



2.2 Traffic Congestion

The majority of the US 31 corridor is presently experiencing high levels of congestion with unacceptable operating conditions (based on INDOT roadway design standards on level-of-service). As growth of the South Bend metropolitan area and Indiana fuels increasing traffic volumes, traffic flow conditions will further deteriorate along US 31 to an unacceptable level from the Michigan Road interchange (Old US 31, north of Plymouth) to the US 20 Bypass.

In order to be able to predict future traffic volumes within the study area for this project, a travel demand model was developed. The travel demand model developed for this project, the US 31 Corridor Travel Demand Model, began with the Indiana Statewide Travel Demand Model (INSTDM) that is utilized by INDOT to predict future traffic volumes on a statewide basis.

During the initial development of the INSTDM in 1998, the state was subdivided into travel analysis zones and origin-destination (OD) studies were performed. At that time, the INSTDM included only the State of Indiana and the abutting Chicago, Cincinnati, and Louisville metropolitan areas, with a base year of 1998, a future year of 2025, and included only the roadway system maintained by the state. For the I-69 Evansville to Indianapolis Tier 1 Environmental Impact Statement (EIS), the geographic area of the ISTDM was expanded to include major portions of surrounding states (I-57 in Illinois, Western Parkway and I-71 in Kentucky, I-94 in Michigan, and I-75 in Ohio). The modeled roadway network was also expanded in the 26 counties in southwest Indiana associated with the I-69 Tier 1 EIS to include all roadways classified as Rural Major Collectors or higher, regardless of maintenance responsibility. The I-69 version of ISTDM was validated in February 2001 and is documented in Appendix V of the I-69 Evansville to Indianapolis Tier 1 FEIS (December, 2003). The I-69 version of the ISTDM was next updated to include the results of the year 2000 Census while maintaining the modeled roadway network, the travel analysis zone structure, and the future year of 2025.

The US 31 Corridor Travel Demand Model expanded the INSTDM by:

- Adding to the INSTDM roadway network to include all roadway network contained in the MACOG metropolitan model for St. Joseph County and all roadways classified as Rural Minor Collectors or higher in Marshall County,
- Extrapolating the travel analysis zone forecasts from the year 2025 to the year 2030,
- Disaggregating the ISTDM travel analysis zones to:
 - Reflect the MACOG metropolitan zonal system north of the US 20 Bypass,
 - Create smaller zones than the MACOG zonal system south of the US 20 Bypass in St. Joseph County (approximating that of the previous US 31 St. Joseph/Marshall County Major Investment Study (MIS) traffic model), and
 - Create a new zonal system in Marshall County approximating Census Block Groups.

Modeling more roadway network with a higher number of smaller travel analysis zones generally results in a more accurate travel demand model that can provide data on a much smaller scale. This expanded travel demand model was developed to provide more detailed information within St. Joseph and Marshall counties while maintaining the



balance of the INSTDM outside of these two counties. The performance and accuracy of the US 31 Corridor Travel Demand Model was checked against actual traffic counts within the US 31 study area and its accuracy was validated when it was found to replicate those traffic volumes within 5%.

Following the development of a US 31 Corridor Travel Demand Model that accurately models the existing travel patterns, future population and employment data by travel analysis zone was inserted to predict future traffic conditions within the study area. The development of the future (Year 2030) traffic conditions utilized population growth and employment growth trends to establish county-wide control totals; then, the 30-year increment in growth by county was allocated to travel analysis zones based on development activity. Development activity information included population and employment change patterns from the MACOG Travel Demand Model, current land use and zoning, future land use patterns of local comprehensive plans, and marketing information on industrial, commercial and residential developments. The long range transportation plans and transportation improvement programs for MACOG and INDOT were reviewed to identify both the major roadway improvement projects completed since the year 2000 as well as those projects currently programmed for future completion. The addition of both the major roadway improvement projects completed since the Year 2000 as well as those projects currently programmed for future completion to the roadway network of the Year 2000 creates the existing-plus-committed roadway network. This existing-plus-committed roadway network represents the No Build Alternative for the future year 2030 that has served as the baseline when comparing the effectiveness and potential impacts of other alternatives throughout the study.

Traffic operating conditions are typically described through a level-of-service (LOS) rating of six levels from “A” through “F”. The LOS rating scale is a qualitative method for describing traffic conditions. The scale ranges from LOS “A”, which corresponds to free-flowing traffic and minimal delays at intersections, to LOS “F”, which corresponds to a complete breakdown in traffic flow. Based on INDOT new construction/reconstruction (4R) design standards outlined in the Indiana Design Manual, a LOS “C” is the minimum acceptable for rural and suburban areas, and LOS “B” is more desirable. In urban intermediate and built-up areas, a LOS “D” is the minimum acceptable, and LOS “C” is more desirable.

