Congestion and Air Quality Management Annual Report - Fiscal Year 2024

Appendix A: Quantitative Assessment Calculations

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For: DelDOT Division of Planning

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1 INTRODUCTION

This appendix was prepared to provide a record of the calculations completed for the four projects assessed quantitatively for DelDOT's FY2024 submissions to the CMAQ PAS (see **Table 1**).

Table 1. FY2024 CMAQ Program Summary

Project Category	Project No.	Project Name
Bike and Ped Facility	T202501103	US13, Paving and Pedestrian Improvements-Llangollen Blvd to Bacon Ave/Boulden Blvd
Bike and Ped Facility	T202101501	Augustine Cutoff Bicycle and Pedestrian Network Improvements
Bike and Travel Demand Management and ITS Facility	T202504703	FY25 Transportation Management Improvements
Carpooling & Vanpooling	T202504802	FY25 Rideshare Projection – Transportation Management Improvements

The methods for completing the emission reduction calculations are discussed in Section 3.0 of the *Congestion and Air Quality Management Annual Report - Fiscal Year 2024*. The following sections present the inputs, standard variables, and outputs generated used by DelDOT to complete these estimation procedures for each of the four quantitative assessments.

1.1 US 13, Pedestrian Improvements

This project was reported to PAS for FY2024 as a quantitative entry. The project is listed under CMAQ ID No. T201901102. The information presented in the tables and figures below was used to calculate annual emissions reductions.

Table 2. US13, Pedestrian Improvements - Background

Project Description	**Project No.**	T201901102
	Evaluation Year	2028
	Project Name	US13, Pedestrian Improvements
	Parallel Route	US 13
	Limits	US13 - Schafer Blvd to Bacon Blvd, US40 - Wilton Blvd to US13
	Length (mi)	4.28

Table 3. US13, Pedestrian Improvements – Mode-Shift Estimate

Input Variables	*Bike*	1
	PED	1
	D[1]	250
	AADT	50,163
	A[2]	0.0104
	C[3]	0.003
Mode Shift Estimate	*Total Annual Traffic*	18,309,495
	Total Annual Trips reduced from Bike Improvements	168,046
	Total Annual Trips reduced from Ped Improvements	168,046
	Total Annual Trips Reduced	336,092
	Avg. Reduction in Daily Passenger Trips	921
	Final AADT	49,242

[1] This variable (D) is the number of days a year when the facility would be open per year. It is used to translate the change in AADT to annual trips converted. The longer a facility is predicted to be in use each year, the more trips converted each year.

[2] This variable (A) is used to determine what percentage of the AADT will be converted into pedestrian and cyclist trips. A is the variable that is used to adjust the AADT reduction estimate based on three criteria: the existing AADT on the parallel route, the length of the proposed facility, and the presence of a university nearby. Facilities adjacent to high-volume routes are assigned a lower adjustment factor than those on low-volume routes. Facilities at least a mile or more in length are assigned a higher adjustment factor than shorter facilities. Facilities near a university are assigned a higher adjustment factor than those that are not.

[3] The value of the variable (C) is determined by the number of activity centers within a 0.25 and 0.5-mile buffer around the project limits. Projects with many activity centers within their 0.25 and 0.5-mile buffer are assigned a larger credit than those with few.

Figure 1. US13, Pedestrian Improvements – Project Datasheet

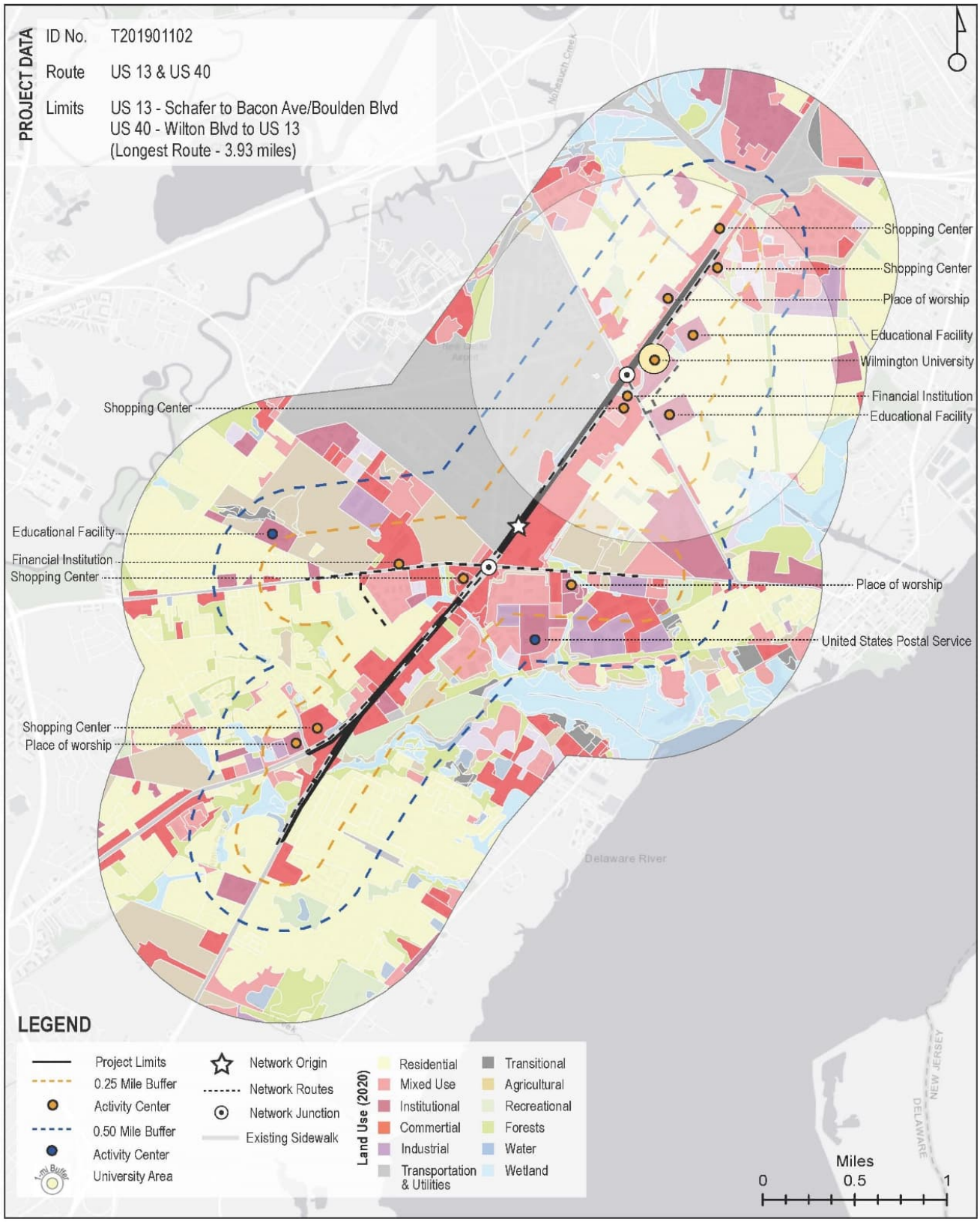
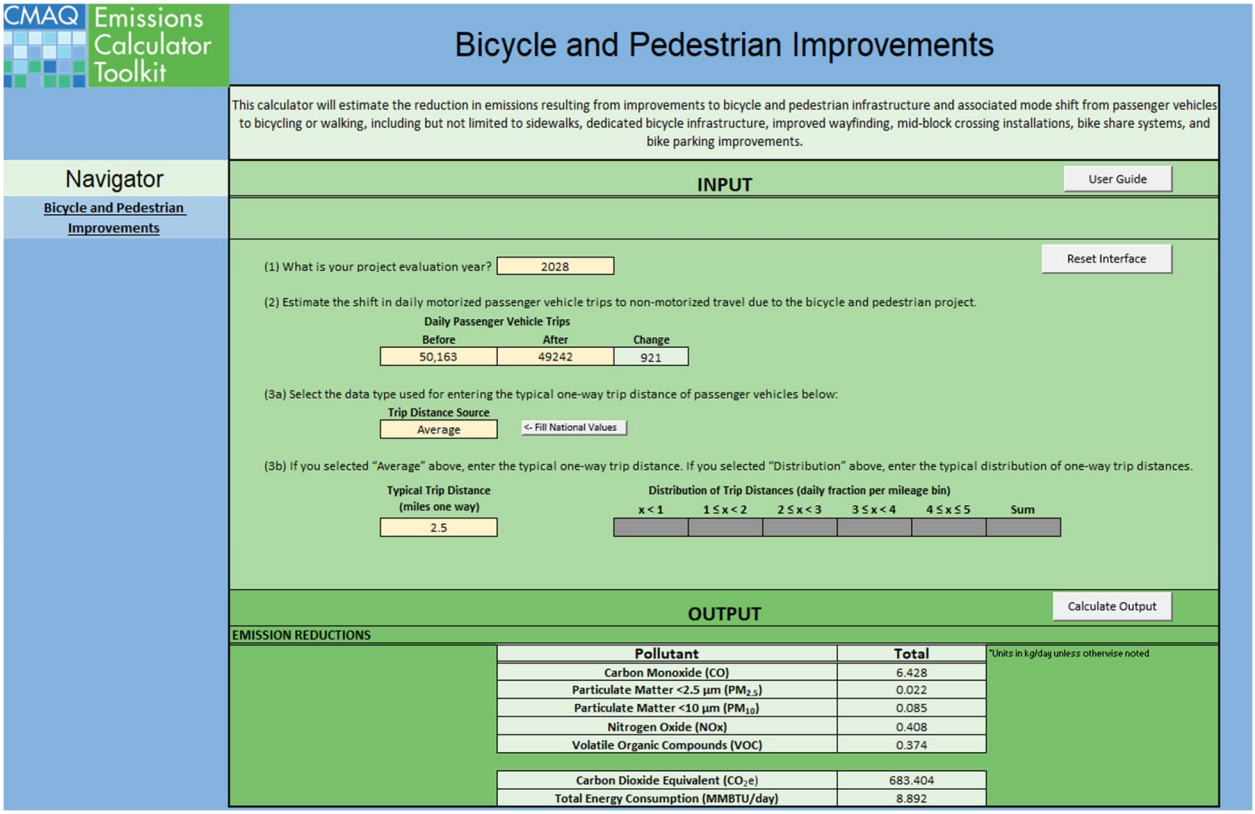


Figure 2. US13, Pedestrian Improvements – CMAQ Toolkit Output



CMAQ Emissions Calculator Toolkit

Bicycle and Pedestrian Improvements

This calculator will estimate the reduction in emissions resulting from improvements to bicycle and pedestrian infrastructure and associated mode shift from passenger vehicles to bicycling or walking, including but not limited to sidewalks, dedicated bicycle infrastructure, improved wayfinding, mid-block crossing installations, bike share systems, and bike parking improvements.

Navigator

Bicycle and Pedestrian Improvements

INPUT

User Guide

Reset Interface

(1) What is your project evaluation year? 2028

(2) Estimate the shift in daily motorized passenger vehicle trips to non-motorized travel due to the bicycle and pedestrian project.

Daily Passenger Vehicle Trips

Before	After	Change
50,163	49242	921

(3a) Select the data type used for entering the typical one-way trip distance of passenger vehicles below:

Trip Distance Source: Average <- Fill National Values

(3b) If you selected "Average" above, enter the typical one-way trip distance. If you selected "Distribution" above, enter the typical distribution of one-way trip distances.

Typical Trip Distance (miles one way)	Distribution of Trip Distances (daily fraction per mileage bin)					
	x < 1	1 ≤ x < 2	2 ≤ x < 3	3 ≤ x < 4	4 ≤ x ≤ 5	Sum
2.5						

OUTPUT

Calculate Output

EMISSION REDUCTIONS

Pollutant	Total
Carbon Monoxide (CO)	6.428
Particulate Matter <2.5 µm ($PM_{2.5}$)	0.022
Particulate Matter <10 µm (PM_{10})	0.085
Nitrogen Oxide (NOx)	0.408
Volatile Organic Compounds (VOC)	0.374
Carbon Dioxide Equivalent (CO_2e)	683.404
Total Energy Consumption (MMBTU/day)	8.892

*Units in kg/day unless otherwise noted

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1.2 Augustine Cutoff – Phase III

This project was reported to PAS for FY2024 as a quantitative entry. The project is listed under CMAQ ID No. T202101501. The information presented in the tables and figures below was used to calculate annual emissions reductions.

Table 4. Augustine Cutoff – Phase III - Background

Project Description	**Project No.**	T202101501
	Evaluation Year	2026
	Project Name	Augustine Cutoff Bicycle and Pedestrian Network Improvements
	Parallel Route	Augustine Cutoff
	Limits	Lovering Avenue to Cantera Road
	Length (mi)	0.61

Table 5. Augustine Cutoff – Phase III – Mode-Shift Estimate

Input Variables	*Bike*	1
	PED	1
	D[1]	250
	AADT	9,341
	A[2]	0.0019
	C[3]	0.003
Mode Shift Estimate	*Total Annual Traffic*	3,409,465
	Total Annual Trips reduced from Bike Improvements	11,443
	Total Annual Trips reduced from Ped Improvements	11,443
	Total Annual Trips Reduced	343,282
	Avg. Reduction in Daily Passenger Trips	63
	Final AADT	9,278

[1]This variable (D) is the number of days a year when the facility would be open per year. It is used to translate the change in AADT to annual trips converted. The longer a facility is predicted to be in use each year, the more trips converted each year.

[2] This variable (A) is used to determine what percentage of the AADT will be converted into pedestrian and cyclist trips. A is the variable that is used to adjust the AADT reduction estimate based on three criteria: the existing AADT on the parallel route, the length of the proposed facility, and the presence of a university nearby. Facilities adjacent to high-volume routes are assigned a lower adjustment factor than those on low-volume routes. Facilities at least a mile or more in length are assigned a higher adjustment factor than shorter facilities. Facilities near a university are assigned a higher adjustment factor than those that are not.

[3]The value of the variable (C) is determined by the number of activity centers within a 0.25 and 0.5-mile buffer around the project limits. Projects with many activity centers within their 0.25 and 0.5-mile buffer are assigned a larger credit than those with few.

Figure 3. Augustine Cutoff – Project Datasheet

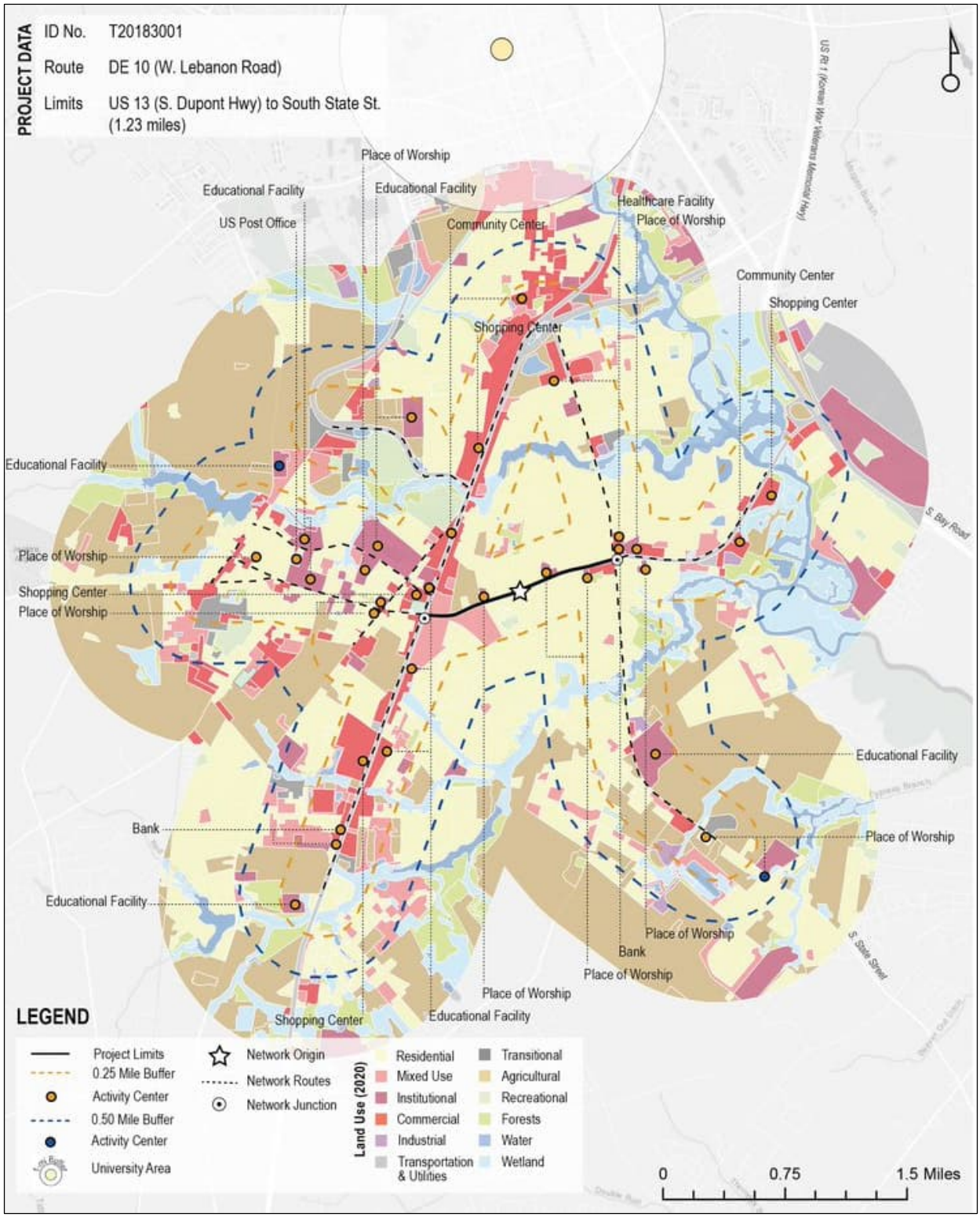
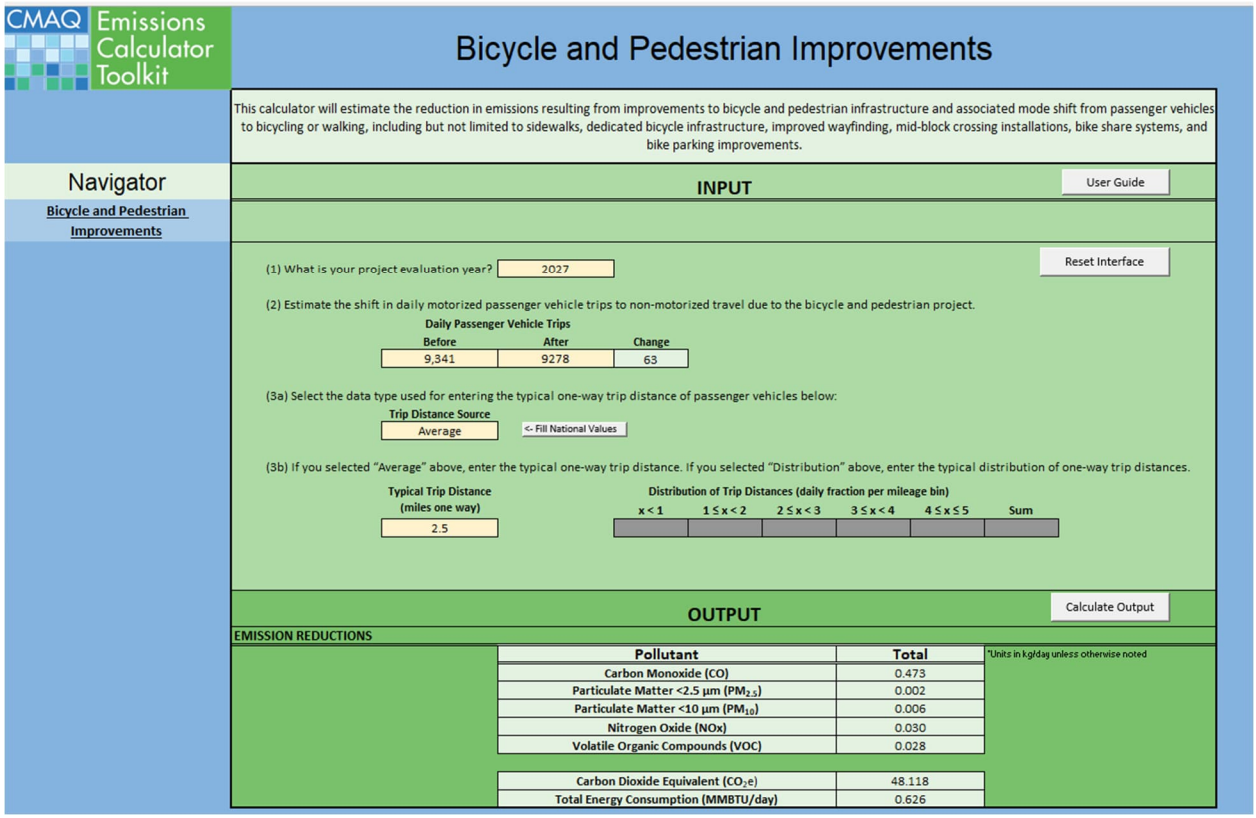


Figure 4. Augustine Cutoff – CMAQ Toolkit Output



CMAQ Emissions Calculator Toolkit

Bicycle and Pedestrian Improvements

This calculator will estimate the reduction in emissions resulting from improvements to bicycle and pedestrian infrastructure and associated mode shift from passenger vehicles to bicycling or walking, including but not limited to sidewalks, dedicated bicycle infrastructure, improved wayfinding, mid-block crossing installations, bike share systems, and bike parking improvements.

Navigator

Bicycle and Pedestrian Improvements

INPUT — User Guide

Reset Interface

(1) What is your project evaluation year? 2027

(2) Estimate the shift in daily motorized passenger vehicle trips to non-motorized travel due to the bicycle and pedestrian project.

Daily Passenger Vehicle Trips

Before	After	Change
9,341	9278	63

(3a) Select the data type used for entering the typical one-way trip distance of passenger vehicles below:

Trip Distance Source: Average <- Fill National Values

(3b) If you selected "Average" above, enter the typical one-way trip distance. If you selected "Distribution" above, enter the typical distribution of one-way trip distances.

Typical Trip Distance (miles one way)	Distribution of Trip Distances (daily fraction per mileage bin)					
	x < 1	1 ≤ x < 2	2 ≤ x < 3	3 ≤ x < 4	4 ≤ x ≤ 5	Sum
2.5						

OUTPUT — Calculate Output

EMISSION REDUCTIONS

Pollutant	Total
Carbon Monoxide (CO)	0.473
Particulate Matter <2.5 µm ($PM_{2.5}$)	0.002
Particulate Matter <10 µm (PM_{10})	0.006
Nitrogen Oxide (NOx)	0.030
Volatile Organic Compounds (VOC)	0.028
Carbon Dioxide Equivalent (CO_2e)	48.118
Total Energy Consumption (MMBTU/day)	0.626

*Units in kg/day unless otherwise noted

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1.3 Rideshare FY2025

Rideshare FY25 was reported to PAS for FY2025 as a quantitative entry. The project is listed under CMAQ ID No. T202504801. All information for FY2025 Rideshare is a projection based on previous years' emission reduction calculations. The information presented in the tables and figures below was used to calculate annual emissions reductions.

Table 6. Rideshare FY2025 - Background

Project Description	*Project No.*	T202504801
	Project Name	2025
	Type	FY25 Rideshare Program
	Limits	Statewide

Table 7. Rideshare Performance Statistics from FY20- FY24

QUANTITATIVELY ASSESSED PROJECTS														
Programming Information			*Daily Emission Benefit (kg/day)*						*$ of CMAQ Funding per Kg of Daily Emission Reduction*					
Project Year	*State Project ID*	*CMAQ Capital Amount*	*VOC*	*CO*	*NOX*	*PM_{10}*	*$PM_{2.5}$*	*CO_2*	*VOC*	*CO*	*NO_X*	*PM_{10}*	*$PM_{2.5}$*	*CO_2*
2020	T202004802	360,000	0.141	5.375	0.082	0.02	0.425	772.415	2,553,191	66,977	4,390,244	18,000,000	847,059	466
2021	T202104801	384,000	0.167	5.987	0.093	0.023	0.442	858.682	2,299,401	64,139	4,129,032	16,695,652	868,778	447
2022	T202204802	333,767	0.187	8.247	0.558	0.033	0.140	1267.655	1,784,848	40,471	598,148	10,114,139	2,384,047	263
2023	T202304802	383,951	0.039	1.61	0.028	0.007	0.103	247.33	9,844,885	238,479	13,712,519	54,850,076	3,727,675	1,552
Average Cost Effectiveness									4,120,582	102,516	5,707,486	24,914,967	1,956,890	682

Table 8. FY25 Rideshare Project Performance Projections

FORECASTED PROJECTS														
Programming Information			*Daily Emission Benefit (kg/day)*						*$ of CMAQ Funding per Kg of Daily Emission Reduction*					
Project Year	*State Project ID*	*CMAQ Capital Amount*	*VOC*	*CO*	*NO_X*	*PM_{10}*	*$PM_{2.5}$*	*CO2*	*VOC*	*CO*	*NO_X*	*PM_{10}*	*$PM_{2.5}$*	*CO_2*
2025	T202504801	384,000	0.093	3.746	0.067	0.015	0.196	562.855	4,120,582	102,516	5,707,486	24,914,967	1,956,890	682

1.4 FY25 Transportation Management Improvements - Statewide Projects

This statewide Transportation Management Improvement project was reported to PAS for FY2024 as a quantitative entry. The project is listed under CMAQ ID No. T202504703. In total, the FY25 Transportation Management Improvements Statewide Projects involved predicting the emission reduction benefits likely to be generated from the development of 34 systems. The names and limits of these systems are provided in Table 9. The emission reductions estimate for each of the 34 systems are listed in Table 10. The locations of each of the 34 systems are shown in **Figure 5.**

Table 9. FY25 Transportation Management Improvements Statewide Projects- Background

Project Description	*Project No.*	T202504703
	Evaluation Year	2025
	Project Name	FY25 Transportation Management Improvements Statewide Projects
	Description	This effort is part of a larger, multi-year initiative administered by Delaware's Department of Transportation to continually invest in the Integrated Traffic Management Systems (ITMS) throughout the State of Delaware. They FY25 iteration includes the following: *ITMS Fiber Installation* – Three separate installations to fill in gaps in existing fiber optic communications backbone. The three installation locations are: • I-95 between the Talley Maintenance Yard and the bridge over Brandywine Creek, • Summit Bridge Road south of Churchtown Road to Summit Bridge Road, and • Summit Bridge Road Broad Street to North of Springmill Drive. The completion of these fiber gaps will provide for a more reliable and robust connection between ITMS devices in the field and the Transportation Management Center for overall network redundancy. *ITMS Wireless Installation* – Seven wireless system upgrades are proposed as part of this obligation. Theses seven locations are: • SR 20 from Warrington Street to Clayton Street • US 9 from 2nd Street to just north of the Broadkill River • SR 1 from Towers Road to Fresh Pond Trailhead • Kirkwood Highway from Meadowood Drive to SR 141 • US 9B from SR 1 to Gills Neck Road • US 9 from SR 1 to Beebe Ave/Monroe Ave • SR 5 from Federal Stret to SR 16 • SR 4 from SR 72 to Augusta Drive The upgrade and addition of new hardware, with more capabilities, will provide DelDOT added redundancy for greater network availability and a more resilient network with enhanced scalability for speed and capacity of this rapidly growing network. *AI-TOMS* – Three AITOMS system upgrades are proposed as part of this obligation. These three locations are: • US 113 from SR 20 to SR 26 • US 13 from Exit 119 to Bigwoods Road • US 40 from MD State Line to SR 1

		The AI-TOMS component involves building upon the work recently completed in the development of the AI-TOMS platform as part of the ATCMTD Grant. This platform uses artificial intelligence and machine learning algorithms to assist in traffic response and operations activities *ITMS Field Devices* – Five devices will be installed as part of this obligation. These installations will affect traffic operations within the following areas: • I-495 Northbound from I-295 to US 13 • I-95 Northbound from SR 273 to Exit 4 • SR 1 Northbound from US 40 to US 13 • SR 1 Northbound from US 13 to SR 273 • SR 1 from SR 16 to US 9 The ITMS Field Devices component includes the installation of devices to provide general traveler information and to alert motorists of any closure or other impacts and divert motorists to secondary routes. *Traffic Signal Retiming* - The Traffic Signal Retiming Project component involves consultant engineering support for signal retiming at approximately 150 traffic signals on approximately 15 corridors, spread across all 3 counties. The affected corridors are: • Elkton Road from the MD State Line to Delaware Avenue • Saulsbury Road from North Street to US 13 • SR 1 from Fred Hudson Road to York Road • SR 1 from SR 54 to James Street • SR 20 from US 13 to Neals School Road • SR 24 from Mulberry Knoll to State Street • SR 299 from US 301 to SR 1 • SR 300 from US 13 to Artisan Drive • SR 4 from Robscott Turn to SR 7 • SR 48 from Wilmington Limits to SR 141 • SR 58 from SR 4 to I-95 • SR 896 from SR 71 to Porter Road • SR 9 from Delaware Street to I-295 • SR 9 from I-295 to Terminal Avenue • US 13 from 40th street to Naamans Road The project also involves traffic data collection at locations where we do not have sufficient data or the prior traffic counts are too old. Before and after studies will be conducted on each corridor to affirm the improved travel time and/or increased traffic volumes because of the retiming effort.

Table 10. FY25 Transportation Management Improvements Statewide Projects – Systems

Device Type	System Name	Primary Route	System Limits
Fiber Installation	I-95 Fiber Gap	I-95	550 ft west of Talley Road to 2250 ft east of Talley Road
	Summit Bridge Road - Broad Street to North of Springmill Drive	Peterson Road	SR 71 to 2400 ft of Marl Pit Road / Armstrong Corner Road
	Summit Bridge Road - Churchtown to 4718 Summit Bridge Road	SR 71	Churchtown Road to 4718 Summit Bridge Road
ITMS Wireless	Dagsboro Pole	SR 20	Warrington Street to Clayton Street
	Gills Neck Road	US 9	2nd Street to just north of the Broadkill RIver
	IRIB Access Point	SR 1	Towers Road to Fresh Pond Trailhead
	Kirkwood Hwy - SR 141 to Meadowood	Kirkwood Hwy	Meadowood Drive to SR 141
	Lewes to Milton I	US 9B	SR 1 to Gills Neck Road
	Lewes to Milton II	US 9	SR 1 to Beebe Ave/Monroe Ave
	Milton DivComm Tower	SR 5	Federal Street to SR 16
	SR 4 at SR 72	SR 4	SR 72 to Augusta Drive
AI-TOMS	Dagsboro	US 113	SR 20 to SR 26
	Smyrna	US 13	Exit 119 to Bigwoods Road
	US 40	US 40	MD State Line to SR 1
ITMS Field Devices	I-495 Northbound at Southern Split DMS	I-495	I-295 TO US 13
	I-95 NB at SR 1 Interchange DMS	I-95	SR 273 TO EXIT 4
	SR 1 NB at US 13 Tybouts Corner DMS	SR 1	US 40 TO US 13
	SR 1 NB at US 40 DMS	SR 1	US 13 TO SR 273
	SR 1 at Hudson Fields Camera+Wavetronix	SR 1	SR 16 TO US 9
Traffic Signal Retiming	Elkton Road from the MD State Line to Delaware Avenue	Elkton Road	MD line to Delaware Ave
	Saulsbury Road from North Street to US 13	Saulsbury Road	North Street to US 13
	SR 1 from Fred Hudson Road to York Road	SR 1	Fred Hudson Road to York Road
	SR 1 from SR 54 to James Street	SR 1	SR 54 to James Street
	SR 20 from US 13 to Neals School Road	SR 20	US 13 to Neals School Road
	SR 24 from Mulberry Knoll to State Street	SR 24	Mulberry Knoll to State Street
	SR 299 from US 301 to SR 1	SR 299	US 301 to SR 1
	SR 300 from US 13 to Artisan Drive	SR 300	US 13 to Artisan Drive
	SR 4 from Robscott Turn to SR 7	SR 4	Robscott Turn to SR 7

Device Type	System Name	Primary Route	System Limits
	SR 48 from Wilmington Limits to SR 141	SR 48	Wilmington Limits to SR 141
	SR 58 from SR 4 to I-95	SR 58	SR 4 to I-95
	SR 896 from SR 71 to Porter Road	SR 896	SR 71 to Porter Road
	SR 9 from Delaware Street to I-295	SR 9	Delaware Street to I-295
	SR 9 from I-295 to Terminal Avenue	SR 9	I-295 to Terminal Avenue
	US 13 from 40th street to Naamans Road	US 13	40th street to Naamans Road

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Figure 5. FY25 Transportation Management Improvements Statewide Projects – Project Datasheet

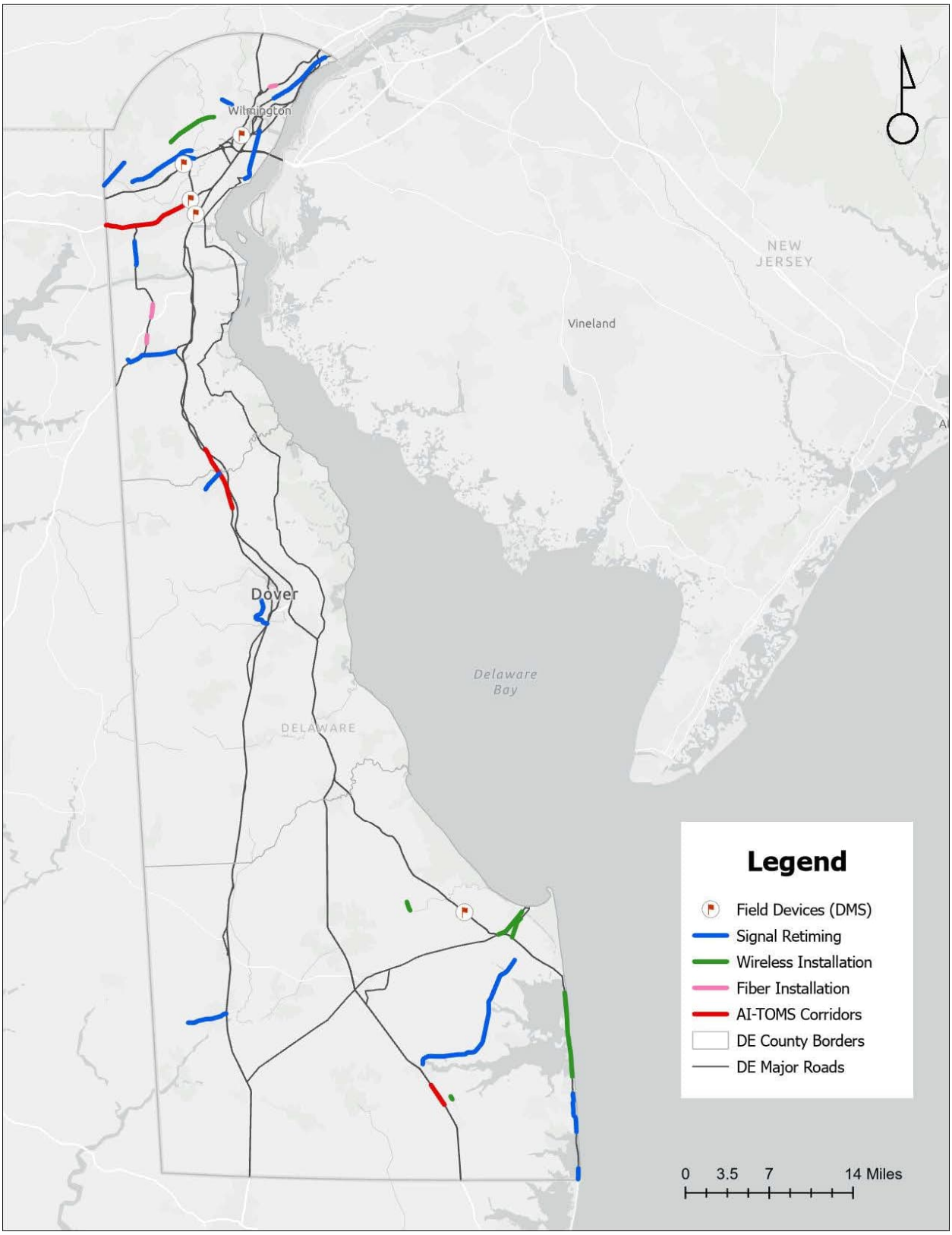


Table 11. FY25 Transportation Management Improvements Statewide Projects – Emission Reduction Summary by System

Device Type	System	CO	$PM_{2.5}$	PM_{10}	NO_x	VOC	CO_2e	Total Energy Consumption (MMBTU)
Fiber Installation	I-95 Fiber Gap	-0.001	0.000	0.000	0.000	0.000	0.041	0.001
	Summit Bridge Road - Broad Street to North of Springmill Drive	0.002	0.000	0.000	0.000	0.000	0.244	0.004
	Summit Bridge Road - Churchtown to 4718 Summit Bridge Road	-	-	-	-	-	-	-
ITMS Wireless	Dagsboro Pole	-	-	-	-	-	-	-
	Gills Neck Road	-	-	-	-	-	-	-
	IRIB Access Point	-0.174	0.018	0.005	-0.005	0.001	11.865	0.154
	Kirkwood Hwy - SR 141 to Meadowood	0.042	0.009	0.002	0.003	0.002	7.045	0.093
	Lewes to Milton I	-	-	-	-	-	-	-
	Lewes to Milton II	0.012	0.002	0.000	0.002	0.000	1.480	0.019
	Milton DivComm Tower	-	-	-	-	-	-	-
	SR 4 at SR 72	0.010	0.004	0.000	0.002	0.000	2.996	0.039
AI-TOMS	Dagsboro	-	-	-	-	-	-	-
	Smyrna	-	-	-	-	-	-	-
	US 40	-	-	-	-	-	-	-
Field Devices	I-495 Northbound at Southern Split DMS	-	-	-	-	-	-	-
	I-95 NB at SR 1 Interchange DMS	-0.003	0.000	0.000	-0.001	0.000	-0.384	-0.005
	SR 1 NB at US 13 Tybouts Corner DMS	-	-	-	-	-	-	-
	SR 1 NB at US 40 DMS	-	-	-	-	-	-	-
	SR 1 at Hudson Fields Camera+Wavetronix	-0.003	0.000	0.000	0.000	0.000	0.063	0.001
	Elkton Road from the MD State Line to Delaware Avenue	0.045	0.005	0.001	0.002	0.000	4.246	0.055

Device Type	System	CO	$PM_{2.5}$	PM_{10}	NO_x	VOC	CO_2e	Total Energy Consumption (MMBTU)
Traffic Signal Retiming	Saulsbury Road from North Street to US 13	-	-	-	-	-	-	-
	SR 1 from Fred Hudson Road to York Road	0.043	0.004	0.000	0.002	0.000	4.110	0.054
	SR 1 from SR 54 to James Street	0.012	0.002	0.000	0.002	0.000	1.504	0.019
	SR 20 from US 13 to Neals School Road	-	-	-	-	-	-	-
	SR 24 from Mulberry Knoll to State Street	-	-	-	-	-	-	-
	SR 299 from US 301 to SR 1	-	-	-	-	-	-	-
	SR 300 from US 13 to Artisan Drive	-	-	-	-	-	-	-
	SR 4 from Robscott Turn to SR 7	0.074	0.020	0.006	0.012	0.002	20.809	0.271
	SR 48 from Wilmington Limits to SR 141	0.011	0.004	0.000	0.002	0.000	7.868	0.553
	SR 58 from SR 4 to I-95	-	-	-	-	-	-	-
	SR 896 from SR 71 to Porter Road	-0.011	0.001	0.000	0.000	0.000	0.291	0.003
	SR 9 from Delaware Street to I-295	-	-	-	-	-	-	-
	SR 9 from I-295 to Terminal Avenue	-	-	-	-	-	-	-
	US 13 from 40th street to Naamans Road	-	-	-	-	-	-	-
GRAND TOTAL		**0.059**	**0.069**	**0.014**	**0.021**	**0.005**	**62.178**	**1.261**

Note: A dash (-) indicates that the system is not predicted to generate daily emission reductions. This outcome is expected to occur when the roadway affected by the proposed investment does not currently experience any travel time delay. Although ITS devices can improve DelDOT's response to non-reoccuring congestion (i.e., delay generated by a vehicular collision), the existing CMAQ project evaluation process only takes into account the ability of the proposed investment to alter average daily conditions.

The subsections which follow are each dedicated to one of the 34 systems which comprise the FY25 Transportation Management Improvements Statewide Project.

1.4.1 AI-TOMS - Dagsboro

This project was reported to PAS for FY2025 as a quantitative entry. The project is listed under CMAQ ID No. T202504703. The information presented in the tables and figures below was used to calculate daily emissions reductions.

Table 12. Dagsboro, SR 20 to SR 26 – CMAQ Toolkit Inputs

Input ID	Input Field	Direction of Travel	
		NB	*SB*
(1)	*Evaluation Year*	2025	2025
(2)	*Area Type*	RURAL	RURAL
(3)	*Corridor Length (miles)*	4.02	4.02
(4)	*Number of Signalized Intersections*	1	1
(5)	*Total Peak Hours per Day (AM+PM)*	24	24
(6)	*Free Flow Speed or Posted Speed Limit*	53.06	53.06
(7)	*Total Volume on Corridor or Direction of Travel (Daily)*	23,264.88	23,264.88
	Total Volume on Corridor or Direction of Travel (Veh/Hour)	969.37	969.37
(8)	*Existing Total Travel Delay Per Vehicle (sec)*	0.78	0.42
(9)	*Truck Percentage*	5.00%	5.00%
(10)	*Use Your Own Delay Reduction Values*	Y	Y
(11)	*Corridor Delay Reduction per Vehicle*	0.00	0.00

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Figure 6. Dagsboro, SR 20 to SR 26 9 – System Location Map

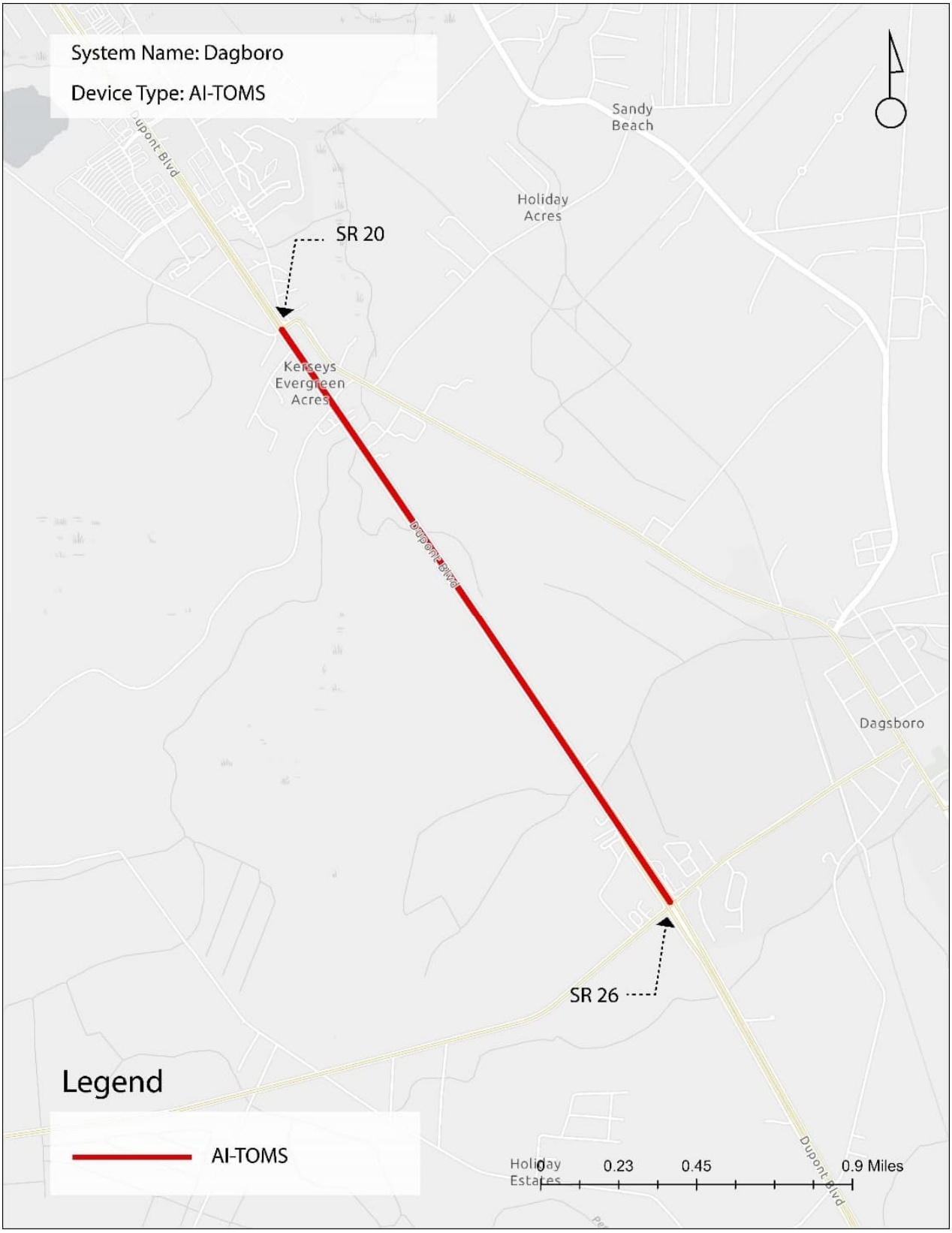


Figure 7. Dagsboro (NB) – CMAQ Toolkit Output

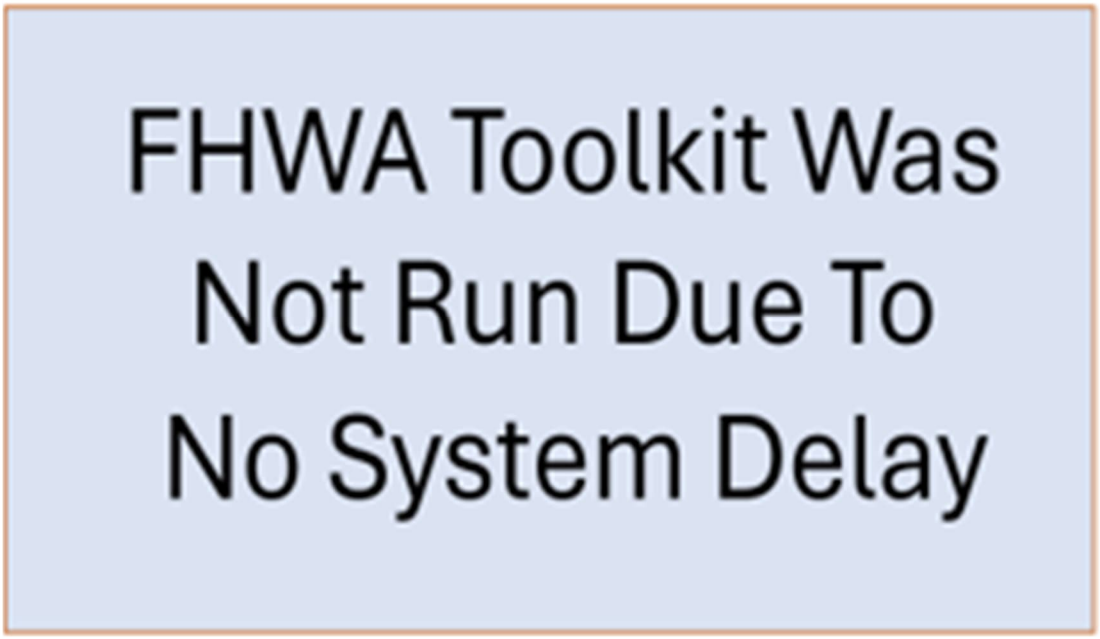
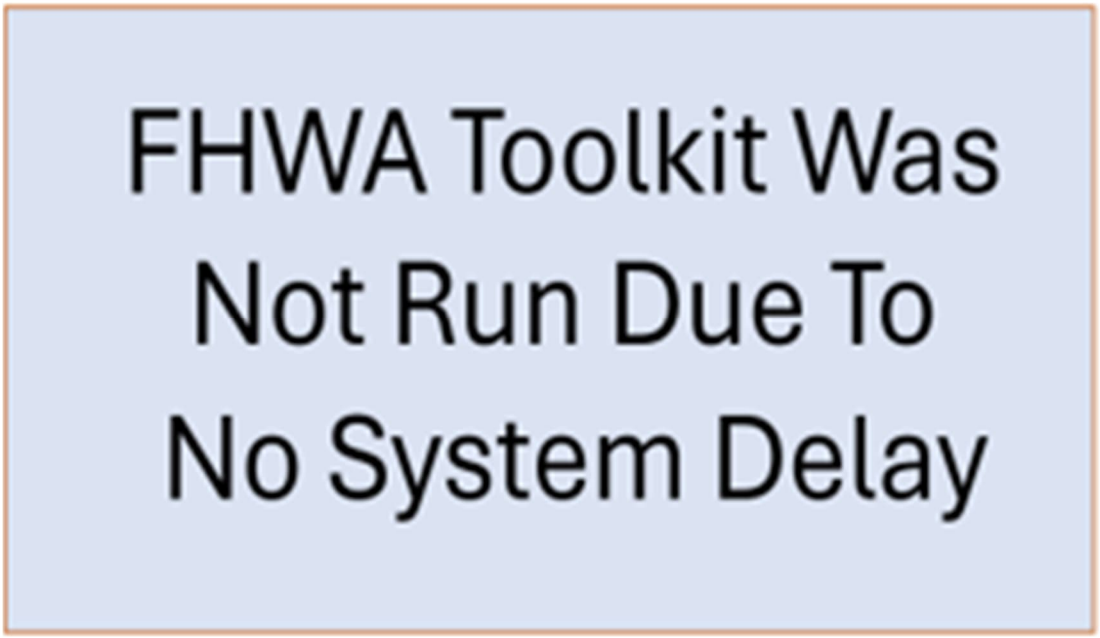


Figure 8. Dagsboro (SB) – CMAQ Toolkit Output



1.4.2 AI-TOMS – Smyrna

This project was reported to PAS for FY2025 as a quantitative entry. The project is listed under CMAQ ID No. T202504703. The information presented in the tables and figures below was used to calculate annual emissions reductions.

