

CHAPTER IV - ENVIRONMENTAL CONSEQUENCES

This chapter describes the potential environmental consequences of the selected improvement alternatives discussed in Chapter II - Alternatives. The basis of the evaluation of the potential social, economic and environmental impacts was established and defined as the baseline condition in Chapter III - Affected Environment. Selected alternatives identified in Chapter II are discussed in more detail in this chapter, in terms of consequences, include the "No-Build" Alternative and expressway/freeway build alternatives.

For the purposes of evaluating the impacts of the competing alternatives and for clarity of discussion, the study area for some of the impact issues has been subdivided by municipal jurisdiction, such as county or city, or has been segmented according to rural and urban characterizations. In either case, to the extent possible, impacts as a whole for the complete project area have been evaluated and included in the discussion.

Based on the final screening of alternatives in the DEIS and supplemented by agency and public comments received on the DEIS and at the Location Public Hearing, Alternative A has been identified as the preferred alignment. This alignment uses the far east bypass of Warrensburg. Refer to text in Chapter II.G and Exhibit II.G-1 for a representation of the preferred alignment. Appendix C illustrates Alternative A in greater detail.

Alternatives discussed in this chapter are the preferred alignment (Alternative A) and the alternative to the preferred (Alternative B). Alternative B has been retained for discussion in this FEIS for documentation should subsequent analysis discover an unmitigatable condition on the preferred alignment.

In general, a corridor width of 183 meters (600 feet) was used for the impact assessment of each expressway/freeway alternative. It is anticipated that further development of the design for the improvements would significantly reduce the actual level or degree of impact. Final right of way width for the improvements would typically be 107 meters (350 feet) in width. Though these procedures do provide an overestimation of the absolute impacts of the proposed action, the assessment does provide a measure of comparison for the purposes of determining the relative environmental consequences of each alternative.

Issues included in the evaluation of the environmental consequences of the proposed action include: Land Use Impacts, Farmland Impacts, Social Impacts, Relocation Impacts, Economic Impacts, Joint Development, Pedestrian and Bicyclist Considerations, Air Quality Impacts, Noise Impacts, Water Quality Impacts, Permits, Wetlands, Water Body Modification and Wildlife Impacts, Floodplain Impacts, Impacts to Terrestrial Communities, Historic and Archaeological Resources, Hazardous Waste Sites, Visual Impacts, Energy, Construction Impacts, Relationship of Local Short-Term Uses Versus Long-Term Productivity and Irreversible and Irretrievable Commitment of Resources.

A. LAND USE IMPACTS

Improvements to Route 13 could directly or indirectly impact local land uses and trends of development in three ways: primarily, cumulatively and secondarily (see Social and Environmental Impacts later in Chapter IV).

Primary impacts to land use are the direct effects resulting from an action and could occur either temporarily during construction or permanently as a result of the action. An example of a primary impact would be the displacement of a use, activity or structure. Other examples of primary impacts include the significant disruption of an activity or use, such as through the elimination of access or parking. Primary impacts can be easily assessed and calculated. The number of displacements, costs associated with relocation and a measure of the area's ability to absorb relocated residents and businesses are means of quantifying primary impacts.

Cumulative impacts result from incremental consequences of an action when added to other past and reasonably foreseeable future actions (Federal Register, 40 CFR 1508.7 CEQ.) In other words, an action impacts land use cumulatively if it modifies an ongoing or anticipated trend of development. For instance, a cumulative impact could be accelerating the pace of development in areas that are currently developing at a moderate pace. Cumulative impacts are assessed by extrapolating known and recognized development trends.

Secondary impacts result from induced development that would not have likely occurred without the action. The Federal Highway Administration (FHWA) describes secondary impacts as those "caused by an action and are later in time or farther removed in distance but are still reasonably foreseeable" (4- CFR 1508.8 CEQ Regulations). For example, a secondary impact could be the attraction of a new industry to locate in the area because of improved access. Secondary impacts are assessed by anticipating future trends.

There are no well-defined techniques to quantify either cumulative or secondary consequences of an action, as a region's growth is determined by many factors. Transportation is an important factor influencing location, magnitude, and timing of future development. Other elements also play important roles, such as the market for real estate, tourism trends, land availability and costs, quality and extent of infrastructure, character of topography and nature of soils.

Impacts on land use by alternatives were rated between 1 and 10. The rating evaluates the disruption to existing regional and local land use patterns, changes in distance and access to existing development from Route 13, displacement impacts, impacts on existing trends of development, capacity of the project area to support committed development, as well as the role of an alternative in stimulating new development in the project area. On the scale of 1 to 10, 1 measures a high level of consistency, and 10 indicates complete inconsistency with the land use factors evaluated.

Discussions of the potential land use impacts for each of the improvement alternatives are presented according to the existing land use, compatibility with future land use plans and bypass effects.

1. "No-Build" Alternative

Impacts of the "No-Build" Alternative would be to the urban (or urbanizing) areas near Higginsville, Warrensburg and Clinton.

a. Primary Impacts

Given that development in the Corridor is connected either directly or indirectly to Route 13, the "No-Build" Alternative would offer no relief from the negative impacts on land use resulting from the current level of traffic congestion in the urban areas. The "No-Build" Alternative would inhibit overall development in the region and commerce and connectivity between communities.

b. Secondary and Cumulative Impacts

The "No-Build" Alternative would impact existing trends and committed developments once a severe level of traffic congestion is reached. As Route 13 becomes excessively congested, activities in congested segments would become increasingly difficult to access. Limitation of access to existing or future development could be required to maintain capacity and safety of the roadway. As a result, points of entry to Route 13 would probably be restricted to specific locations, such as intersections with county roads. The "No-Build" Alternative would tend to foster a concentration of new development around a few major intersections. Without improvements, these intersections would quickly become congested.

Congestion would also likely disperse new residential development over a larger area. A number of smaller commercial areas would develop in a dispersed manner outside urban areas along Route 13. This would compound travel demands and further strain limited transportation facilities in the Corridor.

2. Expressway/Freeway Alternatives

Alternatives described in detail in Chapter II are assessed in the following section and evaluated for impacts on land use. While there are differences in the location and direction of alignments, there are certain overriding similarities in the way the alternatives would impact existing and anticipated land uses. These are noted on the following pages. Specific differences among alternatives are discussed following the summary.

a. Primary Impacts

The alternatives have been located and aligned to minimize their direct impact on existing land uses in the Corridor. Frontage roads, overpasses and underpasses have also been identified for each alternative in order to retain access between existing uses. Displacement impacts are not significant, as most development in the Corridor is concentrated around Higginsville, Warrensburg and Clinton.

In terms of indirect impacts, however, some alternatives could affect the quality of residential areas by impacting their visual, noise and air quality. These impacts could be minimized with the help of well-designed buffers.

A diversion of through traffic from existing Route 13 could also help impact commercial areas along the Corridor. This should not result in a significant loss of business activity, however, as the analysis of economic activity in the Corridor shows that most businesses are served largely by resident population, not through traffic originating or ending outside of the Corridor.

b. Secondary Impacts

An improvement to Route 13 would affect current travel patterns in the Corridor. The extent of this change and its impacts, in terms of induced growth, are difficult to measure. Improved access, travel time and public safety offered by an improvement should aid industry and stimulate segments of the local real estate market. Both these factors should attract new investment to the Corridor.

The potential impacts of the expressway/freeway alternatives on current and future land use areas, as well as other development controls and significant land features, are illustrated on the following exhibits:

- Exhibit IV.A.2-1 Higginsville (Alternatives A and B)
- Exhibit IV.A.2-2 Warrensburg (West Bypass Alternative)
- Exhibit IV.A.2-3 Warrensburg (East Bypass Alternative)
- Exhibit IV.A.2-4 Clinton (Alt. A and B with Alt. 1 - Route 7 Relocation)

c. Cumulative Impacts

The alternatives would support existing development trends in the Corridor. Existing trends, such as the way cities in the Corridor are currently growing, would not be expected to change significantly. The provision of intersections and over/underpasses for roadways, which connect to developed communities, should support existing development patterns in most cases. By improving access to the region, the alternatives would be expected to increase the attractiveness of the area to industry, tourists and others. The alternatives would also reinforce regional links between economic centers and support the growth of an interdependent regional economy.

Depending on the final alignment selected, the alternatives could affect projected expansion of the industrial areas in Clinton and Warrensburg by diverting some potential enterprises to sites closer to a new bypass. Bypasses could also possibly inhibit other potential developments by splitting developable land, impacting visual quality and noise levels or by influencing the real estate market. For instance, developable property made accessible by the alternatives could offer competitive prices to properties currently targeted for development, which could influence location decisions of future development. Highway-oriented establishments, in particular, would be prompted to relocate to take advantage of the better exposure and accessibility provided by a bypass improvement.

d. Lafayette County

Alternative A

Existing Land Use - Existing agricultural land uses which are now relatively unaffected by existing Route 13 in rural areas would in some cases be divided by the new highway. Alternative A is located adjacent to the existing Route 13 with three potential exceptions.

The exceptions are: (1) the northern connection to the new Missouri River bridge; (2) rerouting around the western edge of Higginsville; and (3) potential reconfiguration of the interchange at I-70.

The areas that utilize alignments close or adjacent to Route 13 do have access impacts to adjacent properties. In some cases, structures with insufficient setbacks from the existing highway would be taken. In other cases, structures which are now set back sufficiently from the highway would lose some of their front yard setback and some properties would be enhanced with new commercial potential. Although the impact on existing development may be greater with alternatives adjacent to or utilizing the existing right of way, fewer interruptions to the agriculture industry, the rural landscape and the use of an existing transportation Corridor outweigh the other potential impacts to the built environment.

The connection to existing Route 13 from U.S. 24 divides and disrupts the rural landscape. Much of the land that would be acquired as right of way is cultivated land. Additionally, much of the cultivated land has been terraced to prevent soil erosion. In most cases the terraces are in response to federal subsidy program participation requirements that mandate soil conservation measures. This alternative affects approximately 11 large fields. Cutting across a terraced agricultural operation impacts the design and effectiveness of the agricultural operation. In some cases, the effect of this alternative may effectively alter the utility of large portions of terraced land and require the remaining terraces to be reconfigured to give them utility.

Realigning Route 13 to the west of Higginsville may cause some highway oriented businesses to move or open new locations along the new alignment of Route 13. Industry currently utilizing local streets to access in-town manufacturing facilities would likely modify their transportation patterns to access Route 13 at the most convenient point unless otherwise prohibited by local regulation. The most convenient access location to Higginsville from the south is south of town where the new alignment would meet the expansion of the existing route. New heavy truck traffic from the north that would use Route FF would pass through areas unaccustomed to the traffic and could have an impact on the long-term viability of a particular neighborhood. Additionally, the alignment would have minor impacts on existing subdivisions which are currently located outside of the site and sound of existing Route 13. The realignment would probably not affect the ultimate land use. However, the extent that persons may or may not choose to reinvest in the property may be subject to change due to the location of the new highway.

Impacts to areas near the existing interchange of Route 13 and I-70 are related to the taking of residences, businesses and other structures. Two improvement options exist, allowing through traffic to bypass the existing interchange utilizing fly-over ramps to connect the bypass with existing Route 13 to either the east or west. Both bypass alternatives would utilize the existing interchange with the improvements planned with the "No Action" Alternative. The eastern option impacts four residences and the western five. Additionally, the eastern alignment would disrupt a portion of the industrial park property purchased recently by the City of Higginsville. If the reduction in size of the industrial park becomes a problem, it is surrounded by agricultural land that would not preclude expansion. Configuration of the western bypass appears to be slightly more disruptive as it requires more land area to accommodate the fly-over ramps and

potentially necessary frontage roads. The eastern option is considered to be the preferred routing for Alternative A.

Compatibility with Future Land Use Plans - Although the cities within the Lafayette County portion of the Corridor do not have current comprehensive plans, Lafayette County has a land use plan for all unincorporated areas that was adopted in 1987 to guide development through 2007. Alternative A would have several minor impacts to this plan. The first alteration this alternative may create would be to shift low-density growth in Lexington from the west back to the east where the development would be better served by the new facility. Unfortunately, Lexington lost ten percent of its population from 1980 to 1990 and significant low-density residential growth is unlikely. Secondly, the future development scenario around the City of Higginsville would likely shift in a similar pattern to better utilize the new alignment of Route 13. Although growing, Higginsville is only projected to increase by a maximum of 900 persons over the next thirty years. All of the projected population growth will not require the amount of land planned for in the Lafayette County Comprehensive Plan.

It is difficult to estimate the amount of mixed use development planned at the Route 13 and I-70 Interchange. The Alternative would not likely affect the amount of development, although it may occur in a slightly different location depending on ramp location.

Bypass Effects - Alternative A presents three areas within the county subject to potential bypass effects. The first area is the City of Lexington. The effects on Lexington are discussed in a separate environmental impact statement. The final environmental impact statement (FEIS) is entitled: Route 13 Lafayette/Ray Counties, Missouri, Richmond to Lexington. The City of Higginsville could experience bypass effects in two locations. First, the alternative bypasses the main body of the City and then to some degree bypasses the I-70 and Route 13 Interchange. The main body of the town would probably experience a slight change in the location of a few businesses which are heavily dependent on through traffic. The change in location of tax generating businesses may cause the city to annex some new areas facilitating the recapture of lost tax revenues. This would cause the City to expend additional funds to serve a larger area without the benefit of gaining new revenues. The bypass would provide good visibility to the City, potentially reducing or eliminating any bypass effects - a similar situation could occur at the interchange. It is likely that the revenues lost or gained would not justify a change in business location unless a particular facility is being replaced for another reason. The bypass effects of this alternative would be minimal, as it is located relatively close to the existing route.

The alternative does not appear to adversely impact elderly populations, young children, poverty-stricken areas, minorities, vacancy rates, or community connectivity.

Alternative B

Existing Land Use - Alternative B would have a greater impact on existing land uses than Alternative A. With the exception of two short segments, this alternative follows a new alignment. The new alignment divides at least fifteen terraced farm operations. The alternative would also reshape a large portion of the rural landscape.

Compatibility with Future Land Use Plans - Although the cities within the Lafayette County portion of the Corridor do not have current comprehensive plans, Lafayette

County has a land use plan for all unincorporated areas that was adopted in 1987 to guide development through 2007. Alternative B would have several minor impacts to this plan. This alternative is similar to Alternative A in that it may shift low density growth in Lexington from the west back to the east where the development would be better served by the new facility. Secondly, the future development scenario around the City of Higginsville would likely shift in a similar pattern to better utilize the new alignment of Route 13 at key access points. Alternative B is farther west than Alternative A and would require Higginsville to annex and provide municipal services to a larger area to recapture any sales dollars lost due to businesses which may move to the new alignment. It is difficult to estimate the amount of mixed use development planned at the Route 13 and I-70 Interchange. The alternative is not likely to affect the amount of development although it may occur in a slightly different location depending on ramp location and the ease of access to certain parcels. This alternative is not as close and does not provide good visibility to either Higginsville or the existing I-70/Route 13 Interchange.

Bypass Effects - Bypass impacts, although still minor, may be more distinct under this alternative. The primary reason for this is that the entire alignment bypasses the City and is a greater distance from existing Route 13. The alternative is far enough away from the existing route that it would probably induce the development of a new commercial area near the alternative's primary access to Higginsville.

The alternative does not appear to adversely impact elderly populations, young children, poverty stricken areas, minorities, vacancy rates, or community connectivity.

e. Johnson County

Alternative A (West)

Impacts to Existing Land Use - Although the alignment follows existing Route 13 from the Lafayette/Johnson County Line to a point just north of Warrensburg, approximately one-third of the alignment traverses relatively undeveloped agricultural lands around Warrensburg and then follows existing Route 13 to County Road 1000. The alternative then jogs west, bypassing Post Oak, and rejoining the existing alignment at the Johnson/Henry County Line. The Warrensburg bypass portion would have impacts to the accessibility and configuration of rural landscape. The northern and most of the southern portion of the alignment would follow an alignment adjacent to existing Route 13. This northern portion of the alignment adjacent to existing Route 13 has low-density subdivision development along both sides of existing Route 13. The new highway configuration in this segment of the alternative would necessitate the reconfiguration of access to some of these subdivisions. A similar situation exists south of Warrensburg. Although the development pattern is sparse, the existing route provides access to many parcels and small subdivisions. Many parcels would be faced with access reconfiguration. The alternative's impacts to existing development are minimal, as new access would be provided to all parcels. If the western bypass of Warrensburg is constructed, the rural landscape both north and south of U.S. 50 would be changed.

Compatibility with Future Land Use Plans - The rural portions of Johnson County are not planned. Warrensburg's comprehensive plan indicates moderate growth in undeveloped areas around the developed portions of the City to the north, south and east. The plan indicates limited growth potential exists to the west due to the Post Oak

Creek floodplain. The alternative may shift some planned development from the east side of the community to the west. The alteration is fairly minor as the City plans to make significant transportation improvements serving its fringe development. The bypass alignment would dictate where the improvements are constructed. Conversations with City officials indicate they would work to ensure the bypass would link with the City's transportation plan and that both sides (east and west) of Warrensburg would have improved transportation networks. Currently, the City is focusing industrial development to the east of Route 13 near U.S. 50. A western bypass may shift the market for industrial locations to the west. The impact of this would be minimal if the City is able to expand its industrial base prior to the construction of the bypass. This would be important as the City recently improved several facilities in and near the park to serve industrial development. Improvements to water, sanitary sewer, roads and fire protection systems required a significant funding commitment by the City to support industrial development in its existing park. Induced changes to industrial market demand prior to the completion of the existing industrial park could result in less than the anticipated benefit to the City.

Bypass Effects - The bypass would create many new opportunities for the City. Of the "bypass" alternatives, the western alignments would probably create the most noticeable changes in land development patterns. The alignment would likely cause development to "leap-frog" the floodplain of Post Oak Creek. New development would likely include low-density residential development, local commercial opportunities and a new industrial facility. Improved access points to U.S. 50 would spawn the new industrial facility. The new interchange would provide improved safety and convenience. The alternative is also closer to Kansas City. Effects on development to the east would likely be very limited. The existing industrial park would still be utilized and residential development would continue to utilize infrastructure improvements to the east of the city that include planned road and recent sewer improvements.

The alternative does not appear to adversely impact elderly populations, young children, poverty stricken areas, minorities, vacancy rates or community connectivity.

Alternative B (West)

Impacts to Existing Land Use - The alignment is approximately one-quarter mile west of existing Route 13 from the Lafayette/Johnson County line until the Warrensburg bypass begins. The alignment runs along a quarter section line, only cutting through two cultivated fields. Several more cultivated fields would be affected along an edge. Approximately two-thirds of the alignment traverses relatively undeveloped agricultural lands around Warrensburg and then follows existing Route 13 to County Road 1000. Although most of the land is undeveloped, the alignment passes through the two rural subdivisions north of Warrensburg. The alternative then jogs west, bypassing Post Oak and rejoining the existing alignment at the Johnson/Henry County line. The Warrensburg bypass portion would have impacts to the accessibility and configuration of rural landscape. Most of the southern portion of the alignment would follow an alignment adjacent to existing Route 13. Although the development pattern is sparse, the existing route provides access to many parcels and small subdivisions. Many parcels would be faced with reconfiguration. The alternative's impacts to existing development, though more disruptive than Alternative A, are minimal as new access would be provided to all parcels. If the western bypass of Warrensburg is constructed, the rural landscape both north and south of U.S. 50 would be changed. Warrensburg's

future growth could potentially expand into most of this area either as rural subdivisions or as low-density residential subdivisions served by sanitary sewers and rural water districts. Growth to the west, however, is not the primary focus of existing development trends favoring the eastern outskirts of Warrensburg.

Compatibility with Future Land Use Plans - The rural portions of Johnson County are not planned or zoned. Warrensburg's comprehensive plan indicates moderate growth in undeveloped areas around the developed portions of the City to the north, south and east. Limited growth potential exists to the west due to the Post Oak Creek floodplain. The alternative may shift some planned development from the east side of the community to the west. This alteration would be fairly minor as the City plans to make significant transportation improvements serving its fringe development. The bypass alignment would dictate where the improvements would be constructed. Conversations with City officials indicate they would work to ensure the bypass would link with the City's transportation plan and that both sides (east and west) of Warrensburg would have improved transportation networks. Currently, the City is focusing industrial development to the east of Route 13 near U.S. 50. A western bypass may shift the market for industrial locations to the west. The impact of this would be minimal if the City is able to expand its industrial base utilizing existing facilities prior to the construction of the bypass. This would be important as the City recently improved several facilities in and near the park to serve industrial development. Improvements to water, sanitary sewer, roads and fire protection systems required a significant funding commitment by the City to support industrial development in its existing park. Induced changes to industrial market demand prior to the completion of the existing industrial park could result in less than the anticipated benefit to the City.

Bypass Effects - The bypass would create many new opportunities for the City. Of the "bypass" alternatives, the western alignments would probably create the most noticeable changes in land development patterns. The alignment would likely cause development to "leap-frog" the floodplain of Post Oak Creek. New development would likely include low-density residential development, local commercial opportunities and a new industrial facility. Improved access points to U.S. 50 would spawn the new industrial facility. The new interchange would provide improved safety and convenience. The alternative is also closer to Kansas City. Effects on development to the east would likely be very limited. The existing industrial park would still be utilized and residential development would continue to utilize infrastructure improvements to the east of the city that include planned road and recent sewer improvements.

The alternative does not appear to adversely impact elderly populations, young children, poverty stricken areas, minorities, vacancy rates or community connectivity.

Alternative A (East)

Impacts to Existing Land Use - The portion of the alignment following existing Route 13 and the bypass would impact access to parcels and subdivisions currently having direct access to Route 13 or the county road system. New or reconfigured access would be provided to all affected parcels and subdivisions. The Far Eastern alignment of the alternative would disrupt the rural landscape. The bypass leaves an extended path of disrupted landscape. This is a very long bypass route. Little of the agricultural land is distinctly terraced or otherwise visibly improved.

Compatibility with Future Land Use Plans - Johnson County does not have planning or zoning. The alternative is entirely within the unincorporated area of Johnson County. The bypass may have some impact on the adopted Warrensburg plan. The bypass configuration may pull some development planned to the southwest north, closer to U.S. 50.

Bypass Effects - The primary bypass effect of this alternative is that it is likely to spread low-density growth farther to the north and east along Highway 50 than would otherwise occur. Warrensburg has the sewer capacity to accommodate this growth if it replaces most of the growth that would have occurred to the southeast of the City.

The alternative does not appear to adversely impact elderly populations, young children, poverty stricken areas, minorities, vacancy rates or community connectivity.

Alternative B (East)

Impacts to Existing Land Use - The portion of the alignment following existing route 13 and the bypass would impact access to parcels and subdivisions currently having direct access to Route 13 or the county road system. New or reconfigured access would be provided to all affected parcels and subdivisions. The far eastern alignment of the alternative would disrupt the rural landscape. The bypass would leave an extended path of disrupted landscape. This is a very long bypass route. Little of the agricultural land is distinctly terraced or otherwise visibly improved. This alternative follows the longest Corridor which does not utilize a significant amount of the existing Route 13 Corridor, creating a greater impact to the rural landscape than other Johnson County alternatives.

Compatibility with Future Land Use Plans - Johnson County does not have planning or zoning. The alternative is entirely within the unincorporated area of Johnson County. The bypass may have some impact on the adopted Warrensburg plan. The bypass configuration may pull some development planned to the southwest to the north closer to U.S. 50.

Bypass Effects - The primary bypass effect of this alternative would be to spread low-density growth farther to the north and east along U.S. 50 than would otherwise occur. Warrensburg has the sewer capacity to accommodate this growth if it replaces most of the growth that would have occurred to the southeast of the City.

The alternative does not appear to adversely impact elderly populations, young children, poverty stricken areas, minorities, vacancy rates or community connectivity.

f. Henry County

Alternative A

Impacts to Existing Land Use - The portion of the alignment following existing Route 13 and the bypass would impact access to parcels and subdivisions currently having direct access to Route 13 or the county road system. New or reconfigured access would be provided to all affected parcels and subdivisions.

Compatibility with Future Land Use Plans - Henry County has not voted in favor of countywide planning and zoning. Bypass alternatives near Clinton are being addressed

by a soon to be adopted comprehensive plan. The plan addresses cost efficient ways to grow to the future bypasses.

Bypass Effects - The bypass may cause a shift in commercial development from the current east junction of Routes 13 and 7 to the new intersection of Route 13 and existing Route 7. If Clinton were to completely build out its new industrial park, a new industrial opportunity at the new northern junction of Routes 13 and 7 would be available. Additionally, low density residential development would likely creep farther to the east than otherwise might occur.

The alternative does not appear to adversely impact elderly populations, young children, poverty stricken areas, minorities, vacancy rates or community connectivity.

Alternative B

Impacts to Existing Land Use - The portion of the alignment following existing Route 13 and the bypass would impact access to parcels and subdivisions currently having direct access to Route 13 or the county road system. New or reconfigured access would be provided to all affected parcels and subdivisions.

Compatibility with Future Land Use Plans - Henry County has not voted in favor of countywide planning and zoning. Bypass alternatives near Clinton are being addressed by a soon to be adopted comprehensive plan. The plan addresses cost efficient ways to grow to the future bypasses.

Bypass Effects - The bypass may cause a shift in commercial development from the current east junction of Routes 13 and 7 would be available to the new intersection of Route 13 and existing Route 7. If Clinton were to completely build out its new industrial park, a new industrial opportunity at the new northern junction of Routes 13 and 7 would be available. Additionally, low-density residential development is likely to creep farther to the east than otherwise might occur.

The alternative does not appear to adversely impact elderly populations, young children, poverty stricken areas, minorities, vacancy rates or community connectivity.

Alternative 1 (Route 7 Relocation)

Impacts to Existing Land Use - The portion of the alignment following existing Route 7 and the bypass would impact access to parcels and subdivisions currently having direct access to Route 7 or the county road system. New or reconfigured access will be provided to all affected parcels and subdivisions.

Compatibility with Future Land Use Plans - Henry County has not voted in favor of countywide planning and zoning. Bypass alternatives near Clinton have been addressed in the recently adopted comprehensive plan. The plan addresses cost efficient ways to grow to the future bypasses.

Bypass Effects - The bypass may provide additional commercial opportunities at future intersections. Additionally, existing businesses along Route 7 relying primarily on highway traffic may relocate to more advantageous positions along the bypass. The bypass may also provide a "back door" entrance to the City of Clinton's new Gearhart Industrial Park. The industrial park is designed to provide for this type of access.

The alternative does not appear to adversely impact elderly populations, young children, poverty stricken areas, minorities, vacancy rates or community connectivity.

B. FARMLAND IMPACTS

Farmland impacts include the issues of severance of existing farm ownership, total project economic impacts due to the conversion of farmland to non-agricultural uses, and impacts to the resource base. Overall economic impacts to farmlands are discussed in detail in Section IV.E.3.d and IV.E.4.d.

In the development of the alternative definitions (i.e. alignments, locations and characteristics of the alternatives), farmland parcel (ownership) delineation was considered to avoid and limit severance impacts to the extent possible with the improvements to Route 13. Table IV.B-1 shows the estimated number of farm ownership severance based on a review of the current county assessor maps and alternative alignments. Some assumptions as to the future disposition of severance and uneconomical remnant issues as part of the right of way negotiations are inherent to this inventory. None the less, this summary does provide a relative comparison of the potential severance impacts of the various expressway/freeway alternatives.

Table IV.B-1
Farmland within Alternative Corridors
Corridor Width 183 Meters (600 ft)

Alternative	Number of Affected Parcels	Number of Severed Parcels	Prime Farmland Soils Hectare (Ac)	Total Farmland Soils Hectare (Ac)
Lafayette Co.				
A	57	18	229 (565)	302 (746)
B	51	22	242 (597)	316 (779)
Johnson Co.				
A West	168	14	289 (713)	378 (934)
B West	169	46	278 (686)	382 (942)
A East	117	24	309 (764)	383 (945)
B East	83	24	332 (819)	406 (1003)
Henry Co.				
A	37	16	349 (861)	367 (907)
B	47	14	293 (724)	323 (798)
1 (Rte. 7 Reloc.)	17	5	106 (262)	122 (302)
PROJECT TOTAL				
Preferred (A)	211	58	887 (2,190)	1,052 (2,598)

Since an expressway/freeway Route 13 improvement would have either limited or full access control, current abilities and opportunities to move farm equipment from one field to another or from a base of farm operations to the field may be affected. Depending on the location of the alternative relative to land parcels, the character of land ownership continuity, and current local access mobility, inter-field movements directly impacted by the roadway construction would be restricted to designated access points along the new facility -- intersections at a spacing of no closer than 805 meters (1/2 mile). With the roadway improvements, land ownership's with current access would not be denied as a

result of the improvements and existing access would be maintained. The nature and means of access maintenance would likely be provided by the combination of current local access facilities and intersections along the Route 13 improvements, but the final means of access would be determined in final plan development and right of way acquisition negotiations with the affected landowners. Due to the proximity of Alternative A to existing Route 13 and the current nature and limitations of cross circulation and access caused by the barrier of existing Route 13, Alternative A would likely have less impact on farm operations which are already impacted in some form or fashion by the existing facility. Alternative B would likely affect more farms which currently are not influenced by the existing facility.

