ABBREVIATED SAFETY STUDY

MAD-665-3.28
SR 665 and Spring Valley Rd Intersection

2021 Suburban Intersection Rank #378

Table of Contents

Purpose and Need

This study analyzes the intersection of SR 665 and Spring Valley Rd in Madison County. The purpose of this report is to study this location and analyze the crashes to determine what, if any, actions can be taken to reduce the high percentage of angle crashes that have occurred in the study area.

Existing Conditions

The intersection of SR 665 and Spring Valley Rd is a rural 4 legged intersection in central Madison County, about 3 miles east of London. SR 665 is a 2 lane, undivided roadway classified as a rural major collector with a 55 mph speed limit. Spring Valley Rd is a 2 lane, undivided roadway classified as a rural major collector north of the intersection and a rural minor collector south of the intersection with a 55 mph speed limit.

Currently, Spring Valley Rd traffic stops, with dual stop signs and right side LED signs on all approaches. Dual stop ahead signs also exist on both Galena Rd approaches. Daily traffic volumes are around 1,624 on SR 655, and 924 on spring valley road. A turning movement count from 2023 and traffic forecast is available in the appendix.

Most of the land near the 665 intersection is rural, with a farm on the northeast corner and farmland on the other three corners. The nearest driveways are about 300 ft. north, 325 feet west, and 150 ft. east of the intersection.

Existing safety improvements at this intersection include:

- Dual stops and cross traffic does not stop plaques in 2010
- Dual stop ahead warning signs
- LED stops on both approaches
- In 2020, abbreviated safety funds were used to purchase a small piece of right of way on the southeast corner. This removed a fence that was affecting sight distance. The stop signs on the south leg were also moved up, and a field drive was relocated.

FIGURE 1 AERIAL VIEW

FIGURE 2 NORTHBOUND APPROACH

FIGURE 3 SOUTHBOUND APPROACH

FIGURE 4 EASTBOUND APPROACH

FIGURE 5 WESTBOUND APPROACH

FIGURE 6 LOOKING EAST POST ABBREVIATED FUNDING TO REMOVE FENCE

Crash Trends

23 crashes were reported in this area from 2018 to 2022, with 17 involving injuries. Of the 17, 5 were serious injuries. Of these crashes, 22 were angle crashes and one was a left turn crash. These crashes were spread across the approaches, with 8 involving eastbound drivers.

About 80% of the crashes occurred in the afternoon and evening hours. The all but 2 crashes occurred in dry conditions. Crashes spread fairly evenly through the year and days of the week. There was a slight spike in winter months and on Wednesdays- but nothing significant. After LED stops and fence removal to improve sight distance around 2020, crashes did not drop off, suggesting that short term improvements did not solve the crash problem. NB and WB crashes were 4 in 2018, 2 in 2019, 1 in 2020, 4 in 2021, and 0 in 2022. There has been 1 serious injury crash every year from 2018-2022.

Full crash data is available in the appendix.

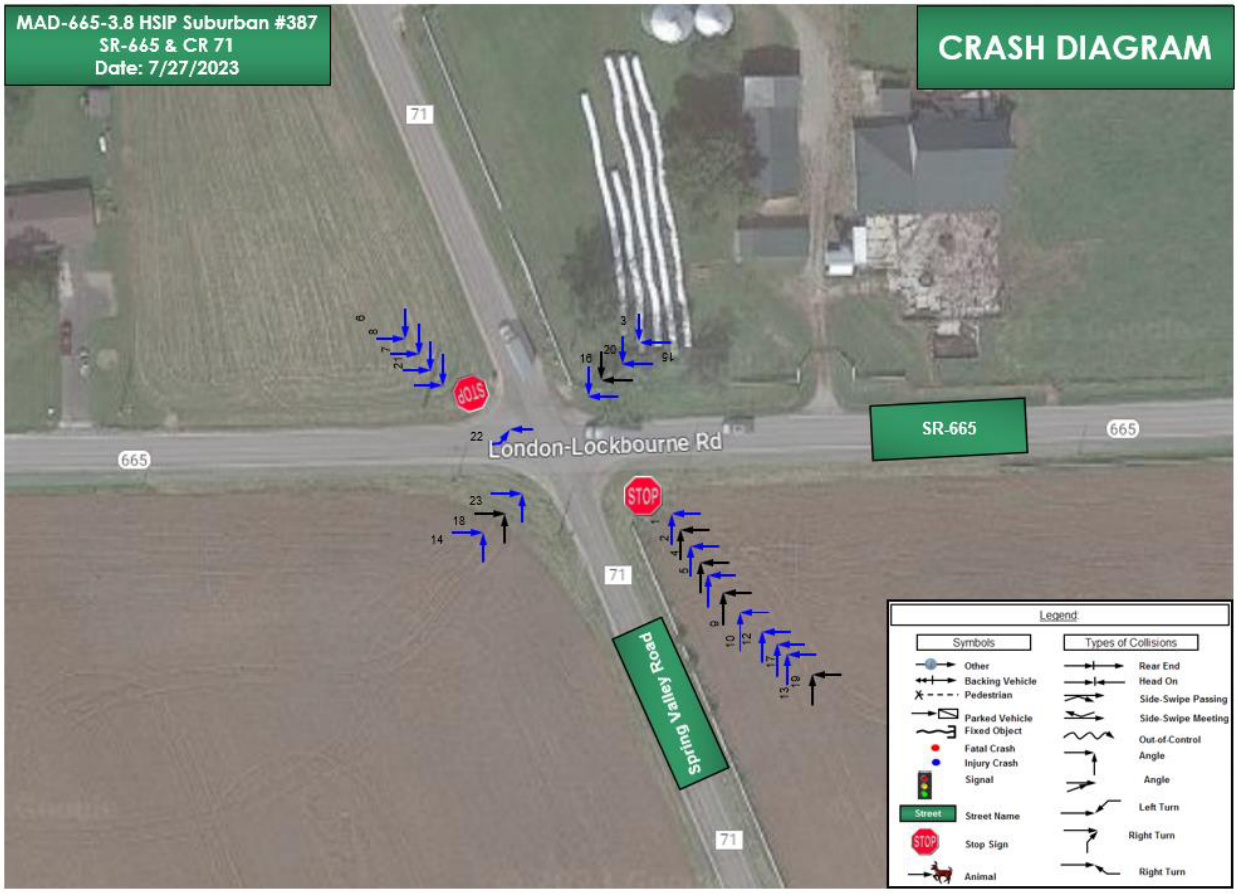


FIGURE 7 COLLISION DIAGRAM

Capacity

Both roadways are lower volume. AWSC would work capacity wise at LOS A opening and LOS B design year. A roundabout would operate at LOS A opening and LOS A design year.

Recommendations

Short Term

Maintain all existing signs. All Way stop could be considered, but it's not preferred for reasons detailed above. Other short-term signage and sight distance improvements have already been implemented. London is off to the west about 2.5 miles, but to the east there are no stops on 665 until Darbydale, which is 10 miles. For this reason, the county engineer is

concerned about driver expectation with an All-Way Stop. Additional signage upgrades have been made to no avail, so it's not guaranteed that an isolated, rural all way stop would help here. Additionally, it would be cheaper to build a roundabout now, rather than later. We've already completed a project to address site distance here.

Long Term

Install a roundabout at the intersection. This would significantly reduce the angle and left turn crashes, which account for 100% of the crashes at this intersection.

