	653	865
	654	1,768
	656	2,447
	657	1,043
	649	2
	651	2,522
	652	1,141
	655	1,774
	Average:	1,445

Buffer, Distance from Project	TAZ [13]	2009 Density (D), persons/ sq.mi.
0.50-1.00 mi.	653	865
	654	1,768
	656	2,447
	657	1,043
	649	2
	651	2,522
	652	1,141
	655	1,774
	Average:	1,445

Buffer, Distance from Project	TAZ	2009 Density (D), persons/ sq.mi.	Area of Buffer (A), sq.mi. [6]	Residents in Buffer (R=D*A)	Existing Adult Cyclists (R*C*0.8) [3]	New Adult Cyclists [4]	Existing Adult Pedestrians [5]	New Adult Pedestrians [5]
0.00-0.25 mi.	above	1,212	0.65	788	2	4	0	1
0.25-0.50 mi.	above	1,445	0.65	939	2	3	1	1
0.50-1.00 mi.	above	1,445	1.30	1,879	5	2	1	0
				3,606	9	8	2	2

Hampton Roads TPO

Checking reasonableness of bicycle demand estimation via comparison to ground counts:

Existing Adult Cyclists:	9	above
New Adult Cyclists:	8	above
Total Adult Cyclists:	17	
Trips, per day per cyclist:	2	trip to destination + return trip
Total Trips per Day:	33	
vs. Trips on Sampled Bikeways:	23	above
	Therefore, the demand calculation results are reasonable.	

Calculating VMT reduction:

	Biking	Walking	
New Users:	8	2	above
Trips, per day per user:	2	2	trip to destination + return trip
New Person Trips on Facility:	16	4	
Eliminated Person Trips by Auto:	16	4	above [7]
Occupancy of Eliminated Auto Trips:	1.25	1.25	[11]
Eliminated Vehicle Trips (Auto):	13	3	
Avg. Alt. Mode Trip Length, mi.:	2	1	[9]
Factor (for converting alt. mode trip lengths):	2	2	[10]
Avg. Eliminated Auto Trip Length, veh-mi.:	4	2	
VMT Reduction, mi:	51	6	
		Total:	57 vehicle-miles

2- EMISSIONS CALCULATIONS:

Type	Emissions Factor, g/mi [5]	VMT Reduction, mi/day (above)	Emissions Reduction, g/day	Emissions Reduction, kg/day	Conversion Factor, wkdays/yr	Emissions Reduction, kg/yr
VOC	0.067	57	4	0.004	250	1
NOx	0.207	57	12	0.012	250	3

3- COST EFFECTIVENESS:

Total Cost:	$2,975,151	above
Useful life, years:	15	as assumed in CMAQ analyses of previous years
Annual Cost:	$198,343	

Type	Cost, $/yr (above)	Emissions Reduction, kg/yr (above)	Cost Effective-ness, $/kg	Con-version Factor, kg/ton	Cost Effective-ness, $/ton
VOC	$198,343	1	$207,922	907	**$188,585,685**
NOx	$198,343	3	$67,299	907	**$61,039,811**

Notes:

[1] Average Day Estimate = [(Weekday Count * 5) + (Weekend Count * 2)] / 7

[2] "A Review of 2000 Census Commute Data for Hampton Roads", HRPDC, Nov. 2005, p. 28

[3] "Low" estimate, re: NCHRP Report 552, pg. 38

[4] "New": i.e. as a result of proposed facility; New = Existing * B, where B varies by buffer: 0-0.25mi: 1.93; 0.25-0.50mi: 1.11; 0.50-1.00mi: 0.39, re: NCHRP Report 552, pg. 39

[5] Pedestrians = Cyclists / 4, based on ground counts at top of page

[6] Only areas lateral to facility are included in buffers; semi-circular areas at ends of facility are not included in buffers

[7] Assuming each new alt. mode trip eliminates an auto trip

[8] Source: VDOT, Hampton Roads average for light duty vehicles and roadway functional classes, 2014, 35mph

[9] Source: 2001 NHTS Table Designer

[10] It is assumed that the eliminated auto trips will have length lower than regular auto trips (10 miles; source [9]) and higher than regular alt. mode trips (shown above).

[11] All-trip occupancy, based on occupancies assumed in CMAQ analyses of previous years: work- 1.1; non-work- 1.3

[12] HRPDC, Feb. 2003, Appendix C

[13] From application

CONGESTION MITIGATION AND AIR QUALITY
BICYCLE AND PEDESTRIAN PROJECTS

JURISDICTION: City of Hampton
PROJECT NAME: **Buckroe Avenue Pedestrian Improvements - Phase 2**
LOCATION: 50 ft. to the west of the intersection of N. Mallory St. and Buckroe Ave, to 50 ft. west of the intersetcion of Buckroe Ave and 5th St.
DESCRIPTION: Project proposes to install curb and gutter, sidewalks, LED street lights and on-street parking on the south side of Buckroe Ave from N. Mallory St to 5th St. On the north side of Buckroe Ave, existing sidewalks will be replaced, as they in disrepair and have significant trip hazards. Lighting along the north side of Buckroe Ave will be replaced with LED acorn lights by
DATE: 8/25/2020 (on application)
PROJECT COST: $1,770,000

1- ESTIMATES OF VMT REDUCTIONS:

Ground counts for reasonableness check re: CMAQ Post Evaluation study [12]:

Bikeway	Bicycle Counts			Pedestrian Counts		
Sampled Bikeway	Weekday Counts	Weekend Counts	Avg. Day Estimate [1]	Weekday Counts	Weekend Counts	Avg. Day Estimate [1]
Goodwin Neck	2	4	3	0	0	0
Warwick Blvd	13	31	18	11	10	11
Col. Pkwy Conn.	34	81	47	7	5	6
Average:	16	39	**23**	6	5	**6**

Demand estimation for proposed facility re: NCHRP Report 552:

Local Bicycle Commute Share (C): 0.3% [2]
Facility Length (L): 0.99 mi. [13]

Buffer, Distance from Project	TAZ [13]	2009 Density (D), persons/ sq.mi.
0.00-0.25 mi.	1063	3,798
	1065	4,177
		0
	Average:	3,798
0.25-0.50 mi.	1063	3,798
	1065	4,177
	1005	3,832
	1003	2,363
	1006	6,392
	1062	6,231
	Average:	4,465

Buffer, Distance from Project	TAZ [13]	2009 Density (D), persons/ sq.mi.
0.50-1.00 mi.	1063	3,798
	1065	4,177
	1005	3,832
	1003	2,363
	1006	6,392
	1062	6,231
	Average:	4,465

Buffer, Distance from Project	TAZ	2009 Density (D), persons/ sq.mi.	Area of Buffer (A), sq.mi. [6]	Residents in Buffer (R=D*A)	Existing Adult Cyclists (R*C*0.8) [3]	New Adult Cyclists [4]	Existing Adult Pedestrians [5]	New Adult Pedestrians [5]
0.00-0.25 mi.	above	3,798	0.50	1,880	5	9	1	2
0.25-0.50 mi.	above	4,465	0.50	2,210	5	6	1	1
0.50-1.00 mi.	above	4,465	0.99	4,421	11	4	3	1
				8,511	20	19	5	5

Checking reasonableness of bicycle demand estimation via comparison to ground counts:

Existing Adult Cyclists:	20	above
New Adult Cyclists:	19	above
Total Adult Cyclists:	39	
Trips, per day per cyclist:	2	trip to destination + return trip
Total Trips per Day:	78	
vs. Trips on Sampled Bikeways:	23	above

Therefore, the demand calculation results are reasonable.

Calculating VMT reduction:

	Biking	Walking	
New Users:	19	5	above
Trips, per day per user:	2	2	trip to destination + return trip
New Person Trips on Facility:	37	9	
Eliminated Person Trips by Auto:	37	9	above [7]
Occupancy of Eliminated Auto Trips:	1.25	1.25	[11]
Eliminated Vehicle Trips (Auto):	30	7	
Avg. Alt. Mode Trip Length, mi.:	2	1	[9]
Factor (for converting alt. mode trip lengths):	2	2	[10]
Avg. Eliminated Auto Trip Length, veh-mi.:	4	2	
VMT Reduction, mi:	120	15	
Total:			135 vehicle-miles

2- EMISSIONS CALCULATIONS:

Type	Emissions Factor, g/mi [5]	VMT Reduction, mi/day (above)	Emissions Reduction, g/day	Emissions Reduction, kg/day	Conversion Factor, wkdays/yr	Emissions Reduction, kg/yr
VOC	0.067	135	9	0.009	250	2
NOx	0.207	135	28	0.028	250	7

3- COST EFFECTIVENESS:

Total Cost:	$1,770,000	above
Useful life, years:	15	as assumed in CMAQ analyses of previous years
Annual Cost:	$118,000	

Type	Cost, $/yr (above)	Emissions Reduction, kg/yr (above)	Cost Effective-ness, $/kg	Con-version Factor, kg/ton	Cost Effective-ness, $/ton
VOC	$118,000	2	$52,229	907	**$47,371,258**
NOx	$118,000	7	$16,905	907	**$15,332,726**

Notes:

[1] Average Day Estimate = [(Weekday Count * 5) + (Weekend Count * 2)] / 7

[2] "A Review of 2000 Census Commute Data for Hampton Roads", HRPDC, Nov. 2005, p. 28

[3] "Low" estimate, re: NCHRP Report 552, pg. 38

[4] "New": i.e. as a result of proposed facility; New = Existing * B, where B varies by buffer: 0-0.25mi: 1.93; 0.25-0.50mi: 1.11; 0.50-1.00mi: 0.39, re: NCHRP Report 552, pg. 39

[5] Pedestrians = Cyclists / 4, based on ground counts at top of page

[6] Only areas lateral to facility are included in buffers; semi-circular areas at ends of facility are not included in buffers

[7] Assuming each new alt. mode trip eliminates an auto trip

[8] Source: VDOT, Hampton Roads average for light duty vehicles and roadway functional classes, 2014, 35mph

[9] Source: 2001 NHTS Table Designer

[10] It is assumed that the eliminated auto trips will have length lower than regular auto trips (10 miles; source [9]) and higher than regular alt. mode trips (shown above).

