

2024-2026 Congestion Mitigation and Air Quality Project Application

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If you need assistance, please contact Brandon Kovnat, SWMPC Associate Planner.

Email kovnatb@swmpc.org or call (269) 925-1137 x 1524

Section 1. Applicant Information

Applicant Name	City of Benton Harbor		
Contact Name	Ellis Mitchell	Title	City Manager
Phone Number	(269) 927-8457	Email	emitchell@bhcit.us
Sponsor (If applicable)			
Engineer/Consultant (If applicable)	Abonmarche Consultants, Inc.		
Phone Number	(269) 926-4549	Email	ddombos@abonmarche.com

Section 2. Project Information & Costs

Project Name: Empire Ave. and Colfax Ave. Traffic Signal Improvements				
City/Village/ Township: (269) 926-4549		County: Berrien		
Project Location <i>(short description of where the project is located)</i>	Empire Ave. and Colfax Ave. Traffic Signal Improvements Empire Avenue at Colfax Avenue in the City of Benton Harbor, immediately southeast of Benton Harbor High School			
Which Emissions form is being used? (list the form name not the MDOT form number)	FHWA Traffic Flow Improvement Tool			
Work Description <i>(Short description of work being performed. Please provide enough information for eligibility to be determined)</i>	Signal Optimization and Actuation in support of a future interconnection project. Pedestrian pushbuttons will be provided for all crossings, single shared pushbutton actuation on each corner.			
Describe how the project will reduce congestion and/or emissions	Fully actuated traffic signal will provide improved operational efficiency for optimization and management of vehicular and pedestrian traffic flows during peak and off-peak hours. Modern controller and vehicle detection systems will be compatible with future corridor interconnection.			
Project Cost <i>Only include CMAQ eligible expenses</i>	\$ 360,400.00	Proposed Year of Funding	2024	
Minimum Local Match – 20% of eligible costs	\$ 72,080.00			
Can you supply additional match beyond the minimum required 20% If so how much?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Amount \$			
Emissions Benefit (from Emissions form)	Volatile Organic Compounds (VOC)	Carbon Monoxide (CO)	Nitrogen Oxide (NO _x)	Particulate Matter (PM 2.5)
	0.011 kg/day	0.091 kg/day	0.046 kg/day	0.004 kg/day

Section 3. Performance measures

Besides emissions reductions what other performance measures will the project contribute to? *(select all that apply)*

- ☒ Safety
- ☐ Pavement Condition
- ☒ System Reliability
- ☐ Pedestrian/Bicycle Connectivity
- ☐ Transit State of Good Repair

If you checked any of the Performance Measures please indicate how the project will improve them:

Addition of actuation for all pedestrian crossings and installation of pedestrian countdown signals will provide improved safety for pedestrian users for this intersection adjacent to Benton Harbor High School.

New actuation for pedestrians and vehicles will allow for full actuation of all approaches with modern equipment for optimization of traffic signal operation and improved detection reliability.

Section 4. Additional Questions

Question	Y/N	If Yes, Provide Brief Explanation of How the project will meet these Criteria
Will the project be ready for obligation by July 1 of the year in which it's programmed?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	This is reflected in the estimated project schedule below.
Will this project use multiple funding sources/be combined with another Non-CMAQ project?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
Is the project being carried out by a sponsored agency, or is a private entity providing funding, materials, or services in support of this project?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
Does the project require Right of Way (ROW) acquisition or an easement?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes, attach a signed letter from that agency granting permission to implement all or part of this project in their right-of-way.

Section 5. Estimated Project Schedule

Activity	Estimated Date
Resolution of Support for Local Match Submitted to SWMPC	January 2024
Project Application Submitted to MOT	July 2024
Grade Inspection Package Submitted to MDOT	August 2024
Grade Inspection Meeting Scheduled	September 2024
Final Plan and Estimate to MDOT	October 2024
Right of Way (ROW) certified	October 2024
Rail Road Permits	n/a
Environmental Mitigation	n/a
Project Obligated	November 2024
Project Letting	January 2025
Construction Start	February 2025
Project Completion	August 2025

Enter NA for any activity that doesn't apply to the project.

CMAQ Project Emissions Forms

FHWA forms can be found at https://www.fhwa.dot.gov/environment/air_quality/cmaq/toolkit/

MDOT forms can be found at: <https://mdotjboss.state.mi.us/webforms/WebFormsHome.htm>

Project Category	Emissions Form	Additional Required Information (Attach to Application)
Dedicated turn lanes	FHWA Traffic Flow Improvement Tool	Indicate the length of the lanes Indicate traffic counts Include a diagram of the modification
Signal Interconnects	FHWA Traffic Flow Improvement Tool	Include all locations in the Location Description Indicate the number of signals in the Work Description
Signal Optimization or Actuation, not part of an interconnect project	FHWA Traffic Flow Improvement Tool	
Roundabouts	FHWA Traffic Flow Improvement Tool	
Non-motorized Pathway	FHWA Bicycle and Pedestrian Improvements Toolkit	Include maps detailing the location of the proposed path Detail the land uses that surround the path Explain how the path provides access to jobs, services, and centers of trade List all connections to other non-motorized paths, if applicable
Travel Demand Management Program	MDOT Form 2619	
Rideshare/Vanpooling:	FHWA Carpooling and Vanpooling Tool	
Operation of New Public Transit Services	MDOT form 2620 (for each route) MDOT form 2608 (For the sum of the entire project)	
Bus Purchase or Replacements	FHWA Transit Bus Retrofits and Replacement Tool	Vehicle lease/purchase How many will be leased or purchase Equipment: Type to be funded
Alternative Fuels and Vehicles	FHWA Alternative Fuels and Vehicles Tool	
Other Project (May need additional details)	MDOT form 2608	

Roundabouts

This calculator will estimate the emission reductions resulting from improving traffic signals at a four-way intersection

INPUT

EXISTING CONDITIONS

Evaluation Year	2021
Area Type	Urban
Business District	No
Total peak hours per day(AM+PM)	4
Existing Intersection is	Signalized

Use the table below to estimate delay (HCM 2010, Exhibit 21-1)

Level of Service Reference Table

LOS	Delay (s/veh)	
	Unsignalized Intersection	Signalized Intersection
A	0 - 10	0 - 10
B	>10 - 15	>10 - 20
C	>15 - 25	>20 - 35
D	>25 - 35	>35 - 55
E	>35 - 50	>55 - 80
F*	>50	>80