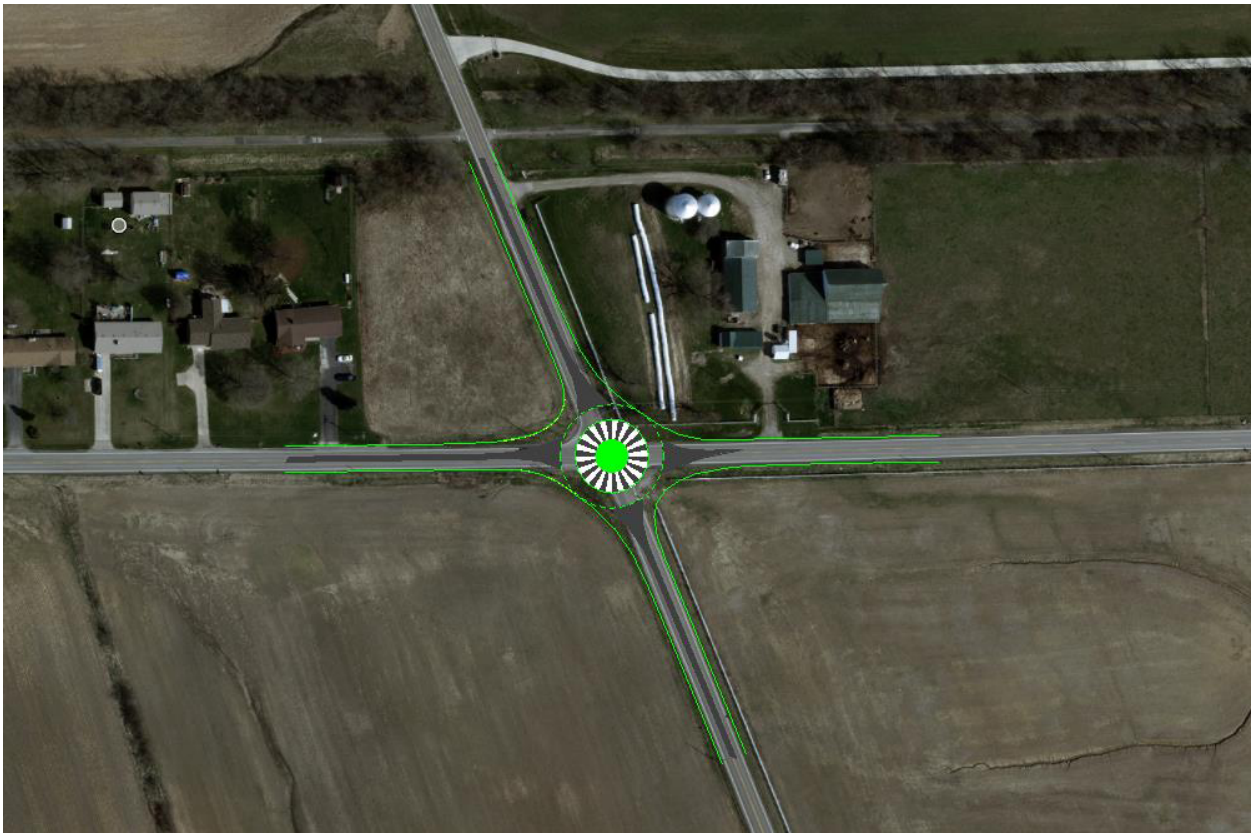


FIGURE 8 CONCEPT SKETCH

Appendix
Crash Data

Safety Benefit - Cost Analysis

ECAT Economic Crash Analysis Tool

General Information

Project Name	MAD-665 at Spring Valley	Contact Email	
Project Description		Contact Phone	
Reference Number		Date Performed	
Analyst		Analysis Year	
Agency/Company			

Select Site Types to be used in Benefit-Cost Analysis:

All Sites

Comments:

Countermeasure Service Lives, Costs, and Safety Benefits

Countermeasures	Service Life (Years)	Initial Cost of Countermeasure	Annual Maintenance & Energy Costs	Salvage Value	Net Present Cost of Countermeasure	Total Cost of Countermeasures	Summary of Annual Crash Modifications	Net Present Value of Safety Benefits
Site Characteristic Improvements (Please add description about improvements i.e. Lane widening)	20	$3,500,000.00			$3,500,000.00	$3,500,000.00	-2.021	$2,255,680
Site Characteristic Improvements (Please add description about improvements i.e. Lighting)					$0.00	$0.00		
Site Characteristic Improvements (Please add description about improvements i.e. Signal Phasing)					$0.00	$0.00		
Site Characteristic Improvements (Please add description about improvements i.e. Added Right Turn Lane)					$0.00	$0.00		
					$0.00	$0.00	0.000	$0
					$0.00	$0.00	0.000	$0
					$0.00	$0.00	0.000	$0
					$0.00	$0.00	0.000	$0
					$0.00	$0.00	0.000	$0
					$0.00	$0.00	0.000	$0
					$0.00	$0.00	0.000	$0
					$0.00	$0.00	0.000	$0
					$0.00	$0.00	0.000	$0
					$0.00	$0.00	0.000	$0
Totals		**$3,500,000.00**	**$0.00**	**$0.00**	**$3,500,000.00**	**$3,500,000.00**	**-2.021**	**$2,255,680**

Safety Benefit - Cost Analysis

ECAT Economic Crash Analysis Tool

General Information

Project Name	MAD-665 at Spring Valley	Contact Email	
Project Description		Contact Phone	
Reference Number		Date Performed	
Analyst		Analysis Year	
Agency/Company			

Benefit - Cost Calculator

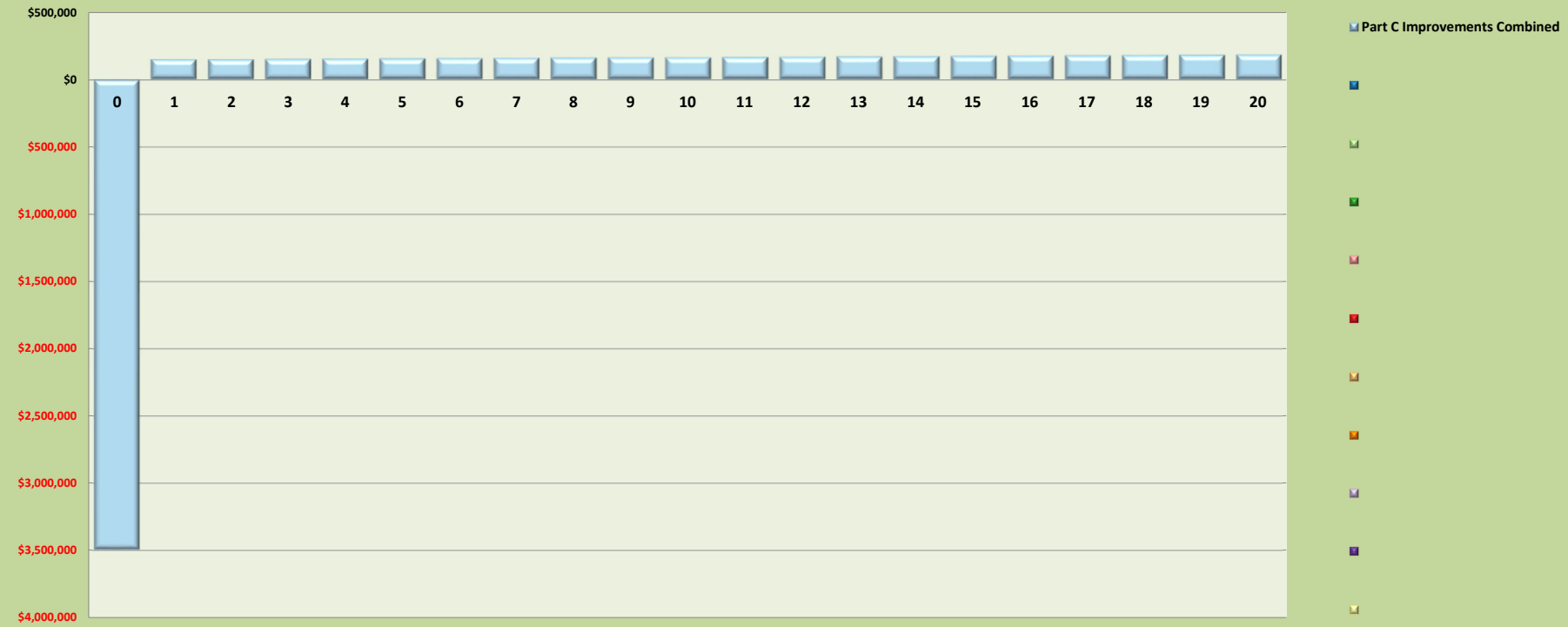
Net Present Value of Project	$3,500,000.00
Net Present Value of Safety Benefits	$2,255,680.09
Net Benefit	($1,244,319.91)
Benefit / Cost Ratio	0.64

