



3.0 DEVELOPMENT OF CORRIDOR ALTERNATIVES

The development of the alternatives for the US 31 Improvement Project began with a broad examination of potential solutions to the transportation needs in the US 31 Corridor. The current transportation system, existing and projected traffic conditions, and the mobility needs for the State of Indiana and the South Bend metropolitan area were examined in determining the purpose and need for the project. The major concerns were increasing traffic congestion, deteriorating safety conditions, and poor statewide connectivity. The INDOT 2000-2025 Long Range Plan and the Michiana Area Council of Governments (MACOG, South Bend Area Metropolitan Planning Organization, MPO) Transportation Plan were reviewed to ensure consistency of the proposed improvements to US 31. The alternatives considered include:

- No Build Alternative
- Travel Demand Management (TDM) Alternatives
- Transportation System Management (TSM) Alternatives
- Intelligent Transportation System (ITS) Applications
- Mass Transit Alternative; and
- Highway Build Alternatives.

3.1 No-Build Alternative

The “No Build” (No Action or Do Nothing) Alternative is represented by the existing roadway network plus programmed major roadway improvements in the South Bend Metropolitan Area. By definition the “No Build” Alternative excludes any major investment in US 31. This alternative is the baseline for comparing the “Build” alternatives; its inclusion as an alternative is required by the National Environmental Policy Act (NEPA).

3.1.1 No Build Alternative Definition

The “No Build” Alternative includes “capacity expansion” projects in the South Bend Metropolitan Area (St. Joseph, Marshall and Elkhart counties) as reported in the MACOG Transportation Improvement Program (2003-2005 TIP) and the balance of Indiana as reported in the Indiana Statewide Transportation Improvement Program (INSTIP). “Capacity expansion” projects include major roadway investments such as major widenings that add through traffic lanes, the extension of existing roadways or construction of new roadways, new interchanges and major roadway realignments or reconstructions that add through traffic carrying capacity.

When programmed or completed “capacity expansion” projects since year 2000 are added to the existing roadway network of the year 2000, the resulting roadway network constitutes the No Build Alternative (or Existing-Plus-Committed Network). It is assumed that these programmed improvements are committed, and will be completed independent of any decision regarding the improvement of US 31 from Plymouth to South Bend.

The committed “capacity expansion” projects in St. Joseph and Marshall counties include:

- Bittersweet Road widening to four lanes from Vistula Drive to McKinley Highway.
- SR 331 (Capital Avenue) extension of a six-lane divided arterial from Douglas Road to Day Road (recently completed).



- SR 331 (Capital Avenue) extension of a six-lane divided arterial from Day Road to Jefferson Boulevard.
- SR 331 (Capital Avenue) extension of a six-lane divided arterial from Jefferson Boulevard to Harrison Road (12th Street).
- SR 331 (Capital Avenue) new construction as a six-lane divided arterial from Harrison Road (12th Street) to the US 20 Bypass.
- SR 331 (Capital Avenue) widening from four to six lanes from Douglas Road to SR 23.
- Cleveland Road widening to four lanes from Brick Road to Bendix Drive.
- Douglas Road widening to four lanes from SR 23 to west of Grape Road and from Main Street to Fir Road.
- Gumwood Road widening to four lanes from Cleveland Road to Brick Road.
- Harrison Road (12th Street) widening to four lanes from Merrifield Road to Fir Road.
- Ironwood Road widening to four lanes from Ridgedale Road to Randolph Street (completed).
- Jefferson Boulevard widening to four lanes from Fir Road to Capital Avenue.
- McKinley Highway widening to five lanes from Elder Road to Birch Road.
- Miami Highway widening to four lanes from Kern Road to Jackson Road.
- Portage Avenue widening to four lanes from Lathrop Drive to Toll Road.
- SR 17 (N. Michigan Street in Plymouth) widening to five lanes from Klinger Street to US 30.
- SR 23 (Edwardsburg Highway) widening to four lanes from Cleveland Road to Brick Road.
- SR 23 widening to four lanes from Campeau Street to Edison Road.

Along the US 31 corridor, INDOT has programmed traffic-operational (safety) improvements to intersections at Kern Road, Roosevelt Road, Madison Road, New Road, and SR 4. The new traffic signal at New Road is the most significant of these “capacity preservation” projects. As these projects do not involve major capital investments that alter the through lane traffic carrying capacity of US 31, these projects will proceed regardless of the decision to improve the US 31 corridor. On the other hand, a pavement resurfacing project that would have added a continuous center left-turn lane from Madison Road to Kern Road has been suspended until the completion of this NEPA document.

3.1.2 No Build Alternative Assessment

Because the No Build Alternative fails to add through traffic carrying capacity, it fails to address a majority of the segments and signalized intersections with an unacceptable level-of-service in the year 2000, and traffic operating conditions continue to deteriorate in the future such that US 31 and its signalized intersections experience unacceptable operating conditions in the year 2030 from Michigan Road (north of Plymouth) to the US 20 Bypass. By adding a traffic signal at New Road, the No Build Alternative addresses the unacceptable delays, among other warrants, for vehicles on this crossroad trying to enter US 31. However, traffic signals will eventually be needed at four more major crossroads to address unacceptable delays to vehicles trying to enter US 31. While these new traffic signals reduce delays for traffic on crossroads entering US 31, they adversely affect the traffic carrying capacity of US 31 accelerating the increase in congestion resulting in longer travel times and slower operating speeds along US 31.

