



Chapter 3: Alternatives

The US 31 Improvement Project has been a dynamic process since its inception. During the course of the study, new alternatives and modifications to alternatives were continually investigated. Section 3.1, Preliminary Alternatives Analysis and Screening, discusses the process by which the preliminary alternatives were developed and screened to four Preliminary Freeway Build Alternatives C, E, F and G. Section 3.2, Modifications to the Alternatives Recommended for Further Analysis, discusses modifications that were made to the four Preliminary Freeway Build Alternatives identified in the Preliminary Alternatives Analysis and Screening Report. These modifications were aimed at avoiding and/or minimizing socio-economic and environmental impacts. The section also discusses the consideration and evaluation of additional alternatives and hybrid alternatives suggested by the public, resource agencies and consulting parties. Section 3.3, Descriptions of the Alternatives Selected for Detailed Study, describes the alternatives selected for detailed study. Section 3.4, Identification of the Alternatives Studied in Detail, identifies the alternatives studied in detail. Section 3.5, Local Road Improvements, identifies needs for improvements to the local and/or state roadway networks that may be accelerated by the improvements to US 31. Section 3.6, Selection of the Preferred Alternative, discusses the process of identifying and provides a description of the Preferred Alternative G-Es.

3.1 Preliminary Alternatives Analysis and Screening

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 mobility.

- The Indiana Department of Transportation (INDOT) 2000-2025 Long Range Transportation Plan and the Michiana Area Council of Governments (MACOG) - the South Bend Area Metropolitan Planning Organization (MPO) - Transportation Plan were both reviewed to ensure consistency of the proposed improvements to US 31.

The potential solutions to the transportation needs in the US 31 corridor that were initially developed for this project and are further discussed in this document included:

- **No-Build Alternative** – represented by the existing roadway network plus programmed major roadway improvements in the South Bend Metropolitan Area. This alternative is the baseline for comparing “build” alternatives; its inclusion as an alternative is required by the National Environmental Policy Act (NEPA)
- **Travel Demand Management (TDM) Alternatives** – actions to spread the peak hours of travel or to encourage the shift to alternative modes of travel to the single-occupancy vehicle (i.e. flexible workdays and road pricing (toll collection))
- **Transportation System Management (TSM) Alternatives** – low-cost capital investments to reduce congestion, improve traffic flow, and measures to optimize performance of the existing transportation infrastructure (i.e. intersection improvements, signal coordination and timing, lane control (reversible lanes) and high-occupancy vehicle (HOV) lanes)



- **Intelligent Transportation System (ITS) Applications** – technology-based programs to actively manage the roadway system (i.e. providing travel information on roadway conditions to daily commuters via message boards, etc.)
- **Mass Transit Alternatives** – rail or bus service along the US 31 corridor
- **Highway Build Alternatives**
 - **Non-Freeway Alternatives** – geometric design options for upgrading existing US 31 and options involving upgrading portions of US 31 on existing and new alignments
 - **Freeway Alternatives** – geometric design options for replacing existing US 31 with a full access control facility

In addition to the potential non-freeway solutions that were developed for this project, nine preliminary freeway alternatives, Alternatives A through I, were initially investigated. These preliminary freeway alternatives were based on alternatives discussed in the 1997 US 31 Major Investment Study (MIS). The MIS was conducted in response to legislation by the Indiana General Assembly, and examined transportation improvement options in the existing US 31 corridor from Plymouth to South Bend.

During the purpose and need development and identification of alternatives phase of the project, an Interagency Review meeting was held on May 15, 2003 with various federal and state environmental resource agencies. The purpose of this meeting was to review the draft *Purpose and Need Statement and Preliminary Alternatives* for the US 31 Corridor Study. A project tour was conducted for all agency representatives as a part of the meeting. This project tour provided the various agency representatives with an opportunity to see the general corridors of the nine preliminary freeway alternatives. In addition to supplemental information on environmental issues and concerns related to the preliminary alternatives, this Inter-Agency Review meeting and project tour generated two additional preliminary freeway alternatives (Alternatives J and K). It also resulted in a slight shift of Alternative H to follow a segment of an existing high transmission powerline corridor.

The initial eleven preliminary freeway alternatives to be evaluated in the study include:

- Five western alternatives (Alternatives A, B, C, D, and E)
- Four eastern alternatives (Alternatives G, H, I, and K)
- Two central alternatives (Alternatives F and J) that utilize large portions of the existing US 31 alignment

This section describes each of the preliminary alternatives initially considered, the screening method utilized for each of the preliminary alternatives in the preliminary screening process as detailed in the Preliminary Alternatives Analysis and Screening Report, and the rationale for selecting the preliminary alternatives to be further evaluated in this document.

3.1.1 Methodology for Screening Alternatives

In order to narrow the number of preliminary alternatives under consideration for further analysis, screening measures were developed for use in evaluating the overall performance and impacts associated with each preliminary alternative. During this initial screening process, each of the preliminary alternatives developed for



the US 31 Improvement Project, from Plymouth to South Bend, was evaluated to determine if it would be carried forward for evaluation in the DEIS. A two-phase process was used to screen each alternative. Phase 1 screened alternatives with respect to purpose and need, while Phase 2 screened alternatives with respect to potential social and environmental impacts. Only those alternatives that met the purpose and need of the project in the Phase 1 analysis were advanced to Phase 2 of the screening process. The screening process is further described below.

Phase 1: Purpose and Need Measures

The first phase of the screening process analyzed the alternatives with respect to the Purpose and Need Statement for this project. To meet the purpose and need for this project, an alternative would have to meet the first two purposes and needs. An alternative would not be eliminated based on the third purpose and need statement. Specific objectives and performance measures were developed for each of the three identified purposes and needs and are discussed in length in Section 2.4, Project Purpose and Need Statement.

To satisfy the first purpose and need for this project, an alternative would have to reduce congestion on existing US 31 by providing the capacity to meet the forecasted travel demand for 2030 at an acceptable level-of-service (LOS). The LOS rating scale of traffic operating conditions utilizes six levels, A-F, and is further explained in Section 2.1, Traffic Congestion. Indiana Design Standards state the minimum acceptable LOS for rural and suburban areas is C (B is preferable) and in urban intermediate/built-up areas is no less than D (C is preferable). Discussions related to rural and urban areas are contained in Section 2.1, Traffic Congestion. A secondary measure of comparison related to congestion for an alternative would be the reduction in the amount of congested vehicle-miles of travel (VMT) and congested vehicle-hours of travel (VHT) in the South Bend Metropolitan Area.

To satisfy the second purpose and need for this project, an alternative would have to improve safety on existing US 31 between US 30 and US 20. This equates to a reduction in the risk of fatal, injury, and property damage only (PDO) accidents to crash rate levels at or below statewide averages for this type of facility; that being associated with travel on existing US 31 between US 30 and US 20. Crash rates are equal to personal injury accidents plus property damage only (PDO) accidents per 100 million annual vehicle-miles of travel. The statewide average crash rate for rural principal arterials is 186.57 accidents per 100 million annual vehicle-miles of travel. A reduction in crash rates (improved safety) is expected by upgrading a roadway facility's level of access control. For example, by improving US 31 from a rural principal arterial with partial and/or no access control to a freeway, vehicle conflicts and the potential for accidents to occur at intersections would be reduced by controlling access to interchanges instead of at-grade intersections. In areas where at-grade intersections are changed to grade separations, the conflicts would be eliminated. In areas along the US 31 corridor in which the new facility is a new-terrain freeway and existing US 31 will remain as a local access roadway, vehicle conflicts and the potential for accidents to occur along existing US 31 and corresponding accident rates would also be reduced. This reduction would be due in large part to the diversion of traffic onto the new freeway facility and a reduction of residual traffic along existing US 31. This reduction of traffic volumes along existing US 31 would reduce the risk of accidents to crash rate levels at or below average for a rural principal arterial. A secondary measure of comparison related to improved safety for an alternative would be the reduction in fatal injury, and PDO accidents to crash rate levels at or below statewide averages for this type of facility in the South Bend Metropolitan Area.

It should be noted that the focus of this project is to address transportation problems related to the US 31 corridor and not to address all transportation problems in the South Bend-Elkhart Metropolitan Area. Therefore, the evaluation of alternatives focuses on the effectiveness of alternatives in addressing the needs along the US 31 corridor. Addressing the transportation problems in the entire metropolitan area is a very important issue and is the purpose of the MACOG Long Range Transportation Plan, which identifies the need to improve the US 31 corridor from South Bend to Plymouth. That Long Range Transportation Plan identifies many other transportation improvement projects aimed at addressing other transportation needs in the metropolitan area, and considers the



most effective combination of transportation improvement projects (including the US 31 improvement) to address the transportation needs of the metropolitan area.

For the third purpose and need for this project, alternatives were evaluated to determine consistency with the INDOT 2000-2025 Long Range Transportation Plan for Statewide Mobility Corridors as well as consistency with the MACOG Transportation Plan. Alternatives were not required to meet the third criterion in order to satisfy the alternatives meeting purpose and need.

If an alternative clearly did not satisfy the project’s purpose and need, it was not advanced to Phase 2 of the screening process. Alternatives that did meet the project’s purpose and need were advanced to Phase 2 of the screening process.

Phase 2: Social and Environmental Measures

The second phase of the screening process analyzed the socio-economic and environmental impacts of the alternatives that were advanced from the purpose and need evaluation in Phase 1 of the screening process. Environmental information used in this preliminary phase of the screening process was collected from existing sources and preliminary windshield and field surveys. A 300-foot wide “working alignment” (using the approximate centerline of each 2000-foot wide “corridor”) was used to determine potential impacts to social, economic, and environmental resources for each alternative. 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. This circle represents an approximation of an interchange footprint to be included in the area studied for potential impacts.

The majority of the initial environmental screening was done using Geographic Information System (GIS) data. Preliminary windshield and field surveys were also used to collect information. Preliminary engineering cost estimates were developed as an additional means of evaluating the study alternatives. The estimates include costs associated with design (preliminary engineering), right-of-way, and construction for each alternative. Construction costs included muck and peat soils considerations. Muck and peat soils contain a high percentage of organic material and require special engineering considerations. These soils must be excavated and filled in with an appropriate, more stable fill material. If they cover a large area, bridging may be necessary. Preliminary information on muck and peat soils can be found in Appendix R. At this stage of study, all costs are approximate and intended primarily for the relative comparison of alternatives.

For preliminary cost estimates in this phase of the project, it was anticipated that US 31 would be constructed as a four-lane divided freeway in rural areas and a four to six-lane undivided freeway with median barrier in urban areas. The rural sections are assumed to have a sixty-foot wide depressed median, 10 foot outside, and 4 foot inside shoulders. The assumed road conditions were used to determine a unit price (\$/mile) based on a state average cost for similar projects (see Appendix Q). These unit costs for roadwork and earthwork were compiled with the associated costs of right-of-way/relocations, bridges, interchanges, traffic maintenance, local road improvements, and other items such as soil modifications and pavement removal to create a preliminary cost estimates for 2003 construction.



Along with preliminary cost estimates, the following environmental resources and/or issues are considered in the screening analysis.

- Preliminary Cost Estimates
- Estimated New Right-of-Way
- Forest Impacts
- Wetland Impacts
- Floodplain Impacts
- Stream Impacts
- Potential Section 4 (f) Properties
- Managed Lands
- Unique Geological/Ecological Areas (Maxinkukee Moraine)
- Farmland Impacts
- Notable Wildlife Habitats
- Residential Relocations
- Business Relocations
- Cemeteries
- Environmental Justice Issues
- Well-Head Protection Area Impacts
- Potential Historic Property Impacts
- Potential Archaeological Impacts
- Potential Residential Noise Impacts
- Hazardous Material Impacts

3.1.2 No-Build Alternative

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 a major widening 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 capacity expansion projects that are programmed for construction or that have been completed since the year 2000 are added to the existing roadway network, 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 the following.

- Bittersweet Road widening to four lanes from Vistula Drive to McKinley Highway
- SR 331 (Capital Avenue) widening from four to six lanes from Douglas Road to SR 23
- 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 US 20
- SR 331 (Capital Avenue) widening from four to six lanes from Jackson Road to US 20
- 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 improvements for 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. These projects do not involve major capital investments that alter the through-lane traffic carrying capacity of US 31, and will proceed regardless of the decision to improve the US 31 corridor. A pavement-resurfacing project that would have added a continuous median left-turn lane along US 31 from Madison Road to Kern Road has been suspended until the completion of this NEPA document.

Since the No-Build Alternative fails to add through traffic-carrying capacity, it fails to address a majority of the segments and existing signalized intersections that have an unacceptable LOS in the year 2000. Traffic operating conditions are expected to 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 US 20. By adding a traffic signal at New Road, the No-Build Alternative addresses the unacceptable delays, among other concerns, for vehicles on this crossroad trying to enter US 31. However, traffic signals will eventually be needed at four additional 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 improvements at some intersections, it fails to address fundamental physical characteristics of existing US 31 that contribute to the above average accident rates when compared to similar facilities. These fundamental physical characteristic problems include the lack of a continuous median/left-turn lane from south of Lakeville to US 20. This area has no provisions to accommodate left-turns into and from public roads and driveways (with the exception of signalized intersections). Neither does it accommodate frequent private driveways where traffic entering US 31 encounters increasing greater delays, or increasing conflicts with growing through traffic (that is a result of the growing number of driveways and on-street parking) in LaPaz and Lakeville.

Finally, the No-Build Alternative reveals travel times and operating speeds along the US 31 corridor deteriorating over time such that the essential mobility function suffers.

Phase 1: Purpose and Need

Traffic Congestion: The No-Build Alternative would not reduce congestion on US 31. Currently, many segments of US 31 operate at an unacceptable LOS during a peak hour. Three of the four signalized intersections also operate at an unacceptable LOS. By 2030, most of the segments and all four existing signalized intersections are projected to operate with unacceptable LOS.

Traffic Safety: The No-Build Alternative would not improve safety on US 31. Present and projected future crash rates on US 31 exceed the statewide averages for rural principal arterials from US 6 through La Paz, through Lakeville, and from Lakeville to US 20.

Consistency with Transportation Plans: The No-Build Alternative is not consistent with the INDOT 2000-2025 Long Range Transportation Plan for Statewide Mobility Corridors or 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 throughout this study and serve as a baseline when comparing the effectiveness and potential impacts of other alternatives.



3.1.3 Travel Demand Management (TDM) Alternatives

The goal of Travel Demand Management (TDM) strategies is to relieve peak hour traffic congestion. TDM strategies involve actions intended to spread the peak hours of travel, encourage carpooling (from single-occupancy vehicle), encourage a shift to alternative modes of travel, and encourage travel on other roadways.

Actions to encourage motorists to shift trips to non-peak hour periods include flexible work hours, flexible workdays, and road pricing (also called congestion pricing). As no major employers exist 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 since 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 land uses to reduce the typical trips generated by the proposed development through actions designed 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 work week) and flexible work locations (telecommuting or dispersal to the work site from remote assembly sites).

Employers-based trip-reduction programs and trip-reduction ordinances do not appear to be viable TDM strategies since there are no major employment centers in the corridor, most development is residential or supportive retail/service uses, and there is no existing or viable transit service. These strategies 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).

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 are 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: TDM alternatives 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: TDM alternatives would not improve safety on US 31 to crash rates at or below the Indiana average for other rural principal arterials. Without a reduction in daily traffic volume or a change in facility type, safety would not be improved.

Consistency with Transportation Plans: TDM alternatives are not consistent with the INDOT 2000-2025 Long Range Transportation 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 Transportation Plan for Statewide Mobility Corridors or with the MACOG Transportation Plan. Therefore, they were not advanced to Phase 2 of the screening process.

3.1.4 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 include, but are not limited to, 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 LOS today, and the fourth signalized intersection will operate at an unacceptable LOS 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 increases more than 50% 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 (HOV) (even limited to peak hours) would result in nearly 90% 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: TSM alternatives 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: TSM alternatives would not improve safety on US 31 to crash rates at or below the Indiana average for other rural principal arterials. Without a reduction in daily traffic volume or a change in facility type, safety would not be improved.

Consistency with Transportation Plans: TSM alternatives are not consistent with the INDOT 2000-2025 Long Range Transportation 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 Transportation Plan for Statewide Mobility Corridors or with the MACOG Transportation Plan. Therefore, they were not advanced to Phase 2 of the screening process.

3.1.5 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 problems.

Phase 1: Purpose and Need

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

Traffic Safety: ITS alternatives would not improve safety on US 31 to crash rates at or below the Indiana average for other rural principal arterials. Without a reduction in daily traffic volume or a change in facility type, safety would not be improved.

Consistency with Transportation Plans: ITS alternatives are not consistent with the INDOT 2000-2025 Long Range Transportation 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 Transportation Plan for Statewide Mobility Corridors or with the MACOG Transportation Plan. Therefore, they were not advanced to Phase 2 of the screening process.

3.1.6 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 US 20, near Miami Highway, and Route 6 serves the residential area on the east side of Miami Highway, immediately south of US 20. 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.

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% of the work trips in St. Joseph County and only 0.4% of the work trips in Marshall County. Between 1990 and 2000, the percent of work trips by public transportation dropped by 29%.

In the US 31 corridor, significant transit service is not a viable option for the following reasons.

- 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 US 20 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 along 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 and from Roosevelt Road to US 20. Thus, less than 5% 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 (Metro Dade County, Florida, Transit Reconfiguration Study; Miami Dade County Transit Authority, 1986).
- 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: The mass transit 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: The mass transit alternative would not improve safety on US 31 to crash rates at or below the Indiana average for other rural principal arterials. 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 Transportation 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, or be consistent with the INDOT 2000-2025 Long Range Transportation Plan for Statewide Mobility Corridors or with the MACOG Transportation Plan. Therefore, it was not advanced to Phase 2 of the screening process.

It should be noted that the combination of various transportation management alternatives (TDM, TSM, ITS, mass transit, etc.) performs only slightly better than any single transportation management alternative. Due to the low-density rural character of the corridor, the combination of transportation management alternatives considered for this project are expected to only minimally reduce traffic volumes on US 31 and would not result in improvements to levels of service on US 31.

3.1.7 Highway Build Alternatives

Highway Build Alternatives were examined in two major geometric design categories:

- Non-Freeway Alternatives with a combination of access control types including partial access control and no access control, and
- Freeways Alternatives with exclusively full access control.

3.1.7.1 Non-Freeway Alternatives

The Non-Freeway Alternatives consist of geometric design options for the upgrading of existing US 31 and options involving upgrading portions of US 31 on a combination of the existing and new alignments. For rural segments of the US 31 improvement on existing alignment, the roadway would be reconstructed creating a four- or six-lane divided facility, providing a median width of at least 16 feet, where a median does not exist today, to accommodate left-turn lanes. The reconstructed rural segment would typically have 11-foot outside shoulders (10 feet paved) and 4-foot paved inside shoulders. For segments of the US 31 improvement through small towns (such as LaPaz and Lakeville), the south edge of South Bend (generally from Kern Road to US 20) and built-up areas with right-of-way limitations (such as from Madison Road to Kern Road), an urban typical section might be used in recognition of right-of-way constraints, using a four-lane divided facility with a 14-foot median and curbs-and-gutters with a 2-foot offset.

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 (i.e., access provided with a combination of at-grade intersections or grade-separated interchanges at selected public roads), as opposed to a freeway having full access control (i.e., access provided at interchanges only). While active railroads would be grade-separated (bridge over/under), the expressway would have at-grade intersections with select public roadways (stop signs on minor



intersecting roadway) 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 paved inside shoulders and a 40-foot median. The typical total right-of-way width would be 150 feet.

If partial access control were pursued for improvements to US 31 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 right-of-way 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. In the five-mile segment from the US 30 interchange to the Michigan Road interchange, just north of Plymouth), existing US 31 is a four-lane divided facility (12-foot lanes with a 5-foot left shoulder and a 10-foot right shoulder) with a depressed, 50-foot wide median and access limited to county public roads (i.e., partial access control). The remaining 15-mile segment from the Michigan Road interchange to the US 20 Bypass interchange is a four-lane facility with varying median and shoulder widths and access is only controlled to adjacent property through driveway permits (i.e., no access control).

From the Michigan Road interchange to just north of US 6 (south edge of LaPaz), existing US 31 has four lanes (12-foot lanes with no left shoulder and a 10-foot right shoulder), lacks partial access control, but has a 16-foot to 24-foot median with few private driveways. Thus, existing US 31 from the US 30 interchange to just north 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 north of US 6 to north of West 1st Road (on the north side of LaPaz) existing US 31 is a four-lane undivided facility (12-foot lanes) with a 4-foot flush median, approximately 58 feet of pavement, curb-and-gutter, and sidewalks. There are no center left-turn lanes but there is some on-street parking through LaPaz. Existing US 31 through LaPaz would be reconstructed to provide a four-lane divided facility with an approximate 14-foot median (or continuous median left-turn lane through town) and curb-and-gutter with sidewalks. The reconstruction could be accomplished within the existing right-of-way; however, existing curbs would have to be moved outward, occasional on-street parking must also be eliminated through LaPaz and access control could not be improved along this section. Achievement of partial access control through LaPaz using local service (frontage) roads to remaining properties and frequent intersecting local streets could only be achieved by the acquisition of structures on both sides of existing US 31.

From the north side of LaPaz to Quinn Trail (south edge of Lakeville), existing US 31 is a four-lane divided facility (12-foot lanes with a 4-foot left shoulder and 12-foot right shoulder) and has a variable median width ranging from 15 feet to 50 feet. This segment would not require improvement.

From Quinn Trail, through and to the north side of Lakeville, existing US 31 is a four-lane undivided facility with a pavement width of 58 to 66 feet with curb-and-gutter and sidewalks. The lone exception is from Patterson Street to Rush Street on the north side of Lakeville, where the pavement narrows to 51 feet. There is on-street parking through Lakeville, but no center left-turn lanes. Existing US 31 through Lakeville would be reconstructed to provide a four-lane divided facility with an approximate 14-foot median (or continuous median left-turn lane through town) and curb-and-gutter with sidewalks. The reconstruction can be accomplished within the existing total 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 total right-of-way is only



60 feet. Additional right-of-way would be required through the north end of town; however, relocations are not anticipated. Achievement of partial access control using local service (frontage) roads to remaining properties and frequent intersecting local streets through Lakeville could only be achieved by the acquisition of structures on both sides of existing US 31.

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

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 total right-of-way width of approximately 150 feet, for a four-lane divided facility (12-foot lanes with a 4-foot left shoulder and 10-foot right shoulder) with a 40-foot median. This 40-foot median width could be increased to a 60- or 80-foot median, if deemed necessary. To the extent practical, partial access control would be achieved.

From the US 30 interchange to north of US 6, the existing total right-of-way width is a minimum of 180 feet. The five-mile segment from the US 30 interchange to the Michigan Road interchange (Old US 30) is a four-lane divided facility (12-foot lanes with a 5-foot left shoulder and a 10-foot right shoulder) with a depressed, 50-foot wide median and access limited to county public roads (i.e., partial access control). From the Michigan Road interchange (Old US 30) to north of US 6 (south edge of LaPaz), existing US 31 has four lanes (12-foot lanes with no left shoulder and a 10-foot right shoulder) and lacks partial access control. Access rights would be acquired to prevent new drives from being created. Joint driveways and occasional short frontage roads (local service roads (LSR)) would be built to reduce existing access points to US 31. North of the Michigan Road interchange (Old US 30), the existing median reduces in width to 16 to 24 feet, but the 40-foot median may be compromised to avoid roadway reconstruction. Thus, existing US 31 from the US 30 interchange to just north 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 north of the US 6 intersection to the north side of LaPaz, existing US 31 is a four-lane undivided facility (12-foot lanes) with a four-foot flush median, approximately 58 feet of pavement, curb-and-gutter, and sidewalks. There are no center left-turn lanes and there is some on-street parking through LaPaz. In this section, a bypass of LaPaz would be built on new alignment, consisting of a four-lane divided facility (12-foot lanes with a 4-foot left shoulder and 10-foot right shoulder), with partial access control and a 40-foot median on a total of 150 feet of new right-of-way. This 40-foot median width could be increased to a 60- or 80-foot median, if deemed necessary.

From the north side of LaPaz to Quinn Trail (south edge of Lakeville), existing US 31 is a four-lane divided facility (12-foot lanes with a 4-foot left shoulder and 12-foot right shoulder) and has a variable median width ranging from 15 feet to 50 feet. The total 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 Trail to SR 4 (the north side of Lakeville), where a four-lane (12-foot lanes) facility with unpaved, stone shoulders exist; a bypass of Lakeville would be built on new alignment. Its location would be west of Lakeville, in the vicinity of an abandoned railroad corridor. The typical cross section for this segment would be a four-lane divided facility (12-foot lanes with a 4-foot left shoulder and 10-foot right shoulder), with partial access control with a 40-foot median on a total of 150 feet of new right-of-way. This 40-foot median width could be increased to a 60- or 80-foot median, if deemed necessary.

From SR 4 to the US 20 Bypass interchange, US 31 is a four-lane undivided facility with 12-foot lanes and 9-foot to 12-foot unpaved, stone outside shoulders. Opposite directions of traffic flow are occasionally separated by a 4-foot flush median strip. This narrow median width is inadequate to accommodate left-turn lanes. As the total right-of-way width is 98 feet, this segment may be reconstructed with 12-foot lanes, a minimum 14-foot median with 10-foot to 12-foot paved shoulders with or without curb-and-gutter, as appropriate, without acquiring additional right-of-way. Achievement of partial access control on this segment using frontage roads for the frequent driveways and intersecting local streets cannot be achieved without the acquisition of additional right-of-way.

Non-Freeway Alternatives Assessment

Reducing Congestion Assessment. Achieving the first project purpose and need of reducing congestion hinges on achieving at least a minimum acceptable level-of-service (LOS C in rural areas and LOS D in urban areas) for forecasted traffic for the year 2030. Table 3.1.1 shows the forecasted traffic volumes for the year 2030 and posted speed limit (operating speed). Table 3.1.2 shows the maximum daily traffic flows for different operating speeds and for 4-lane and 6-lane divided rural arterial highways, similar to that of the Non-Freeway Alternatives.

Segments	2000 Base Year		2030 Future Year	
US 20 – Roosevelt Road	31,526	45 mph	46,000	50 mph
Roosevelt Road – Miller Road	26,419	55 mph	37,500	50 mph
Miller Road – 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 Road	21,400	55 mph	29,300	55 mph
Tyler Road – US 6	19,845	35 mph	28,200	35 mph
US 6 – Michigan Road	24,232	55 mph	35,200	60 mph
Michigan Road– US 30	16,989	55 mph	23,500	60 mph

Note: Segments with unacceptable LOS are shaded.
 Speeds shown represent posted speed limit (operating speed).

Using Tables 3.1.1 and 3.1.2, a comparison of the forecasted traffic volumes for the year 2030 (shown in Table 3.1.1) and the maximum daily traffic volumes for an acceptable LOS (shown in Table 3.1.2 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



Table 3.1.2: 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

Notes: Speeds shown represent posted speed limit (operating speed).
The unacceptable LOS is shaded.

an acceptable LOS for the segment of existing US 31 between Lakeville and LaPaz and from the Michigan Road interchange (Old US 30) 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.

The Non-Freeway Alternatives that use existing alignment of US 31 for the balance of the corridor yet provides bypasses around LaPaz and Lakeville show better performance. This is due to the fact that right-of-way constraints and low-posted speeds through the two towns would not be issues. 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 LOS is achieved from US 30 to the south side of Lakeville; however, the majority of the corridor from the south side of Lakeville to US 20 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 Non-Freeway Alternatives cannot achieve an acceptable LOS, even for a six-lane divided facility, and fail to meet the first purpose and need of reducing congestion in the US 31 corridor.

Improving Safety Assessment. Achieving the second project purpose and need 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 US 20. 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.



The Non-Freeway Alternatives that provide bypasses around LaPaz and Lakeville are more effective in improving safety because they eliminate the frequent driveways and pedestrian movements in the two towns. Nevertheless, the lack of partial access control from north of Lakeville to US 20 does not address the numerous private driveways that contribute to motor vehicle conflicts.

Thus, the Non-Freeway options only partially achieve the project purpose and need of improving safety and upgrading existing US 31. The bypasses around LaPaz and Lakeville result in improved safety over upgrade options passing through the towns. However, the difficulty of achieving partial access control from Lakeville to US 20, without significant residential and business relocations, hampers the ability to improve safety along the highest volume portion of the corridor.

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

Without partial access control throughout the corridor, the Non-Freeway Alternatives are inconsistent with the road characteristics suggested by its high-order road classification in the INDOT 2000-2025 Long Range Transportation Plan for Statewide Mobility Corridors or the MACOG Transportation Plan.

Phase 1: Purpose and Need

Traffic Congestion: As discussed in the *Reducing Congestion Assessment* above, this alternative does not achieve an acceptable LOS and fails to reduce congestion in the US 31 corridor.

Traffic Safety: As discussed in the *Improving Safety Assessment* above, this alternative only partially achieves the purpose of improving safety on the US 31 corridor.

Consistency with Transportation Plans: As discussed in the *Consistency with Transportation Plans Assessment* above, without partial access control, this alternative is not compatible with the INDOT 2000-2025 Long Range Transportation Plan for Statewide Mobility Corridors or the MACOG Transportation Plan.

Conclusion

The 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 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 the Non-Freeway Alternative that bypasses LaPaz and Lakeville and achieve partial access control. Thus, preliminary Freeway Alternative F (described later) best reflects an upgrade of existing US 31 with the addition of interchanges to achieve full access control.

It should also be noted that a Non-Freeway Alternative that includes combinations of various transportation management (TM) alternatives (TDM, TSM, ITS, mass transit, etc.) performs only slightly better than the Non-Freeway Alternative that bypasses LaPaz and Lakeville. Due to the low-density rural character of the corridor, the Non-Freeway Alternative in combination with TM alternatives considered for this project are expected to only minimally reduce traffic volumes on US 31 and would not result in improvements to levels of service on US 31.



3.1.7.2 Freeway Alternatives

Referring to Figure 3.1.1, the 11 preliminary 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). All of the 11 preliminary freeway alternatives have the common southern terminus of the US 31/US 30 interchange. They all follow existing US 31 to West 4A Road before diverging. It should be noted that the portion of existing US 31 from US 30 to West 4A Road has a 50-foot median on a total of 400 feet of right-of-way. This section could relatively easily be upgraded to a freeway facility with the addition of grade separations and/or county road closures. The northern termini of the preliminary freeway alternatives vary along US 20 from northwest of the SR 23 interchange to the eastern SR 331 (Elm Road/Capital Avenue) interchange.

As a result of the Public Information meeting of April 10, 2003, the Resource Agency Review meeting of May 15, 2003, and subsequent correspondence, several new freeway alternatives were suggested. These alternatives included such ideas as utilizing high-voltage, overhead powerline and abandoned railroad corridors; connecting to the existing Ironwood Road/US 20 interchange; utilizing Lilac Road, starting at West 6A Road; and utilizing 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 alternatives presented in April and May of 2003.

Referring to Figure 3.1.1, the first new freeway alternative, Alternative J, is similar to Alternative F, but uses the Mangus Road corridor around the west side of Lakeville. The second new freeway alternative, Alternative K, is similar to Alternative H, but connects to US 20 at the existing Ironwood Road interchange.

In addition to the two new freeway alternatives, some of the previous preliminary freeway alternatives were modified with shifts to more closely parallel powerline corridors. Again, referring to Figure 3.1.1, Alternative H was shifted to the north approximately 2000 feet to more closely parallel a high-voltage, overhead powerline corridor. The other freeway alternatives were also evaluated for their proximity to high-voltage, overhead powerline corridors. A section of Alternative C already parallels a high-voltage, overhead powerline corridor. The shifting of Alternative A approximately one mile to the west to parallel a high-voltage, overhead powerline corridor would route that freeway alternative through Potato Creek State Park, so no modifications were made.

An additional freeway alternative suggested would depart from existing US 31 farther south and east of West 4A Road, the departure point of all of the 11 preliminary freeway alternatives. 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 Riddles Lake and tie into Alternate G, near Tyler Road. By departing from existing US 31 approximately two miles south of all other freeway alternatives, this suggested alternative would require approximately two miles of additional new terrain roadway more than any of the other freeway alternatives. It would not make use of the abandoned railroad corridor to the northwest that is utilized by many of the other freeway alternatives. As a result, construction costs associated with the new terrain roadway, as well as the associated socio-economic and environmental 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 freeway alternative.

The preliminary typical rural freeway cross-section consisted of a four-lane freeway with a 60-foot median, 4-foot inside shoulders, 11-foot outside shoulders (10 feet paved) on a total of 350-450 feet of right-of-way, with a design speed of 70 mph. Full access control would be achieved throughout by the construction of interchanges at selected major crossroads and grade-separations of other significant crossroads and railroads. According to the FHWA Interstate interchange spacing standards and criteria contained in the Indiana Design Manual, interchange spacing in rural areas should average one interchange every five miles, with none closer than three miles.

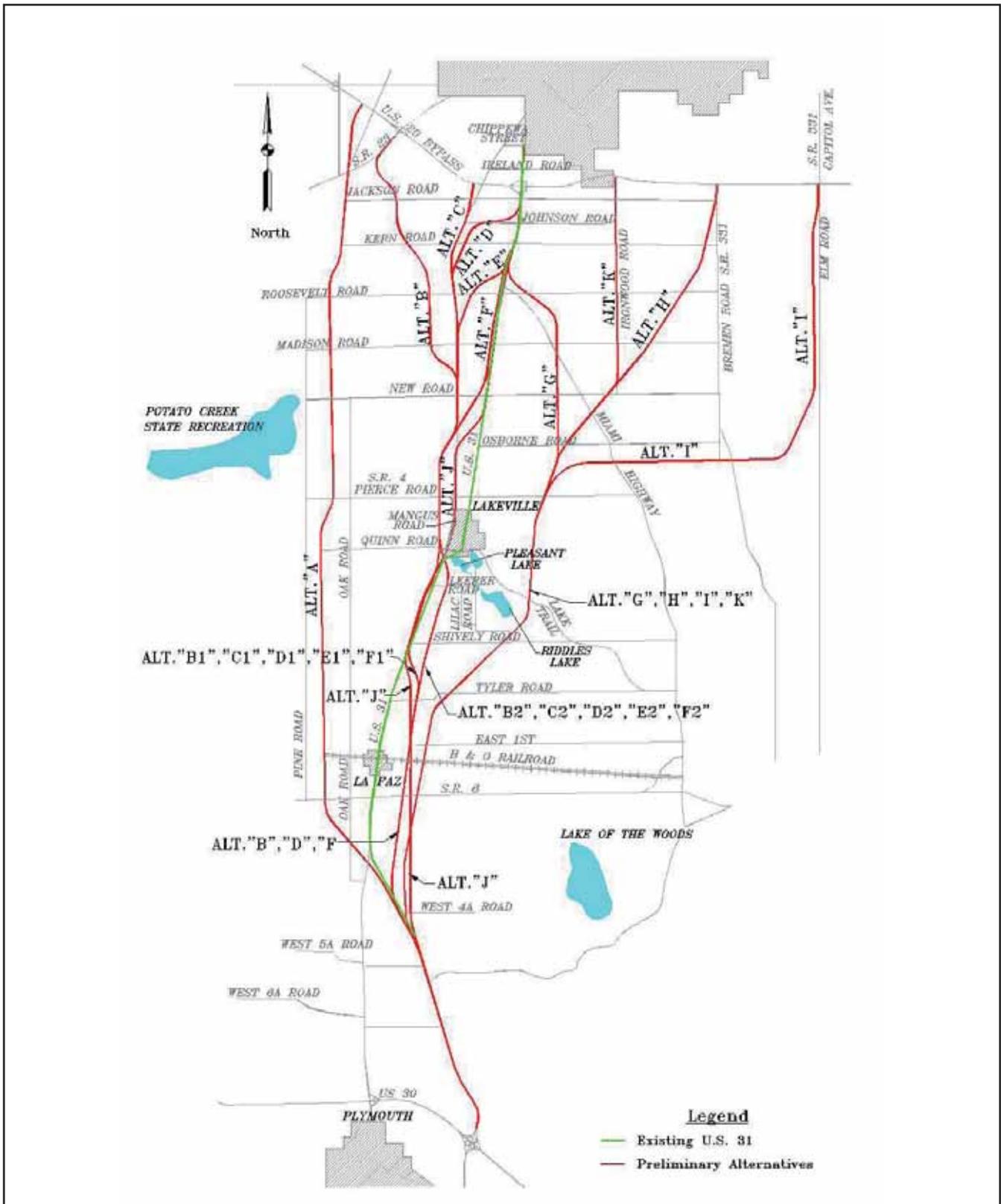


Figure 3.1.1: Preliminary Freeway Alternatives (A - K)



For a portion of the freeway alternatives south of US 20, 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 preliminary urban section consisted of a six-lane freeway with a 38 to 55-foot median and 14-foot outside shoulders (12-foot paved shoulder with a 2-foot barrier offset). It was proposed to be elevated on fill with side retaining walls and concrete barrier on both the median and outside shoulders. It could have one-way, two-lane local service road (frontage road) or collector/distributor (C/D) roadways could be provided within the typical total right-of-way width of 260 to 300 feet, with a mainline design speed of 60 or 70 mph. According to the FHWA interstate interchange spacing standards and criteria contained in the INDOT Design Manual, interchange spacing in urban areas should average one interchange every two miles, not closer than one mile.

For each freeway alternative, existing US 31 and its major intersections were analyzed in accordance with the Highway Capacity Manual (HCM) to determine their present and future LOS. Future Average Daily Traffic (ADT) volumes used to conduct this analysis were generated using output from the regional travel model. Between Plymouth and South Bend, existing US 31 was analyzed in eight segments as well as at four signalized intersections and at six notable two-way stop-controlled intersections (stop control for the crossroad approaches) as listed below:

US 31 Segments:

- US 30 to Michigan Road
- Michigan Road to US 6
- US 6 to Tyler Road
- Tyler Road to Lake Trail
- Lake Trail to SR 4
- SR 4 to Miller Road
- Miller Road to Roosevelt Road
- Roosevelt Road to US 20

US 31 Signalized Intersections:

- US 31 and US 6
- US 31 and SR 4
- US 31 and Kern Road
- US 31 and Johnson Road



US 31 Major Unsignalized Intersections (Two-way Stop-Controlled):

- US 31 and Plymouth-Goshen Trail
- US 31 and W 5A Road
- US 31 and Tyler Road
- US 31 and New Road
- US 31 and Madison Road
- US 31 and Roosevelt Road

Table 3.1.3 shows resulting residual traffic volumes on the existing US 31 when any of the freeway alternatives are constructed. The goal of the freeway alternatives is to divert traffic from existing US 31 on to the new alternative. Table 3.1.3 shows the extent to which each freeway alternative achieves an acceptable level-of-service in the year 2030 for the existing US 31 corridor from US 30 to US 20. Because the freeway alternatives are four-lane

Table 3.1.3: Freeway Alternative Future Traffic and Level-Of-Service on Existing US 31 (Daily Traffic Volumes (LOS) in Year 2030 – Unacceptable LOS* shaded)								
Freeway Alternatives	Segments							
	Rural	Rural	Rural	Rural	Rural	Rural	Rural	Urban
	US 30 to Michigan Road	Michigan Road to US 6	US 6 to Tyler Road	Tyler Road to Lake Trail	Lake Trail to SR 4	SR 4 to New Road	New Road to Roosevelt Road	Roosevelt Road to US 20
No-Build	21,504(C)	28,707(E)	25,687(F)	25,911(D)	28,279(F)	29,714(F)	32,485(F)	43,512(F)
Alternative A		16,065(B)	12,454(D)	12,622(B)	14,922(E)	16,031(C)	18,810(C)	33,766(F)
Alternative B	2,628(A)	5,608(A)	3,108(A)	3,454(A)	5,914(B)	6,259(A)	24,108(E)	35,889(F)
Alternative C	2,532(A)	5,542(A)	3,002(A)	3,285(A)	4,793(A)	3,775(A)	7,568(A)	21,932(D)
Alternative D	2,625(A)	5,622(A)	2,998(A)	3,253(A)	4,529(A)	1,985(A)	5,609(A)	10,612(B)
Alternative E	2,546(A)	5,467(A)	2,827(A)	3,103(A)	4,699(A)	2,291(A)	5,659(A)	7,002(B)
Alternative F	2,545(A)	5,389(A)	2,826(A)	3,095(A)	4,489(A)	5,209(A)	1,690(A)	
Alternative G	2,979(A)	6,181(A)	3,516(A)	3,761(A)	3,971(A)	4,975(A)	8,029(A)	8,992(A)
Alternative H	9,861(A)	16,451(C)	14,408(D)	14,690(B)	16,433(E)	17,568(C)	20,363(D)	34,356(F)
Alternative I	11,225(B)	18,953(C)	17,137(E)	17,436(C)	19,515(F)	21,093(D)	23,783(E)	35,583(F)
Alternative J	541(A)	3,507(A)	2,354(A)	2,634(A)	4,971(B)	2,619(A)		
Alternative K	3,246(A)	6,511(A)	4,278(A)	4,488(A)	5,542(B)	6,309(A)	9,228(B)	25,406(F)

* LOS C is the minimum acceptable for rural segments. LOS D is the minimum acceptable for urban segments.



freeways in the rural area with some six-lane segments near US 20, traffic experiences acceptable operating conditions of LOS C or better when using the freeway alternative in rural segments, and LOS D or better for urban segments. Accordingly, the achievement of an acceptable level-of-service focuses on the residual traffic remaining on the existing US 31 alignment.

Substantiating the assessment of the relief of congestion on existing US 31 is the amount of residual vehicle-miles of travel (VMT) and vehicle-hours of travel (VHT), referring to Table 3.1.4. VMT measures the directness of route to the straight line from the origin to the destination of the trip, and VHT measures congested travel time.

Table 3.1.4: US 31 Residual Vehicle-Miles of Travel and Vehicle-Hours of Travel by Freeway Alternative (in Year 2030 – poorest performers shaded)

Freeway Alternatives	VMT			VHT		
	Miles	% Change from No-Build	Rank	Hours	% Change from No-Build	Rank
No-Build	488,498			8,721		
Alternative A	211,754	-57%	9	3,694	-58%	9
Alternative B	146,804	-70%	8	2,634	-70%	8
Alternative C	74,744	-85%	6	1,306	-85%	6
Alternative D	57,826	-88%	4	1,008	-88%	4
Alternative E	47,398	-90%	3	804	-91%	3
Alternative F	41,993	-91%	2	703	-92%	2
Alternative G	63,189	-87%	5	1,064	-88%	5
Alternative H	251,749	-48%	10	4,380	-50%	10
Alternative I	293,336	-40%	11	5,133	-41%	11
Alternative J	26,241	-95%	1	450	-95%	1
Alternative K	95,095	-81%	7	1,655	-81%	7

A secondary measure for assessing the effectiveness of the freeway alternatives in relieving congestion is the reduction with VMT and VHT in the South Bend Metropolitan Area (Elkhart, Marshall and St. Joseph counties) with an unacceptable LOS (i.e., LOS E or F in urban areas and LOS D, E or F in rural areas). This performance measure addresses how well a single improvement addresses congestion problems throughout the Metro Area (not just congestion along US 31). VMT measures the directness of the route to the straight line from the origin to the destination of the trip, and VHT measures congested travel time. As people are often more open to travel greater distances to save travel time, VHT is a more important consideration than VMT. Table 3.1.5 shows that the rankings for the alternatives.



Table 3.1.5: South Bend Metro Area Congested Vehicle-Miles of Travel and Vehicle-Hours of Travel by Freeway Alternative (in Year 2030 – poorest performers shaded)

Freeway Alternatives	VMT with Unacceptable LOS			VHT with Unacceptable LOS		
	Miles	% Change from No-Build	Rank	Hours	% Change from No-Build	Rank
No-Build	2,509,904			68,867		
Alternative A	2,355,943	-6.13%	6	67,520	-1.96%	11
Alternative B	2,393,659	-4.63%	10	66,245	-3.81%	9
Alternative C	2,409,697	-3.99%	11	67,052	-2.64%	10
Alternative D	2,363,255	-5.84%	8	65,745	-4.53%	6
Alternative E	2,360,917	-5.94%	7	65,662	-4.65%	5
Alternative F	2,366,349	-5.72%	9	65,762	-4.51%	7
Alternative G	2,346,618	-6.51%	5	65,322	-5.15%	3
Alternative H	2,337,643	-6.86%	3	65,315	-5.16%	2
Alternative I	2,292,760	-8.65%	1	66,235	-3.82%	8
Alternative J	2,359,906	-5.98%	4	65,614	-4.72%	4

For the No-Build alternative and for each freeway alternative, present and projected future crash rates on five segments of US 31 were compared to the average statewide crash rates for rural principal arterials (the functional classification for US 31) as follows:

US 31 Segments:

- US 30 to LaPaz
- Through LaPaz
- LaPaz to Lakeville
- Through Lakeville
- Lakeville to US 20



Table 3.1.6 shows the extent to which each freeway alternative reduces total accidents along existing US 31 and in the Metro Area (Elkhart, Marshall and St. Joseph counties). Again, the freeway alternatives that divert the most traffic from existing US 31 result in the best performance. The reduction of accidents in the Metro Area is a secondary consideration that examines the extent to which this improvement project alone reduces the level of accidents throughout the Metro Area (not only US 31).

Table 3.1.6: Existing US 31 and South Bend Metro Area Reduction in Total Accidents by Freeway Alternative (In Year 2030 – poorest performance shaded)						
Freeway Alternatives	Existing US 31 Total Accidents			Metro Area Total Accidents		
	Crashes	% Change from No-Build	Rank	Crashes	% Change from No-Build	Rank
No-Build	375			11,242		
Alternative A	178	-53%	9	10,966	-2.19%	6
Alternative B	151	-60%	8	11,043	-1.77%	7
Alternative C	67	-82%	6	11,074	-1.49%	10.5
Alternative D	49	-87%	5	11,074	-1.49%	10.5
Alternative E	36	-90%	3	10,963	-2.48%	4
Alternative F	25	-93%	2	10,959	-2.52%	3
Alternative G	48	-87%	4	10965	-2.46%	5
Alternative H	204	-46%	10	11,063	-1.59%	8
Alternative I	238	-37%	11	10,067	-1.56%	9
Alternative J	16	-96%	1	10,941	-2.68%	1
Alternative K	83	-78%	7	10,951	-2.59%	2



Table 3.1.7 shows the total crash rate for each freeway alternative for residual traffic on existing US 31 segments. The total crash rate for each freeway alternative is compared to the Indiana average total crash rates for other rural principal arterials. The freeway alternatives that divert the most traffic from existing US 31 result in the lower total crash rate.

