



Chapter 3: Description of 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 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 approaches Kern Road, it assumes a northeasterly direction and ties into existing US 31. It then uses existing US 31 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 in St. Joseph County. The alternative is approximately 20.5 miles in length.

3.1 Comparison of Preferred Alternative to Non-Preferred Alternatives

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 1.3 – Evaluation of Alternatives and Selection of the Preferred Alternative**, briefly described the screening process that was utilized in the Preliminary Alternatives Analysis and Screening and the DEIS for this project; modifications that were made to preliminary alternatives aimed at avoidance and minimization of impacts; consideration of alternatives not fully considered in the DEIS; the evaluation of hybrid alternatives and consideration of Section 404 requirements. Following the evaluation of alternatives, five alternatives remained for further review (See **Figure 3.1**):

- The No-Build (or no action Alternative),
- Preliminary Alternative Cs (modified Alternative C),
- Preliminary Alternative Es (modified Alternative E),
- Preliminary Alternative G-C,
- Preliminary Alternative G-E (hybrid alternative consisting of a combination of the southern portion of Alternative G-C and the northern portion of Alternative Es).

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

US 31 Plymouth to South Bend

Preferred Alternative Mitigation Package



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 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.

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. 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. 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 La Paz, 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 will be carried forward for evaluation throughout the development of the Environmental Impact Statement and serve as a baseline when comparing the effectiveness and potential impacts of other alternatives; however, it is not considered the Preferred Alternative at this time.

A comparison of the remaining freeway alternatives, Alternatives Cs, Es, G-C and G-E 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 available in July of 2004 as shown in Table 3.1):

- The alternatives that were west of existing US 31 (Alternatives Cs, Es and the northern most portion of G-C) exhibited higher impacts to the natural environment, particularly wetlands and forests.
- The alternatives that were east of existing US 31 (Alternatives G-C and G-E) 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-E) 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-E) 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-E) were generally better traffic performers; however, all remaining freeway alternatives meet the projects purpose and need and the associated performance measures.