Table 13. Smyrna – CMAQ Toolkit Inputs

Input ID	Input Field	Direction of Travel	
		NB	*SB*
(1)	Evaluation Year	2025	2025
(2)	Area Type	URBAN	URBAN
(3)	Corridor Length (miles)	55.00	55.00
(4)	Number of Signalized Intersections	1	1
(5)	Total Peak Hours per Day (AM+PM)	24	24
(6)	Free Flow Speed or Posted Speed Limit	47.13	47.13
(7)	Total Volume on Corridor or Direction of Travel (Daily)	26,733.36	26,733.36
	Total Volume on Corridor or Direction of Travel (Veh/Hour)	1,113.89	1,113.89
(8)	Existing Total Travel Delay Per Vehicle (sec)	-	-
(9)	Truck Percentage	5.00%	5.00%
(10)	Use Your Own Delay Reduction Values	Y	Y
(11)	Corridor Delay Reduction per Vehicle	0.00	0.00

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Figure 9. Smyrna – System Location Map

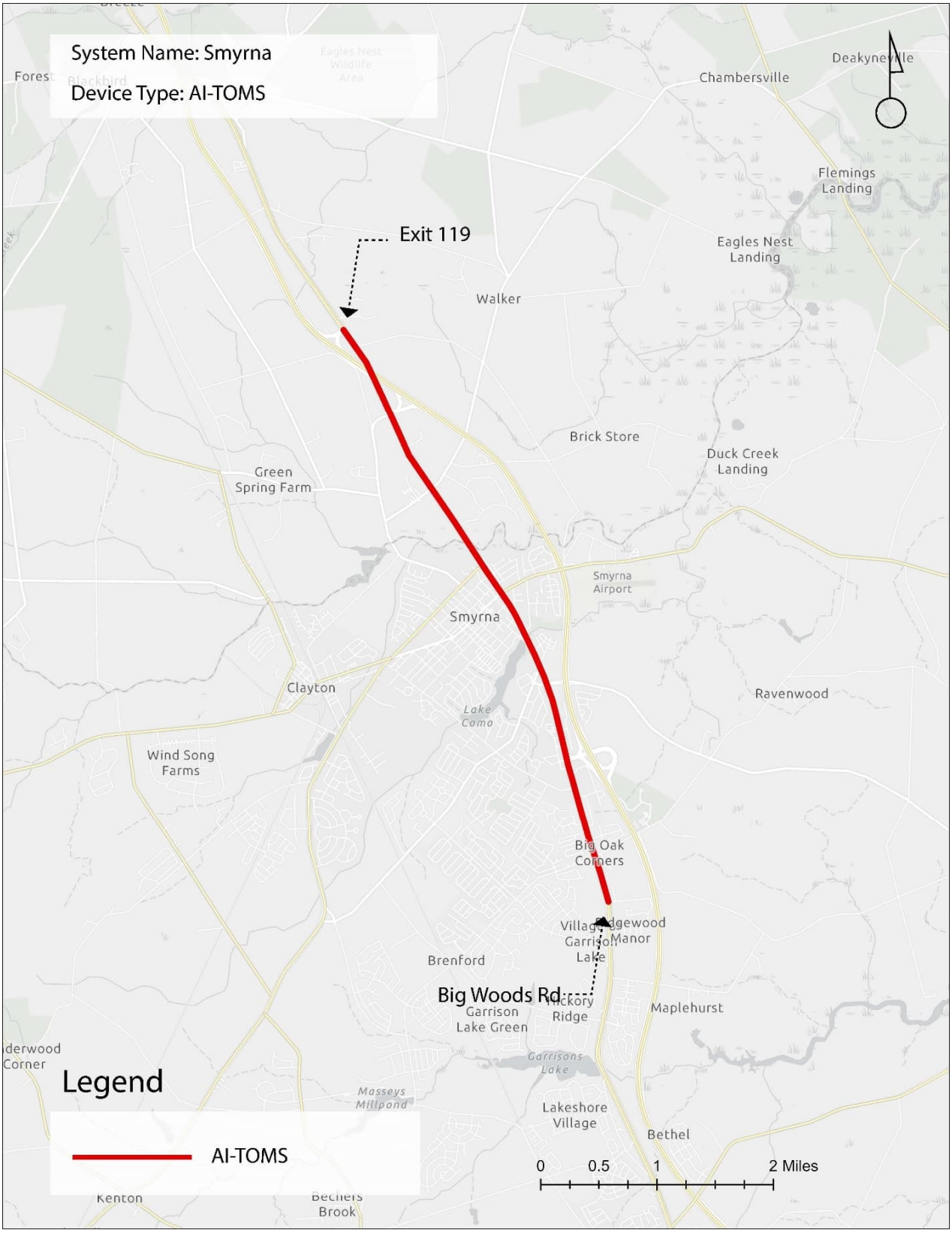


Figure 10. Smyrna (NB) – CMAQ Toolkit Outputs

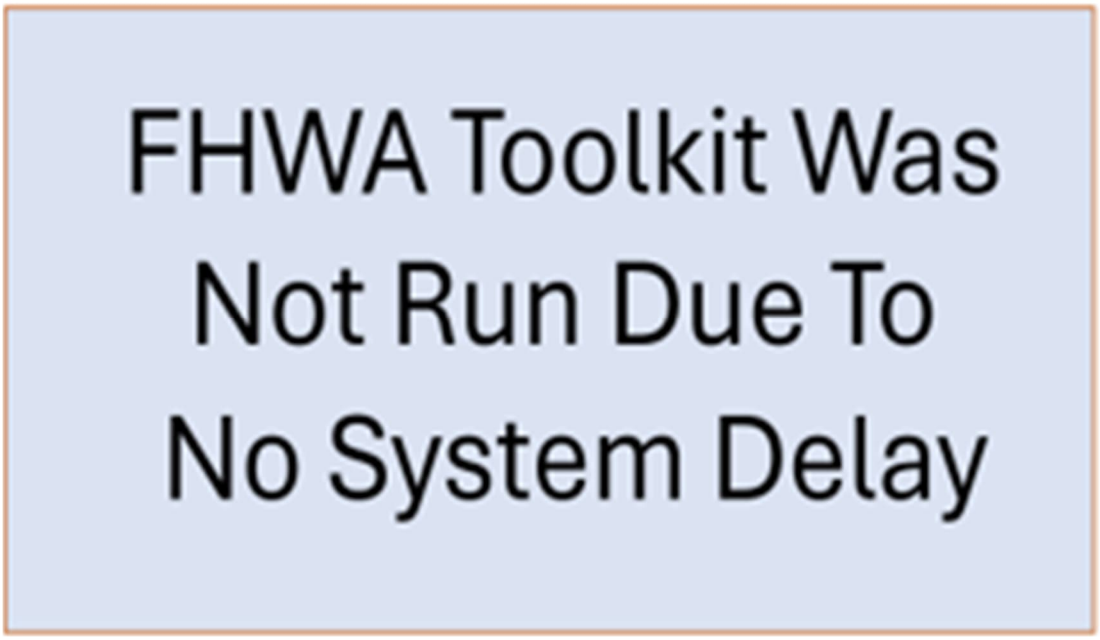
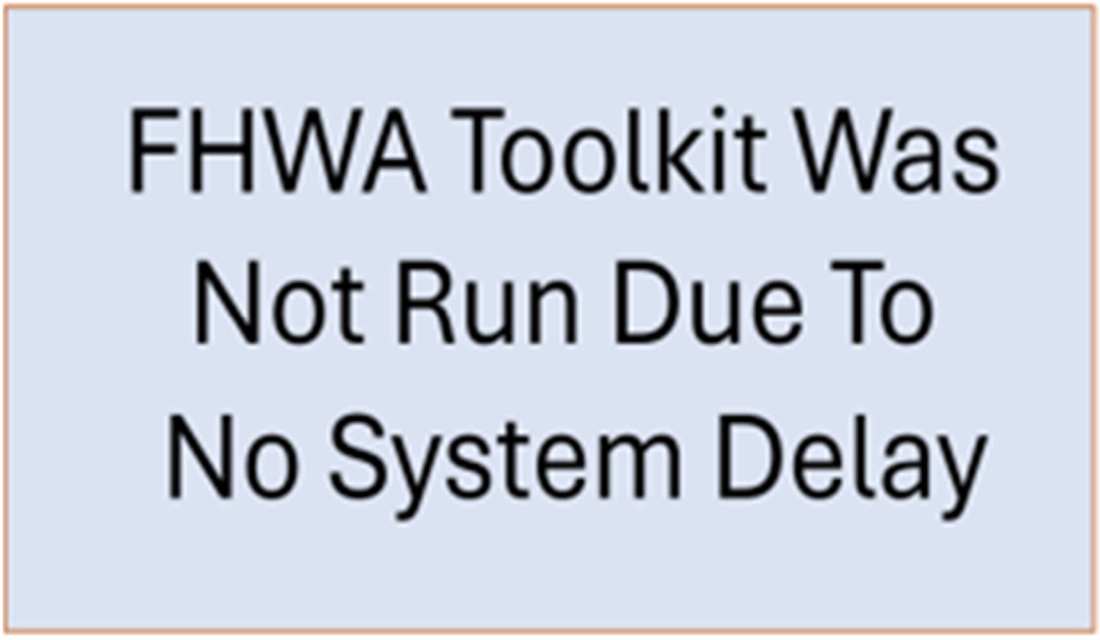


Figure 11. Smyrna (SB) – CMAQ Toolkit Outputs



1.4.3 AI-TOMS – US 40

This project was reported to PAS for FY2025 as a quantitative entry. The project is listed under CMAQ ID No. T202504703. The information presented in the tables and figures below was used to calculate annual emissions reductions.

Table 14. US 40 – CMAQ Toolkit Inputs

Input ID	Input Field	Direction of Travel	
		EB	*WB*
(1)	Evaluation Year	2025	2025
(2)	Area Type	URBAN	URBAN
(3)	Corridor Length (miles)	61.36	61.36
(4)	Number of Signalized Intersections	1	1
(5)	Total Peak Hours per Day (AM+PM)	24	24
(6)	Free Flow Speed or Posted Speed Limit	48.17	48.17
(7)	Total Volume on Corridor or Direction of Travel (Daily)	30,931.32	30,931.32
	Total Volume on Corridor or Direction of Travel (Veh/Hour)	1,288.83	1,288.83
(8)	Existing Total Travel Delay Per Vehicle (sec)	5.92	5.77
(9)	Truck Percentage	5.00%	5.00%
(10)	Use Your Own Delay Reduction Values	Y	Y
(11)	Corridor Delay Reduction per Vehicle	0.00	0.00

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Figure 12. US 40 – System Location Map

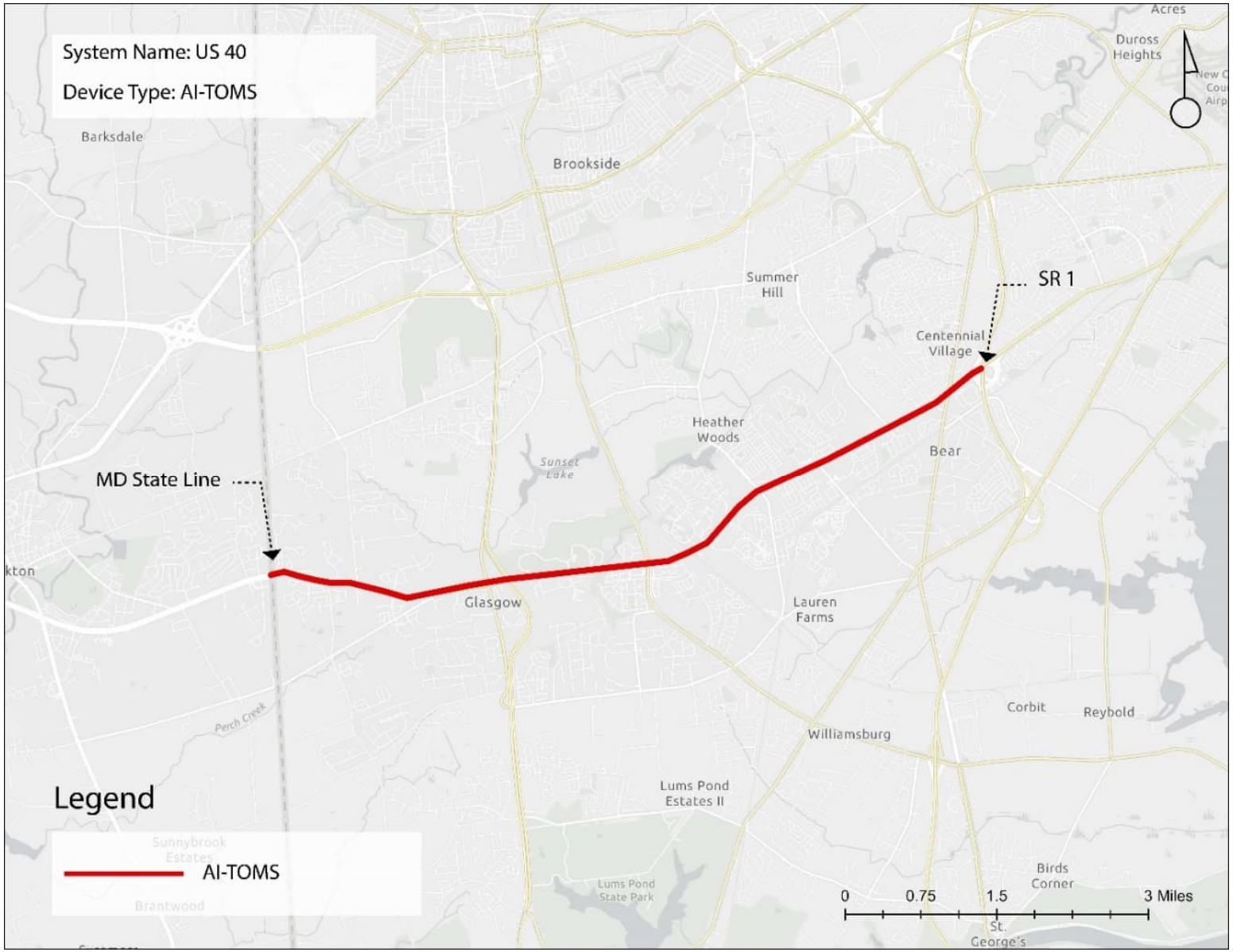


Figure 13. US 40 (EB) – CMAQ Toolkit Outputs

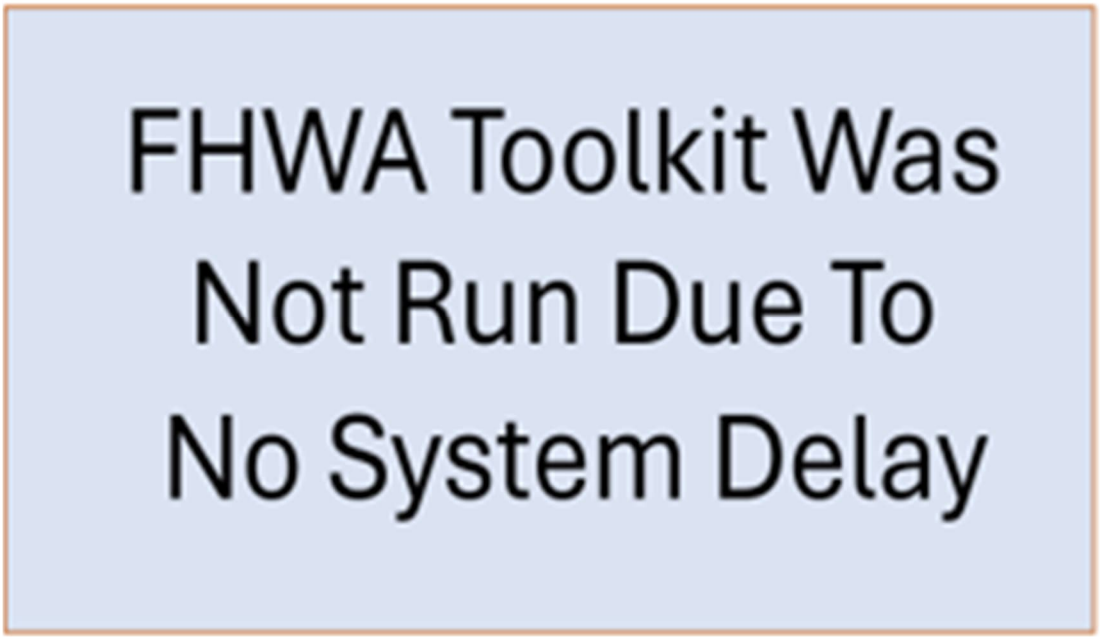
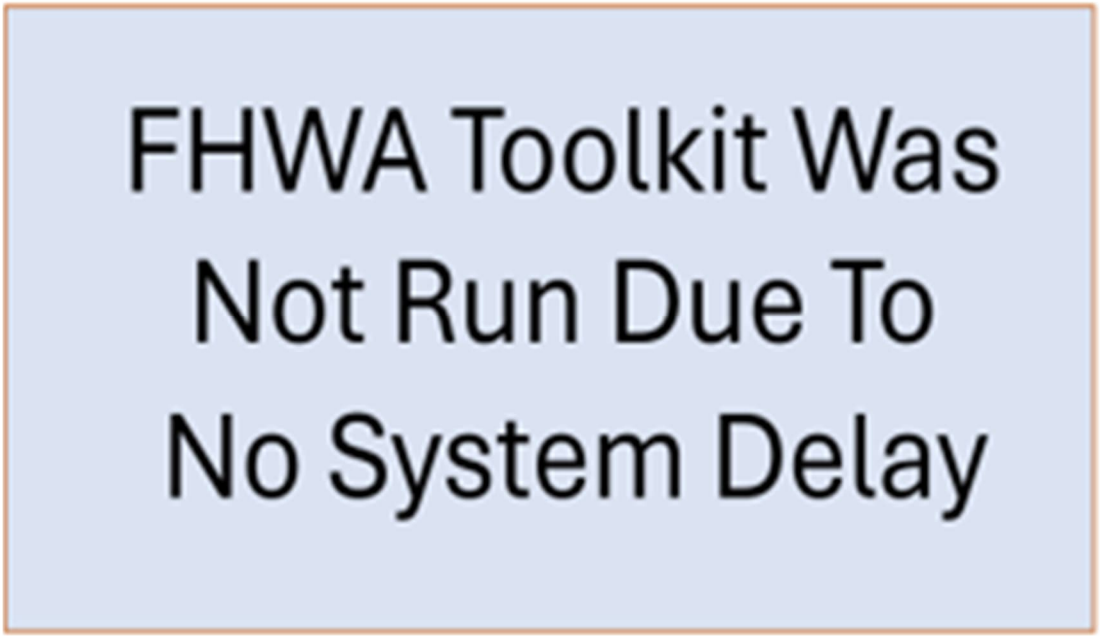


Figure 14. US 40 (WB) – CMAQ Toolkit Outputs



1.4.4 ITMS Wireless – Dagsboro Pole

This project was reported to PAS for FY2025 as a quantitative entry. The project is listed under CMAQ ID No. T202504703. The information presented in the tables and figures below was used to calculate annual emissions reductions.

Table 15. Dagsboro Pole – CMAQ Toolkit Inputs

Input ID	Input Field	Direction of Travel	
		EB	*WB*
(1)	Evaluation Year	2025	2025
(2)	Area Type	Rural	Rural
(3)	Corridor Length (miles)	0.09	0.09
(4)	Number of Signalized Intersections	1	1
(5)	Total Peak Hours per Day (AM+PM)	24	24
(6)	Free Flow Speed or Posted Speed Limit	25	25
(7)	Total Volume on Corridor or Direction of Travel (Daily)	13,363.92	13,363.92
	Total Volume on Corridor or Direction of Travel (Veh/Hour)	556.83	556.83
(8)	Existing Total Travel Delay Per Vehicle (sec)	0.00%	-
(9)	Truck Percentage	5.00%	5.00%
(10)	Use Your Own Delay Reduction Values	Y	Y
(11)	Corridor Delay Reduction per Vehicle	0.00	0.00

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Figure 15. Dagsboro Pole – System Location Map

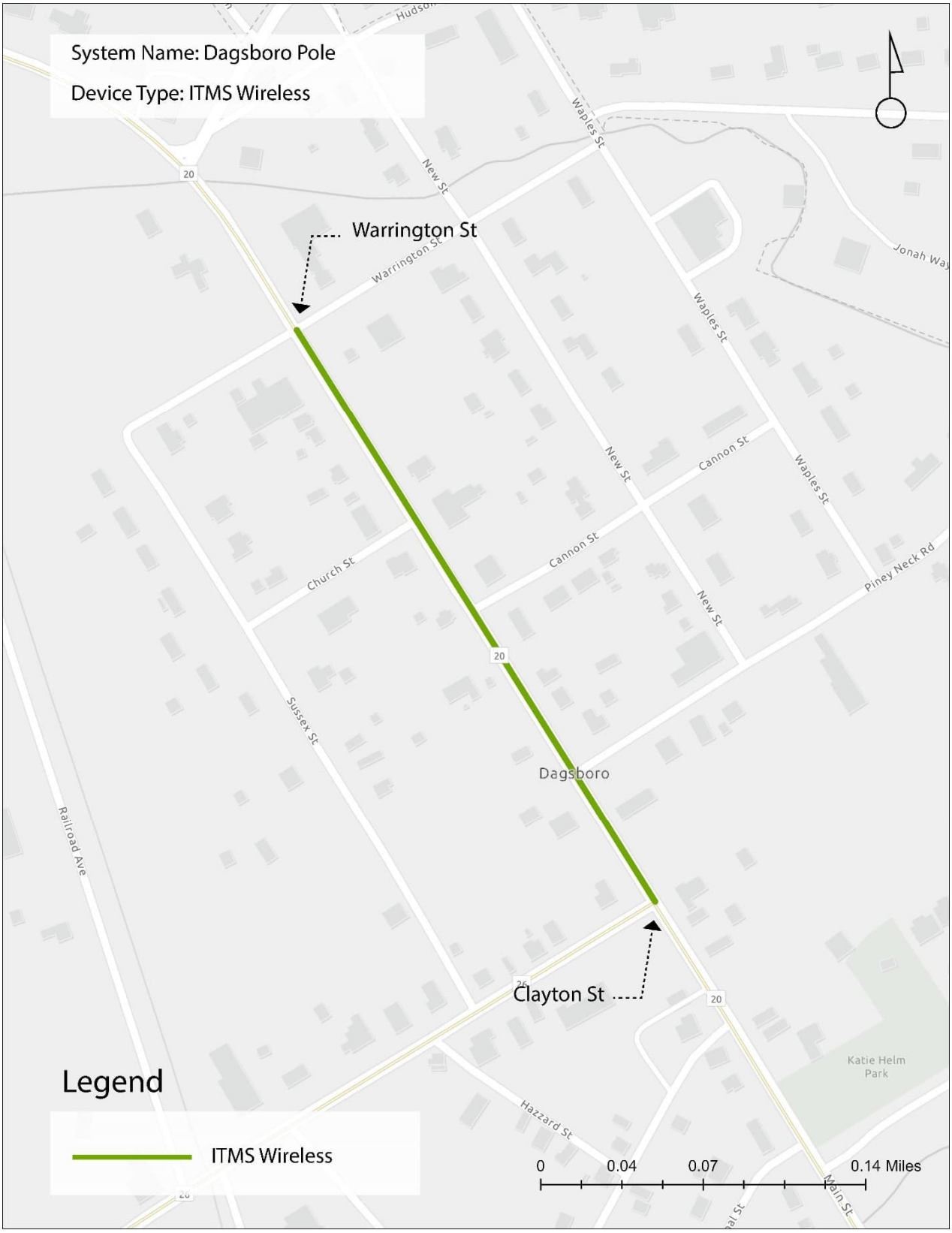


Figure 16. Dagsboro Pole (NB) – CMAQ Toolkit Output

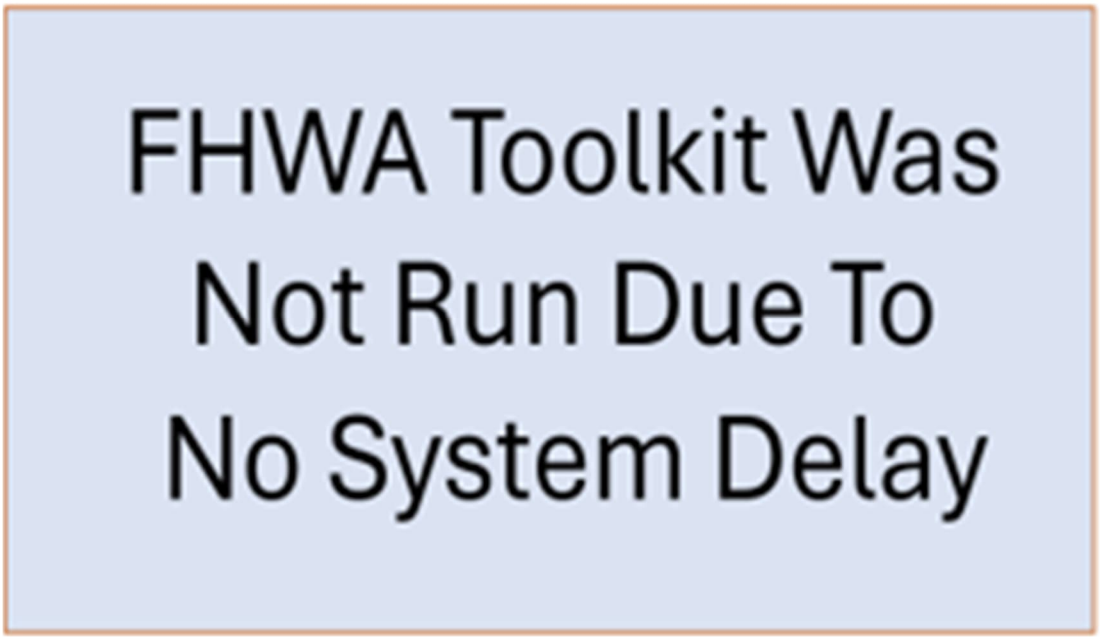
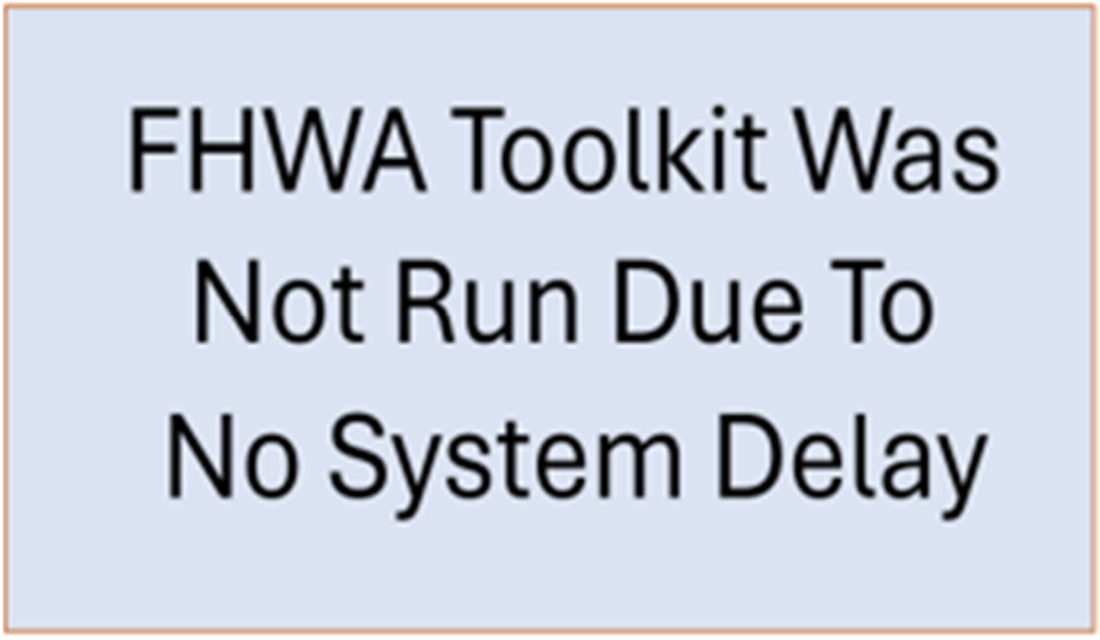


Figure 17. Dagsboro Pole (SB) – CMAQ Toolkit Output



1.4.5 ITMS Wireless – Gills Neck Road

This project was reported to PAS for FY2025 as a quantitative entry. The project is listed under CMAQ ID No. T202504703. The information presented in the tables and figures below was used to calculate annual emissions reductions.

Table 16. Gills Neck Road – CMAQ Toolkit Inputs

Input ID	Input Field	Direction of Travel	
		EB	*WB*
(1)	Evaluation Year	2025	2025
(2)	Area Type	URBAN	URBAN
(3)	Corridor Length (miles)	0.22	0.22
(4)	Number of Signalized Intersections	1	1
(5)	Total Peak Hours per Day (AM+PM)	24	24
(6)	Free Flow Speed or Posted Speed Limit	25.00	25.00
(7)	Total Volume on Corridor or Direction of Travel (Daily)	7,325.76	7,325.76
	Total Volume on Corridor or Direction of Travel (Veh/Hour)	305.24	305.24
(8)	Existing Total Travel Delay Per Vehicle (sec)	-	-
(9)	Truck Percentage	4.20%	4.20%
(10)	Use Your Own Delay Reduction Values	Y	Y
(11)	Corridor Delay Reduction per Vehicle	0.000	0.000

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Figure 18. Gills Neck Road – System Location Map

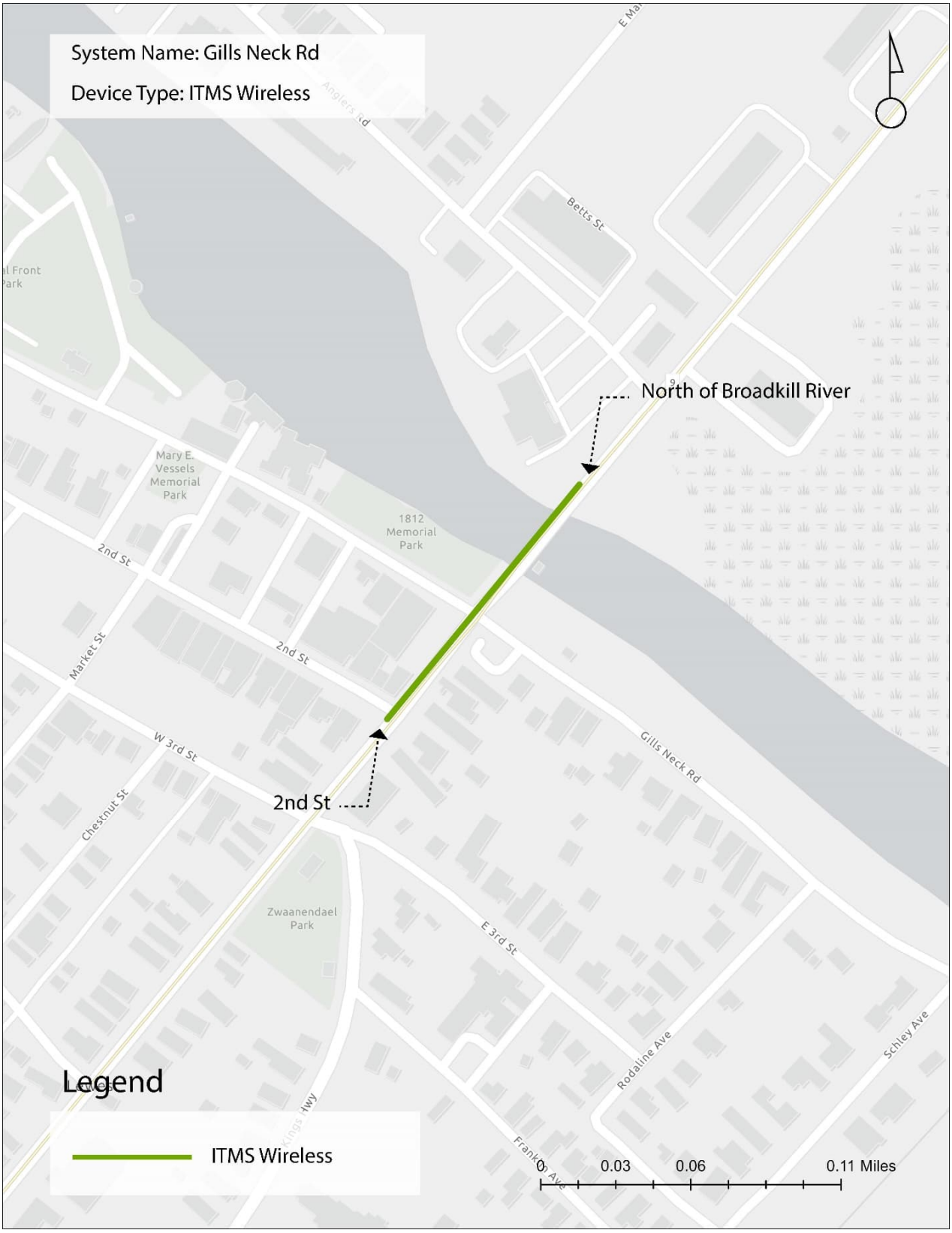


Figure 19. Gills Neck Road (EB) – CMAQ Toolkit Output

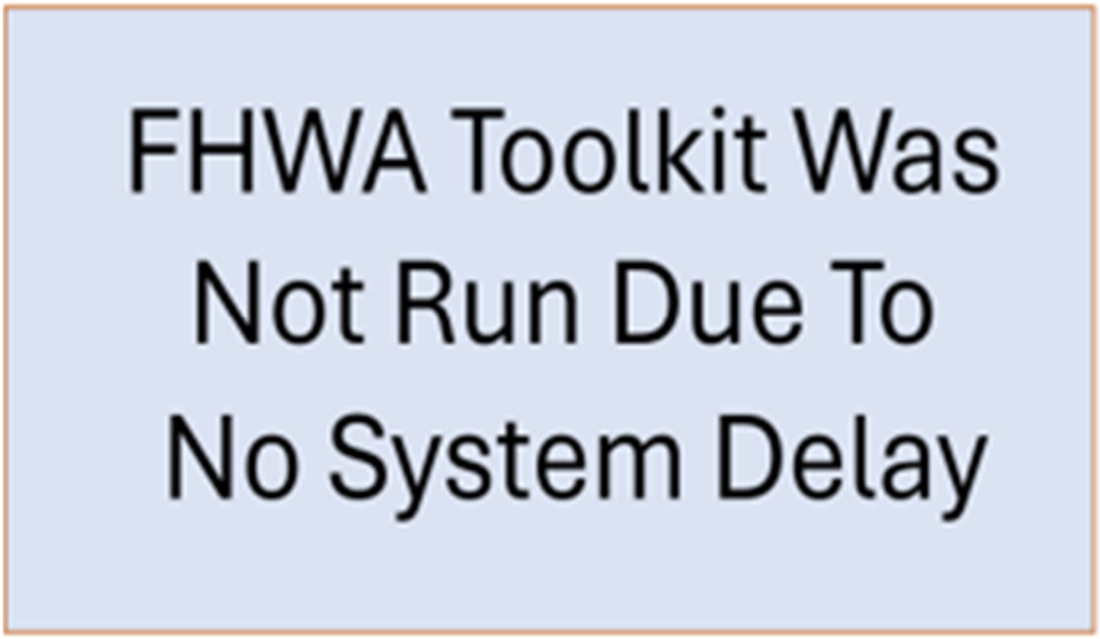
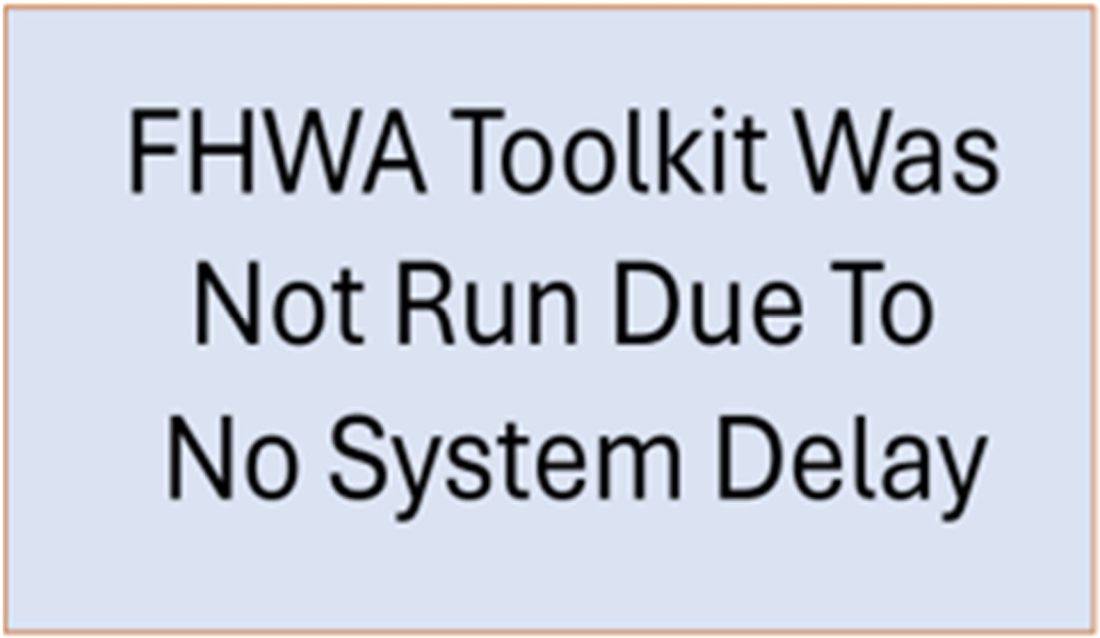


Figure 20. Gills Neck Road (WB) – CMAQ Toolkit Output



1.4.6 ITMS Field Devices – IRIB Access Point

This project was reported to PAS for FY2025 as a quantitative entry. The project is listed under CMAQ ID No. T202504703. The information presented in the tables and figures below was used to calculate annual emissions reductions.

Table 17. IRIB Access Point – CMAQ Toolkit Inputs

Input ID	Input Field	Direction of Travel	
		NB	*SB*
(1)	Evaluation Year	2025	2025
(2)	Area Type	RURAL	RURAL
(3)	Corridor Length (miles)	20.55	20.55
(4)	Number of Signalized Intersections	1	1
(5)	Total Peak Hours per Day (AM+PM)	24	24
(6)	Free Flow Speed or Posted Speed Limit	55.00	55.00
(7)	Total Volume on Corridor or Direction of Travel (Daily)	15,327.60	15,327.60
	Total Volume on Corridor or Direction of Travel (Veh/Hour)	638.65	638.65
(8)	Existing Total Travel Delay Per Vehicle (sec)	1.79	1.53
(9)	Truck Percentage	4.20%	4.20%
(10)	Use Your Own Delay Reduction Values	Y	Y
(11)	Corridor Delay Reduction per Vehicle	0.04	0.03

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Figure 21. IRIB Access Point – System Location Map

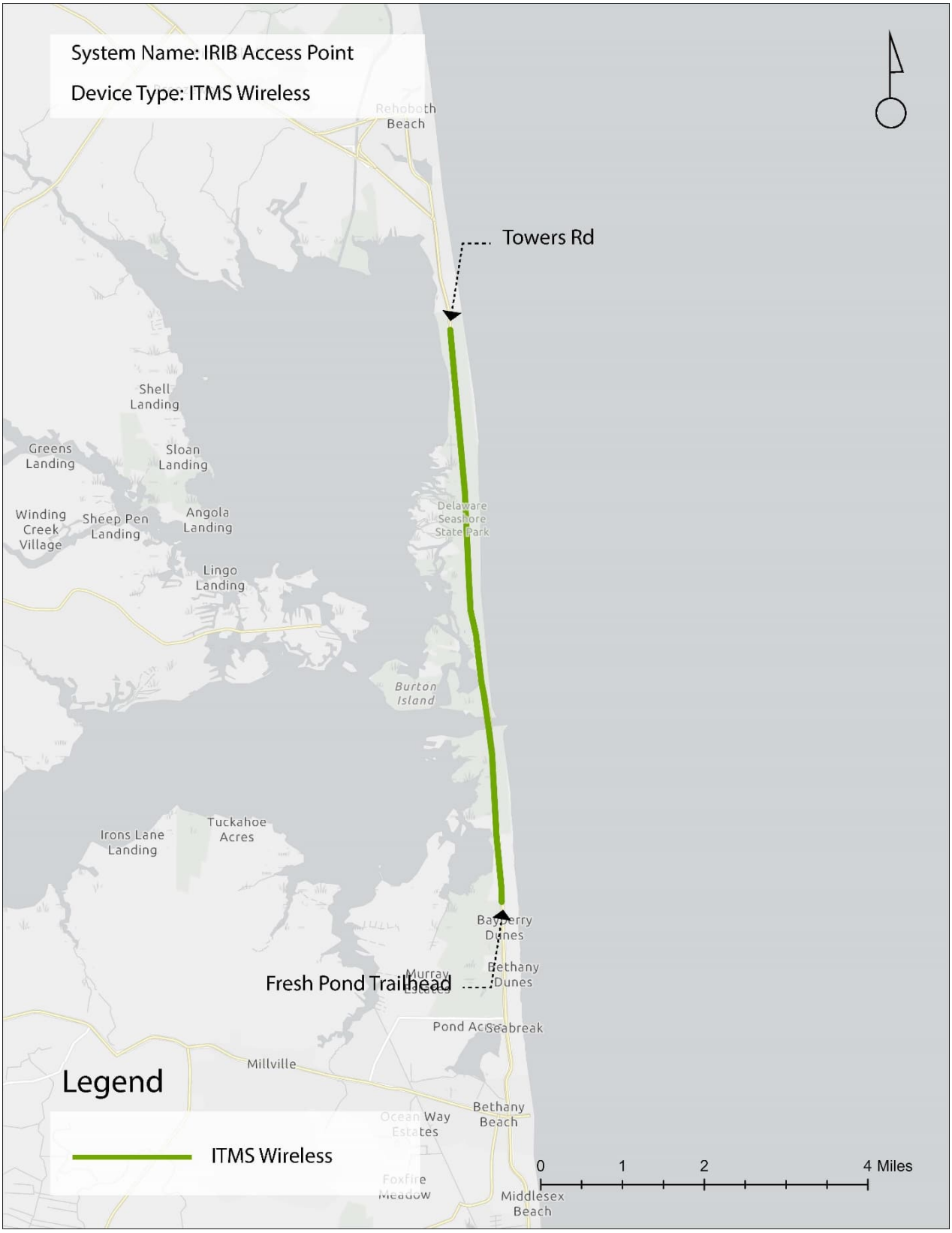
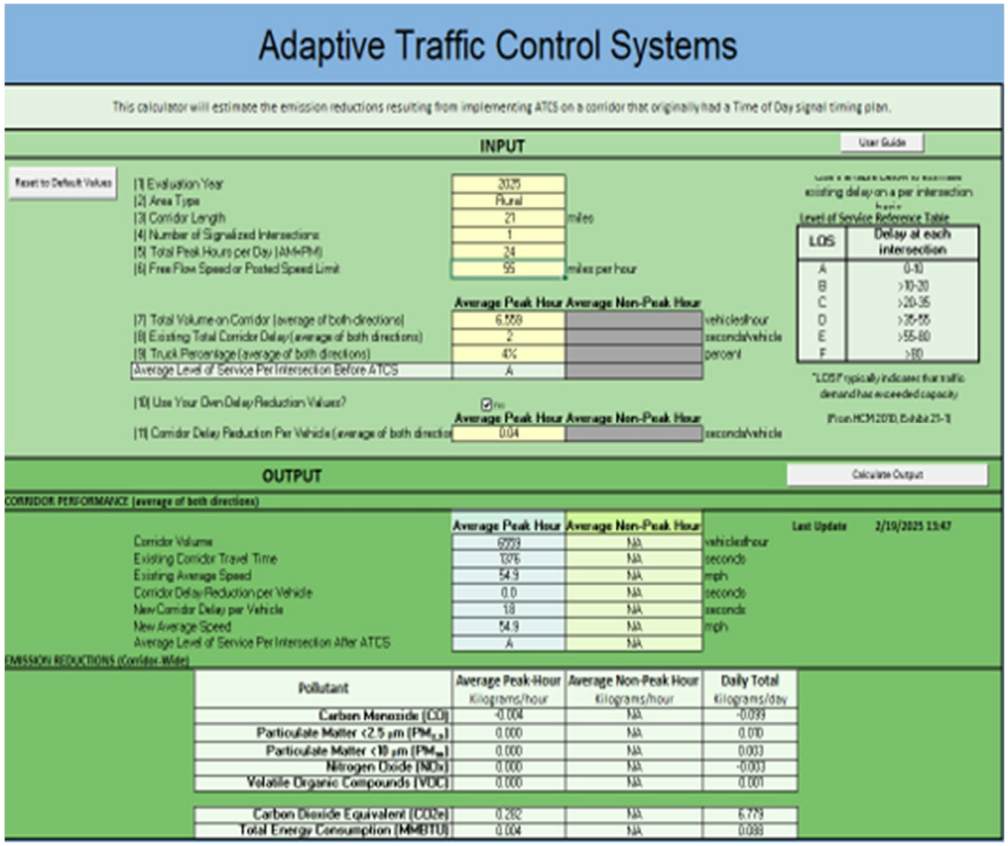


Figure 22. IRIB Access Point (NB) – CMAQ Toolkit Output



Adaptive Traffic Control Systems

This calculator will estimate the emission reductions resulting from implementing ATCS on a corridor that originally had a Time of Day signal timing plan.

INPUT

User Guide

Reset to Default Values

[1] Evaluation Year	2025		
[2] Area Type	Rural		
[3] Corridor Length	21	miles	
[4] Number of Signalized Intersections	1		
[5] Total Peak Hours per Day (AM+PM)	24		
[6] Free Flow Speed or Posted Speed Limit	55	miles per hour	

	Average Peak Hour	Average Non-Peak Hour	
[7] Total Volume on Corridor (average of both directions)	6,559		vehicles/hour
[8] Existing Total Corridor Delay (average of both directions)	2		seconds/vehicle
[9] Truck Percentage (average of both directions)	4%		percent
Average Level of Service Per Intersection Before ATCS	A		

[10] Use Your Own Delay Reduction Values? ☑ Yes

	Average Peak Hour	Average Non-Peak Hour	
[11] Corridor Delay Reduction Per Vehicle (average of both directio	0.04		seconds/vehicle

Use the table below to estimate existing delay on a per intersection basis.

Level of Service Reference Table

LOS	Delay at each intersection
A	0-10
B	>10-20
C	>20-35
D	>35-55
E	>55-80
F	>80

*LOS F typically indicates that traffic demand has exceeded capacity

(From HCM 2010, Exhibit 21-1)

OUTPUT

Calculate Output

CORRIDOR PERFORMANCE (average of both directions)

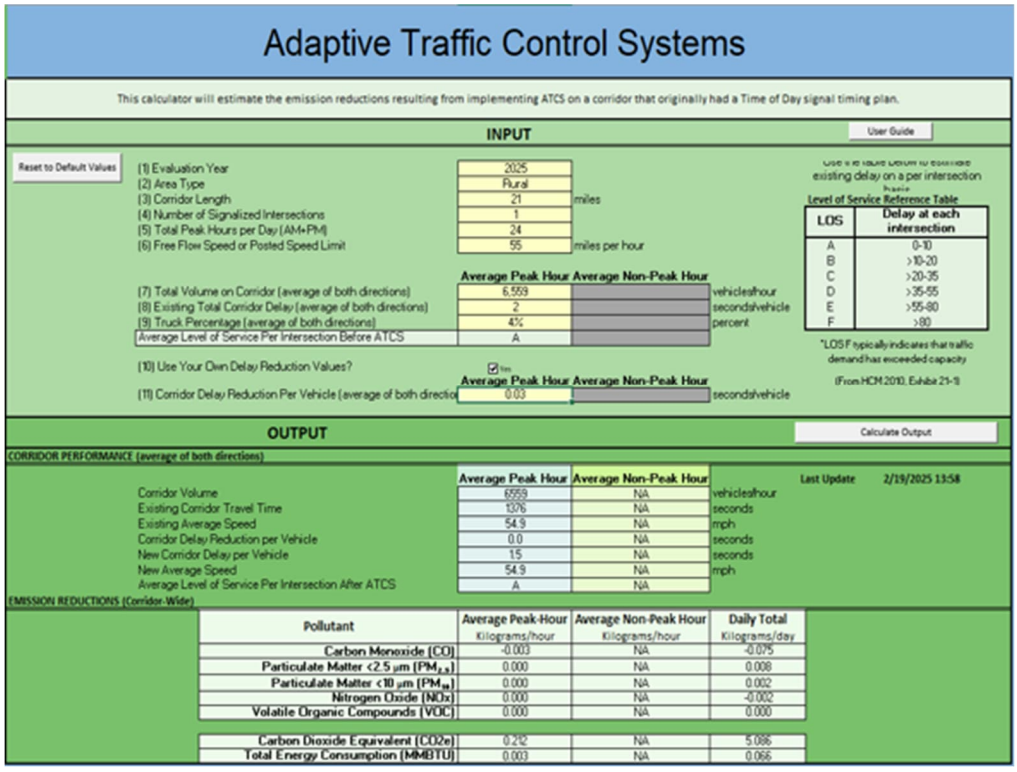
Last Update 2/19/2025 13:47

	Average Peak Hour	Average Non-Peak Hour	
Corridor Volume	6559	NA	vehicles/hour
Existing Corridor Travel Time	1376	NA	seconds
Existing Average Speed	54.9	NA	mph
Corridor Delay Reduction per Vehicle	0.0	NA	seconds
New Corridor Delay per Vehicle	1.8	NA	seconds
New Average Speed	54.9	NA	mph
Average Level of Service Per Intersection After ATCS	A	NA	

EMISSION REDUCTIONS (Corridor-Wide)

Pollutant	Average Peak-Hour Kilograms/hour	Average Non-Peak Hour Kilograms/hour	Daily Total Kilograms/day
Carbon Monoxide (CO)	-0.004	NA	-0.099
Particulate Matter <2.5 μm ($PM_{2.5}$)	0.000	NA	0.010
Particulate Matter <10 μm (PM_{10})	0.000	NA	0.003
Nitrogen Oxide (NOx)	0.000	NA	-0.003
Volatile Organic Compounds (VOC)	0.000	NA	0.001
Carbon Dioxide Equivalent (CO_2e)	0.282	NA	6.779
Total Energy Consumption (MMBTU)	0.004	NA	0.088

Figure 23 IRIB Access Point (SB) – CMAQ Toolkit Output



Adaptive Traffic Control Systems

This calculator will estimate the emission reductions resulting from implementing ATCS on a corridor that originally had a Time of Day signal timing plan.

INPUT

User Guide

Reset to Default Values

[1] Evaluation Year	2025		
[2] Area Type	Rural		
[3] Corridor Length	21	miles	
[4] Number of Signalized Intersections	1		
[5] Total Peak Hours per Day (AM+PM)	24		
[6] Free Flow Speed or Posted Speed Limit	55	miles per hour	

	Average Peak Hour	Average Non-Peak Hour	
[7] Total Volume on Corridor (average of both directions)	6,559		vehicles/hour
[8] Existing Total Corridor Delay (average of both directions)	2		seconds/vehicle
[9] Truck Percentage (average of both directions)	4%		percent
Average Level of Service Per Intersection Before ATCS	A		

[10] Use Your Own Delay Reduction Values? ☑ Yes

	Average Peak Hour	Average Non-Peak Hour	
[11] Corridor Delay Reduction Per Vehicle (average of both directio	0.03		seconds/vehicle

Use the table below to estimate existing delay on a per intersection basis.

Level of Service Reference Table

LOS	Delay at each intersection
A	0-10
B	>10-20
C	>20-35
D	>35-55
E	>55-80
F	>80

*LOS F typically indicates that traffic demand has exceeded capacity

(From HCM 2010, Exhibit 21-1)

OUTPUT

Calculate Output

CORRIDOR PERFORMANCE (average of both directions)

Last Update 2/19/2025 13:58

	Average Peak Hour	Average Non-Peak Hour	
Corridor Volume	6559	NA	vehicles/hour
Existing Corridor Travel Time	1376	NA	seconds
Existing Average Speed	54.9	NA	mph
Corridor Delay Reduction per Vehicle	0.0	NA	seconds
New Corridor Delay per Vehicle	1.5	NA	seconds
New Average Speed	54.9	NA	mph
Average Level of Service Per Intersection After ATCS	A	NA	

EMISSION REDUCTIONS (Corridor-Wide)

Pollutant	Average Peak-Hour Kilograms/hour	Average Non-Peak Hour Kilograms/hour	Daily Total Kilograms/day
Carbon Monoxide (CO)	-0.003	NA	-0.075
Particulate Matter <2.5 μm ($PM_{2.5}$)	0.000	NA	0.008
Particulate Matter <10 μm (PM_{10})	0.000	NA	0.002
Nitrogen Oxide (NOx)	0.000	NA	-0.002
Volatile Organic Compounds (VOC)	0.000	NA	0.000
Carbon Dioxide Equivalent (CO_2e)	0.212	NA	5.086
Total Energy Consumption (MMBTU)	0.003	NA	0.066

1.4.7 ITMS Wireless – Kirkwood Hwy - SR 141 to Meadowood

This project was reported to PAS for FY2025 as a quantitative entry. The project is listed under CMAQ ID No. T202504703. The information presented in the tables and figures below was used to calculate annual emissions reductions.

Table 18. Kirkwood Hwy - SR 141 to Meadowood – CMAQ Toolkit Inputs

Input ID	Input Field	Direction of Travel	
		EB	*WB*
(1)	Evaluation Year	2025	2025
(2)	Area Type	URBAN	URBAN
(3)	Corridor Length (miles)	21.54	21.54
(4)	Number of Signalized Intersections	1	1
(5)	Total Peak Hours per Day (AM+PM)	24	24
(6)	Free Flow Speed or Posted Speed Limit	44.19	44.19
(7)	Total Volume on Corridor or Direction of Travel (Daily)	37,826.88	37,826.88
	Total Volume on Corridor or Direction of Travel (Veh/Hour)	1,576.12	1,576.12
(8)	Existing Total Travel Delay Per Vehicle (sec)	2.47	3.14
(9)	Truck Percentage	5.00%	5.00%
(10)	Use Your Own Delay Reduction Values	Y	Y
(11)	Corridor Delay Reduction per Vehicle	0.049	0.06

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Figure 24. Kirkwood Hwy - SR 141 to Meadowood – System Location Map

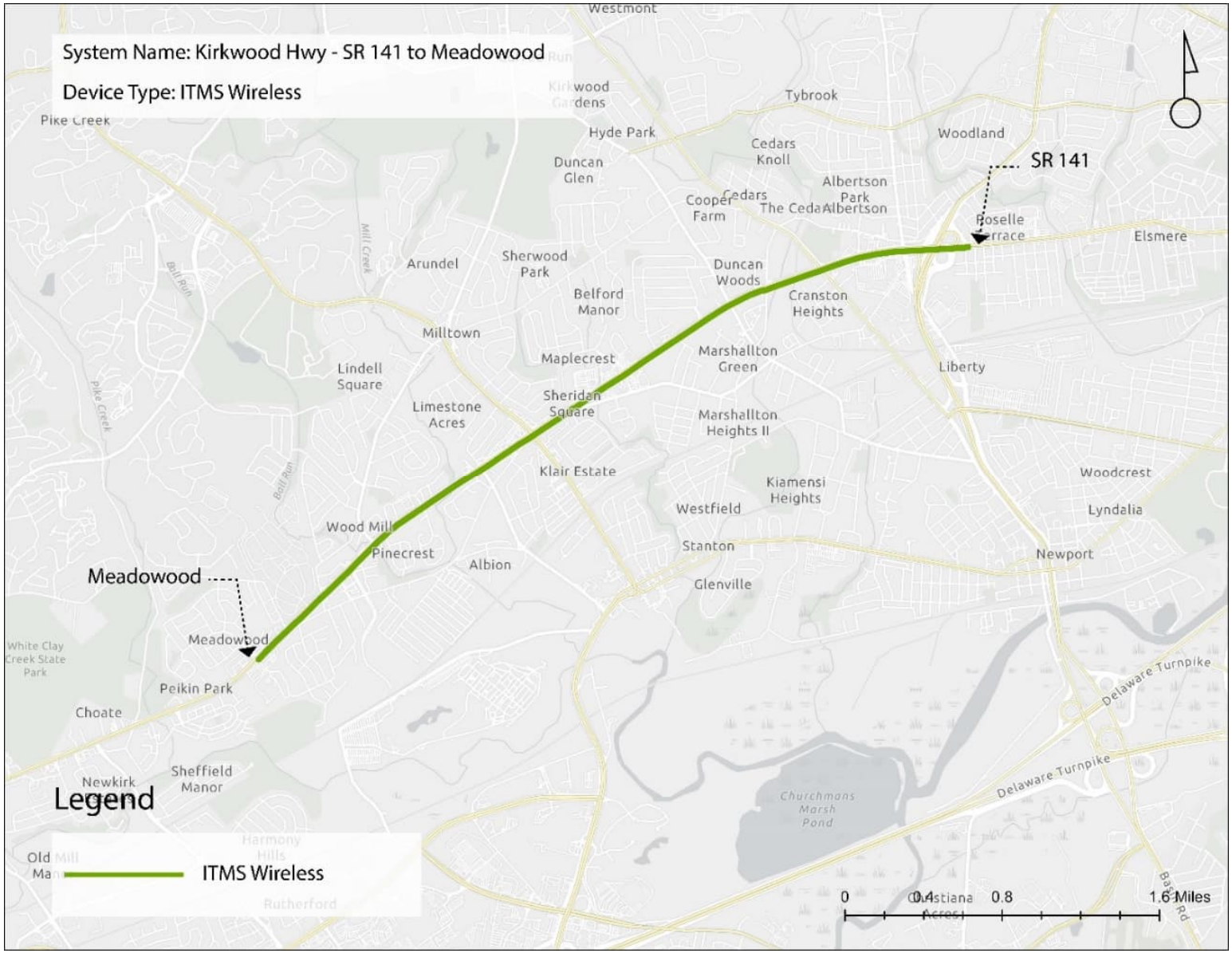
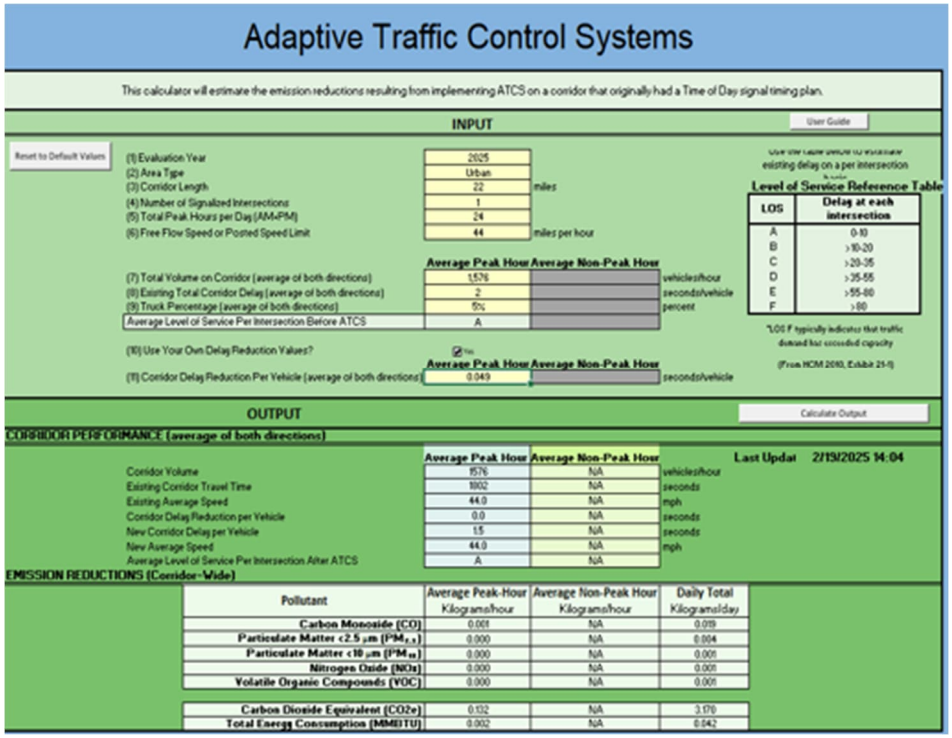


Figure 25. Kirkwood Hwy - SR 141 to Meadowood (EB) – CMAQ Toolkit Outputs



Adaptive Traffic Control Systems

This calculator will estimate the emission reductions resulting from implementing ATCS on a corridor that originally had a Time of Day signal timing plan.