Table 3.1.7: Total Crash Rate by Alternative for Existing US 31 Segments (in year 2030) (Total crash rate exceeding statewide rural principal arterial of 186.57 shaded)					
Freeway Alternatives	US 30 to LaPaz	Through LaPaz	LaPaz to Lakeville	Through Lakeville	Lakeville to US 20
No-Build	94.17	250.82	45.04	456.04	239.93
Alternative A	52.70	121.61	21.94	240.64	186.23
Alternative B	18.40	30.35	6.00	95.37	197.94
Alternative C	18.18	29.31	5.71	77.29	120.96
Alternative D	18.44	29.27	5.65	73.04	58.53
Alternative E	17.93	27.60	5.39	75.78	38.62
Alternative F	17.68	27.59	5.37	72.39	38.62
Alternative G	20.27	34.33	6.54	64.04	
Alternative H	53.97	140.69	25.54	265.01	189.48
Alternative I	62.17	167.33	30.30	314.71	196.25
Alternative J	11.50	22.98	4.58	80.16	
Alternative K	21.36	41.77	7.80	89.37	140.12

Note: Assumes crash rate changes in proportion to residual daily traffic on existing US 31.



Table 3.1.8 summarizes the Phase 1 evaluation for each of the preliminary alternatives related to the Purpose and Need Statement for the project. It also identifies the preliminary alternatives that were advanced to Phase 2 of the screening process. Even though the No-Build Alternative would not address the purpose and need for this project, it was carried forward for evaluation throughout the development of the Environmental Impact Statement and served as a baseline when comparing the effectiveness and potential impacts of other alternatives; however, it is not considered the preferred alternative. Table 3.1.9 summarizes the socio-economic and environmental impacts for each of the preliminary alternatives that were advanced to the Phase 2 of the screening process for the project. It also identifies the preliminary alternatives that were recommended for further study in the DEIS.

Table 3.1.8: Phase 1: Purpose and Need Evaluation				
PHASE 1 – PURPOSE AND NEED EVALUATION				
Alternative	Reduces Congestion On Existing US 31 ¹	Improves Safety ²	Consistent with INDOT and MACOG Transportation Plans ³	Advanced to Phase 2 Screening
No-Build	NO	NO	NO	YES ⁴
TDM	NO	NO	NO	NO
TSM	NO	NO	NO	NO
ITS	NO	NO	NO	NO
Mass Transit	NO	NO	NO	NO
Non-Freeway Alternatives	NO	YES	NO	NO
Freeway Alternatives				
Alternative A	NO	NO	YES	NO
Alternative B	NO	NO	YES	NO
Alternative C	YES	YES	YES	YES
Alternative D	YES	YES	YES	YES
Alternative E	YES	YES	YES	YES
Alternative F	YES	YES	YES	YES
Alternative G	YES	YES	YES	YES
Alternative H	NO	NO	YES	NO
Alternative I	NO	NO	YES	NO
Alternative J	YES	YES	YES	YES
Alternative K	NO	YES	YES	NO

NOTES: Alternatives recommended for advancement to Phase 2 screening shaded.

1. LOS C is the minimum acceptable for rural segments. LOS D is the minimum acceptable for urban segments.
2. Crash rates at or below Indiana average for rural principal arterials.
3. Alternatives were not eliminated solely on their ability to meet this criterion.
4. No-Build Alternative – does not meet purpose and need of the project; however, was carried forward for detailed study.



It is important to note that the US 31 Improvement Project has been a dynamic process. The information contained in Table 3.1.9 is from the best-known existing secondary source data and conceptual design parameters available at the time that the preliminary screening was conducted. Additional information was identified during detailed field reviews later in the progress of the study, and the numbers contained in the detailed analysis of the alternatives studied further in the FEIS, may be slightly different than those contained in Table 3.1.9.

Table 3.1.9: Potential Socio-Economic and Environmental Impact Evaluation For Alternatives Advanced to Phase 2 of Screening Process										
Socio-Economic and/or Environmental Measure	Alternative Location									
	Western						Central		Eastern	
	C1	C2	D1	D2	E1	E2	F1	F2	J	G
Preliminary Average Cost Estimate (million \$) (Year 2003 Dollars)	253	245	263	255	278	266	325	313	346	283
New Right-of-Way (acres)	1050	1071	1130	1152	985	1008	917	961	857	1043
Forest (acres)	162	196	146	178	114	148	75	111	55	117
Wetlands (acres)	77	85	74	81	74	82	48	57	28	43
Floodplains (acres)	11	11	11	11	11	11	11	11	11	35
Streams Impacted	11	12	12	13	11	12	8	9	8	12
Potential 4(f) Property Impacts	2	0	2	1	5	3	5	3	5	4
Managed Land Impacts	5	7	6	8	6	8	5	7	4	5
Unique Geological/Ecological Area ¹	M	M	M	M	M	M	L	L	L	L
Farmland (acres)	824	810	809	797	755	742	727	731	702	833
Notable Wildlife Habitat (IDNR)	2	2	2	2	2	2	1	1	0	1
Residential Relocations	78	48	155	125	146	116	202	172	235	113
Farm Relocations	8	4	8	4	8	4	10	6	10	8
Business Relocations	11	8	46	43	84	81	94	91	86	80
Environmental Justice Issues	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
Well-Head Protection Area Impacts	4	4	4	4	3	3	2	2	2	0
Archaeology Impacts (Previously Surveyed)	4	2	4	2	4	2	4	2	3	2
Historic Property Impacts (on NR or PE) ²	2	2	0	0	1	1	1	1	2	2



Table 3.1.9: Potential Socio-Economic and Environmental Impact Evaluation For Alternatives Advanced to Phase 2 of Screening Process

Socio-Economic and/or Environmental Measure	Alternative Location									
	Western					Central			Eastern	
	C1	C2	D1	D2	E1	E2	F1	F2	J	G
Cemeteries Impacted	0	0	0	0	2	2	4	4	4	2
Potential Residential Noise Impacts	69	54	115	101	82	66	105	88	146	66
Hazardous Material Site Impacts	0	0	6	6	10	10	11	11	13	10
Carried Forward for Detailed Study in DEIS ³	No	Yes	No	No	No	Yes	No	Yes	No	Yes

NOTES: Alternatives recommended for further study shaded.

Alternatives' recommendations are discussed in detail in Chapter 3.1.

1. Unique geological / ecological area evaluations (M-Medium, L-Low) indicate that the impact of the alternatives relative to each other.
2. Historic Property Impacts include those properties listed on or potentially eligible for the National Register, that fall within the 2000-foot corridor for each alternative. These numbers are representative of potential Section 106 impacts.
3. No-Build Alternative – does not meet purpose and need of the project; however, it was carried forward for detailed study.

Freeway Alternatives B through F each consist of two options and are listed in the tables as B1, B2, C1, etc. (see Figure 3.1.13). The options are located south of Lakeville and each is 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 US 31 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 new freeway. Differences in purpose and need measures between the two options are negligible and are not included in the purpose and need discussion.

General descriptions and the screening evaluation for each of the freeway alternatives, as well as the advantages and disadvantages of Options 1 and 2 follow.



Alternative B

Alternative B (See Figure 3.1.3) begins at the existing US 31/US 30 interchange, departs US 31 near West 4A Road, runs east of La Paz, and parallels US 31 to the east near an abandoned railroad. It crosses over US 31 south of Lakeville, runs west of Lakeville, and ends at the existing US 20/SR 23 interchange. This freeway alternative uses the existing US 30 interchange, and includes interchanges at West 5A Road, US 6, SR 4 (Pierce Road), Kern Road, SR 23 (partial interchange) and US 20. Alternative B is 21.2 miles in length, with preliminary costs estimated at \$225 million. This preliminary estimate includes costs for construction, right-of-way and preliminary engineering (design).

Phase 1: Purpose and Need

Traffic Congestion: This alternative fails to address the purpose of reducing congestion on the existing US 31. In the year 2030, two of the eight segments of existing US 31 have an unacceptable LOS. The residual traffic on US 31 requires further major roadway investment in the existing US 31 corridor, besides the cost of the alternative itself, to achieve acceptable traffic operating conditions. These improvements include widening existing US 31 to seven lanes from New Road to US 20 and widening existing SR 23 to five lanes from just north of US 20 to Sample Road.

Traffic Safety: This alternative fails to address the purpose of improving safety on the existing US 31. Future crash rates on existing US 31 exceed the statewide average from Lakeville to US 20. Residual traffic on US 31 requires further major roadway investment along existing US 31 to improve physical conditions adversely affecting safety. One such improvement includes widening existing US 31 to five lanes from SR 4 to New Road.

Consistency with Transportation Plans: This alternative is consistent with the INDOT 2000-2025 Long Range Transportation Plan and with the MACOG Transportation Plan.

Conclusion

Alternative B fails to address the first two purposes and needs for the project (i.e., reduced congestion and improved safety). This alternative would not meet the purpose and need for the project and was not advanced to Phase 2 of the screening process.

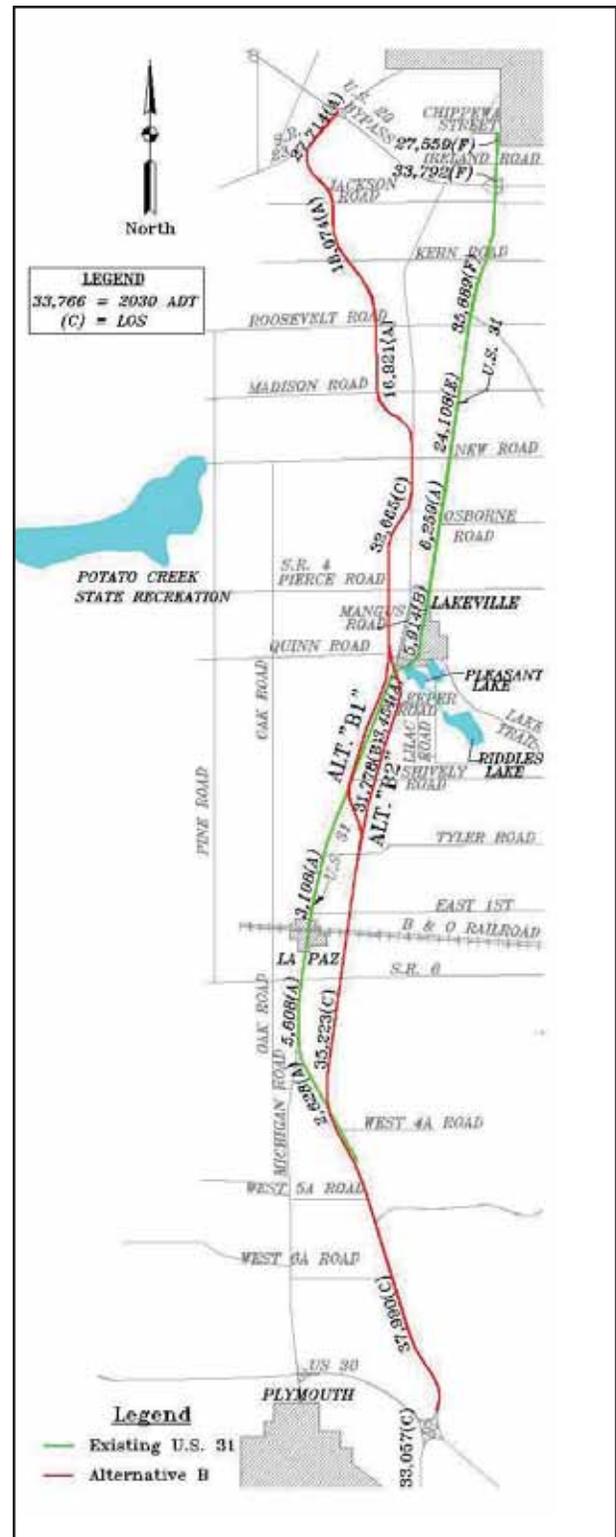


Figure 3.1.3: Alternative B



Alternative C

Alternative C (See Figure 3.1.4) begins at the existing US 31/US 30 interchange, departs US 31 near West 4A Road, runs east of La Paz, and parallels US 31 to the east near an abandoned railroad. It crosses over US 31 south of Lakeville, runs west of Lakeville near an abandoned railroad, and ends at US 20 west of the existing US 31 interchange. This four-lane rural freeway alternative uses the existing US 30 interchange, and includes interchanges at West 5A Road, US 6, SR 4 (Pierce Road), Kern Road and US 20. Alternative C parallels a high transmission powerline for approximately 0.5 miles near Madison Road. Alternative C is the shortest alternative at 19.5 miles in length, with preliminary costs estimated at \$245 million. This preliminary estimate includes costs for construction, right-of-way and preliminary engineering (design).

Phase 1: Purpose and Need

Reduce Congestion: This alternative would reduce congestion of existing US 31. Projected LOS for the year 2030 range from A – C along rural segments and LOS D for the urban segment of existing US 31. These projected LOS values meet INDOT standards.

Improve Traffic Safety: This alternative would improve safety on existing US 31 by diverting traffic from the existing facility. The estimated reduction in accidents from the No-Build is 82% and all segments along existing US 31 would have crash rates at or below statewide averages for other rural principal arterials.

Consistency with Transportation Plans: This alternative is consistent with the INDOT 2000-2025 Long Range Transportation Plan and with the MACOG Transportation Plan.

Alternative C meets all three purposes and needs identified for this project. This alternative was advanced to Phase 2 of the screening process.



Figure 3.1.4: Alternative C



Phase 2: Socio-Economic and Environmental Impacts

Option 1: Given the higher residential, farm, business relocation, impacts to historic sites and higher overall costs (see Table 3.1.9), Option 1 is not recommended to be advanced for further study. The Screening of Options 1 and 2 for Alternatives B-F follows the analysis of Alternative K.

Option 2: The potential socio-economic and environmental impacts identified for Alternative C are listed in Table 3.1.9. This alternative would require an estimated 1,071 acres of new right-of-way, of which 196 acres are forested, 85 acres are wetlands, 11 acres are floodplains, and 810 acres are farmland. Approximately 12 streams would be crossed by the alternative. This alternative crosses the edge of the Maxinkukee Moraine in the northwestern portion of the study area, a unique geological and ecological area. Alternative C is expected to directly impact two Notable Wildlife Habitat Areas as identified by the Indiana Department of Natural Resources (IDNR). According to the Indiana Natural Heritage Data Center, managed by the IDNR Division of Nature Preserves, in 1999 a Blanding's turtle (*Emydoidea blandingii*) was reported within the corridor for this alternative. This report could be representative of a population of this state endangered species in the area.

Alternative C would result in approximately 48 residential, eight businesses, and four farm relocations. There are several large, industrial businesses potentially impacted near the proposed interchange with US 20. This alternative would also potentially impact seven managed lands, which include three classified forests and four classified wildlife areas.

This alternative could potentially impact one property on the National Register, and one property potentially eligible for the National Register. Both properties are located near the proposed Alternative C/US 20 interchange. The property listed on the National Register is the Evergreen Hill Farm. This property includes 38 acres, with an Italianate-style house, c. 1873, barn, cemetery and smokehouse. The Cover House is potentially eligible for the National Register. It is a Prairie-style residence built c. 1920. Both properties are possible Section 106 impacts.

It will also impact two previously surveyed archaeological sites, neither of which was recommended for further study.

This alternative crosses four well-head protection areas.

Conclusion

Alternative C using Option 2 was carried forward for more detailed studies based on a comparative analysis of impacts with other alternatives that were advanced to the Phase 2 screening process. Section 3.1.9 further discusses those alternatives to be carried forward for further analysis.



Alternative D

Alternative D (See Figure 3.1.5) begins at the existing US 31/US 30 interchange, departs US 31 near West 4A Road, runs east of LaPaz, and parallels US 31 to the east near an abandoned railroad. It crosses over US 31 south of Lakeville, runs west of Lakeville near an abandoned railroad, and ends at the existing US 20/US 31 interchange. This freeway alternative uses the existing US 30 interchange, and includes interchanges at West 5A Road, US 6, SR 4 (Pierce Road), Kern Road, US 31 (partial interchange) and US 20. Alternative D is 20.9 miles in length, with preliminary costs estimated at \$255 million. This preliminary estimate includes costs for construction, right-of-way and preliminary engineering (design).

Phase 1: Purpose and Need

Reduce Congestion: This alternative would reduce congestion of existing US 31. Projected LOS for the year 2030 range from A – B along existing US 31, and meet INDOT standards.

Improve Traffic Safety: This alternative would improve safety on existing US 31 by diverting traffic from the existing facility. The estimated reduction in accidents from the No-Build is 87% and all segments along existing US 31 would have crash rates at or below statewide averages for other rural principal arterials.

Consistency with Transportation Plans: This alternative is consistent with the INDOT 2000-2025 Long Range Transportation Plan and with the MACOG Transportation Plan.

Alternative D meets all three purposes and needs identified for this project. This alternative was advanced to Phase 2 of the screening process.

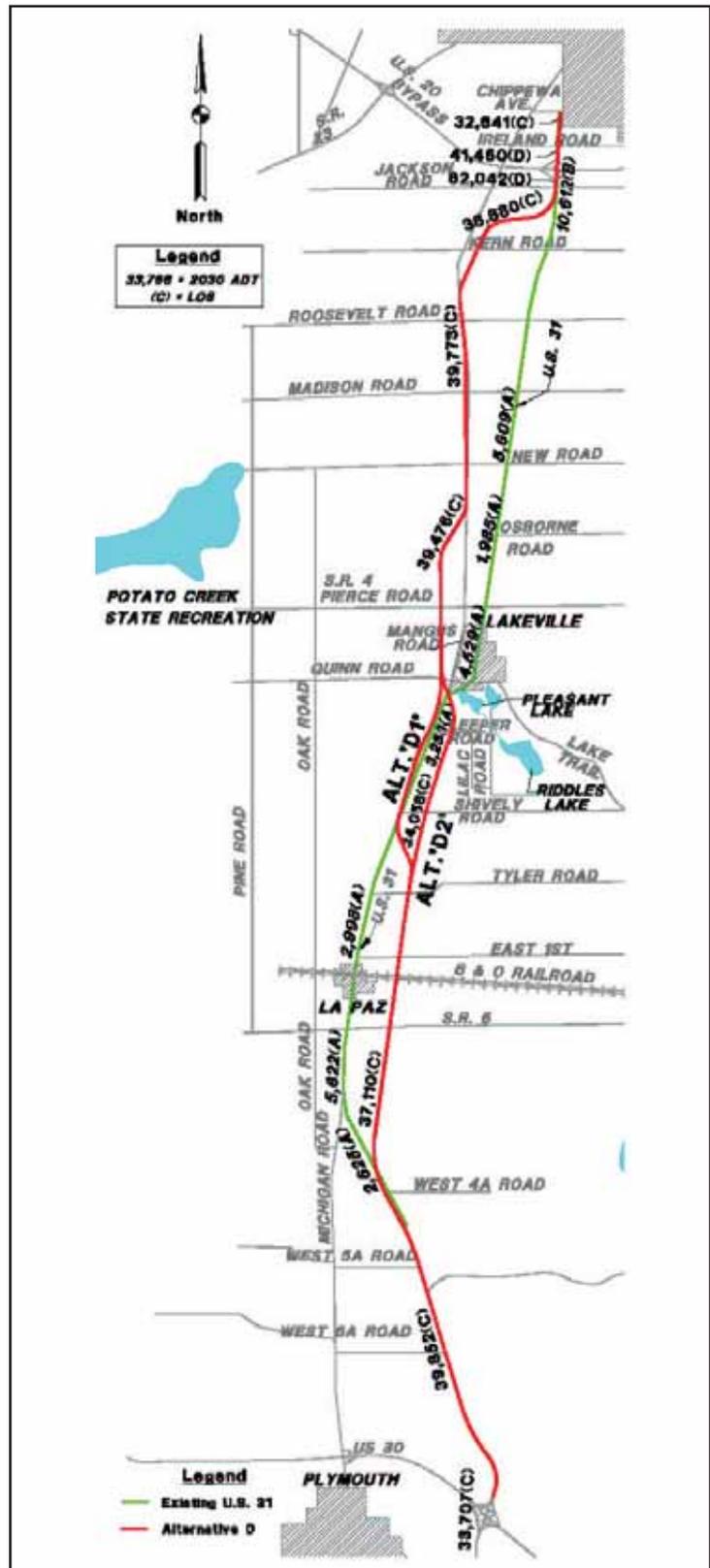


Figure 3.1.5: Alternative D



Phase 2: Socio-Economic and Environmental Impacts

Option 1: Given the higher residential, farm, business relocation, impacts to historic sites and higher overall costs (see Table 3.1.9), Option 1 is not recommended to be advanced for further study. The Screening of Options 1 and 2 for Alternatives B-F follows the analysis of Alternative K.

Option 2: The potential socio-economic and environmental impacts identified for Alternative D are listed in Table 3.1.9. This alternative would require an estimated 1,152 acres of new right-of-way, of which, 178 acres are forested, 81 acres are wetlands, 11 acres are floodplains and 797 acres are farmland. Approximately 13 streams would be crossed by the alternative. This alternative crosses the edge of the Maxinkukee Moraine in the northwestern portion of the study area, a unique geological and ecological area. Alternative D is expected to directly impact two Notable Wildlife Habitat Areas as identified by the IDNR. According to the Indiana Natural Heritage Data Center, managed by the IDNR Division of Nature Preserves, in 1999 a Blanding's turtle (*Emydoidea blandingii*) was reported within the corridor for this alternative. This report could be representative of a population of this state endangered species in the area.

Alternative D would result in approximately 125 residential, 43 business and four farm relocations. This alternative crosses directly through the Whispering Hills Subdivision near its connection with US 31, resulting in a high number of residential relocations and neighborhood impacts.

Alternative D connects to existing US 31 approximately 1/3 of a mile south of the existing US 20 interchange. The close proximity of this connection to the existing interchange creates insufficient distance to accommodate the proper weaving movements for the traffic flow.

Alternative D would impact six potential hazardous material sites including: two Underground Storage Tanks (USTs), one Leaking Underground Storage Tanks (LUSTs), and three Resource Conservation and Recovery Act (RCRA) sites.

This alternative would also potentially impact eight managed lands, which include three classified forests, four classified wildlife areas, and the O'Brien Park. O'Brien Park is located along US 31, just north of Ireland Road.

The O'Brien Park is the only potential Section 4(f) property impacted by this alternative. It will also impact two previously surveyed archaeological sites, neither of which was recommended for further study.

This alternative crosses four well-head protection areas.

Conclusion

Alternative D was eliminated from further consideration based on the insufficient distance required for the needed geometrics in the vicinity of the US 20/US 31 interchange and a comparative analysis of impacts with other alternatives that were advanced to the Phase 2 screening process. Section 3.1.8 contains those alternatives eliminated from further consideration.



Alternative E

Alternative E (See Figure 3.1.6) begins at the existing US 31/US 30 interchange, departs US 31 near West 4A Road, runs east of LaPaz, and parallels US 31 to the east near an abandoned railroad. It crosses over US 31 south of Lakeville, runs west of Lakeville near an abandoned railroad, returns to US 31 south of Kern Road, and ends at the existing US 20/US 31 interchange. This freeway alternative uses the existing US 30 interchange, and includes interchanges at West 5A Road, US 6, SR 4 (Pierce Road), US 31 (partial interchange), Kern Road and US 20. Alternative E is 20.6 miles in length, with preliminary costs estimated at \$266 million. This preliminary estimate includes costs for construction, right-of-way and preliminary engineering (design).

Phase 1: Purpose and Need

Reduce Congestion: This alternative would reduce congestion on existing US 31. Projected LOS for the year 2030 range from A – B along existing US 31 and meet INDOT standards.

Improve Traffic Safety: This alternative would improve safety on existing US 31 by diverting traffic from the existing facility. The estimated reduction in accidents from the No-Build is 90% and all segments along existing US 31 would have crash rates at or below statewide averages for other rural principal arterials.

Consistency with Transportation Plans: This alternative is consistent with the INDOT 2000-2025 Long Range Transportation Plan and with the MACOG Transportation Plan.

Alternative E meets all three purposes and needs identified for this project. This alternative was advanced to Phase 2 of the screening process.

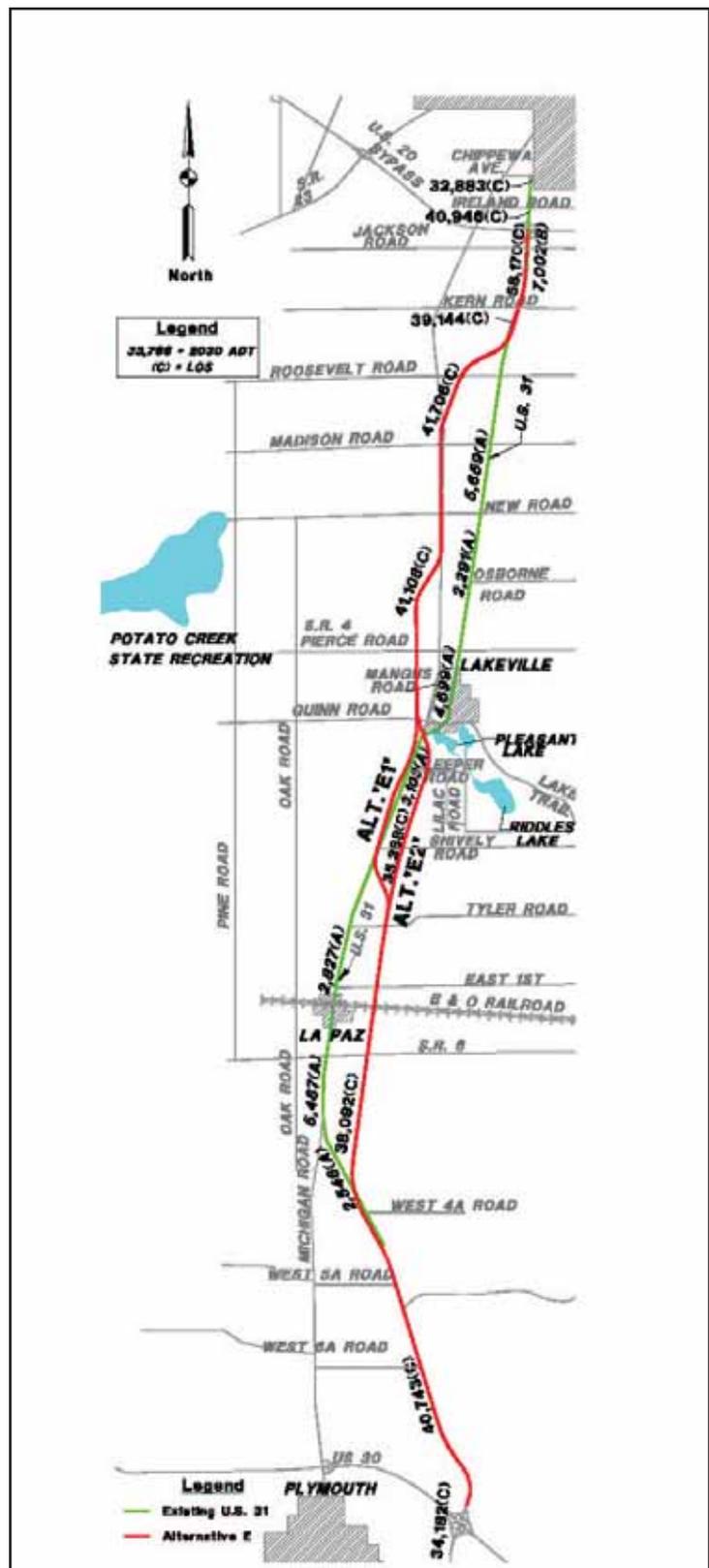


Figure 3.1.6: Alternative E



Phase 2: Socio-Economic and Environmental Impacts

Option 1: Given the higher residential, farm, business relocation, impacts to historic sites and higher overall costs (see Table 3.1.9), Option 1 is not recommended to be advanced for further study. The Screening of Options 1 and 2 for Alternatives B-F follows the analysis of Alternative K.

Option 2: The potential socio-economic and environmental impacts identified for Alternative E are listed in Table 3.1.9. This alternative would require an estimated 1,008 acres of new right-of-way, of which 148 acres are forested, 82 acres are wetlands, 11 acres are floodplains and 742 acres are farmland. Approximately 12 streams would be crossed by the alternative. This alternative crosses the edge of the Maxinkukee Moraine in the northwestern portion of the study area, a unique geological and ecological area. Alternative E is expected to directly impact two Notable Wildlife Habitat Areas as identified by the IDNR. According to the Indiana Natural Heritage Data Center, managed by the IDNR Division of Nature Preserves, in 1999 a Blanding's turtle (*Emydoidea blandingii*) was reported within the corridor for this alternative. This report could be representative of a population of this state endangered species in the area.

Alternative E would result in approximately 116 residential, 81 business, and four farm relocations. Many of the residence and business relocations are located along the existing US 31. This alternative would also impact the Center Township Fire Department.

Alternative E would impact ten potential hazardous material sites including: six USTs, one LUST, and three RCRA sites.

This alternative would also potentially impact eight managed lands, which include three classified forests, four classified wildlife areas, and O'Brien Park. O'Brien Park is located along US 31, just north of Ireland Road.

Potential Section 4(f) sites include O'Brien Park, the Ullery/Farneman House, an Italianate-style house, c. 1860 (a Local Historic Landmark with a high potential to be eligible for the National Register) and the Southlawn Cemetery (a Local Historic Landmark). The Ullery/Farneman House and Southlawn Cemetery are located very close together along existing US 31 (Figure 3.2.16). Due to the close proximity of these two properties, it will be difficult to construct a freeway facility in this area without significant impact to one or both properties. It may be possible to minimize right-of-way requirements between the properties or to shift Alternative E to connect with existing US 31 slightly north of these sites. Because of its high potential to be eligible for the National Register, the Ullery/Farneman House would also most likely be a Section 106 impact.

It will also impact two previously surveyed archaeological sites, one of which was recommended for intensive survey.

This alternative crosses three well-head protection areas.

Conclusion

Alternative E using Option 2 was carried forward for more detailed studies based on a comparative analysis of impacts with other alternatives that were advanced to the Phase 2 screening process. Section 3.1.9 further discusses those alternatives to be carried forward for further analysis.



Alternative F

Alternative F (See Figure 3.1.7) begins at the existing US 31/US 30 interchange, departs US 31 near West 4A Road, runs east of La Paz, and parallels US 31 to the east near an abandoned railroad. It crosses over US 31 south of Lakeville, runs west of Lakeville near an abandoned railroad, returns to US 31 near New Road, and ends at the existing US 20/US 31 interchange. This freeway alternative uses the existing US 30 interchange, and includes interchanges at West 5A Road, US 6, SR 4 (Pierce Road), Kern Road and US 20. Alternative F is 20.4 miles in length, with preliminary costs estimated at \$313 million. This preliminary estimate includes costs for construction, right-of-way and preliminary engineering (design).

Phase 1: Purpose and Need

Reduce Congestion: This alternative would reduce congestion of existing US 31. Alternative F has a projected LOS of A along existing US 31 and meets INDOT standards.

Improve Traffic Safety: This alternative would improve safety on existing US 31 by diverting traffic from the existing facility. The estimated reduction in accidents from the No-Build is 93% and all segments along existing US 31 would have crash rates at or below statewide averages for other rural principal arterials.

Consistency with Transportation Plans: This alternative is consistent with the INDOT 2000-2025 Long Range Transportation Plan and with the MACOG Transportation Plan.

Alternative F meets all three purposes and needs identified for this project. This alternative was advanced to Phase 2 of the screening process.

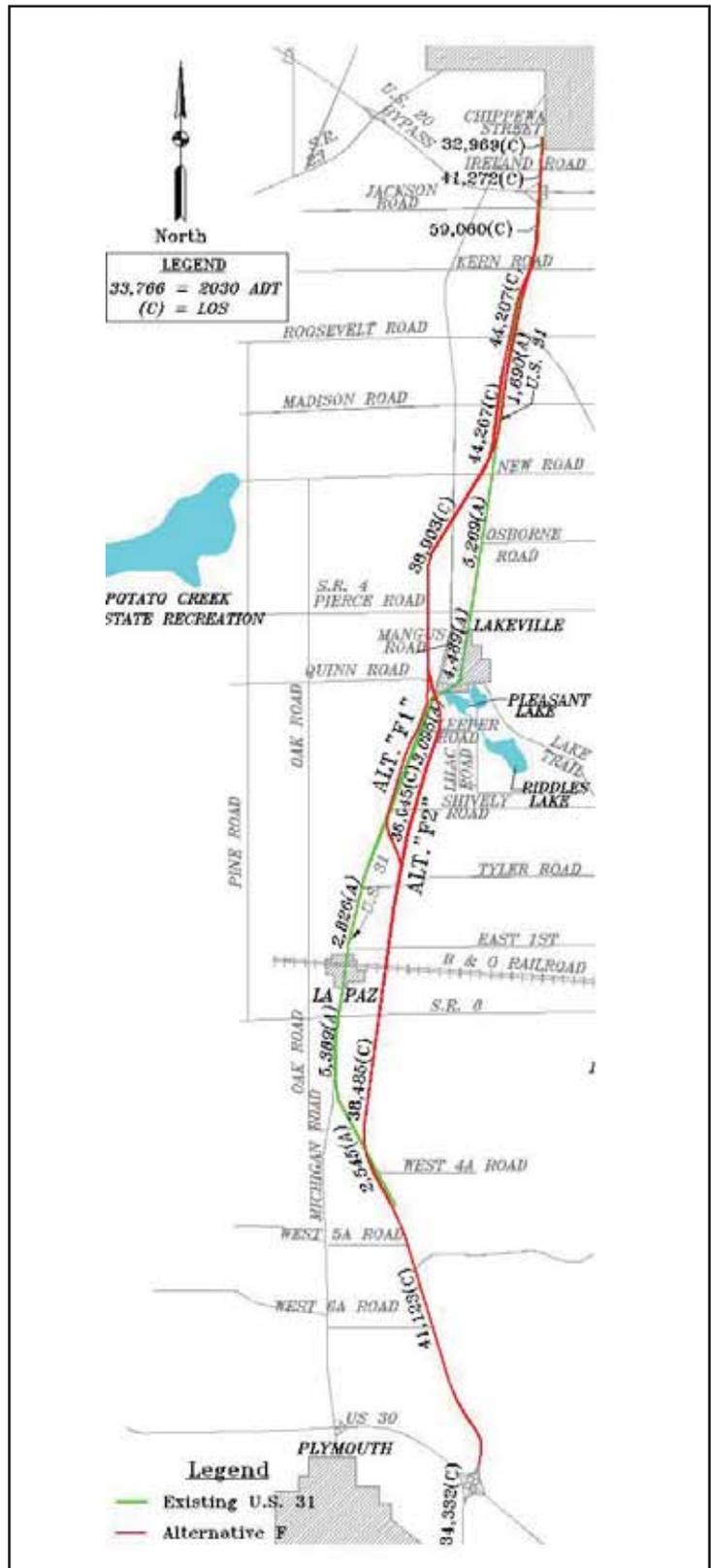


Figure 3.1.7: Alternative F



Phase 2: Socio-Economic and Environmental Impacts

Option 1: Given the higher residential, farm, business relocation, impacts to historic sites and higher overall costs (see Table 3.1.9), Option 1 is not recommended to be advanced for further study. The Screening of Options 1 and 2 for Alternatives B-F follows the analysis of Alternative K.

Option 2: The potential socio-economic and environmental impacts identified for Alternative F are listed in Table 3.1.9. This alternative would require an estimated 961 acres of new right-of-way, of which 111 acres are forested, 57 acres are wetlands, 11 acres are floodplains and 731 acres are farmland. Approximately nine streams would be crossed by the alternative. Alternative F is expected to directly impact one Notable Wildlife Habitat Area as identified by the IDNR. According to the Indiana Natural Heritage Data Center, managed by the IDNR Division of Nature Preserves, in 1999 a Blanding's turtle (*Emydoidea blandingii*) was reported within the corridor for this alternative. This report could be representative of a population of this state endangered species in the area.

Alternative F would result in approximately 172 residential, 91 business, and six farm relocations. Many of the residence and business relocations are located along the existing US 31. This alternative would also impact the Center Township Fire Department.

Alternative F would impact 11 potential hazardous material sites including: seven USTs, one LUST, and three RCRA sites.

This alternative would also potentially impact seven managed lands, which include two classified forests, four classified wildlife areas, and O'Brien Park. O'Brien Park is located along US 31, just north of Ireland Road.

Potential Section 4(f) sites include O'Brien Park, the Ullery/Farneman House, an Italianate-style house, c. 1860 (a Local Historic Landmark with a high potential to be eligible for the National Register) and the Southlawn Cemetery (a Local Historic Landmark). The Ullery/Farneman House and Southlawn Cemetery are located very close together along existing US 31 (Figure 3.2.16). It may be possible to minimize right-of-way requirements between the properties or to shift Alternative F to connect with existing US 31 slightly north of these sites. Because of its high potential to be eligible for the National Register, the Ullery/Farneman House would also most likely be a Section 106 impact.

Three cemeteries, in addition to the Southlawn Cemetery, could also potentially be impacted by this alternative. It will also impact two previously surveyed archaeological sites, none of which were recommended for intensive survey.

This alternative crosses two well-head protection areas.

Conclusion

Alternative F using Option 2 was carried forward for more detailed studies based on a comparative analysis of impacts with other alternatives that were advanced to the Phase 2 screening process. Section 3.1.9 further discusses those alternatives to be carried forward for further analysis.



Alternative G

Alternative G (See Figure 3.1.8) begins at the existing US 31/US 30 interchange, departs US 31 near West 4A Road, runs east of LaPaz, and parallels US 31 to the east near an abandoned railroad. It runs east of Lakeville, returns to US 31 south of Kern Road, and ends at the existing US 20/US 31 interchange. This freeway alternative uses the existing US 30 interchange, and includes interchanges at West 5A Road, US 6, SR 4 (Pierce Road), US 31 (partial interchange), Kern Road and US 20. Alternative G is 21.2 miles in length, with preliminary costs estimated at \$283 million. This preliminary estimate includes costs for construction, right-of-way and preliminary engineering (design).

Phase 1: Purpose and Need

Reduce Congestion: This alternative would reduce congestion on existing US 31. Projected LOS for the year 2030 range from A – B along existing US 31, and meet INDOT standards.

Improve Traffic Safety: This alternative would improve safety on existing US 31 by diverting traffic from the existing facility. The estimated reduction in accidents from the No-Build is 87% and all segments along existing US 31 would have crash rates at or below statewide averages for other rural principal arterials.

Consistency with Transportation Plans: This alternative is consistent with the INDOT 2000-2025 Long Range Transportation Plan and with the MACOG Transportation Plan.

Alternative G meets all three purposes and needs identified for this project. This alternative was advanced to Phase 2 of the screening process.

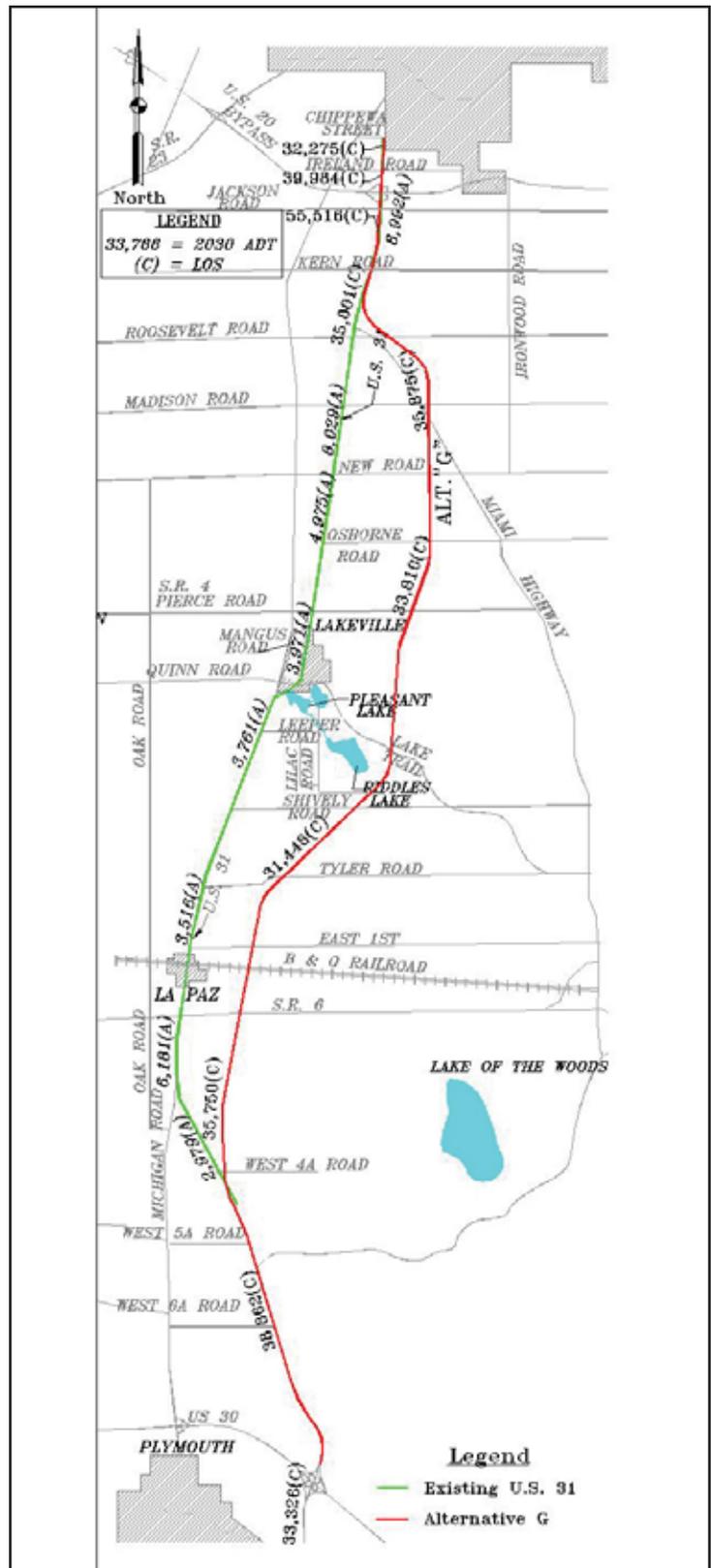


Figure 3.1.8: Alternative G



Phase 2: Socio-Economic and Environmental Impacts

The potential socio-economic and environmental impacts identified for Alternative G are listed in Table 3.1.9. This alternative would require an estimated 1,043 acres of new right-of-way, of which 117 acres are forested, 43 acres are wetlands, 35 acres are floodplains and 833 acres are farmland. Approximately 12 streams would be crossed by the alternative. Alternative G is expected to directly impact one Notable Wildlife Habitat Area as identified by the IDNR.

Alternative G would result in approximately 113 residential, 80 business, and eight farm relocations. This alternative would also impact the Center Township Fire Department. Alternative G would impact ten potential hazardous material sites including: six USTs, one LUST, and three RCRA sites.

This alternative would also potentially impact five managed lands, which include three classified forests, one classified wildlife area, and O'Brien Park. O'Brien Park is located along US 31, just north of Ireland Road.

Potential Section 4(f) sites include O'Brien Park, the Ullery/Farneman House, an Italianate-style house, c. 1860 (a Local Historic Landmark with a high potential to be eligible for the National Register), and the Southlawn Cemetery (a Local Historic Landmark). The Ullery/Farneman House and Southlawn Cemetery are located very close together along existing US 31 (Figure 3.2.16). Due to the close proximity of these two properties, it will be difficult to construct a freeway type facility in this area without significant impact to one or both properties. It may be possible to minimize right-of-way requirements between the properties or to shift Alternative G to connect with existing US 31 slightly north of these sites.

Because of its high potential to be eligible for the National Register, the Ullery/Farneman House would also most likely be a Section 106 impact. A second potential Section 106 impact from Alternative G is the Francis Donaghue Farmstead near Turkey Trail. This property includes an Italianate-style house, c. 1861, bank barn, privy, chicken house, windmill and well house.

It will also impact two previously surveyed archaeological sites, none of which were recommended for intensive survey. One cemetery, in addition to the Southlawn Cemetery, could potentially be impacted by this alternative.

Conclusion

Alternative G was carried forward for more detailed studies based on a comparative analysis of impacts with other alternatives that were advanced to the Phase 2 screening process. Section 3.1.9 further discusses those alternatives to be carried forward for further analysis.



Alternative H

Alternative H (See Figure 3.1.9) begins at the existing US 31/US 30 interchange, departs US 31 near West 4A Road, runs east of La Paz, and parallels US 31 east of an abandoned railroad. It runs east of Lakeville, and ends at the existing western US 20/SR 331 (Bremen Highway) interchange. This freeway alternative uses the existing US 30 interchange, and includes interchanges at West 5A Road, US 6, SR 4 (Pierce Road), SR 331 (south of Kern Road) and US 20. Alternative H parallels a high transmission powerline corridor from near Osborne Road to Kern Road (approximately 4.6 miles). Alternative H is 20.9 miles in length, with preliminary costs estimated at \$239 million. This preliminary estimate includes costs for construction, right-of-way and preliminary engineering (design).

Phase 1: Purpose and Need

Traffic Congestion: This alternative fails to address the purpose of reducing congestion on the existing US 31. In the year 2030, four of the eight segments of existing US 31 have an unacceptable LOS. The residual traffic on US 31 requires further major roadway investment in the existing US 31 corridor, besides the cost of the alternative itself, to achieve acceptable traffic operating conditions. These improvements include four-lane divided bypasses of LaPaz and of Lakeville; widening of existing US 31 to seven lanes from New Road to US 20; widening of Bremen Highway (Union Street) to seven lanes from US 20 to Dragoon Trail; and widening of Bremen Highway (Union Street) to five lanes from Dragoon Trail to SR 933 (Lincolnway).

Traffic Safety: This alternative fails to address the purpose of improving safety on the existing US 31. Future crash rates on existing US 31 exceed the statewide average through Lakeville and north to US 20. Residual traffic on US 31 requires further major roadway investment along existing US 31 to improve physical conditions adversely affecting safety. One such improvement includes the widening of existing US 31 to five lanes from SR 4 to New Road.

Consistency with Transportation Plans: This alternative is consistent with the INDOT 2000-2025 Long Range Transportation Plan and with the MACOG Transportation Plan.