[11] All-trip occupancy, based on occupancies assumed in CMAQ analyses of previous years: work- 1.1; non-work- 1.3

[12] HRPDC, Feb. 2003, Appendix C

[13] From application

CONGESTION MITIGATION AND AIR QUALITY
BICYCLE AND PEDESTRIAN PROJECTS

JURISDICTION: City of Portsmouth
PROJECT NAME: **Complete High Street**
LOCATION: The project extends along High Street approximately 1 mile between downtown Portsmouth and the MLK Freeway
DESCRIPTION: The "Complete" High Street project will transform the Uptown portion of High Street between downtown Portsmouth and the MLK Freeway into a bicycle and pedestrian friendly Complete Street with wide sidewalks, on-street parking, bus pull-offs, and shared travel lanes that are convertible to bike lanes. The project will also include scenic streetscaping, utility relocations, landscaped medians and high visibility crosswalks to reduce speeds within the corridor. A demostration portion of the project would extend from the MLK Freeway to Godwin Street.
DATE: 8/15/2020 (on application)
PROJECT COST: $5,300,000

1- ESTIMATES OF VMT REDUCTIONS:

Ground counts for reasonableness check re: CMAQ Post Evaluation study [12]:

Bikeway	Bicycle Counts			Pedestrian Counts		
Sampled Bikeway	Weekday Counts	Weekend Counts	Avg. Day Estimate [1]	Weekday Counts	Weekend Counts	Avg. Day Estimate [1]
Goodwin Neck	2	4	3	0	0	0
Warwick Blvd	13	31	18	11	10	11
Col. Pkwy Conn.	34	81	47	7	5	6
Average:	16	39	**23**	6	5	**6**

Demand estimation for proposed facility re: NCHRP Report 552:

Local Bicycle Commute Share (C): 0.3% [2]
Facility Length (L): 1.00 mi. [13]

Buffer, Distance from Project	TAZ [13]	2009 Density (D), persons/ sq.mi.
0.00-0.25 mi.	452	3,723
	453	10,175
	471	0
	Average:	4,633
0.25-0.50 mi.	451	3,563
	452	3,723
	453	10,175
	466	8,644
	470	95
	471	0
	Average:	4,367

Buffer, Distance from Project	TAZ [13]	2009 Density (D), persons/ sq.mi.
0.50-1.00 mi.	449	6,721
	451	3,563
	452	3,723
	453	10,175
	466	8,644
	467	6,868
	469	7,486
	470	95
	471	0
	507	5789
	508	2679
	Average:	5,068

Buffer, Distance from Project	TAZ	2009 Density (D), persons/ sq.mi.	Area of Buffer (A), sq.mi. [6]	Residents in Buffer (R=D*A)	Existing Adult Cyclists (R*C*0.8) [3]	New Adult Cyclists [4]	Existing Adult Pedestrians [5]	New Adult Pedestrians [5]
0.00-0.25 mi.	above	4,633	0.50	2,316	6	11	1	3
0.25-0.50 mi.	above	4,367	0.50	2,183	5	6	1	1
0.50-1.00 mi.	above	5,068	1.00	5,068	12	5	3	1
				9,567	23	21	6	5

Checking reasonableness of bicycle demand estimation via comparison to ground counts:

Existing Adult Cyclists:	23	above
New Adult Cyclists:	21	above
Total Adult Cyclists:	44	
Trips, per day per cyclist:	2	trip to destination + return trip
Total Trips per Day:	89	
vs. Trips on Sampled Bikeways:	23	above

Therefore, the demand calculation results are reasonable.

Calculating VMT reduction:

	Biking	Walking	
New Users:	21	5	above
Trips, per day per user:	2	2	trip to destination + return trip
New Person Trips on Facility:	43	11	
Eliminated Person Trips by Auto:	43	11	above [7]
Occupancy of Eliminated Auto Trips:	1.25	1.25	[11]
Eliminated Vehicle Trips (Auto):	34	9	
Avg. Alt. Mode Trip Length, mi.:	2	1	[9]
Factor (for converting alt. mode trip lengths):	2	2	[10]
Avg. Eliminated Auto Trip Length, veh-mi.:	4	2	
VMT Reduction, mi:	136	17	
		Total:	153 vehicle-miles

2- EMISSIONS CALCULATIONS:

Type	Emissions Factor, g/mi [5]	VMT Reduction, mi/day (above)	Emissions Reduction, g/day	Emissions Reduction, kg/day	Conversion Factor, wkdays/yr	Emissions Reduction, kg/yr
VOC	0.067	153	10	0.010	250	3
NOx	0.207	153	32	0.032	250	8

3- COST EFFECTIVENESS:

Total Cost:	$5,300,000	above
Useful life, years:	15	as assumed in CMAQ analyses of previous years
Annual Cost:	$353,333	

Type	Cost, $/yr (above)	Emissions Reduction, kg/yr (above)	Cost Effective-ness, $/kg	Con-version Factor, kg/ton	Cost Effective-ness, $/ton
VOC	$353,333	3	$137,620	907	**$124,821,467**
NOx	$353,333	8	$44,544	907	**$40,401,151**

Notes:

[1] Average Day Estimate = [(Weekday Count * 5) + (Weekend Count * 2)] / 7

[2] "A Review of 2000 Census Commute Data for Hampton Roads", HRPDC, Nov. 2005, p. 28

[3] "Low" estimate, re: NCHRP Report 552, pg. 38

[4] "New": i.e. as a result of proposed facility; New = Existing * B, where B varies by buffer: 0-0.25mi: 1.93; 0.25-0.50mi: 1.11; 0.50-1.00mi: 0.39, re: NCHRP Report 552, pg. 39

[5] Pedestrians = Cyclists / 4, based on ground counts at top of page

[6] Only areas lateral to facility are included in buffers; semi-circular areas at ends of facility are not included in buffers

[7] Assuming each new alt. mode trip eliminates an auto trip

[8] Source: VDOT, Hampton Roads average for light duty vehicles and roadway functional classes, 2014, 35mph

[9] Source: 2001 NHTS Table Designer

[10] It is assumed that the eliminated auto trips will have length lower than regular auto trips (10 miles; source [9]) and higher than regular alt. mode trips (shown above).

[11] All-trip occupancy, based on occupancies assumed in CMAQ analyses of previous years: work- 1.1; non-work- 1.3

[12] HRPDC, Feb. 2003, Appendix C

[13] From application

CONGESTION MITIGATION AND AIR QUALITY
BICYCLE AND PEDESTRIAN PROJECTS

JURISDICTION: City of Suffolk
PROJECT NAME: **Downtown Suffolk Bike Trail**
LOCATION: Constance Road near the Suffolk Riverfront Park (Hilton Garden Inn)
DESCRIPTION: To design and construct a signalized crossing of Constance Road for Bicycle and Pedestrians to connect the Prentis Street Bike Trail (Part of the BOA Regional Trail) to the Main Street Bike and Pedestrian Facilities
DATE: 8/17/2020 (on application)
PROJECT COST: $800,000

1- ESTIMATES OF VMT REDUCTIONS:

Ground counts for reasonableness check re: CMAQ Post Evaluation study [12]:

Bikeway	Bicycle Counts			Pedestrian Counts		
Sampled Bikeway	Weekday Counts	Weekend Counts	Avg. Day Estimate [1]	Weekday Counts	Weekend Counts	Avg. Day Estimate [1]
Goodwin Neck	2	4	3	0	0	0
Warwick Blvd	13	31	18	11	10	11
Col. Pkwy Conn.	34	81	47	7	5	6
Average:	16	39	**23**	6	5	**6**

Demand estimation for proposed facility re: NCHRP Report 552:

Local Bicycle Commute Share (C): 0.3% [2]
Facility Length (L): 0.05 mi. [13]

Buffer, Distance from Project	TAZ [13]	2009 Density (D), persons/ sq.mi.
0.00-0.25 mi.	920	1,455
	950	2,803
	952	2,421
	953	124
	Average:	1,701
0.25-0.50 mi.	919	409
	939	4,743
	940	5,297
	949	2,232
	Average:	3,170

Buffer, Distance from Project	TAZ [13]	2009 Density (D), persons/ sq.mi.
0.50-1.00 mi.	904	1,202
	905	4,158
	946	4,997
	954	1,748
	1006	661
	Average:	2,553

Buffer, Distance from Project	TAZ	2009 Density (D), persons/ sq.mi.	Area of Buffer (A), sq.mi. [6]	Residents in Buffer (R=D*A)	Existing Adult Cyclists (R*C*0.8) [3]	New Adult Cyclists [4]	Existing Adult Pedestrians [5]
0.00-0.25 mi.	above	1,701	0.03	43	0	0	0
0.25-0.50 mi.	above	3,170	0.03	79	0	0	0
0.50-1.00 mi.	above	2,553	0.05	128	0	0	0
				249	1	1	0

Checking reasonableness of bicycle demand estimation via comparison to ground counts:

Existing Adult Cyclists:	1	above
New Adult Cyclists:	1	above
Total Adult Cyclists:	1	
Trips, per day per cyclist:	2	trip to destination + return trip
Total Trips per Day:	2	
vs. Trips on Sampled Bikeways:	23	above
	Therefore, the demand calculation results are reasonable.	

Calculating VMT reduction:

	Biking	Walking	
New Users:	1	0	above
Trips, per day per user:	2	2	trip to destination + return trip
New Person Trips on Facility:	1	0	
Eliminated Person Trips by Auto:	1	0	above [7]
Occupancy of Eliminated Auto Trips:	1.25	1.25	[11]
Eliminated Vehicle Trips (Auto):	1	0	
Avg. Alt. Mode Trip Length, mi.:	2	1	[9]
Factor (for converting alt. mode trip lengths):	2	2	[10]
Avg. Eliminated Auto Trip Length, veh-mi.:	4	2	
VMT Reduction, mi:	3	0	
		Total:	4 vehicle-miles

2- EMISSIONS CALCULATIONS:

Type	Emissions Factor, g/mi [5]	VMT Reduction, mi/day (above)	Emissions Reduction, g/day	Emissions Reduction, kg/day	Conversion Factor, wkdays/yr	Emissions Reduction, kg/yr
VOC	0.067	4	0	0.000	250	0
NOx	0.207	4	1	0.001	250	0

3- COST EFFECTIVENESS:

Total Cost:	$800,000	above
Useful life, years:	15	as assumed in CMAQ analyses of previous years
Annual Cost:	$53,333	

Type	Cost, $/yr (above)	Emissions Reduction, kg/yr (above)	Cost Effective-ness, $/kg	Con-version Factor, kg/ton	Cost Effective-ness, $/ton
VOC	$53,333	0	$838,252	907	**$760,294,767**
NOx	$53,333	0	$271,318	907	**$246,085,746**

Notes:

[1] Average Day Estimate = [(Weekday Count * 5) + (Weekend Count * 2)] / 7

[2] "A Review of 2000 Census Commute Data for Hampton Roads", HRPDC, Nov. 2005, p. 28

[3] "Low" estimate, re: NCHRP Report 552, pg. 38

[4] "New": i.e. as a result of proposed facility; New = Existing * B, where B varies by buffer: 0-0.25mi: 1.93; 0.25-0.50mi: 1.11; 0.50-1.00mi: 0.39, re: NCHRP Report 552, pg. 39

[5] Pedestrians = Cyclists / 4, based on ground counts at top of page

[6] Only areas lateral to facility are included in buffers; semi-circular areas at ends of facility are not included in buffers

[7] Assuming each new alt. mode trip eliminates an auto trip

[8] Source: VDOT, Hampton Roads average for light duty vehicles and roadway functional classes, 2014, 35mph

[9] Source: 2001 NHTS Table Designer

[10] It is assumed that the eliminated auto trips will have length lower than regular auto trips (10 miles; source [9]) and higher than regular alt. mode trips (shown above).