*LOS F typically indicates that traffic demand has exceeded capacity

	Roadway 1	Roadway 2	
Average Annual Daily Traffic volume (AADT) (both directions)	1,961	6,292	veh/day
Peak-hour Volume (both directions)	375	588	veh/hr
Number of Lanes (one direction)	1	1	
Truck Percentage	5%	5%	
Existing Delay per Vehicle	25	35	sec/veh
Existing Left-turn Phase	No	No	
Existing Right-turn Phase	No	No	

PROPOSED CONDITIONS

Cycle Length 90 seconds

	Roadway 1	Roadway 2
Number of Left-Turn Lanes to Add (one direction)	0	0
Left-turn Phase	No	No
Right-turn Phase	No	No
Ratio of Green Time per Cycle Time	0.5	0.5

OUTPUT

PERFORMANCE

		PEAK-HOUR		OFF-PEAK		
		1	2	1	2	
Existing Capacity (both directions)	Roadway	1,714	1,714	1,714	1,714	veh/hr
Proposed Capacity (both directions)		1,714	1,714	1,714	1,714	veh/hr
Volume (both directions)		375	588	23	197	veh/hr
Delay Reduction per vehicle		12.4	21.4	0.0	0.0	sec/veh

		1	2	
Roadway Intersection Delay Reduction per day	Roadway	5.2	14.0	hours
Total Intersection Delay Reduction per day		19.1		hours

EMISSION REDUCTIONS

Pollutant	Peak Hours Kilograms/day	Off-Peak Hours Kilograms/day	Daily Total Kilograms/day
Carbon Monoxide (CO)	0.091	0.000	0.091
Particulate Matter <2.5 µm (PM _{2.5})	0.004	0.000	0.004
Particulate Matter <10 µm (PM ₁₀)	0.004	0.000	0.004
Nitrogen Oxide (NOx)	0.046	0.000	0.046
Volatile Organic Compounds (VOC)	0.011	0.000	0.011
Carbon Dioxide Equivalent (CO ₂ e)	63.640	0.000	63.640
Total Energy Consumption (MMBTU)	0.837	0.000	0.837

2024-2026 Congestion Mitigation and Air Quality Project Application

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Section 1. Applicant Information

Applicant Name	Berrien County Road Department		
Contact Name	Kevin Stack	Title	Engineering Supervisor
Phone Number	269-925-1196 ex 4421	Email	kstack@bcroad.org
Sponsor (If applicable)			
Engineer/Consultant (If applicable)			
Phone Number		Email	

Section 2. Project Information & Costs

Project Name: Countywide Signal Upgrade			
City/Village/ Township: County Wide		County: Berrien	
Project Location <i>(short description of where the project is located)</i>	This project will be located at 13 diferent intersections within, Benton Twp, St Joseph Twp, Lincoln Twp, Lake Twp, Chikaming Twp, and Sodus Twp		
Which Emissions form is being used? (list the form name not the MDOT form number)		Congestion Reduction & Traffic Flow	
Work Description <i>(Short description of work being performed. Please provide enough information for eligibility to be determined)</i>	BCRD is looking to upgrade all signals to accommodate Video Detection, Battery Backup, Replace controllers, Replace all non-LED Traffic Signal Heads, Replace all non-LED Pedestrian Crossing Heads, and add Cell Modems to each signal to allow for remote access into the traffic signal to control traffic flow or adjust timing.		
Describe how the project will reduce congestion and/or emissions	This will allow all traffic signals to operate in the same capacity improving traffic flow conditions, decreasing idle time, and allowing signals to be controlled remotley to handle congestion issue		
Project Cost <i>Only include CMAQ eligible expenses</i>	\$ 310,505.00	Proposed Year of Funding	2024
Minimum Local Match – 20% of eligible costs	\$62101		
Can you supply additional match beyond the minimum required 20% If so how much?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Amount \$37899		

Emissions Benefit (from Emissions form)	Volatile Organic Compounds (VOC)	Carbon Monoxide (CO)	Nitrogen Oxide (NO _x)	Particulate Matter (PM 2.5)

Section 3. Performance measures

<p>Besides emissions reductions what other performance measures will the project contribute to? <i>(select all that apply)</i></p> <p><input checked="" type="checkbox"/> Safety</p> <p><input type="checkbox"/> Pavement Condition</p> <p><input checked="" type="checkbox"/> System Reliability</p> <p><input type="checkbox"/> Pedestrian/Bicycle Connectivity</p> <p><input type="checkbox"/> Transit State of Good Repair</p>	<p>If you checked any of the Performance Measures please indicate how the project will improve them:</p> <p>Safety factor will be achieved by adding battery back up to keep the light functioning during power outages while also providing better visual lighting by upgrading to LED. System will be more reliable due to the upgrade in controllers and remote access to prevent any malfunctions or down time.</p>
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Section 4. Additional Questions

Question	Y/N	If Yes, Provide Brief Explanation of How the project will meet these Criteria
Will the project be ready for obligation by July 1 of the year in which it's programmed?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Project packet will be created in 2023
Will this project use multiple funding sources/be combined with another Non-CMAQ project?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
Is the project being carried out by a sponsored agency, or is a private entity providing funding, materials, or services in support of this project?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
Does the project require Right of Way (ROW) acquisition or an easement?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes, attach a signed letter from that agency granting permission to implement all or part of this project in their right-of-way.

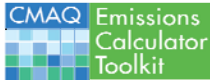
Section 5. Estimated Project Schedule

Activity	Estimated Date
Resolution of Support for Local Match Submitted to SWMPC	02/01/2022
Project Application Submitted to MOT	01/01/2024
Grade Inspection Package Submitted to MDOT	02/01/2024
Grade Inspection Meeting Scheduled	02/01/2024
Final Plan and Estimate to MDOT	03/01/2024
Right of Way (ROW) certified	01/01/2024
Rail Road Permits	NA
Environmental Mitigation	NA
Project Obligated	04/01/2024
Project Letting	05/01/2024

Construction Start	06/01/2024
Project Completion	11/01/2024

Enter NA for any activity that doesn't apply to the project.

