

Interactive Highway Safety Design Model

Crash Prediction Evaluation Report

January 27, 2023

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Report Overview

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Evaluation Date: Fri Jan 27 09:31:45 EST 2023

IHSDM Version: v17.0.0 (Sep 22, 2021)

Crash Prediction Module: v12.0.0 (Sep 22, 2021)

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Project Title: US 36

Project Comment: Created Thu Jan 05 11:55:36 EST 2023

Project Unit System: U.S. Customary

Highway Title: US 36

Highway Comment: Imported from US 36 ALIGNMENTS.xml

Highway Version: 1

Evaluation Title: Evaluation 10

Evaluation Comment: Created Fri Jan 27 09:30:57 EST 2023

Minimum Location: 569+35.000

Maximum Location: 717+85.000

Policy for Superelevation: AASHTO 2011 U.S. Customary

Calibration: HSM Configuration

Crash Distribution: HSM Configuration

Model/CMF: HSM Configuration

First Year of Analysis: 2025

Last Year of Analysis: 2045

Empirical-Bayes Analysis: None

Disclaimer Regarding Crash Prediction Method

IMPORTANT NOTICE ABOUT COMPARING RESULTS FROM HIGHWAY SAFETY MANUAL FIRST EDITION (2010) MODELS TO RESULTS FROM NEW MODELS DEVELOPED UNDER NCHRP PROJECTS 17-70, 17-58, AND 17-68

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- 6+ lane and one-way urban/suburban arterials (including models for segments and intersections): completed under NCHRP Project 17-58.
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However, in the absence of local calibration factors (see HSM-1 Part C, Appendix A for guidance on calibration of the predictive models), it is neither appropriate nor advisable to directly compare the results from new models (from NCHRP Projects 17-58, 17-68, and 17-70) to results from HSM-1 models, as the models were not calibrated to the same base state data sets, and consequently can produce unexpected results. If local calibration factors are available and applied to both new models and HSM-1 models, then it may be appropriate to directly compare the results. [Note: Work being performed under NCHRP Project 17-72 (Update of Crash Modification Factors for the Highway Safety Manual) is expected to re-calibrate many of the old (HSM-1) and new (e.g., NCHRP 17-70) models to data from a single (or small number of) states, that would allow results from all models to be directly compared.]

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The HSM-1 interim method previously included in IHSDM for evaluating roundabouts on urban/suburban arterials (i.e., evaluating an existing intersection and then applying a Crash Modification Factor for replacing the existing intersection with a roundabout) has been deactivated in IHSDM, to minimize any confusion with the new roundabout methodology.

Section Types

Section 1 Evaluation

Section: Section 1

Evaluation Start Location: 569+35.000

Evaluation End Location: 717+85.000

Area Type: Urban

Functional Class: Arterial

Type of Alignment: Divided, Multilane

Model Category: Urban/Suburban Arterial

Calibration Factor: 4D=1.0; 4SG=1.0;

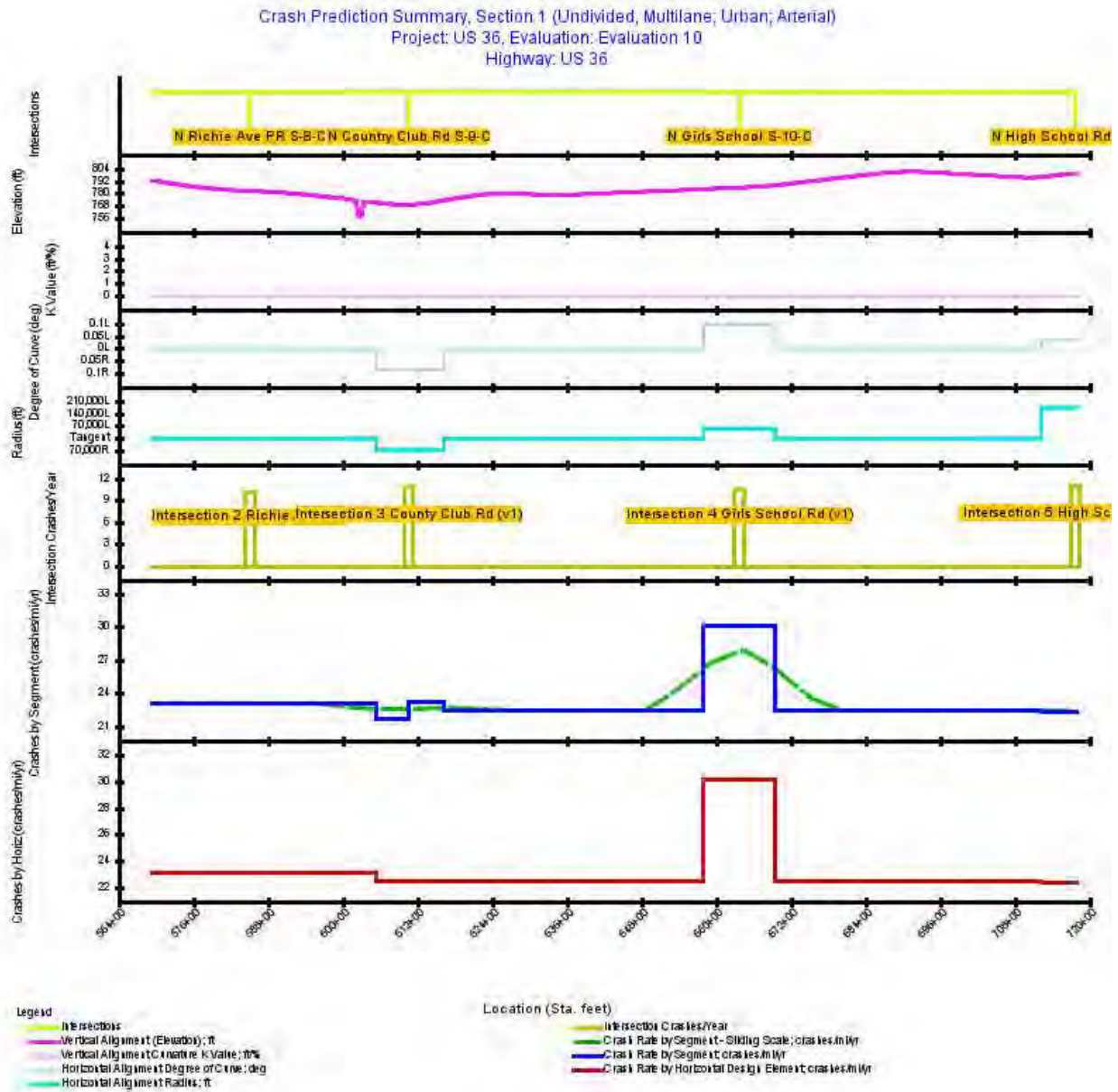


Figure 1. Crash Prediction Summary (Section 1)

[Table 1. Evaluation Highway - Homogeneous Segments \(Section 1\)](#)

IHSDM Analysis Report (Do Nothing Alternative)

Segment No.	Type	Start Location (Sta. ft)	End Location (Sta. ft)	Length (ft)	Length (mi)	Number Major Commercial Driveways	Number Minor Commercial Driveways	Number Major Institutional Driveways	Number Minor Institutional Driveways	Number Major Residential Driveways	Number Minor Residential Driveways	Other Driveways	Lighting	Automated Speed Enforcement	Density (fixed objects/mi ²)	Median Width (ft)	Type	Effective Median Width (ft)	Speed Level	Number Rail Highway Crossings	Average Shoulder Width (ft)	Average Lane Width (ft)
1	Urban/Suburban Arterial Segment Five-lane including center TWLTL	569+35.00	605+23.77	3,588.7	0.6797	0	5	0	0	0	25	6	false	false	0.0	0.00	Non	0.00	Intermediate/High	0	10.00	12.00
2	Urban/Suburban Arterial Segment Five-lane including center TWLTL	605+23.77	610+54.68	530.90	0.1005	0	1	0	0	0	0	1	false	false	0.0	0.00	Non	0.00	Intermediate/High	0	10.00	12.00
3	Urban/Suburban Arterial Segment Five-lane including center TWLTL	610+54.68	616+23.70	569.03	0.1078	0	2	0	0	0	0	1	false	false	0.0	0.00	Non	0.00	Intermediate/High	0	10.00	12.00
4	Urban/Suburban Arterial Segment Five-lane including center TWLTL	616+23.70	657+91.47	4,167.7	0.7894	0	13	0	0	0	0	4	false	false	0.0	0.00	Non	0.00	Intermediate/High	0	10.00	12.00