Expected Annual Crash Adjustment

Number of Fatal & Incapacitating Injury Crashes	-0.208
Number of Injury Crashes	-1.002
Number of Total Crashes	-2.021

Comments:

Safety Benefits and Project Costs Combined Cash Flows By Countermeasure Per Year

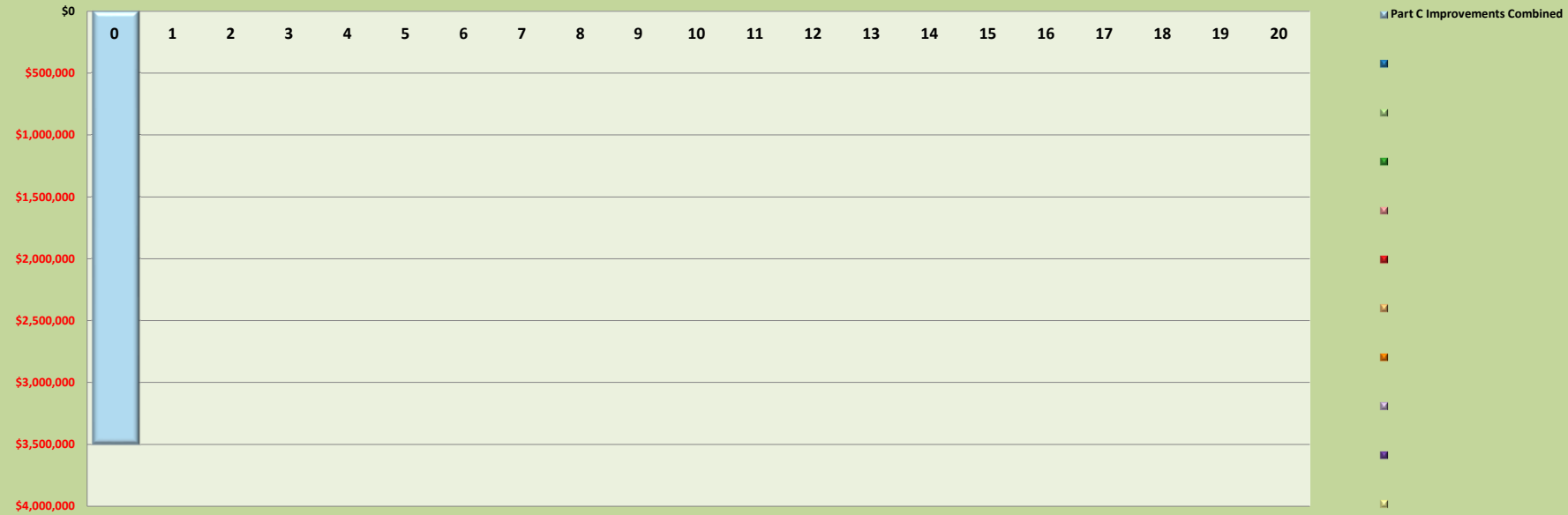


Safety Benefit - Cost Analysis

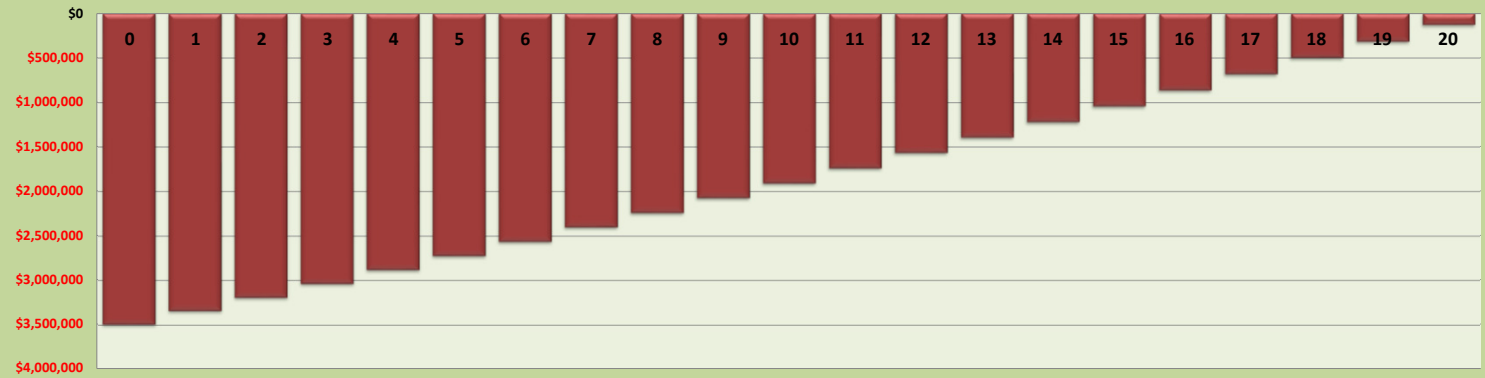
General Information

Project Name	MAD-665 at Spring Valley	Contact Email	
Project Description		Contact Phone	
Reference Number		Date Performed	
Analyst		Analysis Year	
Agency/Company			

Project Costs Only Cash Flows By Countermeasure Per Year



Return on Investment (Safety Benefits and Project Investments)



First year to observe a positive return on investiment: Unknown (Unknown years)

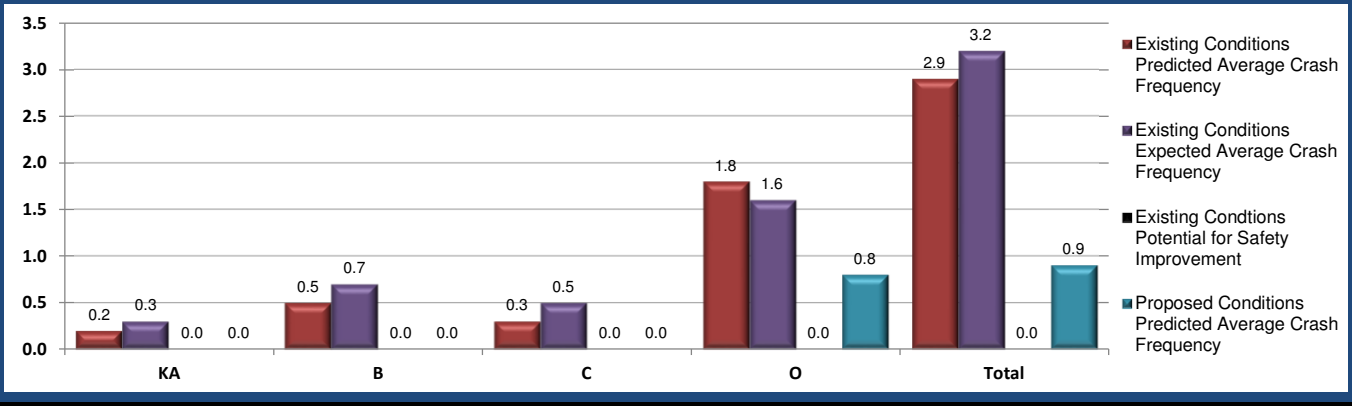
Percentage of Service Life to observe a continuous Positive Return on Investment: Unknown%