Hilltop Road at Cleveland Avenue



Intersection Improvements

Navigator

[Intersection Improvements](#)

[Traffic Signal Synchronization](#)

[Roundabouts](#)

This calculator will estimate the emission reductions resulting from improving traffic signals at a four-way intersection

INPUT

EXISTING CONDITIONS

Evaluation Year	2021
Area Type	Urban
Business District	Yes
Total peak hours per day(AM+PM)	7
Existing Intersection is	Signalized

	Roadway 1	Roadway 2	
Average Annual Daily Traffic volume (AADT) (both directions)	20,358	12,847	veh/day
Peak-hour Volume (both directions)	1,425	839	veh/hr
Number of Lanes (one direction)	2	1	
Truck Percentage	5%	5%	
Existing Delay per Vehicle	20	20	sec/veh
Existing Left-turn Phase	Yes	Yes	
Existing Right-turn Phase	No	No	

Use the table below to estimate delay
(HCM 2010, Exhibit 21-1)

Level of Service Reference Table

LOS	Delay (s/veh)	
	Unsignalized Intersection	Signalized Intersections
A	0 - 10	0 - 10
B	>10 - 15	>10 - 20
C	>15 - 25	>20 - 35
D	>25 - 35	>35 - 55
E	>35 - 50	>55 - 80
F*	>50	>80

*LOS F typically indicates that traffic demand has exceeded capacity

PROPOSED CONDITIONS

Cycle Length	90	seconds

OUTPUT

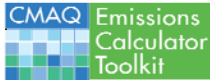
PERFORMANCE

Roadway	PEAK-HOUR		OFF-PEAK		
	1	2	1	2	
Existing Capacity (both directions)	2,939	1,469	2,939	1,469	veh/hr
Proposed Capacity (both directions)	2,939	1,469	2,939	1,469	veh/hr
Volume (both directions)	1,425	839	611	410	veh/hr
Delay Reduction per vehicle	5.1	4.3	0.0	0.0	sec/veh
Roadway Intersection Delay Reduction per day	14.3	6.9			hours
Total Intersection Delay Reduction per day		21.2			hours

EMISSION REDUCTIONS

Pollutant	Peak Hours Kilograms/day	Off-Peak Hours Kilograms/day	Daily Total Kilograms/day
Carbon Monoxide (CO)	0.101	0.000	0.101
Particulate Matter <2.5 µm (PM _{2.5})	0.004	0.000	0.004
Particulate Matter <10 µm (PM ₁₀)	0.004	0.000	0.004
Nitrogen Oxide (NOx)	0.051	0.000	0.051
Volatile Organic Compounds (VOC)	0.012	0.000	0.012
Carbon Dioxide Equivalent (CO ₂ e)	70.490	0.000	70.490
Total Energy Consumption (MMBTU)	0.927	0.000	0.927

Hilltop Road at Washington Avenue



Intersection Improvements

Navigator

[Intersection Improvements](#)

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[Roundabouts](#)

This calculator will estimate the emission reductions resulting from improving traffic signals at a four-way intersection

INPUT

EXISTING CONDITIONS

Evaluation Year	2021
Area Type	Urban
Business District	Yes
Total peak hours per day(AM+PM)	7
Existing Intersection is	Signalized

	Roadway 1	Roadway 2	
Average Annual Daily Traffic volume (AADT) (both directions)	13,719	5,549	veh/day
Peak-hour Volume (both directions)	1,122	547	veh/hr
Number of Lanes (one direction)	2	2	
Truck Percentage	5%	5%	
Existing Delay per Vehicle	20	20	sec/veh
Existing Left-turn Phase	Yes	No	
Existing Right-turn Phase	No	No	

Use the table below to estimate delay
(HCM 2010, Exhibit 21-1)

Level of Service Reference Table

LOS	Delay (s/veh)	
	Unsignalized Intersection	Signalized Intersections
A	0 - 10	0 - 10
B	>10 - 15	>10 - 20
C	>15 - 25	>20 - 35
D	>25 - 35	>35 - 55
E	>35 - 50	>55 - 80
F*	>50	>80

*LOS F typically indicates that traffic demand has exceeded capacity

PROPOSED CONDITIONS

Cycle Length	90	seconds

OUTPUT

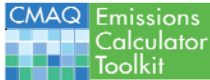
PERFORMANCE

Roadway	PEAK-HOUR		OFF-PEAK		
	1	2	1	2	
Existing Capacity (both directions)	2,939	3,086	2,939	3,086	veh/hr
Proposed Capacity (both directions)	2,939	3,086	2,939	3,086	veh/hr
Volume (both directions)	1,122	547	345	101	veh/hr
Delay Reduction per vehicle	6.1	7.7	0.0	0.0	sec/veh
Roadway Intersection Delay Reduction per day	13.3	8.1			hours
Total Intersection Delay Reduction per day		21.4			hours

EMISSION REDUCTIONS

Pollutant	Peak Hours Kilograms/day	Off-Peak Hours Kilograms/day	Daily Total Kilograms/day
Carbon Monoxide (CO)	0.102	0.000	0.102
Particulate Matter <2.5 µm (PM _{2.5})	0.004	0.000	0.004
Particulate Matter <10 µm (PM ₁₀)	0.005	0.000	0.005
Nitrogen Oxide (NOx)	0.052	0.000	0.052
Volatile Organic Compounds (VOC)	0.012	0.000	0.012
Carbon Dioxide Equivalent (CO ₂ e)	71.261	0.000	71.261
Total Energy Consumption (MMBTU)	0.937	0.000	0.937

John Beers Road at Cleveland Avenue



Intersection Improvements

Navigator

[Intersection Improvements](#)

[Traffic Signal Synchronization](#)

[Roundabouts](#)

This calculator will estimate the emission reductions resulting from improving traffic signals at a four-way intersection

INPUT

EXISTING CONDITIONS

Evaluation Year	2021		
Area Type	Urban		
Business District	No		
Total peak hours per day(AM+PM)	4		
Existing Intersection is	Signalized		
	Roadway 1	Roadway 2	
Average Annual Daily Traffic volume (AADT) (both directions)	9,140	9,497	veh/day
Peak-hour Volume (both directions)	819	839	veh/hr
Number of Lanes (one direction)	1	1	
Truck Percentage	3%	3%	
Existing Delay per Vehicle	15	15	sec/veh
Existing Left-turn Phase	Yes	Yes	
Existing Right-turn Phase	No	No	

Use the table below to estimate delay
(HCM 2010, Exhibit 21-1)

