PROPEL US 31

Smarter Transportation. Stronger Communities.

US 31 SOUTH

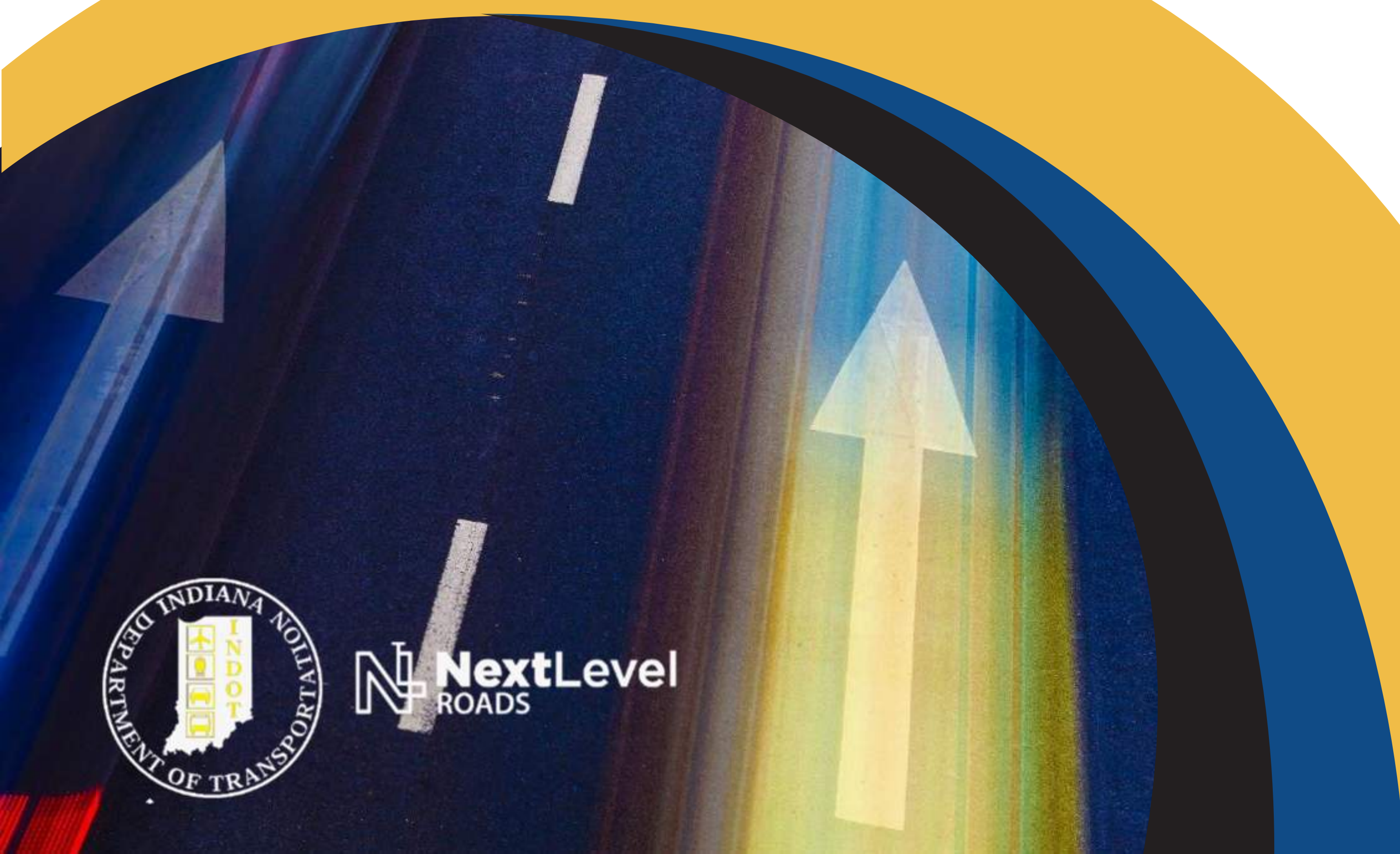
EXISTING TRANSPORTATION CONDITIONS

BETWEEN 276TH STREET (HAMILTON COUNTY) AND CR W 300 N (MIAMI COUNTY)

April 11, 2023

Prepared By

HNTB



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1. INTRODUCTION

1.1. PURPOSE OF THIS REPORT

The Indiana Department of Transportation (INDOT) is conducting Planning and Environment Linkage (PEL) studies of US 31 from 276th Street in Hamilton County to CR 700 N in Fulton County. These studies are commonly referred to as ProPEL US 31. INDOT is also conducting PEL studies along the US 30 corridor. These studies include the portion of US 31 from CR 700 in Fulton County to US 30 in Marshall County.

ProPEL US 31 is an INDOT initiative for transportation planning using collaborative PEL studies to consider environmental, community, and economic goals early in the planning process. These PEL studies will assess innovative ways to renovate the US 31 corridor, while prioritizing community needs and equitable infrastructure. The information, analysis, and decisions made during the PEL process can be leveraged in later phases of project development.

As part of the data-gathering phase of these studies, the purpose of this report is to document existing transportation conditions in the corridor.

1.1.1. PROPEL US 31 STUDY LIMITS

The ProPEL US 31 study is being conducted as two separate PEL studies. The northern study spans from south of the Eel River in Miami County to south of the Fulton/Marshall County Line. The southern study spans two non-adjacent portions of US 31:

1.) From SR 931 in Howard County to CR W 300 N in Miami County and

2.) From 276th Street in Hamilton County to SR 931 in Tipton County.

These limits are depicted in **Figure 1-1**.

Figure 1-1: ProPEL US 31 North and South Study Limits

1.1.2. PROPEL US 31 SOUTH STUDY LIMITS

This existing transportation conditions report focuses on the southern US 31 PEL study in Hamilton, Tipton, Howard and Miami counties. The portion of US 31 through Kokomo (the Kokomo Bypass) is configured as a limited access freeway with grade separated interchanges at all accessible crossroads and is therefore excluded from this study. The study location and limits are shown in **Figures 1-2** and **1-3**.

The following information is reported in this study: study methodology, infrastructure, corridor access, safety analysis, traffic operations, study area transportation projects, and a summary of public comments received to date.

Figure 1-2: Study Location and Limits (1 of 2)

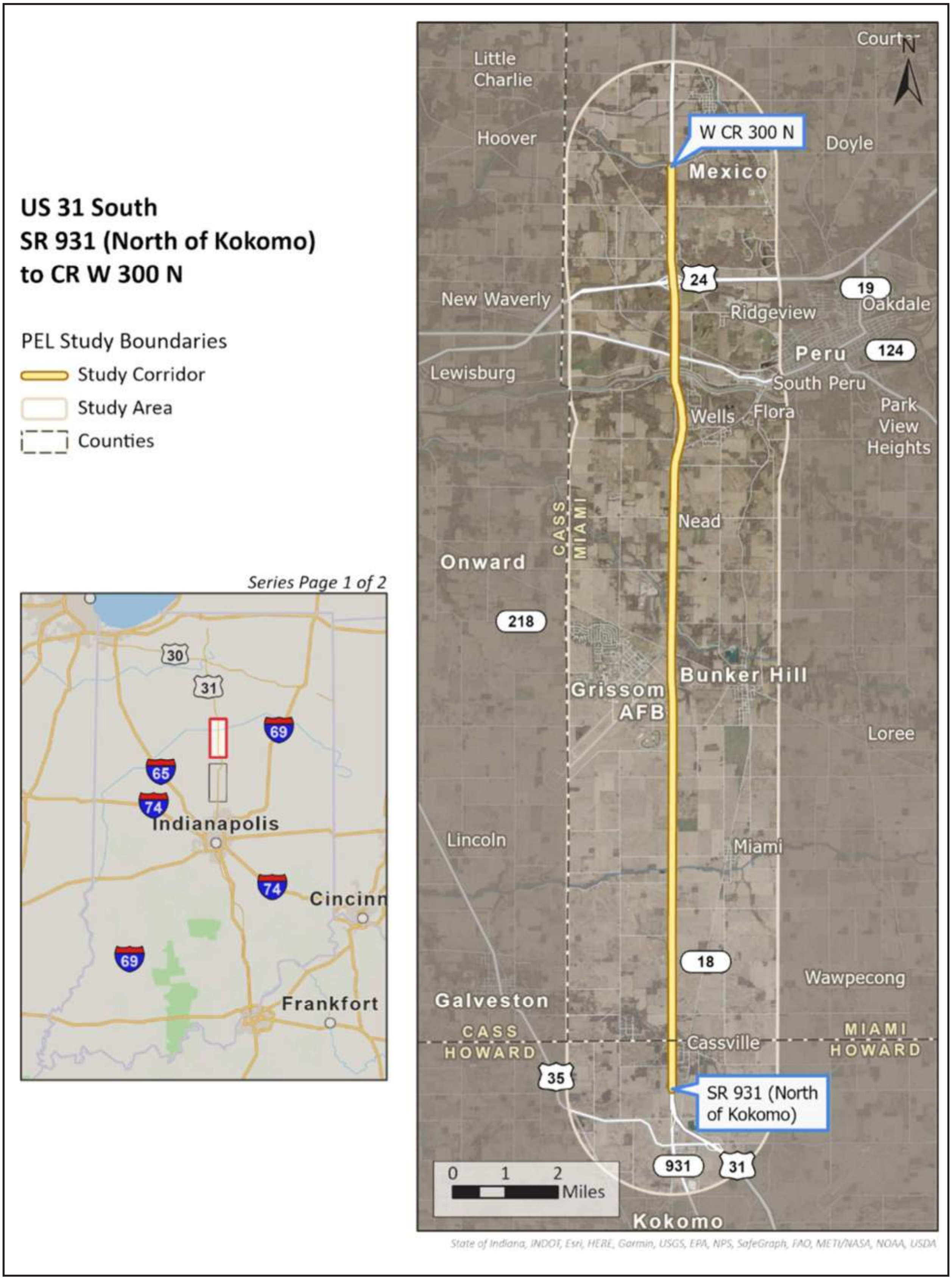
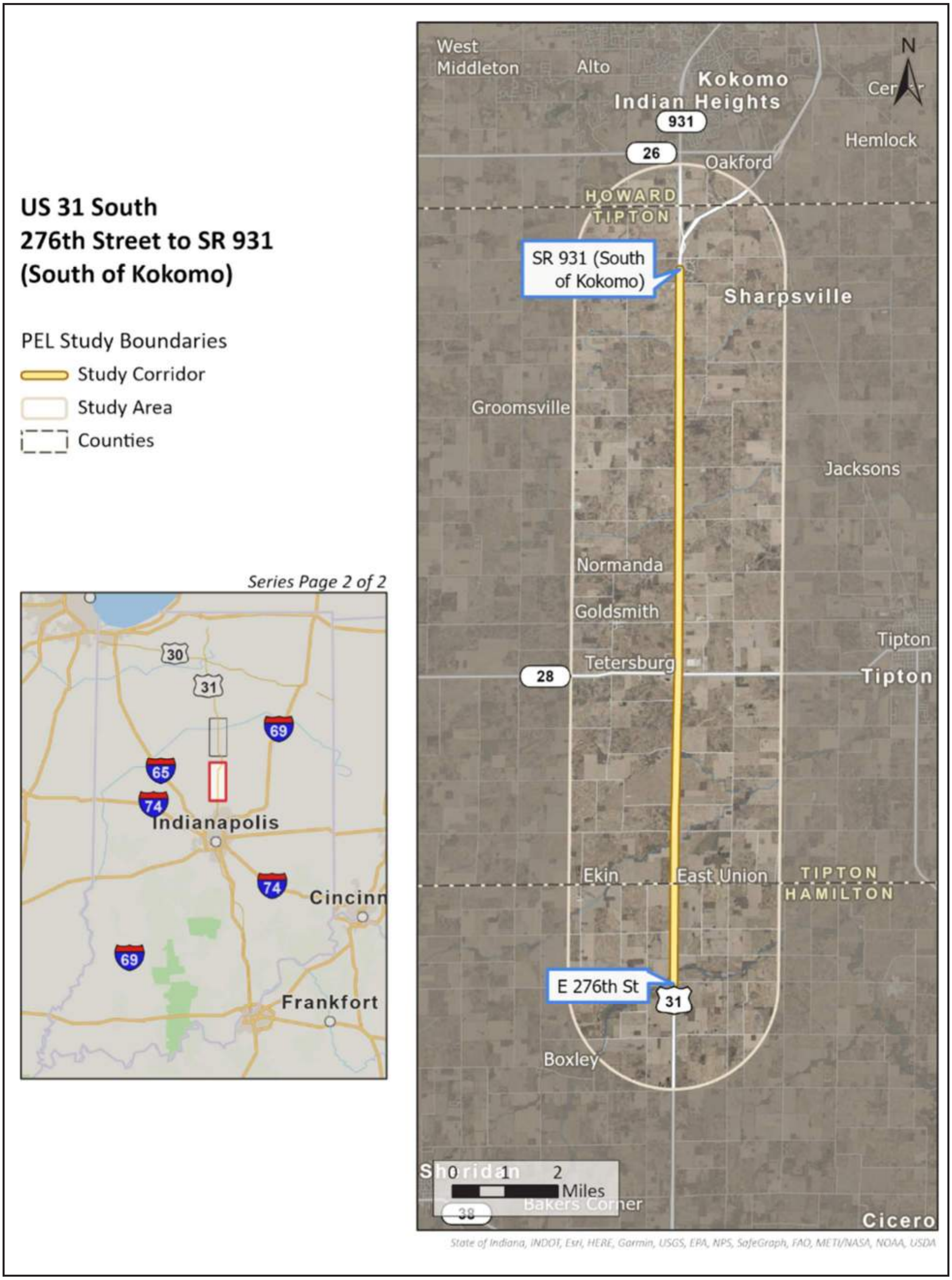


Figure 1-3: Study Location and Limits (2 of 2)



2. METHODOLOGY

2.1. STUDY AREA AND SCOPE

The US 31 South study area extends in a radius of approximately two miles from the study corridor identified in **Section 1**. The existing transportation conditions analysis documented in this report focuses primarily on intersections and segments on US 31 in the US 31 South study area.

The existing transportation conditions summarized in this report included the following:

- Review of existing geometric conditions and access controls on US 31 using the following data sources:
  - Geographic information system (GIS) data
  - Aerial imagery
  - Field observations (notes, photos, and videos)
  - Online websites and data sources
  - Information obtained from State, regional, and/or local representatives
- Safety analysis for a 5-year period using crash data from January 1, 2017 to December 31, 2021.
  - Statistical analysis of the crash data used RoadHAT crash analysis software
- Traffic data collection using:
  - INDOT Traffic Count Database System (TCDS)
  - Turning movement counts collected between 2019 and 2022 (provided by INDOT) with 2020 and 2021 traffic counts reviewed to ensure they were not influenced by COVID-19.
  - Growth rate estimated using the Indiana Statewide Traffic Model (updated for the US 30/US 31 PEL Studies)
- Operational analysis of existing (2022) and future (2045) no-build traffic conditions using:
  - Synchro 11 for signalized and two-way stop-control (TWSC) intersections
  - Sidra 9 for roundabout intersections
  - HCS7 for interchanges
- Review of public feedback and comments received as of January 2023

2.2. STUDY LOCATIONS

Based on the INDOT roadway functional classification, shown in **Figures 2-1** and **2-2**, intersection and interchange study locations were selected on US 31 for cross streets with a classification of major collector, minor arterial, principal arterial, or interstate. This study examines all intersections with crossroads classified as a major collector or higher as these roadways are present within the INDOT Statewide Travel Demand Model (ISTDM). Intersections with crossroads of a lower functional classification are not expected to influence the outcome of this PEL study and/or may be examined as part of subsequent NEPA studies that follow this PEL study. Using this criterion, the 17 locations within the study area are listed below and shown in **Figures 2-3** and **2-4**.

These study locations include five signalized intersections and two interchanges.

- US 31 at W CR 200 N
- US 31 at W CR 100 N (signalized)
- US 31 at US 24 (cloverleaf interchange)
- US 31 at W Blair Pike Road / W Division Road
- US 31 at W Logansport Road
- US 31 at W Airport Road
- US 31 at Business US 31 (signalized)
- US 31 at W CR 500 S
- US 31 at SR 218 N (signalized)
- US 31 at SR 218 S / W Broadway Street
- US 31 at W CR 800 S
- US 31 at SR 18 (signalized)
- US 31 at W CR 550 N
- US 31 at Division Road (signalized)
- US 31 at SR 28 / W 200 S (interchange with ramp terminal roundabouts)
- US 31 at 296th Street
- US 31 at 276th Street

Figure 2-1: INDOT Roadway Functional Classifications (1 of 2)

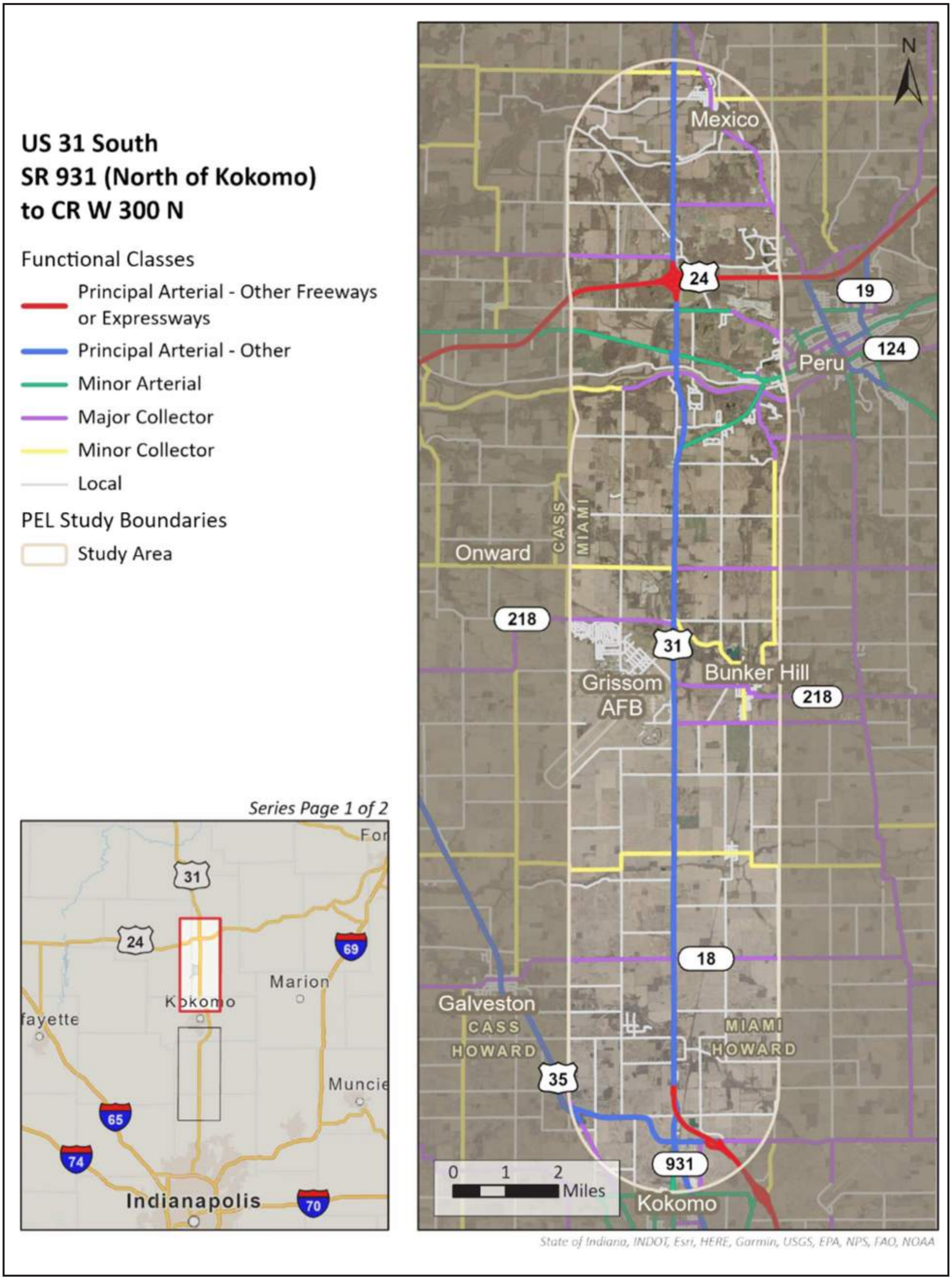


Figure 2-2: INDOT Roadway Functional Classifications (2 of 2)

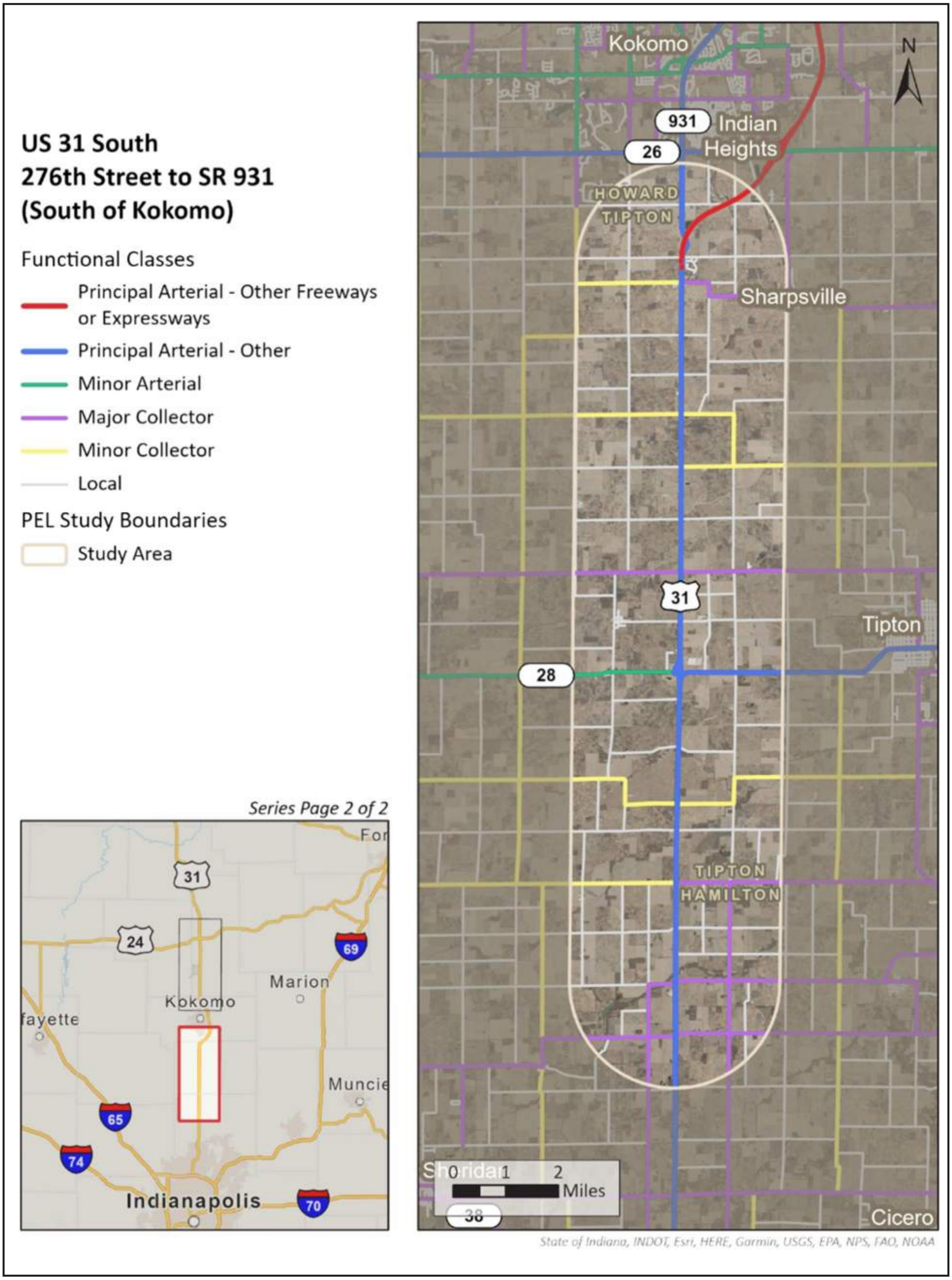


Figure 2-3: Study Locations (1 of 2)

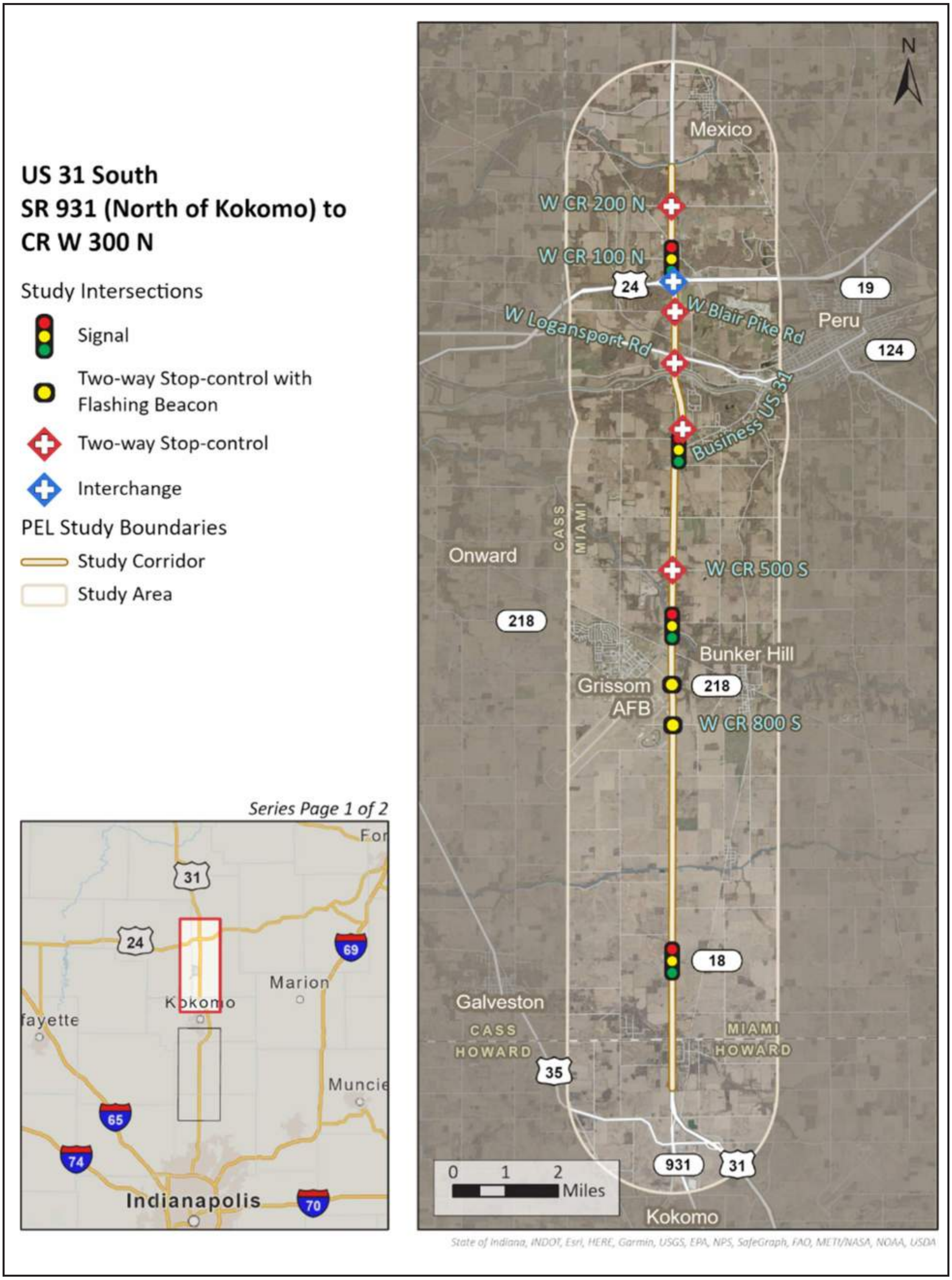
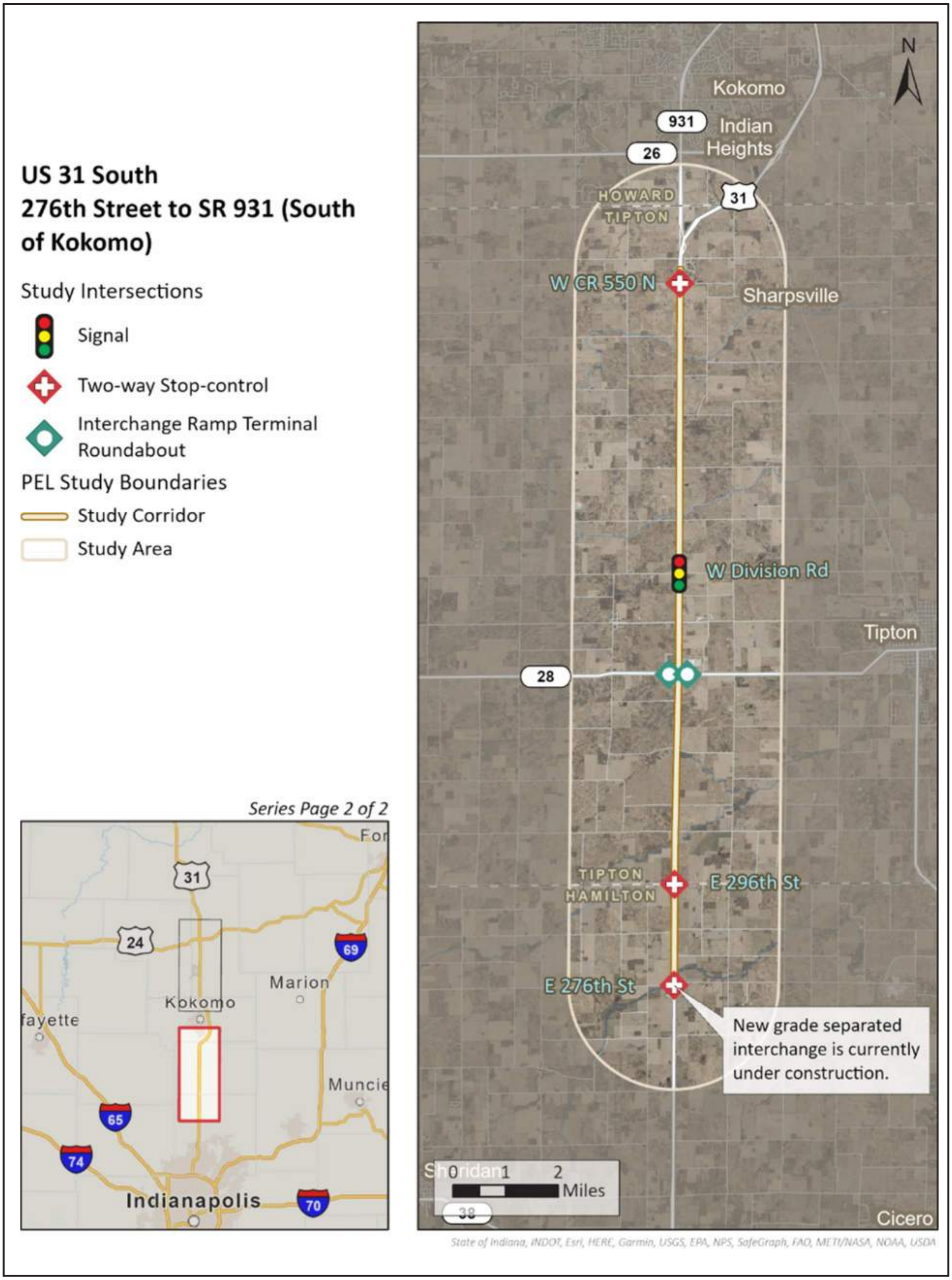


Figure 2-4: Study Locations (2 of 2)



3. INFRASTRUCTURE

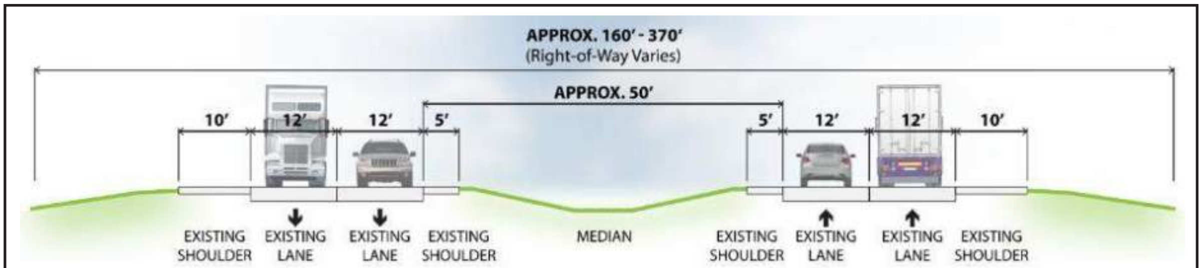
3.1. ROADWAY CLASSIFICATION

Within the study area, US 31 is classified as a 'principal arterial – other' roadway and is in mostly rural portions of northern central Indiana. The posted speed limit on US 31 is 60 mph throughout the study area. US 31 is part of the National Highway System (NHS) and the National Truck Network and therefore has a national significance. US 31 is designated as a Statewide Mobility Corridor and, as such, is intended to provide safe, high-speed connections for long-distance trips between the metropolitan areas of Indiana, and those of the surrounding states.

3.2. TYPICAL SECTION

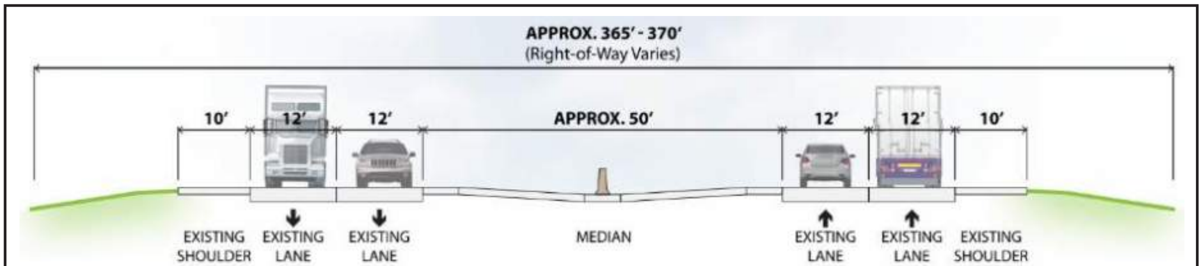
Throughout the study corridor, US 31 is a 4-lane divided roadway with paved inside and outside shoulders, and open drainage. The median is approximately 50' in width with grass medians along most of US 31, except for the US 31 at US 24 interchange, which has a paved median with barrier wall. The approximate typical sections are shown in **Figures 3-1** and **3-2**.

Figure 3-1: US 31 Typical Section Along Majority of Study Corridor



Note: All measurements are approximate and based on aerial photography and apparent ROW.

Figure 3-2: US 31 Typical Section at US 24 Interchange



Note: All measurements are approximate and based on aerial photography and apparent ROW.

3.3. GEOMETRIC DEFICIENCIES

The existing geometry of the US 31 South study corridor was analyzed to determine where features of the roadway do not adhere to FHWA Level One criteria. The US 31 roadway characteristics were developed from the original construction plans and subsequent maintenance and reconstruction plans. A 70 miles per hour (mph) design speed was obtained from the record drawings and adheres to the required design speed for a reconstructed rural freeway per Indiana Design Manual Figure 53-1. The following geometric conditions were identified as items where the existing geometry is expected to be substandard to current Level One requirements.

- The vertical clearance between US 31 and the abandoned railroad bridge near Grissom Air Force Base is substandard at 14’-3”. The required vertical clearance for an existing overpassing bridge is 16’.
- The US 31 South study corridor has a maximum grade of 4.18% for approximately 500’ near the US 24 over US 31 structures. The maximum allowable grade for a rural freeway is 4%.
- The horizontal stopping sight distance line extends past the shoulder for the northbound US 31 curve prior to the Wabash River. Guardrail and a bridge parapet are present and could block the required sight line for a 70 mph design speed. Further analysis and topographic survey data will be required to determine if the sight line would clear these obstructions.
- The superelevation rates were difficult to obtain for all of the curves in the corridor due to a lack of information in the existing plans. The information available indicates a substandard superelevation rate of 4.2% for the horizontal curve south of the Wabash River structures. The required superelevation rate is 5.6%. Since the horizontal curves from Maugans Road to the Wabash River structure were originally constructed in the same contract, its likely these curves will also require a superelevation correction to meet current Level One criteria.
- The travel lane cross slope for the existing roadway was difficult to obtain due to limited information from the existing plans. The original design contracts depict a reinforced concrete pavement with slopes that are below the required 2% minimum cross slope. From a visual inspection of the corridor, a majority of the roadway has a hot-mix asphalt surface. Construct plans for large portions of the corridor showing the HMA surface were not found. The plans that were obtained convey varying cross slope information. Topographic survey data is needed to determine the actual cross slope of the existing roadway.
- The right shoulder widths for the US 31 over Prairie Ditch structures are 8’-6”. The required shoulder width to meet current Level One standards is 10’. Substandard shoulders over bridge structures throughout the corridor are expected.

In addition to the Level One criteria discussed above, Level Two criteria found on INDOTs Level One checklist were also analyzed if existing information was available. The following geometric conditions were identified as items where the existing geometry is expected to be substandard compared to these Level Two requirements.

- The superelevation transition rates were difficult to obtain for all the curves in the corridor due to a lack of information in the existing plans. The information available for the horizontal curve near Maugans Road indicate a relative longitudinal slope of 1% which would be substandard to the required 0.5% maximum for high-speed facilities. Additional analysis from a topographic survey will need to be conducted later to determine the actual superelevation transition lengths of the existing roadway.
- The bridge clear roadway widths for the US 31 over Prairie Ditch structures are 37’-4”. The required bridge clear roadway width to meet current Level Two standards is 38’-8”. Substandard shoulders over bridge structures throughout the corridor are expected to cause bridge clear roadway width deficiencies.

3.4. RIGHT-OF-WAY

Existing right-of-way widths were estimated using parcel lines obtained from the property appraiser websites of the counties along the study corridor. These estimated right-of-way widths are shown in **Figures 3-3** and **3-4**.

Figure 3-3: Estimate of Existing Right-of-Way (1 of 2)

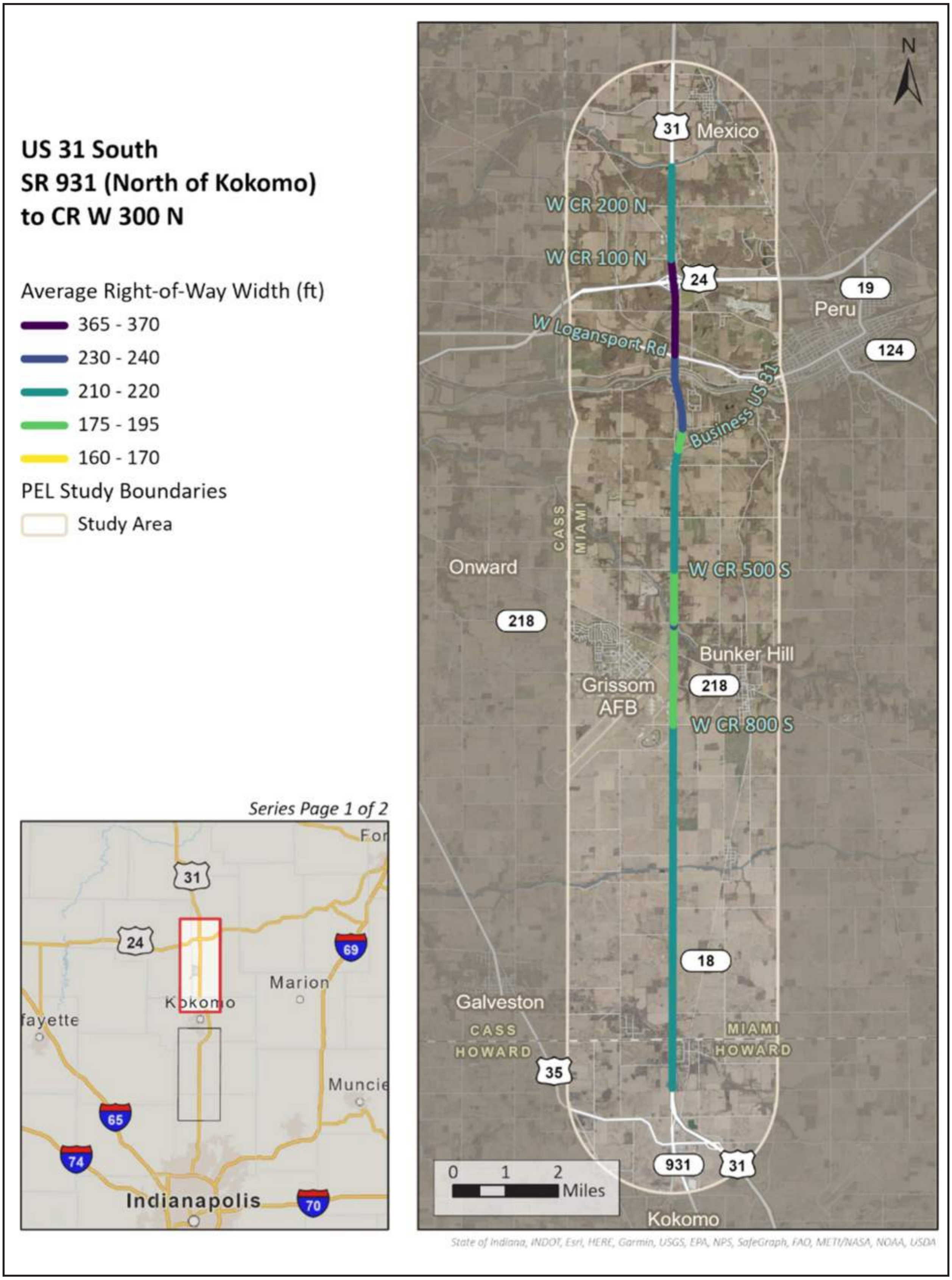
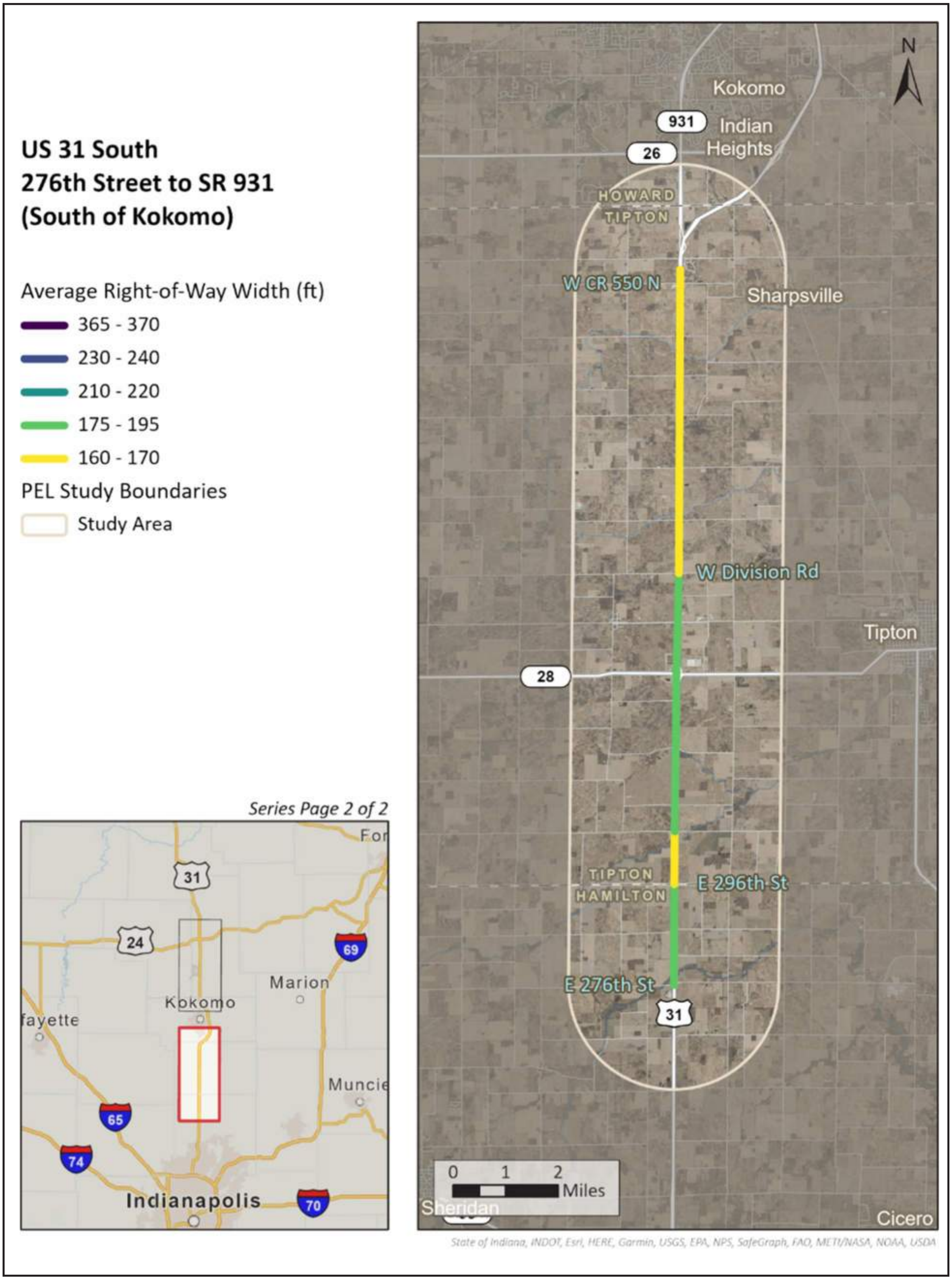


Figure 3-4: Estimate of Existing Right-of-Way (2 of 2)



3.5. RAIL LINE CROSSINGS

There are two rail lines within the US 31 South study corridor, and both are owned by Norfolk Southern. The rail line crossing at Logansport Road, shown in **Figure 3-5**, is grade separated with no interaction between US 31 traffic and rail traffic. The rail line crossing at W CR 100 S, shown in **Figure 3-6**, is approximately 1.0 mile north of SR 28 and crosses US 31 at-grade. Construction of a grade separated crossing at W CR 100 S (Des. No. 1592421) is underway and is expected to be completed in 2023.

Figure 3-5: Rail Line Crossing at Logansport Road

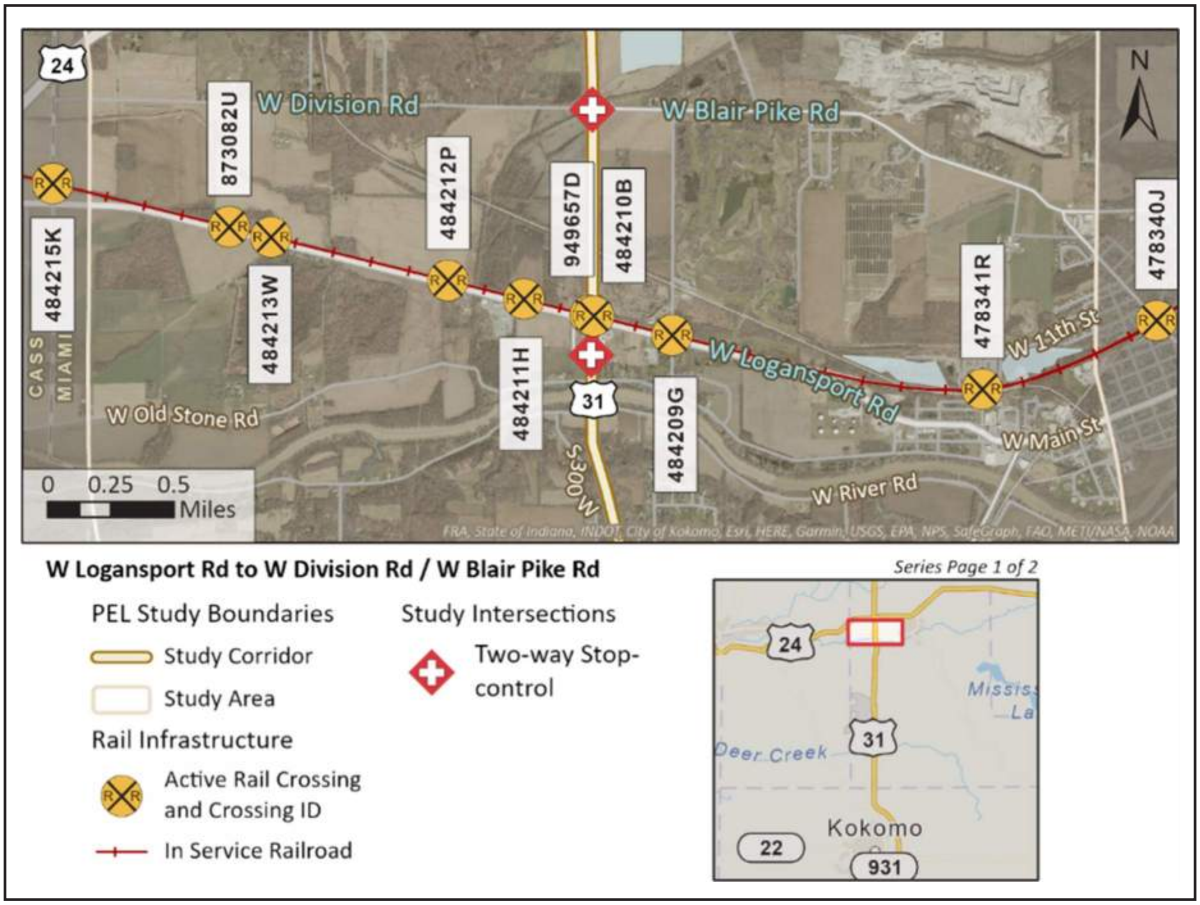
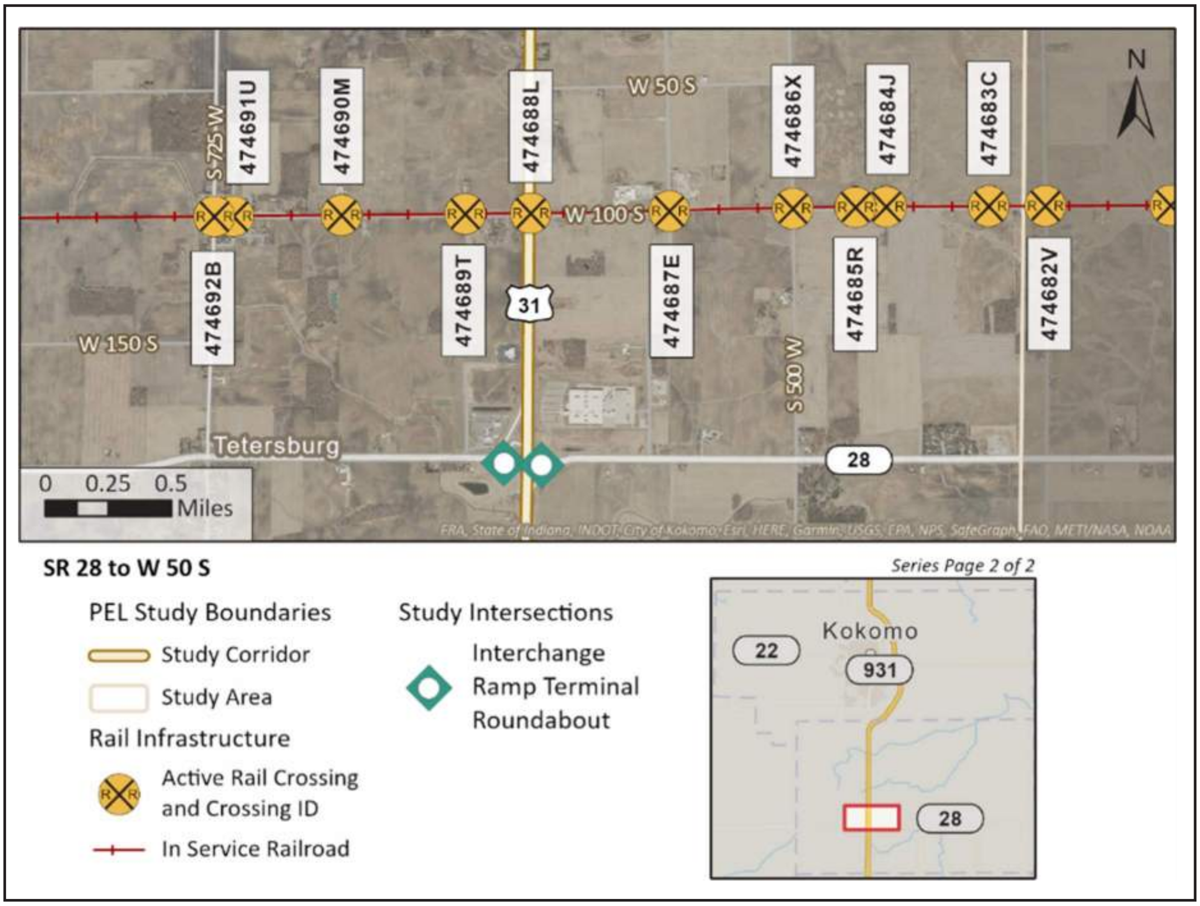


Figure 3-6: Rail Line Crossing at W CR 100 S



3.6. BRIDGES

There are 33 existing bridges within the study corridor, 27 carrying US 31 and 6 crossing US 31. National Bridge Inventory (NBI) condition ratings were obtained for all bridges in the study area and are summarized in **Tables 3-1** and **3-2.** Detailed information about these bridges is provided in **Appendix A**. Bridge condition is determined by the lowest ranking of a bridge element (i.e., deck, super structure, sub-structure, or channel), with rankings defined as follows:

- ≥ 7 = Good Condition
- 5 or 6 = Fair Condition
- ≤ 4 = Poor Condition

The condition ratings indicate that only the bridges over Little Cicero Creek (NBI 9650 & 9660) are classified as being in poor condition as of September 2022. Each existing bridge provides only 36 feet of width and both are considered deficient for this reason. As part of the US 31 & 276th Street interchange project (Des No. 1901797), these bridges are scheduled for deck overlays which will address these deficiencies.

Table 3-1: Existing Bridge Ratings (1 of 2)

Ref No.	Existing Bridge File No.	NBI #	Existing Location	Deck	Super	Sub	Channel	Culvert
1	031-29-04572 BSBL	9660	US 31 over Little Cicero Creek	4	6	6	5	N/A
2	031-29-04572 BNBL	9650	US 31 over Little Cicero Creek	4	6	6	5	N/A
3	031-80-03567 CSBL	9680	US 31 over Prairie Creek	5	6	6	5	N/A
4	031-80-03567 JCNB	9670	US 31 over Prairie Creek	6	6	6	5	N/A
5	031-80-03568 CNBL	9690	US 31 over Cicero Creek	7	7	6	6	N/A
6	031-80-03568 JCSB	9700	US 31 over Cicero Creek	6	6	6	5	N/A
7	031-80-03569 BNBL	9710	US 31 over Dixon Creek	5	5	6	7	N/A
8	031-80-03569 JBSB	9720	US 31 over Dixon Creek	6	6	6	7	N/A
9	028-80-10048 A	7692	SR 28 over US 31	8	8	8	N/A	N/A
10	031-80-03413 NBL	9730	US 31 over Muck Pocket	5	5	5	N/A	N/A
11	031-80-08042	9735	US 31 over Buck Creek	N/A	N/A	N/A	8	7
12	031-80-03570 JBSB	9750	US 31 over Mud Creek	6	6	6	7	N/A
13	031-80-07858 NBL	9740	US 31 over Mud Creek	5	5	6	7	N/A
14	031-80-09826 A	76978	CR 600 N over US 31 NB/SB	8	8	8	N/A	N/A
15	(931)31-34-08827	80598	SR 931 NB Ramp over US 31 SB/NB	8	9	9	N/A	N/A
16	031-52-05754 CNBL	9810	US 31 over S Fork Deer Creek	9	9	7	7	N/A
17	031-52-05754 CSBL	9820	US 31 over S Fork Deer Creek	9	9	7	7	N/A
18	031-52-10761	80810	US 31 over William H Russel Ditch	Not Available				

Table 3-2: Existing Bridge Ratings (2 of 2)

Ref No.	Existing Bridge File No.	NBI #	Existing Location	Deck	Super	Sub	Channel	Culvert
19	031-52-05755 BNBL	9830	US 31 over Deer Creek	6	6	7	7	N/A
20	031-52-05755 BSBL	9840	US 31 over Deer Creek	6	7	7	7	N/A
21	031-52-02358	9850	Abandoned RR over US 31	7	7	6	N/A	N/A
22	031-52-04041 CNBL	9860	US 31 over Big Pipe Creek	8	7	7	7	N/A
23	031-52-04041 JBSB	9870	US 31 over Big Pipe Creek	8	7	7	7	N/A
24	031-52-04857 CNBL	9880	US 31 over Wabash River (, 2 roads)	7	7	6	8	N/A
25	031-52-04857 CSBL	9890	US 31 over Wabash River (, 2 roads)	7	7	6	7	N/A
26	031-52-02317 CNBL	9900	US 31 over Old US 24, NSRR	7	7	6	N/A	N/A
27	031-52-02317 CSBL	9910	US 31 over Old US 24, NSRR	7	8	6	N/A	N/A
28	031-52-02318 CNBL	9920	US 31 over Abandoned RR	7	7	6	N/A	N/A
29	031-52-02318 CSBL	9930	US 31 over Abandoned RR	7	7	7	N/A	N/A
30	031-52-04858 BNBL	9940	US 31 over Prairie Ditch	7	7	7	7	N/A
31	031-52-04858 BSBL	9950	US 31 over Prairie Ditch	7	7	7	6	N/A
32	024-52-08165 EBL	6019	US 24 over US 31	7	8	7	N/A	N/A
33	024-52-06597 BWBL	6021	US 24 over US 31	7	7	6	N/A	N/A

Additionally, two bridges were found to have vertical clearance deficiencies that should be addressed by all build alternatives developed under this PEL study. These include:

- The US 31 bridges over the Wabash River (NBI 9880 & 9890) provide less than 14.5 feet of vertical clearance over Old Stone Road and River Road.
- An abandoned railroad bridge (NBI 9850) crosses over US 31 near Grissom Airforce Base. This bridge provides only 14.5 feet of vertical clearance over the northbound lanes of US 31.

3.7. UTILITIES

Utilities present within the study corridor are listed in **Table 3-3**. The most noteworthy of these utilities are:

- Overhead electric transmission lines owned by Duke Energy and located approximately
  - ¼ mile north of CR 1350 S in Miami County
  - ½ mile north of CR 400 S in Miami County
- Gasoline and diesel pipeline owned by CountryMark Refining & Logistics, LLC that crosses US 31 approximately 0.2 miles north of Airport Road in Miami County
- Anhydrous ammonia pipeline operated by Nustar Pipeline Operating Partnership LP, which crosses US 31 approximately 0.1 miles north of Division Road / Blair Pike Road in Miami County
- Broadband communication line, owned by AT&T and operated by the Department of Homeland Security, that runs along the eastern right of way line of US 31 and serves Grissom Air Force Base

Table 3-3: Utilities within the US 31 Corridor

Utility	Owner
Communications	AT&T - Distribution Clay County Rural Telephone DBA Endeavor Communications Brightspeed
Electric	Duke Energy Frankfurt Municipal Utilities Tipton Municipal Utilities
Sewer & Water	Frankfurt Municipal Utilities Tipton Municipal Utilities
Fiber Optic	IN Fiber Network DBA Intelligent Fiber Network Zayo Bandwidth
Gas	Centerpoint Energy (Formerly Vectren)
Pipeline	Countrymark Refining & Logistics, Inc. Marathon Pipe Line Co. NUSTAR Pipeline Operating Partnership, LLP
Telephone	Frontier Swayzee North Smithville Telephone Company, Inc. Tipton Telephone Cc. T.D.S.

3.8. PEDESTRIAN, BICYCLE, AND TRANSIT FACILITIES

Within the study area, there are no sidewalks, designated bike lanes, or transit facilities on US 31, or on cross streets within one mile of US 31. Along the northern portion of the US 31 South study area, the Nickel Plate Trail is the only dedicated multi-use trail within 2 miles of the study corridor. The Nickel Plate Trail follows an abandoned rail line, which is located east of US 31, and connects the cities of Kokomo and Peru. There are no dedicated multi-use trails within 2 miles of the southern portion of the US 31 South study area.

4. CORRIDOR ACCESS

4.1. GUIDELINES AND CLASSIFICATION

The US 31 South corridor through Hamilton, Tipton, Howard, and Miami counties is classified by the INDOT Access Management Guide as a Tier 1A Mobility Corridor as it:

- Provides safe, high-speed connections for long distance trips
- Serves as a freight artery of the state
- Is part of the National Highway System

According to the INDOT Access Management Guide and the INDOT Driveway Permit Manual, the following guidelines apply to a Tier 1A mobility corridor:

- Signalized intersections with a minimum spacing of ½ mile
- Unsignalized intersections with a minimum spacing of 670 feet (desirable conditions) or 515 feet (limiting conditions) for a posted speed of 55 mph
- 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 31
- All other driveways should be restricted to right-in/right-out (RIRO)
- Left-turn access from 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 intersection
    - 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

4.2. ACCESS REVIEW

The study corridor was found to have 125 driveways, shown in **Figures 4-1** and **4-2**, 60% of which are residential, as listed in **Table 4-1**. Twenty-eight percent (28%) of the driveways provide access to adjacent farmlands, which speaks to the abundance of agricultural land use along the corridor. Sixty-seven percent (67%) of the driveways have full access to US 31.

Table 4-1: Driveway Inventory

<table>
<tr><th colspan="6">Total</th></tr>
<tr><td colspan="6">125 Driveways</td></tr>
<tr><th colspan="6">Breakdown by Driveway Type</th></tr>
<tr><th colspan="2">Residential</th><th colspan="2">Field Access</th><th colspan="2">Commercial</th></tr>
<tr><td colspan="2">75</td><td colspan="2">35</td><td colspan="2">15</td></tr>
<tr><th colspan="6">Breakdown by Level of Access</th></tr>
<tr><th colspan="3">Full (All Movements Allowed)</th><th colspan="3">Right-in/Right-out</th></tr>
<tr><td colspan="3">84</td><td colspan="3">41</td></tr>
</table>

The following locations were identified where median opening spacing violates the 400-foot spacing rule.

- Two segments, both located less than 2,100 feet south of CR 500 S in Miami County
- Between CR 550 N and Walnut Street in Howard County
- 2,250 feet north of CR 100 N in Tipton County

The median width along US 31 within the study area is approximately 50 feet in width; however, all but one of the driveway approach median openings do not include a left-turn lane, which is inconsistent with the Access Management Guidelines. The only driveway location where a left-turn lane is provided at a US 31 median opening is located 2,600 feet south of SR 18 and provides access to the Maple Lawn Village mobile home park.

Figure 4-1: Inventory of US 31 Driveways (1 of 2)

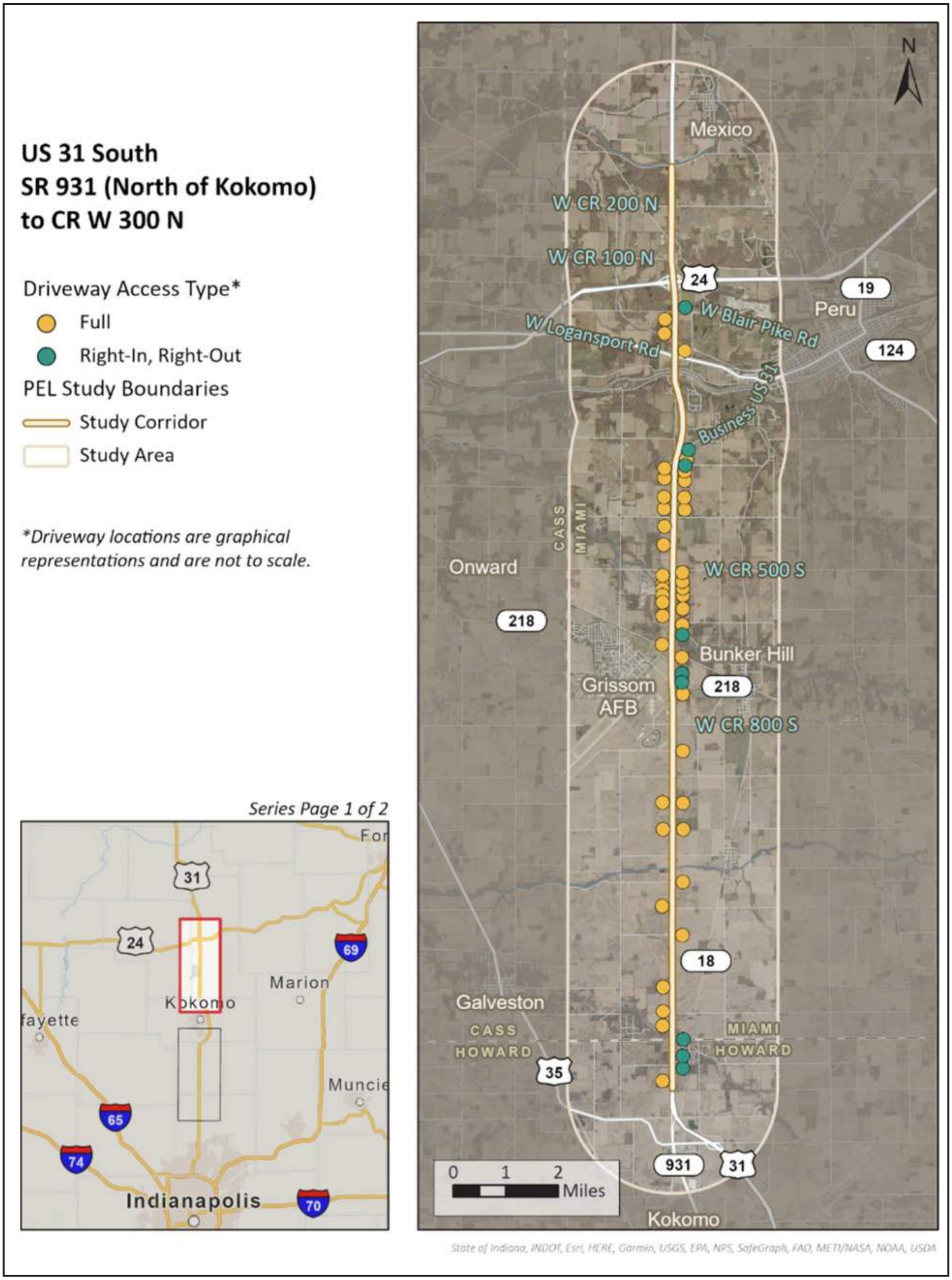
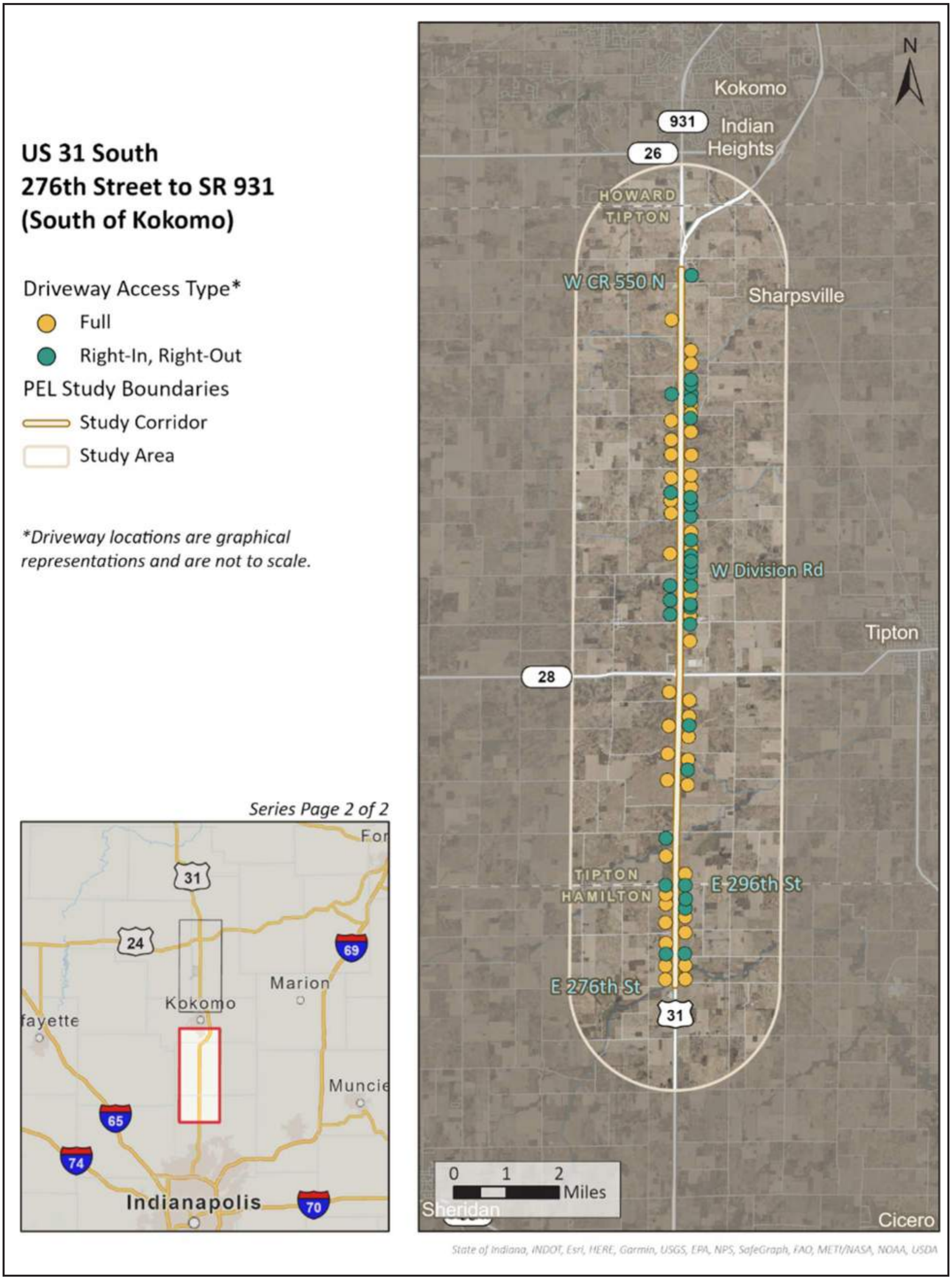


Figure 4-2: Inventory of US 31 Driveways (2 of 2)



Comparing the driveways to the previously discussed guidelines, it was found that:

- Nine (9) parcels do not meet the guideline of one driveway per 400 ft of frontage,
- Forty-two (42) driveways have sub-standard spacing, and
- Seventy-eight (78) residential driveways have full access to US 31 but should have only right-in/right-out (RIRO) access.

While some driveways along the corridor do not meet multiple guidelines, 73% of all driveways do not meet at least one of the access management guidelines. These findings are shown in **Figures 4-3** and **4-4** and summarized in **Table 4-2**.

Table 4-2: Driveway Access Management Guideline Inventory

Total	
125 Driveways	
Meets Access Management Guidelines	
Yes	**No (Does Not Meet 1 or More Access Management Guidelines)**
34	91
Guidelines Not Met (May Overlap)	
Parcels Violating Number of Driveways Guideline	9
Driveways Violating Spacing Requirements	42
Driveways Violating Access Type	78

Figure 4-3: Driveway Conformance with Access Management Guidelines (1 of 2)

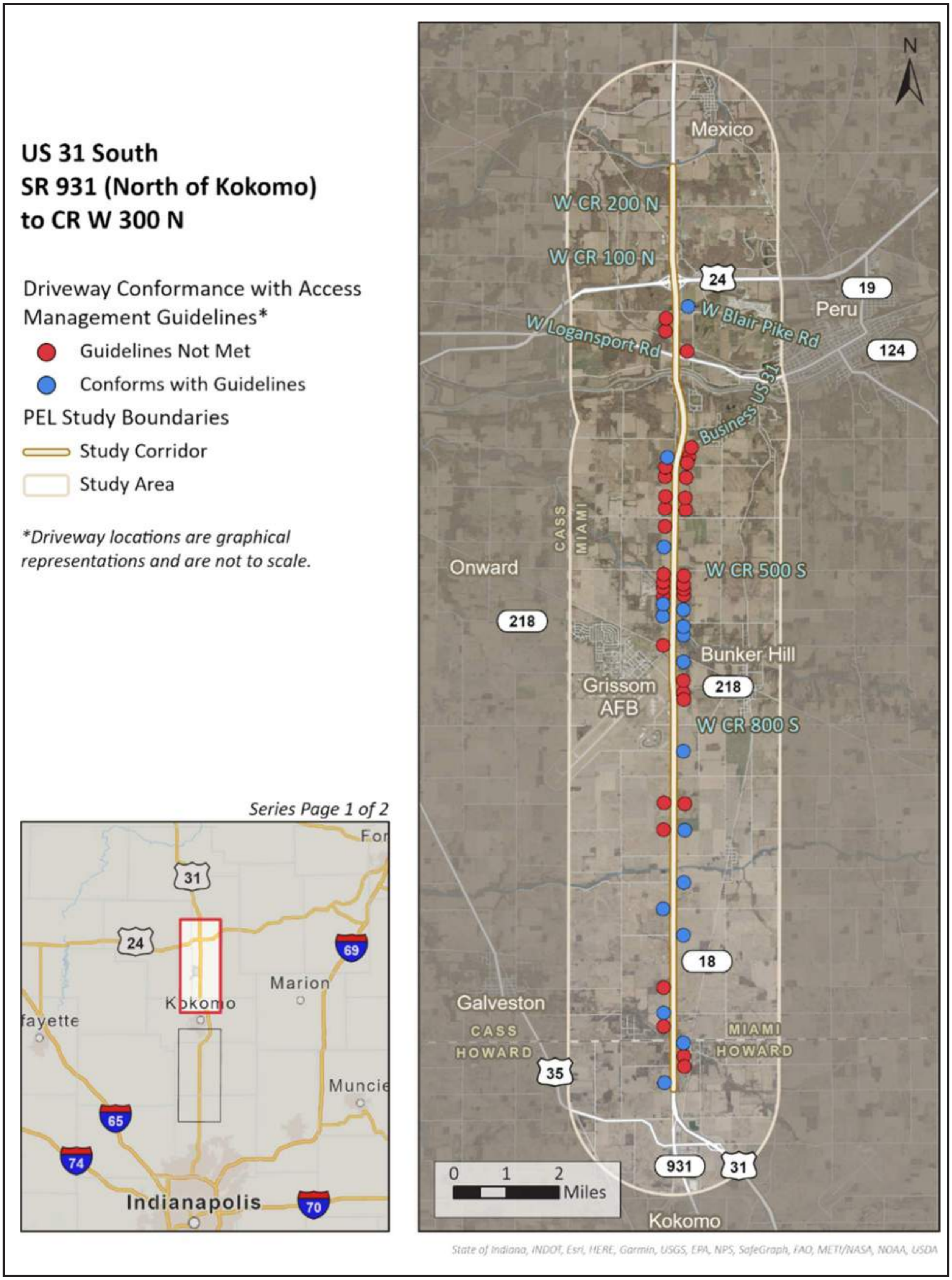
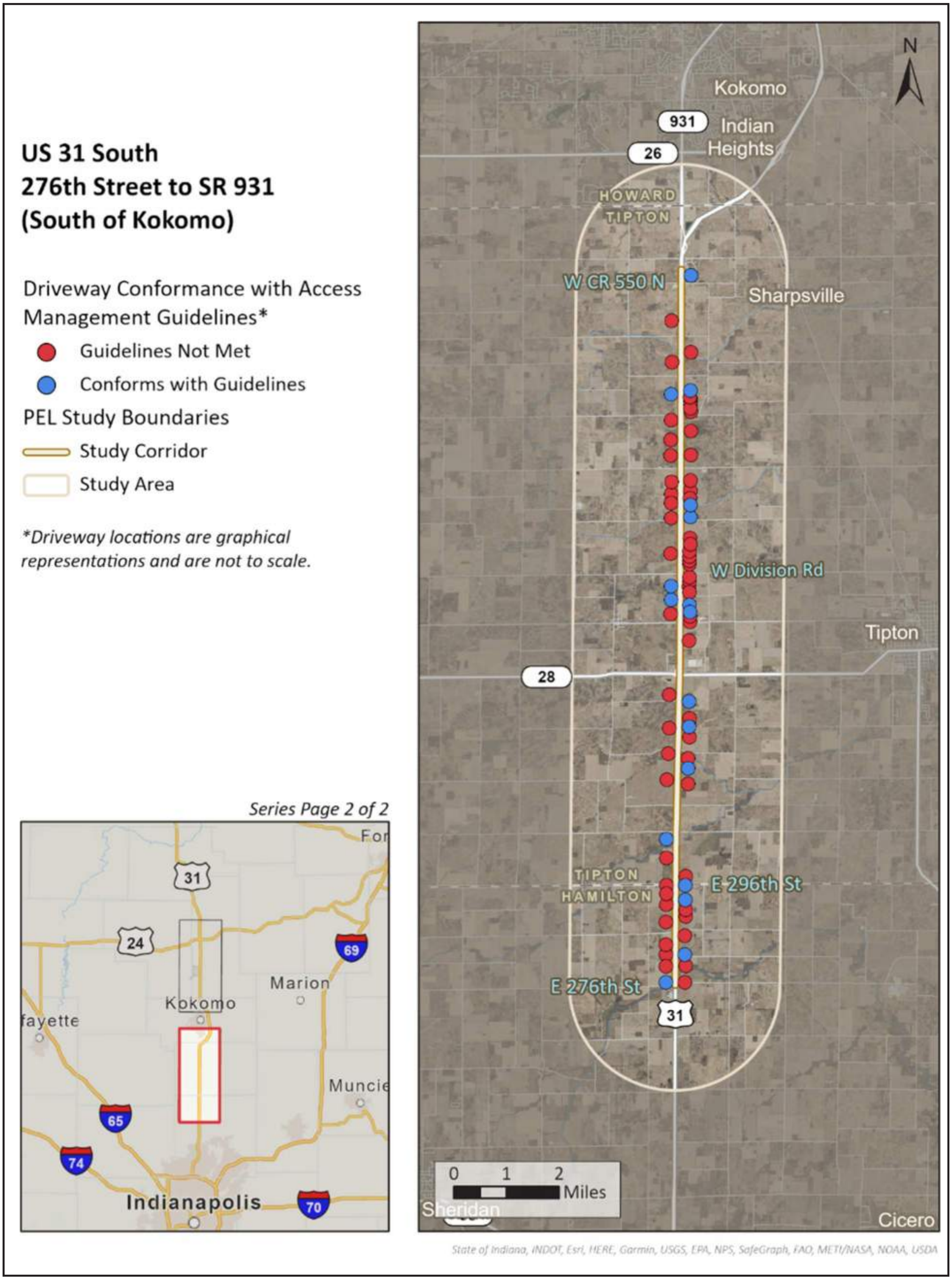


Figure 4-4: Driveway Conformance with Access Management Guidelines (2 of 2)



4.3. SCHOOL BUS ACCESS

The US 31 South study corridor spans the seven school districts listed below:

- North Miami County Schools
- Peru Community Schools
- Maconaquah School Corporation
- Tipton County Northern Community School Corporation
- Tipton Community School Corporation
- Hamilton Heights School Corporation
- Sheridan Community Schools

Each of these school districts was contacted to better understand busing patterns and to obtain observations from their respective transportation departments. The information received from these inquiries indicates that school buses cross or access US 31 at 21 intersections within the study area. Buses currently cross both directions of US 31 at 7 unsignalized intersections and enter or exit US 31 at 9 unsignalized intersections. Each of these intersections are depicted in **Figures 4-5** through **4-10**, along with school district boundaries and locations of each school campus. The Maconaquah School District currently has three locations where buses stop on US 31 to pick up or drop off students. No other school districts currently have stops on US 31.

Sheridan Community Schools and Hamilton Heights School Corporation districts did not respond to inquiries. US 31 is the border between these two districts; therefore, it was assumed that buses in these districts do not travel on, or cross, US 31.

Figure 4-5: School Bus Access Points (1 of 6)

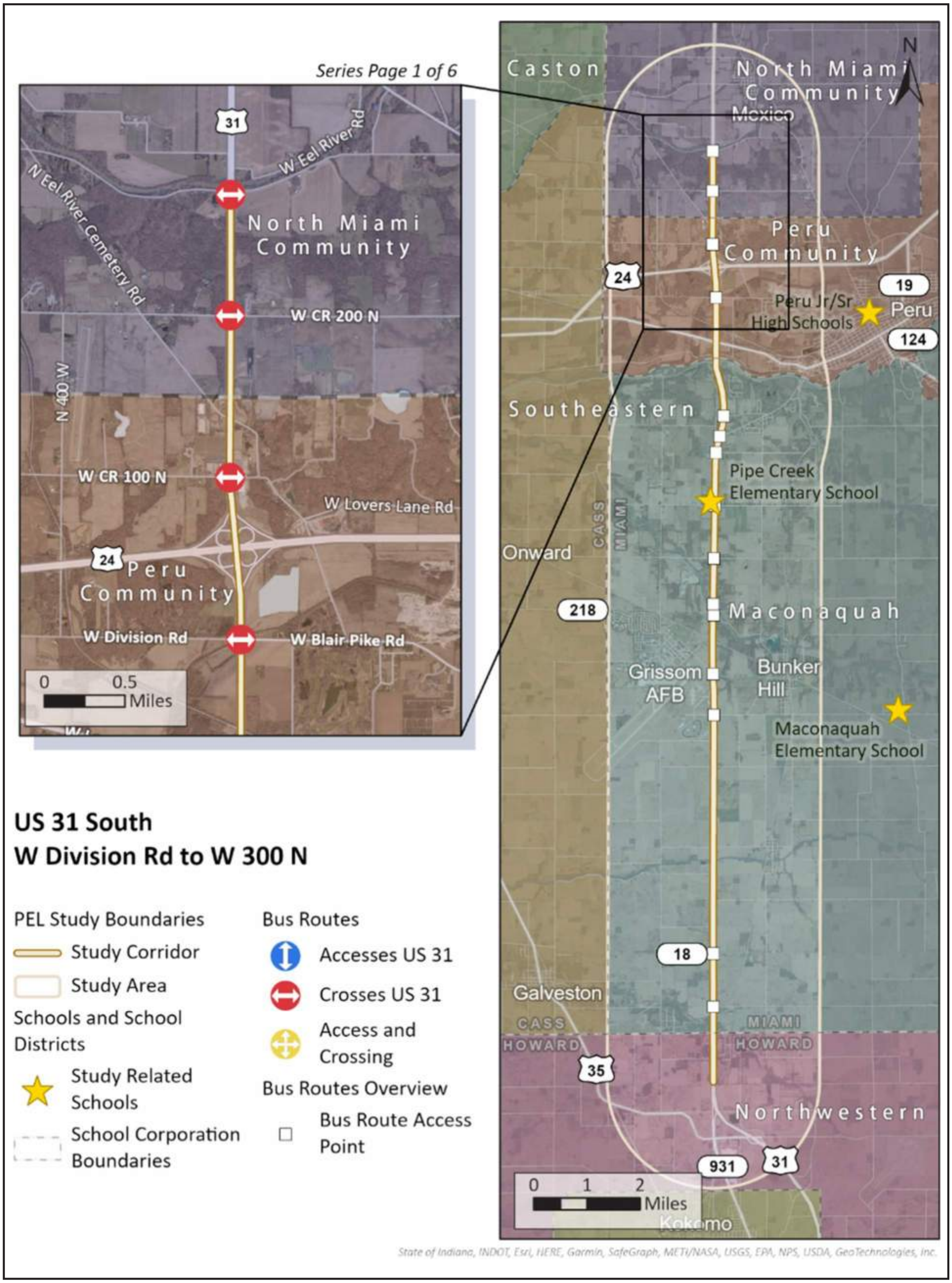


Figure 4-6: School Bus Access Points (2 of 6)

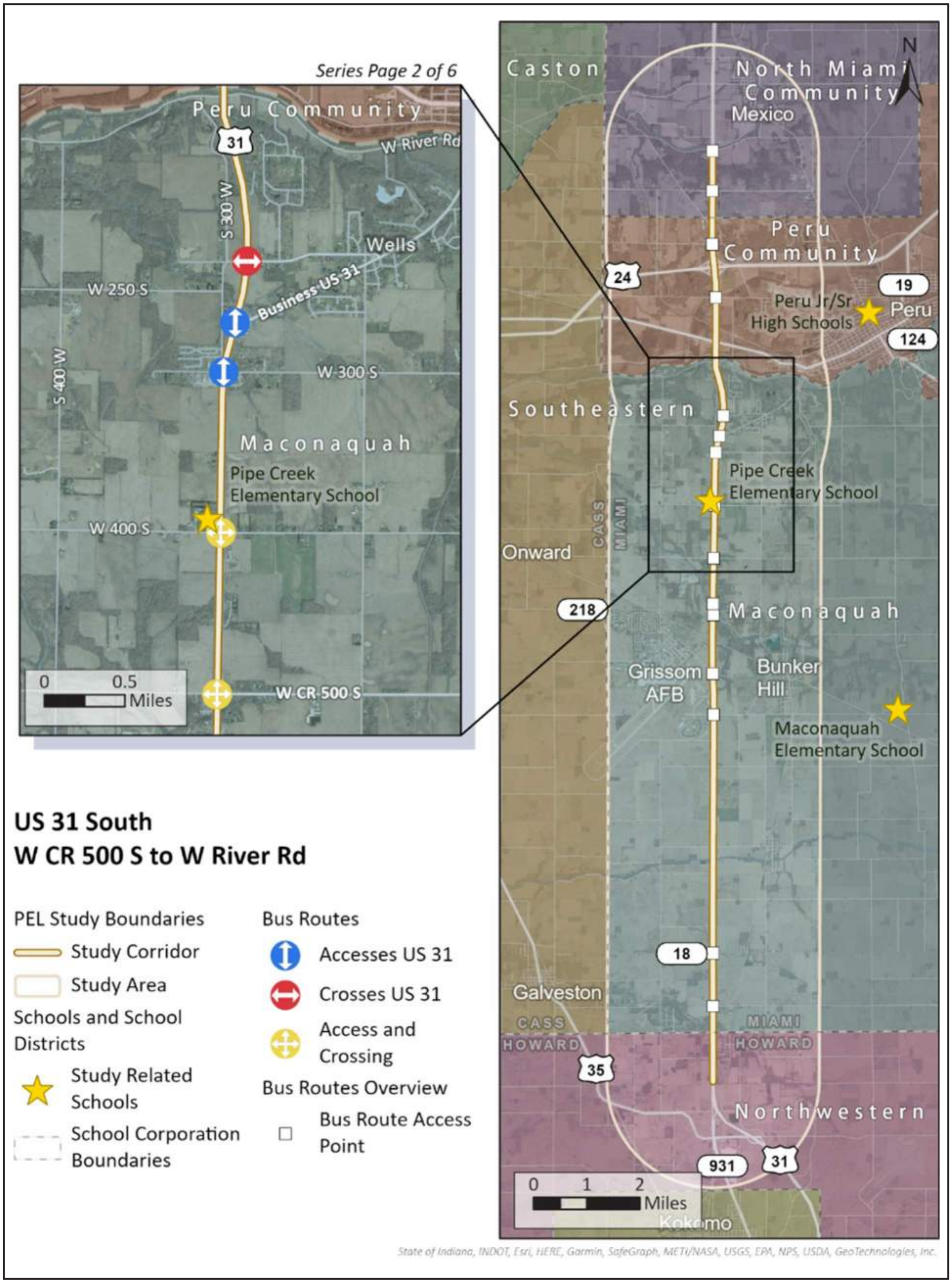


Figure 4-7: School Bus Access Points (3 of 6)

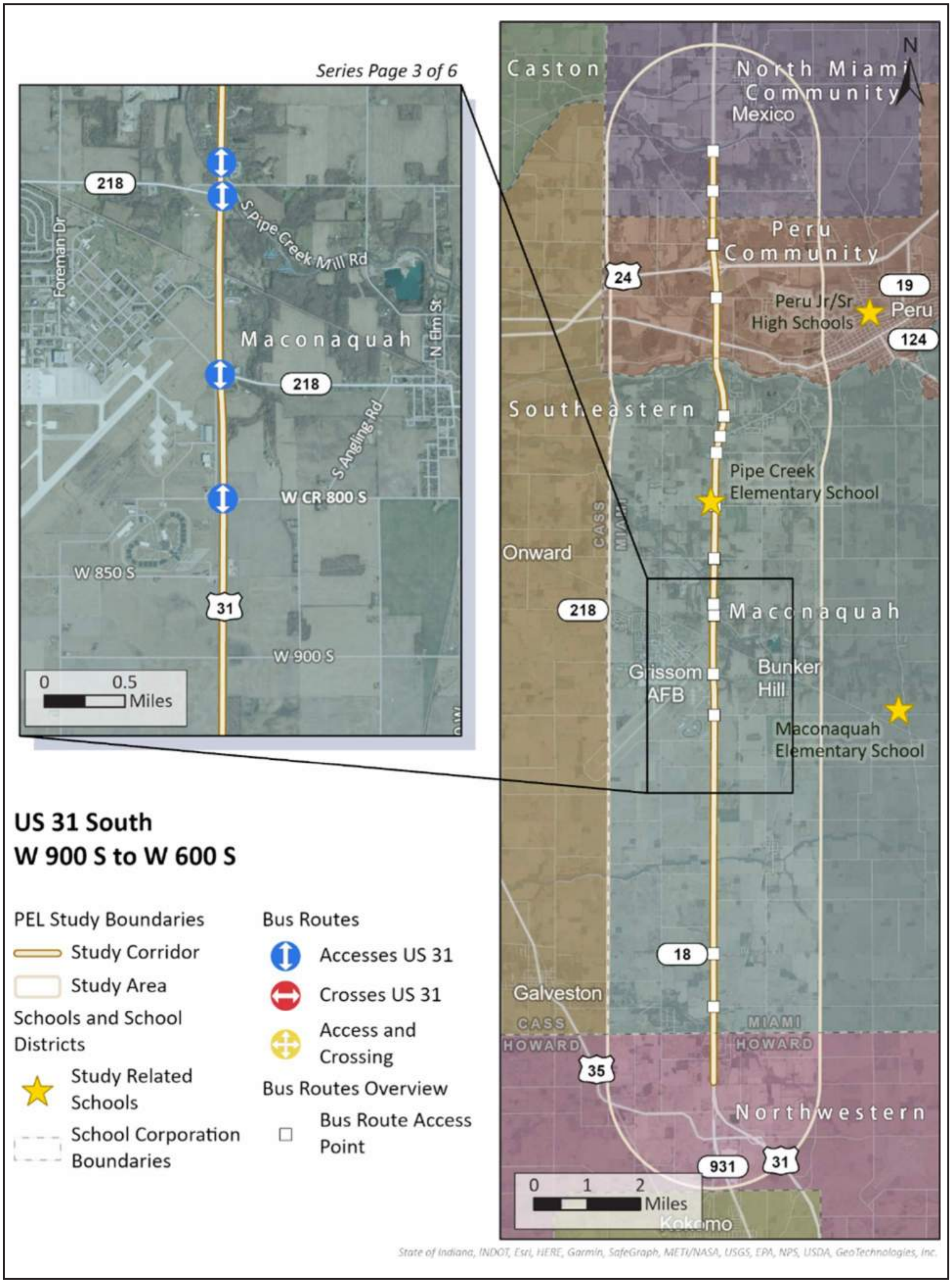


Figure 4-8: School Bus Access Points (4 of 6)

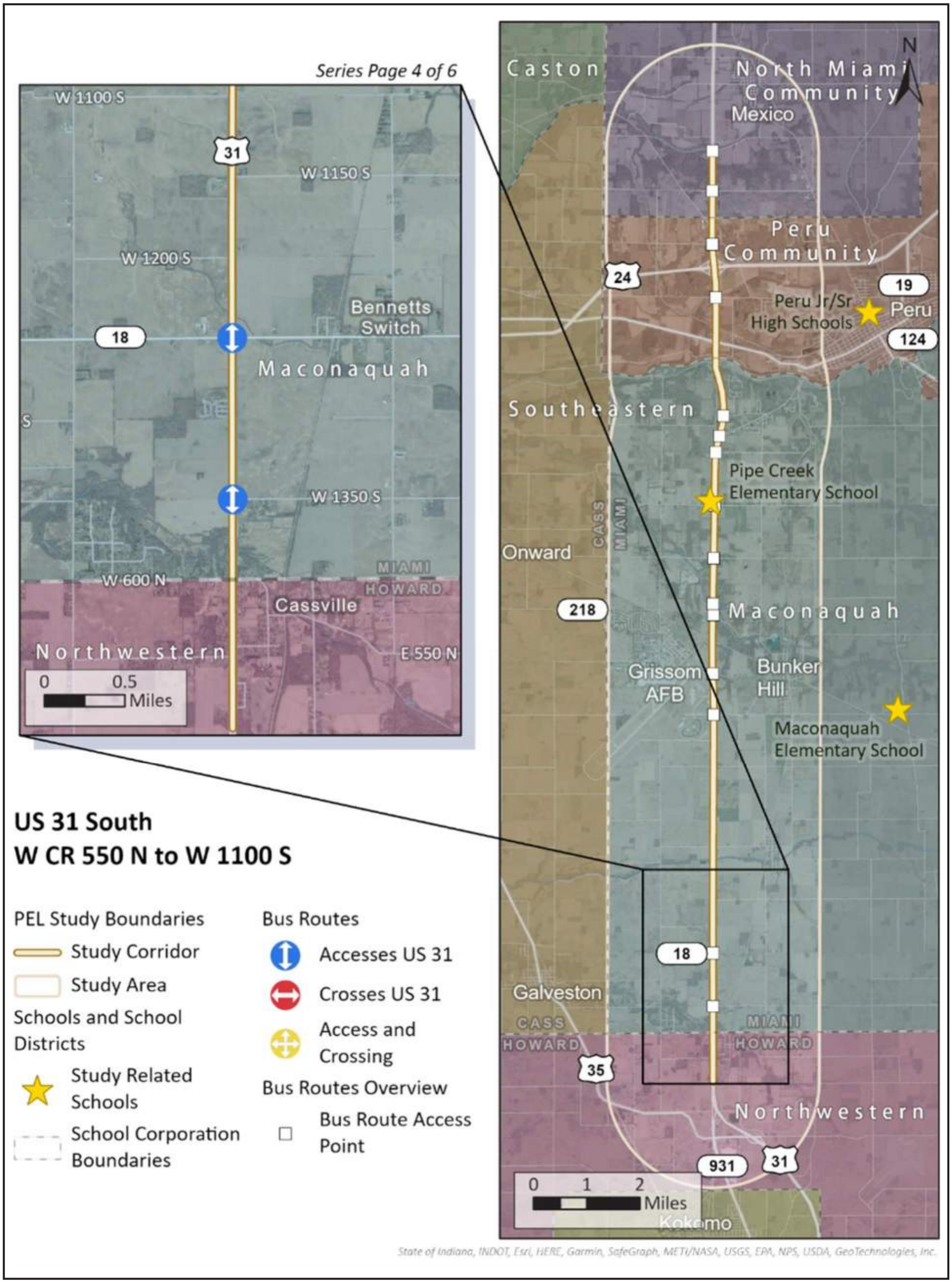


Figure 4-9: School Bus Access Points (5 of 6)

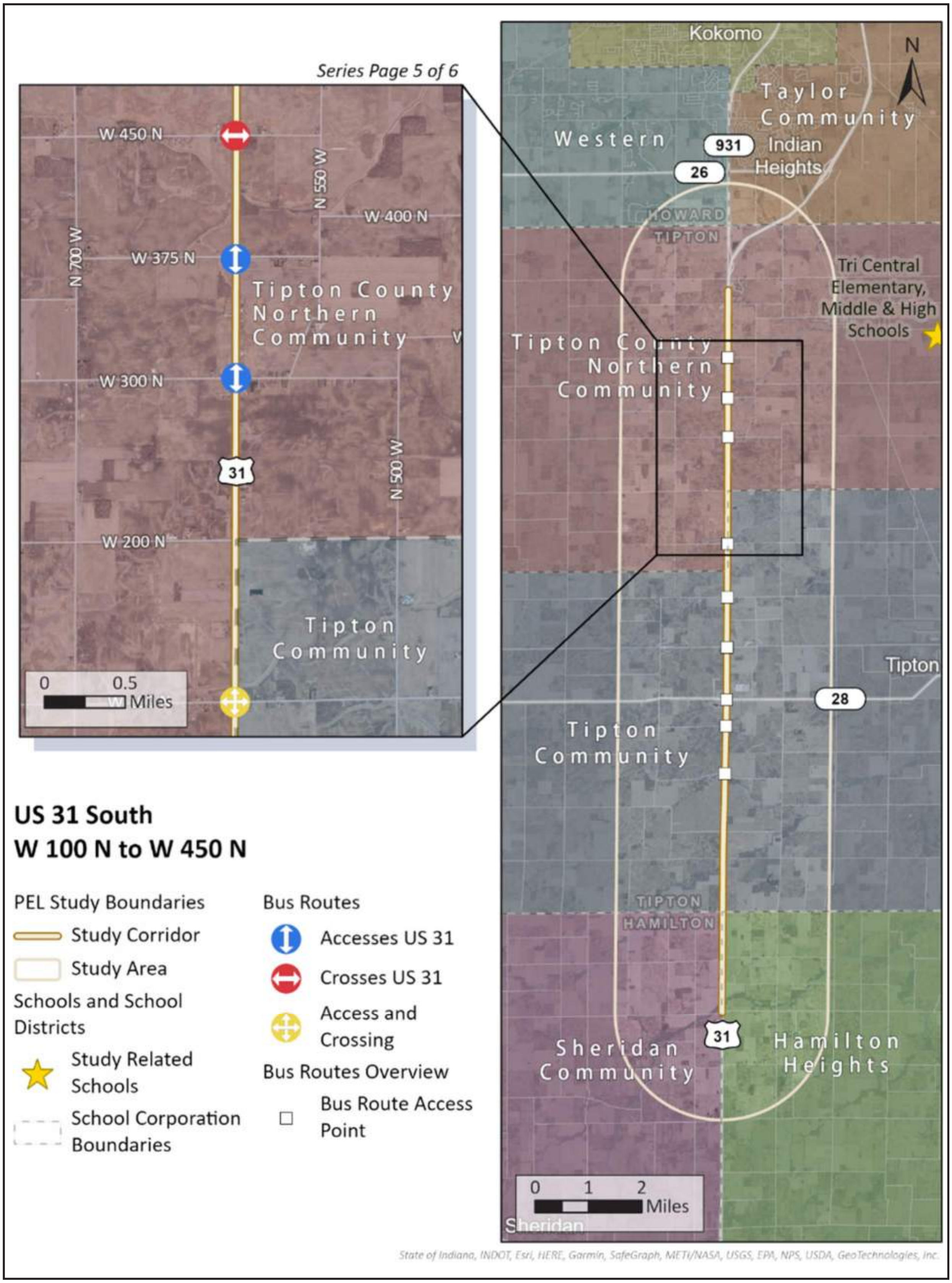
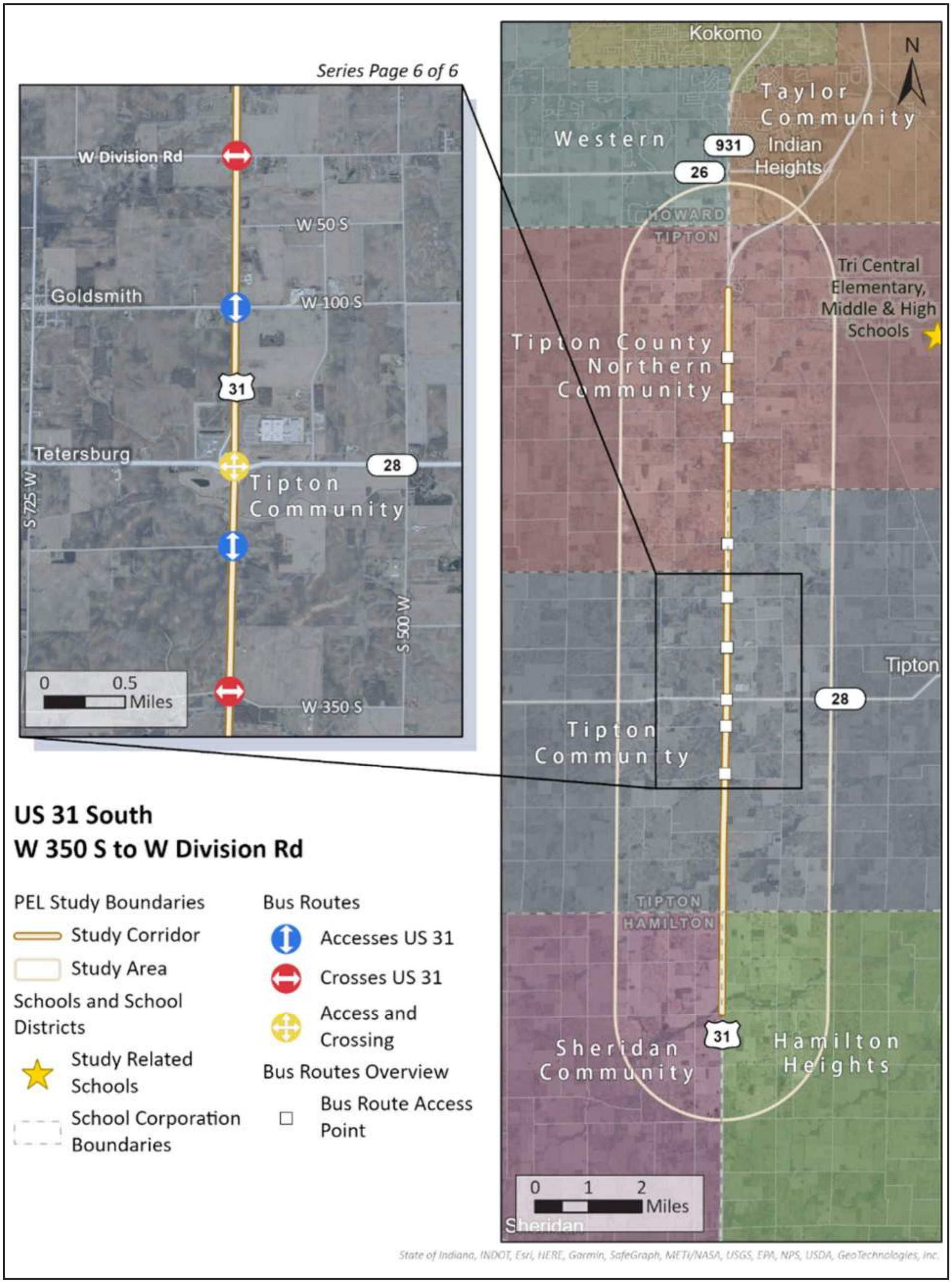


Figure 4-10: School Bus Access Points (6 of 6)



4.4. EMERGENCY MANAGEMENT SERVICES (EMS)

Feedback from county emergency service providers is vital to understand the planning context and needs of the counties operating emergency management services utilizing the US 31 corridor. Phone interviews were held in late January 2023 with emergency management directors for the following counties:

- Hamilton County
- Howard County
- Miami County
- Tipton County

Participants were asked to provide information regarding intersections critical for corridor access and community crossing, as well as any safety issues or concerns related to existing conditions. **Table 4-3** summarizes key interview findings organized by county, intersection locations, and stated issue areas.