INPUT

User Guide

Reset to Default Values

			Average Peak Hour	Average Non-Peak Hour	
(1) Evaluation Year	2025				
(2) Area Type	Urban				
(3) Corridor Length	22	miles			
(4) Number of Signalized Intersections	1				
(5) Total Peak Hours per Day (AM-PM)	24				
(6) Free Flow Speed or Posted Speed Limit	44	miles per hour			
(7) Total Volume on Corridor (average of both directions)	1,576				vehicles/hour
(8) Existing Total Corridor Delay (average of both directions)	2				seconds/vehicle
(9) Truck Percentage (average of both directions)	5%				percent
Average Level of Service Per Intersection Before ATCS	A				
(10) Use Your Own Delay Reduction Values?	☑ Yes				
(11) Corridor Delay Reduction Per Vehicle (average of both directions)	0.049				seconds/vehicle

Use the table below to estimate existing delay on a per intersection basis.

Level of Service Reference Table

LOS	Delay at each intersection
A	0-10
B	>10-20
C	>20-35
D	>35-55
E	>55-80
F	>80

*LOS F typically indicates that traffic demand has exceeded capacity

(From HCM 2010, Exhibit 21-1)

OUTPUT

Calculate Output

CORRIDOR PERFORMANCE (average of both directions)

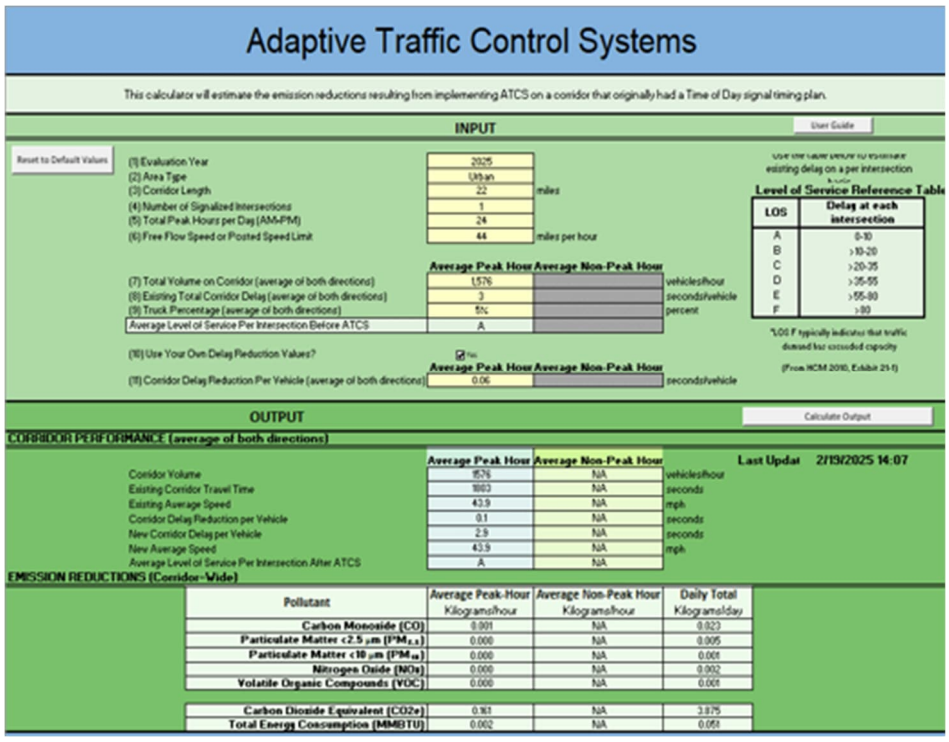
Last Updat 2/19/2025 14:04

	Average Peak Hour	Average Non-Peak Hour	
Corridor Volume	1576	NA	vehicles/hour
Existing Corridor Travel Time	1802	NA	seconds
Existing Average Speed	44.0	NA	mph
Corridor Delay Reduction per Vehicle	0.0	NA	seconds
New Corridor Delay per Vehicle	1.5	NA	seconds
New Average Speed	44.0	NA	mph
Average Level of Service Per Intersection After ATCS	A	NA	

EMISSION REDUCTIONS (Corridor-Wide)

Pollutant	Average Peak-Hour Kilograms/hour	Average Non-Peak Hour Kilograms/hour	Daily Total Kilograms/day
Carbon Monoxide (CO)	0.001	NA	0.019
Particulate Matter <2.5 μm ($PM_{2.5}$)	0.000	NA	0.004
Particulate Matter <10 μm (PM_{10})	0.000	NA	0.001
Nitrogen Oxide (NOx)	0.000	NA	0.001
Volatile Organic Compounds (VOC)	0.000	NA	0.001
Carbon Dioxide Equivalent (CO_2e)	0.132	NA	3.170
Total Energy Consumption (MMBTU)	0.002	NA	0.042

Figure 26. Kirkwood Hwy - SR 141 to Meadowood (WB) – CMAQ Toolkit Outputs



Adaptive Traffic Control Systems

This calculator will estimate the emission reductions resulting from implementing ATCS on a corridor that originally had a Time of Day signal timing plan.

INPUT

User Guide

Reset to Default Values

			Average Peak Hour	Average Non-Peak Hour	
(1) Evaluation Year	2025				
(2) Area Type	Urban				
(3) Corridor Length	22	miles			
(4) Number of Signalized Intersections	1				
(5) Total Peak Hours per Day (AM-PM)	24				
(6) Free Flow Speed or Posted Speed Limit	44	miles per hour			
(7) Total Volume on Corridor (average of both directions)	1,576				vehicles/hour
(8) Existing Total Corridor Delay (average of both directions)	3				seconds/vehicle
(9) Truck Percentage (average of both directions)	5%				percent
Average Level of Service Per Intersection Before ATCS	A				
(10) Use Your Own Delay Reduction Values?	☑ Yes				
(11) Corridor Delay Reduction Per Vehicle (average of both directions)	0.06				seconds/vehicle

Use the table below to estimate existing delay on a per intersection basis.

Level of Service Reference Table

LOS	Delay at each intersection
A	0-10
B	>10-20
C	>20-35
D	>35-55
E	>55-80
F	>80

*LOS F typically indicates that traffic demand has exceeded capacity

(From HCM 2010, Exhibit 21-1)

OUTPUT

Calculate Output

CORRIDOR PERFORMANCE (average of both directions)

Last Updat 2/19/2025 14:07

	Average Peak Hour	Average Non-Peak Hour	
Corridor Volume	1576	NA	vehicles/hour
Existing Corridor Travel Time	1803	NA	seconds
Existing Average Speed	43.9	NA	mph
Corridor Delay Reduction per Vehicle	0.1	NA	seconds
New Corridor Delay per Vehicle	2.9	NA	seconds
New Average Speed	43.9	NA	mph
Average Level of Service Per Intersection After ATCS	A	NA	

EMISSION REDUCTIONS (Corridor-Wide)

Pollutant	Average Peak-Hour Kilograms/hour	Average Non-Peak Hour Kilograms/hour	Daily Total Kilograms/day
Carbon Monoxide (CO)	0.001	NA	0.023
Particulate Matter <2.5 μm ($PM_{2.5}$)	0.000	NA	0.005
Particulate Matter <10 μm (PM_{10})	0.000	NA	0.001
Nitrogen Oxide (NOx)	0.000	NA	0.002
Volatile Organic Compounds (VOC)	0.000	NA	0.001
Carbon Dioxide Equivalent (CO_2e)	0.161	NA	3.875
Total Energy Consumption (MMBTU)	0.002	NA	0.051

1.4.8 ITMS Wireless – Lewes to Milton I

This project was reported to PAS for FY2025 as a quantitative entry. The project is listed under CMAQ ID No. T202504703. The information presented in the tables and figures below was used to calculate annual emissions reductions.

Table 19. Lewes to Milton I – CMAQ Toolkit Inputs

Input ID	Input Field	Direction of Travel	
		NB	*SB*
(1)	Evaluation Year	2025	2025
(2)	Area Type	URBAN	URBAN
(3)	Corridor Length (miles)	13.22	13.22
(4)	Number of Signalized Intersections	1	1
(5)	Total Peak Hours per Day (AM+PM)	24	24
(6)	Free Flow Speed or Posted Speed Limit	29.90	29.90
(7)	Total Volume on Corridor or Direction of Travel (Daily)	13,154.16	13,154.16
	Total Volume on Corridor or Direction of Travel (Veh/Hour)	548.09	548.09
(8)	Existing Total Travel Delay Per Vehicle (sec)	0	0
(9)	Truck Percentage	4.20%	4.20%
(10)	Use Your Own Delay Reduction Values	Y	Y
(11)	Corridor Delay Reduction per Vehicle	0	0

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Figure 27. Lewes to Milton I – System Location Map

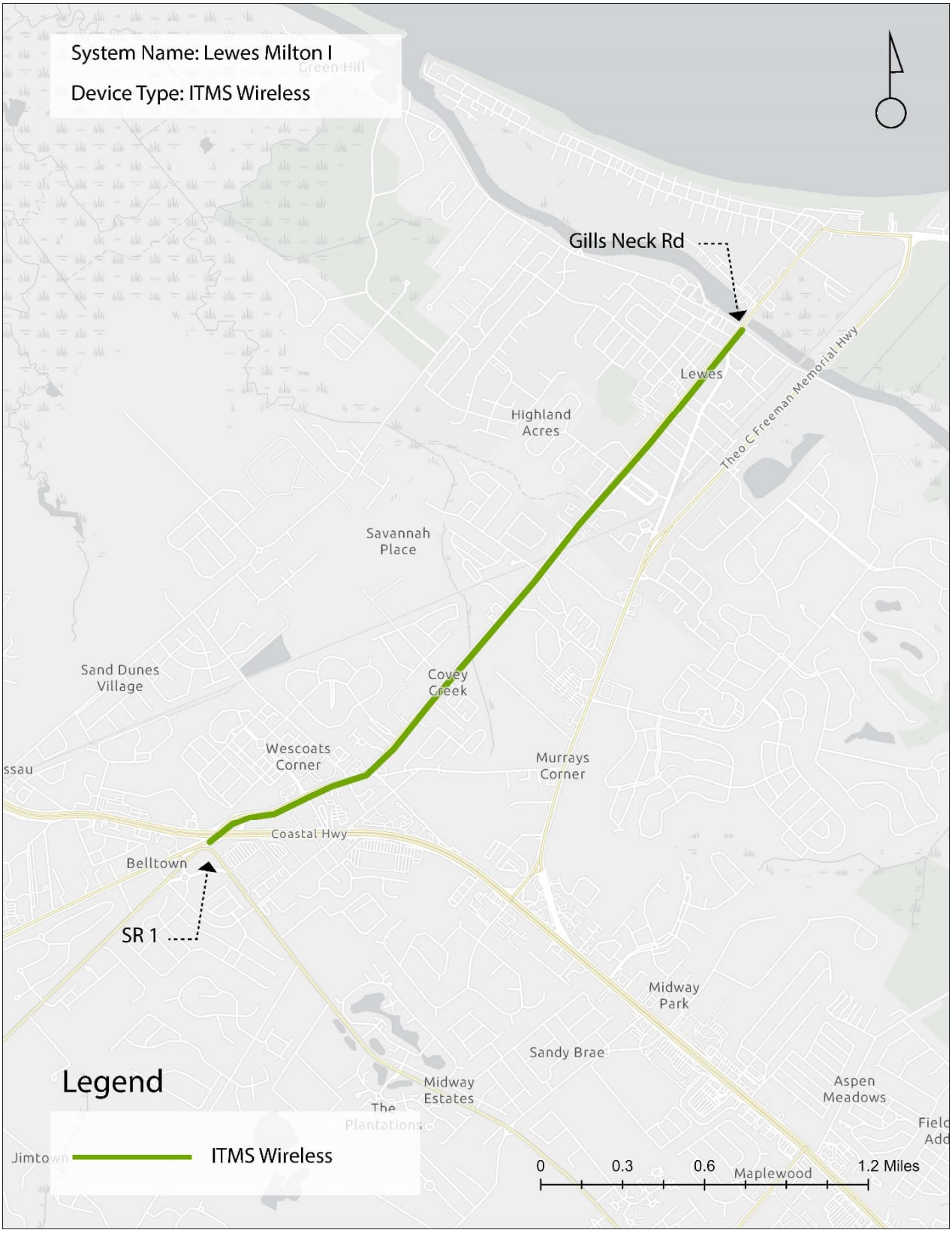


Figure 28. Lewes to Milton I (EB) – CMAQ Toolkit Outputs

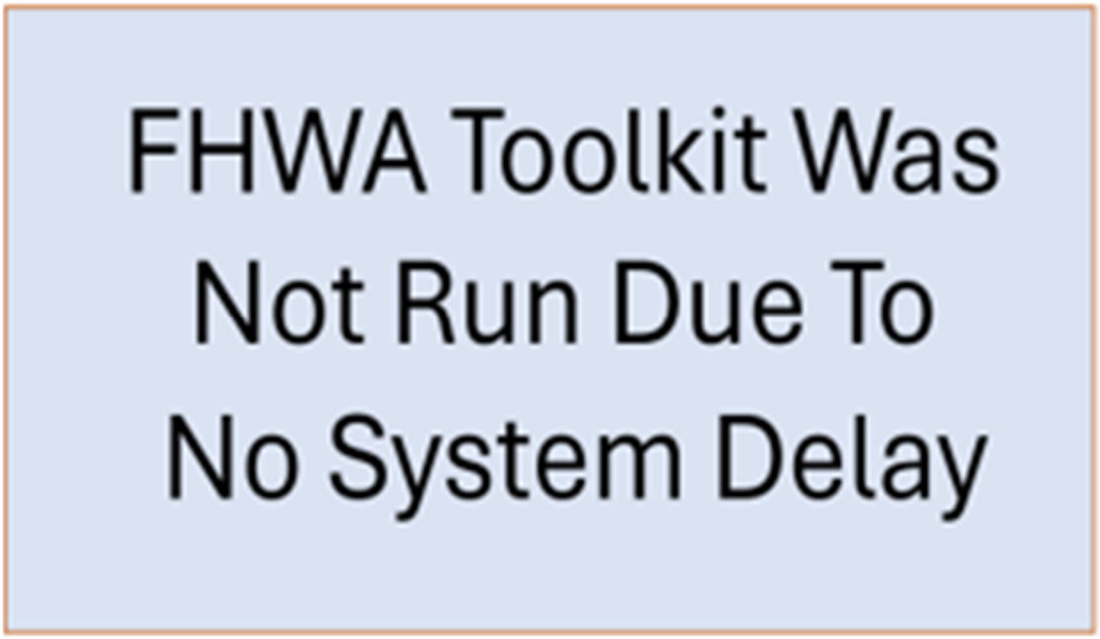
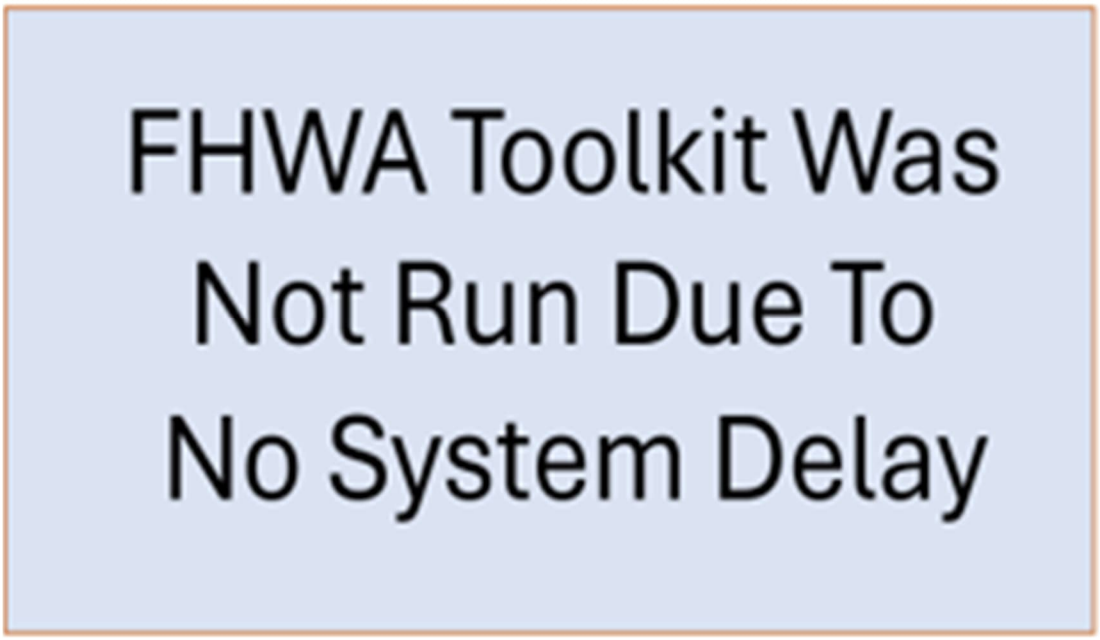


Figure 29. Lewes to Milton I (WB) – CMAQ Toolkit Outputs



1.4.9 ITMS Wireless – Lewes to Milton II

This project was reported to PAS for FY2025 as a quantitative entry. The project is listed under CMAQ ID No. T202504703. The information presented in the tables and figures below was used to calculate annual emissions reductions.

Table 20. Lewes to Milton II – CMAQ Toolkit Inputs

Input ID	Input Field	Direction of Travel	
		EB	*WB*
(1)	Evaluation Year	2025	2025
(2)	Area Type	URBAN	URBAN
(3)	Corridor Length (miles)	8.45	8.45
(4)	Number of Signalized Intersections	1	1
(5)	Total Peak Hours per Day (AM+PM)	24	24
(6)	Free Flow Speed or Posted Speed Limit	35	35
(7)	Total Volume on Corridor or Direction of Travel (Daily)	11,141.28	11,141.28
	Total Volume on Corridor or Direction of Travel (Veh/Hour)	548.09	548.09
(8)	Existing Total Travel Delay Per Vehicle (sec)	1.17	1.50
(9)	Truck Percentage	4.20%	4.20%
(10)	Use Your Own Delay Reduction Values	Y	Y
(11)	Corridor Delay Reduction per Vehicle	.023	.030

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Figure 30. Lewes to Milton II – System Location Map

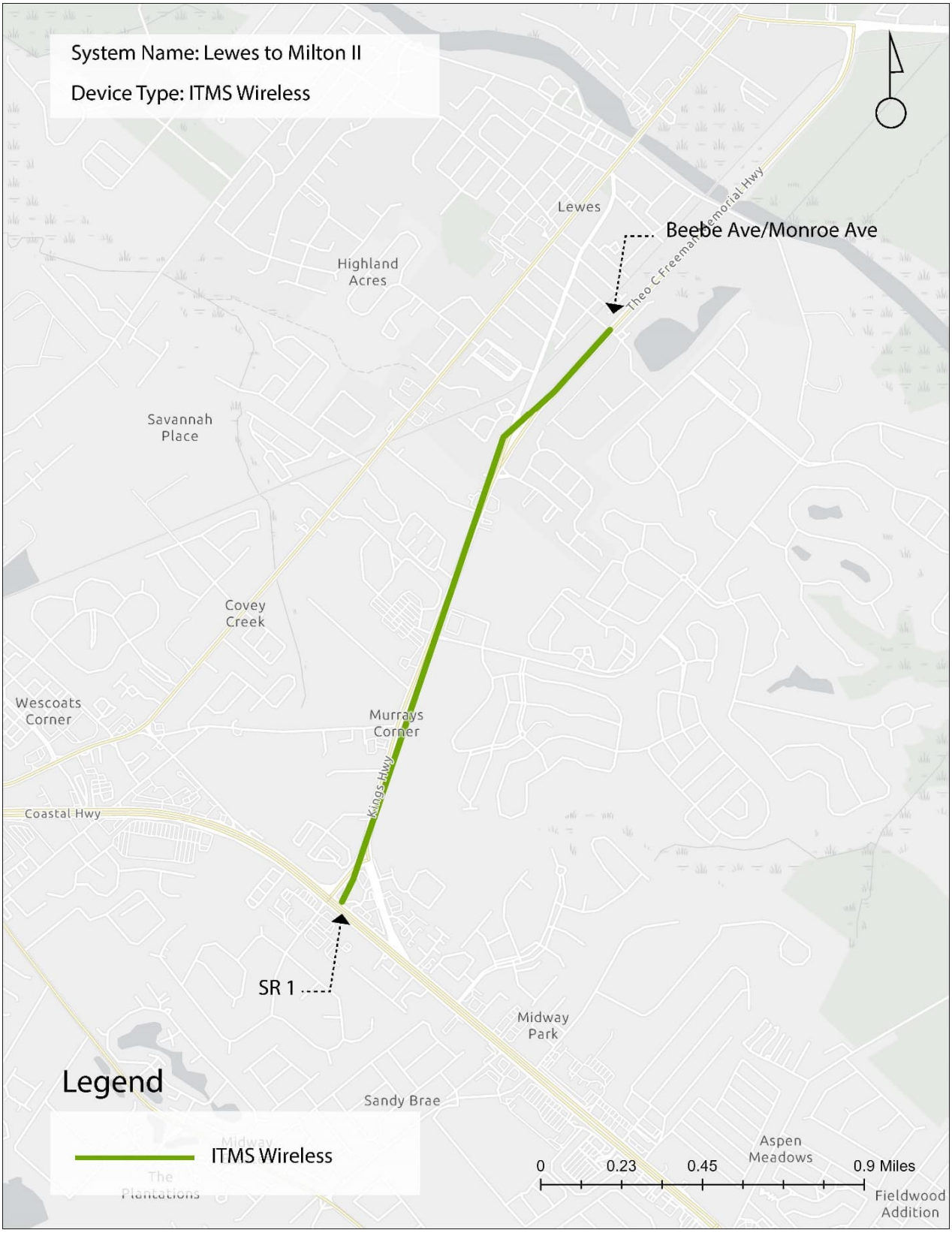
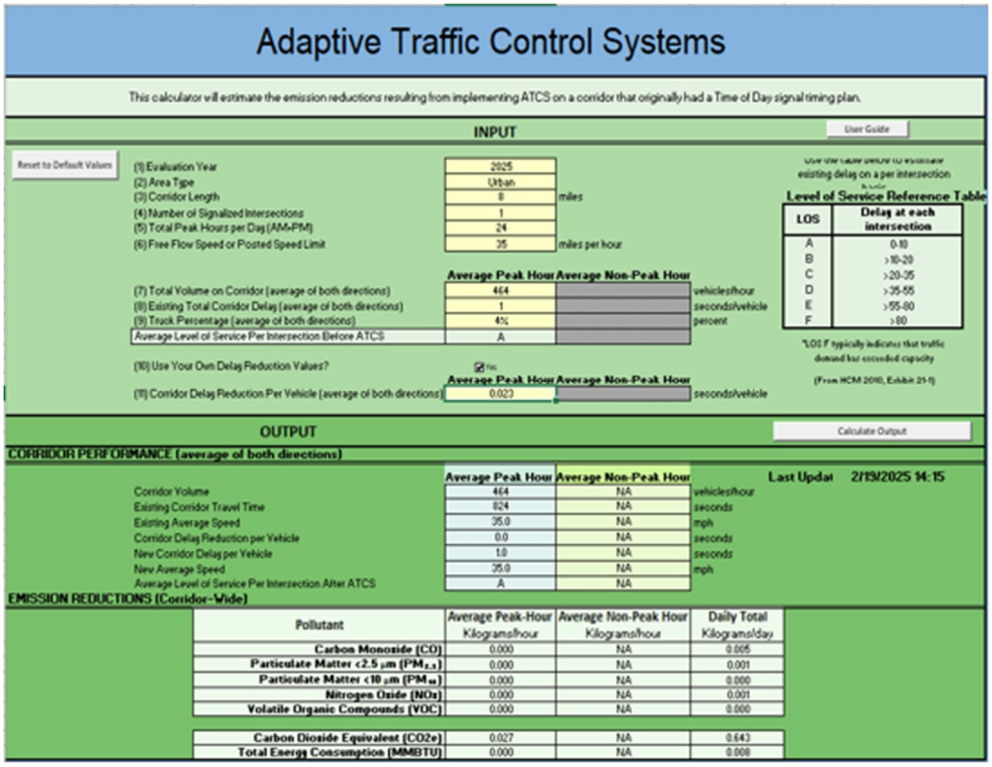


Figure 31. Lewes to Milton II (NB) – CMAQ Toolkit Outputs



Adaptive Traffic Control Systems

This calculator will estimate the emission reductions resulting from implementing ATCS on a corridor that originally had a Time of Day signal timing plan.

INPUT

User Guide

Reset to Default Values

(1) Evaluation Year	2025	
(2) Area Type	Urban	
(3) Corridor Length	8	miles
(4) Number of Signalized Intersections	1	
(5) Total Peak Hours per Day (AM-PM)	24	
(6) Free Flow Speed or Posted Speed Limit	35	miles per hour

	Average Peak Hour	Average Non-Peak Hour	
(7) Total Volume on Corridor (average of both directions)	464		vehicles/hour
(8) Existing Total Corridor Delay (average of both directions)	1		seconds/vehicle
(9) Truck Percentage (average of both directions)	4%		percent
Average Level of Service Per Intersection Before ATCS	A		

(10) Use Your Own Delay Reduction Values? ☑ Yes

	Average Peak Hour	Average Non-Peak Hour	
(11) Corridor Delay Reduction Per Vehicle (average of both directions)	0.023		seconds/vehicle

Use the table below to estimate existing delay on a per intersection basis.

Level of Service Reference Table

LOS	Delay at each intersection
A	0-10
B	>10-20
C	>20-35
D	>35-55
E	>55-80
F	>80

*LOS F typically indicates that traffic demand has exceeded capacity

(From HCM 2010, Exhibit 21-1)

OUTPUT

Calculate Output

CORRIDOR PERFORMANCE (average of both directions)

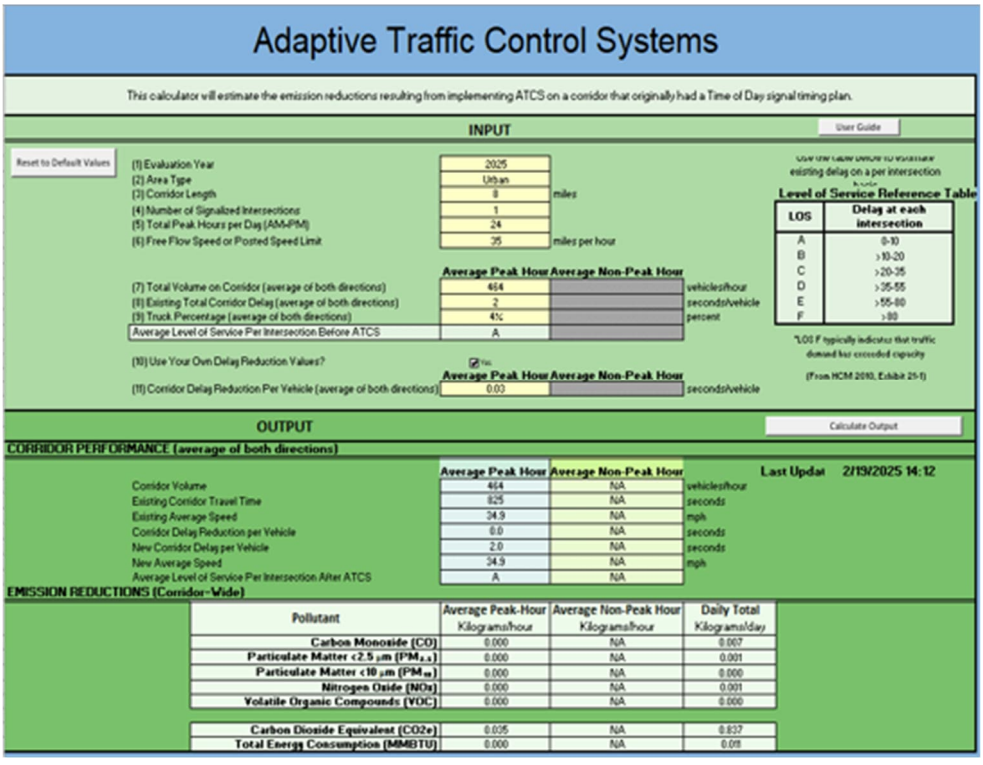
Last Updat 2/19/2025 14:15

	Average Peak Hour	Average Non-Peak Hour	
Corridor Volume	464	NA	vehicles/hour
Existing Corridor Travel Time	824	NA	seconds
Existing Average Speed	35.0	NA	mph
Corridor Delay Reduction per Vehicle	0.0	NA	seconds
New Corridor Delay per Vehicle	1.0	NA	seconds
New Average Speed	35.0	NA	mph
Average Level of Service Per Intersection After ATCS	A	NA	

EMISSION REDUCTIONS (Corridor-Wide)

Pollutant	Average Peak-Hour Kilograms/hour	Average Non-Peak Hour Kilograms/hour	Daily Total Kilograms/day
Carbon Monoxide (CO)	0.000	NA	0.005
Particulate Matter <2.5 μm ($PM_{2.5}$)	0.000	NA	0.001
Particulate Matter <10 μm (PM_{10})	0.000	NA	0.000
Nitrogen Oxide (NO_x)	0.000	NA	0.001
Volatile Organic Compounds (VOC)	0.000	NA	0.000
Carbon Dioxide Equivalent (CO_2e)	0.027	NA	0.643
Total Energy Consumption (MMBTU)	0.000	NA	0.008

Figure 32. Lewes to Milton II (SB) – CMAQ Toolkit Outputs



Adaptive Traffic Control Systems

This calculator will estimate the emission reductions resulting from implementing ATCS on a corridor that originally had a Time of Day signal timing plan.

INPUT

User Guide

Reset to Default Values

(1) Evaluation Year	2025	
(2) Area Type	Urban	
(3) Corridor Length	8	miles
(4) Number of Signalized Intersections	1	
(5) Total Peak Hours per Day (AM-PM)	24	
(6) Free Flow Speed or Posted Speed Limit	35	miles per hour

	Average Peak Hour	Average Non-Peak Hour	
(7) Total Volume on Corridor (average of both directions)	464		vehicles/hour
(8) Existing Total Corridor Delay (average of both directions)	2		seconds/vehicle
(9) Truck Percentage (average of both directions)	4%		percent
Average Level of Service Per Intersection Before ATCS	A		

(10) Use Your Own Delay Reduction Values? ☑ Yes

	Average Peak Hour	Average Non-Peak Hour	
(11) Corridor Delay Reduction Per Vehicle (average of both directions)	0.03		seconds/vehicle

Use the table below to estimate existing delay on a per intersection basis.

Level of Service Reference Table

LOS	Delay at each intersection
A	0-10
B	>10-20
C	>20-35
D	>35-55
E	>55-80
F	>80

*LOS F typically indicates that traffic demand has exceeded capacity

(From HCM 2010, Exhibit 21-1)

OUTPUT

Calculate Output

CORRIDOR PERFORMANCE (average of both directions)

Last Updat 2/19/2025 14:12

	Average Peak Hour	Average Non-Peak Hour	
Corridor Volume	464	NA	vehicles/hour
Existing Corridor Travel Time	825	NA	seconds
Existing Average Speed	34.9	NA	mph
Corridor Delay Reduction per Vehicle	0.0	NA	seconds
New Corridor Delay per Vehicle	2.0	NA	seconds
New Average Speed	34.9	NA	mph
Average Level of Service Per Intersection After ATCS	A	NA	

EMISSION REDUCTIONS (Corridor-Wide)

Pollutant	Average Peak-Hour Kilograms/hour	Average Non-Peak Hour Kilograms/hour	Daily Total Kilograms/day
Carbon Monoxide (CO)	0.000	NA	0.007
Particulate Matter <2.5 μm ($PM_{2.5}$)	0.000	NA	0.001
Particulate Matter <10 μm (PM_{10})	0.000	NA	0.000
Nitrogen Oxide (NO_x)	0.000	NA	0.001
Volatile Organic Compounds (VOC)	0.000	NA	0.000
Carbon Dioxide Equivalent (CO_2e)	0.035	NA	0.837
Total Energy Consumption (MMBTU)	0.000	NA	0.011

1.4.10 ITMS Wireless – Milton DivComm Tower

This project was reported to PAS for FY2025 as a quantitative entry. The project is listed under CMAQ ID No. T202504703. The information presented in the tables and figures below was used to calculate annual emissions reductions.

Table 21. Milton DivComm Tower – CMAQ Toolkit Inputs

Input ID	Input Field	Direction of Travel	
		NB	*SB*
(1)	Evaluation Year	2025	2025
(2)	Area Type	RURAL	RURAL
(3)	Corridor Length (miles)	0.77	0.77
(4)	Number of Signalized Intersections	1	1
(5)	Total Peak Hours per Day (AM+PM)	24	24
(6)	Free Flow Speed or Posted Speed Limit	25.00	25.00
(7)	Total Volume on Corridor or Direction of Travel (Daily)	5,992.08	5,992.08
	Total Volume on Corridor or Direction of Travel (Veh/Hour)	249.67	249.67
(8)	Existing Total Travel Delay Per Vehicle (sec)	-	-
(9)	Truck Percentage	5.00%	5.00%
(10)	Use Your Own Delay Reduction Values	Y	Y
(11)	Corridor Delay Reduction per Vehicle	0.000	0.000

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Figure 33. Milton DivComm Tower – System Location Map

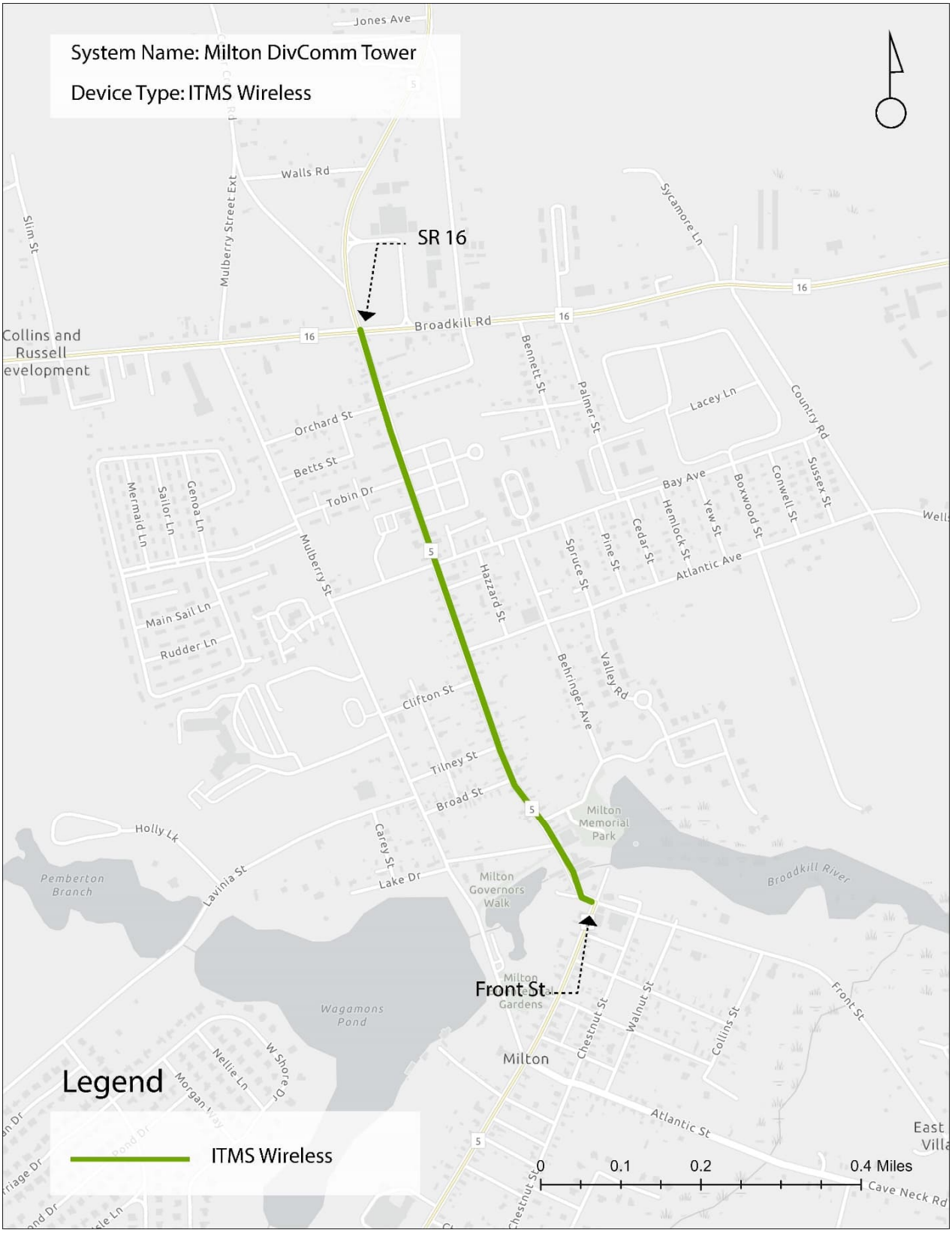


Figure 34. Milton DivComm Tower (NB) – CMAQ Toolkit Outputs

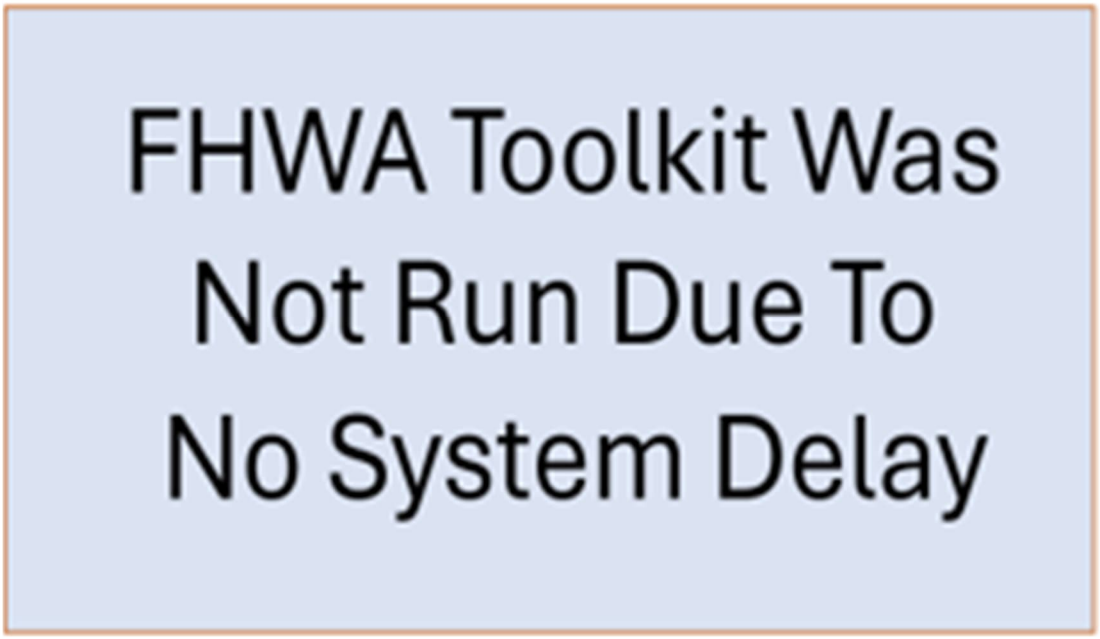
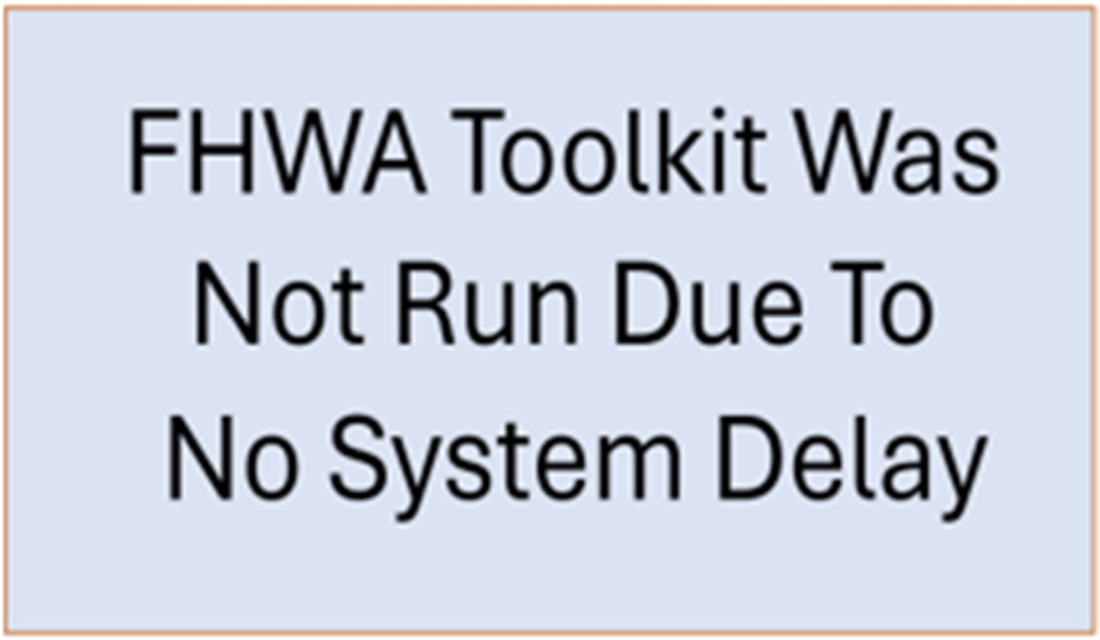


Figure 35. Milton DivComm Tower (SB) – CMAQ Toolkit Outputs



1.4.11 Fiber Installation – SR 4 at SR 72

This project was reported to PAS for FY2025 as a quantitative entry. The project is listed under CMAQ ID No. T202504703. The information presented in the tables and figures below was used to calculate annual emissions reductions.

Table 22. SR 4 at SR 72– CMAQ Toolkit Inputs

Input ID	Input Field	Direction of Travel	
		NB	*SB*
(1)	Evaluation Year	2025	2025
(2)	Area Type	URBAN	URBAN
(3)	Corridor Length (miles)	6.00	6.00
(4)	Number of Signalized Intersections	1	1
(5)	Total Peak Hours per Day (AM+PM)	24	24
(6)	Free Flow Speed or Posted Speed Limit	50.00	50.00
(7)	Total Volume on Corridor or Direction of Travel (Daily)	24.390.00	24,390.00
	Total Volume on Corridor or Direction of Travel (Veh/Hour)	1,016.25	1,016.25
(8)	Existing Total Travel Delay Per Vehicle (sec)	1.45	1.52
(9)	Truck Percentage	5.00%	5.00%
(10)	Use Your Own Delay Reduction Values	Y	Y
(11)	Corridor Delay Reduction per Vehicle	0.029	0.030

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Figure 36. SR 4 at SR 72 – System Location Map

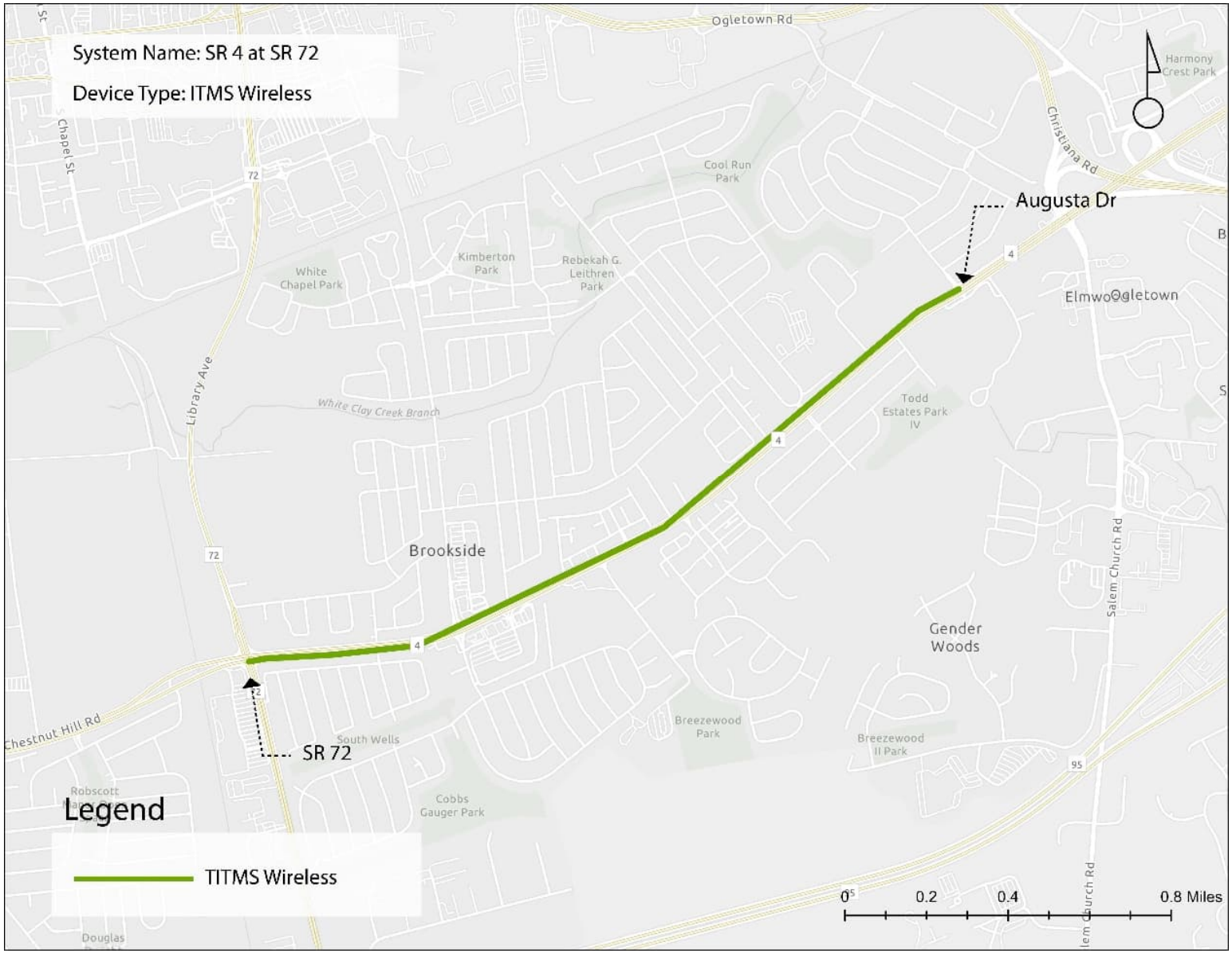
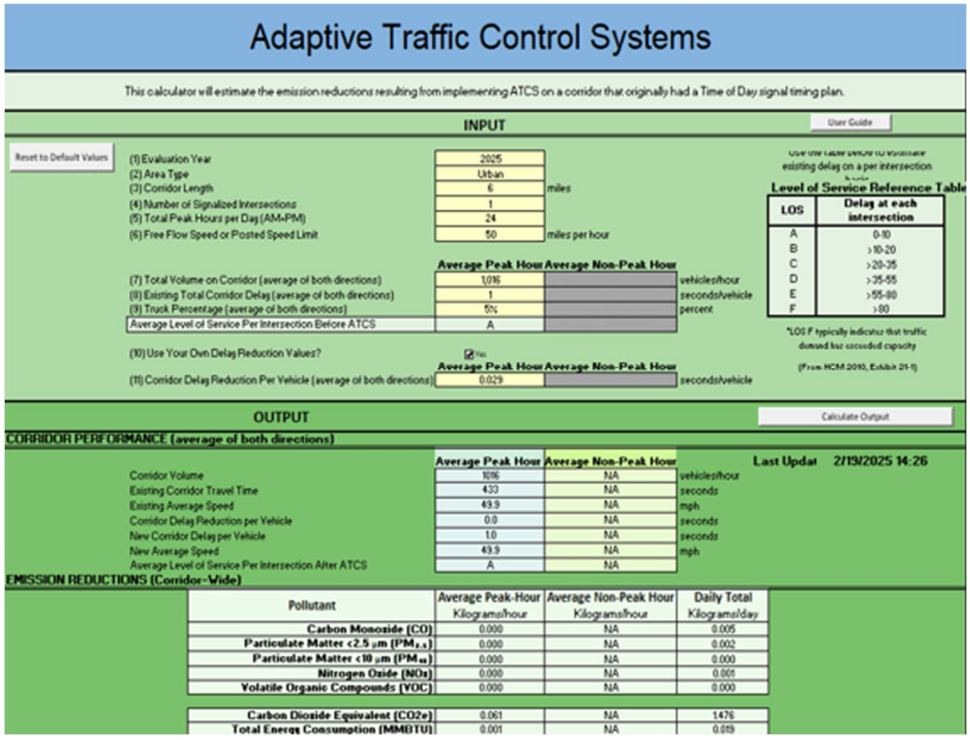


Figure 37. SR 4 at SR 72 (EB) – CMAQ Toolkit Outputs



Adaptive Traffic Control Systems

This calculator will estimate the emission reductions resulting from implementing ATCS on a corridor that originally had a Time of Day signal timing plan.

INPUT

User Guide

Reset to Default Values

(1) Evaluation Year	2025	
(2) Area Type	Urban	
(3) Corridor Length	6	miles
(4) Number of Signalized Intersections	1	
(5) Total Peak Hours per Day (AM+PM)	24	
(6) Free Flow Speed or Posted Speed Limit	50	miles per hour

	Average Peak Hour	Average Non-Peak Hour	
(7) Total Volume on Corridor (average of both directions)	1,016		vehicles/hour
(8) Existing Total Corridor Delay (average of both directions)	1		seconds/vehicle
(9) Truck Percentage (average of both directions)	5%		percent
Average Level of Service Per Intersection Before ATCS	A		

(10) Use Your Own Delay Reduction Values? ☑ Yes

	Average Peak Hour	Average Non-Peak Hour	
(11) Corridor Delay Reduction Per Vehicle (average of both directions)	0.029		seconds/vehicle

Use the table below to estimate existing delay on a per intersection basis.

