Whitton Expressway EIS
Impact Assessment Methodologies

The following impact assessment methodology summaries have been prepared per Section 6002 of the Safe, Accountable, Flexible, Efficient Transportation Efficiency Act—A Legacy for Users (SAFETEA-LU).

A. Socioeconomic Impact Methodology

Socioeconomic impacts will be evaluated in accordance with the following key regulations and guidance: FHWA's Technical Advisory 6640.8A, Guidance for Preparing and Processing Environmental and Section 4(f) Documents (1987).

Evaluation of social impacts will include potential changes in neighborhoods or community cohesion; affordable housing; changes in travel patterns and accessibility; impacts on community facilities; impacts on traffic safety/public safety; and impacts on any special groups such as elderly, handicapped, minority, and transit-dependant persons. Evaluation of economic impacts will include cost estimates of the proposed action and its alternatives; applicable effects on economic development trends and viability; effects on employment opportunities; effects on highway-dependent businesses; effects on existing and planned business development; and effects on tax revenues. Socioeconomic impacts that can be quantified based on available data will be presented as such in the EIS and other impacts will be discussed qualitatively.

Data for socioeconomic impact assessment will be primarily obtained from the most recent US Census of Population and Housing. Supplemental data will be obtained from the City of Jefferson/Capitol Area Metropolitan Planning Organization, Cole County, local and regional land use plans, development plans, and discussion with local officials.

B. Commercial and Residential Impact Methodology

Commercial and residential impacts will be evaluated in accordance with the following key regulations and guidance: The Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 as amended (49 CFR Part 24) and FHWA's Technical Advisory 6640.8A, Guidance for Preparing and Processing Environmental and Section 4(f) Documents (1987).

Evaluation of residential impacts will include an estimate of the number of residential units to be displaced; availability of comparable decent, safe, and sanitary housing in the area; any measures to be taken when replacement housing is insufficient; and, identification of any special relocation needs.

Evaluation of business impacts will include an estimate of the number and types of businesses to be displaced, any special characteristics, and availability of replacement business sites. Impacts to homes and businesses due to changes in access during and after construction will also be discussed.

C. Environmental Justice Methodology

Environmental Justice impacts will be evaluated in accordance with the following key regulations and guidance: Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations (1994) and the U.S. DOT Order on Environmental Justice (5680-1, 1997).

The proposed action and its alternatives will be evaluated to determine whether there would be disproportionately high and adverse impacts on minority and low-income populations with respect to human health and the environment. The analysis will be based on income and race information from the most recently available US Census. Additional information on race and income will be obtained from local agencies/organizations and through public involvement and community outreach activities.

If populations are identified, a determination of effects on those populations will be made. Measures to mitigate identified disproportionate impacts will also be evaluated as necessary.

D. Indirect and Cumulative Effects Methodology

The Federal Highway Administration's (FHWA) position paper*, Secondary and Cumulative Impact Assessment in the Highway Development Process* (April 1992), the Council on Environmental Quality's (CEQ) *Considering Cumulative Effects under the National Environmental Policy Act* (January 1997), the National Cooperative Research Program (NCHRP) Report 466 and CEQ guidance will be used to guide the process for the indirect and cumulative effects analysis.

1. INDIRECT EFFECTS

The analysis will use a systematic approach to identify potential indirect effects that may be caused by the project. The process for identifying indirect effects will include the following steps: Identifying the study area; analyzing the study area's goals and notable features; identifying impact causing activities; analyzing potential impacts of the proposed transportation actions (qualitatively); and assessing the consequences of the effects. The process includes outreach to assess the study area's land use and development patterns and to confirm the results of the analysis.

The study area is defined as western terminus located at Bolivar Street with an eastern terminus of the study corridor at the Eastland Drive interchange and from 300 feet south of Whitton to McCarty Street on the north. Access to the Missouri State Penitentiary (MSP) Redevelopment site, which is located north of McCarty Street, will also be examined.

