



FY 2024

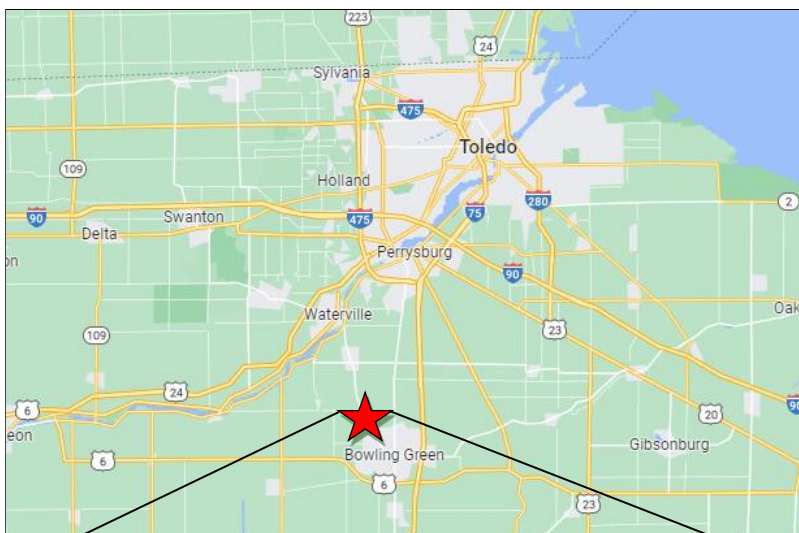
District 2 Planning & Engineering

W00-64-5.40 Safety Study

SR-64 at Bishop Road (Township Road 208)

Plain Township, Wood County

ODOT HSIP 2021 Safety Analyst Rural Intersection Rank #62



ODOT District 2

Office of Capital Programs

12/15/2023

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A. PURPOSE

The purpose of this study is to evaluate the existing safety conditions and to identify potential countermeasures at the intersection of State Route 64 & Bishop Road (Township Road 208) in Wood County. This intersection was ranked as the #62 Rural Intersection statewide on ODOT's Highway Safety Improvement Program's (HSIP) 2021 Safety Analyst list. A copy of the 2021 HSIP Safety Analyst map for Wood County is provided in Appendix A.

A review of the crash data yielded 10 relevant crashes at the intersection during the 3-year study period of 2020-2022. There were zero fatal crashes and 4 (40%) injury crashes at the intersection during that time period.

B. EXISTING CONDITIONS AND BACKGROUND

The intersection of SR-64 & Bishop Rd. is located in Plain Township in Wood County. It is located just northwest of the City of Bowling Green (less than a mile from the corp limit, and about 3 miles from downtown).

The intersection has two-way stop control, with Bishop Rd. traffic having to stop. Bishop Rd. has an approximately 29° angle skew with SR-64. There are no turn lanes or lighting located at the intersection. Both roads have a speed limit of 55 MPH at the intersection.

A significant ditch (approximately 10 feet deep with 1:1 sideslopes) is located immediately adjacent on the east side of SR-64. Guardrail is provided to keep motorists from going into the ditch. The face of the guardrail is about 30 inches from the edge line. A 97"x151" (inside diameter) elliptical culvert crosses the ditch under the east leg of Bishop Rd.

SR-64 is functionally classified as a rural major collector. It primarily connects Bowling Green to several municipalities to the northwest either directly along SR-64 or accessible via local roads which connect to SR-64.

The east leg of Bishop Rd. is functionally classified as a rural major collector, while the west leg is functionally classified as a rural minor collector. The entire length of Bishop Rd. is only around 3 miles, from Liberty Hi Rd. on the west to SR-25 on the east. It is used as a local cut-through around the northern side of Bowling Green to avoid the traffic signals & slower speed zones found on the major streets of northern Bowling Green. Several residential communities are located immediately off of Bishop Rd. east of the study intersection.

In 2009, in response to a fatal crash which occurred earlier that year, a supplemental left-side stop sign was installed on the WB approach of Bishop Rd., and "Cross Traffic Does Not Stop" plaques were installed under the primary stop sign on both approaches of Bishop Rd. Later, the intersection was identified on ODOT's HSIP FY2013 systematic intersection signage list. This list prompted the installation of dualled stop signs, stop ahead warning signs and intersection warning assemblies at selected rural intersections statewide which had an identified crash history. These signs were installed in April 2013. A copy of the New Sign Installation Reports for these sign upgrades can be found in Appendix B.

C. TRAFFIC VOLUMES

According to ODOT’s *Transportation Data Management System* (TDMS, also referred to as MS2), AADT information for SR-64 was collected most recently in 2021. Traffic volumes for the legs of Bishop Rd. were estimated. A summary of this data is shown in the table below.

	SR-64 Both Legs	Bishop Rd. East Leg	Bishop Rd. West Leg
AADT	4,497	1,539	533
% Trucks	2%	N/A	11%

An intersection turning movement count was conducted on Tuesday (3/21/23), Wednesday (3/29/23) and Tuesday (4/25/23) to collect traffic count data during the 8 hours with the highest traffic volumes (6:45-8:45 and 12:00-18:00). The hours with the highest traffic volumes were determined using data found on TDMS. A summary of this traffic count data can be found in Appendix C.

D. CRASH DATA

YEAR	CRASHES
2020	1
2021	5
2022	4

CRASH SEVERITY	
60%	Property Damage Only
40%	Injury
0%	Fatal

TYPE OF CRASH	
90%	Angle
10%	Rear End

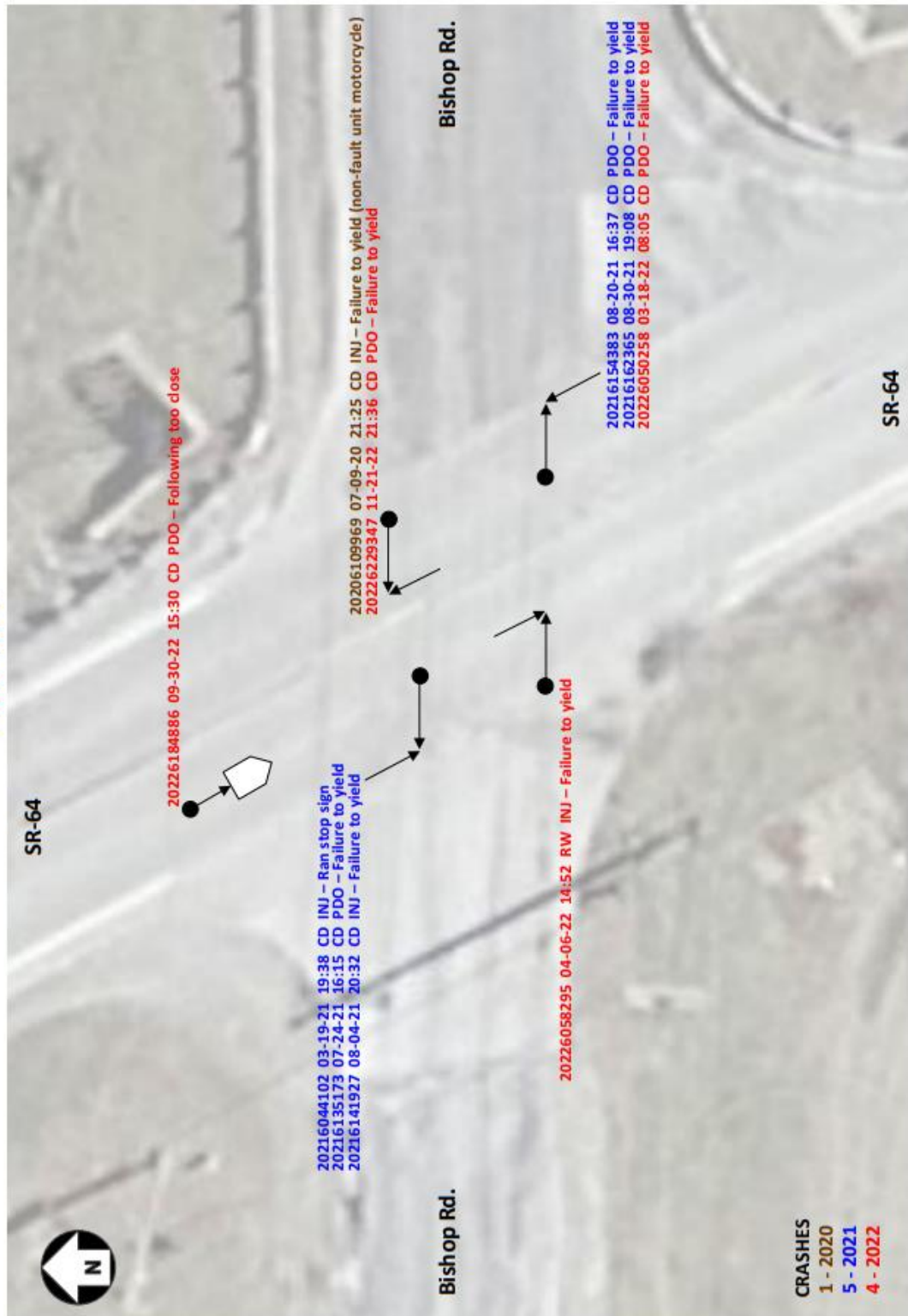
PAVEMENT CONDITION	
90%	Dry
10%	Wet

TIME OF DAY	
80%	Day
10%	Night
10%	Dusk

CONTRIBUTING FACTOR	
80%	Failure to yield
10%	Ran stop sign
10%	Following too close

E. COLLISION DIAGRAM

WOO-64-5.40
2020-2022



F. PROBABLE CAUSES

The probable causes or deficiencies at the intersection were identified through a detailed analysis of the crash patterns, roadway conditions, existing traffic control, traffic volumes and traffic speeds.

The majority of crashes are angle crashes. These may be attributed to a mix of the intersection skew, sight distance constraints, and traffic delay. Each of these factors are described in further detail below.

Skew Angle

The approximate 29° angle skew is above what's currently allowed according to ODOT's *Location & Design Manual (L&D) Volume 1*. According to Section 401.3 of Volume 1 of the L&D, the maximum skew angle is 20° for new or relocated intersections.

For drivers stopped on Bishop Rd., this means that to see oncoming SR-64 traffic on their left side, they have to turn their head further back than what's comfortable. That could be a reason why the stop lines are installed so far back from the edge line (24 feet back on the east leg and 36 feet back on the west leg), so that the angle to turn your head is reduced. Three of the angle crashes were near-side driver's side impacts, which could be a result of this acute skew angle.

Vehicle obstructs sight distance as a result of intersection skew

The skew of the intersection results in the vehicle frame between the window & door on the passenger side obstructing the driver's view of SR-64 to their right (see pictures on the next page). This limits how far and/or how clearly the driver can see oncoming SR-64 traffic. Six of the angle crashes were far-side passenger side impacts, which could be a result of this unique sight obstruction. Drivers could mitigate this if they line-up more perpendicular to SR-64 when stopping.



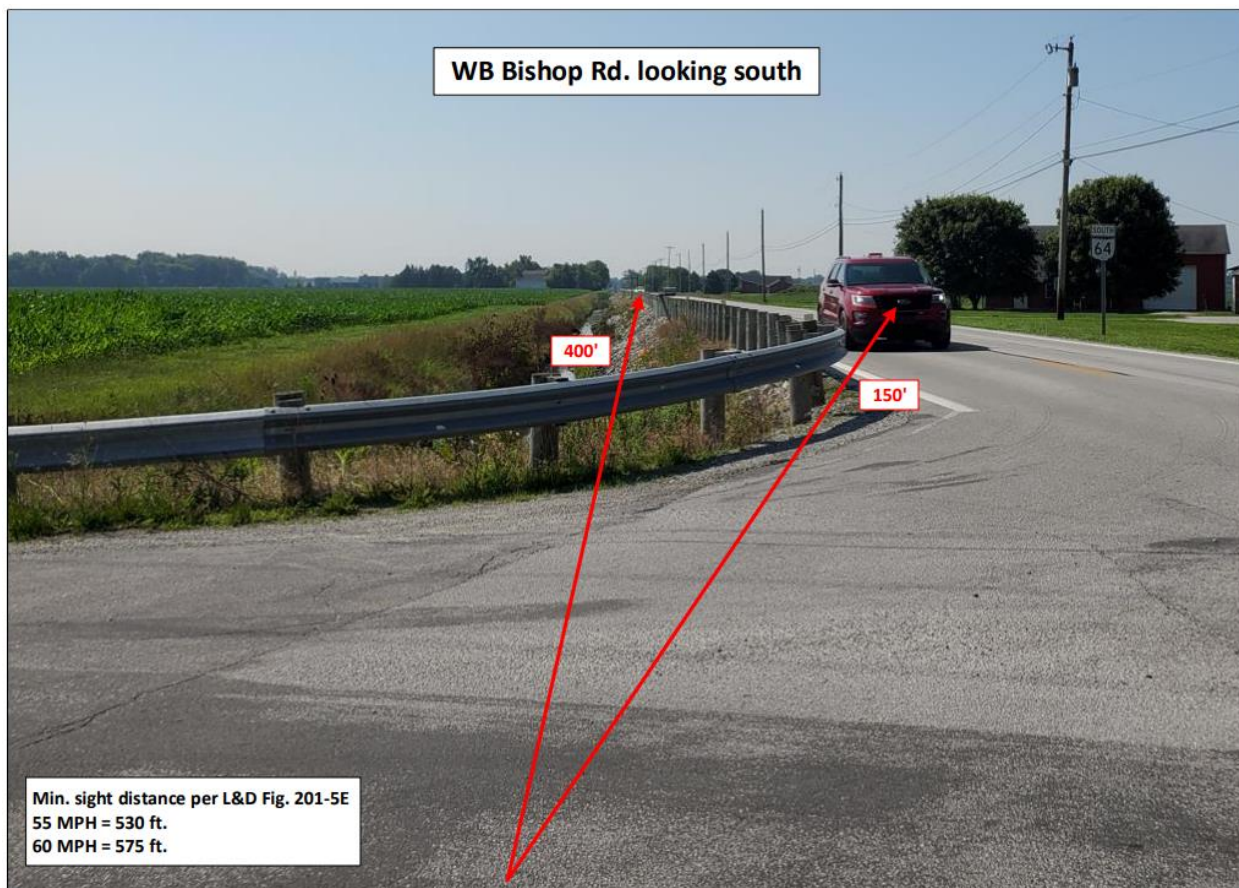
Picture of driver's point-of-view stopped on WB Bishop Rd. looking north



Picture of driver's point-of-view stopped on EB Bishop Rd. looking south

Guardrail restricts sight distance

The guardrail on the east side of SR-64 significantly limits how visible oncoming SR-64 traffic is. There are no other large objects which limit sight distance, so the tops of vehicles are mostly visible. However, the guardrail effectively completely blocks the view of the bottom of oncoming vehicles, which may also include headlights depending on how high or low the stopped driver on Bishop Rd. sits. The limited sight of oncoming vehicles may also make it difficult to judge how far in advance of the intersection they actually are. This may result in Bishop Rd. traffic prematurely pulling out onto SR-64, resulting in angle crashes. Five of the angle crashes involved a driver coming from WB Bishop Rd., which could be a result of the limited sight distance caused by the guardrail.





Traffic delay

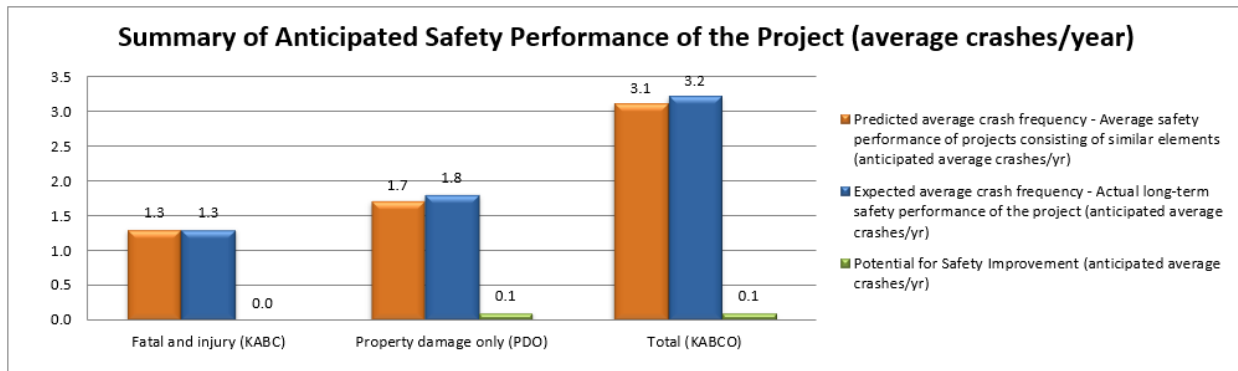
The majority of crashes occurred during the late afternoon or early evening hours. This coincides with the time periods which have the highest hourly traffic volumes. With the higher traffic volumes, there are less gaps for Bishop Rd. traffic to cross or turn onto SR-64. Drivers may pull-out during an insufficient gap in traffic after becoming impatient, resulting in angle crashes. The table below shows the existing delay and Level of Service (LOS) during the AM & PM peak hours of the intersection, based on calculations completed utilizing *Highway Capacity Software* (HCS). The table shows that the delay for Bishop Rd. traffic is slightly higher during the afternoon.

SR-64/Bishop Rd. Existing HCS Summary					
Delay/LOS					
	Intersection	EB Bishop Rd.	WB Bishop Rd.	NB SR-64	SB SR-64
AM Peak (7:30-8:30)	N/A	13.8 B	12.4 B	0.1 A	1.2 A
PM Peak (16:15-17:15)	N/A	14.4 B	14.6 B	0.1 A	1.2 A

G. HIGHWAY SAFETY MANUAL RESULTS

Highway Safety Manual (HSM) calculations were completed using the methodology for rural two-lane, two-way intersections. A table and bar graph summarizing the calculated crash frequencies are provided below.