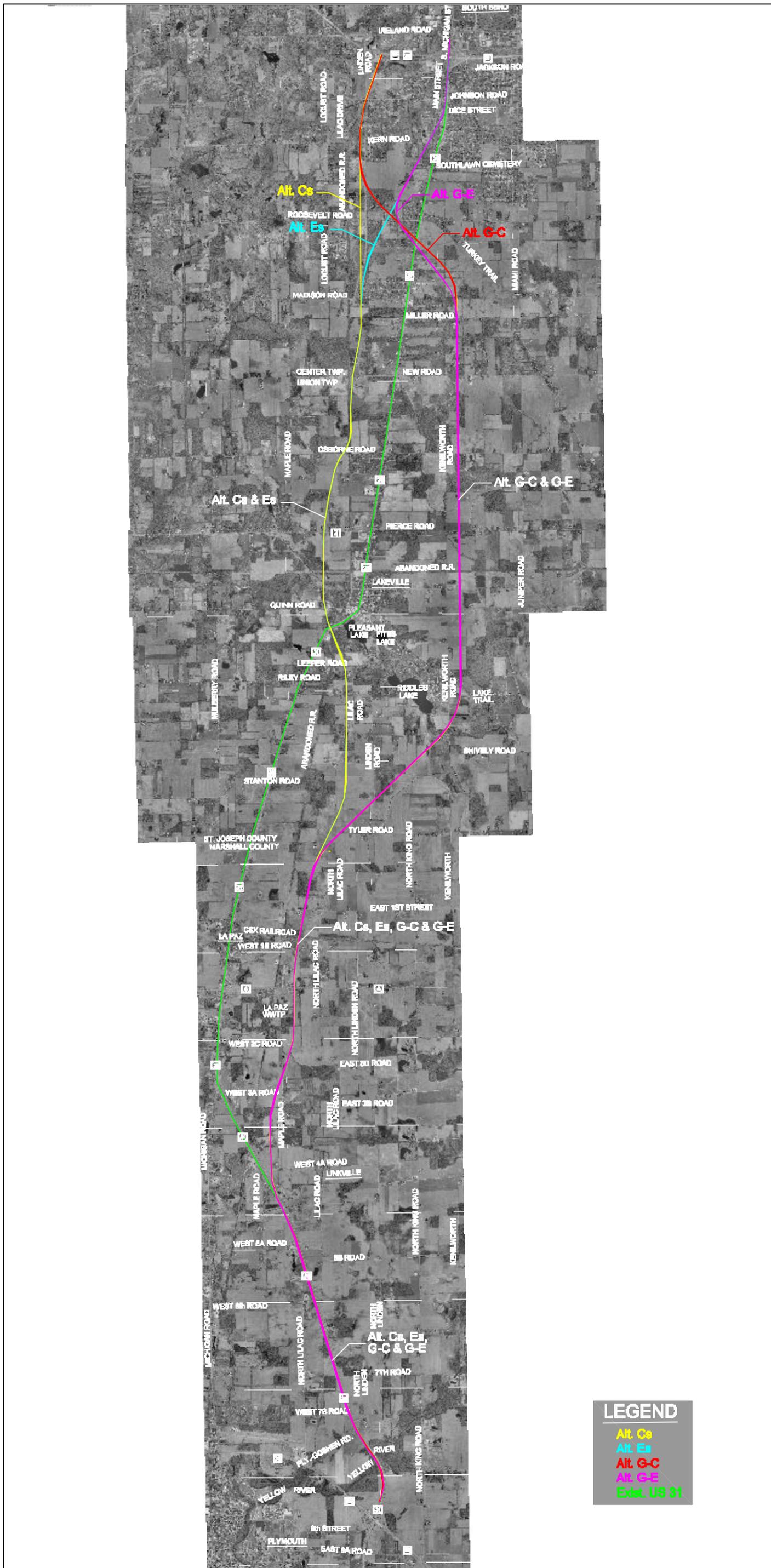


Figure 3.1: Map of Preliminary Alternatives Cs, Es, G-C & G-E



It should be noted that during the course of this study many of the impacts related to the alternatives were very similar for all of the alternatives. Only those impacts that were substantially different for each of the alternatives are listed in the following tables. It should also be noted that the information contained in Table 3.1 is based on the best data available at the time (July 2004).

**Table 3.1: Comparison of Preliminary Alternatives Cs, Es, G-C and G-E
(Data as of July 2004)**

SOCIO-ECONOMIC/ENVIRONMENTAL MEASURE	ALTERNATIVE			
	Cs	Es	G-C	G-E
ENGINEERING (TOTAL) COST (Mil. Of \$)	204.1 to 224.0	269.8 to 289.2	206.0 to 226.5	242.1 to 262.0
CONSTRUCTION COSTS (Mil. Of \$)	146.3 to 165.5	187.0 to 205.6	146.2 to 165.9	160.2 to 179.4
RIGHT-OF-WAY COSTS (Mil. Of \$)	46.3	66.4	48.2	67.5
DESIGN FEES (Mil. Of \$)	11.5 to 12.2	16.4 to 17.2	11.6 to 12.4	14.4 to 15.1
TRAFFIC PERFORMANCE				
Meet Purpose and Need	Yes	Yes	Yes	Yes
RELOCATIONS				
Residences Acquired	49	110	58	107
* Businesses Acquired	8	34	5	36
Businesses Damaged	5	5	4	5
Churches Acquired	1	1	1	1
NWI WETLANDS	54 Ac.	38 Ac.	42 Ac.	33 Ac.
FORESTS	189 Ac.	133 Ac.	135 Ac.	107 Ac.
FARMLAND (ROW CROPS)	390 Ac.	394 Ac.	471 Ac.	462 Ac.

NOTE: * Businesses Acquired Includes Large Farming Operations.