Conclusion

Alternative H fails to address the first two purposes and needs for the project (i.e., reduced congestion and improved safety). This alternative would not meet the purpose and need for the project and was not advanced to Phase 2 of the screening process.

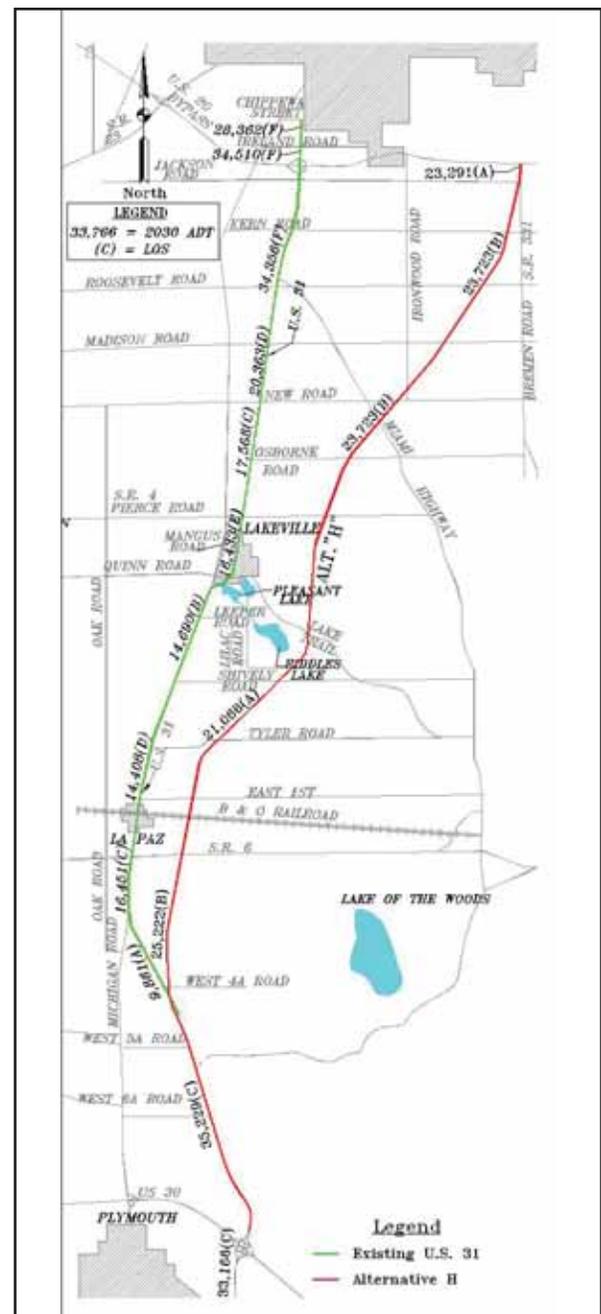


Figure 3.1.9: Alternative H



Alternative I

Alternative I (See Figure 3.1.10) begins at the existing US 31/US 30 interchange, departs US 31 near West 4A Road, runs east of La Paz, and parallels US 31 to the east near an abandoned railroad. It runs east of Lakeville, and ends at the existing eastern US 20/SR 331 (Elm Road/Capital Avenue) interchange. This freeway alternative uses the existing US 30 interchange, and includes interchanges at West 5A Road, US 6, SR 4 (Pierce Road), SR 331 (south of Osborne Road), Elm Road/Kern Road and US 20. Alternative I is the longest alternative at 24.3 miles in length, with preliminary costs estimated at \$272 million. This preliminary estimate includes costs for construction, right-of-way and preliminary engineering (design).

Phase 1: Purpose and Need

Traffic Congestion: This alternative fails to address the purpose of reducing congestion on the existing US 31. In the year 2030, five of the eight segments of existing US 31 have an unacceptable LOS. The residual traffic on US 31 requires further major roadway investment in the existing US 31 corridor, besides the cost of the alternative itself, to achieve acceptable traffic operating conditions. These improvements include four-lane divided bypasses of LaPaz and of Lakeville; and widening of existing US 31 to seven lanes from SR 4 to US 20.

Traffic Safety: This alternative fails to address the purpose of improving safety on the existing US 31. Future crash rates on existing US 31 exceed the statewide average through Lakeville and from Lakeville to US 20. Residual traffic on US 31 requires further major roadway investment to improve physical conditions adversely affecting safety. These improvements include the LaPaz and Lakeville bypasses as well as the widening of US 31 to seven lanes from SR 4 to US 20.

Consistency with Transportation Plans: This alternative is consistent with the INDOT 2000-2025 Long Range Transportation Plan and with the MACOG Transportation Plan.

Conclusion

Alternative I fails to address the first two purposes and needs for the project (i.e., reduced congestion and improved safety). This alternative would not meet the purpose and need for the project and was not advanced to Phase 2 of the screening process.

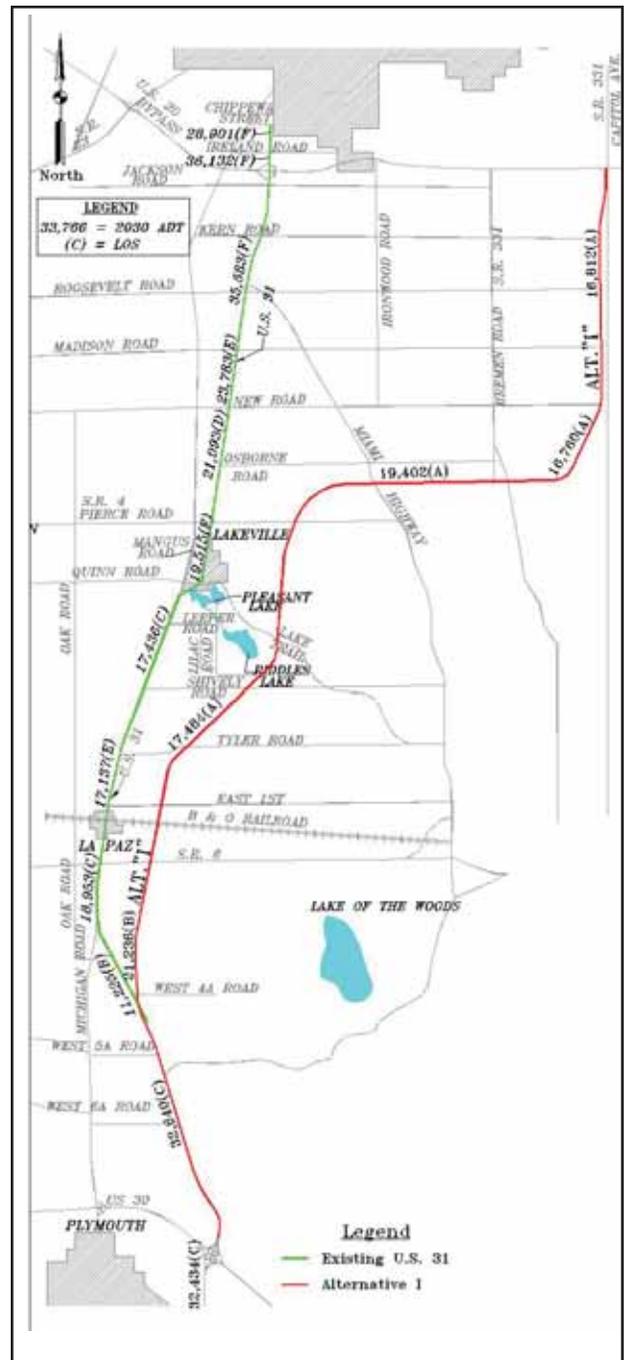


Figure 3.1.10: Alternative I



Alternative J

Alternative J (See Figure 3.1.11) begins at the existing US 31/US 30 interchange, departs US 31 near West 4A Road, runs east of LaPaz, and parallels US 31 to the east near an abandoned railroad. It follows the alignment of US 31 from Shively Road (south of Lakeville) to Quinn Road, departs the US 31 alignment west of Lakeville near an abandoned railroad, returns to US 31 south of New Road, and ends at the existing US 20/US 31 interchange. Alternative J is 20.2 miles in length, with preliminary costs estimated at \$346 million. This preliminary estimate includes costs for construction, right-of-way and preliminary engineering (design).

Phase 1: Purpose and Need

This alternative would reduce congestion on existing US 31. Projected LOS for the year 2030 range from A – B along existing US 31, and meet INDOT standards.

Improve Traffic Safety: This alternative would improve safety on existing US 31 by diverting traffic from the existing facility. The estimated reduction in accidents from the No-Build is 96% and all segments along existing US 31 would have crash rates at or below statewide averages for other rural principal arterials.

Consistency with Transportation Plans: This alternative is consistent with the INDOT 2000-2025 Long Range Transportation Plan and with the MACOG Transportation Plan.

Alternative J meets all three purposes and needs identified for this project. This alternative was advanced to Phase 2 of the screening process.

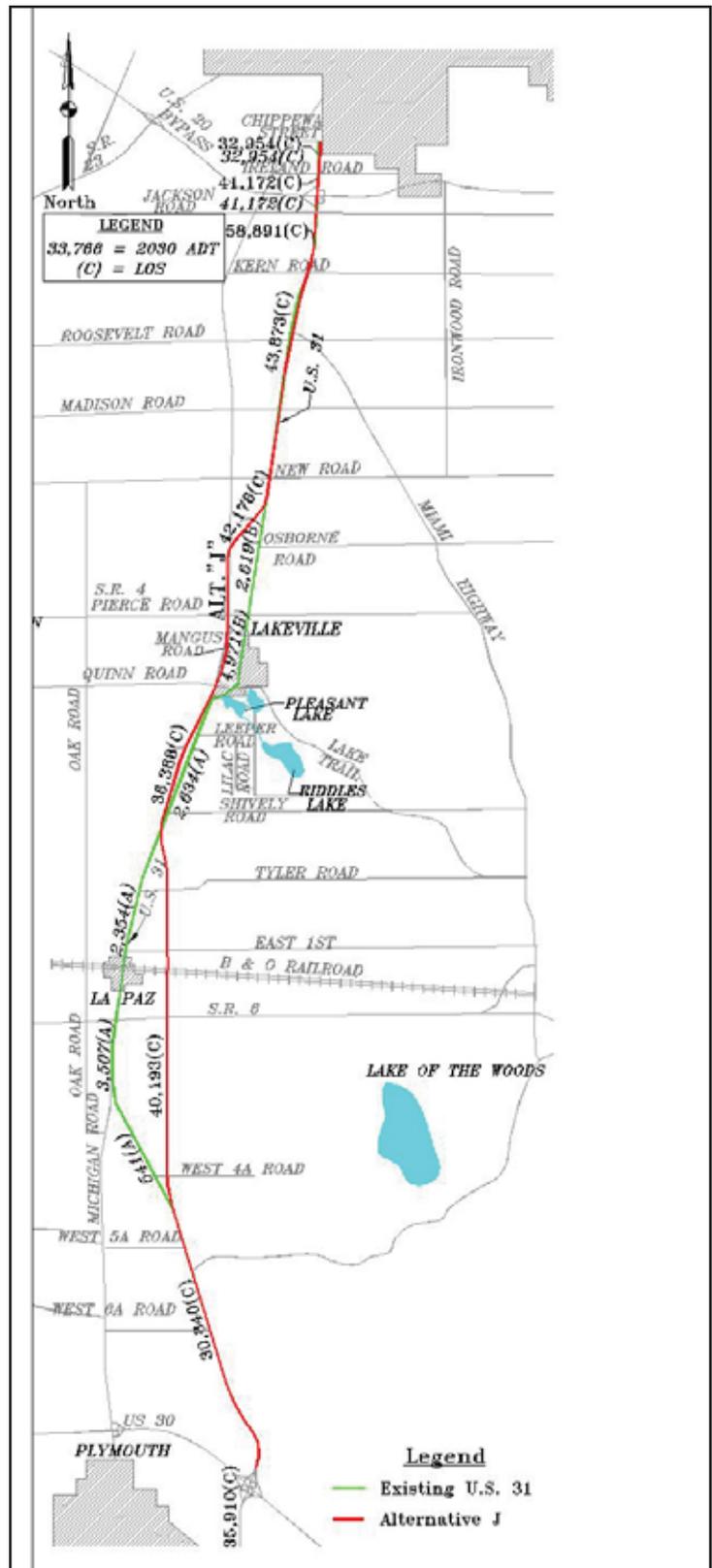


Figure 3.1.11: Alternative J



Phase 2: Socio-Economic and Environmental Impacts

The potential socio-economic and environmental impacts identified for Alternative J are listed in Table 3.1.9. This alternative would require an estimated 857 acres of new right-of-way, of which 55 acres are forested, 28 acres are wetlands, 11 acres are floodplains, and 702 acres are farmland. Approximately eight streams would be crossed by the alternative.

Alternative J would result in approximately 235 residential, 86 businesses, and ten farm relocations. In addition, this alternative would impact a 48-unit apartment complex. Many of the residence and business relocations are located along the existing US 31. This alternative would also impact the Center Township Fire Department, and could potentially impact the LaPaz wastewater treatment plant.

Alternative J would impact 13 potential hazardous material sites including: eight USTs, two LUSTs, and three RCRA sites.

This alternative would also potentially impact four managed lands, which include one classified forests, one classified wildlife areas, O'Brien Park and Newton Park. O'Brien Park is located along US 31, just north of Ireland Road, and Newton Park is located along US 31 near Pierce Road.

Potential Section 4(f) sites include O'Brien Park, Newton Park, the Ullery/Farneman House, an Italianate-style house, c. 1860 (a Local Historic Landmark with a high potential to be eligible for the National Register) and the Southlawn Cemetery (a Local Historic Landmark). The Ullery/Farneman House and Southlawn Cemetery are located very close together along existing US 31 (Figure 3.2.16). Due to the close proximity of these two properties, it will be difficult to construct a freeway type facility in this area without significant impact to one or both properties. Because of its high potential to be eligible for the National Register, the Ullery/Farneman House would also most likely be a Section 106 impact.

Alternative J is adjacent to both the Newton Park in Lakeville and the LaVille Jr.-Sr. High School. Shifting Alternative J to the west to avoid the park and school would make it essentially the same as Alternatives B, C, D, E and F of which Alternatives C, E and F have been carried forward for further analysis.

It will also impact two previously surveyed archaeological sites, none of which were recommended for intensive survey.

This alternative crosses two well-head protection areas.

Conclusion

Alternative J was eliminated from further consideration based on residential relocations being two to six times higher than any other freeway alternative, potential impacts to the Newton Park and LaVille Jr.-Sr. High School and a comparative analysis of impacts with other alternatives that were advanced to the Phase 2 screening process. Section 3.1.8 contains those alternatives eliminated from further consideration.



Alternative K

Alternative K (See Figure 3.1.12) begins at the existing US 31/US 30 interchange, departs US 31 near West 4A Road, runs east of La Paz, and parallels US 31 east of an abandoned railroad. It runs east of Lakeville, angles over to Ironwood Road near New Road, follows the Ironwood Road alignment and ends at the existing US 20/Ironwood Road interchange. This freeway alternative uses the existing US 30 interchange, and includes interchanges at West 5A Road, US 6, SR 4 (Pierce Road), Kern Road and US 20. Alternative K is 20.5 miles in length, with preliminary costs estimated at \$268 million. This preliminary estimate includes costs for construction, right-of-way and preliminary engineering (design).

Phase 1: Purpose and Need

Traffic Congestion: This alternative fails to address the purpose of reducing congestion on the existing US 31. In the year 2030, one of the eight segments of existing US 31 has an unacceptable LOS. The residual traffic on US 31 requires further major roadway investment in the existing US 31 corridor, besides the cost of the alternative itself, to achieve acceptable traffic operating conditions. These improvements include the widening of existing US 31 to five lanes from SR 4 to Roosevelt Road; widening of existing US 31 to seven lanes from Roosevelt Road to US 20; and widening Ironwood Road to seven lanes from US 20 to SR 933 (Lincolnway).

Traffic Safety: This alternative addresses the purpose of improving safety on the existing US 31. The estimated reduction in accidents from the No-Build is 78% and all segments along existing US 31 would have crash rates at or below statewide averages for other rural principal arterials.

Consistency with Transportation Plans: This alternative is consistent with the INDOT 2000-2025 Long Range Transportation Plan and with the MACOG Transportation Plan.

Conclusion

Alternative K fails to address the first purpose and need for the project (i.e., reduced congestion). This alternative would not meet the purpose and need for the project and was not advanced to Phase 2 of the screening process.

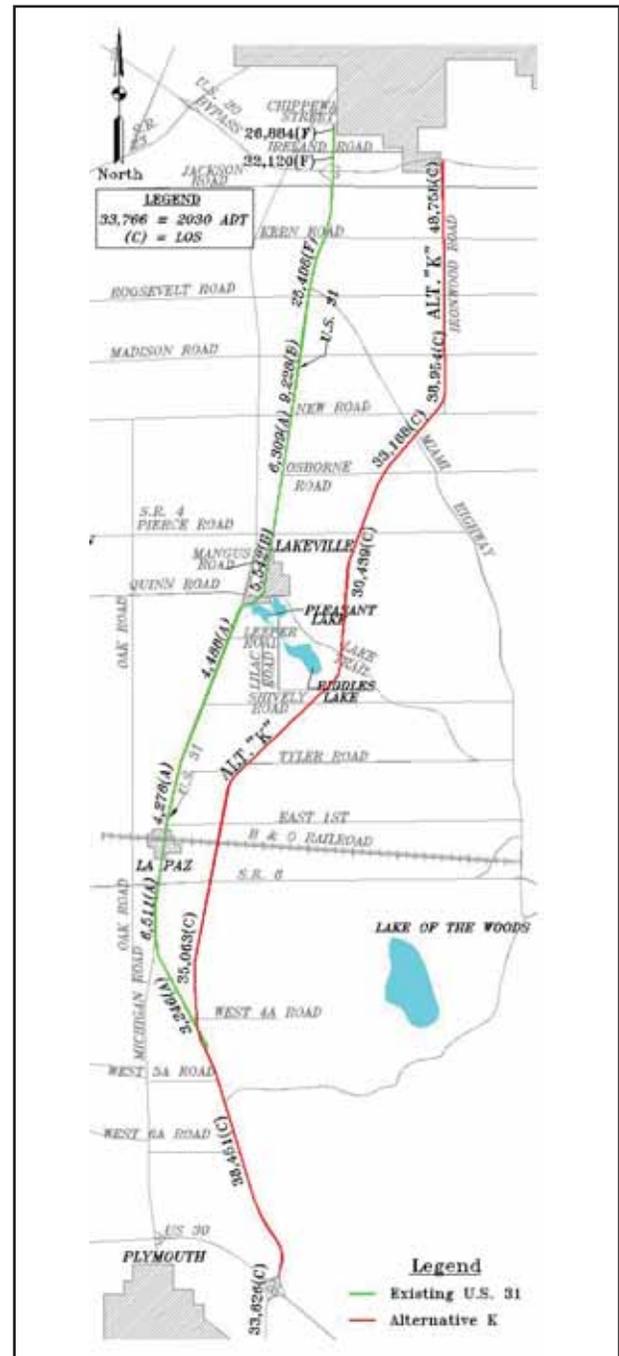


Figure 3.1.12: Alternative K



Screening of Options 1 and 2 for Alternatives B – F

Freeway Alternatives B through F each consists of two options, as shown in Figure 3.1.13, and are listed in the tables as B1, B2, C1, etc. The options are each 3.4 miles in length and differ in terms of their associated environmental impacts. Option 1 diverts to use the existing US 31 for 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, and then crosses to the west of the existing alignment south of Lakeville (Figure 3.1.13).

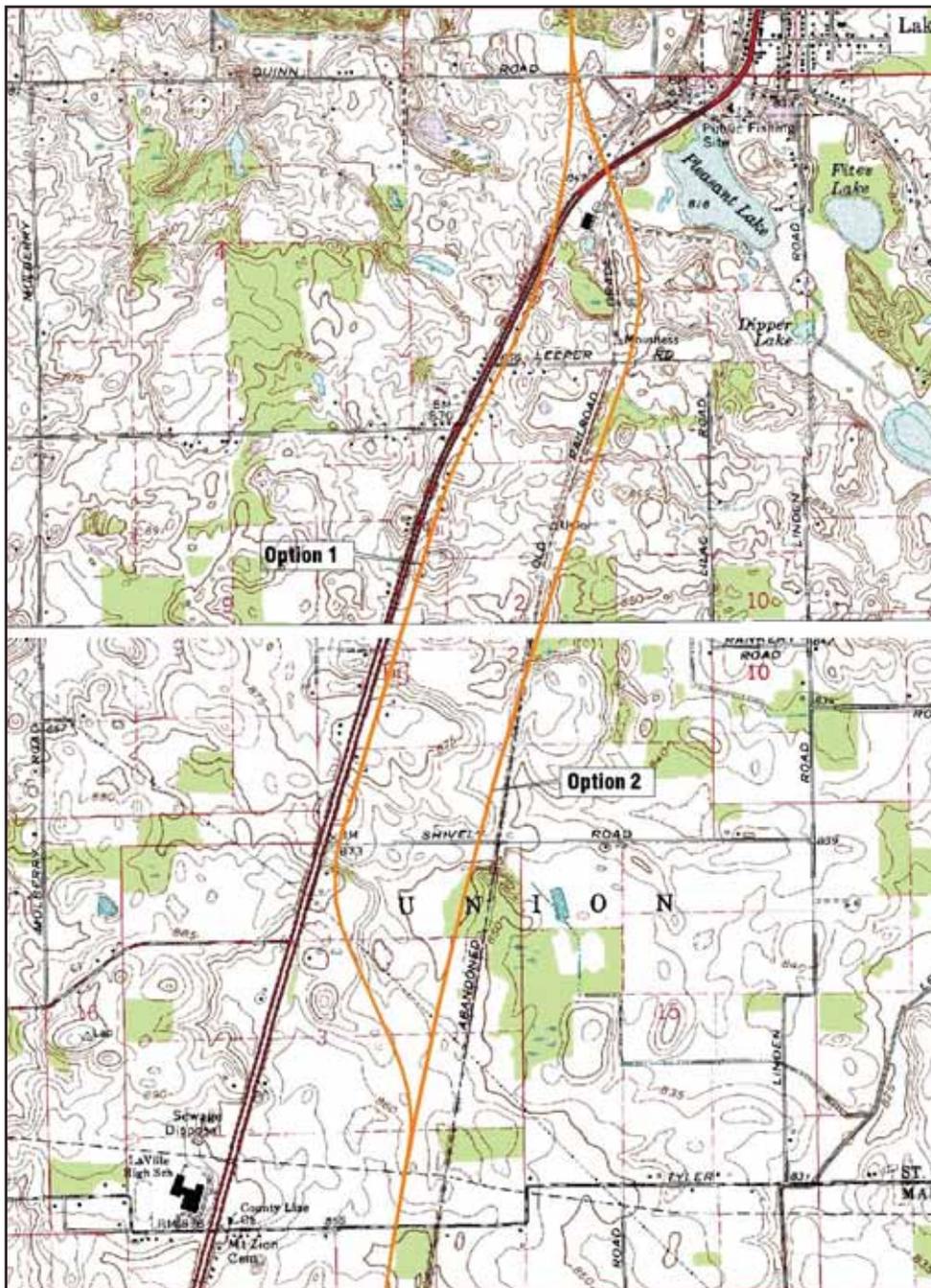


Figure 3.1.13: Options 1 & 2 for Alternatives B - F



Phase 1: Purpose and Need

The screening process for Options 1 and 2 differed from that of the individual freeway alternatives in that the differences in purpose and need measures are expected to be negligible. Thus, if a freeway alternative met the purpose and need identified for the project, both options were directly advanced to Phase 2 of the screening process, the socio-economic and environmental screening, and were viewed in terms of advantages and disadvantages. If a freeway alternative did not meet the purpose and need identified for the project, the alternative, including both Options 1 and 2, was not advanced to Phase 2 of the screening process and was eliminated from further consideration. Table 3.1.8 identifies the alternatives that were advanced to Phase 2 of the screening process, including Alternatives C-F. Alternative B did not meet the purpose and need identified for the project, and therefore, was not advanced to Phase 2 of the screening process.

Phase 2: Socio-Economic and Environmental Impacts

As shown in Table 3.1.8, Freeway Alternatives C-F were advanced to Phase 2 of the screening process and potential impacts to both Options 1 and 2 were identified (C1, C2, D1, etc.). Table 3.1.9 summarizes these potential socio-economic and environmental impacts associated with each of the alternatives that were advanced to Phase 2 of the screening process. Table 3.1.9 also identifies the alternatives recommended for further study.

Option 1 (Alternatives C through F)

This option utilizes the existing US 31 alignment for approximately 1.7 miles south of Lakeville.

Advantages:

- This option uses more of the existing US 31 right-of-way.
- It impacts approximately 34 acres less of forest than Option 2.
- It impacts approximately 8 acres less of wetlands than Option 2.

Disadvantages:

- It impacts two historic sites potentially eligible for the National Register of Historic Places.
- It would require 30 **more** residential relocations than Option 2.
- It would require four **more** farm relocations than Option 2.
- It would require three **more** business relocations than Option 2.
- This option would have **higher** overall costs due to more relocations and construction of frontage roads.
- It would require **greater** maintenance of traffic during construction.
- There is a **higher** potential for utility relocations associated with this option.



Option 2 (Alternatives C – F)

Advantages:

- No sites on or potentially eligible for the National Register would be impacted by this option.
- It follows an abandoned railroad corridor.
- It would require 30 **less** residential relocations than Option 1.
- It would require four **less** farm relocations than Option 1.
- It would require three **less** business relocations than Option 1.
- It would have **lower** overall costs due to fewer relocations and no need for frontage roads.
- It would require **less** maintenance of traffic during construction than Option 1.
- There is a **lower** potential for utility relocations associated with this option.

Disadvantages:

- It uses **less** of the existing US 31 right-of-way.
- It impacts approximately 34 acres **more** of forest than Option 1.
- It impacts approximately 8 acres **more** of wetlands than Option 1.

Conclusion

Given the higher residential, farm, and business relocations, impacts to potential historic sites and higher overall cost, Option 1 was not recommended to be advanced for further study. As further discussed above in the screening of each of the freeway alternative, **for Alternatives C through F, Option 2 was used to screen each alternative.**

3.1.8 Preliminary Alternatives Eliminated From Further Consideration

The preliminary screening process utilized for this study concluded that the following preliminary alternatives were being eliminated from further study for the following reasons:

- *Travel Demand Management (TDM) Alternatives* - Do not meet the purpose and need of the project.
- *Transportation System Management (TSM) Alternatives* - Do not meet the purpose and need of the project.
- *Intelligent Transportation System (ITS) Applications* - Do not meet the purpose and need of the project.
- *Mass Transit Alternative* - Does not meet the purpose and need of the project.



- *Non-Freeway Alternatives (Highway Build Alternative)* - Do not meet the purpose and need of the project.
- *Option 1 for Freeway Alternatives C-F* - Given the higher residential, farm, and business relocations, impacts to potential historic sites and higher overall cost, Option 1 was not recommended to be advanced for further study.
- *Freeway Alternatives A, B, H, I and K (Highway Build Alternatives)* - Do not meet the purpose and need of the project.
- *Freeway Alternative D (Highway Build Alternative)* - Did meet the purpose and need of the project; however, Alternative D crosses through the large Whispering Hills Subdivision, resulting in a high number of residential relocations and neighborhood impacts. It also connects to existing US 31 approximately 1/3 of a mile south of the existing US 20 interchange. The close proximity of this connection to the existing interchange creates insufficient distance to accommodate the proper weaving movements for the traffic flow. Due to the insufficient geometrics, the high number of residential relocations and neighborhood impacts, this alternative was eliminated from further consideration.
- *Freeway Alternative J (Highway Build Alternative)* - Did meet the purpose and need of the project. This freeway alternative was one of the best performers in regards to the purpose and need measures. Generally, the more an alternative utilized portions of existing US 31, the better it performed and Alternative J utilized more of the existing US 31 alignment than any other alternatives. Alternative J also generally had the lowest impacts to the natural environment, as less new right-of-way would be required. However, this alternative also had the highest residential relocations among the alternatives and the highest cost. Alternative J would require 235 residence, two to six times more residential relocations than any of the other freeway alternatives, as well as 86 business relocations. In addition, it would significantly impact two closely situated Local Historical Landmarks along existing US 31, the Ullery/Farneman House, an Italianate-style house (c. 1860) and the Southlawn Cemetery (including the small caretaker's building). Alternative J is adjacent to both the Newton Park in Lakeville and the LaVille Jr.-Sr. High School. Shifting Alternative J to the west to avoid the park and school would make it essentially the same as Alternatives B, C, D, E and F, of which Alternatives C, E, and F have been carried forward for further analysis. Alternative J, although a high performer in regard to purpose and need, was eliminated due to the high relocations, significant impacts to Local Historic Landmarks, impacts to Newton Park and the LaVille Jr.-Sr. High School and high cost.

Figure 3.1.14 shows the freeway alternatives that have been eliminated from further consideration.

Various resource agency correspondences requested that alternatives eliminated from further consideration during the screening process be further evaluated, including the combination of transportation management (TM) alternatives (TDM, TSM, ITS, mass transit, etc.) and build alternatives. It should be noted that a Non-Freeway Alternative that includes combinations of various TM alternatives performs only slightly better than the Non-Freeway Alternative that bypasses LaPaz and Lakeville. Due to the low-density rural character of the corridor, the Non-Freeway Alternative in combination with TM alternatives considered for this project are expected to only minimally reduce traffic volumes on US 31 and would not result in improvements to levels of service on US 31. It should also be noted that the combination of TM alternatives with Freeway Alternatives that were eliminated from further consideration through the screening process performed only slightly better than the Freeway Alternative alone. Again, due to the low-density rural character of the corridor, a Freeway Alternative in combination with TM alternatives considered for this project are expected to only minimally reduce traffic volumes on US 31 and would not result in improvements to levels of service on US 31.

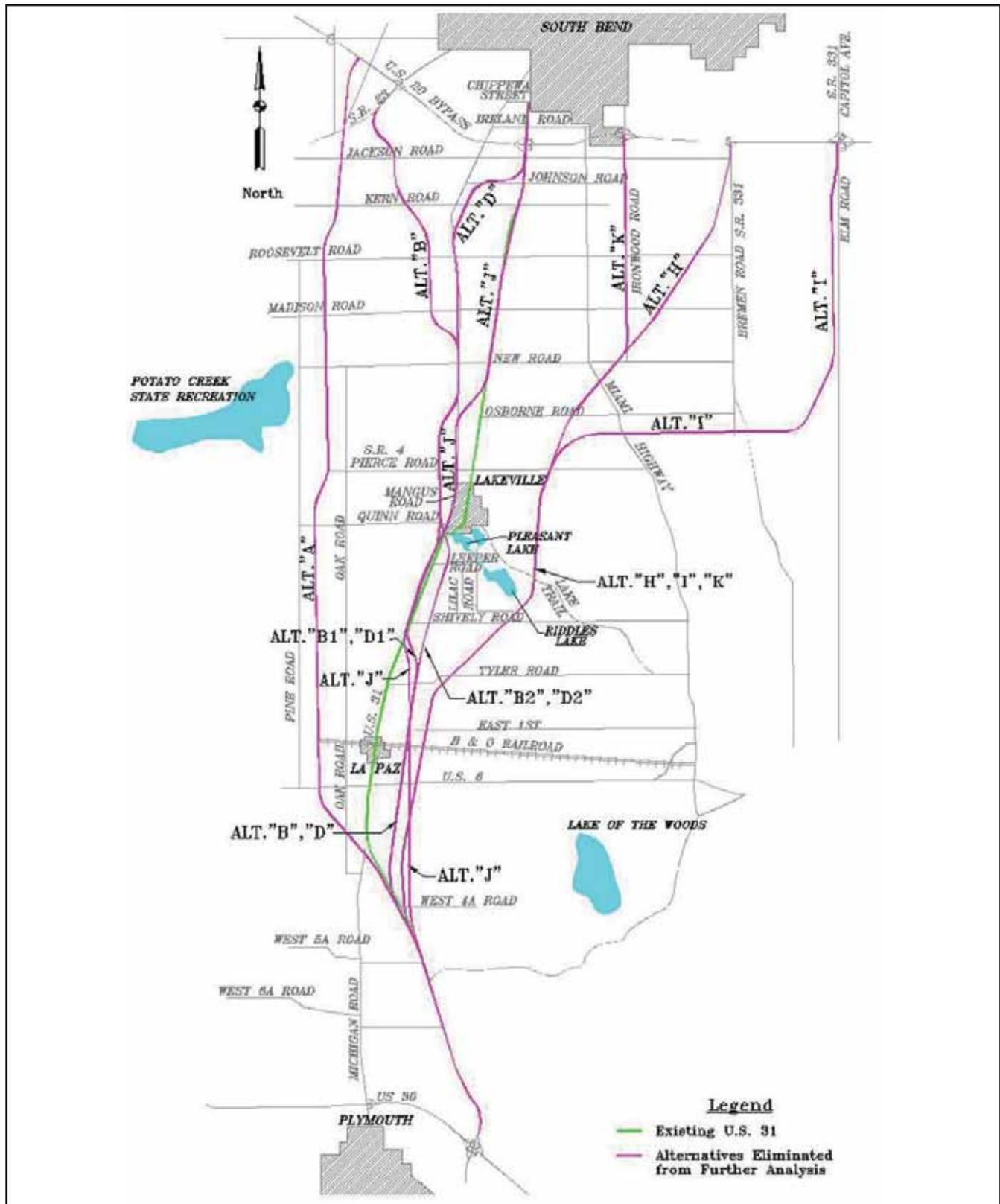


Figure 3.1.14: US 31 Plymouth to South Bend Preliminary Freeway Alternatives Eliminated From Further Consideration (Alternatives A, B, D, H, I, J and K)



3.1.9 Preliminary Alternatives Carried Forward for Further Analysis

Based on the screening measures discussed above, four (4) preliminary freeway alternatives were carried forward for more detailed engineering and environmental evaluations. These four (4) preliminary freeway alternatives were **Alternative C, Alternative E, Alternative F and Alternative G**. In addition to the consideration of these four (4) preliminary freeway alternatives, the No-Build (No Action or Do Nothing) Alternative will continue to be an option considered throughout the life of this project. The preliminary freeway alternatives recommended to be carried forward are shown in Figure 3.1.15. Socio-economic and environmental impacts associated with each of these preliminary alternatives, particularly related to wetland impacts, residential and business relocations and historic property impacts are contained in Table 3.2.1.

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. This alternative does not meet the purpose and need for the project, but will be carried forward for further analysis to serve as a baseline for comparing the Build Alternatives. Carrying the No-Build Alternative is also a requirement of the National Environmental Policy Act (NEPA).

Alternative C

This preliminary freeway alternative meets the purpose and need for the project. It has a relatively low number of residence (48) and business (8) relocations. Alternative C avoids the two closely spaced Local Historic Landmarks (Ullery/Farneman House, c. 1860 and Southlawn Cemetery) on the existing US 31, both of which are potential Section 4(f) issues. This alternative has relatively high potential forest (196 acres) and wetland (85 acres). It crosses the edge of the Maxinkukee Moraine, a unique geological and ecological area, and could potentially affect a population of the state endangered Blandings turtle (*Emydoidea blandingii*).

Alternative E

This preliminary freeway alternative meets the purpose and need for the project. Alternative E uses a significant portion of US 31. It may be possible to minimize right-of-way requirements between the two closely spaced Local Historic Landmark (Ullery/Farneman House, c. 1860 and Southlawn Cemetery) properties or to shift Alternative E to connect with existing US 31, slightly north of the two properties. This alternative has relatively high potential forest (148 acres) and wetland (82 acres) impacts. It crosses the edge of the Maxinkukee Moraine, a unique geological and ecological area, and could potentially affect a population of the state endangered Blandings turtle (*Emydoidea blandingii*).

Alternative F

This preliminary freeway alternative meets the purpose and need for the project. Alternative F uses a significant portion of US 31. It may be possible to minimize right-of-way requirements between the two closely spaced Local Historic Landmark (Ullery/Farneman House, c. 1860 and Southlawn Cemetery) properties or to shift Alternative F to connect with existing US 31, slightly north of the two properties. This alternative has relatively low potential forest (111 acres) and wetland (57 acres) impacts. This alternative could potentially affect a population of the state endangered Blandings turtle (*Emydoidea blandingii*).



Alternative G

This preliminary freeway alternative meets the purpose and need for the project. Alternative G uses a significant portion of US 31. It may be possible to minimize right-of-way requirements between the two closely spaced Local Historic Landmark (Ullery/Farneman House, c. 1860 and Southlawn Cemetery) properties or to shift Alternative G to connect with existing US 31, slightly north of the two properties. This alternative is to the east of the existing US 31, and avoids the unique geological and ecological areas associated with the Maxinkukee Moraine.



3.2 Modifications of Alternatives Recommended for Further Analysis

Following the publication of the Preliminary Alternative Analysis and Screening Report on August 19, 2003, and detailed in Section 3.1, Preliminary Alternatives Analysis and Screening, there were several meetings held to discuss the screening results. These meetings included:

- Community Advisory Committee (CAC) – September 4, 2003
- Section 106 Consulting Parties – September 4, 2003
- Public Information Meeting in Lakeville – September 4, 2003
- St. Joseph County Chamber of Commerce Legislative Affairs - September 9, 2003
- Resource Agency – September 30, 2003
- Emergency Service Provider and School System – September 30, 2003
- Elkhart Chamber of Commerce – October 17, 2003
- Town of LaPaz – November 13, 2003
- Marshall County and Plymouth – December 2, 2003

In addition to information and comments received at the meetings, numerous written comments and comments from the project's website were received. The study team continued to collect and analyze data related to social and environmental impacts for each of the four preliminary freeway alternatives. A team of environmental scientists spent several weeks in the field, walking each of the alternatives and collecting field data. A team of engineers developed proposed lane configurations, interchange locations and configurations, overpass locations, more accurate proposed right-of-way limits and revised construction cost estimates for each of the alternatives.

As the field data and public and resource agency comments were analyzed and preliminary engineering further developed, a more accurate measure of social and environmental impacts of each of the alternatives was determined. A review of these social and environmental impacts raised concerns within the study team, which included resource agencies and consulting parties involved with the project. Concerns focused around both socio-economic and environmental impacts, particularly related to wetland impacts, residential and business relocations, and historic property impacts (see Table 3.2.10).

It is important to again note that the US 31 Improvement Project has been a dynamic process. The information previously presented in Table 3.1.9 was from the best-known existing secondary source data and conceptual design parameters available at the time that the preliminary screening of alternatives was conducted. Additional information was identified during a detailed field review later in the progress of the study, and the numbers contained in Table 3.2.10 may be slightly different than those contained in Table 3.1.9, as well as those contained in subsequent sections of this document.

Along with the socio-economic and environmental concerns, there were also engineering concerns, particularly related to two historically significant sites that impact three of the four recommended preliminary freeway



alternatives. These sites are located along existing US 31, in an area just south of the US 31 and Kern Road intersection. The first historically significant site is known as the Ullery/Farneman House. This site is an Italianate-style house, c. 1860, a Local Historic Landmark that is Potentially Eligible (PE) for the National Register of Historic Places (NR) and a likely Section 4(f) issue. The Ullery/Farneman House is located on the west side of US 31. The second historically significant site is situated directly east of and across US 31 from the Ullery/Farneman House. This site is the Southlawn Cemetery and also a potential Section 4(f) issue (see Figure 3.2.16).

The significance of the Ullery/Farneman House in local history is exemplified by the following facts and folklore:

- The Ullery family settled on Palmer’s Prairie in 1838 and built the home around 1855
- The original farm was approximately 1,000 acres, a large holding for the era
- It is located on Michigan Road, a landmark for travelers in the 1800s
- The house is symbolic of the larger trend of Gentlemen Farmers building homes in the style popularized by Andrew Jackson Downing’s Pattern Books
- According to local folklore, it was reportedly a gathering point for South Bend’s Civil War Soldiers before marching to Indianapolis to be mustered in
- Farneman was prominent in the first St. Joseph Agricultural Society, along with Schuyler Colfax, former Vice-President of the United States

Socio-Economic/ Environmental Measure	ALTERNATIVE			
	C	E	F	G
WETLANDS	68 Ac.	65 Ac.	47 Ac.	36 Ac.
RELOCATIONS				
Residential	48	101	156	100
Business	7	49	60	52
HISTORIC PROPERTIES (on NR or PE) (Within Area of Potential Effect (APE))	4	4	4	8
HISTORIC PROPERTIES (on NR or PE) (Section 4(f))	0	1	1	1

The engineering concerns related to these two potential Section 4(f) properties arose due to the close proximity of these two historically significant properties. It would be difficult to construct a freeway facility in this area without significant impacts to one or both properties. Alternatives E, F and G all pass between these historic sites, along existing US 31, and would have major impacts to both properties (see Figure 3.2.16).

The roadway preliminary typical section in the vicinity of these properties would be an urban section consisting of a six-lane freeway with a 38 to 55-foot median and 14-foot outside shoulders. It was proposed to be elevated on fill with side retaining walls and concrete barrier on both the median and outside shoulders. Local service roads (frontage road) and/or collector/distributor (C/D) roadways could be provided within the typical total right-of-way width of 260 to 300 feet. The mainline design speed is 60 or 70 mph. The urban typical section would place the



Figure 3.2.16: Potential Impacts to Ullery/Farneman House and Southlawn Cemetery



edge of the proposed roadway right-of-way between 30 and 50 feet from the front of the Ullery/Farneman House. It would require the relocation of the Southlawn Cemetery Gate House and the roadway would likely be within 10 to 20 feet of gravesites. Direct access from US 31 to both the Ullery/Farneman House and the Southlawn Cemetery would no longer exist. Along with the physical impacts related to the required roadway right-of-way, there would also be visual and noise impacts to both the Ullery/Farneman House and the Southlawn Cemetery related to the close proximity of the roadway to both sites.

The study team made a commitment to respond to comments received from the public, elected officials, involved resource agencies, and consulting parties. This was exhibited during the course of the study as new alternatives and modifications to alternatives were continually investigated, as described in Section 3.1, Preliminary Alternatives Analysis and Screening. This commitment by the study team to respond to comments continued after the publication of the Preliminary Alternatives Analysis and Screening Report on August 19, 2003. Subsequent meetings, comments and more detailed analysis of socio-economic and environmental impacts led the study team to again investigate the possibility of modifying alternatives in an attempt to avoid and/or minimize impacts.

The major concerns raised by the study team, public, elected officials, resource agencies, and consulting parties that are involved with the projects development, focused around both socio-economic and environmental impacts. These major concerns were particularly related to wetland impacts, residential and business relocations and historic property impacts (see Table 3.2.10). To address these concerns, modifications in the four remaining preliminary freeway alternatives, Alternatives C, E, F and G, were investigated. The goal of these modifications was to avoid and/or minimize impacts to the environment, residents, businesses and historic properties.

The following sections provide a general description of the modified alternatives. Additionally, the socio-economic and environmental impacts of each of the modified alternatives have been compared with the impacts of the original alternatives. Lastly, a recommendation regarding utilization of the original alternative or modified alternative for the remainder of the study is provided.

3.2.1 Alternative F Modifications

One of the main issues driving the alternative modifications was related to three of the four remaining freeway alternatives, Alternatives E, F and G. This was a historic properties issue related to the two historically significant sites located along existing US 31, in the area just south of the US 31 and Kern Road intersection. Alternatives E, F and G all pass between these historic sites, along existing US 31, and would have major impacts to both properties. The historically significant sites are the Ullery/Farneman House and the Southlawn Cemetery, discussed in detail above (see Figure 3.2.16).

Modifications to Alternatives E, F and G were investigated just south of the Ullery/Farneman House and the Southlawn Cemetery area. These modifications came about in an attempt to avoid and/or minimize impacts to the Ullery/Farneman House and Southlawn Cemetery and to eliminate the likely Section 4(f) issues related to both structures. The modifications to Alternative G in this area are discussed later in this section. The modifications to Alternative E, to be called Alternative Es, relocated Alternative E to the west side of (behind) the Ullery/Farneman House and is further discussed later in this section.

The modifications to Alternative F, to be called modified Alternative F, in this area also involved a shift to the west in order to go to the west side of (behind) the Ullery/Farneman House. As shown in Figure 3.2.17, modifications to Alternative F that involve relocating it to the west would significantly impact two residential subdivisions, one just north of Madison Road and west of US 31, the other at Roosevelt Road and west of US 31. Additional modifications to Alternative F that involve the relocation of it further to the west to avoid these two subdivisions

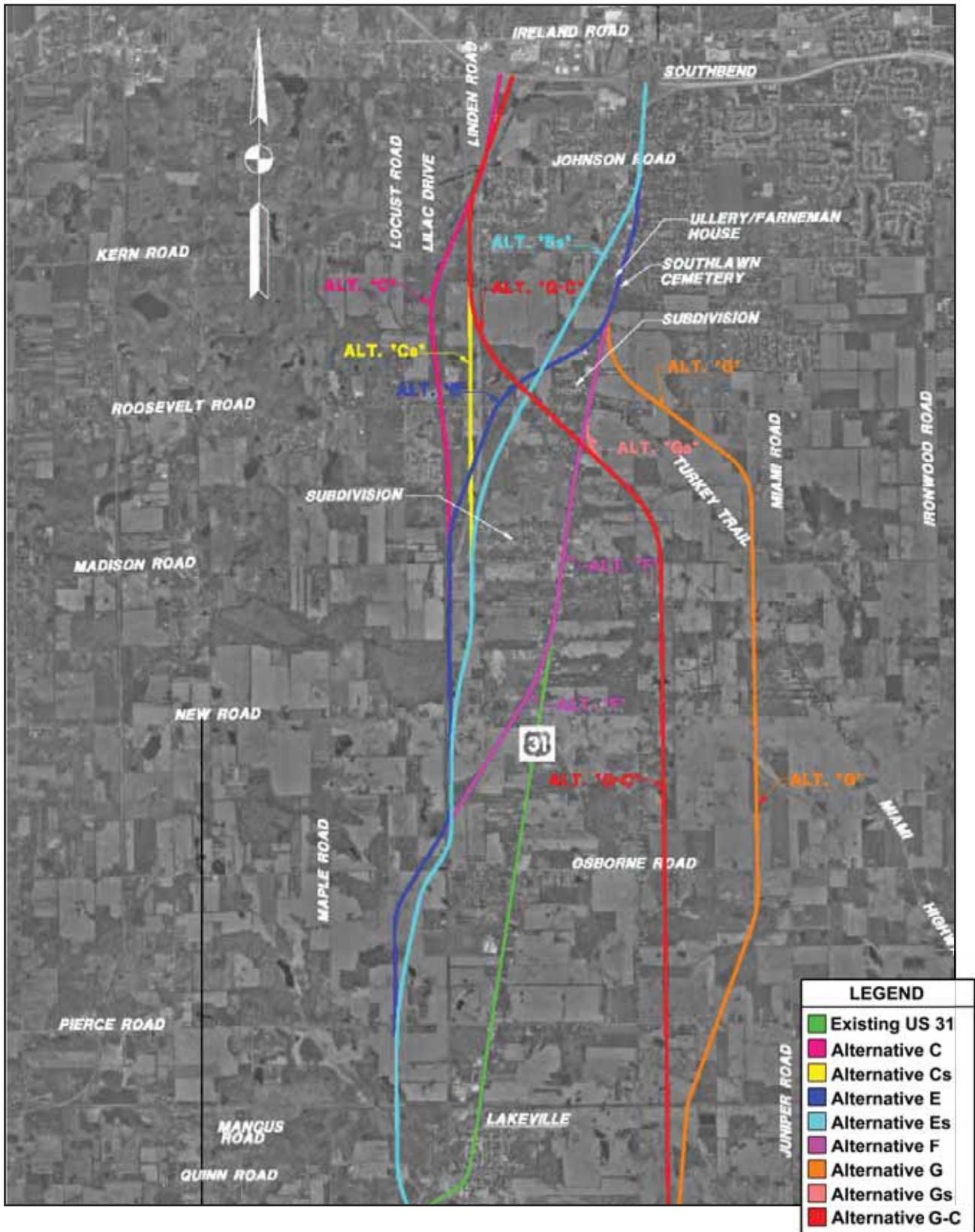


Figure 3.2.17: Alternative F Modifications



would essentially place the modified Alternative F on top of Alternative E and/or Alternative Es. For this reason, there is no modified Alternative F shown in Figure 3.2.17.