Project Safety Performance Report

General Information

Project Name	MAD-665 at Spring Valley	Contact Email	
Project Description		Contact Phone	
Reference Number		Date Performed	
Analyst		Analysis Year	
Agency/Company			

Summary of Anticipated Safety Performance of the Project (average crashes/year)



Project Summary Results (Without Animal Crashes)

	KA	B	C	O	Total
$N_{predicted}$ - Existing Conditions	0.2117	0.5133	0.3419	1.8371	2.9040
$N_{expected}$ - Existing Conditions	0.3063	0.7423	0.4943	1.6422	3.1851
$N_{potential\ for\ improvement}$ - Existing Conditions	0.0000	0.0000	0.0000	0.0000	0.0000
$N_{expected}$ - Proposed Conditions	0.0034	0.0277	0.0340	0.8176	0.8827

Project Safety Performance Report

General Information

Project Name	MAD-665 at Spring Valley	Contact Email	
Project Description		Contact Phone	
Reference Number		Date Performed	
Analyst		Analysis Year	
Agency/Company			

Existing Conditions Project Element Predicted Crash Summary (Without Animal Crashes)

Project Element ID	Common Name	Crash Severity Level				
		KA	B	C	O	Total
SR665; 3.28	Spring Valley Rd	0.2117	0.5133	0.3419	1.8371	2.904

Project Safety Performance Report

General Information

Project Name	MAD-665 at Spring Valley	Contact Email	
Project Description		Contact Phone	
Reference Number		Date Performed	
Analyst		Analysis Year	
Agency/Company			

Existing Conditions Project Element Expected Crash Summary (Without Animal Crashes)

Project Element ID	Common Name	Crash Severity Level				
		KA	B	C	O	Total
SR665; 3.28	Spring Valley Rd	0.3063	0.7423	0.4943	1.6422	3.1851

Project Safety Performance Report

General Information

Project Name	MAD-665 at Spring Valley	Contact Email	
Project Description		Contact Phone	
Reference Number		Date Performed	
Analyst		Analysis Year	
Agency/Company			

Existing Conditions Project Element Potential for Safety Improvement Summary (Without Animal Crashes)

Project Element ID	Common Name	Crash Severity Level				
		KA	B	C	O	Total
SR665; 3.28	Spring Valley Rd	0.0946	0.229	0.1524	-0.1949	0.2811

Project Safety Performance Report

General Information

Project Name	MAD-665 at Spring Valley	Contact Email	
Project Description		Contact Phone	
Reference Number		Date Performed	
Analyst		Analysis Year	
Agency/Company			

Proposed Conditions Project Element Predicted Crash Summary (Without Animal Crashes)

Project Element ID	Common Name	Crash Severity Level				
		KA	B	C	O	Total
SR665; 3.28	Spring Valley Rd	0.0034	0.0277	0.034	0.8176	0.8827

Project Safety Performance Report

General Information

Project Name	MAD-665 at Spring Valley	Contact Email	
Project Description		Contact Phone	
Reference Number		Date Performed	
Analyst		Analysis Year	
Agency/Company			

Summary by Crash Type

Crash Type	Existing			Proposed
	Predicted Crash Frequency	Expected Crash Frequency	PSI	Predicted Crash Frequency
Unknown	0.0118	0.0120		0.0255
Head On	0.0249	0.0314		0.0007
Rear End	0.6206	0.6613		0.1332
Backing	0.1168	0.1077		0.0083
Sideswipe - Meeting	0.0844	0.0942		0.0000
Sideswipe - Passing	0.1312	0.1341		0.2780
Angle	1.1082	1.2872		0.2489
Parked Vehicle	0.1033	0.0985		0.0000
Pedestrian	0.0141	0.0193		0.0007
Animal	0.0000	0.0000		0.0090
Train	0.0005	0.0007		0.0000
Pedalcycles	0.0107	0.0139		0.0007
Other Non-Vehicle	0.0002	0.0003		0.0000
Fixed Object	0.4871	0.5122		0.0892
Other Object	0.0170	0.0163		0.0000
Overturning	0.0293	0.0364		0.0007
Other Non-Collision	0.0385	0.0379		0.0172
Left Turn	0.1054	0.1217		0.0192
Right Turn	0.0000	0.0000		0.0604

MAD-665 at Spring Valley Rd (2018-22)

Crash Summary Sheet

Fatalities	0
Serious Injuries	9
Other Injuries	20

Crashes Per Year	4.60
Fatal and All Injury Crashes	17
Percent Injury	73.9%
Equivalent PDO Index Value	13.01

Crash Severity	Crashes	%
(2) Serious Injury Suspected	5	21.74%
(3) Minor Injury Suspected	5	21.74%
(4) Injury Possible	7	30.43%
(5) PDO/No Injury	6	26.09%
Grand Total	23	100.00%

Year	Crashes	%
2018	5	21.74%
2019	5	21.74%
2020	1	4.35%
2021	8	34.78%
2022	4	17.39%
Grand Total	23	100.00%

Day of Week	Crashes	%
(1) Sunday	1	4.35%
(2) Monday	3	13.04%
(3) Tuesday	5	21.74%
(4) Wednesday	7	30.43%
(5) Thursday	3	13.04%
(6) Friday	2	8.70%
(7) Saturday	2	8.70%
Grand Total	23	100.00%

Crash Type	Crashes	%
Angle	22	95.65%
Left Turn	1	4.35%
Grand Total	23	100.00%

Hour of Day	Crashes	%
6	1	4.35%
9	1	4.35%
10	1	4.35%
11	2	8.70%
12	4	17.39%
13	3	13.04%
14	1	4.35%
15	3	13.04%
16	3	13.04%
17	1	4.35%
18	1	4.35%
19	1	4.35%
20	1	4.35%
Grand Total	23	100.00%

Month	Crashes	%
2	4	17.39%
3	1	4.35%
4	2	8.70%
5	2	8.70%
6	1	4.35%
7	3	13.04%
9	1	4.35%
10	2	8.70%
11	3	13.04%
12	4	17.39%
Grand Total	23	100.00%

MAD-665 at Spring Valley Rd (2018-22)

Crash Summary Sheet

Weather Condition	Crashes	%
Clear	12	52.17%
Cloudy	9	39.13%
Snow	1	4.35%
Rain	1	4.35%
Grand Total	23	100.00%

Road Condition	Crashes	%
Dry	21	91.30%
Wet	2	8.70%
Grand Total	23	100.00%

Light Condition	Crashes	%
Daylight	21	91.30%
Dark - Roadway Not Lighted	2	8.70%
Grand Total	23	100.00%

Number of Units	Crashes	%
2	21	91.30%
4	1	4.35%
3	1	4.35%
Grand Total	23	100.00%

ODOT Location	Crashes	%
Four-Way Intersection	17	73.91%
Not An Intersection	5	21.74%
Data Not Valid or Not Provided	1	4.35%
Grand Total	23	100.00%

Work Zone Related	Crashes	%
No	23	100.00%
Grand Total	23	100.00%

Alcohol Related	Crashes	%
No	22	95.65%
Yes	1	4.35%
Grand Total	23	100.00%

Drug Related (Inc. Marijuana)	Crashes	%
No	22	95.65%
Yes	1	4.35%
Grand Total	23	100.00%