While not specific to any intersections, all directors mentioned increased hazardous materials (HAZMAT) flow on US-31, which is a corridor wide concern. Two incidents were mentioned specifically in interviews, one occurring in 2019 (a hydrochloric gas incident in Tipton County) and another occurring in 2020 (a gasoline tanker fire in Howard County).

Table 4-3: Summary of Key Findings from County Emergency Management Directors

County	Director	Intersection	Issue(s)	Comments
Miami	Kristopher Marks	US 31 at CR 100 N	Safety	Safety concerns with signaled intersections malfunction. Semi-truck traffic is high because of truck stop and weight station.
		US 31 at CR 500 S	Access	Local access. A high-volume local traffic area built to handle heavy truck/farm equipment traffic.
		US 31 at SR 218 N&S	Safety	Safety concerns with signaled intersections malfunction.
		US 31 at Hoosier Boulevard	Safety, Access	Currently a flashing yellow signal. The southbound lane exits off into the Grissom Air Base and both northbound and southbound traffic cross a median in order to get to a small business complex.
		US 31 at CR 800 S	Access	Local access. The road continues to Strawtown Pike near Maconaquah schools with higher traffic volumes due to schools.
		US 31 at CR 900 S	Access	Local access. The road continues east to Bunker Hill Dragstrip with vehicles and trailers exiting US-31.
		US 31 at SR 18	Safety	Safety concerns with signaled intersections malfunction.
Howard	Janice Hart	Intersections identified during the interview were outside of the study area.		
Tipton	Adam DeWitt	US 31 at CR 600 N	Access	School districts utilize CR 600 N.
		US 31 at Division Road	Safety, Access	Current accident-area; if Division Road access is lost, first-responders will have to use north or south options.
Hamilton	Shane Booker	US 31 at Little Cicero Creek	Environmental	Flash flooding is a concern and potential liquefaction.

5. SAFETY ANALYSIS

5.1. CRASH HISTORY

To obtain a better understanding of existing safety issues, an analysis of collision data was conducted for the study intersections previously identified in **Section 2** and the segments between those intersections. Historical crash information was obtained for the time period from January 1, 2017 to December 31, 2021. The resulting 1,564 crashes were then analyzed to determine crash characteristics along the corridor.

Summaries of the crashes throughout the study corridor are provided in **Tables 5-1** and **5-2**. Crash density heat maps and detailed breakdowns of each intersection and segment are provided in **Appendix B**.

Table 5-1: Overall Summary of Crash Types and Severities

Crash Type	Severity			Total	Percentage
	Fatal and Incapacitating Injury	Non-Incapacitating Injury	Property Damage Only (PDO)		
Rear End	76	50	393	519	33.2%
Right Angle	79	33	250	362	23.1%
Collision with Animal	1	4	195	200	12.8%
Ran off Road	19	10	168	197	12.6%
Same Direction Sideswipe	17	7	75	99	6.3%
Left Turn	3	2	62	67	4.3%
Non-Collision	4	1	30	35	2.2%
Other	0	1	23	24	1.5%
Backing Crash	2	2	19	23	1.5%
Collision with object in road	3	0	15	18	1.2%
Right Turn	0	0	8	8	0.5%
Opposite Direction Sideswipe	1	1	5	7	0.4%
Head On	0	1	4	5	0.3%
Total	205	112	1,247	1,564	100%

Table 5-2: Overall Summary of Crash Lighting and Road Conditions

Light Conditions	Road Conditions	# of Crashes	Percentage
Daylight	Dry	789	50.4%
	Wet	111	7.1%
	Ice / Snow	97	6.2%
	Total	997	63.7%
Dawn / Dusk	Dry	50	3.2%
	Wet	14	0.9%
	Ice / Snow	13	0.8%
	Total	77	4.9%
Dark (Lighted)	Dry	42	2.7%
	Wet	10	0.6%
	Ice / Snow	12	0.8%
	Total	64	4.1%
Dark (Not Lighted)	Dry	308	19.7%
	Wet	44	2.8%
	Ice / Snow	74	4.7%
	Total	426	27.2%

5.2. ROADHAT ANALYSIS

Using the RoadHAT crash analysis software, the study corridor was analyzed to determine its performance in comparison to similar segments and intersections within Indiana. The two main outputs of concern from RoadHAT are the Index of Crash Frequency (ICF) and the Index of Crash Cost (ICC). The ICF value indicates how much the reported number of crashes deviate from what is expected. The ICC value indicates how much the crash severity deviates from what is expected. The ICF and ICC values indicate standard deviations from the expected value. Values greater than zero indicate crash frequency or severity greater than expected, while values less than zero indicate crash frequency or severity less than expected.

Table 5-3 summarizes the RoadHAT analysis results for the study corridor. Values greater than 1.0 are highlighted. Eight intersections produced an ICF and/or ICC value greater than 1.0 (see **Figures 5-1** and **5-2**). Of the segments analyzed, none produced an ICC or ICF value greater than 1.0. For the eight intersections with ICF and/or ICC values greater than 1.0, a detailed review of the crash data was conducted. This review is summarized in the following section, with detailed analysis output sheets provided in **Appendix B**.

The collision with animal crashes shown in **Table 5-1** were excluded from the RoadHAT analysis, as these crashes are not considered to be correctable through engineering solutions.

Table 5-3: RoadHat Analysis Summary

Location	ICF	ICC
US 31, Between W CR 300 N and W CR 200 N	-0.20	-0.38
US 31 at W CR 200 N	-0.19	-0.76
US 31, Between W CR 200 N and W CR 100 N	0.45	-0.37
US 31 at W CR 100 N	2.39	0.56
US 31 at US 24 (interchange)	-0.42	0.41
US 31 at W Blair Pike Road / W Division Road	0.19	-0.10
US 31, Between W Blair Pike Road / W Division Road and W Logansport Road	0.66	0.45
US 31 at W Logansport Road	0.68	-0.24
W Logansport Road at Business US 24	-0.34	-0.62
US 31, Between W Logansport Road and W Airport Road	-0.09	0.30
US 31 at W Airport Road	0.46	0.32
US 31, Between W Airport Road and Business US 31	-0.74	-0.73
US 31 at Business US 31	0.09	2.09
US 31, Between Business US 31 and W CR 500 S	-0.01	-0.41
US 31 at W CR 500 S	1.21	1.21
US 31, Between W CR 500 S and SR 218 N	0.04	-0.14
US 31 at SR 218 N	1.67	3.01
US 31, Between SR 218 N and SR 218 S / W Broadway Street	0.92	0.73
US 31 at SR 218 S / W Broadway Street	1.57	1.99
US 31, Between SR 218 S / W Broadway Street and W CR 800 S	-0.13	0.45
US 31 at W CR 800 S	-0.08	0.01
US 31, Between W CR 800 S and SR 18	0.95	0.14
US 31 at SR 18	1.87	0.70
US 31, from SR 18 to South of Ida Drive	-0.79	-0.65
US 31 at W CR 550 N	0.24	0.07
US 31, Between W CR 550 N and Division Road	0.36	-0.17
US 31 at Division Road	1.09	2.03
US 31, Between Division Road and SR 28 / W 200 S	0.61	0.35
US 31 at SR 28 / W 200 S (western roundabout)*	0.90	1.24
US 31 at SR 28 / W 200 S (eastern roundabout)*	0.19	-0.84
US 31, Between SR 28 / W 200 S and 296th Street	0.23	0.07
US 31 at 296th Street	0.79	0.17
US 31, Between 296th Street and 276th Street	-0.29	-0.25
US 31 at 276th Street	-0.14	-0.44

*For comparative purposes, the roundabouts were analyzed in RoadHAT as unsignalized intersections.

Figure 5-1: Study Locations with High Crash Frequency and/or Severity (1 of 2)

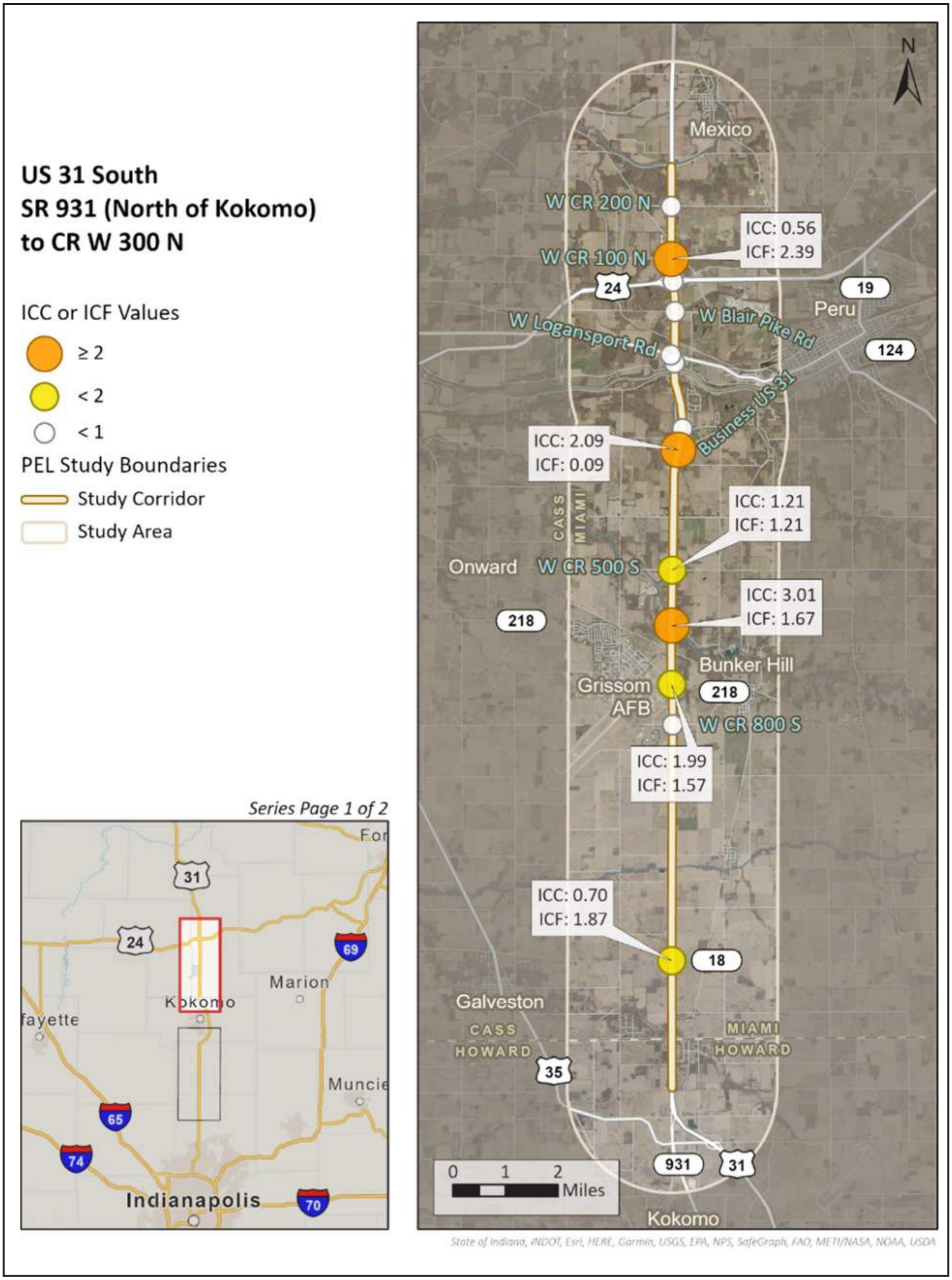
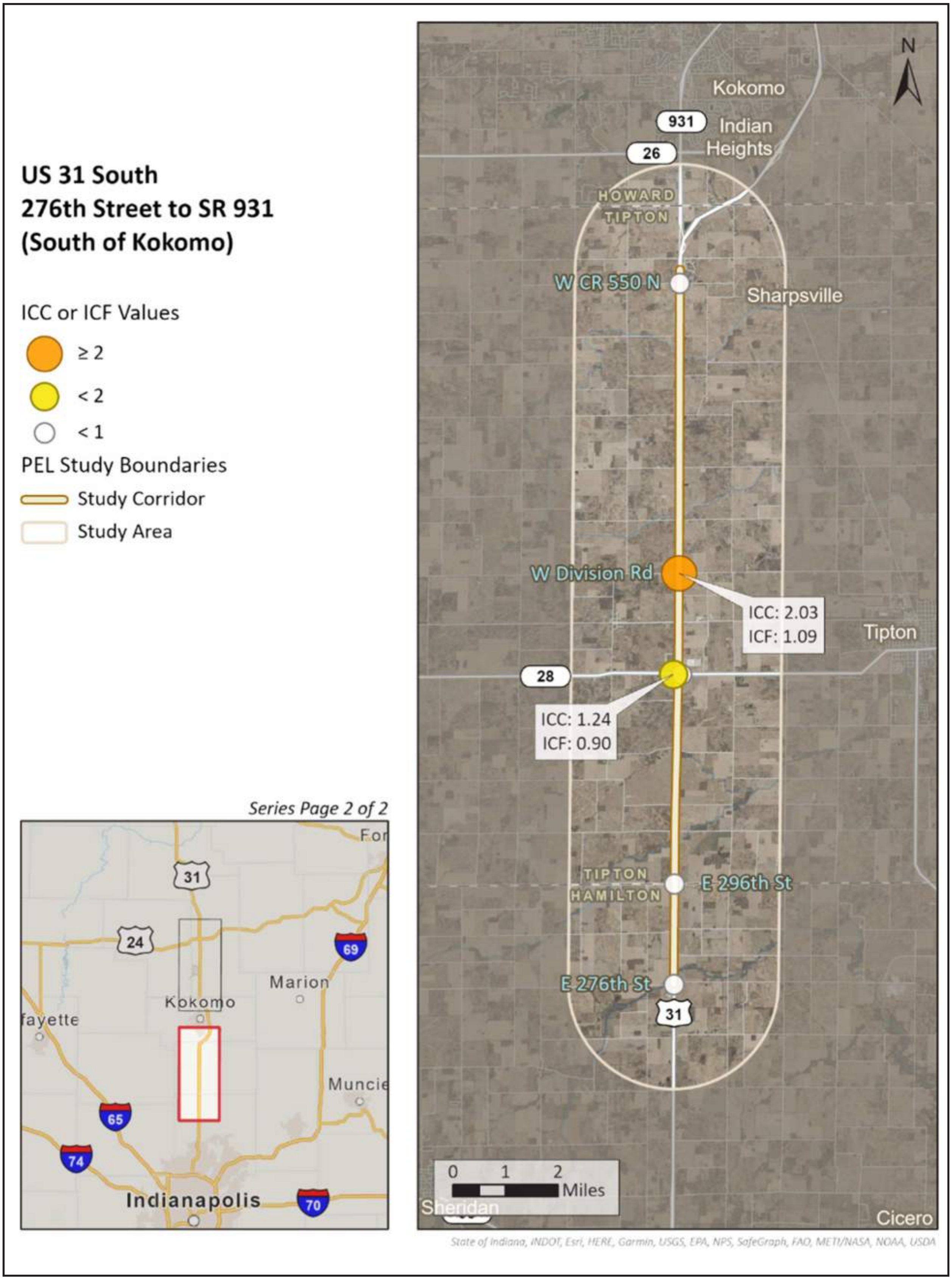


Figure 5-2: Study Locations with High Crash Frequency and/or Severity (2 of 2)



5.3. DETAILED REVIEW OF SELECT LOCATIONS

A detailed review of the locations with ICF and/or ICC values greater than 1.0 is provided here.

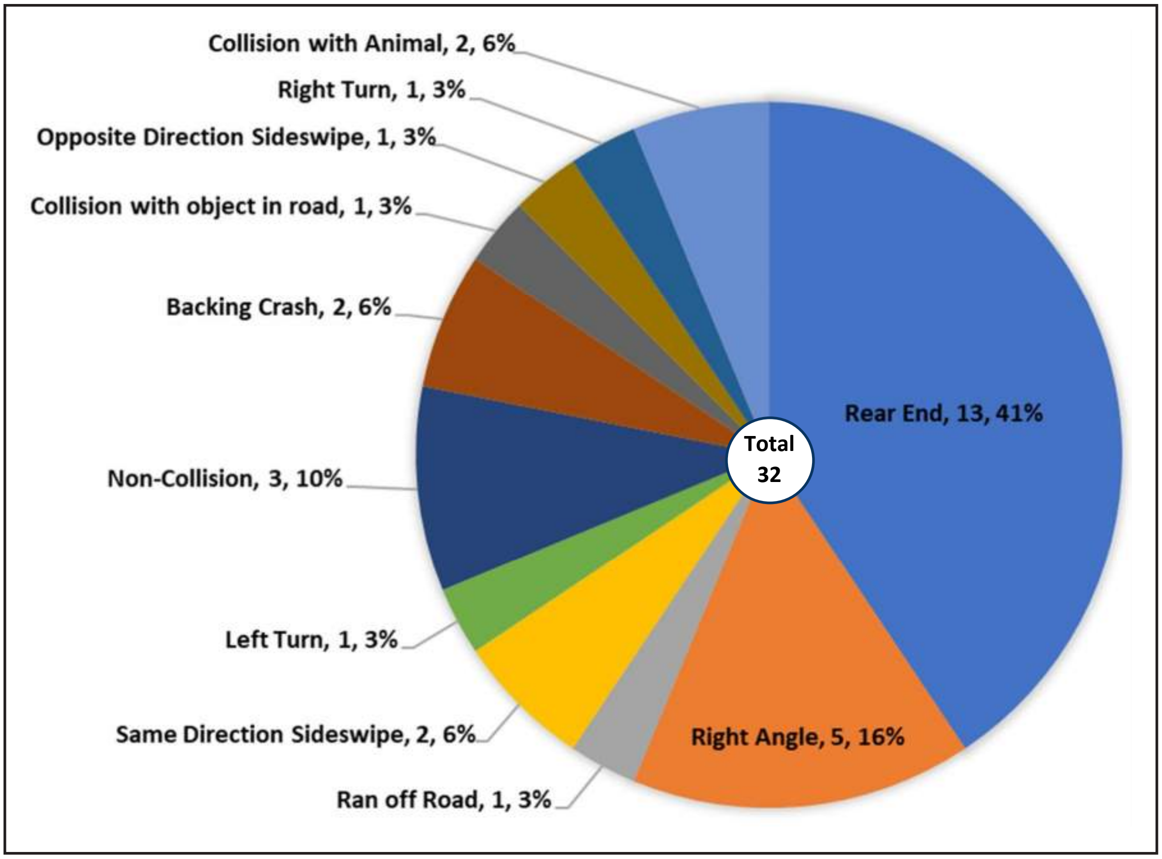
5.3.1. US 31 AT CR 100 N

US 31 at CR 100 N is a signalized intersection. Approximately 41% of the crashes were rear end crashes, with one resulting in a fatality. During field investigation, it was noted that drivers were typically traveling at speeds much higher than the 60 mph posted speed. High travel speeds were commonly noted in the crash narratives. Currently there are “Signal Ahead” warning signs (IMUTCD Sign Code W3-3) with flashing beacons on either side of the road for both the northbound and southbound approaches. Street lighting is present at the intersection. A summary of the ICF value, ICC value, intersection crash severity is provided in **Table 5-4**, and a summary of the intersection crash types is provided in **Figure 5-3**.

Table 5-4: Crash Analysis Summary - US 31 at CR 100 N

ICF	ICC	Fatal and Incapacitating Injury Crashes	Non- Incapacitating Crashes	Property Damage Only Crashes
2.39	0.56	3	2	27

Figure 5-3: Crash Types - US 31 at CR 100 N



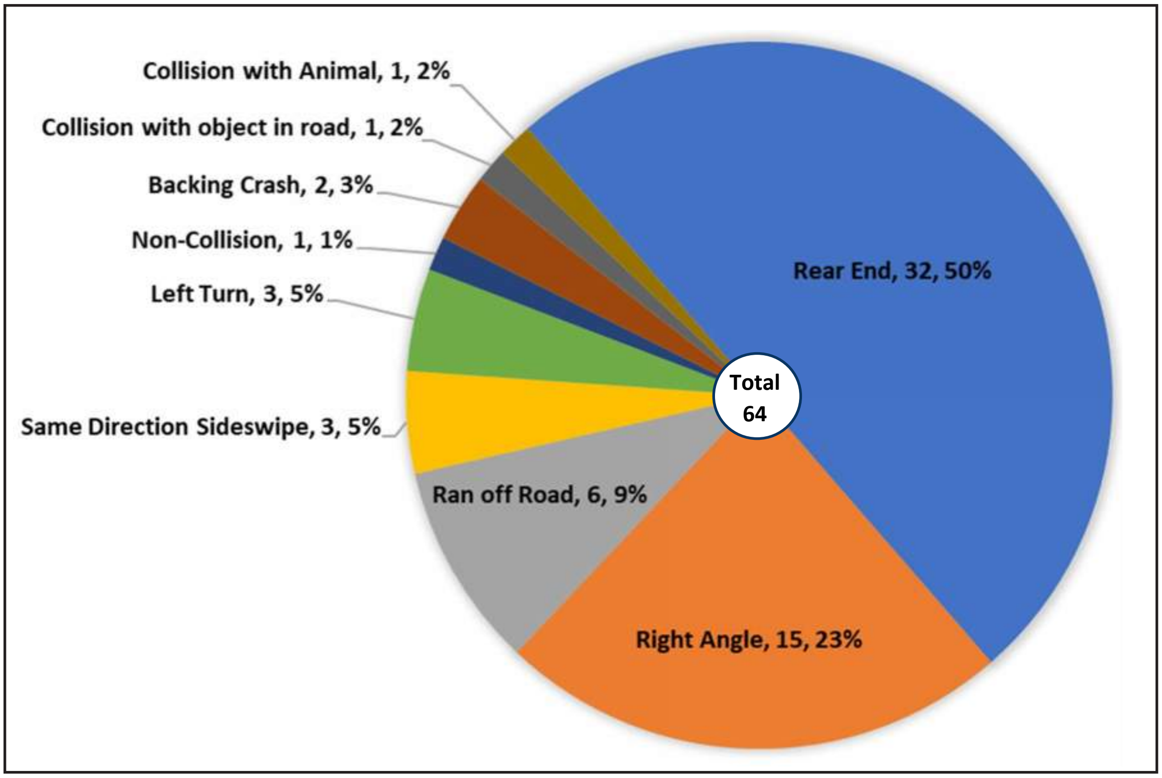
5.3.2. US 31 AT BUSINESS US 31

US 31 at Business 31 is a signalized intersection. Half of the reported crashes were rear end collisions. There are four reported fatalities at the intersection, resulting from two rear end collisions and two right angle collisions. All four of the fatalities were related to vehicles disregarding the signal and/or traveling at an unsafe speed. There are existing "Signal Ahead" warning signs (IMUTCD Sign Code W3-3) with flashing beacons on either side of the road for both the northbound and southbound approach lanes. Street lighting is present at the intersection. A summary of the ICF value, ICC value, intersection crash severity is provided in **Table 5-5**, and a summary of the intersection crash types is provided in **Figure 5-4**.

Table 5-5: Crash Analysis Summary - US 31 at Business US 31

ICF	ICC	Fatal and Incapacitating Injury Crashes	Non- Incapacitating Crashes	Property Damage Only Crashes
0.09	2.09	14	7	43

Figure 5-4: Crash Types - US 31 at Business US 31



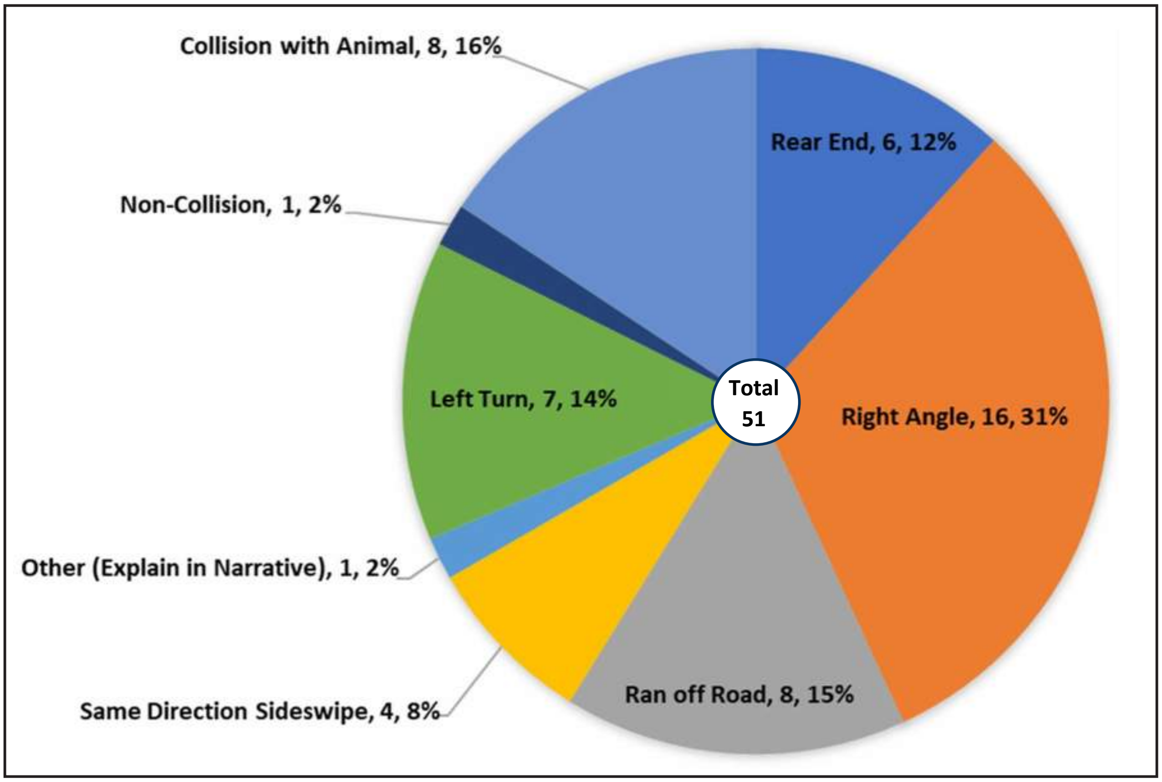
5.3.3. US 31 AT CR 500 S

US 31 at CR 500 S is a two-way stop-controlled (TWSC) intersection with stop-control on the minor approaches. The highest percentage of crashes was right angle at 31%. Investigation into the crash narratives indicated that most of these collisions occurred when drivers from the minor approach (turning left or going through), collided with vehicles on the nearside, major approach before reaching the median. Street lighting is not present at the intersection. A review of crashes by time-of-day indicated that 14 of the 51 crashes (27%) occurred in 'Dark' conditions. A summary of the ICF value, ICC value, intersection crash severity is provided in **Table 5-6**, and a summary of the intersection crash types is provided in **Figure 5-5**.

Table 5-6: Crash Analysis Summary - US 31 at CR 500 S

ICF	ICC	Fatal and Incapacitating Injury Crashes	Non- Incapacitating Crashes	Property Damage Only Crashes
1.21	1.21	11	4	36

Figure 5-5: Crash Types - US 31 at CR 500 S



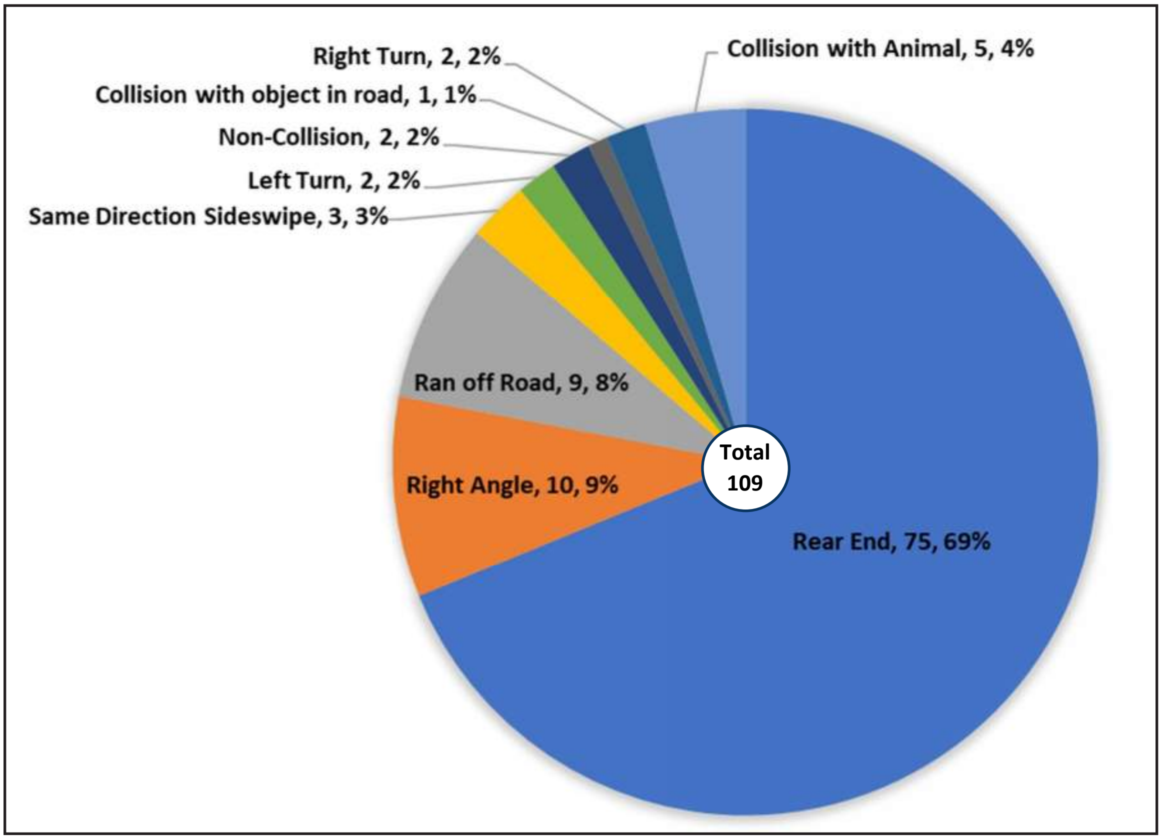
5.3.4. US 31 AT SR 218 N

US 31 at SR 218 N is a signalized T-intersection. Just under 70% of the reported crashes were rear end collisions. The contributing cause for most of the rear end collisions was a combination of the at-fault party following too closely, driving at unsafe speeds, and disregarding the signal. Both the northbound and southbound travel lanes of US 31 have existing "Signal Ahead" signage (IMUTCD Sign Code W3-3), although the northbound signs are not accompanied by flashing beacons whereas the southbound are. Street lighting is not present at the intersection. A review of crashes by time-of-day indicated that 24 of the 109 crashes (22%) occurred in 'Dark' conditions. A summary of the ICF value, ICC value, intersection crash severity is provided in **Table 5-7**, and a summary of the intersection crash types is provided in **Figure 5-6**.

Table 5-7: Crash Analysis Summary - US 31 at SR 218 N

ICF	ICC	Fatal and Incapacitating Injury Crashes	Non- Incapacitating Crashes	Property Damage Only Crashes
1.67	3.01	17	7	85

Figure 5-6: Crash Types - US 31 at SR 218 N



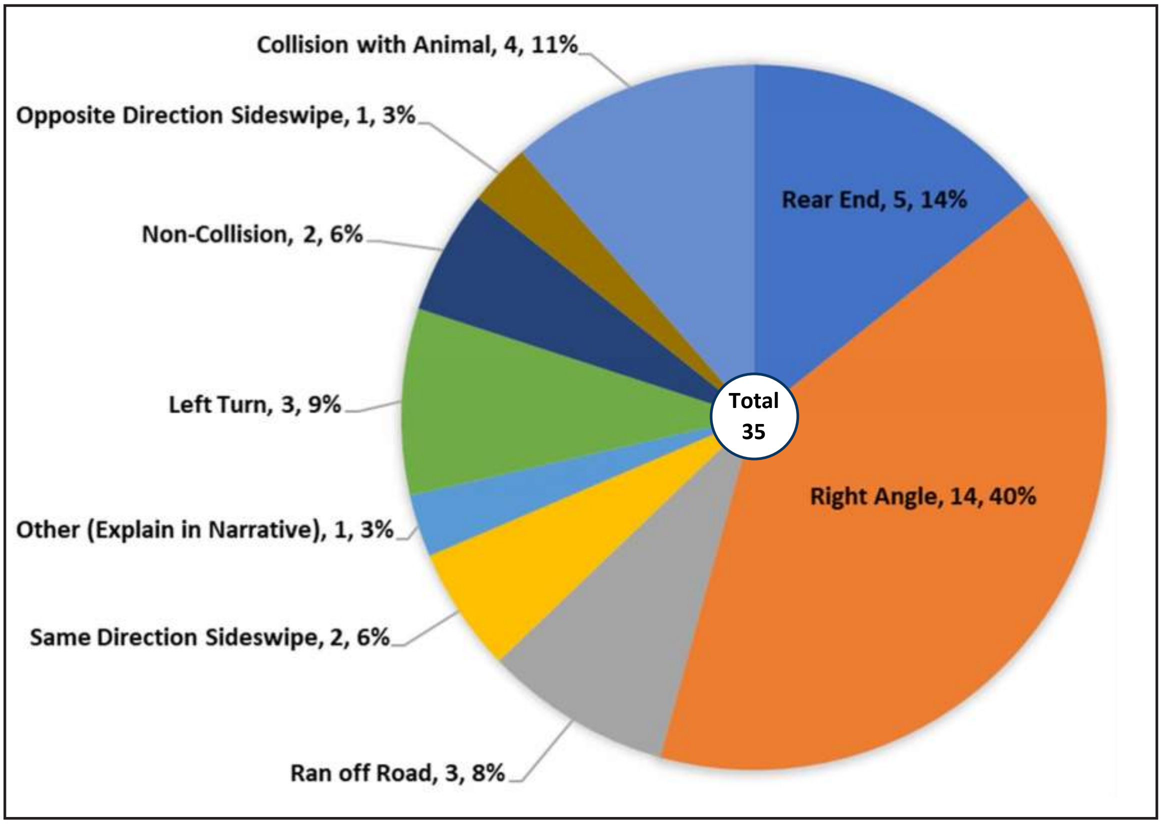
5.3.5. US 31 AT SR 218 S (W BROADWAY STREET)

US 31 at State Road 218 South (West Broadway Street) is an unsignalized T-intersection with stop-control on the minor approach. There is a flashing beacon at the intersection with flashing yellow for US 31 and flashing red for SR 218 S. Forty percent (40%) of crashes were right angle crashes, resulting from drivers attempting to make left turns from SR 218 to Southbound US 31. Street lighting is not present at the intersection. A review of crashes by time-of-day indicated that 10 of the 35 crashes (29%) occurred in 'Dark' conditions. A summary of the ICF value, ICC value, intersection crash severity is provided in **Table 5-8**, and a summary of the intersection crash types is provided in **Figure 5-7**.

Table 5-8: Crash Analysis Summary - US 31 at SR 218 S (W Broadway Street)

ICF	ICC	Fatal and Incapacitating Injury Crashes	Non- Incapacitating Crashes	Property Damage Only Crashes
1.57	1.99	9	4	22

Figure 5-7: Crash Types - US 31 at SR 218 S (W Broadway Street)



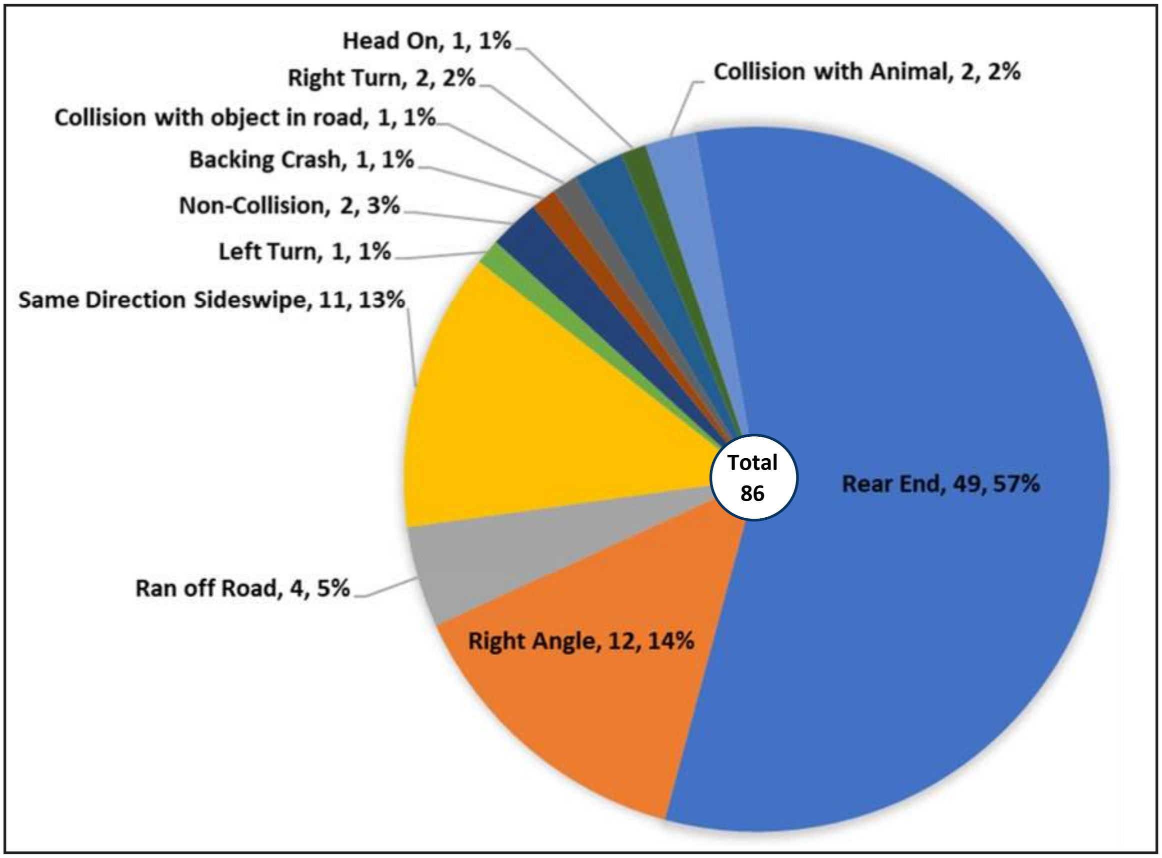
5.3.6. US 31 AT SR 18

US 31 at SR 18 is a signalized intersection. The highest percentage of crashes were rear end crashes at 57%. After further investigation into the crash narratives, it is concluded that most of the collisions were resultant from the combination of the at fault party following too closely, driving at unsafe speeds, and disregarding the signal. There are existing “Signal Ahead” warning signs (IMUTCD Sign Code W3-3) with flashing beacons on either side of the road for both the northbound and southbound approach lanes. Street lighting is not present at the intersection. A review of crashes by time-of-day indicated that 12 of the 86 crashes (14%) occurred in ‘Dark’ conditions. A summary of the ICF value, ICC value, intersection crash severity is provided in **Table 5-9**, and a summary of the intersection crash types is provided in **Figure 5-8**.

Table 5-9: Crash Analysis Summary - US 31 at SR 18

ICF	ICC	Fatal and Incapacitating Injury Crashes	Non- Incapacitating Crashes	Property Damage Only Crashes
1.87	0.70	6	6	74

Figure 5-8: Crash Types - US 31 at SR 18



5.3.7. US 31 AT DIVISION ROAD

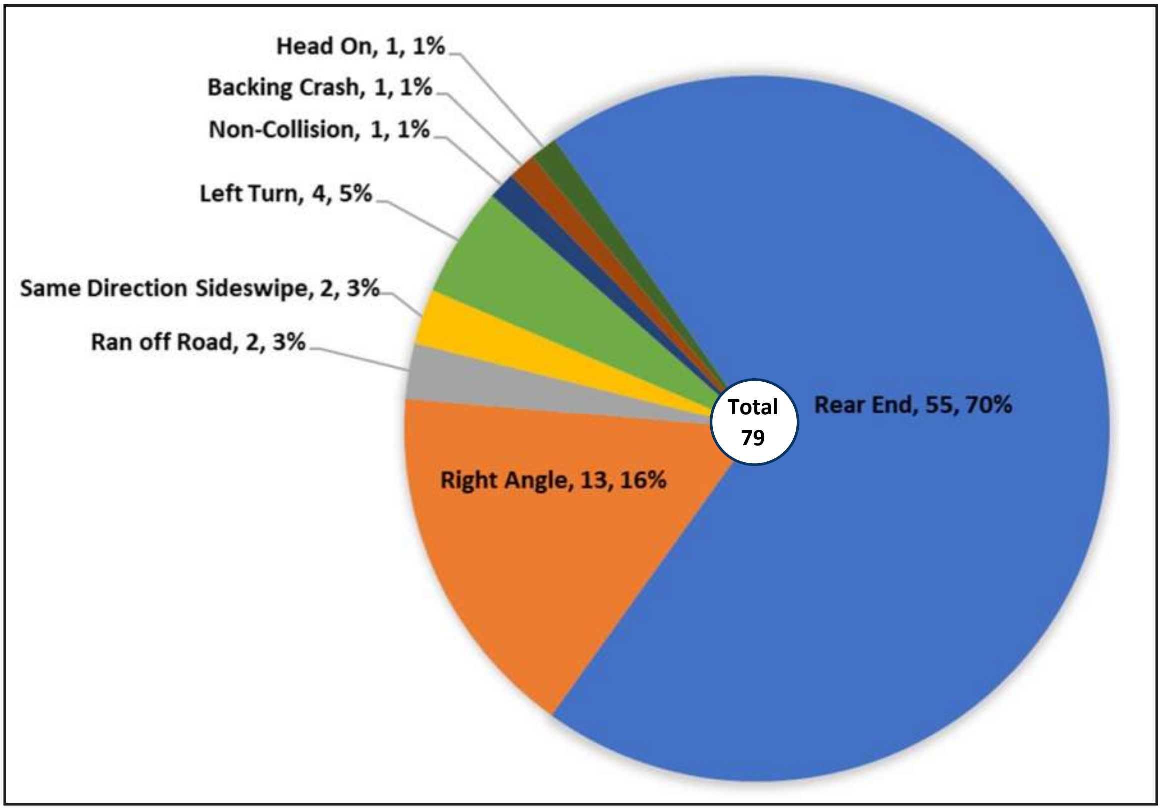
US 31 at Division Road is a signalized intersection. The highest percentage of crashes were rear end crashes at 70%. Review of the crash narratives indicated the cause of the crashes were from the combination of the at the fault party following too closely, driving at unsafe speeds, and disregarding signal. There are existing "Signal Ahead" warning signs (IMUTCD Sign Code W3-3) with flashing beacons on either side of the road for both the northbound and southbound approach lanes. Street lighting is not present at the intersection. A review of crashes by time-of-day indicated that 14 of the 79 crashes (18%) occurred in 'Dark' conditions. A summary of the ICF value, ICC value, intersection crash severity is provided in **Table 5-10**, and a summary of the intersection crash types is provided in **Figure 5-9**.

South of Division Road, construction of the grade separated crossing at W CR 100 S (Des. No. 1592421) began in winter of 2021. While the maintenance of traffic (MOT) during the construction of the grade separated crossing includes restricting the Division Road intersection to right-in/right-out, review of the crash reports indicated that the signal at Division Road was operational throughout the crash analysis time frame (January 1, 2017 to December 31, 2021). While the overpass construction overlaps the crash analysis time frame in 2021, the construction is not expected to have measurable effect on the crash analysis.

Table 5-10: Crash Analysis Summary - US 31 at Division Road

ICF	ICC	Fatal and Incapacitating Injury Crashes	Non- Incapacitating Crashes	Property Damage Only Crashes
1.09	2.03	16	7	56

Figure 5-9: Crash Types - US 31 at Division Road



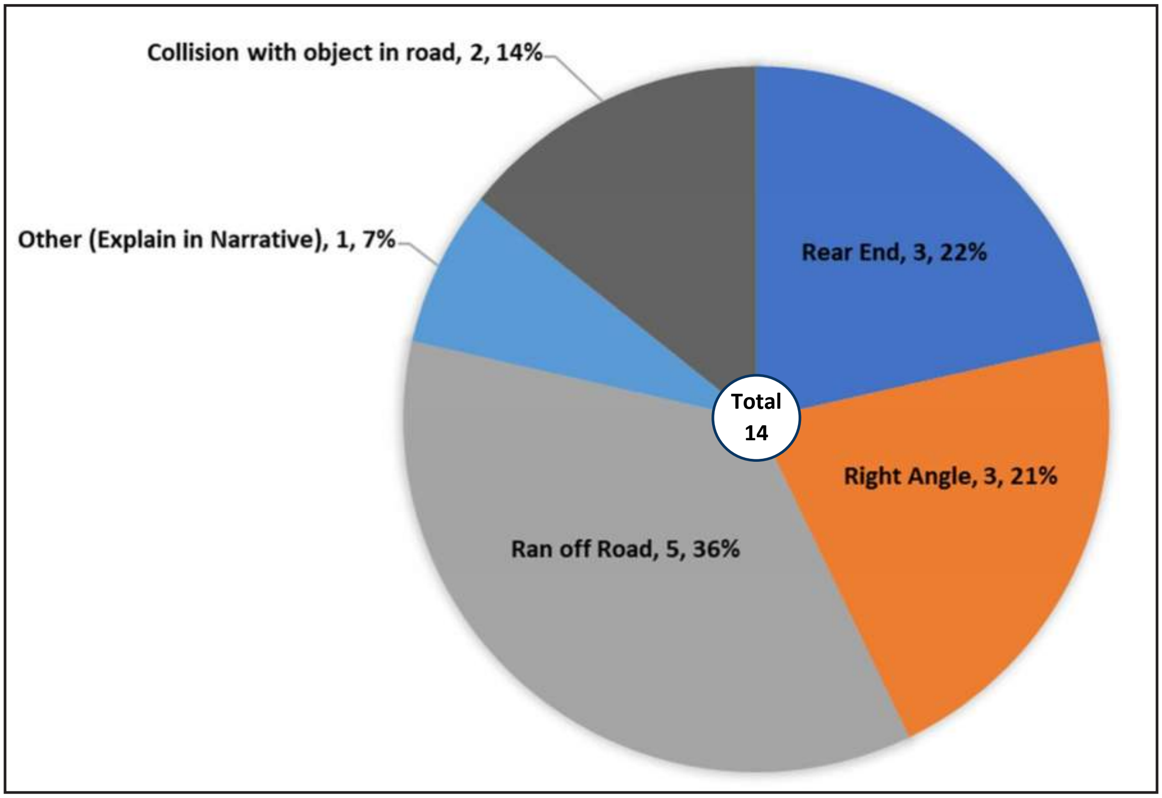
5.3.8. US 31 AT SR 28 / W CR 200 S (WESTERN ROUNDABOUT)

US 31 at SR 28 / W 200 S (western roundabout) is a ramp terminal intersection controlled by a roundabout. For comparative purposes, the roundabout was analyzed as a stop-controlled intersection in the RoadHAT analysis. The highest percentage of crashes were from drivers running off the road, at 36%. Review of the crash narratives revealed that drivers either are unfamiliar with the roundabout or are entering the roundabout at too high of a speed and losing control of their vehicle. A preliminary review of the roundabout geometry indicated the splitter island on the west leg (eastbound approach) may not be long enough given the curvature of the approach. Street lighting is present at the intersection. A summary of the ICF value, ICC value, intersection crash severity is provided in **Table 5-11**, and a summary of the intersection crash types is provided in **Figure 5-10**.

Table 5-11: Crash Analysis Summary - US 31 at SR 28 / W CR 200 S (Western Roundabout)

ICF	ICC	Fatal and Incapacitating Injury Crashes	Non- Incapacitating Crashes	Property Damage Only Crashes
0.90	1.24	4	0	10

Figure 5-10: Crash Types - US 31 at SR 28 / W CR 200 S (Western Roundabout)



6. TRAFFIC OPERATIONS

6.1. EXISTING TRAFFIC VOLUMES

Average Annual Daily Traffic (AADT) volumes were collected from the INDOT Traffic Count Database System (TCDS) along US 31 and on study intersection side streets, where available. Vehicle turning movement counts (TMCs) collected between 2019 and 2022, were provided by INDOT for each of the study intersections. Any traffic counts collected in 2020 or 2021 were reviewed to ensure they were not influenced by COVID-19. For locations where this review indicated a potential problem with the data, INDOT provided updated (2022) counts.

With the existing intersection counts collected in different months and years, the TMCs were adjusted using INDOT's Traffic Adjustment Factors. These factors allow for counts taken in different months and years to be adjusted to the peak season of the existing (2022) analysis year. With these adjustment factors, 2022 peak season turning movement volumes (TMVs) were estimated for use in the existing conditions AM and PM peak hour analysis. Similarly, for locations where AADT volumes were from a year other than 2022, the AADT volumes obtained from the INDOT TCDS were adjusted to the existing (2022) analysis year, using INDOT's Traffic Adjustment Factors.

The adjusted existing (2022) AADT volumes are shown in **Figures 6-1** through **6-6**. Summaries of the TMCs for the AM and PM peak hours are provided in **Appendix C**. Based on the INDOT TCDS, daily truck volumes on US 31 within the study corridor vary from 15% to 17%, south of Kokomo, and from 17% to 27%, north of Kokomo.

6.1.1. ORIGIN-DESTINATION DATA

Origin-destination data was obtained from the Indiana Statewide Travel Demand Model (ISTDM) to provide a sense of the nature of trips in the study corridor. Although this data is not calibrated to existing conditions, it is considered to provide a reasonable representation of trips in the study area.

The daily ISTDM origin-destination data was examined for the study segments of US 31, north and south of Kokomo, and in its entirety between Indianapolis and South Bend. This data is summarized in **Table 6-1**. Trips were categorized into local trips, sub-regional trips, and regional trips, defined as follows:

- Local Trips – Trips using US 31 with origins and/or destinations within the study segment
- Sub-Regional Trips – Trips using US 31 with origins and destinations outside of the study segment
- Regional Through Trips – Trips using US 31 with origins and destinations in or beyond the Indianapolis and South Bend/Mishawaka metropolitan areas.

Table 6-1: Trip Types based on ISTDM O-D data

Segment	Local Trips	Regional Trips	
US 31 North of Kokomo	75%	25%	
		Sub-Regional	Regional Through
		11%	14%
US 31 South of Kokomo	30%	70%	
		Sub-Regional	Regional Through
		59%	11%

Figure 6-1: 2022 Annual Average Daily Traffic (AADT) Volumes (1 of 6)

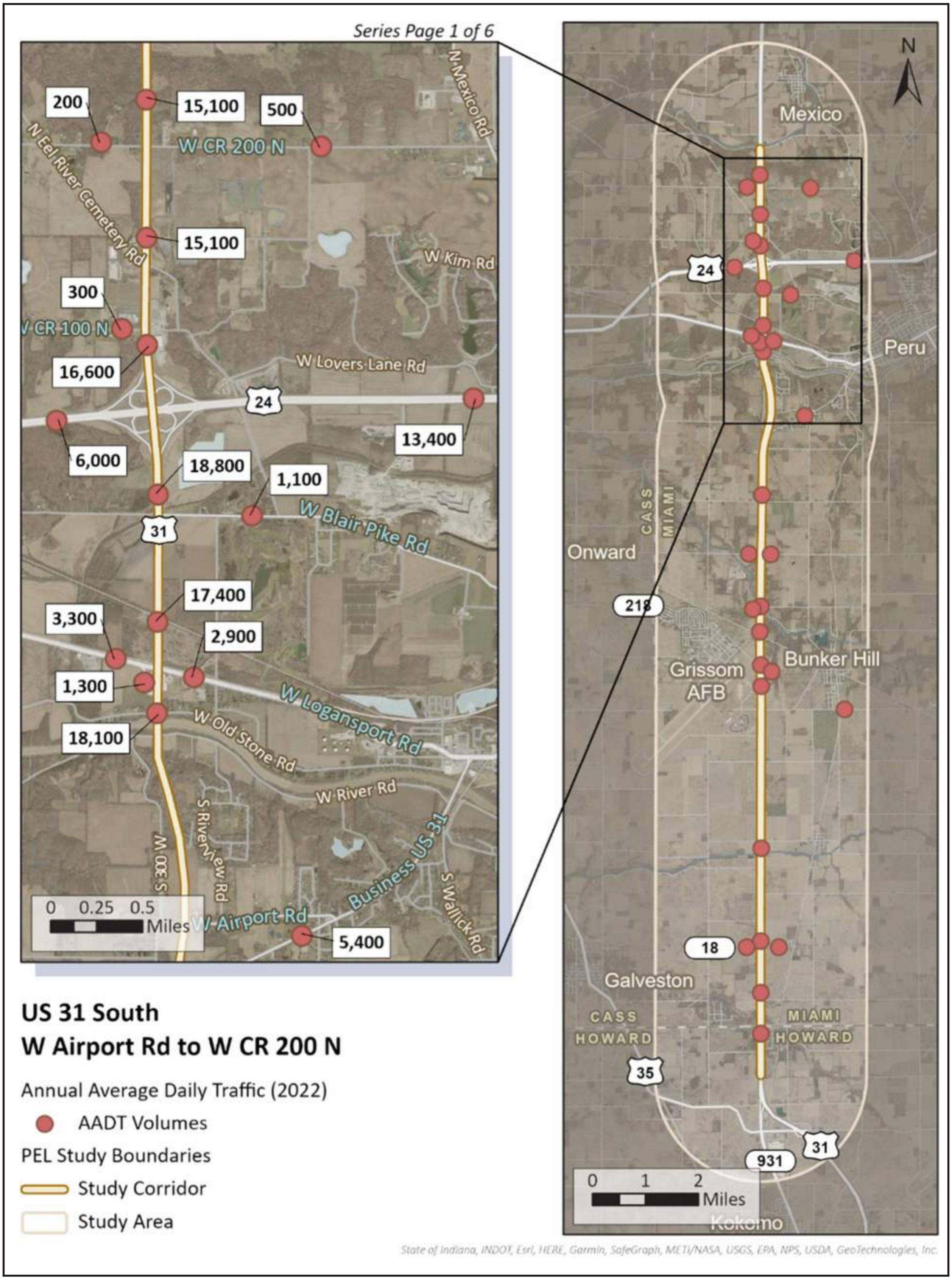


Figure 6-2: 2022 Annual Average Daily Traffic (AADT) Volumes (2 of 6)

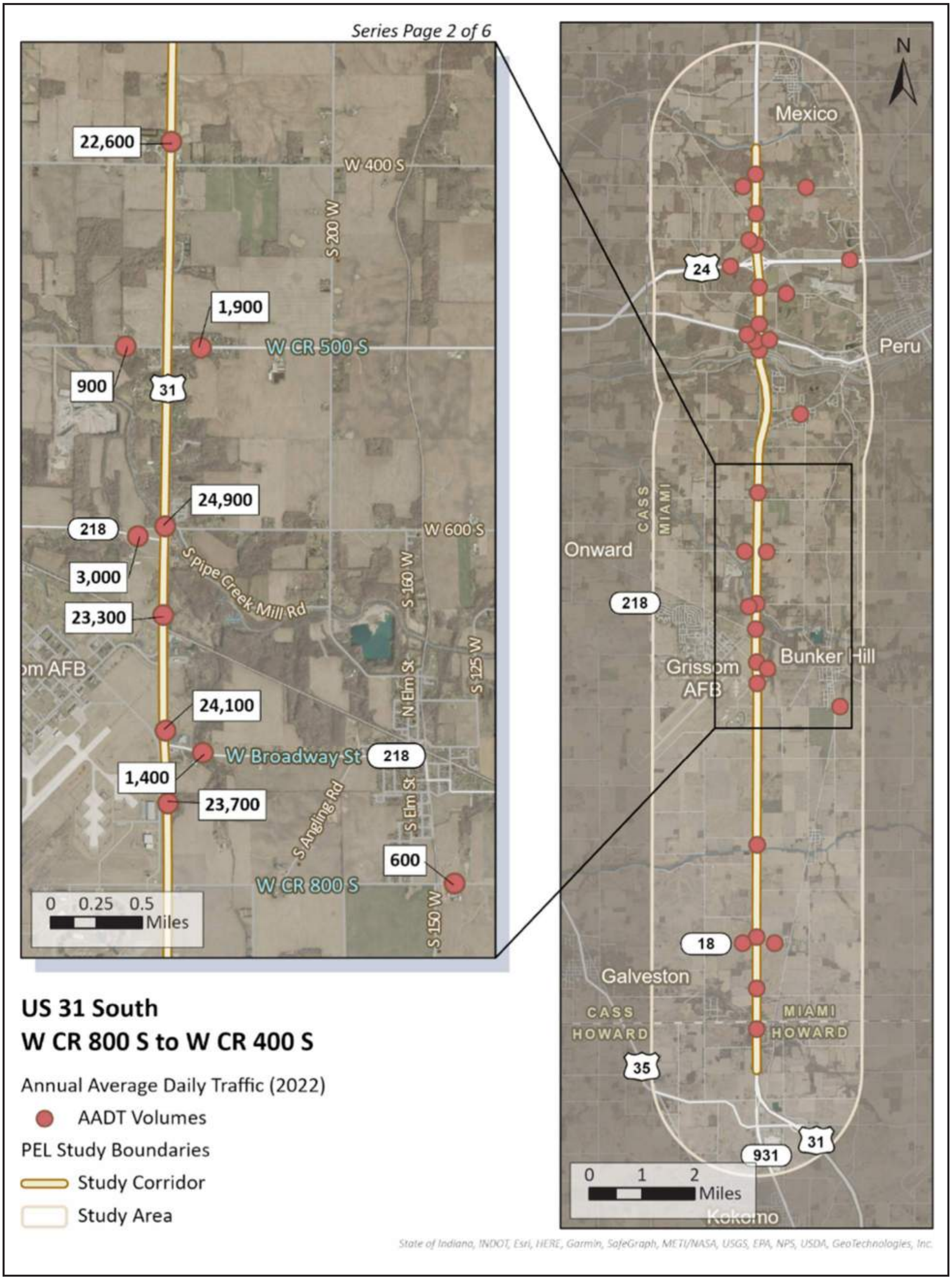


Figure 6-3: 2022 Annual Average Daily Traffic (AADT) Volumes (3 of 6)

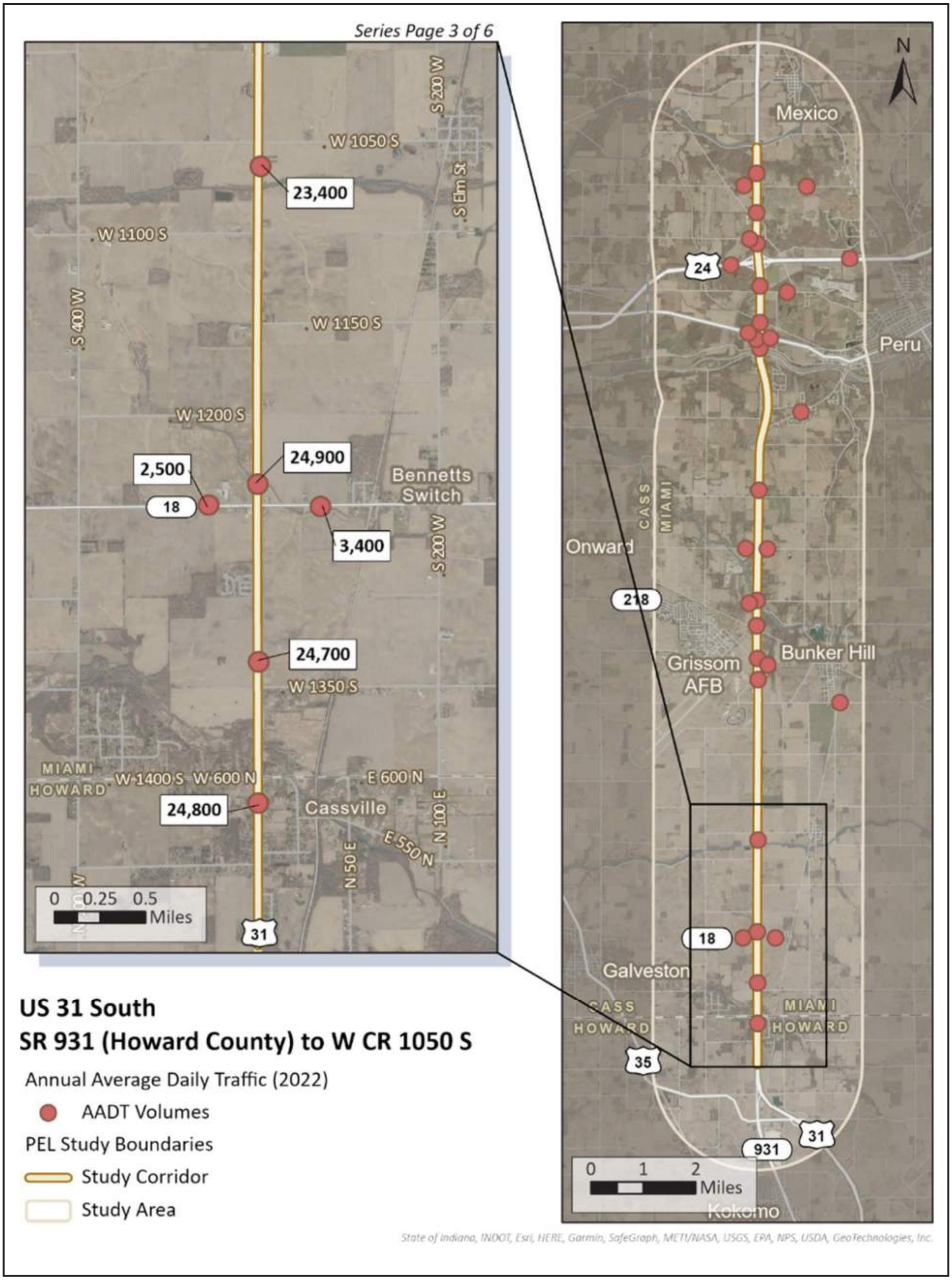


Figure 6-4: 2022 Annual Average Daily Traffic (AADT) Volumes (4 of 6)

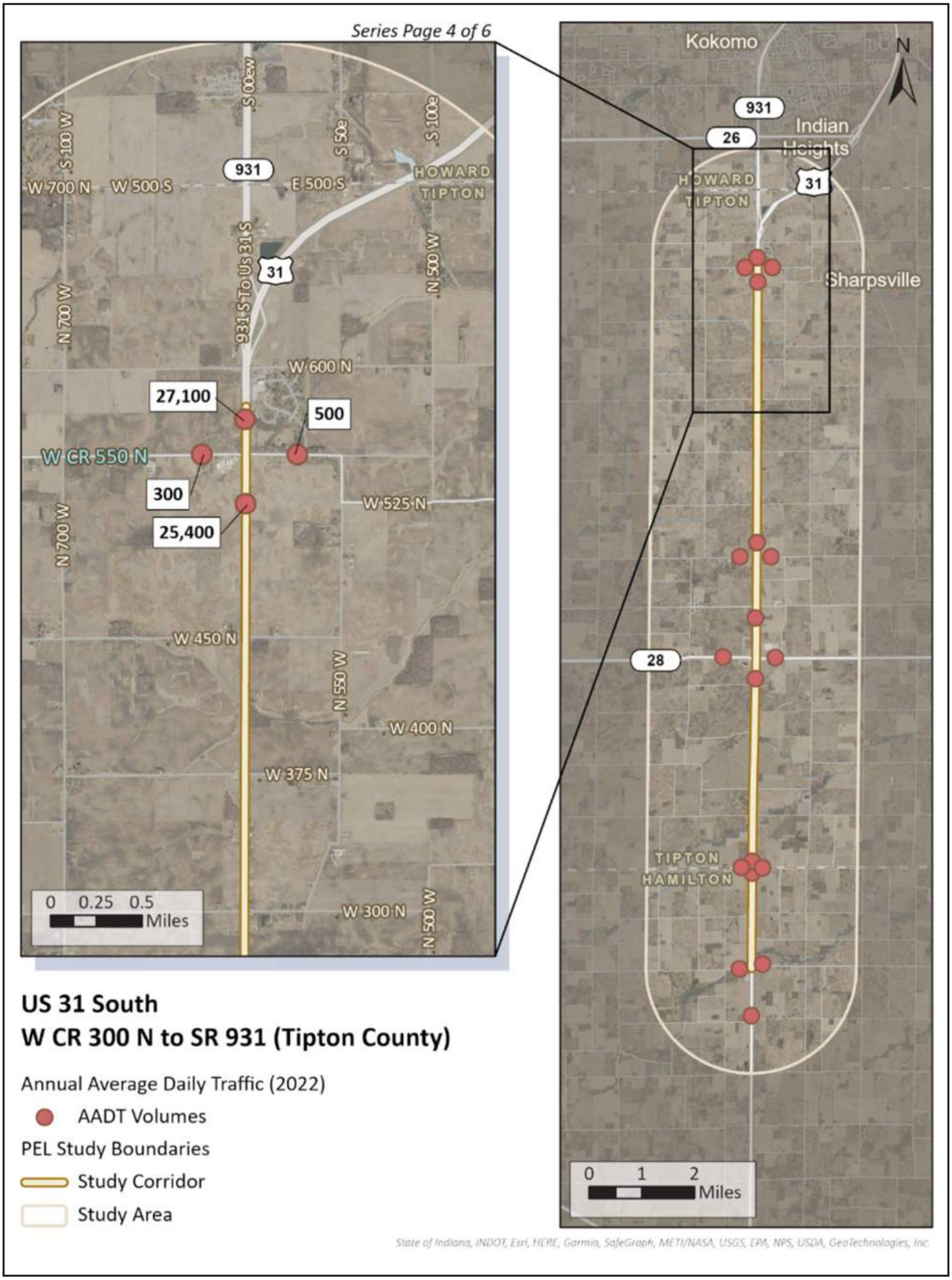


Figure 6-5: 2022 Annual Average Daily Traffic (AADT) Volumes (5 of 6)

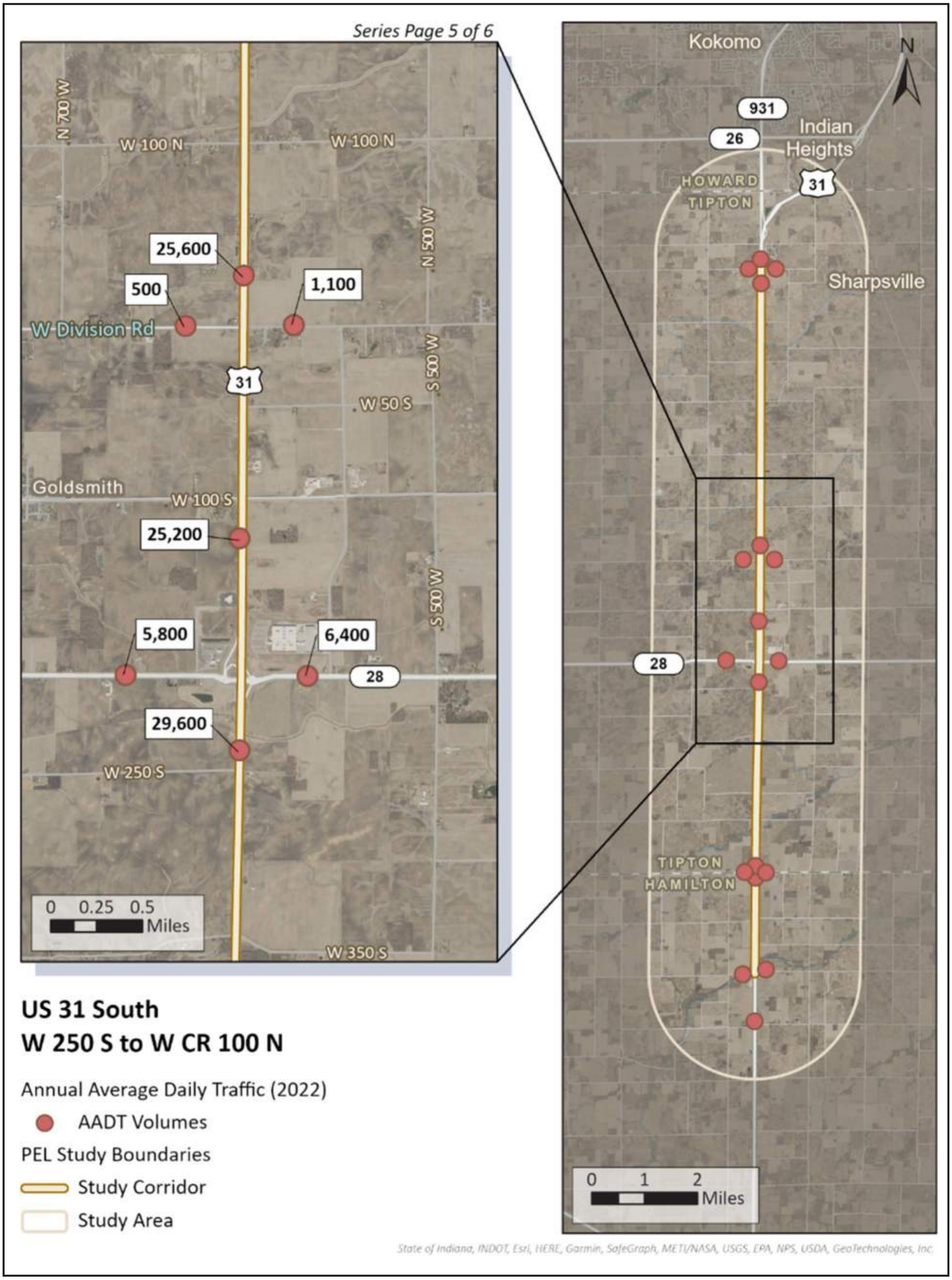
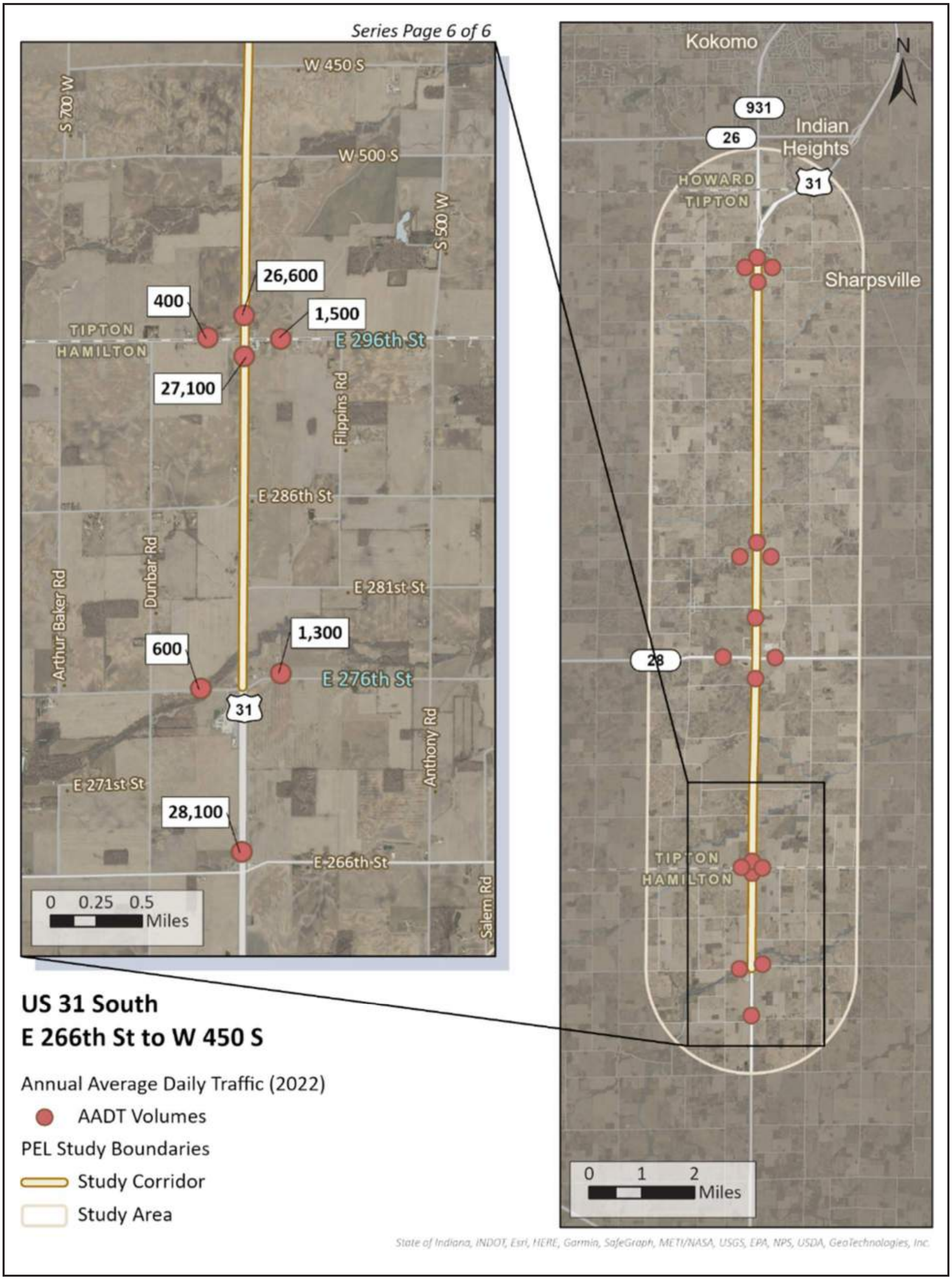


Figure 6-6: 2022 Annual Average Daily Traffic (AADT) Volumes (6 of 6)



6.2. PROJECTED TRAFFIC VOLUMES

To estimate future 2045 design year volumes, a traffic growth rate was calculated using outputs from the Indiana Statewide Traffic Model (updated for the US 30/US 31 PEL Studies). This model provided estimated intersection volumes for each of the study intersections for a base year (2019) and a future year (2045). The future year model included both existing and committed (E+C) projects on, and adjacent to, the US 31 South study corridor. Using these volumes, an average annual growth rate of 0.6% was calculated.

This growth rate was then applied to the 2022 peak season TMVs to estimate the 2045 design year TMVs for the AM and PM peak hours. The peak hour turning movement volumes (TMVs) for each study intersection that result from this methodology are provided in **Appendix C**. Additionally, this growth rate was applied to the existing (2022) AADT volumes to estimate the 2045 design year AADT volumes. These projected design year (2045) AADT volumes are shown in **Figures 6-7** through **6-12**.

6.2.1. EASTBOUND / WESTBOUND THROUGH AND LEFT-TURN VOLUMES

Using the 2045 design year TMVs, eastbound and westbound approach volumes going through or left at US 31 were summarized. This summary is intended to provide information on which locations might benefit the most from the implementation of either a grade separated overpass for the east-west movement (no US 31 access) or a full interchange. These projected design year (2045) TMVs are shown in **Table 6-2**.

Table 6-2: Eastbound / Westbound Through and Left-turn Design Year (2045) Volumes

Intersection	EB/WB Through and Left-turning Vehicles		
	AM Peak	PM Peak	Rank*
US 31 & W 200 N	39	35	10
US 31 & W 100 N	108	97	5
US 31 & US 24	*Grade-separated*		
US 31 & W Division Rd/Blair Pike Road	27	40	11
US 31 & Logansport Rd	*Grade-separated*		
US 31 & W Airport Rd	68	69	8
US 31 & Business US 31	295	248	1
US 31 & W CR 500 S	89	123	4
US 31 & SR 218 N	106	178	3
US 31 & SR 218 S/W Broadway Street	41	24	12
US 31 & W 800 S	52	95	7
US 31 & SR 18	195	195	2
US 31 &W 550 N	21	10	13
US 31 & Division Road	98	92	6
US 31 & SR 28*	*Grade-separated*		
US 31 & 296th Street	94	39	9
US 31 & 276th Street	*Currently being reconstructed as a grade-separated interchange*		

* Intersections are ranked according to the sum of the AM and PM peak hour volumes shown.

Figure 6-7: 2045 Annual Average Daily Traffic (AADT) Volumes (1 of 6)

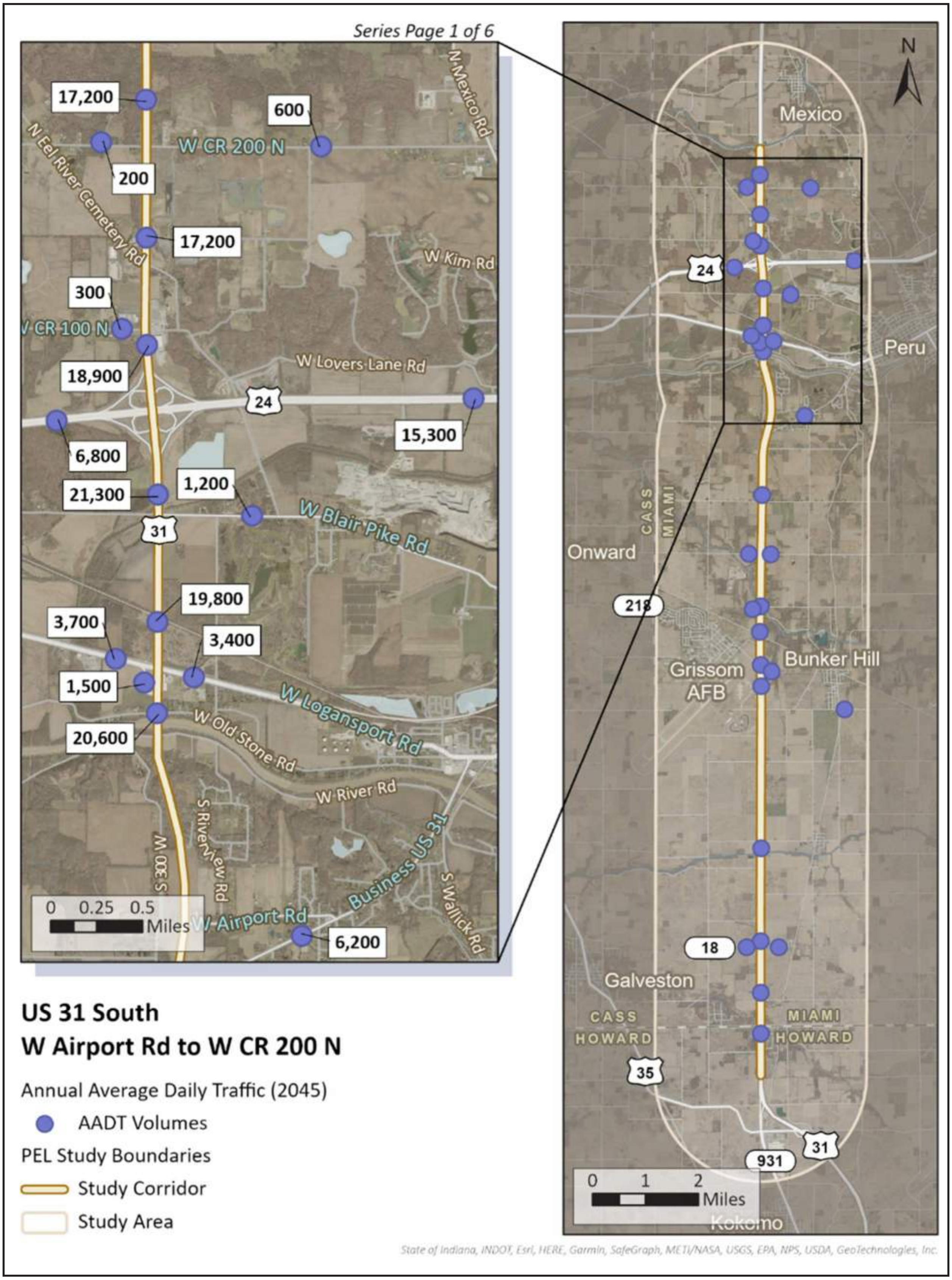


Figure 6-8: 2045 Annual Average Daily Traffic (AADT) Volumes (2 of 6)

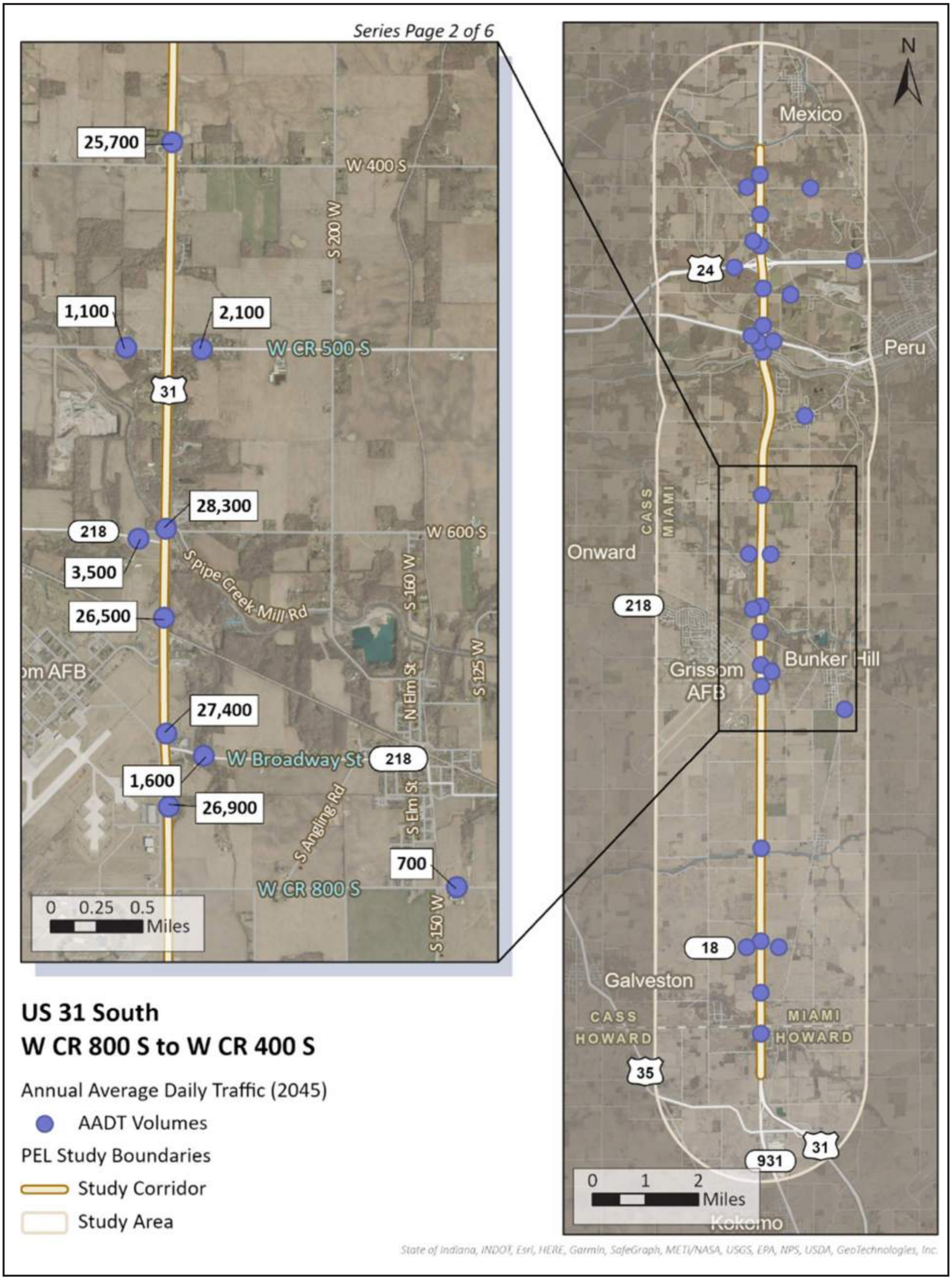


Figure 6-9: 2045 Annual Average Daily Traffic (AADT) Volumes (3 of 6)

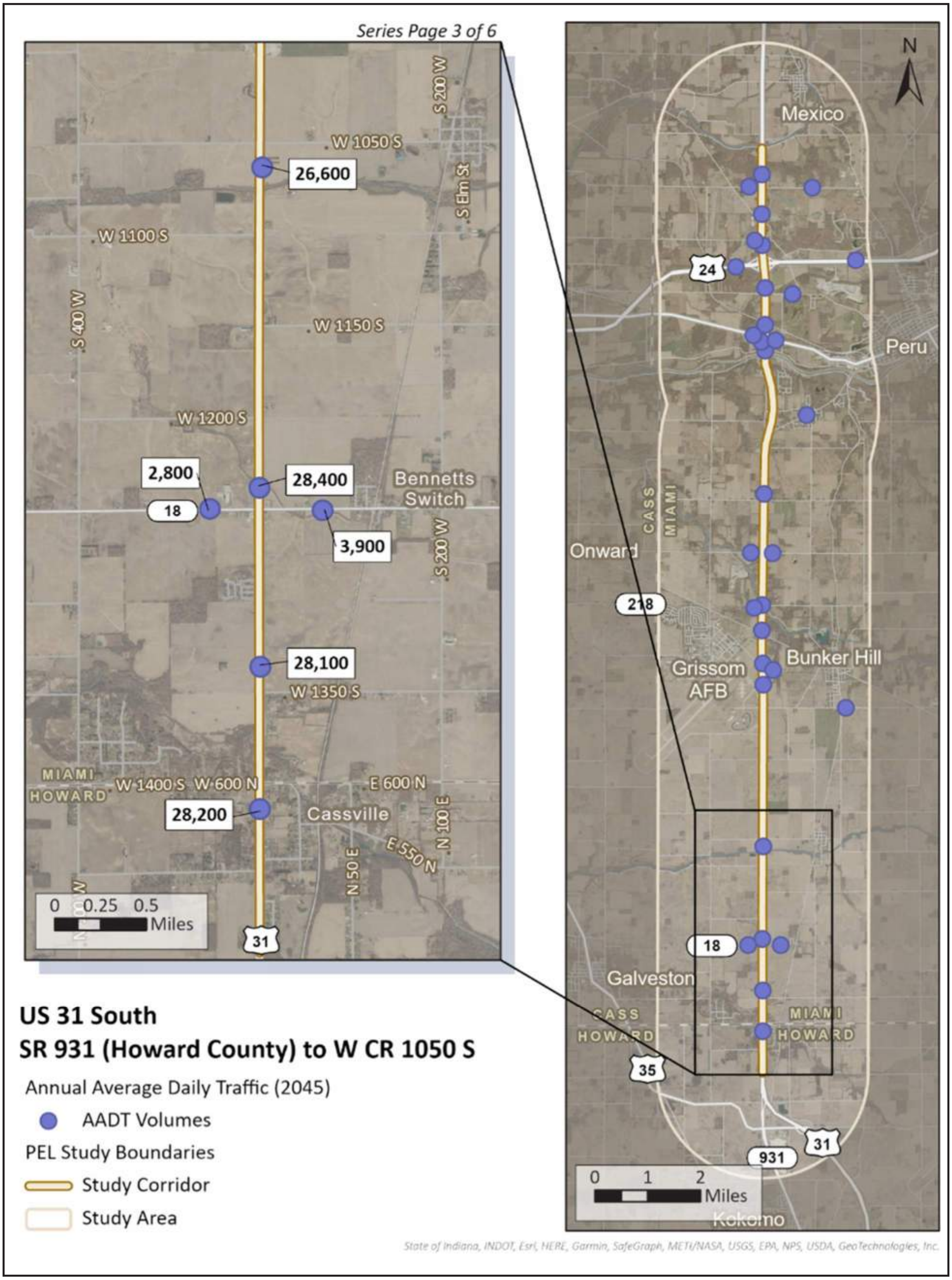


Figure 6-10: 2045 Annual Average Daily Traffic (AADT) Volumes (4 of 6)

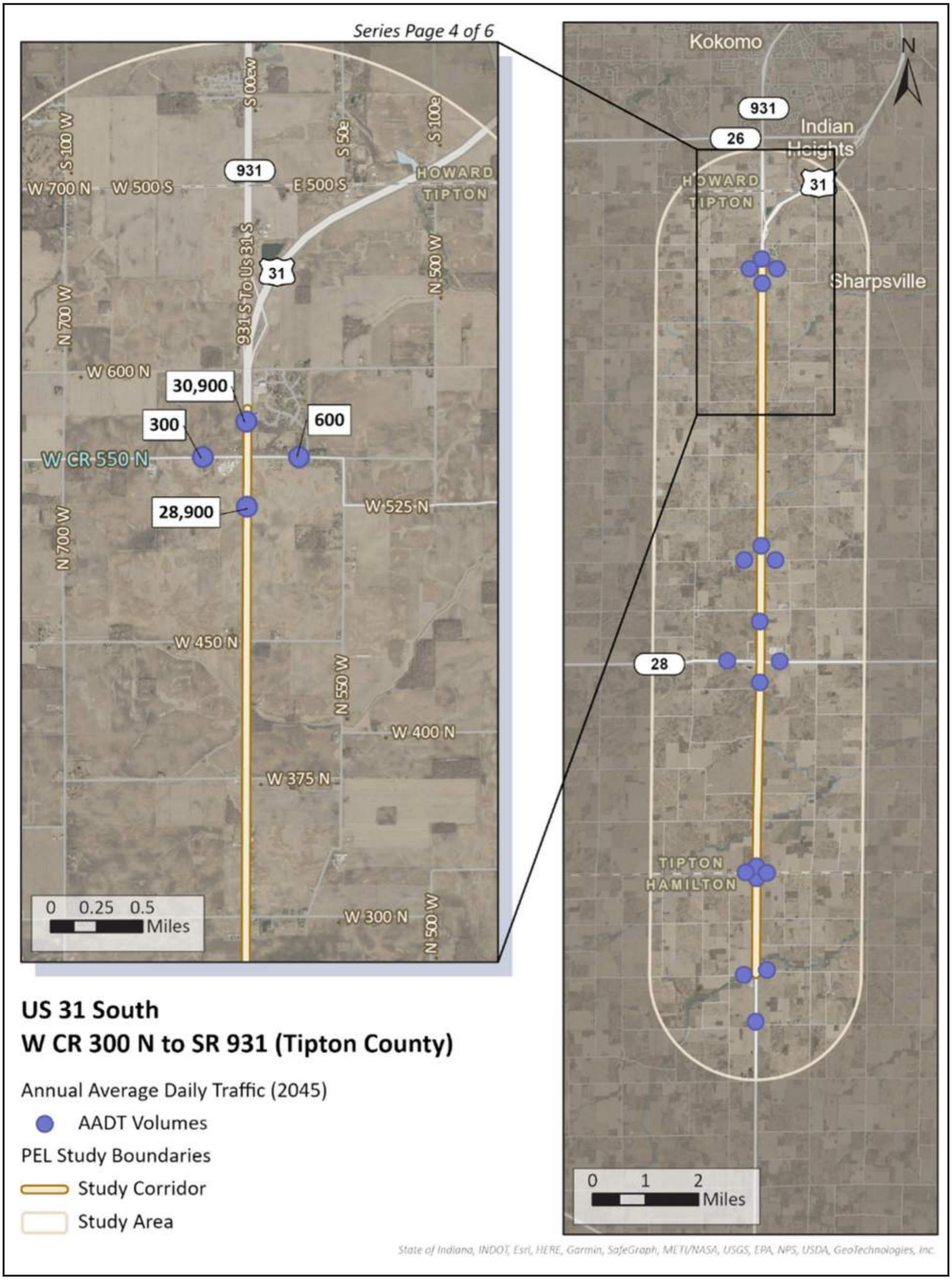


Figure 6-11: 2045 Annual Average Daily Traffic (AADT) Volumes (5 of 6)

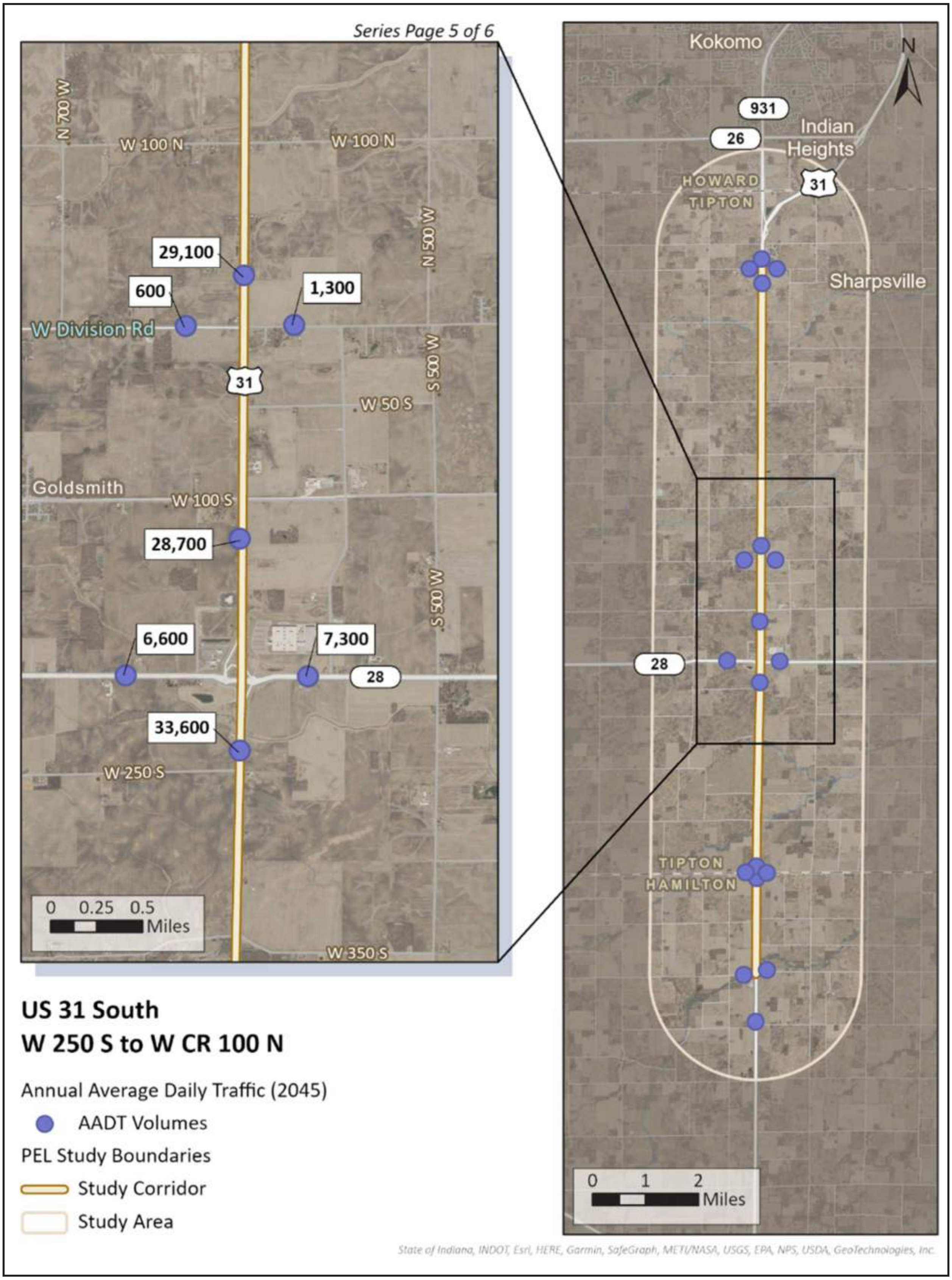
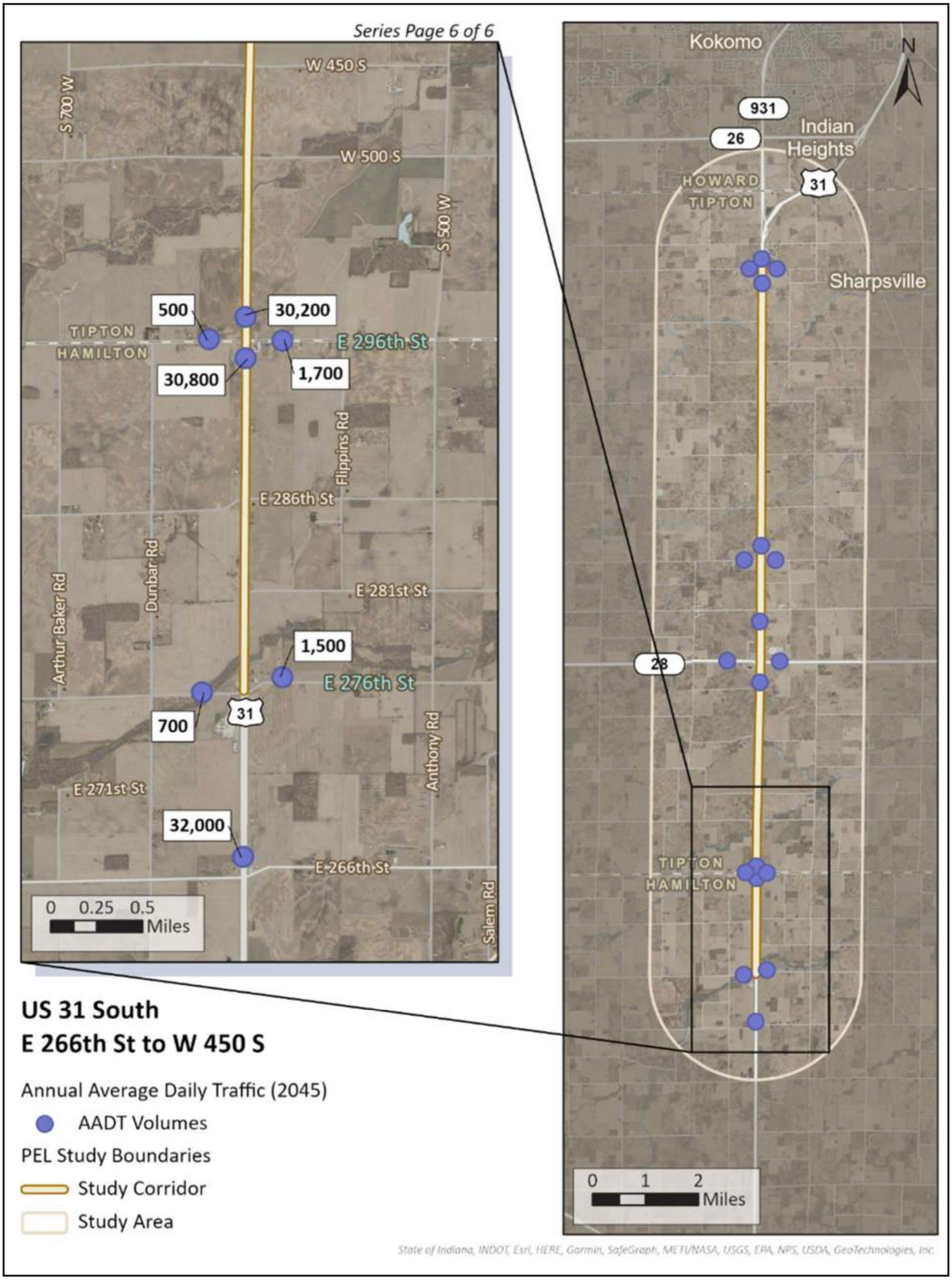


Figure 6-12: 2045 Annual Average Daily Traffic (AADT) Volumes (6 of 6)



6.3. OPERATIONAL ANALYSIS

Using the existing (2022) and future (2045) volumes, the study intersections were analyzed as directed in INDOT's Intersection Traffic Analysis Procedures. In summary:

- Synchro 11 software, using Highway Capacity Manual (HCM) methodology, for signalized and stop-controlled intersection analysis.
- Sidra 9 software, using INDOT directed SIDRA inputs, for roundabout analysis.
- Highway Capacity Software (HCS7) for interchange merge, diverge, and weave analysis.