A comparative evaluation of the data contained in **Table 3.1** above that was based on data available in July 2004, resulted in the identification of Alternative Cs as a Non-Preferred Alternative. The data contained in **Table 3.1** indicated that the impacts associated with Alternatives Cs and G-C were very similar with respect to both social and environmental impacts. A comparison of Alternatives Cs and G-C revealed that Alternative Cs had a slightly lower associated engineering (total) cost and slightly lower residential impacts; however, its associated business impacts and environmental impacts to wetlands and forests were higher than those associated with Alternative G-C. In fact, the impacts to wetlands and forests associated with Alternative Cs were the highest among the remaining freeway alternatives. Alternative Cs is 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 3.1** above that was based on data available in July 2004, also resulted in the identification of Alternative Es as a Non-Preferred Alternative. The data contained in **Table 3.1** indicated that the impacts associated with Alternatives Es and G-E were very similar with respect to both social and environmental impacts. A comparison of Alternatives Es and G-E revealed that Alternative Es had slightly lower business impacts; however, its associated engineering (total) cost, residence impacts and environmental impacts to wetlands and forests were higher than those associated with Alternative G-E. In fact, the engineering (total) cost and impacts to residences associated with Alternative Es were the highest among the remaining freeway alternatives. Alternative Es is considered a Non-Preferred Alternative due to its higher relative environmental impacts to wetlands and forests while exhibiting similar impacts to residences and businesses.

US 31 Plymouth to South Bend

Preferred Alternative Mitigation Package



Following the initial comparative evaluation of the data contained in **Table 3.1**, Alternatives Cs and Es were identified as Non-Preferred Alternatives. Alternatives G-C and G-E remained as alternatives to be further evaluated. These alternatives follow the same alignment from US 30 to near Roosevelt Road. From this point northward, Alternative G-C assumes a northwest direction and terminates approximately 1-mile west of the existing US 31 and US 20 interchange while Alternative G-E assumes a northerly direction and terminates at the existing US 31 and US 20 interchange. Alternative G-C exhibited lower engineering (total) costs, relatively lower residential and business relocations, relatively higher environmental impacts to wetlands and forests, and utilizes very little of the existing US 31 alignment, making it a poorer traffic performer. Alternative G-E 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.

Through the course of this study, the study team continually examined each of the alternatives for opportunities to implement avoidance and minimization measures in the form of shifts in the alignment of the alternatives. Such avoidance and minimization measures had resulted in the reduction of wetland impacts, forest impacts and relocation impacts during the DEIS phase of the project, as discussed in Chapter 3.2 of the DEIS, and resulted in the modified alternatives Cs and Es. As the project progressed, the study team has continued this examination of the alternatives for additional opportunities to implement avoidance measures in the form of shifts in the alternatives alignment. At this point in the study, another such shift in the alignment of 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 measure also provided an opportunity to avoid a 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 became the focus of this study. The results of this avoidance measure are listed in **Table 3.2**, which contains the best data available at the time (August of 2004).

Table 3.2: Comparison of Preliminary Alternatives G-C, G-Cs, G-E and G-Es
(Data as of August 2004)

SOCIO-ECONOMIC/ENVIRONMENTAL MEASURE	ALTERNATIVE			
	G-C	G-Cs	G-E	G-Es
ENGINEERING (TOTAL) COST (Mil. Of \$)	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 Ac.	33 Ac.	33 Ac.	24 Ac.
FORESTS	135 Ac.	124 Ac.	107 Ac.	96 Ac.
FARMLAND (ROW CROPS)	471 Ac.	494 Ac.	462 Ac.	485 Ac.

NOTE: * Businesses Acquired Includes Large Farming Operations.



As the process of identifying a single preferred alternative continued, FHWA and 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 needed 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 included:

- 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,
- Determination of mitigation measures and estimation of associated mitigation costs,
 - Wetland Mitigation and bridging of wetlands,
 - Context Sensitive Solutions,
 - Noise Mitigation,
 - Local Access mitigation.

