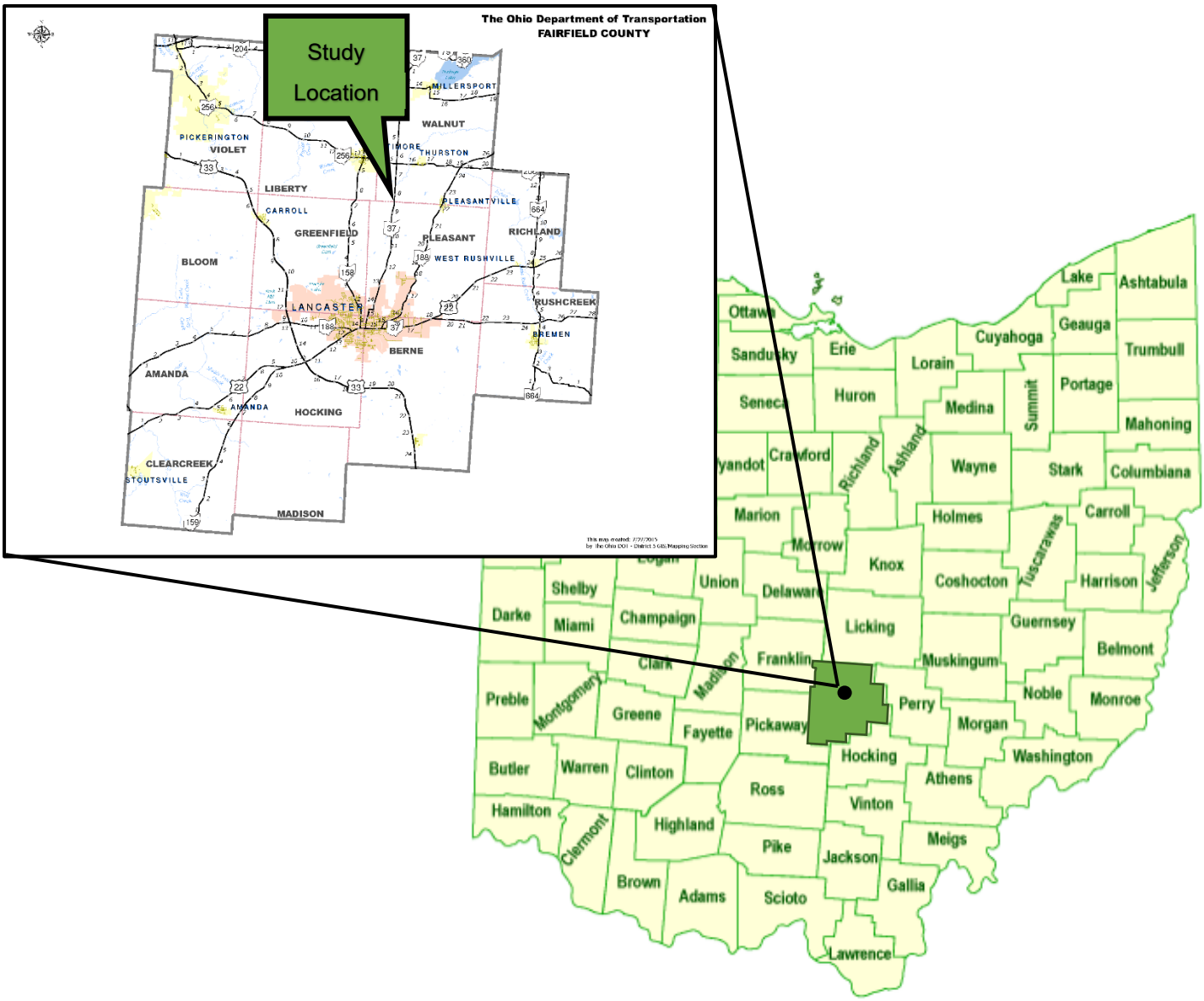
District 5 Highway Safety Program
Safety Study: FAI-37-8.37
SR 37 and Pleasantville Road
2018 HSIP #121 Rural Intersection



Completed By:

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Completion Date: September 3rd, 2021

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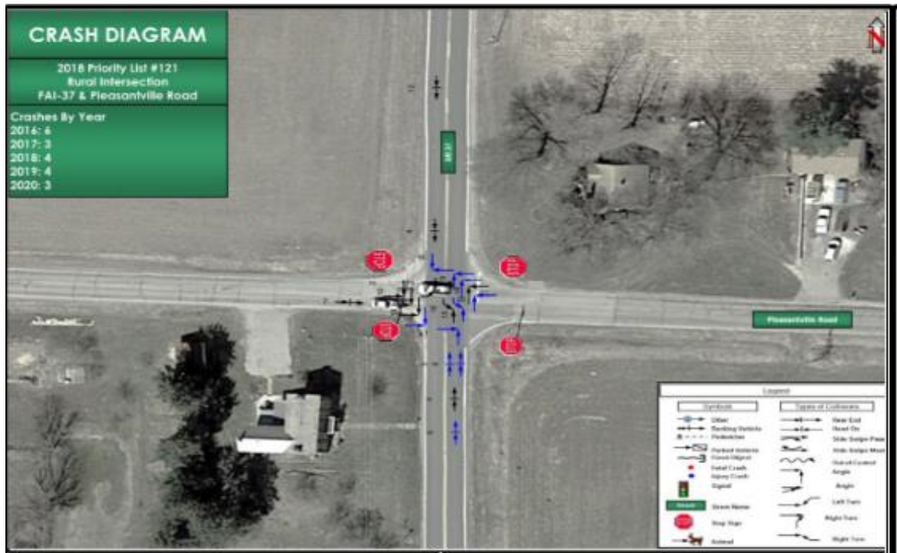
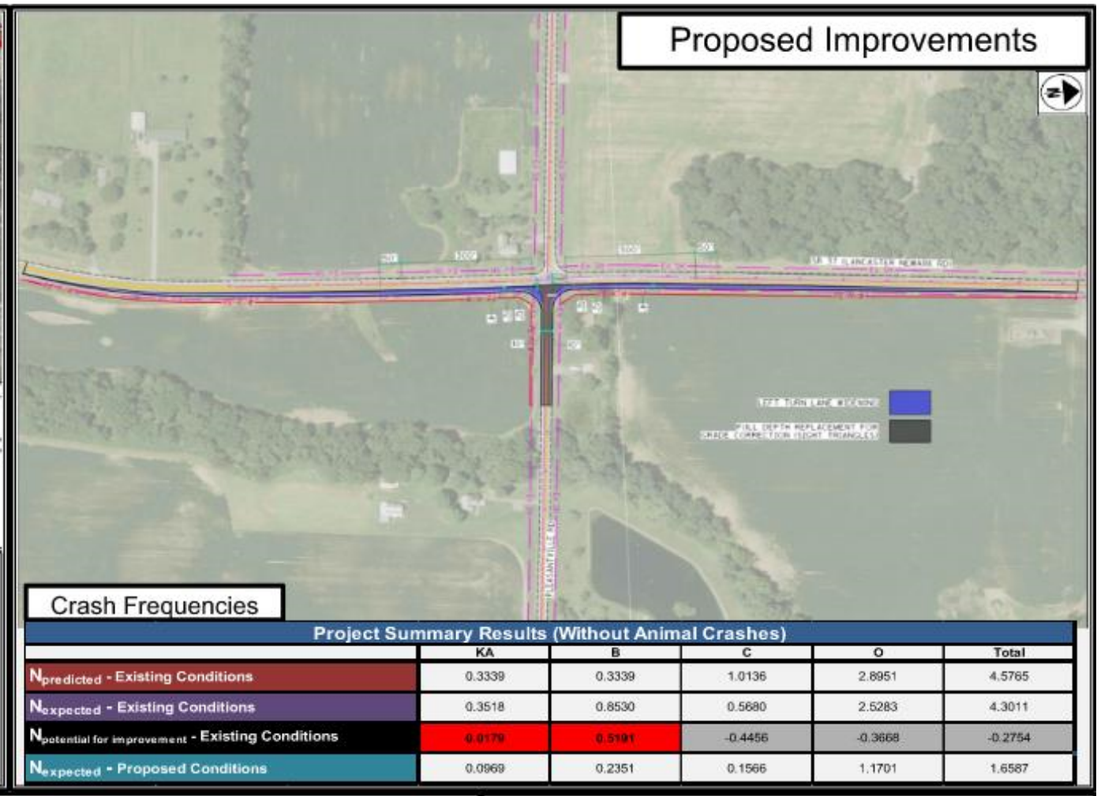
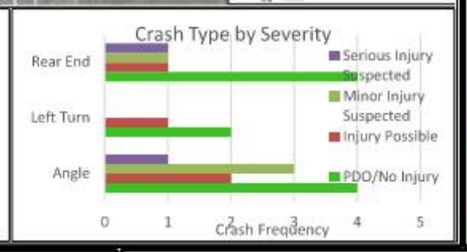
One Page Project Summary



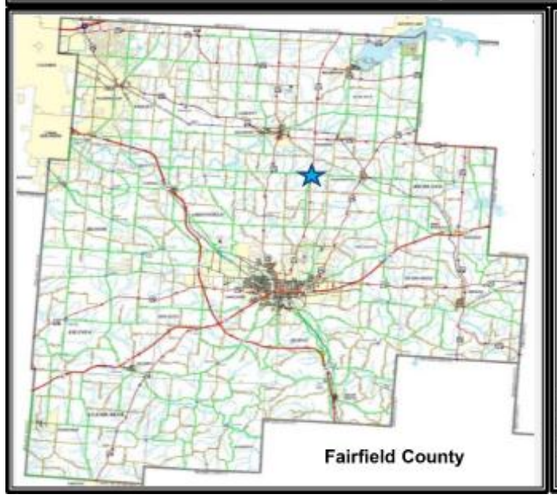




Crash Frequencies

Project Summary Results (Without Animal Crashes)

	KA	B	C	O	Total
$N_{predicted}$ - Existing Conditions	0.3339	0.3339	1.0136	2.8951	4.5765
$N_{expected}$ - Existing Conditions	0.3518	0.8530	0.5680	2.5283	4.3011
$N_{potential\ for\ improvement}$ - Existing Conditions	-0.0179	-0.5191	-0.4456	-0.3668	-0.2754
$N_{expected}$ - Proposed Conditions	0.0969	0.2351	0.1566	1.1701	1.6587



Safety Application Score

Application Scoring

Category	Scoring Value	Points Awarded	Points Possible
Ratio of Observed Fatal and Serious Injuries to Observed Total Crashes	0.10	20	30
Percentage of the Potential for Safety Improvement to Total Expected Crashes	0.00%	0	20
Relative Severity Index	52,015.59	20	20
Equivalent Property Damage Only Index	8.24	20	20
Location Equity Measure	25.84%	8	10
	Total	68	100

Countermeasures:

- Construct left turn lanes on major roadway at a two-way stop control intersection.
- Reconstruction of east leg approch and correct grade to improve intersection sight distance.

Project Summary:

- Construct left turn lanes on major roadway at a two-way stop control intersection.
- Reconstruction of east leg approach to improve intersection sight distance.
- Right-of-way acquisition and utility relocation required.

Application Request:

Design (FY2024)	$300,000
R/W & Utilities (FY2025)	$200,000
Construction (FY2026)	$1,160,000
Total	$1,660,000

FAI-37-8.38 Safety Improvements
Intersection of SR 37 & Pleasantville Road
2018 HSIP Safety Priority List 121st Rural Intersection
ODOT District 5

EXCELLENCE IN GOVERNMENT

Executive Summary

Purpose and Need

The purpose of this safety study is to evaluate the safety conditions at the intersection of SR 37 and Pleasantville Road and determine which countermeasures can be implemented to mitigate crash frequency and severity. This location ranks 121st Rural Intersection on ODOT's HSIP 2018 safety priority list.

Background

The intersection of SR 37 and Pleasantville Road is located approximately 7 miles north of downtown Lancaster and approximately 7 miles east of the Village of Carroll. SR 37 runs north/south and connects the City of Lancaster and Interstate Route 70. Pleasantville Road runs east/west and connects the Village of Pleasantville, the Village of Carroll and US 33.

The study section of SR 37 is classified as a rural minor arterial with a 2019 estimated AADT of 8,838 vehicles per day (vpd). Pleasantville Road is classified as a rural minor collector with a 2019 estimated AADT of 1,943 vpd. The posted and statutory speed limit for the study area on both SR 37 and Pleasantville Road is 55 mph.

Crash Data Summary

Five years of crash data (2016-2020) was reviewed and 20 crashes occurred averaging 4 crashes per year. A review of the crash data shows:

- Angle crashes are the most frequent crash type (50%). The most frequent crash contributing factor was failure to yield (55%).
- 10 of the 20 total crashes (50%) were injury crashes. 2 crashes (10%) were serious injury crashes.

An existing condition safety analysis calculated the predicted average crash frequency to be 4.58 crashes per year and the expected average crash frequency to be 4.30 crashes per year.

Recommended Countermeasures and Related Costs

The preferred countermeasure alternative is the construction of SR 37 left turn lanes with sight distance grade corrections. SR 37 left turn lane widening would remove left-turning vehicles from SR 37 through traffic stream reducing crash frequency and improving the ease of SR 37 driver gap judgements. Widening would also provide opportunity for improving intersection sight distance via roadside embankment removal on the north leg of SR 37 and grade correction by full depth pavement replacement on the east leg of Pleasantville Road. The proposed widening and grade correction would require right-of-way acquisition and utility relocation.

The proposed alternative expected crash frequency is 1.66 crashes per year with an expected reduction of 2.64 crashes per year. The estimated final construction cost (including right-of-way acquisition, utility relocation, design and construction) for the preferred alternative is $1,660,000.

Purpose and Need

The following sections provide an overview of the purpose and need, possible causes, recommended countermeasures, and estimated costs from a safety engineering study at the intersection of SR 37 and Pleasantville Road (CR 17) in Pleasant and Walnut Townships, Fairfield County. The purpose of this safety study is to evaluate the safety conditions at the intersection of SR 37 and Pleasantville Road and determine which countermeasures can be implemented to mitigate crash frequency and severity. This location ranks 121st Rural Intersection on ODOT's HSIP 2018 safety priority list.

Figure 1: SR 37 & Pleasantville Road Intersection looking southward

Existing Conditions

The intersection of SR 37 and Pleasantville Road is located approximately 7 miles north of downtown Lancaster and approximately 7 miles east of the Village of Carroll. SR 37 runs north/south and connects the City of Lancaster and Interstate Route 70. Pleasantville Road runs east/west and connects the Village of Pleasantville, the Village of Carroll and US 33.

The study section of SR 37 is classified as a rural minor arterial with a 2019 estimated AADT of 8,838 vehicles per day (vpd). Pleasantville Road is classified as a rural minor collector with a 2019 estimated AADT of 1,943 vpd. The posted and statutory speed limit for the study area on both SR 37 and Pleasantville Road is 55 mph.

The study intersection has four legs with each approach possessing two travel lanes (one shared through-left-right entering lane and one exiting lane). The traffic control at the intersection is stop control on the minor road approaches (Pleasantville). There is no existing roadway lighting and negligible intersection skew.

SR 37 has 12-foot lanes with 2-foot shoulders. Both SR 37 approaches have dual Intersection Ahead warning signs. Pleasantville Road has 10-foot lanes with little to no shoulders. The Pleasantville Road approaches are signed with dual STOP signs, CROSS TRAFFIC DOES NOTS STOP plaques

and dual STOP AHEAD warning signs. Roadside hazards adjacent to both roads are utility poles.

The existing conditions diagram presented in **Appendix A** shows existing traffic control.

Crash Data

Crash Data Summary

Five years of crash data (2016-2020) was reviewed and 20 crashes occurred averaging 4 crashes per year. The following **Figures 2 and 3** provide an overview of the crash data:

Figure 2: Crashes observed by year

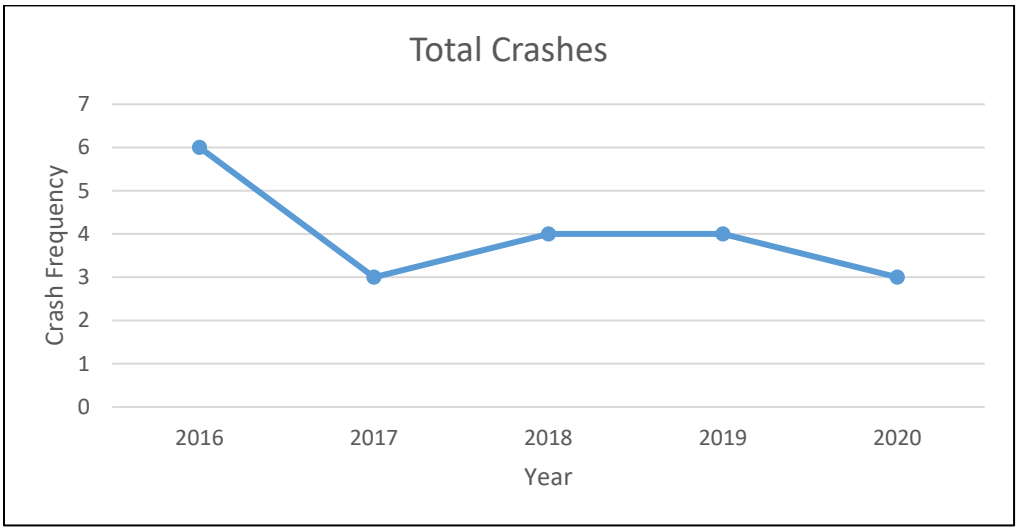
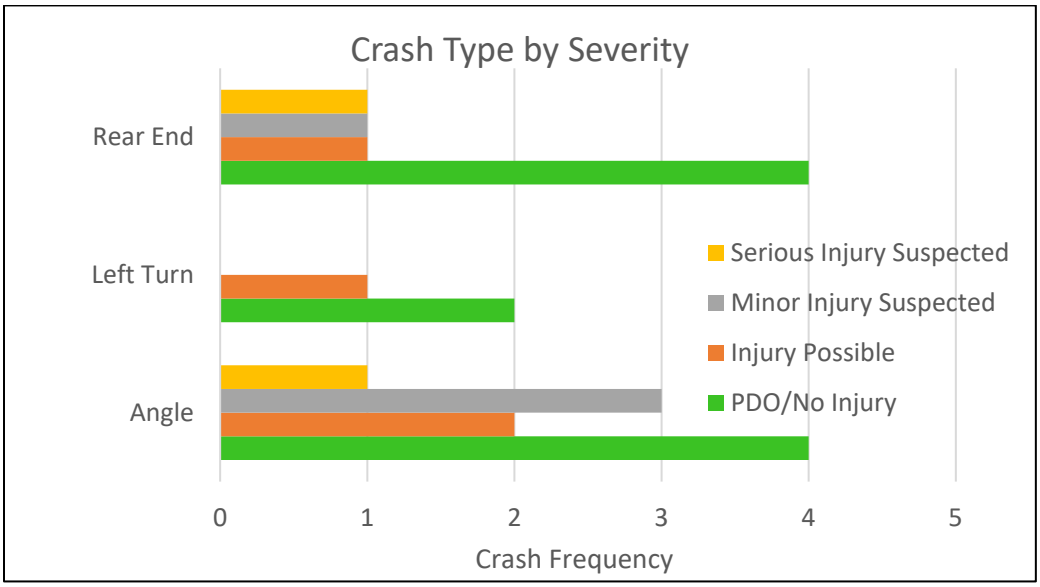


Figure 3: Crashes observed by type and severity



An analysis of the crash data and crash diagram can be found in **Appendix B**.