Level of Service Reference Table

LOS	Delay at each intersection
A	0-10
B	>10-20
C	>20-35
D	>35-55
E	>55-80
F	>80

*LOS F typically indicates that traffic demand has exceeded capacity

(From HCM 2010, Exhibit 21-1)

OUTPUT

Calculate Output

CORRIDOR PERFORMANCE (average of both directions)

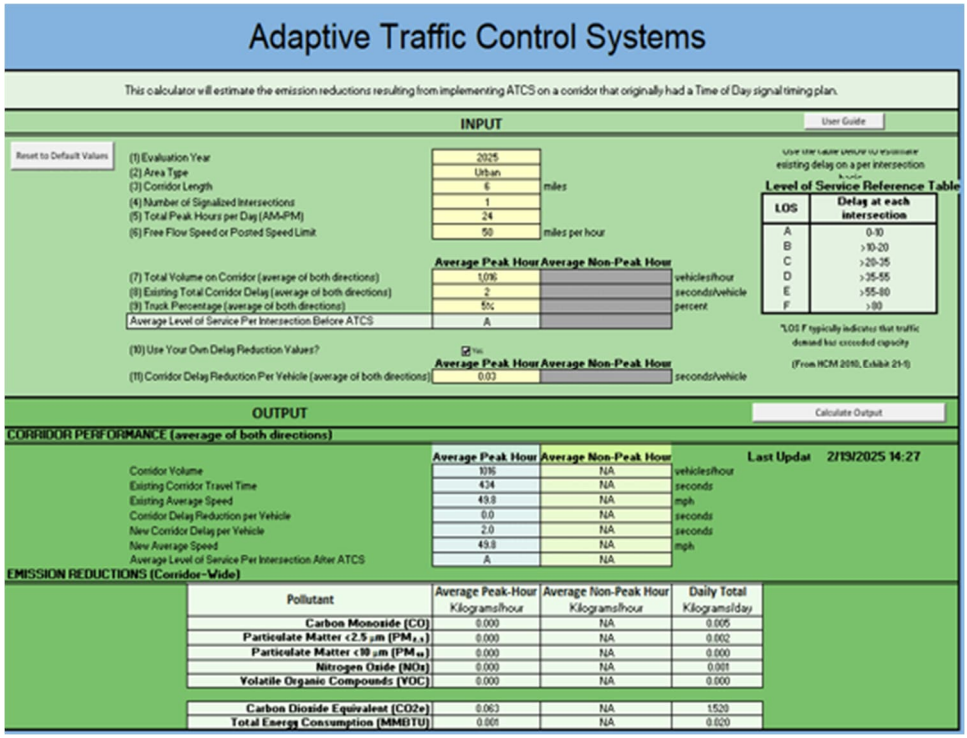
Last Updat 2/19/2025 14:26

	Average Peak Hour	Average Non-Peak Hour	
Corridor Volume	1016	NA	vehicles/hour
Existing Corridor Travel Time	430	NA	seconds
Existing Average Speed	49.9	NA	mph
Corridor Delay Reduction per Vehicle	0.0	NA	seconds
New Corridor Delay per Vehicle	1.0	NA	seconds
New Average Speed	49.9	NA	mph
Average Level of Service Per Intersection After ATCS	A	NA	

EMISSION REDUCTIONS (Corridor-Wide)

Pollutant	Average Peak-Hour Kilograms/hour	Average Non-Peak Hour Kilograms/hour	Daily Total Kilograms/day
Carbon Monoxide (CO)	0.000	NA	0.005
Particulate Matter <2.5 μm ($PM_{2.5}$)	0.000	NA	0.002
Particulate Matter <10 μm (PM_{10})	0.000	NA	0.000
Nitrogen Oxide (NO_x)	0.000	NA	0.001
Volatile Organic Compounds (VOC)	0.000	NA	0.000
Carbon Dioxide Equivalent (CO_2e)	0.061	NA	1.476
Total Energy Consumption (MMBTU)	0.001	NA	0.019

Figure 38. SR 4 at SR 72 (WB) – CMAQ Toolkit Outputs



Adaptive Traffic Control Systems

This calculator will estimate the emission reductions resulting from implementing ATCS on a corridor that originally had a Time of Day signal timing plan.

INPUT

User Guide

Reset to Default Values

(1) Evaluation Year	2025	
(2) Area Type	Urban	
(3) Corridor Length	6	miles
(4) Number of Signalized Intersections	1	
(5) Total Peak Hours per Day (AM+PM)	24	
(6) Free Flow Speed or Posted Speed Limit	50	miles per hour

	Average Peak Hour	Average Non-Peak Hour	
(7) Total Volume on Corridor (average of both directions)	1,016		vehicles/hour
(8) Existing Total Corridor Delay (average of both directions)	2		seconds/vehicle
(9) Truck Percentage (average of both directions)	5%		percent
Average Level of Service Per Intersection Before ATCS	A		

(10) Use Your Own Delay Reduction Values? ☑ Yes

	Average Peak Hour	Average Non-Peak Hour	
(11) Corridor Delay Reduction Per Vehicle (average of both directions)	0.03		seconds/vehicle

Use the table below to estimate existing delay on a per intersection basis.

Level of Service Reference Table

LOS	Delay at each intersection
A	0-10
B	>10-20
C	>20-35
D	>35-55
E	>55-80
F	>80

*LOS F typically indicates that traffic demand has exceeded capacity

(From HCM 2010, Exhibit 21-1)

OUTPUT

Calculate Output

CORRIDOR PERFORMANCE (average of both directions)

Last Updat 2/19/2025 14:27

	Average Peak Hour	Average Non-Peak Hour	
Corridor Volume	1016	NA	vehicles/hour
Existing Corridor Travel Time	434	NA	seconds
Existing Average Speed	49.8	NA	mph
Corridor Delay Reduction per Vehicle	0.0	NA	seconds
New Corridor Delay per Vehicle	2.0	NA	seconds
New Average Speed	49.8	NA	mph
Average Level of Service Per Intersection After ATCS	A	NA	

EMISSION REDUCTIONS (Corridor-Wide)

Pollutant	Average Peak-Hour Kilograms/hour	Average Non-Peak Hour Kilograms/hour	Daily Total Kilograms/day
Carbon Monoxide (CO)	0.000	NA	0.005
Particulate Matter <2.5 μm ($PM_{2.5}$)	0.000	NA	0.002
Particulate Matter <10 μm (PM_{10})	0.000	NA	0.000
Nitrogen Oxide (NO_x)	0.000	NA	0.001
Volatile Organic Compounds (VOC)	0.000	NA	0.000
Carbon Dioxide Equivalent (CO_2e)	0.063	NA	1.520
Total Energy Consumption (MMBTU)	0.001	NA	0.020

1.4.12 ITMS Field Devices – I-495 Northbound at Southern Split DMS

This project was reported to PAS for FY2025 as a quantitative entry. The project is listed under CMAQ ID No. T202504703. The information presented in the tables and figures below was used to calculate annual emissions reductions.

Table 23. I-495 Northbound at Southern Split DMS – CMAQ Toolkit Inputs

Input ID	Input Field	Direction of Travel	
		NB	SB
(1)	Evaluation Year	2025	2025
(2)	Area Type	URBAN	URBAN
(3)	Corridor Length (miles)	4.08	4.08
(4)	Number of Signalized Intersections	1	1
(5)	Total Peak Hours per Day (AM+PM)	24	24
(6)	Free Flow Speed or Posted Speed Limit	65.00	65.00
(7)	Total Volume on Corridor or Direction of Travel (Daily)	83,031.12	83,031.12
	Total Volume on Corridor or Direction of Travel (Veh/Hour)	3,459.63	3,459.63
(8)	Existing Total Travel Delay Per Vehicle (sec)	(0.05)	(0.02)
(9)	Truck Percentage	7.40%	7.40%
(10)	Use Your Own Delay Reduction Values	Y	Y
(11)	Corridor Delay Reduction per Vehicle	0.000	0.000

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Figure 39. I-495 Northbound at Southern Split DMS – System Location Map

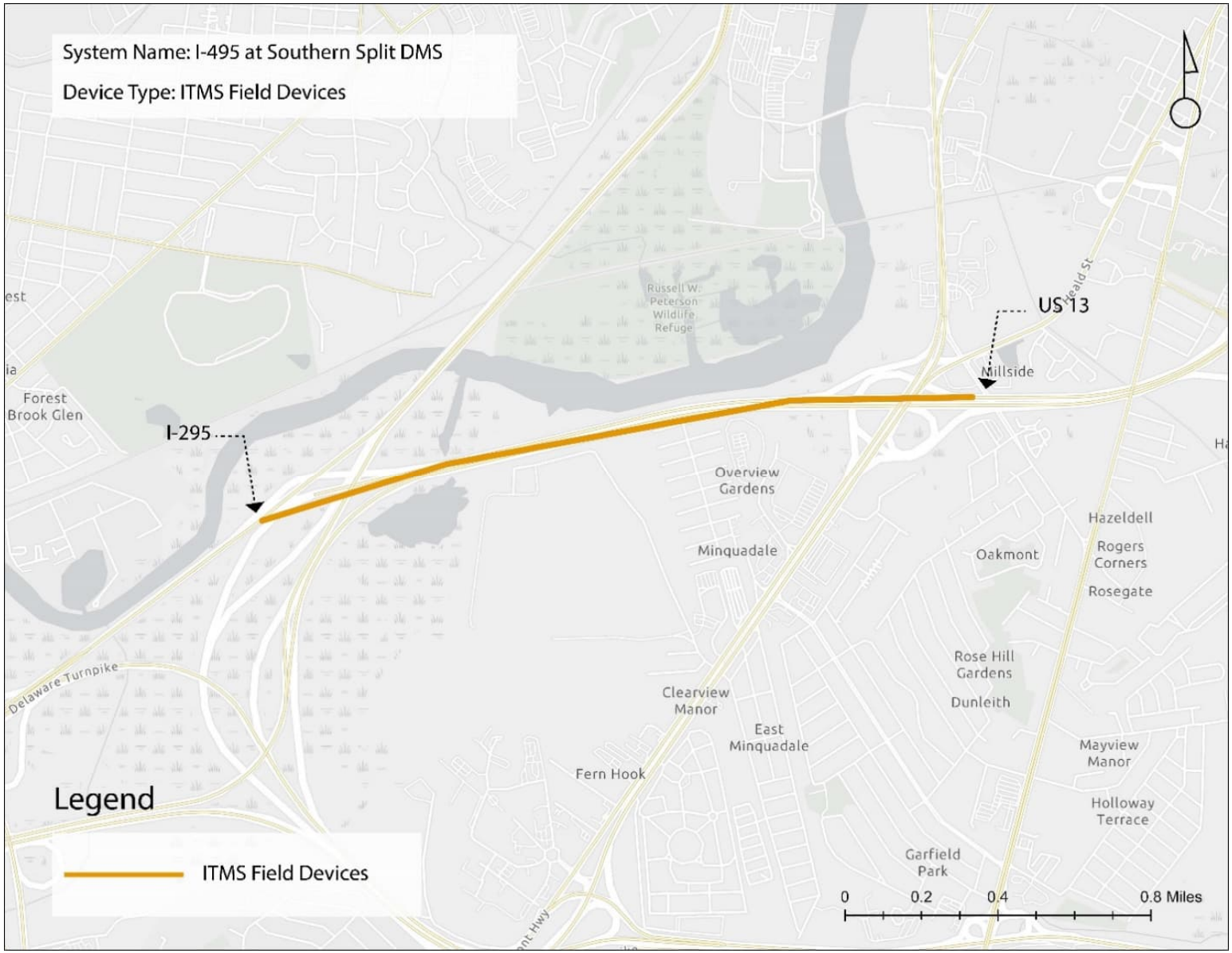


Figure 40. I-495 Northbound at Southern Split DMS (NB) – CMAQ Toolkit Inputs

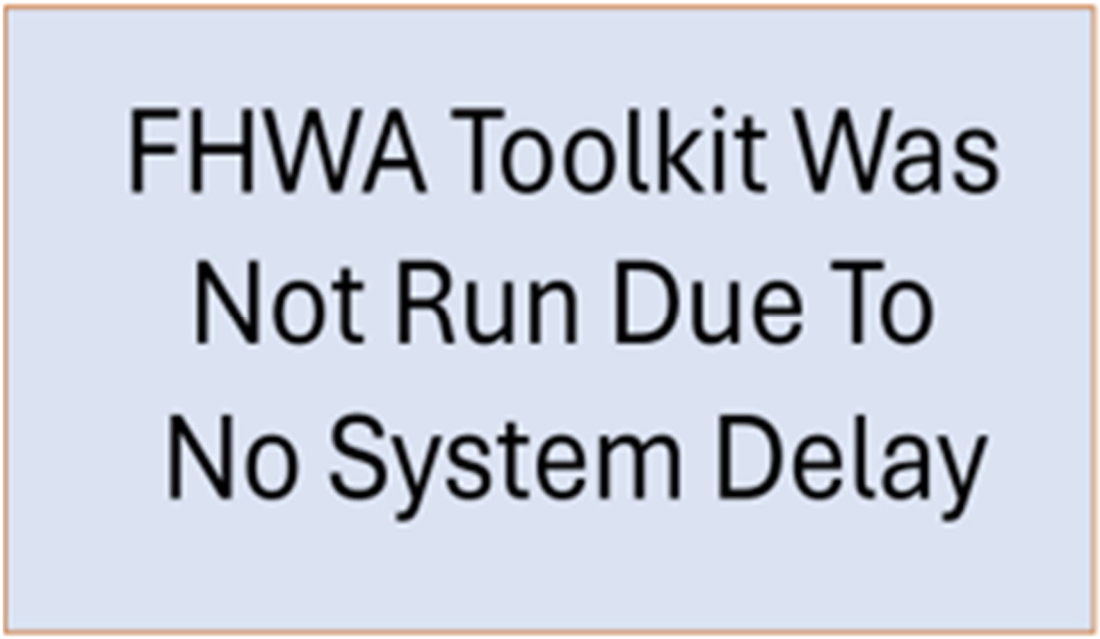
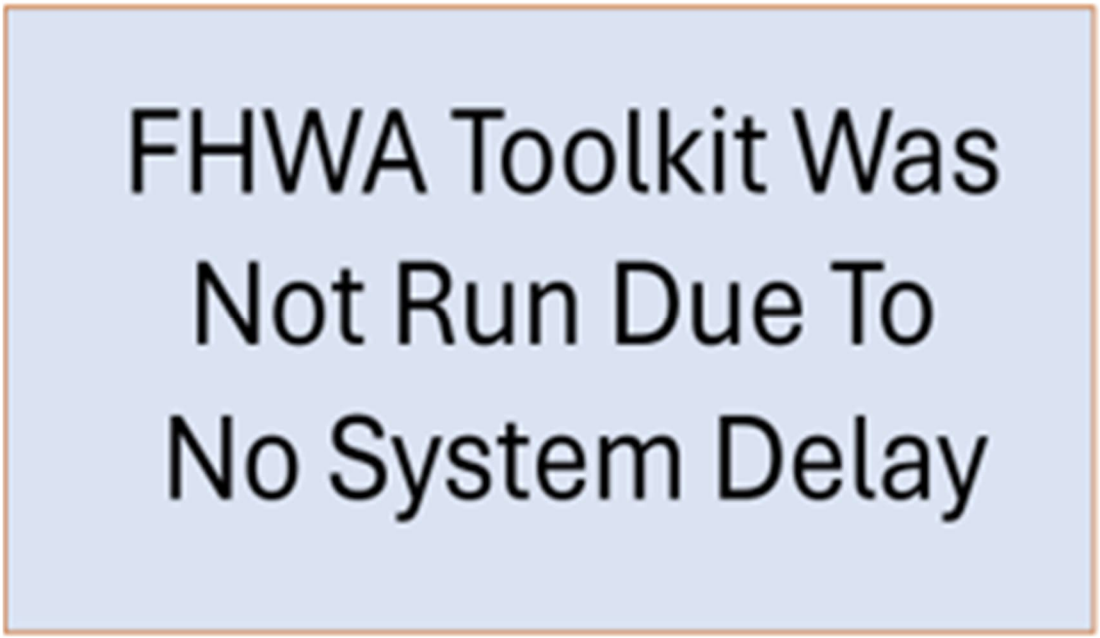


Figure 41. I-495 Northbound at Southern Split DMS (SB) – CMAQ Toolkit Inputs



1.4.13 ITMS Field Devices – I-95 NB at SR 1 Interchange DMS

This project was reported to PAS for FY2025 as a quantitative entry. The project is listed under CMAQ ID No. T202504703. The information presented in the tables and figures below was used to calculate annual emissions reductions.

Table 24. I-95 NB at SR 1 Interchange DMS – CMAQ Toolkit Inputs

Input ID	Input Field	Direction of Travel	
		NB	*SB*
(1)	Evaluation Year	2025	2025
(2)	Area Type	URBAN	URBAN
(3)	Corridor Length (miles)	1.00	1.00
(4)	Number of Signalized Intersections	1	1
(5)	Total Peak Hours per Day (AM+PM)	24	24
(6)	Free Flow Speed or Posted Speed Limit	65.00	65.00
(7)	Total Volume on Corridor or Direction of Travel (Daily)	157,415.04	157,415.04
	Total Volume on Corridor or Direction of Travel (Veh/Hour)	6,558.96	6,558.96
(8)	Existing Total Travel Delay Per Vehicle (sec)	1.79	(0.01)
(9)	Truck Percentage	7.40%	7.40%
(10)	Use Your Own Delay Reduction Values	Y	Y
(11)	Corridor Delay Reduction per Vehicle	0.001	0.000

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Figure 42. I-95 NB at SR 1 Interchange DMS – System Location Map

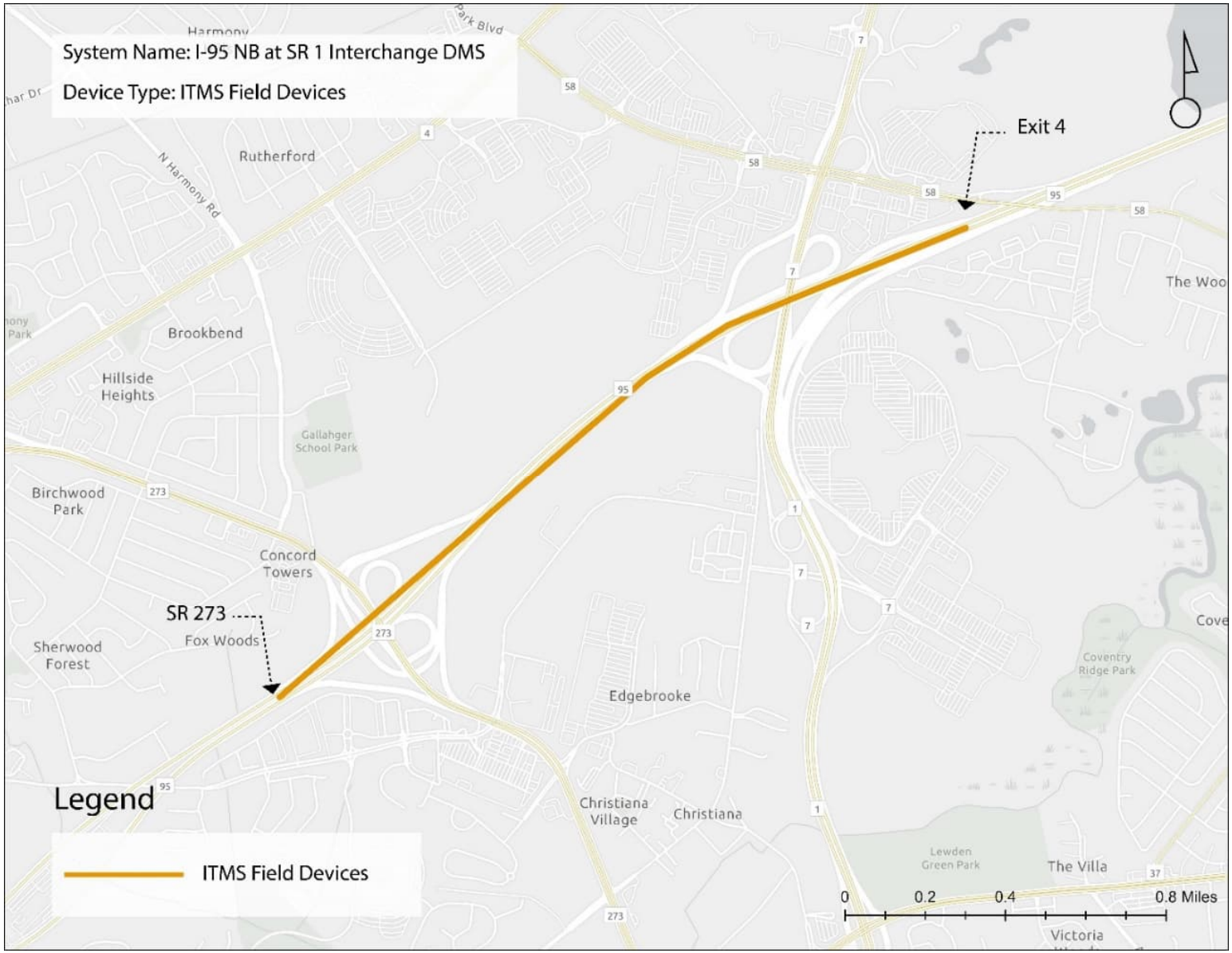
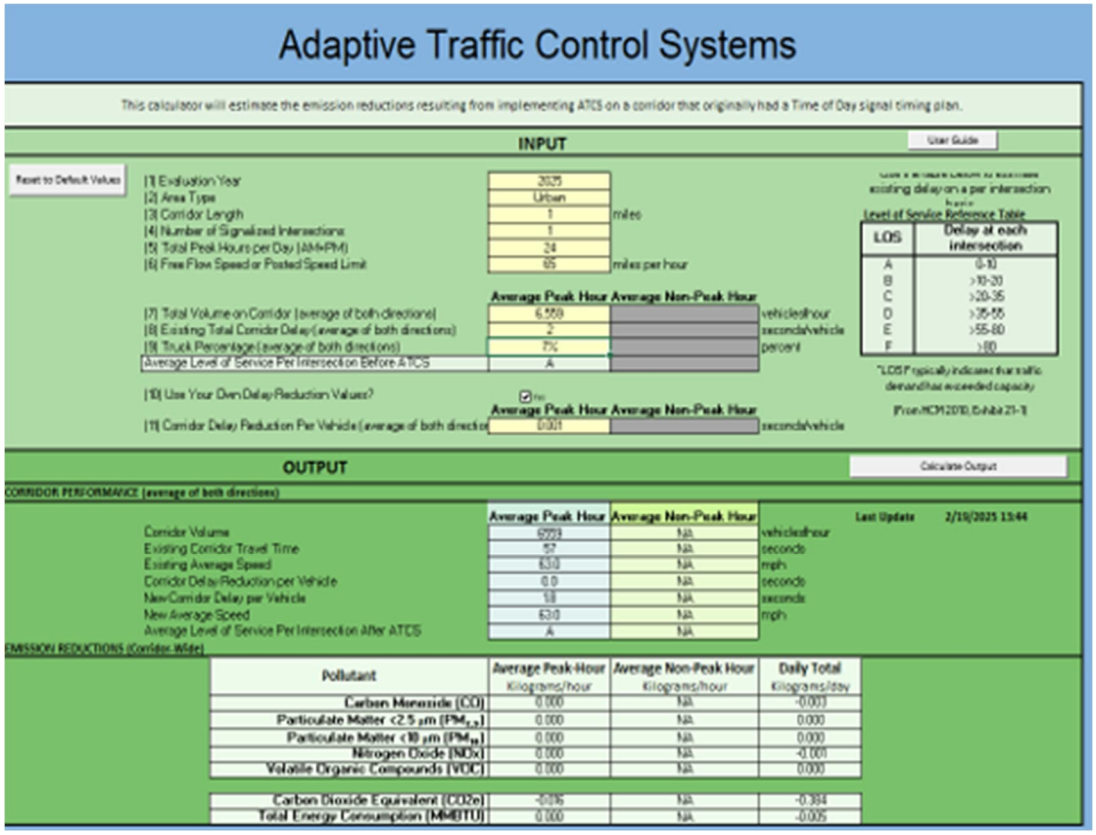


Figure 43. I-95 NB at SR 1 Interchange DMS (NB) – CMAQ Toolkit Outputs



Adaptive Traffic Control Systems

This calculator will estimate the emission reductions resulting from implementing ATCS on a corridor that originally had a Time of Day signal timing plan.

INPUT

User Guide

Reset to Default Values

[1] Evaluation Year	2025		
[2] Area Type	Urban		
[3] Corridor Length	1	miles	
[4] Number of Signalized Intersections	1		
[5] Total Peak Hours per Day (AM+PM)	24		
[6] Free Flow Speed or Posted Speed Limit	65	miles per hour	
	Average Peak Hour	Average Non-Peak Hour	
[7] Total Volume on Corridor (average of both directions)	6,559		vehicles/hour
[8] Existing Total Corridor Delay (average of both directions)	2		seconds/vehicle
[9] Truck Percentage (average of both directions)	7%		percent
Average Level of Service Per Intersection Before ATCS	A		
[10] Use Your Own Delay Reduction Values?	no		
[11] Corridor Delay Reduction Per Vehicle (average of both directions)	0.001		seconds/vehicle

existing delay on a per intersection basis

Level of Service Reference Table

LOS	Delay at each intersection
A	0-10
B	>10-20
C	>20-35
D	>35-55
E	>55-80
F	>80

"LOS F typically indicates that traffic demand has exceeded capacity

(From HCM 2010, Exhibit 21-1)

OUTPUT

Calculate Output

CORRIDOR PERFORMANCE (average of both directions)

Last Update 2/19/2025 13:44

	Average Peak Hour	Average Non-Peak Hour	
Corridor Volume	6559	NA	vehicles/hour
Existing Corridor Travel Time	67	NA	seconds
Existing Average Speed	63.0	NA	mph
Corridor Delay Reduction per Vehicle	0.0	NA	seconds
New Corridor Delay per Vehicle	1.8	NA	seconds
New Average Speed	63.0	NA	mph
Average Level of Service Per Intersection After ATCS	A	NA	

EMISSION REDUCTIONS (Corridor Wide)

Pollutant	Average Peak Hour Kilograms/hour	Average Non-Peak Hour Kilograms/hour	Daily Total Kilograms/day
Carbon Monoxide (CO)	0.000	NA	-0.003
Particulate Matter <2.5 μm ($PM_{2.5}$)	0.000	NA	0.000
Particulate Matter <10 μm (PM_{10})	0.000	NA	0.000
Nitrogen Dioxide (NOx)	0.000	NA	-0.001
Volatile Organic Compounds (VOC)	0.000	NA	0.000
Carbon Dioxide Equivalent (CO2e)	-0.016	NA	-0.394
Total Energy Consumption (MMBTU)	0.000	NA	-0.005

Figure 44. I-95 NB at SR 1 Interchange DMS (SB) – CMAQ Toolkit Outputs

FHWA Toolkit Was Not Run Due To No System Delay

1.4.14 ITMS Field Devices – SR 1 NB at US 13 Tybouts Corner DM

This project was reported to PAS for FY2025 as a quantitative entry. The project is listed under CMAQ ID No. T202504703. The information presented in the tables and figures below was used to calculate annual emissions reductions.

Table 25. SR 1 NB at US 13 Tybouts Corner DMS – CMAQ Toolkit Inputs

Input ID	Input Field	Direction of Travel	
		NB	*SB*
(1)	Evaluation Year	2025	2025
(2)	Area Type	URBAN	URBAN
(3)	Corridor Length (miles)	2.29	2.29
(4)	Number of Signalized Intersections	1	1
(5)	Total Peak Hours per Day (AM+PM)	24	24
(6)	Free Flow Speed or Posted Speed Limit	60.00	60.00
(7)	Total Volume on Corridor or Direction of Travel (Daily)	85,752.00	85,752.00
	Total Volume on Corridor or Direction of Travel (Veh/Hour)	3,573.00	3,573.00
(8)	Existing Total Travel Delay Per Vehicle (sec)	(0.27)	(0.16)
(9)	Truck Percentage	7.40%	7.40%
(10)	Use Your Own Delay Reduction Values	Y	Y
(11)	Corridor Delay Reduction per Vehicle	0.000	0.00

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Figure 45. SR 1 NB at US 13 Tybouts Corner DMS – System Location Map

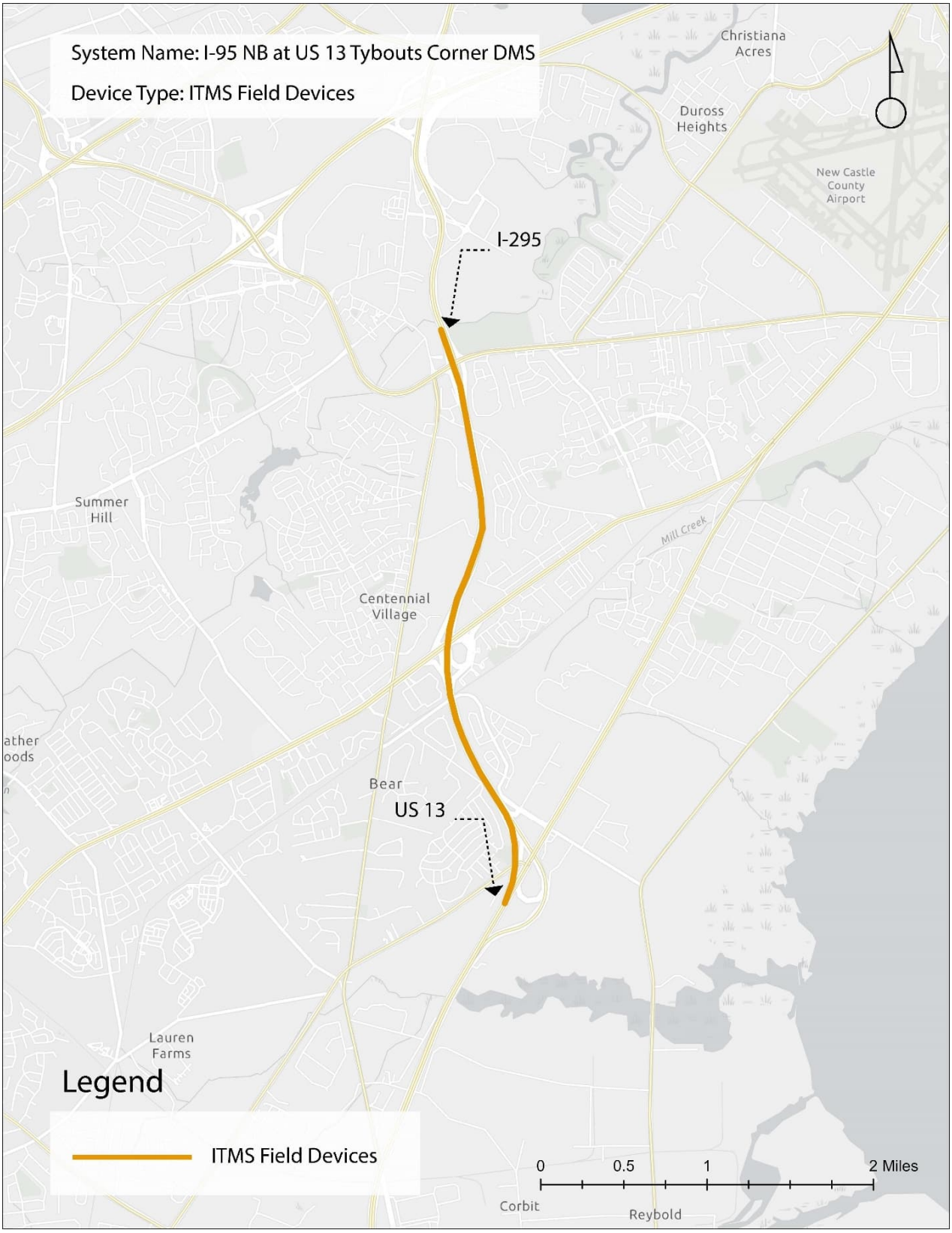


Figure 46. SR 1 NB at US 13 Tybouts Corner DMS (NB) – CMAQ Toolkit Outputs

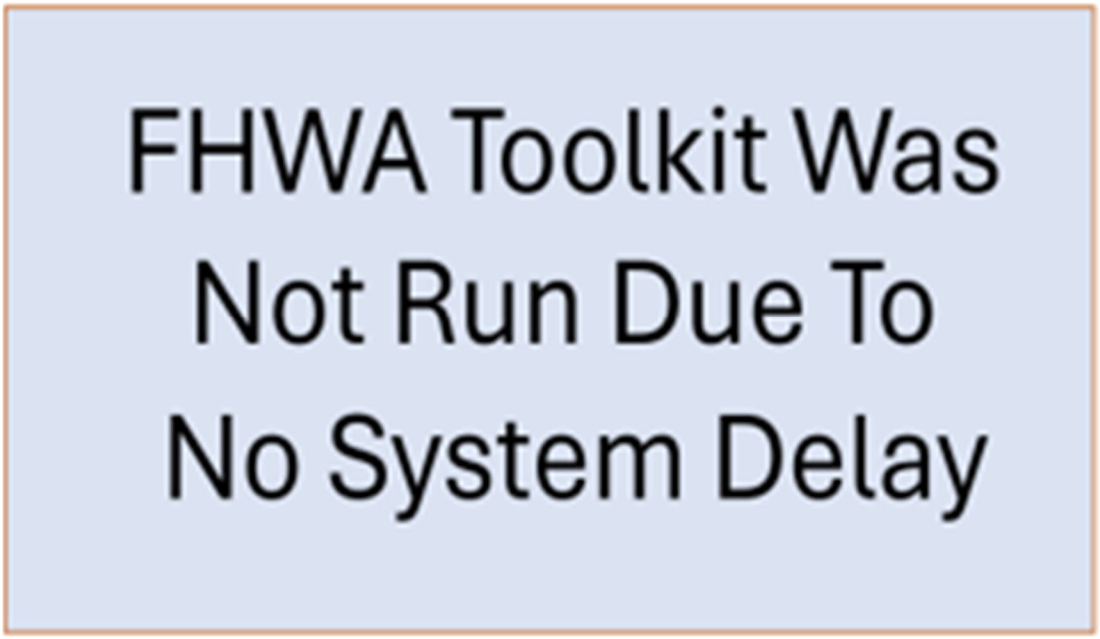
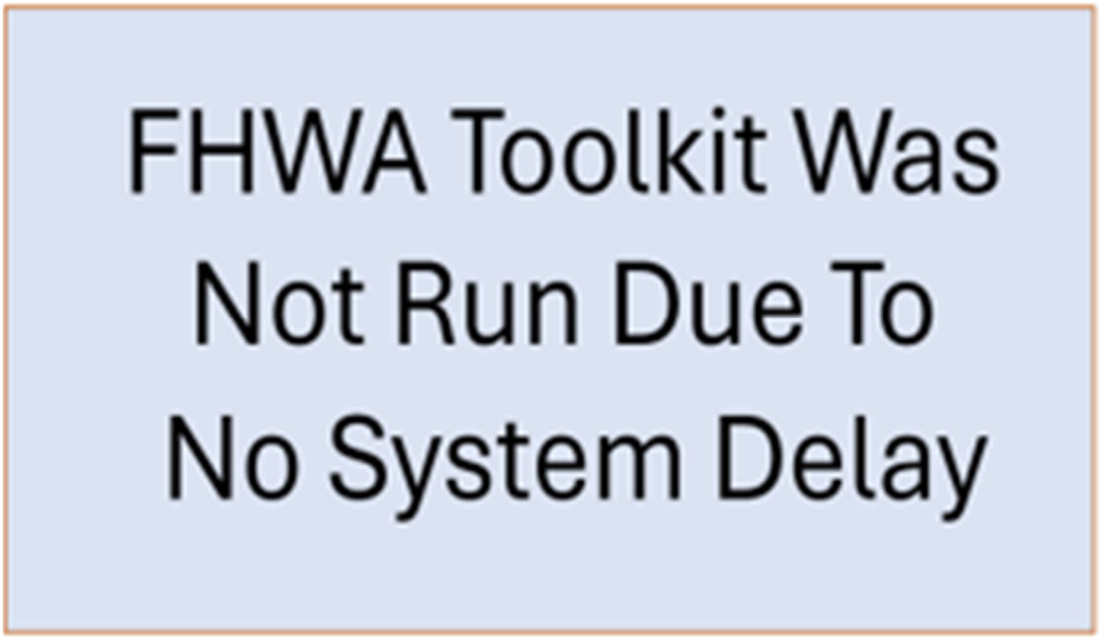


Figure 47. SR 1 NB at US 13 Tybouts Corner DMS (SB) – CMAQ Toolkit Outputs



1.4.15 ITMS Field Devices – SR 1 NB AT US 40 DMS

This project was reported to PAS for FY2025 as a quantitative entry. The project is listed under CMAQ ID No. T202504703. The information presented in the tables and figures below was used to calculate annual emissions reductions.

Table 26. SR 1 NB AT US 40 DMS – CMAQ Toolkit Inputs

Input ID	Input Field	Direction of Travel	
		NB	*SB*
(1)	Evaluation Year	2025	2025
(2)	Area Type	URBAN	URBAN
(3)	Corridor Length (miles)	8.04	8.04
(4)	Number of Signalized Intersections	1	1
(5)	Total Peak Hours per Day (AM+PM)	24	24
(6)	Free Flow Speed or Posted Speed Limit	60.00	60.00
(7)	Total Volume on Corridor or Direction of Travel (Daily)	89,676.00	89,676.00
	Total Volume on Corridor or Direction of Travel (Veh/Hour)	3,736.50	3,736.50
(8)	Existing Total Travel Delay Per Vehicle (sec)	(0.42)	(0.28)
(9)	Truck Percentage	7.40%	7.40%
(10)	Use Your Own Delay Reduction Values	Y	Y
(11)	Corridor Delay Reduction per Vehicle	0.00	0.00

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Figure 48. SR 1 NB AT US 40 DMS – System Location Map

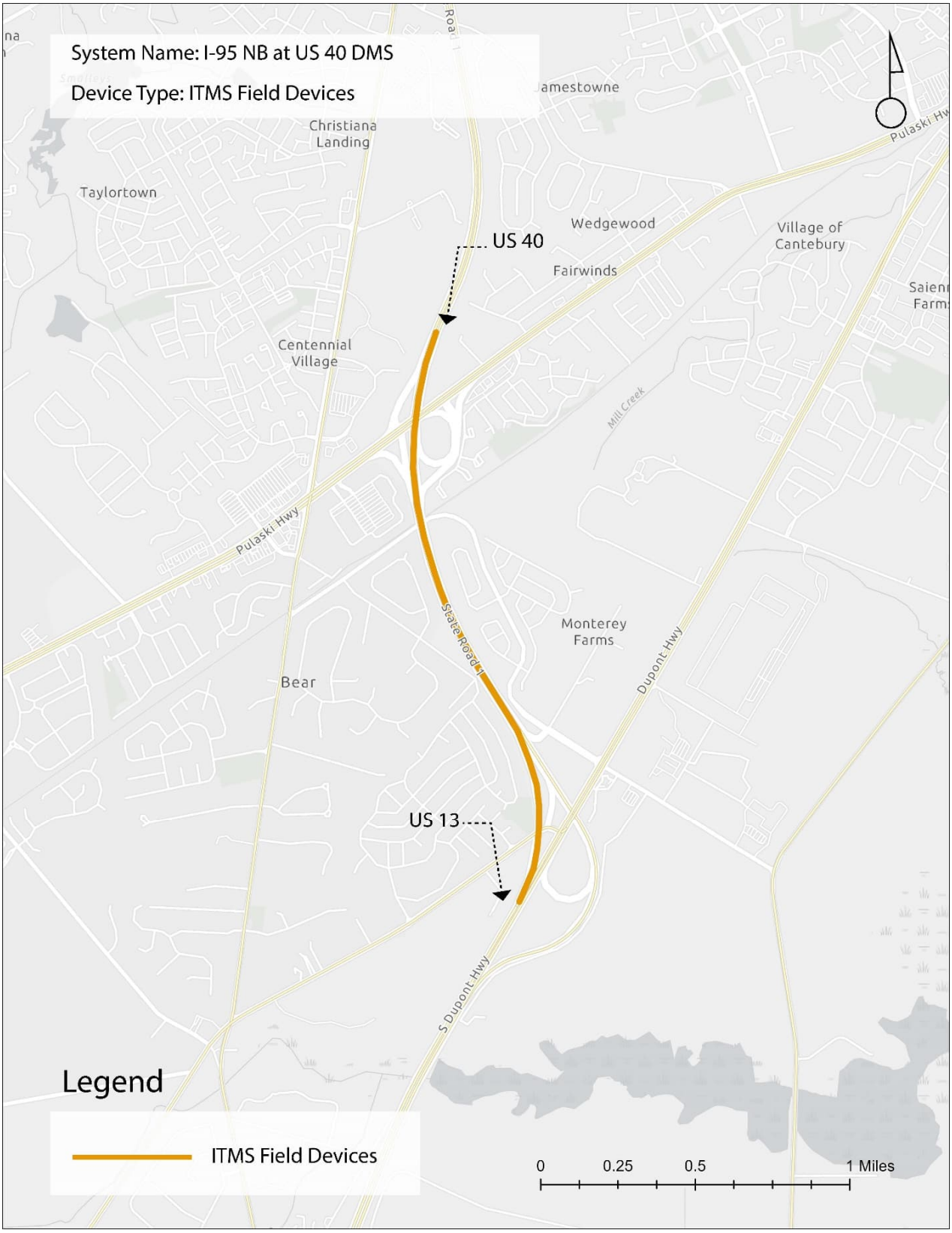


Figure 49. SR 1 NB AT US 40 DMS (NB) – CMAQ Toolkit Outputs

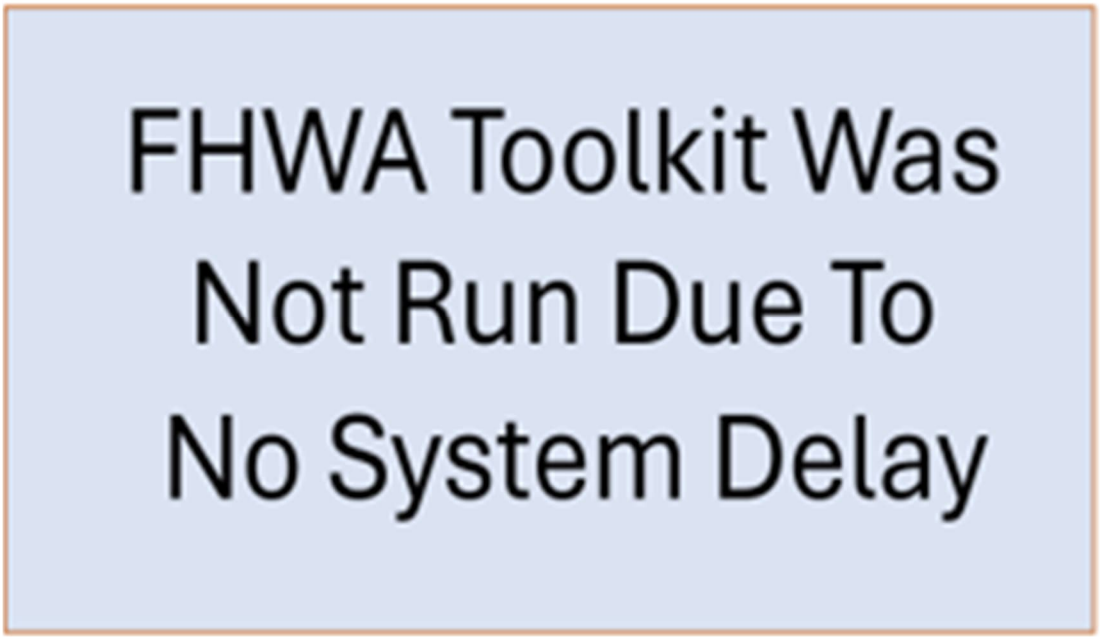
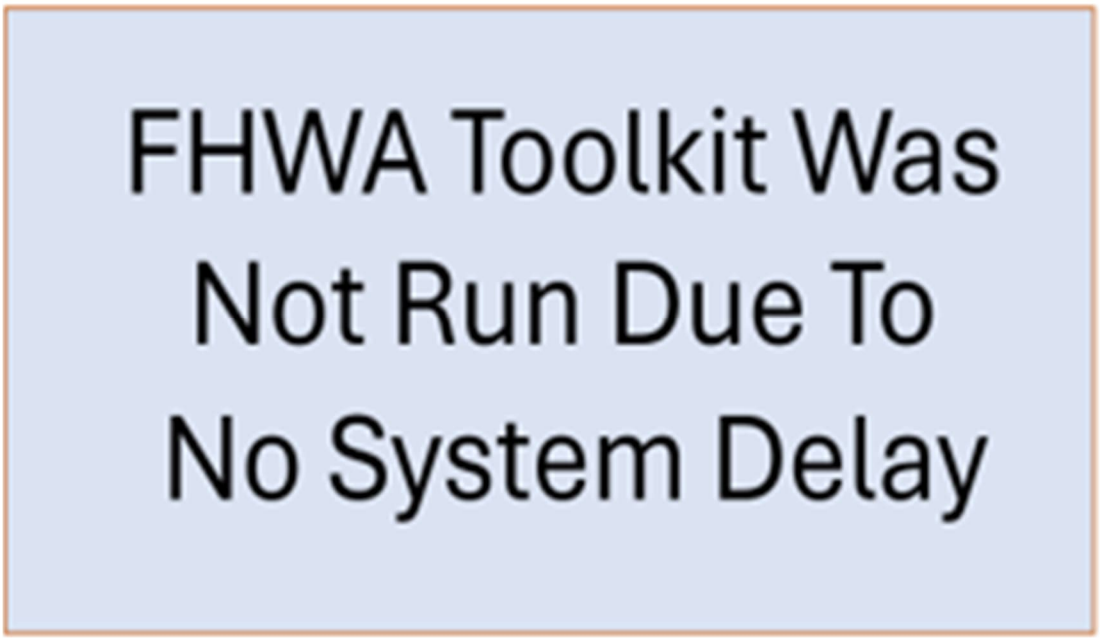


Figure 50. SR 1 NB AT US 40 DMS (SB) – CMAQ Toolkit Outputs



1.4.16 ITMS Field Devices – SR1 at Hudson Fields Camera+Wavetronix

This project was reported to PAS for FY2025 as a quantitative entry. The project is listed under CMAQ ID No. T202504703. The information presented in the tables and figures below was used to calculate annual emissions reductions.

Table 27. SR1 at Hudson Fields Camera+Wavetronix – CMAQ Toolkit Inputs

Input ID	Input Field	Direction of Travel	
		NB	*SB*
(1)	Evaluation Year	2025	2025
(2)	Area Type	URBAN	URBAN
(3)	Corridor Length (miles)	6.70	6.70
(4)	Number of Signalized Intersections	1	1
(5)	Total Peak Hours per Day (AM+PM)	24	24
(6)	Free Flow Speed or Posted Speed Limit	55.00	55.00
(7)	Total Volume on Corridor or Direction of Travel (Daily)	29,577.12	29,577.12
	Total Volume on Corridor or Direction of Travel (Veh/Hour)	1,232.38	1,232.38
(8)	Existing Total Travel Delay Per Vehicle (sec)	0.59	(0.07)
(9)	Truck Percentage	4.20%	4.20%
(10)	Use Your Own Delay Reduction Values	Y	Y
(11)	Corridor Delay Reduction per Vehicle	0.006	0.000

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Figure 51. SR1 at Hudson Fields Camera+Wavetronix – System Location Map

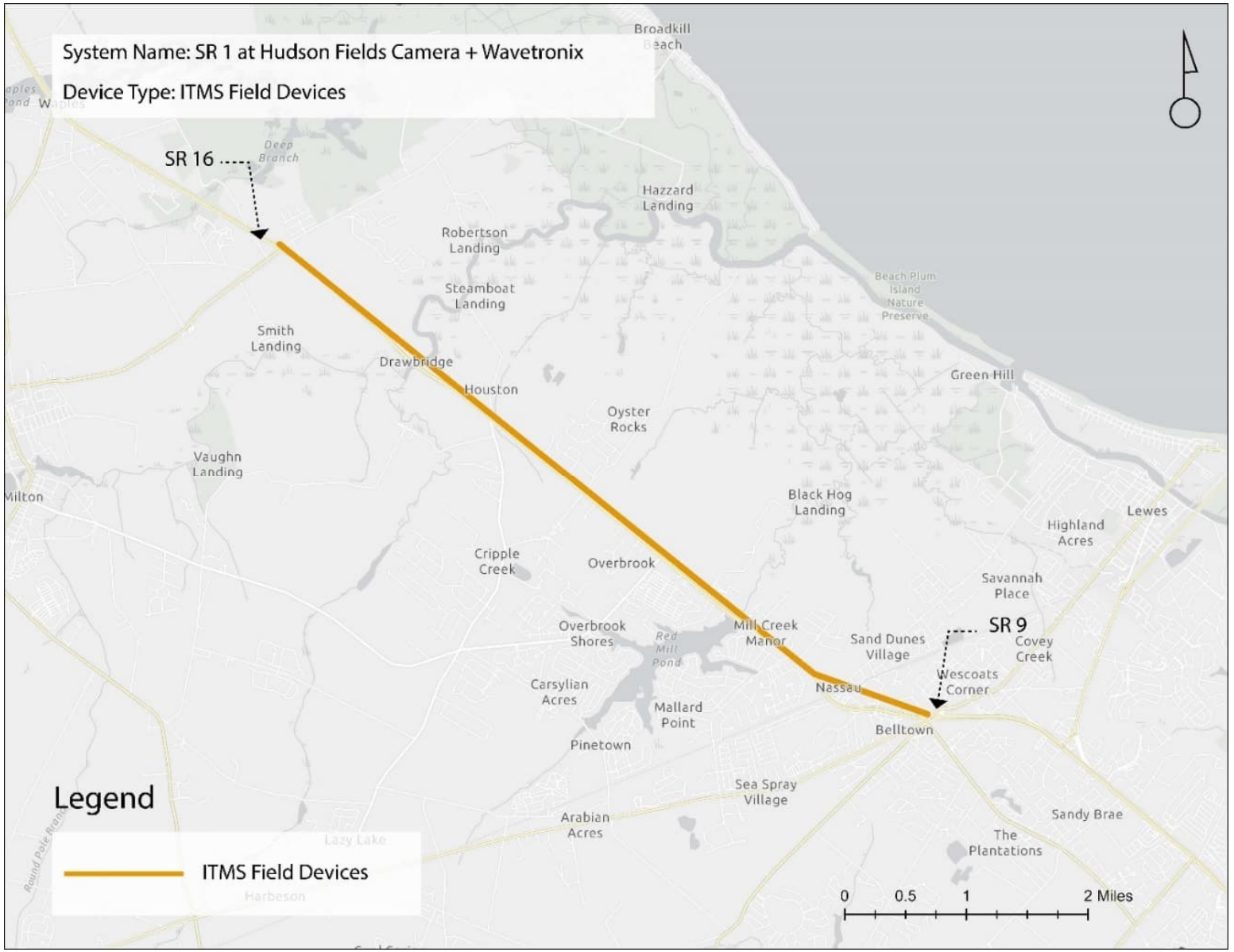
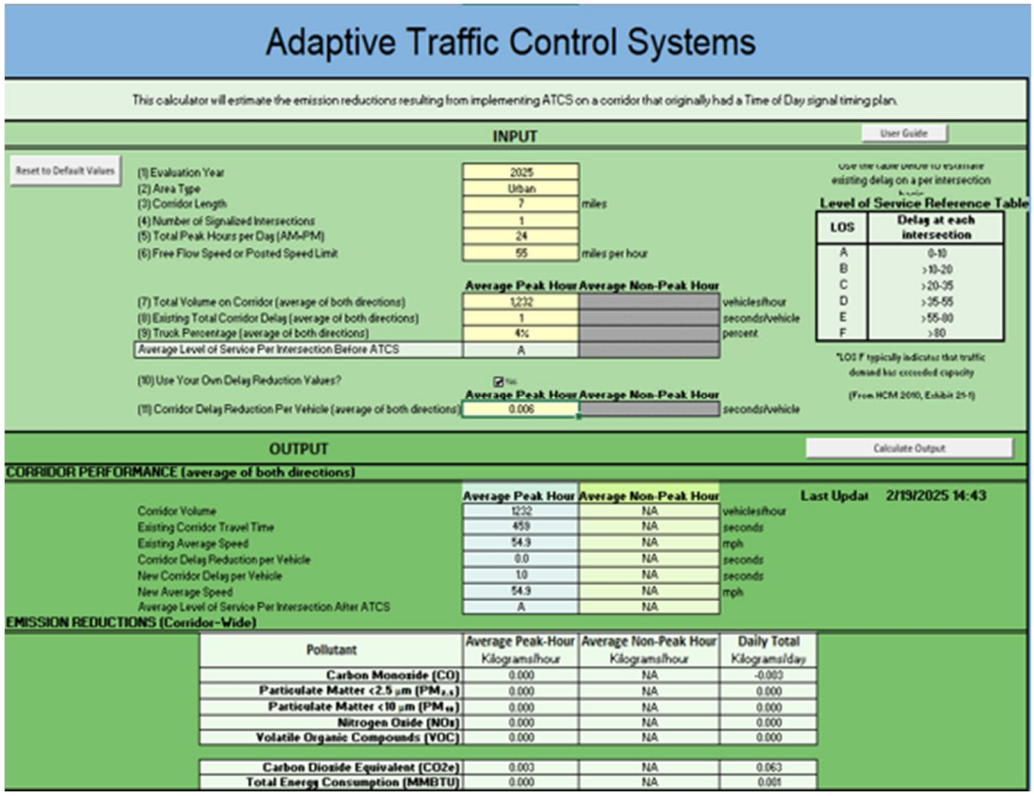


Figure 52. SR1 at Hudson Fields Camera+Wavetronix (NB) – CMAQ Toolkit Outputs



Adaptive Traffic Control Systems

This calculator will estimate the emission reductions resulting from implementing ATCS on a corridor that originally had a Time of Day signal timing plan.

INPUT

User Guide

Reset to Default Values

(1) Evaluation Year	2025	
(2) Area Type	Urban	
(3) Corridor Length	7	miles
(4) Number of Signalized Intersections	1	
(5) Total Peak Hours per Day (AM-PM)	24	
(6) Free Flow Speed or Posted Speed Limit	55	miles per hour

	Average Peak Hour	Average Non-Peak Hour	
(7) Total Volume on Corridor (average of both directions)	1232		vehicles/hour
(8) Existing Total Corridor Delay (average of both directions)	1		seconds/vehicle
(9) Truck Percentage (average of both directions)	4%		percent
Average Level of Service Per Intersection Before ATCS	A		

(10) Use Your Own Delay Reduction Values? ☑ Yes

	Average Peak Hour	Average Non-Peak Hour	
(11) Corridor Delay Reduction Per Vehicle (average of both directions)	0.006		seconds/vehicle

Use the table below to estimate existing delay on a per intersection basis.