Impacts to the resource base are the acquisition of farmlands as measured by the status of production potential by soil types as classified by the Natural Resource Conservation Service (NRCS). The impacts to the resource base, prime farmlands and farmlands of statewide importance, are described below and are summarized in Table IV.B-1.

The Expressway/Freeway Alternatives all used a 183 meter (600 foot) wide Corridor for initial impact assessment screening, although the anticipated right of way would be around 107 meters (350 feet). This allows for the inevitable minor shifts in alignments that develop during the preliminary design. The 183 meter (600 foot) right of way corridor (an anticipated maximum) should, therefore, be viewed as a worst case scenario, with actual impacts from the 107 meter (350 foot) right of way (an anticipated minimum) being less.

Two categories of farmland soils occurring within the Corridor were quantified based on the 183 meter (600 foot) right of way. The two categories of soils are: (1) prime farmland soils and (2) soils that are both prime farmland and farmland of statewide importance. This information was gathered from the "Missouri Technical Guide Transmittal No. 219" (February 6, 1991) and the Soil Surveys of Lafayette (February 1975), Johnson (February 1980) and Henry Counties (February 1976). These sources are issued from the United States Department of Agriculture Natural Resource Conservation Service (NRCS), formally the Soil Conservation Service (SCS). Direct impacts, related to prime farmland and to soils that are both prime farmland and farmland of statewide importance, were taken from the 183 meter (600 foot) right of way Corridor.

The number of prime farmland areas impacted by the alternatives has been quantified. Prime farmland and soils that are both prime farmland and farmland of statewide importance represent the highest quality crop land available in each county. The productivity of prime farmland may be different from county to county. For example, based on the Soil Survey for Lafayette County, a total of 72,253 hectares (178,540 acres) (44.2%) of *prime farmland soils and soils that are both prime farmland and farmland of statewide importance* occur within the county. Johnson County contains 100,565 hectares (248,500 acres) (47.0%) of prime farmland, and Henry County contains 131,088 hectares (323,918 acres) (68.9%) of prime farmland. Lafayette County contains a greater proportion of row cropping than Johnson or Henry Counties, even though prime farmland soils appear to represent a smaller portion of Lafayette County. This is mainly due to the larger amount of wooded areas and thinner/less productive soils in Johnson and Henry Counties. The prime farmland soils in Johnson County and Henry County are better utilized as pasture land rather than row cropping.

Natural Resource Conservation Service representatives in Warrensburg and Clinton stated that the prime farmland in a county is considered the highest quality cropland for that particular county, but it may not compare to the productivity of prime farmland in adjacent counties. This is the case in Johnson and Henry Counties, which contain prime farmland that is not as productive as the prime farmland in Lafayette County. The lower productivity of the soils in Johnson and Henry Counties is due in part to thinner loess soils.

Due primarily to the influence of agricultural land use and secondarily to the location of several areas of urban development within the Corridor, the extent of cleared lands is evident throughout the Corridor. In most cases previously wooded areas have been cleared away for agricultural production.

1. "No-Build" Alternative

The "No Build" Alternative would include those improvements that can reasonably be expected to occur during the 20-year design period. The "No Build" Alternative would have no impact on the prime farmland base of the Route 13 Corridor since no additional right of way would be required. The development which presently occupies prime farmland and farmland of statewide importance would continue, and it is anticipated that additional development would require more lands, some of which would undoubtedly be classified as either prime farmland or farmland of statewide importance.

2. Expressway/Freeway Alternatives

a. Lafayette County

Alternative A

Alternative A would directly impact a total of 302.1 hectares (746 acres) of farmland soils. There are 228.8 hectares (565 acres) of prime farmland and 73.3 hectares (181 acres) of soils that are both prime farmland and farmland of statewide importance.

The eastern bypass I-70/Route 13 Interchange option would directly impact a total of 29.5 hectares (73 acres) of farmland soils. There are 7.3 hectares (18 acres) of prime farmland and 22.3 hectares (55 acres) of soils that are both prime farmland and farmland of statewide importance. The western I-70 interchange option would directly impact a total of 33.2 hectares (82 acres) of farmland soils. There are 9.3 hectares (23 acres) of prime farmland and 23.9 hectares (59 acres) of soils that are both prime farmland and farmland of statewide importance.

Alternative B

Alternative B would directly impact a total of 315.5 hectares (779 acres) of farmland soils. There are 241.7 hectares (597 acres) of prime farmland soils and 73.7 hectares (182 acres) of soils that are both prime farmland and farmland of statewide importance.

b. Johnson County***Alternative A (West)***

Alternative A (West) would directly impact a total of 378.3 hectares (934 acres) of farmland soils. There are 288.7 hectares (713 acres) of prime farmland soils and 89.5 hectares (221 acres) of soils that are both prime farmland and farmland of statewide importance.

Alternative B (West)

Alternative B (West) would directly impact a total of 381.5 hectares (942 acres) of farmland soils. There are 277.8 hectares (686 acres) of prime farmland soils and 103.6 hectares (256 acres) of soils that are both prime farmland and farmland of statewide importance.

Alternative A (East)

Alternative A (East) would directly impact a total of 382.7 hectares (945 acres) of farmland soils. There are 309.4 hectares (764 acres) of prime farmland soils and 73.3 hectares (181 acres) of soils that are both prime farmland and farmland of statewide importance.

Alternative B (East)

Alternative B (East) would directly impact a total of 406.2 hectares (1,003 acres) of farmland soils. There are 331.6 hectares (819 acres) of prime farmland soils and 74.5 hectares (184 acres) of soils that are both prime farmland and farmland of statewide importance.

c. Henry County***Alternative A***

Alternative A would directly impact 367.3 hectares (907 acres) of farmland soils. There are 348.7 hectares (861 acres) of prime farmland soils and 18.6 hectares (46 acres) of soils that are both prime farmland and farmland of statewide importance.

Alternative B

Alternative B would directly impact 323.2 hectares (798 acres) of farmland soils. There are 293.2 hectares (724 acres) of prime farmland soils and 29.9 hectares (74 acres) of soils that are both prime farmland and farmland of statewide importance.

Alternative 1 (Route 7 Relocation)

Alternative 1 (Route 7 Relocation) would directly impact 122.3 hectares (302 acres) of farmland soils. There are 106.1 hectares (262 acres) of prime farmland soils and 16.2 hectares (40 acres) of soils that are both prime farmland and farmland of statewide importance.

3. Form SCS-CPA-106 Results

Impacts to the resource base are analyzed and compared through a process developed by the NRCS called the *Farmland Conservation Impact Rating for Corridor Type Projects*. Form SCS-CPA-106 & 106A, which is the documentation for this rating, is found in Appendix H. An explanation of the corridor assessment criteria used to determine the score of each alternative on the form can also be found in Appendix H. On form SCS-CPA-106 the total points scored for the Preferred Alternative in each county did not exceed the 160-point threshold established for consideration of farmland protection measures. The scores for each alternative alignment are as follows (the Preferred Alternative alignments are shown in bold type):

- Lafayette County - **Alt. A = 159**, Alt. B = 164
- Johnson County - Alt. A West = 154, Alt. B West = 159, Alt. A Near East = 154,
Alt. A Far East = 154, Alt. B Far East = 143
- Henry County - **Alt. A = 126**, Alt. A East Option = 131, Alt. B = 136,
Alt. 1 Rte. 7 = 137

C. SOCIAL IMPACTS

The analysis of social impacts involves the assessment of a variety of factors, which act collectively to create or reinforce a sense of community or place. Community is typically formed through associations between residents and key elements such as neighborhoods, places of commerce, schools and public facilities and gathering places such as worship centers and civic clubs. The degree to which alternatives influence or impact these patterns of social interaction and community is summarized below and discussed in detail on the following pages.

1. Social Interactions and Communities

a. "No-Build" Alternative

The only potential impacts to the current social environment for this alternative would be traffic related. Three primary improvement projects (widening Routes 7 and 13 in Clinton, widening Maguire Street in Warrensburg and widening Route 13 near I-70) along with bridge improvements and shoulder stabilization will improve traffic flow and safety along Route 13 over time. Overall, Route 13 would probably experience worsening congestion and traffic concerns in areas approaching these improvements.

b. Expressway/Freeway Alternatives

Each alternative would increase the efficiency and safety of Route 13 by improving the existing Corridor to a higher design standard. The new facility would result in shorter travel times from point to point, although lack of free access may require a different route from Route 13 to the destination. Access patterns would be changed from unlimited access to existing Route 13 to limited access, usually at one-mile intervals, to the improved Route 13. Although access changes to many residences, businesses,

public facilities, public services recreation areas and churches may occur, the impacts would be very minimal in the sparsely populated Corridor.

Primary Impacts

There is insufficient published data to determine adverse impacts on any social group. There is the potential to adversely impact a minority or low income group due to the low number of displacements, however windshield surveys did not indicate this to be the case.

Three alternatives would have impacts on neighborhood continuity. These alternatives which would divide existing subdivisions include: Alternative B (Lafayette County and Johnson County) with either the west or east Warrensburg bypass. Each alternative impacts ten to fifteen households. Other alternatives would have little or no effect on neighborhood or community cohesion.

When constructing a new highway the state acquires land that is taken out of private ownership and off of the tax roll. The result is a loss in taxing jurisdiction revenues. However, right of way costs in any one county should not exceed 9.2 million dollars. The nature of the condemnation process would most likely result in higher land prices than are on record with the county assessor due to the periodic nature of reassessment and the fact that people usually do not protest low tax assessments. On a percentage basis, the maximum loss of revenue to any taxing jurisdiction would be one percent. This loss would probably not be realized since increased property values and new development around new improvements are expected to be realized. Additionally, counties would experience employment, income and revenue benefits from the construction process.

Secondary and Cumulative Impacts

Secondary and cumulative impacts to the social environment are very difficult to assess. The potential to adversely impact minority groups through a secondary or cumulative impact is minimal. There are no apparent direct impacts or likely actions that could induce a secondary or cumulative impact in the corridor. The community cohesion in the larger cities may be improved as a result of the improved transportation planning to accommodate new by-passes. Secondary impacts to community cohesion in the rural portion of the corridor are unlikely. The tax revenues may also increase as a secondary impact of the new highway construction. Increased capacity and improved efficiency could and are projected to increase travel along Route 13. The increase in demand as a result of increased travel could increase land values and property tax revenue. Increased travel will also provide the opportunity to capture additional sales revenue.

2. Environmental Justice

Pursuant to the provisions of Executive Order 12898: Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations, this FEIS has addressed the following list of issues:

- Air, noise, land and water pollution - Chapter IV.
- Destruction or disruption of man-made and natural resources - Chapter IV.

- Destruction or diminution of aesthetic values - Chapter IV.
- Destruction or disruption of community cohesion - Chapter IV.
- Destruction or disruption of the availability of public and private facilities and service - Chapter IV.
- Injurious displacement of people - Chapter IV.
- Adverse employment effects - Chapter IV.
- Injurious displacement of businesses, farms, housing and people - Chapter IV.
- Tax and property value losses - Chapter IV.
- Increased traffic congestion - Chapter I.
- Exclusion from public involvement - Chapter VII.
- The denial of, or significant delay in the receipts of benefits from MoDOT programs, projects, policies, activities - Chapter IV.

MoDOT used a variety of techniques and studies to determine the conformance with the provisions of Environmental Justice. These included a public involvement program, including the use of newsletters, the use of a corridor advisory committee for each county, and public hearings were held in each of the three counties. There were also meetings and telephone conversations with local officials to determine locations of minority and low income neighborhoods. Census data was analyzed on a township and city basis. There were extensive windshield surveys, during which all the roads within the Corridor were driven to determine and confirm land use. MoDOT has evaluated the project utilizing the aforementioned criteria and has found that there would be no "disproportionately high and adverse" effects on minority or low income populations within the Route 13 Corridor and documents same in the above listed chapters of this FEIS.

D. RELOCATION IMPACTS

Among all the impacts of the construction of a highway or other major transportation improvement projects, the acquisition of real property, including residences and businesses, is the action that engenders the most discussion among those directly affected. In an effort to make the property acquisition process as equitable as possible, standards have been developed to ensure adequate consideration and compensation for the persons whose property is required for the public improvement project. Regardless of the impact, it is often traumatic to be uprooted from one's home, business or the land that has been in the family for generations. While many long-time residents have willingly participated in the recent real estate boom, others have not. It is likely that both long-time residents and recently arrived persons may be affected by the acquisition of their property.

Property that is required for the construction of Route 13 improvements would be subject to the provisions of Public Law 910646, as amended by Public Law 100-17. Public Law 910646 is the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 and is generally referred to as the Uniform Act. This is a federal law. Public Law 100-17 is the Surface Transportation Act of 1987 that amended certain provisions of Public Law 91-646. It also is a federal law.

Provisions of the current Intermodal Surface Transportation Efficiency Act (ISTEA) H.R. 2950 have also included all references to the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, and these provisions require compliance with Title VI of the Civil Rights Act of 1964 (H.R. 2950-34, Section 1017 Acquisition of Rights-of-Way).

MoDOT makes available two booklets -- *When a Highway Comes Your Way* and *The Relocation Assistance and Payment Program*. These booklets explain the process, benefits and rights under the law.

It is the policy of the Missouri Department of Transportation that no person will move from their dwelling until a comparable replacement dwelling has been made available to that person. A comparable replacement dwelling is safe, decent and sanitary. The replacement housing must also be open to persons regardless of race, color, religion or national origin (Title VIII, 1968 Civil Rights Acts).

Under most circumstances, persons residing in a mobile home will be eligible for relocation payments as relocatees who live in conventional dwellings. Advisory services will be provided on a reasonable basis commensurate with the relocatees' needs. Relocatees will be eligible to receive referrals of available replacement properties, assistance in filing claims and other reasonable assistance necessary to assure successful relocation. Comparability will be based primarily on functional rather than physical similarity. The relocation coordination office maintains liaison activities with other agencies, rendering services to persons who must relocate. Occupants of residences and businesses are entitled to receive reasonable and necessary moving costs and related expenses in relocating their personal property, provided that the established policies and measures of MoDOT are followed.

The impacts associated with partial acquisitions are similar to total takings. Some of the possible impacts include:

- Reduced potential for income from farming operations,
- Required relocation of land use activities that are occurring on parcel to be acquired,
- Required adjustments to current storm water management practices,
- Relocation of agricultural underdrains, and
- Loss of possible economic return from mineral rights.

The residual parcel of a partial taking will be provided access to a public road either by rerouting current access or by construction of a local access frontage road. In some cases where the residual parcel is small, it may be acquired as an "uneconomic

remnant" where the cost to provide access exceeds the value of the property. Access to the remaining parcel will be maintained during as well as after construction.

Current vacancy rates indicate that the supply of replacement housing varies throughout the study area. Rural areas of the study area, especially in Henry and Johnson County, have very low vacancy rates. The low rates are offset by fairly high rental vacancies in Clinton and Warrensburg. The study area vacancy rate is approximately 8.1 percent representing over 1,600 units according to the 1990 census. More than 50 percent of the vacant units are in the Clinton and Warrensburg townships. Lafayette County appears to have an adequate supply of housing to accommodate potential displacements. Data on housing costs related directly to displacements and replacement availability are not available.

In addition to vacancy rates, replacement land and structures available for purchase are important to the ability of displaced persons to find replacement land, housing or business structures. The following list shows available land and structures in Lafayette County, Johnson County, and Henry County:

- Lafayette County - September 7, 1995 (Corridor Area Only*)

40	Vacant Tracts of Land (Higginsville area only)
5	Commercial/Industrial (Higginsville area only)
	<i>Residences by Value</i>
24	Less than \$50,000
20	\$50,000 to \$75,000
14	More than \$75,000
10	Multiple Family (Higginsville area only)

- Johnson County - August 22, 1995 (Entire County)

63	Vacant Tracts of Land
28	Commercial/Industrial
	<i>Residences by Value</i>
58	Less than \$50,000
106	\$50,000 to \$75,000
158	More than \$75,000
20	Multiple Family

- Henry County - August 22, 1995 (Entire County)

70	Vacant Tracts of Land
14	Commercial/Industrial
	<i>Residences by Value</i>
46	Less than \$50,000
28	\$50,000 to \$75,000
56	More than \$75,000
0	Multiple Family

*Discussions with local realty agents disclosed that most local realtors do not subscribe to a Multiple Listing Service. Therefore the most accurate measure of real estate availability was by estimate of a knowledgeable local realtor. King Realty in Lexington and Noltz Realty in Higginsville provided estimates.

References:

Lafayette County Comprehensive Plan, 1987
 Warrensburg Comprehensive Plan, 1987
 Clinton Comprehensive Plan, 1982
 Draft Clinton Comprehensive Plan, 1995
 Lafayette County Zoning Ordinance, 1984
 Clinton Zoning Ordinance, 1993
 United States Department of the Interior, Bureau of the Census; Detailed Census of Population and Housing 1990.

Census data indicate the potential areas of concentrated low income or special needs households. Very few members of minority groups are located in the Corridor. Due to the low number of displacements, one group could be disproportionately impacted. However, conversations with local officials, census data analysis and windshield surveys give no reason to believe this to be the case.

The degree of impact of each alternative is directly related to its number of displacements. The more displacements an alternative has, the greater its impact. Displacements based on a 183 meter (600 foot) wide corridor are shown in Table IV.D-1. Displacements occurring on the preferred alternative using typical right of way width are shown in Table IV.D-2.

**Table IV.D-1
Potential Displacements for Expressway/Freeway Alternatives
Based on 183 Meter (600 foot) Band**

Displacement	Lafayette Co.		Johnson County				Henry County			Rte. 13 Total
	Alt. A	Alt. B	Alt. A West	Alt. B West	Alt. A East	Alt. B East	Alt. A	Alt. B	Alt. 1 Rte. 7	Preferred (A)
Conv. Residence	24	22	57	58	40	14	34	22	5	98
Mobile Home	2	4	6	0	3	0	0	0	0	5
Business	2	2	2	0	4	2	0	0	0	6
Public Facility	0	0	0	0	1	0	0	0	0	1

**Table IV.D-2
Potential Displacements for Alternative A
Based on Typical Right of Way Width**

Displacement	Lafayette County	Johnson County East	Henry County	RTE:13 TOTAL	Alternative 1 Route 7 Relocation
Conv. Residence	12	33	5	50	3
Mobile Home	2	10	0	12	0
Business	1	8	2	11	0
Public Facility	0	3	1	4	0

E. ECONOMIC IMPACTS

1. Definition of Economic Development

A public investment is "economically attractive" if the economy is better off with the highway improvement than without it. A well-planned investment would be an asset to the Corridor area and would be of help to the economic future of communities and activities located in proximity to Route 13. Ample evidence exists to support the contention that the Corridor economies would benefit from the roadway improvements.

Included in the following table for reference purposes (Table IV.E.1-1) are the estimated costs of the selected alignment for construction, right of way, relocation and acquisition and the cost to relocate utilities. Please refer to Tables II.H-1 and II.H-2 for additional information.

**Table IV.E.1-1
Estimated Project Cost¹**

Location	Construction	ROW	Relocation and Acquisition ²	Utility Relocations ³	Total
LAFAYETTE COUNTY					
Final Configuration	\$ 83,962,560	\$ 3,073,840	\$1,317,360	\$ 3,498,440	\$ 91,852,200
Initial Construction	57,995,520	3,208,520	1,375,080	2,416,480	64,995,600
JOHNSON COUNTY					
Final Configuration	130,979,520	6,472,970	2,774,130	5,457,480	145,684,100
Initial Construction	111,528,000	6,472,970	2,774,130	4,647,000	125,422,100
HENRY COUNTY					
Final Configuration	65,897,280	2,262,890	969,810	2,745,720	71,875,700
Initial Construction	54,478,080	1,826,510	782,790	2,269,920	59,357,300
TOTAL COSTS - ROUTE 13					
Final Configuration	\$280,839,360	\$11,809,700	\$5,061,300	\$11,701,640	\$309,412,000
Initial Construction	\$224,001,600	\$11,508,000	\$4,932,000	\$ 9,333,400	\$249,775,000
TOTAL COSTS - ROUTE 7					
Final Configuration	\$ 20,276,160	\$ 872,830	\$ 374,070	\$ 844,840	\$ 22,367,900

NOTE: 1 Costs are estimated using 1995 unit costs.
 2 Relocation and acquisition costs are computed as a 30% addition to right of way costs.
 3 In a preliminary estimate, utility relocations are computed as 4% of construction costs.

For purposes of the Route 13 Corridor, economic development is defined as "an increase in the prosperity and incomes of people and institutions." Economic development of this nature in a given area occurs when the incomes and products generated in the area are caused to increase. Such increases occur in either of two ways:

- *More Resources* - If output increases in the area, the increased output will require more resources (land, labor, materials, capital) which means that more people are employed, more incomes are earned and more profits are made. If the highway alternative enables attraction of additional business in the Corridor (new or expanded firms), then the highway has aided the economic development process, to the benefit of the Corridor areas.
- *Efficiency* - Even if the highway does not help to create increased output, it can still help economic development by causing the areas' output to be achieved at less total cost. Reduced transportation costs due to the highway improvements in this way yield increased prosperity and income.

The Route 13 Study suggests that the highway investments would do both: they would attract "more resources" and they would create greater "efficiency." As a result, the highway improvements would have a definite "economic development" role to play.

Highways are essentially "tools" used in transporting goods and people from one place to another. Investments in highways contribute to economic development in that they lower transportation/logistics costs and/or improve people's perceptions of the Corridor thereby causing them to want to settle/invest in the Corridor. Such changes may be realized in numerous ways, including improved safety, decreased fuel and other vehicle operations costs, improved awareness of the ability to travel to the Corridor, revised logistics or agricultural patterns, and reductions in noise or air pollution. But in the final analysis, most of the direct benefits of a highway, and therefore the primary justification for investing in it, flow from using it for transportation.

Benefits from an expressway would accrue to persons and businesses whose vehicles use the highway. In addition, lower transportation costs may be passed on to consumers as lower prices for consumer goods, to workers as higher wages, or to owners of businesses as higher net income. Persons may thus benefit from a transportation investment actually without traveling on the highway.

It is important to keep in mind that for any of these benefits to occur, the investment must either enable significant reductions in transportation costs or cause revised perceptions of the area. If the amount of these savings is small for each trip, if the number of vehicles using the highway is not sufficiently large or if peoples' perceptions do not change dramatically, the investment would not produce additional benefits. Highway investments must be based on reasonable estimates of traffic volumes to be serviced, the cost savings travelers would experience and a realistic assessment of manufacturing, service, logistic or perception changes.

2. Economic Impact Evaluation

A highway improvement of the type envisioned for the Route 13 Corridor would make travel faster, easier and more efficient. It would divert traffic from various other highways to the improved Corridor, and it could also generate new traffic. All of these events would be most welcome, not only because of the travel efficiencies and the improved perception of the area, but also because of what these travel efficiencies and perceptions could mean to the communities along the highway.

On the other hand, a highway improvement would permanently remove farmland from production creating a drain of the Corridor agricultural sector. Likewise, diverting traffic to new bypasses would reduce the traffic flow past existing businesses along Route 13 and would potentially reduce the profitability of those businesses. Therefore, the economic impact evaluation analyzes the various economic development expected to occur in the Route 13 Corridor.

a. REMI Econometrics Model

The economic impact portion of the feasibility study relies on an inter-regional economic model of Missouri's counties. The "REMI" sets of models are private sector models owned by Regional Economic Models, Inc. of Amherst, Massachusetts. That this model is dynamic in nature and adjusts to specific economic and policy changes is a distinct advantage of the REMI series of models.

The REMI model is a comprehensive forecasting and simulation system useful for policy and investment analysis in a wide array of issues. The model is structured to incorporate inter-industry transactions along with feedback from final demand activities. The model determines the proportion of intermediate and final demand that is fulfilled by producers in each Corridor region. Demand not fulfilled by local production leads to imports. The REMI model differs from other input-output models in its ability to allow substitution among factors of production in response to changes in relative factor costs over time. Within the model, wages are responsive to changes in labor market conditions, migration is responsive to changes in expected income and the share of local and export markets responds to changes in regional profitability and export costs.

Simulations with the model can be used to estimate the economic and demographic effects of policy and investment interventions in the Corridors such as economic development programs, infrastructure investments including new highway construction, energy and natural resource conservation programs, state and local tax changes and other policies. The policy simulation compares the performance of a Corridor after a policy intervention with the projected performance of the region. The comparison is based on national forecasts of industry growth, changing technology and estimates of the shifting competitive position of each industry in the Corridor regions compared to that industry elsewhere in the country and elsewhere in Missouri.

The highway improvements considered in this study create a number of events that serve as inputs to the model. These include trucking cost savings, business cost savings, additional roadside expenditures, agricultural changes and others. These direct changes, in monetary terms, serve as inputs into the REMI economic model. For example, the model estimates the regional economic effect from increased profits for businesses and firms in the region created by more efficient truck travel on the highway.

The direct monetary impacts in each of these categories of impact were estimated external to the REMI model. The direct impacts consist of a portion of the travel efficiency benefits (the amount attributable to business travelers) and calculated impacts for the probability of attraction of new industry. Then most, but not all, were input into the REMI model.

b. Economic Impact Terms and Definitions

The highway improvements would yield many different forms of benefits to the local economies. In order to recognize these diverse impacts in a consistent fashion, a single set of "indicators of impact" and a single set of definitions are used throughout the economic impact calculations. The economic impacts are expressed in terms of four indicators of economic impact:

- *Value Added* - The value of each Corridor area's firms' output minus the value of the inputs they purchase from other firms. In the Corridor study, it is the value added by firms located in the defined Corridor impact area, including employee compensation, proprietary income, indirect business taxes and other property income.
- *Wages* - Total increases in payroll (wages and salaries and benefits) paid by local industries due to the improved highway.

- *Employment* - Job impacts are expressed as "full-time equivalents" (FTE's) and include the number of person job years due to road construction and road use, plus the share of those that are employed in sectors that directly or indirectly support the construction process, the road users and the firms that might expand in or locate to the Corridor region.
- *Population* - The net change in resident population attributable to the new highway.

3. Economic Development Impact Types

The highway investments and associated travel efficiencies could cause a number of events to occur, most of which would be beneficial to local economies. These events are categorized into four types:

- Economic impacts resulting from highway construction,
- Impact on region's competitive position,
- Economic impacts of bypassing communities, and
- Removal of farmland from production.

a. Economic Impacts of Highway Construction

The Route 13 alternatives would cost millions of dollars to build. The very act of spending large sums of construction money in an area is of economic value to that area since contractors and construction workers are hired, gravel is purchased, etc. Economic value that is created in the Corridors due to the act of spending such construction funds in the Corridor is estimated.

The capital costs are estimated in terms of construction cost and right of way cost. The construction costs are treated as increases in final demand and input into the REMI model. The right of way costs are treated as transfers and not included. The construction costs are assumed to be spent, initially, within the study Corridor. The economic impacts due to the act of construction comprise the money spent in the Corridor and the flow of this money in terms of re-spending. The impacts include the labor and expenses associated with planning, design and construction, plus the re-spending of those funds to the extent that such re-spending occurs within the Corridor.

b. Impact on Region's Competitive Position

There is a desire for each region to expand existing businesses, to attract new businesses and to diversify the area's economic base. To attract new business, the Corridor must be competitive with other areas.

The question arises as to whether and to what extent a highway investment in the Corridors would benefit the businesses already in the Corridor. A related question is what the highways could do to help foster growth of other, emerging industries. It is clear that competition will be great among regions to maintain as high a level of economic activity as possible and to attract activities demonstrating growth potential

nationally. Keeping transportation costs as low as possible is one of the most effective actions government can take to make any Corridor competitive.

Stated differently, the major economic transition that is taking place nationally creates unique opportunities because previous centers of economic activity will not necessarily continue to dominate. By reducing the cost of doing business, a state or region strengthens its business climate. Facilitating faster, safer travel along the Corridors represents a logical means for increasing the competitive advantage of communities along them.