Contour	Crashes	%
Straight Grade	2	8.70%
Straight Level	21	91.30%
Grand Total	23	100.00%

Marijuana Related	Crashes	%
No	22	95.65%
Yes	1	4.35%
Grand Total	23	100.00%

Roadway Departure	Crashes	%
No	23	100.00%
Grand Total	23	100.00%

Older Driver (65+)	Crashes	%
No	13	56.52%
Yes	10	43.48%
Grand Total	23	100.00%

Intersection Related	Crashes	%
Yes	23	100.00%
Grand Total	23	100.00%

Young Driver (15-25)	Crashes	%
No	14	60.87%
Yes	9	39.13%
Grand Total	23	100.00%

Speed Related	Crashes	%
No	20	86.96%
Yes	3	13.04%
Grand Total	23	100.00%

Motorcycle Involved	Crashes	%
No	22	95.65%
Yes	1	4.35%
Grand Total	23	100.00%

MAD-665 at Spring Valley Rd (2018-22)

Crash Summary Sheet

Unit 1 Summary

Unit 1 Pre-Crash Action	Crashes	%
Straight Ahead	19	82.61%
Entering Traffic Lane	3	13.04%
Making Left Turn	1	4.35%
Grand Total	23	100.00%

Unit 1 Contributing Factor	Crashes	%
Failure to Yield	17	73.91%
Ran Stop Sign	4	17.39%
Operating Defective Equipment	1	4.35%
Improper Start From a Parked Position	1	4.35%
Grand Total	23	100.00%

Unit 1 Object Struck	Crashes	%
Nothing Struck	20	86.96%
Traffic Sign Post	1	4.35%
Ditch	1	4.35%
Fence	1	4.35%
Grand Total	23	100.00%

Unit 1 Traffic Control	Crashes	%
Stop Sign	22	95.65%
No Control	1	4.35%
Grand Total	23	100.00%

Unit 1 Posted Speed	Crashes	%
55	23	100.00%
Grand Total	23	100.00%

Unit 1 Direction From	Crashes	%
South	13	56.52%
North	7	30.43%
Northwest	1	4.35%
West	1	4.35%
Southeast	1	4.35%
Grand Total	23	100.00%

Unit 1 Direction To	Crashes	%
North	14	60.87%
South	7	30.43%
Southeast	1	4.35%
Northwest	1	4.35%
Grand Total	23	100.00%

MAD-665 at Spring Valley Rd (2018-22)

Crash Summary Sheet

Unit 1 Summary

Unit 1 Type	Crashes	%
Passenger Car	11	47.83%
Sport Utility Vehicle	5	21.74%
Pick up	3	13.04%
Cargo Van	2	8.70%
Motorcycle 2 Wheeled	1	4.35%
Single Unit Truck	1	4.35%
Grand Total	23	100.00%

Unit 1 Special Function	Crashes	%
None	22	95.65%
Towing	1	4.35%
Grand Total	23	100.00%

MAD-665 at Spring Valley Rd (2018-22)
Crash Summary Sheet

Unit 2 Summary

Unit 2 Pre-Crash Action	Crashes	%
Straight Ahead	21	91.30%
Making Left Turn	1	4.35%
Slowing or Stopped In Traffic	1	4.35%
Grand Total	23	100.00%

Unit 2 Contributing Factor	Crashes	%
None	23	100.00%
Grand Total	23	100.00%

Unit 2 Direction From	Crashes	%
East	13	56.52%
North	1	4.35%
West	9	39.13%
Grand Total	23	100.00%

Unit 2 Direction To	Crashes	%
East	9	39.13%
South	2	8.70%
West	12	52.17%
Grand Total	23	100.00%

Unit 2 Type	Crashes	%
Passenger Car	10	43.48%
Pick up	4	17.39%
Passenger Van (minivan)	3	13.04%
Sport Utility Vehicle	3	13.04%
Single Unit Truck	1	4.35%
Cargo Van	1	4.35%
Semi-Tractor	1	4.35%
Grand Total	23	100.00%

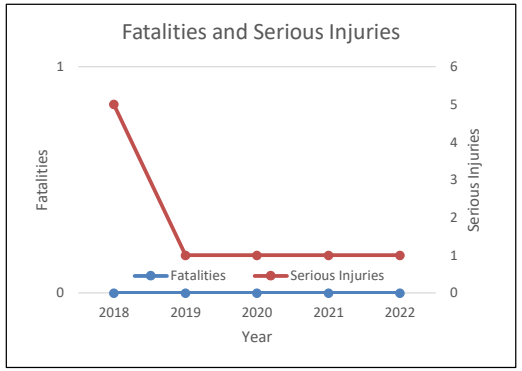
Unit 2 Special Function	Crashes	%
None	21	91.30%
Other / Unknown	1	4.35%
Farm	1	4.35%
Grand Total	23	100.00%

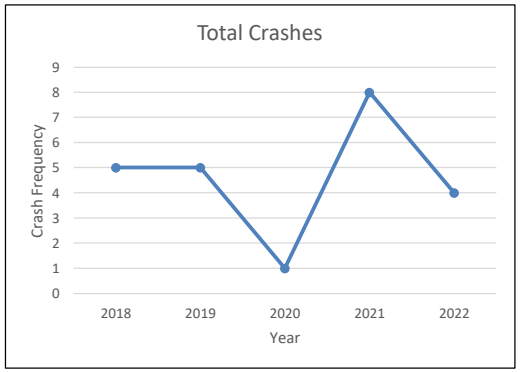
MAD-665 at Spring Valley Rd (2018-22)

Crash Summary Sheet

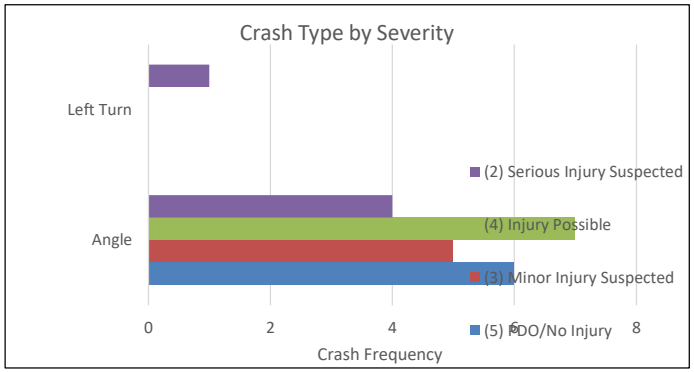
Crashes Per Year	4.60	Percent Injury	73.9%	EPDO	13.01

Year	Total Crashes	Fatalities	Serious Injuries
2018	5	0	5
2019	5	0	1
2020	1	0	1
2021	8	0	1
2022	4	0	1
Grand Total	23	0	9





Total Crashes / Crash Type	Injury Level (2) Serious Inju	(3) Minor Injury	(4) Injury Possil	(5) PDO/No Inj	Grand Total
Angle	4	5	7	6	22
Left Turn	1	0	0	0	1
Grand Total	5	5	7	6	23



MAD-665 at Spring Valley Rd (2018-22)

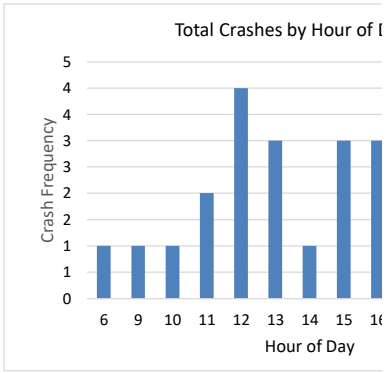
Crash Summary Sheet

Crashes Per Year	4.60	Percent Injury	73.9%	EPDO	13.01

Road Condition	Total Crashes	Fatalities	Serious Injuries
Dry	21	0	8
Wet	2	0	1
Grand Total	23	0	9