	Intersection: SR-64 at Bishop Rd.
Predicted Average Crash Frequency	3.1
Expected Average Crash Frequency	3.2
Expected Excess Crashes	0.1
Potential for Safety Improvement?	YES



H. RECOMMENDED COUNTERMEASURES

The table below lists the countermeasures considered for the intersection as part of this study. Each countermeasure row also lists the Crash Modification Factor (CMF), warrants met, and if the countermeasure was considered for further evaluation.

Countermeasure	CMF	Considered for Further Evaluation?	Warrants Met
Roundabout	0.38 ^E	Yes	Single Lane Roundabout sufficient
Bishop Rd. Realignment	0.88 ^E	Yes	No applicable warrant
Offset Intersection	0.78 ^E	Yes	No applicable warrant
SR-64 Realignment	0.72 ^{E,1} or 0.66 ^{E,2}	Yes	No applicable warrant
Ditch Enclosure	0.72 ^E	Yes	No applicable warrant
Lighting	0.91 ^H	Yes	No applicable warrant
All-Way Stop Control	0.52 ^{H,3}	No	No
Traffic Signal	2.09 ^E	No	No
Left Turn Lanes	0.52 ^{H,4}	No	No
Right Turn Lanes	0.86 ^{H,5} or 0.74 ^{H,6}	No	No

Footnotes:

- E = ECAT-calculated CMF (proposed crashes ÷ expected crashes)
- H = HSM-based CMF
- 1 = Considers realignment of SR-64 only
- 2 = Considers realignment of both SR-64 & Bishop Rd.
- 3 = From HSM Table 14-5
- 4 = From HSM Table 10-13, CMF for 2 left turn lanes
- 5 = From HSM Table 10-14, CMF for 1 right turn lane
- 6 = From HSM Table 10-14, CMF for 2 right turn lanes

The traffic volumes were analyzed to determine if any of the countermeasures met applicable warrants. The traffic count data was also adjusted by the seasonal adjustment factor. The warrant evaluations followed the appropriate procedures according to the various applicable ODOT manuals, including the following:

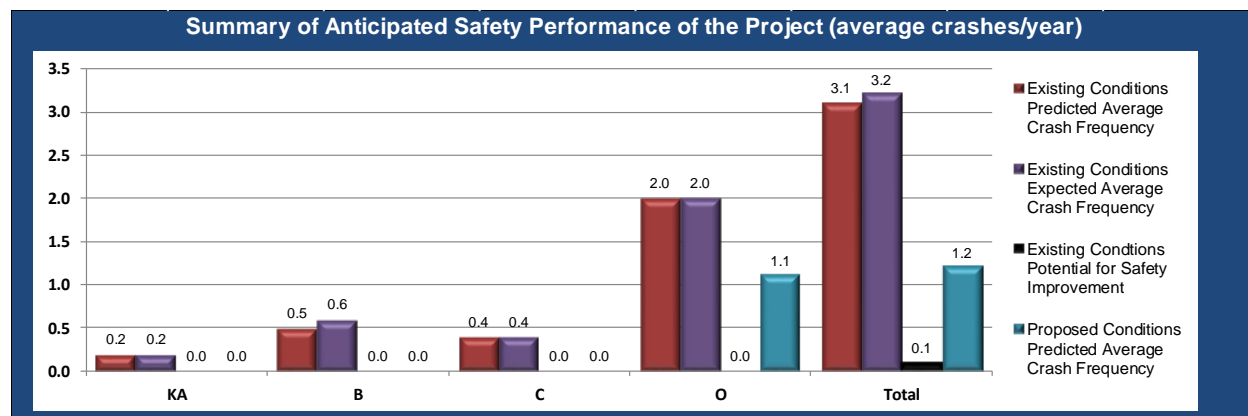
- *Location & Design Manual (L&D)*
- *Ohio Manual of Uniform Traffic Control Devices (OMUTCD)*
- *Traffic Engineering Manual (TEM)*

Details of the warrant summaries for the applicable countermeasures can be found in Appendix D.

The countermeasures meeting warrants were considered for further evaluation. These evaluations are described in further detail on the following pages in this section.

Convert the intersection to a single-lane roundabout

According to HSM-based calculations programmed into ODOT’s *Economic Crash Analysis Tool* (ECAT), converting the intersection to a single-lane roundabout would reduce crashes from 3.2 expected crashes per year to 1.2 proposed crashes per year, around a 63% reduction in crashes. A single-lane roundabout would reduce the speeds of entering vehicles, thereby reducing the severity of any potential crashes. Roundabouts also typically reduce angle crashes by a significant margin, which is currently the main crash type at the intersection. The geometrics of the roundabout would mitigate the skew and sight distance issues which are present with the current stop-controlled configuration.



Output bar graph from ECAT showing crash performance of existing & roundabout configurations

A high-level evaluation of the traffic count data revealed that a single-lane roundabout is likely to operate sufficiently at the intersection. These evaluations are shown in further detail in Appendix D. *Highway Capacity Software* (HCS) was then used to verify that the delay and Level of Service (LOS) would be within acceptable ranges. The HCS evaluation showed that a roundabout would operate better than the current stop-controlled configuration, especially by reducing the delay on the Bishop Rd. approaches. Summary tables of the HCS evaluations for both the roundabout & existing stop-controlled configurations during the AM & PM peak hours are provided on the following page. The detailed HCS output summaries are provided in Appendix E.

SR-64/Bishop Rd. HCS Summary AM Peak Hour (7:30-8:30)					
Delay/LOS					
	Intersection	EB Bishop Rd.	WB Bishop Rd.	NB SR-64	SB SR-64
Existing	N/A	13.8 B	12.4 B	0.1 A	1.2 A
Single Lane Roundabout	4.4 A	4.2 A	3.4 A	3.8 A	4.9 A

SR-64/Bishop Rd. HCS Summary PM Peak Hour (16:15-17:15)					
Delay/LOS					
	Intersection	EB Bishop Rd.	WB Bishop Rd.	NB SR-64	SB SR-64
Existing	N/A	14.4 B	14.6 B	0.1 A	1.2 A
Single Lane Roundabout	4.8 A	3.9 A	4.3 A	5.1 A	4.6 A

Several different geometric layouts for a roundabout were pondered for this study. The intersection has several attributes which complicate the layout for a roundabout, including the following:

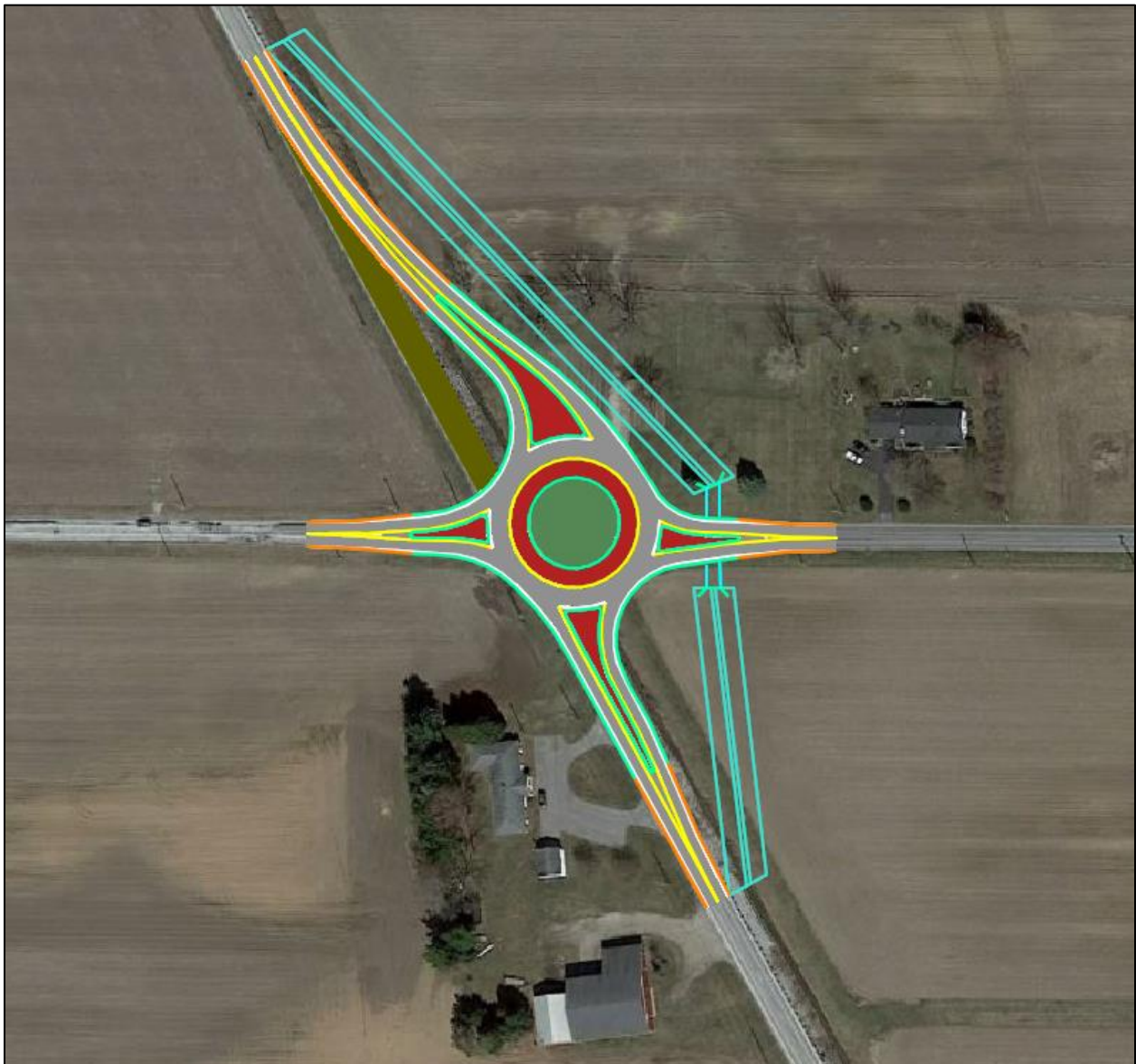
1. Standard roundabout design considerations per the L&D
2. Intersection skew
3. Ditch & culvert on east side of SR-64
4. Nearby residential properties on south & east legs

Conversations were held with ODOT District 2 environmental & right-of-way specialists about potential impacts to the ditch and residential properties. From their perspective, modifying & relocating the ditch is preferred over having residential right-of-way takes & possible resettlements.

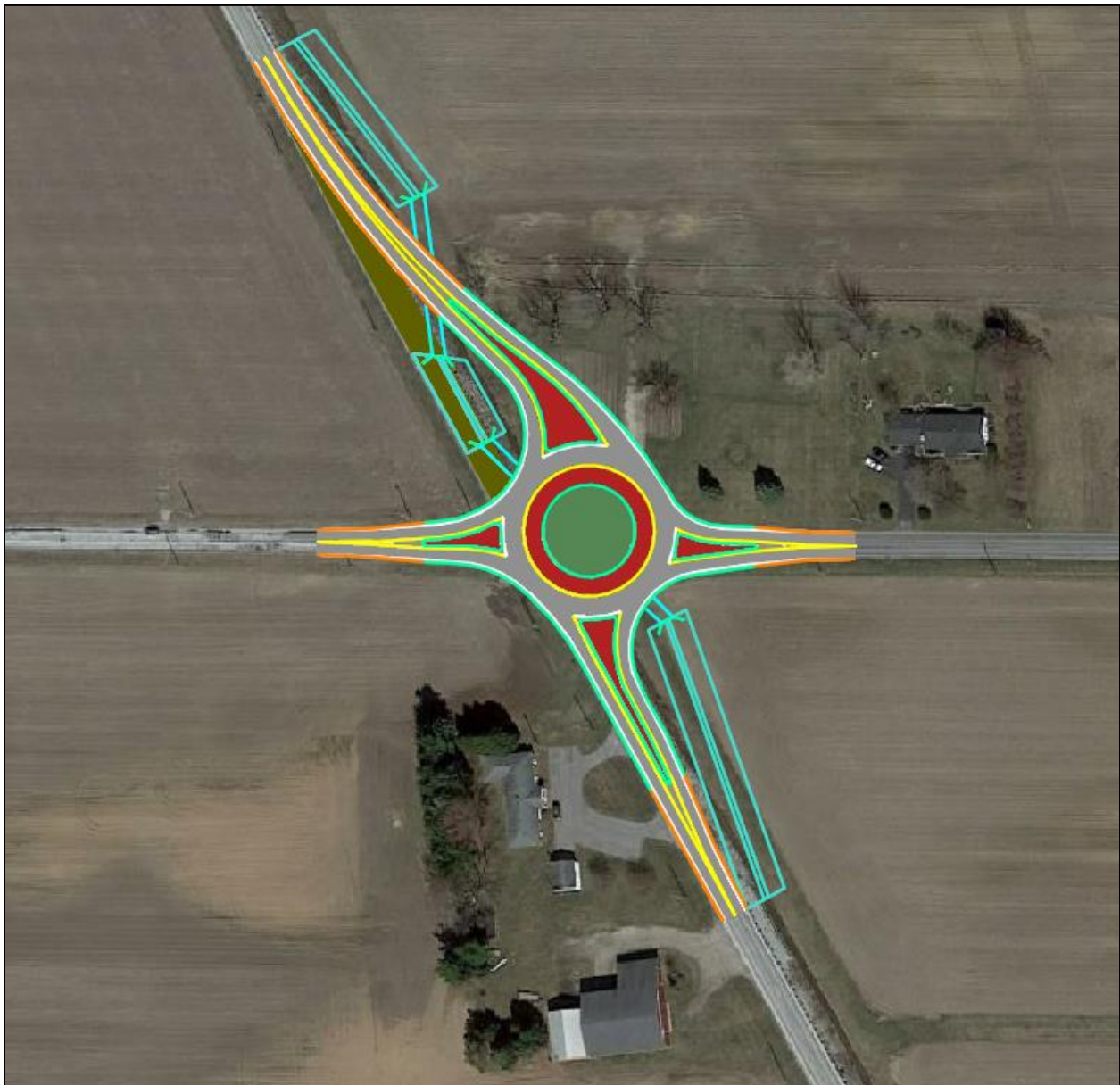
With this information in mind, two different layouts for a single lane roundabout at the intersection were developed which avoided encroaching upon the occupied residential properties on the south & east legs of the intersection. Both of these layouts provided options for how to reroute the ditch through or around the roundabout. These layouts are shown & described on the following pages.

Layout #1 – Offset Roundabout

Layout #1, Offset Roundabout, has the center of the roundabout shifted to the northeast to avoid impacts to the property on the south leg. It is a fairly typical layout for a single lane roundabout, with approach angles slightly under 90°. Two different options are provided for routing the ditch through the project limits. The first option reroutes the ditch east of its current alignment, with a new culvert located under the east leg of Bishop Rd. The second option “snakes” the ditch more-or-less along the existing alignment of the ditch & SR-64 through a series of alternating new ditches & culverts.



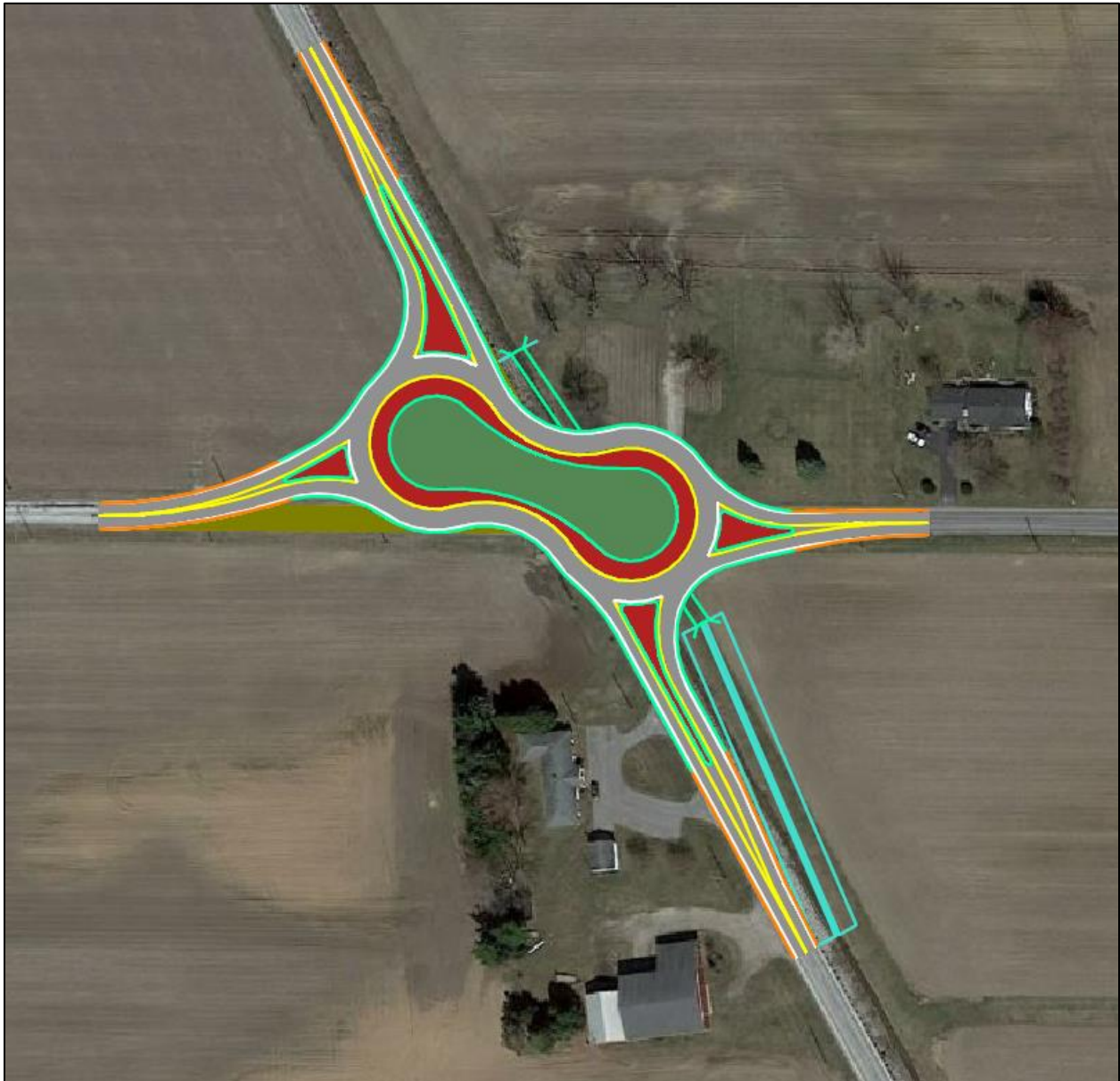
Conceptual drawing of Layout #1, Offset Roundabout, showing rerouted ditch to the east



Conceptual drawing of Layout #1, Offset Roundabout, showing rereouted ditch "snaking" though middle of project limits

Layout #2 – Peanut Roundabout

Layout #2, Peanut Roundabout, would be an unusual layout locally, as no peanut-shaped roundabouts are found in northwest Ohio. The Peanut Roundabout has slightly wider approach angles than the Offset Roundabout. The Peanut Roundabout also lessens impacts to the ditch. A culvert is provided through the middle of the roundabout so that the ditch alignment can stay mostly intact north of Bishop Rd.