[11] All-trip occupancy, based on occupancies assumed in CMAQ analyses of previous years: work- 1.1; non-work- 1.3

[12] HRPDC, Feb. 2003, Appendix C

[13] From application

CONGESTION MITIGATION AND AIR QUALITY
BICYCLE AND PEDESTRIAN PROJECTS

JURISDICTION: City of Suffolk
PROJECT NAME: **Carolina Road Bike Trail**
LOCATION: Carolina Road (rte. 13) from Obici Industrial Boulevard to Rte 13 Bypass
DESCRIPTION: To design and construct a Multiuse Bike and Pedestrian Trail that will connect the Obici Industrial Park (Downtown Suffolk) to the Rte. 13 Bypass including the Public Works Ops Center and Parks and Recreation Operations Facility.
DATE: 8/17/2020 (on application)
PROJECT COST: $4,300,000

1- ESTIMATES OF VMT REDUCTIONS:

Ground counts for reasonableness check re: CMAQ Post Evaluation study [12]:

Bikeway	Bicycle Counts			Pedestrian Counts		
Sampled Bikeway	Weekday Counts	Weekend Counts	Avg. Day Estimate [1]	Weekday Counts	Weekend Counts	Avg. Day Estimate [1]
Goodwin Neck	2	4	3	0	0	0
Warwick Blvd	13	31	18	11	10	11
Col. Pkwy Conn.	34	81	47	7	5	6
Average:	16	39	**23**	6	5	**6**

Demand estimation for proposed facility re: NCHRP Report 552:

Local Bicycle Commute Share (C): 0.3% [2]
Facility Length (L): 1.40 mi. [13]

Buffer, Distance from Project	TAZ [13]	2009 Density (D), persons/ sq.mi.
0.00-0.25 mi.	902	2,976
	908	5,119
	910	22
	913	369
	918	724
	941	6,289
	944	2,822
	988	2,205
	Average:	2,566
0.25-0.50 mi.	942	5,547
	Average:	5,547

Buffer, Distance from Project	TAZ [13]	2009 Density (D), persons/ sq.mi.
0.50-1.00 mi.	909	3,684
	943	1,946
	947	8,053
	948	3,585
	955	2,476
	987	83.0
	Average:	3,305

Buffer, Distance from Project	TAZ	2009 Density (D), persons/ sq.mi.	Area of Buffer (A), sq.mi. [6]	Residents in Buffer (R=D*A)	Existing Adult Cyclists (R*C*0.8) [3]	New Adult Cyclists [4]	Existing Adult Pedestrians [5]	New Adult Pedestrians [5]
0.00-0.25 mi.	above	2,566	0.70	1,796	4	8	1	2
0.25-0.50 mi.	above	5,547	0.70	3,883	9	10	2	3
0.50-1.00 mi.	above	3,305	1.40	4,626	11	4	3	1
				10,305	25	23	6	6

Checking reasonableness of bicycle demand estimation via comparison to ground counts:

Existing Adult Cyclists:	25	above
New Adult Cyclists:	23	above
Total Adult Cyclists:	48	
Trips, per day per cyclist:	2	trip to destination + return trip
Total Trips per Day:	95	
vs. Trips on Sampled Bikeways:	23	above

Therefore, the demand calculation results are reasonable.

Calculating VMT reduction:

	Biking	Walking	
New Users:	23	6	above
Trips, per day per user:	2	2	trip to destination + return trip
New Person Trips on Facility:	46	11	
Eliminated Person Trips by Auto:	46	11	above [7]
Occupancy of Eliminated Auto Trips:	1.25	1.25	[11]
Eliminated Vehicle Trips (Auto):	37	9	
Avg. Alt. Mode Trip Length, mi.:	2	1	[9]
Factor (for converting alt. mode trip lengths):	2	2	[10]
Avg. Eliminated Auto Trip Length, veh-mi.:	4	2	
VMT Reduction, mi:	147	18	
Total:			166 vehicle-miles

2- EMISSIONS CALCULATIONS:

Type	Emissions Factor, g/mi [5]	VMT Reduction, mi/day (above)	Emissions Reduction, g/day	Emissions Reduction, kg/day	Conversion Factor, wkdays/yr	Emissions Reduction, kg/yr
VOC	0.067	166	11	0.011	250	3
NOx	0.207	166	34	0.034	250	9

3- COST EFFECTIVENESS:

Total Cost:	$4,300,000	above
Useful life, years:	15	as assumed in CMAQ analyses of previous years
Annual Cost:	$286,667	

Type	Cost, $/yr (above)	Emissions Reduction, kg/yr (above)	Cost Effective-ness, $/kg	Con-version Factor, kg/ton	Cost Effective-ness, $/ton
VOC	$286,667	3	$103,381	907	**$93,766,298**
NOx	$286,667	9	$33,461	907	**$30,349,478**

Notes:

[1] Average Day Estimate = [(Weekday Count * 5) + (Weekend Count * 2)] / 7

[2] "A Review of 2000 Census Commute Data for Hampton Roads", HRPDC, Nov. 2005, p. 28

[3] "Low" estimate, re: NCHRP Report 552, pg. 38

[4] "New": i.e. as a result of proposed facility; New = Existing * B, where B varies by buffer: 0-0.25mi: 1.93; 0.25-0.50mi: 1.11; 0.50-1.00mi: 0.39, re: NCHRP Report 552, pg. 39

[5] Pedestrians = Cyclists / 4, based on ground counts at top of page

[6] Only areas lateral to facility are included in buffers; semi-circular areas at ends of facility are not included in buffers

[7] Assuming each new alt. mode trip eliminates an auto trip

[8] Source: VDOT, Hampton Roads average for light duty vehicles and roadway functional classes, 2014, 35mph

[9] Source: 2001 NHTS Table Designer

[10] It is assumed that the eliminated auto trips will have length lower than regular auto trips (10 miles; source [9]) and higher than regular alt. mode trips (shown above).

[11] All-trip occupancy, based on occupancies assumed in CMAQ analyses of previous years: work- 1.1; non-work- 1.3

[12] HRPDC, Feb. 2003, Appendix C

[13] From application

CONGESTION MITIGATION AND AIR QUALITY
BICYCLE AND PEDESTRIAN PROJECTS

JURISDICTION: City of Suffolk
PROJECT NAME: **Holland Raod Bike Trail**
LOCATION: Holland Road from RTE 58 Bypass to Washington Street to Constance Road to the Prentis Street Multiuse Trail
DESCRIPTION: To design and construct a Multiuse Bike Trail that will connect the Rte. 58 Multiuse trail to the Prentis Street trail which is a part of the BOA Regional trail.
DATE: 8/17/2020 (on application)
PROJECT COST: $10,300,000

1- ESTIMATES OF VMT REDUCTIONS:

Ground counts for reasonableness check re: CMAQ Post Evaluation study[12]:

Bikeway	Bicycle Counts			Pedestrian Counts		
Sampled Bikeway	Weekday Counts	Weekend Counts	Avg. Day Estimate [1]	Weekday Counts	Weekend Counts	Avg. Day Estimate[1]
Goodwin Neck	2	4	3	0	0	0
Warwick Blvd	13	31	18	11	10	11
Col. Pkwy Conn.	34	81	47	7	5	6
Average:	16	39	**23**	6	5	**6**

Demand estimation for proposed facility re: NCHRP Report 552:

Local Bicycle Commute Share (C): 0.3% [2]
Facility Length (L): 2.14 mi. [13]

Buffer, Distance from Project	TAZ [13]	2009 Density (D), persons/ sq.mi.
0.00-0.25 mi.	903	1,646
	918	724
	945	4,507
	946	4,997
	947	8,053
	948	3,585
	949	2,232
	993	744
	994	1,547
	Average:	3,115
0.25-0.50 mi.	917	148
	940	5,297
	955	2,476
	1012	195
	Average:	2,029

Buffer, Distance from Project	TAZ [13]	2009 Density (D), persons/ sq.mi.
0.50-1.00 mi.	902	2,976
	920	1,455
	939	4,743
	944	2,822
	952	2,421
	953	124
	1011	503
	Average:	2,149

Buffer, Distance from Project	TAZ	2009 Density (D), persons/ sq.mi.	Area of Buffer (A), sq.mi. [6]	Residents in Buffer (R=D*A)	Existing Adult Cyclists (R*C*0.8) [3]	New Adult Cyclists [4]	Existing Adult Pedestrians [5]	New Adult Pedestrians [5]
0.00-0.25 mi.	above	3,115	1.07	3,333	8	15	2	4
0.25-0.50 mi.	above	2,029	1.07	2,171	5	6	1	1
0.50-1.00 mi.	above	2,149	2.14	4,599	11	4	3	1
				10,103	24	26	6	6

Checking reasonableness of bicycle demand estimation via comparison to ground counts:

Existing Adult Cyclists:	24	above
New Adult Cyclists:	26	above
Total Adult Cyclists:	50	
Trips, per day per cyclist:	2	trip to destination + return trip
Total Trips per Day:	100	
vs. Trips on Sampled Bikeways:	23	above
	Therefore, the demand calculation results are reasonable.	

Calculating VMT reduction:

	Biking	Walking	
New Users:	26	6	above
Trips, per day per user:	2	2	trip to destination + return trip
New Person Trips on Facility:	51	13	
Eliminated Person Trips by Auto:	51	13	above [7]
Occupancy of Eliminated Auto Trips:	1.25	1.25	[11]
Eliminated Vehicle Trips (Auto):	41	10	
Avg. Alt. Mode Trip Length, mi.:	2	1	[9]
Factor (for converting alt. mode trip lengths):	2	2	[10]
Avg. Eliminated Auto Trip Length, veh-mi.:	4	2	
VMT Reduction, mi:	163	20	
		Total:	184 vehicle-miles

2- EMISSIONS CALCULATIONS:

Type	Emissions Factor, g/mi [5]	VMT Reduction, mi/day (above)	Emissions Reduction, g/day	Emissions Reduction, kg/day	Conversion Factor, wkdays/yr	Emissions Reduction, kg/yr
VOC	0.067	184	12	0.012	250	3
NOx	0.207	184	38	0.038	250	10

3- COST EFFECTIVENESS:

Total Cost:	$10,300,000	above
Useful life, years:	15	as assumed in CMAQ analyses of previous years
Annual Cost:	$686,667	

Type	Cost, $/yr (above)	Emissions Reduction, kg/yr (above)	Cost Effective-ness, $/kg	Con-version Factor, kg/ton	Cost Effective-ness, $/ton
VOC	$686,667	3	$223,047	907	**$202,303,797**
NOx	$686,667	10	$72,194	907	**$65,479,973**

Notes:

[1] Average Day Estimate = [(Weekday Count * 5) + (Weekend Count * 2)] / 7

[2] "A Review of 2000 Census Commute Data for Hampton Roads", HRPDC, Nov. 2005, p. 28

[3] "Low" estimate, re: NCHRP Report 552, pg. 38

[4] "New": i.e. as a result of proposed facility; New = Existing * B, where B varies by buffer: 0-0.25mi: 1.93; 0.25-0.50mi: 1.11; 0.50-1.00mi: 0.39, re: NCHRP Report 552, pg. 39

[5] Pedestrians = Cyclists / 4, based on ground counts at top of page

[6] Only areas lateral to facility are included in buffers; semi-circular areas at ends of facility are not included in buffers

[7] Assuming each new alt. mode trip eliminates an auto trip

[8] Source: VDOT, Hampton Roads average for light duty vehicles and roadway functional classes, 2014, 35mph

[9] Source: 2001 NHTS Table Designer

[10] It is assumed that the eliminated auto trips will have length lower than regular auto trips (10 miles; source[9]) and higher than regular alt. mode trips (shown above).