2. CUMULATIVE EFFECTS

A qualitative analysis for the project's potential cumulative effects will be conducted. This analysis will involve a two-tiered process. First, the potential combined direct and indirect effects of the project as identified in the EIS and other past, present and reasonably foreseeable future activities will be identified. Second, an assessment of the potential for the project-related effects to have a cumulative effect on natural resources would be conducted and summarized in the EIS. The cumulative effects analysis will identify incremental differences in the area's future transportation improvement, development, resource use, and resource preservation trends with

and without the build alternatives. The geographic area for the cumulative effects analysis will vary depending on the affected resource. For example, the area of potential effect for wetlands and water quality would be the watershed in which the wetland is located.

E. Farmland Impact Methodology

Coordination with the local National Resource Conservation Service (NRCS) office will take place. If necessary, form NRCS-CPA-106, the Farmland Conversion Impact Rating form for corridor type projects, will be completed and submitted to the local NRCS Field Office for review and input in accordance with the Farmland Protection Policy Act.

F. Noise Impact Analysis Methodology

All sound level analysis and noise impact and mitigation determinations will be conducted based on the Federal highway Administration's (FHWA) guidelines and MoDOT's Policy Statement on Traffic Noise Analysis and Abatement Guidelines. Existing L_{eq} sound measurements will be obtained at along the corridor in areas potentially affected by the build alternatives.

Existing and design year traffic noise levels will be modeled at residential, public and commercial receptors along the study corridor with the FHWA's Traffic Noise Prediction Model (TNM)® computer program using traffic characteristics that will yield the greatest hourly traffic noise on a regular basis for existing conditions and the future design year (2035).

G. Wetland Impacts Methodology

The wetland impact analysis will be completed in accordance with Section 404 of the Clean Water Act. Published data such as National Wetland Inventory (NWI) maps, United States Geological Survey (USGS) topographical maps were used to determine areas exhibiting wetland characteristics and will assist in determining the wetland functions.

Field delineations will include photo document and digital mapping to verify wetland inventory mapping and preliminary field observations. Preliminary jurisdictional wetland determination forms with summary report will be submitted to the U.S. Army Corps of Engineers for Clean Water Act Section 404 permit application. The report will also identify and briefly describe all waters of the U.S., other than wetlands and differentiate between intermittent streams, perennial streams, ponds not contiguous with another water of the U.S., ponds contiguous with vegetated wetlands or other water of the U.S. vegetated wetlands, and other special aquatic sites.

Only Practicable Alternative Finding regarding wetland impacts in accordance with Executive Order 11990 will be included within the environmental document.

Impacts to wetlands will be minimized to the extent practicable.

H. Water Quality and Floodplain Impact Methodology

1. WATER QUALITY

Review previous studies regarding ambient water quality within the geographic region of each alternative. Significant water resources such as high quality streams and wellhead areas that may require special protection measures during or after construction will be identified.

2. FLOODPLAIN IMPACTS

For each of the reasonable alternatives with encroachments, a summary of the risk or significance of the environmental impacts will be provided including:

- The risks associated with the implementation of the action.
- The impacts on natural and beneficial floodplain values.
- The support of probable incompatible floodplain development.
- The measures to minimize floodplain impacts associated with the alternative.
- The measures to restore and preserve the natural and beneficial floodplain values impacted by the alternative.
- Identify any FEMA buyout properties in the project area.

For each alternative encroaching on a designated or proposed regulatory floodway, and commensurate with the level of encroachment, document the consistency with the National Flood Insurance Program (NFIP) standards and the coordination with the Federal Emergency Management Agency (FEMA), State Emergency Management Agency (SEMA) and local agencies.

I. Threatened and Endangered Species Analysis Methodology

The Missouri Department of Conservations (MDC) Heritage Database and all other available information will be used to determine if there are any known locations of federal and/or state listed threatened or endangered species or designated critical habitat within the project limits. The Heritage Database will also be used to identify any other rare species or rare natural communities that occur within the project limits. Coordination will take place with MDC and the U.S. Fish and Wildlife Service to identify any rare species concerns they may have. If rare species are known to occur within or near the project limits, site visits and surveys will be conducted to confirm the species presence. If suitable habitat occurs within or near the project limits and it is suspected that a listed species could occur there, surveys will be conducted to determine if the species is present. If it is determined that the project may impact a listed species, MoDOT will conduct the necessary Section 7 Endangered Species Act consultation with the U.S. Fish and Wildlife Service at the appropriate time. Consultation will occur approximately one year prior to construction, which may not be for some time after completion of the EIS.