Exhibit IV.E.3-1 presents a sequential flow of activities involved in moving from the highway improvement itself to the economic impact of that improvement in terms of what it does for competitive position. The activities themselves are described as follows:

- *The Highway Improvement* - The act of building the improved highway has a short-term economic impact; that impact is assessed.
- *Use of the Improved Highway* - The improved road would be used by existing and diverted and possibly induced traffic. Traffic estimates with and without the highway improvement are developed.
- *Reduced Transportation Cost* - The highway improvement would lead to increased travel efficiency in the form of reduced travel time, increased travel reliability, reduced accidents and revised vehicle operating costs. The efficiencies themselves are quantified in the "user analyses" for cars and trucks.
- *Reduced Cost of Doing Business in Corridor* - Transportation cost is one factor in the cost of doing business in the Corridor. If transportation costs, especially trucking costs, decline in the Corridor, this means that the total cost of doing business in the Corridors would also slightly decline.
- *Reduced Prices of Goods and Services* - If costs of production decline due to transportation cost reductions, the result would be reduced prices of goods and services or increased profits or both. Such reductions would apply to goods produced in the Corridors as well as goods shipped into the area.
- *Increased Competitiveness of Corridor's Goods and Services* - With slightly reduced costs and therefore prices, the goods and services produced in the Corridor should be slightly more competitive with the improved highway than without it.
- *Increased Sales* - If the region's goods and services become more competitive due to price decreases, the region's businesses should be able to make additional sales of those goods and services.
- *Increased Production* - If sales increase, production of goods and services would increase by a like amount.
- *Increased Economic Impact* - Increased production generally implies increased payroll, additional jobs, increased tax revenue and increased final demand, value added and output.

c. Economic Impacts of Bypassing Communities

In the fall of 1994, the study team conducted three user surveys. These user surveys were published as Technical Memorandums (TM's) and are available for review upon request. For information, the purpose and conclusion from each of the three TM's is listed below.

Patron Survey

General Information - The surveys were administered at various businesses in Higginsville, Warrensburg and Clinton between September 20th and 24th, 1994. Surveyors were stationed outside participating establishments and asked entering patrons the series of questions provided in the Survey Instrument section. One thousand five hundred and ninety-six (1,596) patrons were surveyed, over five days, in the three communities. The intent of the survey was to obtain an understanding of various businesses in the corridor, determine their patronage, and obtain needed information for later analytical economic analysis.

Conclusions - Virtually all (97% - 98%) of business patrons already knew about the establishment and planned to stop prior to making the trip. Therefore, businesses along the corridor should not expect to see a substantial decline in their business. Even businesses that are traditionally transportation dependent have a heavy reliance on local patrons for the majority of their business. For those patrons diverted away from corridor businesses, the area can expect to lose between \$40 and \$50 per person.

Business Survey

General Information - The surveys were distributed to the list of businesses provided by the three Chamber of Commerce's in Higginsville, Warrensburg and Clinton. Businesses that obviously did not use or rely on patrons or trucking shipments were not sent surveys. One Hundred and fifty-seven (157) surveys were mailed, with self-addressed stamped return envelopes provided, on September 15, 1994. Responses were requested to be returned by October 15th. Eighty-three (83) surveys were returned with one survey being unusable. Therefore, the response rate was 52.2 percent. The intent of the survey was to obtain an understanding of various businesses in the corridor, determine their opinion regarding the bypass, and obtain needed information for later analytical economic analysis.

Conclusions - The businesses surveyed have mixed opinions concerning a bypass around their town. Those businesses that rely on quick transportation and good roads for their shipments tend to favor a bypass, while businesses that depend on drive-by traffic tend to oppose the bypass. The majority of the businesses along existing Route 13 are stable businesses with a long history. The average business has been around for over 20 years. A large percentage of the retail business owners realize that the majority of their business comes from the local population, usually with less than 10 percent coming from "drive-by" traffic. A quarter of the respondents indicated that Route 13 already had too much traffic, which was inhibiting their business.

Hotel/Motel Survey

General Information - The surveys were distributed to area hotels in Clinton, Warrensburg and Higginsville. Blank surveys were delivered to participating hotels on September 19, 1994. The hotel workers were asked to distribute the surveys to their patrons. The surveys were picked up on October 20, 1994. One hundred twenty-eight surveys were completed. The intent of the survey was to obtain an understanding of the area hotel patrons and to obtain needed information for later analytical economic analysis.

Conclusions - The area hotels could lose as much as five percent of their business with a bypass around the three communities. Advertising strategies could help minimize the economic effect. The area's businesses, including hotels, could lose about \$65 for every hotel patron lost to other areas.

As discussed in the alternatives discussion in Chapter II, a variety of routing alternatives were considered in each urban area. The improvement to existing routing was considered along with both a near-in bypass and a routing that generally skirted the developed area of the city. In each case, the improvement to existing alignment was considered to be too disruptive to the community and created impacts that were essentially unmitigatable. All alternatives were considered in equal detail relative to a series of twenty evaluation factors. The selected alignment was found to be the alternative of least impact.

There is a strong perception among business owners in small communities that their business is tied to "drive-by" or "drive-through" traffic. A certain percentage of their patronage, depending on the business type, comes from people traveling through the community and stopping only because they saw the establishment from the road. Therefore, if the "drive-through" patrons traveled around the community, they would not see the business, and the businesses would lose those patrons. In reality, there is some truth to their argument and some misunderstandings. For example, empirical studies have shown that businesses tend to underestimate the contribution of the local population to their success.

To evaluate the potential loss to existing businesses from a highway bypass it is important to have an understanding of the business community, the business patrons, and their ties to the highway. A series of business and patron surveys was conducted in the Fall of 1994 and a literature search completed. The surveys were used to evaluate the business and patron community in the three Route 13 urban areas. The literature search was used to evaluate the bypass impacts based on empirical case examples of similar communities in Missouri, Iowa, Minnesota and Wisconsin.

Based on the survey results and literature search, the ability of existing Route 13 businesses to continue to thrive depends on:

- The stability of existing businesses.
- The size of the community.
- The dependence on "drive-by" traffic.

- The actual amount of "drive-by" traffic reduced.
- The potential economic gain attributable to the bypass (improved competitive position).

d. Removal of Farmland from Production

The right of way required for constructing a new highway creates a drain on the farmable land within the Route 13 Corridor. Removing farmland from production results directly in reduced profits for farmers and indirectly on their suppliers and the associated service industries. In other words, reduced profits indirectly hurt the seed distributor, as well as the grocery store and restaurant.

The direct economic impact of removing farmland from production was based on profitability levels of existing farms in the area. Statistics were obtained from the University of Missouri Agricultural Extension. The indirect economic impact was obtained by cycling the lost profits through the REMI economic model.

4. Estimated Economic Development Impact

The people and businesses near relocated Route 13 stand to gain economically if the new highway is constructed. The Route 13 Corridor would be better able to compete for industrial and commercial businesses, more money would be spent in the area, and overall the regional economy should benefit.

a. Economic Impact of Highway Construction

The total construction cost for Route 13 varies by improvement alternative. The spending of construction money in the area is of economic value to the primary impact area since construction contractors and workers would be hired, construction materials would be purchased, etc. To assess the construction impacts, the estimated construction costs for each route option and highway standard alternative were input into the REMI model. The model was then used to estimate the economic development impacts that might occur in the primary impact area associated with the construction process itself.

The capital cost previously estimated included both the construction cost and right of way cost. For the economic development analysis, the construction cost was treated as an increase in final demand and was input into the REMI model. The right of way cost was treated as a transfer payment (nothing is consumed, the land still exists) and was not included. The construction cost was treated as an increase in final demand within the primary impact area (this is proper since the REMI model determines which construction purchases can be spent in the area and which involve expenditures outside the Corridor). The REMI model determines the amount of materials, labor, etc. that could be supplied locally and estimates the total economic development impacts to the Corridor area created by the expenditure of the highway construction funds. For economic development analysis purposes it was assumed that construction would occur between the year 2002 and 2006.

The economic impacts due to construction comprise the expenditures spent in the primary impact area, the extent to which those funds employ local people and buy local goods and services and the flow of those expenditures in terms of re-spending. The REMI model determines what is needed in highway construction and determines how many local contractors can be hired, what materials can be purchased locally, etc. The impacts include labor and expenses associated with planning, design and construction of the highway, plus the re-spending of those funds to the extent that such re-spending occurs.

The estimated economic development impacts to the primary impact area that would be created by the act of highway construction are summarized on Table IV.E.4-1. These jobs and impacts would include not only those engaged in construction of the highway, but also jobs that serve the construction process, plus those created by the re-spending of money.

**Table IV.E.4-1
Highway Construction Economic Development Impacts
(1994 dollars)**

	Lafayette County		Johnson County				Henry County		TOTAL PREFERRED (A)
	Alt. A	Alt. B	Alt. A West	Alt. B West	Alt. A East	Alt. B East	Alt. A	Alt. B	
Value Added (000)	\$12,826	\$12,939	\$23,905	\$24,011	\$21,968	\$20,628	\$17,099	\$18,028	\$51,893
Wages (000)	\$10,158	\$10,269	\$27,048	\$27,164	\$24,858	\$23,330	\$18,507	\$19,513	\$53,523
Employment	169	170	292	296	268	252	202	213	639
Population	57	57	313	315	288	270	153	161	498

b. Competitive Position Impacts

The new highway should also reduce the cost of conducting business in the Corridor, making the area's goods and services relatively more competitive, thereby, making the area more attractive for economic investment.

The improved competitive position impacts would be directly related to increased productivity. To quantify the anticipated competitive position impacts attributable to the new highway, the reduced costs of doing business were estimated and input into the REMI model. The lower costs may be passed on to consumers as lower prices for consumer goods, to workers as higher wages, or to owners of businesses and firms as higher net income. Therefore, persons may benefit from the highway improvement without even traveling on it.

The new highway also increases the probability that the Corridor would be able to attract new industry to the region. Site selection firms hired by major industrial businesses verified that a community with a four-lane highway is more likely to be selected for industrial location than communities without. However, a highway does not guarantee new industries will move into the area. While location on a four-lane highway may be important, it is not the only factor for industrial location. Labor force conditions, wage rates, the availability of skilled labor and labor/management relations are more important factors for site location.

Forecast transportation cost savings were estimated for each alternative and were input into the REMI model. The REMI model treats these inputs as a reduction in the cost of doing business in the Corridor and compares the Route 13 Study Corridor to other areas in the nation. The REMI model examines a variety of local factors in estimating increased economic activity. Some of the more important factors include:

- Relative differences in labor wage rates and total factor productivity between the primary impact area and the rest of the nation.
- Relative differences in electrical, gas, and oil fuel costs between the primary impact area and the nation.
- Relative differences in state corporate and average property taxes between the primary impact area and the nation.
- Relative differences in capital costs for equipment inventory and structures for each industrial sector.
- Relative differences in production costs and profitability by industry.
- Relative differences in labor intensity.
- Occupation mix of the primary impact area's labor force and demand for each occupational category.

The economic development impacts to the primary impact area from its increased ability to compete for economic activity are illustrated on Table IV.E.4-2. The table displays competitive position impacts for two years: 2002 and 2022. The first year represents annual impacts as if the highway, in its entirety, were built in 2002, and year 2022 represents economic benefits twenty years after the highway is constructed. Also displayed on the table is the discounted thirty year stream of benefits (\$1994). This represents total benefits from increased competitive position over the thirty year analysis period.

Table IV.E.4-2
Increased Competitive Position Economic Development Impacts
(1994 dollars)

	Year 2002	Year 2022	Discounted 30-year Benefits
LAFAYETTE COUNTY - ALTERNATIVE A			
Value Added	\$4,883,000	\$9,784,000	\$64,474,000
Wages	\$2,637,000	\$19,383,000	\$54,036,000
Employment	180	320	
Population	330	630	
LAFAYETTE COUNTY - ALTERNATIVE B			
Value Added	\$4,642,000	\$9,331,000	\$61,349,000
Wages	\$2,510,000	\$18,443,000	\$51,415,000
Employment	180	310	
Population	310	600	

JOHNSON COUNTY - ALTERNATIVE A WEST			
Value Added	\$9,148,000	\$12,537,000	\$110,822,000
Wages	\$5,407,000	\$24,754,000	\$89,421,000
Employment	340	400	
Population	740	840	
JOHNSON COUNTY - ALTERNATIVE B WEST			
Value Added	\$10,373,000	\$14,857,000	\$126,672,000
Wages	\$6,151,000	\$29,535,000	\$103,614,000
Employment	380	480	
Population	830	990	
JOHNSON COUNTY - ALTERNATIVE A EAST			
Value Added	\$12,499,000	\$22,728,000	\$159,626,000
Wages	\$7,502,000	\$46,585,000	\$140,878,000
Employment	460	730	
Population	980	1,520	
JOHNSON COUNTY - ALTERNATIVE B EAST			
Value Added	\$13,250,000	\$23,254,000	\$167,994,000
Wages	\$7,945,000	\$47,508,000	\$146,716,000
Employment	490	750	
Population	1,040	1,560	
HENRY COUNTY - ALTERNATIVE A			
Value Added	\$15,229,000	\$16,087,000	\$177,640,000
Wages	\$8,903,000	\$29,704,000	\$131,369,000
Employment	520	470	
Population	1,090	1,060	
HENRY COUNTY - ALTERNATIVE B			
Value Added	\$15,720,000	\$17,068,000	\$184,088,000
Wages	\$9,212,000	\$31,729,000	\$137,249,000
Employment	540	500	
Population	1,120	1,120	
PROJECT TOTAL - PREFERRED ALTERNATIVE A			
Value Added	\$32,611,000	\$48,599,000	\$401,740,000
Wages	\$19,042,000	\$95,672,000	\$326,283,000
Employment	1,160	1,520	
Population	2,400	3,210	

c. Economic Impacts of Bypassing Communities

A series of business and patron surveys was conducted to provide an understanding of the business community in the three Route 13 urban areas. The questions were aimed at understanding the relative stability of existing businesses and the dependence businesses have on "drive-by" traffic. In conjunction with those surveys, a literature search was undertaken to evaluate the empirical impact bypasses have had on similar communities in Missouri, Iowa, Minnesota, and Wisconsin. Both efforts were undertaken to help analyze the potential impacts a highway bypass would have on the profitability of existing Route 13 businesses.

Based on the survey results and literature search, the ability of existing Route 13 businesses to continue to thrive depends on:

- The stability of existing businesses.

- The size of the community.
- The dependence on "drive-by" traffic.
- The actual amount of "drive-by" traffic reduced.
- The potential economic gain attributable to the bypass (improved competitive position).

The results of the business survey conclude that of those businesses most likely to be impacted by a highway bypass, the average tenure is over twenty years. This is indicative of a stable business community, usually with strong ties to the local population, and adept at overcoming hardships. Likewise, the results of the patron survey show that the overwhelming majority of business patrons were not considered "drive-by" patrons. In fact, 97.6 percent of the Corridor business patrons knew about the establishment and planned to stop prior to making their trip.

The results of the literature search revealed that the largest determinant in determining the impact of a highway bypass is the size of the community. Small communities (usually less than 2,000 people) have a smaller local base for businesses to draw from and tend to have a larger percentage of their business from "drive-by" traffic. When that "drive-by" business is removed, the existing businesses suffer. Communities over 2,000 people, like the three urban Route 13 communities, have a strong enough local contingent to support businesses during the transition. In many instances, the diversion of "drive-by" traffic (including high speed commercial trucks) actually improves the environment for local businesses by increasing safety and accessibility by reducing congestion.

The projected traffic conditions with and without a bypass reveal that the bypass does draw a significant amount of traffic off the existing facility. However, two things are happening that lessen the impact to existing businesses. First, without the bypass, traffic along existing Route 13 is expected to reach congested conditions. As congestion increases, the ability of patrons to get to businesses along Route 13 is reduced in favor of businesses with easier access. Improving congestion, while the total number of trips is reduced actually improves business patronage. Second, as the community grows, the amount of local patrons increases, thereby replacing lost "drive-by" traffic. Similarly, any growth attributable to the new highway results in increased profits for the existing businesses.

The empirical studies tend to support this philosophy. For most communities over 2,000 in population, the bypass created a slight economic downturn as the community adjusted to traffic pattern changes, and then the community quickly rebounded and outperformed existing growth trends. In other words, the existing business communities generally overcame any short-term setbacks and experienced long-term rewards.

Given the business stability and strong ties to the local population, the business community in the three urban areas is not expected to experience a significant impact. In fact, over the next thirty years the highway bypass would have a positive impact on the existing business community.

d. Removal of Farmland from Production

The removal of productive farmland by right of way acquisition during highway construction creates a permanent loss in potential agricultural production. This lost potential, both directly and indirectly, was measured over the life of the highway project.

The lost economic potential includes the direct loss of profit from agricultural uses, as well as the indirect effects to agricultural suppliers and service industries. It is important to note that only the lost production of farmland and not other businesses is evaluated in this section -- the difference being that farmland is a finite resource and relocation is not possible. Other business locations are not finite and MoDOT compensation provides for relocation. Also, this section does not analyze the value of the displaced land. Since MoDOT provides compensation to the land owner there is no economic concern.

The direct result of lost agricultural production was based on information obtained from the University of Missouri Agriculture Extension. The indirect effects were obtained by cycling the direct impacts through the REMI economic model. Table IV.E.4-3 shows the net impact for each alternative. Compared to the economic benefits resulting from the highway, the lost farmland production is not substantial. Likewise, the amount of farmland removed from production compared to the total amount of farmland in the county indicates that the highway would not appreciably harm the agricultural community.

**Table IV.E.4-3
Lost Farmland Production Economic Development Impacts
(1994 \$1,000 of dollars)**

	Lafayette Co.		Johnson County				Henry County		ROUTE 13 TOTAL
	Alt. A	Alt. B	Alt. A West	Alt. B West	Alt. A East	Alt. B East	Alt. A	Alt. B	PREFERRED ALTERNATIVE A
Discounted 30-year Farmland Impacts (000)	\$730	\$690	\$440	\$440	\$420	\$480	\$530	\$390	\$1,680

F. JOINT DEVELOPMENT

Among the potential impacts of new roadway construction are the opportunities for measures which would preserve or enhance social, economic, environmental and visual values. Authority to exploit non-transportation benefits of the project comes from the National Environmental Policy Act of 1969 (NEPA), which declares that it is the "continuous responsibility" of the federal government to "use all practicable means" to "assure for all Americans, safe, healthful, productive and aesthetically and culturally pleasing surrounding." Additionally, the Intermodal Surface Transportation Efficiency Act (ISTEA) encourages bicycle and pedestrian facilities, acquisition of scenic easements, historic sites, beautification, historic preservation and archaeological planning and research.

1. "No-Build" Alternative

A transportation improvement can be the catalyst for the Missouri Department of Transportation to participate in joint development projects. In the "No Action" Alternative, there are no identifiable practicable joint development opportunities. In the case of archaeological and historic resources, for example, there is little impetus to investigate and identify historic resources without the regulations governing proposed transportation improvements. Therefore, important resources may not even be recognized, and there would be little incentive or funding to encourage joint development actions such as recovery, preservation or development of interpretive facilities.

2. Expressway/Freeway Alternatives

No joint development opportunities are planned or underway at this time.

G. PEDESTRIAN AND BICYCLIST CONSIDERATIONS

1. "No-Build" Alternative

Throughout most of the study Corridor, the "No-Build" Alternative would not address any present pedestrian and bicyclist concerns. Currently, existing Route 13 has very narrow shoulders (paved and unpaved) that are marginally suitable for pedestrians, but unsuitable for bicyclists. The exceptions to this would only occur if improvements to existing routes would take place in Warrensburg and Clinton. If McGuire Street in Warrensburg and Routes 7 and 13 in Clinton are widened to four lane arterial streets, it is possible that bike lanes could be designated, or outside lanes widened, to provide a connection to destinations within those communities. This consideration is more significant from a regional context in the City of Clinton where the KATY Trail State Park, an abandoned railroad line converted to a bike/hike trail, meets Route 13.

Recreational trail facilities along the entire study area, along the existing Route 13 roadway, would not likely have the usage demand to justify construction. One exception would be if the trail would connect to a longer, more regional system. Though a possible connection to a statewide system exists at the southern end, none is known to exist or is planned elsewhere in the study area. Furthermore, as a joint development facility, the "No-Build" Alternatives provide little impetus for a Corridor-long trail.

2. Expressway/Freeway Alternatives

By including wider paved shoulders and improved vertical alignments, all of the alternatives would provide a more suitable roadway for pedestrians and bicyclists who choose to utilize these modes of transportation. However, many of the east/west roads that lead to recreational or community destinations are either gravel or paved without shoulders, offering an unsuitable environment for the pedestrian or bicyclist. If it is desired to provide links between these destinations and Route 13, the condition of the side roads would need to be assessed to determine the extent of improvements that would be necessary to provide suitable pedestrian and bicycle routes.

In Henry County, all expressway/freeway alternatives would cross the KATY Trail State Park at existing Route 52. At this location, all alternatives are in the same vicinity and would have the same impacts in regard to the KATY Trail. The alternatives would provide a grade-separated crossing of Route 52 and the KATY Trail by utilizing a folded diamond interchange on the southeast side of Route 52. This presents the potential for MoDOT and the Missouri Department of Natural Resources (MDNR) to jointly develop a trailhead that would provide access to the trail at this location.

Being in the same general location in the vicinity of the KATY Trail, each of the expressway/freeway alternatives have equal opportunity to complement and benefit the existing trail. Like the "No - Build" Alternative, there is little justification for the consideration of a Corridor-long trail improvement due to use demand and regional connectivity.

H. AIR QUALITY IMPACTS

In accordance with the agreement executed in March 1988 between the parties of the Federal Highway Administration (FHWA), MDNR, and MoDOT, a detailed air quality analysis for inclusion in an environmental document will only be prepared on federally funded projects when the present or predicted average daily traffic (ADT) volume on the project exceeds 54,000 vehicles in the year of project construction or 72,700 vehicles in the twentieth (20th) year following the project construction.

In the design year 2022, the maximum ADT volume on the Route 13 project is 30,300, which is much less than the 20th-year ADT of 72,700 required for a detailed air quality analysis. The air quality study was therefore limited to a regional pollutant burden analysis of the proposed Route 13 improvement alternatives.

This analysis focuses on the effect each proposed alternative would have on total air pollutant emissions. The pollutant burden for each "build" alternative may then be compared to the "No - Build" Alternative to determine the relative impact.

1. Methodology

The three main emissions produced by internal combustion in motor vehicle engines are hydrocarbons (HC), carbon monoxide (CO), and nitrogen oxides (NO_x).

HC and NO_x can combine in a complex series of reactions catalyzed by sunlight to produce photochemical oxidants such as ozone and nitrogen dioxide (NO₂). The modeling procedures for ozone and NO₂ require long term meteorological data and detailed areawide emission rates for all potential sources. For this reason, project-level air quality impact for these pollutants is usually determined by a pollutant burden analysis of HC and NO_x.

CO is a colorless, odorless gas, and is the major pollutant from motor vehicle emissions. CO emissions are greatest from vehicles operating at low speeds and prior to complete engine warm-up (within approximately eight minutes of starting). Congested urban roads, therefore, tend to be the principal problem areas for CO.

Because ambient CO concentrations are typically higher during the winter months, variables indicating a winter case were used to calculate CO emissions. Summer conditions were assumed for the analysis of NO_x and HC emissions, since ozone levels are usually highest during the summer season.

The total motor vehicle pollutant burden for the year 2022 "No-Build" and each of the proposed alternatives was determined using ADT traffic, alignment geometry and speed data. This information was used to determine the average total daily number of Vehicle Kilometers Traveled (VKT) and pollutant emission rates.

MOBILE5a, an EPA-approved mobile source emission factor model, was used to calculate emission rates of CO, NO_x and HC for various speeds. These emission rates were used in conjunction with the VKT and speed data to determine the total pollutant burden for each alignment.

2. Air Pollution Emission Levels

Carbon monoxide emissions are significantly higher at low speeds, reaching a minimum level at speeds of between 72-88 kph (45-55 mph). Therefore, projects intended to alleviate congested roadways usually result in an improvement in area CO air quality. Similar to CO, HC emissions decrease with increased speed, reaching a minimum value at speeds in excess of 88 kph (55 mph).

Emission rates of NO_x are higher at speeds of less than 32 kph (20 mph) and greater than 56 kph (35 mph). However, the increase in the NO_x emission rate at speeds of greater than 56 kph (35 mph) is not significant.

A reduction in total VKT, with no change in travel speed, would result in a decrease in emissions of all pollutants.

Table IV.H.2-1 shows the percent difference in total pollutant burden from the "No - Build" Alternative for each of the expressway/freeway alternatives for the year 2022.

**Table IV.H.2-1
Percent Difference from 2022 "No-Build" Alternative**

County	Alternative	% Difference		
		CO	HC	NO _x
Lafayette	A	-5.7	-5.0	-2.9
	B	-6.6	-5.9	-3.9
Johnson	A West	0.1	2.5	6.9
	B West	-1.8	0.3	4.3
	A East	-2.5	-0.7	2.7
	B East	-1.1	0.8	4.5
Henry	A	-7.6	-3.5	8.3
	B	-8.5	-4.5	7.0
AVERAGE	Preferred (A)	-5.3	-3.1	2.7

Total CO emissions would increase slightly in Johnson County with Alternative A West. However, the results indicate that within the entire Corridor, a reduction in total CO emissions could be expected with the proposed project, regardless of the expressway/freeway alternative. This is due to the decrease in traffic congestion and increase in travel speeds that would result from the improvements.

The expressway/freeway alternatives would increase travel speeds and consequently reduce HC emission rates. However, this HC pollutant reduction is opposed by a 1 to 5 percent increase in total VMT in Johnson County. Total HC levels would not be expected to change significantly with the project alternatives.

Increased travel speeds throughout the project Corridor would elevate levels of NO_x by less than 9 percent as compared to the "No - Build" Alternative. Lafayette County is the exception, where a net reduction in VMT of 4 to 5 percent would occur with the proposed alignments, reducing pollutant levels of NO_x despite the travel speed increase.

3. Construction

During construction of the project, methods and operations would be conducted in accordance with MDNR and MoDOT regulations, particularly concerning batch plant operations and clearing and grubbing functions.

4. Compliance

The proposed Route 13 project is located in Lafayette, Johnson and Henry counties, which have been determined to be in compliance with the National Ambient Air Quality Standards. 40 CFR Part 51 is not applicable because the proposed project is located in an attainment area. This project would not cause a violation of the National Ambient Air Quality Standards.

I. NOISE IMPACTS

The FHWA's Noise Abatement Criteria (NAC) and MoDOT's interpretation of the NAC were used in the analysis of the acoustic impact of the proposed project. The analysis was conducted according to the guidelines as presented in the Code of Regulations, Title 23 Part 772, which provides procedures whereby the acoustic impact of the proposed action can be assessed and the needs for abatement measures can be determined when the noise levels approach or exceed the FHWA Noise Abatement Criteria for various land uses as presented in Table IV.I-1. The noise level descriptor used is the equivalent sound level, L_{eq}, defined as the steady state sound level which, in stated time period (usually one hour), contains the same sound energy as the actual time-varying sound.

**Table IV.I-1
Noise Abatement Criteria
Hourly A-weighted Sound Level - Decibels (dBA)**

Activity Category	L_{eq} (1 hour)	Description of Activity Category
A	57 dBA (Exterior)	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the lands are to continue to serve their intended purpose.
B	67 dBA (Exterior)	Picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries and hospitals.
C	72 dBA (Exterior)	Developed lands, properties or activities not included in Categories A or B above.
D	---	Undeveloped lands.
E	52 dBA (Interior)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals and auditoriums.

MoDOT has defined the NAC approach or exceed criteria for Activity Category "B" as being equal to or greater than 65 dBA L_{eq} for noise sensitive receptors such as residences, churches, schools, libraries, hospitals, nursing homes, apartment buildings, condominiums, etc. The criteria for commercial establishments is 72 dBA L_{eq} .

When the 65 dBA L_{eq} criteria is exceeded, noise abatement procedures are to be reviewed for effectiveness and feasibility according to the following criteria:

- Noise wall must provide noise reduction of at least 5 dBA.
- Noise wall must provide attenuation for more than one receptor.
- Noise wall must be 5.5 meters (18 feet) or less in height above normal grade.
- Noise wall must not interfere with normal access to property.
- Noise wall must not pose a traffic safety hazard.
- Noise wall must not exceed a cost of \$30,000 per receptor.
- The majority of affected residences (primary and benefited receptors) must concur that a noise wall is desired

The noise wall would become part of the improvement project unless one of the above criteria cannot be satisfied. Traditionally, noise abatement is not provided for commercial establishments since these establishments require a high level of visibility which cannot be provided with contemporary noise abatement measures (Noise Abatement, Chapter 4, Detail Design, Section 4-07, Urban Projects, Paragraph 4-07.3(3)(k), Missouri Highway and Transportation Department, September 9, 1994).

Based on the identification of the noise sensitive receptors in Chapter III, an analysis of the noise impacts to these receptors for each of the reasonable alternatives was

performed. Table IV.I-2 shows the anticipated year 2022 design hour noise levels for each of the alternatives as compared to the modeled 1993 (current) and projected existing condition noise levels. The "No-Build" Alternative noise levels are represented by the existing condition levels in year 2022.

The FHWA highway traffic noise prediction computer program, STAMINA 2.0/OPTIMA was used to project future design hour traffic noise levels for the year 2022. The following parameters were used in the model to calculate the hourly L_{eq} noise levels:

- Distance between roadway and receiver.
- Hourly traffic volumes for traffic mix.
- Vehicle speed.
- Noise source height of the vehicles.