While the No Build Alternative includes traffic-operational (safety) improvements at some intersections, it fails to address fundamental physical characteristics of existing US 31 that contribute to the above average accidents rates for US 31 compared to similar facilities. These



fundamental physical characteristic problems include the lack of a continuous median/left-turn lane from south of Lakeville to the US 20 Bypass to accommodate left-turns into and from public roads and driveways (with the exception of signalized intersections), frequent private driveways where traffic entering US 31 encounters increasing greater delays, and increasing conflicts with growing through traffic as a result of a growing number of driveways and on-street parking in LaPaz and Lakeville.

Finally, travel times and operating speeds along the US 31 Corridor deteriorate over time for the No Build Alternative such that the essential mobility function of US 31 suffers.

Phase 1: Purpose and Need

Traffic Congestion: This alternative would not reduce congestion on US 31. Currently many segments of US 31 operate at an unacceptable LOS during a peak hour. Three (3) of the four (4) signalized intersections also operate at an unacceptable LOS. By 2030, most of the segments and all four (4) signalized intersections are projected to operate with unacceptable LOS.

Traffic Safety: This alternative would not improve safety on US 31. Present and future crash rates on US 31 exceed the statewide average from US 6 through La Paz, through Lakeville, and from Lakeville to US 20.

Consistency with Transportation Plans: This alternative is not consistent with the INDOT 2000-2025 Long Range Plan for Statewide Mobility Corridors and with the MACOG Transportation Plan.

Conclusion

The No Build Alternative would not address the purpose and need for this project. However, this alternative will be carried forward for evaluation in the DEIS and serve as a baseline when comparing the effectiveness and potential impacts of other alternatives.

3.2 Travel Demand Management (TDM) Alternatives

Travel demand management (TDM) strategies involve actions to spread the peak-hours of travel or to encourage the shift to alternative modes of travel to the single-occupancy vehicle.

Actions to encourage motorists to shift trips to non-peak hour periods include flexible work hours, flexible workdays, and road-pricing. As no major employers existing along the US 31 Corridor, flexible work hours and flexible workdays are not viable TDM strategies for the corridor. Road-pricing involves charging a user fee or toll for the use of the facility based on time of day in order to reduce the level of congestion throughout the day. However, the implementation of road-pricing is impractical because a toll collection system is not feasible on a facility such as existing US 31 without full access control. This was verified in the 1999 Indianapolis to South Bend Toll Road Feasibility Study completed by INDOT.

Actions to encourage the shift to alternative modes of travel include trip-reduction ordinances, employer-based trip reduction programs, vanpooling/carpooling, improved transit services and improved bicycle and pedestrian facilities. A trip-reduction ordinance is a legal mechanism that



requires the developer of non-residential uses to reduce the typical trips generated by the proposed development through actions to increase vehicle occupancy and to facilitate alternative modes. Employer-based trip reduction programs include:

- Parking management strategies to restrict the number of on-site parking spaces available to employees or charging employees for the use of on-site parking spaces.
- Financial incentives to use alternative modes through the subsidy of vanpooling or carpooling or transit fare subsidies.
- Flexible work schedules (flexible hours, four-day workweek) and flexible work locations (telecommuting or dispersal to the work site from remote assembly sites).

With no major employment centers in the corridor, most development being residential or supportive retail/service uses, no existing or viable transit service, employers-based trip reduction programs and trip reduction ordinances do not appear to be viable TDM strategies, and would be insufficient to address the increase in trip-making in the corridor over the next 30 years even if such strategies were viable (Institute of Transportation Engineers, Proceedings of ITE's 1987 National Conference).

Improved transit services are discussed in greater detail under the Mass Transit Alternative (Section 3.5).

While walking and bicycling provide non-motorized opportunities to reduce automobile trip-making, these modes are only effective for short trips – generally one mile for walking and six miles for bicycling in good weather conditions. Except in LaPaz and Lakeville, there are no walkways in the US 31 Corridor, and no bicycle facilities presently serve the corridor. Several abandoned railway beds exist in the US 31 Study Area. However, many abandoned railways have reverted to adjoining property owners and no known local or regional plans underway to convert rails to trails along the US 31 Corridor. As most trips in the corridor are longer than six miles and the corridor is low-density in character, walking and bicycling are ineffective in reducing trips along the US 31 Corridor.

Phase 1: Purpose and Need

Traffic Congestion: This alternative would not noticeably reduce traffic congestion on US 31. Due to the low-density rural character of the corridor, the TDM alternatives considered for this project are expected to only minimally reduce traffic volumes on US 31.

Traffic Safety: This alternative would not improve safety on US 31. Without a reduction in daily traffic volume or a change in facility type, safety would not be improved.