According to the HCM, there are six levels of service (LOS) by which operational performance may be described. These levels of service range between LOS "A" which indicates a relatively free-flowing condition and LOS "F" which indicates operational breakdown. **Table 6-2** shows the LOS and associated operational measure for each type of analysis. Signal timing data used in the operational analysis is provided in **Appendix D**.

Table 6-2: Level of Service (LOS) Operational Measures

LOS	Analysis Type				
	Intersection (Delay in Seconds per Vehicle)			Freeway (Density in Vehicles per Mile per Lane)	
	Signalized	Two-way Stop	Roundabout	Merge / Diverge	Weaving
A	<= 10.0	<= 10.0	<= 10.0	<= 10.0	<= 10.0
B	<= 20.0	<= 15.0	<= 20.0	<= 20.0	<= 20.0
C	<= 35.0	<= 25.0	<= 35.0	<= 28.0	<= 28.0
D	<= 55.0	<= 35.0	<= 55.0	<= 35.0	<= 35.0
E	<= 80.0	<= 50.0	<= 80.0	<= 43.0	<= 43.0
F	> 80.0	> 50.0	> 80.0	> 43.0	> 43.0

6.3.1. EXISTING (2022) OPERATIONAL ANALYSIS

The results of the existing (2022) operational analysis are summarized in **Tables 6-3** and **6-4**, with the detailed analysis output sheets provided in **Appendix E**.

Table 6-3: Existing (2022) Operational Analysis Results (1 of 2)

Intersection	Approach	AM Peak		PM Peak	
		LOS	Delay (sec/veh)	LOS	Delay (sec/veh)
US 31 at W CR 200 N (TWSC)	Eastbound	B	13.9	C	15.8
	Westbound	B	13.2	C	17.3
US 31 at W CR 100 N (Signalized)	Eastbound	D	46.1	D	43.9
	Westbound	E	56.5	E	56.5
	Northbound	B	10.2	B	12.2
	Southbound	B	15.4	B	16.1
	Overall	**B**	**19.2**	**B**	**19.2**
Southbound US 31 at US 24 (Interchange)*	Diverge	A	6.2	A	7.6
	Weave	A	4.2	A	4.9
	Merge	A	8.0	A	9.1
Northbound US 31 at US 24 (Interchange)*	Diverge	A	5.1	A	8.3
	Weave	A	2.5	A	4.4
	Merge	A	6.9	A	9.8
US 31 at W Division Rd / W Blair Pike Rd (TWSC)	Eastbound	B	12.0	C	18.4
	Westbound	B	12.9	C	16.4
US 31 at Ramp to Logansport Rd (TWSC)	Eastbound	B	10.5	B	11.4
US 31 at W Airport Rd (TWSC)	Eastbound	C	15.5	C	22.9
	Westbound	B	14.0	C	18.8
US 31 at Business US 31 (Signalized)	Westbound	C	21.4	C	22.4
	Northbound	A	7.8	A	8.3
	Southbound	A	7.9	A	7.7
	Overall	**B**	**10.5**	**A**	**9.9**
US 31 at CR 500 S (TWSC)	Eastbound	C	17.7	D	32.3
	Westbound	C	22.2	**F**	**54.7**
US 31 at SR 218 N (Signalized)	Eastbound	D	40.2	E	57.9
	Northbound	A	8.7	B	11.2
	Southbound	C	20.2	B	18.0
	Overall	**B**	**17.5**	**B**	**17.7**

*The measure of effectiveness for interchange analysis is density: passenger car equivalent per mile per lane (pc/mi/ln).

Table 6-4: Existing (2022) Operational Analysis Results (2 of 2)

Intersection	Approach	AM Peak		PM Peak	
		LOS	Delay (sec/veh)	LOS	Delay (sec/veh)
US 31 at SR 218 S / W Broadway Street (TWSC)	Westbound	C	16.3	C	20.5
US 31 at W CR 800 S (TWSC)	Eastbound	D	25.5	C	23.7
	Westbound	C	20.2	**E**	**40.4**
US 31 at SR 18 (Signalized)	Eastbound	C	28.3	D	40.8
	Westbound	C	25.1	D	37.7
	Northbound	B	13.9	B	14.4
	Southbound	B	15.7	B	16.1
	Overall	**B**	**16.4**	**B**	**17.4**
US 31 at W CR 550 N (TWSC)	Eastbound	C	16.2	D	28.9
	Westbound	C	17.9	C	15.9
US 31 at Division Road (Signalized)	Eastbound	D	41.0	D	40.1
	Westbound	D	44.0	D	44.5
	Northbound	A	4.6	A	5.3
	Southbound	A	5.7	A	6.2
	Overall	**A**	**7.7**	**A**	**8.1**
US 31 at SR 28 (East roundabout)	Eastbound	A	7.4	A	6.5
	Westbound	A	4.8	A	4.7
	Northbound	A	7.2	A	7.1
	Southbound	A	5.7	A	6.4
	Overall	**A**	**6.1**	**A**	**6.1**
US 31 at SR 28 (West roundabout)	Eastbound	A	7.1	A	6.2
	Westbound	A	4.6	A	4.7
	Southbound	A	8.7	A	6.6
	Overall	**A**	**6.3**	**A**	**5.5**
US 31 at 296th Street (TWSC)	Eastbound	C	19.5	D	29.2
	Westbound	D	29.7	D	31.3
US 31 at 276th Street* (TWSC)	Eastbound	D	27.9	**E**	**40.4**
	Westbound	**E**	**37.1**	**F**	**59.7**

**The 276th Street intersection is currently being reconstructed as a grade-separated interchange. Once complete, this improvement is anticipated to correct all operational deficiencies noted in the analysis of this intersection.*

6.3.2. FUTURE NO-BUILD (2045) OPERATIONAL ANALYSIS

The results of the future no-build (2045) operational analysis are summarized in **Tables 6-5** and **6-6**, with the detailed analysis output sheets provided in **Appendix F**. This analysis assumes no changes to the existing roadway network, other than signal timing adjustments, and is intended to highlight locations where operational deficiencies are likely to occur in the future.

Table 6-5: Future No-Build (2045) Operational Analysis Results (1 of 2)

Intersection	Approach	AM Peak		PM Peak	
		LOS	Delay (sec/veh)	LOS	Delay (sec/veh)
US 31 at W CR 200 N (TWSC)	Eastbound	C	15.1	C	17.3
	Westbound	B	14.0	C	19.7
US 31 at W CR 100 N (Signalized)	Eastbound	D	44.5	D	41.9
	Westbound	E	55.5	E	55.4
	Northbound	B	11.6	B	14.1
	Southbound	B	16.2	B	17.2
	Overall	**B**	**20.0**	**C**	**20.4**
Southbound US 31 at US 24 (Interchange)*	Diverge	A	6.9	A	8.5
	Weave	A	4.9	A	5.7
	Merge	A	8.9	B	10.2
Northbound US 31 at US 24 (Interchange)*	Diverge	A	5.7	A	9.4
	Weave	A	2.9	A	5.0
	Merge	A	7.5	B	10.8
US 31 at Ramp to W Division Rd / W Blair Pike Rd (TWSC)	Eastbound	B	12.5	C	20.8
	Westbound	B	13.9	C	19.1
US 31 at Ramp to Logansport Rd (TWSC)	Eastbound	B	10.9	B	12.1
US 31 at W Airport Rd (TWSC)	Eastbound	C	17.2	D	28.3
	Westbound	C	15.4	C	21.7
US 31 at Business US 31 (Signalized)	Westbound	C	21.4	C	27.0
	Northbound	A	8.9	A	8.7
	Southbound	A	9.0	A	8.0
	Overall	**B**	**11.4**	**B**	**10.8**
US 31 at CR 500 S (TWSC)	Eastbound	C	20.4	**E**	**45.6**
	Westbound	D	27.9	**F**	**110.0**
US 31 at SR 218 N (Signalized)	Eastbound	D	43.7	E	58.3
	Northbound	A	9.2	B	13.3
	Southbound	C	22.3	C	21.5
	Overall	**B**	**19.1**	**C**	**20.4**

*The measure of effectiveness for interchange analysis is density: passenger car equivalent per mile per lane (pc/mi/ln).

Table 6-6: Future No-Build (2045) Operational Analysis Results (2 of 2)

Intersection	Approach	AM Peak		PM Peak	
		LOS	Delay (sec/veh)	LOS	Delay (sec/veh)
US 31 at SR 218 S / W Broadway Street (TWSC)	Westbound	C	18.3	C	24.2
US 31 at W CR 800 S (TWSC)	Eastbound	D	32.6	D	30.6
	Westbound	D	26.0	**F**	**80.6**
US 31 at SR 18 (Signalized)	Eastbound	C	31.6	D	46.4
	Westbound	C	26.6	D	41.6
	Northbound	B	16.0	B	17.1
	Southbound	B	18.4	B	19.5
	Overall	**B**	**18.8**	**C**	**20.6**
US 31 at W CR 550 N (TWSC)	Eastbound	C	18.4	**E**	**36.2**
	Westbound	C	20.7	C	18.1
US 31 at Division Road (Signalized)	Eastbound	D	40.8	D	39.8
	Westbound	D	44.1	D	44.8
	Northbound	A	5.4	A	6.5
	Southbound	A	6.9	A	7.7
	Overall	**A**	**8.6**	**A**	**9.3**
US 31 at SR 28 (East roundabout)	Eastbound	A	7.4	A	6.6
	Westbound	A	4.9	A	4.9
	Northbound	A	7.4	A	7.2
	Southbound	A	5.6	A	6.5
	Overall	**A**	**6.2**	**A**	**6.2**
US 31 at SR 28 (West roundabout)	Eastbound	A	7.3	A	6.2
	Westbound	A	4.8	A	4.8
	Southbound	A	8.8	A	6.8
	Overall	**A**	**6.5**	**A**	**5.6**
US 31 at 296th Street (TWSC)	Eastbound	C	22.9	**E**	**37.9**
	Westbound	**E**	**43.0**	**E**	**43.9**
US 31 at 276th Street* (TWSC)	Eastbound	**E**	**35.0**	**F**	**63.4**
	Westbound	**F**	**61.7**	**F**	**122.8**

**The 276th Street intersection is currently being reconstructed as a grade-separated interchange. Once complete, this improvement is anticipated to correct all operational deficiencies noted in the analysis of this intersection.*

6.3.1. ANALYSIS SUMMARY

To determine which study locations are operationally deficient, the previously reported operational analysis results were compared to a minimal standard of LOS D. This standard was assumed based on information in Section 40-6.02(01) of the 2013 INDOT Design Manual, and was applied as follows:

- Signalized Intersections – Minimum standard of LOS D for the overall intersection with no approaches operating at LOS F.
- Unsignalized Intersections – Minimum standard of LOS D for all stop-controlled approaches.
- Interchange Diverge, Weaving, and Merge Sections – Minimum standard of LOS D for each applicable segment.

Operational analysis indicated the following deficiencies:

- Existing (2022) Traffic Conditions
  - **US 31 at CR 500 S** – Intersection is a 4-legged intersection with stop-control on the eastbound and westbound approaches and free-flow on US 31. The westbound approach operates at LOS F (PM peak hour). Review of traffic count videos showed many of the WB vehicles waiting for gaps in US 31 traffic. While passenger vehicles frequently used the median to make a two-stage turn, larger commercial trucks and trucks with trailers often waited until concurrent gaps were available from both directions of US 31 before crossing or making a left turn onto US 31. The delay for the vehicles waiting for a gap in both directions was noticeably higher than those making a two-stage movement.
  - **US 31 at W CR 800 S** – Intersection is a 4-legged intersection with a flashing beacon and stop-control on the eastbound and westbound approaches (flashing red) and free-flow on US 31 (flashing yellow). The westbound approach operates at LOS E (PM peak hour). No traffic count video was available at the time of this study. Based on a review of the intersection geometry and peak hour volumes, with comparisons to similar study intersections, vehicle gap acceptance is likely to be similar to the CR 500 S and 276th Street intersections discussed in this section. In summary, passenger vehicles are likely to use the median to make two-stage turns, while larger commercial trucks and trucks with trailers are more likely to wait for concurrent gaps from both directions of US 31 before crossing or making a left-turn onto US 31. The delay for the vehicles waiting for a gap in both directions expected to be noticeably higher than those making a two-stage movement.
  - **US 31 at 276th Street** – Intersection is a 4-legged intersection with stop-control on the eastbound and westbound approaches and free-flow on US 31. The eastbound approach operates at LOS E (PM peak hour) and the westbound approach operates at LOS E (AM peak hour) and LOS F (PM peak hour). Review of traffic count videos showed vehicles from both stop-controlled approaches waiting for gaps in US 31 traffic. Passenger vehicles frequently used the median to make a two-stage turn, though larger commercial trucks and trucks with trailers typically waited until concurrent gaps were available from both directions of US 31 before crossing or making a left turn onto US 31. The delay for the vehicles waiting for a gap in both directions was noticeably higher than those making a two-stage movement.
    Note: This intersection is currently being reconstructed as a grade-separated interchange. Once complete, this improvement is anticipated to correct all operational deficiencies noted in the analysis of this intersection.

- Future (2045) No-Build Traffic Conditions
  - **US 31 at CR 500 S** – Intersection is a 4-legged intersection with stop-control on the eastbound and westbound approaches and free-flow on US 31. The operational deficiencies previously noted at this intersection are anticipated to worsen over time, with anticipated design year (2045) operations for the eastbound approach at LOS E (PM peak hour) and the westbound approach at LOS F (PM peak hour).
  - **US 31 at W CR 800 S** – Intersection is a 4-legged intersection with a flashing beacon and stop-control on the eastbound and westbound approaches (flashing red) and free-flow on US 31 (flashing yellow). The operational deficiencies previously noted at this intersection are anticipated to worsen over time, with anticipated design year (2045) operations for the westbound approach at LOS F (PM peak hour).
  - **US 31 at W CR 550 N** – Intersection is a 4-legged intersection with stop-control on the eastbound and westbound approaches and free-flow on US 31. By the 2045 design year, the eastbound approach is anticipated to operate at LOS E (PM peak hour).
  - **US 31 at 296th Street** – Intersection is a 4-legged intersection with stop-control on the eastbound and westbound approaches and free-flow on US 31. By the 2045 design year, LOS E is expected for the eastbound approach (PM peak hour) and the westbound approach (AM & PM peak hour).
  - **US 31 at 276th Street** – As previously noted, this intersection is currently being reconstructed as a grade-separated interchange. Once complete, this improvement is anticipated to correct all operational deficiencies noted in the analysis of this intersection.

6.4. SIGNAL WARRANT ANALYSIS

Signal warrant analysis was conducted for the unsignalized intersections which were determined to have operational deficiencies under existing (2022) and/or future (2045) traffic conditions. With a grade-separated interchange currently being reconstructed at the 276th Street intersection, no signal warrant analysis was conducted for that intersection. Meeting signal warrants does not indicate a traffic signal must be installed, but rather that a traffic signal is justified and may be an acceptable means of improving operations and/or safety. Per the IMUTCD:

- Section 4B.04(01) – "Since vehicular delay and the frequency of some types of crashes are sometimes greater under traffic signal control than under STOP sign control, consideration should be given to providing alternatives to traffic control signals even if one or more of the signal warrants has been satisfied."
- Section 4C.01(03) – "The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal."

Each of the minor street approaches used in these analyses were single lane approaches, with no dedicated left or right-turn lanes. With no dedicated turn lanes, and the high approach speeds on US 31, no right-turn volume reduction was included in this analysis. A summary of the signal warrant analysis results is provided in **Table 6-7**. Signal warrants that are not applicable were not evaluated in this analysis. The signal warrant worksheets for applicable warrants are provided in **Appendix G**.

Table 6-7: Summary of Signal Warrant Analysis

Warrant	Intersection			
	US 31 at CR 500 S	US 31 at CR 800 S	US 31 at CR 550 N	US 31 at 296th Street
1 - Eight-Hour Vehicular Volume*	**No (6 of 8 hours met)**	**No (4 of 8 hours met)**	**No (0 of 8 hours met)**	**No (3 of 8 hours met)**
2 - Four-Hour Vehicular Volume*	**Yes**	**No (3 of 4 hours met)**	**No (0 of 4 hours met)**	**No (3 of 4 hours met)**
3 - Peak Hour	*Not Applicable*	*Not Applicable*	*Not Applicable*	*Not Applicable*
4 - Pedestrian Volume	*Not Applicable*	*Not Applicable*	*Not Applicable*	*Not Applicable*
5 - School Crossing	*Not Applicable*	*Not Applicable*	*Not Applicable*	*Not Applicable*
6 - Coordinated Signal System	*Not Applicable*	*Not Applicable*	*Not Applicable*	*Not Applicable*
7 - Crash Experience	**No (1 of 3 criteria met)**	*Not Applicable*	*Not Applicable*	*Not Applicable*
8 - Roadway Network	*Not Applicable*	*Not Applicable*	*Not Applicable*	*Not Applicable*
9 - Intersection Near a Grade Crossing	*Not Applicable*	*Not Applicable*	*Not Applicable*	*Not Applicable*

* Using 70% volume criteria.

6.5. VEHICLE SPEEDS

The National Performance Management Research Data Set (NPMRDS) was used to study travel speeds in an effort to determine free flow speeds in the study corridor. NPMRDS records the speed for all reporting vehicles on a segment and then aggregates the data into a harmonic mean. Therefore, 15-minute speed information extracted from NPRMDS is the harmonic mean of each speed reading taken for that 15-minute period, on the applicable segment.

When attempting to measure free-flow conditions, speed studies are typically conducted during off peak hours. Therefore, data from NPMRDS was pulled for 10:00 AM-3:00 PM (non-peak hours). Data was pulled for the months of May, June, and July to minimize the likelihood that extreme inclement weather (e.g., ice or snow) would affect the speeds. A summary of the average 15-minute directional speeds for six locations on US 31 is provided in **Figures 6-13** and **6-14**, for passenger vehicles, and in **Figures 6-15** and **6-16**, for heavy vehicles (e.g., vehicles with three or more axles, commercial trucks, semi-trucks, etc.).

These summaries show that average speeds on US 31 are consistently higher than the posted 60 mph speed limit, which in theory should represent the 85th percentile speed. The only exceptions to this are the speed measurements at SR 28 (northbound US 31) and Division Road (southbound US 31). The data at these locations was likely affected by the construction of the railroad overpass construction at W CR 100 S.

For reference, the 85th percentile of the hourly average speed measurements for each month is highlighted in orange.

Figure 6-13: Northbound US 31 - Average Hourly Speeds Between 10 AM and 3 PM (Passenger Vehicles)

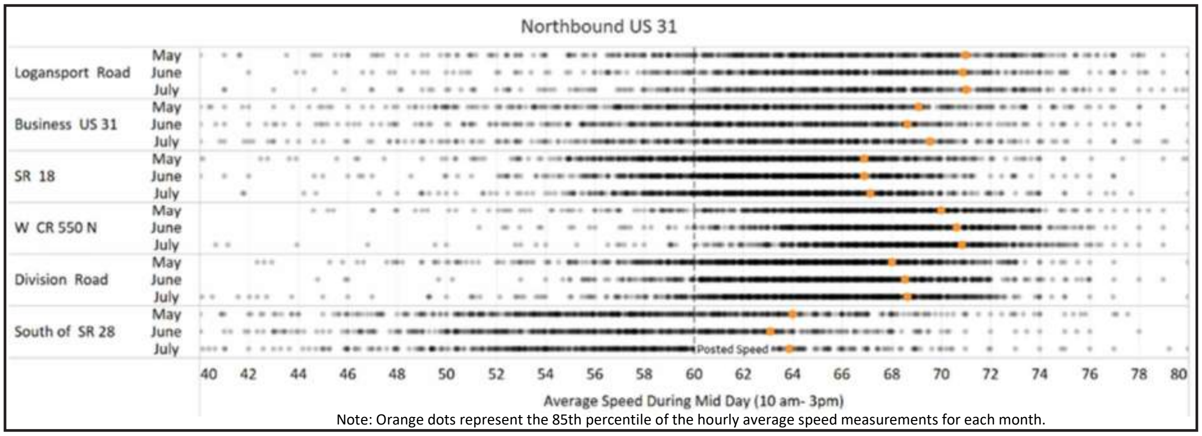


Figure 6-14: Southbound US 31 - Average Hourly Speeds Between 10 AM and 3 PM (Passenger Vehicles)

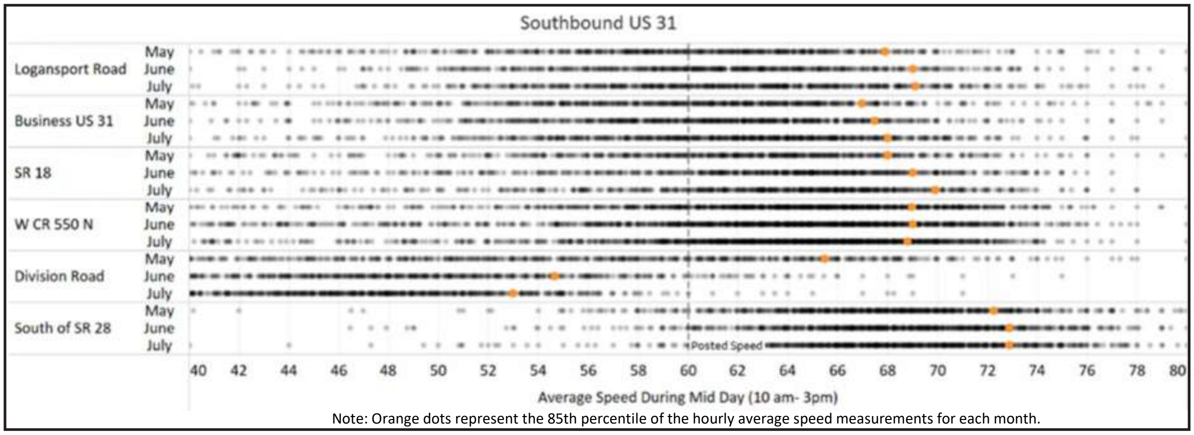


Figure 6-15: Northbound US 31 - Average Hourly Speeds Between 10 AM and 3 PM (Heavy Vehicles)

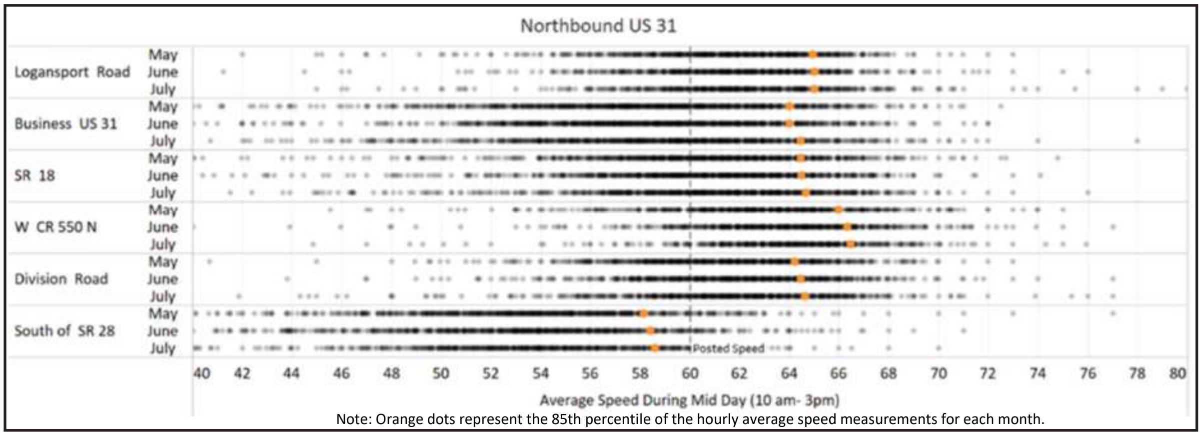
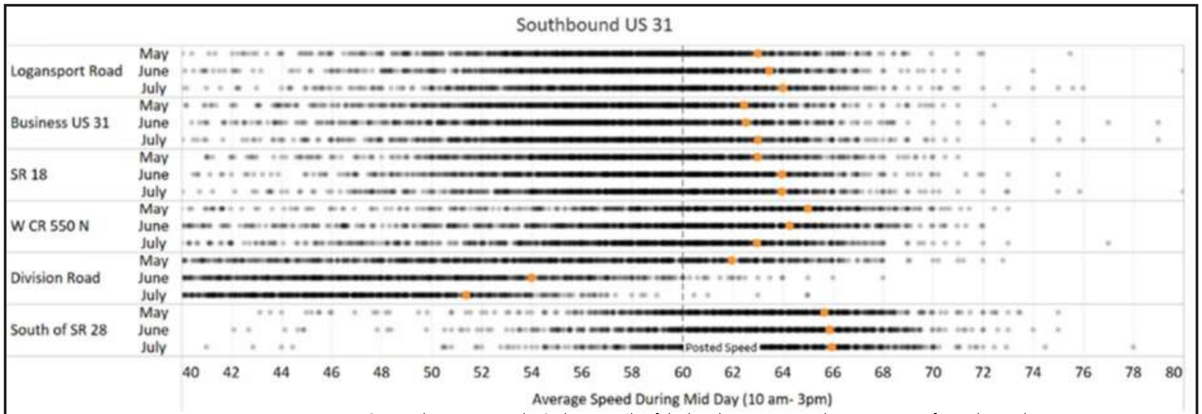


Figure 6-16: Southbound US 31 - Average Hourly Speeds Between 10 AM and 3 PM (Heavy Vehicles)



Note: Orange dots represent the 85th percentile of the hourly average speed measurements for each month.

6.6. FIELD OBSERVATIONS

The following observations were noted during a field review conducted on Thursday November 17, 2022:

- The posted speed limit is 60 mph, but most of the vehicles observed appeared to be traveling at speeds much higher than the posted limit.
- The traffic mix consisted of high numbers of semi-trucks traveling at relatively high speeds.
- With the high speeds on the corridor, making a right turn onto side streets from the mainline at intersections that do not have exclusive right-turn lanes is difficult. Making a right turn under these conditions increases the risk of a crash.
- A large truck with trailer was observed making a southbound U-turn at the US 31 and Airport Road intersection. In conducting the U-turn, the truck began the turn from the inside US 31 through lane (not the left-turn storage lane). It appeared that because of the turning radius of the truck, the driver was not able to initiate the U-turn movement from the left-turn storage lane.
- At multiple locations, the vehicle had to wait in the median to cross the mainline road or turn left on the mainline.
- During the field visit, no farm equipment or pedestrians were encountered on the study corridor.

7. STUDY AREA TRANSPORTATION PROJECTS

7.1. STATEWIDE TRANSPORTATION IMPROVEMENT PROGRAM

The Statewide Transportation Improvement Program (STIP) is a planning document that lists all projects to be funded with federal funds and all state funded projects that are regionally significant. This document covers all such projects that are funded in the upcoming four to five years. The current STIP document covers fiscal years 2022-2026. The previous STIP document (2020-2024) was also evaluated.

The STIP contains eleven projects within the limits of this PEL study, which are summarized in **Table 7-1**. Six of these projects are preservation type projects. Interchange projects were programmed for construction at the US 31 & Business 31 intersection (43602 / 1800042) and the US 31 & SR 218 N intersection (41640 / 1802090); however, both projects have been delayed until this PEL study is completed. An access control project (43201 / 2002313) was programmed for construction in 2022 but was also postponed due to this PEL study. A second access control project (1702626) spanning from Indianapolis to South Bend was also delayed due to this project.

Table 7-1: Summary of STIP Projects within the Study Corridor

Contract No. / Des No.	Construction Funding Year	Location	Work Type
42208 / 1901523	2022	SR 931 Bridge over US 31 NB/SB	Bridge Thin Deck Overlay
41640 / 1802090	2023	US 31 at SR 218 N Jct	New Interchange Construction*
- / 2200539	2023	US 24 EB bridge over US 31	Bridge Deck Overlay
- / 2200862	2024	US 31 NB bridge over Abandoned RR (1.10 miles S of US 24)	Superstructure Repair and Rehabilitation
41640 / 2000903	2023	US 31 NB bridge over Wabash River	Bridge Deck Overlay
43281 / 2001787	2025	Various Locations on US 31 between RP 177.52 and 196.15	Small Structures & Drains Construction
43602 / 1800042	2023	US 31 at Business 31	New Interchange Construction*
43847 / 2100775	2025 - 2026	US 31 over Rife Creek	Small Structure Pipe Lining
43201 / 2002313	2022	US 31 From 3.0 Miles N of SR 38 to SR 931	Access Control*
- / 1702626		US 31 Indianapolis to South Bend	Access Control*
- / 2100113		US 31 from 276th St to US 30	PEL Study

*Project postponed due to PEL Study

7.2. OTHER PUBLICATIONS

The publications listed below each call for improvements to the US 31 South corridor. Summaries of these documents are provided in the *US 31 South Summary of Previous Studies* report produced for this PEL Study.

- INDOT Long-Range Transportation Planning, 2018-2045 Transportation Needs Report
- Miami County Comprehensive Plan (June 2015)
- Tipton County, Indiana Comprehensive Plan (July 2013)
- Hamilton County Comprehensive Plan (2020)

8. PUBLIC INVOLVEMENT

Public involvement meetings were held in December 2022 within the study area. The purpose of these meetings was to provide the public with an opportunity to voice concerns regarding the existing US 31 corridor, and to express their wishes for the future of the corridor. The public was provided the opportunity to submit comments via the in-person meetings, via a virtual meeting, or through the website. There will be other public meetings and opportunities for the public to provide input throughout the PEL study process. The public comments as of January 2023 are summarized below.

8.1. SUMMARY OF COMMENTS

The comments received were grouped according to intersection location (where applicable) and to the general type of concern. Of the 257 comments received as of January 2023, 149 were comments related to specific intersections within the US 31 South study area. **Figures 8-1** and **8-2** show the location and quantity of the comments related to specific intersections. The remaining 108 comments were more general in nature and did not include references to specific locations. **Figure 8-3** provides a summary of all the comments grouped by general type of concern into one of the following categories.

The types used in this summary are:

- Local Mobility – Local mobility comments were primarily related to maintaining access to the homes, businesses, farmland, and towns along, and adjacent to, the US 31 South study corridor by maintaining or improving access to, from, or across US 31.
- Regional Mobility – Regional mobility comments typically related to increasing the ability of traffic to access and travel along US 31 with minimal delay. Comments included requests for additional interchanges, overpasses, and/or the conversion of US 31 to a freeway.
- Safety – Safety comments related to user safety throughout the study area, with the most frequent concerns indicating high travel speeds on US 31, difficulty accessing or crossing US 31, and red light running.
- Redevelopment – Information provided about existing or future redevelopment needs, or concerns.
- Environmental – Comments related to historic properties along the corridor, increased vehicle emissions, and traffic noise of high-speed vehicles.
- Bike and Pedestrian – Bicycle and pedestrian comments related to the additional of non-motorist facilities on, or adjacent to, US 31, such as sidewalks, trails, transitways, or other multimodal accommodations.
- Economic Development – Comments related to economic development focused on the effect US 31 can have on development throughout the corridor.
- Other – Comments that don’t readily fall into any of the above categories.

Figure 8-1: Number of Intersection Related Comments (1 of 2)

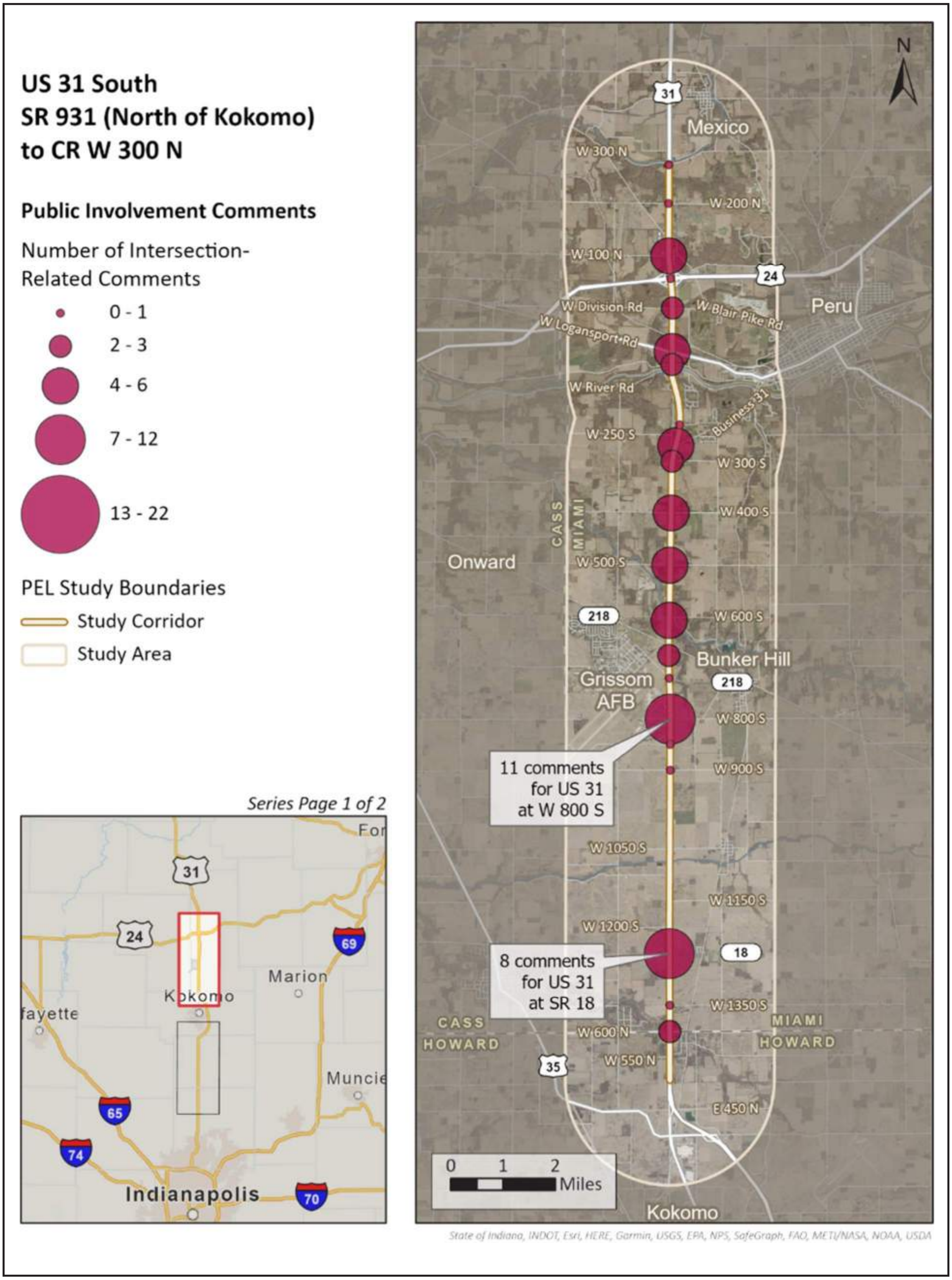
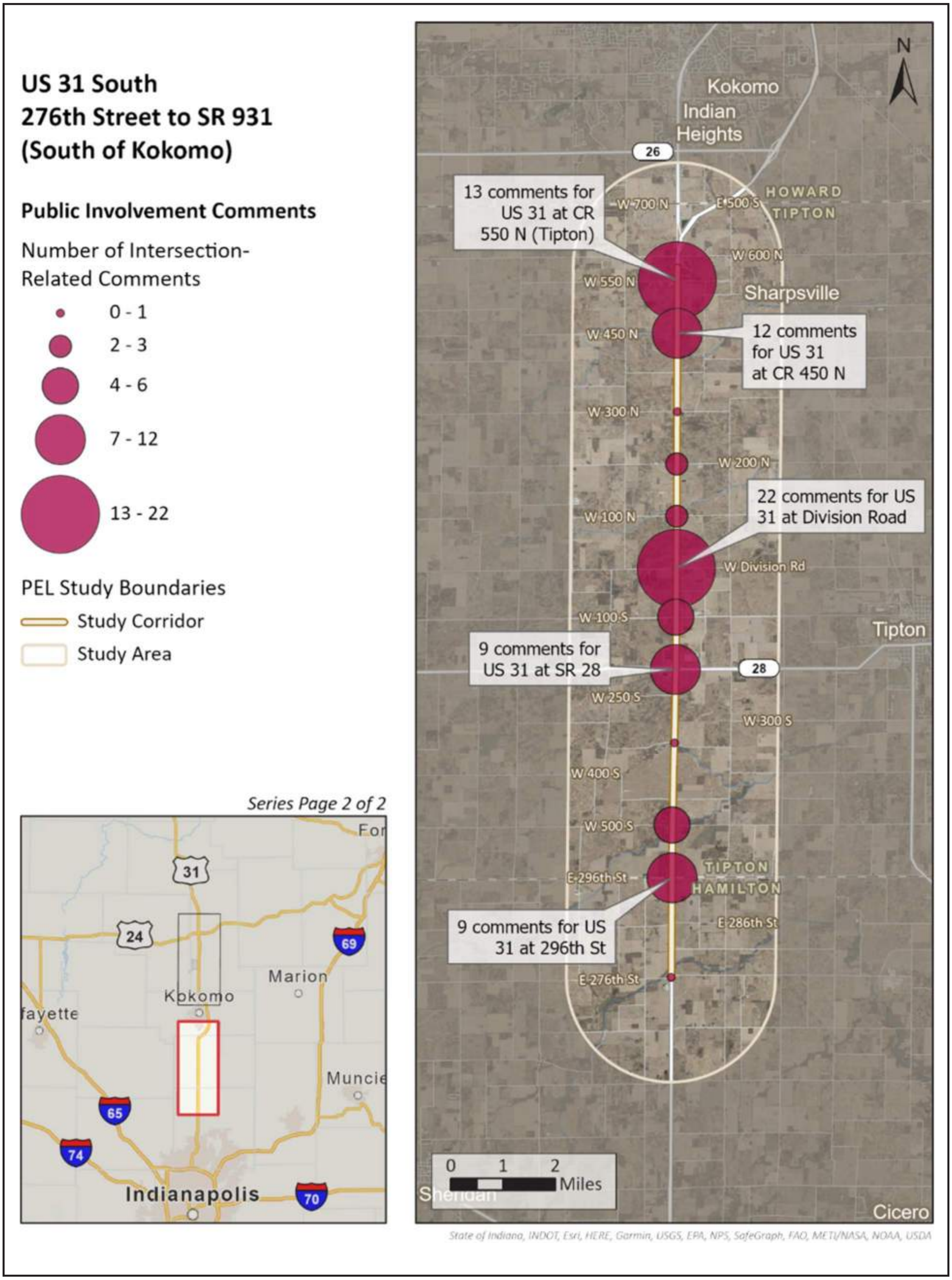
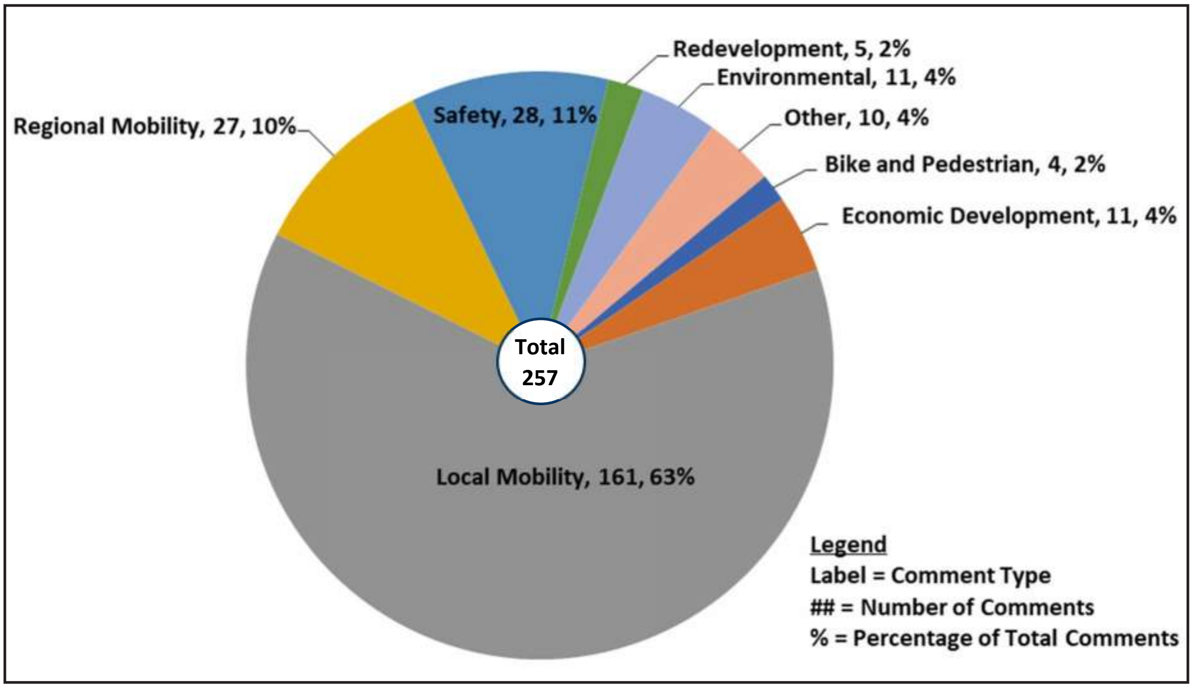


Figure 8-2: Number of Intersection Related Comments (2 of 2)



As shown, the majority of comments received to date were related to local mobility (63%), regional mobility (10%), and safety (11%). With these three categories encompassing over 84% of the total comments received, a detailed review of these three categories is provided in the following sections. While a detailed review is not provided for the other categories, all comments were reviewed and will be considered by the study team.

Figure 8-3: Summary of Public Comment Types Received



8.2. LOCAL MOBILITY

At 63% of the total comments received, local mobility concerns were the most frequent type of comment received. As mentioned previously, these comments were primarily related to maintaining access to the homes, businesses, schools, farmland, and towns along and adjacent to the US 31 South study corridor by maintaining or improving access to, from, or across US 31. Based on the origin / destination data discussed in **Section 6.1**, for vehicle trips on US 31, approximately 75% of trips north of Kokomo and 30% of trips south of Kokomo are local trips that either originate or terminate within the study corridor.

There are currently 125 driveways with access to US 31 within the study limits. These driveways are distributed as listed in **Table 8-1**. Due to the number of driveways, limiting access to US 31 would affect residents throughout the study corridor.

Table 8-1: Existing Number of Driveways per County

County	Driveways
Miami County	46
Howard County	4
Tipton County	60
Hamilton County	15

Surrounding land use along the US 31 corridor is largely agricultural in nature. Twenty-eight percent (28%) of the existing driveways are exclusively for field access. This number of field access driveways suggests that safe mobility and access for farm equipment is an important consideration within the study area.

8.3. REGIONAL MOBILITY

Regional mobility comments accounted for approximately 10% of the total comments received. These comments typically related to increasing the ability of traffic to access and travel along US 31 with minimal delay. Comments included requests for additional interchanges, overpasses, and/or the conversion of US 31 to a freeway. With US 31 being a principal arterial through northern and central Indiana, maintaining regional connectivity with good operational efficiency is a high priority. The efficient movement of people and goods into, out of, and through the study area should be considered.

8.4. SAFETY

Comments related to safety accounted for approximately 11% of the total comments received. These comments related to user safety throughout the study area, with the most frequent concerns indicating high travel speeds on US 31, difficulty accessing or crossing US 31, and red light running. Below is additional detail associated with frequently mentioned locations, with data from the safety analysis detailed in **Section 5**.

8.4.1. US 31 AT BUSINESS US 31 (MIAMI COUNTY)

Comment Summary: Vehicles unable to stop at signal due to high speeds.

Crash data associated with this intersection indicated a crash frequency comparable to other similar INDOT intersections (ICF = 0.09), but an average crash severity higher than expected (ICC = 2.09). The most common crash type at this intersection was rear end crashes with 32 of 64 (50%). According to the crash narratives, the potential contributing causes for crashes at this intersection include: at-fault party following too closely, driving at unsafe speeds, and disregarding the signal. There were four fatalities at this location with contributing causes listed as related to vehicles disregarding the signal and/or traveling at an unsafe speed.

While INDOT currently has no data to directly evaluate the occurrence of red light running in the corridor, as indicated in the crash analysis section of this report, 4 of the 5 signalized intersections included in this study indicated drivers “disregarding the signal” in the list of noted contributing causes.

8.4.2. US 31 AT SR 218 N (MIAMI COUNTY)

Comment Summary: Northbound vehicles coming downhill don’t/can't stop at signal.

Crash data associated with this intersection indicated both crash frequency (ICF = 1.67) and crash severity (ICC = 3.01) that are higher than expected. The most common crash type at this intersection was found to be rear end crashes with 75 of 109 (69%). As indicated in the crash narratives, the potential contributing causes for most of the rear end collisions was a combination of the at-fault party following too closely, driving at unsafe speeds, and disregarding the signal. Calculations for vertical stopping sight distance at this location shows that stopping sight distance is adequate for both the northbound and southbound approaches. The required vertical stopping sight distance for these approaches is 730 feet. The available stopping sight distance is 1,013 feet for the northbound approach and 1,998 feet for the southbound approach.

8.4.3. US 31 AT HOOSIER BLVD (MIAMI COUNTY)

Comment Summary: Difficult to cross US 31.

This intersection is not one of the study intersections specifically analyzed in **Section 5** but is on the US 31 segment analyzed between SR 218 N and SR 218 S / W Broadway Street. In this segment analysis, US 31 was found to have a crash frequency index (ICF = 0.92) and a crash severity index (ICC = 0.73) higher than similar INDOT segments. Of the fifty-five (55) crashes on this segment, twenty-three (23) occurred at the Hoosier Boulevard intersection over the 5-year period from January 1, 2017 to December 31, 2021. These crashes included:

- Eight (8) right angle crashes
- Eight (8) read-end crashes
- Four (4) left-turn crashes
- Two (2) same direction sideswipe crashes
- One (1) ran off road crash

8.4.4. US 31 AT SR 18 (MIAMI COUNTY)

Comment Summary: Safety at the stop light is a concern. Additionally, safety is a concern with the shared through/left lanes.

Crash data associated with this intersection resulted in both crash frequency (ICF = 1.87) and crash severity (ICC = 0.70) that are higher than expected. The most common crash type at this intersection was found to be rear end crashes with 49 of 86 (57%). Review of crash narratives indicated most of the collisions were resultant from the combination of the at fault party following too closely, driving at unsafe speeds, and disregarding the signal.

8.4.5. US 31 AT CR 550 N (TIPTON COUNTY)

Comment Summary: Need for a right-turn lane and concerns about truck traffic at the intersection.

Crash data associated with this intersection indicated a crash frequency (ICF = 0.24) and crash severity (ICC = 0.07) that are comparable to similar INDOT intersections. The most common crash types at this intersection were found to be ran off road crashes with 5 of 19 (26%) and rear end crashes with 4 of 19 (21%). This data suggests that based on crash history, no safety issues exist at this intersection. No operational issues were noted in the existing capacity analysis. Based on the INDOT Design Manual (IDM) guidelines for a right-turn lane, the peak hour volumes at the CR 550 N intersection are too low to justify a right-turn lane on US 31.

8.4.6. US 31 AT CR 450 N (TIPTON COUNTY)

Comment Summary: This is a school bus crossing location; however, it is difficult to cross US 31 due to high speeds.

This intersection is not a study location but was indirectly evaluated through the safety analysis in Chapter 5. The US 31 segment containing this intersection, between W CR 550 N and Division Road, was found to have a crash frequency index (ICF = 0.36) on the segment slightly higher than similar INDOT segments and a crash severity index (ICC = -0.17) lower than similar INDOT segments. A cursory review of the crash data found that of the one hundred and fifty-six (156) crashes on this segment, three (3) occurred at the CR 450 N intersection over the 5-year period from January 1, 2017 to December 31, 2021. This data suggests that no safety issues exist at this intersection.

The Maconaquah School Corporation has multiple bus routes that traverse or cross the US 31 corridor within the study limits. These crossings should be considered when evaluating local mobility needs within the study area. Further coordination with the school corporation officials is recommended to solicit their input as the study progresses.

8.4.7. US 31 AT W CR 100 N (TIPTON COUNTY)

Comment Summary: Access is a challenge due to volume and safety concerns.

This intersection is not a study location but was indirectly evaluated through the safety analysis in Chapter 5. The US 31 segment containing this intersection, between W CR 550 N and Division Road, was found to have a crash frequency index (ICF = 0.36) on the segment slightly higher than similar INDOT segments and a crash severity index (ICC = -0.17) lower than similar INDOT segments. A cursory review of the crash data found one (1) crash that occurred at the CR 100 N intersection over the 5-year period from January 1, 2017 to December 31, 2021. This data suggests that no safety issues exist at this intersection.

9. SUMMARY

This Existing Transportation Conditions Report focuses on the US 31 South study area in Hamilton, Tipton, Howard and Miami counties. The portion of US 31 through Kokomo (the Kokomo Bypass) is configured as a limited access freeway with grade separated interchanges at all accessible crossroads and is therefore excluded from this study.

9.1. EXISTING CONDITIONS

Within the study area, US 31 is classified as 'principal arterial – other' roadway and is in mostly rural portions of northern central Indiana. The posted speed limit on US 31 is 60 mph throughout the study area. US 31 is part of the National Highway System (NHS) network and therefore has a national significance. US 31 is designated as a Statewide Mobility Corridor and, as such, is intended to provide safe, high-speed connections for long-distance trips between the metropolitan areas of Indiana, and those of the surrounding states.

Throughout the study corridor, US 31 is a 4-lane divided roadway with paved inside and outside shoulders, and open drainage. Existing right-of-way widths are estimated to range between 160 and 370 feet. There are two rail crossings and 33 bridges within the study corridor. Within the study area, there are no sidewalks, designated bike lanes, or transit facilities on US 31, or on cross streets within one mile of US 31, though school bus routes cross or access US 31 at 21 intersections within the study area.

The study corridor was found to have 125 driveways, 60% of which are residential. Twenty-eight percent (28%) of the driveways provide access to adjacent farmlands. Seventy-three percent (73%) of all driveways (91 of 125) do not meet at least one of the access management guidelines.

9.2. SAFETY ANALYSIS

An analysis of collision data was conducted for the study intersections, previously identified in **Section 2**, and the segments between those intersections. Historical crash information was obtained for the time period, from January 1, 2017 to December 31, 2021. The resulting 1564 crashes were then analyzed using the RoadHAT crash analysis software to determine crash characteristics along the corridor.

A detailed review of the locations with ICF and/or ICC values greater than 1.0, is provided in **Section 5**. A summary of these locations is provided in **Table 9-1**. Recurring contributing causes noted in the crash narratives include:

- High travel speeds and/or traveling at an unsafe speed
- Disregarding traffic signals
- Following too closely

Table 9-1: Locations with Detailed Crash Summaries

Location	ICF	ICC
US 31 at W CR 100 N	2.39	0.56
US 31 at Business US 31	0.09	2.09
US 31 at W CR 500 S	1.21	1.21
US 31 at SR 218 N	1.67	3.01
US 31 at SR 218 S / W Broadway Street	1.57	1.99
US 31 at SR 18	1.87	0.70
US 31 at Division Road	1.09	2.03
US 31 at SR 28 / W 200 S (western roundabout)*	0.90	1.24

*For comparative purposes, the roundabouts were analyzed in RoadHAT as unsignalized intersections.

9.3. TRAFFIC OPERATIONS

Vehicle turning movement counts (TMCs) collected between 2019 and 2022, were provided by INDOT for each of the study intersections. The TMCs were adjusted using INDOT's Traffic Adjustment Factors to estimate 2022 peak season turning movement volumes (TMVs) for use in the existing conditions AM and PM peak hour analysis.

To estimate future 2045 design year volumes, a traffic growth rate was calculated using outputs from the Indiana Statewide Traffic Model (updated for the US 30/US 31 PEL Studies). The future year model included both existing and committed (E+C) projects on, and adjacent to, the US 31 South study corridor. Using these volumes, an average annual growth rate of 0.6% was calculated. This growth rate was then applied to the 2022 peak season TMVs to estimate the 2045 design year TMVs for the AM and PM peak hours.

Using the existing (2022) and future (2045) volumes, the study intersections were analyzed as directed in INDOT's Intersection Traffic Analysis Procedures. Operational analysis indicated deficiencies at the following intersections (details in **Section 6**):

- US 31 at CR 500 S – Deficiencies noted in existing (2022) and future (2045) conditions.
- US 31 at W CR 800 S – Deficiencies noted in existing (2022) and future (2045) conditions.
- US 31 at W CR 550 N – Deficiencies noted in future (2045) conditions.
- US 31 at 296th Street – Deficiencies noted in future (2045) conditions.
- US 31 at 276th Street – Deficiencies noted in existing (2022) and future (2045) conditions

  Note: The 276th Street intersection is currently being reconstructed as a grade-separated interchange. Once complete, this improvement is anticipated to correct all operational deficiencies noted in the analysis of this intersection.

The National Performance Management Research Data Set (NPMRDS) was used to study travel speeds in an effort to determine free flow speeds in the study corridor. This data showed that average speeds on US 31 are consistently higher than the posted 60 mph speed limit, which in theory should represent the 85th percentile speed. The only exceptions to this are the speed measurements at SR 28 (northbound US 31) and Division Road (southbound US 31). The data at these locations was likely affected by the construction of the railroad overpass construction at W CR 100 S.

9.4. PUBLIC INVOLVEMENT

Public involvement meetings were held in December 2022 within the study area. The purpose of these meetings was to provide the public with an opportunity to voice concerns regarding the existing US 31 corridor and to express their wishes for the future of the corridor. The public was provided the opportunity to submit comments via the in-person meetings, via a virtual meeting, or through the website. There will be other public meetings and opportunities for the public to provide input throughout the PEL study process. The public comments received as of January 2023, were summarized according to location and general type of concern.

Locations with the highest quantity of comments include:

- US 31 at W CR 800 S – 11 comments
- US 31 at SR 18 – 8 comments
- US 31 at CR 550 N – 11 comments
- US 31 at CR 450 N – 12 comments
- US 31 at Division Road – 22 comments
- US 31 at SR 28 – 9 comments
- US 31 at 296th Street – 8 comments

A summary of all comments received, by general type of concern:

- Local Mobility – 161 comments (63%)
- Regional Mobility – 27 comments (10%)
- Safety – 28 comments (11%)
- Redevelopment – 5 comments (2%)
- Environmental – 11 comments (4%)
- Bike and Pedestrian – 4 comments (2%)
- Economic Development – 11 comments (11%)
- Other – 10 comments (4%)

APPENDIX A: BRIDGE INFORMATION

PROPEL US 31

Smarter Transportation. Stronger Communities.

US 31 South

Existing Bridges

W CR 600 S to W CR 200 N

PEL Study Bridges

Existing Bridges with NBI #

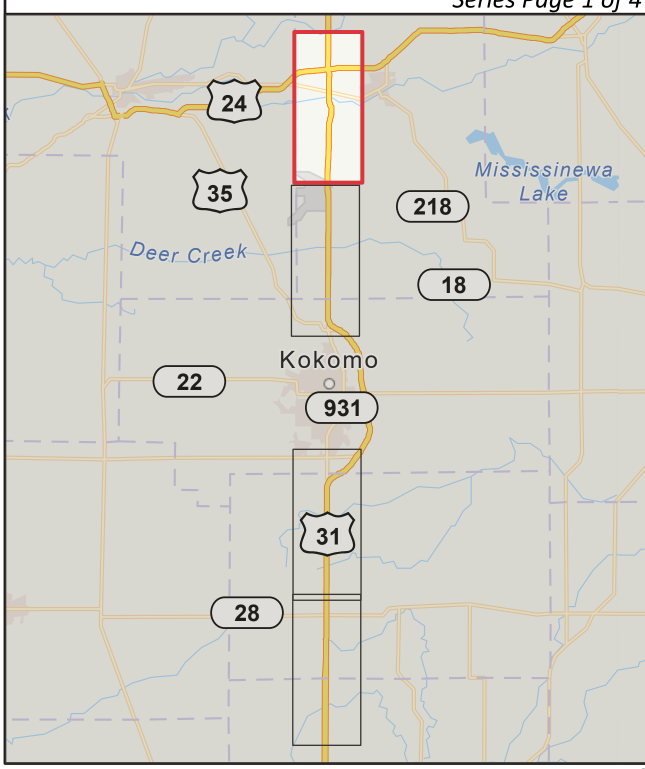
PEL Study Boundaries

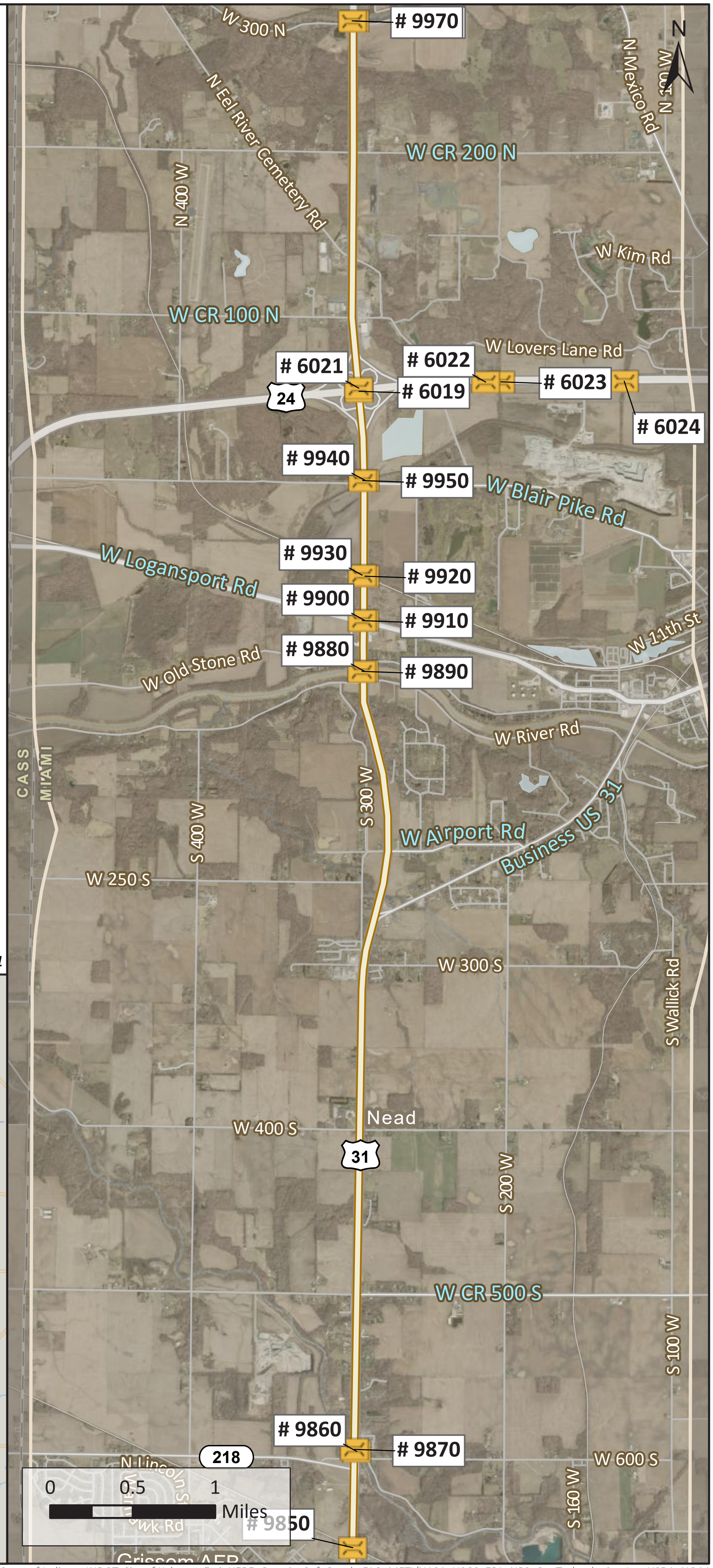
Study Corridor

Study Area

Street Labels

Series Page 1 of 4





State of Indiana, INDOT, City of Kokomo, Esri, HERE, Garmin, SafeGraph, FAO, METI/NASA, USGS, EPA, NPS, GeoTechnologies, Inc, USDA, NOAA

PROPEL US 31

Smarter Transportation. Stronger Communities.

US 31 South

Existing Bridges

SR 931 (North of Kokomo) to SR 218

PEL Study Bridges

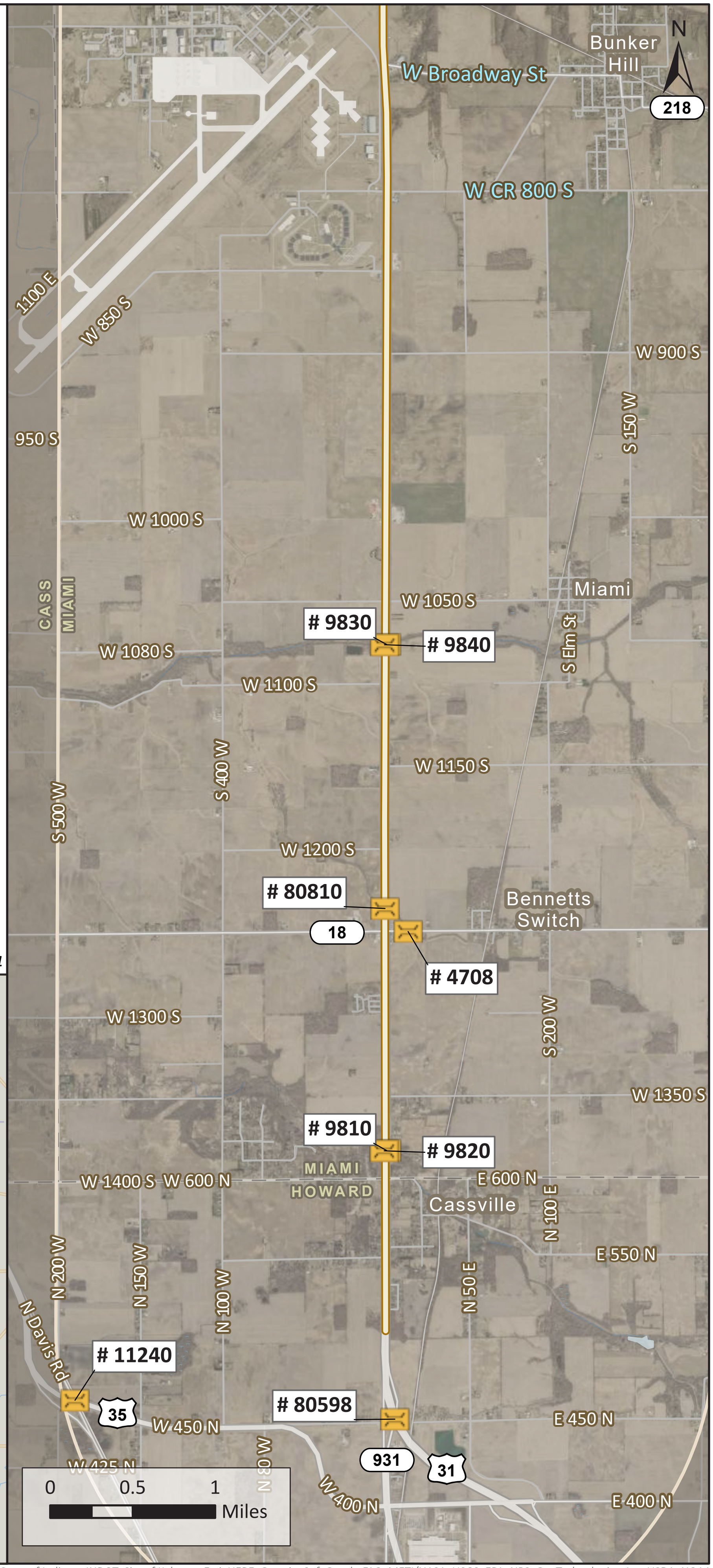
Existing Bridges with NBI #

PEL Study Boundaries

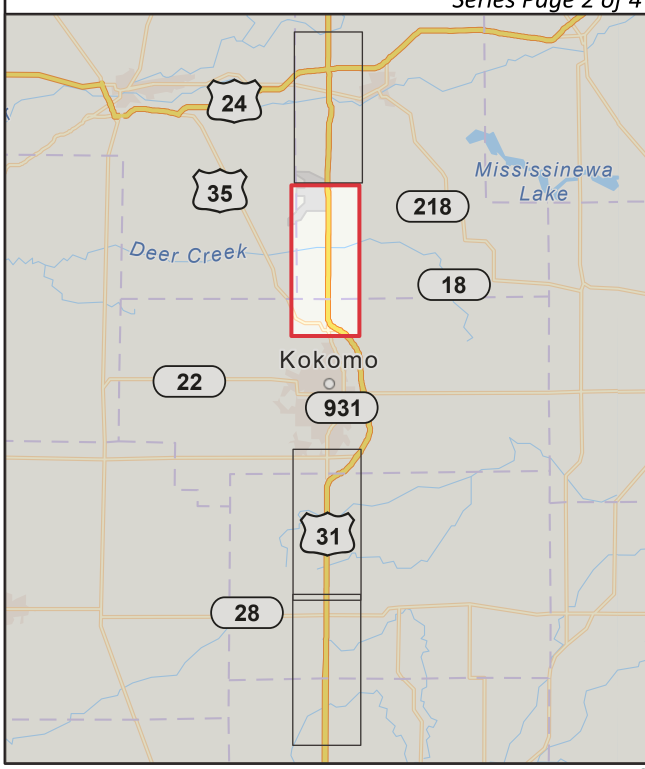
Study Corridor

Study Area

Street Labels



Series Page 2 of 4



State of Indiana, INDOT, City of Kokomo, Esri, HERE, Garmin, SafeGraph, FAO, METI/NASA, USGS, EPA, NPS, GeoTechnologies, Inc, USDA, NOAA

PROPEL
Smarter Transportation.
Stronger Communities.
US 31

US 31 South

Existing Bridges

W Division Rd to SR 931 (South of Kokomo)

PEL Study Bridges

Existing Bridges with NBI #

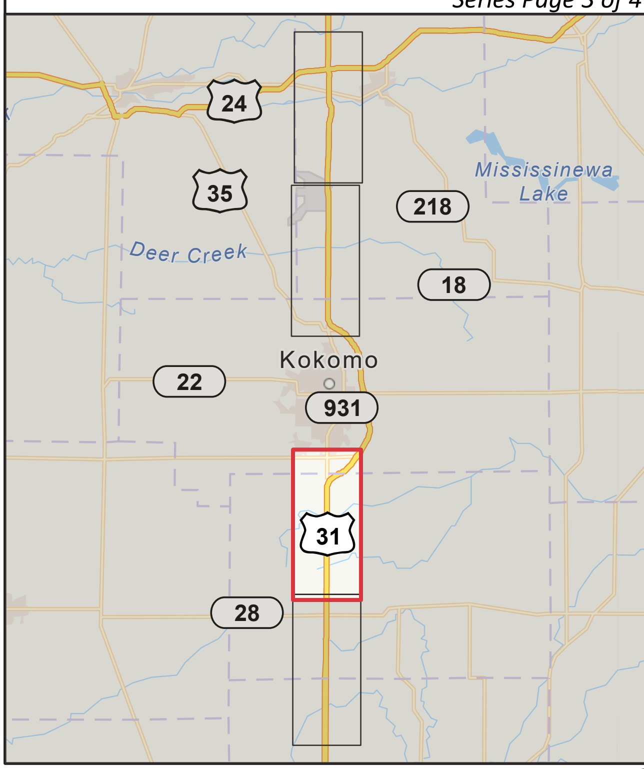
PEL Study Boundaries

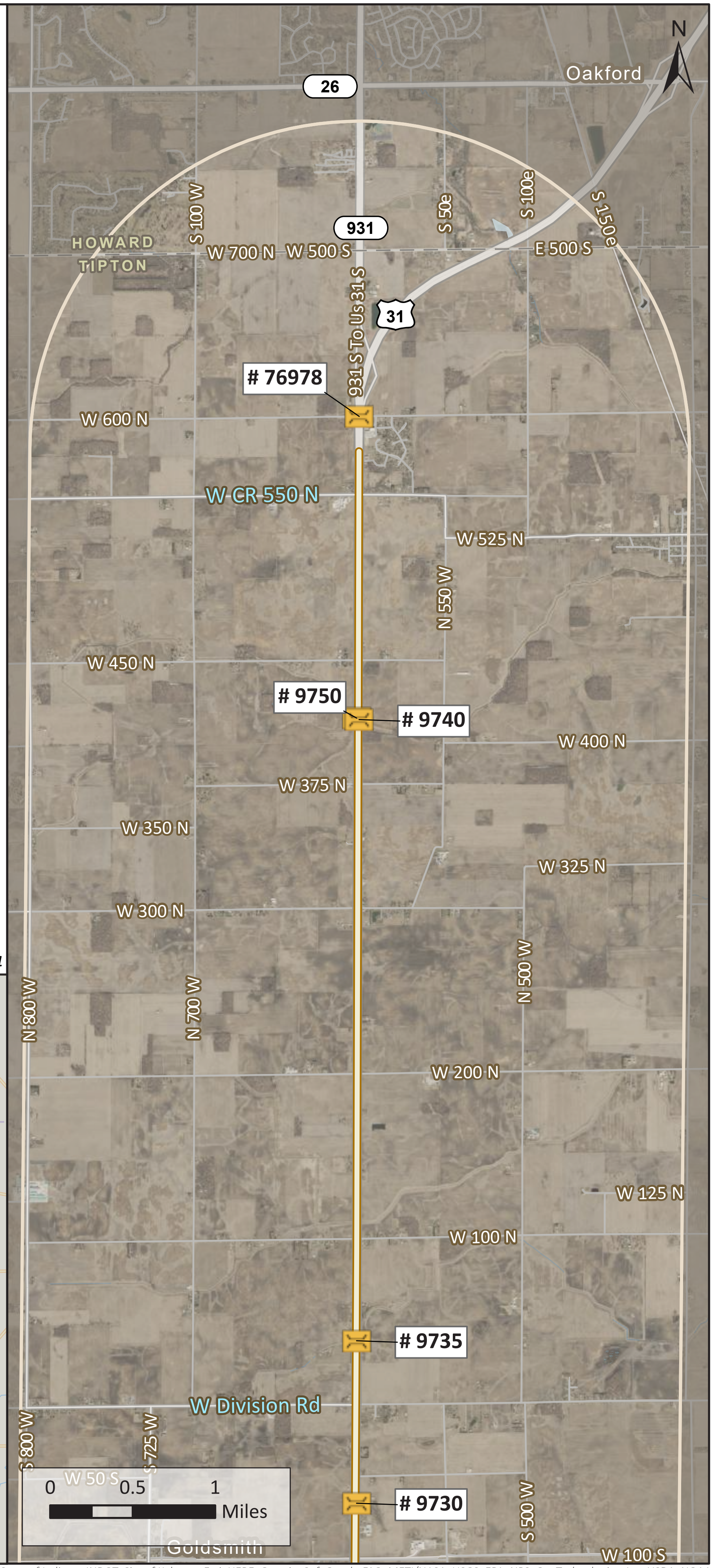
Study Corridor

Study Area

Street Labels

Series Page 3 of 4





State of Indiana, INDOT, City of Kokomo, Esri, HERE, Garmin, SafeGraph, FAO, METI/NASA, USGS, EPA, NPS, GeoTechnologies, Inc, USDA, NOAA

PROPEL US 31

Smarter Transportation. Stronger Communities.

US 31 South

Existing Bridges

E 256th St to W 100 S

PEL Study Bridges

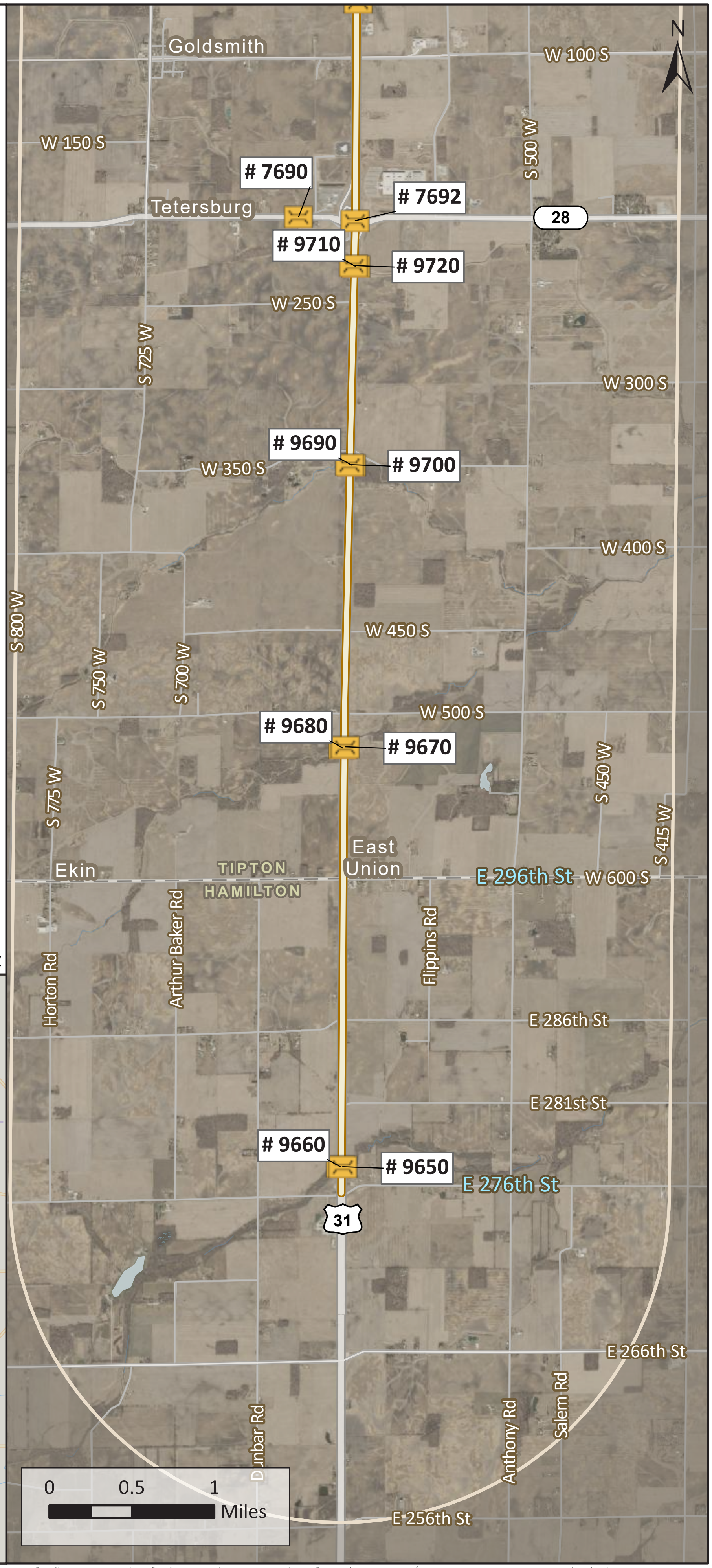
Existing Bridges with NBI #

PEL Study Boundaries

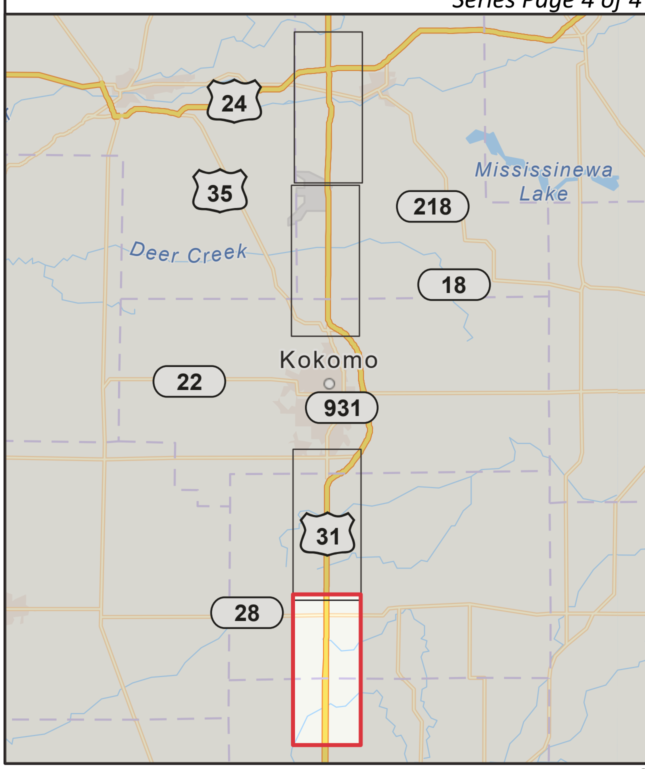
Study Corridor

Study Area

Street Labels



Series Page 4 of 4



State of Indiana, INDOT, City of Kokomo, Esri, HERE, Garmin, SafeGraph, FAO, METI/NASA, USGS, EPA, NPS, GeoTechnologies, Inc, USDA, NOAA

US 31 South - National Bridge Inventory (NBI) Data

Bridge No.	Existing Bridge File No.	Lat	Long	Section	Township	Range	NBI #	County
1	031-29-04572 BSBL	40.19189	-86.12821	7 & 12	20N	3E & 4E	9660	Hamilton
2	031-29-04572 BNBL	40.19189	-86.12795	7 & 12	20N	3E & 4E	9650	Hamilton
3	031-80-03567 CSBL	40.22869	-86.12819	31 & 36	21N	3E & 4E	9680	Tipton
4	031-80-03567 JCNB	40.22879	-86.12792	31 & 36	21N	3E & 4E	9670	Tipton
5	031-80-03568 CNBL	40.25356	-86.12734	19 & 24	21N	3E & 4E	9690	Tipton
6	031-80-03568 JCSB	40.25360	-86.1276	19 & 24	21N	3E & 4E	9700	Tipton
7	031-80-03569 BNBL	40.27103	-86.12700	13 & 18	21N	3E & 4E	9710	Tipton
8	031-80-03569 JBSB	40.27111	-86.12724	13 & 18	21N	3E & 4E	9720	Tipton
9	028-80-10048 A	40.27504	-86.12708	7 & 12	21N	4E	7692	Tipton
10	031-80-03413 NBL	40.29425	-86.12687	7	21N	3E & 4E	9730	Tipton
11	031-80-08042	40.30853	-86.12697	31 & 36	22N	3E & 4E	9735	Tipton
12	031-80-03570 JBSB	40.36326	-86.12733	12	22N	3E	9750	Tipton
13	031-80-07858 NBL	40.36314	-86.12705	12	22N	3E	9740	Tipton
14	031-80-09826 A	40.38978	-86.12722	1, 6, 31, 36	22N & 23 N	3E & 4E	76978	Tipton
15	(931)31-34-08827	40.54198	-86.12605	7	24N	4E	80598	Howard
16	031-52-05754 CNBL	40.56559	-86.12716	31 & 36	25N	3E & 4E	9810	Miami
17	031-52-05754 CSBL	40.56557	-86.12746	31 & 36	25N	3E & 4E	9820	Miami
18	031-52-10761	40.58686	-86.12751	25 & 40	25N	3E & 4E	80810	Miami
19	031-52-05755 BNBL	40.61006	-86.12746	13	25N	3E	9830	Miami
20	031-52-05755 BSBL	40.61005	-86.12772	13	25N	3E	9840	Miami
21	031-52-02358	40.67031	-86.12831	25 & 30	26N	3E & 4E	9850	Miami
22	031-52-04041 CNBL	40.67876	-86.12793	24 & 19	26N	3E & 4E	9860	Miami
23	031-52-04041 JBSB	40.67895	-86.12821	24 & 19	26N	3E & 4E	9870	Miami
24	031-52-04857 CNBL	40.74734	-86.12751	31	27N	4E	9880	Miami
25	031-52-04857 CSBL	40.74732	-86.12779	31	27N	4E	9890	Miami
26	031-52-02317 CNBL	40.7518	-86.12751	30	27N	4E	9900	Miami
27	031-52-02317 CSBL	40.75179	-86.12780	30	27N	4E	9910	Miami
28	031-52-02318 CNBL	40.75569	-86.12751	30	27N	4E	9920	Miami
29	031-52-02318 CSBL	40.75578	-86.12782	30	27N	4E	9930	Miami
30	031-52-04858 BNBL	40.76411	-86.12755	19	27N	4E	9940	Miami
31	031-52-04858 BSBL	40.76409	-86.12782	19	27N	4E	9950	Miami
32	024-52-08165 EBL	40.77194	-86.12829	19	27N	4E	6019	Miami
33	024-52-06597 BWBL	40.77221	-86.12833	19	27N	4E	6021	Miami

US 31 South - National Bridge Inventory (NBI) Data

Bridge No.	Existing Bridge File No.	Existing Location	Structure Type	Out to Out Bridge Floor	Out to Out Bridge Width
1	031-29-04572 BSBL	US 31 over Little Cicero Creek	Continuous Steel Beam Bridge	130.2	36.33
2	031-29-04572 BNBL	US 31 over Little Cicero Creek	Continuous Steel Beam Bridge	130.2	36.33
3	031-80-03567 CSBL	US 31 over Prarie Creek	Reinforced Concrete Girder Bridge	41.83	44
4	031-80-03567 JCNB	US 31 over Prarie Creek	3 Span Cont. reinf. concrete slab Bridge	101.72917	44.3333
5	031-80-03568 CNBL	US 31 over Cicero Creek	Continuous Prestress Conc. I-Beam	60.104	45.667
6	031-80-03568 JCSB	US 31 over Cicero Creek	Continuous Reinforced Concrete Slab	99.52083	44
7	031-80-03569 BNBL	US 31 over Dixon Creek	Rienforced Concrete Girder Bridge	42	46
8	031-80-03569 JBSB	US 31 over Dixon Creek	Cont. Rienforced Concrete Slab Bridge	101.73	41
9	028-80-10048 A	SR 28 over US 31	Continuous Composite Prestressed Concrete Hybrid Bublb-Tee Beam Bridge	149.25	44.33
10	031-80-03413 NBL	US 31 over Muck Pocket	Concrete Slab Bridge	582.875	22
11	031-80-08042	US 31 over Buck Creek	Reinf. Conc. Box culvert	24	186
12	031-80-03570 JBSB	US 31 over Mud Creek	Continuous Reinforced Concrete Slab	95.48	43.8333
13	031-80-07858 NBL	US 31 over Mud Creek	Continuous Reinforced Concrete Slab	95.48	43.833
14	031-80-09826 A	CR 600 N over US 31 NB/SB	Continuous Composite Prestressed Concrete Hybrid Bublb-Tee Beam Bridge	257.5	34.33
15	(931)31-34-08827	SR 931 NB Ramp over US 31 SB/NB	Continuous Composite Prestressed Concrete Bublb-Tee Beam Bridge	311.427	40.833
16	031-52-05754 CNBL	US 31 over S Fork Deer Creek	Continuous Steel Beam Bridge	105.208	42.5
17	031-52-05754 CSBL	US 31 over S Fork Deer Creek	Continuous Steel Beam Bridge	105.208	42.5
18	031-52-10761	US 31 over William H Russel Ditch	Not available	Not available	Not available
19	031-52-05755 BNBL	US 31 over Deer Creek	3 Span Continuous Reinforced-Concret Girder Bridge	104	42.5
20	031-52-05755 BSBL	US 31 over Deer Creek	3 Span Continuous Reinforced-Concret Girder Bridge	104	42.5
21	031-52-02358	Abandoned RR over US 31	2-Span continuous, multiple steel plate girder bridge with thick reinforces concrete fascia on either side	140	21
22	031-52-04041 CNBL	US 31 over Big Pipe Creek	3 Span Continuous Steel Beam Bridge	230.609375	43.6666
23	031-52-04041 JBSB	US 31 over Big Pipe Creek	3 Span Continuous Steel Beam Bridge	230.61	43.67
24	031-52-04857 CNBL	US 31 over Wabash River (, 2 roads)	7 Span continuous, steel plate girder (2 -girder floor beam system) bridge	802.677165	42.979003
25	031-52-04857 CSBL	US 31 over Wabash River (, 2 roads)	7 Span continuous, steel plate girder (2 -girder floor beam system) bridge	803	43
26	031-52-02317 CNBL	US 31 over Old US 24, NSRR	4 Span Continuous Steel Beam Bridge	246.33	38.38
27	031-52-02317 CSBL	US 31 over Old US 24, NSRR	4 Span Continuous Steel Beam Bridge	246.33	38.38
28	031-52-02318 CNBL	US 31 over Abandoned RR	Continuous Steel Beam Bridge	171	42.5
29	031-52-02318 CSBL	US 31 over Abandoned RR	Continuous Steel Beam Bridge	171	42.5
30	031-52-04858 BNBL	US 31 over Prarie Ditch	3 span continuous, reinforced concrete slab bridge	101.54166	40.3333
31	031-52-04858 BSBL	US 31 over Prarie Ditch	3 span continuous, reinforced concrete slab bridge	101.5	40.33
32	024-52-08165 EBL	US 24 over US 31	Continuous, Composite, Welded Plate Girder	259.75	57.4166
33	024-52-06597 BWBL	US 24 over US 31	Continuous, Composite, Welded Plate Girder	253.5	57.33

US 31 South - National Bridge Inventory (NBI) Data

Bridge No.	Existing Bridge File No.	Deck	Super	Sub	Channel	Culvert	Year Built	Rehab A
1	031-29-04572 BSBL	4	6	6	5	N/A	1959	Overlaid and Added barrier, 1983
2	031-29-04572 BNBL	4	6	6	5	N/A	1959	Overlaid and Added Barrier, 1983
3	031-80-03567 CSBL	5	6	6	5	N/A	1951	Overlay, 1987
4	031-80-03567 JCNB	6	6	6	5	N/A	1959	Overlay, 1987
5	031-80-03568 CNBL	7	7	6	6	N/A	1951	Reconstructed Concrete Girders over Pier #2, 1982
6	031-80-03568 JCSB	6	6	6	5	N/A	1959	Overlaid, 1982
7	031-80-03569 BNBL	5	5	6	7	N/A	1951	Widened, Overlaid, Added Concrete Carrier and Placed Riprap Pad in Channel, 1993
8	031-80-03569 JBSB	6	6	6	7	N/A	1959	Overlaid, Raised Railing and Added Riprap Pads Around Interior Piers, 1993
9	028-80-10048 A	8	8	8	N/A	N/A	2016	Overlay, 2016
10	031-80-03413 NBL	5	5	5	N/A	N/A	1940	-
11	031-80-08042	N/A	N/A	N/A	8	7	1994	-
12	031-80-03570 JBSB	6	6	6	7	N/A	1960	Overlaid, Replaced Approach Slabs, Added 18" Deep Revetment Riprap Pads Around Interior Piers and on Slopes, Raised Concrete Barrier, 1993
13	031-80-07858 NBL	5	5	6	7	N/A	1998	-
14	031-80-09826 A	8	8	8	N/A	N/A	2014	Thin Deck Overlay, 2022
15	(931)31-34-08827	8	9	9	N/A	N/A	2013	Thin Deck Overlay, 2022
16	031-52-05754 CNBL	9	9	7	7	N/A	1972	Overlaid, 2000
17	031-52-05754 CSBL	9	9	7	7	N/A	1972	Overlaid, 2000
18	031-52-10761	Not available	Not available	Not available	Not available	Not available	Not available	Not available
19	031-52-05755 BNBL	6	6	7	7	N/A	1972	Rigid Overlay, New Railings, New Approaches, 1999
20	031-52-05755 BSBL	6	7	7	7	N/A	1972	Rigid overlay, New Railings, New Approaches, 1999
21	031-52-02358	7	7	6	N/A	N/A	1969	?
22	031-52-04041 CNBL	8	7	7	7	N/A	1956	Widening, new approahes, NO overlay, 1972
23	031-52-04041 JBSB	8	7	7	7	N/A	1972	New Joints, Partial Deck Replacement for Joints, Rigid Overlay, 1983
24	031-52-04857 CNBL	7	7	6	8	N/A	1964	Bituminous Overlay and Membrane, Guardrail Modifications, 1974
25	031-52-04857 CSBL	7	7	6	7	N/A	1964	Bituminous Overlay and Membrane, Guardrail Modifications, 1974
26	031-52-02317 CNBL	7	7	6	N/A	N/A	1963	Bituminous Overlay and Membrane, New Joints, 1973
27	031-52-02317 CSBL	7	8	6	N/A	N/A	1963	Bituminous Overlay and Membrane, New Joints, 1973
28	031-52-02318 CNBL	7	7	6	N/A	N/A	1963	Bituminous overlay, 1974
29	031-52-02318 CSBL	7	7	7	N/A	N/A	1963	Bituminous overlay, 1974
30	031-52-04858 BNBL	7	7	7	7	N/A	1963	Overlay, 1986
31	031-52-04858 BSBL	7	7	7	6	N/A	1963	Overlay, 1986
32	024-52-08165 EBL	7	8	7	N/A	N/A	2000	-
33	024-52-06597 BWBL	7	7	6	N/A	N/A	1976	Rigid Overlay, Replace median barrier wall, new S-S joints with adjacent concerete, 1985

US 31 South - National Bridge Inventory (NBI) Data

Bridge No.	Existing Bridge File No.	Rehab B	Rehab C	Rehab D
1	031-29-04572 BSBL	Re-overlaid, 1993	Bridge Deck Overlay, 2022	-
2	031-29-04572 BNBL	Re-overlaid, 1993	Bridge Deck Overlay, 2022	-
3	031-80-03567 CSBL	Patched overlay, New Joints, Replaced Portion of Concrete Barrier, 1993	Reoverlaid, Replaced Approach Slabs, Barrier Transitions, and Relief Joints, 2021	-
4	031-80-03567 JCNB	Patched overlay, New Joints, Replaced Portion of Concrete Barrier, 1993	Reoverlaid, Replaced Approach Slabs, Barrier Transitions, and Relief Joints, 2021	-
5	031-80-03568 CNBL	Replaced Superstructure and Widened, 1993	Overlaid, Replaced Approach Slabs, Barrier Transitions and Relief Joints, 2021	-
6	031-80-03568 JCSB	Patched Overlay, New Joints, and Concrete Barrier, 1993	Reoverlaid, Replaced Approach Slabs, Barrier Transitions and Relief Joints, 2021	-
7	031-80-03569 BNBL	Overlaid, Replaced Approach Slabs, Relief Joints, Guardrail & Transitions, 2021	-	-
8	031-80-03569 JBSB	Overlaid, Replaced Approach Slabs, Relief Joints, Guardrail & Transitions, 2021	-	-
9	028-80-10048 A	-	-	-
10	031-80-03413 NBL	-	-	-
11	031-80-08042	-	-	-
12	031-80-03570 JBSB	Reoverlaid, Replaced Approach Slabs, Patched Piers and Bottom of Deck, Added Riprap in Various Locations, 2021	-	-
13	031-80-07858 NBL	-	-	-
14	031-80-09826 A	-	-	-
15	(931)31-34-08827	-	-	-
16	031-52-05754 CNBL	Scour Countermeasures, 2014	Replaced Superstructure, Abutments Made Semi-Integral, 2019	-
17	031-52-05754 CSBL	Scour Countermeasures, 2014	Replaced Superstructure, Abutments Made Semi-Integral, 2019	-
18	031-52-10761	-	-	-
19	031-52-05755 BNBL	Rigid overlay, New Approaches, Fiberwrap on Fascia Girders, 2018	-	-
20	031-52-05755 BSBL	Rigid overlay, New Approaches, Fiberwrap on Fascia Girders, 2018	-	-
21	031-52-02358	-	-	-
22	031-52-04041 CNBL	Replace Original Section of Deck, Rigid Overlay over Entire Deck, Joints, 1983	Deck Replacement, New Mud Walls, New Approaches, 2009	Bridge Painting, 2017
23	031-52-04041 JBSB	New Deck, Abutment Modifications, New Approaches, 2009	Bridge Painting, 2017	Thin Deck Overlay, 2022
24	031-52-04857 CNBL	Rigid Overlay, Joints with Substructure and Deck Modifications, 1985	Superstructure and End Bent Widening, New Deck, 2000	Splice Cleaning and Spot Painting, 2020
25	031-52-04857 CSBL	Rigid Overlay, Joints with Substructure and Deck Modifications, 1985	Superstructure and End Bent Widening, New Deck, 2000	Splice Cleaning and Spot Painting, 2020
26	031-52-02317 CNBL	Rigid Overlay, New Joints with Partial Deck, Substructure and Approach Replacement, Railing Modifications, 1984	New Wider Deck, New Superstructure, Substructure Modifications, New Approaches, 2001	-
27	031-52-02317 CSBL	Rigid Overlay, New Joints with Partial Deck, Substructure and Approach Replacement, Railing Modifications, 1984	New Wider Deck, New Superstructure, Substructure Modifications, New Approaches, 2001	-
28	031-52-02318 CNBL	Widening and All New Deck, 1986	LMC Overlay, Railings, Approaches, 2009	-
29	031-52-02318 CSBL	Widening and LMC Overlay, Part of Old Deck Retained, 1986	New Deck and Approaches, 2009	Epoxy Overlay, Approach Repair, 2023
30	031-52-04858 BNBL	Approach Slab and Joint Replacement, 2010/2011	Overlay, New Barrier Walls, New North Approach Slab, Scour Countermeasures, 2018	-
31	031-52-04858 BSBL	Approach Slab and Joint Repair, 2010/2011	Overlay, New Barrier Walls, New North Approach Slab, Scour Contermeasures, 2018	-
32	024-52-08165 EBL	-	-	-
33	024-52-06597 BWBL	Bridge Widening, All New Deck and Railings, New Approaches, 2000	-	-

US 31 South - National Bridge Inventory (NBI) Data

Bridge No.	Existing Bridge File No.	Rehab E	Remaining Life	Vertical Clearance	Notes
1	031-29-04572 BSBL	-	12	N/A	-
2	031-29-04572 BNBL	-	12	N/A	-
3	031-80-03567 CSBL	-	4	N/A	-
4	031-80-03567 JCNB	-	12	N/A	-
5	031-80-03568 CNBL	-	4	N/A	-
6	031-80-03568 JCSB	-	12	N/A	-
7	031-80-03569 BNBL	-	4	N/A	-
8	031-80-03569 JBSB	-	12	N/A	-
9	028-80-10048 A	-	69	16.82	-
10	031-80-03413 NBL	-	-7	N/A	Entire structure is buried and not visible
11	031-80-08042	-	47	N/A	-
12	031-80-03570 JBSB	-	13	N/A	-
13	031-80-07858 NBL	-	51	N/A	-
14	031-80-09826 A	-	67	16.02	-
15	(931)31-34-08827	-	66	16.96	-
16	031-52-05754 CNBL	-	25	N/A	-
17	031-52-05754 CSBL	-	25	N/A	-
18	031-52-10761	-	Not available	Not available	Structure status: new bridge, not open yet (not ready to archive)
19	031-52-05755 BNBL	-	25	N/A	-
20	031-52-05755 BSBL	-	25	N/A	-
21	031-52-02358	-	22	**14.27**	-
22	031-52-04041 CNBL	Thin Deck overlay, 2022	9	N/A	-
23	031-52-04041 JBSB	-	25	N/a	-
24	031-52-04857 CNBL	New Railings, Rigid Overlay, Substructure Repair and Possible Semi-Integral Conversion, New Approaches, 2023	17	**14.41**; 16.21	-
25	031-52-04857 CSBL	New Railings, Rigid Overlay, Substructure Repair and Possible Semi-Integral Conversion, New Approaches, 2023	17	**14.29**; 17.6	-
26	031-52-02317 CNBL	-	16	26.13; 22.42	-
27	031-52-02317 CSBL	-	16	26.8; 23.17	-
28	031-52-02318 CNBL	-	16	Not available	-
29	031-52-02318 CSBL	-	16	Not available	-
30	031-52-04858 BNBL	-	16	N/A	-
31	031-52-04858 BSBL	-	16	N/A	-
32	024-52-08165 EBL	-	53	17.43	-
33	024-52-06597 BWBL		29	18.09	-

APPENDIX B: SUMMARY OF CRASHES

PROPEL US 31

Smarter Transportation. Stronger Communities.