Level of Service Reference Table

LOS	Delay (s/veh)	
	Unsignalized Intersection	Signalized Intersections
A	0 - 10	0 - 10
B	>10 - 15	>10 - 20
C	>15 - 25	>20 - 35
D	>25 - 35	>35 - 55
E	>35 - 50	>55 - 80
F*	>50	>80

*LOS F typically indicates that traffic demand has exceeded capacity

PROPOSED CONDITIONS

Cycle Length	90	seconds
	Roadway 1	Roadway 2
Number of Left-Turn Lanes to Add (one direction)	0	0
Left-turn Phase	Yes	Yes
Right-turn Phase	No	No
Ratio of Green Time per Cycle Time	0.5	0.5

OUTPUT

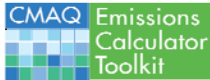
PERFORMANCE

Roadway	PEAK-HOUR		OFF-PEAK		
	1	2	1	2	
Existing Capacity (both directions)	1,664	1,664	1,664	1,664	veh/hr
Proposed Capacity (both directions)	1,664	1,664	1,664	1,664	veh/hr
Volume (both directions)	819	839	293	307	veh/hr
Delay Reduction per vehicle	0.1	0.0	0.0	0.0	sec/veh
	Roadway 1	Roadway 2			
Roadway Intersection Delay Reduction per day	0.1	0.0	hours		
Total Intersection Delay Reduction per day	0.0		hours		

EMISSION REDUCTIONS

Pollutant	Peak Hours Kilograms/day	Off-Peak Hours Kilograms/day	Daily Total Kilograms/day
Carbon Monoxide (CO)	0.000	0.000	0.000
Particulate Matter <2.5 µm (PM _{2.5})	0.000	0.000	0.000
Particulate Matter <10 µm (PM ₁₀)	0.000	0.000	0.000
Nitrogen Oxide (NO _x)	0.000	0.000	0.000
Volatile Organic Compounds (VOC)	0.000	0.000	0.000
Carbon Dioxide Equivalent (CO ₂ e)	0.108	0.000	0.108
Total Energy Consumption (MMBTU)	0.001	0.000	0.001

Napier Avenue at Colfax Avenue



Intersection Improvements

Navigator

[Intersection Improvements](#)

[Traffic Signal Synchronization](#)

[Roundabouts](#)

This calculator will estimate the emission reductions resulting from improving traffic signals at a four-way intersection

INPUT

EXISTING CONDITIONS

Evaluation Year	2021		
Area Type	Urban		
Business District	No		
Total peak hours per day(AM+PM)	6		
Existing Intersection is	Signalized		
	Roadway 1	Roadway 2	
Average Annual Daily Traffic volume (AADT) (both directions)	17,299	3,789	veh/day
Peak-hour Volume (both directions)	1,459	281	veh/hr
Number of Lanes (one direction)	2	1	
Truck Percentage	5%	3%	
Existing Delay per Vehicle	20	25	sec/veh
Existing Left-turn Phase	Yes	Yes	
Existing Right-turn Phase	No	No	

Use the table below to estimate delay
(HCM 2010, Exhibit 21-1)

Level of Service Reference Table

LOS	Delay (s/veh)	
	Unsignalized Intersection	Signalized Intersections
A	0 - 10	0 - 10
B	>10 - 15	>10 - 20
C	>15 - 25	>20 - 35
D	>25 - 35	>35 - 55
E	>35 - 50	>55 - 80
F*	>50	>80

*LOS F typically indicates that traffic demand has exceeded capacity

PROPOSED CONDITIONS

Cycle Length	90	seconds
	Roadway 1	Roadway 2
Number of Left-Turn Lanes to Add (one direction)	0	0
Left-turn Phase	Yes	Yes
Right-turn Phase	No	No
Ratio of Green Time per Cycle Time	0.6	0.4

OUTPUT

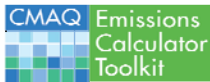
PERFORMANCE

Roadway	PEAK-HOUR		OFF-PEAK		
	1	2	1	2	
Existing Capacity (both directions)	3,918	1,331	3,918	1,331	veh/hr
Proposed Capacity (both directions)	3,918	1,331	3,918	1,331	veh/hr
Volume (both directions)	1,459	281	475	117	veh/hr
Delay Reduction per vehicle	10.7	7.3	9.7	-9.3	sec/veh
	Roadway 1	Roadway 2			
Roadway Intersection Delay Reduction per day	49.1	-2.0			hours
Total Intersection Delay Reduction per day	47.1				hours

EMISSION REDUCTIONS

Pollutant	Peak Hours Kilograms/day	Off-Peak Hours Kilograms/day	Daily Total Kilograms/day
Carbon Monoxide (CO)	0.139	0.000	0.139
Particulate Matter <2.5 µm (PM _{2.5})	0.005	0.000	0.005
Particulate Matter <10 µm (PM ₁₀)	0.006	0.000	0.006
Nitrogen Oxide (NOx)	0.068	0.000	0.068
Volatile Organic Compounds (VOC)	0.017	0.000	0.017
Carbon Dioxide Equivalent (CO ₂ e)	97.775	0.059	97.834
Total Energy Consumption (MMBTU)	1.286	0.001	1.286

Napier Avenue at Crystal Avenue



Intersection Improvements

Navigator

[Intersection Improvements](#)

[Traffic Signal Synchronization](#)

[Roundabouts](#)

This calculator will estimate the emission reductions resulting from improving traffic signals at a four-way intersection

INPUT

EXISTING CONDITIONS

Evaluation Year	2021		
Area Type	Urban		
Business District	No		
Total peak hours per day(AM+PM)	4		
Existing Intersection is	Signalized		
	Roadway 1	Roadway 2	
Average Annual Daily Traffic volume (AADT) (both directions)	13,200	5,972	veh/day
Peak-hour Volume (both directions)	513	503	veh/hr
Number of Lanes (one direction)	2	1	
Truck Percentage	6%	4%	
Existing Delay per Vehicle	10	20	sec/veh
Existing Left-turn Phase	Yes	Yes	
Existing Right-turn Phase	No	No	

Use the table below to estimate delay
(HCM 2010, Exhibit 21-1)

Level of Service Reference Table

LOS	Delay (s/veh)	
	Unsignalized Intersection	Signalized Intersections
A	0 - 10	0 - 10
B	>10 - 15	>10 - 20
C	>15 - 25	>20 - 35
D	>25 - 35	>35 - 55
E	>35 - 50	>55 - 80
F*	>50	>80

