PROPEL US 30

Smarter Transportation. Stronger Communities.

US 30 West

US 30 from SR 49 to Beech Road and US 31 from the W CR 700 N to US 30 Interchange

Existing Transportation Conditions Report

Revision 1 - March 27, 2024

Prepared For:

Indiana Department of Transportation

Prepared By:

American Structurepoint, Inc.
9025 River Road, Suite 200
Indianapolis, Indiana 46240

CDM Smith Inc.
211 N. Pennsylvania Street, Suite 1750
Indianapolis, IN 46204

TABLE OF CONTENTS

APPENDICES

LIST OF FIGURES

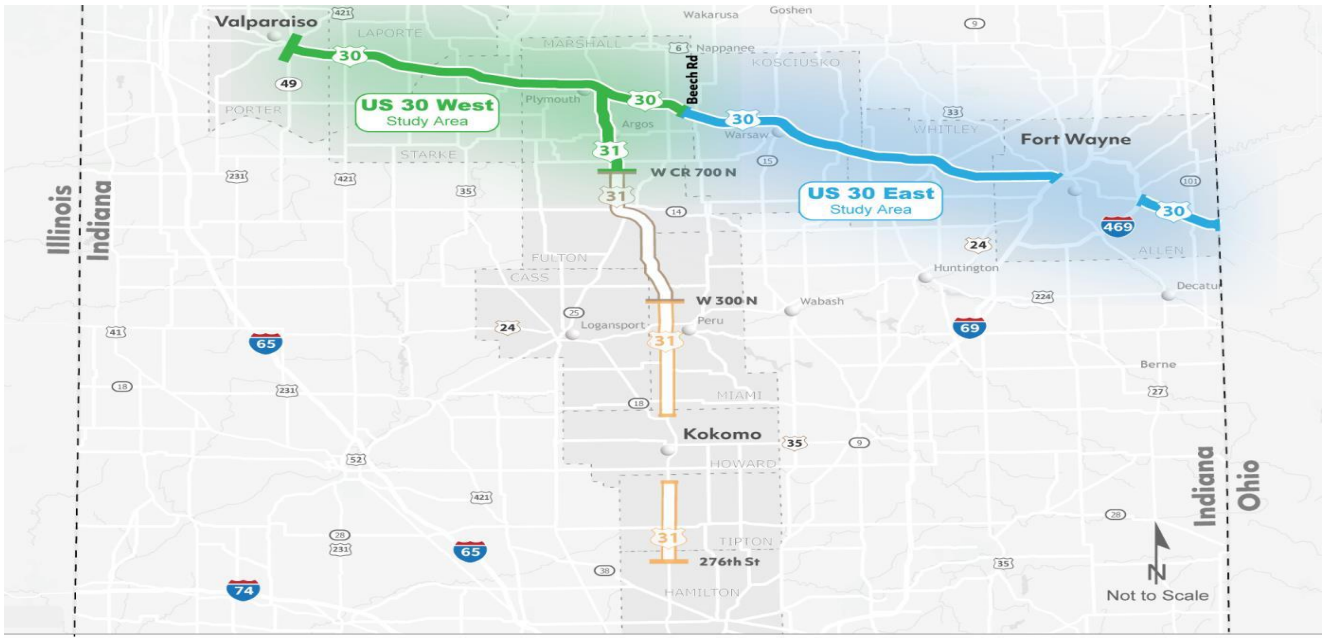
LIST OF TABLES

1. INTRODUCTION

ProPEL is an Indiana Department of Transportation (INDOT) initiative that uses collaborative Planning and Environment Linkages (PEL) studies to consider environmental, community, and economic goals early in the planning process. Through the PEL studies, INDOT aspires to create smarter transportation systems that build stronger communities. The ProPEL US 30 West study area consists of US 30 between S.R. 49 (City of Valparaiso) in Porter County and South Beech Road in Marshall County (approx. 53.2 miles) and US 31 from the northern limits of the US 30 and US 31 interchange in Marshall County south to W C.R. 700 N in Fulton County (approximately 13.9 miles). A map of the study area can be found in **Figure 1**.

The purpose of this technical report is to document the existing roadway, bridge, utility, pedestrian/transit, and traffic conditions within and along the US 30 West study limits.

Figure 1 – ProPEL US 30 and ProPEL US 31 Corridors



2. METHODOLOGY

The study methodology for this existing conditions report consisted of collecting existing roadway data within the noted study limits, including the following:

- Existing road plans from the INDOT Research & Documents Library provided typical section and geometric data for review.
- Existing railroad crossing data was taken from the Federal Railroad Administration's website.
- Posted speed limits and traffic signal locations were determined from on-site visits.
- Roadway classifications/designations were determined from a review of INDOT's website.
- Bridge type, size, location, year of construction, and condition were based on review of bridge inspection reports.
- Utility owners were identified based on an 811 utility ticket and on-site visits.
- Pedestrian, bicycle, and transit facilities were identified based on review of MPO and local agency websites, including MACOG and NIRPC; Starke, Porter, Marshall, Fulton and LaPorte Counties; and the cities/towns of Bourbon, Valparaiso, Plymouth, Argos, Hanna, and Wanatah.
- Crash history was based on crash data and narratives received from INDOT for crashes between 2017 and 2021.
- Existing traffic volumes and turning movement counts at designated intersections were provided by INDOT (12/21 through 11/22).
- Outputs from the Statewide Traffic Model were provided for 2019 Base and 2045 existing and committed (E+C) networks to estimate growth percentages.
- No-build (2045) traffic volumes were developed based upon the existing volumes and the growth rates.

Planned projects noted in Section 7, Study Area Transportation Projects, were determined based on review of INDOT's *Statewide Transportation Improvement Plan* (STIP) and projects included in each county's *Transportation Improvement Plan* (TIP).

3. INFRASTRUCTURE CONDITIONS

3.1. ROADWAY CHARACTERISTICS

3.1.1. ROADWAY TYPICAL SECTION

The US 30 roadway typical section consists of a four-lane divided roadway with a depressed grass median. The travel lanes are 12'-0" wide with a 4'-0" paved inside shoulder and a 10'-0" paved outside shoulder. Where turn lanes are present, the turn lanes are primarily 12'-0" in width. The median width (inside travel lane to inside travel lane) is generally as follows:

- US 30 from SR 49 to US 421 = 26'-0"
- US 30 from US 421 to 1900' W. of CR S 900 W = 40'-0"
- US 30 from 1900' W of CR S 900 W to Beech Road = 50'-0"

All but four intersections (CR S 450 W, West St (Old US 30), CR 300 W, and CR S 50 E) along US 30, where US 30 is intersecting a road classified as "Collector" or higher (see **Table 1**), have left turn lanes in the median. Of the 32 intersections classified as "Collector" or higher, 8 do not have right turn lanes. Many of the intersections at the "local" county roads classified lower than a "Collector" do not have left or right turn lanes.

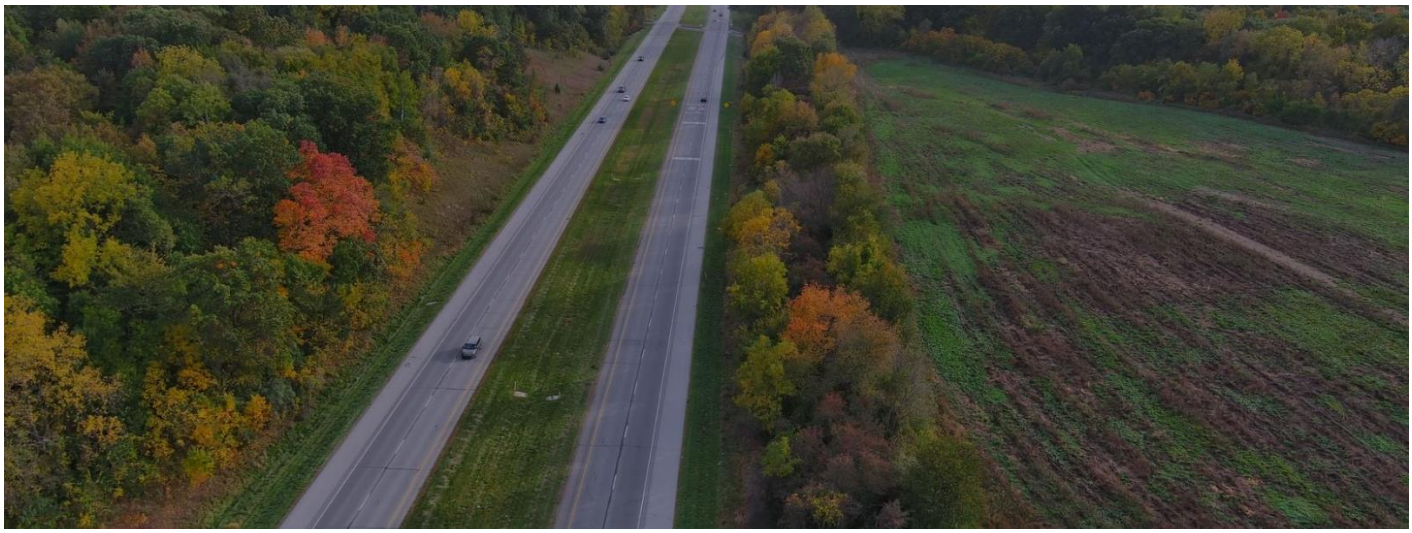
Figure 2 – *US 30 Typical Section*

The US 31 roadway typical section consists of a four-lane divided roadway with a depressed grass median. The travel lanes are 12'-0" wide with a 4'-0" paved inside shoulder and a 10'-0" paved outside shoulder. Where turn lanes are present, the turn lanes are primarily 12'-0" in width. The median width (inside travel lane to inside travel lane) varies as noted below:

- US 31 from US 30 to 13th Road = 50'-0" to 52'-0"
- US 31 from 13th Road to C.R. 700 N = 60'-0"

All but one intersection along US 31 (12B Road), where US 31 is intersecting a road classified as a "Collector" or higher (see **Table 2**), have left turn lanes in the median. Of the 8 intersections classified as "Collector" or higher, one (12 B Road) does not have a right turn lane. Many of the intersections at the "local" county roads classified lower than a "Collector" do not have left or right turn lanes.

Figure 3 – *US 31 Typical Section*



3.1.2. ROADWAY CLASSIFICATIONS

US 30 and US 31 are both classified as Principal Arterials. **Tables 1 and 2** describe primary intersection roadways classified as "Collector" or above:

Table 1 – US 30 Mainline

In/Near	Intersecting Road	Classification	Rural/Urban	Signalized	Left/Right Turn Lanes
Valparaiso	SR 49	Principal Arterial	Urban	No (Interchange)	N/A
	Industrial Dr	Major Collector	Urban	Yes	Yes/Yes
	Porter CR 325 E	Major Collector	Urban	No	Yes/No
	Porter CR 400 E	Major Collector	Rural	No	Yes/No
	Porter CR 450 E	Minor Collector	Rural	No	Yes/No
	County Line Road	Minor Collector	Rural	No	Yes/No
Wanatah	Lincoln Street	Minor Collector	Urban	No	Yes/Yes
Wanatah	Main Street	Major Collector	Urban	No	Yes/Yes
Wanatah	US 421	Principal Arterial	Urban	Yes	Yes/Yes
	LaPorte CR 600 W	Major Collector	Rural	No	Yes EB/Yes WB
Hanna	LaPorte CR 450 W	Minor Collector	Rural	No	No/No
Hanna	Thompson Street	Maj Coll/Min Coll	Rural	No	Yes WB/Yes EB
	West St (Old US 30)	Major Collector	Rural	No	No/No
	LaPorte CR 300 W	Major Collector	Rural	No	No/No
	SR 39	Minor Arterial	Rural	Yes	Yes/Yes
	LaPorte CR 50 E	Major Collector	Rural	No	No/No
	US 35	Principal Arterial	Rural	No (Interchange)	N/A
Hamlet	LaPorte CR 600 N	Minor Collector	Rural	No	Yes/Yes
	LaPorte CR 750 E	Major Collector	Rural	Flashing R/Y	Yes/Yes
Grovertown	SR 23	Major Collector	Rural	Flashing R/Y	Yes/Yes
Donaldson	Union Road	Minor Collector	Rural	No	Yes/Yes
	Queen Road	Major Collector	Rural	Yes	Yes/Yes
Plymouth	Pioneer Drive	Major Collector	Urban	Yes	Yes/Yes
Plymouth	Oak Road	Minor Arterial	Urban	Yes	Yes/Yes
Plymouth	Western Ave	Major Collector	Urban	Underpass	N/A
Plymouth	Michigan Road	Minor Arterial	Urban	Interchange	N/A
Plymouth	Plymouth/Goshen Tr	Major Collector	Rural	No	Yes/ N/A
	US 31	Principal Arterial	Rural	Interchange	N/A
	King Road	Major Collector	Rural	Yes	Yes/Yes
	S. Hawthorn Road	Minor Collector	Rural	No	Yes/Yes
	Fir Road	Major Collector	Rural	No	Yes/Yes
Bourbon	SR 331	Minor Arterial	Rural	Interchange	N/A

Table 2 – US 31 Mainline

In/Near	Intersecting Road	Classification	Rural/Urban	Signalized	Left/Right Turn Lane
Plymouth	US 30	Principal Arterial	Rural	No (Interchange)	N/A
Plymouth	9A Road	Minor Arterial	Rural	Flashing R/Y	Yes/Yes
Plymouth	Lincoln Highway	Minor Arterial	Rural	Underpass	Yes/Yes
	Michigan Road	Major Arterial	Rural	No	Yes/Yes
	12B Road	Minor Collector	Rural	No	No/No
	13th Road	Major Collector	Rural	No	Yes/Yes
Argos	SR 10	Major Collector	Rural	Flashing R/Y	Yes/Yes
	SR 110	Major Collector	Rural	Flashing R/Y	Yes/Yes

3.1.3. POSTED SPEED LIMITS

US 30 and US 31 have varying posted speeds along the roadway. **Table 3** and **Table 4** describe the limits of the posted speeds within the study limits:

Table 3 – US 30 Mainline

From	To	Existing Speed Limit (mph)
SR 49	Porter CR 400 E	55
Porter CR 400 E	County Line Road	60
County Line Road	LaPorte CR 1100 W	55
LaPorte CR 1100 W	US 421	40
US 421	Long Lane	60
Long Lane	2100' E. of SR 39	55
2100' E. of SR 39	Queen Road	60
Queen Road	1800' E of King Road	50
1800' E. of King Road	Beech Road	60

Table 4 – US 31 Mainline

From	To	Existing Speed Limit (mph)
US 30	C.R. 700 N	60

3.1.4. CORRIDOR SPEED AND TRAVEL TIME

Speed data received from National Performance Management Research Data Set (NPMRDS) and INRIX for the year 2022 was analyzed to understand the free flow speeds/ travel times, and impact of congestion on the speeds along the corridor during peak periods. It was determined that there was no impact of peak period traffic operations on the average speeds or travel times in the study corridor. **Table 5 and Table 6** show the average speeds and travel times of the entire study area as well as along the US 30 and 31 corridors. It can be seen that the average speeds of all vehicles along the US 31 corridor are about 7-8 mph higher than on US 30. This is attributed to the existing posted speed limits rather than any congestion or control delays. Looking at the speeds by vehicle type on US 30 and US 31 corridors, the average speeds of passenger vehicles are 4-5 mph faster than the trucks.

Table 5 – Average Speeds

Average Speed (mph)	All Vehicles	Passenger Vehicles	Trucks
Entire Study Area[1]	58.9	61.0	57.1
US 30 Corridor (within study area)	57.1	59.2	55.6
US 31 Corridor (within study area)	65.8	67.8	62.9

Table 6 – Average Travel Times

Travel Time (minutes)	All Vehicles	Passenger Vehicles	Trucks
US 30 Eastbound	56.4	55.1	58.6
US 30 Westbound	56.9	55.3	59.2
US 31 Southbound	19.2	18.6	20.0
US 31 Northbound	19.3	18.8	20.2

[1] Study area limits include: SR 49 (City of Valparaiso) in Porter County and South Beech Road in Marshall County (approx. 53.2 miles); US 31 south corridor between US 30 and US 31 interchange in Marshall County south to W CR 700 N in Fulton County (approximately 13.9 miles)

3.1.5. RAILROAD CROSSINGS

Within the study limits there are five railroad crossings as shown in **Table 7** and **Table 8**.

Table 7 – US 30 Mainline

Crossing No./ Warning Devices	Railroad	Nearby Road	Intersection Type	Avg Trains	Avg Oper Speed	Date of Last Crash
483365P/ Yes	Norfolk Southern	Oak Drive (Plymouth)	At-Grade	4/day	10 mph (Thru)	1986
231996V/ Yes	Chesapeake & Indiana Railroad Company	N. Thompson Road (Hanna)	At-Grade	6/week	10 mph (Thru)	1983

Table 8 – US 31 Mainline

Crossing No./ Warning Devices	Railroad	Nearby Road	Intersection Type	Avg Trains	Avg Oper Speed	Date of Last Crash
478540T	Norfolk Southern	SR 10	US 31 Over	N/A	N/A	N/A
483388W/ Yes	Norfolk Southern	14th Road	At-Grade	1/week	20 mph (Switch)	2007
483365P	Chicago, Fort Wayne & Eastern Railroad	Lincoln Highway (Plymouth)	US 31 Over	N/A	N/A	N/A

The Norfolk Southern Railroad runs immediately south and adjacent to US 30 in three independent locations:

- SR 49 to the Porter/LaPorte County Line
- Long Lane (East of the Town of Hanna) to Old US 30
- Old US 30 to CR N 1200 E

Figure 4 – *US 30 near Oak Drive Railroad Crossing*

3.1.6. EXISTING RIGHT-OF-WAY AND LAND USE

Per review of existing road plans within the study limits, the existing right-of-way along US 30 appears to be 200'; 100' either side of the centerline. Along US 31 within the study limits, the existing right-of-way varies from a minimum of 150' to a maximum of

300'; 75' and 150' either side of centerline, respectively. All right of way is limited access except at the far west 1.5 miles of US 30 within the study limits.

The land use throughout most of the study limits is rural farmland. The City of Valparaiso is located at the far west end of the study limits near the SR 49 interchange. There is industrial development located near this interchange. The City of Plymouth is located west of the interchange of US 30 and US 31. There is substantial commercial and industrial development along US 30 which runs along the north side of the city. US 30 also traverses through, or close to, the rural Towns of Wanatah, Hanna, Hamlet, Grovertown, Inwood, Donaldson, and Bourbon. US 31 traverses along the east side of Plymouth and the west side of the Town of Argos.

The total number of parcels abutting US 30 and US 31 within the study limits is approximately 809, broken up by County as follows:

- Porter – 77 parcels
- LaPorte – 166 parcels
- Starke – 133 parcels
- Marshall – 429 parcels (US 30 – 296; US 31 – 133)
- Fulton – 4 parcels

3.1.7. ROADWAY GEOMETRICS

The geometry of the roadway generally meets current posted and design speed design standards. The lane widths of 12'-0" and shoulder widths of 4'-0" (paved median shoulder) and 10'-0" (paved outside shoulder) meet minimumdesign standards. The depressed median width design standard of 54'-6" is not being met and is substantially less near the town of Wanatah where the median diminishes in width to only 10'-0", substantially less than the desired 54'-6".