J. Parks and Public Lands Analysis Methodology

Potential existing and planned public parks, recreation areas, wildlife and waterfowl refuges, other public use lands and historic sites adjacent or in close proximity to the proposed projects will be identified. Other lands or facilities of special interest that have been funded with a variety

of DNR funds, federal Land and Water Conservation Fund Act money or other federal funds such as Dingell-Johnson or Pittman-Robertson money will also be identified.

Coordination with the MDNR, MDC, the Department of the Interior, and local governments having jurisdiction over the public-use land will take place in order to determine the use and management of the land and their opinion related to potential impacts or effects resulting from the proposed project.

In the case of historic properties, coordination will occur with the State Historic Preservation Office, Advisory Council on Historic Preservation, Department of the Interior and individual landowners, as applicable. Following coordination, the Department will then make a recommendation to FHWA regarding the applicability of Section 4(f) and/or Section 6(f) to these lands based on information found in the FHWA Section 4(f) Policy Paper. FHWA will make the final determination regarding eligibility.

If Section 4(f) and/or Section 6(f) apply, unavoidable impacts will be documented in accordance with FHWA Technical Advisory T 6640.8A. Agreed upon mitigation for impacts will also be documented.

K. Cultural Resource Analysis Methodology

This cultural resource study will be conducted according to MoDOT, state, and federal regulations guiding this research. The State Historic Preservation Office (SHPO) has been consulted regarding the methods on this project and have concurred with them (August 24, 2007).

1. ARCHIVAL REVIEW

An archival review of the proposed study area will be prepared. The study area was defined as extending 200 feet on either side of the existing roadway.

- Build on the Problem Definition Study prepared by MoDOT and summarize all cultural resource investigations that have been conducted within the study area or immediately adjacent to it. This information will be obtained from the Missouri Department of Natural Resources, SHPO in Jefferson City.
- Information on previously recorded archaeological sites will also be obtained from SHPO. The present condition of these resources will be assessed through a brief field check.
- Conduct a historical archival review specific to the study area, documenting the history of use of this area. This archival review will be conducted at the Missouri State Archives in Jefferson City, the State Historical Society of Missouri in Columbia, the Missouri Historical Society in St. Louis, the Mercantile Library in St. Louis, the Jefferson City public library, the Cole County Historical Society in Jefferson City, and other local libraries and archives as needed. Resources consulted will include city histories, historical atlases, fire insurance maps, the U.S. census, Jefferson City assessor's records, and other records as necessary.
- Build on the previous Problem Definition Study and identify properties listed on the National Register of Historic Places, determined eligible by the State Historic

Preservation Office or designated local landmarks by the city of Jefferson City. These properties can include residences, schools, churches, businesses, structures, objects, and landscapes.

- All bridges in the study area will be reviewed. Bridges listed on or eligible for listing on the NRHP will be identified. Fraser's 1996 draft Missouri Historic Bridge Inventory and the 2003 Missouri Historic Bridge List will be reviewed along with other information available through the Missouri Department of Transportation, Historic Preservation section.
- All burial grounds and cemeteries that once existed or still exist within the study area will be identified. This information will be obtained during the historical archival review.
- Prepare a generalized predictive model based upon existing information that will estimate the potential for the presence of archaeological sites, and for places containing human burials. The location of potentially significant buried prehistoric or historical archaeological resources will also be determined.
- Information obtained from this archival research will then be submitted to HNTB and MoDOT for review. This preliminary report will also aid in the planning and the selection of a reasonable alternative.