IHSDM Analysis Report (Do Nothing Alternative)

5	Urban/Suburban Arterial Segment Five-lane including center TWLTL	657+91.47	669+33.14	1,141.67	0.2162	0	12	0	0	0	0	0	0	0	2	false	false	0.0	Non-Intermediate/High	0.00	0	10.00	12.00
6	Urban/Suburban Arterial Segment Five-lane including center TWLTL	669+33.14	712+11.68	4,278.54	0.8103	0	2	0	0	28	10	0	0	0	0	false	false	0.0	Non-Intermediate/High	0.00	0	10.00	12.00
7	Urban/Suburban Arterial Segment Five-lane including center TWLTL	712+11.68	717+85.00	573.31	0.1086	0	2	0	0	0	0	0	0	0	0	false	false	0.0	Non-Intermediate/High	0.00	0	10.00	12.00

[Table 2. Evaluation Intersection \(Section 1\)](#)

Inter. No.	Title	Type	Location (Sta. ft)	Legs	Traffic Control	Approaches w/Left Turn Lanes		Approaches w/Right Turn Lanes		Approaches w/o Right Turn on Red(crossings/day)		Pedestrian Volume	Lighted at Night	Red Light Camera	School Nearby	Number of Bus Stops	Number of Alcohol Sales Establishments	Max Lanes Crossed
						w/Left Turn Lanes	w/Right Turn Lanes	w/o Right Turn on Red	Turn on Red(crossings/day)									
1	Intersection 4 Girls School Rd (v1)	Urban/Suburban Arterial Intersection Four-Legged Signalized	663+62.290	4	Signalized	0	0	0	0	0	0	20	true	false	false	0	0	4
2	Intersection 2 Richie Ave (v1)	Urban/Suburban Arterial Intersection Four-Legged Signalized	585+02.180	4	Signalized	0	0	0	0	0	0	20	true	false	false	0	0	4
3	Intersection 3 County Club Rd (v1)	Urban/Suburban Arterial Intersection Four-Legged Signalized	610+54.680	4	Signalized	0	0	0	0	0	0	20	true	false	false	0	0	4
4	Intersection 5 High School Rd (v1)	Urban/Suburban Arterial Intersection Four-Legged Signalized	717+63.480	4	Signalized	0	0	0	0	0	0	20	true	false	false	0	0	4

[Table 3. Predicted Highway Crash Rates and Frequencies Summary \(Section 1\)](#)

First Year of Analysis	2025
Last Year of Analysis	2045
Evaluated Length (mi)	2.8125
Average Future Road AADT (vpd)	42,145
Predicted Crashes	
Total Crashes	2,271.42
Fatal and Injury Crashes	709.77
Property-Damage-Only Crashes	1,561.65
Percent of Total Predicted Crashes	
Percent Fatal and Injury Crashes (%)	31
Percent Property-Damage-Only Crashes (%)	69
Predicted Crash Rate	
Crash Rate (crashes/mi/yr)	38.4579
FI Crash Rate (crashes/mi/yr)	12.0172
PDO Crash Rate (crashes/mi/yr)	26.4407
Predicted Travel Crash Rate	
Total Travel (million veh-mi)	908.54
Travel Crash Rate (crashes/million veh-mi)	2.50
Travel FI Crash Rate (crashes/million veh-mi)	0.78
Travel PDO Crash Rate (crashes/million veh-mi)	1.72

Table 4. Predicted Crash Frequencies and Rates by Highway Segment/Intersection (Section 1)

Segment Number/Intersection Name/Cross Road	Start Location (Sta. ft)	End Location (Sta. ft)	Length (mi)	Total Predicted Crashes for Evaluation Period	Predicted Total Crash Frequency (crashes/yr)	Predicted FI Crash Frequency (crashes/yr)	Predicted PDO Crash Frequency (crashes/yr)	Predicted Crash Rate (crashes/mi/yr)	Predicted Travel Crash Rate (crashes/million veh-mi)	Predicted Intersection Travel Crash Rate (crashes/million veh)
1	569+35.000	605+23.779	0.6797	329.772	15.7034	4.4309	11.2726	23.1037	1.51	
Intersection 2 Richie Ave (v1)	585+02.180			213.860	10.1838	3.6769	6.5069			0.59
2	605+23.779	610+54.680	0.1005	45.708	2.1766	0.6124	1.5641	21.6468	1.41	
Intersection 3 County Club Rd (v1)	610+54.680			229.006	10.9051	3.9040	7.0010			0.55
3	610+54.680	616+23.705	0.1078	52.699	2.5095	0.7081	1.8014	23.2854	1.51	
4	616+23.705	657+91.478	0.7894	373.045	17.7640	5.0050	12.7590	22.5046	1.46	
5	657+91.478	669+33.145	0.2162	136.649	6.5071	1.8530	4.6541	30.0941	1.95	
Intersection 4 Girls School Rd (v1)	663+62.290			221.836	10.5636	3.7877	6.7760			0.55
6	669+33.145	712+11.685	0.8103	383.384	18.2564	5.1440	13.1124	22.5296	1.46	
7	712+11.685	717+85.000	0.1086	51.050	2.4310	0.6848	1.7462	22.3882	1.45	
Intersection 5 High School Rd (v1)	717+63.480			234.410	11.1624	3.9916	7.1708			0.55
All Segments			2.8125	1,372.307	65.3479	18.4382	46.9097	23.2348	1.51	
All Intersections				899.113	42.8149	15.3602	27.4547			0.56
Total			2.8125	2,271.420	108.1628	33.7984	74.3644	38.4579		

Table 5. Predicted Crash Frequencies and Rates by Horizontal Design Element (Section 1)

Title	Start Location (Sta. ft)	End Location (Sta. ft)	Length (mi)	Total Predicted Crashes for Evaluation Period	Predicted Total Crash Frequency (crashes/yr)	Predicted FI Crash Frequency (crashes/yr)	Predicted PDO Crash Frequency (crashes/yr)	Predicted Crash Rate (crashes/mi/yr)	Predicted Travel Crash Rate (crashes/million veh-mi)
Tangent	569+35.000	605+23.779	0.6797	329.772	15.7034	4.4309	11.2726	23.1037	1.51
Simple Curve 1	605+23.779	616+23.705	0.2083	98.407	4.6860	1.3205	3.3655	22.4945	1.46
Tangent	616+23.705	657+91.478	0.7894	373.045	17.7640	5.0050	12.7590	22.5046	1.46
Simple Curve 2	657+91.478	669+33.145	0.2162	136.649	6.5071	1.8530	4.6541	30.0941	1.95
Tangent	669+33.145	712+11.685	0.8103	383.384	18.2564	5.1440	13.1124	22.5296	1.46
Simple Curve 3	712+11.685	717+85.000	0.1086	51.050	2.4310	0.6848	1.7462	22.3882	1.45

Table 6. Predicted Crash Frequencies by Year (Section 1)

Year	Total Crashes	FI Crashes	Percent FI (%)	PDO Crashes	Percent PDO (%)
2025	101.78	31.75	31.195	70.03	68.805
2026	102.42	31.95	31.201	70.46	68.799
2027	103.05	32.16	31.206	70.89	68.794
2028	103.69	32.36	31.211	71.33	68.789
2029	104.32	32.57	31.216	71.76	68.784
2030	104.96	32.77	31.221	72.19	68.779
2031	105.60	32.97	31.226	72.62	68.774
2032	106.23	33.18	31.231	73.06	68.769
2033	106.87	33.38	31.237	73.49	68.763
2034	107.51	33.59	31.242	73.92	68.758
2035	108.15	33.79	31.247	74.36	68.753
2036	108.79	34.00	31.252	74.79	68.748
2037	109.43	34.20	31.257	75.23	68.743
2038	110.07	34.41	31.262	75.66	68.738
2039	110.72	34.62	31.267	76.10	68.733
2040	111.36	34.82	31.272	76.53	68.728
2041	112.00	35.03	31.277	76.97	68.723
2042	112.65	35.24	31.282	77.41	68.718
2043	113.29	35.45	31.287	77.84	68.713
2044	113.94	35.65	31.292	78.28	68.708
2045	114.58	35.86	31.297	78.72	68.703
Total	2,271.42	709.77	31.248	1,561.65	68.752
Average	108.16	33.80	31.248	74.36	68.752

Note: Fatal and Injury Crashes and Property Damage Only Crashes do not necessarily sum up to Total Crashes because the distribution of these three crashes had been derived independently.