There are several horizontal curves throughout the two corridors. These horizontal curves are based on a review of existing plan information provided by INDOT and are summarized in **Table 9** and **Table 10**. All existing curve radii exceed the required radius values, based on a maximum superelevation rate of 8%.

There are a substantial number of vertical curves within the limits of the study. A general review of the existing plans where vertical information was provided indicates that all of the vertical curves meet and/or exceed the posted speed and design speed criteria for 70 MPH. Note that the design speed along US 30 as it runs along the north side of Plymouth appears to only be 55 mph per review of existing plans. Some existing plan information was difficult to read or no vertical profile information was included as part of the existing plans.

Table 9 – US 30 Mainline

Design Speed (MPH)	PI Location	Existing Radius (ft)	Minimum Required Radius (ft)	County
70	1277+29.9 "JJ"	5,733	1,810	Porter
70	285+68.1 "A"	11,474	1,810	Porter
70	419+39.5 "A"	10,748	1,810	LaPorte
70	451+83.1 "A"	11,462	1,810	LaPorte
70	484+25.6 "A"	10,748	1,810	LaPorte
70	538+39.9 "A"	220,479	1,810	LaPorte
70	559+40.03 "A"	114,647	1,810	LaPorte
70	574+00.00 "A"	550,381	1,810	LaPorte
70	584+98.4 "A"	86,380	1,810	LaPorte
70	773+24.48 "A"	8,603	1,810	LaPorte
70	929+88.0 "A"	8,579	1,810	LaPorte

Design Speed (MPH)	PI Location	Existing Radius (ft)	Minimum Required Radius (ft)	County
70	1226+99.5 "A"	11,432	1,810	Starke
70	1407+04 "F"	8,599	1,810	Starke
70	1580+25 "F"	29,194	1,810	Starke
70	1625+36.8 "F"	42,994	1,810	Starke
70	1668+45.4 "F"	42,994	1,810	Starke
70	1687+87.6 "F"	17,197	1,810	Starke
70	1718+62.5 "G"	8,368	1,810	Starke
70	1742+97.6 "G""	14,382	1,810	Starke
70	1776+06.8 "F"	8,576	1,810	Starke
70	2003+01.9 "F"	8,653	1,810	Starke
70	28+07.7 "A"	4,683	1,810	Marshall
70	144+80.0 "A"	21,619	1,810	Marshall
70	211+36.8 "A"	8,662	1,810	Marshall
70	245+21.7 "A"	8,662	1,810	Marshall
70	379+38.9 "A"	11,457	1,810	Marshall
70	656+22.3 "A"	11,510	1,810	Marshall
70	777+17.0 "A"	7,162	1,810	Marshall
70	886+80.4 "A"	11,459	1,810	Marshall

Table 10 – US 31 Mainline

Design Speed (MPH)	PI Location	Existing Radius (ft)	Required Radius (ft)	County
70	1739+88.6 U""	11,459	1,810	Marshall
70	1906+62.4 "U"	5,730	1,810	Marshall
70	1987+52.6 "U"	7,639	1,810	Marshall
70	2037+75.4 "U"	3,820	1,810	Marshall
70	34+89.2 "A"	8,614	1,810	Marshall

3.1.8. RAMP GEOMETRICS

There are five interchanges within the study limits. The following table (**Table 11**) is an assessment of the ramps at each of the interchanges.

Table 11 – Interchange Ramps

Interchange	Type	Accel/Dec Lane Length (ft)	Posted Exit/Ent Speed (MPH)	Required Length (ft)	Ramp Radius (ft)	Calculated S.E. * (%)	Mainline Speed + (MPH)	Calculated Ramp Speed $$(MPH)
SR 49	**Clover**							
EB on	Accel	900	-	910	300	8.0	60	30
EB Off	-	-	-					
WB on	-	-	-					
WB Off	Decel	900	30	405	358	8.0	60	35

Interchange	Type	Accel/Dec Lane Length (ft)	Posted Exit/Ent Speed (MPH)	Required Length (ft)	Ramp Radius (ft)	Calculated S.E. * (%)	Mainline Speed + (MPH)	Calculated Ramp Speed $$(MPH)
US 35	**Diamond**							
EB On	Accel	700		1230	580	8.2	70	35
EB Off	Decel	700	45	300	1600	7.7	60	45
WB On	Accel	700		910	650	7.1	60	30
WB Off	Decel	250	45	390	1730	7.8	70	45
Michigan St	**Partial Clover**							
EB on	Accel	350	-	1350	573	6.2	70	30
EB Off	Decel	990	25	570	208	7.2	70	20
WB on	Accel	1100	-	1520	208	5.6	70	20
WB Off	Decel	260	30	490	573	7.2	70	35
SR 331	**Diamond**							
EB On	Accel	1000		580	1448	6.6	70	50
EB Off	Decel	950	45	440	1850	4.3	70	40
WB On	Accel	1000		580	1527	6.6	70	50
WB Off	Decel	900	45	390	1800	4.7	70	45
US 30/US 31	**Clover**							
EB to SB Off	Decel	700	45	390	1310	7.4	70	55
EB to SB On	Accel	975		760	800	7.7	60	45
EB to NB Off	Decel	600	25	550	230	9.8	70	30
EB to NB On	Accel	680		1350	250	9.8	70	30
SB to EB On	Accel	600		1350	410	8.8	70	30
SB to EB Off	Decel	690	25	460	220	8.6	60	25
SB to WB On	Accel	750		820	850	7.4	70	45
SB to WB Off	Decel	540	45	240	910	7.8	60	50
NB to EB On	Accel	600		820	885	7.6	70	45
NB to EB Off	Decel	565	45	340	860	8.0	70	50
NB to WB On	Accel	540		1420	390	7.2	70	25
WB to NB Off	Decel	700	45	390	1220	7.8	70	55
WB to NB On	Accel	1140		1000	690	7.8	70	40
NB to WB On	Accel	540		1420	390	7.2	70	25
NB to WB Off	Decel	550	25	460	220	9.6	60	25
WB to SB On	Accel	690		1020	220	7.4	60	25
WB to SB Off	Decel	400	25	550	325	7.4	70	30

** Computed from existing plans*

+ Per IDM Table 53-1 and 53-2

$$ Per IDM Table 43-3A(3)

Numbers in red indicate actual ramp lengths that are less than required lengths, ramp exit calculated speeds that are less than posted ramp exit speeds, and superelevation rates greater than 8% max.

In general, none of the ramp gore areas at the interchanges meet current INDOT standards for entrance and exit ramps except for the SR 49 and SR 331 ramps. Acceleration and deceleration lengths that do not appear to meet current standards are noted in red in **Table 11**. Calculated ramp speeds are based on assumed mainline design speeds and radii per existing design plans. Those ramp speeds were compared to exit speed warning signs in the field. Those not meeting calculated ramp exit speeds are

shown in red. Superelevation rates appear to range from 4.3 to 9.8 percent. A superelevation rate of 8% is the maximum for rural settings per IDM Chapter 48. Five of the ramps (See **Table 11)** were calculated at slightly greater than this 8% maximum.

In addition, ramp travel lane widths appear to meet, or be very close to, the required 16' standard width. Required shoulder widths appear to meet standards on all ramps except the U.S. 30/31 interchange ramps.

3.1.9. PAVEMENT

The pavement condition varies within the study limits. The pavement primarily has at least one asphalt resurface. There are three specific sections of concrete pavement only: the Michigan Street interchange (mainline and ramps), the US 35 interchange (mainline only), and the US 31/30 interchange (mainline only). These sections of concrete pavement are generally in good condition. Several sections of roadway have more recently been resurfaced and several intersections have been more recently upgraded; therefore, many locations have a "good" pavement condition. However, in areas that have not been recently addressed, the pavement is in fair to poor condition, including interchange ramps that are not concrete. In general, some sections of pavement have severe transverse cracking and pavement edge deterioration. The cracking pattern indicates the presence of concrete pavement under the asphalt resurface.

Figure 5 – US 30 Pavement (Oct 2022)

Figure 6 – US 35 Ramp Pavement (Sept 2022)

Several pavement projects are being planned (see **Section 7**) in the near future to further address segments of pavement deterioration.

3.1.10. LIGHTING

In general, the US 30 and US 31 corridors do not currently have lighting in place. However, there is lighting present at specific intersections/interchanges shown below in **Table 12**.

Table 12 – US 30 and US 31 Mainline Lighting Locations

US 30/SR 49 interchange	US 31/C.R. 9A intersection
US 30/US 421 intersection	US 31/Michigan Road intersection
US 30/SR 39 intersection	US 31/13th Road intersection
US 30/US 35 interchange	US 31/SR 10 intersection
US 30/SR 17/Michigan Street interchange	US 31/SR 110 intersection
US 30/US 31 interchange	

3.2. BRIDGES

3.2.1. EXISTING BRIDGES

In reviewing the bridge inventory database bridge inspection reports (2020-2022), the following bridges were identified within the study limits. The bridge size, type, location, year of construction, condition, and vertical clearances are noted in **Table 13, Table 14,** and **Table 15**. In general, the bridges along both US 30 and US 31 are in good condition and all meet the minimum clear roadway width of 38'-0" and 28'-0" for existing bridges to remain in place for both Freeways and Rural Arterials, respectively. **Appendix A** shows the location of each bridge.

Table 13 – US 30 Mainline Bridges

SN	County	Location	Type	Size (L x W) (ft)	Yr Latest Const	Overall Sufficiency Rating
8190	Porter	Crooked Creek	3-Span RC Slab	66 x 91	1955	75.2
8200	LaPorte	Slocum Ditch	Flat Top 3-Sided	29 x 82	2001	98.2
8220	LaPorte	Hunsley Ditch	3-Span RC Slab	82 x 41	1990	99.3
8230	LaPorte	Hunsley Ditch	3-Span RC Slab	82 x 41	1990	99.3
8240	LaPorte	Kankakee River	4-Span PC Girder	165 x 41	2021	99.3
8250	LaPorte	Kankakee River	4-Span PC Girder	165 x 41	2021	99.5
8260	Starke	Shearing Ditch	3-Span PC Girder	82 x 53	2021	99.4
8270	Starke	Shearing Ditch	3-Span PC Girder	82 x 53	2021	99.4
8280	Starke	Robbins Ditch	3-Span PC Girder	120 x 39	1990	88.3
8290	Starke	Robbins Ditch	3-Span PC Girder	120 x 41	1990	78.5
8300	Starke	U.S. 35	3-Span PC Girder	165 x 38	2001	98.0

SN	County	Location	Type	Size (L x W) (ft)	Yr Latest Const	Overall Sufficiency Rating
8310	Starke	U.S. 35	3-Span PC Girder	165 x 38	2001	98.0
8340	Starke	Jain Ditch	3-Span RC Slab	62 x 42	2004	97.4
8350	Starke	Jain Ditch	3-Span RC Slab	62 x 42	2004	97.4
8360	Marshall	Western Ave	3-Span Steel Girder	131 x 39	2004	94.4
8370	Marshall	Western Ave	3-Span Steel Girder	131 x 39	2004	100.0
8400	Marshall	S.R. 17	3-Span Steel Girder	164 x 51	2004	98.3
8410	Marshall	S.R. 17	3-Span Steel Girder	164 x 51	2004	98.3
8420	Marshall	Baker Ditch	1-Span BT Girder	79 x 41	2018	99.1
8430	Marshall	Baker Ditch	1-Span BT Girder	79 x 41	2018	99.1
8440	Marshall	Yellow River	3-Span Steel Girder	195 x 39	2021	99.3
8450	Marshall	Yellow River	3-Span Steel Girder	195 x 39	2021	99.3

Figure 7 – *US 30 over Kankakee River*

Table 14 – US 31 Mainline Bridges

SN	County	Location	Type	Size (L x W) (ft)	Yr Latest Const	Overall Sufficiency Rating
10040	Marshall	N&S Railroad	3-Span Steel Girder	140 x 40	1996	99.4
10050	Marshall	N&S Railroad	3-Span Steel Girder	140 x 40	1996	99.4
10060	Marshall	CFE Railroad	5-Span Steel Girder	268 x 39	1994	95.3
10070	Marshall	CFE Railroad	5-Span Steel Girder	268 x 39	1994	94.4
10080	Marshall	US 30 EB/WB	4-Span Steel Girder	229 x 44	1998	81.1
10090	Marshall	US 30 EB/WB	4-Span Steel Girder	229 x 44	1998	81.1

Table 15 – Bridge Vertical Clearances

SN	County	Location	Req'd Vertical Clearance (ft)	Actual Vertical Clearance (ft)
8300/8310	Starke	US 30 over US 35	16.5	16.8 EB/16.44 WB
8360/8370	Marshall	US 30 over Western Ave	16.5	20.75 EB/20.07 WB
8400/8410	Marshall	US 30 over SR 17	16.5	16.22 EB/17.14 WB
31435	Marshall	SR 331 over US 30	16.5	15.33
10080/10090	Marshall	US 31 over US 30	16.5	16.86 NB/16.96 SB
10040/10050	Marshall	US 31 over NSRR	23	22.33 NB/22.58 SB
10060/10070	Marshall	US 31 over CFE RR and 2 County Roads	23/16.5	13.56 NB/13.83 SB

The vertical clearances for SR 331 over US 30 and US 31 over the two county roads do not meet the 16.5' vertical clearance design standards. Three vertical clearances are slightly under the 23' and 16.5' thresholds as noted in **Table 15**.

3.3. UTILITY OWNER LISTING

A design ticket was requested from Indiana 811 and the following utilities were noted (**Table 16**) as having potential to be located along the US 30 and US 31 corridors within the study limits.

Table 16 – Utilities

Utility Name	Utility Type	Utility Name	Utility Type
AT&T Distribution	Communications	Town of Etna Green	Electric, Sewer, Water
AT&T Transmission	Fiber Optic	Frontier	Telephone
Bourbon Utilities	Sewer, Storm, Water	Town of Hamlet	Sewer, Water
Brightspeed	Communications	Intercarrier Networks	Fiber Optic
Chillicothe Telephone Co. DBA Horizon Telecom	Fiber Optic	Kankakee Valley R.E.M.C.	Electric
Choice Light Inc.	Fiber Optic	Marshall County Fiber, LLC	Fiber Optic
Comcast North	Cable TV	Marshall County R.E.M.C.	Electric
Commercial Broadband Solutions	Fiber Optic	Mediacom, LLC	Cable TV
NIPSCO Electric (LaPorte)	Electric	NIPSCO Gas (Valparaiso)	Gas
NIPSCO Electric (Plymouth)	Electric	Northwestern Indiana Telephone Co.	Telephone
NIPSCO Electric (Valparaiso)	Electric	Pembina Cochin Pipeline	Pipeline
NIPSCO Gas (LaPorte)	Gas	Plymouth Sewer and Water Department	Water, Sewer
NIPSCO Gas (Plymouth)	Gas	Task Force TIPS, Inc.	Fiber Optic
Trunkline Gas Co. (North Judson)	Pipeline	Town of Wanatah	Sewer, Water
Valparaiso Utilities	Sewer, Water	Windstream	Communications
Town of Argos	Electric, Sewer, Storm, Water		

3.4. PEDESTRIAN, BICYCLE, AND TRANSIT

No transit routes or facilities appear to be using the US 30 or US 31 corridors at this time.

No sidewalks are currently present along US 30 or US 31 except for very limited sidewalk along US 30 in Wanatah.

US 30 and US 31 are noted as “unsuitable” bicycle routes based on the INDOT Roadways Bicycle Suitability document.

- Noted Suitable Routes – SR 39, US 35, SR 331, SR 10, SR 17
- Other Noted Unsuitable Routes – US 421, SR 23

MACOG noted several “unsigned” bike routes that intersect US 30 and US 31

- Rose Road, Oak Road, King Road, Elm Road, 12th Road (all near Plymouth)

NIRPC has indicated the following roadways cross US 30 with suitability for bicycles as noted:

- Porter Co. CR 325 E and CR 450 E – Good
- Illinois Street in Wanatah – Excellent

- LaPorte Co. CR 600 W – Fair
- LaPorte Co. CR 450 W and CR 1350 S – Good

4. ACCESS CONTROL

Access along US 30 consists of both limited access right-of-way and non-limited access right-of-way within the study limits. There are 67 roadway intersections along US 30 and 10 of the intersections are currently signalized. There are 17 roadway intersections along US 31 and 4 of the intersections are currently signalized. All of the signalized intersections are spaced at least ½ mile apart which meets the current *INDOT Access Management Guidelines* (AMG). The higher density of driveway/intersections includes 9 median access points in a 2.65 mile stretch east of SR 49 on US 30 and 15 median access points in a 1.75 mile stretch of US 30 through Wanatah. There are also five interchanges located within the study limits. The roadway intersections and interchanges are summarized below in **Table 17** and **Table 18**.