*LOS F typically indicates that traffic demand has exceeded capacity

PROPOSED CONDITIONS

Cycle Length	90	seconds
	Roadway 1	Roadway 2
Number of Left-Turn Lanes to Add (one direction)	0	0
Left-turn Phase	Yes	Yes
Right-turn Phase	No	No
Ratio of Green Time per Cycle Time	0.5	0.5

OUTPUT

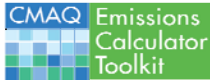
PERFORMANCE

Roadway	PEAK-HOUR		OFF-PEAK		
	1	2	1	2	
Existing Capacity (both directions)	3,235	1,648	3,235	1,648	veh/hr
Proposed Capacity (both directions)	3,235	1,648	3,235	1,648	veh/hr
Volume (both directions)	513	503	557	198	veh/hr
Delay Reduction per vehicle	-2.2	6.7	0.0	0.0	sec/veh
	1	2			
Roadway Intersection Delay Reduction per day	-1.3	3.8			hours
Total Intersection Delay Reduction per day	2.5				hours

EMISSION REDUCTIONS

Pollutant	Peak Hours Kilograms/day	Off-Peak Hours Kilograms/day	Daily Total Kilograms/day
Carbon Monoxide (CO)	0.011	0.000	0.011
Particulate Matter <2.5 µm (PM _{2.5})	0.000	0.000	0.000
Particulate Matter <10 µm (PM ₁₀)	0.000	0.000	0.000
Nitrogen Oxide (NO _x)	0.004	0.000	0.004
Volatile Organic Compounds (VOC)	0.001	0.000	0.001
Carbon Dioxide Equivalent (CO ₂ e)	8.066	0.000	8.066
Total Energy Consumption (MMBTU)	0.106	0.000	0.106

Napier Avenue at Miami Road



Intersection Improvements

Navigator

[Intersection Improvements](#)

[Traffic Signal Synchronization](#)

[Roundabouts](#)

This calculator will estimate the emission reductions resulting from improving traffic signals at a four-way intersection

INPUT

EXISTING CONDITIONS

Evaluation Year	2021		
Area Type	Urban		
Business District	No		
Total peak hours per day(AM+PM)	6		
Existing Intersection is	Signalized		
	Roadway 1	Roadway 2	
Average Annual Daily Traffic volume (AADT) (both directions)	16,463	2,099	veh/day
Peak-hour Volume (both directions)	1,056	191	veh/hr
Number of Lanes (one direction)	1	1	
Truck Percentage	5%	2%	
Existing Delay per Vehicle	20	25	sec/veh
Existing Left-turn Phase	Yes	No	
Existing Right-turn Phase	No	No	

Use the table below to estimate delay
(HCM 2010, Exhibit 21-1)

Level of Service Reference Table

LOS	Delay (s/veh)	
	Unsignalized Intersection	Signalized Intersections
A	0 - 10	0 - 10
B	>10 - 15	>10 - 20
C	>15 - 25	>20 - 35
D	>25 - 35	>35 - 55
E	>35 - 50	>55 - 80
F*	>50	>80

*LOS F typically indicates that traffic demand has exceeded capacity

PROPOSED CONDITIONS

Cycle Length	90	seconds
	Roadway 1	Roadway 2
Number of Left-Turn Lanes to Add (one direction)	0	0
Left-turn Phase	Yes	No
Right-turn Phase	No	No
Ratio of Green Time per Cycle Time	0.7	0.3

OUTPUT

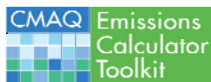
PERFORMANCE

Roadway	PEAK-HOUR		OFF-PEAK		
	1	2	1	2	
Existing Capacity (both directions)	2,286	1,059	2,286	1,059	veh/hr
Proposed Capacity (both directions)	2,286	1,059	2,286	1,059	veh/hr
Volume (both directions)	1,056	191	563	53	veh/hr
Delay Reduction per vehicle	14.0	1.7	21.7	-18.3	sec/veh
	Roadway 1	Roadway 2			
Roadway Intersection Delay Reduction per day	85.8	-4.3	hours		
Total Intersection Delay Reduction per day	81.5		hours		

EMISSION REDUCTIONS

Pollutant	Peak Hours Kilograms/day	Off-Peak Hours Kilograms/day	Daily Total Kilograms/day
Carbon Monoxide (CO)	0.119	0.000	0.120
Particulate Matter <2.5 µm (PM _{2.5})	0.005	0.000	0.005
Particulate Matter <10 µm (PM ₁₀)	0.005	0.000	0.005
Nitrogen Oxide (NOx)	0.060	0.000	0.060
Volatile Organic Compounds (VOC)	0.014	0.000	0.015
Carbon Dioxide Equivalent (CO ₂ e)	83.688	0.188	83.876
Total Energy Consumption (MMBTU)	1.100	0.002	1.103

Napier Avenue at Pipestone Road



Intersection Improvements

Navigator

[Intersection Improvements](#)

[Traffic Signal Synchronization](#)

[Roundabouts](#)

This calculator will estimate the emission reductions resulting from improving traffic signals at a four-way intersection

INPUT

EXISTING CONDITIONS

Evaluation Year	2021
Area Type	Urban
Business District	No
Total peak hours per day(AM+PM)	4
Existing Intersection is	Signalized

	Roadway 1	Roadway 2	
Average Annual Daily Traffic volume (AADT) (both directions)	16,721	9,562	veh/day
Peak-hour Volume (both directions)	1,200	687	veh/hr
Number of Lanes (one direction)	2	2	
Truck Percentage	5%	3%	
Existing Delay per Vehicle	20	20	sec/veh
Existing Left-turn Phase	Yes	Yes	
Existing Right-turn Phase	No	No	

Use the table below to estimate delay
(HCM 2010, Exhibit 21-1)

Level of Service Reference Table

LOS	Delay (s/veh)	
	Unsignalized Intersection	Signalized Intersections
A	0 - 10	0 - 10
B	>10 - 15	>10 - 20
C	>15 - 25	>20 - 35
D	>25 - 35	>35 - 55
E	>35 - 50	>55 - 80
F*	>50	>80

*LOS F typically indicates that traffic demand has exceeded capacity

PROPOSED CONDITIONS

Cycle Length

90

seconds

	Roadway 1	Roadway 2
Number of Left-Turn Lanes to Add (one direction)	0	0
Left-turn Phase	Yes	Yes
Right-turn Phase	No	No
Ratio of Green Time per Cycle Time	0.5	0.5