Consistency with Transportation Plans: This alternative is not consistent with the INDOT 2000-2025 Long Range Plan for Statewide Mobility Corridors and with the MACOG Transportation Plan that call for improvements to US 31.



Conclusion

The TDM alternatives would not address the purpose and need of this project as “stand alone” alternatives because they would not significantly reduce congestion, improve safety, or be consistent with the INDOT 2000-2025 Long Range Plan. Therefore, they were not advanced to Phase 2 of the screening process.

3.3 Transportation System Management (TSM) Alternatives

Transportation system management (TSM) strategies involve low-cost capital investments to reduce congestion, improve traffic flow, and measures to optimize performance of the existing transportation infrastructure. These strategies involve intersection improvements, signal coordination and timing, lane control (reversible lanes) and high-occupancy vehicle lanes. Present signalized intersections in the US 31 Corridor have separate left-turn bays. INDOT has already programmed the improvement of most traffic signals in the corridor including the installation of a traffic signal at New Road. However, three of the four existing signalized intersections operate at an unacceptable level-of-service today, and the fourth signalized intersection will operate at an unacceptable level-of-service before the year 2030. Even with further improvements to the lane configurations and signal timings at these four intersections, the temporary improvements in traffic flow will soon disappear as traffic grows over 50 percent over the next 30 years in the corridor.

Except for the spacing between the Johnson Road and Kern Road traffic signals, the spacing to adjacent traffic signals is more than a mile apart. Thus, traffic signal interconnection, real-time traffic flow monitoring at the traffic signals and traffic signal coordination are not viable options, and provide only a temporary improvement to traffic flow over the next 30 years.

Due to the length of the corridor, existing travel patterns, the low-density rural character of the corridor and existing geometrics of US 31 (a four-lane undivided facility), reversible lanes are not an appropriate option for this rural roadway.

With only four lanes along existing US 31 and a low existing vehicle occupancy rate (about 1.1 persons per vehicle), the designation of one or two lanes in each direction for high-occupancy vehicles (even limited to peak-hours) would result in nearly 90 percent of the vehicles being concentrated in the unrestricted lane during the peak-hours. Traffic would likely divert to the two-lane parallel facilities in the US 31 Study Area that lack sufficient capacity. Thus, the application of HOV lanes to existing US 31 is not an appropriate application.

Phase 1: Purpose and Need

Traffic Congestion: This alternative would not noticeably reduce recurring traffic congestion on US 31. Due to the low-density rural character of the corridor, TSM strategies provide only temporary relief to increasing traffic congestion in the corridor, or are inappropriate solutions (traffic signal interconnection and reversible or HOV lanes).

Traffic Safety: This alternative would not improve safety on US 31. Without a reduction in daily traffic volume or a change in facility type, safety would not be improved.



Consistency with Transportation Plans: This alternative is not consistent with the INDOT 2000-2025 Long Range Plan for Statewide Mobility Corridors and with the MACOG Transportation Plan that call for improvements to US 31.

Conclusion

The TSM alternatives would not address the purpose and need of this project as “stand alone” alternatives because they would not significantly reduce congestion, improve safety, or be consistent with the INDOT 2000-2025 Long Range Plan. Therefore, they were not advanced to Phase 2 of the screening process.

3.4 Intelligent Transportation System (ITS) Applications

Intelligent Transportation System (ITS) options include a variety of technology-based programs to actively manage the roadway system. The most common systems provide travel information on roadway conditions to daily commuters. This enables commuters to adjust travel routes to changing travel conditions. Incident management programs are also part of the ITS toolbox to reduce the effect of accidents and vehicle breakdowns on traffic flow. In light of the rural character, length of the corridor, and lack of adequate alternative north-south routes, ITS options cannot be effectively applied in the US 31 Corridor to solve to congestion problem.

Phase 1: Purpose and Need

Traffic Congestion: Expansion of ITS applications will not improve levels of service significantly.

Traffic Safety: This alternative would not improve safety on US 31. Without a reduction in daily traffic volume or a change in facility type, safety would not be improved.

Consistency with Transportation Plans: This alternative is not consistent with the INDOT 2000-2025 Long Range Plan for Statewide Mobility Corridors and with the MACOG Transportation Plan that call for improvements to US 31.

Conclusion

The ITS applications would not address the purpose and need of this project as “stand alone” alternatives because they would not significantly reduce congestion, improve safety, or be consistent with the INDOT 2000-2025 Long Range Plan. Therefore, they were not advanced to Phase 2 of the screening process.

3.5 Mass Transit Alternative

The Chicago, South Bend and South Shore Railroad provides commuter rail service from the Michiana Regional Airport in northwest South Bend to downtown Chicago, but averages only 100 passengers per day. Local bus transportation for South Bend and Mishawaka is provided by TRANSPO, the South Bend Public Transportation Corporation. TRANSPO provides a system of fifteen fixed routes radiating from downtown South Bend. Although TRANSPO does not provide bus service in the US 31 Corridor, it does have two routes that enter the US 31 Study Area. With 30-minute headways (time period between bus arrivals), Route 8 serves the Scottsdale Mall on the



north side of the US 20 Bypass near Miami Highway, and Route 6 serves the residential area on the east side of Miami Highway immediately south of the US 20 Bypass. In Plymouth, Rock City Riders provides Section 18 transit services; however, such transit service is available to the elderly, handicapped and economically disadvantaged and not the general public.