Table 17 – Intersecting Roadways

Mainline	Intersection	Signal Type	Near Location	County	Distance to Closest Signal
US 30	SR 49	Interchange	Valpo	Porter	N/A
US 30	Comeford Rd	Unsignalized	Just E. of SR 49 Valpo	Porter	0.18 mi
US 30	Industrial Drive	Signal	Just E. of SR 49 Valpo	Porter	0.32 mi
US 30	Pilot Travel Center	Signal	E. of SR 49 Valpo	Porter	0.32 mi
US 30	CR N 325 E	Unsignalized	E. of SR 49	Porter	0.77 mi
US 30	CR N 400 E	Unslignalized	E. of SR 49	Porter	N/A
US 30	CR. N 450 E	Unsignalized		Porter	N/A
US 30	CR 575 E	Unsignalized		Porter	N/A
US 30	County Line Road	Unsignalized		Porter/LaPorte	N/A
US 30	CR W 1200 S	Unsignalized		LaPorte	N/A
US 30	CR S 1100 W	Unsignalized	Wanatah	LaPorte	1.00 mi
US 30	N. Lincoln Street	Unsignalized	Wanatah	LaPorte	0.65 mi
US 30	Stoneyard Drive	Unsignalized	Wanatah	LaPorte	0.55 mi
US 30	N. Illinois Street	Unsignalized	Wanatah	LaPorte	0.37 mi
US 30	N. Main Street	Unsignalized	Wanatah	LaPorte	0.31 mi
US 30	Condon Road	Unsignalized	Wanatah	LaPorte	0.25 mi
US 30	N. Ohio Street	Unsignalized	Wanatah	LaPorte	0.23 mi
US 30	US 421	Signal	Wanatah	LaPorte	
US 30	CR S 900 W	Unsignalized		LaPorte	1.0 mi
US 30	CR S 800 W	Unsignalized		LaPorte	N/A
US 30	CR S 700 W	Unsignalized		LaPorte	N/A
US 30	CR S 600 W	Unsignalized		LaPorte	N/A
US 30	CR S 450 W	Unsignalized	Hanna	LaPorte	N/A
US 30	Thompson St	Unsignalized	Hanna	LaPorte	N/A
US 30	CR W 1350 S	Unsignalized	Hanna	LaPorte	N/A
US 30	US 30 Alt Route	Unsignalized	E of Hanna	LaPorte	N/A
US 30	Long Lane	Unsignalized	E of Hanna	LaPorte	1.0 mi
US 30	SR 39	Signal	E of Hanna	LaPorte	
US 30	CR W 1400 S	Unsignalized		LaPorte	0.5 mi
US 30	CR S 100 W	Unsignalized		LaPorte	1.0 mi
US 30	CR N 50 E	Unsignalized		LaPorte	N/A
US 30	CR N 125 E	Unsignalized		LaPorte	N/A

Mainline	Intersection	Signal Type	Near Location	County	Distance to Closest Signal
US 30	E Old US 30	Unsignalized		LaPorte	N/A
US 30	CR N 300 E	Unsignalized		LaPorte	N/A
US 30	US 35	Interchange		LaPorte	N/A
US 30	CR N 500 E	Unsignalized	W of Hamlet	LaPorte	N/A
US 30	CR N 600 E	Unsignalized	Hamlet	LaPorte	N/A
US 30	E Old US 30	Unsignalized	E of Hamlet	LaPorte	N/A
US 30	CR 750 E	Flashing Y/R	E of Hamlet	LaPorte	
US 30	CR E 500 N	Unsignalized		LaPorte	N/A
US 30	C.R. N 900 E	Unsignalized	W of Grovertown	Starke	0.9 mi
US 30	S.R. 23	Flashing Y/R	Grovertown	Starke	
US 30	C.R. N 1100 E	Unsignalized	E of Grovertown	Starke	N/A
US 30	C.R. N 1150 E	Unsignalized		Starke	N/A
US 30	C.R. N 1200 E	Unsignalized		Starke	N/A
US 30	Old U.S. 30	Unsignalized		Marshall	N/A
US 30	Union Road	Unsignalized		Marshall	N/A
US 30	Tulip Road	Unsignalized		Marshall	N/A
US 30	Rose Road	Unsignalized		Marshall	N/A
US 30	Redwood Road	Unsignalized		Marshall	0.51 mi
US 30	Queen	Signal	Plymouth	Marshall	1.52 mi
US 30	Pioneer	Signal	Plymouth	Marshall	1.0 mi
US 30	N. Oak Drive	Signal	Plymouth	Marshall	1.0 mi
US 30	Michigan Road	Interchange	Plymouth	Marshall	N/A
US 30	Plymouth/Goshen	Unsignalized	Plymouth	Marshall	N/A
US 30	US 31	Interchange	Plymouth	Marshall	N/A
US 30	King/9A	Signal	Plymouth	Marshall	
US 30	S. Irish Rd	Unsignalized		Marshall	N/A
US 30	Hawthorn Road	Unsignalized		Marshall	N/A
US 30	Gumwood Road	Unsignalized		Marshall	N/A
US 30	Fir Road	Unsignalized		Marshall	N/A
US 30	Elm Road	Unsignalized	NW of Bourbon	Marshall	N/A
US 30	SR 331	Interchange	N of Bourbon	Marshall	N/A
US 30	12th Road	Unsignalized	NE of Bourbon	Marshall	N/A
US 30	12B Road	Unsignalized		Marshall	N/A
US 30	Beech Road	Unsignalized		Marshall	N/A
US 31	9A	Flashing Y/R	Plymouth	Marshall	3.0 mi
US 31	11th Road	Unsignalized		Marshall	N/A
US 31	12th Road	Unsignalized		Marshall	N/A
US 31	MIchigan Road	Unsignalized		Marshall	N/A
US 31	12B Road	Unsignlaized		Marshall	N/A
US 31	13th/Michigan Rd	Unsignalized		Marshall	N/A
US 31	14th Road	Unsignalized		Marshall	N/A
US 31	W. 14C Road	Unsignalized		Marshall	N/A
US 31	16th Road	Unsignalized		Marshall	0.44 mi
US 31	S.R. 10	Flashing Y/R	Argos	Marshall	0.5 mi
US 31	Dewey Street	Flashing Y/R	Argos	Marshall	0.5 mi
US 31	18th Road	Unsignalized		Marshall	N/A
US 31	19th Road	Unsignalized		Marshall	N/A
US 31	Kennilworth Road	Unsignalized		Marshall	N/A

Mainline	Intersection	Signal Type	Near Location	County	Distance to Closest Signal
US 31	20B Road	Unsignalized		Marshall	0.53
US 31	SR 110	Flashing Y/R	S. of Argos	Marshall/Fulton	3.0 mi
US 31	CR 700 N	Unsignalized		Fulton	N/A

Table 18 – Interchange Locations

Interchange Location	Interchange Type	County
US 30 and SR 49	3 Quad Cloverleaf	Porter
US 30 and US 35	Diamond	Starke
US 30 at Michigan Road	E. Side Parclo	Marshall
US 30 and US 31	Full Cloverleaf	Marshall
US 30 and SR 331	Diamond	Marshall

Access to the US 30 and US 31 corridors is currently available outside of the public road approaches as well. There are a total of 120 driveway access points in the study area and 30 farm field approaches. 115 of the driveways are on US 30 while the remaining 5 are on US 31. **Table 19** shows the type of driveway as defined by the AMG.

Table 19 – Type of Driveways

US 30				
Driveway Type	**Number of Driveways**	**Min. Separation Violation**	**Frontage Violation**	**Full Access Violation**
Major Commercial	11	4	2	n/a
Minor Commercial	9	7	2	7
Sub-Minor Commercial	40	33	14	12
Private	55	43	6	30
Farm Field	27	3	0	17
US 31				
Driveway Type	**Number of Driveways**	**Min. Separation Violation**	**Frontage Violation**	**Full Access Violation**
Major Commercial	0	0	0	n/a
Minor Commercial	0	0	0	0
Sub-Minor Commercial	0	0	0	0
Private	5	2	0	4
Farm Field	3	3	2	0

A major commercial driveway serves a private commercial property and generates enough traffic to require auxiliary lanes. A minor commercial driveway serves a private commercial property that does not have auxiliary lanes whereas a sub-minor commercial driveway serves a private commercial property that has less than or equal to 25 vehicles per day access the drive. A private driveway services a private residence, barn, or private garage. A farm field approach was not defined in the AMG, but is an unimproved access into a field for use by farm equipment.

For access management purposes, both US 30 and US 31 in the study area are considered Tier 1A corridors as they are statewide mobility corridors that provide safe, high-speed connnections for long distance trips, serve as freight arteries, and are part of the National Highway System. According to the AMG and the INDOT Driveway Permit Manual, the following guidelines apply to a Tier 1A mobility corridor for driveways:

- Driveways with a minimum separation of 495 feet for a posted speed of 55 mph
- Only major commercial driveways may provide full access to US 30 or US 31
- All other driveways should be restricted to right-in/right-out (RIRO)
- Left-turn access from US 30 or US 31 is allowed, if reviewed and approved by INDOT
- Parcels should have only one driveway unless the parcel frontage exceeds 400 feet in length
- Median openings may be provided only when all of the following criteria are met:
    - The median opening is more than 400 feet from an existing median opening
    - The median opening will improve safety
    - There is sufficient room for turn lanes and recover tapers
    - The median opening will operate acceptably
- A mainline left-turn lane is required at a driveway when one or more of the following criteria are met:
    - On divided highways where median width is equal to or greater than 24 feet
    - Where a new approach is constructed as the 4th leg of a 3-legged itnesection
    - Where capacity analysis determines a left turn is necessary to meet level of service criteria
    - Where crash data, existing traffic operations, sight distance, or engineering judgment indicate a significant conflict related to right-turning vehicles

Give these guidelines, all driveways are restricted along the corridors. Full movements may be allowed at major commercial driveways, but all other driveways should be limited to (RIRO). As shown in **Table 19**, there are 70 drives that are not major commercial that have full access. In addition, 89 of the 120 driveways do not meet the spacing requirements of 495 feet between driveways for 55 mph. Twenty-six driveways are located on parcels that have less than 400 feet of frontage, but more than one drive. There is a particularly high concentration of driveways near Wanatah and Grovertown along US 30 and the only driveways on US 31 are near the Michigan Road intersection. As shown in Section 5 of this report, these areas also feature a higher concentration of crashes.

5. SAFETY

A review of crash data within the study limits revealed a total of 1,017 crashes occurred between 2017 – 2021. In this period, 14 fatal crashes (1.4% of total) and 258 injury crashes (25% of total) were reported. The most common crash types were rear-end (27% of total), roadway departure (23% of total), and right-angle crashes (16% of total). Deer crashes (231 crashes) appeared to be random throughout the corridors with no specific “hot spot” locations. The deer crashes were removed from the crash analysis to more accurately assess the safety of the corridor.

Throughout the corridor there were 230 run-off-the-road crashes which comprised 23% of the total crashes, 35% of which occurred during dark-not lighted conditions. Clear/cloudy conditions were present for 44% of the crashes however the road surface condition was noted as “dry” in only 37% of the crashes. Rain (17%), snow (20%), or other weather conditions present such as blowing sand/soil/snow (9%), sleet/freezing rain (7%), or severe winds (1%) were observed for 56% of the total crashes. The run-off the road crashes are higher than the statewide averages[2] for dark not lighted (15%*) and weather related (15%*) crashes. Further evaluation was conducted at four (4) hot spots along the corridor, which included the following locations:

1. US 30 & SR 421
2. US 30 & SR 35
3. US 30, east of Hawthorne Road
4. US 31, 14th Road to North of Michigan Road

[2] Statewide rates from Indiana Crash Facts 2020, A publication of the Indiana University Public Policy Institute in partnership with the Indiana Criminal Justice Institute

These locations comprised 45% (104) of the run-off-the-road crashes for the US 30 and US 31 west study area. A combination of dark – not lighted conditions, weather related, and road surface conditions were significant contributing factors to the crashes at these locations as well, mirroring the overall statistics of the corridors. It should be noted that the apparent hotspot along US 30 east of Hawthorne Road appears to be erroneous location (Lat/Long info) as a significant number of crashes were reported at the identical coordinates but does not appear to have the characteristics where this level of crashes (25/230, nearly 11% of total off-road crashes) would occur.

The crash data was sorted by location with the intent to identify high concentrations of crashes at intersections or within segments along each corridor. Crashes were then sorted by the type of roadway junction feature of the crash report, which either identified a type of junction to denote an intersection crash or no relation to junction to denote a segment crash.

5.1. INTERSECTION CRASHES

Intersection crashes accounted for 386 crashes, including 5 fatal and 118 injury crashes. Right angle (32% of total) and rear-end crashes (30% of total) were the predominant crash types at intersections in the study area. Twenty-two percent of crashes occurred in wet, snowy, or icy road surface conditions and 14% of crashes occurred in dark (not lighted) conditions.

5.2. SEGMENT CRASHES

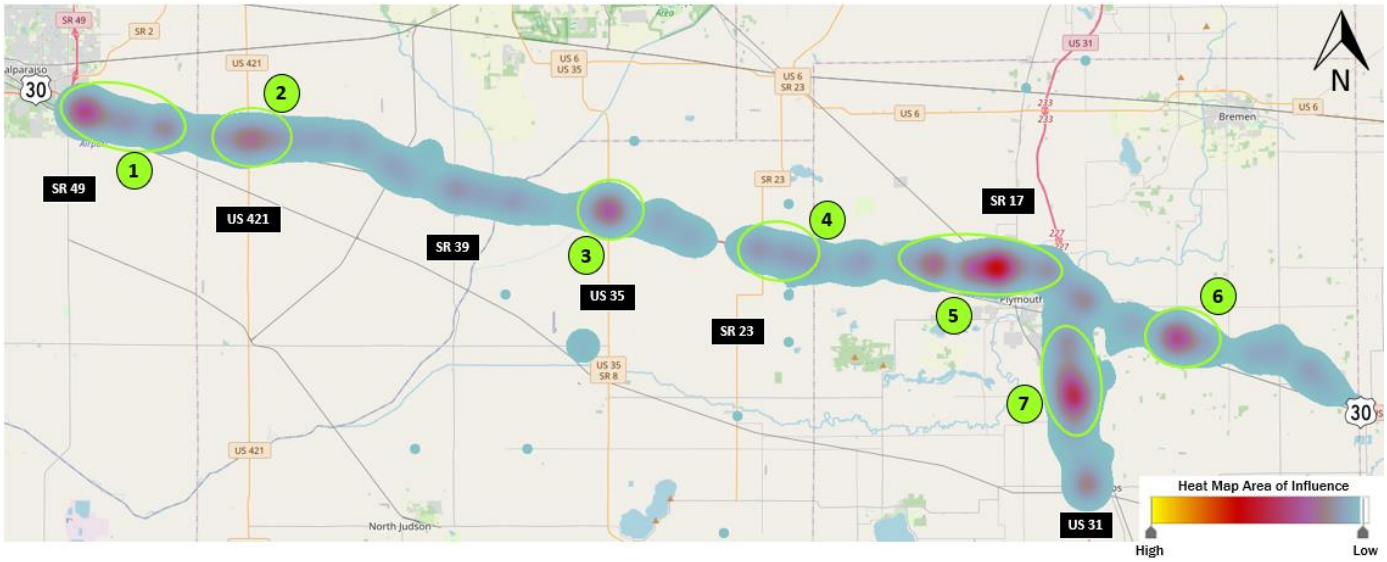
The crash data from 2017-2021 indicated 631 crashes were reported to have no relation to junction including 9 fatal, 140 injury, and 482 property damage-only crashes. The main crash types excluding deer crashes were roadway departure (32% of total), and rear-end (26% of total) crashes. Segments with high crash concentrations were identified as shown in **Figure 8.**

1. US 30 from Industrial Drive to N 450 East
2. US 30 from S 1100 West to S 900 West
3. US 30 between US 35 ramps
4. US 30 from west of SR 23 to North 1200 East West County Line Road
5. US 30 from Pioneer Drive to east of Plymouth Goshen Trail
6. US 30 from west of South Iris Road to Fir Road
7. US 31 from south of West 14th Road to S of Lincoln Highway

For segment (no relation to junction) fatal and injury crashes, 29% of crashes were rear-end, 27% were roadway departure, and 13% were right angles. Thirty-four percent of crashes occurred in dark (not lighted) conditions. The combined percentage of fatal and injury segment crashes that occurred in ice, snow, or wet road surface conditions was 32%.

Common crash factors were distracted/inattentive driving as drivers were often not able to stop for vehicles stopped at red lights or failed to yield to mainline vehicles turning from side streets and driveways.

Figure 8 – Segment Crash Heat Map



5.3. HIGH SEVERITY CRASH LOCATIONS

High severity (fatal and incapacitating injury) crashes included 171 incapacitating injury crashes and 14 fatal crashes between 2017 – 2021. These crashes involved predominantly right angle, rear end, and roadway departure (run off the road) crashes. These high severity crash locations were identified by examining crash locations plotted on a map using geographic coordinates as shown in **Figure 8**. Crash narratives were examined to identify common factors and recurring issues. The RoadHAT evaluation analysis for these locations are presented in Section 5.4 of this report. The common factors and recurring issues for each location were noted as follows:

- **US 30 near intersection of CR 575, approximately 4 miles east of SR 49**: Vehicles running off road was a recurring issue. Although some crashes were noted as not related to intersection, the open median at the intersection was a factor as drivers entering from the side street failed to yield to mainline vehicles or drove in the wrong direction of travel. The lack of barrier along the US 30 grass median was also an issue as one driver that departed the roadway through the median proceeded to enter the opposite direction of travel.

- **US 30 West of US 421 in Wanatah**: Crashes in this area were related to conflicts and potential speed differential between turning vehicles and thru traffic as many driveways and full median openings are closely spaced within a short segment. Improper turning or lane use were also reported to have resulted in crashes at this location. There is also a continuous left turn lane within the closely spaced drives/intersections that may be contributing to crashes.

- **US 30 and US 421**: Crashes at this signalized intersection were rear-end crashes related to distracted/inattentive drivers, possible speeding or speed differential, and improper lane use. Driver expectancy appears to be an issue as drivers were unable to brake in time to avoid rear-end collisions when other vehicles were stopped at the red light.

- **US 30 and SR 39**: Crashes at this signalized intersection were related to distracted/inattentive drivers, possible speeding or speed differential, and improper lane use or turning. Driver expectancy appears to be an issue as drivers were unable to brake in time to avoid rear-end collisions when other vehicles were stopped at the red light. Failure to yield to through traffic was also reported.

- **US 30 and Truck Stop Driveway, approximately 1,070 feet east of SR 39**: The driveway east of the SR 39 intersection includes a full-access median opening. Crashes at this intersection were rear-end crashes related to distracted/inattentive drivers,

possible speeding or speed differential, and improper lane use or turning. Driver expectancy appears to be an issue as drivers were unable to brake in time to avoid rear-end collisions when other vehicles were stopped at the red light. Failure to yield to through traffic was also reported. A direct conflict between through and right-turning vehicles may be contributing to rear-end crashes as there is no exclusive westbound right turn lane for right turning vehicles to clear the travel way when reducing speed to complete the turn that may be contributing to the rear-end crashes as well.

- **US 30 and North 600 East/North Starke Road**: Crashes at this unsignalized intersection involved turning, angle, and rear-end crashes. Review of crash narratives indicated distracted/inattentive drivers, possible speeding or speed differential, and improper lane use or turning were common causes. Construction and poor lighting/poor visibility were reported as contributing factors. Failing to yield to through traffic and vehicles stopped in median attempting to complete a two-stage turning movement were situations reported that led to crashes at this location. One rear-end crash report indicated snow on the road surface was a factor.

- **US 30 near SR 23**: Crashes at or near the unsignalized intersection involved right angle and turning crashes, and one pedestrian crash. Review of crash narratives indicated failing to yield to through traffic from side streets/driveways, and improper lane use or turning were situations that led to crashes. The one pedestrian crash included a pedestrian walking in the roadway in the path of a vehicle, leading to the crash.

- **US 30 and Tulip Road**: Head-on, right-angle, and roadway departure crashes were reported near this unsignalized intersection. Wrong-way travel resulted in head-on crashes, including one reported with alcohol involvement. One roadway departure crash indicated ice on the road as a contributing factor.

- **US 30 and Queen Road**: Crashes at this signalized intersection involved right-angle and rear-end crashes. Review of crash narratives indicated distracted/inattentive drivers, possible speeding or speed differential, and failing to yield were common causes of crashes. Suspected drug use was also reported as a contributing factor in one instance. Driver expectancy appears to be an issue as drivers disregarded or were unable to brake in time to avoid entering the intersection on the red light or avoid collisions with other vehicles stopped at the red light. Power outages that reportedly resulted in a flashing red or dark signal at the time of the crash were contributing factors in two instances.

- **US 30 and Pioneer Drive**: Crashes at this signalized intersection involved right angle, rear-end, turning, and roadway departure crashes. Review of crash narratives indicated distracted/inattentive drivers, possible speeding or speed differential near the intersection, and red-light running/failing to yield were common causes. Alcohol and drug use was also reported as a contributing factor in two instances. Driver expectancy appears to be an issue as drivers disregarded or were unable to brake in time to avoid entering the intersection on the red light or avoid collisions with other vehicles stopped at the red light.