OUTPUT

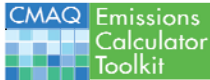
PERFORMANCE

Roadway	PEAK-HOUR		OFF-PEAK		
	1	2	1	2	
Existing Capacity (both directions)	3,265	3,329	3,265	3,329	veh/hr
Proposed Capacity (both directions)	3,265	3,329	3,265	3,329	veh/hr
Volume (both directions)	1,200	687	596	341	veh/hr
Delay Reduction per vehicle	6.2	7.5	0.0	0.0	sec/veh
Roadway Intersection Delay Reduction per day	8.3	5.7			hours
Total Intersection Delay Reduction per day		14.0			hours

EMISSION REDUCTIONS

Pollutant	Peak Hours Kilograms/day	Off-Peak Hours Kilograms/day	Daily Total Kilograms/day
Carbon Monoxide (CO)	0.065	0.000	0.065
Particulate Matter <2.5 µm (PM _{2.5})	0.002	0.000	0.002
Particulate Matter <10 µm (PM ₁₀)	0.003	0.000	0.003
Nitrogen Oxide (NO _x)	0.029	0.000	0.029
Volatile Organic Compounds (VOC)	0.007	0.000	0.007
Carbon Dioxide Equivalent (CO ₂ e)	45,964	0.000	45,964
Total Energy Consumption (MMBTU)	0.605	0.000	0.605

Napier Avenue at Union Avenue



Intersection Improvements

Navigator

[Intersection Improvements](#)

[Traffic Signal Synchronization](#)

[Roundabouts](#)

This calculator will estimate the emission reductions resulting from improving traffic signals at a four-way intersection

INPUT

EXISTING CONDITIONS

Evaluation Year	2021		
Area Type	Urban		
Business District	No		
Total peak hours per day(AM+PM)	4		
Existing Intersection is	Signalized		
	Roadway 1	Roadway 2	
Average Annual Daily Traffic volume (AADT) (both directions)	17,299	3,789	veh/day
Peak-hour Volume (both directions)	1,459	281	veh/hr
Number of Lanes (one direction)	2	1	
Truck Percentage	5%	3%	
Existing Delay per Vehicle	15	20	sec/veh
Existing Left-turn Phase	Yes	Yes	
Existing Right-turn Phase	No	No	

Use the table below to estimate delay
(HCM 2010, Exhibit 21-1)

Level of Service Reference Table

LOS	Delay (s/veh)	
	Unsignalized Intersection	Signalized Intersections
A	0 - 10	0 - 10
B	>10 - 15	>10 - 20
C	>15 - 25	>20 - 35
D	>25 - 35	>35 - 55
E	>35 - 50	>55 - 80
F*	>50	>80

*LOS F typically indicates that traffic demand has exceeded capacity

PROPOSED CONDITIONS

Cycle Length	90	seconds
	Roadway 1	Roadway 2
Number of Left-Turn Lanes to Add (one direction)	0	0
Left-turn Phase	Yes	Yes
Right-turn Phase	No	No
Ratio of Green Time per Cycle Time	0.5	0.5

OUTPUT

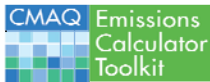
PERFORMANCE

Roadway	PEAK-HOUR		OFF-PEAK		
	1	2	1	2	
Existing Capacity (both directions)	3,265	1,664	3,265	1,664	veh/hr
Proposed Capacity (both directions)	3,265	1,664	3,265	1,664	veh/hr
Volume (both directions)	1,459	281	573	133	veh/hr
Delay Reduction per vehicle	0.5	7.7	0.0	0.0	sec/veh
	Roadway 1	Roadway 2			
Roadway Intersection Delay Reduction per day	0.8	2.4			hours
Total Intersection Delay Reduction per day		3.2			hours

EMISSION REDUCTIONS

Pollutant	Peak Hours Kilograms/day	Off-Peak Hours Kilograms/day	Daily Total Kilograms/day
Carbon Monoxide (CO)	0.015	0.000	0.015
Particulate Matter <2.5 µm (PM _{2.5})	0.000	0.000	0.000
Particulate Matter <10 µm (PM ₁₀)	0.001	0.000	0.001
Nitrogen Oxide (NO _x)	0.006	0.000	0.006
Volatile Organic Compounds (VOC)	0.002	0.000	0.002
Carbon Dioxide Equivalent (CO ₂ e)	10.558	0.000	10.558
Total Energy Consumption (MMBTU)	0.139	0.000	0.139

Pipestone Road at Mall Drive



Intersection Improvements

Navigator

[Intersection Improvements](#)

[Traffic Signal Synchronization](#)

[Roundabouts](#)

This calculator will estimate the emission reductions resulting from improving traffic signals at a four-way intersection

INPUT

EXISTING CONDITIONS

Evaluation Year	2021		
Area Type	Urban		
Business District	No		
Total peak hours per day(AM+PM)	4		
Existing Intersection is	Signalized		
	Roadway 1	Roadway 2	
Average Annual Daily Traffic volume (AADT) (both directions)	9,562	10,285	veh/day
Peak-hour Volume (both directions)	670	720	veh/hr
Number of Lanes (one direction)	2	2	
Truck Percentage	5%	5%	
Existing Delay per Vehicle	15	20	sec/veh
Existing Left-turn Phase	Yes	No	
Existing Right-turn Phase	No	No	

Use the table below to estimate delay
(HCM 2010, Exhibit 21-1)

Level of Service Reference Table

LOS	Delay (s/veh)	
	Unsignalized Intersection	Signalized Intersections
A	0 - 10	0 - 10
B	>10 - 15	>10 - 20
C	>15 - 25	>20 - 35
D	>25 - 35	>35 - 55
E	>35 - 50	>55 - 80
F*	>50	>80

*LOS F typically indicates that traffic demand has exceeded capacity

PROPOSED CONDITIONS

Cycle Length	90	seconds
	Roadway 1	Roadway 2
Number of Left-Turn Lanes to Add (one direction)	0	0
Left-turn Phase	Yes	No
Right-turn Phase	No	No
Ratio of Green Time per Cycle Time	0.5	0.5