2. ARCHITECTURAL EVALUATION

An architectural study will be conducted. The Area of Potential Effects (APE) will include the actual construction limits as well as the adjacent area, where visual or sound impact could occur. Since a section of the new roadway could be elevated between Broadway and Monroe Streets, and a new interchange will be constructed for the proposed prison access on Jackson, Chestnut, or Clark Streets, all first tier properties plus those within 200 feet either side of the center line will be documented between U.S. Routes 54/63 and Vetter Lane. Once plans for the prison interchange have been finalized, a slightly greater area may need to be surveyed to be included within the APE. From a point east of Vetter Lane, the area to be impacted will be less and the APE is defined as including first tier properties and any second tier properties that are adjacent to first tier properties scheduled to be removed.

- Conduct a survey and evaluate for National Register eligibility all buildings, structures, objects, sites, and districts, within the proposed APE within the framework discussed in part b.
- At least two photographs, from different angles, will be taken of all eligible properties that date before 1967. Additional photographs may also be taken of significant architectural features. For potential National Register districts and subdivisions dating before 1967, photographs showing streetscape views (several buildings) will be taken to give the flavor and present condition of the district or neighborhood within the APE. At least one photograph will be taken of non-eligible properties that date prior to 1967. For modern buildings that date after 1967, no photographs will be taken, unless the building has exceptional significance and potentially eligible for the National Register. If the SHPO requests additional photographs of any resource, regardless of age, it will be provided.
- All properties within the APE will be assigned a number prior to the start of the survey in an attempt to keep the property numbers in consecutive order. These numbers will be placed on overall maps of the project area, and explained in project methodology. The maps will also identify properties that are eligible for the National Register, properties

currently listed on the National Register, properties that are not eligible and modern properties constructed after 1967.

- Missouri State Historic Preservation Office Architectural/Historic Inventory Survey Forms will be completed for those properties recommended eligible for the National Register. A more in-depth history of these properties will also be conducted to determine if they may be eligible under Criteria A or B. For properties listed on the National Register, a survey form will not be completed unless the resource has been significantly altered.
- A driveby of the project area will then be conducted with appropriate representatives from ARC, HNTB, MoDOT, SHPO, city officials, and other consulting parties, to discuss eligibility of resources prior to the report being written.
- The nature and magnitude of impacts the proposed improvements to the Rex Whitton Expressway will have on the eligible or listed properties will be determined. Indirect effects to NRHP eligible resources will also be assessed.
- The results of the architectural survey will be summarized within a new report, which will incorporate the previous information gathered during the archival review. This report will include a summary table for the eligible historic architectural resources with a brief description, the impact, if any, the project will have on them (including nature and magnitude), and the criteria under which they are recommended eligible. The report along with completed architectural forms and photographs will then be sent for review by HNTB and MoDOT. When the report is acceptable to those agencies it will be forwarded to the SHPO, and other consulting parties for comment. Review comments will then be incorporated into a final report.

3. ARCHAEOLOGICAL SURVEY

An archaeological survey will be conducted of the proposed construction easement, which will be determined through consultation with HNTB, MoDOT, and SHPO.

- Conduct an archaeological survey of accessible locations within the APE for archaeological resources. Given that most of the project area is located within an urban environment, it is likely that archaeological resources, especially those associated with the prehistoric or early historic occupations, are buried under years of building rubble and may not be visible on the surface.
- Potential subsurface historical archaeological sites will be identified based on the archival records search. The excavation of backhoe trenches to verify the presence of buried archaeological resources will not be conducted as part of these investigations, but will take place, along with the excavation of any exposed features, as part of future investigations.
- Determine the impact that the proposed project would have, if any, on eligible archaeological sites in the archaeological APE.
- Prepare a technical report describing the results of the archaeological survey. This report will incorporate information from previous archaeological investigations and sites reported near the APE. The report will also include a summary table for the eligible archaeological resources with a brief description, the impact, if any, and magnitude of the impact the project will have on them, and the criteria under which they are considered eligible. SHPO site forms will also be prepared for all archeological sites identified during the survey. This information will be reviewed by HNTB, MoDOT, SHPO, and other consulting parties. Review comments will then be incorporated into a final report on the archaeological investigations.