The bus ridership is characterized by a transit-dependent population. According to the 2000 Census, public transportation (including taxicab) was the means of transportation to work for only 1.2 percent of the work trips in St. Joseph County and 0.4 percent of the work trips in Marshall County. Between 1990 and 2000, the percent of work trips by public transportation dropped by 29 percent.

In the US 31 Corridor, significant transit service is not a viable option because:

- Trip-ends are dispersed rather than concentrated resulting in insufficient ridership to cover transit-operating costs (trip ends were modeled as part of the traffic analysis for this project).
- A geographic area south of the US 20 Bypass to Kern Road between Miami Highway and Ironwood Road is within the City of South Bend. Existing US 31 falls in St. Joseph and Marshall counties and the small incorporated areas of Lakeville and LaPaz. Thus, these jurisdictions (not the City of South Bend) must provide the transit operating subsidies to extend any transit service down existing US 31.
- In the year 2030, population densities along existing US 31 are expected to be less than 2,000 persons per square mile except on the east side of US 31 to Miami Highway from Roosevelt Road to the US 20 Bypass. Thus, less than five percent of the corridor will have sufficient population densities in the year 2030 to meet the minimum threshold considered necessary for the provision of transit service.
- According to the Urban Transport Fact Book, mass transit carries only about 2% of the commuters in urban areas.

Phase 1: Purpose and Need

Traffic Congestion: This alternative would not noticeably reduce traffic congestion on US 31. It is not reasonable to assume that enough travelers would divert to transit service to result in improvements to levels of service on US 31.

Traffic Safety: This alternative would not improve safety on US 31. Without a reduction in daily traffic volume or a change in facility type, safety would not be improved.

Consistency with Transportation Plans: This alternative is not consistent with the INDOT 2000-2025 Long Range Plan for Statewide Mobility Corridors and with the MACOG Transportation Plan that call for improvements to US 31.



Conclusion

The Mass Transit Alternative would not address the purpose and need of this project as a “stand alone” alternative because it would not significantly reduce congestion or improve safety. Therefore, it was not advanced to Phase 2 of the screening process.

3.6 Highway Build Alternatives

Highway “build” alternatives were examined in two major geometric design categories:

- rural arterials (non-freeway) with partial or no access control, and
- freeways with full access control.

3.6.1 Rural Arterial (Non-Freeway) Alternatives

The Rural Arterial (Non-Freeway) Alternatives consist of geometric design options for the upgrading of existing US 31 and options involving upgrading portions of US 31 on existing and new alignments. For rural segments of the US 31 improvement on existing alignment, the roadway would be reconstructed to provide a median of at least 16 feet creating a four- or six-lane divided facility where a median does not exist today to accommodate left-turns. The reconstructed rural segment would typically have 11-foot shoulders (10 feet paved). For segments of the US 31 improvement through small urban places (such as LaPaz and Lakeville), the south edge of South Bend (generally from Kern Road to the US 20 Bypass) and built-up areas with right-of-way limitations (such as from Madison Road to Kern Road), an urban typical section might be used for a four-lane divided facility with a 14-foot median and 2-foot curb-and-gutters.

For rural segments of the US 31 improvement on new alignment, the facility would have the character of an expressway -- a rural arterial with partial access control. While active railroads would be grade-separated, the expressway would have at-grade intersections with select public roadways and intersections with major crossroads would be signalized. The typical cross-section for the rural expressway would be two or three 12-foot lanes in each direction with 11-foot outside shoulders (10 feet paved), 4-foot inside shoulders and a 40-foot median. The typical right-of-way width would be 150 feet.

If partial access control were pursued for the US 31 improvement on existing alignment, local service (frontage) roadways may be required, but could not be provided through LaPaz or Lakeville without acquiring structures on one or both sides. If interchanges were proposed at major crossroads, additional right-of-way would be required for the interchanges as well as local service (frontage) roads to serve abutting parcels not acquired.

US 31 Upgrade Options using Existing Alignment

Options to upgrade US 31 on the existing alignment involve adding a median allowing development of left-turn lanes or a center lane for continuous left-turns. From US 30 to the Michigan Road interchange (north of Plymouth), existing US 31 is a four-lane divided facility with a 50-foot median and 10-foot shoulders, and has partial access control. From the Michigan Road interchange to just south of US 6 (south edge of LaPaz), existing US 31 lacks partial access control, but has a 16-foot to 24-foot median with few private driveways. Thus, existing US 31 from



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US 30 to just south of US 6 is a four-lane divided facility, and would not require improvement. Expansion to six-lanes could be accomplished within the median.