Crash Analysis

A review of the crash data shows:

- Angle crashes are the most frequent crash type (50%). The most frequent crash contributing factor was failure to yield (55%).
- 10 of the 20 total crashes (50%) were injury crashes. 2 crashes (10%) were serious injury crashes.

An existing condition safety analysis calculated the predicted average crash frequency to be 4.58 crashes per year and the expected average crash frequency to be 4.30 crashes per year.

Other Transportation Analysis

An intersection turning movement count was performed on February 23rd, 2021. Signal warrant analysis was conducted using guidance from the OMUTCD Chapter 4C and Traffic Engineering Manual Section 402-3. The analysis determined the intersection meets Warrant 7 (Crash Experience). The signal warrant analysis summary is presented in **Appendix F**.

The following traffic operations were analyzed using 2021 peak hour count data and linearly-grown 2024/2044 peak hour traffic volumes:

- Two-Way Stop Control (TWSC, Existing Condition)
- SR 37 Left Turn Lane Widening (maintaining TWSC)
- Signalization and SR 37 LTL Widening
- Modern Roundabout

A 1.74% linear growth rate from TFMS was applied to all projected opening year (2024) and design year (2044) turn movement volumes. The turn lane widening alternative without signalization show the Pleasantville Road approaches operating at a LOS E and F in the opening and design years respectively. The signalization and turn lane widening alternative results in LOS B in the opening and design years. The roundabout alternative results in the best traffic operations with LOS A in the opening and design years. **Figure 4** below shows a summary of the HCS operational analysis for each of the alternatives evaluated and the reports for each condition can be found in **Appendix F**.

Figure 4 - Operational Analysis Summary

Traffic Control Condition	Approach LOS & Delay (s/veh)				Intersection LOS & Delay (s/veh)
	EB	WB	NB	SB	
Two-Way Stop (TWSC) - 2021	D (28.8)	C (20.2)	-	-	-
TWSC (No Build) - 2024	E (34.0)	C (22.2)	-	-	-
TWSC w/ SR 37 Left Turn Lane Widening - 2024	E (33.3)	C (21.9)	-	-	-
Traffic Signal w/ Left Turn Lane Widening - 2024	B (18.1)	B (17.0)	B (17.1)	B (17.9)	B (17.6)
Roundabout - 2024	A (6.0)	A (5.0)	A (6.7)	A (6.2)	A (6.3)
TWSC (No Build) - 2044	F (199.3)	F (72.1)	-	-	-
TWSC w/ SR 37 Left Turn Lane Widening - 2044	F (186.0)	F (65.5)	-	-	-
Traffic Signal w/ Left Turn Lane Widening - 2044	C (20.3)	B (18.5)	B (18.3)	B (19.8)	B (19.3)
Roundabout - 2044	A (8.3)	A (6.1)	A (9.2)	A (8.1)	A (8.4)

Identification of Potential Countermeasures

Short-term crash countermeasures, such as sight triangle clearing and signage improvements, have been implemented in past years. Long-term countermeasures could include:

- Widening and constructing left turn lanes
- Increasing sight triangles via grade correction
- Constructing a roundabout
- Installing intersection lighting
- Relocating utility poles within the clear zone

Countermeasure Evaluation

SR 37 Left Turn Lane Widening

SR 37 left turn lane widening would remove left-turning vehicles from SR 37 through traffic stream reducing crash frequency and improving the ease of SR 37 driver gap judgements. Widening would also provide opportunity for improving intersection sight distance via roadside embankment removal on the north leg of SR 37 and grade correction by full depth pavement replacement on the east leg of Pleasantville Road. The proposed widening and grade correction would require right-of-way acquisition and utility relocation.

The estimated final construction cost (including right-of-way acquisition, utility relocation, design and construction) for the left turn lane widening alternative is $1,660,000.

This alternative has a proposed expected average crash frequency of 1.66 crashes per year with an expected decrease of 2.64 crashes per year. The net present value of safety benefits was found to be $2,815,159 with a safety benefit-cost ratio of 1.75.

Signalization and SR 37 Left Turn Lane Widening

Traffic signalization would provide LED signal heads with reflectorized backplates (proven crash countermeasure) and RADAR vehicle detection. Traffic signal timing and/or phasing providing yellow and red clearance intervals per the latest NCHRP guidance will optimize traffic operations and safety while mitigating red light running. Intersection sight distance and project impact assumptions for this alternative are similar to the left turn lane widening only alternative above.

The estimated final construction cost (including right-of-way acquisition, utility relocation, design and construction) for the traffic signalization and left turn lane widening alternative is $1,930,000.

This alternative has a proposed expected crash frequency is 5.65 crashes per year with an expected *increase* of 1.35 crashes per year. The net present value of safety benefits was found to be $1,793,012 with a safety benefit-cost ratio of 0.95.

Peanut Roundabout

Converting the intersection to a peanut roundabout would greatly improve safety via elimination of conflict points while reducing the project's footprint and impacts compared to a typical modern roundabout layout. The roundabout alternative would require right-of-way acquisition and utility relocation. The estimated final construction cost (including right-of-way acquisition, utility relocation, design and construction) for the roundabout alternative is $3,350,000.

This alternative has a proposed expected crash frequency is 0.96 crashes per year with an expected decrease of 3.34 crashes per year. The net present value of safety benefits was found to be $3,405,986 and with a safety benefit-cost ratio of 1.08.

Figure 5 below summarizes safety analysis of all three alternatives. Cost estimates are in **Appendix C**, ECAT safety analysis is in **Appendix D and** the proposed condition diagrams are in **Appendix E**.

Figure 5 – Alternative Safety Summary

Crash Countermeasure Alternative	Present Cost Estimates				Proposed Expected Crash Frequency	Expected Crash Reduction	Safety Benefit	B/C Ratio
	Construction	R/W & Utilities	Design	**Total**				
LTL Widening	$ 1,160,000	$ 200,000	$300,000	**$1,660,000**	1.66	2.64	$ 2,815,159	**1.70**
Signalization & LTL Widening	$ 1,410,000	$ 200,000	$320,000	**$1,930,000**	5.65	-1.35	$ 1,793,012	**0.93**
Roundabout	$ 2,350,000	$ 400,000	$600,000	**$3,350,000**	0.96	3.34	$ 3,405,986	**1.02**

Proposed Condition Diagram – LTL Widening

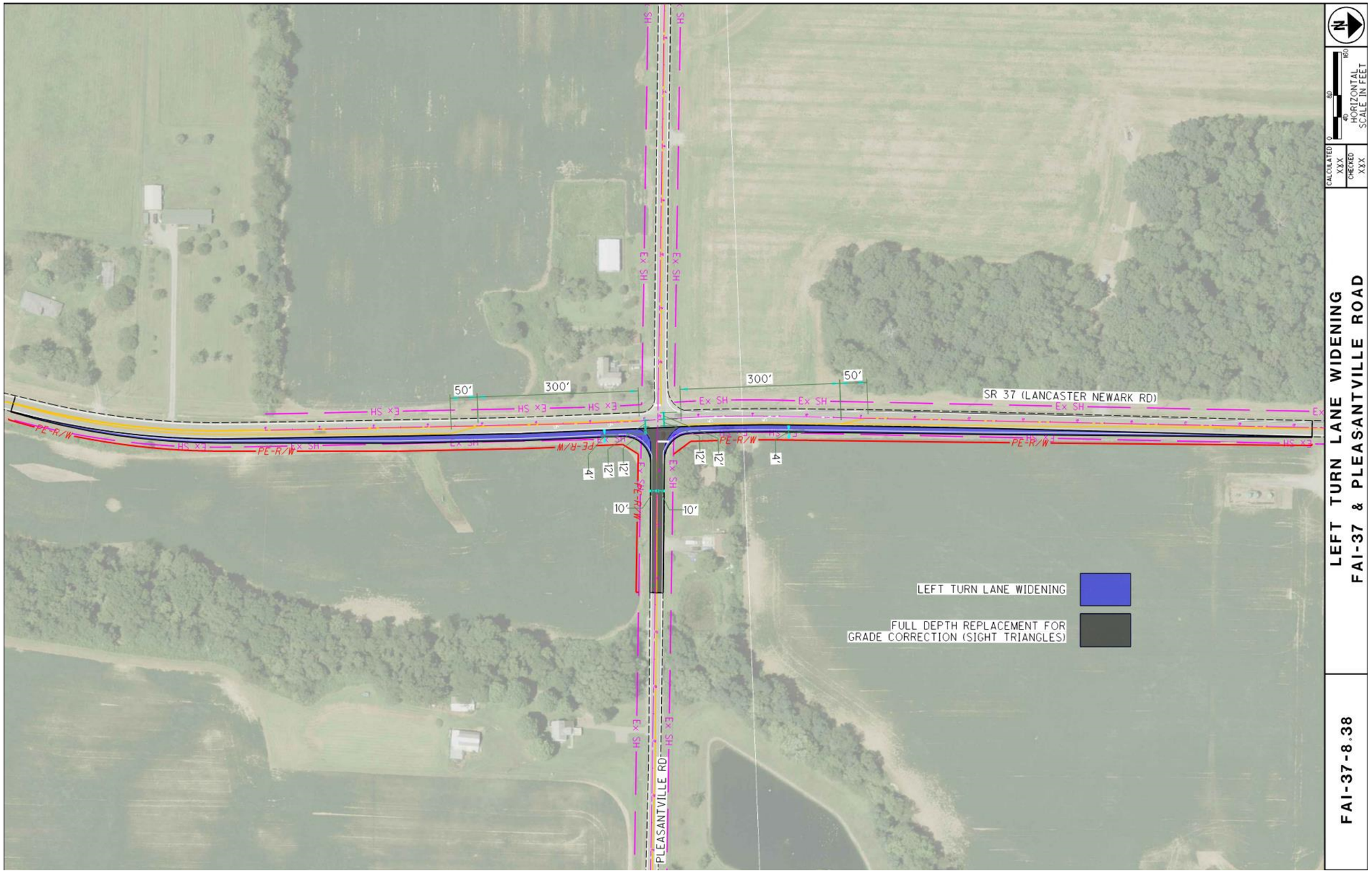


Figure 6: SR 37 & Pleasantville Road Intersection looking northward from east leg

Conclusions

From 2016 to 2020, 20 crashes occurred at the study intersection. Angle crashes are the most frequent crash type and failure to yield was the most common crash contributing factor. 50% of crashes were injury crashes and 10% were serious injury crashes. A safety performance analysis of the SR 37 & Pleasantville Road intersection found the expected crash frequency of existing site conditions to be 4.30 crashes per year.

Countermeasures were identified and evaluated to mitigate the observed crash patterns at the intersection. The preferred countermeasure alternative is the construction of SR 37 left turn lanes with sight distance grade correction. The proposed alternative expected crash frequency is 1.66 crashes per year with an expected reduction of 2.64 crashes per year. This alternative will require right-of-way acquisition and utility relocation. The estimated final construction cost (including right-of-way acquisition, utility relocation, design and construction) for the preferred alternative is $1,610,000.

Countermeasure Recommendations and Implementation Plan

Design and other professional development services for the preferred countermeasure alternative would need to be performed via consultant services. The estimated start of construction for the project is 2026.

Appendix A: Existing Condition Diagram

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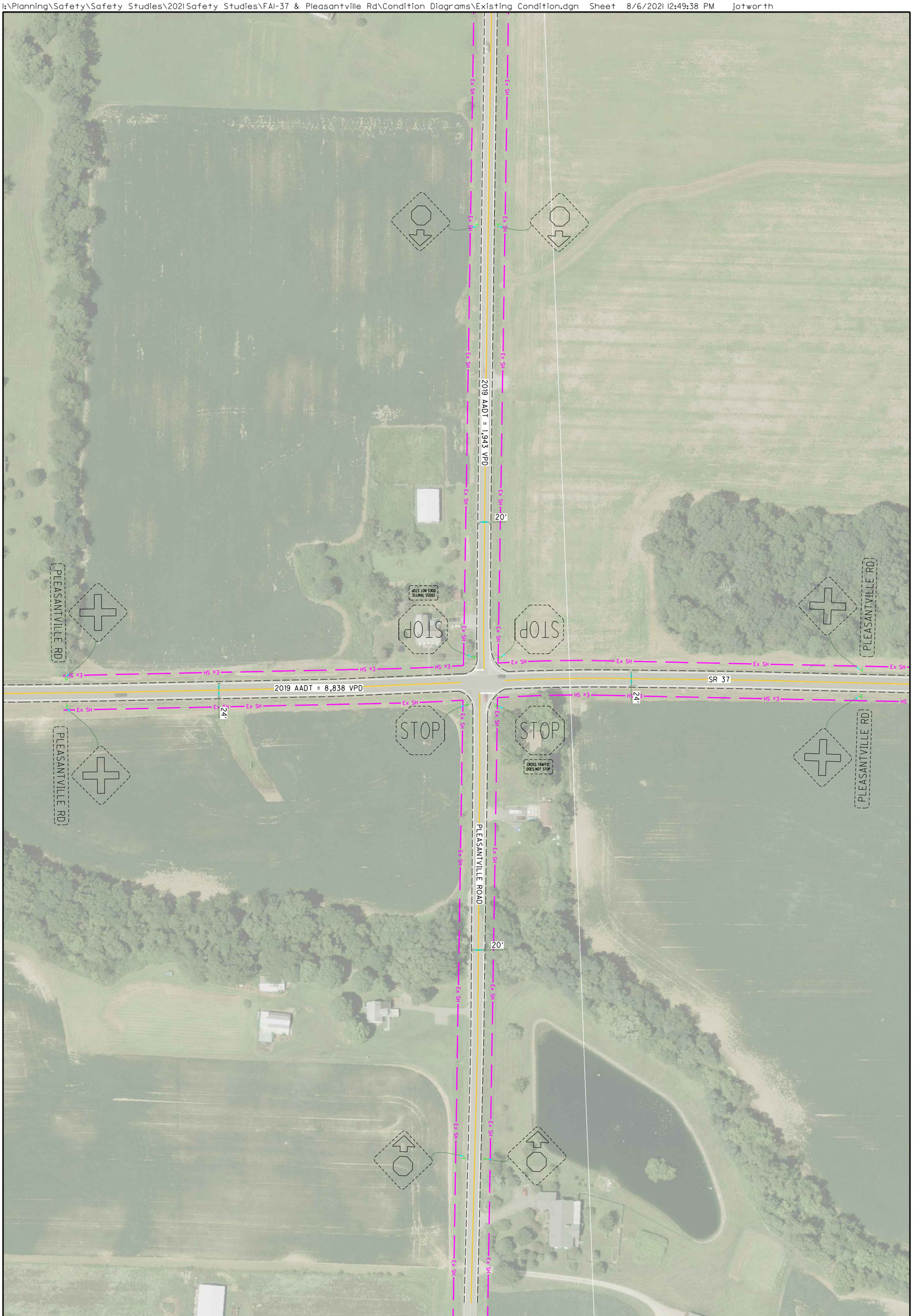