Level of Service Reference Table

LOS	Delay at each intersection
A	0-10
B	>10-20
C	>20-35
D	>35-55
E	>55-80
F	>80

*LOS F typically indicates that traffic demand has exceeded capacity

(From HCM 2010, Exhibit 21-1)

OUTPUT

Calculate Output

CORRIDOR PERFORMANCE (average of both directions)

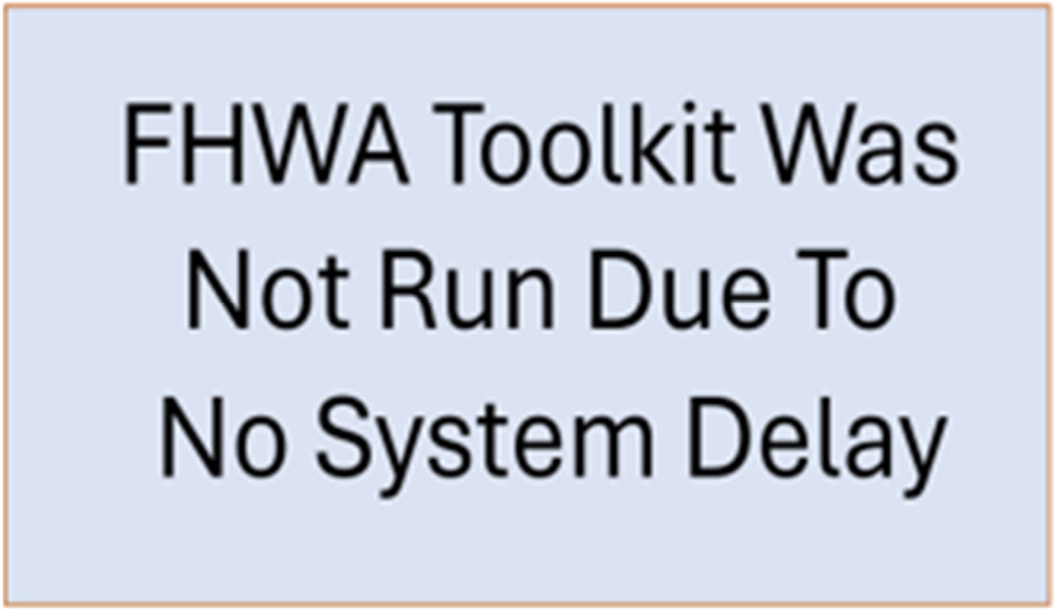
Last Updat 2/13/2025 14:43

	Average Peak Hour	Average Non-Peak Hour	
Corridor Volume	1232	NA	vehicles/hour
Existing Corridor Travel Time	459	NA	seconds
Existing Average Speed	54.9	NA	mph
Corridor Delay Reduction per Vehicle	0.0	NA	seconds
New Corridor Delay per Vehicle	1.0	NA	seconds
New Average Speed	54.9	NA	mph
Average Level of Service Per Intersection After ATCS	A	NA	

EMISSION REDUCTIONS (Corridor-Wide)

Pollutant	Average Peak-Hour Kilograms/hour	Average Non-Peak Hour Kilograms/hour	Daily Total Kilograms/day
Carbon Monoxide (CO)	0.000	NA	-0.003
Particulate Matter <2.5 μm ($PM_{2.5}$)	0.000	NA	0.000
Particulate Matter <10 μm (PM_{10})	0.000	NA	0.000
Nitrogen Oxide (NOx)	0.000	NA	0.000
Volatile Organic Compounds (VOC)	0.000	NA	0.000
Carbon Dioxide Equivalent (CO_2e)	0.003	NA	0.063
Total Energy Consumption (MMBTU)	0.000	NA	0.001

Figure 53. SR1 at Hudson Fields Camera+Wavetronix (SB) – CMAQ Toolkit Outputs



1.4.17 Traffic Signal Retiming – Elkton Road: Md Line to Delaware Ave

This project was reported to PAS for FY2025 as a quantitative entry. The project is listed under CMAQ ID No. T202504703. The information presented in the tables and figures below was used to calculate annual emissions reductions.

Table 28. Elkton Road: Md Line to Delaware Ave – CMAQ Toolkit Inputs

Input ID	Input Field	Direction of Travel	
		EB	*WB*
(1)	Evaluation Year	2025	2025
(2)	Area Type	URBAN	URBAN
(3)	Corridor Length (miles)	12.65	12.65
(4)	Number of Signalized Intersections	1	1
(5)	Total Peak Hours per Day (AM+PM)	24	24
(6)	Free Flow Speed or Posted Speed Limit	39.84	39.84
(7)	Total Volume on Corridor or Direction of Travel (Daily)	26,016.24	26,016.24
	Total Volume on Corridor or Direction of Travel (Veh/Hour)	1,084.01	1,084.01
(8)	Existing Total Travel Delay Per Vehicle (sec)	1.07	0.88
(9)	Truck Percentage	5.00%	5.00%
(10)	Use Your Own Delay Reduction Values	Y	Y
(11)	Corridor Delay Reduction per Vehicle	0.053	0.044

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Figure 54. Elkton Road: Md Line to Delaware Ave – System Location Map

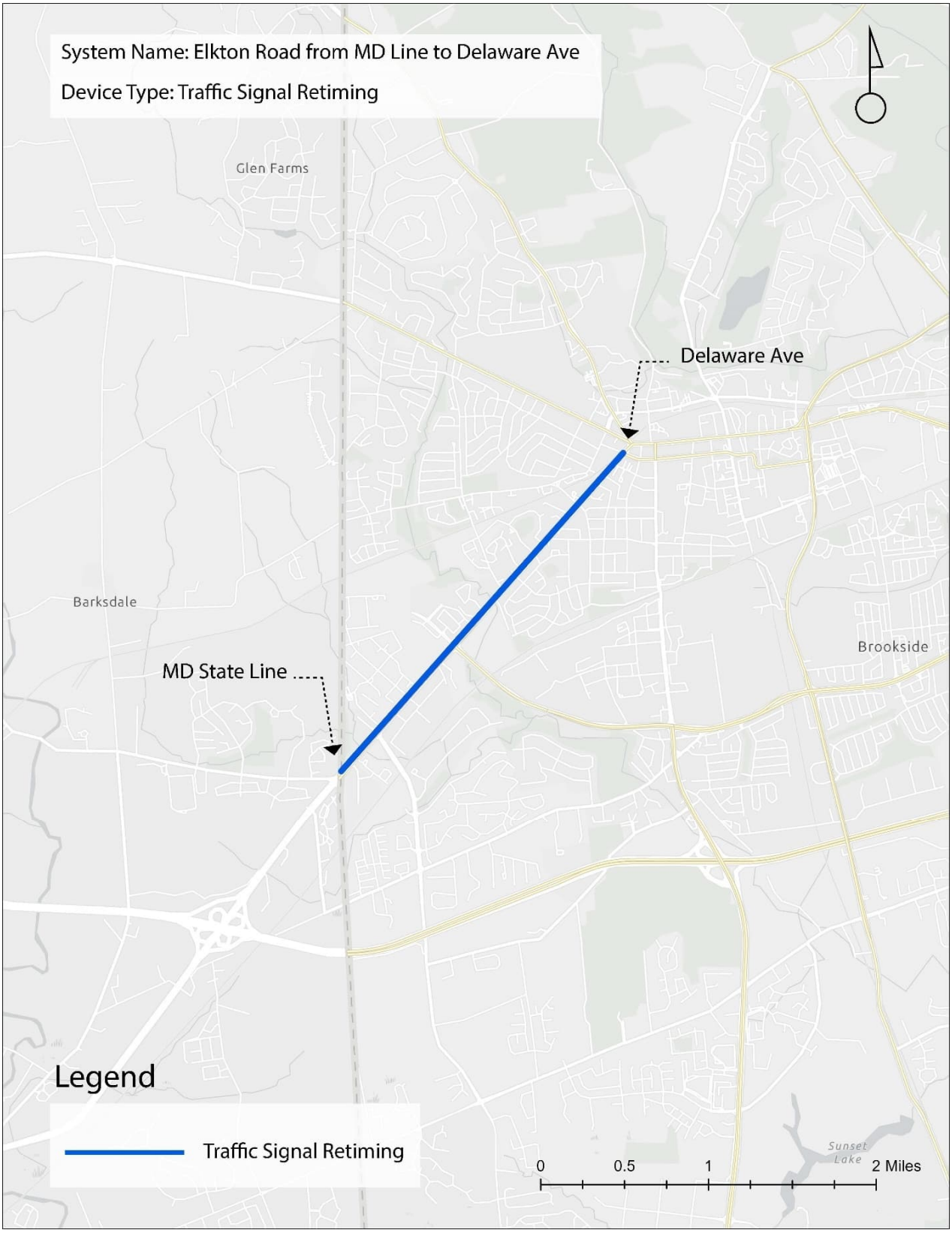
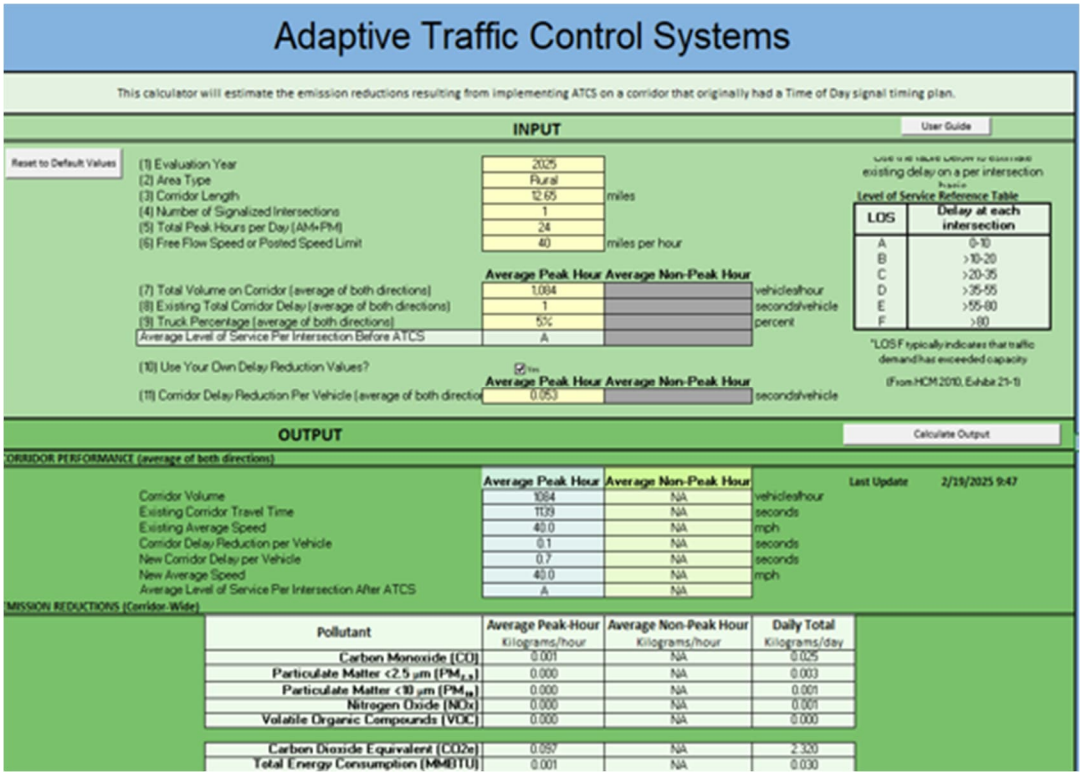


Figure 55. Elkton Road: Md Line to Delaware Ave (EB) – CMAQ Toolkit Output



Adaptive Traffic Control Systems

This calculator will estimate the emission reductions resulting from implementing ATCS on a corridor that originally had a Time of Day signal timing plan.

INPUT

User Guide

Reset to Default Values

(1) Evaluation Year	2025	
(2) Area Type	Rural	
(3) Corridor Length	12.65	miles
(4) Number of Signalized Intersections	1	
(5) Total Peak Hours per Day (AM+PM)	24	
(6) Free Flow Speed or Posted Speed Limit	40	miles per hour

	Average Peak Hour	Average Non-Peak Hour	
(7) Total Volume on Corridor (average of both directions)	1,084		vehicles/hour
(8) Existing Total Corridor Delay (average of both directions)	1		seconds/vehicle
(9) Truck Percentage (average of both directions)	5%		percent
Average Level of Service Per Intersection Before ATCS	A		

(10) Use Your Own Delay Reduction Values? ☑ Yes

	Average Peak Hour	Average Non-Peak Hour	
(11) Corridor Delay Reduction Per Vehicle (average of both directio	0.053		seconds/vehicle

existing delay on a per intersection basis

Level of Service Reference Table

LOS	Delay at each intersection
A	0-10
B	>10-20
C	>20-35
D	>35-55
E	>55-80
F	>80

*LOS F typically indicates that traffic demand has exceeded capacity

(From HCM 2010, Exhibit 21-1)

OUTPUT

Calculate Output

CORRIDOR PERFORMANCE (average of both directions)

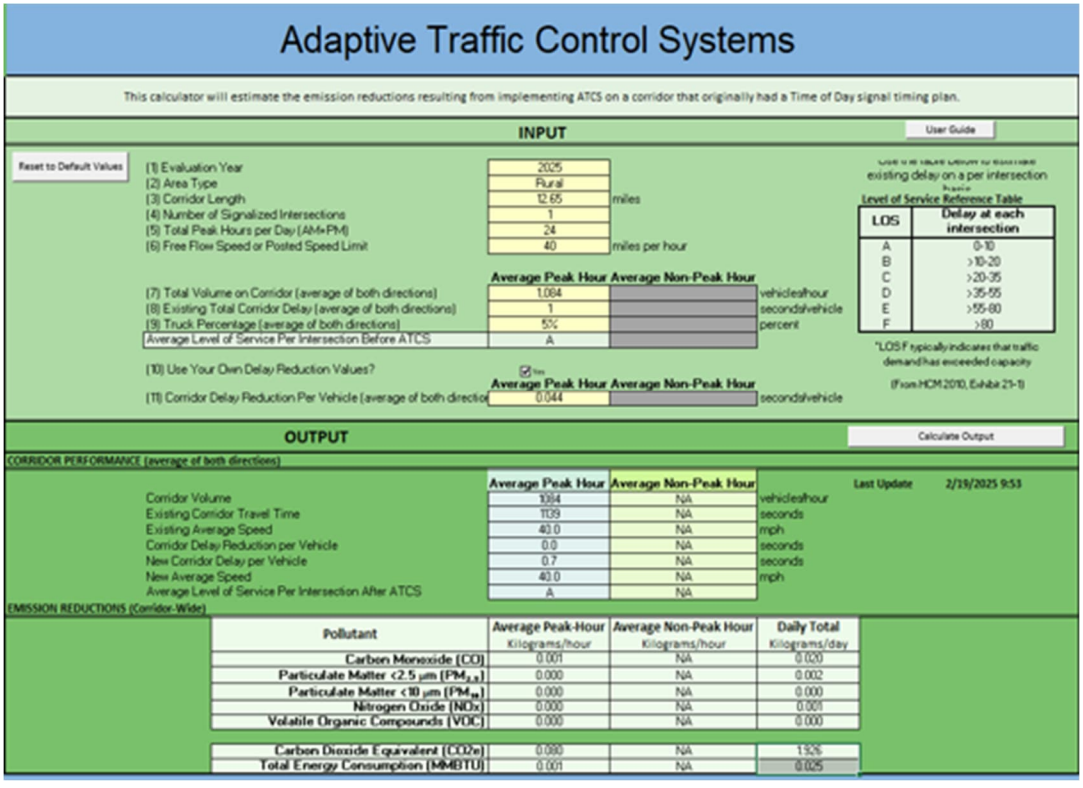
Last Update 2/19/2025 9:47

	Average Peak Hour	Average Non-Peak Hour	
Corridor Volume	1084	NA	vehicles/hour
Existing Corridor Travel Time	1139	NA	seconds
Existing Average Speed	40.0	NA	mph
Corridor Delay Reduction per Vehicle	0.1	NA	seconds
New Corridor Delay per Vehicle	0.7	NA	seconds
New Average Speed	40.0	NA	mph
Average Level of Service Per Intersection After ATCS	A	NA	

EMISSION REDUCTIONS (Corridor-Wide)

Pollutant	Average Peak-Hour Kilograms/hour	Average Non-Peak Hour Kilograms/hour	Daily Total Kilograms/day
Carbon Monoxide (CO)	0.001	NA	0.025
Particulate Matter <2.5 μm ($PM_{2.5}$)	0.000	NA	0.003
Particulate Matter <10 μm (PM_{10})	0.000	NA	0.001
Nitrogen Oxide (NOx)	0.000	NA	0.001
Volatile Organic Compounds (VOC)	0.000	NA	0.000
Carbon Dioxide Equivalent (CO_2e)	0.097	NA	2.320
Total Energy Consumption (MMBTU)	0.001	NA	0.030

Figure 56. Elkton Road: Md Line to Delaware Ave (WB) – CMAQ Toolkit Output



Adaptive Traffic Control Systems

This calculator will estimate the emission reductions resulting from implementing ATCS on a corridor that originally had a Time of Day signal timing plan.

INPUT

User Guide

Reset to Default Values

(1) Evaluation Year	2025	
(2) Area Type	Rural	
(3) Corridor Length	12.65	miles
(4) Number of Signalized Intersections	1	
(5) Total Peak Hours per Day (AM+PM)	24	
(6) Free Flow Speed or Posted Speed Limit	40	miles per hour

	Average Peak Hour	Average Non-Peak Hour	
(7) Total Volume on Corridor (average of both directions)	1,084		vehicles/hour
(8) Existing Total Corridor Delay (average of both directions)	1		seconds/vehicle
(9) Truck Percentage (average of both directions)	5%		percent
Average Level of Service Per Intersection Before ATCS	A		

(10) Use Your Own Delay Reduction Values? ☑ Yes

	Average Peak Hour	Average Non-Peak Hour	
(11) Corridor Delay Reduction Per Vehicle (average of both directio	0.044		seconds/vehicle

existing delay on a per intersection basis

Level of Service Reference Table

LOS	Delay at each intersection
A	0-10
B	>10-20
C	>20-35
D	>35-55
E	>55-80
F	>80

*LOS F typically indicates that traffic demand has exceeded capacity

(From HCM 2010, Exhibit 21-1)

OUTPUT

Calculate Output

CORRIDOR PERFORMANCE (average of both directions)

Last Update 2/19/2025 9:53

	Average Peak Hour	Average Non-Peak Hour	
Corridor Volume	1084	NA	vehicles/hour
Existing Corridor Travel Time	1139	NA	seconds
Existing Average Speed	40.0	NA	mph
Corridor Delay Reduction per Vehicle	0.0	NA	seconds
New Corridor Delay per Vehicle	0.7	NA	seconds
New Average Speed	40.0	NA	mph
Average Level of Service Per Intersection After ATCS	A	NA	

EMISSION REDUCTIONS (Corridor-Wide)

Pollutant	Average Peak-Hour Kilograms/hour	Average Non-Peak Hour Kilograms/hour	Daily Total Kilograms/day
Carbon Monoxide (CO)	0.001	NA	0.020
Particulate Matter <2.5 μm ($PM_{2.5}$)	0.000	NA	0.002
Particulate Matter <10 μm (PM_{10})	0.000	NA	0.000
Nitrogen Oxide (NOx)	0.000	NA	0.001
Volatile Organic Compounds (VOC)	0.000	NA	0.000
Carbon Dioxide Equivalent (CO_2e)	0.080	NA	1.926
Total Energy Consumption (MMBTU)	0.001	NA	0.025

1.4.18 Traffic Signal Retiming – US 13: 40th Street to Naamans Road

This project was reported to PAS for FY2025 as a quantitative entry. The project is listed under CMAQ ID No. T202504703. The information presented in the tables and figures below was used to calculate annual emissions reductions.

Table 29. US 13: 40th Street to Naamans Road – CMAQ Toolkit Inputs

Input ID	Input Field	Direction of Travel	
		NB	*SB*
(1)	Evaluation Year	2025	2025
(2)	Area Type	URBAN	URBAN
(3)	Corridor Length (miles)	61.05	61.05
(4)	Number of Signalized Intersections	1	1
(5)	Total Peak Hours per Day (AM+PM)	24	24
(6)	Free Flow Speed or Posted Speed Limit	38.86	38.86
(7)	Total Volume on Corridor or Direction of Travel (Daily)	12,396.72	12,396.72
	Total Volume on Corridor or Direction of Travel (Veh/Hour)	516.53	516.53
(8)	Existing Total Travel Delay Per Vehicle (sec)	-	-
(9)	Truck Percentage	5.00%	5.00%
(10)	Use Your Own Delay Reduction Values	Y	Y
(11)	Corridor Delay Reduction per Vehicle	0.000	0.00

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Figure 57. US 13: 40th Street to Naamans Road – System Location Map

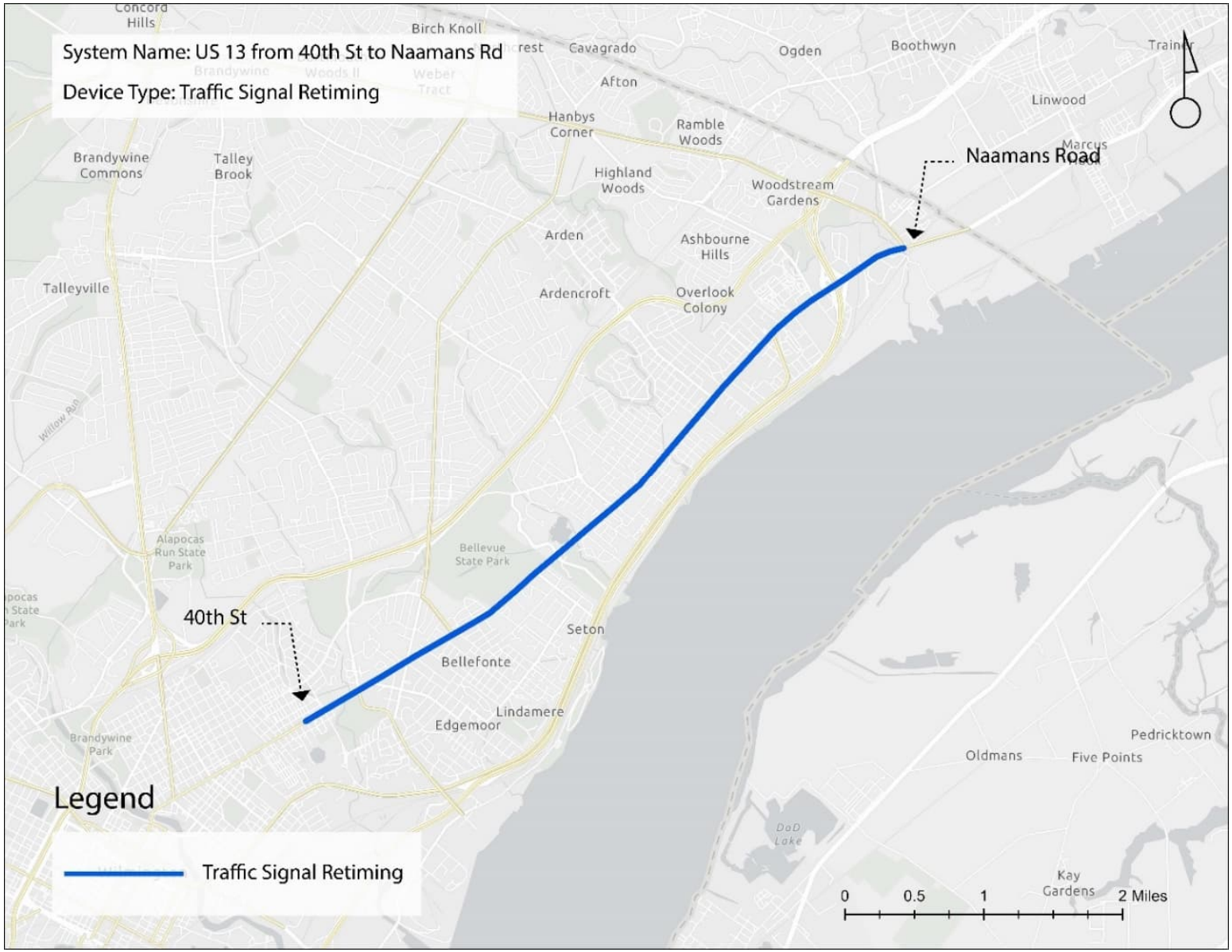


Figure 58. US 13: 40th Street to Naamans Road (NB) – CMAQ Toolkit Outputs

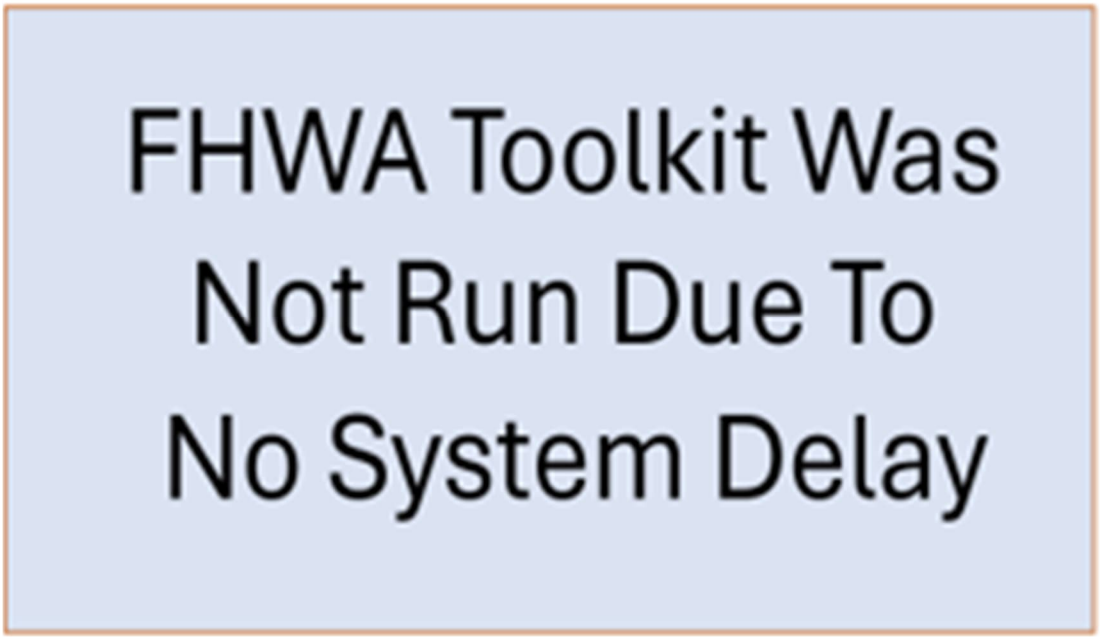
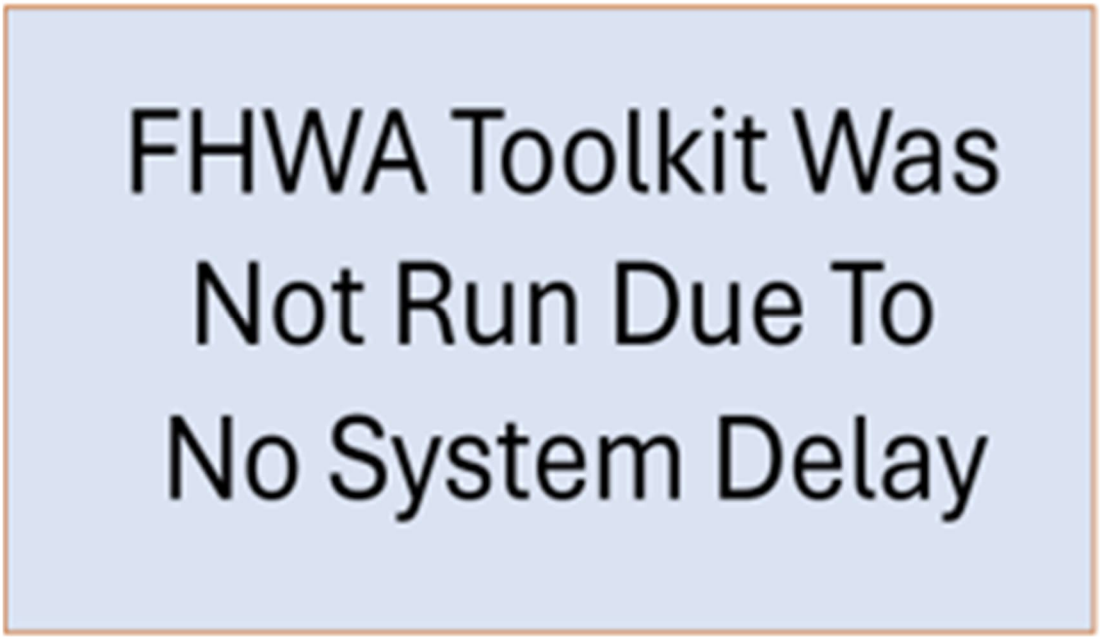


Figure 59. US 13: 40th Street to Naamans Road (SB) – CMAQ Toolkit Outputs



1.4.19 Traffic Signal Retiming – Saulsbury Road: North Street to US 13

This project was reported to PAS for FY2025 as a quantitative entry. The project is listed under CMAQ ID No. T202504703. The information presented in the tables and figures below was used to calculate annual emissions reductions.

Table 30. Saulsbury Road: North Street to US 13 – CMAQ Toolkit Inputs

Input ID	Input Field	Direction of Travel	
		NB	*SB*
(1)	Evaluation Year	2025	2025
(2)	Area Type	URBAN	URBAN
(3)	Corridor Length (miles)	5.94	5.94
(4)	Number of Signalized Intersections	1	1
(5)	Total Peak Hours per Day (AM+PM)	24	24
(6)	Free Flow Speed or Posted Speed Limit	40.13	40.13
(7)	Total Volume on Corridor or Direction of Travel (Daily)	9,680.88	9,680.88
	Total Volume on Corridor or Direction of Travel (Veh/Hour)	403.37	403.37
(8)	Existing Total Travel Delay Per Vehicle (sec)	-	-
(9)	Truck Percentage	5.02%	5.02%
(10)	Use Your Own Delay Reduction Values	Y	Y
(11)	Corridor Delay Reduction per Vehicle	0.000	0.00

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Figure 60. Saulsbury Road: North Street to US 13 – System Location Map

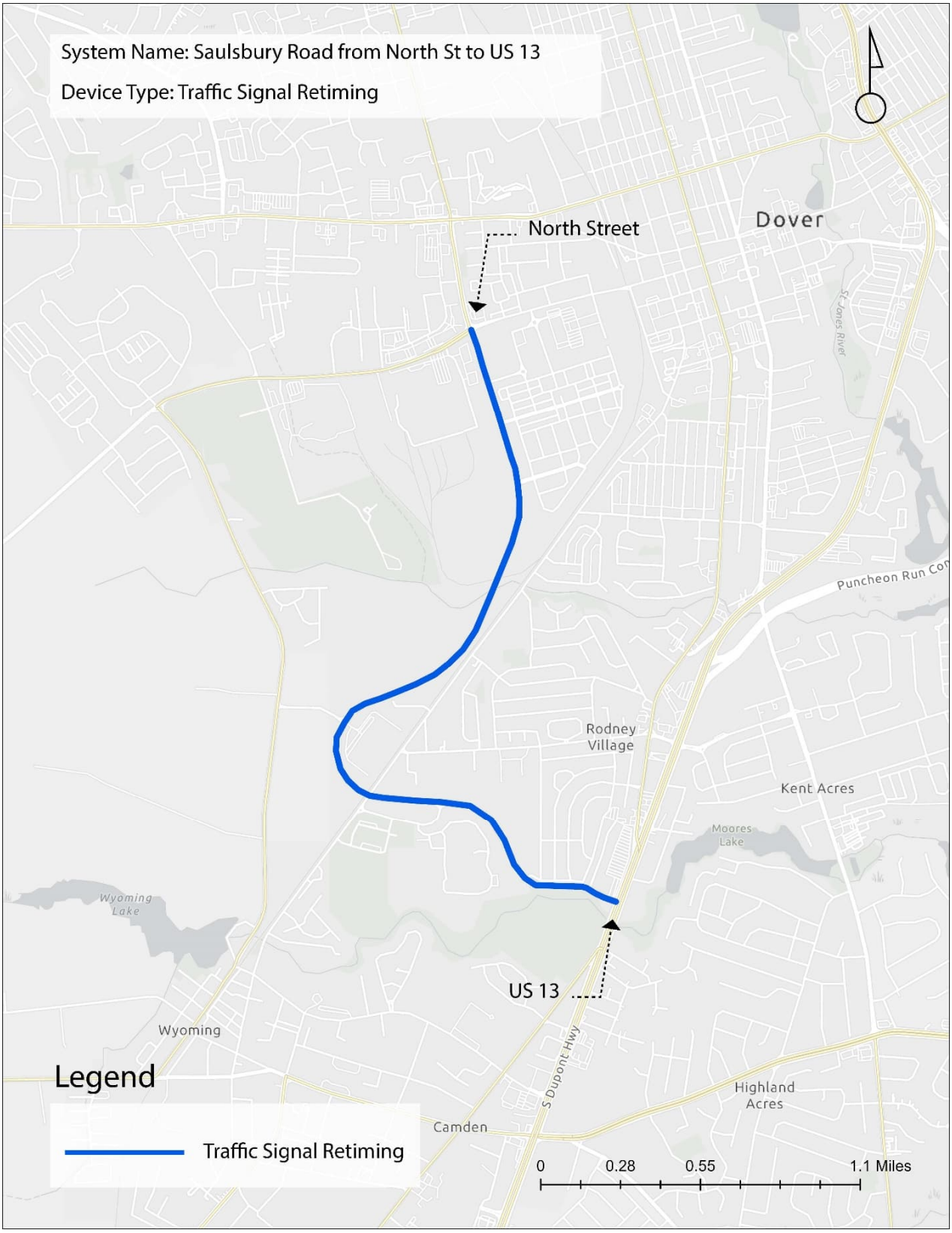


Figure 61. Saulsbury Road: North Street to US 13 (NB) – CMAQ Toolkit Outputs

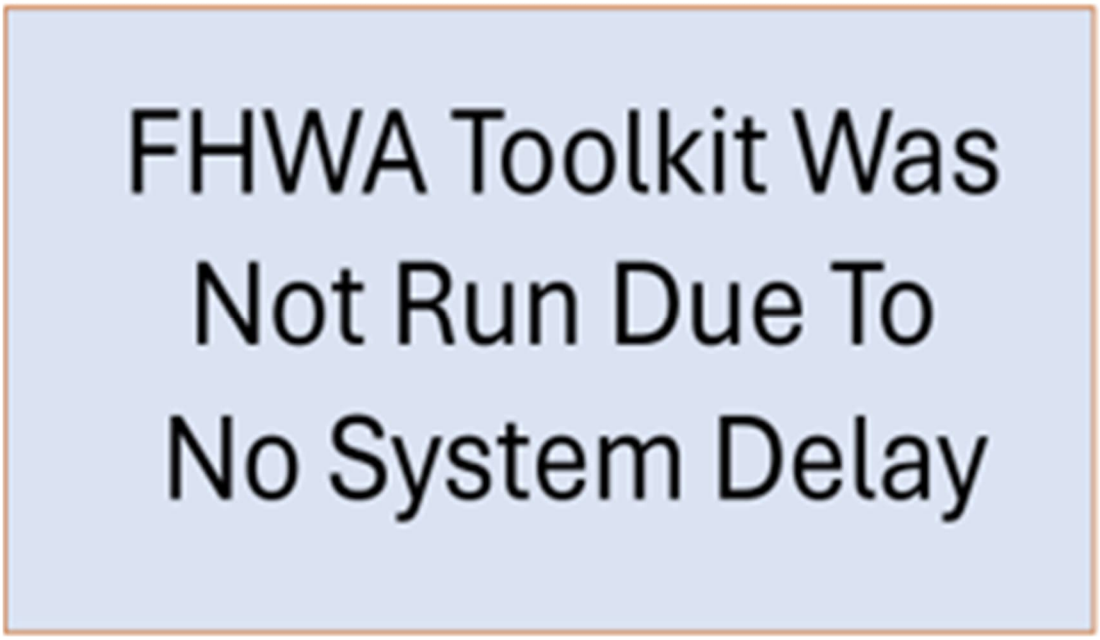
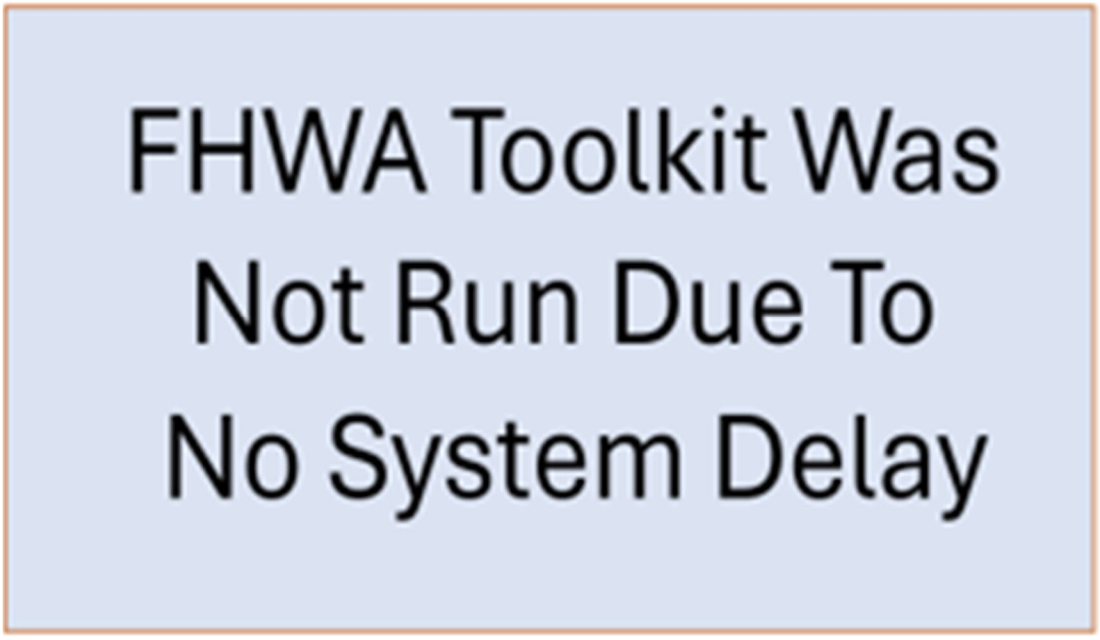


Figure 62. Saulsbury Road: North Street to US 13 (SB) – CMAQ Toolkit Outputs



1.4.20 Traffic Signal Retiming – SR 1: Fred Hudson Road To York Road

This project was reported to PAS for FY2025 as a quantitative entry. The project is listed under CMAQ ID No. T202304703. The information presented in the tables and figures below was used to calculate annual emissions reductions.

Table 31. SR 1 from Fred Hudson Road to York Road – CMAQ Toolkit Inputs

Input ID	Input Field	Direction of Travel	
		NB	*SB*
(1)	Evaluation Year	2025	2025
(2)	Area Type	URBAN	URBAN
(3)	Corridor Length (miles)	19.74	19.74
(4)	Number of Signalized Intersections	1	1
(5)	Total Peak Hours per Day (AM+PM)	24	24
(6)	Free Flow Speed or Posted Speed Limit	37.93	37.93
(7)	Total Volume on Corridor or Direction of Travel (Daily)	18,680.88	18,680.88
	Total Volume on Corridor or Direction of Travel (Veh/Hour)	778.37	778.37
(8)	Existing Total Travel Delay Per Vehicle (sec)	1.27	1.20
(9)	Truck Percentage	4.14%	4.14%
(10)	Use Your Own Delay Reduction Values	Y	Y
(11)	Corridor Delay Reduction per Vehicle	0.063	0.060

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Figure 63. SR 1 Fred Hudson Road to York Road – System Location Map

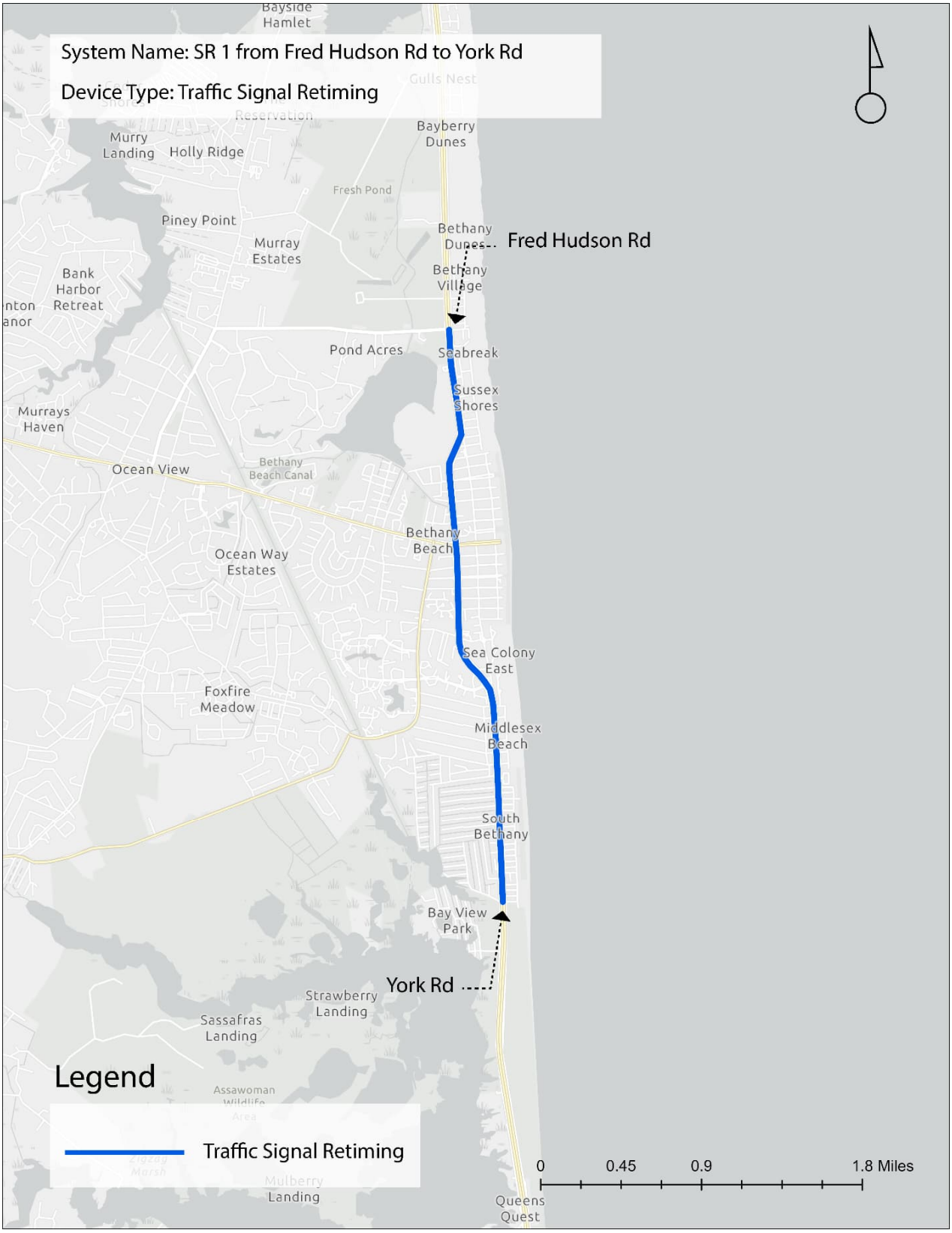
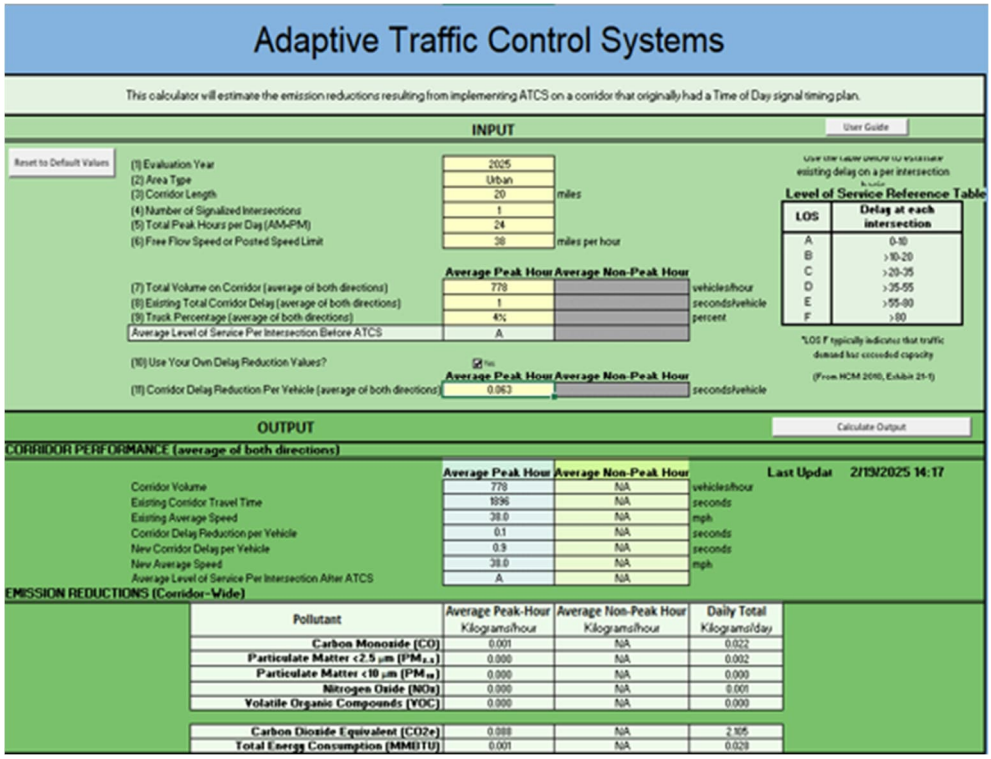


Figure 64. SR 1 from Fred Hudson Road to York Road (NB) – CMAQ Toolkit Outputs



Adaptive Traffic Control Systems

This calculator will estimate the emission reductions resulting from implementing ATCS on a corridor that originally had a Time of Day signal timing plan.

INPUT

User Guide

Reset to Default Values

			Average Peak Hour	Average Non-Peak Hour	
(1) Evaluation Year	2025				
(2) Area Type	Urban				
(3) Corridor Length	20	miles			
(4) Number of Signalized Intersections	1				
(5) Total Peak Hours per Day (AM-PM)	24				
(6) Free Flow Speed or Posted Speed Limit	38	miles per hour			
(7) Total Volume on Corridor (average of both directions)			778		vehicles/hour
(8) Existing Total Corridor Delay (average of both directions)			1		seconds/vehicle
(9) Truck Percentage (average of both directions)			4%		percent
Average Level of Service Per Intersection Before ATCS			A		
(10) Use Your Own Delay Reduction Values?	☑ Yes				
(11) Corridor Delay Reduction Per Vehicle (average of both directions)			0.063		seconds/vehicle

Use the table below to estimate existing delay on a per intersection basis.

Level of Service Reference Table

LOS	Delay at each intersection
A	0-10
B	>10-20
C	>20-35
D	>35-55
E	>55-80
F	>80

*LOS F typically indicates that traffic demand has exceeded capacity

(From HCM 2010, Exhibit 21-1)

OUTPUT

Calculate Output

CORRIDOR PERFORMANCE (average of both directions)

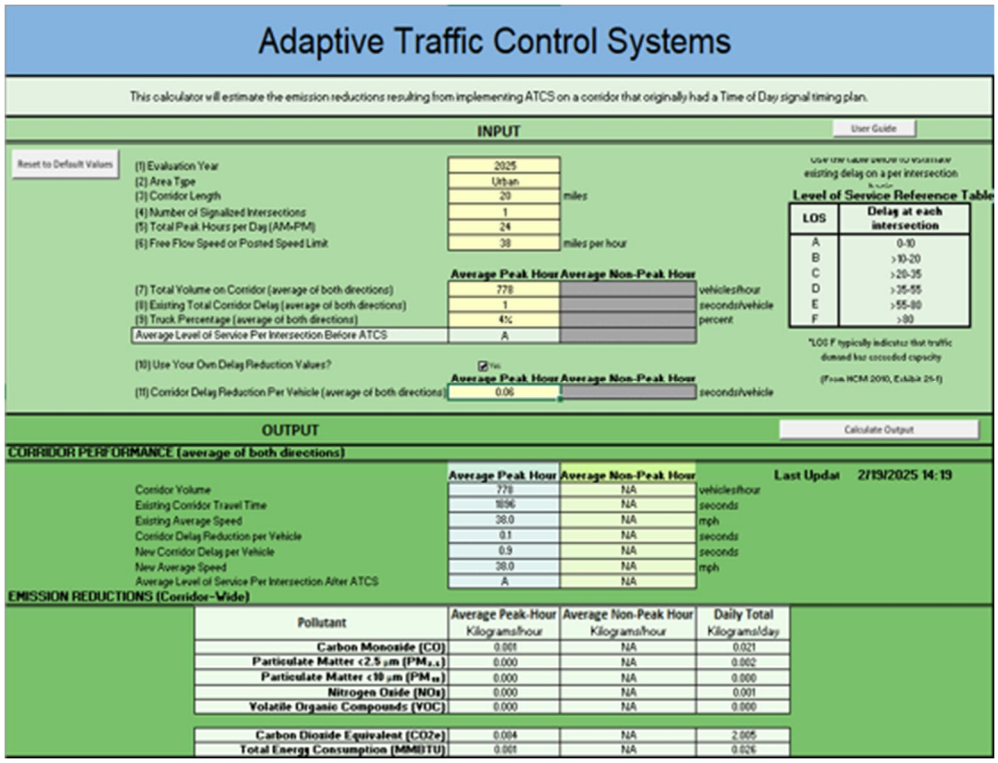
Last Updat 2/19/2025 14:17

	Average Peak Hour	Average Non-Peak Hour	
Corridor Volume	778	NA	vehicles/hour
Existing Corridor Travel Time	1896	NA	seconds
Existing Average Speed	38.0	NA	mph
Corridor Delay Reduction per Vehicle	0.1	NA	seconds
New Corridor Delay per Vehicle	0.9	NA	seconds
New Average Speed	38.0	NA	mph
Average Level of Service Per Intersection After ATCS	A	NA	

EMISSION REDUCTIONS (Corridor-Wide)

Pollutant	Average Peak-Hour Kilograms/hour	Average Non-Peak Hour Kilograms/hour	Daily Total Kilograms/day
Carbon Monoxide (CO)	0.001	NA	0.022
Particulate Matter <2.5 μm ($PM_{2.5}$)	0.000	NA	0.002
Particulate Matter <10 μm (PM_{10})	0.000	NA	0.000
Nitrogen Oxide (NOx)	0.000	NA	0.001
Volatile Organic Compounds (VOC)	0.000	NA	0.000
Carbon Dioxide Equivalent (CO_2e)	0.088	NA	2.105
Total Energy Consumption (MMBTU)	0.001	NA	0.029

Figure 65. SR from Fred Hudson Road to York Road (SB) – CMAQ Toolkit Outputs



Adaptive Traffic Control Systems

This calculator will estimate the emission reductions resulting from implementing ATCS on a corridor that originally had a Time of Day signal timing plan.

INPUT

User Guide

Reset to Default Values

			Average Peak Hour	Average Non-Peak Hour	
(1) Evaluation Year	2025				
(2) Area Type	Urban				
(3) Corridor Length	20	miles			
(4) Number of Signalized Intersections	1				
(5) Total Peak Hours per Day (AM-PM)	24				
(6) Free Flow Speed or Posted Speed Limit	38	miles per hour			
(7) Total Volume on Corridor (average of both directions)			778		vehicles/hour
(8) Existing Total Corridor Delay (average of both directions)			1		seconds/vehicle
(9) Truck Percentage (average of both directions)			4%		percent
Average Level of Service Per Intersection Before ATCS			A		
(10) Use Your Own Delay Reduction Values?	☑ Yes				
(11) Corridor Delay Reduction Per Vehicle (average of both directions)			0.06		seconds/vehicle

Use the table below to estimate existing delay on a per intersection basis.

Level of Service Reference Table

LOS	Delay at each intersection
A	0-10
B	>10-20
C	>20-35
D	>35-55
E	>55-80
F	>80

*LOS F typically indicates that traffic demand has exceeded capacity

(From HCM 2010, Exhibit 21-1)

OUTPUT

Calculate Output

CORRIDOR PERFORMANCE (average of both directions)

Last Updat 2/19/2025 14:19

	Average Peak Hour	Average Non-Peak Hour	
Corridor Volume	778	NA	vehicles/hour
Existing Corridor Travel Time	1896	NA	seconds
Existing Average Speed	38.0	NA	mph
Corridor Delay Reduction per Vehicle	0.1	NA	seconds
New Corridor Delay per Vehicle	0.9	NA	seconds
New Average Speed	38.0	NA	mph
Average Level of Service Per Intersection After ATCS	A	NA	

EMISSION REDUCTIONS (Corridor-Wide)

Pollutant	Average Peak-Hour Kilograms/hour	Average Non-Peak Hour Kilograms/hour	Daily Total Kilograms/day
Carbon Monoxide (CO)	0.001	NA	0.021
Particulate Matter <2.5 μm ($PM_{2.5}$)	0.000	NA	0.002
Particulate Matter <10 μm (PM_{10})	0.000	NA	0.000
Nitrogen Oxide (NOx)	0.000	NA	0.001
Volatile Organic Compounds (VOC)	0.000	NA	0.000
Carbon Dioxide Equivalent (CO_2e)	0.084	NA	2.005
Total Energy Consumption (MMBTU)	0.001	NA	0.026

1.4.21 Traffic Signal Retiming – SR 1: SR 54 to James Street

This project was reported to PAS for FY2025 as a quantitative entry. The project is listed under CMAQ ID No. T202504703. The information presented in the tables and figures below was used to calculate annual emissions reductions.