- Identify and recommend for further evaluation archaeological resources determined to be potentially eligible for the National Register. Develop an appropriate plan for backhoe trenching used to search for any buried archaeological sites. Develop recommendations for Phase II testing for any identified archaeological sites potentially eligible for the National Register.

L. Hazardous Materials Analysis Methodology

All hazardous material sites impacted by the Preferred Alternative will be identified. For the purposes of this assessment, hazardous wastes and materials are defined as products or wastes regulated by the U.S. Environmental Protection Agency (EPA) or the State of Missouri Department of Natural Resources (MDNR). These include substances regulated under the Comprehensive Emergency Response, Compensation, and Liability Act (CERCLA), The Resource Conservation and Recovery Act (RCRA), The Toxic Substances Control Act (ToSCA), The Federal Insecticide Fungicide, and Rodenticide Act (FIFRA), solid waste management, and storage tanks.

Hazardous waste assessment involves data collection efforts, including review of government agency lists and, and a field reconnaissance of the study corridor. The data reviewed include the following:

- Federal Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS);
- National Response Center Hotline Database;
- Missouri Department of Natural Resources (MDNR) Environmental Emergency Response Database;
- MDNR Confirmed Abandoned and Uncontrolled Hazardous Waste Disposal Sites in Missouri (Currently Published Fiscal Year);
- MDNR Missouri Hazardous Waste Generator Database;
- MDNR Hazardous Waste Treatment, Storage, and Disposal Facilities List;
- MDNR Underground Storage Tank (UST) Database;
- MDNR Solid Waste Facilities List.

A summary will be prepared comparing the relative ease of avoiding the hazardous waste sites within each of the alternative corridors and the relative clean up effort for each site. This information will be used in combination with other environmental and engineering constraints to select a preferred alternative.

M. Visual Impact Assessment Methodology

1. VISUAL QUALITY

In order to determine a visual quality rating, the existing visual environment is described and separated into visual assessment units.

a. Existing Visual Environment

A description of the existing visual environment takes into account the urban or rural regional context, and its physiographic characteristics, including land uses, such as commercial, residential, industrial, agricultural, natural/open space, etc. In addition, notable visual resources

that are scenically significant and contribute to the visual identity of the environment are identified and described.

b. Visual Assessment Units

The visual impacts of a project may be quite varied in different areas of a project corridor because the areas themselves can be visually distinct, can exhibit unique and consistent visual characteristics, and can possess varying degrees of visual quality. The study corridor can be divided into separate areas or units within which there are consistent visual characteristics and a uniform visual experience. These areas, called "Visual Assessment Units," have direct relationships to physiography and land use, and can be thought of as "outdoor rooms." The boundaries of the visual assessment units occur where there is a change in visual character. The strongest determinations of the visual boundaries are *topography* and *landscape components.*

- ***Topography*** – Topography influences many natural systems such as drainage, vegetation, geology, aspect, etc. These natural systems often have distinct and variable characteristics with visual consequences.

- ***Landscape Components*** – Landscape components are distinct elements in the visual environment. Natural land cover elements such as trees, water, rocks, and open areas; developed land uses such as roads, bridges, and buildings; and identifiable patterns such as power line corridors and agricultural crops, constitute landscape components.

The visual assessment units are determined by analyzing the topography of the study corridor, studying the major landscape components, studying aerial photography and through windshield surveys.

c. Visual Quality Rating

The "visual assessment units" described above are studied to determine a visual quality rating. The quality of the visual environment can be collectively defined using the attributes of *vividness*, *intactness*, and *unity*. *Vividness* is the relative strength of the seen image, *intactness* is the visual integrity of the natural or man-made landscape and its freedom from encroaching elements, and *unity* is the overall visual harmony of a composition and the degree to which the various elements combine in a coherent way. The identified visual assessment units present within the study corridor, and the relative existing visual quality rating of each (on a scale of low, moderate, or high) is presented in table form (see Table 1 example).

d. Viewers

Visual impact is determined by change in the visual environment as related to viewer response. For the purpose of highway project assessment, there are two distinct categories of viewers, or viewer response, to be considered: (1) viewers who are users of the project facility and who have views of the surrounding environment (i.e. views *from* the road); and (2) the "visual receptors", or people who can observe the roadway from an adjacent vantage point (i.e. views *of* the road).