[11] All-trip occupancy, based on occupancies assumed in CMAQ analyses of previous years: work- 1.1; non-work- 1.3

[12] HRPDC, Feb. 2003, Appendix C

[13] From application

CONGESTION MITIGATION AND AIR QUALITY
BICYCLE AND PEDESTRIAN PROJECTS

JURISDICTION: City of Suffolk
PROJECT NAME: **Downtown Suffolk Bike Trail Crossing**
LOCATION: Constance Road near the Suffolk Riverfront Park (Hilton Garden Inn)
DESCRIPTION: To design and construct a signalized crossing of Constance Road for Bicycle and Pedestrians to connect the Prentis Street Bike Trail (Part of the BOA Regional Trail) to the Main Street Bike and Pedestrian Facilities
DATE: 8/17/2020 (on application)
PROJECT COST: $1,300,000

1- ESTIMATES OF VMT REDUCTIONS:

Ground counts for reasonableness check re: CMAQ Post Evaluation study[12]:

Bikeway	Bicycle Counts			Pedestrian Counts		
Sampled Bikeway	Weekday Counts	Weekend Counts	Avg. Day Estimate[1]	Weekday Counts	Weekend Counts	Avg. Day Estimate[1]
Goodwin Neck	2	4	3	0	0	0
Warwick Blvd	13	31	18	11	10	11
Col. Pkwy Conn.	34	81	47	7	5	6
Average:	16	39	**23**	6	5	**6**

Demand estimation for proposed facility re: NCHRP Report 552:

Local Bicycle Commute Share (C): 0.3% [2]
Facility Length (L): 0.05 mi. [13]

Buffer, Distance from Project	TAZ [13]	2009 Density (D), persons/ sq.mi.
0.00-0.25 mi.	920	1,455
	950	2,803
	952	2,421
	953	124
	Average:	1,701
0.25-0.50 mi.	919	409
	939	4,743
	940	5,297
	949	2,232
	Average:	3,170

Buffer, Distance from Project	TAZ [13]	2009 Density (D), persons/ sq.mi.
0.50-1.00 mi.	904	1,202
	946	4,997
	954	1,748
	1006	661
	Average:	2,152

Buffer, Distance from Project	TAZ	2009 Density (D), persons/ sq.mi.	Area of Buffer (A), sq.mi. [6]	Residents in Buffer (R=D*A)	Existing Adult Cyclists (R*C*0.8) [3]	New Adult Cyclists [4]	Existing Adult Pedestrians [5]	New Adult Pedestrians [5]
0.00-0.25 mi.	above	1,701	0.03	43	0	0	0	0
0.25-0.50 mi.	above	3,170	0.03	79	0	0	0	0
0.50-1.00 mi.	above	2,152	0.05	108	0	0	0	0
				229	1	1	0	0

Checking reasonableness of bicycle demand estimation via comparison to ground counts:

Existing Adult Cyclists:	1	above
New Adult Cyclists:	1	above
Total Adult Cyclists:	1	
Trips, per day per cyclist:	2	trip to destination + return trip
Total Trips per Day:	2	
vs. Trips on Sampled Bikeways:	23	above

Therefore, the demand calculation results are reasonable.

Calculating VMT reduction:

	Biking	Walking	
New Users:	1	0	above
Trips, per day per user:	2	2	trip to destination + return trip
New Person Trips on Facility:	1	0	
Eliminated Person Trips by Auto:	1	0	above [7]
Occupancy of Eliminated Auto Trips:	1.25	1.25	[11]
Eliminated Vehicle Trips (Auto):	1	0	
Avg. Alt. Mode Trip Length, mi.:	2	1	[9]
Factor (for converting alt. mode trip lengths):	2	2	[10]
Avg. Eliminated Auto Trip Length, veh-mi.:	4	2	
VMT Reduction, mi:	3	0	
		Total:	4 vehicle-miles

2- EMISSIONS CALCULATIONS:

Type	Emissions Factor, g/mi [5]	VMT Reduction, mi/day (above)	Emissions Reduction, g/day	Emissions Reduction, kg/day	Conversion Factor, wkdays/yr	Emissions Reduction, kg/yr
VOC	0.067	4	0	0.000	250	0
NOx	0.207	4	1	0.001	250	0

3- COST EFFECTIVENESS:

Total Cost:	$1,300,000	above
Useful life, years:	15	as assumed in CMAQ analyses of previous years
Annual Cost:	$86,667	

Type	Cost, $/yr (above)	Emissions Reduction, kg/yr (above)	Cost Effective-ness, $/kg	Con-version Factor, kg/ton	Cost Effective-ness, $/ton
VOC	$86,667	0	$1,412,420	907	**$1,281,064,658**
NOx	$86,667	0	$457,160	907	**$414,644,116**

Notes:

[1] Average Day Estimate = [(Weekday Count * 5) + (Weekend Count * 2)] / 7

[2] "A Review of 2000 Census Commute Data for Hampton Roads", HRPDC, Nov. 2005, p. 28

[3] "Low" estimate, re: NCHRP Report 552, pg. 38

[4] "New": i.e. as a result of proposed facility; New = Existing * B, where B varies by buffer: 0-0.25mi: 1.93; 0.25-0.50mi: 1.11; 0.50-1.00mi: 0.39, re: NCHRP Report 552, pg. 39

[5] Pedestrians = Cyclists / 4, based on ground counts at top of page

[6] Only areas lateral to facility are included in buffers; semi-circular areas at ends of facility are not included in buffers

[7] Assuming each new alt. mode trip eliminates an auto trip

[8] Source: VDOT, Hampton Roads average for light duty vehicles and roadway functional classes, 2014, 35mph

[9] Source: 2001 NHTS Table Designer

[10] It is assumed that the eliminated auto trips will have length lower than regular auto trips (10 miles; source[9]) and higher than regular alt. mode trips (shown above).

[11] All-trip occupancy, based on occupancies assumed in CMAQ analyses of previous years: work- 1.1; non-work- 1.3

[12] HRPDC, Feb. 2003, Appendix C

[13] From application

CONGESTION MITIGATION AND AIR QUALITY
BICYCLE AND PEDESTRIAN PROJECTS

JURISDICTION: York County
PROJECT NAME: **Victory Boulevard Shared Use Path**
LOCATION: North side of Victory Boulevard (Route 171) between Big Bethel Road (Route 600) and East Yorktown Road (Route 782)
DESCRIPTION: Ten-foot wide asphalt shared use path

DATE: 8/12/2020 (on application)
PROJECT COST: $660,750

1- ESTIMATES OF VMT REDUCTIONS:

Ground counts for reasonableness check re: CMAQ Post Evaluation study[12]:

Bikeway	Bicycle Counts			Pedestrian Counts		
Sampled Bikeway	Weekday Counts	Weekend Counts	Avg. Day Estimate [1]	Weekday Counts	Weekend Counts	Avg. Day Estimate[1]
Goodwin Neck	2	4	3	0	0	0
Warwick Blvd	13	31	18	11	10	11
Col. Pkwy Conn.	34	81	47	7	5	6
Average:	16	39	**23**	6	5	**6**

Demand estimation for proposed facility re: NCHRP Report 552:

Local Bicycle Commute Share (C): 0.3% [2]
Facility Length (L): 1.20 mi. [13]

Buffer, Distance from Project	TAZ [13]	2009 Density (D), persons/ sq.mi.
0.00-0.25 mi.	1902	1,813
	1903	2,511
	1904	916
	1905	1,542
	Average:	1,696
0.25-0.50 mi.	1700	1,813
	1703	2,177
	1709	887
	1902	1,813
	1903	2,511
	1904	916
	1905	1,542
	Average:	1,666

Buffer, Distance from Project	TAZ [13]	2009 Density (D), persons/ sq.mi.
0.50-1.00 mi.	1700	1,813
	1703	2,177
	1709	887
	1901	1,813
	1902	2,511
	1903	916
	1904	1,542
	1905	
	Average:	1,666

Buffer, Distance from Project	TAZ	2009 Density (D), persons/ sq.mi.	Area of Buffer (A), sq.mi. [6]	Residents in Buffer (R=D*A)	Existing Adult Cyclists (R*C*0.8) [3]	New Adult Cyclists [4]	Existing Adult Pedestrians [5]	New Adult Pedestrians [5]
0.00-0.25 mi.	above	1,696	0.60	1,017	2	5	1	1
0.25-0.50 mi.	above	1,666	0.60	999	2	3	1	1
0.50-1.00 mi.	above	1,666	1.20	1,999	5	2	1	0
				4,015	10	9	2	2

Checking reasonableness of bicycle demand estimation via comparison to ground counts:

Existing Adult Cyclists:	10	above
New Adult Cyclists:	9	above
Total Adult Cyclists:	19	
Trips, per day per cyclist:	2	trip to destination + return trip
Total Trips per Day:	38	
vs. Trips on Sampled Bikeways:	23	above

Therefore, the demand calculation results are reasonable.

Calculating VMT reduction:

	Biking	Walking	
New Users:	9	2	above
Trips, per day per user:	2	2	trip to destination + return trip
New Person Trips on Facility:	18	5	
Eliminated Person Trips by Auto:	18	5	above [7]
Occupancy of Eliminated Auto Trips:	1.25	1.25	[11]
Eliminated Vehicle Trips (Auto):	15	4	
Avg. Alt. Mode Trip Length, mi.:	2	1	[9]
Factor (for converting alt. mode trip lengths):	2	2	[10]
Avg. Eliminated Auto Trip Length, veh-mi.:	4	2	
VMT Reduction, mi:	59	7	
		Total:	67 vehicle-miles

2- EMISSIONS CALCULATIONS:

Type	Emissions Factor, g/mi [5]	VMT Reduction, mi/day (above)	Emissions Reduction, g/day	Emissions Reduction, kg/day	Conversion Factor, wkdays/yr	Emissions Reduction, kg/yr
VOC	0.067	67	4	0.004	250	1
NOx	0.207	67	14	0.014	250	3

3- COST EFFECTIVENESS:

Total Cost:	$660,750	above
Useful life, years:	15	as assumed in CMAQ analyses of previous years
Annual Cost:	$44,050	

Type	Cost, $/yr (above)	Emissions Reduction, kg/yr (above)	Cost Effective-ness, $/kg	Con-version Factor, kg/ton	Cost Effective-ness, $/ton
VOC	$44,050	1	$39,506	907	**$35,831,914**
NOx	$44,050	3	$12,787	907	**$11,597,769**

Notes:

[1] Average Day Estimate = [(Weekday Count * 5) + (Weekend Count * 2)] / 7

[2] "A Review of 2000 Census Commute Data for Hampton Roads", HRPDC, Nov. 2005, p. 28

[3] "Low" estimate, re: NCHRP Report 552, pg. 38

[4] "New": i.e. as a result of proposed facility; New = Existing * B, where B varies by buffer: 0-0.25mi: 1.93; 0.25-0.50mi: 1.11; 0.50-1.00mi: 0.39, re: NCHRP Report 552, pg. 39

[5] Pedestrians = Cyclists / 4, based on ground counts at top of page

[6] Only areas lateral to facility are included in buffers; semi-circular areas at ends of facility are not included in buffers

[7] Assuming each new alt. mode trip eliminates an auto trip

[8] Source: VDOT, Hampton Roads average for light duty vehicles and roadway functional classes, 2014, 35mph

[9] Source: 2001 NHTS Table Designer

[10] It is assumed that the eliminated auto trips will have length lower than regular auto trips (10 miles; source[9]) and higher than regular alt. mode trips (shown above).

[11] All-trip occupancy, based on occupancies assumed in CMAQ analyses of previous years: work- 1.1; non-work- 1.3

[12] HRPDC, Feb. 2003, Appendix C

[13] From application

CONGESTION MITIGATION AND AIR QUALITY
HIGHWAY - CORRIDOR IMPROVEMENTS

JURISDICTION: Chesapeake
PROJECT NAME: **460/58/13 Safety Improvements**
LOCATION: 460/58/13
DESCRIPTION: The 460/58/13 Safety Improvements project seeks to address systemic safety concerns along the 460/58/13 corridor by installing a system of Restricted Crossing U-Turns (RCUTs). The present configuration of the existing roadway has excessive access for a roadway that functions like a freeway.