Conclusion

Modifications to Alternative F, called modified Alternative F, that would relocate it to the west of the Ullery/Farneman House, in an attempt to avoid and/or minimize impacts and eliminate the Section 4(f) issue, would essentially make the modified Alternative F the same as Alternative E and/or Alternative Es. For this reason, the modified Alternative F was eliminated from further consideration. Additionally, due to the potential Section 4(f) issues associated with Alternative F and the two historically significant structures discussed above, and the presence of prudent and feasible alternatives without potential Section 4(f) issues, Alternative F was also eliminated from further consideration. Section 3.3, Description of the Alternatives Selected for Detailed Study contains those alternatives selected for detailed study.

3.2.2 Alternatives C and E Modifications

Alternatives C and E follow the same alignment from the US 30 and US 31 interchange to just north of Madison Road. Any modification made to either of these alternatives in this area, aimed at avoiding and/or minimizing impacts, would be made to both of the alternatives.

Just north of Madison Road, Alternatives C and E diverge and follow separate alignments northward to US 20. Modifications made to one alternative would therefore be independent of modifications made to the other alternative.

This section discusses modifications made to both Alternatives C and E. These modifications (shifts) are identified as Alternative Cs and Alternative Es. Each of the alternatives contains three separate areas in which modifications were made in an attempt to avoid and/or minimize impacts. The corridors were divided into three segments to represent the three areas in which the alternatives were modified. For each of the three segments, an evaluation and comparison of impacts was made. Based on this comparison of impacts, a recommendation was made for each of the three segments, regarding utilization of the original alternative or the modified alternative. Table 3.3.26 summarizes the recommendation for each of the three segments.

The southern segment of the modifications to Alternatives C and E extends from West 4A Road to the south edge of Lakeville. In this southern segment, Alternatives C and E follow the same alignment and were evaluated together in Section 3.2.2.1.

The central segment of the modifications to Alternatives C and E extends from SR 4 (Pierce Road) to just north of Osborne Road. In this central segment, Alternatives C and E follow the same alignment and were evaluated together in Section 3.2.2.2.

The northern segment of the modifications to Alternatives C and E extends from Madison Road to US 20. In this northern segment, Alternatives C and E follow different alignments and were evaluated separately. Alternative C is evaluated in Section 3.2.2.3 and Alternative E is evaluated in Section 3.2.2.4.

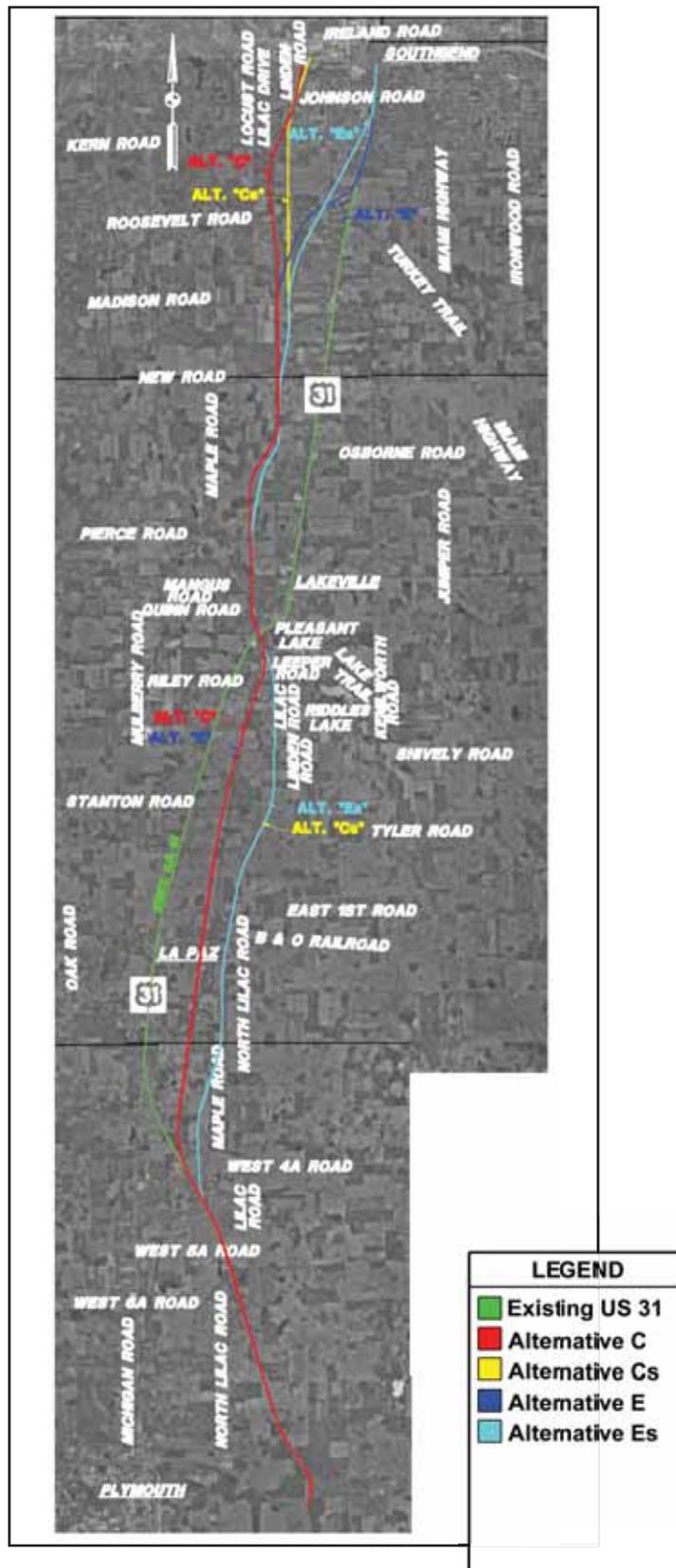


Figure 3.2.18: Alternative C and E Modifications



3.2.2.1 Alternatives C and E Modifications from West 4A Road to the South Edge of Lakeville

The southern segment of the modifications to Alternatives C and E extends from West 4A Road to the south edge of Lakeville (see Figure 3.2.19). In this southern segment, Alternatives C and E follow the same alignment and were evaluated together.

This alignment modification involved the shift of Alternative C, to be called Alternative Cs, and Alternative E, to be called Alternative Es, to the east. The modified Alternatives Cs and Es were shifted to follow Alternative G from West 4A Road to just south of Tyler Road. At that point, Alternatives Cs and Es continue northward and connect with Alternatives C and E on the south edge of Lakeville. The main goal of these alignment modifications was to avoid and/or minimize impacts to wetlands while striving to prevent any significant increase in the number of residential and business relocations.

Table 3.2.11 summarizes the socio-economic and environmental measures related to wetland impacts, residential and business relocations and historic properties impacts.

Table 3.2.11: Comparison of Alternatives C, E, Cs and Es from West 4A Road to south side of Lakeville		
Socio-Economic/Environmental Measure	ALTERNATIVE	
	C & E	CS & ES
WETLANDS	26 Acres	13 Acres
RELOCATIONS		
Residential	20	21
Business	1	2
HISTORIC IMPACTS (on NR or PE) (within APE)	0	0
HISTORIC IMPACTS (on NR or PE) (Section 4(f))	0	0

Conclusion

Modifications to Alternative C and E, called Alternatives Cs and Es, that would relocate them to the east, reduce the wetland impacts by 50% while having modest impact to relocations and no impact to historic properties. For these reasons, **in the segment from West 4A Road to the south side of Lakeville**, Alternatives Cs and Es were carried forward for more detailed study. Section 3.3 contains those alternatives selected for detailed study.

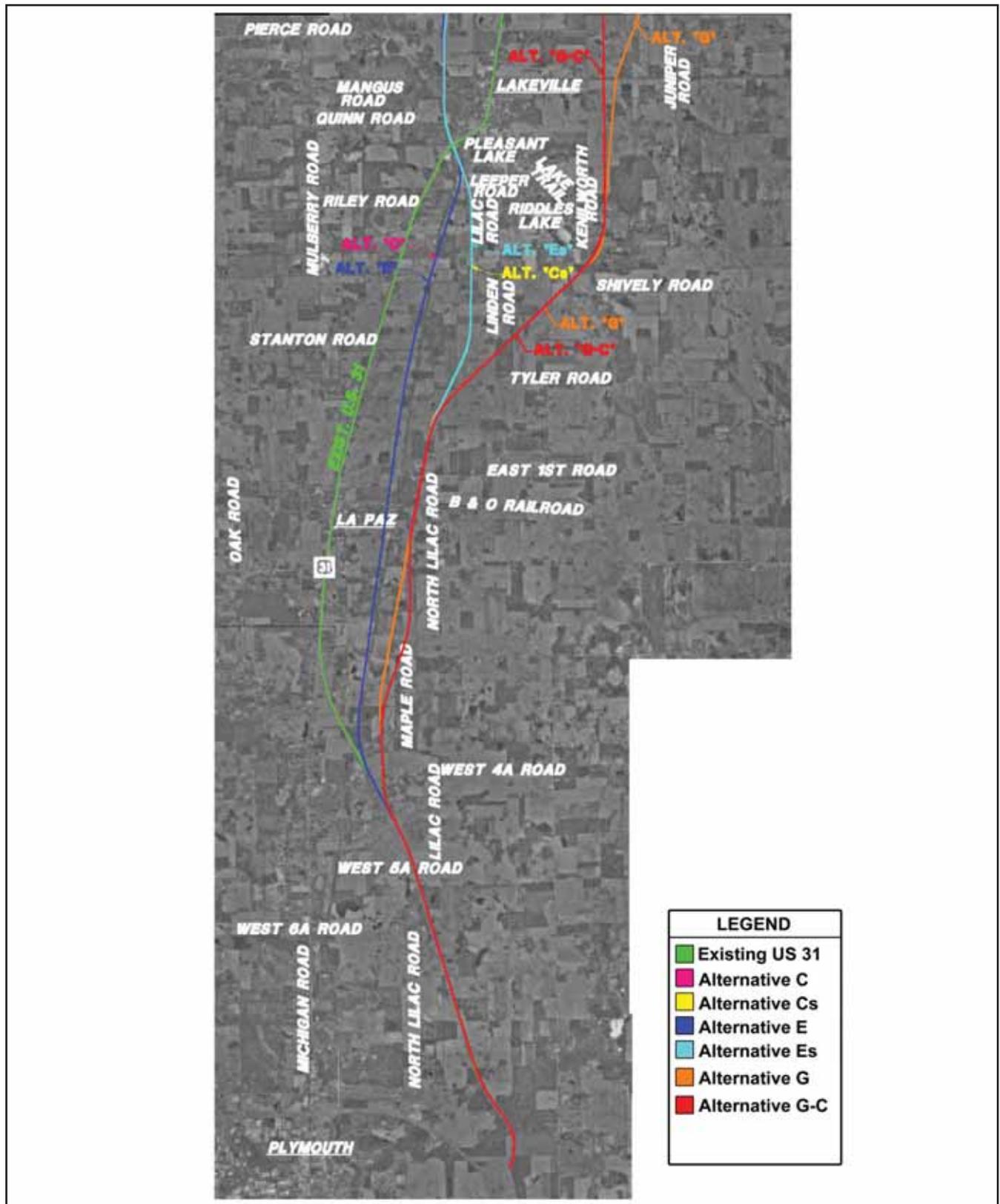


Figure 3.2.19: Alternative C and E Modifications from West 4A Road to the South Edge of Lakeville



3.2.2.2 Alternatives C and E Modifications from SR 4 (Pierce Road) to Just North of Osborne Road

The central segment of the modifications to Alternatives C and E extends from SR 4 (Pierce Road) to just north of Osborne Road (see figure 3.2.20). In this central segment, Alternatives C and E follow the same alignment and were evaluated together.

This alignment modification involved the shift of Alternative C, to be called Alternative Cs, and Alternative E, to be called Alternative Es, to the east. Alternatives Cs and Es continue northward and connect with Alternatives C and E just north of Osborne Road. The main goal of these alignment modifications was to avoid and/or minimize impacts to wetlands while striving to prevent any significant increase in the number of residential and business relocations.

Table 3.2.12 summarizes the socio-economic and environmental measures related to wetland impacts, residential and business relocations and historic properties impacts.

Socio-Economic/Environmental Measure	Alternative	
	C & E	Cs & Es
WETLANDS	3 Acres	2 Acres
RELOCATIONS		
Residential	3	3
Business	0	0
HISTORIC IMPACTS (on NR or PE) (within APE)	0	0
HISTORIC IMPACTS (on NR or PE) (Section 4(f))	0	0

Conclusion

Modifications to Alternative C and E, called Alternatives Cs and Es, that would relocate them to the east, reduce the wetland impacts by one acre and had no impact on residential relocations or to historic properties. The one-acre of wetland reduction in this segment is a particularly high quality wetland. For these reasons, **in the segment from SR 4 (Pierce Road) to just north of Osborne Road**, Alternatives Cs and Es were carried forward for more detailed study. Section 3.3 contains those alternatives selected for detailed study.



3.2.2.3 Alternative C Modifications from New Road to US 20

The northern segment of the modifications to Alternatives C and E extends from New Road to US 20. In this northern segment, Alternatives C and E follow different alignments and were evaluated separately.

This alignment modification involved the shift of Alternative C, to be called Alternative Cs, to the east. Alternatives Cs continues northward and terminates at US 20 (see figure 3.2.21). The main goal of this alignment modification was to avoid and/or minimize impacts to wetlands while striving to prevent any significant increase in the number of residential and business relocations.

Table 3.2.13 summarizes the socio-economic and environmental measures related to wetland impacts, residential and business relocations and historic properties impacts.

Table 3.2.13: Comparison of Alternatives C and Cs from New Road to US 20		
Socio-Economic/Environmental Measure	Alternative	
	C	Cs
WETLANDS	31 Acres	38 Acres
RELOCATIONS		
Residential	17	17
Business	4	4
HISTORIC IMPACTS (on NR or PE) (within APE)	4	4
HISTORIC IMPACTS (on NR or PE) (Section 4(f))	0	0

Conclusion

Modifications to Alternative C, called Alternatives Cs, relocating it to the east, increased the wetland impacts by seven acres and had no impact on residential relocations or to historic properties. Due to the increases in wetland impacts, **in the segment from New Road to US 20**, Alternatives C was carried forward for more detailed study. Section 3.3 contains those alternatives selected for detailed study.

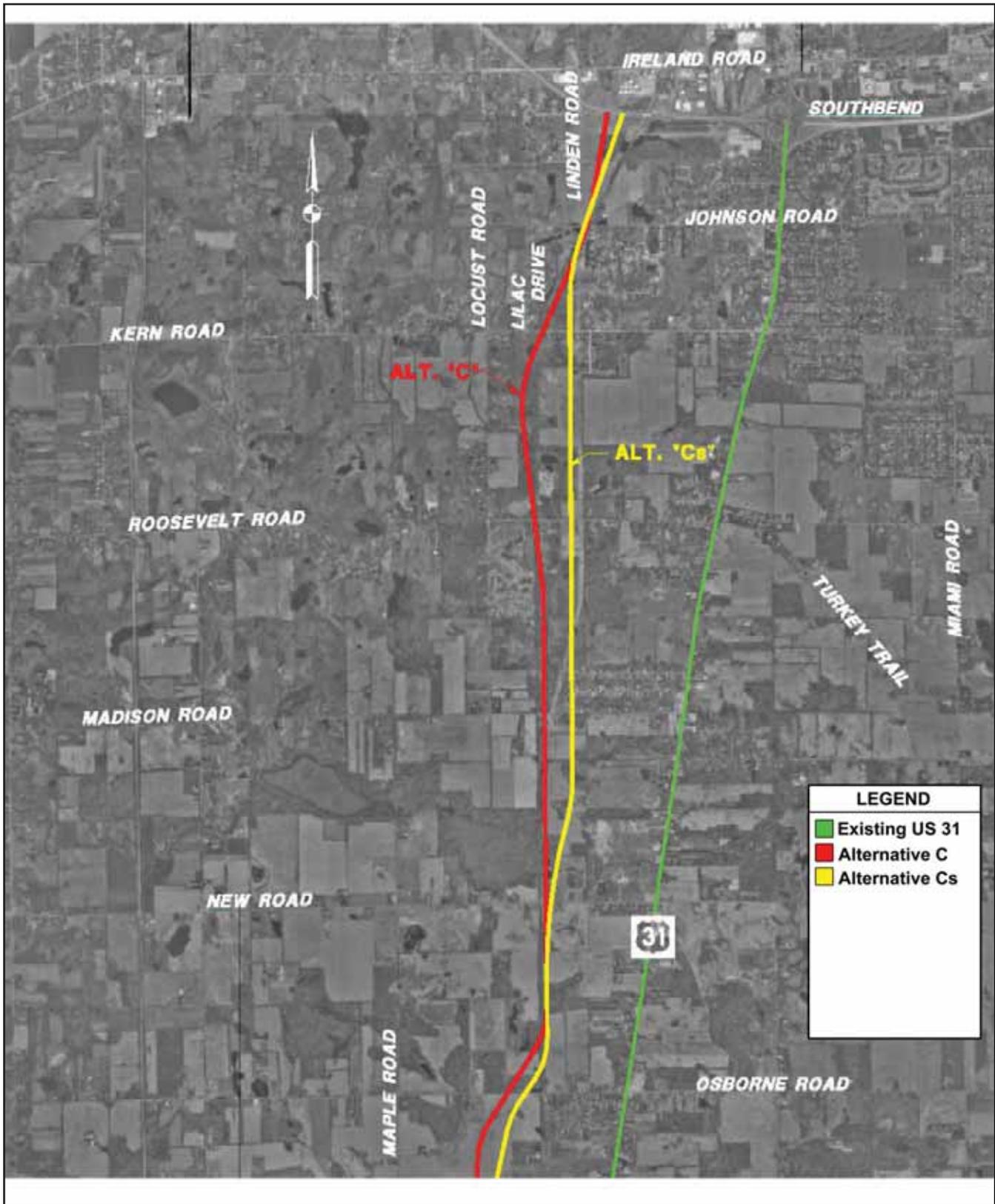


Figure 3.2.21: Alternative C Modifications from New Road to US 20



3.2.2.4 Alternative E Modifications from New Road to US 20

The northern segment of the modifications to Alternatives C and E extends from New Road to US 20. In this northern segment, Alternatives C and E follow different alignments and were evaluated separately.

Cultural Resource issues were the driving force behind the need to modify this segment of Alternative E. Two historically significant sites are located along existing US 31, in the area just south of the US 31 and Kern Road intersection. The historically significant sites are the Ullery/Farneman House and the Southlawn Cemetery, discussed in detail above (see Figure 3.2.16).

Alternative E passes between these historic sites, along existing US 31, and would have major impacts to both properties. Modifications to Alternatives E were investigated just south of the area of the two historic sites in an attempt to avoid and/or minimize impacts to the historic sites and to eliminate the likely Section 4(f) issues related to both the Ullery/Farneman House and the Southlawn Cemetery. The modifications to Alternative E, to be called Alternative Es, relocated Alternative E to the west side of (behind) the Ullery/Farneman House. Alternative Es continues northward and connects to Alternative E between Kern Road and Johnson Road (see Figure 3.2.22).

Table 3.2.14 summarizes the socio-economic and environmental measures related to wetland impacts, residential and business relocations and historic properties impacts.

Table 3.2.14: Comparison of Alternatives E and Es from New Road to US 20		
Socio-Economic/Environmental Measure	Alternative	
	E	Es
WETLANDS	26 Acres	14 Acres
RELOCATIONS		
Residential	73	50
Business	46	26
HISTORIC IMPACTS (on NR or PE) (within APE)	4	4
HISTORIC IMPACTS (on NR or PE) (Section 4(f))	1	0

Conclusion

Modifications to Alternative E, called Alternatives Es, relocating it to the east and behind the Ullery/Farneman House reduced the wetland impacts by 12 acres, decreased residential relocations by 23 and business relocations by 20, and eliminated the Section 4(f) issue related to historic properties. Due to these reasons, **in the segment from New Road to US 20**, Alternatives Es was carried forward for more detailed study. Section 3.3 contains those alternatives selected for detailed study.

Following publication of the DEIS, City of South Bend officials expressed concerns with Preliminary Alternative Es related to the proposed facility being an elevated roadway, constructed on retaining walls, from Kern Road northward to the US 31/US 20 interchange. Along with this, they were also concerned with local access to the subdivisions on the east and west sides of the alternative between Kern Road and the US 31/US20 interchange. Local officials in South Bend met with the Project Management Team on two occasions to discuss these concerns and potential modifications to Alternative Es to address these concerns. Through the course of discussions at

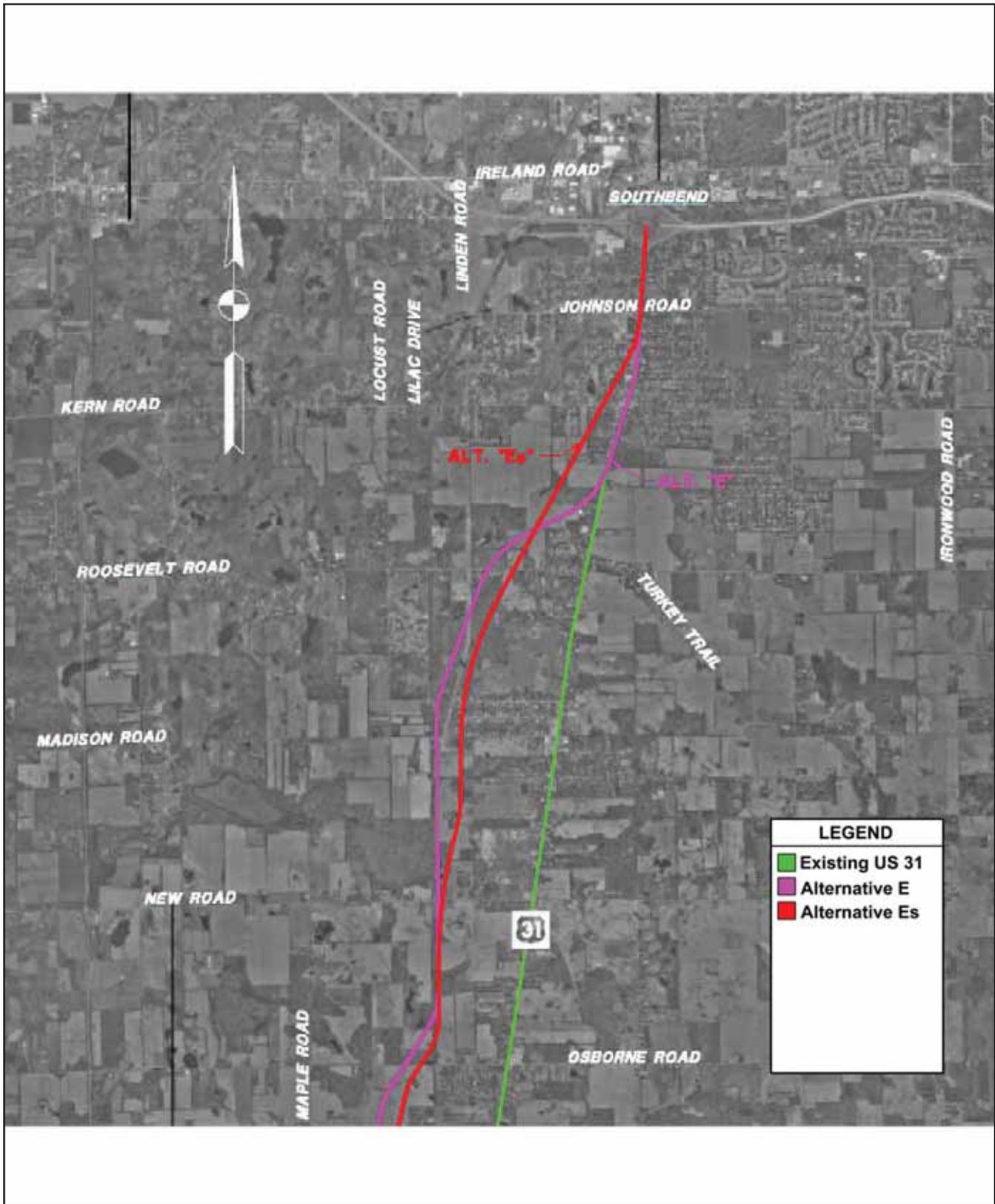


Figure 3.2.22: Alternative E Modifications from New Road to US 20



these meetings, additional modifications were made to the alternative as well as the local access plan that was in the best interests of both the City of South Bend and INDOT. These modifications included revising Alternative Es between Kern Road and the US 31/US 20 interchange to be an “at grade” facility and not an elevated roadway, constructed on retaining walls. A revised local access plan was developed to improve north-south connectivity between Kern Road and Ireland Road, just north of US 20, that included two separate grade separated crossings of US 20, one on the west side of US 31 at Scott Street and the other on the east side of US 31 at Fellows Street as further discussed in Section 3.5. East-west connectivity across US 31 was improved with the addition of grade-separated crossings at Johnson Road and Jackson Road and the extension of Main Street southward, under the proposed US 31, to existing US 31 near Kern Road.

3.2.3 Alternatives G Modifications

Alternative G is the only eastern preliminary freeway alternative that was recommended for further study. This section will discuss modifications made to Alternative G. These modifications are identified as Alternative Gs and G-C.

Two separate modifications to Alternative G were investigated, Alternatives Gs and G-C. Both of the modified alternatives follow Alternative G from the existing US 30 and US 31 interchange to Lake Trail, just east of Riddles Lake. At that point, the alternatives diverge as Alternative G goes northeast while Alternatives Gs and G-C continue northward on a common alignment, just east of and parallel to Kenilworth Road. Just north of Miller Road and south of Turkey Trail, Alternatives Gs and G-C turn to the northwest and parallel Turkey Trail. As these two alternatives approach existing US 31, they diverge. Alternative Gs turns northward and ties into existing US 31 at Roosevelt Road. It continues northward along existing US 31, connects to Alternative G south of Kern Road and terminates at the existing US 31 and US 20 interchange. Alternative G-C continues northeast, crosses existing US 31 near Roosevelt Road and ties into Alternative C near Kern Road. From that point, Alternative G-C continues northward, following the same alignment as Alternative C, and terminates at US 20.

Several issues drove the modifications to Alternative G. Concerns were expressed at the September 30, 2003 resource agency meeting related to this alternative. It was suggested that Alternative G should remain closer to existing US 31. This westward modification was accomplished by continuing northward at Lake Trail, instead of diverging northeast as Alternative G does.

Concerns were also expressed at the September 4, 2003 Section 106 consulting parties meeting with regard to potential cultural resource impacts associated with Alternative G. The consulting parties had concerns related to historic properties, particularly potential impacts to several properties along the Miami Highway and Turkey Trail. Those concerns were also addressed by the westward modification at Lake Trail. This modification keeps Alternatives Gs and G-C closer to existing US 31 and further away from the Miami Highway. The northwestern turn of Alternatives Gs and G-C, just north of Miller Road, keeps both alternatives south of Turkey Trail.

Cultural Resource issues were the driving force behind the need to modify the segment of Alternative G north of Roosevelt Road. Two historically significant sites are located along existing US 31, in the area just south of the US 31 and Kern Road intersection. The historically significant sites are the Ullery/Farneman House and the Southlawn Cemetery, discussed in detail above (see Figure 3.2.16).

Alternative G passes between these historic sites, along existing US 31, and would have major impacts to both properties. The modifications made to Alternative G called Alternative Gs does not address the impacts to these properties as it turns northward and ties into existing US 31 at Roosevelt Road. Alternative Gs continues northward along existing US 31, connects to Alternative G south of Kern Road, and passes between these historic sites.



Alternative G-C was investigated in an attempt to avoid and/or minimize impacts to the historic sites and to eliminate the likely Section 4(f) issues related to both structures. Instead of turning northward and rejoining Alternative G, as Alternative Gs does just south of Roosevelt Road, Alternative G-C continues northwest, crosses existing US 31 just south of Roosevelt Road and south of the area of the two historic sites, and ties into Alternative C near Kern Road. Alternative G-C relocated Alternative G to the south (below) and west side of (behind) the Ullery/Farneman House. This modification eliminates the direct impacts to the Ullery/Farneman House and the Southlawn Cemetery.

For both Freeway Alternatives Gs and G-C, existing US 31 and its major intersections were analyzed in accordance with the Highway Capacity Manual (HCM) to determine their present and future LOS. Future Average Daily Traffic (ADT) volumes used to conduct this analysis were generated using output from the regional travel model. Between Plymouth and South Bend, existing US 31 was analyzed in eight segments as well as at four signalized intersections and at six notable two-way stop-controlled intersections (stop control for the crossroad approaches) as listed below.

US 31 Segments:

- US 30 to Michigan Road (Old US 31)
- Michigan Road to US 6
- US 6 to Tyler Road
- Tyler Road to Lake Trail
- Lake Trail to SR 4
- SR 4 to Miller Road
- Miller Road to Roosevelt Road
- Roosevelt Road to US 20

US 31 Signalized Intersections:

- US 31 and US 6
- US 31 and SR 4
- US 31 and Kern Road
- US 31 and Johnson Road

US 31 Major Unsignalized Intersections (Two-Way Stop-Controlled):

- US 31 and Plymouth-Goshen Trail
- US 31 and W 5A Road
- US 31 and Tyler Road
- US 31 and New Road
- US 31 and Madison Road
- US 31 and Roosevelt Road



Table 3.2.15 shows resulting residual traffic volumes on the existing US 31 when either of the modified freeway alternatives are constructed. The goal of the modified freeway alternatives is to divert traffic from existing US 31 on to the new alternative. Table 3.2.15 shows the extent to which each modified freeway alternative achieves an acceptable LOS in the year 2030 for the existing US 31 corridor from US 30 to US 20. Because the modified freeway alternatives are four-lane freeways in the rural area with some six-lane segments in the urban section near US 20, traffic experiences acceptable operating conditions of LOS C or better when using the modified freeway alternative in rural segments, and LOS D or better for urban segments. Accordingly, the achievement of an acceptable LOS focuses on the residual traffic remaining on the existing US 31 alignment.

Table 3.2.15: Modified Freeway Alternative Future Traffic and LOS on Existing US 31 (Daily Traffic Volumes (LOS) in Year 2030 – Unacceptable LOS* shaded)

Freeway Alternatives	Segments							
	Rural	Rural	Rural	Rural	Rural	Rural	Rural	Urban
	US 30 to Michigan Road	Michigan Road to US 6	US 6 to Tyler Road	Tyler Road to Lake Trail	Lake Trail to SR 4	SR 4 to New Road	New Road to Roosevelt Road	Roosevelt Road to US 20
No-Build	21,504(C)	28,707(E)	25,687(F)	25,911(D)	28,279(F)	29,714(F)	32,485(F)	43,512(F)
Gs	2,979(A)	6,181(A)	3,516(A)	3,761(A)	3,971(A)	4,975(A)	8,029(A)	8,992(A)
G-C	3,139(A)	6,249(A)	3,748(A)	3,993(A)	5,844(B)	7,221(A)	10,212(B)	19,409(D)

* LOS C is the minimum acceptable for rural segments. LOS D is the minimum acceptable for urban segments.

Substantiating the assessment of the relief of congestion on existing US 31 is the amount of residual vehicle-miles of travel (VMT) and vehicle-hours of travel (VHT), referring to Table 3.2.16. VMT measures the directness of route to the straight line from the origin to the destination of the trip, and VHT measures congested travel time.

Table 3.2.16: US 31 Residual Vehicle-Miles of Travel and Vehicle-Hours of Travel by Modified Freeway Alternative (in Year 2030)

Freeway Alternatives	VMT		VHT	
	Miles	% Change from No-Build	Hours	% Change from No-Build
No-Build	488,498		8,721	
Gs	63,189	-87%	1,064	-88%
G-C	94,624	-81%	1,637	-81%



A secondary consideration for assessing the effectiveness of the modified freeway alternatives in relieving congestion is the reduction of VMT and VHT in the South Bend Metropolitan Area (Elkhart, Marshall and St. Joseph counties) with an unacceptable LOS (i.e., LOS E, or F in urban areas and LOS D, E or F in rural areas). This performance measure addresses how well a single improvement addresses congestion problems throughout the Metro Area (not just congestion along US 31). VMT measures the directness of route to the straight line from the origin to the destination of the trip, and VHT measures congested travel time. As people are often more open to travel greater distances to save travel time, VHT is a more important consideration than VMT. Table 3.2.17 shows that the results for both modified alternatives.

Freeway Alternatives	VMT with Unacceptable LOS		VHT with Unacceptable LOS	
	Miles	% Change from No-Build	Hours	% Change from No-Build
No-Build	2,509,904		68,867	
Gs	2,346,618	-6.51%	65,322	-5.15%
G-C	2,339,040	-6.81%	65,059	-5.53%

For the No-Build Alternative and for both Freeway Alternatives G-s and G-C, present and projected future crash rates on five segments of US 31 were compared to the average statewide crash rates for rural principal arterials (the functional classification for US 31) as listed below:

US 31 Segments:

- US 30 to LaPaz
- Through LaPaz
- LaPaz to Lakeville
- Through Lakeville
- Lakeville to US 20

Table 3.2.18 shows the extent to which both modified freeway alternatives reduces total accidents along existing US 31 and in the Metro Area (Elkhart, Marshall and St. Joseph counties). Again, the modified freeway alternatives that divert the most traffic from existing US 31 result in the best performance. The reduction of accidents in the Metro Area is a secondary consideration that examines the extent to which this improvement project alone reduces the level of accidents throughout the Metro area (not only US 31).

It should again be noted that the focus of this project is to address transportation problems related to the US 31 corridor and not to address all transportation problems in the South Bend-Elkhart Metropolitan Area. Therefore, the evaluation of alternatives focuses on the effectiveness of alternatives in addressing the needs along the US 31 corridor. Addressing the transportation problems in the entire metropolitan area is a very important issue and is the purpose of the MACOG Long Range Transportation Plan, which identifies the need to improve the US 31 corridor from South Bend to Plymouth. The Long Range Transportation Plan identifies many other transportation



improvement projects aimed at addressing other transportation needs in the metropolitan area, and considers the most effective combination of transportation improvement projects (including the US 31 improvement) to address the transportation needs of the metropolitan area.

Table 3.2.18: Existing US 31 and South Bend Metro Area Reduction in Total Accidents by Modified Freeway Alternative (in Year 2030)

Freeway Alternatives	Existing US 31 Total Accidents		Metro Area Total Accidents	
	Crashes	% Change from No-Build	Crashes	% Change from No-Build
No-Build	375		11,242	
Gs	48	-87%	10,965	-2.46%
G-C	83	-78%	11,009	-2.07%

Table 3.2.19 shows the total crash rate for both modified freeway alternatives for residual traffic on existing US 31 segments. The total crash rate for each modified freeway alternative is compared to the Indiana average total crash rates for other rural principal arterials. The modified freeway alternatives that divert the most traffic from existing US 31 result in the lower total crash rate.

Table 3.2.19: Total Crash Rate by Modified Alternative for Existing US 31 Segments (in year 2030) (total crash rate exceeding statewide rural principal arterial of 186.57 shaded)

Freeway Alternatives	US 30 to LaPaz	Through LaPaz	LaPaz to Lakeville	Through Lakeville	Lakeville to US 20
No-Build	94.17	250.82	45.04	456.04	239.93
Gs	20.27	34.33	6.54	64.04	
G-C	20.50	36.60	6.94	94.24	107.05

Note: Assumes crash rate changes in proportion to residual daily traffic on existing US 31.

Phase 1: Purpose and Need

Reduce Congestion: Both Alternatives Gs and G-C would reduce congestion on existing US 31. For the year 2030, Alternative Gs has an LOS A for all segments and Alternative G-C ranges from LOS A - B along rural segments and LOS D for the urban segment of existing US 31. These projected LOS values meet INDOT standards.

Improve Traffic Safety: Both Alternatives Gs and G-C would improve safety on US 31 by diverting traffic from the existing facility. The estimated reduction in accidents from the No-Build is 87% for Modified Alternative Gs and 78% for Modified Alternative G-C, and all segments along existing US 31 would have crash rates at or below statewide averages for other rural principal arterials.

Consistency with Transportation Plans: Both Alternatives Gs and G-C are consistent with the INDOT 2000-2025 Long Range Transportation Plan and with the MACOG Transportation Plan.

Alternatives Gs and G-C meet the purpose and need identified for this project. These alternatives were advanced to Phase 2 of the screening process.



Phase 2: Socio-Economic and Environmental Impacts

Table 3.2.20 summarizes the socio-economic and environmental measures related to wetland impacts, residential and business relocations and historic properties impacts.

Socio-Economic/Environmental Measure	Alternative		
	G	Gs	G-C
Wetlands	34 Acres	30 Acres	43 Acres
Relocations			
Residential	97	130	66
Business	52	54	9
Historic Impacts (on NR or PE) (within APE)	8	5	6
Historic Impacts (on NR or PE) (Section 4(f))	1	1	0

Conclusion

The modifications to Alternative G, called Alternatives Gs, that would relocate it to the west, closer to existing US 31 and further away from the Miami Highway and Turkey Trail, reduced the wetland impacts by four acres, increased residential relocations by 33 and business relocations by two, and reduced the historic impacts to those structures located within the area of potential impact (APE) by three. It did not eliminate the potential Section 4(f) issue related to historic properties. Due to increases in both residential and business relocations and the failure to eliminate the potential Section 4(f) issue related to historic properties, Alternative Gs was eliminated from further consideration.

Due to the potential Section 4(f) issues associated with Alternative G and the two historically significant structures discussed above, and the presence of prudent and feasible alternatives without potential Section 4(f) issues, Alternative G was also eliminated from further consideration.

The modifications to Alternative G, called Alternative G-C, relocating it to the west, closer to existing US 31 and further away from the Miami Highway and Turkey Trail, as well as south (below) and west (behind) the Ullery/Farneman House, increased wetland impacts by nine acres, a 26% increase. However, it reduced residential relocations by 31, a 32% reduction, and business relocations by 43, an 83% reduction. Alternative G-C reduced the historic impacts to those structures located within the APE by two and it eliminated the potential Section 4(f) issue related to historic properties. Due to reductions in both residential and business relocations and the elimination of the potential Section 4(f) issue related to historic properties, Alternatives G-C was carried forward for more detailed study. Section 3.3 contains those alternatives selected for detailed study.

3.2.4 Summary of Modifications to Preliminary Alternatives From Screening Report

To address concerns related to impacts to both the human and natural environments, modifications in the four freeway alternatives recommended for further study in the Preliminary Alternatives Analysis and Screening Report, Alternatives C, E, F and G were investigated, as detailed in Sections 3.2.1, 3.2.2 and 3.2.3 above. The goal



of these modifications was to avoid and/or minimize impacts to the environment, residents, businesses, and historic properties. The socio-economic and environmental impacts of each of the modified alternatives were compared with the impacts of the original alternatives. Based on this comparison, a recommendation regarding utilization of the original alternative or modified alternative was provided. Table 3.2.21 summarizes the recommendations for each of the sections in which each alternative was modified, as detailed in Section 3.2, Modifications of the Alternatives Recommended for Further Analysis.

SEGMENT LOCATION	FREEWAY ALTERNATIVE							
	C	Cs	E	Es	F	G	Gs	G-C
Southern Segment – From West 4A Road to Lakeville		X		X				
Central Segment – From SR 4 to North of Osborne Road		X		X				
Northern Segment – From New Road to US 20	X			X				
From West 4A Road to US 20								X

Based on the information contained in Table 3.2.21, Alternatives Cs, Es and G-C, as modified in Section 3.2 and summarized in Table 3.2.21, were recommended for further study. It should be noted that due to the potential Section 4(f) issues associated with Alternatives F, G and Gs and the two historically significant structures discussed in Section 3.2.1, and the presence of prudent and feasible alternatives without potential Section 4(f) issues, Alternatives F, G and Gs were eliminated from further consideration.

3.2.5 Evaluation of Hybrid Alternatives

During resource agency meetings and in comments received during the comment period on the DEIS, the USACE and the U.S. Department of the Interior requested a review of modifications to alternatives that would maximize the use of the existing US 31 corridor. Additionally, the Indiana Department of Natural Resources (IDNR) requested a review of potential modifications to Alternative G-C north of Roosevelt Road to avoid impacts to natural resources. Public comments also requested the investigation of the combination of Alternatives Es and G-C north of Roosevelt Road. In response to these comments, a “hybrid” alternative, Alternative G-E was developed.

Alternative G-E is a hybrid alternative consisting of a combination of the southern portion of Preliminary Alternative G-C and the northern portion of Preliminary Alternative Es (see Figure 3.2.24). Table 3.2.22 compares the socio-economic and environmental impacts associated with Alternative G-E to those alternatives that were previously recommended for further study (Alternatives Cs, Es and G-C). It is important to again note that the US 31 Improvement Project has been a dynamic process. Similar impact information presented in previous sections of this document was from data and conceptual design parameters available at an earlier stage in the progress of the study. Additional information was collected and design was further developed through the progress of the study. Impact information contained in previous tables may be slightly different than those contained in Table 3.2.22. Additionally, impact information contained in subsequent sections of this document will likely be different as additional information will be collected and design will be further developed.



Additional analysis, as detailed in Table 3.2.22, indicated that the hybrid alternative resulted in a reduction of wetland impacts and avoidance of many high quality wetland complexes located west of existing US 31, a reduction in forest impacts, was a good traffic performer, was an alternative that utilized more of the existing US 31 corridor, and had relocation impacts and cost estimates that were consistent with the other alternatives being studied further. **Therefore, the range of reasonable alternatives in the decision-making process was expanded to include Alternative G-E, along with the No-Build Alternative and Alternatives Cs, Es and G-C.**

Table 3.2.22: Comparison of Alternatives G-E with Cs, Es and G-C				
Socio-Economic/Environmental Measure	Alternative			
	Cs	Es	G-C	G-E
ENGINEERING COSTS (TOTAL) (MIL. OF \$) (Year 2003 Dollars)	204.1 to 224.0	269.8 to 289.2	206.0 to 226.5	242.1 to 262.0
NWI WETLANDS	54 Acres	38 Acres	42 Acres	33 Acres
TRAFFIC PERFORMANCE				
Meets Purpose and Need	Yes	Yes	Yes	Yes
Performance (Compared to other Alternatives, 1 is Best Performer)	3	1	4	2
RELOCATIONS				
Residences Acquired	49	110	58	107
Businesses Acquired (Includes Large Farming Operations)	8	34	5	36
Businesses Damaged	5	5	4	5
Churches Acquired	1	1	1	1
HISTORIC PROPERTIES (Compared to other Alternatives)				
Visual Impacts	Medium	Low	High	High
Noise Impacts	Medium	Low	High	High
Potential Section 4(f) Issues	0	0	0	0
Forests	189 Acres	133 Acres	135 Acres	107 Acres
Farmland (Row Crop)	390 Acres	394 Acres	471 Acres	462 Acres

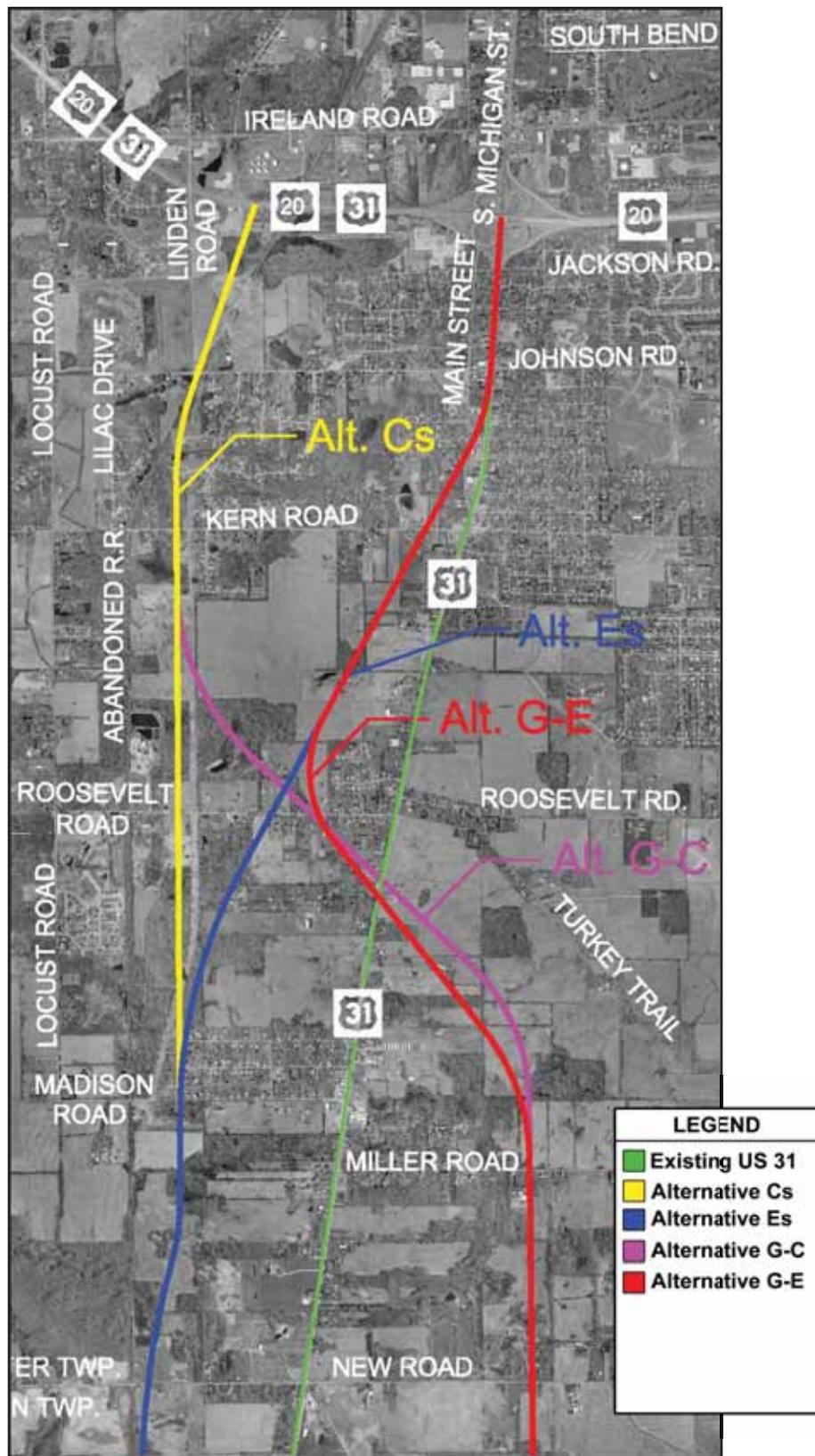


Figure 3.2.24: Preliminary Alternative G-E (“Hybrid Alternative”)



3.2.6 Modifications to Alternatives G-C and G-E

As the project continued to progress, the study team continually investigated potential modifications to the alternatives that would avoid and/or minimize impacts to both the natural and human environment. During one of many field investigations aimed at collecting additional data for Alternatives Cs, Es, G-C and G-E, a team of environmental scientists identified a very high quality wetland complex that was being impacted by Alternatives G-C and G-E. This wetland complex was located between the eastward extension of SR 4 (Pierce Road) and Miller Road, just south of New Road. The team of environmental scientists coordinated with a team of engineers to investigate potential modifications in the form of shifts in the alignment of Alternatives G-C and G-E to the east, called G-Cs and G-Es (see Figure 3.2.25). Again, the goal of these modifications was avoidance and/or minimization of impacts to the natural and human environment.