The United States Census Bureau has established a definition of urban and rural that is used uniformly through the nation and has been utilized for this project. An Urbanized Area (UA) or Urban Cluster (UC) consists of core Census Block Groups or Census Blocks with at least 1,000 persons per square mile and surrounding Census Blocks that have an overall density of at least 500 persons per square mile. All territory located outside UAs or UCs is classified as rural. This definition may be found on the US Census Bureau website under “Census 2000 Urban and Rural Classification”. Except for the segment from Miller Road (about three miles south of the US 20 Bypass) to the US 20 Bypass, the US 31 corridor is considered rural, where a LOS “C” is the minimum acceptable and any level below that is unacceptable.

The methods for calculating LOS are given in the Transportation Research Board’s (TRB) Highway Capacity Manual (HCM), and were revised in year 2000. US 31 and its major intersections were analyzed in accordance with this method to determine their LOS. Between Plymouth and South Bend, US 31 was analyzed in eight segments on the basis of traffic counts conducted in the year 2000, and a LOS was determined for each segment. A LOS was calculated for all four signalized intersections and six notable two-way stop-controlled intersections (stop control for the crossroad approaches) based on traffic counts conducted in the year 2002. Table 2.2.1 shows the base (year 2000) and future (Year 2030) LOS of the US 31 segments. Table 2.2.2 shows the base (year 2002) and future (year 2030) LOS at major intersections. Figure 2.2.1 shows segments and intersections failing to meet INDOT minimum design standards for LOS for the base and future years.



Table 2.2.1: Base and Future Years' Levels-Of-Service of US 31 Segments

Termini	Area Type	2000 Base Year				2030 Future Year			
		AADT*	Daily Vehicle Capacity	V/C Ratio	LOS	AADT	Daily Vehicle Capacity	V/C Ratio	LOS
US 30 - Michigan Rd.	Rural	16,989	39,800	0.43	B	23,500	39,800	0.59	C
Michigan Rd. – US 6	Rural	24,232	39,800	0.61	C	35,200	39,800	0.88	E
US 6 – Tyler Rd.	Rural	19,845	22,300	0.89	E	28,200	22,300	1.26	F
Tyler Rd. – Lake Trail	Rural	21,400	39,800	0.54	C	29,300	39,800	0.74	D
Lake Trail – SR 4	Rural	27,217	22,300	1.22	F	40,300	22,300	1.81	F
SR 4 – Miller Rd.	Rural	24,240	27,700	0.89	E	34,400	27,700	1.24	F
Miller Rd. - Roosevelt Rd.	Urban	26,419	27,700	0.95	E	37,500	27,700	1.35	F
Roosevelt Rd. - US 20	Urban	31,526	27,700	1.14	F	46,000	27,700	1.66	F

Note: Shading denotes failure to meet INDOT minimum design standards for LOS of C in rural areas and D in urban areas.

* AADT is average annual daily traffic.

Table 2.2.2: Base and Future Years' Levels-of-Service for US 31 Intersections

	Area Type	2002 Base Year		2030 Future Year	
		AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour
Signalized Intersections					
US 6	Rural	E	F	F	F
SR 4	Rural	B	B	D	E
Kern Road	Urban	E	D	F	F
Johnson Road	Urban	E	D	F	F
Major Unsignalized Intersections (Two-Way Stop-Controlled)					
Plymouth-Goshen Trail	Rural	C	C	D	E
W 5A Road	Rural	B	C	C	C
Tyler Road	Rural	E	D	F	F
New Road	Rural	E	F	F	F
Madison Road	Urban	C	C	F	F
Roosevelt Road	Urban	D	D	F	F

Note: Shading denotes failure to meet INDOT minimum design standards for LOS of C in rural areas and D in urban areas.



Base LOS conditions are unacceptable for the following:

- In the year 2002, three out of four signalized intersections operate at unacceptable levels (LOS E or F) during the AM and/or PM peak hours.
- In the year 2002, two out of six major unsignalized intersections operate at unacceptable levels (LOS D, E, or F) during the AM and PM peak hours.
- In the year 2000, five out of eight US 31 segments operate at an unacceptable LOS. US 31, from US 6 through La Paz to Tyler Road, operates at a LOS E. US 31, from Lake Trail south of Lakeville to US 20, operates at a LOS E or F.