US 31 South

Crash Density Heat Map

SR 931 (North of Kokomo) to CR W 300 N

Relative Crash Density

Low

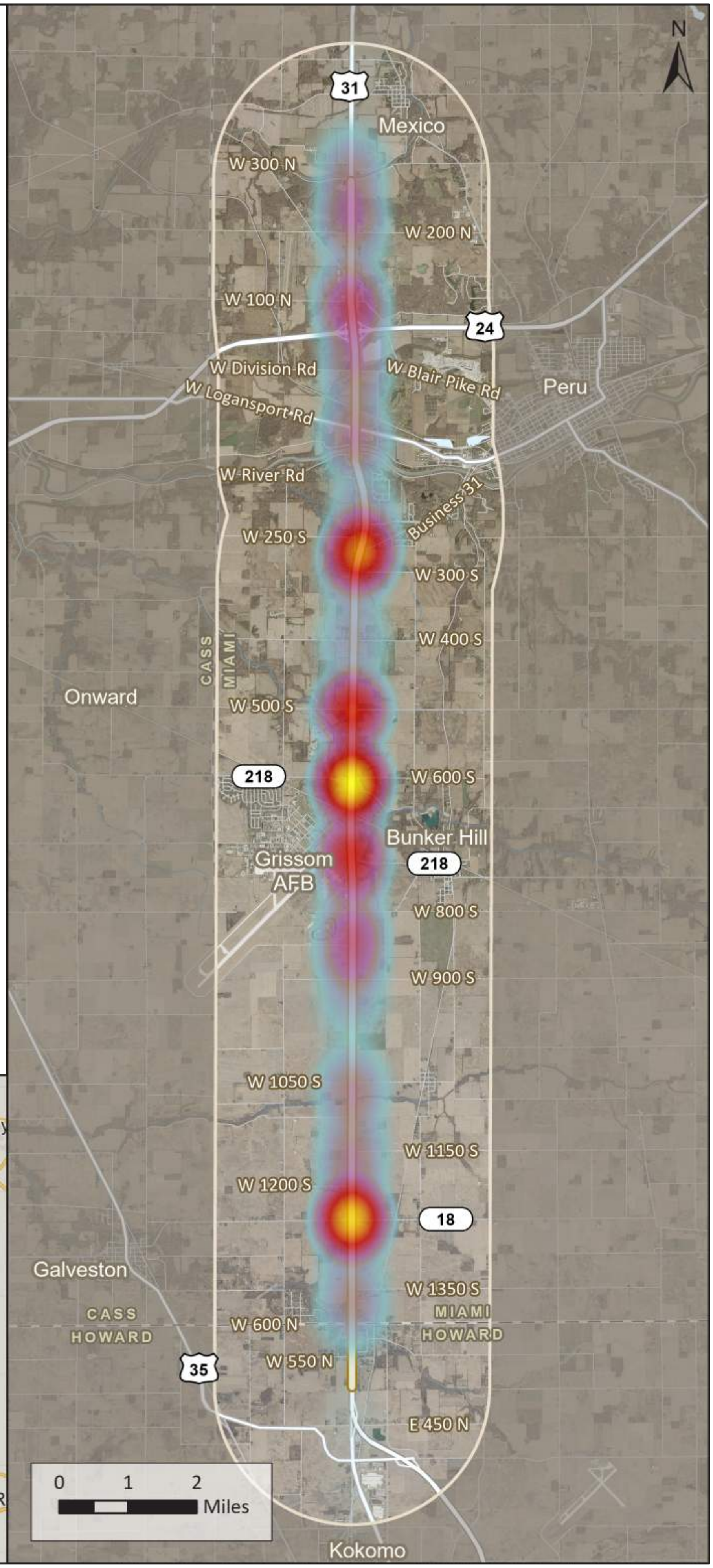
High

PEL Study Boundaries

Study Corridor

Study Area

Series Page 1 of 2



State of Indiana, INDOT, Esri, HERE, Garmin, SafeGraph, FAO, METI/NASA, USGS, EPA, NPS, GeoTechnologies, Inc, USDA, NOAA

PROPEL US 31

Smarter Transportation. Stronger Communities.

US 31 South

Crash Density Heat Map

276th Street to SR 931 (South of Kokomo)

Relative Crash Density

Low

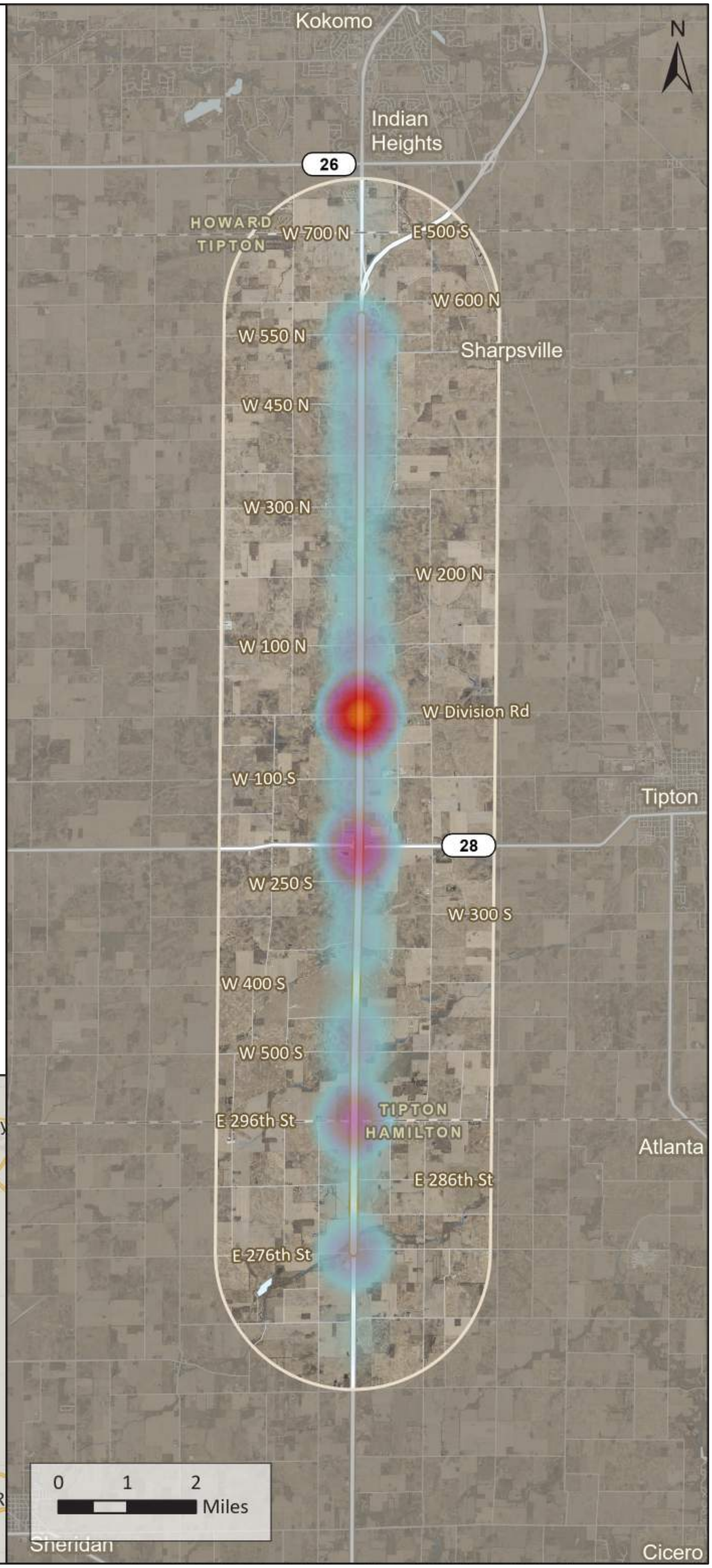
High

PEL Study Boundaries

Study Corridor

Study Area

Series Page 2 of 2



State of Indiana, INDOT, Esri, HERE, Garmin, SafeGraph, FAO, METI/NASA, USGS, EPA, NPS, GeoTechnologies, Inc, USDA, NOAA

Intersection Crash Summaries

US 31 at W CR 200 N

Number of Collisions by Type					
	Fatal and Incapacitating Injury	Non-Incapacitating Injury	Property Damage Only	Total	Percentage
Rear End	0	0	1	**1**	8%
Ran off Road	0	1	4	**5**	38%
Same Direction Sideswipe	0	0	2	**2**	15%
Collision with Animal*	0	0	5	**5**	38%
Total	**0**	**1**	**12**	**13**	100%
* Deer and other animal crashes are not included in the RoadHAT analysis					
RoadHAT Output					
ICF	-0.19				
ICC	-0.76				

US 31 at W CR 100 N

Number of Collisions by Type					
	Fatal and Incapacitating Injury	Non-Incapacitating Injury	Property Damage Only	Total	Percentage
Rear End	1	1	11	**13**	41%
Right Angle	0	0	5	**5**	16%
Ran off Road	0	1	0	**1**	3%
Same Direction Sideswipe	0	0	2	**2**	6%
Left Turn	0	0	1	**1**	3%
Non-Collision	2	0	1	**3**	9%
Backing Crash	0	0	2	**2**	6%
Collision with object in road	0	0	1	**1**	3%
Opposite Direction Sideswipe	0	0	1	**1**	3%
Right Turn	0	0	1	**1**	3%
Collision with Animal*	0	0	2	**2**	6%
Total	**3**	**2**	**27**	**32**	100%
* Deer and other animal crashes are not included in the RoadHAT analysis					
RoadHAT Output					
ICF	2.39				
ICC	0.56				

US 31 at US 24 (interchange)

Number of Collisions by Type					
	Fatal and Incapacitating Injury	Non-Incapacitating Injury	Property Damage Only	Total	Percentage
Ran off Road	2	0	3	**5**	24%
Same Direction Sideswipe	1	0	4	**5**	24%
Other (Explain in Narrative)	0	0	2	**2**	10%
Non-Collision	0	0	1	**1**	5%
Collision with Animal*	0	1	7	**8**	38%
Total	**3**	**1**	**17**	**21**	100%
* Deer and other animal crashes are not included in the RoadHAT analysis					
RoadHAT Output					
ICF	-0.42				
ICC	0.41				

Intersection Crash Summaries

US 31 at W Blair Pike Road / W Division Road

Number of Collisions by Type					
	Fatal and Incapacitating Injury	**Non-Incapacitating Injury**	**Property Damage Only**	**Total**	**Percentage**
Rear End	1	3	3	**7**	37%
Right Angle	1	0	0	**1**	5%
Ran off Road	0	0	4	**4**	21%
Same Direction Sideswipe	0	0	4	**4**	21%
Collision with object in road	0	0	1	**1**	5%
Collision with Animal*	0	0	2	**2**	11%
Total	**2**	**3**	**14**	**19**	100%
* Deer and other animal crashes are not included in the RoadHAT analysis					
RoadHAT Output					
ICF	0.19				
ICC	-0.10				

US 31 at W Logansport Road

Number of Collisions by Type					
	Fatal and Incapacitating Injury	**Non-Incapacitating Injury**	**Property Damage Only**	**Total**	**Percentage**
Rear End	0	0	6	**6**	35%
Right Angle	1	0	0	**1**	6%
Ran off Road	0	0	5	**5**	29%
Same Direction Sideswipe	0	0	3	**3**	18%
Collision with object in road	0	0	1	**1**	6%
Head On	0	0	1	**1**	6%
Total	**1**	**0**	**16**	**17**	100%
RoadHAT Output					
ICF	0.68				
ICC	-0.24				

W Logansport Road at Business US 24

Number of Collisions by Type					
	Fatal and Incapacitating Injury	**Non-Incapacitating Injury**	**Property Damage Only**	**Total**	**Percentage**
Rear End	0	0	2	**2**	33%
Ran off Road	0	0	1	**1**	17%
Collision with Animal*	0	0	3	**3**	50%
Total	**0**	**0**	**6**	**6**	100%
* Deer and other animal crashes are not included in the RoadHAT analysis					
RoadHAT Output					
ICF	-0.34				
ICC	-0.62				

Intersection Crash Summaries

US 31 at W Airport Road

Number of Collisions by Type					
	Fatal and Incapacitating Injury	**Non-Incapacitating Injury**	**Property Damage Only**	**Total**	**Percentage**
Rear End	0	0	2	**2**	14%
Right Angle	2	0	1	**3**	21%
Ran off Road	0	0	1	**1**	7%
Same Direction Sideswipe	0	0	1	**1**	7%
Other (Explain in Narrative)	0	0	2	**2**	14%
Left Turn	0	0	1	**1**	7%
Collision with object in road	0	0	1	**1**	7%
Collision with Animal*	0	0	3	**3**	21%
Total	**2**	**0**	**12**	**14**	100%
* Deer and other animal crashes are not included in the RoadHAT analysis					
RoadHAT Output					
ICF	0.46				
ICC	0.32				

US 31 at Business US 31

Number of Collisions by Type					
	Fatal and Incapacitating Injury	**Non-Incapacitating Injury**	**Property Damage Only**	**Total**	**Percentage**
Rear End	7	3	22	**32**	50%
Right Angle	6	3	6	**15**	23%
Ran off Road	1	1	4	**6**	9%
Same Direction Sideswipe	0	0	3	**3**	5%
Left Turn	0	0	3	**3**	5%
Non-Collision	0	0	1	**1**	2%
Backing Crash	0	0	2	**2**	3%
Collision with object in road	0	0	1	**1**	2%
Collision with Animal*	0	0	1	**1**	2%
Total	**14**	**7**	**43**	**64**	100%
* Deer and other animal crashes are not included in the RoadHAT analysis					
RoadHAT Output					
ICF	0.09				
ICC	2.09				

US 31 at W CR 500 S

Number of Collisions by Type					
	Fatal and Incapacitating Injury	**Non-Incapacitating Injury**	**Property Damage Only**	**Total**	**Percentage**
Rear End	1	1	4	**6**	12%
Right Angle	7	3	6	**16**	31%
Ran off Road	2	0	6	**8**	16%
Same Direction Sideswipe	0	0	4	**4**	8%
Other (Explain in Narrative)	0	0	1	**1**	2%
Left Turn	0	0	7	**7**	14%
Non-Collision	1	0	0	**1**	2%
Collision with Animal*	0	0	8	**8**	16%
Total	**11**	**4**	**36**	**51**	100%
* Deer and other animal crashes are not included in the RoadHAT analysis					
RoadHAT Output					
ICF	1.21				
ICC	1.21				

Intersection Crash Summaries

US 31 at SR 218 N

Number of Collisions by Type					
	Fatal and Incapacitating Injury	**Non-Incapacitating Injury**	**Property Damage Only**	**Total**	**Percentage**
Rear End	11	4	60	**75**	69%
Right Angle	1	2	7	**10**	9%
Ran off Road	4	0	5	**9**	8%
Same Direction Sideswipe	0	0	3	**3**	3%
Left Turn	1	0	1	**2**	2%
Non-Collision	0	1	1	**2**	2%
Collision with object in road	0	0	1	**1**	1%
Right Turn	0	0	2	**2**	2%
Collision with Animal*	0	0	5	**5**	5%
Total	**17**	**7**	**85**	**109**	100%
* Deer and other animal crashes are not included in the RoadHAT analysis					
RoadHAT Output					
ICF	1.67				
ICC	3.01				

US 31 at SR 218 S / W Broadway Street

Number of Collisions by Type					
	Fatal and Incapacitating Injury	**Non-Incapacitating Injury**	**Property Damage Only**	**Total**	**Percentage**
Rear End	3	0	2	**5**	14%
Right Angle	5	2	7	**14**	40%
Ran off Road	0	0	3	**3**	9%
Same Direction Sideswipe	0	0	2	**2**	6%
Other (Explain in Narrative)	0	0	1	**1**	3%
Left Turn	1	0	2	**3**	9%
Non-Collision	0	0	2	**2**	6%
Opposite Direction Sideswipe	0	1	0	**1**	3%
Collision with Animal*	0	1	3	**4**	11%
Total	**9**	**4**	**22**	**35**	100%
* Deer and other animal crashes are not included in the RoadHAT analysis					
RoadHAT Output					
ICF	1.57				
ICC	1.99				

Intersection Crash Summaries

US 31 at W CR 800 S

Number of Collisions by Type					
	Fatal and Incapacitating Injury	**Non-Incapacitating Injury**	**Property Damage Only**	**Total**	**Percentage**
Rear End	0	1	4	**5**	26%
Right Angle	3	0	2	**5**	26%
Ran off Road	0	0	1	**1**	5%
Same Direction Sideswipe	1	0	2	**3**	16%
Other (Explain in Narrative)	0	0	1	**1**	5%
Left Turn	0	0	1	**1**	5%
Backing Crash	0	1	0	**1**	5%
Opposite Direction Sideswipe	0	0	1	**1**	5%
Right Turn	0	0	1	**1**	5%
Total	**4**	**2**	**13**	**19**	100%
RoadHAT Output					
ICF	-0.08				
ICC	0.01				

US 31 at SR 18

Number of Collisions by Type					
	Fatal and Incapacitating Injury	**Non-Incapacitating Injury**	**Property Damage Only**	**Total**	**Percentage**
Rear End	5	3	41	**49**	57%
Right Angle	1	3	8	**12**	14%
Ran off Road	0	0	4	**4**	5%
Same Direction Sideswipe	0	0	11	**11**	13%
Left Turn	0	0	1	**1**	1%
Non-Collision	0	0	2	**2**	2%
Backing Crash	0	0	1	**1**	1%
Collision with object in road	0	0	1	**1**	1%
Right Turn	0	0	2	**2**	2%
Head On	0	0	1	**1**	1%
Collision with Animal*	0	0	2	**2**	2%
Total	**6**	**6**	**74**	**86**	100%
* Deer and other animal crashes are not included in the RoadHAT analysis					
RoadHAT Output					
ICF	1.87				
ICC	0.70				

Intersection Crash Summaries

US 31 at W CR 550 N

Number of Collisions by Type					
	Fatal and Incapacitating Injury	**Non-Incapacitating Injury**	**Property Damage Only**	**Total**	**Percentage**
Rear End	0	0	4	**4**	21%
Right Angle	0	0	1	**1**	5%
Ran off Road	1	0	4	**5**	26%
Same Direction Sideswipe	0	0	1	**1**	5%
Collision with object in road	1	0	2	**3**	16%
Opposite Direction Sideswipe	1	0	0	**1**	5%
Head On	0	0	1	**1**	5%
Collision with Animal*	0	0	3	**3**	16%
Total	**3**	**0**	**16**	**19**	100%
* Deer and other animal crashes are not included in the RoadHAT analysis					
RoadHAT Output					
ICF	0.24				
ICC	0.07				

US 31 at Division Road

Number of Collisions by Type					
	Fatal and Incapacitating Injury	**Non-Incapacitating Injury**	**Property Damage Only**	**Total**	**Percentage**
Rear End	9	4	42	**55**	70%
Right Angle	7	1	5	**13**	16%
Ran off Road	0	0	2	**2**	3%
Same Direction Sideswipe	0	0	2	**2**	3%
Left Turn	0	1	3	**4**	5%
Non-Collision	0	0	1	**1**	1%
Backing Crash	0	0	1	**1**	1%
Head On	0	1	0	**1**	1%
Total	**16**	**7**	**56**	**79**	100%
RoadHAT Output					
ICF	1.09				
ICC	2.03				

US 31 at SR 28 / W 200 S (western roundabout)

Number of Collisions by Type					
	Fatal and Incapacitating Injury	**Non-Incapacitating Injury**	**Property Damage Only**	**Total**	**Percentage**
Rear End	0	0	3	**3**	21%
Right Angle	1	0	2	**3**	21%
Ran off Road	1	0	4	**5**	36%
Other (Explain in Narrative)	0	0	1	**1**	7%
Collision with object in road	2	0	0	**2**	14%
Total	**4**	**0**	**10**	**14**	100%
RoadHAT Output					
ICF	0.90				
ICC	1.24				

Intersection Crash Summaries

US 31 at SR 28 / W 200 S (eastern roundabout)

Number of Collisions by Type					
	Fatal and Incapacitating Injury	Non-Incapacitating Injury	Property Damage Only	Total	Percentage
Rear End	0	0	3	**3**	20%
Right Angle	0	0	7	**7**	47%
Ran off Road	0	0	2	**2**	13%
Backing Crash	0	0	3	**3**	20%
Total	**0**	**0**	**15**	**15**	100%
RoadHAT Output					
ICF	0.19				
ICC	-0.84				

US 31 at 296th Street

Number of Collisions by Type					
	Fatal and Incapacitating Injury	Non-Incapacitating Injury	Property Damage Only	Total	Percentage
Rear End	0	0	7	**7**	21%
Right Angle	4	3	3	**10**	30%
Ran off Road	0	1	3	**4**	12%
Same Direction Sideswipe	0	0	3	**3**	9%
Left Turn	0	0	4	**4**	12%
Collision with object in road	0	0	2	**2**	6%
Opposite Direction Sideswipe	0	0	2	**2**	6%
Right Turn	0	0	1	**1**	3%
Total	**4**	**4**	**25**	**33**	100%
RoadHAT Output					
ICF	0.79				
ICC	0.17				

US 31 at 276th Street

Number of Collisions by Type					
	Fatal and Incapacitating Injury	Non-Incapacitating Injury	Property Damage Only	Total	Percentage
Rear End	1	0	3	**4**	18%
Right Angle	1	0	0	**1**	5%
Ran off Road	0	1	4	**5**	23%
Same Direction Sideswipe	0	0	5	**5**	23%
Left Turn	0	0	5	**5**	23%
Collision with Animal*	0	0	2	**2**	9%
Total	**2**	**1**	**19**	**22**	100%
* Deer and other animal crashes are not included in the RoadHAT analysis					
RoadHAT Output					
ICF	-0.14				
ICC	-0.44				

Segment Crash Summaries

US 31, Between W CR 300 N and W CR 200 N

Number of Collisions by Type					
	Fatal and Incapacitating Injury	**Non-Incapacitating Injury**	**Property Damage Only**	**Total**	**Percentage**
Rear End	0	0	2	**2**	7%
Ran off Road	1	0	8	**9**	33%
Same Direction Sideswipe	0	0	1	**1**	4%
Collision with Animal*	0	0	15	**15**	56%
Total	**1**	**0**	**26**	**27**	100%
* Deer and other animal crashes are not included in the RoadHAT analysis					
RoadHAT Output					
ICF	-0.20				
ICC	-0.38				

US 31, Between W CR 200 N and W CR 100 N

Number of Collisions by Type					
	Fatal and Incapacitating Injury	**Non-Incapacitating Injury**	**Property Damage Only**	**Total**	**Percentage**
Rear End	0	1	3	**4**	11%
Ran off Road	1	1	10	**12**	34%
Same Direction Sideswipe	0	0	4	**4**	11%
Right Angle	0	0	2	**2**	6%
Other (Explain in Narrative)	0	0	1	**1**	3%
Non-Collision	0	0	1	**1**	3%
Collision with Animal*	0	0	11	**11**	31%
Total	**1**	**2**	**32**	**35**	100%
* Deer and other animal crashes are not included in the RoadHAT analysis					
RoadHAT Output					
ICF	0.45				
ICC	-0.37				

US 31, Between W Blair Pike Road / W Division Road and W Logansport Road

Number of Collisions by Type					
	Fatal and Incapacitating Injury	**Non-Incapacitating Injury**	**Property Damage Only**	**Total**	**Percentage**
Rear End	0	0	2	**2**	6%
Ran off Road	3	0	15	**18**	56%
Same Direction Sideswipe	1	0	1	**2**	6%
Right Angle	0	0	2	**2**	6%
Other (Explain in Narrative)	0	0	1	**1**	3%
Collision with object in road	0	0	2	**2**	6%
Non-Collision	0	0	1	**1**	3%
Collision with Animal*	0	0	4	**4**	13%
Total	**4**	**0**	**28**	**32**	100%
* Deer and other animal crashes are not included in the RoadHAT analysis					
RoadHAT Output					
ICF	0.66				
ICC	0.45				

Segment Crash Summaries

US 31, Between W Logansport Road and W Airport Road

Number of Collisions by Type					
	Fatal and Incapacitating Injury	**Non-Incapacitating Injury**	**Property Damage Only**	**Total**	**Percentage**
Rear End	0	0	1	**1**	3%
Ran off Road	5	1	12	**18**	55%
Same Direction Sideswipe	0	0	1	**1**	3%
Right Angle	0	0	1	**1**	3%
Non-Collision	0	0	1	**1**	3%
Collision with Animal*	0	0	11	**11**	33%
Total	**5**	**1**	**27**	**33**	100%
* Deer and other animal crashes are not included in the RoadHAT analysis					
RoadHAT Output					
ICF	-0.09				
ICC	0.30				

US 31, Between W Airport Road and Business US 31

Number of Collisions by Type					
	Fatal and Incapacitating Injury	**Non-Incapacitating Injury**	**Property Damage Only**	**Total**	**Percentage**
Ran off Road	0	0	2	**2**	40%
Non-Collision	0	0	1	**1**	20%
Collision with Animal*	0	1	1	**2**	40%
Total	**0**	**1**	**4**	**5**	100%
* Deer and other animal crashes are not included in the RoadHAT analysis					
RoadHAT Output					
ICF	-0.74				
ICC	-0.73				

US 31, Between Business US 31 and W CR 500 S

Number of Collisions by Type					
	Fatal and Incapacitating Injury	**Non-Incapacitating Injury**	**Property Damage Only**	**Total**	**Percentage**
Rear End	1	1	6	**8**	12%
Ran off Road	1	1	18	**20**	30%
Same Direction Sideswipe	2	0	6	**8**	12%
Right Angle	1	0	3	**4**	6%
Other (Explain in Narrative)	0	0	1	**1**	1%
Collision with object in road	0	0	6	**6**	9%
Non-Collision	0	0	1	**1**	1%
Left Turn	0	0	2	**2**	3%
Backing Crash	0	0	2	**2**	3%
Collision with Animal*	1	0	14	**15**	22%
Total	**6**	**2**	**59**	**67**	100%
* Deer and other animal crashes are not included in the RoadHAT analysis					
RoadHAT Output					
ICF	-0.01				
ICC	-0.41				

Segment Crash Summaries

US 31, Between W CR 500 S and SR 218 N

Number of Collisions by Type					
	Fatal and Incapacitating Injury	**Non-Incapacitating Injury**	**Property Damage Only**	**Total**	**Percentage**
Rear End	1	0	8	**9**	19%
Ran off Road	2	0	9	**11**	23%
Same Direction Sideswipe	0	0	9	**9**	19%
Collision with object in road	1	0	1	**2**	4%
Non-Collision	0	0	1	**1**	2%
Backing Crash	0	0	1	**1**	2%
Collision with Animal*	0	0	14	**14**	30%
Total	**4**	**0**	**43**	**47**	100%
* Deer and other animal crashes are not included in the RoadHAT analysis					
RoadHAT Output					
ICF	0.04				
ICC	-0.14				

US 31, Between SR 218 N and SR 218 S / W Broadway Street

Number of Collisions by Type					
	Fatal and Incapacitating Injury	**Non-Incapacitating Injury**	**Property Damage Only**	**Total**	**Percentage**
Rear End	2	2	15	**19**	35%
Ran off Road	2	1	6	**9**	16%
Same Direction Sideswipe	0	0	7	**7**	13%
Right Angle	1	1	6	**8**	15%
Other (Explain in Narrative)	0	0	1	**1**	2%
Collision with object in road	0	0	1	**1**	2%
Left Turn	2	1	1	**4**	7%
Collision with Animal*	0	1	5	**6**	11%
Total	**7**	**6**	**42**	**55**	100%
* Deer and other animal crashes are not included in the RoadHAT analysis					
RoadHAT Output					
ICF	0.92				
ICC	0.73				

US 31, Between SR 218 S / W Broadway Street and W CR 800 S

Number of Collisions by Type					
	Fatal and Incapacitating Injury	**Non-Incapacitating Injury**	**Property Damage Only**	**Total**	**Percentage**
Rear End	2	0	6	**8**	50%
Ran off Road	2	0	2	**4**	25%
Same Direction Sideswipe	0	0	2	**2**	13%
Collision with object in road	0	0	2	**2**	13%
Total	**4**	**0**	**12**	**16**	100%
RoadHAT Output					
ICF	-0.13				
ICC	0.45				

Segment Crash Summaries

US 31, Between W CR 800 S and SR 18

Number of Collisions by Type					
	Fatal and Incapacitating Injury	**Non-Incapacitating Injury**	**Property Damage Only**	**Total**	**Percentage**
Rear End	8	9	43	**60**	36%
Ran off Road	5	2	19	**26**	16%
Same Direction Sideswipe	0	1	19	**20**	12%
Right Angle	5	4	5	**14**	8%
Other (Explain in Narrative)	0	1	5	**6**	4%
Collision with object in road	0	0	8	**8**	5%
Non-Collision	0	0	5	**5**	3%
Left Turn	0	0	3	**3**	2%
Backing Crash	0	0	1	**1**	1%
Right Turn	0	0	1	**1**	1%
Opposite Direction Sideswipe	0	0	1	**1**	1%
Collision with Animal*	0	0	21	**21**	13%
Total	**18**	**17**	**131**	**166**	100%
* Deer and other animal crashes are not included in the RoadHAT analysis					
RoadHAT Output					
ICF		0.95			
ICC		0.14			

US 31, from SR 18 to South of Ida Drive

Number of Collisions by Type					
	Fatal and Incapacitating Injury	**Non-Incapacitating Injury**	**Property Damage Only**	**Total**	**Percentage**
Rear End	1	2	6	**9**	24%
Ran off Road	0	1	3	**4**	11%
Same Direction Sideswipe	0	0	6	**6**	16%
Right Angle	3	1	1	**5**	14%
Collision with object in road	0	0	2	**2**	5%
Non-Collision	0	0	1	**1**	3%
Left Turn	0	0	1	**1**	3%
Collision with Animal*	0	0	9	**9**	24%
Total	**4**	**4**	**29**	**37**	100%
* Deer and other animal crashes are not included in the RoadHAT analysis					
RoadHAT Output					
ICF		-0.79			
ICC		-0.65			

Segment Crash Summaries

US 31, Between W CR 550 N and Division Road

Number of Collisions by Type					
	Fatal and Incapacitating Injury	Non-Incapacitating Injury	Property Damage Only	Total	Percentage
Rear End	10	9	31	**50**	32%
Ran off Road	4	6	38	**48**	31%
Same Direction Sideswipe	1	2	22	**25**	16%
Right Angle	2	0	0	**2**	1%
Other (Explain in Narrative)	0	0	2	**2**	1%
Collision with object in road	0	1	1	**2**	1%
Non-Collision	0	0	5	**5**	3%
Left Turn	0	0	2	**2**	1%
Collision with Animal*	0	0	20	**20**	13%
Total	**17**	**18**	**121**	**156**	100%
* Deer and other animal crashes are not included in the RoadHAT analysis					
RoadHAT Output					
ICF	0.36				
ICC	-0.17				

US 31, Between Division Road and SR 28 / W 200 S

Number of Collisions by Type					
	Fatal and Incapacitating Injury	Non-Incapacitating Injury	Property Damage Only	Total	Percentage
Rear End	5	2	20	**27**	40%
Ran off Road	3	0	13	**16**	24%
Same Direction Sideswipe	1	0	7	**8**	12%
Right Angle	0	0	1	**1**	1%
Other (Explain in Narrative)	0	0	3	**3**	4%
Collision with object in road	0	0	5	**5**	7%
Non-Collision	1	0	1	**2**	3%
Left Turn	0	0	1	**1**	1%
Head On	0	0	1	**1**	1%
Collision with Animal*	0	0	4	**4**	6%
Total	**10**	**2**	**56**	**68**	100%
* Deer and other animal crashes are not included in the RoadHAT analysis					
RoadHAT Output					
ICF	0.61				
ICC	0.35				

US 31, Between SR 28 / W 200 S and 296th Street

Number of Collisions by Type					
	Fatal and Incapacitating Injury	Non-Incapacitating Injury	Property Damage Only	Total	Percentage
Rear End	4	4	24	**32**	30%
Ran off Road	7	3	21	**31**	29%
Same Direction Sideswipe	3	1	16	**20**	19%
Right Angle	3	1	2	**6**	6%
Collision with object in road	0	0	3	**3**	3%
Non-Collision	0	0	3	**3**	3%
Collision with Animal*	0	0	12	**12**	11%
Total	**17**	**9**	**81**	**107**	100%
* Deer and other animal crashes are not included in the RoadHAT analysis					
RoadHAT Output					
ICF	0.23				
ICC	0.07				

Segment Crash Summaries

US 31, Between 296th Street and 276th Street

Number of Collisions by Type					
	Fatal and Incapacitating Injury	**Non-Incapacitating Injury**	**Property Damage Only**	**Total**	**Percentage**
Rear End	3	0	6	**9**	20%
Ran off Road	3	0	14	**17**	38%
Same Direction Sideswipe	0	1	7	**8**	18%
Other (Explain in Narrative)	0	0	1	**1**	2%
Collision with object in road	0	0	2	**2**	4%
Collision with Animal*	0	0	8	**8**	18%
Total	**6**	**1**	**38**	**45**	100%
* Deer and other animal crashes are not included in the RoadHAT analysis					
RoadHAT Output					
ICF	-0.29				
ICC	-0.25				

RoadHAT 4D

Index of Crash Frequency and Cost - Form F1

Page 1/2

Settings: Indiana state settings   Version: Version 4.1

Location	US 31, Between W CR 200 N and W CR 300 N	
GIS		
Post		
Analyst	Andrea L. Horn	
Date	11/1/2022	

INPUT	
Road Facility Type	Rural multilane Segment
Beginning	54.811
End	55.562
AADT (veh/day)	14200
Intersection Density (int/mi)	1.52
First Year with Crash Data (yyyy)	2017
Last Year with Crash Data (yyyy)	2021
Number of Crashes (crash/period)	
Fatal and Incapacitating Injury Crashes	1
Non-Incapacitating and Possible Injury Crashes	0
Property Damage Only Crashes	11
Route or Road Type	Rural multilane Segment
Average Crash Costs ($)	
Fatal and Incapacitating Injury Crashes	2442800
Non-Incapacitating and Possible Injury Crashes	368100
Property Damage Only Crashes	31600
Crash Cost Year (yyyy)	2017
OUTPUT	
Segment Length (mi)	0.751
Expected Crash Frequency (crash/year)	
Fatal and Incapacitating Injury Crashes	0.358
Non-Incapacitating and Possible Injury Crashes	0.21
Property Damage Only Crashes	2.33
All Crashes	2.90
Index of Crash Frequency	**-0.20**
Index of Crash Cost	**-0.38**

RoadHAT 4D

Index of Crash Frequency and Cost - Form F1

Page 2/2

Settings: Indiana state settings   Version: Version 4.1

Location	US 31, Between W CR 200 N and W CR 300 N	
GIS		
Post		
Analyst	Andrea L. Horn	
Date	11/1/2022	

Comments:

RoadHAT 4D	Index of Crash Frequency and Cost - Form F1	Page 1/2

Settings: Indiana state settings	Version: Version 4.1	
Location	US 31 at W CR 200 N	
GIS		
Post		
Analyst	JCA	
Date		

INPUT	
Road Facility Type	Unsignalized Rural State Intersection
Busiest Road AADT (veh/day)	14200
Crossing Road AADT (veh/day)	500
T Intersection Indicator (1 if present, 0 otherwise)	0
First Year with Crash Data (yyyy)	2017
Last Year with Crash Data (yyyy)	2021
Number of Crashes (crash/period)	
Fatal and Incapacitating Injury Crashes	0
Non-Incapacitating and Possible Injury Crashes	1
Property Damage Only Crashes	7
Route or Road Type	Unsignalized Rural State Intersection
Average Crash Costs ($)	
Fatal and Incapacitating Injury Crashes	2335800
Non-Incapacitating and Possible Injury Crashes	389500
Property Damage Only Crashes	32200
Crash Cost Year (yyyy)	2017
OUTPUT	
Expected Crash Frequency (crash/year)	
Fatal and Incapacitating Injury Crashes	0.352
Non-Incapacitating and Possible Injury Crashes	0.16
Property Damage Only Crashes	1.37
All Crashes	1.88
Index of Crash Frequency	**-0.19**
Index of Crash Cost	**-0.76**

RoadHAT 4D	Index of Crash Frequency and Cost - Form F1	Page 2/2

Settings: Indiana state settings	Version: Version 4.1	
Location	US 31 at W CR 200 N	
GIS		
Post		
Analyst	JCA	
Date		

Comments:

RoadHAT 4D	Index of Crash Frequency and Cost - Form F1	Page 1/2

Settings: Indiana state settings	Version: Version 4.1	
Location	US 31, Between W CR 100 N and W CR 200 N	
GIS		
Post		
Analyst	Andrea L. Horn	
Date	11/1/2022	

INPUT	
Road Facility Type	Rural multilane Segment
Beginning	53.810
End	54.811
AADT (veh/day)	14200
Intersection Density (int/mi)	1.23
First Year with Crash Data (yyyy)	2017
Last Year with Crash Data (yyyy)	2021
Number of Crashes (crash/period)	
Fatal and Incapacitating Injury Crashes	1
Non-Incapacitating and Possible Injury Crashes	2
Property Damage Only Crashes	21
Route or Road Type	Rural multilane Segment
Average Crash Costs ($)	
Fatal and Incapacitating Injury Crashes	2442800
Non-Incapacitating and Possible Injury Crashes	368100
Property Damage Only Crashes	31600
Crash Cost Year (yyyy)	2017
OUTPUT	
Segment Length (mi)	1.001
Expected Crash Frequency (crash/year)	
Fatal and Incapacitating Injury Crashes	0.463
Non-Incapacitating and Possible Injury Crashes	0.27
Property Damage Only Crashes	2.72
All Crashes	3.45
Index of Crash Frequency	**0.45**
Index of Crash Cost	**-0.37**

RoadHAT 4D	Index of Crash Frequency and Cost - Form F1	Page 2/2

Settings: Indiana state settings	Version: Version 4.1	
Location	US 31, Between W CR 100 N and W CR 200 N	
GIS		
Post		
Analyst	Andrea L. Horn	
Date	11/1/2022	

Comments:

RoadHAT 4D	Index of Crash Frequency and Cost - Form F1	Page 1/2

Settings: Indiana state settings	Version: Version 4.1	
Location	US 31 at W CR 100 N	
GIS		
Post		
Analyst	JCA	
Date		

INPUT	
Road Facility Type	Signalized Rural State Intersection
Busiest Road AADT (veh/day)	15000
Crossing Road AADT (veh/day)	400
T Intersection Indicator (1 if present, 0 otherwise)	0
First Year with Crash Data (yyyy)	2017
Last Year with Crash Data (yyyy)	2021
Number of Crashes (crash/period)	
Fatal and Incapacitating Injury Crashes	3
Non-Incapacitating and Possible Injury Crashes	2
Property Damage Only Crashes	25
Route or Road Type	Signalized Rural State Intersection
Average Crash Costs ($)	
Fatal and Incapacitating Injury Crashes	2203700
Non-Incapacitating and Possible Injury Crashes	428200
Property Damage Only Crashes	40300
Crash Cost Year (yyyy)	2017
OUTPUT	
Expected Crash Frequency (crash/year)	
Fatal and Incapacitating Injury Crashes	0.393
Non-Incapacitating and Possible Injury Crashes	0.19
Property Damage Only Crashes	1.32
All Crashes	1.91
Index of Crash Frequency	**2.39**
Index of Crash Cost	**0.56**

RoadHAT 4D	Index of Crash Frequency and Cost - Form F1	Page 2/2

Settings: Indiana state settings	Version: Version 4.1	
Location	US 31 at W CR 100 N	
GIS		
Post		
Analyst	JCA	
Date		

Comments:

RoadHAT 4D	**Index of Crash Frequency and Cost - Form F1**	Page 1/2

Settings: Indiana state settings Version: Version 4.1		
Location	US 31 at US 24 (interchange)	
GIS		
Post		
Analyst	JCA	
Date		

INPUT	
Road Facility Type	Rural interchange non-freeway Segment
Beginning	0
End	0.84
AADT (veh/day)	14600
Clover Interchange (1 if present, 0 otherwise)	1
Diamond Interchange (1 if present, 0 otherwise)	0
Jug Interchange (1 if present, 0 otherwise)	0
First Year with Crash Data (yyyy)	2017
Last Year with Crash Data (yyyy)	2021
Number of Crashes (crash/period)	
Fatal and Incapacitating Injury Crashes	3
Non-Incapacitating and Possible Injury Crashes	0
Property Damage Only Crashes	10
Route or Road Type	Rural interchange non-freeway Segment
Average Crash Costs ($)	
Fatal and Incapacitating Injury Crashes	1851100
Non-Incapacitating and Possible Injury Crashes	388200
Property Damage Only Crashes	36400
Crash Cost Year (yyyy)	2017
OUTPUT	
Segment Length (mi)	0.84
Expected Crash Frequency (crash/year)	
Fatal and Incapacitating Injury Crashes	0.233
Non-Incapacitating and Possible Injury Crashes	0.49
Property Damage Only Crashes	4.36
All Crashes	5.08

RoadHAT 4D	**Index of Crash Frequency and Cost - Form F1**	Page 2/2

Settings: Indiana state settings Version: Version 4.1		
Location	US 31 at US 24 (interchange)	
GIS		
Post		
Analyst	JCA	
Date		

Index of Crash Frequency	**-0.42**
Index of Crash Cost	**0.41**
Comments:	

RoadHAT 4D	Index of Crash Frequency and Cost - Form F1	Page 1/2

Settings: Indiana state settings Version: Version 4.1		
Location	US 31 at W Blair Pike Road / W Division Road	
GIS		
Post		
Analyst	JCA	
Date		

INPUT	
Road Facility Type	Unsignalized Rural State Intersection
Busiest Road AADT (veh/day)	18500
Crossing Road AADT (veh/day)	1000
T Intersection Indicator (1 if present, 0 otherwise)	0
First Year with Crash Data (yyyy)	2017
Last Year with Crash Data (yyyy)	2021
Number of Crashes (crash/period)	
Fatal and Incapacitating Injury Crashes	2
Non-Incapacitating and Possible Injury Crashes	3
Property Damage Only Crashes	12
Route or Road Type	Unsignalized Rural State Intersection
Average Crash Costs ($)	
Fatal and Incapacitating Injury Crashes	2335800
Non-Incapacitating and Possible Injury Crashes	389500
Property Damage Only Crashes	32200
Crash Cost Year (yyyy)	2017
OUTPUT	
Expected Crash Frequency (crash/year)	
Fatal and Incapacitating Injury Crashes	0.530
Non-Incapacitating and Possible Injury Crashes	0.27
Property Damage Only Crashes	2.15
All Crashes	2.95
Index of Crash Frequency	**0.19**
Index of Crash Cost	**-0.10**

RoadHAT 4D	Index of Crash Frequency and Cost - Form F1	Page 2/2

Settings: Indiana state settings Version: Version 4.1		
Location	US 31 at W Blair Pike Road / W Division Road	
GIS		
Post		
Analyst	JCA	
Date		

Comments:

RoadHAT 4D

Index of Crash Frequency and Cost - Form F1

Page 1/2

Settings: Indiana state settings	Version: Version 4.1	
Location	US 31, Between W Logansport Road and W Blair Pike Road / W Division Road	
GIS		
Post		
Analyst	Andrea L. Horn	
Date	11/1/2022	

INPUT	
Road Facility Type	Rural multilane Segment
Beginning	51.822
End	52.799
AADT (veh/day)	18500
Intersection Density (int/mi)	0
First Year with Crash Data (yyyy)	2017
Last Year with Crash Data (yyyy)	2021
Number of Crashes (crash/period)	
Fatal and Incapacitating Injury Crashes	4
Non-Incapacitating and Possible Injury Crashes	0
Property Damage Only Crashes	24
Route or Road Type	Rural multilane Segment
Average Crash Costs ($)	
Fatal and Incapacitating Injury Crashes	2442800
Non-Incapacitating and Possible Injury Crashes	368100
Property Damage Only Crashes	31600
Crash Cost Year (yyyy)	2017
OUTPUT	
Segment Length (mi)	0.977
Expected Crash Frequency (crash/year)	
Fatal and Incapacitating Injury Crashes	0.467
Non-Incapacitating and Possible Injury Crashes	0.29
Property Damage Only Crashes	2.79
All Crashes	3.54
Index of Crash Frequency	**0.66**
Index of Crash Cost	**0.45**

RoadHAT 4D

Index of Crash Frequency and Cost - Form F1

Page 2/2

Settings: Indiana state settings	Version: Version 4.1	
Location	US 31, Between W Logansport Road and W Blair Pike Road / W Division Road	
GIS		
Post		
Analyst	Andrea L. Horn	
Date	11/1/2022	

Comments:

RoadHAT 4D	Index of Crash Frequency and Cost - Form F1	Page 1/2

Settings: Indiana state settings	Version: Version 4.1	
Location	US 31 at W Logansport Road	
GIS		
Post		
Analyst	JCA	
Date		

INPUT	
Road Facility Type	Unsignalized Rural State Intersection
Busiest Road AADT (veh/day)	18500
Crossing Road AADT (veh/day)	1300
T Intersection Indicator (1 if present, 0 otherwise)	1
First Year with Crash Data (yyyy)	2017
Last Year with Crash Data (yyyy)	2021
Number of Crashes (crash/period)	
Fatal and Incapacitating Injury Crashes	1
Non-Incapacitating and Possible Injury Crashes	0
Property Damage Only Crashes	16
Route or Road Type	Unsignalized Rural State Intersection
Average Crash Costs ($)	
Fatal and Incapacitating Injury Crashes	2335800
Non-Incapacitating and Possible Injury Crashes	389500
Property Damage Only Crashes	32200
Crash Cost Year (yyyy)	2017
OUTPUT	
Expected Crash Frequency (crash/year)	
Fatal and Incapacitating Injury Crashes	0.300
Non-Incapacitating and Possible Injury Crashes	0.18
Property Damage Only Crashes	1.67
All Crashes	2.14
Index of Crash Frequency	**0.68**
Index of Crash Cost	**-0.24**

RoadHAT 4D	Index of Crash Frequency and Cost - Form F1	Page 2/2

Settings: Indiana state settings	Version: Version 4.1	
Location	US 31 at W Logansport Road	
GIS		
Post		
Analyst	JCA	
Date		

Comments:

RoadHAT 4D	Index of Crash Frequency and Cost - Form F1	Page 1/2

Settings: Indiana state settings	Version: Version 4.1	
Location	US 31, Between W Airport Road and W Logansport Road	
GIS		
Post		
Analyst	Andrea L. Horn	
Date	11/1/2022	

INPUT	
Road Facility Type	Rural multilane Segment
Beginning	50.554
End	51.822
AADT (veh/day)	18000
Intersection Density (int/mi)	0.93
First Year with Crash Data (yyyy)	2017
Last Year with Crash Data (yyyy)	2021
Number of Crashes (crash/period)	
Fatal and Incapacitating Injury Crashes	5
Non-Incapacitating and Possible Injury Crashes	1
Property Damage Only Crashes	16
Route or Road Type	Rural multilane Segment
Average Crash Costs ($)	
Fatal and Incapacitating Injury Crashes	2442800
Non-Incapacitating and Possible Injury Crashes	368100
Property Damage Only Crashes	31600
Crash Cost Year (yyyy)	2017
OUTPUT	
Segment Length (mi)	1.268
Expected Crash Frequency (crash/year)	
Fatal and Incapacitating Injury Crashes	0.679
Non-Incapacitating and Possible Injury Crashes	0.42
Property Damage Only Crashes	3.65
All Crashes	4.75
Index of Crash Frequency	**-0.09**
Index of Crash Cost	**0.30**

RoadHAT 4D	Index of Crash Frequency and Cost - Form F1	Page 2/2

Settings: Indiana state settings	Version: Version 4.1	
Location	US 31, Between W Airport Road and W Logansport Road	
GIS		
Post		
Analyst	Andrea L. Horn	
Date	11/1/2022	

Comments:

RoadHAT 4D	Index of Crash Frequency and Cost - Form F1	Page 1/2

Settings: Indiana state settings	Version: Version 4.1	
Location	US 31 at W Airport Road	
GIS		
Post		
Analyst	JCA	
Date		

INPUT	
Road Facility Type	Unsignalized Rural State Intersection One AADT
Busiest Road AADT (veh/day)	18000
T Intersection Indicator (1 if present, 0 otherwise)	0
Crossing Road Principal or Minor Arterial Indicator (1 if present, 0 otherwise)	0
Crossing Road Major or Minor Collector Indicator (1 if present, 0 otherwise)	0
First Year with Crash Data (yyyy)	2017
Last Year with Crash Data (yyyy)	2021
Number of Crashes (crash/period)	
Fatal and Incapacitating Injury Crashes	2
Non-Incapacitating and Possible Injury Crashes	0
Property Damage Only Crashes	9
Route or Road Type	Unsignalized Rural State Intersection One AADT
Average Crash Costs ($)	
Fatal and Incapacitating Injury Crashes	2335800
Non-Incapacitating and Possible Injury Crashes	389500
Property Damage Only Crashes	32200
Crash Cost Year (yyyy)	2017
OUTPUT	
Expected Crash Frequency (crash/year)	
Fatal and Incapacitating Injury Crashes	0.237
Non-Incapacitating and Possible Injury Crashes	0.14
Property Damage Only Crashes	1.14
All Crashes	1.51
Index of Crash Frequency	**0.46**
Index of Crash Cost	**0.32**

RoadHAT 4D	Index of Crash Frequency and Cost - Form F1	Page 2/2

Settings: Indiana state settings	Version: Version 4.1	
Location	US 31 at W Airport Road	
GIS		
Post		
Analyst	JCA	
Date		

Comments:

RoadHAT 4D	Index of Crash Frequency and Cost - Form F1	Page 1/2

Settings: Indiana state settings	Version: Version 4.1	
Location	US 31, Between Business US 31 and W Airport Road	
GIS		
Post		
Analyst	Andrea L. Horn	
Date	11/1/2022	

INPUT	
Road Facility Type	Rural multilane Segment
Beginning	50.163
End	50.554
AADT (veh/day)	18000
Intersection Density (int/mi)	0
First Year with Crash Data (yyyy)	2017
Last Year with Crash Data (yyyy)	2021
Number of Crashes (crash/period)	
Fatal and Incapacitating Injury Crashes	0
Non-Incapacitating and Possible Injury Crashes	0
Property Damage Only Crashes	3
Route or Road Type	Rural multilane Segment
Average Crash Costs ($)	
Fatal and Incapacitating Injury Crashes	2442800
Non-Incapacitating and Possible Injury Crashes	368100
Property Damage Only Crashes	31600
Crash Cost Year (yyyy)	2017
OUTPUT	
Segment Length (mi)	0.391
Expected Crash Frequency (crash/year)	
Fatal and Incapacitating Injury Crashes	0.178
Non-Incapacitating and Possible Injury Crashes	0.11
Property Damage Only Crashes	1.49
All Crashes	1.78
Index of Crash Frequency	**-0.74**
Index of Crash Cost	**-0.73**

RoadHAT 4D	Index of Crash Frequency and Cost - Form F1	Page 2/2

Settings: Indiana state settings	Version: Version 4.1	
Location	US 31, Between Business US 31 and W Airport Road	
GIS		
Post		
Analyst	Andrea L. Horn	
Date	11/1/2022	

Comments:

RoadHAT 4D	Index of Crash Frequency and Cost - Form F1	Page 1/2

Settings: Indiana state settings	Version: Version 4.1	
Location	US 31 at Business US 31	
GIS		
Post		
Analyst	JCA	
Date		

INPUT	
Road Facility Type	Signalized Rural State Intersection
Busiest Road AADT (veh/day)	23500
Crossing Road AADT (veh/day)	7500
T Intersection Indicator (1 if present, 0 otherwise)	1
First Year with Crash Data (yyyy)	2017
Last Year with Crash Data (yyyy)	2021
Number of Crashes (crash/period)	
Fatal and Incapacitating Injury Crashes	14
Non-Incapacitating and Possible Injury Crashes	7
Property Damage Only Crashes	42
Route or Road Type	Signalized Rural State Intersection
Average Crash Costs ($)	
Fatal and Incapacitating Injury Crashes	2203700
Non-Incapacitating and Possible Injury Crashes	428200
Property Damage Only Crashes	40300
Crash Cost Year (yyyy)	2017
OUTPUT	
Expected Crash Frequency (crash/year)	
Fatal and Incapacitating Injury Crashes	0.672
Non-Incapacitating and Possible Injury Crashes	0.89
Property Damage Only Crashes	10.13
All Crashes	11.69
Index of Crash Frequency	**0.09**
Index of Crash Cost	**2.09**

RoadHAT 4D	Index of Crash Frequency and Cost - Form F1	Page 2/2

Settings: Indiana state settings	Version: Version 4.1	
Location	US 31 at Business US 31	
GIS		
Post		
Analyst	JCA	
Date		

Comments:

RoadHAT 4D	Index of Crash Frequency and Cost - Form F1	Page 1/2

Settings: Indiana state settings	Version: Version 4.1	
Location	US 31, Between W CR 500 S and Business US 31	
GIS		
Post		
Analyst	Andrea L. Horn	
Date	11/1/2022	

INPUT	
Road Facility Type	Rural multilane Segment
Beginning	47.845
End	50.163
AADT (veh/day)	23500
Intersection Density (int/mi)	1.88
First Year with Crash Data (yyyy)	2017
Last Year with Crash Data (yyyy)	2021
Number of Crashes (crash/period)	
Fatal and Incapacitating Injury Crashes	5
Non-Incapacitating and Possible Injury Crashes	2
Property Damage Only Crashes	45
Route or Road Type	Rural multilane Segment
Average Crash Costs ($)	
Fatal and Incapacitating Injury Crashes	2442800
Non-Incapacitating and Possible Injury Crashes	368100
Property Damage Only Crashes	31600
Crash Cost Year (yyyy)	2017
OUTPUT	
Segment Length (mi)	2.318
Expected Crash Frequency (crash/year)	
Fatal and Incapacitating Injury Crashes	1.761
Non-Incapacitating and Possible Injury Crashes	1.23
Property Damage Only Crashes	7.48
All Crashes	10.47
Index of Crash Frequency	**-0.01**
Index of Crash Cost	**-0.41**

RoadHAT 4D	Index of Crash Frequency and Cost - Form F1	Page 2/2

Settings: Indiana state settings	Version: Version 4.1	
Location	US 31, Between W CR 500 S and Business US 31	
GIS		
Post		
Analyst	Andrea L. Horn	
Date	11/1/2022	

Comments:

RoadHAT 4D	Index of Crash Frequency and Cost - Form F1	Page 1/2

Settings: Indiana state settings	Version: Version 4.1	
Location	US 31 at W CR 500 S	
GIS		
Post		
Analyst	JCA	
Date		

INPUT	
Road Facility Type	Unsignalized Rural State Intersection One AADT
Busiest Road AADT (veh/day)	24800
T Intersection Indicator (1 if present, 0 otherwise)	0
Crossing Road Principal or Minor Arterial Indicator (1 if present, 0 otherwise)	0
Crossing Road Major or Minor Collector Indicator (1 if present, 0 otherwise)	1
First Year with Crash Data (yyyy)	2017
Last Year with Crash Data (yyyy)	2021
Number of Crashes (crash/period)	
Fatal and Incapacitating Injury Crashes	11
Non-Incapacitating and Possible Injury Crashes	4
Property Damage Only Crashes	28
Route or Road Type	Unsignalized Rural State Intersection One AADT
Average Crash Costs ($)	
Fatal and Incapacitating Injury Crashes	2335800
Non-Incapacitating and Possible Injury Crashes	389500
Property Damage Only Crashes	32200
Crash Cost Year (yyyy)	2017
OUTPUT	
Expected Crash Frequency (crash/year)	
Fatal and Incapacitating Injury Crashes	0.789
Non-Incapacitating and Possible Injury Crashes	0.45
Property Damage Only Crashes	2.87
All Crashes	4.12
Index of Crash Frequency	**1.21**
Index of Crash Cost	**1.21**

RoadHAT 4D	Index of Crash Frequency and Cost - Form F1	Page 2/2

Settings: Indiana state settings	Version: Version 4.1	
Location	US 31 at W CR 500 S	
GIS		
Post		
Analyst	JCA	
Date		

Comments:

RoadHAT 4D	Index of Crash Frequency and Cost - Form F1	Page 1/2

Settings: Indiana state settings Version: Version 4.1		
Location	US 31, Between SR 218 N and W CR 500 S	
GIS		
Post		
Analyst	Andrea L. Horn	
Date	11/1/2022	

INPUT	
Road Facility Type	Rural multilane Segment
Beginning	46.782
End	47.845
AADT (veh/day)	24800
Intersection Density (int/mi)	2.29
First Year with Crash Data (yyyy)	2017
Last Year with Crash Data (yyyy)	2021
Number of Crashes (crash/period)	
Fatal and Incapacitating Injury Crashes	4
Non-Incapacitating and Possible Injury Crashes	0
Property Damage Only Crashes	29
Route or Road Type	Rural multilane Segment
Average Crash Costs ($)	
Fatal and Incapacitating Injury Crashes	2442800
Non-Incapacitating and Possible Injury Crashes	368100
Property Damage Only Crashes	31600
Crash Cost Year (yyyy)	2017
OUTPUT	
Segment Length (mi)	1.063
Expected Crash Frequency (crash/year)	
Fatal and Incapacitating Injury Crashes	0.869
Non-Incapacitating and Possible Injury Crashes	0.63
Property Damage Only Crashes	4.89
All Crashes	6.39
Index of Crash Frequency	**0.04**
Index of Crash Cost	**-0.14**

RoadHAT 4D	Index of Crash Frequency and Cost - Form F1	Page 2/2

Settings: Indiana state settings Version: Version 4.1		
Location	US 31, Between SR 218 N and W CR 500 S	
GIS		
Post		
Analyst	Andrea L. Horn	
Date	11/1/2022	

Comments:

RoadHAT 4D

Index of Crash Frequency and Cost - Form F1

Page 1/2

Settings: Indiana state settings Version: Version 4.1

Location	US 31 at SR 218 N	
GIS		
Post		
Analyst	JCA	
Date		

INPUT	
Road Facility Type	Signalized Rural State Intersection
Busiest Road AADT (veh/day)	24800
Crossing Road AADT (veh/day)	4000
T Intersection Indicator (1 if present, 0 otherwise)	1
First Year with Crash Data (yyyy)	2017
Last Year with Crash Data (yyyy)	2021
Number of Crashes (crash/period)	
Fatal and Incapacitating Injury Crashes	17
Non-Incapacitating and Possible Injury Crashes	7
Property Damage Only Crashes	80
Route or Road Type	Signalized Rural State Intersection
Average Crash Costs ($)	
Fatal and Incapacitating Injury Crashes	2203700
Non-Incapacitating and Possible Injury Crashes	428200
Property Damage Only Crashes	40300
Crash Cost Year (yyyy)	2017
OUTPUT	
Expected Crash Frequency (crash/year)	
Fatal and Incapacitating Injury Crashes	0.573
Non-Incapacitating and Possible Injury Crashes	0.67
Property Damage Only Crashes	7.41
All Crashes	8.65
Index of Crash Frequency	**1.67**
Index of Crash Cost	**3.01**

RoadHAT 4D

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Settings: Indiana state settings Version: Version 4.1

Location	US 31 at SR 218 N	
GIS		
Post		
Analyst	JCA	
Date		

Comments:

RoadHAT 4D	Index of Crash Frequency and Cost - Form F1	Page 1/2

Settings: Indiana state settings	Version: Version 4.1	
Location	US 31, Between SR 218 S / W Broadway Street and SR 218 N	
GIS		
Post		
Analyst	Andrea L. Horn	
Date	11/1/2022	

INPUT	
Road Facility Type	Rural multilane Segment
Beginning	45.671
End	46.782
AADT (veh/day)	24000
Intersection Density (int/mi)	1.08
First Year with Crash Data (yyyy)	2017
Last Year with Crash Data (yyyy)	2021
Number of Crashes (crash/period)	
Fatal and Incapacitating Injury Crashes	7
Non-Incapacitating and Possible Injury Crashes	5
Property Damage Only Crashes	37
Route or Road Type	Rural multilane Segment
Average Crash Costs ($)	
Fatal and Incapacitating Injury Crashes	2442800
Non-Incapacitating and Possible Injury Crashes	368100
Property Damage Only Crashes	31600
Crash Cost Year (yyyy)	2017
OUTPUT	
Segment Length (mi)	1.111
Expected Crash Frequency (crash/year)	
Fatal and Incapacitating Injury Crashes	0.752
Non-Incapacitating and Possible Injury Crashes	0.52
Property Damage Only Crashes	4.22
All Crashes	5.50
Index of Crash Frequency	**0.92**
Index of Crash Cost	**0.73**

RoadHAT 4D	Index of Crash Frequency and Cost - Form F1	Page 2/2

Settings: Indiana state settings	Version: Version 4.1	
Location	US 31, Between SR 218 S / W Broadway Street and SR 218 N	
GIS		
Post		
Analyst	Andrea L. Horn	
Date	11/1/2022	

Comments:

RoadHAT 4D	Index of Crash Frequency and Cost - Form F1	Page 1/2

Settings: Indiana state settings Version: Version 4.1		
Location	US 31 at SR 218 S / W Broadway Street	
GIS		
Post		
Analyst	JCA	
Date		

INPUT	
Road Facility Type	Unsignalized Rural State Intersection
Busiest Road AADT (veh/day)	24000
Crossing Road AADT (veh/day)	1500
T Intersection Indicator (1 if present, 0 otherwise)	1
First Year with Crash Data (yyyy)	2017
Last Year with Crash Data (yyyy)	2021
Number of Crashes (crash/period)	
Fatal and Incapacitating Injury Crashes	9
Non-Incapacitating and Possible Injury Crashes	3
Property Damage Only Crashes	19
Route or Road Type	Unsignalized Rural State Intersection
Average Crash Costs ($)	
Fatal and Incapacitating Injury Crashes	2335800
Non-Incapacitating and Possible Injury Crashes	389500
Property Damage Only Crashes	32200
Crash Cost Year (yyyy)	2017
OUTPUT	
Expected Crash Frequency (crash/year)	
Fatal and Incapacitating Injury Crashes	0.366
Non-Incapacitating and Possible Injury Crashes	0.22
Property Damage Only Crashes	2.03
All Crashes	2.62
Index of Crash Frequency	**1.57**
Index of Crash Cost	**1.99**

RoadHAT 4D	Index of Crash Frequency and Cost - Form F1	Page 2/2

Settings: Indiana state settings Version: Version 4.1		
Location	US 31 at SR 218 S / W Broadway Street	
GIS		
Post		
Analyst	JCA	
Date		

Comments:

RoadHAT 4D	Index of Crash Frequency and Cost - Form F1	Page 1/2

Settings: Indiana state settings	Version: Version 4.1	
Location	US 31, Between W CR 800 S and SR 218 S / W Broadway Street	
GIS		
Post		
Analyst	Andrea L. Horn	
Date	11/1/2022	

INPUT	
Road Facility Type	Rural multilane Segment
Beginning	44.899
End	45.671
AADT (veh/day)	23700
Intersection Density (int/mi)	0
First Year with Crash Data (yyyy)	2017
Last Year with Crash Data (yyyy)	2021
Number of Crashes (crash/period)	
Fatal and Incapacitating Injury Crashes	4
Non-Incapacitating and Possible Injury Crashes	0
Property Damage Only Crashes	12
Route or Road Type	Rural multilane Segment
Average Crash Costs ($)	
Fatal and Incapacitating Injury Crashes	2442800
Non-Incapacitating and Possible Injury Crashes	368100
Property Damage Only Crashes	31600
Crash Cost Year (yyyy)	2017
OUTPUT	
Segment Length (mi)	0.772
Expected Crash Frequency (crash/year)	
Fatal and Incapacitating Injury Crashes	0.442
Non-Incapacitating and Possible Injury Crashes	0.30
Property Damage Only Crashes	2.87
All Crashes	3.61
Index of Crash Frequency	**-0.13**
Index of Crash Cost	**0.45**

RoadHAT 4D	Index of Crash Frequency and Cost - Form F1	Page 2/2

Settings: Indiana state settings	Version: Version 4.1	
Location	US 31, Between W CR 800 S and SR 218 S / W Broadway Street	
GIS		
Post		
Analyst	Andrea L. Horn	
Date	11/1/2022	

Comments:

RoadHAT 4D	Index of Crash Frequency and Cost - Form F1	Page 1/2

Settings: Indiana state settings	Version: Version 4.1	
Location	US 31 at W CR 800 S	
GIS		
Post		
Analyst	JCA	
Date		

INPUT	
Road Facility Type	Unsignalized Rural State Intersection One AADT
Busiest Road AADT (veh/day)	24400
T Intersection Indicator (1 if present, 0 otherwise)	0
Crossing Road Principal or Minor Arterial Indicator (1 if present, 0 otherwise)	0
Crossing Road Major or Minor Collector Indicator (1 if present, 0 otherwise)	1
First Year with Crash Data (yyyy)	2017
Last Year with Crash Data (yyyy)	2021
Number of Crashes (crash/period)	
Fatal and Incapacitating Injury Crashes	4
Non-Incapacitating and Possible Injury Crashes	2
Property Damage Only Crashes	13
Route or Road Type	Unsignalized Rural State Intersection One AADT
Average Crash Costs ($)	
Fatal and Incapacitating Injury Crashes	2335800
Non-Incapacitating and Possible Injury Crashes	389500
Property Damage Only Crashes	32200
Crash Cost Year (yyyy)	2017
OUTPUT	
Expected Crash Frequency (crash/year)	
Fatal and Incapacitating Injury Crashes	0.778
Non-Incapacitating and Possible Injury Crashes	0.45
Property Damage Only Crashes	2.84
All Crashes	4.07
Index of Crash Frequency	**-0.08**
Index of Crash Cost	**0.01**

RoadHAT 4D	Index of Crash Frequency and Cost - Form F1	Page 2/2

Settings: Indiana state settings	Version: Version 4.1	
Location	US 31 at W CR 800 S	
GIS		
Post		
Analyst	JCA	
Date		

Comments:

RoadHAT 4D	Index of Crash Frequency and Cost - Form F1	Page 1/2

Settings: Indiana state settings Version: Version 4.1		
Location	US 31, Between SR 18 and W CR 800 S	
GIS		
Post		
Analyst	Andrea L. Horn	
Date	11/1/2022	

INPUT	
Road Facility Type	Rural multilane Segment
Beginning	40.413
End	44.899
AADT (veh/day)	24400
Intersection Density (int/mi)	1.4
First Year with Crash Data (yyyy)	2017
Last Year with Crash Data (yyyy)	2021
Number of Crashes (crash/period)	
Fatal and Incapacitating Injury Crashes	18
Non-Incapacitating and Possible Injury Crashes	17
Property Damage Only Crashes	110
Route or Road Type	Rural multilane Segment
Average Crash Costs ($)	
Fatal and Incapacitating Injury Crashes	2442800
Non-Incapacitating and Possible Injury Crashes	368100
Property Damage Only Crashes	31600
Crash Cost Year (yyyy)	2017
OUTPUT	
Segment Length (mi)	4.486
Expected Crash Frequency (crash/year)	
Fatal and Incapacitating Injury Crashes	3.351
Non-Incapacitating and Possible Injury Crashes	2.33
Property Damage Only Crashes	11.20
All Crashes	16.88
Index of Crash Frequency	**0.95**
Index of Crash Cost	**0.14**

RoadHAT 4D	Index of Crash Frequency and Cost - Form F1	Page 2/2

Settings: Indiana state settings Version: Version 4.1		
Location	US 31, Between SR 18 and W CR 800 S	
GIS		
Post		
Analyst	Andrea L. Horn	
Date	11/1/2022	

Comments:

RoadHAT 4D	Index of Crash Frequency and Cost - Form F1	Page 1/2

Settings: Indiana state settings	Version: Version 4.1	
Location	US 31 at SR 18	
GIS		
Post		
Analyst	JCA	
Date		

INPUT	
Road Facility Type	Signalized Rural State Intersection
Busiest Road AADT (veh/day)	22800
Crossing Road AADT (veh/day)	2500
T Intersection Indicator (1 if present, 0 otherwise)	0
First Year with Crash Data (yyyy)	2017
Last Year with Crash Data (yyyy)	2021
Number of Crashes (crash/period)	
Fatal and Incapacitating Injury Crashes	6
Non-Incapacitating and Possible Injury Crashes	6
Property Damage Only Crashes	72
Route or Road Type	Signalized Rural State Intersection
Average Crash Costs ($)	
Fatal and Incapacitating Injury Crashes	2203700
Non-Incapacitating and Possible Injury Crashes	428200
Property Damage Only Crashes	40300
Crash Cost Year (yyyy)	2017
OUTPUT	
Expected Crash Frequency (crash/year)	
Fatal and Incapacitating Injury Crashes	0.791
Non-Incapacitating and Possible Injury Crashes	0.70
Property Damage Only Crashes	5.29
All Crashes	6.78
Index of Crash Frequency	**1.87**
Index of Crash Cost	**0.70**

RoadHAT 4D	Index of Crash Frequency and Cost - Form F1	Page 2/2

Settings: Indiana state settings	Version: Version 4.1	
Location	US 31 at SR 18	
GIS		
Post		
Analyst	JCA	
Date		

Comments:

RoadHAT 4D	Index of Crash Frequency and Cost - Form F1	Page 1/2

Settings: Indiana state settings Version: Version 4.1		
Location	US 31, From South of Ida Drive to SR 18	
GIS		
Post		
Analyst	Andrea L. Horn	
Date	11/1/2022	

INPUT	
Road Facility Type	Rural multilane Segment
Beginning	37.997
End	40.413
AADT (veh/day)	25800
Intersection Density (int/mi)	3.45
First Year with Crash Data (yyyy)	2017
Last Year with Crash Data (yyyy)	2021
Number of Crashes (crash/period)	
Fatal and Incapacitating Injury Crashes	4
Non-Incapacitating and Possible Injury Crashes	4
Property Damage Only Crashes	20
Route or Road Type	Rural multilane Segment
Average Crash Costs ($)	
Fatal and Incapacitating Injury Crashes	2442800
Non-Incapacitating and Possible Injury Crashes	368100
Property Damage Only Crashes	31600
Crash Cost Year (yyyy)	2017
OUTPUT	
Segment Length (mi)	2.416
Expected Crash Frequency (crash/year)	
Fatal and Incapacitating Injury Crashes	2.442
Non-Incapacitating and Possible Injury Crashes	1.85
Property Damage Only Crashes	10.03
All Crashes	14.32
Index of Crash Frequency	**-0.79**
Index of Crash Cost	**-0.65**

RoadHAT 4D	Index of Crash Frequency and Cost - Form F1	Page 2/2

Settings: Indiana state settings Version: Version 4.1		
Location	US 31, From South of Ida Drive to SR 18	
GIS		
Post		
Analyst	Andrea L. Horn	
Date	11/1/2022	

Comments:

RoadHAT 4D	Index of Crash Frequency and Cost - Form F1	Page 1/2

Settings: Indiana state settings	Version: Version 4.1	
Location	US 31 at W CR 550 N	
GIS		
Post		
Analyst	JCA	
Date		

INPUT	
Road Facility Type	Unsignalized Rural State Intersection
Busiest Road AADT (veh/day)	28000
Crossing Road AADT (veh/day)	500
T Intersection Indicator (1 if present, 0 otherwise)	0
First Year with Crash Data (yyyy)	2017
Last Year with Crash Data (yyyy)	2021
Number of Crashes (crash/period)	
Fatal and Incapacitating Injury Crashes	3
Non-Incapacitating and Possible Injury Crashes	0
Property Damage Only Crashes	13
Route or Road Type	Unsignalized Rural State Intersection
Average Crash Costs ($)	
Fatal and Incapacitating Injury Crashes	2335800
Non-Incapacitating and Possible Injury Crashes	389500
Property Damage Only Crashes	32200
Crash Cost Year (yyyy)	2017
OUTPUT	
Expected Crash Frequency (crash/year)	
Fatal and Incapacitating Injury Crashes	0.516
Non-Incapacitating and Possible Injury Crashes	0.25
Property Damage Only Crashes	1.92
All Crashes	2.68
Index of Crash Frequency	**0.24**
Index of Crash Cost	**0.07**

RoadHAT 4D	Index of Crash Frequency and Cost - Form F1	Page 2/2

Settings: Indiana state settings	Version: Version 4.1	
Location	US 31 at W CR 550 N	
GIS		
Post		
Analyst	JCA	
Date		

Comments:

RoadHAT 4D	Index of Crash Frequency and Cost - Form F1	Page 1/2

Settings: Indiana state settings	Version: Version 4.1	
Location	US 31, Between Division Road and W CR 550 N	
GIS		
Post		
Analyst	Andrea L. Horn	
Date	11/1/2022	

INPUT	
Road Facility Type	Rural multilane Segment
Beginning	27.781
End	33.299
AADT (veh/day)	29100
Intersection Density (int/mi)	0.94
First Year with Crash Data (yyyy)	2017
Last Year with Crash Data (yyyy)	2021
Number of Crashes (crash/period)	
Fatal and Incapacitating Injury Crashes	17
Non-Incapacitating and Possible Injury Crashes	18
Property Damage Only Crashes	101
Route or Road Type	Rural multilane Segment
Average Crash Costs ($)	
Fatal and Incapacitating Injury Crashes	2442800
Non-Incapacitating and Possible Injury Crashes	368100
Property Damage Only Crashes	31600
Crash Cost Year (yyyy)	2017
OUTPUT	
Segment Length (mi)	5.518
Expected Crash Frequency (crash/year)	
Fatal and Incapacitating Injury Crashes	4.455
Non-Incapacitating and Possible Injury Crashes	3.25
Property Damage Only Crashes	13.82
All Crashes	21.53
Index of Crash Frequency	**0.36**
Index of Crash Cost	**-0.17**

RoadHAT 4D	Index of Crash Frequency and Cost - Form F1	Page 2/2

Settings: Indiana state settings	Version: Version 4.1	
Location	US 31, Between Division Road and W CR 550 N	
GIS		
Post		
Analyst	Andrea L. Horn	
Date	11/1/2022	

Comments:

RoadHAT 4D	Index of Crash Frequency and Cost - Form F1	Page 1/2

Settings: Indiana state settings	Version: Version 4.1	
Location	US 31 at Division Road	
GIS		
Post		
Analyst	JCA	
Date		

INPUT	
Road Facility Type	Signalized Rural State Intersection
Busiest Road AADT (veh/day)	29100
Crossing Road AADT (veh/day)	2700
T Intersection Indicator (1 if present, 0 otherwise)	0
First Year with Crash Data (yyyy)	2017
Last Year with Crash Data (yyyy)	2021
Number of Crashes (crash/period)	
Fatal and Incapacitating Injury Crashes	16
Non-Incapacitating and Possible Injury Crashes	7
Property Damage Only Crashes	56
Route or Road Type	Signalized Rural State Intersection
Average Crash Costs ($)	
Fatal and Incapacitating Injury Crashes	2203700
Non-Incapacitating and Possible Injury Crashes	428200
Property Damage Only Crashes	40300
Crash Cost Year (yyyy)	2017
OUTPUT	
Expected Crash Frequency (crash/year)	
Fatal and Incapacitating Injury Crashes	0.893
Non-Incapacitating and Possible Injury Crashes	0.88
Property Damage Only Crashes	6.76
All Crashes	8.54
Index of Crash Frequency	**1.09**
Index of Crash Cost	**2.03**

RoadHAT 4D	Index of Crash Frequency and Cost - Form F1	Page 2/2

Settings: Indiana state settings	Version: Version 4.1	
Location	US 31 at Division Road	
GIS		
Post		
Analyst	JCA	
Date		

Comments:

RoadHAT 4D	Index of Crash Frequency and Cost - Form F1	Page 1/2

Settings: Indiana state settings	Version: Version 4.1	
Location	US 31, Between SR 28 / W 200 S and Division Road	
GIS		
Post		
Analyst	Andrea L. Horn	
Date	11/1/2022	

INPUT	
Road Facility Type	Rural multilane Segment
Beginning	25.856
End	27.781
AADT (veh/day)	27200
Intersection Density (int/mi)	0.58
First Year with Crash Data (yyyy)	2017
Last Year with Crash Data (yyyy)	2021
Number of Crashes (crash/period)	
Fatal and Incapacitating Injury Crashes	10
Non-Incapacitating and Possible Injury Crashes	2
Property Damage Only Crashes	52
Route or Road Type	Rural multilane Segment
Average Crash Costs ($)	
Fatal and Incapacitating Injury Crashes	2442800
Non-Incapacitating and Possible Injury Crashes	368100
Property Damage Only Crashes	31600
Crash Cost Year (yyyy)	2017
OUTPUT	
Segment Length (mi)	1.925
Expected Crash Frequency (crash/year)	
Fatal and Incapacitating Injury Crashes	1.362
Non-Incapacitating and Possible Injury Crashes	0.97
Property Damage Only Crashes	6.26
All Crashes	8.59
Index of Crash Frequency	**0.61**
Index of Crash Cost	**0.35**

RoadHAT 4D	Index of Crash Frequency and Cost - Form F1	Page 2/2

Settings: Indiana state settings	Version: Version 4.1	
Location	US 31, Between SR 28 / W 200 S and Division Road	
GIS		
Post		
Analyst	Andrea L. Horn	
Date	11/1/2022	

Comments:

RoadHAT 4D	Index of Crash Frequency and Cost - Form F1	Page 1/2

Settings: Indiana state settings	Version: Version 4.1	
Location	US 31 at SR 28 (east roundabout)	
GIS		
Post		
Analyst	JCA	
Date		

INPUT	
Road Facility Type	Unsignalized Rural State Intersection
Busiest Road AADT (veh/day)	5300
Crossing Road AADT (veh/day)	3200
T Intersection Indicator (1 if present, 0 otherwise)	0
First Year with Crash Data (yyyy)	2017
Last Year with Crash Data (yyyy)	2021
Number of Crashes (crash/period)	
Fatal and Incapacitating Injury Crashes	0
Non-Incapacitating and Possible Injury Crashes	0
Property Damage Only Crashes	15
Route or Road Type	Unsignalized Rural State Intersection
Average Crash Costs ($)	
Fatal and Incapacitating Injury Crashes	2335800
Non-Incapacitating and Possible Injury Crashes	389500
Property Damage Only Crashes	32200
Crash Cost Year (yyyy)	2017
OUTPUT	
Expected Crash Frequency (crash/year)	
Fatal and Incapacitating Injury Crashes	0.405
Non-Incapacitating and Possible Injury Crashes	0.22
Property Damage Only Crashes	1.97
All Crashes	2.60
Index of Crash Frequency	**0.19**
Index of Crash Cost	**-0.84**

Note that this intersection is a roundabout. This analysis was conducted to provide an approximation of intersection safety compared to a standard unsignalized intersection.

RoadHAT 4D	Index of Crash Frequency and Cost - Form F1	Page 2/2

Settings: Indiana state settings	Version: Version 4.1	
Location	US 31 at SR 28 (east roundabout)	
GIS		
Post		
Analyst	JCA	
Date		

Comments:

RoadHAT 4D	Index of Crash Frequency and Cost - Form F1	Page 1/2

Settings: Indiana state settings	Version: Version 4.1	
Location	US 31 at SR 28 (west roundabout)	
GIS		
Post		
Analyst	JCA	
Date		

INPUT	
Road Facility Type	Unsignalized Rural State Intersection
Busiest Road AADT (veh/day)	4000
Crossing Road AADT (veh/day)	3500
T Intersection Indicator (1 if present, 0 otherwise)	1
First Year with Crash Data (yyyy)	2017
Last Year with Crash Data (yyyy)	2021
Number of Crashes (crash/period)	
Fatal and Incapacitating Injury Crashes	4
Non-Incapacitating and Possible Injury Crashes	0
Property Damage Only Crashes	10
Route or Road Type	Unsignalized Rural State Intersection
Average Crash Costs ($)	
Fatal and Incapacitating Injury Crashes	2335800
Non-Incapacitating and Possible Injury Crashes	389500
Property Damage Only Crashes	32200
Crash Cost Year (yyyy)	2017
OUTPUT	
Expected Crash Frequency (crash/year)	
Fatal and Incapacitating Injury Crashes	0.183
Non-Incapacitating and Possible Injury Crashes	0.11
Property Damage Only Crashes	1.23
All Crashes	1.52
Index of Crash Frequency	**0.90**
Index of Crash Cost	**1.24**

Note that this intersection is a roundabout. This analysis was conducted to provide an approximation of intersection safety compared to a standard unsignalized intersection.