Each reasonable alternative was divided into segments based on the projected design hour traffic volumes. Two typical sections were utilized for the modeling -- the existing roadway cross section for the "No-Build" Alternative and the improved four-lane section for the expressway/freeway alternatives. For the various segments of the alternatives, including the "No-Build" Alternative, contour widths were estimated utilizing the noise prediction program for both the 65 dBA and 72 dBA levels. The noise levels within the boundaries of the noise contours would be greater than the 65 dBA and 72 dBA levels, respectively, such that any existing receptor located within the contour area that would not be displaced by the construction would be exposed to noise levels in excess of the respective NAC level. Once the noise contour widths were determined, existing receptors were inventoried utilizing 1:12,000 aerial mosaic maps. The following discussion presents the total number of receptors, including residences and commercial structures, which would be exposed to noise levels in excess of the NAC levels. Table IV.I-2 presents those sensitive receptors identified in Chapter III which would be impacted.

Receptors that are located along the preferred alternative (Alternative A) that have been identified as being impacted as per MoDOT criteria are illustrated on the 1"=1000' plan plates in Appendix C.

1. "No-Build" Alternative

With the "No-Build" Alternative, future design hour noise levels would increase slightly due to increases in traffic volumes. For those sensitive receptors located along the existing Route 13 roadway, increases ranging from 2 to 4 dBA would be anticipated. Receptors located away from the influence of the existing Route 13 roadway would likely realize some increased noise due to traffic increases along other minor roads. For those receptors which are isolated from roadway traffic, the noise levels would likely not increase. This analysis only considers noise directly generated from roadway vehicle activities; secondary effects are not considered.

**Table IV.I-2
Projected Peak Hour Noise Levels for Alternatives**

DEIS Site No.	NAC Category	Description	No Build	Expressway/Freeway Alternatives Noise Levels dBA (Year 2022)			
				A	B		
LAFAYETTE COUNTY							
L1	Cemeteries	-----	53	55	55		
L11	Cemeteries	Sharp Cemetery	59	59	59		
L12	Institutional Facilities	John Knox Village	58	56	56		
L13	Churches	First Assembly of God	60	60	60		
L14	Churches	Church of Christ	59	58	58		
L16	Recreational Uses	Fairground Park	79	76	77		
L17	Schools	Rolling Meadows St. School	60	60	60		
L18	Schools	Higginsville Jr. & Sr. High	63	62	62		
L22	Cultural Sites	Linwood Lawn	51	56	56		
JOHNSON COUNTY				A west	B west	A east	B east
J4	Churches	Bethel Baptist Church	78	66	77	77	77
J5	Cemeteries	Grange Cemetery	53			58	
J6	Cemeteries	-----	59				
J10	Institutional Facilities	West Central Recovery Center	66				
J11	Cemeteries	Maxwell Cemetery	54				
J15	Schools	-----	63				
J16	Recreational Uses	City Park	47-64		47-71		
J18	Churches	Baptist Church	75	73	73	73	73
J19	Recreational Uses	Golf Course	47-65	64	64	64	64
J20	Churches	LDS Church	62				
J21	Schools	High School	50-55				
J22	Cemeteries	Rock Cemetery	64	63	63	63	63
J23	Cemeteries	-----	74	73	73	72	72
J24	Cemeteries	Sutten Cemetery	62			62	62
J25	Cemeteries	Rickas Cemetery	47				
J26	Churches	Mount Zion Church	62			67	67
J28	Cemeteries	Mount Zion Cemetery	73	73	73	73	71
J29	Cemeteries	-----	65	63	63	63	63
J36	Cultural Sites	Garden of Eden Station	65	64	64	64	64
HENRY COUNTY							
H2	Churches	Shawnee Mound Church	64	64			
H3	Cemeteries	Shawnee Mound Cemetery	63	63			
H7	Churches	Quarles Baptist Church	60	63	47		
H8	Cemeteries	-----	47	48	54		
H9	Churches	Clinton Fellowship	63	61	57		
H11	Cemeteries	Antioch Cemetery	57	50	50		
H12	Institutional Facilities	Hospital	66	62	62		
H14	Recreational Uses	Owen Creek Golf Club	55-70	55-68	55-68		
H15	Cemeteries	Englewood Cemetery	50-64	50-63	50-63		
H16	Churches	Lutheran Church	66	65	65		
H17	Churches	St. Paul's Episcopal Church	66	66	66		
H24	Recreational Uses	Golf Club	50-72	50-71	50-71		
H28	Recreational Uses	KATY Trail State Park	68	70-71	70-71		

As shown in Table IV.I-2, a number of sensitive receptors would be exposed to design hour noise levels greater than NAC level of 65 dBA for the "No-Build" Alternative. Total receptors impacted would include:

- Lafayette County - 75 residential and 2 park receptors would be exposed to noise levels exceeding the 65 dBA NAC level, and approximately 21

businesses would be exposed to noise levels exceeding the 72 dBA NAC level.

- Johnson County - 210 residential, 2 churches, 2 parks, 1 institutional facility and 1 cultural site receptor would be exposed to noise levels exceeding the 65 dBA NAC level, and 71 businesses would be exposed to noise levels exceeding the 72 dBA NAC level.
- Henry County - 61 residential, 2 churches, 1 institutional facility and 5 park receptors would be exposed to noise levels exceeding the 65 dBA NAC level, and 4 businesses would be exposed to noise levels exceeding the 72 dBA NAC level.

2. Expressway/Freeway Alternatives

With the expressway/freeway alternatives, design hour noise levels at several noise sensitive receptors would be increased due to the introduction of roadway vehicles into the receptors' aural environment. However, for those existing receptors located along the existing route at some locations, as much as a 5 dBA noise level reduction would be realized due to the reduction of traffic volumes along the existing facility. Table IV.1-2 shows the anticipated peak hour noise levels for each of the build alternatives for those sensitive receptors identified in Chapter III. In addition to these receptors, residential and commercial receptors potentially impacted are identified below.

It should be noted that between the publication of the DEIS and the preparation of this document, a verification of noise sensitive receptors along the preferred alignment, Alternative A, was conducted in the field. Thus, some values for Alternative A may vary from those shown in the DEIS.

a. Lafayette County

Alternative A

The 65 dBA L_{eq} noise contour widths along Alignment A would be as follows:

	<u>65 dBA Noise Contour Width</u>
North Terminus to Bus. Route 13 (North)	152.4 m (550')
Bus. Route 13 (North) to Route 13	121.9 m (400')
Route 13 to Route FF	Within R/W
Route FF to Route MM	137.2 m (450')
Route MM to I-70	213.3 m (700')
I-70 to Route YY/County Line	198.1 m (650')

Based on the modeling and the information available on the aerial mosaic, a total of 13 residential receptors along Alignment A would be exposed to noise levels exceeding MoDOT's NAC level.

Alternative B

The 65 dBA L_{eq} noise contour widths along Alternative B would be as follows:

	<u>65 dBA Noise Contour Width</u>
North Terminus to CR 161	152.4 m (550')
CR 161 to Route FF	Within R/W
Route FF to CR 355	121.9 (400')
CR 355 to Route YY/County Line	198.1 m (650')

A total of 4 residential receptors and 1 park receptor would be exposed to noise levels exceeding the 65 dBA NAC level.

b. Johnson County**Alternative A (West)**

Alternative A (West) would decrease noise levels along Route 13 through Warrensburg by 1 to 2 dBA. The 65 dBA L_{eq} noise contour widths along the proposed alignment would be as follows:

	<u>65 dBA Noise Contour Width</u>
County Line/Route YY to Route V	213.3 m (700')
Route V to Route 13	228.6 m (750')
Route 13 to USH 50	Within R/W
USH 50 to Pine Street	243.8 m (800')
Pine Street to SR BB	182.9 m (600')
SR BB to CR 350	121.9 m (400')
CR 350 to Route Y	243.8 m (800')
Route Y to Route 2	213.3 m (700')
Route 2 to County Line	152.4 m (500')

Alternative A (West) would expose 9 residential receptors, 2 churches receptors and 1 park receptor to noise levels exceeding MoDOT's noise abatement criteria.

Alternative B (West)

Alternative B (West) would decrease noise levels through Warrensburg by 1 to 2 dBA. The 65 dBA L_{eq} noise contour widths along Alternative B (West) would be as follows:

	<u>65 dBA Noise Contour Width</u>
County Line/Route YY to Route V	213.3 m (700')
Route V to USH 50	Within R/W
USH 50 to Pine Street	243.8 m (800')
Pine Street to SR BB	182.9 m (600')

SR BB to CR 350	121.9 m (400')
CR 350 to Route Y	243.8 m (800')
Route Y to Route 2	213.3 m (700')
Route 2 to County Line	152.4 m (500')

A total of 15 residential receptors, 2 church receptors and 1 park receptor would be exposed to noise levels at or above 65 dBA L_{eq} with the proposed alternative.

Alternative A (East)

Noise levels through Warrensburg would be reduced by 1 to 2 dB with Alternative A (East). The 65 dBA L_{eq} noise contour widths along this alignment would be as follows:

	<u>65 dBA Noise Contour Width</u>
County Line/Route YY to Route V	213.3 m (700')
Route V to USH 50	Within R/W
USH 50 to Montserrat Parkway	213.3 m (700')
Montserrat Parkway to Route DD	243.8 m (800')
Route DD to Route Y	137.2 m (450')
Route Y to CR 600	121.9 m (400')
CR 600 to Route 2	213.3 m (700')
Route 2 to County Line	152.4 m (500')

A total of 38 residential receptors and one public use receptor would be exposed to noise levels exceeding MoDOT's noise abatement criteria.

Alternative B (East)

Alternative B (East) would decrease noise levels along Route 13 through Warrensburg by 1 to 2 dBA. The 65 dBA L_{eq} noise contours along Alternative B (East) would be as follows:

	<u>65 dBA Noise Contour Width</u>
County Line/Route YY to Route 13	213.3 m (700')
Route 13 to USH 50	Within R/W
USH 50 to Montserrat Parkway	213.3 m (700')
Montserrat Parkway to Route DD	243.8 m (800')
Route DD to Route Y	137.2 m (450')
Route Y to Route 2	121.9 m (400')
Route 2 to County Line	Within R/W

A total of 2 residential receptors and 2 church receptors would be exposed to noise levels exceeding MoDOT's noise abatement criteria of 65 dBA L_{eq} .

c. Henry County

Alternative A

Alternative A would decrease noise levels along Route 13 through Clinton by 1 to 4 dBA. The 65 dBA L_{eq} noise contour widths along Alternative A would be as follows:

	<u>65 dBA Noise Contour Width</u>
County Line to Route CC	152.4 m (500')
Route CC to Route 13	198.1 m (650')
Route 13 to Route 7	213.3 m (700')
Route 7 to Southern Terminus	213.3 m (700')

A total of 7 residential receptors and one park receptor would be exposed to noise levels exceeding MoDOT's noise abatement criteria.

Alternative B

Alternative B would decrease noise levels along Route 13 through Clinton by 1 to 4 dBA. The 65 dBA L_{eq} noise contour widths would be as follows:

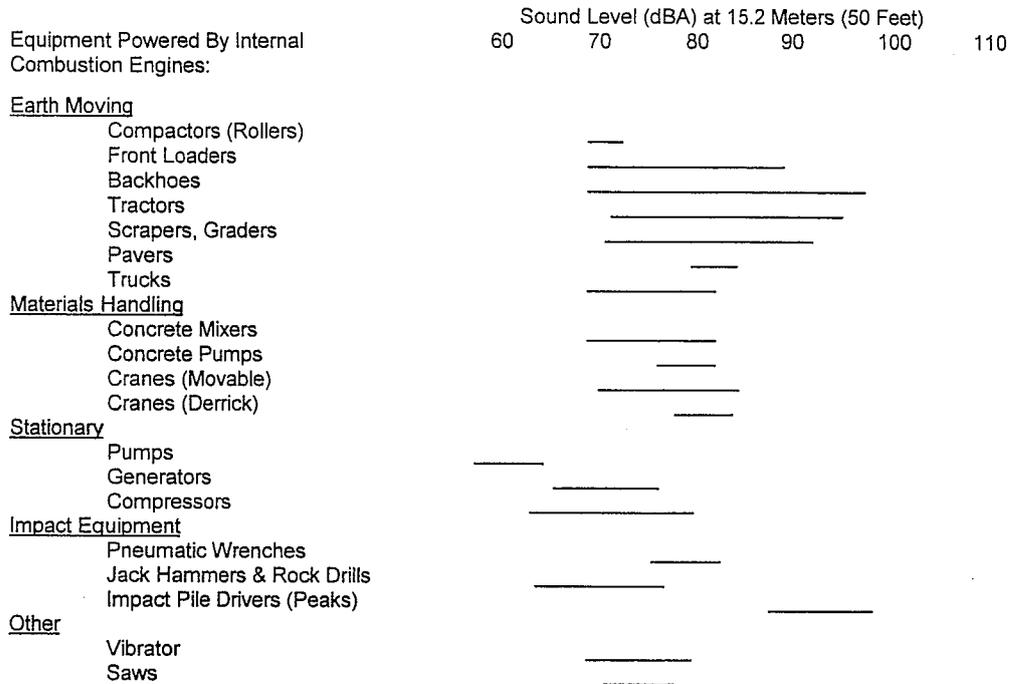
	<u>65 dBA Noise Contour Width</u>
County Line to Route CC	152.4 m (500')
Route CC to CR NE 300	198.1 m (650')
CR NE 300 to Route 7	213.3 m (700')
Route 7 to Southern Terminus	213.3 m (700')

A total of 3 residential receptors, 2 church receptors and 3 park receptors would be exposed to noise levels exceeding MoDOT's noise abatement criteria.

3. Construction Noise

The major construction elements of this project would be earth removal, hauling, grading, paving and bridge construction. General construction noise impacts, such as temporary speech interference for passersby and those individuals living or working near the project, can be expected, particularly from earth moving equipment during grading operations and from paving operations. Table IV.1-3 lists some typical peak operating noise levels at a distance of 15.2 meters (50 feet), grouping construction equipment according to mobility and operating characteristics. Considering the relatively short-term nature of construction noise, impacts would not be substantial. The transmission loss characteristics of nearby structures would be sufficient to moderate the effects of intrusive construction noise.

**TABLE IV.I-3
Construction Equipment Sound Levels**



Source: U.S. Report to the President and Congress on Noise, February 1972.

4. Mitigation Summary

Based on the investigations of the potential noise impacts of the various alternatives, mitigation of noise would not be needed. For those receptors located along the improvement, as additional information on residences and design specifics are developed, abatement measures would be re-analyzed. A final decision regarding mitigation measures for noise impacts would be made upon the completion of the project design.

In Johnson County, a residential area located between Route V and Warrensburg was assessed for potential applications of noise mitigation. A barrier 548.6 meters (1,800 feet) in length and 4.6 meters (15 feet) in height would cost approximately \$460,000 assuming a unit cost of \$17 per square foot. This barrier would provide abatement for approximately 9 residences at a cost of more than \$50,000 per residence -- a cost considerably greater than MoDOT criterion of \$30,000 per residence.

As demonstrated by the example above, local access requirements and low residential density adjacent to the alternatives would prevent the implementation of reasonable and feasible noise mitigation measures. The cost of abatement measures would likely exceed MoDOT cost criteria of \$30,000 per receptor. Consequently, noise mitigation is not anticipated for any of the alternatives throughout the study area.

J. WATER QUALITY IMPACTS

Studies by the FHWA reported in a Technical Summary entitled "Effects of Highway Runoff on Receiving Waters" dated June, 1987, indicate annual pollutant loads are insignificant from highways with less than 30,000 ADT. Predicted traffic volumes for the project are below this threshold. The surface area of the planned facility would generally account for only a minute percentage of the drainage basin when viewed in total area.

1. "No-Build" Alternative

The "No-Build" Alternative would have no impact on the water quality of streams within the Route 13 Corridor area. If no construction occurs, storm water runoff at the current traffic volume (under 30,000 vehicles per day) puts forth minimal to no impact on the aquatic environments of most receiving waters, as stated by the Federal Highway Administration; Effects of Highway Runoff on Receiving Waters; Reports No. FHWA/RD-84/062-066, June 1987.

2. Expressway/Freeway Alternatives

Generally, all forms of expressway/freeway construction, its operation and the maintenance of it contribute to water runoff. Operation and maintenance creates runoff that contains various pollutants such as hydrocarbons, oils, greases, battery acid and coolant solutions along with material from tires and other vehicle debris. Motor vehicle accidents can also contribute to the pollutants as chemicals used for clean up could be flushed into drainage systems. These pollutants can accumulate in large amounts in just a brief period of time.

Other variables, which may impact the magnitude of water quality, include traffic composition and volume, maintenance activities, adjacent land use, climate, types of roadside vegetation and characteristics of the local and regional drainage area.

Construction activities can impact water quality both directly and indirectly. The MDNR has noted that nutrients can leach from the project areas which have been hydroseeded and mulched to prevent erosion, which may increase levels of phosphorus in streams.

Streams that may be impacted in the Route 13 Corridor by the proposed alternatives include the following (uses of streams were obtained from the Department of Natural Resources Water Quality Standards, 10 CSR 20-7.0310; 3-30-94; pages 42-111):

- Tabo and Davis Creeks, in Lafayette County, which both span the width of the study area and provide water for livestock and wildlife, have naturally occurring conditions for aquatic life with criteria for protection of human health concerning fish consumption.
- Blackwater River, in Johnson County, spans the width of the study area and provides irrigation; livestock and wildlife watering; naturally occurring conditions for aquatic life with criteria for protection of human health concerning fish consumption; swimming; skiing; skin diving; boating; canoeing and drinking water. Also located in Johnson County, is Post Oak

Creek which would be impacted along with some of its tributaries. Post Oak Creek provides water for livestock as well as wildlife and has naturally occurring conditions for aquatic life with criteria for protection of human health concerning fish consumption.

- Wade, Sand, Deer and Coal Creeks in Henry County would be impacted as they are crossed by the proposed alternatives. Each of these streams provide water for livestock and wildlife and have naturally occurring conditions for aquatic life with criteria for protection of human health concerning fish consumption. Each of these creeks drain directly into the Truman Reservoir or Tebo Freshwater Lake which is located outside of the study Corridor. Also located in Henry County is Rose Creek, which would be impacted by Alternative 1 (Route 7). Rose Creek drains into the South Grand River -- a major river basin.

Temporary impacts to streams in the Route 13 study Corridor can be minimized if the management practices outlined by the MDC are followed. Those practices include: conformance to the State Channel Modification Guidelines when modifying channels or relocating streams; grading and seeding disturbed areas as soon as possible, using MDC's planting and seeding recommendations; minimize disturbance to the stream banks and riparian zones; avoid working in stream channels between March 1 and June 15 to the extent practicable; and undertaking all necessary precautions to prevent petroleum products from entering streams. The MDNR's Solid Waste Management Program has suggested compost or wood chips be used whenever possible during construction and use recyclable materials for construction activities.

Care should be taken to provide proper slope design in loessial, residual and alluvial soils to prohibit, or induce erosion. Given the geologic nature of the study area, it is assumed most cut slopes would be singular angle slopes such as 3 horizontal to 1 vertical. The geology and anticipated grades would also preclude the use of compound or benched rock cuts. MoDOT, in cooperation with the MDNR, has developed a construction water pollution control program to protect the environment from sedimentation and construction pollutants during the building process. Excavations that would cause downgrading of streams should also be avoided.

Impacts to strip mines are not anticipated and impacts of acid drainage should not be a concern.

K. PERMITS

1. "No-Build" Alternative

Permits would not be required for the "No-Build" Alternative.

2. Expressway/Freeway Alternatives

Permits applicable to the highway build alternatives may be categorized into two groups: regulatory permits and construction permits. Regulatory permits assist government agencies in the administration and implementation of federal, state or local statutes or

initiatives. These permit programs are processed through planning and design phases of proposed actions. Construction permits serve as regulators of construction activities to protect the adjacent environs. State or local government agencies typically operate roadway construction permit programs.

The various expressway/freeway alternatives would have essentially equivalent permitting requirements and, as such, may be addressed collectively.

MoDOT and the MDNR have an agreement concerning the preservation of water quality during MoDOT construction activities in lieu of a project-specific discharge permit. In coordination with the MDNR, MoDOT has developed a construction water pollution control program to protect the adjacent environment from sedimentation and construction activities. These procedures, in the form of contract standards and specifications for the construction activities, will be utilized for the Route 13/Route 7 construction and MoDOT is committed to assuring best management practices by the highway contractors.

a. Regulatory Permits

Section 10 of the Rivers and Harbors Act (U.S. Army Corps of Engineers)

This permit regulates the obstruction or alteration of navigable water of the United States. None of the expressway/freeway alternatives cross a navigable stream and consequently would not be regulated by this act.

Section 404 of the Clean Water Act (U.S. Army Corps of Engineers)

This act prohibits the discharge of dredged or fill material into "Waters of the U.S." unless exempted or authorized by the Corps of Engineers (COE). Section 404 is the primary Federal statute that implements federal regulatory policies concerning the protection of wetlands as specified in various orders and regulations. Based on preliminary investigations performed for the COE, it has been determined that Waters of the U.S., including wetlands, are present in the study Corridor. These waters have been identified as stream areas, ponds, wetlands, and abandoned strip mine pits. Since impacts to these areas by the expressway/freeway alternatives will be avoided and minimized through alignment decisions or by spanning the streambeds with bridge structures, it is anticipated that nationwide permit(s) may be applicable at many crossings.

With the merger of the NEPA/Clean Water Act review processes, which is discussed in Chapter VII - Comments and Coordination, a permit application will be prepared for the preferred alternative and included in Appendix J of this FEIS.

Under certain specific circumstances, a project may qualify for authorization by Nationwide Permit. A Nationwide Permit is a form of General Permit which authorizes a category of minor activities throughout the nation and allow those activities to occur with little, if any, delays or paperwork. In this case, one or more Nationwide Permit(s) may be applicable and the COE will evaluate their applicability. The Nationwide Permit for road crossings and discharges in areas to be above the headwaters are likely to be applicable to this project. It should be noted that all Nationwide Permits, if applicable, are subject to certain conditions, i.e., culvert and bridge crossings, even above the headwaters, must be designed to carry expected high flows.

Section 9 of the Rivers and Harbors Act (U.S. Coast Guard)

This act regulates construction of bridges and causeways on navigable waterways of the United States. Similar to Section 10, this project would not be regulated by this act.

b. Construction Permits

MoDOT, in coordination with the MDNR, has developed a construction water pollution control program to protect the adjacent environment from sedimentation and construction material pollutants discharged from construction activities. These procedures and specifications would be utilized for the highway construction, and MoDOT is committed to assuring the best management practices by the highway contractor. This agreement satisfies the requirements for a National Pollutant Discharge Elimination System (NPDES) permit, Section 402 of the federal Clean Water Act and the Missouri Clean Water Act. Other construction-related permits include temporary batch plant permits issued by MDNR. Mitigation plans would be done to comply with the specific permit requirements.

Additional construction permits may be required from local governments.

L. WETLANDS

1. "No-Build" Alternative

The "No-Build" Alternative would have no direct impacts on wetlands or "Waters of the U.S." as it exists today. However, the "No -Build" Alternative also includes improvements that can reasonably be expected to occur during the design period. In the case of street and bridge widening, additional right of way may be needed which could have an impact on adjacent wetlands or "Waters of the U.S."

Secondary and Cumulative Impacts

In a "No-Build" situation, the lower standard of design that was used 60 years ago when Route 13 was originally constructed could continue to be a factor contributing to automobile accidents which can not only claim lives, but can also result in fuel and oil spills, and clean-up chemicals being deposited on the surface. There is also the possibility that a hazardous material spill could occur as the result of an accident. As these contaminants run off the roadway through precipitation or wash-down following the accident, they have the potential of reaching wetlands and "waters of the U. S." Although the amount of contaminants may be minimal for each accident, the concentration of these over a long period of time may diminish the function and value of the affected wetlands.

Any improvements that would reasonably be expected to occur could also secondarily impact existing "Waters of the U. S.", including wetlands, through run-off of salt, de-icing agents, automotive by-products, changes in stream hydraulics, or through sedimentation. Care must be taken during the planning and construction phases to avoid. Unavoidable impacts will be minimized and mitigated.

2. Expressway/Freeway Alternatives

The expressway/freeway alternatives have avoided direct impacts to the South Grand River Bottoms, a large potential jurisdictional wetland area located west of the Missouri/Kansas/Texas Railroad embankment southwest of Clinton. However, numerous stream crossings, ponds and abandoned strip mine pits, are subject to regulation under Section 404 as "Waters of the U.S.". It should be noted that all these areas are classified as palustrine, riverine, or lacustrine wetlands under the Cowardin system of classification, which reflects the fact that these areas may perform several typical wetland functions, but are likely not considered jurisdictional wetlands pursuant to Section 404.

There is also the potential for any of the expressway/freeway alternatives to contribute to indirect impacts to "Waters of the U.S." Sedimentation and/or changes in the nature of the stream hydraulics could have adverse effects on downstream or downslope wetlands. Care must be taken during the planning and construction phases to effectively predict these types of impacts and avoid them. Unavoidable impacts will be minimized and mitigated.

Throughout the discussions of impacts to "Waters of the U.S." in this section, references to pond sizes will be designated as follows:

- Small ponds: 0.4 hectares (1 acre) or less
- Medium ponds: 0.81 hectares (2 acres)
- Large ponds: 1.42 hectares (3.5 acres)

Streams that have a drainage area greater than 2.41 square kilometers (1.5 square miles) will be referred to as major streams, and those with a drainage area less than 2.41 square kilometers (1.5 square miles) will be referred to as minor streams. A 183 meter (600 foot) wide band was used to determine potential impacts in the evaluation screening process for each alternative. It should be noted that approximately 91.4 meters (300 feet) to 106.7 meters (350 feet) would be the actual area of direct impact.

It should also be noted that only a fraction of these acreages would be jurisdictional wetlands. Due to the Corridors length and width and the numerous alternative alignments which were evaluated during the initial and subsequent screening process and alignment refinement process, the potential wetlands areas were determined by remote sensing data which included many areas which will likely not be jurisdictional wetlands but meet one or more of MoDOT wetlands protocol criteria.

This process was used to evaluate each alternative at the same level and the alignments which showed the least potential wetlands impacts were advanced to the next level of screening and alternative refinement.

Table IV.L.3-1 is a summary of the potential wetland impacts within the 183 meter (600 foot) influence area for each expressway/freeway alternatives that served as the basis for the DEIS comparisons. Additional design development would reduce the impact width to approximately 91.4 meters (300 feet) to 106.7 meters (350 feet).

**Table IV. L.3-1
Summary of Potential Wetland Impacts as Shown in DEIS
Corridor Width 183 Meters (600 ft)**

Alternative	Number of Stream Crossings	Area of Potential Wetlands hectares (acres)	Number of Ponds	Area of Ponds hectares (acres)
Lafayette Co.				
A	8	55 (137)	31	17.4 (43)
B	7	54.6 (135)	33	20 (50)
Johnson County				
A West	19	85 (210)	51	28 (69)
B West	19	83 (204)	53	28.7 (71)
A East	22	55 (135)	51	32 (79)
B East	20	58 (143)	38	21 (52)
Henry County				
A	10	33.6 (83)	27	21.9 (54)
B	11	35 (87)	36	31.2 (77)
1 (Rte. 7 Reloc.)	3	6.5 (16)	6	3.4 (8.5)
ROUTE 13 TOTAL				
Preferred (A)	40	144 (355)	109	71.3 (176)

The Preferred Alternative, which was selected by the Draft EIS process as being the most practical alternative having the least impact on the aquatic environment, was subjected to more intensive field survey for jurisdictional wetlands as a part of the Preliminary Jurisdictional Wetland Determination (PJWD). This information, including field forms, was submitted to the Kansas City District COE and the NRCS Field Office in Warrensburg for their review and concurrence. The survey was based on a typical 106.7 meter (350 ft.) right of way width. The following paragraphs of this section address the findings of the PJWD survey.

Pursuant to E.O. 11990, the preferred alternative was found to be the least damaging practical alternative during the merged NEPA-404 process. MoDOT will continue work with COE and other appropriate natural resource management agencies to develop appropriate mitigation strategies. These would include considerations of bridge and roadway construction techniques as well as the design of any mitigation sites that are deemed necessary by the COE through the Section 404 process as compensation for project impacts to the aquatic environment. The MoDOT design engineers and environmental staff will also attempt to further minimize the impacts to waters which cannot be otherwise avoided. This process, however, commences in the preliminary engineering design phase of the project, subsequent to the corridor location and environmental impact statement phase of the project. It is not possible, at this time, to determine the specifications, precise quantity or type of mitigation that is necessary to compensate for construction impacts until the specific impacts can be addressed in the detailed engineering design phase of the project.

a. Lafayette County***Alternative A***

The Preferred Alternative would potentially impact 23 ponds consisting of 0.80 hectares (1.97 acres) of "emergent" wetland fringe, 0.04 hectares (0.09 acres) of "forested" wetland fringe and 1.69 hectares (4.19 acres) of open water designated as "Waters of the U. S. "

Eleven (11) stream crossings occur resulting in potential impacts to 1.02 hectares (2.51 acres) of "Waters of the U. S." (i.e. up to the limit of the ordinary high water mark). Streams with a drainage area greater than 3.89 sq. km. (1.5 sq. miles) that are impacted include Lick Fork, Tabo Creek, Davis Creek and North Blackjack Creek.