Conceptual drawing of Layout #2, Peanut Roundabout

Realign the Bishop Rd. approaches

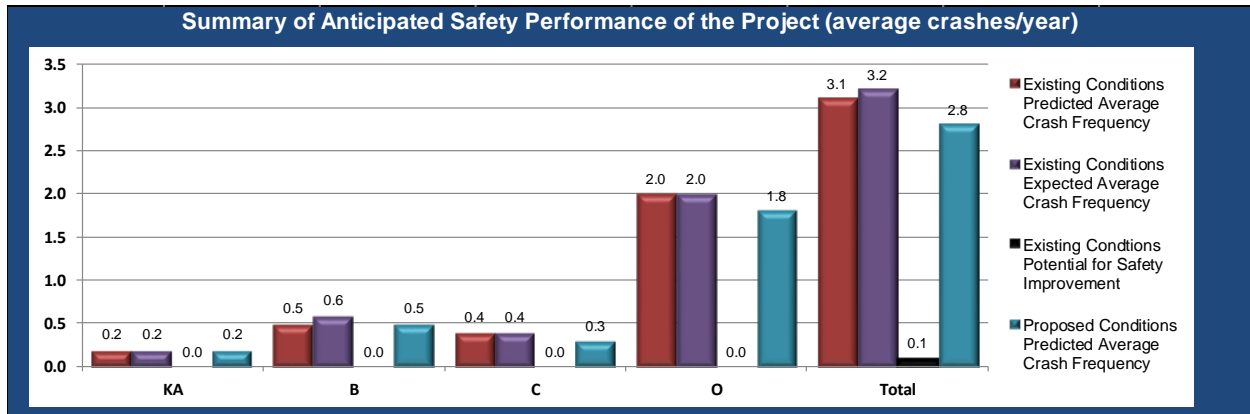
Realigning the approaches of Bishop Rd. would address the skew angle & vehicle frame obstruction issues which are occurring with the current intersection configuration. By aligning the Bishop Rd. approaches at closer to a 90° angle with SR-64, stopped motorists should be able to see oncoming traffic more clearly & directly out of their vehicle windows. For some corners of the intersection, it would also be possible to provide wider radii to facilitate turning vehicles.

L&D Figure 401-1 was used as the primary guide for realigning Bishop Rd. according to ODOT specifications. For this countermeasure, curvature was introduced on the east leg of Bishop Rd., with the idea of this being accomplished through pavement markings and not roadway realignment to preserve the ditch & culvert. This reduced the skew angle to around 12°. Next, the west leg of Bishop Rd. was realigned directly across from the east leg and at the same skew angle. Wider corner radii were provided on the west side of SR-64.



Conceptual drawing of Bishop Rd. realignment

According to ECAT, realigning the legs of Bishop Rd. to create a 12° skew would result in 2.8 crashes per year, a 12.5% reduction from the current 3.2 expected crashes per year.



Output bar graph from ECAT showing crash performance of existing & realignment configurations

The realigned intersection is assumed to have the same operational performance as the existing intersection alignment, since two-way stop control is retained.

Create an offset intersection

For this countermeasure, the alignment of the east leg of Bishop Rd. remained the same as with the Bishop Rd. realignment. However, the west leg of Bishop Rd. was realigned to the north to create an offset intersection. The west leg of Bishop Rd. was able to be realigned perpendicular to SR-64. Wider corner radii were also provided on the west side of SR-64. This option significantly reduces the limits of the impacted roadway.

While it becomes more difficult for Bishop Rd. through traffic to cross SR-64, safety benefits are associated with creating this more complex crossing maneuver. If an angle crash were to occur, it is less likely that both vehicles would be perpendicular to one another, reducing the overall potential severity. Having the west leg of Bishop Rd. align at a right angle with SR-64 also reduces the intersection skew CMF and enhances the intersection sight distance.



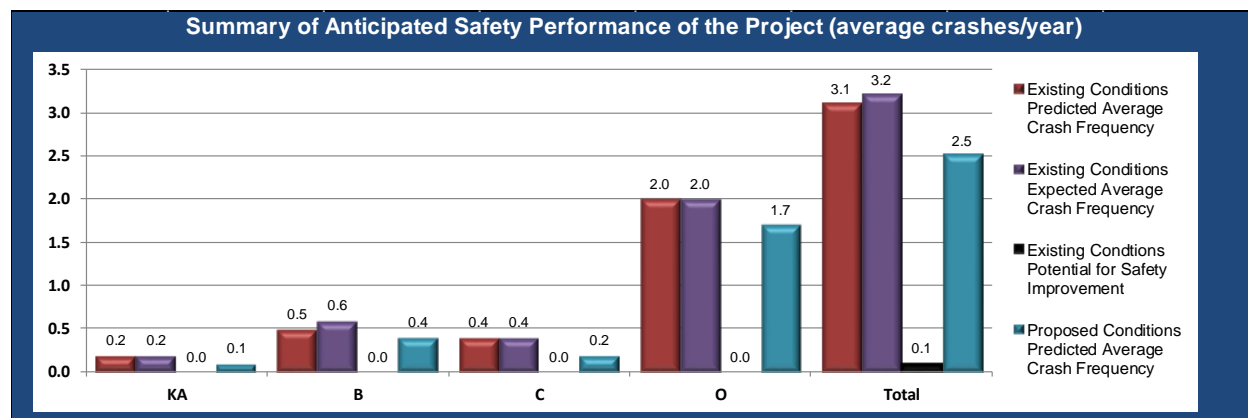
Conceptual drawing of offset intersection countermeasure

HSM Table 14-2 presents CMFs for converting a 4-leg intersection into two 3-leg intersections. While the table specifies that the CMFs are for urban settings, it was deemed the most appropriate available CMF to approximate the crash benefits for the study intersection. The appropriate CMFs to use are based on the total proportion of traffic entering from the minor street, in this case Bishop Rd. Using the traffic count data, it was calculated that 17.8% of the total entering traffic was coming from the two Bishop Rd. approaches. Since this falls within the 15-30% minor street entering traffic CMF range, the 0.75 CMF was used for fatal & injury crashes while the 1.00 CMF was used for PDO crashes.

Treatment	Setting (Intersection Type)	Traffic Volume	Crash Type (Severity)	CMF
Convert four-leg intersection into two three-leg intersections	Urban (Four-leg)	Minor-road traffic > 30% of total entering	All types (injury)	0.67
			All types (non-injury)	0.90
		Minor-road traffic = 15-30% of total entering	All types (injury)	0.75
			All types (non-injury)	1.00
		Minor-road traffic < 15% of total entering	All types (injury)	1.35
			All types (non-injury)	1.15

Table showing selected information from HSM Table 14-2. CMF data used for this study is highlighted in yellow.

The offset intersection CMF information was imported into ECAT. The ECAT results showed that the offset intersection would result in 2.5 crashes per year, a 22% reduction from the current 3.2 expected crashes per year.



Output bar graph from ECAT showing crash performance of existing & offset intersection configurations

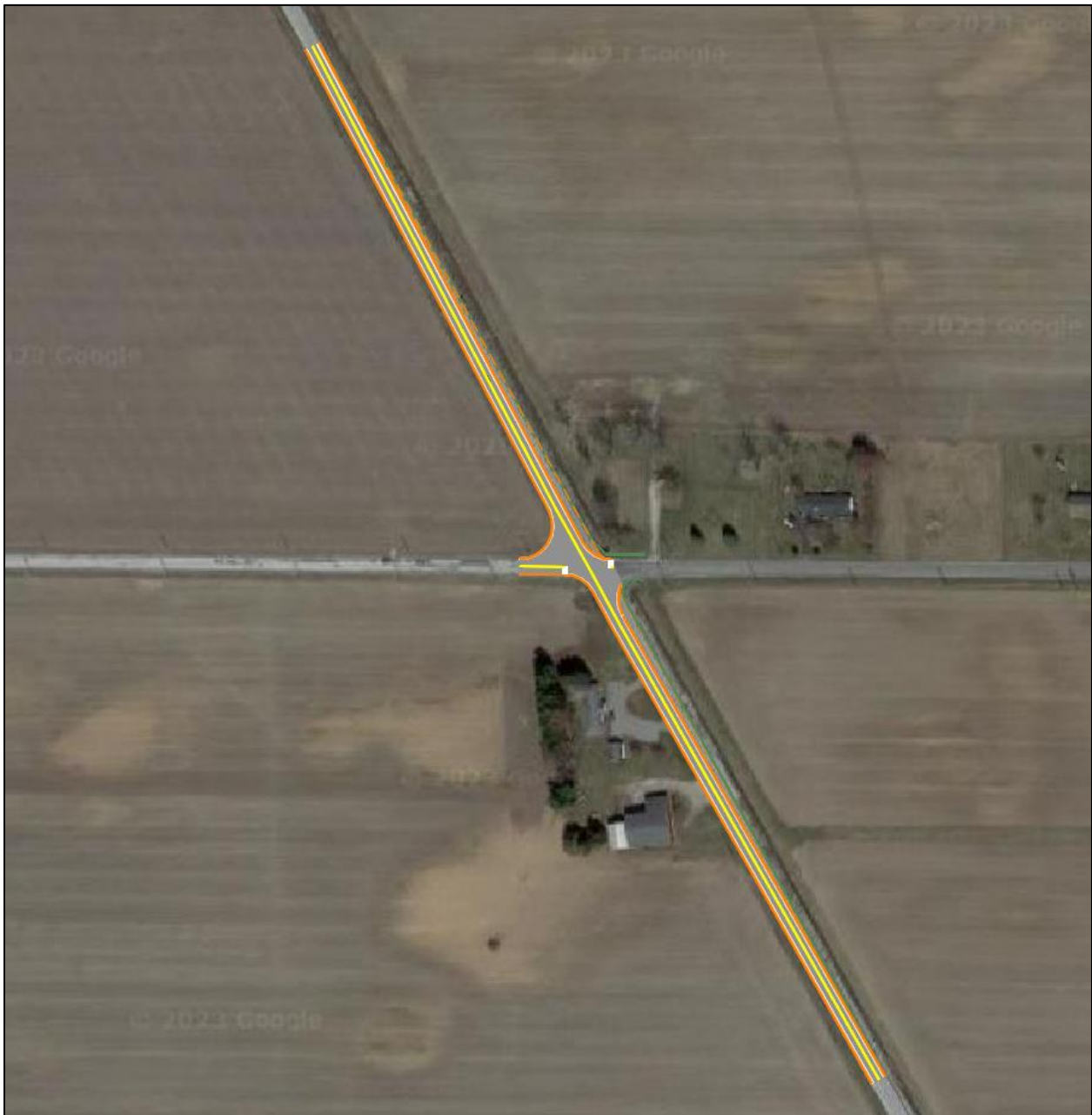
HCS is incapable of analyzing any delay associated with possible NB & SB SR-64 left turn overlaps, or for the introduced turns for Bishop Rd. traffic wanting to stay straight and cross SR-64. Therefore, the offset intersection is assumed to have the same operational performance as the existing intersection alignment.

Realign SR-64 approaches

It is possible to shift SR-64 slightly to the west so that traffic on the east leg of Bishop Rd. stops past the line of guardrail. With the guardrail no longer obstructing the view of oncoming traffic, the overall sight distance would increase substantially.



Close-up of conceptual drawing of SR-64 realignment. The new alignment is shown in solid lines and shaded in gray. The current roadway is shown with orange dashed lines. The guardrail runs are shown with green lines.



Zoomed-out conceptual drawing of SR-64 realignment, showing approximate project limits.

Besides improved sight distance, shifting SR-64 west has the added benefits of increasing the radii on all corners of the intersection to facilitate turning vehicles, and creates separation from the guardrail, allowing for more forgiveness with drivers who may inadvertently veer off the road.

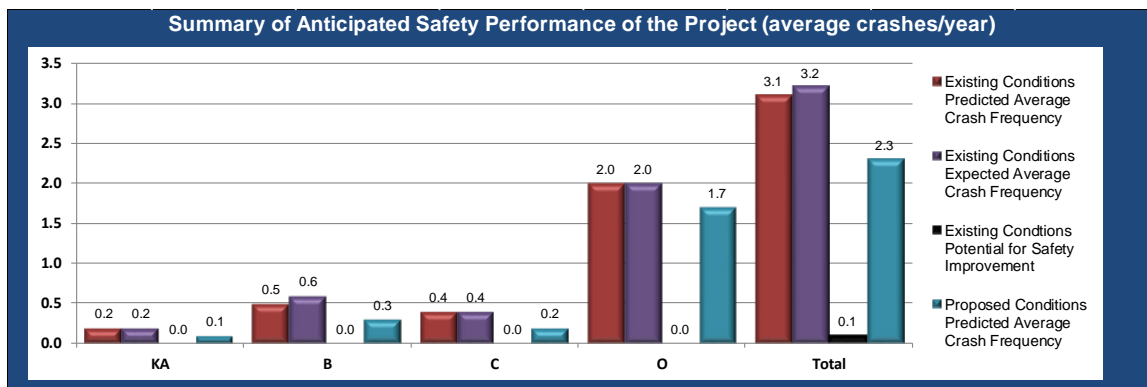
The realignment of SR-64 can also be combined with the realignment of Bishop Rd. In this instance, the shifting of SR-64 to the west also allows for the east leg of Bishop Rd. to be curved greater to align with SR-64 more perpendicular. For the conceptual below, the skew angle has been reduced to around 8°.



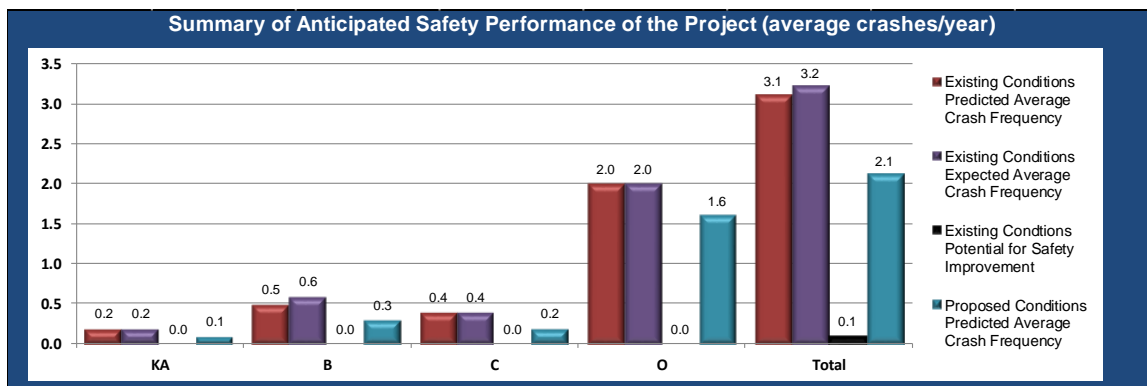
Conceptual drawing showing realignment of both SR-64 and Bishop Rd.

To approximate the crash benefits of this countermeasure, research was done to find a CMF for increasing the intersection sight distance, which is not a default CMF in the HSM for rural 2-lane intersections. HSM Section 14A.6.2 lists “increase intersection sight triangle distance” as a treatment with unknown crash effects. The Federal Highway Administration’s (FHWA) *CMF Clearinghouse* website¹ was utilized to attempt to find CMFs for increasing the intersection sight distance. 3-star quality CMFs were found for “increase triangle sight distance” applicable to 4-leg intersections. These CMFs were valued at 0.53 for fatal & injury crashes, and 0.89 for PDO crashes. Information about these CMFs can be found in Appendix F.

Inputting the “increase triangle sight distance” CMFs into ECAT showed that realigning SR-64 would result in 2.3 crashes per year, a 28% reduction from the current 3.2 expected crashes per year. If the realignment of Bishop Rd. was also incorporated to reduce the intersection skew, this would result in 2.1 crashes per year at the intersection, a 34% reduction.