RoadHAT 4D	Index of Crash Frequency and Cost - Form F1	Page 2/2

Settings: Indiana state settings	Version: Version 4.1	
Location	US 31 at SR 28 (west roundabout)	
GIS		
Post		
Analyst	JCA	
Date		

Comments:

RoadHAT 4D	Index of Crash Frequency and Cost - Form F1	Page 1/2

Settings: Indiana state settings Version: Version 4.1		
Location	US 31, Between 296th Street and SR 28 / W 200 S	
GIS		
Post		
Analyst	Andrea L. Horn	
Date	11/1/2022	

INPUT	
Road Facility Type	Rural multilane Segment
Beginning	21.8660
End	25.856
AADT (veh/day)	27500
Intersection Density (int/mi)	1.05
First Year with Crash Data (yyyy)	2017
Last Year with Crash Data (yyyy)	2021
Number of Crashes (crash/period)	
Fatal and Incapacitating Injury Crashes	17
Non-Incapacitating and Possible Injury Crashes	9
Property Damage Only Crashes	69
Route or Road Type	Rural multilane Segment
Average Crash Costs ($)	
Fatal and Incapacitating Injury Crashes	2442800
Non-Incapacitating and Possible Injury Crashes	368100
Property Damage Only Crashes	31600
Crash Cost Year (yyyy)	2017
OUTPUT	
Segment Length (mi)	3.99
Expected Crash Frequency (crash/year)	
Fatal and Incapacitating Injury Crashes	3.102
Non-Incapacitating and Possible Injury Crashes	2.23
Property Damage Only Crashes	10.84
All Crashes	16.18
Index of Crash Frequency	**0.23**
Index of Crash Cost	**0.07**

RoadHAT 4D	Index of Crash Frequency and Cost - Form F1	Page 2/2

Settings: Indiana state settings Version: Version 4.1		
Location	US 31, Between 296th Street and SR 28 / W 200 S	
GIS		
Post		
Analyst	Andrea L. Horn	
Date	11/1/2022	

Comments:

RoadHAT 4D	Index of Crash Frequency and Cost - Form F1	Page 1/2

Settings: Indiana state settings	Version: Version 4.1	
Location	US 31 at 296th Street	
GIS		
Post		
Analyst	JCA	
Date		

INPUT	
Road Facility Type	Unsignalized Rural State Intersection
Busiest Road AADT (veh/day)	27500
Crossing Road AADT (veh/day)	1300
T Intersection Indicator (1 if present, 0 otherwise)	0
First Year with Crash Data (yyyy)	2017
Last Year with Crash Data (yyyy)	2021
Number of Crashes (crash/period)	
Fatal and Incapacitating Injury Crashes	4
Non-Incapacitating and Possible Injury Crashes	4
Property Damage Only Crashes	25
Route or Road Type	Unsignalized Rural State Intersection
Average Crash Costs ($)	
Fatal and Incapacitating Injury Crashes	2335800
Non-Incapacitating and Possible Injury Crashes	389500
Property Damage Only Crashes	32200
Crash Cost Year (yyyy)	2017
OUTPUT	
Expected Crash Frequency (crash/year)	
Fatal and Incapacitating Injury Crashes	0.730
Non-Incapacitating and Possible Injury Crashes	0.40
Property Damage Only Crashes	2.96
All Crashes	4.09
Index of Crash Frequency	**0.79**
Index of Crash Cost	**0.17**

RoadHAT 4D	Index of Crash Frequency and Cost - Form F1	Page 2/2

Settings: Indiana state settings	Version: Version 4.1	
Location	US 31 at 296th Street	
GIS		
Post		
Analyst	JCA	
Date		

Comments:

RoadHAT 4D	Index of Crash Frequency and Cost - Form F1	Page 1/2

Settings: Indiana state settings Version: Version 4.1		
Location	US 31, Between 276th Street and 296th Street	
GIS		
Post		
Analyst	Andrea L. Horn	
Date	11/1/2022	

INPUT	
Road Facility Type	Rural multilane Segment
Beginning	19.948
End	21.866
AADT (veh/day)	28400
Intersection Density (int/mi)	1.16
First Year with Crash Data (yyyy)	2017
Last Year with Crash Data (yyyy)	2021
Number of Crashes (crash/period)	
Fatal and Incapacitating Injury Crashes	6
Non-Incapacitating and Possible Injury Crashes	1
Property Damage Only Crashes	30
Route or Road Type	Rural multilane Segment
Average Crash Costs ($)	
Fatal and Incapacitating Injury Crashes	2442800
Non-Incapacitating and Possible Injury Crashes	368100
Property Damage Only Crashes	31600
Crash Cost Year (yyyy)	2017
OUTPUT	
Segment Length (mi)	1.918
Expected Crash Frequency (crash/year)	
Fatal and Incapacitating Injury Crashes	1.517
Non-Incapacitating and Possible Injury Crashes	1.12
Property Damage Only Crashes	6.94
All Crashes	9.57
Index of Crash Frequency	**-0.29**
Index of Crash Cost	**-0.25**

RoadHAT 4D	Index of Crash Frequency and Cost - Form F1	Page 2/2

Settings: Indiana state settings Version: Version 4.1		
Location	US 31, Between 276th Street and 296th Street	
GIS		
Post		
Analyst	Andrea L. Horn	
Date	11/1/2022	

Comments:

RoadHAT 4D	Index of Crash Frequency and Cost - Form F1	Page 1/2

Settings: Indiana state settings	Version: Version 4.1	
Location	US 31 at 276th Street	
GIS		
Post		
Analyst	JCA	
Date		

INPUT	
Road Facility Type	Unsignalized Rural State Intersection One AADT
Busiest Road AADT (veh/day)	28400
T Intersection Indicator (1 if present, 0 otherwise)	0
Crossing Road Principal or Minor Arterial Indicator (1 if present, 0 otherwise)	0
Crossing Road Major or Minor Collector Indicator (1 if present, 0 otherwise)	1
First Year with Crash Data (yyyy)	2017
Last Year with Crash Data (yyyy)	2021
Number of Crashes (crash/period)	
Fatal and Incapacitating Injury Crashes	2
Non-Incapacitating and Possible Injury Crashes	1
Property Damage Only Crashes	17
Route or Road Type	Unsignalized Rural State Intersection One AADT
Average Crash Costs ($)	
Fatal and Incapacitating Injury Crashes	2335800
Non-Incapacitating and Possible Injury Crashes	389500
Property Damage Only Crashes	32200
Crash Cost Year (yyyy)	2017
OUTPUT	
Expected Crash Frequency (crash/year)	
Fatal and Incapacitating Injury Crashes	0.880
Non-Incapacitating and Possible Injury Crashes	0.51
Property Damage Only Crashes	3.15
All Crashes	4.55
Index of Crash Frequency	**-0.14**
Index of Crash Cost	**-0.44**

RoadHAT 4D	Index of Crash Frequency and Cost - Form F1	Page 2/2

Settings: Indiana state settings	Version: Version 4.1	
Location	US 31 at 276th Street	
GIS		
Post		
Analyst	JCA	
Date		

Comments:

APPENDIX C: TRAFFIC VOLUME SUMMARIES

PEAK HOUR - TURNING MOVEMENT COUNTS

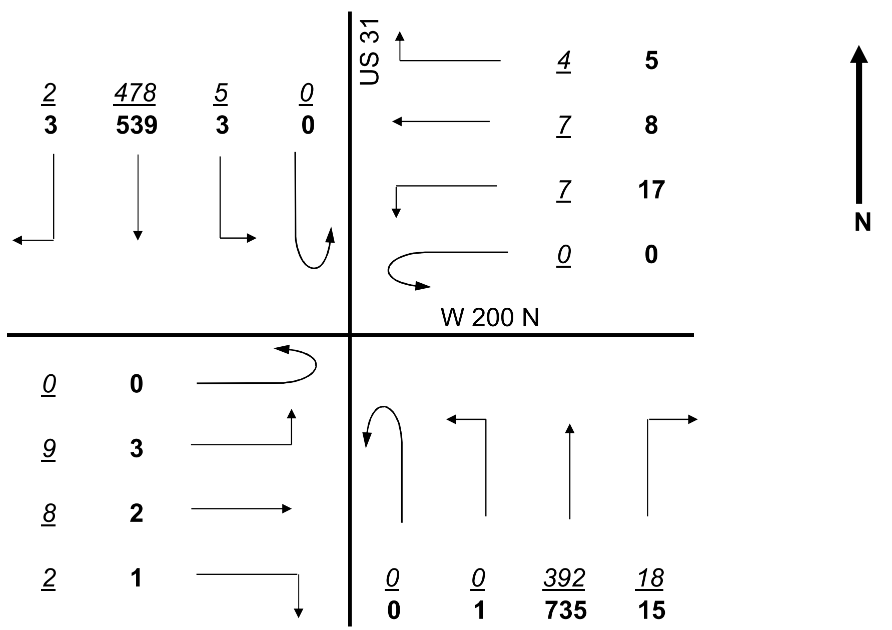
US 31 at W 200 N — **VEHICLES (CARS & TRUCKS)**

RAW 15-MINUTE VOLUMES	EB VEHICLES W 200 N				WB VEHICLES W 200 N				NB VEHICLES US 31				SB VEHICLES US 31				INTERSECTION TOTAL
	UTURN	LT	THRU	RT	UTURN	LT	THRU	RT	UTURN	LT	THRU	RT	UTURN	LT	THRU	RT	VEHICLES
AM PEAK																	
7:45-8:00	0	5	1	1	0	2	0	1	0	0	96	6	0	1	95	0	208
8:00-8:15	0	3	2	0	0	1	2	1	0	0	95	3	0	0	129	0	236
8:15-8:30	0	0	1	0	0	3	3	2	0	0	105	4	0	3	138	1	260
8:30-8:45	0	1	4	1	0	1	2	0	0	0	96	5	0	1	116	1	228
PM PEAK																	
3:15-3:30	0	0	0	0	0	5	3	1	0	0	192	1	0	0	134	0	336
3:30-3:45	0	1	1	1	0	5	2	3	0	1	192	6	0	1	133	1	347
3:45-4:00	0	1	1	0	0	3	1	1	0	0	183	3	0	1	148	2	344
4:00-4:15	0	1	0	0	0	4	2	0	0	0	168	5	0	1	124	0	305
TOTAL VOLUMES																	
AM PEAK	0	9	8	2	0	7	7	4	0	0	392	18	0	5	478	2	932
PM PEAK	0	3	2	1	0	17	8	5	0	1	735	15	0	3	539	3	1332
% TRUCKS																	
AM PEAK	0.0%	0.0%	0.0%	0.0%	0.0%	14.3%	0.0%	0.0%	0.0%	0.0%	23.5%	5.6%	0.0%	40.0%	18.8%	0.0%	
PM PEAK	0.0%	33.3%	0.0%	0.0%	0.0%	0.0%	12.5%	0.0%	0.0%	0.0%	13.5%	6.7%	0.0%	33.3%	16.3%	33.3%	

TURNING MOVEMENT COUNTS
US 31 at W 200 N

Count Date: 10/24/22

	PHF
AM PEAK	0.90
PM PEAK	0.96

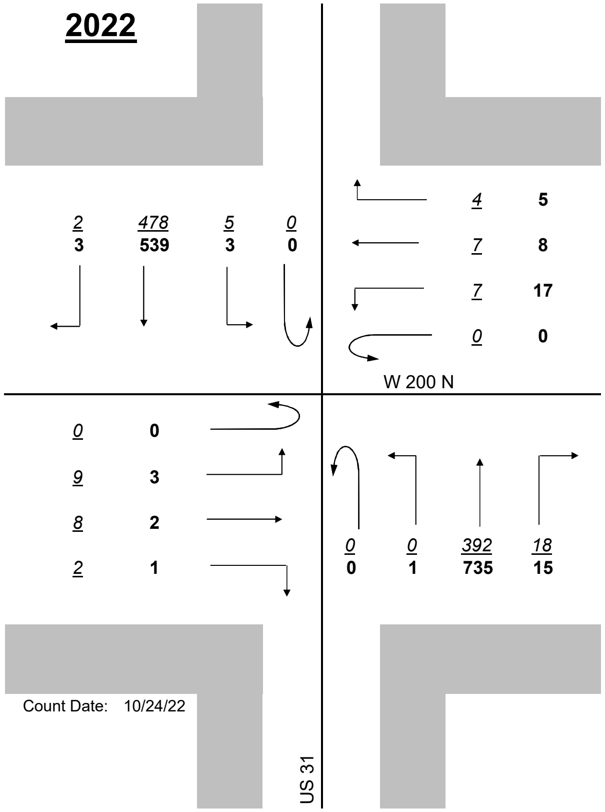


Legend:

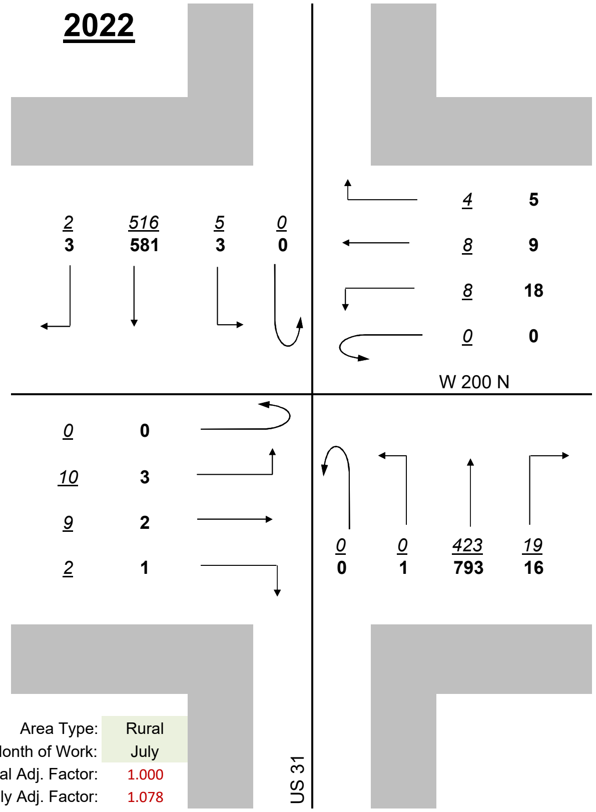
000 AM Peak 7:45 AM-8:45 AM

000 PM Peak 3:15 PM-4:15 PM

Raw Counts

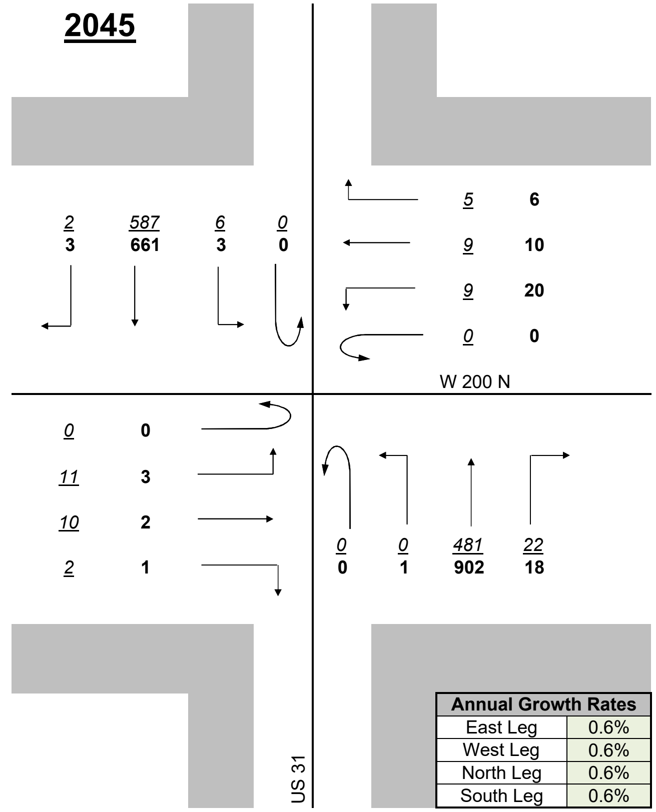


Adjusted Existing Volumes



Area Type:	Rural
Month of Work:	July
Annual Adj. Factor:	1.000
Monthly Adj. Factor:	1.078

Design Year



Annual Growth Rates	
East Leg	0.6%
West Leg	0.6%
North Leg	0.6%
South Leg	0.6%

Legend:
000 AM Peak
000 PM Peak

PEAK HOUR - TURNING MOVEMENT COUNTS

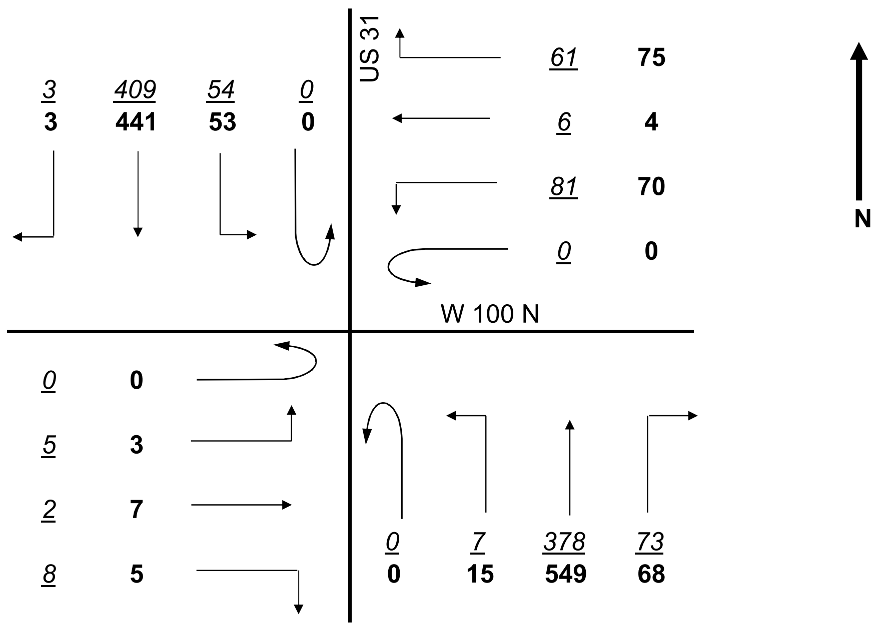
US 31 at W 100 N **VEHICLES (CARS & TRUCKS)**

RAW 15-MINUTE VOLUMES	EB VEHICLES W 100 N				WB VEHICLES W 100 N				NB VEHICLES US 31				SB VEHICLES US 31				INTERSECTION TOTAL
	UTURN	LT	THRU	RT	UTURN	LT	THRU	RT	UTURN	LT	THRU	RT	UTURN	LT	THRU	RT	VEHICLES
AM PEAK																	
9:00-9:15	0	1	2	1	0	24	0	19	0	1	84	21	0	13	102	1	269
9:15-9:30	0	1	0	1	0	20	2	15	0	1	85	27	0	13	114	0	279
9:30-9:45	0	0	0	3	0	18	4	15	0	2	104	11	0	13	86	1	257
9:45-10:00	0	3	0	3	0	19	0	12	0	3	105	14	0	15	107	1	282
PM PEAK																	
3:30-3:45	0	2	6	0	0	18	1	15	0	4	132	22	0	10	107	2	319
3:45-4:00	0	1	1	3	0	18	0	21	0	6	131	16	0	15	121	0	333
4:00-4:15	0	0	0	1	0	18	2	18	0	2	150	15	0	19	103	1	329
4:15-4:30	0	0	0	1	0	16	1	21	0	3	136	15	0	9	110	0	312
TOTAL VOLUMES																	
AM PEAK	0	5	2	8	0	81	6	61	0	7	378	73	0	54	409	3	1087
PM PEAK	0	3	7	5	0	70	4	75	0	15	549	68	0	53	441	3	1293
% TRUCKS																	
AM PEAK	0.0%	0.0%	0.0%	0.0%	0.0%	23.5%	0.0%	21.3%	0.0%	0.0%	19.6%	24.7%	0.0%	11.1%	18.6%	0.0%	
PM PEAK	0.0%	0.0%	0.0%	0.0%	0.0%	30.0%	25.0%	18.7%	0.0%	0.0%	13.7%	27.9%	0.0%	7.5%	14.1%	0.0%	

TURNING MOVEMENT COUNTS
US 31 at W 100 N

Count Date: 8/27/19

	PHF
AM PEAK	0.96
PM PEAK	0.97

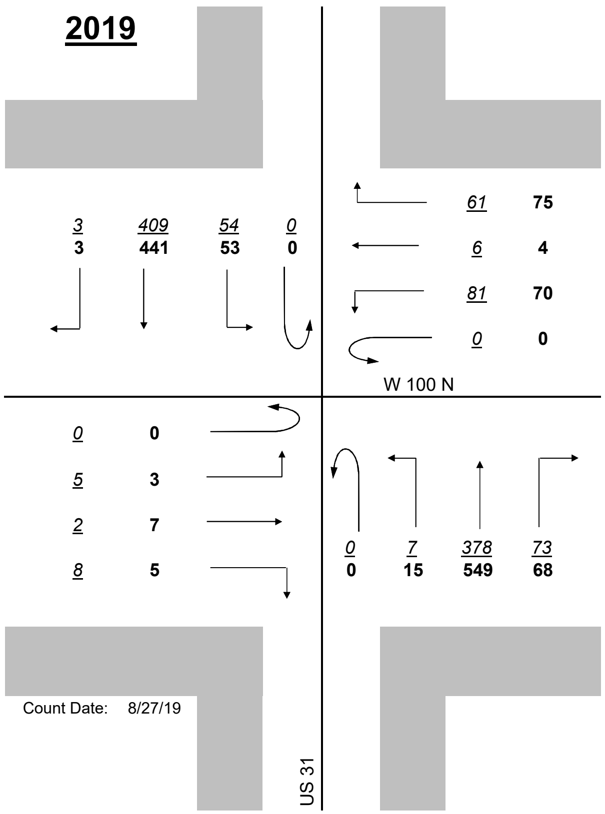


Legend:

000 AM Peak 9:00 AM-10:00 AM

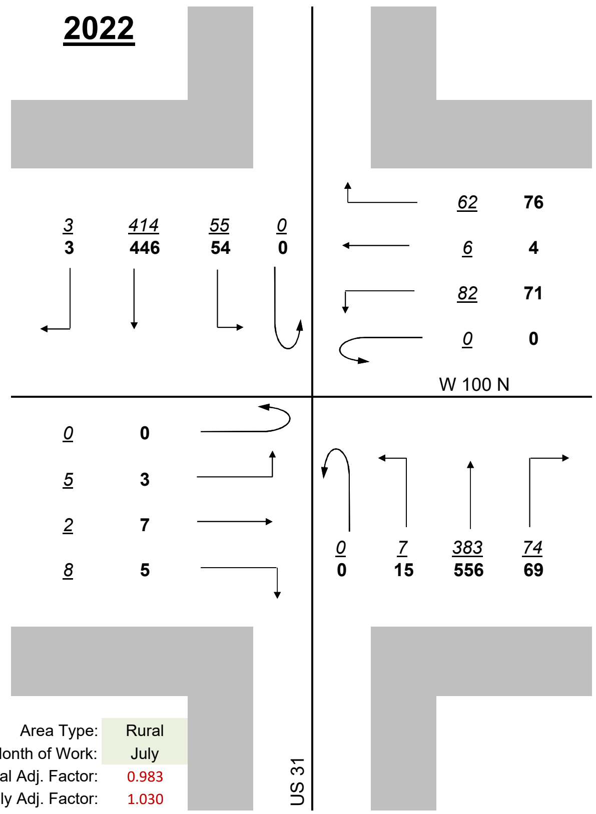
000 PM Peak 3:30 PM-4:30 PM

Raw Counts



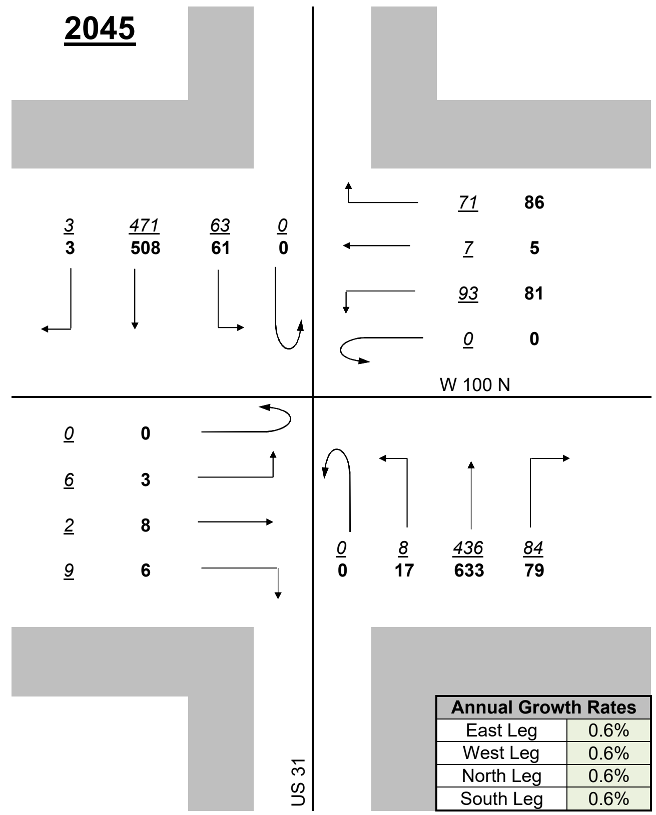
Count Date: 8/27/19

Adjusted Existing Volumes



Area Type:	Rural
Month of Work:	July
Annual Adj. Factor:	0.983
Monthly Adj. Factor:	1.030

Design Year



Annual Growth Rates	
East Leg	0.6%
West Leg	0.6%
North Leg	0.6%
South Leg	0.6%

Legend:
000 AM Peak
000 PM Peak

PEAK HOUR - TURNING MOVEMENT COUNTS

US 31 at US 24

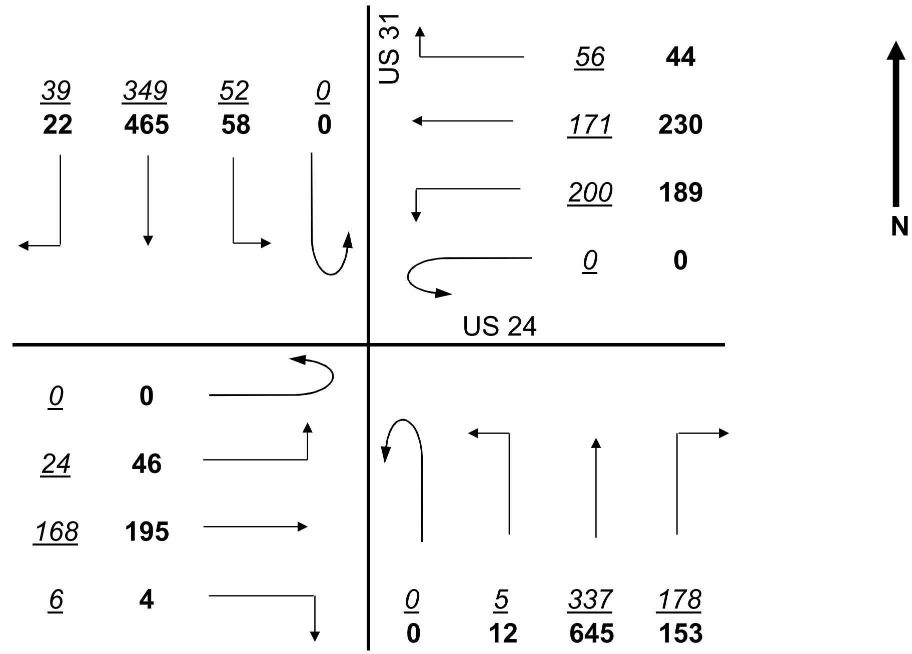
VEHICLES (CARS & TRUCKS)

VOLUMES	EB VEHICLES US 24				WB VEHICLES US 24				NB VEHICLES US 31				SB VEHICLES US 31				INTERSECTION TOTAL
	UTURN	LT	THRU	RT	UTURN	LT	THRU	RT	UTURN	LT	THRU	RT	UTURN	LT	THRU	RT	VEHICLES
AM PEAK																	
7:00-8:00	0	24	168	6	0	200	171	56	0	5	337	178	0	52	349	39	1585
PM PEAK																	
3:00-4:00	0	46	195	4	0	189	230	44	0	12	645	153	0	58	465	22	2063
% TRUCKS																	
AM PEAK	0.0%	37.5%	31.5%	16.7%	0.0%	16.5%	22.8%	33.9%	0.0%	20.0%	28.5%	14.0%	0.0%	40.4%	23.2%	17.9%	
PM PEAK	0.0%	28.3%	21.5%	25.0%	0.0%	19.0%	25.7%	36.4%	0.0%	33.3%	13.8%	11.8%	0.0%	29.3%	20.2%	36.4%	

TURNING MOVEMENT COUNTS
US 31 at US 24

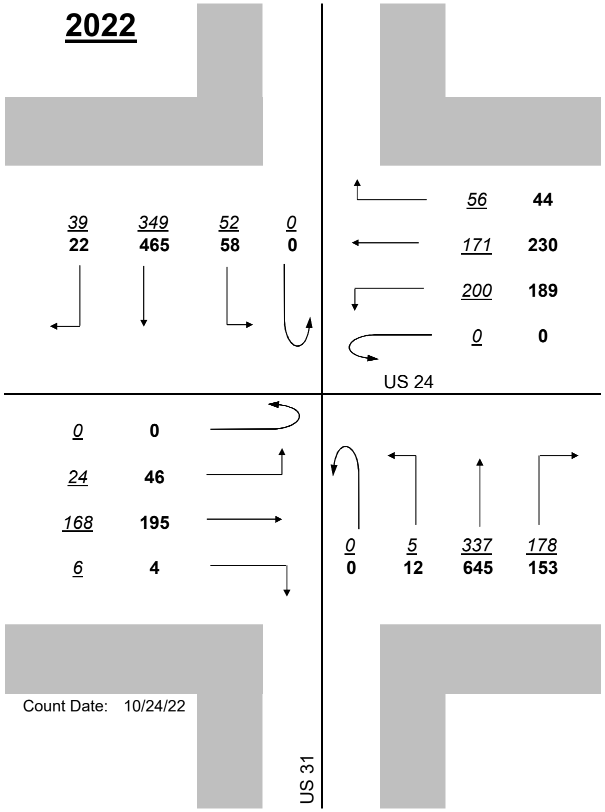
Count Date: 10/24/22

	PHF
AM PEAK	0.91
PM PEAK	0.91



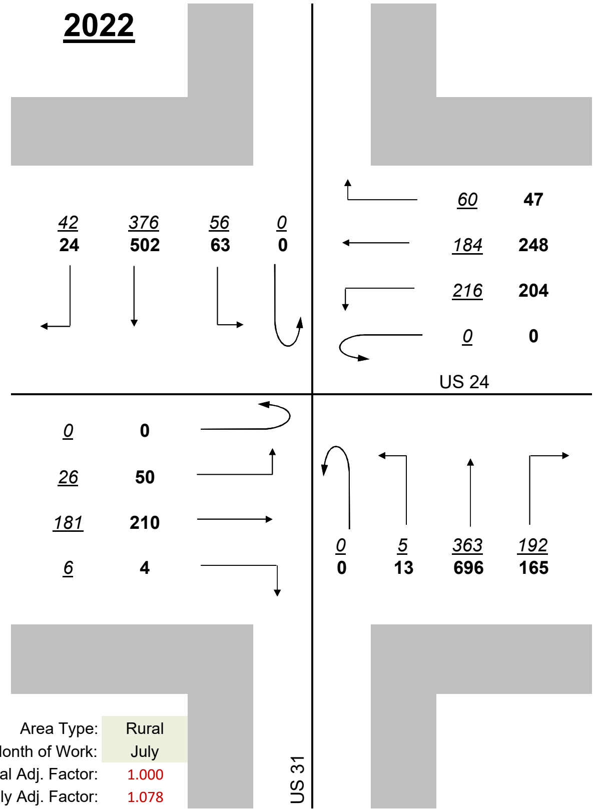
Legend:
000 AM Peak 7:00 AM-8:00 AM
000 PM Peak 3:00 PM-4:00 PM

Raw Counts



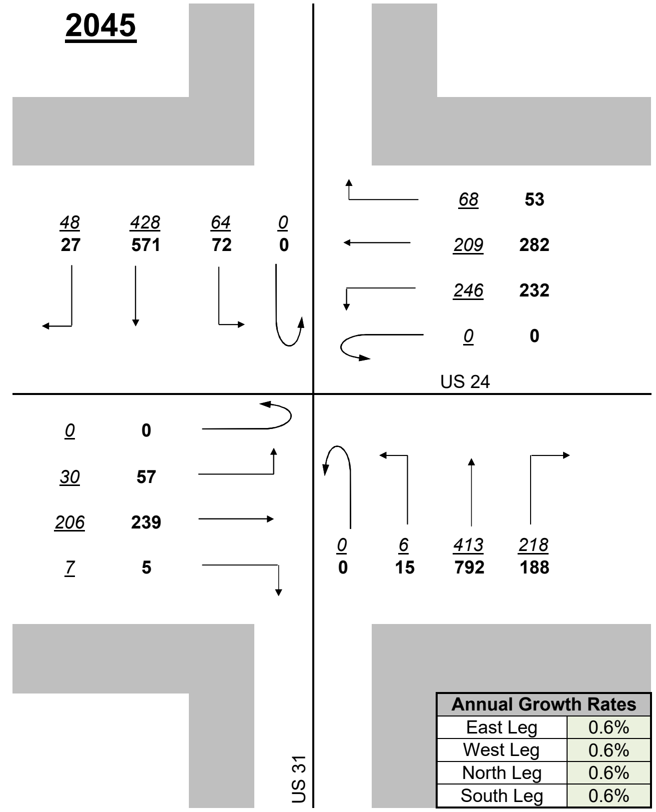
Count Date: 10/24/22

Adjusted Existing Volumes



Area Type:	Rural
Month of Work:	July
Annual Adj. Factor:	1.000
Monthly Adj. Factor:	1.078

Design Year



Annual Growth Rates	
East Leg	0.6%
West Leg	0.6%
North Leg	0.6%
South Leg	0.6%

Legend:
000 AM Peak
000 PM Peak

PEAK HOUR - TURNING MOVEMENT COUNTS

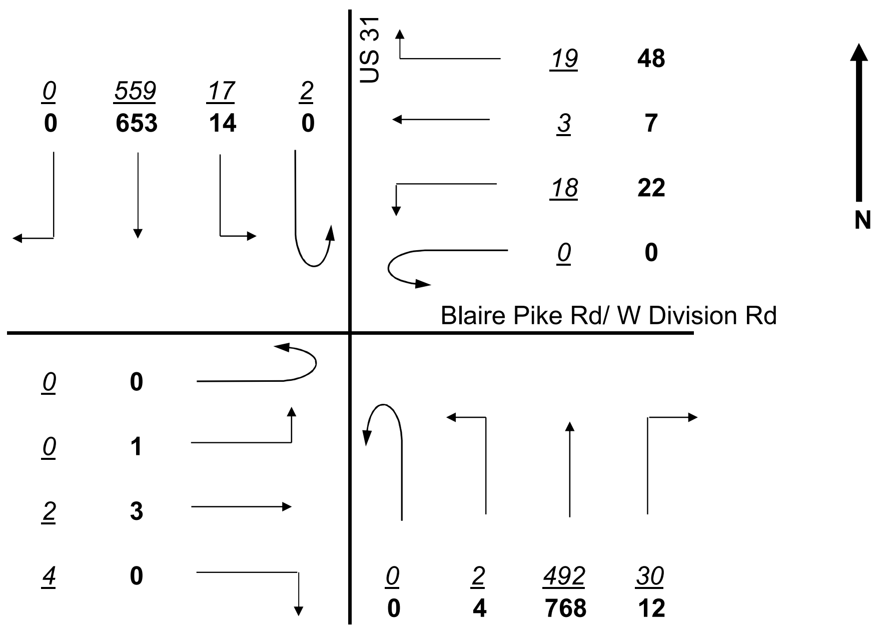
US 31 at Blaire Pike Rd/ W Division Rd **VEHICLES (CARS & TRUCKS)**

RAW 15-MINUTE VOLUMES	EB VEHICLES Blaire Pike Rd/ W Division Rd				WB VEHICLES Blaire Pike Rd/ W Division Rd				NB VEHICLES US 31				SB VEHICLES US 31				INTERSECTION TOTAL
	UTURN	LT	THRU	RT	UTURN	LT	THRU	RT	UTURN	LT	THRU	RT	UTURN	LT	THRU	RT	VEHICLES
AM PEAK																	
7:30-7:45	0	0	1	1	0	3	0	8	0	0	139	10	0	5	131	0	298
7:45-8:00	0	0	1	1	0	4	1	3	0	0	113	9	0	4	144	0	280
8:00-8:15	0	0	0	2	0	10	1	4	0	0	112	6	2	3	135	0	275
8:15-8:30	0	0	0	0	0	1	1	4	0	2	128	5	0	5	149	0	295
PM PEAK																	
3:15-3:30	0	0	1	0	0	6	2	12	0	1	210	5	0	3	159	0	399
3:30-3:45	0	1	1	0	0	5	4	14	0	0	188	1	0	3	183	0	400
3:45-4:00	0	0	1	0	0	5	0	12	0	0	197	5	0	4	156	0	380
4:00-4:15	0	0	0	0	0	6	1	10	0	3	173	1	0	4	155	0	353
TOTAL VOLUMES																	
AM PEAK	0	0	2	4	0	18	3	19	0	2	492	30	2	17	559	0	1148
PM PEAK	0	1	3	0	0	22	7	48	0	4	768	12	0	14	653	0	1532
% TRUCKS																	
AM PEAK	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	17.9%	0.0%	0.0%	0.0%	14.8%	0.0%	
PM PEAK	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	10.7%	0.0%	0.0%	0.0%	15.2%	0.0%	

TURNING MOVEMENT COUNTS
US 31 at Blaire Pike Rd/ W Division Rd

Count Date: 10/24/22

	PHF
AM PEAK	0.96
PM PEAK	0.96

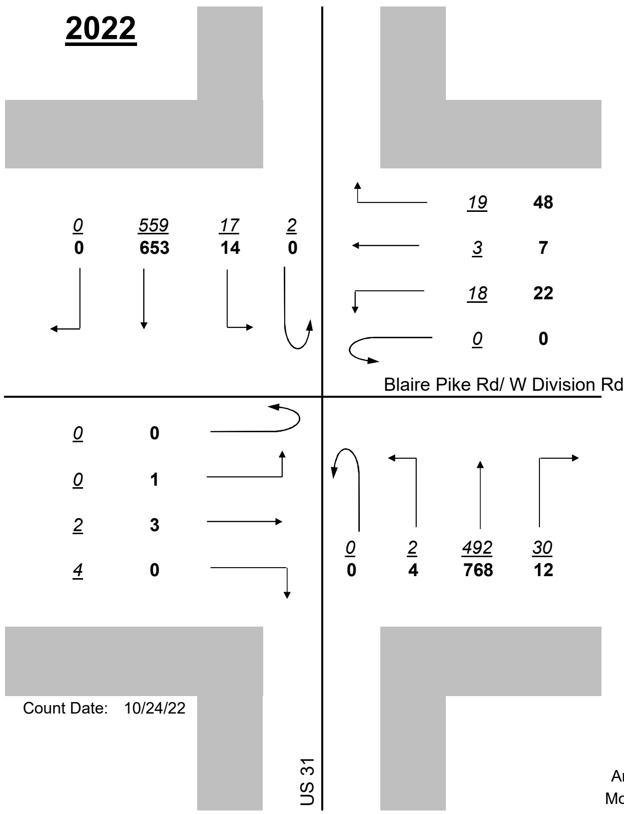


Legend:

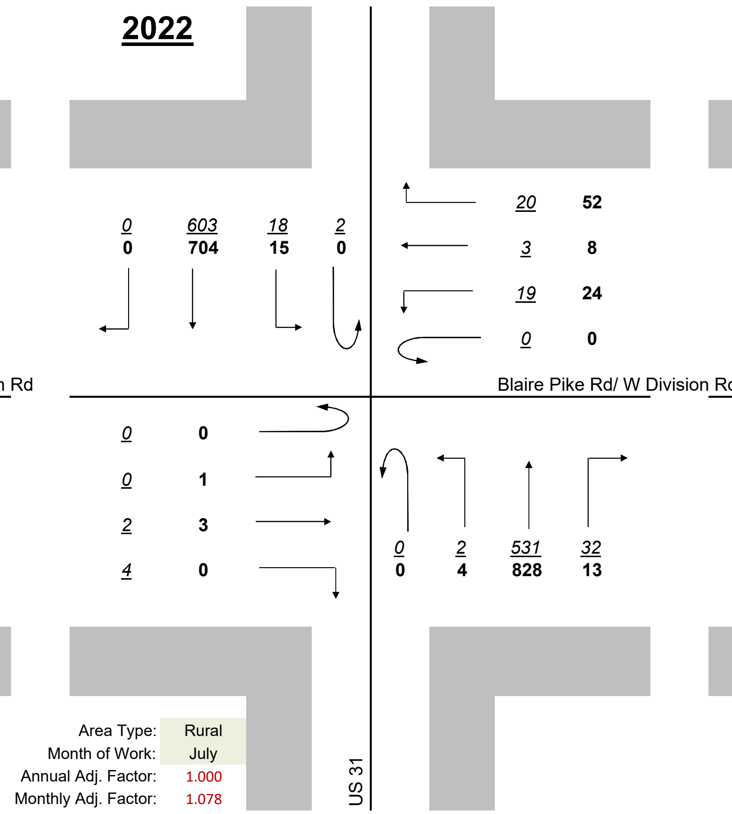
000 AM Peak 7:30 AM-8:30 AM

000 PM Peak 3:15 PM-4:15 PM

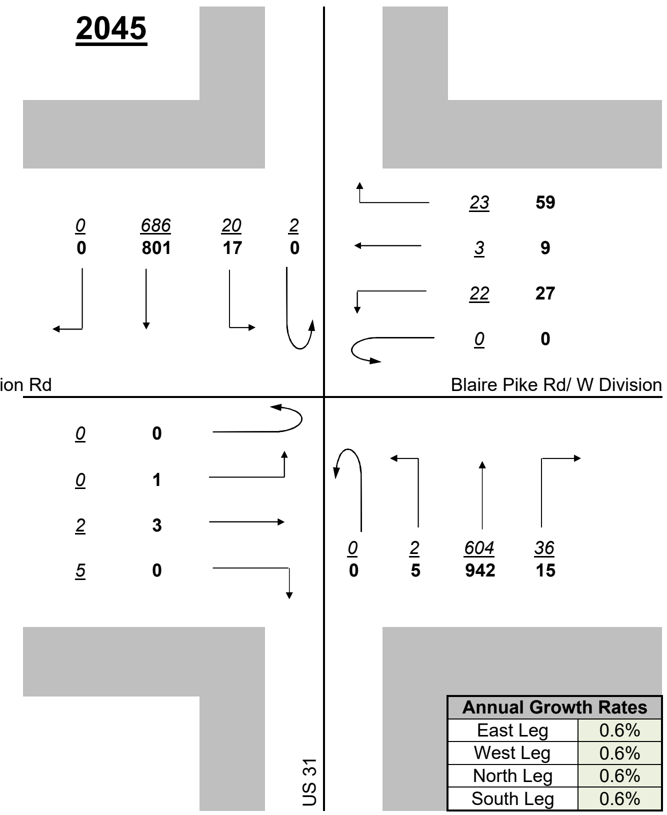
Raw Counts



Adjusted Existing Volumes



Design Year



Legend:
000 AM Peak
000 PM Peak

PEAK HOUR - TURNING MOVEMENT COUNTS

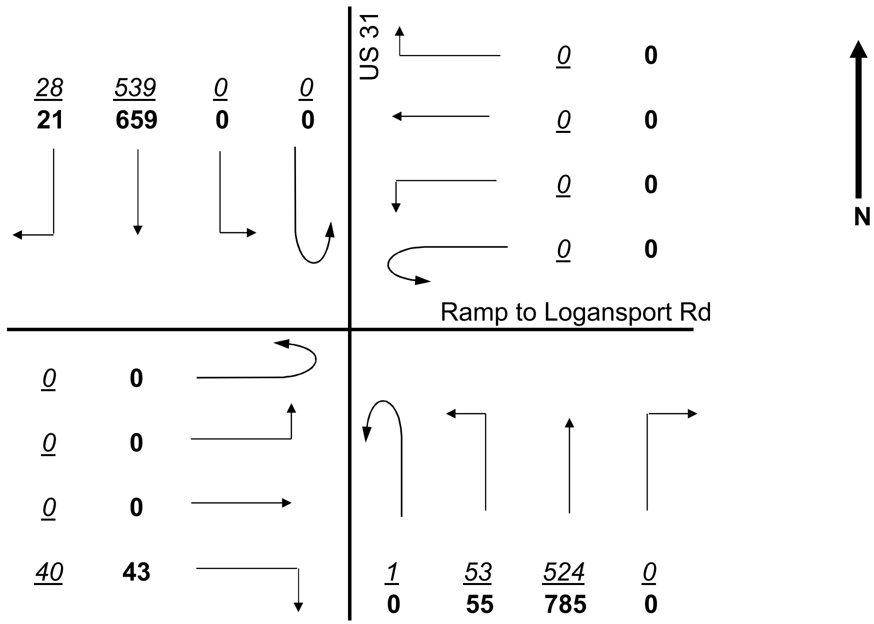
US 31 at Ramp to Logansport Rd — **VEHICLES (CARS & TRUCKS)**

RAW 15-MINUTE VOLUMES	EB VEHICLES Ramp to Logansport Rd				WB VEHICLES Ramp to Logansport Rd				NB VEHICLES US 31				SB VEHICLES US 31				INTERSECTION TOTAL
	UTURN	LT	THRU	RT	UTURN	LT	THRU	RT	UTURN	LT	THRU	RT	UTURN	LT	THRU	RT	VEHICLES
AM PEAK																	
7:30-7:45	0	0		11					1	15	147		0		126	7	307
7:45-8:00	0	0		11					0	15	124		0		137	8	295
8:00-8:15	0	0		8					0	13	117		0		137	6	281
8:15-8:30	0	0		10					0	10	136		0		139	7	302
PM PEAK																	
3:15-3:30	0	0		6					0	12	217		0		167	5	407
3:30-3:45	0	0		13					0	15	191		0		197	7	423
3:45-4:00	0	0		15					0	11	200		0		145	3	374
4:00-4:15	0	0		9					0	17	177		0		150	6	359
TOTAL VOLUMES																	
AM PEAK	0	0	0	40	0	0	0	0	1	53	524	0	0	0	539	28	1185
PM PEAK	0	0	0	43	0	0	0	0	0	55	785	0	0	0	659	21	1563
% TRUCKS																	
AM PEAK	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.9%	16.4%	0.0%	0.0%	0.0%	13.9%	10.7%	
PM PEAK	0.0%	0.0%	0.0%	2.3%	0.0%	0.0%	0.0%	0.0%	0.0%	1.8%	11.0%	0.0%	0.0%	0.0%	14.7%	9.5%	

TURNING MOVEMENT COUNTS
US 31 at Ramp to Logansport Rd

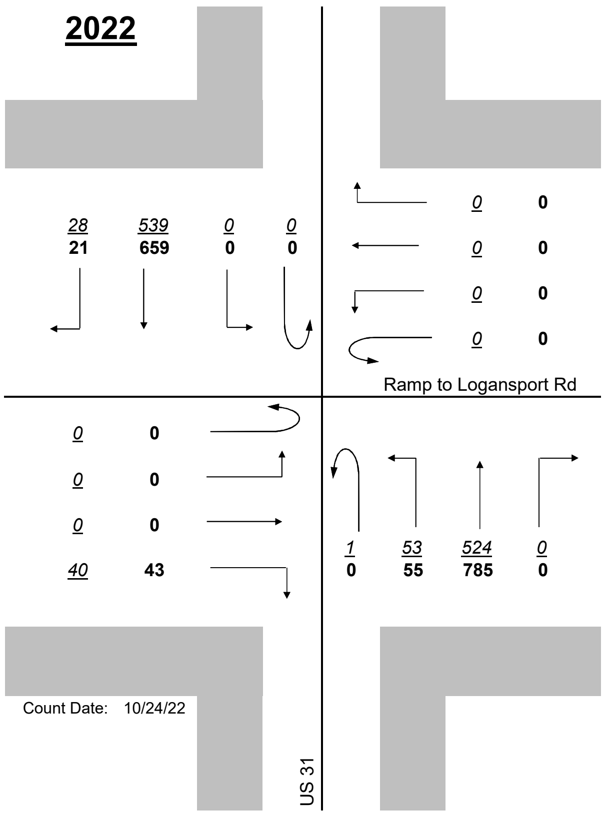
Count Date: 10/24/22

	PHF
AM PEAK	0.96
PM PEAK	0.92

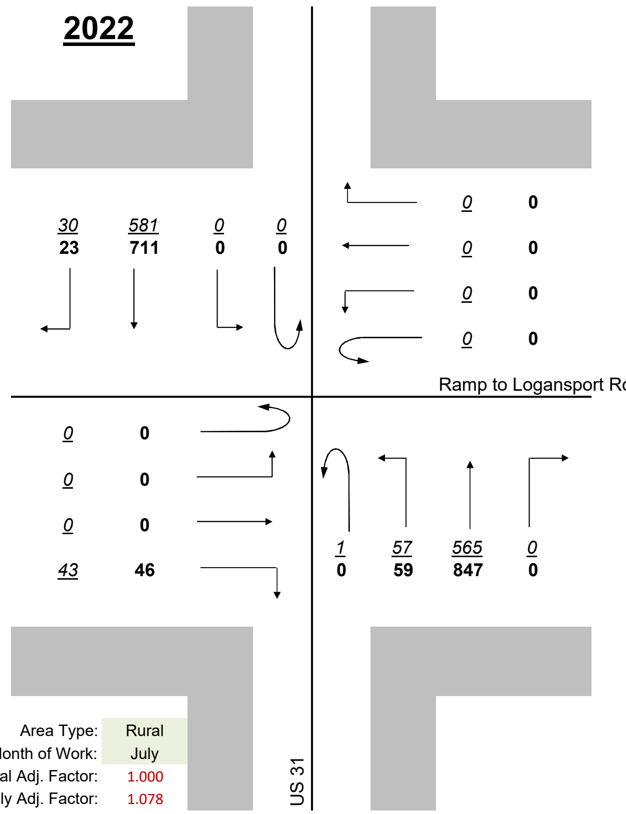


Legend:
000 AM Peak 7:30 AM-8:30 AM
000 PM Peak 3:15 PM-4:15 PM

Raw Counts

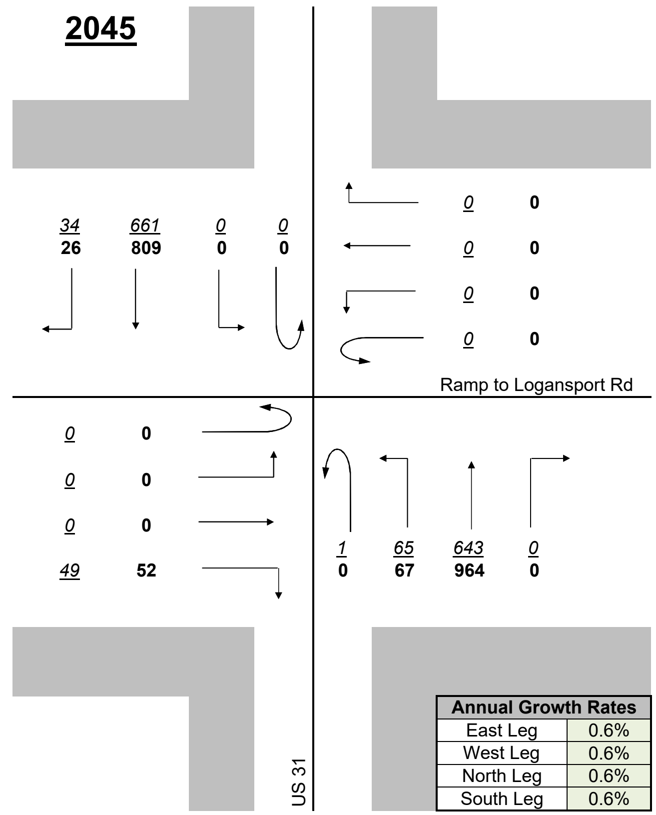


Adjusted Existing Volumes



Area Type:	Rural
Month of Work:	July
Annual Adj. Factor:	1.000
Monthly Adj. Factor:	1.078

Design Year



Annual Growth Rates	
East Leg	0.6%
West Leg	0.6%
North Leg	0.6%
South Leg	0.6%

Legend:
000 AM Peak
000 PM Peak

PEAK HOUR - TURNING MOVEMENT COUNTS

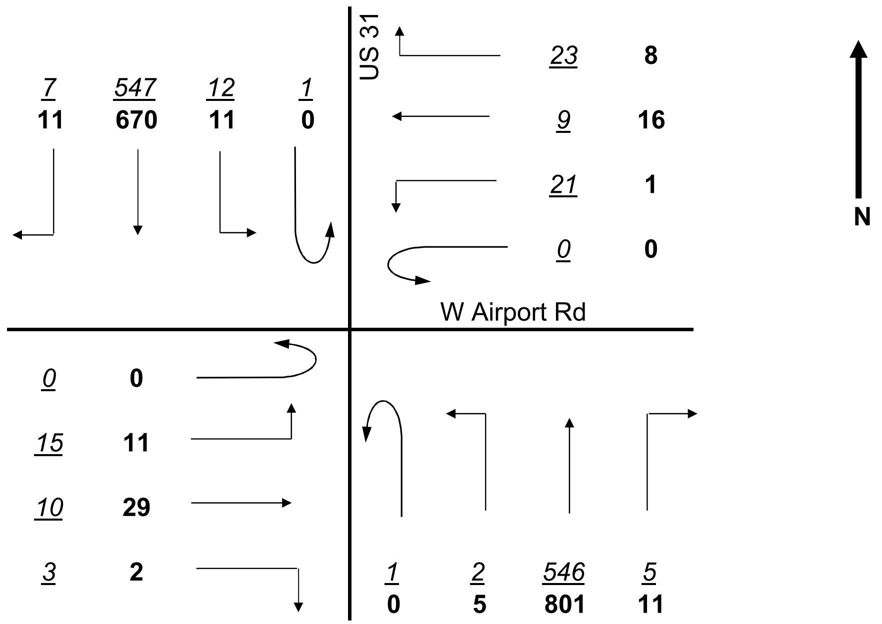
US 31 at W Airport Rd **VEHICLES (CARS & TRUCKS)**

RAW 15-MINUTE VOLUMES	EB VEHICLES W Airport Rd				WB VEHICLES W Airport Rd				NB VEHICLES US 31				SB VEHICLES US 31				INTERSECTION TOTAL
	UTURN	LT	THRU	RT	UTURN	LT	THRU	RT	UTURN	LT	THRU	RT	UTURN	LT	THRU	RT	VEHICLES
AM PEAK																	
7:15-7:30	0	2	3	1	0	7	3	9	0	0	137	1	0	1	133	2	299
7:30-7:45	0	6	4	0	0	4	3	7	1	1	151	1	1	3	131	2	315
7:45-8:00	0	5	3	2	0	5	0	3	0	1	122	1	0	4	147	0	293
8:00-8:15	0	2	0	0	0	5	3	4	0	0	136	2	0	4	136	3	295
PM PEAK																	
3:00-3:15	0	4	6	2	0	0	6	0	0	0	183	3	0	1	157	2	364
3:15-3:30	0	3	11	0	0	1	1	0	0	2	224	3	0	3	160	2	410
3:30-3:45	0	2	5	0	0	0	4	4	0	3	205	3	0	3	197	5	431
3:45-4:00	0	2	7	0	0	0	5	4	0	0	189	2	0	4	156	2	371
TOTAL VOLUMES																	
AM PEAK	0	15	10	3	0	21	9	23	1	2	546	5	1	12	547	7	1202
PM PEAK	0	11	29	2	0	1	16	8	0	5	801	11	0	11	670	11	1576
% TRUCKS																	
AM PEAK	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	50.0%	15.9%	0.0%	0.0%	0.0%	14.3%	0.0%	
PM PEAK	0.0%	9.1%	3.4%	0.0%	0.0%	0.0%	6.3%	0.0%	0.0%	20.0%	11.9%	9.1%	0.0%	9.1%	14.6%	0.0%	

TURNING MOVEMENT COUNTS
US 31 at W Airport Rd

Count Date: 10/24/22

	PHF
AM PEAK	0.95
PM PEAK	0.91

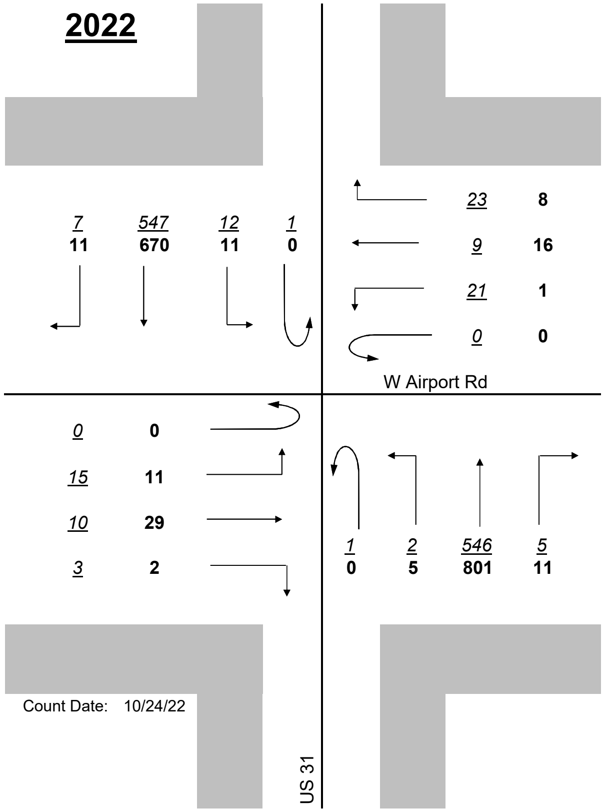


Legend:

000 AM Peak 7:15 AM-8:15 AM

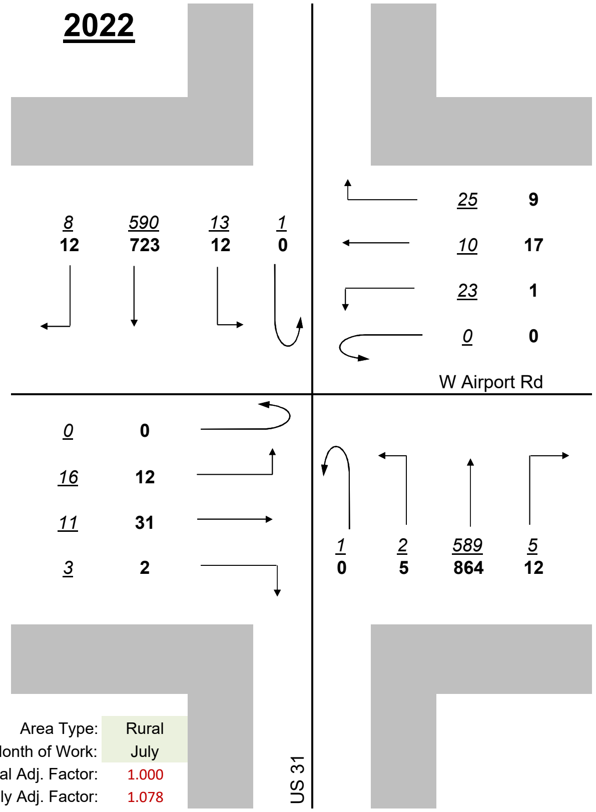
000 PM Peak 3:00 PM-4:00 PM

Raw Counts



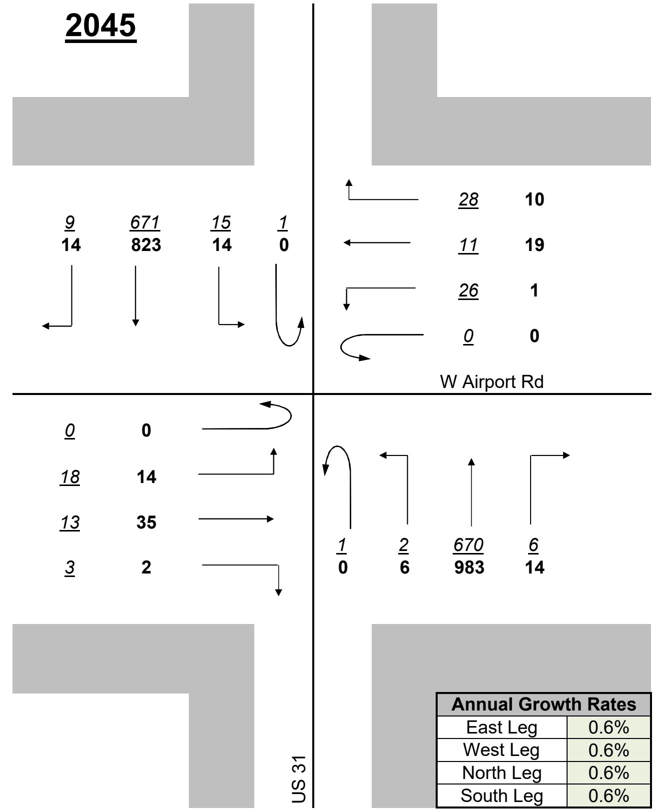
Count Date: 10/24/22

Adjusted Existing Volumes



Area Type:	Rural
Month of Work:	July
Annual Adj. Factor:	1.000
Monthly Adj. Factor:	1.078

Design Year



Annual Growth Rates	
East Leg	0.6%
West Leg	0.6%
North Leg	0.6%
South Leg	0.6%

Legend:
000 AM Peak
000 PM Peak

PEAK HOUR - TURNING MOVEMENT COUNTS

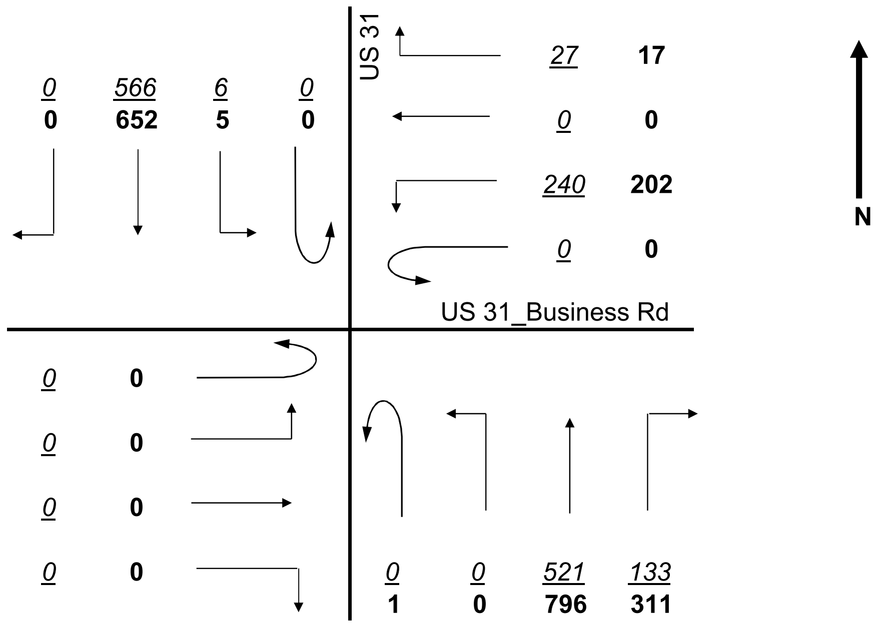
US 31 at US 31_Business Rd **VEHICLES (CARS & TRUCKS)**

RAW 15-MINUTE VOLUMES	EB VEHICLES US 31_Business Rd				WB VEHICLES US 31_Business Rd				NB VEHICLES US 31				SB VEHICLES US 31				INTERSECTION TOTAL
	UTURN	LT	THRU	RT	UTURN	LT	THRU	RT	UTURN	LT	THRU	RT	UTURN	LT	THRU	RT	VEHICLES
AM PEAK																	
7:15-7:30					0	66		9	0		129	31	0	2	137		374
7:30-7:45					0	67		8	0		143	35	0	2	139		394
7:45-8:00					0	64		7	0		119	37	0	1	149		377
8:00-8:15					0	43		3	0		130	30	0	1	141		348
PM PEAK																	
3:15-3:30					0	52		4	1		223	66	0	1	158		505
3:30-3:45					0	52		5	0		204	77	0	3	188		529
3:45-4:00					0	44		3	0		190	86	0	0	151		474
4:00-4:15					0	54		5	0		179	82	0	1	155		476
TOTAL VOLUMES																	
AM PEAK	0	0	0	0	0	240	0	27	0	0	521	133	0	6	566	0	1493
PM PEAK	0	0	0	0	0	202	0	17	1	0	796	311	0	5	652	0	1984
% TRUCKS																	
AM PEAK	0.0%	0.0%	0.0%	0.0%	0.0%	1.3%	0.0%	3.7%	0.0%	0.0%	17.1%	3.0%	0.0%	16.7%	13.8%	0.0%	
PM PEAK	0.0%	0.0%	0.0%	0.0%	0.0%	0.5%	0.0%	5.9%	0.0%	0.0%	11.4%	1.0%	0.0%	0.0%	14.4%	0.0%	

TURNING MOVEMENT COUNTS
US 31 at US 31_Business Rd

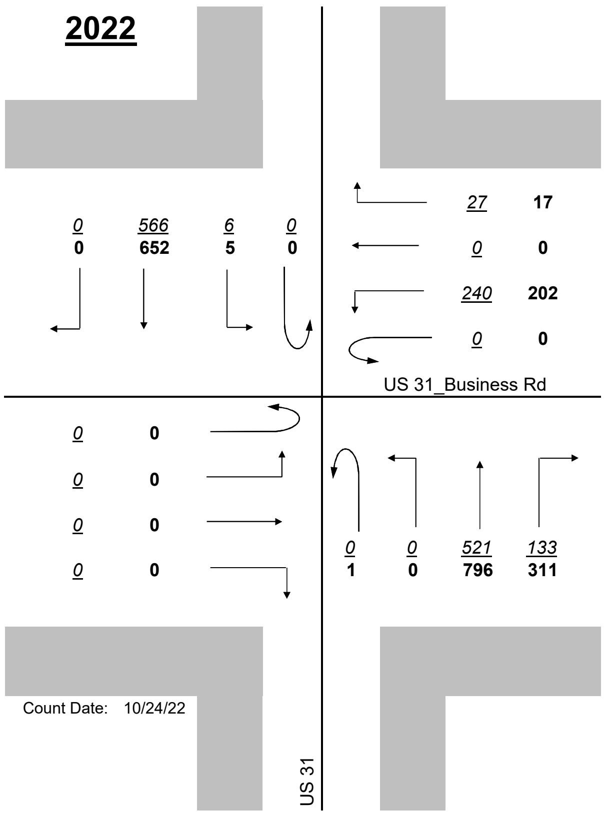
Count Date: 10/24/22

	PHF
AM PEAK	0.95
PM PEAK	0.94

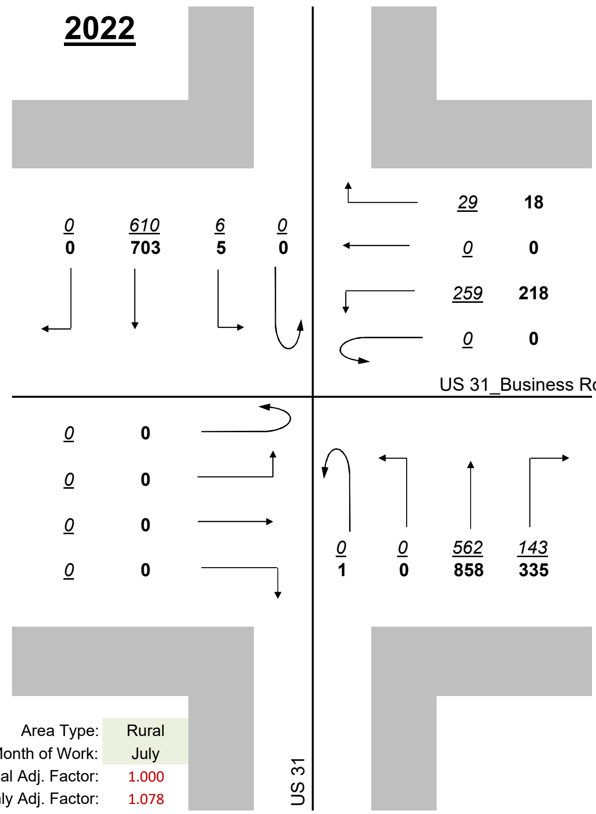


Legend:
000 AM Peak 7:15 AM-8:15 AM
000 PM Peak 3:15 PM-4:15 PM

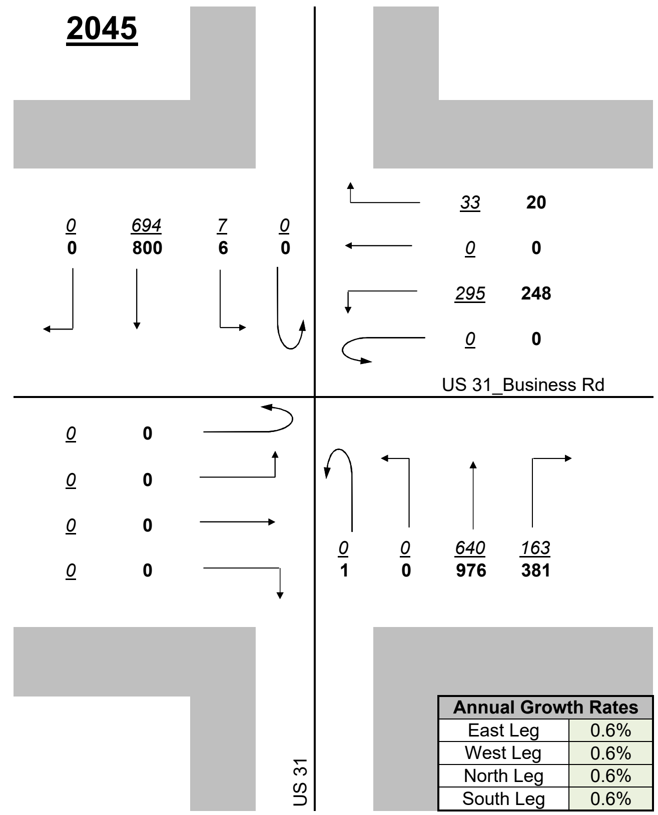
Raw Counts	Adjusted Existing Volumes	Design Year



Count Date: 10/24/22



Area Type:	Rural
Month of Work:	July
Annual Adj. Factor:	1.000
Monthly Adj. Factor:	1.078



Annual Growth Rates	
East Leg	0.6%
West Leg	0.6%
North Leg	0.6%
South Leg	0.6%

Legend:
000 AM Peak
000 PM Peak

PEAK HOUR - TURNING MOVEMENT COUNTS

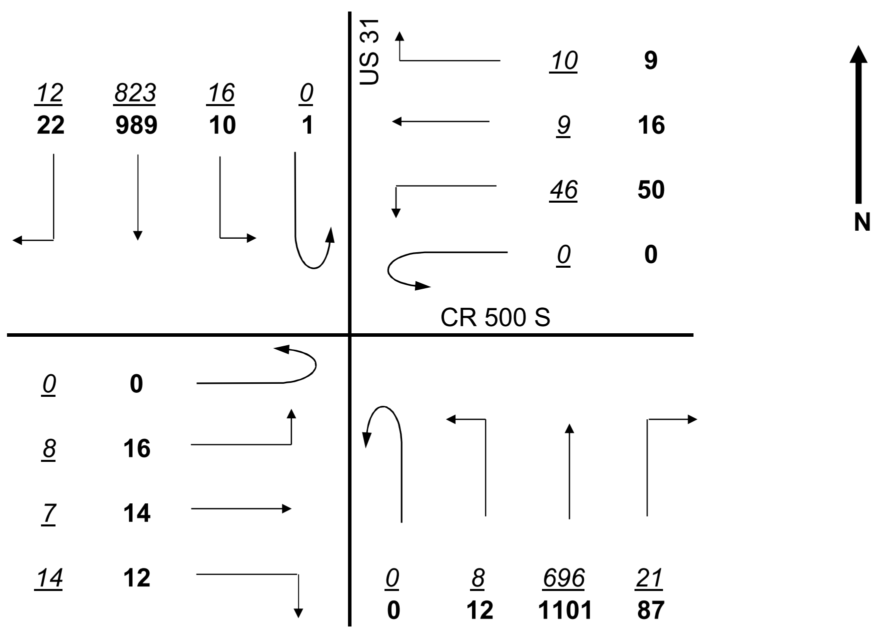
US 31 at CR 500 S **VEHICLES (CARS & TRUCKS)**

RAW 15-MINUTE VOLUMES	EB VEHICLES CR 500 S				WB VEHICLES CR 500 S				NB VEHICLES US 31				SB VEHICLES US 31				INTERSECTION TOTAL
	UTURN	LT	THRU	RT	UTURN	LT	THRU	RT	UTURN	LT	THRU	RT	UTURN	LT	THRU	RT	VEHICLES
AM PEAK																	
7:30-7:45	0	5	2	5	0	18	5	3	0	4	173	5	0	1	205	3	429
7:45-8:00	0	0	2	5	0	10	0	2	0	3	171	8	0	2	217	1	421
8:00-8:15	0	1	2	3	0	7	2	4	0	0	178	5	0	6	188	3	399
8:15-8:30	0	2	1	1	0	11	2	1	0	1	174	3	0	7	213	5	421
PM PEAK																	
3:00-3:15	0	6	1	5	0	16	4	1	0	3	279	19	0	3	264	7	608
3:15-3:30	0	6	6	3	0	14	2	3	0	2	278	21	0	3	254	8	600
3:30-3:45	0	1	1	2	0	9	4	2	0	6	264	23	1	3	232	4	552
3:45-4:00	0	3	6	2	0	11	6	3	0	1	280	24	0	1	239	3	579
TOTAL VOLUMES																	
AM PEAK	0	8	7	14	0	46	9	10	0	8	696	21	0	16	823	12	1670
PM PEAK	0	16	14	12	0	50	16	9	0	12	1101	87	1	10	989	22	2339
% TRUCKS																	
AM PEAK	0.0%	0.0%	0.0%	7.1%	0.0%	2.2%	0.0%	20.0%	0.0%	25.0%	14.8%	0.0%	0.0%	6.3%	10.4%	0.0%	
PM PEAK	0.0%	0.0%	7.1%	16.7%	0.0%	0.0%	0.0%	0.0%	0.0%	33.3%	9.3%	3.4%	0.0%	10.0%	11.8%	0.0%	

TURNING MOVEMENT COUNTS
US 31 at CR 500 S

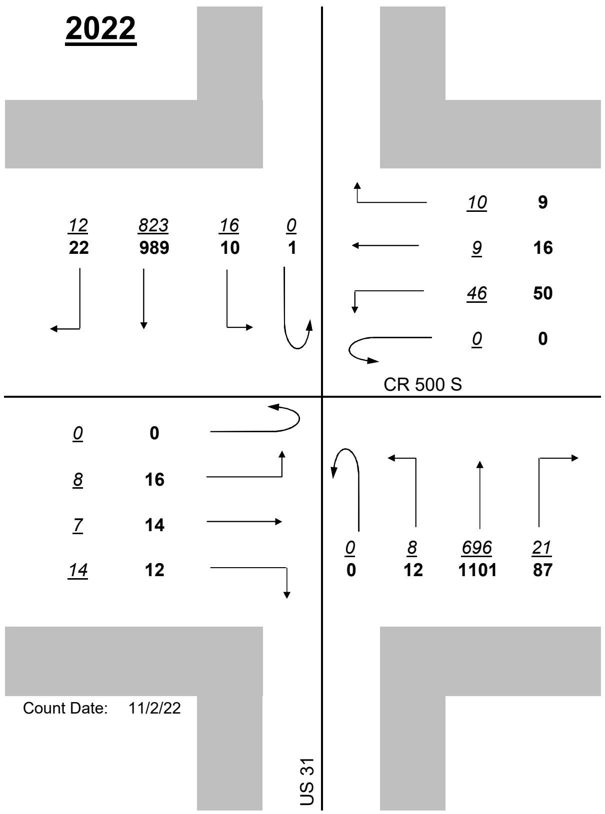
Count Date: 11/2/22

	PHF
AM PEAK	0.97
PM PEAK	0.96

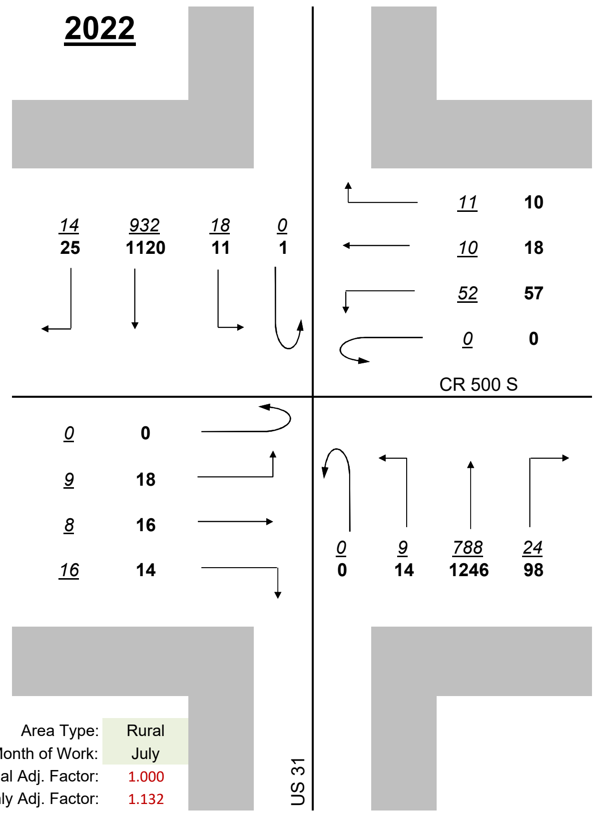


Legend:
_000_ AM Peak 7:30 AM-8:30 AM
000 PM Peak 3:00 PM-4:00 PM

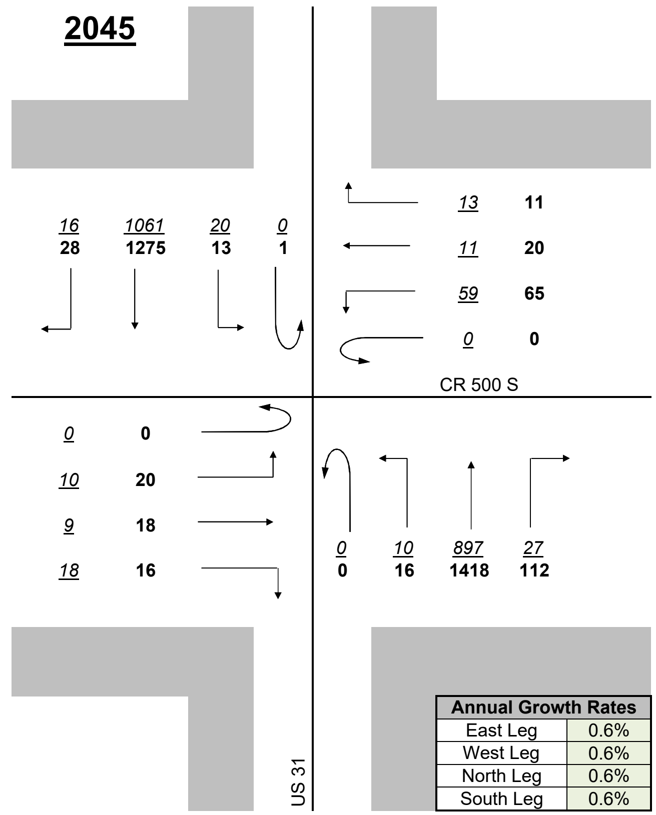
Raw Counts	Adjusted Existing Volumes	Design Year



Count Date: 11/2/22



Area Type:	Rural
Month of Work:	July
Annual Adj. Factor:	1.000
Monthly Adj. Factor:	1.132



Annual Growth Rates	
East Leg	0.6%
West Leg	0.6%
North Leg	0.6%
South Leg	0.6%

Legend:
000 AM Peak
000 PM Peak

PEAK HOUR - TURNING MOVEMENT COUNTS

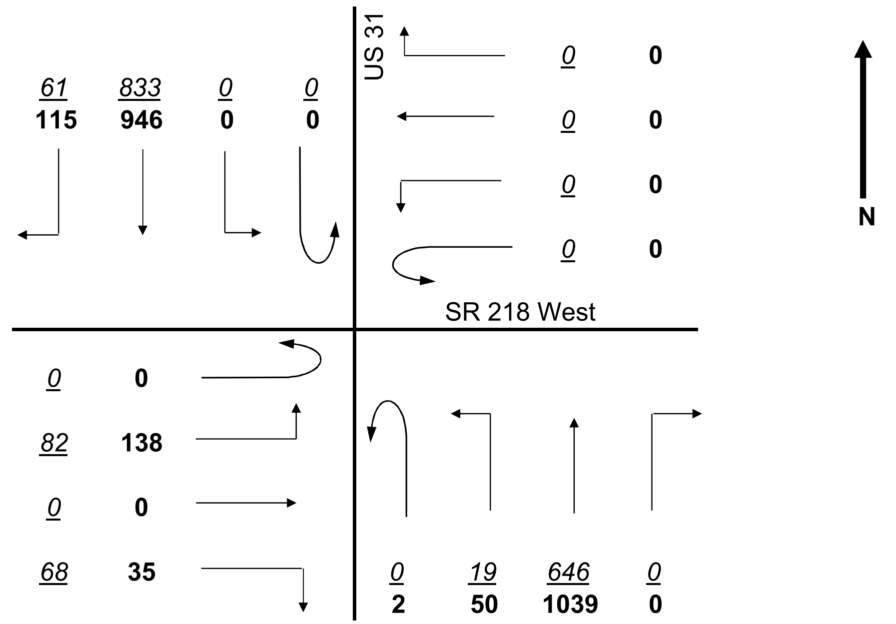
US 31 at SR 218 West — **VEHICLES (CARS & TRUCKS)**

RAW 15-MINUTE VOLUMES	EB VEHICLES SR 218 West				WB VEHICLES SR 218 West				NB VEHICLES US 31				SB VEHICLES US 31				INTERSECTION TOTAL VEHICLES
	UTURN	LT	THRU	RT	UTURN	LT	THRU	RT	UTURN	LT	THRU	RT	UTURN	LT	THRU	RT	
AM PEAK																	
7:30-7:45	0	20	0	17	0	0	0	0	0	7	165	0	0	0	231	19	459
7:45-8:00	0	17	0	29	0	0	0	0	0	4	159	0	0	0	211	16	436
8:00-8:15	0	27	0	9	0	0	0	0	0	3	152	0	0	0	181	21	393
8:15-8:30	0	18	0	13	0	0	0	0	0	5	170	0	0	0	210	5	421
PM PEAK																	
3:00-3:15	0	42	0	9	0	0	0	0	1	6	249	0	0	0	253	27	587
3:15-3:30	0	26	0	4	0	0	0	0	0	16	277	0	0	0	255	21	599
3:30-3:45	0	36	0	11	0	0	0	0	1	16	244	0	0	0	193	39	540
3:45-4:00	0	34	0	11	0	0	0	0	0	12	269	0	0	0	245	28	599
TOTAL VOLUMES																	
AM PEAK	0	82	0	68	0	0	0	0	0	19	646	0	0	0	833	61	1709
PM PEAK	0	138	0	35	0	0	0	0	2	50	1039	0	0	0	946	115	2325
% TRUCKS																	
AM PEAK	0.0%	6.1%	0.0%	10.3%	0.0%	0.0%	0.0%	0.0%	0.0%	5.3%	15.6%	0.0%	0.0%	0.0%	10.0%	3.3%	
PM PEAK	0.0%	3.6%	0.0%	20.0%	0.0%	0.0%	0.0%	0.0%	0.0%	14.0%	8.2%	0.0%	0.0%	0.0%	11.9%	2.6%	

TURNING MOVEMENT COUNTS
US 31 at SR 218 West

Count Date: 11/2/22

	PHF
AM PEAK	0.93
PM PEAK	0.97

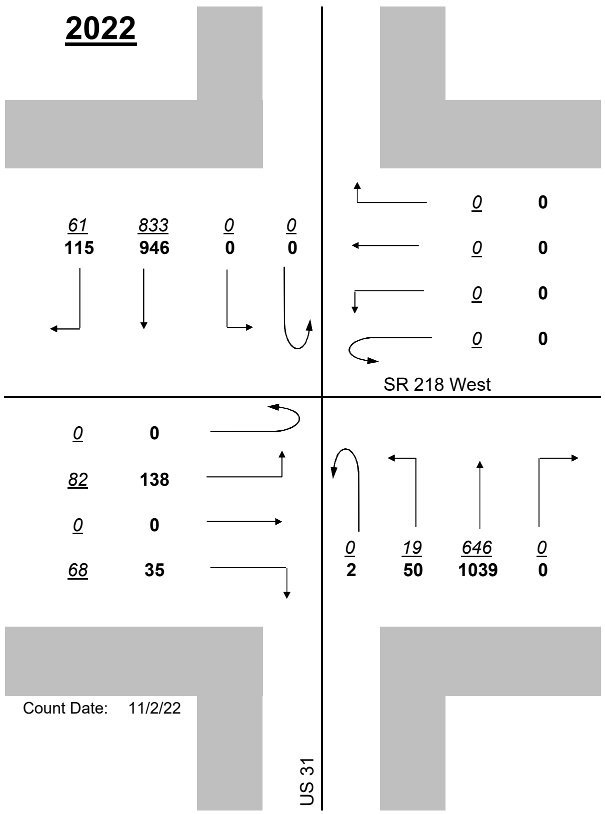


Legend:

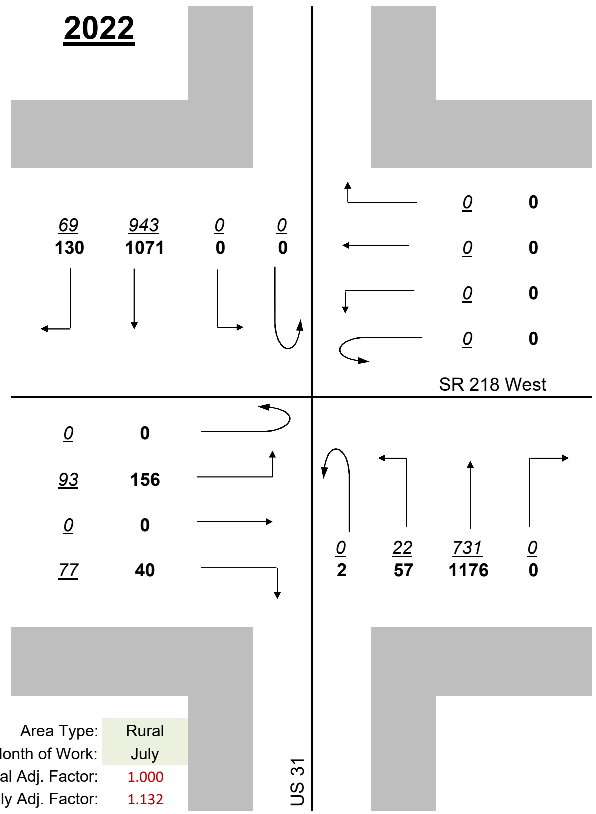
000 AM Peak 7:30 AM-8:30 AM

000 PM Peak 3:00 PM-4:00 PM

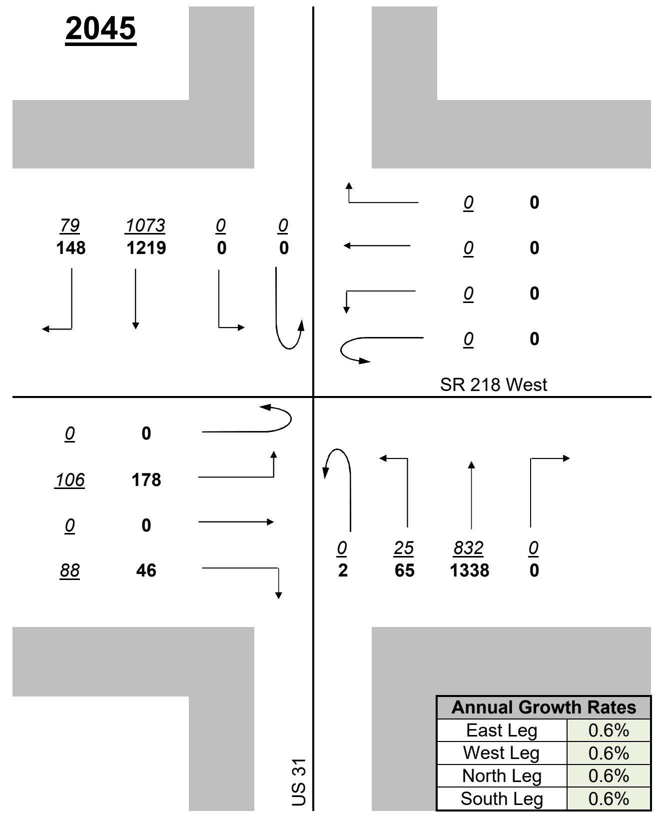
Raw Counts	Adjusted Existing Volumes	Design Year



Count Date: 11/2/22



Area Type:	Rural
Month of Work:	July
Annual Adj. Factor:	1.000
Monthly Adj. Factor:	1.132



Annual Growth Rates	
East Leg	0.6%
West Leg	0.6%
North Leg	0.6%
South Leg	0.6%

Legend:
000 AM Peak
000 PM Peak

PEAK HOUR - TURNING MOVEMENT COUNTS

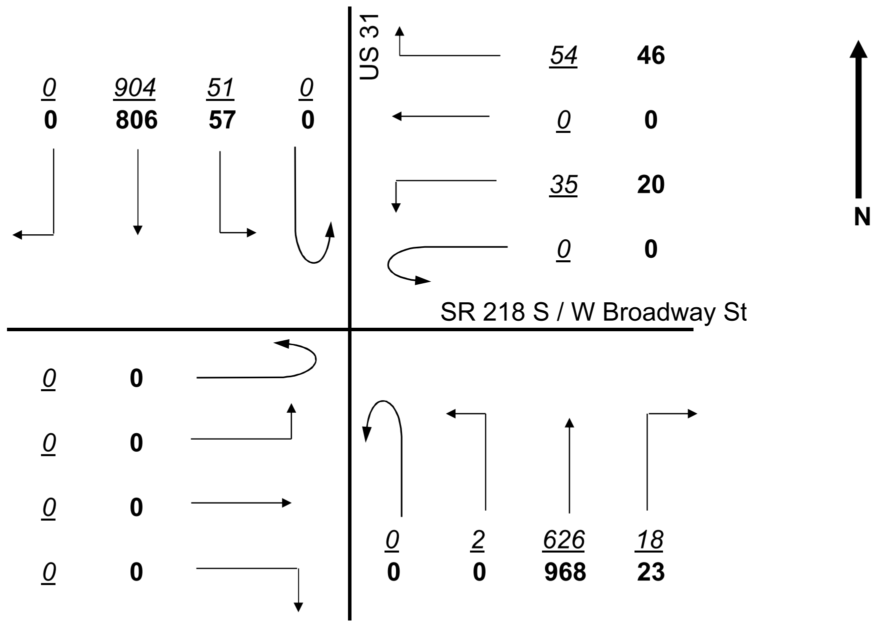
US 31 at SR 218 S / W Broadway St **VEHICLES (CARS & TRUCKS)**

RAW 15-MINUTE VOLUMES	EB VEHICLES SR 218 S / W Broadway St				WB VEHICLES SR 218 S / W Broadway St				NB VEHICLES US 31				SB VEHICLES US 31				INTERSECTION TOTAL
	UTURN	LT	THRU	RT	UTURN	LT	THRU	RT	UTURN	LT	THRU	RT	UTURN	LT	THRU	RT	VEHICLES
AM PEAK																	
7:15-7:30	0	0	0	0	0	15	0	13	0	1	157	5	0	8	215	0	414
7:30-7:45	0	0	0	0	0	5	0	19	0	0	172	3	0	14	216	0	429
7:45-8:00	0	0	0	0	0	9	0	12	0	1	154	4	0	9	245	0	434
8:00-8:15	0	0	0	0	0	6	0	10	0	0	143	6	0	20	228	0	413
PM PEAK																	
3:30-3:45	0	0	0	0	0	4	0	6	0	0	220	2	0	10	206	0	448
3:45-4:00	0	0	0	0	0	1	0	10	0	0	259	5	0	15	208	0	498
4:00-4:15	0	0	0	0	0	4	0	14	0	0	259	10	0	15	202	0	504
4:15-4:30	0	0	0	0	0	11	0	16	0	0	230	6	0	17	190	0	470
TOTAL VOLUMES																	
AM PEAK	0	0	0	0	0	35	0	54	0	2	626	18	0	51	904	0	1690
PM PEAK	0	0	0	0	0	20	0	46	0	0	968	23	0	57	806	0	1920
% TRUCKS																	
AM PEAK	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	13.1%	0.0%	0.0%	2.0%	10.1%	0.0%	
PM PEAK	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.2%	0.0%	0.0%	9.3%	0.0%	0.0%	1.8%	10.7%	0.0%	

TURNING MOVEMENT COUNTS
US 31 at SR 218 S / W Broadway St

Count Date: 8/27/22

	PHF
AM PEAK	0.97
PM PEAK	0.95

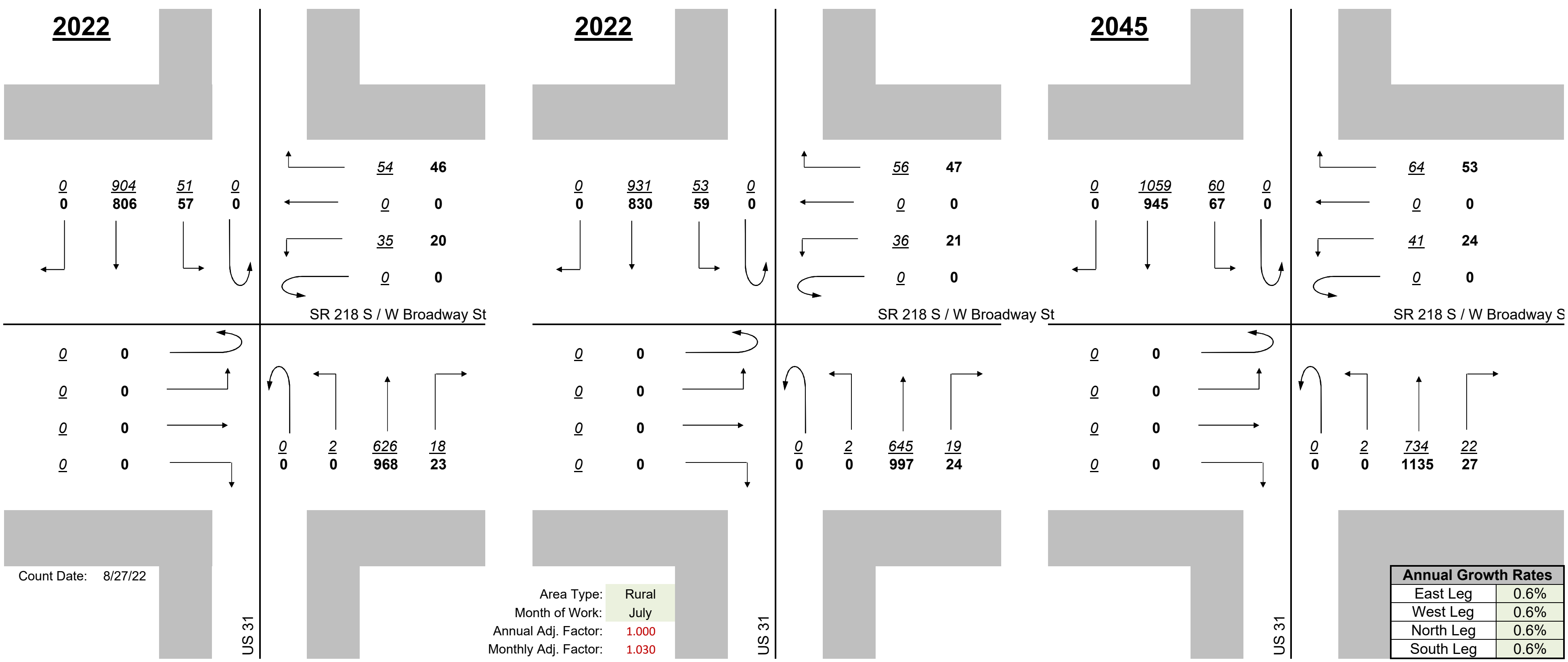


Legend:

000 AM Peak 7:15 AM-8:15 AM

000 PM Peak 3:30 PM-4:30 PM

Raw Counts	Adjusted Existing Volumes	Design Year



Annual Growth Rates	
East Leg	0.6%
West Leg	0.6%
North Leg	0.6%
South Leg	0.6%

Legend:
000 AM Peak
000 PM Peak

PEAK HOUR - TURNING MOVEMENT COUNTS

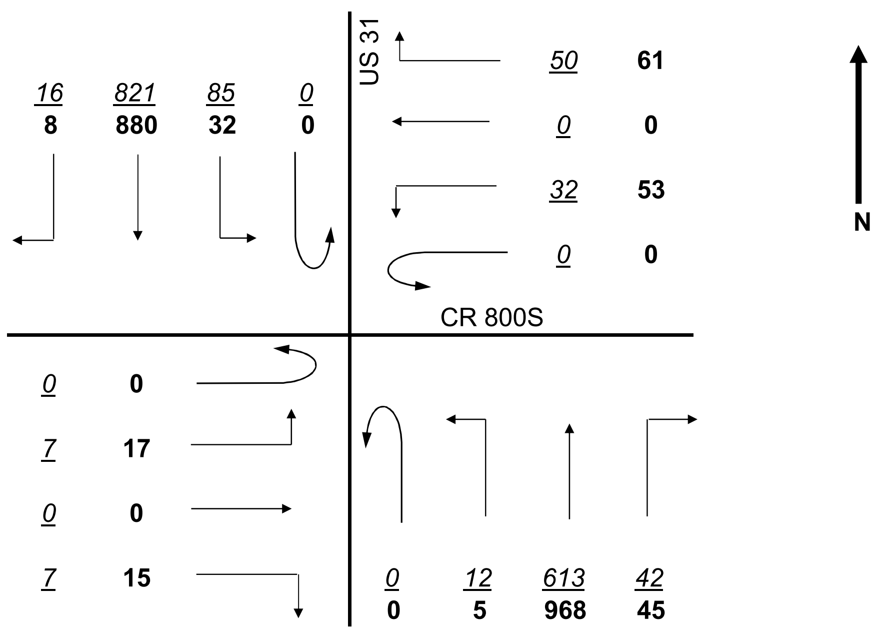
US 31 at CR 800S **VEHICLES (CARS & TRUCKS)**

RAW 15-MINUTE VOLUMES	EB VEHICLES CR 800S				WB VEHICLES CR 800S				NB VEHICLES US 31				SB VEHICLES US 31				INTERSECTION TOTAL
	UTURN	LT	THRU	RT	UTURN	LT	THRU	RT	UTURN	LT	THRU	RT	UTURN	LT	THRU	RT	VEHICLES
AM PEAK																	
7:30-7:45	0	2	0	0	0	8	0	7	0	5	152	7	0	5	212	6	404
7:45-8:00	0	2	0	2	0	2	0	5	0	3	170	19	0	32	227	6	468
8:00-8:15	0	3	0	2	0	10	0	18	0	4	138	11	0	32	185	0	403
8:15-8:30	0	0	0	3	0	12	0	20	0	0	153	5	0	16	197	4	410
PM PEAK																	
3:15-3:30	0	3	0	2	0	26	0	42	0	0	226	12	0	6	207	4	528
3:30-3:45	0	7	0	2	0	18	0	11	0	3	265	12	0	10	224	1	553
3:45-4:00	0	5	0	7	0	3	0	4	0	1	243	9	0	10	235	1	518
4:00-4:15	0	2	0	4	0	6	0	4	0	1	234	12	0	6	214	2	485
TOTAL VOLUMES																	
AM PEAK	0	7	0	7	0	32	0	50	0	12	613	42	0	85	821	16	1685
PM PEAK	0	17	0	15	0	53	0	61	0	5	968	45	0	32	880	8	2084
% TRUCKS																	
AM PEAK	0.0%	28.6%	0.0%	14.3%	0.0%	0.0%	0.0%	12.0%	0.0%	0.0%	15.5%	4.8%	0.0%	9.4%	10.7%	12.5%	
PM PEAK	0.0%	11.8%	0.0%	13.3%	0.0%	1.9%	0.0%	13.1%	0.0%	20.0%	7.7%	4.4%	0.0%	18.8%	10.6%	25.0%	

TURNING MOVEMENT COUNTS
US 31 at CR 800S

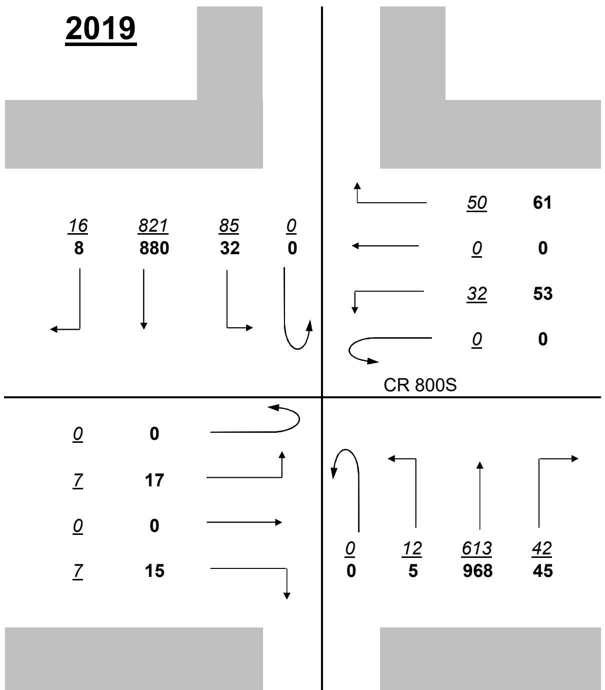
Count Date: 12/3/19

	PHF
AM PEAK	0.90
PM PEAK	0.94



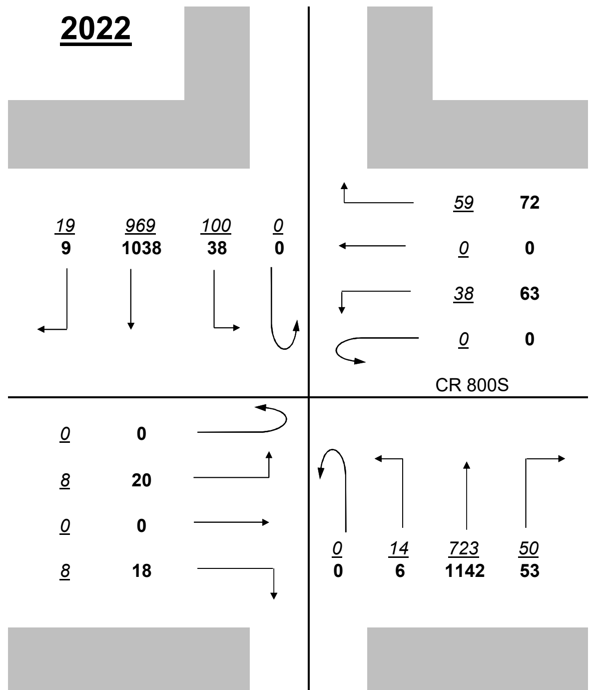
Legend:
000 AM Peak 7:30 AM-8:30 AM
000 PM Peak 3:15 PM-4:15 PM

Raw Counts



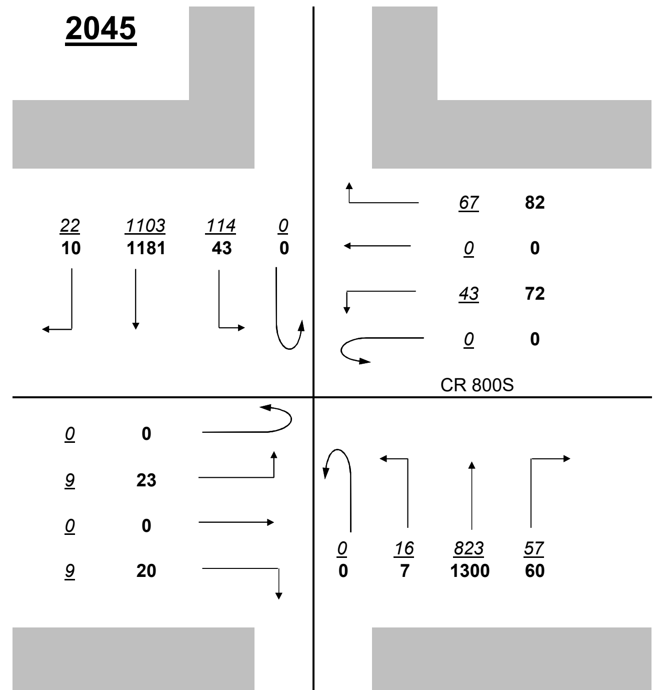
Count Date: 12/3/19

Adjusted Existing Volumes



Area Type:	Rural
Month of Work:	July
Annual Adj. Factor:	0.983
Monthly Adj. Factor:	1.200

Design Year



Annual Growth Rates	
East Leg	0.6%
West Leg	0.6%
North Leg	0.6%
South Leg	0.6%

Legend:
000 AM Peak
000 PM Peak

PEAK HOUR - TURNING MOVEMENT COUNTS

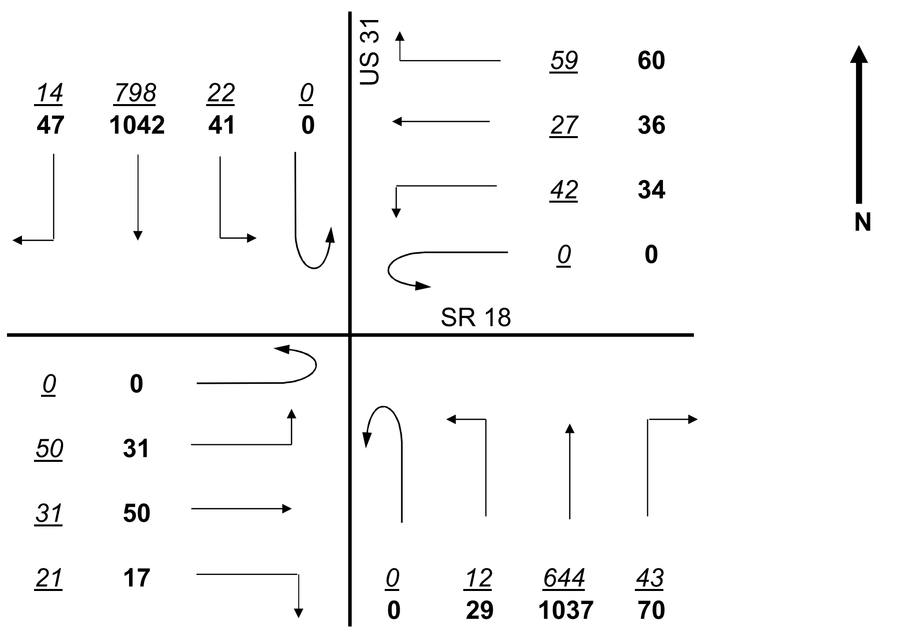
US 31 at SR 18 **VEHICLES (CARS & TRUCKS)**

RAW 15-MINUTE VOLUMES	EB VEHICLES SR 18				WB VEHICLES SR 18				NB VEHICLES US 31				SB VEHICLES US 31				INTERSECTION TOTAL
	UTURN	LT	THRU	RT	UTURN	LT	THRU	RT	UTURN	LT	THRU	RT	UTURN	LT	THRU	RT	VEHICLES
AM PEAK																	
7:15-7:30	0	15	11	6	0	11	10	19	0	1	164	7	0	4	205	5	458
7:30-7:45	0	8	5	9	0	13	8	12	0	2	166	12	0	3	203	5	446
7:45-8:00	0	16	4	3	0	8	3	17	0	7	166	13	0	6	216	3	462
8:00-8:15	0	11	11	3	0	10	6	11	0	2	148	11	0	9	174	1	397
PM PEAK																	
3:00-3:15	0	9	9	3	0	6	12	18	0	4	267	19	0	12	251	5	615
3:15-3:30	0	8	7	6	0	8	6	12	0	7	253	19	0	10	287	16	639
3:30-3:45	0	7	16	6	0	12	5	12	0	6	270	16	0	7	266	14	637
3:45-4:00	0	7	18	2	0	8	13	18	0	12	247	16	0	12	238	12	603
TOTAL VOLUMES																	
AM PEAK	0	50	31	21	0	42	27	59	0	12	644	43	0	22	798	14	1763
PM PEAK	0	31	50	17	0	34	36	60	0	29	1037	70	0	41	1042	47	2494
% TRUCKS																	
AM PEAK	0.0%	4.0%	32.3%	9.5%	0.0%	7.1%	25.9%	10.2%	0.0%	8.3%	14.6%	11.6%	0.0%	27.3%	7.9%	14.3%	
PM PEAK	0.0%	9.7%	20.0%	11.8%	0.0%	5.9%	16.7%	20.0%	0.0%	10.3%	8.2%	5.7%	0.0%	19.5%	10.9%	0.0%	

TURNING MOVEMENT COUNTS
US 31 at SR 18

Count Date: 11/2/22

	PHF
AM PEAK	0.95
PM PEAK	0.98

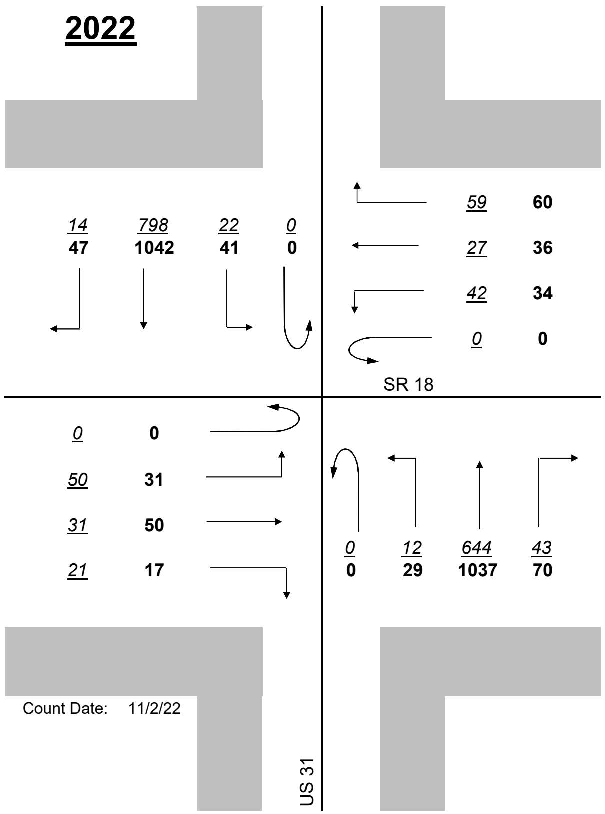


Legend:

_000_ AM Peak 7:15 AM-8:15 AM

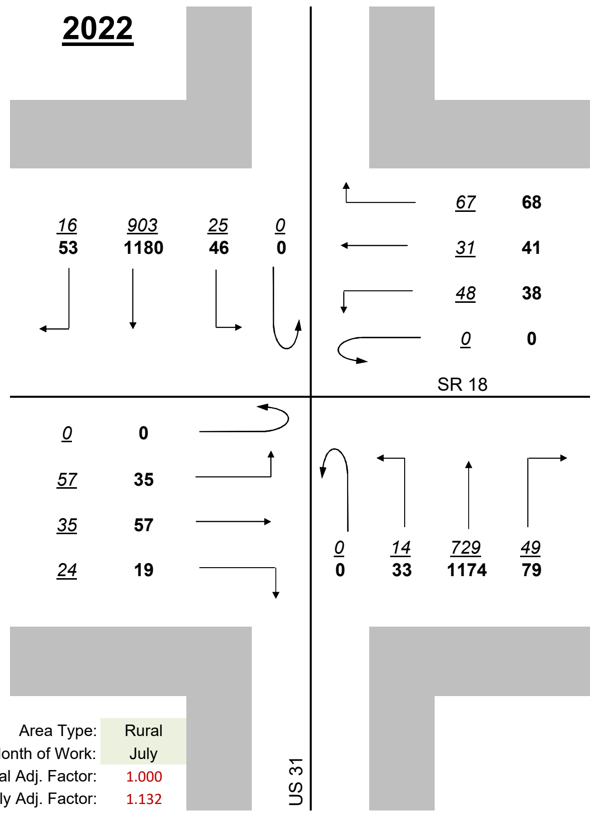
000 PM Peak 3:00 PM-4:00 PM

Raw Counts



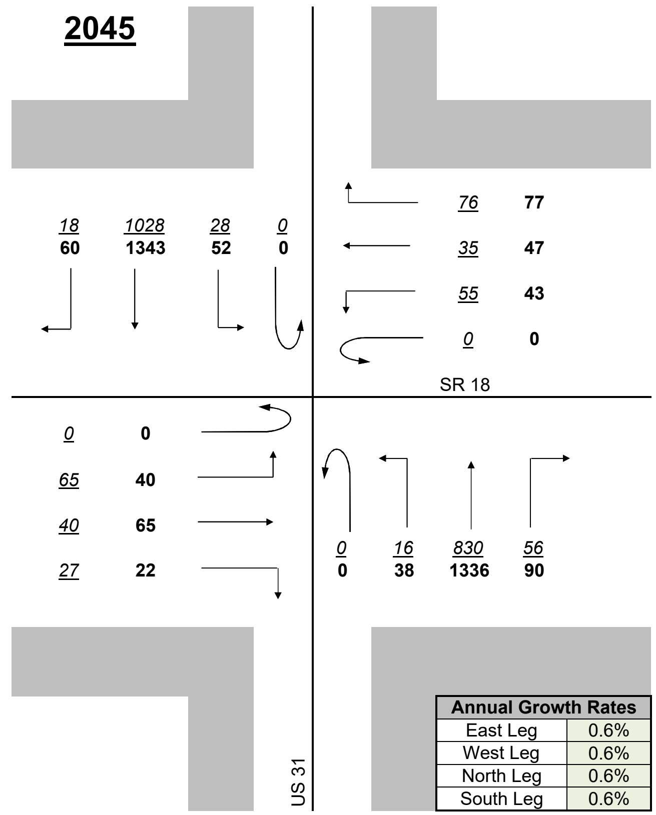
Count Date: 11/2/22

Adjusted Existing Volumes



Area Type:	Rural
Month of Work:	July
Annual Adj. Factor:	1.000
Monthly Adj. Factor:	1.132

Design Year



Annual Growth Rates	
East Leg	0.6%
West Leg	0.6%
North Leg	0.6%
South Leg	0.6%

Legend:
_000_ AM Peak
000 PM Peak

PEAK HOUR - TURNING MOVEMENT COUNTS

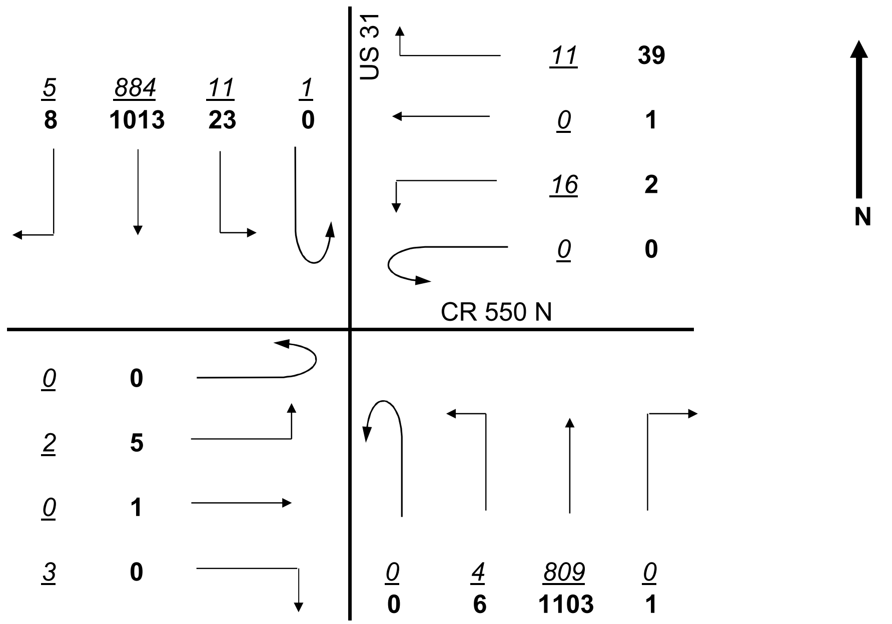
US 31 at CR 550 N | **VEHICLES (CARS & TRUCKS)**

RAW 15-MINUTE VOLUMES	EB VEHICLES CR 550 N				WB VEHICLES CR 550 N				NB VEHICLES US 31				SB VEHICLES US 31				INTERSECTION TOTAL
	UTURN	LT	THRU	RT	UTURN	LT	THRU	RT	UTURN	LT	THRU	RT	UTURN	LT	THRU	RT	VEHICLES
AM PEAK																	
7:00-7:15	0	0	0	0	0	6	0	2	0	1	166	0	0	2	201	0	378
7:15-7:30	0	1	0	2	0	3	0	3	0	3	198	0	0	2	231	0	443
7:30-7:45	0	1	0	1	0	4	0	2	0	0	219	0	0	1	223	0	451
7:45-8:00	0	0	0	0	0	3	0	4	0	0	226	0	1	6	229	5	474
PM PEAK																	
3:30-3:45	0	1	1	0	0	1	0	24	0	1	269	0	0	6	233	1	537
3:45-4:00	0	1	0	0	0	0	0	4	0	1	235	0	0	3	264	1	509
4:00-4:15	0	3	0	0	0	1	0	5	0	4	294	0	0	4	250	0	561
4:15-4:30	0	0	0	0	0	0	1	6	0	0	305	1	0	10	266	6	595
TOTAL VOLUMES																	
AM PEAK	0	2	0	3	0	16	0	11	0	4	809	0	1	11	884	5	1746
PM PEAK	0	5	1	0	0	2	1	39	0	6	1103	1	0	23	1013	8	2202
% TRUCKS																	
AM PEAK	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	11.7%	0.0%	0.0%	0.0%	8.9%	0.0%	
PM PEAK	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	6.6%	0.0%	0.0%	4.3%	10.5%	0.0%	

TURNING MOVEMENT COUNTS
US 31 at CR 550 N

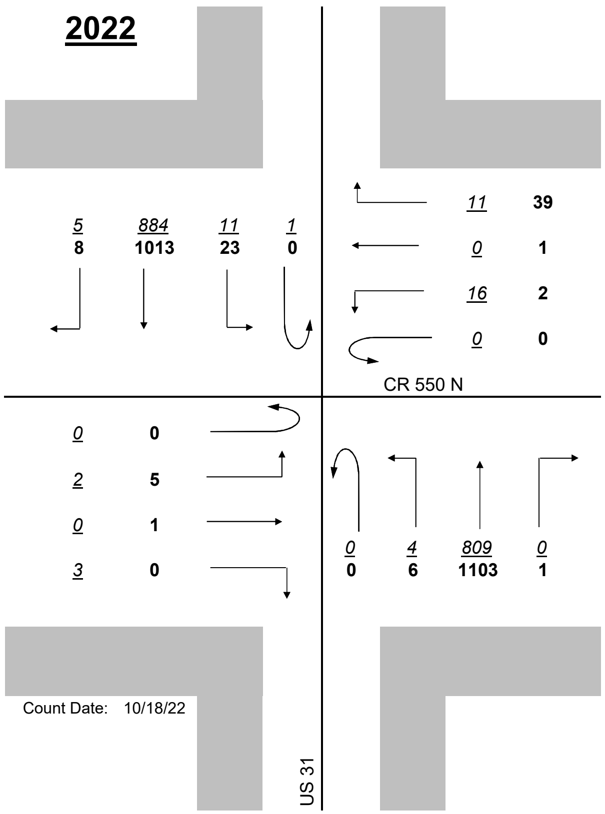
Count Date: 10/18/22

	PHF
AM PEAK	0.92
PM PEAK	0.93

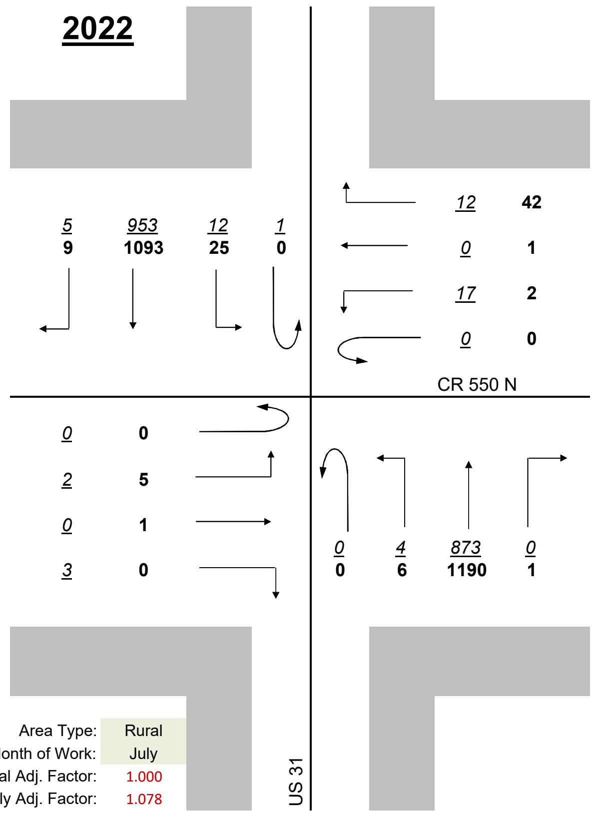


Legend:
000 AM Peak 7:00 AM-8:00 AM
000 PM Peak 3:30 PM-4:30 PM

Raw Counts

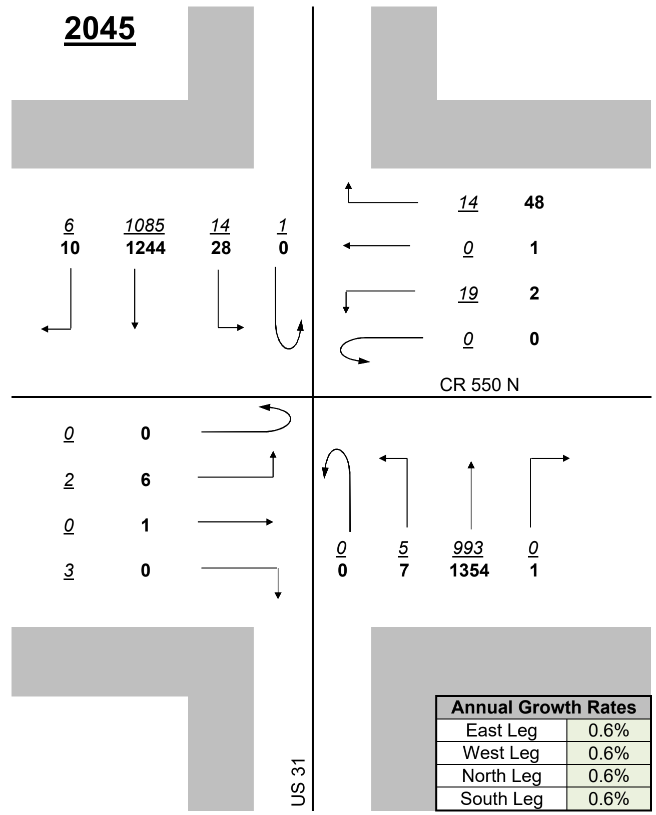


Adjusted Existing Volumes



Area Type:	Rural
Month of Work:	July
Annual Adj. Factor:	1.000
Monthly Adj. Factor:	1.078

Design Year



Annual Growth Rates	
East Leg	0.6%
West Leg	0.6%
North Leg	0.6%
South Leg	0.6%

Legend:
000 AM Peak
000 PM Peak

PEAK HOUR - TURNING MOVEMENT COUNTS

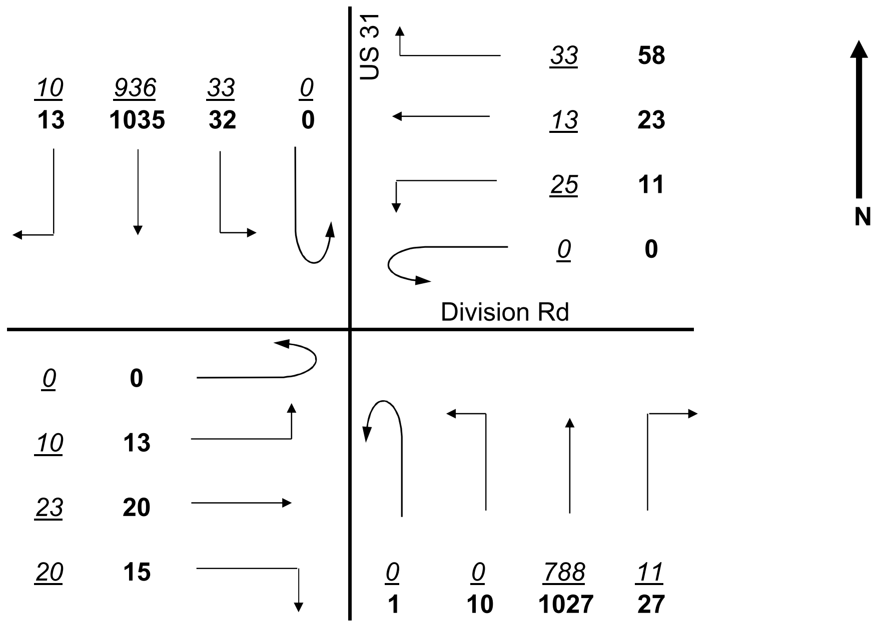
US 31 at Division Rd | **VEHICLES (CARS & TRUCKS)**

RAW 15-MINUTE VOLUMES	EB VEHICLES Division Rd				WB VEHICLES Division Rd				NB VEHICLES US 31				SB VEHICLES US 31				INTERSECTION TOTAL
	UTURN	LT	THRU	RT	UTURN	LT	THRU	RT	UTURN	LT	THRU	RT	UTURN	LT	THRU	RT	VEHICLES
AM PEAK																	
7:15-7:30	0	2	7	6	0	5	7	2	0	0	206	3	0	8	249	3	498
7:30-7:45	0	2	10	8	0	8	2	6	0	0	218	6	0	9	262	5	536
7:45-8:00	0	2	5	5	0	7	3	11	0	0	198	1	0	12	219	2	465
8:00-8:15	0	4	1	1	0	5	1	14	0	0	166	1	0	4	206	0	403
PM PEAK																	
4:00-4:15	0	2	7	4	0	2	4	9	0	2	233	6	0	7	258	5	539
4:15-4:30	0	3	1	4	0	3	5	18	0	3	266	4	0	6	277	6	596
4:30-4:45	0	6	9	3	0	0	11	17	1	2	267	5	0	9	234	0	564
4:45-5:00	0	2	3	4	0	6	3	14	0	3	261	12	0	10	266	2	586
TOTAL VOLUMES																	
AM PEAK	0	10	23	20	0	25	13	33	0	0	788	11	0	33	936	10	1902
PM PEAK	0	13	20	15	0	11	23	58	1	10	1027	27	0	32	1035	13	2285
% TRUCKS																	
AM PEAK	0.0%	0.0%	13.0%	5.0%	0.0%	16.0%	30.8%	0.0%	0.0%	0.0%	9.8%	9.1%	0.0%	0.0%	7.6%	0.0%	
PM PEAK	0.0%	0.0%	10.0%	0.0%	0.0%	9.1%	17.4%	1.7%	0.0%	0.0%	7.4%	0.0%	0.0%	3.1%	11.3%	0.0%	

TURNING MOVEMENT COUNTS
US 31 at Division Rd

Count Date: 12/13/22

	PHF
AM PEAK	0.89
PM PEAK	0.96



Legend:
000 AM Peak 7:15 AM-8:15 AM
000 PM Peak 4:00 PM-5:00 PM

Raw Counts

2022

10	*936*	*33*	*0*
13	**1035**	**32**	**0**

33	**58**
13	**23**
25	**11**
0	**0**

Division Rd

0	**0**
10	**13**
23	**20**
20	**15**

0	*0*	*788*	*11*
1	**10**	**1027**	**27**

Count Date: 12/13/22

US 31

Adjusted Existing Volumes

2022

12	*1123*	*40*	*0*
16	**1242**	**38**	**0**

40	**70**
16	**28**
30	**13**
0	**0**

Division Rd

0	**0**
12	**16**
28	**24**
24	**18**

0	*0*	*946*	*13*
1	**12**	**1233**	**32**

Area Type:	Rural
Month of Work:	July
Annual Adj. Factor:	1.000
Monthly Adj. Factor:	1.200

US 31

Design Year

2045

14	*1278*	*46*	*0*
18	**1413**	**43**	**0**

46	**80**
18	**32**
34	**15**
0	**0**

Division Rd

0	**0**
14	**18**
32	**27**
27	**20**

0	*0*	*1077*	*15*
1	**14**	**1403**	**36**

US 31

Annual Growth Rates	
East Leg	0.6%
West Leg	0.6%
North Leg	0.6%
South Leg	0.6%

Legend:
000 AM Peak
000 PM Peak

PEAK HOUR - TURNING MOVEMENT COUNTS

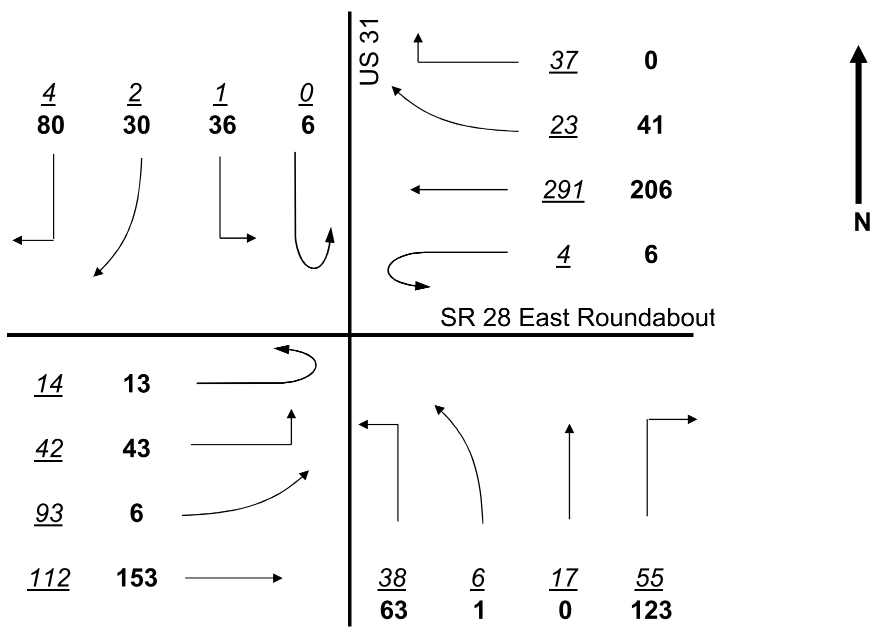
US 31 at SR 28 East Roundabout **VEHICLES (CARS & TRUCKS)**

RAW 15-MINUTE VOLUMES	EB VEHICLES SR 28 East Roundabout				WB VEHICLES SR 28 East Roundabout				NB VEHICLES US 31				SB VEHICLES US 31				INTERSECTION TOTAL VEHICLES
	UTURN	LT	THRU	RT	UTURN	LT	THRU	RT	UTURN	LT	THRU	RT	UTURN	LT	THRU	RT	
AM PEAK																	
6:30-6:45	3	11	38	18	1	66	11	17	9	4	6	10	0	0	1	0	195
6:45-7:00	5	9	46	37	1	73	1	20	14	0	9	13	0	1	0	1	230
7:00-7:15	1	12	3	30	1	78	6	0	6	2	1	16	0	0	1	1	158
7:15-7:30	5	10	6	27	1	74	5	0	9	0	1	16	0	0	0	2	156
PM PEAK																	
3:15-3:30	2	16	0	43	2	60	7	0	14	0	0	31	1	0	5	14	195
3:30-3:45	3	8	2	37	0	50	11	0	8	0	0	32	4	31	18	54	258
3:45-4:00	4	11	1	37	3	46	10	0	24	1	0	35	1	4	5	6	188
4:00-4:15	4	8	3	36	1	50	13	0	17	0	0	25	0	1	2	6	166
TOTAL VOLUMES																	
AM PEAK	14	42	93	112	4	291	23	37	38	6	17	55	0	1	2	4	739
PM PEAK	13	43	6	153	6	206	41	0	63	1	0	123	6	36	30	80	807
% TRUCKS																	
AM PEAK	14.3%	38.1%	2.2%	13.4%	0.0%	6.9%	8.7%	0.0%	15.8%	0.0%	0.0%	9.1%	0.0%	0.0%	0.0%	50.0%	
PM PEAK	23.1%	30.2%	16.7%	15.7%	0.0%	12.6%	12.2%	0.0%	9.5%	0.0%	0.0%	4.1%	0.0%	0.0%	0.0%	1.3%	

TURNING MOVEMENT COUNTS
US 31 at SR 28 East Roundabout

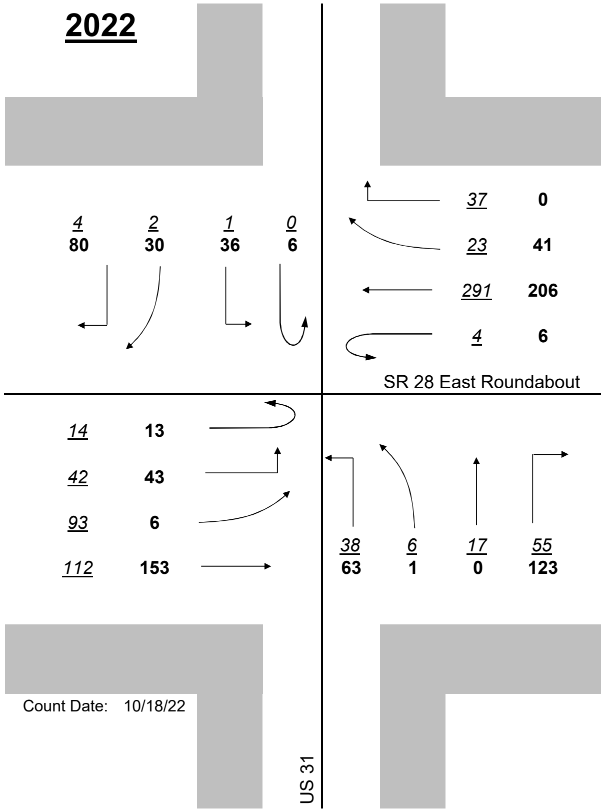
Count Date: 10/18/22

	PHF
AM PEAK	0.80
PM PEAK	0.78



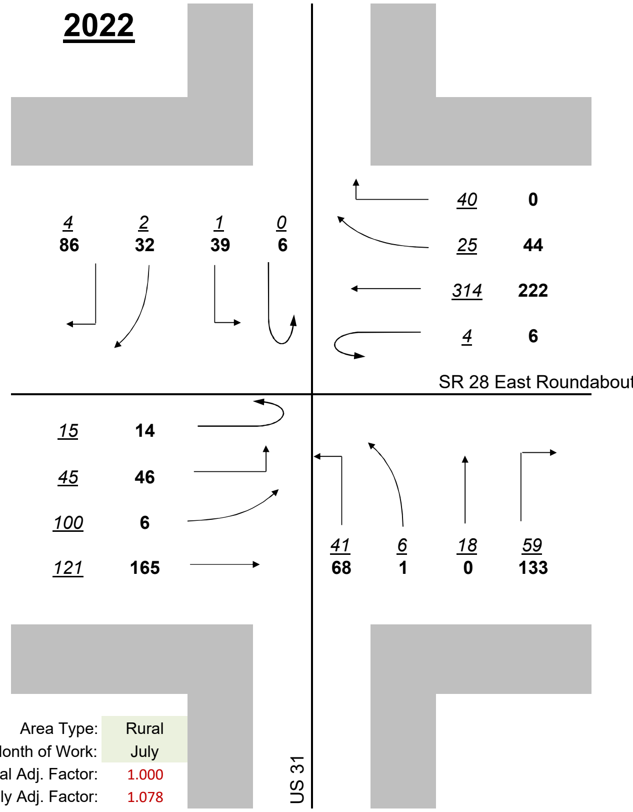
Legend:
_000_ AM Peak 6:30 AM-7:30 AM
000 PM Peak 3:15 PM-4:15 PM

Raw Counts



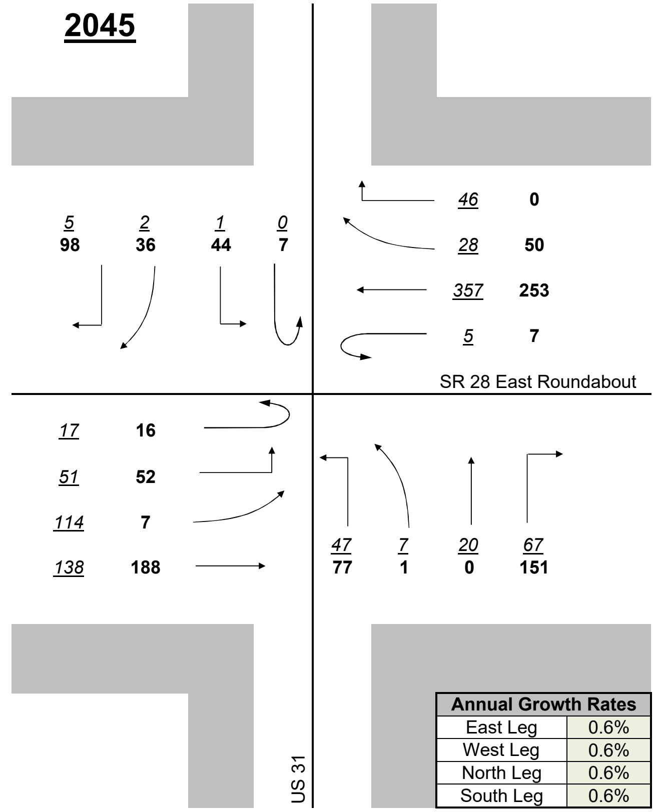
Count Date: 10/18/22

Adjusted Existing Volumes



Area Type:	Rural
Month of Work:	July
Annual Adj. Factor:	1.000
Monthly Adj. Factor:	1.078

Design Year



Annual Growth Rates	
East Leg	0.6%
West Leg	0.6%
North Leg	0.6%
South Leg	0.6%

Legend:
_000_ AM Peak
000 PM Peak

PEAK HOUR - TURNING MOVEMENT COUNTS

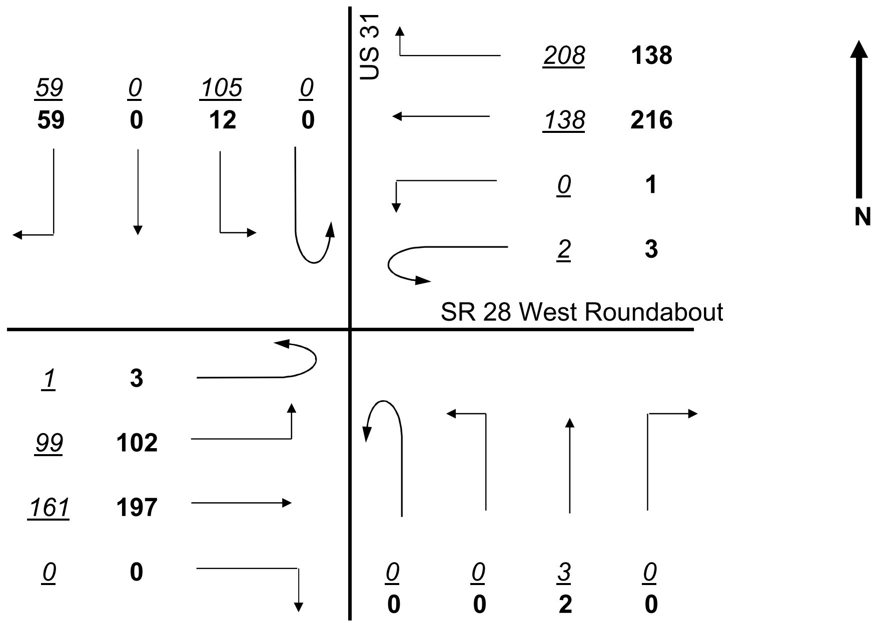
US 31 at SR 28 West Roundabout **VEHICLES (CARS & TRUCKS)**

RAW 15-MINUTE VOLUMES	EB VEHICLES SR 28 West Roundabout				WB VEHICLES SR 28 West Roundabout				NB VEHICLES US 31				SB VEHICLES US 31				INTERSECTION TOTAL
	UTURN	LT	THRU	RT	UTURN	LT	THRU	RT	UTURN	LT	THRU	RT	UTURN	LT	THRU	RT	VEHICLES
AM PEAK																	
6:30-6:45	1	21	36	0	2	0	34	40	0	0	1	0	0	38	0	19	192
6:45-7:00	0	35	56	0	0	0	44	53	0	0	1	0	0	43	0	13	245
7:00-7:15	0	21	35	0	0	0	29	59	0	0	0	0	0	11	0	11	166
7:15-7:30	0	22	34	0	0	0	31	56	0	0	1	0	0	13	0	16	173
PM PEAK																	
4:30-4:45	1	22	45	0	1	1	43	37	0	0	0	0	0	4	0	15	169
4:45-5:00	1	26	38	0	2	0	63	26	0	0	0	0	0	2	0	11	169
5:00-5:15	0	28	59	0	0	0	57	40	0	0	1	0	0	2	0	16	203
5:15-5:30	1	26	55	0	0	0	53	35	0	0	1	0	0	4	0	17	192
TOTAL VOLUMES																	
AM PEAK	1	99	161	0	2	0	138	208	0	0	3	0	0	105	0	59	776
PM PEAK	3	102	197	0	3	1	216	138	0	0	2	0	0	12	0	59	733
% TRUCKS																	
AM PEAK	0.0%	9.1%	20.5%	0.0%	0.0%	0.0%	12.3%	4.3%	0.0%	0.0%	0.0%	0.0%	0.0%	1.0%	0.0%	22.0%	
PM PEAK	0.0%	14.7%	10.2%	0.0%	0.0%	0.0%	11.6%	5.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	37.3%	

TURNING MOVEMENT COUNTS
US 31 at SR 28 West Roundabout

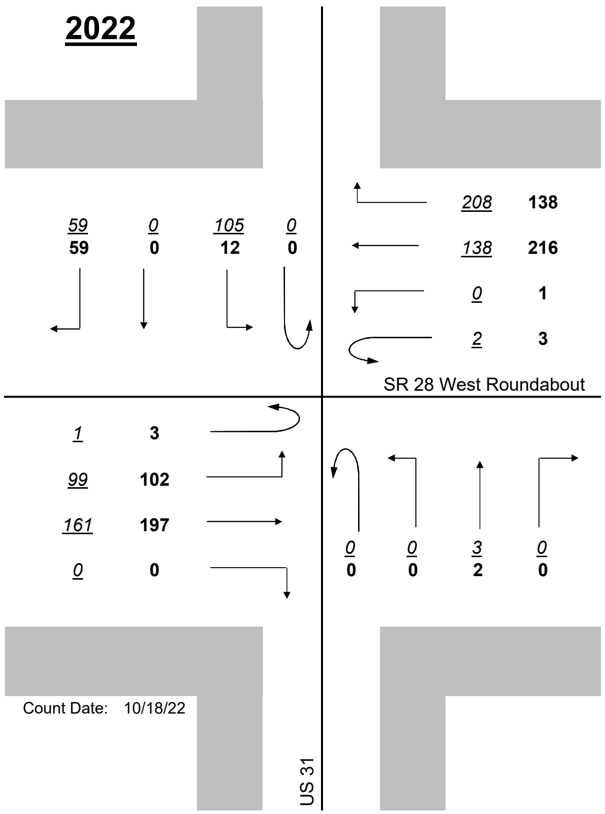
Count Date: 10/18/22

	PHF
AM PEAK	0.79
PM PEAK	0.90

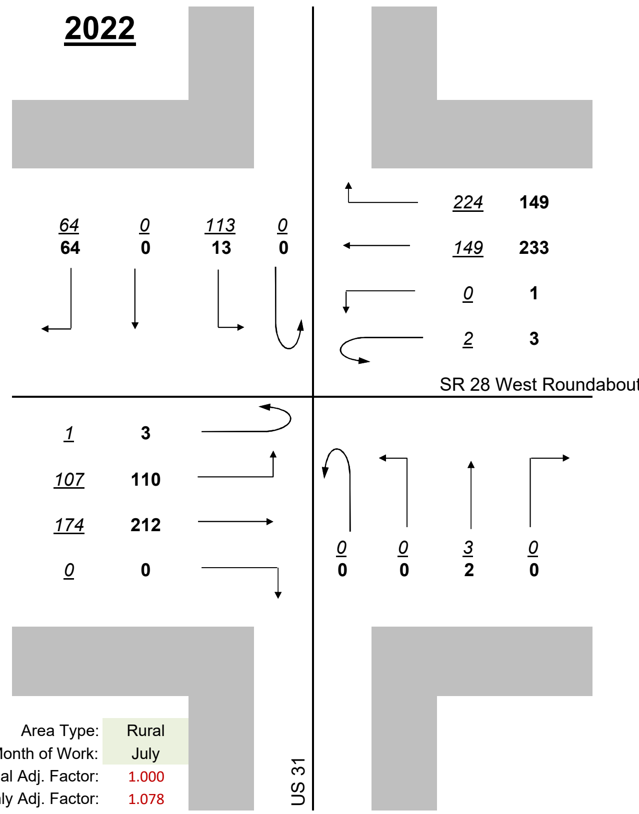


Legend:
000 AM Peak 6:30 AM-7:30 AM
000 PM Peak 4:30 PM-5:30 PM

Raw Counts

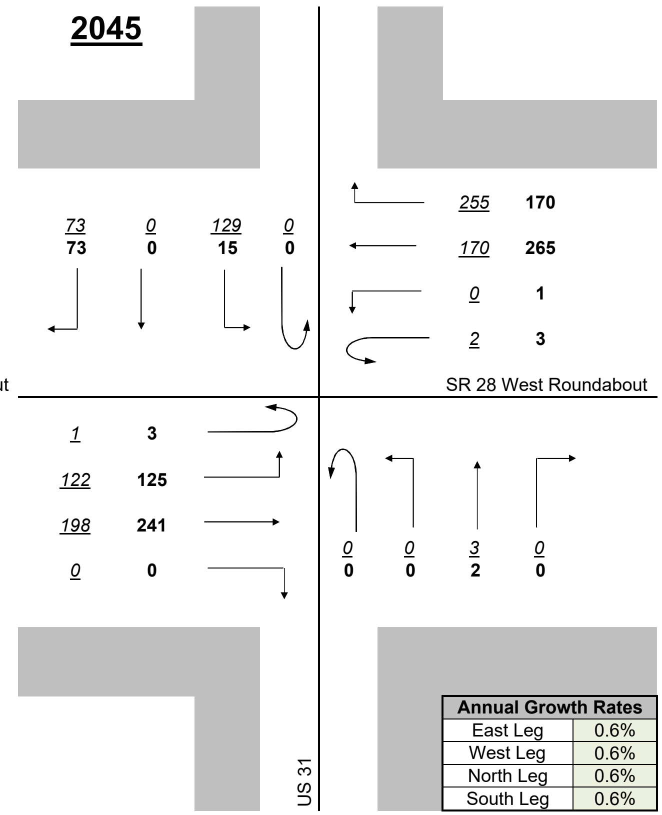


Adjusted Existing Volumes



Area Type: Rural
Month of Work: July
Annual Adj. Factor: 1.000
Monthly Adj. Factor: 1.078

Design Year



Annual Growth Rates	
East Leg	0.6%
West Leg	0.6%
North Leg	0.6%
South Leg	0.6%

Legend:
000 AM Peak
000 PM Peak

PEAK HOUR - TURNING MOVEMENT COUNTS

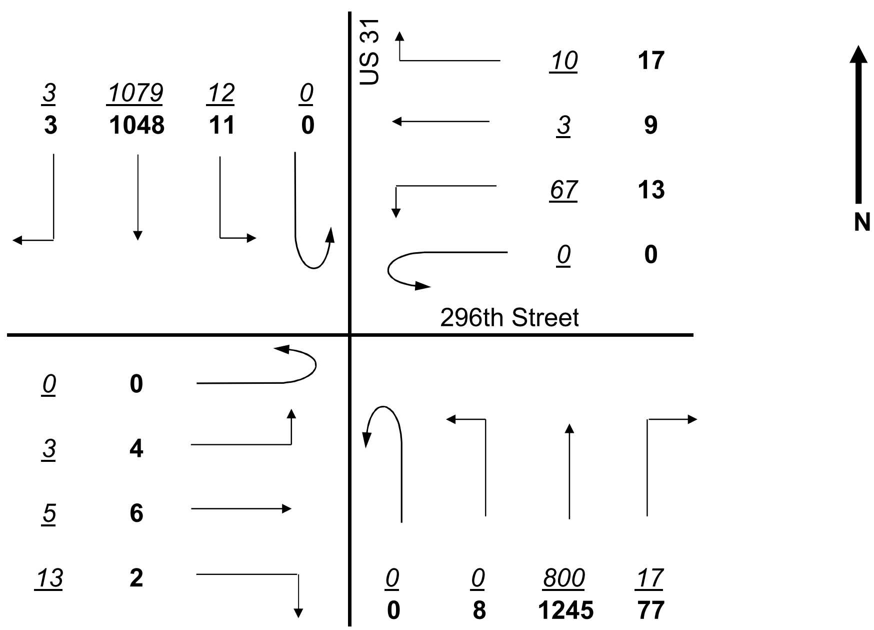
US 31 at 296th Street | **VEHICLES (CARS & TRUCKS)**

RAW 15-MINUTE VOLUMES	EB VEHICLES 296th Street				WB VEHICLES 296th Street				NB VEHICLES US 31				SB VEHICLES US 31				INTERSECTION TOTAL
	UTURN	LT	THRU	RT	UTURN	LT	THRU	RT	UTURN	LT	THRU	RT	UTURN	LT	THRU	RT	VEHICLES
AM PEAK																	
7:15-7:30	0	1	1	5	0	22	0	0	0	0	213	2	0	1	252	1	498
7:30-7:45	0	0	1	4	0	21	1	3	0	0	223	6	0	2	290	0	551
7:45-8:00	0	2	0	1	0	11	1	5	0	0	188	5	0	7	277	0	497
8:00-8:15	0	0	3	3	0	13	1	2	0	0	176	4	0	2	260	2	466
PM PEAK																	
4:45-5:00	0	0	0	0	0	0	1	2	0	0	334	22	0	3	239	0	601
5:00-5:15	0	3	1	0	0	4	2	2	0	0	319	24	0	3	260	0	618
5:15-5:30	0	0	4	0	0	5	3	9	0	6	312	19	0	0	274	2	634
5:30-5:45	0	1	1	2	0	4	3	4	0	2	280	12	0	5	275	1	590
TOTAL VOLUMES																	
AM PEAK	0	3	5	13	0	67	3	10	0	0	800	17	0	12	1079	3	2012
PM PEAK	0	4	6	2	0	13	9	17	0	8	1245	77	0	11	1048	3	2443
% TRUCKS																	
AM PEAK	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	12.8%	11.8%	0.0%	0.0%	7.1%	0.0%	
PM PEAK	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	6.7%	1.3%	0.0%	0.0%	10.4%	0.0%	

TURNING MOVEMENT COUNTS
US 31 at 296th Street

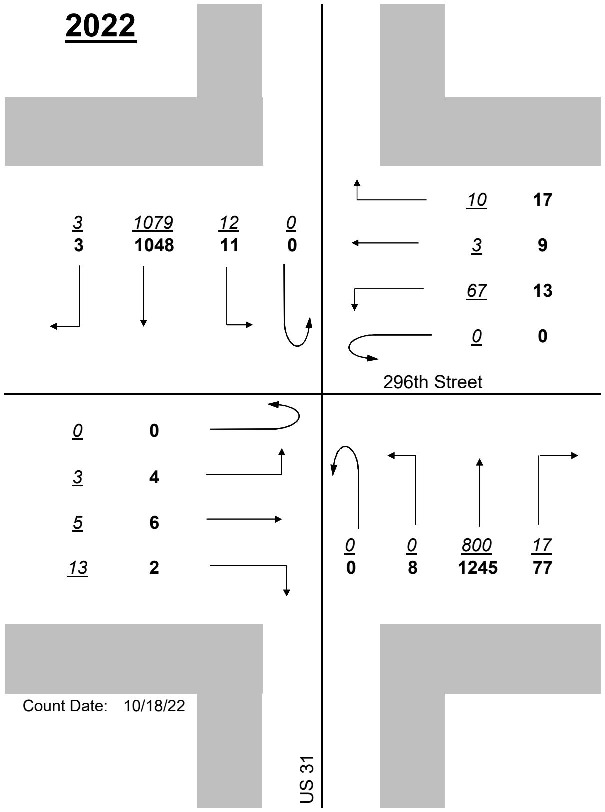
Count Date: 10/18/22

	PHF
AM PEAK	0.91
PM PEAK	0.96



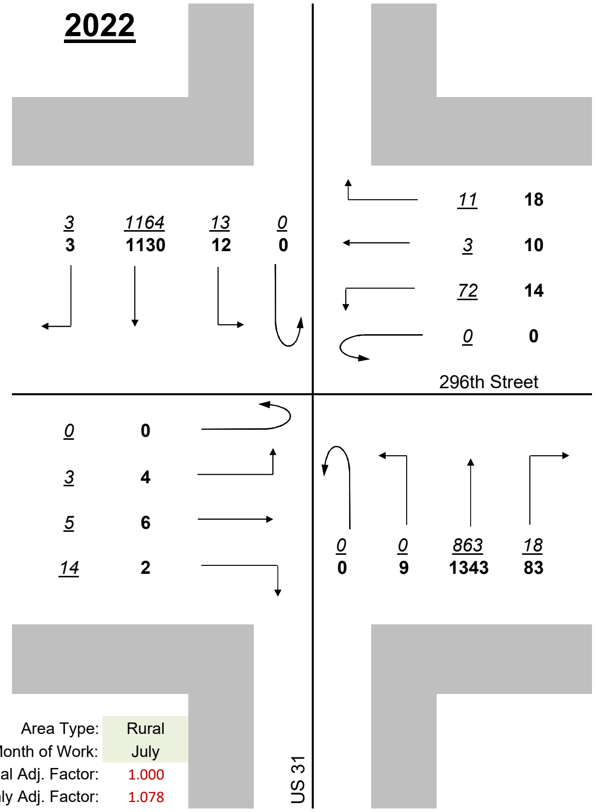
Legend:
000 AM Peak 7:15 AM-8:15 AM
000 PM Peak 4:45 PM-5:45 PM

Raw Counts



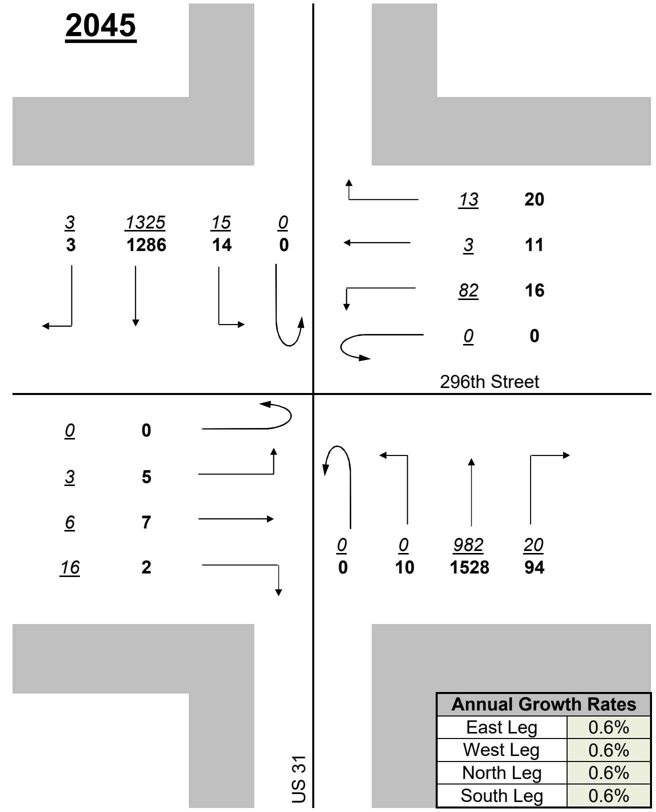
Count Date: 10/18/22

Adjusted Existing Volumes



Area Type:	Rural
Month of Work:	July
Annual Adj. Factor:	1.000
Monthly Adj. Factor:	1.078

Design Year



Annual Growth Rates	
East Leg	0.6%
West Leg	0.6%
North Leg	0.6%
South Leg	0.6%

Legend:
000 AM Peak
000 PM Peak

PEAK HOUR - TURNING MOVEMENT COUNTS

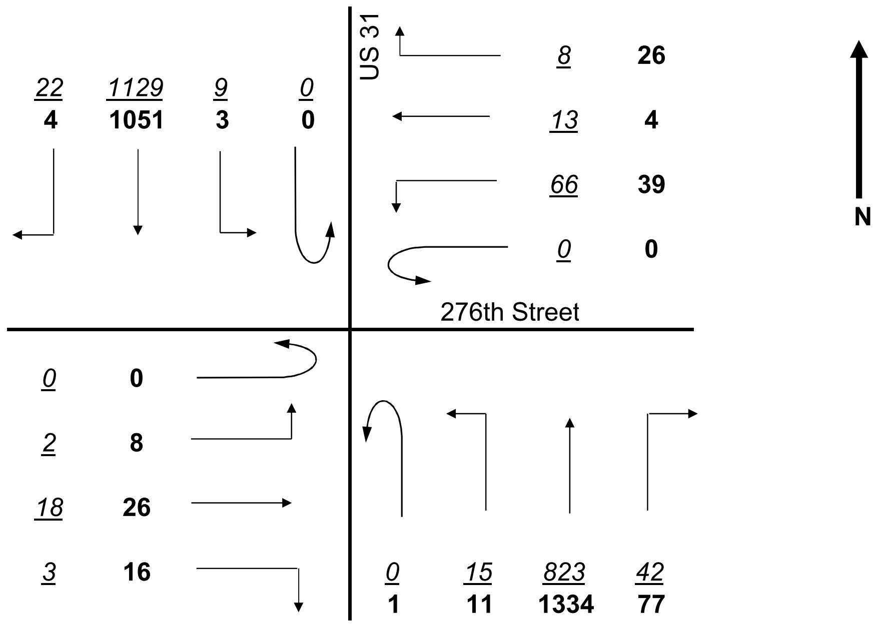
US 31 at 276th Street **VEHICLES (CARS & TRUCKS)**

RAW 15-MINUTE VOLUMES	EB VEHICLES 276th Street				WB VEHICLES 276th Street				NB VEHICLES US 31				SB VEHICLES US 31				INTERSECTION TOTAL
	UTURN	LT	THRU	RT	UTURN	LT	THRU	RT	UTURN	LT	THRU	RT	UTURN	LT	THRU	RT	VEHICLES
AM PEAK																	
7:00-7:15	0	0	6	1	0	20	4	1	0	4	194	9	0	1	241	9	490
7:15-7:30	0	0	4	1	0	10	4	3	0	7	217	13	0	3	294	7	563
7:30-7:45	0	0	4	1	0	15	3	2	0	2	228	10	0	4	291	4	564
7:45-8:00	0	2	4	0	0	21	2	2	0	2	184	10	0	1	303	2	533
PM PEAK																	
4:30-4:45	0	2	8	2	0	6	1	8	0	3	331	17	0	0	259	2	639
4:45-5:00	0	0	6	5	0	12	1	5	1	3	331	20	0	2	253	0	639
5:00-5:15	0	5	10	6	0	12	2	9	0	4	350	20	0	1	262	0	681
5:15-5:30	0	1	2	3	0	9	0	4	0	1	322	20	0	0	277	2	641
TOTAL VOLUMES																	
AM PEAK	0	2	18	3	0	66	13	8	0	15	823	42	0	9	1129	22	2150
PM PEAK	0	8	26	16	0	39	4	26	1	11	1334	77	0	3	1051	4	2600
% TRUCKS																	
AM PEAK	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	12.5%	0.0%	0.0%	11.8%	4.8%	0.0%	22.2%	6.4%	0.0%	
PM PEAK	0.0%	12.5%	7.7%	6.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	6.4%	0.0%	0.0%	0.0%	10.1%	50.0%	

TURNING MOVEMENT COUNTS
US 31 at 276th Street

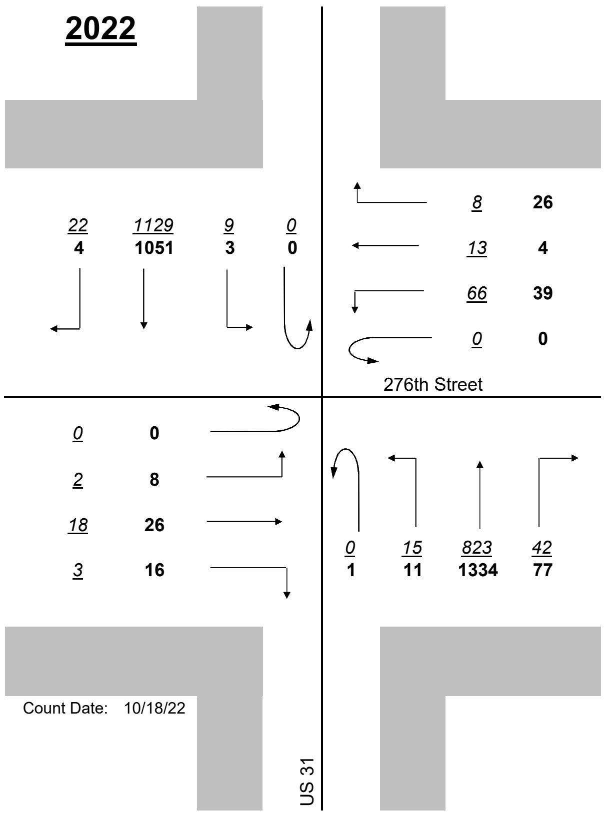
Count Date: 10/18/22

	PHF
AM PEAK	0.95
PM PEAK	0.95

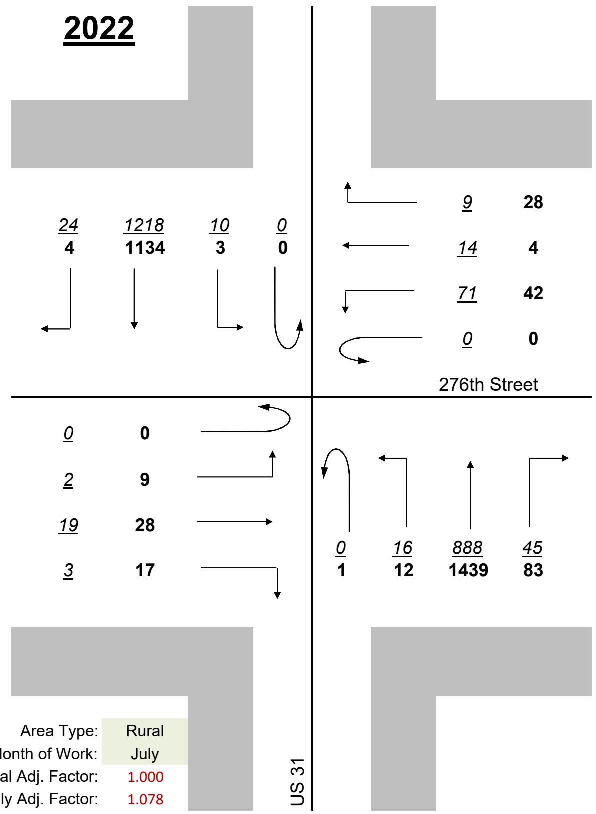


Legend:
_000_ AM Peak 7:00 AM-8:00 AM
000 PM Peak 4:30 PM-5:30 PM

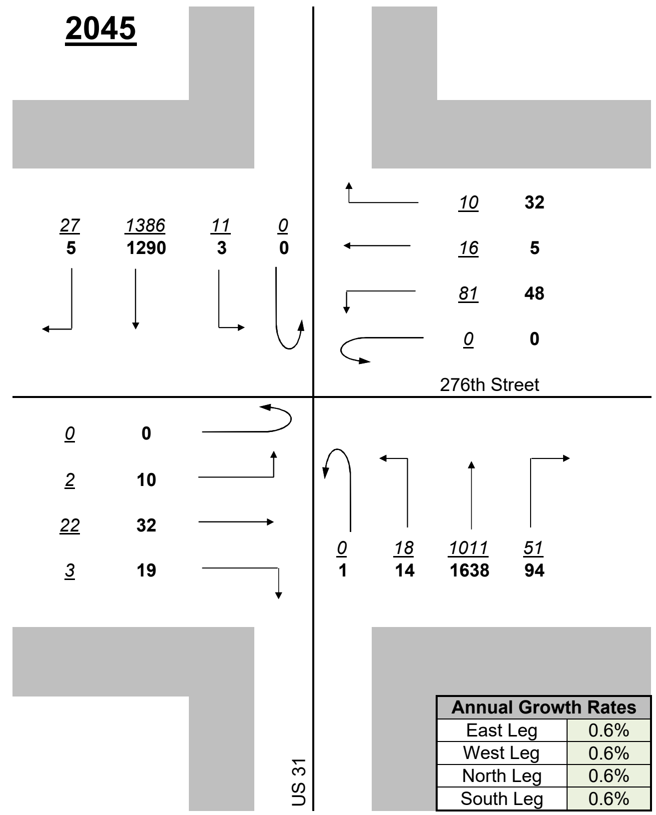
Raw Counts	Adjusted Existing Volumes	Design Year



Count Date: 10/18/22



Area Type:	Rural
Month of Work:	July
Annual Adj. Factor:	1.000
Monthly Adj. Factor:	1.078



Annual Growth Rates	
East Leg	0.6%
West Leg	0.6%
North Leg	0.6%
South Leg	0.6%

Legend:
000 AM Peak
000 PM Peak

APPENDIX D: SIGNAL TIMING PLANS

Intersection: 1052019 - US 31 & CR 100 N¬9/6/2022 3:32 PM

Timing Plans

Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Min Green	6	25	0	6	6	25	0	6	0	0	0	0	0	0	0	0
Bike Min Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cond Service Min Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Delay Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Walk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Walk2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Walk Max	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ped Clear	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ped Clear 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ped Clear Max	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ped Carry Over	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Veh Ext	3.0	6.0	3.0	5.0	3.0	6.0	3.0	5.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Veh Ext2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Max1	30	60	0	30	25	60	0	30	0	0	0	0	0	0	0	0
Max2	30	60	0	30	25	60	0	30	0	0	0	0	0	0	0	0
Max3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dynamic Max	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dynamic Max Step	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Yellow	3.6	6.0	3.2	4.5	3.6	6.0	3.2	4.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Red Clear	3.0	3.0	1.0	3.0	2.5	3.0	1.0	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Red Max	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Red Revert	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Actuations Before	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Added Initial	0.0	1.1	0.0	0.0	0.0	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Max Initial	0	39	0	0	0	39	0	0	0	0	0	0	0	0	0	0
Time Before Reduce	0	20	0	0	0	20	0	0	0	0	0	0	0	0	0	0
Cars Before Reduce	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Reduce By	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce	0	28	0	0	0	28	0	0	0	0	0	0	0	0	0	0
Min Gap	0.0	3.2	0.0	0.0	0.0	3.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection: 1052018 - US 31 & Business 31¬9/6/2022 3:33 PM

Timing Plans

Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Min Green	0	25	0	10	0	25	0	0	0	0	0	0	0	0	0	0
Bike Min Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cond Service Min Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Delay Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Walk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Walk2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Walk Max	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ped Clear	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ped Clear 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ped Clear Max	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ped Carry Over	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Veh Ext	0.0	5.5	0.0	3.0	0.0	5.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Veh Ext2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Max1	0	65	0	40	0	65	0	0	0	0	0	0	0	0	0	0
Max2	0	65	0	40	0	65	0	0	0	0	0	0	0	0	0	0
Max3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dynamic Max	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dynamic Max Step	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Yellow	0.0	6.0	0.0	4.5	0.0	6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Red Clear	0.0	2.0	0.0	2.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Red Max	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Red Revert	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Actuations Before	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Added Initial	0.0	2.1	0.0	0.0	0.0	2.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Max Initial	0	30	0	0	0	30	0	0	0	0	0	0	0	0	0	0
Time Before Reduce	0	15	0	0	0	15	0	0	0	0	0	0	0	0	0	0
Cars Before Reduce	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Reduce By	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce	0	21	0	0	0	21	0	0	0	0	0	0	0	0	0	0
Min Gap	0.0	3.0	0.0	0.0	0.0	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection: 1052016 - US 31 & SR 218 N Jct¬9/6/2022 3:36 PM

Timing Plans

Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Min Green	10	25	0	15	0	35	0	0	0	0	0	0	0	0	0	0
Bike Min Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cond Service Min Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Delay Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Walk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Walk2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Walk Max	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ped Clear	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ped Clear 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ped Clear Max	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ped Carry Over	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Veh Ext	3.5	5.5	3.0	5.5	3.5	5.5	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Veh Ext2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Max1	35	65	0	45	0	65	0	0	0	0	0	0	0	0	0	0
Max2	35	65	0	45	0	65	0	0	0	0	0	0	0	0	0	0
Max3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dynamic Max	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dynamic Max Step	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Yellow	3.6	6.0	3.2	4.5	3.6	6.0	3.2	4.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Red Clear	3.0	3.0	1.0	3.0	3.0	3.0	1.0	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Red Max	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Red Revert	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Actuations Before	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Added Initial	0.0	2.5	0.0	2.1	0.0	2.1	0.0	2.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Max Initial	0	35	0	34	0	35	0	34	0	0	0	0	0	0	0	0
Time Before Reduce	0	25	0	20	0	25	0	20	0	0	0	0	0	0	0	0
Cars Before Reduce	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Reduce By	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce	0	20	0	20	0	20	0	20	0	0	0	0	0	0	0	0
Min Gap	0.0	3.0	0.0	3.0	0.0	3.0	0.0	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection: 1052017 - US 31 & SR 18¬9/6/2022 3:37 PM

Timing Plans

Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Min Green	8	25	0	10	10	25	0	10	0	0	0	0	0	0	0	0
Bike Min Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cond Service Min Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Delay Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Walk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Walk2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Walk Max	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ped Clear	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ped Clear 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ped Clear Max	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ped Carry Over	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Veh Ext	3.5	6.0	3.0	3.0	3.5	6.0	6.5	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Veh Ext2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Max1	25	65	0	15	25	65	0	15	0	0	0	0	0	0	0	0
Max2	25	65	0	40	25	65	0	40	0	0	0	0	0	0	0	0
Max3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dynamic Max	0	125	0	40	0	105	0	40	0	0	0	0	0	0	0	0
Dynamic Max Step	0.0	15.0	0.0	5.0	0.0	15.0	0.0	5.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Yellow	3.6	6.0	3.2	4.5	3.6	6.0	3.2	4.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Red Clear	2.0	3.0	1.0	3.0	3.0	3.0	1.0	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Red Max	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Red Revert	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Actuations Before	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Added Initial	0.0	2.1	0.0	2.1	0.0	2.1	0.0	2.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Max Initial	0	28	0	34	0	28	0	34	0	0	0	0	0	0	0	0
Time Before Reduce	0	25	0	20	0	25	0	20	0	0	0	0	0	0	0	0
Cars Before Reduce	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Reduce By	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce	0	20	0	20	0	20	0	20	0	0	0	0	0	0	0	0
Min Gap	0.0	5.5	0.0	3.0	0.0	5.5	0.0	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection: 1080008 - US 31 & Division Rd¬9/6/2022 3:59 PM

Timing Plans

Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Min Green	4	70	0	8	4	70	0	8	0	0	0	0	0	0	0	0
Bike Min Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cond Service Min Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Delay Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Walk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Walk2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Walk Max	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ped Clear	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ped Clear 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ped Clear Max	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ped Carry Over	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Veh Ext	2.0	6.0	2.0	3.0	2.0	6.0	2.0	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Veh Ext2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Max1	0	55	0	20	0	55	0	20	50	0	0	0	0	0	0	0
Max2	0	55	0	20	0	55	0	20	0	0	0	0	0	0	0	0
Max3	0	0	0	20	0	0	0	20	0	0	0	0	0	0	0	0
Dynamic Max	0	55	0	30	0	55	0	30	0	0	0	0	0	0	0	0
Dynamic Max Step	0.0	15.0	0.0	10.0	0.0	15.0	0.0	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Yellow	5.1	5.1	4.0	4.2	5.1	5.1	4.0	4.2	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Red Clear	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Red Max	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Red Revert	2.0	9.0	2.0	9.0	2.0	9.0	2.0	9.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Actuations Before	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Added Initial	0.0	1.8	0.0	0.0	0.0	1.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Max Initial	0	40	0	0	0	40	0	0	0	0	0	0	0	0	0	0
Time Before Reduce	0	20	0	0	0	20	0	0	0	0	0	0	0	0	0	0
Cars Before Reduce	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Reduce By	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce	0	23	0	0	0	23	0	0	0	0	0	0	0	0	0	0
Min Gap	0.0	6.0	0.0	0.0	0.0	6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

APPENDIX E: EXISTING (2022) TRAFFIC ANALYSIS

Intersection	
Int Delay, s/veh	1.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	19	3	71	14	9	16	888	45	10	1218	24
Future Vol, veh/h	2	19	3	71	14	9	16	888	45	10	1218	24
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	350	-	-	330	-	-
Veh in Median Storage, #	-	2	-	-	2	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	12	0	12	5	22	6	0
Mvmt Flow	2	20	3	75	15	9	17	935	47	11	1282	25

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1826	2333	654	1666	2322	491	1307	0	0	982	0	0
Stage 1	1317	1317	-	993	993	-	-	-	-	-	-	-
Stage 2	509	1016	-	673	1329	-	-	-	-	-	-	-
Critical Hdwy	7.5	6.5	6.9	7.5	6.5	7.14	4.1	-	-	4.54	-	-
Critical Hdwy Stg 1	6.5	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.5	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.42	2.2	-	-	2.42	-	-
Pot Cap-1 Maneuver	49	37	414	~ 65	38	497	536	-	-	589	-	-
Stage 1	169	229	-	267	326	-	-	-	-	-	-	-
Stage 2	520	318	-	416	226	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	43	35	414	~ 57	36	497	536	-	-	589	-	-
Mov Cap-2 Maneuver	149	171	-	204	165	-	-	-	-	-	-	-
Stage 1	164	225	-	258	316	-	-	-	-	-	-	-
Stage 2	471	308	-	369	222	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	27.9	37.1	0.2	0.1
HCM LOS	D	E		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	536	-	-	182	208	589	-	-
HCM Lane V/C Ratio	0.031	-	-	0.139	0.476	0.018	-	-
HCM Control Delay (s)	11.9	-	-	27.9	37.1	11.2	-	-
HCM Lane LOS	B	-	-	D	E	B	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.5	2.3	0.1	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	1.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	3	5	14	72	3	11	0	863	18	13	1164	3
Future Vol, veh/h	3	5	14	72	3	11	0	863	18	13	1164	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	400	-	-	325	-	-
Veh in Median Storage, #	-	2	-	-	2	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	0	0	0	0	0	0	0	13	12	0	7	0
Mvmt Flow	3	5	15	79	3	12	0	948	20	14	1279	3

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1785	2277	641	1628	2268	484	1282	0	0	968	0	0
Stage 1	1309	1309	-	958	958	-	-	-	-	-	-	-
Stage 2	476	968	-	670	1310	-	-	-	-	-	-	-
Critical Hdwy	7.5	6.5	6.9	7.5	6.5	6.9	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.5	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.5	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	53	41	422	~ 69	41	534	548	-	-	720	-	-
Stage 1	171	231	-	280	338	-	-	-	-	-	-	-
Stage 2	544	335	-	417	231	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	50	40	422	~ 64	40	534	548	-	-	720	-	-
Mov Cap-2 Maneuver	156	178	-	222	181	-	-	-	-	-	-	-
Stage 1	171	227	-	280	338	-	-	-	-	-	-	-
Stage 2	526	335	-	384	227	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	19.5	29.7	0	0.1
HCM LOS	C	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	548	-	-	273	238	720	-	-
HCM Lane V/C Ratio	-	-	-	0.089	0.397	0.02	-	-
HCM Control Delay (s)	0	-	-	19.5	29.7	10.1	-	-
HCM Lane LOS	A	-	-	C	D	B	-	-
HCM 95th %tile Q(veh)	0	-	-	0.3	1.8	0.1	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	12	28	24	30	16	40	0	946	13	40	1123	12
Future Volume (veh/h)	12	28	24	30	16	40	0	946	13	40	1123	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1707	1826	1663	1441	1900	1900	1752	1767	1900	1781	1900
Adj Flow Rate, veh/h	13	31	27	34	18	45	0	1063	15	45	1262	13
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	0	13	5	16	31	0	0	10	9	0	8	0
Cap, veh/h	62	79	58	84	32	56	77	2500	1125	415	2578	27
Arrive On Green	0.10	0.10	0.10	0.10	0.10	0.10	0.00	0.75	0.75	0.75	0.75	0.75
Sat Flow, veh/h	171	826	611	337	340	587	441	3328	1497	532	3432	35
Grp Volume(v), veh/h	71	0	0	97	0	0	0	1063	15	45	622	653
Grp Sat Flow(s),veh/h/ln	1607	0	0	1264	0	0	441	1664	1497	532	1692	1775
Q Serve(g_s), s	0.0	0.0	0.0	2.9	0.0	0.0	0.0	10.9	0.2	3.1	13.5	13.5
Cycle Q Clear(g_c), s	3.9	0.0	0.0	6.9	0.0	0.0	0.0	10.9	0.2	14.0	13.5	13.5
Prop In Lane	0.18		0.38	0.35		0.46	1.00		1.00	1.00		0.02
Lane Grp Cap(c), veh/h	199	0	0	173	0	0	77	2500	1125	415	1271	1333
V/C Ratio(X)	0.36	0.00	0.00	0.56	0.00	0.00	0.00	0.43	0.01	0.11	0.49	0.49
Avail Cap(c_a), veh/h	270	0	0	229	0	0	112	2765	1244	457	1406	1474
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	39.9	0.0	0.0	41.1	0.0	0.0	0.0	4.2	2.9	6.8	4.6	4.6
Incr Delay (d2), s/veh	1.1	0.0	0.0	2.8	0.0	0.0	0.0	0.4	0.0	0.4	1.1	1.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.6	0.0	0.0	2.3	0.0	0.0	0.0	2.0	0.0	0.3	2.8	2.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	41.0	0.0	0.0	44.0	0.0	0.0	0.0	4.7	2.9	7.2	5.6	5.6
LnGrp LOS	D	A	A	D	A	A	A	A	A	A	A	A
Approach Vol, veh/h		71			97			1078			1320	
Approach Delay, s/veh		41.0			44.0			4.6			5.7	
Approach LOS		D			D			A			A	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		77.6		15.6		77.6		15.6				
Change Period (Y+Rc), s		7.6		6.7		7.6		6.7				
Max Green Setting (Gmax), s		77.4		13.3		77.4		13.3				
Max Q Clear Time (g_c+I1), s		12.9		5.9		16.0		8.9				
Green Ext Time (p_c), s		26.3		0.1		34.1		0.1				

Intersection Summary			
HCM 6th Ctrl Delay			7.7
HCM 6th LOS			A

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	0	3	17	0	12	4	873	0	12	953	5
Future Vol, veh/h	2	0	3	17	0	12	4	873	0	12	953	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	350	-	-	400	-	-
Veh in Median Storage, #	-	2	-	-	2	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0	0	12	0	0	9	0
Mvmt Flow	2	0	3	18	0	13	4	949	0	13	1036	5

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1548	2022	521	1501	2024	475	1041	0	0	949	0	0
Stage 1	1065	1065	-	957	957	-	-	-	-	-	-	-
Stage 2	483	957	-	544	1067	-	-	-	-	-	-	-
Critical Hdwy	7.5	6.5	6.9	7.5	6.5	6.9	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.5	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.5	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	79	59	505	86	59	541	676	-	-	732	-	-
Stage 1	241	302	-	281	339	-	-	-	-	-	-	-
Stage 2	539	339	-	496	301	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	76	58	505	84	58	541	676	-	-	732	-	-
Mov Cap-2 Maneuver	213	214	-	239	216	-	-	-	-	-	-	-
Stage 1	240	297	-	279	337	-	-	-	-	-	-	-
Stage 2	523	337	-	484	296	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	16.2	17.9	0	0.1
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	676	-	-	326	311	732	-	-
HCM Lane V/C Ratio	0.006	-	-	0.017	0.101	0.018	-	-
HCM Control Delay (s)	10.4	-	-	16.2	17.9	10	-	-
HCM Lane LOS	B	-	-	C	C	B	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.3	0.1	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	57	35	24	48	31	67	14	729	49	25	903	16
Future Volume (veh/h)	57	35	24	48	31	67	14	729	49	25	903	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1841	1426	1752	1796	1515	1752	1781	1678	1722	1500	1781	1693
Adj Flow Rate, veh/h	60	37	25	51	33	71	15	767	52	26	951	17
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	4	32	10	7	26	10	8	15	12	27	8	14
Cap, veh/h	138	68	32	189	95	236	62	1454	666	66	1525	646
Arrive On Green	0.16	0.16	0.16	0.16	0.16	0.16	0.04	0.46	0.46	0.05	0.45	0.45
Sat Flow, veh/h	352	428	201	631	595	1485	1697	3188	1459	1428	3385	1434
Grp Volume(v), veh/h	122	0	0	84	0	71	15	767	52	26	951	17
Grp Sat Flow(s),veh/h/ln	981	0	0	1226	0	1485	1697	1594	1459	1428	1692	1434
Q Serve(g_s), s	4.4	0.0	0.0	0.0	0.0	2.8	0.6	11.3	1.3	1.2	14.0	0.4
Cycle Q Clear(g_c), s	8.2	0.0	0.0	3.8	0.0	2.8	0.6	11.3	1.3	1.2	14.0	0.4
Prop In Lane	0.49		0.20	0.61		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	238	0	0	284	0	236	62	1454	666	66	1525	646
V/C Ratio(X)	0.51	0.00	0.00	0.30	0.00	0.30	0.24	0.53	0.08	0.40	0.62	0.03
Avail Cap(c_a), veh/h	362	0	0	417	0	398	270	2050	939	184	2021	856
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.6	0.0	0.0	24.6	0.0	24.2	30.6	12.7	10.0	30.3	13.7	10.0
Incr Delay (d2), s/veh	1.7	0.0	0.0	0.6	0.0	0.7	2.4	1.1	0.2	4.6	1.5	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.8	0.0	0.0	1.1	0.0	0.9	0.2	3.2	0.3	0.4	4.3	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	28.3	0.0	0.0	25.2	0.0	24.9	33.0	13.8	10.2	34.9	15.2	10.0
LnGrp LOS	C	A	A	C	A	C	C	B	B	C	B	B
Approach Vol, veh/h		122			155			834			994	
Approach Delay, s/veh		28.3			25.1			13.9			15.7	
Approach LOS		C			C			B			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	8.6	38.8		17.9	9.0	38.4		17.9
Change Period (Y+Rc), s	5.6	9.0		7.5	6.6	9.0		7.5
Max Green Setting (Gmax), s	3.4	42.0		17.5	10.4	39.0		17.5
Max Q Clear Time (g_c+I1), s	3.2	13.3		10.2	2.6	16.0		5.8
Green Ext Time (p_c), s	0.0	12.7		0.3	0.0	13.4		0.4

Intersection Summary		
HCM 6th Ctrl Delay		16.4
HCM 6th LOS		B

Intersection	
Int Delay, s/veh	1.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	8	0	8	38	0	59	14	723	50	100	969	19
Future Vol, veh/h	8	0	8	38	0	59	14	723	50	100	969	19
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	300	-	-	-	600	-	325	625	-	640
Veh in Median Storage, #	-	2	-	-	2	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	29	0	14	0	0	12	0	16	5	9	11	12
Mvmt Flow	9	0	9	42	0	66	16	803	56	111	1077	21

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1733	2190	539	1596	2155	402	1098	0	0	859	0	0
Stage 1	1299	1299	-	835	835	-	-	-	-	-	-	-
Stage 2	434	891	-	761	1320	-	-	-	-	-	-	-
Critical Hdwy	8.08	6.5	7.18	7.5	6.5	7.14	4.1	-	-	4.28	-	-
Critical Hdwy Stg 1	7.08	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	7.08	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.79	4	3.44	3.5	4	3.42	2.2	-	-	2.29	-	-
Pot Cap-1 Maneuver	42	46	457	73	48	571	643	-	-	735	-	-
Stage 1	135	234	-	333	386	-	-	-	-	-	-	-
Stage 2	504	363	-	368	228	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	32	38	457	62	40	571	643	-	-	735	-	-
Mov Cap-2 Maneuver	118	150	-	213	155	-	-	-	-	-	-	-
Stage 1	132	199	-	325	376	-	-	-	-	-	-	-
Stage 2	435	354	-	306	194	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	25.5	20.2	0.2	1
HCM LOS	D	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	643	-	-	118	457	344	735	-	-
HCM Lane V/C Ratio	0.024	-	-	0.075	0.019	0.313	0.151	-	-
HCM Control Delay (s)	10.7	-	-	38	13	20.2	10.8	-	-
HCM Lane LOS	B	-	-	E	B	C	B	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.2	0.1	1.3	0.5	-	-

Intersection	
Int Delay, s/veh	0.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	36	56	645	19	53	931
Future Vol, veh/h	36	56	645	19	53	931
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Free	-	None	-	None
Storage Length	0	100	-	275	300	-
Veh in Median Storage, #	2	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	97	97	97	97	97	97
Heavy Vehicles, %	0	0	13	0	2	10
Mvmt Flow	37	58	665	20	55	960

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1255	-	0	0	685	0
Stage 1	665	-	-	-	-	-
Stage 2	590	-	-	-	-	-
Critical Hdwy	6.8	-	-	-	4.14	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	-	-	-	2.22	-
Pot Cap-1 Maneuver	166	0	-	-	904	-
Stage 1	478	0	-	-	-	-
Stage 2	522	0	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	156	-	-	-	904	-
Mov Cap-2 Maneuver	356	-	-	-	-	-
Stage 1	478	-	-	-	-	-
Stage 2	490	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	16.3	0	0.5
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	356	-	904	-
HCM Lane V/C Ratio	-	-	0.104	-	0.06	-
HCM Control Delay (s)	-	-	16.3	0	9.2	-
HCM Lane LOS	-	-	C	A	A	-
HCM 95th %tile Q(veh)	-	-	0.3	-	0.2	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	93	0	77	0	0	0	22	731	0	0	943	69
Future Volume (veh/h)	93	0	77	0	0	0	22	731	0	0	943	69
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1811	1900	1752	1900	1900	1900	1826	1663	1900	1900	1752	1856
Adj Flow Rate, veh/h	100	0	83	0	0	0	24	786	0	0	1014	74
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	6	0	10	0	0	0	5	16	0	0	10	3
Cap, veh/h	188	13	116	0	317	0	193	2054	1047	80	1550	732
Arrive On Green	0.17	0.00	0.17	0.00	0.00	0.00	0.11	0.65	0.00	0.00	0.47	0.47
Sat Flow, veh/h	758	80	695	0	1900	0	1739	3159	1610	700	3328	1572
Grp Volume(v), veh/h	183	0	0	0	0	0	24	786	0	0	1014	74
Grp Sat Flow(s),veh/h/ln	1533	0	0	0	1900	0	1739	1580	1610	700	1664	1572
Q Serve(g_s), s	8.8	0.0	0.0	0.0	0.0	0.0	1.1	10.4	0.0	0.0	21.1	2.4
Cycle Q Clear(g_c), s	10.1	0.0	0.0	0.0	0.0	0.0	1.1	10.4	0.0	0.0	21.1	2.4
Prop In Lane	0.55		0.45	0.00		0.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	317	0	0	0	317	0	193	2054	1047	80	1550	732
V/C Ratio(X)	0.58	0.00	0.00	0.00	0.00	0.00	0.12	0.38	0.00	0.00	0.65	0.10
Avail Cap(c_a), veh/h	332	0	0	0	336	0	201	2054	1047	80	1550	732
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	35.4	0.0	0.0	0.0	0.0	0.0	36.1	7.3	0.0	0.0	18.5	13.5
Incr Delay (d2), s/veh	4.8	0.0	0.0	0.0	0.0	0.0	0.3	0.5	0.0	0.0	2.2	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.0	0.0	0.0	0.0	0.0	0.0	0.5	2.6	0.0	0.0	7.3	0.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	40.2	0.0	0.0	0.0	0.0	0.0	36.4	7.9	0.0	0.0	20.7	13.8
LnGrp LOS	D	A	A	A	A	A	D	A	A	A	C	B
Approach Vol, veh/h		183			0			810			1088	
Approach Delay, s/veh		40.2			0.0			8.7			20.2	
Approach LOS		D						A			C	

Timer - Assigned Phs		2		4	5	6		8				
Phs Duration (G+Y+Rc), s		67.5		22.5	16.6	50.9		22.5				
Change Period (Y+Rc), s		9.0		7.5	6.6	9.0		7.5				
Max Green Setting (Gmax), s		57.6		15.9	10.4	40.6		15.9				
Max Q Clear Time (g_c+I1), s		12.4		12.1	3.1	23.1		0.0				
Green Ext Time (p_c), s		13.3		0.5	0.0	11.2		0.0				

Intersection Summary		
HCM 6th Ctrl Delay		17.5
HCM 6th LOS		B

Intersection	
Int Delay, s/veh	1.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	9	8	16	52	10	11	9	788	24	18	932	14
Future Vol, veh/h	9	8	16	52	10	11	9	788	24	18	932	14
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	350	100	-	350
Veh in Median Storage, #	-	2	-	-	2	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	97	97	97	97	97	97	97	97	97	97	97	97
Heavy Vehicles, %	0	0	7	2	0	20	25	15	0	6	10	0
Mvmt Flow	9	8	16	54	10	11	9	812	25	19	961	14

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1428	1854	481	1353	1843	406	975	0	0	837	0	0
Stage 1	999	999	-	830	830	-	-	-	-	-	-	-
Stage 2	429	855	-	523	1013	-	-	-	-	-	-	-
Critical Hdwy	7.5	6.5	7.04	7.54	6.5	7.3	4.6	-	-	4.22	-	-
Critical Hdwy Stg 1	6.5	5.5	-	6.54	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.5	5.5	-	6.54	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.37	3.52	4	3.5	2.45	-	-	2.26	-	-
Pot Cap-1 Maneuver	97	75	518	108	76	546	578	-	-	768	-	-
Stage 1	265	324	-	331	388	-	-	-	-	-	-	-
Stage 2	580	378	-	505	319	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	89	72	518	99	73	546	578	-	-	768	-	-
Mov Cap-2 Maneuver	231	233	-	267	235	-	-	-	-	-	-	-
Stage 1	261	316	-	326	382	-	-	-	-	-	-	-
Stage 2	544	372	-	464	311	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	17.7	22.2	0.1	0.2
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	578	-	-	317	284	768	-	-
HCM Lane V/C Ratio	0.016	-	-	0.107	0.265	0.024	-	-
HCM Control Delay (s)	11.3	-	-	17.7	22.2	9.8	-	-
HCM Lane LOS	B	-	-	C	C	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.4	1	0.1	-	-

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	259	29	562	143	6	610
Future Volume (veh/h)	259	29	562	143	6	610
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1885	1841	1648	1856	1648	1693
Adj Flow Rate, veh/h	273	31	592	0	6	642
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	1	4	17	3	17	14
Cap, veh/h	358	311	1586		431	1629
Arrive On Green	0.20	0.20	0.51	0.00	0.51	0.51
Sat Flow, veh/h	1795	1560	3214	1572	727	3300
Grp Volume(v), veh/h	273	31	592	0	6	642
Grp Sat Flow(s),veh/h/ln	1795	1560	1566	1572	727	1608
Q Serve(g_s), s	7.1	0.8	5.7	0.0	0.2	6.1
Cycle Q Clear(g_c), s	7.1	0.8	5.7	0.0	5.9	6.1
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	358	311	1586		431	1629
V/C Ratio(X)	0.76	0.10	0.37		0.01	0.39
Avail Cap(c_a), veh/h	1765	1533	3617		902	3715
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	18.6	16.1	7.4	0.0	9.2	7.5
Incr Delay (d2), s/veh	3.4	0.1	0.4	0.0	0.0	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.8	0.3	1.1	0.0	0.0	1.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	22.0	16.3	7.8	0.0	9.2	7.9
LnGrp LOS	C	B	A		A	A
Approach Vol, veh/h	304		592			648
Approach Delay, s/veh	21.4		7.8			7.9
Approach LOS	C		A			A

Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		33.0		16.3		33.0
Change Period (Y+Rc), s		8.0		6.5		8.0
Max Green Setting (Gmax), s		57.0		48.5		57.0
Max Q Clear Time (g_c+I1), s		7.7		9.1		8.1
Green Ext Time (p_c), s		9.4		0.9		10.5

Intersection Summary						
HCM 6th Ctrl Delay			10.5			
HCM 6th LOS			B			

Notes

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	16	11	3	23	10	25	2	589	5	13	590	8
Future Vol, veh/h	16	11	3	23	10	25	2	589	5	13	590	8
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	475	-	-	450	-	-
Veh in Median Storage, #	-	2	-	-	2	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0	50	16	0	0	14	0
Mvmt Flow	17	12	3	24	11	26	2	620	5	14	621	8

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	973	1282	315	972	1284	313	629	0	0	625	0	0
Stage 1	653	653	-	627	627	-	-	-	-	-	-	-
Stage 2	320	629	-	345	657	-	-	-	-	-	-	-
Critical Hdwy	7.5	6.5	6.9	7.5	6.5	6.9	5.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.5	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.5	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.7	-	-	2.2	-	-
Pot Cap-1 Maneuver	210	167	687	210	166	689	686	-	-	966	-	-
Stage 1	427	467	-	443	479	-	-	-	-	-	-	-
Stage 2	672	478	-	649	465	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	195	164	687	201	163	689	686	-	-	966	-	-
Mov Cap-2 Maneuver	369	344	-	380	347	-	-	-	-	-	-	-
Stage 1	426	460	-	442	478	-	-	-	-	-	-	-
Stage 2	630	477	-	621	458	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	15.5	14	0	0.2
HCM LOS	C	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	686	-	-	376	462	966	-	-
HCM Lane V/C Ratio	0.003	-	-	0.084	0.132	0.014	-	-
HCM Control Delay (s)	10.3	-	-	15.5	14	8.8	-	-
HCM Lane LOS	B	-	-	C	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.3	0.5	0	-	-

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	43	57	565	581	30
Future Vol, veh/h	0	43	57	565	581	30
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Stop	-	None	-	Yield
Storage Length	-	0	275	-	-	200
Veh in Median Storage, #	2	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	0	0	2	16	14	11
Mvmt Flow	0	45	59	589	605	31

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	303	605	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.9	4.14	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.3	2.22	-	-	-
Pot Cap-1 Maneuver	0	699	969	-	-	-
Stage 1	0	-	-	-	-	-
Stage 2	0	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	699	969	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.5	0.8	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	969	-	699	-	-
HCM Lane V/C Ratio	0.061	-	0.064	-	-
HCM Control Delay (s)	9	-	10.5	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0.2	-	0.2	-	-

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	2	4	19	3	20	2	531	32	18	603	0
Future Vol, veh/h	0	2	4	19	3	20	2	531	32	18	603	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	2	-	-	2	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	96	96	96	96	96	96	96	96	96	96	96	96
Heavy Vehicles, %	0	0	0	0	0	0	0	18	0	0	15	0
Mvmt Flow	0	2	4	20	3	21	2	553	33	19	628	0

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	948	1256	314	927	1240	293	628	0	0	586	0	0
Stage 1	666	666	-	574	574	-	-	-	-	-	-	-
Stage 2	282	590	-	353	666	-	-	-	-	-	-	-
Critical Hdwy	7.5	6.5	6.9	7.5	6.5	6.9	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.5	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.5	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	218	173	688	226	177	709	964	-	-	999	-	-
Stage 1	420	460	-	476	506	-	-	-	-	-	-	-
Stage 2	707	498	-	642	460	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	205	167	688	218	171	709	964	-	-	999	-	-
Mov Cap-2 Maneuver	371	345	-	401	352	-	-	-	-	-	-	-
Stage 1	419	447	-	475	504	-	-	-	-	-	-	-
Stage 2	680	497	-	617	447	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	12	12.9	0	0.3
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	964	-	-	517	499	999	-	-
HCM Lane V/C Ratio	0.002	-	-	0.012	0.088	0.019	-	-
HCM Control Delay (s)	8.7	0	-	12	12.9	8.7	0.1	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0	0.3	0.1	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	2	8	82	6	62	7	383	74	55	414	3
Future Volume (veh/h)	5	2	8	82	6	62	7	383	74	55	414	3
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1900	1900	1544	1900	1589	1900	1604	1530	1737	1618	1900
Adj Flow Rate, veh/h	5	2	8	85	6	65	7	399	77	57	431	3
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	0	0	0	24	0	21	0	20	25	11	19	0
Cap, veh/h	92	46	112	146	15	82	19	1934	823	72	2067	1082
Arrive On Green	0.13	0.13	0.13	0.13	0.13	0.13	0.01	0.63	0.63	0.04	0.67	0.67
Sat Flow, veh/h	401	360	869	774	118	637	1810	3047	1296	1654	3075	1610
Grp Volume(v), veh/h	15	0	0	156	0	0	7	399	77	57	431	3
Grp Sat Flow(s),veh/h/ln	1630	0	0	1529	0	0	1810	1523	1296	1654	1537	1610
Q Serve(g_s), s	0.0	0.0	0.0	10.9	0.0	0.0	0.5	6.6	2.8	4.1	6.4	0.1
Cycle Q Clear(g_c), s	0.9	0.0	0.0	11.8	0.0	0.0	0.5	6.6	2.8	4.1	6.4	0.1
Prop In Lane	0.33		0.53	0.54		0.42	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	250	0	0	244	0	0	19	1934	823	72	2067	1082
V/C Ratio(X)	0.06	0.00	0.00	0.64	0.00	0.00	0.37	0.21	0.09	0.79	0.21	0.00
Avail Cap(c_a), veh/h	559	0	0	546	0	0	134	1934	823	240	2067	1082
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	45.9	0.0	0.0	50.6	0.0	0.0	59.0	9.2	8.5	56.8	7.5	6.5
Incr Delay (d2), s/veh	0.2	0.0	0.0	5.9	0.0	0.0	11.7	0.2	0.2	17.1	0.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	0.0	5.0	0.0	0.0	0.3	1.9	0.7	2.0	1.8	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	46.1	0.0	0.0	56.5	0.0	0.0	70.7	9.4	8.7	73.9	7.7	6.5
LnGrp LOS	D	A	A	E	A	A	E	A	A	E	A	A
Approach Vol, veh/h		15			156			483			491	
Approach Delay, s/veh		46.1			56.5			10.2			15.4	
Approach LOS		D			E			B			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	11.8	85.2		23.0	7.3	89.7		23.0				
Change Period (Y+Rc), s	6.6	9.0		7.5	6.1	9.0		7.5				
Max Green Setting (Gmax), s	17.4	40.0		39.5	8.9	49.0		39.5				
Max Q Clear Time (g_c+I1), s	6.1	8.6		2.9	2.5	8.4		13.8				
Green Ext Time (p_c), s	0.1	6.9		0.1	0.0	7.1		1.7				
Intersection Summary												
HCM 6th Ctrl Delay			19.2									
HCM 6th LOS			B									

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	10	9	2	8	8	4	0	423	19	5	516	2
Future Vol, veh/h	10	9	2	8	8	4	0	423	19	5	516	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	300	-	300	300	-	-
Veh in Median Storage, #	-	2	-	-	2	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	0	0	14	0	0	0	24	6	40	19	0
Mvmt Flow	11	10	2	9	9	4	0	470	21	6	573	2

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	826	1077	288	774	1057	235	575	0	0	491	0	0
Stage 1	586	586	-	470	470	-	-	-	-	-	-	-
Stage 2	240	491	-	304	587	-	-	-	-	-	-	-
Critical Hdwy	7.5	6.5	6.9	7.78	6.5	6.9	4.1	-	-	4.9	-	-
Critical Hdwy Stg 1	6.5	5.5	-	6.78	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.5	5.5	-	6.78	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.64	4	3.3	2.2	-	-	2.6	-	-
Pot Cap-1 Maneuver	268	221	715	268	227	773	1008	-	-	843	-	-
Stage 1	468	500	-	513	563	-	-	-	-	-	-	-
Stage 2	748	552	-	648	500	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	260	219	715	260	225	773	1008	-	-	843	-	-
Mov Cap-2 Maneuver	420	398	-	434	404	-	-	-	-	-	-	-
Stage 1	468	497	-	513	563	-	-	-	-	-	-	-
Stage 2	732	552	-	628	497	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	13.9	13.2	0	0.1
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1008	-	-	427	461	843	-	-
HCM Lane V/C Ratio	-	-	-	0.055	0.048	0.007	-	-
HCM Control Delay (s)	0	-	-	13.9	13.2	9.3	-	-
HCM Lane LOS	A	-	-	B	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.2	0.2	0	-	-

Intersection	
Int Delay, s/veh	2.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	9	28	17	42	4	28	12	1439	83	3	1134	4
Future Vol, veh/h	9	28	17	42	4	28	12	1439	83	3	1134	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	350	-	-	330	-	-
Veh in Median Storage, #	-	2	-	-	2	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	12	8	6	0	0	0	0	6	0	0	10	50
Mvmt Flow	9	29	18	44	4	29	13	1515	87	3	1194	4

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1988	2830	599	2203	2789	801	1198	0	0	1602	0	0
Stage 1	1202	1202	-	1585	1585	-	-	-	-	-	-	-
Stage 2	786	1628	-	618	1204	-	-	-	-	-	-	-
Critical Hdwy	7.74	6.66	7.02	7.5	6.5	6.9	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.74	5.66	-	6.5	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.74	5.66	-	6.5	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.62	4.08	3.36	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	32	~ 16	435	~ 25	19	332	590	-	-	414	-	-
Stage 1	181	244	-	115	170	-	-	-	-	-	-	-
Stage 2	330	150	-	448	259	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	28	~ 16	435	~ 19	18	332	590	-	-	414	-	-
Mov Cap-2 Maneuver	143	116	-	101	129	-	-	-	-	-	-	-
Stage 1	177	242	-	112	166	-	-	-	-	-	-	-
Stage 2	287	147	-	375	257	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	40.4	59.7	0.1	0
HCM LOS	E	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	590	-	-	157	139	414	-	-
HCM Lane V/C Ratio	0.021	-	-	0.362	0.56	0.008	-	-
HCM Control Delay (s)	11.2	-	-	40.4	59.7	13.8	-	-
HCM Lane LOS	B	-	-	E	F	B	-	-
HCM 95th %tile Q(veh)	0.1	-	-	1.5	2.8	0	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	4	6	2	14	10	18	9	1343	83	12	1130	3
Future Vol, veh/h	4	6	2	14	10	18	9	1343	83	12	1130	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	400	-	-	325	-	-
Veh in Median Storage, #	-	2	-	-	2	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	96	96	96	96	96	96	96	96	96	96	96	96
Heavy Vehicles, %	0	0	0	0	0	0	0	7	1	0	10	0
Mvmt Flow	4	6	2	15	10	19	9	1399	86	13	1177	3

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1928	2708	590	2078	2666	743	1180	0	0	1485	0	0
Stage 1	1205	1205	-	1460	1460	-	-	-	-	-	-	-
Stage 2	723	1503	-	618	1206	-	-	-	-	-	-	-
Critical Hdwy	7.5	6.5	6.9	7.5	6.5	6.9	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.5	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.5	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	41	21	456	32	23	362	599	-	-	459	-	-
Stage 1	198	259	-	138	196	-	-	-	-	-	-	-
Stage 2	388	186	-	448	259	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	36	20	456	30	22	362	599	-	-	459	-	-
Mov Cap-2 Maneuver	161	133	-	123	142	-	-	-	-	-	-	-
Stage 1	195	252	-	136	193	-	-	-	-	-	-	-
Stage 2	343	183	-	423	252	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	29.2	31.3	0.1	0.1
HCM LOS	D	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	599	-	-	161	180	459	-	-
HCM Lane V/C Ratio	0.016	-	-	0.078	0.243	0.027	-	-
HCM Control Delay (s)	11.1	-	-	29.2	31.3	13.1	-	-
HCM Lane LOS	B	-	-	D	D	B	-	-
HCM 95th %tile Q(veh)	0	-	-	0.2	0.9	0.1	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	16	24	18	13	28	70	12	1233	32	38	1242	16
Future Volume (veh/h)	16	24	18	13	28	70	12	1233	32	38	1242	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1752	1900	1767	1648	1870	1900	1796	1900	1856	1737	1900
Adj Flow Rate, veh/h	17	25	19	14	29	73	12	1284	33	40	1294	17
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	0	10	0	9	17	2	0	7	0	3	11	0
Cap, veh/h	77	85	51	53	44	91	327	2550	1203	323	2492	33
Arrive On Green	0.10	0.10	0.10	0.10	0.10	0.10	0.75	0.75	0.75	0.75	0.75	0.75
Sat Flow, veh/h	281	853	513	99	437	911	426	3413	1610	414	3335	44
Grp Volume(v), veh/h	61	0	0	116	0	0	12	1284	33	40	640	671
Grp Sat Flow(s),veh/h/ln	1647	0	0	1447	0	0	426	1706	1610	414	1650	1729
Q Serve(g_s), s	0.0	0.0	0.0	3.4	0.0	0.0	1.1	14.3	0.5	4.1	15.0	15.0
Cycle Q Clear(g_c), s	3.2	0.0	0.0	7.3	0.0	0.0	16.1	14.3	0.5	18.3	15.0	15.0
Prop In Lane	0.28		0.31	0.12		0.63	1.00		1.00	1.00		0.03
Lane Grp Cap(c), veh/h	214	0	0	188	0	0	327	2550	1203	323	1233	1292
V/C Ratio(X)	0.28	0.00	0.00	0.62	0.00	0.00	0.04	0.50	0.03	0.12	0.52	0.52
Avail Cap(c_a), veh/h	276	0	0	247	0	0	361	2820	1330	356	1363	1429
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	39.4	0.0	0.0	41.2	0.0	0.0	8.2	4.8	3.1	8.5	4.9	4.9
Incr Delay (d2), s/veh	0.7	0.0	0.0	3.3	0.0	0.0	0.2	0.6	0.0	0.6	1.2	1.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.3	0.0	0.0	2.7	0.0	0.0	0.1	2.8	0.1	0.3	3.1	3.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	40.1	0.0	0.0	44.5	0.0	0.0	8.4	5.4	3.1	9.1	6.1	6.1
LnGrp LOS	D	A	A	D	A	A	A	A	A	A	A	A
Approach Vol, veh/h		61			116			1329			1351	
Approach Delay, s/veh		40.1			44.5			5.3			6.2	
Approach LOS		D			D			A			A	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		77.6		16.1		77.6		16.1				
Change Period (Y+Rc), s		7.6		6.7		7.6		6.7				
Max Green Setting (Gmax), s		77.4		13.3		77.4		13.3				
Max Q Clear Time (g_c+I1), s		18.1		5.2		20.3		9.3				
Green Ext Time (p_c), s		34.2		0.1		34.3		0.2				

Intersection Summary		
HCM 6th Ctrl Delay		8.1
HCM 6th LOS		A

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	1	0	2	1	42	6	1190	1	25	1093	9
Future Vol, veh/h	5	1	0	2	1	42	6	1190	1	25	1093	9
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	350	-	-	400	-	-
Veh in Median Storage, #	-	2	-	-	2	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	0	0	0	0	0	0	0	7	0	4	10	0
Mvmt Flow	5	1	0	2	1	45	6	1280	1	27	1175	10