From south of US 6 to Center Street on the north side of LaPaz, existing US 31 is a four-lane undivided facility with about 58 feet of pavement, curb-and-gutter and sidewalks. Existing US 31 through LaPaz would be reconstructed to provide a four-lane divided facility with an approximate 14-foot median (or continuous left-turn center lane through the heart of town) and curb-and-gutter with sidewalks. The reconstruction can be accomplished within the existing right-of-way, but existing curbs would have to be moved outward. Occasional on-street parking must also be eliminated through LaPaz. Achievement of partial access control through LaPaz cannot be achieved within existing right-of-way and would require the acquisition of structures on both sides to provide local service (frontage) roads to remaining properties and frequent intersecting local streets.

From the north side of LaPaz to Quinn Road, existing US 31 is a four-lane divided facility with a variable median width from 15 feet to 50 feet. This segment would not require improvement.

From Quinn Road through Lakeville to the US 20 Bypass interchange, existing US 31 is a four-lane undivided facility with a pavement width of 58 to 66 feet with curb-and-gutter and sidewalks, except for 51-foot pavement width from Patterson Street to Rush Street on the north edge of town. Existing US 31 through Lakeville would be reconstructed to provide a four-lane divided facility with an approximate 14-foot median (or continuous left-turn center lane through the heart of town) and curb-and-gutter with sidewalks. The reconstruction can be accomplished within the existing right-of-way of 90 feet south of Patterson Street, but existing on-street parking would have to be prohibited on both sides through town. North of Patterson Street to the north edge of town, the existing right-of-way is only 60 feet. Additional right-of-way will be required through the north end of town: however, relocations are not anticipated. Achievement of partial access control through Lakeville cannot be achieved within existing right-of-way and would require the acquisition of structures on both sides to provide local service (frontage) roads to remaining properties and frequent intersecting local streets.

From the north edge of Lakeville to the US 20 Bypass interchange, US 31 is a four-lane undivided facility with 9-foot to 12-foot unpaved shoulders. Opposite directions of flow are occasionally separated by a 4-foot flush strip, but this narrow median width is inadequate to accommodate left-turn lanes. As the right-of-way width is 98 feet, this segment may be reconstructed with a minimum 14-foot median with 10-foot to 12-foot shoulders with or without curb-and-gutter as appropriate without acquiring additional right-of-way. Achievement of partial access control on this segment cannot be achieved within existing right-of-way, and would require the acquisition of portions of front yards and possibly some additional right-of-way to provide frontage roads for the frequent driveways and intersecting local streets.

US 31 Upgrade Using Existing Alignments with New Alignments around Towns

Options to improve US 31 on existing and new alignments would involve using the existing alignment of US 31 except through the towns of LaPaz and Lakeville where bypasses would be constructed on new alignments. These options would be based on a desirable right-of-way width of about 150 feet for a four-lane divided facility with a 40-foot median and 10-foot paved shoulders. To the extent practical, partial access control would be achieved.



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From US 30 to south of US 6, the existing right-of-way width is a minimum of 180 feet, and partial access control with a 50-foot median exists from US 30 to the Michigan Road interchange. North of Michigan Road interchange to south of US 6, access rights would be acquired to prevent new private driveways from being creating. Joint driveways and occasional short frontage roads would be built to reduce existing access points to US 31. North of the Michigan Road interchange, the existing median shrinks to 16 to 24 feet, but the 40-foot median may be compromised to avoid roadway reconstruction.

From south of the US 6 intersection to the north side of LaPaz where the median currently exists on US 31, a bypass of LaPaz would be built on new alignment for a four-lane divided roadway with partial access control with a 40-foot median on 150 feet of new right-of-way.

From the north side of LaPaz to Quinn Road on the south side of Lakeville, the existing four-lane divided alignment of US 31 would be used with a variable median width of 15 to 50 feet. The right-of-way varies from 162 to 180 feet along this segment. Access rights would be acquired to prevent new private driveways from being created. Joint driveways and occasional short frontage roads would be built to reduce existing access points to US 31.

From Quinn Road to SR 4 on the north side of Lakeville where unpaved shoulders exist, a bypass of Lakeville would be built on new alignment west of Lakeville in the vicinity of abandoned railroad for a four-lane divided roadway with partial access control with a 40-foot median on 150 feet of new right-of-way.

From SR 4 to the US 20 Bypass, this segment may be reconstructed with a minimum 14-foot median with 10-foot to 12-foot shoulders with or without curb-and-gutter as appropriate, within the existing 100 feet of right-of-way. Achievement of partial access control on this segment cannot be achieved within existing right-of-way, and would require the acquisition of portions of front yards and possibly some additional right-of-way to provide local service (frontage) roads for the frequent driveways and intersecting local streets.

Rural Arterial Alternatives Assessment

Reducing Congestion Assessment. Achieving the first project purpose of reducing congestion hinges on the achieving an acceptable level-of-service (i.e., LOS C) for forecasted traffic for the year 2030. Table 3.6.1 shows the forecasted traffic volumes for the year 2030 and posted speeds. Table 3.6.2 shows the maximum daily traffic flows for 4-lane and 6-lane divided rural arterial highways for different posted speeds.