DATE: 8/17/2020 (1)
PROJECT COST: $14,168,104

1 - EMISSIONS REDUCTION

Arterial Intersection(s)	Number of Intersections	AADT (1)	Peak Hour Volume (2)	Delay Savings	Delay Savings (s / pk hr) (4)	Delay Savings
460/58/13						
Suffolk City Line to Bowers Hill Interchange	4	78,000	7,020	10.7	300,456	491

Isolated Intersections (Total)						
			0	10.7	0	0

Total Delay Savings 491 hr/day

Type	Emissions Factor, g/hr [6]	Change in Veh Delay, hr/day (above)	Emissions Reduction, g/day	Emissions Reduction, kg/day	Conversion Factor, wkdays/yr	Emissions Reduction, kg/yr
VOC	0.147	491	72	0.1	250	18
NOx	0.637	491	313	0.3	250	78

2 - COST EFFECTIVENESS

Total Cost:	$14,168,104	(from above)
Useful Life, years:	30 [3]	
Annual Cost:	$472,270	

Type	Cost, $/yr (above)	Emissions Reduction, kg/yr (above)	Cost Effectiveness, $/kg	Cost Effectiveness,
VOC	$472,270	18	$26,176	**$23,741,654**
NOx	$472,270	78	$6,041	**$5,478,843**

[1] From application
[2] VDOT AADT * Regional k factor from 2014 CMP database (0.090)
[3] As previously assumed
[4] Number of Signals * Peak Hr Volume * Delay Savings
[5] Delay Savings / Delay Represented by Peak Hour (.17) / 3600 s/hr
Peak Hour Delay Factor Source: "Cost Benefit Model for Intersection Level of Service Improvements", HRPDC, 6/97
[6] VDOT, Fleet Avg Emission Factors for Hampton Roads (Based on US EPA Model MOVES2010b), 2021, idle

CONGESTION MITIGATION AND AIR QUALITY
HIGHWAY - CORRIDOR IMPROVEMENTS

JURISDICTION: Suffolk
PROJECT NAME: **Holland Road (Route 58) Corridor Improvements**

LOCATION: Holland Road Corridor from 3 miles west of Manning Bridge Road to the Holland Bypass.
DESCRIPTION: Provide for closed drainage, curbing, median barriers and safety shoulders
DATE: 8/17/2020 (1)
PROJECT COST: $32,000,000

1 - EMISSIONS REDUCTION

Arterial Intersection(s)	Number of Intersections	AADT (1)	Peak Hour Volume (2)	Delay Savings (s/veh)(3)	Delay Savings (s / pk hr)(4)	Delay Savings (hr/day)(5)
Holland Road						
Pioneer Rd	1	27,000	2,430	10.7	26,001	42
				Total Delay Savings		42 hr/day

Type	Emissions Factor, g/hr (6)	Change in Veh Delay, hr/day (above)	Emissions Reduction, g/day	Emissions Reduction, kg/day	Conversion Factor, wkdays/yr	Emissions Reduction, kg/yr
VOC	0.147	42	6	0.0	250	2
NOx	0.637	42	27	0.0	250	7

2 - COST EFFECTIVENESS

Total Cost:	$32,000,000	(from above)
Useful Life, years:	30 [3]	
Annual Cost:	$1,066,667	

Type	Cost, $/yr (above)	Emissions Reduction, kg/yr (above)	Cost Effectiveness, $/kg	Cost Effectiveness, $/ton
VOC	$1,066,667	2	$683,176	**$619,640,846**
NOx	$1,066,667	7	$157,656	**$142,994,041**

[1] From application
[2] VDOT AADT * Regional k factor from 2014 CMP database (0.090)
[3] As previously assumed
[4] Number of Signals * Peak Hr Volume * Delay Savings
[5] Delay Savings / Delay Represented by Peak Hour (.17) / 3600 s/hr
Peak Hour Delay Factor Source: "Cost Benefit Model for Intersection Level of Service Improvements", HRPDC, 6/97
[6] VDOT, Fleet Avg Emission Factors for Hampton Roads (Based on US EPA Model MOVES2010b), 2021, idle

CONGESTION MITIGATION AND AIR QUALITY
HIGHWAY - CORRIDOR IMPROVEMENTS

JURISDICTION: Virginia Beach
PROJECT NAME: **Holland Road Phase II**
LOCATION: Holland Road from South Plaza Trail to RosemontRoad
DESCRIPTION: This project proposes to modify the typical section of Holland Road from South Plaza Trail to Rosemont Road.

DATE: 8/17/2020 [1]
PROJECT COST: $1,058,746

1 - EMISSIONS REDUCTION

Arterial Intersection(s)	Number of Intersections	AADT [1]	Peak Hour Volume [2]	Delay Savings (s/veh)[3]	Delay Savings (s / pk hr)[4]	Delay Savings (hr/day)[5]
Holland Road						
S Plaza Trail to	4	38,500	3,465	10.7	148,302	242
Chimney Hill Pkwy	2	32,800	2,952	10.7	63,173	103
				Total Delay Savings		346 hr/day

Type	Emissions Factor, g/hr [6]	Change in Veh Delay, hr/day (above)	Emissions Reduction, g/day	Emissions Reduction, kg/day	Conversion Factor, wkdays/yr	Emissions Reduction, kg/yr
VOC	0.147	346	51	0.1	250	13
NOx	0.637	346	220	0.2	250	55

2 - COST EFFECTIVENESS

Total Cost:	$1,058,746	(from above)
Useful Life, years:	30 [3]	
Annual Cost:	$35,292	

Type	Cost, $/yr (above)	Emissions Reduction, kg/yr (above)	Cost Effectiveness, $/kg	Cost Effectiveness, $/ton
VOC	$35,292	13	$2,779	**$2,520,654**
NOx	$35,292	55	$641	**$581,689**

[1] From application
[2] VDOT AADT * Regional k factor from 2014 CMP database (0.090)
[3] As previously assumed
[4] Number of Signals * Peak Hr Volume * Delay Savings
[5] Delay Savings / Delay Represented by Peak Hour (.17) / 3600 s/hr
Peak Hour Delay Factor Source: "Cost Benefit Model for Intersection Level of Service Improvements", HRPDC, 6/97
[6] VDOT, Fleet Avg Emission Factors for Hampton Roads (Based on US EPA Model MOVES2010b), 2021, idle

CONGESTION MITIGATION AND AIR QUALITY
HIGHWAY PROJECTS - INTERSECTION GEOMETRY

JURISDICTION:	Chesapeake
PROJECT NAME:	**N Battlefield Blvd/Byron St Traffic Signal**
LOCATION:	Intersection of Battlefield Blvd/Byron St
DESCRIPTION:	This project proposes a new traffic signal at the N Battlefield Boulevard/Byron Street/Thrasher Road intersection
DATE:	8/4/2020 (1)
PROJECT COST:	$675,000

1 - REDUCED AUTO EMISSIONS

Weekday PM Peak Hour

Intersection Delay Before Project		244.2	sec/veh (1)
Intersection Delay After Project		207.1	sec/veh (1)
Change In Intersection Delay		37.1	sec/veh, pk hr
Total Vehicles During Peak Hour		7,850	veh/hr (1)
	divided by	3,600	sec/hr
Change In Intersection Delay		80.9	veh hr's, pk hr
	divided by	17%	pk hr delay factor(2)
Change In Intersection Delay		475.9	hours/day

Type	Emissions Factor, g/hr (3)	Delay Change, hr/day (above)	Emissions Reduction, g/day	Emissions Reduction, kg/day	Conversion Factor, weekdays/yr	Emissions Reduction, kg/yr
VOC	1.246	475.9	593	0.593	250	148.2
NOx	1.168	475.9	556	0.556	250	139.0

2 - COST EFFECTIVENESS

Total Cost:	$675,000	(from above)
Useful life, years:	10 (4)	
Annual Cost:	$67,500	

Type	Cost, $/yr (above)	Emissions Reduction, kg/yr (above)	Cost Effective-ness, $/kg	Conversion Factor, kg/ton	Cost Effective-ness, $/ton
VOC	$67,500	148.2	$455	907	**$413,010**
NOx	$67,500	139.0	$486	907	**$440,591**

Notes:
(1) From application
(2) pk hr delay factor = pk hr delay / daily delay;
Source: "Cost Benefit Model for Intersection Level of Service Improvements", HRPDC, Page 8, June 1997.
(3) Source: VDOT, Fleet Avg. Emission Factors for Hampton Roads (Based on US EPA Model MOVES2014a), 2023, idle.
(4) As previously assumed.

Hampton Roads TPO

CONGESTION MITIGATION AND AIR QUALITY
HIGHWAY PROJECTS - INTERSECTION GEOMETRY

JURISDICTION: Chesapeake
PROJECT NAME: **Deep Creek Elementary School Traffic Signal Improvement**
LOCATION: Deep Creek Elementary and High Schools
DESCRIPTION: Constructing a traffic signal and modifying internal access along Forehand Drive and Margaret Booker Drive to allow safe ingress and egress to Deep Creek Elementary and High schools

DATE: 8/4/2020 (1)
PROJECT COST: $2,100,000

1 - REDUCED AUTO EMISSIONS

Weekday PM Peak Hour

Intersection Delay Before Project		213.6	sec/veh (1)
Intersection Delay After Project		68.6	sec/veh (1)
Change In Intersection Delay		145.0	sec/veh, pk hr
Total Vehicles During Peak Hour		2,700	veh/hr (1)
	divided by	3,600	sec/hr
Change In Intersection Delay		108.8	veh hr's, pk hr
	divided by	17%	pk hr delay factor(2)
Change In Intersection Delay		639.7	hours/day

Type	Emissions Factor, g/hr (3)	Delay Change, hr/day (above)	Emissions Reduction, g/day	Emissions Reduction, kg/day	Conversion Factor, weekdays/yr	Emissions Reduction, kg/yr
VOC	1.246	639.7	797	0.797	250	199.3
NOx	1.168	639.7	747	0.747	250	186.8

2 - COST EFFECTIVENESS

Total Cost:	$2,100,000	(from above)
Useful life, years:	10 (4)	
Annual Cost:	$210,000	

Type	Cost, $/yr (above)	Emissions Reduction, kg/yr (above)	Cost Effective-ness, $/kg	Conversion Factor, kg/ton	Cost Effective-ness, $/ton
VOC	$210,000	199.3	$1,054	907	**$955,847**
NOx	$210,000	186.8	$1,124	907	**$1,019,679**

Notes:
(1) From application
(2) pk hr delay factor = pk hr delay / daily delay;
Source: "Cost Benefit Model for Intersection Level of Service Improvements", HRPDC, Page 8, June 1997.
(3) Source: VDOT, Fleet Avg. Emission Factors for Hampton Roads (Based on US EPA Model MOVES2014a), 2023, idle.
(4) As previously assumed.

Hampton Roads TPO

CONGESTION MITIGATION AND AIR QUALITY
HIGHWAY PROJECTS - INTERSECTION GEOMETRY

JURISDICTION: Chesapeake
PROJECT NAME: **Centerville Turnpike / Elbow Road Intersection Improvements**
LOCATION: Intersection of Centerville Turnpike / Elbow Road
DESCRIPTION: Widening the southbound approach to include an additional through lane and an exclusive right-turn lane as well as continuing through the intersection for approximately 1,000' to provided adequate receiving lanes. Additionally, improvements would also widen the westbound approach to include dual left-turn lanes.