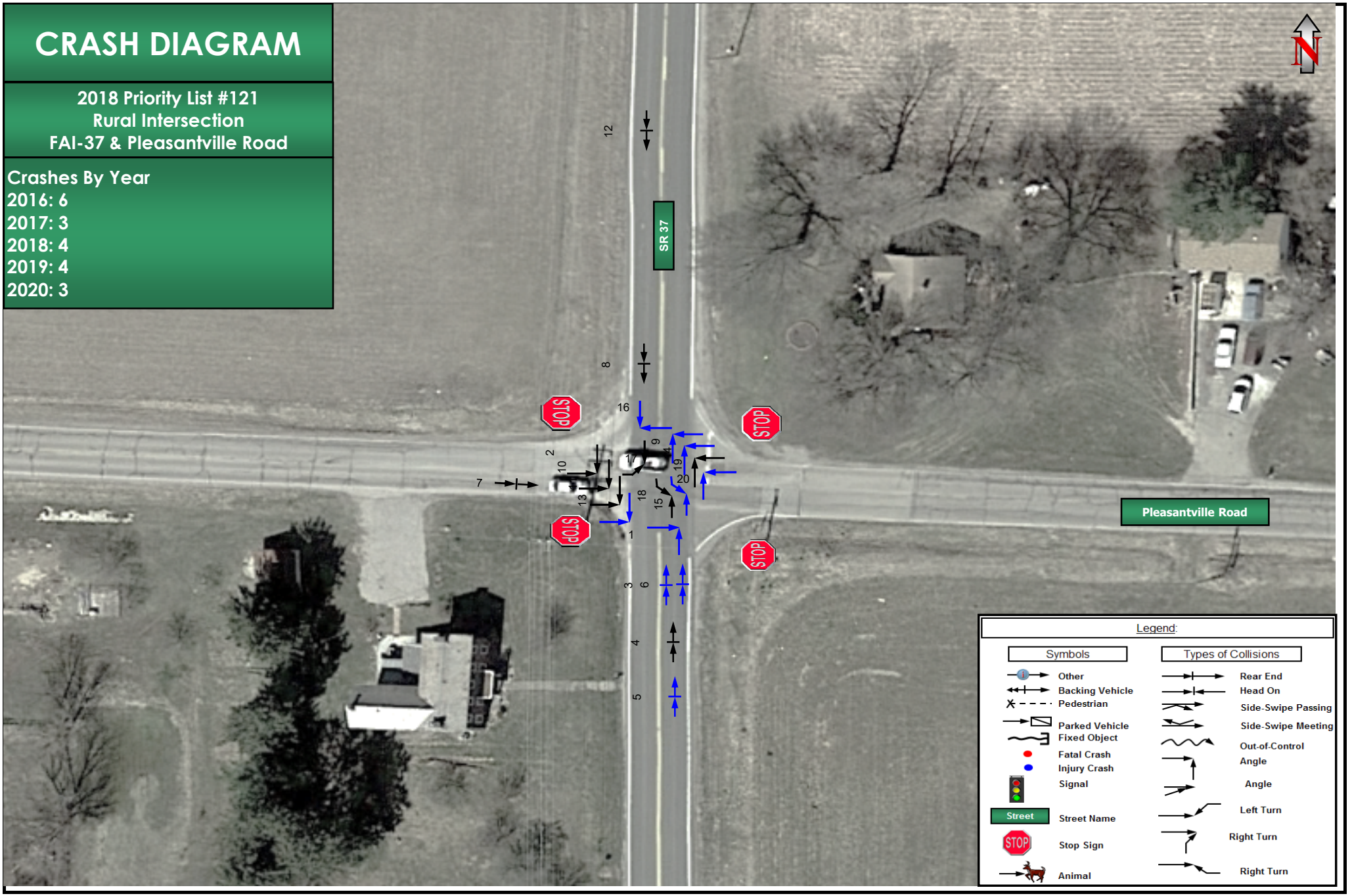
	FAI-37-8.38	EXISTING CONDITIONS FAI-37 & PLEASANTVILLE ROAD	CALCULATED XXX CHECKED XXX	0 75 37.5 150 HORIZONTAL SCALE IN FEET

Appendix B: Crash Data & Crash Diagram

CRASH DIAGRAM

2018 Priority List #121
Rural Intersection
FAI-37 & Pleasantville Road

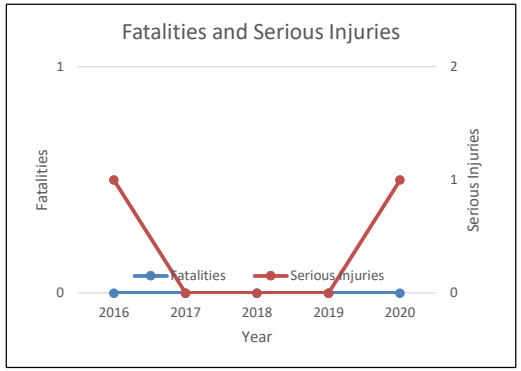
Crashes By Year
2016: 6
2017: 3
2018: 4
2019: 4
2020: 3

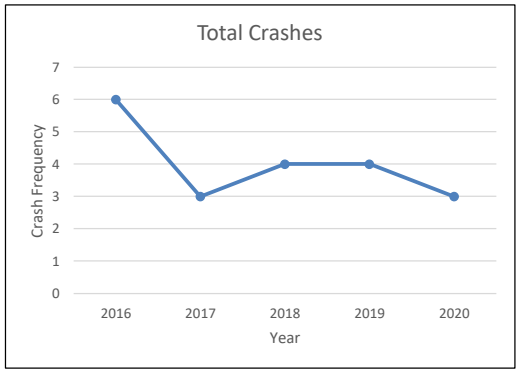


FAI-37 & Pleasantville Rd 2016-2020

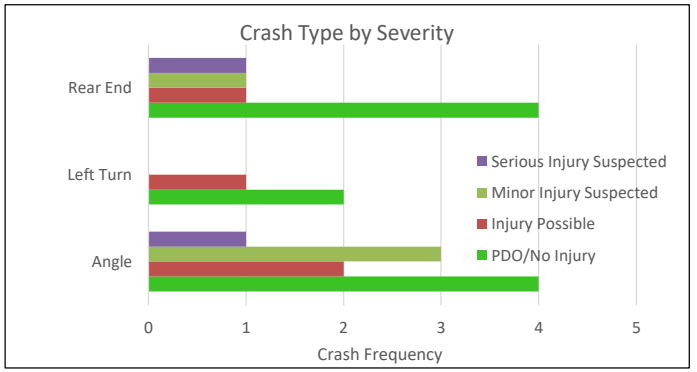
Crash Summary Sheet

Year	Total Crashes	Fatalities	Serious Injuries
2016	6	0	1
2017	3	0	0
2018	4	0	0
2019	4	0	0
2020	3	0	1
Grand Total	20	0	2





Total Crashes Crash Type	Injury Level PDO/No Injury	Injury Possible	Minor Injury Su	Serious Injury S	Grand Total
Angle	4	2	3	1	10
Rear End	4	1	1	1	7
Left Turn	2	1	0	0	3
Grand Total	10	4	4	2	20

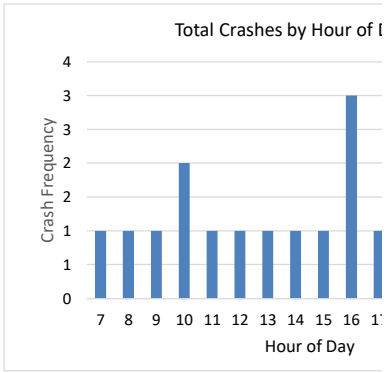


FAI-37 & Pleasantville Rd 2016-2020
Crash Summary Sheet

Road Condition	Total Crashes	Fatalities	Serious Injuries
Dry	17	0	2
Wet	3	0	0
Grand Total	20	0	2

Hour of Day	Total Crashes
7	1
8	1
9	1
10	2
11	1
12	1
13	1
14	1
15	1
16	3
17	1
18	2
19	1
20	1
22	1
23	1
Grand Total	20

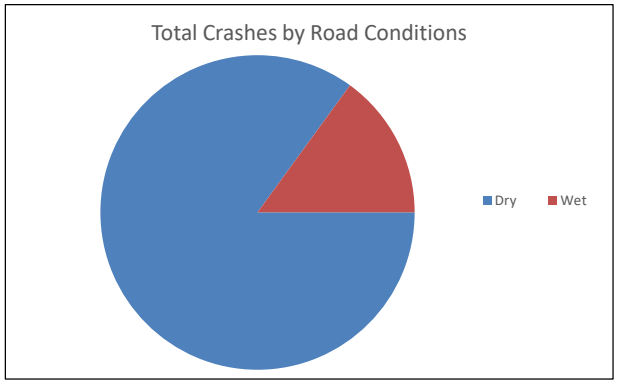
Month	Total Crashes
January	1
March	1
April	3
May	3
July	1
August	2
September	5
October	3
December	1
Grand Total	20

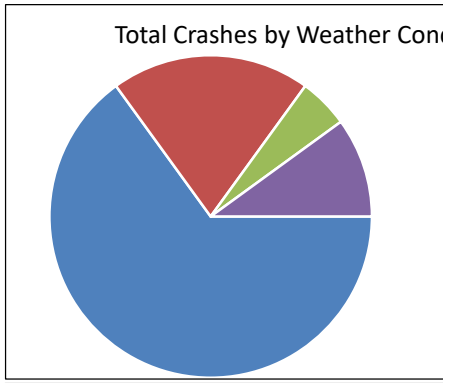


Weather	Total Crashes	Fatalities	Serious Injuries
Clear	13	0	2
Cloudy	4	0	0
Fog, Smog, Smoke	1	0	0
Rain	2	0	0
Grand Total	20	0	2

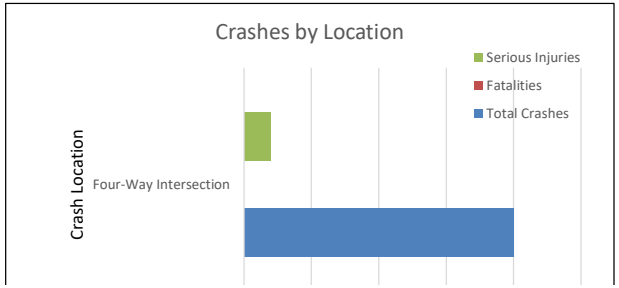
Day in Week	Total Crashes
Sunday	2
Monday	4
Tuesday	3
Wednesday	3
Thursday	2
Friday	4
Saturday	2
Grand Total	20

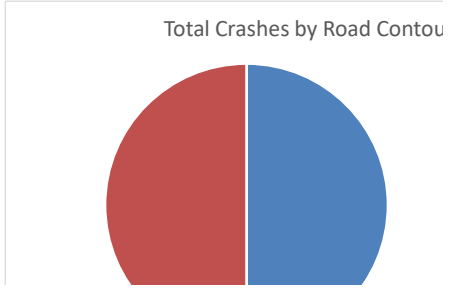
Crash Location	Total Crashes	Fatalities	Serious Injuries
Four-Way Intersection	20	0	2
Grand Total	20	0	2





Roadway Contour	Total Crashes	Fatalities	Serious Injuries
Straight Grade	10	0	1
Straight Level	10	0	1
Grand Total	20	0	2





Appendix C: Cost Estimates

Preliminary Cost Estimate - FAI-37 & Pleasantville Road Intersection Improvements					
SR 37 Left Turn Lane Widening					
Item	Description	Quantity	Units	Unit Price	Cost
201	Clearing and Grubbing	1	LS	$ 25,000.00	$ 25,000.00
202	Pavement Removed	1700	SY	$ 15.00	$ 25,500.00
203	Excavation	4200	CY	$ 20.00	$ 84,000.00
203	Embankment	4200	CY	$ 15.00	$ 63,000.00
204	Subgrade Compaction	5700	SY	$ 2.00	$ 11,400.00
206	Cement	150	TON	$ 175.00	$ 26,250.00
206	Curing Coat	5700	SY	$ 1.00	$ 5,700.00
206	Cement Stabilized Subgrade, 12 Inches Deep	5700	SY	$ 8.00	$ 45,600.00
301	4" Asphalt Concrete Base, PG64-22	480	CY	$ 180.00	$ 86,400.00
304	6" Aggregate Base	720	CY	$ 65.00	$ 46,800.00
407	Tack Coat	530	GAL	$ 4.00	$ 2,120.00
441	1.5" Asphalt Concrete Surface Course, Type 1, (448), PG64-22	180	CY	$ 250.00	$ 45,000.00
441	1.5" Asphalt Concrete Intermediate Course, Type 2, (448)	180	CY	$ 200.00	$ 36,000.00
611	18" Conduit, Type B	200	FT	$ 100.00	$ 20,000.00
614	Maintaining Traffic	1	LS	$ 50,000.00	$ 50,000.00
617	Compacted Aggregate	675	CY	$ 60.00	$ 40,500.00
623	Construction Layout Stakes and Surveying	1	LS	$ 20,000.00	$ 20,000.00
624	Mobilization	1	LS	$ 40,000.00	$ 40,000.00
630	Sign, Flat Sheet	110	SF	$ 20.00	$ 2,200.00
630	Ground Mounted Support, No. 3 Post	120	FT	$ 15.00	$ 1,800.00
644	Stop Line	100	FT	$ 10.00	$ 1,000.00
644	Edge Line, 6"	0.6	MI	$ 4,000.00	$ 2,400.00
644	Channelizing Line, 8"	550	FT	$ 2.00	$ 1,100.00
644	Centerline	0.9	MI	$ 5,000.00	$ 4,500.00
644	Lane Arrow	4	EA	$ 110.00	$ 440.00
653	Topsoil Furnished and Placed	720	CY	$ 35.00	$ 25,200.00
659	Seeding and Mulching	5000	SY	$ 2.00	$ 8,000.00
832	Erosion Control	1	EA	$ 25,000.00	$ 25,000.00
		Subtotal			$ 744,910.00
		Contingency (35%)			$ 260,718.50
		Subtotal			$ 1,005,628.50
		Inflation (15%)			$ 150,844.28
		Total			$ 1,156,472.78

Preliminary Cost Estimate - FAI-37 & Pleasantville Road Intersection Improvements					
Traffic Signalization & SR 37 Left Turn Lane Widening					
Item	Description	Quantity	Units	Unit Price	Cost
201	Clearing and Grubbing	1	LS	$ 25,000.00	$ 25,000.00
202	Pavement Removed	1700	SY	$ 15.00	$ 25,500.00
203	Excavation	4200	CY	$ 20.00	$ 84,000.00
203	Embankment	4200	CY	$ 15.00	$ 63,000.00
204	Subgrade Compaction	5700	SY	$ 2.00	$ 11,400.00
206	Cement	150	TON	$ 175.00	$ 26,250.00
206	Curing Coat	5700	SY	$ 1.00	$ 5,700.00
206	Cement Stabilized Subgrade, 12 Inches Deep	5700	SY	$ 8.00	$ 45,600.00
301	4" Asphalt Concrete Base, PG64-22	480	CY	$ 180.00	$ 86,400.00
304	6" Aggregate Base	720	CY	$ 65.00	$ 46,800.00
407	Tack Coat	530	GAL	$ 4.00	$ 2,120.00
441	1.5" Asphalt Concrete Surface Course, Type 1, (448), PG64-22	180	CY	$ 250.00	$ 45,000.00
441	1.5" Asphalt Concrete Intermediate Course, Type 2, (448)	180	CY	$ 200.00	$ 36,000.00
611	18" Conduit, Type B	200	FT	$ 100.00	$ 20,000.00
614	Maintaining Traffic	1	LS	$ 50,000.00	$ 50,000.00
617	Compacted Aggregate	675	CY	$ 60.00	$ 40,500.00
623	Construction Layout Stakes and Surveying	1	LS	$ 20,000.00	$ 20,000.00
624	Mobilization	1	LS	$ 40,000.00	$ 40,000.00
625	Ground Rod	6	EA	$ 200.00	$ 1,200.00
625	Pullbox, 725.06, Size 18	5	EA	$ 800.00	$ 4,000.00
625	Conduit, 4", 725.04	50	FT	$ 30.00	$ 1,500.00
625	Conduit, Jacked or Drilled, 725.04	300	FT	$ 45.00	$ 13,500.00
625	Trench	50	FT	$ 15.00	$ 750.00
625	Power Service	1	EA	$ 3,500.00	$ 3,500.00
630	Sign, Flat Sheet	110	SF	$ 20.00	$ 2,200.00
630	Ground Mounted Support, No. 3 Post	120	FT	$ 15.00	$ 1,800.00
632	Strain Pole, Type TC-81.10, Design 10	4	EA	$ 6,000.00	$ 24,000.00
632	Strain Pole Foundation	4	EA	$ 3,750.00	$ 15,000.00
632	Vehicular Signal Head, (LED), 3-Section, 12" Lens, 1-Way, Polycarbonate	6	EA	$ 800.00	$ 4,800.00
632	Vehicular Signal Head, (LED), 5-Section, 12" Lens, 1-Way, Polycarbonate	2	EA	$ 1,250.00	$ 2,500.00
632	Messenger Wire, 7 Strand, 3/8" Diameter with Accessories	400	FT	$ 11.00	$ 4,400.00
632	Signal Cable, 7 Conductor, No. 14 AWG	1750	FT	$ 3.00	$ 5,250.00
632	Power Cable, 3 Conductor, No. 6 AWG	200	FT	$ 5.00	$ 1,000.00
632	Service Cable, 3 Conductor, No. 6 AWG	200	FT	$ 5.00	$ 1,000.00
633	Controller Unit, Type 2070E, with Cabinet, Type 332	1	EA	$ 14,000.00	$ 14,000.00
633	Cabinet Foundation	1	EA	$ 2,000.00	$ 2,000.00
633	Controller Work Pad	1	EA	$ 600.00	$ 600.00
633	Uninterruptible Power Supply (UPS), 1000 Watt	1	EA	$ 5,300.00	$ 5,300.00
644	Stop Line	100	FT	$ 10.00	$ 1,000.00
644	Edge Line, 6"	0.6	MI	$ 4,000.00	$ 2,400.00
644	Channelizing Line, 8"	550	FT	$ 2.00	$ 1,100.00
644	Centerline	0.9	MI	$ 5,000.00	$ 4,500.00
644	Lane Arrow	4	EA	$ 110.00	$ 440.00
653	Topsoil Furnished and Placed	720	CY	$ 35.00	$ 25,200.00
659	Seeding and Mulching	5000	SY	$ 2.00	$ 10,000.00
809	Advance Radar Detection	4	EA	$ 7,250.00	$ 29,000.00
809	Stop Line Radar Detection	4	EA	$ 7,000.00	$ 28,000.00
832	Erosion Control	1	EA	$ 25,000.00	$ 25,000.00
			Subtotal		$ 908,210.00
			Contingency (35%)		$ 317,873.50
			Subtotal		$ 1,226,083.50
			Inflation (15%)		$ 183,912.53
			Total		$ 1,409,996.03

Preliminary Cost Estimate - FAI-37 & Pleasantville Road Intersection Improvements					
Roundabout					
Item	Description	Quantity	Units	Unit Price	Cost
201	Clearing and Grubbing	1	LS	$ 25,000.00	$ 25,000.00
202	Pavement Removed	5400	SY	$ 10.00	$ 54,000.00
203	Excavation	12000	CY	$ 20.00	$ 240,000.00
203	Embankment	9000	CY	$ 20.00	$ 180,000.00
204	Subgrade Compaction	11000	SY	$ 2.50	$ 27,500.00
206	Cement	290	TON	$ 175.00	$ 50,750.00
206	Curing Coat	11000	SY	$ 1.00	$ 11,000.00
206	Cement Stabilized Subgrade, 12 Inches Deep	11000	SY	$ 5.00	$ 55,000.00
301	4" Asphalt Concrete Base	660	CY	$ 160.00	$ 105,600.00
304	6" Aggregate Base	990	CY	$ 60.00	$ 59,400.00
407	Tack Coat	570	GAL	$ 3.00	$ 1,710.00
441	1.5" Asphalt Concrete Surface Course, Type 1, (448), PG64-22	250	CY	$ 210.00	$ 52,500.00
441	1.5" Asphalt Concrete Surface Course, Type 1, (448), (Driveways)	10	CY	$ 210.00	$ 2,100.00
441	1.5" Asphalt Concrete Intermediate Course, Type 2, (448)	250	CY	$ 170.00	$ 42,500.00
609	Curb, Type 6	2200	FT	$ 20.00	$ 44,000.00
609	Curb, Type 7	550	FT	$ 25.00	$ 13,750.00
609	Combination Curb and Gutter, Type 2	3200	FT	$ 25.00	$ 80,000.00
609	Combination Curb and Gutter, Type 9	700	FT	$ 30.00	$ 21,000.00
609	6" Concrete Traffic Island	2125	SY	$ 70.00	$ 148,750.00
611	12" Conduit, Type B	1000	FT	$ 70.00	$ 70,000.00
611	Catch Basin, No. 3A	12	EA	$ 2,500.00	$ 30,000.00
614	Maintaining Traffic	1	LS	$ 50,000.00	$ 50,000.00
619	Field Office, Type A	6	MNTH	$ 2,000.00	$ 12,000.00
623	Construction Layout Stakes and Surveying	1	LS	$ 20,000.00	$ 20,000.00
624	Mobilization	1	LS	$ 40,000.00	$ 40,000.00
630	Sign, Flat Sheet	240	SF	$ 20.00	$ 4,800.00
630	Ground Mounted Support	360	FT	$ 15.00	$ 5,400.00
644	Yield Line	60	FT	$ 20.00	$ 1,200.00
644	Centerline	0.1	MI	$ 8,000.00	$ 800.00
644	Dotted Line	120	FT	$ 3.00	$ 360.00
653	Topsoil Furnished and Placed	575	CY	$ 40.00	$ 23,000.00
659	Seeding and Mulching	6900	SY	$ 2.00	$ 13,800.00
832	Erosion Control	1	EA	$ 25,000.00	$ 25,000.00
		Subtotal			$ 1,510,920.00
		Contingency (35%)			$ 528,822.00
		Subtotal			$ 2,039,742.00
		Inflation (15%)			$ 305,961.30
		Total			$ 2,345,703.30

Otworth, Joshua

From: Schmelzer, Edward
Sent: Thursday, August 5, 2021 10:16 AM
To: Wooldridge, John; Deitrich, William
Cc: Otworth, Joshua; Morgan, Douglas; Thompson, Tyrell
Subject: RE: FAI-37 & Pleasantville Road Safety Study R/W Acq., Utility Relocation & Design Cost Estimates

John,

Preliminary utility relocation reimbursement costs.