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Table 3.6.1: Present and Future Daily Traffic Volumes on Existing US 31

Termini	Year 2000		Year 2030	
	Daily Volume	Speed	Daily Volume	Speed
US 20 – Roosevelt Rd.	31,526	45 mph	46,000	50 mph
Roosevelt Rd. – Miller Rd.	26,419	55 mph	37,500	50 mph
Miller Rd. – SR 4	24,240	55 mph	34,400	50 mph
SR 4 – Lake Trail	27,217	35 mph	40,300	35 mph
Lake Trail – Tyler Rd.	21,400	55 mph	29,300	55 mph
Tyler Rd. – US 6	19,845	35 mph	28,200	35 mph
US 6 – Michigan Rd.	24,232	55 mph	35,200	55 mph
Michigan Rd. – US 30	16,989	55 mph	23,500	55 mph

Note: Segments with unacceptable LOS are shaded.

Table 3.6.2: Maximum Daily Traffic Volumes for Divided Multi-Lane Rural Arterials

Level of Service	4-Lane Divided				6-Lane Divided			
	35 mph	45 mph	50 mph	55 mph	35 mph	45 mph	50 mph	55 mph
A	5,800	7,800	8,800	9,800	8,700	11,700	13,200	14,700
B	10,000	13,200	14,800	16,400	15,000	19,800	22,200	24,600
C	14,400	18,600	20,600	22,700	21,600	27,900	30,900	34,100
D	17,400	22,200	24,600	27,000	26,100	33,300	36,900	40,500
E	21,400	26,600	29,200	31,800	32,100	39,900	43,800	47,700
F	>21,400	>26,600	>29,200	>31,800	>32,100	>39,900	>43,800	>47,000

Source: Highway Capacity Manual Table 7-11 assuming level terrain, 10% peak-hour factor, 60/40 directional flow split, 15% commercial vehicles, 60 percent green time and 20 or less driveways per mile. The unacceptable LOS is shaded.

Using Tables 3.6.1 and 3.6.2, a comparison of the forecasted traffic volumes for the year 2030 (shown in Table 3.6.1) and the maximum daily traffic volumes for an acceptable level-of-service (shown in Table 3.6.2 as being C) reveals that existing US 31 upgrade options (adding a median or continuous left-turn center lane to undivided portions of US 31) cannot be achieved for a four-lane divided facility. In fact, a six-lane divided facility can only achieve an acceptable LOS for the segment of existing US 31 between Lakeville and LaPaz and from the Michigan Road interchange to US 30. This would require reconstruction of the existing US 31 where medians currently exist to provide a six-lane facility; however, the majority of the corridor would not achieve an acceptable LOS.

Because of right-of-way constraints and low posted speeds through LaPaz and Lakeville, rural arterial alternative options that provide bypasses around these two communities and use the existing alignment of US 31 for the balance of the corridor show better performance. However, a four-lane divided facility still cannot achieve an acceptable level-of-service even with bypasses of LaPaz and Lakeville. If a six-lane divided facility were considered, an acceptable level of service is achieved from US 30 to the south side of Lakeville; however, the majority of the corridor from the



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south side of Lakeville to the US 20 Bypass would still not achieve an acceptable LOS even with the bypass of Lakeville.

Thus, with partial access control and bypasses of LaPaz and Lakeville, the Rural Arterial Alternatives cannot achieve an acceptable level-of-service even for a six-lane divided facility, and fail to meet the Purpose 1 of reducing congestion in the US 31 corridor.

Improving Safety Assessment. Achieving the second project purpose of improving safety hinges on whether the roadway improvements can reduce accidents in the long-term.

The existing US 31 upgrade options (adding a continuous median or left-turn center lane to undivided portions of US 31) address one of the physical characteristics of existing US 31 that contributes to the above average accident rate by providing a median or left-turn lanes where none exist through LaPaz and from the south side of Lakeville to the US 20 Bypass. The existing US 31 upgrade options all require the removal of on-street parking in LaPaz and Lakeville further reducing motor vehicle conflicts. However, the existing US 31 upgrade options do not eliminate the numerous private driveways that also contribute to motor vehicle conflicts and pedestrian conflicts in LaPaz and Lakeville.

Because of frequent driveways and pedestrian movements in LaPaz and Lakeville, rural arterial alternative options that provide bypasses around these two communities are more effective in improving safety. Nevertheless, the lack of partial access control from north of Lakeville to the US 20 Bypass does not address the numerous private driveways that contribute to motor vehicle conflicts.

Thus, the rural arterial alternative options partially achieve the project purpose of improving safety and upgrading US 31 with bypasses around LaPaz and Lakeville results in improved safety over upgrade options passing through town. However, the difficulty of achieving partial access control from Lakeville to the US 20 Bypass without significant residential and business relocations hampers the ability to improve safety along the highest volume portion of the corridor.

Consistency with Transportation Plans. Achieving the third project purpose involves evaluating consistency with the INDOT 2000-2025 Long Range Plan for Statewide Mobility Corridors and the MACOG Transportation Plan.