Table 32. SR 1: SR 54 to James Street – CMAQ Toolkit Inputs

Input ID	Input Field	Direction of Travel	
		NB	*SB*
(1)	Evaluation Year	2025	2025
(2)	Area Type	URBAN	URBAN
(3)	Corridor Length (miles)	0.91	0.91
(4)	Number of Signalized Intersections	1	1
(5)	Total Peak Hours per Day (AM+PM)	24	24
(6)	Free Flow Speed or Posted Speed Limit	35.00	35.00
(7)	Total Volume on Corridor or Direction of Travel (Daily)	11,709.12	11,709.12
	Total Volume on Corridor or Direction of Travel (Veh/Hour)	487.88	487.88
(8)	Existing Total Travel Delay Per Vehicle (sec)	0.55	0.50
(9)	Truck Percentage	4.20%	4.20%
(10)	Use Your Own Delay Reduction Values	Y	Y
(11)	Corridor Delay Reduction per Vehicle	0.027	0.025

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Figure 66. SR 1: SR 54 to James Street – System Location Map

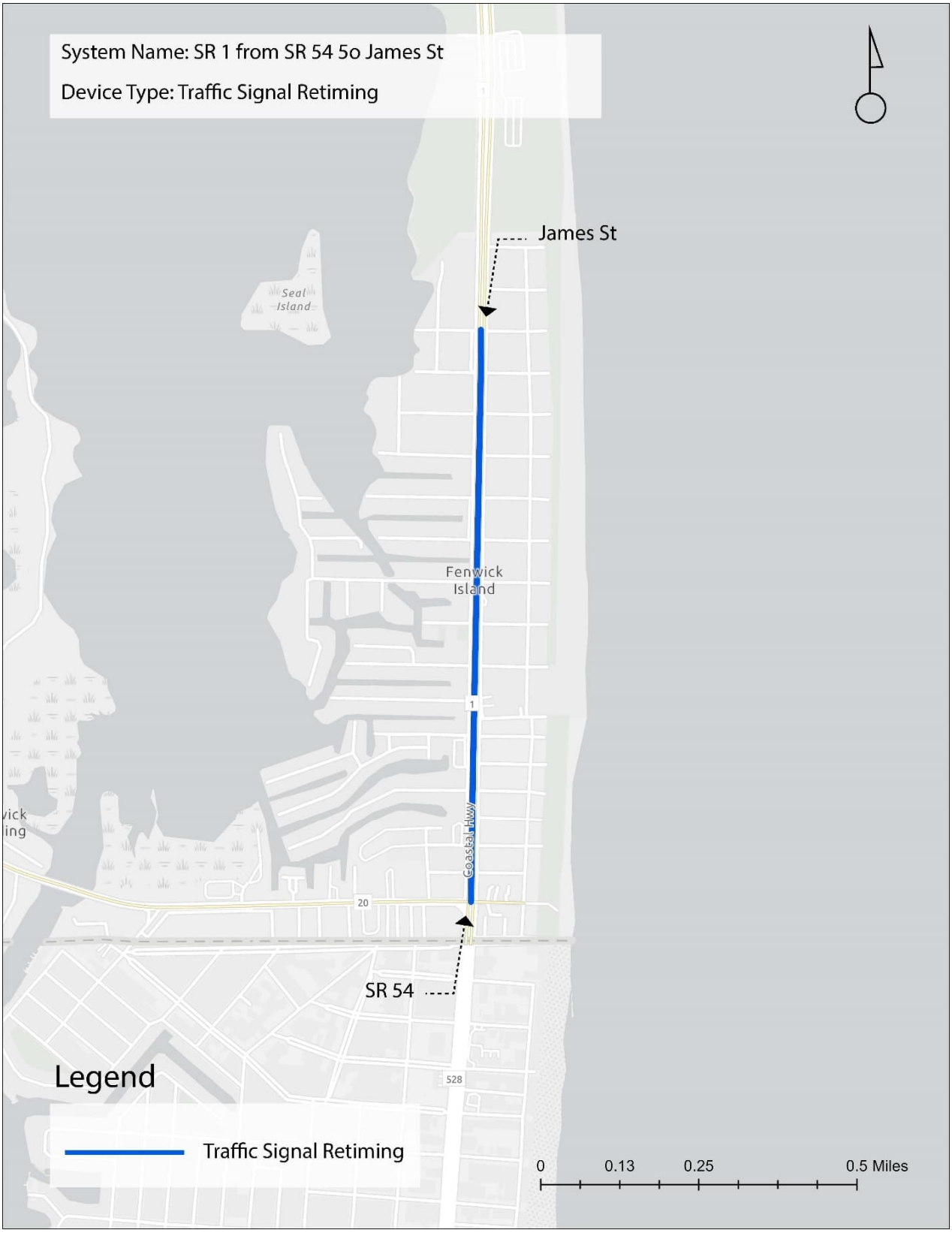
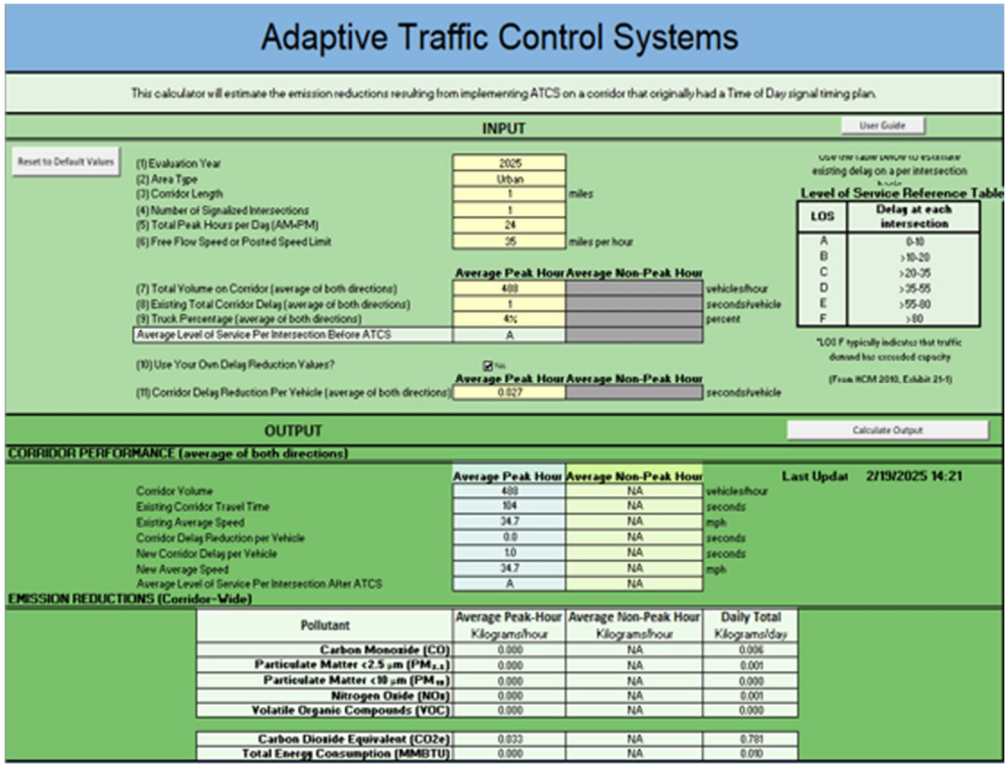


Figure 67. SR 1 from SR 54 to James Street (NB) – CMAQ Toolkit Outputs



Adaptive Traffic Control Systems

This calculator will estimate the emission reductions resulting from implementing ATCS on a corridor that originally had a Time of Day signal timing plan.

INPUT

User Guide

Reset to Default Values

(1) Evaluation Year	2025	
(2) Area Type	Urban	
(3) Corridor Length	1	miles
(4) Number of Signalized Intersections	1	
(5) Total Peak Hours per Day (AM+PM)	24	
(6) Free Flow Speed or Posted Speed Limit	35	miles per hour

	Average Peak Hour	Average Non-Peak Hour	
(7) Total Volume on Corridor (average of both directions)	488		vehicles/hour
(8) Existing Total Corridor Delay (average of both directions)	1		seconds/vehicle
(9) Truck Percentage (average of both directions)	4%		percent
Average Level of Service Per Intersection Before ATCS	A		

(10) Use Your Own Delay Reduction Values? ☑ Yes

	Average Peak Hour	Average Non-Peak Hour	
(11) Corridor Delay Reduction Per Vehicle (average of both directions)	0.027		seconds/vehicle

Use the table below to estimate existing delay on a per intersection basis.

Level of Service Reference Table

LOS	Delay at each intersection
A	0-10
B	>10-20
C	>20-35
D	>35-55
E	>55-80
F	>80

*LOS F typically indicates that traffic demand has exceeded capacity

(From HCM 2010, Exhibit 21-1)

OUTPUT

Calculate Output

CORRIDOR PERFORMANCE (average of both directions)

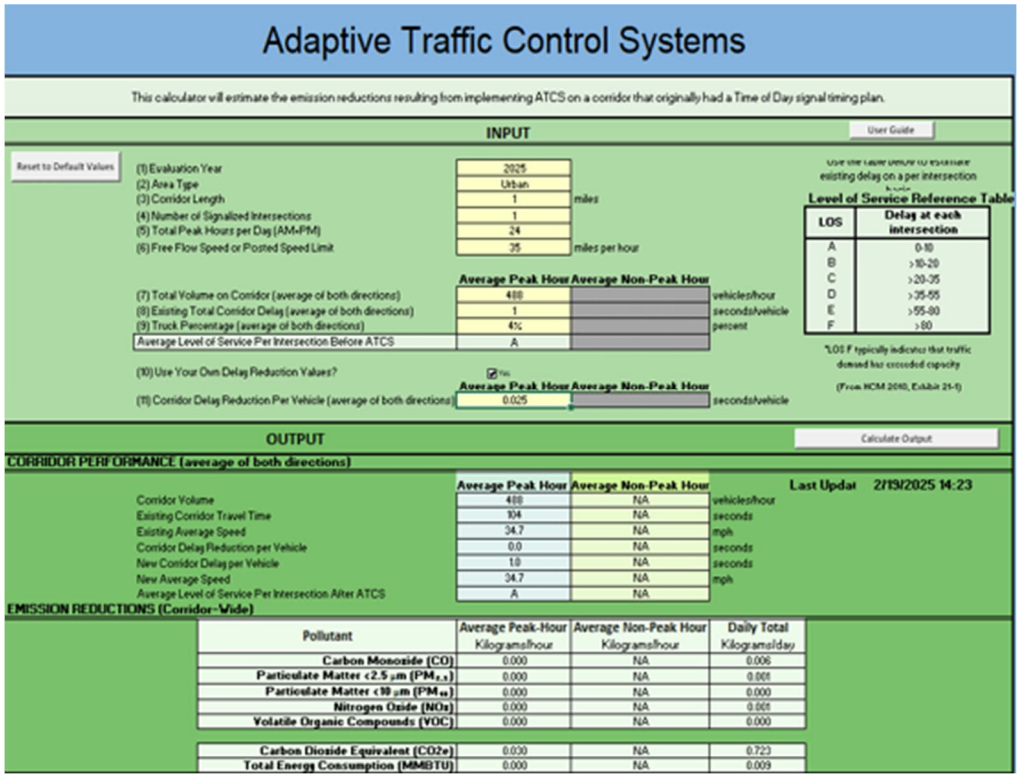
Last Updat 2/19/2025 14:21

	Average Peak Hour	Average Non-Peak Hour	
Corridor Volume	488	NA	vehicles/hour
Existing Corridor Travel Time	104	NA	seconds
Existing Average Speed	34.7	NA	mph
Corridor Delay Reduction per Vehicle	0.0	NA	seconds
New Corridor Delay per Vehicle	1.0	NA	seconds
New Average Speed	34.7	NA	mph
Average Level of Service Per Intersection After ATCS	A	NA	

EMISSION REDUCTIONS (Corridor-Wide)

Pollutant	Average Peak-Hour Kilograms/hour	Average Non-Peak Hour Kilograms/hour	Daily Total Kilograms/day
Carbon Monoxide (CO)	0.000	NA	0.006
Particulate Matter <2.5 μm ($PM_{2.5}$)	0.000	NA	0.001
Particulate Matter <10 μm (PM_{10})	0.000	NA	0.000
Nitrogen Oxide (NOx)	0.000	NA	0.001
Volatile Organic Compounds (VOC)	0.000	NA	0.000
Carbon Dioxide Equivalent (CO2e)	0.033	NA	0.781
Total Energy Consumption (MMBTU)	0.000	NA	0.010

Figure 68. SR 1 from SR 54 to James Street (SB) – CMAQ Toolkit Outputs



Adaptive Traffic Control Systems

This calculator will estimate the emission reductions resulting from implementing ATCS on a corridor that originally had a Time of Day signal timing plan.

INPUT

User Guide

Reset to Default Values

(1) Evaluation Year	2025	
(2) Area Type	Urban	
(3) Corridor Length	1	miles
(4) Number of Signalized Intersections	1	
(5) Total Peak Hours per Day (AM+PM)	24	
(6) Free Flow Speed or Posted Speed Limit	35	miles per hour

	Average Peak Hour	Average Non-Peak Hour	
(7) Total Volume on Corridor (average of both directions)	488		vehicles/hour
(8) Existing Total Corridor Delay (average of both directions)	1		seconds/vehicle
(9) Truck Percentage (average of both directions)	4%		percent
Average Level of Service Per Intersection Before ATCS	A		

(10) Use Your Own Delay Reduction Values? ☑ Yes

	Average Peak Hour	Average Non-Peak Hour	
(11) Corridor Delay Reduction Per Vehicle (average of both directions)	0.025		seconds/vehicle

Use the table below to estimate existing delay on a per intersection basis.

Level of Service Reference Table

LOS	Delay at each intersection
A	0-10
B	>10-20
C	>20-35
D	>35-55
E	>55-80
F	>80

*LOS F typically indicates that traffic demand has exceeded capacity

(From HCM 2010, Exhibit 21-1)

OUTPUT

Calculate Output

CORRIDOR PERFORMANCE (average of both directions)

Last Updat 2/19/2025 14:23

	Average Peak Hour	Average Non-Peak Hour	
Corridor Volume	488	NA	vehicles/hour
Existing Corridor Travel Time	104	NA	seconds
Existing Average Speed	34.7	NA	mph
Corridor Delay Reduction per Vehicle	0.0	NA	seconds
New Corridor Delay per Vehicle	1.0	NA	seconds
New Average Speed	34.7	NA	mph
Average Level of Service Per Intersection After ATCS	A	NA	

EMISSION REDUCTIONS (Corridor-Wide)

Pollutant	Average Peak-Hour Kilograms/hour	Average Non-Peak Hour Kilograms/hour	Daily Total Kilograms/day
Carbon Monoxide (CO)	0.000	NA	0.006
Particulate Matter <2.5 μm ($PM_{2.5}$)	0.000	NA	0.001
Particulate Matter <10 μm (PM_{10})	0.000	NA	0.000
Nitrogen Oxide (NOx)	0.000	NA	0.001
Volatile Organic Compounds (VOC)	0.000	NA	0.000
Carbon Dioxide Equivalent (CO2e)	0.030	NA	0.723
Total Energy Consumption (MMBTU)	0.000	NA	0.009

1.4.22 Traffic Signal Retiming – SR 20: US 13 to Neals School Road

This project was reported to PAS for FY2025 as a quantitative entry. The project is listed under CMAQ ID No. T202504703. The information presented in the tables and figures below was used to calculate annual emissions reductions.

Table 33. SR 20 from US 13 to Neals School Road – CMAQ Toolkit Inputs

Input ID	Input Field	Direction of Travel	
		EB	*WB*
(1)	Evaluation Year	2025	2025
(2)	Area Type	URBAN	URBAN
(3)	Corridor Length (miles)	23.38	23.38
(4)	Number of Signalized Intersections	1	1
(5)	Total Peak Hours per Day (AM+PM)	24	24
(6)	Free Flow Speed or Posted Speed Limit	33.01	33.01
(7)	Total Volume on Corridor or Direction of Travel (Daily)	11,532.48	11,532.48
	Total Volume on Corridor or Direction of Travel (Veh/Hour)	480.52	480.52
(8)	Existing Total Travel Delay Per Vehicle (sec)	-	-
(9)	Truck Percentage	4.61%	4.61%
(10)	Use Your Own Delay Reduction Values	Y	Y
(11)	Corridor Delay Reduction per Vehicle	0.000	0.00

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Figure 69. SR 20 from US 13 to Neals School Road – System Location Map

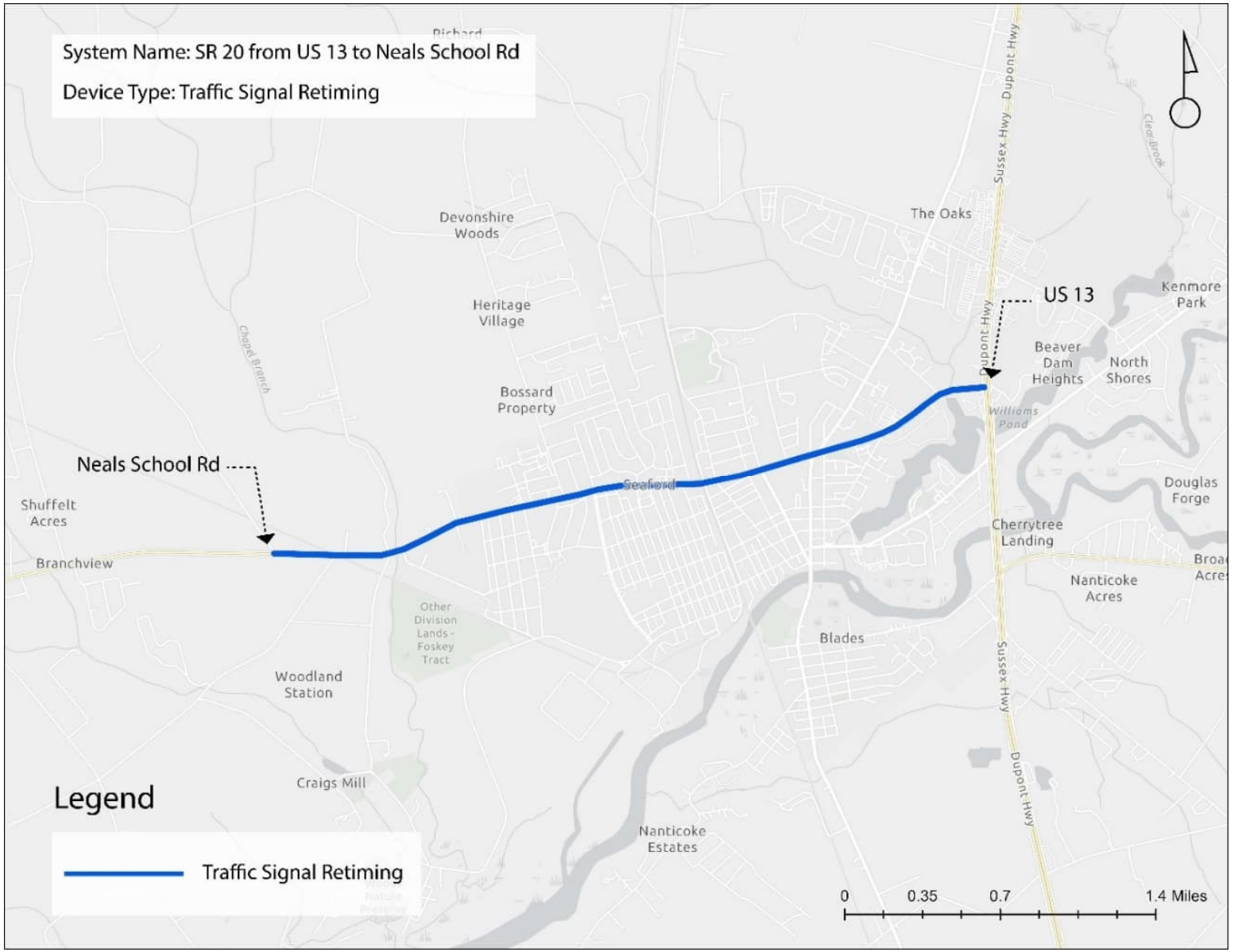


Figure 70. SR 20 from US 13 to Neals School Road (EB) – CMAQ Toolkit Outputs

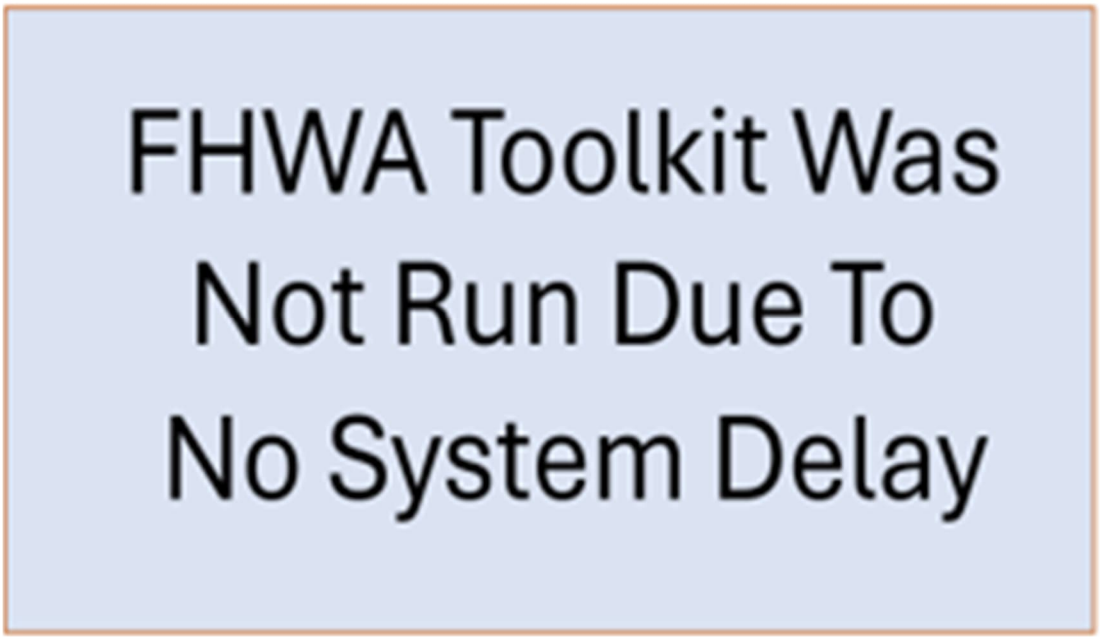
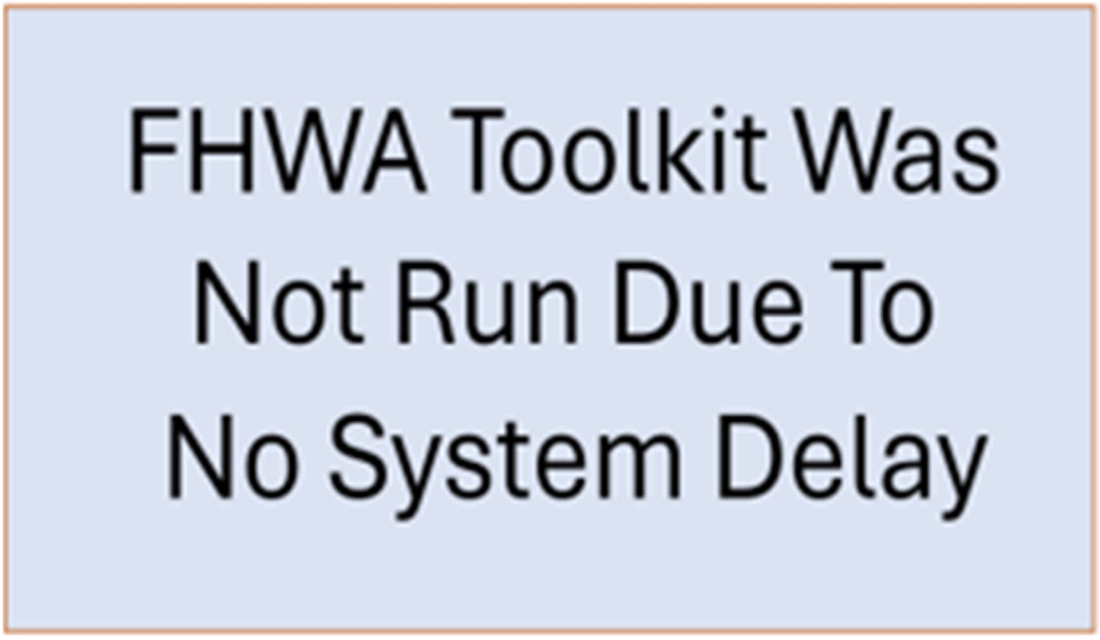


Figure 71. SR 20 from US 13 to Neals School Road (WB) – CMAQ Toolkit Outputs



1.4.23 Traffic Signal Retiming – SR 24 from Mulberry Knoll to State Street Millsboro

This project was reported to PAS for FY2025 as a quantitative entry. The project is listed under CMAQ ID No. T202304703. The information presented in the tables and figures below was used to calculate annual emissions reductions.

Table 34. SR 24 from Mulberry Knoll to State Street Millsboro – CMAQ Toolkit Inputs

Input ID	Input Field	Direction of Travel	
		NB	*SB*
(1)	Evaluation Year	2025	2025
(2)	Area Type	RURAL	RURAL
(3)	Corridor Length (miles)	108.16	108.16
(4)	Number of Signalized Intersections	1	1
(5)	Total Peak Hours per Day (AM+PM)	24	24
(6)	Free Flow Speed or Posted Speed Limit	42.98	42.98
(7)	Total Volume on Corridor or Direction of Travel (Daily)	15,024.00	15,024.00
	Total Volume on Corridor or Direction of Travel (Veh/Hour)	626.00	626.00
(8)	Existing Total Travel Delay Per Vehicle (sec)	-	-
(9)	Truck Percentage	4.20%	4.20%
(10)	Use Your Own Delay Reduction Values	Y	Y
(11)	Corridor Delay Reduction per Vehicle	0.00	0.00

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Figure 72. SR 24 from Mulberry Knoll to State Street Millsboro – System Location Map

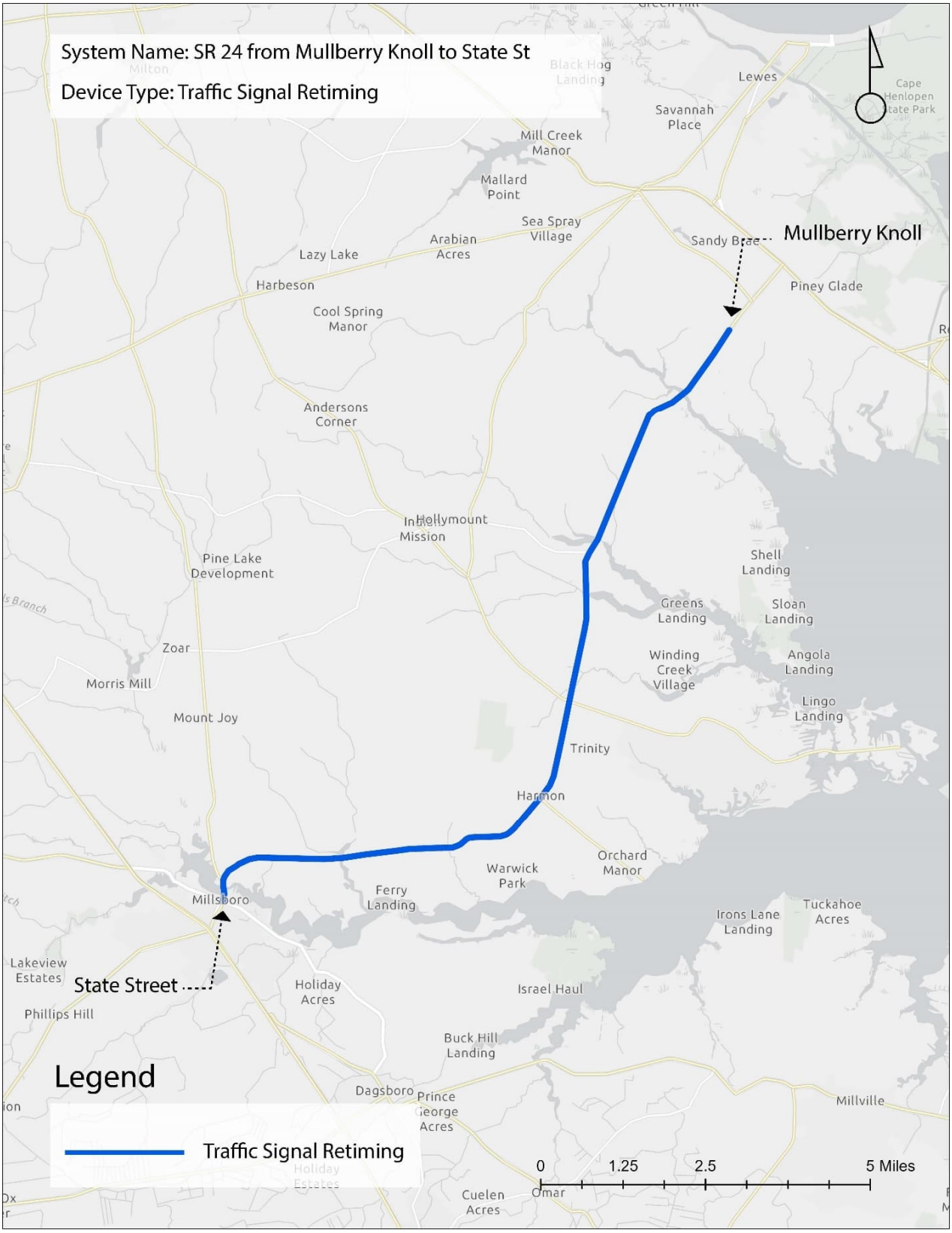


Figure 73. SR 24 from Mulberry Knoll to State Street Millsboro (EB) – CMAQ Toolkit Outputs

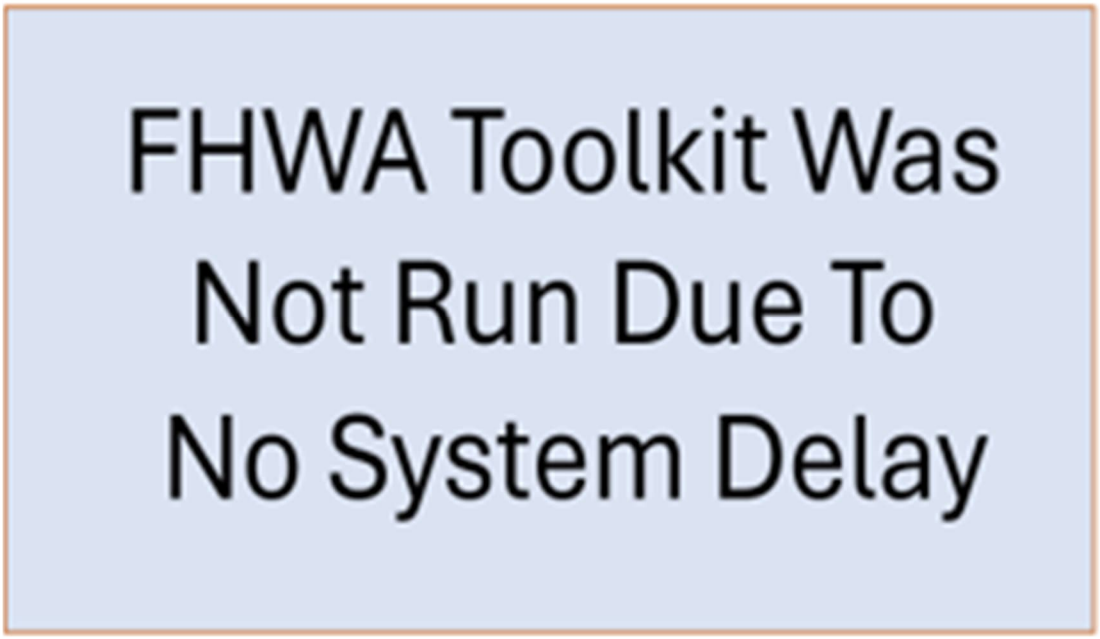
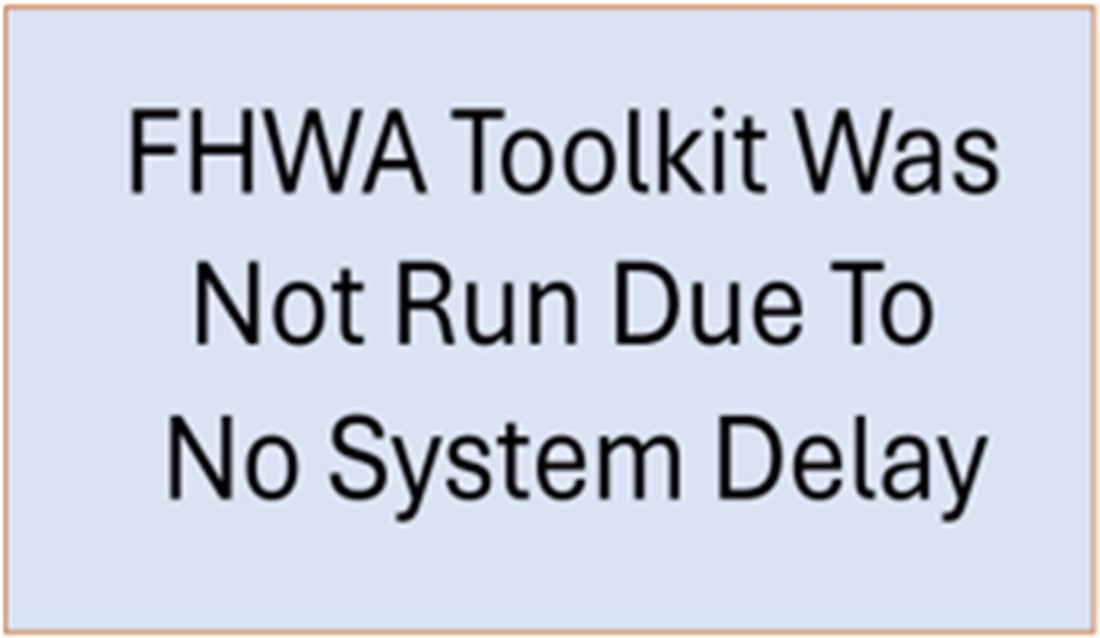


Figure 74. SR 24 from Mulberry Knoll to State Street Millsboro (WB) – CMAQ Toolkit Outputs



1.4.24 Traffic Signal Retiming – SR 299 from US 301 to SR 1

This project was reported to PAS for FY2025 as a quantitative entry. The project is listed under CMAQ ID No. T202304703. The information presented in the tables and figures below was used to calculate annual emissions reductions.

Table 35. SR 299 from US 301 to SR 1 – CMAQ Toolkit Inputs

Input ID	Input Field	Direction of Travel	
		EB	*WB*
(1)	Evaluation Year	2025	2025
(2)	Area Type	URBAN	URBAN
(3)	Corridor Length (miles)	29.89	29.89
(4)	Number of Signalized Intersections	1	1
(5)	Total Peak Hours per Day (AM+PM)	24	24
(6)	Free Flow Speed or Posted Speed Limit	41.91	41.91
(7)	Total Volume on Corridor or Direction of Travel (Daily)	16,272.72	16,272.72
	Total Volume on Corridor or Direction of Travel (Veh/Hour)	678.03	678.03
(8)	Existing Total Travel Delay Per Vehicle (sec)	-	-
(9)	Truck Percentage	3.55%	3.55%
(10)	Use Your Own Delay Reduction Values	Y	Y
(11)	Corridor Delay Reduction per Vehicle	0.000	0.00

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Figure 75. SR 299 from US 301 to SR 1 – System Location Map

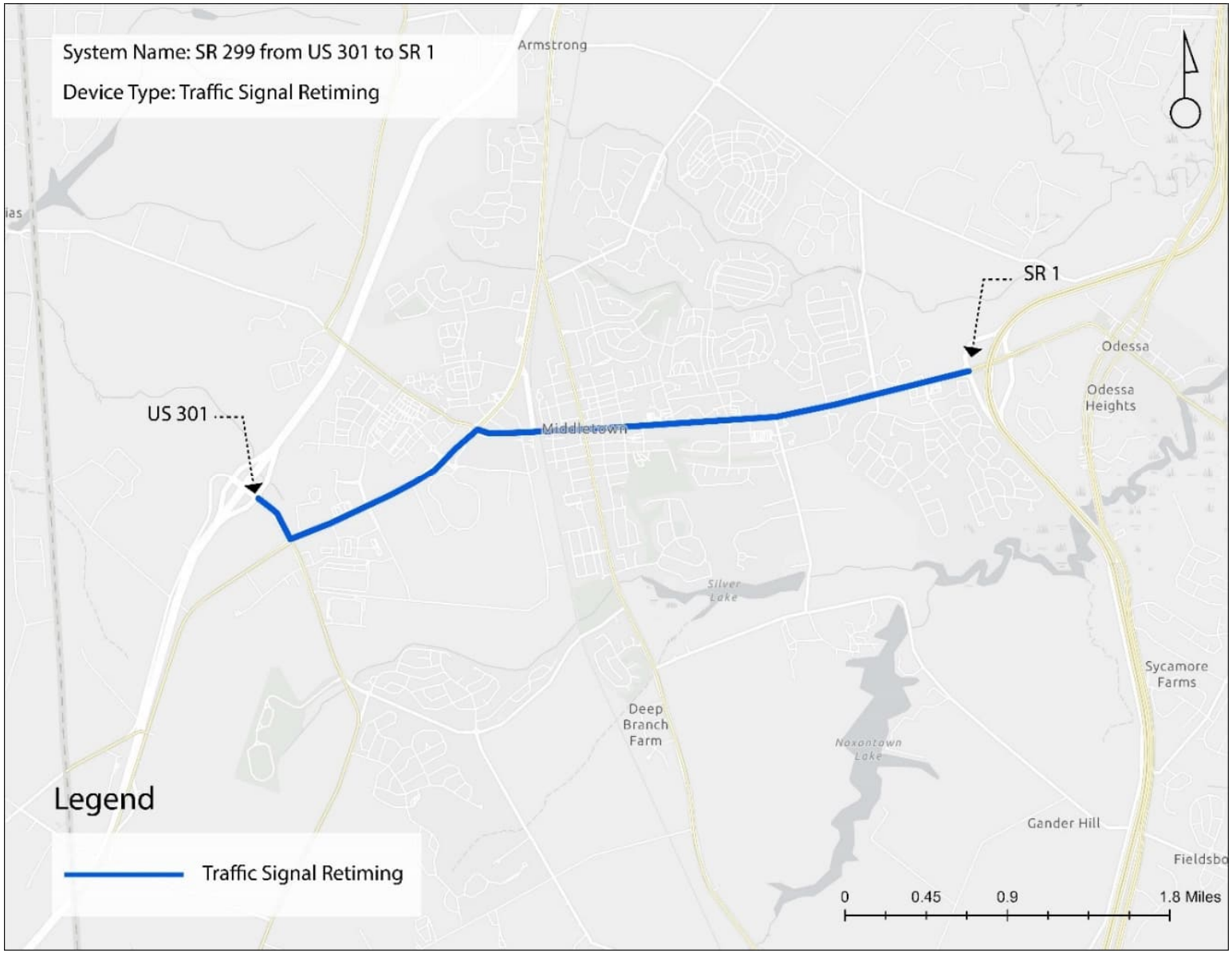


Figure 76. SR 299 from US 301 to SR 1 (EB) – CMAQ Toolkit Outputs

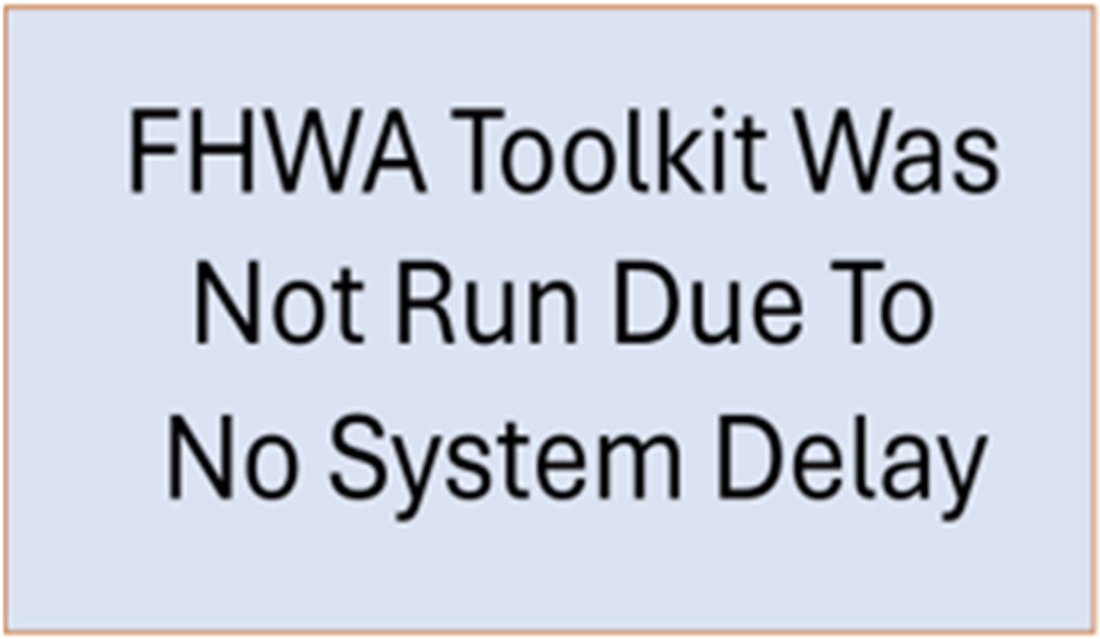
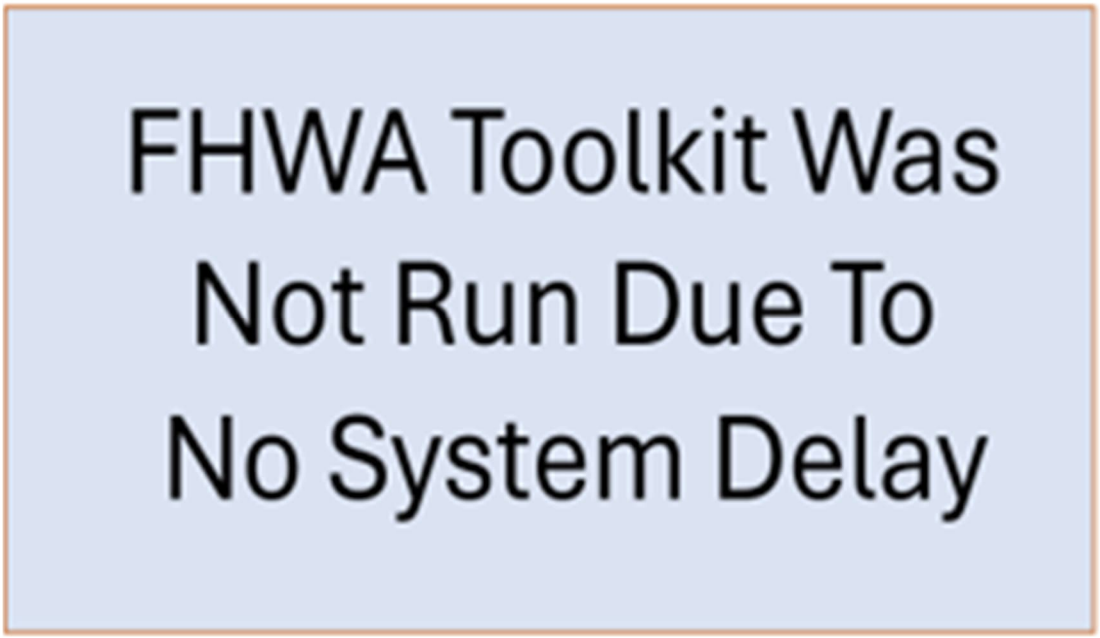


Figure 77. SR 299 from US 301 to SR 1 (WB) – CMAQ Toolkit Outputs



1.4.25 Traffic Signal Retiming – SR 300 from US 13 to Artisan Drive

This project was reported to PAS for FY2025 as a quantitative entry. The project is listed under CMAQ ID No. T202504703. The information presented in the tables and figures below was used to calculate annual emissions reductions.

Table 36. SR 300 from US 13 to Artisan Drive – CMAQ Toolkit Inputs

Input ID	Input Field	Direction of Travel	
		EB	*WB*
(1)	Evaluation Year	2025	2025
(2)	Area Type	URBAN	URBAN
(3)	Corridor Length (miles)	7.08	7.08
(4)	Number of Signalized Intersections	1	1
(5)	Total Peak Hours per Day (AM+PM)	24	24
(6)	Free Flow Speed or Posted Speed Limit	40.96	40.96
(7)	Total Volume on Corridor or Direction of Travel (Daily)	12,777.84	12,777.84
	Total Volume on Corridor or Direction of Travel (Veh/Hour)	532.41	532.41
(8)	Existing Total Travel Delay Per Vehicle (sec)	-	-
(9)	Truck Percentage	4.97%	4.97%
(10)	Use Your Own Delay Reduction Values	Y	Y
(11)	Corridor Delay Reduction per Vehicle	0.00	0.00

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Figure 78. SR 300 from US 13 to Artisan Drive – System Location Map

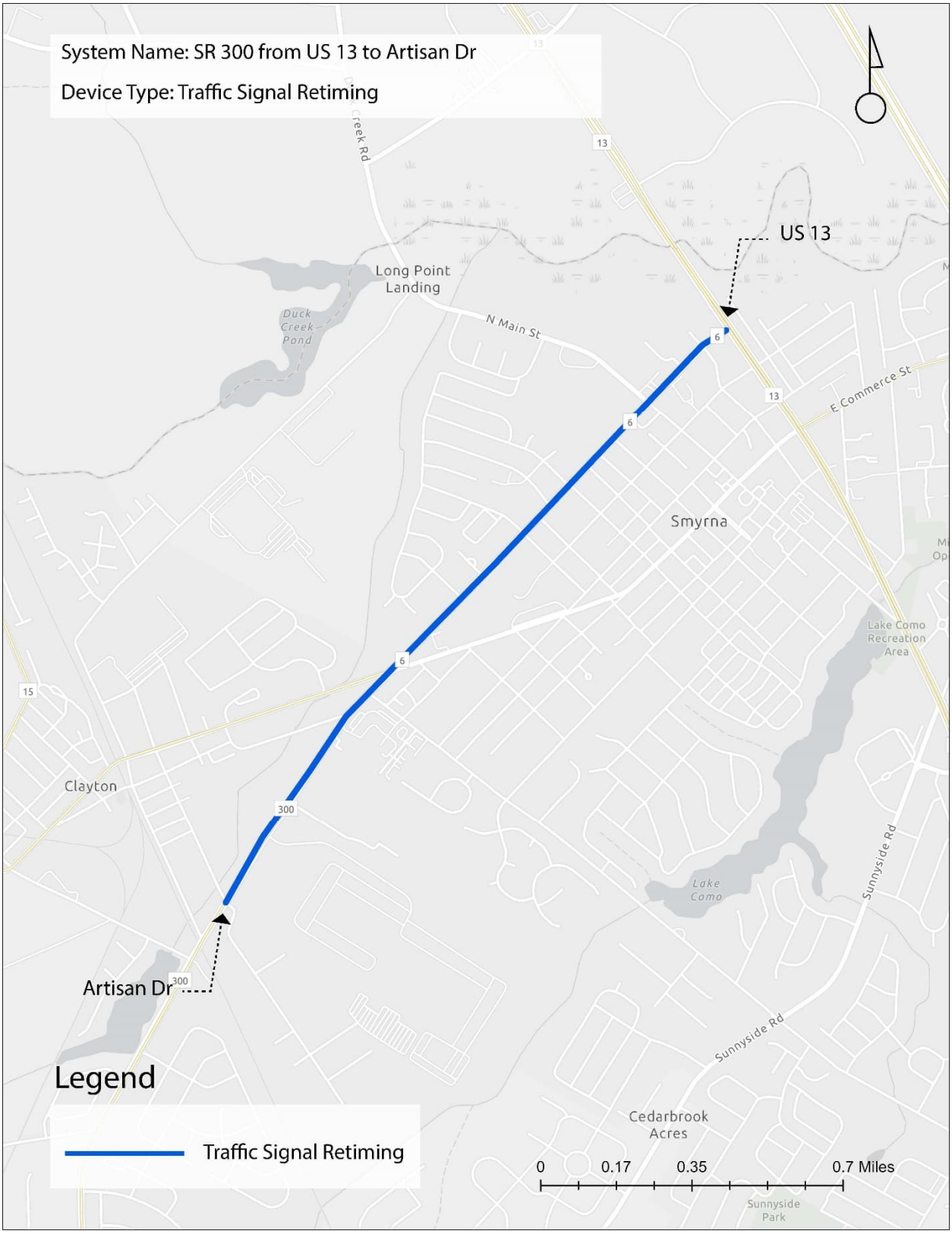


Figure 79. SR 300 from US 13 to Artisan Drive (EB) – CMAQ Toolkit Outputs

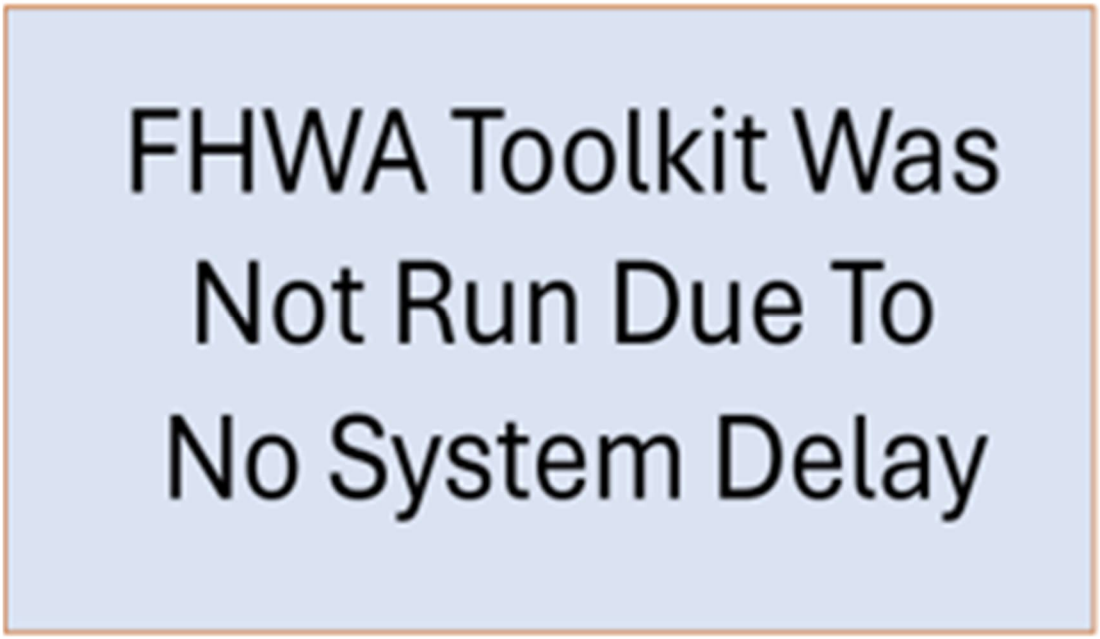
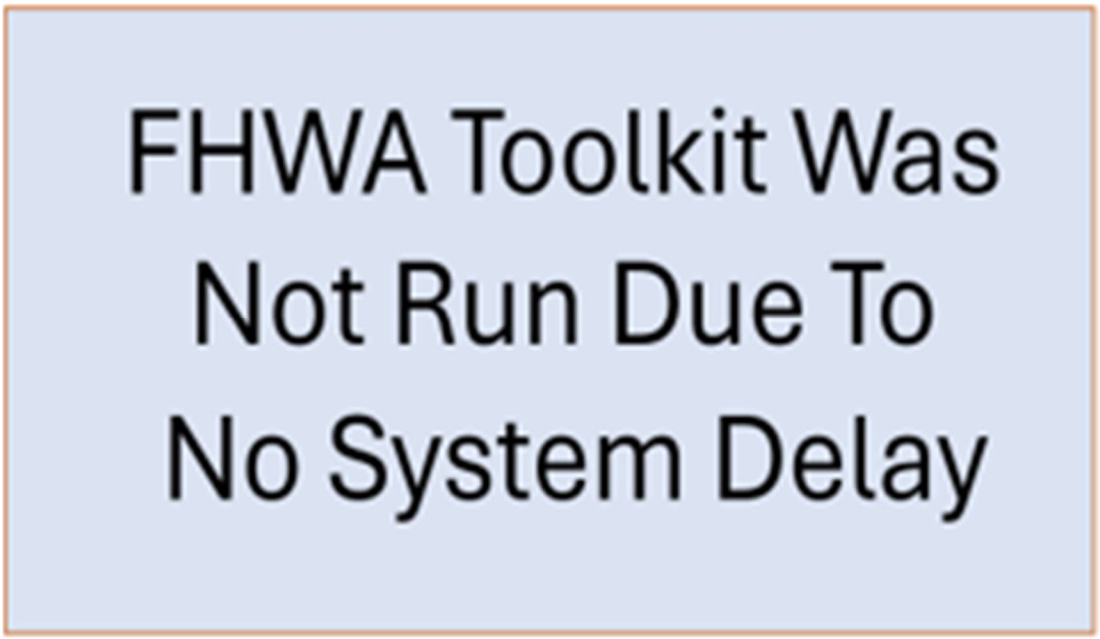


Figure 80. SR 300 from US 13 to Artisan Drive (WB) – CMAQ Toolkit Outputs



1.4.26 Traffic Signal Retiming – SR 4 from Robscott to SR 7

This project was reported to PAS for FY2025 as a quantitative entry. The project is listed under CMAQ ID No. T202504703. The information presented in the tables and figures below was used to calculate annual emissions reductions.