LTL Design = $200,000

Peanut Design =$400,000

South Central Power, Gas and Telephone could be in a reimbursable position.

Ed Schmelzer
Utility Relocation Coordinator
ODOT District 5
9600 Jacksontown Road, Jacksontown, Ohio 43030
740-323-5126
transportation.ohio.gov

OHIO DEPARTMENT OF TRANSPORTATION

From: Wooldridge, John <John.Wooldridge@dot.ohio.gov>
Sent: Tuesday, August 3, 2021 2:22 PM
To: Schmelzer, Edward <Ed.Schmelzer@dot.ohio.gov>; Deitrich, William <William.Deitrich@dot.ohio.gov>
Subject: FW: FAI-37 & Pleasantville Road Safety Study R/W Acq., Utility Relocation & Design Cost Estimates

Hello Ed and Bill,

Can one of you provide a double estimate for utilities relocation.

LTL (3 Parcels – Eichhorn, Comstock, Eichhorn):
Acquisition: $80,000
RW Services: $20,000
Utilities: $
Total: $

Peanut (4 Parcels – Eichhorn, Comstock, Miller, Young):
Acquisition: $125,000
RW Services: $25,000
Utilities: $
Total: $

Thanks!

Respectfully,

John R. Wooldridge
Real Estate Administrator
ODOT District 5
9600 Jacksontown Road, Jacksontown, OH 43030
740.323.5427
transportation.ohio.gov

From: Otworth, Joshua <Joshua.Otworth@dot.ohio.gov>
Sent: Tuesday, August 3, 2021 1:49 PM
To: Wooldridge, John <John.Wooldridge@dot.ohio.gov>; Thompson, Tyrell <Ty.Thompson@dot.ohio.gov>; Morgan, Douglas <Doug.Morgan@dot.ohio.gov>
Subject: FAI-37 & Pleasantville Road Safety Study R/W Acq., Utility Relocation & Design Cost Estimates

JR,
I'm trying to wrap up a safety study for the intersection of FAI-37 & Pleasantville Road. I need right-of-way acquisition and utility relocation cost estimates for the funding application and ECAT. I've attached the proposed condition diagrams for the two alternates: left turn lane widening (with grade correction) and peanut roundabout. Note the preferred alt. is the LTL widening.

Doug and Ty,
If we aren't going to design the prospective project in-house, how much would the estimated design cost be for each of the alternatives?

I would like these as soon as possible so I can complete the study but definitely want these estimates by the end of August. Reach out with questions.

Thank you,
Joshua Otworth, PE
Traffic & Safety Engineer
ODOT District 5 Capital Programs
9600 Jacksontown Road, Jacksontown, Ohio 43030
740.323.5274
transportation.ohio.gov

Otworth, Joshua

From: Wooldridge, John
Sent: Thursday, August 5, 2021 10:20 AM
To: Otworth, Joshua
Subject: RE: FAI-37 & Pleasantville Road Safety Study R/W Acq., Utility Relocation & Design Cost Estimates

Hey Josh,

Ed just sent you the Utility numbers and the R/W was included (they are in addition to Ty's estimates). Please let us know if you need anything else. Thanks and take care Josh.

Respectfully,

John R. Wooldridge
Real Estate Administrator
ODOT District 5
9600 Jacksontown Road, Jacksontown, OH 43030
740.323.5427
transportation.ohio.gov

From: Otworth, Joshua <Joshua.Otworth@dot.ohio.gov>
Sent: Tuesday, August 3, 2021 1:49 PM
To: Wooldridge, John <John.Wooldridge@dot.ohio.gov>; Thompson, Tyrell <Ty.Thompson@dot.ohio.gov>; Morgan, Douglas <Doug.Morgan@dot.ohio.gov>
Subject: FAI-37 & Pleasantville Road Safety Study R/W Acq., Utility Relocation & Design Cost Estimates

JR,
I'm trying to wrap up a safety study for the intersection of FAI-37 & Pleasantville Road. I need right-of-way acquisition and utility relocation cost estimates for the funding application and ECAT. I've attached the proposed condition diagrams for the two alternates: left turn lane widening (with grade correction) and peanut roundabout. Note the preferred alt. is the LTL widening.

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I would like these as soon as possible so I can complete the study but definitely want these estimates by the end of August. Reach out with questions.

Thank you,
Joshua Otworth, PE
Traffic & Safety Engineer
ODOT District 5 Capital Programs
9600 Jacksontown Road, Jacksontown, Ohio 43030

740.323.5274
transportation.ohio.gov

Otworth, Joshua

From: Thompson, Tyrell
Sent: Wednesday, August 4, 2021 7:59 AM
To: Otworth, Joshua; Wooldridge, John; Morgan, Douglas
Subject: RE: FAI-37 & Pleasantville Road Safety Study R/W Acq., Utility Relocation & Design Cost Estimates

Josh – I would use $300,000 for the total design/professional services. If further breakdown is needed, please see below. The values are based on PID 109329; however, they are inflated as the costs associated with 109329 do not include RW Services, Environmental Services, Survey, general increase in professional services costs, etc.

PE (Survey + Design + Environmental) = $225,000
DD (RW Services + Detailed Design) = $75,000

Ty Thompson, P.E.
(p) 740.323.5194
transportation.ohio.gov

From: Otworth, Joshua <Joshua.Otworth@dot.ohio.gov>
Sent: Tuesday, August 3, 2021 1:49 PM
To: Wooldridge, John <John.Wooldridge@dot.ohio.gov>; Thompson, Tyrell <Ty.Thompson@dot.ohio.gov>; Morgan, Douglas <Doug.Morgan@dot.ohio.gov>
Subject: FAI-37 & Pleasantville Road Safety Study R/W Acq., Utility Relocation & Design Cost Estimates

JR,
I'm trying to wrap up a safety study for the intersection of FAI-37 & Pleasantville Road. I need right-of-way acquisition and utility relocation cost estimates for the funding application and ECAT. I've attached the proposed condition diagrams for the two alternates: left turn lane widening (with grade correction) and peanut roundabout. Note the preferred alt. is the LTL widening.

Doug and Ty,
If we aren't going to design the prospective project in-house, how much would the estimated design cost be for each of the alternatives?

I would like these as soon as possible so I can complete the study but definitely want these estimates by the end of August. Reach out with questions.

Thank you,
Joshua Otworth, PE
Traffic & Safety Engineer
ODOT District 5 Capital Programs
9600 Jacksontown Road, Jacksontown, Ohio 43030
740.323.5274
transportation.ohio.gov

EXCELLENCE IN GOVERNMENT

FY 2022-2026 Business Plan Inflation Calculator:

Not sure if you have the latest calculator? Click here.

Last Modified: 7/30/2021

Today's Date:
August 9, 2021

Please Enter Values in the Yellow Areas Only:

Estimation Start Date:
Less than or Equal to Today's Date
(mm/dd/yyyy)

8/9/2021
Start Date:

Enter Construction Mid-Point Date:
(cannot exceed 08/09/2046)
(mm/dd/yyyy)

7/29/2026
Construction Mid-Point Date:

Present-Day Estimated Cost:

$2,670,000.00
Estimated Dollar Amount:

Estimate Start Date to Construction Mid-Point Date: **59** **Months**

Inflation - Start to Mid-Point of Construction:

	(compounded growth rate)	Inflated Dollar Amount:
Business Plan	**15.4%**	**$3,082,219.74**

Estimator's Name:

County - Route - Section:

PID:

Estimator's Notes:

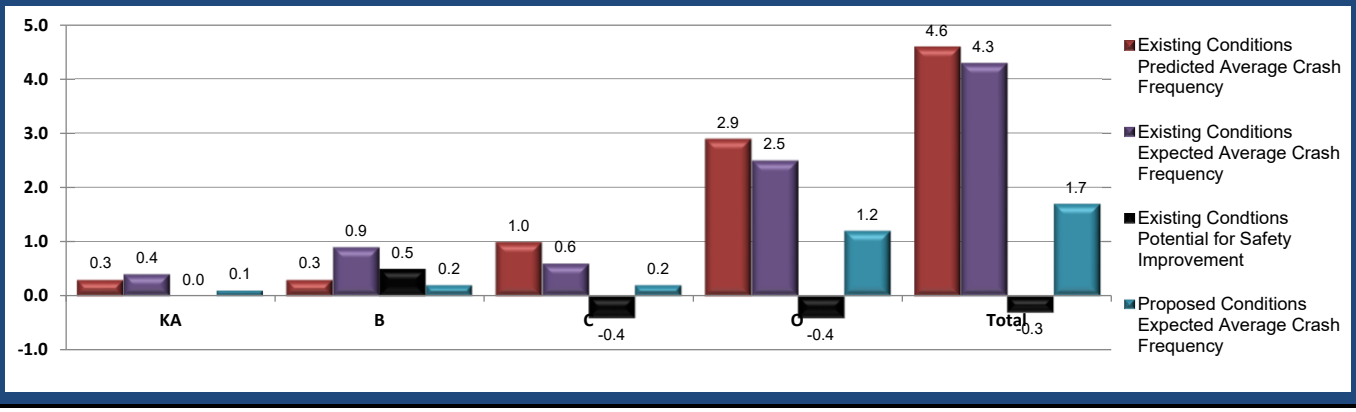
Appendix D: ECAT Analysis

Project Safety Performance Report

General Information

Project Name	FAI-37 & Pleasantville Road	Contact Email	
Project Description	LTL Widening	Contact Phone	
Reference Number		Date Performed	
Analyst	Josh Otworth	Analysis Year	2021
Agency/Company	ODOT D5		

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



Project Summary Results (Without Animal Crashes)

	KA	B	C	O	Total
$N_{predicted}$ - Existing Conditions	0.3339	0.3339	1.0136	2.8951	4.5765
$N_{expected}$ - Existing Conditions	0.3518	0.8530	0.5680	2.5283	4.3011
$N_{potential\ for\ improvement}$ - Existing Conditions	**0.0179**	**0.5191**	-0.4456	-0.3668	-0.2754
$N_{expected}$ - Proposed Conditions	0.0969	0.2351	0.1566	1.1701	1.6587

Project Safety Performance Report

General Information

Project Name	FAI-37 & Pleasantville Road	Contact Email	
Project Description	LTL Widening	Contact Phone	
Reference Number		Date Performed	
Analyst	Josh Otworth	Analysis Year	2021
Agency/Company	ODOT D5		

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

Project Element ID	Common Name	Crash Severity Level				
		KA	B	C	O	Total
SR37; 8.37		0.3339	0.3339	1.0136	2.8951	4.5765

Project Safety Performance Report

General Information

Project Name	FAI-37 & Pleasantville Road	Contact Email	
Project Description	LTL Widening	Contact Phone	
Reference Number		Date Performed	
Analyst	Josh Otworth	Analysis Year	2021
Agency/Company	ODOT D5		

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

Project Element ID	Common Name	Crash Severity Level				
		KA	B	C	O	Total
SR37; 8.37		0.3518	0.853	0.568	2.5283	4.3011

Project Safety Performance Report

General Information

Project Name	FAI-37 & Pleasantville Road	Contact Email	
Project Description	LTL Widening	Contact Phone	
Reference Number		Date Performed	
Analyst	Josh Otworth	Analysis Year	2021
Agency/Company	ODOT D5		

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

Project Element ID	Common Name	Crash Severity Level				
		KA	B	C	O	Total
SR37; 8.37		0.0179	0.5191	-0.4456	-0.3668	-0.2754

Project Safety Performance Report

General Information

Project Name	FAI-37 & Pleasantville Road	Contact Email	
Project Description	LTL Widening	Contact Phone	
Reference Number		Date Performed	
Analyst	Josh Otworth	Analysis Year	2021
Agency/Company	ODOT D5		

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

Project Element ID	Common Name	Crash Severity Level				
		KA	B	C	O	Total
SR37; 8.37		0.0969	0.2351	0.1566	1.1701	1.6587

Project Safety Performance Report

General Information

Project Name	FAI-37 & Pleasantville Road	Contact Email	
Project Description	LTL Widening	Contact Phone	
Reference Number		Date Performed	
Analyst	Josh Otworth	Analysis Year	2021
Agency/Company	ODOT D5		

Summary by Crash Type

Crash Type	Existing			Proposed
	Predicted Crash Frequency	Expected Crash Frequency	PSI	Expected Crash Frequency
Unknown	0.6966	0.0167	-0.6799	0.0087
Head On	0.0394	0.0390	-0.0004	0.0203
Rear End	0.7505	0.9092	**0.1587**	0.4728
Backing	0.1749	0.1625	-0.0124	0.0845
Sideswipe - Meeting	0.1258	0.1258	0.0000	0.0654
Sideswipe - Passing	0.1832	0.1893	**0.0061**	0.0984
Angle	1.4773	1.6785	**0.2012**	0.8728
Parked Vehicle	0.1498	0.1453	-0.0045	0.0756
Pedestrian	0.0218	0.0228	**0.0010**	0.0119
Animal	0.0000	0.0000	0.0000	0.0000
Train	0.0003	0.0008	**0.0005**	0.0004
Pedalcycles	0.0139	0.0169	**0.0030**	0.0088
Other Non-Vehicle	0.0000	0.0004	**0.0004**	0.0002
Fixed Object	0.6747	0.7102	**0.0355**	0.3693
Other Object	0.0252	0.0239	-0.0013	0.0124
Overturning	0.0417	0.0457	**0.0040**	0.0238
Other Non-Collision	0.0582	0.0548	-0.0034	0.0285
Left Turn	0.1432	0.1593	**0.0161**	0.0828
Right Turn	0.0000	0.0000	0.0000	0.0000

Safety Benefit - Cost Analysis

General Information

Project Name	FAI-37 & Pleasantville Road	Contact Email	
Project Description	LTL Widening	Contact Phone	
Reference Number		Date Performed	
Analyst	Josh Otworth	Analysis Year	2021
Agency/Company	ODOT D5		

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

All Sites

Comments:

Countermeasure Service Lives, Costs, and Safety Benefits

Countermeasures	Service Life (Years)	Initial Cost of Countermeasure	Annual Maintenance & Energy Costs	Salvage Value	Net Present Cost of Countermeasure	Total Cost of Countermeasures	Summary of Annual Crash Modifications	Net Present Value of Safety Benefits
LTL Widening	20	$1,660,000.00			$1,660,000.00	$1,660,000.00	-2.065	$1,913,435
		$0.00			$0.00	$0.00		
		$0.00			$0.00	$0.00		
		$0.00			$0.00	$0.00		
CMF 1 - Increase triangle sight distance	20	$0.00			$0.00	$0.00	-0.578	$901,724
		$0.00			$0.00	$0.00	0.000	$0
		$0.00			$0.00	$0.00	0.000	$0
		$0.00			$0.00	$0.00	0.000	$0
		$0.00			$0.00	$0.00	0.000	$0
		$0.00			$0.00	$0.00	0.000	$0
		$0.00			$0.00	$0.00	0.000	$0
		$0.00			$0.00	$0.00	0.000	$0
		$0.00			$0.00	$0.00	0.000	$0
		$0.00			$0.00	$0.00	0.000	$0
Totals		**$1,660,000.00**	**$0.00**	**$0.00**	**$1,660,000.00**	**$1,660,000.00**	**-2.642**	**$2,815,159**

Safety Benefit - Cost Analysis

General Information

Project Name	FAI-37 & Pleasantville Road	Contact Email	
Project Description	LTL Widening	Contact Phone	
Reference Number		Date Performed	
Analyst	Josh Otworth	Analysis Year	2021
Agency/Company	ODOT D5		