Output bar graph from ECAT showing crash performance of SR-64-only realignment configuration



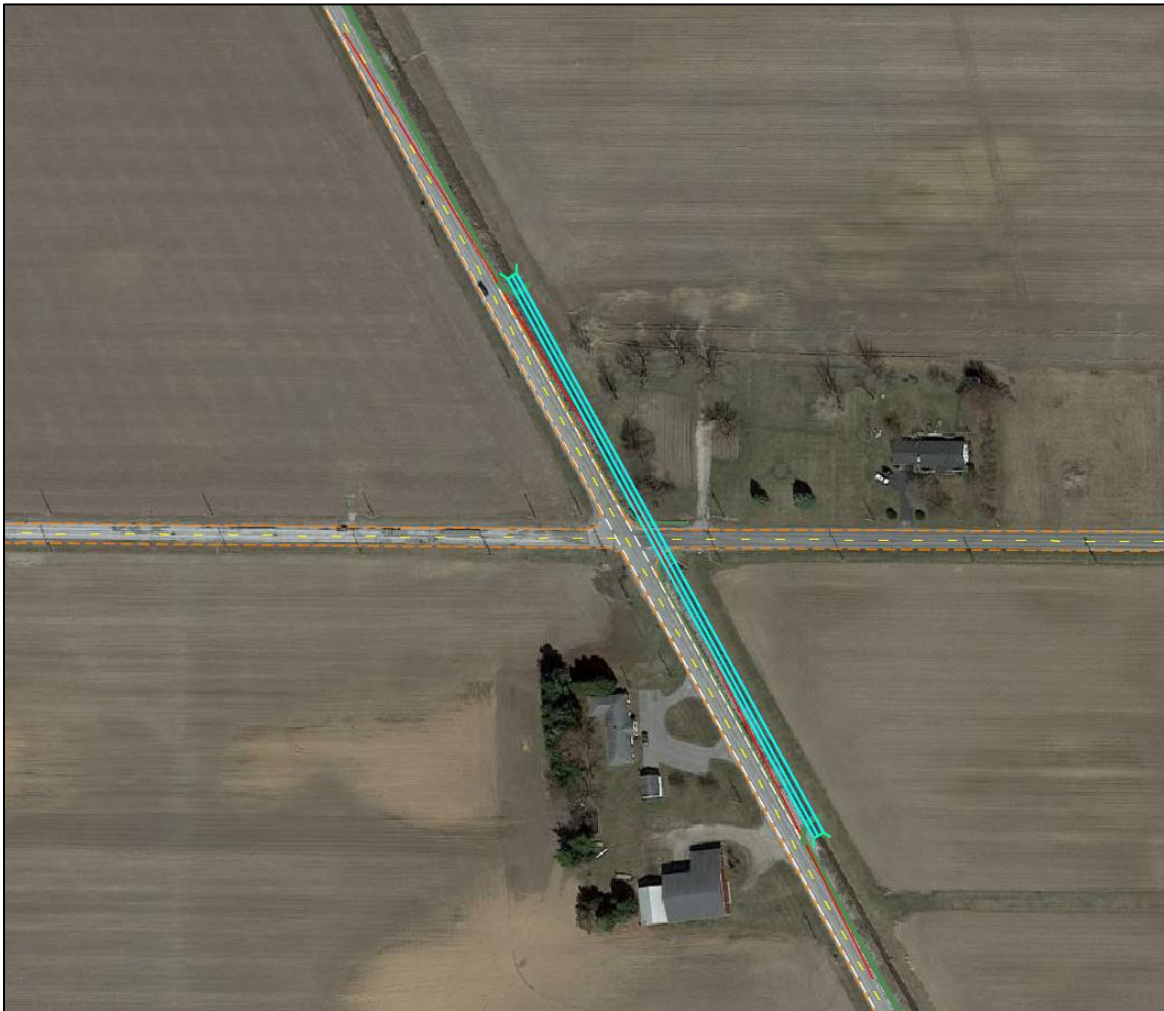
Output bar graph from ECAT showing crash performance of SR-64 realignment configuration also including Bishop Rd. realignment

Since the SR-64 realignment configurations retain two-way stop control, they are assumed to have the same operational performance as the existing intersection.

¹ [CMF Clearinghouse](#)

Enclose the ditch

Another option to increase the sight distance is by filling-in the ditch and shortening the guardrail runs to the point necessary to create sufficient intersection sight distance per current L&D standards. The total length of the necessary ditch enclosure to achieve sufficient intersection sight distance is estimated to be about 740 feet. The roadway alignments would stay intact. The culvert would either need to be extended or replaced, depending on what is deemed most practical based on constructability & the condition/remaining life cycle of the existing culvert. There would also likely be environmental concerns which would need to be addressed since the ditch would be impacted.



Conceptual of ditch enclosure option. The culvert extension is represented by the light blue lines. The new guardrail alignment is shown with green lines. The necessary sight distance lines are shown in red.

The “increase triangle sight distance” CMF was assumed to apply similarly to this configuration as it was for the SR-64 realignment option. Therefore, the crash reduction would be the same in both instances (2.3 expected crashes per year, a 28% reduction from the current 3.2 expected crashes per year). Likewise, since the roadway alignment isn’t changing, the operational performance of the intersection is the same as the existing configuration.

Install lighting at the intersection

Although nighttime crashes make up a low percentage of total crashes at the intersection, overhead lighting could still be installed at the intersection to reduce overall crashes. According to the HSM, on average, adding lighting to a 4-leg rural stop-controlled intersection reduces all crashes by 9%. Lighting could be installed as a stand-alone countermeasure or in conjunction with one of the other countermeasures discussed above to create further safety benefits.

Countermeasures removed from consideration

The following countermeasures were considered for the intersection, but ultimately were not recommended or further evaluated due to not meeting their applicable warrants.

1. All-way stop control
2. Traffic signal
3. Left turn lanes
4. Right turn lanes

All four countermeasures failed meeting warrants because the traffic volumes on both SR-64 & Bishop Rd. were too low to surpass the appropriate minimum threshold volume(s). Summaries of the evaluated warrants for each of these countermeasures can be found in Appendix D.

I. PROJECT INFORMATION

Previous Projects:

PID: 88495

Project Name: WOO SR 64 04.12 Resurf

Description: A 2-lane district allocation funded project to resurface SR-64 from Bowling Green north corp line to SR-582; perform necessary related work.

Construction: June 2013 – September 2013

Future Projects:

PID: 101285

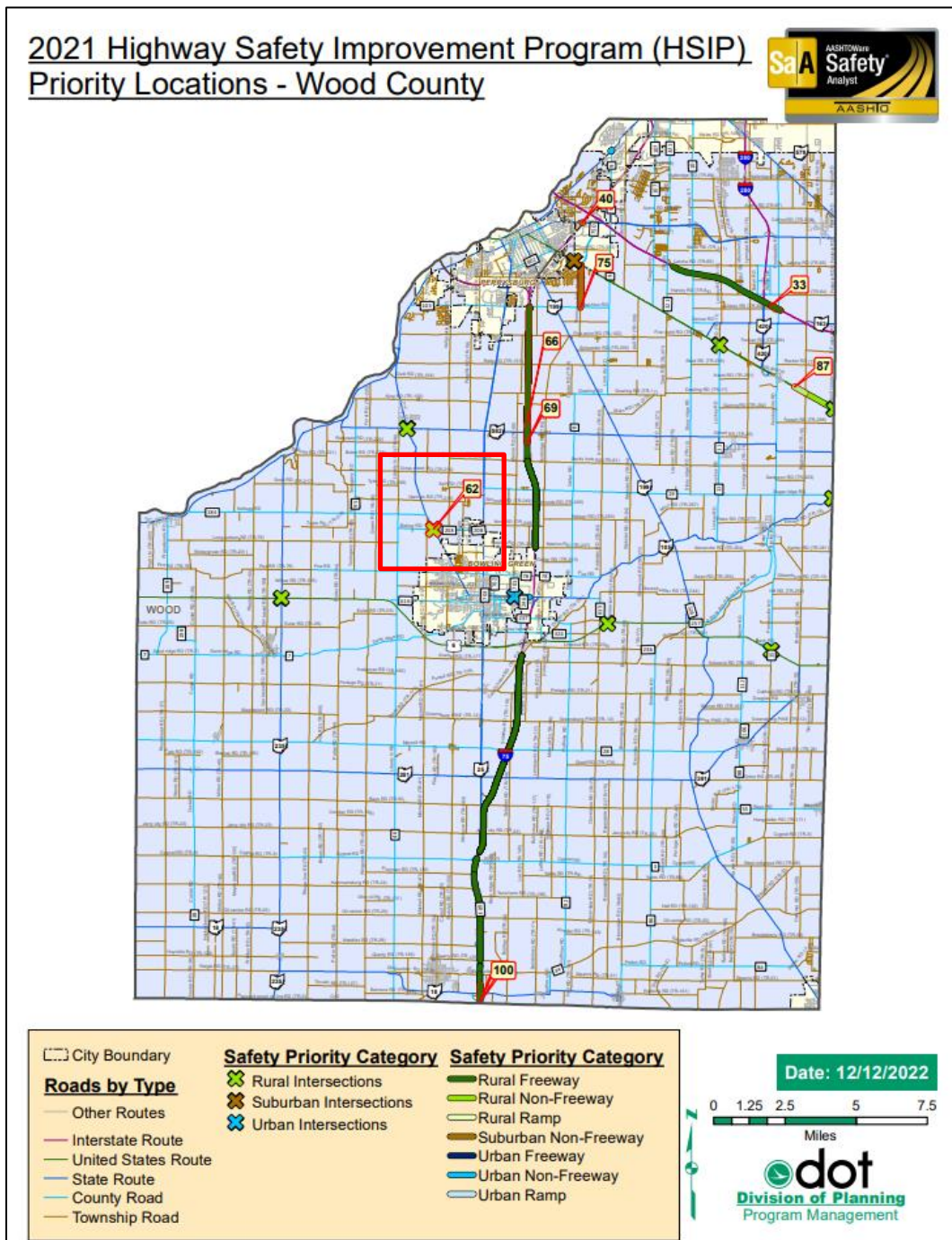
Project Name: WOO SR 64 4.39 Resurf

Description: Resurface SR-64 in Wood County from Bowling Green corp limit to SR-582; perform necessary related work.

Construction: June 2026 – October 2026


APPENDIX A

2021 HSIP SAFETY ANALYST WOOD COUNTY MAP



APPENDIX B

NEW SIGN INSTALLATION REPORTS



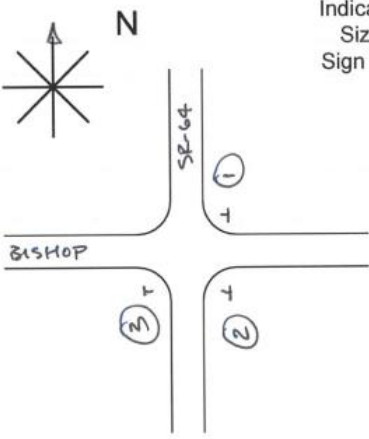
New Sign Installation Report

ODOT District 2 317 E. Poe Road Bowling Green, OH 43402
PH 419-353-8131 FAX 419-373-4446





















No: W-1151
L=1

TO: _____ ATTN: _____ DATE: 26 AUG 2009 SUBMITTED BY: WATERFIELD

COUNTY: WOOD ROUTE: SR-64 LOCATION: BISHOP ROAD













Indicate Sign Size and Sign Legend






 R-1 (R1-1)	 R-2 (R1-2)	 R-10 (R2-1)	 R-123 (R3-4)
 R-41B (R5-1)	 R-41A (R5-1a)	 W-68 (W8-H22)	 W-79 (S3-1)
 W-94 (W10-1)	 W-47 (W3-3)	 N-1 (I-H2a)	 N-41 (D10-1)
 W-45A (W3-1a)	 W-49R (W4-1R)	 W-24 (W2-1)	 W-34 (W5-2)
 W-66 (W10-H12)	 W-97 (W13-2)	 W-98 (W13-3)	 W-33 (W1-8L)


Number of Posts: ONE - #3 POST

Remarks: INSTALL SECONDARY WB R1-1 AND INSTALL W4-4p PLAQUES.

			 M-50 (M2-H7)	 N-2 (I-H2f)	 N-29 (D9-2)
			JCT M-17 (M2-1)	NORTH M-37 (M3-1)	SOUTH M-38 (M3-3)
Code #: _____	TO M-8 (M4-5)	EAST M-39 (M3-2)	WEST M-40 (M3-4)	 W-30 (W1-7)	

Signature: _____ Completion Date: _____

Sign Summary	
<p>1</p> <p>WB Bishop Road, at NE corner of SR-64 intersection</p>  <p>Existing 30" R1-1</p>  <p>W4-4p 24" x 12"</p> <p>CROSS TRAFFIC DOES NOT STOP</p>	<p>3</p> <p>EB Bishop Road, at SW corner of SR-64 intersection</p>  <p>Existing 30" R1-1</p>  <p>W4-4p 24" x 12"</p> <p>CROSS TRAFFIC DOES NOT STOP</p>
<p>2</p> <p>WB Bishop Road, at SE corner of SR-64 intersection</p>  <p>R1-1 30" x 30"</p>	



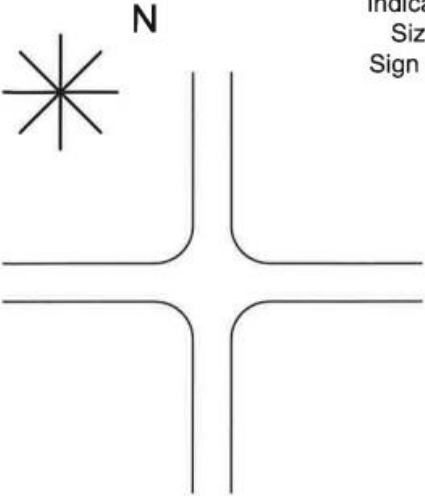
New Sign Installation Report

ODOT District 2 317 E. Poe Road Bowling Green, OH 43402
PH 419-353-8131 FAX 419-373-4446

No: W-1606
L=2

TO: _____ ATTN: _____ DATE: 18 DEC 2012 SUBMITTED BY: WATERFIELD

COUNTY: WOOD ROUTE: SR-64 LOCATION: BISHOP RD



Indicate Sign
Size and
Sign Legend


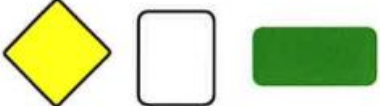
 R-1 (R1-1)	 R-2 (R1-2)	 R-10 (R2-1)	 R-123 (R3-4)
 R-41B (R5-1)	 R-41A (R5-1a)	 W-68 (W8-H22)	 W-79 (S3-1)
 W-94 (W10-1)	 W-47 (W3-3)	 N-1 (I-H2a)	 N-41 (D10-1)
 W-45A (W3-1a)	 W-49R (W4-1R)	 W-24 (W2-1)	 W-34 (W5-2)
 W-66 (W10-H12)	 W-97 (W13-2)	 W-98 (W13-3)	 W-33 (W1-8L)
 M-50 (M2-H7)	 N-2 (I-H2f)	 N-29 (D9-2)	
 M-17 (M2-1)	 M-37 (M3-1)	 M-38 (M3-3)	 W-30 (W1-7)
 M-8 (M4-5)	 M-39 (M3-2)	 M-40 (M3-4)	

Number of Posts: 24 - #3 POSTS

Remarks: UPGRADE INTERSECTION SIGNING.

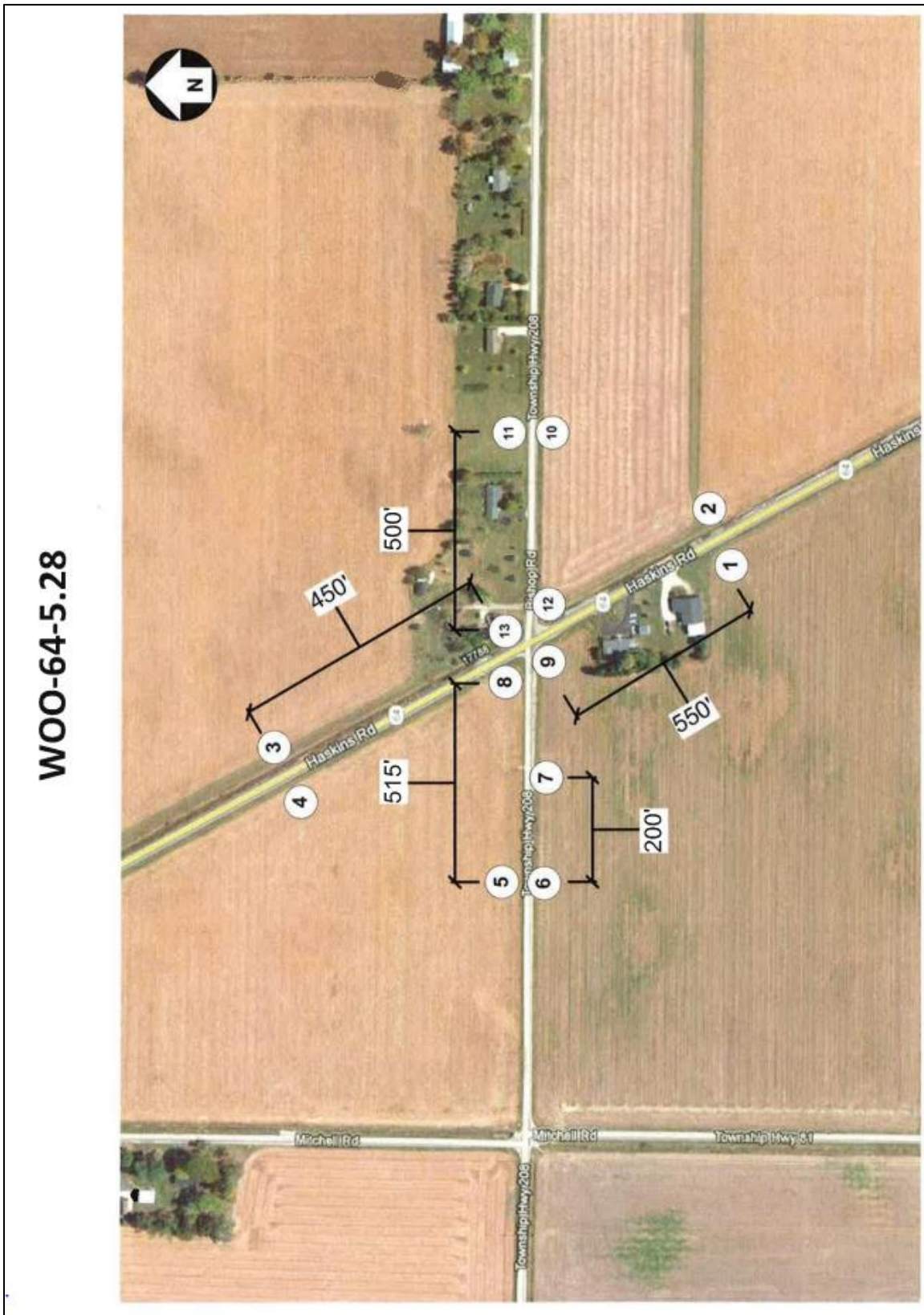
HSIP FUNDING

★ PLEASE COMPLETE BY FRIDAY 28 JUN 2013 ★










Code #: _____

Signature: _____ Completion Date: _____



Sign Summary

<p>1</p> <p>NB SR-64 550' S of Bishop Rd., west side</p>  <p>W2-1 36" x 36"</p> <p>W16-H8 48" x 8"</p> <p>BISHOP RD</p>	<p>3</p> <p>SB SR-64 450' N of Bishop Rd., east side</p>  <p>W2-1 36" x 36"</p> <p>W16-H8 48" x 8"</p> <p>BISHOP RD</p>	<p>5</p> <p>EB Bishop Rd. 515' W of SR-64, north side</p>  <p>W3-1 36" x 36"</p>
<p>2</p> <p>NB SR-64 550' S of Bishop Rd., east side</p>  <p>W2-1 36" x 36"</p> <p>W16-H8 48" x 8"</p> <p>BISHOP RD</p>	<p>4</p> <p>SB SR-64 450' N of Bishop Rd., west side</p>  <p>W2-1 36" x 36"</p> <p>W16-H8 48" x 8"</p> <p>BISHOP RD</p>	<p>6</p> <p>EB Bishop Rd. 515' W of SR-64, south side</p>  <p>W3-1 36" x 36"</p>
<p>7</p> <p>EB Bishop Rd. 200' E of location 6</p> <p>Remove existing W3-1</p>		