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1887	2527	593	1935	2532	641	1185	0	0	1281	0	0
Stage 1	1234	1234	-	1293	1293	-	-	-	-	-	-	-
Stage 2	653	1293	-	642	1239	-	-	-	-	-	-	-
Critical Hdwy	7.5	6.5	6.9	7.5	6.5	6.9	4.1	-	-	4.18	-	-
Critical Hdwy Stg 1	6.5	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.5	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.24	-	-
Pot Cap-1 Maneuver	44	28	454	41	28	422	596	-	-	527	-	-
Stage 1	190	251	-	175	235	-	-	-	-	-	-	-
Stage 2	427	235	-	434	250	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	37	26	454	39	26	422	596	-	-	527	-	-
Mov Cap-2 Maneuver	159	148	-	153	155	-	-	-	-	-	-	-
Stage 1	188	238	-	173	233	-	-	-	-	-	-	-
Stage 2	376	233	-	410	237	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	28.9	15.9	0.1	0.3
HCM LOS	D	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	596	-	-	157	378	527	-	-
HCM Lane V/C Ratio	0.011	-	-	0.041	0.128	0.051	-	-
HCM Control Delay (s)	11.1	-	-	28.9	15.9	12.2	-	-
HCM Lane LOS	B	-	-	D	C	B	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.4	0.2	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	35	57	19	38	41	68	33	1174	79	46	1180	53
Future Volume (veh/h)	35	57	19	38	41	68	33	1174	79	46	1180	53
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1752	1604	1722	1811	1648	1604	1752	1781	1811	1604	1737	1752
Adj Flow Rate, veh/h	36	58	19	39	42	69	34	1198	81	47	1204	54
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	10	20	12	6	17	20	10	8	6	20	11	10
Cap, veh/h	83	90	24	122	105	165	106	1929	875	94	1837	826
Arrive On Green	0.12	0.12	0.12	0.12	0.12	0.12	0.06	0.57	0.57	0.06	0.56	0.56
Sat Flow, veh/h	249	744	201	511	868	1359	1668	3385	1535	1527	3300	1485
Grp Volume(v), veh/h	113	0	0	81	0	69	34	1198	81	47	1204	54
Grp Sat Flow(s),veh/h/ln	1193	0	0	1380	0	1359	1668	1692	1535	1527	1650	1485
Q Serve(g_s), s	3.9	0.0	0.0	0.0	0.0	4.2	1.7	21.1	2.1	2.7	22.8	1.5
Cycle Q Clear(g_c), s	8.6	0.0	0.0	4.6	0.0	4.2	1.7	21.1	2.1	2.7	22.8	1.5
Prop In Lane	0.32		0.17	0.48		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	198	0	0	227	0	165	106	1929	875	94	1837	826
V/C Ratio(X)	0.57	0.00	0.00	0.36	0.00	0.42	0.32	0.62	0.09	0.50	0.66	0.07
Avail Cap(c_a), veh/h	345	0	0	375	0	311	213	2497	1132	195	2398	1079
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	38.3	0.0	0.0	36.4	0.0	36.4	40.0	12.8	8.7	40.6	13.8	9.1
Incr Delay (d2), s/veh	2.6	0.0	0.0	0.9	0.0	1.7	2.1	1.2	0.2	4.9	1.5	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.4	0.0	0.0	1.6	0.0	1.4	0.7	6.5	0.6	1.1	7.0	0.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	40.8	0.0	0.0	37.4	0.0	38.1	42.1	14.0	8.9	45.5	15.3	9.2
LnGrp LOS	D	A	A	D	A	D	D	B	A	D	B	A
Approach Vol, veh/h		113			150			1313			1305	
Approach Delay, s/veh		40.8			37.7			14.4			16.1	
Approach LOS		D			D			B			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	11.1	60.0		18.4	12.3	58.8		18.4
Change Period (Y+Rc), s	5.6	9.0		7.5	6.6	9.0		7.5
Max Green Setting (Gmax), s	11.4	66.0		20.5	11.4	65.0		20.5
Max Q Clear Time (g_c+I1), s	4.7	23.1		10.6	3.7	24.8		6.6
Green Ext Time (p_c), s	0.0	26.3		0.3	0.0	25.0		0.4

Intersection Summary			
HCM 6th Ctrl Delay			17.4
HCM 6th LOS			B

Intersection	
Int Delay, s/veh	2.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	20	0	18	63	0	72	6	1142	53	38	1038	9
Future Vol, veh/h	20	0	18	63	0	72	6	1142	53	38	1038	9
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	300	-	-	-	600	-	325	625	-	640
Veh in Median Storage, #	-	2	-	-	2	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	12	0	13	2	0	13	20	8	4	19	11	25
Mvmt Flow	21	0	19	67	0	77	6	1215	56	40	1104	10

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1804	2467	552	1859	2421	608	1114	0	0	1271	0	0
Stage 1	1184	1184	-	1227	1227	-	-	-	-	-	-	-
Stage 2	620	1283	-	632	1194	-	-	-	-	-	-	-
Critical Hdwy	7.74	6.5	7.16	7.54	6.5	7.16	4.5	-	-	4.48	-	-
Critical Hdwy Stg 1	6.74	5.5	-	6.54	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.74	5.5	-	6.54	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.62	4	3.43	3.52	4	3.43	2.4	-	-	2.39	-	-
Pot Cap-1 Maneuver	45	31	450	~ 45	33	413	528	-	-	459	-	-
Stage 1	185	265	-	189	253	-	-	-	-	-	-	-
Stage 2	419	238	-	435	262	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	34	28	450	~ 40	30	413	528	-	-	459	-	-
Mov Cap-2 Maneuver	150	145	-	161	162	-	-	-	-	-	-	-
Stage 1	183	242	-	187	250	-	-	-	-	-	-	-
Stage 2	337	235	-	380	239	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	23.7	40.4	0.1	0.5
HCM LOS	C	E		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	528	-	-	150	450	239	459	-	-
HCM Lane V/C Ratio	0.012	-	-	0.142	0.043	0.601	0.088	-	-
HCM Control Delay (s)	11.9	-	-	32.9	13.4	40.4	13.6	-	-
HCM Lane LOS	B	-	-	D	B	E	B	-	-
HCM 95th %tile Q(veh)	0	-	-	0.5	0.1	3.5	0.3	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	0.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	21	47	997	24	59	830
Future Vol, veh/h	21	47	997	24	59	830
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Free	-	None	-	None
Storage Length	0	100	-	275	300	-
Veh in Median Storage, #	2	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	0	2	9	0	2	11
Mvmt Flow	22	49	1049	25	62	874

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1610	-	0	0	1074	0
Stage 1	1049	-	-	-	-	-
Stage 2	561	-	-	-	-	-
Critical Hdwy	6.8	-	-	-	4.14	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	-	-	-	2.22	-
Pot Cap-1 Maneuver	97	0	-	-	645	-
Stage 1	303	0	-	-	-	-
Stage 2	540	0	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	88	-	-	-	645	-
Mov Cap-2 Maneuver	255	-	-	-	-	-
Stage 1	303	-	-	-	-	-
Stage 2	488	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	20.5	0	0.7
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	255	-	645	-
HCM Lane V/C Ratio	-	-	0.087	-	0.096	-
HCM Control Delay (s)	-	-	20.5	0	11.2	-
HCM Lane LOS	-	-	C	A	B	-
HCM 95th %tile Q(veh)	-	-	0.3	-	0.3	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	156	0	40	0	0	0	57	1176	0	0	1071	130
Future Volume (veh/h)	156	0	40	0	0	0	57	1176	0	0	1071	130
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1841	1900	1604	1900	1900	1900	1693	1781	1900	1900	1722	1856
Adj Flow Rate, veh/h	161	0	41	0	0	0	59	1212	0	0	1104	134
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	4	0	20	0	0	0	14	8	0	0	12	3
Cap, veh/h	241	0	48	0	303	0	134	2380	1132	60	1848	888
Arrive On Green	0.16	0.00	0.16	0.00	0.00	0.00	0.08	0.70	0.00	0.00	0.56	0.56
Sat Flow, veh/h	1173	0	299	0	1900	0	1612	3385	1610	468	3272	1572
Grp Volume(v), veh/h	202	0	0	0	0	0	59	1212	0	0	1104	134
Grp Sat Flow(s),veh/h/ln	1472	0	0	0	1900	0	1612	1692	1610	468	1636	1572
Q Serve(g_s), s	16.1	0.0	0.0	0.0	0.0	0.0	4.2	19.9	0.0	0.0	26.6	4.9
Cycle Q Clear(g_c), s	16.1	0.0	0.0	0.0	0.0	0.0	4.2	19.9	0.0	0.0	26.6	4.9
Prop In Lane	0.80		0.20	0.00		0.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	288	0	0	0	303	0	134	2380	1132	60	1848	888
V/C Ratio(X)	0.70	0.00	0.00	0.00	0.00	0.00	0.44	0.51	0.00	0.00	0.60	0.15
Avail Cap(c_a), veh/h	367	0	0	0	404	0	153	2380	1132	60	1848	888
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	49.2	0.0	0.0	0.0	0.0	0.0	52.3	8.2	0.0	0.0	17.1	12.4
Incr Delay (d2), s/veh	8.7	0.0	0.0	0.0	0.0	0.0	2.7	0.8	0.0	0.0	1.4	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.4	0.0	0.0	0.0	0.0	0.0	1.7	5.8	0.0	0.0	9.1	1.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	57.9	0.0	0.0	0.0	0.0	0.0	55.0	9.0	0.0	0.0	18.6	12.8
LnGrp LOS	E	A	A	A	A	A	E	A	A	A	B	B
Approach Vol, veh/h		202			0			1271			1238	
Approach Delay, s/veh		57.9			0.0			11.2			18.0	
Approach LOS		E						B			B	
Timer - Assigned Phs		2		4	5	6		8				
Phs Duration (G+Y+Rc), s		93.4		26.6	16.6	76.8		26.6				
Change Period (Y+Rc), s		9.0		7.5	6.6	9.0		7.5				
Max Green Setting (Gmax), s		78.0		25.5	11.4	60.0		25.5				
Max Q Clear Time (g_c+I1), s		21.9		18.1	6.2	28.6		0.0				
Green Ext Time (p_c), s		26.2		1.1	0.0	18.6		0.0				
Intersection Summary												
HCM 6th Ctrl Delay			17.7									
HCM 6th LOS			B									

Intersection	
Int Delay, s/veh	2.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	18	16	14	57	18	10	14	1246	98	11	1120	25
Future Vol, veh/h	18	16	14	57	18	10	14	1246	98	11	1120	25
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	350	100	-	350
Veh in Median Storage, #	-	2	-	-	2	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	96	96	96	96	96	96	96	96	96	96	96	96
Heavy Vehicles, %	0	7	17	0	0	0	33	9	3	10	12	0
Mvmt Flow	19	17	15	59	19	10	15	1298	102	11	1167	26

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1878	2619	584	1942	2543	649	1193	0	0	1400	0	0
Stage 1	1189	1189	-	1328	1328	-	-	-	-	-	-	-
Stage 2	689	1430	-	614	1215	-	-	-	-	-	-	-
Critical Hdwy	7.5	6.64	7.24	7.5	6.5	6.9	4.76	-	-	4.3	-	-
Critical Hdwy Stg 1	6.5	5.64	-	6.5	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.5	5.64	-	6.5	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4.07	3.47	3.5	4	3.3	2.53	-	-	2.3	-	-
Pot Cap-1 Maneuver	45	22	419	~ 40	27	417	434	-	-	445	-	-
Stage 1	203	250	-	167	226	-	-	-	-	-	-	-
Stage 2	407	190	-	451	256	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	38	21	419	~ 33	25	417	434	-	-	445	-	-
Mov Cap-2 Maneuver	163	132	-	142	151	-	-	-	-	-	-	-
Stage 1	196	244	-	161	218	-	-	-	-	-	-	-
Stage 2	350	183	-	396	250	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	32.3	54.7	0.1	0.1
HCM LOS	D	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	434	-	-	181	156	445	-	-
HCM Lane V/C Ratio	0.034	-	-	0.276	0.568	0.026	-	-
HCM Control Delay (s)	13.6	-	-	32.3	54.7	13.3	-	-
HCM Lane LOS	B	-	-	D	F	B	-	-
HCM 95th %tile Q(veh)	0.1	-	-	1.1	2.9	0.1	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	218	18	858	335	5	703
Future Volume (veh/h)	218	18	858	335	5	703
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1885	1811	1737	1885	1900	1693
Adj Flow Rate, veh/h	232	19	913	0	5	748
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	1	6	11	1	0	14
Cap, veh/h	332	284	1783		363	1737
Arrive On Green	0.18	0.18	0.54	0.00	0.54	0.54
Sat Flow, veh/h	1795	1535	3387	1598	621	3300
Grp Volume(v), veh/h	232	19	913	0	5	748
Grp Sat Flow(s),veh/h/ln	1795	1535	1650	1598	621	1608
Q Serve(g_s), s	6.4	0.5	9.3	0.0	0.3	7.3
Cycle Q Clear(g_c), s	6.4	0.5	9.3	0.0	9.5	7.3
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	332	284	1783		363	1737
V/C Ratio(X)	0.70	0.07	0.51		0.01	0.43
Avail Cap(c_a), veh/h	1311	1120	4192		816	4085
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	20.1	17.7	7.7	0.0	10.7	7.3
Incr Delay (d2), s/veh	2.7	0.1	0.6	0.0	0.0	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.5	0.2	1.9	0.0	0.0	1.4
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	22.8	17.8	8.3	0.0	10.8	7.7
LnGrp LOS	C	B	A		B	A
Approach Vol, veh/h	251		913			753
Approach Delay, s/veh	22.4		8.3			7.7
Approach LOS	C		A			A

Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		36.5		16.2		36.5
Change Period (Y+Rc), s		8.0		6.5		8.0
Max Green Setting (Gmax), s		67.0		38.5		67.0
Max Q Clear Time (g_c+I1), s		11.3		8.4		11.5
Green Ext Time (p_c), s		17.2		0.7		13.2

Intersection Summary						
HCM 6th Ctrl Delay			9.9			
HCM 6th LOS			A			

Notes

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	12	31	2	1	17	9	5	864	12	12	723	12
Future Vol, veh/h	12	31	2	1	17	9	5	864	12	12	723	12
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	475	-	-	450	-	-
Veh in Median Storage, #	-	2	-	-	2	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	9	3	0	0	6	0	20	12	9	9	15	0
Mvmt Flow	13	34	2	1	19	10	5	949	13	13	795	13

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1322	1800	404	1407	1800	481	808	0	0	962	0	0
Stage 1	828	828	-	966	966	-	-	-	-	-	-	-
Stage 2	494	972	-	441	834	-	-	-	-	-	-	-
Critical Hdwy	7.68	6.56	6.9	7.5	6.62	6.9	4.5	-	-	4.28	-	-
Critical Hdwy Stg 1	6.68	5.56	-	6.5	5.62	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.68	5.56	-	6.5	5.62	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4.03	3.3	3.5	4.06	3.3	2.4	-	-	2.29	-	-
Pot Cap-1 Maneuver	108	78	602	101	76	537	707	-	-	670	-	-
Stage 1	317	381	-	277	322	-	-	-	-	-	-	-
Stage 2	508	327	-	570	372	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	98	76	602	88	74	537	707	-	-	670	-	-
Mov Cap-2 Maneuver	260	238	-	239	237	-	-	-	-	-	-	-
Stage 1	315	374	-	275	320	-	-	-	-	-	-	-
Stage 2	466	325	-	506	365	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	22.9	18.8	0.1	0.2
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	707	-	-	250	291	670	-	-
HCM Lane V/C Ratio	0.008	-	-	0.198	0.102	0.02	-	-
HCM Control Delay (s)	10.1	-	-	22.9	18.8	10.5	-	-
HCM Lane LOS	B	-	-	C	C	B	-	-
HCM 95th %tile Q(veh)	0	-	-	0.7	0.3	0.1	-	-

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	46	59	847	711	23
Future Vol, veh/h	0	46	59	847	711	23
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Stop	-	None	-	Yield
Storage Length	-	0	275	-	-	200
Veh in Median Storage, #	2	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	2	2	11	15	10
Mvmt Flow	0	50	64	921	773	25

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	387	773	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.94	4.14	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	0	611	838	-	-	-
Stage 1	0	-	-	-	-	-
Stage 2	0	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	611	838	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.4	0.6	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	838	-	611	-	-
HCM Lane V/C Ratio	0.077	-	0.082	-	-
HCM Control Delay (s)	9.7	-	11.4	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0.2	-	0.3	-	-

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	3	0	24	8	52	4	828	13	15	704	0
Future Vol, veh/h	1	3	0	24	8	52	4	828	13	15	704	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	2	-	-	2	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	96	96	96	96	96	96	96	96	96	96	96	96
Heavy Vehicles, %	0	0	0	0	0	0	0	11	0	0	15	0
Mvmt Flow	1	3	0	25	8	54	4	863	14	16	733	0

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1209	1650	367	1278	1643	439	733	0	0	877	0	0
Stage 1	765	765	-	878	878	-	-	-	-	-	-	-
Stage 2	444	885	-	400	765	-	-	-	-	-	-	-
Critical Hdwy	7.5	6.5	6.9	7.5	6.5	6.9	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.5	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.5	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	141	100	636	125	101	571	881	-	-	779	-	-
Stage 1	366	415	-	313	368	-	-	-	-	-	-	-
Stage 2	568	366	-	603	415	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	121	96	636	120	97	571	881	-	-	779	-	-
Mov Cap-2 Maneuver	296	265	-	274	271	-	-	-	-	-	-	-
Stage 1	363	400	-	310	365	-	-	-	-	-	-	-
Stage 2	498	363	-	577	400	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	18.4	16.4	0	0.4
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	881	-	-	272	403	779	-	-
HCM Lane V/C Ratio	0.005	-	-	0.015	0.217	0.02	-	-
HCM Control Delay (s)	9.1	0	-	18.4	16.4	9.7	0.2	-
HCM Lane LOS	A	A	-	C	C	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0	0.8	0.1	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	7	5	71	4	76	15	556	69	54	446	3
Future Volume (veh/h)	3	7	5	71	4	76	15	556	69	54	446	3
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1900	1900	1455	1530	1618	1900	1693	1485	1781	1693	1900
Adj Flow Rate, veh/h	3	7	5	73	4	78	15	573	71	56	460	3
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	0	0	0	30	25	19	0	14	28	8	14	0
Cap, veh/h	67	141	86	121	16	94	36	1980	775	72	2066	1035
Arrive On Green	0.15	0.15	0.15	0.15	0.15	0.15	0.02	0.62	0.62	0.04	0.64	0.64
Sat Flow, veh/h	208	946	577	513	105	627	1810	3216	1259	1697	3216	1610
Grp Volume(v), veh/h	15	0	0	155	0	0	15	573	71	56	460	3
Grp Sat Flow(s),veh/h/ln	1731	0	0	1245	0	0	1810	1608	1259	1697	1608	1610
Q Serve(g_s), s	0.0	0.0	0.0	12.5	0.0	0.0	1.0	10.0	2.8	3.9	7.2	0.1
Cycle Q Clear(g_c), s	0.9	0.0	0.0	14.4	0.0	0.0	1.0	10.0	2.8	3.9	7.2	0.1
Prop In Lane	0.20		0.33	0.47		0.50	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	295	0	0	230	0	0	36	1980	775	72	2066	1035
V/C Ratio(X)	0.05	0.00	0.00	0.67	0.00	0.00	0.42	0.29	0.09	0.78	0.22	0.00
Avail Cap(c_a), veh/h	552	0	0	420	0	0	134	1980	775	218	2066	1035
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	43.8	0.0	0.0	49.4	0.0	0.0	58.1	10.8	9.4	56.9	8.9	7.7
Incr Delay (d2), s/veh	0.2	0.0	0.0	7.1	0.0	0.0	7.7	0.4	0.2	16.6	0.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	0.0	5.0	0.0	0.0	0.5	3.2	0.7	1.9	2.2	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	43.9	0.0	0.0	56.5	0.0	0.0	65.9	11.1	9.6	73.5	9.2	7.7
LnGrp LOS	D	A	A	E	A	A	E	B	A	E	A	A
Approach Vol, veh/h		15			155			659			519	
Approach Delay, s/veh		43.9			56.5			12.2			16.1	
Approach LOS		D			E			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	11.7	82.9		25.4	8.5	86.1		25.4				
Change Period (Y+Rc), s	6.6	9.0		7.5	6.1	9.0		7.5				
Max Green Setting (Gmax), s	15.4	45.0		36.5	8.9	52.0		36.5				
Max Q Clear Time (g_c+I1), s	5.9	12.0		2.9	3.0	9.2		16.4				
Green Ext Time (p_c), s	0.1	10.1		0.1	0.0	7.7		1.5				

Intersection Summary			
HCM 6th Ctrl Delay			19.2
HCM 6th LOS			B

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	3	2	1	18	9	5	1	793	16	3	581	3
Future Vol, veh/h	3	2	1	18	9	5	1	793	16	3	581	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	300	-	300	300	-	-
Veh in Median Storage, #	-	2	-	-	2	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	96	96	96	96	96	96	96	96	96	96	96	96
Heavy Vehicles, %	33	0	0	0	12	0	0	14	7	33	16	33
Mvmt Flow	3	2	1	19	9	5	1	826	17	3	605	3

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1033	1458	304	1138	1442	413	608	0	0	843	0	0
Stage 1	613	613	-	828	828	-	-	-	-	-	-	-
Stage 2	420	845	-	310	614	-	-	-	-	-	-	-
Critical Hdwy	8.16	6.5	6.9	7.5	6.74	6.9	4.1	-	-	4.76	-	-
Critical Hdwy Stg 1	7.16	5.5	-	6.5	5.74	-	-	-	-	-	-	-
Critical Hdwy Stg 2	7.16	5.5	-	6.5	5.74	-	-	-	-	-	-	-
Follow-up Hdwy	3.83	4	3.3	3.5	4.12	3.3	2.2	-	-	2.53	-	-
Pot Cap-1 Maneuver	149	131	698	159	120	594	980	-	-	619	-	-
Stage 1	378	486	-	336	361	-	-	-	-	-	-	-
Stage 2	506	382	-	681	457	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	143	130	698	157	119	594	980	-	-	619	-	-
Mov Cap-2 Maneuver	310	307	-	305	289	-	-	-	-	-	-	-
Stage 1	378	484	-	336	361	-	-	-	-	-	-	-
Stage 2	488	382	-	674	455	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	15.8	17.3	0	0.1
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	980	-	-	340	325	619	-	-
HCM Lane V/C Ratio	0.001	-	-	0.018	0.103	0.005	-	-
HCM Control Delay (s)	8.7	-	-	15.8	17.3	10.8	-	-
HCM Lane LOS	A	-	-	C	C	B	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.3	0	-	-

MOVEMENT SUMMARY

Site: 101 [US 31 at SR 28 (West Roundabout) (Site Folder: Existing (2022) AM Peak)]

Site Category: Existing Design
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
East: SR 28 / W 200 S														
1u	U	2	0.0	3	0.0	0.388	13.2	LOS B	2.3	61.7	0.39	0.48	0.39	38.6
6	T1	149	12.3	189	12.3	0.388	4.8	LOS A	2.3	61.7	0.39	0.48	0.39	37.0
16	R2	224	4.3	284	4.3	0.388	4.5	LOS A	2.3	61.7	0.39	0.48	0.39	35.8
Approach		375	7.5	475	7.5	0.388	4.6	LOS A	2.3	61.7	0.39	0.48	0.39	36.3
North: SB US 31 Ramps														
7	L2	113	1.0	143	1.0	0.199	10.7	LOS B	0.9	24.6	0.38	0.63	0.38	35.4
14	R2	64	22.0	81	22.0	0.199	5.1	LOS A	0.9	24.6	0.38	0.63	0.38	33.6
Approach		177	8.6	224	8.6	0.199	8.7	LOS A	0.9	24.6	0.38	0.63	0.38	34.7
West: SR 28 / W 200 S														
5u	U	1	0.0	1	0.0	0.318	13.1	LOS B	1.7	48.8	0.37	0.54	0.37	37.2
5	L2	107	9.1	135	9.1	0.318	10.7	LOS B	1.7	48.8	0.37	0.54	0.37	35.9
2	T1	174	20.5	220	20.5	0.318	4.8	LOS A	1.7	48.8	0.37	0.54	0.37	35.6
Approach		282	16.1	357	16.1	0.318	7.1	LOS A	1.7	48.8	0.37	0.54	0.37	35.7
All Vehicles		834	10.6	1056	10.6	0.388	6.3	LOS A	2.3	61.7	0.38	0.53	0.38	35.8

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [US 31 at SR 28 (East Roundabout) (Site Folder: Existing (2022) AM Peak)]

Site Category: Existing Design
Roundabout

Vehicle Movement Performance															
Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: NB US 31 Off-Ramp														
3	L2	41	15.8	51	15.8	0.063	11.1	LOS B	0.2	6.0	0.37	0.63	0.37	35.0
3a	L1	6	0.0	8	0.0	0.063	9.4	LOS A	0.2	6.0	0.37	0.63	0.37	35.1
18a	R1	18	0.0	23	0.0	0.063	4.1	LOS A	0.2	6.0	0.37	0.63	0.37	35.0
18	R2	59	9.1	74	9.1	0.070	5.3	LOS A	0.2	6.7	0.40	0.57	0.40	35.7
Approach		124	9.6	155	9.6	0.070	7.2	LOS A	0.2	6.7	0.38	0.60	0.38	35.3
East: SR 28 / W 200 S														
1u	U	4	0.0	5	0.0	0.286	13.3	LOS B	1.3	34.5	0.41	0.45	0.41	38.2
6	T1	314	6.9	393	6.9	0.286	4.8	LOS A	1.3	34.5	0.41	0.45	0.41	36.7
16a	R1	25	8.7	31	8.7	0.034	4.8	LOS A	0.1	3.2	0.38	0.48	0.38	36.8
16b	R3	40	0.0	50	0.0	0.031	4.2	LOS A	0.1	2.9	0.22	0.49	0.22	36.1
Approach		383	6.2	479	6.2	0.286	4.8	LOS A	1.3	34.5	0.39	0.45	0.39	36.7
NorthEast: FCA Road														
1bx	L3	1	0.0	1	0.0	0.003	12.2	LOS B	0.0	0.3	0.43	0.55	0.43	36.8
16ax	R1	2	0.0	3	0.0	0.003	4.4	LOS A	0.0	0.3	0.43	0.55	0.43	35.7
16x	R2	4	50.0	5	50.0	0.005	4.7	LOS A	0.0	0.6	0.24	0.43	0.24	35.3
Approach		7	28.6	9	28.6	0.005	5.7	LOS A	0.0	0.6	0.32	0.48	0.32	35.6
West: SR 28 / W 200 S														
5u	U	15	14.3	19	14.3	0.272	12.7	LOS B	1.6	43.8	0.06	0.54	0.06	37.3
5b	L3	45	38.1	56	38.1	0.272	11.7	LOS B	1.6	43.8	0.06	0.54	0.06	35.9
5a	L1	100	2.2	125	2.2	0.272	8.7	LOS A	1.6	43.8	0.06	0.54	0.06	36.1
2	T1	121	13.4	151	13.4	0.272	4.0	LOS A	1.6	43.8	0.06	0.54	0.06	36.2
Approach		281	13.4	351	13.4	0.272	7.4	LOS A	1.6	43.8	0.06	0.54	0.06	36.2
All Vehicles		795	9.5	994	9.5	0.286	6.1	LOS A	1.6	43.8	0.27	0.51	0.27	36.3

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [US 31 at SR 28 (West Roundabout) (Site Folder: Existing (2022) PM Peak)]

Site Category: Existing Design
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
East: SR 28 / W 200 S														
1u	U	4	0.0	4	0.0	0.354	13.1	LOS B	1.9	51.1	0.35	0.46	0.35	38.7
6	T1	233	11.6	259	11.6	0.354	4.7	LOS A	1.9	51.1	0.35	0.46	0.35	37.0
16	R2	149	5.1	166	5.1	0.354	4.5	LOS A	1.9	51.1	0.35	0.46	0.35	35.9
Approach		386	9.0	429	9.0	0.354	4.7	LOS A	1.9	51.1	0.35	0.46	0.35	36.6
North: SB US 31 Ramps														
7	L2	13	0.0	14	0.0	0.102	10.8	LOS B	0.4	12.7	0.43	0.60	0.43	36.8
14	R2	64	37.3	71	37.3	0.102	5.8	LOS A	0.4	12.7	0.43	0.60	0.43	34.4
Approach		77	31.0	86	31.0	0.102	6.6	LOS A	0.4	12.7	0.43	0.60	0.43	34.8
West: SR 28 / W 200 S														
5u	U	3	0.0	3	0.0	0.278	12.6	LOS B	1.6	44.0	0.12	0.47	0.12	38.3
5	L2	110	14.7	122	14.7	0.278	10.2	LOS B	1.6	44.0	0.12	0.47	0.12	36.7
2	T1	212	10.2	236	10.2	0.278	4.0	LOS A	1.6	44.0	0.12	0.47	0.12	36.8
Approach		325	11.6	361	11.6	0.278	6.2	LOS A	1.6	44.0	0.12	0.47	0.12	36.7
All Vehicles		788	12.2	876	12.2	0.354	5.5	LOS A	1.9	51.1	0.26	0.48	0.26	36.5

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [US 31 at SR 28 (East Roundabout) (Site Folder: Existing (2022) PM Peak)]

Site Category: Existing Design
Roundabout

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: NB US 31 Off-Ramp														
3	L2	68	9.5	87	9.5	0.090	11.4	LOS B	0.3	9.1	0.43	0.71	0.43	34.0
3a	L1	1	0.0	1	0.0	0.090	9.8	LOS A	0.3	9.1	0.43	0.71	0.43	33.8
18	R2	133	4.1	171	4.1	0.124	4.9	LOS A	0.5	12.6	0.40	0.55	0.40	35.8
Approach		202	5.9	259	5.9	0.124	7.1	LOS A	0.5	12.6	0.41	0.61	0.41	35.1
East: SR 28 / W 200 S														
1u	U	6	0.0	8	0.0	0.213	13.0	LOS B	1.0	26.8	0.34	0.43	0.34	38.4
6	T1	222	12.6	285	12.6	0.213	4.6	LOS A	1.0	26.8	0.34	0.43	0.34	36.8
16a	R1	44	12.2	56	12.2	0.060	4.5	LOS A	0.2	6.3	0.34	0.46	0.34	36.9
16b	R3	1	0.0	1	0.0	0.001	3.9	LOS A	0.0	0.1	0.07	0.48	0.07	36.4
Approach		273	12.2	350	12.2	0.213	4.7	LOS A	1.0	26.8	0.34	0.43	0.34	36.9
NorthEast: FCA Road														
1ux	U	6	0.0	8	0.0	0.076	13.5	LOS B	0.3	6.9	0.43	0.66	0.43	36.3
1bx	L3	39	0.0	50	0.0	0.076	12.2	LOS B	0.3	6.9	0.43	0.66	0.43	35.8
16ax	R1	32	0.0	41	0.0	0.076	4.5	LOS A	0.3	6.9	0.43	0.66	0.43	34.8
16x	R2	86	1.3	110	1.3	0.072	4.1	LOS A	0.3	7.4	0.23	0.45	0.23	36.6
Approach		163	0.7	209	0.7	0.076	6.4	LOS A	0.3	7.4	0.33	0.55	0.33	36.0
West: SR 28 / W 200 S														
5u	U	14	23.1	18	23.1	0.255	13.2	LOS B	1.4	39.7	0.24	0.48	0.24	37.1
5b	L3	46	30.2	59	30.2	0.255	12.0	LOS B	1.4	39.7	0.24	0.48	0.24	36.3
5a	L1	6	16.7	8	16.7	0.255	9.2	LOS A	1.4	39.7	0.24	0.48	0.24	35.8
2	T1	165	15.7	212	15.7	0.255	4.3	LOS A	1.4	39.7	0.24	0.48	0.24	36.4
Approach		231	19.1	296	19.1	0.255	6.5	LOS A	1.4	39.7	0.24	0.48	0.24	36.4
All Vehicles		869	10.4	1114	10.4	0.255	6.1	LOS A	1.4	39.7	0.33	0.51	0.33	36.2

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
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Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

HCS7 Freeway Weaving Report

Project Information

Analyst	Pratik Srivastava	Date	12/16/2022
Agency		Analysis Year	2022
Jurisdiction		Time Period Analyzed	AM Peak
Project Description	Weave Analysis#1 on US 31 NB between US 24 EB and WB exit and entrance ramps	Unit	United States Customary

Geometric Data

Number of Lanes (N), ln	3	Segment Type	Freeway
Segment Length (L_S), ft	545	Number of Maneuver Lanes (N_{WL}), ln	2
Weaving Configuration	One-Sided	Ramp-to-Freeway Lane Changes (LC_{RF}), lc	1
Terrain Type	Level	Freeway-to-Ramp Lane Changes (LC_{FR}), lc	1
Percent Grade, %	-	Ramp-to-Ramp Lane Changes (LC_{RR}), lc	0
Interchange Density (ID), int/mi	0.33	Cross Weaving Managed Lane	No

Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Weather Type	Non-Severe Weather	Final Capacity Adjustment Factor (CAF)	1.000
Incident Type	No Incident	Demand Adjustment Factor (DAF)	1.000

Demand and Capacity

	FF	RF	RR	FR
Demand Volume (V_i), veh/h	363	26	0	5
Peak Hour Factor (PHF)	0.91	0.91	0.91	0.91
Total Trucks, %	28.50	37.50	0.00	20.00
Heavy Vehicle Adjustment Factor (f_{HV})	0.778	0.727	1.000	0.833
Flow Rate (v_i), pc/h	513	39	0	7

Weaving Flow Rate (v_W), pc/h	46	Freeway Max Capacity (c_{IFL}), pc/h/ln	2400
Non-Weaving Flow Rate (v_{NW}), pc/h	513	Density-Based Capacity (c_{IWL}), pc/h/ln	2184
Total Flow Rate (v), pc/h	559	Demand Flow-Based Capacity (c_{IW}), pc/h	29268
Volume Ratio (VR)	0.082	Weaving Segment Capacity (c_W), veh/h	5078
Minimum Lane Change Rate (LC_{MIN}), lc/h	46	Adjusted Weaving Area Capacity, pc/h	6552
Maximum Weaving Length (L_{MAX}), ft	3366	Volume-to-Capacity Ratio (v/c)	0.09

Speed and Density

Non-Weaving Vehicle Index (I_{NW})	9	Average Weaving Speed (S_W), mi/h	71.3
Non-Weaving Lane Change Rate (LC_{NW}), lc/h	0	Average Non-Weaving Speed (S_{NW}), mi/h	73.8
Weaving Lane Change Rate (LC_W), lc/h	115	Average Speed (S), mi/h	73.6
Weaving Lane Change Rate (LC_{All}), lc/h	115	Density (D), pc/mi/ln	2.5
Weaving Intensity Factor (W)	0.066	Level of Service (LOS)	A

HCS7 Freeway Weaving Report

Project Information

Analyst	Pratik Srivastava	Date	12/16/2022
Agency		Analysis Year	2022
Jurisdiction		Time Period Analyzed	PM Peak
Project Description	Weave Analysis#2 on US 31 NB between US 24 EB and WB exit and entrance ramps	Unit	United States Customary

Geometric Data

Number of Lanes (N), ln	3	Segment Type	Freeway
Segment Length (L_S), ft	545	Number of Maneuver Lanes (N_{WL}), ln	2
Weaving Configuration	One-Sided	Ramp-to-Freeway Lane Changes (LC_{RF}), lc	1
Terrain Type	Level	Freeway-to-Ramp Lane Changes (LC_{FR}), lc	1
Percent Grade, %	-	Ramp-to-Ramp Lane Changes (LC_{RR}), lc	0
Interchange Density (ID), int/mi	0.33	Cross Weaving Managed Lane	No

Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Weather Type	Non-Severe Weather	Final Capacity Adjustment Factor (CAF)	1.000
Incident Type	No Incident	Demand Adjustment Factor (DAF)	1.000

Demand and Capacity

	FF	RF	RR	FR
Demand Volume (V_i), veh/h	696	50	0	13
Peak Hour Factor (PHF)	0.91	0.91	0.91	0.91
Total Trucks, %	13.80	28.30	0.00	33.30
Heavy Vehicle Adjustment Factor (f_{HV})	0.879	0.779	1.000	0.750
Flow Rate (v_i), pc/h	870	71	0	19

Weaving Flow Rate (v_W), pc/h	90	Freeway Max Capacity (c_{IFL}), pc/h/ln	2400
Non-Weaving Flow Rate (v_{NW}), pc/h	870	Density-Based Capacity (c_{IWL}), pc/h/ln	2175
Total Flow Rate (v), pc/h	960	Demand Flow-Based Capacity (c_{IW}), pc/h	25532
Volume Ratio (VR)	0.094	Weaving Segment Capacity (c_W), veh/h	5671
Minimum Lane Change Rate (LC_{MIN}), lc/h	90	Adjusted Weaving Area Capacity, pc/h	6525
Maximum Weaving Length (L_{MAX}), ft	3481	Volume-to-Capacity Ratio (v/c)	0.15

Speed and Density

Non-Weaving Vehicle Index (I_{NW})	16	Average Weaving Speed (S_W), mi/h	70.2
Non-Weaving Lane Change Rate (LC_{NW}), lc/h	0	Average Non-Weaving Speed (S_{NW}), mi/h	72.8
Weaving Lane Change Rate (LC_W), lc/h	159	Average Speed (S), mi/h	72.5
Weaving Lane Change Rate (LC_{All}), lc/h	159	Density (D), pc/mi/ln	4.4
Weaving Intensity Factor (W)	0.086	Level of Service (LOS)	A

HCS7 Freeway Weaving Report

Project Information

Analyst	Pratik Srivastava	Date	12/16/2022
Agency		Analysis Year	2022
Jurisdiction		Time Period Analyzed	AM Peak
Project Description	Weave Analysis#3 on US 31 SB between US 24 EB and WB entrance and exit ramps	Unit	United States Customary

Geometric Data

Number of Lanes (N), ln	3	Segment Type	Freeway
Segment Length (L_S), ft	545	Number of Maneuver Lanes (N_{WL}), ln	2
Weaving Configuration	One-Sided	Ramp-to-Freeway Lane Changes (LC_{RF}), lc	1
Terrain Type	Level	Freeway-to-Ramp Lane Changes (LC_{FR}), lc	1
Percent Grade, %	-	Ramp-to-Ramp Lane Changes (LC_{RR}), lc	0
Interchange Density (ID), int/mi	0.33	Cross Weaving Managed Lane	No

Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Weather Type	Non-Severe Weather	Final Capacity Adjustment Factor (CAF)	1.000
Incident Type	No Incident	Demand Adjustment Factor (DAF)	1.000

Demand and Capacity

	FF	RF	RR	FR
Demand Volume (V_i), veh/h	376	216	0	56
Peak Hour Factor (PHF)	0.91	0.91	0.91	0.91
Total Trucks, %	23.20	16.50	0.00	40.40
Heavy Vehicle Adjustment Factor (f_{HV})	0.812	0.858	1.000	0.712
Flow Rate (v_i), pc/h	509	277	0	86

Weaving Flow Rate (v_W), pc/h	363	Freeway Max Capacity (c_{IFL}), pc/h/ln	2400
Non-Weaving Flow Rate (v_{NW}), pc/h	509	Density-Based Capacity (c_{IWL}), pc/h/ln	1917
Total Flow Rate (v), pc/h	872	Demand Flow-Based Capacity (c_{IW}), pc/h	5769
Volume Ratio (VR)	0.416	Weaving Segment Capacity (c_W), veh/h	4697
Minimum Lane Change Rate (LC_{MIN}), lc/h	363	Adjusted Weaving Area Capacity, pc/h	5751
Maximum Weaving Length (L_{MAX}), ft	6861	Volume-to-Capacity Ratio (v/c)	0.15

Speed and Density

Non-Weaving Vehicle Index (I_{NW})	9	Average Weaving Speed (S_W), mi/h	65.5
Non-Weaving Lane Change Rate (LC_{NW}), lc/h	0	Average Non-Weaving Speed (S_{NW}), mi/h	71.0
Weaving Lane Change Rate (LC_W), lc/h	432	Average Speed (S), mi/h	68.6
Weaving Lane Change Rate (LC_{All}), lc/h	432	Density (D), pc/mi/ln	4.2
Weaving Intensity Factor (W)	0.188	Level of Service (LOS)	A

HCS7 Freeway Weaving Report

Project Information

Analyst	Pratik Srivastava	Date	12/16/2022
Agency		Analysis Year	2022
Jurisdiction		Time Period Analyzed	PM Peak
Project Description	Weave Analysis#4 on US 31 SB between US 24 EB and WB entrance and exit ramps	Unit	United States Customary

Geometric Data

Number of Lanes (N), ln	3	Segment Type	Freeway
Segment Length (L_S), ft	545	Number of Maneuver Lanes (N_{WL}), ln	2
Weaving Configuration	One-Sided	Ramp-to-Freeway Lane Changes (LC_{RF}), lc	1
Terrain Type	Level	Freeway-to-Ramp Lane Changes (LC_{FR}), lc	1
Percent Grade, %	-	Ramp-to-Ramp Lane Changes (LC_{RR}), lc	0
Interchange Density (ID), int/mi	0.33	Cross Weaving Managed Lane	No

Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Weather Type	Non-Severe Weather	Final Capacity Adjustment Factor (CAF)	1.000
Incident Type	No Incident	Demand Adjustment Factor (DAF)	1.000

Demand and Capacity

	FF	RF	RR	FR
Demand Volume (V_i), veh/h	502	204	0	63
Peak Hour Factor (PHF)	0.91	0.91	0.91	0.91
Total Trucks, %	20.20	19.00	0.00	29.30
Heavy Vehicle Adjustment Factor (f_{HV})	0.832	0.840	1.000	0.773
Flow Rate (v_i), pc/h	663	267	0	90

Weaving Flow Rate (v_W), pc/h	357	Freeway Max Capacity (c_{IFL}), pc/h/ln	2400
Non-Weaving Flow Rate (v_{NW}), pc/h	663	Density-Based Capacity (c_{IWL}), pc/h/ln	1973
Total Flow Rate (v), pc/h	1020	Demand Flow-Based Capacity (c_{IW}), pc/h	6857
Volume Ratio (VR)	0.350	Weaving Segment Capacity (c_W), veh/h	4906
Minimum Lane Change Rate (LC_{MIN}), lc/h	357	Adjusted Weaving Area Capacity, pc/h	5919
Maximum Weaving Length (L_{MAX}), ft	6126	Volume-to-Capacity Ratio (v/c)	0.17

Speed and Density

Non-Weaving Vehicle Index (I_{NW})	12	Average Weaving Speed (S_W), mi/h	65.6
Non-Weaving Lane Change Rate (LC_{NW}), lc/h	0	Average Non-Weaving Speed (S_{NW}), mi/h	70.8
Weaving Lane Change Rate (LC_W), lc/h	426	Average Speed (S), mi/h	68.9
Weaving Lane Change Rate (LC_{All}), lc/h	426	Density (D), pc/mi/ln	4.9
Weaving Intensity Factor (W)	0.186	Level of Service (LOS)	A

HCS7 Freeway Merge Report

Project Information			
Analyst	Pratik Srivastava	Date	12/16/2022
Agency		Analysis Year	2022
Jurisdiction		Time Period Analyzed	AM Peak
Project Description	US 31 NB and US 24 WB On Ramp	Unit	United States Customary

Geometric Data		
	Freeway	Ramp
Number of Lanes (N), ln	2	1
Free-Flow Speed (FFS), mi/h	75.0	35.0
Segment Length (L) / Acceleration Length (L_A),ft	1500	580
Terrain Type	Level	Level
Percent Grade, %	-	-
Segment Type / Ramp Side	Freeway	Right

Adjustment Factors		
Driver Population	All Familiar	All Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	1.000	1.000
Final Capacity Adjustment Factor (CAF)	1.000	1.000
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity		
Demand Volume (V_i)	389	60
Peak Hour Factor (PHF)	0.91	0.91
Total Trucks, %	29.10	33.90
Single-Unit Trucks (SUT), %	-	-
Tractor-Trailers (TT), %	-	-
Heavy Vehicle Adjustment Factor (f_{HV})	0.775	0.747
Flow Rate (v_i),pc/h	552	88
Capacity (c), pc/h	4800	2000
Volume-to-Capacity Ratio (v/c)	0.13	0.04

Speed and Density			
Upstream Equilibrium Distance (L_{EQ}), ft	-	Number of Outer Lanes on Freeway (N_O)	0
Distance to Upstream Ramp (L_{UP}), ft	-	Speed Index (M_S)	0.288
Downstream Equilibrium Distance (L_{EQ}), ft	-	Flow Outer Lanes (v_{OA}), pc/h/ln	-
Distance to Downstream Ramp (L_{DOWN}), ft	-	On-Ramp Influence Area Speed (S_R), mi/h	65.5
Prop. Freeway Vehicles in Lane 1 and 2 (P_{FM})	1.000	Outer Lanes Freeway Speed (S_O), mi/h	75.0
Flow in Lanes 1 and 2 (v_{12}), pc/h	552	Ramp Junction Speed (S), mi/h	65.5
Flow Entering Ramp-Infl. Area (v_{R12}), pc/h	640	Average Density (D), pc/mi/ln	4.9
Level of Service (LOS)	A	Density in Ramp Influence Area (D_R), pc/mi/ln	6.9

HCS7 Freeway Merge Report

Project Information

Analyst	Pratik Srivastava	Date	12/16/2022
Agency		Analysis Year	2022
Jurisdiction		Time Period Analyzed	PM Peak
Project Description	US 31 NB and US 24 WB On Ramp	Unit	United States Customary

Geometric Data

	Freeway	Ramp
Number of Lanes (N), ln	2	1
Free-Flow Speed (FFS), mi/h	75.0	35.0
Segment Length (L) / Acceleration Length (LA),ft	1500	580
Terrain Type	Level	Level
Percent Grade, %	-	-
Segment Type / Ramp Side	Highway/CD Roadway	Right

Adjustment Factors

Driver Population	All Familiar	All Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	1.000	1.000
Final Capacity Adjustment Factor (CAF)	1.000	1.000
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity

Demand Volume (Vi)	746	47
Peak Hour Factor (PHF)	0.91	0.91
Total Trucks, %	14.77	36.40
Single-Unit Trucks (SUT), %	-	-
Tractor-Trailers (TT), %	-	-
Heavy Vehicle Adjustment Factor (fHV)	0.871	0.733
Flow Rate (vi),pc/h	941	70
Capacity (c), pc/h	4400	2000
Volume-to-Capacity Ratio (v/c)	0.23	0.04

Speed and Density

Upstream Equilibrium Distance (LEQ), ft	-	Number of Outer Lanes on Freeway (NO)	0
Distance to Upstream Ramp (LUP), ft	-	Speed Index (MS)	0.291
Downstream Equilibrium Distance (LEQ), ft	-	Flow Outer Lanes (vOA), pc/h/ln	-
Distance to Downstream Ramp (LDOWN), ft	-	On-Ramp Influence Area Speed (SR), mi/h	65.4
Prop. Freeway Vehicles in Lane 1 and 2 (PFM)	1.000	Outer Lanes Freeway Speed (SO), mi/h	75.0
Flow in Lanes 1 and 2 (v12), pc/h	941	Ramp Junction Speed (S), mi/h	65.4
Flow Entering Ramp-Infl. Area (vR12), pc/h	1011	Average Density (D), pc/mi/ln	7.7
Level of Service (LOS)	A	Density in Ramp Influence Area (DR), pc/mi/ln	9.8

HCS7 Freeway Merge Report

Project Information			
Analyst	Pratik Srivastava	Date	12/16/2022
Agency		Analysis Year	2022
Jurisdiction		Time Period Analyzed	AM Peak
Project Description	US 31 SB and US 24 EB On Ramp	Unit	United States Customary

Geometric Data		
	Freeway	Ramp
Number of Lanes (N), ln	2	1
Free-Flow Speed (FFS), mi/h	75.0	35.0
Segment Length (L) / Acceleration Length (L_A),ft	1500	590
Terrain Type	Level	Level
Percent Grade, %	-	-
Segment Type / Ramp Side	Freeway	Right

Adjustment Factors		
Driver Population	All Familiar	All Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	1.000	1.000
Final Capacity Adjustment Factor (CAF)	1.000	1.000
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity		
Demand Volume (V_i)	592	6
Peak Hour Factor (PHF)	0.91	0.91
Total Trucks, %	20.76	16.70
Single-Unit Trucks (SUT), %	-	-
Tractor-Trailers (TT), %	-	-
Heavy Vehicle Adjustment Factor (f_{HV})	0.828	0.857
Flow Rate (v_i),pc/h	786	8
Capacity (c), pc/h	4800	2000
Volume-to-Capacity Ratio (v/c)	0.17	0.00

Speed and Density			
Upstream Equilibrium Distance (L_{EQ}), ft	-	Number of Outer Lanes on Freeway (N_O)	0
Distance to Upstream Ramp (L_{UP}), ft	-	Speed Index (M_S)	0.288
Downstream Equilibrium Distance (L_{EQ}), ft	-	Flow Outer Lanes (v_{OA}), pc/h/ln	-
Distance to Downstream Ramp (L_{DOWN}), ft	-	On-Ramp Influence Area Speed (S_R), mi/h	65.5
Prop. Freeway Vehicles in Lane 1 and 2 (P_{FM})	1.000	Outer Lanes Freeway Speed (S_O), mi/h	75.0
Flow in Lanes 1 and 2 (v_{12}), pc/h	786	Ramp Junction Speed (S), mi/h	65.5
Flow Entering Ramp-Infl. Area (v_{R12}), pc/h	794	Average Density (D), pc/mi/ln	6.1
Level of Service (LOS)	A	Density in Ramp Influence Area (D_R), pc/mi/ln	8.0

HCS7 Freeway Merge Report

Project Information

Analyst	Pratik Srivastava	Date	12/16/2022
Agency		Analysis Year	2022
Jurisdiction		Time Period Analyzed	PM Peak
Project Description	US 31 SB and US 24 EB On Ramp	Unit	United States Customary

Geometric Data

	Freeway	Ramp
Number of Lanes (N), ln	2	1
Free-Flow Speed (FFS), mi/h	75.0	35.0
Segment Length (L) / Acceleration Length (L_A),ft	1500	590
Terrain Type	Level	Level
Percent Grade, %	-	-
Segment Type / Ramp Side	Freeway	Right

Adjustment Factors

Driver Population	All Familiar	All Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	1.000	1.000
Final Capacity Adjustment Factor (CAF)	1.000	1.000
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity

Demand Volume (V_i)	706	4
Peak Hour Factor (PHF)	0.91	0.91
Total Trucks, %	19.85	25.00
Single-Unit Trucks (SUT), %	-	-
Tractor-Trailers (TT), %	-	-
Heavy Vehicle Adjustment Factor (f_{HV})	0.834	0.800
Flow Rate (v_i),pc/h	930	5
Capacity (c), pc/h	4800	2000
Volume-to-Capacity Ratio (v/c)	0.19	0.00

Speed and Density

Upstream Equilibrium Distance (L_{EQ}), ft	-	Number of Outer Lanes on Freeway (N_O)	0
Distance to Upstream Ramp (L_{UP}), ft	-	Speed Index (M_S)	0.290
Downstream Equilibrium Distance (L_{EQ}), ft	-	Flow Outer Lanes (v_{OA}), pc/h/ln	-
Distance to Downstream Ramp (L_{DOWN}), ft	-	On-Ramp Influence Area Speed (S_R), mi/h	65.4
Prop. Freeway Vehicles in Lane 1 and 2 (P_{FM})	1.000	Outer Lanes Freeway Speed (S_O), mi/h	75.0
Flow in Lanes 1 and 2 (v_{12}), pc/h	930	Ramp Junction Speed (S), mi/h	65.4
Flow Entering Ramp-Infl. Area (v_{R12}), pc/h	935	Average Density (D), pc/mi/ln	7.1
Level of Service (LOS)	A	Density in Ramp Influence Area (D_R), pc/mi/ln	9.1

HCS7 Freeway Diverge Report

Project Information

Analyst	Pratik Srivastava	Date	12/16/2022
Agency		Analysis Year	2022
Jurisdiction		Time Period Analyzed	AM Peak
Project Description	US 31 NB and US 24 EB Off Ramp	Unit	United States Customary

Geometric Data

	Freeway	Ramp
Number of Lanes (N), ln	2	1
Free-Flow Speed (FFS), mi/h	75.0	35.0
Segment Length (L) / Deceleration Length (L_A),ft	1500	400
Terrain Type	Level	Level
Percent Grade, %	-	-
Segment Type / Ramp Side	Freeway	Right

Adjustment Factors

Driver Population	All Familiar	All Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	1.000	1.000
Final Capacity Adjustment Factor (CAF)	1.000	1.000
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity

Demand Volume (V_i)	368	192
Peak Hour Factor (PHF)	0.91	0.91
Total Trucks, %	28.38	14.00
Single-Unit Trucks (SUT), %	-	-
Tractor-Trailers (TT), %	-	-
Heavy Vehicle Adjustment Factor (f_{HV})	0.779	0.877
Flow Rate (v_i),pc/h	519	241
Capacity (c), pc/h	4800	2000
Volume-to-Capacity Ratio (v/c)	0.11	0.12

Speed and Density

Upstream Equilibrium Distance (L_{EQ}), ft	-	Number of Outer Lanes on Freeway (N_O)	0
Distance to Upstream Ramp (L_{UP}), ft	-	Speed Index (D_S)	0.450
Downstream Equilibrium Distance (L_{EQ}), ft	-	Flow Outer Lanes (v_{OA}), pc/h/ln	-
Distance to Downstream Ramp (L_{DOWN}), ft	-	Off-Ramp Influence Area Speed (S_R), mi/h	60.2
Prop. Freeway Vehicles in Lane 1 and 2 (P_{FD})	1.000	Outer Lanes Freeway Speed (S_O), mi/h	82.3
Flow in Lanes 1 and 2 (v_{12}), pc/h	519	Ramp Junction Speed (S), mi/h	60.2
Flow Entering Ramp-Infl. Area (v_{R12}), pc/h	-	Average Density (D), pc/mi/ln	4.3
Level of Service (LOS)	A	Density in Ramp Influence Area (D_R), pc/mi/ln	5.1

HCS7 Freeway Diverge Report

Project Information

Analyst	Pratik Srivastava	Date	12/16/2022
Agency		Analysis Year	2022
Jurisdiction		Time Period Analyzed	PM Peak
Project Description	US 31 NB and US 24 EB Off Ramp	Unit	United States Customary

Geometric Data

	Freeway	Ramp
Number of Lanes (N), ln	2	1
Free-Flow Speed (FFS), mi/h	75.0	35.0
Segment Length (L) / Deceleration Length (L_A),ft	1500	400
Terrain Type	Level	Level
Percent Grade, %	-	-
Segment Type / Ramp Side	Freeway	Right

Adjustment Factors

Driver Population	All Familiar	All Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	1.000	1.000
Final Capacity Adjustment Factor (CAF)	1.000	1.000
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity

Demand Volume (V_i)	709	165
Peak Hour Factor (PHF)	0.91	0.91
Total Trucks, %	14.16	11.80
Single-Unit Trucks (SUT), %	-	-
Tractor-Trailers (TT), %	-	-
Heavy Vehicle Adjustment Factor (f_{HV})	0.876	0.894
Flow Rate (v_i),pc/h	889	203
Capacity (c), pc/h	4800	2000
Volume-to-Capacity Ratio (v/c)	0.19	0.10

Speed and Density

Upstream Equilibrium Distance (L_{EQ}), ft	-	Number of Outer Lanes on Freeway (N_O)	0
Distance to Upstream Ramp (L_{UP}), ft	-	Speed Index (D_S)	0.446
Downstream Equilibrium Distance (L_{EQ}), ft	-	Flow Outer Lanes (v_{OA}), pc/h/ln	-
Distance to Downstream Ramp (L_{DOWN}), ft	-	Off-Ramp Influence Area Speed (S_R), mi/h	60.3
Prop. Freeway Vehicles in Lane 1 and 2 (P_{FD})	1.000	Outer Lanes Freeway Speed (S_O), mi/h	82.3
Flow in Lanes 1 and 2 (v_{12}), pc/h	889	Ramp Junction Speed (S), mi/h	60.3
Flow Entering Ramp-Infl. Area (v_{R12}), pc/h	-	Average Density (D), pc/mi/ln	7.4
Level of Service (LOS)	A	Density in Ramp Influence Area (D_R), pc/mi/ln	8.3

HCS7 Freeway Diverge Report

Project Information

Analyst	Pratik Srivastava	Date	12/16/2022
Agency		Analysis Year	2022
Jurisdiction		Time Period Analyzed	AM Peak
Project Description	US 31 SB and US 24 WB Off Ramp	Unit	United States Customary

Geometric Data

	Freeway	Ramp
Number of Lanes (N), ln	2	1
Free-Flow Speed (FFS), mi/h	75.0	35.0
Segment Length (L) / Deceleration Length (L_A),ft	1500	350
Terrain Type	Level	Level
Percent Grade, %	-	-
Segment Type / Ramp Side	Freeway	Right

Adjustment Factors

Driver Population	All Familiar	All Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	1.000	1.000
Final Capacity Adjustment Factor (CAF)	1.000	1.000
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity

Demand Volume (V_i)	432	42
Peak Hour Factor (PHF)	0.91	0.91
Total Trucks, %	25.43	17.90
Single-Unit Trucks (SUT), %	-	-
Tractor-Trailers (TT), %	-	-
Heavy Vehicle Adjustment Factor (f_{HV})	0.797	0.848
Flow Rate (v_i),pc/h	596	54
Capacity (c), pc/h	4800	2000
Volume-to-Capacity Ratio (v/c)	0.12	0.03

Speed and Density

Upstream Equilibrium Distance (L_{EQ}), ft	-	Number of Outer Lanes on Freeway (N_O)	0
Distance to Upstream Ramp (L_{UP}), ft	-	Speed Index (D_S)	0.433
Downstream Equilibrium Distance (L_{EQ}), ft	-	Flow Outer Lanes (v_{OA}), pc/h/ln	-
Distance to Downstream Ramp (L_{DOWN}), ft	-	Off-Ramp Influence Area Speed (S_R), mi/h	60.7
Prop. Freeway Vehicles in Lane 1 and 2 (P_{FD})	1.000	Outer Lanes Freeway Speed (S_O), mi/h	82.3
Flow in Lanes 1 and 2 (v_{12}), pc/h	596	Ramp Junction Speed (S), mi/h	60.7
Flow Entering Ramp-Infl. Area (v_{R12}), pc/h	-	Average Density (D), pc/mi/ln	4.9
Level of Service (LOS)	A	Density in Ramp Influence Area (D_R), pc/mi/ln	6.2

HCS7 Freeway Diverge Report

Project Information

Analyst	Pratik Srivastava	Date	12/16/2022
Agency		Analysis Year	2022
Jurisdiction		Time Period Analyzed	PM Peak
Project Description	US 31 SB and US 24 WB Off Ramp	Unit	United States Customary

Geometric Data

	Freeway	Ramp
Number of Lanes (N), ln	2	1
Free-Flow Speed (FFS), mi/h	75.0	35.0
Segment Length (L) / Deceleration Length (L_A),ft	1500	350
Terrain Type	Level	Level
Percent Grade, %	-	-
Segment Type / Ramp Side	Freeway	Right

Adjustment Factors

Driver Population	All Familiar	All Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	1.000	1.000
Final Capacity Adjustment Factor (CAF)	1.000	1.000
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity

Demand Volume (V_i)	565	24
Peak Hour Factor (PHF)	0.91	0.91
Total Trucks, %	21.21	36.40
Single-Unit Trucks (SUT), %	-	-
Tractor-Trailers (TT), %	-	-
Heavy Vehicle Adjustment Factor (f_{HV})	0.825	0.733
Flow Rate (v_i),pc/h	753	36
Capacity (c), pc/h	4800	2000
Volume-to-Capacity Ratio (v/c)	0.16	0.02

Speed and Density

Upstream Equilibrium Distance (L_{EQ}), ft	-	Number of Outer Lanes on Freeway (N_O)	0
Distance to Upstream Ramp (L_{UP}), ft	-	Speed Index (D_S)	0.431
Downstream Equilibrium Distance (L_{EQ}), ft	-	Flow Outer Lanes (v_{OA}), pc/h/ln	-
Distance to Downstream Ramp (L_{DOWN}), ft	-	Off-Ramp Influence Area Speed (S_R), mi/h	60.8
Prop. Freeway Vehicles in Lane 1 and 2 (P_{FD})	1.000	Outer Lanes Freeway Speed (S_O), mi/h	82.3
Flow in Lanes 1 and 2 (v_{12}), pc/h	753	Ramp Junction Speed (S), mi/h	60.8
Flow Entering Ramp-Infl. Area (v_{R12}), pc/h	-	Average Density (D), pc/mi/ln	6.2
Level of Service (LOS)	A	Density in Ramp Influence Area (D_R), pc/mi/ln	7.6

APPENDIX F: FUTURE (2045) TRAFFIC ANALYSIS

Intersection	
Int Delay, s/veh	3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	22	3	81	16	10	18	1011	51	11	1386	27
Future Vol, veh/h	2	22	3	81	16	10	18	1011	51	11	1386	27
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	350	-	-	330	-	-
Veh in Median Storage, #	-	2	-	-	2	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	12	0	12	5	22	6	0
Mvmt Flow	2	23	3	85	17	11	19	1064	54	12	1459	28

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	2076	2653	744	1894	2640	559	1487	0	0	1118	0	0
Stage 1	1497	1497	-	1129	1129	-	-	-	-	-	-	-
Stage 2	579	1156	-	765	1511	-	-	-	-	-	-	-
Critical Hdwy	7.5	6.5	6.9	7.5	6.5	7.14	4.1	-	-	4.54	-	-
Critical Hdwy Stg 1	6.5	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.5	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.42	2.2	-	-	2.42	-	-
Pot Cap-1 Maneuver	32	~ 23	362	~ 44	24	448	458	-	-	517	-	-
Stage 1	131	188	-	221	281	-	-	-	-	-	-	-
Stage 2	473	273	-	366	185	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	27	~ 22	362	~ 36	22	448	458	-	-	517	-	-
Mov Cap-2 Maneuver	115	140	-	164	131	-	-	-	-	-	-	-
Stage 1	126	184	-	212	269	-	-	-	-	-	-	-
Stage 2	415	262	-	310	181	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	35	61.7	0.2	0.1
HCM LOS	E	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	458	-	-	148	168	517	-	-
HCM Lane V/C Ratio	0.041	-	-	0.192	0.67	0.022	-	-
HCM Control Delay (s)	13.2	-	-	35	61.7	12.1	-	-
HCM Lane LOS	B	-	-	E	F	B	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.7	3.9	0.1	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	3	6	16	82	3	13	0	982	20	15	1325	3
Future Vol, veh/h	3	6	16	82	3	13	0	982	20	15	1325	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	400	-	-	325	-	-
Veh in Median Storage, #	-	2	-	-	2	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	0	0	0	0	0	0	0	13	12	0	7	0
Mvmt Flow	3	7	18	90	3	14	0	1079	22	16	1456	3

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	2031	2591	730	1854	2581	551	1459	0	0	1101	0	0
Stage 1	1490	1490	-	1090	1090	-	-	-	-	-	-	-
Stage 2	541	1101	-	764	1491	-	-	-	-	-	-	-
Critical Hdwy	7.5	6.5	6.9	7.5	6.5	6.9	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.5	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.5	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	34	26	369	~ 47	26	483	469	-	-	642	-	-
Stage 1	132	189	-	233	294	-	-	-	-	-	-	-
Stage 2	498	290	-	367	189	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	32	25	369	~ 42	25	483	469	-	-	642	-	-
Mov Cap-2 Maneuver	121	145	-	183	147	-	-	-	-	-	-	-
Stage 1	132	184	-	233	294	-	-	-	-	-	-	-
Stage 2	478	290	-	329	184	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	22.9	43	0	0.1
HCM LOS	C	E		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	469	-	-	228	198	642	-	-
HCM Lane V/C Ratio	-	-	-	0.12	0.544	0.026	-	-
HCM Control Delay (s)	0	-	-	22.9	43	10.8	-	-
HCM Lane LOS	A	-	-	C	E	B	-	-
HCM 95th %tile Q(veh)	0	-	-	0.4	2.9	0.1	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	14	32	27	34	18	46	0	1077	15	46	1278	14
Future Volume (veh/h)	14	32	27	34	18	46	0	1077	15	46	1278	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1707	1826	1663	1441	1900	1900	1752	1767	1900	1781	1900
Adj Flow Rate, veh/h	16	36	30	38	20	52	0	1210	17	52	1436	16
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	0	13	5	16	31	0	0	10	9	0	8	0
Cap, veh/h	65	89	63	87	35	63	76	2471	1111	351	2545	28
Arrive On Green	0.11	0.11	0.11	0.11	0.11	0.11	0.00	0.74	0.74	0.74	0.74	0.74
Sat Flow, veh/h	187	835	590	334	333	598	372	3328	1497	462	3429	38
Grp Volume(v), veh/h	82	0	0	110	0	0	0	1210	17	52	708	744
Grp Sat Flow(s),veh/h/ln	1612	0	0	1266	0	0	372	1664	1497	462	1692	1775
Q Serve(g_s), s	0.0	0.0	0.0	3.3	0.0	0.0	0.0	13.9	0.3	4.8	17.5	17.5
Cycle Q Clear(g_c), s	4.5	0.0	0.0	7.9	0.0	0.0	0.0	13.9	0.3	18.7	17.5	17.5
Prop In Lane	0.20		0.37	0.35		0.47	1.00		1.00	1.00		0.02
Lane Grp Cap(c), veh/h	217	0	0	186	0	0	76	2471	1111	351	1256	1317
V/C Ratio(X)	0.38	0.00	0.00	0.59	0.00	0.00	0.00	0.49	0.02	0.15	0.56	0.56
Avail Cap(c_a), veh/h	300	0	0	252	0	0	98	2661	1197	377	1353	1419
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	39.7	0.0	0.0	41.1	0.0	0.0	0.0	4.9	3.2	8.7	5.4	5.4
Incr Delay (d2), s/veh	1.1	0.0	0.0	3.0	0.0	0.0	0.0	0.5	0.0	0.7	1.5	1.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.8	0.0	0.0	2.6	0.0	0.0	0.0	2.8	0.1	0.5	3.9	4.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	40.8	0.0	0.0	44.1	0.0	0.0	0.0	5.5	3.2	9.4	6.9	6.8
LnGrp LOS	D	A	A	D	A	A	A	A	A	A	A	A
Approach Vol, veh/h		82			110			1227			1504	
Approach Delay, s/veh		40.8			44.1			5.4			6.9	
Approach LOS		D			D			A			A	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		77.6		16.7		77.6		16.7				
Change Period (Y+Rc), s		7.6		6.7		7.6		6.7				
Max Green Setting (Gmax), s		75.4		15.3		75.4		15.3				
Max Q Clear Time (g_c+I1), s		15.9		6.5		20.7		9.9				
Green Ext Time (p_c), s		30.8		0.2		38.1		0.2				

Intersection Summary			
HCM 6th Ctrl Delay			8.6
HCM 6th LOS			A

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	0	3	19	0	14	5	993	0	14	1085	6
Future Vol, veh/h	2	0	3	19	0	14	5	993	0	14	1085	6
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	350	-	-	400	-	-
Veh in Median Storage, #	-	2	-	-	2	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0	0	12	0	0	9	0
Mvmt Flow	2	0	3	21	0	15	5	1079	0	15	1179	7

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1763	2302	593	1709	2305	540	1186	0	0	1079	0	0
Stage 1	1213	1213	-	1089	1089	-	-	-	-	-	-	-
Stage 2	550	1089	-	620	1216	-	-	-	-	-	-	-
Critical Hdwy	7.5	6.5	6.9	7.5	6.5	6.9	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.5	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.5	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	55	39	454	60	39	491	596	-	-	654	-	-
Stage 1	196	257	-	233	294	-	-	-	-	-	-	-
Stage 2	492	294	-	447	256	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	52	38	454	58	38	491	596	-	-	654	-	-
Mov Cap-2 Maneuver	173	178	-	198	180	-	-	-	-	-	-	-
Stage 1	194	251	-	231	292	-	-	-	-	-	-	-
Stage 2	473	292	-	434	250	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	18.4	20.7	0.1	0.1
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	596	-	-	275	265	654	-	-
HCM Lane V/C Ratio	0.009	-	-	0.02	0.135	0.023	-	-
HCM Control Delay (s)	11.1	-	-	18.4	20.7	10.6	-	-
HCM Lane LOS	B	-	-	C	C	B	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.5	0.1	-	-

HCM 6th Signalized Intersection Summary
60: US 31 (North of Kokomo) & SR 18

Timing Plan:

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	65	40	27	55	35	76	16	830	56	28	1028	18
Future Volume (veh/h)	65	40	27	55	35	76	16	830	56	28	1028	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1841	1426	1752	1796	1515	1752	1781	1678	1722	1500	1781	1693
Adj Flow Rate, veh/h	68	42	28	58	37	80	17	874	59	29	1082	19
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	4	32	10	7	26	10	8	15	12	27	8	14
Cap, veh/h	137	70	34	190	97	278	68	1476	676	69	1550	657
Arrive On Green	0.19	0.19	0.19	0.19	0.19	0.19	0.04	0.46	0.46	0.05	0.46	0.46
Sat Flow, veh/h	339	372	181	595	520	1485	1697	3188	1459	1428	3385	1434
Grp Volume(v), veh/h	138	0	0	95	0	80	17	874	59	29	1082	19
Grp Sat Flow(s),veh/h/ln	893	0	0	1114	0	1485	1697	1594	1459	1428	1692	1434
Q Serve(g_s), s	6.2	0.0	0.0	0.0	0.0	3.4	0.7	14.9	1.7	1.4	18.7	0.5
Cycle Q Clear(g_c), s	11.6	0.0	0.0	5.3	0.0	3.4	0.7	14.9	1.7	1.4	18.7	0.5
Prop In Lane	0.49		0.20	0.61		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	240	0	0	288	0	278	68	1476	676	69	1550	657
V/C Ratio(X)	0.57	0.00	0.00	0.33	0.00	0.29	0.25	0.59	0.09	0.42	0.70	0.03
Avail Cap(c_a), veh/h	298	0	0	350	0	354	231	1841	843	156	1816	770
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	29.5	0.0	0.0	26.2	0.0	25.6	34.2	14.6	11.0	33.9	15.8	10.9
Incr Delay (d2), s/veh	2.2	0.0	0.0	0.7	0.0	0.6	2.3	1.4	0.2	4.8	2.2	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.3	0.0	0.0	1.4	0.0	1.1	0.3	4.5	0.5	0.5	6.1	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	31.6	0.0	0.0	26.9	0.0	26.2	36.5	16.0	11.2	38.7	18.0	11.0
LnGrp LOS	C	A	A	C	A	C	D	B	B	D	B	B
Approach Vol, veh/h		138			175			950			1130	
Approach Delay, s/veh		31.6			26.6			16.0			18.4	
Approach LOS		C			C			B			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.2	43.0		21.3	9.5	42.6		21.3				
Change Period (Y+Rc), s	5.6	9.0		7.5	6.6	9.0		7.5				
Max Green Setting (Gmax), s	8.0	42.4		17.5	10.0	39.4		17.5				
Max Q Clear Time (g_c+I1), s	3.4	16.9		13.6	2.7	20.7		7.3				
Green Ext Time (p_c), s	0.0	13.6		0.2	0.0	12.9		0.5				
Intersection Summary												
HCM 6th Ctrl Delay			18.8									
HCM 6th LOS			B									

Intersection	
Int Delay, s/veh	2.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	9	0	9	43	0	67	16	823	57	114	1103	22
Future Vol, veh/h	9	0	9	43	0	67	16	823	57	114	1103	22
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	300	-	-	-	600	-	325	625	-	640
Veh in Median Storage, #	-	2	-	-	2	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	29	0	14	0	0	12	0	16	5	9	11	12
Mvmt Flow	10	0	10	48	0	74	18	914	63	127	1226	24

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1973	2493	613	1817	2454	457	1250	0	0	977	0	0
Stage 1	1480	1480	-	950	950	-	-	-	-	-	-	-
Stage 2	493	1013	-	867	1504	-	-	-	-	-	-	-
Critical Hdwy	8.08	6.5	7.18	7.5	6.5	7.14	4.1	-	-	4.28	-	-
Critical Hdwy Stg 1	7.08	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	7.08	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.79	4	3.44	3.5	4	3.42	2.2	-	-	2.29	-	-
Pot Cap-1 Maneuver	27	30	407	50	31	524	564	-	-	661	-	-
Stage 1	102	191	-	283	341	-	-	-	-	-	-	-
Stage 2	462	319	-	318	186	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	19	23	407	~ 41	24	524	564	-	-	661	-	-
Mov Cap-2 Maneuver	88	112	-	172	117	-	-	-	-	-	-	-
Stage 1	99	154	-	274	330	-	-	-	-	-	-	-
Stage 2	384	309	-	251	150	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	32.6	26	0.2	1.1
HCM LOS	D	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	564	-	-	88	407	291	661	-	-
HCM Lane V/C Ratio	0.032	-	-	0.114	0.025	0.42	0.192	-	-
HCM Control Delay (s)	11.6	-	-	51.1	14.1	26	11.7	-	-
HCM Lane LOS	B	-	-	F	B	D	B	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.4	0.1	2	0.7	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	0.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	41	64	734	22	60	1059
Future Vol, veh/h	41	64	734	22	60	1059
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Free	-	None	-	None
Storage Length	0	100	-	275	300	-
Veh in Median Storage, #	2	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	97	97	97	97	97	97
Heavy Vehicles, %	0	0	13	0	2	10
Mvmt Flow	42	66	757	23	62	1092

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1427	-	0	0	780	0
Stage 1	757	-	-	-	-	-
Stage 2	670	-	-	-	-	-
Critical Hdwy	6.8	-	-	-	4.14	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	-	-	-	2.22	-
Pot Cap-1 Maneuver	128	0	-	-	833	-
Stage 1	429	0	-	-	-	-
Stage 2	476	0	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	119	-	-	-	833	-
Mov Cap-2 Maneuver	313	-	-	-	-	-
Stage 1	429	-	-	-	-	-
Stage 2	441	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	18.3	0	0.5
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	313	-	833	-
HCM Lane V/C Ratio	-	-	0.135	-	0.074	-
HCM Control Delay (s)	-	-	18.3	0	9.7	-
HCM Lane LOS	-	-	C	A	A	-
HCM 95th %tile Q(veh)	-	-	0.5	-	0.2	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	106	0	88	0	0	0	25	832	0	0	1073	79
Future Volume (veh/h)	106	0	88	0	0	0	25	832	0	0	1073	79
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1811	1900	1752	1900	1900	1900	1826	1663	1900	1900	1752	1856
Adj Flow Rate, veh/h	114	0	95	0	0	0	27	895	0	0	1154	85
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	6	0	10	0	0	0	5	16	0	0	10	3
Cap, veh/h	192	9	116	0	317	0	193	2054	1047	80	1550	732
Arrive On Green	0.17	0.00	0.17	0.00	0.00	0.00	0.11	0.65	0.00	0.00	0.47	0.47
Sat Flow, veh/h	779	54	694	0	1900	0	1739	3159	1610	632	3328	1572
Grp Volume(v), veh/h	209	0	0	0	0	0	27	895	0	0	1154	85
Grp Sat Flow(s),veh/h/ln	1526	0	0	0	1900	0	1739	1580	1610	632	1664	1572
Q Serve(g_s), s	11.0	0.0	0.0	0.0	0.0	0.0	1.3	12.4	0.0	0.0	25.5	2.7
Cycle Q Clear(g_c), s	11.9	0.0	0.0	0.0	0.0	0.0	1.3	12.4	0.0	0.0	25.5	2.7
Prop In Lane	0.55		0.45	0.00		0.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	316	0	0	0	317	0	193	2054	1047	80	1550	732
V/C Ratio(X)	0.66	0.00	0.00	0.00	0.00	0.00	0.14	0.44	0.00	0.00	0.74	0.12
Avail Cap(c_a), veh/h	325	0	0	0	327	0	193	2054	1047	80	1550	732
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	36.1	0.0	0.0	0.0	0.0	0.0	36.1	7.7	0.0	0.0	19.7	13.6
Incr Delay (d2), s/veh	7.5	0.0	0.0	0.0	0.0	0.0	0.4	0.7	0.0	0.0	3.3	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.8	0.0	0.0	0.0	0.0	0.0	0.5	3.1	0.0	0.0	9.0	0.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	43.7	0.0	0.0	0.0	0.0	0.0	36.5	8.4	0.0	0.0	23.0	13.9
LnGrp LOS	D	A	A	A	A	A	D	A	A	A	C	B
Approach Vol, veh/h		209			0			922			1239	
Approach Delay, s/veh		43.7			0.0			9.2			22.3	
Approach LOS		D						A			C	
Timer - Assigned Phs		2		4	5	6		8				
Phs Duration (G+Y+Rc), s		67.5		22.5	16.6	50.9		22.5				
Change Period (Y+Rc), s		9.0		7.5	6.6	9.0		7.5				
Max Green Setting (Gmax), s		58.0		15.5	10.0	41.4		15.5				
Max Q Clear Time (g_c+I1), s		14.4		13.9	3.3	27.5		0.0				
Green Ext Time (p_c), s		15.6		0.3	0.0	10.3		0.0				
Intersection Summary												
HCM 6th Ctrl Delay			19.1									
HCM 6th LOS			B									

Intersection	
Int Delay, s/veh	1.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	10	9	18	59	11	13	10	897	27	20	1061	16
Future Vol, veh/h	10	9	18	59	11	13	10	897	27	20	1061	16
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	350	100	-	350
Veh in Median Storage, #	-	2	-	-	2	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	97	97	97	97	97	97	97	97	97	97	97	97
Heavy Vehicles, %	0	0	7	2	0	20	25	15	0	6	10	0
Mvmt Flow	10	9	19	61	11	13	10	925	28	21	1094	16

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1624	2109	547	1539	2097	463	1110	0	0	953	0	0
Stage 1	1136	1136	-	945	945	-	-	-	-	-	-	-
Stage 2	488	973	-	594	1152	-	-	-	-	-	-	-
Critical Hdwy	7.5	6.5	7.04	7.54	6.5	7.3	4.6	-	-	4.22	-	-
Critical Hdwy Stg 1	6.5	5.5	-	6.54	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.5	5.5	-	6.54	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.37	3.52	4	3.5	2.45	-	-	2.26	-	-
Pot Cap-1 Maneuver	69	52	468	79	53	500	507	-	-	693	-	-
Stage 1	218	279	-	282	343	-	-	-	-	-	-	-
Stage 2	535	333	-	458	275	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	62	49	468	70	50	500	507	-	-	693	-	-
Mov Cap-2 Maneuver	190	197	-	224	198	-	-	-	-	-	-	-
Stage 1	214	271	-	276	336	-	-	-	-	-	-	-
Stage 2	493	326	-	412	267	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	20.4	27.9	0.1	0.2
HCM LOS	C	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	507	-	-	271	241	693	-	-
HCM Lane V/C Ratio	0.02	-	-	0.141	0.355	0.03	-	-
HCM Control Delay (s)	12.2	-	-	20.4	27.9	10.4	-	-
HCM Lane LOS	B	-	-	C	D	B	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.5	1.5	0.1	-	-

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	295	33	640	163	7	694
Future Volume (veh/h)	295	33	640	163	7	694
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1885	1841	1648	1856	1648	1693
Adj Flow Rate, veh/h	311	35	674	0	7	731
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	1	4	17	3	17	14
Cap, veh/h	397	345	1543		380	1585
Arrive On Green	0.22	0.22	0.49	0.00	0.49	0.49
Sat Flow, veh/h	1795	1560	3214	1572	674	3300
Grp Volume(v), veh/h	311	35	674	0	7	731
Grp Sat Flow(s),veh/h/ln	1795	1560	1566	1572	674	1608
Q Serve(g_s), s	8.3	0.9	7.1	0.0	0.3	7.6
Cycle Q Clear(g_c), s	8.3	0.9	7.1	0.0	7.4	7.6
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	397	345	1543		380	1585
V/C Ratio(X)	0.78	0.10	0.44		0.02	0.46
Avail Cap(c_a), veh/h	1717	1491	3519		805	3614
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	18.6	15.7	8.3	0.0	10.7	8.4
Incr Delay (d2), s/veh	3.4	0.1	0.5	0.0	0.1	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.2	0.3	1.5	0.0	0.0	1.6
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	22.0	15.9	8.9	0.0	10.8	9.0
LnGrp LOS	C	B	A		B	A
Approach Vol, veh/h	346		674			738
Approach Delay, s/veh	21.4		8.9			9.0
Approach LOS	C		A			A
Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		33.0		17.7		33.0
Change Period (Y+Rc), s		8.0		6.5		8.0
Max Green Setting (Gmax), s		57.0		48.5		57.0
Max Q Clear Time (g_c+I1), s		9.1		10.3		9.6
Green Ext Time (p_c), s		11.0		1.0		12.4
Intersection Summary						
HCM 6th Ctrl Delay			11.4			
HCM 6th LOS			B			
Notes						

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

Intersection												
Int Delay, s/veh	1.2											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	18	13	3	26	11	28	2	670	6	15	671	9
Future Vol, veh/h	18	13	3	26	11	28	2	670	6	15	671	9
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	475	-	-	450	-	-
Veh in Median Storage, #	-	2	-	-	2	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0	50	16	0	0	14	0
Mvmt Flow	19	14	3	27	12	29	2	705	6	16	706	9

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1106	1458	358	1104	1459	356	715	0	0	711	0	0
Stage 1	743	743	-	712	712	-	-	-	-	-	-	-
Stage 2	363	715	-	392	747	-	-	-	-	-	-	-
Critical Hdwy	7.5	6.5	6.9	7.5	6.5	6.9	5.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.5	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.5	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.7	-	-	2.2	-	-
Pot Cap-1 Maneuver	168	131	644	168	131	646	626	-	-	898	-	-
Stage 1	378	425	-	394	439	-	-	-	-	-	-	-
Stage 2	634	438	-	610	423	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	153	128	644	159	128	646	626	-	-	898	-	-
Mov Cap-2 Maneuver	324	306	-	336	309	-	-	-	-	-	-	-
Stage 1	377	417	-	393	438	-	-	-	-	-	-	-
Stage 2	587	437	-	577	415	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	17.2	15.4	0	0.2
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	626	-	-	331	416	898	-	-
HCM Lane V/C Ratio	0.003	-	-	0.108	0.164	0.018	-	-
HCM Control Delay (s)	10.8	-	-	17.2	15.4	9.1	-	-
HCM Lane LOS	B	-	-	C	C	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.4	0.6	0.1	-	-

Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	49	65	643	661	34
Future Vol, veh/h	0	49	65	643	661	34
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Stop	-	None	-	Yield
Storage Length	-	0	275	-	-	200
Veh in Median Storage, #	2	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	0	0	2	16	14	11
Mvmt Flow	0	51	68	670	689	35

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	345	689	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.9	4.14	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.3	2.22	-	-	-
Pot Cap-1 Maneuver	0	657	901	-	-	-
Stage 1	0	-	-	-	-	-
Stage 2	0	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	657	901	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.9	0.9	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	901	-	657	-	-
HCM Lane V/C Ratio	0.075	-	0.078	-	-
HCM Control Delay (s)	9.3	-	10.9	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0.2	-	0.3	-	-

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	2	5	22	3	23	2	604	36	20	686	0
Future Vol, veh/h	0	2	5	22	3	23	2	604	36	20	686	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	2	-	-	2	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	96	96	96	96	96	96	96	96	96	96	96	96
Heavy Vehicles, %	0	0	0	0	0	0	0	18	0	0	15	0
Mvmt Flow	0	2	5	23	3	24	2	629	38	21	715	0

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1077	1428	358	1053	1409	334	715	0	0	667	0	0
Stage 1	757	757	-	652	652	-	-	-	-	-	-	-
Stage 2	320	671	-	401	757	-	-	-	-	-	-	-
Critical Hdwy	7.5	6.5	6.9	7.5	6.5	6.9	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.5	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.5	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	176	136	644	183	140	668	895	-	-	932	-	-
Stage 1	370	419	-	428	467	-	-	-	-	-	-	-
Stage 2	672	458	-	602	419	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	163	130	644	175	134	668	895	-	-	932	-	-
Mov Cap-2 Maneuver	326	305	-	357	313	-	-	-	-	-	-	-
Stage 1	369	403	-	426	465	-	-	-	-	-	-	-
Stage 2	641	456	-	572	403	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	12.5	13.9	0	0.4
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	895	-	-	489	454	932	-	-
HCM Lane V/C Ratio	0.002	-	-	0.015	0.11	0.022	-	-
HCM Control Delay (s)	9	0	-	12.5	13.9	9	0.2	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0	0.4	0.1	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	6	2	9	93	7	71	8	436	84	63	471	3
Future Volume (veh/h)	6	2	9	93	7	71	8	436	84	63	471	3
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1900	1900	1544	1900	1589	1900	1604	1530	1737	1618	1900
Adj Flow Rate, veh/h	6	2	9	97	7	74	8	454	88	66	491	3
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	0	0	0	24	0	21	0	20	25	11	19	0
Cap, veh/h	103	45	122	160	16	92	21	1865	793	83	2014	1055
Arrive On Green	0.14	0.14	0.14	0.14	0.14	0.14	0.01	0.61	0.61	0.05	0.66	0.66
Sat Flow, veh/h	434	313	840	784	109	635	1810	3047	1296	1654	3075	1610
Grp Volume(v), veh/h	17	0	0	178	0	0	8	454	88	66	491	3
Grp Sat Flow(s),veh/h/ln	1587	0	0	1528	0	0	1810	1523	1296	1654	1537	1610
Q Serve(g_s), s	0.0	0.0	0.0	12.5	0.0	0.0	0.5	8.2	3.4	4.7	7.9	0.1
Cycle Q Clear(g_c), s	1.0	0.0	0.0	13.5	0.0	0.0	0.5	8.2	3.4	4.7	7.9	0.1
Prop In Lane	0.35		0.53	0.54		0.42	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	271	0	0	268	0	0	21	1865	793	83	2014	1055
V/C Ratio(X)	0.06	0.00	0.00	0.66	0.00	0.00	0.38	0.24	0.11	0.79	0.24	0.00
Avail Cap(c_a), veh/h	552	0	0	547	0	0	134	1865	793	240	2014	1055
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	44.3	0.0	0.0	49.6	0.0	0.0	58.9	10.6	9.7	56.3	8.5	7.2
Incr Delay (d2), s/veh	0.2	0.0	0.0	5.9	0.0	0.0	10.7	0.3	0.3	15.1	0.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	0.0	5.6	0.0	0.0	0.3	2.5	0.9	2.3	2.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	44.5	0.0	0.0	55.5	0.0	0.0	69.6	10.9	10.0	71.5	8.8	7.2
LnGrp LOS	D	A	A	E	A	A	E	B	A	E	A	A
Approach Vol, veh/h		17			178			550			560	
Approach Delay, s/veh		44.5			55.5			11.6			16.2	
Approach LOS		D			E			B			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	12.7	82.4		24.9	7.5	87.6		24.9				
Change Period (Y+Rc), s	6.6	9.0		7.5	6.1	9.0		7.5				
Max Green Setting (Gmax), s	17.4	40.0		39.5	8.9	49.0		39.5				
Max Q Clear Time (g_c+I1), s	6.7	10.2		3.0	2.5	9.9		15.5				
Green Ext Time (p_c), s	0.1	7.9		0.1	0.0	8.2		1.9				
Intersection Summary												
HCM 6th Ctrl Delay			20.0									
HCM 6th LOS			B									

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	11	10	2	9	9	5	0	481	22	6	587	2
Future Vol, veh/h	11	10	2	9	9	5	0	481	22	6	587	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	300	-	300	300	-	-
Veh in Median Storage, #	-	2	-	-	2	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	0	0	14	0	0	0	24	6	40	19	0
Mvmt Flow	12	11	2	10	10	6	0	534	24	7	652	2

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	939	1225	327	880	1202	267	654	0	0	558	0	0
Stage 1	667	667	-	534	534	-	-	-	-	-	-	-
Stage 2	272	558	-	346	668	-	-	-	-	-	-	-
Critical Hdwy	7.5	6.5	6.9	7.78	6.5	6.9	4.1	-	-	4.9	-	-
Critical Hdwy Stg 1	6.5	5.5	-	6.78	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.5	5.5	-	6.78	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.64	4	3.3	2.2	-	-	2.6	-	-
Pot Cap-1 Maneuver	222	180	675	223	186	737	943	-	-	787	-	-
Stage 1	419	460	-	468	528	-	-	-	-	-	-	-
Stage 2	716	515	-	611	459	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	214	178	675	216	184	737	943	-	-	787	-	-
Mov Cap-2 Maneuver	375	359	-	393	366	-	-	-	-	-	-	-
Stage 1	419	456	-	468	528	-	-	-	-	-	-	-
Stage 2	697	515	-	589	455	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	15.1	14	0	0.1
HCM LOS	C	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	943	-	-	382	424	787	-	-
HCM Lane V/C Ratio	-	-	-	0.067	0.06	0.008	-	-
HCM Control Delay (s)	0	-	-	15.1	14	9.6	-	-
HCM Lane LOS	A	-	-	C	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.2	0.2	0	-	-

Intersection	
Int Delay, s/veh	4.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	10	32	19	48	5	32	14	1638	94	3	1290	5
Future Vol, veh/h	10	32	19	48	5	32	14	1638	94	3	1290	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	350	-	-	330	-	-
Veh in Median Storage, #	-	2	-	-	2	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	12	8	6	0	0	0	0	6	0	0	10	50
Mvmt Flow	11	34	20	51	5	34	15	1724	99	3	1358	5

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	2262	3220	682	2506	3173	912	1363	0	0	1823	0	0
Stage 1	1367	1367	-	1804	1804	-	-	-	-	-	-	-
Stage 2	895	1853	-	702	1369	-	-	-	-	-	-	-
Critical Hdwy	7.74	6.66	7.02	7.5	6.5	6.9	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.74	5.66	-	6.5	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.74	5.66	-	6.5	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.62	4.08	3.36	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	19	~ 9	383	~ 15	11	280	511	-	-	340	-	-
Stage 1	142	202	-	84	132	-	-	-	-	-	-	-
Stage 2	282	115	-	400	216	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	16	~ 9	383	~ 10	11	280	511	-	-	340	-	-
Mov Cap-2 Maneuver	111	89	-	75	100	-	-	-	-	-	-	-
Stage 1	138	200	-	82	128	-	-	-	-	-	-	-
Stage 2	231	112	-	312	214	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	63.4	122.8	0.1	0
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	511	-	-	122	106	340	-	-
HCM Lane V/C Ratio	0.029	-	-	0.526	0.844	0.009	-	-
HCM Control Delay (s)	12.3	-	-	63.4	122.8	15.7	-	-
HCM Lane LOS	B	-	-	F	F	C	-	-
HCM 95th %tile Q(veh)	0.1	-	-	2.5	4.9	0	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	7	2	16	11	20	10	1528	94	14	1286	3
Future Vol, veh/h	5	7	2	16	11	20	10	1528	94	14	1286	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	400	-	-	325	-	-
Veh in Median Storage, #	-	2	-	-	2	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	96	96	96	96	96	96	96	96	96	96	96	96
Heavy Vehicles, %	0	0	0	0	0	0	0	7	1	0	10	0
Mvmt Flow	5	7	2	17	11	21	10	1592	98	15	1340	3

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	2194	3082	672	2365	3034	845	1343	0	0	1690	0	0
Stage 1	1372	1372	-	1661	1661	-	-	-	-	-	-	-
Stage 2	822	1710	-	704	1373	-	-	-	-	-	-	-
Critical Hdwy	7.5	6.5	6.9	7.5	6.5	6.9	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.5	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.5	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	26	12	403	19	13	310	520	-	-	383	-	-
Stage 1	156	216	-	103	156	-	-	-	-	-	-	-
Stage 2	339	147	-	398	215	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	21	11	403	17	12	310	520	-	-	383	-	-
Mov Cap-2 Maneuver	126	102	-	92	112	-	-	-	-	-	-	-
Stage 1	153	208	-	101	153	-	-	-	-	-	-	-
Stage 2	287	144	-	367	207	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	37.9	43.9	0.1	0.2
HCM LOS	E	E		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	520	-	-	124	140	383	-	-
HCM Lane V/C Ratio	0.02	-	-	0.118	0.35	0.038	-	-
HCM Control Delay (s)	12.1	-	-	37.9	43.9	14.8	-	-
HCM Lane LOS	B	-	-	E	E	B	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.4	1.4	0.1	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	18	27	20	15	32	80	14	1403	36	43	1413	18
Future Volume (veh/h)	18	27	20	15	32	80	14	1403	36	43	1413	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1752	1900	1767	1648	1870	1900	1796	1900	1856	1737	1900
Adj Flow Rate, veh/h	19	28	21	16	33	83	15	1461	38	45	1472	19
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	0	10	0	9	17	2	0	7	0	3	11	0
Cap, veh/h	79	94	56	54	49	101	266	2518	1188	264	2462	32
Arrive On Green	0.11	0.11	0.11	0.11	0.11	0.11	0.74	0.74	0.74	0.74	0.74	0.74
Sat Flow, veh/h	275	846	501	100	437	909	359	3413	1610	347	3336	43
Grp Volume(v), veh/h	68	0	0	132	0	0	15	1461	38	45	728	763
Grp Sat Flow(s),veh/h/ln	1623	0	0	1446	0	0	359	1706	1610	347	1650	1729
Q Serve(g_s), s	0.0	0.0	0.0	4.0	0.0	0.0	1.9	18.6	0.6	6.5	19.6	19.7
Cycle Q Clear(g_c), s	3.6	0.0	0.0	8.4	0.0	0.0	21.6	18.6	0.6	25.1	19.6	19.7
Prop In Lane	0.28		0.31	0.12		0.63	1.00		1.00	1.00		0.02
Lane Grp Cap(c), veh/h	229	0	0	204	0	0	266	2518	1188	264	1218	1276
V/C Ratio(X)	0.30	0.00	0.00	0.65	0.00	0.00	0.06	0.58	0.03	0.17	0.60	0.60
Avail Cap(c_a), veh/h	287	0	0	260	0	0	290	2748	1297	288	1329	1393
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	39.1	0.0	0.0	41.2	0.0	0.0	10.9	5.7	3.3	11.4	5.8	5.8
Incr Delay (d2), s/veh	0.7	0.0	0.0	3.6	0.0	0.0	0.3	0.8	0.0	1.1	1.8	1.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.5	0.0	0.0	3.2	0.0	0.0	0.2	4.0	0.1	0.5	4.4	4.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	39.8	0.0	0.0	44.8	0.0	0.0	11.2	6.5	3.4	12.5	7.6	7.5
LnGrp LOS	D	A	A	D	A	A	B	A	A	B	A	A
Approach Vol, veh/h		68			132			1514			1536	
Approach Delay, s/veh		39.8			44.8			6.5			7.7	
Approach LOS		D			D			A			A	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		77.6		17.3		77.6		17.3				
Change Period (Y+Rc), s		7.6		6.7		7.6		6.7				
Max Green Setting (Gmax), s		76.4		14.3		76.4		14.3				
Max Q Clear Time (g_c+I1), s		23.6		5.6		27.1		10.4				
Green Ext Time (p_c), s		37.3		0.1		36.6		0.2				
Intersection Summary												
HCM 6th Ctrl Delay			9.3									
HCM 6th LOS			A									

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	6	1	0	2	1	48	7	1354	1	28	1244	10
Future Vol, veh/h	6	1	0	2	1	48	7	1354	1	28	1244	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	350	-	-	400	-	-
Veh in Median Storage, #	-	2	-	-	2	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	0	0	0	0	0	0	0	7	0	4	10	0
Mvmt Flow	6	1	0	2	1	52	8	1456	1	30	1338	11

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	2149	2877	675	2203	2882	729	1349	0	0	1457	0	0
Stage 1	1404	1404	-	1473	1473	-	-	-	-	-	-	-
Stage 2	745	1473	-	730	1409	-	-	-	-	-	-	-
Critical Hdwy	7.5	6.5	6.9	7.5	6.5	6.9	4.1	-	-	4.18	-	-
Critical Hdwy Stg 1	6.5	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.5	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.24	-	-
Pot Cap-1 Maneuver	28	17	401	25	17	370	517	-	-	450	-	-
Stage 1	149	208	-	135	193	-	-	-	-	-	-	-
Stage 2	377	193	-	384	207	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	22	16	401	23	16	370	517	-	-	450	-	-
Mov Cap-2 Maneuver	124	116	-	118	124	-	-	-	-	-	-	-
Stage 1	147	194	-	133	190	-	-	-	-	-	-	-
Stage 2	318	190	-	356	193	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	36.2	18.1	0.1	0.3
HCM LOS	E	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	517	-	-	123	330	450	-	-
HCM Lane V/C Ratio	0.015	-	-	0.061	0.166	0.067	-	-
HCM Control Delay (s)	12.1	-	-	36.2	18.1	13.6	-	-
HCM Lane LOS	B	-	-	E	C	B	-	-
HCM 95th %tile Q(veh)	0	-	-	0.2	0.6	0.2	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	40	65	22	43	47	77	38	1336	90	52	1343	60
Future Volume (veh/h)	40	65	22	43	47	77	38	1336	90	52	1343	60
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1752	1604	1722	1811	1648	1604	1752	1781	1811	1604	1737	1752
Adj Flow Rate, veh/h	41	66	22	44	48	79	39	1363	92	53	1370	61
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	10	20	12	6	17	20	10	8	6	20	11	10
Cap, veh/h	78	97	27	118	106	193	109	1970	893	93	1873	843
Arrive On Green	0.14	0.14	0.14	0.14	0.14	0.14	0.07	0.58	0.58	0.06	0.57	0.57
Sat Flow, veh/h	226	686	188	464	751	1359	1668	3385	1535	1527	3300	1485
Grp Volume(v), veh/h	129	0	0	92	0	79	39	1363	92	53	1370	61
Grp Sat Flow(s),veh/h/ln	1100	0	0	1215	0	1359	1668	1692	1535	1527	1650	1485
Q Serve(g_s), s	5.4	0.0	0.0	0.0	0.0	5.4	2.3	28.9	2.7	3.5	31.5	1.9
Cycle Q Clear(g_c), s	12.3	0.0	0.0	6.9	0.0	5.4	2.3	28.9	2.7	3.5	31.5	1.9
Prop In Lane	0.32		0.17	0.48		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	202	0	0	224	0	193	109	1970	893	93	1873	843
V/C Ratio(X)	0.64	0.00	0.00	0.41	0.00	0.41	0.36	0.69	0.10	0.57	0.73	0.07
Avail Cap(c_a), veh/h	276	0	0	298	0	266	166	2218	1006	158	2144	964
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	43.1	0.0	0.0	40.4	0.0	40.1	45.8	15.0	9.5	46.8	16.4	10.0
Incr Delay (d2), s/veh	3.3	0.0	0.0	1.2	0.0	1.4	2.4	1.7	0.2	6.5	2.2	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.3	0.0	0.0	2.1	0.0	1.8	1.0	9.5	0.8	1.4	10.3	0.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	46.4	0.0	0.0	41.6	0.0	41.5	48.2	16.7	9.7	53.4	18.6	10.1
LnGrp LOS	D	A	A	D	A	D	D	B	A	D	B	B
Approach Vol, veh/h		129			171			1494			1484	
Approach Delay, s/veh		46.4			41.6			17.1			19.5	
Approach LOS		D			D			B			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	11.8	68.7		22.0	13.3	67.2		22.0				
Change Period (Y+Rc), s	5.6	9.0		7.5	6.6	9.0		7.5				
Max Green Setting (Gmax), s	10.6	67.2		20.1	10.2	66.6		20.1				
Max Q Clear Time (g_c+I1), s	5.5	30.9		14.3	4.3	33.5		8.9				
Green Ext Time (p_c), s	0.0	26.7		0.2	0.0	24.7		0.5				