A comparative evaluation of the data contained in Table 3.3 below that was based on data available in September 2004, 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, the DEIS indicates that it appears that there is sufficient availability of comparable housing to accommodate the expected number of residential relocations. The DEIS also indicates 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 associated environmental impacts to wetlands and forests for Alternative G-C 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 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”. This alternative would also have resulted in a higher loss of forestland and the fragmentation of forest habitat.

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, 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.

Alternatives G-Cs and G-Es have their own unique impacts (See Table 3.3). 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, 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”.

3.2 Design Characteristics

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 alternatives are 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 3.2 and 3.3. Typical cross sections for the portion of the study area considered urban, from Kern Road to US 20, are shown in Figures 3.4 and 3.5.

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 between US 30 and the proposed interchange at 7th Road in Marshall County is shown in Figure 3.2. In this segment, the rural typical section will



Table 3.3: Comparison of Preliminary Alternatives G-Cs and G-Es
(Data as of September 2004)

SOCIO-ECONOMIC/ENVIRONMENTAL MEASURE	ALTERNATIVE	
	G-Cs	G-Es
COST (Without Mitigation) (Mil. Of \$)	255.2 to 284.2	281.1 to 307.3
CONSTRUCTION COSTS (Mil. Of \$)	168.4 to 196.5	175.2 to 200.5
RECONSTRUCTION OF US 20 (Mil. Of \$)	26.7	20.5
RIGHT-OF-WAY COSTS (Mil. Of \$)	48.2	70.0
DESIGN FEES (Mil. Of \$)	11.9 to 12.8	15.4 to 16.3
* MITIGATION COST (Mil. Of \$)	32.8 to 36.2	33.7 to 36.7
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
LOCAL ACCESS (Construction Costs) (Mil. Of \$)	0.0	9.6
LOCAL ACCESS (Right-of-Way Costs) (Mil. Of \$)	0.0	3.1
RESIDENCES ACQUIRED	0	11
BUSINESSES ACQUIRED	0	0
TOTAL PROJECT COSTS (Mil. Of \$)	288.0 to 320.4	314.8 to 344.0
TRAFFIC PERFORMANCE		
Meet Purpose and Need	Yes	Yes
Traffic Operational problems with US 31 and us 20 interchange	Yes	No
RELOCATIONS		
Residences Acquired	58	110
** Businesses Acquired	5	39
Businesses Damaged	4	5
Churches Acquired	1	1
*** NWI WETLANDS	36 Ac.	26 Ac.
FORESTS	135 Ac.	96 Ac.
FARMLAND (ROW CROPS)	471 Ac.	485 Ac.

NOTES: * Wetland Mitigation Ratios are based off of the INDOT MOU signed January 28, 1991, and investigators professional judgment on quality. Costs associated with Mitigation for Bridging Wetlands only include those areas north of Roosevelt Road.

** Businesses Acquired Includes Large Farming Operations.

*** Wetland Impacts are from NWI Maps from US 30 to Roosevelt Road and from Field Delineations from Roosevelt Road to US 20.