Table 3.2.23 compares the socio-economic and environmental impacts associated with Alternatives G-C, G-E, G-Cs and G-Es. It is important to again note that the US 31 Improvement Project has been a dynamic process. Similar information previously presented was from the data and conceptual design parameters available at a particular stage in the progress of the study. Additional information was collected and design was further developed through the progress of the study. Impact information contained in previous tables may be slightly different than those contained in Table 3.2.23. Additionally, impact information contained in subsequent sections of this document will likely be different as additional information will be collected and design will be further developed.

Table 3.2.23: Comparison of Preliminary Alternatives G-C, G-Cs, G-E and G-Es				
SOCIO-ECONOMIC/ENVIRONMENTAL MEASURE	ALTERNATIVE			
	G-C	G-Cs	G-E	G-Es
ENGINEERING (TOTAL) COST (Mil. Of \$) (Year 2003 Dollars)	206.0 to 226.5	205.5 to 226.1	242.1 to 262.0	241.6 to 261.6
CONSTRUCTION COSTS (Mil. Of \$)	146.2 to 165.9	146.4 to 166.1	160.2 to 179.4	160.4 to 179.6
RIGHT-OF-WAY COSTS (Mil. Of \$)	48.2	47.6	67.5	66.9
DESIGN FEES (Mil. Of \$)	11.6 to 12.4	11.5 to 12.4	14.4 to 15.1	14.3 to 15.1
RELOCATIONS				
Residences Acquired	58	54	107	103
* Businesses Acquired	5	6	36	37
Businesses Damaged	4	4	5	5
Churches Acquired	1	1	1	1
NWI WETLANDS	42 Acres	33 Acres	33 Acres	24 Acres
FORESTS	135 Acres	124 Acres	107 Acres	96 Acres
FARMLAND (ROW CROPS)	471 Acres	494 Acres	462 Acres	485 Acres

NOTE: * Businesses Acquired Includes Large Farming Operations.

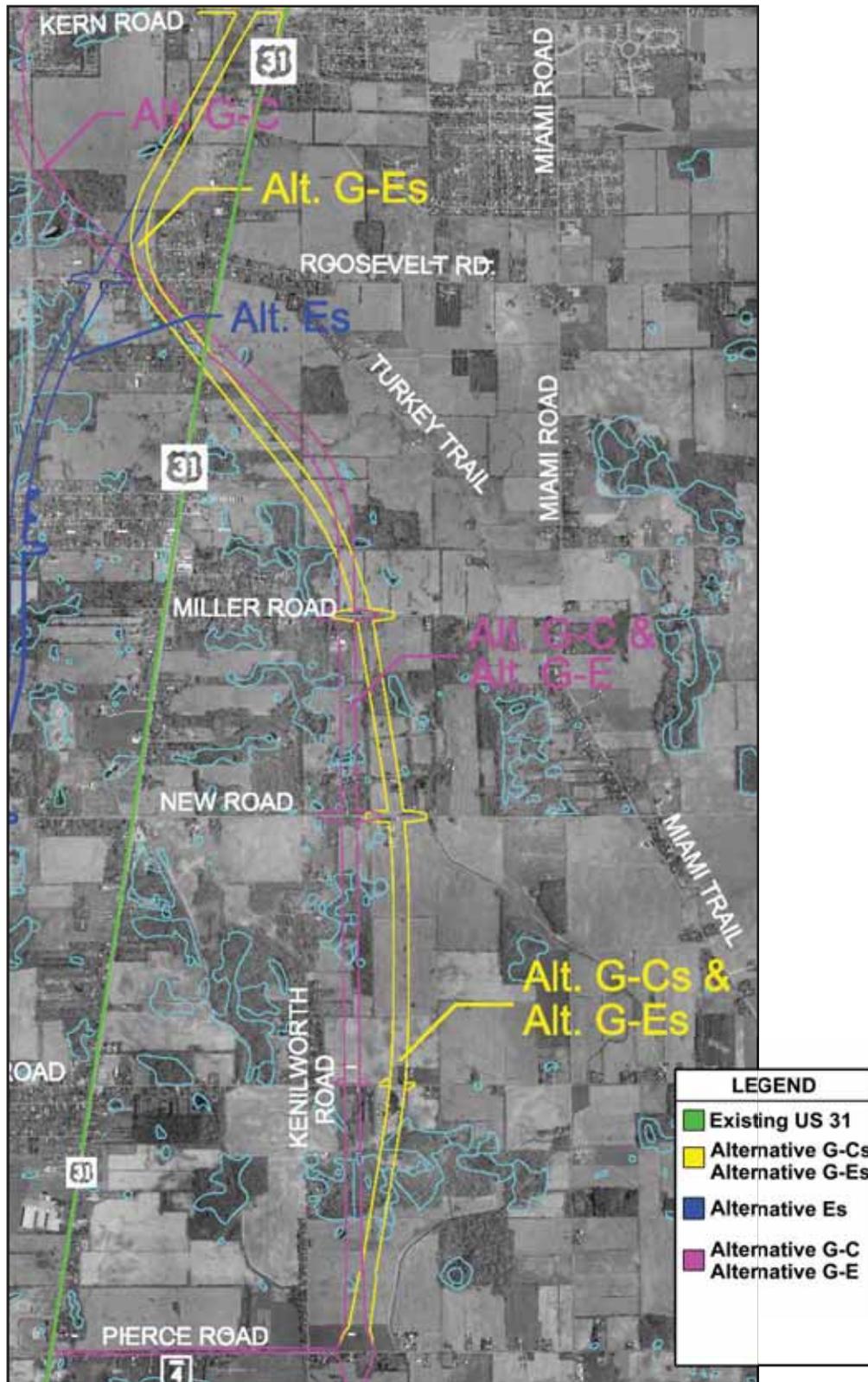


Figure 3.2.25: Modifications to Alternatives G-C and G-E



As shown in Table 3.2.23, the modifications or shifts to Alternatives G-C and G-E, called G-Cs and G-Es, provided positive results as impacts to both the human and natural environments were further reduced. This included a slight reduction in residential relocations and further reductions to wetlands and forests. This particular avoidance/minimization measure also provided an opportunity to avoid the high quality wetland complex associated with both of the alternatives. **Due to the positive results related to impact reductions seen by this shift in the alignments, Alternatives G-C and G-E were eliminated from further consideration and Alternatives G-Cs and G-Es were added to the range of reasonable alternatives in the decision-making process, that includes the No-Build Alternative and Alternatives Cs, Es, G-Cs and G-Es.**

3.2.7 Consideration of Alternative G – Ironwood Road Connection

During resource agency meetings and in comments received during the comment period on the DEIS, it was requested that a review of options not fully considered in the DEIS be completed. Identified, in particular, were modifications to Alternative G that would terminate at the existing US 20 and Ironwood Road interchange, as was the case for the previously eliminated Preliminary Alternative K. In response to those comments, INDOT and FHWA considered Alternative G - Ironwood Road Connection. Alternative G – Ironwood Road Connection follows the same alignment as Alternative G-Cs from the existing US 30 and US 31 interchange to New Road. At that point, the alternatives diverge. Alternative G-Cs continues northward just east of and parallel to Kenilworth Road. The Modified Alternative G – Ironwood Road Connection turns northeast and ties into Ironwood Road, near Kern Road. From that point, it continues northward, following Ironwood Road, and terminates at the existing US 20 and Ironwood Road interchange. The US 20 and Ironwood Road interchange was the north terminus of Preliminary Alternative K that was eliminated from further consideration during the initial Preliminary Alternatives Analysis and Screening due to its failure to meet the purpose and need of the project.

Alternative G – Ironwood Road Connection follows the same alignment as the modified Alternatives Gs and G-Cs from the existing US 30 and US 31 interchange to New Road. At that point, the alternatives diverge. Modified Alternatives Gs and G-Cs continue northward on a common alignment, just east of and parallel to Kenilworth Road. The Modified Alternative G – Ironwood Road Connection turns northeast and ties into Ironwood Road, near Kern Road. From that point, it continues northward, following Ironwood Road, and terminates at the existing US 20 and Ironwood Road interchange (see Figure 3.2.26).

For Modified Freeway Alternatives G – Ironwood Road Connection, existing US 31 and its major intersections were analyzed in accordance with the Highway Capacity Manual (HCM) to determine their present and future LOS as discussed above for Modified Alternatives Gs and G-C. Future Average Daily Traffic (ADT) volumes used to conduct this analysis were generated using output from the regional travel model. Between Plymouth and South Bend, US 31 was analyzed in eight segments as well as at four signalized intersections and at six notable two-way stop-controlled intersections (stop control for the crossroad approaches) as above for Modified Alternatives Gs and G-C.

Table 3.2.24 shows resulting residual traffic volumes on the existing US 31 when the modified freeway alternative is constructed. The goal of the modified freeway alternative is to divert traffic from existing US 31 on to the new alternative. Table 3.2.24 shows the extent to which this modified freeway alternative achieves an acceptable LOS in the year 2030 for the existing US 31 corridor from US 30 to US 20. Because the modified freeway alternative is a four-lane freeway in the rural area with some six-lane segments in the urban area near US 20, traffic experiences acceptable operating conditions of LOS C or better when using the modified freeway alternative in rural segments. In the urban segment from Roosevelt Road to the US 20 interchange, traffic experiences unacceptable operating conditions of LOS F when using the modified freeway alternative. Accordingly, the achievement of an acceptable LOS focuses on the residual traffic remaining on the existing US 31 alignment.

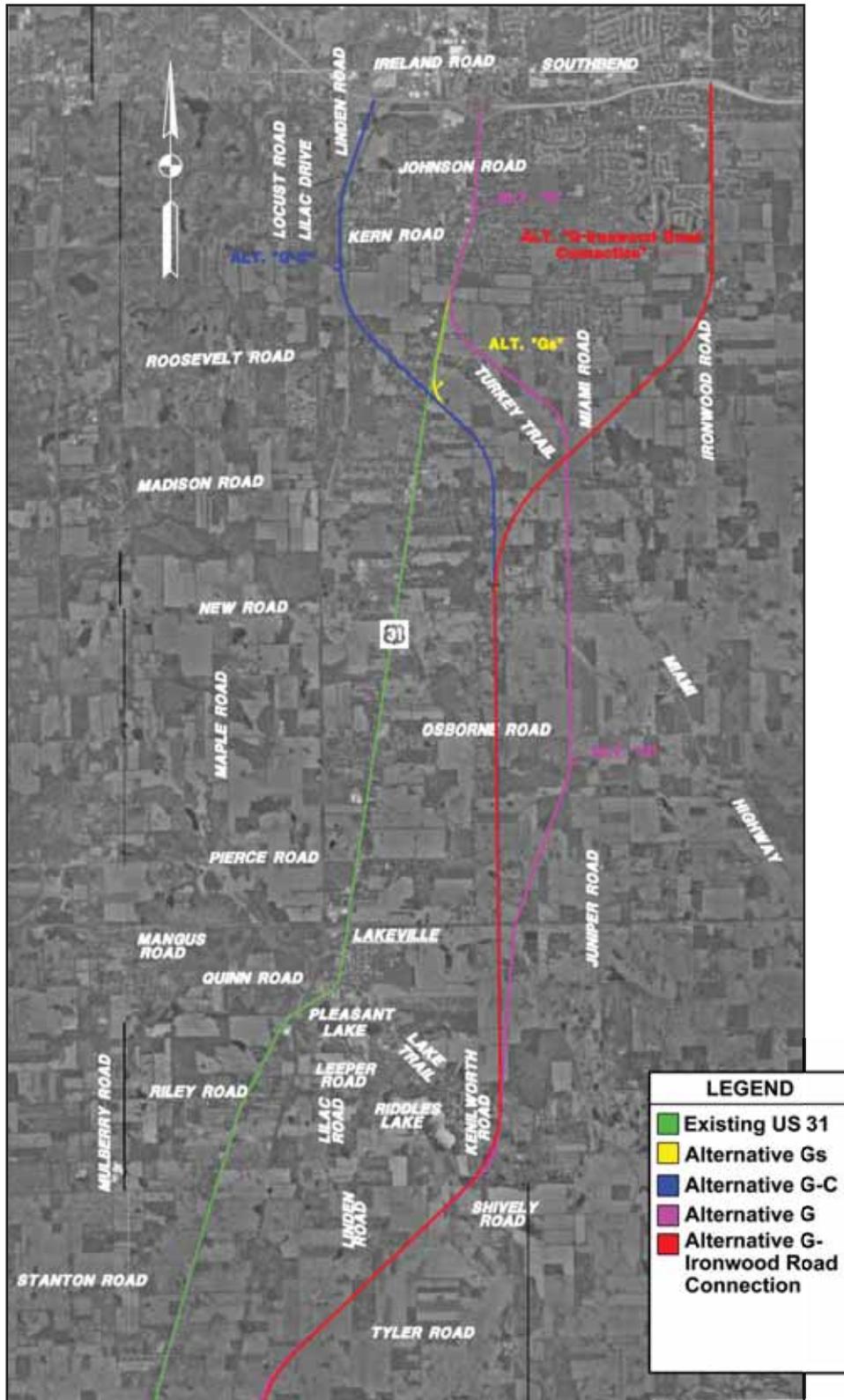


Figure 3.2.26: Alternative G – Ironwood Road Connection



Table 3.2.24: Modified Freeway Alternative Future Traffic and Level-Of-Service on Existing US 31 (Daily Traffic Volumes (LOS) in Year 2030 – Unacceptable LOS* shaded)

Freeway Alternatives	Segments							
	Rural	Rural	Rural	Rural	Rural	Rural	Rural	Urban
	US 30 to Michigan Road	Michigan Road to US 6	US 6 to Tyler Road	Tyler Road to Lake Trail	Lake Trail to SR 4	SR 4 to New Road	New Road to Roosevelt Road	Roosevelt Road to US 20
No-Build	21,504(C)	28,707(E)	25,687(F)	25,911(D)	28,279(F)	29,714(F)	32,485(F)	43,512(F)
Ironwood Road Connection	3,494(A)	7,344(A)	5,122(A)	5,344(A)	6,556(A)	7,336(A)	10,173(B)	26,120(F)

* LOS C is the minimum acceptable for rural segments. LOS D is the minimum acceptable for urban segments.

Substantiating the assessment of the relief of congestion on existing US 31 is the amount of residual VMT and VHT, referring to Table 3.2.25. VMT measures the directness of route to the straight line from the origin to the destination of the trip, and VHT measures congested travel time.

Table 3.2.25: US 31 Residual Vehicle-Miles of Travel and Vehicle-Hours of Travel by Modified Freeway Alternative (in Year 2030)

Freeway Alternatives	VMT		VHT	
	Miles	% Change from No-Build	Hours	% Change from No-Build
No-Build	488,498		8,721	
Ironwood Road Connection	107,643	-78%	1,869	-79%

A secondary consideration for assessing the effectiveness of the modified freeway alternative in relieving congestion is the reduction of VMT and VHT in the South Bend Metropolitan Area (Elkhart, Marshall and St. Joseph counties) with an unacceptable LOS (i.e., LOS E or F in urban areas and LOS D, E or F in rural areas). This performance measure addresses how well a single improvement addresses congestion problems throughout the Metro Area (not just congestion along US 31). As people are often more open to travel greater distances to save travel time, VHT is a more important consideration than VMT. Table 3.2.26 shows that the results for the modified alternative.



Table 3.2.26: South Bend Metro Area Congested Vehicle-Miles of Travel and Vehicle-Hours of Travel by Modified Freeway Alternative (in Year 2030)

Freeway Alternatives	VMT with Unacceptable LOS		VHT with Unacceptable LOS	
	Miles	% Change from No-Build	Hours	% Change from No-Build
No-Build	2,509,904		68,867	
Ironwood Road Connection	2,341,884	-6.69%	65,133	-5.42%

For the No-Build Alternative and for Modified Freeway Alternatives G – Ironwood Road Connection, present and projected future crash rates on five segments of US 31 were compared to the average statewide crash rates for rural principal arterials (the functional classification for US 31) as detailed above for Modified Alternatives Gs and G-C.

Table 3.2.27 shows the extent to which this modified freeway alternative reduces total accidents along existing US 31 and in the Metro Area (Elkhart, Marshall and St. Joseph counties). Again, the modified freeway alternatives that divert the most traffic from existing US 31 result in the best performance. The reduction of accidents in the Metro Area is a secondary consideration that examines the extent to which this improvement project alone reduces the level of accidents throughout the Metro Area (not only US 31).

Table 3.2.27: Existing US 31 and South Bend Metro Area Reduction in Total Accidents by Modified Freeway Alternative (in Year 2030)

Freeway Alternatives	Existing US 31 Total Accidents		Metro Area Total Accidents	
	Crashes	% Change from No-Build	Crashes	% Change from No-Build
No-Build	375		11,242	
Ironwood Road Connection	90	-76%	10,978	-2.35%

Table 3.2.28 shows the total crash rate for this modified freeway alternative for residual traffic on existing US 31 segments. The total crash rate for each modified freeway alternative is compared to the Indiana average total crash rates for other rural principal arterials. The modified freeway alternatives that divert the most traffic from existing US 31 result in the lower total crash rate.

Table 3.2.28: Total Crash Rate by Modified Alternative for Existing US 31 Segments (in year 2030) (total crash rate exceeding statewide rural principal arterial of 186.57 shaded)

Freeway Alternatives	US 30 to LaPaz	Through LaPaz	LaPaz to Lakeville	Through Lakeville	Lakeville to US 20
No-Build	94.17	250.82	45.04	456.04	239.93
Ironwood Road Connection	24.09	50.01	9.29	105.73	144.06

Note: Assumes crash rate changes in proportion to residual daily traffic on existing US 31.



Phase 1: Purpose and Need

Traffic Congestion: The Modified Alternative G – Ironwood Road Connection alone fails to address the purpose of reducing congestion on the existing US 31. In the year 2030, one of the eight segments of existing US 31 has an unacceptable LOS. The urban segment from Roosevelt Road to US 20 has a LOS F.

It should also be noted that an Alternative G – Ironwood Road Connection that includes combinations of various transportation management (TM) alternatives (TDM, TSM, ITS, mass transit, etc.) performs only slightly better than the alternative alone. Due to the low-density rural character of the corridor, Alternative G – Ironwood Road Connection in combination with TM alternatives considered for this project are expected to only minimally reduce traffic volumes on US 31 and would not result in improvements to levels of service on US 31.

In order for the Alternative G – Ironwood Road Connection to adequately address the purpose of reducing congestion on the existing US 31, the residual traffic on US 31 requires further major roadway investment projects, besides the cost of the alternative itself, to achieve acceptable traffic operating conditions. These improvements include the widening of existing US 31 from a four-lane to a seven-lane section from Roosevelt Road to US 20 to reach a minimum acceptable LOS D and the widening of Ironwood Road from four to seven lanes from US 20 to SR 933 (Lincolnway) to reach a minimum acceptable LOS D. A combination of these two roadway investment projects along with the alternative would provide and acceptable LOS.

Traffic Safety: The Modified Alternative G- Ironwood Road Connection improves safety on US 31 by diverting traffic from the existing facility. The estimated reduction in accidents from the No-Build is 76% and all segments along existing US 31 would have crash rates at or below statewide averages for other rural principal arterials. However, the residual traffic on US 31 requires further major roadway investment to improve physical conditions adversely affecting safety. One such improvement is the widening of existing US 31 to five lanes from SR 4 to Roosevelt Road.

Consistency with Transportation Plans: This alternative is consistent with the INDOT 2000-2025 Long Range Transportation Plan and with the MACOG Transportation Plan.

Alternative G – Ironwood Road Connection, in combination with the two additional roadway investment projects, meets the purpose and need identified for this project. This alternative, in combination with the two additional roadway investment projects, was advanced to Phase 2 of the screening process.

Phase 2: Socio-Economic and Environmental Impacts

For Alternative G – Ironwood Road Connection, data regarding potential historic impacts on properties eligible or potentially eligible for the National Register of Historic Places (NR), local historic landmarks and adverse impacts potentially requiring mitigation was also examined. It was found that the required improvements to existing US 31 from Roosevelt Road to US 20 associated with the alternative would have a direct impact (a Section 4(4) issue) on one historic property that is eligible for the NR, the Ullery/Farneman House, which is located on existing US 31 just south of Kern Road. This site would be directly impacted by the widening of existing US 31 from four to seven lanes and would result in the new roadway right-of-way being within 50' to 60' of the structure.

The alternative would have direct impacts on two properties that are Potentially Eligible (PE) for the NR. The first structure is WSBT, a local radio broadcasting station. The structure located at this site is an Art Moderne Building with some modifications and was the site of one of the first radio stations within the State of Indiana. The second PE property directly impacted is the Denslow House, an Italianate structure with some modifications



that is located along Ironwood Road, north of US 20. It was found that the required improvements to Ironwood Road, consisting of widening from four to seven lanes from US 20 to SR 933 associated with the alternative, would directly impact the structure with the necessity of additional right-of-way for the roadway improvements.

The alternative would have adverse effects on several properties that may require mitigation. The first of these properties is the Peter Schaefer Farmstead on Roosevelt Road. This property is located within 1,000 feet of the alternative with resulting potential visual impacts. The second of these properties is Donaghue Farmstead on Turkey Trail. This property is located within 400 feet of the alternative with resulting potential visual and auditory impacts. The third of these properties is the Bunch Farm on Pierce Road. This property is located within 1,880 feet of a proposed interchange associated with the alternative. It is also located adjacent to a proposed local road improvement that will be required to Pierce Road as an extension of SR 4 from existing US 31 to a new interchange associated with the alternative. The proximity of this property to the new interchange and local road improvement project would result in potential visual and auditory impacts.

The alternative would potentially have impacts on a Local Historic Landmark, the Southlawn Cemetery, which is located directly east of and across existing US 31 from the Ullery/Farneman House. It was found that the required improvements to existing US 31, consisting of widening from four to seven lanes from Roosevelt Road to US 20 associated with the alternative, would directly impact the property and result in the new roadway right-of-way being within 25 feet to 30 feet of the Southlawn Cemetery Gate House and within 80 feet to 90 feet of graves.

The alternative crosses the Dragoon Trail and Turkey Trail. There is potential historical archaeological impacts along these trails given their importance in the early settlement of northwest Indiana. Dragoon Trail is a pre-statehood trail utilized for moving troops between South Bend and Fort Wayne. Turkey Trail has been identified as an historic Indian trail and also identified as an area having a rural and historic farm setting significance.

Figure 3.2.27 identifies the potential historic and archaeological impacts associated with Alternative G – Ironwood Road Connection.

For Alternative G – Ironwood Road Connection, data regarding potential socio-economic impacts was also examined. It was found that the alternative would directly impact the St. Joseph County Fairgrounds, a 150-acre facility on southwest corner of Ironwood Road and Jackson Road. The fairgrounds host the yearly 4-H Fair and other community activities year-round. The alternative would eliminate two main entrances to fairgrounds or require frontage roads for access and would take Esther Singer 4-H Exhibit Hall, the main exhibition hall. When compared to the other preliminary freeway alternatives under consideration, Alternatives Cs, Es and G-C, it was also found that Alternative G – Ironwood Road Connection would require from 1.75 to 4 times more residential relocations than any other alternative and would have a total cost that was from 15% to 50% higher than any of the other alternatives. The increased number of residential relocations and increased total costs are largely due to the two additional roadway investment projects required in combination with Alternative G – Ironwood Road Connection in order to meet the projects purpose and need of reducing congestion on US 31. These additional roadway investment projects are the widening of existing US 31 from four lanes to seven lanes from Roosevelt Road to US 20 and the widening of Ironwood Road from four to seven lanes from US 20 to SR 933 (Lincolnway).

For Alternative G – Ironwood Road Connection, data regarding potential environmental impacts (wetlands, forests, farmlands, etc.) was also examined. When compared to the other preliminary freeway alternatives under consideration, Alternatives Cs, Es and G-C, it was found that Alternative G – Ironwood Road Connection slightly reduced forest and wetland impacts while slightly increasing farmland impacts.

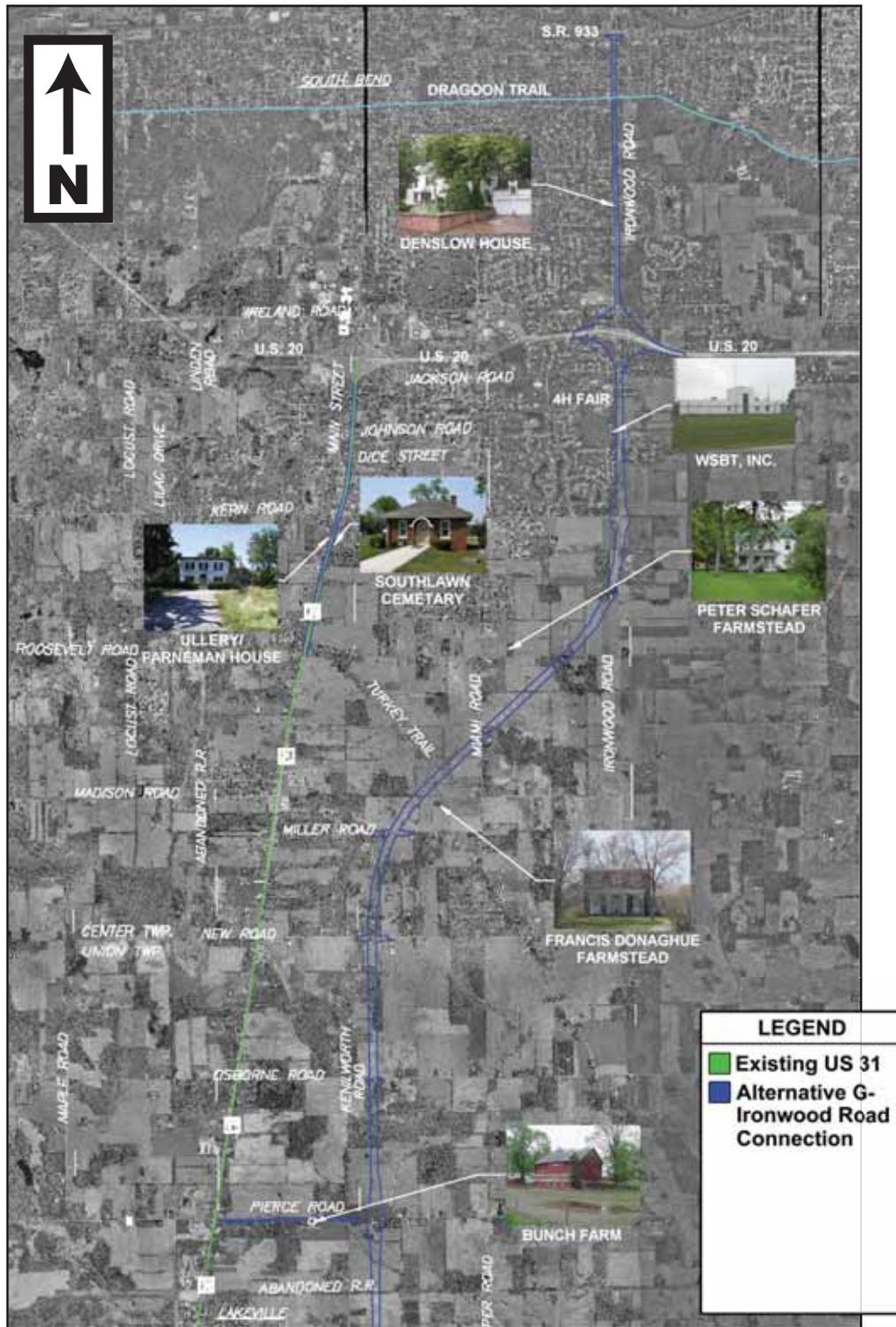


Figure 3.2.27: Alternative G – Ironwood Road Connection Potential Historic Property Impacts



Table 3.2.29 compares the socio-economic and environmental impacts associated with Alternative G – Ironwood Connection to those alternatives recommended for further study (Alternatives Cs, Es, G-Cs and G-Es). It is important to again note that the US 31 Improvement Project has been a dynamic process. Similar impact information presented in previous sections of this document was from data and conceptual design parameters available at an earlier stage in the progress of the study. Additional information was collected and design was further developed through the progress of the study. Impact information contained in previous tables may be slightly different than those contained in Table 3.2.29, as well as those contained in subsequent sections of this document.

Table 3.2.29: Comparison of Alternatives G-Ironwood Road Connection with Cs, Es, G-Cs and G-Es					
Socio-Economic/Environmental Measure	Alternative				
	Cs	Es	G-Cs	G-Es	G-Ironwood
ENGINEERING COSTS (Total) (Mil. Of \$) (Year 2003 Dollars)	204.1 to 224.0	269.8 to 289.2	205.5 to 226.1	241.6 to 261.6	310.3 to 329.6
NWI WETLANDS	54 Acres	38 Acres	33 Acres	24 Acres	31 Acres
TRAFFIC PERFORMANCE					
Meets Purpose and Need	Yes	Yes	Yes	Yes	Yes
Performance (Compared to other Alternatives, 1 is Best Performer)	3	1	4	2	5
RELOCATIONS					
Residences Acquired	49	110	55	103	194
Businesses Acquired (Includes Large Farming Operations)	8	34	6	37	38
Businesses Damaged	5	5	4	5	22
Churches Acquired	1	1	1	1	4
HISTORIC PROPERTIES (Compared to other Alternatives)					
Visual Impacts	Medium	Low	Medium	Medium	High
Noise Impacts	Medium	Low	Medium	Medium	High
Potential Section 4(f) Issues	0	0	0	0	1
FORESTS	189 Acres	133 Acres	124 Acres	96 Acres	99 Acres
FARMLAND (ROW CROP)	390 Acres	394 Acres	494 Acres	485 Acres	531 Acres



Conclusion

Modified Alternative G – Ironwood Road Connection, as a stand-alone alternative, fails to address the first purpose and need for the project (i.e., reduced congestion). In order for the Alternative G – Ironwood Road Connection to adequately address the purpose of reducing congestion on the existing US 31, the residual traffic on US 31 requires further major roadway investment projects, besides the cost of the alternative itself, to achieve acceptable traffic operating conditions. These improvements include the widening of existing US 31 from a four-lane to a seven-lane section from Roosevelt Road to US 20 to reach a minimum acceptable LOS D and the widening of Ironwood Road from four to seven lanes from US 20 to SR 933 (Lincolnway) to reach a minimum acceptable LOS D. A combination of these two roadway investment projects along with the alternative would provide an acceptable LOS.

In Phase 2 of the screening process, it was found that while the wetland and forest impacts associated with Alternative G – Ironwood Road Connection were slightly less than those of the alternatives to be studied further. However, they were still higher than the wetland and forest impacts associated with the hybrid Alternative G-Es.

As discussed above, Alternative G – Ironwood Road Connection had a much higher associated total cost; higher residential relocations; higher potential historic impacts: including a Section 4(f) issue, and higher farmland impacts. **Based on these considerations, FHWA and INDOT concluded that Alternative G – Ironwood Road Connection was not a reasonable alternative and was not added to the range of reasonable alternatives to be considered in the decision-making process, that includes the No-Build Alternative and Alternatives Cs, Es, G-Cs and G-Es.**



3.3 Description of the Alternatives Selected for Detailed Study

The Preliminary Alternative Analysis and Screening Report, dated August 19, 2003 and detailed in Section 3.1, Preliminary Alternatives Analysis and Screening, recommended the following preliminary alternatives for further study in the Draft Environmental Impact Statement (DEIS):

- No-Build Alternative
- Alternative C (Freeway Alternative)
- Alternative E (Freeway Alternative)
- Alternative F (Freeway Alternative)
- Alternative G (Freeway Alternative)

Following the publication of the Preliminary Alternatives Analysis and Screening Report, information and comments were received at various meetings and from the project's website. The study team continued to collect and analyze data related to social and environmental impacts for each of the four preliminary freeway alternatives. Proposed lane configurations, interchange locations and configurations, overpass locations, more accurate proposed right-of-way limits, and revised construction cost estimates for each of the alternatives were developed.

As the field data and public and resource agency comments were analyzed and preliminary engineering further developed, a more accurate measure of social and environmental impacts of each of the alternatives was determined. A review of these socio-economic and environmental impacts raised concerns within the study team, resource agencies, and consulting parties involved with the project. Concerns focused around both socio-economic and environmental impacts, particularly related to wetland impacts, residential and business relocations, and historic property impacts.

To address these concerns, modifications in the four remaining freeway alternatives, Alternatives C, E, F and G, were investigated as detailed in Section 3.2. The goal of these modifications was to avoid and/or minimize impacts to the environment, residents, businesses and historic properties. Section 3.2.4 summarizes the recommendations of the modified alternatives as detailed in Section 3.2, Modifications of the Alternatives Recommended for Further Analysis, that resulted in the reasonable range of alternatives in the decision-making process being revised to include Alternatives Cs, Es and G-C.

Later in the study progress, during the DEIS Public Comment Period, comments received from the Indiana Department of Natural Resources (IDNR) requested a review of potential modifications to Alternative G-C north of Roosevelt Road to avoid impacts to natural resources. In response to this request and similar requests made by public comments, a "hybrid" alternative, Alternative G-E was developed. Alternative G-E, as discussed in Section 3.2.5, Evaluation of Hybrid Alternatives, was a hybrid alternative consisting of a combination of the southern portion of Preliminary Alternative G-C, from US 31 to Roosevelt Road, and the northern portion of Preliminary Alternative Es, from Roosevelt Road to US 20. Additional analysis indicated that the hybrid alternative resulted in a reduction of wetland impacts and avoidance of many high quality wetland complexes west of existing US 31, a reduction in forest impacts, was a good traffic performer, was an alternative that utilized more of the existing US 31 corridor and had relocation impacts and cost estimates that were consistent with the other alternatives being studied. Therefore, the range of reasonable alternatives in the decision-making process was expanded to include Alternative G-E as well as Alternatives Cs, Es and G-C.



Further attempts at avoidance and/or minimization of impacts were investigated as the study progressed. The last of these attempts that resulted in the reduction of impacts was therefore, incorporated into the study were modifications to both Alternative G-C and G-E, called G-Cs and G-Es. These modifications, as discussed in Section 3.2.6, Modifications to Alternatives G-C and G-E, involved a shift in alignment to the east in order to avoid a wetland complex that was located between the eastward extension of SR 4 (Pierce Road) and Miller Road, just south of New Road. This modification provided positive results as impacts to both the human and natural environments were further reduced. This included a slight reduction in residential relocations and further reductions to wetlands and forests. This particular avoidance/minimization measure also provided an opportunity to avoid the high quality wetland complex associated with both of the alternatives. Due to the positive results related to impact reductions seen by this shift in the alignments, Alternatives G-C and G-E were eliminated from further consideration and Alternatives G-Cs and G-Es were added to the range of reasonable alternatives in the decision-making process.

Following the modifications made to the preliminary alternatives throughout the study process as detailed in Section 3.2, Modifications of Alternatives Recommended for Further Study, and the range of reasonable alternatives in the decision-making process was expanded to include the following alternatives (see Figure 3.3.28).

- No-Build Alternative
- Alternative Cs (Freeway Alternative)
- Alternative Es (Freeway Alternative)
- Alternative G-Cs (Freeway Alternative)
- Alternative G-Es (Freeway “hybrid” Alternative)

3.3.1 No-Build Alternative

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 a major widening 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 capacity expansion projects that are programmed for construction or that have been completed since the year 2000 are added to the existing roadway network, the resulting roadway network constitutes the No-Build Alternative (or Existing-Plus-Committed Network). It is assumed that these committed improvements 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) widening from four to six lanes from Douglas Road to SR 23

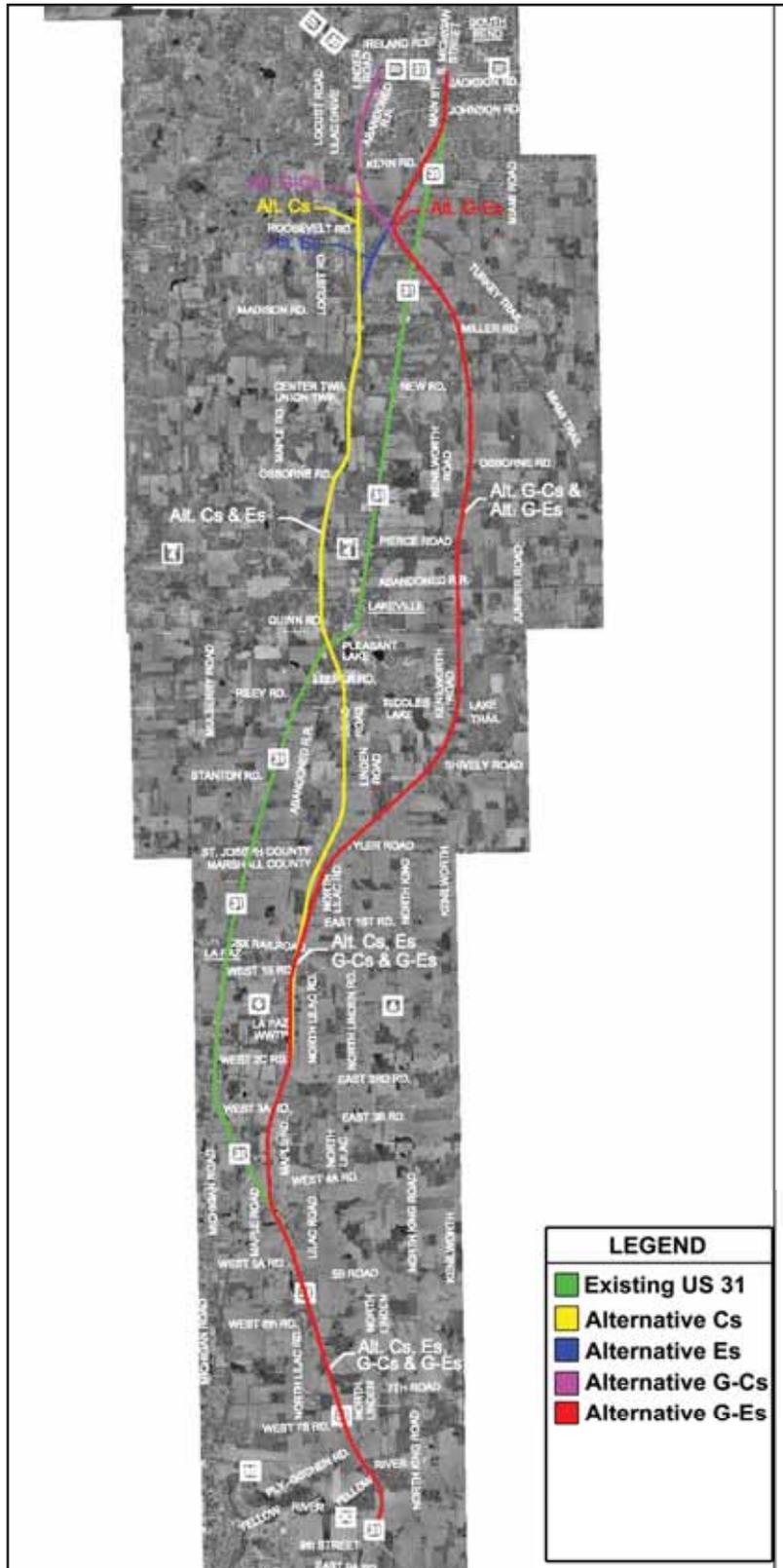


Figure 3.3.28: Preliminary Alternatives Cs, Es, G-Cs and G-Es



- 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 Jackson Road to US 20
- 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 improvements for 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 along US 31 from Madison Road to Kern Road has been suspended until the completion of this NEPA document.



3.3.2 Alternative Cs (Freeway Alternative)

Alternative Cs begins at the existing US 31 and US 30 interchange, utilizing the existing cloverleaf configuration, and proceeds northward along the existing US 31 alignment to just south of West 4A Road in Marshall County, just south of LaPaz. It then continues northward on new alignment east of LaPaz and parallels existing US 31. Just south of Lakeville, in St. Joseph County, it crosses existing US 31 and continues northward, west of Lakeville, paralleling existing US 31. It terminates at US 20, approximately one mile west of the existing US 31 and US 20 interchange.

The proposed facility would require existing intersections and access points to be converted to interchanges, overpasses (grade-separations) or access closures. See Section 5.1, Traffic and Transportation, for a more detailed description of the alternative and associated access points.

It is anticipated that there will be five new interchanges along Alternative Cs, not including the use of the existing interchange at US 30 and US 31 or the modifications required at the existing US 31 and US 20 interchange. All anticipated interchange locations and types are conceptual and will be refined in later phases of the project development. Likely interchange locations and types would be:

- Utilize existing interchange at US 30
- Diamond interchange at the Marshall County proposed extension of 7th Road
- Diamond interchange at US 6 (with provisions for a potential future partial cloverleaf)
- Diamond interchange at SR 4 (Pierce Road)
- Diamond interchange at Kern Road
- Trumpet interchange at US 20
- Modify existing interchange at existing US 31 and US 20

There will be grade separations (overpasses) and local service (frontage) roads for many public roads intersecting with US 31 and not listed as a likely interchange location. It is anticipated that there will be 14 grade separations along Alternative Cs, including an additional reconstruction of the existing grade separation at Linden Road over US 20 due to the addition of ramp lanes along US 20 associated with the new interchange; however, the details of access will be refined as the project advances through the development phases. Likely grade separation locations would be:

- Plymouth-Goshen Trail
- Lilac Road/West 6th Road
- West 4A Road
- West 3A Road
- East 1st Road
- Tyler Road



- Leeper Road
- Existing US 31 just south of Lakeville
- Quinn Road
- New Road
- Madison Road
- Roosevelt Road
- Johnson Road
- Linden Road over US 20 reconstruction

There will be public roads that are not listed as a likely interchange or grade separation (overpass) locations. When two public roads are close to one another, a grade separation may be provided at one road and the other road relocated to use the same grade separation. Frontage or local service roads are provided where land may be landlocked by full access control of the alternative. It is anticipated that there will be four such public roads along Alternative Cs that will likely be relocated to an adjacent overpass. However, the details of access will be refined as the project advances through the development phases. Likely road relocation locations to an alternate site of access would be:

- Maple Road connection to existing US 31 near West 4A Road
- Maple Road connection to West 2C Road
- Quinn Trail connection to existing US 31
- Linden Road connection to Johnson Road

There will be public roads that are not listed as a likely interchange or grade separation (overpass) locations or listed as a road likely to be relocated to an alternate access point. Access across the new freeway for these roads will be eliminated and a cul-de-sac constructed on either side of the new freeway. It is anticipated that there will be seven such public roads along Alternative Cs; however, the details of access will be refined as the project advances through the development phases. Roadways likely to lose access and be terminated with a cul-de-sac would be:

- West 7B Road
- West 5A Road
- Existing US 31 near 4A Road
- West 2C Road
- West 1B Road



- Shively Road
- Osborne Road

In addition to the likely locations of interchanges, grade separations, and road closures, there would also be two grade separations for railroad crossings at the following locations:

- CSX Railroad on the north edge of LaPaz, between West 1B Road and East 1st Road
- Abandoned Railroad corridor just south of US 20

3.3.3 Alternative Es (Freeway Alternative)

Alternative Es begins at the existing US 31 and US 30 interchange, utilizing the existing cloverleaf configuration, and proceeds northward along the existing US 31 alignment to just south of West 4A Road in Marshall County, just south of LaPaz. It then continues northward on new alignment east of LaPaz and parallels existing US 31. Just south of Lakeville, in St. Joseph County, it crosses existing US 31 and continues northward, west of Lakeville, paralleling existing US 31. Just north of Madison Road the alternative assumes a northeasterly direction and ties into existing US 31 just north of Kern Road. It then terminates at the existing US 31 and US 20 interchange. It should be noted that Alternative Es between Kern Road and the US 31/US 20 interchange was modified, as discussed in Section 3.2.2.4, to be an “at grade” facility and not an elevated roadway, constructed on retaining walls as presented in the DEIS.