Hour of Day	Total Crashes
6	1
9	1
10	1
11	2
12	4
13	3
14	1
15	3
16	3
17	1
18	1
19	1
20	1
Grand Total	23

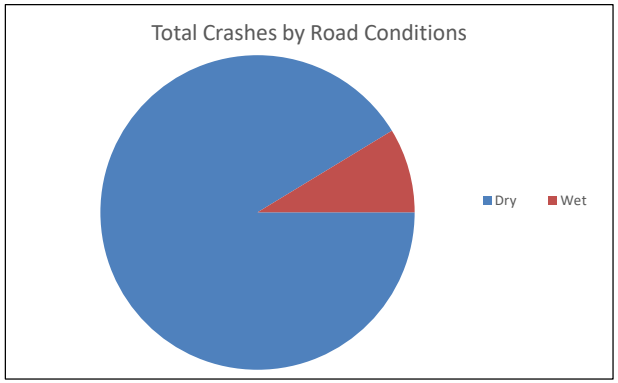
Month	Total Crashes
February	4
March	1
April	2
May	2
June	1
July	3
September	1
October	2
November	3
December	4
Grand Total	23

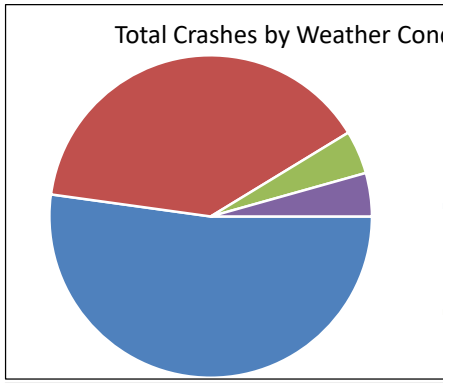


Weather	Total Crashes	Fatalities	Serious Injuries
Clear	12	0	8
Cloudy	9	0	0
Snow	1	0	1
Rain	1	0	0
Grand Total	23	0	9

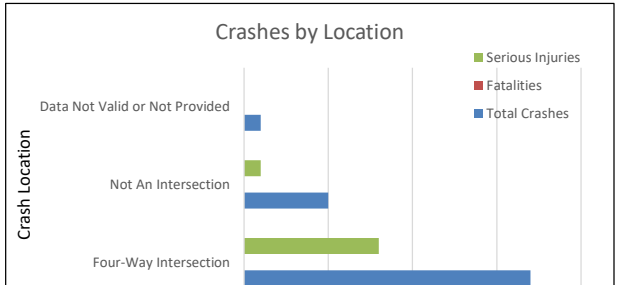
Day in Week	Total Crashes
(1) Sunday	1
(2) Monday	3
(3) Tuesday	5
(4) Wednesday	7
(5) Thursday	3
(6) Friday	2
(7) Saturday	2
Grand Total	23

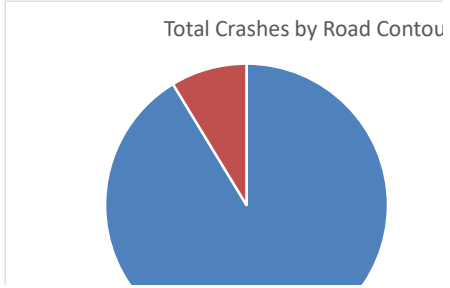
Crash Location	Total Crashes	Fatalities	Serious Injuries
Four-Way Intersection	17	0	8
Not An Intersection	5	0	1
Data Not Valid or Not Provided	1	0	0
Grand Total	23	0	9





Roadway Contour	Total Crashes	Fatalities	Serious Injuries
Straight Level	21	0	9
Straight Grade	2	0	0
Grand Total	23	0	9





STUDY AND ANALYSIS INFORMATION

Municipality:		**Traffic Volumes Obtained By:**	ODOT
County:	Madison	**Analysis Date:**	5/18/2023
ODOT Engineering District:	6	**Agency/ Company Name Performing Warrant Analysis:**	ODOT District 6
Google map link:	Map		

Analysis Information

Data Collection Date:	4/18/2023
Day of the Week:	Tuesday

Is the intersection in a built-up area of an isolated community of <10,000 population? No

Existing Traffic Signal at intersection: No

Total Number of Approaches at Intersection: 4

Major Street Information

Major Street Name and Route Number: SR 665

Major Street Approach Direction: E-Bound / W-Bound

Number of Thru Lanes on Each Major Street Approach: 1 **LANE(S)**

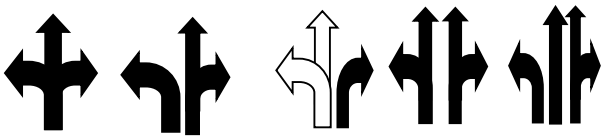
Speed Limit or 85th Percentile Speed on the Major Street*: 55 **MPH**

*Unknown assumes below 45 mph

Minor Street Information

Minor Street Name and Route Number: Spring Valley Rd

Minor Street Approach Configuration: 1 N-Bound / 1 S-Bound



1 2 3 4 5

Number of Thru Lanes on Each Minor Street Approach: 1 **LANE(S)**

Apply Right Turn Lane Reduction*: Yes

*Right Turn Lane Reduction Shall be used for Warrants 1, 2, & 3 for New ODOT Signals. Please refer to TEM 402-3.2 for clarification and criteria under which Right Turn Reduction is not required.

TRAFFIC SIGNAL WARRANT ANALYSIS FINDINGS

	Applicable?	Warrant Satisfied?	Notes and Comments:	
Warrant 1, Eight-Hour Vehicular Volume	Yes	**No**		
Warrant 2, Four-Hour Vehicular Volume	Yes	**No**		
Warrant 3, Peak Hour	Yes	**No**	Signals installed under Warrant 3 should be traffic actuated.	**Peak Hour** 4:30 PM 5:30 PM
For Warrants 1-3, new ODOT signals must be based off of 100% volume thresholds (TEM 402-3.2)				
Warrant 4, Pedestrian Volume	No		If this warrant is met, and a traffic control signal is justified by an engineering study, the traffic control signal shall be equipped with pedestrian signal heads complying with the provisions set forth in Chapter 4E of the OMUTCD.	**Peak Hour** 4:15 PM 5:15 PM
Warrant 5, School Crossing	No		N/A	
Warrant 6, Coordinated Signal System	No		(Shall not be used as the sole warrant in the analysis)	
Warrant 7, Crash Experience	Yes	**No**	If this is the sole warrant, signal must be semi-actuated with control devices which provide proper coordination if installed at an intersection within a coordinated system and normally should be fully traffic actuated if installed at an isolated intersection.	
Warrant 8, Roadway Network	No		(Shall not be used as the sole warrant in the analysis)	
Warrant 9, Intersection Near a Grade Crossing	No		Figure 4C-9	
Multi-Way Stop Warrant	No		May be used as an interim measure if traffic signal warrants are satisfied.	