Table 7. Predicted Five Lane or Fewer Crash Type Distribution (Section 1)

Element Type	Crash Type	Fatal and Injury		Property Damage Only		Total	
		Crashes	Crashes (%)	Crashes	Crashes (%)	Crashes	Crashes (%)
Highway Segment	Collision with Animal	0.49	0.0	5.85	0.3	6.33	0.3
Highway Segment	Collision with Bicycle	15.91	0.7	0.00	0.0	15.91	0.7
Highway Segment	Collision with Fixed Object	12.09	0.5	91.67	4.0	103.76	4.6
Highway Segment	Collision with Other Object	0.15	0.0	7.28	0.3	7.43	0.3
Highway Segment	Other Single-vehicle Collision	17.64	0.8	14.56	0.6	32.21	1.4
Highway Segment	Collision with Pedestrian	30.50	1.3	0.00	0.0	30.50	1.3
Highway Segment	Total Single Vehicle Crashes	76.78	3.4	119.36	5.3	196.14	8.6
Highway Segment	Angle Collision	12.24	0.5	40.57	1.8	52.81	2.3
Highway Segment	Driveway-related Collision	65.55	2.9	178.13	7.8	243.68	10.7
Highway Segment	Head-on Collision	5.14	0.2	2.75	0.1	7.89	0.3
Highway Segment	Other Multi-vehicle Collision	4.41	0.2	19.94	0.9	24.35	1.1
Highway Segment	Rear-end Collision	207.16	9.1	447.64	19.7	654.80	28.8
Highway Segment	Sideswipe, Opposite Direction Collision	0.98	0.0	6.19	0.3	7.17	0.3
Highway Segment	Sideswipe, Same Direction Collision	14.94	0.7	170.53	7.5	185.47	8.2
Highway Segment	Total Multiple Vehicle Crashes	310.43	13.7	865.74	38.1	1,176.17	51.8
Highway Segment	Total Highway Segment Crashes	387.20	17.0	985.10	43.4	1,372.31	60.4
Intersection	Collision with Animal	0.02	0.0	0.07	0.0	0.08	0.0
Intersection	Collision with Bicycle	13.27	0.6	0.00	0.0	13.27	0.6
Intersection	Collision with Fixed Object	6.80	0.3	28.32	1.2	35.12	1.5
Intersection	Non-Collision	1.29	0.1	1.11	0.0	2.40	0.1
Intersection	Collision with Other Object	0.66	0.0	2.28	0.1	2.94	0.1
Intersection	Other Single-vehicle Collision	0.37	0.0	0.75	0.0	1.11	0.0
Intersection	Collision with Parked Vehicle	0.01	0.0	0.03	0.0	0.04	0.0
Intersection	Collision with Pedestrian	1.45	0.1	0.00	0.0	1.45	0.1
Intersection	Total Intersection Single Vehicle Crashes	23.86	1.1	32.55	1.4	56.41	2.5
Intersection	Angle Collision	103.65	4.6	132.74	5.8	236.39	10.4
Intersection	Head-on Collision	14.64	0.6	16.32	0.7	30.96	1.4
Intersection	Other Multi-vehicle Collision	16.43	0.7	114.78	5.1	131.21	5.8
Intersection	Rear-end Collision	134.42	5.9	262.75	11.6	397.17	17.5
Intersection	Sideswipe	29.57	1.3	17.41	0.8	46.98	2.1
Intersection	Total Intersection Multiple Vehicle Crashes	298.71	13.2	544.00	23.9	842.71	37.1
Intersection	Total Intersection Crashes	322.56	14.2	576.55	25.4	899.11	39.6
	Total Crashes	709.77	31.2	1,561.65	68.8	2,271.42	100.0

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Crash Prediction Evaluation Report

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User Name: ibrahem.shatnawi

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Project Comment: Created Thu Jan 05 11:55:36 EST 2023

Project Unit System: U.S. Customary

Highway Title: US 36

Highway Comment: Imported from US 36 ALIGNMENTS.xml

Highway Version: 1

Evaluation Title: Evaluation 18

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Minimum Location: 569+35.000

Maximum Location: 717+85.000

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Section Types

Section 1 Evaluation

Section: Section 1

Evaluation Start Location: 569+35.000

Evaluation End Location: 717+85.000

Area Type: Urban

Functional Class: Arterial

Type of Alignment: Divided, Multilane

Model Category: Urban/Suburban Arterial

Calibration Factor: 4D=1.0; 4SG=1.0;

Crash Prediction Summary, Section 1 (Divided, Multilane; Urban; Arterial)
 Project: US 36- Alternative 1(Copy 1), Evaluation: Evaluation 18
 Highway: US 36