Benefit - Cost Calculator

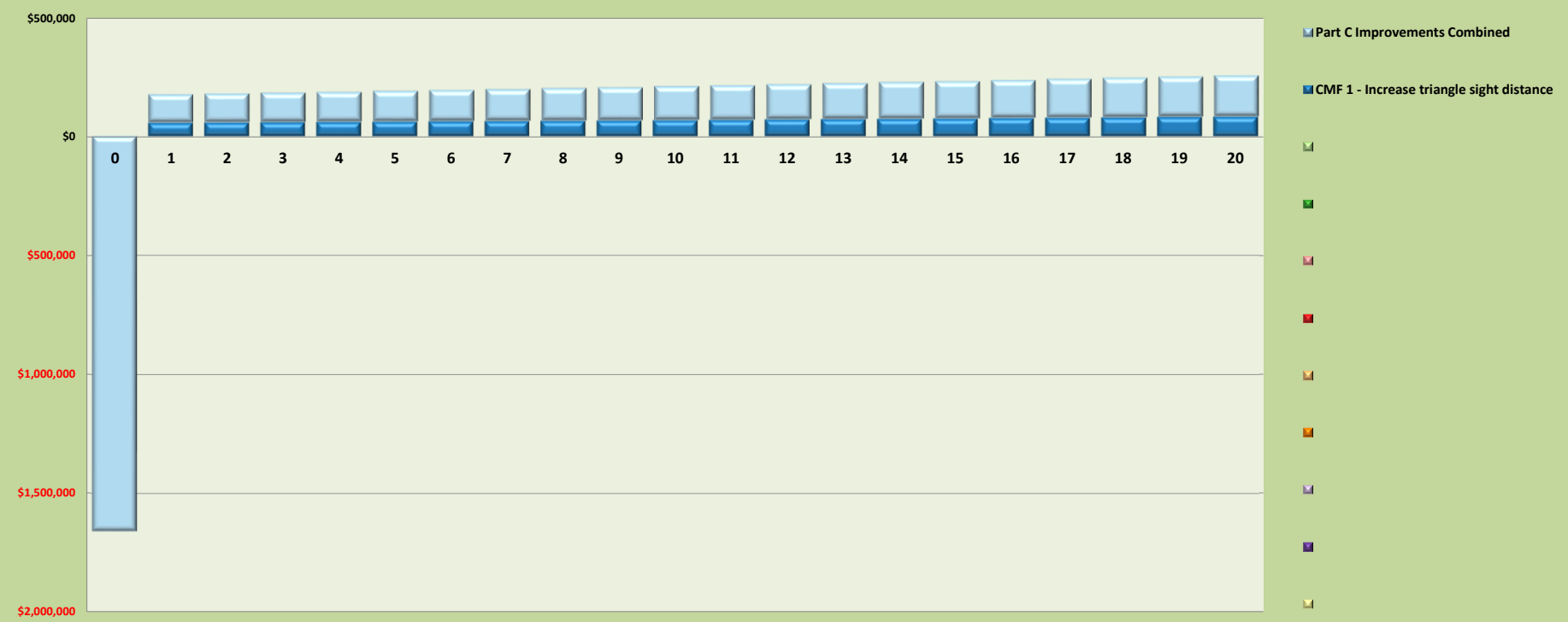
Net Present Value of Project	$1,660,000.00
Net Present Value of Safety Benefits	$2,815,159.29
Net Benefit	$1,155,159.29
Benefit / Cost Ratio	1.70

Expected Annual Crash Adjustment

Number of Fatal & Incapacitating Injury Crashes	-0.255
Number of Injury Crashes	-1.284
Number of Total Crashes	-2.642

Comments:

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

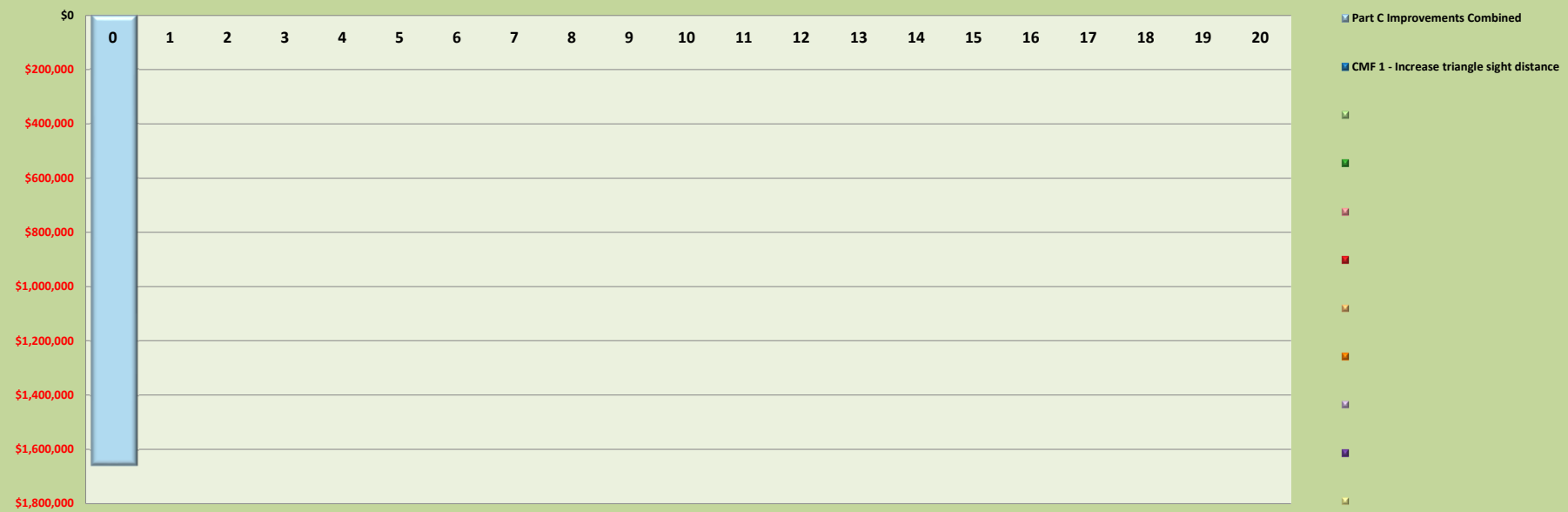


Safety Benefit - Cost Analysis

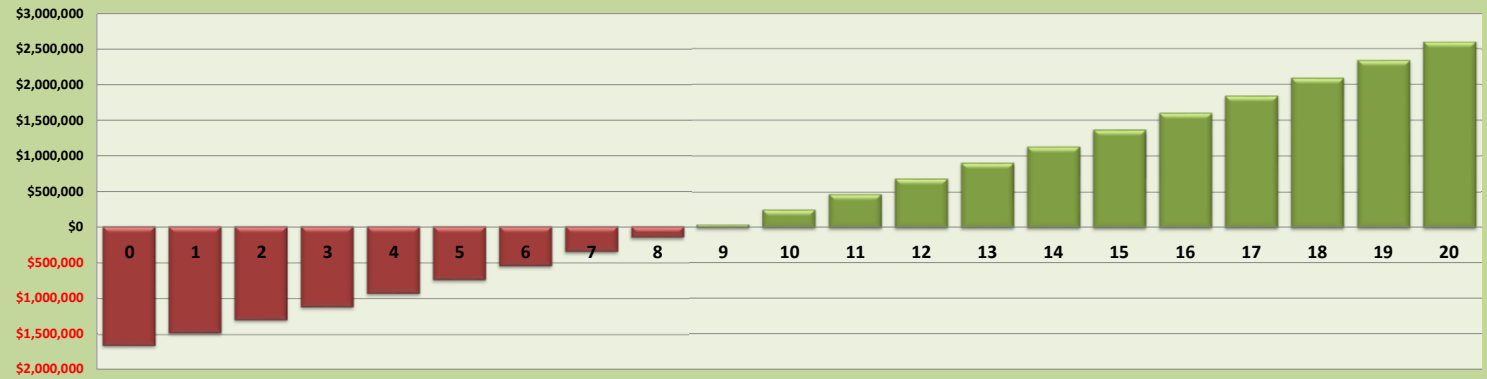
General Information

Project Name	FAI-37 & Pleasantville Road	Contact Email	
Project Description	LTL Widening	Contact Phone	
Reference Number		Date Performed	
Analyst	Josh Otworth	Analysis Year	2021
Agency/Company	ODOT D5		

Project Costs Only Cash Flows By Countermeasure Per Year



Return on Investment (Safety Benefits and Project Investments)



First year to observe a positive return on investiment: 2030 (9 years)

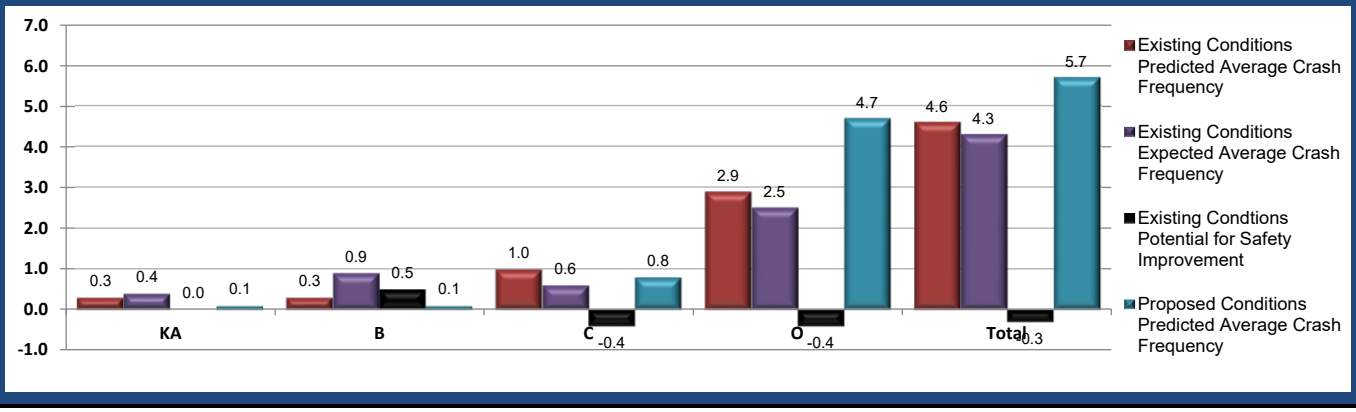
Percentage of Service Life to observe a continuous Positive Return on Investment: 60.00%

Project Safety Performance Report

General Information

Project Name	FAI-37 & Pleasantville Road	Contact Email	
Project Description	Signalization and LTL Widening	Contact Phone	
Reference Number		Date Performed	
Analyst	Josh Otworth	Analysis Year	2021
Agency/Company	ODOT D5		

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



Project Summary Results (Without Animal Crashes)

	KA	B	C	O	Total
$N_{predicted}$ - Existing Conditions	0.3339	0.3339	1.0136	2.8951	4.5765
$N_{expected}$ - Existing Conditions	0.3518	0.8530	0.5680	2.5283	4.3011
$N_{potential\ for\ improvement}$ - Existing Conditions	**0.0179**	**0.5191**	-0.4456	-0.3668	-0.2754
$N_{expected}$ - Proposed Conditions	0.0874	0.0874	0.7556	4.7227	5.6531

Project Safety Performance Report

General Information

Project Name	FAI-37 & Pleasantville Road	Contact Email	
Project Description	Signalization and LTL Widening	Contact Phone	
Reference Number		Date Performed	
Analyst	Josh Otworth	Analysis Year	2021
Agency/Company	ODOT D5		

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

Project Element ID	Common Name	Crash Severity Level				
		KA	B	C	O	Total
SR37; 8.37		0.3339	0.3339	1.0136	2.8951	4.5765

Project Safety Performance Report

General Information

Project Name	FAI-37 & Pleasantville Road	Contact Email	
Project Description	Signalization and LTL Widening	Contact Phone	
Reference Number		Date Performed	
Analyst	Josh Otworth	Analysis Year	2021
Agency/Company	ODOT D5		

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

Project Element ID	Common Name	Crash Severity Level				
		KA	B	C	O	Total
SR37; 8.37		0.3518	0.853	0.568	2.5283	4.3011

Project Safety Performance Report

General Information

Project Name	FAI-37 & Pleasantville Road	Contact Email	
Project Description	Signalization and LTL Widening	Contact Phone	
Reference Number		Date Performed	
Analyst	Josh Otworth	Analysis Year	2021
Agency/Company	ODOT D5		

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

Project Element ID	Common Name	Crash Severity Level				
		KA	B	C	O	Total
SR37; 8.37		0.0179	0.5191	-0.4456	-0.3668	-0.2754

Project Safety Performance Report

General Information

Project Name	FAI-37 & Pleasantville Road	Contact Email	
Project Description	Signalization and LTL Widening	Contact Phone	
Reference Number		Date Performed	
Analyst	Josh Otworth	Analysis Year	2021
Agency/Company	ODOT D5		

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

Project Element ID	Common Name	Crash Severity Level				
		KA	B	C	O	Total
SR37; 8.37		0.0874	0.0874	0.7556	4.7227	5.6531

Project Safety Performance Report

General Information

Project Name	FAI-37 & Pleasantville Road	Contact Email	
Project Description	Signalization and LTL Widening	Contact Phone	
Reference Number		Date Performed	
Analyst	Josh Otworth	Analysis Year	2021
Agency/Company	ODOT D5		

Summary by Crash Type

Crash Type	Existing			Proposed
	Predicted Crash Frequency	Expected Crash Frequency	PSI	Predicted Crash Frequency
Unknown	0.6966	0.0167	-0.6799	0.6734
Head On	0.0394	0.0390	-0.0004	0.0316
Rear End	0.7505	0.9092	**0.1587**	2.1768
Backing	0.1749	0.1625	-0.0124	0.2918
Sideswipe - Meeting	0.1258	0.1258	0.0000	0.0992
Sideswipe - Passing	0.1832	0.1893	**0.0061**	0.3977
Angle	1.4773	1.6785	**0.2012**	0.9629
Parked Vehicle	0.1498	0.1453	-0.0045	0.2152
Pedestrian	0.0218	0.0228	**0.0010**	0.0289
Animal	0.0000	0.0000	0.0000	0.0000
Train	0.0003	0.0008	**0.0005**	0.0000
Pedalcycles	0.0139	0.0169	**0.0030**	0.0201
Other Non-Vehicle	0.0000	0.0004	**0.0004**	0.0000
Fixed Object	0.6747	0.7102	**0.0355**	0.3258
Other Object	0.0252	0.0239	-0.0013	0.0118
Overturning	0.0417	0.0457	**0.0040**	0.0183
Other Non-Collision	0.0582	0.0548	-0.0034	0.0323
Left Turn	0.1432	0.1593	**0.0161**	0.3673
Right Turn	0.0000	0.0000	0.0000	0.0000

Safety Benefit - Cost Analysis

General Information

Project Name	FAI-37 & Pleasantville Road	Contact Email	
Project Description	Signalization and LTL Widening	Contact Phone	
Reference Number		Date Performed	
Analyst	Josh Otworth	Analysis Year	2021
Agency/Company	ODOT D5		

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

All Sites

Comments:

Countermeasure Service Lives, Costs, and Safety Benefits

Countermeasures	Service Life (Years)	Initial Cost of Countermeasure	Annual Maintenance & Energy Costs	Salvage Value	Net Present Cost of Countermeasure	Total Cost of Countermeasures	Summary of Annual Crash Modifications	Net Present Value of Safety Benefits
LTL Widening	20	$1,680,000.00			$1,680,000.00	$1,680,000.00	2.486	$650,095
Signalization	20	$250,000.00			$250,000.00	$250,000.00		
		$0.00			$0.00	$0.00		
		$0.00			$0.00	$0.00		
CMF 1 - Increase triangle sight distance	20	$0.00			$0.00	$0.00	-1.409	$1,142,918
		$0.00			$0.00	$0.00	0.000	$0
		$0.00			$0.00	$0.00	0.000	$0
		$0.00			$0.00	$0.00	0.000	$0
		$0.00			$0.00	$0.00	0.000	$0
		$0.00			$0.00	$0.00	0.000	$0
		$0.00			$0.00	$0.00	0.000	$0
		$0.00			$0.00	$0.00	0.000	$0
		$0.00			$0.00	$0.00	0.000	$0
Totals		**$1,930,000.00**	**$0.00**	**$0.00**	**$1,930,000.00**	**$1,930,000.00**	**1.077**	**$1,793,012**

Safety Benefit - Cost Analysis

General Information

Project Name	FAI-37 & Pleasantville Road	Contact Email	
Project Description	Signalization and LTL Widening	Contact Phone	
Reference Number		Date Performed	
Analyst	Josh Otworth	Analysis Year	2021
Agency/Company	ODOT D5		