- **US 30 and Oak Road**: Crashes at the signalized intersection were mostly rear-end crashes, but also involved angle, turning, and roadway departure crashes. Review of crash narratives indicated distracted/inattentive drivers, possible speeding or speed differential near the intersection, following too closely and red-light running/failing to yield were common causes of crashes. Driver expectancy appears to be an issue as drivers disregarded or were unable to brake in time to avoid entering the intersection on the red light or avoid collisions with other vehicles stopped at the red light. One roadway departure crash report indicated ice on the road surface was a factor while one right-angle crash in which a driver ran a red light indicated poor visibility due to snow.

- **US 30 and Plymouth Goshen Trail**: Right angle, turning, and roadway departure crashes were reported at or near this unsignalized intersection. Crash narratives reported failing to yield (from controlled approach to mainline) led to most crashes, indicating potential sight distance deficiencies and/or potential speeding or speed differential near the intersection. It appears the median is now closed for side street through and turning traffic.

- **US 31 and 12th Road**: Two crashes in this area were a result of roadway departure. Distracted/inattentive driving was reported as a contributing factor in two instances and failure to yield in the remaining instance.

- **US 31 and 11th Road**: Right angle and left turn angle crashes were reported at this unsignalized intersection. Crash narratives reported failing to yield (from controlled approach to mainline) led to most crashes, including one fatal crash. These contributing actions indicate potential sight distance deficiencies and/or potential speeding or speed differential near the intersection. Conflicting vehicles stopping in the median attempting to complete a two-stage turning movement were situations reported that led to crashes at this location as well, including vehicles with trailers that remain in direct conflict with mainline traffic while stopped in the median. There was not enough storage to accommodate the full length of the vehicle.

- **US 31 and Michigan Road**: Right angle, left turn angle, rear-end, and roadway departure crashes were reported at or near this unsignalized intersection. Crash narratives reported failing to yield (from controlled approach to mainline) led to most crashes, indicating potential sight distance deficiencies and/or potential speeding or speed differential near the intersection. In two instances, drivers failed to brake in time to avoid colliding with vehicles that are required to stop at RR crossings, leading to rear-end crashes. The RR crossing is located approximately 0.5 mi. south of the intersection. In these two crashes, potentially inattentive drivers were involved in addition to poor visibility due to weather (in one instance). In the roadway departure crashes reported, drivers lost control of the vehicle while attempting to turn at the intersection

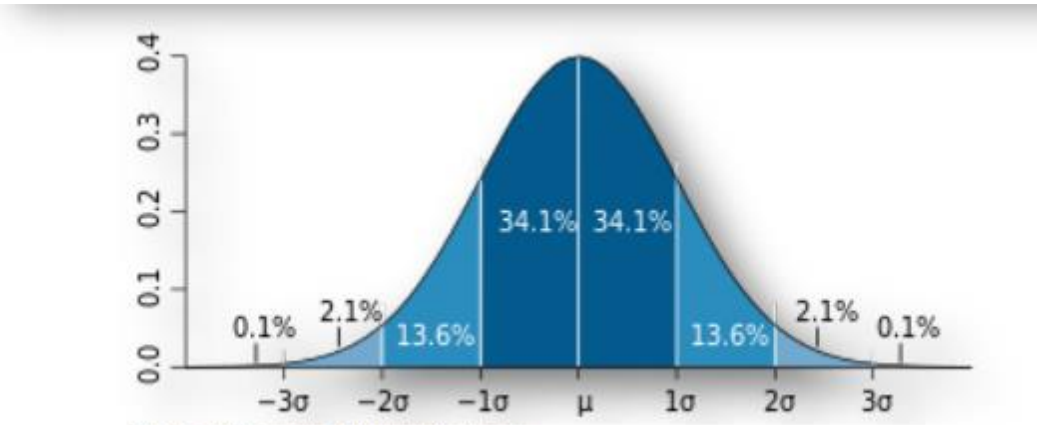
- **US 31 and SR 10/Indiana Avenue**: Right-angle and left turn angle crashes were reported at this unsignalized intersection. Crash narratives reported failing to yield (from controlled approach to mainline) led to most crashes. These contributing actions indicate potential sight distance deficiencies (to the south) and/or potential speeding or speed differential near the intersection. Conflicting vehicles stopping in the median attempting to complete a two-stage turning movement were situations reported that led to crashes at this location as well, including vehicles with trailers that remain in direct conflict with mainline traffic while stopped in the median where there is not enough storage to accommodate the full length of the vehicle. Suspected alcohol and drug involvement were reported in one instance.

5.4. ROADHAT EVALUATIONS: US 30 WEST

RoadHAT evaluations were performed for the purpose of comparing the safety performance of study locations to that of state averages. The two main measures used for this purpose are RoadHAT outputs index of crash frequency (ICF) and index of crash cost (ICC). Crash frequency is a measure of the number of crashes that occurred within a set period of time (usually one year). It does not consider exposure to risk (volume, segment length, etc.).

The index of crash frequency (ICF) accounts for random crash variability to measure the difference between expected crashes and reported crashes. This measure indicates by how many standard deviations the reported number of crashes differs from the expected number of crashes. **Figure 9** illustrates how the ICF may be interpreted in terms of the standard deviation of a bell curve. This reference figure is provided in the RoadHAT practice pointers for design exceptions. The ICF is a measure useful for comparison of the analysis locations to system-wide statistics.

Figure 9 – *Standard Deviation in a Bell Curve Distribution*



Bell Curve illustrating Standard Deviation

In evaluating the ICF measure, an ICF=0 indicates the facility's crash performance is equal to the average (or what is expected) from that facility. Locations with an ICF greater than 0 indicates a higher crash frequency than the average while locations with an ICF less than 0 indicate a lower than average crash frequency. A higher ICF value indicates greater variation from the expected crash average of a facility. Therefore, the ICF is used to prioritize high crash locations with the intent to focus safety improvement efforts on locations with greater potential for risk.

Similarly, the index of crash cost (ICC) measures the difference between expected and estimated crash costs, indicating by how many standard deviations actual crash cost differs from the expected crash cost. Due to the higher cost of fatal and injury crashes, a high ICC could indicate higher than average fatal and injury crashes in the analysis facility.

RoadHAT Evaluation Results

The evaluation encompassed crash history between 2017 – 2021. The RoadHAT evaluation was performed to function as a primary filter of study segments (roadway sections subdivided by major crossroads and county lines) in order to identify segments with the highest potential for safety improvement. The analysis results of the RoadHAT evaluation developed for the US 30 West study are summarized in **Table 20** for segments and **Table 21** for interchange segments/intersections. Deer crashes have been removed from the evaluation.

Table 20 – RoadHAT Results Summary for Segments

Segment	Facility Type	AADT	Length (mi)	Reported Crashes (2017 - 2021)			Expected (crashes/year)			ICF	ICC
				F&I	NI & P	PDO	F&I	NI & P	PDO		
Segment 13: US 31 from SR 10 to Michigan Rd/13th Rd	Rural Multilane Segment	16200	3.54	21	8	75	2.39	1.5	8.63	0.85	0.65
Segment 1: US 30 from Comeford Rd to LaPorte County Line	Rural Multilane Segment	19200	4.78	25	18	83	3.235	2.09	10.54	0.78	0.53
Segment 8: US 30 Starke County Line to Pioneer Dr	Rural Multilane Segment	14600	4.55	15	11	45	2.496	1.46	8.32	0.2	0.21
Segment 14: US 31 from Michigan Rd/13th Rd to Michigan Rd	Rural Multilane Segment	20500	0.82	4	3	26	0.726	0.52	4.43	0.19	0.1
Segment 15: US 31 from Michigan Rd to US 30	Urban Multilane Segment	13100	3.05	12	7	53	2.43	1.63	14.79	-0.29	-0.06
Segment 11: US 30 from US 31 to SR 331	Rural Multilane Segment	13700	8.01	7	3	52	3.725	2.06	10.19	-0.3	-0.58
Segment 3: US 30 from US 421 to SR 39	Rural Multilane Segment	16000	8.31	12	8	62	4.987	3.01	13.29	-0.32	-0.48
Segment 9: US 30 from Pioneer Dr to N Michigan Blvd/SR 17	Urban Multilane Segment	21100	3.07	19	5	77	3.533	2.7	23.29	-0.39	-0.05
Segment 2: US 30 from Porter County Line to US 421	Rural Multilane Segment	17500	1.93	4	0	38	2.042	1.45	8.93	-0.41	-0.61
Segment 7: US 30 from SR 23 to Marshall County Line	Rural Multilane Segment	15300	2.19	5	0	20	1.272	0.76	5.46	-0.42	-0.26
Segment 6: US 30 from US 35 to US 23	Rural Multilane Segment	13500	5.84	14	2	27	2.983	1.69	9.14	-0.5	-0.12
Segment 5: US 30 from LaPorte County Line to US 35	Rural Multilane Segment	11900	3.81	4	1	22	1.781	0.97	6.36	-0.53	-0.53
Segment 10: US 30 from N Michigan Rd/SR 17 to US 31	Urban Multilane Segment	14200	1.57	6	6	13	1.184	0.9	9.03	-0.66	-0.04
Segment 4: US 30 from SR 39 to Starke County Line	Rural Multilane Segment	12500	1.95	6	1	5	0.925	0.52	4.23	-0.71	0.15
Segment 12: US 30 from SR 331 to Kosciusko County Line	Rural Multilane Segment	14700	3.24	10	2	9	1.772	1.05	6.69	-0.72	0.03

**F&I = Fatal and Incapacitating, NI&P = Non-Incapacitating and Possible Injury, PDO + Property Damage Only*

Table 21 – RoadHAT Results Summary for Intersections and Interchange Segments

Intersection/Interchange Segments	Facility Type	AADT	Length (mi)	Reported Crashes (2017 - 2021)			Expected (crashes/year)			ICF	ICC
				F&I	NI & P	PDO	F&I	NI & P	PDO		
US 30 & Tulip Rd	Rural State Intersection	14800		4	2	5	0.197	0.07	0.66	1.32	1.32
US 31 & SR 10	Rural State Intersection	19600		11	6	26	0.708	0.4	3.14	1.28	1.54
US 30 & Oak Rd	Urban State Intersection	25100		13	4	69	0.773	0.83	8.07	1.04	1.87
US 30 & Queen Rd	Urban State Intersection	16400		7	8	27	0.414	0.4	3.89	1.02	1.82
US 31 & Michigan Rd/13th Rd	Urban State Intersection	23300		5	1	25	0.322	0.29	2.75	0.9	1.11
US 30 & Plymouth Goshen Tr	Urban State Intersection	15200		6	6	8	0.236	0.21	2.02	0.77	1.98
US 30 & 12th Rd/Cedar Rd	Rural State Intersection	13600		5	1	4	0.189	0.11	0.94	0.6	1.5
US 31 & 11th Rd	Urban State Intersection	19200		5	0	11	0.222	0.19	1.91	0.4	1.32
US 30 & King Rd/9A Rd	Rural State Intersection	14200		2	2	21	0.596	0.4	2.98	0.34	-0.25
US 30 & Montdale Dr	Urban State Intersection	19500		3	5	14	0.649	0.36	2.44	0.31	0.07
US 30 & Pioneer Dr	Urban State Intersection	24500		7	2	39	0.662	0.79	6.74	0.23	0.81
US 30 & Condon Rd	Rural State Intersection	18600		2	0	4	0.136	0.09	0.83	0.13	0.67
US 30 & SR 39	Rural State Intersection	18300		3	4	20	0.667	0.5	3.75	0.13	0
US 30 & Truck Stop	Rural State Intersection	13100		4	0	0	0.102	0.06	0.66	-0.02	1.52
US 30 & County Rd 575 E	Rural State Intersection	18200		2	0	5	0.239	0.14	1.15	-0.09	0.29
US 30 & Industrial Drive	Urban State Intersection	23400		6	4	23	0.599	0.7	6	-0.13	0.76
US 30 & N 600 E	Rural State Intersection	16100		6	1	8	0.592	0.33	2.61	-0.19	0.66
US 30 & Thompson	Rural State Intersection	14500		1	0	10	0.511	0.28	2	-0.24	-0.49
US 30 & US 421	Rural State Intersection	22400		5	7	18	0.864	0.8	6.24	-0.32	0.2
US 30 & S 600 W	Rural State Intersection	14600		1	4	5	0.514	0.28	2.01	-0.32	-0.33
US 30 & N Main	Urban State Intersection	18700		1	0	11	0.628	0.35	2.37	-0.33	-0.56

Intersection/Interchange Segments	Facility Type	AADT	Length (mi)	Reported Crashes			Expected			ICF	ICC
				F&I	NI & P	PDO	F&I	NI & P	PDO		
US 30 & N 400 E	Unsignalized Urban State Intersection	17900		0	2	6	0.606	0.34	2.3	-0.59	-0.74
US 30 & SR 17/N Michigan St	Urban Interchange Freeway Segment	20000	0.56	2	0	10	0.208	0.17	4.82	-0.72	0.27
US 30 & SR 23	Unsignalized Rural State Intersection	15200		3	1	3	0.532	0.28	2.3	-0.73	0.04
US 30 & S 300 W (Long Ln)	Unsignalized Rural State Intersection	14100		1	0	3	0.5	0.27	1.96	-0.82	-0.51
US 31 & Michigan Rd	Unsignalized Rural State Intersection	22100		1	0	2	0.401	0.25	1.91	-0.87	-0.44
US 30 & Fir Rd	Unsignalized Rural State Intersection	12900		1	0	2	0.465	0.25	1.84	-0.88	-0.48
US 30 & Pilot Travel Center	Signalized Urban State Intersection	20700		3	0	5	0.462	0.51	4.5	-0.9	-0.07
US 30 & County Line Rd	Unsignalized Rural State Intersection	19300		1	1	2	0.644	0.36	2.42	-0.9	-0.56
US 30 & CR 750 E	Unsignalized Rural State Intersection	14500		0	0	3	0.362	0.17	1.42	-0.91	-0.87
US 31 & 9A Rd	Unsignalized Urban State Intersection	19400		1	0	2	0.307	0.27	2.62	-0.92	-0.42
US 30 & US 31	Urban Interchange Freeway Segment	13300	0.66	1	0	5	0.162	0.15	4.37	-1	-0.2
US 30 & US 30 Alt	Unsignalized Rural State Intersection	14100		0	0	0	0.279	0.17	1.4	-1.12	-0.78
US 30 & SR 331	Rural Interchange Freeway Segment	3400	0.91	0	0	10	0.71	0.037	7.39	-1.22	-1.7

The analysis results indicated several locations in the US 30 and US 31 corridors had a negative ICF value, which indicates fewer crashes occurred during the study period (2017 - 2021) than what would be expected from these facilities. The ICC for the US 30 and US 31 segment locations confirmed that crash costs were not substantially in excess of the expected crash costs, indicating a normal crash severity distribution (comparable to safety performance of the average facility). The high severity crash location narratives were reviewed and common factors and recurring issues were provided in Section 5.3. A summary of the overall observations are contained in the next section.

5.5. SAFETY REVIEW CONCLUSIONS

The crash data evaluation enabled various conclusions to be drawn from crash history within the study limits:

- The RoadHAT evaluation results were sorted in order of highest to lowest index of crash frequency (ICF) that is intended to identify high crash locations within the study area and develop safety improvement priorities accordingly.

- A substantial number of crashes occurred in segments with **higher concentrations of intersections/driveways/median openings** and tended to be closer to the intersections and/or median openings, even though some were reported as 'no relation to junction'.
- Areas with **higher concentrations of driveways** (areas 1, 2, and 5 in **Figure 8**) had more crashes due to higher potential for conflicts.
- **Speeding** and **speed differential** is suspected to be an issue as the vehicles that enter or exit the roadway from side streets and driveways maneuver at slower speeds than vehicles traveling along the mainline. Where no turning or acceleration lanes are present, the speed differential created substantial potential for conflict.
- Many crashes reported **involved trailers**. Often vehicles that had a trailer would attempt to cross the road to either turn left or travel through and/or across in two-stage movements while the median width is insufficient to fully store a vehicle with a trailer. Therefore, this left the vehicles exposed and in direct conflict with mainline vehicles, which then resulted in crashes.

The high-speed profile of the mainline roadway,coupled with predominantly unrestricted access throughout the study area, results in substantial conflicting vehicle movements that lead to the crash types experienced.

6. TRAFFIC OPERATIONS

The following intersections within the study area were analyzed to evaluate traffic operations at these locations for the existing (2022) and design year (2045) traffic conditions. The study limits consist of 23 selected at-grade intersections and 5 interchanges. **Table 22** provides a brief description of the roadways forming the study intersections.

Table 22 – Study Intersections

ID	Intersection	Existing Traffic Control
1	US 30 & SR 49	Interchange
2	US 30 & E Industrial Drive	Signalized
3	US 30 & Montdale Drive	Stop-Controlled
4	US 30 & N 400 E	Stop-Controlled
5	US 30 & County Line Road	Stop-Controlled
6	US 30 & N Main Street	Stop-Controlled
7	US 30 & US Hwy 421	Signalized
8	US 30 & S 600 W	Stop-Controlled
9	US 30 & N Thompson Street	Stop-Controlled
10	US 30 & US 30 Alternate Rte.	Stop-Controlled
11	US 30 & S 300 W	Stop-Controlled
12	US 30 & SR 39	Signalized
13	US 30 & US 35 Interchange	Interchange
14	US 30 & N 750 E	Stop-Controlled
15	US 30 & N 1000 E	Stop-Controlled
16	US 30 & Queen Road	Signalized
17	US 30 & Pioneer Drive	Signalized
18	US 30 & N Oak Road	Signalized
19	US 30 & N Michigan Street	Interchange
20	US 30 & Plymouth Goshen Trail	Stop-Controlled
21	US 30 & US 31 Interchange	Interchange
22	US 30 & 9a Road	Signalized
23	US 30 & Fir Road	Stop-Controlled
24	US 30 & Main St Interchange	Interchange
25	US 31 & W 9a Road	Stop-Controlled
26	US 31 & Michigan Road	Stop-Controlled
27	US 31 & 13th Road	Stop-Controlled
28	US 31 & SR 10	Stop-Controlled

Existing AADT volumes *(2022)* were collected from the INDOT Traffic Count Database System (TCDS) for the US 30 and US 31 mainlines. The segment AADT volumes are shown in **Table 23** and **Table 24**.