Table 37. SR 4 from Robscott to SR 7 – CMAQ Toolkit Inputs

Input ID	Input Field	Direction of Travel	
		EB	*WB*
(1)	Evaluation Year	2025	2025
(2)	Area Type	URBAN	URBAN
(3)	Corridor Length (miles)	39.97	39.97
(4)	Number of Signalized Intersections	1	1
(5)	Total Peak Hours per Day (AM+PM)	24	24
(6)	Free Flow Speed or Posted Speed Limit	48.20	48.20
(7)	Total Volume on Corridor or Direction of Travel (Daily)	23,292.48	23,292.48
	Total Volume on Corridor or Direction of Travel (Veh/Hour)	970.52	970.52
(8)	Existing Total Travel Delay Per Vehicle (sec)	4.38	4.36
(9)	Truck Percentage	4.98%	4.98%
(10)	Use Your Own Delay Reduction Values	Y	Y
(11)	Corridor Delay Reduction per Vehicle	0.219	0.218

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Figure 81. SR 4 from Robscott to SR 7– System Location Map

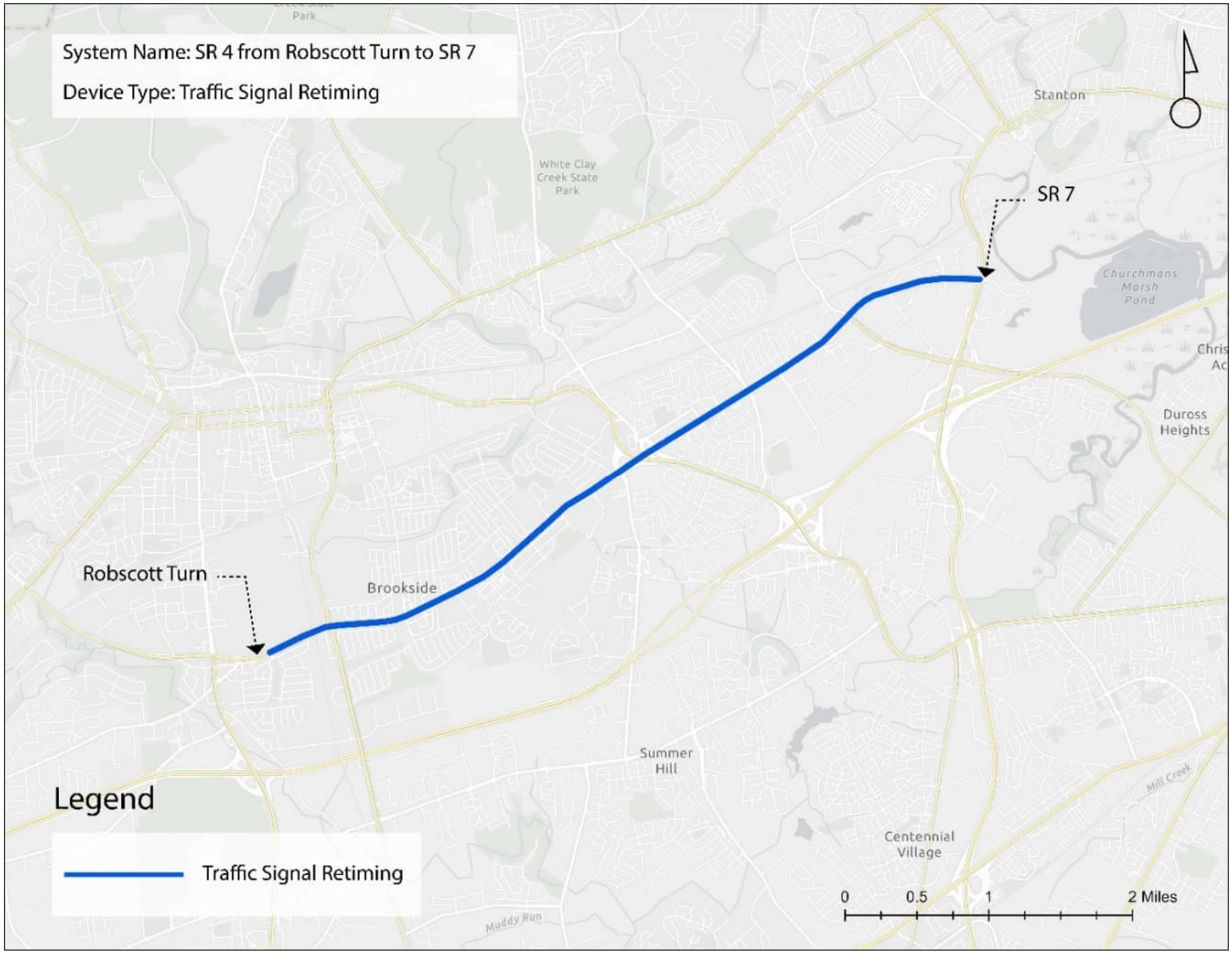
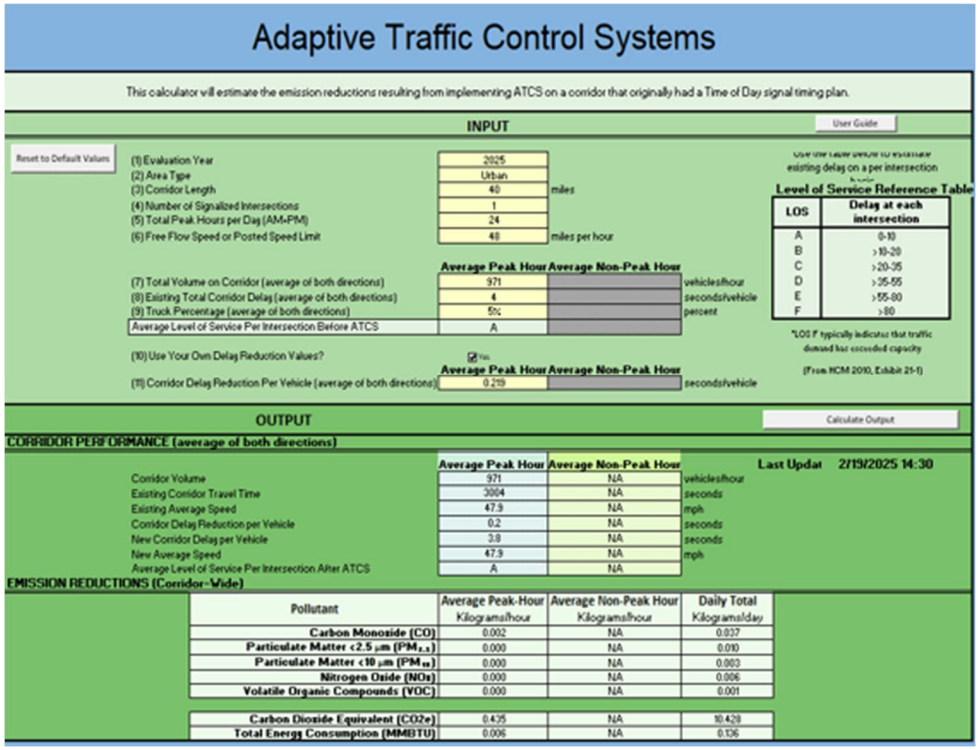


Figure 82. SR 4 from Robscott to SR 7 (EB) – CMAQ Toolkit Outputs



Adaptive Traffic Control Systems

This calculator will estimate the emission reductions resulting from implementing ATCS on a corridor that originally had a Time of Day signal timing plan.

INPUT

User Guide

Reset to Default Values

(1) Evaluation Year	2025		
(2) Area Type	Urban		
(3) Corridor Length	40	miles	
(4) Number of Signalized Intersections	1		
(5) Total Peak Hours per Day (AM+PM)	24		
(6) Free Flow Speed or Posted Speed Limit	48	miles per hour	

	Average Peak Hour	Average Non-Peak Hour	
(7) Total Volume on Corridor (average of both directions)	971		vehicles/hour
(8) Existing Total Corridor Delay (average of both directions)	4		seconds/vehicle
(9) Truck Percentage (average of both directions)	5%		percent
Average Level of Service Per Intersection Before ATCS	A		

(10) Use Your Own Delay Reduction Values? ☑ Yes

	Average Peak Hour	Average Non-Peak Hour	
(11) Corridor Delay Reduction Per Vehicle (average of both directions)	0.219		seconds/vehicle

Use the table below to estimate existing delay on a per intersection basis.

Level of Service Reference Table

LOS	Delay at each intersection
A	0-10
B	>10-20
C	>20-35
D	>35-55
E	>55-80
F	>80

*LOS F typically indicates that traffic demand has exceeded capacity

(From HCM 2010, Exhibit 21-1)

OUTPUT

Calculate Output

CORRIDOR PERFORMANCE (average of both directions)

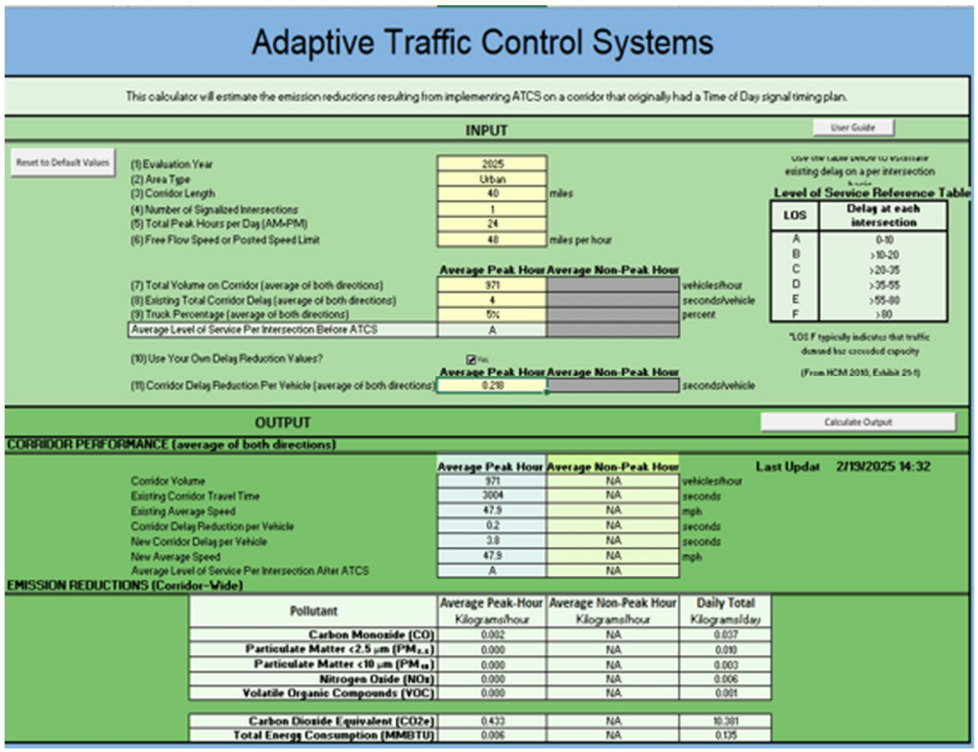
Last Updat 2/19/2025 14:30

	Average Peak Hour	Average Non-Peak Hour	
Corridor Volume	971	NA	vehicles/hour
Existing Corridor Travel Time	3004	NA	seconds
Existing Average Speed	47.9	NA	mph
Corridor Delay Reduction per Vehicle	0.2	NA	seconds
New Corridor Delay per Vehicle	3.8	NA	seconds
New Average Speed	47.9	NA	mph
Average Level of Service Per Intersection After ATCS	A	NA	

EMISSION REDUCTIONS (Corridor-Wide)

Pollutant	Average Peak-Hour Kilograms/hour	Average Non-Peak Hour Kilograms/hour	Daily Total Kilograms/day
Carbon Monoxide (CO)	0.002	NA	0.037
Particulate Matter <2.5 μm ($PM_{2.5}$)	0.000	NA	0.010
Particulate Matter <10 μm (PM_{10})	0.000	NA	0.003
Nitrogen Oxide (NO_x)	0.000	NA	0.006
Volatile Organic Compounds (VOC)	0.000	NA	0.001
Carbon Dioxide Equivalent (CO_2e)	0.435	NA	10.428
Total Energy Consumption (MMBTU)	0.006	NA	0.136

Figure 83. SR 4 from Robscott to SR 7 (SB) – CMAQ Toolkit Outputs



Adaptive Traffic Control Systems

This calculator will estimate the emission reductions resulting from implementing ATCS on a corridor that originally had a Time of Day signal timing plan.

INPUT

User Guide

Reset to Default Values

(1) Evaluation Year	2025		
(2) Area Type	Urban		
(3) Corridor Length	40	miles	
(4) Number of Signalized Intersections	1		
(5) Total Peak Hours per Day (AM+PM)	24		
(6) Free Flow Speed or Posted Speed Limit	48	miles per hour	

	Average Peak Hour	Average Non-Peak Hour	
(7) Total Volume on Corridor (average of both directions)	971		vehicles/hour
(8) Existing Total Corridor Delay (average of both directions)	4		seconds/vehicle
(9) Truck Percentage (average of both directions)	5%		percent
Average Level of Service Per Intersection Before ATCS	A		

(10) Use Your Own Delay Reduction Values? ☑ Yes

	Average Peak Hour	Average Non-Peak Hour	
(11) Corridor Delay Reduction Per Vehicle (average of both directions)	0.218		seconds/vehicle

Use the table below to estimate existing delay on a per intersection basis.

Level of Service Reference Table

LOS	Delay at each intersection
A	0-10
B	>10-20
C	>20-35
D	>35-55
E	>55-80
F	>80

*LOS F typically indicates that traffic demand has exceeded capacity

(From HCM 2010, Exhibit 21-1)

OUTPUT

Calculate Output

CORRIDOR PERFORMANCE (average of both directions)

Last Updat 2/19/2025 14:32

	Average Peak Hour	Average Non-Peak Hour	
Corridor Volume	971	NA	vehicles/hour
Existing Corridor Travel Time	3004	NA	seconds
Existing Average Speed	47.9	NA	mph
Corridor Delay Reduction per Vehicle	0.2	NA	seconds
New Corridor Delay per Vehicle	3.8	NA	seconds
New Average Speed	47.9	NA	mph
Average Level of Service Per Intersection After ATCS	A	NA	

EMISSION REDUCTIONS (Corridor-Wide)

Pollutant	Average Peak-Hour Kilograms/hour	Average Non-Peak Hour Kilograms/hour	Daily Total Kilograms/day
Carbon Monoxide (CO)	0.002	NA	0.037
Particulate Matter <2.5 μm ($PM_{2.5}$)	0.000	NA	0.010
Particulate Matter <10 μm (PM_{10})	0.000	NA	0.003
Nitrogen Oxide (NO_x)	0.000	NA	0.006
Volatile Organic Compounds (VOC)	0.000	NA	0.001
Carbon Dioxide Equivalent (CO_2e)	0.433	NA	10.381
Total Energy Consumption (MMBTU)	0.006	NA	0.135

1.4.27 Traffic Signal Retiming – SR 48: Wilmington Limits to SR 141

This project was reported to PAS for FY2025 as a quantitative entry. The project is listed under CMAQ ID No. T202504703. The information presented in the tables and figures below was used to calculate annual emissions reductions.

Table 38. SR 48: Wilmington Limits to SR 141 – CMAQ Toolkit Inputs

Input ID	Input Field	Direction of Travel	
		EB	*WB*
(1)	Evaluation Year	2025	2025
(2)	Area Type	URBAN	URBAN
(3)	Corridor Length (miles)	0.93	0.93
(4)	Number of Signalized Intersections	1	1
(5)	Total Peak Hours per Day (AM+PM)	24	24
(6)	Free Flow Speed or Posted Speed Limit	30.00	30.00
(7)	Total Volume on Corridor or Direction of Travel (Daily)	24,617.04	24,617.04
	Total Volume on Corridor or Direction of Travel (Veh/Hour)	1,025.71	1,025.71
(8)	Existing Total Travel Delay Per Vehicle (sec)	1.05	1.00
(9)	Truck Percentage	5.00%	5.00%
(10)	Use Your Own Delay Reduction Values	Y	Y
(11)	Corridor Delay Reduction per Vehicle	0.053	0.050

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Figure 84. SR 48: Wilmington Limits to SR 141 – System Location Map

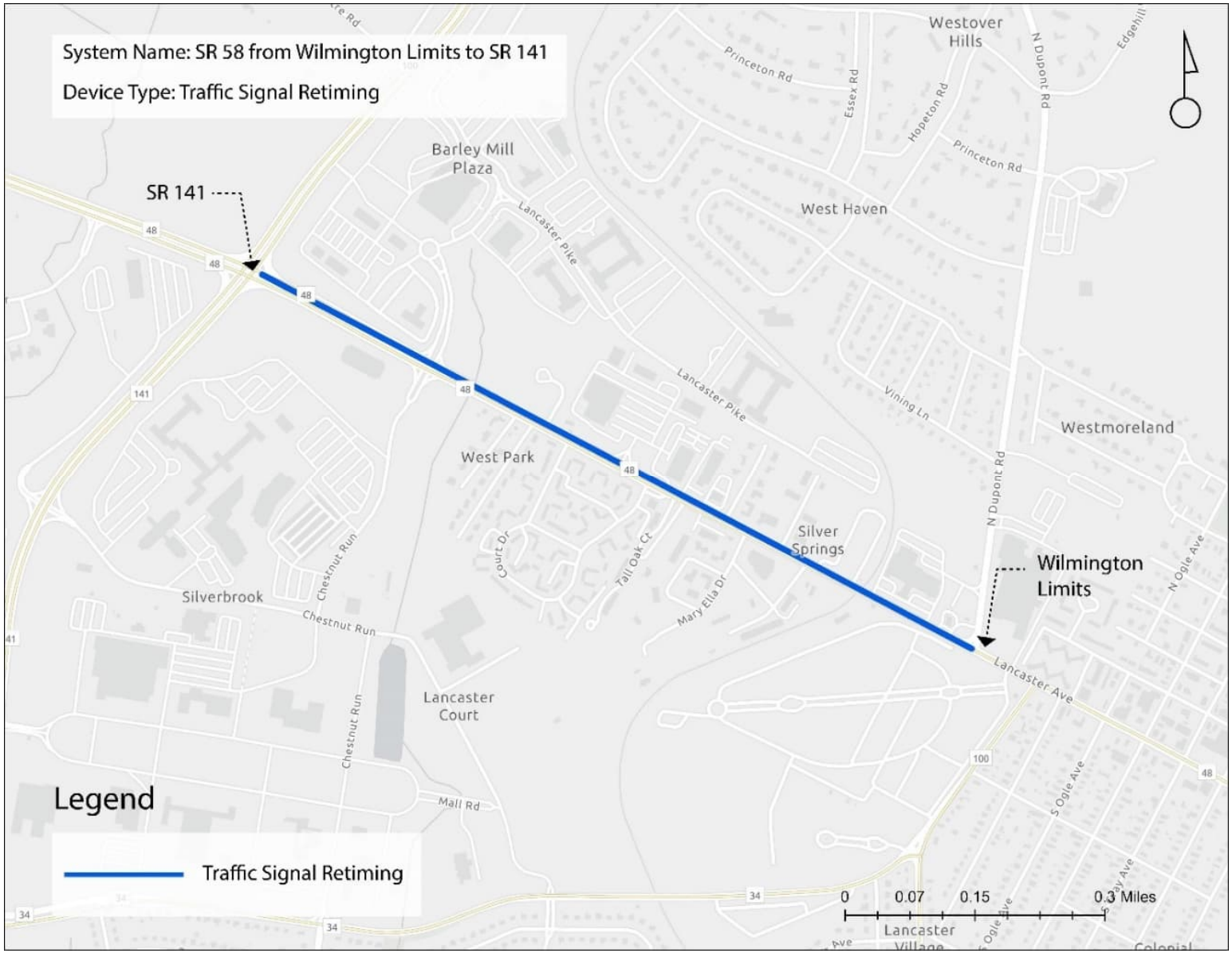
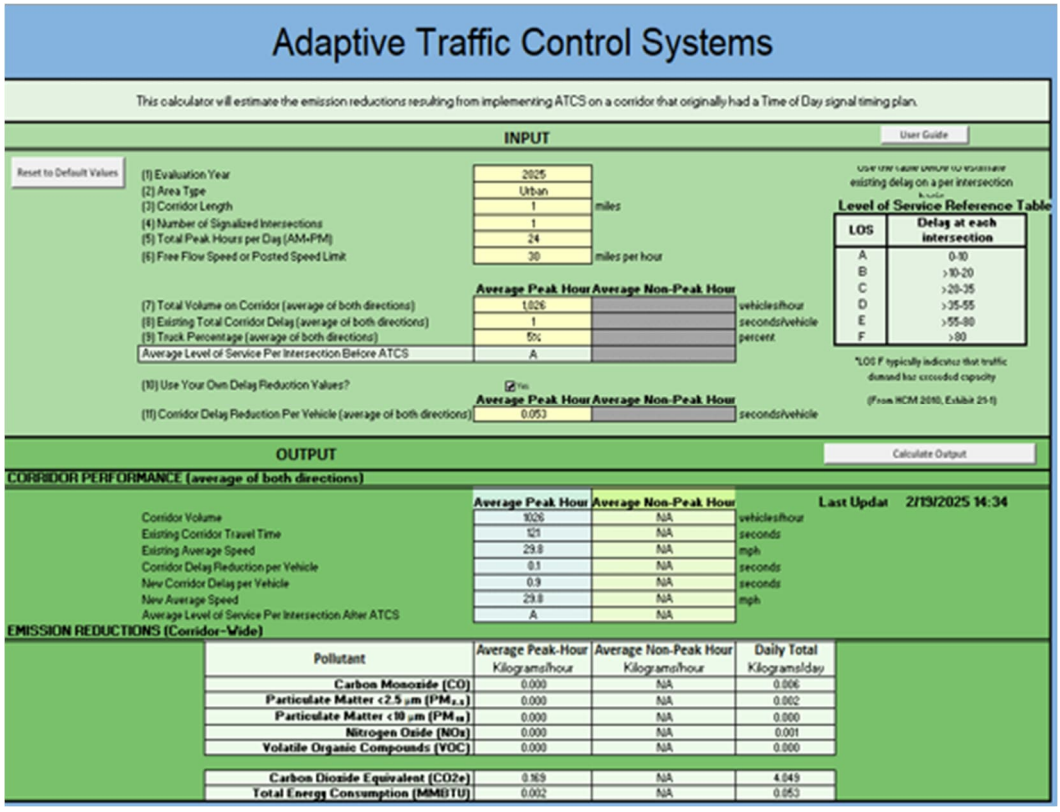


Figure 85. SR 48: Wilmington Limits to SR 141 (EB) – CMAQ Toolkit Outputs



Adaptive Traffic Control Systems

This calculator will estimate the emission reductions resulting from implementing ATCS on a corridor that originally had a Time of Day signal timing plan.

INPUT

User Guide

Reset to Default Values

			Average Peak Hour	Average Non-Peak Hour	
(1) Evaluation Year	2025				
(2) Area Type	Urban				
(3) Corridor Length	1	miles			
(4) Number of Signalized Intersections	1				
(5) Total Peak Hours per Day (AM+PM)	24				
(6) Free Flow Speed or Posted Speed Limit	30	miles per hour			
(7) Total Volume on Corridor (average of both directions)			1,026		vehicles/hour
(8) Existing Total Corridor Delay (average of both directions)			1		seconds/vehicle
(9) Truck Percentage (average of both directions)			5%		percent
Average Level of Service Per Intersection Before ATCS			A		
(10) Use Your Own Delay Reduction Values?	☑ Yes				
(11) Corridor Delay Reduction Per Vehicle (average of both directions)			0.053		seconds/vehicle

Use the table below to estimate existing delay on a per intersection basis.

Level of Service Reference Table

LOS	Delay at each intersection
A	0-10
B	>10-20
C	>20-35
D	>35-55
E	>55-80
F	>80

*LOS F typically indicates that traffic demand has exceeded capacity

(From HCM 2010, Exhibit 21-1)

OUTPUT

Calculate Output

CORRIDOR PERFORMANCE (average of both directions)

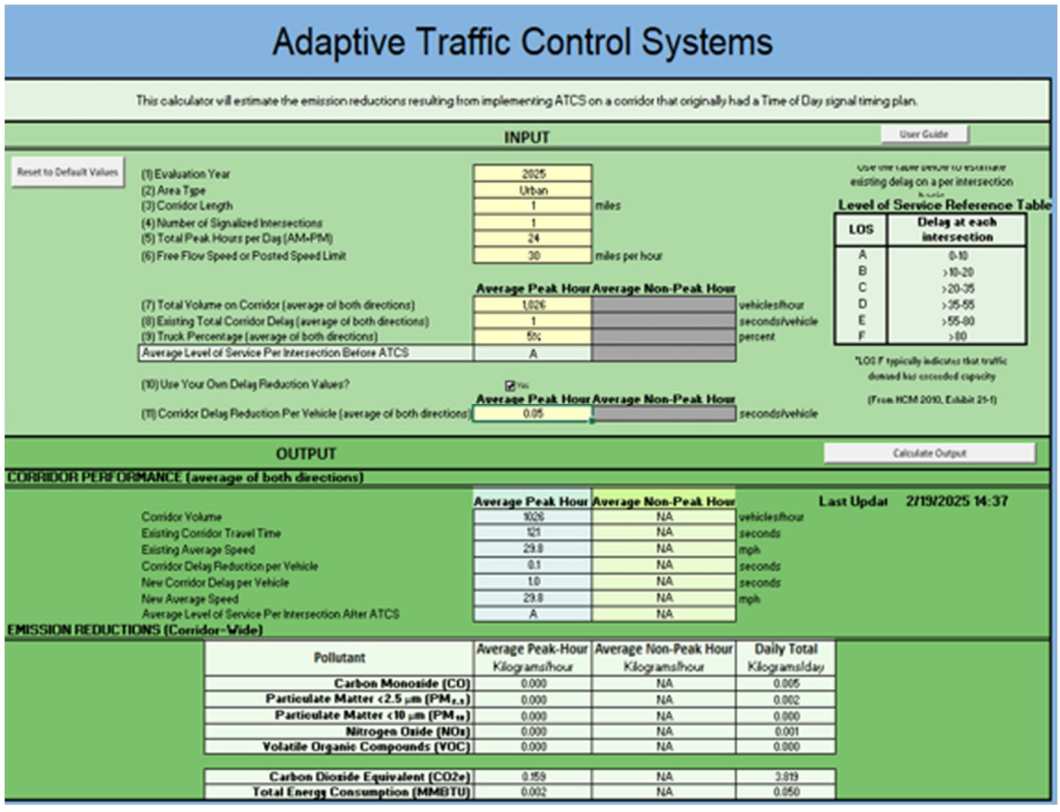
Last Updat 2/19/2025 14:34

	Average Peak Hour	Average Non-Peak Hour	
Corridor Volume	1026	NA	vehicles/hour
Existing Corridor Travel Time	121	NA	seconds
Existing Average Speed	29.8	NA	mph
Corridor Delay Reduction per Vehicle	0.1	NA	seconds
New Corridor Delay per Vehicle	0.9	NA	seconds
New Average Speed	29.8	NA	mph
Average Level of Service Per Intersection After ATCS	A	NA	

EMISSION REDUCTIONS (Corridor-Wide)

Pollutant	Average Peak-Hour Kilograms/hour	Average Non-Peak Hour Kilograms/hour	Daily Total Kilograms/day
Carbon Monoxide (CO)	0.000	NA	0.006
Particulate Matter <2.5 μm ($PM_{2.5}$)	0.000	NA	0.002
Particulate Matter <10 μm (PM_{10})	0.000	NA	0.000
Nitrogen Oxide (NO_x)	0.000	NA	0.001
Volatile Organic Compounds (VOC)	0.000	NA	0.000
Carbon Dioxide Equivalent (CO_2e)	0.169	NA	4.049
Total Energy Consumption (MMBTU)	0.002	NA	0.053

Figure 86. SR 48: Wilmington Limits to SR 141 (WB) – CMAQ Toolkit Outputs



Adaptive Traffic Control Systems

This calculator will estimate the emission reductions resulting from implementing ATCS on a corridor that originally had a Time of Day signal timing plan.

INPUT

User Guide

Reset to Default Values

			Average Peak Hour	Average Non-Peak Hour	
(1) Evaluation Year	2025				
(2) Area Type	Urban				
(3) Corridor Length	1	miles			
(4) Number of Signalized Intersections	1				
(5) Total Peak Hours per Day (AM+PM)	24				
(6) Free Flow Speed or Posted Speed Limit	30	miles per hour			
(7) Total Volume on Corridor (average of both directions)			1,026		vehicles/hour
(8) Existing Total Corridor Delay (average of both directions)			1		seconds/vehicle
(9) Truck Percentage (average of both directions)			5%		percent
Average Level of Service Per Intersection Before ATCS			A		
(10) Use Your Own Delay Reduction Values?	☑ Yes				
(11) Corridor Delay Reduction Per Vehicle (average of both directions)			0.05		seconds/vehicle

Use the table below to estimate existing delay on a per intersection basis.

Level of Service Reference Table

LOS	Delay at each intersection
A	0-10
B	>10-20
C	>20-35
D	>35-55
E	>55-80
F	>80

*LOS F typically indicates that traffic demand has exceeded capacity

(From HCM 2010, Exhibit 21-1)

OUTPUT

Calculate Output

CORRIDOR PERFORMANCE (average of both directions)

Last Updat 2/19/2025 14:37

	Average Peak Hour	Average Non-Peak Hour	
Corridor Volume	1026	NA	vehicles/hour
Existing Corridor Travel Time	121	NA	seconds
Existing Average Speed	29.8	NA	mph
Corridor Delay Reduction per Vehicle	0.1	NA	seconds
New Corridor Delay per Vehicle	1.0	NA	seconds
New Average Speed	29.8	NA	mph
Average Level of Service Per Intersection After ATCS	A	NA	

EMISSION REDUCTIONS (Corridor-Wide)

Pollutant	Average Peak-Hour Kilograms/hour	Average Non-Peak Hour Kilograms/hour	Daily Total Kilograms/day
Carbon Monoxide (CO)	0.000	NA	0.005
Particulate Matter <2.5 μm ($PM_{2.5}$)	0.000	NA	0.002
Particulate Matter <10 μm (PM_{10})	0.000	NA	0.000
Nitrogen Oxide (NO_x)	0.000	NA	0.001
Volatile Organic Compounds (VOC)	0.000	NA	0.000
Carbon Dioxide Equivalent (CO_2e)	0.159	NA	3.819
Total Energy Consumption (MMBTU)	0.002	NA	0.050

1.4.28 Traffic Signal Retiming – SR 58: SR 4 to I-95

This project was reported to PAS for FY2025 as a quantitative entry. The project is listed under CMAQ ID No. T202504703. The information presented in the tables and figures below was used to calculate annual emissions reductions.

Table 39. SR 58: SR 4 to I-95 – CMAQ Toolkit Inputs

Input ID	Input Field	Direction of Travel	
		EB	*WB*
(1)	Evaluation Year	2025	2025
(2)	Area Type	URBAN	URBAN
(3)	Corridor Length (miles)	4.92	4.92
(4)	Number of Signalized Intersections	1	1
(5)	Total Peak Hours per Day (AM+PM)	24	24
(6)	Free Flow Speed or Posted Speed Limit	41.63	41.63
(7)	Total Volume on Corridor or Direction of Travel (Daily)	22,362.00	22,362.00
	Total Volume on Corridor or Direction of Travel (Veh/Hour)	931.75	931.75
(8)	Existing Total Travel Delay Per Vehicle (sec)	-	-
(9)	Truck Percentage	5.20%	5.20%
(10)	Use Your Own Delay Reduction Values	Y	Y
(11)	Corridor Delay Reduction per Vehicle	0.00	0.00

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Figure 87. SR 58: SR 4 to I-95 – System Location Map

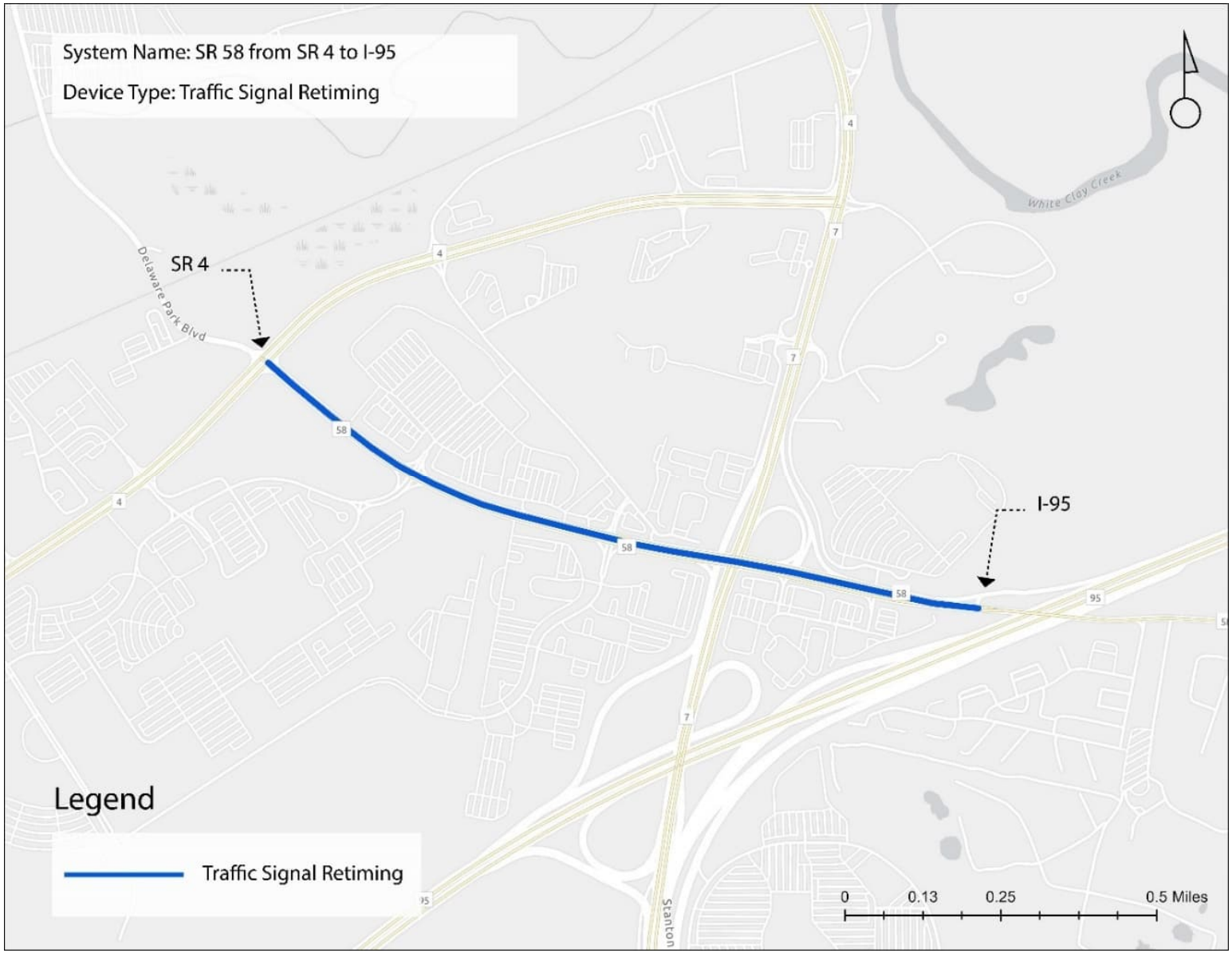


Figure 88. SR 58: SR 4 to I-95 (EB) – CMAQ Toolkit Outputs

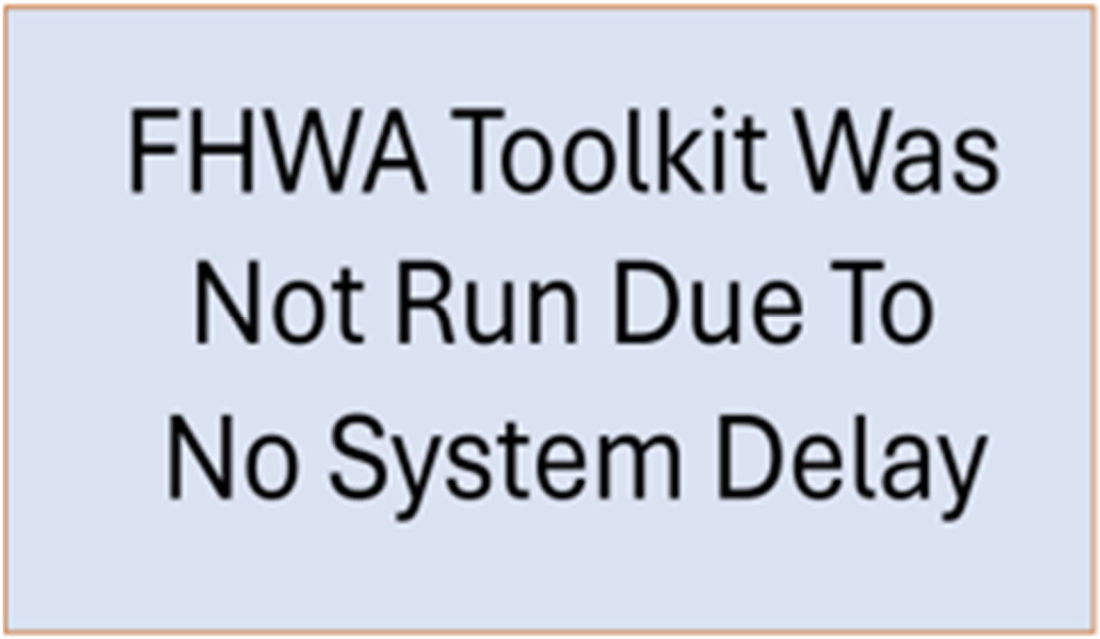
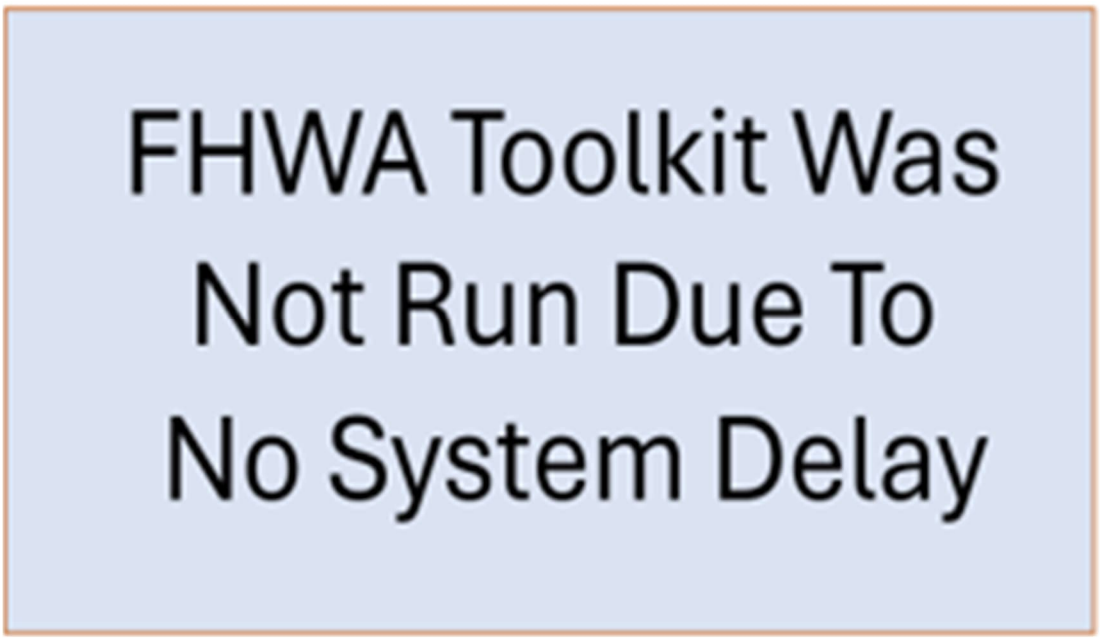


Figure 89. SR 58: SR 4 to I-95 (WB) – CMAQ Toolkit Outputs



1.4.29 Traffic Signal Retiming – SR 896 from SR 71 to Porter Road

This project was reported to PAS for FY2025 as a quantitative entry. The project is listed under CMAQ ID No. T202504703. The information presented in the tables and figures below was used to calculate annual emissions reductions.

Table 40. SR 896 from SR 71 to Porter Road – CMAQ Toolkit Inputs

Input ID	Input Field	Direction of Travel	
		NB	*SB*
(1)	Evaluation Year	2025	2025
(2)	Area Type	URBAN	URBAN
(3)	Corridor Length (miles)	2.01	2.01
(4)	Number of Signalized Intersections	1	1
(5)	Total Peak Hours per Day (AM+PM)	24	24
(6)	Free Flow Speed or Posted Speed Limit	55.00	55.00
(7)	Total Volume on Corridor or Direction of Travel (Daily)	18,593.04	18,593.04
	Total Volume on Corridor or Direction of Travel (Veh/Hour)	774.71	774.71
(8)	Existing Total Travel Delay Per Vehicle (sec)	0.44	0.22
(9)	Truck Percentage	5.00%	5.00%
(10)	Use Your Own Delay Reduction Values	Y	Y
(11)	Corridor Delay Reduction per Vehicle	0.022	0.011

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Figure 90. SR 896 from SR 71 to Porter Road – System Location Map

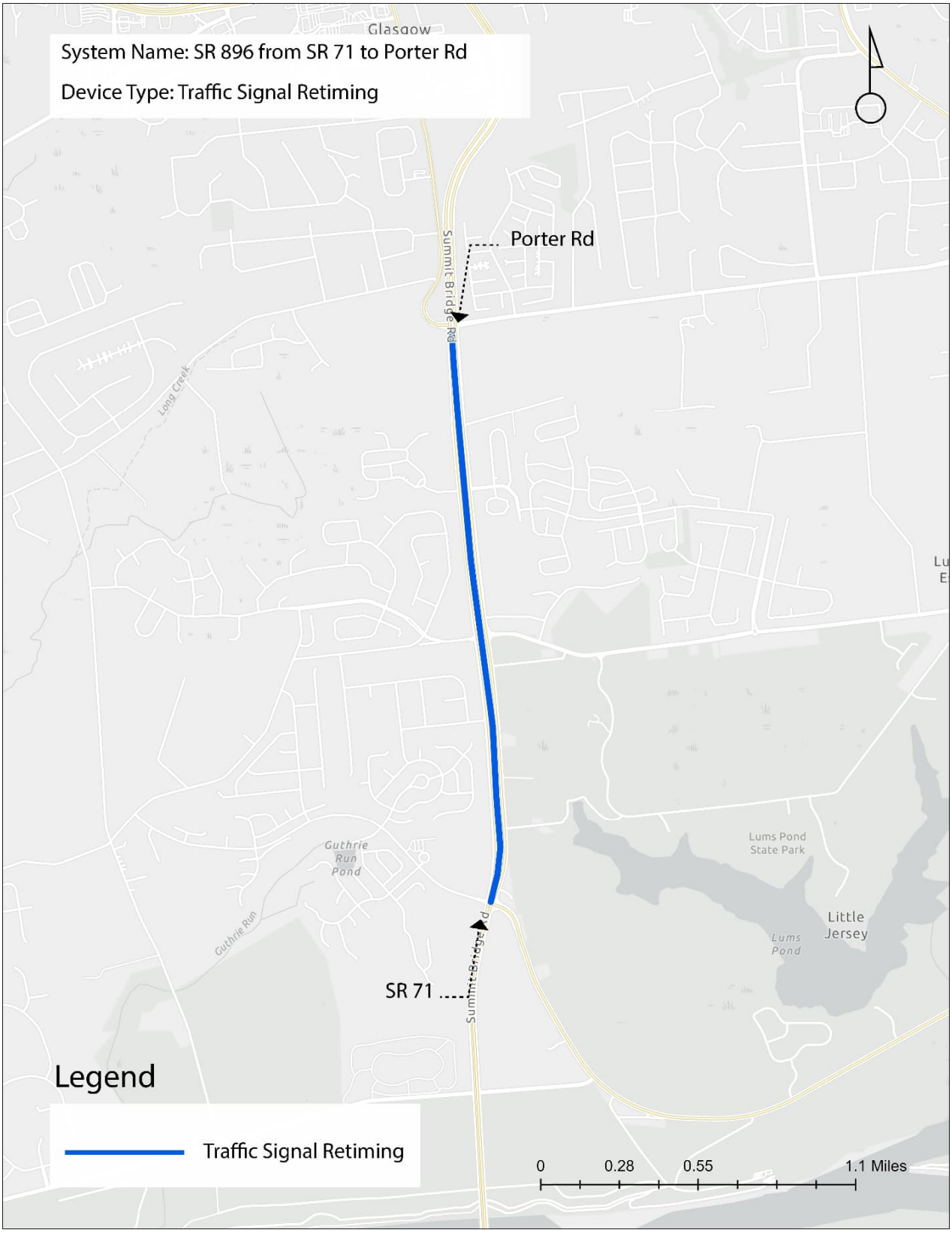
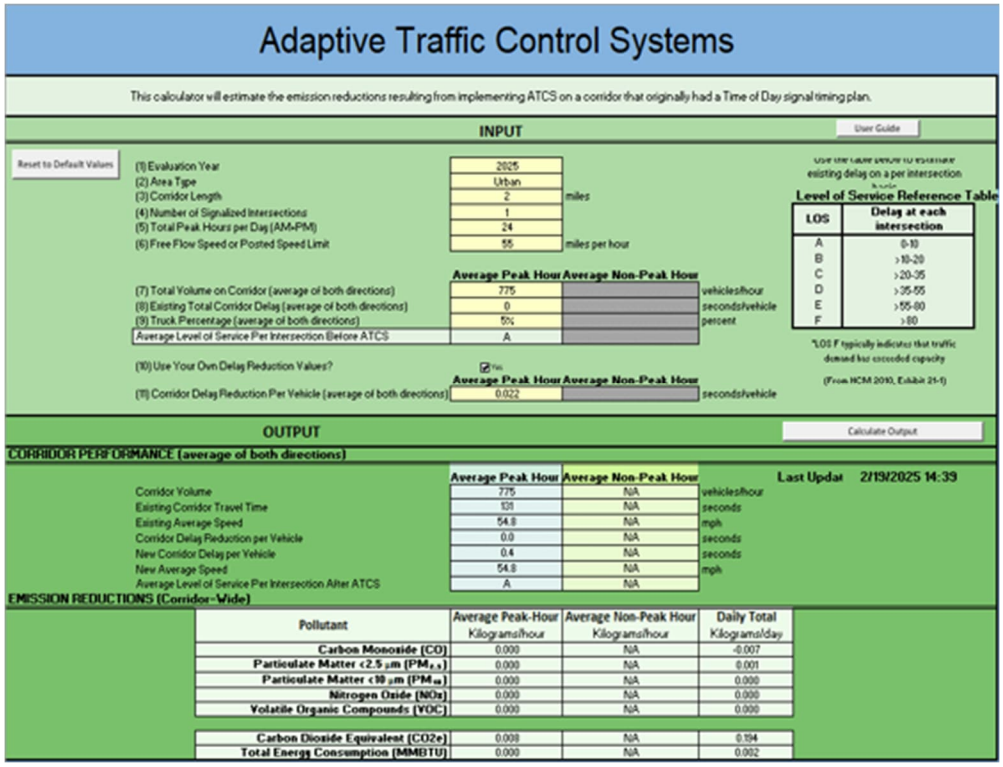


Figure 91. SR 896 from SR 71 to Porter Road (NB) – CMAQ Toolkit Outputs



Adaptive Traffic Control Systems

This calculator will estimate the emission reductions resulting from implementing ATCS on a corridor that originally had a Time of Day signal timing plan.

INPUT

User Guide

Reset to Default Values

(1) Evaluation Year	2025		
(2) Area Type	Urban		
(3) Corridor Length	2	miles	
(4) Number of Signalized Intersections	1		
(5) Total Peak Hours per Day (AM-PM)	24		
(6) Free Flow Speed or Posted Speed Limit	55	miles per hour	

	Average Peak Hour	Average Non-Peak Hour	
(7) Total Volume on Corridor (average of both directions)	775		vehicles/hour
(8) Existing Total Corridor Delay (average of both directions)	0		seconds/vehicle
(9) Truck Percentage (average of both directions)	5%		percent
Average Level of Service Per Intersection Before ATCS	A		

(10) Use Your Own Delay Reduction Values? ☑ Yes

	Average Peak Hour	Average Non-Peak Hour	
(11) Corridor Delay Reduction Per Vehicle (average of both directions)	0.022		seconds/vehicle

Use the table below to estimate existing delay on a per intersection basis.

Level of Service Reference Table

LOS	Delay at each intersection
A	0-10
B	>10-20
C	>20-35
D	>35-55
E	>55-80
F	>80

*LOS F typically indicates that traffic demand has exceeded capacity

(From HCM 2010, Exhibit 21-1)

OUTPUT

Calculate Output

CORRIDOR PERFORMANCE (average of both directions)

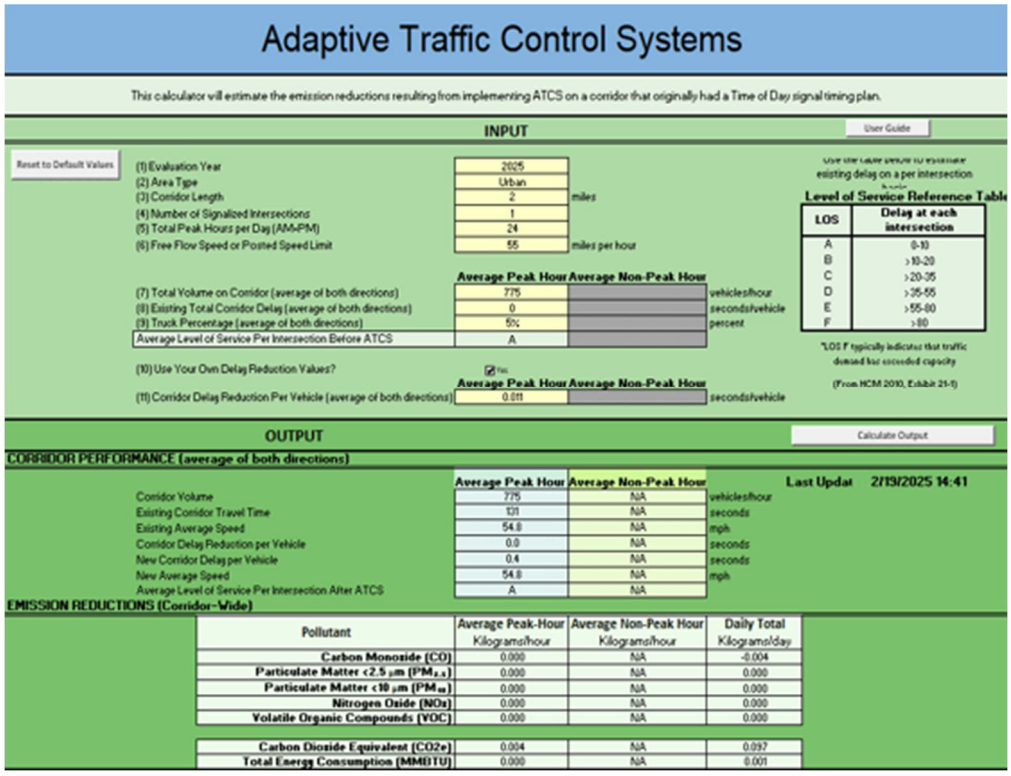
Last Updat 2/19/2025 14:39

	Average Peak Hour	Average Non-Peak Hour	
Corridor Volume	775	NA	vehicles/hour
Existing Corridor Travel Time	131	NA	seconds
Existing Average Speed	54.8	NA	mph
Corridor Delay Reduction per Vehicle	0.0	NA	seconds
New Corridor Delay per Vehicle	0.4	NA	seconds
New Average Speed	54.8	NA	mph
Average Level of Service Per Intersection After ATCS	A	NA	

EMISSION REDUCTIONS (Corridor-Wide)

Pollutant	Average Peak-Hour Kilograms/hour	Average Non-Peak Hour Kilograms/hour	Daily Total Kilograms/day
Carbon Monoxide (CO)	0.000	NA	-0.007
Particulate Matter <2.5 μm ($PM_{2.5}$)	0.000	NA	0.001
Particulate Matter <10 μm (PM_{10})	0.000	NA	0.000
Nitrogen Oxide (NOx)	0.000	NA	0.000
Volatile Organic Compounds (VOC)	0.000	NA	0.000
Carbon Dioxide Equivalent (CO_2e)	0.008	NA	0.194
Total Energy Consumption (MMBTU)	0.000	NA	0.002

Figure 92. SR 896 from SR 71 to Porter Road (SB) – CMAQ Toolkit Outputs



Adaptive Traffic Control Systems

This calculator will estimate the emission reductions resulting from implementing ATCS on a corridor that originally had a Time of Day signal timing plan.

INPUT

User Guide

Reset to Default Values

(1) Evaluation Year	2025		
(2) Area Type	Urban		
(3) Corridor Length	2	miles	
(4) Number of Signalized Intersections	1		
(5) Total Peak Hours per Day (AM-PM)	24		
(6) Free Flow Speed or Posted Speed Limit	55	miles per hour	

	Average Peak Hour	Average Non-Peak Hour	
(7) Total Volume on Corridor (average of both directions)	775		vehicles/hour
(8) Existing Total Corridor Delay (average of both directions)	0		seconds/vehicle
(9) Truck Percentage (average of both directions)	5%		percent
Average Level of Service Per Intersection Before ATCS	A		

(10) Use Your Own Delay Reduction Values? ☑ Yes

	Average Peak Hour	Average Non-Peak Hour	
(11) Corridor Delay Reduction Per Vehicle (average of both directions)	0.011		seconds/vehicle

Use the table below to estimate existing delay on a per intersection basis.

Level of Service Reference Table

LOS	Delay at each intersection
A	0-10
B	>10-20
C	>20-35
D	>35-55
E	>55-80
F	>80

*LOS F typically indicates that traffic demand has exceeded capacity

(From HCM 2010, Exhibit 21-1)

OUTPUT

Calculate Output

CORRIDOR PERFORMANCE (average of both directions)

Last Updat 2/19/2025 14:41

	Average Peak Hour	Average Non-Peak Hour	
Corridor Volume	775	NA	vehicles/hour
Existing Corridor Travel Time	131	NA	seconds
Existing Average Speed	54.8	NA	mph
Corridor Delay Reduction per Vehicle	0.0	NA	seconds
New Corridor Delay per Vehicle	0.4	NA	seconds
New Average Speed	54.8	NA	mph
Average Level of Service Per Intersection After ATCS	A	NA	

EMISSION REDUCTIONS (Corridor-Wide)

Pollutant	Average Peak-Hour Kilograms/hour	Average Non-Peak Hour Kilograms/hour	Daily Total Kilograms/day
Carbon Monoxide (CO)	0.000	NA	-0.004
Particulate Matter <2.5 μm ($PM_{2.5}$)	0.000	NA	0.000
Particulate Matter <10 μm (PM_{10})	0.000	NA	0.000
Nitrogen Oxide (NOx)	0.000	NA	0.000
Volatile Organic Compounds (VOC)	0.000	NA	0.000
Carbon Dioxide Equivalent (CO_2e)	0.004	NA	0.097
Total Energy Consumption (MMBTU)	0.000	NA	0.001

1.4.30 Traffic Signal Retiming – SR 9 from Delaware St. to I-295

This project was reported to PAS for FY2025 as a quantitative entry. The project is listed under CMAQ ID No. T202504703. The information presented in the tables and figures below was used to calculate annual emissions reductions.