Finally without partial access control throughout the corridor, the rural arterial (non-freeway) alternatives are inconsistent with the road characteristics suggested by its high-order road classification in the INDOT 2000-2025 Long Range Plan for Statewide Mobility Corridors.

Phase 1: Purpose and Need

Traffic Congestion: This alternative does not achieve an acceptable LOS and fails to reduce congestion in the US 31 corridor.

Traffic Safety: This alternative only partially achieves the purpose of improving safety on the US 31 corridor.



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Consistency with Transportation Plans: Without partial access control, this alternative is not compatible with the INDOT 2000-2025 Long Range Plan for Statewide Mobility Corridors.

Conclusion

The Rural Arterial (Non-Freeway) Alternatives do not address the purpose and need of this project. Therefore, they were not advanced to Phase 2 of the screening process.

It should be noted that a rural arterial (non-freeway) alternative that includes interchanges at some major intersections, but achieves only partial access control along the balance of the corridor performs no better than rural arterial alternative options that bypass LaPaz and Lakeville and achieve partial access control. Thus, freeway Alternative F (described later) best reflects an upgrade of existing US 31 with the addition of interchanges to achieve full access control.

3.6.2 Freeway Alternatives

Referring to Figure 3.6.1, the eleven (11) preliminary “Build” freeway alternatives are labeled “A” through “K”, generally from west to east. Alternatives A - I were derived from the US 31 Major Investment Study for St. Joseph-Marshall Counties (1997). As a result of the Public Information meeting of April 10, 2003, the Interagency Review meeting of May 15, 2003, and subsequent correspondence, several new alternatives were suggested. These alternatives included such ideas as using powerlines and abandoned railroad corridors, connecting to the Ironwood Road/US 20 interchange, using Lilac Road starting at West 6A Road, and using the Mangus Road corridor located on the west side of Lakeville. After investigation of these suggestions, two new alternatives were added, Alternatives J and K, to the nine preliminary freeway build alternatives presented in April and May, and a couple of the previous preliminary freeway build alternatives were shifted. General descriptions of each alternative can be found in **Section 4.0, Screening of Alternatives**, and more detailed descriptions are in Appendix E.



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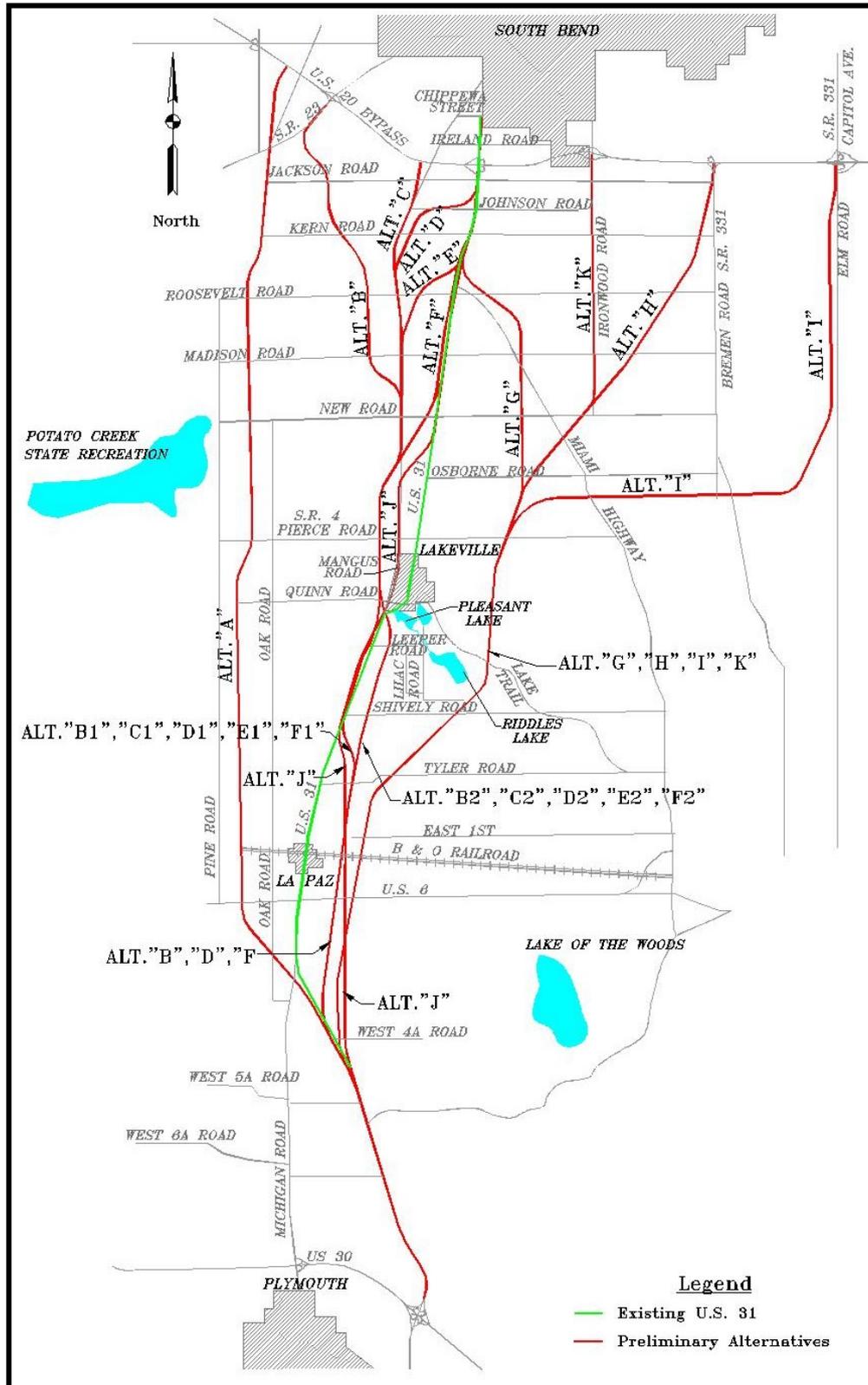