The proposed facility would require existing intersections and access points to be converted to interchanges, overpasses (grade-separations) or access closures. See Section 5.1, Traffic and Transportation, for a more detailed description of the alternative and associated access points.

It is anticipated that there will be four new interchanges along Alternative Es, not including the use of the existing interchange at US 30 and US 31 and the reconstruction of the existing interchange at US 31 and US 20. All anticipated interchange locations and types are conceptual and will be refined in later phases of the project development. Likely interchange locations and types would be:

- Utilize existing interchange at US 30
- Diamond interchange at the Marshall County proposed extension of 7th Road
- Diamond interchange at US 6 (with provisions for a potential future partial cloverleaf)
- Diamond interchange at SR 4 (Pierce Road)
- Diamond interchange at Kern Road
- Reconstruction of existing interchange at US 20

There will be grade separations (overpasses) and local service (frontage) roads for many public roads intersecting with US 31 and not listed as a likely interchange location. It is anticipated that there will be 16 grade separations along Alternative Es. However, the details of access will be refined as the project advances through the development phases. Likely grade separation locations would be:



- Plymouth-Goshen Trail
- Lilac Road/West 6th Road
- West 4A Road
- West 3A Road
- East 1st Road
- Tyler Road
- Leeper Road
- Existing US 31 just south of Lakeville
- Quinn Road
- New Road
- Madison Road
- Roosevelt Road
- Main Street
- Johnson Road
- Johnson Road bridge over Main Street
- Jackson Road

There will be public roads that are not listed as a likely interchange or grade separation (overpass) locations. When two public roads are close to one another, a grade separation may be provided at one road and the other road relocated to use the same grade separation. Frontage or local service roads are provided where land may be landlocked by full access control of the alternative. It is anticipated that there will be seven such public roads along Alternative Es that will likely be relocated to an adjacent overpass. However, the details of access will be refined as the project advances through the development phases. Likely road relocations to an alternate site of access would be:

- Maple Road connection to existing US 31 near West 4A Road
- Maple Road connection to West 2C Road
- Quinn Trail connection to existing US 31
- Existing US 31 connection to Main Street north of Kern Road
- Existing US 31 connection to Hildebrand Street south of Johnson Road



- Connection between Johnson Road and West Ritter Avenue to Main Street
- Main Street connection to Jackson Road

There will be public roads that are not listed as a likely interchange or grade separation (overpass) location or listed as a road likely to be relocated to an alternate access point. Access across the new freeway for these roads will be eliminated and a cul-de-sac constructed on either side of the new freeway. It is anticipated that there will be 10 such public roads along Alternative E. However, the details of access will be refined as the project advances through the development phases. Roadways likely to lose access and be terminated with a cul-de-sac would be:

- West 7B Road
- West 5A Road
- Existing US 31 near 4A Road
- West 2C Road
- West 1B Road
- Shively Road
- Osborne Road
- Louise Drive
- Roycroft Road
- Jewell Avenue

In addition to the likely locations of interchanges, grade separations, and road closures, there would also be a grade separation for a railroad crossing at the following location:

- CSX Railroad on the north edge of LaPaz, between West 1B Road and East 1st Road

3.3.4 Alternative G-Cs (Freeway Alternative)

Alternative G-Cs begins at the existing US 31 and US 30 interchange, utilizing the existing cloverleaf configuration, and proceeds northward along the existing US 31 alignment to just south of West 4A Road in Marshall County, just south of LaPaz. It then continues northward on new alignment east of LaPaz and parallels existing US 31. Just south of the Marshall-St. Joseph County line, the alternative assumes a northeasterly direction around the east side of Riddles Lake, where it then continues in a northerly direction bypassing Lakeville on the east and paralleling existing US 31. Near Miller Road, the alternative turns in a northwesterly direction and crosses to the west side of existing US 31 just south of Roosevelt Road. The alternative then turns in a northerly direction, paralleling existing US 31, and terminates at US 20, approximately one mile west of the existing US 31 and US 20 interchange.

The proposed facility would require existing intersections and access points to be converted to interchanges, overpasses (grade-separations), or access closures. See Section 5.1, Traffic and Transportation, for a more detailed



description of the alternative and associated access points.

It is anticipated that there will be five new interchanges along Alternative G-Cs, not including the use of the existing interchange at US 30 and US 31 or modifications required at the existing US 31 and US 20 interchange. All anticipated interchange locations and types are conceptual and will be refined in later phases of the project development. Likely interchange locations and types would be:

- Utilize existing interchange at US 30
- Diamond interchange at the Marshall County proposed extension of 7th Road
- Diamond interchange at US 6 (with provisions for a potential future partial cloverleaf)
- Diamond interchange at SR 4 (Pierce Road)
- Diamond interchange at Kern Road
- Trumpet interchange at US 20
- Modify existing interchange at existing US 31 and US 20

There will be grade separations (overpasses) and local service (frontage) roads for many public roads intersecting with US 31 and not listed as a likely interchange location. It is anticipated that there will be 14 grade separations along Alternative G-Cs, including an additional reconstruction of the existing grade separation at Linden Road over US 20 due to the addition of ramp lanes along US 20 associated with the new interchange; however, the details of access will be refined as the project advances through the development phases. Likely grade separation locations would be:

- Plymouth-Goshen Trail
- Lilac Road/West 6th Road
- West 4A Road
- West 3A Road
- East 1st Road
- Tyler Road
- Kenilworth Road
- Lake Trail
- New Road



- Miller Road
- Existing US 31 south of Kern Road
- Roosevelt Road
- Johnson Road
- Linden Road over US 20 reconstruction

There will be public roads that are not listed as a likely interchange or grade separation (overpass) locations. When two public roads are close to one another, a grade separation may be provided at one road and the other road relocated to use the same grade separation. Frontage or local service roads are provided where land may be landlocked by full access control of the alternative. It is anticipated that there will be four such public roads along Alternative G-Cs that will likely be relocated to an adjacent overpass. However, the details of access will be refined as the project advances through the development phases. Likely road relocation locations to an alternate site of access would be:

- Maple Road connection to existing US 31 near West 4A Road
- Maple Road connection to West 2C Road
- North Lilac Road connection to Tyler Road
- Linden Road connection to Johnson Road

There will be public roads that are not listed as a likely interchange or grade separation (overpass) location or listed as a road likely to be relocated to an alternate access point. Access across the new freeway for these roads will be eliminated and a cul-de-sac constructed on either side of the new freeway. It is anticipated that there will be nine such public roads along Alternative G-Cs; however, the details of access will be refined as the project advances through the development phases. Roadways likely to lose access and be terminated with a cul-de-sac would be:

- West 7B Road
- West 5A Road
- Existing US 31 near 4A Road
- West 2C Road
- West 1B Road
- Linden Road
- Rockstroth Road
- Quinn Road
- Osborne Road



In addition to the likely locations of interchanges, grade separations and road closures, there would also be two grade separations for railroad crossings at the following locations:

- CSX Railroad on the north edge of LaPaz, between West 1B Road and East 1st Road
- Abandoned Railroad corridor just south of US 20

3.3.5 Alternative G-Es (Freeway “Hybrid” Alternative)

Alternative G-Es begins at the existing US 31 and US 30 interchange, utilizing the existing cloverleaf configuration, and proceeds northward along the existing US 31 alignment to just south of West 4A Road in Marshall County, just south of LaPaz. It then continues northward on new alignment east of LaPaz, paralleling existing US 31. Just south of the Marshall-St. Joseph County line, the alternative assumes a northeasterly direction east of Riddles Lake, and then continues north, east of Lakeville, paralleling existing US 31. Near Miller Road, the alternative turns in a northwesterly direction and crosses existing US 31 just south of Roosevelt Road. As the alternative approaches Kern Road, it assumes a northeasterly direction and ties into existing US 31, just north of Kern Road. It then follows existing US 31 northward and terminates at the existing US 31 and US 20 interchange location. It should be noted that Alternative G-Es between Kern Road and the US 31/US 20 interchange includes the same modifications as those made to Alternative Es, as discussed in Section 3.2.2.4, to be an “at grade” facility and not an elevated roadway, constructed on retaining walls.

The proposed facility would require existing intersections and access points to be converted to interchanges, overpasses (grade separations), or access closures. See Section 5.1, Traffic and Transportation, for a more detailed description of the alternative and associated access points.

It is anticipated that there will be five new interchanges along Alternative G-Es, not including the use of the existing interchange at US 30 and US 31 or modifications required at the existing US 31 and US 20 interchange. All anticipated interchange locations and types are conceptual and will be refined in later phases of the project development. Likely interchange locations and types would be:

- Utilize existing interchange at US 30
- Diamond interchange at the Marshall County proposed extension of 7th Road
- Diamond interchange at US 6 (with provisions for a potential future partial cloverleaf)
- Diamond interchange at SR 4 (Pierce Road)
- Diamond interchange at Kern Road
- Reconstruction of the existing interchange at existing US 31 and US 20



There will be grade separations (overpasses) and local service (frontage) roads for many public roads intersecting with US 31 and not listed as a likely interchange location. It is anticipated that there will be 16 grade separations along Alternative G-Es; however, the details of access will be refined as the project advances through the development phases. Likely grade separation locations would be:

- Plymouth-Goshen Trail
- Lilac Road/West 6th Road
- West 4A Road
- West 3A Road
- East 1st Road
- Tyler Road
- Kenilworth Road
- Lake Trail
- New Road
- Miller Road
- Existing US 31 south of Kern Road
- Roosevelt Road
- Main Street
- Johnson Road
- Johnson Road bridge over Main Street
- Jackson Road

There will be public roads that are not listed as a likely interchange or grade separation (overpass) locations. When two public roads are close to one another, a grade separation may be provided at one road and the other road relocated to use the same grade separation. Frontage or local service roads are provided where land may be landlocked by full access control of the alternative. It is anticipated that there will be seven such public roads along Alternative G-Es that will likely be relocated to an adjacent overpass. However, the details of access will be refined as the project advances through the development phases. Likely road relocation locations to an alternate site of access would be:

- Maple Road connection to existing US 31 near West 4A Road
- Maple Road connection to West 2C Road



- North Lilac Road connection to Tyler Road
- Existing US 31 connection to Main Street north of Kern Road
- Existing US 31 connection to Hildebrand Street south of Johnson Road
- Connection between Johnson Road and W. Ritter Avenue to Main Street
- Main Street connection to Jackson Road

There will be public roads that are not listed as a likely interchange or grade separation (overpass) location or listed as a road likely to be relocated to an alternate access point. Access across the new freeway for these roads will be eliminated and a cul-de-sac constructed on either side of the new freeway. It is anticipated that there will be 10 such public roads along Alternative G-Es; however, the details of access will be refined as the project advances through the development phases. Roadways likely to lose access and be terminated with a cul-de-sac would be:

- West 7B Road
- West 5A Road
- Existing US 31 near 4A Road
- West 2C Road
- West 1B Road
- Linden Road
- Rockstroth Road
- Quinn Road
- Osborne Road
- Jewell Avenue

In addition to the likely locations of interchanges, grade separations and road closures, there would also be a grade separation for a railroad crossing at the following location:

- CSX Railroad on the north edge of LaPaz, between West 1B Road and East 1st Road



3.4 Identification of Alternatives Studied Further

A comparison of the four modified Freeway Build Alternatives recommended for further study was completed and is discussed in detail in Chapter 4, Affected Environment; Chapter 5, Environmental Consequences; Chapter 6, Mitigation; and Chapter 7, Section 4(f) Evaluation, of this Final Environmental Impact Statement (FEIS). As discussed in Section 3.3, Description of Alternatives Selected for Detailed Study, the following five alternatives were studied further (see Figure 3.4.29).

- No-Build Alternative
- Alternative Cs (Freeway Alternative)
- Alternative Es (Freeway Alternative)
- Alternative G-Cs (Freeway Alternative)
- Alternative G-Es (Freeway “hybrid” Alternative)

Based on the following findings, Alternatives Cs, Es, G-Cs and G-Es were identified as the alternatives studied in detail (see Figure 3.4.29). This FEIS was prepared following the Draft Environmental Impact Statement (DEIS) public comment period, the public hearing and additional fieldwork. Section 3.6, Selection of the Preferred Alternative, of this document discusses the process of identifying and describes the Preferred Alternative G-Es.

For each alternative, existing US 31 and its major intersections were analyzed in accordance with the Highway Capacity Manual (HCM) to determine their present and future LOS. Future Average Daily Traffic (ADT) volumes used to conduct this analysis were generated using output from the regional travel model. Between Plymouth and South Bend, existing US 31 was analyzed in eight segments as well as at four signalized intersections and at six notable two-way stop-controlled intersections (stop control for the crossroad approaches) as listed below:

US 31 Segments:

- US 30 to Michigan Road
- Michigan Road to US 6
- US 6 to Tyler Road
- Tyler Road to Lake Trail
- Lake Trail to SR 4 (Pierce Road)
- SR 4 (Pierce Road) to Miller Road
- Miller Road to Roosevelt Road
- Roosevelt Road to US 20

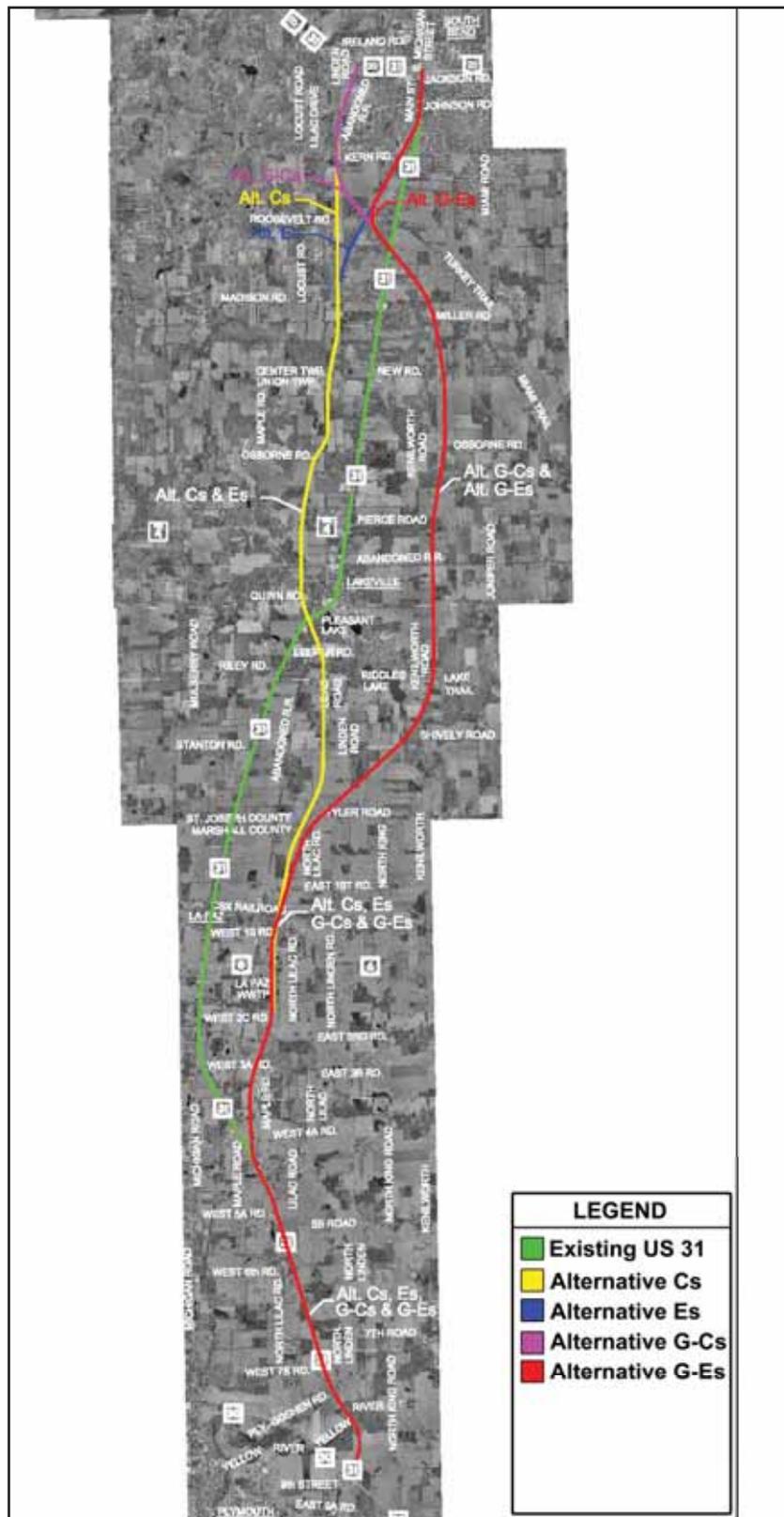


Figure 3.4.29: Preliminary Alternatives Studied in Detail – Alternatives Cs, Es, G-Cs and G-Es



US 31 Signalized Intersections:

- US 31 and US 6
- US 31 and SR 4
- US 31 and Kern Road
- US 31 and Johnson Road

US 31 Major Unsignalized Intersections (Two-Way Stop-Controlled):

- US 31 and Plymouth-Goshen Trail
- US 31 and West 5A Road
- US 31 and Tyler Road
- US 31 and New Road
- US 31 and Madison Road
- US 31 and Roosevelt Road

Table 3.4.30 shows resulting residual traffic volumes on the existing US 31 when any of the freeway alternatives are constructed. The goal of the freeway alternatives is to divert traffic from existing US 31 on to the new alternative. Table 3.4.30 shows the extent to which each freeway alternative achieves an acceptable LOS in the year 2030 for the existing US 31 corridor from US 30 to US 20. Because the alternatives are four-lane freeways in the rural area with some six-lane urban segments near US 20, traffic experiences acceptable operating conditions of LOS C or better when using the freeway alternative in rural segments, and LOS D or better for urban segments. Accordingly, the achievement of an acceptable LOS focuses on the residual traffic remaining on the existing US 31 alignment.

Substantiating the assessment of the relief of congestion on existing US 31 is the amount of residual vehicle-miles of travel (VMT) and vehicle-hours of travel (VHT), referring to Table 3.4.31. VMT measures the directness of route to the straight line from the origin to the destination of the trip, and VHT measures congested travel time.

A secondary measure for assessing the effectiveness of the freeway alternatives in relieving congestion is the reduction with VMT and VHT in the South Bend Metropolitan Area (Elkhart, Marshall and St. Joseph counties) with an unacceptable LOS (i.e., LOS E or F in urban areas and LOS D, E or F in rural areas). This performance measure addresses how well a single improvement addresses congestion problems throughout the Metro Area (not just congestion along US 31). VMT measures the directness of route to the straight line from the origin to the destination of the trip, and VHT measures congested travel time. As people are often more open to travel greater distances to save travel time, VHT is a more important consideration than VMT. Table 3.4.32 shows that the rankings for the alternatives.



Table 3.4.30: Future Traffic and LOS on Existing US 31 for the Alternatives Studied in Detail (Daily Traffic Volumes (LOS) in Year 2030 – Unacceptable LOS* Shaded)

Alternative	Segments (location of daily volume reported)							
	Rural	Rural	Rural	Rural	Rural	Rural	Rural	Urban
	US 30 to Michigan Road (north of W6A Rd)	Michigan Road to US 6 (south of US 6)	US 6 to Tyler Road (south of Tyler Road)	Tyler Road to Lake Trail (south of S. Quinn Trail)	Lake Trail to SR 4 (north of Patterson Street)	SR 4 to New Road (south of New Road)	New Road to Roosevelt Road (south of Roosevelt Road)	Roosevelt Road to US 20 (north of Kern Road)
No-Build	21,215(C)	26,542(D)	23,279(F)	23,362(D)	29,691(F)	26,789(F)	29,445(F)	39,323 (F)
Alternatives Cs	512(A)	4,485(A)	2,695(A)	2,998(A)	5,327(A)	5,435(A)	7,681(A)	18,369(D)
Alternatives Es	514(A)	4,324(A)	2,530(A)	2,837(A)	5,227(A)	4,072(A)	6,684(A)	7,987(B)**
Alternatives G-Cs	612(A)	4,593(A)	3,885(A)	4,147(A)	5,441(A)	7,001(A)	9,407(B)	19,587(D)
Alternatives G-Es	426(A)	4,450(A)	3,193(A)	3,339(A)	3,355(A)	5,187(A)	7,990(A)	9,133(B)**

* LOS C is the minimum acceptable for rural segments. LOS D is the minimum acceptable for urban segments.

** Volume south of Kern Road is shown because it is higher than north of Kern Road.

Source: US 31 Improvement Project Travel Demand Model for 2030 daily volumes.

Table 3.4.31: US 31 Residual Vehicle-Miles of Travel and Vehicle-Hours of Travel by Freeway Alternative (in Year 2030)

Alternative	VMT			VHT		
	Miles	% Change from No-Build	Rank	Hours	% Change from No-Build	Rank
No-Build	452,698			7,795		
Alternatives Cs	71,491	-84%	3	1,249	-84%	3
Alternatives Es	51,242	-89%	1	879	-89%	1
Alternatives G-Cs	87,897	-81%	4	1,528	-80%	4
Alternatives G-Es	58,901	-87%	2	1,004	-87%	2

Source: US 31 Improvement Project Travel Demand Model



Table 3.4.32: South Bend Metro Area Congested Vehicle-Miles of Travel and Vehicle-Hours of Travel by Freeway Alternative (in Year 2030)

Alternative	VMT with Unacceptable LOS			VHT with Unacceptable LOS		
	Miles	% Change from No-Build	Rank	Hours	% Change from No-Build	Rank
No-Build	2,397,910			66,479		
Alternatives Cs	2,379,539	-0.77%	3	66,246	-0.35%	3
Alternatives Es	2,386,746	-0.47%	4	66,312	-0.25%	4
Alternatives G-Cs	2,351,290	-1.90%	1	65,550	-1.40%	1
Alternatives G-Es	2,368,817	-1.20%	2	65,945	-0.80%	2

Source: US 31 Improvement Project Travel Demand Model for roadway segments with volume-to-capacity ratio greater than 0.70.

It should be noted that the focus of this project is to address transportation problems related to the US 31 corridor and not to address all transportation problems in the South Bend-Elkhart Metropolitan Area. Therefore, the evaluation of alternatives focuses on the effectiveness of alternatives in addressing the needs along the US 31 corridor. Addressing the transportation problems in the entire metropolitan area is a very important issue and is the purpose of the MACOG Long Range Transportation Plan, which identifies the need to improve the US 31 corridor from South Bend to Plymouth. That Long Range Transportation Plan identifies many other transportation improvement projects aimed at addressing other transportation needs in the metropolitan area, and considers the most effective combination of transportation improvement projects (including the US 31 improvement) to address the transportation needs of the metropolitan area.

For the No-Build alternative and for each freeway alternative, present and projected future crash rates on five segments of US 31 were compared to the average statewide crash rates for rural principal arterials (the functional classification for US 31) as listed below:

US 31 Segments:

- US 30 to LaPaz
- Through LaPaz
- LaPaz to Lakeville
- Through Lakeville
- Lakeville to US 20

Table 3.4.33 shows the extent to which each freeway alternative reduces total accidents along existing US 31 and in the Metro Area (Elkhart, Marshall and St. Joseph counties). Again, the freeway alternatives that divert the most traffic from existing US 31 result in the best performance. The reduction of accidents in the Metro Area is



a secondary consideration that examines the extent to which this improvement project alone reduces the level of accidents throughout the Metro Area (not only US 31).

Table 3.4.33: Existing US 31 and South Bend Metro Area Reduction in Total Accidents by Freeway Alternative (In Year 2030)

Alternative	Existing US 31 Total Accidents			Metro Area Total Accidents		
	Crashes	% Change from No-Build	Rank	Crashes	% Change from No-Build	Rank
No-Build	346			11,153		
Alternative Cs	65	-81%	3	11,004	-1.34%	1
Alternative Es	42	-88%	1	11,021	-1.18%	3.5
Alternative G-Cs	79	-77%	4	11,006	-1.32%	2
Alternative G-Es	49	-86%	2	11,021	-1.18%	3.5

Source: US 31 Improvement Project Travel Demand Model

Table 3.4.34 shows the total crash rate for each freeway alternative for residual traffic on existing US 31 segments. The total crash rate for each freeway alternative is compared to the Indiana average total crash rates for other rural principal arterials. The freeway alternatives that divert the most traffic from existing US 31 result in the lowest total crash rates.

Table 3.4.34: Total Crash Rate by Alternative for Existing US 31 Segments (in year 2030)
(Total crash rate exceeding statewide rural principal arterial of 186.57 shaded)

Alternative	US 30 to LaPaz	Through LaPaz	LaPaz to Lakeville	Through Lakeville	Lakeville to US 20
No-Build	94.17	250.82	45.04	456.04	239.93
Alternative Cs	15.91	29.05	5.78	81.82	79.81
Alternative Es	15.34	27.27	5.47	80.28	47.11
Alternative G-Cs	16.30	41.88	8.00	83.57	91.04
Alternative G-Es	15.79	34.42	6.44	51.53	56.02

Note: Assumes crash rate changes in proportion to residual daily traffic on existing US 31

A comparative summary of the socio-economic and environmental impacts of the four freeway alternatives, Alternatives Cs, Es, G-Cs and G-Es is contained in Table 3.4.35. Regarding the values contained in Table 3.4.35, the following should be noted:

- All costs are in millions of dollars and year 2005 dollars
- All values are based on a 300-foot total right-of-way with additional right-of-way required at interchange locations, at grade separations (overpasses and underpasses), and at other locations related to local access issues as is reflected in the footprint of the alternative



- Local Road Improvement Projects include preliminary engineering, right-of-way, and construction costs and are further discussed in Section 3.5
- Businesses Acquired includes large farming operations
- Estimated Farmed Wetlands are calculated as 2% of all Hydric Soils on agricultural land. The percentage is an estimate based on coordination with the Natural Resources Conservation Service (NRCS)

Table 3.4.35: Alternatives Studied in Detail

Socio-Economic/Environmental Measure	ALTERNATIVE				
	Cs	Es	G-Cs	G-Es	Final Pref. Alt. G-Es ¹
COSTS (Total) (Mil. Of \$) (year 2005 dollars)	324.7 to 327.9	362.3 to 365.9	332.2 to 339.7	366.9 to 374.4	371.0 to 378.3
Length (Miles)	19.5	19.9	20.3	20.5	20.5
No. of New Interchanges (Total Interchanges)	5 (7)	5 (6)	5 (7)	5 (6)	5 (6)
No. of Grade Separations (Overpass/Underpass)	16	16	16	16	16
No. of Grade Separations (Railroad Crossings)	2	1	2	1	1
CONSTRUCTION COSTS (Mil. of \$)	208.6 to 211.8	218.2 to 221.3	213.4 to 220.9	221.7 to 228.7	223.2 to 230.2
RECONSTRUCTION of US 20 Right-of-Way & Construction (Mil. of \$)	29.6	21.1	29.6	21.1	21.1
LOCAL & STATE ROAD IMPROVEMENT PROJECTS Right-of-Way & Construction (Mil. Of \$)	3.6	11.5	5.8	13.7	13.6
US 31 MAINLINE RIGHT-OF-WAY COSTS (Mil. of \$)	44.7	70.7	47.1	70.9	72.5
ENGINEERING COSTS (Mil. of \$)	13.7	18.1	13.9	18.3	18.3
UTILITY RELOCATION COSTS (Mil. of \$)	17.2	17.2	17.2	17.2	17.2
MITIGATION COSTS (Mil. of \$)	7.3	5.5 to 6.0	5.2	4.0 to 4.5	5.1 to 5.4
TRAFFIC PERFORMANCE					
Meet Purpose and Need	Yes	Yes	Yes	Yes	Yes
Performance (Compared to Other Alternatives, 1 is Best Performer)	3	1	4	2	2
LAND USE	961 Ac.	968 Ac.	1,012 Ac.	1,011 Ac.	1,061 Ac.
Agricultural (row crop)	390 Ac.	395 Ac.	504 Ac.	503 Ac.	537 Ac.
Commercial	15 Ac.	23 Ac.	16 Ac.	23 Ac.	23 Ac.
Church/Religious	2 Ac.				
Herbaceous Cover	51 Ac.	48 Ac.	68 Ac.	52 Ac.	53 Ac.



Table 3.4.35: Alternatives Studied in Detail (Continued)

Socio-Economic/Environmental Measure	ALTERNATIVE				
	Cs	Es	G-Cs	G-Es	Final Pref. Alt. G-Es ¹
Open Water	<1 Ac.				
Pasture	14 Ac.	12 Ac.	3 Ac.	4 Ac.	4 Ac.
Transportation	213 Ac.	220 Ac.	217 Ac.	222 Ac.	226 Ac.
Residential	51 Ac.	86 Ac.	55 Ac.	77 Ac.	82 Ac.
Scrub/Shrub	38 Ac.	46 Ac.	31 Ac.	36 Ac.	37 Ac.
Woodland (Wetland & Non-Wetland) (Forests)	186 Ac.	135 Ac.	115 Ac.	91 Ac.	96 Ac.
RELOCATIONS					
Residences Acquired	50	128	59	124	131
Businesses Acquired ²	7	40	5	39	39
Businesses Damaged	5	13	5	13	13
Churches Acquired	1	1	1	1	1
HISTORIC PROPERTIES (Listed or Eligible)					
SECTION 4(f) PROPERTIES	0	0	0	0	0
PROPERTIES WITHIN A.P.E.	5	4	9	8	8
PROPERTIES ADVERSELY AFFECTED BUT NO SUBSTANTIAL LOSS OF INTEGRITY	0	0	1	1	1
ARCHAEOLOGICAL SITES					
Within Alignment	2	3	2	3	3
TOTAL WETLANDS (NWI + FARMED)	51.6 Ac.	35.6 Ac.	30.7 Ac.	23.9 Ac.	29.93 Ac.³
WETLANDS (From NWI Maps)	49.6 Ac.	33.7 Ac.	27.8 Ac.	21.1 Ac.	
Forested	21.8 Ac.	17.8 Ac.	17.7 Ac.	14.8 Ac.	13.21 Ac.
Scrub/Shrub	3.0 Ac.	1.6 Ac.	1.4 Ac.	0.0 Ac.	1.45 Ac.
Emergent	24.0 Ac.	13.6 Ac.	8.7 Ac.	6.3 Ac.	15.27 Ac.
Aquatic Bed	0.8 Ac.	0.7 Ac.	0.0 Ac.	0.0 Ac.	0.0 Ac.
ESTIMATED FARMED WETLANDS	2.0 Ac.	1.9 Ac.	2.9 Ac.	2.8 Ac.	0.44 Ac.⁴
STREAM IMPACTS (No. of Impact Locations) (USGS)	18	19	18	17	17
WILDLIFE HABITAT AREAS					
Potato Creek State Park & Swamp Rose Nature Preserve	0	0	0	0	0
Notable Wildlife Habitat (IDNR)	2	1	0	0	0
Classified Wildlife Habitat (IDNR)	4	3	0	0	0



Table 3.4.35: Alternatives Studied in Detail (Continued)

Socio-Economic/Environmental Measure	ALTERNATIVE				Final Pref. Alt. G-Es ¹
	Cs	Es	G-Cs	G-Es	
Classified Forest (IDNR)	2-3	2-3	1-2	1-2	1-2
Conservation Reserve Program (CRP) (NRCS)	1	2	2	1	1
Wetland Reserve Program (WRP) (NRCS)	1	1	0	0	0
Partners for Fish and Wildlife Program (USFWS)	2	1	0	0	0
INDIRECT IMPACTS					
Farmland	115 Ac.	50 Ac.	105 Ac.	45 Ac.	45 Ac.
Wetland	3 Ac.	3 Ac.	3 Ac.	3 Ac.	3 Ac.
Forests	30 Ac.	25 Ac.	10 Ac.	10 Ac.	10 Ac.

NOTES: The final impacts associated with Preferred Alternative G-Es are Shaded

1. Following the identification of Alternative G-Es as the Preferred Alternative, additional, in-depth studies were performed on the alternative. These additional studies included, but were not limited to, refinement of local access plan and proposed right-of-way requirements, wetland delineations, wetland quality evaluations, Phase 1a Archaeological Review, etc.
2. Businesses acquired include large farming operations
3. Delineations of wetlands resulted in 29.93 acres of wetlands impacted, of which, 25.51 acres of which were jurisdictional and 4.42 acres were isolated wetlands.
4. One farmed wetland area was identified. This area met the three U.S. Army Corps of Engineers wetland criteria and was considered an emergent wetland. This farmed wetland was included in the emergent wetland total.

It is important to again note that the US 31 Improvement Project has been a dynamic process. Similar impact information presented in previous sections of this document was from data and conceptual design parameters available at an earlier stage in the progress of the study. The study team has continued to collect and analyze data related to social and environmental impacts for each of the preliminary freeway alternatives under consideration, including detailed field reviews, throughout the study. Proposed lane configurations, interchange locations and configurations, overpass locations, more accurate proposed right-of-way limits, and revised construction cost estimates for each of the alternatives were continually developed and the associated impacts updated. Impact information contained in previous tables may be slightly different than those contained in Table 3.4.35. Additionally, impact information contained in subsequent sections of this document will likely be different as additional information will be collected and design will be further developed.

South of Tyler Road, Alternatives Cs, Es, G-Cs and G-Es all follow the same alignment located east of existing US 31; therefore, their impacts are equal. From Tyler Road to Madison Road, Alternatives Cs and Es follow the same alignment and are for the most part located on the west side of existing US 31, while Alternatives G-Cs and G-Es remain on the east side of existing US 31. From Madison Road to US 20, Alternatives Cs and Es diverge and continue northward to US 20. Alternative Cs terminates at a new interchange at US 20, approximately one mile west of the existing US 31 and US 20 interchange. Alternative Es terminates at the existing US 31 and US 20 interchange. Alternatives G-Cs and G-Es cross from the east side to the west side of existing US 31 just south of Roosevelt Road, where they then diverge. Alternative G-Cs continues northwest and ties into the Alternative Cs alignment and also terminates at a new interchange at US 20, approximately one mile west of the existing US 31 and US 20 interchange. Alternative G-Es, as it approaches Kern Road, assumes a northeasterly direction and ties into existing US 31, just north of Kern Road. It then follows existing US 31 northward and terminates at the existing US 31 and US 20 interchange location.



Natural Resource Impacts

Regarding wetland impacts, based on calculations from the National Wetland Inventory (NWI) Maps and an estimate of farmed wetland impacts, Alternative G-Es has the least amount of wetland impacts at 23.9 acres, followed by Alternative G-Cs at 30.7 acres, followed by Alternative Es at 35.6 acres, and then Alternative Cs with the highest amount at 51.6 acres. The No-Build Alternative would have no impact on this resource.

Wetland delineations were performed from the Preferred Alternative G-Es during July - October 2004. A total of 29.93 acres of wetland were delineated within the Preferred Alternative G-Es footprint. Representatives from the United States Army Corps of Engineers (USACE) and IDEM reviewed the potential wetland impacts for the Preferred Alternative G-Es during a field review on November 4-6, 2004. In a jurisdictional determination letter dated February 24, 2005, the USACE identified 25.51 acres as falling under federal jurisdiction and 4.42 acres as isolated wetlands. Isolated wetland impacts will likely fall under state jurisdiction under the Indiana Department of Environmental Management (IDEM) Isolated Wetlands Regulatory Program.

Alternatives Cs and Es traverse an area of complex glacial drift in the northwestern quarter of the study area, from approximately the north edge of Lakeville to US 20, formerly the Maxinkukee Moraine (see Figure 5.9.15). The unique glacial deposits in this area are also unique from a wildlife habitat perspective. These areas are less conducive to agriculture, thus many forested and wetland communities remain. The majority of threatened and endangered species records from the Indiana Natural Heritage Data Center are from this area, as are many of the notable wildlife habitat areas as identified by the Indiana Department of Natural Resources (IDNR), and lands enrolled in state and federal programs that promote and manage wildlife habitat. Alternative G-Cs avoids this area for the most part, with the exception of the northern most portion, from approximately Roosevelt Road to its northern terminus at US 20. Alternative G-Es is located east of and avoids this complex glacial drift area.

Regarding floodplain impacts and water crossings for this analysis, an interim version of the Indiana Department of Natural Resources Division of Water Digital Flood Insurance Rate Maps (DFIRM) was used to determine potential floodplain impacts. The purpose of this interim digital data is to provide much of the same information as the paper Federal Emergency Management Agency (FEMA) FIRM. Hard copy FEMA FIRM were also checked for floodplain impacts. Section 5.11, Floodplains, provides a more detailed analysis related to potential floodplain impacts associated with each of the alternatives studied in detail. Based on this analysis, Alternative Cs and Es have the least amount of potential floodplain impacts with 1,400 and 1,450 feet in length of impacts, respectively, along with 10.3 and 9.9 acres in area. Alternatives G-Cs and G-Es have similar potential floodplain impacts at 1,995 and 2,045 feet in length of impacts, respectively, along with 11.4 acres in area. Related to the floodplain impacts is the number of water crossings noted for each of the alternatives studied in detail. Alternative Es has the most stream impacts with 19, followed by Cs and G-Cs with 18. Alternative G-Es has 17 stream impact locations. The No-Build Alternative would have no impact on these resources.

Agricultural Land/Farmland Impacts

Regarding farmland impacts (agricultural, row crops), Alternatives Cs at 390 acres and Es at 395 acres impact essentially the same amount of farmland while Alternative G-Cs at 504 acres and Alternative G-Es at 503 acres would impact approximately 115 acres more than the other two alternatives studied in detail. The No-Build Alternative would have no impact on this resource.

Purpose and Need

Although Alternatives Cs, Es, G-Cs and G-Es all meet the purpose and need of the project, they perform at different levels with regard to reduction in congestion. Section 5.1, Traffic and Transportation, provides a more detailed analysis related to traffic performance of each of the alternatives studied in detail.



Alternative Es is the best traffic performer of the four alternatives studied in detail as it provides existing US 31 with an LOS of A from the southern terminus at the US 31 and US 30 interchange to Roosevelt Road. From Roosevelt Road to the northern termini at US 20, the alternative provides an LOS of B.

Alternative G-Es performs very similarly to Alternative Es as it provides existing US 31 with an LOS of A from the southern terminus at the US 31 and US 30 interchange to Roosevelt Road. From Roosevelt Road to the northern termini at US 20, the alternative provides an LOS of B. The difference between the performance of Alternatives Es and G-Es is that Alternative G-Es has a future daily traffic volume that is approximately 1,150 vehicles per day higher than that of Alternative Es (see Table 3.4.30).

Alternative Cs provides existing US 31 with an LOS of A from the southern terminus at the US 31 and US 30 interchange to Roosevelt Road. From Roosevelt Road to the northern termini at US 20, the alternative provides an LOS of D, the minimum acceptable LOS for an urban section.

Alternative G-Cs performs very similarly to Alternative Cs as it provides existing US 31 with an LOS of A from the southern terminus at the US 31 and US 30 interchange to New Road. From New Road to Roosevelt Road, the alternative provides an LOS of B. From Roosevelt Road to the northern termini at US 20, the alternative provides an LOS of D, the minimum acceptable LOS for an urban type section.

Even though the No-Build Alternative would not address the purpose and need for this project, it was carried forward for evaluation throughout the development of the Environmental Impact Statement and served as a baseline when comparing the effectiveness and potential impacts of other alternatives; however, it is not considered the preferred alternative.

Other Considerations

Community Opinion:

Meetings with the St. Joseph County Chamber of Commerce, business groups and local developers during the initial screening phase of the project indicated a general preference in the alternatives studied in detail that terminate to the west of the existing US 31 and US 20 interchange. This would include both Alternatives Cs and G-Cs. Items influencing this preference include the elimination of the disruption of existing businesses along US 31 that are south of US 20 for alternatives that utilize the existing US 31 alignment. This would include Alternatives Es and G-Es.

Additionally, local commercial development is expected in the area immediately north of US 20 and west of existing US 31 along Ireland Road. Local chamber of commerce officials and local developers have indicated that the alternatives that terminate west of the existing US 31 and US 20 interchange, Alternatives Cs and G-Cs, would better serve this planned commercial development. This is confirmed in a letter from Mark N. Egan, CCE, President and CEO of the Chamber of Commerce of St. Joseph County, and contained in Appendix C.

Following publication of the DEIS, City of South Bend officials expressed concerns with Preliminary Alternative Es related to the proposed facility being an elevated roadway, constructed on retaining walls, from Kern Road northward to the US 31/US 20 interchange. Along with this, they were also concerned with local access to the subdivisions on the east and west sides of the alternative between Kern Road and the US 31/US 20 interchange. These concerns were expressed in two separate letters from the City of South Bend Mayor Stephen Luecke and contained in Appendix C.

Local officials in South Bend met with the Project Management Team on two occasions to discuss these concerns and potential modifications to the alternative to address these concerns. Through the course of discussions at these



meetings, modifications were made to the alternative as well as the local access plan that was in the best interests of both the City of South Bend and INDOT. These modifications included revising the alternative between Kern Road and the US 31/US 20 interchange to be an “at grade” facility and not an elevated roadway, constructed on retaining walls. A revised local access plan was also developed to improve north-south connectivity between Kern Road and Ireland Road, just north of US 20 as discussed in Section 3.5, Local Road Improvements. East-west connectivity across US 31 was improved with the addition of grade-separated crossings at Johnson Road and Jackson Road and the extension of Main Street southward, under the proposed US 31, to existing US 31 near Kern Road. Following these modifications to the alternative and the associated local access plan, City of South Bend officials expressed in a letter (see Appendix C) that they were prepared to support an alternative that terminates at the existing US 20 and US 31 interchange, Alternatives Es and G-Es, if chosen as the preferred route.

Compatibility with Local Land Use Plans:

The Plymouth Comprehensive Plan includes the upgrade of US 31. There were some inconsistencies between the draft comprehensive plan and the interchange locations, grade separation locations and road closures and potential relocations for the continuation of access contained in the DEIS. Instead of an interchange located at West 5A Road as was included in the DEIS, the Draft Plymouth Comprehensive Plan indicated an interchange to be located at 7th Road where a roadway or intersection with existing US 31 does not currently exist. For the Plymouth-Goshen Road, the comprehensive plan recommends a grade separation, which was consistent with the DEIS. At both West 7B Road and Lilac Road/West 6th Road, the comprehensive plan recommends a road closure, which was consistent with the DEIS.

The Marshall County Thoroughfare Plan assumes the upgrade of existing US 31 throughout Marshall County. The alternatives under consideration each leave the existing US 31 alignment near West 4A Road, prior to the north border of Marshall County. The thoroughfare plan recommends the closure of West 5A Road, which was identified as an interchange location the DEIS. It also identifies a grade separation at West 4A Road. However, the DEIS identified this location as a public road that is not listed as a likely interchange or grade separation (overpass) location, or listed as a road likely to be relocated to an alternate access point. The local access plan contained in the DEIS recommended access across the new freeway for West 4A Road be eliminated and a cul-de-sac constructed on either side of the new freeway. The thoroughfare plan recommends the closure of West 2C Road which was consistent with the DEIS.

Following publication of the DEIS, local officials in Marshall County and Plymouth expressed concerns with the local access plan associated with the preliminary alternatives within the county and met with the Project Management Team on two occasions to discuss these access issues. These issues focused on interchange, overpass/underpass and cul-de-sac locations. Through the course of discussions at these meetings, Marshall County, Plymouth and INDOT officials were able to modify the Marshall County local access plan and produce a plan that was in the best interest of both parties. The most significant change related to the revised Marshall County local access plan involved the elimination of a proposed interchange at West 5A Road and the addition of an interchange at 7th Road. This change in local access is consistent with the Marshall County Comprehensive Plan and the Plymouth Comprehensive Plan. No interchange had been proposed at the 7th Road location initially as no intersecting roadway currently exists at 7th Road and US 31. Due to the lack of a connecting roadway at the 7th Road interchange location, Marshall County officials made a written commitment to complete a 7th Road extension project that would begin at Michigan Road and extend eastward to the western limits of the proposed US 31 interchange at 7th Road. It would then begin on the east side of the proposed 7th Road interchange and continue eastward to 7th Road. This commitment included funding associated with preliminary engineering, environmental studies, right-of-way acquisition and construction costs. It is anticipated that Marshall County will utilize Federal funding for the construction of the 7th Road Extension Project, which will require the associated environmental evaluation



to follow the NEPA process. It should be noted that while the US 31 and 7th Road interchange, including the US 31 Bridge over 7th Road and the associated interchange ramps, is identified as a part of this EIS, the timing of the construction of the interchange is directly related to the timing of the construction of the 7th Road Extension Project. Construction of the interchange ramps that will provide access to and from US 31 at 7th Road will not be completed by INDOT prior to the completion of the 7th Road Extension NEPA process and the construction of the 7th Road Extension Project by the county.

The South Bend and St. Joseph County Comprehensive Plan incorporates the Michiana Area Council of Governments (MACOG), the local Metropolitan Planning Organization (MPO) plan. The plan is consistent with this study but the plan is not specifically related to interchanges, grade separations and road closures. The MPO land use plan identifies that area immediately south of the existing US 31 and US 20 interchange as an area expected to see residential growth in the future. It also identifies the portion of US 31 included in the study area as an area that would benefit from further study.

Total Costs:

Total costs associated with each of the four alternatives studied in detail range from \$324.7 to \$374.4 million. These preliminary total costs include construction costs associated with the alternative, required reconstruction of US 20, local road improvement projects, right-of-way costs and preliminary engineering (design) costs. The costs are in year 2005 dollars. Alternative Cs has the lowest total cost between \$324.7 and \$327.9 million. Alternative G-Cs has a total cost between \$332.2 and \$339.7 million. Alternative Es has a total cost between \$362.3 and \$365.9 million. Alternative G-Es has the highest total cost between \$366.9 and \$374.4 million.

A comparison of construction costs indicates that Alternative Cs has the lowest construction cost between \$208.6 and \$211.8 million. Alternatives G-Cs and Es have essentially the same construction costs with Alternative G-Cs between \$213.4 and \$220.9 million and Alternative Es between \$218.2 and \$221.3 million. Alternative G-Es has construction costs between \$221.7 and \$228.7 million. The difference in construction costs associated with the alternatives is largely due to the differences in length of the alternatives as the longest alternative, Alternative G-Es, is one mile longer than the shortest alternative, Alternative Cs.