Future (year 2030) LOS conditions are unacceptable for the following:

- In the year 2030, four out of four signalized intersections operate at unacceptable levels (LOS “D”, “E”, or “F”) during the AM and PM peak hours.
- In the year 2030, five out of six major unsignalized intersections operate at unacceptable levels (LOS “D”, “E”, or “F”) during the AM and PM peak hours.
- In the year 2030, all US 31 segments operate at an unacceptable LOS, except the most southern one from US 30 to Michigan Road.

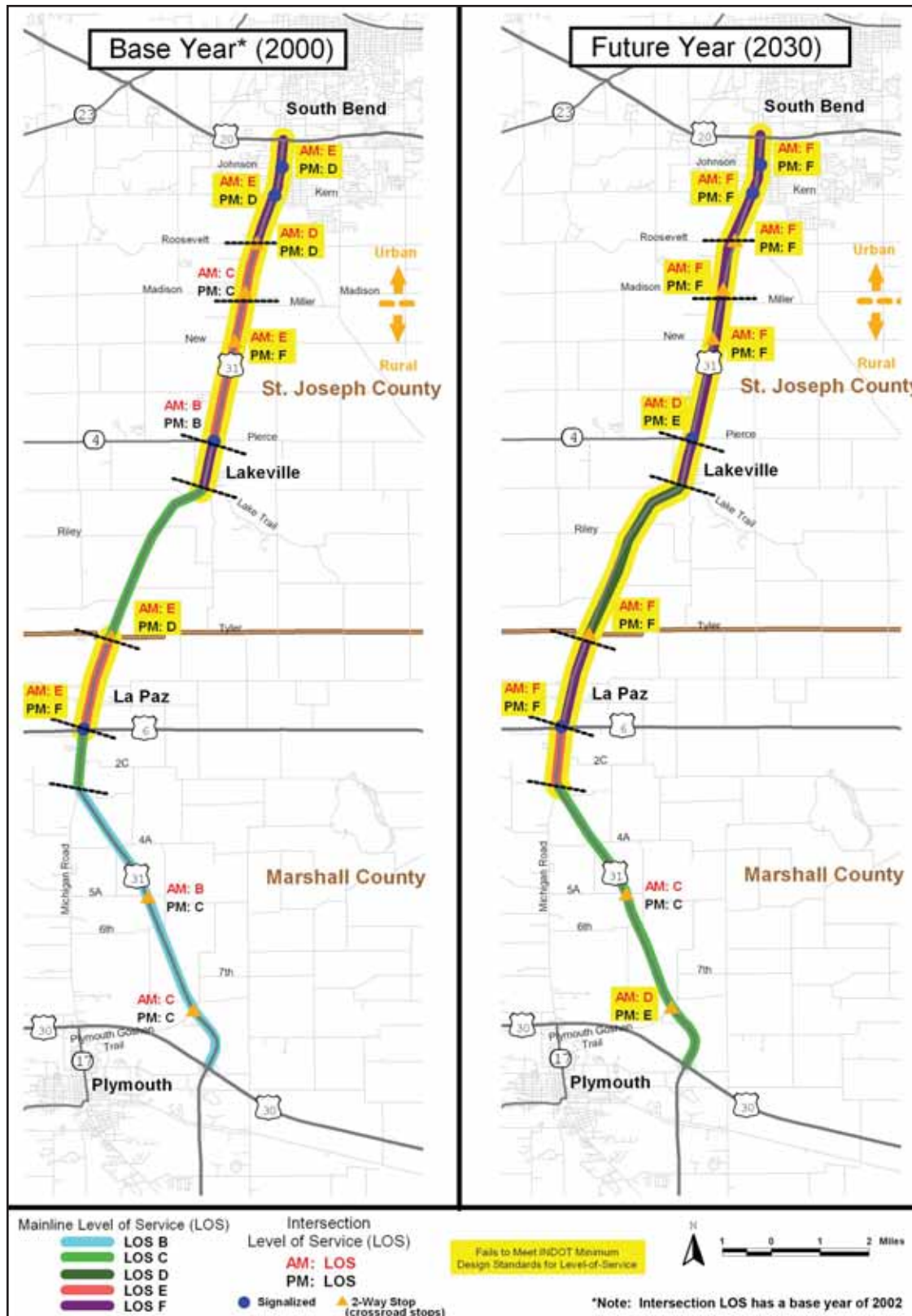


Figure 2.2.1: US 31 Segments and Intersections Failing to Meet INDOT Minimum Design Standards for Level-of-Service (LOS) (assuming no improvements to US 31)