Table 23 – US 30 Mainline AADT Existing 2022 Volumes

From	To	AADT
SR 49	Porter CR 400 E	21,400
Porter CR 400 E	County Line Road	18,300
County Line Road	LaPorte CR 1100 W	18,900
LaPorte CR 1100 W	US 421	18,200
US 421	Long Lane	14,600
Long Lane	2100’ E. of SR 39	13,100
2100’ E. of SR 39	Queen Road	14,000
Queen Road	1800’ E of King Road	14,100
1800’ E. of King Road	Beech Road	14,600

Table 24 – US 31 Mainline AADT Existing 2022 Volumes

From	To	AADT
US 30	Michigan Road	17,700
Michigan Road	SR 10	19,800
SR 10	CR 700 N	15,200

A review of the existing data confirmed that the US 30 and US 31 corridors have substantial heavy vehicle percentages along both the mainlines and the side streets. The range of existing truck percentages is shown in Table 25 for each mainline approach based upon the turning movement counts (TMCs) that were collected for the key intersections, as well as the data for the interchanges that was taken from the TCDS website. An average heavy vehicle percentage was also provided for the mainline movements. The heavy vehicle percentages by intersection are provided in **Appendix B**.

Table 25 – US 30 and US 31 Heavy Vehicle Percentages

Roadway	Direction	AM Peak Period % Heavy Vehicles Range (Average)	PM Peak Period % Heavy Vehicles Range (Average)
US 30	Eastbound	22% – 51% (38%)	17% - 41% (27%)
	Westbound	18% – 50% (33%)	18% - 45% (33%)
US 31	Northbound	26% - 31% (28%)	19% - 27% (24%)
	Southbound	22% - 26% (24%)	18% - 21% (20%)

6.1. TRAFFIC FORECASTING

Twenty-four-hour turning movement counts at the study intersections were collected between November 2021 and November 2022. Traffic data from the INDOT Traffic Count Database System (TCDS) was utilized for interchange mainline and ramps that were not captured by the turning movement counts.

Year 2019 and 2045 transportation demand models were developed by INDOT for the PROPEL US 30 and US 31 studies. These included the 2019 and 2045 expected daily turning movement volumes at all study intersections, which were utilized to develop annual growth rates for each approach at the study area intersections and interchanges. A linear annual growth rate was developed for each study intersection and applied by movement. It was then applied to the collected traffic turning movement counts to develop the design year (2045) volumes at the study intersections. The growth rate percentages and intersection turning movement volumes for the existing and design year are provided in **Appendix C, Appendix D and Appendix E**, respectively.

6.2. CAPACITY ANALYSIS

6.2.1. FREEWAY ANALYSIS

A capacity analysis was performed for the freeway segments in the interchange area of influence to evaluate the existing (2022) and future (2045) condition operations at the following interchanges:

- US 30 and SR 49
- US 30 and US 35
- US 30 and N Michigan Street

- US 30 and US 31
- US 30 and Main Street

The freeway segment types that were analyzed consisted of the following: mainline, merge, and diverge. HCS 2022 was used to facilitate the analysis of the freeway segments. The freeway analysis measures of effectiveness consisted of density and Level-of-Service (LOS). Queuing and volume-to-capacity ratios were also evaluated as a check against the density values. Operating conditions of the freeway segments were considered to be acceptable if found to operate at LOS D or better as many jurisdictions currently apply this threshold for defining when automobile site traffic mitigation is required (per INDOT Applicant's Guide to Traffic Impact Studies). The LOS criteria for freeway segments as defined in the *Highway Capacity Manual* are provided in **Table 26**. Outputs for the analysis contained in this section is contained in **Appendices F**.

Table 26 – LOS Thresholds for Freeway Segments

LOS	Density (pc/mi/ln)		Comments
	Basic Freeway Segment	Ramp Merge/Diverge	
A	≤ 11	≤ 10	Unrestricted operations
B	> 11-18	> 10-20	Merging and diverging maneuvers noticeable to drivers
C	> 18-26	> 20-28	Influence area speeds begin to decline
D	> 26-35	> 28-35	Influence area turbulence becomes intrusive
E	> 35-45	> 35	Turbulence felt by virtually all drivers
F	>45 or v/c > 1.0	v/c > 1.0	Ramp and freeway queues form

US 30 Mainline Analysis

US 30 includes two travel lanes in each direction within the study limits. The basic freeway segments (mainline) level-of-service results during the AM and PM Peak hours for the existing (2022) and design year (2045) no-build traffic conditions are shown in **Table 27**. The capacity analysis results indicate that for both peak periods, during all analysis periods, each segment is anticipated to operate at LOS C or better. Analysis of the intersecting freeway segments was also included and is provided in **Table 27** as well.

US 31 Mainline Analysis

US 30 includes two travel lanes in each direction within the study limits. The basic freeway segments (mainline) level-of-service results during the AM and PM Peak hours for the existing (2022) and design year (2045) no-build traffic conditions are shown in **Table 27**. The capacity analysis results indicate that for both peak periods, during all analysis periods, each segment is anticipated to operate at LOS B or better.

Table 27 – Basic Freeway Segment Analysis Summary for US 30

Location, Movement		Existing 2022				Design year 2045			
		AM Peak		PM Peak		AM Peak		PM Peak	
		Avg. Density (pc/mi/hr)	LOS	Avg. Density (pc/mi/hr)	LOS	Avg. Density (pc/mi/hr)	LOS	Avg. Density (pc/mi/hr)	LOS
US 30 Mainline, E of SR 49	**EB**	10.4	A	11.2	B	12.8	B	13.8	B
	WB	10.3	A	11.4	B	12.7	B	14.1	B
US 30 Mainline, W of SR 49	**EB**	8.6	A	9.7	A	12.5	B	14.1	B
	WB	6.2	A	7.6	A	9.0	A	11.1	B
SR 49 Mainline, S of US 30	**NB**	7.0	A	11.6	B	8.6	A	14.3	B
	SB	11.6	B	9.4	A	14.2	B	11.5	B
SR 49 Mainline, N of US 30	**NB**	13.8	B	18.3	C	16.9	B	22.5	C
	SB	10.6	A	16.0	B	13.1	B	19.6	C
US 30 Mainline, E of US 35	**EB**	6.3	A	6.9	A	7.7	A	8.4	A
	WB	5.7	A	8.2	A	7.0	A	10.1	A
US 30 Mainline, W of US 35	**EB**	5.6	A	6.6	A	6.9	A	8.2	A
	WB	5.6	A	7.5	A	6.9	A	9.3	A
US 35 Mainline, N of US 30	**NB**	1.7	A	1.8	A	2.0	A	2.2	A
	SB	1.7	A	1.8	A	2.1	A	2.2	A
US 35 Mainline, S of US 30	**NB**	2.6	A	2.6	A	3.2	A	3.2	A
	SB	2.3	A	3.1	A	2.8	A	3.8	A
US 30 Mainline, E of Michigan Rd	**EB**	6.3	A	7.8	A	7.8	A	9.6	A
	WB	6.4	A	7.3	A	7.9	A	9.0	A
US 30 Mainline, W of Michigan Rd	**EB**	6.3	A	7.3	A	7.7	A	8.9	A
	WB	6.9	A	7.8	A	8.6	A	9.7	A
US 30 Mainline, E of US 31	**EB**	5.2	A	6.2	A	6.4	A	7.7	A
	WB	5.1	A	6.4	A	6.3	A	7.8	A
US 30 Mainline, W of US 31	**EB**	6.2	A	8.9	A	7.6	A	10.9	A
	WB	7.3	A	10.9	A	9.0	A	13.4	B
US 31 Mainline, N of US 30	**NB**	7.6	A	8.2	A	9.4	A	10.1	A
	SB	7.1	A	10.7	A	8.8	A	13.1	B
US 31 Mainline, S of US 30	**NB**	6.9	A	7.5	A	8.5	A	9.3	A
	SB	6.3	A	8.8	A	7.7	A	10.8	A
US 30 Mainline, E of Main St	**EB**	4.8	A	6.2	A	5.9	A	7.7	A
	WB	5.5	A	6.3	A	6.8	A	7.8	A
US 30 Mainline, W of Main St	**EB**	4.6	A	5.8	A	5.7	A	7.1	A
	WB	4.7	A	6.5	A	5.8	A	8.0	A

6.2.2. INTERCHANGE ANALYSIS

A capacity analysis was performed for the merge and diverge operations at the previously identified interchange locations for the existing (2022) conditions and design year (2045) operations. The LOS criteria for freeway segments as defined in the *Highway Capacity Manual* are provided in **Table 26**. Results are shown for each interchange in **Table 28** through **Table 32.** The interchange analysis results indicate that for both peak periods, during all analysis periods, each segment is anticipated to operate at LOS C or better. Outputs for the analysis contained in this section is contained in **Appendix G**.

Table 28 – Interchange Analysis Summary for US 30 & SR 49

Movement		Existing 2022				Design year 2045			
		AM Peak		PM Peak		AM Peak		PM Peak	
		Avg. Density (pc/mi/hr)	LOS	Avg. Density (pc/mi/hr)	LOS	Avg. Density (pc/mi/hr)	LOS	Avg. Density (pc/mi/hr)	LOS
NB SR 49 to EB US 30	Diverge	7.2	A	11.9	B	8.8	A	14.6	B
	Merge	10.7	A	11.5	A	15.1	B	16.5	B
WB US 30 to NB SR 49	Diverge	11.5	A	12.5	A	14.3	B	15.5	B
	Merge	14.7	B	20.0	B	19.9	B	27.0	C
SB SR 49 to WB US 30	Diverge	10.5	A	16.0	A	12.9	A	19.8	A
	Merge	6.1	A	7.3	A	7.5	A	8.9	A
EB US 30 to SB SR 49	Diverge	8.8	A	9.9	A	12.8	A	14.5	A
	Merge	11.7	A	9.4	A	14.1	B	11.1	A
NB SR 49 to WB US 30	Diverge	5.6	A	11.3	A	6.9	A	13.9	A
	Merge	5.3	A	5.3	A	6.2	A	6.2	A
SB SR 49 to EB US 30	Diverge	12.7	A	17.1	B	15.7	B	21.2	B
	Merge	12.1	B	13.1	B	17.7	B	19.2	B
WB US 30 to SB SR 49	Diverge	4.5	A	4.9	A	5.5	A	6.0	A
	Merge	8.5	A	13.7	B	10.3	A	16.7	B

Table 29 – Interchange Analysis Summary for US 30 & US 35

Movement		Existing 2022				Design year 2045			
		AM Peak		PM Peak		AM Peak		PM Peak	
		Avg. Density (pc/mi/hr)	LOS	Avg. Density (pc/mi/hr)	LOS	Avg. Density (pc/mi/hr)	LOS	Avg. Density (pc/mi/hr)	LOS
NB US 35 to EB US 30	Diverge	2.8	A	2.8	A	3.4	A	3.4	A
	Merge	5.9	A	6.6	A	6.9	A	7.7	A
SB US 35 to WB US 30	Diverge	1.8	A	1.9	A	2.2	A	2.3	A
	Merge	5.3	A	7.1	A	6.3	A	8.6	A
WB US 30 to NB US 35	Diverge	5.7	A	8.1	A	7.0	A	10.0	B
	Merge	1.7	A	1.9	A	2.0	A	2.2	A
WB US 30 to SB US 35	Diverge	5.5	A	6.5	A	6.8	A	8.1	A
	Merge	2.3	A	3.3	A	2.7	A	3.7	A

Table 30 – Interchange Analysis Summary for US 30 & N Michigan Street

Movement		Existing 2022				Design year 2045			
		AM Peak		PM Peak		AM Peak		PM Peak	
		Avg. Density (pc/mi/hr)	LOS	Avg. Density (pc/mi/hr)	LOS	Avg. Density (pc/mi/hr)	LOS	Avg. Density (pc/mi/hr)	LOS
EB US 30 to SB Michigan St	Diverge	6.7	A	8.2	A	8.2	A	10.1	A
	Merge	--	--	--	--	--	--	--	--
NB Michigan St to EB US 30	Diverge	--	--	--	--	--	--	--	--
	Merge	6.3	A	8.7	B	7.5	A	10.6	B
SB Michigan St to WB US 30	Diverge	--	--	--	--	--	--	--	--
	Merge	6.9	A	7.6	A	8.5	A	9.3	A
WB US 30 to NB Michigan St	Diverge	6.9	A	8.2	A	8.4	A	10.0	A
	Merge	--	--	--	--	--	--	--	--

Table 31 – Interchange Analysis Summary for US 30 & US 31

Movement		Existing 2022				Design year 2045			
		AM Peak		PM Peak		AM Peak		PM Peak	
		Avg. Density (pc/mi/hr)	LOS	Avg. Density (pc/mi/hr)	LOS	Avg. Density (pc/mi/hr)	LOS	Avg. Density (pc/mi/hr)	LOS
EB US 30 to NB US 31	Diverge	4.5	A	6.7	A	5.6	A	8.3	A
	Merge	6.8	A	7.5	A	8.4	A	9.2	A
EB US 30 to SB US 31	Diverge	6.3	A	9.0	A	7.7	A	11.1	A
	Merge	4.8	A	6.2	A	5.9	A	7.7	A
NB US 31 to EB US 30	Diverge	7.0	A	7.6	A	8.6	A	9.4	A
	Merge	5.0	A	6.2	A	5.0	A	7.6	A
NB US 31 to WB US 30	Diverge	8.6	A	9.1	A	10.6	A	11.1	A
	Merge	3.7	A	4.3	A	4.5	A	5.3	A
SB US 31 to EB US 30	Diverge	6.2	A	7.8	A	7.6	A	9.6	A
	Merge	5.0	A	7.7	A	6.1	A	9.5	A
SB US 31 to WB US 30	Diverge	7.3	A	10.8	A	8.9	A	13.3	A
	Merge	6.5	A	10.1	A	8.0	A	12.4	A
WB US 30 to NB US 31	Diverge	5.2	A	6.5	A	6.4	A	8.0	A
	Merge	6.7	A	7.0	A	8.2	A	8.6	A
WB US 30 to SB US 31	Diverge	6.8	A	10.6	A	8.4	A	13.0	A
	Merge	7.4	A	10.3	A	9.1	A	12.7	A

Table 32 – Interchange Analysis Summary for US 30 & Main Street

Movement		Existing 2022				Design year 2045			
		AM Peak		PM Peak		AM Peak		PM Peak	
		Avg. Density (pc/mi/hr)	LOS	Avg. Density (pc/mi/hr)	LOS	Avg. Density (pc/mi/hr)	LOS	Avg. Density (pc/mi/hr)	LOS
EB US 30 to SB Main St	Diverge	4.9	A	6.0	A	6.0	A	7.5	A
	Merge	--	--	--	--	--	--	--	--
NB Main St to EB US 30	Diverge	--	--	--	--	--	--	--	--
	Merge	4.9	A	6.4	A	6	A	7.9	A
SB Main St to WB US 30	Diverge	--	--	--	--	--	--	--	--
	Merge	4.8	A	5.8	A	5.8	A	7.0	A
WB US 30 to NB Main St	Diverge	5.1	A	6.7	A	6.2	A	8.2	A
	Merge	--	--	--	--	--	--	--	--

6.2.3. INTERSECTION ANALYSIS

The traffic analysis for at-grade study intersections for the existing (2022) and design year (2045) no-build traffic conditions was evaluated based on meeting the criteria for acceptable traffic operations. In general, the operating conditions were considered to be acceptable if found to operate at a level-of-service of LOS D or better as many jurisdictions currently apply this threshold for defining when automobile site traffic mitigation is required (per INDOT Applicant's Guide to Traffic Impact Studies). The 95th percentile queue lengths were also taken into consideration when determining the need for improvements based on queuing impacts.

Capacity analysis of signalized and stop-controlled intersections was performed using Synchro (Version 11.0) utilizing the methodology outlined in the *Highway Capacity Manual* (HCM 6th Edition or HCM 2000 wherever required).

The standard parameter used to evaluate traffic operating conditions is referred to as the level-of-service (LOS). There are six LOS (A through F) which relate to driving conditions from best to worst, respectively. LOS for signalized and unsignalized (stop-control and roundabout) intersections is defined in terms of control delay per vehicle, which is a direct correlation to driver discomfort, frustration, fuel consumption, and lost travel time. **Table 33** provides the LOS criteria as defined in the *Highway Capacity Manual*.

Table 33 – Intersection LOS Thresholds

LOS	Signalized/Roundabout Intersection Control Delay per Vehicle (seconds)	Unsignalized Intersection Control Delay per Vehicle (seconds)
A	≤ 10	≤ 10
B	> 10 and ≤ 20	> 10 and ≤ 15
C	> 20 and ≤ 35	> 15 and ≤ 25
D	> 35 and ≤ 55	> 25 and ≤ 35
E	> 55 and ≤ 80	> 35 and ≤ 50
F	> 80 or v/c > 1.0	> 50 or v/c > 1.0

Based on the results of the capacity analysis, all signalized study intersections are anticipated to operate at overall acceptable level of service (LOS D) during both the AM and PM peak hours under the existing (2022) and design year (2045) no-build traffic conditions. All movements at the signalized intersections are also anticipated to operate with acceptable levels-of-service. Results for the signalized intersection capacity analysis for the existing (2022) and design year (2045) are summarized in **Table 34** and **Table 35**, respectively. Outputs for the analysis contained in this section is contained in **Appendix H**.