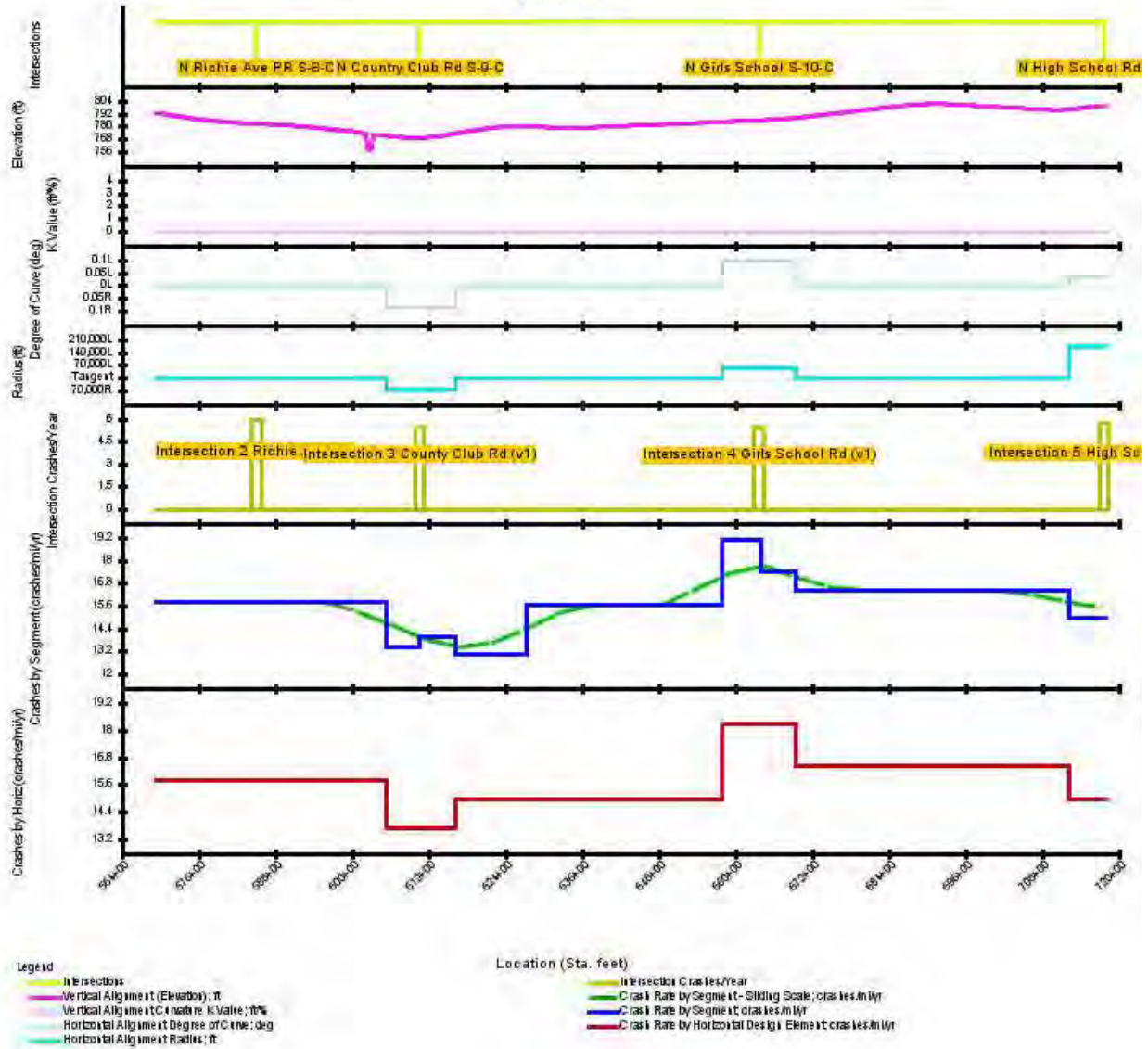


Figure 1. Crash Prediction Summary (Section 1)

[Table 1. Evaluation Highway - Homogeneous Segments \(Section 1\)](#)

IHSDM Analysis Report (Preferred Alternative)

Segment No.	Type	Start Location (Sta. ft)	End Location (Sta. ft)	Length (ft)	Length (mi)	Number Major Commercial Driveways	Number Minor Commercial Driveways	Number Major Industrial/Institutional	Number Minor Industrial/Institutional	Number Major Residential Driveways	Number Minor Residential Driveways	Number Other Driveways	Lighting	Automated Speed Enforcement	Density (fixed objects/mi)	Median Width (ft)	Type	Effective Median Width (ft)	Speed Level	Number Highway Crossings	Average Lane Width (ft)
1	Urban/Suburban Arterial Segment Six-lane Divided	569+35.0	605+23.7	3,588	0.679	0	5	0	0	0	0	25	6	false	0.0	12.00	Non-Traversable Median	16.00	Intermediate/High	0	11.33
2	Urban/Suburban Arterial Segment Six-lane Divided	605+23.7	610+54.6	530.90	0.100	0	1	0	0	0	0	1	1	false	0.0	12.00	Non-Traversable Median	16.00	Intermediate/High	0	11.33
3	Urban/Suburban Arterial Segment Six-lane Divided	610+54.6	616+23.7	569.03	0.107	0	2	0	0	0	0	1	1	false	0.0	12.00	Non-Traversable Median	16.00	Intermediate/High	0	11.33
4	Urban/Suburban Arterial Segment Six-lane Divided	616+23.7	627+24.0	1,100	0.208	0	1	0	0	0	0	1	1	false	0.0	12.00	Non-Traversable Median	16.00	Intermediate/High	0	11.33
5	Urban/Suburban Arterial Segment Six-lane Divided	627+24.0	657+91.4	3,067	0.581	0	12	0	0	0	0	3	3	false	0.0	12.00	Non-Traversable Median	16.00	Intermediate/High	0	11.33

IHSDM Analysis Report (Preferred Alternative)

6	Urban/Suburban Arterial Segment Six-lane Divided	657+91.4 664+00.0	78 00	608.52 3	0.115	0	7	0	0	0	0	0	0	0	0	0	0	0	2	false	0.0	12.00	Non-Traversable Median	16.00	Intermediate/High	0	2.00	11.33
7	Urban/Suburban Arterial Segment Six-lane Divided	664+00.0 669+33.1	00 45	533.14 0	0.101	0	5	0	0	0	0	0	0	0	0	0	0	0	0	false	0.0	12.00	Non-Traversable Median	16.00	Intermediate/High	0	2.00	11.33
8	Urban/Suburban Arterial Segment Six-lane Divided	669+33.1 712+11.6	45 85	4,278.54 3	0.810	0	2	0	0	0	28	10	0	0	0	0	0	0	10	false	0.0	12.00	Non-Traversable Median	16.00	Intermediate/High	0	2.00	11.33
9	Urban/Suburban Arterial Segment Six-lane Divided	712+11.6 717+85.0	85 00	573.31 6	0.108	0	2	0	0	0	0	0	0	0	0	0	0	0	0	false	0.0	12.00	Non-Traversable Median	16.00	Intermediate/High	0	2.00	11.33

Table 2. Evaluation Intersection (Section 1)

Inter. No.	Title	Type	Location (Sta. ft)	Legs	Traffic Control	Approaches w/Left Turn Lanes	Approaches w/Right Turn Lanes	Approaches w/o Right Turn on Red	Pedestrian Volume (crossings/day)	Lighted at Night	Red Light Camera	School Nearby	Number of Bus Stops	Number of Alcohol Sales Establishments	Max Lanes Crossed
1	Intersection 4 Girls School Rd (v1)	Urban/Suburban Arterial Intersection Four-Legged Signalized	663+62.290	4	Signalized	0	0	0	20	true	false	false	0	0	6
2	Intersection 2 Richie Ave (v1)	Urban/Suburban Arterial Intersection Four-Legged Signalized	585+02.180	4	Signalized	0	0	0	20	true	false	false	0	0	6
3	Intersection 3 County Club Rd (v1)	Urban/Suburban Arterial Intersection Four-Legged Signalized	610+54.680	4	Signalized	0	0	0	20	true	false	false	0	0	6
4	Intersection 5 High School Rd (v1)	Urban/Suburban Arterial Intersection Four-Legged Signalized	717+63.480	4	Signalized	0	0	0	20	true	false	false	0	0	6

Table 3. User Defined CMF Used in the Eval Intersection CPM Evaluation (Section 1)

Site No.	Name	Description	Start CMF Year	End CMF Year	Severity	CMF Value
1	raised/curb left-turn channelization	raised/curb left-turn channelization	2025	2045	Total	0.7500
2	raised/curb left-turn channelization	raised/curb left-turn channelization	2025	2045	Total	0.7500
3	raised/curb left-turn channelization	raised/curb left-turn channelization	2025	2045	Total	0.7500
4	raised/curb left-turn channelization	raised/curb left-turn channelization	2025	2045	Total	0.7500

[Table 4. Predicted Highway Crash Rates and Frequencies Summary \(Section 1\)](#)

First Year of Analysis	2025
Last Year of Analysis	2045
Evaluated Length (mi)	2.8125
Average Future Road AADT (vpd)	42,384
Predicted Crashes	
Total Crashes	1,406.41
Fatal and Injury Crashes	638.04
Property-Damage-Only Crashes	768.37
Percent of Total Predicted Crashes	
Percent Fatal and Injury Crashes (%)	45
Percent Property-Damage-Only Crashes (%)	55
Predicted Crash Rate	
Crash Rate (crashes/mi/yr)	23.8123
FI Crash Rate (crashes/mi/yr)	10.8028
PDO Crash Rate (crashes/mi/yr)	13.0095
Predicted Travel Crash Rate	
Total Travel (million veh-mi)	913.70
Travel Crash Rate (crashes/million veh-mi)	1.54
Travel FI Crash Rate (crashes/million veh-mi)	0.70
Travel PDO Crash Rate (crashes/million veh-mi)	0.84

Table 5. Predicted Crash Frequencies and Rates by Highway Segment/Intersection (Section 1)