Eleven (11) wetland areas are potentially impacted including 0.07 hectares (0.17 acres) of "emergent" wetland, 0.52 hectares (1.28 acres) of "grassed waterway" and 1.39 hectares (3.44 acres) of "wet pasture".

See Tables IV.L.3-2, IV.L.3-3 and IV.L.3-4 for quantities and total potential impacts to ponds, streams and wetlands.

b. Johnson County***Alternative A (East)***

The Preferred Alternative would potentially impact 42 ponds consisting of 2.21 hectares (5.46 acres) of "emergent" wetland fringe, 0.004 hectares (0.01 acres) of "scrub-shrub" wetland fringe, 0.26 hectares (0.65 acres) of "forested" wetland fringe and 4.33 hectares (10.69 acres) of open water designated as "Waters of the U. S. "

Forty-three (43) stream crossings occur resulting in potential impacts to 4.20 hectares (10.38 acres) of "Waters of the U. S." (i.e. up to the limit of the ordinary high water mark). Streams with a drainage area greater than 3.89 sq. km. (1.5 sq. miles) that are impacted include the Blackwater River, Bear Creek, East Bear Creek, West Bear Creek and Brawley Creek.

Seventeen (17) wetland areas are potentially impacted including 1.80 hectares (4.47 acres) of "emergent" wetland, 0.07 hectares (0.18 acres) of "scrub-shrub" wetland, 0.44 hectares (1.10 acres) of "forested" wetland, 1.22 hectares (3.01 acres) of "wet pasture" and 0.91 hectares (2.24 acres) of "farmed wetland".

See Tables IV.L.3-2, IV.L.3-3 and IV.L.3-4 for quantities and total impacts to ponds, streams and wetlands.

c. Henry County***Alternative A***

The Preferred Alternative would potentially impact 19 ponds consisting of 1.96 hectares (4.85 acres) of "emergent" wetland fringe, 0.10 hectares (0.24 acres) of "scrub-shrub" wetland fringe, 0.16 hectares (0.40 acres) of "forested" wetland fringe and 4.16 hectares (10.27 acres) of open water designated as "Waters of the U.S."

Seventeen (17) stream crossings occur resulting in potential impacts to 1.50 hectares (3.70 acres) of "Waters of the U. S." (i.e. up to the limit of the ordinary high water mark). Streams with a drainage area greater than 3.89 sq. km. (1.5 sq. miles) that are impacted include Deer Creek and Coal Creek. These two streams occupy part of the floodplain surrounding Truman Reservoir and contain the most adjacent wetlands of any of the streams within the entire Route 13 corridor. The Deer Creek area within the Preferred Alternative Corridor, consists of 1.86 hectares (4.59 acres) of adjacent "emergent" wetlands, and the Coal Creek area, within the Preferred Alternative Corridor, consists of 2.92 hectares (7.21 acres) of adjacent "emergent" wetlands and 0.35 hectares (0.86 acres) of adjacent "forested" wetlands.

A total of twenty-two (22) wetland areas are potentially impacted (includes those of Deer Creek and Coal Creek mentioned above) including 5.34 hectares (13.20 acres) of "emergent" wetland, 0.35 hectares (0.86 acres) of "forested" wetland, 0.10 hectares (0.24 acres) of "grassed waterway" and 0.32 hectares (0.79 acres) of "farmed wetland".

See Tables IV.L.3-2, IV.L.3-3 and IV.L.3-4 for quantities and total potential impacts to ponds, streams and wetlands.

Alternative 1 (Route 7 Relocation)

Alternative 1 would potentially impact 4 ponds consisting of 0.08 hectares (0.21 acres) of "emergent" wetland fringe and 0.21 hectares (0.52 acres) of open water designated as "Waters of the U. S. "

Seven (7) stream crossings occur resulting in potential impacts to 0.62 hectares (1.54 acres) of "Waters of the U. S." (i.e. up to the limit of the ordinary high water mark). Town Creek is the only stream impacted by this alternative that has a drainage area greater than 3.89 sq. km. (1.5 sq. miles).

One (1) wetland area, classified as a "wet pasture", is potentially impacted and contains 0.07 hectares (0.18 acres).

See Tables IV.L.3-2, IV.L.3-3 and IV.L.3-4 for quantities and total impacts to ponds, streams and wetlands.

**Table IV.L.3-2
Potential Jurisdictional Wetlands Impacts for Proposed Action
PONDS and STREAMS**

COUNTY	PONDS - hectares (acres)					STREAMS	
	No.	Wetland Fringe			Waters of the U.S. (open water)	No.	Waters of the U.S.
		Emergent	Scrub-shrub	Forested			
Lafayette	23	0.80 (1.97)	0.00 (0.00)	0.04 (0.07)	1.69 (4.19)	11	1.02 (2.51)
Johnson	42	2.21 (5.46)	0.004 (0.010)	0.26 (0.65)	4.33 (10.69)	43	4.20 (10.38)
Henry	19	1.96 (4.85)	0.10 (0.24)	0.16 (0.40)	4.16 (10.27)	17	1.50 (3.70)
Henry (Rte 7)	4	0.08 (0.21)	0.00 (0.00)	0.00 (0.00)	0.21 (0.52)	7	0.62 (1.54)
TOTAL	88	5.05 (12.49)	0.104 (0.25)	0.46 (1.14)	10.39 (25.67)	78	7.34 (18.13)

**Table IV.L.3-3
Potential Jurisdictional Wetlands Impacts for Proposed Action
WETLANDS**

COUNTY	WETLANDS - hectares (acres)						
	No.	Emergent	Scrub-shrub	Forested	Grassed Waterway	Wet Pasture	Farmed Wetland
Lafayette	11	0.07 (0.17)	0.00 (0.00)	0.00 (0.00)	0.52 (1.28)	1.39 (3.44)	0.00 (0.00)
Johnson	17	1.80 (4.33)	0.07 (0.18)	0.44 (1.10)	0.00 (0.00)	1.22 (3.01)	0.91 (2.24)
Henry	22	5.34 (13.20)	0.00 (0.00)	0.35 (0.86)	0.10 (0.24)	0.00 (0.00)	0.32 (0.79)
Henry (Rte 7)	1	0.03 (0.08)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.07 (0.18)	0.00 (0.00)
TOTAL	51	7.25 (17.92)	0.07 (0.18)	0.79 (1.96)	0.62 (1.52)	2.68 (6.63)	1.23 (3.03)

The total potential impacts by classification for the entire project are 15.61 hectares (38.56 acres) of "emergent" wetland which includes "grassed waterway" and "wet pasture", 0.18 hectares (0.43 acres) of "scrub-shrub", 1.26 hectares (3.10 acres) of "forested" wetland, 1.23 hectares (3.03 acres) of "farmed wetlands", and 17.73 hectares (43.80 acres) of "waters of the U.S." Total potential impacts to wetland classifications and "waters of the U. S." within the preferred alternative corridor for the entire project are summarized in the following table:

**Table IV.L.3-4
Total Potential Jurisdictional Wetland Impacts
By Wetland Classification in hectares (acres)**

COUNTY	Emergent	Scrub-shrub	Forested	Farmed Wetland	Waters of the U.S.
Lafayette	2.78 (6.86)	0.00 0.00	0.04 (0.09)	0.00 0.00	2.71 (6.70)
Johnson	5.24 (12.94)	0.08 (0.19)	0.71 (1.75)	0.91 (2.24)	8.53 (21.07)
Henry	7.59 (18.76)	0.10 (0.24)	0.51 (1.26)	0.32 (0.79)	6.49 (16.03)
TOTALS	15.61 (38.56)	0.18 (0.43)	1.26 (3.10)	1.23 (3.03)	17.73 (43.80)

Note: Emergent total also includes Grassed Waterway and Wet Pasture areas.

Secondary and Cumulative Impacts

There is the potential for any of the expressway/freeway alternatives to contribute to secondary impacts to "Waters of the U. S." Sedimentation and/or changes in the nature of the stream hydraulics could have adverse effects on downstream or downslope wetlands. Care must be taken during the planning and construction phases to effectively predict these types of impacts and avoid them. Unavoidable impacts will be minimized and mitigated.

A new roadway built to current design standards with limited access points will likely reduce the number of accidents. This in turn would reduce potential for the by-products

and chemical contaminants that could run off the road. As some businesses relocate from the existing route to the newer one, less traffic volumes on the older route may help to reduce accidents and the resulting contaminant run-off. However, a new roadway adds to the amount of pavement area that must be maintained, resulting in a cumulative increase in the amount of run-off from salt, de-icing agents and automotive by-products.

The alternatives would likely act as a catalyst for increased growth, relocated development and expansion in the region. New development along the new roadway can result in more wetlands being filled or impacted either with or without permits. New development that takes place without due consideration being given to the run-off potential can also result in increased erosion and sedimentation that can reach existing wetlands and "Waters of the U. S."

Eventually those wetlands that are affected by a prolonged concentration of sedimentation or contaminant run-off could suffer from diminished function and value.

3. Project Implications and Recommendations

Construction activities requiring discharges into jurisdictional Waters of the U.S., which include wetlands and other special aquatic sites, require a Department of the Army Permit under Section 404 of the Clean Water Act. Jurisdictional wetlands would likely be impacted by the alternatives for this project and the potential also would exist for impacting jurisdictional "Waters of the U.S." wherever streams or other water bodies would be crossed by alternative alignments. Such streams are regulated below the limits of the ordinary high water mark. Therefore, impacts may be avoided by crossing streams on structure or designing crossings that require no discharges of fill below the ordinary high water mark. Alternatives to bridging may include certain culvert designs that are capable of conveying 100-year flood flows but do not require backfilling below high water limits. Final wetland delineation is anticipated to be accomplished to determine actual impacts on the selected alignment.

The definition of the bridge types for stream crossings will occur during subsequent design development and is referred to as the bridge Type, Size and Location (TS&L). It is the policy of MoDOT to reduce impacts to the aquatic environment and to utilize erosion control measures during construction. Erosion control includes both vegetative and inorganic materials. MoDOT does have a tree replacement policy for highway projects and does plan to adhere to it with this project. Additional vegetative plantings, beyond those specified above are not anticipated.

M. WATER BODY MODIFICATION AND WILDLIFE IMPACTS

A highway improvement or construction project can be considered in the amount of acres of habitat lost through the right of way acquisition, but the concept of habitat fragmentation should be considered in a larger context as it directly impacts wildlife. Habitat fragmentation, whether it be aquatic or terrestrial, can have serious impacts on some species of wildlife when the habitats that support them are reduced to the point where the habitat can no longer support viable populations. Species diversity can be lowered to the point that only those species with a high tolerance of man and development are those that survive within the disturbed habitat.

Areas of importance in reference to habitat alteration within the Route 13 study Corridor would be wooded areas of 16.2 hectares (40 acres) or more and the riparian forests associated with some of the creeks. The importance of these areas increases as an overall look throughout the Corridor reveals very little forested areas. The sparseness of these areas would negate the migration of species, as they would have limited areas to relocate. In areas where trees would be cleared, the implementation of MoDOT's replacement program, approved on April 4, 1991, comes into action. This states that for every 15.24 centimeter (6 inch) diameter tree that is removed, two trees would be planted.

Impacts to water bodies are also important. Water body modification can impact wildlife such as fish by the types of environments that some species of fish prefer to inhabit. Not only do the streams and ponds within the Corridor serve as habitats for aquatic species, but they also provide drinking water for terrestrial wildlife. The focus for this section is on water body modification impacts, since the wildlife has already adapted to the pre-existing disturbances of terrestrial habitats.

The following acreage should be considered as a worst case scenario. The impacts caused by the alternatives were first calculated with a 183 meter (600 foot) wide right of way and then the typical right of way, which is a nominal 91 meters (300 feet) wide. Preliminary and final engineering design activities would more accurately locate the 91 meter (300 foot) wide right of way within the 183 meter (600 foot) band and would also include the limits of construction with respect to the cut and fill slopes. For this study, a 183 meter (600 foot) width was used throughout when determining impact acreage.

1. "No-Build" Alternative

In this alternative, conditions would remain as they currently are. Wildlife has adapted to the existing location of Route 13 and, although roadway mortality would continue to increase at its present level, no additional wildlife or habitat impacts would be anticipated.

2. Expressway/Freeway Alternatives

a. Lafayette County

Davis Creek contains the greatest amount of fish fauna in the county with about 14 varieties of fish, as shown in Table IV.M-1. The varieties range from the Green Sunfish and Orangespotted Sunfish, which typically inhabit streams with high turbidity, variation in temperature and flow, and stagnant pools; to the Bluntnose Minnow that can live in a range of habitats, but prefers quiet, clear medium to large streams with some vegetation; to the Redfin Shiner that prefers clear warm waters; and the Logperch which avoids turbid streams and enters only those streams with large permanent pools. Blackjack Creek exhibits the least varieties of fish. Those fish range from the Common Shiner; which prefers small, clear streams with high gradients; to the Black Bullhead, which prefers turbid waters, lack of water current, and little fish species diversity.

Alternative A

Alternative A, using the eastern I-70/Route 13 Interchange option, has a total of 31 ponds, 26 of which are 0.4 hectares (one acre) or less in size, two that are 0.8 hectares

(two acres) in size and three that are 1.4 hectares (3.5 acres) or greater, impacting a total of approximately 17.4 hectares (43 acres). The western option has a total of 29 ponds, 23 of which are 0.4 hectares (one acre) or less in size, three that are 0.8 hectares (two acres) in size and three that are 1.4 hectares (3.5 acres) or greater, which total approximately 17 hectares (42 acres).

Alternative B

Alternative B has a total of 33 ponds, 23 of which are 0.4 hectares (one acre) or less in size, seven that are 0.8 hectares (two acres) in size and three that are 1.4 hectares (3.5 acres) or greater, which total approximately 20.2 hectares (50 acres).

b. Johnson County

Blackwater River exhibits the greatest amount of fish fauna in the county with about 16 varieties of fish as shown in Table IV.M-1. They range from the Black Bullhead and Red Shiner, which can tolerate high turbidity and silty streams, while avoiding clear, cool streams; to the Central Stoneroller which prefers moderate gradients and flow with defined riffles; to the Sand Shiner that prefers shallow, permanent flowing, moderately clear, low gradient streams. Bear Creek contains the least varieties of fish. They range from the Black Bullhead which can inhabit turbid waters, to the Golden Shiner that prefers pools or impoundments and tolerates moderately turbid water, to the Common Shiner that prefers clear streams with high gradients.

Alternative A (West)

Alternative A (West) has a wooded area of 16.2 hectares (40 acres) or more and a total of 51 ponds, 36 of which are 0.4 hectares (one acre) or less in size, 13 that are 0.8 hectares (two acres) and two that are 1.4 hectares (3.5 acres), which total 27.9 hectares (69 acres).

Alternative B (West)

Alternative B (West) has a wooded area of 16.2 hectares (40 acres) or more and a total of 53 ponds, 38 of which are 0.4 hectares (one acre) or less in size, 13 that are 0.8 hectares (two acres) and two that are 1.4 hectares (3.5 acres), which total approximately 28.7 hectares (71 acres).

Alternative A (East)

Alternative A (East) has a wooded area of 16.2 hectares (40 acres) or more, and a total of 51 ponds, 38 of which are 0.4 hectares (one acre) or less in size, nine that are 0.8 hectares (two acres), and four that are 1.4 hectares (3.5 acres) or greater, which total approximately 32.4 hectares (80 acres).

Alternative B (East)

Alternative B (East) has two wooded areas of 16.2 hectares (40 acres) or more, one of which is a riparian forest, and a total of 38 ponds, 29 of which are 0.4 hectares (one acre) or less in size, six that are 0.8 hectares (two acres) and three that are 1.4 hectares (3.5 acres), which total approximately 21.1 hectares (52 acres).

**Table IV.M-1
Fish Fauna and Associated Streams**

FISH	STREAMS										
	Lafayette Co.				Johnson Co.				Henry Co.		
	Tabo	Davis	Bikjk	Mulk	South	Post	Bikjk	Bear	Mulk	SG	Honey
1. Gizzard Shad	x	x								x	
2. Carp					x					x	
3. Golden Shiner			x			x	x			x	
4. Creek Chub	x	x	x		x		x	x		x	x
5. Hornyhead Chub										x	
6. Suckermouth Minnow	x	x			x					x	x
7. Redfin Shiner		x		x	x			x	x	x	
8. Common Shiner			x			x	x	x			
9. Red Shiner	x			x	x				x	x	x
10. Sand Shiner	x				x			x		x	x
11. Plains Minnow					x						
12. Bluntnose Minnow		x		x	x			x	x	x	
13. Flathead Minnow	x	x		x	x				x	x	x
14. Central Stoneroller		x		x	x			x	x		
15. Bigmouth Buffalo	x									x	
16. River Carpsucker		x		x	x			x	x		
17. White Sucker						x		x		x	
18. Black Bullhead	x	x	x		x		x			x	x
19. Yellow Bullhead								x			
20. Channel Catfish	x	x		x	x				x	x	
21. Stonecat										x	
22. Flathead Catfish										x	
23. Largemouth Bass										x	
24. Green Sunfish	x	x		x	x			x	x	x	x
25. Orangespotted Sunfish		x			x					x	
26. Bluegill				x		x			x		
27. Logperch		x			x						
28. Johnny Darter	x							x		x	
29. Orangethroat Darter		x				x				x	
TOTAL	11	14	4	9	16	5	4	11	9	22	7

Creeks: Bikjk - Blackjack, Mulk - Mulkey, South - South Fork/Blackwater/Post Oak, Post - Post Oak, SG - South Grand River, Honey - (East Fork) Honey Creek.

c. Henry County

South Grand River has the most varieties of fish within the county and the Corridor with approximately 22 species as shown on Table IV.M-1. They range from the Black Bullhead and Red Shiner, which tolerate high turbidity, to the Carp and Stonecat that can inhabit a wide range of environments, to those fish such as the Hornyhead Chub and Sand Shiner, which prefer clear streams. The (East Fork) Honey Creek has a small variety of fish ranging from the Creek Chub that prefers flowing, turbid streams, the Green Sunfish that can tolerate high turbidity and stagnant waters, to the Sand Shiner and the Suckermouth Minnow that prefers clear, moderate to low gradients, but can tolerate turbidity as long as the riffles are silt free.

Alternative A

Alternative A has a total of 27 ponds, 17 of which are 0.4 hectares (one acre) or less in size, five that are 0.8 hectares (two acres), and five that are greater than 1.4 hectares (3.5 acres), which total approximately 22.3 hectares (55 acres).

Alternative B

Alternative B has a total of 36 ponds, 25 of which are 0.4 hectares (1 acre) or less in size, 4 that are 0.8 hectares (2 acres) and 7 that are greater than 1.4 hectares (3.5 acres), which total approximately 31.2 hectares (77 acres).

Alternative 1 (Route 7 Relocation)

Alternative 1 (Route 7 relocation) has a wooded area of 16.2 hectares (40 acres) or more and a total of six ponds, five of which are 0.4 hectares (one acre) or less in size and one that is 1.4 hectares (3.5 acres), which total approximately 3.6 hectares (nine acres).

d. Update of Value on Preferred Alignment

As a result of field activities during the preparation of the wetland PJWD, the following observations were made concerning water bodies along Alternative A.

Lafayette County

Within the 106.7 meter (350 foot) wide corridor of the Preferred Alternative, 23 ponds are directly impacted. They range in size from approximately 0.04 hectares (0.10 acres) or less to approximately 0.40 hectares (one acre). Total pond area impacted is 3.15 hectares (7.80 acres). Eleven streams are impacted totaling 0.97 hectares (2.41 acres). Direct impacts to riparian woodland habitat total 5.03 hectares (12.42 acres).

Johnson County

Within the 106.7 meter (350 foot) wide corridor of the Preferred Alternative, 42 ponds are directly impacted. They range in size from approximately 0.04 hectares (0.10 acres) or less to approximately 0.77 hectares (1.90 acres). Total pond area impacted is 6.80 hectares (16.81 acres). Forty-three (43) streams are impacted totaling 4.20 hectares (10.38 acres). Direct impacts to riparian woodland habitat total 31.95 hectares (78.95 acres). One upland wooded area of 16.2 hectares (40 acres) or more is directly impacted, 2.60 hectares (6.43 acres) of which is within the corridor.

Henry County

Within the 106.7 meter (350 foot) wide corridor of the Preferred Alternative, 19 ponds are directly impacted. They range in size from approximately 0.04 hectares (0.10 acres) or less to approximately 2.71 hectares (6.70 acres). Total pond area impacted is 6.55 hectares (16.19 acres). Seventeen (17) streams are impacted totaling 1.50 hectares (3.70 acres). Direct impacts to riparian woodland habitat total 12.47 hectares (30.81 acres).

Alternative 1 (Route 7 Relocation)

Within the 106.7 meter (350 foot) wide corridor of Alternative 1, four ponds are directly impacted. They range in size from approximately 0.06 hectares (0.14 acres) to approximately 0.09 hectares (0.22 acres). Total pond area impacted is 0.29 hectares (0.73 acres). Seven streams are impacted totaling 0.62 hectares (1.54 acres). Direct impacts to riparian woodland habitat total 5.62 hectares (13.89 acres).

N. FLOODPLAIN IMPACTS

In the evaluation of the potential impacts to floodplains in the study area, consideration was given to the increased flooding risks, impacts to the existing natural and beneficial floodplain values, support of probable floodplain development and possible measures to minimize impacts and restore the existing floodplain values.

The impacts to floodplains has been minimized by aligning stream crossings at right angles with the direction of the stream for those streams that are regulated by the National Flood Insurance Program (NFIP). For those streams that do not currently have a defined regulatory floodway (i.e. flood hazard map), the same regulatory criteria have been assumed for the EIS and would be used in subsequent design development. The impact to regulatory floodways has been kept to a minimum by spanning the floodway with a bridge structure to prevent encroachment. The flood insurance studies which have been performed and are currently available have been utilized and are referenced in Chapter III, Section B.4.c.

Missouri Executive Order 82-19, which indicates how the State will comply with the requirements of the NFIP, would be adhered to for all floodplain crossings. The above directive indicates that a broad and unified effort will be made to insure that developments in floodplains, such as highways, will be adequately analyzed to lessen the risk of flood losses.

Pursuant to E.O.11988, the preferred alternative was found to be the least damaging practical alternative alignment. The preferred alternative (A-A East-A) would impact 94.9 hectares (234 acres) of floodplain. The preferred alternative impacts a greater number of acres of floodplain than any other combination of alternatives (B-A West, B West, B East-B). Alternative A-A East-A was determined to provide the best solution to correcting existing roadway deficiencies, provides better service to local traffic, and has an overall lower environmental impact.

Spanning the entire floodplain of a stream or a river is not always economically justified. There are, however, guidelines and standards established by the State and Federal Emergency Management Agency (FEMA) which established the requirements for spanning a stream for flood hazards. At locations where a regulatory floodway has been established, the roadway would, at a minimum, span the floodway. For streams where there is no floodway but a flood hazard boundary map does exist, the same criteria would be applied as that of a regulatory stream. All the counties in which Route 13 is located have either floodway maps or a flood hazard boundary map.

For drainage crossings, a structure would be provided for the conveyance of stormwater runoff. In subsequent design development for the preferred alternative, analyses would

be performed to determine the appropriate type, size and location for each drainage structure. Most major drainages would likely require a bridge structure for the roadway crossing – defined as a structure with a span in excess of 20 feet.

1. "No-Build" Alternative

The "No-Build" Alternative would have very minor new floodplain impacts even from potential bridge widenings. There would be no additional flooding risks incurred, very minor impacts on natural and beneficial floodplain values and no new support of probable incompatible floodplain development.

2. Expressway/Freeway Alternatives

In the early screening and evaluation of the potential improvement alternatives, correspondence from the Federal Emergency Management Agency was received regarding regulatory requirements and their implications on the evaluation (see Appendix K - Correspondence). Compliance with the appropriate regulations has been considered in the definition of the alternatives (location, bridge sizes, costs, etc.) and in the evaluation of the alternatives as presented below. Estimates of the number of major floodplain crossings and the approximate floodplain areas which would be impacted by the alternatives are shown in Table IV.N-1. These estimates are based on an assumed corridor width of 183 meters (600 feet) and further design development would significantly reduce the actual degree of impact for the improvements.

**Table IV.N-1
Floodplain Impacts for Expressway/Freeway Alternatives**

Alternative	Floodplain Impact Area Hectares (Ac)	Major Stream Crossings Meters (Feet)
Lafayette County		
A	16.4 (40)	140 (460)
B	15.4 (38)	201 (660)
Johnson County		
A West	44.5 (110)	302 (990)
B West	42.9 (106)	332 (1,090)
A East	46.1 (114)	338 (1,110)
B East	46.1 (114)	314 (1,030)
Henry County		
A	32.4 (80)	238 (780)
B	27.1 (67)	277 (910)
1 (Rte. 7 Reloc.)	8.1 (20)	30 (100)
ROUTE 13 TOTAL		
Preferred (A)	94.9 (234)	716 (2,350)

a. Alternative A

Alternative A, the expressway/freeway alternative located adjacent to existing Route 13, would have the following floodplain impacts:

Flooding Risks

Because the majority of this alignment is an improvement to an existing facility, few new flooding risks would result. The portion of the alignment adjacent to the existing Route 13 facility would be designed to either maintain or decrease, if necessary, the existing flooding risk. The new flooding risks that may occur on the bypasses around cities would be minimized due to the proposed roadway elevations that would be set above the predicted 100-year flood levels as a result of roadway profile requirements for the new facilities. Furthermore, this alternative may result in a reduction of current flooding risks, due to the opportunity to incorporate remedial measures into portions of the new roadway and the removal of existing facilities that may be associated with current flooding risks. The risks of flooding to users of the roadway and the potential for property loss and hazard to life would be minimal.

Impacts on Natural and Beneficial Floodplain Values

In addition to floodwater conveyance and peak discharge attenuation, floodplains provide other beneficial roles such as habitat for wildlife and stormwater purification. Generally, due to the relative magnitude of the impacts and the predominant agricultural uses of the existing floodplain areas, these impacts would not be significant. The footprint of the roadway fills placed within the floodplain would be minimal when compared to total floodplain surface area. Roadway fill would generally not be allowed to impact natural stream channels and would not be allowed to encroach into floodplains beyond what would result in .32 meters (1 foot) of backwater for a predicted 50-year flood event. Lafayette, Johnson, and Henry Counties participate in the National Flood Insurance Program (NFIP), and therefore require floodplain development permits for construction activities within special flood hazard areas. Federal Emergency Management Agency (FEMA) NFIP minimum standards require that total accumulative increases in water surface elevations resulting from floodplain development in regulatory streams be less than .32 meters (1 foot). Bridges crossing special flood hazard areas would therefore need to be hydraulically designed to meet the NFIP criteria. In addition to floodwater conveyance and peak discharge attenuation, floodplains provide other beneficial roles such as habitat for wildlife and stormwater purification. Generally, due to the relative magnitude of the impacts and the predominant agricultural uses of the existing floodplain areas, these impacts would not be significant.

The Tabo Creek crossing at the existing Route 13 location, although the largest floodplain crossing of Lafayette County in Alternative A, would result in minor loss of floodplain values due to the width of the basin and the existing stream characteristics. Proposed crossings of the Blackwater River and Bear Creek on the Warrensburg far east bypass contribute to the largest floodplain impacts for Johnson County. Henry County crossings of the Deer Creek/Coal Creek floodplain with the placement of large span bridges and/or relief bridges would have minimal loss of flow conveyance through the floodplain crossing. Impacts on natural and beneficial floodplain values resulting from the major improvement alternative would not be significant.

Support of Probable Floodplain Development

The floodplains along the existing Route 13 alignment have experienced some development over the many years that the existing facility has been in place. Alternative A improvements and new bypasses should not directly increase this development.

Therefore, incompatible floodplain development adjacent to the project as a result of the construction of Alternative A is not anticipated.

Measures to Minimize Floodplain Impacts and Measures to Restore and Preserve the Natural and Beneficial Floodplain Values

The impact of any encroachments on floodplain hydraulics would be minor. Floodplain development should not be supported by this project. Therefore, no additional measures to limit or minimize impacts are necessary.