APPENDIX C

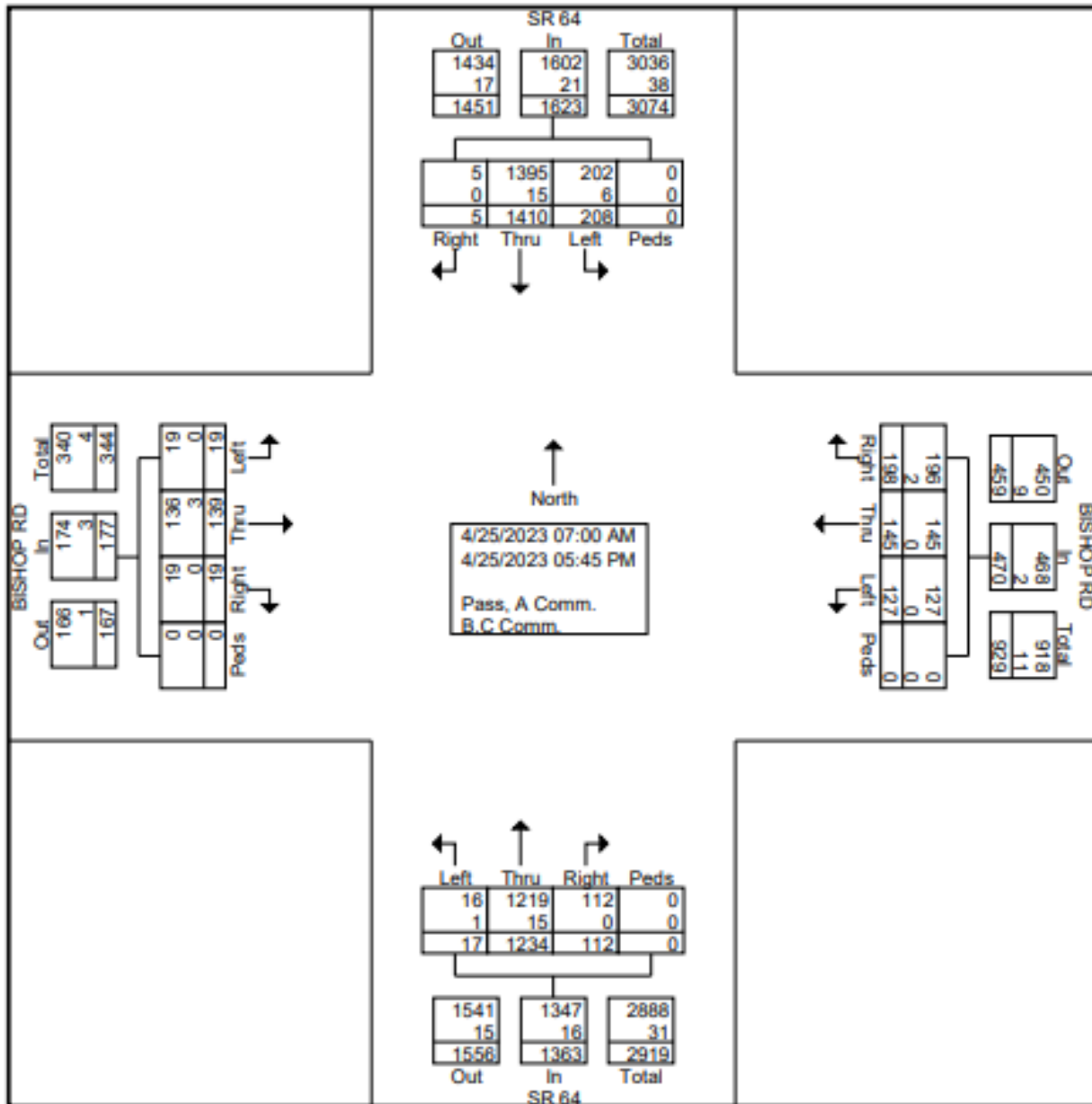
TRAFFIC COUNT DATA

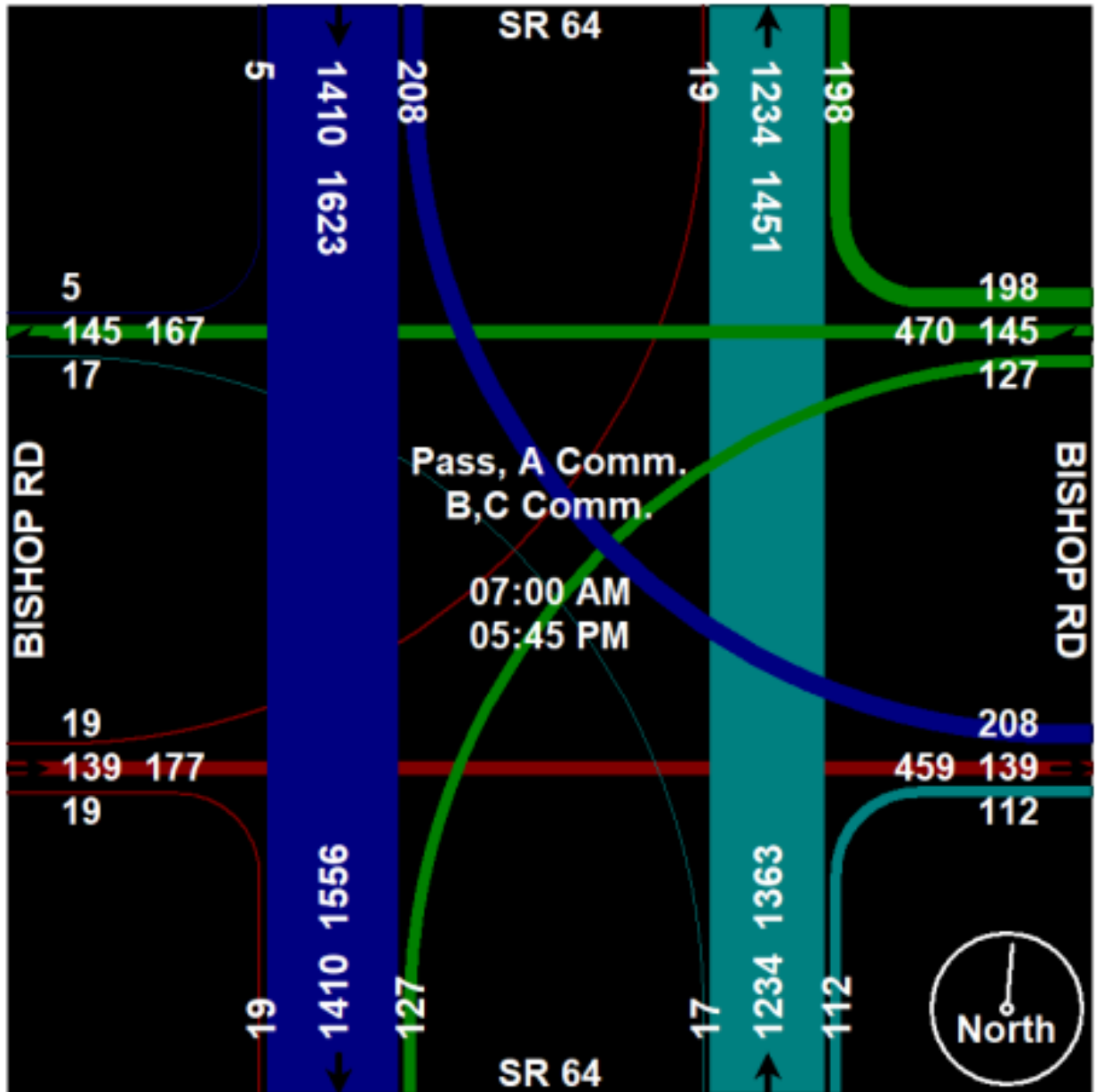
Ohio Department of Transportation, District 2
317 E. Poe Rd.
Bowling Green, OH 43402

File Name : WOO-64-5.40 Factor Total (timeshift) 4-25-23
Site Code : 00000000
Start Date : 4/25/2023
Page No : 1

Groups Printed- Pass, A Comm. - B,C Comm.

Start Time	SR 64 Southbound					BISHOP RD Westbound					SR 64 Northbound					BISHOP RD Eastbound					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
07:00 AM	0	33	4	0	37	3	2	0	0	5	4	26	0	0	30	0	4	2	0	6	78
07:15 AM	0	35	4	0	39	8	3	3	0	14	2	24	0	0	26	2	9	1	0	12	91
07:30 AM	0	67	11	0	78	4	3	4	0	11	2	28	0	0	30	2	8	2	0	12	131
07:45 AM	0	68	13	0	81	4	3	3	0	10	4	34	2	0	40	0	4	1	0	5	136
Total	0	203	32	0	235	19	11	10	0	40	12	112	2	0	126	4	25	6	0	35	436
08:00 AM	0	70	8	0	78	8	6	4	0	18	4	33	0	0	37	0	12	0	0	12	145
08:15 AM	0	50	5	0	55	4	4	4	0	12	4	20	0	0	24	0	7	0	0	7	98
08:30 AM	0	41	4	0	45	5	3	4	0	12	4	26	0	0	30	0	2	0	0	2	89
08:45 AM	0	46	2	0	48	3	2	4	0	9	4	27	0	0	31	1	4	1	0	6	94
Total	0	207	19	0	226	20	15	16	0	51	16	106	0	0	122	1	25	1	0	27	426
*** BREAK ***																					
12:00 PM	0	24	6	0	30	1	4	4	0	9	2	41	1	0	44	0	1	0	0	1	84
12:15 PM	0	30	4	0	34	3	5	7	0	15	6	26	1	0	33	0	2	1	0	3	85
12:30 PM	0	29	9	0	38	3	1	5	0	9	4	21	0	0	25	0	1	0	0	1	73
12:45 PM	1	30	4	0	35	5	4	2	0	11	2	19	0	0	21	1	3	0	0	4	71
Total	1	113	23	0	137	12	14	18	0	44	14	107	2	0	123	1	7	1	0	9	313
01:00 PM	0	29	7	0	36	1	1	4	0	6	1	23	0	0	24	1	5	1	0	7	73
01:15 PM	0	27	5	0	32	6	3	4	0	13	3	23	1	0	27	0	6	0	0	6	78
01:30 PM	0	36	2	0	38	5	3	0	0	8	2	20	1	0	23	0	3	0	0	3	72
01:45 PM	0	42	4	0	46	4	4	1	0	9	3	16	0	0	19	0	4	0	0	4	78
Total	0	134	18	0	152	16	11	9	0	36	9	82	2	0	93	1	18	1	0	20	301
02:00 PM	0	30	6	0	36	6	3	2	0	11	3	26	0	0	29	0	1	0	0	1	77
02:15 PM	0	44	9	0	53	3	4	8	0	15	4	33	1	0	38	1	2	0	0	3	109
02:30 PM	0	46	7	0	53	9	6	5	0	20	3	39	0	0	42	0	5	0	0	5	120
02:45 PM	0	37	5	0	42	12	7	5	0	24	3	47	1	0	51	2	5	3	0	10	127
Total	0	157	27	0	184	30	20	20	0	70	13	145	2	0	160	3	13	3	0	19	433
03:00 PM	0	37	6	0	43	13	10	7	0	30	1	49	2	0	52	1	5	2	0	8	133
03:15 PM	0	37	6	0	43	7	5	0	0	12	7	52	0	0	59	1	2	1	0	4	118
03:30 PM	0	59	6	0	65	14	7	1	0	22	7	52	1	0	60	0	7	0	0	7	154
03:45 PM	2	48	9	0	59	7	7	3	0	17	1	51	0	0	52	0	4	2	0	6	134
Total	2	181	27	0	210	41	29	11	0	81	16	204	3	0	223	2	18	5	0	25	539
04:00 PM	0	57	2	0	59	12	11	7	0	30	6	71	3	0	80	0	4	0	0	4	173
04:15 PM	0	54	6	0	60	8	8	6	0	22	8	68	0	0	76	1	10	0	0	11	169
04:30 PM	0	61	6	0	67	5	3	7	0	15	5	70	0	0	75	2	7	0	0	9	166
04:45 PM	0	53	8	0	61	8	2	3	0	13	5	57	1	0	63	3	2	0	0	5	142
Total	0	225	22	0	247	33	24	23	0	80	24	266	4	0	294	6	23	0	0	29	650
05:00 PM	0	55	12	0	67	7	8	6	0	21	4	81	1	0	86	0	5	1	0	6	180
05:15 PM	1	59	9	0	69	8	7	5	0	20	2	60	1	0	63	0	2	1	0	3	155
05:30 PM	0	31	8	0	39	6	3	5	0	14	2	36	0	0	38	0	2	0	0	2	93
05:45 PM	1	45	11	0	57	6	3	4	0	13	0	35	0	0	35	1	1	0	0	2	107
Total	2	190	40	0	232	27	21	20	0	68	8	212	2	0	222	1	10	2	0	13	535
Grand Total	5	1410	208	0	1623	198	145	127	0	470	112	1234	17	0	1363	19	139	19	0	177	3633
Apprch %	0.3	86.9	12.8	0		42.1	30.9	27	0		8.2	90.5	1.2	0		10.7	78.5	10.7	0		
Total %	0.1	38.8	5.7	0	44.7	5.5	4	3.5	0	12.9	3.1	34	0.5	0	37.5	0.5	3.8	0.5	0	4.9	
% Pass, A Comm.	5	1395	202	0	1602	196	145	127	0	468	112	1219	16	0	1347	19	136	19	0	174	3591
% Pass, A Comm.	100	98.9	97.1	0	98.7	99	100	100	0	99.6	100	98.8	94.1	0	98.8	100	97.8	100	0	98.3	98.8
B,C Comm.	0	15	6	0	21	2	0	0	0	2	0	15	1	0	16	0	3	0	0	3	42
% B,C Comm.	0	1.1	2.9	0	1.3	1	0	0	0	0.4	0	1.2	5.9	0	1.2	0	2.2	0	0	1.7	1.2





APPENDIX D

WARRANT EVALUATIONS

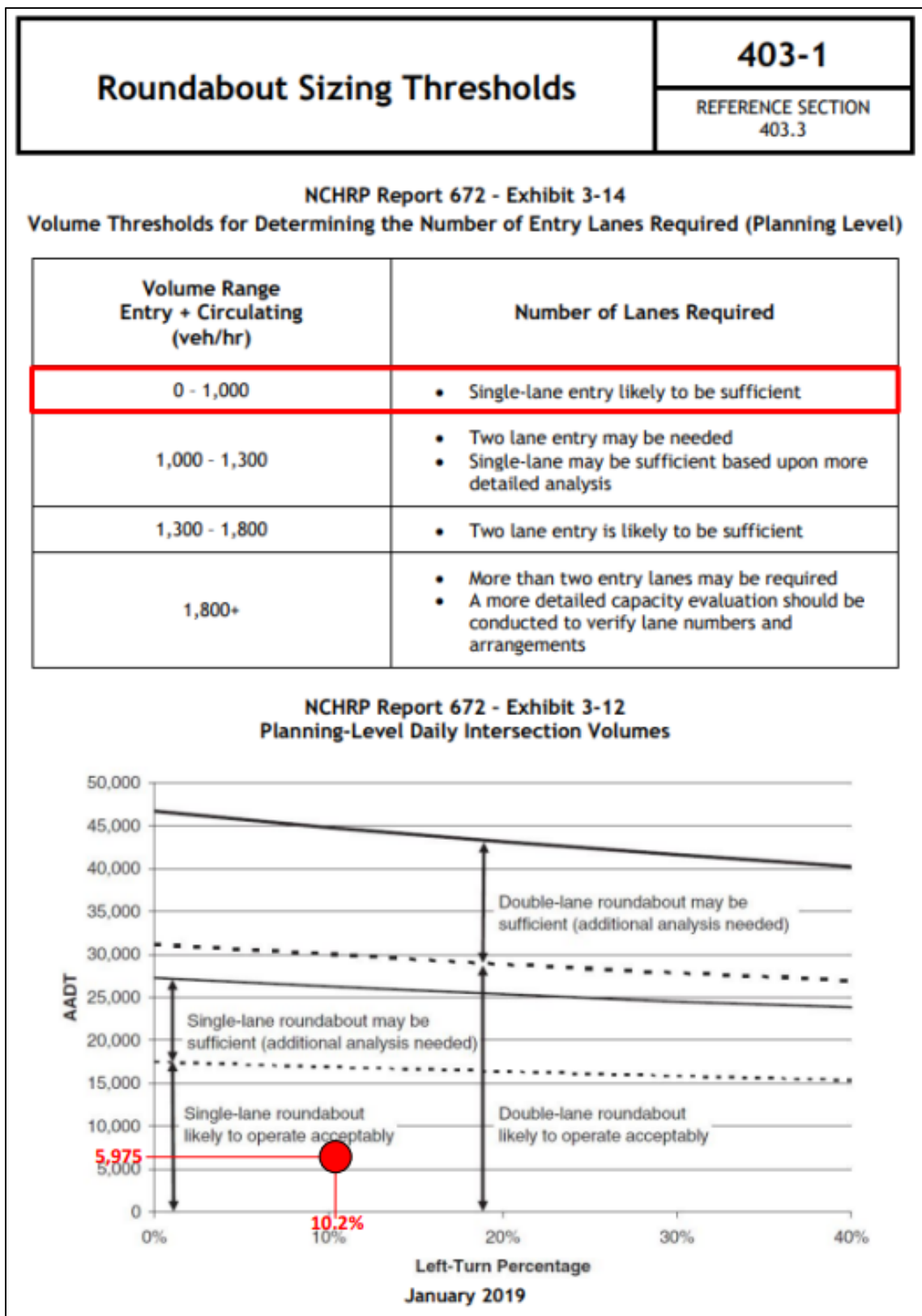
SR-64 at Bishop Rd. Roundabout Volumes																
Hour	SR-64 SB				Bishop Rd. WB				SR-64 NB				Bishop Rd. EB			
	Right	Thru	Left	Total	Right	Thru	Left	Total	Right	Thru	Left	Total	Right	Thru	Left	Total
7:00-8:00	0	203	32	235	19	11	10	40	12	112	2	126	4	25	6	35
8:00-9:00	0	207	19	226	20	15	16	51	16	106	0	122	1	25	1	27
12:00-1:00	1	113	23	137	12	14	18	44	14	107	2	123	1	7	1	9
1:00-2:00	0	134	18	152	16	11	9	36	9	82	2	93	1	18	1	20
2:00-3:00	0	157	27	184	30	20	20	70	13	145	2	160	3	13	3	19
3:00-4:00	2	181	27	210	41	29	11	81	16	204	3	223	2	18	5	25
4:00-5:00	0	225	22	247	33	24	23	80	24	266	4	294	6	23	0	29
5:00-6:00	2	190	40	232	27	21	20	68	8	212	2	222	1	10	2	13