OUTPUT

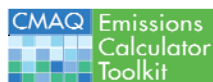
PERFORMANCE

Roadway	PEAK-HOUR		OFF-PEAK		
	1	2	1	2	
Existing Capacity (both directions)	3,265	3,429	3,265	3,429	veh/hr
Proposed Capacity (both directions)	3,265	3,429	3,265	3,429	veh/hr
Volume (both directions)	670	720	344	370	veh/hr
Delay Reduction per vehicle	2.5	7.4	0.0	0.0	sec/veh
	1	2			
Roadway Intersection Delay Reduction per day	1.8	5.9			hours
Total Intersection Delay Reduction per day	7.8				hours

EMISSION REDUCTIONS

Pollutant	Peak Hours Kilograms/day	Off-Peak Hours Kilograms/day	Daily Total Kilograms/day
Carbon Monoxide (CO)	0.037	0.000	0.037
Particulate Matter <2.5 µm (PM _{2.5})	0.001	0.000	0.001
Particulate Matter <10 µm (PM ₁₀)	0.002	0.000	0.002
Nitrogen Oxide (NO _x)	0.019	0.000	0.019
Volatile Organic Compounds (VOC)	0.004	0.000	0.004
Carbon Dioxide Equivalent (CO ₂ e)	25.851	0.000	25.851
Total Energy Consumption (MMBTU)	0.340	0.000	0.340

Pipestone Road at Meijer entrance



Intersection Improvements

Navigator

[Intersection Improvements](#)

[Traffic Signal Synchronization](#)

[Roundabouts](#)

This calculator will estimate the emission reductions resulting from improving traffic signals at a four-way intersection

INPUT

EXISTING CONDITIONS

Evaluation Year	2021
Area Type	Urban
Business District	No
Total peak hours per day(AM+PM)	4
Existing Intersection is	Signalized

	Roadway 1	Roadway 2	
Average Annual Daily Traffic volume (AADT) (both directions)	9,562	8,500	veh/day
Peak-hour Volume (both directions)	670	595	veh/hr
Number of Lanes (one direction)	2	1	
Truck Percentage	5%	2%	
Existing Delay per Vehicle	15	25	sec/veh
Existing Left-turn Phase	No	No	
Existing Right-turn Phase	No	No	

Use the table below to estimate delay
(HCM 2010, Exhibit 21-1)

Level of Service Reference Table

LOS	Delay (s/veh)	
	Unsignalized Intersection	Signalized Intersections
A	0 - 10	0 - 10
B	>10 - 15	>10 - 20
C	>15 - 25	>20 - 35
D	>25 - 35	>35 - 55
E	>35 - 50	>55 - 80
F*	>50	>80

*LOS F typically indicates that traffic demand has exceeded capacity

PROPOSED CONDITIONS

Cycle Length	90	seconds
Number of Left-Turn Lanes to Add (one direction)	0	0
Left-turn Phase	No	No
Right-turn Phase	No	No
Ratio of Green Time per Cycle Time	0.5	0.5

OUTPUT

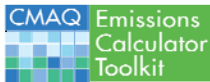
PERFORMANCE

Roadway	PEAK-HOUR		OFF-PEAK		
	1	2	1	2	
Existing Capacity (both directions)	3,429	1,765	3,429	1,765	veh/hr
Proposed Capacity (both directions)	3,429	1,765	3,429	1,765	veh/hr
Volume (both directions)	670	595	344	306	veh/hr
Delay Reduction per vehicle	2.5	11.5	0.0	0.0	sec/veh
Roadway Intersection Delay Reduction per day	1.9	7.6			hours
Total Intersection Delay Reduction per day		9.5			hours

EMISSION REDUCTIONS

Pollutant	Peak Hours Kilograms/day	Off-Peak Hours Kilograms/day	Daily Total Kilograms/day
Carbon Monoxide (CO)	0.042	0.000	0.042
Particulate Matter <2.5 µm (PM _{2.5})	0.001	0.000	0.001
Particulate Matter <10 µm (PM ₁₀)	0.001	0.000	0.001
Nitrogen Oxide (NO _x)	0.014	0.000	0.014
Volatile Organic Compounds (VOC)	0.004	0.000	0.004
Carbon Dioxide Equivalent (CO ₂ e)	30.462	0.000	30.462
Total Energy Consumption (MMBTU)	0.401	0.000	0.401

Pipestone Road at Sodus Parkway



Intersection Improvements

Navigator

[Intersection Improvements](#)

[Traffic Signal Synchronization](#)

[Roundabouts](#)

This calculator will estimate the emission reductions resulting from improving traffic signals at a four-way intersection

INPUT

EXISTING CONDITIONS

Evaluation Year	2021
Area Type	Urban
Business District	No
Total peak hours per day(AM+PM)	4
Existing Intersection is	Signalized

	Roadway 1	Roadway 2	
Average Annual Daily Traffic volume (AADT) (both directions)	3,277	7,929	veh/day
Peak-hour Volume (both directions)	269	848	veh/hr
Number of Lanes (one direction)	2	2	
Truck Percentage	5%	5%	
Existing Delay per Vehicle	25	15	sec/veh
Existing Left-turn Phase	Yes	Yes	
Existing Right-turn Phase	No	No	

Use the table below to estimate delay
(HCM 2010, Exhibit 21-1)

Level of Service Reference Table

LOS	Delay (s/veh)	
	Unsignalized Intersection	Signalized Intersections
A	0 - 10	0 - 10
B	>10 - 15	>10 - 20
C	>15 - 25	>20 - 35
D	>25 - 35	>35 - 55
E	>35 - 50	>55 - 80
F*	>50	>80

*LOS F typically indicates that traffic demand has exceeded capacity

PROPOSED CONDITIONS

Cycle Length	90	seconds

OUTPUT

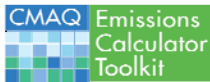
PERFORMANCE

Roadway	PEAK-HOUR		OFF-PEAK		
	1	2	1	2	
Existing Capacity (both directions)	3,265	3,265	3,265	3,265	veh/hr
Proposed Capacity (both directions)	3,265	3,265	3,265	3,265	veh/hr
Volume (both directions)	269	848	110	227	veh/hr
Delay Reduction per vehicle	13.3	2.1	0.0	0.0	sec/veh
Roadway Intersection Delay Reduction per day	4.0	2.0			hours
Total Intersection Delay Reduction per day		5.9			hours