DATE: 8/4/2020 (1)
PROJECT COST: $4,850,000

1 - REDUCED AUTO EMISSIONS

Weekday PM Peak Hour

Intersection Delay Before Project		59.2	sec/veh (1)
Intersection Delay After Project		34.5	sec/veh (1)
Change In Intersection Delay		24.7	sec/veh, pk hr
Total Vehicles During Peak Hour		2,721	veh/hr (1)
	divided by	3,600	sec/hr
Change In Intersection Delay		18.7	veh hr's, pk hr
	divided by	17%	pk hr delay factor (2)
Change In Intersection Delay		109.8	hours/day

Type	Emissions Factor, g/hr (3)	Delay Change, hr/day (above)	Emissions Reduction, g/day	Emissions Reduction, kg/day	Conversion Factor, weekdays/yr	Emissions Reduction, kg/yr
VOC	1.246	109.8	137	0.137	250	34.2
NOx	1.168	109.8	128	0.128	250	32.1

2 - COST EFFECTIVENESS

Total Cost:	$4,850,000	(from above)
Useful life, years:	10 (4)	
Annual Cost:	$485,000	

Type	Cost, $/yr (above)	Emissions Reduction, kg/yr (above)	Cost Effective-ness, $/kg	Conversion Factor, kg/ton	Cost Effective-ness, $/ton
VOC	$485,000	34.2	$14,178	907	**$12,859,287**
NOx	$485,000	32.1	$15,125	907	**$13,718,041**

Notes:
(1) From application
(2) pk hr delay factor = pk hr delay / daily delay;
Source: "Cost Benefit Model for Intersection Level of Service Improvements", HRPDC, Page 8, June 1997.
(3) Source: VDOT, Fleet Avg. Emission Factors for Hampton Roads (Based on US EPA Model MOVES2014a), 2023, idle.
(4) As previously assumed.

Hampton Roads TPO

CONGESTION MITIGATION AND AIR QUALITY
HIGHWAY PROJECTS - INTERSECTION GEOMETRY

JURISDICTION: Chesapeake
PROJECT NAME: **Battlefield Blvd and Johnstown Road Intersection Improvements**
LOCATION: Intersection of Battlefield Blvd and Johnstown Road
DESCRIPTION: Addition of through lanes and modified signal phasing at the Battlefield/Johnstown/Mt. Pleasant intersection and the implementation of an unsignalized continuous green T concept at the intersection of Mt. Pleasant Road and Woodford Drive

DATE: 8/17/2020 (1)
PROJECT COST: $2,673,656

1 - REDUCED AUTO EMISSIONS

Weekday PM Peak Hour

Intersection Delay Before Project		61.3	sec/veh (1)
Intersection Delay After Project		38.4	sec/veh (1)
Change In Intersection Delay		22.9	sec/veh, pk hr
Total Vehicles During Peak Hour		4,167	veh/hr (1)
	divided by	3,600	sec/hr
Change In Intersection Delay		26.5	veh hr's, pk hr
	divided by	17%	pk hr delay factor (2)
Change In Intersection Delay		155.9	hours/day

Type	Emissions Factor, g/hr (3)	Delay Change, hr/day (above)	Emissions Reduction, g/day	Emissions Reduction, kg/day	Conversion Factor, weekdays/yr	Emissions Reduction, kg/yr
VOC	1.246	155.9	194	0.194	250	48.6
NOx	1.168	155.9	182	0.182	250	45.5

2 - COST EFFECTIVENESS

Total Cost:	$2,673,656	(from above)
Useful life, years:	10 (4)	
Annual Cost:	$267,366	

Type	Cost, $/yr (above)	Emissions Reduction, kg/yr (above)	Cost Effective-ness, $/kg	Conversion Factor, kg/ton	Cost Effective-ness, $/ton
VOC	$267,366	48.6	$5,505	907	**$4,992,835**
NOx	$267,366	45.5	$5,872	907	**$5,326,261**

Notes:
(1) From application
(2) pk hr delay factor = pk hr delay / daily delay;
Source: "Cost Benefit Model for Intersection Level of Service Improvements", HRPDC, Page 8, June 1997.
(3) Source: VDOT, Fleet Avg. Emission Factors for Hampton Roads (Based on US EPA Model MOVES2014a), 2023, idle.
(4) As previously assumed.

Hampton Roads TPO

CONGESTION MITIGATION AND AIR QUALITY
HIGHWAY PROJECTS - INTERSECTION GEOMETRY

JURISDICTION: Suffolk
PROJECT NAME: **Constance Road/Wilroy Road Intersection**
LOCATION: Intersection of Constance Road/Wilroy Road
DESCRIPTION: Interestion improvements at the intersection of Constance Road at Wilroy Road to include signal equipment, turn lane additions and improvements and retiming the traffic signal.

DATE: 8/17/2020 (1)
PROJECT COST: $3,200,000

1 - REDUCED AUTO EMISSIONS

Weekday PM Peak Hour

Intersection Delay Before Project		75	sec/veh (1)
Intersection Delay After Project		40	sec/veh (1)
Change In Intersection Delay		35.0	sec/veh, pk hr
Total Vehicles During Peak Hour		750	veh/hr (1)
	divided by	3,600	sec/hr
Change In Intersection Delay		7.3	veh hr's, pk hr
	divided by	17%	pk hr delay factor(2)
Change In Intersection Delay		42.9	hours/day

Type	Emissions Factor, g/hr (3)	Delay Change, hr/day (above)	Emissions Reduction, g/day	Emissions Reduction, kg/day	Conversion Factor, weekdays/yr	Emissions Reduction, kg/yr
VOC	1.246	42.9	53	0.053	250	13.4
NOx	1.168	42.9	50	0.050	250	12.5

2 - COST EFFECTIVENESS

Total Cost:	$3,200,000	(from above)
Useful life, years:	10 (4)	
Annual Cost:	$320,000	

Type	Cost, $/yr (above)	Emissions Reduction, kg/yr (above)	Cost Effective-ness, $/kg	Conversion Factor, kg/ton	Cost Effective-ness, $/ton
VOC	$320,000	13.4	$23,950	907	**$21,723,076**
NOx	$320,000	12.5	$25,550	907	**$23,173,761**

Notes:
(1) From application
(2) pk hr delay factor = pk hr delay / daily delay;
Source: "Cost Benefit Model for Intersection Level of Service Improvements", HRPDC, Page 8, June 1997.
(3) Source: VDOT, Fleet Avg. Emission Factors for Hampton Roads (Based on US EPA Model MOVES2014a), 2023, idle.
(4) As previously assumed.

Hampton Roads TPO

CONGESTION MITIGATION AND AIR QUALITY
HIGHWAY PROJECTS - INTERSECTION GEOMETRY

JURISDICTION: Suffolk
PROJECT NAME: **Washington Street at Whitemarsh Road Intersection**
LOCATION: Intersection of Washington Street/Whitemarsh Road
DESCRIPTION: Design and construct interestion improvements at the intersection of Washington Street and Whitemarsh Road to include Signal equipment, turn lane additions and improvements and retiming the traffic signal.
DATE: 8/17/2020 (1)
PROJECT COST: $3,200,000

1 - REDUCED AUTO EMISSIONS

Weekday PM Peak Hour

Intersection Delay Before Project		50	sec/veh (1)
Intersection Delay After Project		30	sec/veh (1)
Change In Intersection Delay		20.0	sec/veh, pk hr
Total Vehicles During Peak Hour		280	veh/hr (1)
	divided by	3,600	sec/hr
Change In Intersection Delay		1.6	veh hr's, pk hr
	divided by	17%	pk hr delay factor (2)
Change In Intersection Delay		9.2	hours/day

Type	Emissions Factor, g/hr (3)	Delay Change, hr/day (above)	Emissions Reduction, g/day	Emissions Reduction, kg/day	Conversion Factor, weekdays/yr	Emissions Reduction, kg/yr
VOC	1.246	9.2	11	0.011	250	2.9
NOx	1.168	9.2	11	0.011	250	2.7

2 - COST EFFECTIVENESS

Total Cost:	$3,200,000	(from above)
Useful life, years:	10 (4)	
Annual Cost:	$320,000	

Type	Cost, $/yr (above)	Emissions Reduction, kg/yr (above)	Cost Effective-ness, $/kg	Conversion Factor, kg/ton	Cost Effective-ness, $/ton
VOC	$320,000	2.9	$112,268	907	**$101,826,920**
NOx	$320,000	2.7	$119,765	907	**$108,627,006**

Notes:
(1) From application
(2) pk hr delay factor = pk hr delay / daily delay;
Source: "Cost Benefit Model for Intersection Level of Service Improvements", HRPDC, Page 8, June 1997.
(3) Source: VDOT, Fleet Avg. Emission Factors for Hampton Roads (Based on US EPA Model MOVES2014a), 2023, idle.
(4) As previously assumed.

Hampton Roads TPO

CONGESTION MITIGATION AND AIR QUALITY
HIGHWAY PROJECTS - INTERSECTION GEOMETRY

JURISDICTION: Suffolk
PROJECT NAME: **Wilroy Road at Progress Road Intersection**
LOCATION: Intersection of Wilroy Road/Progress Road
DESCRIPTION: Design and construct interestion improvements at the intersection of Wilroy Road and Progress Raod to include Signal equipment, turn lane additions and improvements and retiming the traffic signal.
DATE: 8/17/2020 (1)
PROJECT COST: $2,500,000

1 - REDUCED AUTO EMISSIONS

Weekday PM Peak Hour

Intersection Delay Before Project		45	sec/veh (1)
Intersection Delay After Project		20	sec/veh (1)
Change In Intersection Delay		25.0	sec/veh, pk hr
Total Vehicles During Peak Hour		1,040	veh/hr (1)
	divided by	3,600	sec/hr
Change In Intersection Delay		7.2	veh hr's, pk hr
	divided by	17%	pk hr delay factor (2)
Change In Intersection Delay		42.5	hours/day

Type	Emissions Factor, g/hr (3)	Delay Change, hr/day (above)	Emissions Reduction, g/day	Emissions Reduction, kg/day	Conversion Factor, weekdays/yr	Emissions Reduction, kg/yr
VOC	1.246	42.5	53	0.053	250	13.2
NOx	1.168	42.5	50	0.050	250	12.4

2 - COST EFFECTIVENESS

Total Cost:	$2,500,000	(from above)
Useful life, years:	10 (4)	
Annual Cost:	$250,000	

Type	Cost, $/yr (above)	Emissions Reduction, kg/yr (above)	Cost Effective-ness, $/kg	Conversion Factor, kg/ton	Cost Effective-ness, $/ton
VOC	$250,000	13.2	$18,891	907	**$17,134,338**
NOx	$250,000	12.4	$20,153	907	**$18,278,583**

Notes:
(1) From application
(2) pk hr delay factor = pk hr delay / daily delay;
Source: "Cost Benefit Model for Intersection Level of Service Improvements", HRPDC, Page 8, June 1997.
(3) Source: VDOT, Fleet Avg. Emission Factors for Hampton Roads (Based on US EPA Model MOVES2014a), 2023, idle.
(4) As previously assumed.