Hour	SR-64 SB		Bishop Rd. WB		SR-64 NB		Bishop Rd. EB	
	Vehicles Conflicting	Vehicles Entering	Vehicles Conflicting	Vehicles Entering	Vehicles Conflicting	Vehicles Entering	Vehicles Conflicting	Vehicles Entering
7:00-8:00	23	235	120	40	63	126	245	35
8:00-9:00	31	226	107	51	45	122	242	27
12:00-1:00	34	137	110	44	31	123	154	9
1:00-2:00	22	152	85	36	37	93	161	20
2:00-3:00	42	184	150	70	43	160	204	19
3:00-4:00	43	210	212	81	50	223	219	25
4:00-5:00	51	247	270	80	45	294	270	29
5:00-6:00	43	232	216	68	52	222	250	13

Max sum of entering and conflicting vehicles = 350 veh/hr

Volumes for Exhibit 3-12

Count Total	3633
% AADT (from SHIFT)	60.8%
Hourly AADT Correction Factor	1.64
Calculated AADT	5975
Left Turn %	10.2%



Ohio Department of Transportation, District 2

317 E. Poe Rd.
Bowling Green, OH 43402

SR-64 at Bishop Rd. Multi-Way Stop Warrants - Summary

Study Date: 7/5/23

Criteria A – Interim Measure = Not Evaluated

Criteria B – Crash Experience = Satisfied
5 of 5 correctable crashes in 12-month period (2021)

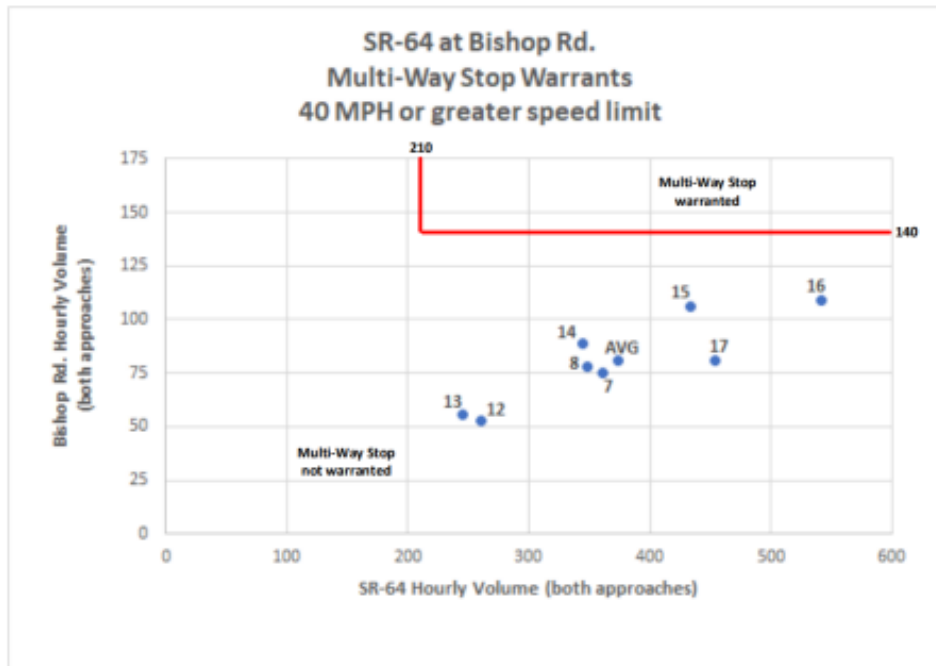
Criteria C – Minimum Volumes & Delays = Not Satisfied

Delay Criteria = Not Evaluated

8 Hours Individually Meeting = Not Satisfied
0 of 8 hours meet or exceed threshold

Average of 8 Hours Meeting = Not Satisfied

Criteria D – 80% of Volumes, Delays, and Crashes = Not Evaluated



Ohio Department of Transportation, District 2

317 E. Poe Rd.
Bowling Green, OH 43402

SR-64 at Bishop Rd. Signal Warrants Summary (100% volumes applied)

Warrant 1 – Eight Hour Vehicular Volumes = Not Satisfied

Warrant 1A – Minimum Vehicular Volume = Not Satisfied

0 of 8 hours meet or exceed threshold

Warrant 1B – Interruption of Continuous Traffic = Not Satisfied

0 of 8 hours meet or exceed threshold

Warrant 1C – Combination of Warrants = Not Satisfied

0 of 8 hours meet or exceed threshold

Warrant 2 – Four Hour Vehicular Volumes = Not Satisfied

0 of 4 hours meet or exceed threshold

Warrant 3 – Peak Hour Vehicular Volumes = Not Satisfied

0 of 1 hours meet or exceed threshold

Warrant 4 – Pedestrian Volumes = Not Evaluated

Warrant 5 – School Crossing = Not Evaluated

Warrant 6 – Coordinated Signal System = Not Evaluated

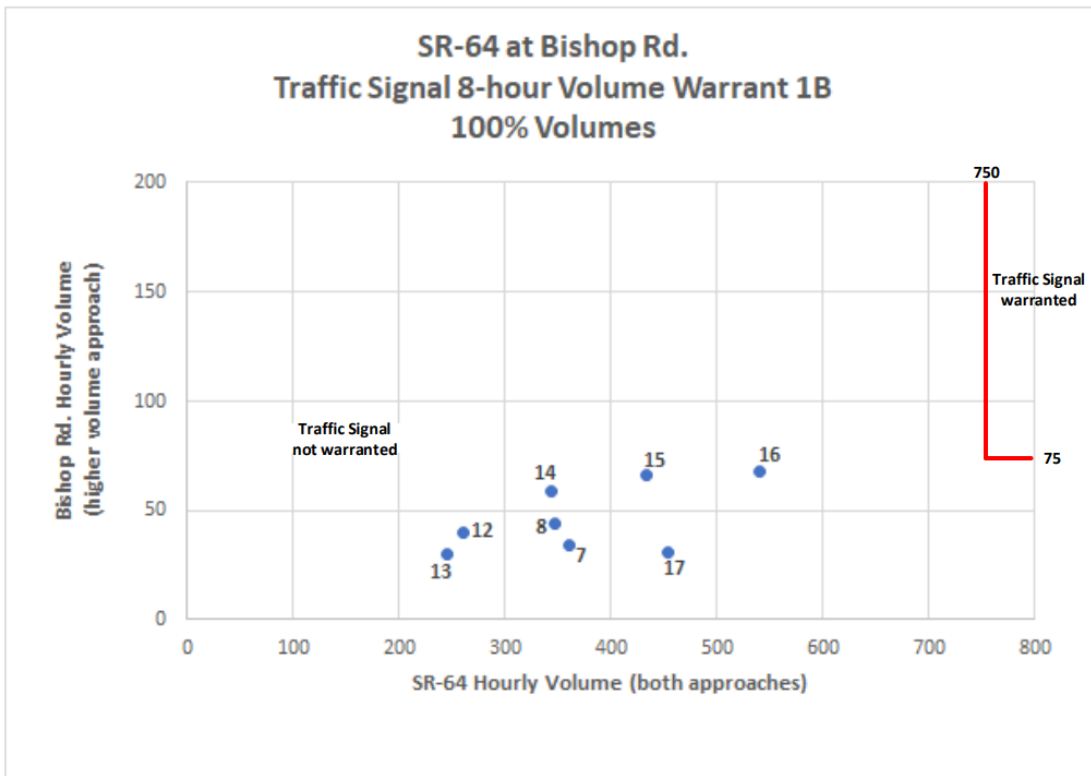
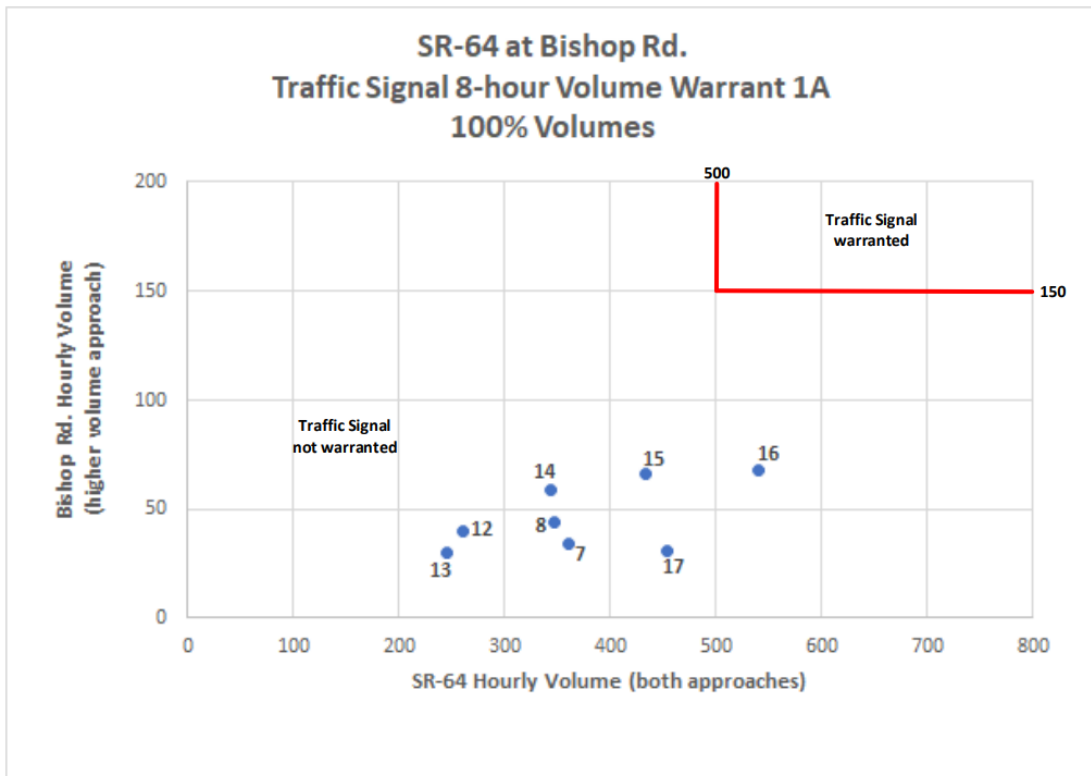
Warrant 7 – Crash Experience = Satisfied

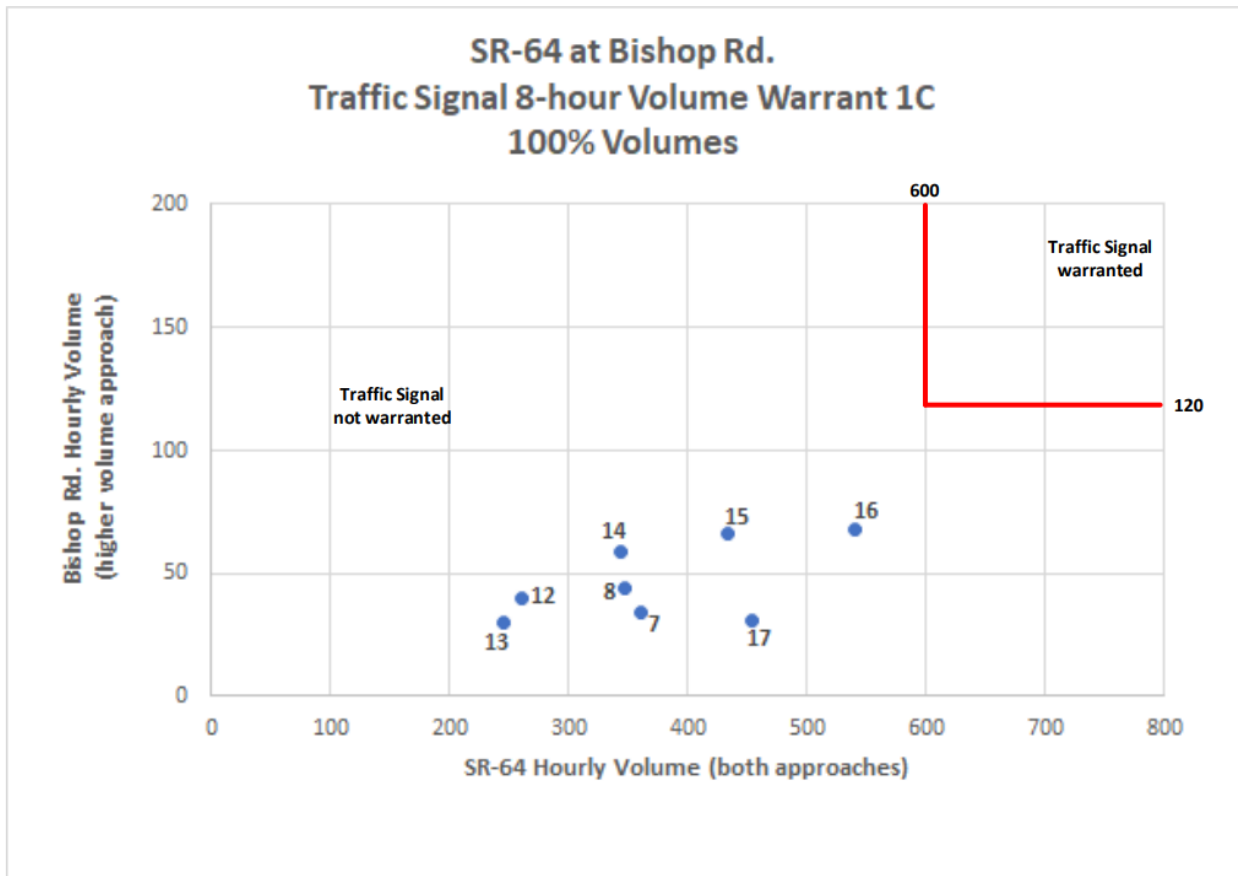
5 of 5 correctable crashes in 12-month period (2021)