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

If no warrants are satisfied, additional options may be considered:
1. An engineering study, performed by a firm prequalified by ODOT for signal design, if approved by the ODOT district, may be used to justify a new signal installation or retention of an existing signal that otherwise does not meet the published warrants. An example of such an instance is a traffic signal in proximity to a railroad crossing that serves to reduce queuing across the tracks.
2. According to TEM 402-2, If the actual turning movement counts fail to satisfy a signal warrant, it may be acceptable to use traffic volumes projected to the second year after project completion. The **Modeling and Forecasting Section** should provide the projected traffic volumes.
3. A pedestrian hybrid beacon may be considered for installation to facilitate pedestrian crossings at a location that does not meet traffic signal warrants (see Chapter 4C of TEM) or at a location that meets traffic signal warrants under Sections 4C.05 and/or 4C.06 but a decision is made to not install a traffic control signal. **Please fill inputs on PHB Score Sheet and submit to ODOT.**

Considerations such as geometrics and lack of sight distance generally have not been accepted in lieu of satisfying signal warrants. These considerations may allow an otherwise unwarranted traffic signal to be retained at **100 percent** local cost. Please review TEM 402-4 for details.

Conclusion:

Notes:

HCS Two-Way Stop-Control Report

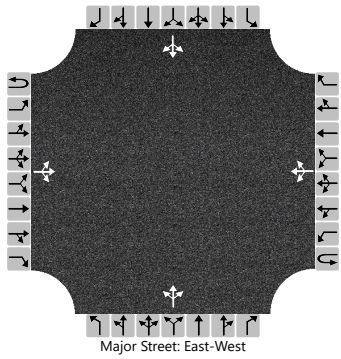
General Information

Analyst	
Agency/Co.	
Date Performed	8/28/2023
Analysis Year	2023
Time Analyzed	2047 AM
Intersection Orientation	East-West
Project Description	No Build

Site Information

Intersection	SR 665 and Spring Valley Rd
Jurisdiction	
East/West Street	SR 665
North/South Street	Spring Valley Rd
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes


Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		10	120	10		10	120	50		20	90	20		40	30	10
Percent Heavy Vehicles (%)		7				7				7	7	7		7	7	7
Proportion Time Blocked																
Percent Grade (%)										0				0		
Right Turn Channelized																
Median Type | Storage			Undivided													

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.17				4.17				7.17	6.57	6.27		7.17	6.57	6.27
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.26				2.26				3.56	4.06	3.36		3.56	4.06	3.36

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		11				11					141				87	
Capacity, c (veh/h)		1360				1411					580				512	
v/c Ratio		0.01				0.01					0.24				0.17	
95% Queue Length, Q_{95} (veh)		0.0				0.0					0.9				0.6	
Control Delay (s/veh)		7.7	0.1	0.1		7.6	0.1	0.1			13.2				13.5	
Level of Service (LOS)		A	A	A		A	A	A			B				B	
Approach Delay (s/veh)	0.6				0.5				13.2				13.5			
Approach LOS	A				A				B				B			

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HCS Two-Way Stop-Control Report

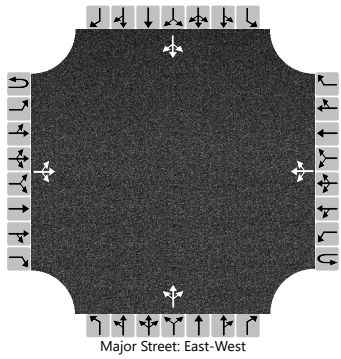
General Information

Analyst	
Agency/Co.	
Date Performed	8/28/2023
Analysis Year	2023
Time Analyzed	2047 PM
Intersection Orientation	East-West
Project Description	No Build

Site Information

Intersection	SR 665 and Spring Valley Rd
Jurisdiction	
East/West Street	SR 665
North/South Street	Spring Valley Rd
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes


Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		10	150	30		30	190	60		20	50	20		80	90	10
Percent Heavy Vehicles (%)		7				7				7	7	7		7	7	7
Proportion Time Blocked																
Percent Grade (%)										0				0		
Right Turn Channelized																
Median Type | Storage			Undivided													

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.17				4.17				7.17	6.57	6.27		7.17	6.57	6.27
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.26				2.26				3.56	4.06	3.36		3.56	4.06	3.36

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		11				33					98				196	
Capacity, c (veh/h)		1263				1348					443				410	
v/c Ratio		0.01				0.02					0.22				0.48	
95% Queue Length, Q_{95} (veh)		0.0				0.1					0.8				2.5	
Control Delay (s/veh)		7.9	0.1	0.1		7.7	0.2	0.2			15.4				21.6	
Level of Service (LOS)		A	A	A		A	A	A			C				C	
Approach Delay (s/veh)	0.5				1.0				15.4				21.6			
Approach LOS	A				A				C				C			

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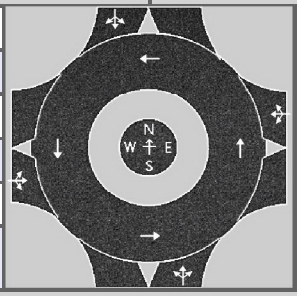
HCS Roundabouts Report

General Information

Analyst	Jerry Sanor
Agency or Co.	D6
Date Performed	8/28/2023
Analysis Year	2047
Time Analyzed	PM Peak
Project Description	MAD 665 at spring valley rd



Site Information

Intersection	SR 665 & Spring Valley Road
E/W Street Name	SR 665
N/S Street Name	Spring valley
Analysis Time Period, hrs	0.25
Peak Hour Factor	0.92
Jurisdiction	ODOT

Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Number of Lanes (N)	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0
Lane Assignment			LTR				LTR				LTR				LTR	
Volume (V), veh/h	0	10	150	30	0	30	190	60	0	20	50	20	0	80	90	10
Percent Heavy Vehicles, %	8	8	8	8	3	8	8	8	3	3	3	3	3	1	1	1
Flow Rate (v_{PCE}), pc/h	0	12	177	35	0	35	224	71	0	22	56	22	0	88	99	11
Right-Turn Bypass	None				None				None				None			
Conflicting Lanes	1				1				1				1			
Pedestrians Crossing, p/h	0				0				0				0			
Proportion of CAVs	0															

Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway, s		4.9763			4.9763			4.9763			4.9763	
Follow-Up Headway, s		2.6087			2.6087			2.6087			2.6087	

Flow Computations, Capacity and v/c Ratios

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v_e), pc/h		224			330			100			198	
Entry Volume, veh/h		207			305			98			195	
Circulating Flow (v_c), pc/h	222			90			277			281		
Exiting Flow (v_{ex}), pc/h	287			257			139			169		
Capacity (c_{pce}), pc/h		1100			1259			1040			1036	
Capacity (c), veh/h		1016			1162			1015			1023	
v/c Ratio (x)		0.20			0.26			0.10			0.19	

Delay and Level of Service

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh		5.5			5.5			4.4			5.3	
Lane LOS		A			A			A			A	
95% Queue, veh		0.8			1.1			0.3			0.7	
Approach Delay, s/veh | LOS	5.5	A		5.5	A		4.4	A		5.3	A	
Intersection Delay, s/veh | LOS	5.3						A					

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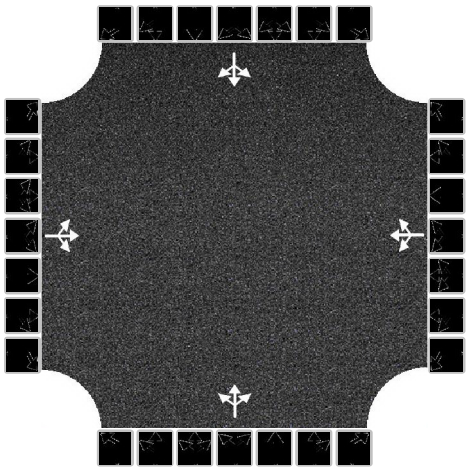
HCS All-Way Stop Control Report