Table 34 – Signalized Intersections Existing (2022) Year Analysis

Signalized Intersections Existing			Existing (2022) AM Peak			Existing (2022) PM Peak		
ID	Intersection	Approach	Delay (s/veh) / LOS	V/C	95th %tile Queues (feet)	Delay (s/veh) / LOS	V/C	95th %tile Queues (feet)
2	US 30 and E Industrial Dr	***Overall***	***16.4 / B***	--		***20.7 / C***	--	
		Eastbound	15.5 / B	0.77	150	19.2 / B	0.52	100
		Westbound	12.7 / B	0.48	250	17.7 / B	0.6	275
		Northbound	37.1 / D	0.52	125	35.6 / D	0.58	150
		Southbound	32.1 / C	0.29	50	28.4 / C	0.45	50
7	US 30 and US Hwy 421	***Overall***	***25.4 / C***	--		***23.2 / C***	--	
		Eastbound	16.3 / B	0.52	150	17.2 / B	0.63	200
		Westbound	20.3 / C	0.8	175	20.2 / C	0.64	200
		Northbound	45.3 / D	0.79	150	37.1 / D	0.53	100
		Southbound	43.8 / D	0.64	100	41.1 / D	0.64	150
12	US 30 and SR 39	***Overall***	***11.9 / B***	--		***11.5 / B***	--	
		Eastbound	8.2 / A	0.28	100	7.9 / A	0.27	100
		Westbound	8.4 / A	0.26	100	8.0 / A	0.30	125
		Northbound	28.8 / C	0.51	125	30.3 / C	0.46	100
		Southbound	25.7 / C	0.17	50	28.1 / C	0.34	100
16	US 30 and Queen Rd	***Overall***	***10.1 / B***	--		***10.5 / B***	--	
		Eastbound	3.6 / A	0.21	75	6.6 / A	0.30	125
		Westbound	6.0 / A	0.21	75	6.5 / A	0.35	150
		Northbound	29.6 / C	0.32	75	35.7 / D	0.56	100
		Southbound	36.3 / D	0.64	125	33.6 / C	0.49	100
17	US 30 and Pioneer Dr	***Overall***	***15.5 / B***	--		***17.3 / B***	--	
		Eastbound	12.6 / B	0.27	100	14.0 / B	0.35	125
		Westbound	12.6 / B	0.23	100	14.3 / B	0.41	100
		Northbound	26.1 / C	0.35	50	27.9 / C	0.53	75
		Southbound	27.4 / C	0.30	75	28.3 / C	0.30	75
18	US 30 and N Oak Rd	***Overall***	***22.9 / C***	--		***28.7 / C***	--	
		Eastbound	17.5 / B	0.32	100	21.3 / C	0.33	125
		Westbound	16.8 / B	0.32	100	20.0 / B	0.42	100
		Northbound	32.3 / C	0.52	50	33.7 / C	0.62	75
		Southbound	35.5 / D	0.68	75	40.6 / D	0.81	75
22	US 30 and 9a Rd	***Overall***	***13.1 / B***	--		***12.7 / B***	--	
		Eastbound	8.5 / A	0.23	100	9.1 / A	0.26	100
		Westbound	10.0 / B	0.22	75	9.7 / A	0.24	100
		Northbound	26.9 / C	0.36	100	27.9 / C	0.31	75
		Southbound	25.6 / C	0.24	50	26.1 / C	0.00	50

 # 95th percentile volume exceeds capacity, queue may be longer

Table 35 – Signalized Intersections Design (2045) Year Analysis

Signalized Intersections No-Build			Design (2045) AM Peak			Design (2045) PM Peak		
ID	Intersection	Approach	Delay (s/veh) / LOS	V/C	95th %tile Queues (feet)	Delay (s/veh) / LOS	V/C	95th %tile Queues (feet)
2	US 30 and E Industrial Dr	***Overall***	***22.1 / C***	--		***20.7 / C***	--	
		Eastbound	20.2 / C	0.87	250	19.2 / B	0.52	#157
		Westbound	19.5 / B	0.66	325	17.7 / B	0.6	350
		Northbound	43.8 / D	0.57	#115	35.6 / D	0.58	#167
		Southbound	38.3 / D	0.56	75	28.4 / C	0.45	150
7	US 30 and US Hwy 421	***Overall***	***31.4 / C***	--		***30.5 / C***	--	
		Eastbound	23.5 / C	0.72	175	22.9 / C	0.8	225
		Westbound	32.3 / C	1.07	200	26.8 / C	0.43	225
		Northbound	38.5 / D	0.69	#140	46.6 / D	0.72	#94
		Southbound	46.4 / D	0.71	150	53.9 / D	0.74	#228
12	US 30 and SR 39	***Overall***	***15.4 / B***	--		***11.5 / B***	--	
		Eastbound	10.1 / B	0.36	150	7.9 / A	0.27	150
		Westbound	14.0 / B	0.28	125	8.0 / A	0.30	125
		Northbound	31.0 / C	0.59	150	30.3 / C	0.46	125
		Southbound	27.1 / C	0.21	75	28.1 / C	0.34	125
16	US 30 and Queen Rd	***Overall***	***10.1 / B***	--		***10.8 / B***	--	
		Eastbound	4.5 / A	0.26	75	6.9 / A	0.35	150
		Westbound	7.2 / A	0.25	100	7.0 / A	0.40	175
		Northbound	27.6 / C	0.30	75	37.5 / D	0.61	125
		Southbound	31.4 / C	0.58	125	33.9 / C	0.52	100
17	US 30 and Pioneer Dr	***Overall***	***16.1 / B***	--		***17.3 / B***	--	
		Eastbound	12.9 / B	0.31	125	14.0 / B	0.35	175
		Westbound	13.6 / B	0.26	100	14.3 / B	0.41	125
		Northbound	27.7 / C	0.38	75	27.9 / C	0.53	75
		Southbound	28.9 / C	0.30	75	28.3 / C	0.30	75
18	US 30 and N Oak Rd	***Overall***	***24.0 / C***	--		***28.7 / C***	--	
		Eastbound	18.9 / B	0.39	125	21.3 / C	0.33	175
		Westbound	17.9 / B	0.39	100	20.0 / B	0.42	125
		Northbound	34.2 / C	0.56	75	33.7 / C	0.62	75
		Southbound	37.7 / D	0.70	75	40.6 / D	0.81	75
22	US 30 and 9a Rd	***Overall***	***14.6 / B***	--		***12.7 / B***	--	
		Eastbound	10.7 / B	0.31	125	9.1 / A	0.26	150
		Westbound	12.1 / B	0.25	100	9.7 / A	0.24	125
		Northbound	27.5 / C	0.41	100	27.9 / C	0.31	100
		Southbound	24.7 / C	0.00	50	26.1 / C	0.00	50

 # 95th percentile volume exceeds capacity, queue may be longer

All movements at the stop-controlled intersections, with the exception of the eastbound approach at US 31 and SR 10 intersection (#28), are anticipated to operate with acceptable levels-of-service during both the AM and PM peak hours under the existing (2022) and design year (2045) no-build traffic conditions. The eastbound approach at the US 31 and SR 10 intersection is anticipated to operate at LOS E during the PM peak hour of the design year (2045) traffic conditions. INDOT currently has a project in the design phase at both the SR 10 and SR 110 intersections which is intended to address these operations issues. Results for the stop-controlled intersection capacity analysis for the existing (2022) and design year (2045) are summarized in **Table 36** and **Table 37**, respectively.

Table 36 – Stop-Controlled Intersections Existing (2022) Year Analysis

Stop-Controlled Intersections Existing			Existing (2022) AM Peak			Existing (2022) PM Peak		
ID	Intersection	Approach	Delay (s/veh) / LOS	V/C	95th %tile Queues (feet)	Delay (s/veh) / LOS	V/C	95th %tile Queues (feet)
3	US 30 and Montdale Dr	Eastbound*	8.4 / A	0.02	25	9.7 / A	0.02	25
		Westbound*	9.8 / A	0.06	25	9.4 / A	0.04	25
		Northbound	13.9 / B	0.11	25	14.8 / B	0.12	25
		Southbound	16.4 / C	0.09	25	19.7 / C	0.14	25
4	US 30 and N 400 E	Eastbound*	9.4/A	0.02	25	9.2 / A	0.01	25
		Westbound*	8.4/A	0.001	25	9.6 / A	0.011	25
		Northbound	13.3/B	0.04	25	20 / C	0.07	25
		Southbound	12/B	0.03	25	13.6 / B	0.04	25
5	US 30 and County Line Rd	Eastbound*	9.5/A	0.001	25	8.9 / A	0.003	25
		Westbound*	8.5/A	0.001	25	10.3 / B	0.01	25
		Northbound	15.6/C	0.04	25	17.7 / C	0.04	25
		Southbound	14.1 / B	0.02	25	18.5 / C	0.04	25
6	US 30 and N Main St	Westbound*	8.6 / A	0.02	25	10 / B	0.04	25
		Northbound	13 / B	0.11	25	15 / C	0.14	25
8	US 30 and S 600 W	Eastbound*	8.8 / A	0.05	25	9.2 / A	0.06	25
		Northbound	17.4 / C	0.12	25	19.5 / C	0.07	25
		Southbound	13.4 / B	0.15	25	15.9 / C	0.23	25
9	US 30 and N Thompson St	Eastbound*	8.6 / A	0.001	25	9.1 / A	0.01	25
		Westbound*	8.3 / A	0.002	25	9.4 / A	0.01	25
		Northbound	14.9 / B	0.08	25	14.8 / B	0.06	25
		Southbound	13.5 / B	0.02	25	16.3 / C	0.04	25
10	US 30 and US 30 Alternate Rte	Westbound*	8.3 / A	0.01	25	8.4 / A	0.01	25
		Northbound	9.7 / A	0.01	25	10.9 / B	0.01	25
11	US 30 and S 300 W	Eastbound*	9.9 / A	0.003	25	8.6 / A	0.002	25
		Northbound	14.5 / B	0.04	25	17.3 / C	0.01	25
		Southbound	10.8 / B	0.01	25	14.6 / B	0.02	25
14	US 30 and N 750 E	Eastbound*	8.5 / A	0.04	25	8.8 / A	0.003	25
		Westbound*	8.3 / A	0.01	25	8.9 / A	0.01	25
		Northbound	16.2 / C	0.1	25	16.3 / C	0.05	25
		Southbound	13.6 / B	0.13	25	14.6 / B	0.10	25
15	US 30 and N 1000 E	Eastbound*	8.6 / A	0.01	25	8.8 / A	0.02	25
		Westbound*	8.6 / A	0.01	25	8.4 / A	0.04	25
		Northbound	12.3 / B	0.11	25	15.9 / C	0.16	25
		Southbound	13.2 / B	0.09	25	18.7 / C	0.22	25

Table 37 – Stop-Controlled Intersections Existing (2022) Year Analysis, Continued

Stop-Controlled Intersections Existing			Existing (2022) AM Peak			Existing (2022) PM Peak		
ID	Intersection	Approach	Delay (s/veh) / LOS	V/C	95th %tile Queues (feet)	Delay (s/veh) / LOS	V/C	95th %tile Queues (feet)
19S	US 30 WB & Michigan Rd	Westbound	12.4 / B	0.108	25	13.3 / B	0.102	25
		Southbound	8.6 / A	0.019	25	8.8 / A	0.015	25
19N	US 30 EB & Michigan Rd	Westbound	12 / B	0.076	25	14.1 / B	0.11	25
		Southbound	9.1 / A	0.033	25	9.1 / A	0.033	25
20	US 30 and Plymouth	Northbound	9.7 / A	0.04	25	10.8 / B	0.07	25
		Southbound	10.1 / B	0.02	25	11.3 / B	0.05	25
23	US 30 and Fir Rd	Eastbound*	7.9/A	0.001	25	8.3 / A	0.01	25
		Westbound*	7.9/A	0.001	25	8.3 / A	0.001	25
		Northbound	12.9 / B	0.04	25	13.4 / B	0.02	25
		Southbound	12.4 / B	0.04	25	14 / B	0.09	25
25	US 31 and W 9a Rd	Eastbound	10.4 / B	0.10	25	12.1 / B	0.14	25
		Westbound	10.2 / B	0.01	25	10.6 / B	0.01	25
		Northbound*	10.4 / B	0.16	25	12.1 / B	0.10	25
26	US 31 and Michigan Rd	Eastbound	11.5 / B	0.17	25	13.5 / B	0.23	25
		Northbound*	9.4 / A	0.15	25	10.4 / B	0.18	25
27	US 31 and 13th Rd	Eastbound	21.9 / C	0.11	25	24.5 / C	0.04	25
		Westbound	12.9 / B	0.23	25	12.1 / B	0.15	25
		Northbound*	8.9 / A	0.004	25	12.3 / B	0.002	25
		Southbound*	9.3 / A	0.10	25	9.9 / A	0.12	25
28	US 31 and SR 10	Eastbound	22.6 / C	0.21	25	25.4 / D	0.25	25
		Westbound	21 / C	0.47	75	21.7 / C	0.39	50
		Northbound*	8.6 / A	0.01	25	9 / A	0.01	25
		Southbound*	9.1 / A	0.08	25	9.5 / A	0.08	25

**Free-Flow (Non-Stop Controlled) Approach*

Table 38 – Stop-Controlled Intersections Design (2045) Year Analysis

Stop-Controlled Intersections Existing			Design (2045) AM Peak			Design (2045) PM Peak		
ID	Intersection	Approach	Delay (s/veh) / LOS	V/C	95th %tile Queues (feet)	Delay (s/veh) / LOS	V/C	95th %tile Queues (feet)
3	US 30 and Montdale Dr	Eastbound*	8.6 / A	0.03	25	10.2 / B	0.02	25
		Westbound*	10.8 / B	0.08	25	10.3 / B	0.06	25
		Northbound	18.2 / C	0.19	25	17.8 / C	0.18	25
		Southbound	18.5 / C	0.11	25	23.7 / C	0.19	25
4	US 30 and N 400 E	Eastbound*	9.7/A	0.03	25	9.6 / A	0.01	25
		Westbound*	8.7/A	0.001	25	10.6 / B	0.02	25
		Northbound	14.1 / B	0.06	25	25.2 / D	0.12	25
		Southbound	12.7/B	0.03	25	14.9 / B	0.05	25
5	US 30 and County Line Rd	Eastbound*	9.24/A	0.001	25	9.1 / A	0.004	25
		Westbound*	8.6/A	0.001	25	11.3 / B	0.04	25
		Northbound	15.1 / C	0.07	25	23 / C	0.19	25
		Southbound	14.7 / B	0.03	25	30.1 / D	0.14	25
6	US 30 and N Main St	Westbound*	9 / A	0.02	25	11.5 / B	0.05	25
		Northbound	14.2 / B	0.13	25	19.6 / C	0.21	25
8	US 30 and S 600 W	Eastbound*	9 / A	0.06	25	9.5 / A	0.06	25
		Northbound	20.8 / C	0.23	25	24.7 / C	0.21	25
		Southbound	15.1 / C	0.20	25	18.9 / C	0.30	50
9	US 30 and N Thompson St	Eastbound*	8.7 / A	0.001	25	9.6 / A	0.01	25
		Westbound*	8.4 / A	0.002	25	9.9 / A	0.01	25
		Northbound	15.8 / C	0.09	25	16.9 / C	0.08	25
		Southbound	13.8 / B	0.03	25	18.7 / C	0.05	25
10	US 30 and US 30 Alternate Rte	Westbound*	8.4 / A	0.01	25	8.8 / A	0.01	25
		Northbound	9.8 / A	0.01	25	11.5 / B	0.01	25
11	US 30 and S 300 W	Eastbound*	10 / B	0.003	25	8.9 / A	0.002	25
		Northbound	15.3 / C	0.04	25	19.8 / C	0.01	25
		Southbound	10.8 / B	0.01	25	16.2 / C	0.02	25
14	US 30 and N 750 E	Eastbound*	8.6 / A	0.05	25	9.1 / A	0.004	25
		Westbound*	8.4 / A	0.01	25	9.2 / A	0.01	25
		Northbound	12.5 / B	0.03	25	16.5 / C	0.03	25
		Southbound	12.9 / B	0.11	25	14.4 / B	0.08	25
15	US 30 and N 1000 E	Eastbound*	8.8 / A	0.01	25	9.3 / A	0.03	25
		Westbound*	8.9 / A	0.01	25	8.8 / A	0.06	25
		Northbound	13.2 / B	0.13	25	19.1 / C	0.23	25
		Southbound	14.5 / B	0.12	25	23.9 / C	0.32	50

Table 39 – Stop-Controlled Intersections Design (2045) Year Analysis, Continued

Stop-Controlled Intersections Existing			Design (2045) AM Peak			Design (2045) PM Peak		
ID	Intersection	Approach	Delay (s/veh) / LOS	V/C	95th %tile Queues (feet)	Delay (s/veh) / LOS	V/C	95th %tile Queues (feet)
19S	US 30 WB & Michigan Rd	Westbound	11.8 / B	0.089	25	13.1 / B	0.098	25
		Southbound	8.4 / A	0.016	25	8.8 / A	0.015	25
19N	US 30 EB & Michigan Rd	Westbound	11.4 / B	0.062	25	13.8 / B	0.106	25
		Southbound	8.9 / A	0.028	25	9 / A	0.032	25
20	US 30 and Plymouth	Northbound	10.1 / B	0.05	25	11.6 / B	0.09	25
		Southbound	10.6 / B	0.03	25	12.3 / B	0.08	25
23	US 30 and Fir Rd	Eastbound*	8.2 / A	0.00	25	8.7 / A	0.01	25
		Westbound*	8.3/A	0.00	25	8.9 / A	0.001	25
		Northbound	14.3 / B	0.05	25	15.7 / C	0.03	25
		Southbound	13.4 / B	0.05	25	16.3 / C	0.13	25
25	US 31 and W 9a Rd	Eastbound	10.7 / B	0.12	25	13.3 / B	0.19	25
		Westbound	10.7 / B	0.01	25	11.5 / B	0.02	25
		Northbound*	10.7 / B	0.18	25	13.3 / B	0.13	25
26	US 31 and Michigan Rd	Eastbound	12.1 / B	0.19	25	15.2 / C	0.27	50
		Northbound*	9.9 / A	0.17	25	11.2 / B	0.22	25
27	US 31 and 13th Rd	Eastbound	25.5 / D	0.15	25	32.2 / D	0.06	25
		Westbound	14.8 / B	0.3	50	14.1 / B	0.22	25
		Northbound*	9 / A	0.01	25	13.4 / B	0.003	25
		Southbound*	9.9 / A	0.12	25	11.1 / B	0.16	25
28	US 31 and SR 10	Eastbound	25.9 / D	0.25	25	35.5 / E	0.37	50
		Westbound	25.7 / D	0.56	100	31.8 / D	0.56	100
		Northbound*	8.8 / A	0.01	25	9.5 / A	0.02	25
		Southbound*	9.4 / A	0.10	25	10.1 / B	0.10	25

**Free-Flow (Non-Stop Controlled) Approach*

7. TRANSPORTATION PROJECTS WITHIN STUDY LIMITS

The projects shown in **Table 40** through **Table 42** are currently planned projects based on review of INDOT's STIP or the local agency's TIP. These projects were cross-referenced with INDOT's LaPorte District planned projects and only confirmed projects that are moving forward are included in this list.

Table 40 – List of Potential Projects - MACOG

Project	SFY CN	Source	Agency	Des. No. / Contract No.
US 30 - SR 17 to SR 19 – HMA PM	SFY 2022	2022-2026 TIP	INDOT	1701528 R-42236
US 31 at SR 10 New Interchange. US 31 - SR 110 to SR 10 Access Control, US 31 at SR 110 New Interchange. US 31 at CR 700 N New Bridge Construction	SFY 2028	2022-2026 TIP	INDOT	1802052 2200482 2200483 2200484 T-41777
SR 10 – SR 117 to US 31 HMA PM	SFY 2024	2022-2026 TIP	INDOT	2000611 R-43043
US 30 4.74 mi to 9.5 mi E. of US 35 HMA Overlay Minor Structural	SFY 2026	2022-2026 TIP	INDOT	2100225 R-43901
US 421 over CF&E RR - 0.37 mi S. of US 30 Bridge Deck Overlay	SFY 2022	2022-2026 STIP	INDOT	1901468 42508
US 30 EB/WB over Western Ave – Thin Deck Overlay	SFY 2024	2022-2026 STIP	INDOT	2100696/2100697 43900

Table 41 – List of Potential Projects - NIRPC

Project	SFY CN	Source	Agency	Des. No. /Contract No.
US 30 Bridge Replacement over Crooked Creek 3.52 mi E of SR 49 (CIP Box Culvert)	SFY 2023	2022-2026 TIP	INDOT	1703005 B-41438
US 30 at UNT to Blad Ditch Small Structure & Drain Construction	SFY 2027		INDOT	2200508 R-42454
US 30 – US 421 to SR 38 HMA Minor Structural	SFY 2023	2022-2026 TIP	INDOT	1900057 R-42454
US 30 EB/WB over Baker Ditch – Bridge Thin Deck Overlay	SFY 2027		INDOT	2200948 2200949 R-445646

Table 42 – List of Potential Projects – Pipe Linings

Project	SFY CN	Source	Agency	Des. No. / Contract No.
US 30 0.47 mi E of SR 331 Small Structure Pipe Lining	SFY 2023	2022-2026 TIP	INDOT	1703019
US 30 under CR 12 B Road Small Structure Pipe Lining	SFY 2023	2022-2026 TIP	INDOT	1703022
US 30 2.87 mi E of SR 331 Small Structure Pipe Lining (East of US 30 West Study Limits)	SFY 2023	2022-2026 TIP	INDOT	1703028
US 30 4.07 mi E of SR 331 Small Structure Pipe Lining (East of US 30 West Study Limits)	SFY 2023	2022-2026 TIP	INDOT	1703029

- Bridge painting and Bridge Deck Overlay projects (FY 2022) are noted in the STIP document. These projects are assumed to be completed.