Alternative Cs also has the lowest right-of way costs at approximately \$44.7 million. Even though Alternative G-Cs is a mile longer and has a higher construction cost, its right-of-way costs of approximately \$47.1 million are only slightly higher than Cs. Alternative Es and G-Es have the highest right-of-way costs at approximately \$70.7 and \$70.9 million, respectively. Differences in the right-of way costs are largely due to the number and type of relocations associated with each alternative.

Utility relocation costs associated with Alternatives Cs, Es, G-Cs and G-Es are estimated at \$17.2 million. An estimate of wetland, noise and stream mitigation costs associated with Alternative G-Es ranges from \$4.0 to \$4.5 million. Mitigation costs associated with Alternatives G-Cs and Es are similar and estimated at \$5.2 million and ranging from \$5.5 and \$6.0 million, respectively. Alternative Cs has the highest estimated mitigation costs at \$7.3 million.

Cost associated with the No-Build Alternative would only include cost for the capacity expansion projects that are programmed for construction.

Residential/Commercial Relocations:

Relocations for each of the four alternatives studied in detail vary as related to residential and commercial



relocations. Alternatives Es and G-Es have the highest number of residential relocations with 128 and 124, respectively. Alternative G-Cs has 59 residential relocations and Cs has the fewest at 50 residential relocations. Differences in commercial relocations indicate that Alternatives Es and G-Es are substantially higher than Cs and G-Cs, which have essentially the same number. Alternatives Es and G-Es impact a commercial corridor as they join existing US 31 from just north of Kern road to US 20. Commercial relocations for Alternative Es are 40 businesses acquired and 13 businesses damaged. Commercial relocations for Alternative G-Es are 39 businesses acquired and 13 businesses damaged. Alternative Cs has seven associated business relocations and five businesses damaged. Alternative G-Cs has the least impacts to businesses with five business relocations and five businesses damaged. The No-Build Alternative would have no impacts to residents or businesses beyond those associated with the programmed capacity expansion projects.

Noise Impacts:

Noise impacts for each of the four alternatives studied in detail indicate no conclusive advantage for any one of the alternatives studied in detail. Each of the alternatives studied in detail is close to some suburban neighborhoods in the north end of the project area. Alternative Cs is slightly higher than the others with approximately 78 residences, one business and four recreational areas, including two baseball and two soccer fields, impacted. It should be noted that approximately 30 of the residences impacted by Alternative Cs are in very close proximity to each other as they are all located within the Sun Communities Mobile Home Park off of Locust Road. Es impacts approximately 51 residences, three businesses and four recreational areas, including two baseball and two soccer fields. Alternative G-Cs impacts approximately 64 residences, no business and four recreational areas including two baseball and two soccer fields. Preferred Alternative G-Es impacts approximately 53 residences, two businesses and four recreational areas, including two baseball and two soccer fields. No-Build Alternative would have no noise impacts beyond those associated with the programmed capacity expansion projects.



3.5 Local Road Improvements

The conversion and/or replacement of a partial or no access control non-freeway facility, such as existing US 31, to a freeway facility with full access control, as is the case with each of the four alternatives studied in detail (Alternatives Cs, Es, G-Cs and G-Es) will often have dramatic effects on the local traffic patterns. These types of projects will often concentrate the flow of local traffic to the lower-level local roadways that feed upper-level local and state roadways that provide access to the freeway. There is often a substantial increase in traffic volumes associated with the traffic migration to the local or state roadways that have access to the new freeway facility. This increase in traffic volumes can often change the facility type and functional classification of the local or state roadway and accelerate the need to improve the local or state roadway.

The upgrade of US 31 to a freeway facility with full access control will affect the flow of local traffic, as local commuters will redirect their routes to roadways with access to the freeway. These changes in traffic patterns will affect the traffic volume and change the type of facility or some of the local or state roadways that will access the new freeway. This will drive the need for expansion of the local or state roadways, the need for which is accelerated by the improvements to US 31. Local and State roadway improvements identified for the US 31 Improvement Project include:

State Roadways

- US 6 upgrade to four lanes from just east of the existing US 31 and US 6 intersection, eastward to the proposed interchange – Alternatives Cs, Es, G-Cs and G-Es
- SR 4 (Pierce Road) extension from existing US 31 to new US 31 – Alternatives G-Cs and G-Es

Local Roadways

- Fellows Street extension southward over existing US 20 from Ireland Road to Jackson Road – Alternative G-Es
- Scott Street extension northward over existing US 20 from Jackson Road to Ireland Road – Alternative G-Es
- 7th Road extension in Marshall County from Michigan Road eastward to the new US 31 and 7th Road interchange and further eastward to existing 7th Road – Alternatives Cs, Es, G-Cs and G-Es

The socio-economic and environmental impacts for the US 6 extension, the SR 4 (Pierce Road) extension, Fellows Street extension and Scott Street extension local roadway improvement projects have been included in the summary of impacts for Alternatives Cs, Es, G-Cs and G-Es, contained in Table 3.6.39. Costs associated with preliminary engineering (design), right-of-way and right-of-way engineering (design) and construction of the local roadway improvement project, for each of the alternatives, are listed as a line item in the table. All other socio-economic and environmental impacts are also included with those of the alternative. It should be noted that the socio-economic and environmental impacts for the 7th Road extension local roadway improvement project in Marshall County have not been included in the summary of impacts contained in Table 3.6.39. Marshall County officials have committed to this project as a local project utilizing local funding which will eventually require a separate environmental analysis to be conducted following the NEPA process.

3.5.1 US 6 Upgrade

The US 6 Upgrade local roadway improvement project consists of the extension of the existing four-lane section of US 6 from just east of the existing US 31 and US 6 intersection, eastward to the proposed interchange (see Figure 3.5.30). Preliminary Alternatives Cs, Es, G-Cs and G-Es may need this local road improvement project. It is anticipated that the addition of two lanes of pavement, resulting in a total of four lanes, would occur on the north side of



Figure 3.5.30: US 6 Upgrade Local Roadway Improvement Project



the existing two lanes of pavement. An approximate total right-of-way width of 150 feet (approximately 50 feet of additional right-of-way north of the existing right-of-way line) was used to determine socio-economic and environmental impacts contained in Table 3.6.39.

Construction Costs

The construction costs and preliminary engineering (design) fees associated with the improvements to US 6 related to Alternatives Cs, Es, G-Cs and G-Es would be approximately \$2,600,000 (year 2005 dollars). This would include the construction of two new lanes of pavement approximately one mile in length. Upgrading this two-lane roadway to desirable standards for a four-lane section would include the addition of two 12-foot lanes with a 10-foot paved outside shoulder and a 4-foot paved median shoulder.

Right-of-Way Costs

The right-of-way costs and right-of-way engineering (design) fees associated with the improvements to US 6 related to Alternatives Cs, Es, G-Cs and G-Es would be approximately \$1,600,000 (year 2005 dollars). This would include one residential relocation, no business relocations and approximately seven acres of new right-of-way.

Traffic Volumes

Current year 2000 traffic counts along US 6 in this area are approximately 7,400 vehicles per day. The predicted future year 2030 traffic volumes along US 6 in this area associated with the No-Build Alternative are approximately 8,935 vehicles per day. The predicted future year 2030 traffic volumes along US 6 associated with the improvements to US 6 between existing US 31 and the proposed interchange, west of the proposed interchange, and traffic volumes along US 6 east of the proposed interchange related to each of the preliminary freeway alternatives are summarized in Table 3.5.36:

ALTERNATIVE	West of Proposed Interchange (Between Existing US 31 and Proposed Interchange)	East of Proposed Interchange
Alternative Cs	8,880 vehicles per day	13,780 vehicles per day
Alternative Es	9,515 vehicles per day	11,850 vehicles per day
Alternative G-Cs	9,025 vehicles per day	12,080 vehicles per day
Alternative G-Es	9,920 vehicles per day	11,535 vehicles per day

3.5.2 SR 4 (Pierce Road) Upgrade

The SR 4 (Pierce Road) Upgrade local roadway improvement project consists of the extension of SR 4 from the existing US 31 and SR 4 intersection, eastward to the proposed interchange (see Figure 3.5.31). The existing segment of roadway in this area is currently a county road named Pierce Road. Preliminary Alternatives G-Cs and G-Es may need this local road improvement project. For the SR 4 (Pierce Road) extension, a total right-of-way width of 100 feet was used to determine socio-economic and environmental impacts as contained in Table 3.6.39. For this

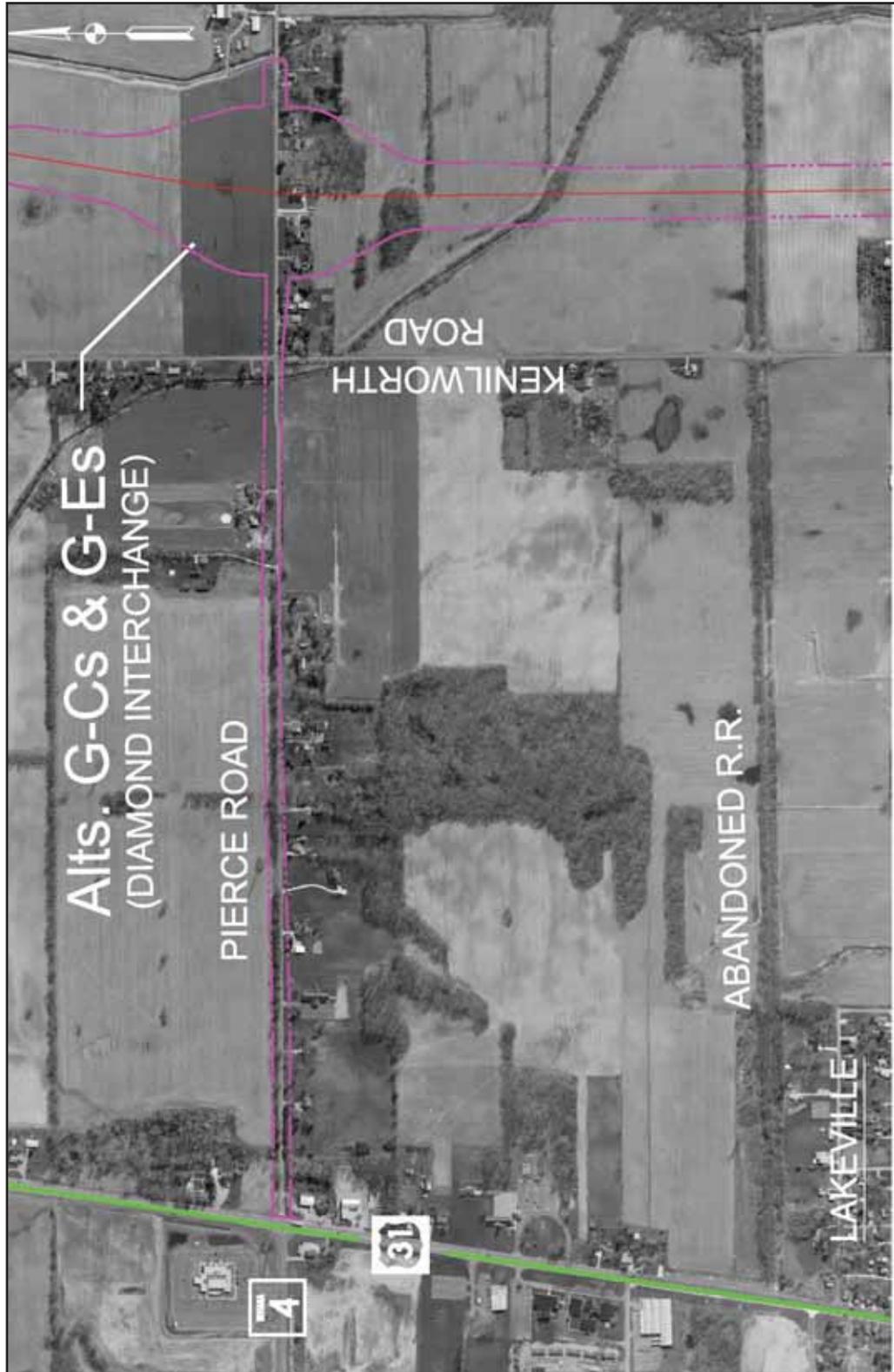


Figure 3.5.31: SR 4 (Pierce Road) Upgrade Local Roadway Improvement Project



local roadway improvement project, the proposed roadway alignment was shifted slightly northward of the existing roadway alignment so that a majority of the right-of-way impacts were along the north side of Pierce Road.

Construction Costs

The construction costs and preliminary engineering (design) fees associated with the improvements to SR 4 (Pierce Road) related to Alternatives G-Cs and G-Es would be approximately \$1,400,000 (year 2005 dollars). This would include approximately 1.25 miles of new two-lane roadway and one stream crossing. Upgrading this two-lane roadway to desirable standards would include a roadway typical section consisting of 12-foot lanes with 10-foot paved shoulders, on a total of approximately 100 feet of right-of-way.

Right-of-Way Costs

The right-of-way costs and right-of-way engineering (design) fees associated with the improvements to SR 4 (Pierce Road) related to Alternatives G-Cs and G-Es would be approximately \$800,000 (year 2005 dollars). This would include no residential relocations, no business relocations and approximately ten acres of new right-of-way.

Traffic Volumes

Current year 2000 traffic counts along Pierce Road in this area are approximately 790 vehicles per day. The predicted future year 2030 traffic volumes along Pierce Road in this area associated with the No-Build Alternative are approximately 875 vehicles per day. The predicted future year 2030 traffic volumes along Pierce Road associated with the extension of SR 4 and the improvements to Pierce Road between existing US 31 and the proposed interchange are approximately 2,385 vehicles per day for Alternative G-Cs and 4,070 vehicles per day for Alternative G-Es.

3.5.3 Fellows Street Extension

Following publication of the Draft Environmental Impact Statement (DEIS), City of South Bend officials expressed concerns with local access to the subdivisions on the east and west sides of the Alternatives Es and G-Es between Kern Road and the US 31/US 20 interchange. Local officials in South Bend met with the Project Management Team on two occasions to discuss these concerns and potential modifications to the alternatives to address these concerns. Through the course of discussions at these meetings, modifications were made to the local access plan that was in the best interests of both the City of South Bend and the Indiana Department of Transportation (INDOT). These modifications included the development of a revised local access plan aimed at improving north-south connectivity between Kern Road and Ireland Road, just north of US 20. The revised local access plan included the addition of two separate grade separated crossings of US 20, one on the east side of US 31 at Fellows Street and the other on the west side of US 31 at Scott Street as discussed below.

The Fellows Street extension local roadway improvement project consists of the extension of Fellows Street from the existing Ireland Road and Fellows Street intersection just north of US 20, southward over US 20 to Jackson Road (see Figure 3.5.32). Preliminary Alternatives Es and G-Es may need this local road improvement project. For the Fellows Street extension, a total right-of-way width of 100 feet was used to determine socio-economic and environmental impacts as contained in Table 3.6.39.

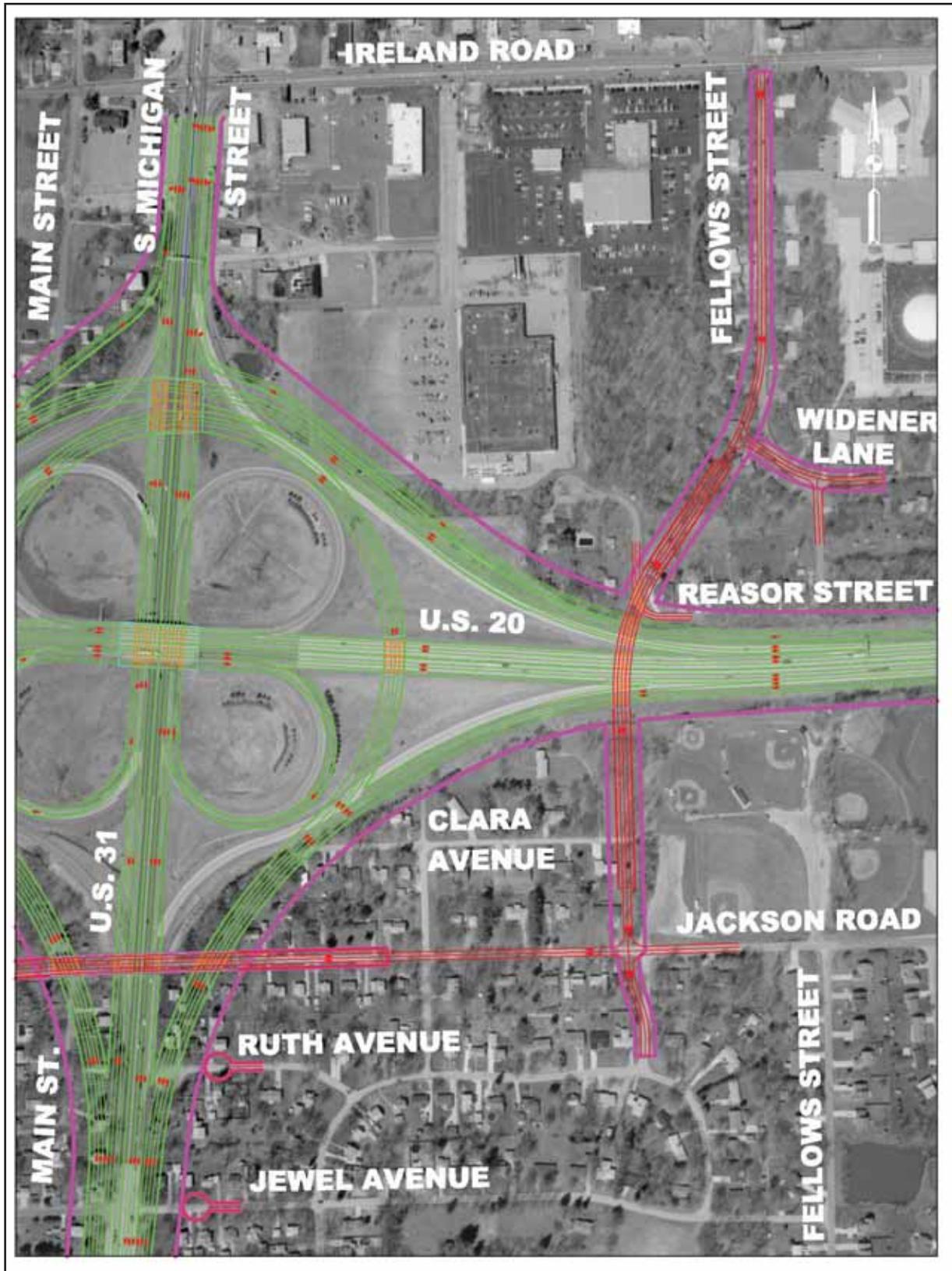


Figure 3.5.32: Fellows Street Extension Local Roadway Improvement Project



Construction Costs

The construction costs and preliminary engineering (design) fees associated with the Fellows Street extension local roadway improvement project related to Alternatives Es and G-Es would be approximately \$2,800,000 (year 2005 dollars). This would include approximately 0.5 miles of new two-lane roadway and the bridge crossing US 20. Upgrading this two-lane roadway to desirable standards would include a roadway typical section consisting of 12-foot lanes with 10-foot paved shoulders.

Right-of-Way Costs

The right-of-way costs and right-of-way engineering (design) fees associated with the Fellows Street extension local roadway improvement project related to Alternatives Es and G-Es would be approximately \$1,800,000 (year 2005 dollars). This would include seven residential relocations, no business relocations and approximately five acres of new right-of-way.

Traffic Volumes

The Fellows Street north-south connection across US 20 does not currently exist as existing Fellows Street terminates just north of US 20. Current year 2000 traffic counts along this segment of Fellows Street were not available but are approximated at less than 1,000 vehicles per day. The predicted future year 2030 traffic volumes along Fellows Street in this area associated with the No-Build Alternative are expected to increase slightly; however, the increase would be very minimal and future volumes would likely remain at less than 1,000 vehicles per day. The predicted future year 2030 traffic volumes along Fellows Street associated with the extension of Fellows Street southward from Ireland Road, over US 20 to Jackson Road, are approximately 5,700 vehicles per day for Alternatives Es and G-Es.

3.5.4 Scott Street Extension

As discussed above, the Fellows Street extension and the Scott Street extension local roadway improvement projects developed in response to concerns expressed by City of South Bend officials related to local access to the subdivisions on the east and west sides of the Alternatives Es and G-Es between Kern Road and the US 31/US 20 interchange. Modifications were made to the local access plan contained in the DEIS that was in the best interests of both the City of South Bend and the Indiana Department of Transportation (INDOT). These modifications included the development of a revised local access plan aimed at improving north-south connectivity between Kern Road and Ireland Road, just north of US 20. The revised local access plan included the addition of two different grade separated crossings of US 20, one on the west side of US 31 at Scott Street and the other on the east side of US 31 at Fellows Street as discussed above.

The Scott Street extension local roadway improvement project consists of the extension of Scott Street from the existing Jackson Road and Scott Street intersection just south of US 20, northward over US 20 to Ireland Road (see Figure 3.5.33). Preliminary Alternatives Es and G-Es may need this local road improvement project. For the Scott Street extension, a total right-of-way width of 100 feet was used to determine socio-economic and environmental impacts as contained in Table 3.6.39.

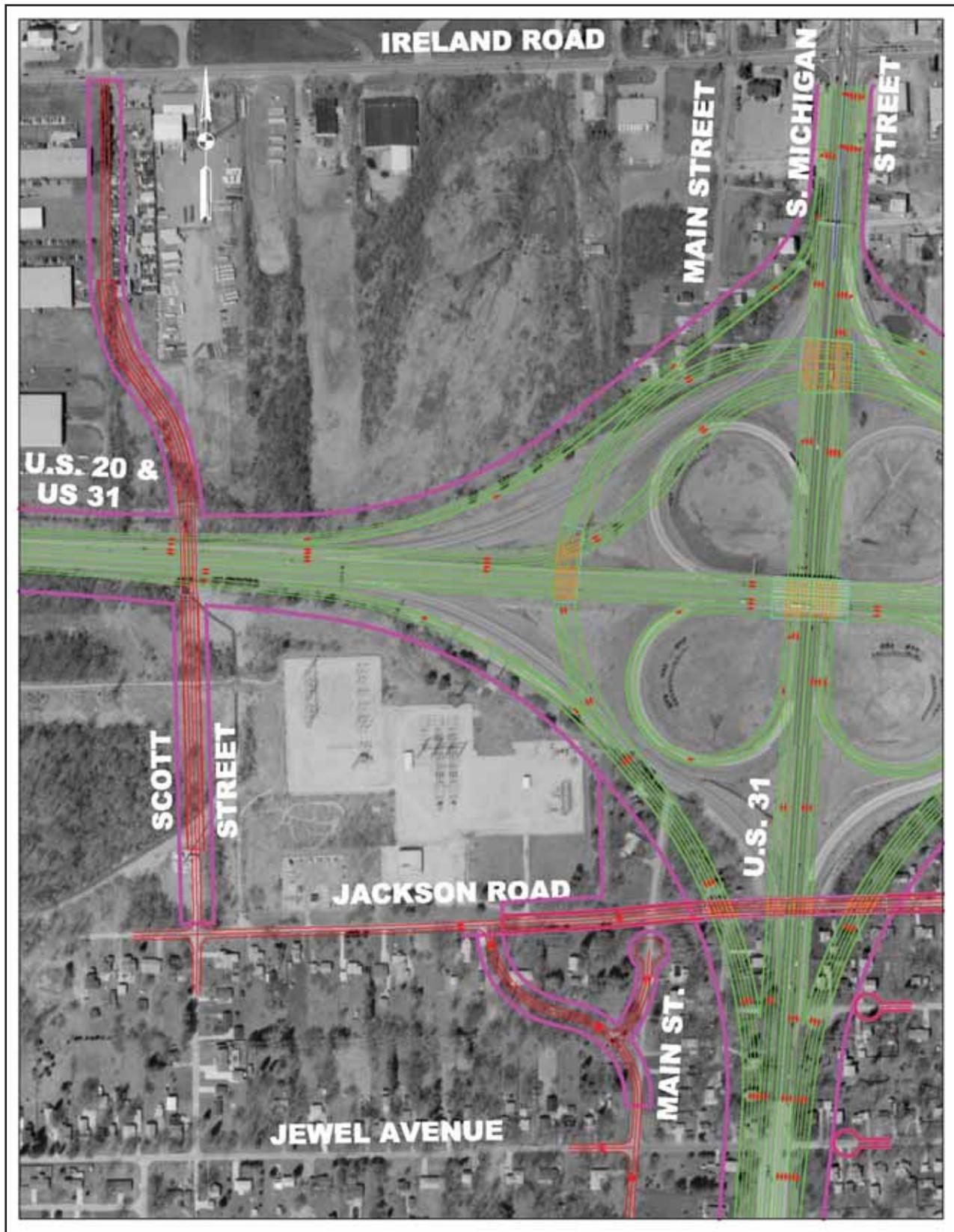


Figure 3.5.33: Scott Street Extension Local Roadway Improvement Project



Construction Costs

The construction costs and preliminary engineering (design) fees associated with the Scott Street extension local roadway improvement project related to Alternatives Es and G-Es would be approximately \$2,200,000 (year 2005 dollars). This would include approximately 0.5 miles of new two-lane roadway and the bridge crossing US 20. Upgrading this two-lane roadway to desirable standards would include a roadway typical section consisting of 12-foot lanes with 10-foot paved shoulders.

Right-of-Way Costs

The right-of-way costs and right-of-way engineering (design) fees associated with the Scott Street extension local roadway improvement project related to Alternatives Es and G-Es would be approximately \$400,000 (year 2005 dollars). This would include no residential relocations, no business relocations and approximately five acres of new right-of-way.

Traffic Volumes

The Scott Street north-south connection across US 20 does not currently exist as existing Scott Street terminates at Jackson Road, just south of US 20. The predicted future year 2030 traffic volumes along Scott Street associated with the extension of Scott Street northward from Jackson Road, over US 20 to Ireland Road, are less than 500 vehicles per day for Alternatives Es and G-Es. While this future traffic count is relatively small, it is important to note that future traffic volumes for this local roadway improvement project is largely driven by future land use along the roadways north and south of US 20. If the areas north of US 20 and west of US 31 were redeveloped for commercial use as opposed to the current industrial uses and the mixture of residential and industrial uses south of US 20 and west of US 31 further developed, the traffic volumes could be significantly higher on the Scott Street extension. These future traffic volumes could reach levels similar to those expected for the Fellows Street extension local roadway project, in the range of 3,000 to 5,000 vehicles per day. It is also important to note that one of the purposes of this local roadway improvement is to improve north-south access for emergency service providers by providing access across US 20 to the subdivisions located south of US 20 and west of US 31.

3.5.5 7th Road Extension

A local roadway improvement project developed as a result of coordination between the study team and local officials in Marshall County and Plymouth. The preliminary alternatives studied in detail in the DEIS were on common alignment throughout the length of Marshall County, with the exception of a small segment just south of the Marshall and St. Joseph County line. This meant that the location of the preferred alternative was essentially determined in Marshall County in the DEIS. Local officials in Marshall County and Plymouth expressed concerns with the local access plan associated with the preliminary alternatives within the county and met with the Project Management Team on two occasions to discuss these access issues. These issues focused on interchange, overpass/underpass and cul-de-sac locations. Through the course of discussions at these meetings, Marshall County and INDOT officials were able to modify the Marshall County local access plan and produce a plan that was in the best interest of both parties. The most significant change related to the revised Marshall County local access plan and the resulting local roadway improvement project, involved the elimination of a proposed interchange at West 5A Road and the addition of an interchange at 7th Road for Alternatives Cs, Es, G-Cs and G-Es. This change in local access is consistent with the Marshall County Comprehensive Plan and Plymouth Comprehensive Plan. No interchange had been proposed at the 7th Road location initially as no intersecting roadway currently exists at 7th Road and US 31.



Figure 3.5.34: 7th Road Extension Local Roadway Improvement Project



Due to no existing connecting roadway at the 7th Road interchange location, Marshall County officials made a written commitment to complete a 7th Road extension project that would begin at Michigan Road (Old US 31) and extend eastward to the western limits of the proposed US 31 interchange at 7th Road. It would then begin on the east side of the proposed 7th Road interchange and continue eastward to 7th Road (see Figure 3.5.34). This commitment included funding associated with preliminary engineering, environmental studies, right-of-way acquisition and construction costs. Preliminary Alternatives Cs, Es, G-Cs and G-Es may need this local road improvement project. For the 7th Road extension, the alignment of the proposed roadway has not been determined by local officials. The graphical representation of the 7th Road extension as shown in Figure 3.5.34 is a conceptual representation developed for this EIS only. The final alignment of the 7th Road extension is to be determined by Marshall County officials during the design of the local roadway project.

It is anticipated that Marshall County will utilize Federal funding for the construction of the 7th Road Extension Project, which will require the associated environmental evaluation to follow the NEPA process. It should be noted that while the US 31 and 7th Road interchange, including the US 31 Bridge over 7th Road and the associated interchange ramps, is identified as a part of this EIS, the timing of the construction of the interchange is directly related to the timing of the construction of the 7th Road Extension Project. Construction of the interchange ramps that will provide access to and from US 31 at 7th Road will not be completed by INDOT prior to the completion of the 7th Road Extension NEPA process and the construction of the 7th Road Extension Project by the county.

Construction Costs

The construction costs and preliminary engineering (design) fees associated with the 7th Road extension local roadway project related to Alternatives Cs, Es, G-Cs and G-Es were not estimated for this EIS as Marshall County officials have committed to this undertaking. It is estimated that this project would include approximately 2.0 miles of new two-lane roadway and two stream crossings. This two-lane roadway, designed to desirable standards, would likely include a roadway typical section consisting of 12-foot lanes with 10-foot paved shoulders, on a total of approximately 100 feet of right-of-way.

Right-of-Way Costs

The right-of-way costs associated with the 7th Road extension local roadway project related to Alternatives Cs, Es, G-Cs and G-Es were not estimated for this EIS as Marshall County officials have committed to this undertaking. Since it is anticipated that the county will utilize Federal funding for the construction of the 7th Road Extension Project and the associated environmental evaluation will be required to follow the NEPA process, the direct impacts of the project will be determined at that time. No direct socio-economic and environmental impacts for the 7th Road Extension Project have been determined or included in Table 3.6.39; however, in response to requests made at the July 14, 2004, resource agency meeting, an estimation of the impacts associated with the project have been included as indirect impacts in the cumulative impacts of the US 31 Project and are further discussed in Chapter 5.20 – Indirect and Cumulative Impacts. Utilizing the conceptual alignment and the approximate required right-of-way width discussed above, a potential footprint for the project was determined (see Figure 3.5.34). Utilizing the best-known existing secondary sources of information available, including GIS data and aerial photography, environmental information was collected and an impact analysis was performed. An estimate of potential indirect impacts associated with the 7th Road Extension Project include wetland impacts, determined from digital NWI maps, of 3 acres; forest impacts of 5 acres; and farmland impacts of 15 acres. It is anticipated that there will likely be one residential relocation associated with the 7th Road Extension Project. During the environmental documentation and design phases of the 7th Road Extension project development, avoidance and minimization measures may result in the reduction of these impacts.



Traffic Volumes

The 7th Road extension does not currently exist between Michigan Road and North Linden Road. The predicted future year 2030 traffic volumes along 7th Road associated with the improvements to 7th Road between Michigan Road and the proposed interchange, west of the proposed interchange, and traffic volumes along 7th Road east of the proposed interchange related to each of the preliminary freeway alternatives are summarized in Table 3.5.37.

Table 3.5.37: Future Year 2030 Traffic Counts for 7th Road for Alternatives Cs, Es, G-Cs and G-Es (Preferred Alternative G-Es shaded)		
ALTERNATIVE	West of Proposed Interchange (Between Michigan Road (Old US 31) and Proposed Interchange)	East of Proposed Interchange (Between Proposed Interchange and North Linden Road)
Alternative Cs	8,030 vehicles per day	4,030 vehicles per day
Alternative Es	7,440 vehicles per day	4,080 vehicles per day
Alternative G-Cs	6,960 vehicles per day	4,230 vehicles per day
Alternative G-Es	7,145 vehicles per day	4,080 vehicles per day



3.5.6 Summary of Local Road Improvement Projects

The upgrade of US 31 to a freeway facility with full access control will affect the flow of local traffic, as local commuters will redirect their routes to roadways with access to the freeway. These changes in traffic patterns will affect the traffic volume and change the type of facility or some of the local or state roadways that will access the new freeway. This will drive the need for expansion of the local or state roadways, the need for which is accelerated by the improvements to US 31. Table 3.5.38 summarizes the local roadway improvements identified for the US 31 Improvement Project for Alternatives Cs, Es, G-Cs and G-Es.

Table 3.5.38: Summary of Local Roadway Improvement Projects for Alternatives Cs, Es, G-Cs and G-Es (Costs include Preliminary Engineering (Design), Right-of-Way and Construction) (Preferred Alternative G-Es shaded)				
Local Roadway Improvement Project	ALTERNATIVE			
	Cs	Es	G-Cs	G-Es
US 6 Extension (Mil. of \$) (Year 2005 Dollars)	4.2	4.2	4.2	4.2
Construction Costs and Preliminary Engineering Fees (Mil. of \$)	2.6	2.6	2.6	2.6
Right-of-Way Costs and Right-of-Way Engineering Fees (Mil. of \$)	1.6	1.6	1.6	1.6
SR 4 (Pierce Road) Upgrade (Mil. of \$) (Year 2005 Dollars)	N/A	N/A	2.2	2.2
Construction Costs and Preliminary Engineering Fees (Mil. of \$)	N/A	N/A	1.4	1.4
Right-of-Way Costs and Right-of-Way Engineering Fees (Mil. of \$)	N/A	N/A	0.8	0.8
Fellows Street Extension (Mil. of \$) (Year 2005 Dollars)	N/A	4.6	N/A	4.6
Construction Costs and Preliminary Engineering Fees (Mil. of \$)	N/A	2.8	N/A	2.8
Right-of-Way Costs and Right-of-Way Engineering Fees (Mil. of \$)	N/A	1.8	N/A	1.8
Scott Street Extension (Mil. of \$) (Year 2005 Dollars)	N/A	2.6	N/A	2.6
Construction Costs and Preliminary Engineering Fees (Mil. of \$)	N/A	2.2	N/A	2.2
Right-of-Way Costs and Right-of-Way Engineering Fees (Mil. of \$)	N/A	0.4	N/A	0.4
* 7th Road Extension (Mil. of \$) (Year 2005 Dollars)	* N/A	* N/A	* N/A	* N/A
ALTERNATIVE TOTAL (Mil. of \$) (Year 2005 Dollars)	4.2	11.4	6.4	13.6

NOTE: * Marshall County officials have made a written commitment to complete a 7th Road extension project.



3.6 Selection of the Preferred Alternative

3.6.1 Identification of Preferred Alternative

The Preferred Alternative was selected through a multi-stage process that involved extensive analysis of traffic performance, environmental impacts and costs, as well as consideration of input from resource agencies, local elected and appointed officials and the public. Section 3.1, Preliminary Alternatives Analysis and Screening, described the screening process that was utilized in the Preliminary Alternatives Analysis and Screening and the Draft Environmental Impact Statement (DEIS) for this project. Section 3.2, Modifications to the Alternatives Recommended for Further Analysis, discussed modifications that were made to preliminary alternatives aimed at avoidance and minimization of impacts; consideration of alternatives not fully considered in the DEIS; and the evaluation of hybrid alternatives. Following the evaluation of alternatives, five alternatives remained for further review (See Figure 3.6.35):

- No-Build Alternative
- Alternative Cs (Freeway Alternative)
- Alternative Es (Freeway Alternative)
- Alternative G-Cs (Freeway Alternative)
- Alternative G-Es (Freeway “Hybrid” Alternative)

It is important to note that the US 31 Improvement Project has been a dynamic process. The information contained in the following tables is from the information and conceptual design parameters available at each of the phases in the screening process. As the study progressed, additional information was collected and analyzed, more specific design parameters and details were developed, and the associated impacts were revised and updated as is evident in the following tables.

The No-Build (or No Action) Alternative constitutes the existing roadway network of the year 2000 plus roadway projects completed since 2000 and those projects that are currently planned or committed for construction (referred to as the Existing-Plus-Committed, or “E+C” Transportation Network). It is assumed that these committed improvements will be completed independent of any decision regarding the improvement of US 31 from Plymouth to South Bend.

The No-Build Alternative includes “capacity expansion” projects in the South Bend Metropolitan Area (St. Joseph, Marshall and Elkhart counties) as reported in the Michiana Area Council of Governments (MACOG), the South Bend Area Metropolitan Planning Organization, 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 a major widening that adds 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. Section 3.3.1 lists the carrying capacity projects that are included in the MACOG 2003-2005 TIP and in the INSTIP that constitutes the Existing-Plus-Committed Transportation Network.

The No-Build Alternative would not address the purpose and need for this project. Since it fails to add through traffic carrying capacity, it would not reduce congestion on US 31. Referring to Section 3.1, currently many

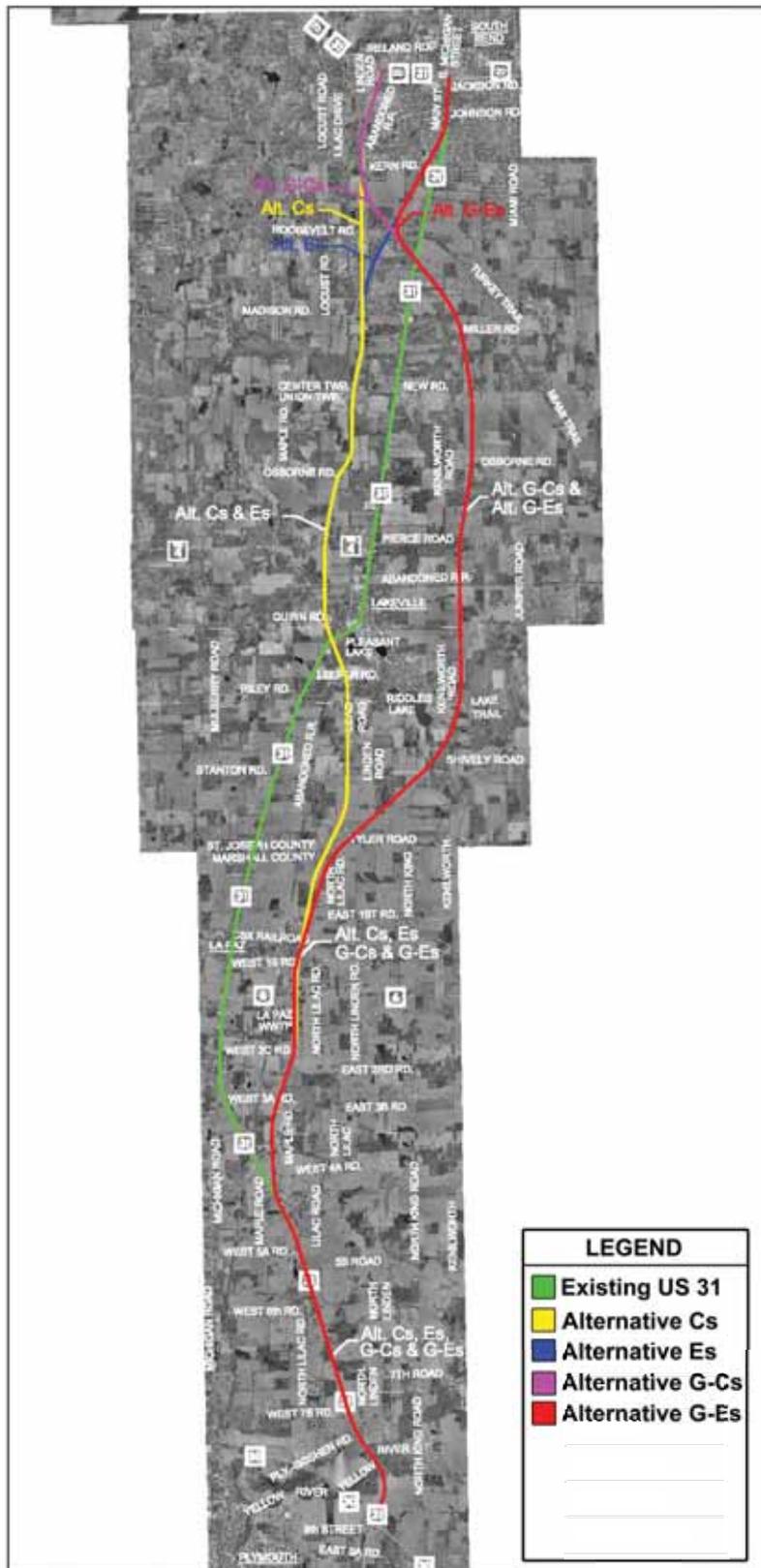


Figure 3.6.35: Preliminary Alternatives Studied in Detail – Alternatives Cs, Es, G-Cs and G-Es



segments of US 31 operate at an unacceptable LOS during a peak hour. Three of the four signalized intersections also operate at an unacceptable LOS. Referring to Section 3.4, by the year 2030, most of the segments and all four existing signalized intersections are projected to operate with unacceptable LOS. Additionally, the No-Build Alternative would not improve safety on US 31. Present and projected future crash rates on US 31 exceed the statewide averages for rural principal arterials from US 6 through LaPaz, through Lakeville, and from Lakeville to US 20. While the No-Build Alternative includes traffic-operational improvements at some intersections, it fails to address fundamental physical characteristics of existing US 31 that contribute to the above average accident rates when compared to similar facilities. Finally, the No-Build Alternative is not consistent with the INDOT 2000-2025 Long Range Transportation Plan for Statewide Mobility Corridors or with the MACOG Transportation Plan. With the No-Build Alternative, travel times and operating speeds along US 31 will continue to deteriorate over time such that the essential mobility function of US 31 suffers. This alternative would not have any direct impacts to the natural environment and would not require funds for construction.

Even though the No-Build Alternative would not address the purpose and need for this project, it was carried forward for evaluation throughout the development of the Environmental Impact Statement and served as a baseline when comparing the effectiveness and potential impacts of other alternatives; however, it is not considered the preferred alternative.

A comparison of the remaining freeway alternatives, Alternatives Cs, Es, G-Cs and G-Es identified different types of impacts related to each alternative. Some generalizations related to the impacts of the alternatives included (note that the generalizations are based on data shown in Table 3.6.39):

- The alternatives that were west of existing US 31 (Alternatives Cs, Es and the northern most portion of G-Cs) exhibited higher impacts to the natural environment, particularly wetlands and forests
- The alternatives that were east of existing US 31 (Alternatives G-Cs and G-Es) exhibited higher farmland impacts but had lower wetland and forest impacts
- The alternatives that utilized more of the existing US 31 corridor (Alternatives Es and G-Es) exhibited higher impacts to the human environment, particularly residential and business relocations
- The alternatives that utilized more of the existing US 31 corridor (Alternatives Es and G-Es) generally exhibited higher total costs than those that were largely new terrain corridors
- The alternatives that utilized more of the existing US 31 corridor (Alternatives Es and G-Es) were generally better traffic performers; however, all remaining freeway alternatives meet the project's purpose and need and the associated performance measures

It should be noted that the information contained in Table 3.6.39 is based on the best data available at the time that the preferred alternative was identified (September 2004). Section 3.6.2, Description of the Preferred Alternative, contains more detailed data related to the Preferred Alternative G-Es as more detailed studies were performed on the Preferred Alternative G-Es following its identification.



Table 3.6.39: Comparison of Preliminary Alternatives Cs, Es, G-Cs, G-Es, and Final Preferred Alternative G-Es

Socio-Economic/Environmental Measure	ALTERNATIVE				
	Cs	Es	G-Cs	G-Es	Final Pref. Alt. G-Es ¹
COSTS (Total) (Mil. Of \$) (year 2005 dollars)	324.7 to 327.9	362.3 to 365.9	332.2 to 339.7	366.9 to 374.4	371.0 to 378.3
Length (Miles)	19.5	19.9	20.3	20.5	20.5
No. of New Interchanges (Total Interchanges)	5 (7)	5 (6)	5 (7)	5 (6)	5 (6)
No. of Grade Separations (Overpass/Underpass)	16	16	16	16	16
No. of Grade Separations (Railroad Crossings)	2	1	2	1	1
CONSTRUCTION COSTS (Mil. of \$)	208.6 to 211.8	218.2 to 221.3	213.4 to 220.9	221.7 to 228.7	223.2 to 230.2
RECONSTRUCTION of US 20 Right-of-Way & Construction (Mil. of \$)	29.6	21.1	29.6	21.1	21.1
LOCAL & STATE ROAD IMPROVEMENT PROJECTS Right-of-Way & Construction (Mil. Of \$)	3.6	11.5	5.8	13.7	13.6
US 31 MAINLINE RIGHT-OF-WAY COSTS (Mil. of \$)	44.7	70.7	47.1	70.9	72.5
ENGINEERING COSTS (Mil. of \$)	13.7	18.1	13.9	18.3	18.3
UTILITY RELOCATION COSTS (Mil. of \$)	17.2	17.2	17.2	17.2	17.2
MITIGATION COSTS (Mil. of \$)	7.3	5.5 to 6.0	5.2	4.0 to 4.5	5.1 to 5.4
TRAFFIC PERFORMANCE					
Meet Purpose and Need	Yes	Yes	Yes	Yes	Yes
Performance (Compared to Other Alternatives, 1 is Best Performer)	3	1	4	2	2
LAND USE	961 Ac.	968 Ac.	1,012 Ac.	1,011 Ac.	1,061 Ac.
Agricultural (row crop)	390 Ac.	395 Ac.	504 Ac.	503 Ac.	537 Ac.
Commercial	15 Ac.	23 Ac.	16 Ac.	23 Ac.	23 Ac.
Church/Religious	2 Ac.				
Herbaceous Cover	51 Ac.	48 Ac.	68 Ac.	52 Ac.	53 Ac.
Open Water	<1 Ac.				
Pasture	14 Ac.	12 Ac.	3 Ac.	4 Ac.	4 Ac.
Transportation	213 Ac.	220 Ac.	217 Ac.	222 Ac.	226 Ac.
Residential	51 Ac.	86 Ac.	55 Ac.	77 Ac.	82 Ac.
Scrub/Shrub	38 Ac.	46 Ac.	31 Ac.	36 Ac.	37 Ac.
Woodland (Wetland & Non-Wetland) (Forests)	186 Ac.	135 Ac.	115 Ac.	91 Ac.	96 Ac.