Views FROM the Road – Existing key views from the road can be discussed here if there is an existing roadway that is one of the alternative alignments that will be evaluated in the study.

Views OF the Road – In most cases, the "Sensitive Visual Receptors" are those individuals concentrated in the residential areas, parks and schools who would have the potential for undesirable views *of* the road. (Views of the road are usually not undesirable to commercial and industrial receptors.) This discussion identifies those areas in the study corridor that have high concentrations of sensitive visual receptors. The relative concentration of sensitive visual receptors for each visual assessment unit is presented in a table (see Table 1 example).

Table 1 (example)
Visual Quality and Visual Receptors

Visual Assessment Units	Visual Quality Rating	Relative Concentration Of Sensitive Visual Receptors
1. Downtown KC Area	Moderate to High	Low to Moderate
2. River Market Area	High	Moderate to High
3. Columbus Park Neighborhood	Moderate to High	High
4. Troost Avenue Area	Low	Low to Moderate
5. Chouteau Court/Paseo West Neighborhood	Moderated to Low	High
6. KC University of Medicine and Biosciences Complex	High	Moderate
7. Riverside Housing Complex	High	High
8. Kessler Park	High	Low
9. Industrial Area – KC	Low	Low
10. Isle of Capri Casino	Moderate	Low

2. VISUAL IMPACTS

Visual quality impacts are determined by the degree of change in the visual environment as related to viewer response.

a. Views *Of* and *From* the Road

This section discusses the visual impacts that each roadway alternative has on the Sensitive Visual Receptors (i.e. views *of* the road) as described in the Affected Environment section. The discussion includes an impact rating (from low to high) based on the degree of change that would occur to the existing environment and the roadway's degree of visibility to the Sensitive Visual Receptors. Roadway encroachments have the potential to negatively affect the visual quality of the surrounding environment if a high degree of change occurs to a high quality environment.

Each roadway alternative is also evaluated in terms of scenic viewing opportunities (views *from* the road). Although notable visual resources along the corridor possess the high visual quality that provides scenic viewing opportunities for users of the roadway, those resources are also potentially sensitive to the visual impacts resulting from encroachment of the roadway (see paragraph above).

b. Aesthetic Considerations / Visual Enhancements

If applicable, aesthetic design features can be discussed. As roadway design plans are developed, design features could be integrated into the overall aesthetics of the project. Design

elements and landscaping can also help to maintain the property values of the neighborhoods adjacent to the roadway. Bridges and other roadway elements can be enhanced with integrated treatments that may include decorative wall and bridge features and finishes, pedestrian railings, aesthetic lighting, paving and other potential elements and amenities that complement and visually blend these improvements into their surroundings to enhance the character and aesthetics of the environment.

If practicable, in urban areas, and in areas where the roadway is visible to residences, landscaping with evergreen trees and shrubs can help to screen and soften the views *of* the road in addition to providing enhanced views *from* the road.

In the detailed design phase for the Preferred Alternative, it would be determined whether or not sound abatement is desired by the residential neighborhoods. If sound walls are incorporated in these areas, the residents' views of the road would be eliminated, but walls would be highly visible to the residents. Walls would also be part of the drivers' view from the roadway. Therefore, if sound walls are incorporated in the project, landscaping and aesthetically pleasing surface treatments could be considered in order to soften or reduce the visual impact of the walls.

N. Construction Impact Methodology

Construction impacts will be evaluated in accordance with the Federal Highway Administration's (FHWA) Technical Advisory 6640.8A. The project's construction impact and the conceptual plan for maintaining traffic during construction for project-area businesses, residents and freeway travelers will be evaluated. The following impacts may be assessed and mitigation measures developed as required:

- access to facilities and services;
- construction sequencing;
- traffic management;
- economic impacts;
- noise;
- water quality/erosion and sedimentation;
- construction solid and hazardous waste;
- vibration; and,
- air quality (emissions and fugitive dust).