The nature of Alternative A makes complete avoidance of floodplains impractical; however, impacts to floodplains would be minimized by following standard design criteria and using existing alignment and embankment as much as possible. Total areas of potential floodplain impacts, assuming a 61 meter (200 foot) additional width adjacent to the existing alignment, are shown in Chapter II. This alternative is consistent with local, state and federal water resources and floodplain management programs. All practical measures to minimize detrimental impacts on the floodplains would be incorporated into design.

b. Alternative B

Except for a few differences, which are noted specifically in the following paragraphs, Alternative B is essentially equivalent to Alternative A in terms of potential floodplain impacts. The total acreage of potential impacts is shown by alternative in Chapter II. Specific floodplain impacts would be as follows:

Flooding Risks

The proposed roadway grade would always be set above the predicted 100-year flood levels and opportunities to incorporate remedial measures into the facility would be possible. Therefore, the risks of flooding to users of the roadway and the potential for property loss and hazard to life would be minimal.

Impacts on Natural and Beneficial Floodplain Values

In addition to floodwater conveyance and peak discharge attenuation, floodplains provide other beneficial roles such as habitat for wildlife and stormwater purification. Generally, due to the relative magnitude of the impacts and the predominant agricultural uses of the existing floodplain areas, these impacts would not be significant.

Floodplains in the study area range from relatively narrow to moderately wide, so encroachments would result in minor loss of significant flood conveyance and storage potential. The proposed crossing of Bear Creek on the Warrensburg near east bypass would have a much smaller impact to the floodplain than the Alternative A crossing. Impacts on natural and beneficial floodplain values resulting from the improvement would not be significant.

Support of Probable Floodplain Development

Incompatible floodplain development as a result of the construction of the roadway would not be generally anticipated adjacent to the project. The proposed project would have limited access, with access available usually only at intersections with existing

roadways. Therefore, additional roadway construction would be required beyond that proposed for this project before new floodplain development could occur. Having a new road available nearer the presently undeveloped floodplains would make it easier to undertake the additional roadway construction necessary for access to those undeveloped floodplains. However, the NFIP standards would apply for any new floodplain developments and can be used by the participating counties to help control such developments.

Measures to Minimize Floodplain Impacts and Measures to Restore and Preserve the Natural and Beneficial Floodplain Values

The impact of any encroachments on floodplain hydraulics would be minor. Floodplain development should not be supported by this project. Therefore, no additional measures to limit or minimize impacts are proposed.

The nature of the terrain in the project area makes complete avoidance of the floodplain areas impractical; however, impacts on the floodplain would be minimized by following standard stream crossing design criteria, avoiding direct impacts on stream channels, and adjusting alignments where possible. The proposed action would be consistent with local, state and federal water resources and floodplain management programs. All practical measures to minimize harm on the floodplains would be incorporated.

O. IMPACTS TO TERRESTRIAL COMMUNITIES

The Route 13 study Corridor has not experienced excessive development, but is predominately an agricultural area. Throughout the Corridor, reduction of habitats in wooded areas can be contributed to the clearing of forested areas for agricultural use. Grazing as well as crop farming has also altered habitats located in prairie grasslands. These areas not only serve as year around habitats for some species, but they also serve as habitats for seasonal residents and areas of courtship for various species. The alteration of such habitats can result in a permanent modification of the bio-diversity within the Route 13 study Corridor, and some of the species, which potentially would be impacted, are considered threatened or endangered.

1. Natural Communities

Natural Communities within the Route 13 Corridor were discussed in Chapter III, Section 5. Some of the natural vegetative communities include forests, prairies, a fen and a glade. Other natural features include a swamp, a sandstone shelter, a seep and springs. The Route 13 Corridor is predominately agricultural, and as such many of the natural features have been greatly altered. Although some of the natural features are not of highest rank, all were considered in terms of impact. Natural features were located and those sites were used as environmental location control points for the definition of the improvement alternatives and most of them would be avoided. The information was obtained through the MDC's Natural Features Inventory publications for Lafayette and Johnson Counties (December 1987) and Henry County (January 1984).

Although most of the Missouri Department of Conservation's Potential Natural Feature Sites were avoided during the screening process, several prairie sites and a former fen

will be impacted by some of the alternatives. Most of the impacted prairies are low quality sites, which contain only a small percentage of prairie grasses. The Missouri Department of Conservation rejected these prairie sites.

The only exception is a "notable" 8 acre prairie that would be impacted by Alternative B in Henry County. If Alternative B in Henry County is chosen as part of an amended or refined preferred alternative, the "notable" prairie site would most likely be suitable as a site for prairie sod collection.

MoDOT has a replacement program that provides for the planting of two trees for every tree greater than 15.25 centimeters (6 inches) in diameter that is removed. These determinations will be a function of final roadway design.

Two "rejected" prairie sites would be impacted by the preferred alternative in Johnson County and one former prairie site would be disturbed in Henry County. The two prairie habitats in Johnson County are of low quality and the site in Henry County no longer exists due to current cultivation activities. No natural features sites would be impacted in Lafayette County by the preferred alternative or by any of the other expressway/freeway alternatives.

MoDOT would be amenable to the idea of cultivating prairie sod by MDC prior to the construction of the improvements for those sites impacted by the preferred alternative. However, due to the avoidance of most sites by the alignment, only two sites could be potential candidates and these two sites, both in Johnson County, are of poor quality.

a. "No-Build" Alternative

This alternative would allow the conditions of the natural communities to remain constant. Impacts as a result of agricultural uses may continue at the present rate, however, no additional impacts to natural communities or wildlife are anticipated.

b. Expressway/Freeway Alternatives

Lafayette County

Alternative A - Alternative A would have no natural features sites impacted.

Alternative B - Alternative B would have no natural features sites impacted.

Johnson County

Alternative A (West) - Alternative A (West) would impact two natural features. One site is a low quality prairie (*Missouri Department of Conservation's Potential Natural Feature Site (PNFS) #28/Site J2; Exhibit III.B.5-1, Natural Environmental Constraints - Johnson County*). The other site is a former fen (*PNFS #122/Site J16; Exhibit III.B.5-1*). The prairie contains invasive prairie grass stands. The fen has been drained and developed as the Steyermark site.

Alternative B (West) - Alternative B (West) would disturb a site, which previously contained a fen (PNFS #122/Site J16; Exhibit III.B.5-1). This is the same site disturbed by Alternative A (West).

Alternative A (East) - Alternative A (East) would impact three natural features. Two sites are low quality prairies and one site is a former fen. One of the prairies is a pasture with scattered prairie grasses and non-conservative forbs (PNFS #37A/Site J9; Exhibit III.B.5-1). The other prairie (PNFS #28/Site J2; Exhibit III.B.5-1) and the fen (PNFS #122/Site J16; Exhibit III.B.5-1) are the same sites disturbed by Alternative A (West).

Alternative B (East) - Alternative B (East) would impact three natural features -- two are prairie sites and the other a remnant prairie site.

Henry County

Alternative A - Alternative A would disturb a former prairie site, which is currently being cultivated (PNFS #85/Site H8; Exhibit III.B.5-1, *Natural Environmental Constraints, Henry County*).

Alternative B - Alternative B would impact two natural feature sites. One site is a notable 8 acre prairie (PNFS #61/Site H1; Exhibit III.B.5-1) and the other site is the cultivated area disturbed by Alternative A (PNFS #85/Site H8; Exhibit III.B.5-1).

Alternative 1 (Route 7 Relocation) - Alternative 1 (Route 7 Relocation) would have no natural features sites impacted.

2. Endangered, Threatened and Rare Species

Endangered, threatened and rare species within the Route 13 study Corridor were discussed in Chapter III, Section 5. The species discussed include the Texas Horned Lizard, Greater Prairie-chicken, Henslow's Sparrow, Bald Eagle, Great Blue Heron Rookery, Mead's Milkweed, Shaved Sedge, Small Sundrops, Narrow-leaved Coneflower and Buffalo Clover. The sites of each were located, plotted and used as environmental location control points. The information was obtained through correspondence with the MDC dated September 20, 1994 and August 22, 1994, the MDC's Rare and Endangered Species of Missouri Checklist, 1992, and the MDC's Natural Features Inventory publications for Lafayette and Johnson Counties (December 1987) and Henry County (January 1984).

The Missouri Department of Conservation was contacted November 24, 1998 regarding an updated listing of Endangered, Threatened, Rare Species of Plants and Wildlife as well as sensitive biological resources. When compared with the listing provided earlier in the Route 13 Corridor Location and EIS Study, it was found that three additional sites were listed. None of the species listed carry a federal or state status but are described following the location information. These three sites are as follows:

- Narrow-leaved coneflower (*Echinacea angustifolia*)
T46NR25W Section 20
Critically imperiled in the state

- Northern crawfish frog (*Rana areolata circulosa*)
T46NR25W Section 22
Rare and uncommon in the state
- Texas horned lizard (*Phrynosoma cornutum*)
T41NR26W Section 02
Imperiled in the state

These sites were located on the corridor maps and it was noted that the preferred alignment does not affect any of the sites enumerated above.

a. Lafayette County

Alternative A

Alternative A would not impact any endangered, threatened or rare species.

Alternative B

Alternative B would not impact any endangered, threatened or rare species.

b. Johnson County

Alternative A (West)

Alternative A (West) would not impact any endangered, threatened or rare species.

Alternative B (West)

Alternative B (West) would not impact any endangered, threatened or rare species.

Alternative A (East)

Alternative A (East) would impact one watch-listed species -- the Northern Crawfish Frog.

Alternative B (East)

Alternative B (East) would not impact any endangered, threatened or rare species.

c. Henry County

Alternative A

Alternative A would not impact any endangered, threatened or rare species.

Alternative B

Alternative B would not impact any endangered, threatened or rare species.

Alternative 1 (Route 7 Relocation)

Alternative 1 (Route 7 Relocation) would not impact any endangered, threatened or rare species.

If construction plans for the Route 13/Route 7 improvements vary from the alignments presented in this Final EIS, or if new information is obtained indicating that listed species may be affected, a resurvey of impacts to endangered species would be performed by MoDOT.

P. HISTORIC AND ARCHAEOLOGICAL INVESTIGATION

The results of the Phase I cultural resource survey are presented in this section of this FEIS. For a discussion of all alternatives, please refer to discussion of cultural resources in the DEIS.

In accordance with MoDOT protocol for the investigation of cultural resources, those resources in Chapter III, Section B.6 that would be affected by the preferred alternative (Alternative A) have been identified. These resources have been considered based on the various investigations and include archaeological, architectural, historic bridge and historical sites. All of the potentially affected resources for the preferred alternative were reviewed by the State Historic Preservation Officer (SHPO) to determine the eligibility of each for inclusion in the National Register of Historic Places (NRHP).

An Archaeological Survey of Missouri (ASM) site file and records review identified 121 archaeological sites in Lafayette County, 387 archaeological sites in Johnson County and 949 archaeological sites in Henry County. The large number of sites identified in Henry County is a result of cultural resource responsibilities of the Kansas City District, Corps of Engineers on federal property. A total of 116 archaeological sites were identified within the boundaries of the Route 13 Study Corridor. Documentation of previously recorded archaeological sites within the Route 13 Study Corridor assisted the study team in early identification of potential flaws in alignment alternatives. Six previously recorded archaeological sites (23LF22, 23LF55, 23JO48, 23HE17, 23HE283 and 23HE284) were located within or adjacent to the alternative alignments. Review of cultural resources reports and project maps at the Missouri Historic Preservation Program (HPP) of the Department of Natural Resources (DNR) library resulted in the identification of no additional resources. All previously recorded archaeological sites were avoided during elimination of alternative alignments or design changes.

A full Phase I survey of the preferred alignment was conducted in the summer of 1996. Sixteen archaeological sites (23LF132-136, 23JO406-411, 23JO413 and 23HE958-961) were identified within the preferred alignment. Six archaeological sites are prehistoric (23LF132, 23JO406, 23JO408, 23JO410, 23JO411 and 23HE960) and 10 sites are historic (23LF133, 23LF134, 23LF135, 23LF136, 23JO407, 23JO409, 23JO413, 23HE958, 23HE959 and 23HE961).

Of these 16 sites, four [23JO407 and 23HE960 along with 23LF133 and 23HE959, for which DNR-HPP has requested additional archival research as part of a Phase II assessment effort (DNR-HPP review letter dated 8 April 1998)] represent resources that have the potential of containing significant information that can contribute to prehistory

and history. Phase II assessments were conducted to determine site function, integrity and National Register of Historic Places eligibility. The remaining 12 archaeological sites recorded during the Phase I cultural resource survey do not contain significant characteristics and are not considered eligible for the National Register. These resources are represented by surface scatters of historic and/or prehistoric artifacts. None of these sites are believed to contain intact subsurface cultural features or deposits. HPP-DNR concurred that no further work is required for this group of resources.

A total of 168 Missouri Historic Property Inventory Forms were completed on individual structures, buildings, objects or complexes of architectural resources located along the alternative alignments (Table III.B.6-7). Only structures, buildings or objects 50 years old or older were photographed and documented during this phase of the survey. The styles and types along the alternatives ranged from double pen to Italianate.

Barns represented the largest class of architecture recorded with 29 stand alone (with no other associated structures, buildings or objects) and many more associated with other primary architectural properties. Bungalows were the second greatest class of properties with 23 recorded as either stand alone or with associated buildings or structures. There were 20 composite, 17 Gabled Ell, 13 I-House, 11 Open Gable, six Minimal Traditional, six Pyramid Square, six Central Passage, five Crossplan, five Double Pen, four Side Gabled, three ruins, three False Front, two Shotgun, two Single Pen and one each of American Four Square, Central Hall, Commercial Sign, Ell Shaped, Gable End, Gas Station, Multiple Entry, Saltbox, Shed, Side Hall, Side Steeple, Silo and T-shaped recorded.

There were 21 buildings that could be dated to before 1900 and numerous architectural resources dated to around the turn of the century. The range of architectural resources within the alternative alignments reflects the changing social and economic conditions of this primarily rural study corridor.

Architectural resources that were considered to be >50 years old were identified and reviewed as part of the DEIS program. As the project team worked through various alignment configurations, some of the alternatives were dropped from further consideration. With this refinement in the project scope, the team worked with DNR-HPP to identify whether any of the >50 year old architectural resources required further consideration. Based on a concurrent review of the 168 Missouri Historic Property Inventory forms with HNTB, HPA, MoDOT and DNR-HPP staff, 11 properties were considered potentially eligible for the NRHP (WW2, XX8, NN7, OO11, JJJ3, MM22, BB11, G3, N16, EE6 and BBB4). One hundred thirty-four properties were determined to possess no significant characteristics. Of the original 11 properties considered potentially eligible for the NRHP, 6 (BBB4, BB11, MM22, JJJ3, XX8 and WW2) have been avoided by the preferred alternative. An additional 23 properties required further documentation before a determination could be made. Of these 23 properties, only seven would have been directly or indirectly affected by the preferred alternative. Further refinement of the preferred alignment avoided all of the seven properties.

Architectural resources that were considered to be <50 years old and with the potential to be affected by the proposed improvements within the preferred alternative were identified and reviewed as part of the FEIS program. As the project team identified and

refined the preferred alignment all structures not previously identified were photographed and mapped on project plates. The resulting 253 architectural resources were submitted to the DNR-HPP for review and comment. None of the additional architectural resources were determined eligible for listing in the NRHP (DNR-HPP letter of January 2, 1997).

Eighty-two bridge and culvert structures (13 in Lafayette County, 38 in Johnson County and 31 in Henry County) were identified along the preferred alignment. Of this total, 79 structures are located along existing Route 13, 1 (Br-085) is located on existing Route 7, 1 (Br-164) is located on Henry CR NW221 and 1 (Br-165) is located on Henry CR NW131.

Documentation for each of the 82 bridge and culvert resources identified along the preferred alignment was submitted to DNR-HPP for review and comment. None of these resources was considered eligible for the National Register of Historic Places and no significant bridge or culvert resources will be affected by the preferred alignment.

1. "No-Build" Alternative

This alternative could affect significant cultural resources where they are present in areas that are planned for development. Cultural resources investigations are seldom performed when a private individual or company develops a tract of ground. Most cultural resources remain unknown beyond the professional community or the various resource agencies. Because of this, there is little doubt that significant resources would be affected without mitigation in private development areas.

2. Expressway/Freeway Alternatives

Cultural resources of various types, sizes and importance have been found in all environmental settings throughout the study area. A number of cultural resources would be affected by any of alternatives currently being considered. There is no known alternative with the corridor that would have no effect on cultural resources. Consideration has been given to the location and characteristics of the recorded cultural resources in the design and assessment of each alternative. Efforts have been made to avoid potentially significant cultural resources throughout the study Corridor and to otherwise minimize effects.

a. Lafayette County

Archaeological Investigations - As a result of the Phase I cultural resource survey, five archaeological sites (23LF132-136) were recorded within the preferred alignment. Only 23LF133 required additional assessment to determine its eligibility for the NRHP. The remaining sites contain no characteristics that when viewed in their most favorable light would make it eligible for the NRHP. HPP-DNR concurred that no further work is required for this group of resources.

Architectural Investigations - A review of all architectural resources located within the preferred alternative by DNR-HPP has resulted in no resources determined eligible for the NRHP. With the exception of EE6 (Higginsville Sign), there are no architectural NRHP listings located within the preferred alternative. EE6 (Higginsville Sign), located

in the proposed interchange of existing Route 13 and Business 13, has been considered eligible for the NRHP and will be moved from its present location to allow for the construction of an upgraded interchange at this location.

Historical Bridge Investigations – Thirteen bridge or culvert structures are located within this segment of the preferred alternative. None of these resources contain characteristics that would make them potentially eligible for the NRHP.

Historical Investigations – No historic properties (not including archaeological or architectural resources) are located along the alternative.

b. Johnson County

Archaeological Investigations – As a result of the Phase I cultural resource survey, seven archaeological sites (23JO406-411 and 23JO413) were recorded within the preferred alignment. Six sites (23JO404, 23JO408-411 and 23JO413) contain no characteristics that when viewed in their most favorable light would make it eligible for the NRHP. DNR-HPP concurred that no further work is required for this group of resources. Only 23JO407 required additional assessment to determine its eligibility for the NRHP.

Architectural Investigations – A review of all architectural resources located within the preferred alternative by DNR-HPP has resulted in no resources determined eligible for the National Register. There are no architectural NRHP listings located within the preferred alternative.

Historical Bridge Investigations – Thirty-eight bridge or culvert structures are located within this segment of the preferred alternative. None of these resources contain characteristics that would make them potentially eligible for the NRHP.

Historical Investigations – No historic properties (not including archaeological or architectural resources) are located along the alternative.

c. Henry County

Archaeological Investigations – As a result of the Phase I cultural resource survey, four archaeological sites (23HE958-961) were recorded within the preferred alignment. Two sites (23HE958 and 23HE961) contain no characteristics that when viewed in their most favorable light would make it eligible for the NRHP. DNR-HPP concurred that no further work is required for this group of resources. 23HE960 and 23HE959 required additional assessment to determine their eligibility for the NRHP.

Architectural Investigations – A review of all architectural resources located within the preferred alternative by DNR-HPP has resulted in no resources determined eligible for the NRHP. There are no architectural NRHP listings located within the preferred alternative.

Historical Bridge Investigations – Thirty-one bridge or culvert structures are located within this segment of the preferred alternative. None of these resources contain characteristics that would make them potentially eligible for the NRHP.

Historical Investigations – No historic properties (not including archaeological or architectural resources) are located along the alternative.

3. Results of Determinations of Effect

Because the EIS Project Team has eliminated many of the links that were initially included in the EIS documentation process, several resources considered potentially eligible by DNR-HPP have been avoided. Included among these resources are BBB4 (Steve Yingling House located in eliminated link B9), BB11 (Joseph Mcandrus Ruin located in eliminated link G1), MM22 (Mrs. Warren Sellman Barn located in eliminated link F32), JJJ3 (Gretchen Pennock House located in eliminated link H8), XX8 (James Fowler House located in eliminated link H1) and WW2 (Michael Hoppe House located in eliminated link H1). With the exception of EE6 (Higginsville Sign located in retained link B4), each of the remaining resources considered by DNR-HPP to be eligible for the NRHP are located along a retained link that has been modified to substantially reduce or eliminate potential effects. It is this group of resources (EE6 Higginsville Sign, G3 Bruce Baker House, N16 Charlessa Moore House, NN7 Shawnee Mound Store and OO11 William Ragland House) for which a Determination of Effect was required as part of the comprehensive planning effort.

Each of the resources identified by DNR-HPP as being potentially eligible for the NRHP has been reviewed by the FHWA in accordance with the Criteria of Adverse Effect set forth in 36 C.F.R. §§ 800.9(b) and (b)(1) and the relationship of each to the APE of the proposed undertaking has been established by the EIS Project Team. A document was prepared and submitted to seek DNR-HPP concurrence in the application by FHWA of the Criteria of Adverse Effect set forth in 36 C.F.R. §§ 800.9(b) and (b)(1).

As a result of the efforts of the EIS Project Team in successfully shifting the preferred alignment away from G3, N16 and OO11 and successfully maintaining the preferred alignment on the east side of the existing roadway at NN7, it is concluded that the proposed undertaking will have no effect on G3, N16, OO11 and NN7 and that no further action is necessary [36 C.F.R. § 800.5(b)].

EE6 will be directly affected by the preferred alignment. FHWA, through MoDOT, proposes to implement a relocation program for EE6, in consultation with DNR-HPP, at a time following final design and construction of the intersection at existing Highway 13 and Business Route 13. As a result of the relocation program, it is concluded that the proposed undertaking will have no adverse effect on EE6 [36 C.F.R. §§ 800.5(d)(1) and (2)] and that further action be limited to the proposed relocation program.

DNR-HPP, by letter dated 13 October 1998 concurred in these findings in connection with G3, N16, OO11, NN7 and EE6 (Appendix J).

4. Results of the Phase II Investigations

A full Phase I survey of the preferred alignment was conducted in the summer of 1996. Sixteen archaeological sites (23LF132-136, 23JO406-411, 23JO413 and 23HE958-961) were identified within the preferred alignment. Six archaeological sites are prehistoric (23LF132, 23JO406, 23JO408, 23JO410, 23JO411 and 23HE960) and 10 sites are historic (23LF133, 23LF134, 23LF135, 23LF136, 23JO407, 23JO409, 23JO413,

23HE958, 23HE959 and 23HE961). All of the potentially affected resources for the preferred alternatives were reviewed by DNR-HPP to determine the eligibility of each site for inclusion in the National Register of Historic Places (NRHP).

Of these 16 sites, four [23JO407 and 23HE960 along with 23LF133 and 23HE959, for which HPP has requested additional archival research as part of a Phase II assessment effort (HPP-DNR review letter dated 6 January 1998)] represent resources that have the potential of containing significant information that can contribute to prehistory and history. Phase II assessments have been conducted at each site and none were found to be associated with significant persons [36 C.F.R. § 60.4(b)] or are considered to contain intact subsurface cultural features or deposits or otherwise have the potential to contain information important in prehistory or history [36 C.F.R. § 60.4(d)]. No further work is recommended for this group of resources.

DNR-HPP, by letter dated March 30th, 1999, and shown in Appendix J of this FEIS, concurred in these findings in connection with 23JO407, 23HE960, 23LF133 and 23HE959.

Q. HAZARDOUS WASTE SITES

1. "No-Build " Alternative

The "No-Build" Alternative for the Route 13 Corridor would have no effect on the potentially hazardous waste sites identified during the hazardous material screening except for those potential areas where committed projects are located. Examples could include Route 13/Route 7 widening in Clinton or the possible improvement of the I-70 Interchange. Any current release of hazardous materials or waste would likely continue.

2. Expressway/Freeway Alternatives

Waste sites encountered by the expressway/freeway alternatives would be affected by the project. Releases into the environment may be aggravated by construction activities resulting in new or additional contamination and possible worker exposures. Types of potential negative impacts may include, but are not limited to, those impacts listed as follows:

- Dust from disturbing contaminated soils during earth moving activities, with potential exposure to workers and nearby residents.
- Unearthing disposal sites and spreading hazardous materials.
- Exposing seeps during construction and releasing contaminated groundwater to the environment.
- Exposing workers to hazardous materials or waste unearthed or released during construction.
- Displacement of contaminated soils by borrowing or excavating and placing material in an embankment or undocumented area.

However, the likelihood of these impacts occurring is low due to preventative measures taken before and during construction. Avoidance of known sites would be provided to the extent possible. Known impacts would be remediated prior to or as part of construction of the roadway improvements. If an unknown site would be encountered during construction, measures would be taken as necessary to eliminate or minimize any adverse environmental consequences.

A positive impact of the expressway/freeway alternatives would be remediation or clean up of the waste sites identified within the Corridor of the selected alternative. Remediation of solid and hazardous waste sites, and related contamination, would be conducted in the pre-construction phase of the project.

The hazardous material screening of the study Corridor rated the observed waste sites as having a high, moderate, or low potential of impacting the expressway/freeway alternatives. For the alternatives where the proposed action impacts a potential waste site of low potential, future site inspections and characterization would be performed as part of the design or construction phases. The preferred method of mitigation measure for these low potential sites is avoidance. If, due to other factors, a low potential site cannot be avoided and is impacted by the project, it is anticipated the necessary remediation, if any, would not be substantial or consequential.

Seventeen sites have a moderate or high potential for contamination impacts and would be crossed by the reasonable alternatives. The potential impacts of the alternatives and the proposed mitigation plans are discussed below for the potential hazardous and solid waste sites identified during the hazardous material screening.

Correspondence with the United States Air Force and the MDNR has documented an agreement regarding possible PCB contamination near the former Minuteman II silos and an assessment of the hazards of exposure. The agreement states that no excavation beyond 0.6 meters (two feet) of depth should take place within 7.5 meters (twenty-five feet) of the fenced perimeter of the launch facility. Only two former Minuteman sites, Site N-6 in Lafayette County and Site M-3 in Johnson County, might intrude on the 7.5 meter (25') buffer. This situation will be addressed by Special Provisions in final construction plans.

Final construction plan preparation will note that the existing ground is not to be disturbed within an area 7.5 meters (25') outside of the missile site property fence. If additional information is needed during plan preparation, the designer should contact the Department of the Air Force at (816) 687-6347.

a. Lafayette County

Alternative A

One business site (Site L-25) along the existing Route 13 within Lafayette County present a moderate potential impact due to present or past storage of hazardous materials or petroleum products. Spills and leaks from storage tanks would be the most likely scenario. Leaks and spills of fuels and oils and closure of storage tanks is regulated by the MDNR. Site L-25 (Gift Shop) was formerly a service station which possibly operated either AST's or UST's along with other uses of oils and/or solvents.

One missile launch facility (N-6) is located adjacent to the alternative and should be avoided.

The preferred mitigation would be avoidance. However, where proposed actions cannot avoid these sites, a thorough site inspection and characterization prior to purchase of right of way would be performed. It is anticipated that any necessary remediation would not be substantial or consequential. Any remediation plan developed for leaking storage tanks requires approval from MDNR prior to implementation.

Alternative B

One site (L-25) along the existing Route 13 within Lafayette County presents a moderate impact potential due to likely past storage of petroleum products. Leaks and spills of fuels and oils and closure of storage tanks are regulated by the MDNR. Site L-25 (Gift Shop) was formerly a service station which operated either AST's or UST's along with other uses of oils and/or solvents.

The preferred mitigation would be avoidance. However, where proposed actions cannot avoid these sites, a thorough site inspection and characterization prior to purchase of right of way would be performed. It is anticipated that any necessary remediation would not be substantial or consequential. Any remediation plan developed for leaking storage tanks requires approval from MDNR prior to implementation.

One site L-34 (Higginsville Gun Club) has a high potential for contamination due to the use of lead ammunition. The preferred mitigation would be avoidance. However, selective placement of the proposed action may avoid the target range areas. Where the proposed action cannot avoid the site, additional site characterization, inspection and sampling for high concentrations of lead may be desired after right of way is defined. Remediation may involve clean-up by removal or documentation and burial/capping of contaminated areas subject to approval by the MDNR.

b. Johnson County

Alternative A (West)

Five sites (J-34, J-35, J-12, J-13, J-25) along existing Route 13 within Johnson County present a moderate impact. Four of these sites could impact the project through the hazardous materials they may use or store. The remaining site – a former service station which is now a church – presents the possibility of remaining UST'S or contaminated soil.

Sites J-34 (Boyds Fix-it-Shop), J-35 (R & J Garage), J-12 (MoDOT Maintenance Facility), and J-13 (Warrensburg Hydraulics) likely use, store or generate hazardous materials. Only sites J-12 and J-34 have regulatory documentation. J-12 is on the RCRIS small generator list and J-34 was reported for possibly dumping petroleum products.

Site J-25 (New Pentecostal Church) currently occupies a building which appears to have been previously used as a service station. This site likely used UST's or AST's with the risk of possible leaks from these tanks.