Benefit - Cost Calculator

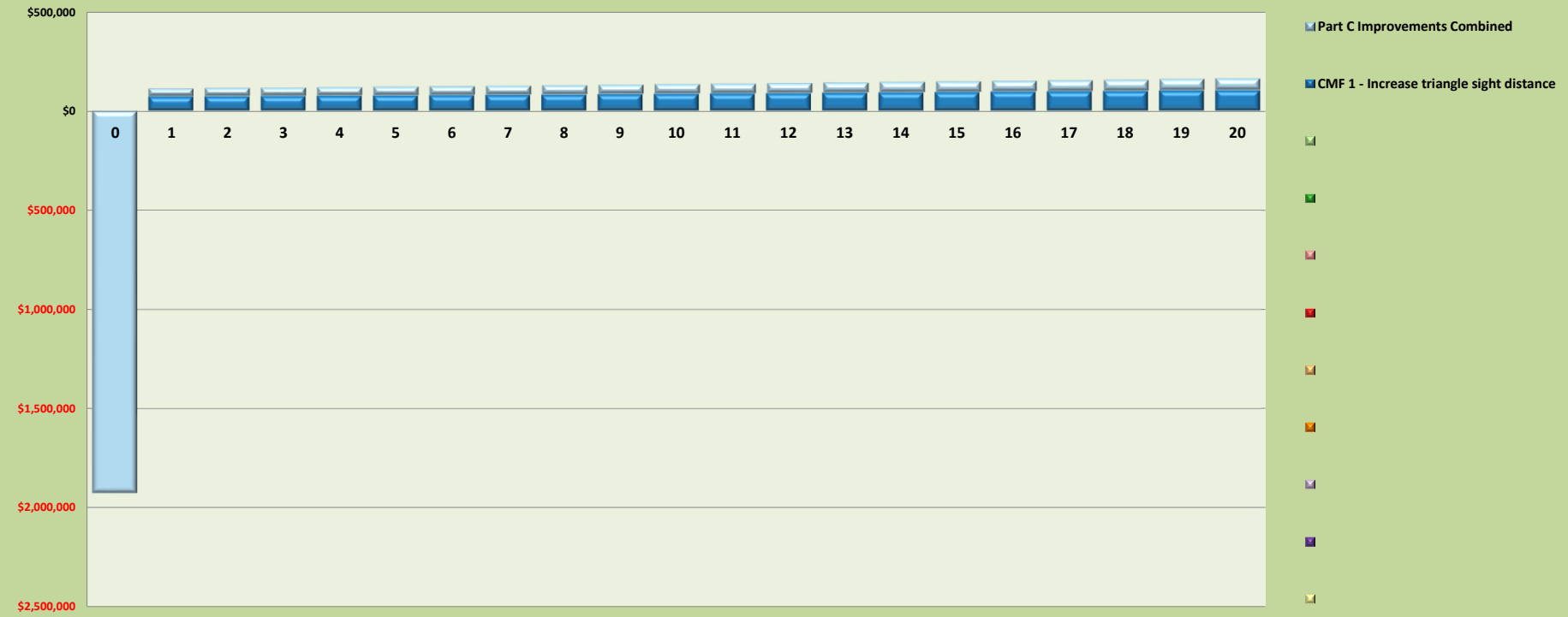
Net Present Value of Project	$1,930,000.00
Net Present Value of Safety Benefits	$1,793,012.36
Net Benefit	($136,987.64)
Benefit / Cost Ratio	0.93

Expected Annual Crash Adjustment

Number of Fatal & Incapacitating Injury Crashes	-0.247
Number of Injury Crashes	-0.751
Number of Total Crashes	1.077

Comments:

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

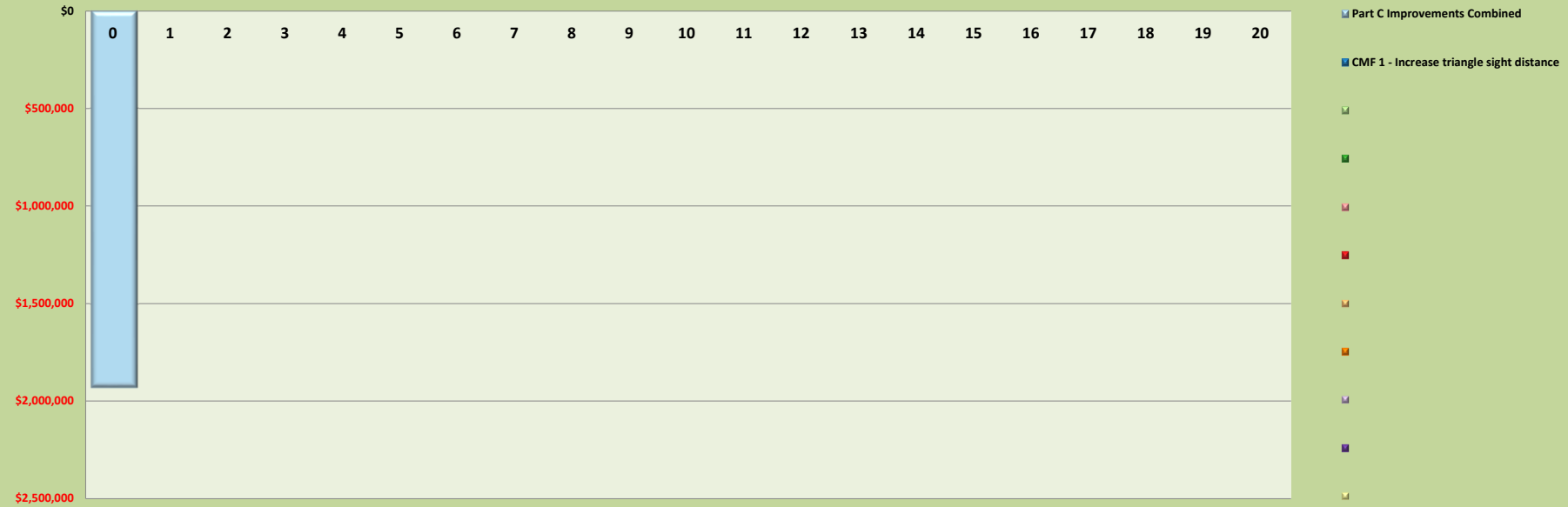


Safety Benefit - Cost Analysis

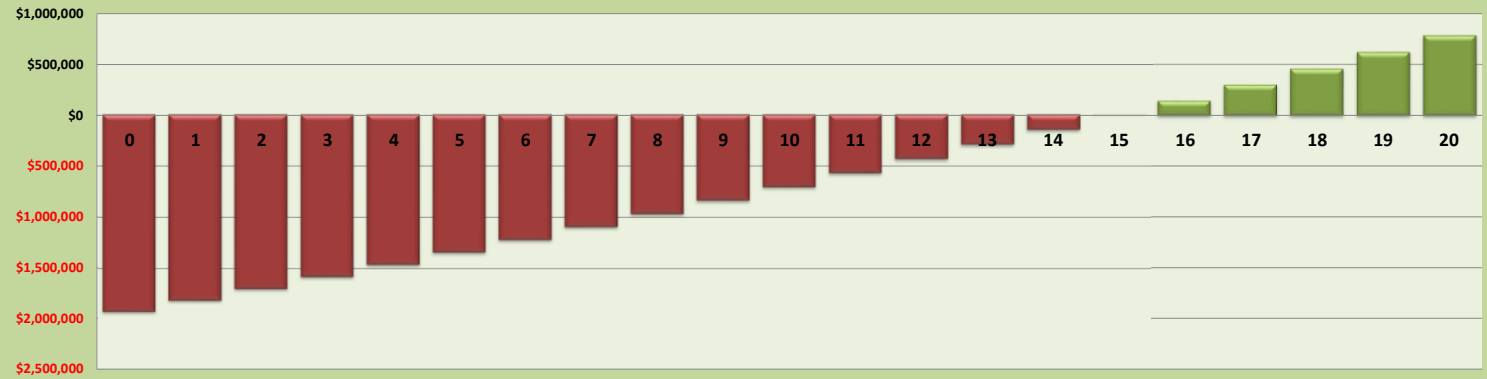
General Information

Project Name	FAI-37 & Pleasantville Road	Contact Email	
Project Description	Signalization and LTL Widening	Contact Phone	
Reference Number		Date Performed	
Analyst	Josh Otworth	Analysis Year	2021
Agency/Company	ODOT D5		

Project Costs Only Cash Flows By Countermeasure Per Year



Return on Investment (Safety Benefits and Project Investments)



First year to observe a positive return on investiment: 2037 (16 years)

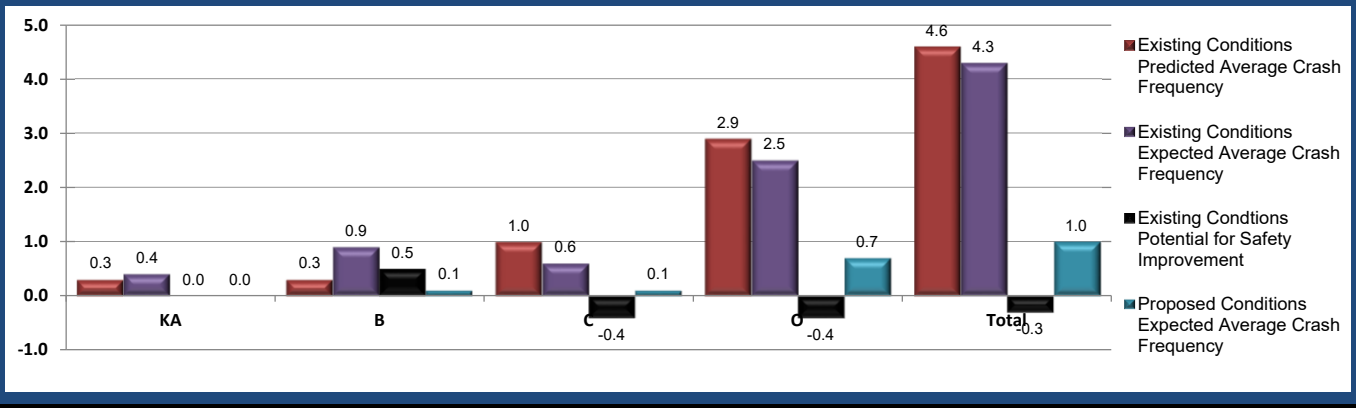
Percentage of Service Life to observe a continuous Positive Return on Investment: 25.00%

Project Safety Performance Report

General Information

Project Name	FAI-37 & Pleasantville Road	Contact Email	
Project Description	Roundabout	Contact Phone	
Reference Number		Date Performed	
Analyst	Josh Otworth	Analysis Year	2021
Agency/Company	ODOT D5		

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



Project Summary Results (Without Animal Crashes)

	KA	B	C	O	Total
$N_{predicted}$ - Existing Conditions	0.3339	0.3339	1.0136	2.8951	4.5765
$N_{expected}$ - Existing Conditions	0.3518	0.8530	0.5680	2.5283	4.3011
$N_{potential\ for\ improvement}$ - Existing Conditions	**0.0179**	**0.5191**	-0.4456	-0.3668	-0.2754
$N_{expected}$ - Proposed Conditions	0.0457	0.1109	0.0738	0.7332	0.9636

Project Safety Performance Report

General Information

Project Name	FAI-37 & Pleasantville Road	Contact Email	
Project Description	Roundabout	Contact Phone	
Reference Number		Date Performed	
Analyst	Josh Otworth	Analysis Year	2021
Agency/Company	ODOT D5		

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

Project Element ID	Common Name	Crash Severity Level				
		KA	B	C	O	Total
SR37; 8.37		0.3339	0.3339	1.0136	2.8951	4.5765

Project Safety Performance Report

General Information

Project Name	FAI-37 & Pleasantville Road	Contact Email	
Project Description	Roundabout	Contact Phone	
Reference Number		Date Performed	
Analyst	Josh Otworth	Analysis Year	2021
Agency/Company	ODOT D5		

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

Project Element ID	Common Name	Crash Severity Level				
		KA	B	C	O	Total
SR37; 8.37		0.3518	0.853	0.568	2.5283	4.3011

Project Safety Performance Report

General Information

Project Name	FAI-37 & Pleasantville Road	Contact Email	
Project Description	Roundabout	Contact Phone	
Reference Number		Date Performed	
Analyst	Josh Otworth	Analysis Year	2021
Agency/Company	ODOT D5		

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

Project Element ID	Common Name	Crash Severity Level				
		KA	B	C	O	Total
SR37; 8.37		0.0179	0.5191	-0.4456	-0.3668	-0.2754

Project Safety Performance Report

General Information

Project Name	FAI-37 & Pleasantville Road	Contact Email	
Project Description	Roundabout	Contact Phone	
Reference Number		Date Performed	
Analyst	Josh Otworth	Analysis Year	2021
Agency/Company	ODOT D5		

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

Project Element ID	Common Name	Crash Severity Level				
		KA	B	C	O	Total
SR37; 8.37		0.0457	0.1109	0.0738	0.7332	0.9636

Project Safety Performance Report

General Information

Project Name	FAI-37 & Pleasantville Road	Contact Email	
Project Description	Roundabout	Contact Phone	
Reference Number		Date Performed	
Analyst	Josh Otworth	Analysis Year	2021
Agency/Company	ODOT D5		

Summary by Crash Type

Crash Type	Existing			Proposed
	Predicted Crash Frequency	Expected Crash Frequency	PSI	Expected Crash Frequency
Unknown	0.6966	0.0167	-0.6799	0.0040
Head On	0.0394	0.0390	-0.0004	0.0070
Rear End	0.7505	0.9092	**0.1587**	0.2123
Backing	0.1749	0.1625	-0.0124	0.0456
Sideswipe - Meeting	0.1258	0.1258	0.0000	0.0274
Sideswipe - Passing	0.1832	0.1893	**0.0061**	0.0469
Angle	1.4773	1.6785	**0.2012**	0.3439
Parked Vehicle	0.1498	0.1453	-0.0045	0.0392
Pedestrian	0.0218	0.0228	**0.0010**	0.0034
Animal	0.0000	0.0000	0.0000	0.0000
Train	0.0003	0.0008	**0.0005**	0.0002
Pedalcycles	0.0139	0.0169	**0.0030**	0.0028
Other Non-Vehicle	0.0000	0.0004	**0.0004**	0.0001
Fixed Object	0.6747	0.7102	**0.0355**	0.1689
Other Object	0.0252	0.0239	-0.0013	0.0064
Overturning	0.0417	0.0457	**0.0040**	0.0084
Other Non-Collision	0.0582	0.0548	-0.0034	0.0142
Left Turn	0.1432	0.1593	**0.0161**	0.0330
Right Turn	0.0000	0.0000	0.0000	0.0000

Safety Benefit - Cost Analysis

General Information

Project Name	FAI-37 & Pleasantville Road	Contact Email	
Project Description	Roundabout	Contact Phone	
Reference Number		Date Performed	
Analyst	Josh Otworth	Analysis Year	2021
Agency/Company	ODOT D5		

Comments:

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

All Sites

Countermeasure Service Lives, Costs, and Safety Benefits

Countermeasures	Service Life (Years)	Initial Cost of Countermeasure	Annual Maintenance & Energy Costs	Salvage Value	Net Present Cost of Countermeasure	Total Cost of Countermeasures	Summary of Annual Crash Modifications	Net Present Value of Safety Benefits
		$0.00			$0.00	$0.00	0.000	$0
		$0.00			$0.00	$0.00		
		$0.00			$0.00	$0.00		
		$0.00			$0.00	$0.00		
CMF 1 - Convert intersection with minor-road stop control to modern roundabout (Rural)	20	$3,350,000.00			$3,350,000.00	$3,350,000.00	-3.338	$3,405,986
		$0.00			$0.00	$0.00	0.000	$0
		$0.00			$0.00	$0.00	0.000	$0
		$0.00			$0.00	$0.00	0.000	$0
		$0.00			$0.00	$0.00	0.000	$0
		$0.00			$0.00	$0.00	0.000	$0
		$0.00			$0.00	$0.00	0.000	$0
		$0.00			$0.00	$0.00	0.000	$0
		$0.00			$0.00	$0.00	0.000	$0
		$0.00			$0.00	$0.00	0.000	$0
Totals		**$3,350,000.00**	**$0.00**	**$0.00**	**$3,350,000.00**	**$3,350,000.00**	**-3.338**	**$3,405,986**

Safety Benefit - Cost Analysis

General Information

Project Name	FAI-37 & Pleasantville Road	Contact Email	
Project Description	Roundabout	Contact Phone	
Reference Number		Date Performed	
Analyst	Josh Otworth	Analysis Year	2021
Agency/Company	ODOT D5		

Benefit - Cost Calculator

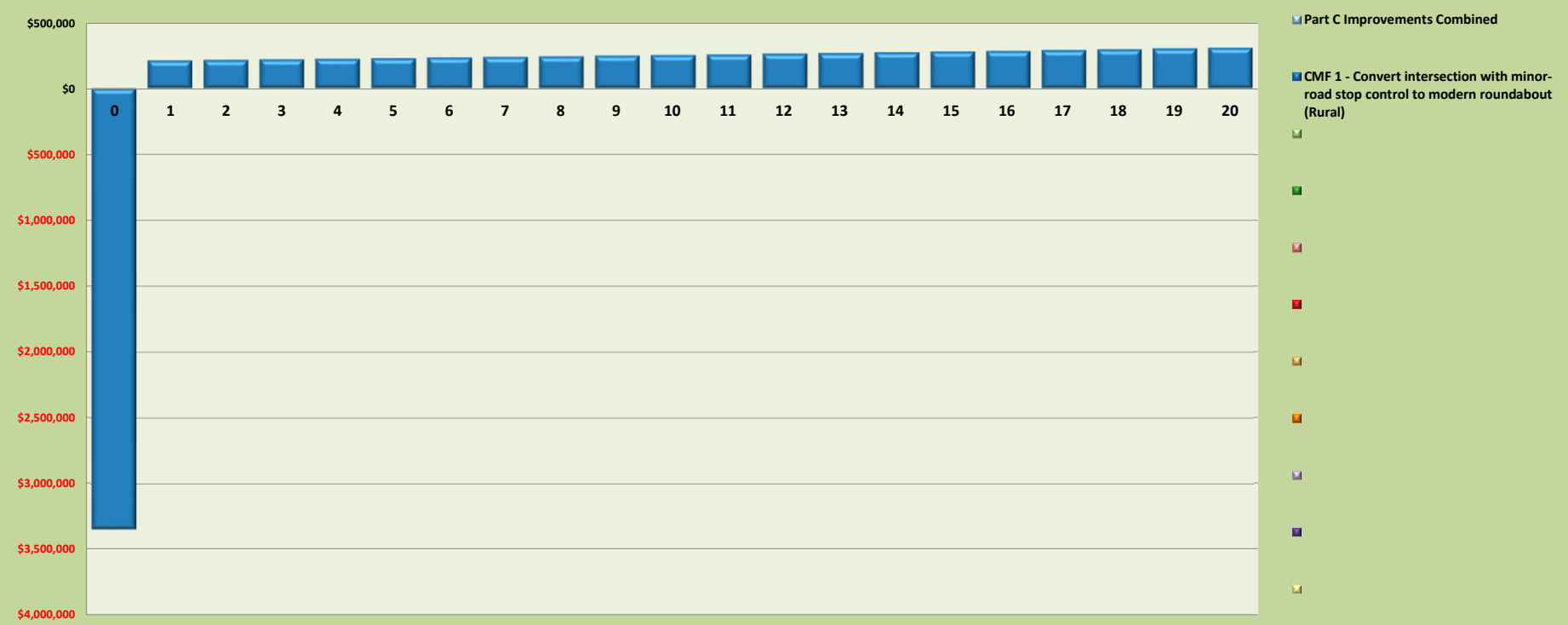
Net Present Value of Project	$3,350,000.00
Net Present Value of Safety Benefits	$3,405,985.91
Net Benefit	$55,985.91
Benefit / Cost Ratio	1.02