Segment Number/Intersection Name/Cross Road	Start Location (Sta. ft)	End Location (Sta. ft)	Length (mi)	Total Predicted Crashes for Evaluation Period	Predicted Total Crash Frequency (crashes/yr)	Predicted FI Crash Frequency (crashes/yr)	Predicted PDO Crash Frequency (crashes/yr)	Predicted Crash Rate (crashes/mi/yr)	Predicted Travel Crash Rate (crashes/million veh-mi)	Predicted Intersection Travel Crash Rate (crashes/million veh)
1	569+35.000	605+23.779	0.6797	225.326	10.7298	4.4005	6.3293	15.7863	1.07	
Intersection 2 Richie Ave (v1)	585+02.180			125.371	5.9701	3.1842	2.7859			0.36
2	605+23.779	610+54.680	0.1005	28.276	1.3465	0.5534	0.7931	13.3910	0.91	
Intersection 3 County Club Rd (v1)	610+54.680			115.353	5.4930	2.9318	2.5612			0.29
3	610+54.680	616+23.705	0.1078	31.579	1.5037	0.6177	0.8861	13.9533	0.95	
4	616+23.705	627+24.000	0.2084	57.184	2.7231	1.1196	1.6035	13.0672	0.89	
5	627+24.000	657+91.478	0.5810	191.193	9.1044	3.7713	5.3331	15.6713	0.96	
6	657+91.478	664+00.000	0.1153	46.129	2.1966	0.9080	1.2886	19.0594	1.17	
Intersection 4 Girls School Rd (v1)	663+62.290			114.761	5.4648	2.9285	2.5363			0.27
7	664+00.000	669+33.145	0.1010	36.953	1.7596	0.7257	1.0339	17.4267	1.11	
8	669+33.145	712+11.685	0.8103	279.006	13.2860	5.4832	7.8027	16.3958	1.04	
9	712+11.685	717+85.000	0.1086	34.168	1.6270	0.6722	0.9548	14.9843	0.95	
Intersection 5 High School Rd (v1)	717+63.480			121.115	5.7674	3.0868	2.6806			0.28
All Segments			2.8125	929.812	44.2768	18.2517	26.0251	15.7428	1.02	
All Intersections				476.601	22.6953	12.1312	10.5640			0.30
Total			2.8125	1,406.413	66.9720	30.3829	36.5891	23.8123		

Table 6. Predicted Crash Frequencies and Rates by Horizontal Design Element (Section 1)

Title	Start Location (Sta. ft)	End Location (Sta. ft)	Length (mi)	Total Predicted Crashes for Evaluation Period	Predicted Total Crash Frequency (crashes/yr)	Predicted FI Crash Frequency (crashes/yr)	Predicted PDO Crash Frequency (crashes/yr)	Predicted Crash Rate (crashes/mi/yr)	Predicted Travel Crash Rate (crashes/million veh-mi)
Tangent	569+35.000	605+23.779	0.6797	225.326	10.7298	4.4005	6.3293	15.7863	1.07
Simple Curve 1	605+23.779	616+23.705	0.2083	59.854	2.8502	1.1711	1.6791	13.6819	0.93
Tangent	616+23.705	657+91.478	0.7894	248.377	11.8275	4.8909	6.9365	14.9838	0.94
Simple Curve 2	657+91.478	669+33.145	0.2162	83.081	3.9562	1.6337	2.3225	18.2969	1.14
Tangent	669+33.145	712+11.685	0.8103	279.006	13.2860	5.4832	7.8027	16.3958	1.04
Simple Curve 3	712+11.685	717+85.000	0.1086	34.168	1.6270	0.6722	0.9548	14.9843	0.95

Table 7. Predicted Crash Frequencies by Year (Section 1)

Year	Total Crashes	FI Crashes	Percent FI (%)	PDO Crashes	Percent PDO (%)
2025	63.78	28.88	45.275	34.90	54.725
2026	64.10	29.03	45.284	35.07	54.716
2027	64.42	29.18	45.293	35.24	54.707
2028	64.74	29.33	45.302	35.41	54.698
2029	65.06	29.48	45.312	35.58	54.688
2030	65.38	29.63	45.321	35.75	54.679
2031	65.69	29.78	45.330	35.92	54.670
2032	66.01	29.93	45.339	36.08	54.661
2033	66.33	30.08	45.347	36.25	54.653
2034	66.65	30.23	45.356	36.42	54.644
2035	66.97	30.38	45.365	36.59	54.635
2036	67.29	30.53	45.374	36.76	54.626
2037	67.61	30.68	45.383	36.93	54.617
2038	67.93	30.84	45.392	37.09	54.608
2039	68.25	30.99	45.401	37.26	54.599
2040	68.57	31.14	45.410	37.43	54.590
2041	68.89	31.29	45.419	37.60	54.581
2042	69.21	31.44	45.427	37.77	54.573
2043	69.53	31.59	45.436	37.94	54.564
2044	69.84	31.74	45.445	38.10	54.555
2045	70.17	31.89	45.454	38.27	54.546
Total	1,406.41	638.04	45.367	768.37	54.633
Average	66.97	30.38	45.367	36.59	54.633

Note: Fatal and Injury Crashes and Property Damage Only Crashes do not necessarily sum up to Total Crashes because the distribution of these three crashes had been derived independently.

Table 8. Predicted Crash Severity by Urban Arterial/Intersection (Section 1)

Seg. No.	Type	Fatal (K) Crashes (crashes)	Incapacitating Injury (A) Crashes (crashes)	Non-Incapacitating Injury (B) Crashes (crashes)	Possible Injury (C) Crashes (crashes)	No Injury (O) Crashes (crashes)
1	USA Segment 6+ Lanes	1.1844	6.2289	24.2206	60.7765	132.9160
2	USA Intersection 6+ Lanes	0.4458	4.2968	18.7197	43.4052	58.5038
2	USA Segment 6+ Lanes	0.1489	0.7833	3.0460	7.6432	16.6541
3	USA Intersection 6+ Lanes	0.4105	3.9562	17.2359	39.9645	53.7858
3	USA Segment 6+ Lanes	0.1662	0.8744	3.3998	8.5312	18.6071
4	USA Segment 6+ Lanes	0.3013	1.5848	6.1623	15.4630	33.6729
5	USA Segment 6+ Lanes	1.0150	5.3383	20.7577	52.0870	111.9945
6	USA Segment 6+ Lanes	0.2444	1.2853	4.9977	12.5407	27.0606
1	USA Intersection 6+ Lanes	0.4100	3.9518	17.2168	39.9204	53.2624
7	USA Segment 6+ Lanes	0.1953	1.0273	3.9945	10.0233	21.7122
8	USA Segment 6+ Lanes	1.4758	7.7615	30.1801	75.7306	163.8576
9	USA Segment 6+ Lanes	0.1809	0.9515	3.6999	9.2841	20.0512
4	USA Intersection 6+ Lanes	0.4322	4.1654	18.1473	42.0778	56.2927
All Segments		4.9123	25.8354	100.4585	252.0795	546.5262
All Intersections		1.6984	16.3701	71.3197	165.3679	221.8447
Total		6.6108	42.2055	171.7782	417.4473	768.3709

Table 9. Predicted Six Lane or Greater Crash Type Distribution (Section 1)