General and Site Information

Analyst	Jerry Sanor
Agency/Co.	D6
Date Performed	8/28/2023
Analysis Year	2023
Analysis Time Period (hrs)	0.25
Time Analyzed	PM Peak
Project Description	2047 PM Peak AWSC
Intersection	SR 655 and Spring Valley Road
Jurisdiction	ODOT
East/West Street	SR 665
North/South Street	Spring Valley Road
Peak Hour Factor	0.92

Lanes



Turning Movement Demand Volumes

Approach	Eastbound			Westbound			Northbound			Southbound		
Movement	L	T	R	L	T	R	L	T	R	L	T	R
Volume (veh/h)	10	150	30	30	190	60	20	50	20	80	90	10
% Thrus in Shared Lane												

Lane Flow Rate and Adjustments

Approach	Eastbound			Westbound			Northbound			Southbound		
Lane	L1	L2	L3	L1	L2	L3	L1	L2	L3	L1	L2	L3
Configuration	LTR			LTR			LTR			LTR		
Flow Rate, v (veh/h)	207			304			98			196		
Percent Heavy Vehicles	8			8			3			1		
Initial Departure Headway, h_d (s)	3.20			3.20			3.20			3.20		
Initial Degree of Utilization, x	0.184			0.271			0.087			0.174		
Final Departure Headway, h_d (s)	5.25			5.09			5.57			5.50		
Final Degree of Utilization, x	0.301			0.430			0.151			0.299		
Move-Up Time, m (s)	2.0			2.0			2.0			2.0		
Service Time, t_s (s)	3.25			3.09			3.57			3.50		

Capacity, Delay and Level of Service

Approach	Eastbound			Westbound			Northbound			Southbound		
Lane	L1	L2	L3	L1	L2	L3	L1	L2	L3	L1	L2	L3
Configuration	LTR			LTR			LTR			LTR		
Flow Rate, v (veh/h)	207			304			98			196		
Capacity (veh/h)	686			708			646			655		
95% Queue Length, Q_{95} (veh)	1.3			2.2			0.5			1.3		
Control Delay (s/veh)	10.5			11.9			9.6			10.8		
Level of Service, LOS	B			B			A			B		
Approach Delay (s/veh) | LOS	10.5	B		11.9	B		9.6	A		10.8	B	
Intersection Delay (s/veh) | LOS	11.0						B					

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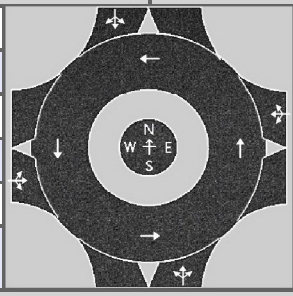
HCS Roundabouts Report

General Information

Analyst	Jerry Sanor
Agency or Co.	D6
Date Performed	8/28/2023
Analysis Year	2047
Time Analyzed	AM Peak
Project Description	MAD 665 at spring valley rd



Site Information

Intersection	SR 665 & Spring Valley Road
E/W Street Name	SR 665
N/S Street Name	Spring valley
Analysis Time Period, hrs	0.25
Peak Hour Factor	0.92
Jurisdiction	ODOT

Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Number of Lanes (N)	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0
Lane Assignment			LTR				LTR				LTR				LTR	
Volume (V), veh/h	0	10	120	0	0	50	120	10	0	20	90	20	0	40	30	0
Percent Heavy Vehicles, %	8	8	8	8	3	8	8	8	3	3	3	3	3	1	1	1
Flow Rate (v_{PCE}), pc/h	0	12	141	0	0	59	141	12	0	22	100	22	0	44	33	0
Right-Turn Bypass	None				None				None				None			
Conflicting Lanes	1				1				1				1			
Pedestrians Crossing, p/h	0				0				0				0			
Proportion of CAVs	0															

Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway, s		4.9763			4.9763			4.9763			4.9763	
Follow-Up Headway, s		2.6087			2.6087			2.6087			2.6087	

Flow Computations, Capacity and v/c Ratios

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v_e), pc/h		153			212			144			77	
Entry Volume, veh/h		141			196			140			76	
Circulating Flow (v_c), pc/h	136			134			197			222		
Exiting Flow (v_{ex}), pc/h	207			163			124			92		
Capacity (c_{pce}), pc/h		1201			1204			1129			1100	
Capacity (c), veh/h		1109			1111			1101			1086	
v/c Ratio (x)		0.13			0.18			0.13			0.07	

Delay and Level of Service

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh		4.4			4.8			4.4			3.9	
Lane LOS		A			A			A			A	
95% Queue, veh		0.4			0.6			0.4			0.2	
Approach Delay, s/veh | LOS	4.4	A		4.8	A		4.4	A		3.9	A	
Intersection Delay, s/veh | LOS	4.5						A					

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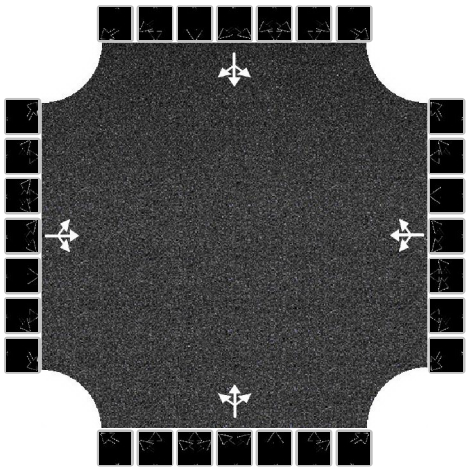
HCS All-Way Stop Control Report

General and Site Information

Analyst	Jerry Sanor
Agency/Co.	D6
Date Performed	8/28/2023
Analysis Year	2023
Analysis Time Period (hrs)	0.25
Time Analyzed	AM Peak
Project Description	2047 AM Peak AWSC
Intersection	SR 655 and Spring Valley Road
Jurisdiction	ODOT
East/West Street	SR 665
North/South Street	Spring Valley Road
Peak Hour Factor	0.92

Lanes



Turning Movement Demand Volumes

Approach	Eastbound			Westbound			Northbound			Southbound		
Movement	L	T	R	L	T	R	L	T	R	L	T	R
Volume (veh/h)	10	120	0	50	120	10	20	90	20	40	30	0
% Thrus in Shared Lane												

Lane Flow Rate and Adjustments

Approach	Eastbound			Westbound			Northbound			Southbound		
Lane	L1	L2	L3	L1	L2	L3	L1	L2	L3	L1	L2	L3
Configuration	LTR			LTR			LTR			LTR		
Flow Rate, v (veh/h)	141			196			141			76		
Percent Heavy Vehicles	8			8			3			1		
Initial Departure Headway, h_d (s)	3.20			3.20			3.20			3.20		
Initial Degree of Utilization, x	0.126			0.174			0.126			0.068		
Final Departure Headway, h_d (s)	4.86			4.80			4.84			5.07		
Final Degree of Utilization, x	0.191			0.261			0.190			0.107		
Move-Up Time, m (s)	2.0			2.0			2.0			2.0		
Service Time, t_s (s)	2.86			2.80			2.84			3.07		

Capacity, Delay and Level of Service

Approach	Eastbound			Westbound			Northbound			Southbound		
Lane	L1	L2	L3	L1	L2	L3	L1	L2	L3	L1	L2	L3
Configuration	LTR			LTR			LTR			LTR		
Flow Rate, v (veh/h)	141			196			141			76		
Capacity (veh/h)	740			750			744			710		
95% Queue Length, Q_{95} (veh)	0.7			1.0			0.7			0.4		
Control Delay (s/veh)	9.0			9.5			9.0			8.7		
Level of Service, LOS	A			A			A			A		
Approach Delay (s/veh) | LOS	9.0	A		9.5	A		9.0	A		8.7	A	
Intersection Delay (s/veh) | LOS	9.1						A					

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