Hampton Roads TPO

CONGESTION MITIGATION AND AIR QUALITY

CITYWIDE SIGNAL SYSTEM

JURISDICTION:	Chesapeake
PROJECT NAME:	Chesapeake Signal System - Phasse 1-4
LOCATION:	Citywide
DESCRIPTION:	New signal timing for strategic corridors and isolated intersections
DATE:	8/4/2020 [1]
PROJECT COST:	$600,000

1 - EMISSIONS REDUCTION

		Low Volume Intersections	Medium Volume Intersections	High Volume Intersections	Total Intersections	
	veh / pm pk hr:	Less than 2,690	2,690 to 5,900	More than 5,900		
Number of Intersections [1]:		124	47	6	177	[A]
	multiplied by:	2,690	5,900	9,500	veh / pm pk hr [2]	
	multiplied by:	10.7	10.7	10.7	sec/veh [2]	
	divided by:	3,600	3,600	3,600	sec/hr	
	divided by:	0.17	0.17	0.17	delay factor [3]	
Change in Vehicle Delay:		5,832	4,848	997	hrs/day	

Total Change in Vehicle Delay (sum of 3 col's above): 11,677 hrs/day

Type	Emissions Factor, g/hr [4]	Change in Veh Delay, hr/day (above)	Emissions Reduction, g/day [5]	Emissions Reduction, kg/day	Conversion Factor, wkdays/yr	Emissions Reduction, kg/yr
VOC	1.246	11,677	14,549	14.5	250	3,637
NOx	1.168	11,677	13,638	13.6	250	3,410

2 - COST EFFECTIVENESS

Total Cost:	$600,000	(from above)
Useful Life, years:	10 [2]	
Annual Cost:	$60,000	

Type	Cost, $/yr (above)	Emissions Reduction, kg/yr (above)	Cost Effectiveness, $/kg	Conversion Factor, kg/ton	Cost Effectiveness, $/ton
VOC	$60,000	3,637	$16.50	907	**$14,962**
NOx	$60,000	3,410	$17.60	907	**$15,961**

Notes:

[1] From application

[2] As previously assumed

[3] Portion of daily delay represented by peak hour
Source: "Cost Benefit Model for Intersection Level of Service Improvements", HRPDC, June 1997.

[4] Source: VDOT, Fleet Avg. Emission Factors for Hampton Roads (Based on US EPA Model MOVES2014a), 2023, idle.

[5] Emission Factor * Change in Vehicle Delay

CONGESTION MITIGATION AND AIR QUALITY

CITYWIDE SIGNAL SYSTEM

JURISDICTION:	Chesapeake
PROJECT NAME:	**Citywide Signal System Upgrade**
LOCATION:	Citywide
DESCRIPTION:	Citywide - 174 signalized intersections
DATE:	8/5/2020 [1]
PROJECT COST:	$1,250,000

1 - EMISSIONS REDUCTION

		Low Volume Intersections	Medium Volume Intersections	High Volume Intersections	Total Intersections
	veh / pm pk hr:	Less than 2,690	2,690 to 5,900	More than 5,900	
Number of Intersections [1]:		78	75	21	174
	multiplied by:	2,690	5,900	9,500	veh / pm pk hr [2]
	multiplied by:	10.7	10.7	10.7	sec/veh [2]
	divided by:	3,600	3,600	3,600	sec/hr
	divided by:	0.17	0.17	0.17	delay factor [3]
Change in Vehicle Delay:		3,668	7,737	3,488	hrs/day

Total Change in Vehicle Delay (sum of 3 col's above): 14,893 hrs/day

Type	Emissions Factor, g/hr [4]	Change in Veh Delay, hr/day (above)	Emissions Reduction, g/day [5]	Emissions Reduction, kg/day	Conversion Factor, wkdays/yr	Emissions Reduction, kg/yr
VOC	1.246	14,893	18,557	18.6	250	4,639
NOx	1.168	14,893	17,395	17.4	250	4,349

2 - COST EFFECTIVENESS

Total Cost:	$1,250,000	(from above)
Useful Life, years:	10 [2]	
Annual Cost:	$125,000	

Type	Cost, $/yr (above)	Emissions Reduction, kg/yr (above)	Cost Effectiveness, $/kg	Conversion Factor, kg/ton	Cost Effectiveness, $/ton
VOC	$125,000	4,639	$26.94	907	**$24,439**
NOx	$125,000	4,349	$28.74	907	**$26,071**

Notes:

[1] From application

[2] As previously assumed

[3] Portion of daily delay represented by peak hour
Source: "Cost Benefit Model for Intersection Level of Service Improvements", HRPDC, June 1997.

[4] Source: VDOT, Fleet Avg. Emission Factors for Hampton Roads (Based on US EPA Model MOVES2014a), 2023, idle.

[5] Emission Factor * Change in Vehicle Delay

CONGESTION MITIGATION AND AIR QUALITY

CITYWIDE SIGNAL SYSTEM

JURISDICTION: Portsmouth
PROJECT NAME: **Portsmouth Citywide Signal System Upgrade**
LOCATION: Citywide
DESCRIPTION: Enhancements to the citywide traffic signal system in the City of Portsmouth.
DATE: 8/5/2020 (1)
PROJECT COST: $1,225,000

1 - EMISSIONS REDUCTION

		Low Volume Intersections	Medium Volume Intersections	High Volume Intersections	Total Intersections
	veh / pm pk hr:	Less than 2,690	2,690 to 5,900	More than 5,900	
Number of Intersections (1):		67	53	0	120
	multiplied by:	2,690	5,900	9,500	veh / pm pk hr (2)
	multiplied by:	10.7	10.7	10.7	sec/veh (2)
	divided by:	3,600	3,600	3,600	sec/hr
	divided by:	0.17	0.17	0.17	delay factor (3)
Change in Vehicle Delay:		3,151	5,467	0	hrs/day

Total Change in Vehicle Delay (sum of 3 col's above): 8,618 hrs/day

Type	Emissions Factor, g/hr (4)	Change in Veh Delay, hr/day (above)	Emissions Reduction, g/day (5)	Emissions Reduction, kg/day	Conversion Factor, wkdays/yr	Emissions Reduction, kg/yr
VOC	1.246	8,618	10,738	10.7	250	2,685
NOx	1.168	8,618	10,066	10.1	250	2,517

2 - COST EFFECTIVENESS

Total Cost: $1,225,000 (from above)
Useful Life, years: 10 (2)
Annual Cost: $122,500

Type	Cost, $/yr (above)	Emissions Reduction, kg/yr (above)	Cost Effectiveness, $/kg	Conversion Factor, kg/ton	Cost Effectiveness, $/ton
VOC	$122,500	2,685	$45.63	907	**$41,387**
NOx	$122,500	2,517	$48.68	907	**$44,151**

Notes:
(1) From application
(2) As previously assumed
(3) Portion of daily delay represented by peak hour
Source: "Cost Benefit Model for Intersection Level of Service Improvements", HRPDC, June 1997.
(4) Source: VDOT, Fleet Avg. Emission Factors for Hampton Roads (Based on US EPA Model MOVES2010b), 2021, idle.
(5) Emission Factor * Change in Vehicle Delay

CONGESTION MITIGATION AND AIR QUALITY

CITYWIDE SIGNAL SYSTEM

JURISDICTION:	Virginia Beach
PROJECT NAME:	**Traffic Signal System Retiming**
LOCATION:	Citywide
DESCRIPTION:	Retiming of 51 intersections along 4 main arterial corridors
DATE:	8/17/2020 [1]
PROJECT COST:	$663,000

1 - EMISSIONS REDUCTION

		Low Volume Intersections	Medium Volume Intersections	High Volume Intersections	Total Intersections
	veh / pm pk hr:	Less than 2,690	2,690 to 5,900	More than 5,900	
Number of Intersections [1]:		7	36	8	51
	multiplied by:	2,690	5,900	9,500	veh / pm pk hr [2]
	multiplied by:	10.7	10.7	10.7	sec/veh [2]
	divided by:	3,600	3,600	3,600	sec/hr
	divided by:	0.17	0.17	0.17	delay factor [3]
Change in Vehicle Delay:		329	3,714	1,329	hrs/day

Total Change in Vehicle Delay (sum of 3 col's above): 5,372 hrs/day

Type	Emissions Factor, g/hr [4]	Change in Veh Delay, hr/day (above)	Emissions Reduction, g/day [5]	Emissions Reduction, kg/day	Conversion Factor, wkdays/yr	Emissions Reduction, kg/yr
VOC	1.246	5,372	6,693	6.7	250	1,673
NOx	1.168	5,372	6,274	6.3	250	1,568

2 - COST EFFECTIVENESS

Total Cost:	$663,000	(from above)
Useful Life, years:	10 [2]	
Annual Cost:	$66,300	

Type	Cost, $/yr (above)	Emissions Reduction, kg/yr (above)	Cost Effectiveness, $/kg	Conversion Factor, kg/ton	Cost Effectiveness, $/ton
VOC	$66,300	1,673	$39.62	907	**$35,939**
NOx	$66,300	1,568	$42.27	907	**$38,339**

Notes:

[1] From application

[2] As previously assumed

[3] Portion of daily delay represented by peak hour
Source: "Cost Benefit Model for Intersection Level of Service Improvements", HRPDC, June 1997.

[4] Source: VDOT, Fleet Avg. Emission Factors for Hampton Roads (Based on US EPA Model MOVES2014a), 2023, idle.

[5] Emission Factor * Change in Vehicle Delay

CONGESTION MITIGATION AND AIR QUALITY

CITYWIDE SIGNAL SYSTEM

JURISDICTION: Suffplk
PROJECT NAME: **Citywide Signal System Upgrade**
LOCATION: Citywide
DESCRIPTION:
Upgrade to TS-2 cabinents and install fiber optic or cellular network connectivity.
DATE: 8/15/2016 (1)
PROJECT COST: $2,650,000

1 - EMISSIONS REDUCTION

		Low Volume Intersections	Medium Volume Intersections	High Volume Intersections	Total Intersections
	veh / pm pk hr:	Less than 2,690	2,690 to 5,900	More than 5,900	
Number of Intersections (1):		6	7	8	21
	multiplied by:	2,690	5,900	9,500	veh / pm pk hr (2)
	multiplied by:	10.7	10.7	10.7	sec/veh (2)
	divided by:	3,600	3,600	3,600	sec/hr
	divided by:	0.17	0.17	0.17	delay factor (3)
Change in Vehicle Delay:		282	722	1,329	hrs/day

Total Change in Vehicle Delay (sum of 3 col's above): 2,333 hrs/day

Type	Emissions Factor, g/hr (4)	Change in Veh Delay, hr/day (above)	Emissions Reduction, g/day (5)	Emissions Reduction, kg/day	Conversion Factor, wkdays/yr	Emissions Reduction, kg/yr
VOC	1.246	2,333	2,907	2.9	250	727
NOx	1.168	2,333	2,725	2.7	250	681

2 - COST EFFECTIVENESS

Total Cost: $2,650,000 (from above)
Useful Life, years: 10 (2)
Annual Cost: $265,000

Type	Cost, $/yr (above)	Emissions Reduction, kg/yr (above)	Cost Effectiveness, $/kg	Conversion Factor, kg/ton	Cost Effectiveness, $/ton
VOC	$265,000	727	$364.64	907	**$330,732**
NOx	$265,000	681	$389.00	907	**$352,819**

Notes:
(1) From application
(2) As previously assumed
(3) Portion of daily delay represented by peak hour
Source: "Cost Benefit Model for Intersection Level of Service Improvements", HRPDC, June 1997.
(4) Source: VDOT, Fleet Avg. Emission Factors for Hampton Roads (Based on US EPA Model MOVES2014a), 2023, idle.
(5) Emission Factor * Change in Vehicle Delay

Hampton Roads TPO

CONGESTION MITIGATION AND AIR QUALITY
OTHER

JURISDICTION:	The Port of Virginia
PROJECT NAME:	**Green Operator Program**
LOCATION:	HRTPO Planning Area
DESCRIPTION:	Air quality and congestion management program (clean diesel technologies for dray truck replacements, tug repowering, cargo handling equipment, and monitored Transportation Demand Management Program to induce the shift of containers from single truck trips to barge or rail.
DATE:	8/14/2020 [1]
PROJECT COST:	$5,000,000

1 - EMISSIONS REDUCTION

Vehicle Volume (ADT)	24,500	/1440	17.01	vehicles per minute
Train Crossings per day	5		340.28	vehicles delayed per train [3]
Average Obstruction per train (min)	20		10	average vehicle delay (mins) [6]