Element Type	Crash Type	Fatal and Injury		Property Damage Only		Total	
		Crashes	Crashes (%)	Crashes	Crashes (%)	Crashes	Crashes (%)
Highway Segment	Angle Collision	29.22	2.1	40.06	2.8	69.28	4.9
Highway Segment	Head-on Collision	3.85	0.3	5.93	0.4	9.79	0.7
Highway Segment	Other Multi-vehicle Collision	9.63	0.7	16.32	1.2	25.95	1.8
Highway Segment	Rear-end Collision	246.95	17.6	292.30	20.8	539.25	38.4
Highway Segment	Sideswipe, Opposite Direction Collision	3.53	0.3	9.89	0.7	13.42	1.0
Highway Segment	Sideswipe, Same Direction Collision	27.94	2.0	129.58	9.2	157.52	11.2
Highway Segment	Total Segment Multiple Vehicle Crashes	321.13	22.8	494.09	35.1	815.22	58.0
Highway Segment	Collision with Bicycle	7.27	0.5	0.00	0.0	7.27	0.5
Highway Segment	Collision with Fixed Object Left Side	12.21	0.9	18.33	1.3	30.54	2.2
Highway Segment	Collision with Fixed Object Right Side	13.70	1.0	20.62	1.5	34.31	2.4
Highway Segment	Collision with Other Object	1.32	0.1	3.79	0.3	5.11	0.4
Highway Segment	Other Single-vehicle Collision	13.98	1.0	9.19	0.7	23.18	1.6
Highway Segment	Collision with Pedestrian	13.63	1.0	0.00	0.0	13.63	1.0
Highway Segment	Total Segment Single Vehicle Six Lanes or More Crashes	62.12	4.4	51.94	3.7	114.05	8.1
Highway Segment	Total Highway Segment Crashes	383.24	27.3	546.03	38.8	929.28	66.1
Intersection	Angle Collision	182.56	13.0	122.46	8.7	305.01	21.7
Intersection	Collision with Bicycle	8.87	0.6	0.00	0.0	8.87	0.6
Intersection	Head-on Collision	22.76	1.6	10.21	0.7	32.96	2.3
Intersection	Other Multi-vehicle Collision	7.10	0.5	4.88	0.3	11.98	0.9
Intersection	Other Single-vehicle Collision	2.94	0.2	13.53	1.0	16.47	1.2
Intersection	Collision with Pedestrian	1.18	0.1	0.00	0.0	1.18	0.1
Intersection	Rear-end Collision	20.31	1.4	32.83	2.3	53.14	3.8
Intersection	Sideswipe	9.30	0.7	37.94	2.7	47.23	3.4
Intersection	Total Intersection Total Vehicle Crashes	255.00	18.1	221.84	15.8	476.85	33.9
Intersection	Total Intersection Crashes	255.00	18.1	221.84	15.8	476.85	33.9
	Total Crashes	638.25	45.4	767.88	54.6	1,406.12	100.0

Note: Fatal and Injury Crashes and Property Damage Only Crashes do not necessarily sum up to Total Crashes because the distribution of these three crashes had been derived independently.

Interactive Highway Safety Design Model

Crash Prediction Evaluation Report

January 27, 2023

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Report Overview

Report Generated: Jan 27, 2023 8:36 AM

Report Template: System: Single Page [System] (mlcpm3, Dec 5, 2019 3:16 PM)

Evaluation Date: Thu Jan 26 19:02:38 EST 2023

IHSDM Version: v17.0.0 (Sep 22, 2021)

Crash Prediction Module: v12.0.0 (Sep 22, 2021)

User Name: ibrahem.shatnawi

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Project Title: US 36- Alternative 2(Copy 1)

Project Comment: Created Thu Jan 05 11:55:36 EST 2023

Project Unit System: U.S. Customary

Highway Title: US 36

Highway Comment: Imported from US 36 ALIGNMENTS.xml

Highway Version: 1

Evaluation Title: Evaluation 26

Evaluation Comment: Created Thu Jan 26 19:01:03 EST 2023

Minimum Location: 569+35.000

Maximum Location: 717+85.000

Policy for Superelevation: AASHTO 2011 U.S. Customary

Calibration: HSM Configuration

Crash Distribution: HSM Configuration

Model/CMF: HSM Configuration

First Year of Analysis: 2025

Last Year of Analysis: 2045

Empirical-Bayes Analysis: None

Disclaimer Regarding Crash Prediction Method

IMPORTANT NOTICE ABOUT COMPARING RESULTS FROM HIGHWAY SAFETY MANUAL FIRST EDITION (2010) MODELS TO RESULTS FROM NEW MODELS DEVELOPED UNDER NCHRP PROJECTS 17-70, 17-58, AND 17-68

Since the publication of the Highway Safety Manual - First Edition (HSM-1), in 2010 by the American Association of State Highway and Transportation Officials (AASHTO), multiple research efforts have been undertaken through the National Cooperative Highway Research Program (NCHRP) to develop safety performance models for road segment and intersection facility types that were not initially reflected in the HSM-1, in order to expand the breadth and depth of the HSM in the future.

The IHSDM Crash Prediction Module (CPM) is intended as a faithful implementation of HSM Part C predictive methods. As NCHRP projects to develop new predictive methods for the HSM are completed, FHWA works to incorporate the new methods into IHSDM, sometimes in advance of publication in the HSM. The following new crash predictive methods have been accepted by NCHRP project panels and incorporated into IHSDM, while pending AASHTO's approval for incorporation into a future edition of the HSM:

- Roundabouts: completed in 2018 under NCHRP Project 17-70, the new methods will provide improved outcomes for the safety analysis of roundabouts.
- 6+ lane and one-way urban/suburban arterials (including models for segments and intersections): completed under NCHRP Project 17-58.
- Intersection crash prediction methods for some intersection configurations and traffic control types not currently addressed in the HSM (e.g., all-way stop; rural 3-leg signalized; 3-leg stop-controlled where the major leg turns; urban 5-leg signalized; urban high-speed intersections): completed in 2021 under NCHRP Project 17-68.

However, in the absence of local calibration factors (see HSM-1 Part C, Appendix A for guidance on calibration of the predictive models), it is neither appropriate nor advisable to directly compare the results from new models (from NCHRP Projects 17-58, 17-68, and 17-70) to results from HSM-1 models, as the models were not calibrated to the same base state data sets, and consequently can produce unexpected results. If local calibration factors are available and applied to both new models and HSM-1 models, then it may be appropriate to directly compare the results. [Note: Work being performed under NCHRP Project 17-72 (Update of Crash Modification Factors for the Highway Safety Manual) is expected to re-calibrate many of the old (HSM-1) and new (e.g., NCHRP 17-70) models to data from a single (or small number of) states, that would allow results from all models to be directly compared.]

The models produced for NCHRP Project 17-70 have independent value in terms of informing the design of a roundabout and assessing the effects of different design characteristics on the expected safety performance of a roundabout.

The HSM-1 interim method previously included in IHSDM for evaluating roundabouts on urban/suburban arterials (i.e., evaluating an existing intersection and then applying a Crash Modification Factor for replacing the existing intersection with a roundabout) has been deactivated in IHSDM, to minimize any confusion with the new roundabout methodology.

Section Types

Section 1 Evaluation

Section: Section 1

Evaluation Start Location: 569+35.000

Evaluation End Location: 717+85.000

Area Type: Urban

Functional Class: Arterial

Type of Alignment: Divided, Multilane

Model Category: Urban/Suburban Arterial

Calibration Factor: 4D=1.0; 4SG=1.0;

Crash Prediction Summary, Section 1 (Divided, Multilane; Urban; Arterial)
 Project: US 36- Alternative 2(Copy 1), Evaluation: Evaluation 26
 Highway: US 36