Figure 3.6.1: Preliminary Freeway Alternatives (A - K)



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Alternative J, is similar to Alternative F, but uses the Mangus Road corridor around Lakeville. The second new alternative, Alternative K, connects to US 20 at the Ironwood Road interchange. Alternatives H was shifted to the north approximately 2000 feet to closely parallel a set of powerlines. All the remaining alternatives were also evaluated for their proximity to powerlines. A section of Alternative C already parallels a powerline. Shifting Alternative A approximately one mile to the west to parallel a powerline would route that alternative through Potato Creek State Park.

Another suggested additional alternative would depart from existing US 31 farther south and east. This suggested alternative would depart from existing US 31 near West 6A Road and utilize the Lilac Road corridor, continue north and northeast around Pleasant Lake and Riddle Lake and tie into Alternate G. This suggested alternate would require approximately 2 miles of additional new terrain roadway. It would not make use of the abandoned railroad corridor to the northwest that is utilized by many of the other alternatives. As a result, construction costs associated with the new terrain roadway as well as the impacts to sensitive resources would be substantially higher than those alternatives utilizing more of the existing US 31 corridor and then following the abandoned railroad corridor. On this basis, it was decided not to examine further the possibility of this suggested new alternative.

All "Build" freeway alternatives have the common southern terminus of the US 31/US 30 interchange, and follow US 31 to West 4A Road before diverging. (The portion of existing US 31 from US 30 to West 4A Road has a 50-foot median on 400 feet of right-of-way. It can relatively easily be upgraded to a freeway with the addition of grade separations at Plymouth-Goshen Trail and West 6 Road and an interchange at West 5A Road.) The northern terminus of the "Build" alternatives vary along US 20 from northwest of the SR 23 interchange to the eastern SR 131 (Elm Road/Capital Avenue) interchange. The corridors are about 2,000 feet in width to permit later adjustment of the alignments. A "working alignment" right-of-way of 300 - 500 feet is assumed for environmental impact and cost analysis purposes. Potential interchange locations were also included in the "working alignment". Depending on the expected type of interchange, a 500- or 1000- foot radius circle was incorporated into the working alignment at the potential interchange location.

The typical rural freeway cross section is a four-lane freeway with a 60-foot median, 4-foot inside shoulders, 11-foot (10 feet paved) outside shoulders on 350-450 feet of right-of-way, posted for 55 mph with a design speed of 70 mph. Full access control would be achieved throughout by the construction of interchanges at major crossroads and grade-separations of other significant crossroads and railroads. According to the FHWA interstate interchange spacing standards, interchange spacing in rural areas should average one interchange every five (5) miles, not closer than two (2) miles; and in urban areas average one interchange every two (2) miles, not closer than one (1) mile.

For the freeway alternatives that connect to major existing facilities south of the US 20 Bypass, a typical urban freeway cross-section is proposed. For instance, an urban section would be used once an alternative connects to the existing US 31 alignment, or another major road such as SR 23 or Bremen Highway. The length and termini of the urban section will differ for each alternative. The urban section is a six-lane freeway with a 38 to 55-foot median with 14-foot outside shoulders. It could be elevated on fill with side retaining walls and one-way two-lane local service road (frontage road) or collector/distributor (C/D) roadways would be provided within the typical right-of-way of 260 to 300 feet, with a design speed of 60 or 70 mph.



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Alternatives B – F each consist of two (2) Options and are listed in the tables as B1, B2, C1, etc. The Options are south of Lakeville and each approximately 3.4 miles in length. Option 1 follows existing US 31 from Shively Road to Quinn Road for approximately 1.7 miles before leaving the existing US 31 alignment just south of Lakeville. Option 2 follows the abandoned railroad corridor east of US 31, then crosses to the west of the existing alignment south of Lakeville. Option 1 would retain the existing southbound US 31 lanes as a two-way local service road, incorporate the northbound lanes into the freeway and add a two-way frontage road from Shively Road to Leeper Road on the east side of the freeway. Differences in Purpose and Need measures between the two Options are negligible and are not included in the Purpose and Need discussion. The advantages and disadvantages of each Option are discussed in more detail in **Section 4.3**.