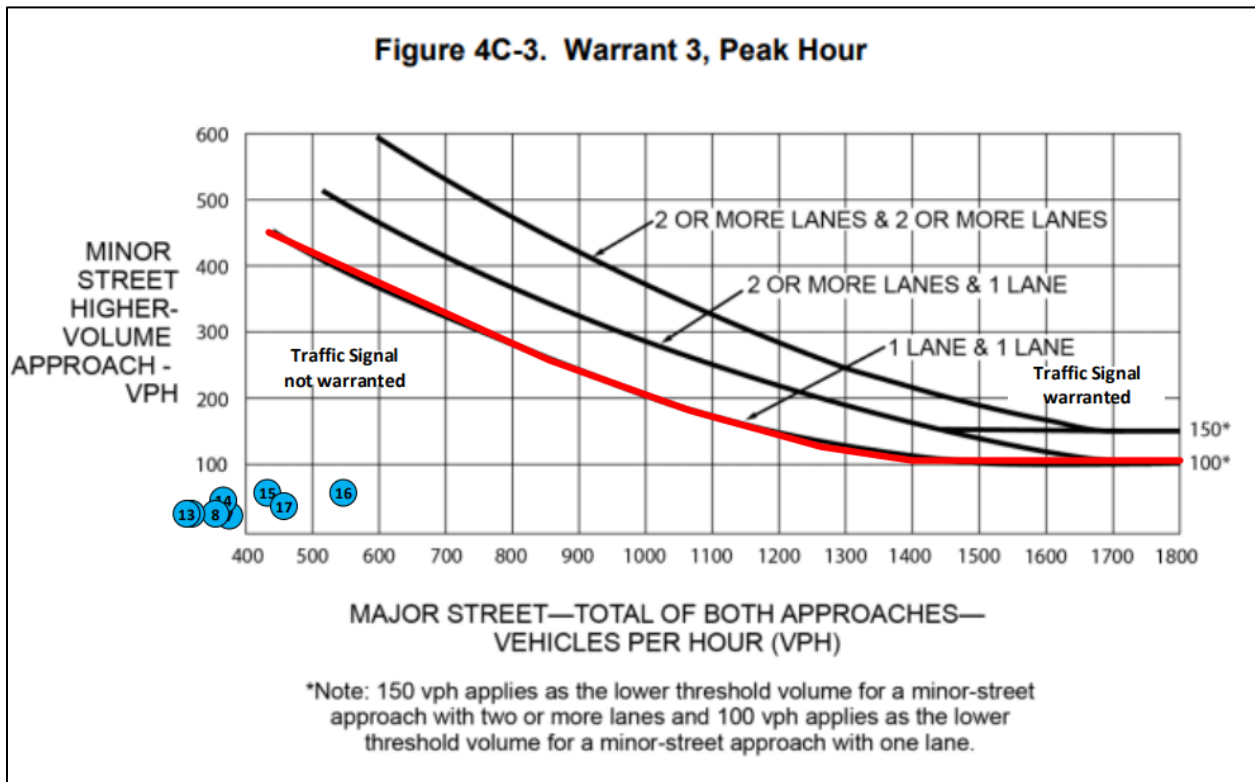
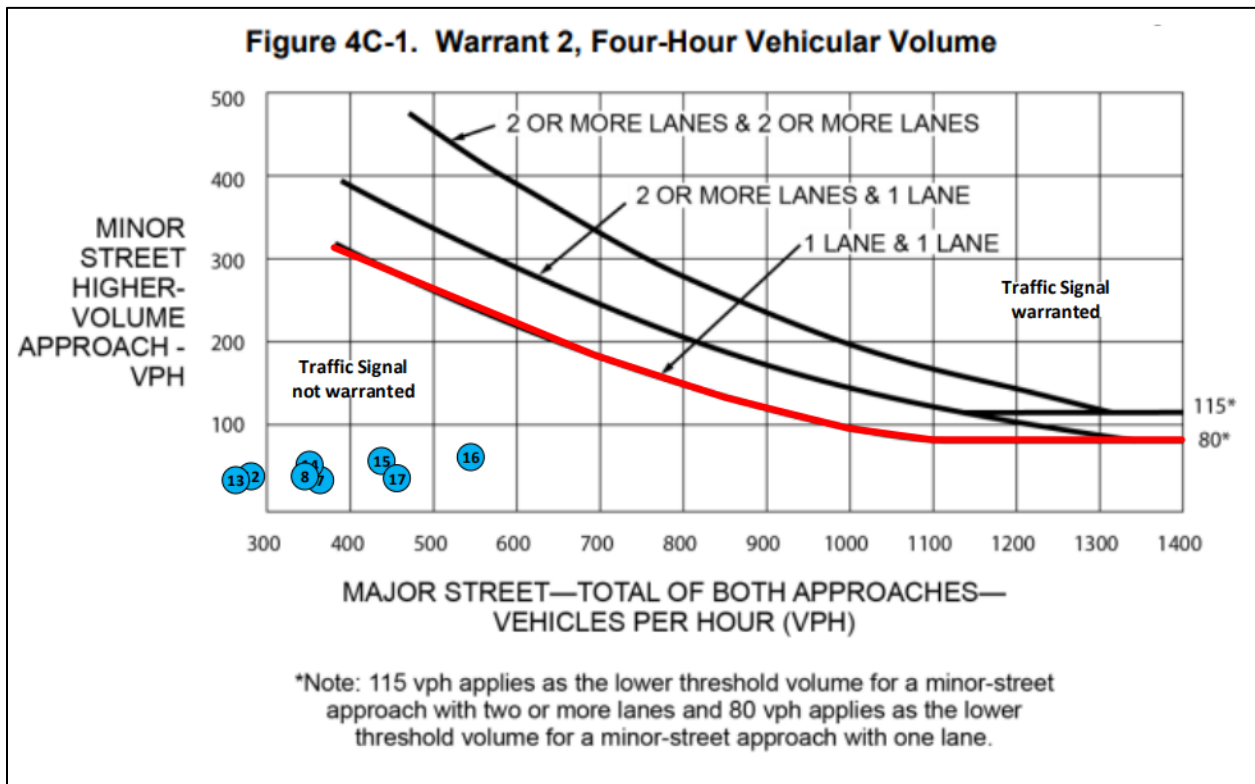
Warrant 8 – Roadway Network = Not Evaluated

Warrant 9 – Intersection Near a Grade Crossing = Not Evaluated

Study Date: 4/25/23







Ohio Department of Transportation, District 2

317 E. Poe Rd.
Bowling Green, OH 43402

SR-64 at Bishop Rd. Signal Warrants Summary (70% volumes applied)

Warrant 1 – Eight Hour Vehicular Volumes = Not Satisfied

Warrant 1A – Minimum Vehicular Volume = Not Satisfied

0 of 8 hours meet or exceed threshold

Warrant 1B – Interruption of Continuous Traffic = Not Satisfied

1 of 8 hours meet or exceed threshold

Warrant 1C – Combination of Warrants = Not Satisfied

0 of 8 hours meet or exceed threshold

Warrant 2 – Four Hour Vehicular Volumes = Not Satisfied

0 of 4 hours meet or exceed threshold

Warrant 3 – Peak Hour Vehicular Volumes = Not Satisfied

0 of 1 hours meet or exceed threshold

Warrant 4 – Pedestrian Volumes = Not Evaluated

Warrant 5 – School Crossing = Not Evaluated

Warrant 6 – Coordinated Signal System = Not Evaluated

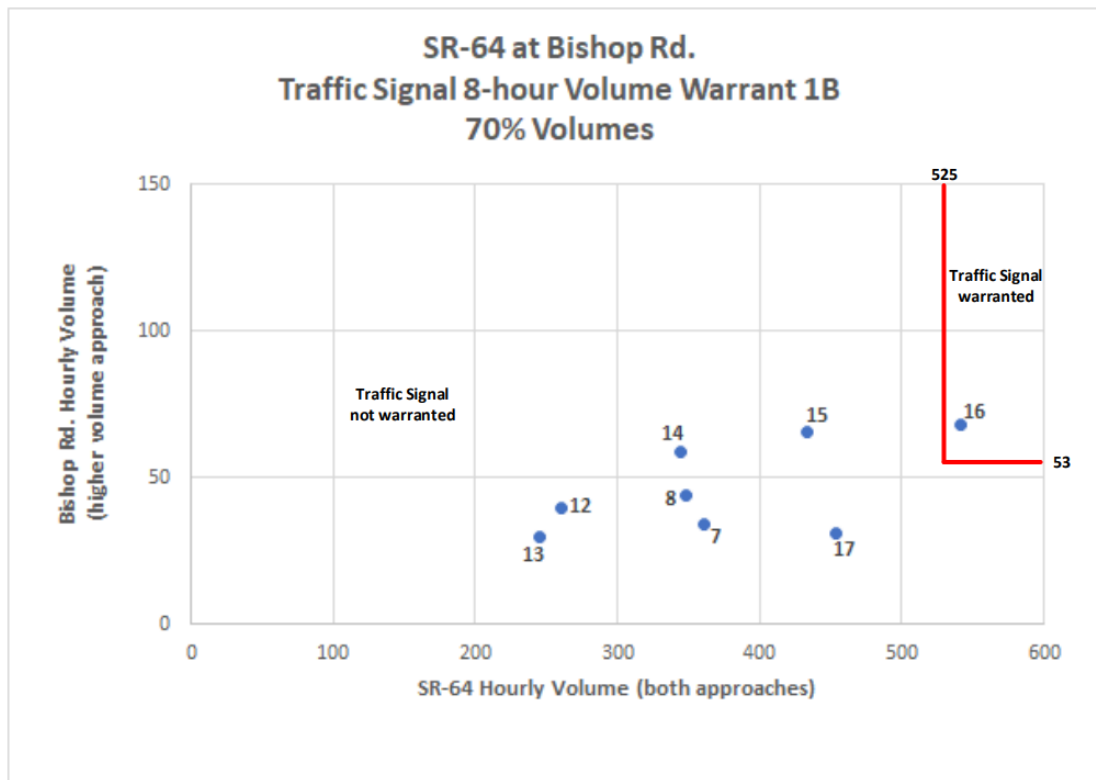
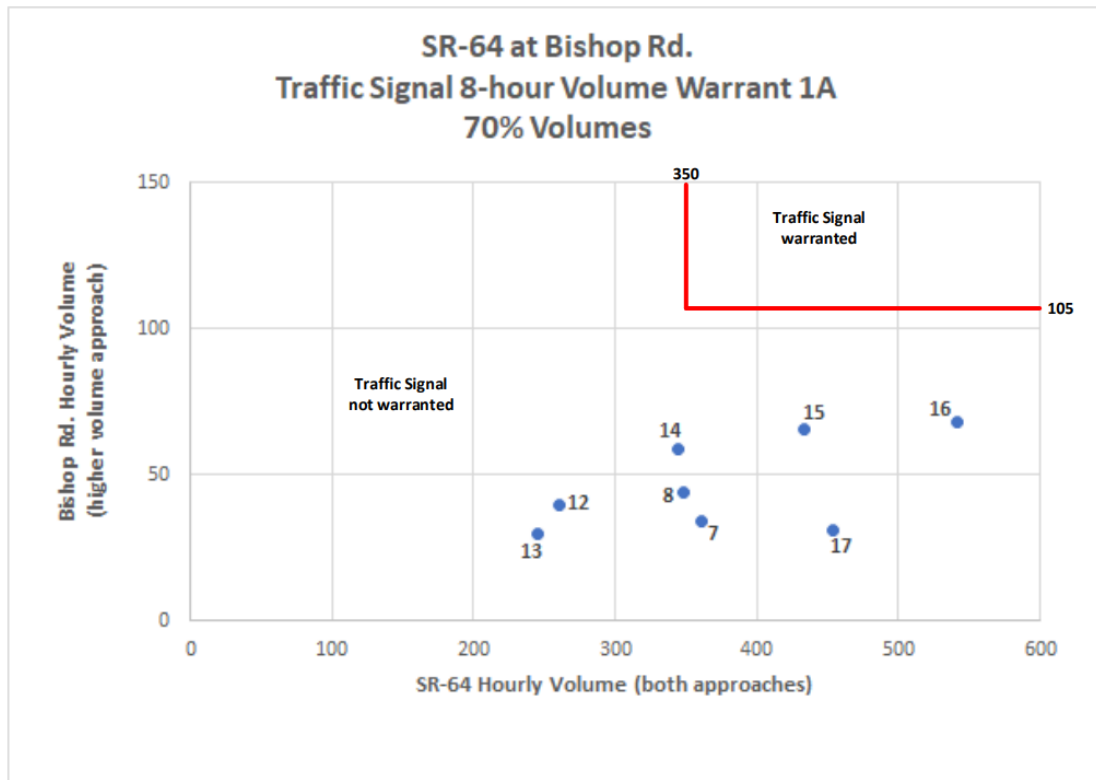
Warrant 7 – Crash Experience = Satisfied

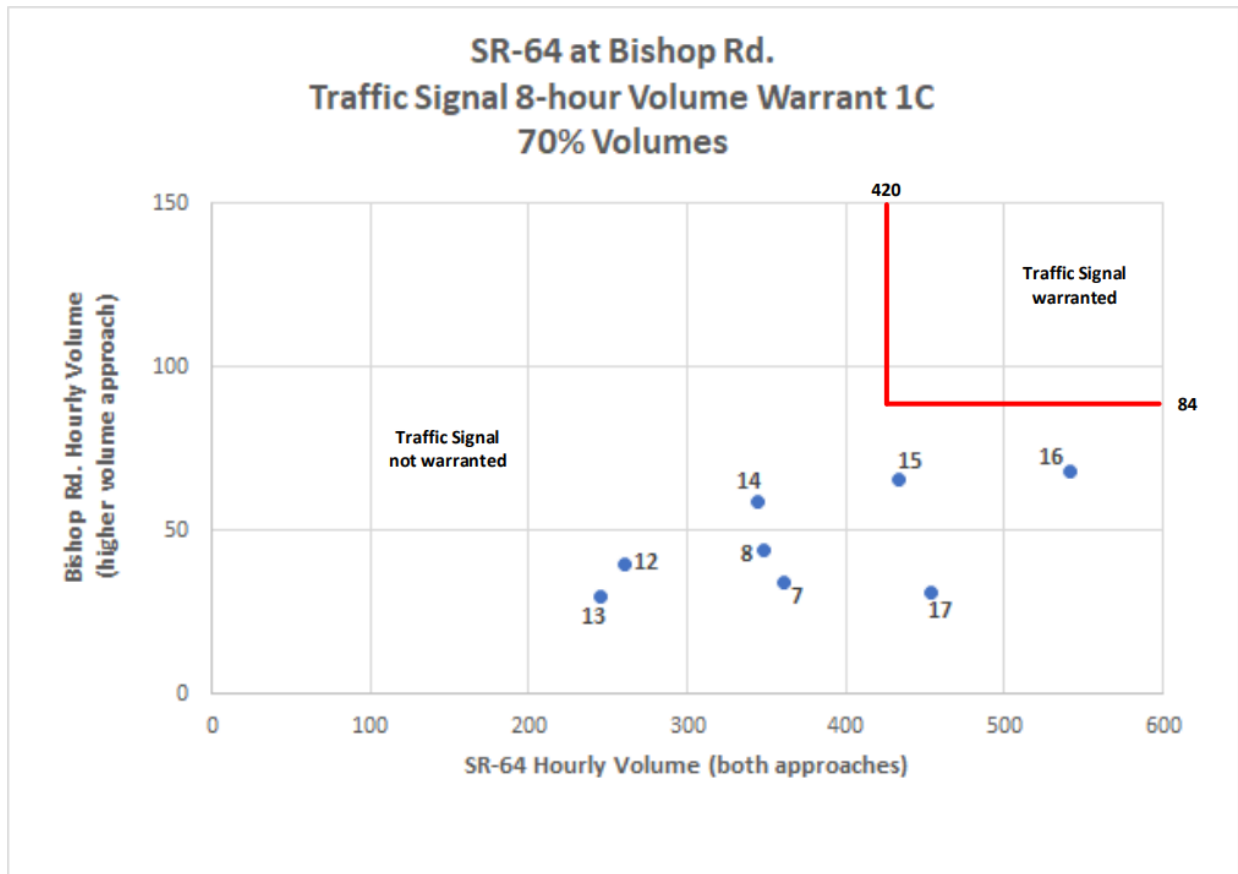
5 of 5 correctable crashes in 12-month period (2021)

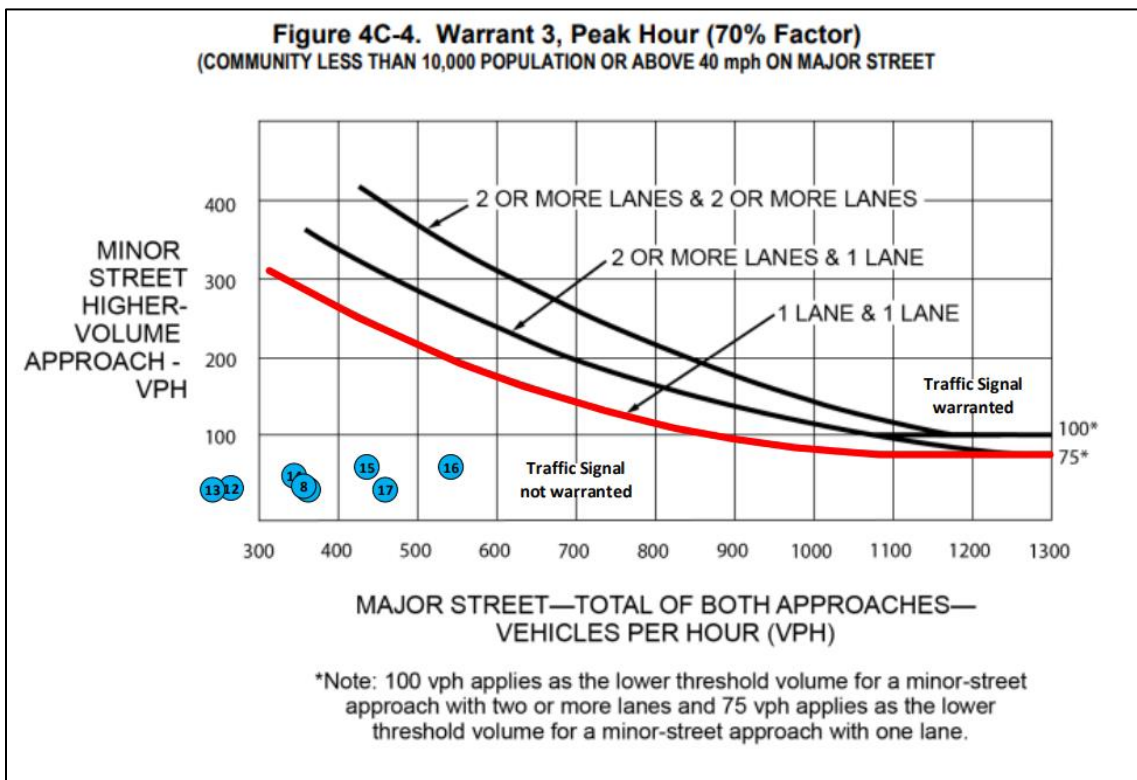
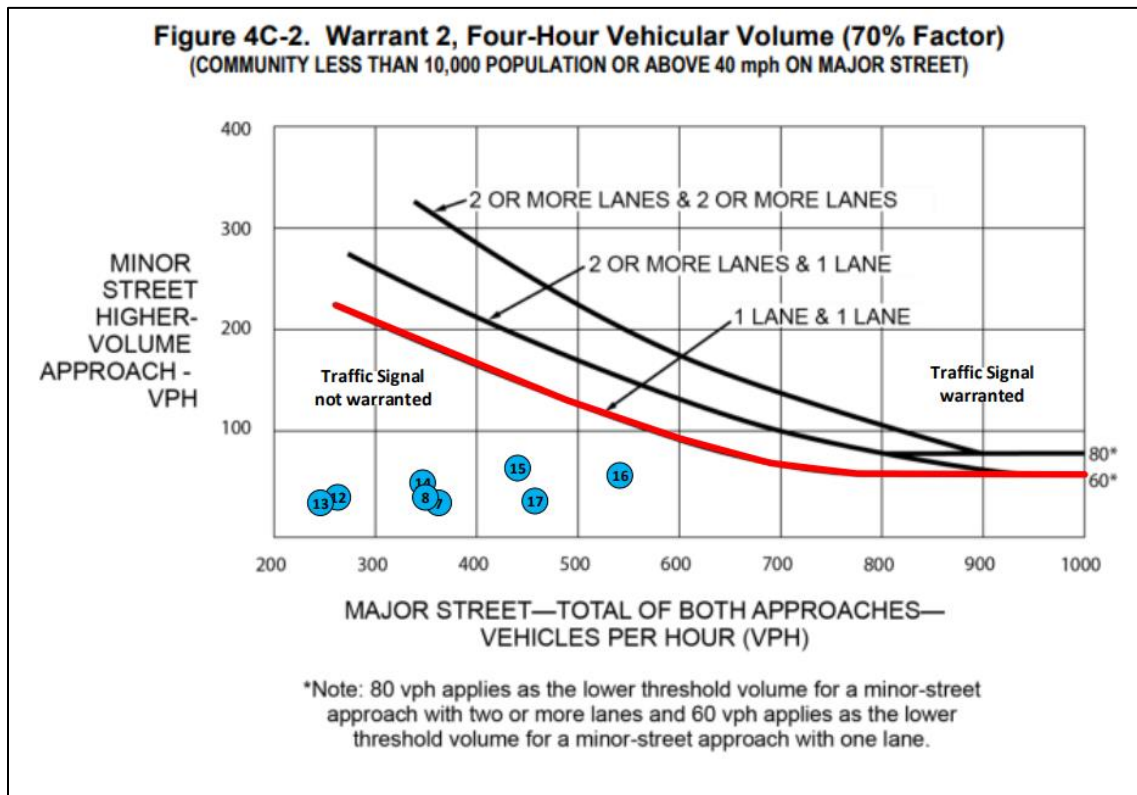
Warrant 8 – Roadway Network = Not Evaluated