US 31 Plymouth to South Bend

Preferred Alternative Mitigation Package

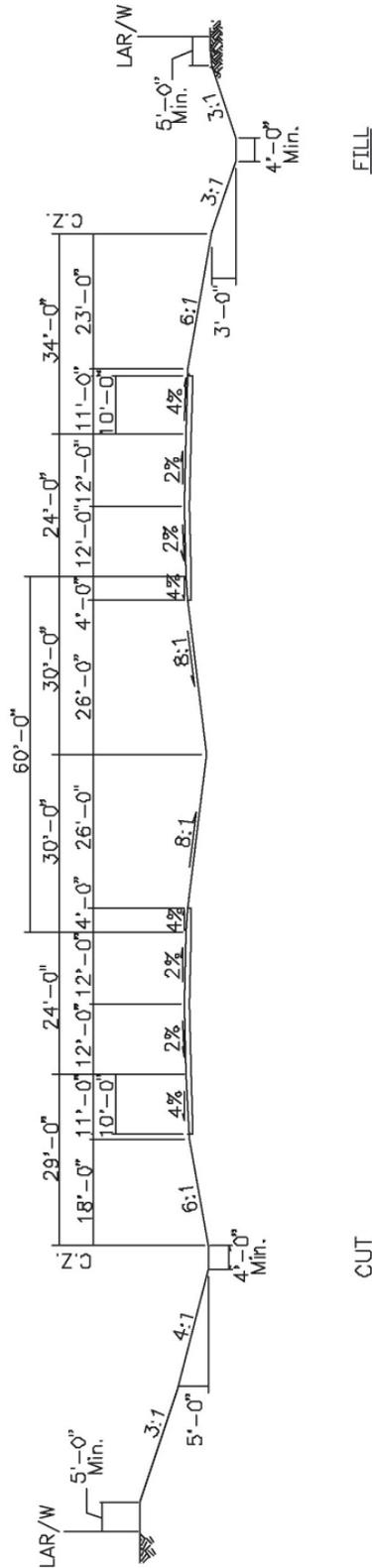


consist of a four-lane freeway with two-lanes in each direction. It will have a 60-foot grass median width, 4-foot paved inside shoulders, 10-foot paved outside shoulders, on a total of approximately 300 feet of right-of-way, with a design speed of 70 mph. The rural section of the Preferred Alternative between the proposed interchange at 7th Road in Marshall County and the proposed interchange at Kern Road in St. Joseph County is shown in Figure 3.3. In this segment, the rural typical section will consist of a four-lane freeway with two-lanes in each direction. It will have an 84-foot grass median width, 4-foot paved inside shoulders, 10-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 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 section of the Preferred Alternative between Kern Road and US 20 is considered an urban section as shown in Figures 3.4 and 3.5. The urban section of the Preferred Alternative between the Kern Road interchange and the Johnson Road overpass is shown in Figure 3.4. In this segment, the urban typical section will consist of an eight-lane freeway with four-lanes in each direction. The northbound and southbound lanes have an additional 12-foot paved future traffic lane on the median side and 14-foot paved inside shoulders on both lanes that will be separated by a concrete median barrier, 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 45 or 50mph. The additional 12-foot paved future traffic lane located on the median side of both the northbound and southbound lanes could either be utilized immediately as a through lane or marked as a paved shoulder to be utilized in the future, if warranted by future traffic volumes, resulting in a ten-lane section. The resulting cross section would match the urban segment north of the Johnson Road overpass to US 20 as described below.