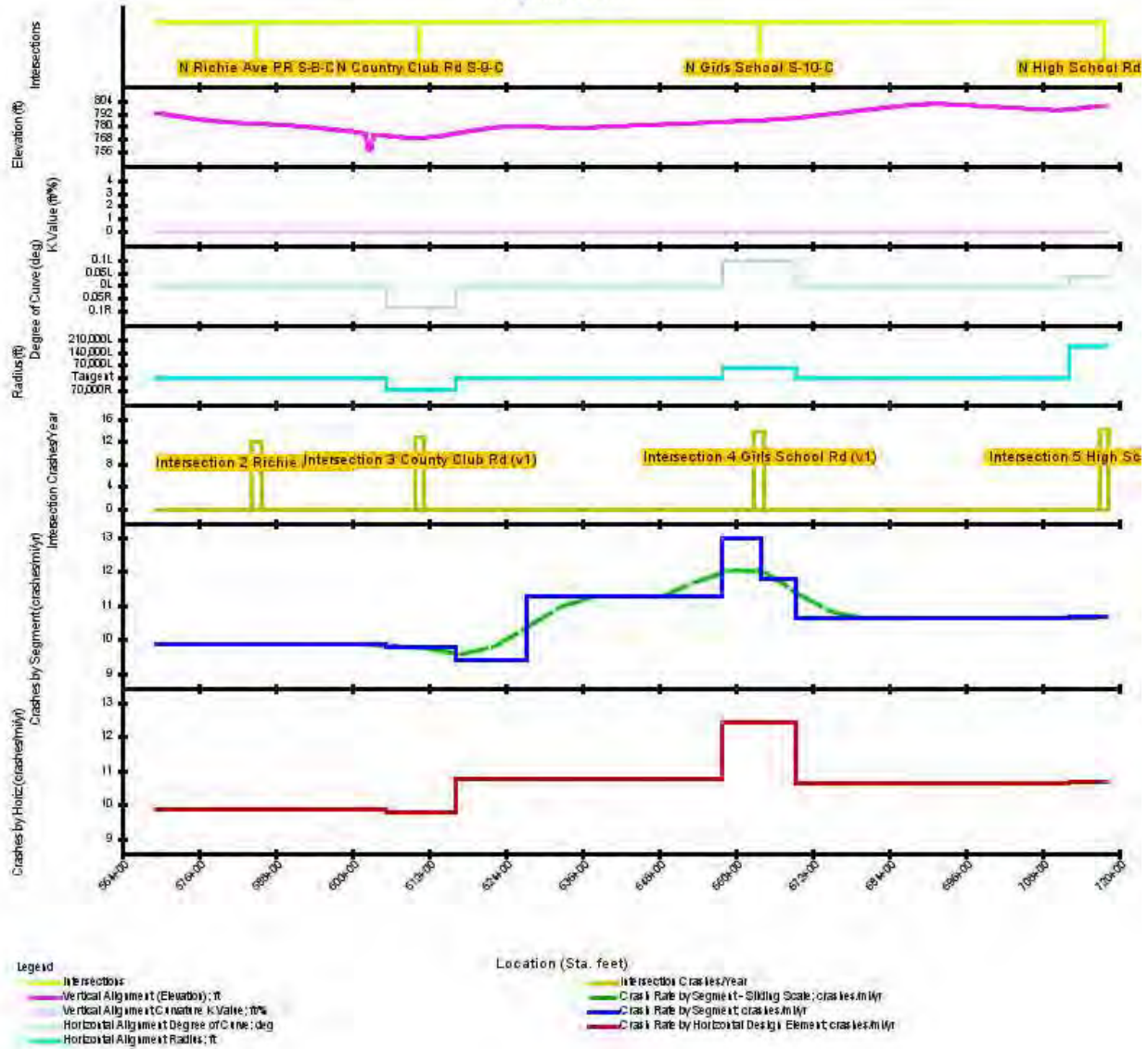


Figure 1. Crash Prediction Summary (Section 1)

[Table 1. Evaluation Highway - Homogeneous Segments \(Section 1\)](#)

IHSDM Analysis Report (Displaced Lefts Alternative)

Seg. No.	Type	Start Location (Sta. ft)	End Location (Sta. ft)	Length (ft)	Length (mi)	Number Major Commercial Driveways	Number Minor Commercial Driveways	Number Major Industrial/Institutional	Number Minor Industrial/Institutional	Number Major Residential Driveways	Number Minor Residential Driveways	Number Other Driveways	Lighting Enforcement	Automated Speed Enforcement	Density (fixed objects/mi)	Median Width (ft)	Effective Median Width (ft)	Speed Level	Number Highway Crossings	Average Shoulder Width (ft)	Average Lane Width (ft)
1	Urban/Suburban Arterial Segment Four-lane Divided	569+35.000	605+23.779	3,588.78	0.6797	0	5	0	0	0	25	6	false	false	0.0	0.00	0.00	Intermediate/High	0	2.00	12.00
2	Urban/Suburban Arterial Segment Four-lane Divided	605+23.779	616+23.705	1,099.93	0.2083	0	3	0	0	0	0	2	false	false	0.0	0.00	0.00	Intermediate/High	0	2.00	12.00
3	Urban/Suburban Arterial Segment Four-lane Divided	616+23.705	627+24.000	1,100.29	0.2084	0	1	0	0	0	0	1	false	false	0.0	0.00	0.00	Intermediate/High	0	2.00	12.00
4	Urban/Suburban Arterial Segment Four-lane Divided	627+24.000	657+91.478	3,067.48	0.5810	0	12	0	0	0	0	3	false	false	0.0	0.00	0.00	Intermediate/High	0	2.00	12.00

[Table 2. Evaluation Intersection \(Section 1\)](#)

Inter. No.	Title	Type	Location (Sta. ft)	Legs	Traffic Control	Approaches w/Left Turn Lanes	Approaches w/Right Turn Lanes	Approaches w/o Right Turn on Red	Pedestrian Volume (crossings/day)	Lighted at Night	Red Light Camera	School Nearby	Number of Bus Stops	Number of Alcohol Sales Establishments	Max Lanes Crossed
1	Intersection 4 Girls School Rd (v1)	Urban/Suburban Arterial Intersection Four-Legged Signalized	663+62.290	4	Signalized	0	0	0	20	true	false	false	0	0	4
2	Intersection 2 Richie Ave (v1)	Urban/Suburban Arterial Intersection Four-Legged Signalized	585+02.180	4	Signalized	0	0	0	20	true	false	false	0	0	4
3	Intersection 3 County Club Rd (v1)	Urban/Suburban Arterial Intersection Four-Legged Signalized	610+54.680	4	Signalized	0	0	0	20	true	false	false	0	0	4
4	Intersection 5 High School Rd (v1)	Urban/Suburban Arterial Intersection Four-Legged Signalized	717+63.480	4	Signalized	0	0	0	20	true	false	false	0	0	4

Table 3. User Defined CMF Used in the Eval Intersection CPM Evaluation (Section 1)

Site No.	Name	Description	Start CMF Year	End CMF Year	Severity	CMF Value
1	Convert intersection to displaced left turn intersection	Convert intersection to displaced left turn intersection	2025	2045	Total	1.2240
2	CONVERT INTERSECTION TO DISPLACED LEFT TURN INTERSECTION	CONVERT INTERSECTION TO DISPLACED LEFT TURN INTERSECTION	2025	2045	Total	1.2240
3	CONVERT INTERSECTION TO DISPLACED LEFT TURN INTERSECTION	CONVERT INTERSECTION TO DISPLACED LEFT TURN INTERSECTION	2025	2045	Total	1.2240
4	Convert intersection to displaced left turn intersection	Convert intersection to displaced left turn intersection	2025	2045	Total	1.2240

Table 4. Predicted Highway Crash Rates and Frequencies Summary (Section 1)

First Year of Analysis	2025
Last Year of Analysis	2045
Evaluated Length (mi)	2.8125
Average Future Road AADT (vpd)	42,384
Predicted Crashes	
Total Crashes	1,723.37
Fatal and Injury Crashes	567.65
Property-Damage-Only Crashes	1,155.71
Percent of Total Predicted Crashes	
Percent Fatal and Injury Crashes (%)	33
Percent Property-Damage-Only Crashes (%)	67
Predicted Crash Rate	
Crash Rate (crashes/mi/yr)	29.1787
FI Crash Rate (crashes/mi/yr)	9.6110
PDO Crash Rate (crashes/mi/yr)	19.5676
Predicted Travel Crash Rate	
Total Travel (million veh-mi)	913.70
Travel Crash Rate (crashes/million veh-mi)	1.89
Travel FI Crash Rate (crashes/million veh-mi)	0.62
Travel PDO Crash Rate (crashes/million veh-mi)	1.26

Table 5. Predicted Crash Frequencies and Rates by Highway Segment/Intersection (Section 1)