Table 41. SR 9 from Delaware St. to I-295 – CMAQ Toolkit Inputs

Input ID	Input Field	Direction of Travel	
		NB	*SB*
(1)	Evaluation Year	2025	2025
(2)	Area Type	URBAN	URBAN
(3)	Corridor Length (miles)	12.60	12.60
(4)	Number of Signalized Intersections	1	1
(5)	Total Peak Hours per Day (AM+PM)	24	24
(6)	Free Flow Speed or Posted Speed Limit	41.43	41.43
(7)	Total Volume on Corridor or Direction of Travel (Daily)	13,195.68	13,195.68
	Total Volume on Corridor or Direction of Travel (Veh/Hour)	549.82	549.82
(8)	Existing Total Travel Delay Per Vehicle (sec)	-	-
(9)	Truck Percentage	5.06%	5.06%
(10)	Use Your Own Delay Reduction Values	Y	Y
(11)	Corridor Delay Reduction per Vehicle	0.00	0.00

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Figure 93. SR 9 from Delaware St. to I-295 – System Location Map

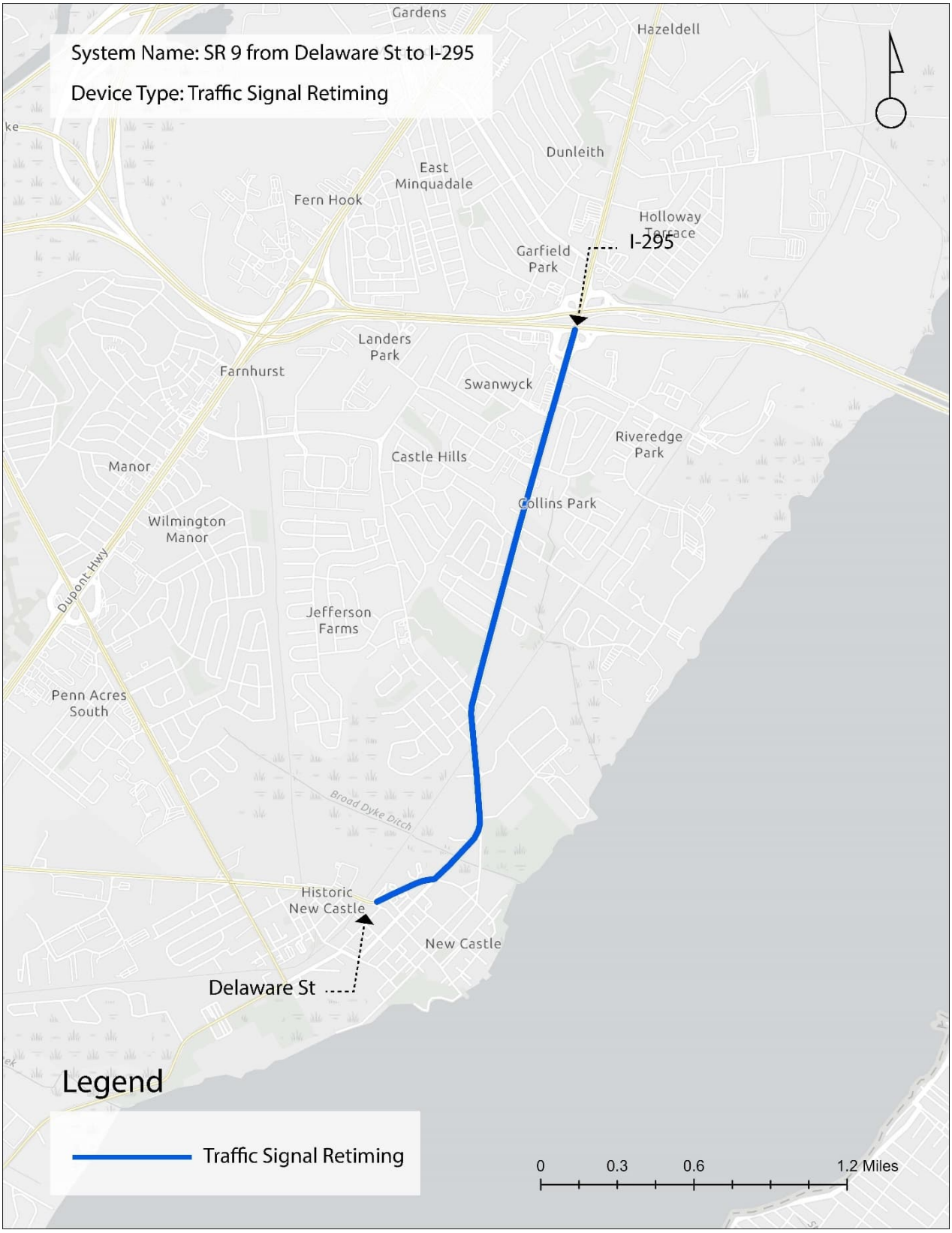


Figure 94. SR 9 from Delaware St. to I-295 (NB) – CMAQ Toolkit Outputs

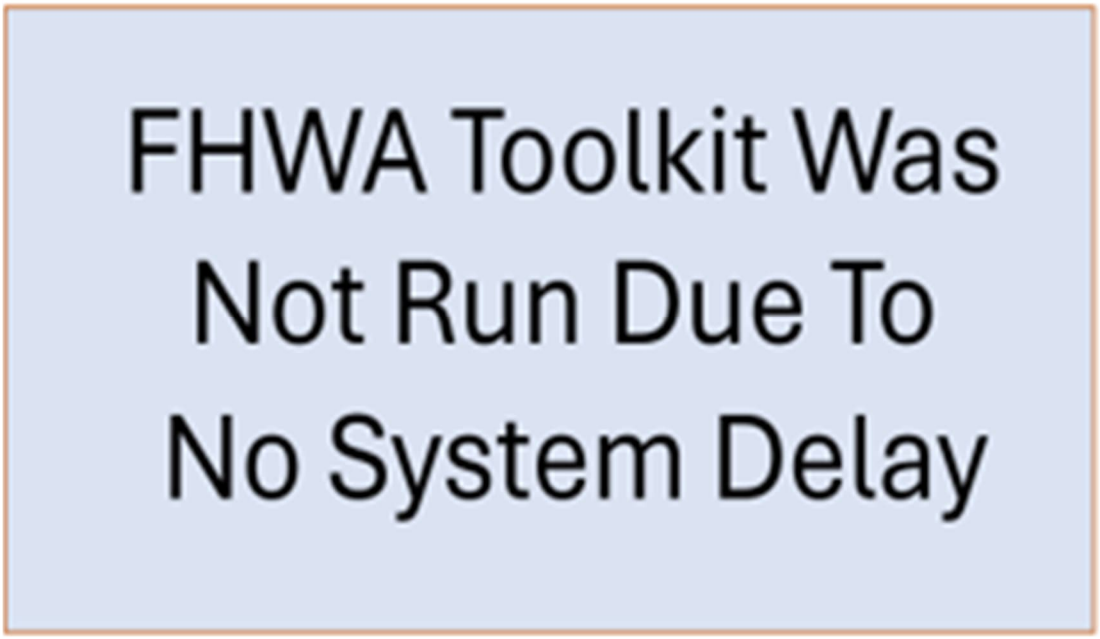
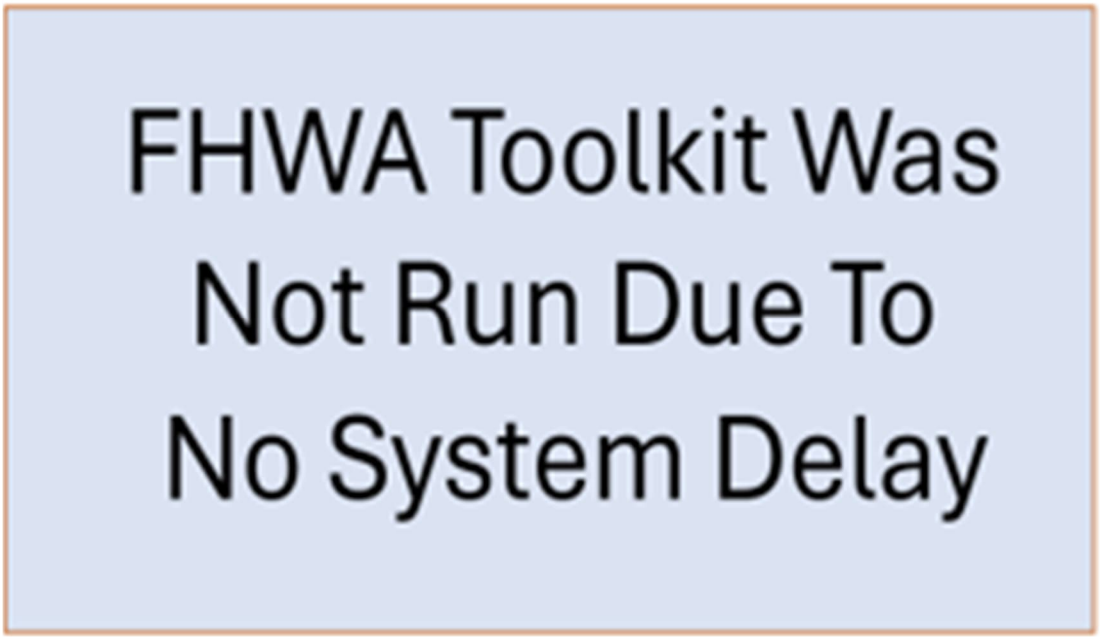


Figure 95. SR 9 from Delaware St. to I-295 (SB) – CMAQ Toolkit Outputs



1.4.31 Traffic Signal Retiming – SR 9: I-295 to Terminal Avenue

This project was reported to PAS for FY2025 as a quantitative entry. The project is listed under CMAQ ID No. T202504703. The information presented in the tables and figures below was used to calculate annual emissions reductions.

Table 42. SR 9: I-295 to Terminal Avenue – CMAQ Toolkit Inputs

Input ID	Input Field	Direction of Travel	
		NB	*SB*
(1)	Evaluation Year	2025	2025
(2)	Area Type	URBAN	URBAN
(3)	Corridor Length (miles)	3.40	3.40
(4)	Number of Signalized Intersections	1	1
(5)	Total Peak Hours per Day (AM+PM)	24	24
(6)	Free Flow Speed or Posted Speed Limit	43.53	43.53
(7)	Total Volume on Corridor or Direction of Travel (Daily)	16,161.84	16,161.84
	Total Volume on Corridor or Direction of Travel (Veh/Hour)	673.41	673.41
(8)	Existing Total Travel Delay Per Vehicle (sec)	-	-
(9)	Truck Percentage	5.44%	5.44%
(10)	Use Your Own Delay Reduction Values	Y	Y
(11)	Corridor Delay Reduction per Vehicle	0.000	0.00

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Figure 96. SR 9 from I-295 to Terminal Avenue – System Location Map

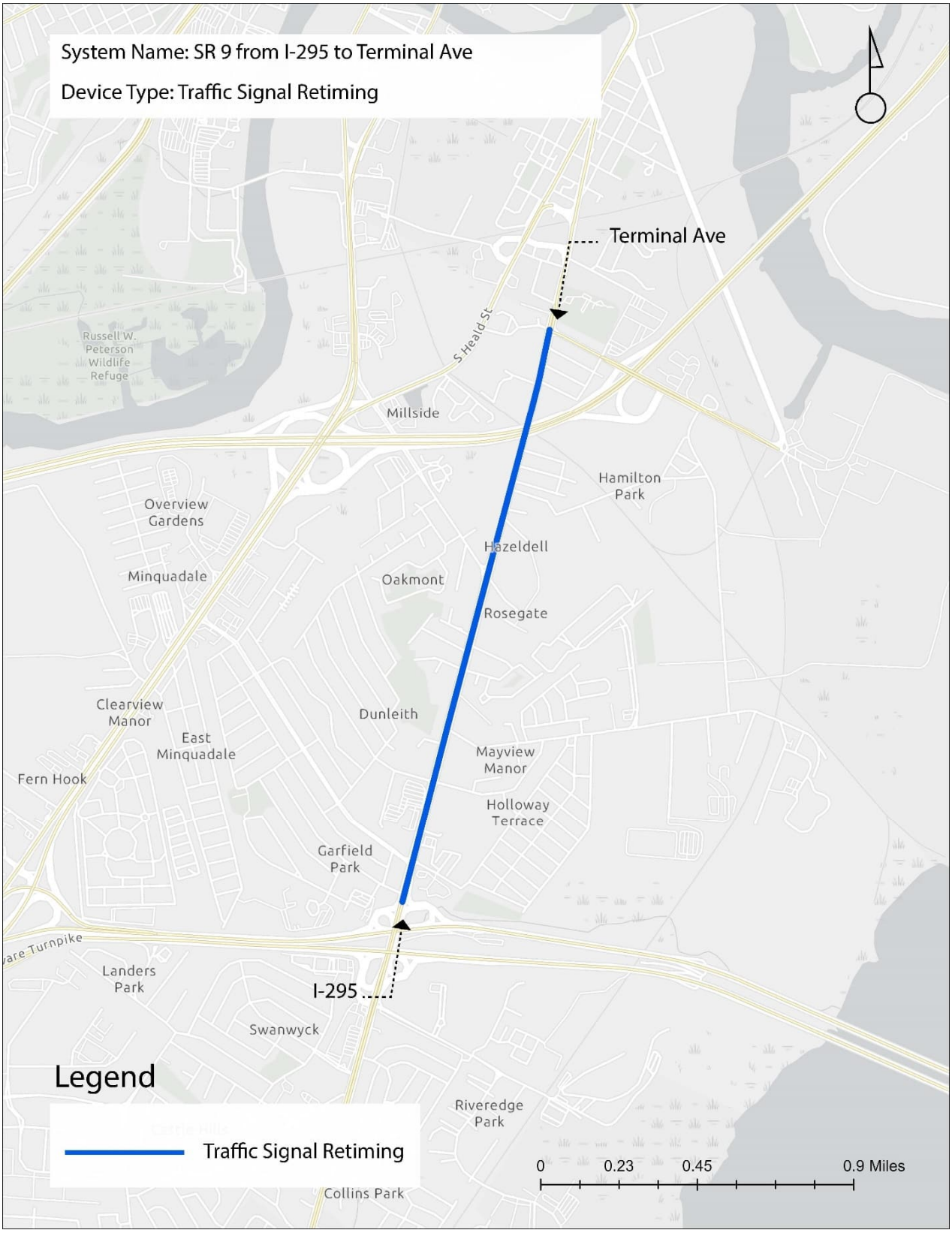


Figure 97. SR 9 from I-295 to Terminal Avenue (NB) – CMAQ Toolkit Outputs

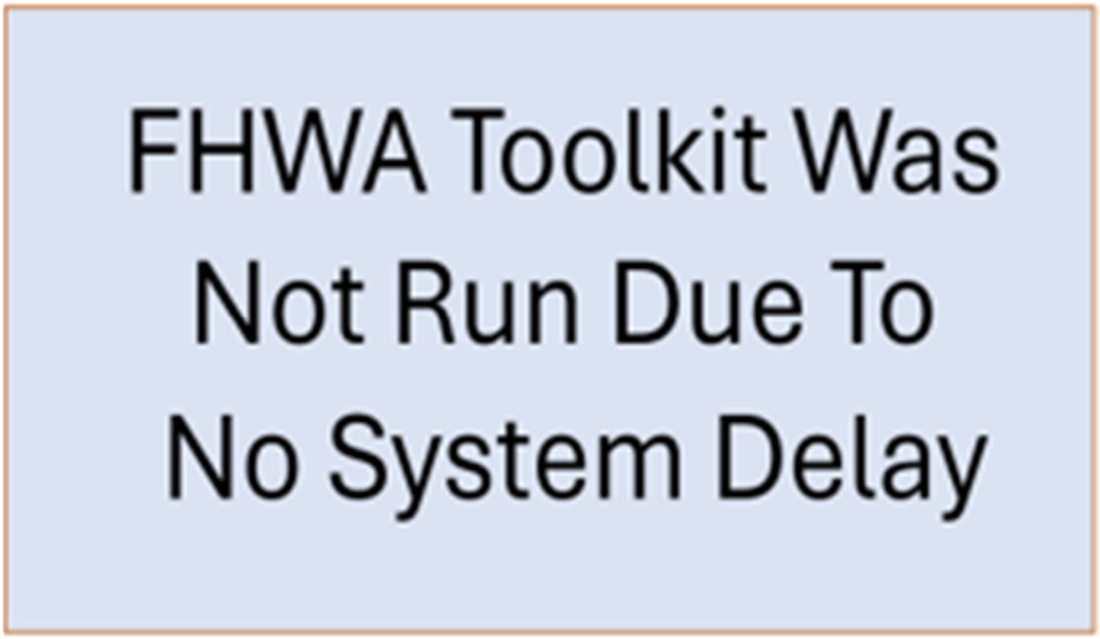
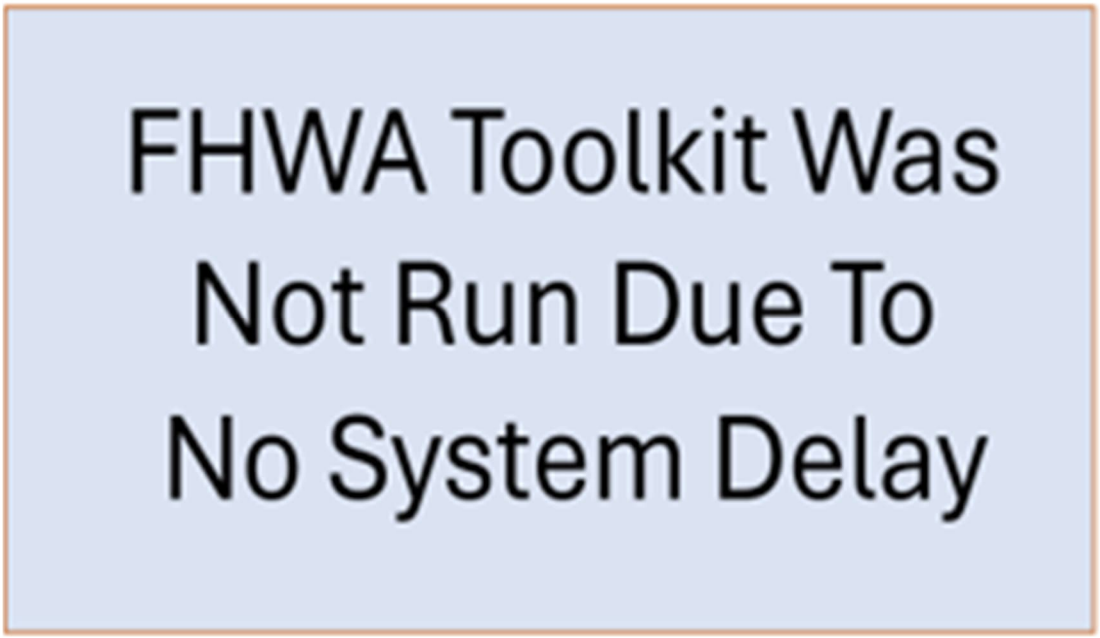


Figure 98. SR 9 from I-295 to Terminal Avenue (SB) – CMAQ Toolkit Outputs



1.4.32 Fiber Installation – I-95 Fiber Gap

This project was reported to PAS for FY2025 as a quantitative entry. The project is listed under CMAQ ID No. T202504703. The information presented in the tables and figures below was used to calculate annual emissions reductions.

Table 43. I-95 Fiber Gap – CMAQ Toolkit Inputs

Input ID	Input Field	Direction of Travel	
		NB	*SB*
(1)	Evaluation Year	2025	2025
(2)	Area Type	URBAN	URBAN
(3)	Corridor Length (miles)	0.53	0.53
(4)	Number of Signalized Intersections	1	1
(5)	Total Peak Hours per Day (AM+PM)	24	24
(6)	Free Flow Speed or Posted Speed Limit	55.00	55.00
(7)	Total Volume on Corridor or Direction of Travel (Daily)	58,754.88	58,754.88
	Total Volume on Corridor or Direction of Travel (Veh/Hour)	2,448.12	2,448.12
(8)	Existing Total Travel Delay Per Vehicle (sec)	(0.07)	0.11
(9)	Truck Percentage	7.40%	7.40%
(10)	Use Your Own Delay Reduction Values	Y	Y
(11)	Corridor Delay Reduction per Vehicle	0.000	0.001

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Figure 99. I-95 Fiber Gap – System Location Map

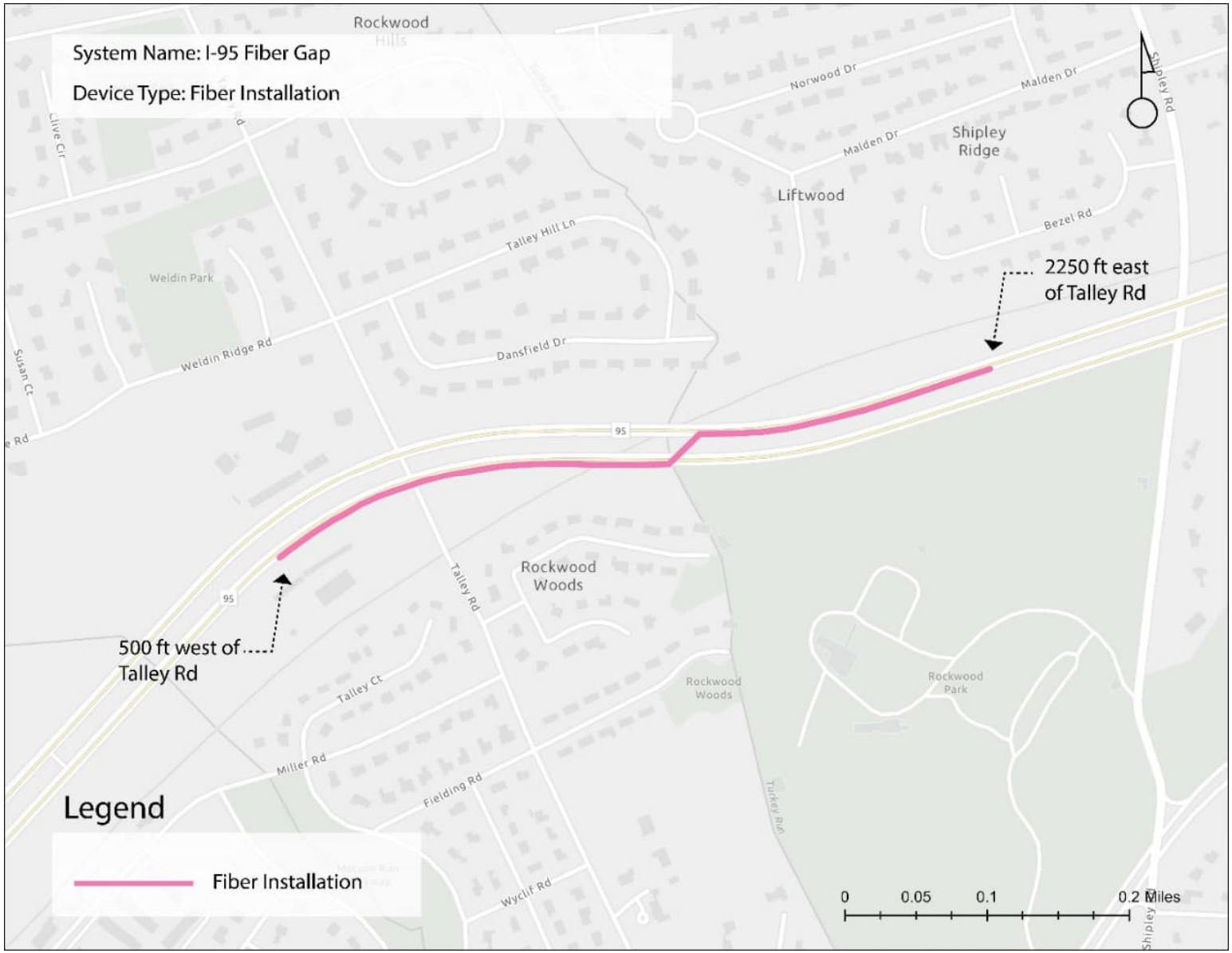


Figure 100. I-95 Fiber Gap (NB) – CMAQ Toolkit Output

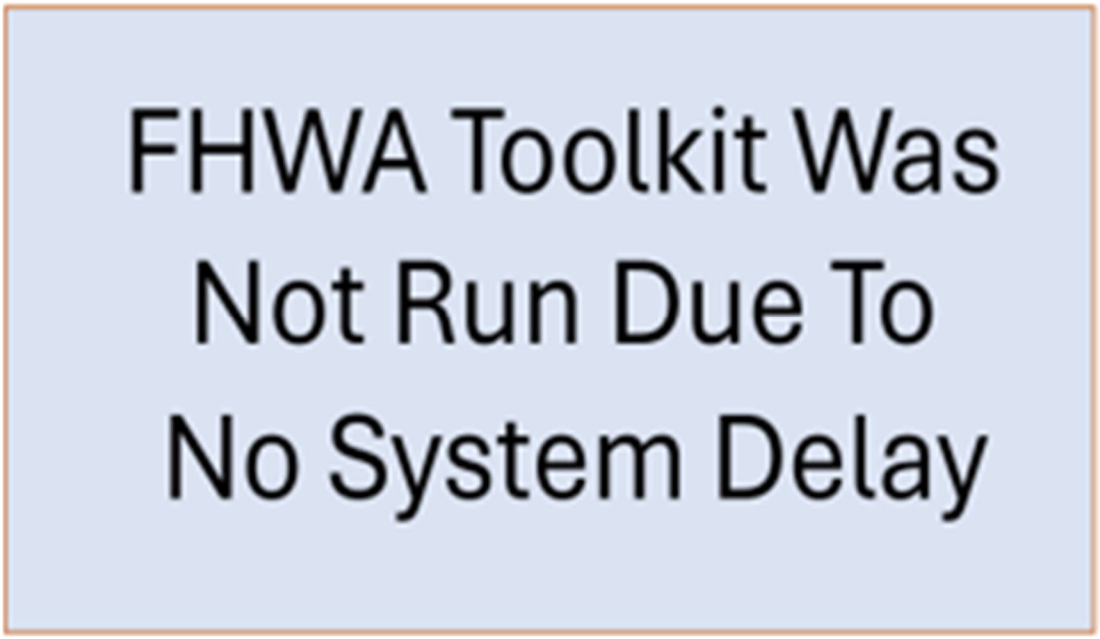
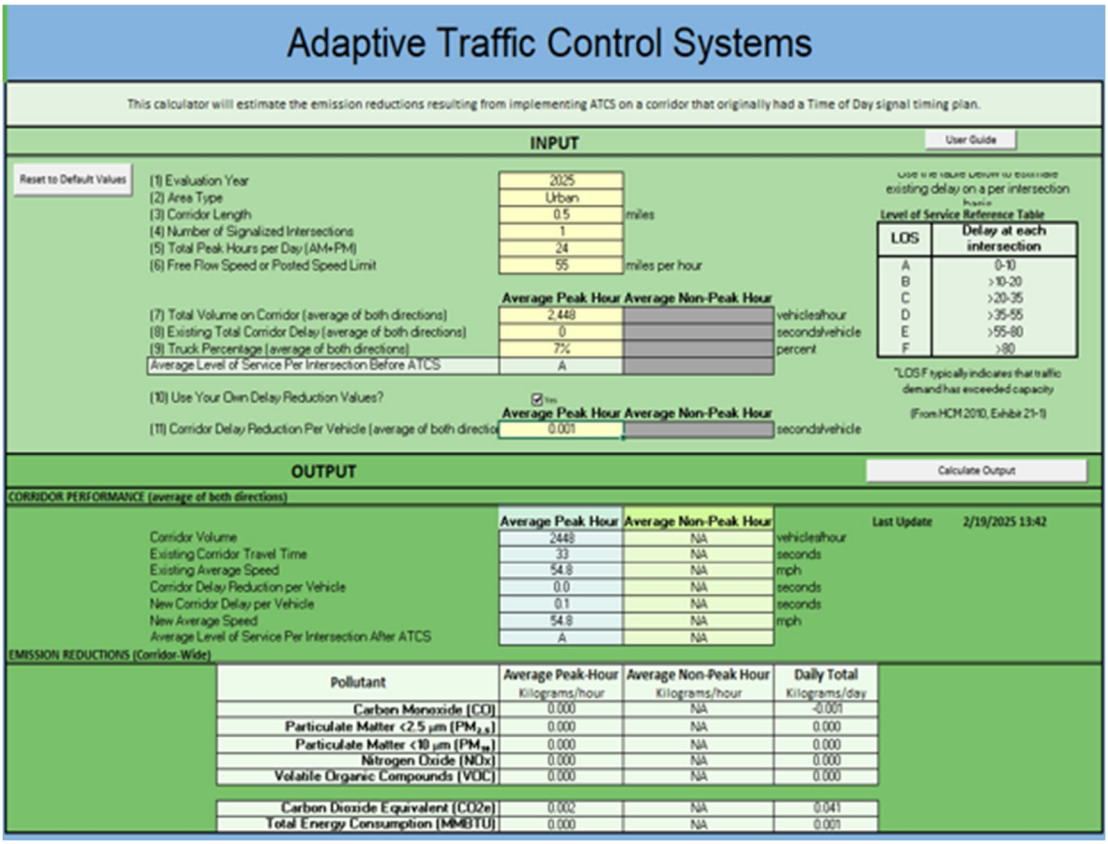


Figure 101. I-95 Fiber Gap (SB) – CMAQ Toolkit Output



Adaptive Traffic Control Systems

This calculator will estimate the emission reductions resulting from implementing ATCS on a corridor that originally had a Time of Day signal timing plan.

INPUT

User Guide

Reset to Default Values

(1) Evaluation Year	2025	
(2) Area Type	Urban	
(3) Corridor Length	0.5	miles
(4) Number of Signalized Intersections	1	
(5) Total Peak Hours per Day (AM+PM)	24	
(6) Free Flow Speed or Posted Speed Limit	55	miles per hour

	Average Peak Hour	Average Non-Peak Hour	
(7) Total Volume on Corridor (average of both directions)	2,448		vehicles/hour
(8) Existing Total Corridor Delay (average of both directions)	0		seconds/vehicle
(9) Truck Percentage (average of both directions)	7%		percent
Average Level of Service Per Intersection Before ATCS	A		

(10) Use Your Own Delay Reduction Values? ☑ Yes

	Average Peak Hour	Average Non-Peak Hour	
(11) Corridor Delay Reduction Per Vehicle (average of both directio	0.001		seconds/vehicle

Use the value below to estimate existing delay on a per intersection basis.

Level of Service Reference Table

LOS	Delay at each intersection
A	0-10
B	>10-20
C	>20-35
D	>35-55
E	>55-80
F	>80

"LOS F typically indicates that traffic demand has exceeded capacity

(From HCM 2010, Exhibit 21-1)

OUTPUT

Calculate Output

CORRIDOR PERFORMANCE (average of both directions)

Last Update 2/19/2025 13:42

	Average Peak Hour	Average Non-Peak Hour	
Corridor Volume	2448	NA	vehicles/hour
Existing Corridor Travel Time	33	NA	seconds
Existing Average Speed	54.8	NA	mph
Corridor Delay Reduction per Vehicle	0.0	NA	seconds
New Corridor Delay per Vehicle	0.1	NA	seconds
New Average Speed	54.8	NA	mph
Average Level of Service Per Intersection After ATCS	A	NA	

EMISSION REDUCTIONS (Corridor-Wide)

Pollutant	Average Peak-Hour Kilograms/hour	Average Non-Peak Hour Kilograms/hour	Daily Total Kilograms/day
Carbon Monoxide (CO)	0.000	NA	-0.001
Particulate Matter <2.5 μm ($PM_{2.5}$)	0.000	NA	0.000
Particulate Matter <10 μm (PM_{10})	0.000	NA	0.000
Nitrogen Oxide (NOx)	0.000	NA	0.000
Volatile Organic Compounds (VOC)	0.000	NA	0.000
Carbon Dioxide Equivalent (CO_2e)	0.002	NA	0.041
Total Energy Consumption (MMBTU)	0.000	NA	0.001

1.4.33 Fiber Installation – Summit Bridge Road - Broad Street to North of Springmill Drive

This project was reported to PAS for FY2025 as a quantitative entry. The project is listed under CMAQ ID No. T202504703. The information presented in the tables and figures below was used to calculate annual emissions reductions.

Table 44. Summit Bridge Road - Broad Street to North of Springmill Drive – CMAQ Toolkit Inputs

Input ID	Input Field	Direction of Travel	
		NB	*SB*
(1)	Evaluation Year	2025	2025
(2)	Area Type	URBAN	URBAN
(3)	Corridor Length (miles)	0.67	0.67
(4)	Number of Signalized Intersections	1	1
(5)	Total Peak Hours per Day (AM+PM)	24	24
(6)	Free Flow Speed or Posted Speed Limit	45.00	45.00
(7)	Total Volume on Corridor or Direction of Travel (Daily)	29,295.04	29,295.04
	Total Volume on Corridor or Direction of Travel (Veh/Hour)	1,288.96	1,288.96
(8)	Existing Total Travel Delay Per Vehicle (sec)	0.34	0.25
(9)	Truck Percentage	0.00%	0.00%
(10)	Use Your Own Delay Reduction Values	Y	Y
(11)	Corridor Delay Reduction per Vehicle	0.003	0.003

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Figure 102. Summit Bridge Road - Broad Street to North of Springmill Drive – System Location Map

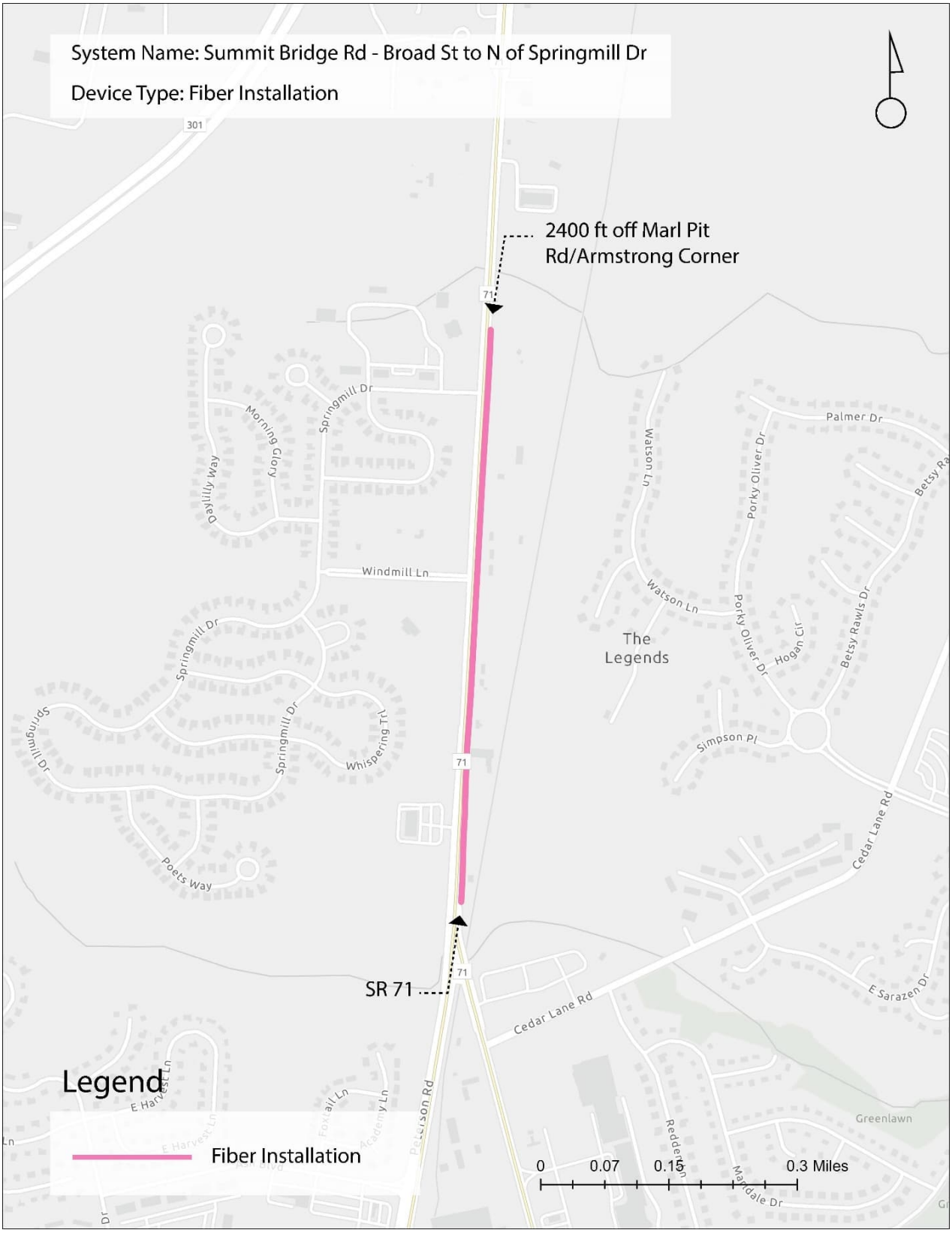
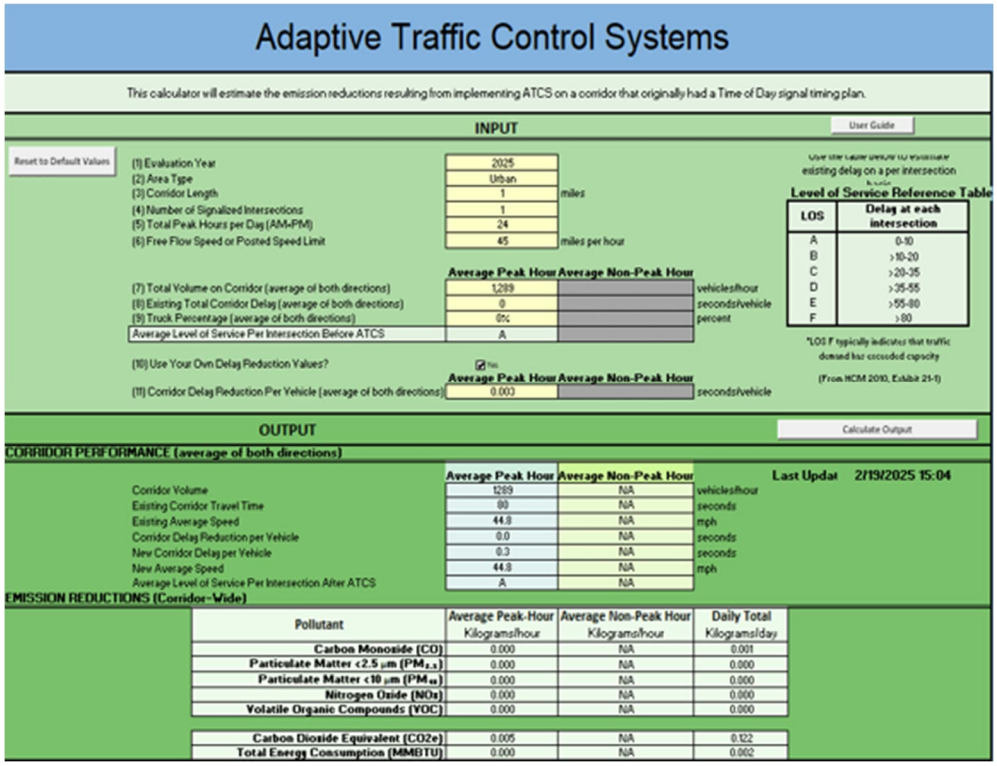


Figure 103. Summit Bridge Road - Broad Str to North of Springmill Dr (NB) – CMAQ Toolkit Outputs



Adaptive Traffic Control Systems

This calculator will estimate the emission reductions resulting from implementing ATCS on a corridor that originally had a Time of Day signal timing plan.

INPUT

User Guide

Reset to Default Values

			Average Peak Hour	Average Non-Peak Hour	
(1) Evaluation Year	2025				
(2) Area Type	Urban				
(3) Corridor Length	1	miles			
(4) Number of Signalized Intersections	1				
(5) Total Peak Hours per Day (AM+PM)	24				
(6) Free Flow Speed or Posted Speed Limit	45	miles per hour			
(7) Total Volume on Corridor (average of both directions)			1,289		vehicles/hour
(8) Existing Total Corridor Delay (average of both directions)			0		seconds/vehicle
(9) Truck Percentage (average of both directions)			0%		percent
Average Level of Service Per Intersection Before ATCS			A		
(10) Use Your Own Delay Reduction Values?			Yes		
(11) Corridor Delay Reduction Per Vehicle (average of both directions)			0.000		seconds/vehicle

Use the table below to estimate existing delay on a per intersection basis.

Level of Service Reference Table

LOS	Delay at each intersection
A	0-10
B	>10-20
C	>20-35
D	>35-55
E	>55-80
F	>80

*LOS F typically indicates that traffic demand has exceeded capacity

(From HCM 2010, Exhibit 21-1)

OUTPUT

Calculate Output

CORRIDOR PERFORMANCE (average of both directions)

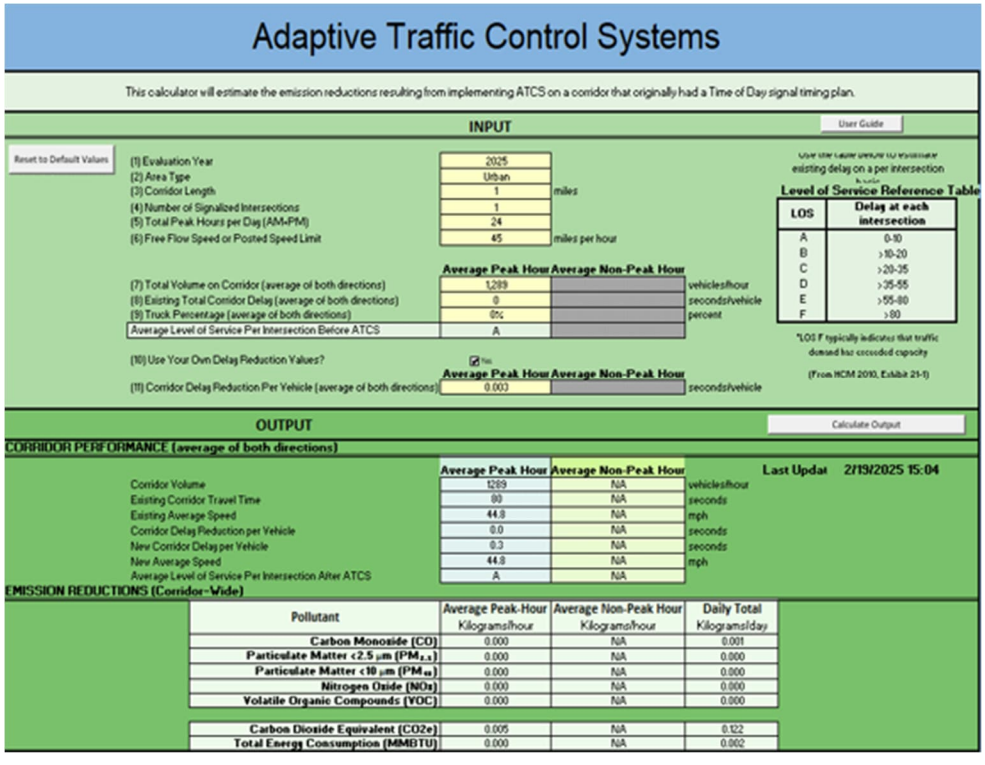
Last Updat 2/19/2025 15:04

	Average Peak Hour	Average Non-Peak Hour	
Corridor Volume	1289	NA	vehicles/hour
Existing Corridor Travel Time	80	NA	seconds
Existing Average Speed	44.8	NA	mph
Corridor Delay Reduction per Vehicle	0.0	NA	seconds
New Corridor Delay per Vehicle	0.3	NA	seconds
New Average Speed	44.8	NA	mph
Average Level of Service Per Intersection After ATCS	A	NA	

EMISSION REDUCTIONS (Corridor-Wide)

Pollutant	Average Peak-Hour Kilograms/hour	Average Non-Peak Hour Kilograms/hour	Daily Total Kilograms/day
Carbon Monoxide (CO)	0.000	NA	0.001
Particulate Matter <2.5 μm ($PM_{2.5}$)	0.000	NA	0.000
Particulate Matter <10 μm (PM_{10})	0.000	NA	0.000
Nitrogen Oxide (NO_x)	0.000	NA	0.000
Volatile Organic Compounds (VOC)	0.000	NA	0.000
Carbon Dioxide Equivalent (CO_2e)	0.005	NA	0.122
Total Energy Consumption (MMBTU)	0.000	NA	0.002

Figure 104. Summit Bridge Road - Broad St to North of Springmill Dr (SB) – CMAQ Toolkit Outputs



Adaptive Traffic Control Systems

This calculator will estimate the emission reductions resulting from implementing ATCS on a corridor that originally had a Time of Day signal timing plan.

INPUT

User Guide

Reset to Default Values

			Average Peak Hour	Average Non-Peak Hour	
(1) Evaluation Year	2025				
(2) Area Type	Urban				
(3) Corridor Length	1	miles			
(4) Number of Signalized Intersections	1				
(5) Total Peak Hours per Day (AM+PM)	24				
(6) Free Flow Speed or Posted Speed Limit	45	miles per hour			
(7) Total Volume on Corridor (average of both directions)			1,289		vehicles/hour
(8) Existing Total Corridor Delay (average of both directions)			0		seconds/vehicle
(9) Truck Percentage (average of both directions)			0%		percent
Average Level of Service Per Intersection Before ATCS			A		
(10) Use Your Own Delay Reduction Values?			Yes		
(11) Corridor Delay Reduction Per Vehicle (average of both directions)			0.000		seconds/vehicle

Use the table below to estimate existing delay on a per intersection basis.

Level of Service Reference Table

LOS	Delay at each intersection
A	0-10
B	>10-20
C	>20-35
D	>35-55
E	>55-80
F	>80

*LOS F typically indicates that traffic demand has exceeded capacity

(From HCM 2010, Exhibit 21-1)

OUTPUT

Calculate Output

CORRIDOR PERFORMANCE (average of both directions)

Last Updat 2/19/2025 15:04

	Average Peak Hour	Average Non-Peak Hour	
Corridor Volume	1289	NA	vehicles/hour
Existing Corridor Travel Time	80	NA	seconds
Existing Average Speed	44.8	NA	mph
Corridor Delay Reduction per Vehicle	0.0	NA	seconds
New Corridor Delay per Vehicle	0.3	NA	seconds
New Average Speed	44.8	NA	mph
Average Level of Service Per Intersection After ATCS	A	NA	

EMISSION REDUCTIONS (Corridor-Wide)

Pollutant	Average Peak-Hour Kilograms/hour	Average Non-Peak Hour Kilograms/hour	Daily Total Kilograms/day
Carbon Monoxide (CO)	0.000	NA	0.001
Particulate Matter <2.5 μm ($PM_{2.5}$)	0.000	NA	0.000
Particulate Matter <10 μm (PM_{10})	0.000	NA	0.000
Nitrogen Oxide (NO_x)	0.000	NA	0.000
Volatile Organic Compounds (VOC)	0.000	NA	0.000
Carbon Dioxide Equivalent (CO_2e)	0.005	NA	0.122
Total Energy Consumption (MMBTU)	0.000	NA	0.002

1.4.34 Fiber Installation – Summit Bridge Road

This project was reported to PAS for FY2025 as a quantitative entry. The project is listed under CMAQ ID No. T202504703. The information presented in the tables and figures below was used to calculate annual emissions reductions.

Table 45. Summit Bridge Road - Churchtown to 4718 Summit Bridge Rd (SB) – CMAQ Toolkit Inputs

Input ID	Input Field	Direction of Travel	
		NB	*SB*
(1)	Evaluation Year	2025	2025
(2)	Area Type	RURAL	RURAL
(3)	Corridor Length (miles)	1.10	1.10
(4)	Number of Signalized Intersections	1	1
(5)	Total Peak Hours per Day (AM+PM)	24	24
(6)	Free Flow Speed or Posted Speed Limit	50.00	50.00
(7)	Total Volume on Corridor or Direction of Travel (Daily)	30,935.04	30,935.04
	Total Volume on Corridor or Direction of Travel (Veh/Hour)	1,288.96	1,288.96
(8)	Existing Total Travel Delay Per Vehicle (sec)	(0.07)	(0.06)
(9)	Truck Percentage	0.00%	0.00%
(10)	Use Your Own Delay Reduction Values	Y	Y
(11)	Corridor Delay Reduction per Vehicle	0.00	0.00

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Figure 105. Summit Bridge Road - Churchtown to 4718 Summit Bridge Rd (SB) –System Location Map

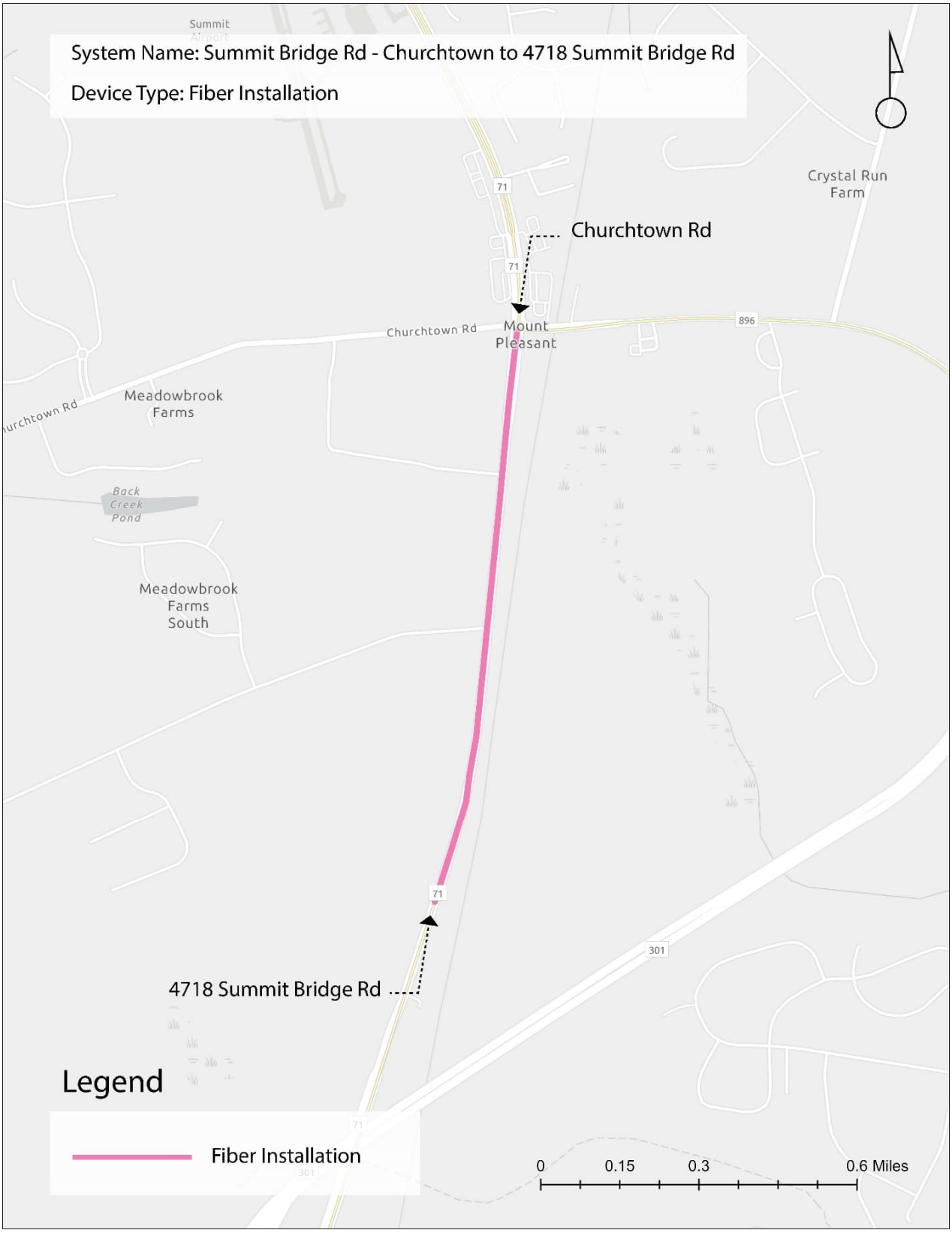


Figure 106. Summit Bridge Rd - Churchtown to 4718 Summit Bridge Rd (NB) – CMAQ Toolkit Outputs

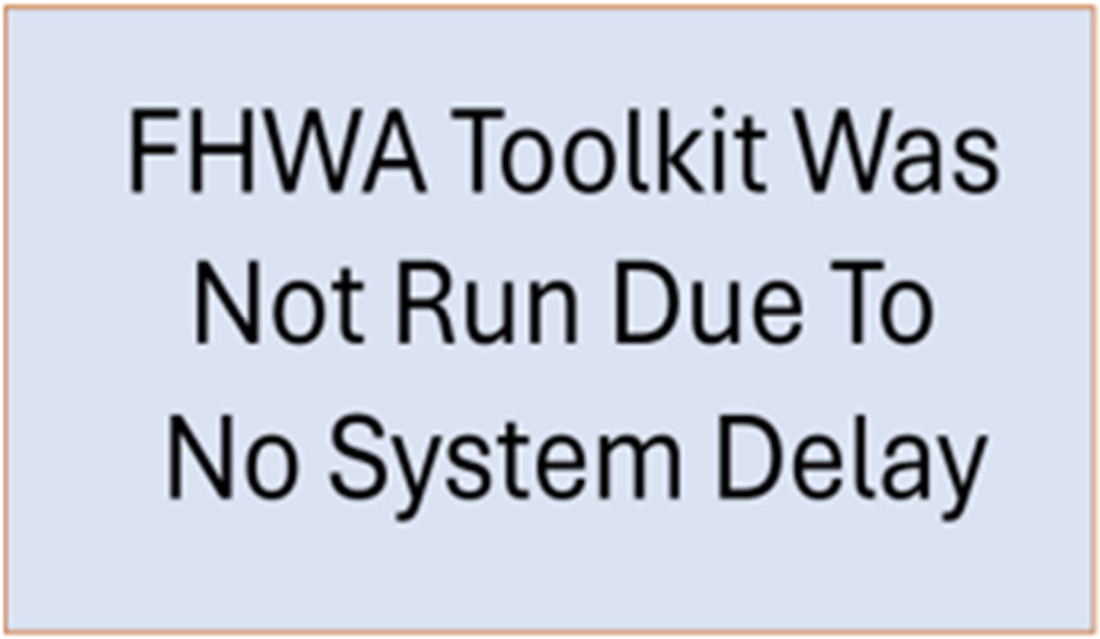


Figure 107. Summit Bridge Rd - Churchtown to 4718 Summit Bridge Rd (SB) – CMAQ Toolkit Outputs