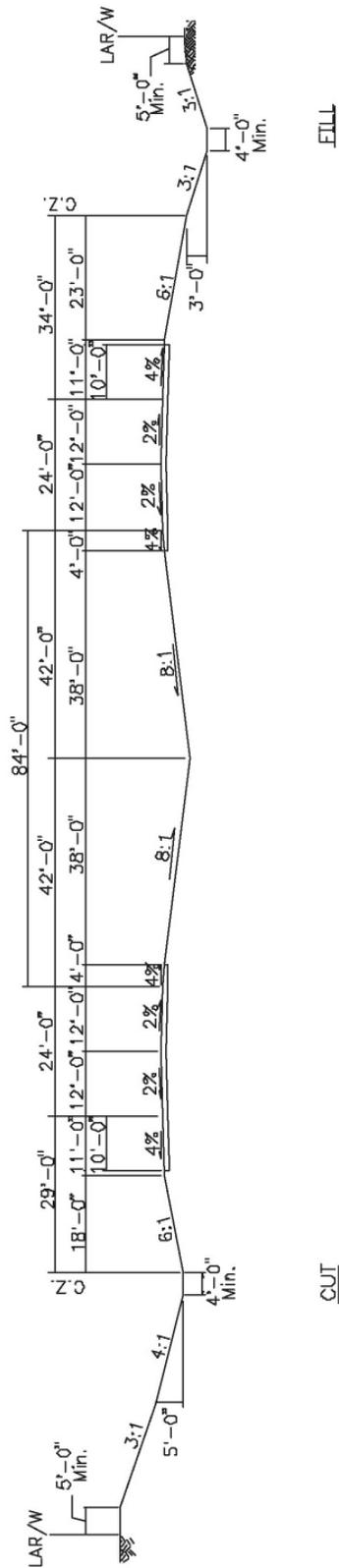
The urban section of the Preferred Alternative between Johnson Road and the US 20 interchange is shown in Figure 3.5. In this segment, the urban typical section will consist of a twelve-lane freeway with six-lanes in each direction. The northbound and southbound lanes have 14-foot paved inside shoulders on both lanes and will be separated by a concrete median barrier, 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 45 or 50mph. The southbound median lane of pavement will be constructed with this project but will not be utilized as a travel lane unless the segment of roadway immediately south, from the Johnson Road overpass to the Kern Road interchange, were expanded to a six-lane section in the future as described above.

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 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 3.2 through 3.5), a 300-foot wide corridor was established for the preferred alternative. 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, 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.



RURAL TYPICAL SECTION
 From US 30 to Just South of 7th Road Interchange

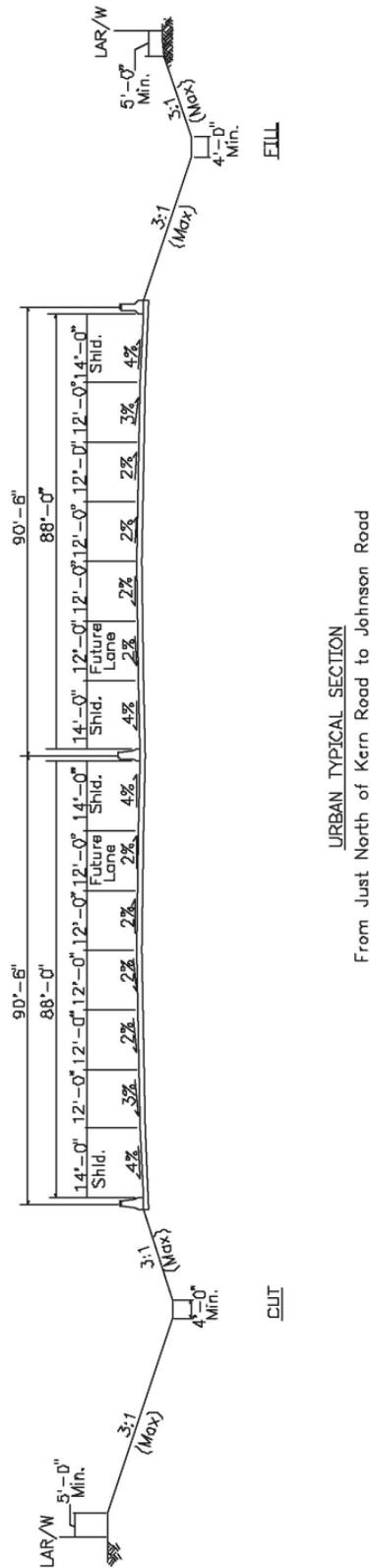
Figure 3.2: Rural Typical Section
 (From US 30 to Just South of 7th Road Interchange)



RURAL TYPICAL SECTION

From Just South of 7th Road Interchange to Just North of Kern Road Interchange

Figure 3.3: Rural Typical Section
(From Just South of 7th Road Interchange to Just North of Kern Road Interchange)



URBAN TYPICAL SECTION
 From Just North of Kern Road to Johnson Road

Figure 3.4: Urban Typical Section
 (From Just North of Kern Road to Johnson Road)