Table 3.6.39: Comparison of Preliminary Alternatives Cs, Es, G-Cs,G-Es, and Final Preferred Alternative G-Es (Continued)

Socio-Economic/Environmental Measure	ALTERNATIVE				Final Pref. Alt. G-Es ¹
	Cs	Es	G-Cs	G-Es	
RELOCATIONS					
Residences Acquired	50	128	59	124	131
Businesses Acquired ²	7	40	5	39	39
Businesses Damaged	5	13	5	13	13
Churches Acquired	1	1	1	1	1
HISTORIC PROPERTIES (Listed or Eligible)					
SECTION 4(f) PROPERTIES	0	0	0	0	0
PROPERTIES WITHIN A.P.E.	5	4	9	8	8
PROPERTIES ADVERSELY AFFECTED BUT NO SUBSTANTIAL LOSS OF INTEGRITY	0	0	1	1	1
ARCHAEOLOGICAL SITES					
Within Alignment	2	3	2	3	3
TOTAL WETLANDS (NWI + FARMED)	51.6 Ac.	35.6 Ac.	30.7 Ac.	23.9 Ac.	29.93 Ac.³
WETLANDS (From NWI Maps)	49.6 Ac.	33.7 Ac.	27.8 Ac.	21.1 Ac.	
Forested	21.8 Ac.	17.8 Ac.	17.7 Ac.	14.8 Ac.	13.21 Ac.
Scrub/Shrub	3.0 Ac.	1.6 Ac.	1.4 Ac.	0.0 Ac.	1.45 Ac.
Emergent	24.0 Ac.	13.6 Ac.	8.7 Ac.	6.3 Ac.	15.27 Ac.
Aquatic Bed	0.8 Ac.	0.7 Ac.	0.0 Ac.	0.0 Ac.	0.0 Ac.
ESTIMATED FARMED WETLANDS	2.0 Ac.	1.9 Ac.	2.9 Ac.	2.8 Ac.	0.44 Ac.⁴
STREAM IMPACTS (No. of Impact Locations) (USGS)	18	19	18	17	17
WILDLIFE HABITAT AREAS					
Potato Creek State Park & Swamp Rose Nature Preserve	0	0	0	0	0
Notable Wildlife Habitat (IDNR)	2	1	0	0	0
Classified Wildlife Habitat (IDNR)	4	3	0	0	0
Classified Forest (IDNR)	2-3	2-3	1-2	1-2	1-2
Conservation Reserve Program (CRP) (NRCS)	1	2	2	1	1
Wetland Reserve Program (WRP) (NRCS)	1	1	0	0	0
Partners for Fish and Wildlife Program (USFWS)	2	1	0	0	0



Table 3.6.39: Comparison of Preliminary Alternatives Cs, Es, G-Cs, G-Es, and Final Preferred Alternative G-Es (Continued)

Socio-Economic/Environmental Measure	ALTERNATIVE				
	Cs	Es	G-Cs	G-Es	Final Pref. Alt. G-Es ¹
INDIRECT IMPACTS					
Farmland	115 Ac.	50 Ac.	105 Ac.	45 Ac.	45 Ac.
Wetland	3 Ac.	3 Ac.	3 Ac.	3 Ac.	3 Ac.
Forests	30 Ac.	25 Ac.	10 Ac.	10 Ac.	10 Ac.

NOTES: The final impacts associated with Preferred Alternative G-Es are Shaded

1. Following the identification of Alternative G-Es as the Preferred Alternative, additional, in-depth studies were performed on the alternative. These additional studies included, but were not limited to, refinement of local access plan and proposed right-of-way requirements, wetland delineations, Phase 1a Archaeological Review, etc.
2. Businesses acquired include large farming operations
3. Delineations of wetlands resulted in 29.93 acres of wetlands impacted, of which, 25.51 acres of which were jurisdictional and 4.42 acres were isolated wetlands.
4. One farmed wetland area was identified. This area met the three U.S. Army Corps of Engineers wetland criteria and was considered an emergent wetland. This farmed wetland was included in the emergent wetland total.

A comparative evaluation of the data contained in Table 3.6.39 above resulted in the identification of Alternative Cs as a Non-Preferred Alternative. The data contained in Table 3.6.39 indicated that the impacts associated with Alternatives Cs and G-Cs were very similar with respect to both social and environmental impacts, particularly costs, relocations and land use. A comparison of Alternatives Cs and G-Cs revealed that Alternative Cs had a slightly lower associated engineering (total) cost, slightly lower residential impacts and significantly lower agricultural (row crops) impacts. However, its associated business impacts were slightly higher and environmental impacts to wetlands and forests (woodland) were significantly higher than those associated with Alternative G-Cs. In fact, the impacts to wetlands and forests associated with Alternative Cs were the highest among the remaining freeway alternatives. **Alternative Cs was considered a Non-Preferred Alternative due to its higher relative environmental impacts to wetlands and forests while exhibiting similar impacts to residences and businesses.**

A comparative evaluation of the data contained in Table 3.6.39 above also resulted in the identification of Alternative Es as a Non-Preferred Alternative. The data contained in Table 3.6.39 indicated that the impacts associated with Alternatives Es and G-Es were very similar with respect to both social and environmental impacts, particularly costs, relocations and land use. A comparison of Alternatives Es and G-Es revealed that Alternative Es had slightly lower engineering (total) cost and significantly lower agricultural (row crops) impacts; however, its residential and business impacts were slightly higher and environmental impacts to wetlands and forests were significantly higher than those associated with Alternative G-Es. **Alternative Es was considered a Non-Preferred Alternative due to its higher relative environmental impacts to wetlands and forests while exhibiting similar impacts to residences and businesses.**

Following the initial comparative evaluation of the data contained in Table 3.6.39, Alternatives Cs and Es were identified as Non-Preferred Alternatives. Alternatives G-Cs and G-Es remained as alternatives to be further evaluated. These alternatives follow the same alignment from US 30 northward to near Roosevelt Road. From this point northward, Alternative G-Cs assumes a northwesterly direction and terminates approximately 1 mile west of the existing US 31 and US 20 interchange while Alternative G-Es assumes a northeasterly direction and terminates at the existing US 31 and US 20 interchange. Alternative G-Cs exhibited lower engineering (total) costs, relatively lower residential and business relocations, relatively higher environmental impacts to wetlands and forests, and



utilized very little of the existing US 31 alignment, making it a poorer traffic performer than Alternative G-Es. Alternative G-Es exhibited the lowest environmental impacts related to wetlands and forests, it utilized more of the existing US 31 alignment, making it a better traffic performer, and its engineering (total) costs and residential and business relocations were relatively higher.

As the process of identifying a single preferred alternative continued, the Federal Highway Administration (FHWA) and the Indiana Department of Transportation (INDOT) agreed that additional field data should be collected and analyzed, roadway engineering and associated costs should be refined and further developed and the human and natural environmental impacts should be re-assessed. Since Alternatives G-Cs and G-Es follow the same alignment from US 30 to near Roosevelt Road, FHWA and INDOT agreed that the additional studies in this area were not necessary at this time in the decision-making process, as impacts would be the same for each of the alternatives. Instead, the additional analysis focused on the area in which Alternatives G-Cs and G-Es did not follow a common alignment, essentially from Roosevelt Road northward to US 20. Some of the additional items included in the additional analysis of Alternatives G-Cs and G-Es from Roosevelt Road to US 20:

- Delineation and quality evaluation of wetland complexes and refinement of wetland impacts;
- Refinement of forest and farmland impacts;
- Further conceptual design and cost update for the US 31 and US 20 interchange associated with each of the alternatives including reconstruction of US 20 within the interchange limits;
- Further conceptual design and cost update of local access issues, particularly related to Alternative G-Es from Kern Road to US 20 and northward to Ireland Road;
- Refinement of residential and business relocations and the associated costs; and
- Determination of potential mitigation measures and estimation of associated mitigation costs;
 - Wetland Mitigation and Bridging of Wetlands;
 - Context Sensitive Solutions;
 - Noise Mitigation.

Table 3.6.40 contains the results of the additional analysis that focused on the area in which Alternatives G-Cs and G-Es did not follow a common alignment, essentially from Roosevelt Road northward to US 20.



Table 3.6.40: Comparison of Preliminary Alternatives G-Cs and G-Es		
SOCIO-ECONOMIC/ENVIRONMENTAL MEASURE	ALTERNATIVE	
	G-Cs	G-Es
COST (Without Mitigation) (Mil. Of \$) (Year 2005 Dollars)	309.8 to 317.3	345.7 to 352.7
CONSTRUCTION COSTS (Mil. Of \$)	213.4 to 220.9	221.7 to 228.7
RECONSTRUCTION OF US 20 RIGHT-OF-WAY & CONSTRUCTION (Mil. Of \$)	29.6	21.1
LOCAL & STATE ROAD IMPROVEMENT PROJECTS RIGHT-OF-WAY & CONSTRUCTION (Mil. Of \$)	5.8	13.7
US 31 MAINLINE RIGHT-OF-WAY COSTS (Mil. Of \$)	47.1	70.9
ENGINEERING (DESIGN) FEES (Mil. Of \$)	13.9	18.3
* MITIGATION COST (Mil. Of \$)	32.8 to 36.2	21.0 to 24.0
WETLAND MITIGATION (Mil. Of \$)	3.6 to 4.1	2.0 to 2.5
BRIDGING OF WETLANDS (Mil. Of \$)	10.7	0.0
CONTEXT SENSITIVE SOLUTIONS (Mil. Of \$)	16.8 to 19.7	17.5 to 20.0
NOISE MITIGATION (Mil. Of \$)	1.7	1.5
TOTAL PROJECT COSTS (Mil. Of \$)	342.6 to 353.5	366.7 to 376.7
TRAFFIC PERFORMANCE		
Meet Purpose and Need	Yes	Yes
Traffic Operational problems with US 31 and us 20 interchange	Yes	No
RELOCATIONS		
RESIDENCES ACQUIRED	58	124
** BUSINESSES ACQUIRED	5	39
BUSINESSES DAMAGED	5	13
CHURCHES ACQUIRED	1	1
*** WETLANDS (NWI + FARMED)	30.7 Acres	23.9 Acres
FORESTS	115 Acres	91 Acres
FARMLAND (ROW CROPS)	504 Acres	503 Acres

NOTES:

- * Wetland Mitigation Ratios are based off of the INDOT MOU signed January 28, 1991, and investigators professional judgment on quality. Costs estimates associated with Mitigation for Bridging Wetlands only include those areas north of Roosevelt Road.
- ** Businesses Acquired Include Large Farming Operations
- *** Wetland Impacts are from NWI Maps and estimated Farmed Wetlands are calculated as 2% of all Hydric Soils on agricultural land. The percentage is an estimate based on coordination with the Natural Resources Conservation Service (NRCS).



A comparative evaluation of the data contained in Table 3.6.40 resulted in the identification of Alternatives G-Cs as a Non-Preferred Alternative and Alternative G-Es as the Preferred Alternative. Alternative G-Cs had lower associated total project cost and lower residential and business impacts than those associated with Preferred Alternative G-Es. While residential and business impacts associated with Preferred Alternative G-Es are higher than those for Alternative G-Cs, Chapter 6.1 – Relocation Assistance, states that it appears that there is sufficient availability of comparable housing to accommodate the expected number of residential relocations. Chapter 6.1 – Relocation Assistance, also states that the availability of commercial real estate is most prevalent in the South Bend area at the north end of the corridor (near the US 20 Bypass) and that there appears to be adequate availability of commercial property. It is anticipated that there will be opportunities for many of the relocated businesses to rebuild in the same general vicinity with little or no loss in business in the long term.

The traffic performance of Alternative G-Cs was not as good as Preferred Alternative G-Es. Alternative G-Cs utilized very little of existing US 31, although it did meet the purpose and need of the project and the associated performance measures. As a more detailed conceptual design of the interchange of Alternative G-Cs with US 20 developed (see Figure 3.6.36), engineers expressed concerns with operational problems associated with the interchanges proximity to the existing US 31 and US 20 interchange. The operation problems associated with the interchange configuration focused on insufficient traffic weaving lengths for several traffic movements. Traffic weaving lengths are essentially a distance that a driver has to weave through other lanes of traffic in order to get to an appropriate lane that allows the traffic movement that a driver desires. Inadequate weaving lengths or lengths near minimum allowable values tend to lead to traffic congestion and generally less safe driving conditions as driver actions become less predictable. The proposed interchange at US 20 for Preferred Alternative G-Es consists of the reconstruction of the existing interchange (see Figure 3.6.37) and did not exhibit operational problems.

The associated environmental impacts to wetlands and forests for Alternative G-Cs were higher than those for Preferred Alternative G-Es. Alternative G-Cs had severe impacts on several high quality wetland complexes located north of Roosevelt Road, south of US 20 and west of existing US 31. Wetlands in this portion of the study area are among the highest quality wetland complexes within the entire study area. Impacts to these wetland complexes would be very difficult to mitigate as they are in many cases forested wetlands that cannot be reconstructed and take many years to develop. Bridging of these wetlands as a mitigation measure was evaluated but this method of mitigation is relatively expensive and often still results in the destruction of considerable amounts of forested wetlands. By utilizing the existing US 31 alignment north of Kern Road, Preferred Alternative G-Es does not impact these high quality wetland complexes. In comments received during the DEIS Public Comment Period, the U.S. Environmental Protection Agency (USEPA) emphasized the importance of selecting a preferred alternative in accordance with the wetlands permitting requirements under Section 404 of the Clean Water Act. In particular, the USEPA mentioned the need to ensure consistency with the Section 404(b)(1) Guidelines, which require (in the context of Section 404 permit decisions) selection of the “least environmentally damaging practicable alternative” or “LEDPA” (See Appendix T for Section 404(b)(1) LEDPA analysis). This alternative would also have resulted in a higher loss of forestland and the fragmentation of forest habitat.

Alternatives G-Cs and G-Es have their own unique impacts (see Table 3.6.40). The No-Build Alternative has no impacts but does not address the needs of the project. Alternative G-Cs had the lowest associated total project cost and the lower residential and business impacts. It was generally a poorer traffic performer, had operational problems associated with its interchange at US 20 and had high environmental impacts to wetlands and forests. Due to this,

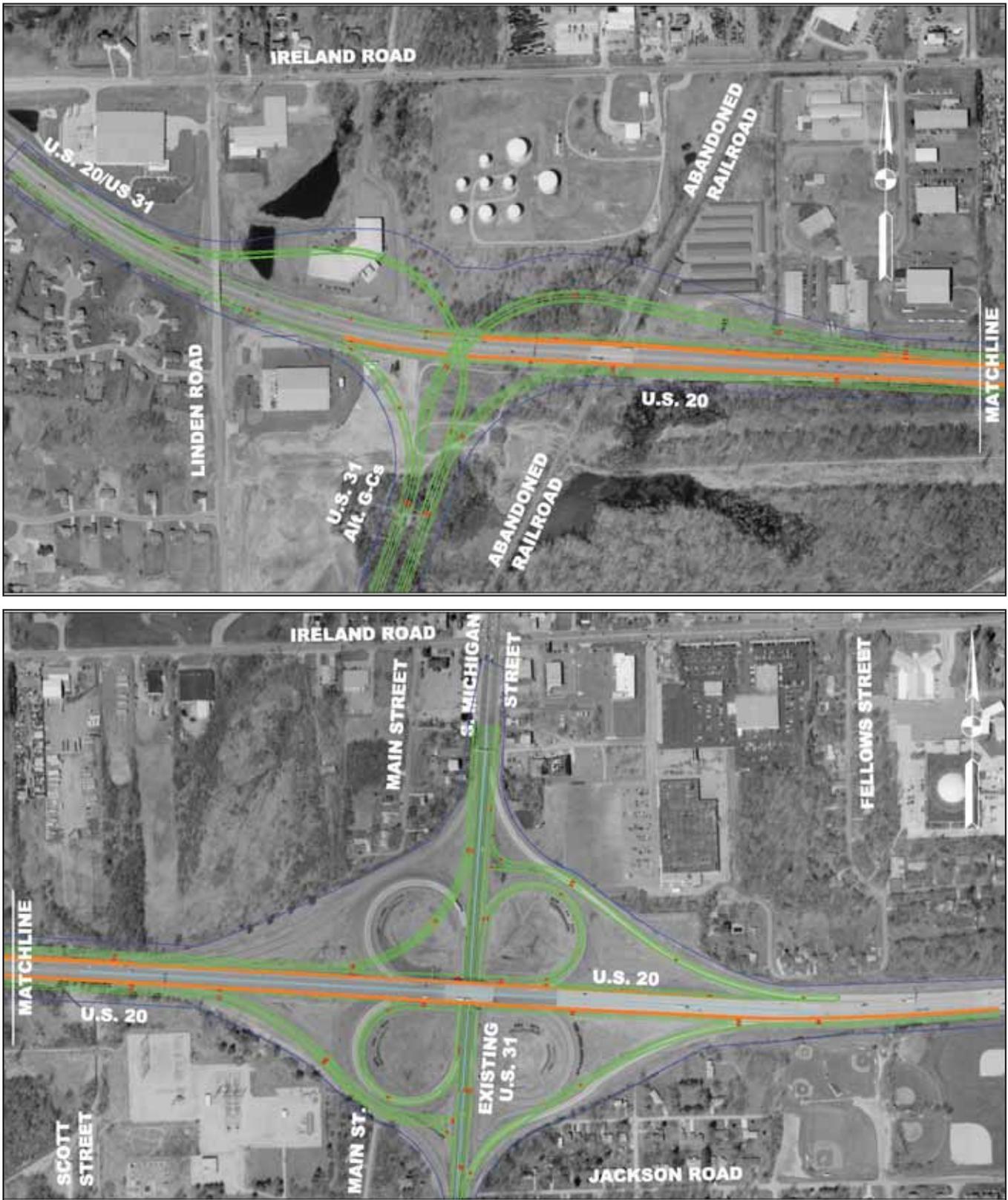


Figure 3.6.36: Proposed Interchange at Alternative G-Cs and US 20

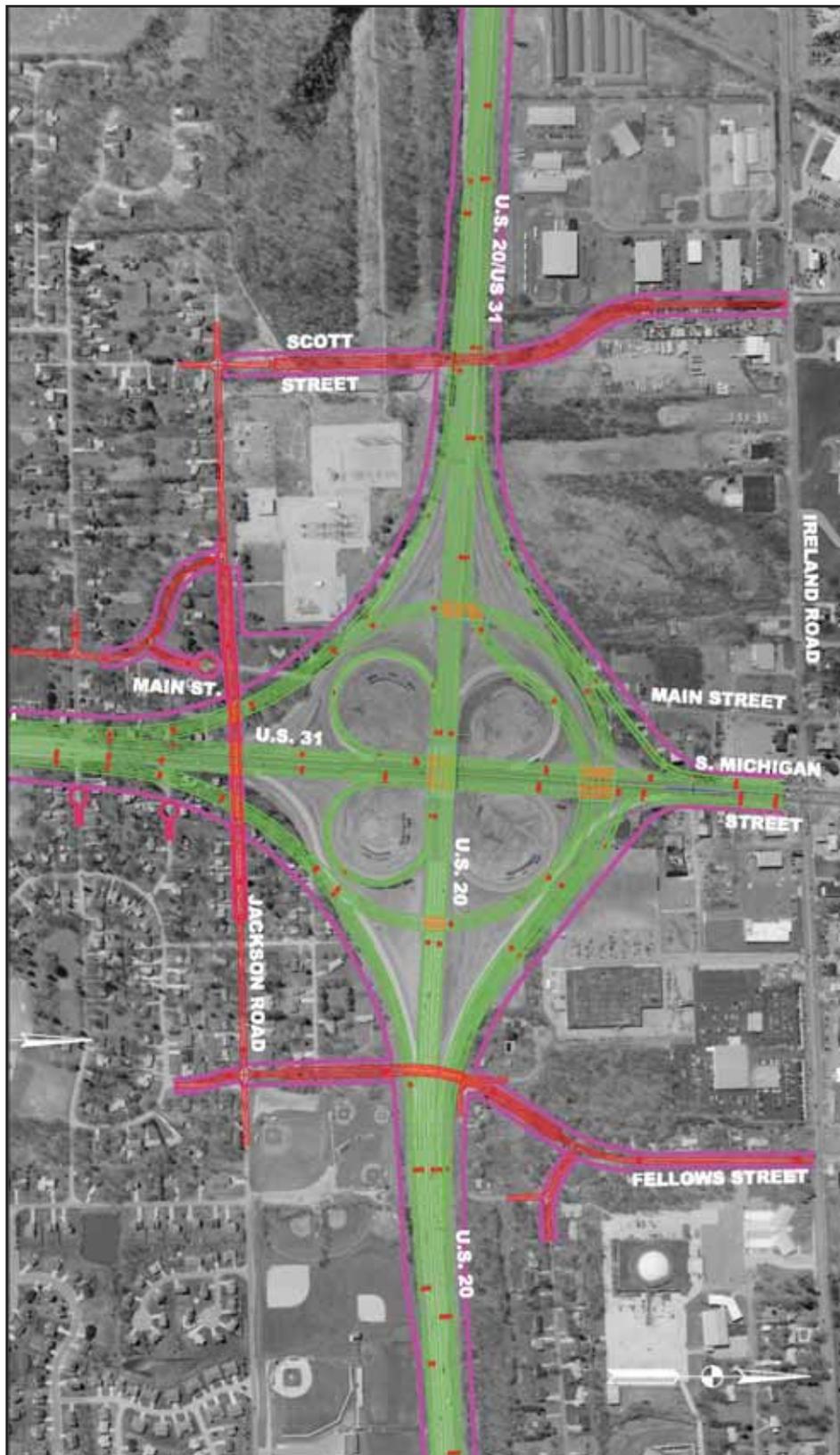


Figure 3.6.37: Proposed Interchange at Alternative G-Es and US 20



Alternative G-Cs is considered a Non-Preferred Alternative. While Alternative G-Es had a higher associated total project cost and higher residential and business impacts, it was a better traffic performer and did not exhibit operational problems associated with its interchange at US 20. Alternative G-Es also has lower environmental impacts to wetlands and forests and meets the Section 404(b)(1) Guidelines that require selection of the “least environmentally damaging practicable alternative”.

3.6.2 Description of the Preferred Alternative

Preferred Alternative G-Es (see maps contained in Appendix A) begins at the existing US 31 and US 30 interchange, utilizing the existing cloverleaf configuration, and proceeds northward along the existing US 31 alignment to just south of West 4A Road in Marshall County, just south of LaPaz. It then departs the existing US 31 alignment and continues northward on new alignment east of LaPaz, paralleling existing US 31. Just south of the Marshall-St. Joseph County line, the alternative assumes a northeasterly direction east of Riddles Lake, and then continues north, east of Lakeville, paralleling existing US 31. Near Miller Road, Preferred Alternative G-Es turns in a northwesterly direction and crosses existing US 31 just south of Roosevelt Road. As the Preferred Alternative G-Es approaches Kern Road, it assumes a northeasterly direction and ties into existing US 31. It then uses the existing US 31 alignment northward and terminates at the existing US 31 and US 20 interchange location. Proposed interchange locations include the use of the existing interchange at US 30, new interchanges at the proposed extension of 7th Road, and at US 6 in Marshall County; as well as at Pierce Road (extension of SR 4), at Kern Road and a reconfiguration of the existing US 31 and US 20 interchange (see Appendix S) in St. Joseph County. The alternative is approximately 20.5 miles in length.

A comparison of the four modified Freeway Build Alternatives recommended for further study, Alternative Cs, Es, G-Cs and G-Es was completed and is discussed in detail in Chapter 4, Affected Environment; Chapter 5, Environmental Consequences; Chapter 6, Mitigation; and Chapter 7, Section 4(f) Evaluation, of this Final Environmental Impact Statement (FEIS). Also contained in these chapters is a more comprehensive discussion of the impacts associated with the Preferred Alternative G-Es. Following the identification of Alternative G-Es as the Preferred Alternative, additional, in-depth studies were performed on the alternative. These additional studies included, but were not limited to, refinement of local access plan and proposed right-of-way requirements, wetland delineations, wetland quality evaluations, Phase 1a Archaeological Review, etc. Table 3.6.41 summarizes some of the impacts related to Preferred Alternative G-Es and further described in Chapters 5, 6 and 7.



Table 3.6.41: Impacts Associated with Preferred Alternative G-Es	
Socio-Economic/Environmental Measure	ALTERNATIVE G-Es
COSTS (Total) (Mil. Of \$) (year 2005 dollars)	371.0 to 378.3
Length (Miles)	20.5
No. of New Interchanges (Total Interchanges)	5 (6)
No. of Grade Separations (Overpass/Underpass)	16
No. of Grade Separations (Railroad Crossings)	1
CONSTRUCTION COSTS (Mil. of \$)	223.2 to 230.2
RECONSTRUCTION of US 20 Right-of-Way & Construction (Mil. of \$)	21.1
LOCAL & STATE ROAD IMPROVEMENT PROJECTS Right-of-Way & Construction (Mil. Of \$)	13.6
US 31 MAINLINE RIGHT-OF-WAY COSTS (Mil. of \$)	72.5
ENGINEERING COSTS (Mil. of \$)	18.3
UTILITY RELOCATION COSTS (Mil of \$)	17.2
MITIGATION COSTS (Mil of \$)	5.1 to 5.4
TRAFFIC PERFORMANCE	
Meet Purpose and Need	Yes
Performance (Compared to Other Alternatives (Cs, Es and G-Cs), 1 is Best Performer)	2
LAND USE	
Agricultural (row crop)	537 Ac.
Commercial	23 Ac.
Church/Religious	2 Ac.
Herbaceous Cover	53 Ac.
Open Water	<1 Ac.
Pasture	4 Ac.
Transportation	226 Ac.
Residential	82 Ac.
Scrub/Shrub	37 Ac.
Woodland (Wetland & Non-Wetland) (Forests)	96 Ac.
RELOCATIONS	
Residences Acquired	131
Businesses Acquired ¹	39
Businesses Damaged	13
Churches Acquired	1



Table 3.6.41: Impacts Associated with Preferred Alternative G-Es (Continued)

Socio-Economic/Environmental Measure	ALTERNATIVE G-Es
HISTORIC PROPERTIES (Listed or Eligible)	
SECTION 4(f) PROPERTIES	0
PROPERTIES WITHIN A.P.E.	8
PROPERTIES ADVERSELY AFFECTED BUT NO SUBSTANTIAL LOSS OF INTEGRITY	1
ARCHAEOLOGICAL SITES	
Within Alignment	3
TOTAL WETLANDS (DELINEATED)²	29.93 Ac.
Forested	13.21 Ac.
Scrub/Shrub	1.45 Ac.
Emergent	15.27 Ac.
Aquatic Bed	0.0 Ac.
ESTIMATED FARMED WETLANDS³	0.44 Ac.
STREAM IMPACTS (No. of Impact Locations) (USGS)	17
WILDLIFE HABITAT AREAS	
Potato Creek State Park & Swamp Rose Nature Preserve	0
Notable Wildlife Habitat (IDNR)	0
Classified Wildlife Habitat (IDNR)	0
Classified Forest (IDNR)	1-2
Conservation Reserve Program (CRP) (NRCS)	1
Wetland Reserve Program (WRP) (NRCS)	0
Partners for Fish and Wildlife Program (USFWS)	0
INDIRECT IMPACTS	
Farmland	45 Ac.
Wetland	3 Ac.
Forests	10 Ac.

NOTES:

1. Businesses Acquired Include Large Farming Operations
2. Delineations of wetlands resulted in 29.93 acres of wetlands impacted, of which, 25.51 acres of which were jurisdictional and 4.42 acres were isolated wetlands.
3. One farmed wetland area was identified. This area met the three U.S. Army Corps of Engineers wetland criteria and was considered an emergent wetland. This farmed wetland was included in the emergent wetland total.



The Preferred Alternative G-Es is a freeway alternative that will have full access control. Control of access refers to the regulation of public access rights to and from properties abutting the highway. With full control of access, preference is given to through traffic on US 31 by providing access connections with selected public roads only at interchanges, by prohibiting crossings at grade utilizing stop controlled or traffic signalized intersections, and by prohibiting direct private and commercial driveway connections.

The alignment of the alternative, as with all of the alternative that were evaluated for this study, is based on the guidelines established by the American Association of State Highway and Transportation Officials (AASHTO) in *A Policy on Geometric Design of Highways and Streets, 2001*, and supplemented by the INDOT Road Design Manual. The proposed facility is to provide a highway designed to freeway design standards and would be signed and identified as US 31.

Typical cross sections were developed for the determination of costs and potential impacts to environmental resources. Typical cross sections for the portion of the study considered rural, from US 30 to Kern Road, are shown in Figures 3.6.38 and 3.6.39. Typical cross sections for the portion of the study area considered urban, from Kern Road to US 20, are shown in Figures 3.6.40 and 3.6.41.

Refined roadway typical cross sections, as approved by INDOT, will be determined during subsequent project design phases. For use in this study, the rural section of the Preferred Alternative G-Es from US 30 to just south of West 4A Road in Marshall County is shown in Figure 3.6.38. This segment consists of an upgrade of existing US 31 and the rural typical section will consist of a four-lane freeway with two lanes in each direction. It will have a depressed grass median that will vary in width from 50 to 76 feet from north of the US 30 interchange to the bridge over the Yellow River. The grass median will be 76 feet north of the Yellow River Bridge. It will have 4-foot paved inside shoulders, 12-foot paved outside shoulders, on a total of approximately 300 feet of right-of-way, with a design speed of 70 mph. The existing median in this segment was widened to a total of 84 feet in order to provide adequate room for the potential expansion of the facility to a six-lane freeway, with three lanes in each direction. This would be accomplished, if warranted by future traffic volumes, with the addition of the third lane in the median of both the northbound and southbound sides and would result in a 60-foot (required minimum median width) grass median following the expansion.

The rural section of the Preferred Alternative G-Es from just south of West 4A Road in Marshall County to the proposed interchange at Kern Road in St. Joseph County is shown in Figure 3.6.39. In this segment, the rural typical section will consist of a four-lane freeway with two-lanes in each direction. It will have an 76-foot depressed grass median width, 4-foot paved inside shoulders, 12-foot paved outside shoulders, on a total of approximately 300 feet of right-of-way, with a design speed of 70 mph. The median in this segment was widened to a total of 84 feet in order to provide adequate room for the potential expansion of the facility to a six-lane freeway, with three lanes in each direction. This would be accomplished, if warranted by future traffic volumes, with the addition of the third lane in the median of both the northbound and southbound sides and would result in a 60-foot (required minimum median width) median following the expansion.

The section of the Preferred Alternative G-Es between Kern Road and US 20 is considered an urban section as shown in Figures 3.6.40 and 3.6.41. The urban section of the Preferred Alternative G-Es between the Kern Road interchange and the Johnson Road overpass is shown in Figure 3.6.40. In this segment, the urban typical section will consist of an eight-lane freeway with four lanes in each direction. This section will have a 30.5-foot depressed grass median, 12-foot paved inside shoulders, 14-foot paved outside shoulders with concrete median barrier, on a total of approximately 300 feet of right-of-way, with a design speed of 55 mph. The median width in this section is sufficient for an additional future travel lane.

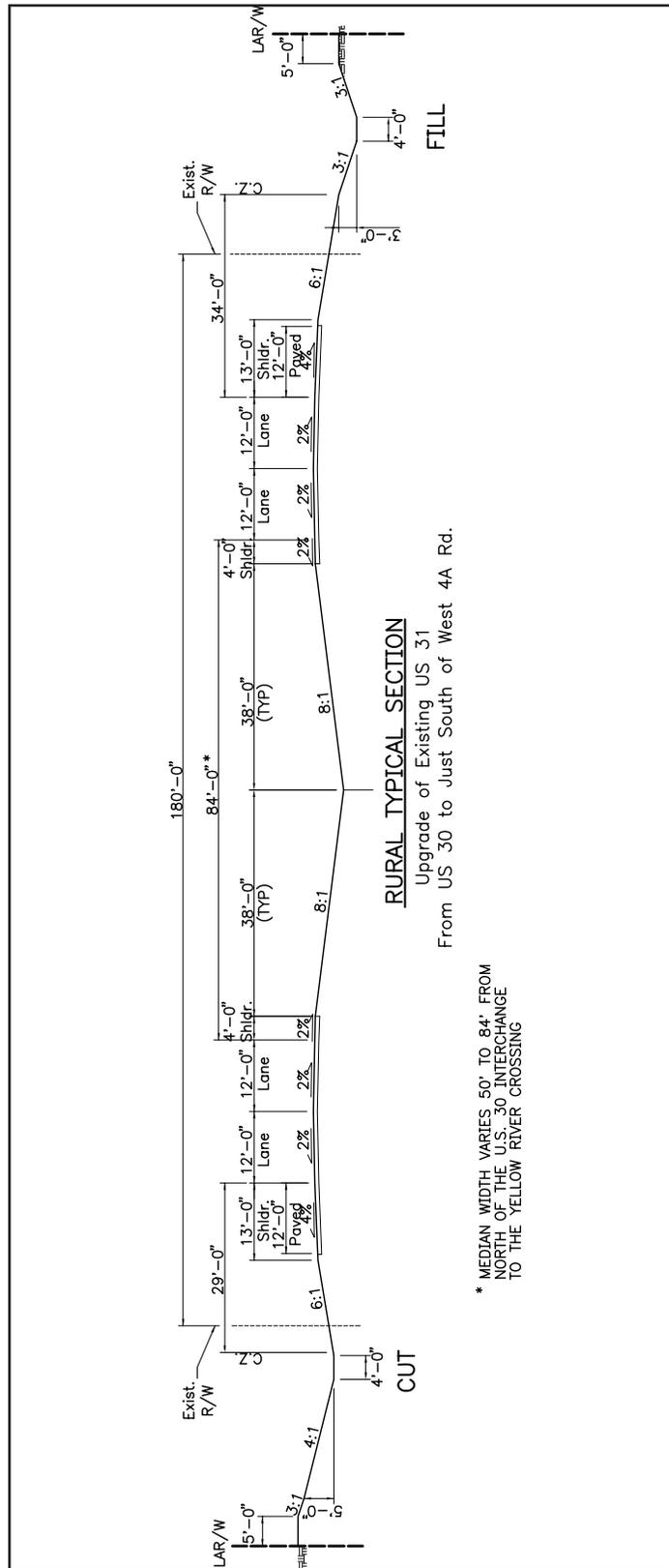


Figure 3.6.38: Rural Typical Section (From US 30 to Just South of West 4A Road)

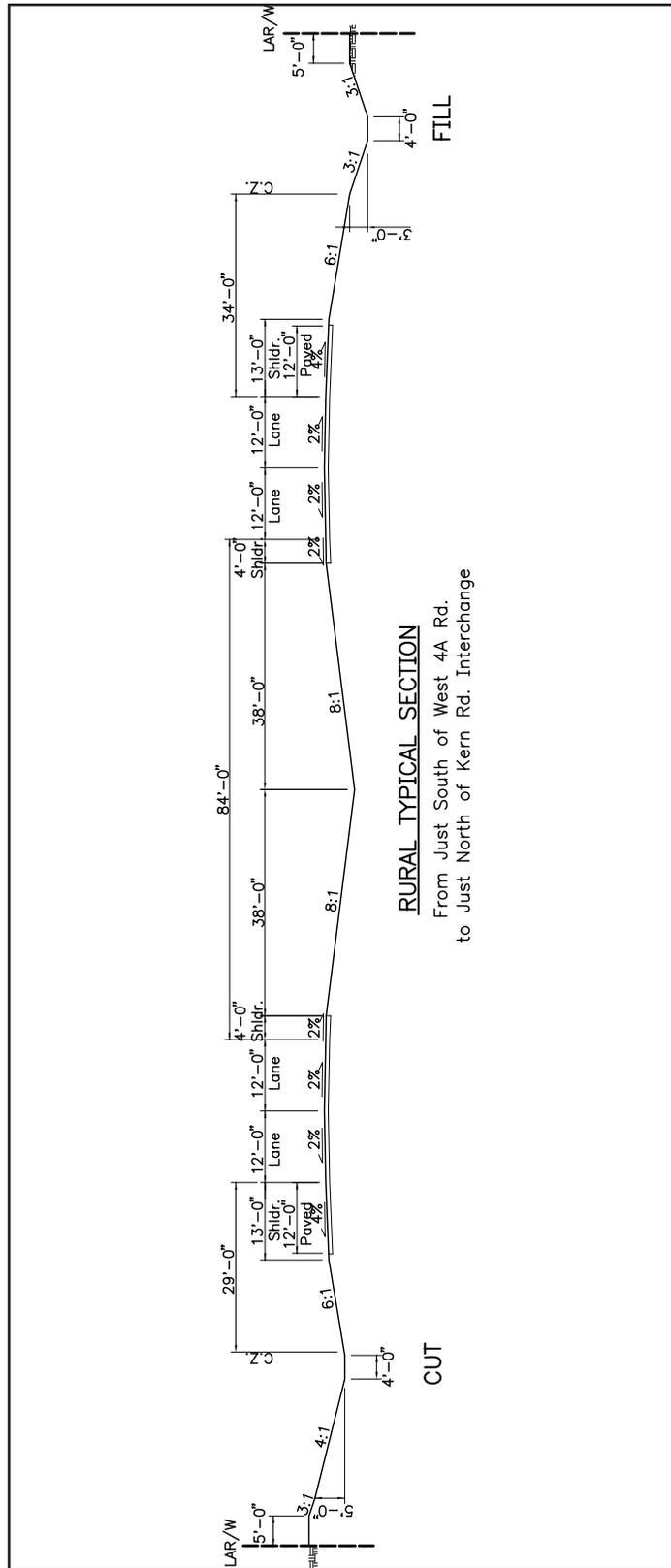


Figure 3.6.39: Rural Typical Section (From Just South of West 4A Road to Just North of the Kern Road Interchange)



The urban section of Preferred Alternative G-Es between Johnson Road and the US 20 interchange is shown in Figure 3.6.41. In this segment, the urban typical section will have five through lanes (three northbound through lanes and two southbound through lanes). In addition to these through lanes, five auxiliary lanes will also be provided, (two northbound and three southbound auxiliary lanes). This section will have a 30.5-foot depressed grass median, 12-foot paved inside shoulders, 14-foot paved outside shoulders with concrete median barrier, on a total of approximately 300 feet of right-of-way, with a design speed of 55 mph. The median width in this section is sufficient for an additional future travel lane.

The topography of the land traversed by a roadway project such as this has an influence on both the horizontal and vertical alignment. Topography in the north-central region of the State of Indiana, in which this project is located, is typically classified as level terrain. In geographic areas that exhibit level terrain characteristics, highway sight distances, as governed by both horizontal and vertical restrictions, are generally long or can be made to be so without construction difficulty or major expense. Right-of-way limits associated with level terrain are generally more consistent and smaller than areas exhibiting rolling or mountainous terrain. Considering the level terrain traversed by this project and proposed typical cross sections to be utilized throughout the length of the alternative (see Figures 3.6.38 through 3.6.41), a 300-foot wide corridor was established for the Preferred Alternative G-Es. Additional right-of-way will be required at interchange locations, at grade separations (overpasses and underpasses), and at other locations related to local access issues as is reflected in the footprint of the alternative. In the absence of detailed survey data, horizontal and vertical alignments, based on the centerline of the relevant 300-foot wide corridor of the Preferred Alternative G-Es, were approximated using U.S. Geological Survey (USGS) Maps and aerial photography. Contour lines on USGS Maps are at 5-foot intervals. Based upon these intervals, the alignment and 300-foot wide corridor developed from them, aerial photography and proposed typical cross sections should be considered conceptual designs only, and do not represent final design. During the final design process that will follow the completion of this study, a field survey will be completed and construction limits and actual right-of-way requirements will be determined.

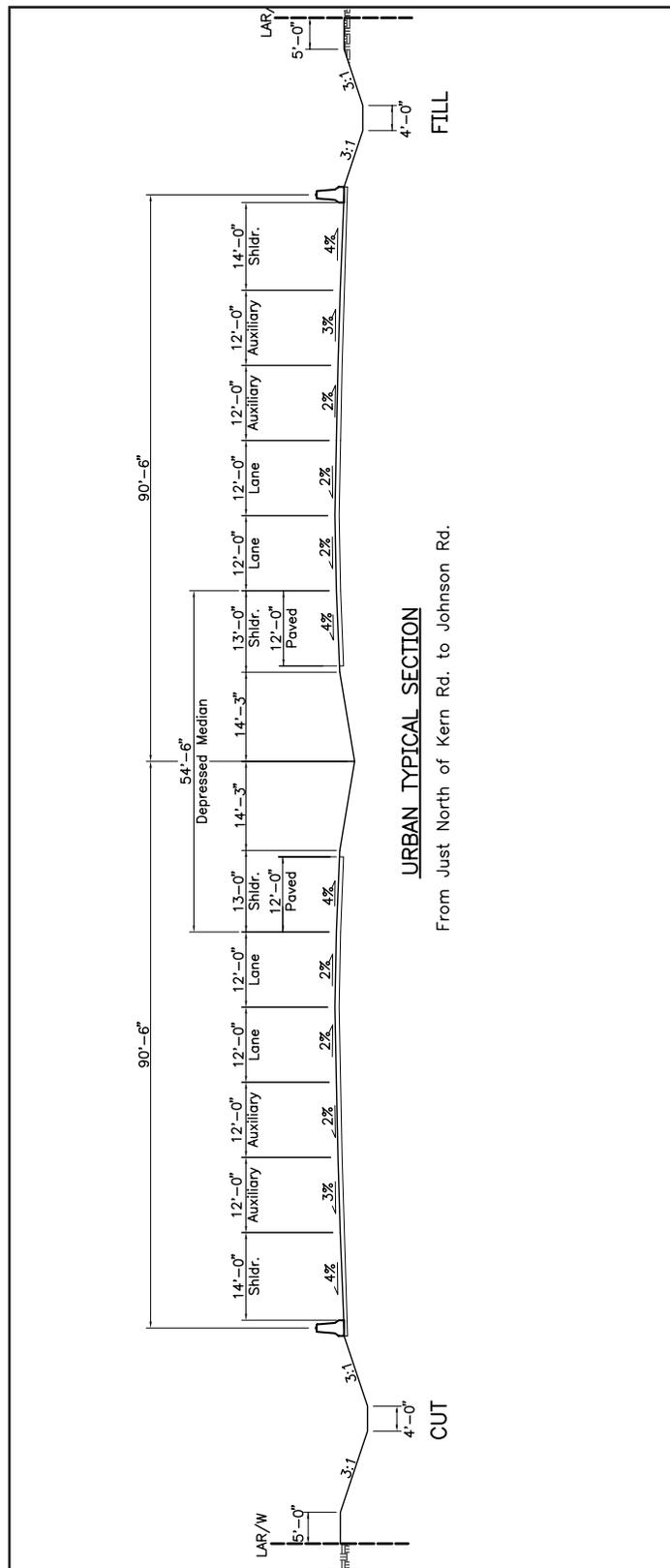
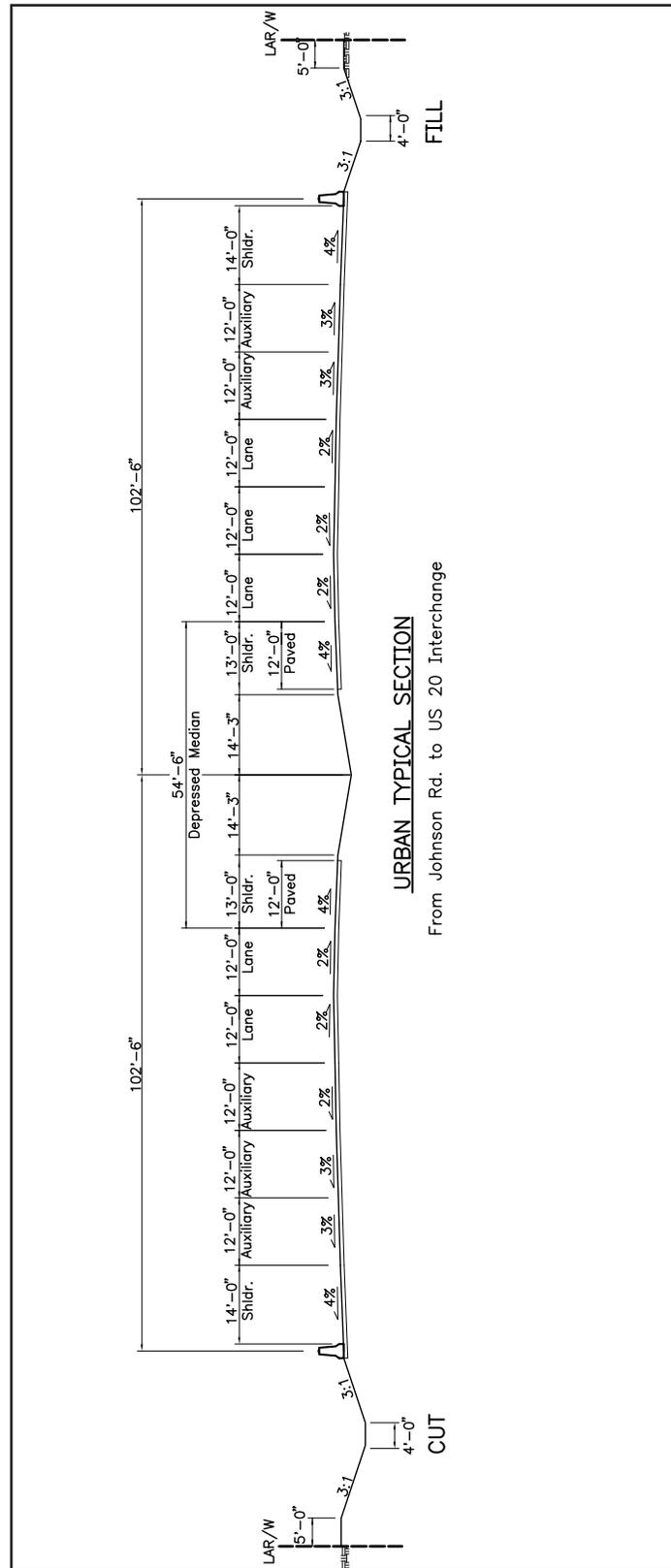


Figure 3.6.40: Urban Typical Section (From Just North of the Kern Road Interchange to Johnson Road)



URBAN TYPICAL SECTION
 From Johnson Rd. to US 20 Interchange

Figure 3.6.41: Urban Typical Section (From Johnson Road to the US 20 Interchange)