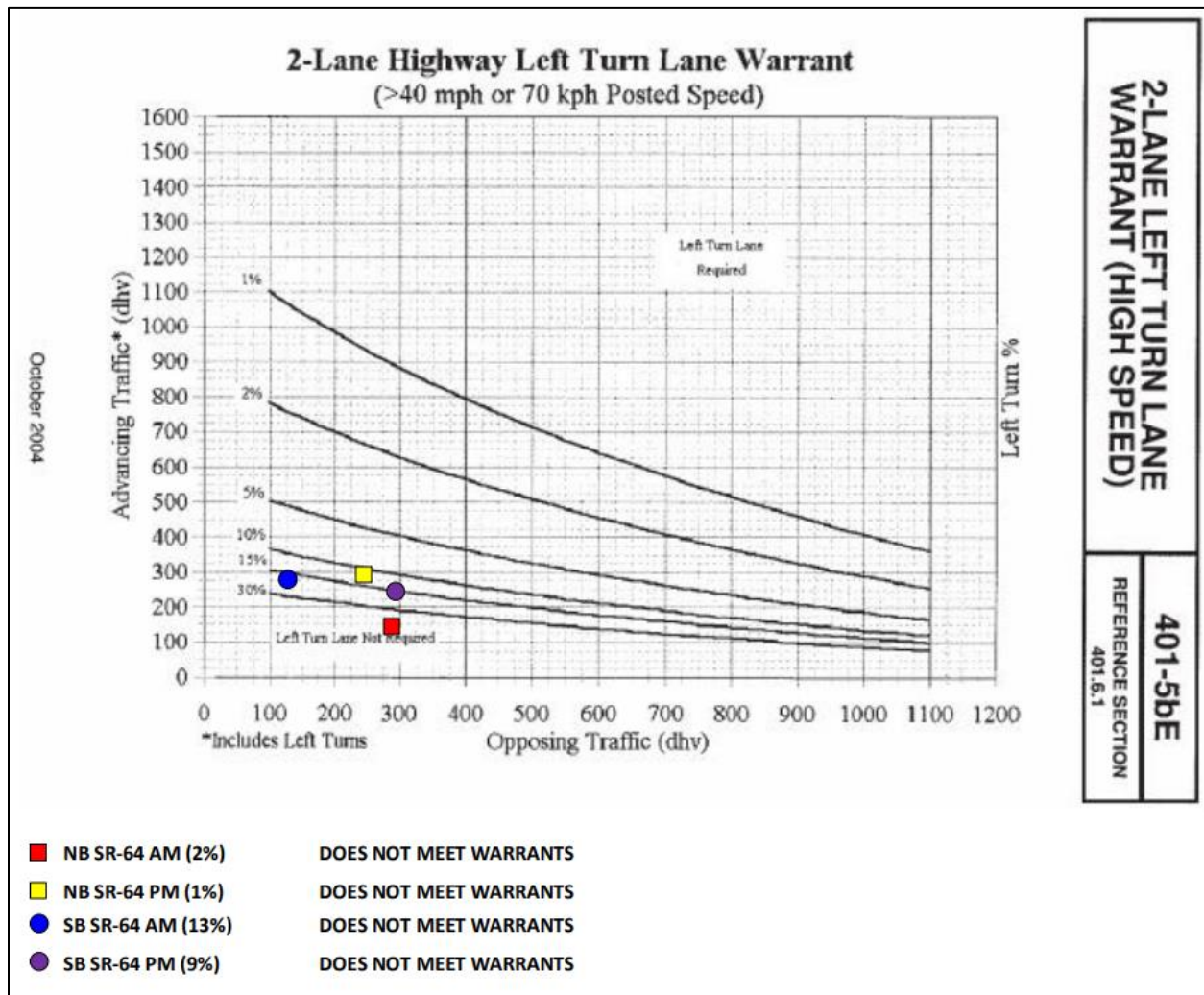
Warrant 9 – Intersection Near a Grade Crossing = Not Evaluated

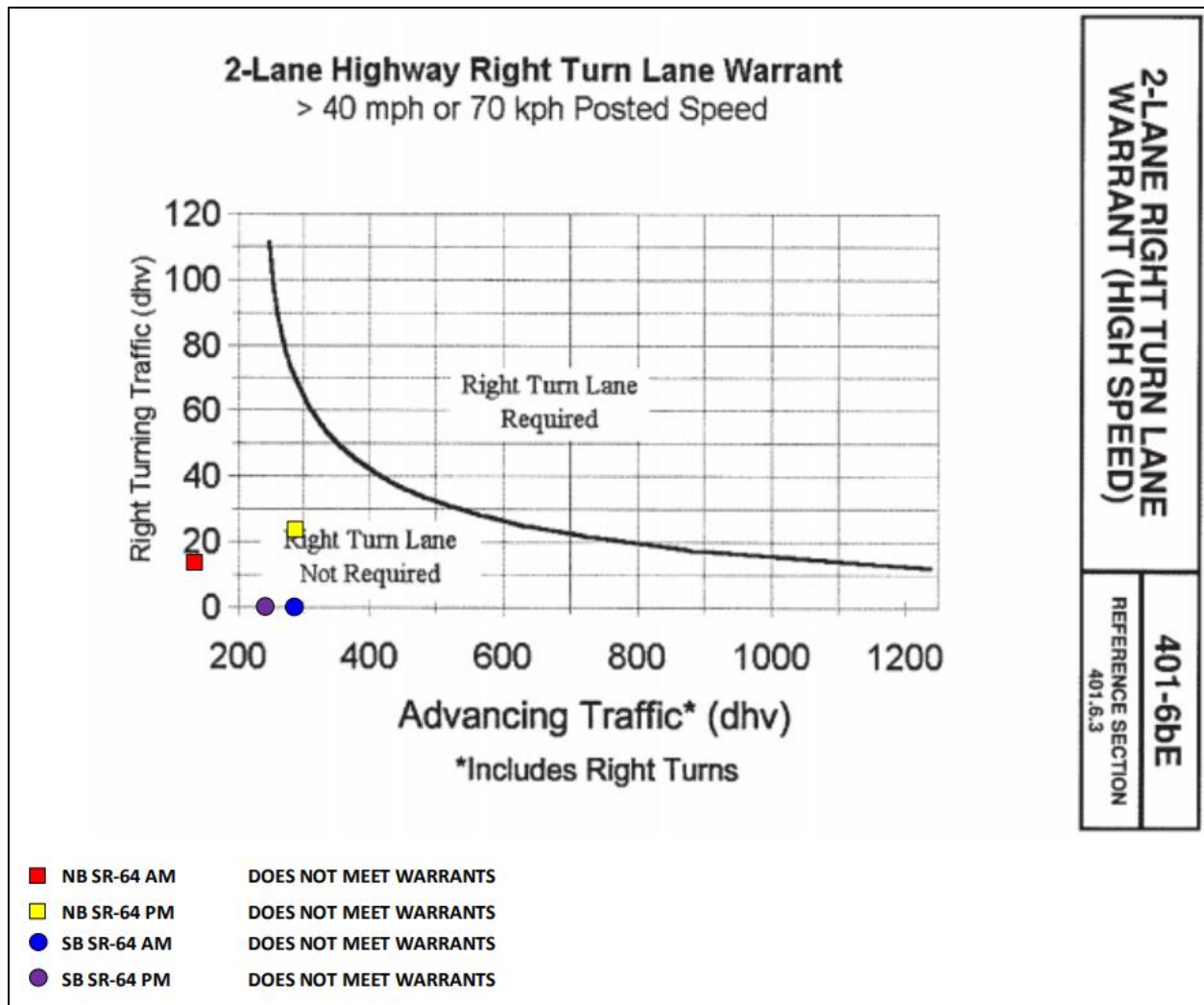
Study Date: 4/25/23











APPENDIX E

HCS EVALUATIONS

HCS7 Two-Way Stop-Control Report																	
General Information								Site Information									
Analyst	Zachary Porter							Intersection	SR-64/Bishop Rd.								
Agency/Co.	ODOT							Jurisdiction	ODOT								
Date Performed	8/10/2023							East/West Street	Bishop Rd.								
Analysis Year	2023							North/South Street	SR-64								
Time Analyzed	7:30-8:30							Peak Hour Factor	0.88								
Intersection Orientation	North-South							Analysis Time Period (hrs)	0.25								
Project Description	WOO-64-5.40 HCS Existing AM																
Lanes																	
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		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6	
Number of Lanes		0	1	0		0	1	0		0	1	0		0	1	0	
Configuration			LTR				LTR				LTR				LTR		
Volume (veh/h)		3	31	2		15	16	20		2	115	14		37	255	0	
Percent Heavy Vehicles (%)		2	2	2		1	1	1		1				1			
Proportion Time Blocked																	
Percent Grade (%)		0				0											
Right Turn Channelized																	
Median Type Storage		Undivided															
Critical and Follow-up Headways																	
Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1			
Critical Headway (sec)		7.12	6.52	6.22		7.11	6.51	6.21		4.11				4.11			
Base Follow-Up Headway (sec)		3.5	4.0	3.3		3.5	4.0	3.3		2.2				2.2			
Follow-Up Headway (sec)		3.52	4.02	3.32		3.51	4.01	3.31		2.21				2.21			
Delay, Queue Length, and Level of Service																	
Flow Rate, v (veh/h)			41				58			2					42		
Capacity, c (veh/h)			449				544			1278					1441		
v/c Ratio			0.09				0.11			0.00					0.03		
95% Queue Length, Q ₉₅ (veh)			0.3				0.4			0.0					0.1		
Control Delay (s/veh)			13.8				12.4			7.8					7.6		
Level of Service (LOS)			B				B			A					A		
Approach Delay (s/veh)		13.8				12.4				0.1				1.2			
Approach LOS		B				B				A				A			

HCS7 Two-Way Stop-Control Report																	
General Information								Site Information									
Analyst	Zachary Porter							Intersection	SR-64/Bishop Rd.								
Agency/Co.	ODOT							Jurisdiction	ODOT								
Date Performed	8/10/2023							East/West Street	Bishop Rd.								
Analysis Year	2023							North/South Street	SR-64								
Time Analyzed	16:15-17:15							Peak Hour Factor	0.91								
Intersection Orientation	North-South							Analysis Time Period (hrs)	0.25								
Project Description	WOO-64-5.40 HCS Existing PM																
Lanes																	
<p style="text-align: center;">Major Street: North-South</p>																	
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		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6	
Number of Lanes		0	1	0		0	1	0	0	0	1	0	0	0	1	0	
Configuration			LTR				LTR				LTR				LTR		
Volume (veh/h)		1	24	6		22	21	28		2	276	22		32	223	0	
Percent Heavy Vehicles (%)		2	2	2		1	1	1		1				1			
Proportion Time Blocked																	
Percent Grade (%)		0				0											
Right Turn Channelized																	
Median Type Storage		Undivided															
Critical and Follow-up Headways																	
Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1			
Critical Headway (sec)		7.12	6.52	6.22		7.11	6.51	6.21		4.11				4.11			
Base Follow-Up Headway (sec)		3.5	4.0	3.3		3.5	4.0	3.3		2.2				2.2			
Follow-Up Headway (sec)		3.52	4.02	3.32		3.51	4.01	3.31		2.21				2.21			
Delay, Queue Length, and Level of Service																	
Flow Rate, v (veh/h)			34				78			2				35			
Capacity, c (veh/h)			417				455			1327				1238			
v/c Ratio			0.08				0.17			0.00				0.03			
95% Queue Length, Q ₉₅ (veh)			0.3				0.6			0.0				0.1			
Control Delay (s/veh)			14.4				14.6			7.7				8.0			
Level of Service (LOS)			B				B			A				A			
Approach Delay (s/veh)		14.4				14.6				0.1				1.2			
Approach LOS		B				B				A				A			

HCS7 Roundabouts Report																
General Information								Site Information								
Analyst	Zachary Porter								Intersection		SR-64/Bishop Rd.					
Agency or Co.	ODOT								E/W Street Name		Bishop Rd.					
Date Performed	8/10/2023								N/S Street Name		SR-64					
Analysis Year	2023								Analysis Time Period (hrs)		0.25					
Time Analyzed	7:30-8:30								Peak Hour Factor		0.88					
Project Description	WOO-64-5.40 HCS Roundab...								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	3	31	2	0	15	16	20	0	2	115	14	0	37	255	0
Percent Heavy Vehicles, %	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1
Flow Rate (v _{adj}), pc/h	0	3	36	2	0	17	18	23	0	2	132	16	0	42	293	0
Right-Turn Bypass	None				None				None				None			
Conflicting Lanes	1				1				1				1			
Pedestrians Crossing, p/h	0				0				0				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	41				58				150				335			
Entry Volume, veh/h	40				57				149				332			
Circulating Flow (v _c), pc/h	352				137				81				37			
Exiting Flow (v _e), pc/h	94				20				158				312			
Capacity (c _{adj}), pc/h	964				1200				1271				1329			
Capacity (c), veh/h	945				1188				1258				1316			
v/c Ratio (x)	0.04				0.05				0.12				0.25			
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	4.2				3.4				3.8				4.9			
Lane LOS	A				A				A				A			
95% Queue, veh	0.1				0.2				0.4				1.0			
Approach Delay, s/veh	4.2				3.4				3.8				4.9			
Approach LOS	A				A				A				A			
Intersection Delay, s/veh LOS	4.4				A				A				A			

HCS7 Roundabouts Report																
General Information								Site Information								
Analyst	Zachary Porter								Intersection		SR-64/Bishop Rd.					
Agency or Co.	ODOT								E/W Street Name		Bishop Rd.					
Date Performed	8/10/2023								N/S Street Name		SR-64					
Analysis Year	2023								Analysis Time Period (hrs)		0.25					
Time Analyzed	7:30-8:30								Peak Hour Factor		0.91					
Project Description	WOO-64-5.40 HCS Roundab...								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	1	24	6	0	22	21	28	0	2	276	22	0	32	223	0
Percent Heavy Vehicles, %	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1
Flow Rate (v _{flow}), pc/h	0	1	27	7	0	24	23	31	0	2	306	24	0	36	248	0
Right-Turn Bypass	None				None				None				None			
Conflicting Lanes	1				1				1				1			
Pedestrians Crossing, p/h	0				0				0				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	35			78			332			284						
Entry Volume, veh/h	34			77			329			281						
Circulating Flow (v _c), pc/h	308			309			64			49						
Exiting Flow (v _e), pc/h	87			25			338			279						
Capacity (C _{flow}), pc/h	1008			1007			1293			1313						
Capacity (c), veh/h	988			997			1280			1300						
v/c Ratio (x)	0.03			0.08			0.26			0.22						
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	3.9			4.3			5.1			4.6						
Lane LOS	A			A			A			A						
95% Queue, veh	0.1			0.3			1.0			0.8						
Approach Delay, s/veh	3.9			4.3			5.1			4.6						
Approach LOS	A			A			A			A						
Intersection Delay, s/veh LOS	4.8						A									

APPENDIX F

INCREASE TRIANGLE SIGHT DISTANCE CMF INFORMATION

CMF COMPARISON		
Below you will find comparisons for the CMFs you chose. Please note that the rows <i>highlighted and bold/italic</i> contain the differences in the selected CMFs.		
Countermeasure Name	Increase triangle sight distance	Increase triangle sight distance
CMF ID	<u>307</u>	<u>308</u>
CMF	0.53	0.89
Study Reference	<u>ELVIK, R. AND VAA, T., 2004</u>	<u>ELVIK, R. AND VAA, T., 2004</u>
Unadjusted Standard Error AMF		
CMFunction		
Star Rating	★★★★☆	★★★★☆
Rating Score Total	75	75
Crash Type	All	All
Crash Severity	<i>Serious injury, Minor injury</i>	<i>Property damage only (PDO)</i>
Crash Time of Day		
Area Type	Not specified	Not specified
Road Division Type		
Road Type	Not specified	Not specified
Min Number of Lanes		
Max Number of Lanes		
Number of Lanes Direction		
Number of Lanes Comment		
Intersection Type	Roadway/roadway (not interchange related)	Roadway/roadway (not interchange related)
Intersection Geometry	4-leg	4-leg
Traffic Control	Not specified	Not specified
Minimum Speed Limit		
Maximum Speed Limit		
Speed Unit		
Speed Limit Comment		
Study Type	9	9