The preferred mitigation would be avoidance. However, where proposed actions cannot avoid these sites, a thorough site inspection and characterization prior to purchase of right of way would be performed. It is anticipated that any necessary remediation would not be substantial or consequential. Any remediation plan developed for leaking storage tanks requires approval from MDNR prior to implementation.

Site J-27 (Hilty [Marrs] Quarry) has a high potential for contamination due to past partial use of the quarry as a sanitary landfill during the early 1960's. The preferred method would be avoidance of the landfill area. Further site delineation is recommended if the quarry property is used for right of way.

One missile launch facility (M-3) is located adjacent to the alternative and should be avoided.

Alternative B (West)

One site, J-25 (New Pentecostal Church), has a moderate potential for contamination and Site J-27 (Hilty [Marr] Quarry) has a high potential for contamination and impact. Both impacts are described in Alternative A (West).

Alternative A (East)

Site J-27 (Hilty [Marr] Quarry) has a high potential for contamination and is previously described in Alternative A (West). The preferred method would be avoidance of the landfill area. Further site delineation is recommended if the quarry property is used for right of way.

One site, J-35 (R & J Garage), has a moderate potential for contamination and is previously described in Alternative A (West).

Site J-23 (animal waste lagoon) has a low to moderate potential for contamination. Further characterization of this site is suggested.

One missile launch facility (M-3) is located adjacent to the alternative and should be avoided.

Alternative B (East)

One missile launch facility (M-3) is located adjacent to the alternative and should be avoided.

c. Henry County

Alternative A

One site, H-15 along existing Route 13, presents a moderate potential impact due to past storage of petroleum products. Leaks and spills of fuels and oils and closure of storage tanks are regulated by the MDNR.

Site H-15 is an abandoned building whose apparent former use was a service station. The service station likely stored fuel in AST's or UST's.

The preferred mitigation would be avoidance. However, where proposed actions cannot avoid this site, a thorough site inspection and characterization prior to purchase of right of way would be performed. It is anticipated that any necessary remediation would not be substantial or consequential. Any remediation plan developed for leaking storage tanks requires approval from MDNR prior to implementation.

Alternative B

No impacts from hazardous materials would be anticipated for this alternative.

Alternative 1 (Route 7 Relocation)

No impacts from hazardous materials would be anticipated for this alternative.

R. VISUAL IMPACTS

1. "No-Build" Alternative

Throughout the study Corridor, the "No-Build" Alternative would not alter the existing visual quality of the environment. Since there would be no major changes in the horizontal and vertical alignment of Route 13 and Route 7, except in the City of Clinton, the existing visual environment would be left intact.

Secondary and Cumulative Impacts

With the exception of the improvements that can reasonably be expected to occur during the design period, the "No-Build" Alternative could secondarily and cumulatively have a positive impact on the visual environment in some areas that are not used for agricultural purposes. With the absence of construction activity in the existing right of way and adjacent parcels; native trees, grasses and wildflowers, as they multiply and mature, will increase the quality of views from the road and will help the roadway blend into the environment.

2. Expressway/Freeway Alternatives

The expressway/freeway alternatives consist of a four-lane access controlled facility with a depressed grassy median.

a. Lafayette County

Alternative A

This alternative would have an overall low visual impact on the environment. This would be the result of the alignment being adjacent to existing Route 13 throughout most of the county. Two exceptions to this occur -- one from Highway 24 southeast to Route 13, and the other as the alternative bypasses Higginsville to the west. In these areas the impact would be moderately low as it travels through cultivated cropland where no roadway currently exists.

The quality of views from the road would be moderately low throughout much of the county. An exception occurs at the valleys of Tabo Creek and Davis Creek where they would be moderately high because of the combination of trees and water. The concentration of visual receptors would be low along the entire alignment, therefore views of the road would be minimal.

The intersection of Alternative A and I-70 has two alternative locations designated as options. The west option would have an overall moderate visual impact on the environment. It would have a moderately low visual impact through the cultivated cropland and the commercial/industrial area north of I-70, and a moderately high visual impact as it travels through the forested area south of I-70. The quality of views from the road would be moderately low along most of the alignment except at the small lake and through the forested area where the views would be of high quality. The concentration of sensitive visual receptors would be low.

The eastern option would have an overall moderately low visual impact on the environment as it travels through mostly cultivated cropland. The quality of views from the road would be moderately low, and the concentration of sensitive visual receptors would be low.

Alternative B

This alternative would have an overall moderately low visual impact on the environment. It would have a moderately low visual impact as it travels through the cultivated croplands throughout most of the county. In the Tabo Creek and Davis Creek valleys, the impact would increase to moderately high because of the higher visual quality in these areas.

The quality of views from the road would be moderately low along most of the alignment except at the creek valleys and the cloverleaf interchange at I-70. The creek valleys would provide moderately high quality views, and the elevated ramps at the interchange would have the potential of providing views to Maple Leaf Lake and other high to moderately high quality water bodies in the area. The concentration of visual receptors is low along most of the alternative with the exception of Maple Leaf Lake where recreationists may have views of the interchange. However, since I-70 is presently so close to the lake, the addition of an interchange to the northeast would not be perceived as a high degree of change.

b. Johnson County

Alternative A (West)

This alternative would have an overall moderately low visual impact on the environment as the majority of the alternative follows existing Route 13 and travels through agricultural grassland and cropland. As the alternative passes through the valleys of the Blackwater River and Post Oak Creek, the visual impact would be moderate.

The quality of views from the road would be high as the alignment travels over the high point ridges in the northern most and southern most portion of the county where opportunities exist for distant panoramic views of the regional landscape. The views from the road would be of high quality through the forested areas north of Cornelia, and of

moderately high quality in the Blackwater River and Post Oak Creek valleys. The concentration of the visual receptors along this alignment is low, therefore views of the road would be minimal.

Alternative B (West)

This alternative would have an overall moderate visual impact on the environment. In the northern third of the county, it travels through grassland and cropland on a high point ridge 805 meters (0.5 miles) west of existing Route 13. On the ridge, the panoramic views from the road would be of high quality.

As this alternative passes through the valleys of the Blackwater River and Post Oak Creek it follows the same alignment as the previously described Alternative B (West), and therefore has the same visual impacts and viewer considerations to the Henry County line.

Alternative A (East)

This alternative would have an overall moderately low visual impact on the environment as the majority of the alignment follows existing Route 13 and travels through agricultural grassland and cropland. The visual impact in the valleys of the Blackwater River and Bear Creek would be moderate.

The quality of views from the road would be high as the alignment travels over the high point ridges and through the forested areas in the southern portion of the county and would be moderately high in the valleys of the Blackwater River and Bear Creek. The concentration of visual receptors along this alignment is low, therefore the views of the road would be minimal.

Alternative B (East)

This alternative would have an overall moderate visual impact on the environment. The northern quarter of the alternative follows existing Route 13, but the remainder is a new alignment that travels through grassland, cropland and the valleys of the Blackwater River and Bear Creek. The visual impact would be moderately low in the grassland/cropland areas and moderate in the river and creek valleys.

The quality of views from the road would be high as the alternative travels over the high point ridges in the north and south quarters of the Corridor, and moderately high as it travels through the river and creek valleys. The concentration of visual receptors along this alternative is low, therefore the views of the road would be minimal.

c. Henry County

Alternative A

This alternative would have a low visual impact along most of the alignment as it follows existing Route 13. About 4.8 kilometers (3 miles) north of Clinton it leaves Route 13 and bypasses Clinton to the east where the visual impact on the environment becomes moderately low in the grasslands and cropland areas. The alignment crosses the Deer Creek and Coal Creek valleys where the visual impact would be moderate.

High quality panoramic views from the road would be afforded as the alternative follows the high point ridge from the Johnson County line to approximately 4.8 kilometers (3 miles) south of Shawnee Mound. Opportunities for high quality views would also occur as the alignment approaches Truman Reservoir, and moderately high quality views of linear bodies of water would be offered as the alignment travels adjacent to the abandoned strip mines northeast of Clinton. The concentration of visual receptors along the alternative is low until it reaches the vicinity of Truman Reservoir where a high concentration of recreationists would be affected by views of the road.

Alternative B

This alternative would have an overall moderately low visual impact on the environment. Most of the alternative travels through grassland, cropland and scattered woods of moderately low visual quality. It also passes through an abandoned strip mine area of moderately high visual quality where it would have a moderately high impact on the environment. However, the views of the strip mine water bodies would be moderately high. This alternative also travels adjacent to a forested area that could provide high quality views from the road.

The concentration of visual receptors along the alternative down to Truman Reservoir is low, which would result in minimal views of the road. South of Route 52 to Truman Reservoir, this alternative follows the same alignment as alternative A and would have the same visual impacts and viewer considerations as were stated for that area of the Corridor.

Alternative 1 (Route 7 Relocation)

This alternative would have a moderately low visual impact on the environment as it travels through cropland and grassland areas. The quality of views from the road would be moderate to moderately low. The concentration of sensitive visual receptors in this area is low, therefore the potential for views of the road would be minimal.

Secondary and Cumulative Impacts

The alternatives will secondarily and cumulatively impact the visual quality of the environment as increases in growth, development and traffic volumes occur. New development, in the absence of visual design guidelines and regulations, and increased traffic volumes will contribute to a decline in the visual quality of the environment as open or natural areas become built up.

S. ENERGY

Energy considerations to be taken into account when evaluating the various alternatives in the Route 13 Corridor include the energy consumed during construction and the energy consumed after construction is completed during operations and maintenance. Energy consumed during construction includes energy consumed for earthwork and construction activities, as well as energy consumed off-site for the production of materials and equipment. Energy consumed during construction also includes energy

expenditures caused by vehicle delay due to construction activities, such as lane closures.

Energy consumed after construction includes energy used to fuel vehicles, as well as energy used for maintenance of the vehicles and roadway. When considering energy required for operations and maintenance after construction, the marginal energy expenditure must be considered. For example, the energy required for the maintenance of a four-lane facility would be expected to be less than twice the energy required for the maintenance of the current two-lane facility, due to economies of scale. However, a four-lane freeway/expressway facility would more than double the capacity of a two-lane facility without limited access.

The energy consumed by vehicles traveling on the proposed facility should be considered in a global, rather than local, framework. For example, while the proposed facility might carry additional vehicles, it is likely that these vehicles represent trips diverted from other facilities rather than latent demand. Thus the issue to be considered is the relative energy consumption. Because the proposed facility is a limited access freeway/expressway facility with adequate capacity, vehicles would be expected to travel at freeflow speeds with relatively few stops for traffic signals, which represents very favorable conditions with respect to fuel consumption. Furthermore, the fuel consumption for trips that continue to be served on the facility would be expected to decrease because the average operating speeds on the new facility would be higher than the existing speeds, due both to the increased capacity and limited access.

T. CONSTRUCTION IMPACTS

MoDOT has developed a series of Standard Specifications for Highway Construction. These specifications include, but are not limited to, air, noise and water pollution control measures to minimize construction impacts. The Standard Specifications for Highway Construction also include traffic control and safety measures. MoDOT would implement these Standard Specifications on the Route 13 Corridor project for construction activity resulting from the selection of any of the alternatives. Pollution control measures, both temporary and permanent, would be enacted under the project construction specifications.

Although construction can have adverse impacts on noise and air quality levels, construction impacts in the Route 13 Corridor are not expected to be severe. Construction impacts would be of relatively limited duration, and because much of the Route 13 Corridor is located in rural areas, the number of receptors exposed to the increased noise level and decreased air quality would be limited. Furthermore, impacts would be mitigated by adherence to construction permit and contract conditions, which include prohibitions against the burning of construction debris, and control measures to limit pollution if tree trunks and limbs are permitted to be burned on site.

Specifications and procedures for the disposal of wastes resulting from construction activity would be developed with consideration given to the Missouri Department of Natural Resources (MDNR) Solid Waste Management Program. This program emphasizes the need to develop uses and markets for recycled and recyclable materials

in construction activities. These materials include, but are not limited to, waste tires, rubberized asphalt, ground glass subgrade, structural steel, plastic lumber and paints which utilize recycled glass. Furthermore, any potential hazards in the right of way would be identified and handled in accordance with all applicable regulations. For example, all underground storage tanks within the Route 13 Corridor right of way would be identified and disposed of in a proper manner during construction of the project.

Construction impacts on water resources include both direct and indirect impacts. Stormwater runoff is addressed by MoDOT's Sediment and Erosion Control Program and would be used to address this concern during construction. MDNR has noted that nutrients leached from project areas that have been hydroseeded and mulched can result in increased phosphorus levels in streams and adjacent water bodies, such as creeks and the Truman Reservoir. Runoff can also potentially impact private wells. Private wells in MoDOT right of way would be located, mapped and protected until closure by MoDOT, as mandated by MoDOT's Standard Specifications. Where the selected alternative crosses streams, special measures to minimize the potential for ground water contamination would be implemented.

The Missouri Department of Conservation (MDC) has stated that the following best management practices should reduce impacts to the aquatic environment to a minimal level. These best management practices, as outlined by the MDC, include conformance to the State Channel Modification Guidelines when altering channels or relocating streams; grading and seeding disturbed areas as soon as possible and in compliance with the MDC seeding and planting recommendations; minimizing disturbances to the stream banks and riparian zones; avoiding work in stream channels from the beginning of March to mid June as possible and practicable; and undertaking all necessary precautions to prevent petroleum products from entering streams.

U. RELATIONSHIP OF LOCAL SHORT-TERM USES VERSUS LONG-TERM PRODUCTIVITY

1. "No-Build" Alternative

The "No-Build" Alternative would result in no change to the local short-term use of land and resources. This scenario would include routine maintenance activities, and any improvements made by local entities, such as cities, counties or the private sector, including developers and property owners who wish to improve access to their properties. These improvements, which may or may not meet MoDOT standards, typically consist of paving turning radii and driveway access points. While these improvements may enhance access for a property owner, they do little to improve the overall traffic operations on Route 13. In summary, the "No-Build" Alternative would have no impact on local short-term uses, however, it would be expected to have negative impacts on long-term productivity relative to the highway build alternatives. Negative impacts include increases in vehicle delay, particularly in areas such as Warrensburg and Clinton, and increases in the number of accidents as vehicle kilometers (miles) of travel continue to increase without any substantial roadway improvements.

2. Expressway/Freeway Alternatives

Expressway/freeway alternatives would result in minimal changes to local short-term uses but would have significant benefits to long-term productivity. These alternatives would impact local uses, resulting in displacements in some cases, and changes in access in other cases. However, the construction of any of the highway build alternatives would enhance long-term productivity by reducing delay and excess fuel consumption and increasing safety. To the extent that the resources conserved through improved travel efficiency are invested in more productive uses, long-term productivity would be impacted in a positive way.

V. IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

1. "No-Build" Alternative

The "No-Build" Alternative would be expected to result in increases in vehicle delay, particularly in areas such as Warrensburg and Clinton, and an increase in the number of accidents as vehicle kilometers (miles) of travel continue to increase. Increases in vehicle delay would result in lost time and energy. Increases in accidents would result not only in property damage and potentially in lost lives, but also in lost productivity from work and in increased expenditures for medical care.

2. Expressway/Freeway Alternatives

The expressway/freeway alternatives would consume substantial resources, including natural resources, both materials and energy, human resources and financial resources. These resources cannot effectively be recovered once they have been expended for the construction. The man-hours expended for the design and construction cannot be reclaimed, nor can the energy required for construction. The materials used in the construction may be, in some cases, recycled, but not without incurring additional and substantial costs.

Construction of any of the highway build alternatives would also require conversion of land from its present use to use as a road or right of way. The impacts of this conversion depend, to some extent, on the prior converted use, mainly the extent to which it was developed. Although it is possible for the land to be restored if the road is removed, restoration would be expected to incur substantial expenditures. Furthermore, since most land is subject to taxation based on its intrinsic value, current use and condition, conversion of land to use as a road or road right of way results in an opportunity cost, the magnitude of which is equal to the tax revenue that would result if the land were not being used for a roadway. However, this effect is mitigated to the extent that new development or increased value of land adjacent to the roadway increases in value and offsets the loss of revenue from conversion of the land used for the road and right of way.

The commitment of the resources required for the construction of any of the highway build alternatives is warranted on the presumption that the improvement of the Route 13

roadway would contribute to the safety and economic welfare of residents in the Corridor and in the state, as well as those traveling from other parts of the country.

W. PUBLIC LANDS

There would be no public land impacts in Lafayette or Johnson County for the expressway/freeway alternatives. In Henry County, relocated Route 13/Route 7 would impact two public land areas. In both park land areas, the expressway/freeway alternatives are on the same alignment. The first is the KATY Trail State Park and the second is the Bethlehem Wildlife Management Area, a MDC leasehold within the Harry S. Truman Reservoir Wildlife Management Lands. The Bethlehem WMA is a multiple use area and is not a Section 4(f) resource.

1. KATY Trail State Park

In Henry County, all expressway/freeway alternatives (Alternatives A and B) would cross the KATY Trail State Park, located northeast of Clinton and parallel to Route 52, at the same location. The KATY Trail, a state park which traverses the state of Missouri from near St. Charles to a present terminus at Clinton, a distance of about 414 kilometers (230 miles), is eligible as a Section 4(f) resource. The State Park is under the management of the MDNR that has been developing sections of the Trail as a hiking and biking facility. The three sections of the KATY Trail State Park which are open are St. Charles to Treloir, Jefferson City to Franklin and Boonville to NE of Sedalia. The length and extent of the KATY Trail State Park makes avoidance alternatives impractical for any of the eastern bypasses of Clinton.

The KATY Trail follows the original routing of the Missouri Kansas & Texas (MKT aka KATY) Railroad, and as such offers the recreational user a variety of experiences which include, but are not limited to, towns, cities, rivers, bluffs, woodlands, and farmlands. It crosses a variety of terrains, a mix of urban, suburban, rural and natural landscapes and is presently subject to a range of visual and aural vistas as well as impacts. The KATY Trail not only crosses other transportation facilities, but is crossed by roads and highways throughout its length including I-70 as well as numerous federal and state highways, county roads and driveways. While many of these crossings are grade separated, there are numerous examples of at-grade crossings throughout its present length.

The reconstruction of numerous sections of the Trail damaged by the flood of 1993 has slowed new construction activities. The section of the Trail influenced by these alternatives under consideration has not yet been converted to a hiking and biking trail.

The right of way for the KATY Trail is variable throughout its length, but in the vicinity of Route 13 is generally 30.48 meters (100 feet) wide. The existing right of way for Route 52 is 27.42 meters (90 feet) wide. Over time, agricultural uses along the railroad right of way have encroached and it often appears that the right of way is only 15.24 to 22.86 meters (50 to 75 feet) in width. The KATY Trail State Park contains approximately 1,128 hectares (2,788 acres) of right of way based on a length of 370 kilometers (230 miles) with an average width of 30.5 meters (100 feet).

The proposed alternatives would be crossing the Katy Trail State Park and Route 52 on structure. The Route 13/Route 7 roadway would be elevated to cross over Route 52 and the bridge would be extended to cross the Katy Trail State Park at the same location. Initial review of the proposed crossing indicates that the bridge would be approximately 104 meters (340 feet) in length. The "bridge shadow" (i.e. that portion of the KATY Trail that would be directly underneath the overpass structure) would include an area approximately 743 square meters (8,000 sq. ft.) or 0.07 hectares (0.18 acres) in size. Refer to Exhibit IV.W-1 for a preliminary plan and profile of the crossing site.

The proposed bridge would clear span the entire width of the KATY Trail State Park, the support columns being located adjacent to the old railroad right of way, and would be entirely on MoDOT right of way. MoDOT and MDNR are presently working to determine the appropriate overpass height, but is likely to be between 4.3 meters (14 feet) and 7.0 meters (23 feet).

The interchange is proposed to be a folded diamond type such that the access ramps would not be located on KATY Trail land but on the opposite side (southern side) of Route 52. Located near the interchange site, there is an existing road crossing of the KATY Trail, Henry County Road NE 81, which proceeds northward from Route 52. In order to maintain current access to NE 81, it would be relocated under the bridge structure on the north side of the KATY Trail. The existing NE 81 intersection with Route 52 would be located across from the southbound on-ramp intersection with Route 52. The existing driveway intersection with NE 81 would need to be relocated as well. The driveway would be relocated along the toe of slope for the Route 13/Route 7 embankment and would terminate at NE 81 prior to the KATY Trail crossing. As shown on Exhibit IV.W-1, no new crossings of the KATY Trail would be required with this configuration.

Although the construction schedule of Route 13 and Route 7 improvements have not been determined at this time, the KATY Trail State Park hiking and biking trail construction is proceeding from Sedalia to Clinton. Construction of the hiking and biking trail commenced in the winter of 1998 with rebuilding of the bridge crossings on the KATY Trail State Park. Preliminary construction, grading and subgrade stabilization will continue throughout 1998 with final surfacing being complete by summer of 1999, under an optimistic trail construction schedule. MoDOT will develop a construction schedule, in consultation with the MDNR, of the activities and provide for alternate routing, if necessary, during those times when it is deemed appropriate.

The overpass of Route 13 would not substantially impair the use of the KATY Trail State Park in as much as it would be one additional overpass of a linear state park which traverses much of the entire state and both crosses and is crossed by numerous federal, state, local, and private highways and roads. The user of the trail, the bicyclist and/or hiker, should not be subject to any reduction in their recreational experience and enjoyment of the hiking and biking activities by the Route 13 overpass being in place. There is an existing overpass of the trail by Route 7/13 in Clinton several miles farther down the KATY Trail.

The overpass of Route 13 would not harm the KATY Trail State Park as there are no piers or appurtenances being located on the Park right of way. The overpass may actually have the occasional benefit of providing shade or shelter to the bicyclist or the hiker during a rest period.

The KATY Trail is presently located parallel to and adjacent with Route 52 within the study area. It was once a very common practice to locate highways along railroads since both share a common purpose and objective. With the conversion of the railroad right of way to a recreational trail, the State Park is located next to Route 52 with ambient noise levels associated with roadway traffic. The proximity of the Trail to the highway is part of the recreational experience currently available to the park users. Current peak hour noise levels are estimated to be approximately 65 dBA (see Section III.B.9 and IV.I) -- at or above the MoDOT Noise Abatement Criteria. It is also estimated that future peak hour noise levels (Year 2022) would be approximately 68 dBA all along the trail within the study area.

With the interchange improvements, the relocated County Road NE 81 would parallel the KATY Trail a distance of 122 meters to 152 meters (400 feet to 500 feet). Traffic volumes on NE 81 are very low and the usage of the road is primarily for local access. The relocation of NE 81 would not alter or diminish the recreational experience of the KATY Trail user and would not alter the function of the Trail.

The construction schedule plan, developed in consultation with the MDNR, would minimize impacts associated with the construction phase of the Route 13 project.

Coordination between MoDOT and MDNR concerning impacts on the KATY Trail will continue as the KATY State Park is continued across the entire state. Highway projects will continue to cross the KATY Trail and standards regarding the crossing and mitigation of effects are being developed as these projects continue through the different environments adjacent to the KATY Trail.

In the case of the Route 13 and Route 7 improvements, design features have been included to avoid direct impacts to the KATY Trail. Through the design process, and as coordination between MoDOT and MDNR continue on a statewide scale, coordination with MDNR would continue for Route 13 to address the logistics of not disrupting the Trail activities during construction.

2. Bethlehem Wildlife Management Area

In consultation with other resources agencies, the FHWA has determined that the Bethlehem Wildlife Management Area (WMA) is not a Section 4(f) resource. Consequently, a Section 4(f) statement, in compliance with the Department of Transportation Act of 1966, has not been drafted. However, measures have been incorporated into the location study to avoid the area to the fullest extent reasonably possible and to minimize direct impacts.

The Route 13 Expressway/Freeway Alternatives would cross the Bethlehem WMA, east of Clinton, on the same alignment. This WMA is located on COE lands associated with Truman Lake and is managed by the MDC. The Harry S. Truman Reservoir Wildlife Management Lands contain about 22,660 hectares (56,000 acres). The WMA contains about 1,416 hectares (3,500 acres), is located both within and along the eastern and southern city limits of Clinton, and is adjacent to the existing alignment of Route 13, north of the crossing of Truman Lake. The proposed alignment of Route 13 relocation would require approximately 32.4 hectares (80 acres) of land from the Bethlehem WMA.

The Bethlehem WMA is managed for wildlife habitat, does permit hunting during the appropriate season, and due to its location along the northern shore of Truman Lake, provides unrestricted access for walk-in fishing. The location of the Bethlehem WMA is shown on the Public Lands exhibit, Exhibit III.B.10-1, and its extent should be noted. Any corridor improvement east of existing Route 13 would be located on the Bethlehem WMA. This alternative alignment had the least impact on wetland resources of any alternative east of Route 13 and was chosen primarily for that reason.

The Kansas City District COE, as the property owner, was contacted to determine the extent of the existing COE facilities and the location of planned facilities, if any. None were noted in the COE review of their master plan for Truman Lake. (See Appendix K.)

The Missouri Department of Conservation (MDC), as the leasee of the land and manager of the Bethlehem Wildlife Area, was contacted to determine the extent of existing MDC facilities and the location of any planned or programmed facilities. None were noted in this review. Correspondence to this effect is included in Appendix K.

The MDC personnel at the Clinton Office stated that although the proposed Route 13 corridor project alignment would have some impacts on their operation of the WMA, the impacts would likely not be significant. MoDOT would consult with MDC on this issue. The location could likely be accommodated within the framework of the existing management plan. The Bethlehem WMA does not restrict hunting except as noted in the Wildlife Code. The Bethlehem WMA does not function as a refuge or sanctuary for the protection of species of wildlife. It does provide habitat for the management of wildlife species.

Although access to the WMA is essentially unchanged, a connection from County Road SE100 to SE91 could be constructed along the southern edge of the relocated Route 13 improvements to maintain local access in the WMA.

The Route 13 by-pass would require the relocation of several food plots. MDC personnel would require review of the existing management agreements. It may be necessary to amend existing agreements to construct new food plots or clear additional lands for the planting of food plots during the appropriate season.

There is an existing gravel parking lot for WMA users that would be directly impacted by the Route 13 improvements. This parking lot primarily serves hunters accessing the WMA. A new area would be needed to maintain access to the far western portion of the WMA, adjacent to existing Route 13. The existing parking lot, located to the south and associated with the boat launching facility, would not be impacted by the improvements, as the relocation would tie back to the existing alignment of Route 13 north of the boat launching area.

An Environmental Assessment (EA) culminating in a Finding of No Significant Impact (FONSI) has been completed for the Route 13 improvements south of Clinton (MoDOT Job No. J4P0933B). Impacts to public lands associated with that proposed action are presented in the EA.

During subsequent design development, prior to the acquisition of right of way for construction, coordination with the Corps of Engineers will be provided for Consent to Easement Structures and for right of way easements.