Intersection Summary		
HCM 6th Ctrl Delay		20.6
HCM 6th LOS		C

Intersection												
Int Delay, s/veh	5.2											
Movement	**EBL**	**EBT**	**EBR**	**WBL**	**WBT**	**WBR**	**NBL**	**NBT**	**NBR**	**SBL**	**SBT**	**SBR**
Lane Configurations												
Traffic Vol, veh/h	23	0	20	72	0	82	7	1300	60	43	1181	10
Future Vol, veh/h	23	0	20	72	0	82	7	1300	60	43	1181	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	300	-	-	-	600	-	325	625	-	640
Veh in Median Storage, #	-	2	-	-	2	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	12	0	13	2	0	13	20	8	4	19	11	25
Mvmt Flow	24	0	21	77	0	87	7	1383	64	46	1256	11

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	2054	2809	628	2117	2756	692	1267	0	0	1447	0	0
Stage 1	1348	1348	-	1397	1397	-	-	-	-	-	-	-
Stage 2	706	1461	-	720	1359	-	-	-	-	-	-	-
Critical Hdwy	7.74	6.5	7.16	7.54	6.5	7.16	4.5	-	-	4.48	-	-
Critical Hdwy Stg 1	6.74	5.5	-	6.54	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.74	5.5	-	6.54	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.62	4	3.43	3.52	4	3.43	2.4	-	-	2.39	-	-
Pot Cap-1 Maneuver	28	18	400	~ 29	20	362	456	-	-	387	-	-
Stage 1	146	221	-	148	210	-	-	-	-	-	-	-
Stage 2	370	195	-	385	219	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	~ 19	16	400	~ 25	17	362	456	-	-	387	-	-
Mov Cap-2 Maneuver	115	110	-	126	129	-	-	-	-	-	-	-
Stage 1	144	195	-	146	207	-	-	-	-	-	-	-
Stage 2	277	192	-	321	193	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	30.6	80.6	0.1	0.5
HCM LOS	D	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	456	-	-	115	400	193	387	-	-
HCM Lane V/C Ratio	0.016	-	-	0.213	0.053	0.849	0.118	-	-
HCM Control Delay (s)	13	-	-	44.6	14.5	80.6	15.5	-	-
HCM Lane LOS	B	-	-	E	B	F	C	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.8	0.2	6.2	0.4	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	0.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	24	53	1135	27	67	945
Future Vol, veh/h	24	53	1135	27	67	945
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Free	-	None	-	None
Storage Length	0	100	-	275	300	-
Veh in Median Storage, #	2	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	0	2	9	0	2	11
Mvmt Flow	25	56	1195	28	71	995

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1835	-	0	0	1223	0
Stage 1	1195	-	-	-	-	-
Stage 2	640	-	-	-	-	-
Critical Hdwy	6.8	-	-	-	4.14	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	-	-	-	2.22	-
Pot Cap-1 Maneuver	69	0	-	-	566	-
Stage 1	254	0	-	-	-	-
Stage 2	493	0	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	60	-	-	-	566	-
Mov Cap-2 Maneuver	213	-	-	-	-	-
Stage 1	254	-	-	-	-	-
Stage 2	431	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	24.2	0	0.8
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	213	-	566	-
HCM Lane V/C Ratio	-	-	0.119	-	0.125	-
HCM Control Delay (s)	-	-	24.2	0	12.3	-
HCM Lane LOS	-	-	C	A	B	-
HCM 95th %tile Q(veh)	-	-	0.4	-	0.4	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	178	0	46	0	0	0	65	1338	0	0	1219	148
Future Volume (veh/h)	178	0	46	0	0	0	65	1338	0	0	1219	148
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1841	1900	1604	1900	1900	1900	1693	1781	1900	1900	1722	1856
Adj Flow Rate, veh/h	184	0	47	0	0	0	67	1379	0	0	1257	153
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	4	0	20	0	0	0	14	8	0	0	12	3
Cap, veh/h	262	0	53	0	337	0	134	2318	1103	60	1789	860
Arrive On Green	0.18	0.00	0.18	0.00	0.00	0.00	0.08	0.68	0.00	0.00	0.55	0.55
Sat Flow, veh/h	1172	0	299	0	1900	0	1612	3385	1610	399	3272	1572
Grp Volume(v), veh/h	231	0	0	0	0	0	67	1379	0	0	1257	153
Grp Sat Flow(s),veh/h/ln	1472	0	0	0	1900	0	1612	1692	1610	399	1636	1572
Q Serve(g_s), s	18.4	0.0	0.0	0.0	0.0	0.0	4.8	26.0	0.0	0.0	33.9	5.9
Cycle Q Clear(g_c), s	18.4	0.0	0.0	0.0	0.0	0.0	4.8	26.0	0.0	0.0	33.9	5.9
Prop In Lane	0.80		0.20	0.00		0.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	315	0	0	0	337	0	134	2318	1103	60	1789	860
V/C Ratio(X)	0.73	0.00	0.00	0.00	0.00	0.00	0.50	0.59	0.00	0.00	0.70	0.18
Avail Cap(c_a), veh/h	367	0	0	0	404	0	153	2318	1103	60	1789	860
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	48.1	0.0	0.0	0.0	0.0	0.0	52.6	10.1	0.0	0.0	20.0	13.7
Incr Delay (d2), s/veh	10.1	0.0	0.0	0.0	0.0	0.0	3.4	1.1	0.0	0.0	2.3	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.4	0.0	0.0	0.0	0.0	0.0	2.0	7.9	0.0	0.0	11.9	2.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	58.3	0.0	0.0	0.0	0.0	0.0	56.0	11.2	0.0	0.0	22.4	14.1
LnGrp LOS	E	A	A	A	A	A	E	B	A	A	C	B
Approach Vol, veh/h		231			0			1446			1410	
Approach Delay, s/veh		58.3			0.0			13.3			21.5	
Approach LOS		E						B			C	
Timer - Assigned Phs		2		4	5	6		8				
Phs Duration (G+Y+Rc), s		91.2		28.8	16.6	74.6		28.8				
Change Period (Y+Rc), s		9.0		7.5	6.6	9.0		7.5				
Max Green Setting (Gmax), s		78.0		25.5	11.4	60.0		25.5				
Max Q Clear Time (g_c+I1), s		28.0		20.4	6.8	35.9		0.0				
Green Ext Time (p_c), s		29.5		0.9	0.1	17.5		0.0				
Intersection Summary												
HCM 6th Ctrl Delay			20.4									
HCM 6th LOS			C									

Intersection	
Int Delay, s/veh	4.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	20	18	16	65	20	11	16	1418	112	13	1275	28
Future Vol, veh/h	20	18	16	65	20	11	16	1418	112	13	1275	28
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	350	100	-	350
Veh in Median Storage, #	-	2	-	-	2	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	96	96	96	96	96	96	96	96	96	96	96	96
Heavy Vehicles, %	0	7	17	0	0	0	33	9	3	10	12	0
Mvmt Flow	21	19	17	68	21	11	17	1477	117	14	1328	29

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	2139	2984	664	2213	2896	739	1357	0	0	1594	0	0
Stage 1	1356	1356	-	1511	1511	-	-	-	-	-	-	-
Stage 2	783	1628	-	702	1385	-	-	-	-	-	-	-
Critical Hdwy	7.5	6.64	7.24	7.5	6.5	6.9	4.76	-	-	4.3	-	-
Critical Hdwy Stg 1	6.5	5.64	-	6.5	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.5	5.64	-	6.5	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4.07	3.47	3.5	4	3.3	2.53	-	-	2.3	-	-
Pot Cap-1 Maneuver	28	~ 13	370	~ 25	~ 16	364	367	-	-	372	-	-
Stage 1	160	207	-	128	185	-	-	-	-	-	-	-
Stage 2	357	151	-	400	213	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	22	~ 12	370	~ 19	~ 15	364	367	-	-	372	-	-
Mov Cap-2 Maneuver	127	101	-	108	120	-	-	-	-	-	-	-
Stage 1	153	199	-	122	176	-	-	-	-	-	-	-
Stage 2	291	144	-	333	205	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	45.6	110	0.2	0.1
HCM LOS	E	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	367	-	-	143	120	372	-	-
HCM Lane V/C Ratio	0.045	-	-	0.393	0.833	0.036	-	-
HCM Control Delay (s)	15.3	-	-	45.6	110	15	-	-
HCM Lane LOS	C	-	-	E	F	C	-	-
HCM 95th %tile Q(veh)	0.1	-	-	1.7	5	0.1	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	248	20	976	381	6	800
Future Volume (veh/h)	248	20	976	381	6	800
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1885	1811	1737	1885	1900	1693
Adj Flow Rate, veh/h	264	21	1038	0	6	851
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	1	6	11	1	0	14
Cap, veh/h	333	285	1888		328	1839
Arrive On Green	0.19	0.19	0.57	0.00	0.57	0.57
Sat Flow, veh/h	1795	1535	3387	1598	552	3300
Grp Volume(v), veh/h	264	21	1038	0	6	851
Grp Sat Flow(s),veh/h/ln	1795	1535	1650	1598	552	1608
Q Serve(g_s), s	8.4	0.7	11.8	0.0	0.4	9.2
Cycle Q Clear(g_c), s	8.4	0.7	11.8	0.0	12.2	9.2
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	333	285	1888		328	1839
V/C Ratio(X)	0.79	0.07	0.55		0.02	0.46
Avail Cap(c_a), veh/h	1155	987	3694		630	3600
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	23.3	20.1	8.0	0.0	11.8	7.5
Incr Delay (d2), s/veh	4.2	0.1	0.7	0.0	0.1	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.5	0.2	2.5	0.0	0.0	1.9
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	27.5	20.2	8.7	0.0	11.9	8.0
LnGrp LOS	C	C	A		B	A
Approach Vol, veh/h	285		1038			857
Approach Delay, s/veh	27.0		8.7			8.0
Approach LOS	C		A			A
Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		42.2		17.6		42.2
Change Period (Y+Rc), s		8.0		6.5		8.0
Max Green Setting (Gmax), s		67.0		38.5		67.0
Max Q Clear Time (g_c+I1), s		13.8		10.4		14.2
Green Ext Time (p_c), s		20.5		0.8		15.6
Intersection Summary						
HCM 6th Ctrl Delay			10.8			
HCM 6th LOS			B			

Notes

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	14	35	2	1	19	10	6	983	14	14	823	14
Future Vol, veh/h	14	35	2	1	19	10	6	983	14	14	823	14
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	475	-	-	450	-	-
Veh in Median Storage, #	-	2	-	-	2	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	9	3	0	0	6	0	20	12	9	9	15	0
Mvmt Flow	15	38	2	1	21	11	7	1080	15	15	904	15

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1507	2051	460	1603	2051	548	919	0	0	1095	0	0
Stage 1	942	942	-	1102	1102	-	-	-	-	-	-	-
Stage 2	565	1109	-	501	949	-	-	-	-	-	-	-
Critical Hdwy	7.68	6.56	6.9	7.5	6.62	6.9	4.5	-	-	4.28	-	-
Critical Hdwy Stg 1	6.68	5.56	-	6.5	5.62	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.68	5.56	-	6.5	5.62	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4.03	3.3	3.5	4.06	3.3	2.4	-	-	2.29	-	-
Pot Cap-1 Maneuver	78	54	554	72	52	485	636	-	-	594	-	-
Stage 1	269	337	-	229	277	-	-	-	-	-	-	-
Stage 2	460	281	-	526	328	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	68	52	554	59	50	485	636	-	-	594	-	-
Mov Cap-2 Maneuver	218	200	-	196	200	-	-	-	-	-	-	-
Stage 1	266	329	-	226	274	-	-	-	-	-	-	-
Stage 2	411	278	-	451	320	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	28.3	21.7	0.1	0.2
HCM LOS	D	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	636	-	-	210	249	594	-	-
HCM Lane V/C Ratio	0.01	-	-	0.267	0.132	0.026	-	-
HCM Control Delay (s)	10.7	-	-	28.3	21.7	11.2	-	-
HCM Lane LOS	B	-	-	D	C	B	-	-
HCM 95th %tile Q(veh)	0	-	-	1	0.5	0.1	-	-

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	52	67	964	809	26
Future Vol, veh/h	0	52	67	964	809	26
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Stop	-	None	-	Yield
Storage Length	-	0	275	-	-	200
Veh in Median Storage, #	2	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	2	2	11	15	10
Mvmt Flow	0	57	73	1048	879	28

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	440	879	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.94	4.14	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	0	565	764	-	-	-
Stage 1	0	-	-	-	-	-
Stage 2	0	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	565	764	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.1	0.7	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	764	-	565	-	-
HCM Lane V/C Ratio	0.095	-	0.1	-	-
HCM Control Delay (s)	10.2	-	12.1	-	-
HCM Lane LOS	B	-	B	-	-
HCM 95th %tile Q(veh)	0.3	-	0.3	-	-

Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	3	0	27	9	59	5	942	15	17	801	0
Future Vol, veh/h	1	3	0	27	9	59	5	942	15	17	801	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	2	-	-	2	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	96	96	96	96	96	96	96	96	96	96	96	96
Heavy Vehicles, %	0	0	0	0	0	0	0	11	0	0	15	0
Mvmt Flow	1	3	0	28	9	61	5	981	16	18	834	0

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1375	1877	417	1454	1869	499	834	0	0	997	0	0
Stage 1	870	870	-	999	999	-	-	-	-	-	-	-
Stage 2	505	1007	-	455	870	-	-	-	-	-	-	-
Critical Hdwy	7.5	6.5	6.9	7.5	6.5	6.9	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.5	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.5	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	106	72	590	93	73	522	808	-	-	702	-	-
Stage 1	317	372	-	265	324	-	-	-	-	-	-	-
Stage 2	523	321	-	560	372	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	86	68	590	88	69	522	808	-	-	702	-	-
Mov Cap-2 Maneuver	251	226	-	231	232	-	-	-	-	-	-	-
Stage 1	313	354	-	261	319	-	-	-	-	-	-	-
Stage 2	442	317	-	528	354	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	20.8	19.1	0.1	0.4
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	808	-	-	232	354	702	-	-
HCM Lane V/C Ratio	0.006	-	-	0.018	0.28	0.025	-	-
HCM Control Delay (s)	9.5	0.1	-	20.8	19.1	10.3	0.2	-
HCM Lane LOS	A	A	-	C	C	B	A	-
HCM 95th %tile Q(veh)	0	-	-	0.1	1.1	0.1	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	8	6	81	5	86	17	633	79	61	508	3
Future Volume (veh/h)	3	8	6	81	5	86	17	633	79	61	508	3
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1900	1900	1455	1530	1618	1900	1693	1485	1781	1693	1900
Adj Flow Rate, veh/h	3	8	6	84	5	89	18	653	81	63	524	3
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	0	0	0	30	25	19	0	14	28	8	14	0
Cap, veh/h	66	159	103	133	17	105	41	1900	744	80	1993	998
Arrive On Green	0.17	0.17	0.17	0.17	0.17	0.17	0.02	0.59	0.59	0.05	0.62	0.62
Sat Flow, veh/h	180	938	610	523	98	621	1810	3216	1259	1697	3216	1610
Grp Volume(v), veh/h	17	0	0	178	0	0	18	653	81	63	524	3
Grp Sat Flow(s),veh/h/ln	1729	0	0	1242	0	0	1810	1608	1259	1697	1608	1610
Q Serve(g_s), s	0.0	0.0	0.0	14.7	0.0	0.0	1.2	12.5	3.4	4.4	8.9	0.1
Cycle Q Clear(g_c), s	1.0	0.0	0.0	16.6	0.0	0.0	1.2	12.5	3.4	4.4	8.9	0.1
Prop In Lane	0.18		0.35	0.47		0.50	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	328	0	0	254	0	0	41	1900	744	80	1993	998
V/C Ratio(X)	0.05	0.00	0.00	0.70	0.00	0.00	0.44	0.34	0.11	0.78	0.26	0.00
Avail Cap(c_a), veh/h	553	0	0	420	0	0	134	1900	744	218	1993	998
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	41.8	0.0	0.0	48.2	0.0	0.0	57.9	12.6	10.7	56.6	10.4	8.7
Incr Delay (d2), s/veh	0.1	0.0	0.0	7.2	0.0	0.0	7.3	0.5	0.3	15.3	0.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	0.0	5.7	0.0	0.0	0.6	4.1	0.9	2.2	2.8	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	41.9	0.0	0.0	55.4	0.0	0.0	65.2	13.1	11.0	71.8	10.7	8.7
LnGrp LOS	D	A	A	E	A	A	E	B	B	E	B	A
Approach Vol, veh/h		17			178			752			590	
Approach Delay, s/veh		41.9			55.4			14.1			17.2	
Approach LOS		D			E			B			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	12.3	79.9		27.8	8.8	83.4		27.8				
Change Period (Y+Rc), s	6.6	9.0		7.5	6.1	9.0		7.5				
Max Green Setting (Gmax), s	15.4	45.0		36.5	8.9	52.0		36.5				
Max Q Clear Time (g_c+I1), s	6.4	14.5		3.0	3.2	10.9		18.6				
Green Ext Time (p_c), s	0.1	11.4		0.1	0.0	8.9		1.7				
Intersection Summary												
HCM 6th Ctrl Delay			20.4									
HCM 6th LOS			C									

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	3	2	1	20	10	6	1	902	18	3	661	3
Future Vol, veh/h	3	2	1	20	10	6	1	902	18	3	661	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	300	-	300	300	-	-
Veh in Median Storage, #	-	2	-	-	2	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	96	96	96	96	96	96	96	96	96	96	96	96
Heavy Vehicles, %	33	0	0	0	12	0	0	14	7	33	16	33
Mvmt Flow	3	2	1	21	10	6	1	940	19	3	689	3

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1174	1658	346	1294	1640	470	692	0	0	959	0	0
Stage 1	697	697	-	942	942	-	-	-	-	-	-	-
Stage 2	477	961	-	352	698	-	-	-	-	-	-	-
Critical Hdwy	8.16	6.5	6.9	7.5	6.74	6.9	4.1	-	-	4.76	-	-
Critical Hdwy Stg 1	7.16	5.5	-	6.5	5.74	-	-	-	-	-	-	-
Critical Hdwy Stg 2	7.16	5.5	-	6.5	5.74	-	-	-	-	-	-	-
Follow-up Hdwy	3.83	4	3.3	3.5	4.12	3.3	2.2	-	-	2.53	-	-
Pot Cap-1 Maneuver	115	99	656	122	90	545	912	-	-	550	-	-
Stage 1	333	446	-	287	318	-	-	-	-	-	-	-
Stage 2	464	337	-	643	417	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	110	98	656	121	89	545	912	-	-	550	-	-
Mov Cap-2 Maneuver	271	268	-	261	253	-	-	-	-	-	-	-
Stage 1	333	444	-	287	318	-	-	-	-	-	-	-
Stage 2	443	337	-	635	415	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	17.3	19.7	0	0.1
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	912	-	-	299	283	550	-	-
HCM Lane V/C Ratio	0.001	-	-	0.021	0.133	0.006	-	-
HCM Control Delay (s)	9	-	-	17.3	19.7	11.6	-	-
HCM Lane LOS	A	-	-	C	C	B	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.5	0	-	-

MOVEMENT SUMMARY

Site: 101 [US 31 at SR 28 (West Roundabout) (Site Folder: No-Build (2045) AM Peak)]

Site Category: Existing Design
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
East: SR 28 / W 200 S														
1u	U	2	0.0	3	0.0	0.451	13.3	LOS B	2.9	77.9	0.46	0.51	0.46	38.4
6	T1	170	12.3	215	12.3	0.451	4.9	LOS A	2.9	77.9	0.46	0.51	0.46	36.8
16	R2	255	4.3	323	4.3	0.451	4.7	LOS A	2.9	77.9	0.46	0.51	0.46	35.6
Approach		427	7.5	541	7.5	0.451	4.8	LOS A	2.9	77.9	0.46	0.51	0.46	36.1
North: SB US 31 Ramps														
7	L2	129	1.0	163	1.0	0.233	10.8	LOS B	1.1	30.0	0.42	0.65	0.42	35.3
14	R2	73	22.0	92	22.0	0.233	5.2	LOS A	1.1	30.0	0.42	0.65	0.42	33.5
Approach		202	8.6	256	8.6	0.233	8.8	LOS A	1.1	30.0	0.42	0.65	0.42	34.6
West: SR 28 / W 200 S														
5u	U	1	0.0	1	0.0	0.370	13.2	LOS B	2.1	60.3	0.42	0.55	0.42	37.1
5	L2	122	9.1	154	9.1	0.370	10.9	LOS B	2.1	60.3	0.42	0.55	0.42	35.7
2	T1	198	20.5	251	20.5	0.370	5.0	LOS A	2.1	60.3	0.42	0.55	0.42	35.5
Approach		321	16.1	406	16.1	0.370	7.3	LOS A	2.1	60.3	0.42	0.55	0.42	35.6
All Vehicles		950	10.6	1203	10.6	0.451	6.5	LOS A	2.9	77.9	0.44	0.55	0.44	35.6

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [US 31 at SR 28 (East Roundabout) (Site Folder: No-Build (2045) AM Peak)]

Site Category: Existing Design
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: NB US 31 Off-Ramp														
3	L2	47	15.8	59	15.8	0.073	11.2	LOS B	0.3	7.0	0.39	0.65	0.39	34.9
3a	L1	7	0.0	9	0.0	0.073	9.4	LOS A	0.3	7.0	0.39	0.65	0.39	35.0
18a	R1	20	0.0	25	0.0	0.073	4.2	LOS A	0.3	7.0	0.39	0.65	0.39	34.9
18	R2	67	9.1	84	9.1	0.082	5.4	LOS A	0.3	7.8	0.42	0.60	0.42	35.6
Approach		141	9.6	176	9.6	0.082	7.4	LOS A	0.3	7.8	0.41	0.62	0.41	35.2
East: SR 28 / W 200 S														
1u	U	5	0.0	6	0.0	0.331	13.4	LOS B	1.6	41.2	0.45	0.46	0.45	38.0
6	T1	357	6.9	446	6.9	0.331	4.9	LOS A	1.6	41.2	0.45	0.46	0.45	36.5
16a	R1	28	8.7	35	8.7	0.039	4.9	LOS A	0.1	3.7	0.40	0.51	0.40	36.8
16b	R3	46	0.0	58	0.0	0.036	4.2	LOS A	0.1	3.4	0.23	0.50	0.23	36.0
Approach		436	6.2	545	6.2	0.331	4.9	LOS A	1.6	41.2	0.42	0.47	0.42	36.5
NorthEast: FCA Road														
1bx	L3	1	0.0	1	0.0	0.003	12.2	LOS B	0.0	0.3	0.45	0.56	0.45	36.8
16ax	R1	2	0.0	3	0.0	0.003	4.5	LOS A	0.0	0.3	0.45	0.56	0.45	35.6
16x	R2	5	50.0	6	50.0	0.006	4.8	LOS A	0.0	0.8	0.26	0.44	0.26	35.3
Approach		8	31.3	10	31.3	0.006	5.6	LOS A	0.0	0.8	0.33	0.48	0.33	35.6
West: SR 28 / W 200 S														
5u	U	17	14.3	21	14.3	0.310	12.7	LOS B	1.9	53.4	0.07	0.53	0.07	37.2
5b	L3	51	38.1	64	38.1	0.310	11.7	LOS B	1.9	53.4	0.07	0.53	0.07	35.9
5a	L1	114	2.2	143	2.2	0.310	8.7	LOS A	1.9	53.4	0.07	0.53	0.07	36.1
2	T1	138	13.4	173	13.4	0.310	4.0	LOS A	1.9	53.4	0.07	0.53	0.07	36.2
Approach		320	13.4	400	13.4	0.310	7.4	LOS A	1.9	53.4	0.07	0.53	0.07	36.2
All Vehicles		905	9.5	1131	9.5	0.331	6.2	LOS A	1.9	53.4	0.30	0.52	0.30	36.2

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [US 31 at SR 28 (West Roundabout) (Site Folder: No-Build (2045) PM Peak)]

Site Category: Existing Design
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
East: SR 28 / W 200 S														
1u	U	4	0.0	4	0.0	0.408	13.2	LOS B	2.3	62.5	0.40	0.48	0.40	38.5
6	T1	265	11.6	294	11.6	0.408	4.8	LOS A	2.3	62.5	0.40	0.48	0.40	36.9
16	R2	170	5.1	189	5.1	0.408	4.6	LOS A	2.3	62.5	0.40	0.48	0.40	35.7
Approach		439	9.0	488	9.0	0.408	4.8	LOS A	2.3	62.5	0.40	0.48	0.40	36.4
North: SB US 31 Ramps														
7	L2	15	0.0	17	0.0	0.121	10.9	LOS B	0.5	15.2	0.46	0.63	0.46	36.7
14	R2	73	37.3	81	37.3	0.121	6.0	LOS A	0.5	15.2	0.46	0.63	0.46	34.4
Approach		88	30.9	98	30.9	0.121	6.8	LOS A	0.5	15.2	0.46	0.63	0.46	34.7
West: SR 28 / W 200 S														
5u	U	3	0.0	3	0.0	0.317	12.6	LOS B	2.0	53.3	0.13	0.47	0.13	38.2
5	L2	125	14.7	139	14.7	0.317	10.2	LOS B	2.0	53.3	0.13	0.47	0.13	36.6
2	T1	241	10.2	268	10.2	0.317	4.0	LOS A	2.0	53.3	0.13	0.47	0.13	36.7
Approach		369	11.6	410	11.6	0.317	6.2	LOS A	2.0	53.3	0.13	0.47	0.13	36.7
All Vehicles		896	12.2	996	12.2	0.408	5.6	LOS A	2.3	62.5	0.30	0.49	0.30	36.4

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [US 31 at SR 28 (East Roundabout) (Site Folder: No-Build (2045) PM Peak)]

Site Category: Existing Design
Roundabout

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: NB US 31 Off-Ramp														
3	L2	77	9.5	99	9.5	0.106	11.6	LOS B	0.4	10.6	0.46	0.74	0.46	33.9
3a	L1	1	0.0	1	0.0	0.106	10.0	LOS A	0.4	10.6	0.46	0.74	0.46	33.7
18	R2	151	4.1	194	4.1	0.145	5.0	LOS A	0.6	14.9	0.43	0.56	0.43	35.7
Approach		229	5.9	294	5.9	0.145	7.2	LOS A	0.6	14.9	0.44	0.62	0.44	35.1
East: SR 28 / W 200 S														
1u	U	7	0.0	9	0.0	0.247	13.1	LOS B	1.2	31.8	0.37	0.44	0.37	38.3
6	T1	253	12.6	324	12.6	0.247	4.7	LOS A	1.2	31.8	0.37	0.44	0.37	36.7
16a	R1	50	12.2	64	12.2	0.070	4.7	LOS A	0.3	7.4	0.36	0.48	0.36	36.8
16b	R3	1	0.0	1	0.0	0.001	3.9	LOS A	0.0	0.1	0.07	0.48	0.07	36.4
Approach		311	12.2	399	12.2	0.247	4.9	LOS A	1.2	31.8	0.37	0.45	0.37	36.7
NorthEast: FCA Road														
1ux	U	7	0.0	9	0.0	0.088	13.6	LOS B	0.3	8.1	0.46	0.67	0.46	36.2
1bx	L3	44	0.0	56	0.0	0.088	12.3	LOS B	0.3	8.1	0.46	0.67	0.46	35.8
16ax	R1	36	0.0	46	0.0	0.088	4.5	LOS A	0.3	8.1	0.46	0.67	0.46	34.7
16x	R2	98	1.3	126	1.3	0.083	4.1	LOS A	0.3	8.5	0.25	0.46	0.25	36.5
Approach		185	0.7	237	0.7	0.088	6.5	LOS A	0.3	8.5	0.35	0.56	0.35	35.9
West: SR 28 / W 200 S														
5u	U	16	23.1	21	23.1	0.293	13.2	LOS B	1.7	47.7	0.27	0.48	0.27	37.0
5b	L3	52	30.2	67	30.2	0.293	12.1	LOS B	1.7	47.7	0.27	0.48	0.27	36.2
5a	L1	7	16.7	9	16.7	0.293	9.3	LOS A	1.7	47.7	0.27	0.48	0.27	35.7
2	T1	188	15.7	241	15.7	0.293	4.4	LOS A	1.7	47.7	0.27	0.48	0.27	36.3
Approach		263	19.0	337	19.0	0.293	6.6	LOS A	1.7	47.7	0.27	0.48	0.27	36.3
All Vehicles		988	10.4	1267	10.4	0.293	6.2	LOS A	1.7	47.7	0.35	0.52	0.35	36.1

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

HCS7 Freeway Weaving Report

Project Information

Analyst	Pratik Srivastava	Date	12/16/2022
Agency		Analysis Year	2045
Jurisdiction		Time Period Analyzed	AM Peak
Project Description	Weave Analysis#1 on US 31 NB between US 24 EB and WB exit and entrance ramps	Unit	United States Customary

Geometric Data

Number of Lanes (N), ln	3	Segment Type	Freeway
Segment Length (L_S), ft	545	Number of Maneuver Lanes (N_{WL}), ln	2
Weaving Configuration	One-Sided	Ramp-to-Freeway Lane Changes (LC_{RF}), lc	1
Terrain Type	Level	Freeway-to-Ramp Lane Changes (LC_{FR}), lc	1
Percent Grade, %	-	Ramp-to-Ramp Lane Changes (LC_{RR}), lc	0
Interchange Density (ID), int/mi	0.33	Cross Weaving Managed Lane	No

Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Weather Type	Non-Severe Weather	Final Capacity Adjustment Factor (CAF)	1.000
Incident Type	No Incident	Demand Adjustment Factor (DAF)	1.000

Demand and Capacity

	FF	RF	RR	FR
Demand Volume (V_i), veh/h	413	30	0	6
Peak Hour Factor (PHF)	0.91	0.91	0.91	0.91
Total Trucks, %	28.50	37.50	0.00	20.00
Heavy Vehicle Adjustment Factor (f_{HV})	0.778	0.727	1.000	0.833
Flow Rate (v_i), pc/h	583	45	0	8

Weaving Flow Rate (v_W), pc/h	53	Freeway Max Capacity (c_{IFL}), pc/h/ln	2400
Non-Weaving Flow Rate (v_{NW}), pc/h	583	Density-Based Capacity (c_{IWL}), pc/h/ln	2183
Total Flow Rate (v), pc/h	636	Demand Flow-Based Capacity (c_{IW}), pc/h	28916
Volume Ratio (VR)	0.083	Weaving Segment Capacity (c_W), veh/h	5076
Minimum Lane Change Rate (LC_{MIN}), lc/h	53	Adjusted Weaving Area Capacity, pc/h	6549
Maximum Weaving Length (L_{MAX}), ft	3375	Volume-to-Capacity Ratio (v/c)	0.10

Speed and Density

Non-Weaving Vehicle Index (I_{NW})	11	Average Weaving Speed (S_W), mi/h	71.1
Non-Weaving Lane Change Rate (LC_{NW}), lc/h	0	Average Non-Weaving Speed (S_{NW}), mi/h	73.6
Weaving Lane Change Rate (LC_W), lc/h	122	Average Speed (S), mi/h	73.4
Weaving Lane Change Rate (LC_{All}), lc/h	122	Density (D), pc/mi/ln	2.9
Weaving Intensity Factor (W)	0.069	Level of Service (LOS)	A

HCS7 Freeway Weaving Report

Project Information

Analyst	Pratik Srivastava	Date	12/16/2022
Agency		Analysis Year	2045
Jurisdiction		Time Period Analyzed	PM Peak
Project Description	Weave Analysis#2 on US 31 NB between US 24 EB and WB exit and entrance ramps	Unit	United States Customary

Geometric Data

Number of Lanes (N), ln	3	Segment Type	Freeway
Segment Length (L_S), ft	545	Number of Maneuver Lanes (N_{WL}), ln	2
Weaving Configuration	One-Sided	Ramp-to-Freeway Lane Changes (LC_{RF}), lc	1
Terrain Type	Level	Freeway-to-Ramp Lane Changes (LC_{FR}), lc	1
Percent Grade, %	-	Ramp-to-Ramp Lane Changes (LC_{RR}), lc	0
Interchange Density (ID), int/mi	0.33	Cross Weaving Managed Lane	No

Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Weather Type	Non-Severe Weather	Final Capacity Adjustment Factor (CAF)	1.000
Incident Type	No Incident	Demand Adjustment Factor (DAF)	1.000

Demand and Capacity

	FF	RF	RR	FR
Demand Volume (V_i), veh/h	792	57	0	15
Peak Hour Factor (PHF)	0.91	0.91	0.91	0.91
Total Trucks, %	13.80	28.30	0.00	33.30
Heavy Vehicle Adjustment Factor (f_{HV})	0.879	0.779	1.000	0.750
Flow Rate (v_i), pc/h	990	80	0	22

Weaving Flow Rate (v_W), pc/h	102	Freeway Max Capacity (c_{IFL}), pc/h/ln	2400
Non-Weaving Flow Rate (v_{NW}), pc/h	990	Density-Based Capacity (c_{IWL}), pc/h/ln	2176
Total Flow Rate (v), pc/h	1092	Demand Flow-Based Capacity (c_{IW}), pc/h	25806
Volume Ratio (VR)	0.093	Weaving Segment Capacity (c_W), veh/h	5673
Minimum Lane Change Rate (LC_{MIN}), lc/h	102	Adjusted Weaving Area Capacity, pc/h	6528
Maximum Weaving Length (L_{MAX}), ft	3472	Volume-to-Capacity Ratio (v/c)	0.17

Speed and Density

Non-Weaving Vehicle Index (I_{NW})	18	Average Weaving Speed (S_W), mi/h	70.0
Non-Weaving Lane Change Rate (LC_{NW}), lc/h	0	Average Non-Weaving Speed (S_{NW}), mi/h	72.5
Weaving Lane Change Rate (LC_W), lc/h	171	Average Speed (S), mi/h	72.3
Weaving Lane Change Rate (LC_{All}), lc/h	171	Density (D), pc/mi/ln	5.0
Weaving Intensity Factor (W)	0.091	Level of Service (LOS)	A

HCS7 Freeway Weaving Report

Project Information

Analyst	Pratik Srivastava	Date	12/16/2022
Agency		Analysis Year	2045
Jurisdiction		Time Period Analyzed	AM Peak
Project Description	Weave Analysis#3 on US 31 SB between US 24 EB and WB entrance and exit ramps	Unit	United States Customary

Geometric Data

Number of Lanes (N), ln	3	Segment Type	Freeway
Segment Length (L_S), ft	545	Number of Maneuver Lanes (N_{WL}), ln	2
Weaving Configuration	One-Sided	Ramp-to-Freeway Lane Changes (LC_{RF}), lc	1
Terrain Type	Level	Freeway-to-Ramp Lane Changes (LC_{FR}), lc	1
Percent Grade, %	-	Ramp-to-Ramp Lane Changes (LC_{RR}), lc	0
Interchange Density (ID), int/mi	0.33	Cross Weaving Managed Lane	No

Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Weather Type	Non-Severe Weather	Final Capacity Adjustment Factor (CAF)	1.000
Incident Type	No Incident	Demand Adjustment Factor (DAF)	1.000

Demand and Capacity

	FF	RF	RR	FR
Demand Volume (V_i), veh/h	428	246	0	64
Peak Hour Factor (PHF)	0.91	0.91	0.91	0.91
Total Trucks, %	23.20	16.50	0.00	40.40
Heavy Vehicle Adjustment Factor (f_{HV})	0.812	0.858	1.000	0.712
Flow Rate (v_i), pc/h	579	315	0	99

Weaving Flow Rate (v_W), pc/h	414	Freeway Max Capacity (c_{IFL}), pc/h/ln	2400
Non-Weaving Flow Rate (v_{NW}), pc/h	579	Density-Based Capacity (c_{IWL}), pc/h/ln	1916
Total Flow Rate (v), pc/h	993	Demand Flow-Based Capacity (c_{IW}), pc/h	5755
Volume Ratio (VR)	0.417	Weaving Segment Capacity (c_W), veh/h	4694
Minimum Lane Change Rate (LC_{MIN}), lc/h	414	Adjusted Weaving Area Capacity, pc/h	5748
Maximum Weaving Length (L_{MAX}), ft	6872	Volume-to-Capacity Ratio (v/c)	0.17

Speed and Density

Non-Weaving Vehicle Index (I_{NW})	11	Average Weaving Speed (S_W), mi/h	64.8
Non-Weaving Lane Change Rate (LC_{NW}), lc/h	0	Average Non-Weaving Speed (S_{NW}), mi/h	70.4
Weaving Lane Change Rate (LC_W), lc/h	483	Average Speed (S), mi/h	68.0
Weaving Lane Change Rate (LC_{All}), lc/h	483	Density (D), pc/mi/ln	4.9
Weaving Intensity Factor (W)	0.205	Level of Service (LOS)	A

HCS7 Freeway Weaving Report

Project Information

Analyst	Pratik Srivastava	Date	12/16/2022
Agency		Analysis Year	2045
Jurisdiction		Time Period Analyzed	PM Peak
Project Description	Weave Analysis#4 on US 31 SB between US 24 EB and WB entrance and exit ramps	Unit	United States Customary

Geometric Data

Number of Lanes (N), ln	3	Segment Type	Freeway
Segment Length (L_S), ft	545	Number of Maneuver Lanes (N_{WL}), ln	2
Weaving Configuration	One-Sided	Ramp-to-Freeway Lane Changes (LC_{RF}), lc	1
Terrain Type	Level	Freeway-to-Ramp Lane Changes (LC_{FR}), lc	1
Percent Grade, %	-	Ramp-to-Ramp Lane Changes (LC_{RR}), lc	0
Interchange Density (ID), int/mi	0.33	Cross Weaving Managed Lane	No

Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Weather Type	Non-Severe Weather	Final Capacity Adjustment Factor (CAF)	1.000
Incident Type	No Incident	Demand Adjustment Factor (DAF)	1.000

Demand and Capacity

	FF	RF	RR	FR
Demand Volume (V_i), veh/h	571	232	0	72
Peak Hour Factor (PHF)	0.91	0.91	0.91	0.91
Total Trucks, %	20.20	19.00	0.00	29.30
Heavy Vehicle Adjustment Factor (f_{HV})	0.832	0.840	1.000	0.773
Flow Rate (v_i), pc/h	754	304	0	102

Weaving Flow Rate (v_W), pc/h	406	Freeway Max Capacity (c_{IFL}), pc/h/ln	2400
Non-Weaving Flow Rate (v_{NW}), pc/h	754	Density-Based Capacity (c_{IWL}), pc/h/ln	1973
Total Flow Rate (v), pc/h	1160	Demand Flow-Based Capacity (c_{IW}), pc/h	6857
Volume Ratio (VR)	0.350	Weaving Segment Capacity (c_W), veh/h	4906
Minimum Lane Change Rate (LC_{MIN}), lc/h	406	Adjusted Weaving Area Capacity, pc/h	5919
Maximum Weaving Length (L_{MAX}), ft	6126	Volume-to-Capacity Ratio (v/c)	0.20

Speed and Density

Non-Weaving Vehicle Index (I_{NW})	14	Average Weaving Speed (S_W), mi/h	64.9
Non-Weaving Lane Change Rate (LC_{NW}), lc/h	0	Average Non-Weaving Speed (S_{NW}), mi/h	70.2
Weaving Lane Change Rate (LC_W), lc/h	475	Average Speed (S), mi/h	68.2
Weaving Lane Change Rate (LC_{All}), lc/h	475	Density (D), pc/mi/ln	5.7
Weaving Intensity Factor (W)	0.203	Level of Service (LOS)	A

HCS7 Freeway Merge Report

Project Information

Analyst	Pratik Srivastava	Date	12/16/2022
Agency		Analysis Year	2045
Jurisdiction		Time Period Analyzed	AM Peak
Project Description	US 31 NB and US 24 WB On Ramp	Unit	United States Customary

Geometric Data

	Freeway	Ramp
Number of Lanes (N), ln	2	1
Free-Flow Speed (FFS), mi/h	75.0	35.0
Segment Length (L) / Acceleration Length (L_A),ft	1500	580
Terrain Type	Level	Level
Percent Grade, %	-	-
Segment Type / Ramp Side	Freeway	Right

Adjustment Factors

Driver Population	All Familiar	All Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	1.000	1.000
Final Capacity Adjustment Factor (CAF)	1.000	1.000
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity

Demand Volume (V_i)	443	68
Peak Hour Factor (PHF)	0.91	0.91
Total Trucks, %	29.11	33.90
Single-Unit Trucks (SUT), %	-	-
Tractor-Trailers (TT), %	-	-
Heavy Vehicle Adjustment Factor (f_{HV})	0.775	0.747
Flow Rate (v_i),pc/h	628	100
Capacity (c), pc/h	4800	2000
Volume-to-Capacity Ratio (v/c)	0.15	0.05

Speed and Density

Upstream Equilibrium Distance (L_{EQ}), ft	-	Number of Outer Lanes on Freeway (N_O)	0
Distance to Upstream Ramp (L_{UP}), ft	-	Speed Index (M_S)	0.288
Downstream Equilibrium Distance (L_{EQ}), ft	-	Flow Outer Lanes (v_{OA}), pc/h/ln	-
Distance to Downstream Ramp (L_{DOWN}), ft	-	On-Ramp Influence Area Speed (S_R), mi/h	65.5
Prop. Freeway Vehicles in Lane 1 and 2 (P_{FM})	1.000	Outer Lanes Freeway Speed (S_O), mi/h	75.0
Flow in Lanes 1 and 2 (v_{12}), pc/h	628	Ramp Junction Speed (S), mi/h	65.5
Flow Entering Ramp-Infl. Area (v_{R12}), pc/h	728	Average Density (D), pc/mi/ln	5.6
Level of Service (LOS)	A	Density in Ramp Influence Area (D_R), pc/mi/ln	7.5

HCS7 Freeway Merge Report

Project Information

Analyst	Pratik Srivastava	Date	12/16/2022
Agency		Analysis Year	2045
Jurisdiction		Time Period Analyzed	PM Peak
Project Description	US 31 NB and US 24 WB On Ramp	Unit	United States Customary

Geometric Data

	Freeway	Ramp
Number of Lanes (N), ln	2	1
Free-Flow Speed (FFS), mi/h	75.0	35.0
Segment Length (L) / Acceleration Length (L_A),ft	1500	580
Terrain Type	Level	Level
Percent Grade, %	-	-
Segment Type / Ramp Side	Highway/CD Roadway	Right

Adjustment Factors

Driver Population	All Familiar	All Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	1.000	1.000
Final Capacity Adjustment Factor (CAF)	1.000	1.000
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity

Demand Volume (V_i)	849	53
Peak Hour Factor (PHF)	0.91	0.91
Total Trucks, %	14.77	36.40
Single-Unit Trucks (SUT), %	-	-
Tractor-Trailers (TT), %	-	-
Heavy Vehicle Adjustment Factor (f_{HV})	0.871	0.733
Flow Rate (v_i),pc/h	1071	79
Capacity (c), pc/h	4400	2000
Volume-to-Capacity Ratio (v/c)	0.26	0.04

Speed and Density

Upstream Equilibrium Distance (L_{EQ}), ft	-	Number of Outer Lanes on Freeway (N_O)	0
Distance to Upstream Ramp (L_{UP}), ft	-	Speed Index (M_S)	0.293
Downstream Equilibrium Distance (L_{EQ}), ft	-	Flow Outer Lanes (v_{OA}), pc/h/ln	-
Distance to Downstream Ramp (L_{DOWN}), ft	-	On-Ramp Influence Area Speed (S_R), mi/h	65.3
Prop. Freeway Vehicles in Lane 1 and 2 (P_{FM})	1.000	Outer Lanes Freeway Speed (S_O), mi/h	75.0
Flow in Lanes 1 and 2 (v_{12}), pc/h	1071	Ramp Junction Speed (S), mi/h	65.3
Flow Entering Ramp-Infl. Area (v_{R12}), pc/h	1150	Average Density (D), pc/mi/ln	8.8
Level of Service (LOS)	B	Density in Ramp Influence Area (D_R), pc/mi/ln	10.8

HCS7 Freeway Merge Report

Project Information

Analyst	Pratik Srivastava	Date	12/16/2022
Agency		Analysis Year	2045
Jurisdiction		Time Period Analyzed	AM Peak
Project Description	US 31 SB and US 24 EB On Ramp	Unit	United States Customary

Geometric Data

	Freeway	Ramp
Number of Lanes (N), ln	2	1
Free-Flow Speed (FFS), mi/h	75.0	35.0
Segment Length (L) / Acceleration Length (L_A),ft	1500	590
Terrain Type	Level	Level
Percent Grade, %	-	-
Segment Type / Ramp Side	Freeway	Right

Adjustment Factors

Driver Population	All Familiar	All Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	1.000	1.000
Final Capacity Adjustment Factor (CAF)	1.000	1.000
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity

Demand Volume (V_i)	674	7
Peak Hour Factor (PHF)	0.91	0.91
Total Trucks, %	20.75	16.70
Single-Unit Trucks (SUT), %	-	-
Tractor-Trailers (TT), %	-	-
Heavy Vehicle Adjustment Factor (f_{HV})	0.828	0.857
Flow Rate (v_i),pc/h	895	9
Capacity (c), pc/h	4800	2000
Volume-to-Capacity Ratio (v/c)	0.19	0.00

Speed and Density

Upstream Equilibrium Distance (L_{EQ}), ft	-	Number of Outer Lanes on Freeway (N_O)	0
Distance to Upstream Ramp (L_{UP}), ft	-	Speed Index (M_S)	0.289
Downstream Equilibrium Distance (L_{EQ}), ft	-	Flow Outer Lanes (v_{OA}), pc/h/ln	-
Distance to Downstream Ramp (L_{DOWN}), ft	-	On-Ramp Influence Area Speed (S_R), mi/h	65.5
Prop. Freeway Vehicles in Lane 1 and 2 (P_{FM})	1.000	Outer Lanes Freeway Speed (S_O), mi/h	75.0
Flow in Lanes 1 and 2 (v_{12}), pc/h	895	Ramp Junction Speed (S), mi/h	65.5
Flow Entering Ramp-Infl. Area (v_{R12}), pc/h	904	Average Density (D), pc/mi/ln	6.9
Level of Service (LOS)	A	Density in Ramp Influence Area (D_R), pc/mi/ln	8.9

HCS7 Freeway Merge Report

Project Information			
Analyst	Pratik Srivastava	Date	12/16/2022
Agency		Analysis Year	2045
Jurisdiction		Time Period Analyzed	PM Peak
Project Description	US 31 SB and US 24 EB On Ramp	Unit	United States Customary

Geometric Data		
	Freeway	Ramp
Number of Lanes (N), ln	2	1
Free-Flow Speed (FFS), mi/h	75.0	35.0
Segment Length (L) / Acceleration Length (L_A),ft	1500	590
Terrain Type	Level	Level
Percent Grade, %	-	-
Segment Type / Ramp Side	Freeway	Right

Adjustment Factors		
Driver Population	All Familiar	All Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	1.000	1.000
Final Capacity Adjustment Factor (CAF)	1.000	1.000
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity		
Demand Volume (V_i)	803	5
Peak Hour Factor (PHF)	0.91	0.91
Total Trucks, %	19.85	25.00
Single-Unit Trucks (SUT), %	-	-
Tractor-Trailers (TT), %	-	-
Heavy Vehicle Adjustment Factor (f_{HV})	0.834	0.800
Flow Rate (v_i),pc/h	1058	7
Capacity (c), pc/h	4800	2000
Volume-to-Capacity Ratio (v/c)	0.22	0.00

Speed and Density			
Upstream Equilibrium Distance (L_{EQ}), ft	-	Number of Outer Lanes on Freeway (N_O)	0
Distance to Upstream Ramp (L_{UP}), ft	-	Speed Index (M_S)	0.291
Downstream Equilibrium Distance (L_{EQ}), ft	-	Flow Outer Lanes (v_{OA}), pc/h/ln	-
Distance to Downstream Ramp (L_{DOWN}), ft	-	On-Ramp Influence Area Speed (S_R), mi/h	65.4
Prop. Freeway Vehicles in Lane 1 and 2 (P_{FM})	1.000	Outer Lanes Freeway Speed (S_O), mi/h	75.0
Flow in Lanes 1 and 2 (v_{12}), pc/h	1058	Ramp Junction Speed (S), mi/h	65.4
Flow Entering Ramp-Infl. Area (v_{R12}), pc/h	1065	Average Density (D), pc/mi/ln	8.1
Level of Service (LOS)	B	Density in Ramp Influence Area (D_R), pc/mi/ln	10.2

HCS7 Freeway Diverge Report

Project Information			
Analyst	Pratik Srivastava	Date	12/16/2022
Agency		Analysis Year	2045
Jurisdiction		Time Period Analyzed	AM Peak
Project Description	US 31 NB and US 24 EB Off Ramp	Unit	United States Customary

Geometric Data		
	Freeway	Ramp
Number of Lanes (N), ln	2	1
Free-Flow Speed (FFS), mi/h	75.0	35.0
Segment Length (L) / Deceleration Length (L_A),ft	1500	400
Terrain Type	Level	Level
Percent Grade, %	-	-
Segment Type / Ramp Side	Freeway	Right

Adjustment Factors		
Driver Population	All Familiar	All Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	1.000	1.000
Final Capacity Adjustment Factor (CAF)	1.000	1.000
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity		
Demand Volume (V_i)	419	218
Peak Hour Factor (PHF)	0.91	0.91
Total Trucks, %	28.38	14.00
Single-Unit Trucks (SUT), %	-	-
Tractor-Trailers (TT), %	-	-
Heavy Vehicle Adjustment Factor (f_{HV})	0.779	0.877
Flow Rate (v_i),pc/h	591	273
Capacity (c), pc/h	4800	2000
Volume-to-Capacity Ratio (v/c)	0.12	0.14

Speed and Density			
Upstream Equilibrium Distance (L_{EQ}), ft	-	Number of Outer Lanes on Freeway (N_O)	0
Distance to Upstream Ramp (L_{UP}), ft	-	Speed Index (D_S)	0.453
Downstream Equilibrium Distance (L_{EQ}), ft	-	Flow Outer Lanes (v_{OA}), pc/h/ln	-
Distance to Downstream Ramp (L_{DOWN}), ft	-	Off-Ramp Influence Area Speed (S_R), mi/h	60.1
Prop. Freeway Vehicles in Lane 1 and 2 (P_{FD})	1.000	Outer Lanes Freeway Speed (S_O), mi/h	82.3
Flow in Lanes 1 and 2 (v_{12}), pc/h	591	Ramp Junction Speed (S), mi/h	60.1
Flow Entering Ramp-Infl. Area (v_{R12}), pc/h	-	Average Density (D), pc/mi/ln	4.9
Level of Service (LOS)	A	Density in Ramp Influence Area (D_R), pc/mi/ln	5.7

HCS7 Freeway Diverge Report

Project Information

Analyst	Pratik Srivastava	Date	12/16/2022
Agency		Analysis Year	2045
Jurisdiction		Time Period Analyzed	PM Peak
Project Description	US 31 NB and US 24 EB Off Ramp	Unit	United States Customary

Geometric Data

	Freeway	Ramp
Number of Lanes (N), ln	2	1
Free-Flow Speed (FFS), mi/h	75.0	35.0
Segment Length (L) / Deceleration Length (L_A),ft	1500	400
Terrain Type	Level	Level
Percent Grade, %	-	-
Segment Type / Ramp Side	Freeway	Right

Adjustment Factors

Driver Population	All Familiar	All Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	1.000	1.000
Final Capacity Adjustment Factor (CAF)	1.000	1.000
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity

Demand Volume (V_i)	807	188
Peak Hour Factor (PHF)	0.91	0.91
Total Trucks, %	14.16	11.80
Single-Unit Trucks (SUT), %	-	-
Tractor-Trailers (TT), %	-	-
Heavy Vehicle Adjustment Factor (f_{HV})	0.876	0.894
Flow Rate (v_i),pc/h	1012	231
Capacity (c), pc/h	4800	2000
Volume-to-Capacity Ratio (v/c)	0.21	0.12

Speed and Density

Upstream Equilibrium Distance (L_{EQ}), ft	-	Number of Outer Lanes on Freeway (N_O)	0
Distance to Upstream Ramp (L_{UP}), ft	-	Speed Index (D_S)	0.449
Downstream Equilibrium Distance (L_{EQ}), ft	-	Flow Outer Lanes (v_{OA}), pc/h/ln	-
Distance to Downstream Ramp (L_{DOWN}), ft	-	Off-Ramp Influence Area Speed (S_R), mi/h	60.2
Prop. Freeway Vehicles in Lane 1 and 2 (P_{FD})	1.000	Outer Lanes Freeway Speed (S_O), mi/h	82.3
Flow in Lanes 1 and 2 (v_{12}), pc/h	1012	Ramp Junction Speed (S), mi/h	60.2
Flow Entering Ramp-Infl. Area (v_{R12}), pc/h	-	Average Density (D), pc/mi/ln	8.4
Level of Service (LOS)	A	Density in Ramp Influence Area (D_R), pc/mi/ln	9.4

HCS7 Freeway Diverge Report

Project Information

Analyst	Pratik Srivastava	Date	12/16/2022
Agency		Analysis Year	2045
Jurisdiction		Time Period Analyzed	AM Peak
Project Description	US 31 SB and US 24 WB Off Ramp	Unit	United States Customary

Geometric Data

	Freeway	Ramp
Number of Lanes (N), ln	2	1
Free-Flow Speed (FFS), mi/h	75.0	35.0
Segment Length (L) / Deceleration Length (L_A),ft	1500	350
Terrain Type	Level	Level
Percent Grade, %	-	-
Segment Type / Ramp Side	Freeway	Right

Adjustment Factors

Driver Population	All Familiar	All Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	1.000	1.000
Final Capacity Adjustment Factor (CAF)	1.000	1.000
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity

Demand Volume (V_i)	492	48
Peak Hour Factor (PHF)	0.91	0.91
Total Trucks, %	25.44	17.90
Single-Unit Trucks (SUT), %	-	-
Tractor-Trailers (TT), %	-	-
Heavy Vehicle Adjustment Factor (f_{HV})	0.797	0.848
Flow Rate (v_i),pc/h	678	62
Capacity (c), pc/h	4800	2000
Volume-to-Capacity Ratio (v/c)	0.14	0.03

Speed and Density

Upstream Equilibrium Distance (L_{EQ}), ft	-	Number of Outer Lanes on Freeway (N_O)	0
Distance to Upstream Ramp (L_{UP}), ft	-	Speed Index (D_S)	0.434
Downstream Equilibrium Distance (L_{EQ}), ft	-	Flow Outer Lanes (v_{OA}), pc/h/ln	-
Distance to Downstream Ramp (L_{DOWN}), ft	-	Off-Ramp Influence Area Speed (S_R), mi/h	60.7
Prop. Freeway Vehicles in Lane 1 and 2 (P_{FD})	1.000	Outer Lanes Freeway Speed (S_O), mi/h	82.3
Flow in Lanes 1 and 2 (v_{12}), pc/h	678	Ramp Junction Speed (S), mi/h	60.7
Flow Entering Ramp-Infl. Area (v_{R12}), pc/h	-	Average Density (D), pc/mi/ln	5.6
Level of Service (LOS)	A	Density in Ramp Influence Area (D_R), pc/mi/ln	6.9

HCS7 Freeway Diverge Report

Project Information

Analyst	Pratik Srivastava	Date	12/16/2022
Agency		Analysis Year	2045
Jurisdiction		Time Period Analyzed	PM Peak
Project Description	US 31 SB and US 24 WB Off Ramp	Unit	United States Customary

Geometric Data

	Freeway	Ramp
Number of Lanes (N), ln	2	1
Free-Flow Speed (FFS), mi/h	75.0	35.0
Segment Length (L) / Deceleration Length (L_A),ft	1500	350
Terrain Type	Level	Level
Percent Grade, %	-	-
Segment Type / Ramp Side	Freeway	Right

Adjustment Factors

Driver Population	All Familiar	All Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	1.000	1.000
Final Capacity Adjustment Factor (CAF)	1.000	1.000
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity

Demand Volume (V_i)	643	27
Peak Hour Factor (PHF)	0.91	0.91
Total Trucks, %	21.22	36.40
Single-Unit Trucks (SUT), %	-	-
Tractor-Trailers (TT), %	-	-
Heavy Vehicle Adjustment Factor (f_{HV})	0.825	0.733
Flow Rate (v_i),pc/h	856	40
Capacity (c), pc/h	4800	2000
Volume-to-Capacity Ratio (v/c)	0.18	0.02

Speed and Density

Upstream Equilibrium Distance (L_{EQ}), ft	-	Number of Outer Lanes on Freeway (N_O)	0
Distance to Upstream Ramp (L_{UP}), ft	-	Speed Index (D_S)	0.432
Downstream Equilibrium Distance (L_{EQ}), ft	-	Flow Outer Lanes (v_{OA}), pc/h/ln	-
Distance to Downstream Ramp (L_{DOWN}), ft	-	Off-Ramp Influence Area Speed (S_R), mi/h	60.7
Prop. Freeway Vehicles in Lane 1 and 2 (P_{FD})	1.000	Outer Lanes Freeway Speed (S_O), mi/h	82.3
Flow in Lanes 1 and 2 (v_{12}), pc/h	856	Ramp Junction Speed (S), mi/h	60.7
Flow Entering Ramp-Infl. Area (v_{R12}), pc/h	-	Average Density (D), pc/mi/ln	7.1
Level of Service (LOS)	A	Density in Ramp Influence Area (D_R), pc/mi/ln	8.5

APPENDIX G: SIGNAL WARRANT WORKSHEETS

TRAFFIC SIGNAL WARRANT SUMMARY

City:	Peru	Engineer:	Jeremy Ashlock
County:	Miami	Date:	February 6, 2023
District:	Fort Wayne		

Major Street:	US 31	Lanes:	2	Major Approach Speed:	60
Minor Street:	CR 500 S	Lanes:	1	Minor Approach Speed:	45

MUTCD Electronic Reference to Chapter 4: http://mutcd.fhwa.dot.gov/pdfs/2009r1r2/part4.pdf

Volume Level Criteria

1. Is the posted speed or 85th-percentile of major street > 40 mph (70 km/h)? ☑ Yes ☐ No
2. Is the intersection in a built-up area of an isolated community with a population < 10,000? ☐ Yes ☑ No

"70%" volume level **may** be used if Question 1 **or** 2 above is answered "Yes" ☑ 70% ☑ 100%

WARRANT 1 - EIGHT-HOUR VEHICULAR VOLUME

Warrant 1 is satisfied if Condition A or Condition B is "100%" satisfied for eight hours. ☐ Yes ☑ No

Warrant 1 is also satisfied if both Condition A and Condition B are "80%" satisfied (should only be applied after an adequate trial of other alternatives that could cause less delay and inconvenience to traffic has failed to solve the traffic problems). ☐ Yes ☑ No

Condition A - Minimum Vehicular Volume

Condition A is intended for application at locations where a large volume of intersecting traffic is the principal reason to consider installing a traffic control signal.

100% Satisfied: ☐ Yes ☑ No

80% Satisfied: ☐ Yes ☑ No

70% Satisfied: ☐ Yes ☑ No

Number of Lanes for moving traffic on each approach		Vehicles per hour on major-street (total of both approaches)			Vehicles per hour on minor-street (one direction only)		
Major	Minor	100%[a]	80%[b]	70%[c]	100%[a]	80%[b]	70%[c]
1	1	500	400	350	150	120	105
2 or more	1	600	480	420	150	120	105
2 or more	2 or more	600	480	420	200	160	140
1	2 or more	500	400	350	200	160	140

[a] Basic Minimum hourly volume
[b] Used for combination of Conditions A and B after adequate trial of other remedial measures
[c] May be used when the major-street speed exceeds 40 mph or in an isolated community with a population of less than 10,000

Record 8 highest hours and the corresponding major-street and minor-street volumes in the Instructions Sheet.

Street	Eight Highest Hours							
	6 AM to 7 AM	7 AM to 8 AM	8 AM to 9 AM	12 PM to 1 PM	2 PM to 3 PM	3 PM to 4 PM	4 PM to 5 PM	5 PM to 6 PM
Major	1,119	1,446	1,468	1,540	1,906	2,222	2,003	1,820
Minor	77	104	65	52	55	75	63	52

Existing Volumes

TRAFFIC SIGNAL WARRANT SUMMARY

Condition B - Interruption of Continuous Traffic

Condition B is intended for application where Condition A is not satisfied and the traffic volume on a major street is so heavy that traffic on the minor intersecting street suffers excessive delay or conflict in entering or crossing the major street.

Applicable:	☑ Yes	☐ No
100% Satisfied:	☐ Yes	☑ No
80% Satisfied:	☐ Yes	☑ No
70% Satisfied:	☐ Yes	☑ No

Number of Lanes for moving traffic on each approach		Vehicles per hour on major-street (total of both approaches)			Vehicles per hour on minor-street (one direction only)		
Major	**Minor**	**100%[a]**	**80%[b]**	**70%[c]**	**100%[a]**	**80%[b]**	**70%[c]**
1	1	750	600	525	75	60	53
2 or more	1	900	720	630	75	60	53
2 or more	2 or more	900	720	630	100	80	70
1	2 or more	750	600	525	100	80	70

[a] Basic Minimum hourly volume

[b] Used for combination of Conditions A and B after adequate trial of other remedial measures

[c] May be used when the major-street speed exceeds 40 mph or in an isolated community with a population of less than 10,000

Record 8 highest hours and the corresponding major-street and minor-street volumes in the Instructions Sheet.

Eight Highest Hours								
Street	**6 AM to 7 AM**	**7 AM to 8 AM**	**8 AM to 9 AM**	**12 PM to 1 PM**	**2 PM to 3 PM**	**3 PM to 4 PM**	**4 PM to 5 PM**	**5 PM to 6 PM**
Major	1,119	1,446	1,468	1,540	1,906	2,222	2,003	1,820
Minor	77	104	65	52	55	75	63	52

Existing Volumes

TRAFFIC SIGNAL WARRANT SUMMARY

City:	**Peru**	Engineer:	**Jeremy Ashlock**
County:	**Miami**	Date:	**February 6, 2023**
District:	**Fort Wayne**		

Major Street:	**US 31**	Lanes:	**2**	Major Approach Speed:	**60**
Minor Street:	**CR 500 S**	Lanes:	**1**	Minor Approach Speed:	**45**

MUTCD Electronic Reference to Chapter 4: http://mutcd.fhwa.dot.gov/pdfs/2009r1r2/part4.pdf

Volume Level Criteria

1. Is the posted speed or 85th-percentile of major street > 40 mph (70 km/h)? ☑ Yes ☐ No
2. Is the intersection in a built-up area of an isolated community with a population < 10,000? ☐ Yes ☑ No

"70%" volume level **may** be used if Question 1 **or** 2 above is answered "Yes" ☑ Yes ☐ No

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

If all four points lie above the appropriate line, then the warrant is satisfied.

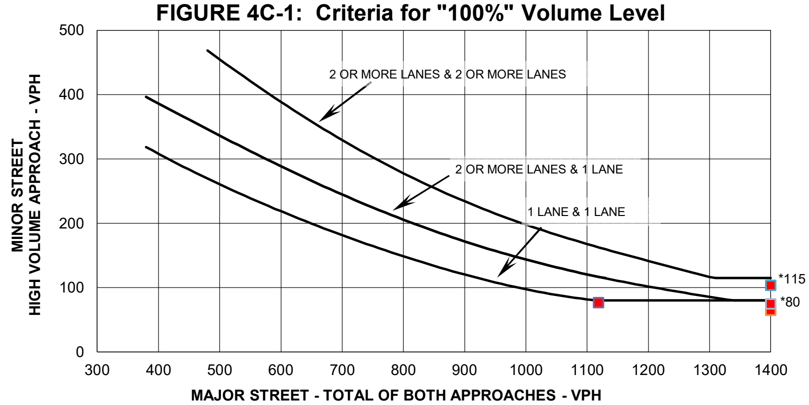
Applicable: ☑ Yes ☐ No
Satisfied: ☑ Yes ☐ No

Plot four volume combinations on the applicable figure below.

100% Volume Level

Four Highest Hours	Volumes	
	Major Street	Minor Street
6 AM to 7 AM	1119	77
7 AM to 8 AM	1446	104
8 AM to 9 AM	1468	65
3 PM to 4 PM	2222	75

FIGURE 4C-1: Criteria for "100%" Volume Level



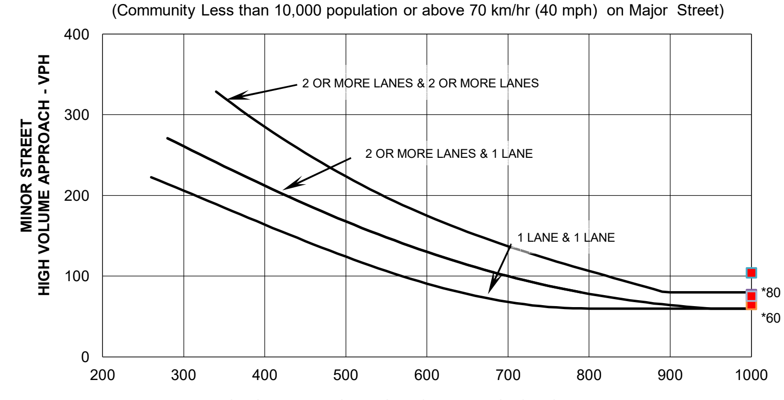
* Note: *115 vph applies as the lower threshold volume for a minor street approach with two or more lanes and 80 vph applies as the lower threshold volume threshold for a minor street approach with one lane.*

70% Volume Level

Four Highest Hours	Volumes	
	Major Street	Minor Street
6 AM to 7 AM	1119	77
7 AM to 8 AM	1446	104
8 AM to 9 AM	1468	65
3 PM to 4 PM	2222	75

FIGURE 4C-2: Criteria for "70%" Volume Level

(Community Less than 10,000 population or above 70 km/hr (40 mph) on Major Street)



* Note: *80 vph applies as the lower threshold volume for a minor street approach with two or more lanes and 60 vph applies as the lower threshold volume threshold for a minor street approach with one lane.*

TRAFFIC SIGNAL WARRANT SUMMARY

City:	**Peru**	Engineer:	**Jeremy Ashlock**
County:	**Miami**	Date:	**February 6, 2023**
District:	**Fort Wayne**		

Major Street:	**US 31**	Lanes:	**2**	Major Approach Speed:	**60**
Minor Street:	**CR 500 S**	Lanes:	**1**	Minor Approach Speed:	**45**

MUTCD Electronic Reference to Chapter 4: http://mutcd.fhwa.dot.gov/pdfs/2009r1r2/part4.pdf

WARRANT 7 - CRASH EXPERIENCE

Record hours where criteria are fulfilled, the corresponding volume, and other information in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☑ Yes ☐ No
Satisfied: ☐ Yes ☑ No

Criteria		Hour								Volume Major	Volume Minor	Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. One of the warrants to the right is met.	Warrant 1, Condition A (80% satisfied)									2222	75		No		No
	Warrant 1, Condition B (80% satisfied)	X	X	X			X	X					No		
	Warrant 4, Pedestrian Volume at 80% of volume requirements: # ped/hr for four (4) hours or # ped/hr for one (1) hour.												No		
2. Adequate trial of other remedial measure has failed to reduce crash frequency.		Measure tried:													No
3. Five or more reported crashes, of types susceptible to correction by signal, have occurred within a 12-month period.		Observed Crash Types:	Left-turn / Angle							Number of crashes per 12 months:			6	Yes	

TRAFFIC SIGNAL WARRANT SUMMARY

City:	**Peru**	Engineer:	**Jeremy Ashlock**
County:	**Miami**	Date:	**February 6, 2023**
District:	**Fort Wayne**		

Major Street:	**US 31**	Lanes:	**2**	Major Approach Speed:	**60**
Minor Street:	**CR 500 S**	Lanes:	**1**	Minor Approach Speed:	**45**

MUTCD Electronic Reference to Chapter 4: http://mutcd.fhwa.dot.gov/pdfs/2009r1r2/part4.pdf

CONCLUSIONS

Remarks: Warrant 1 is **not** met. Using 70% volume criteria, 6 of the 8 hours are met, with the remaining 2 hours short of the criteria by 1 vehicle (52 vehicles observed with the 70% criteria being 53 vehicles).
Warrant 2 is met using 70% volume criteria. Warrant 7 meets 1 of 3 criteria.

WARRANTS SATISFIED:

☐ Warrant 1	☐ Not Applicable
☑ Warrant 2	☐ Not Applicable
☐ Warrant 3	☑ Not Applicable
☐ Warrant 4	☑ Not Applicable
☐ Warrant 5	☑ Not Applicable
☐ Warrant 6	☑ Not Applicable
☐ Warrant 7	☐ Not Applicable
☐ Warrant 8	☑ Not Applicable
☐ Warrant 9	☑ Not Applicable

TRAFFIC SIGNAL WARRANT SUMMARY

City:	**Bunker Hill**	Engineer:	**Jeremy Ashlock**
County:	**Miami**	Date:	**December 28, 2022**
District:	**Fort Wayne**		

Major Street:	**US 31**	Lanes:	**2**	Major Approach Speed:	**60**
Minor Street:	**CR 800S**	Lanes:	**1**	Minor Approach Speed:	**45**

MUTCD Electronic Reference to Chapter 4: http://mutcd.fhwa.dot.gov/pdfs/2009r1r2/part4.pdf

Volume Level Criteria

1. Is the posted speed or 85th-percentile of major street > 40 mph (70 km/h)? ☑ Yes ☐ No
2. Is the intersection in a built-up area of an isolated community with a population < 10,000? ☐ Yes ☑ No

"70%" volume level **may** be used if Question 1 **or** 2 above is answered "Yes" ☑ 70% ☑ 100%

WARRANT 1 - EIGHT-HOUR VEHICULAR VOLUME

Warrant 1 is satisfied if Condition A or Condition B is "100%" satisfied for eight hours. ☐ Yes ☑ No

Warrant 1 is also satisfied if both Condition A and Condition B are "80%" satisfied (should only be applied after an adequate trial of other alternatives that could cause less delay and inconvenience to traffic has failed to solve the traffic problems). ☐ Yes ☑ No

Condition A - Minimum Vehicular Volume

Condition A is intended for application at locations where a large volume of intersecting traffic is the principal reason to consider installing a traffic control signal.

100% Satisfied: ☐ Yes ☑ No

80% Satisfied: ☐ Yes ☑ No

70% Satisfied: ☐ Yes ☑ No

Number of Lanes for moving traffic on each approach		Vehicles per hour on major-street (total of both approaches)			Vehicles per hour on minor-street (one direction only)		
Major	**Minor**	**100%[a]**	**80%[b]**	**70%[c]**	**100%[a]**	**80%[b]**	**70%[c]**
1	1	500	400	350	150	120	105
2 or more	1	600	480	420	150	120	105
2 or more	2 or more	600	480	420	200	160	140
1	2 or more	500	400	350	200	160	140

[a] Basic Minimum hourly volume
[b] Used for combination of Conditions A and B after adequate trial of other remedial measures
[c] May be used when the major-street speed exceeds 40 mph or in an isolated community with a population of less than 10,000

Record 8 highest hours and the corresponding major-street and minor-street volumes in the Instructions Sheet.

Street	Eight Highest Hours							
	6 AM to 7 AM	**7 AM to 8 AM**	**8 AM to 9 AM**	**2 PM to 3 PM**	**3 PM to 4 PM**	**4 PM to 5 PM**	**5 PM to 6 PM**	**6 PM to 7 PM**
Major	1,195	1,536	1,415	1,580	1,920	1,847	1,730	1,219
Minor	36	45	88	38	119	42	71	54

Existing Volumes

TRAFFIC SIGNAL WARRANT SUMMARY

Condition B - Interruption of Continuous Traffic

Condition B is intended for application where Condition A is not satisfied and the traffic volume on a major street is so heavy that traffic on the minor intersecting street suffers excessive delay or conflict in entering or crossing the major street.

Applicable:	☑ Yes	☐ No
100% Satisfied:	☐ Yes	☑ No
80% Satisfied:	☐ Yes	☑ No
70% Satisfied:	☐ Yes	☑ No

Number of Lanes for moving traffic on each approach		Vehicles per hour on major-street (total of both approaches)			Vehicles per hour on minor-street (one direction only)		
Major	**Minor**	**100%[a]**	**80%[b]**	**70%[c]**	**100%[a]**	**80%[b]**	**70%[c]**
1	1	750	600	525	75	60	53
2 or more	1	900	720	630	75	60	53
2 or more	2 or more	900	720	630	100	80	70
1	2 or more	750	600	525	100	80	70

[a] Basic Minimum hourly volume

[b] Used for combination of Conditions A and B after adequate trial of other remedial measures

[c] May be used when the major-street speed exceeds 40 mph or in an isolated community with a population of less than 10,000

Record 8 highest hours and the corresponding major-street and minor-street volumes in the Instructions Sheet.

Eight Highest Hours								
Street	**6 AM to 7 AM**	**7 AM to 8 AM**	**8 AM to 9 AM**	**2 PM to 3 PM**	**3 PM to 4 PM**	**4 PM to 5 PM**	**5 PM to 6 PM**	**6 PM to 7 PM**
Major	1,195	1,536	1,415	1,580	1,920	1,847	1,730	1,219
Minor	36	45	88	38	119	42	71	54

Existing Volumes

TRAFFIC SIGNAL WARRANT SUMMARY

City:	Bunker Hill	Engineer:	Jeremy Ashlock
County:	Miami	Date:	December 28, 2022
District:	Fort Wayne		

Major Street:	US 31	Lanes:	2	Major Approach Speed:	60
Minor Street:	CR 800S	Lanes:	1	Minor Approach Speed:	45

MUTCD Electronic Reference to Chapter 4: http://mutcd.fhwa.dot.gov/pdfs/2009r1r2/part4.pdf

Volume Level Criteria

1. Is the posted speed or 85th-percentile of major street > 40 mph (70 km/h)? ☑ Yes ☐ No
2. Is the intersection in a built-up area of an isolated community with a population < 10,000? ☐ Yes ☑ No

"70%" volume level **may** be used if Question 1 **or** 2 above is answered "Yes" ☑ Yes ☐ No

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

If all four points lie above the appropriate line, then the warrant is satisfied.

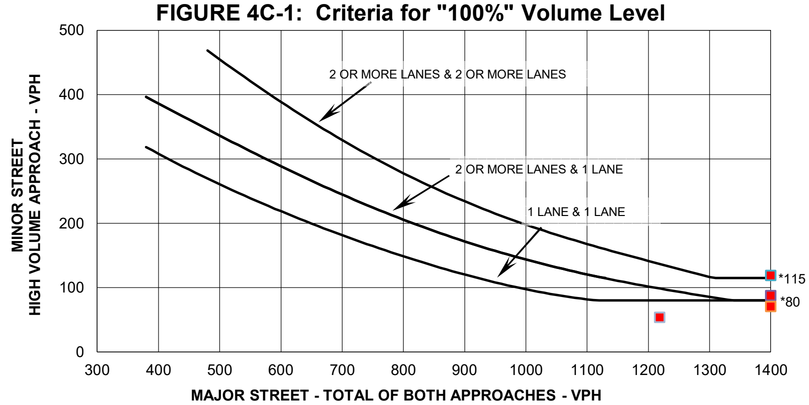
Applicable: ☑ Yes ☐ No
Satisfied: ☐ Yes ☑ No

Plot four volume combinations on the applicable figure below.

100% Volume Level

Four Highest Hours	Volumes	
	Major Street	Minor Street
8 AM to 9 AM	1415	88
3 PM to 4 PM	1920	119
5 PM to 6 PM	1730	71
6 PM to 7 PM	1219	54

FIGURE 4C-1: Criteria for "100%" Volume Level



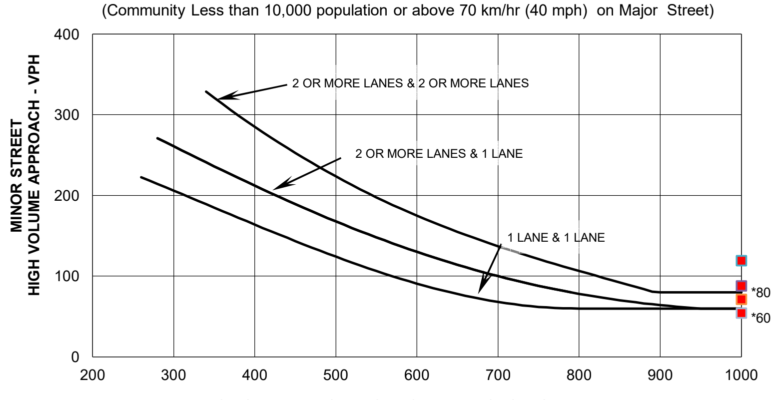
* Note: *115 vph applies as the lower threshold volume for a minor street approach with two or more lanes and 80 vph applies as the lower threshold volume threshold for a minor street approach with one lane.*

70% Volume Level

Four Highest Hours	Volumes	
	Major Street	Minor Street
8 AM to 9 AM	1415	88
3 PM to 4 PM	1920	119
5 PM to 6 PM	1730	71
6 PM to 7 PM	1219	54

FIGURE 4C-2: Criteria for "70%" Volume Level

(Community Less than 10,000 population or above 70 km/hr (40 mph) on Major Street)



* Note: *80 vph applies as the lower threshold volume for a minor street approach with two or more lanes and 60 vph applies as the lower threshold volume threshold for a minor street approach with one lane.*

TRAFFIC SIGNAL WARRANT SUMMARY

City:	**Bunker Hill**	Engineer:	**Jeremy Ashlock**
County:	**Miami**	Date:	**December 28, 2022**
District:	**Fort Wayne**		

Major Street:	**US 31**	Lanes:	**2**	Major Approach Speed:	**60**
Minor Street:	**CR 800S**	Lanes:	**1**	Minor Approach Speed:	**45**

MUTCD Electronic Reference to Chapter 4: http://mutcd.fhwa.dot.gov/pdfs/2009r1r2/part4.pdf

CONCLUSIONS

Remarks: Warrant 1 is **not** met. Using 70% volume criteria, 4 of the 8 hours are met.
Warrant 2 is **not** met. Using 70% volume criteria, 3 of the 4 hours are met, with the remaining 1 hour short of the criteria by 6 vehicles (54 vehicles observed with the 70% criteria being 60 vehicles).

WARRANTS SATISFIED:

Warrant	Satisfied	Not Applicable
Warrant 1	☐	☐
Warrant 2	☐	☐
Warrant 3	☐	☑
Warrant 4	☐	☑
Warrant 5	☐	☑
Warrant 6	☐	☑
Warrant 7	☐	☑
Warrant 8	☐	☑
Warrant 9	☐	☑

TRAFFIC SIGNAL WARRANT SUMMARY

City: **Sharpsville**
County: **Tipton**
District: **Greenfield**

Engineer: **Jeremy Ashlock**
Date: **December 28, 2022**

Major Street: **US 31** Lanes: **2** Major Approach Speed: **60**
Minor Street: **CR 550 N** Lanes: **1** Minor Approach Speed: **45**

MUTCD Electronic Reference to Chapter 4: http://mutcd.fhwa.dot.gov/pdfs/2009r1r2/part4.pdf

Volume Level Criteria

1. Is the posted speed or 85th-percentile of major street > 40 mph (70 km/h)? ☑ Yes ☐ No
2. Is the intersection in a built-up area of an isolated community with a population < 10,000? ☐ Yes ☑ No

"70%" volume level **may** be used if Question 1 **or** 2 above is answered "Yes" ☑ 70% ☑ 100%

WARRANT 1 - EIGHT-HOUR VEHICULAR VOLUME

Warrant 1 is satisfied if Condition A or Condition B is "100%" satisfied for eight hours. ☐ Yes ☑ No

Warrant 1 is also satisfied if both Condition A and Condition B are "80%" satisfied (should only be applied after an adequate trial of other alternatives that could cause less delay and inconvenience to traffic has failed to solve the traffic problems). ☐ Yes ☑ No

Condition A - Minimum Vehicular Volume

Condition A is intended for application at locations where a large volume of intersecting traffic is the principal reason to consider installing a traffic control signal.

100% Satisfied: ☐ Yes ☑ No
80% Satisfied: ☐ Yes ☑ No
70% Satisfied: ☐ Yes ☑ No

Number of Lanes for moving traffic on each approach		Vehicles per hour on major-street (total of both approaches)			Vehicles per hour on minor-street (one direction only)		
Major	Minor	100%[a]	80%[b]	70%[c]	100%[a]	80%[b]	70%[c]
1	1	500	400	350	150	120	105
2 or more	1	600	480	420	150	120	105
2 or more	2 or more	600	480	420	200	160	140
1	2 or more	500	400	350	200	160	140

[a] Basic Minimum hourly volume
[b] Used for combination of Conditions A and B after adequate trial of other remedial measures
[c] May be used when the major-street speed exceeds 40 mph or in an isolated community with a population of less than 10,000

Record 8 highest hours and the corresponding major-street and minor-street volumes in the Instructions Sheet.

Street	Eight Highest Hours							
	6 AM to 7 AM	7 AM to 8 AM	8 AM to 9 AM	11 AM to 12 PM	1 PM to 2 PM	3 PM to 4 PM	5 PM to 6 PM	6 PM to 7 PM
Major	1,405	1,714	1,484	1,655	1,605	1,983	2,066	1,537
Minor	17	27	16	20	16	37	23	25

Existing Volumes

TRAFFIC SIGNAL WARRANT SUMMARY

Condition B - Interruption of Continuous Traffic

Condition B is intended for application where Condition A is not satisfied and the traffic volume on a major street is so heavy that traffic on the minor intersecting street suffers excessive delay or conflict in entering or crossing the major street.

Applicable:	☑ Yes	☐ No
100% Satisfied:	☐ Yes	☑ No
80% Satisfied:	☐ Yes	☑ No
70% Satisfied:	☐ Yes	☑ No

Number of Lanes for moving traffic on each approach		Vehicles per hour on major-street (total of both approaches)			Vehicles per hour on minor-street (one direction only)		
Major	Minor	100%[a]	80%[b]	70%[c]	100%[a]	80%[b]	70%[c]
1	1	750	600	525	75	60	53
2 or more	1	900	720	630	75	60	53
2 or more	2 or more	900	720	630	100	80	70
1	2 or more	750	600	525	100	80	70

[a] Basic Minimum hourly volume

[b] Used for combination of Conditions A and B after adequate trial of other remedial measures

[c] May be used when the major-street speed exceeds 40 mph or in an isolated community with a population of less than 10,000

Record 8 highest hours and the corresponding major-street and minor-street volumes in the Instructions Sheet.

Eight Highest Hours								
Street	6 AM to 7 AM	7 AM to 8 AM	8 AM to 9 AM	11 AM to 12 PM	1 PM to 2 PM	3 PM to 4 PM	5 PM to 6 PM	6 PM to 7 PM
Major	1,405	1,714	1,484	1,655	1,605	1,983	2,066	1,537
Minor	17	27	16	20	16	37	23	25

Existing Volumes

TRAFFIC SIGNAL WARRANT SUMMARY

City: **Sharpsville** | Engineer: **Jeremy Ashlock**
County: **Tipton** | Date: **December 28, 2022**
District: **Greenfield**

Major Street: **US 31** | Lanes: **2** | Major Approach Speed: **60**
Minor Street: **CR 550 N** | Lanes: **1** | Minor Approach Speed: **45**

MUTCD Electronic Reference to Chapter 4: http://mutcd.fhwa.dot.gov/pdfs/2009r1r2/part4.pdf

Volume Level Criteria

1. Is the posted speed or 85th-percentile of major street > 40 mph (70 km/h)? ☑ Yes ☐ No
2. Is the intersection in a built-up area of an isolated community with a population < 10,000? ☐ Yes ☑ No

"70%" volume level **may** be used if Question 1 **or** 2 above is answered "Yes" ☑ Yes ☐ No

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

If all four points lie above the appropriate line, then the warrant is satisfied.

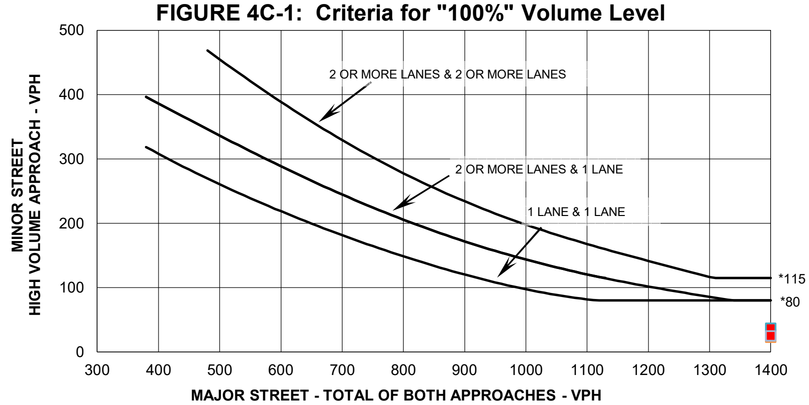
Applicable: ☑ Yes ☐ No
Satisfied: ☐ Yes ☑ No

Plot four volume combinations on the applicable figure below.

100% Volume Level

Four Highest Hours	Volumes	
	Major Street	Minor Street
7 AM to 8 AM	1714	27
3 PM to 4 PM	1983	37
5 PM to 6 PM	2066	23
6 PM to 7 PM	1537	25

FIGURE 4C-1: Criteria for "100%" Volume Level



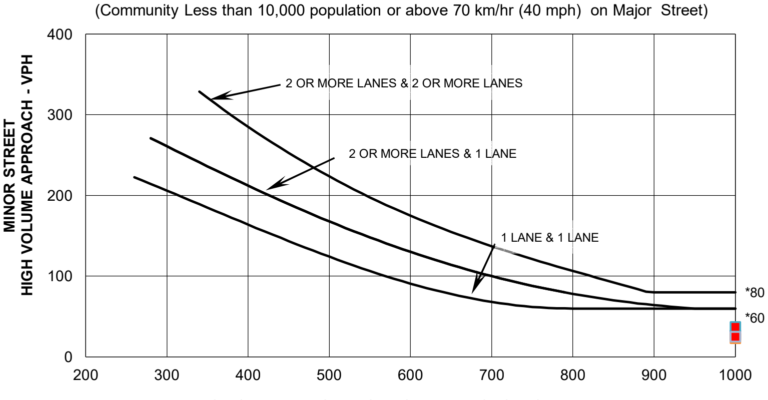
** Note: 115 vph applies as the lower threshold volume for a minor street approach with two or more lanes and 80 vph applies as the lower threshold volume threshold for a minor street approach with one lane.*

70% Volume Level

Four Highest Hours	Volumes	
	Major Street	Minor Street
7 AM to 8 AM	1714	27
3 PM to 4 PM	1983	37
5 PM to 6 PM	2066	23
6 PM to 7 PM	1537	25

FIGURE 4C-2: Criteria for "70%" Volume Level

(Community Less than 10,000 population or above 70 km/hr (40 mph) on Major Street)



** Note: 80 vph applies as the lower threshold volume for a minor street approach with two or more lanes and 60 vph applies as the lower threshold volume threshold for a minor street approach with one lane.*

TRAFFIC SIGNAL WARRANT SUMMARY

City:	**Sharpsville**	Engineer:	**Jeremy Ashlock**
County:	**Tipton**	Date:	**December 28, 2022**
District:	**Greenfield**		

Major Street:	**US 31**	Lanes:	**2**	Major Approach Speed:	**60**
Minor Street:	**CR 550 N**	Lanes:	**1**	Minor Approach Speed:	**45**

MUTCD Electronic Reference to Chapter 4: http://mutcd.fhwa.dot.gov/pdfs/2009r1r2/part4.pdf

CONCLUSIONS

Remarks: Warrant 1 is **not** met. Using 70% volume criteria, 0 of the 8 hours are met.
Warrant 2 is **not** met. Using 70% volume criteria, 0 of the 4 hours are met.

WARRANTS SATISFIED:

☐ Warrant 1	☐ Not Applicable
☐ Warrant 2	☐ Not Applicable
☐ Warrant 3	☑ Not Applicable
☐ Warrant 4	☑ Not Applicable
☐ Warrant 5	☑ Not Applicable
☐ Warrant 6	☑ Not Applicable
☐ Warrant 7	☑ Not Applicable
☐ Warrant 8	☑ Not Applicable
☐ Warrant 9	☑ Not Applicable

TRAFFIC SIGNAL WARRANT SUMMARY

City:	**Atlanta**	Engineer:	**Jeremy Ashlock**
County:	**Hamilton**	Date:	**December 28, 2022**
District:	**Greenfield**		

Major Street:	**US 31**	Lanes:	**2**	Major Approach Speed:	**60**
Minor Street:	**296th Street**	Lanes:	**1**	Minor Approach Speed:	**45**

MUTCD Electronic Reference to Chapter 4: http://mutcd.fhwa.dot.gov/pdfs/2009r1r2/part4.pdf

Volume Level Criteria

1. Is the posted speed or 85th-percentile of major street > 40 mph (70 km/h)? ☑ Yes ☐ No
2. Is the intersection in a built-up area of an isolated community with a population < 10,000? ☐ Yes ☑ No

"70%" volume level **may** be used if Question 1 **or** 2 above is answered "Yes" ☑ 70% ☑ 100%

WARRANT 1 - EIGHT-HOUR VEHICULAR VOLUME

Warrant 1 is satisfied if Condition A or Condition B is "100%" satisfied for eight hours. ☐ Yes ☑ No

Warrant 1 is also satisfied if both Condition A and Condition B are "80%" satisfied (should only be applied after an adequate trial of other alternatives that could cause less delay and inconvenience to traffic has failed to solve the traffic problems). ☐ Yes ☑ No

Condition A - Minimum Vehicular Volume

Condition A is intended for application at locations where a large volume of intersecting traffic is the principal reason to consider installing a traffic control signal.

100% Satisfied: ☐ Yes ☑ No
80% Satisfied: ☐ Yes ☑ No
70% Satisfied: ☐ Yes ☑ No

Number of Lanes for moving traffic on each approach		Vehicles per hour on major-street (total of both approaches)			Vehicles per hour on minor-street (one direction only)		
Major	**Minor**	**100%[a]**	**80%[b]**	**70%[c]**	**100%[a]**	**80%[b]**	**70%[c]**
1	1	500	400	350	150	120	105
2 or more	1	600	480	420	150	120	105
2 or more	2 or more	600	480	420	200	160	140
1	2 or more	500	400	350	200	160	140

[a] Basic Minimum hourly volume
[b] Used for combination of Conditions A and B after adequate trial of other remedial measures
[c] May be used when the major-street speed exceeds 40 mph or in an isolated community with a population of less than 10,000

Record 8 highest hours and the corresponding major-street and minor-street volumes in the Instructions Sheet.

Street	Eight Highest Hours							
	6 AM to 7 AM	7 AM to 8 AM	8 AM to 9 AM	10 AM to 11 AM	11 AM to 12 PM	2 PM to 3 PM	3 PM to 4 PM	5 PM to 6 PM
Major	1,479	1,895	1,751	1,495	1,728	1,817	2,055	2,308
Minor	83	88	64	36	38	46	39	42

Existing Volumes

TRAFFIC SIGNAL WARRANT SUMMARY

Condition B - Interruption of Continuous Traffic

Condition B is intended for application where Condition A is not satisfied and the traffic volume on a major street is so heavy that traffic on the minor intersecting street suffers excessive delay or conflict in entering or crossing the major street.

Applicable:	☑ Yes	☐ No
100% Satisfied:	☐ Yes	☑ No
80% Satisfied:	☐ Yes	☑ No
70% Satisfied:	☐ Yes	☑ No

Number of Lanes for moving traffic on each approach		Vehicles per hour on major-street (total of both approaches)			Vehicles per hour on minor-street (one direction only)		
Major	Minor	100%[a]	80%[b]	70%[c]	100%[a]	80%[b]	70%[c]
1	1	750	600	525	75	60	53
2 or more	1	900	720	630	75	60	53
2 or more	2 or more	900	720	630	100	80	70
1	2 or more	750	600	525	100	80	70

[a] Basic Minimum hourly volume

[b] Used for combination of Conditions A and B after adequate trial of other remedial measures

[c] May be used when the major-street speed exceeds 40 mph or in an isolated community with a population of less than 10,000

Record 8 highest hours and the corresponding major-street and minor-street volumes in the Instructions Sheet.

Eight Highest Hours								
Street	6 AM to 7 AM	7 AM to 8 AM	8 AM to 9 AM	10 AM to 11 AM	11 AM to 12 PM	2 PM to 3 PM	3 PM to 4 PM	5 PM to 6 PM
Major	1,479	1,895	1,751	1,495	1,728	1,817	2,055	2,308
Minor	83	88	64	36	38	46	39	42

Existing Volumes

TRAFFIC SIGNAL WARRANT SUMMARY

City:	Atlanta	Engineer:	Jeremy Ashlock
County:	Hamilton	Date:	December 28, 2022
District:	Greenfield		

Major Street:	US 31	Lanes:	2	Major Approach Speed:	60
Minor Street:	296th Street	Lanes:	1	Minor Approach Speed:	45

MUTCD Electronic Reference to Chapter 4: http://mutcd.fhwa.dot.gov/pdfs/2009r1r2/part4.pdf

Volume Level Criteria

1. Is the posted speed or 85th-percentile of major street > 40 mph (70 km/h)? ☑ Yes ☐ No
2. Is the intersection in a built-up area of an isolated community with a population < 10,000? ☐ Yes ☑ No

"70%" volume level **may** be used if Question 1 **or** 2 above is answered "Yes" ☑ Yes ☐ No

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

If all four points lie above the appropriate line, then the warrant is satisfied.

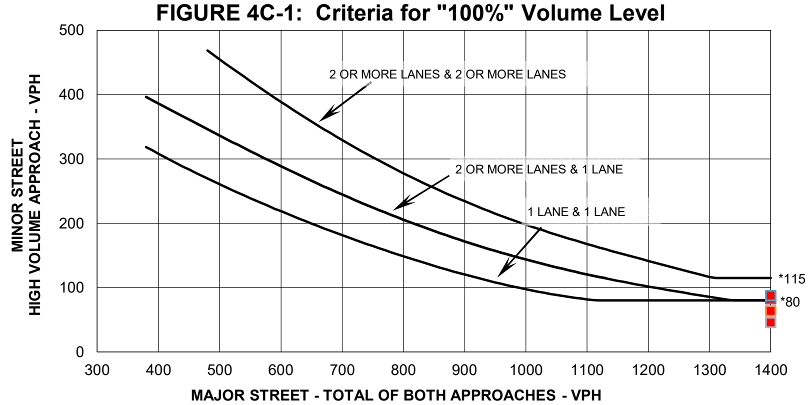
Applicable: ☑ Yes ☐ No
Satisfied: ☐ Yes ☑ No

Plot four volume combinations on the applicable figure below.

100% Volume Level

Four Highest Hours	Volumes	
	Major Street	Minor Street
6 AM to 7 AM	1479	83
7 AM to 8 AM	1895	88
8 AM to 9 AM	1751	64
2 PM to 3 PM	1817	46

FIGURE 4C-1: Criteria for "100%" Volume Level



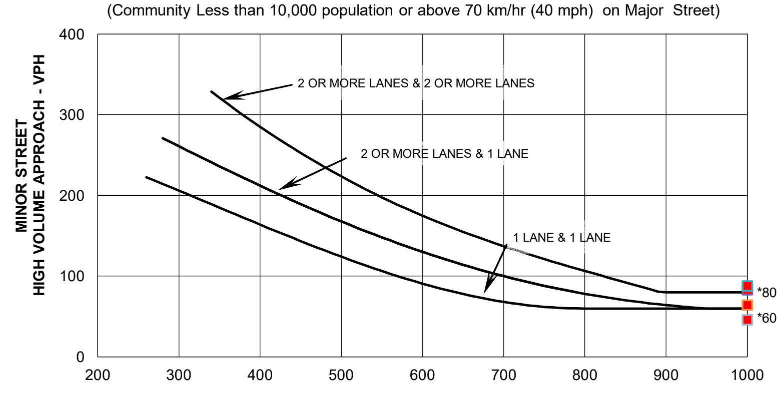
* Note: *115 vph applies as the lower threshold volume for a minor street approach with two or more lanes and 80 vph applies as the lower threshold volume threshold for a minor street approach with one lane.*

70% Volume Level

Four Highest Hours	Volumes	
	Major Street	Minor Street
6 AM to 7 AM	1479	83
7 AM to 8 AM	1895	88
8 AM to 9 AM	1751	64
2 PM to 3 PM	1817	46

FIGURE 4C-2: Criteria for "70%" Volume Level

(Community Less than 10,000 population or above 70 km/hr (40 mph) on Major Street)



* Note: *80 vph applies as the lower threshold volume for a minor street approach with two or more lanes and 60 vph applies as the lower threshold volume threshold for a minor street approach with one lane.*

TRAFFIC SIGNAL WARRANT SUMMARY

City:	**Atlanta**	Engineer:	**Jeremy Ashlock**
County:	**Hamilton**	Date:	**December 28, 2022**
District:	**Greenfield**		

Major Street:	**US 31**	Lanes:	**2**	Major Approach Speed:	**60**
Minor Street:	**296th Street**	Lanes:	**1**	Minor Approach Speed:	**45**

MUTCD Electronic Reference to Chapter 4: http://mutcd.fhwa.dot.gov/pdfs/2009r1r2/part4.pdf

CONCLUSIONS

Remarks: Warrant 1 is **not** met. Using 70% volume criteria, 3 of the 8 hours are met.
Warrant 2 is **not** met. Using 70% volume criteria, 3 of the 4 hours are met, with the remaining 1 hour short of the criteria by 14 vehicles (46 vehicles observed with the 70% criteria being 60 vehicles).

WARRANTS SATISFIED:

Warrant	Satisfied	Not Applicable
Warrant 1	☐	☐
Warrant 2	☐	☐
Warrant 3	☐	☑
Warrant 4	☐	☑
Warrant 5	☐	☑
Warrant 6	☐	☑
Warrant 7	☐	☑
Warrant 8	☐	☑
Warrant 9	☐	☑