Expected Annual Crash Adjustment

Number of Fatal & Incapacitating Injury Crashes	-0.306
Number of Injury Crashes	-1.542
Number of Total Crashes	-3.338

Comments:

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

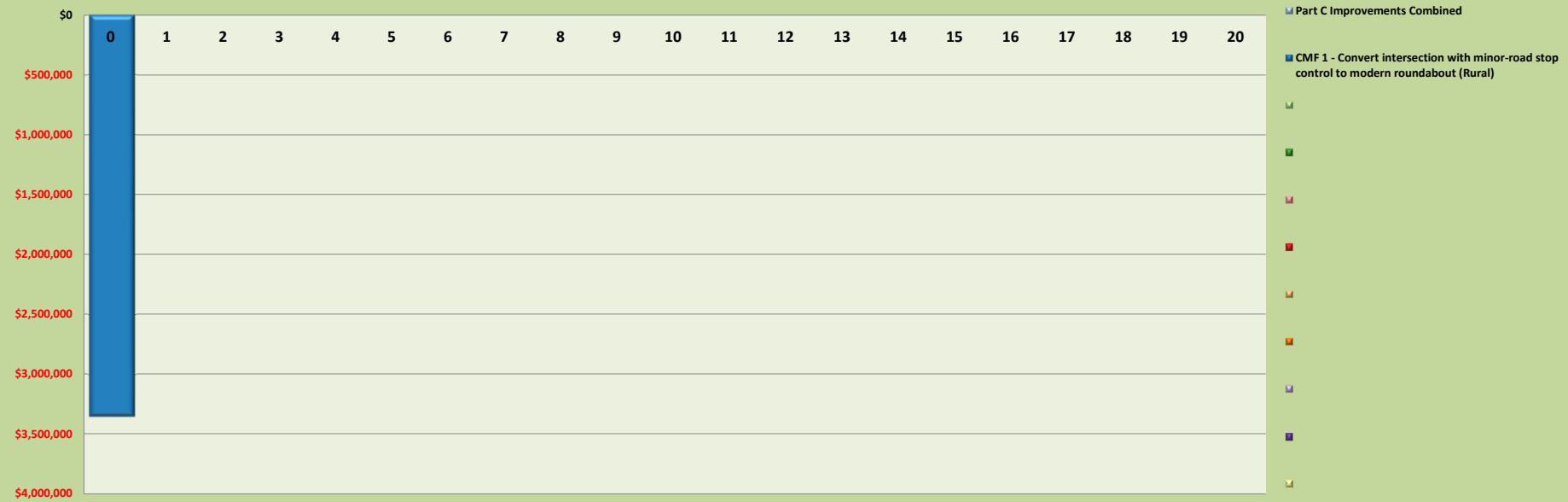


Safety Benefit - Cost Analysis

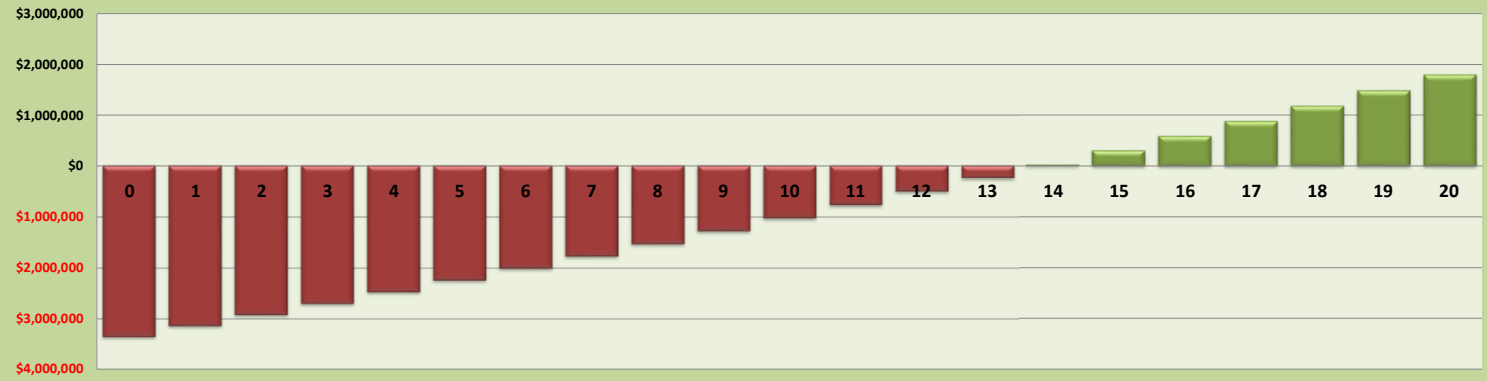
General Information

Project Name	FAI-37 & Pleasantville Road	Contact Email	
Project Description	Roundabout	Contact Phone	
Reference Number		Date Performed	
Analyst	Josh Otworth	Analysis Year	2021
Agency/Company	ODOT D5		

Project Costs Only Cash Flows By Countermeasure Per Year



Return on Investment (Safety Benefits and Project Investments)



First year to observe a positive return on investiment: 2035 (14 years)

Percentage of Service Life to observe a continuous Positive Return on Investment: 35.00%

Appendix E: Proposed Condition Diagram

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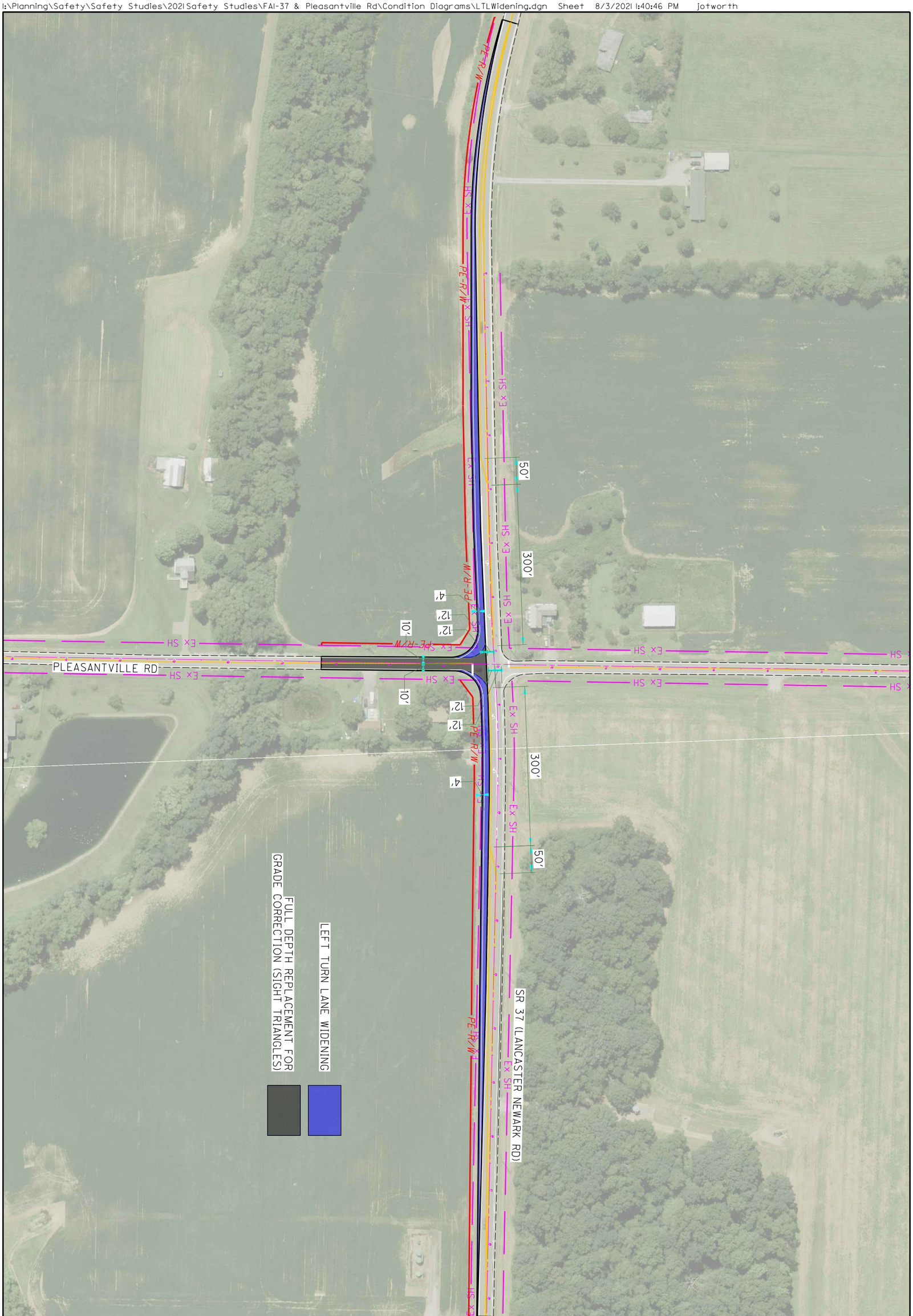
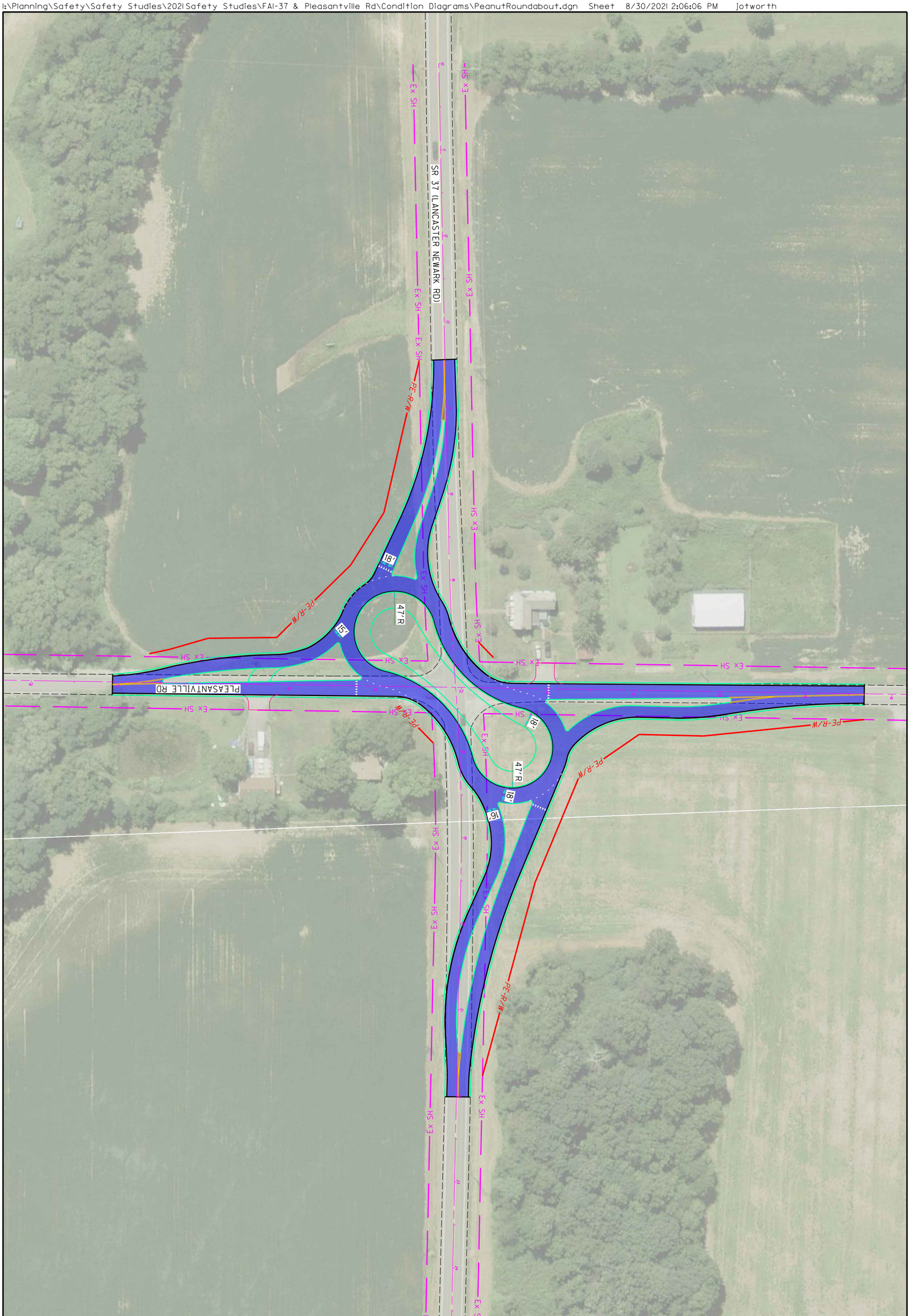


	FAI-37-8.38	LEFT TURN LANE WIDENING FAI-37 & PLEASANTVILLE ROAD	CALCULATED XXX CHECKED XXX	0 80 40 160 HORIZONTAL SCALE IN FEET

I:\Planning\Safety\Safety Studies\2021 Safety Studies\FAI-37 & Pleasantville Rd\Condition Diagrams\PeanutRoundabout.dgn Sheet 8/30/2021 2:06:06 PM jotworth



	FAI-37-8.38	PEANUT ROUNDABOUT FAI-37 & PLEASANTVILLE ROAD	CALCULATED XXX CHECKED XXX	0 50 25 100 HORIZONTAL SCALE IN FEET

Appendix F: Other Transportation Analysis

STUDY AND ANALYSIS INFORMATION

Municipality:		**Traffic Volumes Obtained By:**	STS
County:	Fairfield	**Analysis Date:**	3/10/2021
ODOT Engineering District:	5	**Agency/ Company Name Performing Warrant Analysis:**	ODOT D5

Analysis Information

Data Collection Date:	2/23/2021
Day of the Week:	Tuesday

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

Existing Traffic Signal at intersection: No

Total Number of Approaches at Intersection: 4

Major Street Information

Major Street Name and Route Number: SR 37

Major Street Approach Direction: N-Bound / S-Bound

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

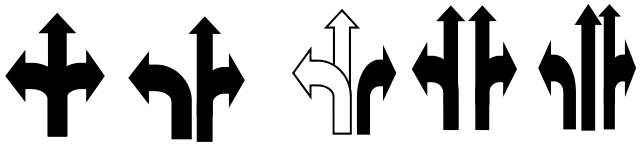
Speed Limit or 85th Percentile Speed on the Major Street*: 55 **MPH**

*Unknown assumes below 45 mph

Minor Street Information

Minor Street Name and Route Number: Pleasantville Road

Minor Street Approach Configuration: 1 E-Bound / 1 W-Bound



1 2 3 4 5

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

Apply Right Turn Lane Reduction*: Yes

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

TRAFFIC SIGNAL WARRANT ANALYSIS FINDINGS

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

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

If no warrants are satisfied, additional options may be considered:

1. An engineering study, performed by a firm prequalified by ODOT for signal design, if approved by the district, may be used to justify a new signal installation or retention of an existing signal that otherwise do meet the published warrants. An example of such an instance is a traffic signal in proximity to a railroad c that serves to reduce queuing across the tracks.

2. According to TEM 402-2, If the actual turning movement counts fail to satisfy a signal warrant, it may b acceptable to use traffic volumes projected to the second year after project completion. The **Modeling ar Forecasting Section** should provide the projected traffic volumes.

3. A pedestrian hybrid beacon may be considered for installation to facilitate pedestrian crossings at a loc does not meet traffic signal warrants (see Chapter 4C of TEM) or at a location that meets traffic signal wa under Sections 4C.05 and/or 4C.06 but a decision is made to not install a traffic control signal. **Please fil on PHB Score Sheet and submit to ODOT.**

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

Conclusion: Inconclusive

Notes: Traffic Signal as Crash Countermeasure will be considered as an alternative.