Segment Number/Intersection Name/Cross Road	Start Location (Sta. ft)	End Location (Sta. ft)	Length (mi)	Total Predicted Crashes for Evaluation Period	Predicted Total Crash Frequency (crashes/yr)	Predicted FI Crash Frequency (crashes/yr)	Predicted PDO Crash Frequency (crashes/yr)	Predicted Crash Rate (crashes/mi/yr)	Predicted Travel Crash Rate (crashes/million veh-mi)	Predicted Intersection Travel Crash Rate (crashes/million veh)
1	569+35.000	605+23.779	0.6797	141.147	6.7213	1.8692	4.8521	9.8887	0.67	
Intersection 2 Richie Ave (v1)	585+02.180			250.641	11.9353	4.2929	7.6424			0.72
2	605+23.779	616+23.705	0.2083	42.873	2.0416	0.5674	1.4742	9.8002	0.67	
Intersection 3 County Club Rd (v1)	610+54.680			267.061	12.7172	4.5337	8.1835			0.67
3	616+23.705	627+24.000	0.2084	41.154	1.9597	0.5427	1.4170	9.4041	0.64	
4	627+24.000	657+91.478	0.5810	137.634	6.5540	1.8183	4.7357	11.2813	0.69	
5	657+91.478	664+00.000	0.1153	31.450	1.4976	0.4201	1.0775	12.9946	0.80	
Intersection 4 Girls School Rd (v1)	663+62.290			287.465	13.6888	4.9327	8.7561			0.68
6	664+00.000	669+33.145	0.1010	25.008	1.1909	0.3329	0.8579	11.7937	0.75	
7	669+33.145	712+11.685	0.8103	180.949	8.6166	2.3891	6.2275	10.6335	0.68	
8	712+11.685	717+85.000	0.1086	24.323	1.1582	0.3212	0.8370	10.6667	0.68	
Intersection 5 High School Rd (v1)	717+63.480			293.660	13.9838	5.0107	8.9732			0.68
All Segments			2.8125	624.538	29.7399	8.2610	21.4789	10.5742	0.68	
All Intersections				1,098.828	52.3251	18.7700	33.5551			0.69
Total			2.8125	1,723.365	82.0650	27.0311	55.0340	29.1787		

Table 6. Predicted Crash Frequencies and Rates by Horizontal Design Element (Section 1)

Title	Start Location (Sta. ft)	End Location (Sta. ft)	Length (mi)	Total Predicted Crashes for Evaluation Period	Predicted Total Crash Frequency (crashes/yr)	Predicted FI Crash Frequency (crashes/yr)	Predicted PDO Crash Frequency (crashes/yr)	Predicted Crash Rate (crashes/mi/yr)	Predicted Travel Crash Rate (crashes/million veh-mi)
Tangent	569+35.000	605+23.779	0.6797	141.147	6.7213	1.8692	4.8521	9.8887	0.67
Simple Curve 1	605+23.779	616+23.705	0.2083	42.873	2.0416	0.5674	1.4742	9.8002	0.67
Tangent	616+23.705	657+91.478	0.7894	178.788	8.5137	2.3611	6.1527	10.7857	0.68
Simple Curve 2	657+91.478	669+33.145	0.2162	56.458	2.6885	0.7531	1.9354	12.4338	0.78
Tangent	669+33.145	712+11.685	0.8103	180.949	8.6166	2.3891	6.2275	10.6335	0.68
Simple Curve 3	712+11.685	717+85.000	0.1086	24.323	1.1582	0.3212	0.8370	10.6667	0.68

[Table 7. Predicted Crash Frequencies by Year \(Section 1\)](#)

Year	Total Crashes	FI Crashes	Percent FI (%)	PDO Crashes	Percent PDO (%)
2025	76.58	25.16	32.851	51.42	67.149
2026	77.12	25.34	32.860	51.78	67.140
2027	77.66	25.53	32.869	52.14	67.131
2028	78.21	25.71	32.877	52.50	67.123
2029	78.75	25.90	32.886	52.85	67.114
2030	79.30	26.09	32.895	53.22	67.105
2031	79.85	26.27	32.904	53.58	67.097
2032	80.40	26.46	32.912	53.94	67.088
2033	80.95	26.65	32.921	54.30	67.079
2034	81.50	26.84	32.929	54.66	67.071
2035	82.05	27.02	32.938	55.02	67.062
2036	82.60	27.21	32.946	55.39	67.054
2037	83.15	27.40	32.954	55.75	67.046
2038	83.71	27.59	32.962	56.12	67.038
2039	84.26	27.78	32.971	56.48	67.029
2040	84.82	27.97	32.979	56.85	67.021
2041	85.37	28.16	32.987	57.21	67.013
2042	85.93	28.35	32.995	57.58	67.005
2043	86.49	28.54	33.003	57.95	66.997
2044	87.05	28.73	33.011	58.31	66.989
2045	87.61	28.93	33.019	58.68	66.981
Total	1,723.37	567.65	32.939	1,155.71	67.061
Average	82.06	27.03	32.939	55.03	67.061

[Note: Fatal and Injury Crashes and Property Damage Only Crashes do not necessarily sum up to Total Crashes because the distribution of these three crashes had been derived independently.](#)

Table 8. Predicted Five Lane or Fewer Crash Type Distribution (Section 1)

Element Type	Crash Type	Fatal and Injury		Property Damage Only		Total	
		Crashes	Crashes (%)	Crashes	Crashes (%)	Crashes	Crashes (%)
Highway Segment	Collision with Animal	0.01	0.0	2.88	0.2	2.89	0.2
Highway Segment	Collision with Bicycle	3.05	0.2	0.00	0.0	3.05	0.2
Highway Segment	Collision with Fixed Object	5.45	0.3	37.14	2.2	42.60	2.5
Highway Segment	Collision with Other Object	0.30	0.0	0.73	0.0	1.04	0.1
Highway Segment	Other Single-vehicle Collision	5.14	0.3	4.93	0.3	10.07	0.6
Highway Segment	Collision with Pedestrian	11.59	0.7	0.00	0.0	11.59	0.7
Highway Segment	Total Single Vehicle Crashes	25.54	1.5	45.69	2.7	71.23	4.1
Highway Segment	Angle Collision	5.40	0.3	13.41	0.8	18.81	1.1
Highway Segment	Driveway-related Collision	13.02	0.8	32.83	1.9	45.85	2.7
Highway Segment	Head-on Collision	2.70	0.2	2.61	0.2	5.31	0.3
Highway Segment	Other Multi-vehicle Collision	6.48	0.4	26.45	1.5	32.93	1.9
Highway Segment	Rear-end Collision	112.25	6.5	246.62	14.3	358.88	20.8
Highway Segment	Sideswipe, Opposite Direction Collision	1.35	0.1	0.37	0.0	1.72	0.1
Highway Segment	Sideswipe, Same Direction Collision	6.75	0.4	83.08	4.8	89.82	5.2
Highway Segment	Total Multiple Vehicle Crashes	147.94	8.6	405.37	23.5	553.31	32.1
Highway Segment	Total Highway Segment Crashes	173.48	10.1	451.06	26.2	624.54	36.2
Intersection	Collision with Animal	0.02	0.0	0.08	0.0	0.10	0.0
Intersection	Collision with Bicycle	16.21	0.9	0.00	0.0	16.21	0.9
Intersection	Collision with Fixed Object	8.32	0.5	34.62	2.0	42.94	2.5
Intersection	Non-Collision	1.58	0.1	1.35	0.1	2.93	0.2
Intersection	Collision with Other Object	0.81	0.0	2.79	0.2	3.59	0.2
Intersection	Other Single-vehicle Collision	0.45	0.0	0.92	0.1	1.36	0.1
Intersection	Collision with Parked Vehicle	0.01	0.0	0.04	0.0	0.05	0.0
Intersection	Collision with Pedestrian	1.78	0.1	0.00	0.0	1.78	0.1
Intersection	Total Intersection Single Vehicle Crashes	29.17	1.7	39.79	2.3	68.96	4.0
Intersection	Angle Collision	126.66	7.3	162.23	9.4	288.88	16.8
Intersection	Head-on Collision	17.89	1.0	19.95	1.2	37.83	2.2
Intersection	Other Multi-vehicle Collision	20.07	1.2	140.29	8.1	160.36	9.3
Intersection	Rear-end Collision	164.25	9.5	321.13	18.6	485.38	28.2
Intersection	Sideswipe	36.13	2.1	21.28	1.2	57.41	3.3
Intersection	Total Intersection Multiple Vehicle Crashes	365.00	21.2	664.86	38.6	1,029.87	59.8
Intersection	Total Intersection Crashes	394.17	22.9	704.66	40.9	1,098.83	63.8
	Total Crashes	567.65	32.9	1,155.71	67.1	1,723.37	100.0

Note: Fatal and Injury Crashes and Property Damage Only Crashes do not necessarily sum up to Total Crashes because the distribution of these three crashes had been derived independently.