8. PUBLIC INVOLVEMENT SUMMARY

8.1. SUMMARY OF COMMENTS RECEIVED THROUGH DECEMBER 2022

A total of 431 comments were received during the formal comment period (August 2022 through December 2022). The event that garnered the most comments during this period was the PIM (Public Information Meeting) (288 comments received).

A thematic analysis approach was applied to discover patterns and common concerns across a wide-ranging set of comments and feedback. The analytical process was as follows:

1. Coding data - Every two or three lines of text within each comment was coded with handles that identified key words, concepts, images, and reflections. Codes, or topics, are clear and concise phrases that are easily definable and can be identified across all media used in the analysis. The codes became the foundation for the themes.

2. Theme identification – From the initial coding, patterns emerged that represented the collective concerns from all comments and developed into themes. Codes help define similar sentiments that are expressed differently across comments and grouping codes help define themes.

There were multiple ways to submit comments during the first formal public comment period, summarized in **Table 43**.

Table 43 – Public Comment Summary

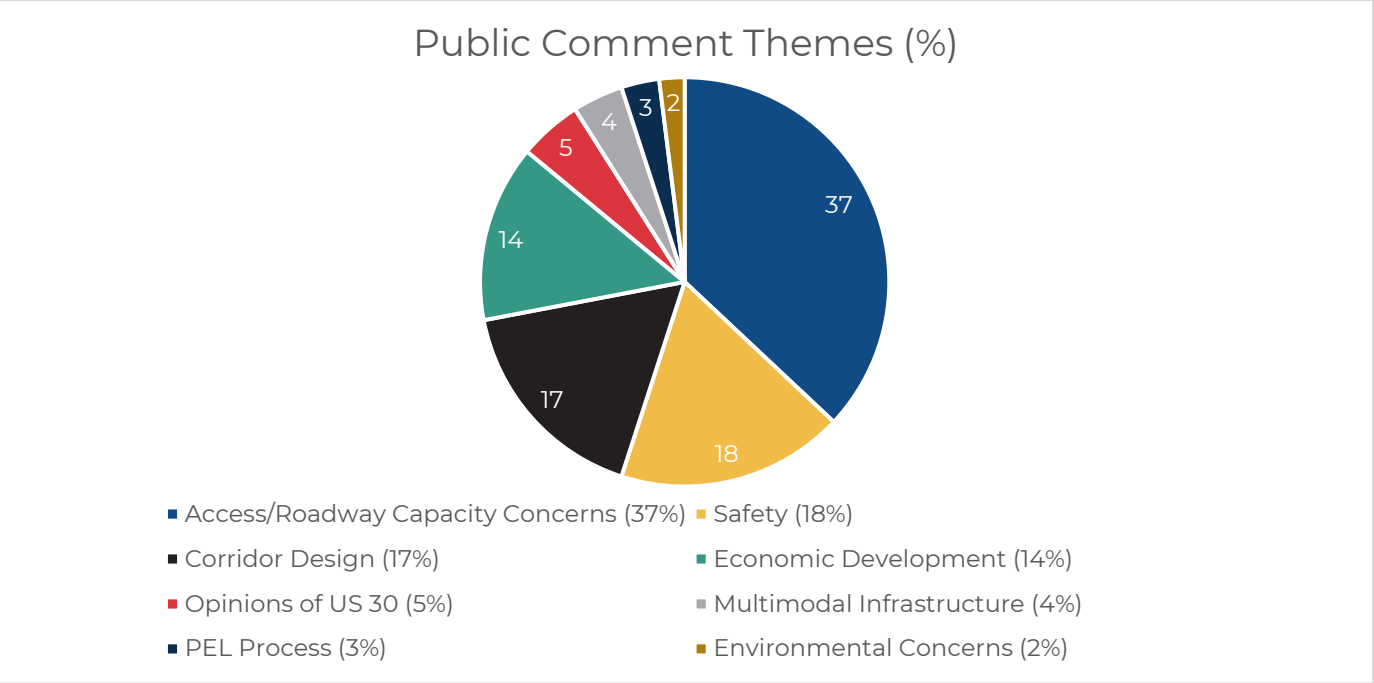
Delivery Method	Comment Category/Event	# Comments Received
Online	• Study Launch • Public Comment Period #1 • Virtual Public Information Meeting	135
Collected at Meeting*	• Office Hours #1 • Office Hours #2 • Public Information Meeting	294
E-Mail*	Public Comment Period #1	1
Phone**	Public Comment Period #1	1

**Includes completed comment forms and transcribed verbal discussions*
***Transcribed comment from phone conversation*

"Keep the Rural Character/Aesthetics of the Corridor" was mentioned the most by community members throughout the public comment period, **70** times!

The eight themes for comments or concerns received during the public comment period were:

Figure 10 – *Public Comment Theme Chart*



8.2. KEY MESSAGES

During the first phase of public involvement, concerns about access were the most common theme. Communities along US 30 West are concerned with how any changes to US 30 West will impacaccess for communities, businesses, people, and emergency personnel. Specific access points along the corridor were cited in the public meeting and online comments. Safety was often mentioned along with access concerns. The way the major access and safety themes were described are below:

- Access to private properties along US 30 and US 31
- Access for emergency personnel
- How the agricultural industry will be able to access US 30
- Concern with towns being cut off from US 30, notably Hamlet
- Safety concerns at intersections and crossings along US 30
- Safety concerns at the intersection of US 31 and SR 110
- Safety concerns at and near the US 30 and US 31 interchange

8.3. TALLY OF ALL COMMENT TOPICS

All comments and feedback were compiled and the thematic analysis was conducted. The infographics below depict what emerged during the analysis. The first infographic is a Count of Comment Topics (or codes), which is the number of times that specific topic was mentioned across all comments, and the themes that emerged from the analysis. The second infographic is the mapped locations of issues along the corridor identified by the public.

Figure 11-1 – *Public Comment infographic*

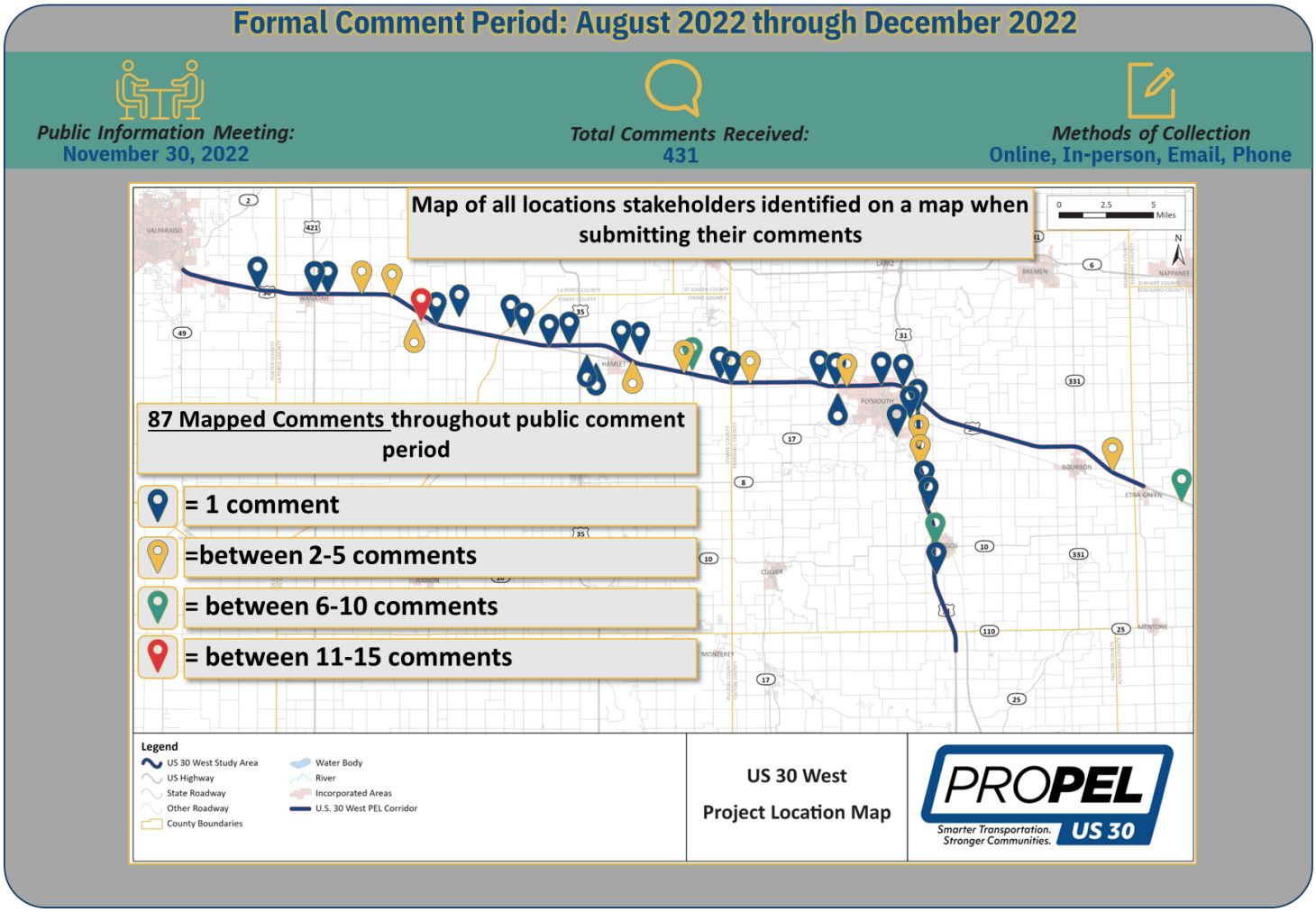
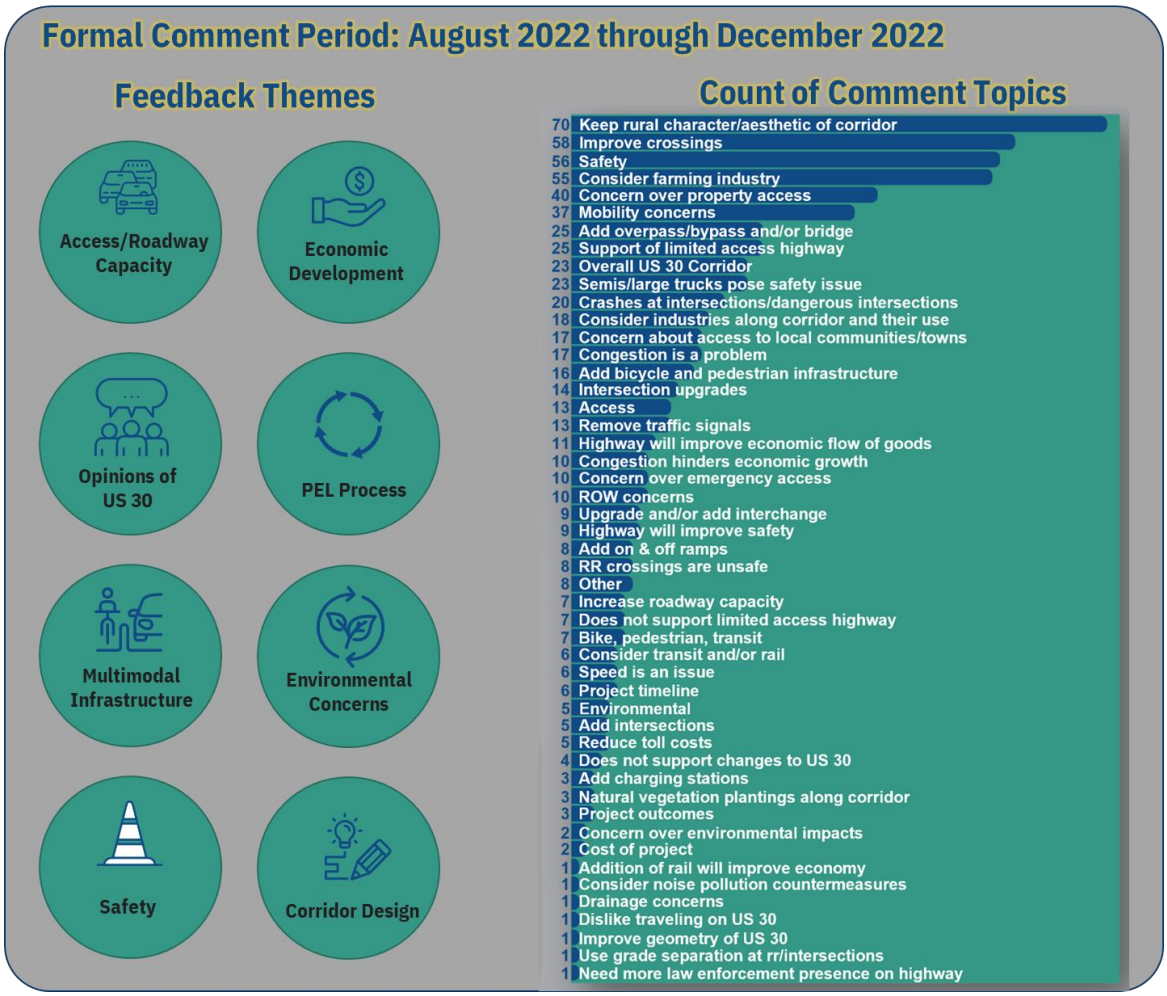
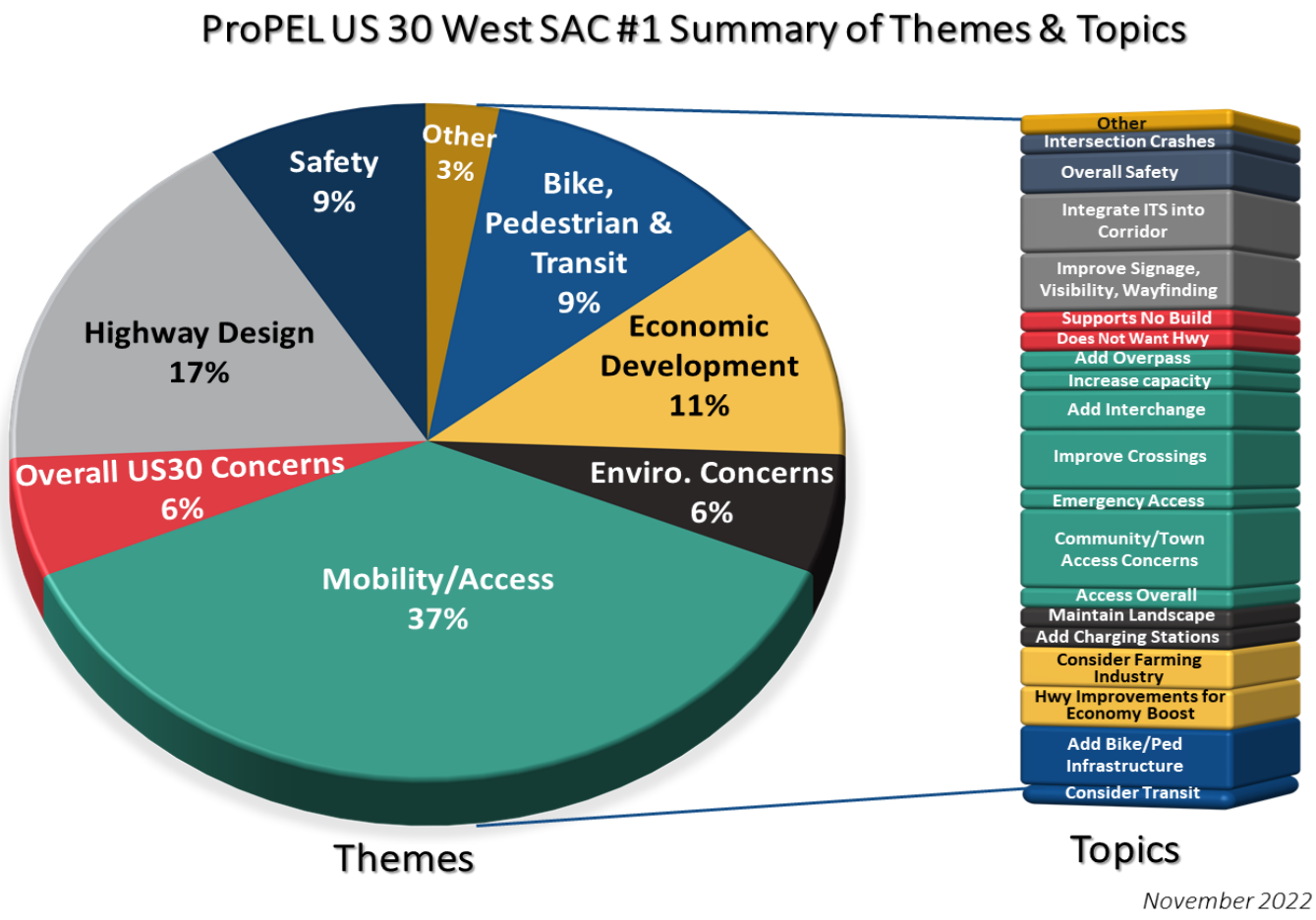


Figure 12-2 – *Public Comment infographic*



The first round of SAC (Stakeholder Advisory Committee) meetings was held on November 28 and November 29, 2022. The purpose of the SAC is to have a group of people that represent different stakeholder groups within the study area advise the project team. Their comments were analyzed separately because their feedback was based on the needs of the groups they represent and the SAC meeting was not open to the public. The following chart summarizes the major themes discussed by SAC members at both meetings and a breakdown of their concerns by theme. Comments received by the SAC members fell into eight themes depicted by the pie chart. The stacked bar adjacent to the pie chart is a breakdown of the most common topics discussed; the larger the stack, the more times that topic was discussed in the meetings. The colors of the stacked bar chart correspond with the theme colors depicted in the pie chart.