Peak Hour
4:45 PM
5:45 PM

Peak Hour
4:45 PM
5:45 PM

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HCS7 Two-Way Stop-Control Report

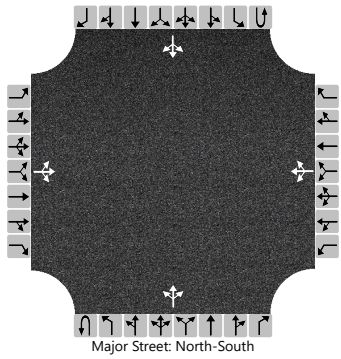
General Information

Analyst	Josh Otworth
Agency/Co.	ODOT D5
Date Performed	6/14/2021
Analysis Year	2021
Time Analyzed	PM Peak
Intersection Orientation	North-South
Project Description	Existing Condition

Site Information

Intersection	FAI-37 & Pleasantville Rd
Jurisdiction	
East/West Street	SR 37
North/South Street	Pleasantville Rd
Peak Hour Factor	0.86
Analysis Time Period (hrs)	0.25

Lanes


Major Street: North-South

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)		29	87	19		10	31	14		13	295	10		26	314	23
Percent Heavy Vehicles (%)		1	1	1		4	4	4		4				3		
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)		7.11	6.51	6.21		7.14	6.54	6.24		4.14				4.13		
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)		3.51	4.01	3.31		3.54	4.04	3.34		2.24				2.23		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			157				64			15				30		
Capacity, c (veh/h)			304				301			1156				1199		
v/c Ratio			0.52				0.21			0.01				0.03		
95% Queue Length, Q_{95} (veh)			2.8				0.8			0.0				0.1		
Control Delay (s/veh)			28.8				20.2			8.2				8.1		
Level of Service (LOS)			D				C			A				A		
Approach Delay (s/veh)		28.8				20.2				0.5				0.8		
Approach LOS		D				C										

HCS7 Two-Way Stop-Control Report

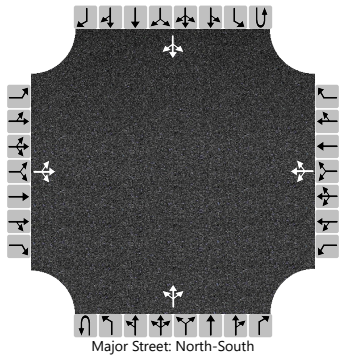
General Information

Analyst	Josh Otworth
Agency/Co.	ODOT D5
Date Performed	6/14/2021
Analysis Year	2021
Time Analyzed	PM Peak
Intersection Orientation	North-South
Project Description	2024 No Build

Site Information

Intersection	FAI-37 & Pleasantville Rd
Jurisdiction	
East/West Street	SR 37
North/South Street	Pleasantville Rd
Peak Hour Factor	0.86
Analysis Time Period (hrs)	0.25

Lanes


Major Street: North-South

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)		31	92	20		11	33	15		14	310	11		27	330	24
Percent Heavy Vehicles (%)		1	1	1		4	4	4		4				3		
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)		7.11	6.51	6.21		7.14	6.54	6.24		4.14				4.13		
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)		3.51	4.01	3.31		3.54	4.04	3.34		2.24				2.23		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			166				69			16				31		
Capacity, c (veh/h)			284				278			1137				1180		
v/c Ratio			0.58				0.25			0.01				0.03		
95% Queue Length, Q_{95} (veh)			3.4				0.9			0.0				0.1		
Control Delay (s/veh)			34.0				22.2			8.2				8.1		
Level of Service (LOS)			D				C			A				A		
Approach Delay (s/veh)		34.0				22.2				0.5				0.8		
Approach LOS		D				C										

HCS7 Two-Way Stop-Control Report

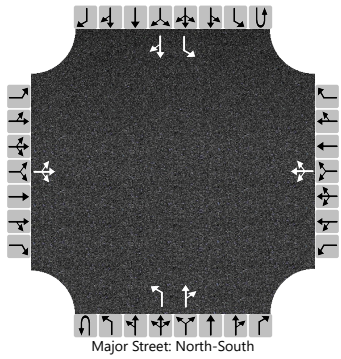
General Information

Analyst	Josh Otworth
Agency/Co.	ODOT D5
Date Performed	6/14/2021
Analysis Year	2021
Time Analyzed	PM Peak
Intersection Orientation	North-South
Project Description	2024 Build

Site Information

Intersection	FAI-37 & Pleasantville Rd
Jurisdiction	
East/West Street	SR 37
North/South Street	Pleasantville Rd
Peak Hour Factor	0.86
Analysis Time Period (hrs)	0.25

Lanes


Major Street: North-South

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	1	0	0	1	1	0
Configuration			LTR				LTR			L		TR		L		TR
Volume (veh/h)		31	92	20		11	33	15		14	310	11		27	330	24
Percent Heavy Vehicles (%)		1	1	1		4	4	4		4				3		
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)		7.11	6.51	6.21		7.14	6.54	6.24		4.14				4.13		
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)		3.51	4.01	3.31		3.54	4.04	3.34		2.24				2.23		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			166				69			16				31		
Capacity, c (veh/h)			288				281			1137				1180		
v/c Ratio			0.58				0.24			0.01				0.03		
95% Queue Length, Q_{95} (veh)			3.4				0.9			0.0				0.1		
Control Delay (s/veh)			33.3				21.9			8.2				8.1		
Level of Service (LOS)			D				C			A				A		
Approach Delay (s/veh)		33.3				21.9				0.3				0.6		
Approach LOS		D				C										

HCS7 Two-Way Stop-Control Report

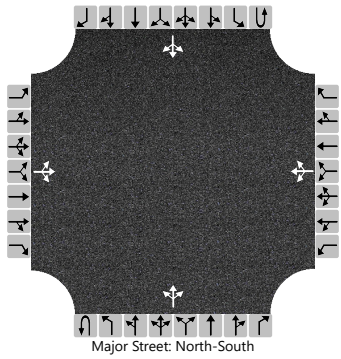
General Information

Analyst	Josh Otworth
Agency/Co.	ODOT D5
Date Performed	6/14/2021
Analysis Year	2021
Time Analyzed	PM Peak
Intersection Orientation	North-South
Project Description	2044 No Build

Site Information

Intersection	FAI-37 & Pleasantville Rd
Jurisdiction	
East/West Street	SR 37
North/South Street	Pleasantville Rd
Peak Hour Factor	0.86
Analysis Time Period (hrs)	0.25

Lanes


Major Street: North-South

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)		41	122	27		14	43	20		18	413	14		36	440	32
Percent Heavy Vehicles (%)		1	1	1		4	4	4		4				3		
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)		7.11	6.51	6.21		7.14	6.54	6.24		4.14				4.13		
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)		3.51	4.01	3.31		3.54	4.04	3.34		2.24				2.23		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			221				90			21				42		
Capacity, c (veh/h)			178				136			1011				1062		
v/c Ratio			1.24				0.66			0.02				0.04		
95% Queue Length, Q_{95} (veh)			12.2				3.6			0.1				0.1		
Control Delay (s/veh)			199.3				72.1			8.6				8.5		
Level of Service (LOS)			F				F			A				A		
Approach Delay (s/veh)		199.3				72.1				0.6				1.1		
Approach LOS		F				F										

HCS7 Two-Way Stop-Control Report

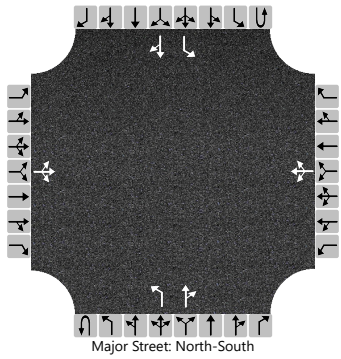
General Information

Analyst	Josh Otworth
Agency/Co.	ODOT D5
Date Performed	6/14/2021
Analysis Year	2021
Time Analyzed	PM Peak
Intersection Orientation	North-South
Project Description	2044 Build

Site Information

Intersection	FAI-37 & Pleasantville Rd
Jurisdiction	
East/West Street	SR 37
North/South Street	Pleasantville Rd
Peak Hour Factor	0.86
Analysis Time Period (hrs)	0.25

Lanes


Major Street: North-South

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	1	0	0	1	1	0
Configuration			LTR				LTR			L		TR		L		TR
Volume (veh/h)		41	122	27		14	43	20		18	413	14		36	440	32
Percent Heavy Vehicles (%)		1	1	1		4	4	4		4				3		
Proportion Time Blocked																
Percent Grade (%)		0				0										
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

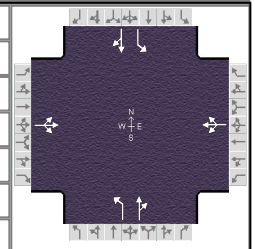
Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1		
Critical Headway (sec)		7.11	6.51	6.21		7.14	6.54	6.24		4.14				4.13		
Base Follow-Up Headway (sec)		3.5	4.0	3.3		3.5	4.0	3.3		2.2				2.2		
Follow-Up Headway (sec)		3.51	4.01	3.31		3.54	4.04	3.34		2.24				2.23		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			221				90			21				42		
Capacity, c (veh/h)			183				143			1011				1062		
v/c Ratio			1.21				0.63			0.02				0.04		
95% Queue Length, Q_{95} (veh)			11.8				3.4			0.1				0.1		
Control Delay (s/veh)			186.0				65.5			8.6				8.5		
Level of Service (LOS)			F				F			A				A		
Approach Delay (s/veh)		186.0				65.5				0.3				0.6		
Approach LOS		F				F										

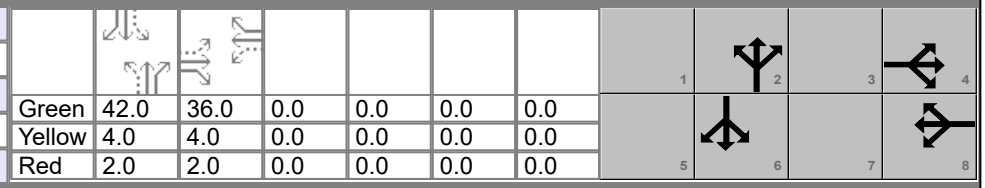
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	ODOT D5			Duration, h	0.250
Analyst	Josh Otworth	Analysis Date	6/16/2021	Area Type	Other
Jurisdiction	State	Time Period		PHF	0.86
Urban Street	FAI-37	Analysis Year	2021	Analysis Period	1> 4:45
Intersection	FAI-37 & Pleasantville Rd	File Name	2024 Signal LTLs.xus		
Project Description	2024 PM Peak				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	31	92	20	11	33	15	14	310	11	27	330	24

Signal Information			
Cycle, s	90.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	42.0	36.0	0.0	0.0	0.0	0.0						
Yellow	4.0	4.0	0.0	0.0	0.0	0.0						
Red	2.0	2.0	0.0	0.0	0.0	0.0						

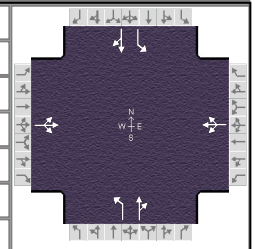
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4		8		2		6
Case Number		8.0		8.0		6.0		6.0
Phase Duration, s		42.0		42.0		48.0		48.0
Change Period, ($Y+R_c$), s		6.0		6.0		6.0		6.0
Max Allow Headway (*MAH*), s		3.9		3.9		3.9		3.9
Queue Clearance Time (g_s), s		7.9		4.4		18.6		17.7
Green Extension Time (g_e), s		0.7		0.7		2.9		2.9
Phase Call Probability		1.00		1.00		1.00		1.00
Max Out Probability		0.00		0.00		0.01		0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (*v*), veh/h		166			69		16	373		31	412	
Adjusted Saturation Flow Rate (*s*), veh/h/ln		1618			1545		959	1685		1001	1688	
Queue Service Time (g_s), s		0.0			0.0		1.1	13.7		2.0	15.5	
Cycle Queue Clearance Time (g_c), s		5.9			2.4		16.6	13.7		15.7	15.5	
Green Ratio (*g/C*)		0.40			0.40		0.47	0.47		0.47	0.47	
Capacity (*c*), veh/h		696			666		363	786		395	788	
Volume-to-Capacity Ratio (*X*)		0.239			0.103		0.045	0.475		0.079	0.522	
Back of Queue (*Q*), ft/ln (95 th percentile)		93.5			37.2		10.7	208.2		20	228.9	
Back of Queue (*Q*), veh/ln (95 th percentile)		3.7			1.4		0.4	8.1		0.8	8.9	
Queue Storage Ratio (*RQ*) (95 th percentile)		0.00			0.00		0.00	0.00		0.00	0.00	
Uniform Delay (d_1), s/veh		18.0			16.9		22.8	16.4		21.8	16.9	
Incremental Delay (d_2), s/veh		0.2			0.1		0.1	0.4		0.1	0.6	
Initial Queue Delay (d_3), s/veh		0.0			0.0		0.0	0.0		0.0	0.0	
Control Delay (*d*), s/veh		18.1			17.0		22.8	16.9		21.9	17.6	
Level of Service (LOS)		B			B		C	B		C	B	
Approach Delay, s/veh / LOS	18.1	B		17.0	B		17.1	B		17.9	B	
Intersection Delay, s/veh / LOS	17.6						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.91	B	1.91	B	1.67	B	1.67	B
Bicycle LOS Score / LOS	0.76	A	0.60	A	1.13	A	1.22	A

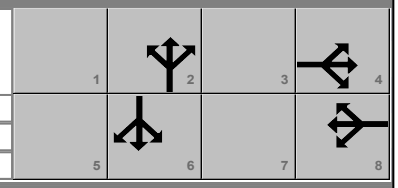
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	ODOT D5			Duration, h	0.250
Analyst	Josh Otworth	Analysis Date	6/16/2021	Area Type	Other
Jurisdiction	State	Time Period		PHF	0.86
Urban Street	FAI-37	Analysis Year	2021	Analysis Period	1> 4:45
Intersection	FAI-37 & Pleasantville Rd	File Name	2044 Signal LTLs.xus		
Project Description	2044 PM Peak				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	41	122	27	14	43	20	18	413	14	36	440	32

Signal Information													
Cycle, s	90.0	Reference Phase	2										
Offset, s	0	Reference Point	End										
Uncoordinated	Yes	Simult. Gap E/W	On	Green	44.0	34.0	0.0	0.0	0.0	0.0			
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	4.0	4.0	0.0	0.0	0.0	0.0			
				Red	2.0	2.0	0.0	0.0	0.0	0.0			



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4		8		2		6
Case Number		8.0		8.0		6.0		6.0
Phase Duration, s		40.0		40.0		50.0		50.0
Change Period, ($Y+R_c$), s		6.0		6.0		6.0		6.0
Max Allow Headway (*MAH*), s		4.0		4.0		3.9		3.9
Queue Clearance Time (g_s), s		10.5		5.3		25.9		24.4
Green Extension Time (g_e), s		1.0		1.0		4.0		4.1
Phase Call Probability		1.00		1.00		1.00		1.00
Max Out Probability		0.00		0.00		0.07		0.06

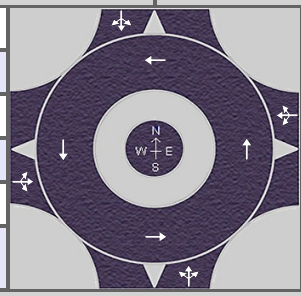
Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (*v*), veh/h		221			90		21	497		42	549	
Adjusted Saturation Flow Rate (*s*), veh/h/ln		1614			1537		845	1685		894	1688	
Queue Service Time (g_s), s		1.3			0.0		1.7	19.2		3.2	22.2	
Cycle Queue Clearance Time (g_c), s		8.5			3.3		23.9	19.2		22.4	22.2	
Green Ratio (*g/C*)		0.38			0.38		0.49	0.49		0.49	0.49	
Capacity (*c*), veh/h		658			628		285	824		326	825	
Volume-to-Capacity Ratio (*X*)		0.336			0.143		0.073	0.603		0.128	0.665	
Back of Queue (*Q*), ft/ln (95 th percentile)		135.5			51.5		15.3	273.4		29.3	310.3	
Back of Queue (*Q*), veh/ln (95 th percentile)		5.4			2.0		0.6	10.6		1.1	12.1	
Queue Storage Ratio (*RQ*) (95 th percentile)		0.00			0.00		0.00	0.00		0.00	0.00	
Uniform Delay (d_1), s/veh		20.0			18.4		26.5	16.7		24.8	17.4	
Incremental Delay (d_2), s/veh		0.3			0.1		0.1	1.2		0.2	2.0	
Initial Queue Delay (d_3), s/veh		0.0			0.0		0.0	0.0		0.0	0.0	
Control Delay (*d*), s/veh		20.3			18.5		26.6	17.9		25.0	19.4	
Level of Service (LOS)		C			B		C	B		C	B	
Approach Delay, s/veh / LOS	20.3	C		18.5	B		18.3	B		19.8	B	
Intersection Delay, s/veh / LOS	19.3						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.91	B	1.91	B	1.67	B	1.67	B
Bicycle LOS Score / LOS	0.85	A	0.64	A	1.34	A	1.46	A

HCS7 Roundabouts Report

General Information

Analyst	Josh Otworth
Agency or Co.	ODOT D5
Date Performed	6/16/2021
Analysis Year	2021
Time Analyzed	
Project Description	2024 PM Peak



Site Information

Intersection	FAI-37 & Pleasantville Rd
E/W Street Name	Pleasantville Road
N/S Street Name	SR 37
Analysis Time Period (hrs)	0.25
Peak Hour Factor	0.86
Jurisdiction	State

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	31	92	20	0	11	33	15	0	14	310	11	0	27	330	24
Percent Heavy Vehicles, %	1	1	1	1	4	4	4	4	4	4	4	4	3	3	3	3
Flow Rate (v_{PCE}), pc/h	0	36	108	23	0	13	40	18	0	17	375	13	0	32	395	29
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		167			71			405			456	
Entry Volume, veh/h		165			68			389			443	
Circulating Flow (v_c), pc/h	440			428			176			70		
Exiting Flow (v_{ex}), pc/h	153			86			429			431		
Capacity (c_{pce}), pc/h		881			892			1153			1285	
Capacity (c), veh/h		872			858			1109			1247	
v/c Ratio (x)		0.19			0.08			0.35			0.35	

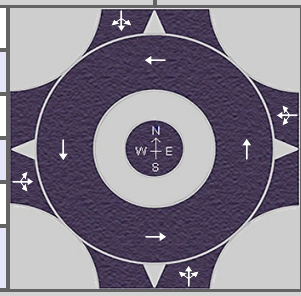
Delay and Level of Service

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh		6.0			5.0			6.7			6.2	
Lane LOS		A			A			A			A	
95% Queue, veh		0.7			0.3			1.6			1.6	
Approach Delay, s/veh	6.0			5.0			6.7			6.2		
Approach LOS	A			A			A			A		
Intersection Delay, s/veh | LOS	6.3						A					

HCS7 Roundabouts Report

General Information

Analyst	Josh Otworth
Agency or Co.	ODOT D5
Date Performed	6/16/2021
Analysis Year	2021
Time Analyzed	
Project Description	2044 PM Peak



Site Information

Intersection	FAI-37 & Pleasantville Rd
E/W Street Name	Pleasantville Road
N/S Street Name	SR 37
Analysis Time Period (hrs)	0.25
Peak Hour Factor	0.86
Jurisdiction	State

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	41	122	27	0	14	43	20	0	18	413	14	0	36	440	32
Percent Heavy Vehicles, %	1	1	1	1	4	4	4	4	4	4	4	4	3	3	3	3
Flow Rate (v_{PCE}), pc/h	0	48	143	32	0	17	52	24	0	22	499	17	0	43	527	38
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		223			93			538			608	
Entry Volume, veh/h		221			89			517			590	
Circulating Flow (v_c), pc/h	587			569			234			91		
Exiting Flow (v_{ex}), pc/h	203			112			571			576		
Capacity (c_{pce}), pc/h		758			772			1087			1258	
Capacity (c), veh/h		751			743			1045			1221	
v/c Ratio (x)		0.29			0.12			0.49			0.48	

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		8.3			6.1			9.2			8.1	
Lane LOS		A			A			A			A	
95% Queue, veh		1.2			0.4			2.8			2.7	
Approach Delay, s/veh	8.3			6.1			9.2			8.1		
Approach LOS	A			A			A			A		
Intersection Delay, s/veh | LOS	8.4						A					