EMISSION REDUCTIONS

Pollutant	Peak Hours Kilograms/day	Off-Peak Hours Kilograms/day	Daily Total Kilograms/day
Carbon Monoxide (CO)	0.028	0.000	0.028
Particulate Matter <2.5 µm (PM _{2.5})	0.001	0.000	0.001
Particulate Matter <10 µm (PM ₁₀)	0.001	0.000	0.001
Nitrogen Oxide (NO _x)	0.014	0.000	0.014
Volatile Organic Compounds (VOC)	0.003	0.000	0.003
Carbon Dioxide Equivalent (CO ₂ e)	19.664	0.000	19.664
Total Energy Consumption (MMBTU)	0.259	0.000	0.259

Red Arrow Hwy at DC Cook nuclear plant



Intersection Improvements

Navigator

[Intersection Improvements](#)

[Traffic Signal Synchronization](#)

[Roundabouts](#)

This calculator will estimate the emission reductions resulting from improving traffic signals at a four-way intersection

INPUT

EXISTING CONDITIONS

Evaluation Year	2021
Area Type	Rural
Business District	No
Total peak hours per day(AM+PM)	4
Existing Intersection is	Signalized

	Roadway 1	Roadway 2	
Average Annual Daily Traffic volume (AADT) (both directions)	9,541	1,400	veh/day
Peak-hour Volume (both directions)	835	600	veh/hr
Number of Lanes (one direction)	2	1	
Truck Percentage	5%	3%	
Existing Delay per Vehicle	15	15	sec/veh
Existing Left-turn Phase	No	No	
Existing Right-turn Phase	No	No	

Use the table below to estimate delay
(HCM 2010, Exhibit 21-1)

Level of Service Reference Table

LOS	Delay (s/veh)	
	Unsignalized Intersection	Signalized Intersections
A	0 - 10	0 - 10
B	>10 - 15	>10 - 20
C	>15 - 25	>20 - 35
D	>25 - 35	>35 - 55
E	>35 - 50	>55 - 80
F*	>50	>80

*LOS F typically indicates that traffic demand has exceeded capacity

PROPOSED CONDITIONS

Cycle Length	90	seconds

OUTPUT

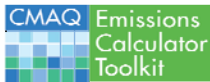
PERFORMANCE

Roadway	PEAK-HOUR		OFF-PEAK		
	1	2	1	2	
Existing Capacity (both directions)	3,429	1,748	3,429	1,748	veh/hr
Proposed Capacity (both directions)	3,265	1,664	3,265	1,664	veh/hr
Volume (both directions)	835	600	310	0	veh/hr
Delay Reduction per vehicle	2.1	1.3	0.0	0.0	sec/veh
Roadway Intersection Delay Reduction per day	1.9	0.9			hours
Total Intersection Delay Reduction per day		2.8			hours

EMISSION REDUCTIONS

Pollutant	Peak Hours Kilograms/day	Off-Peak Hours Kilograms/day	Daily Total Kilograms/day
Carbon Monoxide (CO)	0.013	0.000	0.013
Particulate Matter <2.5 µm (PM _{2.5})	0.001	0.000	0.001
Particulate Matter <10 µm (PM ₁₀)	0.001	0.000	0.001
Nitrogen Oxide (NOx)	0.006	0.000	0.006
Volatile Organic Compounds (VOC)	0.002	0.000	0.002
Carbon Dioxide Equivalent (CO ₂ e)	9.348	0.000	9.348
Total Energy Consumption (MMBTU)	0.123	0.000	0.123

Red Arrow Hwy at Sawyer Road



Intersection Improvements

Navigator

[Intersection Improvements](#)

[Traffic Signal Synchronization](#)

[Roundabouts](#)

This calculator will estimate the emission reductions resulting from improving traffic signals at a four-way intersection

INPUT

EXISTING CONDITIONS

Evaluation Year	2021		
Area Type	Rural		
Business District	No		
Total peak hours per day(AM+PM)	4		
Existing Intersection is	Signalized		
	Roadway 1	Roadway 2	
Average Annual Daily Traffic volume (AADT) (both directions)	6,315	3,809	veh/day
Peak-hour Volume (both directions)	442	266	veh/hr
Number of Lanes (one direction)	2	1	
Truck Percentage	5%	3%	
Existing Delay per Vehicle	15	20	sec/veh
Existing Left-turn Phase	Yes	No	
Existing Right-turn Phase	No	No	

Use the table below to estimate delay
(HCM 2010, Exhibit 21-1)

Level of Service Reference Table

LOS	Delay (s/veh)	
	Unsignalized Intersection	Signalized Intersections
A	0 - 10	0 - 10
B	>10 - 15	>10 - 20
C	>15 - 25	>20 - 35
D	>25 - 35	>35 - 55
E	>35 - 50	>55 - 80
F*	>50	>80

*LOS F typically indicates that traffic demand has exceeded capacity

PROPOSED CONDITIONS

Cycle Length	90	seconds
	Roadway 1	Roadway 2
Number of Left-Turn Lanes to Add (one direction)	0	0
Left-turn Phase	Yes	No
Right-turn Phase	No	No
Ratio of Green Time per Cycle Time	0.5	0.5

OUTPUT

PERFORMANCE

Roadway	PEAK-HOUR		OFF-PEAK		
	1	2	1	2	
Existing Capacity (both directions)	3,265	1,748	3,265	1,748	veh/hr
Proposed Capacity (both directions)	3,265	1,748	3,265	1,748	veh/hr
Volume (both directions)	442	266	227	137	veh/hr
Delay Reduction per vehicle	2.9	7.8	0.0	0.0	sec/veh
	Roadway 1	Roadway 2			
Roadway Intersection Delay Reduction per day	1.4	2.3			hours
Total Intersection Delay Reduction per day		3.8			hours

EMISSION REDUCTIONS

Pollutant	Peak Hours Kilograms/day	Off-Peak Hours Kilograms/day	Daily Total Kilograms/day
Carbon Monoxide (CO)	0.018	0.000	0.018
Particulate Matter <2.5 µm (PM _{2.5})	0.001	0.000	0.001
Particulate Matter <10 µm (PM ₁₀)	0.001	0.000	0.001
Nitrogen Oxide (NO _x)	0.007	0.000	0.007
Volatile Organic Compounds (VOC)	0.002	0.000	0.002
Carbon Dioxide Equivalent (CO ₂ e)	12.427	0.000	12.427
Total Energy Consumption (MMBTU)	0.163	0.000	0.163