Arterial	Number of Vehicles Delayed [4]	Avg Delay Before (s/veh)	Avg Delay After (s/veh)	Delay Savings (s/veh)	Delay Savings (s/day)	Delay Savings (hr/day)
Freeman Avenue						
North Main Street at CSX Main Line Crossing	1701	600	0	600	1,020,833	284
				Total Delay Savings		284 hr/day

Type	Emissions Factor, g/hr [2]	Change in Veh Delay, hr/day (above)	Emissions Reduction, g/day	Emissions Reduction, kg/day	Conversion Factor, wkdays/yr [3]	Emissions Reduction, kg/yr
VOC	1.246	284	353	0.4	250	88
NOx	1.168	284	331	0.3	250	83

2 - COST EFFECTIVENESS

Total Cost:	$5,000,000
Useful Life, years:	15 [5]
Annual Cost:	$333,333

Type	Cost, $/yr (above)	Emissions Reduction, kg/yr (above)	Cost Effectiveness, $/kg	Cost Effectiveness, $/ton
VOC	$333,333	88	$3,774	**$3,422,754**
NOx	$333,333	83	$4,026	**$3,651,328**

[1] From application
[2] Source: VDOT, Fleet Avg. Emission Factors for Hampton Roads (Based on US EPA Model MOVES2010b 2014a) 2023, idle
[3] Average Obstruction per train (minutes) * Vehicles per minute
[4] Vehicles delayed per train * number of train crossings per day
[5] Assumed useful life in years for railroad crossing early warning system
[6] Avg. of 20 minute maximum delay and 0 minute minimum delay; (AVG 20,0)

Hampton Roads TPO

CONGESTION MITIGATION AND AIR QUALITY

TRANSIT AND FIXED GUIDEWAY PROJECTS - VEHICLE PURCHASE/REPLACEMENT

AGENCY:	WATA
PROJECT NAME:	**Five (5) Bus Purchase Replacement**
DESCRIPTION:	Replacement of (5) ultra-low sulfur deisel buses.
DATE:	7/10/2020 [1]
PROJECT COST:	$3,700,000

Number of Vehicles Being Retired	5	vehicles[1]
Number of New Vehicles	5	vehicles[1]
Average Yearly Vehicle-Miles for Retired Vehicles	73,500	vehicle-miles[1]
Average Yearly Vehicle-Miles for New Vehicles	73,500	vehicle-miles[1]

1 - CHANGE IN VEHICLE EMISSIONS

Current Vehicles	Emissions Rate g / bhp-hr [1]	Emissions Rate g/mi [2]	VMT mi/yr/bus	Number of Vehicles	Yearly Emissions g/yr	Yearly Emissions kg/yr
VOC	1.30	6.08	73,500	5	2,235,392	2,235
NOx	2.6	12.12	73,500	5	4,453,589	4,454

New Vehicles	Emissions Rate g / bhp-hr [1]	Emissions Rate g/mi [2]	VMT mi/yr/bus	Number of Vehicles	Yearly Emissions g/yr	Yearly Emissions kg/yr
VOC	0.14	0.66	73,500	5	240,735	241
NOx	0.2	0.94	73,500	5	343,907	344

2 - EMISSIONS REDUCTION

Reduction in Emissions	VOC	1,995	kg/yr
	NOx	4,110	kg/yr

3 - COST EFFECTIVENESS

Total Cost:	$3,700,000	(from above)
Useful life, years:	15 [3]	
Annual Cost:	$246,667	

Type	Cost, $/yr (above)	Emissions Reduction, kg/yr (above)	Cost Effectiveness, $/kg	Cost Eff., $/Ton
VOC	$246,667	1,995	$123.66	**$112,163**
NOx	$246,667	4,110	$60.02	**$54,439**

[1] From application; given values for HC as proxy value for VOC

[2] Applying a conversion factor of 4.679 bhp-hr / mi, EPA data for Mobile6 (no conversion factor yet available for MOVES2010B model)

[3] As assumed previously

Hampton Roads TPO

APPENDIX B

RSTP Project Evaluation Worksheets

Prioritization Tool Scoring

Number	Code	Applicant	Project Name (HRTPO Prioritization Tool ID)	From	To	Score	Total Cost	Total RSTP Request	Total FY-27 Request
Highway: Utilizing HRTPO Prioritization Tool									
Roadway Widening, New Facilities, HOV Lanes, Intersection Improvements									
1	CH3RS	Chesapeake	Green Tree Road Extended	Kempsville Road	Clearfield Avenue	80	$ 12,096,521	$ 12,096,521	$ 1,977,146
2	CH4ARS	Chesapeake	Centerville Turnpike Widening (Segment 1)	Chesapeake City Line/Virgina Beach City Line	Copper Way	118	$ 48,850,000	$ 48,850,000	$ 3,300,000
3	CH4BRS	Chesapeake	Centerville Turnpike Widening (Segment 2)	Copper Way	approximately 1000 feet south of Elbow Road including improvements to Elbow Road intersection	118	$ 17,500,000	$ 17,500,000	$ 1,500,000
4	CH4CRS	Chesapeake	Centerville Turnpike Widening (Segment 3)	approximately 1000 feet south of Elbow Road including improvements to Elbow Road intersection	Mt. Pleasant Road	118	$ 126,000,000	$ 126,000,000	$ 8,500,000
5	CH5RS	Chesapeake	NB Rt 168/Rt 17 to WB I-64 Ramp Improvements	I64 WB CD widening - just south of where it becomes one-lane section-acceleration lane widening to include 550 ft acceleration lane and 300 ft taper	just into an acceleration lane along I-64 WBCD Road	122	$ 7,491,133	$ 7,491,133	$ 1,765,248
6	CH6RS	Chesapeake	Battlefield Blvd and Johnston Rd Intersection Improvements	N/A	N/A	94	$ 2,673,656	$ 2,673,656	$ 555,500
7	CH7ARS	Chesapeake	Mt Pleasant Widening Phase I	Chesapeake Expressway	Etheridge Road	96	$ 30,000,000	$ 30,000,000	$ 3,700,000
8	CH7BRS	Chesapeake	Mt Pleasant Widening Phase II	Etheridge Road	Back Road (West)	89	$ 16,150,000	$ 16,150,000	$ 1,250,000
9	CH7CRS	Chesapeake	Mt Pleasant Widening Phase III	Back Road	Back Road	89	$ 24,600,000	$ 24,600,000	$ 1,900,000
10	CH7DRS	Chesapeake	Mt Pleasant Widening Phase IV	Back Road	Centerville Turnpike	89	$ 19,000,000	$ 19,000,000	$ 1,500,000
11	SP1RS	SPSA	SPSA Flyover - Phase I	Flyover - N/A	Flyover - N/A	87	$ 23,036,694	$ 23,036,694	$ 1,500,000
12	VB1RS	Virginia Beach	Laskin Rd Phase I-B	Red Robin Road	Oriole Drive	139	$ 32,200,000	$ 29,921,019	$ 1,280,800
13	VB2RS	Virginia Beach	Laskin Rd Phase III	Phillip Avenue	Republic Road	146	$ 31,503,154	$ 31,503,154	$ 3,669,000
14	YC1RS	York County	Route 17 Widening Between Route 630 and Route 173	just north of Wolf Trap Road (1.52 miles north of Route 620)	Route 173 (Denbigh Blvd/Goodwin Neck Road	137	$ 23,906,101	$ 5,600,000	$ 5,600,000
Corridor Operational Improvements									
15	CH1RS	Chesapeake	Western Branch Rails to Trails Phase 2	end of Phase 1 trail at Taylor Road	Chesapeake City line	21	$ 1,893,650	$ 1,893,650	$ 431,594

RSTP Scoring Process – Corridor Operational Improvements

Applicant	Project Name (code)	Total Cost	Arterial LOS (R (0-25)	ADT of Ro (0-20)	Cost-Effectiveness (lowest $/vmt = 20; highest $/vmt = 0; straight line interp) (0-25)	Existing Accidents (Rel Scale-max pts to project w/ highest accident rate or frequency (0-20)	Project Readiness (detailed design and cost estimates, ready to go: 10 pts) (0-10)	Total (0-100)
Chesapeake	460/58/13 Safety Improvements (CH2RS)	$14,186,104	12	15	6	15	0	48
Hampton	Phoebus/Downtown LED Light Replacement (HA1RS)	$730,000	8	8	5	5	5	31

RSTP Scoring Process – Bridge Rehabilitation

Applicant	Project Name (code)	Total Cost	Bridge Condition (Rel Scale-max pts to bridge w/ the worst condition)	(0-60)	ADT of Bridge (Rel Scale-max points to bridge w/ highest ADT)	(0-30)	Project Readiness (detailed design and cost estimates, ready to go: 10 pts)	(0-10)	Total (0-100)
Norfolk	Brambleton Avenue Bridge Rehab (NO1RS)	$ 4,000,000		40		25		2	**67**
Norfolk	Shore Drive Bridge Rehab (NO2RS)	$ 3,000,000		40		20		2	**62**

RSTP Scoring Process – Alternatives Analysis and Feasibility Studies

Applicant	Project Name (code)	Total Cost	1. Is the study necessary to address a major issue or to revise the Plan?	(0-25)	2. Is the study necessary to address a safety issue?	(0-15)	3. Is the study concerned with encouraging multi-modal transport-ation?	(0-10)	4. Does the study address the mobility or access-ability needs of the region?	(0-20)	5. Is the study well defined in terms of purpose, design concept and scope?	(0-10)	6. Do the goals and objectives of the study show support for economic develop-ment?	(0-10)	7. Do the goals and objectives demonstrate preservation or protection of the environ-ment?	(0-10)	Total (0-100)
Gloucester County	Rt 17 Widening (GC1RS)	$175,000	Yes	12	Yes	10	Yes	7	Yes	10	Yes	10	Yes	5	Yes	5	**59**
York County	Roadway Needs Assessment (YC2RS)	$600,000	Yes	15	Yes	10	Yes	9	Yes	12	Yes	10	Yes	5	Yes	5	**66**
WATA	Transit Strategic Plan (WT1RS)	$360,000	Yes	20	Yes	5	Yes	10	Yes	20	Yes	10	Yes	5	Yes	5	**75**

RSTP Scoring Process – Vehicle Replacement

Applicant	Project Name (code)	Total Cost	Average age of vehicles (FTA standard is 12 years -Bus & 4 years-Vans)	(0-30)	Percent o vehicles i fleet over (12 Bus: 4-Van years old fleet	(0-20)	Emissions changes of the old and new vehicles	(0-20)	Average daily ridership / new vehicle anticipated & or purchased	(0-15)	Average mileage of the vehicles in Fleet (FTA Standards = 500,000 -Bus and 100,000-Van)	(0-15)	Total (0-100)
WATA	Five Bus Replacement (WA2RS)	$3,700,000	12	20	0%	15	.34 g/bhp-hr	15		7	N/A	7	**64**

RSTP Scoring Process – Intermodal

Applicant	Project Name (code)	Total Cost	Establishes connections between modes/ corridors/ centers?	(0-40)	Improves operating system to accommodate intermodal movements?	(0-25)	Improves rail or vehicular access to freight facilities or major industries?	(0-25)	Project has detailed design and cost estimates and is ready to go?	(0-10)	Total (0-100)
Suffolk	Holland Road Intermodal Improvement Project (SF1RS)	$37,000,000	Yes	20	Yes	12	Yes	15	No	0	**47**

APPENDIX C

Public Project Ideas

No public project ideas received