Figure 13 – *SAC#1 Summary of Themes and Topics*



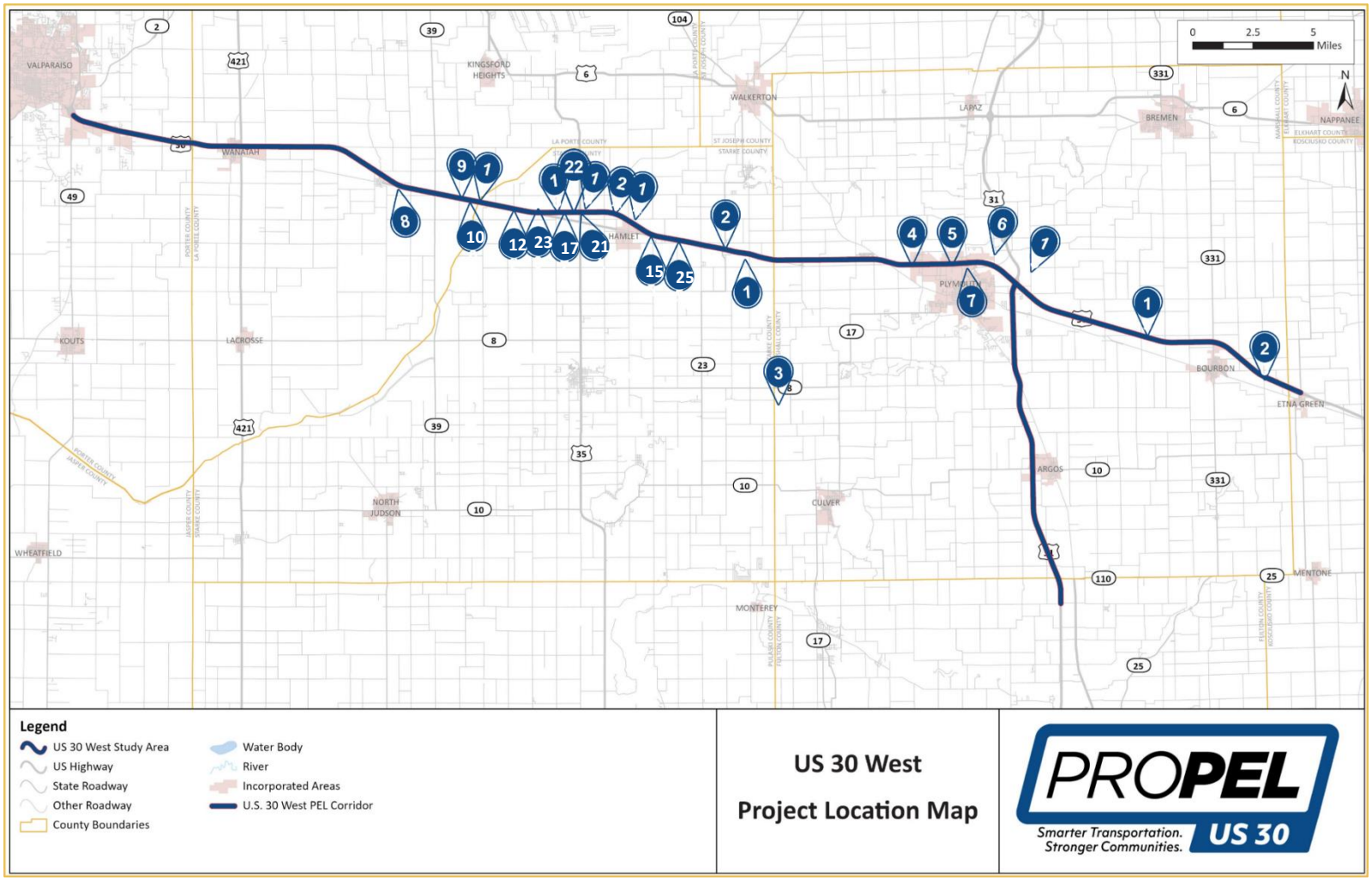
8.4. PUBLIC INFORMATION MEETING (PIM) CORRIDOR ISSUE IDENTIFICATION

At the first PIM, attendees could visit a variety of designated stations throughout the Oregon-Davis High School cafeteria. Each station focused on a specific theme with maps and display boards that prompted attendees to engage with study team members, write ideas on sticky notes, and/or vote on pre-written ideas with sticker dots.

Each dot that was used to indicate support for an idea and each sticky note that was placed on a board or map were individually counted toward the total number of PIM comments received and used in the overall thematic analysis. Many PIM attendees commented more than once on the boards that were offered throughout the stations.

The PIM included a corridor issue identification station, which had large maps of the US 30 West study area. Participants were given sticky notes and pens to make comments. The study team asked attendees to write down specific issues they have experienced on US 30 and US 31 and place them on the map in locations where they experienced the issue. The map below identifies the location of each comment received. The numbers on the map correspond with the numbered comments below the map.

Figure 14 – *Comment Location Map*



1. Overpass needed at 1100 E at US 30
2. Interchange needed at SR 23 and US 30
3. Need access for Ancilla College at Union Road
4. Interchange needed at Pioneer Dr. and US 30
5. Interchange needed at Oak Rd and US 30
6. Plymouth Goshen Trail at US 30 is a safety concern
7. Right-angle crashes and crossing fatalities have occurred here
8. Several issues noted at this location by campground owner at this location:
    - US 30 and Thompson Road intersection in Hanna has no 'left turn only' lane heading east bound that has resulted in many accidents. (Our customers turn here, and we get safety complaints).
    - There is no safe pedestrian crossing from north to south side of town in Hanna. Many students and teens cross the highway by foot and bike.
    - Increased noise on highway could affect business.
9. At grade rail crossing at this location is dangerous
10. Tanker trucks and school buses must make a complete stop in Hanna at US 30 and railroad tracks, while other traffic proceeds at 60 miles per hour.
11. Need for emergency access (fire, ambulance) and farm access on both sides of the highway
12. Poor line of sight
13. Improve a north/south roadway east of US 31, so people east of US 31 will have a more direct access.
14. Need an overpass at CR 50 E and US 30
15. Don't take my house! Turning lanes are needed. I fear being rear ended turning off highway.
16. Exit lane needed at Frontage Road and US 30
17. Would like to keep CR 300 E open
18. Steep ramp for trucks
19. Need an overpass for Fir Road and US 30 in Bourbon Township.
20. A truck stop is going in at this intersection, which has had several fatal accidents in the past due to gentle curve at the intersection (Beech Road and US 30)
21. Dangerous intersection between semis and school buses
22. Bucket factory (Norton Packaging) gets a lot of traffic regularly. Other option for them is to come in from E 500 North, but E 500 North would need a lot of work to make that feasible.
23. Co-op and businesses at this location need semi access
24. Old US 30 to merge to US 30 toward Plymouth
25. Semis cannot make the turn from US 30 to SR 23 and then directly onto E 500 North if going into Hamlet.

A few sticky note comments were placed on the maps that referenced the corridor in general:

- Add community ponds, parks, and wildlife areas on US 30 easements
- Put access roads along highway to allow crossing of country roads
- Get local impact
- Good access to Hanna

In addition to the above comments, a group representing Starke County Commissioners and businessessuggested improving intersections by adding acceleration/decelerations/turning lanes and adding lighting rather than converting US 30 to freeway conditions. This group also submitted a map illustrating recommended access improvements along US 30. The recommended improvements are intended to protect and maintain local access for businesses and emergency access in the event that US 30 would be converted to freeway conditions. These included new interchanges, overpasses, and frontage roads. The recommendations are summarized on the map below.

Figure 15 – *Starke County Comments*

8.5. FUTURE VISION OF THE CORRIDOR

In addition to providing location-specific feedback, PIM attendees were asked to envision the future of US 30 West and how they would like to see the corridor function and fit into their communities. Visitors to this station viewed five large poster boards that had pre-written prompts asking people's opinions related to the transportation function, aesthetic/community character, economic development, how they use the corridor, and what they want US 30 West to be like in 2035. Participants used sticky notes for written responses and sticker dots to select from a list of options provided on each board. The boards are described below with the comments received for each board. The graphs represent the tally of sticky dots placed next to the phrases.

8.6. BOARD 1: VISION FOR THE FUTURE – IMAGINE IT IS THE YEAR 2035

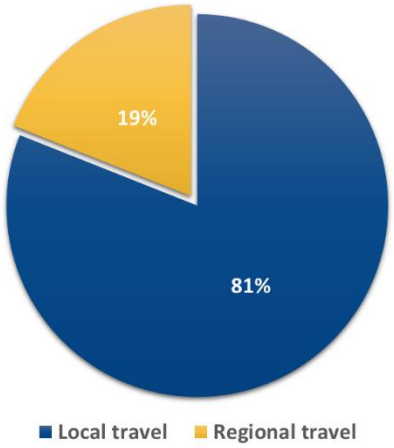
"What do you want US 30 West to look like in 2035?"

- Safe, well maintained, and no tolls
- Safer highway
- Limited access highway with fewer stoplights
- Quit putting band aids on the roads, use money for what we have
- A purpose and need statement that protects existing businesses and residents from any disruptions, and a design that provides opportunities and mobility along corridor
- Eliminate all stop lights
- Interchanges at east side of Plymouth

8.7. BOARD 2: VISION FOR THE FUTURE – HOW DO YOU USE THE CORRIDOR?

Q1: Where do you go? (59 responses to this question)

Figure 16 – *Board 2 Responses*



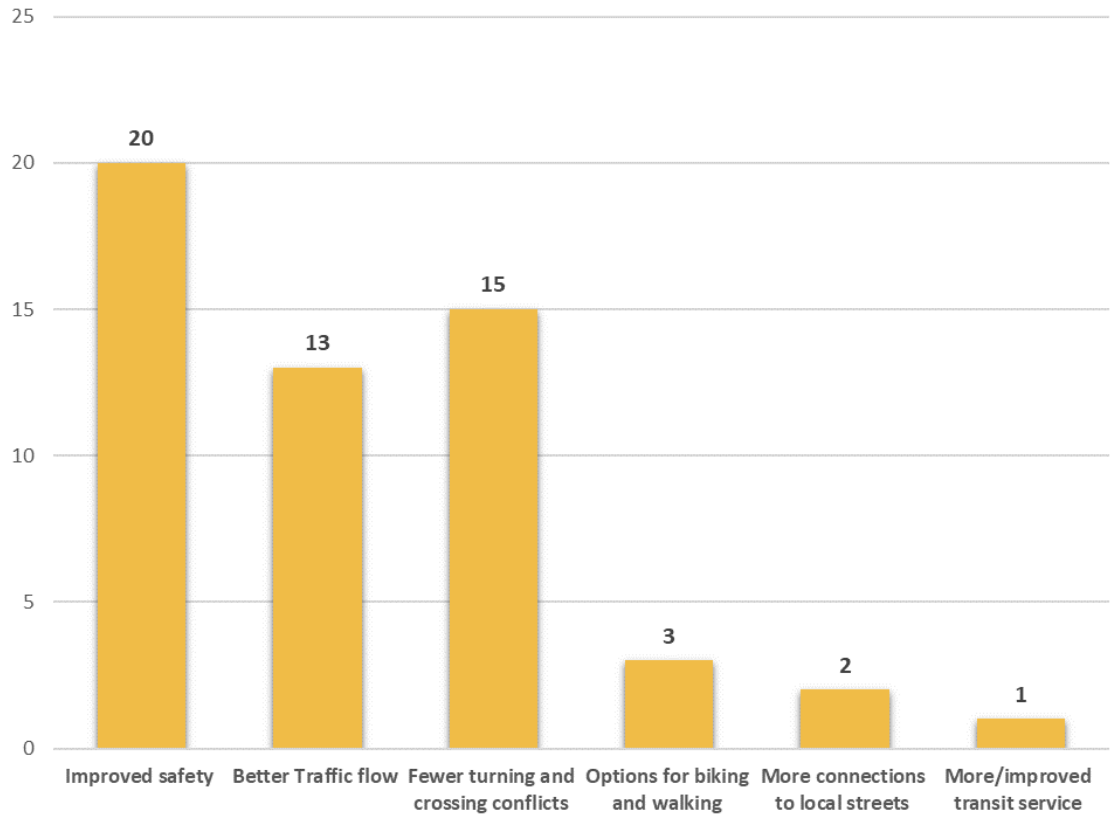
Q2: What is your favorite thing or biggest concern about driving on US 30 and US 31?

- Safety concerns at intersections
- The number of semi-trucks already on Highway 30 and school bus safety
- Crossing 30 with agricultural equipment, which requires all east/west traffic to be clear – hard to find anymore
- Stay to old road and rail areas so don't have to split up land and take land to new road, be concerned about agricultural travel and what roads need to be open
- I like being able to drive straight from anywhere north of US 30 to south of US 30 in a straight shot

8.8. BOARD 3: VISION FOR THE FUTURE – TRANSPORTATION FUNCTION

Q1: What would improve travel along US 30 West?

Figure 17 – *Board 3 Responses*



8.9. BOARD 4: VISION FOR THE FUTURE – ECONOMIC DEVELOPMENT

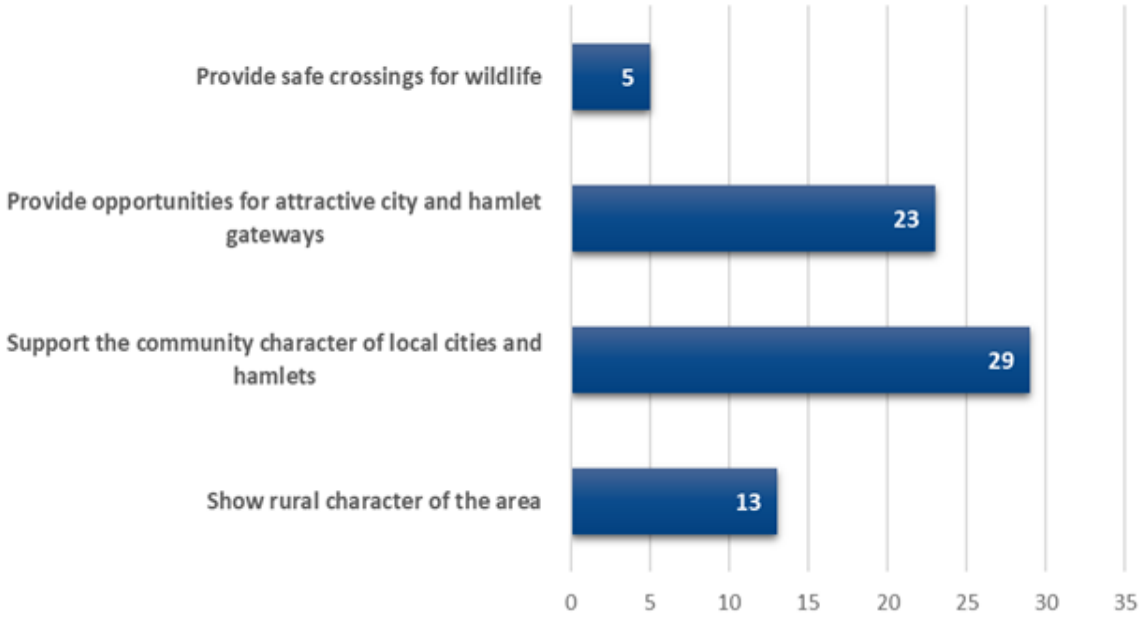
Q1: How should US 30 and US 31 support the local economy?

Figure 18 – *Board 4 Responses*

8.10. BOARD 5: VISION FOR THE FUTURE – AESTHETICS/COMMUNITY CHARACTER

Q1: How could US 30 and US 31 reflect the local area?

Figure 19 – *Board 5 Responses*



8.11. LOCATION-BASED COMMENTS RECEIVED VIA PIMA

The list below highlights location-based comments received through PIMA and at office hours. The list does not include concerns listed about individual residential properties.

- CR 600 West at US 30 is a school crossing and the entrance to Hanna In. 46340. What are the proposed crossing solutions for these roads to have exits and entrances from US 30?
- It is VERY hard to cross US 30 now if you wish to go to Hamlet, Indiana, since semis are allowed to use this road instead of paying the tolls to use the TOLL ROAD. We are a farming community so it you close our roads to cross for the farmers to go to the elevator to take their products it is going to be farther for the farmers to go to get to Hamlet, Indiana. Also, it would be detrimental for our FIRE DEPARTMENT if they have a FIRE CALL north of US 30. This could mean loss of life if they must take an alternate route to get to a fire. It seems like always; you worry more about the $$$ you would receive than the lives of the RURAL PEOPLE who live in the affected areas!!!!
- An overpass needs installed at the Plymouth-Laporte/ US 30 crossing in Marshall County. That light turns red every 15 minutes due to the high volume of traffic crossing US 30, causing many accidents.
- Interchanges at CR 600, US 35 and SR 23 in Starke County. CR 600 is a must for town of Hamlet and Oregon-Davis schools!

- Most significant concern is maintaining access from the north side of US 30 to the south side of US 30. We would like to see at least five access points north-south, at the following places: SR 23, CR 1100 E, CR 750 E, CR 600 E, and US 35.
- I'm concerned about access points on the corridor. Marian University at Ancilla will need access near Donaldson.
- I am concerned about the US 30/King Rd interchange in Marshall County. Since all traffic is funneled onto that intersection from 9th Road and King Road north of US 30 as well as traffic from the Pilot Truck Stop, 9th Road and King Road south of US 30, it is a heavily traveled intersection. We have many bicyclists (not just Amish) and horse/buggy travelers at that interchange as well. It is also a regular occurrence to see semi-trucks ignore the stoplight on US 30 and blow through the intersection. I would like to see an overpass or underpass so travelers can safely cross US 30 as well as on-and-off ramps so King Road traffic can access US 30 as the heavy volume of traffic is accustomed to do there. If this can't be accomplished, a bike/buggy bridge over or under US 30 would be nice. A "J turn" at that intersection will not help those of us on bicycles (I'm not Amish, I simply like to ride my bike for transportation) to cross US 30 safely.
- Access to US 31 needs to be a priority for the south side of US 30. I live just off 11th Road in Marshall County. 11th Road is the primary connector for the south side of Plymouth. There are many housing subdivisions that use 11th Road. If the road is closed, you need to drive through Plymouth to gain access. As we look farther south, an overpass needs to be installed at SR 10. That is a very dangerous intersection that needs attention very soon.
- We need an intersection at Old 30 for growth of Plymouth on the east side, 13th Road (for one of the largest dairies in the state), SR 10 and SR 110, and 11th Road. Also, an access road from 13th Road to the Old 31 intersection to Plymouth.
- From my subdivision at 11th and King Roads in Marshall County, we can access Plymouth town via Lincoln Highway or 11th Road. I am certain the 11th Road intersection with US 31 will be part of this plan. I do not care if it's a J-turn, an R-cut, a bridge, or a tunnel, just don't close this crossing down. Further, I can hear the highway from my house, about 0.7 miles away from US 31. It is certain to get louder once this highway is improved. I would request plantings, sound barriers, berms, and beautification to improve both the look of this residential and light industrial area and also to cut down on noise pollution from the highway.
- I was notified that discussions have begun regarding closing the US 31 crossing at 11th Road in Plymouth. I am the President of Kuert Concrete, Inc. that operates a ready-mix concrete facility off 11th Road bordering US 31. This crossing is essential for our operation, as our ready-mix trucks will primarily access US 31 to complete deliveries. In addition to our operation, we are also neighbors with Irving Materials, Inc. and Stockberger, who also rely heavily on the 11th Road crossing for heavy truck traffic into their sand and gravel operations off 11th Road. Diverting all this heavy truck traffic down King Road will not be favorable for the homeowners in the subdivision at the corner of King Road and 11th Road. Please notify me of any future public discussions regarding the closing of this intersection.