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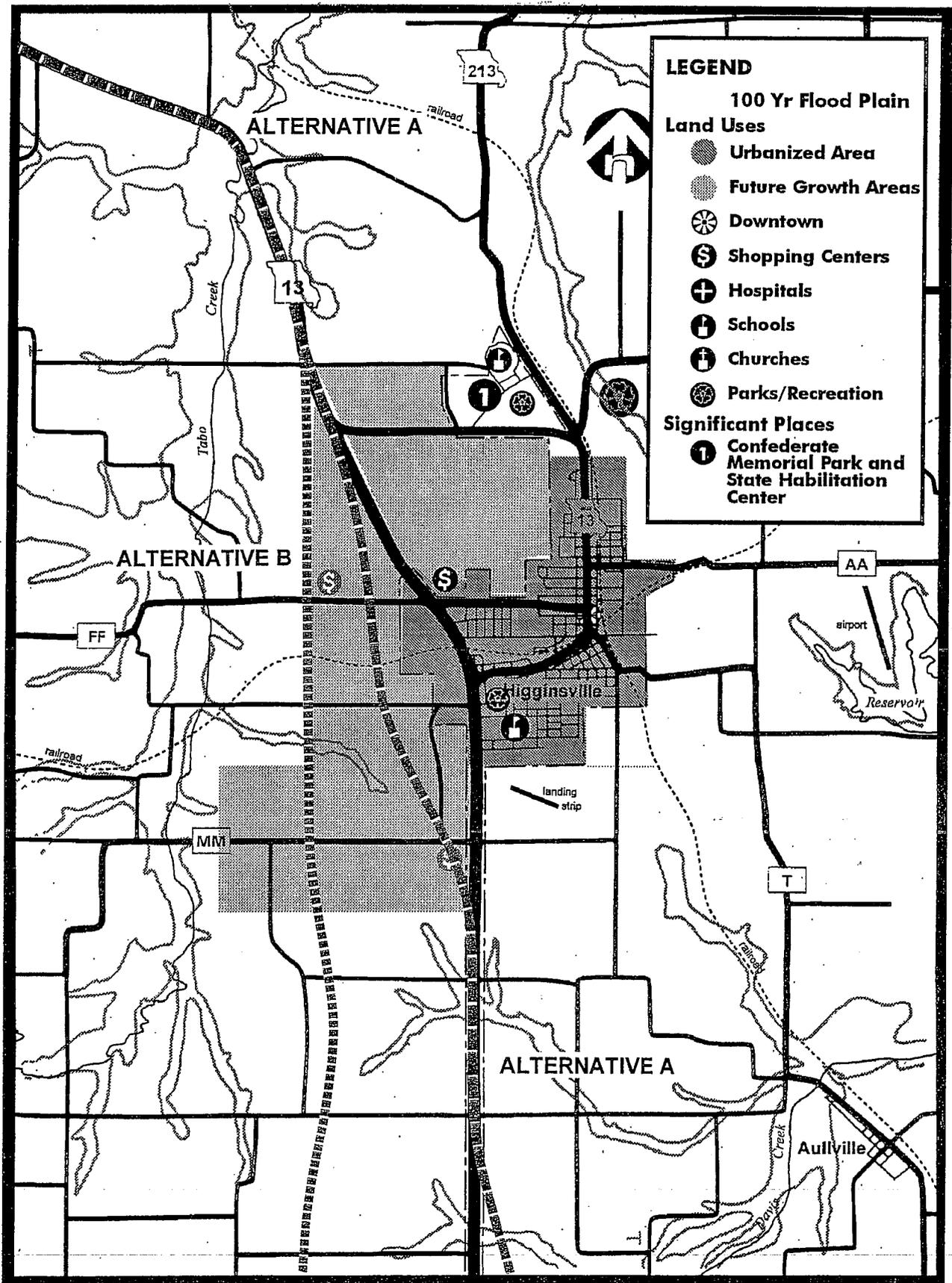


EXHIBIT IV.A.2-1 Land Use Impacts - Higginsville

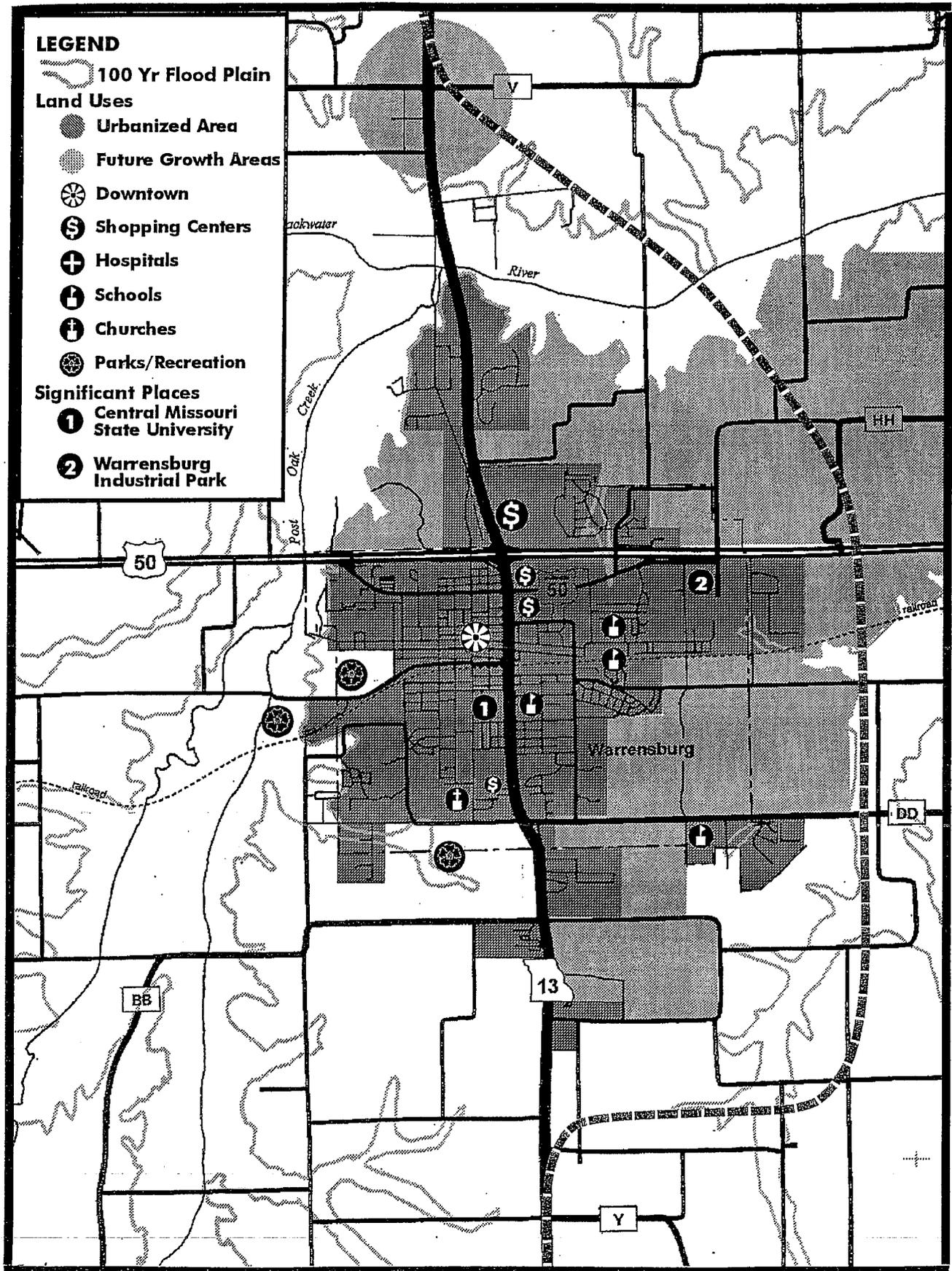


EXHIBIT IV.A.2-2 Land Use Impacts - Warrensburg East

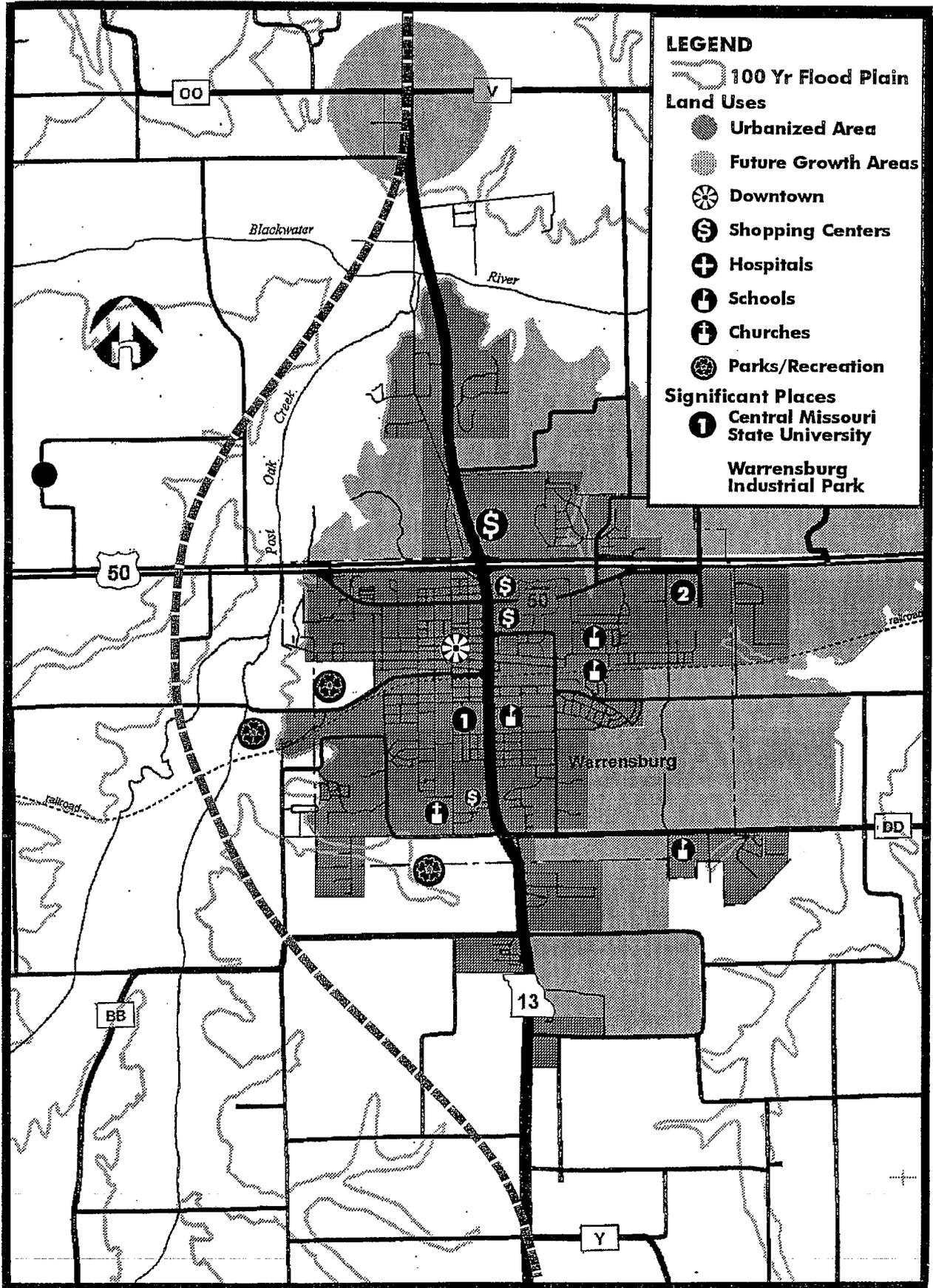


EXHIBIT IV.A.2-3 Land Use Impacts - Warrensburg West

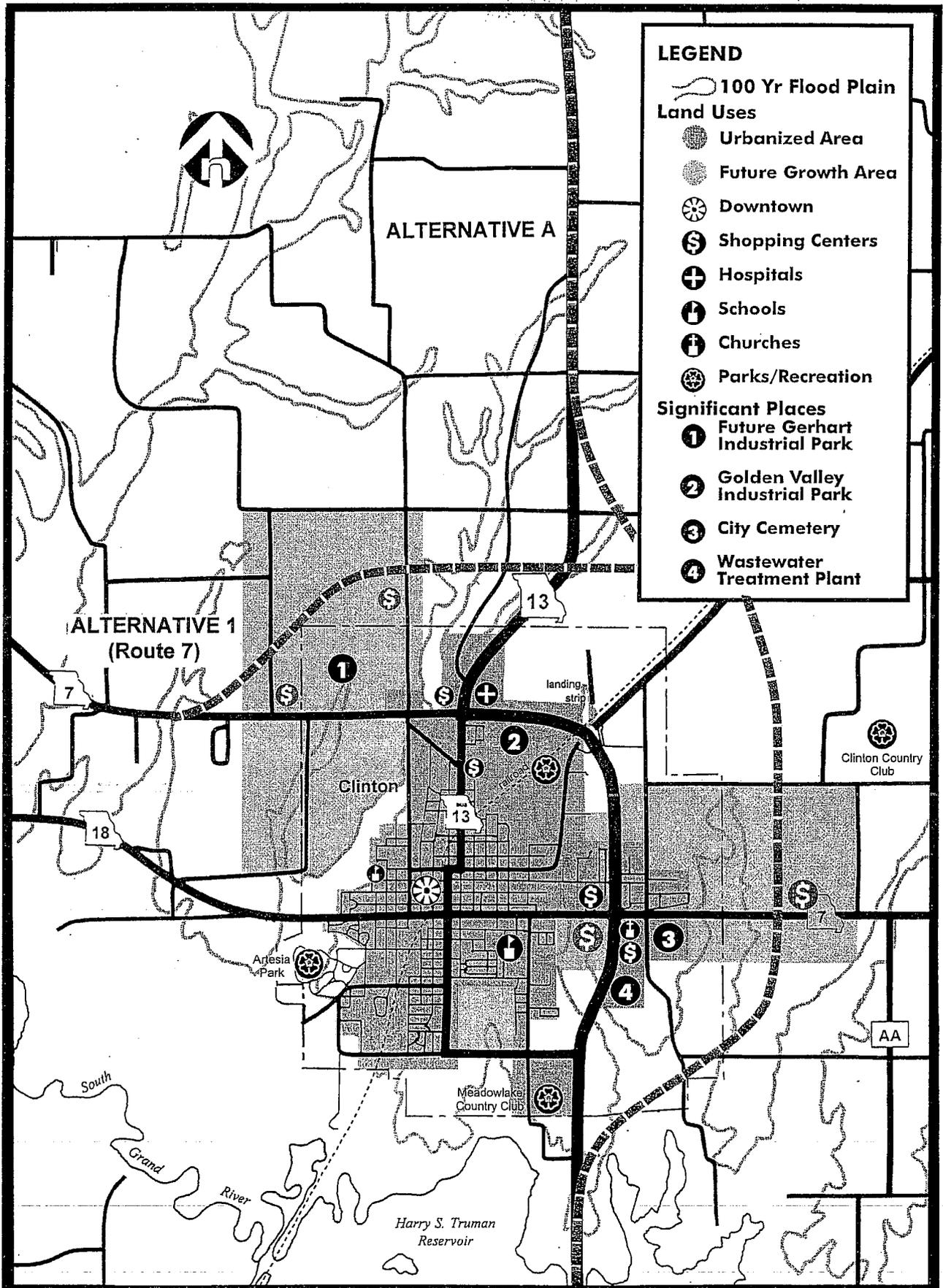
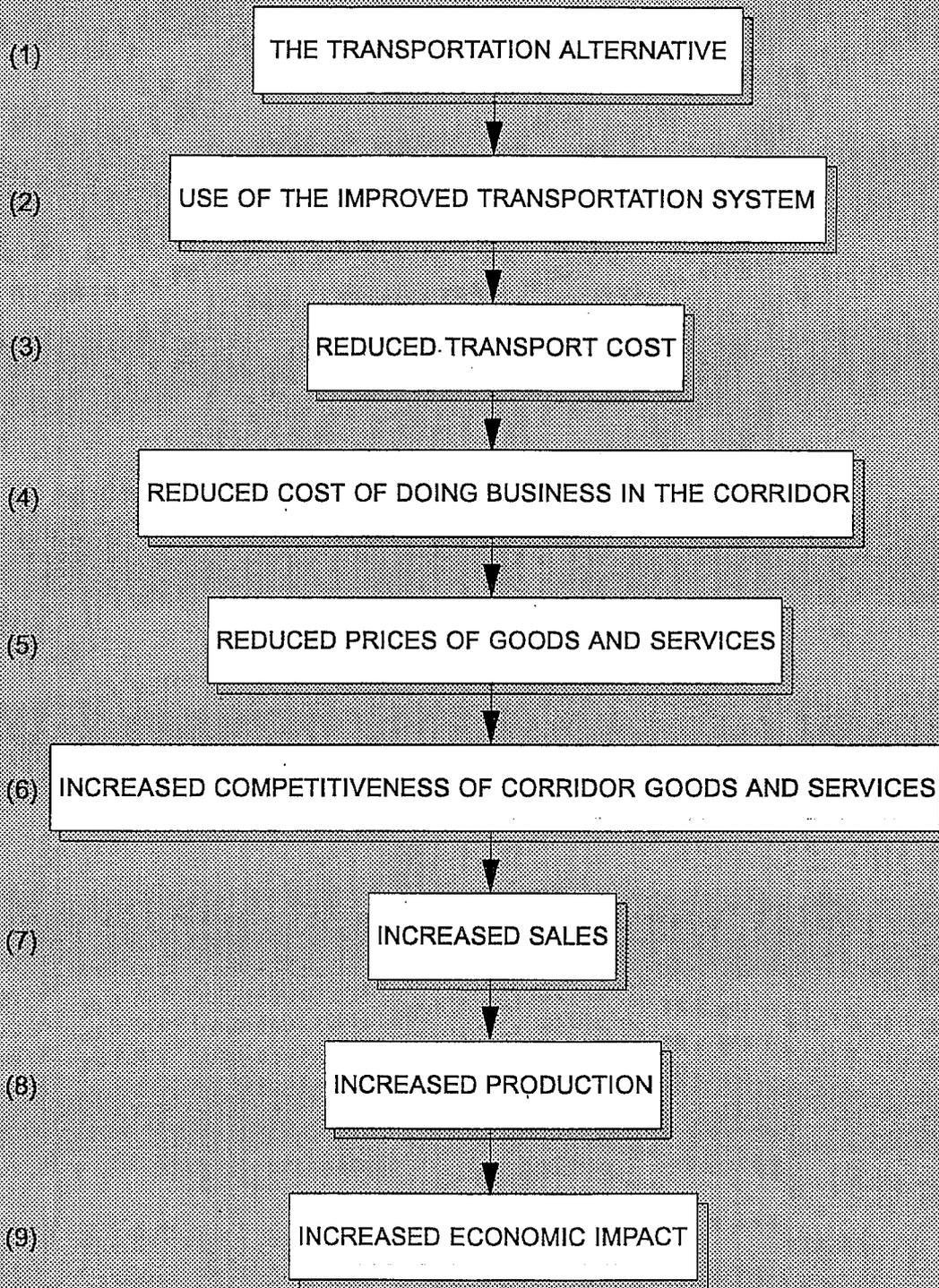


EXHIBIT IV.A.2-4 Land Use Impacts - Clinton

Exhibit IV.E.3-1
COMPETITIVE POSITION PRINCIPLES



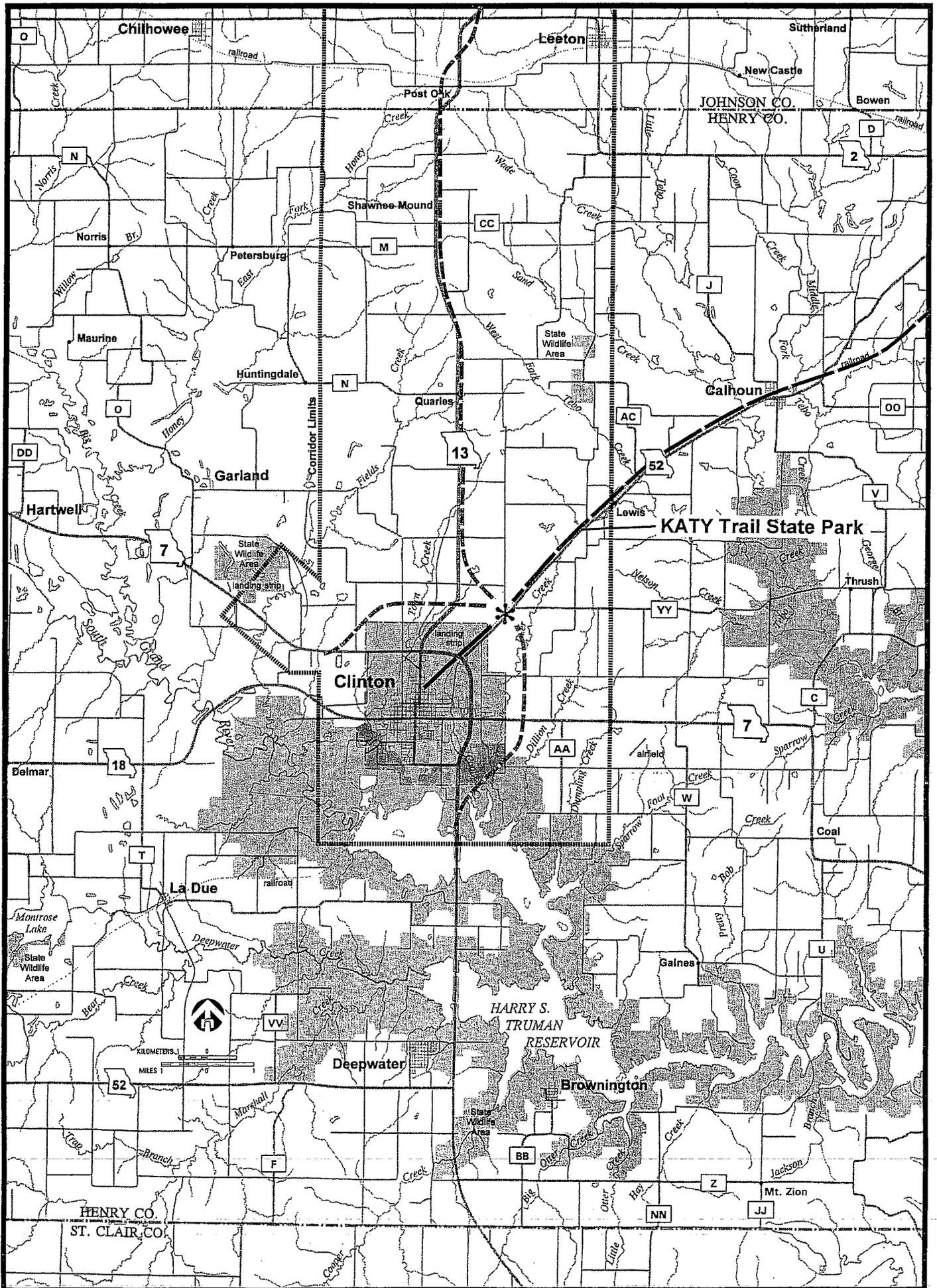


EXHIBIT IV.W.1 KATY Trail State Park Crossing (Location Map)

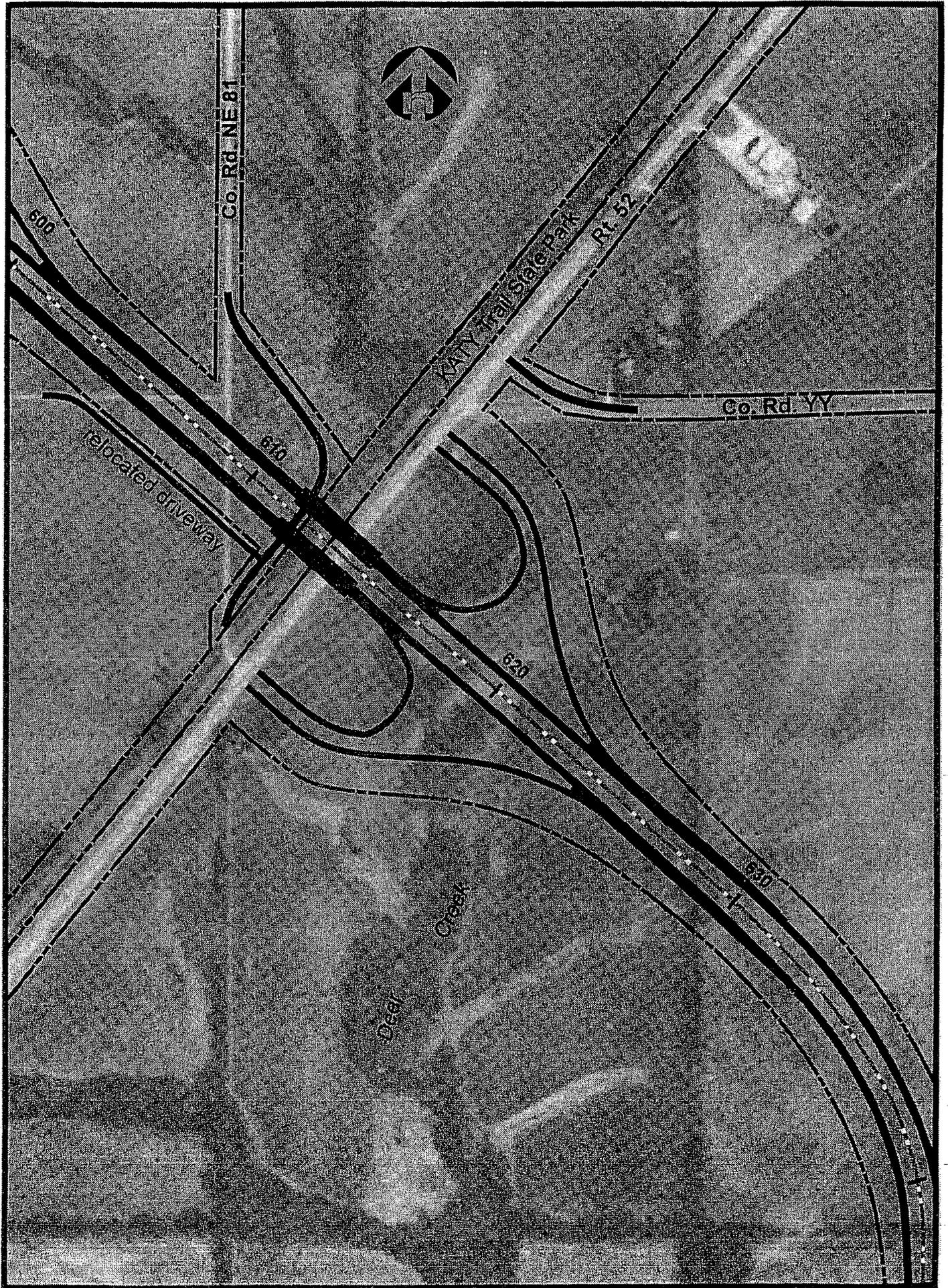
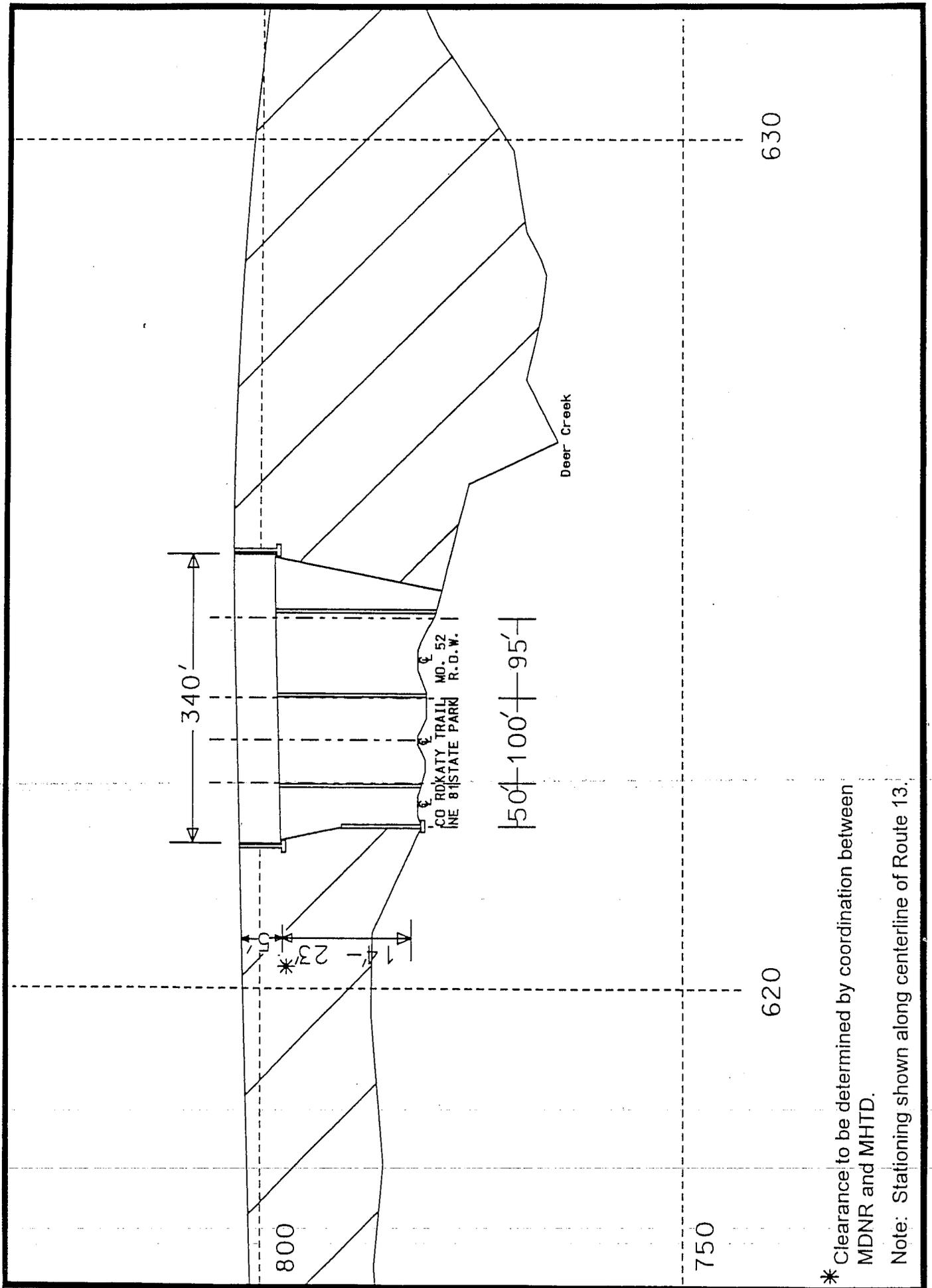


EXHIBIT IV.W.1 KATY Trail State Park Crossing



* Clearance to be determined by coordination between MDNR and MHTD.
 Note: Stationing shown along centerline of Route 13.

EXHIBIT IV.W.1 KATY Trail State Park Crossing (Profile)